

**Appendix files to the  
SAR Compliance Test Report Salo\_SAR\_0545\_06**

|                                   |                                                                                                                                          |                                |                                                                                                                                                                        |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test report no.:</b>           | Salo_SAR_0545_06_Appendix                                                                                                                | <b>Date of report:</b>         | 2005-11-30                                                                                                                                                             |
| <b>Template version:</b>          | 4                                                                                                                                        | <b>Number of pages:</b>        | 4 + 6 + 9                                                                                                                                                              |
| <b>Testing laboratory:</b>        | TCC Salo<br>P.O. Box 86<br>Joensuunkatu 7H / Kiila 1B<br>FIN-24101 SALO, FINLAND<br>Tel. +358 (0) 7180 08000<br>Fax. +358 (0) 7180 45220 | <b>Client:</b>                 | Nokia UK / Southwood<br>Nokia House<br>Summit Avenue, Southwood<br>FARNBOROUGH<br>HAMPSHIRE GU 14 0NG<br>UNITED KINGDOM<br>Tel. +44-1252-866000<br>Fax +44-1252-866001 |
| <b>Responsible test engineer:</b> | Virpi Tuominen                                                                                                                           | <b>Product contact person:</b> | Stefan Emery                                                                                                                                                           |
| <b>Measurements made by:</b>      | Janne Hirsimäki, Virpi Tuominen                                                                                                          |                                |                                                                                                                                                                        |
| <b>Tested device:</b>             | RM-92                                                                                                                                    |                                |                                                                                                                                                                        |
| <b>FCC ID:</b>                    | QFXRM-92                                                                                                                                 | <b>IC:</b>                     | 661Z-RM92                                                                                                                                                              |
| <b>Documentation:</b>             | The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.                                  |                                |                                                                                                                                                                        |

**Date and signatures:**

For the contents:



Digitally signed by Virpi Tuominen  
DN: CN = Virpi Tuominen, C = FI, O =  
Nokia, OU = Cert T  
Date: 2005.11.30 17:56:57 +02'00'

**Virpi Tuominen**  
Senior Design Engineer

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**APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORT(S)**

E-field probes SN: 1395 and SN:1396  
See the next six pages.



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

Accreditation No.: SCS 108

Client **Nokia Salo TCC**

Certificate No: **ET3-1395\_Sep05**

CALIBRATION CERTIFICATE

|                                  |                                                                                      |
|----------------------------------|--------------------------------------------------------------------------------------|
| Object                           | ET3DV6 - SN:1395                                                                     |
| Calibration procedure(s)         | QA CAL-01.v5 and QA CAL-12.v4<br>Calibration procedure for dosimetric E-field probes |
| Calibration date:                | September 3, 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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID #            | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration  |
|----------------------------|-----------------|-------------------------------------------|------------------------|
| Power meter E4419B         | GB41293874      | 3-May-05 (METAS, No. 251-00466)           | May-06                 |
| Power sensor E4412A        | MY41495277      | 3-May-05 (METAS, No. 251-00466)           | May-06                 |
| Power sensor E4412A        | MY41498087      | 3-May-05 (METAS, No. 251-00466)           | May-06                 |
| Reference 3 dB Attenuator  | SN: S5054 (3c)  | 11-Aug-05 (METAS, No. 251-00499)          | Aug-06                 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 3-May-05 (METAS, No. 251-00467)           | May-06                 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 11-Aug-05 (METAS, No. 251-00500)          | Aug-06                 |
| Reference Probe ES3DV2     | SN: 3013        | 7-Jan-05 (SPEAG, No. ES3-3013_Jan05)      | Jan-06                 |
| DAE4                       | SN: 654         | 29-Nov-04 (SPEAG, No. DAE4-654_Nov04)     | Nov-05                 |
| Secondary Standards        | ID #            | Check Date (in house)                     | Scheduled Check        |
| RF generator HP 8648C      | US3642U01700    | 4-Aug-99 (SPEAG, in house check Dec-03)   | In house check: Dec-05 |
| Network Analyzer HP 8753E  | US37390585      | 18-Oct-01 (SPEAG, in house check Nov-04)  | In house check: Nov 05 |

|                |               |                       |           |
|----------------|---------------|-----------------------|-----------|
| Calibrated by: | Name          | Function              | Signature |
|                | Nico Vetterli | Laboratory Technician |           |
| Approved by:   | Name          | Function              | Signature |
|                | Katja Pokovic | Technical Manager     |           |

Issued: September 5, 2005

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

DASY - Parameters of Probe: ET3DV6 SN:1395

| Sensitivity in Free Space <sup>A</sup> |              |                       | Diode Compression <sup>B</sup> |       |
|----------------------------------------|--------------|-----------------------|--------------------------------|-------|
| NormX                                  | 1.86 ± 10.1% | μV/(V/m) <sup>2</sup> | DCP X                          | 91 mV |
| NormY                                  | 1.82 ± 10.1% | μV/(V/m) <sup>2</sup> | DCP Y                          | 91 mV |
| NormZ                                  | 1.82 ± 10.1% | μV/(V/m) <sup>2</sup> | DCP Z                          | 91 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>be</sub> [%]                     | Without Correction Algorithm | 9.6                               | 5.0    |  |
| SAR <sub>be</sub> [%]                     | With Correction Algorithm    | 0.0                               | 0.2    |  |
| TSL                                       | 1750 MHz                     | Typical SAR gradient: 10 % per mm |        |  |
| Sensor Center to Phantom Surface Distance |                              | 3.7 mm                            | 4.7 mm |  |
| SAR <sub>be</sub> [%]                     | Without Correction Algorithm | 13.4                              | 8.8    |  |
| SAR <sub>be</sub> [%]                     | With Correction Algorithm    | 1.1                               | 0.1    |  |

