MOTOROLA

ACCREDITED
Certificate Number: 1449-01

FCC ID: AZ489FT7016
DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 3 of 4

Government & Enterprise Mobility Solutions
EME Test Laboratory
8000 West Sunrise Blvd
Fort Lauderdale, FL. 33322

Date of Report: 3/20/06
Report Revision: A
Report ID: WDE1000_Rev A_060320_SR3388

Responsible Engineer: Kim Uong (EME lead Eng.)
Date/s Tested: 2/13/06 – 3/10/06
Manufacturer/Location: Motorola South Israel
Sector/Group/Div.: MCIL Israel
Date submitted for test: 1/26/06
DUT Description: WDE1000 (Wireless Device Enabler) with 2 transmitters: 802.11a@4.9GHz and 802.11b/g @ 2.4GHz
Test TX mode(s): CW
Max. Power output: 0.126W for 4.94-4.99GHz; 0.079W for 2400-2483.5MHz
Nominal Power: 0.1Watt for 4.94-4.99GHz; 0.063W for 2400-2483.5MHz
Tx Frequency Bands: 4942.5-4987.5MHz (5MHz step size) ; 2412-2462MHz (5MHz step size)
Signaling type: OFDM @4.9GHz; DSSS and OFDM @ 2.4GHz
Model(s) Tested: F2889A
Model(s) Certified: F2889A
Serial Number(s): 537SGA0057, 537SGA0060
Classification: General Population/Uncontrolled
Rule Part(s): 15 & 90

Approved Accessories:
Antenna(s):
6487848V60 PIFA (on board ant) 2400-2483.5MHz 1/4Wave ; 2.5dBi gain
6487848V61 PIFA (on board ant) 4.94-4.99GHz 1/4Wave; 3.3dBi gain

Max. Calc. 1-g/10-g Avg. SAR: 0.43/0.24 W/kg (Body)

Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with the national and international reference standards and guidelines listed in section 2.0 of this report. This report shall not be reproduced without written approval from an officially designated representative of the Motorola EME Laboratory.

This reporting format is consistent with the test report guidelines of the TIA TSB-150 December 2004
The results and statements contained in this report pertain only to the device(s) evaluated.

Signature on file- Ken Enger
Ken Enger GEMS EME Lab Senior Resource Manager, Laboratory Director,

Approval Date: 3/20/06

Certification Date: 03/17/06

Certification No.: L1060363P

Appendix C
Dipole Calibration Certificates

ANFAA001

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

Client **Motorola CGISS**

CALIBRATION CERTIFICATE

Object(s)	D2450V2 - SN:703
Calibration procedure(s)	QA CAL-05.v2 Calibration procedure for dipole validation kits
Calibration date:	July 19, 2004
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Date issued: July 19, 2004

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

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

DASY

Dipole Validation Kit

Type: D2450V2

Serial: 703

Manufactured: March 22, 2001
Calibrated: July 19, 2004

1. Measurement Conditions

The measurements were performed in the quarter size flat phantom filled with **head simulating solution** of the following electrical parameters at 2450 MHz:

Relative Dielectricity	**38.3**	± 5%
Conductivity	**1.86 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ES3DV2 (SN:3025 Conversion factor 4.55 at 2450 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the quarter size flat phantom and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. The included distance spacer was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ES3DV2 SN:3025 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	**54.0 mW/g** ± 16.8 % (k=2)[1]
averaged over 10 cm^3 (10 g) of tissue:	**24.4 mW/g** ± 16.2 % (k=2)[1]

[1] validation uncertainty

3. Dipole Impedance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	**1.147 ns**	(one direction)
Transmission factor:	**0.975**	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance spacer was in place during impedance measurements.

Feedpoint impedance at 2450 MHz:	Re{Z} = **52.4 Ω**
	Im {Z} = **1.7 Ω**
Return Loss at 2450 MHz	**-30.9 dB**

4. Handling

Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

5. Design

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.

