

Appendix**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	53.4 Ω - 10.4 j Ω
Return Loss	- 19.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	0.995 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	November 18, 2002

DASY4 Validation Report for Head TSL

Date/Time: 26.10.2005 13:50:47

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 450 MHz; Type: D450V2; Serial: D450V2 - SN:1010

Communication System: CW; Frequency: 450 MHz; Duty Cycle: 1:1

Medium: HSL450;

Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.86 \text{ mho/m}$; $\epsilon_r = 44.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (LF); ConvF (6.59, 6.59, 6.59); Calibrated: 11.07.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 4.4; Type: Flat Phantom 4.4
- Measurement SW: DASY4, V4.6 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 159

d=15mm, Pin=398mW/Area Scan (61x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.18 mW/g

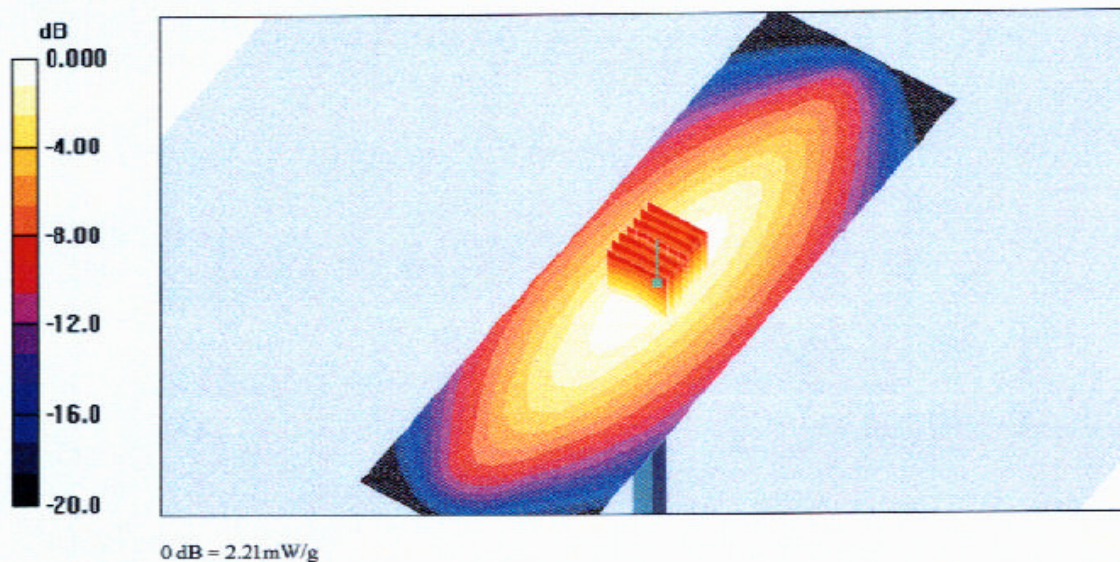
d=15mm, Pin=398mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

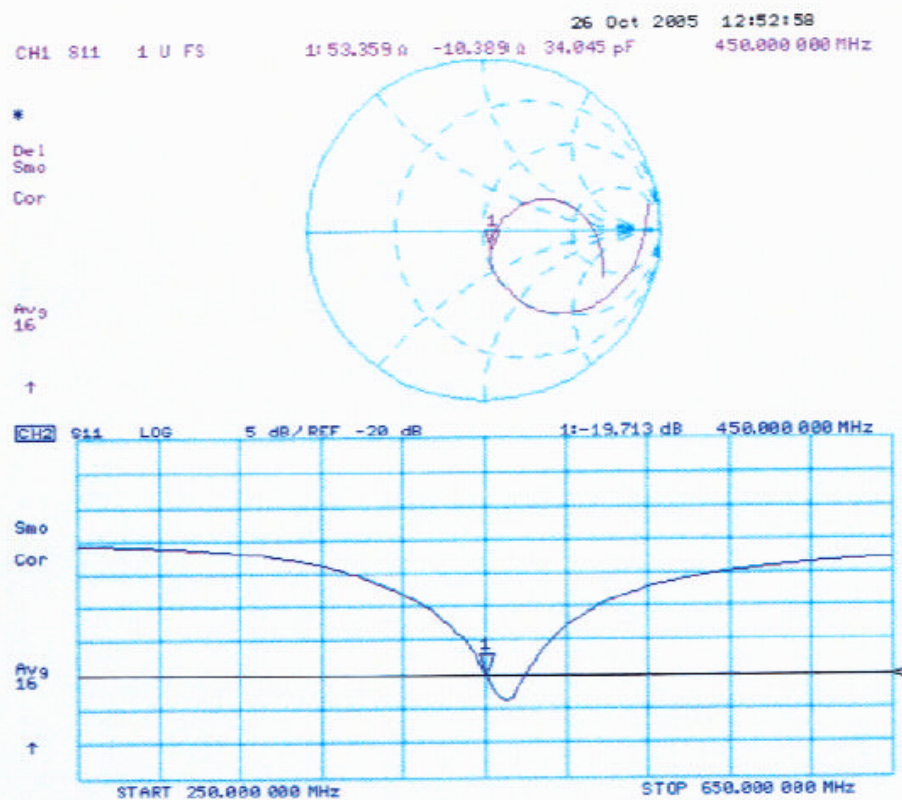
Reference Value = 52.8 V/m; Power Drift = -0.004 dB

