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

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

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S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Nokia Salo TCC

Certificate No: D750V3-1034_Jul11

CALIBRATION CERTIFICATE

Object: D750V3 - SN:1034

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

Calibration date: July 07, 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 ± 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:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 11, 2011

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.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.7 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.12 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**8.33 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.39 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**5.48 mW / g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.2 ± 6 %	0.96 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.20 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**8.79 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.45 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**5.80 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.8 Ω - 1.6 jΩ
Return Loss	- 28.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.1 Ω - 3.5 jΩ
Return Loss	- 28.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.033 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 06, 2011

Date: 07.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

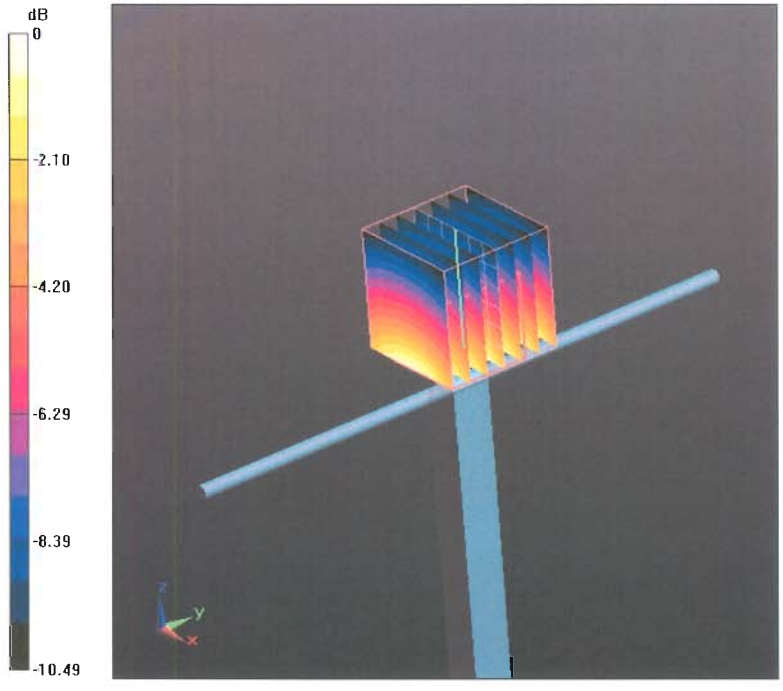
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1034

Communication System: CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.91 mho/m; ε_r = 41.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

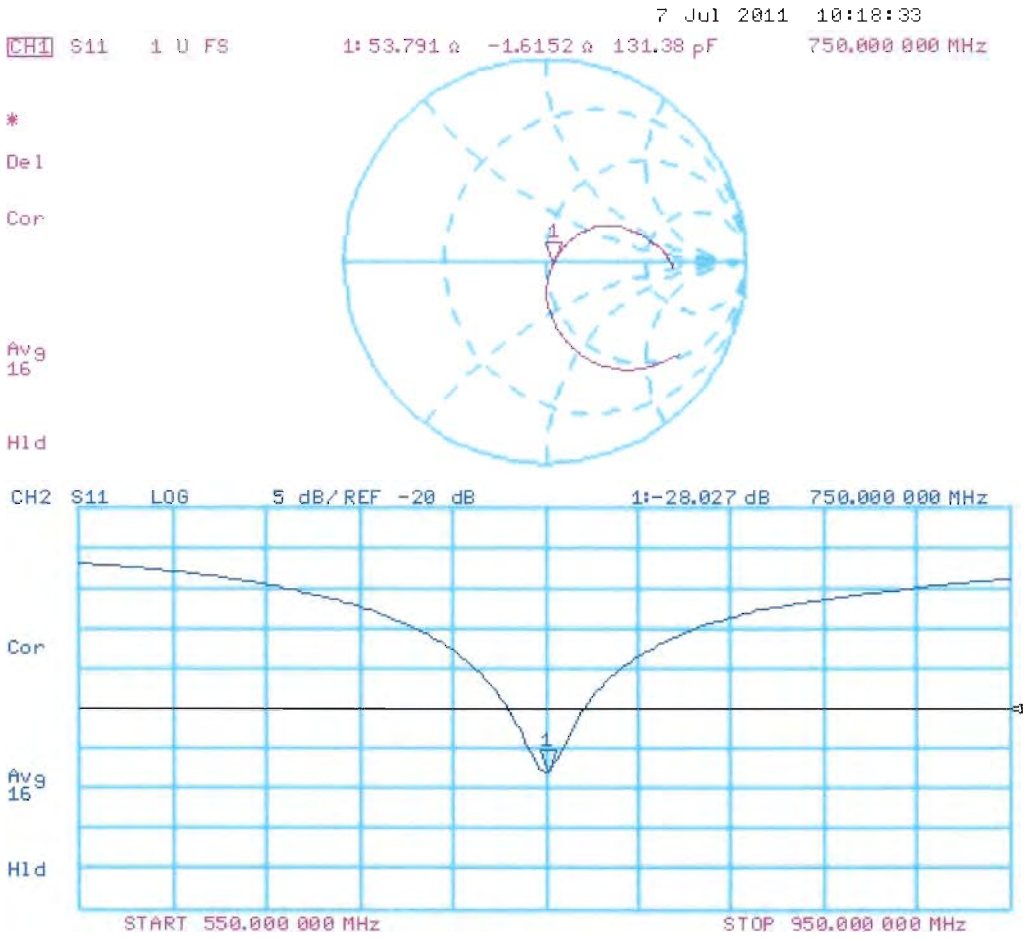
- Probe: ES3DV3 - SN3205; ConvF(6.33, 6.33, 6.33); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250mW; dip=15mm; dist=3.0mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.065 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.205 W/kg
SAR(1 g) = 2.12 mW/g; SAR(10 g) = 1.39 mW/g
Maximum value of SAR (measured) = 2.487 mW/g



0 dB = 2.490mW/g

Impedance Measurement Plot for Head TSL



Date: 07.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

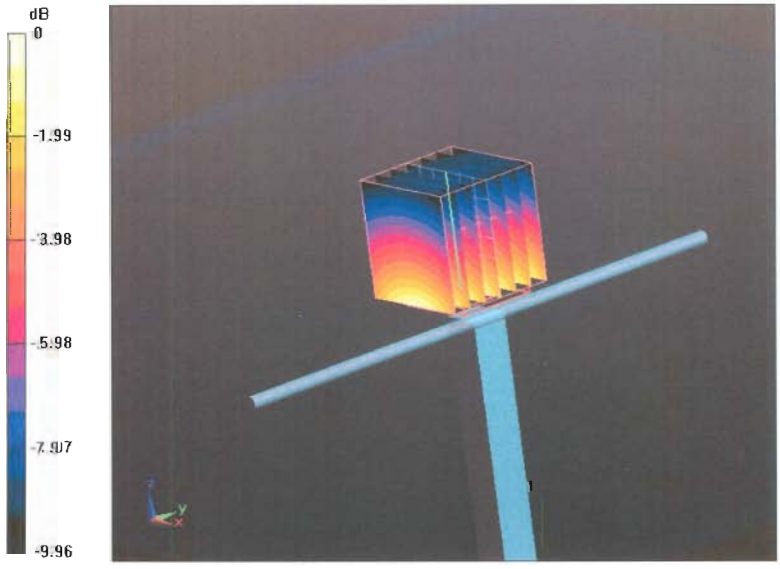
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1034

Communication System: CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.96 mho/m; ε_r = 55.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

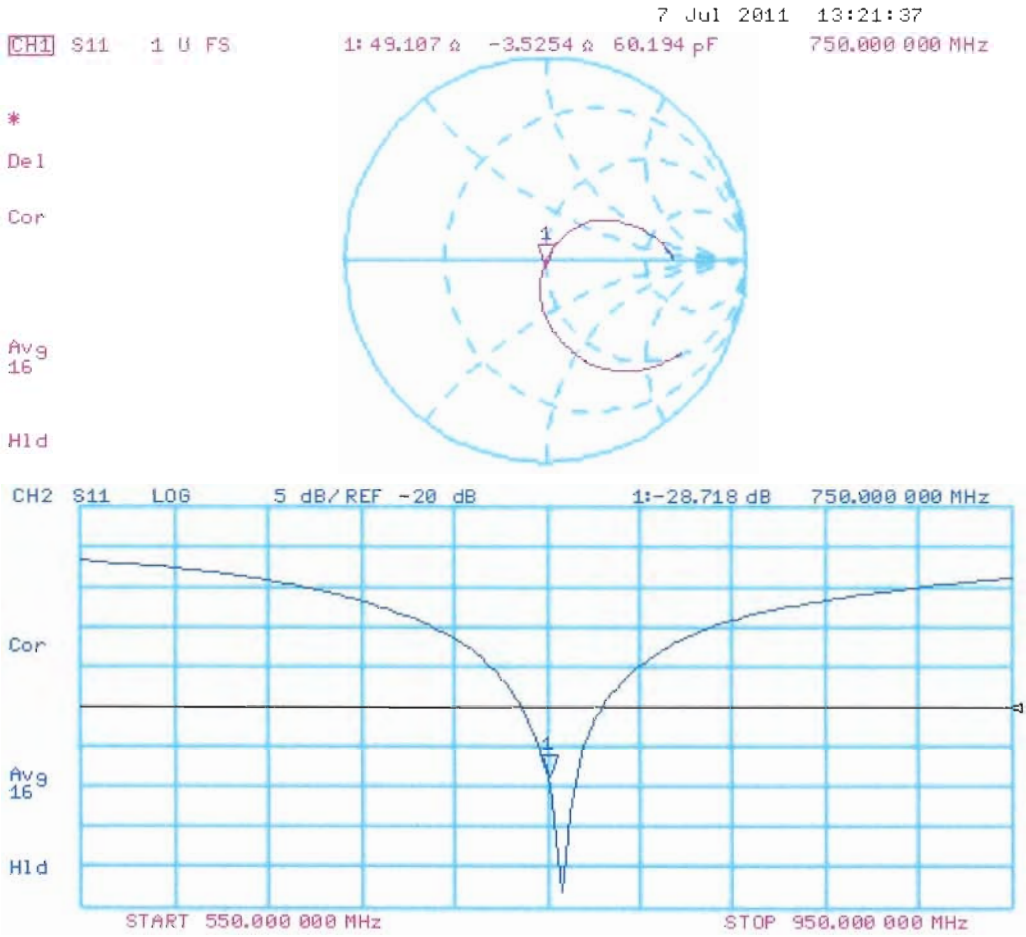
- Probe: ES3DV3 - SN3205; ConvF(6.12, 6.12, 6.12); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250mW; dip=15mm; dist=3.0mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.234 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.265 W/kg
SAR(1 g) = 2.2 mW/g; SAR(10 g) = 1.45 mW/g
Maximum value of SAR (measured) = 2.566 mW/g



0 dB = 2.570mW/g

Impedance Measurement Plot for Body TSL



Dipole D750V3 – SN: 1034 Antenna Parameters measured: 2012-05-07.

