APPENDIX 2: System validation

1. Validation uncertainty

The uncertainty budget has been determined for the DASY5 measurement system according to the SPEAG documents[2] and is given in the following Table

<300MHz-6GHz>

Error Description	Uncertainty value ± %	Probability distribution	divisor	(ci) 1g	Standard Uncertainty (1g)	vi or veff
Measurement System						
Probe calibration	±6.55	Normal	1	1	±6.55	∞
Axial isotropy of the probe	±4.7	Rectangular	√3	1	±2.7	∞
Spherical isotropy of the probe	±9.6	Rectangular	0	0	0	∞
Boundary effects	±1.0	Rectangular	√3	1	±1.2	∞
Probe linearity	±4.7	Rectangular	√3	1	±2.7	∞
Detection limit	±1.0	Rectangular	√3	1	±0.6	∞
Readout electronics	±0.3	Normal	1	1	±0.3	∞
Response time	0	Rectangular	√3	1	0	∞
Integration time	0	Rectangular	√3	1	0	∞
RF ambient Noise	±1.0	Rectangular	√3	1	±1.7	∞
RF ambient Reflections	±1.0	Rectangular	√3	1	±1.7	∞
Probe Positioner	±0.8	Rectangular	√3	1	±0.5	∞
Probe positioning	±6.7	Rectangular	√3	1	±3.9	∞
Algorithms for Max.SAR Eval.	±2.0	Rectangular	√3	1	±1.2	∞
Dipole						
Deviation of exp.dipole	±5.5	Rectangular	√3	1	±3.2	∞
Dipole Axis to Liquid Distance	±2.0	Rectangular	√3	1	±1.2	∞
Input power and SAR drift meas.	±3.4	Rectangular	√3	1	±2.7	∞
Phantom and Setup						
Phantom uncertainty	±4.0	Rectangular	√3	1	±2.3	∞
SAR correction	±1.9	Rectangular	√3	1	±1.1	
Liquid conductivity (target)	±5.0	Rectangular	√3	0.78	±2.3	∞
Liquid conductivity (meas.)	+4.5	Rectangular	1	0.26	±1.2	∞
Liquid permittivity (target)	±5.0	Rectangular	√3	0.78	±2.3	∞
Liquid permittivity (meas.)	-4.8	Rectangular	1	0.23	±1.1	∞
Combined Standard Uncertainty					**±10.989**	
Expanded Uncertainty (k=2)					**±21.98**	

2. System validation result Body 2450

Simulated Tissue Liquid Parameter confirmation

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*1	Measured	Deviation [%]	Limit [%]
20-Oct	24.5	59	MSL 2450	24.7	2450	εr	52.7	51.0	-3.2	+/-5
						σ [mho/m]	1.95	2.03	4.1	+/-5

εr: Relative Permittivity / σ : Coductivity

*1 The Target value is a parameter defined in FCC OET 65 .

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*2	Measured	Deviation [%]	Limit*3 [%]
20-Oct	24.5	59	MSL 2450	24.7	2450	εr	52.5	51.0	-2.9	+/-6
						σ [mho/m]	1.95	2.03	4.1	+/-6

εr: Relative Permittivity / σ : Coductivity

*2 The target value is the calibrated dipole Body TSL parameters. (D2450V2 SN:713, Measured Body TSL parameters)

*3 The limit is for deviation provided by manufacture.

System validation result

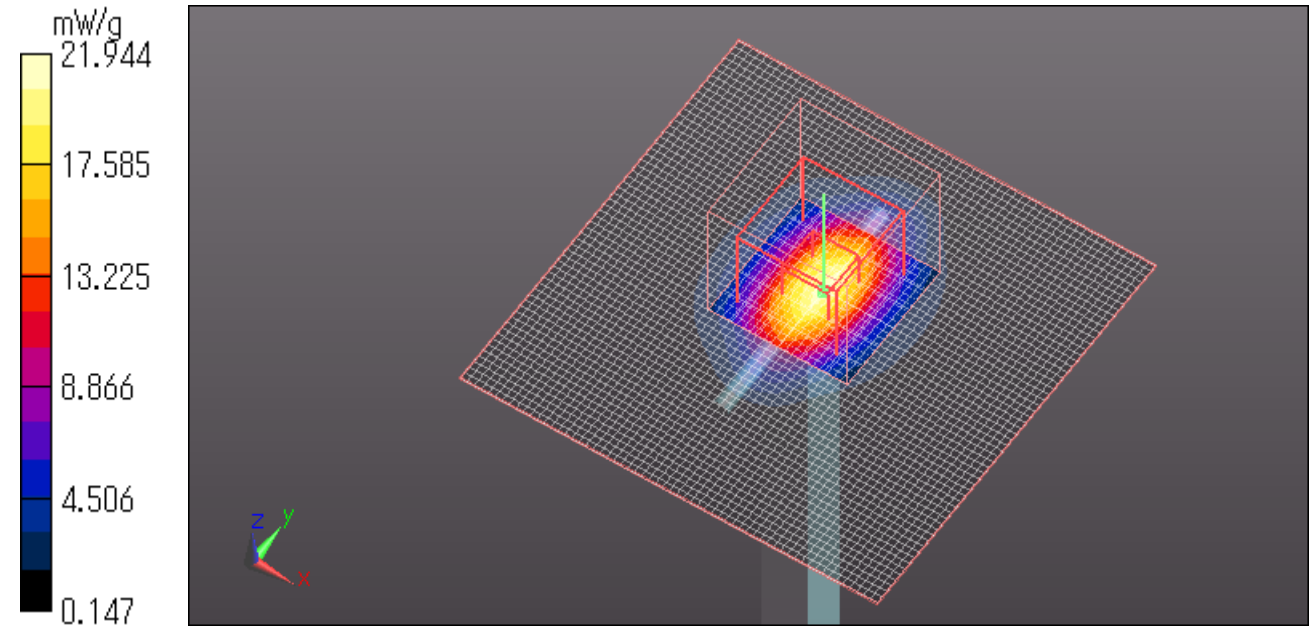
SYSTEM VALIDATION						
Date	Frequency [MHz]	SAR 1g [W/kg]				
		Forward Power 250mW Measured	Conversion 1W Calculation	Target 1W *1	Deviation [%]	Limit [%]
20-Oct	2450.00	14.30	57.20	51.90	-9.3	+/-10

*1 The taget value is the parameter defined in 1g SAR (normalized to 1W) in manufacturer calibrated dipole (D2450V2 SN:713)

Body 2450MHz System Validation DATA / Dipole2.4GHz / Forward Conducted Power : 250mW
Communication System: CW; Communication System Band: D2450 (2450.0 MHz);
Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 2.03 mho/m; ε_r = 51; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration
Probe: EX3DV4 - SN3540; ConvF(7.64, 7.64, 7.64); Calibrated: 2011/07/21
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2011/07/20
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.6 (1);

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 21.976 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.0 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 29.700 W/kg
SAR(1 g) = 14.3 mW/g; SAR(10 g) = 6.62 mW/g
Maximum value of SAR (measured) = 21.944 mW/g
Date: 2011/10/20
Ambient Temp. : 24.5 degree.C. Liquid Temp.; 24.7 degree.C.