Sensor Offset

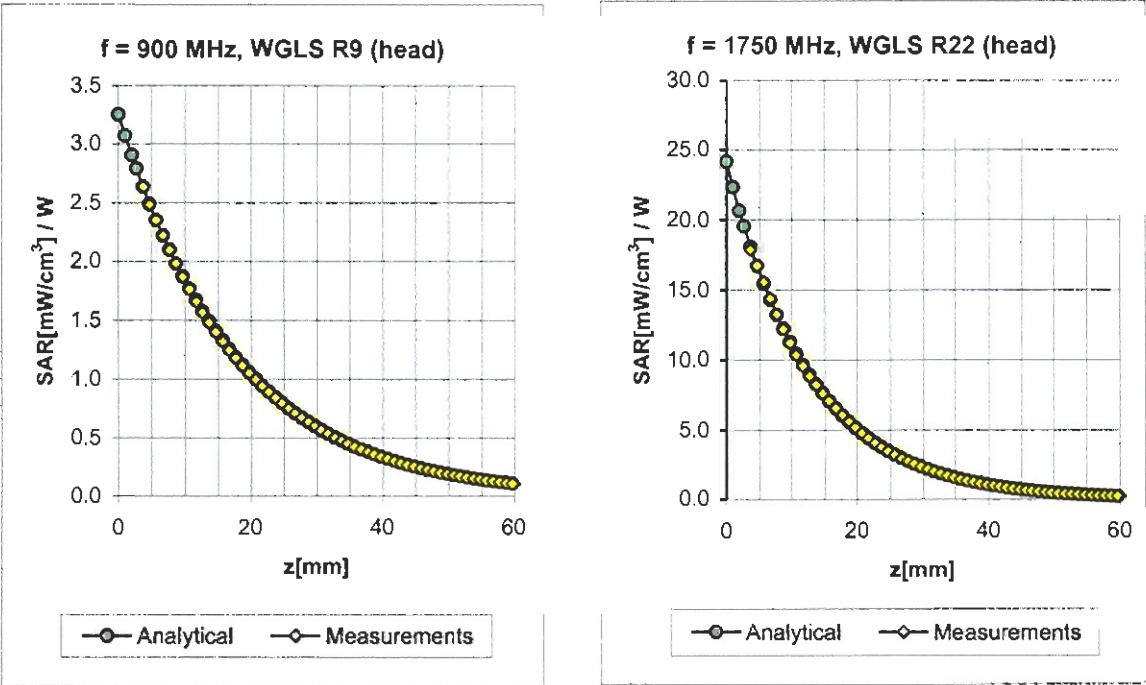
|                            |        |
|----------------------------|--------|
| Probe Tip to Sensor Center | 2.7 mm |
|----------------------------|--------|

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<sup>2</sup>-field uncertainty inside TSL (see Page 8).

<sup>B</sup> Numerical linearization parameter; uncertainty not required.

Conversion Factor Assessment



| f [MHz] | Validity [MHz] <sup>c</sup> | TSL  | Permittivity | Conductivity | Alpha | Depth | ConvF | Uncertainty   |
|---------|-----------------------------|------|--------------|--------------|-------|-------|-------|---------------|
| 450     | ± 50 / ± 100                | Head | 43.5 ± 5%    | 0.87 ± 5%    | 0.05  | 1.80  | 6.78  | ± 13.3% (k=2) |
| 835     | ± 50 / ± 100                | Head | 41.5 ± 5%    | 0.90 ± 5%    | 0.77  | 1.66  | 5.96  | ± 11.0% (k=2) |
| 900     | ± 50 / ± 100                | Head | 41.5 ± 5%    | 0.97 ± 5%    | 0.71  | 1.77  | 5.88  | ± 11.0% (k=2) |
| 1750    | ± 50 / ± 100                | Head | 40.1 ± 5%    | 1.37 ± 5%    | 0.74  | 2.11  | 4.87  | ± 11.0% (k=2) |
| 1900    | ± 50 / ± 100                | Head | 40.0 ± 5%    | 1.40 ± 5%    | 0.67  | 2.33  | 4.73  | ± 11.0% (k=2) |
| 1950    | ± 50 / ± 100                | Head | 40.0 ± 5%    | 1.40 ± 5%    | 0.67  | 2.32  | 4.54  | ± 11.0% (k=2) |
| 2450    | ± 50 / ± 100                | Head | 39.2 ± 5%    | 1.80 ± 5%    | 0.87  | 1.91  | 4.30  | ± 11.8% (k=2) |
| 450     | ± 50 / ± 100                | Body | 56.7 ± 5%    | 0.94 ± 5%    | 0.03  | 1.95  | 6.92  | ± 13.3% (k=2) |
| 835     | ± 50 / ± 100                | Body | 55.2 ± 5%    | 0.97 ± 5%    | 0.63  | 1.87  | 5.91  | ± 11.0% (k=2) |
| 900     | ± 50 / ± 100                | Body | 55.0 ± 5%    | 1.05 ± 5%    | 0.62  | 1.93  | 5.71  | ± 11.0% (k=2) |
| 1750    | ± 50 / ± 100                | Body | 53.4 ± 5%    | 1.49 ± 5%    | 0.62  | 2.73  | 4.22  | ± 11.0% (k=2) |
| 1900    | ± 50 / ± 100                | Body | 53.3 ± 5%    | 1.52 ± 5%    | 0.67  | 2.46  | 4.19  | ± 11.0% (k=2) |
| 1950    | ± 50 / ± 100                | Body | 53.3 ± 5%    | 1.52 ± 5%    | 0.68  | 2.37  | 4.09  | ± 11.0% (k=2) |
| 2450    | ± 50 / ± 100                | Body | 52.7 ± 5%    | 1.95 ± 5%    | 0.95  | 1.69  | 4.04  | ± 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.