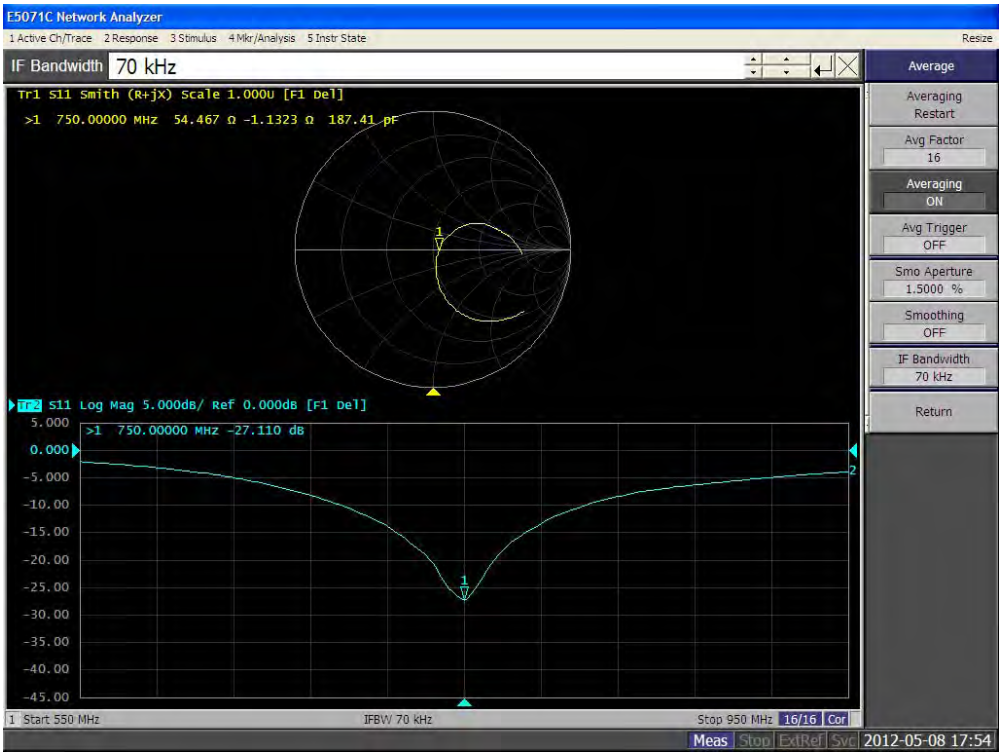
Antenna Parameters with Head TSL

	Calibration certificate	Annual measurement
Impedance, transformed to feed point	53.8 Ω - 1.6 jΩ	54.5 Ω - 1.1 jΩ
Return loss	-28.0 dB	-27.1 dB

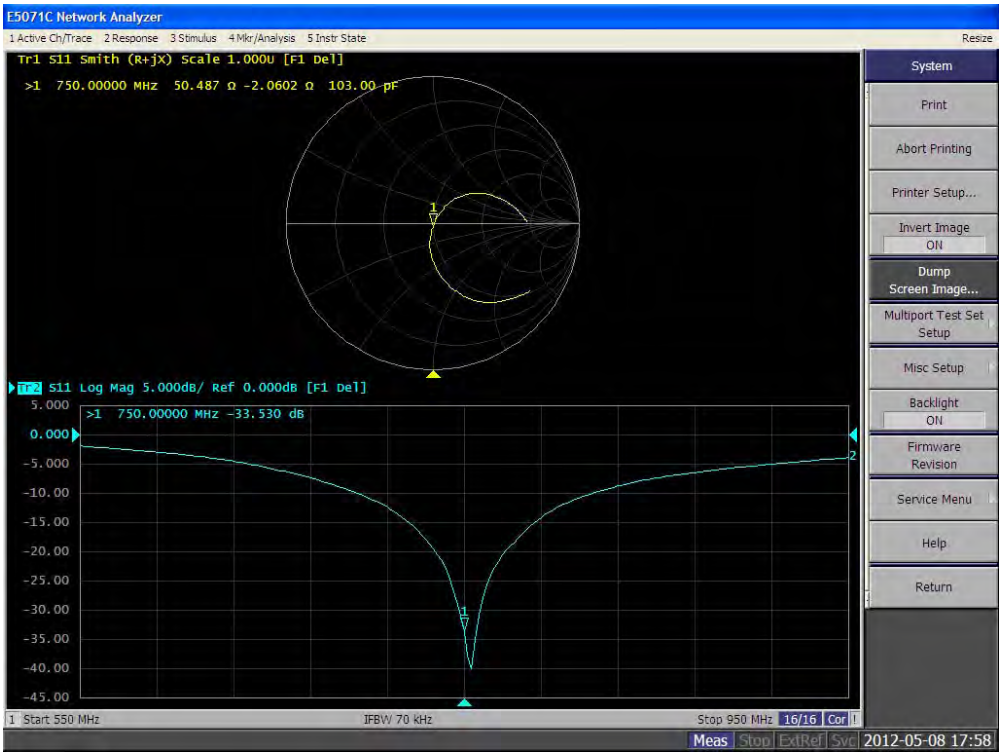
Antenna Parameters with Body TSL

	Calibration certificate	Annual measurement
Impedance, transformed to feed point	49.1 Ω - 3.5 jΩ	50.5 Ω - 2.1 jΩ
Return loss	-28.7 dB	-33.5 dB

Impedance Measurement Plot for Head TSL 750



Impedance Measurement Plot for Body TSL 750



ASSET 6987

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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 ± 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	Israe El-Naouq
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 17, 2012

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

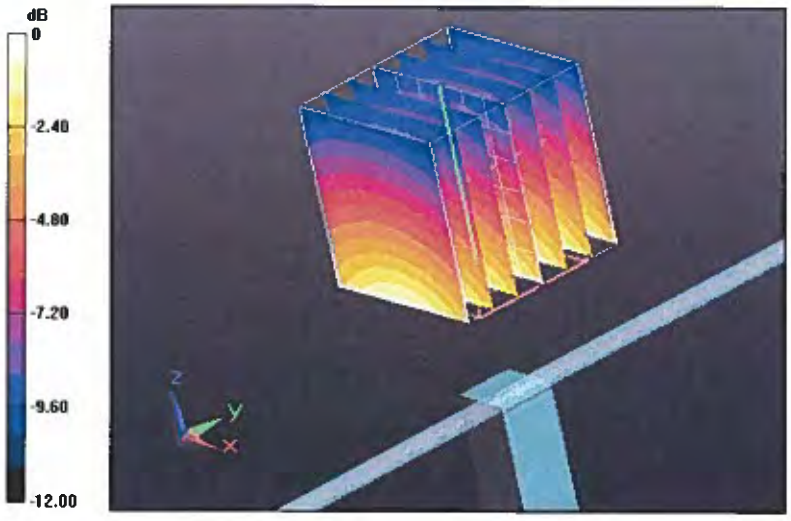
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 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



0 dB = 2.690mW/g = 8.60 dB 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

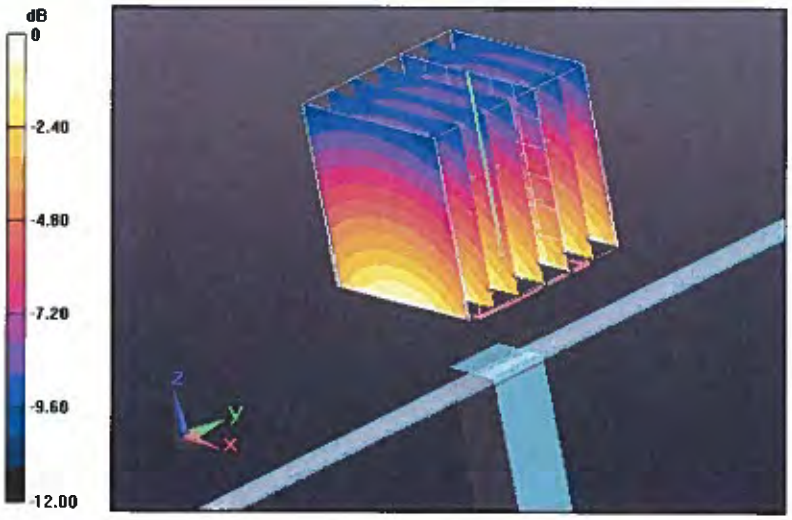
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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: 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



0 dB = 2.830mW/g = 9.04 dB mW/g

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Accreditation No.: SCS 108

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 ± 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

Date: 13.09.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

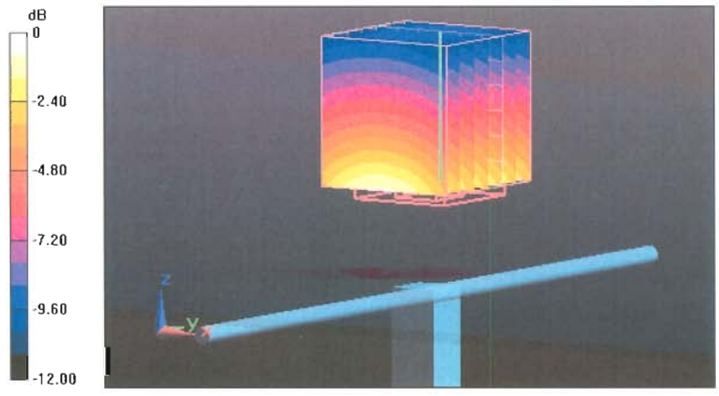
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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=5mm, dy=5mm, dz=5mm
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



0 dB = 2.710mW/g

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

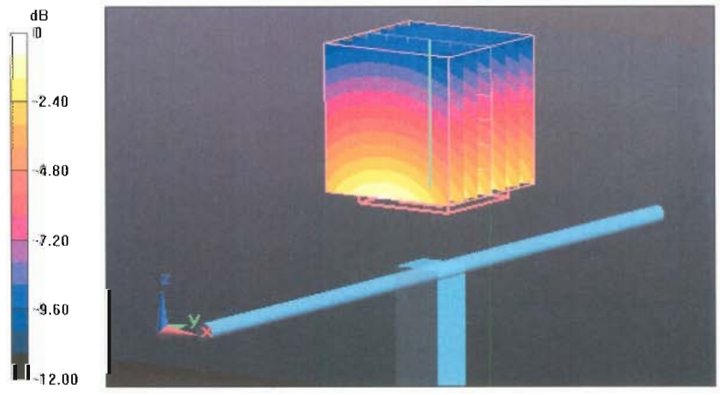
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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=5mm, dy=5mm, dz=5mm
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



0 dB = 2.850mW/g

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Schmid & Partner
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

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 ± 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 15, 2011

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.

