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**APPENDIX F: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORTS**



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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Multilateral Agreement for the recognition of calibration certificates

Client **Nokia Salo TCC**

Certificate No: **D835V2-462\_Sep11**

## CALIBRATION CERTIFICATE

Object **D835V2 - SN: 462**

Calibration procedure(s) **QA CAL-05.v8  
Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **September 13, 2011**

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 (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 06-Oct-10 (No. 217-01266)         | Oct-11                 |
| Power sensor HP 8481A       | US37292783         | 06-Oct-10 (No. 217-01266)         | Oct-11                 |
| Reference 20 dB Attenuator  | SN: S5086 (20b)    | 29-Mar-11 (No. 217-01367)         | Apr-12                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 29-Mar-11 (No. 217-01371)         | Apr-12                 |
| Reference Probe ES3DV3      | SN: 3205           | 29-Apr-11 (No. ES3-3205_Apr11)    | Apr-12                 |
| DAE4                        | SN: 601            | 04-Jul-11 (No. DAE4-601_Jul11)    | Jul-12                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06     | 100005             | 04-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

|                |             |                       |           |
|----------------|-------------|-----------------------|-----------|
|                | Name        | Function              | Signature |
| Calibrated by: | Dimce Iliev | Laboratory Technician |           |

|              |               |                   |
|--------------|---------------|-------------------|
| Approved by: | Katja Pokovic | Technical Manager |
|--------------|---------------|-------------------|

Issued: September 13, 2011

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## Appendix

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 51.6 $\Omega$ - 1.8 j $\Omega$ |
| Return Loss                          | - 32.4 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 47.8 $\Omega$ - 3.7 j $\Omega$ |
| Return Loss                          | - 27.2 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.391 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 | March 27, 2002 |

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 462**

Communication System: CW; Frequency: 835 MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.89 \text{ mho/m}$ ;  $\epsilon_r = 41.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

**Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:**

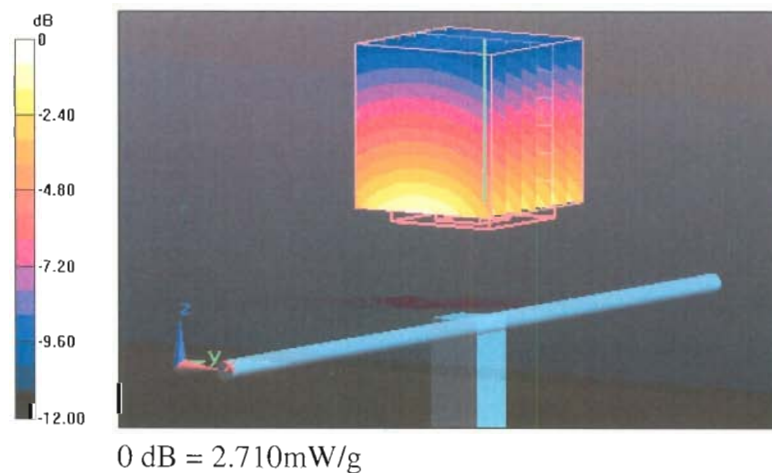
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 56.987 V/m; Power Drift = 0.02 dB

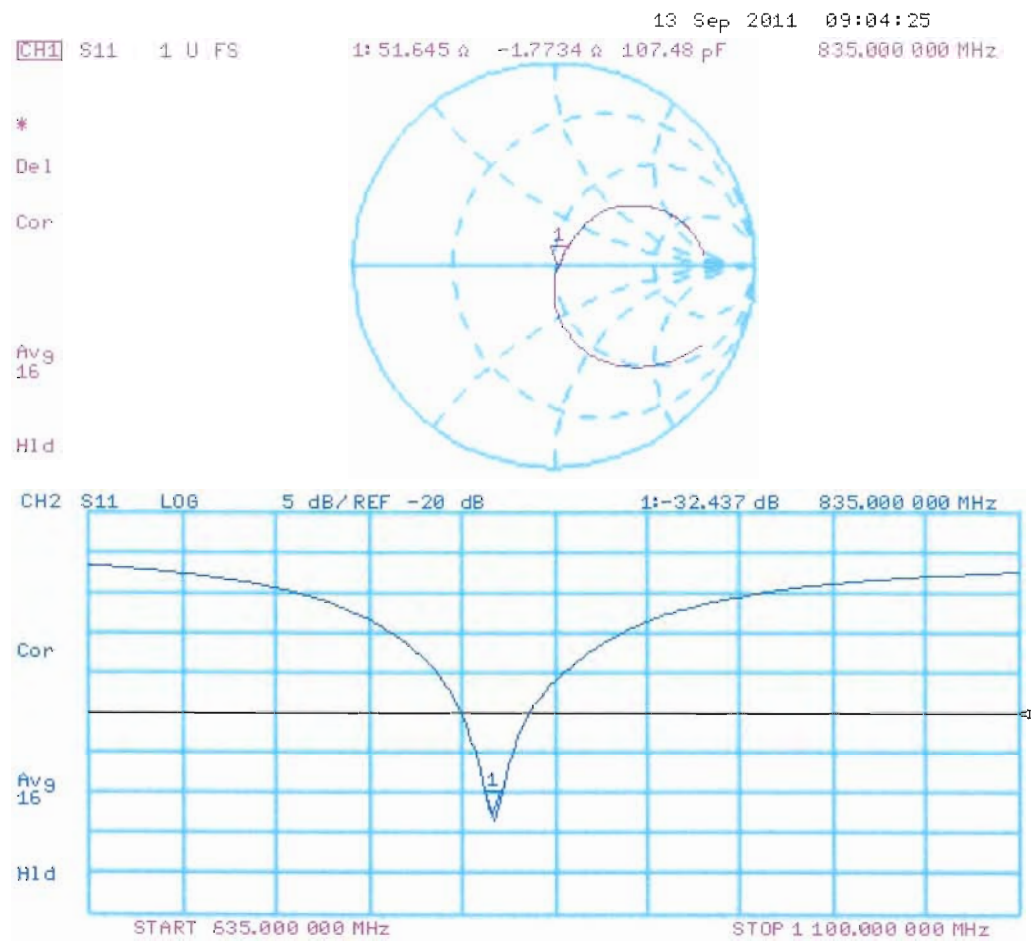
Peak SAR (extrapolated) = 3.423 W/kg

**SAR(1 g) = 2.33 mW/g; SAR(10 g) = 1.52 mW/g**

Maximum value of SAR (measured) = 2.708 mW/g



## Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 12.09.2011

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 462**

Communication System: CW; Frequency: 835 MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 1 \text{ mho/m}$ ;  $\epsilon_r = 53.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

### **Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:**

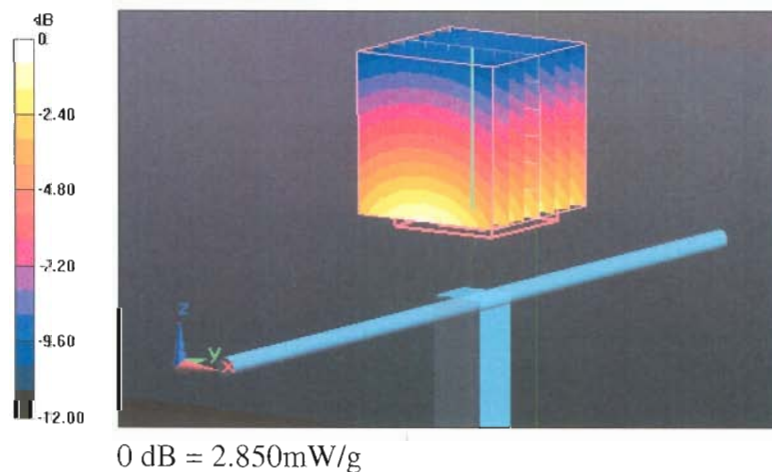
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 55.464 V/m; Power Drift = 0.0033 dB

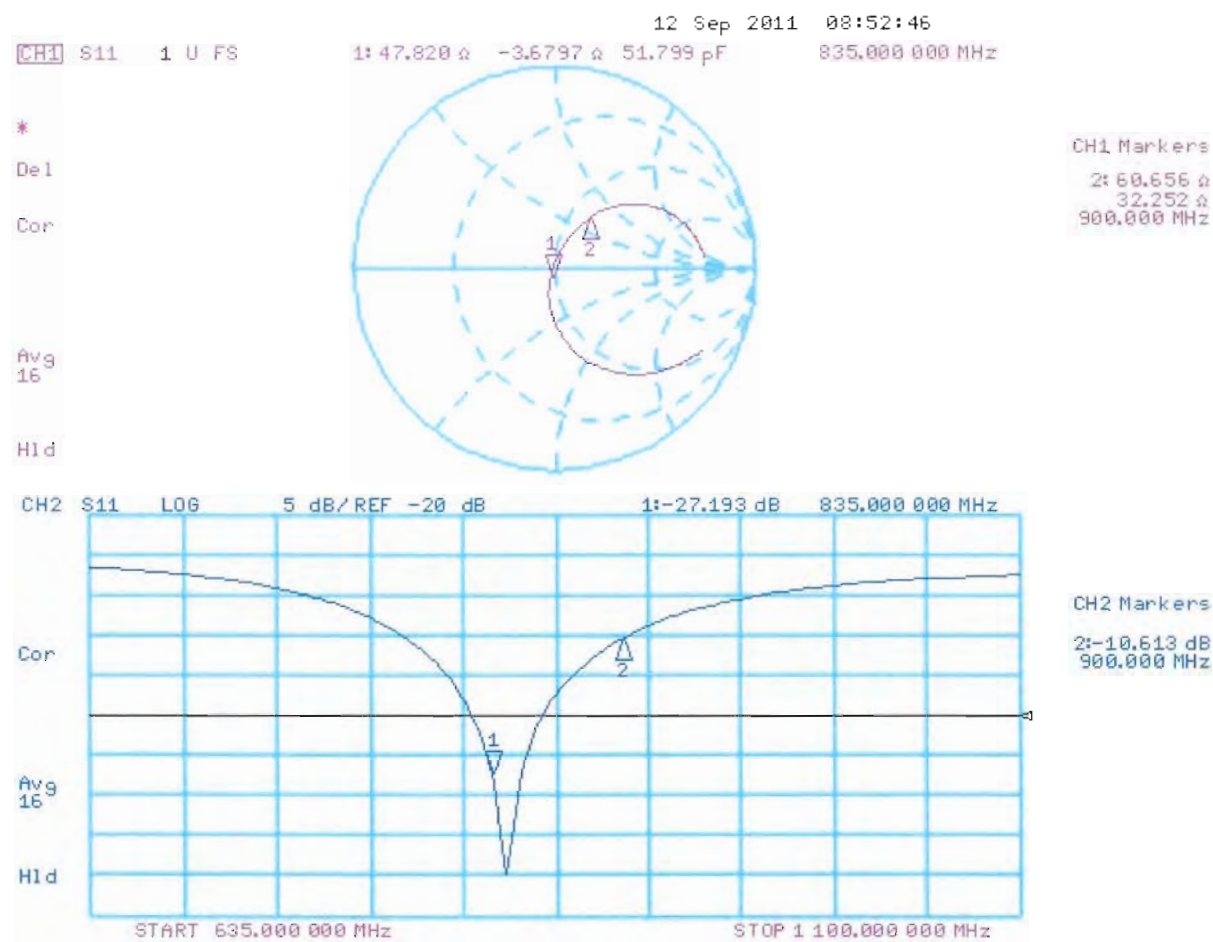
Peak SAR (extrapolated) = 3.540 W/kg

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

Maximum value of SAR (measured) = 2.851 mW/g



Impedance Measurement Plot for Body TSL



**Dipole D835V2 – SN: 462 Antenna Parameters measured: 2012-04-03.**

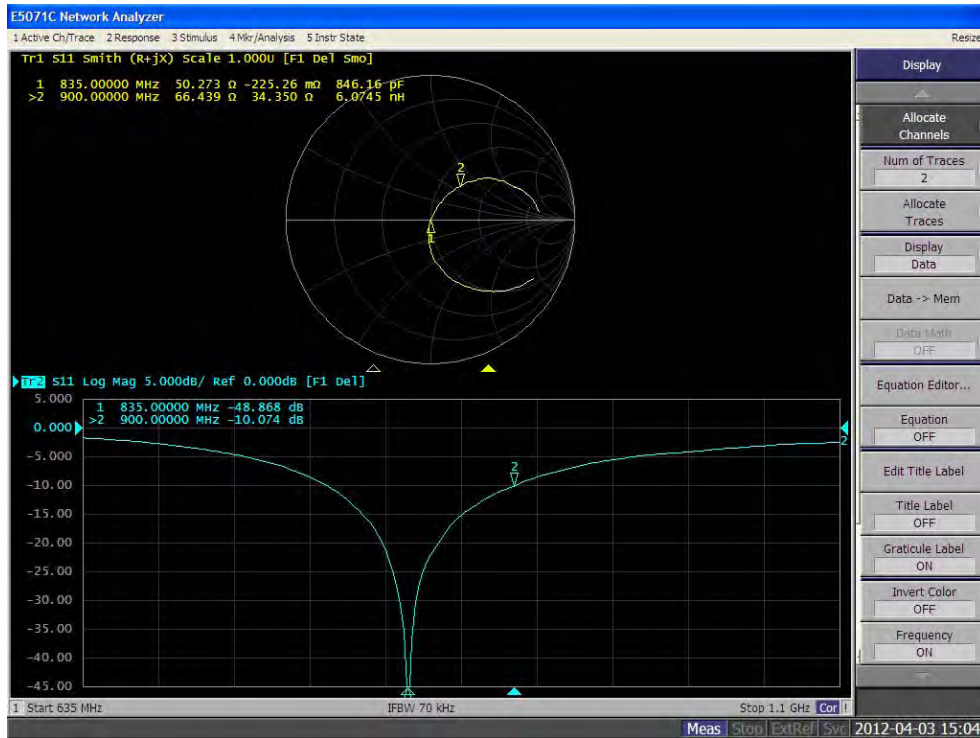
**Antenna Parameters with Head TSL**

|                                      | Calibration<br>certificate     | Annual<br>measurement          |
|--------------------------------------|--------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.7 $\Omega$ - 2.8 j $\Omega$ | 50.3 $\Omega$ - 0.2 j $\Omega$ |
| Return loss                          | -30.7 dB                       | -48.9 dB                       |

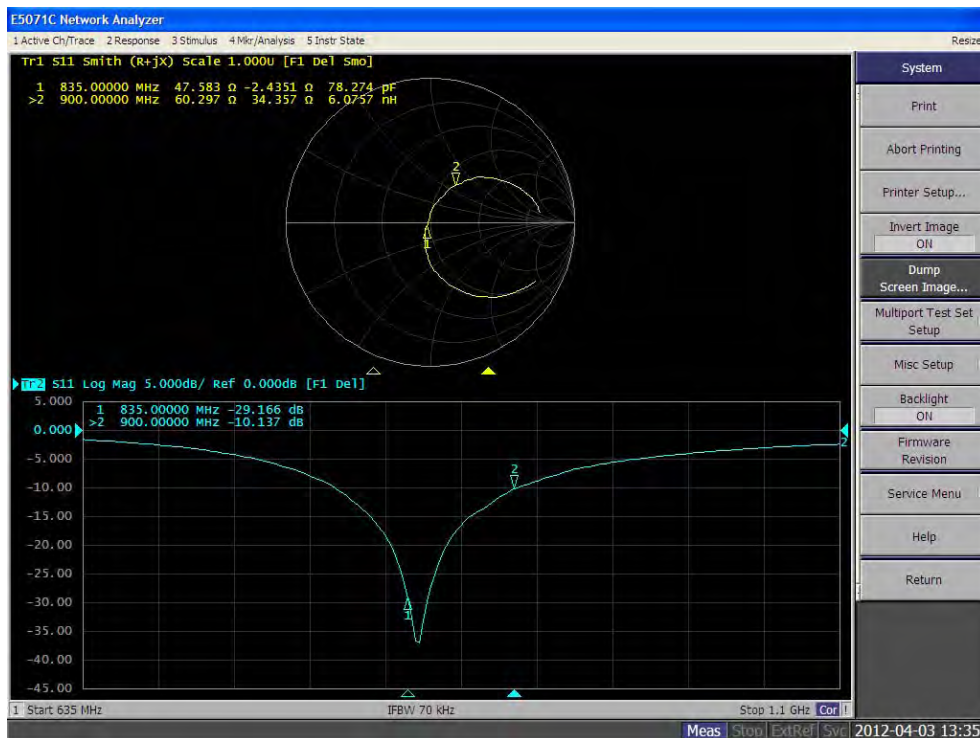
**Antenna Parameters with Body TSL**

|                                      | Calibration<br>certificate     | Annual<br>measurement          |
|--------------------------------------|--------------------------------|--------------------------------|
| Impedance, transformed to feed point | 47.4 $\Omega$ - 3.8 j $\Omega$ | 47.6 $\Omega$ - 2.4 j $\Omega$ |
| Return loss                          | -26.5 dB                       | -29.2 dB                       |

## Impedance Measurement Plot for Head TSL 835



## Impedance Measurement Plot for Body TSL 835





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Accreditation No.: **SCS 108**

Client **Nokia Salo TCC**

Certificate No: **D1900V2-5d030\_Feb12**

## CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d030**

Calibration procedure(s) **QA CAL-05.v8  
Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **February 22, 2012**

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 (Certificate No.)     | Scheduled Calibration |
|-----------------------------|--------------------|--------------------------------|-----------------------|
| Power meter EPM-442A        | GB37480704         | 05-Oct-11 (No. 217-01451)      | Oct-12                |
| Power sensor HP 8481A       | US37292783         | 05-Oct-11 (No. 217-01451)      | Oct-12                |
| Reference 20 dB Attenuator  | SN: 5086 (20g)     | 29-Mar-11 (No. 217-01368)      | Apr-12                |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 29-Mar-11 (No. 217-01371)      | Apr-12                |
| Reference Probe ES3DV3      | SN: 3205           | 30-Dec-11 (No. ES3-3205_Dec11) | Dec-12                |
| DAE4                        | SN: 601            | 04-Jul-11 (No. DAE4-601_Jul11) | Jul-12                |

| Secondary Standards       | ID #             | Check Date (in house)             | Scheduled Check        |
|---------------------------|------------------|-----------------------------------|------------------------|
| Power sensor HP 8481A     | MY41092317       | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06   | 100005           | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-11) | In house check: Oct-12 |

|                |                |                       |           |
|----------------|----------------|-----------------------|-----------|
|                | Name           | Function              | Signature |
| Calibrated by: | Israe El-Naouq | Laboratory Technician |           |
| Approved by:   | Katja Pokovic  | Technical Manager     |           |

Issued: February 22, 2012

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## Appendix

### Antenna Parameters with Head TSL

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | $52.0\ \Omega + 5.3\ j\Omega$ |
| Return Loss                          | - 25.2 dB                     |

### Antenna Parameters with Body TSL

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | $47.6\ \Omega + 5.4\ j\Omega$ |
| Return Loss                          | - 24.4 dB                     |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.192 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 | December 17, 2002 |

## DASY5 Validation Report for Head TSL

Date: 22.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d030**

Communication System: CW; Frequency: 1900 MHz

Medium parameters used:  $f = 1900 \text{ MHz}$ ;  $\sigma = 1.4 \text{ mho/m}$ ;  $\epsilon_r = 40.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

**Dipole Calibration for Head Tissue/Pin=250 mW,  $d=10\text{mm}$ /Zoom Scan (7x7x7)/Cube 0:**

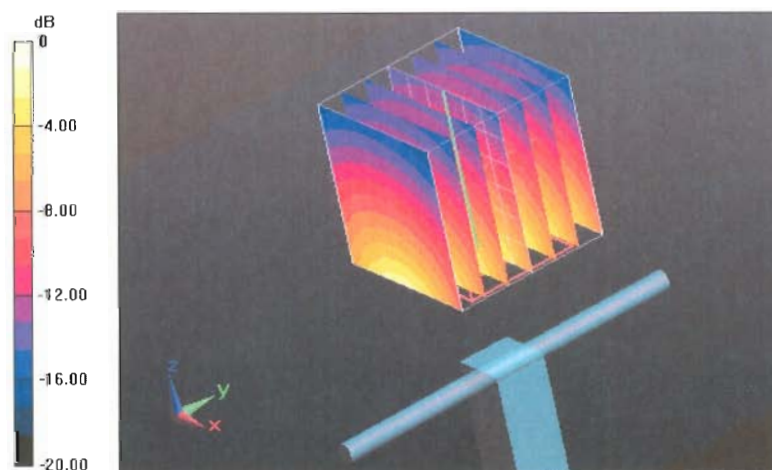
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 96.565 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 17.4270

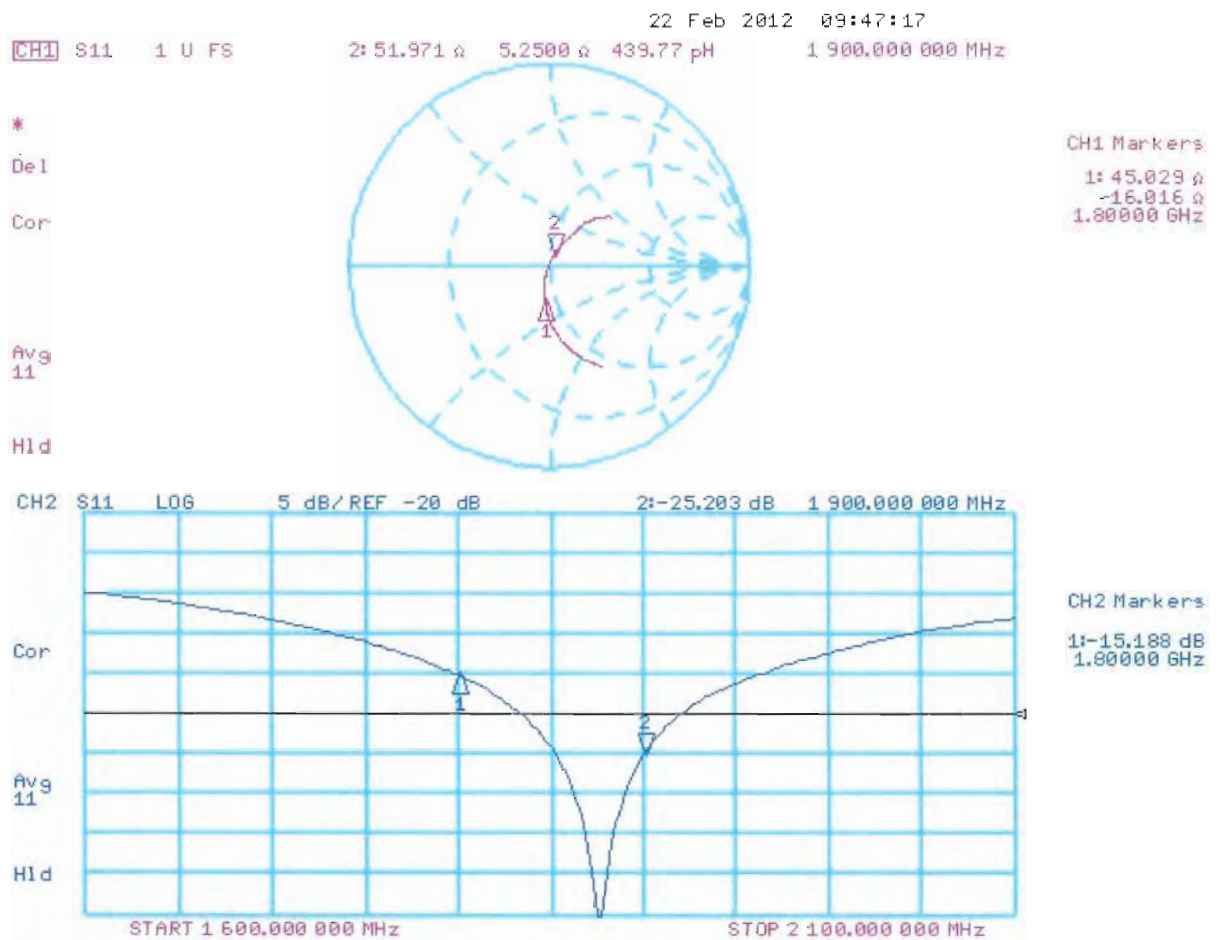
**SAR(1 g) = 9.79 mW/g; SAR(10 g) = 5.18 mW/g**

Maximum value of SAR (measured) = 12.117 mW/g



0 dB = 12.120mW/g = 21.67 dB mW/g

## Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 22.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d030**

Communication System: CW; Frequency: 1900 MHz

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.56$  mho/m;  $\epsilon_r = 53$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

**Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.541 V/m; Power Drift = -0.0095 dB

Peak SAR (extrapolated) = 17.4260

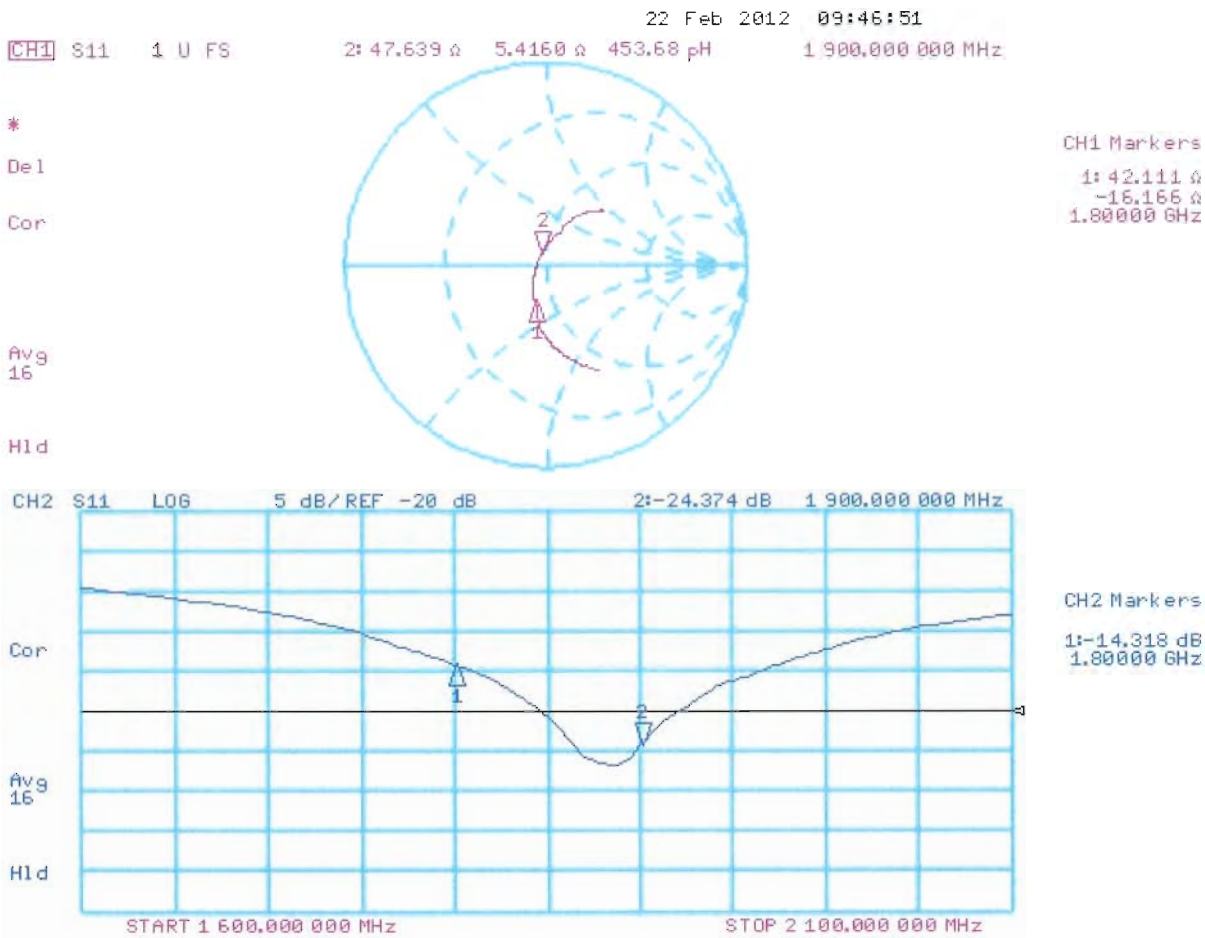
**SAR(1 g) = 9.87 mW/g; SAR(10 g) = 5.17 mW/g**

Maximum value of SAR (measured) = 12.485 mW/g



0 dB = 12.480mW/g = 21.92 dB mW/g

Impedance Measurement Plot for Body TSL



## Dipole D1900V2 - SN5d030 Antenna Parameters measured: 2012-04-02.

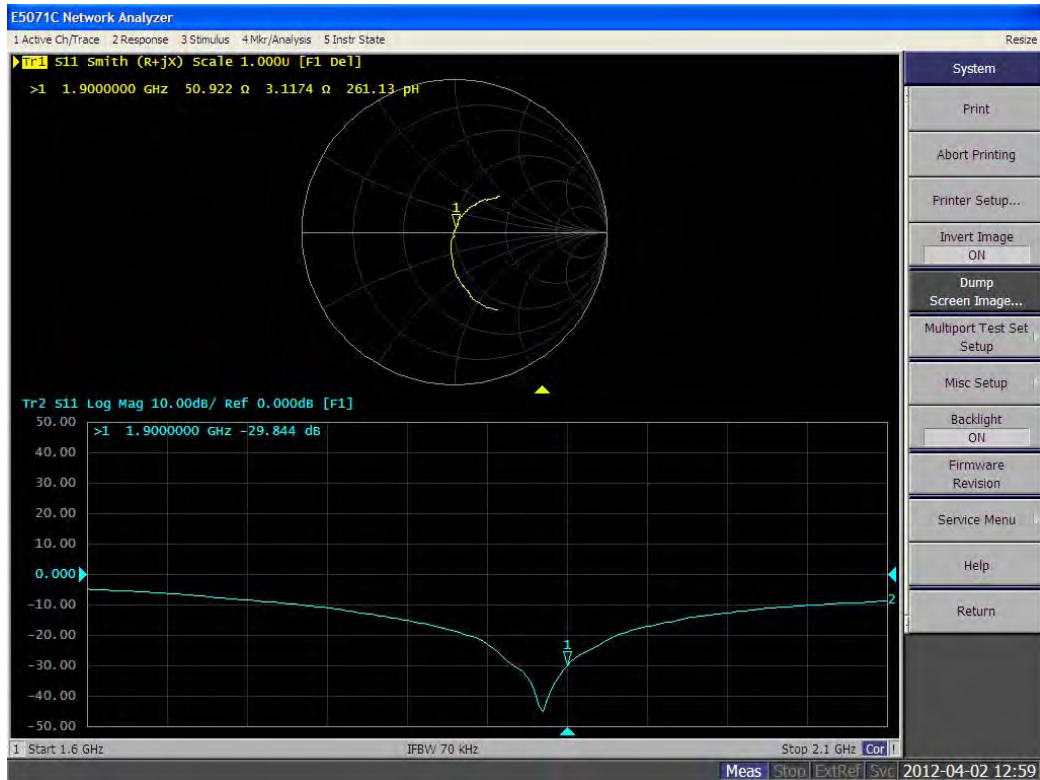
### Antenna Parameters with Head TSL

|                                      | Calibration<br>certificate   | Annual<br>measurement        |
|--------------------------------------|------------------------------|------------------------------|
| Impedance, transformed to feed point | 52.0 $\Omega$ 5.3 j $\Omega$ | 50.9 $\Omega$ 3.1 j $\Omega$ |
| Return loss                          | -25.2 dB                     | -29.8 dB                     |

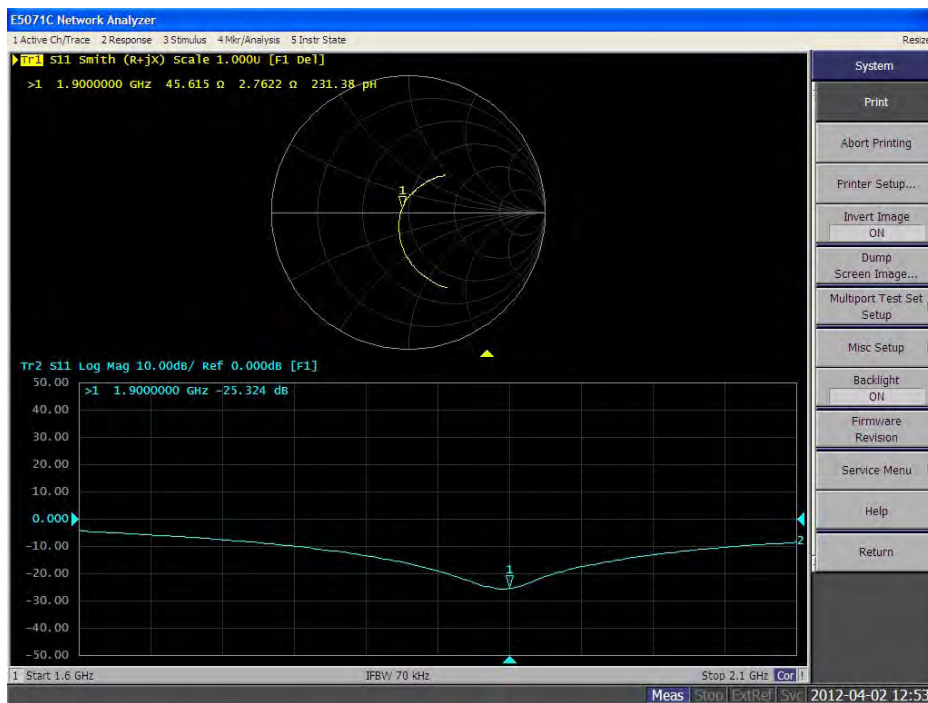
### Antenna Parameters with Body TSL

|                                      | Calibration<br>certificate   | Annual<br>measurement        |
|--------------------------------------|------------------------------|------------------------------|
| Impedance, transformed to feed point | 47.6 $\Omega$ 5.4 j $\Omega$ | 45.6 $\Omega$ 2.8 j $\Omega$ |
| Return loss                          | -24.4 dB                     | -25.3 dB                     |

## Impedance Measurement Plot for Head TSL 1900



## Impedance Measurement Plot for Body TSL 1900





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Accreditation No.: **SCS 108**

Client **Nokia Salo TCC**

Certificate No: **D2450V2-729\_Sep11**

## CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 729**

Calibration procedure(s) **QA CAL-05.v8**  
**Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **September 13, 2011**

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 (Certificate No.)     | Scheduled Calibration |
|-----------------------------|--------------------|--------------------------------|-----------------------|
| Power meter EPM-442A        | GB37480704         | 06-Oct-10 (No. 217-01266)      | Oct-11                |
| Power sensor HP 8481A       | US37292783         | 06-Oct-10 (No. 217-01266)      | Oct-11                |
| Reference 20 dB Attenuator  | SN: S5086 (20b)    | 29-Mar-11 (No. 217-01367)      | Apr-12                |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 29-Mar-11 (No. 217-01371)      | Apr-12                |
| Reference Probe ES3DV3      | SN: 3205           | 29-Apr-11 (No. ES3-3205_Apr11) | Apr-12                |
| DAE4                        | SN: 601            | 04-Jul-11 (No. DAE4-601_Jul11) | Jul-12                |

| Secondary Standards       | ID #             | Check Date (in house)             | Scheduled Check        |
|---------------------------|------------------|-----------------------------------|------------------------|
| Power sensor HP 8481A     | MY41092317       | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06   | 100005           | 04-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

|                |             |                       |           |
|----------------|-------------|-----------------------|-----------|
|                | Name        | Function              | Signature |
| Calibrated by: | Dimce Iliev | Laboratory Technician |           |

|              |               |                   |
|--------------|---------------|-------------------|
| Approved by: | Katja Pokovic | Technical Manager |
|--------------|---------------|-------------------|

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### 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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:

- DASY4/5 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.

|                                     |                        |             |
|-------------------------------------|------------------------|-------------|
| <b>DASY Version</b>                 | DASY5                  | V52.6.2     |
| <b>Extrapolation</b>                | Advanced Extrapolation |             |
| <b>Phantom</b>                      | Modular Flat Phantom   |             |
| <b>Distance Dipole Center - TSL</b> | 10 mm                  | with Spacer |
| <b>Zoom Scan Resolution</b>         | dx, dy, dz = 5 mm      |             |
| <b>Frequency</b>                    | 2450 MHz $\pm$ 1 MHz   |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Head TSL parameters</b>             | 22.0 °C             | 39.2           | 1.80 mho/m           |
| <b>Measured Head TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 38.3 $\pm$ 6 % | 1.85 mho/m $\pm$ 6 % |
| <b>Head TSL temperature change during test</b> | < 0.5 °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 | 13.9 mW / g                                      |
| SAR for nominal Head TSL parameters                         | normalized to 1W   | <b>54.6 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 | 6.45 mW / g                                      |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>25.6 mW / g <math>\pm</math> 16.5 % (k=2)</b> |