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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**

Client **Nokia Salo TCC**

Certificate No: **ET3-1396\_Jan05**

## CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1396**

Calibration procedure(s) **QA CAL-01.v5 and QA CAL-13.v4  
Calibration procedure for dosimetric E-field probes**

Calibration date: **January 20, 2005**

Condition of the calibrated item **In Tolerance**

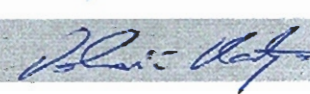
This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

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 |
|----------------------------|-----------------|-------------------------------------------|-----------------------|
| Power meter E4419B         | GB41293874      | 5-May-04 (METAS, No. 251-00388)           | May-05                |
| Power sensor E4412A        | MY41495277      | 5-May-04 (METAS, No. 251-00388)           | May-05                |
| Reference 3 dB Attenuator  | SN: S5054 (3c)  | 10-Aug-04 (METAS, No. 251-00403)          | Aug-05                |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 3-May-04 (METAS, No. 251-00389)           | May-05                |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 10-Aug-04 (METAS, No. 251-00404)          | Aug-05                |
| Reference Probe ES3DV2     | SN: 3013        | 7-Jan-05 (SPEAG, No. ES3-3013_Jan05)      | Jan-06                |
| DAE4                       | SN: 617         | 29-Sep-04 (SPEAG, No. DAE4-617_Sep04)     | Sep-05                |

| Secondary Standards       | ID #         | Check Date (in house)                    | Scheduled Check        |
|---------------------------|--------------|------------------------------------------|------------------------|
| Power sensor HP 8481A     | MY41092180   | 18-Sep-02 (SPEAG, in house check Oct-03) | In house check: Oct 05 |
| RF generator HP 8648C     | US3642U01700 | 4-Aug-99 (SPEAG, in house check Dec-03)  | In house check: Dec-05 |
| Network Analyzer HP 8753E | US37390585   | 18-Oct-01 (SPEAG, in house check Nov-04) | In house check: Nov 05 |

|                |                      |                              |                                                                                       |
|----------------|----------------------|------------------------------|---------------------------------------------------------------------------------------|
|                | Name                 | Function                     | Signature                                                                             |
| Calibrated by: | <b>Nico Vetterli</b> | <b>Laboratory Technician</b> |  |
| Approved by:   | <b>Katja Pokovic</b> | <b>Technical Manager</b>     |  |

Issued: January 20, 2005

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

DASY - Parameters of Probe: ET3DV6 SN:1396

| Sensitivity in Free Space <sup>A</sup> |              |                       | Diode Compression <sup>B</sup> |       |
|----------------------------------------|--------------|-----------------------|--------------------------------|-------|
| NormX                                  | 1.81 ± 10.1% | μV/(V/m) <sup>2</sup> | DCP X                          | 91 mV |
| NormY                                  | 1.80 ± 10.1% | μV/(V/m) <sup>2</sup> | DCP Y                          | 91 mV |
| NormZ                                  | 1.93 ± 10.1% | μV/(V/m) <sup>2</sup> | DCP Z                          | 91 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>be</sub> [%]                     | Without Correction Algorithm | 8.1                               | 4.4    |  |
| SAR <sub>be</sub> [%]                     | With Correction Algorithm    | 0.1                               | 0.2    |  |
| TSL                                       | 1750 MHz                     | Typical SAR gradient: 10 % per mm |        |  |
| Sensor Center to Phantom Surface Distance |                              | 3.7 mm                            | 4.7 mm |  |
| SAR <sub>be</sub> [%]                     | Without Correction Algorithm | 11.6                              | 8.0    |  |
| SAR <sub>be</sub> [%]                     | With Correction Algorithm    | 0.7                               | 0.3    |  |

Sensor Offset

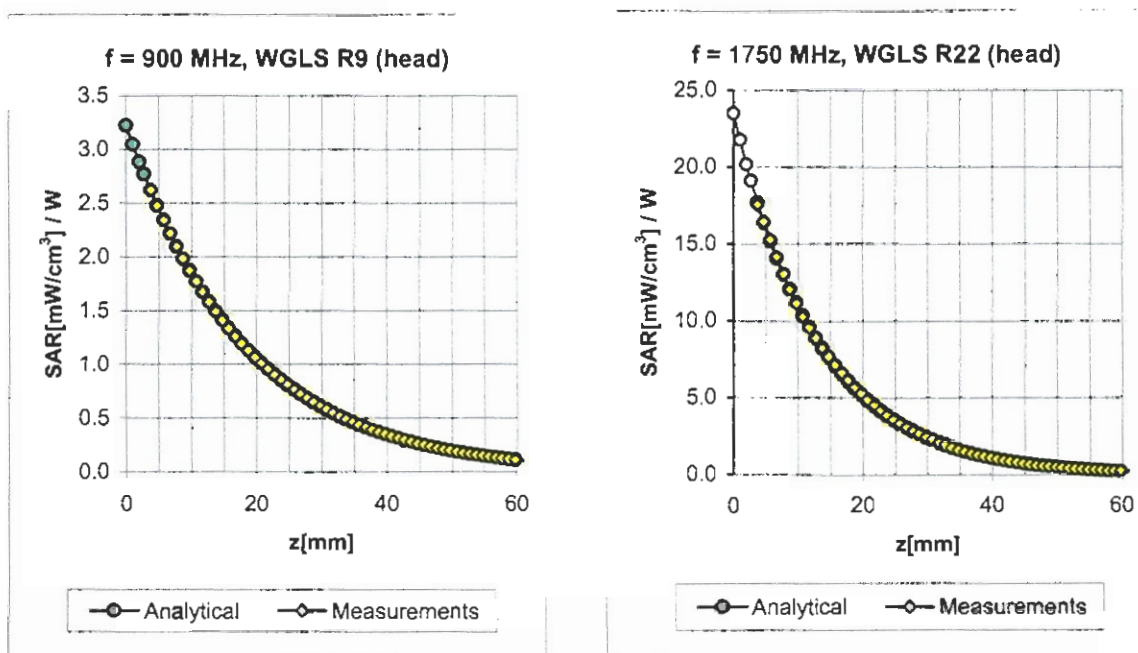
|                            |        |
|----------------------------|--------|
| Probe Tip to Sensor Center | 2.7 mm |
|----------------------------|--------|