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 ± 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 ± 0.2) °C	39.6 ± 6 %	1.43 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (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 ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (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 ± 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 ± 0.2) °C	54.2 ± 6 %	1.59 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (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 ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (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 ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.9 Ω + 6.4 jΩ
Return Loss	- 23.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.3 Ω + 6.8 jΩ
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

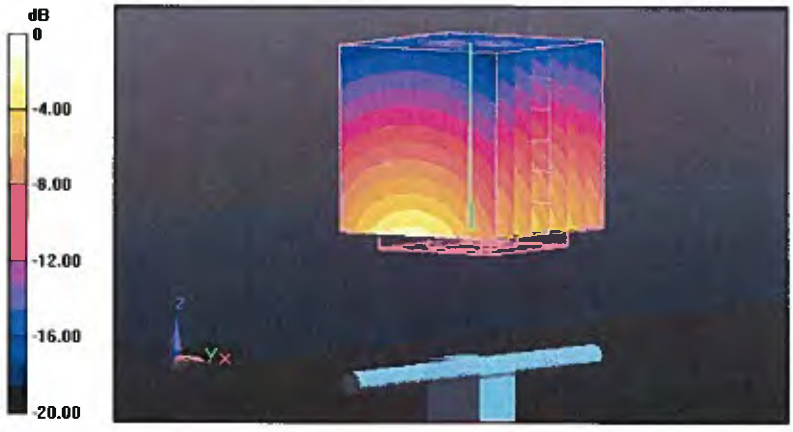
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.43 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 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)

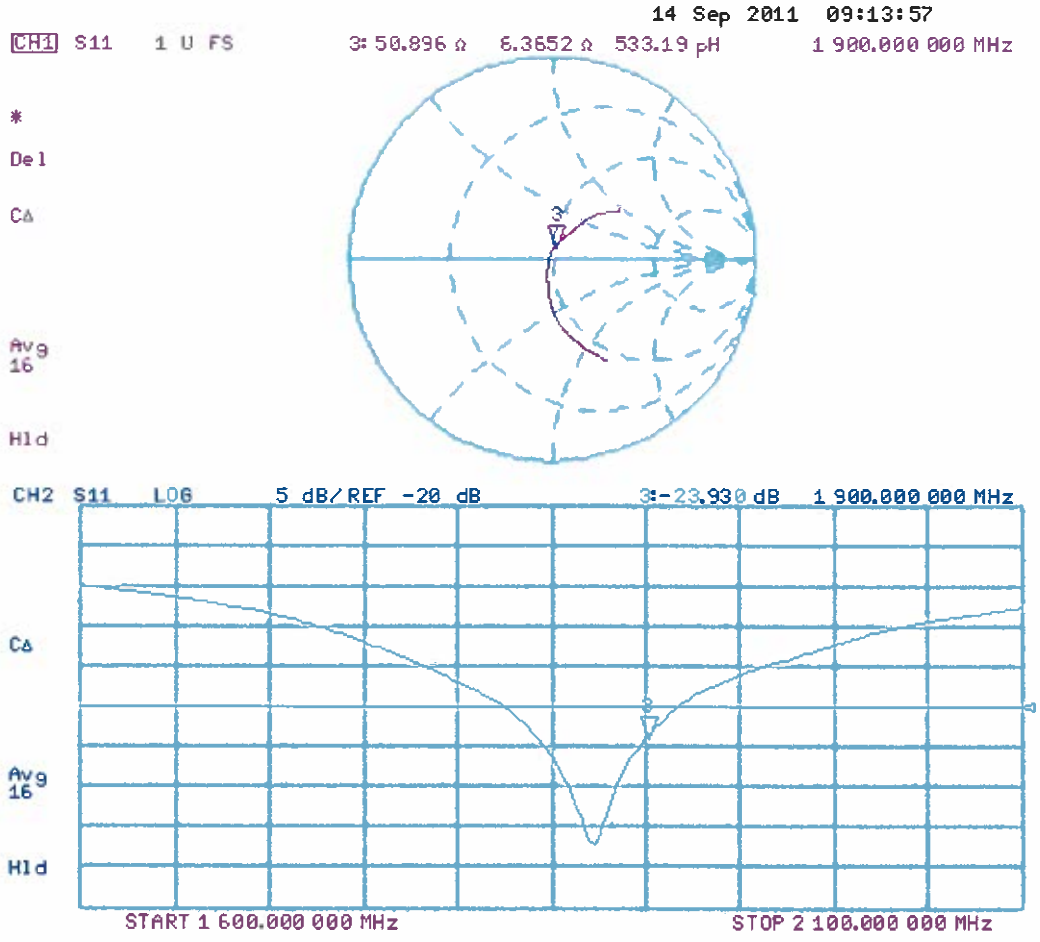
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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



0 dB = 12.760mW/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

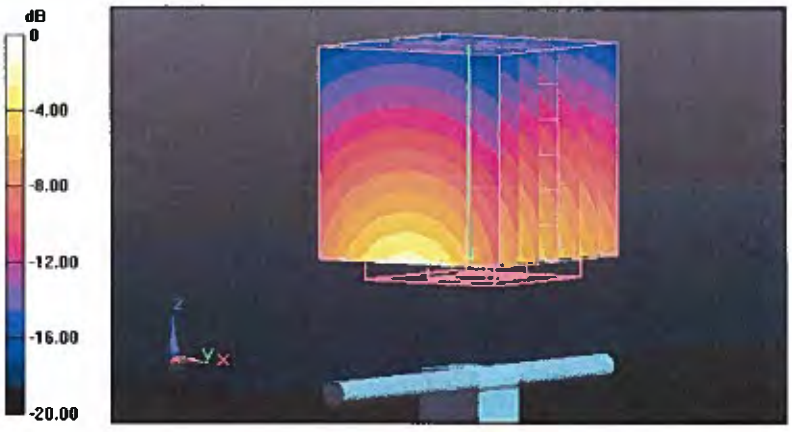
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.59 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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)

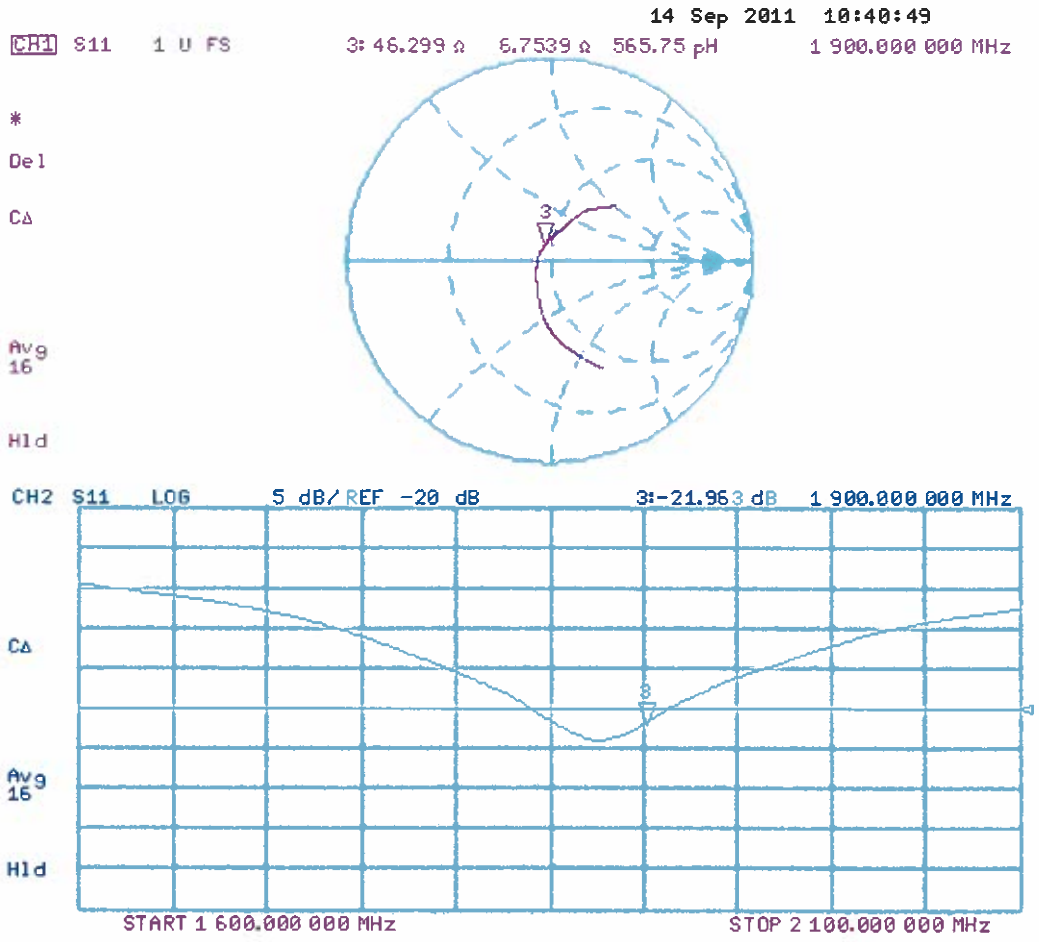
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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



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

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

Accreditation No.: SCS 108

Client Nokia Salo TCC

Certificate No: 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 ± 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

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.

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	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.3 ± 6 %	1.85 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.9 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**54.6 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.45 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**25.6 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.7 ± 6 %	2.04 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.3 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**51.8 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.18 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**24.4 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8 Ω - 0.6 jΩ
Return Loss	- 34.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.7 Ω + 1.1 jΩ
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

Date: 13.09.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

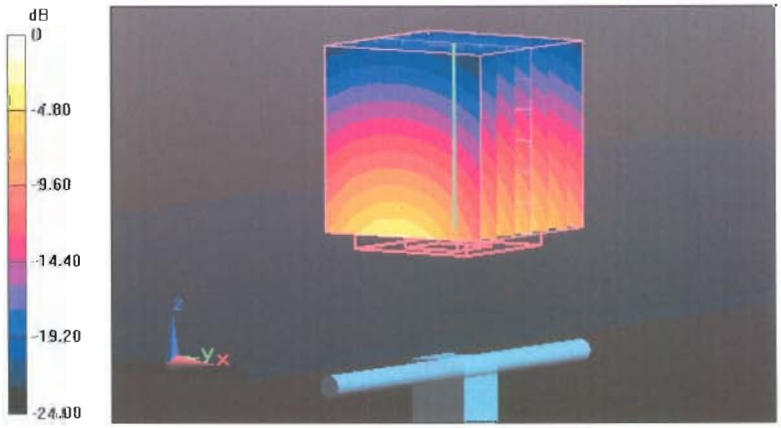
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.85 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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)

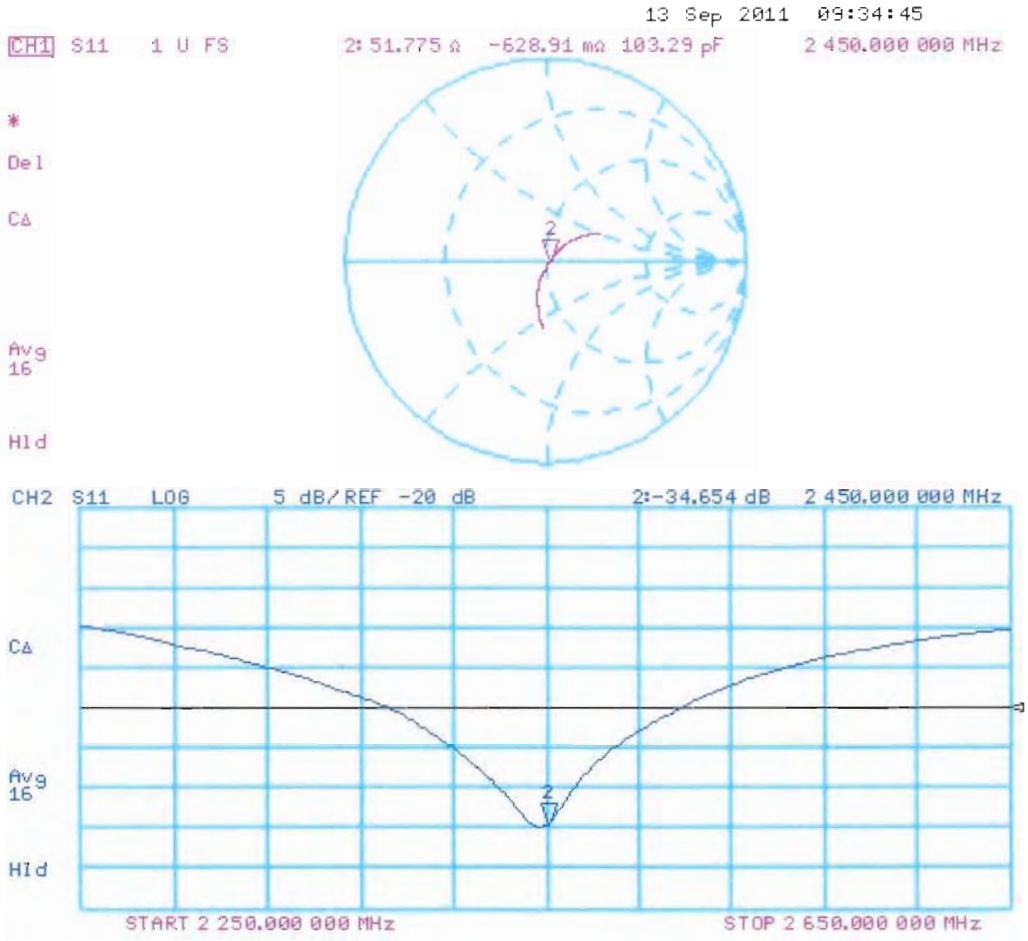
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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