3 System Validation Dipole (D2450V2,S/N:713)

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

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

Accredited by the Swiss Accreditation Service (SAS)
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 UL Japan (PTT)

Certificate No: D2450V2-713_Sep10

CALIBRATION CERTIFICATE

Object D2450V2 - SN: 713

Calibration procedure(s) QA CAL-05.v7
Calibration procedure for dipole validation kits

Calibration date: September 06, 2010

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-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

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	4-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-09)	In house check: Oct-10

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 8, 2010

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

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	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
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	39.0 ± 6 %	1.74 mho/m ± 6 %
Head TSL temperature during test	(21.8 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.9 mW / g
SAR normalized	normalized to 1W	51.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**52.4 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.08 mW / g
SAR normalized	normalized to 1W	24.3 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 mW /g ± 16.5 % (k=2)**

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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	52.5 ± 6 %	1.95 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 mW / g
SAR normalized	normalized to 1W	52.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**51.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.04 mW / g
SAR normalized	normalized to 1W	24.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**24.1 mW / g ± 16.5 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.0 Ω + 1.0 jΩ
Return Loss	- 30.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.6 Ω + 2.1 jΩ
Return Loss	- 33.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.160 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 05, 2002

DASY5 Validation Report for Head TSL

Date/Time: 03.09.2010 15:07:26

Test Laboratory: SPEAG, Zurich, Switzerland

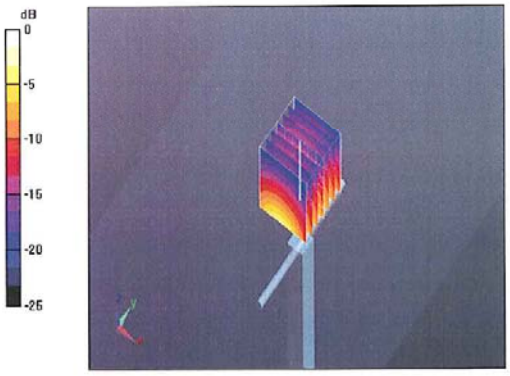
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:713

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL U12 BB
Medium parameters used: f = 2450 MHz; σ = 1.74 mho/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

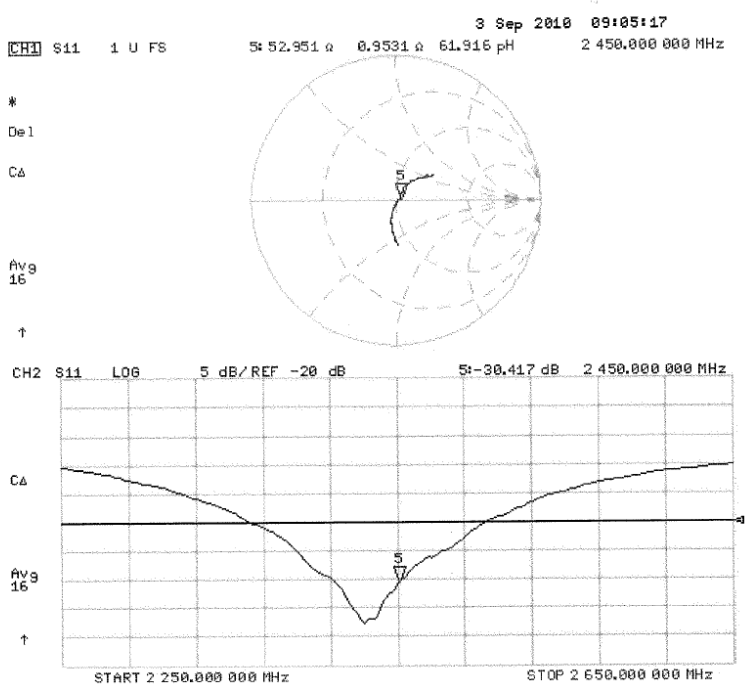
- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Head/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 100.4 V/m; Power Drift = 0.050 dB
Peak SAR (extrapolated) = 26.3 W/kg
SAR(1 g) = 12.9 mW/g; SAR(10 g) = 6.08 mW/g
Maximum value of SAR (measured) = 16.2 mW/g



0 dB = 16.2mW/g

Impedance Measurement Plot for Head TSL



Validation Report for Body

Date/Time: 06.09.2010 13:42:13

Test Laboratory: SPEAG, Zurich, Switzerland

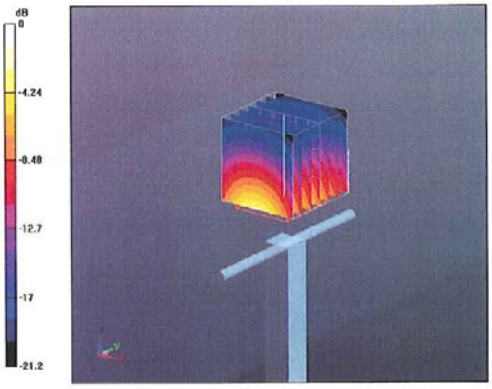
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:713

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: MSL U12 BB
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Body/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.7 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 27 W/kg
SAR(1 g) = 13 mW/g; SAR(10 g) = 6.04 mW/g
Maximum value of SAR (measured) = 16.9 mW/g



0 dB = 16.9mW/g

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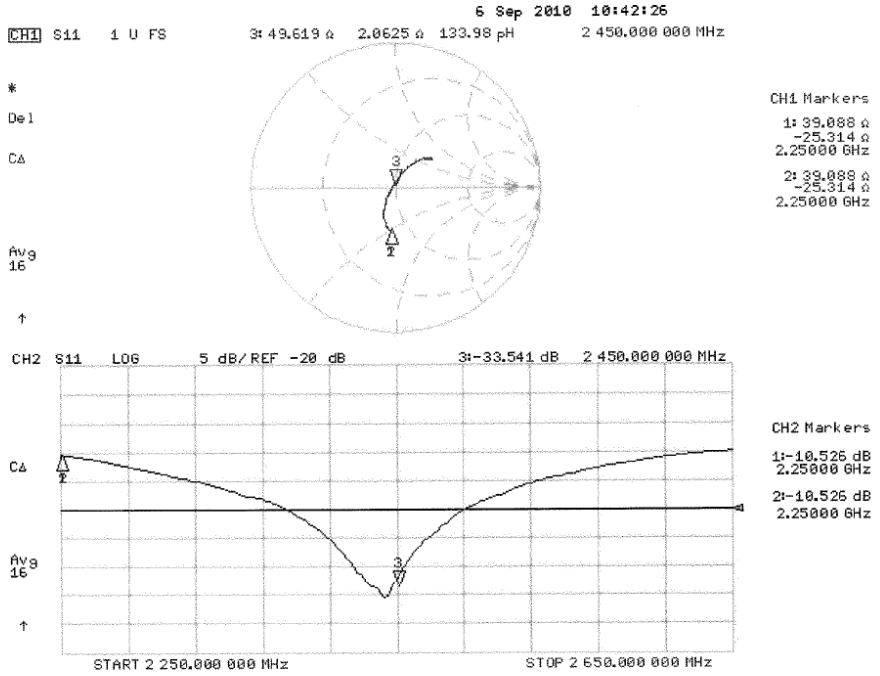
Impedance Measurement Plot for Body TSL



