

# 9. System Validation from Original equipment supplier

ccredited by the Swiss Accreditat	tion Service (SAS)	Accreditation	No.: SCS 108
he Swiss Accreditation Service	is one of the signatories		
Aultilateral Agreement for the re	ecognition of calibration		
Client SGS-TW (Aude	n)	Certificate No	D2450V2-727_Apr10
CALIBRATION C	ERTIFICATE		
Object	D2450V2 - SN: 7	27	
Calibration procedure(s)	QA CAL-05.v7		
	Calibration proce	dure for dipole validation kits	
Calibration date:	April 29, 2010		
		onal standards, which realize the physical un robability are given on the following pages ar	
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The measurements and the unce All calibrations have been conduc Calibration Equipment used (M&	rtainties with confidence p cted in the closed laborator TE critical for calibration)	robability are given on the following pages ar ry facility: environment temperature $(22 \pm 3)^{\circ}$	nd are part of the certificate. C and humidity < 70%.
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Calibration Laboratory of Schmid & Partner **Engineering AG** Zeughausstrasse 43, 8004 Zurich, Switzerland



SWISS BRATH

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

Accreditation No.: SCS 108

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

# 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.

Certificate No: D2450V2-727\_Apr10

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SGS Taiwan Ltd. 台灣檢驗科技股份有限公司

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 f (886-2) 2298-0488 t (886-2) 2299-3279



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# **Measurement Conditions**

DASY Version	DASY5	V5.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	

			_
Distance Dipole Center - TSL	10 mm	with Spacer	1
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	39.8 ± 6 %	1.78 mho/m ± 6 %
Head TSL temperature during test	(21.5 ± 0.2) °C		

# SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.2 mW / g
SAR normalized	normalized to 1W	52.8 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	53.2 mW /g ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	6.22 mW / g
		6.22 mW / g 24.9 mW / g

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prosecuted to the fullest extent of the law.



# **Body TSL parameters**

	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	54.2 ± 6 %	2.01 mho/m ± 6 %
Body TSL temperature during test	(22.5 ± 0.2) °C		

# SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.4 mW / g
SAR normalized	normalized to 1W	53.6 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	53.2 mW / g ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
	condition 250 mW input power	6.23 mW / g
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL SAR measured SAR normalized	Contraction	6.23 mW / g 24.9 mW / g



Certificate No: D2450V2-727\_Apr10

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#### Appendix

# Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.3 Ω + 1.7 jΩ
Return Loss	- 28.9 dB

#### Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.3 Ω + 3.6 jΩ	
Return Loss	- 29.0 dB	

#### **General Antenna Parameters and Design**

Electrical Delay (one direction)	1.150 ns
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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

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# **DASY5 Validation Report for Head TSL**

Date/Time: 22.04.2010 16:30:51

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:727

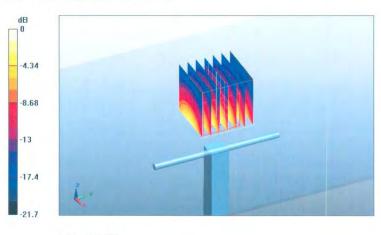
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium: HSL U11 BB Medium parameters used: f = 2450 MHz;  $\sigma = 1.78 \text{ mho/m}$ ;  $\varepsilon_r = 39.8$ ;  $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

#### Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement

grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 101.0 V/m; Power Drift = 0.064 dB Peak SAR (extrapolated) = 26.8 W/kg SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.22 mW/g Maximum value of SAR (measured) = 16.9 mW/g



0 dB = 16.9 mW/g

Certificate No: D2450V2-727\_Apr10

Page 6 of 9

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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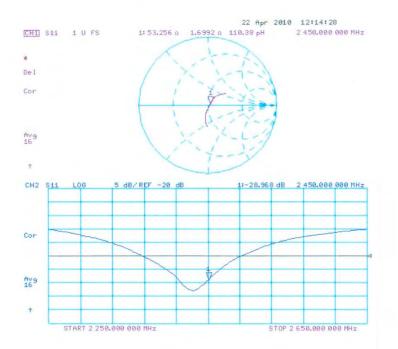
台灣檢驗科技股份有限公司



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# Impedance Measurement Plot for Head TSL





Certificate No: D2450V2-727\_Apr10

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Report No. : EN/2010/A0009 Page : 151 of 166

# **DASY5 Validation Report for Body**

Date/Time: 29.04.2010 14:57:43

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:727

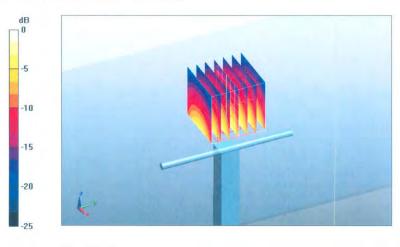
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium: MSL U11 BB Medium parameters used: f = 2450 MHz;  $\sigma = 2 \text{ mho/m}$ ;  $\varepsilon_r = 54.1$ ;  $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection) .
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010 .
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57 .