Date: 12.09.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

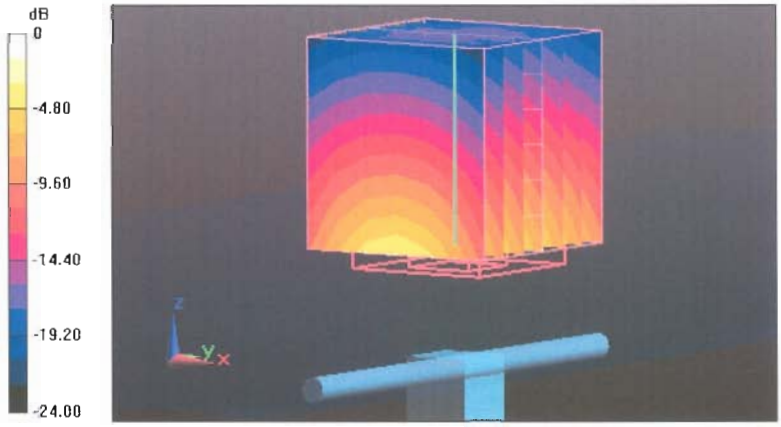
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.04 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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)

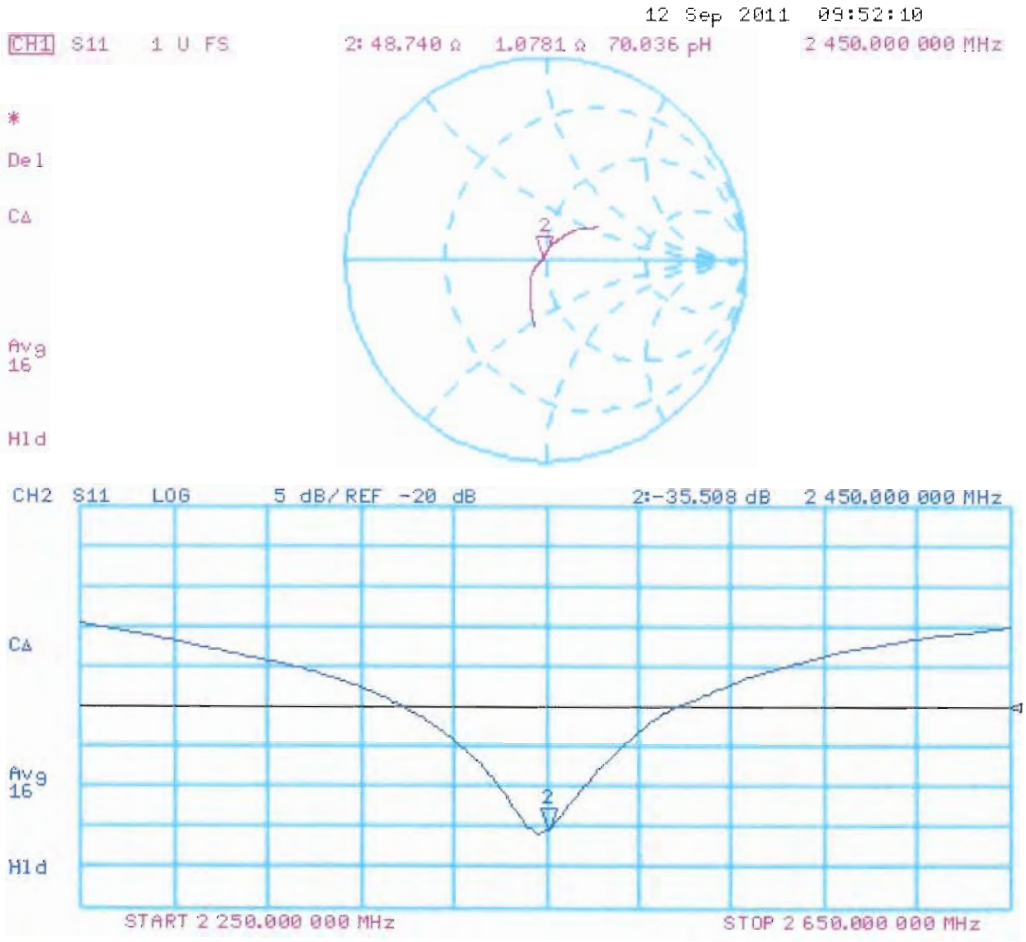
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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



Calibration Laboratory of
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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 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 ± 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 Pokovic	Technical Manager	

Issued: February 14, 2012

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	49.6 Ω - 8.3 jΩ
Return Loss	- 21.6 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	52.0 Ω - 1.9 jΩ
Return Loss	- 31.3 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	58.9 Ω - 3.2 jΩ
Return Loss	- 21.2 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	49.2 Ω - 7.7 jΩ
Return Loss	- 22.1 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	52.6 Ω - 1.0 jΩ
Return Loss	- 31.3 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	59.8 Ω - 2.9 jΩ
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

Date: 14.02.2012

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; σ = 4.6 mho/m; ε_r = 35.3; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 4.89 mho/m; ε_r = 34.9; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 5.19 mho/m; ε_r = 34.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

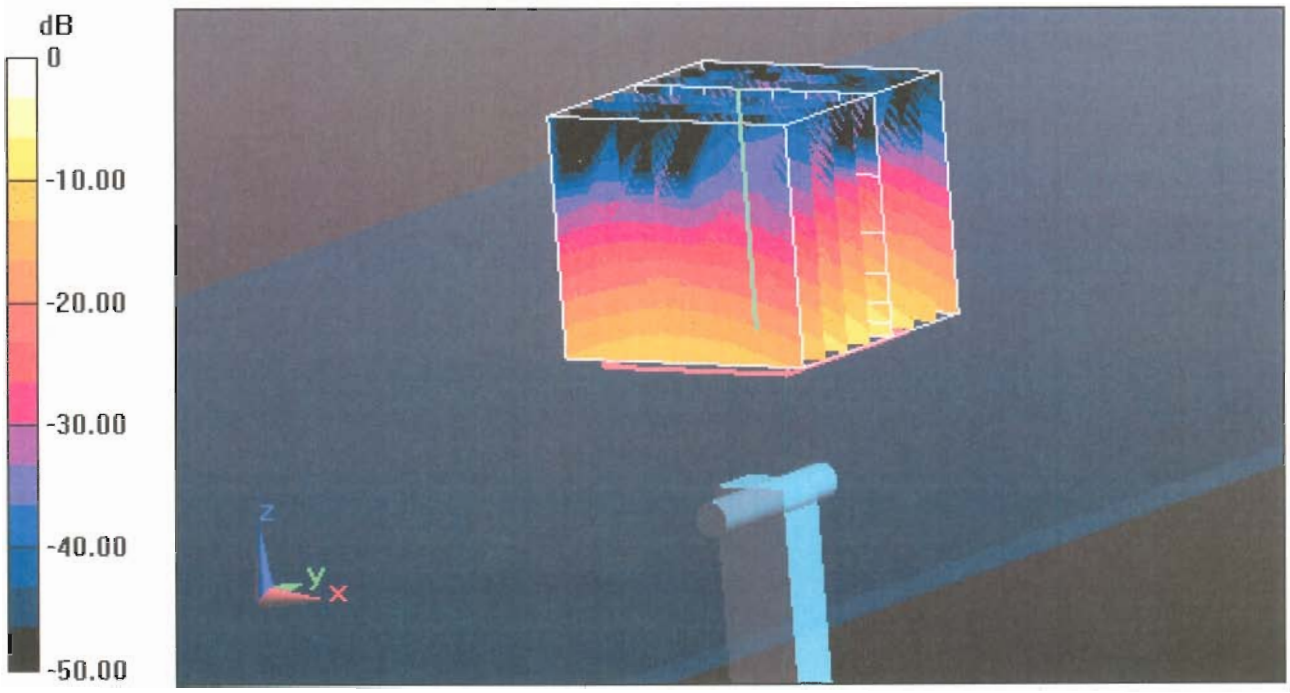
DASY52 Configuration:

- 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

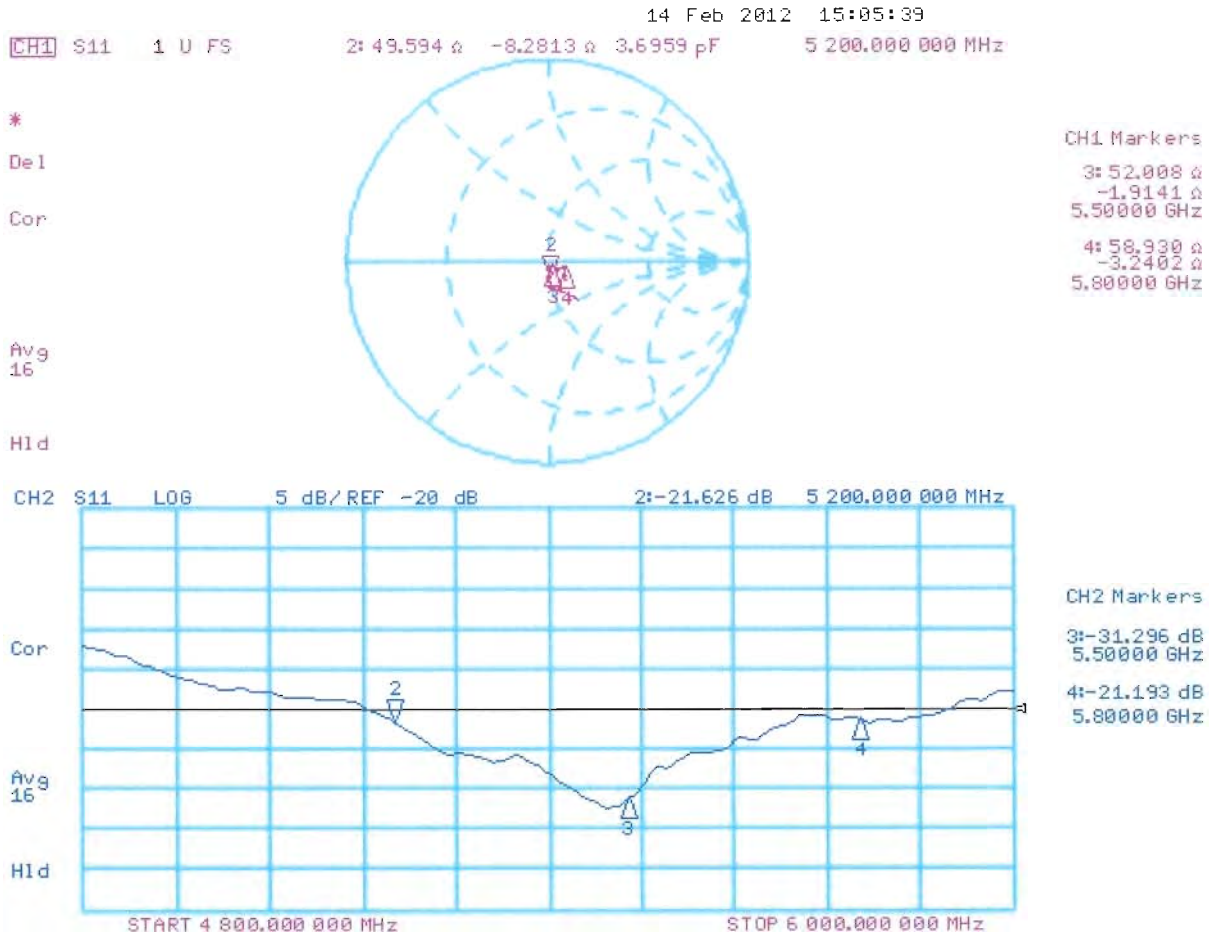
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.801 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 34.8980
SAR(1 g) = 8.65 mW/g; SAR(10 g) = 2.45 mW/g
Maximum value of SAR (measured) = 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