## Body TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Body TSL parameters</b>             | 22.0 °C             | 52.7           | 1.95 mho/m           |
| <b>Measured Body TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 51.7 $\pm$ 6 % | 2.04 mho/m $\pm$ 6 % |
| <b>Body TSL temperature change during test</b> | < 0.5 °C            | ----           | ----                 |

## SAR result with Body TSL

|                                                             |                    |                                                  |
|-------------------------------------------------------------|--------------------|--------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Body TSL</b> | Condition          |                                                  |
| SAR measured                                                | 250 mW input power | 13.3 mW / g                                      |
| SAR for nominal Body TSL parameters                         | normalized to 1W   | <b>51.8 mW / g <math>\pm</math> 17.0 % (k=2)</b> |

|                                                               |                    |                                                  |
|---------------------------------------------------------------|--------------------|--------------------------------------------------|
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Body TSL</b> | condition          |                                                  |
| SAR measured                                                  | 250 mW input power | 6.18 mW / g                                      |
| SAR for nominal Body TSL parameters                           | normalized to 1W   | <b>24.4 mW / g <math>\pm</math> 16.5 % (k=2)</b> |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $51.8 \Omega - 0.6 j\Omega$ |
| Return Loss                          | - 34.7 dB                   |

### Antenna Parameters with Body TSL

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $48.7 \Omega + 1.1 j\Omega$ |
| Return Loss                          | - 35.5 dB                   |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.148 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 | January 09, 2003 |

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 729**

Communication System: CW; Frequency: 2450 MHz

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.85$  mho/m;  $\epsilon_r = 38.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

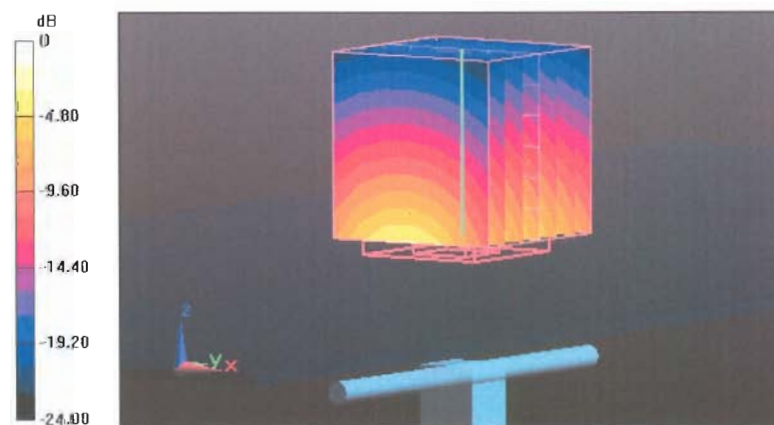
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 102.5 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 28.852 W/kg

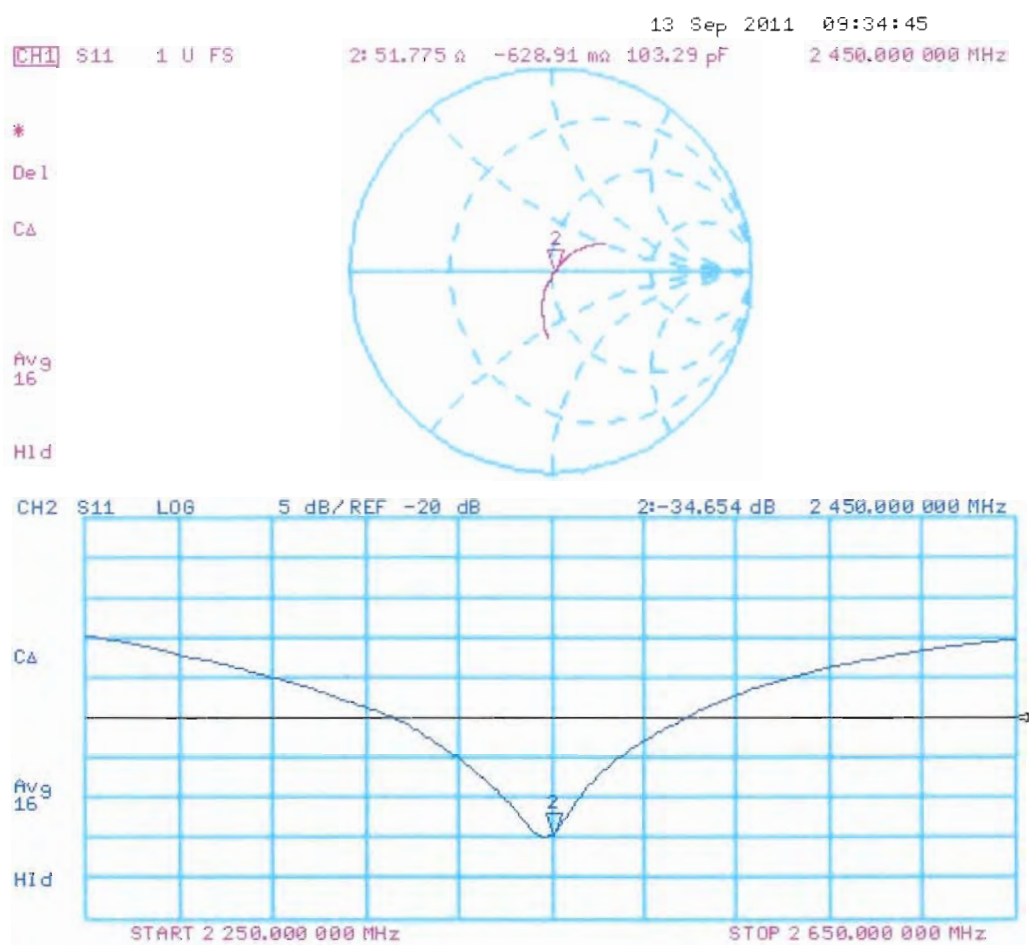
**SAR(1 g) = 13.9 mW/g; SAR(10 g) = 6.45 mW/g**

Maximum value of SAR (measured) = 18.134 mW/g



0 dB = 18.130mW/g

# Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 12.09.2011

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 729**

Communication System: CW; Frequency: 2450 MHz

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 2.04$  mho/m;  $\epsilon_r = 51.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

**Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

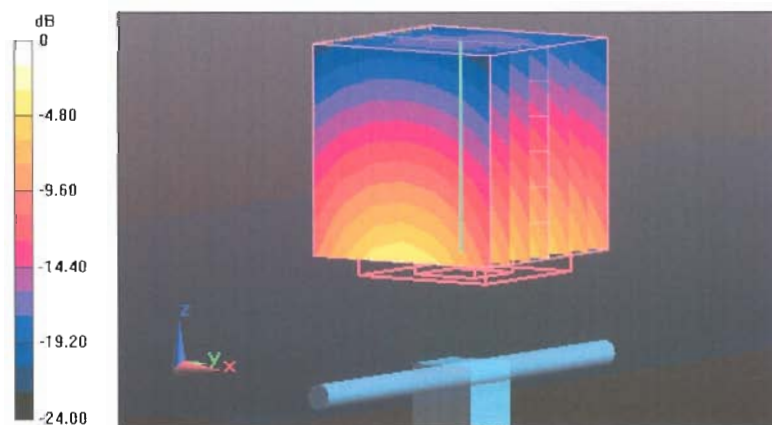
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.035 V/m; Power Drift = -0.0016 dB

Peak SAR (extrapolated) = 27.393 W/kg

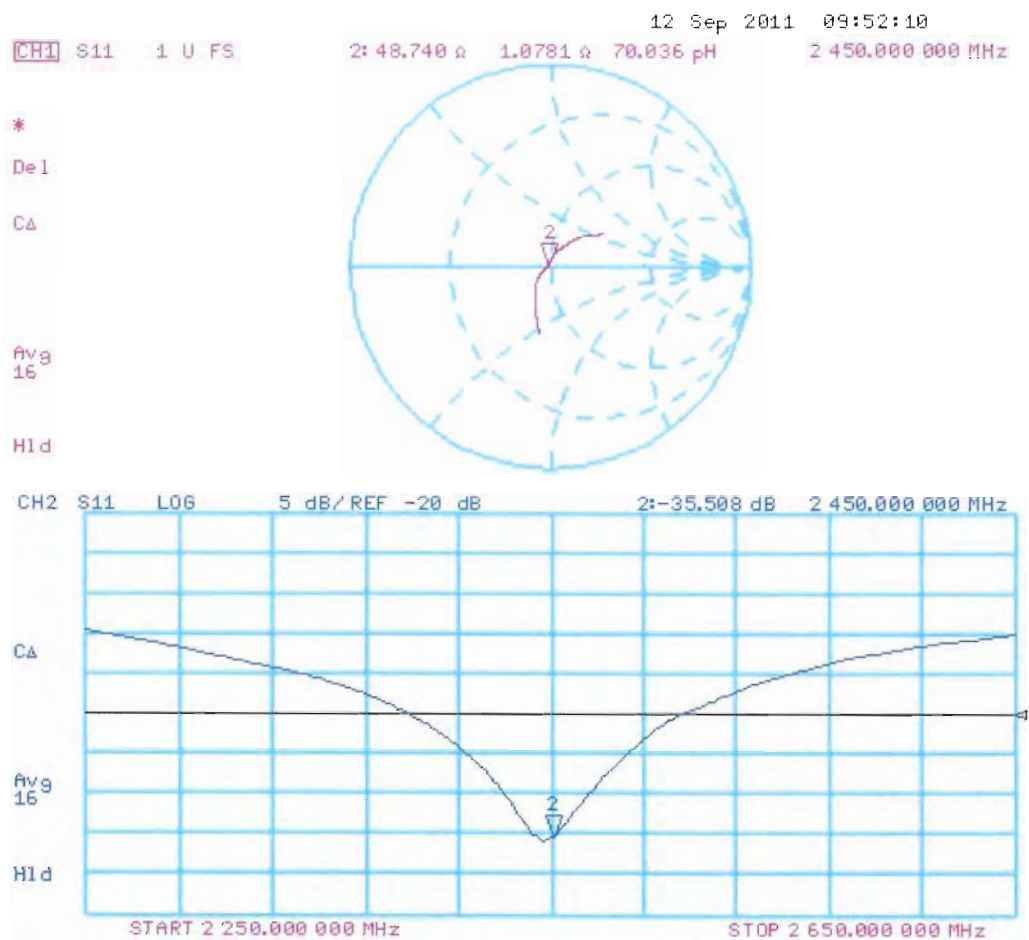
**SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.18 mW/g**

Maximum value of SAR (measured) = 17.569 mW/g



0 dB = 17.570mW/g

## Impedance Measurement Plot for Body TSL



**Dipole D2450V2 – SN:729 Antenna Parameters measured: 2012-04-03.**

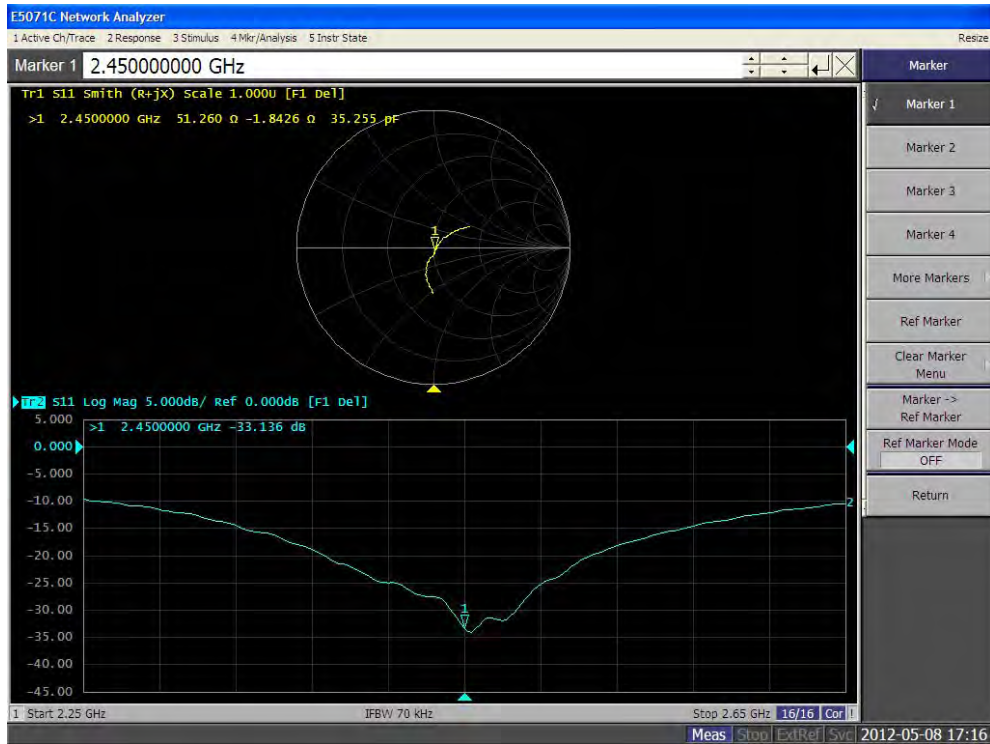
**Antenna Parameters with Head TSL**

|                                      | Calibration<br>certificate     | Annual<br>measurement          |
|--------------------------------------|--------------------------------|--------------------------------|
| Impedance, transformed to feed point | 51.8 $\Omega$ - 0.6 j $\Omega$ | 51.3 $\Omega$ - 1.8 j $\Omega$ |
| Return loss                          | -34.7 dB                       | -33.1 dB                       |

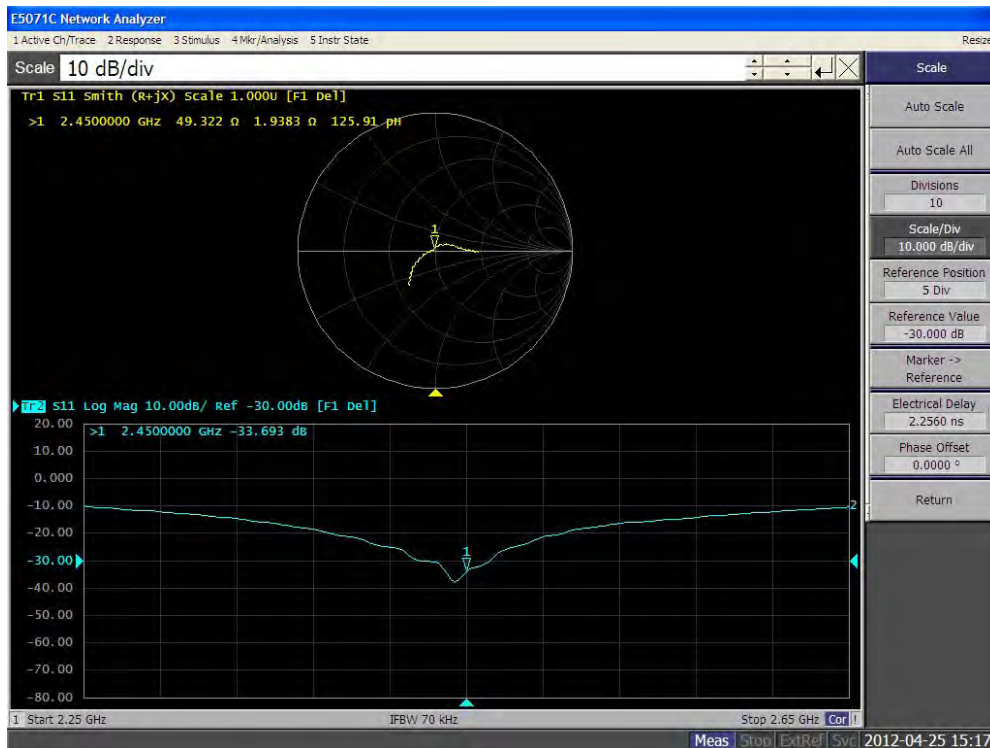
**Antenna Parameters with Body TSL**

|                                      | Calibration<br>certificate     | Annual<br>measurement        |
|--------------------------------------|--------------------------------|------------------------------|
| Impedance, transformed to feed point | 48.7 $\Omega$ - 1.1 j $\Omega$ | 49.3 $\Omega$ 1.9 j $\Omega$ |
| Return loss                          | -35.5 dB                       | -33.7 dB                     |

## Impedance Measurement Plot for Head TSL 2450



## Impedance Measurement Plot for Body TSL 2450





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Accreditation No.: **SCS 108**

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Multilateral Agreement for the recognition of calibration certificates

Client **Nokia Salo TCC**

Certificate No: **D5GHzV2-1032\_Feb12**

## CALIBRATION CERTIFICATE

Object **D5GHzV2 - SN: 1032**

Calibration procedure(s) **QA CAL-22.v1  
Calibration procedure for dipole validation kits between 3-6 GHz**

Calibration date: **February 14, 2012**

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 (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 05-Oct-11 (No. 217-01451)         | Oct-12                 |
| Power sensor HP 8481A       | US37292783         | 05-Oct-11 (No. 217-01451)         | Oct-12                 |
| Reference 20 dB Attenuator  | SN: 5086 (20g)     | 29-Mar-11 (No. 217-01368)         | Apr-12                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 29-Mar-11 (No. 217-01371)         | Apr-12                 |
| Reference Probe EX3DV4      | SN: 3503           | 30-Dec-11 (No. EX3-3503_Dec11)    | Dec-12                 |
| DAE4                        | SN: 601            | 04-Jul-11 (No. DAE4-601_Jul11)    | Jul-12                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06     | 100005             | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-11) | In house check: Oct-12 |

|                |                |                       |           |
|----------------|----------------|-----------------------|-----------|
|                | Name           | Function              | Signature |
| Calibrated by: | Israe El-Naouq | Laboratory Technician |           |
| Approved by:   | Katja Pekovic  | Technical Manager     |           |

Issued: February 14, 2012

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

## Appendix

### Antenna Parameters with Head TSL at 5200 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 49.6 $\Omega$ - 8.3 j $\Omega$ |
| Return Loss                          | - 21.6 dB                      |

### Antenna Parameters with Head TSL at 5500 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 52.0 $\Omega$ - 1.9 j $\Omega$ |
| Return Loss                          | - 31.3 dB                      |

### Antenna Parameters with Head TSL at 5800 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 58.9 $\Omega$ - 3.2 j $\Omega$ |
| Return Loss                          | - 21.2 dB                      |

### Antenna Parameters with Body TSL at 5200 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 49.2 $\Omega$ - 7.7 j $\Omega$ |
| Return Loss                          | - 22.1 dB                      |

### Antenna Parameters with Body TSL at 5500 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 52.6 $\Omega$ - 1.0 j $\Omega$ |
| Return Loss                          | - 31.3 dB                      |

### Antenna Parameters with Body TSL at 5800 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 59.8 $\Omega$ - 2.9 j $\Omega$ |
| Return Loss                          | - 20.6 dB                      |

## General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.201 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 09, 2004 |

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1032**

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz  
Medium parameters used:  $f = 5200$  MHz;  $\sigma = 4.6$  mho/m;  $\epsilon_r = 35.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $f = 5500$  MHz;  $\sigma = 4.89$  mho/m;  $\epsilon_r = 34.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $f = 5800$  MHz;  $\sigma = 5.19$  mho/m;  $\epsilon_r = 34.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.41, 5.41, 5.41), ConvF(4.91, 4.91, 4.91), ConvF(4.81, 4.81, 4.81); Calibrated: 30.12.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 65.348 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 30.0130

**SAR(1 g) = 7.98 mW/g; SAR(10 g) = 2.28 mW/g**

Maximum value of SAR (measured) = 19.030 mW/g

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.801 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 34.8980

**SAR(1 g) = 8.65 mW/g; SAR(10 g) = 2.45 mW/g**

Maximum value of SAR (measured) = 21.094 mW/g

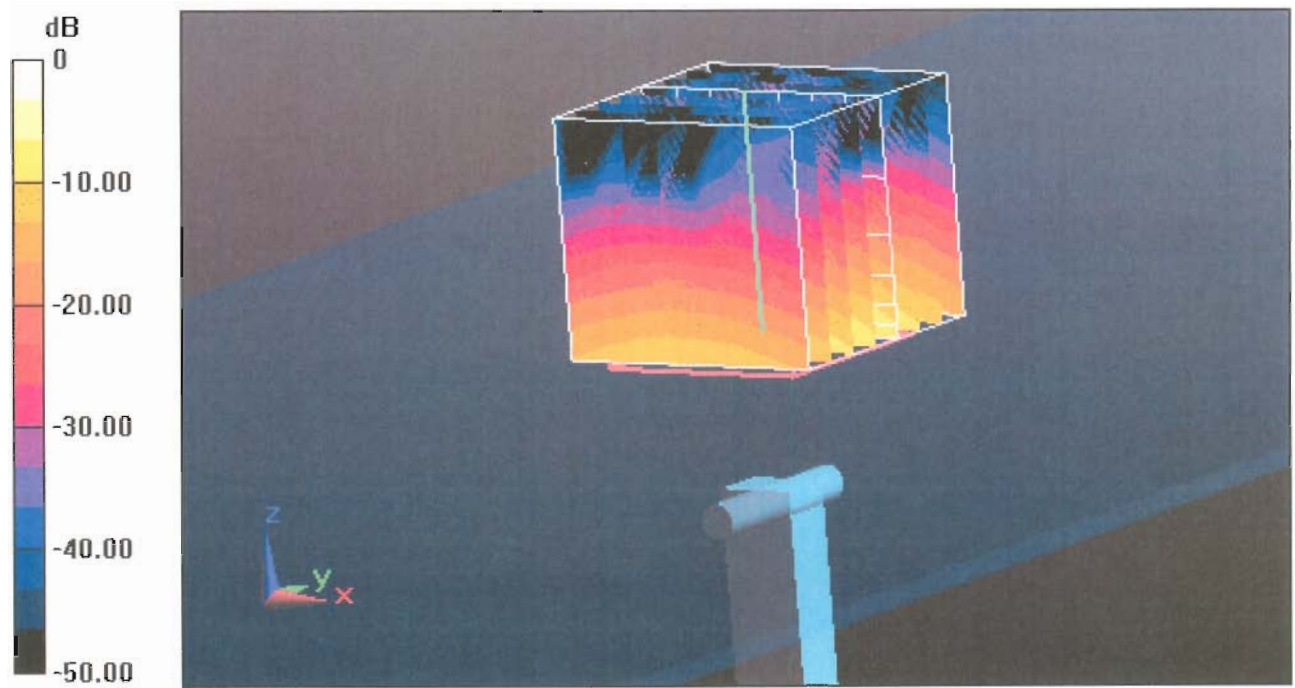
**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 60.873 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 33.7370

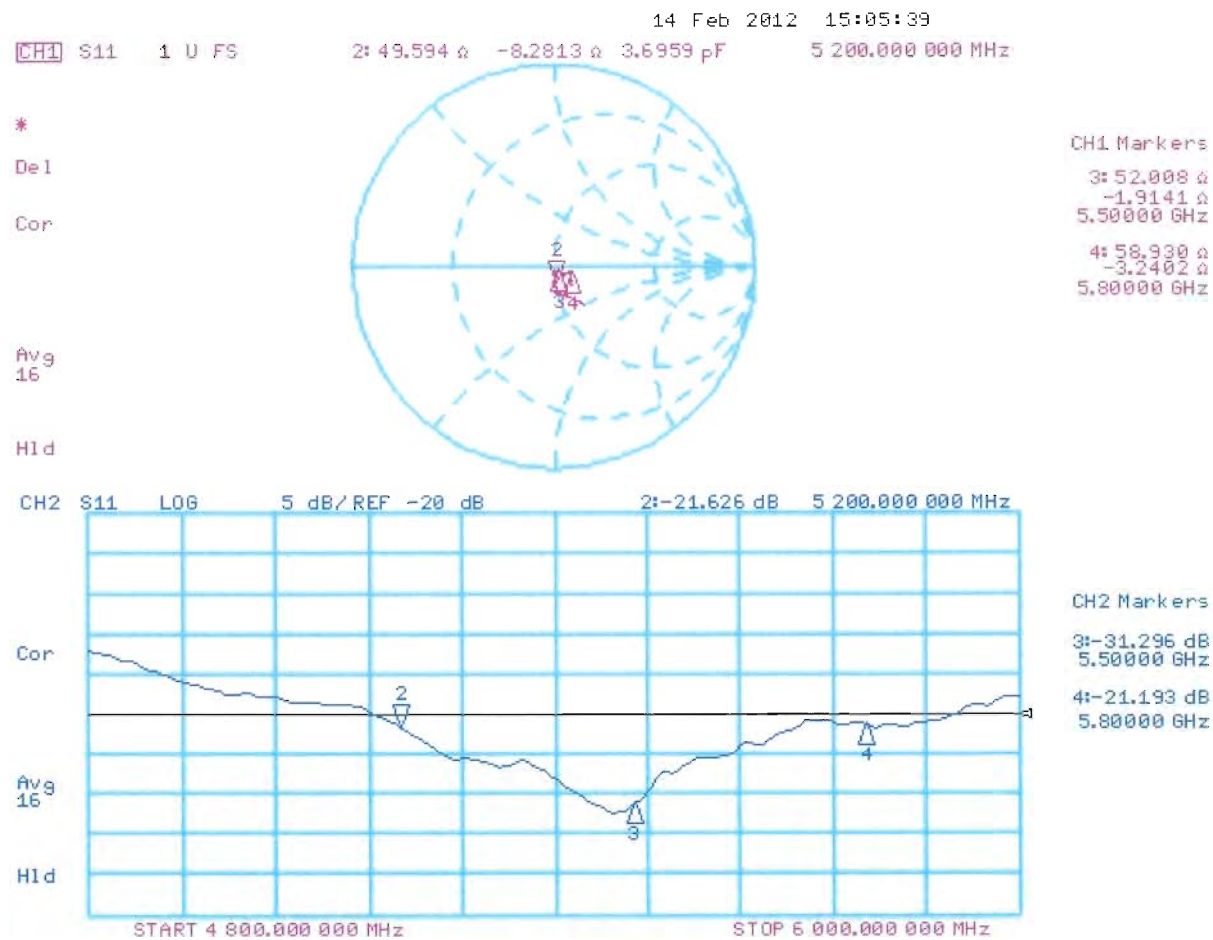
**SAR(1 g) = 7.92 mW/g; SAR(10 g) = 2.25 mW/g**

Maximum value of SAR (measured) = 19.840 mW/g



0 dB = 19.840mW/g = 25.95 dB mW/g

Impedance Measurement Plot for Head TSL



Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1032**

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz  
Medium parameters used:  $f = 5200 \text{ MHz}$ ;  $\sigma = 5.48 \text{ mho/m}$ ;  $\epsilon_r = 48.6$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters used:  $f = 5500 \text{ MHz}$ ;  $\sigma = 5.87 \text{ mho/m}$ ;  $\epsilon_r = 48.1$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters used:  $f = 5800 \text{ MHz}$ ;  $\sigma = 6.28 \text{ mho/m}$ ;  $\epsilon_r = 48.2$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

**DASY52 Configuration:**

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91), ConvF(4.43, 4.43, 4.43), ConvF(4.38, 4.38, 4.38); Calibrated: 30.12.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

**Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:**Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=1.4\text{mm}$ 

Reference Value = 57.401 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 28.2500

**SAR(1 g) = 7.23 mW/g; SAR(10 g) = 2.03 mW/g**

Maximum value of SAR (measured) = 16.493 mW/g

**Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:**Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=1.4\text{mm}$ 

Reference Value = 57.876 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 33.4980

**SAR(1 g) = 7.78 mW/g; SAR(10 g) = 2.16 mW/g**

Maximum value of SAR (measured) = 18.246 mW/g

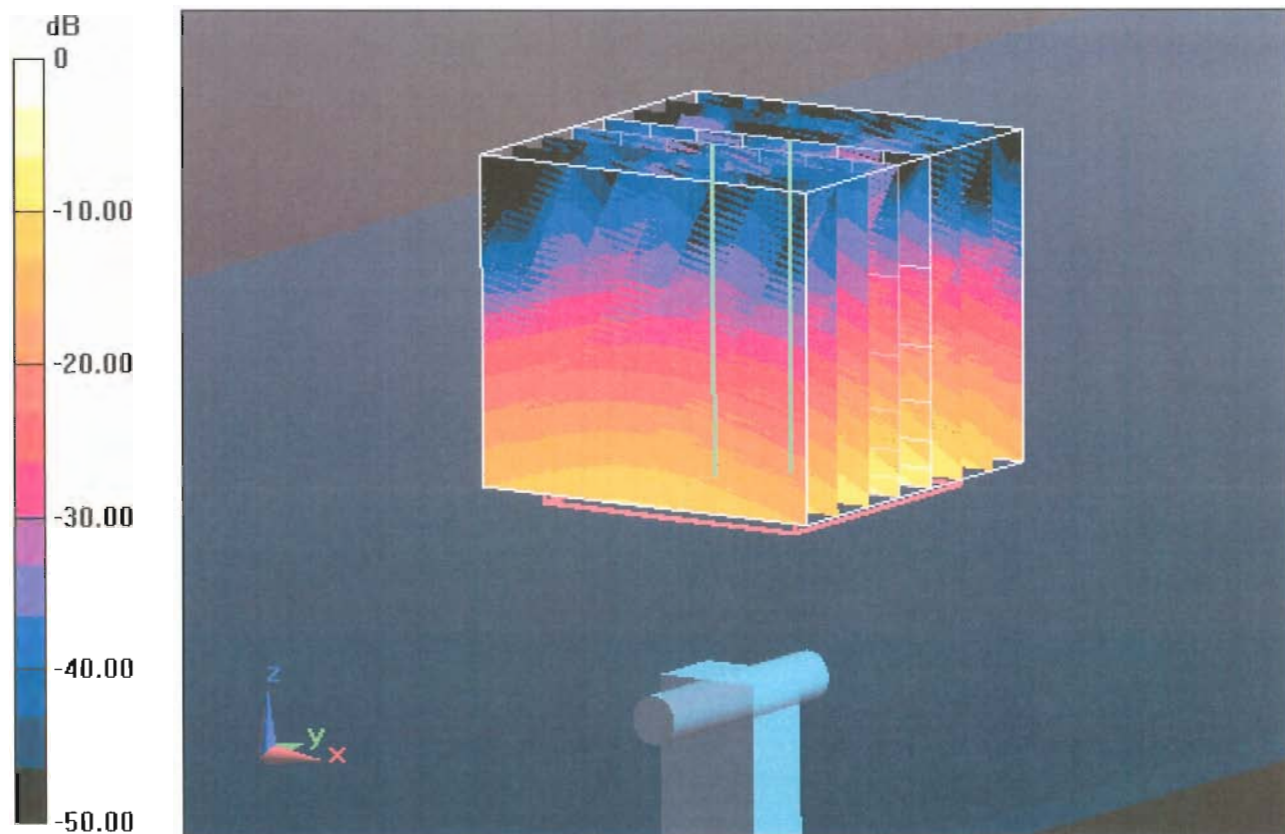
**Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:**Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=1.4\text{mm}$ 

Reference Value = 54.089 V/m; Power Drift = -0.0018 dB

Peak SAR (extrapolated) = 33.8810

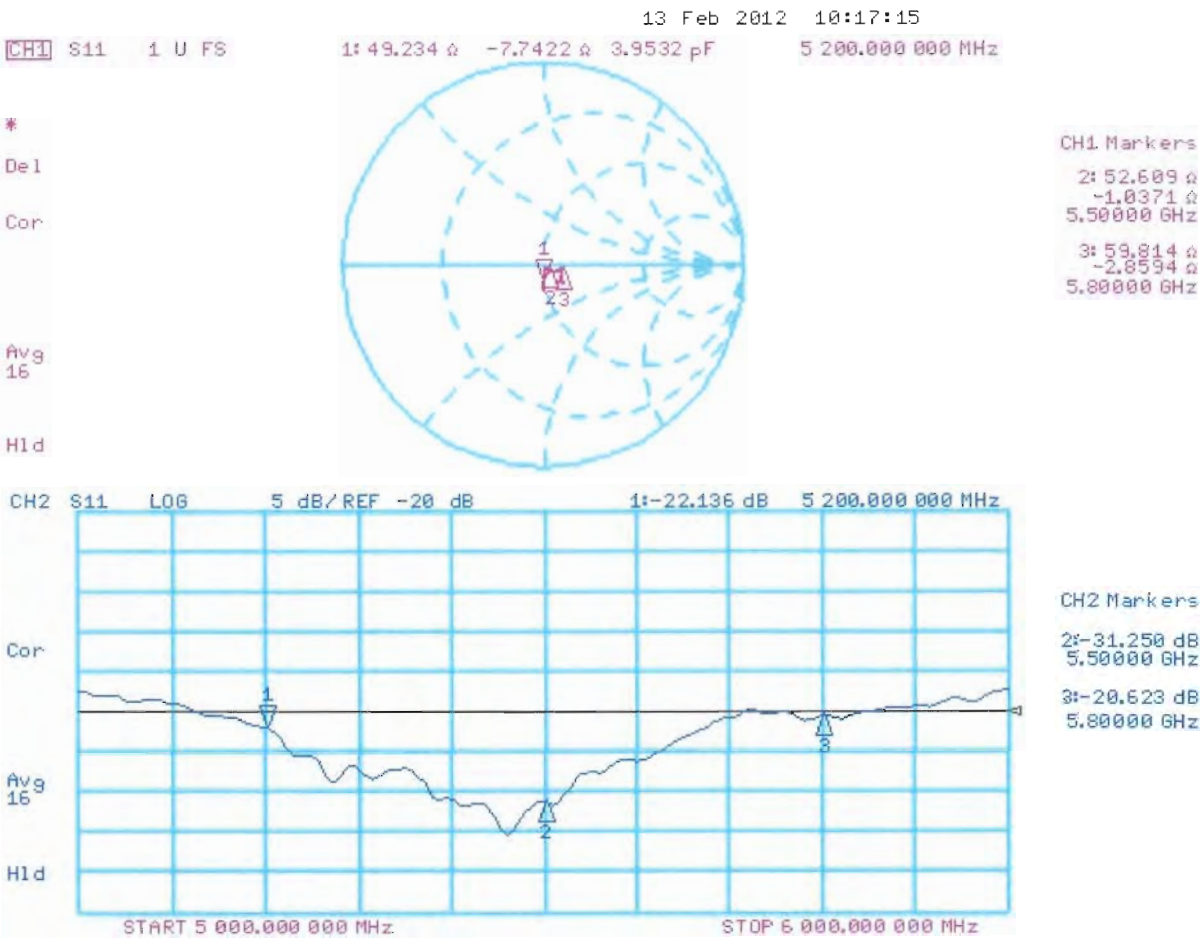
**SAR(1 g) = 7.21 mW/g; SAR(10 g) = 1.99 mW/g**

Maximum value of SAR (measured) = 17.435 mW/g



0 dB = 17.440mW/g = 24.83 dB mW/g

Impedance Measurement Plot for Body TSL





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



**S** Schweizerischer Kalibrierdienst  
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**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Nokia SD**

Certificate No: **D750V3-1057\_May12**

## CALIBRATION CERTIFICATE

Object **D750V3 - SN: 1057**

Calibration procedure(s) **QA CAL-05.v8**  
**Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **May 10, 2012**

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 (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 05-Oct-11 (No. 217-01451)         | Oct-12                 |
| Power sensor HP 8481A       | US37292783         | 05-Oct-11 (No. 217-01451)         | Oct-12                 |
| Reference 20 dB Attenuator  | SN: 5058 (20k)     | 27-Mar-12 (No. 217-01530)         | Apr-13                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 27-Mar-12 (No. 217-01533)         | Apr-13                 |
| Reference Probe ES3DV3      | SN: 3205           | 30-Dec-11 (No. ES3-3205_Dec11)    | Dec-12                 |
| DAE4                        | SN: 601            | 04-Jul-11 (No. DAE4-601_Jul11)    | Jul-12                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06     | 100005             | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-11) | In house check: Oct-12 |

Calibrated by: **Name** **Function**  
**Claudio Leubler** **Laboratory Technician**

Signature

Approved by: **Katja Pokovic** **Technical Manager**

Issued: May 10, 2012

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Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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### 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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:

- DASY4/5 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.

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%.

