TEST REPORT
FROM
RADIO FREQUENCY
INVESTIGATION LTD.

Test of: Datascope Corp.
Panorama Telepack - 608

(Body Measurements Only)

To: OET Bulletin 65 Supplement C: (2001-01)

Measurements were performed on the DASY4 System

Test Report Serial No:
RFI/SARB1/RP46050JD01A

This Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director:	**Checked By:**
Tested By:	**Release Version No: PDF001**
Issue Date: 31 March 2004	**Test Dates: 12 March 2004**

It should be noted that the standard, OET Bulletin 65 Supplement C: (2001-01) is not listed on RFI's current UKAS schedule and is therefore "not UKAS accredited".

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Table of Contents

1. Client Information

1.1. Client Details

Company Name:	Datascope Corp.
Address:	800 MacArthur Blvd. Mahwah NJ 07430 0619 United Stated of America
Contact Name:	Mr J Fidacaro

1.2. Test Laboratory

Company Name:	Radio Frequency Investigation Ltd.
Address:	Ewhurst Park Ramsdell Basingstoke Hampshire RG26 5RQ.
Contact Name:	Mr J Lomako

2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Description of EUT

The client has stated that the EUT is a patient worn wireless ECG monitor that forms part of a wireless patient monitor system.

2.2. Identification Of Equipment Under Test (EUT)

Brand Name	Datascope Corp. Panorama Telepack - 608.
Model Name or Number	0998-00-0191-01
Unique type Identification:	ME0003AX
Serial Number	WTP0016
Battery Serial Number	15A LR6
Country Of Manufacture	USA
Date Of Receipt	12 March 2004

2.3. Modifications Incorporated In EUT

During the course of testing the EUT was not modified.

2.4. Additional Information Related to the EUT

Equipment Class:	Portable
FCC Rule Part(s):	OET Bulletin 65 Supplement C
Device Category:	Transmitter
Application Type	Not Applicable
Maximum Power Output:	613.96875 MHz – 89.8 dBµV/m at 3m (Field Strength Measurement). Calculated Power - 0.314 mW.
Transmit Frequency Allocation Of EUT When Under Test (Channels):	**835 MHz Band:** 191 – Top Channel – 613.96875 MHz
Modulation(s):	0 Hz
Modulation Scheme (Crest Factor)	1
Battery Type(s):	2 x AA Alkaline
Antenna Length and Type:	External (Cable Antenna)
Number Of Antenna Positions	1
Intended Operating Environment:	Medical Environment
Weight:	Approx 237.08g
Dimensions (without Antenna) mm:	Approx 127 (L) x 74 (W) x 29 (H) mm
Power Supply Requirement:	
DC Supply (Volts/Amps)	Not applicable
AC Supply (Volts/Amps)	Not applicable
Internal Battery Supply:	3V Alkaline
Port(s):	ECG connector (x5) RS232 serial port (Service port only for programming of channel(s) by client.

2.5. Support Equipment

No support equipment was used to exercise the EUT during testing.

3. Test Specification, Methods And Procedures

3.1. Test Specification

Reference:	OET Bulletin 65 Supplement C: (2001-01)
Title:	Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification.

3.2. Methods And Procedures

The methods and procedures used were as detailed in:

EN 50361: 2001
Title: Basic standard for the measurement of specific absorption rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz).

ANSI/IEEE C95.1: 1999
IEEE standard for safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz.

Federal Communications Commission, “Evaluating compliance with FCC Guidelines for human exposure to radio frequency electromagnetic fields”, OET Bulletin 65 Supplement C, FCC, Washington, D.C, 20554, 2001.

Thomas Schmid, Oliver Egger and Neils Kuster, “Automated E-field scanning system for dosimetric assessments”, IEEE Transaction on microwave theory and techniques, Vol. 44, pp. 105-113, January 1996.

Neils Kuster, Ralph Kastle and Thomas Schmid, “Dosimetric evaluation of mobile communications equipment with know precision”, IEICE Transactions of communications, Vol. E80-B, No.5, pp. 645-652, May 1997.

3.3. Definition Of Measurement Equipment

The measurement equipment used complied with the requirements as detailed in OET Bulletin 65 Supplement C, Appendix D.

4. Deviations From The Test Specification

At the client request the EUT was tested at an operating frequency of 613.96875 MHz transmit and idle mode only in a body worn configuration.

5. Operation Of The EUT During Testing

5.1. Operating Modes

The EUT was tested using the following operated mode:

Transmitting mode / Idle mode.

6. Summary Of Test Results

6.1. Summary Of Tests

Test Name	Specification Reference	Compliancy Status
Specific Absorption Rate (SAR)	OET Bulletin 65 Supplement C	Complied

6.2. Test Results For Specific Absorption Rate – 835 MHz Body

Environmental Conditions

Temperature Variation in Lab (°C):	24.0 to 25.0
Temperature Variation in Liquid (°C):	24.3 to 23.3

Field Strength Measurement Before Test:	Refer to Section 6.3

Position	Section	Frequency Channel No	Distance from antenna to phantom (mm)	SAR Level (W/kg) 1g	SAR Limit (W/kg) 1g	Margin (W/kg) 1g	Result
Rear Idle	Flat	191	0	0.001	1.6	1.599	Complied
Rear Transmit	Flat	191	0	0.002	1.6	1.598	Complied
Front Transmit	Flat	191	0	0.000	1.6	1.600	Complied

6.3. Field Strength Measurement

Field Strength Measurement – Body

Top Channel: 89.8 dBμV/m at 3m

Calculated Power: 0.314 mW

7. SAR Measurement System

7.1. Radio Frequency Investigation SAR measurement facility utilises the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 system is comprised of the robot controller, computer, near-field probe, probe alignment sensor, and the SAM phantom containing brain or muscle equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card. The DAE3 utilises a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching mulitplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

8. SAR Safety Limits

Exposure Limits (General populations/Uncontrolled Exposure Environment)	**SAR** (W/Kg)
Spatial Peak (averaged over any 1 g of tissue)	1.6

Notes:

1. The OET Bulletin 65 Supplement C SAR safety limits specified in the table above apply to devices operated in the General Population / Uncontrolled Exposure Environment.

2. Uncontrolled environments are defined as locations where there is exposure of individuals who have no knowledge or control of their exposure.

9. Details of SAR Evaluation

9.1. The equipment under test was found to be compliant for localised specific absorption rate (SAR) based on the following provisions and conditions:

a) The ECG connectors and Telepack-608 unit were placed in a normal operating position as indicated in the position drawing on the unit to the phantom.

b) With all 5 ECG connector touching the phantom the centre line of each ECG connector and Telepack-608 unit was aligned with an imaginary plane (X and Y axis)

c) For the rear position the Telepack-608 unit was gradually moved towards the flat section until the separating distance was 0mm.

d) For the front position the Telepack-608 unit was gradually moved towards the flat section until the separating distance was 0mm

e) SAR measurements were evaluated at maximum power and the unit was operated for an appropriate period prior to the evaluation in order to minimise the drift.

f) The device was keyed to operate continuously in the transmit mode for the duration of the test run. Then in idle mode for the duration of a test run.

g) The location of the maximum spatial SAR distribution (Hot Spot) was determined relative to the Telepack-608 unit and its antenna (ECG connectors).

h) The EUT was tested with a fully charged battery.

10. Evaluation Procedures

10.1. The Specific Absorption Rate (SAR) evaluation was performed in the following manner:

a) (i) The evaluation was performed in an applicable area of the phantom depending on the type of device being tested. For devices worn about the ear during normal operation, both the left and right ear positions were evaluated at the centre frequency of the band at maximum power. The side, which produced the greatest SAR, determined which side of the phantom would be used for the entire evaluation. The positioning of the head worn device relative to the phantom was dictated by FCC OET bulletin 65 Supplement C.

   (ii) For body worn devices or devices which can be operated within 20 cm of the body, the flat section of the phantom was used. The type of device being evaluated dictated the distance of the EUT to the outer surface of the phantom flat section.

b) The SAR was determined by a pre-defined procedure within the DASY4 software. The exposed region of the phantom was scanned near the inner surface with a grid spacing of 20mm x 20mm or appropriate resolution.

c) A 7x7x7 matrix was performed around the greatest spatial SAR distribution found during the area scan of the applicable exposed region. SAR values were then calculated using a 3-D spline interpolation algorithm and averaged over spatial volumes of 1 and 10 grams.

d) If the EUT had any appreciable drift over the course of the evaluation, then the EUT was re-evaluated. Any unusual anomalies over the course of the test also warranted a re-evaluation.

11. System Validation

11.1. Prior to the assessment, the system was verified in the flat region of the phantom. A 900MHz dipole was used. A forward power of 250 mW was applied to the dipole and system was verified to a tolerance of ±5% for the 900MHz dipole. The applicable verification (normalised to 1 Watt) is as follows:

Dipole Validation Kit	Target SAR 1g (W/kg)	Measured SAR 1g (W/kg)
D900V2 / 124 (12/03/04)	11.00	11.00

12. Simulated Tissues

12.1. The body mixture consists of water and glycol. Visual inspection is made to ensure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the tissue.

	Frequency
	900MHz Muscle
Water	50.75%
Sugar	48.21%
Salt	0.94%
Kathon	0.10%

13. Tissue Parameters

13.1. The dielectric parameters of the fluids were verified prior to the SAR evaluation using a 58070C Dielectric Probe Kit and an 8753E Network Analyser. The dielectric parameters of the fluid are as follows:

Frequency (MHz)	Equivalent Tissue	Dielectric Constant ε_r	Conductivity σ (mho/m)
835 (12/03/04)	Muscle	53.3	0.93

14. DASY4 Systems Specifications

Robot System

Positioner:	Stäubli Unimation Corp. Robot Model: RX90L
Repeatability:	0.025 mm
No. of axis:	6
Serial Number:	F00/SD89A1/A/01
Reach:	1185 mm
Payload:	3.5 kg
Control Unit:	CS7
Programming Language:	V+

Data Acquisition Electronic (DAE) System

Cell Controller

PC:	Dell Precision 340
Operating System:	Windows NT
Data Card:	DASY4 Measurement Server
Serial Number:	1080

Data Converter

Features:	Signal Amplifier, multiplexer, A/D converter and control logic.
Software:	DASY4 Software
Connecting Lines:	Optical downlink for data and status info. Optical uplink for commands and clock.

PC Interface Card

Function:	24 bit (64 MHz) DSP for real time processing Link to DAE3 16 nit A/D converter for surface detection system serial link to robot direct emergency stop output for robot.

E-Field Probe

Model:	ET3DV6
Serial No:	1528
Construction:	Triangular core fibre optic detection system
Frequency:	10 MHz to 3 GHz
Linearity:	±0.2 dB (30 MHz to 3 GHz)
Probe Length (mm):	337
Probe Diameter (mm):	12
Tip Length (mm):	10
Tip Diameter (mm):	6.8
Sensor X Offset (mm):	2.7
Sensor Y Offset (mm):	2.7
Sensor Z Offset (mm):	2.7

Phantom

Phantom:	SAM Phantom
Shell Material:	Fibreglass
Thickness:	2.0 ±0.1 mm

15. Validation results – 900 MHz – 12 March 2004

15.1. System Validation

15.1.1. Validation of the system test configuration was carried out prior to testing.

Validation Dipole Type and Serial No.	Calibrated Value of SAR in 1g volume (W/kg) at 900 MHz	Measured Value of SAR in 1g volume (W/kg) at 900 MHz	Percentage Difference (≤5%)
D900V2 / 124	11.00	11.00	Yes

A 900 dipole was used to perform 835 MHz Body validation. This was possible as the device centre frequency is within ± 100 MHz of the verification frequencies.

15.1.2. Liquid Properties

15.1.3. Properties of the tissue simulating liquid were measured prior to testing.

Property	Target Value (835 MHz)	Measured/Calculated Value (835 MHz)	Percentage Difference (≤5%)
Relative Permittivity	55.20	53.30	Yes
Conductivity	0.97	0.93	Yes

15.2. Temperature Variation

15.2.1. The temperature of the laboratory and within the tissue simulating liquid for this test shall not exceed the range +15ºC to +30ºC.

15.2.2. The actual temperature measured at the beginning and end of each test was recorded and the maximum range is shown below:

Measurement	Maximum Temperature	Minimum Temperature
Laboratory	25.0	24.0
Tissue Simulating Liquid	24.3	23.3

16. Measurement Uncertainty

16.1. No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

16.2. The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

16.3. The uncertainty of the result may need to be taken into account when interpreting the measurement results.

16.4. The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	**Range**	**Confidence Level**	**Calculated Uncertainty**
Specific Absorption Rate	850 MHz	95%	± 17.12 %

16.5. The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

16.6. Measurement uncertainties in SAR measurements are difficult to quantify due to several variables including biological, physiological, and environment. However, the estimated measurement uncertainties in SAR are less than 30%.

16.7. According to ANSI/IEEE C95.3, the overall uncertainties are difficult to assess and will vary with the type of meter and usage situation. However, accuracy's of ±1 to 3 dB can be expected in practice, with greater uncertainties in near-field situations and at higher frequencies (shorter wavelengths), or areas where large reflecting objects are present. Under optimum measurement conditions, SAR measurement uncertainties of at least ±2 dB can be expected.

16.8. According to CENELEC, typical worst-case uncertainty of field measurements is ±5 dB. For well-defined modulation characteristics the uncertainty can be reduced to ±3 dB.