Small end caps have been added to the dipole arms in order to improve matching when loaded according to the position as explained in Section 1. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

6. Power Test

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

Date/Time: 07/19/04 12:21:11

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN703

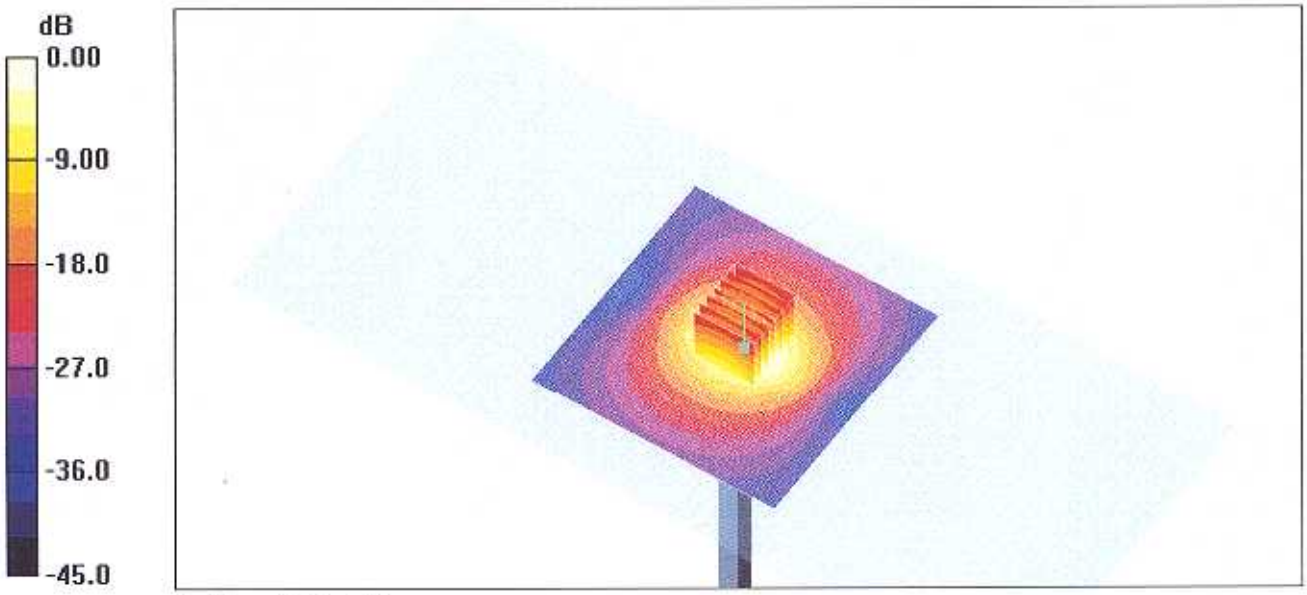
Communication System: CW-2450; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL 2450 MHz;
Medium parameters used: f = 2450 MHz; σ = 1.86 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.55, 4.55, 4.55); Calibrated: 9/29/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn904; Calibrated: 6/25/2004
- Phantom: Flat Phantom quarter size; Type: QD000P50AA; Serial: SN:1002;
- Measurement SW: DASY4, V4.3 Build 8; Postprocessing SW: SEMCAD, V1.8 Build 117