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D2450V2 Calibration for Impedance and Return-loss

Date	September 13, 2011		
Ambient Temperature	24.5 deg.C	Relative humidity	63%RH

1. Test environment

Equipment	Dipole Antenna	Model	D2450V2
Manufacture	Schmid&Partner Engineering AG	Serial	713
Tested by	Miyo Kishimoto/ISE/ULI		

2. Equipment used

Control No.	Instrument	Manufacturer	Model No	Serial No	Calibration Date * Interval(month)
MNA-01	Network Analyzer	Agilent/HP	E8358A	US41080381	2011/08/22* 12
MNCK-01	Type N Calibration Kit	Agilent	85032F	MY41495257	2011/08/12 * 12
EST-46	3.5mm Calibration Kit	Agilent	85052D	MY43252869	2011/06/13*12
MDA-12	Dipole Antenna	Schmid&Partner Engineering AG	D1450V2	1024	2009/06/23 * 36
MPSAM-02	SAM Phantom	Schmid&Partner Engineering AG	SAM Twin Phantom V4.0	1333	Pre Check
MOS-24	Thermo-Hygrometer	Custom	CTH-201	0005	2011/02/23 * 12
HSL2450					Daily check
MSL2450					Daily check
SAR room					Daily check

3. Test Result

Impeadance,Transformed to feed point	Head	Deviation	Tolerance	Result
Calibration (SPEAG) 2010/9/06	53.0 Ω+1.0jΩ	-	-	-
Calibration(ULJ)2011/9/13	52.27Ω-0.57jΩ	-0.73Ω-1.57jΩ	+/-5Ω+/-5jΩ	Complied

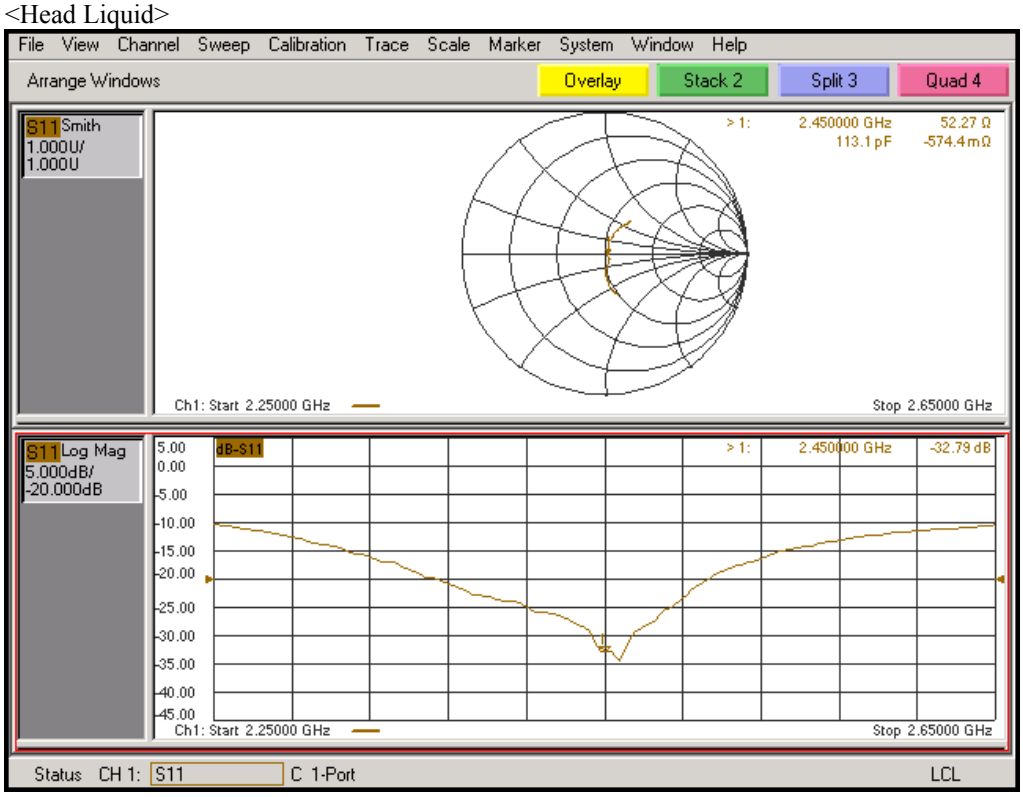
Return loss	Head	Deviation	Tolerance	Result
Calibration (SPEAG) 2010/9/06	-30.4dB	-	-	-
Calibration(ULJ)2011/9/13	-32.79dB	-2.39dB	30.4 *+/-20%	Complied
Impeadance,Transformed to feed point	Body	Deviation	Tolerance	Result
Calibration (SPEAG) 2010/9/06	49.6 Ω+2.1jΩ	-	-	-
Calibration(ULJ)2011/9/13	48.28Ω+0.35jΩ	-1.32Ω+1.75jΩ	+/-5Ω+/-5jΩ	Complied

Return loss	Body	Deviation	Tolerance	Result
Calibration (SPEAG) 2010/9/06	-33.5dB	-	-	-
Calibration(ULJ)2011/9/13	-34.98dB	-1.48dB	33.5*+/-20%	Complied

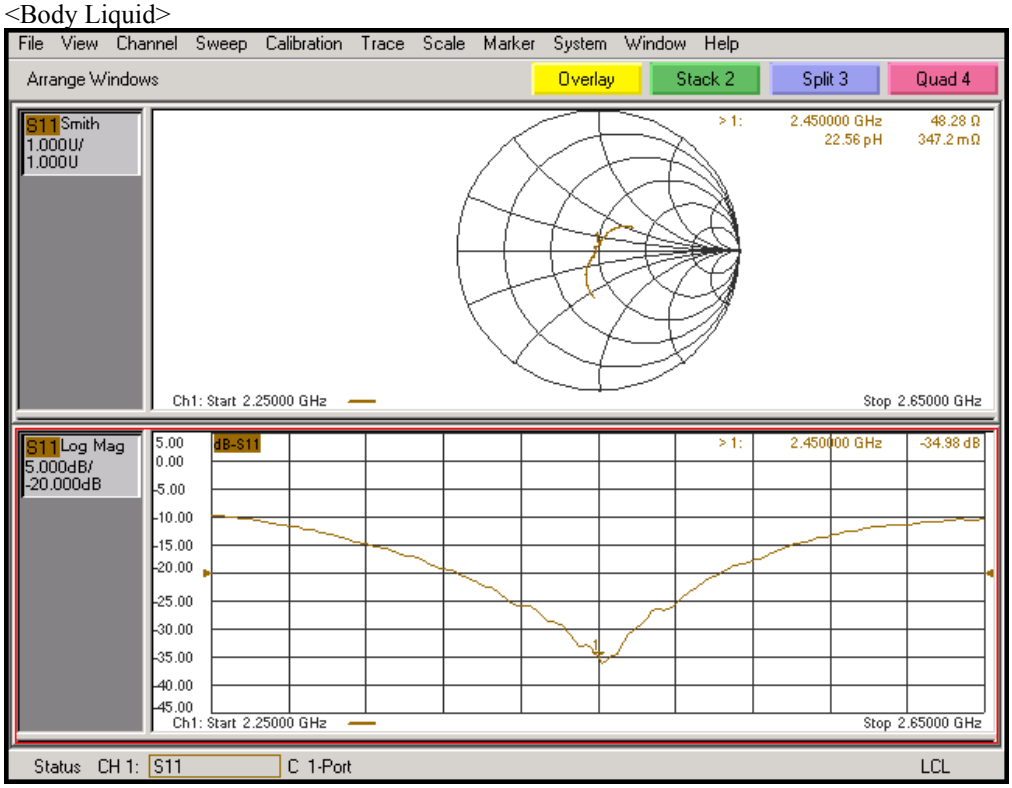
*Tolerance : According to the KDB450824D02