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<sup>2</sup>-field uncertainty inside TSL (see Page 8).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

## Conversion Factor Assessment



| $f$ [MHz] | Validity [MHz] <sup>c</sup> | TSL  | Permittivity   | Conductivity   | Alpha | Depth | ConvF Uncertainty       |
|-----------|-----------------------------|------|----------------|----------------|-------|-------|-------------------------|
| 300       | $\pm 50 / \pm 100$          | Head | $45.3 \pm 5\%$ | $0.87 \pm 5\%$ | 0.48  | 1.68  | $7.89 \pm 13.3\% (k=2)$ |
| 450       | $\pm 50 / \pm 100$          | Head | $43.5 \pm 5\%$ | $0.87 \pm 5\%$ | 0.15  | 1.84  | $7.98 \pm 13.3\% (k=2)$ |
| 835       | $\pm 50 / \pm 100$          | Head | $41.5 \pm 5\%$ | $0.90 \pm 5\%$ | 0.60  | 1.76  | $6.87 \pm 11.0\% (k=2)$ |
| 900       | $\pm 50 / \pm 100$          | Head | $41.5 \pm 5\%$ | $0.97 \pm 5\%$ | 0.54  | 1.86  | $6.55 \pm 11.0\% (k=2)$ |
| 1750      | $\pm 50 / \pm 100$          | Head | $40.1 \pm 5\%$ | $1.37 \pm 5\%$ | 0.55  | 2.29  | $5.44 \pm 11.0\% (k=2)$ |
| 1900      | $\pm 50 / \pm 100$          | Head | $40.0 \pm 5\%$ | $1.40 \pm 5\%$ | 0.53  | 2.47  | $5.25 \pm 11.0\% (k=2)$ |
| 1950      | $\pm 50 / \pm 100$          | Head | $40.0 \pm 5\%$ | $1.40 \pm 5\%$ | 0.51  | 2.70  | $4.85 \pm 11.0\% (k=2)$ |
| 2450      | $\pm 50 / \pm 100$          | Head | $39.2 \pm 5\%$ | $1.80 \pm 5\%$ | 0.62  | 2.27  | $4.59 \pm 11.8\% (k=2)$ |
| 450       | $\pm 50 / \pm 100$          | Body | $56.7 \pm 5\%$ | $0.94 \pm 5\%$ | 0.13  | 1.66  | $7.78 \pm 13.3\% (k=2)$ |
| 835       | $\pm 50 / \pm 100$          | Body | $55.2 \pm 5\%$ | $0.97 \pm 5\%$ | 0.43  | 2.16  | $6.62 \pm 11.0\% (k=2)$ |
| 900       | $\pm 50 / \pm 100$          | Body | $55.0 \pm 5\%$ | $1.05 \pm 5\%$ | 0.45  | 2.16  | $6.32 \pm 11.0\% (k=2)$ |
| 1750      | $\pm 50 / \pm 100$          | Body | $53.4 \pm 5\%$ | $1.49 \pm 5\%$ | 0.52  | 2.71  | $4.81 \pm 11.0\% (k=2)$ |
| 1900      | $\pm 50 / \pm 100$          | Body | $53.3 \pm 5\%$ | $1.52 \pm 5\%$ | 0.53  | 2.90  | $4.64 \pm 11.0\% (k=2)$ |
| 1950      | $\pm 50 / \pm 100$          | Body | $53.3 \pm 5\%$ | $1.52 \pm 5\%$ | 0.54  | 2.66  | $4.50 \pm 11.0\% (k=2)$ |
| 2450      | $\pm 50 / \pm 100$          | Body | $52.7 \pm 5\%$ | $1.95 \pm 5\%$ | 0.58  | 2.37  | $4.18 \pm 11.8\% (k=2)$ |

<sup>c</sup> The validity of  $\pm 100 \text{ MHz}$  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.

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**APPENDIX D: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)**

835MHz dipole, SN: 462  
1900MHz dipole, SN: 5d026  
2450MHz dipole, SN: 749

See the next nine pages.