Peak SAR (extrapolated) = 2.98 W/kg

SAR(1 g) = 2.04 mW/g; SAR(10 g) = 1.37 mW/g

Maximum value of SAR (measured) = 2.21 mW/g



Impedance Measurement Plot for Head TSL

APPENDIX D - TEST SYSTEM VERIFICATIONS SCANS

Liquid Measurement Result

2006-08-21

Simulant	Freq [MHz]	Parameters	Liquid Temp [°C]	Target Value	Measured Value	Deviation [%]	Limits [%]
Body	450	ϵ_r	22.0	56.7	56.5	-0.35	± 5
		σ	22.0	0.94	0.935	-0.53	± 5
		1g SAR	22.0	4.874	4.866	-0.16	± 10
Head	450	ϵ_r	22.0	43.5	43.3	-0.46	± 5
		σ	22.0	0.87	0.85	-2.35	± 5
		1g SAR	22.0	4.9	4.83	-1.45	± 10

ϵ_r = relative permittivity, σ = conductivity and $\rho=1000\text{kg/m}^3$

Test Laboratory: Bay Area Compliance Lab Corp. (BACL)**System Validation for Head****DUT: Dipole 450 MHz; Type: D450V2; Serial: D450V2 - SN: 1010**

Communication System: CW; Frequency: 450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 450$ MHz; $s = 0.85$ mho/m; $\epsilon_r = 43.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1604; ConvF(7.14, 7.14, 7.14); Calibrated: 5/2/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn456; Calibrated: 10/18/2005
- Phantom: SAM with CRP; Type: Twin SAM; Serial: TP-1032
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

d=15mm, Pin=1W/Area Scan (61x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 4.92 mW/g

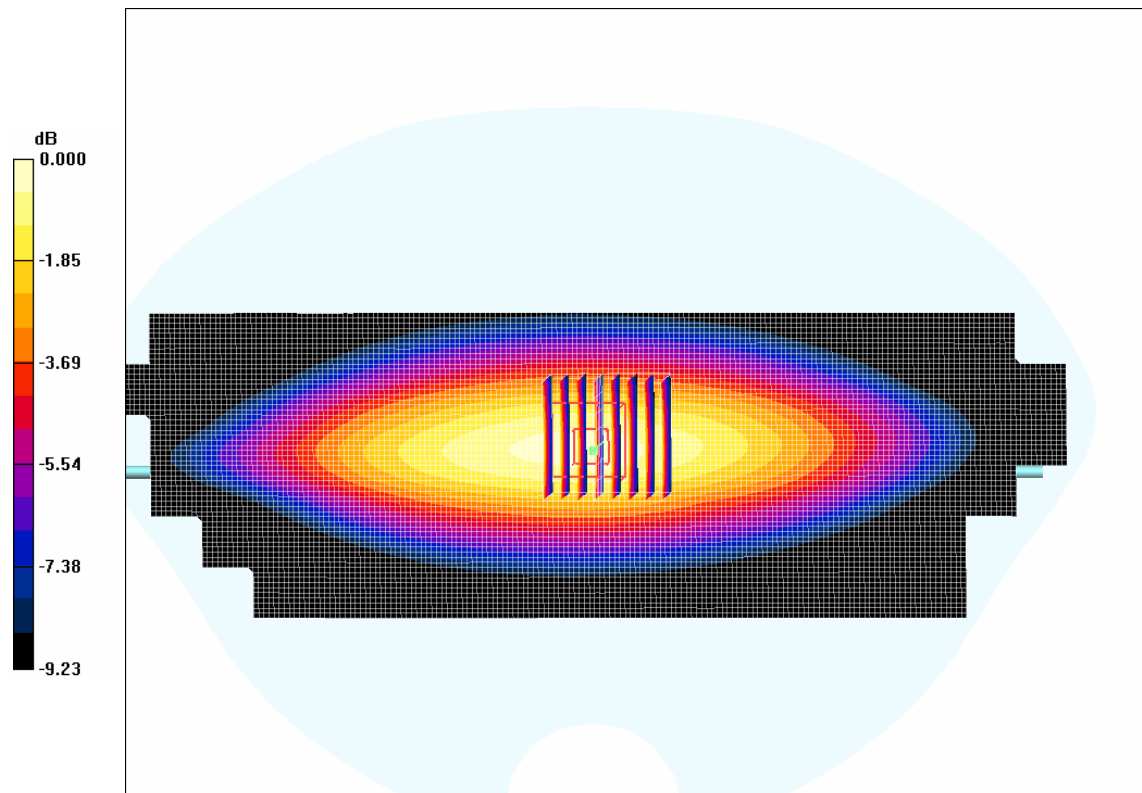
d=15mm, Pin=1W/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 62.4 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 4.95 W/kg