# Pin250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement

grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 96.1 V/m; Power Drift = 0.00929 dB Peak SAR (extrapolated) = 27.7 W/kg SAR(1 g) = 13.4 mW/g; SAR(10 g) = 6.23 mW/g Maximum value of SAR (measured) = 17.6 mW/g



 $0 \, dB = 17.6 \, mW/g$ 

Certificate No: D2450V2-727 Apr10

Page 8 of 9

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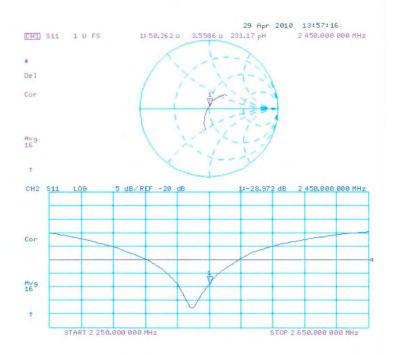
台灣檢驗科技股份有限公司



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# Impedance Measurement Plot for Body TSL





Certificate No: D2450V2-727\_Apr10

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# Report No. : EN/2010/A0009 Page : 153 of 166

The Swiss Accreditation Service	e is one of the signatorie		
Multilateral Agreement for the r			
Client SGS-TW (Aud	-		No: D5GHzV2-1023 Jan10
CALIBRATION O			
CALIBRATION	ERIFICATE		
Object	D5GHzV2 - SN:	1023	
	01.011.00.1		
Calibration procedure(s)	QA CAL-22.v1 Calibration proce	dure for dipole validation kits be	etween 3-6 GHz
Calibration date:	January 21, 2010	)	
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		onal standards, which realize the physical u	
		onal standards, which realize the physical u robability are given on the following pages a	
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Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



SWISS

BRATH

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

Accreditation No.: SCS 108

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

# 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) DASY4/5 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.

Certificate No: D5GHzV2-1023\_Jan10

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#### **Measurement Conditions**

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

DASY Version	DASY5	V5.2
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 = 4.0 mm, dz = 2.5 mm	
Frequency	5200 MHz ± 1 MHz 5500 MHz ± 1 MHz 5800 MHz ± 1 MHz	

#### Head TSL parameters at 5200 MHz

	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	34.8 ± 6 %	4.58 mho/m ± 6 %
Head TSL temperature during test	(21.2 ± 0.2) °C		

# SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	condition	
SAR measured	100 mW input power	7.85 mW / g
SAR normalized	normalized to 1W	78.5 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	77.9 mW / g ± 19.9 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.22 mW / g
SAR normalized	normalized to 1W	22.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	22.0 mW / g ± 19.5 % (k=2)

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# 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	34.1 ± 6 %	4.86 mho/m ± 6 %
Head TSL temperature during test	(21.2 ± 0.2) °C		

# SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	condition	
SAR measured	100 mW input power	8.35 mW / g
SAR normalized	normalized to 1W	83.5 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	82.7 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.35 mW / g
SAR normalized	normalized to 1W	23.5 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	23.3 mW / g ± 19.5 % (k=2)

#### 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	33.7 ± 6 %	5.13 mho/m ± 6 %
Head TSL temperature during test	(21.2 ± 0.2) °C		

# SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	condition	
SAR measured	100 mW input power	7.75 mW / g
SAR normalized	normalized to 1W	77.5 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	76.7 mW / g ± 19.9 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
	condition 100 mW input power	2.18 mW / g
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL SAR measured SAR normalized		2.18 mW / g 21.8 mW / g

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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	47.5 ± 6 %	5.52 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 <sup>3</sup> (1 g) of Body TSL	condition	
SAR measured	100 mW input power	8.02 mW / g
SAR normalized	normalized to 1W	80.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	79.7 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.22 mW / g
SAR normalized	normalized to 1W	22.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	22.1 mW / g ± 19.5 % (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	46.8 ± 6 %	5.89 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C		

# SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	condition	
SAR measured	100 mW input power	8.49 mW / g
SAR normalized	normalized to 1W	84.9 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	84.3 mW / g ± 19.9 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
	condition 100 mW input power	2.33 mW / g
SAR measured		2.33 mW / g 23.3 mW / g
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL SAR measured SAR normalized SAR for nominal Body TSL parameters	100 mW input power	

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#### Body TSL parameters at 5800 MHz

Tho	following	naramotore	and	calculations	MORO	applied	
THE	PHILVIOIO	parameters	anu	calculations	were	applieu.	