Client

Nokia Salo TCC

## CALIBRATION CERTIFICATE

Object(s) **D835V2 - SN:462**

Calibration procedure(s) **QA CAL-05.v2  
Calibration procedure for dipole validation kits**

Calibration date: **July 14, 2004**

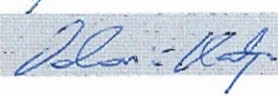
Condition of the calibrated item **In Tolerance (according to the specific calibration document)**

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

| Model Type                | ID #       | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration  |
|---------------------------|------------|-------------------------------------------|------------------------|
| Power meter EPM E442      | GB37480704 | 6-Nov-03 (METAS, No. 252-0254)            | Nov-04                 |
| Power sensor HP 8481A     | US37292783 | 6-Nov-03 (METAS, No. 252-0254)            | Nov-04                 |
| Power sensor HP 8481A     | MY41092317 | 18-Oct-02 (Agilent, No. 20021018)         | Oct-04                 |
| RF generator R&S SML-03   | 100698     | 27-Mar-2002 (R&S, No. 20-92389)           | In house check: Mar-05 |
| Network Analyzer HP 8753E | US37390585 | 18-Oct-01 (SPEAG, in house check Nov-03)  | In house check: Oct 05 |

|                |                |                     |                                                                                       |
|----------------|----------------|---------------------|---------------------------------------------------------------------------------------|
|                | Name           | Function            | Signature                                                                             |
| Calibrated by: | Judith Mueller | Technician          |  |
| Approved by:   | Katja Pokovic  | Laboratory Director |  |

Date issued: July 15, 2004

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN462**

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

Medium: HSL 835 MHz;

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.92 \text{ mho/m}$ ;  $\epsilon_r = 41.8$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.3, 6.3, 6.3); Calibrated: 1/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn903; Calibrated: 2/19/2004
- Phantom: Flat Phantom half size; Type: QD000P49AA; Serial: SN:1001;
- Measurement SW: DASY4, V4.3 Build 8; Postprocessing SW: SEMCAD, V1.8 Build 117

**Pin = 250 mW; d = 15 mm/Area Scan (81x81x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) =  $2.62 \text{ mW/g}$

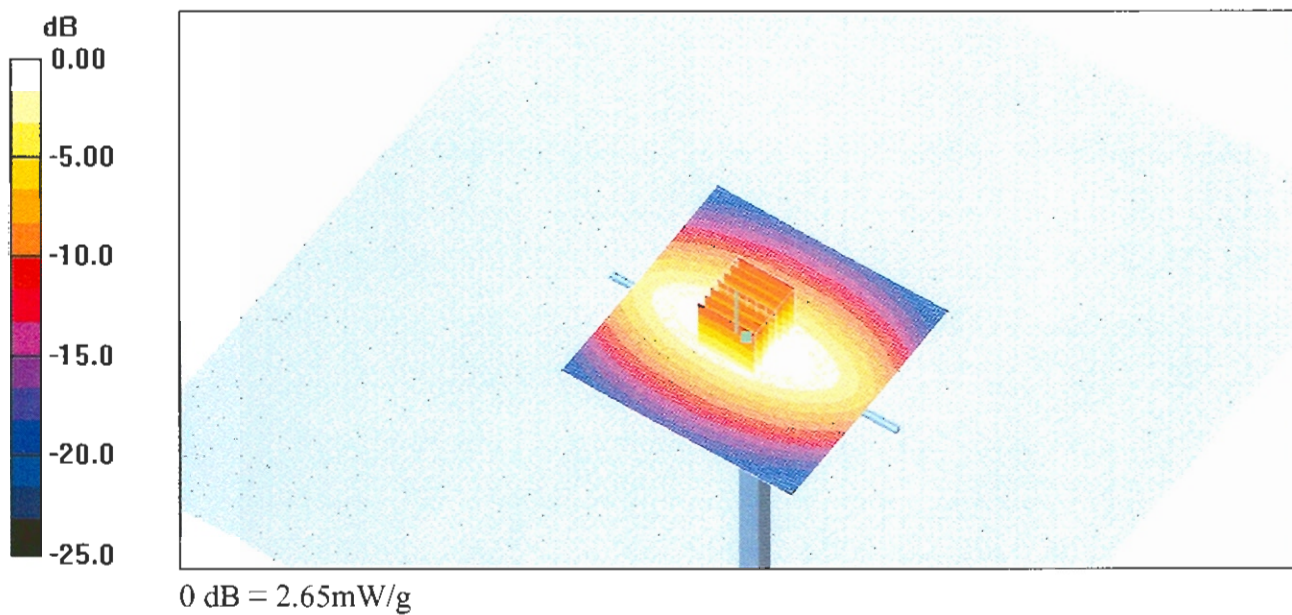
**Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $55.1 \text{ V/m}$ ; Power Drift =  $-0.01 \text{ dB}$

Peak SAR (extrapolated) =  $3.72 \text{ W/kg}$

**SAR(1 g) =  $2.45 \text{ mW/g}$ ; SAR(10 g) =  $1.59 \text{ mW/g}$**

Maximum value of SAR (measured) =  $2.65 \text{ mW/g}$



Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN462**

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

Medium: Muscle 835 MHz;

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.99$  mho/m;  $\epsilon_r = 54.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.13, 6.13, 6.13); Calibrated: 1/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn903; Calibrated: 2/19/2004
- Phantom: Flat Phantom half size; Type: QD000P49AA; Serial: SN:1001;
- Measurement SW: DASY4, V4.3 Build 8; Postprocessing SW: SEMCAD, V1.8 Build 117