SAR(1 g) = 4.83 mW/g; SAR(10 g) = 3.22 mW/g

Maximum value of SAR (measured) = 4.88 mW/g



0 dB = 4.88mW/g

Test Laboratory: Bay Area Compliance Lab Corp. (BACL)**System Validation for Body****DUT: Dipole 450 MHz; Type: D450V2; Serial: D450V2 - SN: 1010**

Communication System: CW; Frequency: 450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 450$ MHz; $s = 0.935$ mho/m; $\epsilon_r = 56.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1604; ConvF(7.42, 7.42, 7.42); Calibrated: 5/2/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn456; Calibrated: 10/18/2005
- Phantom: SAM with CRP; Type: Twin SAM; Serial: TP-1032
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

d=15mm, Pin=1W/Area Scan (61x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 4.96 mW/g

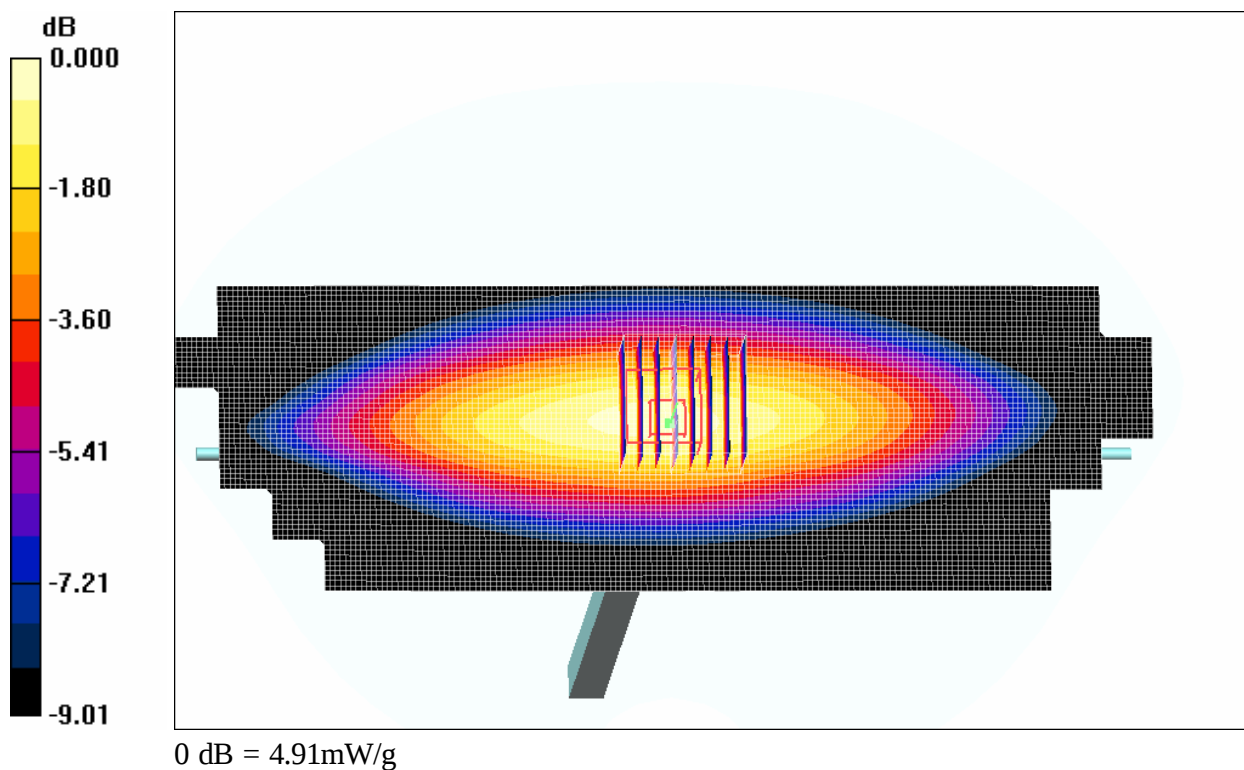
d=15mm, Pin=1W/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 61.7 V/m; Power Drift = 0.050 dB