Measurement Plots

<Head Liquid>



<Body Liquid>



4. System validation result Body 5GHz

Simulated Tissue Liquid Parameter confirmation

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*1	Measured	Deviation [%]	Limit [%]
19-Oct	24.0	42	MSL 3-6GHz	23.5	5200	εr	49.0	46.9	-4.3	+/-5
						σ [mho/m]	5.30	5.49	3.6	+/-5
19-Oct	24.0	42	MSL 3-6GHz	23.5	5500	εr	48.6	46.4	-4.5	+/-5
						σ [mho/m]	5.65	5.81	2.8	+/-5
19-Oct	24.0	42	MSL 3-6GHz	23.5	5800	εr	48.2	45.9	-4.8	+/-5
						σ [mho/m]	6.00	6.27	4.5	+/-5
8-Nov	24.3	43	MSL 3-6GHz	24.0	5200	εr	49.0	47.2	-3.7	+/-5
						σ [mho/m]	5.30	5.54	4.5	+/-5
8-Nov	24.3	43	MSL 3-6GHz	24.0	5500	εr	48.6	46.4	-4.5	+/-5
						σ [mho/m]	5.65	5.90	4.4	+/-5
9-Nov	24.3	43	MSL 3-6GHz	24.0	5800	εr	48.2	46.0	-4.6	+/-5
						σ [mho/m]	6.00	6.28	4.7	+/-5

εr: Relative Permittivity / σ : Coductivity

*1 The Target value is a parameter defined in FCC OET 65 .

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*2	Measured	Deviation [%]	Limit*3 [%]
19-Oct	24.0	42	MSL 3-6GHz	23.5	5200	εr	48.8	46.9	-3.9	+/-6
						σ [mho/m]	5.45	5.49	0.7	+/-6
19-Oct	24.0	42	MSL 3-6GHz	24.0	5500	εr	48.3	46.4	-3.9	+/-6
						σ [mho/m]	5.86	5.81	-0.9	+/-6
19-Oct	24.0	42	MSL 3-6GHz	24.0	5800	εr	47.7	45.9	-3.8	+/-6
						σ [mho/m]	6.27	6.27	0.0	+/-6
8-Nov	24.3	43	MSL 3-6GHz	24.0	5200	εr	48.8	47.2	-3.3	+/-5
						σ [mho/m]	5.45	5.54	1.7	+/-5
8-Nov	24.3	43	MSL 3-6GHz	24.0	5500	εr	48.3	46.4	-3.9	+/-5
						σ [mho/m]	5.86	5.90	0.7	+/-5
9-Nov	24.3	43	MSL 3-6GHz	24.0	5800	εr	47.7	46.0	-3.6	+/-5
						σ [mho/m]	6.27	6.28	0.2	+/-5

εr: Relative Permittivity / σ : Coductivity

*2 The target value is the calibrated dipole Body TSL parameters. (D5GHzV2 SN:1020, Measured Body TSL parameters)

*3 The limit is for deviation provided by manufacture.

System validation result

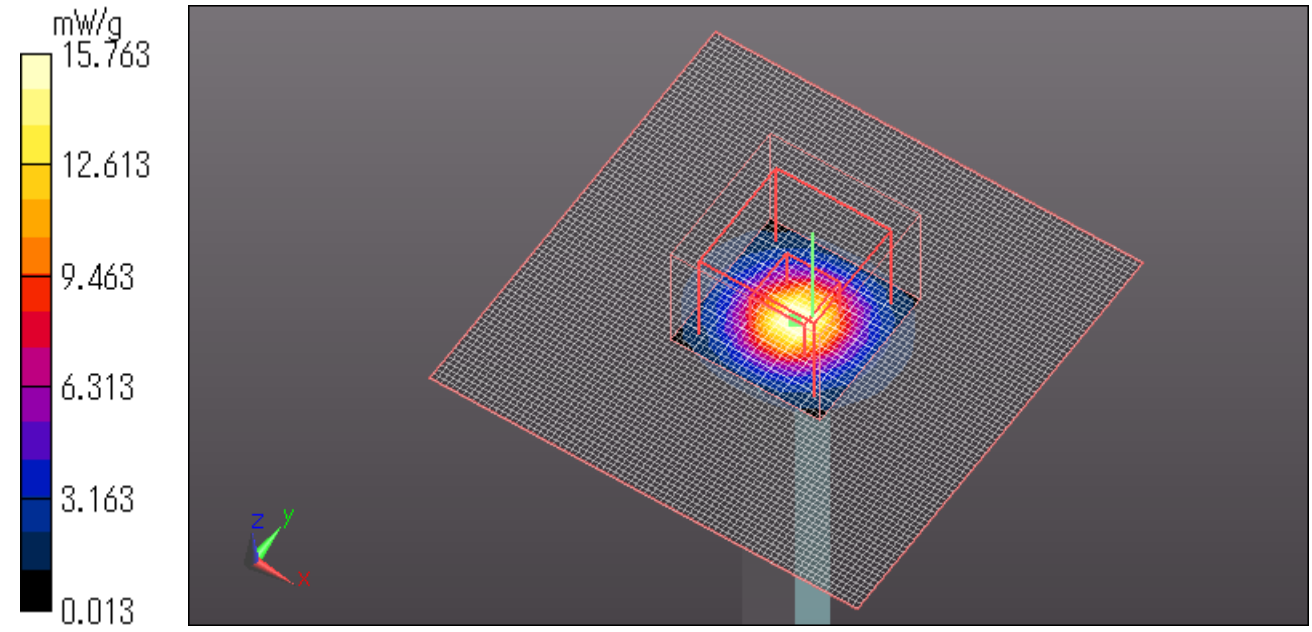
SYSTEM VALIDATION						
Date	Frequency [MHz]	SAR 1g [W/kg]				
		Forward Power 100mW Measured	Conversion 1W Calculation	Target 1W *1	Deviation [%]	Limit [%]
19-Oct	5200	8.10	81.00	75.10	7.9	+/-10
19-Oct	5500	8.59	85.90	79.90	7.5	+/-10
19-Oct	5800	8.05	80.50	74.40	8.2	+/-10
8-Nov	5200	8.22	82.20	75.10	9.5	+/-10
8-Nov	5500	8.63	86.30	79.90	8.0	+/-10
8-Nov	5800	7.73	77.30	74.40	3.9	+/-10