DASY5 Validation Report for Body TSL

Date: 13.02.2012

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; σ = 5.48 mho/m; ε_r = 48.6; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 5.87 mho/m; ε_r = 48.1; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 6.28 mho/m; ε_r = 48.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

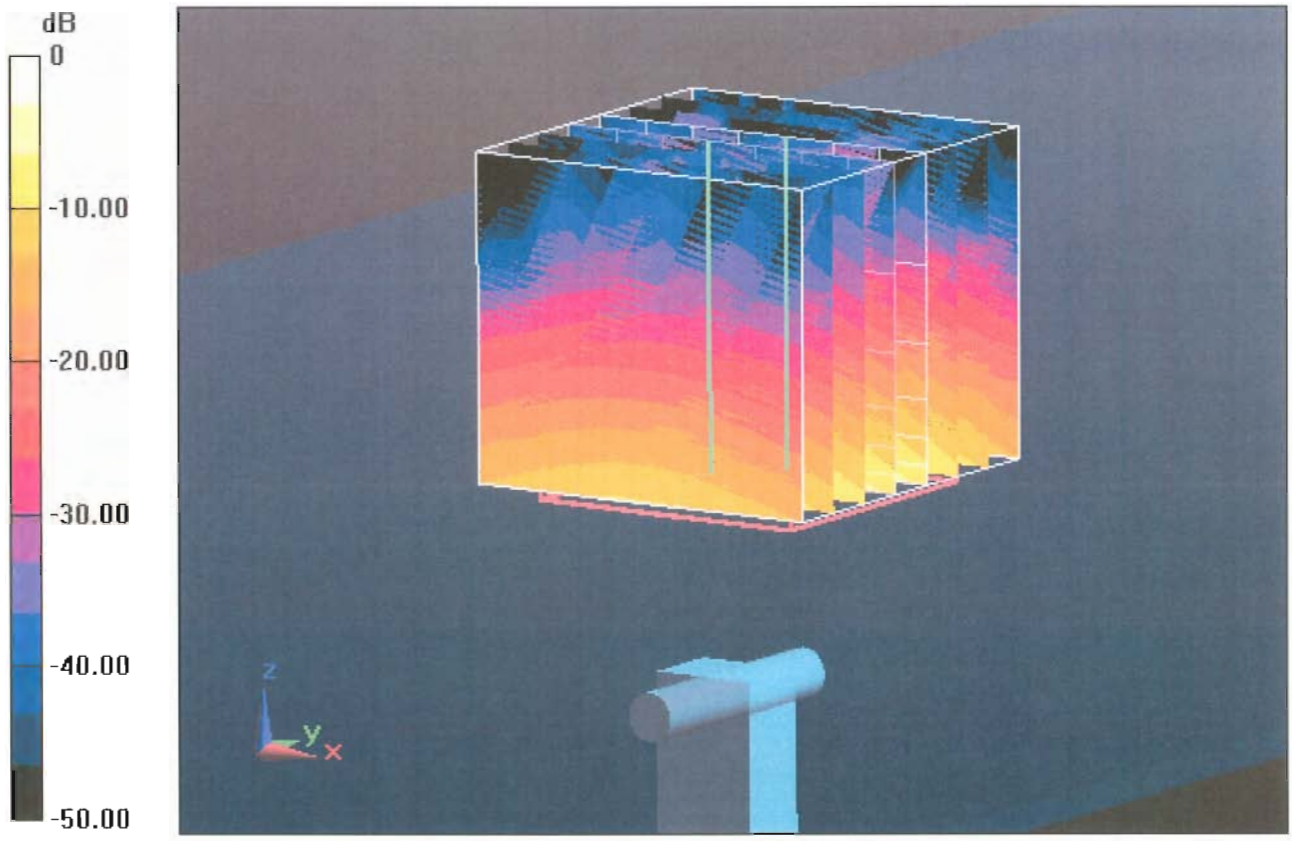
DASY52 Configuration:

- 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=4mm, dy=4mm, dz=1.4mm
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

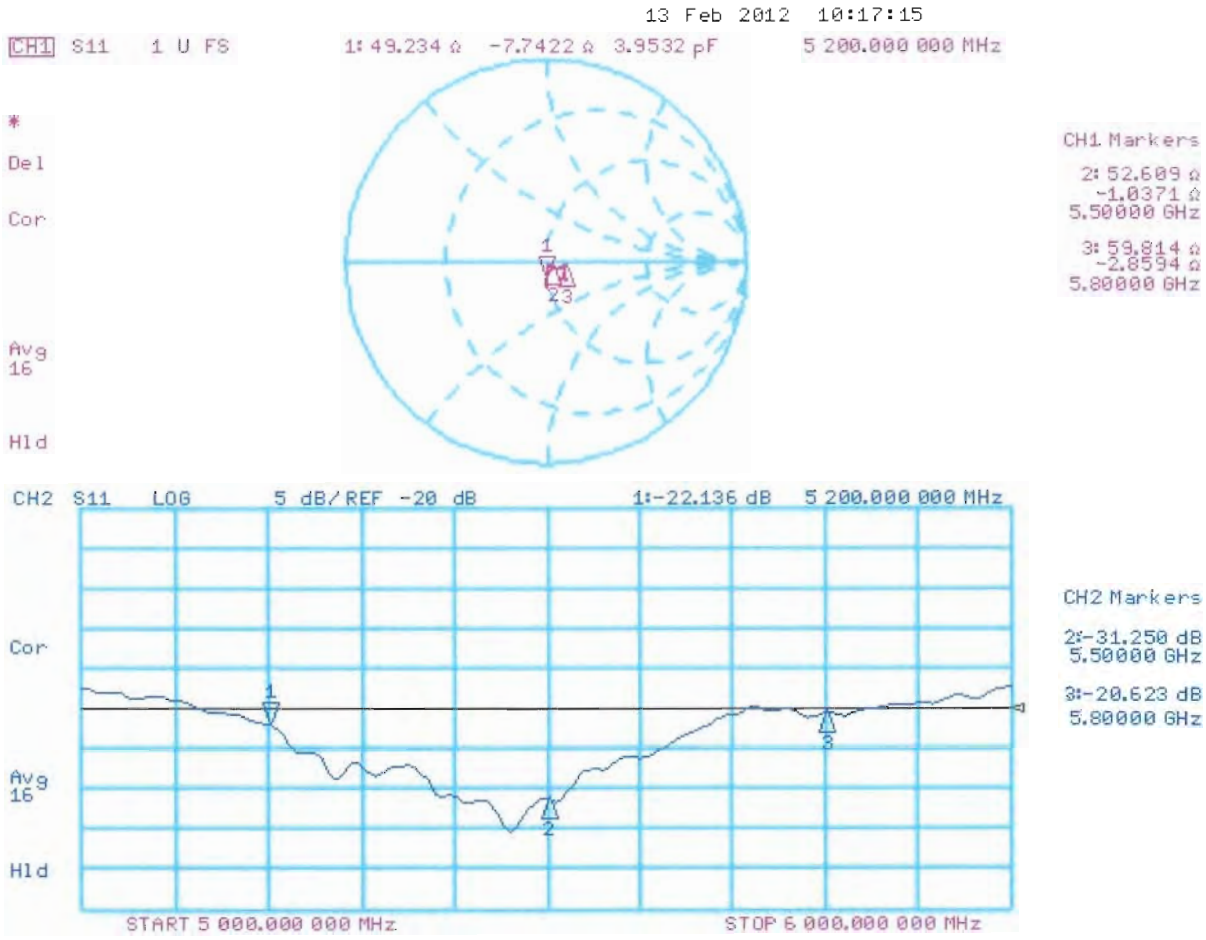
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 57.876 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 33.4980
SAR(1 g) = 7.78 mW/g; SAR(10 g) = 2.16 mW/g
Maximum value of SAR (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=4mm, dy=4mm, dz=1.4mm
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



APPENDIX G: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED LTE TRANSMISSION MODES

Type: RM-845; Serial number: C1A138246/E2 used for LTE750 SAR Head and Body-worn measurements.

Channel bandwidth 10 MHz				
Modulation	Resource block configuration	Low channel	Mid channel	High channel
QPSK	1 RB, zero offset	-	23.35	-
QPSK	1 RB,full offset	-	22.94	-
QPSK	1 RB, centered	-	23.52	-
QPSK	50 % RB, centered	-	22.71	-
QPSK	100 % RB	-	22.54	-
16QAM	1 RB, zero offset	-	22.21	-
16QAM	1 RB,full offset	-	21.88	-
16QAM	1 RB, centered	-	22.4	-
16QAM	50 % RB, centered	-	21.78	-
16QAM	100 % RB	-	21.61	-
64QAM	1 RB, zero offset	-	-	-
64QAM	1 RB,full offset	-	-	-
64QAM	1 RB, centered	-	-	-
64QAM	50 % RB, centered	-	-	-
64QAM	100 % RB	-	-	-

Channel bandwidth 5 MHz				
Modulation	Resource block configuration	Low channel	Mid channel	High channel
QPSK	1 RB, zero offset	22.68	22.65	23.02
QPSK	1 RB,full offset	22.91	22.91	22.51
QPSK	1 RB, centered	22.92	23.01	22.76
QPSK	50 % RB, centered	21.84	22.17	22.13
QPSK	100 % RB	21.95	22.17	22
16QAM	1 RB, zero offset	22.07	22.14	22.29
16QAM	1 RB,full offset	22.19	22.04	21.33
16QAM	1 RB, centered	22.71	22.18	21.69
16QAM	50 % RB, centered	21.74	22.19	22.06
16QAM	100 % RB	21.92	21.19	22.03
64QAM	1 RB, zero offset	-	-	-
64QAM	1 RB,full offset	-	-	-
64QAM	1 RB, centered	-	-	-
64QAM	50 % RB, centered	-	-	-
64QAM	100 % RB	-	-	-

Type: RM-845; Serial number: C1A138254/F2 used for LTE750 Wireless Router mode testing