Measurement Uncertainty (Continued)

Specific Absorption Rate Uncertainty at 850 MHz, GSM Modulation Scheme calculated in accordance with IEEE 1528-200X

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	c_i	Standard Uncertainty		υ_i or υ_{eff}
B	Probe calibration	8.900	8.900	normal (k=2)	2.0000	1.0000	4.450	4.450	∞
B	Axial Isotropy	0.100	0.100	normal (k=2)	2.0000	1.0000	0.050	0.050	∞
B	Hemispherical Isotropy	0.100	0.100	normal (k=2)	2.0000	1.0000	0.050	0.050	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	2.330	2.330	Rectangular	1.7321	1.0000	1.345	1.345	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.650	0.650	normal (k=2)	2.0000	1.0000	0.325	0.325	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	0.005	0.005	Rectangular	1.7321	1.0000	0.003	0.003	∞
B	RF Ambinet conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration/ Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	0.584	0.584	normal (k=1)	1.0000	1.0000	0.584	0.584	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10

Measurement Uncertainty (Continued)

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	c_i	Standard Uncertainty		υ_i or υ_{eff}
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drit of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (measured value)	2.440	2.440	Rectangular	1.7321	1.0000	1.409	1.409	∞
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Permittivity (measured value)	2.440	2.440	Rectangular	1.7321	1.0000	1.409	1.409	∞
	Combined standard uncertainty			t-distribution			8.74	8.74	>500
	Expanded uncertainty			k = 1.96			17.12	17.12	>500

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Model Number
A034	Narda 20W Termination	Narda	374BNM
A1094	Sony MVC FD-81	Sony	MVC - FD81
A1097	SMA Directional Coupler	MiDISCO	MDC6223-30
A1174	Dielectric Probe Kit	Agilent Technologies	85070C
A1185	Probe	Schmid & Partners	ET3 DV6
A1225	Low noise Amplifier	Mini Circuits	ZHL-42
A1234	Data Acquisition Electronics	Schmid & Partners	DAE3
A1235	900MHz Validation Dipole	Schmid & Partners	D900V2
A1238	SAM Phantom	Schmid & Partners	001
A1328	Handset Positioner	Schmid & Partners	Modification
A215	20 dB Attenuator	Narda	766-20
C1052	Cable	Utiflex	FA210A0030M3030
C1053	Cable	Utiflex	FA210A0003M3030
C1054	Cable	Utiflex	FA210A0001M3050A
G046	Signal Generator	Gigatronics	7100/.01-20
G0528	Robot Power Supply	Schmid & Partners	DASY
G088	PSU	Thurlby Thandar	CPX200
M011	NRV-Z1 Power Sensor	Rohde & Schwarz	NRV-Z1
M1001	Spectrum Analyser 8594A	Hewlett Packard	8594A
M1015	Network Analyser	Agilent Technologies	8753ES
M103	URY Power Meter	Rohde & Schwarz	URY
M1047	Robot Arm	Staubli	RX908 L
M1130	Rohde & Schwarz	Rohde & Schwarz	URY-Z2
M509	Thermometer	Testo	110
S256	Site 56	RFI	N/A

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

Appendix 2. SAR Distribution Scans

This appendix contains SAR Distribution Scans.

Scan Reference Number	Title
SCN/46050JD0146050/001	Flat Section 835MHz TelePack-608 Unit CH191 Rear Idle
SCN/46050JD0146050/002	Flat Section 835MHz TelePack-608 Unit CH191 Rear Transmit
SCN/46050JD0146050/003	Flat Section 835MHz TelePack-608 Unit CH191 Front Transmit
SCN/Validation_001	SCN/Validation 001

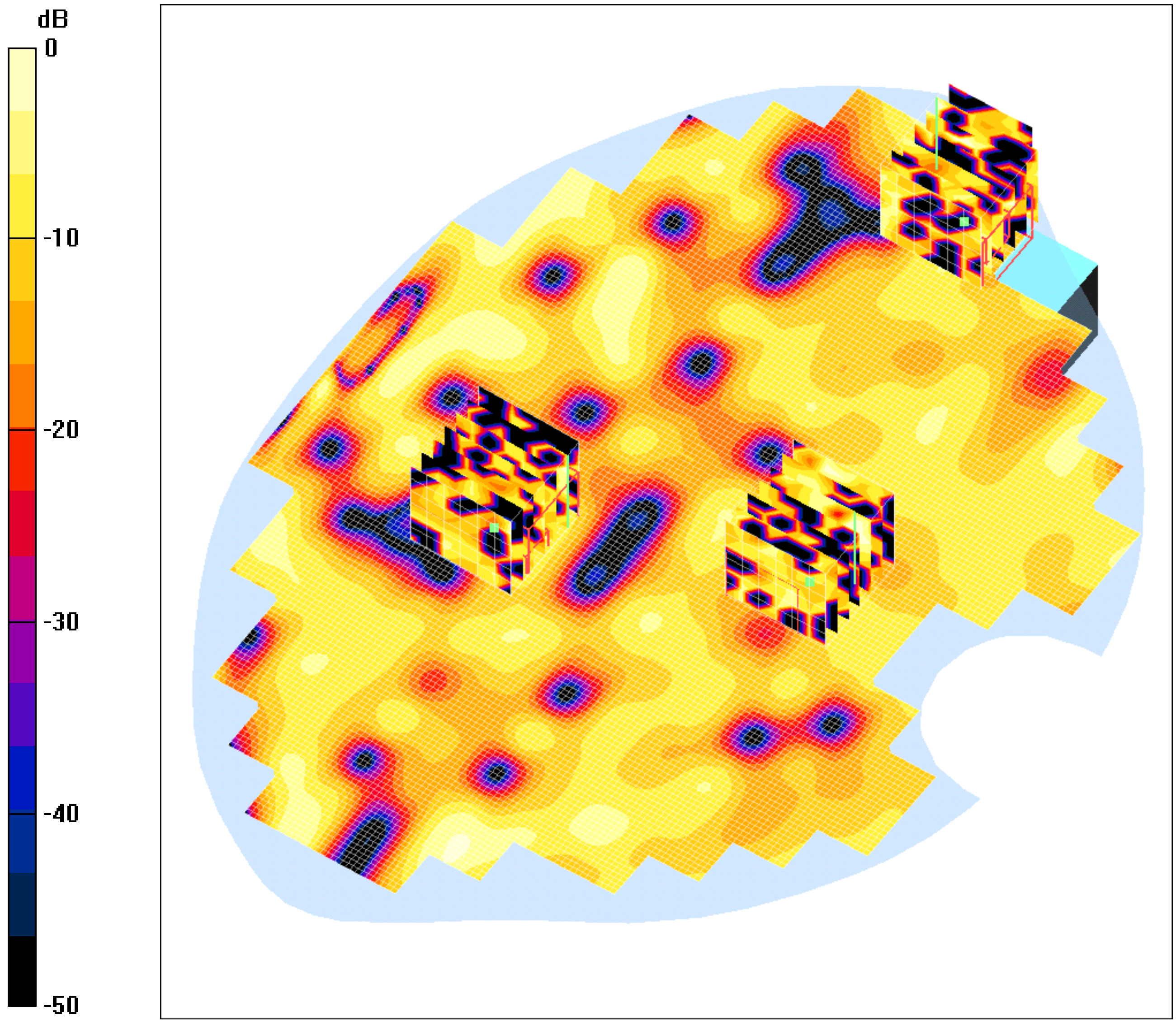
Date: 12/03/04

46050/JD01/001

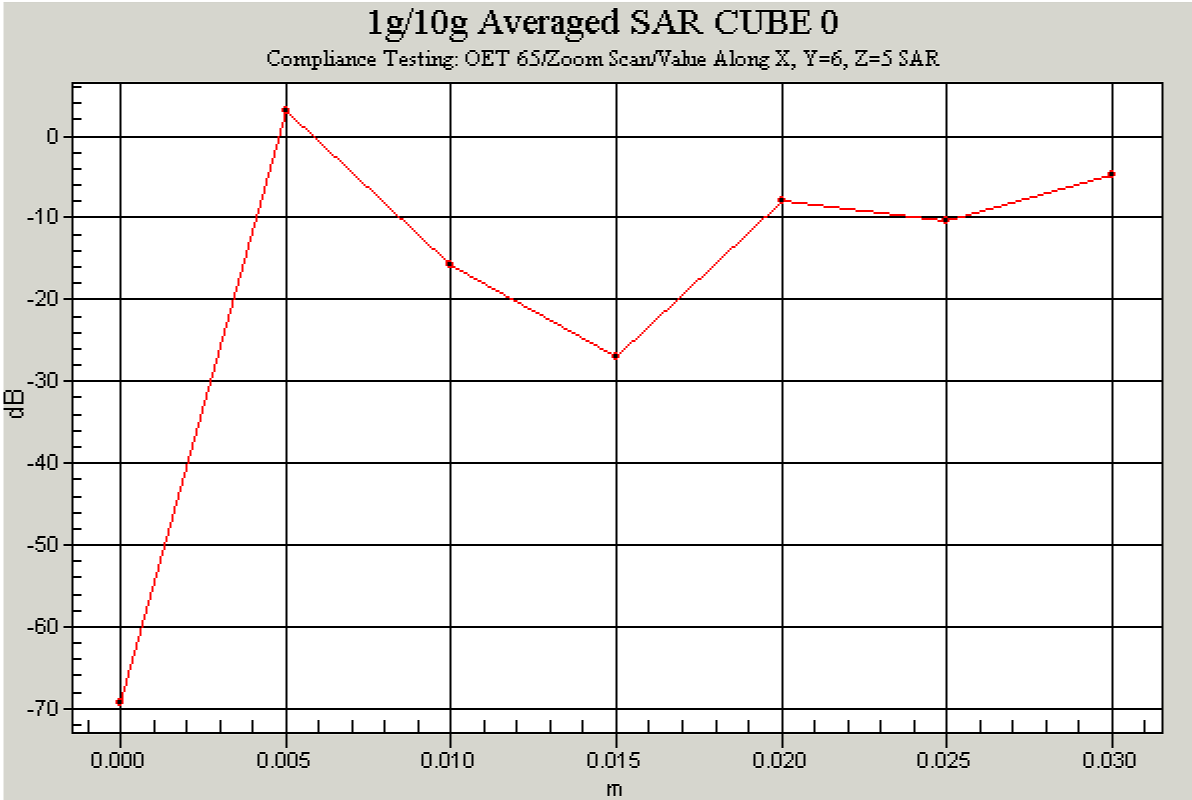
Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

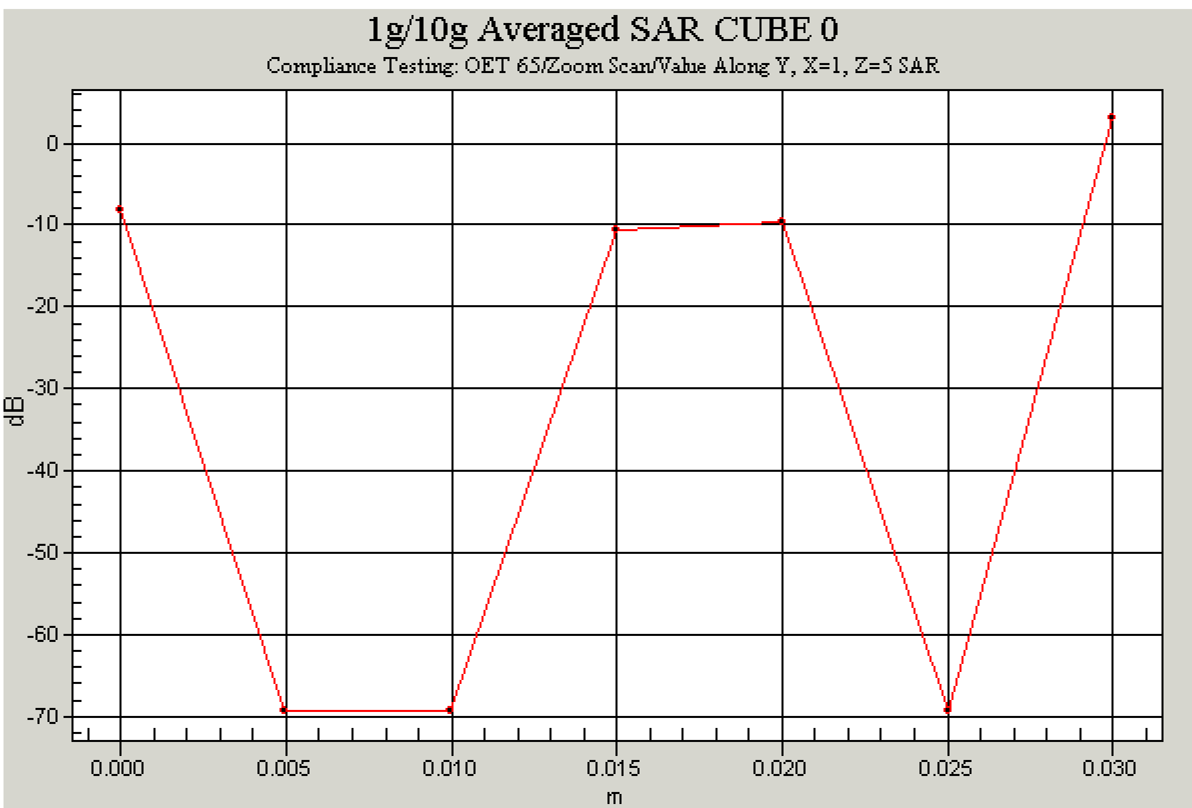
46050_JD01_Flat_Section_835MHz_TelePack_ Unit_CH191_Rear_Idle