## Measurement Conditions

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

|                                     |                        |             |
|-------------------------------------|------------------------|-------------|
| <b>DASY Version</b>                 | DASY5                  | V52.8.1     |
| <b>Extrapolation</b>                | Advanced Extrapolation |             |
| <b>Phantom</b>                      | Modular Flat Phantom   |             |
| <b>Distance Dipole Center - TSL</b> | 15 mm                  | with Spacer |
| <b>Zoom Scan Resolution</b>         | dx, dy, dz = 5 mm      |             |
| <b>Frequency</b>                    | 750 MHz $\pm$ 1 MHz    |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Head TSL parameters</b>             | 22.0 °C             | 41.9           | 0.89 mho/m           |
| <b>Measured Head TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 42.3 $\pm$ 6 % | 0.92 mho/m $\pm$ 6 % |
| <b>Head TSL temperature change during test</b> | < 0.5 °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 | 2.16 mW / g                                      |
| SAR for nominal Head TSL parameters                         | normalized to 1W   | <b>8.44 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 | 1.41 mW / g                                      |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>5.53 mW / g <math>\pm</math> 16.5 % (k=2)</b> |

## Body TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Body TSL parameters</b>             | 22.0 °C             | 55.5           | 0.96 mho/m           |
| <b>Measured Body TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 55.6 $\pm$ 6 % | 0.96 mho/m $\pm$ 6 % |
| <b>Body TSL temperature change during test</b> | < 0.5 °C            | ----           | ----                 |

## SAR result with Body TSL

|                                                             |                    |                                                  |
|-------------------------------------------------------------|--------------------|--------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Body TSL</b> | Condition          |                                                  |
| SAR measured                                                | 250 mW input power | 2.21 mW / g                                      |
| SAR for nominal Body TSL parameters                         | normalized to 1W   | <b>8.84 mW / g <math>\pm</math> 17.0 % (k=2)</b> |

|                                                               |                    |                                                  |
|---------------------------------------------------------------|--------------------|--------------------------------------------------|
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Body TSL</b> | condition          |                                                  |
| SAR measured                                                  | 250 mW input power | 1.46 mW / g                                      |
| SAR for nominal Body TSL parameters                           | normalized to 1W   | <b>5.84 mW / g <math>\pm</math> 16.5 % (k=2)</b> |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.5 $\Omega$ - 1.8 j $\Omega$ |
| Return Loss                          | - 28.4 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 49.1 $\Omega$ - 3.4 j $\Omega$ |
| Return Loss                          | - 29.1 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.037 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 | November 08, 2011 |

## DASY5 Validation Report for Head TSL

Date: 10.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1057**

Communication System: CW; Frequency: 750 MHz

Medium parameters used:  $f = 750$  MHz;  $\sigma = 0.92$  mho/m;  $\epsilon_r = 42.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.33, 6.33, 6.33); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

### Dipole Calibration for Head Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.685 V/m; Power Drift = 0.00 dB

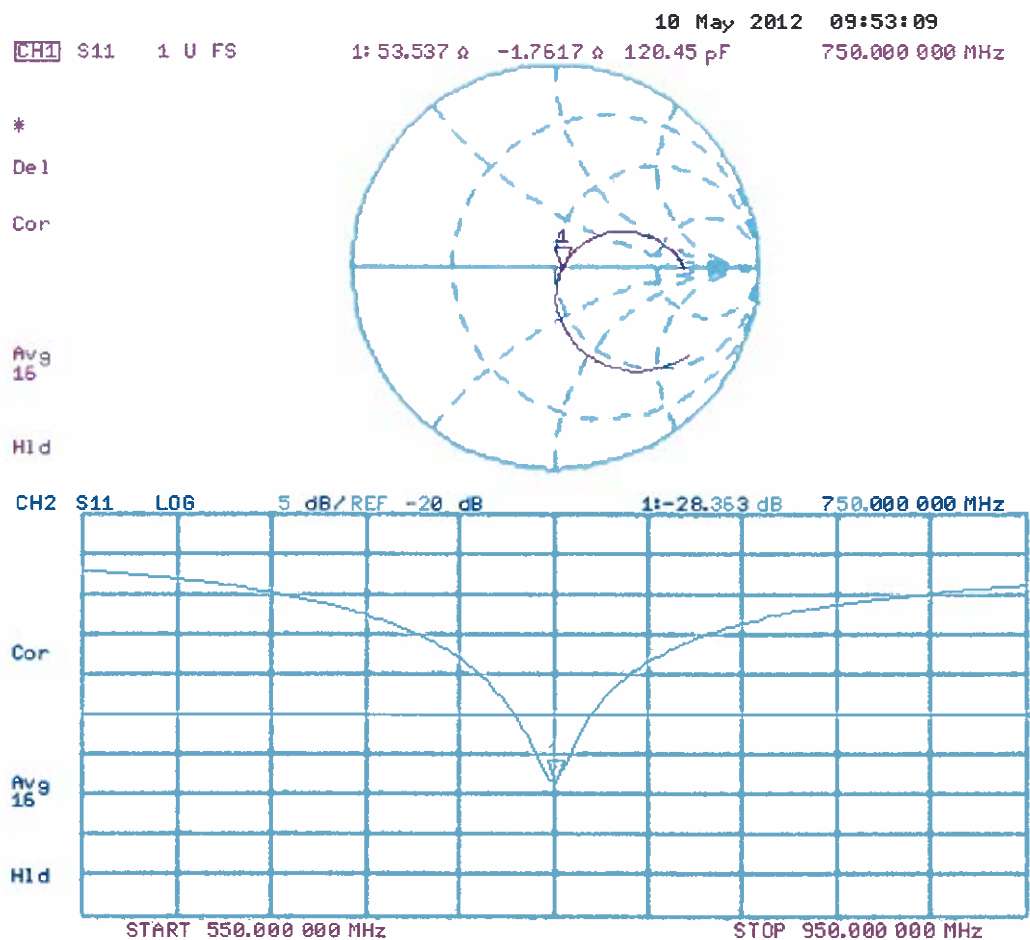
Peak SAR (extrapolated) = 3.259 mW/g

**SAR(1 g) = 2.16 mW/g; SAR(10 g) = 1.41 mW/g**

Maximum value of SAR (measured) = 2.52 mW/g



## Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 10.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1057**

Communication System: CW; Frequency: 750 MHz

Medium parameters used:  $f = 750$  MHz;  $\sigma = 0.96$  mho/m;  $\epsilon_r = 55.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.12, 6.12, 6.12); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

### Dipole Calibration for Body Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

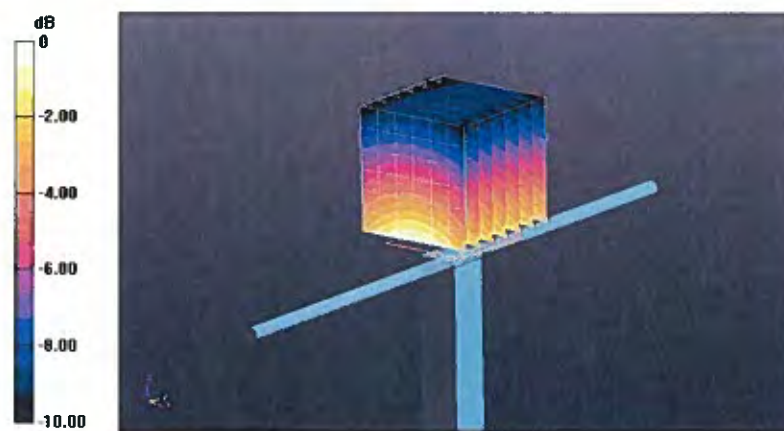
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 52.836 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 3.299 mW/g

**SAR(1 g) = 2.21 mW/g; SAR(10 g) = 1.46 mW/g**

Maximum value of SAR (measured) = 2.59 mW/g

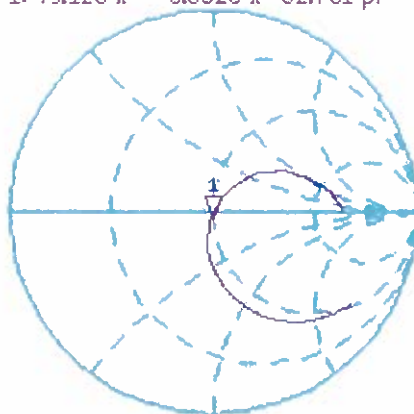


0 dB = 2.59 mW/g = 8.27 dB mW/g

## Impedance Measurement Plot for Body TSL

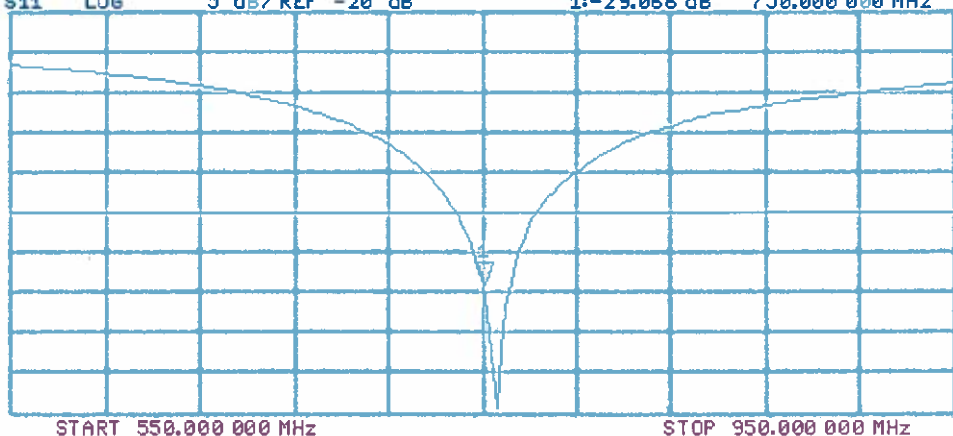
10 May 2012 12:47:21  
CH1 S11 1 U FS 1: 49.125  $\Omega$  -3.3828  $\Omega$  62.731 pF 750.000 000 MHz

\*  
De1  
Cor  
Avg  
16  
H1 d



CH2 S11 LOG 5 dB/REF -20 dB 1: -29.066 dB 750.000 000 MHz

Cor  
Avg  
16  
H1 d





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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Nokia SD**

Certificate No: **D750V3-1010\_Feb12**

## CALIBRATION CERTIFICATE

Object **D750V3 - SN: 1010**

Calibration procedure(s) **QA CAL-05.v8**  
**Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **February 09, 2012**

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 (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 05-Oct-11 (No. 217-01451)         | Oct-12                 |
| Power sensor HP 8481A       | US37292783         | 05-Oct-11 (No. 217-01451)         | Oct-12                 |
| Reference 20 dB Attenuator  | SN: 5086 (20g)     | 29-Mar-11 (No. 217-01368)         | Apr-12                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 29-Mar-11 (No. 217-01371)         | Apr-12                 |
| Reference Probe ES3DV3      | SN: 3205           | 30-Dec-11 (No. ES3-3205_Dec11)    | Dec-12                 |
| DAE4                        | SN: 601            | 04-Jul-11 (No. DAE4-601_Jul11)    | Jul-12                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06     | 100005             | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-11) | In house check: Oct-12 |

Calibrated by: **Israe El-Naouq** **Israe El-Naouq**  
 Name **Israe El-Naouq** Function **Laboratory Technician**

Approved by: **Katja Pokovic** **Katja Pokovic**  
 Name **Katja Pokovic** Function **Technical Manager**

Issued: February 9, 2012

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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:**

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

**Additional Documentation:**

- d) DASY4/5 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.

|                                     |                        |             |
|-------------------------------------|------------------------|-------------|
| <b>DASY Version</b>                 | DASY5                  | V52.8.0     |
| <b>Extrapolation</b>                | Advanced Extrapolation |             |
| <b>Phantom</b>                      | Modular Flat Phantom   |             |
| <b>Distance Dipole Center - TSL</b> | 15 mm                  | with Spacer |
| <b>Zoom Scan Resolution</b>         | dx, dy, dz = 5 mm      |             |
| <b>Frequency</b>                    | 750 MHz $\pm$ 1 MHz    |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Head TSL parameters</b>             | 22.0 °C             | 41.9           | 0.89 mho/m           |
| <b>Measured Head TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 42.3 $\pm$ 6 % | 0.92 mho/m $\pm$ 6 % |
| <b>Head TSL temperature change during test</b> | < 0.5 °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 | 2.18 mW / g                                      |
| SAR for nominal Head TSL parameters                         | normalized to 1W   | <b>8.52 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 | 1.42 mW / g                                      |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>5.57 mW / g <math>\pm</math> 16.5 % (k=2)</b> |

## Body TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Body TSL parameters</b>             | 22.0 °C             | 55.5           | 0.96 mho/m           |
| <b>Measured Body TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 55.6 $\pm$ 6 % | 0.96 mho/m $\pm$ 6 % |
| <b>Body TSL temperature change during test</b> | < 0.5 °C            | ----           | ----                 |

## SAR result with Body TSL

|                                                             |                    |                                                  |
|-------------------------------------------------------------|--------------------|--------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Body TSL</b> | Condition          |                                                  |
| SAR measured                                                | 250 mW input power | 2.22 mW / g                                      |
| SAR for nominal Body TSL parameters                         | normalized to 1W   | <b>8.88 mW / g <math>\pm</math> 17.0 % (k=2)</b> |

|                                                               |                    |                                                  |
|---------------------------------------------------------------|--------------------|--------------------------------------------------|
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Body TSL</b> | condition          |                                                  |
| SAR measured                                                  | 250 mW input power | 1.47 mW / g                                      |
| SAR for nominal Body TSL parameters                           | normalized to 1W   | <b>5.88 mW / g <math>\pm</math> 16.5 % (k=2)</b> |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.6 $\Omega$ + 0.0 j $\Omega$ |
| Return Loss                          | - 29.1 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 48.9 $\Omega$ - 3.0 j $\Omega$ |
| Return Loss                          | - 29.7 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.036 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 | September 29, 2009 |

## DASY5 Validation Report for Head TSL

Date: 09.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1010**

Communication System: CW; Frequency: 750 MHz

Medium parameters used:  $f = 750$  MHz;  $\sigma = 0.92$  mho/m;  $\epsilon_r = 42.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.33, 6.33, 6.33); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

**Dipole Calibration for Head Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:**

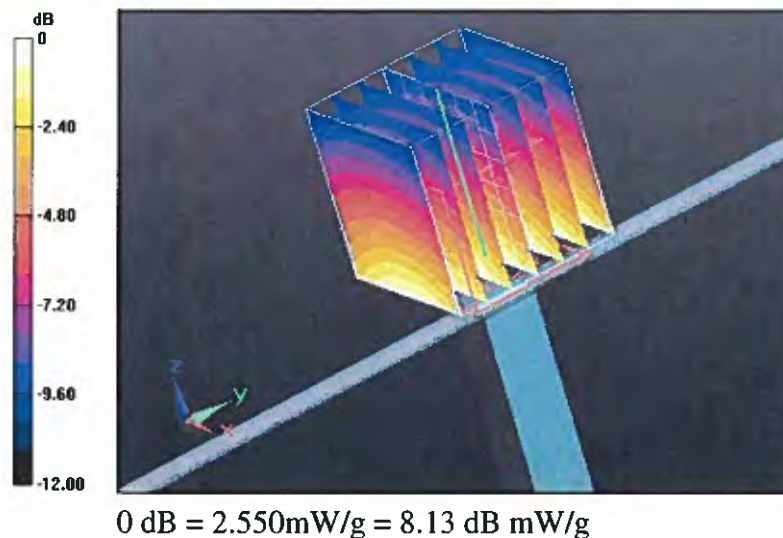
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.903 V/m; Power Drift = 0.02 dB

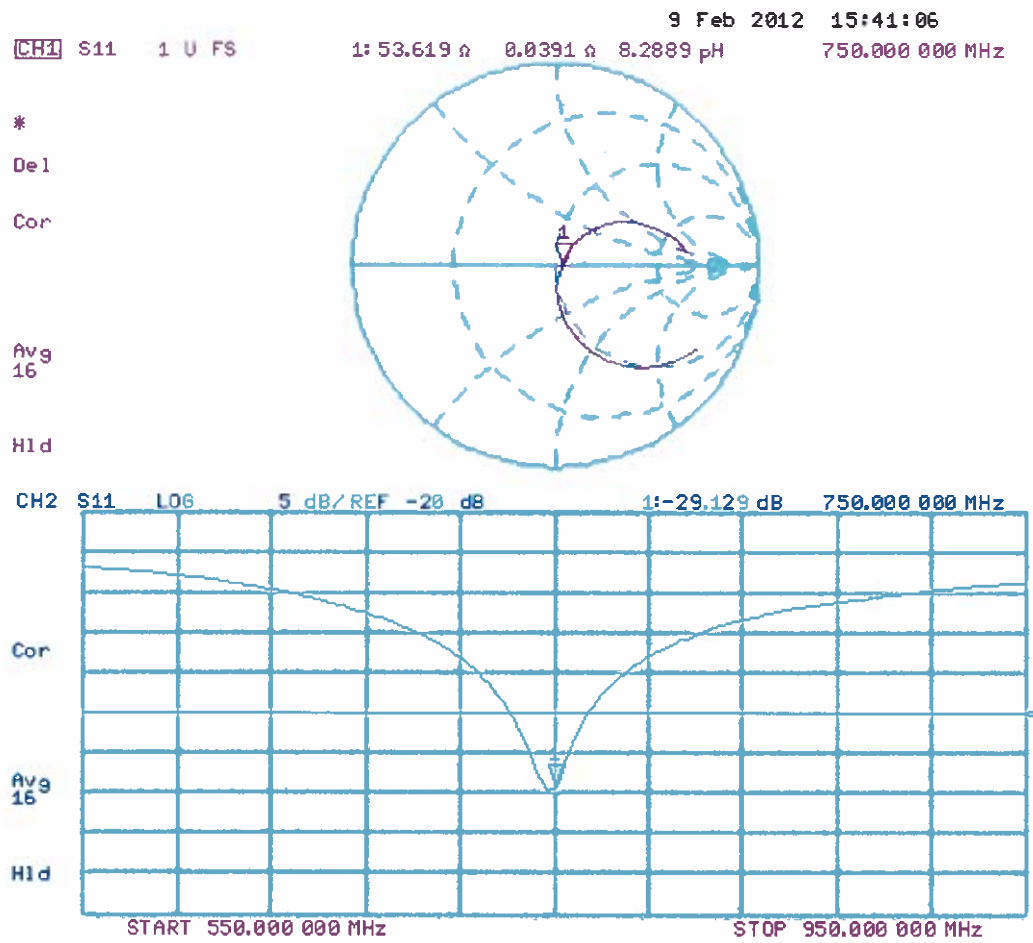
Peak SAR (extrapolated) = 3.2910

**SAR(1 g) = 2.18 mW/g; SAR(10 g) = 1.42 mW/g**

Maximum value of SAR (measured) = 2.553 mW/g



## Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 09.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1010**

Communication System: CW; Frequency: 750 MHz

Medium parameters used:  $f = 750 \text{ MHz}$ ;  $\sigma = 0.96 \text{ mho/m}$ ;  $\epsilon_r = 55.6$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.12, 6.12, 6.12); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

### Dipole Calibration for Body Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

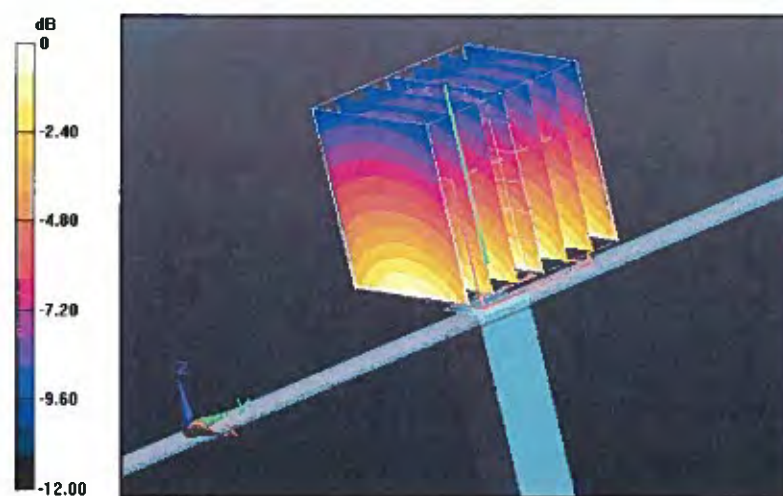
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 53.292 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 3.2950

**SAR(1 g) = 2.22 mW/g; SAR(10 g) = 1.47 mW/g**

Maximum value of SAR (measured) = 2.588 mW/g

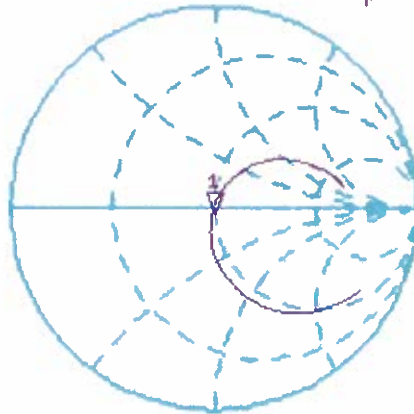


0 dB = 2.590mW/g = 8.27 dB mW/g

## Impedance Measurement Plot for Body TSL

9 Feb 2012 12:49:11  
CH1 S11 1 U FS 1: 48.867  $\Omega$  -3.0371  $\Omega$  69.871 pF 750.000 000 MHz

\*  
De1  
Cor



Avg  
16

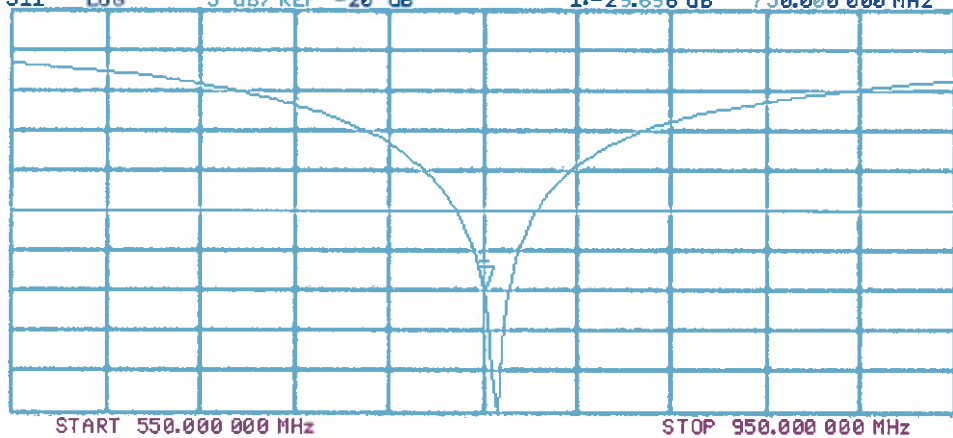
H1 d

CH2 S11 LOG 5 dB/REF -20 dB 1:-29.696 dB 750.000 000 MHz

Cor

Avg  
16

H1 d



7022

**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

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Accreditation No.: **SCS 108**

Client **Nokia SD**

Certificate No: **D835V2-4d040\_Sep12**

## CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d040**

Calibration procedure(s) **QA CAL-05.v8**  
**Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **September 12, 2012**

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 (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 05-Oct-11 (No. 217-01451)         | Oct-12                 |
| Power sensor HP 8481A       | US37292783         | 05-Oct-11 (No. 217-01451)         | Oct-12                 |
| Reference 20 dB Attenuator  | SN: 5058 (20k)     | 27-Mar-12 (No. 217-01530)         | Apr-13                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 27-Mar-12 (No. 217-01533)         | Apr-13                 |
| Reference Probe ES3DV3      | SN: 3205           | 30-Dec-11 (No. ES3-3205_Dec11)    | Dec-12                 |
| DAE4                        | SN: 601            | 27-Jun-12 (No. DAE4-601_Jun12)    | Jun-13                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06     | 100005             | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-11) | In house check: Oct-12 |

Calibrated by: **Jeton Kastrati** Name **Laboratory Technician** Function

Approved by: **Katja Pokovic** Name **Technical Manager** Function

**Signature**

*[Signature]*

*[Signature]*

Issued: September 12, 2012

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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:**

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

**Additional Documentation:**

- d) DASY4/5 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.

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%.

## Measurement Conditions

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

|                              |                        |             |
|------------------------------|------------------------|-------------|
| DASY Version                 | DASY5                  | V52.8.2     |
| Extrapolation                | Advanced Extrapolation |             |
| Phantom                      | Modular Flat Phantom   |             |
| Distance Dipole Center - TSL | 15 mm                  | with Spacer |
| 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 | 41.0 $\pm$ 6 % | 0.90 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | < 0.5 °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 | 2.38 mW / g                    |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 9.49 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 | 1.56 mW / g                    |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 6.23 mW / g $\pm$ 16.5 % (k=2) |

## 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 $\pm$ 0.2) °C | 53.3 $\pm$ 6 % | 1.00 mho/m $\pm$ 6 % |
| Body TSL temperature change during test | < 0.5 °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 for nominal Body TSL parameters                   | normalized to 1W   | 9.50 mW / g $\pm$ 17.0 % (k=2) |

|                                                         |                    |                                |
|---------------------------------------------------------|--------------------|--------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                |
| SAR measured                                            | 250 mW input power | 1.61 mW / g                    |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 6.29 mW / g $\pm$ 16.5 % (k=2) |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.7 $\Omega$ - 3.8 j $\Omega$ |
| Return Loss                          | - 28.3 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 47.1 $\Omega$ - 5.0 j $\Omega$ |
| Return Loss                          | - 24.5 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.393 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 | September 20, 2005 |

## DASY5 Validation Report for Head TSL

Date: 12.09.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d040**

Communication System: CW; Frequency: 835 MHz

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.9$  mho/m;  $\epsilon_r = 41$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

### **Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm 2/Zoom Scan (7x7x7)/Cube 0:**

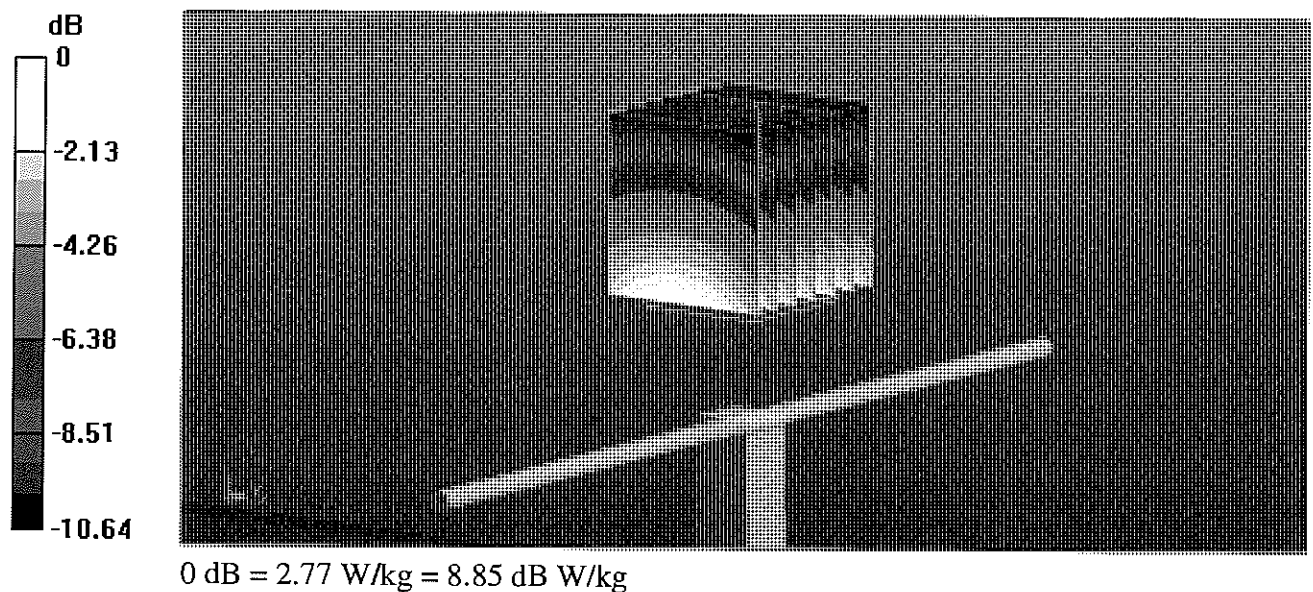
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.255 V/m; Power Drift = -0.01 dB

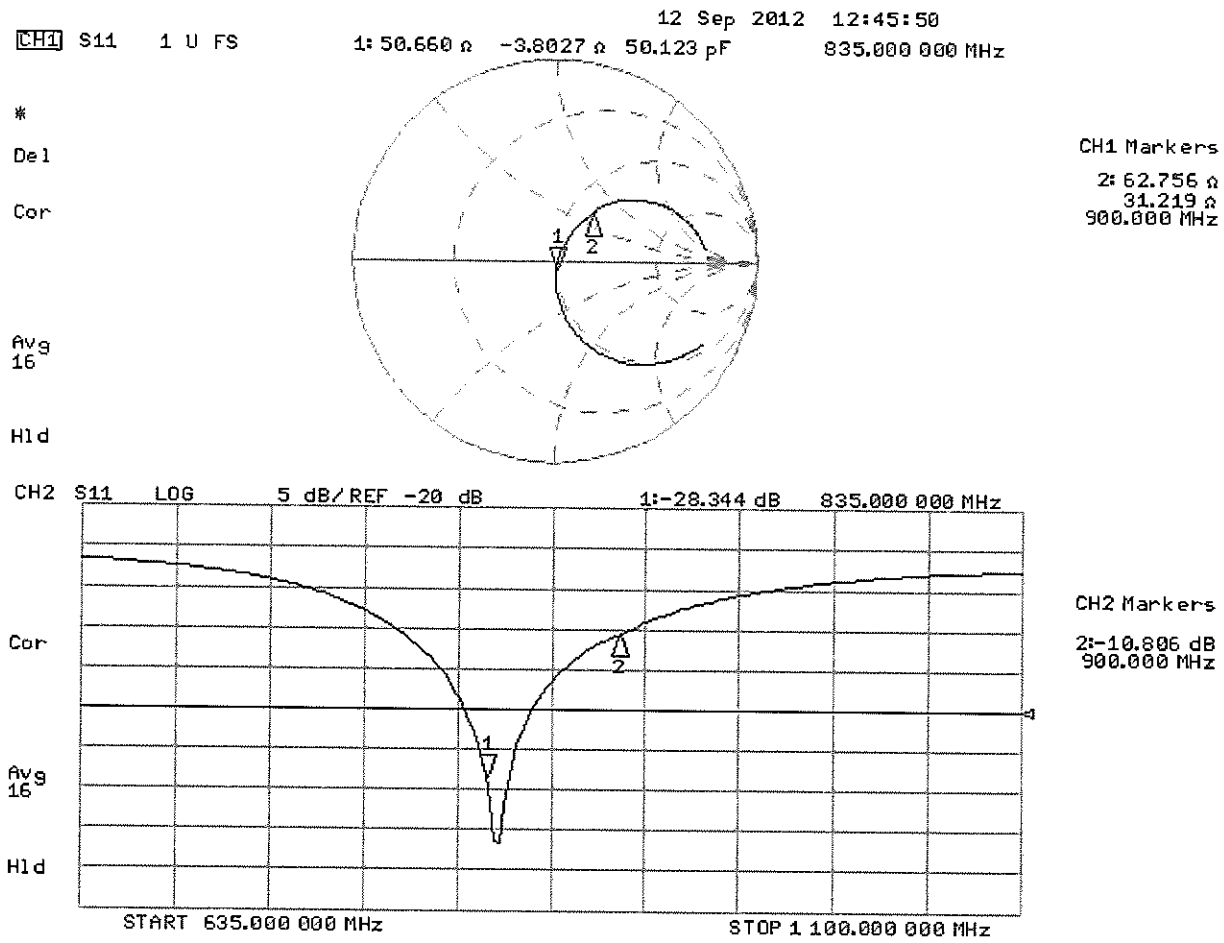
Peak SAR (extrapolated) = 3.512 mW/g

**SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.56 mW/g**

Maximum value of SAR (measured) = 2.77 W/kg



Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 12.09.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d040**

Communication System: CW; Frequency: 835 MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 1 \text{ mho/m}$ ;  $\epsilon_r = 53.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

### **Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:**

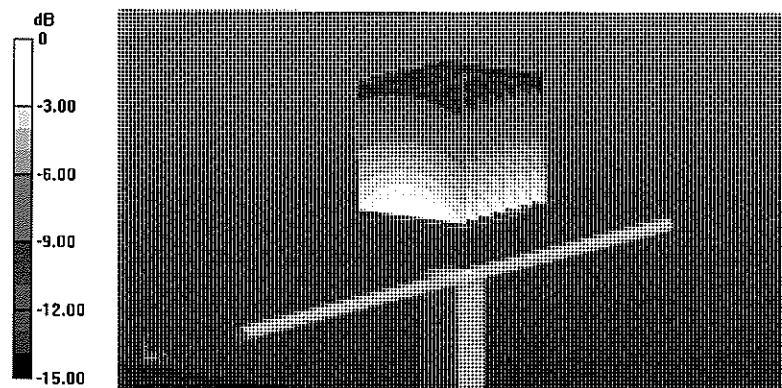
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 55.248 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.563 mW/g

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

Maximum value of SAR (measured) = 2.85 W/kg

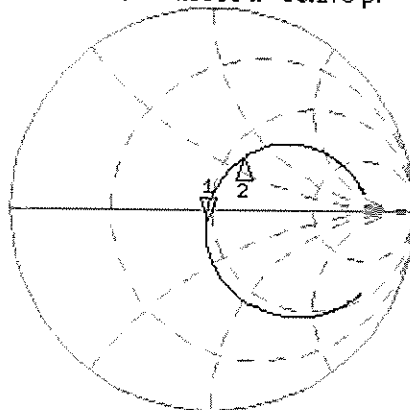


0 dB = 2.85 W/kg = 9.10 dB W/kg

# Impedance Measurement Plot for Body TSL

CH1 S11 1 U FS 12 Sep 2012 08:55:25  
 1: 47.088  $\Omega$  -4.9805  $\Omega$  38.270 pF 835.000 000 MHz

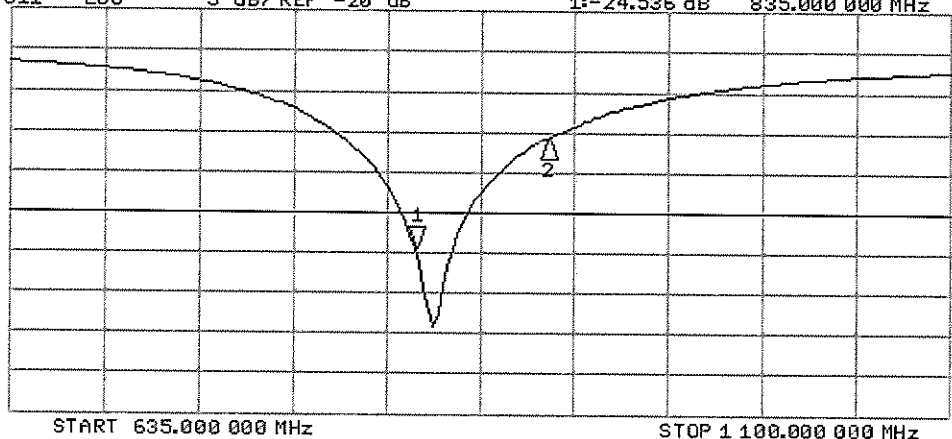
\*  
 Del  
 Cor  
 Avg  
 16  
 H1d



CH1 Markers  
 2: 58.117  $\Omega$   
 31.316  $\Omega$   
 900.000 MHz

CH2 S11 LOG 5 dB/REF -20 dB 1: -24.536 dB 835.000 000 MHz

Cor  
 Avg  
 16  
 H1d



CH2 Markers  
 2: -10.830 dB  
 900.000 MHz

ASSET 6987

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 Zeughausstrasse 43, 8004 Zurich, Switzerland



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 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Nokia SD**

Certificate No: **D835V2-487\_Feb12**

## CALIBRATION CERTIFICATE

Object **D835V2 - SN: 487**

Calibration procedure(s) **QA CAL-05.v8**  
**Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **February 17, 2012**

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 (Certificate No.)     | Scheduled Calibration |
|-----------------------------|--------------------|--------------------------------|-----------------------|
| Power meter EPM-442A        | GB37480704         | 05-Oct-11 (No. 217-01451)      | Oct-12                |
| Power sensor HP 8481A       | US37292783         | 05-Oct-11 (No. 217-01451)      | Oct-12                |
| Reference 20 dB Attenuator  | SN: 5086 (20g)     | 29-Mar-11 (No. 217-01368)      | Apr-12                |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 29-Mar-11 (No. 217-01371)      | Apr-12                |
| Reference Probe ES3DV3      | SN: 3205           | 30-Dec-11 (No. ES3-3205_Dec11) | Dec-12                |
| DAE4                        | SN: 601            | 04-Jul-11 (No. DAE4-601_Jul11) | Jul-12                |

| Secondary Standards       | ID #             | Check Date (in house)             | Scheduled Check        |
|---------------------------|------------------|-----------------------------------|------------------------|
| Power sensor HP 8481A     | MY41092317       | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06   | 100005           | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-11) | In house check: Oct-12 |

|                |                |                       |           |
|----------------|----------------|-----------------------|-----------|
|                | Name           | Function              | Signature |
| Calibrated by: | Israe El-Naouq | Laboratory Technician |           |
| Approved by:   | Katja Pokovic  | Technical Manager     |           |

Issued: February 17, 2012

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

## DASY5 Validation Report for Head TSL

Date: 17.02.2012

Test Laboratory: The name of your organization

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 487**

Communication System: CW; Frequency: 835 MHz

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.89$  mho/m;  $\epsilon_r = 41$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

### Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

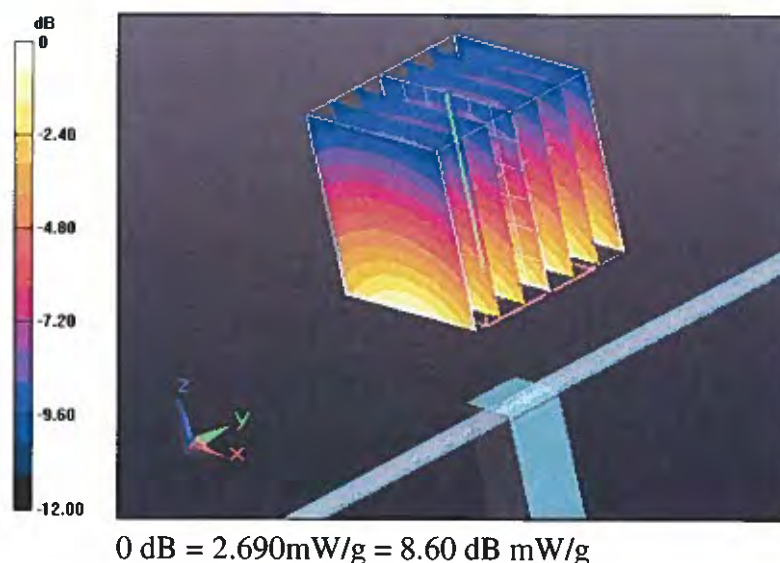
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.945 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.4020

**SAR(1 g) = 2.31 mW/g; SAR(10 g) = 1.51 mW/g**

Maximum value of SAR (measured) = 2.691 mW/g



## DASY5 Validation Report for Body TSL

Date: 17.02.2012

Test Laboratory: The name of your organization

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 487**

Communication System: CW; Frequency: 835 MHz

Medium parameters used:  $f = 835$  MHz;  $\sigma = 1.01$  mho/m;  $\epsilon_r = 55.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

### Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

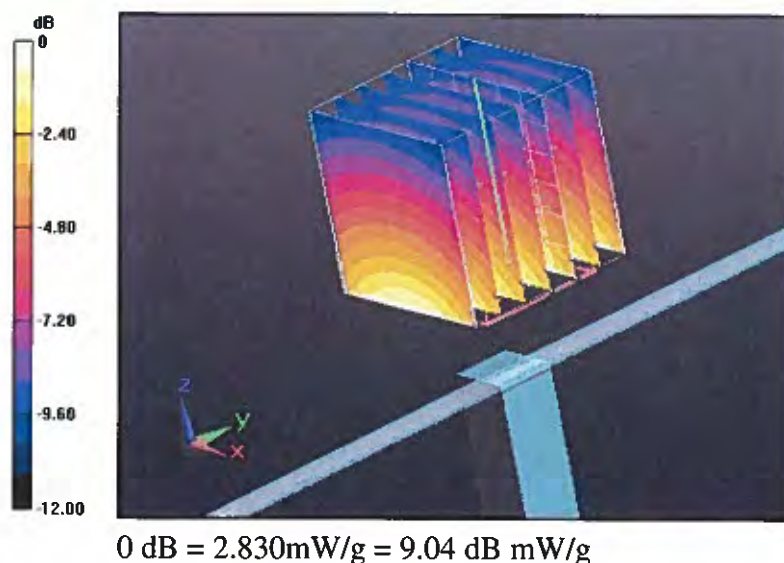
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.922 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.5200

**SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g**

Maximum value of SAR (measured) = 2.833 mW/g





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Accreditation No.: **SCS 108**

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Multilateral Agreement for the recognition of calibration certificates

Client **Nokia SD**

Certificate No: **D1750V2-1080\_Dec12**

## CALIBRATION CERTIFICATE

Object **D1750V2 - SN: 1080**

Calibration procedure(s) **QA CAL-05.v8**  
**Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **December 05, 2012**

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 (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 01-Nov-12 (No. 217-01640)         | Oct-13                 |
| Power sensor HP 8481A       | US37292783         | 01-Nov-12 (No. 217-01640)         | Oct-13                 |
| Reference 20 dB Attenuator  | SN: 5058 (20k)     | 27-Mar-12 (No. 217-01530)         | Apr-13                 |
| Type-N mismatch combination | SN: 5047.3 / 06327 | 27-Mar-12 (No. 217-01533)         | Apr-13                 |
| Reference Probe ES3DV3      | SN: 3205           | 30-Dec-11 (No. ES3-3205_Dec11)    | Dec-12                 |
| DAE4                        | SN: 601            | 27-Jun-12 (No. DAE4-601_Jun12)    | Jun-13                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06     | 100005             | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-12) | In house check: Oct-13 |

Calibrated by: **Israe El-Naouq**      Name: **Israe El-Naouq**      Function: **Laboratory Technician**

Approved by: **Katja Pokovic**      Name: **Katja Pokovic**      Function: **Technical Manager**

Signature

Issued: December 5, 2012

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Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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**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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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:**

- DASY4/5 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.