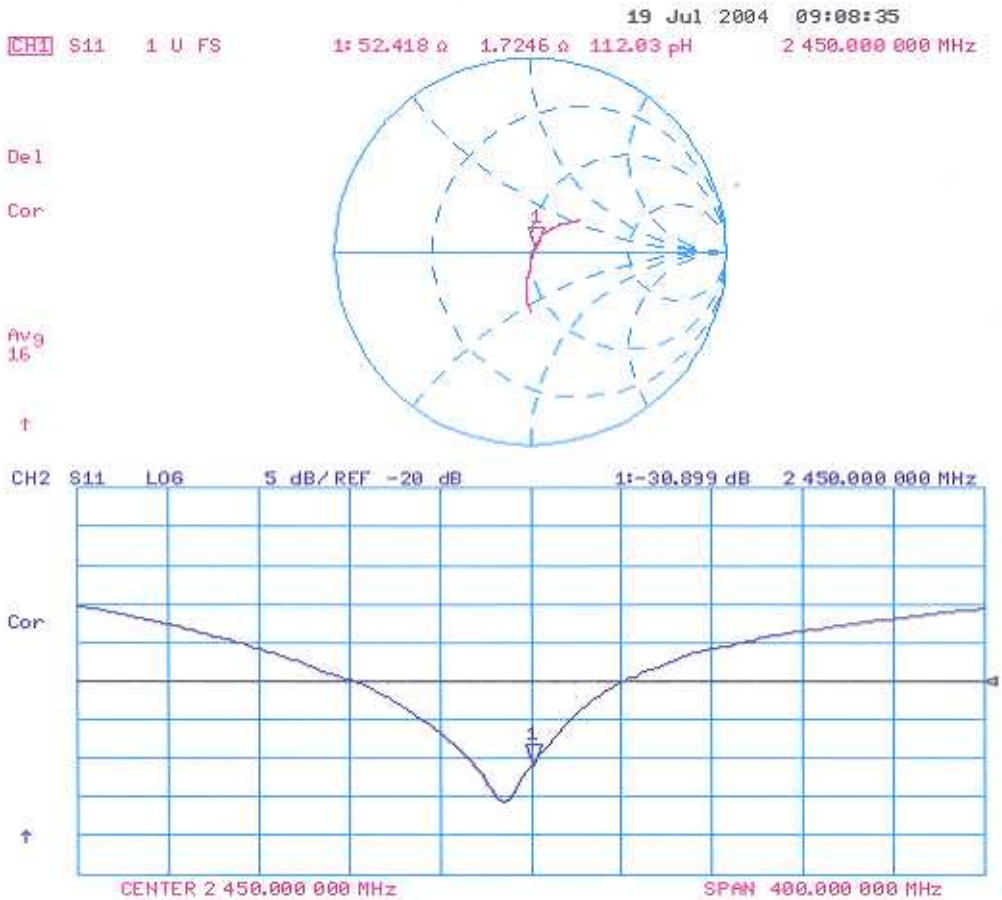
Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 15.5 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.6 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 29.2 W/kg
SAR(1 g) = 13.5 mW/g; SAR(10 g) = 6.09 mW/g
Maximum value of SAR (measured) = 15.4 mW/g



0 dB = 15.4mW/g

703
head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CH2 S11 LOG 5 dB/ REF -20 dB
1:-30.899 dB 2 450.000 000 MHz
Cor
CENTER 2 450.000 000 MHz
SPAN 400.000 000 MHz

ANFA4002

12/04

Calibration Laboratory of
Schmid & Partner
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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 **Motorola CGISS**

Certificate No: D2450V2-704_Nov04

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 704
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	November 15, 2004
Condition of the calibrated item	In Tolerance

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Power sensor HP 8481A	US37292783	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference Probe ES3DV2	SN 3025	29-Oct-04 (SPEAG, No. ES3-3025_Oct04)	Oct-05
DAE4	SN 601	6-Nov-03 (SPEAG, No. DAE4-601_Jul04)	Jul-05

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

	Name	Function	Signature
Calibrated by:	Judith Mueller	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 24, 2004

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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) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
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 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

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

DASY Version	DASY4	V4.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	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	(23.0 ± 0.2) °C	38.3 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature during test	(23.0 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	condition	
SAR measured	250 mW input power	13.8 mW / g
SAR normalized	normalized to 1W	55.2 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**53.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.26 mW / g
SAR normalized	normalized to 1W	25.0 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**24.4 mW / g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.7 Ω + j1.9 Ω
Return Loss	- 29.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.151 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 22, 2001