	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	46.1 ± 6 %	6.26 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 <sup>3</sup> (1 g) of Body TSL	condition	
SAR measured	100 mW input power	7.37 mW / g
SAR normalized	normalized to 1W	73.7 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	73.2 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.02 mW / g
SAR normalized	normalized to 1W	20.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.0 mW / g ± 19.5 % (k=2)



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#### Appendix

# Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	51.1 Ω - 7.6 jΩ	
Return Loss	-22.4 dB	

#### Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	52.4 Ω - 2.0 jΩ	
Return Loss	-30.4 dB	

#### Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	58.4 Ω - 0.5 jΩ	
Return Loss	-22.2 dB	

# Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	51.0 Ω - 6.9 jΩ	
Return Loss	-23.3 dB	

#### Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	51.2 Ω - 0.5 jΩ	
Return Loss	-37.9 dB	

# Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	56.8 Ω + 1.3 jΩ	
Return Loss	-23.8 dB	

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1.179 ns

#### **General Antenna Parameters and Design**

Electrical Delay (one direction)

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 05, 2004

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#### **DASY5 Validation Report for Head TSL**

Date/Time: 21.01.2010 18:04:15

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1023

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: HSL 3-6 GHz

Medium parameters used: f = 5200 MHz;  $\sigma = 4.6 \text{ mho/m}$ ;  $\varepsilon_r = 34.7$ ;  $\rho = 1000 \text{ kg/m}^3$ Medium parameters used: f = 5500 MHz;  $\sigma = 4.88 \text{ mho/m}$ ;  $\varepsilon_r = 34.1$ ;  $\rho = 1000 \text{ kg/m}^3$ Medium parameters used: f = 5800 MHz;  $\sigma = 5.16 \text{ mho/m}$ ;  $\varepsilon_r = 33.7$ ;  $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 SN3503; ConvF(5.36, 5.36, 5.36), ConvF(4.85, 4.85, 4.85), ConvF(4.74, 4.74, 4.74); Calibrated: 11.03.2009
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 5.0 (front): Type: OD000P50AA: Serial: 1001
- Measurement SW: DASY5, V5.2 Build 157: SEMCAD X Version 14.0 Build 57

# Configuration D5GHzV2 Dipole (Head)/d=10mm, Pin=250mW, f=5200 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2.5mm Reference Value = 64 V/m; Power Drift = 0.080 dB Peak SAR (extrapolated) = 30.4 W/kg SAR(1 g) = 7.85 mW/g; SAR(10 g) = 2.22 mW/g Maximum value of SAR (measured) = 15.2 mW/g

Configuration D5GHzV2 Dipole (Head)/d=10mm, Pin=250mW, f=5500 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm Reference Value = 65 V/m; Power Drift = 0.053 dB Peak SAR (extrapolated) = 34 W/kg

SAR(1 g) = 8.35 mW/g; SAR(10 g) = 2.35 mW/gMaximum value of SAR (measured) = 16.3 mW/g

# Configuration D5GHzV2 Dipole (Head)/d=10mm, Pin=250mW, f=5800 MHz/Zoom Scan

(4x4x2.5mm), dist=2mm (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm Reference Value = 61.5 V/m; Power Drift = 0.067 dB Peak SAR (extrapolated) = 33 W/kg SAR(1 g) = 7.75 mW/g; SAR(10 g) = 2.18 mW/gMaximum value of SAR (measured) = 15.4 mW/g

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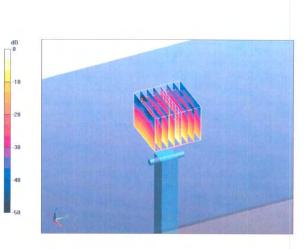
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0 dB = 15.4 mW/g