**Pin = 250 mW; d = 15 mm/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 2.64 mW/g

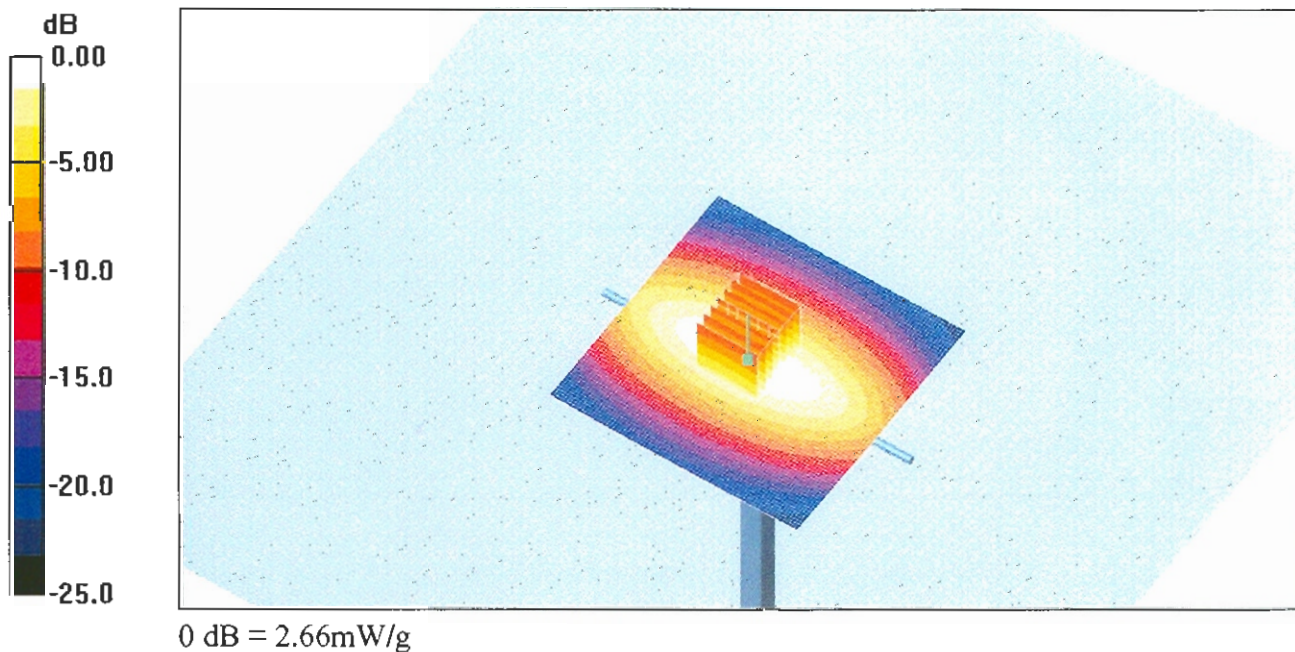
**Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.6 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 3.59 W/kg

**SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.61 mW/g**

Maximum value of SAR (measured) = 2.66 mW/g



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



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

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

Accreditation No.: **SCS 108**

Client **Nokia DK2**

Certificate No: **D1900V2-5d026\_Jan05**

## CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d026**

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

Calibration date: **January 17, 2005**

Condition of the calibrated item **In Tolerance**

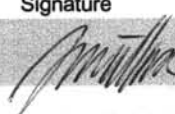
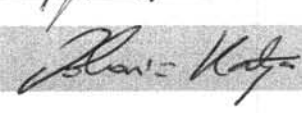
This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

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 |
|----------------------------|------------------|-------------------------------------------|-----------------------|
| Power meter EPM E442       | GB37480704       | 12-Oct-04 (METAS, No. 251-00412)          | Oct-05                |
| Power sensor HP 8481A      | US37292783       | 12-Oct-04 (METAS, No. 251-00412)          | Oct-05                |
| Reference 20 dB Attenuator | SN: 5086 (20g)   | 10-Aug-04 (METAS, No 251-00402)           | Aug-05                |
| Reference 10 dB Attenuator | SN: 5047.2 (10r) | 10-Aug-04 (METAS, No 251-00402)           | Aug-05                |
| Reference Probe ET3DV6     | SN 1507          | 26-Oct-04 (SPEAG, No. ET3-1507_Oct04)     | Oct-05                |
| DAE4                       | SN 601           | 07-Jan-05 (SPEAG, No. DAE4-601_Jan05)     | Jan-06                |

| Secondary Standards       | ID #             | Check Date (in house)                    | Scheduled Check        |
|---------------------------|------------------|------------------------------------------|------------------------|
| Power sensor HP 8481A     | MY41092317       | 18-Oct-02 (SPEAG, in house check Oct-03) | In house check: Oct-05 |
| RF generator R&S SML-03   | 100698           | 27-Mar-02 (SPEAG, in house check Dec-03) | In house check: Dec-05 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (SPEAG, in house check Nov-04) | In house check: Nov 05 |

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

Issued: January 20, 2005

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

## DASY4 Validation Report for Head TSL

Date/Time: 01/17/05 15:43:59

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d026**

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

Medium: HSL 1900 MHz;

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 39.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.2, 5.2, 5.2); Calibrated: 24.01.2002
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.4 Build 11; Postprocessing SW: SEMCAD, V1.8 Build 133