Peak SAR (extrapolated) = 4.60 W/kg

SAR(1 g) = 4.866 mW/g; SAR(10 g) = 3.79 mW/g

Maximum value of SAR (measured) = 4.91 mW/g



APPENDIX E - EUT SCANS

Test Laboratory: Bay Area Compliance Lab Corp. (BACL)

HYT, Body worn with belt clip and headset

DUT: Walki Talki; Type: TC-700U7; Serial: 6927404370130

Communication System: CW; Frequency: 450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 450 \text{ MHz}$; $s = 0.935 \text{ mho/m}$; $\epsilon_r = 56.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1604; ConvF(7.42, 7.42, 7.42); Calibrated: 5/2/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn456; Calibrated: 10/18/2005
- Phantom: SAM with CRP; Type: Twin SAM; Serial: TP-1032
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

Body worn position with belt clip with headset/ Area Scan (51x101x1): Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$
Maximum value of SAR (interpolated) = 4.01 mW/g

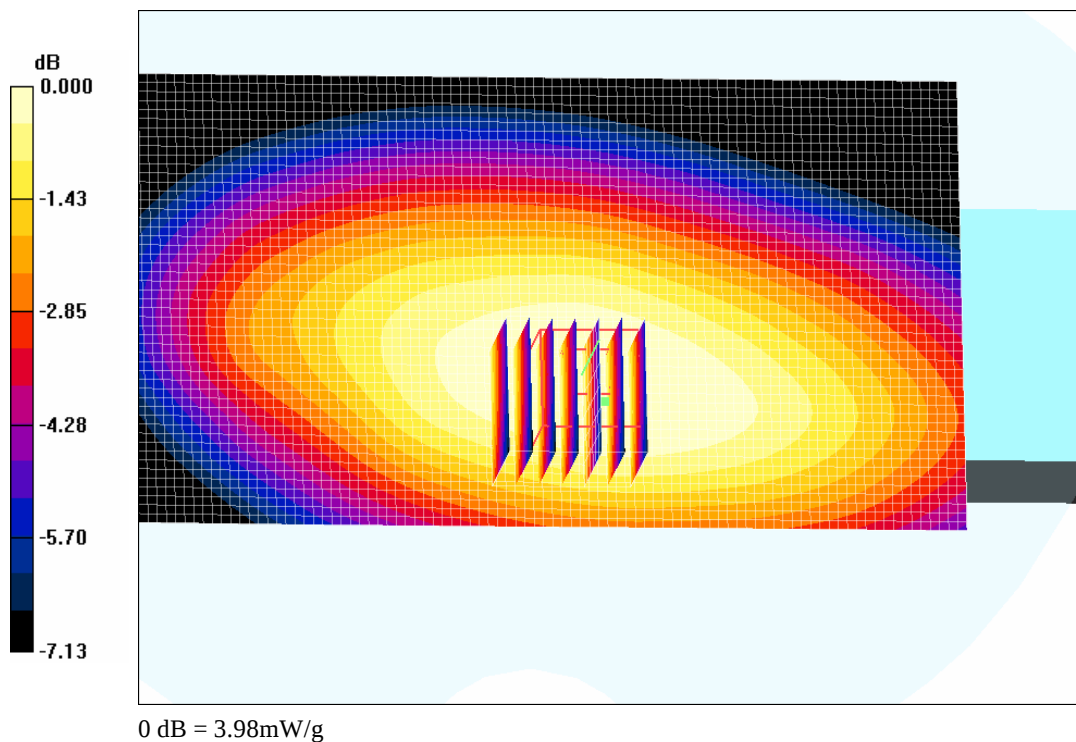
Body worn position with belt clip with headset/Zoom Scan (7x7 x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 72.4 V/m; Power Drift = 0.06dB