DUT: Datascope Panorama Telepack ; Type: 608; Serial: 0998-00-0191-01



0 dB = 0.000497mW/g


1g/10g Averaged SAR CUBE 0
Compliance Testing: OET 65/Zoom Scan/Value Along X, Y=6, Z=5 SAR
dB
0
-10
-20
-30
-40
-50
-60
-70
0.000
0.005
0.010
0.015
0.020
0.025
0.030
m


1g/10g Averaged SAR CUBE 0
Compliance Testing: OET 65/Zoom Scan/Value Along Y, X=1, Z=5 SAR
dB
0
-10
-20
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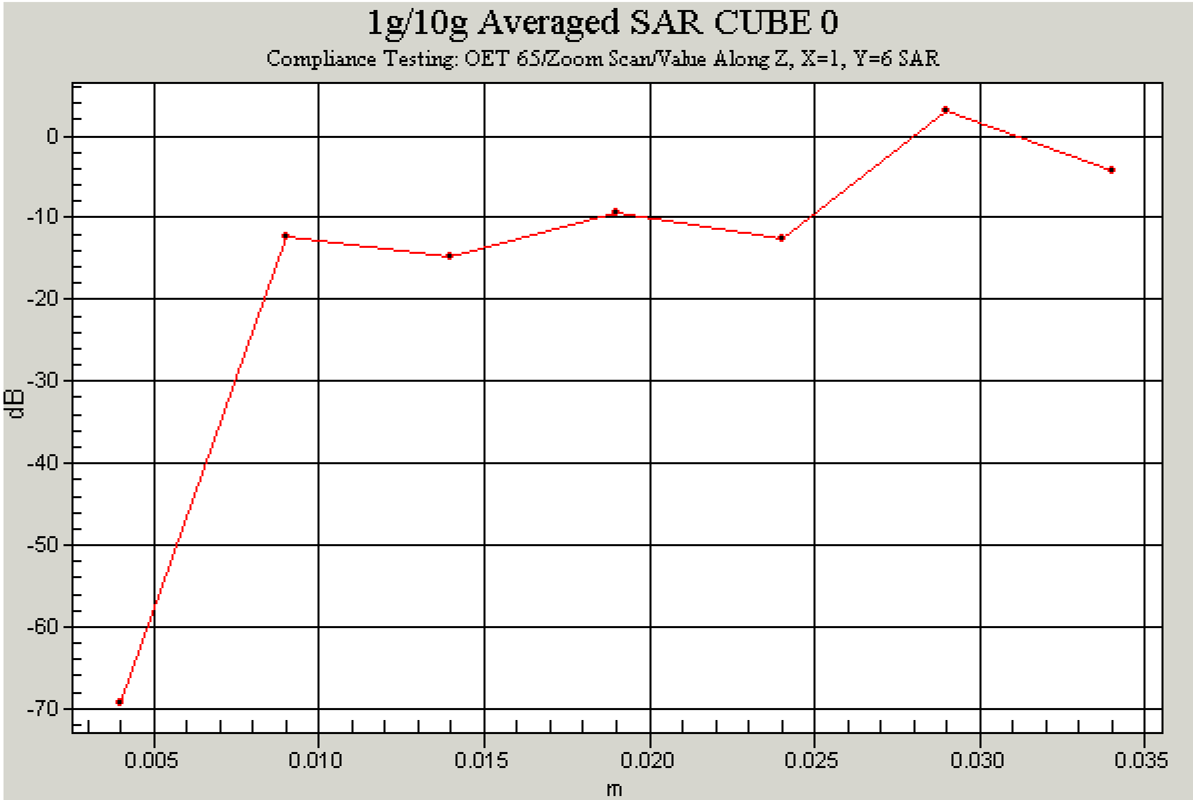
-40
-50
-60
-70
0.000
0.005
0.010
0.015
0.020
0.025
0.030
m


1g/10g Averaged SAR CUBE 0
Compliance Testing: OET 65/Zoom Scan/Value Along Z, X=1, Y=6 SAR
dB
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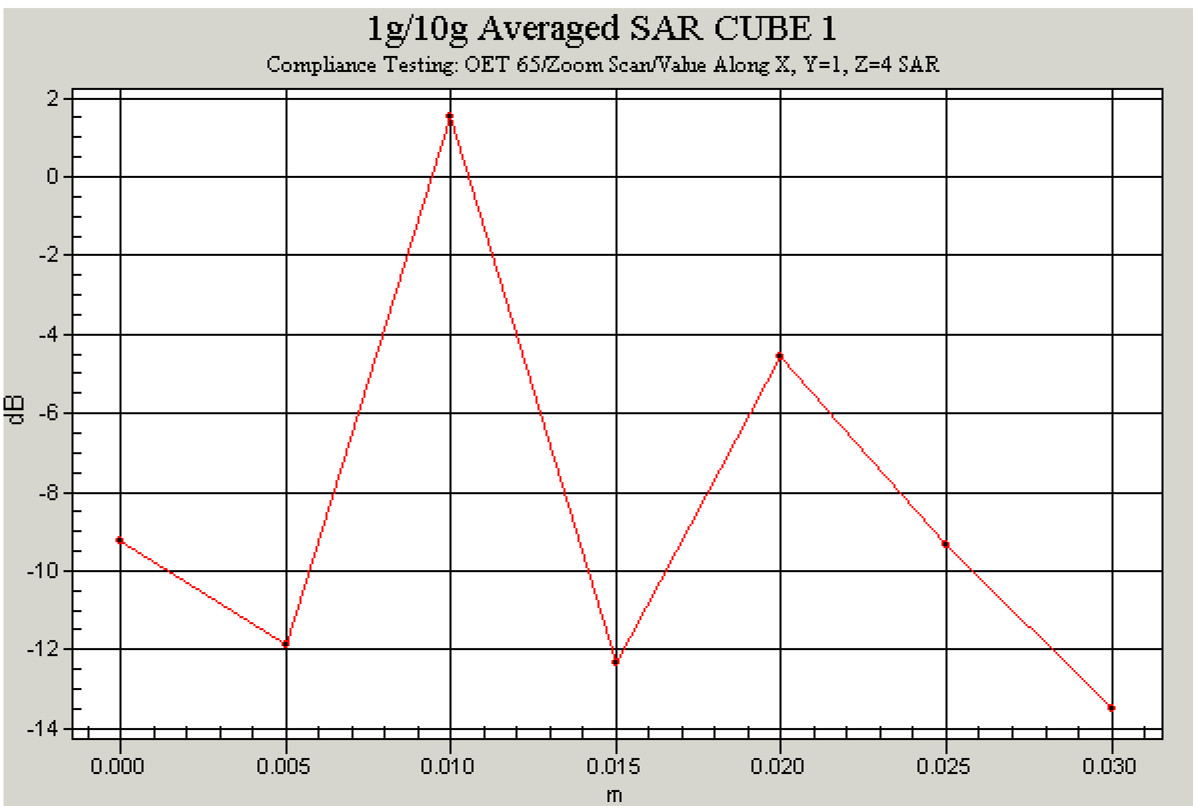
-10
-20
-30
-40
-50
-60
-70
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m


