

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	46.0 ± 6 %	6.07 mho/m ± 6 %
Body TSL temperature during test	(22.2 ± 0.2) °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	condition	
SAR measured	100 mW input power	6.82 mW / g
SAR normalized	normalized to 1W	68.2 mW / g
SAR for nominal Body TSL parameters ¹	normalized to 1W	67.6 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	1.87 mW / g
SAR normalized	normalized to 1W	18.7 mW / g
SAR for nominal Body TSL parameters ¹	normalized to 1W	18.5 mW / g ± 19.5 % (k=2)

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

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	49.7 Ω - 4.0 j Ω
Return Loss	-28.0 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	52.2 Ω - 2.5 j Ω
Return Loss	-29.8 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	55.0 Ω - 2.0 j Ω
Return Loss	-25.9 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	49.5 Ω - 4.0 j Ω
Return Loss	-27.9 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	52.8 Ω - 2.2 j Ω
Return Loss	-29.2 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	55.3 Ω - 0.4 j Ω
Return Loss	-26.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 ns
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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	December 30, 2005

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHz; Serial: D5GHzV2 - SN:1041

Communication System: CW-5GHz; Frequency: 5200 MHzFrequency: 5500 MHzFrequency: 5800 MHz;
Duty Cycle: 1:1

Medium: HSL 5800 MHz

Medium parameters used: $f = 5200$ MHz; $\sigma = 4.45$ mho/m; $\epsilon_r = 34.9$; $\rho = 1000$ kg/m³ Medium parameters used: $f = 5500$ MHz; $\sigma = 4.75$ mho/m; $\epsilon_r = 34.3$; $\rho = 1000$ kg/m³ Medium parameters used: $f = 5800$ MHz; $\sigma = 5.03$ mho/m; $\epsilon_r = 33.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

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: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

d=10mm, Pin=100mW, f=5200 MHz/Zoom Scan (8x8x10), dist=2mm (8x8x10)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 61.5 V/m; Power Drift = 0.087 dB

Peak SAR (extrapolated) = 29.7 W/kg

SAR(1 g) = 7.72 mW/g; SAR(10 g) = 2.17 mW/g

Maximum value of SAR (measured) = 15.8 mW/g

d=10mm, Pin=100mW, f=5500 MHz 2/Zoom Scan (8x8x10), dist=2mm (8x8x10)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 62.1 V/m; Power Drift = 0.092 dB

Peak SAR (extrapolated) = 33.5 W/kg

SAR(1 g) = 8.23 mW/g; SAR(10 g) = 2.3 mW/g

Maximum value of SAR (measured) = 17 mW/g

d=10mm, Pin=100mW, f=5800 MHz 2/Zoom Scan (8x8x10), dist=2mm (8x8x10)/Cube 0:

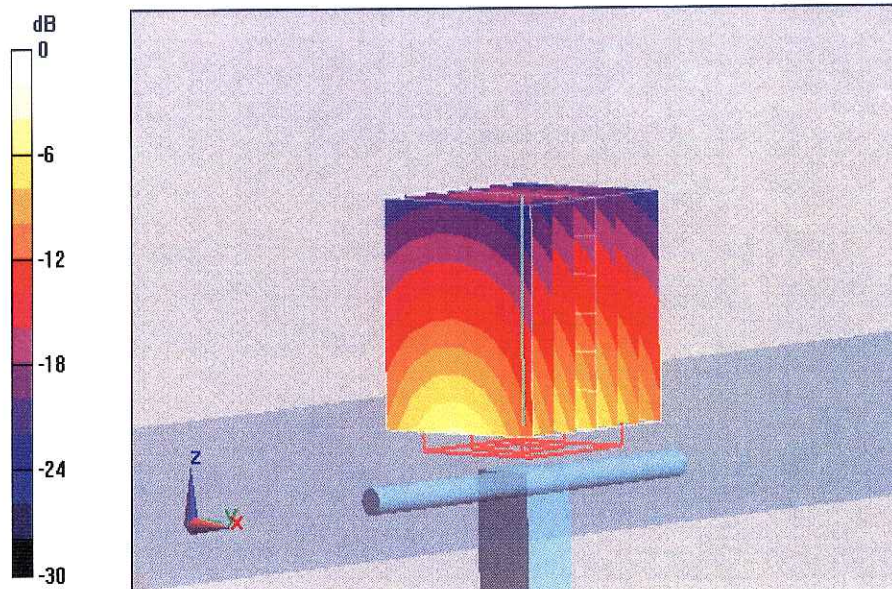
Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 58.5 V/m; Power Drift = 0.096 dB