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%.

## Measurement Conditions

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

|                              |                        |             |
|------------------------------|------------------------|-------------|
| DASY Version                 | DASY5                  | V52.8.3     |
| Extrapolation                | Advanced Extrapolation |             |
| Phantom                      | Modular Flat Phantom   |             |
| Distance Dipole Center - TSL | 10 mm                  | with Spacer |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm      |             |
| Frequency                    | 1750 MHz $\pm$ 1 MHz   |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters             | 22.0 °C             | 40.1           | 1.37 mho/m           |
| Measured Head TSL parameters            | (22.0 $\pm$ 0.2) °C | 39.3 $\pm$ 6 % | 1.34 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | < 0.5 °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 | 9.02 W/kg                    |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 36.4 W/kg $\pm$ 17.0 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                              |
| SAR measured                                            | 250 mW input power | 4.81 W/kg                    |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 19.4 W/kg $\pm$ 16.5 % (k=2) |

## Body TSL parameters

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Body TSL parameters             | 22.0 °C             | 53.4           | 1.49 mho/m           |
| Measured Body TSL parameters            | (22.0 $\pm$ 0.2) °C | 51.8 $\pm$ 6 % | 1.47 mho/m $\pm$ 6 % |
| Body TSL temperature change during test | < 0.5 °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 | 9.45 W/kg                    |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 37.9 W/kg $\pm$ 17.0 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                              |
| SAR measured                                            | 250 mW input power | 5.07 W/kg                    |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 20.3 W/kg $\pm$ 16.5 % (k=2) |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.1 $\Omega$ - 0.1 j $\Omega$ |
| Return Loss                          | - 58.4 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 46.3 $\Omega$ + 0.0 j $\Omega$ |
| Return Loss                          | - 28.3 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.218 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 | January 19, 2011 |

## DASY5 Validation Report for Head TSL

Date: 05.12.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1080**

Communication System: CW; Frequency: 1750 MHz

Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.34$  mho/m;  $\epsilon_r = 39.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.22, 5.22, 5.22); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

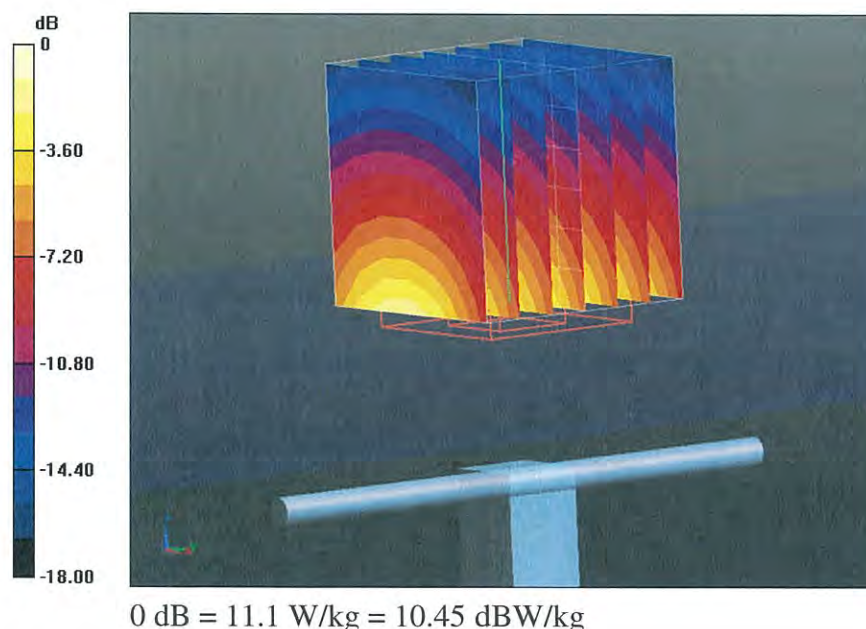
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.874 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 16.0 W/kg

**SAR(1 g) = 9.02 W/kg; SAR(10 g) = 4.81 W/kg**

Maximum value of SAR (measured) = 11.1 W/kg



## Impedance Measurement Plot for Head TSL

5 Dec 2012 10:35:10  
[CH1] S11 1 U FS 1: 50.070  $\Omega$  -107.42 m $\Omega$  846.62 pF 1 750.000 000 MHz

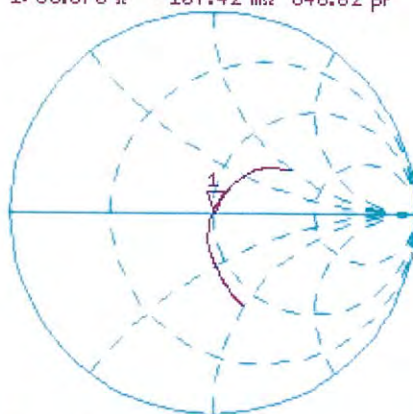
\*

De1

Cor

Avg  
16

H1d

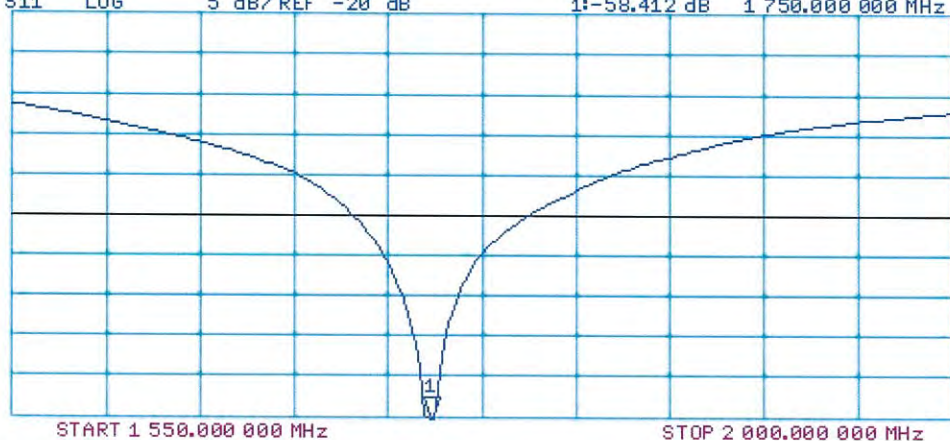


CH2 S11 LOG 5 dB/REF -20 dB 1:-58.412 dB 1 750.000 000 MHz

Cor

Avg  
16

H1d



## DASY5 Validation Report for Body TSL

Date: 05.12.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1080**

Communication System: CW; Frequency: 1750 MHz

Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 51.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.85, 4.85, 4.85); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

**Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

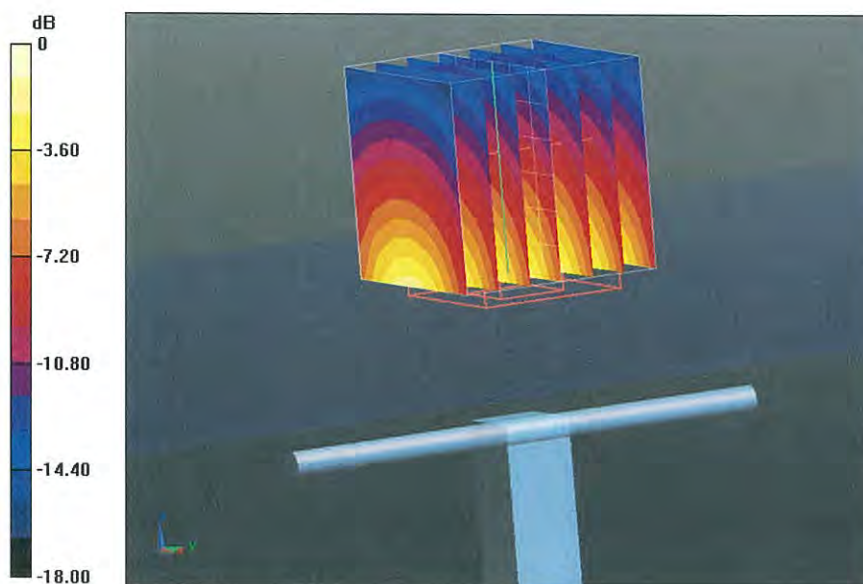
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.874 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 16.3 W/kg

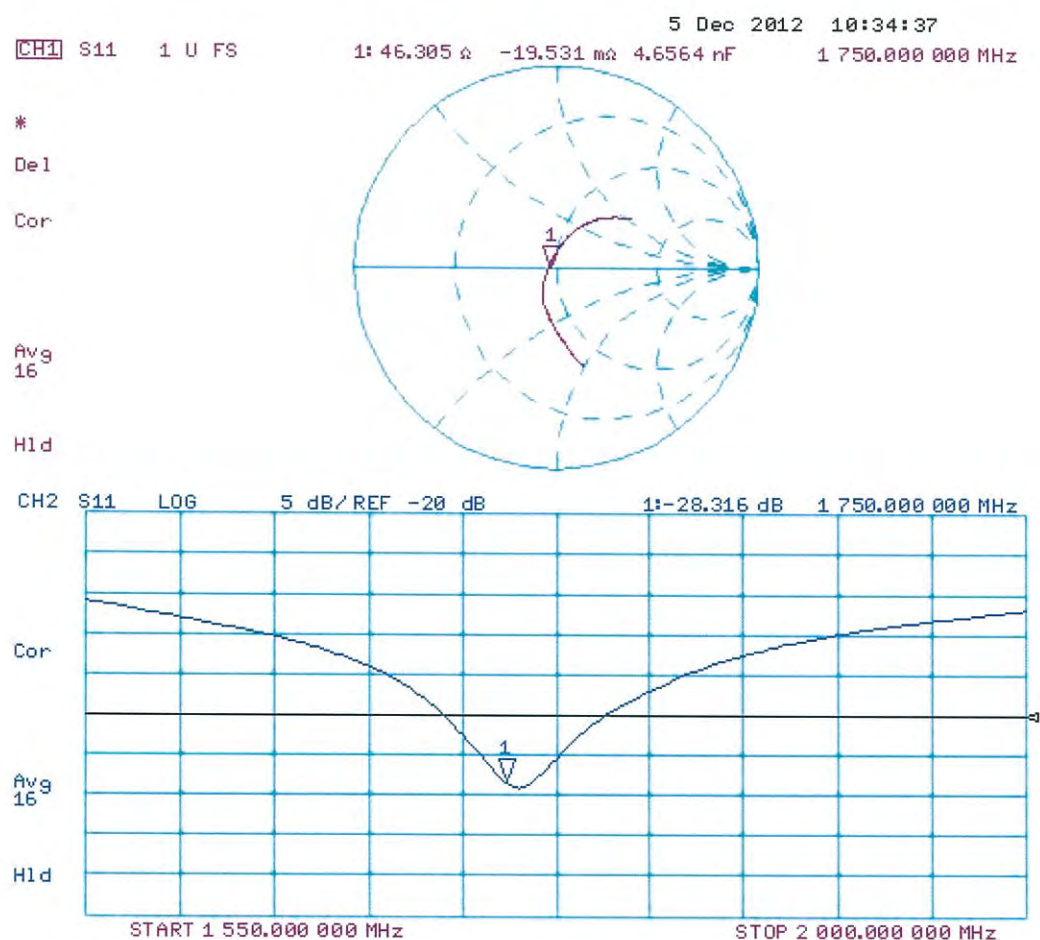
**SAR(1 g) = 9.45 W/kg; SAR(10 g) = 5.07 W/kg**

Maximum value of SAR (measured) = 11.7 W/kg



0 dB = 11.7 W/kg = 10.68 dBW/kg

## Impedance Measurement Plot for Body TSL





**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

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Nokia SD**

Certificate No: **D1750V2-1081\_Dec12**

## CALIBRATION CERTIFICATE

Object **D1750V2 - SN: 1081**

Calibration procedure(s) **QA CAL-05.v8**  
**Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **December 05, 2012**

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 (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 01-Nov-12 (No. 217-01640)         | Oct-13                 |
| Power sensor HP 8481A       | US37292783         | 01-Nov-12 (No. 217-01640)         | Oct-13                 |
| Reference 20 dB Attenuator  | SN: 5058 (20k)     | 27-Mar-12 (No. 217-01530)         | Apr-13                 |
| Type-N mismatch combination | SN: 5047.3 / 06327 | 27-Mar-12 (No. 217-01533)         | Apr-13                 |
| Reference Probe ES3DV3      | SN: 3205           | 30-Dec-11 (No. ES3-3205_Dec11)    | Dec-12                 |
| DAE4                        | SN: 601            | 27-Jun-12 (No. DAE4-601_Jun12)    | Jun-13                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06     | 100005             | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-12) | In house check: Oct-13 |

Calibrated by: **Israe El-Naouq**      Name: **Israe El-Naouq**      Function: **Laboratory Technician**

Approved by: **Katja Pokovic**      Name: **Katja Pokovic**      Function: **Technical Manager**

Signature  
  


Issued: December 5, 2012

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Multilateral Agreement for the recognition of calibration certificates

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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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:**

- DASY4/5 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.

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%.

## Measurement Conditions

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

|                              |                        |             |
|------------------------------|------------------------|-------------|
| DASY Version                 | DASY5                  | V52.8.3     |
| Extrapolation                | Advanced Extrapolation |             |
| Phantom                      | Modular Flat Phantom   |             |
| Distance Dipole Center - TSL | 10 mm                  | with Spacer |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm      |             |
| Frequency                    | 1750 MHz $\pm$ 1 MHz   |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters             | 22.0 °C             | 40.1           | 1.37 mho/m           |
| Measured Head TSL parameters            | (22.0 $\pm$ 0.2) °C | 39.3 $\pm$ 6 % | 1.34 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | < 0.5 °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 | 9.04 W/kg                    |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 36.5 W/kg $\pm$ 17.0 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                              |
| SAR measured                                            | 250 mW input power | 4.82 W/kg                    |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 19.4 W/kg $\pm$ 16.5 % (k=2) |

## Body TSL parameters

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Body TSL parameters             | 22.0 °C             | 53.4           | 1.49 mho/m           |
| Measured Body TSL parameters            | (22.0 $\pm$ 0.2) °C | 51.8 $\pm$ 6 % | 1.47 mho/m $\pm$ 6 % |
| Body TSL temperature change during test | < 0.5 °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 | 9.31 W/kg                    |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 37.3 W/kg $\pm$ 17.0 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                              |
| SAR measured                                            | 250 mW input power | 5.00 W/kg                    |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 20.0 W/kg $\pm$ 16.5 % (k=2) |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 49.4 $\Omega$ - 0.2 j $\Omega$ |
| Return Loss                          | - 44.2 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 45.6 $\Omega$ + 0.2 j $\Omega$ |
| Return Loss                          | - 26.8 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.218 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 | January 19, 2011 |

## DASY5 Validation Report for Head TSL

Date: 05.12.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1081**

Communication System: CW; Frequency: 1750 MHz

Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.34$  mho/m;  $\epsilon_r = 39.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.22, 5.22, 5.22); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

### **Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

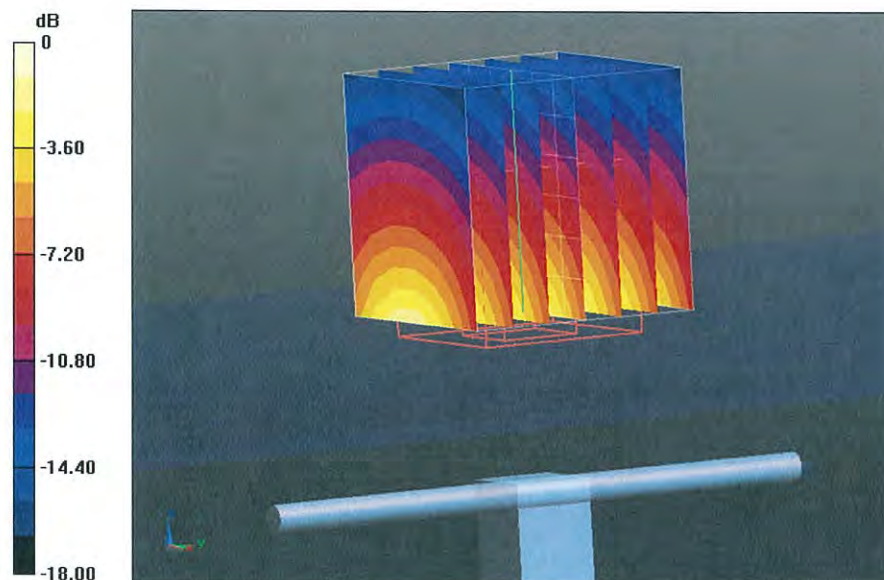
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.123 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 16.1 W/kg

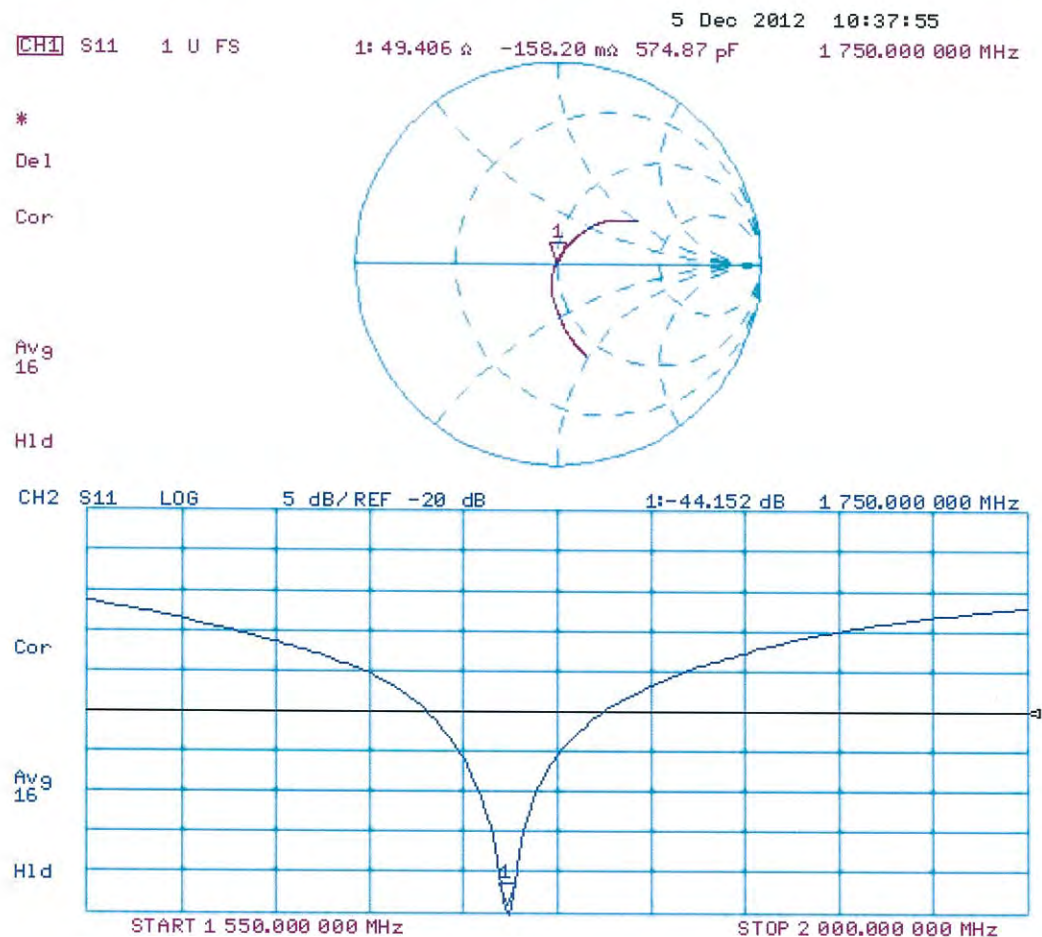
**SAR(1 g) = 9.04 W/kg; SAR(10 g) = 4.82 W/kg**

Maximum value of SAR (measured) = 11.1 W/kg



0 dB = 11.1 W/kg = 10.45 dBW/kg

# Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 05.12.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1081**

Communication System: CW; Frequency: 1750 MHz

Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 51.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.85, 4.85, 4.85); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

**Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

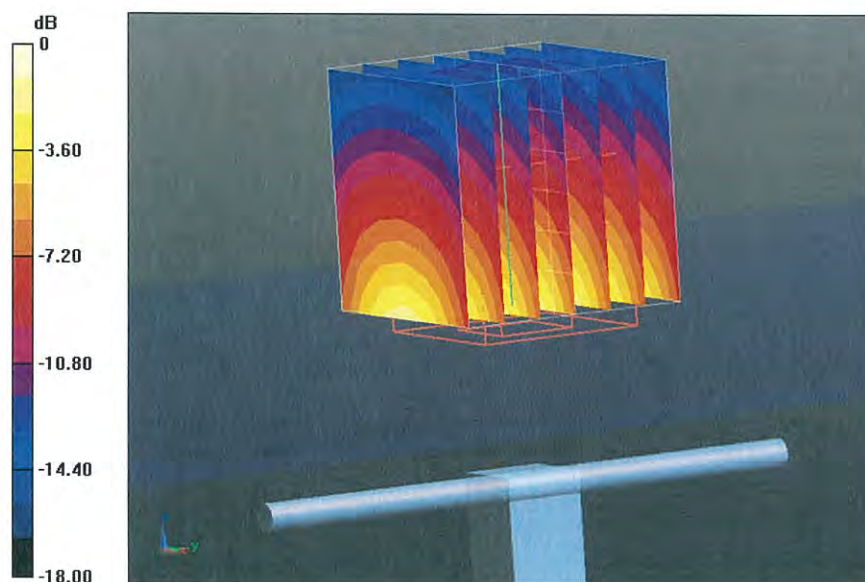
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.123 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 16.1 W/kg

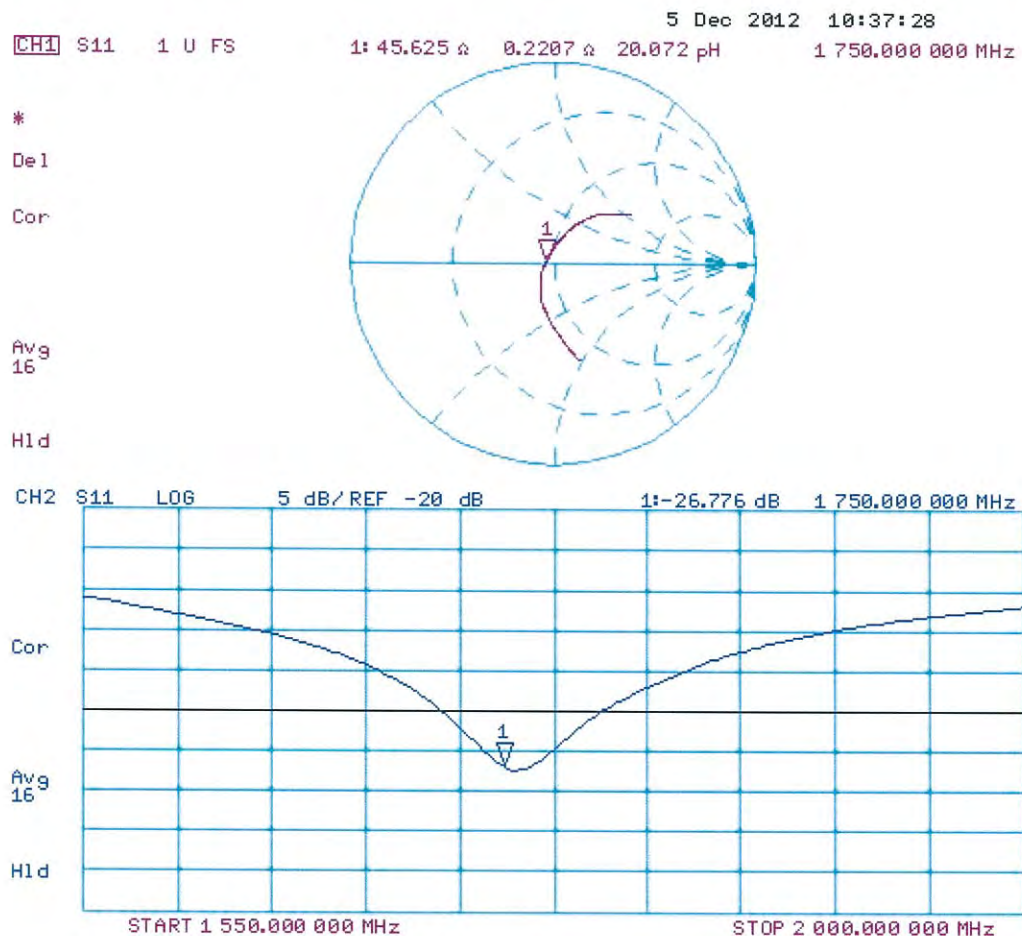
**SAR(1 g) = 9.31 W/kg; SAR(10 g) = 5 W/kg**

Maximum value of SAR (measured) = 11.7 W/kg



0 dB = 11.7 W/kg = 10.68 dBW/kg

## Impedance Measurement Plot for Body TSL



6048

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



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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Nokia SD**

Certificate No: **D1900V2-534\_Sep12**

## CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 534**

Calibration procedure(s) **QA CAL-05.v8**  
 Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **September 14, 2012**

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 (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 05-Oct-11 (No. 217-01451)         | Oct-12                 |
| Power sensor HP 8481A       | US37292783         | 05-Oct-11 (No. 217-01451)         | Oct-12                 |
| Reference 20 dB Attenuator  | SN: 5058 (20k)     | 27-Mar-12 (No. 217-01530)         | Apr-13                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 27-Mar-12 (No. 217-01533)         | Apr-13                 |
| Reference Probe ES3DV3      | SN: 3205           | 30-Dec-11 (No. ES3-3205_Dec11)    | Dec-12                 |
| DAE4                        | SN: 601            | 27-Jun-12 (No. DAE4-601_Jun12)    | Jun-13                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06     | 100005             | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-11) | In house check: Oct-12 |

Calibrated by: **Jeton Kastrati** Name: **Jeton Kastrati** Function: **Laboratory Technician**

Approved by: **Katja Pokovic** Technical Manager

Signature

*[Handwritten signature of Jeton Kastrati]*  
*[Handwritten signature of Katja Pokovic]*

Issued: September 14, 2012

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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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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:

- DASY4/5 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.

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%.

## Measurement Conditions

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

|                              |                        |             |
|------------------------------|------------------------|-------------|
| DASY Version                 | DASY5                  | V52.8.2     |
| Extrapolation                | Advanced Extrapolation |             |
| Phantom                      | Modular Flat Phantom   |             |
| Distance Dipole Center - TSL | 10 mm                  | with Spacer |
| 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 | 40.6 $\pm$ 6 % | 1.37 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | < 0.5 °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 | 9.64 mW / g                    |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 39.2 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 | 5.11 mW / g                    |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 20.6 mW / g $\pm$ 16.5 % (k=2) |

## 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 $\pm$ 0.2) °C | 52.5 $\pm$ 6 % | 1.54 mho/m $\pm$ 6 % |
| Body TSL temperature change during test | < 0.5 °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 | 10.1 mW / g                    |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 40.0 mW / g $\pm$ 17.0 % (k=2) |

|                                                         |                    |                                |
|---------------------------------------------------------|--------------------|--------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                |
| SAR measured                                            | 250 mW input power | 5.34 mW / g                    |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 21.2 mW / g $\pm$ 16.5 % (k=2) |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | $52.0\ \Omega + 4.5\ j\Omega$ |
| Return Loss                          | - 26.3 dB                     |

### Antenna Parameters with Body TSL

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | $47.6\ \Omega + 4.5\ j\Omega$ |
| Return Loss                          | - 25.6 dB                     |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.204 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 | January 31, 2001 |

## DASY5 Validation Report for Head TSL

Date: 14.09.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 534**

Communication System: CW; Frequency: 1900 MHz

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.37$  mho/m;  $\epsilon_r = 40.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

### **Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

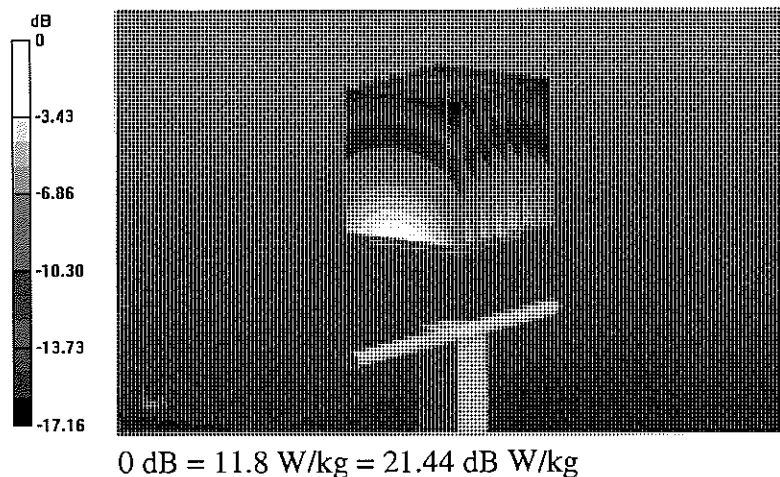
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.550 V/m; Power Drift = 0.02 dB

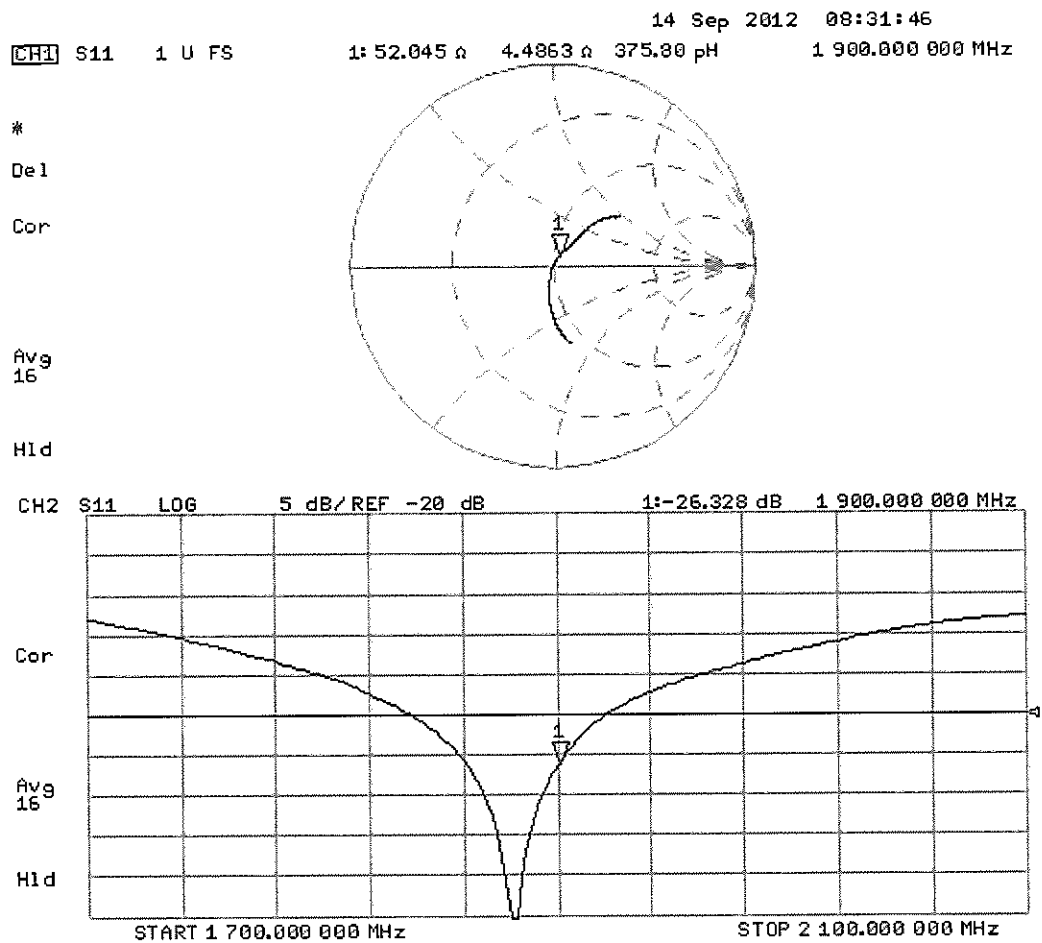
Peak SAR (extrapolated) = 17.069 mW/g

**SAR(1 g) = 9.64 mW/g; SAR(10 g) = 5.11 mW/g**

Maximum value of SAR (measured) = 11.8 W/kg



# Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 14.09.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 534**