DASY4 Validation Report for Head TSL

Date/Time: 11/15/04 16:19:49

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN704

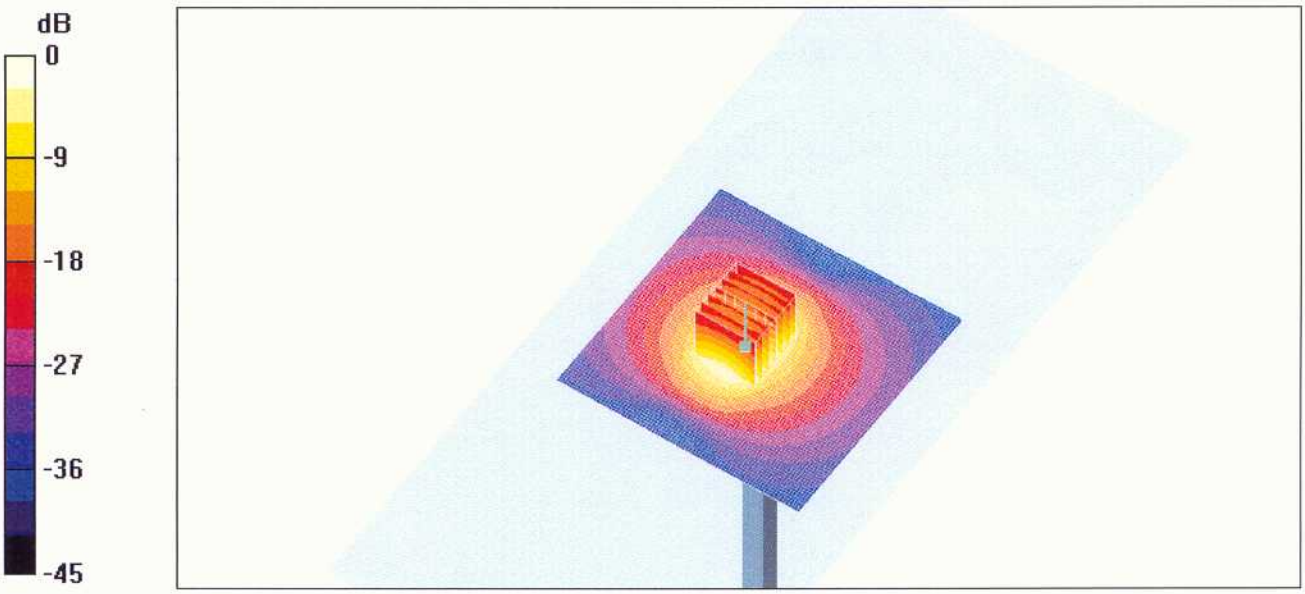
Communication System: CW-2450; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL 2450 MHz;
Medium parameters used: f = 2450 MHz; σ = 1.86 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.4, 4.4, 4.4); Calibrated: 29.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 22.07.2004
- Phantom: Flat Phantom quarter size -SN:1001; Type: QD000P50AA; Serial: SN:1001;
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