Channel bandwidth 10 MHz				
Modulation	Resource block configuration	Low channel	Mid channel	High channel
QPSK	1 RB, zero offset	-	22.84	-
QPSK	1 RB,full offset	-	22.48	-
QPSK	1 RB, centered	-	23.12	-
QPSK	50 % RB, centered	-	21.86	-
QPSK	100 % RB	-	21.71	-
16QAM	1 RB, zero offset	-	21.38	-
16QAM	1 RB,full offset	-	21.05	-
16QAM	1 RB, centered	-	21.61	-
16QAM	50 % RB, centered	-	20.93	-
16QAM	100 % RB	-	20.71	-
64QAM	1 RB, zero offset	-	-	-
64QAM	1 RB,full offset	-	-	-
64QAM	1 RB, centered	-	-	-
64QAM	50 % RB, centered	-	-	-
64QAM	100 % RB	-	-	-

Channel bandwidth 5 MHz				
Modulation	Resource block configuration	Low channel	Mid channel	High channel
QPSK	1 RB, zero offset	22.3	22.53	22.46
QPSK	1 RB,full offset	22.48	22.42	22.09
QPSK	1 RB, centered	22.52	22.54	22.14
QPSK	50 % RB, centered	21.21	21.42	21.27
QPSK	100 % RB	21.07	21.35	21.05
16QAM	1 RB, zero offset	21.23	21.4	21.63
16QAM	1 RB,full offset	21.38	21.24	20.95
16QAM	1 RB, centered	21.36	21.42	21.29
16QAM	50 % RB, centered	21.2	20.31	21.24
16QAM	100 % RB	20.18	20.27	20.22
64QAM	1 RB, zero offset	-	-	-
64QAM	1 RB,full offset	-	-	-
64QAM	1 RB, centered	-	-	-
64QAM	50 % RB, centered	-	-	-
64QAM	100 % RB	-	-	-

Type: RM-845; Serial number: C1A138405/FF2 used for LTE750 reduced-power SVLTE mode testing

Channel bandwidth 10 MHz				
Modulation	Resource block configuration	Low channel	Mid channel	High channel
QPSK	1 RB, zero offset	-	19.13	-
QPSK	1 RB,full offset	-	19.06	-
QPSK	1 RB, centered	-	19.43	-
QPSK	50 % RB, centered	-	18.32	-
QPSK	100 % RB	-	18.06	-
16QAM	1 RB, zero offset	-	17.83	-
16QAM	1 RB,full offset	-	17.5	-
16QAM	1 RB, centered	-	17.93	-
16QAM	50 % RB, centered	-	17.33	-
16QAM	100 % RB	-	17.19	-
64QAM	1 RB, zero offset	-	-	-
64QAM	1 RB,full offset	-	-	-
64QAM	1 RB, centered	-	-	-
64QAM	50 % RB, centered	-	-	-
64QAM	100 % RB	-	-	-

Channel bandwidth 5 MHz				
Modulation	Resource block configuration	Low channel	Mid channel	High channel
QPSK	1 RB, zero offset	18.64	18.77	18.9
QPSK	1 RB,full offset	18.92	18.82	18.53
QPSK	1 RB, centered	18.74	18.9	18.88
QPSK	50 % RB, centered	17.62	17.88	17.8
QPSK	100 % RB	17.52	17.79	17.57
16QAM	1 RB, zero offset	17.85	18.81	18
16QAM	1 RB,full offset	17.93	17.93	17.39
16QAM	1 RB, centered	17.87	18	17.83
16QAM	50 % RB, centered	17.58	17.81	17.68
16QAM	100 % RB	16.56	17.77	17.72
64QAM	1 RB, zero offset	-	-	-
64QAM	1 RB,full offset	-	-	-
64QAM	1 RB, centered	-	-	-
64QAM	50 % RB, centered	-	-	-
64QAM	100 % RB	-	-	-

APPENDIX H: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED CDMA TRANSMISSION MODES

Type: RM-845; Serial number: C1A138294/B1 used for CDMA800 SAR Head, Body-worn and Wireless Router testing

Radio Config	Service Option	SCH1 Rate	1013	384	777
RC1	SO1	NA	NA	NA	NA
RC1	SO2	NA	23.54	23.40	23.50
RC1	SO3	NA	23.54	23.40	23.50
RC1	SO55	NA	23.54	23.40	23.50
RC2	SO9	NA	23.54	23.40	23.50
RC2	SO17	NA	23.54	23.40	23.50
RC2	SO55	NA	23.54	23.40	23.50
RC3	SO1	NA	NA	NA	NA
RC3	SO2	NA	23.54	23.40	23.50
RC3	SO3	NA	23.54	23.40	23.50
RC3	**SO55**	**NA**	**23.54**	**23.40**	**23.50**
RC3	SO32	0	23.50	23.40	23.50
RC3	SO32	9.6	23.54	23.40	23.50
RC3	SO32	19.2	23.54	23.40	23.50
RC3	SO32	38.4	23.54	23.40	23.50
RC3	SO32	76.8	23.54	23.40	23.50
RC3	SO32	153.6	23.54	23.40	23.50
RC3	SO33	9.6	NA	NA	NA
RC3	SO33	19.2	NA	NA	NA
RC3	SO33	38.4	NA	NA	NA
RC3	SO33	76.8	NA	NA	NA
RC3	SO33	153.6	NA	NA	NA

(CDMA800 Table continues)

(CDMA800 Table continues)

RC4	SO1	NA	NA	NA	NA
RC4	SO2	NA	23.54	23.40	23.50
RC4	SO3	NA	23.54	23.40	23.50
RC4	SO55	NA	23.54	23.40	23.50
RC4	SO32	0	23.50	23.40	23.50
RC4	SO32	9.6	23.54	23.40	23.50
RC4	SO32	19.2	23.54	23.40	23.50
RC4	SO32	38.4	23.54	23.40	23.50
RC4	SO32	76.8	23.54	23.40	23.50
RC4	SO32	153.6	23.54	23.40	23.50
RC4	SO33	9.6	NA	NA	NA
RC4	SO33	19.2	NA	NA	NA
RC4	SO33	38.4	NA	NA	NA
RC4	SO33	76.8	NA	NA	NA
RC4	SO33	153.6	NA	NA	NA
RC5	SO9	NA	23.50	23.50	23.40
RC5	SO17	NA	23.50	23.50	23.40
RC5	SO55	NA	23.50	23.50	23.40
RC5	SO33	9.6	NA	NA	NA
RC5	SO33	19.2	NA	NA	NA
RC5	SO33	38.4	NA	NA	NA
RC5	SO33	76.8	NA	NA	NA
RC5	SO33	153.6	NA	NA	NA

EVDO Rev 0

Radio Config	Data Rate	1013	384	777
RTAP	9.6	23.50	23.40	23.50
RTAP	19.2	23.50	23.40	23.50
RTAP	38.4	23.50	23.40	23.50
RTAP	76.8	23.50	23.40	23.50
RTAP	153.6	23.50	23.40	23.50

EVDO Rev A

Radio Config	Pckt Size	1013	384	777
RETAP	256	23.55	23.50	23.50
RETAP	512	23.55	23.50	23.50
RETAP	1024	23.50	23.50	23.50
RETAP	2048	23.50	23.50	23.50
RETAP	3072	23.50	23.50	23.50
RETAP	6144	23.50	23.50	23.50
RETAP	12288	23.50	23.50	23.50

Type: RM-845; Serial number: C1A138211/A2 used for CDMA1900 SAR Head and Body-worn testing

Radio Config	Service Option	SCH1 Rate	25	600	1175
RC1	SO1	NA	NA	NA	NA
RC1	SO2	NA	23.00	23.20	23.10
RC1	SO3	NA	23.00	23.30	23.10
RC1	SO55	NA	23.00	23.20	23.10
RC2	SO9	NA	22.99	23.26	23.10
RC2	SO17	NA	23.00	23.20	23.20
RC2	SO55	NA	23.00	23.20	23.20
RC3	SO1	NA	NA	NA	NA
RC3	SO2	NA	23.00	23.20	23.10
RC3	SO3	NA	23.00	23.20	23.10
RC3	**SO55**	**NA**	**23.00**	**23.20**	**23.10**
RC3	SO32	0	23.00	23.20	23.10
RC3	SO32	9.6	23.00	23.20	23.10
RC3	SO32	19.2	23.00	23.20	23.10
RC3	SO32	38.4	23.00	23.20	23.10
RC3	SO32	76.8	23.00	23.20	23.10
RC3	SO32	153.6	23.00	23.20	23.10
RC3	SO33	9.6	NA	NA	NA
RC3	SO33	19.2	NA	NA	NA
RC3	SO33	38.4	NA	NA	NA
RC3	SO33	76.8	NA	NA	NA
RC3	SO33	153.6	NA	NA	NA

(CDMA1900 for Head and Body-worn Table continues)

(CDMA1900 for Head and Body-worn Table continues)

RC4	SO1	NA	NA	NA	NA
RC4	SO2	NA	23.00	23.20	23.00
RC4	SO3	NA	22.90	23.20	23.00
RC4	SO55	NA	23.00	23.20	23.00
RC4	SO32	0	23.00	23.20	22.97
RC4	SO32	9.6	23.00	23.20	23.00
RC4	SO32	19.2	23.00	23.20	22.90
RC4	SO32	38.4	23.00	23.20	23.00
RC4	SO32	76.8	23.00	23.20	23.00
RC4	SO32	153.6	23.00	23.20	23.00
RC4	SO33	9.6	NA	NA	NA
RC4	SO33	19.2	NA	NA	NA
RC4	SO33	38.4	NA	NA	NA
RC4	SO33	76.8	NA	NA	NA
RC4	SO33	153.6	NA	NA	NA
RC5	SO9	NA	23.00	23.15	23.00
RC5	SO17	NA	22.95	23.15	23.00
RC5	SO55	NA	22.95	23.15	23.00
RC5	SO33	9.6	NA	NA	NA
RC5	SO33	19.2	NA	NA	NA
RC5	SO33	38.4	NA	NA	NA
RC5	SO33	76.8	NA	NA	NA
RC5	SO33	153.6	NA	NA	NA

EVDO Rev 0

Radio Config	Data Rate	25	600	1175
RTAP	9.6	22.8	22.98	22.9
RTAP	19.2	22.8	23	22.9
RTAP	38.4	22.9	22.9	22.9
RTAP	76.8	22.8	23	22.85
RTAP	153.6	22.80	22.99	22.89

EVDO Rev A

Radio Config	Pckt Size	25	600	1175
RETAP	256	23.00	23.20	23.10
RETAP	512	23.00	23.10	23.12
RETAP	1024	23.00	23.10	23.12
RETAP	2048	23.00	23.10	23.10
RETAP	3072	23.00	23.10	23.10
RETAP	6144	23.00	23.10	23.12
RETAP	12288	23.00	23.10	23.12