Communication System: CW; Frequency: 1900 MHz

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.54$  mho/m;  $\epsilon_r = 52.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

**Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

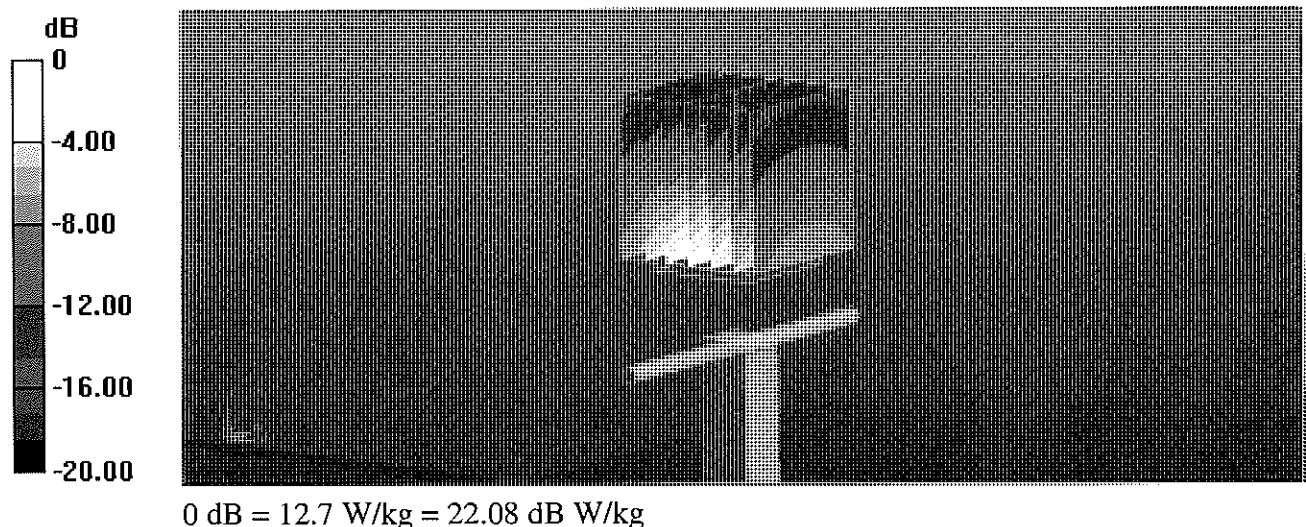
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.550 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 17.586 mW/g

**SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.34 mW/g**

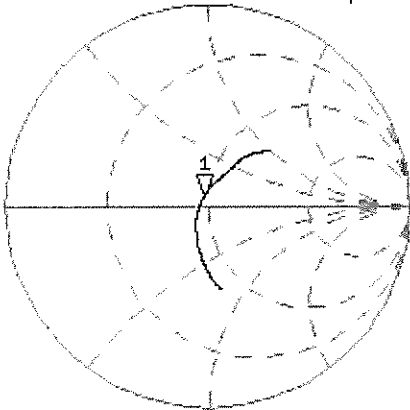
Maximum value of SAR (measured) = 12.7 W/kg



Impedance Measurement Plot for Body TSL

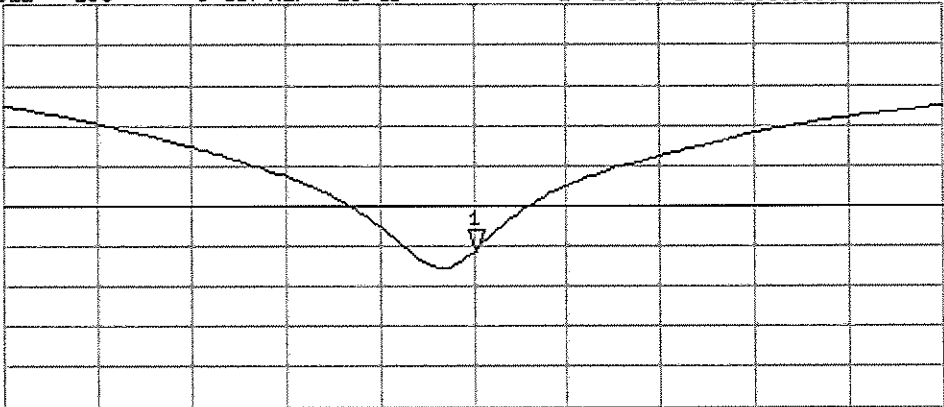
14 Sep 2012 08:31:19  
CH1 S11 1 U FS 1: 47.607  $\Omega$  4.5078  $\Omega$  377.60  $\mu\text{H}$  1 900.000 000 MHz

\*  
De1  
Cor  
Avg  
16  
H1d



CH2 S11 LOG 5 dB/REF -20 dB 1:-25.644 dB 1 900.000 000 MHz

Cor  
Avg  
16  
H1d



START 1 700.000 000 MHz STOP 2 100.000 000 MHz

7324

**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 Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Client **Nokia SD**

Certificate No: **D1900V2-5d099\_Sep11**

## CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d099**

Calibration procedure(s) **QA CAL-05.v8**  
**Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **September 15, 2011**

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 (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 06-Oct-10 (No. 217-01266)         | Oct-11                 |
| Power sensor HP 8481A       | US37292783         | 06-Oct-10 (No. 217-01266)         | Oct-11                 |
| Reference 20 dB Attenuator  | SN: S5086 (20b)    | 29-Mar-11 (No. 217-01367)         | Apr-12                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 29-Mar-11 (No. 217-01371)         | Apr-12                 |
| Reference Probe ES3DV3      | SN: 3205           | 29-Apr-11 (No. ES3-3205_Apr11)    | Apr-12                 |
| DAE4                        | SN: 601            | 04-Jul-11 (No. DAE4-601_Jul11)    | Jul-12                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06     | 100005             | 04-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

Calibrated by: **Dimce Iliev** **Function** **Laboratory Technician** **Signature** *D. Iliev*

Approved by: **Katja Pokovic** **Technical Manager** *K. Pokovic*

Issued: September 15, 2011

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

### 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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:

- DASY4/5 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                 | DASY5                  | V52.6.2     |
| Extrapolation                | Advanced Extrapolation |             |
| Phantom                      | Modular Flat Phantom   |             |
| Distance Dipole Center - TSL | 10 mm                  | with Spacer |
| 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 | 39.6 $\pm$ 6 % | 1.43 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | < 0.5 °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 | 10.1 mW / g                    |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 39.8 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 | 5.26 mW / g                    |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 20.9 mW / g $\pm$ 16.5 % (k=2) |

## 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 $\pm$ 0.2) °C | 54.2 $\pm$ 6 % | 1.59 mho/m $\pm$ 6 % |
| Body TSL temperature change during test | < 0.5 °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 | 10.6 mW / g                    |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 41.4 mW / g $\pm$ 17.0 % (k=2) |

|                                                         |                    |                                |
|---------------------------------------------------------|--------------------|--------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                |
| SAR measured                                            | 250 mW input power | 5.56 mW / g                    |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 22.0 mW / g $\pm$ 16.5 % (k=2) |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.9 $\Omega$ + 6.4 j $\Omega$ |
| Return Loss                          | - 23.9 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 46.3 $\Omega$ + 6.8 j $\Omega$ |
| Return Loss                          | - 22.0 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.203 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 | September 26, 2007 |

## DASY5 Validation Report for Head TSL

Date: 15.09.2011

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d099**

Communication System: CW; Frequency: 1900 MHz

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 39.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.201 V/m; Power Drift = 0.03 dB

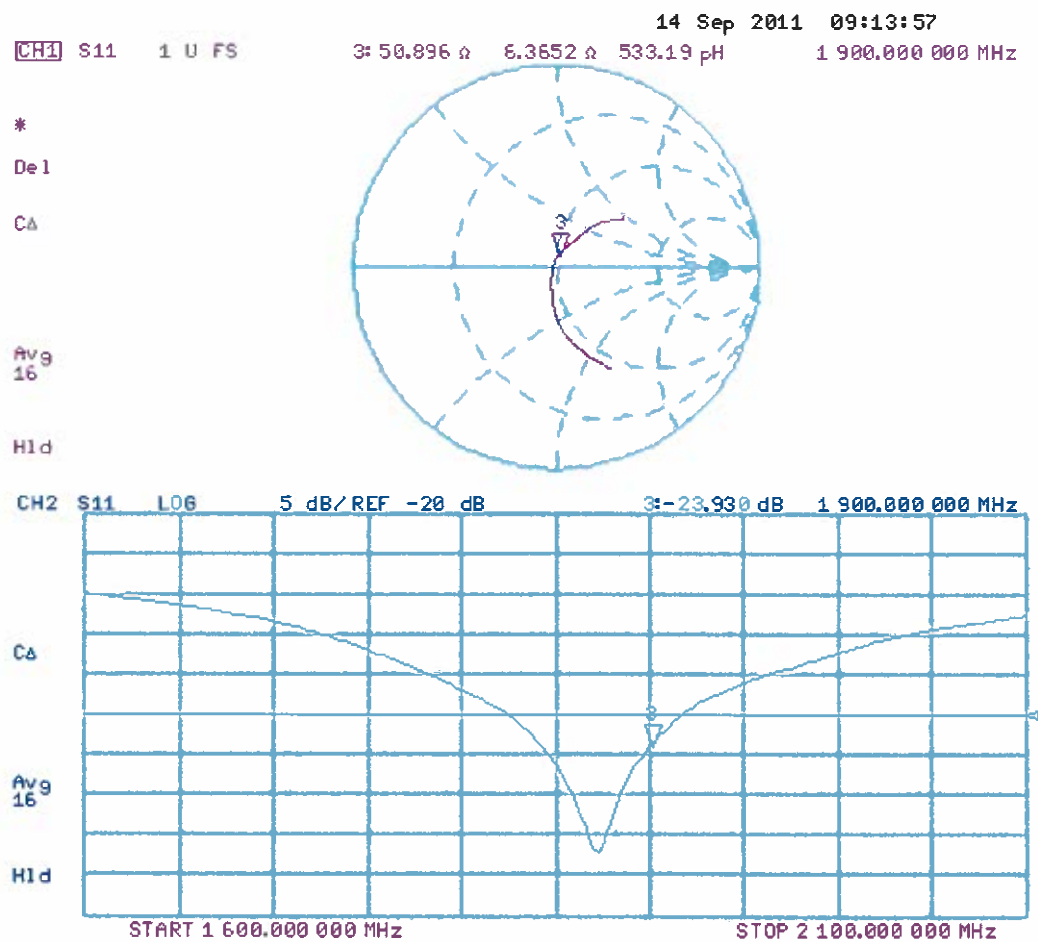
Peak SAR (extrapolated) = 18.370 W/kg

**SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.26 mW/g**

Maximum value of SAR (measured) = 12.759 mW/g



Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 14.09.2011

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d099**

Communication System: CW; Frequency: 1900 MHz

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.59$  mho/m;  $\epsilon_r = 54.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

**Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

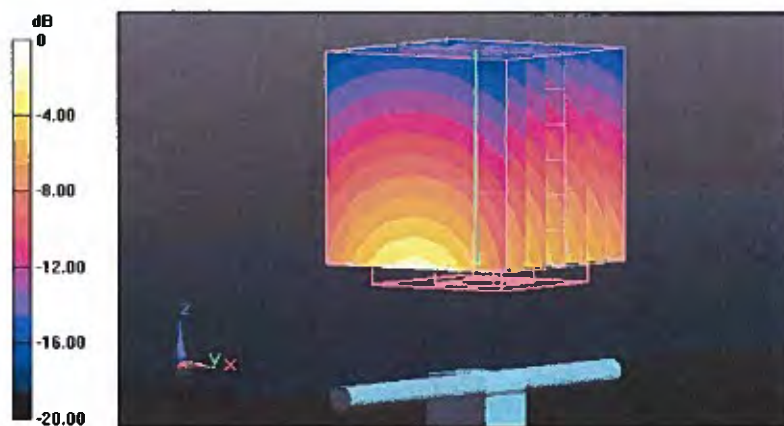
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.840 V/m; Power Drift = 0.00072 dB

Peak SAR (extrapolated) = 18.707 W/kg

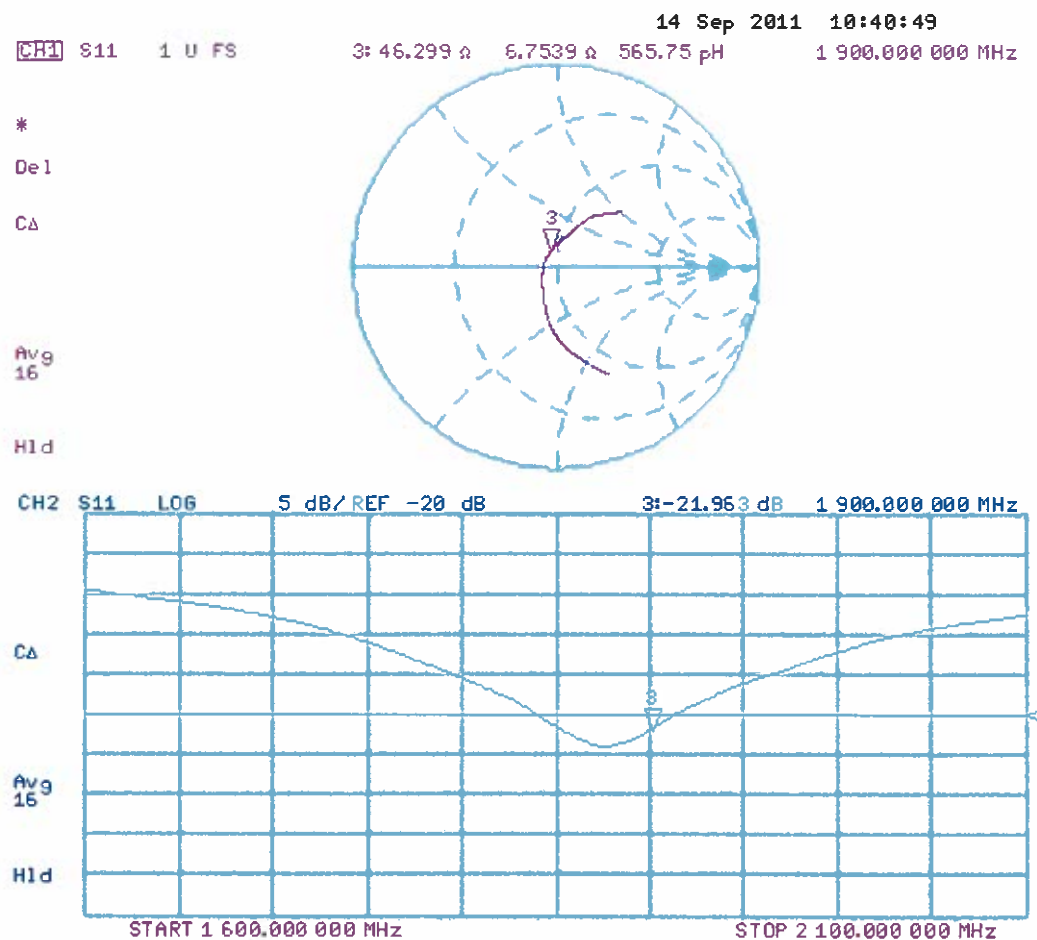
**SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.56 mW/g**

Maximum value of SAR (measured) = 13.461 mW/g



0 dB = 13.460mW/g

Impedance Measurement Plot for Body TSL



## APPENDIX G: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED LTE TRANSMISSION MODES

### G.1 Power Tuning Targets

| Band                  | Target Tuning Power in Head and Body worn measurements |       |       |        |        |        |
|-----------------------|--------------------------------------------------------|-------|-------|--------|--------|--------|
|                       | 1.4 MHz                                                | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| LTE750 (Band 13)      | N/A                                                    | N/A   | 23.0  | 23.0   | N/A    | N/A    |
| LTE1700/2100 (Band 4) | N/A                                                    | N/A   | 22.9  | 22.9   | 22.9   | 22.9   |

| Band                  | Target Tuning Power in WR mode |       |       |        |        |        |
|-----------------------|--------------------------------|-------|-------|--------|--------|--------|
|                       | 1.4 MHz                        | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| LTE750 (Band 13)      | N/A                            | N/A   | 23.0  | 23.0   | N/A    | N/A    |
| LTE1700/2100 (Band 4) | N/A                            | N/A   | 17.9  | 17.9   | 17.9   | 17.9   |

| Band                  | Target Tuning Power in SVLTE mode                             |                                                               |                                                                |                                                                |
|-----------------------|---------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|
| LTE750 (Band 13)      | When active with CDMA 800 powers $\geq$ 18.4 dBm:<br>18.8 dBm | When active with CDMA 800 powers $\leq$ 18.4 dBm:<br>23 dBm   | When active with CDMA 1900 powers $\geq$ 18.4 dBm:<br>18.8 dBm | When active with CDMA 1900 powers $\leq$ 18.4 dBm:<br>23 dBm   |
| LTE1700/2100 (Band 4) | When active with CDMA 800 powers $\geq$ 18.4 dBm:<br>18.9 dBm | When active with CDMA 800 powers $\leq$ 18.4 dBm:<br>22.9 dBm | When active with CDMA 1900 powers $\geq$ 18.4 dBm:<br>18.9 dBm | When active with CDMA 1900 powers $\leq$ 18.4 dBm:<br>22.9 dBm |

## G.2 Conducted Power from the Samples used in the Testing

“Max Average Power (dBm)” column lists measured powers with MPR active. The “Reduced Power” column lists measured powers with MPR and A-MPR active (as defined by 3GPP TS 36.101). **A-MPR is not supported in this device.**

Type: RM-860; Serial number: 354106/05/000822/3 used for LTE750 (Band13) for Head, Body-worn and Wireless Router SAR measurements.

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 779.5           | 23205          | 5               | 1         | 0         | QPSK       | 23.31                   | -                  |
| 779.5           | 23205          | 5               | 1         | 12        | QPSK       | 23.35                   | -                  |
| 779.5           | 23205          | 5               | 1         | 24        | QPSK       | 23.40                   | -                  |
| 779.5           | 23205          | 5               | 12        | 0         | QPSK       | 22.75                   | -                  |
| 779.5           | 23205          | 5               | 12        | 6         | QPSK       | 22.74                   | -                  |
| 779.5           | 23205          | 5               | 12        | 13        | QPSK       | 22.59                   | -                  |
| 779.5           | 23205          | 5               | 25        | 0         | QPSK       | 22.56                   | -                  |
| 779.5           | 23205          | 5               | 1         | 0         | 16QAM      | 22.62                   | -                  |
| 779.5           | 23205          | 5               | 1         | 12        | 16QAM      | 22.68                   | -                  |
| 779.5           | 23205          | 5               | 1         | 24        | 16QAM      | 22.57                   | -                  |
| 779.5           | 23205          | 5               | 12        | 0         | 16QAM      | 21.72                   | -                  |
| 779.5           | 23205          | 5               | 12        | 6         | 16QAM      | 21.57                   | -                  |
| 779.5           | 23205          | 5               | 12        | 13        | 16QAM      | 21.53                   | -                  |
| 779.5           | 23205          | 5               | 25        | 0         | 16QAM      | 21.62                   | -                  |
|                 |                |                 |           |           |            |                         |                    |
| 782.0           | 23230          | 5               | 1         | 0         | QPSK       | 23.32                   | -                  |
| 782.0           | 23230          | 5               | 1         | 12        | QPSK       | 23.35                   | -                  |
| 782.0           | 23230          | 5               | 1         | 24        | QPSK       | 23.33                   | -                  |
| 782.0           | 23230          | 5               | 12        | 0         | QPSK       | 22.82                   | -                  |
| 782.0           | 23230          | 5               | 12        | 6         | QPSK       | 22.73                   | -                  |
| 782.0           | 23230          | 5               | 12        | 13        | QPSK       | 22.65                   | -                  |
| 782.0           | 23230          | 5               | 25        | 0         | QPSK       | 22.69                   | -                  |
| 782.0           | 23230          | 5               | 1         | 0         | 16QAM      | 22.34                   | -                  |
| 782.0           | 23230          | 5               | 1         | 12        | 16QAM      | 22.33                   | -                  |
| 782.0           | 23230          | 5               | 1         | 24        | 16QAM      | 22.28                   | -                  |
| 782.0           | 23230          | 5               | 12        | 0         | 16QAM      | 21.65                   | -                  |
| 782.0           | 23230          | 5               | 12        | 6         | 16QAM      | 21.72                   | -                  |
| 782.0           | 23230          | 5               | 12        | 13        | 16QAM      | 21.64                   | -                  |
| 782.0           | 23230          | 5               | 25        | 0         | 16QAM      | 21.71                   | -                  |
|                 |                |                 |           |           |            |                         |                    |

(Table LTE750 / 354106/05/000822/3 continues)

(Table LTE750 / 354106/05/000822/3 continues)

|       |       |    |    |    |       |       |       |
|-------|-------|----|----|----|-------|-------|-------|
| 784.5 | 23255 | 5  | 1  | 0  | QPSK  | 23.29 | -     |
| 784.5 | 23255 | 5  | 1  | 12 | QPSK  | 23.31 | -     |
| 784.5 | 23255 | 5  | 1  | 24 | QPSK  | 23.31 | -     |
| 784.5 | 23255 | 5  | 12 | 0  | QPSK  | 22.75 | -     |
| 784.5 | 23255 | 5  | 12 | 6  | QPSK  | 22.61 | -     |
| 784.5 | 23255 | 5  | 12 | 13 | QPSK  | 22.77 | -     |
| 784.5 | 23255 | 5  | 25 | 0  | QPSK  | 22.71 | -     |
| 784.5 | 23255 | 5  | 1  | 0  | 16QAM | 22.82 | -     |
| 784.5 | 23255 | 5  | 1  | 12 | 16QAM | 22.68 | -     |
| 784.5 | 23255 | 5  | 1  | 24 | 16QAM | 22.79 | -     |
| 784.5 | 23255 | 5  | 12 | 0  | 16QAM | 21.65 | -     |
| 784.5 | 23255 | 5  | 12 | 6  | 16QAM | 21.72 | -     |
| 784.5 | 23255 | 5  | 12 | 13 | 16QAM | 21.73 | -     |
| 784.5 | 23255 | 5  | 25 | 0  | 16QAM | 21.69 | -     |
|       |       |    |    |    |       |       |       |
| 782.0 | 23230 | 10 | 1  | 0  | QPSK  | 23.41 | 11.83 |
| 782.0 | 23230 | 10 | 1  | 24 | QPSK  | 23.42 | 23.30 |
| 782.0 | 23230 | 10 | 1  | 49 | QPSK  | 23.40 | 20.81 |
| 782.0 | 23230 | 10 | 25 | 0  | QPSK  | 22.69 | 10.63 |
| 782.0 | 23230 | 10 | 25 | 12 | QPSK  | 22.72 | 10.94 |
| 782.0 | 23230 | 10 | 25 | 25 | QPSK  | 22.71 | 16.82 |
| 782.0 | 23230 | 10 | 50 | 0  | QPSK  | 22.60 | 10.91 |
| 782.0 | 23230 | 10 | 1  | 0  | 16QAM | 22.60 | 10.10 |
| 782.0 | 23230 | 10 | 1  | 24 | 16QAM | 22.54 | 22.20 |
| 782.0 | 23230 | 10 | 1  | 49 | 16QAM | 22.55 | 19.25 |
| 782.0 | 23230 | 10 | 25 | 0  | 16QAM | 21.65 | 9.61  |
| 782.0 | 23230 | 10 | 25 | 12 | 16QAM | 21.67 | 15.73 |
| 782.0 | 23230 | 10 | 25 | 25 | 16QAM | 21.61 | 10.01 |
| 782.0 | 23230 | 10 | 50 | 0  | 16QAM | 21.48 | 9.64  |

Type: RM-860; Serial number: 354106/05/000820/7 used for LTE750 (Band13) for SAR Head and Body-worn SAR measurements in SVLTE mode.

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 779.5           | 23205          | 5               | 1         | 0         | QPSK       | 19.21                   | -                  |
| 779.5           | 23205          | 5               | 1         | 12        | QPSK       | 19.26                   | -                  |
| 779.5           | 23205          | 5               | 1         | 24        | QPSK       | 19.29                   | -                  |
| 779.5           | 23205          | 5               | 12        | 0         | QPSK       | 18.75                   | -                  |
| 779.5           | 23205          | 5               | 12        | 6         | QPSK       | 18.79                   | -                  |
| 779.5           | 23205          | 5               | 12        | 13        | QPSK       | 18.72                   | -                  |
| 779.5           | 23205          | 5               | 25        | 0         | QPSK       | 18.63                   | -                  |
| 779.5           | 23205          | 5               | 1         | 0         | 16QAM      | 18.41                   | -                  |
| 779.5           | 23205          | 5               | 1         | 12        | 16QAM      | 18.27                   | -                  |
| 779.5           | 23205          | 5               | 1         | 24        | 16QAM      | 18.22                   | -                  |
| 779.5           | 23205          | 5               | 12        | 0         | 16QAM      | 17.65                   | -                  |
| 779.5           | 23205          | 5               | 12        | 6         | 16QAM      | 17.71                   | -                  |
| 779.5           | 23205          | 5               | 12        | 13        | 16QAM      | 17.68                   | -                  |
| 779.5           | 23205          | 5               | 25        | 0         | 16QAM      | 17.67                   | -                  |
|                 |                |                 |           |           |            |                         |                    |
| 782.0           | 23230          | 5               | 1         | 0         | QPSK       | 19.27                   | -                  |
| 782.0           | 23230          | 5               | 1         | 12        | QPSK       | 19.37                   | -                  |
| 782.0           | 23230          | 5               | 1         | 24        | QPSK       | 19.31                   | -                  |
| 782.0           | 23230          | 5               | 12        | 0         | QPSK       | 18.79                   | -                  |
| 782.0           | 23230          | 5               | 12        | 6         | QPSK       | 18.75                   | -                  |
| 782.0           | 23230          | 5               | 12        | 13        | QPSK       | 18.80                   | -                  |
| 782.0           | 23230          | 5               | 25        | 0         | QPSK       | 18.66                   | -                  |
| 782.0           | 23230          | 5               | 1         | 0         | 16QAM      | 18.24                   | -                  |
| 782.0           | 23230          | 5               | 1         | 12        | 16QAM      | 18.23                   | -                  |
| 782.0           | 23230          | 5               | 1         | 24        | 16QAM      | 18.18                   | -                  |
| 782.0           | 23230          | 5               | 12        | 0         | 16QAM      | 17.70                   | -                  |
| 782.0           | 23230          | 5               | 12        | 6         | 16QAM      | 17.65                   | -                  |
| 782.0           | 23230          | 5               | 12        | 13        | 16QAM      | 17.69                   | -                  |
| 782.0           | 23230          | 5               | 25        | 0         | 16QAM      | 17.71                   | -                  |
|                 |                |                 |           |           |            |                         |                    |

(Table LTE750 / 354106/05/000820/7 continues)

(Table LTE750 / 354106/05/000820/7 continues)

|       |       |    |    |    |       |       |       |
|-------|-------|----|----|----|-------|-------|-------|
| 784.5 | 23255 | 5  | 1  | 0  | QPSK  | 19.23 | -     |
| 784.5 | 23255 | 5  | 1  | 12 | QPSK  | 19.34 | -     |
| 784.5 | 23255 | 5  | 1  | 24 | QPSK  | 19.33 | -     |
| 784.5 | 23255 | 5  | 12 | 0  | QPSK  | 18.71 | -     |
| 784.5 | 23255 | 5  | 12 | 6  | QPSK  | 18.81 | -     |
| 784.5 | 23255 | 5  | 12 | 13 | QPSK  | 18.65 | -     |
| 784.5 | 23255 | 5  | 25 | 0  | QPSK  | 18.64 | -     |
| 784.5 | 23255 | 5  | 1  | 0  | 16QAM | 18.27 | -     |
| 784.5 | 23255 | 5  | 1  | 12 | 16QAM | 18.35 | -     |
| 784.5 | 23255 | 5  | 1  | 24 | 16QAM | 18.28 | -     |
| 784.5 | 23255 | 5  | 12 | 0  | 16QAM | 17.65 | -     |
| 784.5 | 23255 | 5  | 12 | 6  | 16QAM | 17.67 | -     |
| 784.5 | 23255 | 5  | 12 | 13 | 16QAM | 17.65 | -     |
| 784.5 | 23255 | 5  | 25 | 0  | 16QAM | 17.71 | -     |
|       |       |    |    |    |       |       |       |
| 782.0 | 23230 | 10 | 1  | 0  | QPSK  | 19.19 | 7.91  |
| 782.0 | 23230 | 10 | 1  | 24 | QPSK  | 19.21 | 19.29 |
| 782.0 | 23230 | 10 | 1  | 49 | QPSK  | 19.17 | 16.66 |
| 782.0 | 23230 | 10 | 25 | 0  | QPSK  | 18.58 | 6.96  |
| 782.0 | 23230 | 10 | 25 | 12 | QPSK  | 18.69 | 7.05  |
| 782.0 | 23230 | 10 | 25 | 25 | QPSK  | 18.61 | 12.66 |
| 782.0 | 23230 | 10 | 50 | 0  | QPSK  | 18.54 | 7.01  |
| 782.0 | 23230 | 10 | 1  | 0  | 16QAM | 18.17 | 6.32  |
| 782.0 | 23230 | 10 | 1  | 24 | 16QAM | 18.19 | 18.42 |
| 782.0 | 23230 | 10 | 1  | 49 | 16QAM | 18.07 | 15.01 |
| 782.0 | 23230 | 10 | 25 | 0  | 16QAM | 17.63 | 5.51  |
| 782.0 | 23230 | 10 | 25 | 12 | 16QAM | 17.73 | 5.61  |
| 782.0 | 23230 | 10 | 25 | 25 | 16QAM | 17.67 | 11.72 |
| 782.0 | 23230 | 10 | 50 | 0  | 16QAM | 17.61 | 5.56  |

Type: RM-860; Serial number: 354106/05/000818/1 used for LTE1700/2100 (Band4) for Head and Body-worn SAR measurements.

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dB m) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|---------------------|
| 1720.0          | 20050          | 5               | 1         | 0         | QPSK       | 23.39                   | 23.35               |
| 1720.0          | 20050          | 5               | 1         | 12        | QPSK       | 23.33                   | 23.34               |
| 1720.0          | 20050          | 5               | 1         | 24        | QPSK       | 23.39                   | 23.33               |
| 1720.0          | 20050          | 5               | 12        | 0         | QPSK       | 22.44                   | 21.45               |
| 1720.0          | 20050          | 5               | 12        | 6         | QPSK       | 22.41                   | 21.47               |
| 1720.0          | 20050          | 5               | 12        | 13        | QPSK       | 22.37                   | 21.38               |
| 1720.0          | 20050          | 5               | 25        | 0         | QPSK       | 22.22                   | 21.29               |
| 1720.0          | 20050          | 5               | 1         | 0         | 16QAM      | 22.13                   | 22.18               |
| 1720.0          | 20050          | 5               | 1         | 12        | 16QAM      | 22.19                   | 22.13               |
| 1720.0          | 20050          | 5               | 1         | 24        | 16QAM      | 22.17                   | 22.21               |
| 1720.0          | 20050          | 5               | 12        | 0         | 16QAM      | 21.27                   | 20.47               |
| 1720.0          | 20050          | 5               | 12        | 6         | 16QAM      | 21.29                   | 20.33               |
| 1720.0          | 20050          | 5               | 12        | 13        | 16QAM      | 21.25                   | 20.35               |
| 1720.0          | 20050          | 5               | 25        | 0         | 16QAM      | 21.31                   | 20.35               |
|                 |                |                 |           |           |            |                         |                     |
| 1732.5          | 20175          | 5               | 1         | 0         | QPSK       | 23.41                   | 23.37               |
| 1732.5          | 20175          | 5               | 1         | 12        | QPSK       | 23.38                   | 23.32               |
| 1732.5          | 20175          | 5               | 1         | 24        | QPSK       | 23.23                   | 23.31               |
| 1732.5          | 20175          | 5               | 12        | 0         | QPSK       | 22.34                   | 21.44               |
| 1732.5          | 20175          | 5               | 12        | 6         | QPSK       | 22.37                   | 21.42               |
| 1732.5          | 20175          | 5               | 12        | 13        | QPSK       | 22.33                   | 21.41               |
| 1732.5          | 20175          | 5               | 25        | 0         | QPSK       | 22.27                   | 21.27               |
| 1732.5          | 20175          | 5               | 1         | 0         | 16QAM      | 21.96                   | 21.90               |
| 1732.5          | 20175          | 5               | 1         | 12        | 16QAM      | 21.92                   | 21.93               |
| 1732.5          | 20175          | 5               | 1         | 24        | 16QAM      | 21.83                   | 21.97               |
| 1732.5          | 20175          | 5               | 12        | 0         | 16QAM      | 21.27                   | 20.47               |
| 1732.5          | 20175          | 5               | 12        | 6         | 16QAM      | 21.22                   | 20.32               |
| 1732.5          | 20175          | 5               | 12        | 13        | 16QAM      | 21.26                   | 20.36               |
| 1732.5          | 20175          | 5               | 25        | 0         | 16QAM      | 21.24                   | 20.35               |
|                 |                |                 |           |           |            |                         |                     |
| 1745.0          | 20300          | 5               | 1         | 0         | QPSK       | 23.40                   | 23.39               |
| 1745.0          | 20300          | 5               | 1         | 12        | QPSK       | 23.37                   | 23.29               |
| 1745.0          | 20300          | 5               | 1         | 24        | QPSK       | 23.31                   | 23.28               |
| 1745.0          | 20300          | 5               | 12        | 0         | QPSK       | 22.44                   | 21.52               |
| 1745.0          | 20300          | 5               | 12        | 6         | QPSK       | 22.49                   | 21.51               |
| 1745.0          | 20300          | 5               | 12        | 13        | QPSK       | 22.27                   | 21.30               |
| 1745.0          | 20300          | 5               | 25        | 0         | QPSK       | 22.31                   | 21.36               |

(Table for LTE1700/2100 / 354106/05/000818/1 continues)

(Table for LTE1700/2100 / 354106/05/000818/1 continues)

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1745.0          | 20300          | 5               | 1         | 0         | 16QAM      | 22.12                   | 22.31              |
| 1745.0          | 20300          | 5               | 1         | 12        | 16QAM      | 22.16                   | 22.37              |
| 1745.0          | 20300          | 5               | 1         | 24        | 16QAM      | 22.09                   | 22.22              |
| 1745.0          | 20300          | 5               | 12        | 0         | 16QAM      | 21.36                   | 20.46              |
| 1745.0          | 20300          | 5               | 12        | 6         | 16QAM      | 21.22                   | 20.31              |
| 1745.0          | 20300          | 5               | 12        | 13        | 16QAM      | 21.21                   | 20.27              |
| 1745.0          | 20300          | 5               | 25        | 0         | 16QAM      | 21.27                   | 20.37              |
|                 |                |                 |           |           |            |                         |                    |
| 1720.0          | 20050          | 10              | 1         | 0         | QPSK       | 23.24                   | 23.25              |
| 1720.0          | 20050          | 10              | 1         | 24        | QPSK       | 23.33                   | 23.33              |
| 1720.0          | 20050          | 10              | 1         | 49        | QPSK       | 23.19                   | 23.27              |
| 1720.0          | 20050          | 10              | 25        | 0         | QPSK       | 22.29                   | 21.37              |
| 1720.0          | 20050          | 10              | 25        | 12        | QPSK       | 22.33                   | 21.35              |
| 1720.0          | 20050          | 10              | 25        | 25        | QPSK       | 22.27                   | 21.33              |
| 1720.0          | 20050          | 10              | 50        | 0         | QPSK       | 22.12                   | 21.18              |
| 1720.0          | 20050          | 10              | 1         | 0         | 16QAM      | 22.35                   | 22.29              |
| 1720.0          | 20050          | 10              | 1         | 24        | 16QAM      | 22.44                   | 22.43              |
| 1720.0          | 20050          | 10              | 1         | 49        | 16QAM      | 22.38                   | 22.44              |
| 1720.0          | 20050          | 10              | 25        | 0         | 16QAM      | 21.29                   | 20.32              |
| 1720.0          | 20050          | 10              | 25        | 12        | 16QAM      | 21.27                   | 20.35              |
| 1720.0          | 20050          | 10              | 25        | 25        | 16QAM      | 21.26                   | 20.28              |
| 1720.0          | 20050          | 10              | 50        | 0         | 16QAM      | 21.03                   | 20.15              |
|                 |                |                 |           |           |            |                         |                    |
| 1732.5          | 20175          | 10              | 1         | 0         | QPSK       | 23.36                   | 23.27              |
| 1732.5          | 20175          | 10              | 1         | 24        | QPSK       | 23.34                   | 23.35              |
| 1732.5          | 20175          | 10              | 1         | 49        | QPSK       | 23.41                   | 23.26              |
| 1732.5          | 20175          | 10              | 25        | 0         | QPSK       | 22.4                    | 21.42              |
| 1732.5          | 20175          | 10              | 25        | 12        | QPSK       | 22.29                   | 21.37              |
| 1732.5          | 20175          | 10              | 25        | 25        | QPSK       | 22.33                   | 21.34              |
| 1732.5          | 20175          | 10              | 50        | 0         | QPSK       | 22.19                   | 21.20              |
| 1732.5          | 20175          | 10              | 1         | 0         | 16QAM      | 22.00                   | 21.95              |
| 1732.5          | 20175          | 10              | 1         | 24        | 16QAM      | 21.83                   | 22.01              |
| 1732.5          | 20175          | 10              | 1         | 49        | 16QAM      | 22.09                   | 21.99              |
| 1732.5          | 20175          | 10              | 25        | 0         | 16QAM      | 21.37                   | 20.41              |
| 1732.5          | 20175          | 10              | 25        | 12        | 16QAM      | 21.39                   | 20.42              |
| 1732.5          | 20175          | 10              | 25        | 25        | 16QAM      | 21.36                   | 20.41              |
| 1732.5          | 20175          | 10              | 50        | 0         | 16QAM      | 21.24                   | 20.29              |