1g/10g Averaged SAR CUBE 1
Compliance Testing: OET 65/Zoom Scan/Value Along X, Y=1, Z=4 SAR
dB
2
0
-2
-4
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-10
-12
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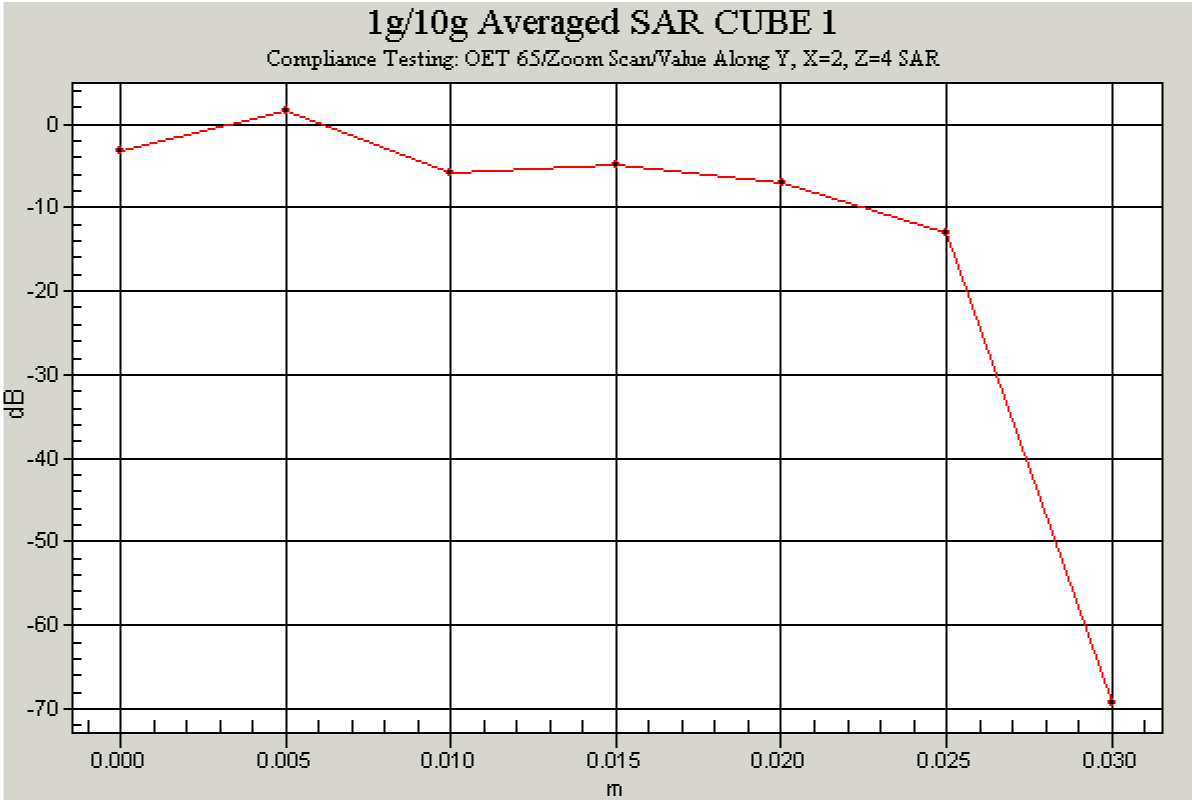
0.005
0.010
0.015
0.020
0.025
0.030
m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Compliance Testing: OET 65/Zoom Scan/Value Along Y, X=2, Z=4 SAR
dB
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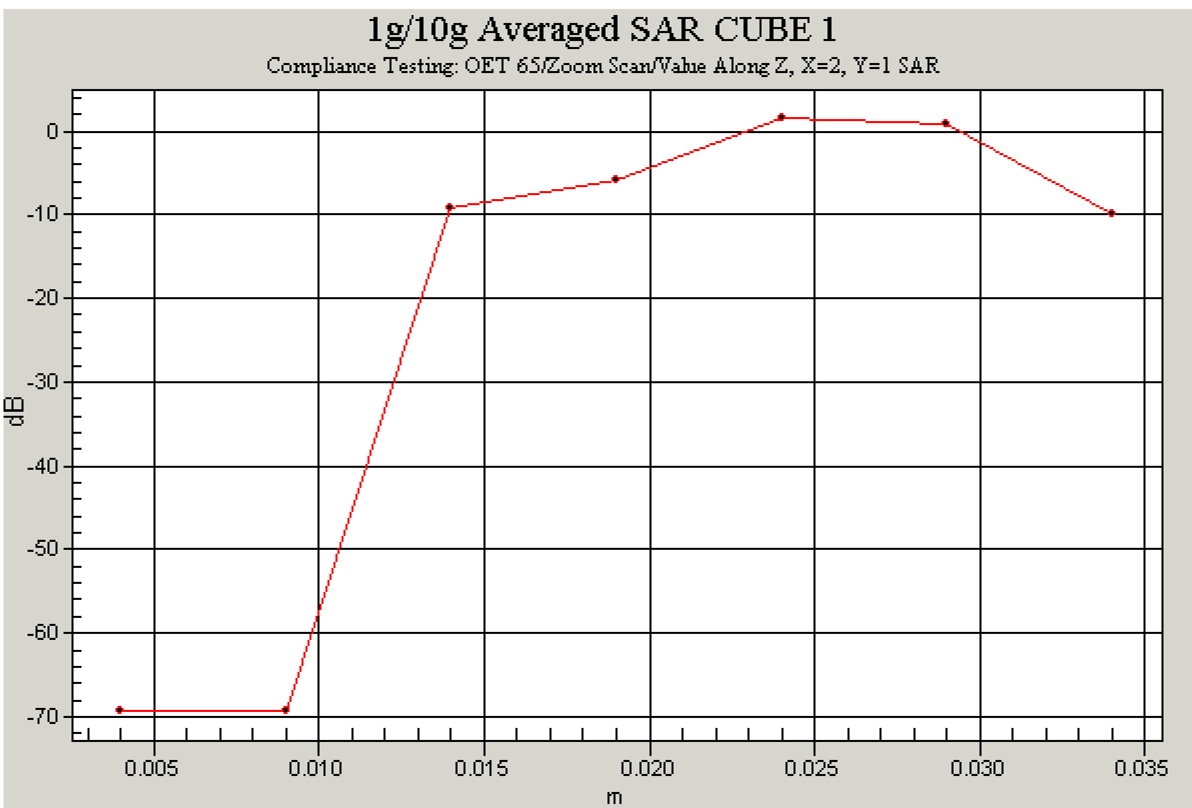
-10
-20
-30
-40
-50
-60
-70
0.000
0.005
0.010
0.015
0.020
0.025
0.030
m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0.015
0.020
0.025
0.030
0.035
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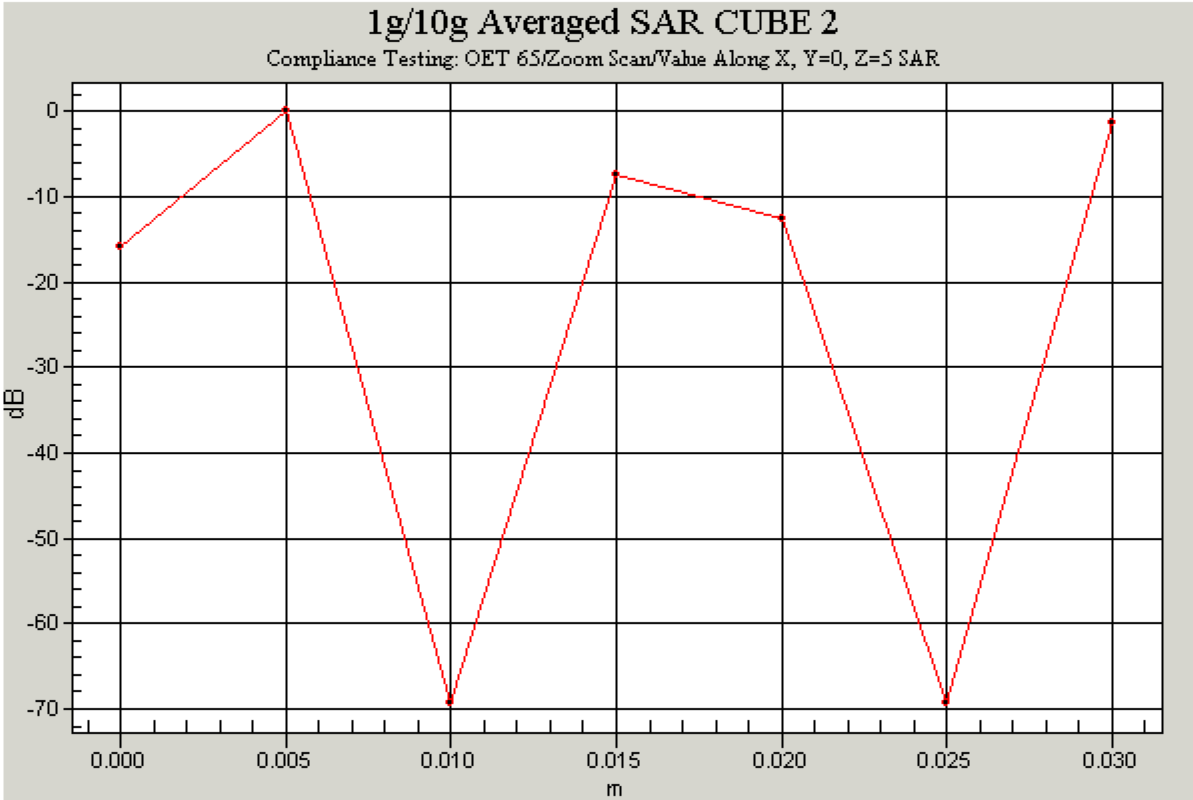
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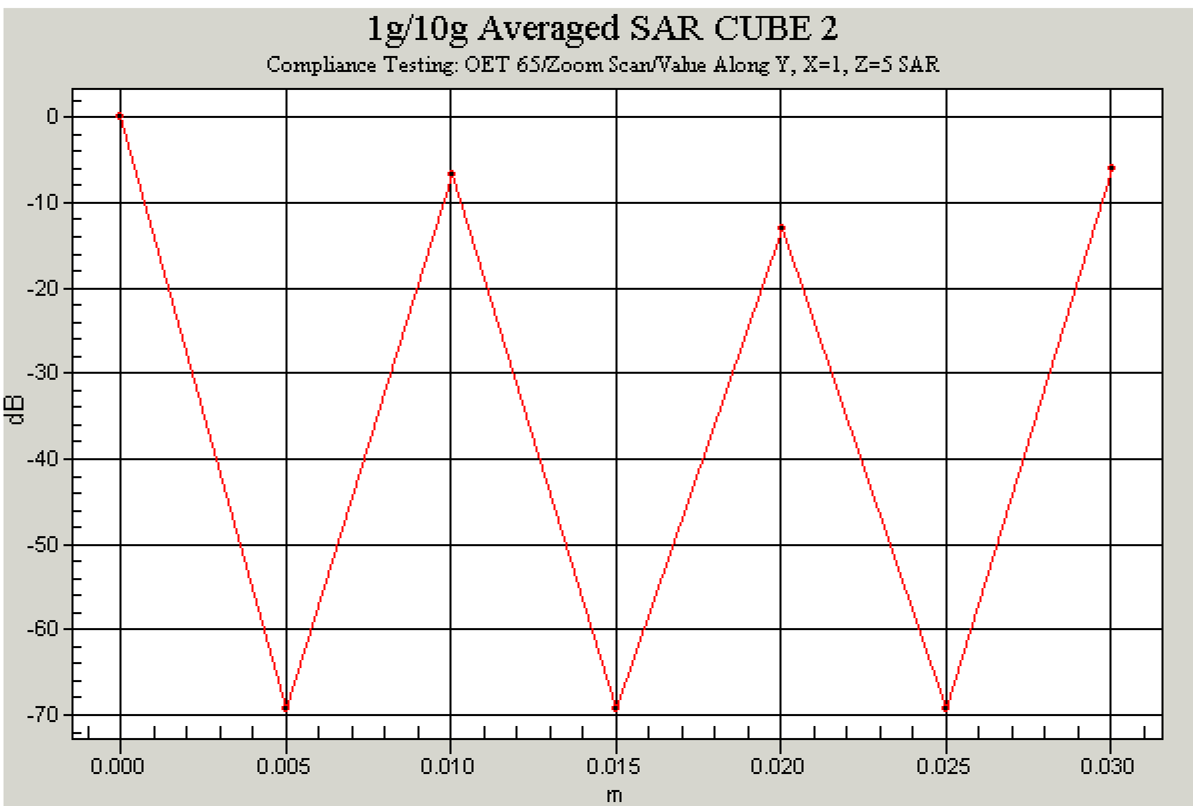
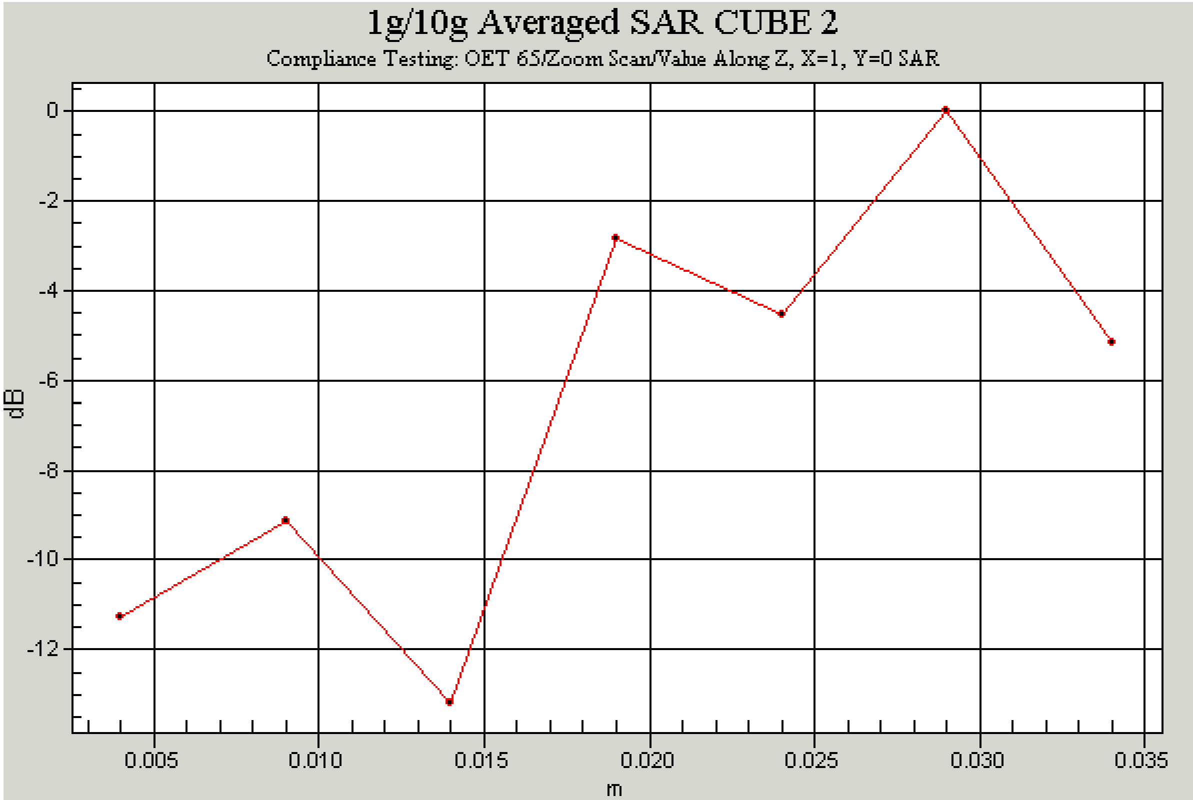
-10
-20
-30
-40
-50
-60
-70
0.000
0.005
0.010
0.015
0.020
0.025
0.030
m


1g/10g Averaged SAR CUBE 2
Compliance Testing: OET 65/Zoom Scan/Value Along Y, X=1, Z=5 SAR
dB
0
-10
-20
-30
-40
-50
-60
-70
0.000
0.005
0.010
0.015
0.020
0.025
0.030
m



Communication System: 850 MHz; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: 835MHz MSL Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.934 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1528; ConvF(6.3, 6.3, 6.3); Calibrated: 29/07/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 19/05/2003
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 93

Rear Idle/Area Scan (201x151x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 0.292 V/m
Power Drift = -2 dB
Maximum value of SAR = 0.000455 mW/g

Rear Idle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.015 W/kg
SAR(1 g) = 7.12e-005 mW/g; SAR(10 g) = 4.07e-005 mW/g
Reference Value = 0.292 V/m
Power Drift = -2 dB
Maximum value of SAR = 0.000992 mW/g

Rear Idle/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 562.1 W/kg
SAR(1 g) = 0.000882 mW/g; SAR(10 g) = 0.00029 mW/g
Reference Value = 0.292 V/m
Power Drift = -2 dB
Maximum value of SAR = 0.000704 mW/g

Rear Idle/Zoom Scan (7x7x7)/Cube 2: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.020 W/kg
SAR(1 g) = 0.000111 mW/g; SAR(10 g) = 3.68e-005 mW/g
Reference Value = 0.292 V/m
Power Drift = -2 dB
Maximum value of SAR = 0.000497 mW/g