**Pin = 250 mW; d = 10 mm/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 10.8 mW/g

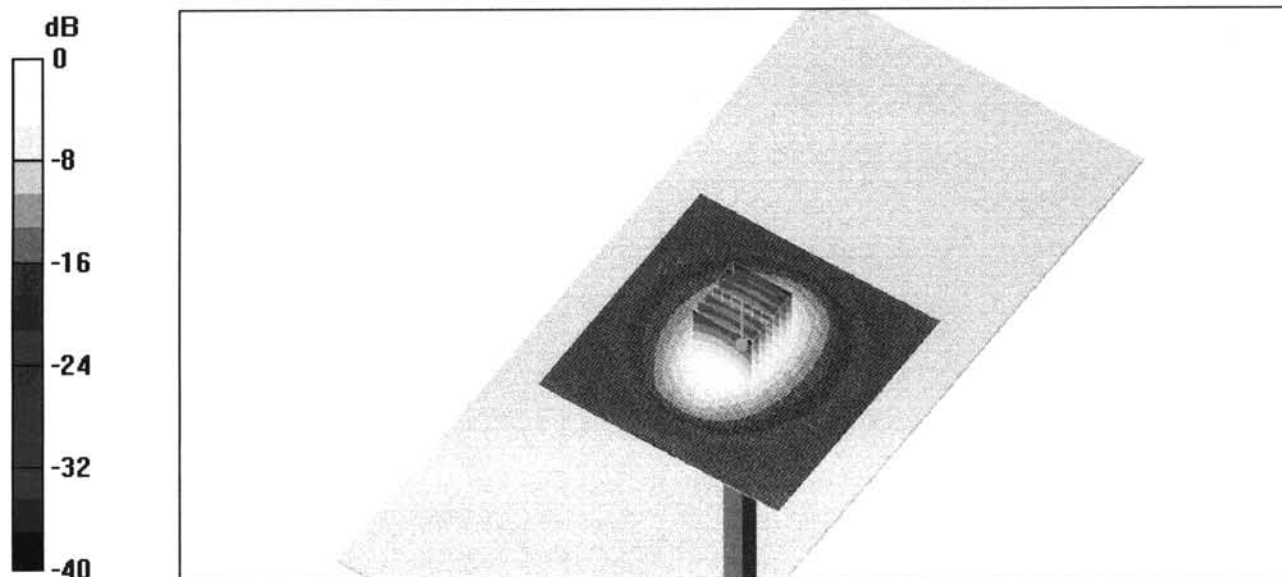
**Pin = 250 mW; d = 10 mm/Zoom Scan 2 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.9 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 16.9 W/kg

**SAR(1 g) = 9.49 mW/g; SAR(10 g) = 4.94 mW/g**

Maximum value of SAR (measured) = 10.7 mW/g



0 dB = 10.7mW/g

## DASY4 Validation Report for Body TSL

Date/Time: 01/12/05 18:39:42

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:51d026**

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

Medium: Muscle 1800 MHz;

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.57$  mho/m;  $\epsilon_r = 52.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.43, 4.43, 4.43); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.4 Build 11; Postprocessing SW: SEMCAD, V1.8 Build 133

**Pin = 250 mW; d = 10 mm/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 11.1 mW/g

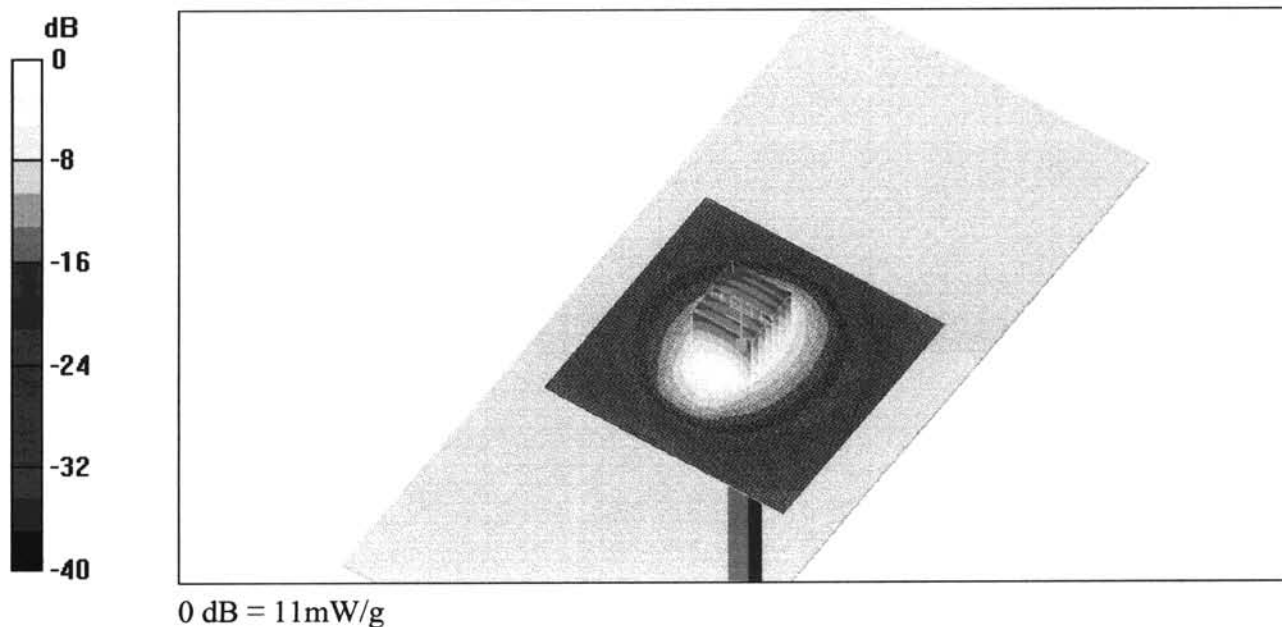
**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 83.5 V/m; Power Drift = 0.1 dB

Peak SAR (extrapolated) = 16.4 W/kg

**SAR(1 g) = 9.65 mW/g; SAR(10 g) = 5.11 mW/g**

Maximum value of SAR (measured) = 11 mW/g



Client

Nokia Salo TCC

## CALIBRATION CERTIFICATE

Object(s)

D2450V2 - SN:749

Calibration procedure(s)

QA CAL-05.v2  
Calibration procedure for dipole validation kits

Calibration date:

June 7, 2004

Condition of the calibrated item

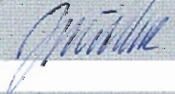
In Tolerance (according to the specific calibration document)