(Table for LTE1700/2100 / 354106/05/000818/1 continues)

(Table for LTE1700/2100 / 354106/05/000818/1 continues)

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1745.0          | 20300          | 10              | 1         | 0         | QPSK       | 23.36                   | 23.31              |
| 1745.0          | 20300          | 10              | 1         | 24        | QPSK       | 23.41                   | 23.40              |
| 1745.0          | 20300          | 10              | 1         | 49        | QPSK       | 23.37                   | 23.34              |
| 1745.0          | 20300          | 10              | 25        | 0         | QPSK       | 22.36                   | 21.41              |
| 1745.0          | 20300          | 10              | 25        | 12        | QPSK       | 22.33                   | 21.36              |
| 1745.0          | 20300          | 10              | 25        | 25        | QPSK       | 22.29                   | 21.30              |
| 1745.0          | 20300          | 10              | 50        | 0         | QPSK       | 22.22                   | 21.25              |
| 1745.0          | 20300          | 10              | 1         | 0         | 16QAM      | 22.13                   | 22.07              |
| 1745.0          | 20300          | 10              | 1         | 24        | 16QAM      | 22.07                   | 22.09              |
| 1745.0          | 20300          | 10              | 1         | 49        | 16QAM      | 22.02                   | 21.97              |
| 1745.0          | 20300          | 10              | 25        | 0         | 16QAM      | 21.29                   | 20.34              |
| 1745.0          | 20300          | 10              | 25        | 12        | 16QAM      | 21.33                   | 20.39              |
| 1745.0          | 20300          | 10              | 25        | 25        | 16QAM      | 21.30                   | 20.32              |
| 1745.0          | 20300          | 10              | 50        | 0         | 16QAM      | 21.25                   | 20.31              |
|                 |                |                 |           |           |            |                         |                    |
| 1720.0          | 20050          | 15              | 1         | 0         | QPSK       | 23.22                   | 23.26              |
| 1720.0          | 20050          | 15              | 1         | 36        | QPSK       | 23.23                   | 23.26              |
| 1720.0          | 20050          | 15              | 1         | 74        | QPSK       | 23.31                   | 23.29              |
| 1720.0          | 20050          | 15              | 37        | 0         | QPSK       | 22.21                   | 21.28              |
| 1720.0          | 20050          | 15              | 37        | 18        | QPSK       | 22.20                   | 21.27              |
| 1720.0          | 20050          | 15              | 37        | 38        | QPSK       | 22.16                   | 21.25              |
| 1720.0          | 20050          | 15              | 75        | 0         | QPSK       | 22.09                   | 21.22              |
| 1720.0          | 20050          | 15              | 1         | 0         | 16QAM      | 22.36                   | 22.36              |
| 1720.0          | 20050          | 15              | 1         | 36        | 16QAM      | 22.29                   | 22.32              |
| 1720.0          | 20050          | 15              | 1         | 74        | 16QAM      | 22.31                   | 22.28              |
| 1720.0          | 20050          | 15              | 37        | 0         | 16QAM      | 21.33                   | 20.38              |
| 1720.0          | 20050          | 15              | 37        | 18        | 16QAM      | 21.30                   | 20.33              |
| 1720.0          | 20050          | 15              | 37        | 38        | 16QAM      | 21.21                   | 20.35              |
| 1720.0          | 20050          | 15              | 75        | 0         | 16QAM      | 21.06                   | 20.17              |
|                 |                |                 |           |           |            |                         |                    |
| 1732.5          | 20175          | 15              | 1         | 0         | QPSK       | 23.27                   | 23.26              |
| 1732.5          | 20175          | 15              | 1         | 36        | QPSK       | 23.29                   | 23.33              |
| 1732.5          | 20175          | 15              | 1         | 74        | QPSK       | 23.30                   | 23.27              |
| 1732.5          | 20175          | 15              | 37        | 0         | QPSK       | 22.31                   | 21.35              |
| 1732.5          | 20175          | 15              | 37        | 18        | QPSK       | 22.19                   | 21.29              |
| 1732.5          | 20175          | 15              | 37        | 38        | QPSK       | 22.08                   | 21.19              |
| 1732.5          | 20175          | 15              | 75        | 0         | QPSK       | 22.10                   | 21.28              |

(Table for LTE1700/2100 / 354106/05/000818/1 continues)

(Table for LTE1700/2100 / 354106/05/000818/1 continues)

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1732.5          | 20175          | 15              | 1         | 0         | 16QAM      | 22.10                   | 22.20              |
| 1732.5          | 20175          | 15              | 1         | 36        | 16QAM      | 22.23                   | 22.20              |
| 1732.5          | 20175          | 15              | 1         | 74        | 16QAM      | 21.97                   | 22.01              |
| 1732.5          | 20175          | 15              | 37        | 0         | 16QAM      | 21.36                   | 20.37              |
| 1732.5          | 20175          | 15              | 37        | 18        | 16QAM      | 21.29                   | 20.39              |
| 1732.5          | 20175          | 15              | 37        | 38        | 16QAM      | 21.12                   | 20.25              |
| 1732.5          | 20175          | 15              | 75        | 0         | 16QAM      | 21.11                   | 20.25              |
|                 |                |                 |           |           |            |                         |                    |
| 1745.0          | 20300          | 15              | 1         | 0         | QPSK       | 23.22                   | 23.25              |
| 1745.0          | 20300          | 15              | 1         | 36        | QPSK       | 23.27                   | 23.31              |
| 1745.0          | 20300          | 15              | 1         | 74        | QPSK       | 23.36                   | 23.31              |
| 1745.0          | 20300          | 15              | 37        | 0         | QPSK       | 22.27                   | 21.33              |
| 1745.0          | 20300          | 15              | 37        | 18        | QPSK       | 22.29                   | 21.32              |
| 1745.0          | 20300          | 15              | 37        | 38        | QPSK       | 22.22                   | 21.28              |
| 1745.0          | 20300          | 15              | 75        | 0         | QPSK       | 22.20                   | 21.30              |
| 1745.0          | 20300          | 15              | 1         | 0         | 16QAM      | 22.46                   | 22.35              |
| 1745.0          | 20300          | 15              | 1         | 36        | 16QAM      | 22.37                   | 22.39              |
| 1745.0          | 20300          | 15              | 1         | 74        | 16QAM      | 22.20                   | 22.29              |
| 1745.0          | 20300          | 15              | 37        | 0         | 16QAM      | 21.29                   | 20.28              |
| 1745.0          | 20300          | 15              | 37        | 18        | 16QAM      | 21.36                   | 20.43              |
| 1745.0          | 20300          | 15              | 37        | 38        | 16QAM      | 21.28                   | 20.29              |
| 1745.0          | 20300          | 15              | 75        | 0         | 16QAM      | 21.17                   | 20.31              |
|                 |                |                 |           |           |            |                         |                    |
| 1720.0          | 20050          | 20              | 1         | 0         | QPSK       | 23.26                   | 23.24              |
| 1720.0          | 20050          | 20              | 1         | 49        | QPSK       | 23.19                   | 23.22              |
| 1720.0          | 20050          | 20              | 1         | 99        | QPSK       | 23.21                   | 23.26              |
| 1720.0          | 20050          | 20              | 50        | 0         | QPSK       | 22.08                   | 21.17              |
| 1720.0          | 20050          | 20              | 50        | 24        | QPSK       | 22.21                   | 21.28              |
| 1720.0          | 20050          | 20              | 50        | 50        | QPSK       | 22.17                   | 21.25              |
| 1720.0          | 20050          | 20              | 100       | 0         | QPSK       | 22.17                   | 21.24              |
| 1720.0          | 20050          | 20              | 1         | 0         | 16QAM      | 22.24                   | 22.25              |
| 1720.0          | 20050          | 20              | 1         | 49        | 16QAM      | 22.28                   | 22.25              |
| 1720.0          | 20050          | 20              | 1         | 99        | 16QAM      | 22.02                   | 21.96              |
| 1720.0          | 20050          | 20              | 50        | 0         | 16QAM      | 21.19                   | 20.29              |
| 1720.0          | 20050          | 20              | 50        | 24        | 16QAM      | 21.17                   | 20.27              |
| 1720.0          | 20050          | 20              | 50        | 50        | 16QAM      | 21.11                   | 20.19              |
| 1720.0          | 20050          | 20              | 100       | 0         | 16QAM      | 21.07                   | 20.16              |

(Table for LTE1700/2100 / 354106/05/000818/1 continues)

(Table for LTE1700/2100 / 354106/05/000818/1 continues)

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1732.5          | 20175          | 20              | 1         | 0         | QPSK       | 23.27                   | 23.25              |
| 1732.5          | 20175          | 20              | 1         | 49        | QPSK       | 23.34                   | 23.30              |
| 1732.5          | 20175          | 20              | 1         | 99        | QPSK       | 23.29                   | 23.28              |
| 1732.5          | 20175          | 20              | 50        | 0         | QPSK       | 22.28                   | 21.33              |
| 1732.5          | 20175          | 20              | 50        | 24        | QPSK       | 22.27                   | 21.31              |
| 1732.5          | 20175          | 20              | 50        | 50        | QPSK       | 22.11                   | 21.18              |
| 1732.5          | 20175          | 20              | 100       | 0         | QPSK       | 22.15                   | 21.23              |
| 1732.5          | 20175          | 20              | 1         | 0         | 16QAM      | 22.25                   | 22.23              |
| 1732.5          | 20175          | 20              | 1         | 49        | 16QAM      | 22.27                   | 22.19              |
| 1732.5          | 20175          | 20              | 1         | 99        | 16QAM      | 22.15                   | 22.09              |
| 1732.5          | 20175          | 20              | 50        | 0         | 16QAM      | 21.15                   | 20.23              |
| 1732.5          | 20175          | 20              | 50        | 24        | 16QAM      | 21.23                   | 20.28              |
| 1732.5          | 20175          | 20              | 50        | 50        | 16QAM      | 21.10                   | 20.13              |
| 1732.5          | 20175          | 20              | 100       | 0         | 16QAM      | 21.20                   | 20.29              |
|                 |                |                 |           |           |            |                         |                    |
| 1745.0          | 20300          | 20              | 1         | 0         | QPSK       | 23.25                   | 23.28              |
| 1745.0          | 20300          | 20              | 1         | 49        | QPSK       | 23.39                   | 23.33              |
| 1745.0          | 20300          | 20              | 1         | 99        | QPSK       | 23.22                   | 23.26              |
| 1745.0          | 20300          | 20              | 50        | 0         | QPSK       | 22.11                   | 21.18              |
| 1745.0          | 20300          | 20              | 50        | 24        | QPSK       | 22.36                   | 21.43              |
| 1745.0          | 20300          | 20              | 50        | 50        | QPSK       | 22.19                   | 21.28              |
| 1745.0          | 20300          | 20              | 100       | 0         | QPSK       | 22.22                   | 21.26              |
| 1745.0          | 20300          | 20              | 1         | 0         | 16QAM      | 22.23                   | 22.11              |
| 1745.0          | 20300          | 20              | 1         | 49        | 16QAM      | 22.26                   | 22.24              |
| 1745.0          | 20300          | 20              | 1         | 99        | 16QAM      | 21.96                   | 21.93              |
| 1745.0          | 20300          | 20              | 50        | 0         | 16QAM      | 21.31                   | 20.33              |
| 1745.0          | 20300          | 20              | 50        | 24        | 16QAM      | 21.31                   | 20.34              |
| 1745.0          | 20300          | 20              | 50        | 50        | 16QAM      | 21.16                   | 20.19              |
| 1745.0          | 20300          | 20              | 100       | 0         | 16QAM      | 21.27                   | 20.30              |

Type: RM-860; Serial number: 354106/05/000902/3 used for LTE1700/2100 (Band4) for Wireless Router Body SAR measurements.

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dB m) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|---------------------|
| 1720.0          | 20050          | 5               | 1         | 0         | QPSK       | 18.07                   | 18.28               |
| 1720.0          | 20050          | 5               | 1         | 12        | QPSK       | 18.19                   | 18.32               |
| 1720.0          | 20050          | 5               | 1         | 24        | QPSK       | 18.16                   | 18.29               |
| 1720.0          | 20050          | 5               | 12        | 0         | QPSK       | 16.90                   | 15.93               |
| 1720.0          | 20050          | 5               | 12        | 6         | QPSK       | 17.24                   | 16.27               |
| 1720.0          | 20050          | 5               | 12        | 13        | QPSK       | 17.27                   | 16.21               |
| 1720.0          | 20050          | 5               | 25        | 0         | QPSK       | 16.96                   | 16.12               |
| 1720.0          | 20050          | 5               | 1         | 0         | 16QAM      | 17.19                   | 17.34               |
| 1720.0          | 20050          | 5               | 1         | 12        | 16QAM      | 17.36                   | 17.36               |
| 1720.0          | 20050          | 5               | 1         | 24        | 16QAM      | 17.15                   | 17.31               |
| 1720.0          | 20050          | 5               | 12        | 0         | 16QAM      | 16.43                   | 15.50               |
| 1720.0          | 20050          | 5               | 12        | 6         | 16QAM      | 16.46                   | 15.57               |
| 1720.0          | 20050          | 5               | 12        | 13        | 16QAM      | 16.42                   | 15.52               |
| 1720.0          | 20050          | 5               | 25        | 0         | 16QAM      | 16.01                   | 15.18               |
|                 |                |                 |           |           |            |                         |                     |
| 1732.5          | 20175          | 5               | 1         | 0         | QPSK       | 18.12                   | 18.34               |
| 1732.5          | 20175          | 5               | 1         | 12        | QPSK       | 18.34                   | 18.39               |
| 1732.5          | 20175          | 5               | 1         | 24        | QPSK       | 18.33                   | 18.28               |
| 1732.5          | 20175          | 5               | 12        | 0         | QPSK       | 17.22                   | 16.39               |
| 1732.5          | 20175          | 5               | 12        | 6         | QPSK       | 17.18                   | 16.26               |
| 1732.5          | 20175          | 5               | 12        | 13        | QPSK       | 17.14                   | 16.22               |
| 1732.5          | 20175          | 5               | 25        | 0         | QPSK       | 17.16                   | 16.09               |
| 1732.5          | 20175          | 5               | 1         | 0         | 16QAM      | 17.27                   | 17.36               |
| 1732.5          | 20175          | 5               | 1         | 12        | 16QAM      | 17.33                   | 17.32               |
| 1732.5          | 20175          | 5               | 1         | 24        | 16QAM      | 17.22                   | 17.32               |
| 1732.5          | 20175          | 5               | 12        | 0         | 16QAM      | 16.42                   | 15.53               |
| 1732.5          | 20175          | 5               | 12        | 6         | 16QAM      | 16.36                   | 15.51               |
| 1732.5          | 20175          | 5               | 12        | 13        | 16QAM      | 16.39                   | 15.47               |
| 1732.5          | 20175          | 5               | 25        | 0         | 16QAM      | 16.27                   | 15.37               |
|                 |                |                 |           |           |            |                         |                     |
| 1745.0          | 20300          | 5               | 1         | 0         | QPSK       | 18.31                   | 18.41               |
| 1745.0          | 20300          | 5               | 1         | 12        | QPSK       | 18.33                   | 18.34               |
| 1745.0          | 20300          | 5               | 1         | 24        | QPSK       | 18.36                   | 18.42               |
| 1745.0          | 20300          | 5               | 12        | 0         | QPSK       | 17.27                   | 16.29               |
| 1745.0          | 20300          | 5               | 12        | 6         | QPSK       | 17.23                   | 16.23               |
| 1745.0          | 20300          | 5               | 12        | 13        | QPSK       | 17.17                   | 16.21               |
| 1745.0          | 20300          | 5               | 25        | 0         | QPSK       | 17.31                   | 16.24               |

(Table for LTE1700/2100 / 354106/05/000902/3 continues)

(Table for LTE1700/2100 / 354106/05/000902/3 continues)

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1745.0          | 20300          | 5               | 1         | 0         | 16QAM      | 17.36                   | 17.32              |
| 1745.0          | 20300          | 5               | 1         | 12        | 16QAM      | 17.31                   | 17.34              |
| 1745.0          | 20300          | 5               | 1         | 24        | 16QAM      | 17.35                   | 17.38              |
| 1745.0          | 20300          | 5               | 12        | 0         | 16QAM      | 16.50                   | 15.69              |
| 1745.0          | 20300          | 5               | 12        | 6         | 16QAM      | 16.37                   | 15.54              |
| 1745.0          | 20300          | 5               | 12        | 13        | 16QAM      | 16.33                   | 15.37              |
| 1745.0          | 20300          | 5               | 25        | 0         | 16QAM      | 16.22                   | 15.39              |
|                 |                |                 |           |           |            |                         |                    |
| 1720.0          | 20050          | 10              | 1         | 0         | QPSK       | 18.31                   | 18.36              |
| 1720.0          | 20050          | 10              | 1         | 24        | QPSK       | 18.29                   | 18.33              |
| 1720.0          | 20050          | 10              | 1         | 49        | QPSK       | 18.25                   | 18.29              |
| 1720.0          | 20050          | 10              | 25        | 0         | QPSK       | 17.32                   | 16.31              |
| 1720.0          | 20050          | 10              | 25        | 12        | QPSK       | 17.33                   | 16.34              |
| 1720.0          | 20050          | 10              | 25        | 25        | QPSK       | 17.37                   | 16.32              |
| 1720.0          | 20050          | 10              | 50        | 0         | QPSK       | 17.17                   | 16.37              |
| 1720.0          | 20050          | 10              | 1         | 0         | 16QAM      | 17.32                   | 17.37              |
| 1720.0          | 20050          | 10              | 1         | 24        | 16QAM      | 17.28                   | 17.33              |
| 1720.0          | 20050          | 10              | 1         | 49        | 16QAM      | 17.30                   | 17.32              |
| 1720.0          | 20050          | 10              | 25        | 0         | 16QAM      | 16.35                   | 15.47              |
| 1720.0          | 20050          | 10              | 25        | 12        | 16QAM      | 16.33                   | 15.39              |
| 1720.0          | 20050          | 10              | 25        | 25        | 16QAM      | 16.42                   | 15.42              |
| 1720.0          | 20050          | 10              | 50        | 0         | 16QAM      | 16.24                   | 15.31              |
|                 |                |                 |           |           |            |                         |                    |
| 1732.5          | 20175          | 10              | 1         | 0         | QPSK       | 18.39                   | 18.31              |
| 1732.5          | 20175          | 10              | 1         | 24        | QPSK       | 18.37                   | 18.29              |
| 1732.5          | 20175          | 10              | 1         | 49        | QPSK       | 18.49                   | 18.33              |
| 1732.5          | 20175          | 10              | 25        | 0         | QPSK       | 17.48                   | 16.34              |
| 1732.5          | 20175          | 10              | 25        | 12        | QPSK       | 17.45                   | 16.29              |
| 1732.5          | 20175          | 10              | 25        | 25        | QPSK       | 17.48                   | 16.37              |
| 1732.5          | 20175          | 10              | 50        | 0         | QPSK       | 17.51                   | 16.34              |
| 1732.5          | 20175          | 10              | 1         | 0         | 16QAM      | 17.30                   | 17.35              |
| 1732.5          | 20175          | 10              | 1         | 24        | 16QAM      | 17.88                   | 17.39              |
| 1732.5          | 20175          | 10              | 1         | 49        | 16QAM      | 17.48                   | 17.34              |
| 1732.5          | 20175          | 10              | 25        | 0         | 16QAM      | 16.64                   | 15.52              |
| 1732.5          | 20175          | 10              | 25        | 12        | 16QAM      | 16.70                   | 15.51              |
| 1732.5          | 20175          | 10              | 25        | 25        | 16QAM      | 16.62                   | 15.43              |
| 1732.5          | 20175          | 10              | 50        | 0         | 16QAM      | 16.55                   | 15.35              |

(Table for LTE1700/2100 / 354106/05/000902/3 continues)

(Table for LTE1700/2100 / 354106/05/000902/3 continues)

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1745.0          | 20300          | 10              | 1         | 0         | QPSK       | 18.35                   | 18.31              |
| 1745.0          | 20300          | 10              | 1         | 24        | QPSK       | 18.30                   | 18.33              |
| 1745.0          | 20300          | 10              | 1         | 49        | QPSK       | 18.30                   | 18.38              |
| 1745.0          | 20300          | 10              | 25        | 0         | QPSK       | 17.20                   | 16.31              |
| 1745.0          | 20300          | 10              | 25        | 12        | QPSK       | 17.22                   | 16.35              |
| 1745.0          | 20300          | 10              | 25        | 25        | QPSK       | 17.33                   | 16.38              |
| 1745.0          | 20300          | 10              | 50        | 0         | QPSK       | 17.35                   | 16.35              |
| 1745.0          | 20300          | 10              | 1         | 0         | 16QAM      | 17.33                   | 17.37              |
| 1745.0          | 20300          | 10              | 1         | 24        | 16QAM      | 17.35                   | 17.32              |
| 1745.0          | 20300          | 10              | 1         | 49        | 16QAM      | 17.32                   | 17.35              |
| 1745.0          | 20300          | 10              | 25        | 0         | 16QAM      | 16.38                   | 15.44              |
| 1745.0          | 20300          | 10              | 25        | 12        | 16QAM      | 16.42                   | 15.51              |
| 1745.0          | 20300          | 10              | 25        | 25        | 16QAM      | 16.35                   | 15.41              |
| 1745.0          | 20300          | 10              | 50        | 0         | 16QAM      | 16.22                   | 15.28              |
|                 |                |                 |           |           |            |                         |                    |
| 1720.0          | 20050          | 15              | 1         | 0         | QPSK       | 18.24                   | 18.32              |
| 1720.0          | 20050          | 15              | 1         | 36        | QPSK       | 18.32                   | 18.34              |
| 1720.0          | 20050          | 15              | 1         | 74        | QPSK       | 18.37                   | 18.38              |
| 1720.0          | 20050          | 15              | 37        | 0         | QPSK       | 17.34                   | 16.36              |
| 1720.0          | 20050          | 15              | 37        | 18        | QPSK       | 17.32                   | 16.39              |
| 1720.0          | 20050          | 15              | 37        | 38        | QPSK       | 17.36                   | 16.45              |
| 1720.0          | 20050          | 15              | 75        | 0         | QPSK       | 17.24                   | 16.35              |
| 1720.0          | 20050          | 15              | 1         | 0         | 16QAM      | 17.29                   | 17.28              |
| 1720.0          | 20050          | 15              | 1         | 36        | 16QAM      | 17.26                   | 17.32              |
| 1720.0          | 20050          | 15              | 1         | 74        | 16QAM      | 17.33                   | 17.35              |
| 1720.0          | 20050          | 15              | 37        | 0         | 16QAM      | 16.39                   | 15.53              |
| 1720.0          | 20050          | 15              | 37        | 18        | 16QAM      | 16.27                   | 15.38              |
| 1720.0          | 20050          | 15              | 37        | 38        | 16QAM      | 16.32                   | 15.44              |
| 1720.0          | 20050          | 15              | 75        | 0         | 16QAM      | 16.41                   | 15.53              |
|                 |                |                 |           |           |            |                         |                    |
| 1732.5          | 20175          | 15              | 1         | 0         | QPSK       | 18.36                   | 18.34              |
| 1732.5          | 20175          | 15              | 1         | 36        | QPSK       | 18.29                   | 18.31              |
| 1732.5          | 20175          | 15              | 1         | 74        | QPSK       | 18.25                   | 18.32              |
| 1732.5          | 20175          | 15              | 37        | 0         | QPSK       | 17.36                   | 16.36              |
| 1732.5          | 20175          | 15              | 37        | 18        | QPSK       | 17.33                   | 16.41              |
| 1732.5          | 20175          | 15              | 37        | 38        | QPSK       | 17.29                   | 16.35              |
| 1732.5          | 20175          | 15              | 75        | 0         | QPSK       | 17.37                   | 16.42              |

(Table for LTE1700/2100 / 354106/05/000902/3 continues)

(Table for LTE1700/2100 / 354106/05/000902/3 continues)

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1732.5          | 20175          | 15              | 1         | 0         | 16QAM      | 17.32                   | 17.31              |
| 1732.5          | 20175          | 15              | 1         | 36        | 16QAM      | 17.31                   | 17.35              |
| 1732.5          | 20175          | 15              | 1         | 74        | 16QAM      | 17.38                   | 17.28              |
| 1732.5          | 20175          | 15              | 37        | 0         | 16QAM      | 16.35                   | 15.53              |
| 1732.5          | 20175          | 15              | 37        | 18        | 16QAM      | 16.44                   | 15.42              |
| 1732.5          | 20175          | 15              | 37        | 38        | 16QAM      | 16.33                   | 15.36              |
| 1732.5          | 20175          | 15              | 75        | 0         | 16QAM      | 16.37                   | 15.53              |
|                 |                |                 |           |           |            |                         |                    |
| 1745.0          | 20300          | 15              | 1         | 0         | QPSK       | 18.30                   | 18.36              |
| 1745.0          | 20300          | 15              | 1         | 36        | QPSK       | 18.32                   | 18.38              |
| 1745.0          | 20300          | 15              | 1         | 74        | QPSK       | 18.29                   | 18.35              |
| 1745.0          | 20300          | 15              | 37        | 0         | QPSK       | 17.22                   | 16.28              |
| 1745.0          | 20300          | 15              | 37        | 18        | QPSK       | 17.39                   | 16.42              |
| 1745.0          | 20300          | 15              | 37        | 38        | QPSK       | 17.33                   | 16.48              |
| 1745.0          | 20300          | 15              | 75        | 0         | QPSK       | 17.24                   | 16.43              |
| 1745.0          | 20300          | 15              | 1         | 0         | 16QAM      | 17.22                   | 17.24              |
| 1745.0          | 20300          | 15              | 1         | 36        | 16QAM      | 17.29                   | 17.29              |
| 1745.0          | 20300          | 15              | 1         | 74        | 16QAM      | 17.37                   | 17.37              |
| 1745.0          | 20300          | 15              | 37        | 0         | 16QAM      | 16.40                   | 15.53              |
| 1745.0          | 20300          | 15              | 37        | 18        | 16QAM      | 16.42                   | 15.48              |
| 1745.0          | 20300          | 15              | 37        | 38        | 16QAM      | 16.47                   | 15.44              |
| 1745.0          | 20300          | 15              | 75        | 0         | 16QAM      | 16.25                   | 15.28              |
|                 |                |                 |           |           |            |                         |                    |
| 1720.0          | 20050          | 20              | 1         | 0         | QPSK       | 18.25                   | 18.35              |
| 1720.0          | 20050          | 20              | 1         | 49        | QPSK       | 18.39                   | 18.33              |
| 1720.0          | 20050          | 20              | 1         | 99        | QPSK       | 18.36                   | 18.30              |
| 1720.0          | 20050          | 20              | 50        | 0         | QPSK       | 17.42                   | 16.44              |
| 1720.0          | 20050          | 20              | 50        | 24        | QPSK       | 17.44                   | 16.48              |
| 1720.0          | 20050          | 20              | 50        | 50        | QPSK       | 17.36                   | 16.38              |
| 1720.0          | 20050          | 20              | 100       | 0         | QPSK       | 17.33                   | 16.32              |
| 1720.0          | 20050          | 20              | 1         | 0         | 16QAM      | 17.27                   | 17.33              |
| 1720.0          | 20050          | 20              | 1         | 49        | 16QAM      | 17.32                   | 17.36              |
| 1720.0          | 20050          | 20              | 1         | 99        | 16QAM      | 17.35                   | 17.44              |
| 1720.0          | 20050          | 20              | 50        | 0         | 16QAM      | 16.37                   | 15.47              |
| 1720.0          | 20050          | 20              | 50        | 24        | 16QAM      | 16.29                   | 15.38              |
| 1720.0          | 20050          | 20              | 50        | 50        | 16QAM      | 16.42                   | 15.48              |
| 1720.0          | 20050          | 20              | 100       | 0         | 16QAM      | 16.27                   | 15.39              |

(Table for LTE1700/2100 / 354106/05/000902/3 continues)

(Table for LTE1700/2100 / 354106/05/000902/3 continues)

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1732.5          | 20175          | 20              | 1         | 0         | QPSK       | 18.34                   | 18.38              |
| 1732.5          | 20175          | 20              | 1         | 49        | QPSK       | 18.36                   | 18.33              |
| 1732.5          | 20175          | 20              | 1         | 99        | QPSK       | 18.34                   | 18.31              |
| 1732.5          | 20175          | 20              | 50        | 0         | QPSK       | 17.31                   | 16.38              |
| 1732.5          | 20175          | 20              | 50        | 24        | QPSK       | 17.42                   | 16.43              |
| 1732.5          | 20175          | 20              | 50        | 50        | QPSK       | 17.46                   | 16.46              |
| 1732.5          | 20175          | 20              | 100       | 0         | QPSK       | 17.29                   | 16.31              |
| 1732.5          | 20175          | 20              | 1         | 0         | 16QAM      | 17.34                   | 17.34              |
| 1732.5          | 20175          | 20              | 1         | 49        | 16QAM      | 17.32                   | 17.27              |
| 1732.5          | 20175          | 20              | 1         | 99        | 16QAM      | 17.35                   | 17.29              |
| 1732.5          | 20175          | 20              | 50        | 0         | 16QAM      | 16.36                   | 15.44              |
| 1732.5          | 20175          | 20              | 50        | 24        | 16QAM      | 16.31                   | 15.39              |
| 1732.5          | 20175          | 20              | 50        | 50        | 16QAM      | 16.37                   | 15.46              |
| 1732.5          | 20175          | 20              | 100       | 0         | 16QAM      | 16.33                   | 15.45              |
|                 |                |                 |           |           |            |                         |                    |
| 1745.0          | 20300          | 20              | 1         | 0         | QPSK       | 18.41                   | 18.31              |
| 1745.0          | 20300          | 20              | 1         | 49        | QPSK       | 18.32                   | 18.33              |
| 1745.0          | 20300          | 20              | 1         | 99        | QPSK       | 18.33                   | 18.37              |
| 1745.0          | 20300          | 20              | 50        | 0         | QPSK       | 17.12                   | 16.24              |
| 1745.0          | 20300          | 20              | 50        | 24        | QPSK       | 17.31                   | 16.32              |
| 1745.0          | 20300          | 20              | 50        | 50        | QPSK       | 17.18                   | 16.10              |
| 1745.0          | 20300          | 20              | 100       | 0         | QPSK       | 17.16                   | 16.21              |
| 1745.0          | 20300          | 20              | 1         | 0         | 16QAM      | 17.38                   | 17.39              |
| 1745.0          | 20300          | 20              | 1         | 49        | 16QAM      | 17.37                   | 17.34              |
| 1745.0          | 20300          | 20              | 1         | 99        | 16QAM      | 17.34                   | 17.38              |
| 1745.0          | 20300          | 20              | 50        | 0         | 16QAM      | 16.42                   | 15.43              |
| 1745.0          | 20300          | 20              | 50        | 24        | 16QAM      | 16.39                   | 15.49              |
| 1745.0          | 20300          | 20              | 50        | 50        | 16QAM      | 16.30                   | 15.43              |
| 1745.0          | 20300          | 20              | 100       | 0         | 16QAM      | 16.29                   | 15.39              |

Type: RM-860; Serial number: 354106/05/000820/7 used for LTE1700/2100 (Band4) for Head and Body-worn SAR measurements in SVLTE mode.