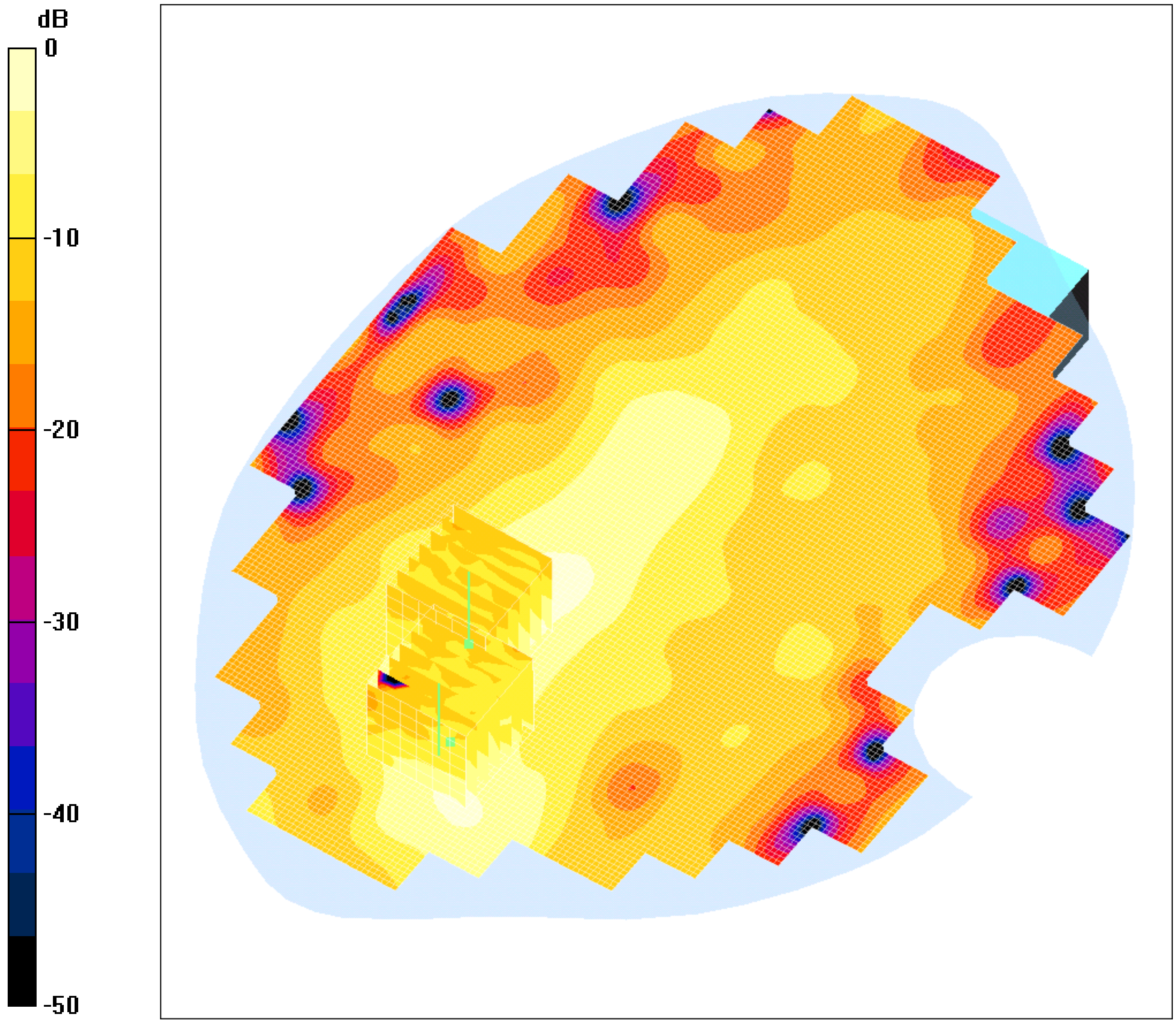
Date: 12/03/04

46050/JD01/002

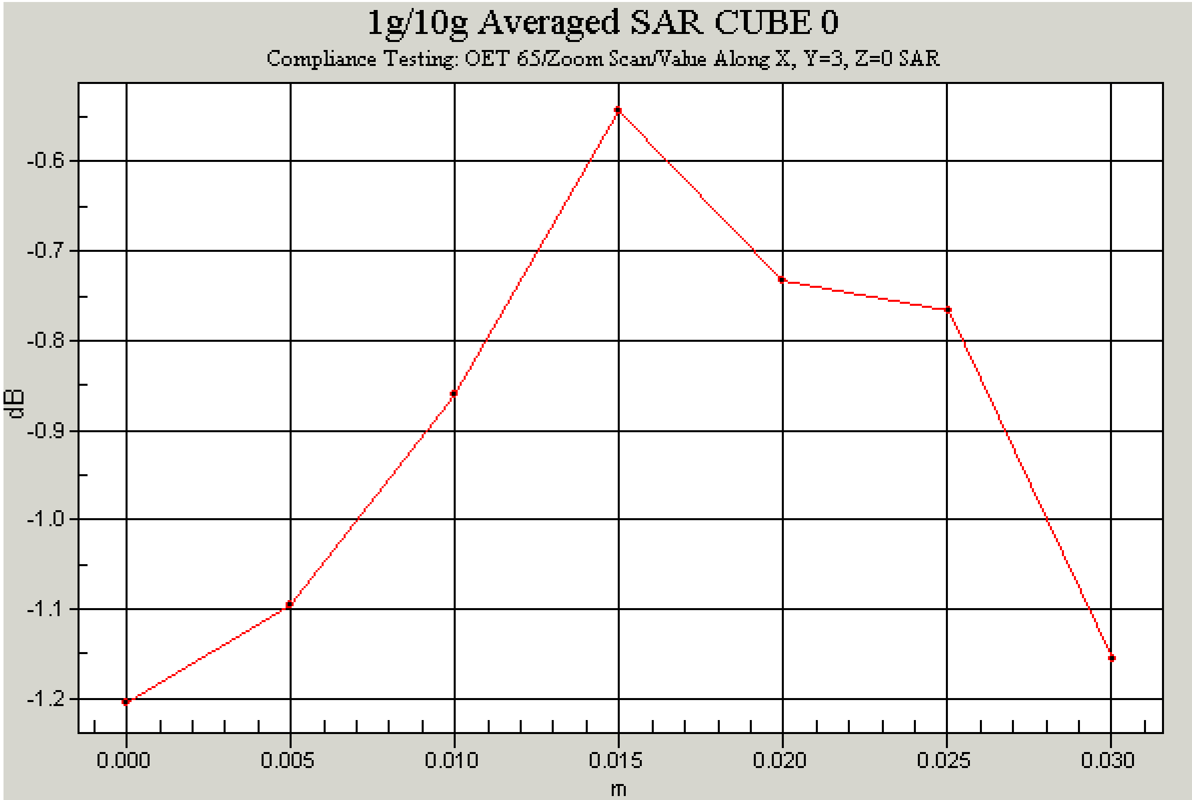
Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

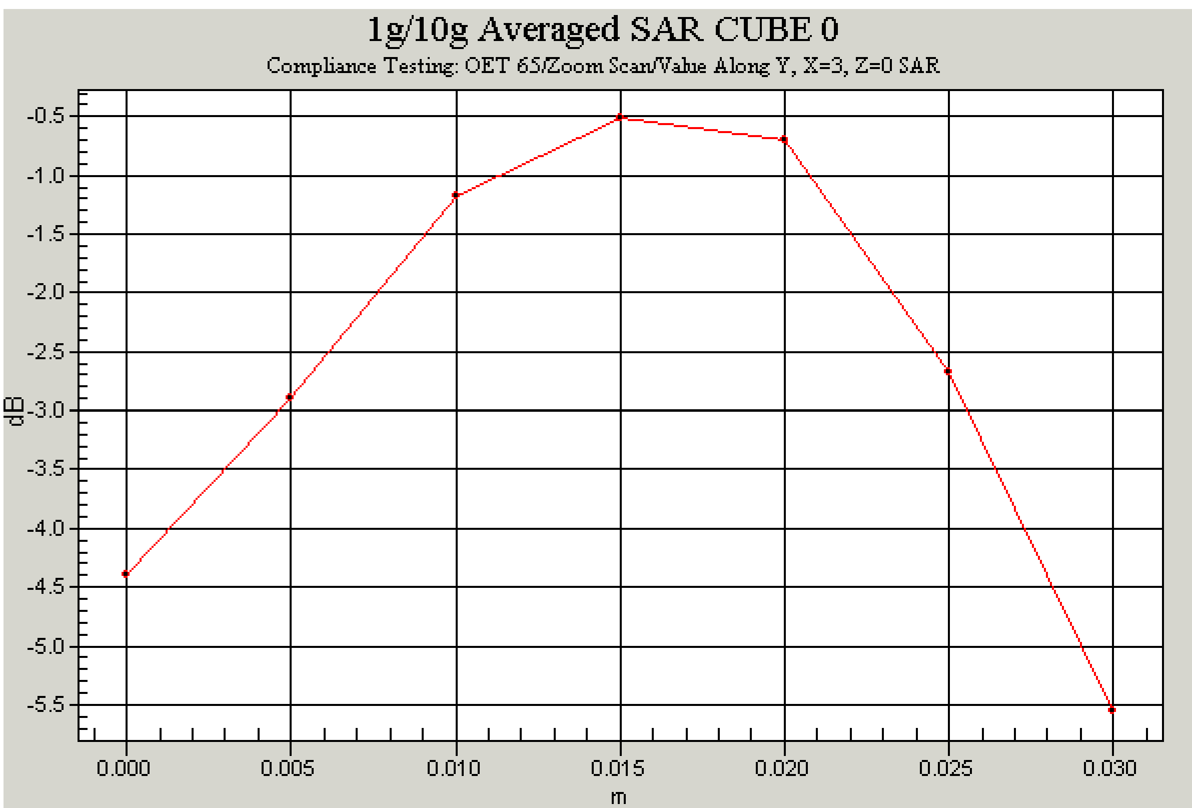
46050_JD01_Flat_Section_835MHz_TelePack-608_ Unit_CH191_Rear_Transmitt

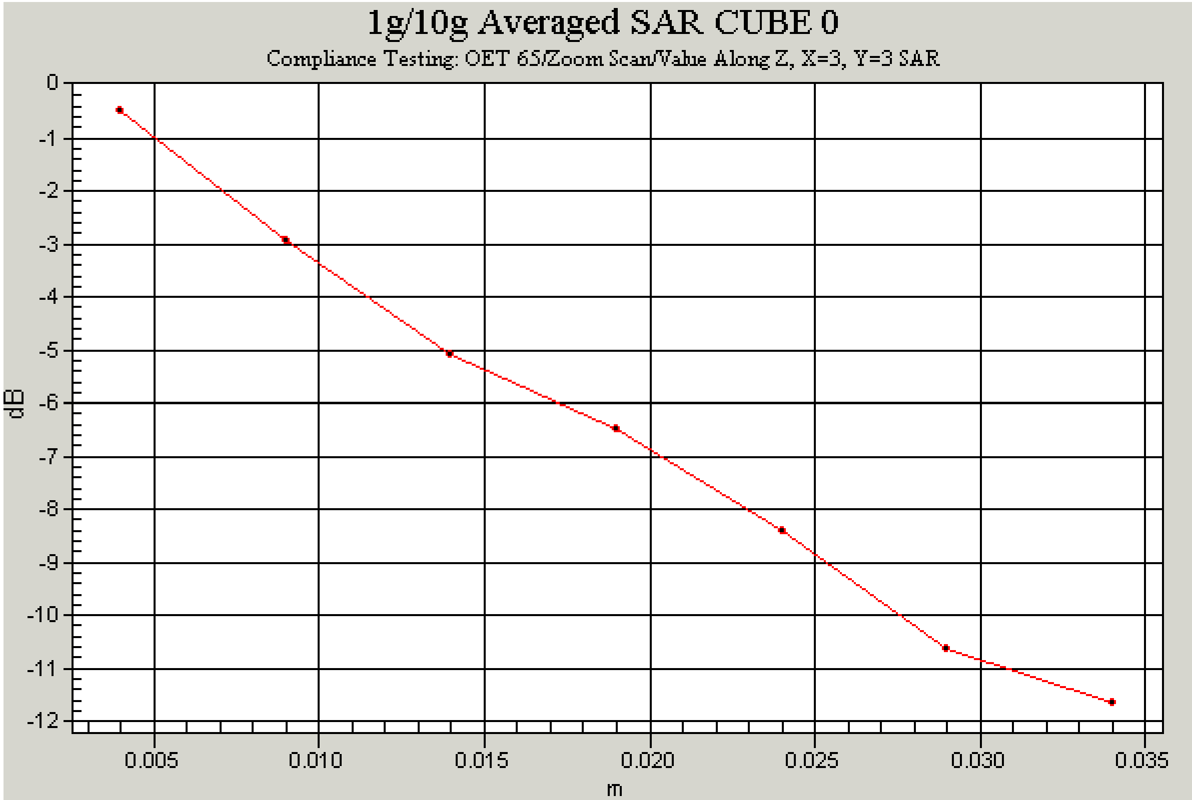
DUT: Datascope Panorama Telepack ; Type: 608; Serial: 0998-00-0191-01