Peak SAR (extrapolated) = 3.93 W/kg

SAR(1 g) = 3.82 mW/g; SAR(10 g) = 2.34 mW/g

Maximum value of SAR (measured) = 3.98 mW/g



Plot #1

Test Laboratory: Bay Area Compliance Lab Corp. (BACL)**HYT, Face position 2.5cm separation to flat phantom****DUT: Walki Talki; Type: TC-700U7; Serial: 6927404370130**

Communication System: CW; Frequency: 450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 450$ MHz; $s = 0.85$ mho/m; $\epsilon_r = 43.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET 3DV6 - SN1604; ConvF(7.14, 7.14, 7.14); Calibrated: 5/2/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn456; Calibrated: 10/18/2005
- Phantom: SAM with CRP; Type: Twin SAM; Serial: TP-1032
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

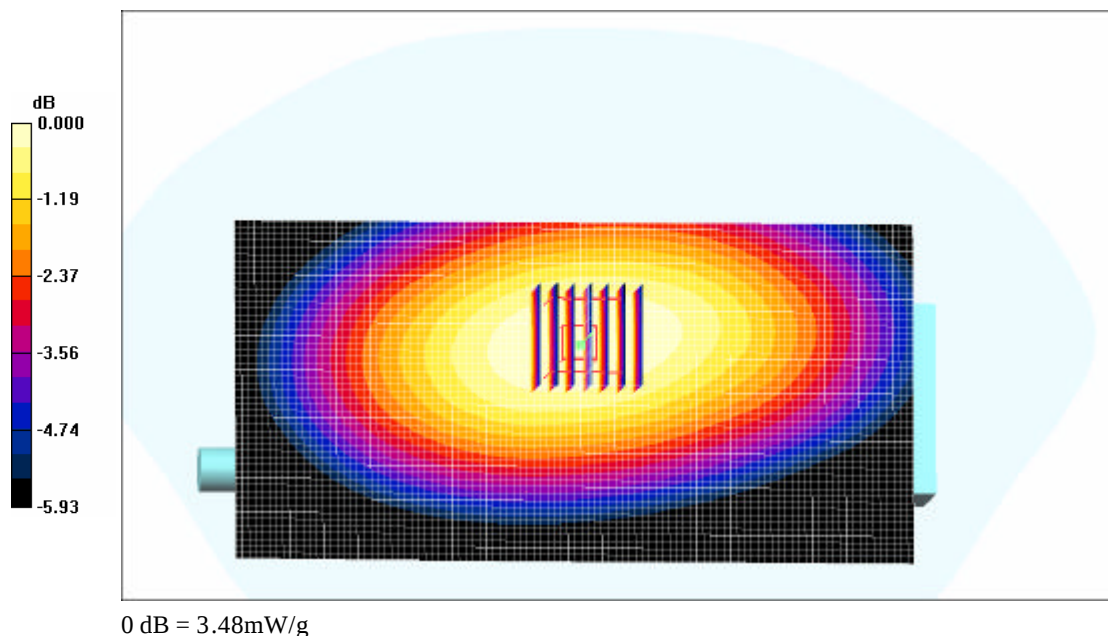
Face position 2.5cm separation to flat phantom/Area Scan (51x101x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.56 mW/g**Face position 2.5cm separation to flat phantom/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