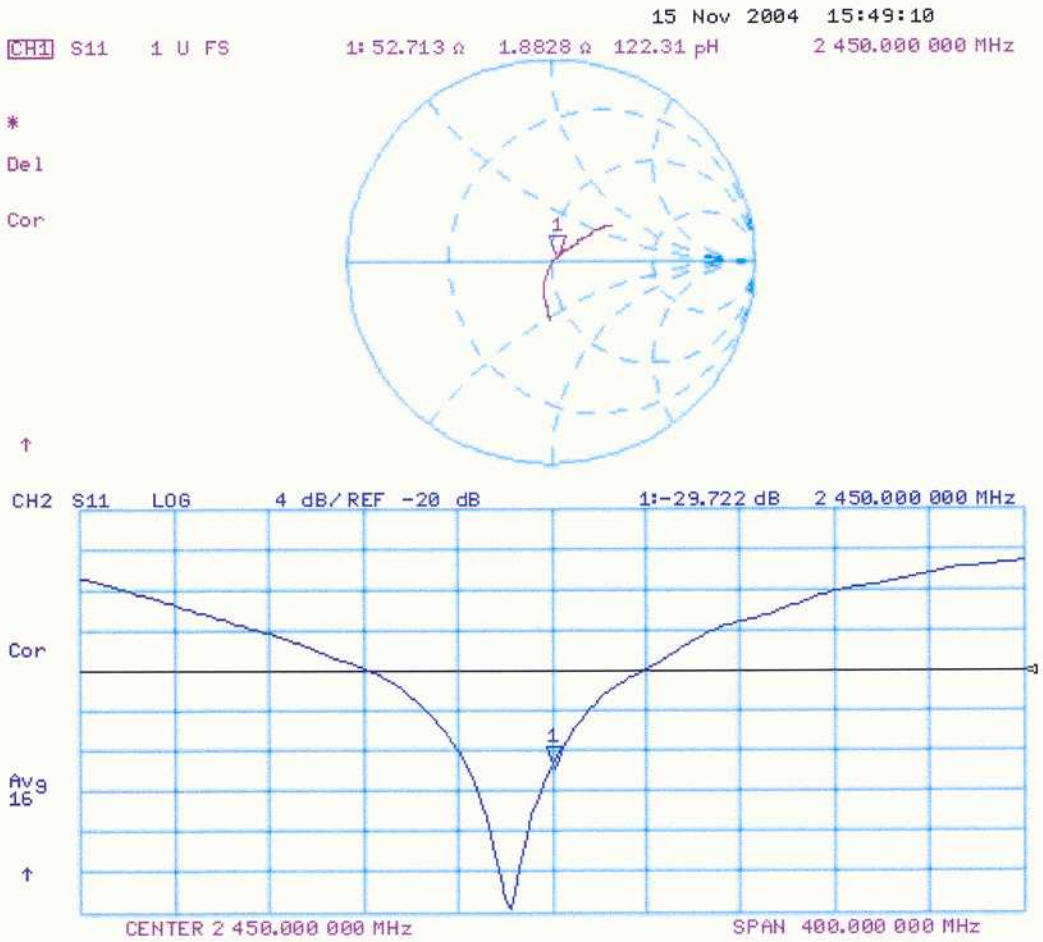
Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 15.9 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 79.9 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6.26 mW/g
Maximum value of SAR (measured) = 15.8 mW/g



0 dB = 15.8 mW/g

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 108

Client Motorola CGISS

Certificate No: D5GHzV2-1017_Nov05

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN: 1017
Calibration procedure(s)	QA CAL-22.v1 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	November 22, 2005
Condition of the calibrated item	In Tolerance

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 10 dB Attenuator	SN: 5047.2 (10r)	11-Aug-05 (METAS, No 251-00498)	Aug-06
Reference Probe EX3DV4	SN 3503	19-Mar-05 (SPEAG, No. Ex3-3503_Mar05)	Mar-06
DAE4	SN 601	07-Jan-05 (SPEAG, No. DAE4-601_Jan05)	Jan-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41093315	10-Aug-03 (SPEAG, in house check Oct-05)	In house check: Oct-06
Power meter E4419B	GB43310788	12-Aug-03 (SPEAG, in house check Oct-05)	In house check: Oct-06
RF generator R&S SMT-06	100005	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov-05