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1720.0          | 20050          | 5               | 1         | 0         | QPSK       | 19.43                   | 19.35              |
| 1720.0          | 20050          | 5               | 1         | 12        | QPSK       | 19.39                   | 19.41              |
| 1720.0          | 20050          | 5               | 1         | 24        | QPSK       | 19.37                   | 19.40              |
| 1720.0          | 20050          | 5               | 12        | 0         | QPSK       | 18.49                   | 17.57              |
| 1720.0          | 20050          | 5               | 12        | 6         | QPSK       | 18.47                   | 17.48              |
| 1720.0          | 20050          | 5               | 12        | 13        | QPSK       | 18.41                   | 17.40              |
| 1720.0          | 20050          | 5               | 25        | 0         | QPSK       | 18.44                   | 17.49              |
| 1720.0          | 20050          | 5               | 1         | 0         | 16QAM      | 18.10                   | 17.97              |
| 1720.0          | 20050          | 5               | 1         | 12        | 16QAM      | 17.97                   | 18.05              |
| 1720.0          | 20050          | 5               | 1         | 24        | 16QAM      | 18.20                   | 18.12              |
| 1720.0          | 20050          | 5               | 12        | 0         | 16QAM      | 17.06                   | 16.16              |
| 1720.0          | 20050          | 5               | 12        | 6         | 16QAM      | 17.12                   | 16.23              |
| 1720.0          | 20050          | 5               | 12        | 13        | 16QAM      | 17.26                   | 16.34              |
| 1720.0          | 20050          | 5               | 25        | 0         | 16QAM      | 17.10                   | 16.22              |
|                 |                |                 |           |           |            |                         |                    |
| 1732.5          | 20175          | 5               | 1         | 0         | QPSK       | 19.39                   | 19.37              |
| 1732.5          | 20175          | 5               | 1         | 12        | QPSK       | 19.33                   | 19.37              |
| 1732.5          | 20175          | 5               | 1         | 24        | QPSK       | 19.36                   | 19.44              |
| 1732.5          | 20175          | 5               | 12        | 0         | QPSK       | 18.41                   | 17.52              |
| 1732.5          | 20175          | 5               | 12        | 6         | QPSK       | 18.56                   | 17.51              |
| 1732.5          | 20175          | 5               | 12        | 13        | QPSK       | 18.51                   | 17.53              |
| 1732.5          | 20175          | 5               | 25        | 0         | QPSK       | 18.51                   | 17.33              |
| 1732.5          | 20175          | 5               | 1         | 0         | 16QAM      | 18.12                   | 18.00              |
| 1732.5          | 20175          | 5               | 1         | 12        | 16QAM      | 18.02                   | 17.97              |
| 1732.5          | 20175          | 5               | 1         | 24        | 16QAM      | 17.92                   | 18.03              |
| 1732.5          | 20175          | 5               | 12        | 0         | 16QAM      | 17.20                   | 16.31              |
| 1732.5          | 20175          | 5               | 12        | 6         | 16QAM      | 17.21                   | 16.41              |
| 1732.5          | 20175          | 5               | 12        | 13        | 16QAM      | 17.23                   | 16.31              |
| 1732.5          | 20175          | 5               | 25        | 0         | 16QAM      | 17.05                   | 16.25              |
|                 |                |                 |           |           |            |                         |                    |
| 1745.0          | 20300          | 5               | 1         | 0         | QPSK       | 19.41                   | 19.40              |
| 1745.0          | 20300          | 5               | 1         | 12        | QPSK       | 19.36                   | 19.39              |
| 1745.0          | 20300          | 5               | 1         | 24        | QPSK       | 19.32                   | 19.30              |
| 1745.0          | 20300          | 5               | 12        | 0         | QPSK       | 18.52                   | 17.59              |
| 1745.0          | 20300          | 5               | 12        | 6         | QPSK       | 18.50                   | 17.54              |
| 1745.0          | 20300          | 5               | 12        | 13        | QPSK       | 18.42                   | 17.44              |
| 1745.0          | 20300          | 5               | 25        | 0         | QPSK       | 18.59                   | 17.46              |

(Table for LTE1700/2100 / 354106/05/000820/7 continues)

(Table for LTE1700/2100 / 354106/05/000820/7 continues)

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1745.0          | 20300          | 5               | 1         | 0         | 16QAM      | 18.03                   | 17.99              |
| 1745.0          | 20300          | 5               | 1         | 12        | 16QAM      | 18.06                   | 18.03              |
| 1745.0          | 20300          | 5               | 1         | 24        | 16QAM      | 17.97                   | 18.03              |
| 1745.0          | 20300          | 5               | 12        | 0         | 16QAM      | 17.13                   | 16.22              |
| 1745.0          | 20300          | 5               | 12        | 6         | 16QAM      | 17.07                   | 16.22              |
| 1745.0          | 20300          | 5               | 12        | 13        | 16QAM      | 17.18                   | 16.32              |
| 1745.0          | 20300          | 5               | 25        | 0         | 16QAM      | 17.21                   | 16.18              |
|                 |                |                 |           |           |            |                         |                    |
| 1720.0          | 20050          | 10              | 1         | 0         | QPSK       | 19.35                   | 19.29              |
| 1720.0          | 20050          | 10              | 1         | 24        | QPSK       | 19.37                   | 19.37              |
| 1720.0          | 20050          | 10              | 1         | 49        | QPSK       | 19.42                   | 19.33              |
| 1720.0          | 20050          | 10              | 25        | 0         | QPSK       | 18.49                   | 17.49              |
| 1720.0          | 20050          | 10              | 25        | 12        | QPSK       | 18.38                   | 17.54              |
| 1720.0          | 20050          | 10              | 25        | 25        | QPSK       | 18.31                   | 17.44              |
| 1720.0          | 20050          | 10              | 50        | 0         | QPSK       | 18.44                   | 17.46              |
| 1720.0          | 20050          | 10              | 1         | 0         | 16QAM      | 17.93                   | 18.09              |
| 1720.0          | 20050          | 10              | 1         | 24        | 16QAM      | 18.05                   | 18.13              |
| 1720.0          | 20050          | 10              | 1         | 49        | 16QAM      | 18.03                   | 18.03              |
| 1720.0          | 20050          | 10              | 25        | 0         | 16QAM      | 17.33                   | 16.22              |
| 1720.0          | 20050          | 10              | 25        | 12        | 16QAM      | 17.34                   | 16.32              |
| 1720.0          | 20050          | 10              | 25        | 25        | 16QAM      | 17.43                   | 16.39              |
| 1720.0          | 20050          | 10              | 50        | 0         | 16QAM      | 17.42                   | 16.35              |
|                 |                |                 |           |           |            |                         |                    |
| 1732.5          | 20175          | 10              | 1         | 0         | QPSK       | 19.32                   | 19.43              |
| 1732.5          | 20175          | 10              | 1         | 24        | QPSK       | 19.28                   | 19.29              |
| 1732.5          | 20175          | 10              | 1         | 49        | QPSK       | 19.37                   | 19.37              |
| 1732.5          | 20175          | 10              | 25        | 0         | QPSK       | 18.39                   | 17.46              |
| 1732.5          | 20175          | 10              | 25        | 12        | QPSK       | 18.40                   | 17.48              |
| 1732.5          | 20175          | 10              | 25        | 25        | QPSK       | 18.41                   | 17.57              |
| 1732.5          | 20175          | 10              | 50        | 0         | QPSK       | 18.33                   | 17.51              |
| 1732.5          | 20175          | 10              | 1         | 0         | 16QAM      | 18.00                   | 18.17              |
| 1732.5          | 20175          | 10              | 1         | 24        | 16QAM      | 18.01                   | 18.15              |
| 1732.5          | 20175          | 10              | 1         | 49        | 16QAM      | 17.96                   | 18.13              |
| 1732.5          | 20175          | 10              | 25        | 0         | 16QAM      | 17.46                   | 16.44              |
| 1732.5          | 20175          | 10              | 25        | 12        | 16QAM      | 17.67                   | 16.49              |
| 1732.5          | 20175          | 10              | 25        | 25        | 16QAM      | 17.51                   | 16.52              |
| 1732.5          | 20175          | 10              | 50        | 0         | 16QAM      | 17.37                   | 16.45              |

(Table for LTE1700/2100 / 354106/05/000820/7 continues)

(Table for LTE1700/2100 / 354106/05/000820/7 continues)

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1745.0          | 20300          | 10              | 1         | 0         | QPSK       | 19.39                   | 19.30              |
| 1745.0          | 20300          | 10              | 1         | 24        | QPSK       | 19.31                   | 19.32              |
| 1745.0          | 20300          | 10              | 1         | 49        | QPSK       | 19.40                   | 19.36              |
| 1745.0          | 20300          | 10              | 25        | 0         | QPSK       | 18.44                   | 17.57              |
| 1745.0          | 20300          | 10              | 25        | 12        | QPSK       | 18.54                   | 17.48              |
| 1745.0          | 20300          | 10              | 25        | 25        | QPSK       | 18.43                   | 17.40              |
| 1745.0          | 20300          | 10              | 50        | 0         | QPSK       | 18.50                   | 17.49              |
| 1745.0          | 20300          | 10              | 1         | 0         | 16QAM      | 18.07                   | 17.97              |
| 1745.0          | 20300          | 10              | 1         | 24        | 16QAM      | 18.11                   | 18.05              |
| 1745.0          | 20300          | 10              | 1         | 49        | 16QAM      | 18.09                   | 18.12              |
| 1745.0          | 20300          | 10              | 25        | 0         | 16QAM      | 17.28                   | 16.16              |
| 1745.0          | 20300          | 10              | 25        | 12        | 16QAM      | 17.39                   | 16.23              |
| 1745.0          | 20300          | 10              | 25        | 25        | 16QAM      | 17.49                   | 16.41              |
| 1745.0          | 20300          | 10              | 50        | 0         | 16QAM      | 17.44                   | 16.32              |
|                 |                |                 |           |           |            |                         |                    |
| 1720.0          | 20050          | 15              | 1         | 0         | QPSK       | 19.42                   | 19.37              |
| 1720.0          | 20050          | 15              | 1         | 36        | QPSK       | 19.37                   | 19.37              |
| 1720.0          | 20050          | 15              | 1         | 74        | QPSK       | 19.33                   | 19.44              |
| 1720.0          | 20050          | 15              | 37        | 0         | QPSK       | 18.33                   | 17.52              |
| 1720.0          | 20050          | 15              | 37        | 18        | QPSK       | 18.36                   | 17.51              |
| 1720.0          | 20050          | 15              | 37        | 38        | QPSK       | 18.42                   | 17.53              |
| 1720.0          | 20050          | 15              | 75        | 0         | QPSK       | 18.49                   | 17.33              |
| 1720.0          | 20050          | 15              | 1         | 0         | 16QAM      | 18.21                   | 18.10              |
| 1720.0          | 20050          | 15              | 1         | 36        | 16QAM      | 18.23                   | 18.07              |
| 1720.0          | 20050          | 15              | 1         | 74        | 16QAM      | 18.09                   | 18.03              |
| 1720.0          | 20050          | 15              | 37        | 0         | 16QAM      | 17.54                   | 16.41              |
| 1720.0          | 20050          | 15              | 37        | 18        | 16QAM      | 17.58                   | 16.41              |
| 1720.0          | 20050          | 15              | 37        | 38        | 16QAM      | 17.44                   | 16.31              |
| 1720.0          | 20050          | 15              | 75        | 0         | 16QAM      | 17.49                   | 16.35              |
|                 |                |                 |           |           |            |                         |                    |
| 1732.5          | 20175          | 15              | 1         | 0         | QPSK       | 19.36                   | 19.40              |
| 1732.5          | 20175          | 15              | 1         | 36        | QPSK       | 19.40                   | 19.39              |
| 1732.5          | 20175          | 15              | 1         | 74        | QPSK       | 19.38                   | 19.30              |
| 1732.5          | 20175          | 15              | 37        | 0         | QPSK       | 18.40                   | 17.59              |
| 1732.5          | 20175          | 15              | 37        | 18        | QPSK       | 18.41                   | 17.54              |
| 1732.5          | 20175          | 15              | 37        | 38        | QPSK       | 18.37                   | 17.44              |
| 1732.5          | 20175          | 15              | 75        | 0         | QPSK       | 18.44                   | 17.46              |

(Table for LTE1700/2100 / 354106/05/000820/7 continues)

(Table for LTE1700/2100 / 354106/05/000820/7 continues)

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1732.5          | 20175          | 15              | 1         | 0         | 16QAM      | 18.13                   | 17.99              |
| 1732.5          | 20175          | 15              | 1         | 36        | 16QAM      | 18.15                   | 18.03              |
| 1732.5          | 20175          | 15              | 1         | 74        | 16QAM      | 18.11                   | 18.03              |
| 1732.5          | 20175          | 15              | 37        | 0         | 16QAM      | 17.47                   | 16.36              |
| 1732.5          | 20175          | 15              | 37        | 18        | 16QAM      | 17.55                   | 16.49              |
| 1732.5          | 20175          | 15              | 37        | 38        | 16QAM      | 17.53                   | 16.44              |
| 1732.5          | 20175          | 15              | 75        | 0         | 16QAM      | 17.32                   | 16.18              |
|                 |                |                 |           |           |            |                         |                    |
| 1745.0          | 20300          | 15              | 1         | 0         | QPSK       | 19.39                   | 19.35              |
| 1745.0          | 20300          | 15              | 1         | 36        | QPSK       | 19.35                   | 19.41              |
| 1745.0          | 20300          | 15              | 1         | 74        | QPSK       | 19.37                   | 19.40              |
| 1745.0          | 20300          | 15              | 37        | 0         | QPSK       | 18.38                   | 17.57              |
| 1745.0          | 20300          | 15              | 37        | 18        | QPSK       | 18.46                   | 17.48              |
| 1745.0          | 20300          | 15              | 37        | 38        | QPSK       | 18.32                   | 17.40              |
| 1745.0          | 20300          | 15              | 75        | 0         | QPSK       | 18.52                   | 17.49              |
| 1745.0          | 20300          | 15              | 1         | 0         | 16QAM      | 18.03                   | 17.97              |
| 1745.0          | 20300          | 15              | 1         | 36        | 16QAM      | 18.11                   | 18.05              |
| 1745.0          | 20300          | 15              | 1         | 74        | 16QAM      | 17.97                   | 18.12              |
| 1745.0          | 20300          | 15              | 37        | 0         | 16QAM      | 17.53                   | 16.39              |
| 1745.0          | 20300          | 15              | 37        | 18        | 16QAM      | 17.59                   | 16.43              |
| 1745.0          | 20300          | 15              | 37        | 38        | 16QAM      | 17.47                   | 16.41              |
| 1745.0          | 20300          | 15              | 75        | 0         | 16QAM      | 17.35                   | 16.22              |
|                 |                |                 |           |           |            |                         |                    |
| 1720.0          | 20050          | 20              | 1         | 0         | QPSK       | 19.37                   | 19.29              |
| 1720.0          | 20050          | 20              | 1         | 49        | QPSK       | 19.41                   | 19.37              |
| 1720.0          | 20050          | 20              | 1         | 99        | QPSK       | 19.39                   | 19.33              |
| 1720.0          | 20050          | 20              | 50        | 0         | QPSK       | 18.40                   | 17.49              |
| 1720.0          | 20050          | 20              | 50        | 24        | QPSK       | 18.49                   | 17.54              |
| 1720.0          | 20050          | 20              | 50        | 50        | QPSK       | 18.51                   | 17.44              |
| 1720.0          | 20050          | 20              | 100       | 0         | QPSK       | 18.53                   | 17.46              |
| 1720.0          | 20050          | 20              | 1         | 0         | 16QAM      | 18.28                   | 18.09              |
| 1720.0          | 20050          | 20              | 1         | 49        | 16QAM      | 18.25                   | 18.13              |
| 1720.0          | 20050          | 20              | 1         | 99        | 16QAM      | 18.12                   | 18.03              |
| 1720.0          | 20050          | 20              | 50        | 0         | 16QAM      | 17.09                   | 16.22              |
| 1720.0          | 20050          | 20              | 50        | 24        | 16QAM      | 17.34                   | 16.22              |
| 1720.0          | 20050          | 20              | 50        | 50        | 16QAM      | 17.47                   | 16.32              |
| 1720.0          | 20050          | 20              | 100       | 0         | 16QAM      | 17.32                   | 16.18              |

(Table for LTE1700/2100 / 354106/05/000820/7 continues)

(Table for LTE1700/2100 / 354106/05/000820/7 continues)

| Frequency (MHz) | Channel Number | Bandwidth (MHz) | RB Number | RB Offset | Modulation | Max Average Power (dBm) | Reduced Power(dBm) |
|-----------------|----------------|-----------------|-----------|-----------|------------|-------------------------|--------------------|
| 1732.5          | 20175          | 20              | 1         | 0         | QPSK       | 19.39                   | 19.43              |
| 1732.5          | 20175          | 20              | 1         | 49        | QPSK       | 19.38                   | 19.29              |
| 1732.5          | 20175          | 20              | 1         | 99        | QPSK       | 19.33                   | 19.37              |
| 1732.5          | 20175          | 20              | 50        | 0         | QPSK       | 18.41                   | 17.46              |
| 1732.5          | 20175          | 20              | 50        | 24        | QPSK       | 18.37                   | 17.48              |
| 1732.5          | 20175          | 20              | 50        | 50        | QPSK       | 18.43                   | 17.57              |
| 1732.5          | 20175          | 20              | 100       | 0         | QPSK       | 18.49                   | 17.61              |
| 1732.5          | 20175          | 20              | 1         | 0         | 16QAM      | 18.31                   | 18.26              |
| 1732.5          | 20175          | 20              | 1         | 49        | 16QAM      | 18.38                   | 18.28              |
| 1732.5          | 20175          | 20              | 1         | 99        | 16QAM      | 18.21                   | 18.23              |
| 1732.5          | 20175          | 20              | 50        | 0         | 16QAM      | 17.27                   | 16.44              |
| 1732.5          | 20175          | 20              | 50        | 24        | 16QAM      | 17.41                   | 16.49              |
| 1732.5          | 20175          | 20              | 50        | 50        | 16QAM      | 17.49                   | 16.52              |
| 1732.5          | 20175          | 20              | 100       | 0         | 16QAM      | 17.47                   | 16.57              |
|                 |                |                 |           |           |            |                         |                    |
| 1745.0          | 20300          | 20              | 1         | 0         | QPSK       | 19.34                   | 19.30              |
| 1745.0          | 20300          | 20              | 1         | 49        | QPSK       | 19.36                   | 19.32              |
| 1745.0          | 20300          | 20              | 1         | 99        | QPSK       | 19.27                   | 19.36              |
| 1745.0          | 20300          | 20              | 50        | 0         | QPSK       | 18.44                   | 17.57              |
| 1745.0          | 20300          | 20              | 50        | 24        | QPSK       | 18.47                   | 17.48              |
| 1745.0          | 20300          | 20              | 50        | 50        | QPSK       | 18.43                   | 17.40              |
| 1745.0          | 20300          | 20              | 100       | 0         | QPSK       | 18.47                   | 17.49              |
| 1745.0          | 20300          | 20              | 1         | 0         | 16QAM      | 18.22                   | 17.97              |
| 1745.0          | 20300          | 20              | 1         | 49        | 16QAM      | 18.34                   | 18.05              |
| 1745.0          | 20300          | 20              | 1         | 99        | 16QAM      | 18.30                   | 18.12              |
| 1745.0          | 20300          | 20              | 50        | 0         | 16QAM      | 17.22                   | 16.16              |
| 1745.0          | 20300          | 20              | 50        | 24        | 16QAM      | 17.39                   | 16.23              |
| 1745.0          | 20300          | 20              | 50        | 50        | 16QAM      | 17.31                   | 16.34              |
| 1745.0          | 20300          | 20              | 100       | 0         | 16QAM      | 17.44                   | 16.32              |

## APPENDIX H: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED CDMA TRANSMISSION MODES

### H.1 Power Tuning Targets

| <b>CDMA 800,<br/>Head, Body-worn and Wireless Router Body</b> |             |             |              |
|---------------------------------------------------------------|-------------|-------------|--------------|
| Configuration                                                 | Low channel | Mid channel | High channel |
| CDMA 1X                                                       | 23.3        | 23.3        | 23.3         |
| CDMA EVDO                                                     | 23.3        | 23.3        | 23.3         |
| <b>CDMA 1900<br/>Head and Body-worn</b>                       |             |             |              |
| Configuration                                                 | Low channel | Mid channel | High channel |
| CDMA 1X                                                       | 21.8        | 21.8        | 21.8         |
| CDMA EVDO                                                     | 21.8        | 21.8        | 21.8         |
| <b>CDMA 1900<br/>Wireless Router Body</b>                     |             |             |              |
| Configuration                                                 | Low channel | Mid channel | High channel |
| CDMA 1X                                                       | 20.4        | 20.4        | 20.4         |
| CDMA EVDO                                                     | 20.4        | 20.4        | 20.4         |

| <b>CDMA 800 for SVLTE mode</b>  |             |             |              |
|---------------------------------|-------------|-------------|--------------|
| Configuration                   | Low channel | Mid channel | High channel |
| CDMA 1X                         | 18.4        | 18.4        | 18.4         |
| CDMA EVDO                       | 18.4        | 18.4        | 18.4         |
| <b>CDMA 1900 for SVLTE mode</b> |             |             |              |
| Configuration                   | Low channel | Mid channel | High channel |
| CDMA 1X                         | 18.4        | 18.4        | 18.4         |
| CDMA EVDO                       | 18.4        | 18.4        | 18.4         |

## H.2 Conducted Power from the Samples used in the Testing

Type: RM-860; Serial number: 354106/05/000836/3 used for CDMA800 Head, Body-worn and Wireless Router SAR testing

| Band         |                |           | CDMA 800                 |                         |                         |
|--------------|----------------|-----------|--------------------------|-------------------------|-------------------------|
| Radio Config | Service Option | SCH1 Rate | CH 1013<br>824.70<br>MHz | CH 384<br>836.52<br>MHz | CH 777<br>848.31<br>MHz |
| RC1          | S01            | NA        | NA                       | NA                      | NA                      |
| RC1          | S02            | NA        | 23.93                    | 23.90                   | 23.75                   |
| RC1          | S03            | NA        | 23.95                    | 23.88                   | 23.77                   |
| RC1          | S055           | NA        | 23.96                    | 23.86                   | 23.74                   |
| RC2          | S09            | NA        | 23.92                    | 23.89                   | 23.73                   |
| RC2          | S017           | NA        | 23.97                    | 23.87                   | 23.74                   |
| RC2          | S055           | NA        | 23.96                    | 23.85                   | 23.69                   |
| RC3          | S01            | NA        | NA                       | NA                      | NA                      |
| RC3          | S02            | NA        | 23.89                    | 23.80                   | 23.69                   |
| RC3          | S03            | NA        | 23.90                    | 23.83                   | 23.72                   |
| <b>RC3</b>   | <b>S055</b>    | <b>NA</b> | <b>23.94</b>             | <b>23.80</b>            | <b>23.72</b>            |
| RC3          | S032           | 0         | 23.97                    | 23.85                   | 23.76                   |
| RC3          | S032           | 9.6       | 23.90                    | 23.77                   | 23.67                   |
| RC3          | S032           | 19.2      | 23.93                    | 23.78                   | 23.69                   |
| RC3          | S032           | 38.4      | 23.95                    | 23.75                   | 23.70                   |
| RC3          | S032           | 76.8      | 23.90                    | 23.75                   | 23.70                   |
| RC3          | S032           | 153.6     | 23.91                    | 23.76                   | 23.72                   |
| RC3          | S033           | 9.6       | NA                       | NA                      | NA                      |
| RC3          | S033           | 19.2      | NA                       | NA                      | NA                      |
| RC3          | S033           | 38.4      | NA                       | NA                      | NA                      |
| RC3          | S033           | 76.8      | NA                       | NA                      | NA                      |
| RC3          | S033           | 153.6     | NA                       | NA                      | NA                      |

(Tables for CDMA800 / 354106/05/000836/3 continues)

(Tables for CDMA800 / 354106/05/000836/3 continues)

|     |      |       |       |       |       |
|-----|------|-------|-------|-------|-------|
| RC4 | S01  | NA    | NA    | NA    | NA    |
| RC4 | S02  | NA    | 23.95 | 23.81 | 23.68 |
| RC4 | S03  | NA    | 23.92 | 23.75 | 23.67 |
| RC4 | S055 | NA    | 23.93 | 23.85 | 23.71 |
| RC4 | S032 | 0     | 23.89 | 23.88 | 23.68 |
| RC4 | S032 | 9.6   | 23.94 | 23.81 | 23.75 |
| RC4 | S032 | 19.2  | 23.95 | 23.74 | 23.77 |
| RC4 | S032 | 38.4  | 23.88 | 23.79 | 23.73 |
| RC4 | S032 | 76.8  | 23.89 | 23.77 | 23.65 |
| RC4 | S032 | 153.6 | 23.91 | 23.82 | 23.68 |
| RC4 | S033 | 9.6   | NA    | NA    | NA    |
| RC4 | S033 | 19.2  | NA    | NA    | NA    |
| RC4 | S033 | 38.4  | NA    | NA    | NA    |
| RC4 | S033 | 76.8  | NA    | NA    | NA    |
| RC4 | S033 | 153.6 | NA    | NA    | NA    |
| RC5 | S09  | NA    | 23.92 | 23.71 | 23.68 |
| RC5 | S017 | NA    | 23.94 | 23.79 | 23.65 |
| RC5 | S055 | NA    | 23.90 | 23.85 | 23.64 |
| RC5 | S033 | 9.6   | NA    | NA    | NA    |
| RC5 | S033 | 19.2  | NA    | NA    | NA    |
| RC5 | S033 | 38.4  | NA    | NA    | NA    |
| RC5 | S033 | 76.8  | NA    | NA    | NA    |
| RC5 | S033 | 153.6 | NA    | NA    | NA    |

EVDO Rev 0

| Radio Config | Data Rate | 1013  | 384   | 777   |
|--------------|-----------|-------|-------|-------|
| RTAP         | 9.6       | 23.84 | 23.71 | 23.63 |
| RTAP         | 19.2      | 23.87 | 23.69 | 23.61 |
| RTAP         | 38.4      | 23.86 | 23.76 | 23.59 |
| RTAP         | 76.8      | 23.82 | 23.67 | 23.65 |
| RTAP         | 153.6     | 23.85 | 23.70 | 23.68 |

(Tables for CDMA800 / 354106/05/000836/3 continues)

(Tables for CDMA800 / 354106/05/000836/3 continues)

**EVDO Rev A**

| <b>Radio Config</b> | <b>Pckt Size</b> | <b>1013</b> | <b>384</b> | <b>777</b> |
|---------------------|------------------|-------------|------------|------------|
| RETAP               | 256              | 23.83       | 23.69      | 23.66      |
| RETAP               | 512              | 23.86       | 23.72      | 23.62      |
| RETAP               | 1024             | 23.85       | 23.76      | 23.63      |
| RETAP               | 2048             | 23.87       | 23.73      | 23.65      |
| RETAP               | 3072             | 23.85       | 23.69      | 23.60      |
| RETAP               | 6144             | 23.87       | 23.68      | 23.60      |
| RETAP               | 12288            | 23.91       | 23.75      | 23.59      |

Type: RM-860; Serial number: 354106/05/000899/1 used for CDMA1900 Head and Body-worn SAR testing

| Band         |                |           | CDMA 1900               |                         |                           |
|--------------|----------------|-----------|-------------------------|-------------------------|---------------------------|
| Radio Config | Service Option | SCH1 Rate | CH 25<br>1851.25<br>MHz | CH 600<br>1880.0<br>MHz | CH 1175<br>1908.75<br>MHz |
| RC1          | S01            | NA        | NA                      | NA                      | NA                        |
| RC1          | S02            | NA        | 21.97                   | 22.16                   | 22.29                     |
| RC1          | S03            | NA        | 21.92                   | 22.29                   | 22.15                     |
| RC1          | S055           | NA        | 21.91                   | 22.06                   | 22.23                     |
| RC2          | S09            | NA        | 21.90                   | 22.16                   | 22.23                     |
| RC2          | S017           | NA        | 22.12                   | 21.96                   | 22.17                     |
| RC2          | S055           | NA        | 22.27                   | 22.24                   | 22.26                     |
| RC3          | S01            | NA        | NA                      | NA                      | NA                        |
| RC3          | S02            | NA        | 22.26                   | 21.99                   | 22.11                     |
| RC3          | S03            | NA        | 22.18                   | 22.22                   | 22.12                     |
| <b>RC3</b>   | <b>S055</b>    | <b>NA</b> | <b>22.18</b>            | <b>22.26</b>            | <b>22.19</b>              |
| RC3          | S032           | 0         | 22.21                   | 21.91                   | 22.04                     |
| RC3          | S032           | 9.6       | 22.10                   | 22.18                   | 22.02                     |
| RC3          | S032           | 19.2      | 21.98                   | 22.08                   | 22.00                     |
| RC3          | S032           | 38.4      | 22.03                   | 22.22                   | 21.97                     |
| RC3          | S032           | 76.8      | 22.17                   | 22.26                   | 22.06                     |
| RC3          | S032           | 153.6     | 22.10                   | 22.12                   | 22.03                     |
| RC3          | S033           | 9.6       | NA                      | NA                      | NA                        |
| RC3          | S033           | 19.2      | NA                      | NA                      | NA                        |
| RC3          | S033           | 38.4      | NA                      | NA                      | NA                        |
| RC3          | S033           | 76.8      | NA                      | NA                      | NA                        |
| RC3          | S033           | 153.6     | NA                      | NA                      | NA                        |

(Tables for CDMA1900 / 354106/05/000899/1 continues)

(Tables for CDMA1900 / 354106/05/000899/1 continues)

|     |      |       |       |       |       |
|-----|------|-------|-------|-------|-------|
| RC4 | S01  | NA    | NA    | NA    | NA    |
| RC4 | S02  | NA    | 22.16 | 22.09 | 22.00 |
| RC4 | S03  | NA    | 22.05 | 22.08 | 21.97 |
| RC4 | S055 | NA    | 22.03 | 22.23 | 22.03 |
| RC4 | S032 | 0     | 22.06 | 22.18 | 21.94 |
| RC4 | S032 | 9.6   | 21.97 | 22.22 | 21.97 |
| RC4 | S032 | 19.2  | 21.97 | 22.07 | 22.03 |
| RC4 | S032 | 38.4  | 21.91 | 22.14 | 21.95 |
| RC4 | S032 | 76.8  | 22.03 | 22.15 | 21.94 |
| RC4 | S032 | 153.6 | 21.97 | 22.11 | 21.94 |
| RC4 | S033 | 9.6   | NA    | NA    | NA    |
| RC4 | S033 | 19.2  | NA    | NA    | NA    |
| RC4 | S033 | 38.4  | NA    | NA    | NA    |
| RC4 | S033 | 76.8  | NA    | NA    | NA    |
| RC4 | S033 | 153.6 | NA    | NA    | NA    |
| RC5 | S09  | NA    | 22.03 | 22.07 | 21.95 |
| RC5 | S017 | NA    | 22.13 | 22.15 | 21.93 |
| RC5 | S055 | NA    | 22.08 | 22.26 | 22.01 |
| RC5 | S033 | 9.6   | NA    | NA    | NA    |
| RC5 | S033 | 19.2  | NA    | NA    | NA    |
| RC5 | S033 | 38.4  | NA    | NA    | NA    |
| RC5 | S033 | 76.8  | NA    | NA    | NA    |
| RC5 | S033 | 153.6 | NA    | NA    | NA    |

**EVDO Rev 0**

| Radio Config | Data Rate | 1013  | 384   | 1175  |
|--------------|-----------|-------|-------|-------|
| RTAP         | 9.6       | 22.02 | 22.11 | 22.02 |
| RTAP         | 19.2      | 22.09 | 22.14 | 21.94 |
| RTAP         | 38.4      | 22.02 | 22.08 | 22.01 |
| RTAP         | 76.8      | 22.07 | 22.16 | 22.03 |
| RTAP         | 153.6     | 22.12 | 21.95 | 21.96 |

(Tables for CDMA1900 / 354106/05/000899/1 continues)

(Tables for CDMA1900 / 354106/05/000899/1 continues)

**EVDO Rev A**

| Radio Config | Pckt Size | 1013  | 384   | 1175  |
|--------------|-----------|-------|-------|-------|
| RETAP        | 256       | 22.17 | 22.08 | 22.13 |
| RETAP        | 512       | 22.05 | 22.10 | 22.13 |
| RETAP        | 1024      | 22.27 | 22.11 | 22.14 |
| RETAP        | 2048      | 22.20 | 22.20 | 21.99 |
| RETAP        | 3072      | 22.15 | 22.09 | 22.02 |
| RETAP        | 6144      | 22.13 | 22.10 | 22.05 |
| RETAP        | 12288     | 22.22 | 22.03 | 22.00 |

Type: RM-860; Serial number: 354106/05/000840/5 used for CDMA1900 Wireless Router SAR testing

| Band         |                | CDMA 1900 |                         |                         |                           |
|--------------|----------------|-----------|-------------------------|-------------------------|---------------------------|
| Radio Config | Service Option | SCH1 Rate | CH 25<br>1851.25<br>MHz | CH 600<br>1880.0<br>MHz | CH 1175<br>1908.75<br>MHz |
| RC1          | S01            | NA        | NA                      | NA                      | NA                        |
| RC1          | S02            | NA        | 20.97                   | 20.81                   | 20.79                     |
| RC1          | S03            | NA        | 20.92                   | 20.80                   | 20.80                     |
| RC1          | S055           | NA        | 20.94                   | 20.79                   | 20.86                     |
| RC2          | S09            | NA        | 20.92                   | 20.82                   | 20.79                     |
| RC2          | S017           | NA        | 20.89                   | 20.78                   | 20.80                     |
| RC2          | S055           | NA        | 20.89                   | 20.77                   | 20.81                     |
| RC3          | S01            | NA        | NA                      | NA                      | NA                        |
| RC3          | S02            | NA        | 20.90                   | 20.76                   | 20.74                     |
| RC3          | S03            | NA        | 20.87                   | 20.80                   | 20.82                     |
| <b>RC3</b>   | <b>S055</b>    | <b>NA</b> | <b>20.87</b>            | <b>20.83</b>            | <b>20.78</b>              |
| RC3          | S032           | 0         | 20.89                   | 20.82                   | 20.83                     |
| RC3          | S032           | 9.6       | 20.92                   | 20.80                   | 20.77                     |
| RC3          | S032           | 19.2      | 20.95                   | 20.81                   | 20.75                     |
| RC3          | S032           | 38.4      | 20.93                   | 20.84                   | 20.85                     |
| RC3          | S032           | 76.8      | 20.88                   | 20.90                   | 20.81                     |
| RC3          | S032           | 153.6     | 20.87                   | 20.89                   | 20.78                     |
| RC3          | S033           | 9.6       | NA                      | NA                      | NA                        |
| RC3          | S033           | 19.2      | NA                      | NA                      | NA                        |
| RC3          | S033           | 38.4      | NA                      | NA                      | NA                        |
| RC3          | S033           | 76.8      | NA                      | NA                      | NA                        |
| RC3          | S033           | 153.6     | NA                      | NA                      | NA                        |

(Tables for CDMA1900 / 354106/05/000840/5 continues)

(Tables for CDMA1900 / 354106/05/000840/5 continues)

|     |      |       |       |       |       |
|-----|------|-------|-------|-------|-------|
| RC4 | S01  | NA    | NA    | NA    | NA    |
| RC4 | S02  | NA    | 20.95 | 20.87 | 20.72 |
| RC4 | S03  | NA    | 20.93 | 20.86 | 20.78 |
| RC4 | S055 | NA    | 20.92 | 20.84 | 20.81 |
| RC4 | S032 | 0     | 20.91 | 20.87 | 20.82 |
| RC4 | S032 | 9.6   | 20.90 | 20.85 | 20.77 |
| RC4 | S032 | 19.2  | 20.87 | 20.80 | 20.78 |
| RC4 | S032 | 38.4  | 20.91 | 20.81 | 20.83 |
| RC4 | S032 | 76.8  | 20.89 | 20.82 | 20.76 |
| RC4 | S032 | 153.6 | 20.99 | 20.79 | 20.79 |
| RC4 | S033 | 9.6   | NA    | NA    | NA    |
| RC4 | S033 | 19.2  | NA    | NA    | NA    |
| RC4 | S033 | 38.4  | NA    | NA    | NA    |
| RC4 | S033 | 76.8  | NA    | NA    | NA    |
| RC4 | S033 | 153.6 | NA    | NA    | NA    |
| RC5 | S09  | NA    | 20.89 | 20.75 | 20.77 |
| RC5 | S017 | NA    | 20.85 | 20.77 | 20.78 |
| RC5 | S055 | NA    | 20.87 | 20.79 | 20.78 |
| RC5 | S033 | 9.6   | NA    | NA    | NA    |
| RC5 | S033 | 19.2  | NA    | NA    | NA    |
| RC5 | S033 | 38.4  | NA    | NA    | NA    |
| RC5 | S033 | 76.8  | NA    | NA    | NA    |
| RC5 | S033 | 153.6 | NA    | NA    | NA    |

**EVDO Rev 0**

| Radio Config | Data Rate | 25    | 600   | 1175  |
|--------------|-----------|-------|-------|-------|
| RTAP         | 9.6       | 20.81 | 20.95 | 20.77 |
| RTAP         | 19.2      | 20.82 | 20.98 | 20.77 |
| RTAP         | 38.4      | 20.78 | 20.94 | 20.78 |
| RTAP         | 76.8      | 20.79 | 20.96 | 20.74 |
| RTAP         | 153.6     | 20.80 | 20.97 | 20.75 |

(Tables for CDMA1900 / 354106/05/000840/5 continues)

(Tables for CDMA1900 / 354106/05/000840/5 continues)

**EVDO Rev A**

| <b>Radio Config</b> | <b>Pckt Size</b> | <b>25</b> | <b>600</b> | <b>1175</b> |
|---------------------|------------------|-----------|------------|-------------|
| RETAP               | 256              | 20.89     | 20.95      | 20.78       |
| RETAP               | 512              | 20.88     | 20.86      | 20.79       |
| RETAP               | 1024             | 20.83     | 20.89      | 20.86       |
| RETAP               | 2048             | 20.83     | 20.90      | 20.80       |
| RETAP               | 3072             | 20.85     | 20.92      | 20.75       |
| RETAP               | 6144             | 20.82     | 20.91      | 20.80       |
| RETAP               | 12288            | 20.80     | 20.87      | 20.82       |

Type: RM-860; Serial number: 354106/05/000820/7 used for CDMA800 and CDMA1900 Head and Body-worn SAR testing in SVLTE mode

| Band         |                |           | CDMA 800                 |                         |                         | CDMA 1900               |                         |                           |
|--------------|----------------|-----------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|---------------------------|
| Radio Config | Service Option | SCH1 Rate | CH 1013<br>824.70<br>MHz | CH 384<br>836.52<br>MHz | CH 777<br>848.31<br>MHz | CH 25<br>1851.25<br>MHz | CH 600<br>1880.0<br>MHz | CH 1175<br>1908.75<br>MHz |
| RC1          | S01            | NA        | NA                       | NA                      | NA                      | NA                      | NA                      | NA                        |
| RC1          | S02            | NA        | 18.75                    | 18.84                   | 18.80                   | 18.71                   | 18.92                   | 18.90                     |
| RC1          | S03            | NA        | 18.72                    | 18.87                   | 18.77                   | 18.75                   | 18.94                   | 18.93                     |
| RC1          | S055           | NA        | 18.71                    | 18.85                   | 18.78                   | 18.77                   | 18.93                   | 18.89                     |
| RC2          | S09            | NA        | 18.80                    | 18.83                   | 18.80                   | 18.75                   | 18.94                   | 18.92                     |
| RC2          | S017           | NA        | 18.81                    | 18.86                   | 18.78                   | 18.81                   | 18.93                   | 18.90                     |
| RC2          | S055           | NA        | 18.83                    | 18.83                   | 18.76                   | 18.87                   | 18.90                   | 18.91                     |
| RC3          | S01            | NA        | NA                       | NA                      | NA                      | NA                      | NA                      | NA                        |
| RC3          | S02            | NA        | 18.82                    | 18.85                   | 18.79                   | 18.85                   | 18.93                   | 18.93                     |
| RC3          | S03            | NA        | 18.79                    | 18.87                   | 18.77                   | 18.85                   | 18.89                   | 18.93                     |
| <b>RC3</b>   | <b>S055</b>    | <b>NA</b> | <b>18.79</b>             | <b>18.89</b>            | <b>18.75</b>            | <b>18.78</b>            | <b>18.93</b>            | <b>18.87</b>              |
| RC3          | S032           | 0         | 18.82                    | 18.88                   | 18.77                   | 18.85                   | 18.90                   | 18.88                     |
| RC3          | S032           | 9.6       | 18.79                    | 18.85                   | 18.76                   | 18.82                   | 18.88                   | 18.89                     |
| RC3          | S032           | 19.2      | 18.81                    | 18.80                   | 18.75                   | 18.75                   | 18.89                   | 18.86                     |
| RC3          | S032           | 38.4      | 18.79                    | 18.84                   | 18.73                   | 18.79                   | 18.93                   | 18.86                     |
| RC3          | S032           | 76.8      | 18.77                    | 18.79                   | 18.76                   | 18.78                   | 18.91                   | 18.88                     |
| RC3          | S032           | 153.6     | 18.78                    | 18.81                   | 18.72                   | 18.77                   | 18.92                   | 18.89                     |
| RC3          | S033           | 9.6       | NA                       | NA                      | NA                      | NA                      | NA                      | NA                        |
| RC3          | S033           | 19.2      | NA                       | NA                      | NA                      | NA                      | NA                      | NA                        |
| RC3          | S033           | 38.4      | NA                       | NA                      | NA                      | NA                      | NA                      | NA                        |
| RC3          | S033           | 76.8      | NA                       | NA                      | NA                      | NA                      | NA                      | NA                        |
| RC3          | S033           | 153.6     | NA                       | NA                      | NA                      | NA                      | NA                      | NA                        |