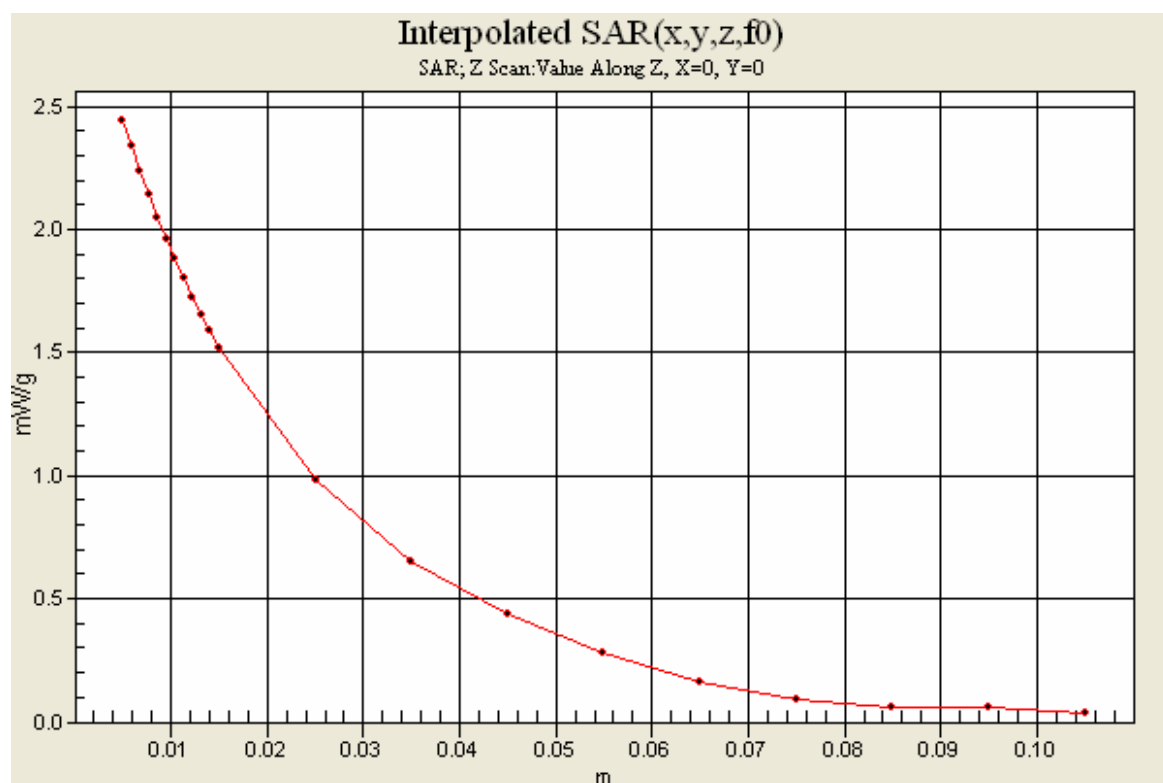
Reference Value = 68.8 V/m; Power Drift = -0.113 dB

Peak SAR (extrapolated) = 2.56 W/kg

SAR(1 g) = 2.24 mW/g; SAR(10 g) = 1.12 mW/g

Maximum value of SAR (measured) = 2.48 mW/g

**Plot#2**



Z-Axis

APPENDIX F – CONDUCTED OUTPUT POWER MEASUREMENT

Provision Applicable

The measured peak output power should be greater and within 5% than EMI measurement.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Test equipment

Hewlett Packard HP8565E Spectrum Analyzer, Calibration Due Date: 2007-01-11

Test Results

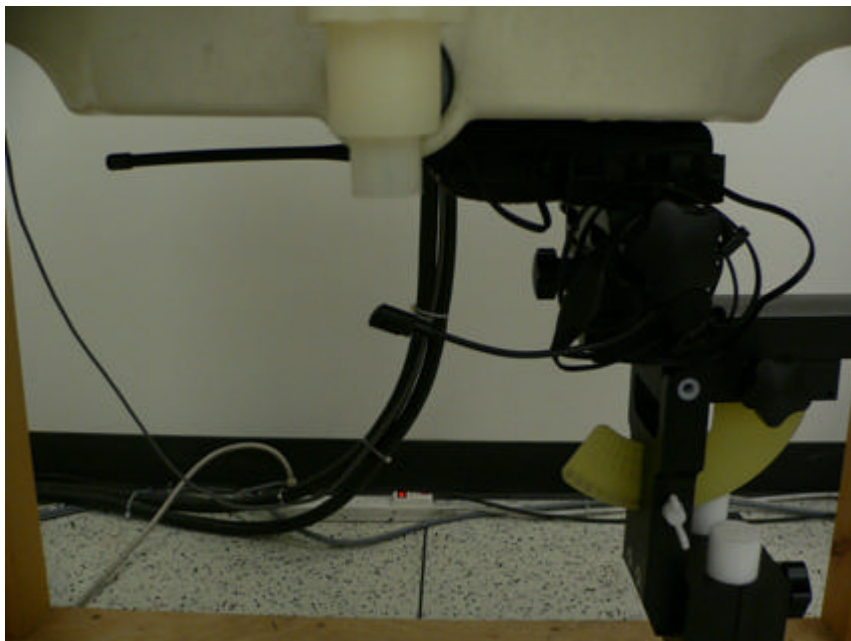
Frequency (MHz)	Output Power in dBm	Output Power in Watts
435.975	36.19	4.159