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Fin Bomholt	R&D Director	

Issued: November 23, 2005

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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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) IEC Std 62209 Part 2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", Draft Version 0.9, December 2004

b) 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:

c) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

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

DASY Version	DASY4	V4.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan resolution	dx, dy = 10 mm	
Zoom Scan Resolution	dx, dy = 4.3 mm, dz = 3 mm	
Frequency	5000 MHz ± 1 MHz 5200 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.6 ± 6 %	4.53 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	condition	
SAR measured	250 mW input power	20.3 mW / g
SAR normalized	normalized to 1W	81.2 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**80.9 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.68 mW / g
SAR normalized	normalized to 1W	22.7 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**22.6 mW / g ± 19.5 % (k=2)**

[1] Correction to nominal TSL parameters according to c), chapter "SAR Sensitivities"

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	5.09 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	condition	
SAR measured	250 mW input power	19.6 mW / g
SAR normalized	normalized to 1W	78.4 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**77.8 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.46 mW / g
SAR normalized	normalized to 1W	21.8 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**21.6 mW / g ± 19.5 % (k=2)**

Head TSL parameters at 5000 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.2	4.45 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.9 ± 6 %	4.33 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Head TSL at 5000 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	condition	
SAR measured	250 mW input power	19.2 mW / g
SAR normalized	normalized to 1W	76.8 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**76.6 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.50 mW / g
SAR normalized	normalized to 1W	22.0 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**21.9 mW / g ± 19.5 % (k=2)**

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.6 ± 6 %	5.17 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	condition	
SAR measured	250 mW input power	18.4 mW / g
SAR normalized	normalized to 1W	73.6 mW / g
SAR for nominal Body TSL parameters [1]	normalized to 1W	**73.4 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.22 mW / g
SAR normalized	normalized to 1W	20.9 mW / g
SAR for nominal Body TSL parameters [1]	normalized to 1W	**20.8 mW / g ± 19.5 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.4 ± 6 %	5.95 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	condition	
SAR measured	250 mW input power	17.4 mW / g
SAR normalized	normalized to 1W	69.6 mW / g
SAR for nominal Body TSL parameters [1]	normalized to 1W	**69.2 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.84 mW / g
SAR normalized	normalized to 1W	19.4 mW / g
SAR for nominal Body TSL parameters [1]	normalized to 1W	**19.3 mW / g ± 19.5 % (k=2)**

Body TSL parameters at 5000 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.3	5.07 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.9 ± 6 %	4.80 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL at 5000 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	condition	
SAR measured	250 mW input power	19.2 mW / g
SAR normalized	normalized to 1W	76.8 mW / g
SAR for nominal Body TSL parameters [1]	normalized to 1W	**76.1 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.53 mW / g
SAR normalized	normalized to 1W	22.1 mW / g
SAR for nominal Body TSL parameters [1]	normalized to 1W	**21.8 mW / g ± 19.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	49.9 Ω - 9.0jΩ
Return Loss	-20.9 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	59.6 Ω - 3.5 jΩ
Return Loss	-20.7 dB

Antenna Parameters with Head TSL at 5000 MHz

Impedance, transformed to feed point	48.4 Ω - 15.0jΩ
Return Loss	-16.3 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	50.0 Ω - 7.1jΩ
Return Loss	-23.0 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	60.8 Ω - 2.2 jΩ
Return Loss	-20.1 dB

Antenna Parameters with Body TSL at 5000 MHz

Impedance, transformed to feed point	47.6 Ω - 13.5jΩ
Return Loss	-17.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.177 ns

After long term use with 40 W 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	February 5, 2004

DASY4 Validation Report for Head TSL

Date/Time: 22.11.2005 14:29:08

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHz; Serial: D5GHzV2 - SN:1017

Communication System: CW-5GHz; Frequency: 5000 MHz Frequency: 5200 MHz Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: HSL 5800 MHz;
Medium parameters used: f = 5000 MHz; σ = 4.33 mho/m; ε_r = 35.9; ρ = 1000 kg/m^3 Medium parameters used: f = 5200 MHz; σ = 4.53 mho/m; ε_r = 35.6; ρ = 1000 kg/m^3 Medium parameters used: f = 5800 MHz; σ = 5.09 mho/m; ε_r = 34.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(6.08, 6.08, 6.08)ConvF(5.56, 5.56, 5.56)ConvF(4.95, 4.95, 4.95); Calibrated: 19.03.2005
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