Type: RM-845; Serial number: C1A138294/B1 used for CDMA1900 Wireless testing

Radio Config	Service Option	SCH1 Rate	25	600	1175
RC1	SO1	NA	NA	NA	NA
RC1	SO2	NA	22.50	22.63	22.60
RC1	SO3	NA	22.50	22.60	22.60
RC1	SO55	NA	22.50	22.60	22.60
RC2	SO9	NA	22.50	22.63	22.60
RC2	SO17	NA	22.50	22.60	22.60
RC2	SO55	NA	22.50	22.60	22.60
RC3	SO1	NA	NA	NA	NA
RC3	SO2	NA	22.50	22.63	22.60
RC3	SO3	NA	22.50	22.60	22.60
RC3	SO55	NA	22.50	22.60	22.60
RC3	SO32	0	22.50	22.60	22.60
RC3	SO32	9.6	22.50	22.63	22.60
RC3	SO32	19.2	22.50	22.60	22.60
RC3	SO32	38.4	22.50	22.60	22.60
RC3	SO32	76.8	22.50	22.60	22.60
RC3	SO32	153.6	22.50	22.60	22.60
RC3	SO33	9.6	NA	NA	NA
RC3	SO33	19.2	NA	NA	NA
RC3	SO33	38.4	NA	NA	NA
RC3	SO33	76.8	NA	NA	NA
RC3	SO33	153.6	NA	NA	NA

(CDMA1900 for Wireless Router Table continues)

(CDMA1900 for Wireless Router Table continues)

RC4	SO1	NA	NA	NA	NA
RC4	SO2	NA	22.50	22.63	22.60
RC4	SO3	NA	22.50	22.60	22.60
RC4	SO55	NA	22.50	22.60	22.60
RC4	SO32	0	22.50	22.60	22.60
RC4	SO32	9.6	22.50	22.63	22.60
RC4	SO32	19.2	22.50	22.60	22.60
RC4	SO32	38.4	22.50	22.60	22.60
RC4	SO32	76.8	22.50	22.60	22.60
RC4	SO32	153.6	22.50	22.60	22.60
RC4	SO33	9.6	NA	NA	NA
RC4	SO33	19.2	NA	NA	NA
RC4	SO33	38.4	NA	NA	NA
RC4	SO33	76.8	NA	NA	NA
RC4	SO33	153.6	NA	NA	NA
RC5	SO9	NA	22.50	22.60	22.55
RC5	SO17	NA	22.50	22.60	22.55
RC5	SO55	NA	22.50	22.60	22.55
RC5	SO33	9.6	NA	NA	NA
RC5	SO33	19.2	NA	NA	NA
RC5	SO33	38.4	NA	NA	NA
RC5	SO33	76.8	NA	NA	NA
RC5	SO33	153.6	NA	NA	NA

EVDO Rev 0

Radio Config	Data Rate	25	600	1175
RTAP	9.6	22.40	22.40	22.50
RTAP	19.2	22.40	22.40	22.50
RTAP	38.4	22.40	22.40	22.50
RTAP	76.8	22.40	22.40	22.50
RTAP	153.6	22.40	22.40	22.50

EVDO Rev A

Radio Config	Pckt Size	25	600	1175
RETAP	256	22.40	22.50	22.60
RETAP	512	22.40	22.50	22.60
RETAP	1024	22.40	22.50	22.60
RETAP	2048	22.40	22.50	22.60
RETAP	3072	22.40	22.50	22.60
RETAP	6144	22.40	22.50	22.60
RETAP	12288	22.40	22.50	22.60

Type: RM-845; Serial number: C1A138332/BC1, used for reduced-power CDMA1900 SV-mode testing

	Take 1			Take 2		
	25	600	1175	25	600	1175
BC1 RC1 S02	18.86	18.80	18.70	18.77	18.73	18.64
BC1 RC1 S03	18.89	18.80	18.73	18.99	18.91	18.86
BC1 RC1 SO55	18.88	18.83	18.69	18.99	18.92	18.81
BC1 RC2 S09	19.05	18.99	18.89	18.77	18.69	18.62
BC1 RC2 SO17	18.89	18.79	18.72	18.80	18.74	18.64
BC1 RC2 SO55	19.03	18.96	18.89	18.98	18.93	18.84
BC1 RC3 S02	18.83	18.77	18.66	18.97	18.92	18.77
BC1 RC3 SO3	18.82	18.74	18.64	18.94	18.91	18.79
BC1 RC3 SO55	19.02	18.98	18.86	18.78	18.70	18.63
BC1 RC4 SO2	18.81	18.72	18.67	18.98	18.91	18.80
BC1 RC4 SO3	19.01	18.95	18.85	18.98	18.90	18.80
BC1 RC4 SO55	18.82	18.73	18.64	18.95	18.93	18.79
BC1 RC5 SO9	18.81	18.71	18.63	18.97	18.90	18.78
BC1 RC5 SO17	19.00	18.95	18.85	18.96	18.91	18.76
BC1 RC5 SO55	18.96	18.99	18.93	18.96	18.95	18.90
	Take 3			Average		
	25	600	1175	25	600	1175
BC1 RC1 S02	18.92	18.88	18.80	18.85	18.80	18.71
BC1 RC1 S03	18.98	18.94	18.87	18.95	18.89	18.82
BC1 RC1 SO55	18.97	18.91	18.81	18.95	18.89	18.77
BC1 RC2 S09	18.93	18.90	18.80	18.91	18.86	18.77
BC1 RC2 SO17	18.96	18.91	18.83	18.88	18.81	18.73
BC1 RC2 SO55	18.74	18.66	18.57	18.92	18.85	18.77
BC1 RC3 S02	18.97	18.88	18.78	18.92	18.86	18.74
BC1 RC3 SO3	18.96	18.89	18.78	18.90	18.85	18.74
BC1 RC3 SO55	18.94	18.88	18.79	18.91	18.85	18.76
BC1 RC4 SO2	18.95	18.88	18.77	18.91	18.83	18.75
BC1 RC4 SO3	18.89	18.85	18.74	18.96	18.90	18.80
BC1 RC4 SO55	18.95	18.86	18.80	18.91	18.84	18.75
BC1 RC5 SO9	18.92	18.90	18.75	18.90	18.84	18.72
BC1 RC5 SO17	18.95	18.91	18.78	18.97	18.92	18.80
BC1 RC5 SO55	18.93	18.96	18.88	18.95	18.97	18.90

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

Type: RM-845; Serial number: C1A138373/C1 used for GSM/GPRS/EGPRS850 SAR Head, Body-worn and Wireless router measurements.

GSM 850			
Slot configuration	Low channel	Mid channel	High channel
GSM 1-slot	31.9	31.9	31.8
GPRS 2-slot	29.9	29.9	29.6
GPRS 3-slot	28	28.2	27.7
GPRS 4-slot	26.9	26.6	26.5
EGRPS 1-slot	26.5	26.5	26.4
EGPRS 2-slot	26.2	26.2	26.2
EGPRS 3-slot	26	26.1	26
EGPRS 4-slot	25.6	25.8	25.6

Type: RM-845; Serial number: C1A138245/D2 used for GSM/GPRS/EGPRS1900 SAR Head, Body-worn and Wireless router measurements.

GSM 1900			
Slot configuration	Low channel	Mid channel	High channel
GSM 1-slot	29.3	29.3	29
GPRS 2-slot	26.7	26.7	26.4
GPRS 3-slot	24.9	24.9	24.6
GPRS 4-slot	23.8	23.7	23.5
EGRPS 1-slot	25.5	25.4	25.3
EGPRS 2-slot	23.9	23.8	23.6
EGPRS 3-slot	23.9	23.8	23.6
EGPRS 4-slot	22.6	22.6	22.4

APPENDIX J: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED WCDMA TRANSMISSION MODES

Type: RM-845; Serial number: C1A138226/D1 used for WCDMA850 SAR Head, Body-worn and Wireless router measurements.

WCDMA 5			
Mode	Low channel	Mid channel	High channel
WCDMA	23.2	23.25	23.33
HSUPA Sub-mode 1	-	-	-
HSUPA Sub-mode 2	-	-	-
HSUPA Sub-mode 3	-	-	-
HSUPA Sub-mode 4	-	-	-
HSUPA Sub-mode 5	-	-	-

Type: RM-845; Serial number: C1A138373/C1 used for WCDMA1900 SAR Head, and Body-worn measurements.

Type: RM-845; Serial number: C1A138245/D2 used for WCDMA1900 SAR Wireless Router measurements.

WCDMA 2, C1A138373/C1			
Mode	Low channel	Mid channel	High channel
WCDMA	23.08	23.05	22.94
HSUPA Sub-mode 1	-	-	-
HSUPA Sub-mode 2	-	-	-
HSUPA Sub-mode 3	-	-	-
HSUPA Sub-mode 4	-	-	-
HSUPA Sub-mode 5	-	-	-

WCDMA 2, C1A138245/D2			
Mode	Low channel	Mid channel	High channel
WCDMA	22.15	22.11	21.86
HSUPA Sub-mode 1	-	-	-
HSUPA Sub-mode 2	-	-	-
HSUPA Sub-mode 3	-	-	-
HSUPA Sub-mode 4	-	-	-
HSUPA Sub-mode 5	-	-	-

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

APPENDIX K: CONDUCTED POWER RESULTS FOR WLAN2450 AND WLAN5000

Type: RM-845; Serial: C1A138223/G1

Modulation mode	Ch 1	Ch 6	Ch 11
b-mode WLAN DSSS 1 Mbps	17.44	17.56	17.52
b-mode WLAN DSSS 2 Mbps	17.48	17.61	17.52
b-mode WLAN DSSS 5.5 Mbps	17.71	17.85	17.85
b-mode WLAN DSSS 11 Mbps	17.62	17.74	17.72
g-mode WLAN OFDM 6 Mbps	15.61	16.45	15.84
g-mode WLAN OFDM 9 Mbps	15.65	16.43	15.85
g-mode WLAN OFDM 12 Mbps	14.78	15.59	15.78
g-mode WLAN OFDM 18 Mbps	15.63	15.65	15.88
g-mode WLAN OFDM 24 Mbps	15.63	15.64	15.08
g-mode WLAN OFDM 36 Mbps	15.63	14.93	15.19
g-mode WLAN OFDM 48 Mbps	12.90	13.88	13.14
g-mode WLAN OFDM 54 Mbps	13.04	13.76	13.29
n-mode MCS 0: OFDM 6.5 / 7.25 Mbps	14.72	13.90	14.21
n-mode MCS 1: OFDM 13.0 / 14.4 Mbps	13.86	14.77	15.02
n-mode MCS 2: OFDM 19.5 / 21.7 Mbps	13.90	13.95	15.05
n-mode MCS 3: OFDM 26.0 / 28.9 Mbps	14.77	13.91	14.24
n-mode MCS 4: OFDM 39.0 / 43.3 Mbps	12.91	13.96	13.29
n-mode MCS 5: OFDM 52.0 / 57.8 Mbps	13.04	13.01	13.22
n-mode MCS 6: OFDM 58.5 / 65.0 Mbps	13.01	13.84	13.24
n-mode MCS 7: OFDM 65.0 / 72.2 Mbps	12.94	12.92	13.41
n-mode MCS 0: OFDM 13.5 / 15.0 Mbps	-	-	-
n-mode MCS 1: OFDM 27.0 / 30.0 Mbps	-	-	-
n-mode MCS 2: OFDM 40.5 / 45.0 Mbps	-	-	-
n-mode MCS 3: OFDM 54.0 / 60.0 Mbps	-	-	-
n-mode MCS 4: OFDM 81.0 / 90.0 Mbps	-	-	-
n-mode MCS 5: OFDM 108.0 / 120.0 Mbps	-	-	-
n-mode MCS 6: OFDM 121.5 / 135.0 Mbps	-	-	-
n-mode MCS 7: OFDM 135.0 / 150.0 Mbps	-	-	-