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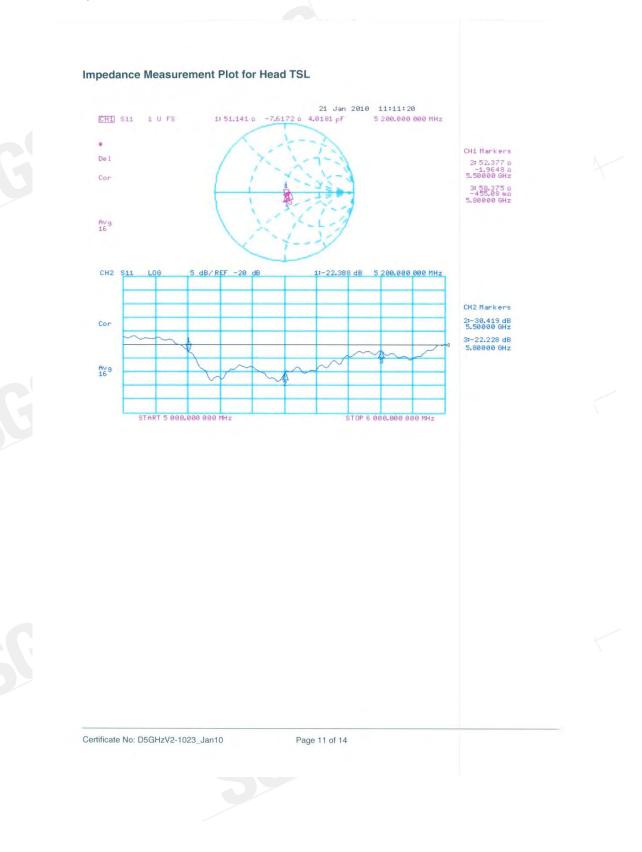
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# **DASY5 Validation Report for Body TSL**

Date/Time: 20.01.2010 16:22:13

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1023

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: MSL 3-6 GHz

Medium parameters used: f = 5200 MHz;  $\sigma$  = 5.52 mho/m;  $\epsilon_r$  = 47.5;  $\rho$  = 1000 kg/m<sup>3</sup> Medium parameters used: f = 5500 MHz;  $\sigma = 5.89 \text{ mho/m}$ ;  $\varepsilon_r = 46.8$ ;  $\rho = 1000 \text{ kg/m}^3$ Medium parameters used: f = 5800 MHz;  $\sigma = 6.26$  mho/m;  $c_c = 46.1$ ; p = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

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

#### DASY5 Configuration:

- Probe: EX3DV4 SN3503; ConvF(4.88, 4.88, 4.88), ConvF(4.37, 4.37, 4.37), ConvF(4.57, 4.57, 4.57); Calibrated; 11.03.2009
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

# Configuration D5GHzV2 Dipole (Body)/d=10mm, Pin=100mW, f=5200 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2.5mm Reference Value = 60.3 V/m; Power Drift = -0.00586 dB Peak SAR (extrapolated) = 31.3 W/kg SAR(1 g) = 8.02 mW/g; SAR(10 g) = 2.22 mW/gMaximum value of SAR (measured) = 15.6 mW/g

Configuration D5GHzV2 Dipole (Body)/d=10mm, Pin=100mW, f=5500 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm Reference Value = 61 V/m; Power Drift = 0.017 dB Peak SAR (extrapolated) = 35.2 W/kg SAR(1 g) = 8.49 mW/g; SAR(10 g) = 2.33 mW/g

Maximum value of SAR (measured) = 16.8 mW/g

# Configuration D5GHzV2 Dipole (Body)/d=10mm, Pin=100mW, f=5800 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2.5mm Reference Value = 55.6 V/m; Power Drift = 0.00363 dB Peak SAR (extrapolated) = 32.4 W/kg SAR(1 g) = 7.37 mW/g; SAR(10 g) = 2.02 mW/g Maximum value of SAR (measured) = 14.8 mW/g

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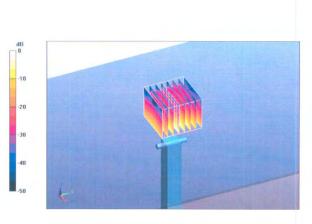
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 $0 \, dB = 14.8 \, mW/g$ 

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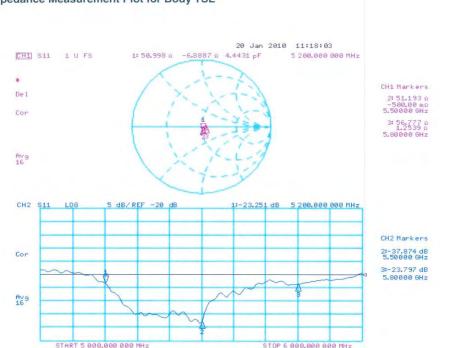
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#### Impedance Measurement Plot for Body TSL





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**End of report** 

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