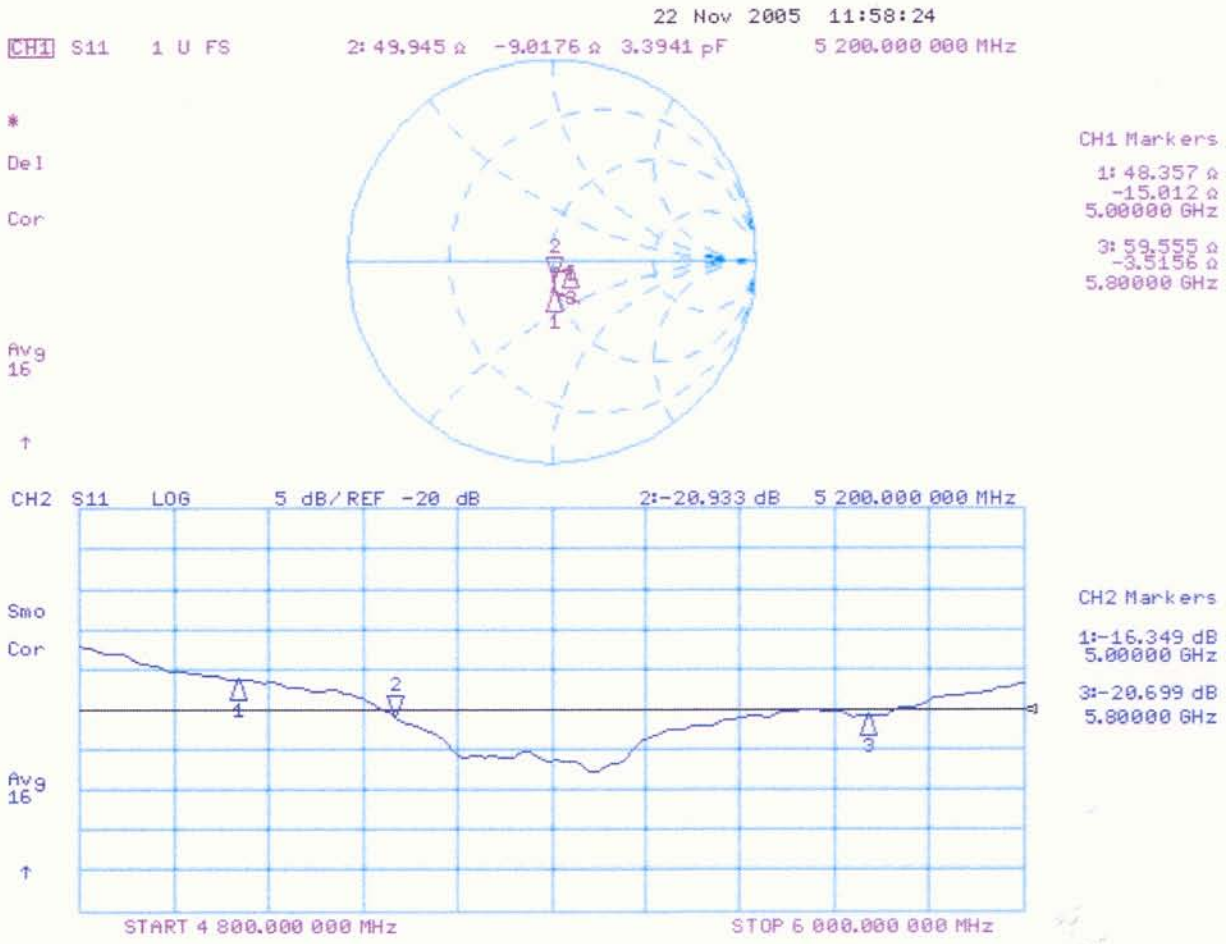
d=10mm, Pin=250mW, f=5000 MHz/Area Scan (91x91x1): Measurement grid: dx=dy=10mm
Maximum value of SAR (interpolated) = 41.4 mW/g