*1 The taget value is the parameter defined in 1g SAR (normalized to 1W) in manufacturer calibrated dipole (D5GHzV2 SN:1020)

Body 5200MHz System Validation DATA / Dipole5GHz / Forward Conducted Power : 100mW
Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz);
Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.49 mho/m; ε_r = 46.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration
Probe: EX3DV4 - SN3540; ConvF(3.94, 3.94, 3.94); Calibrated: 2011/07/21
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2011/07/20
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.6 (1);

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.762 mW/g

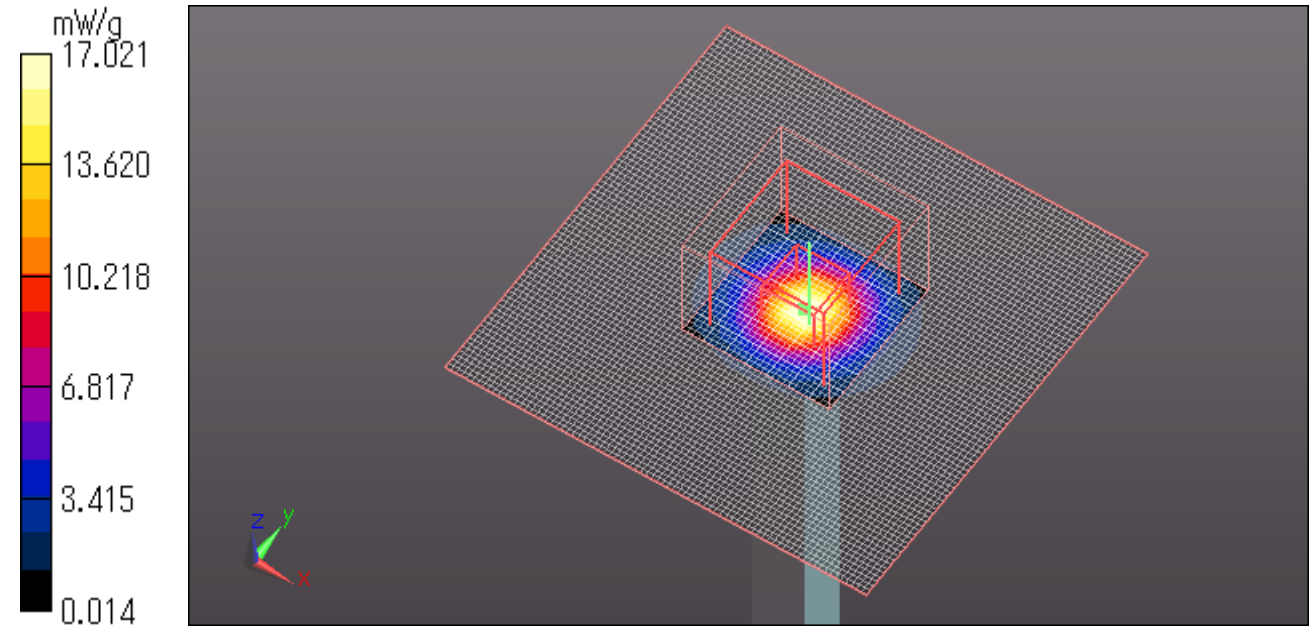
Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 42.683 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 29.493 W/kg
SAR(1 g) = 8.1 mW/g; SAR(10 g) = 2.28 mW/g
Maximum value of SAR (measured) = 15.763 mW/g
Date: 2011/10/20
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



Body 5500MHz System Validation DATA / Dipole5GHz / Forward Conducted Power : 100mW
Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz);
Frequency: 5500 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5500 MHz; σ = 5.81 mho/m; ε_r = 46.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration
Probe: EX3DV4 - SN3540; ConvF(3.56, 3.56, 3.56); Calibrated: 2011/07/21
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2011/07/20
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.6 (1);

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 17.867 mW/g

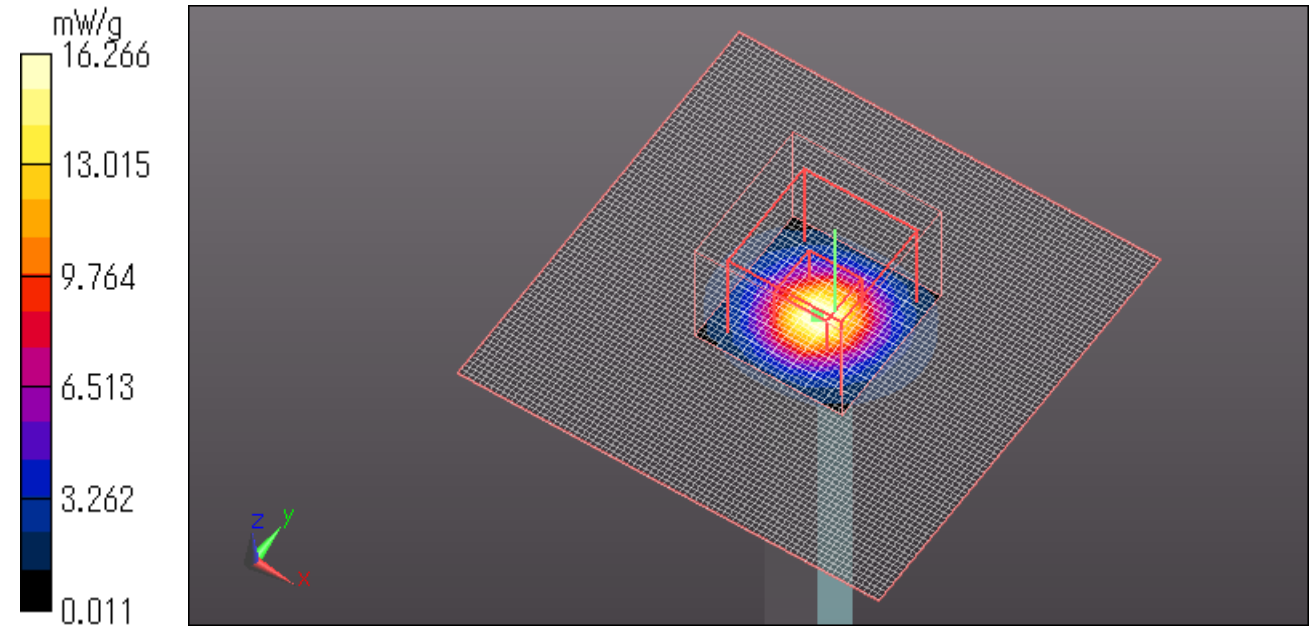
Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 42.619 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 33.298 W/kg
SAR(1 g) = 8.59 mW/g; SAR(10 g) = 2.37 mW/g
Maximum value of SAR (measured) = 17.021 mW/g
Date: 2011/10/20
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



Body 5800MHz System Validation DATA / Dipole5GHz / Forward Conducted Power : 100mW
Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz);
Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 6.27 mho/m; ε_r = 45.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration
Probe: EX3DV4 - SN3540; ConvF(3.4, 3.4, 3.4); Calibrated: 2011/07/21
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2011/07/20
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.6 (1);