(Tables for CDMA800 and CDMA1900 / 354106/05/000820/7 continues)

(Tables for CDMA800 and CDMA1900 / 354106/05/000820/7 continues)

|     |      |       |       |       |       |       |       |       |
|-----|------|-------|-------|-------|-------|-------|-------|-------|
| RC4 | S01  | NA    | NA    | NA    | NA    | NA    | NA    | NA    |
| RC4 | S02  | NA    | 18.79 | 18.81 | 18.72 | 18.76 | 18.90 | 18.90 |
| RC4 | S03  | NA    | 18.74 | 18.82 | 18.76 | 18.78 | 18.95 | 18.86 |
| RC4 | S055 | NA    | 18.74 | 18.84 | 18.74 | 18.87 | 18.90 | 18.89 |
| RC4 | S032 | 0     | 18.81 | 18.80 | 18.72 | 18.80 | 18.90 | 18.85 |
| RC4 | S032 | 9.6   | 18.86 | 18.89 | 18.72 | 18.81 | 18.93 | 18.87 |
| RC4 | S032 | 19.2  | 18.87 | 18.87 | 18.75 | 18.78 | 18.95 | 18.92 |
| RC4 | S032 | 38.4  | 18.86 | 18.79 | 18.77 | 18.77 | 18.95 | 18.86 |
| RC4 | S032 | 76.8  | 18.83 | 18.86 | 18.76 | 18.80 | 18.91 | 18.93 |
| RC4 | S032 | 153.6 | 18.79 | 18.85 | 18.72 | 18.75 | 18.96 | 18.85 |
| RC4 | S033 | 9.6   | NA    | NA    | NA    | NA    | NA    | NA    |
| RC4 | S033 | 19.2  | NA    | NA    | NA    | NA    | NA    | NA    |
| RC4 | S033 | 38.4  | NA    | NA    | NA    | NA    | NA    | NA    |
| RC4 | S033 | 76.8  | NA    | NA    | NA    | NA    | NA    | NA    |
| RC4 | S033 | 153.6 | NA    | NA    | NA    | NA    | NA    | NA    |
| RC5 | S09  | NA    | 18.86 | 18.89 | 18.73 | 18.81 | 18.91 | 18.85 |
| RC5 | S017 | NA    | 18.79 | 18.82 | 18.75 | 18.78 | 18.94 | 18.90 |
| RC5 | S055 | NA    | 18.78 | 18.87 | 18.76 | 18.88 | 18.93 | 18.84 |
| RC5 | S033 | 9.6   | NA    | NA    | NA    | NA    | NA    | NA    |
| RC5 | S033 | 19.2  | NA    | NA    | NA    | NA    | NA    | NA    |
| RC5 | S033 | 38.4  | NA    | NA    | NA    | NA    | NA    | NA    |
| RC5 | S033 | 76.8  | NA    | NA    | NA    | NA    | NA    | NA    |
| RC5 | S033 | 153.6 | NA    | NA    | NA    | NA    | NA    | NA    |

**EVDO Rev 0**

| Radio Config | Data Rate | 1013  | 384   | 777   | 25    | 600   | 1175  |
|--------------|-----------|-------|-------|-------|-------|-------|-------|
| RTAP         | 9.6       | 18.84 | 18.86 | 18.91 | 18.85 | 18.85 | 18.95 |
| RTAP         | 19.2      | 18.86 | 18.91 | 18.88 | 18.84 | 18.84 | 18.92 |
| RTAP         | 38.4      | 18.80 | 18.89 | 18.89 | 18.83 | 18.87 | 18.90 |
| RTAP         | 76.8      | 18.82 | 18.91 | 18.95 | 18.87 | 18.86 | 18.87 |
| RTAP         | 153.6     | 18.81 | 18.87 | 18.92 | 18.82 | 18.86 | 18.94 |

(Tables for CDMA800 and CDMA1900 / 354106/05/000820/7 continues)

(Tables for CDMA800 and CDMA1900 / 354106/05/000820/7 continues)

**EVDO Rev A**

| Radio Config | Pckt Size | 1013  | 384   | 777   | 25    | 600   | 1175  |
|--------------|-----------|-------|-------|-------|-------|-------|-------|
| RETAP        | 256       | 18.82 | 18.87 | 18.89 | 18.79 | 18.83 | 18.94 |
| RETAP        | 512       | 18.86 | 18.90 | 18.85 | 18.82 | 18.90 | 18.88 |
| RETAP        | 1024      | 18.80 | 18.88 | 18.87 | 18.86 | 18.87 | 18.92 |
| RETAP        | 2048      | 18.74 | 18.89 | 18.86 | 18.86 | 18.83 | 18.87 |
| RETAP        | 3072      | 18.80 | 18.82 | 18.92 | 18.85 | 18.90 | 18.91 |
| RETAP        | 6144      | 18.81 | 18.83 | 18.89 | 18.81 | 18.87 | 18.92 |
| RETAP        | 12288     | 18.85 | 18.88 | 18.86 | 18.81 | 18.89 | 18.94 |

## APPENDIX I: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED GSM/GPRS/EGPRS TRANSMISSION MODES

### I.1 Power Tuning Targets

| <b>GSM/GPRS/EGPRS 850</b><br><b>Head, Body-worn and Wireless Router Body</b> |             |             |              |
|------------------------------------------------------------------------------|-------------|-------------|--------------|
| Slot configuration                                                           | Low channel | Mid channel | High channel |
| GSM 1-slot                                                                   | 31.8        | 31.8        | 31.8         |
| GPRS 2-slot                                                                  | 29.3        | 29.3        | 29.3         |
| GPRS 3-slot                                                                  | 27.5        | 27.5        | 27.5         |
| GPRS 4-slot                                                                  | 26.4        | 26.4        | 26.4         |
| EGPRS 1-slot                                                                 | 26.9        | 26.9        | 26.9         |
| EGPRS 2-slot                                                                 | 26.9        | 26.9        | 26.9         |
| EGPRS 3-slot                                                                 | 24.8        | 24.8        | 24.8         |
| EGPRS 4-slot                                                                 | 23.8        | 23.8        | 23.8         |

| <b>GSM/GPRS/EGPRS 1900</b><br><b>Head and Body-worn</b> |             |             |              |
|---------------------------------------------------------|-------------|-------------|--------------|
| Slot configuration                                      | Low channel | Mid channel | High channel |
| GSM 1-slot                                              | 29.0        | 29.0        | 29.0         |
| GPRS 2-slot                                             | 25.9        | 25.9        | 25.9         |
| GPRS 3-slot                                             | 24.0        | 24.0        | 24.0         |
| GPRS 4-slot                                             | 22.8        | 22.8        | 22.8         |
| EGPRS 1-slot                                            | 26.0        | 26.0        | 26.0         |
| EGPRS 2-slot                                            | 25.9        | 25.9        | 25.9         |
| EGPRS 3-slot                                            | 23.9        | 23.9        | 23.9         |
| EGPRS 4-slot                                            | 22.9        | 22.9        | 22.9         |

| <b>GSM/GPRS/EGPRS 1900<br/>Wireless Router mode</b> |             |             |              |
|-----------------------------------------------------|-------------|-------------|--------------|
| Slot configuration                                  | Low channel | Mid channel | High channel |
| GSM 1-slot                                          | 25.5        | 25.5        | 25.5         |
| GPRS 2-slot                                         | 22.5        | 22.5        | 22.5         |
| GPRS 3-slot                                         | 20.7        | 20.7        | 20.7         |
| GPRS 4-slot                                         | 19.5        | 19.5        | 19.5         |
| EGPRS 1-slot                                        | 25.5        | 25.5        | 25.5         |
| EGPRS 2-slot                                        | 22.5        | 22.5        | 22.5         |
| EGPRS 3-slot                                        | 20.7        | 20.7        | 20.7         |
| EGPRS 4-slot                                        | 19.5        | 19.5        | 19.5         |

## I.2 Conducted Power from the Samples used in the Testing

Type: RM-860; Serial number: 354106/05/000833/0 used for

- GSM/GPRS/EGPRS850 Head, Body-worn and Wireless Router SAR measurements
- GSM/GPRS/EGPRS1900 Head and Body-worn SAR measurements

| <b>GSM/GPRS/EGPRS 850<br/>Head, Body-worn and Wireless Router</b> |                     |                     |                     |
|-------------------------------------------------------------------|---------------------|---------------------|---------------------|
| Slot configuration                                                | CH 128<br>824.2 MHz | CH 190<br>836.6 MHz | CH 251<br>848.8 MHz |
| GSM 1-slot                                                        | 32.20               | 32.28               | 32.40               |
| GPRS 2-slot                                                       | 29.65               | 29.90               | 29.90               |
| GPRS 3-slot                                                       | 27.87               | 27.95               | 27.98               |
| GPRS 4-slot                                                       | 26.75               | 26.80               | 26.80               |
| EGPRS 1-slot                                                      | 27.30               | 27.40               | 27.45               |
| EGPRS 2-slot                                                      | 27.25               | 27.32               | 27.35               |
| EGPRS 3-slot                                                      | 25.20               | 25.30               | 25.30               |
| EGPRS 4-slot                                                      | 24.20               | 24.30               | 24.25               |

| <b>GSM/GPRS/EGPRS 1900<br/>Head and Body-worn</b> |                         |                         |                         |
|---------------------------------------------------|-------------------------|-------------------------|-------------------------|
| Slot configuration                                | CH 512<br>1850.2<br>MHz | CH 661<br>1880.0<br>MHz | CH 810<br>1909.8<br>MHz |
| GSM 1-slot                                        | 29.35                   | 29.35                   | 29.40                   |
| GPRS 2-slot                                       | 26.30                   | 26.32                   | 26.50                   |
| GPRS 3-slot                                       | 24.40                   | 24.40                   | 24.65                   |
| GPRS 4-slot                                       | 23.20                   | 23.35                   | 23.45                   |
| EGPRS 1-slot                                      | 26.35                   | 26.40                   | 26.45                   |
| EGPRS 2-slot                                      | 26.30                   | 26.35                   | 26.45                   |
| EGPRS 3-slot                                      | 24.30                   | 24.35                   | 24.40                   |
| EGPRS 4-slot                                      | 23.25                   | 23.35                   | 24.40                   |

Type: RM-860; Serial number: 354106/05/000840/5 used for GSM/GPRS/EGPRS1900 Wireless Router SAR measurements

| <b>GSM/GPRS/EGPRS 1900<br/>Wireless Router mode</b> |                      |                      |                      |
|-----------------------------------------------------|----------------------|----------------------|----------------------|
| Slot configuration                                  | CH 512<br>1850.2 MHz | CH 661<br>1880.0 MHz | CH 810<br>1909.8 MHz |
| GSM 1-slot                                          | 25.90                | 26.00                | 26.10                |
| GPRS 2-slot                                         | 22.90                | 22.90                | 23.20                |
| GPRS 3-slot                                         | 21.10                | 21.20                | 21.30                |
| GPRS 4-slot                                         | 19.90                | 20.00                | 20.20                |
| EGPRS 1-slot                                        | 26.20                | 26.30                | 26.50                |
| EGPRS 2-slot                                        | 22.90                | 23.00                | 23.20                |
| EGPRS 3-slot                                        | 21.10                | 21.20                | 21.30                |
| EGPRS 4-slot                                        | 20.00                | 20.20                | 20.40                |

## APPENDIX J: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED WCDMA TRANSMISSION MODES

### J.1 Power Tuning Targets

| WCDMA 850 (Band 5)<br>Head, Body-worn and Wireless Router |             |             |              |
|-----------------------------------------------------------|-------------|-------------|--------------|
| Mode                                                      | Low channel | Mid channel | High channel |
| WCDMA                                                     | 22.9        | 22.9        | 22.9         |

| WCDMA1900 (Band 2)<br>Head and Body-worn |             |             |              |
|------------------------------------------|-------------|-------------|--------------|
| Mode                                     | Low channel | Mid channel | High channel |
| WCDMA                                    | 20.4        | 20.4        | 20.4         |

| WCDMA1900 (Band 2)<br>Wireless Router |             |             |              |
|---------------------------------------|-------------|-------------|--------------|
| Mode                                  | Low channel | Mid channel | High channel |
| WCDMA                                 | 16.4        | 16.4        | 16.4         |

## J.2 Conducted Power from the Samples used in the Testing

Type: RM-860; Serial number: 354106/05/000821/5 used for

- WCDMA850 Head, Body-worn and Wireless router SAR measurements
- WCDMA1900 Head and Body-worn SAR measurements

| WCDMA 850 (Band 5)  |             |             |              |
|---------------------|-------------|-------------|--------------|
| Mode                | Low channel | Mid channel | High channel |
| WCDMA               | 23.45       | 23.31       | 23.35        |
| WCDMA 1900 (Band 2) |             |             |              |
| Mode                | Low channel | Mid channel | High channel |
| WCDMA               | 20.91       | 20.84       | 20.82        |

Type: RM-860; Serial number: 354106/05/000840/5 used for WCDMA1900 Wireless router SAR measurements

| WCDMA 1900 (Band 2) |             |             |              |
|---------------------|-------------|-------------|--------------|
| Mode                | Low channel | Mid channel | High channel |
| WCDMA               | 16.88       | 16.84       | 16.85        |

WCDMA and HSUPA Subtest mode conducted powers, measured from a separate, fully representative sample are presented in Appendix D.

## APPENDIX K: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED WLAN TRANSMISSION MODES

### K.1 Power Tuning Targets for Head, Body-worn and Wireless Router measurements

| WLAN 2.4 GHz Tuning Target          |      |      |      |       |       |
|-------------------------------------|------|------|------|-------|-------|
| Mode                                | CH 1 | CH 2 | CH 6 | CH 10 | CH 11 |
| b-mode WLAN DSSS 1 Mbps             | 12.8 | *    | 12.8 | *     | 12.8  |
| b-mode WLAN DSSS 2 Mbps             | 12.8 | *    | 12.8 | *     | 12.8  |
| b-mode WLAN DSSS 5.5 Mbps           | 12.8 | *    | 12.8 | *     | 12.8  |
| b-mode WLAN DSSS 11 Mbps            | 12.8 | *    | 12.8 | *     | 12.8  |
| g-mode WLAN OFDM 6 Mbps             | 12.8 | *    | 12.8 | *     | 12.8  |
| g-mode WLAN OFDM 9 Mbps             | 12.8 | *    | 12.8 | *     | 12.8  |
| g-mode WLAN OFDM 12 Mbps            | 12.8 | *    | 12.8 | *     | 12.8  |
| g-mode WLAN OFDM 18 Mbps            | 12.8 | *    | 12.8 | *     | 12.8  |
| g-mode WLAN OFDM 24 Mbps            | 12.8 | *    | 12.8 | *     | 12.8  |
| g-mode WLAN OFDM 36 Mbps            | 12.8 | *    | 12.8 | *     | 12.8  |
| g-mode WLAN OFDM 48 Mbps            | 12.8 | *    | 12.8 | *     | 12.8  |
| g-mode WLAN OFDM 54 Mbps            | 12.8 | *    | 12.8 | *     | 12.8  |
| n-mode MCS 0: OFDM 6.5 / 7.25 Mbps  | 12.8 | *    | 12.8 | *     | 12.8  |
| n-mode MCS 1: OFDM 13.0 / 14.4 Mbps | 12.8 | *    | 12.8 | *     | 12.8  |
| n-mode MCS 2: OFDM 19.5 / 21.7 Mbps | 12.8 | *    | 12.8 | *     | 12.8  |
| n-mode MCS 3: OFDM 26.0 / 28.9 Mbps | 12.8 | *    | 12.8 | *     | 12.8  |
| n-mode MCS 4: OFDM 39.0 / 43.3 Mbps | 12.8 | *    | 12.8 | *     | 12.8  |
| n-mode MCS 5: OFDM 52.0 / 57.8 Mbps | 12.8 | *    | 12.8 | *     | 12.8  |
| n-mode MCS 6: OFDM 58.5 / 65.0 Mbps | 12.8 | *    | 12.8 | *     | 12.8  |
| n-mode MCS 7: OFDM 65.0 / 72.2 Mbps | 12.8 | *    | 12.8 | *     | 12.8  |

| WLAN 5GHz, tuning targets      |              |
|--------------------------------|--------------|
| Mode                           | All channels |
| WLAN OFDM 6 Mbps               | 12.0         |
| WLAN OFDM 9 Mbps               | 12.0         |
| WLAN OFDM 12 Mbps              | 12.0         |
| WLAN OFDM 18 Mbps              | 12.0         |
| WLAN OFDM 24 Mbps              | 12.0         |
| WLAN OFDM 36 Mbps              | 12.0         |
| WLAN OFDM 48 Mbps              | 12.0         |
| WLAN OFDM 54 Mbps              | 12.0         |
| MCS 0: OFDM 6.5 / 7.25 Mbps    | 12.0         |
| MCS 1: OFDM 13.0 / 14.4 Mbps   | 12.0         |
| MCS 2: OFDM 19.5 / 21.7 Mbps   | 12.0         |
| MCS 3: OFDM 26.0 / 28.9 Mbps   | 12.0         |
| MCS 4: OFDM 39.0 / 43.3 Mbps   | 12.0         |
| MCS 5: OFDM 52.0 / 57.8 Mbps   | 12.0         |
| MCS 6: OFDM 58.5 / 65.0 Mbps   | 12.0         |
| MCS 7: OFDM 65.0 / 72.2 Mbps   | 12.0         |
| MCS 0: OFDM 13.5 / 15.0 Mbps   | 10.0         |
| MCS 1: OFDM 27.0 / 30.0 Mbps   | 10.0         |
| MCS 2: OFDM 40.5 / 45.0 Mbps   | 10.0         |
| MCS 3: OFDM 54.0 / 60.0 Mbps   | 10.0         |
| MCS 4: OFDM 81.0 / 90.0 Mbps   | 10.0         |
| MCS 5: OFDM 108.0 / 120.0 Mbps | 10.0         |
| MCS 6: OFDM 121.5 / 135.0 Mbps | 10.0         |
| MCS 7: OFDM 135.0 / 150.0 Mbps | 10.0         |

## K.2 Conducted Power from the Samples used in the Testing

Type: RM-860;

Serial number: 354106/05/000891/8 used for WLAN2450 SAR Head, Body-worn and Wireless Router measurements.

| WLAN 2.4 GHz                        |       |      |       |       |       |
|-------------------------------------|-------|------|-------|-------|-------|
| Mode                                | CH 1  | CH 2 | CH 6  | CH 10 | CH 11 |
| b-mode WLAN DSSS 1 Mbps             | 13.21 | *    | 13.28 | *     | 13.80 |
| b-mode WLAN DSSS 2 Mbps             | 13.34 | *    | 13.47 | *     | 13.50 |
| b-mode WLAN DSSS 5.5 Mbps           | 13.40 | *    | 13.62 | *     | 13.53 |
| b-mode WLAN DSSS 11 Mbps            | 13.23 | *    | 14.06 | *     | 13.88 |
| g-mode WLAN OFDM 6 Mbps             | 13.61 | *    | 13.66 | *     | 13.62 |
| g-mode WLAN OFDM 9 Mbps             | 13.63 | *    | 13.34 | *     | 13.46 |
| g-mode WLAN OFDM 12 Mbps            | 13.72 | *    | 13.69 | *     | 13.37 |
| g-mode WLAN OFDM 18 Mbps            | 13.68 | *    | 13.83 | *     | 13.52 |
| g-mode WLAN OFDM 24 Mbps            | 13.56 | *    | 13.44 | *     | 13.23 |
| g-mode WLAN OFDM 36 Mbps            | 13.72 | *    | 13.64 | *     | 13.16 |
| g-mode WLAN OFDM 48 Mbps            | 13.56 | *    | 13.42 | *     | 13.47 |
| g-mode WLAN OFDM 54 Mbps            | 13.52 | *    | 13.41 | *     | 13.20 |
| n-mode MCS 0: OFDM 6.5 / 7.25 Mbps  | 13.37 | *    | 13.82 | *     | 13.78 |
| n-mode MCS 1: OFDM 13.0 / 14.4 Mbps | 13.20 | *    | 13.80 | *     | 13.58 |
| n-mode MCS 2: OFDM 19.5 / 21.7 Mbps | 13.56 | *    | 13.55 | *     | 13.57 |
| n-mode MCS 3: OFDM 26.0 / 28.9 Mbps | 13.48 | *    | 13.65 | *     | 13.47 |
| n-mode MCS 4: OFDM 39.0 / 43.3 Mbps | 13.45 | *    | 13.44 | *     | 13.56 |
| n-mode MCS 5: OFDM 52.0 / 57.8 Mbps | 13.83 | *    | 13.43 | *     | 13.17 |
| n-mode MCS 6: OFDM 58.5 / 65.0 Mbps | 13.77 | *    | 13.45 | *     | 13.36 |
| n-mode MCS 7: OFDM 65.0 / 72.2 Mbps | 13.74 | *    | 13.57 | *     | 13.31 |

Type: RM-860;

- Serial number: 354106/05/000819/9 used for WLAN5000 SAR Head and Body-worn measurements in sub-bands 1 and 3.
- Serial number: 354106/05/000737/1 used for WLAN5000 SAR Head and Body-worn measurements in sub-bands 2 and 4

| WLAN 5 GHz                   |       |       |       |       |       |       |
|------------------------------|-------|-------|-------|-------|-------|-------|
| Mode                         | 36    | 40    | 44    | 48    | 52    | 56    |
| WLAN OFDM 6 Mbps             | 12.19 | 12.68 | 12.33 | 12.25 | 12.55 | 13.10 |
| WLAN OFDM 9 Mbps             | 11.97 | 11.91 | 12.41 | 12.15 | 12.61 | 13.01 |
| WLAN OFDM 12 Mbps            | 11.99 | 12.00 | 12.12 | 12.05 | 12.63 | 12.92 |
| WLAN OFDM 18 Mbps            | 11.91 | 12.74 | 12.05 | 12.07 | 12.51 | 13.21 |
| WLAN OFDM 24 Mbps            | 11.86 | 11.92 | 12.12 | 12.19 | 12.95 | 12.77 |
| WLAN OFDM 36 Mbps            | 11.99 | 11.94 | 12.18 | 12.19 | 12.41 | 12.71 |
| WLAN OFDM 48 Mbps            | 11.93 | 12.14 | 12.07 | 12.03 | 12.66 | 12.81 |
| WLAN OFDM 54 Mbps            | 12.64 | 11.94 | 12.17 | 12.27 | 12.51 | 12.84 |
| MCS 0: OFDM 6.5 / 7.25 Mbps  | 12.02 | 12.24 | 12.42 | 12.02 | 12.79 | 13.11 |
| MCS 1: OFDM 13.0 / 14.4 Mbps | 12.07 | 11.94 | 12.45 | 12.24 | 12.52 | 12.79 |
| MCS 2: OFDM 19.5 / 21.7 Mbps | 12.28 | 12.02 | 12.08 | 12.80 | 12.73 | 13.31 |
| MCS 3: OFDM 26.0 / 28.9 Mbps | 12.25 | 11.99 | 12.81 | 12.20 | 12.45 | 12.87 |
| MCS 4: OFDM 39.0 / 43.3 Mbps | 12.07 | 11.99 | 12.36 | 12.21 | 12.60 | 13.13 |
| MCS 5: OFDM 52.0 / 57.8 Mbps | 11.86 | 11.90 | 11.95 | 12.00 | 12.59 | 13.09 |
| MCS 6: OFDM 58.5 / 65.0 Mbps | 11.80 | 11.76 | 12.05 | 11.95 | 12.45 | 12.86 |
| MCS 7: OFDM 65.0 / 72.2 Mbps | 11.97 | 11.90 | 11.99 | 12.09 | 12.50 | 12.91 |

|                                | 38   | 42   | 46   | 50   | 54    | 58    |
|--------------------------------|------|------|------|------|-------|-------|
| MCS 0: OFDM13.5 / 15.0 Mbps    | 8.99 | 9.09 | 9.27 | 9.12 | 9.76  | 10.23 |
| MCS 1: OFDM 27.0 / 30.0 Mbps   | 9.04 | 9.11 | 9.30 | 9.17 | 10.24 | 9.83  |
| MCS 2: OFDM 40.5 / 45.0 Mbps   | 8.97 | 9.18 | 9.35 | 9.13 | 10.28 | 9.86  |
| MCS 3: OFDM 54.0 / 60.0 Mbps   | 8.92 | 9.07 | 9.26 | 9.08 | 10.21 | 9.79  |
| MCS 4: OFDM 81.0 / 90.0 Mbps   | 8.94 | 9.03 | 9.31 | 9.14 | 9.76  | 9.76  |
| MCS 5: OFDM 108.0 / 120.0 Mbps | 8.92 | 9.15 | 9.30 | 9.11 | 10.23 | 9.81  |
| MCS 6: OFDM 121.5 / 135.0 Mbps | 8.99 | 9.10 | 9.30 | 9.08 | 10.24 | 10.23 |
| MCS 7: OFDM 135.0 / 150.0 Mbps | 8.99 | 9.09 | 9.29 | 9.12 | 9.77  | 9.82  |

| Mode                         | 60    | 64    | 100   | 104   | 108   | 112   |
|------------------------------|-------|-------|-------|-------|-------|-------|
| WLAN OFDM 6 Mbps             | 12.93 | 12.80 | 12.71 | 12.62 | 12.49 | 12.59 |
| WLAN OFDM 9 Mbps             | 12.57 | 13.01 | 13.15 | 13.01 | 12.33 | 12.71 |
| WLAN OFDM 12 Mbps            | 12.60 | 12.65 | 12.91 | 12.57 | 12.56 | 12.88 |
| WLAN OFDM 18 Mbps            | 12.92 | 12.70 | 12.93 | 12.67 | 12.53 | 12.83 |
| WLAN OFDM 24 Mbps            | 12.59 | 12.57 | 12.93 | 12.58 | 12.56 | 13.03 |
| WLAN OFDM 36 Mbps            | 12.90 | 13.07 | 12.90 | 12.69 | 12.37 | 12.45 |
| WLAN OFDM 48 Mbps            | 12.67 | 12.64 | 12.64 | 12.55 | 12.16 | 12.70 |
| WLAN OFDM 54 Mbps            | 12.38 | 12.64 | 13.00 | 12.17 | 12.34 | 12.23 |
| MCS 0: OFDM 6.5 / 7.25 Mbps  | 12.75 | 12.85 | 12.51 | 12.47 | 12.50 | 12.41 |
| MCS 1: OFDM 13.0 / 14.4 Mbps | 12.64 | 12.66 | 12.54 | 12.55 | 12.52 | 12.51 |
| MCS 2: OFDM 19.5 / 21.7 Mbps | 12.59 | 13.33 | 12.50 | 12.45 | 12.48 | 12.51 |
| MCS 3: OFDM 26.0 / 28.9 Mbps | 13.12 | 12.64 | 12.82 | 12.56 | 12.49 | 12.51 |
| MCS 4: OFDM 39.0 / 43.3 Mbps | 12.71 | 13.01 | 12.43 | 12.55 | 12.70 | 12.70 |
| MCS 5: OFDM 52.0 / 57.8 Mbps | 12.64 | 13.00 | 12.62 | 12.49 | 12.59 | 12.53 |
| MCS 6: OFDM 58.5 / 65.0 Mbps | 12.66 | 12.89 | 12.77 | 12.52 | 12.42 | 12.68 |
| MCS 7: OFDM 65.0 / 72.2 Mbps | 12.75 | 12.90 | 12.52 | 12.38 | 12.44 | 12.49 |

|                                | 62   | 102  | 106  | 110  | 114  | 118  |
|--------------------------------|------|------|------|------|------|------|
| MCS 0: OFDM 13.5 / 15.0 Mbps   | 9.71 | 9.61 | 9.60 | 9.60 | 9.52 | 9.36 |
| MCS 1: OFDM 27.0 / 30.0 Mbps   | 9.71 | 9.65 | 9.61 | 9.62 | 9.58 | 9.40 |
| MCS 2: OFDM 40.5 / 45.0 Mbps   | 9.66 | 9.66 | 9.59 | 9.62 | 9.54 | 9.37 |
| MCS 3: OFDM 54.0 / 60.0 Mbps   | 9.66 | 9.21 | 9.19 | 9.61 | 9.49 | 9.29 |
| MCS 4: OFDM 81.0 / 90.0 Mbps   | 9.69 | 9.18 | 9.10 | 9.66 | 9.55 | 9.33 |
| MCS 5: OFDM 108.0 / 120.0 Mbps | 9.74 | 9.63 | 9.13 | 9.51 | 9.55 | 9.33 |
| MCS 6: OFDM 121.5 / 135.0 Mbps | 9.65 | 9.61 | 9.19 | 9.66 | 9.49 | 9.33 |
| MCS 7: OFDM 135.0 / 150.0 Mbps | 9.68 | 9.20 | 9.58 | 9.58 | 9.51 | 9.37 |

| Mode                         | 116   | 120   | 124   | 128   | 132   | 136   |
|------------------------------|-------|-------|-------|-------|-------|-------|
| WLAN OFDM 6 Mbps             | 12.67 | 12.73 | 13.21 | 12.98 | 12.99 | 13.11 |
| WLAN OFDM 9 Mbps             | 13.20 | 12.40 | 12.85 | 12.51 | 13.02 | 13.09 |
| WLAN OFDM 12 Mbps            | 12.39 | 12.50 | 12.93 | 12.83 | 13.19 | 12.94 |
| WLAN OFDM 18 Mbps            | 12.61 | 12.47 | 12.98 | 12.81 | 12.96 | 13.07 |
| WLAN OFDM 24 Mbps            | 12.40 | 12.36 | 12.88 | 12.80 | 12.95 | 13.23 |
| WLAN OFDM 36 Mbps            | 12.49 | 12.45 | 12.72 | 12.98 | 12.92 | 12.83 |
| WLAN OFDM 48 Mbps            | 12.44 | 12.38 | 12.87 | 12.80 | 13.00 | 12.78 |
| WLAN OFDM 54 Mbps            | 12.54 | 12.25 | 12.87 | 12.72 | 12.65 | 12.95 |
| MCS 0: OFDM 6.5 / 7.25 Mbps  | 12.69 | 12.45 | 12.55 | 12.32 | 12.66 | 12.58 |
| MCS 1: OFDM 13.0 / 14.4 Mbps | 12.43 | 12.75 | 12.59 | 12.47 | 12.70 | 12.71 |
| MCS 2: OFDM 19.5 / 21.7 Mbps | 12.66 | 12.41 | 12.67 | 12.43 | 12.62 | 12.79 |
| MCS 3: OFDM 26.0 / 28.9 Mbps | 12.34 | 12.38 | 12.53 | 12.45 | 12.34 | 12.59 |
| MCS 4: OFDM 39.0 / 43.3 Mbps | 12.48 | 12.44 | 12.71 | 12.57 | 12.23 | 12.72 |
| MCS 5: OFDM 52.0 / 57.8 Mbps | 12.53 | 12.22 | 12.23 | 12.16 | 12.46 | 12.51 |
| MCS 6: OFDM 58.5 / 65.0 Mbps | 12.57 | 12.53 | 12.60 | 12.65 | 12.54 | 12.58 |
| MCS 7: OFDM 65.0 / 72.2 Mbps | 12.49 | 12.39 | 12.62 | 12.62 | 12.31 | 12.68 |

|                                | 122  | 126  | 130  | 134  | 138  |
|--------------------------------|------|------|------|------|------|
| MCS 0: OFDM 13.5 / 15.0 Mbps   | 9.84 | 9.46 | 9.36 | 9.69 | 9.62 |
| MCS 1: OFDM 27.0 / 30.0 Mbps   | 9.51 | 9.47 | 9.39 | 9.72 | 9.69 |
| MCS 2: OFDM 40.5 / 45.0 Mbps   | 9.52 | 9.46 | 9.77 | 9.67 | 9.72 |
| MCS 3: OFDM 54.0 / 60.0 Mbps   | 9.47 | 9.42 | 9.73 | 9.69 | 9.63 |
| MCS 4: OFDM 81.0 / 90.0 Mbps   | 9.49 | 9.46 | 9.37 | 9.69 | 9.69 |
| MCS 5: OFDM 108.0 / 120.0 Mbps | 9.53 | 9.48 | 9.70 | 9.68 | 9.66 |
| MCS 6: OFDM 121.5 / 135.0 Mbps | 9.46 | 9.47 | 9.75 | 9.65 | 9.76 |
| MCS 7: OFDM 135.0 / 150.0 Mbps | 9.47 | 9.46 | 9.72 | 9.69 | 9.65 |

| Mode                         | 140   | 149   | 153   | 157   | 161   | 165   |
|------------------------------|-------|-------|-------|-------|-------|-------|
| WLAN OFDM 6 Mbps             | 13.02 | 13.08 | 13.07 | 13.10 | 12.92 | 12.76 |
| WLAN OFDM 9 Mbps             | 13.16 | 13.14 | 13.01 | 13.09 | 12.86 | 12.66 |
| WLAN OFDM 12 Mbps            | 12.68 | 13.22 | 13.05 | 13.03 | 12.86 | 12.65 |
| WLAN OFDM 18 Mbps            | 12.68 | 13.17 | 13.03 | 12.96 | 12.85 | 12.80 |
| WLAN OFDM 24 Mbps            | 12.62 | 13.09 | 13.05 | 12.99 | 12.84 | 12.59 |
| WLAN OFDM 36 Mbps            | 12.70 | 13.05 | 12.94 | 13.15 | 12.89 | 12.72 |
| WLAN OFDM 48 Mbps            | 12.64 | 13.10 | 13.14 | 13.13 | 12.81 | 12.71 |
| WLAN OFDM 54 Mbps            | 12.40 | 13.08 | 12.99 | 12.97 | 12.96 | 12.63 |
| MCS 0: OFDM 6.5 / 7.25 Mbps  | 12.52 | 13.26 | 13.19 | 13.06 | 13.12 | 13.06 |
| MCS 1: OFDM 13.0 / 14.4 Mbps | 12.57 | 13.31 | 13.12 | 13.05 | 12.91 | 12.74 |
| MCS 2: OFDM 19.5 / 21.7 Mbps | 12.68 | 13.28 | 13.06 | 13.07 | 12.94 | 12.72 |
| MCS 3: OFDM 26.0 / 28.9 Mbps | 12.62 | 12.99 | 13.06 | 13.45 | 12.76 | 12.92 |
| MCS 4: OFDM 39.0 / 43.3 Mbps | 12.62 | 13.28 | 13.04 | 12.90 | 12.82 | 12.72 |
| MCS 5: OFDM 52.0 / 57.8 Mbps | 12.46 | 13.38 | 13.15 | 13.06 | 12.87 | 12.79 |
| MCS 6: OFDM 58.5 / 65.0 Mbps | 12.37 | 13.26 | 13.23 | 13.00 | 12.93 | 12.72 |
| MCS 7: OFDM 65.0 / 72.2 Mbps | 12.34 | 12.97 | 13.10 | 13.02 | 12.75 | 12.69 |

|                                | 151   | 155   | 159   | 163  |
|--------------------------------|-------|-------|-------|------|
| MCS 0: OFDM 13.5 / 15.0 Mbps   | 9.99  | 9.91  | 9.96  | 9.87 |
| MCS 1: OFDM 27.0 / 30.0 Mbps   | 10.03 | 9.97  | 9.99  | 9.94 |
| MCS 2: OFDM 40.5 / 45.0 Mbps   | 10.03 | 10.38 | 9.97  | 9.95 |
| MCS 3: OFDM 54.0 / 60.0 Mbps   | 10.00 | 9.95  | 9.94  | 9.93 |
| MCS 4: OFDM 81.0 / 90.0 Mbps   | 9.90  | 9.89  | 10.02 | 9.87 |
| MCS 5: OFDM 108.0 / 120.0 Mbps | 10.04 | 9.99  | 9.95  | 9.83 |
| MCS 6: OFDM 121.5 / 135.0 Mbps | 10.06 | 9.98  | 9.91  | 9.83 |
| MCS 7: OFDM 135.0 / 150.0 Mbps | 10.37 | 9.93  | 9.94  | 9.87 |