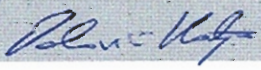
This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

| Model Type                | ID #       | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration  |
|---------------------------|------------|-------------------------------------------|------------------------|
| Power meter EPM E442      | GB37480704 | 6-Nov-03 (METAS, No. 252-0254)            | Nov-04                 |
| Power sensor HP 8481A     | US37292783 | 6-Nov-03 (METAS, No. 252-0254)            | Nov-04                 |
| Power sensor HP 8481A     | MY41092317 | 18-Oct-02 (Agilent, No. 20021018)         | Oct-04                 |
| RF generator R&S SML-03   | 100698     | 27-Mar-2002 (R&S, No. 20-92389)           | In house check: Mar-05 |
| Network Analyzer HP 8753E | US37390585 | 18-Oct-01 (SPEAG, in house check Nov-03)  | In house check: Oct 05 |

|                |                |            |                                                                                       |
|----------------|----------------|------------|---------------------------------------------------------------------------------------|
|                | Name           | Function   | Signature                                                                             |
| Calibrated by: | Judith Mueller | Technician |  |

|              |               |                     |                                                                                       |
|--------------|---------------|---------------------|---------------------------------------------------------------------------------------|
|              | Name          | Function            | Signature                                                                             |
| Approved by: | Katja Pokovic | Laboratory Director |  |

Date issued: June 14, 2004

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN749**

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL 2450 MHz;

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.86$  mho/m;  $\epsilon_r = 38.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.55, 4.55, 4.55); Calibrated: 9/29/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn411; Calibrated: 11/6/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006;
- Measurement SW: DASY4, V4.2 Build 54; Postprocessing SW: SEMCAD, V1.8 Build 112

**Pin = 250 mW; d = 10 mm/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm

Reference Value = 85.3 V/m; Power Drift = 0.0 dB

Maximum value of SAR (interpolated) = 15.2 mW/g

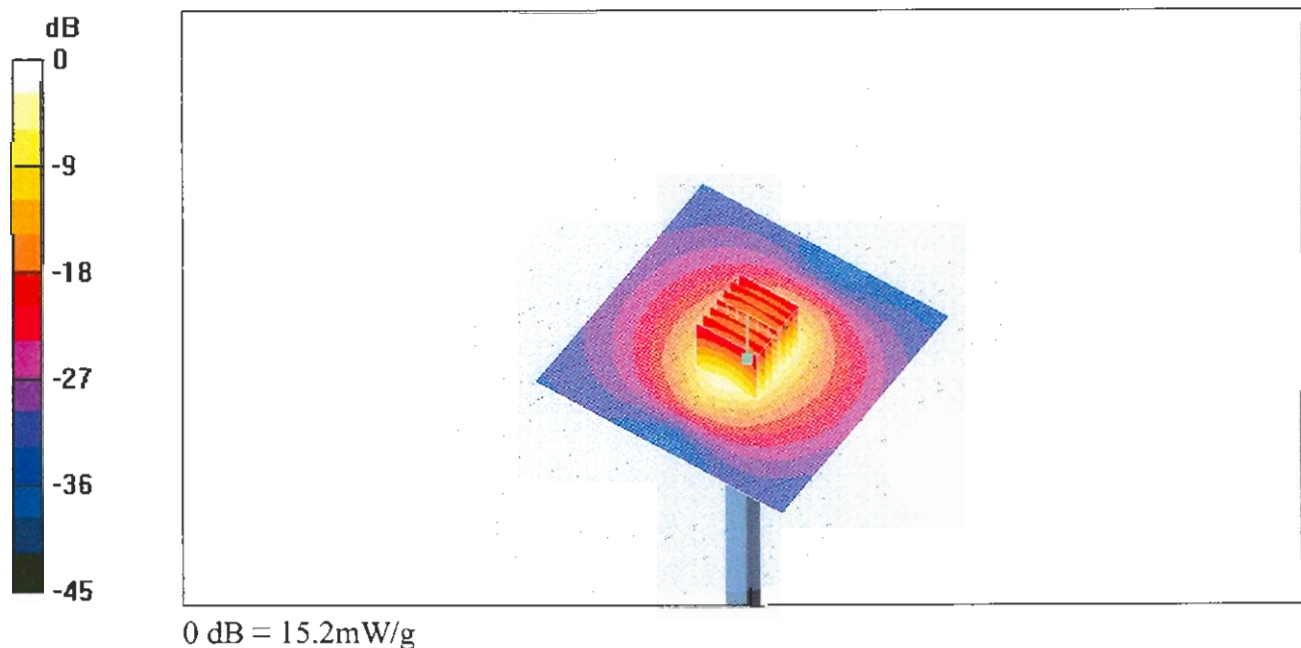
**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 85.3 V/m; Power Drift = 0.0 dB

Maximum value of SAR (measured) = 15.2 mW/g

Peak SAR (extrapolated) = 29.2 W/kg

**SAR(1 g) = 13.5 mW/g; SAR(10 g) = 6.11 mW/g**



Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN749**

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: Muscle 2450 MHz;

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 2$  mho/m;  $\epsilon_r = 51.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.22, 4.22, 4.22); Calibrated: 9/29/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn411; Calibrated: 11/6/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006;
- Measurement SW: DASY4, V4.2 Build 54; Postprocessing SW: SEMCAD, V1.8 Build 112

**Pin = 250 mW; d = 10 mm/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm

Reference Value = 81.2 V/m; Power Drift = 0.0 dB

Maximum value of SAR (interpolated) = 15 mW/g

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

Reference Value = 81.2 V/m; Power Drift = 0.0 dB

Maximum value of SAR (measured) = 15.1 mW/g

Peak SAR (extrapolated) = 27.5 W/kg

**SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.1 mW/g**