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 17.960 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 40.444 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 32.656 W/kg
SAR(1 g) = 8.05 mW/g; SAR(10 g) = 2.21 mW/g
Maximum value of SAR (measured) = 16.266 mW/g
Date: 2011/10/20
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



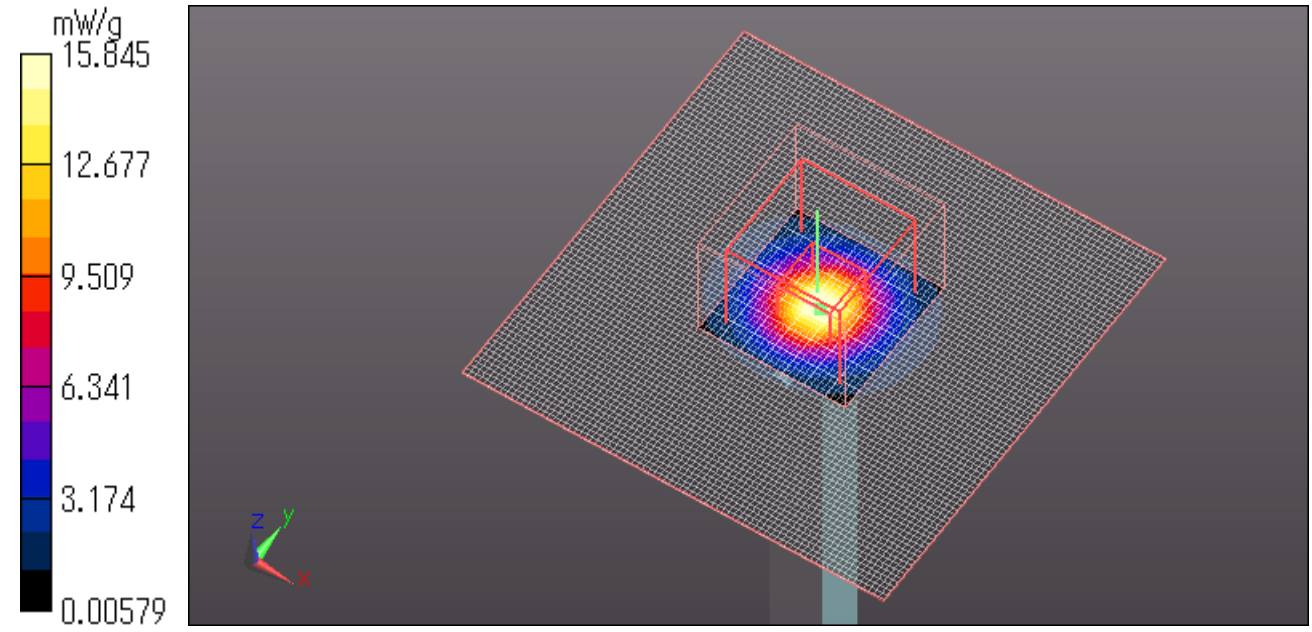
Body 5200MHz System Validation DATA / Dipole5GHz / Forward Conducted Power : 100mW Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.54 mho/m; ε_r = 47.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration
Probe: EX3DV4 - SN3540; ConvF(3.94, 3.94, 3.94); Calibrated: 2011/07/21
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2011/07/20
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.6 (1);

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 17.725 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 61.699 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 32.449 W/kg

SAR(1 g) = 8.22 mW/g; SAR(10 g) = 2.31 mW/g
Maximum value of SAR (measured) = 15.845 mW/g

Date: 2011/11/08
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



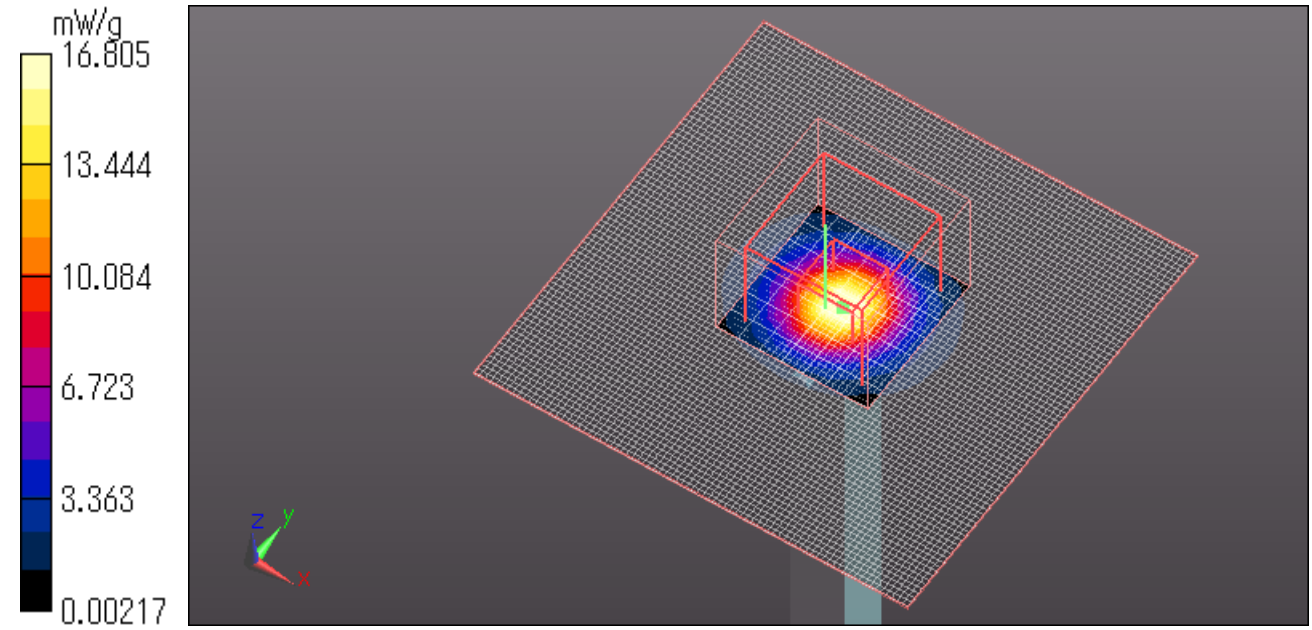
Body 5500MHz System Validation DATA / Dipole5GHz / Forward Conducted Power : 100mW
Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5500 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5500 MHz; σ = 5.9 mho/m; ε_r = 46.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration
Probe: EX3DV4 - SN3540; ConvF(3.56, 3.56, 3.56); Calibrated: 2011/07/21
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2011/07/20
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.6 (1);

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 18.499 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 63.585 V/m; Power Drift = 0.0068 dB
Peak SAR (extrapolated) = 34.380 W/kg

SAR(1 g) = 8.63 mW/g; SAR(10 g) = 2.39 mW/g
Maximum value of SAR (measured) = 16.805 mW/g

Date: 2011/11/08
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.