Type: RM-845; Serial: C1A138344/G4

WLAN 5 GHz						
Mode	Channel					
	36	40	44	48	52	56
WLAN OFDM 6 Mbps	11.83	11.57	11.84	11.67	11.85	11.85
WLAN OFDM 9 Mbps	11.69	11.60	11.95	11.70	11.96	12.10
WLAN OFDM 12 Mbps	11.63	11.55	11.57	11.54	12.02	11.78
WLAN OFDM 18 Mbps	11.67	11.74	11.66	11.65	11.72	11.84
WLAN OFDM 24 Mbps	11.63	11.68	11.98	11.83	11.70	11.74
WLAN OFDM 36 Mbps	11.59	11.08	12.05	11.62	11.71	11.94
WLAN OFDM 48 Mbps	11.69	11.43	11.66	11.64	11.63	12.05
WLAN OFDM 54 Mbps	11.63	11.57	11.87	11.61	11.64	11.82
MCS 0: OFDM 6.5 / 7.25 Mbps	11.75	11.49	12.05	11.70	11.72	11.85
MCS 1: OFDM 13.0 / 14.4 Mbps	11.77	11.73	12.03	11.64	11.77	11.90
MCS 2: OFDM 19.5 / 21.7 Mbps	11.75	11.39	11.66	11.71	11.70	11.88
MCS 3: OFDM 26.0 / 28.9 Mbps	11.78	11.39	11.73	11.75	11.67	11.87
MCS 4: OFDM 39.0 / 43.3 Mbps	11.76	11.73	11.71	11.74	11.78	11.83
MCS 5: OFDM 52.0 / 57.8 Mbps	11.75	11.69	12.05	11.92	11.71	11.94
MCS 6: OFDM 58.5 / 65.0 Mbps	11.79	11.61	11.59	11.66	11.70	11.86
MCS 7: OFDM 65.0 / 72.2 Mbps	11.83	11.57	11.84	11.67	11.85	11.85
MCS 0: OFDM13.5 / 15.0 Mbps	7.88	7.81	7.99	8.01	8.05	7.85
MCS 1: OFDM 27.0 / 30.0 Mbps	7.90	7.81	7.99	8.08	8.10	8.31
MCS 2: OFDM 40.5 / 45.0 Mbps	7.74	7.42	7.59	8.05	8.12	7.77
MCS 3: OFDM 54.0 / 60.0 Mbps	7.77	7.23	7.46	7.97	8.05	7.76
MCS 4: OFDM 81.0 / 90.0 Mbps	7.80	7.63	7.47	7.76	7.57	7.82
MCS 5: OFDM 108.0 / 120.0 Mbps	7.54	7.78	7.99	7.56	8.00	8.21
MCS 6: OFDM 121.5 / 135.0 Mbps	7.89	7.36	7.48	7.55	8.05	7.79
MCS 7: OFDM 135.0 / 150.0 Mbps	7.85	7.79	7.50	8.00	8.02	7.87

(5GHz Table continues)

(5GHz Table continues)

WLAN 5 GHz						
Mode						
	60	64	100	104	108	112
WLAN OFDM 6 Mbps	11.74	11.77	12.11	11.90	11.94	11.98
WLAN OFDM 9 Mbps	11.63	11.88	12.07	11.99	11.86	11.91
WLAN OFDM 12 Mbps	11.76	11.86	12.09	11.92	11.88	12.03
WLAN OFDM 18 Mbps	11.77	11.88	12.19	11.92	11.89	11.87
WLAN OFDM 24 Mbps	11.76	11.90	12.21	11.98	11.96	11.81
WLAN OFDM 36 Mbps	11.80	11.76	12.10	12.03	12.15	11.93
WLAN OFDM 48 Mbps	11.69	11.76	11.96	11.88	11.75	11.85
WLAN OFDM 54 Mbps	11.83	11.81	12.24	12.06	11.75	11.84
MCS 0: OFDM 6.5 / 7.25 Mbps	11.77	11.93	12.17	12.07	11.93	12.00
MCS 1: OFDM 13.0 / 14.4 Mbps	11.81	11.62	12.19	12.05	12.03	11.93
MCS 2: OFDM 19.5 / 21.7 Mbps	11.76	11.95	12.11	12.09	11.97	11.96
MCS 3: OFDM 26.0 / 28.9 Mbps	11.82	11.93	12.05	12.10	11.84	12.07
MCS 4: OFDM 39.0 / 43.3 Mbps	11.67	11.47	12.10	12.02	12.05	12.02
MCS 5: OFDM 52.0 / 57.8 Mbps	11.66	11.67	11.93	12.08	11.92	11.87
MCS 6: OFDM 58.5 / 65.0 Mbps	11.81	11.69	12.10	12.11	12.01	12.02
MCS 7: OFDM 65.0 / 72.2 Mbps	11.74	11.77	12.11	11.90	11.94	11.98
MCS 0: OFDM13.5 / 15.0 Mbps	8.24	8.15	8.34	8.28	8.17	8.34
MCS 1: OFDM 27.0 / 30.0 Mbps	8.32	8.24	8.41	8.25	8.22	8.35
MCS 2: OFDM 40.5 / 45.0 Mbps	7.92	7.78	8.40	8.28	8.21	8.37
MCS 3: OFDM 54.0 / 60.0 Mbps	7.87	7.98	8.30	8.22	8.24	8.35
MCS 4: OFDM 81.0 / 90.0 Mbps	7.82	7.83	8.29	8.22	8.22	8.34
MCS 5: OFDM 108.0 / 120.0 Mbps	8.21	8.11	8.24	8.21	8.16	8.28
MCS 6: OFDM 121.5 / 135.0 Mbps	7.56	7.57	8.32	8.23	8.10	8.27
MCS 7: OFDM 135.0 / 150.0 Mbps	8.30	7.93	8.35	8.28	8.20	8.34

(5GHz Table continues)

(5GHz Table continues)

WLAN 5 GHz						
Mode	116	120	124	128	132	136
WLAN OFDM 6 Mbps	11.98	12.00	12.00	11.79	11.95	11.98
WLAN OFDM 9 Mbps	11.92	11.92	12.00	11.87	11.83	11.91
WLAN OFDM 12 Mbps	11.96	11.97	11.98	11.78	11.89	11.96
WLAN OFDM 18 Mbps	11.98	11.90	12.03	11.81	12.03	11.98
WLAN OFDM 24 Mbps	11.91	11.99	12.01	11.70	11.99	11.82
WLAN OFDM 36 Mbps	11.89	11.98	11.98	11.71	12.09	11.87
WLAN OFDM 48 Mbps	11.94	12.01	12.03	11.82	12.19	11.99
WLAN OFDM 54 Mbps	11.95	11.88	12.07	11.95	12.12	11.79
MCS 0: OFDM 6.5 / 7.25 Mbps	12.10	12.14	12.14	11.81	12.26	12.01
MCS 1: OFDM 13.0 / 14.4 Mbps	11.99	12.06	12.16	11.95	12.21	12.01
MCS 2: OFDM 19.5 / 21.7 Mbps	12.01	12.08	12.15	11.83	11.91	11.97
MCS 3: OFDM 26.0 / 28.9 Mbps	11.99	11.96	12.27	11.82	12.20	12.00
MCS 4: OFDM 39.0 / 43.3 Mbps	11.96	11.68	12.04	11.91	12.20	12.05
MCS 5: OFDM 52.0 / 57.8 Mbps	12.03	11.97	12.09	11.61	11.90	12.04
MCS 6: OFDM 58.5 / 65.0 Mbps	12.01	11.92	12.12	11.87	11.95	11.84
MCS 7: OFDM 65.0 / 72.2 Mbps	11.98	12.00	12.00	11.79	11.95	11.98
MCS 0: OFDM13.5 / 15.0 Mbps	8.37	8.31	8.35	8.15	8.18	8.16
MCS 1: OFDM 27.0 / 30.0 Mbps	8.39	8.31	8.40	8.20	8.18	8.17
MCS 2: OFDM 40.5 / 45.0 Mbps	8.42	8.32	8.42	8.18	8.21	8.12
MCS 3: OFDM 54.0 / 60.0 Mbps	8.30	8.29	8.29	8.14	8.53	8.16
MCS 4: OFDM 81.0 / 90.0 Mbps	8.37	7.81	8.39	8.20	8.22	8.09
MCS 5: OFDM 108.0 / 120.0 Mbps	8.29	8.35	8.26	8.17	8.54	8.09
MCS 6: OFDM 121.5 / 135.0 Mbps	8.34	8.27	8.41	8.16	8.24	8.05
MCS 7: OFDM 135.0 / 150.0 Mbps	8.38	8.28	8.37	8.16	8.61	8.14

(5GHz Table continues)

(5GHz Table continues)

WLAN 5 GHz						
Mode						
	140	149	153	157	161	165
WLAN OFDM 6 Mbps	11.83	11.85	12.04	11.98	11.96	11.75
WLAN OFDM 9 Mbps	11.81	11.67	11.99	11.88	11.85	11.72
WLAN OFDM 12 Mbps	11.82	12.05	11.99	11.91	11.87	11.72
WLAN OFDM 18 Mbps	11.78	11.97	11.98	12.09	11.85	11.73
WLAN OFDM 24 Mbps	11.75	12.04	11.91	11.93	11.77	11.81
WLAN OFDM 36 Mbps	11.69	11.95	12.01	11.85	11.91	11.65
WLAN OFDM 48 Mbps	11.88	12.01	12.10	12.08	11.58	11.67
WLAN OFDM 54 Mbps	11.84	11.97	12.07	11.81	11.81	11.63
MCS 0: OFDM 6.5 / 7.25 Mbps	11.86	12.10	11.88	12.09	11.75	12.08
MCS 1: OFDM 13.0 / 14.4 Mbps	11.92	12.14	12.08	11.99	11.90	11.87
MCS 2: OFDM 19.5 / 21.7 Mbps	11.90	11.80	12.03	12.13	11.97	11.80
MCS 3: OFDM 26.0 / 28.9 Mbps	11.81	12.11	12.03	12.06	11.94	11.78
MCS 4: OFDM 39.0 / 43.3 Mbps	11.90	12.04	11.91	12.11	12.04	11.83
MCS 5: OFDM 52.0 / 57.8 Mbps	11.86	12.00	11.80	11.99	11.84	11.65
MCS 6: OFDM 58.5 / 65.0 Mbps	11.82	12.03	12.00	12.05	11.65	11.68
MCS 7: OFDM 65.0 / 72.2 Mbps	11.83	11.85	12.04	11.98	11.96	11.75
MCS 0: OFDM13.5 / 15.0 Mbps	8.14	7.81	8.36	8.25	8.09	7.91
MCS 1: OFDM 27.0 / 30.0 Mbps	8.21	8.31	8.34	7.82	8.10	8.01
MCS 2: OFDM 40.5 / 45.0 Mbps	8.31	8.28	8.39	8.28	8.13	8.22
MCS 3: OFDM 54.0 / 60.0 Mbps	8.16	8.20	7.89	8.24	8.11	8.09
MCS 4: OFDM 81.0 / 90.0 Mbps	8.22	7.80	8.35	8.30	7.93	8.32
MCS 5: OFDM 108.0 / 120.0 Mbps	8.12	7.79	7.82	7.79	8.05	7.84
MCS 6: OFDM 121.5 / 135.0 Mbps	8.02	8.27	7.80	8.19	8.12	7.79
MCS 7: OFDM 135.0 / 150.0 Mbps	8.13	8.27	7.89	7.82	8.12	7.89