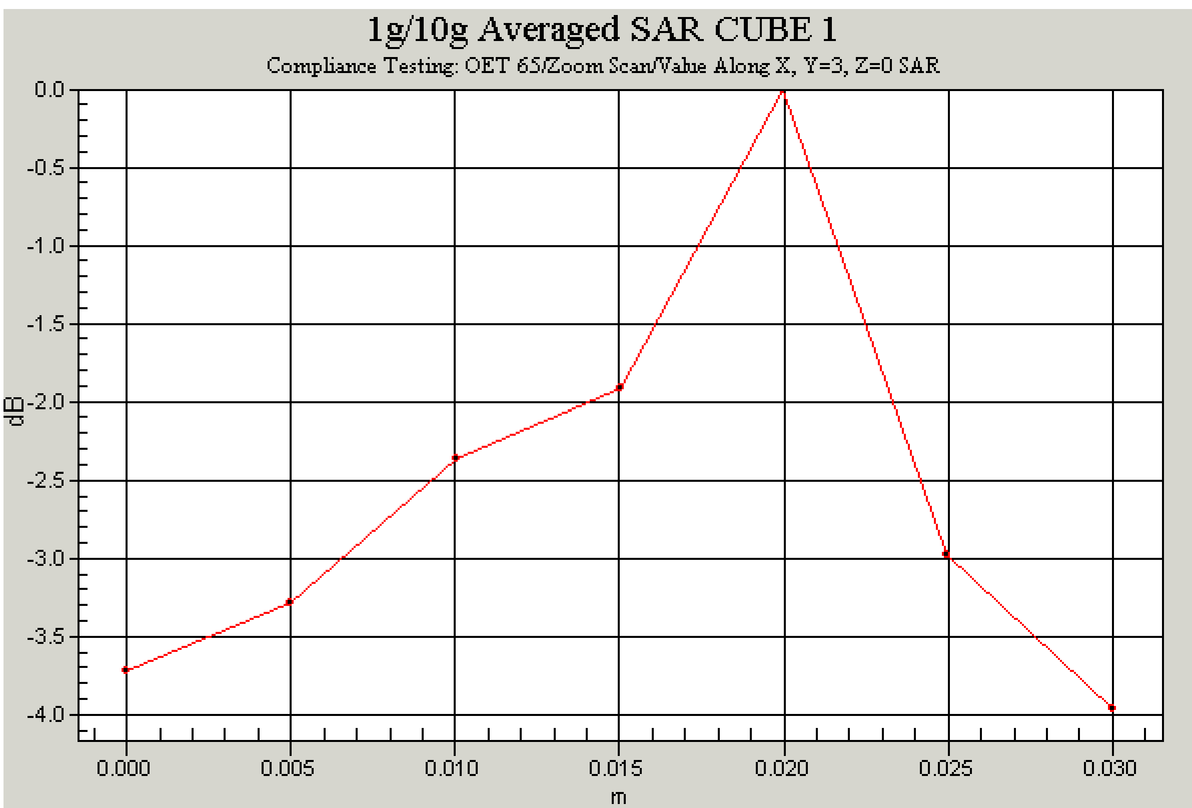


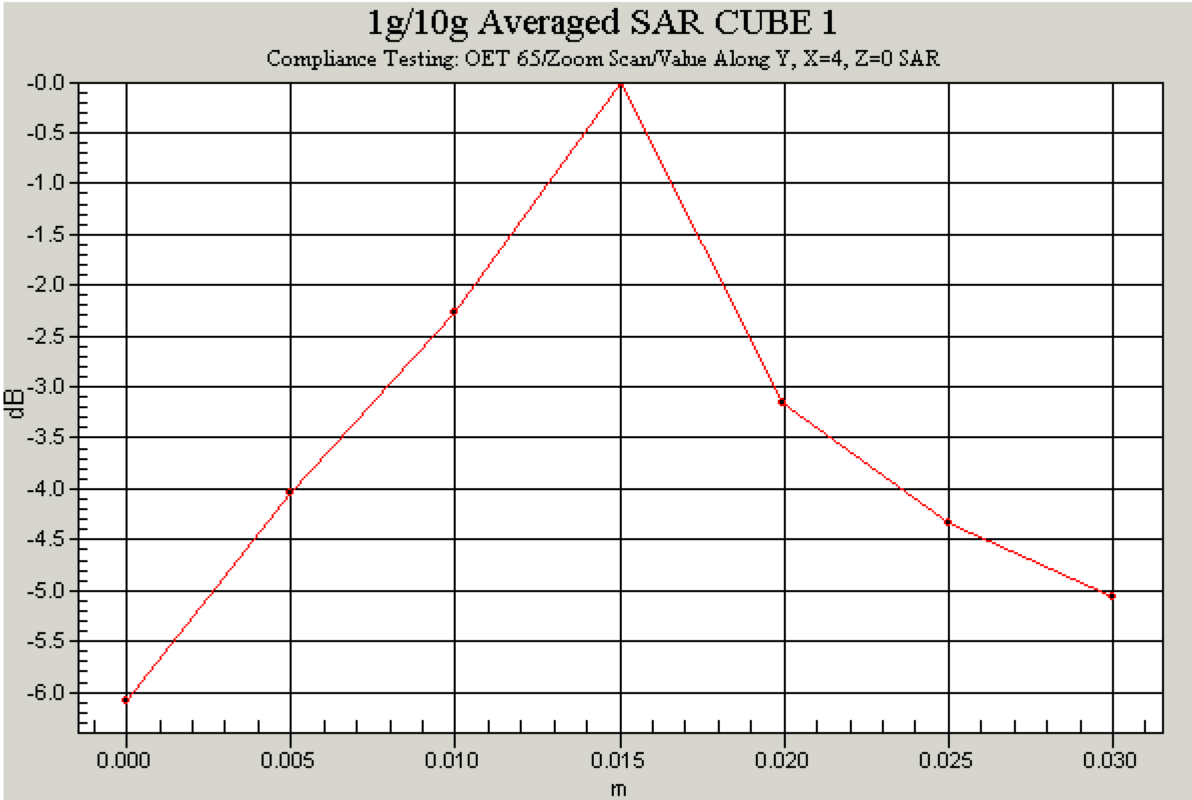
0 dB = 0.00295mW/g

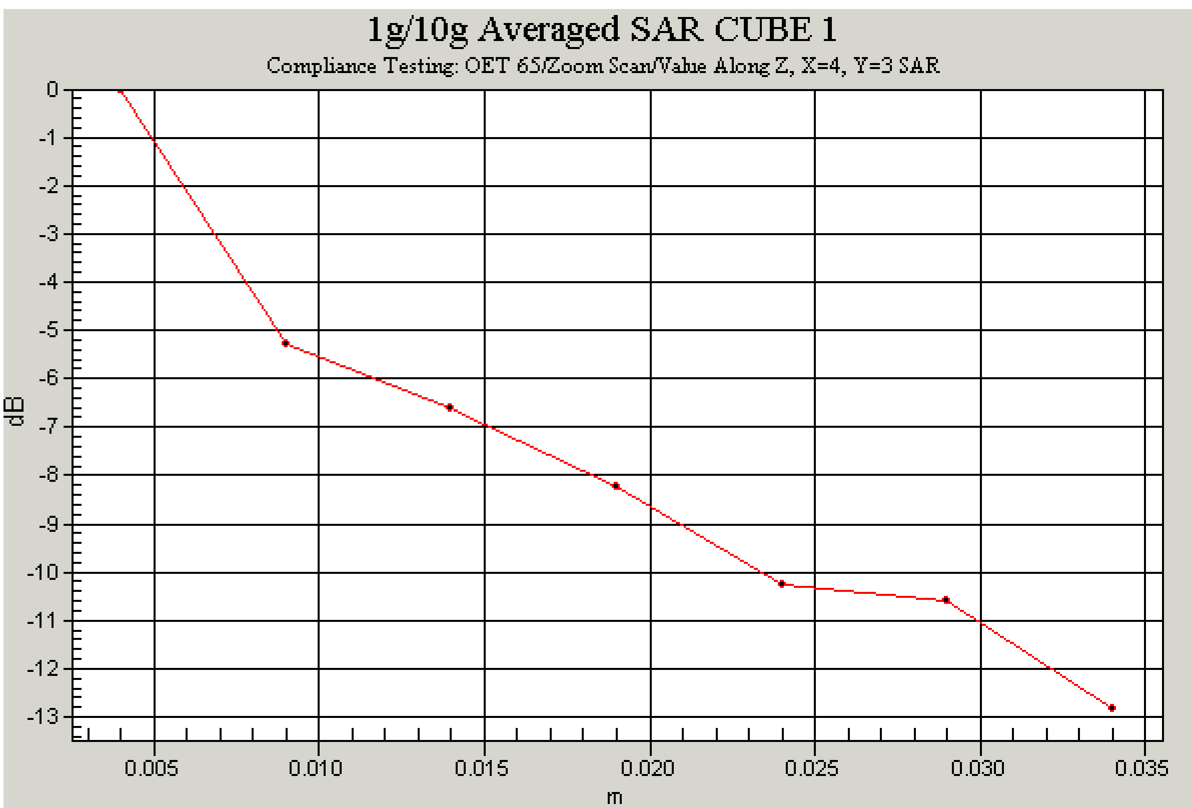

1g/10g Averaged SAR CUBE 0
Compliance Testing: OET 65/Zoom Scan/Value Along X, Y=3, Z=0 SAR
-0.6
-0.7
-0.8
-0.9
-1.0
-1.1
-1.2
dB
0.000
0.005
0.010
0.015
0.020
0.025
0.030
m


1g/10g Averaged SAR CUBE 0
Compliance Testing: OET 65/Zoom Scan/Value Along Y, X=3, Z=0 SAR
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0
-5.5
dB
0.000
0.005
0.010
0.015
0.020
0.025
0.030
m


1g/10g Averaged SAR CUBE 0
Compliance Testing: OET 65/Zoom Scan/Value Along Z, X=3, Y=3 SAR
dB
m
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
0.005
0.010
0.015
0.020
0.025
0.030
0.035


1g/10g Averaged SAR CUBE 1
Compliance Testing: OET 65/Zoom Scan/Value Along X, Y=3, Z=0 SAR
dB
m
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
0.000
0.005
0.010
0.015
0.020
0.025
0.030





Communication System: 850 MHz; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: 835MHz MSL Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.934 mho/m; ε_r = 55;

$\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1528; ConvF(6.3, 6.3, 6.3); Calibrated: 29/07/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 19/05/2003
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 93

Rear Transmitt/Area Scan (201x151x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 0.819 V/m
Power Drift = -0.3 dB
Maximum value of SAR = 0.00273 mW/g

Rear Transmitt/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.00531 W/kg
SAR(1 g) = 0.00239 mW/g; SAR(10 g) = 0.00132 mW/g
Reference Value = 0.819 V/m
Power Drift = -0.3 dB
Maximum value of SAR = 0.0026 mW/g

Rear Transmitt/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.00872 W/kg
SAR(1 g) = 0.00209 mW/g; SAR(10 g) = 0.00111 mW/g
Reference Value = 0.819 V/m
Power Drift = -0.3 dB
Maximum value of SAR = 0.00295 mW/g