d=10mm, Pin=250mW, f=5000 MHz/Zoom Scan (8x8x8), dist=2mm (8x8x8)/Cube 0:
Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 81.0 V/m; Power Drift = 0.147 dB
Peak SAR (extrapolated) = 69.3 W/kg
SAR(1 g) = 19.2 mW/g; SAR(10 g) = 5.5 mW/g
Maximum value of SAR (measured) = 35.8 mW/g

d=10mm, Pin=250mW, f=5200 MHz/Zoom Scan (8x8x8), dist=2mm (8x8x8)/Cube 0:
Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 81.8 V/m; Power Drift = 0.104 dB
Peak SAR (extrapolated) = 76.8 W/kg
SAR(1 g) = 20.3 mW/g; SAR(10 g) = 5.68 mW/g
Maximum value of SAR (measured) = 39.5 mW/g

d=10mm, Pin=250mW, f=5800 MHz/Zoom Scan (8x8x8), dist=2mm (8x8x8)/Cube 0:
Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 75.9 V/m; Power Drift = 0.109 dB
Peak SAR (extrapolated) = 81.6 W/kg
SAR(1 g) = 19.6 mW/g; SAR(10 g) = 5.46 mW/g
Maximum value of SAR (measured) = 38.1 mW/g

Impedance Measurement Plot for Head TSL



DASY4 Validation Report for Body TSL

Date/Time: 22.11.2005 19:27:04

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHz; Serial: D5GHzV2 - SN:1017

Communication System: CW-5GHz; Frequency: 5000 MHz Frequency: 5800 MHz Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: MSL 5800 MHz;
Medium parameters used: f = 5000 MHz; σ = 4.8 mho/m; ε_r = 47.9; ρ = 1000 kg/m^3 Medium parameters used: f = 5800 MHz; σ = 5.95 mho/m; ε_r = 47.4; ρ = 1000 kg/m^3 Medium parameters used: f = 5200 MHz; σ = 5.17 mho/m; ε_r = 48.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.28, 5.28, 5.28)ConvF(4.69, 4.69, 4.69)ConvF(5.18, 5.18, 5.18); Calibrated: 19.03.2005
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

d=10mm, Pin=250mW, f=5000 MHz/Area Scan (91x91x1): Measurement grid: dx=dy=10mm
Maximum value of SAR (interpolated) = 40.9 mW/g

d=10mm, Pin=250mW, f=5000 MHz/Zoom Scan (8x8x8), dist=2mm (8x8x8)/Cube 0:
Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 82.1 V/m; Power Drift = -0.099 dB
Peak SAR (extrapolated) = 63.8 W/kg
SAR(1 g) = 19.2 mW/g; SAR(10 g) = 5.53 mW/g
Maximum value of SAR (measured) = 36.6 mW/g

d=10mm, Pin=250mW, f=5200 MHz/Zoom Scan (8x8x8), dist=2mm (8x8x8)/Cube 0:
Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 78.1 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 63.3 W/kg
SAR(1 g) = 18.4 mW/g; SAR(10 g) = 5.22 mW/g
Maximum value of SAR (measured) = 35.4 mW/g

d=10mm, Pin=250mW, f=5800 MHz/Zoom Scan (8x8x8), dist=2mm (8x8x8)/Cube 0:
Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 69.1 V/m; Power Drift = 0.027 dB
Peak SAR (extrapolated) = 70.3 W/kg
SAR(1 g) = 17.4 mW/g; SAR(10 g) = 4.84 mW/g
Maximum value of SAR (measured) = 34.5 mW/g

Impedance Measurement Plot for Body TSL