APPENDIX G – EUT TEST POSITION PHOTOS

Face 2.5 cm separation to flat phantom



Body Worn with belt clip and accessory



EUT Front View



EUT Review View



EUT – Antenna



EUT – Accessory (headset)



APPENDIX I - INFORMATIVE REFERENCES

- [1] Federal Communications Commission, "Report and order: Guidelines for evaluating the environmental effects of radiofrequency radiation", Tech. Rep. FCC 96-326, FCC, Washington, D.C. 20554, 1996.
- [2] David L. Means Kwok Chan, Robert F. Cleveland, "Evaluating compliance with FCC guidelines for human exposure to radiofrequency electromagnetic fields", Tech. Rep., Federal Communication Commission, Office of Engineering & Technology, Washington, DC, 1997.
- [3] Thomas Schmid, Oliver Egger, and Niels Kuster, "Automated E-field scanning system for dosimetric assessments", IEEE Transactions on Microwave Theory and Techniques, vol. 44, pp. 105-113, Jan. 1996.
- [4] Niels Kuster, Ralph K. Astle, and Thomas Schmid, "Dosimetric evaluation of mobile communications equipment with known precision", IEEE Transactions on Communications, vol. E80-B, no. 5, pp. 645-652, May 1997.
- [5] CENELEC, "Considerations for evaluating of human exposure to electromagnetic fields (EMFs) from mobile telecommunication equipment (MTE) in the frequency range 30MHz - 6GHz", Tech. Rep., CENELEC, European Committee for Electrotechnical Standardization, Brussels, 1997.
- [6] ANSI, ANSI/IEEE C95.1-1992: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, The Institute of Electrical and Electronics Engineers, Inc., New York, NY 10017, 1992.
- [7] Katja Pokovic, Thomas Schmid, and Niels Kuster, "Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies", in ICECOM '97, Dubrovnik, October 15-17, 1997, pp. 120-24.
- [8] Katja Pokovic, Thomas Schmid, and Niels Kuster, "E-field probe with improved isotropy in brain simulating liquids", in Proceedings of the ELMAR, Zadar, Croatia, 23-25 June, 1996, pp. 172-175.
- [9] Volker Hombach, Klaus Meier, Michael Burkhardt, Eberhard K. Uhn, and Niels Kuster, "The dependence of EM energy absorption upon human head modeling at 900 MHz", IEEE Transactions on Microwave Theory and Techniques, vol. 44, no. 10, pp. 1865-1873, Oct. 1996.
- [10] Klaus Meier, Ralf Kastle, Volker Hombach, Roger Tay, and Niels Kuster, "The dependence of EM energy absorption upon human head modeling at 1800 MHz", IEEE Transactions on Microwave Theory and Techniques, Oct. 1997, in press.
- [11] W. Gander, Computermathematik, Birkhaeuser, Basel, 1992.
- [12] W. H. Press, S. A. Teukolsky, W. T. Vetterling, and B. P. Flannery, Numerical Recipes in C, The Art of Scientific Computing, Second Edition, Cambridge University Press, 1992. Dosimetric Evaluation of Sample device, month 1998 9
- [13] NIS81 NAMAS, "The treatment of uncertainty in EMC measurement", Tech. Rep., NAMAS Executive, National Physical Laboratory, Teddington, Middlesex, England, 1994.
- [14] Barry N. Taylor and Christ E. Kuyatt, "Guidelines for evaluating and expressing the uncertainty of NIST measurement results", Tech. Rep., National Institute of Standards and Technology, 1994. Dosimetric Evaluation of Sample device, month 1998 10.

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