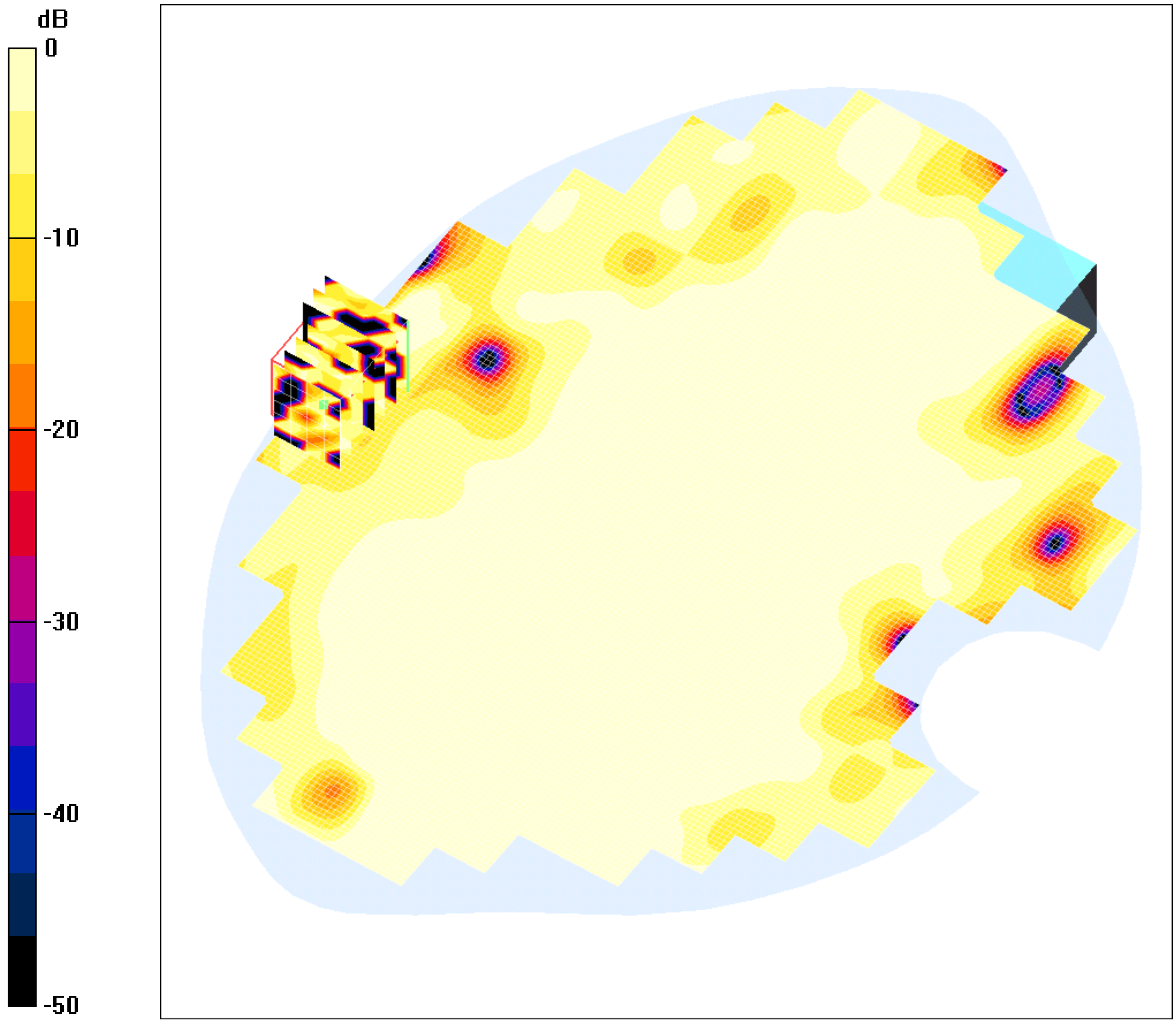
Date: 12/03/04

46050/JD01/003

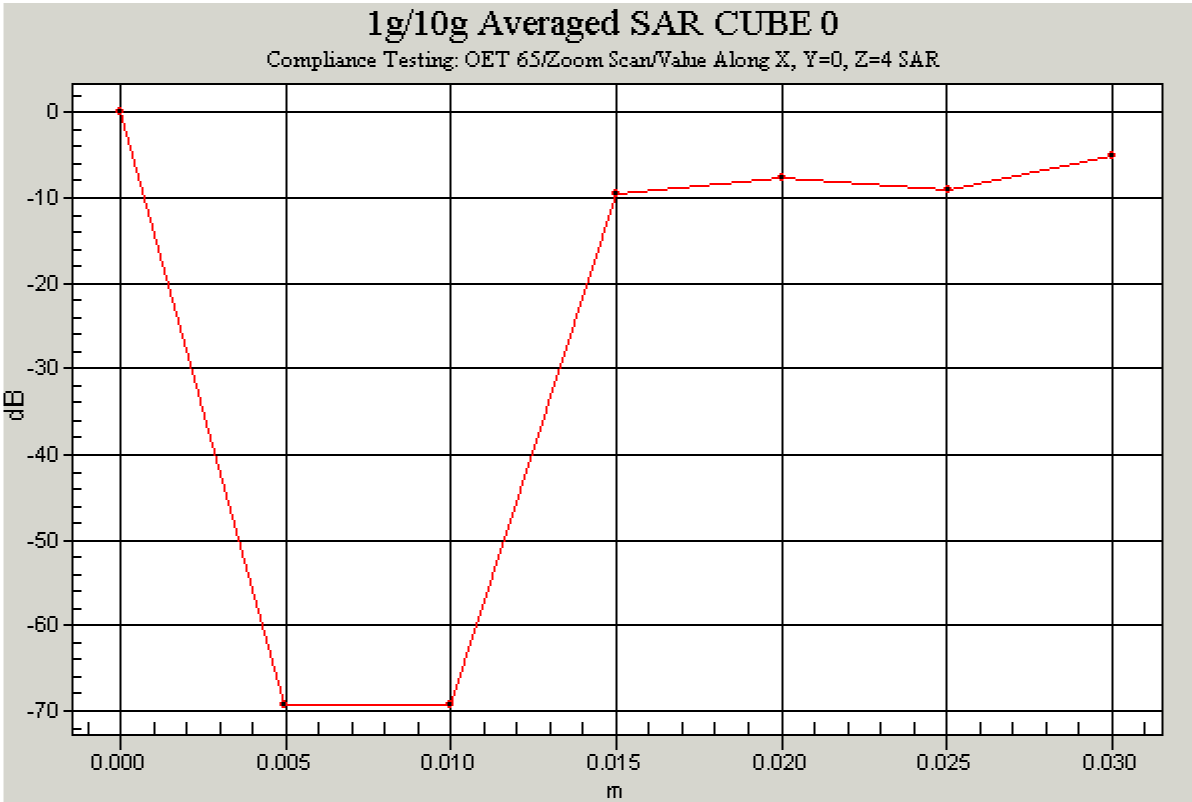
Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

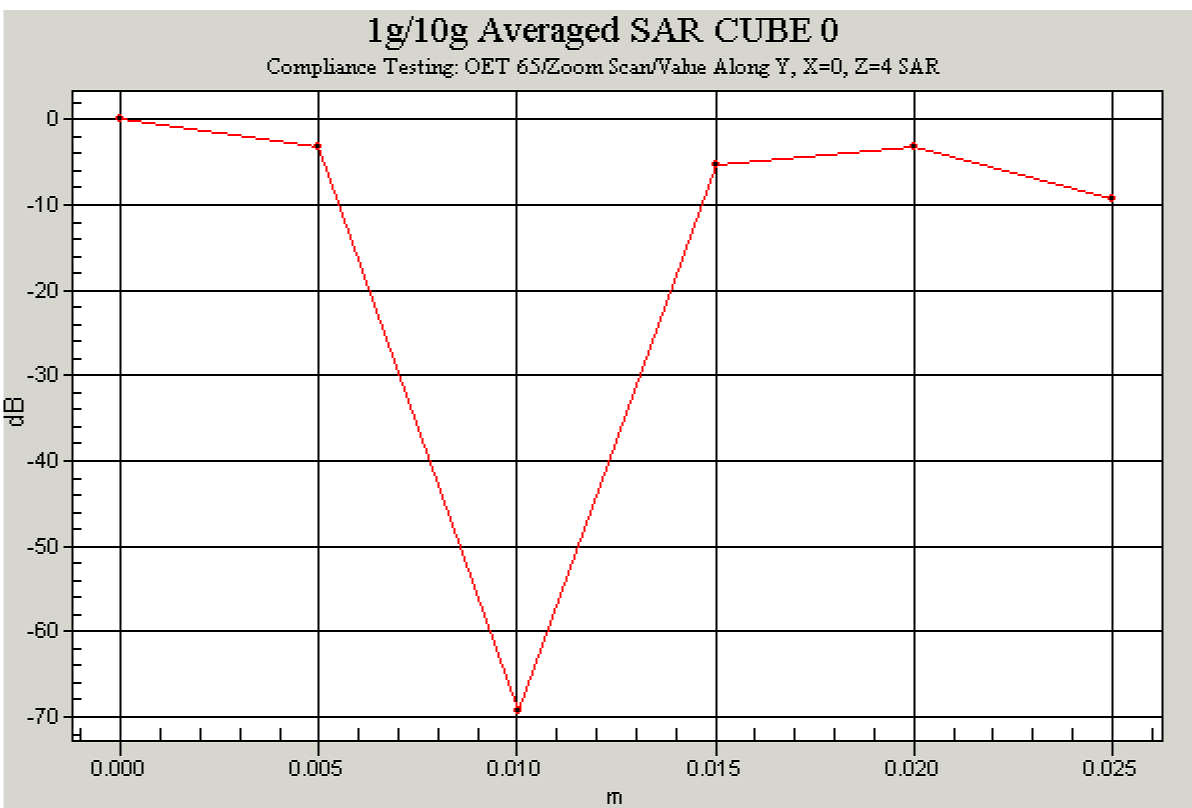
46050_JD01_Flat_Section_835MHz_TelePack-608_ Unit_CH191_Front_Transmitt

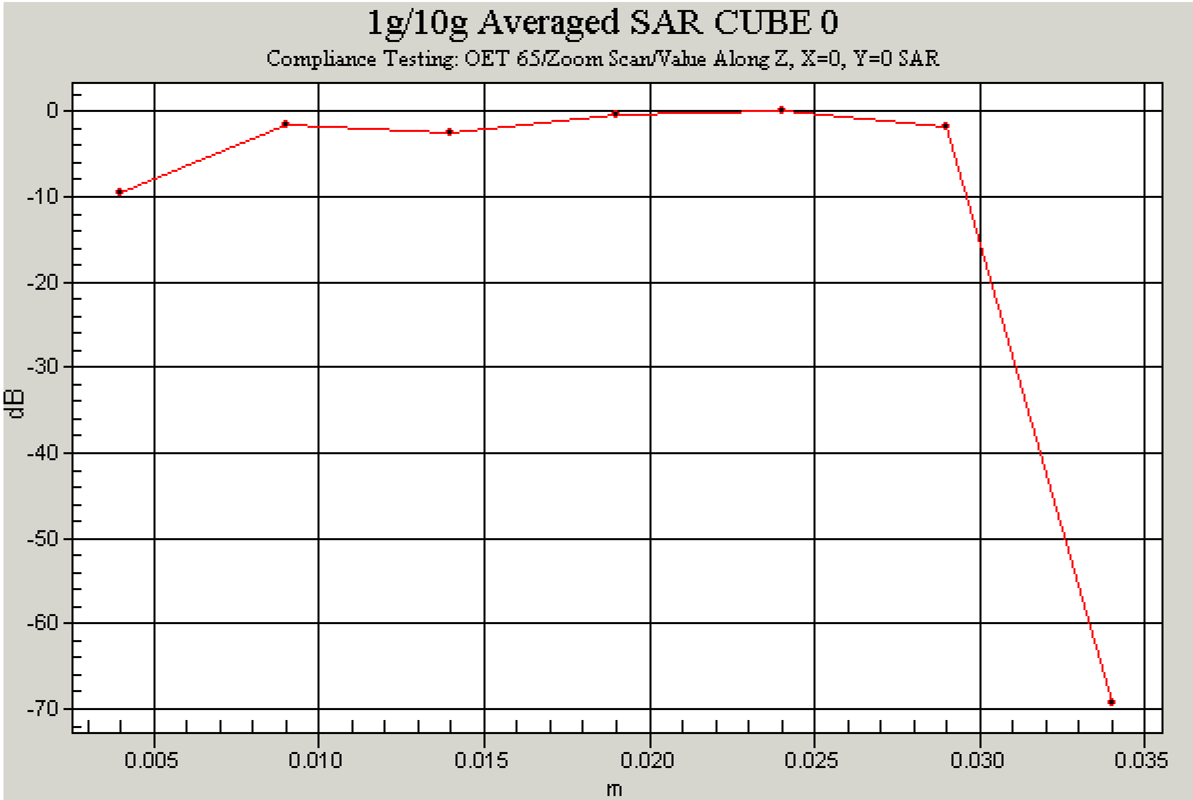
DUT: Datascope Panorama Telepack ; Type: 608; Serial: 0998-00-0191-01



0 dB = 0.00027mW/g


1g/10g Averaged SAR CUBE 0
Compliance Testing: OET 65/Zoom Scan/Value Along X, Y=0, Z=4 SAR
0
-10
-20
-30
-40
-50
-60
-70
dB
0.000
0.005
0.010
0.015
0.020
0.025
0.030
m


1g/10g Averaged SAR CUBE 0
Compliance Testing: OET 65/Zoom Scan/Value Along Y, X=0, Z=4 SAR
0
-10
-20
-30
-40
-50
-60
-70
dB
0.000
0.005
0.010
0.015
0.020
0.025
m



Communication System: 850 MHz; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: 835MHz MSL Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.934 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1528; ConvF(6.3, 6.3, 6.3); Calibrated: 29/07/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 19/05/2003
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 93

Front Transmitt/Area Scan (201x151x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 0.899 V/m
Power Drift = -0.1 dB
Maximum value of SAR = 3721.4 mW/g

Front Transmitt/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.017 W/kg
SAR(1 g) = 0.000106 mW/g; SAR(10 g) = 5.44e-005 mW/g
Reference Value = 0.899 V/m
Power Drift = -0.1 dB
Maximum value of SAR = 0.00027 mW/g

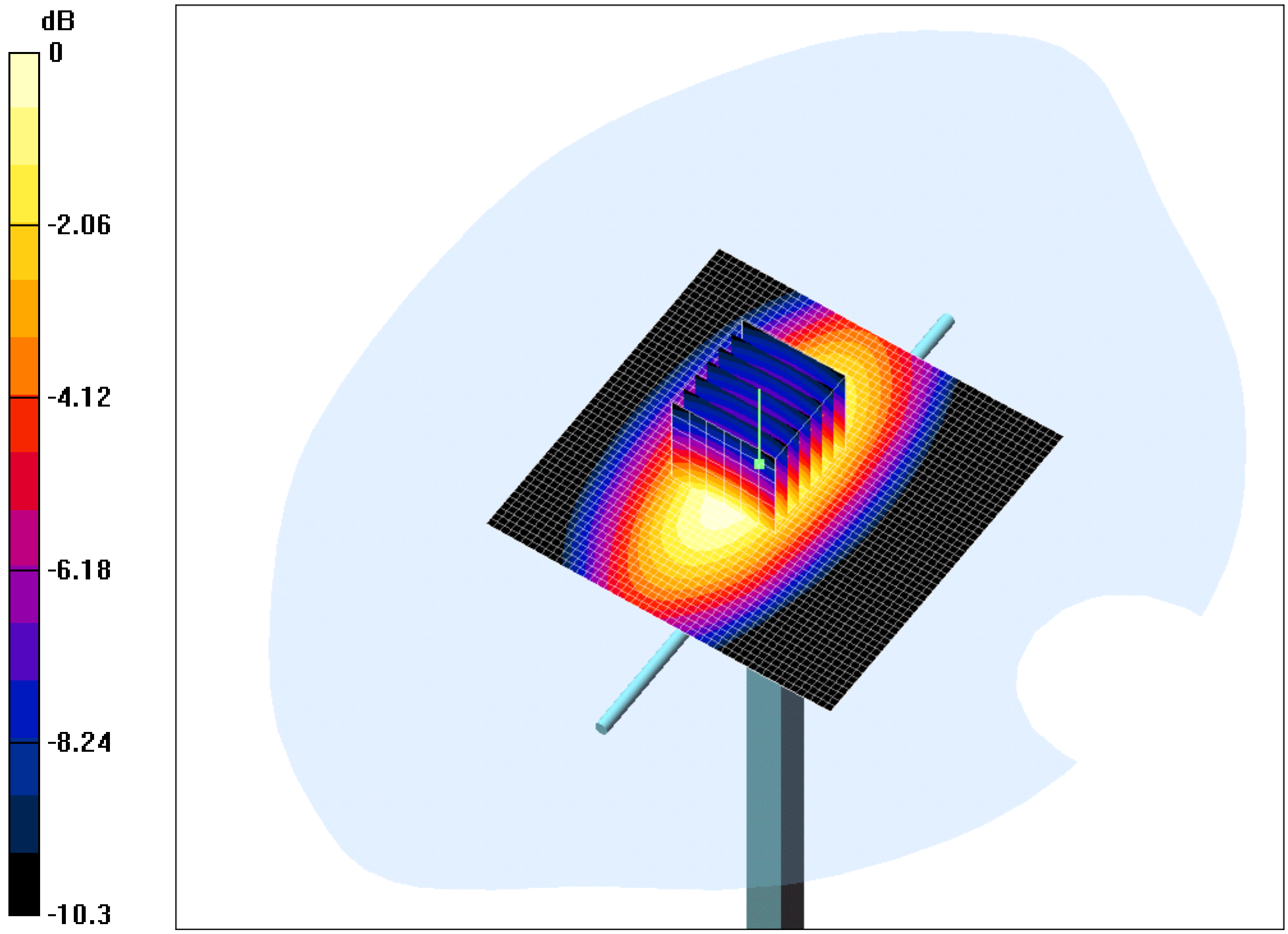
Date: 12/03/04

VALIDATION_001

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

System Performance Check-D850 12 03 04

DUT: Dipole 900 MHz; Type: D900V2; Serial: SN124



0 dB = 2.85mW/g

Communication System: CW; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: 835MHz MSL Medium parameters used (interpolated): f = 900 MHz; σ = 0.99 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1528; ConvF(6.2, 6.2, 6.2); Calibrated: 29/07/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)

Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 19/05/2003

- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.2 Build 12; Postprocessing SW: SEMCAD, V1.8 Build 93

d=10mm, Pin=250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Reference Value = 54.1 V/m
Power Drift = 0.1 dB
Maximum value of SAR = 2.92 mW/g

d=10mm, Pin=250mW/Zoom Scan 7x7x7 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 3.69 W/kg
SAR(1 g) = 2.62 mW/g; SAR(10 g) = 1.73 mW/g
Reference Value = 54.1 V/m
Power Drift = 0.1 dB
Maximum value of SAR = 2.85 mW/g

Appendix 3. Test Configuration Photograph

This appendix contains the following photograph(s):

Photograph Reference Number	Title
PHT/SAR_Configuration	Test configuration for the measurement of Specific Absorption Rate (SAR)

PHT/SAR_Configuration

Appendix 4. Calibration Data

This appendix contains the calibration data and certificates.