Peak SAR (extrapolated) = 32.3 W/kg

SAR(1 g) = 7.59 mW/g; SAR(10 g) = 2.11 mW/g

Maximum value of SAR (measured) = 16 mW/g

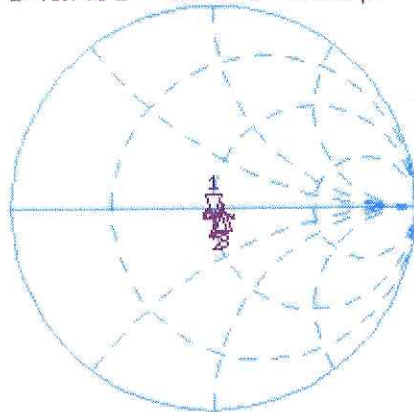


0 dB = 16mW/g

Impedance Measurement Plot for Head TSL

14 May 2009 15:16:02
 CH1 S11 1 U FS 1: 49.740 Ω -3.9727 $\angle$ 7.7043 pF 5 200.000 000 MHz

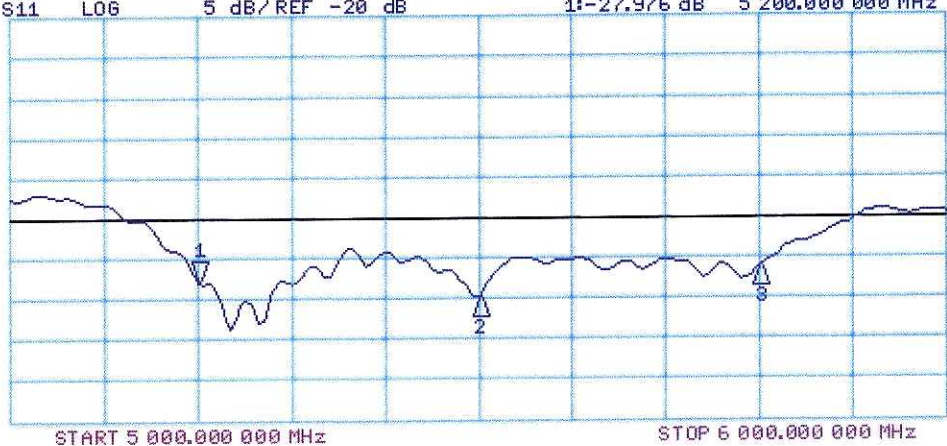
*
 Del
 Cor
 Avg
 16
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CH1 Markers
 2: 52.160 Ω
 -2.5215 $\angle$
 5.50000 GHz
 3: 54.957 Ω
 -1.9590 $\angle$
 5.80000 GHz

CH2 S11 LOG 5 dB/REF -20 dB 1: -27.976 dB 5 200.000 000 MHz

Cor
 Avg
 16
 ↑



CH2 Markers
 2: -29.761 dB
 5.50000 GHz
 3: -25.880 dB
 5.80000 GHz

DASY5 Validation Report for Body TSL

15.05.2009 11:08:30

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHz; Serial: D5GHzV2 - SN:1041

Communication System: CW-5GHz; Frequency: 5200 MHz Frequency: 5500 MHz Frequency: 5800 MHz;
Duty Cycle: 1:1

Medium: MSL 5800 MHz

Medium parameters used: $f = 5200$ MHz; $\sigma = 5.29$ mho/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³ Medium parameters used: $f = 5500$ MHz; $\sigma = 5.68$ mho/m; $\epsilon_r = 46.7$; $\rho = 1000$ kg/m³ Medium parameters used: $f = 5800$ MHz; $\sigma = 6.06$ mho/m; $\epsilon_r = 46.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

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, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

d=10mm, Pin=100mW, f=5200 MHz/Area Scan (61x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 14.5 mW/g

d=10mm, Pin=100mW, f=5200 MHz/Zoom Scan (8x8x10), dist=2mm (8x8x10)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 57.2 V/m; Power Drift = 0.089 dB

Peak SAR (extrapolated) = 26.6 W/kg

SAR(1 g) = 7 mW/g; SAR(10 g) = 1.94 mW/g

Maximum value of SAR (measured) = 14.2 mW/g

d=10mm, Pin=100mW, f=5500 MHz/Zoom Scan (8x8x10), dist=2mm (8x8x10)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 58.7 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 31 W/kg

SAR(1 g) = 7.66 mW/g; SAR(10 g) = 2.11 mW/g

Maximum value of SAR (measured) = 15.8 mW/g

d=10mm, Pin=100mW, f=5800 MHz/Zoom Scan (8x8x10), dist=2mm (8x8x10)/Cube 0:

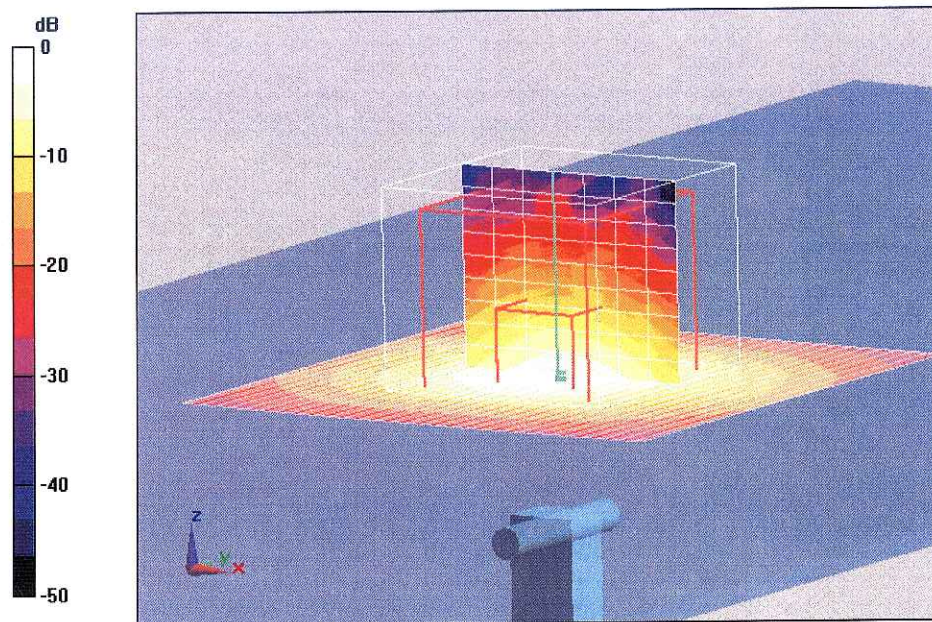
Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 53.9 V/m; Power Drift = -0.00954 dB

Peak SAR (extrapolated) = 29.3 W/kg

SAR(1 g) = 6.82 mW/g; SAR(10 g) = 1.87 mW/g

Maximum value of SAR (measured) = 14.3 mW/g



0 dB = 14.3mW/g

Impedance Measurement Plot for Body TSL