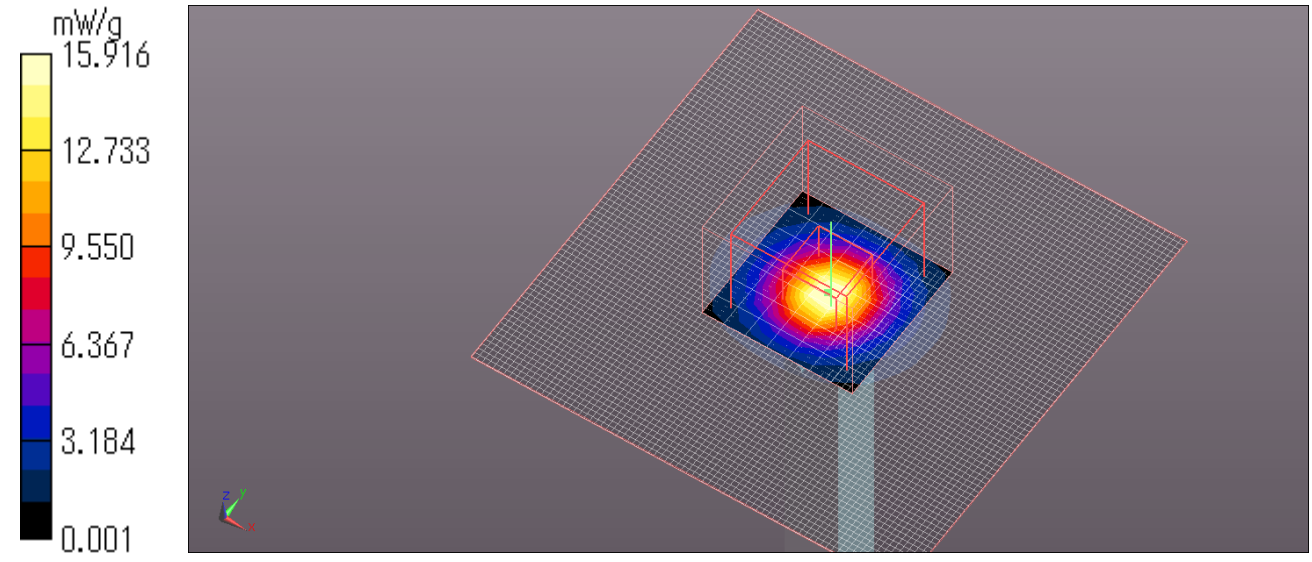


Body 5800MHz System Validation DATA / Dipole5GHz / Forward Conducted Power : 100mW
Communication System: CW; Communication System Band: Exported from older format (data unavailable - please correct).; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 6.28 mho/m; ε_r = 46; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration
Probe: EX3DV4 - SN3540; ConvF(3.4, 3.4, 3.4); Calibrated: 2011/07/21
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2011/07/20
Phantom: ELI 4.0; Type: QDOVA001BA; Serial: xxxx
Measurement SW: DASY52, Version 52.6 (1);

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 17.782 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 60.375 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 32.623 W/kg
SAR(1 g) = 7.73 mW/g; SAR(10 g) = 2.11 mW/g
Maximum value of SAR (measured) = 15.916 mW/g

Date: 2011/11/09
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



5. System Validation Dipole (D5GHzV2,S/N:1020)

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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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 UL Japan (PTT)

Certificate No: D5GHz-1020_Aug11

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN: 1020
Calibration procedure(s)	QA CAL-22.v1 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	August 23, 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: 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	04-Mar-11 (No. EX3-3503_Mar11)	Mar-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: August 23, 2011

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

Certificate No: D5GHz-1020_Aug11 Page 1 of 13

Calibration Laboratory of
Schmid & Partner
Engineering AG
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**

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 V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5500 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	35.7 ± 6 %	4.49 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.59 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**75.7 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.16 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**21.5 mW /g ± 16.5 % (k=2)**

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.3 ± 6 %	4.79 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.91 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**78.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.24 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**22.3 mW / g ± 16.5 % (k=2)**

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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	34.8 ± 6 %	5.09 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.31 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**72.8 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.08 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.7 mW / g ± 16.5 % (k=2)**

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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	48.8 ± 6 %	5.45 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.52 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**75.1 mW / g ± 18.1 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.11 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.1 mW / g ± 17.6 % (k=2)**

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.3 ± 6 %	5.86 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.00 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**79.9 mW / g ± 18.1 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.22 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**22.2 mW / g ± 17.6 % (k=2)**

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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	47.7 ± 6 %	6.27 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.45 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**74.4 mW / g ± 18.1 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.07 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.7 mW / g ± 17.6 % (k=2)**

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Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	48.8 Ω - 9.8 jΩ
Return Loss	- 20.0 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	49.3 Ω - 2.7 jΩ
Return Loss	- 31.1 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	55.4 Ω - 0.8 jΩ
Return Loss	- 25.7 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	49.2 Ω - 8.4 jΩ
Return Loss	- 21.4 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	49.7 Ω - 2.0 jΩ
Return Loss	- 33.9 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	56.6 Ω + 0.4 jΩ
Return Loss	- 24.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 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	February 05, 2004

DASY5 Validation Report for Head TSL

Date: 22.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHz; Serial: D5GHzV2 - SN: 1020

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.49 mho/m; ε_r = 35.7; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5500 MHz; σ = 4.79 mho/m; ε_r = 35.3; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5800 MHz; σ = 5.09 mho/m; ε_r = 34.8; 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: 04.03.2011
- 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 52.6.2(482); SEMCAD X 14.4.5(3634)

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 = 64.076 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 28.396 W/kg
SAR(1 g) = 7.59 mW/g; SAR(10 g) = 2.16 mW/g
Maximum value of SAR (measured) = 17.283 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 = 63.853 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 31.592 W/kg
SAR(1 g) = 7.91 mW/g; SAR(10 g) = 2.24 mW/g
Maximum value of SAR (measured) = 18.499 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 = 58.832 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 30.526 W/kg
SAR(1 g) = 7.31 mW/g; SAR(10 g) = 2.08 mW/g
Maximum value of SAR (measured) = 17.712 mW/g

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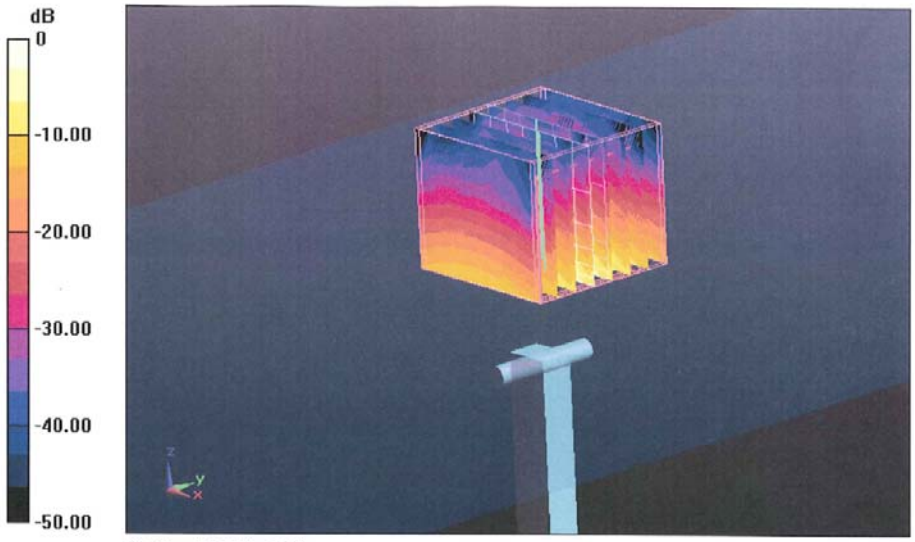

0 dB = 17.710mW/g

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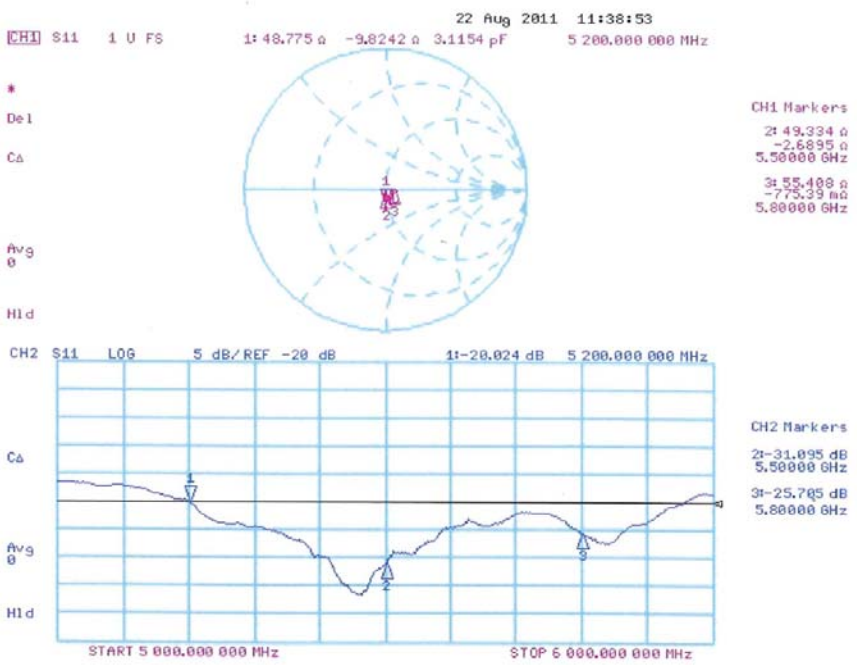
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 23.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHz; Serial: D5GHzV2 - SN: 1020

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 5.45 mho/m; ε_r = 48.8; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5500 MHz; σ = 5.86 mho/m; ε_r = 48.3; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5800 MHz; σ = 6.27 mho/m; ε_r = 47.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

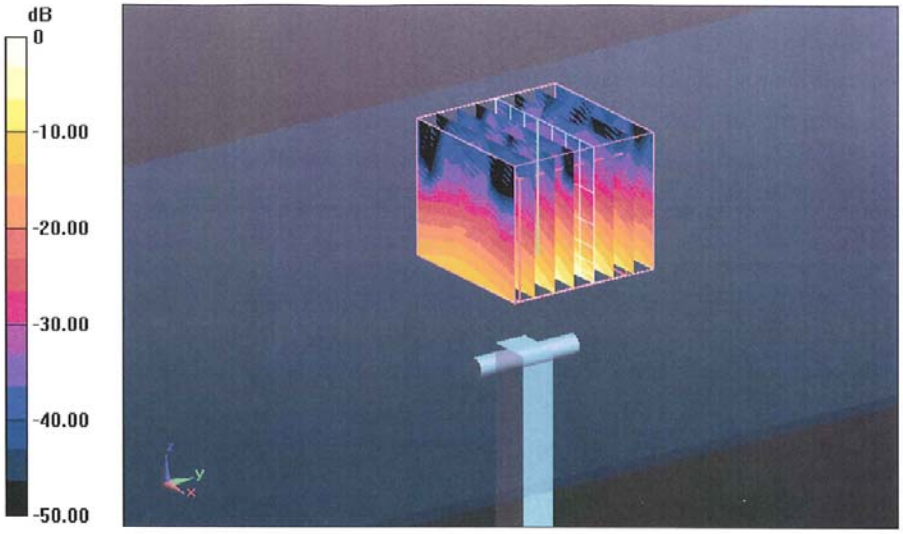
DASY52 Configuration:

- 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: 04.03.2011
- 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 52.6.2(482); SEMCAD X 14.4.5(3634)

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 = 58.047 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 29.159 W/kg
SAR(1 g) = 7.52 mW/g; SAR(10 g) = 2.11 mW/g
Maximum value of SAR (measured) = 17.129 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 = 58.219 V/m; Power Drift = 0.0032 dB
Peak SAR (extrapolated) = 33.950 W/kg
SAR(1 g) = 8 mW/g; SAR(10 g) = 2.22 mW/g
Maximum value of SAR (measured) = 18.840 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 = 54.661 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 34.226 W/kg
SAR(1 g) = 7.45 mW/g; SAR(10 g) = 2.07 mW/g
Maximum value of SAR (measured) = 18.095 mW/g



0 dB = 18.090mW/g

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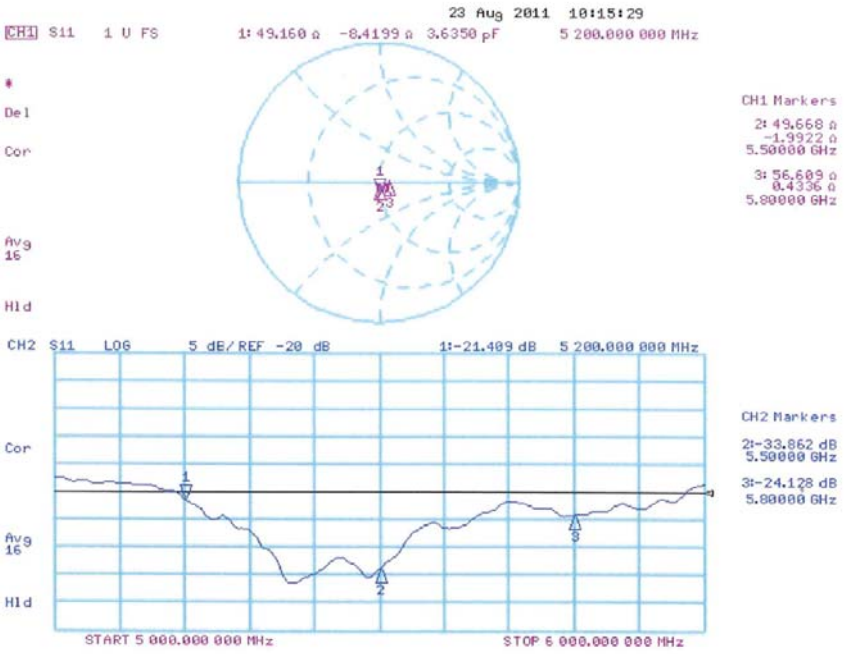
Impedance Measurement Plot for Body TSL



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