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A1185.

CHECKED 06/08/03

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

Client RFI

CALIBRATION CERTIFICATE

Object(s)	ET3DV6 - SN:1528
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	July 29, 2003
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
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (Agilent, No. 20020918)	Sep-03
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03
Fluke Process Calibrator Type 702	SN: 6295803	3-Sep-01 (ELCAL, No.2360)	Sep-03

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: July 29, 2003

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

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

Probe ET3DV6

SN:1528

Manufactured:	March 21, 2000
Last calibration:	February 6, 2003
Recalibrated:	July 29, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1528

Sensitivity in Free Space

NormX	**1.51**	$\mu V/(V/m)^2$
NormY	**1.28**	$\mu V/(V/m)^2$
NormZ	**1.34**	$\mu V/(V/m)^2$

Diode Compression

DCP X	**99**	mV
DCP Y	**99**	mV
DCP Z	**99**	mV

Sensitivity in Tissue Simulating Liquid

Head 900 MHz ε_r = 41.5 ± 5% σ = 0.97 ± 5% mho/m

Valid for f=855-945 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**6.3**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.3**	± 9.5% (k=2)	Alpha	**0.41**
ConvF Z	**6.3**	± 9.5% (k=2)	Depth	**2.46**

Head 1800 MHz ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

Valid for f=1710-1890 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**5.0**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.0**	± 9.5% (k=2)	Alpha	**0.51**
ConvF Z	**5.0**	± 9.5% (k=2)	Depth	**2.62**

Boundary Effect

Head 900 MHz Typical SAR gradient: 5 % per mm

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	10.2	6.0
SAR_{be} [%]	With Correction Algorithm	0.3	0.3

Head 1800 MHz Typical SAR gradient: 10 % per mm

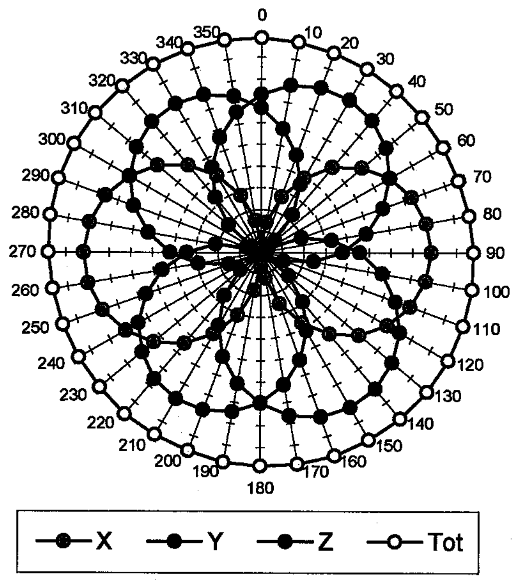
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	13.9	9.2
SAR_{be} [%]	With Correction Algorithm	0.2	0.0

Sensor Offset

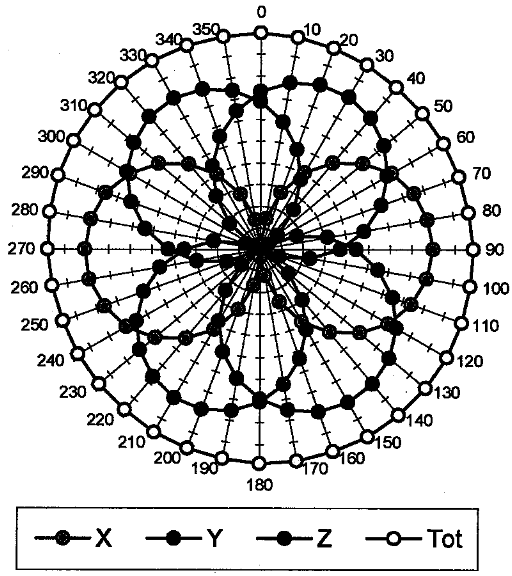
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.6 ± 0.2**	mm

Receiving Pattern (ϕ , $\theta = 0°$)

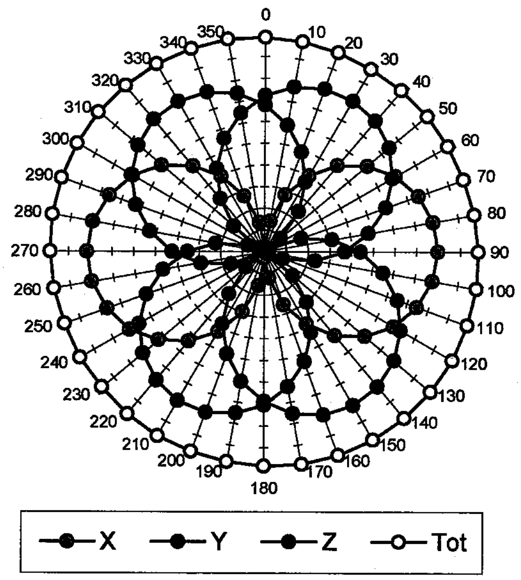
f = 30 MHz, TEM cell ifi110



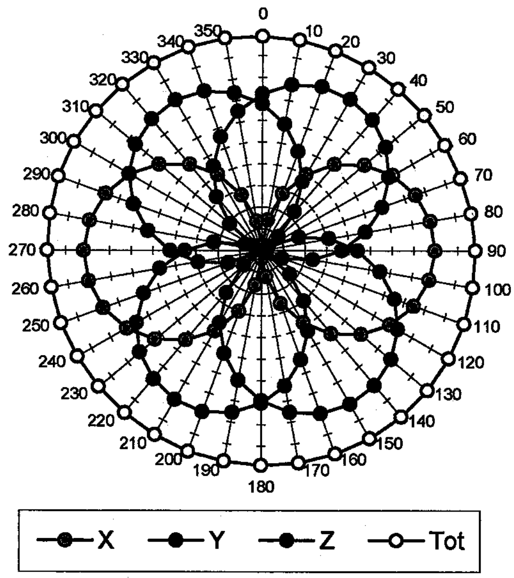
f = 100 MHz, TEM cell ifi110

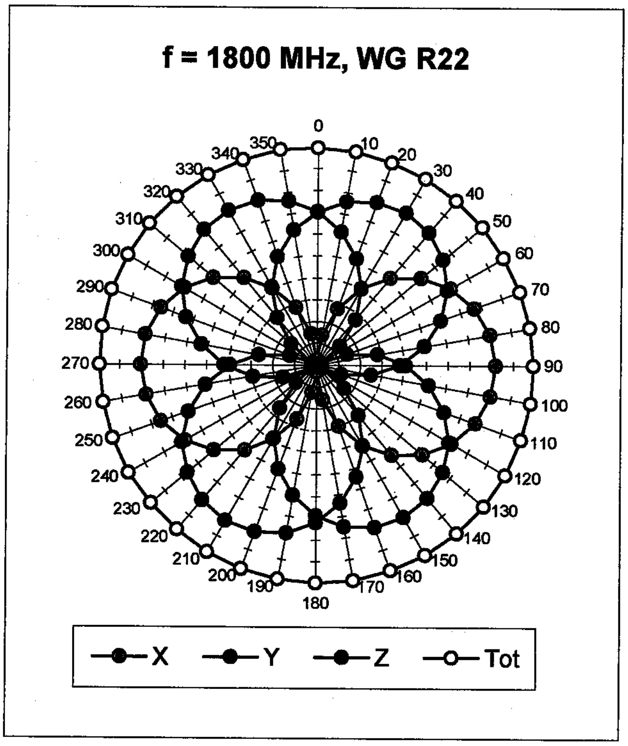


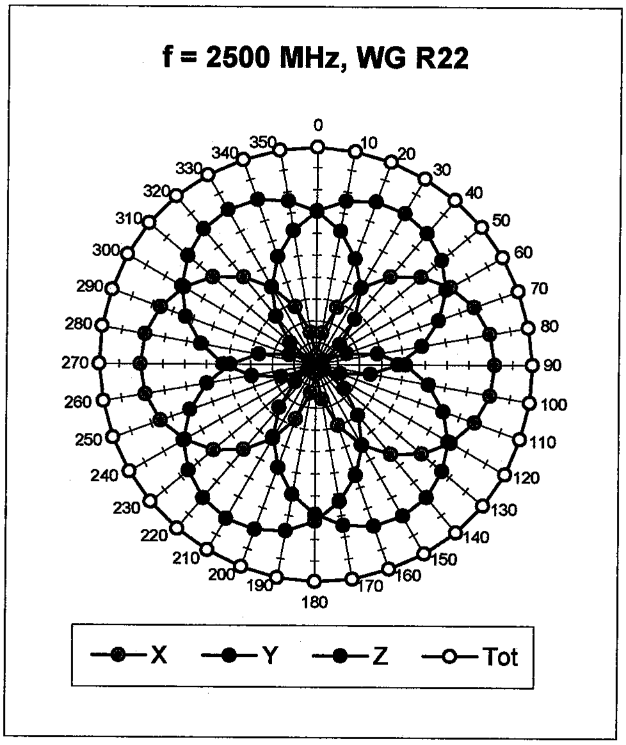
f = 300 MHz, TEM cell ifi110



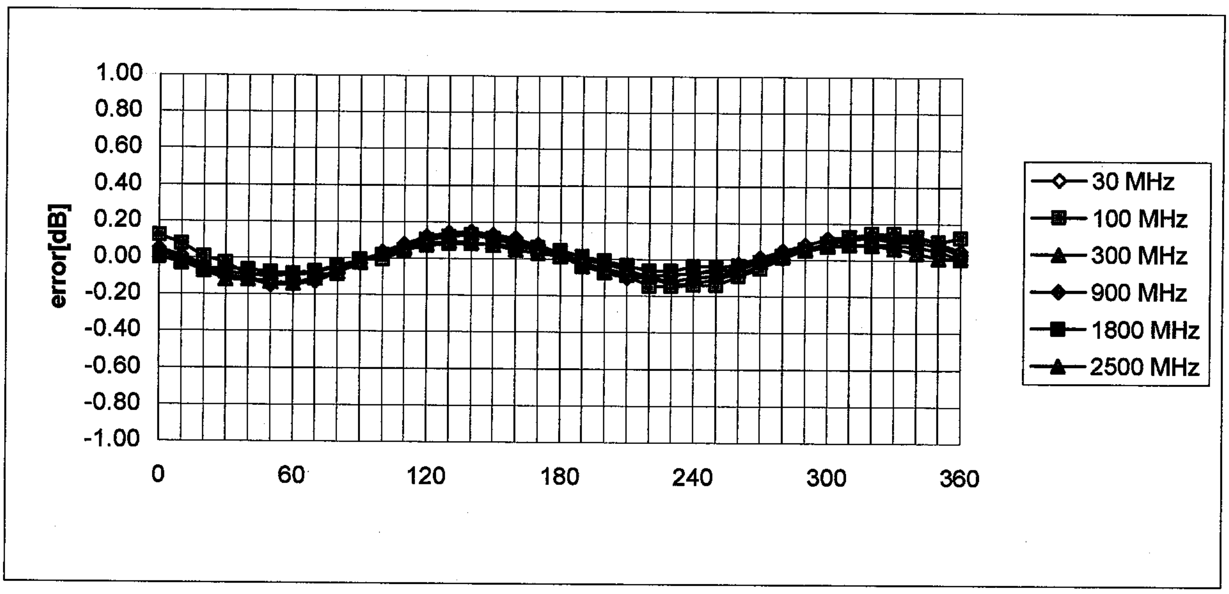
f = 900 MHz, TEM cell ifi110





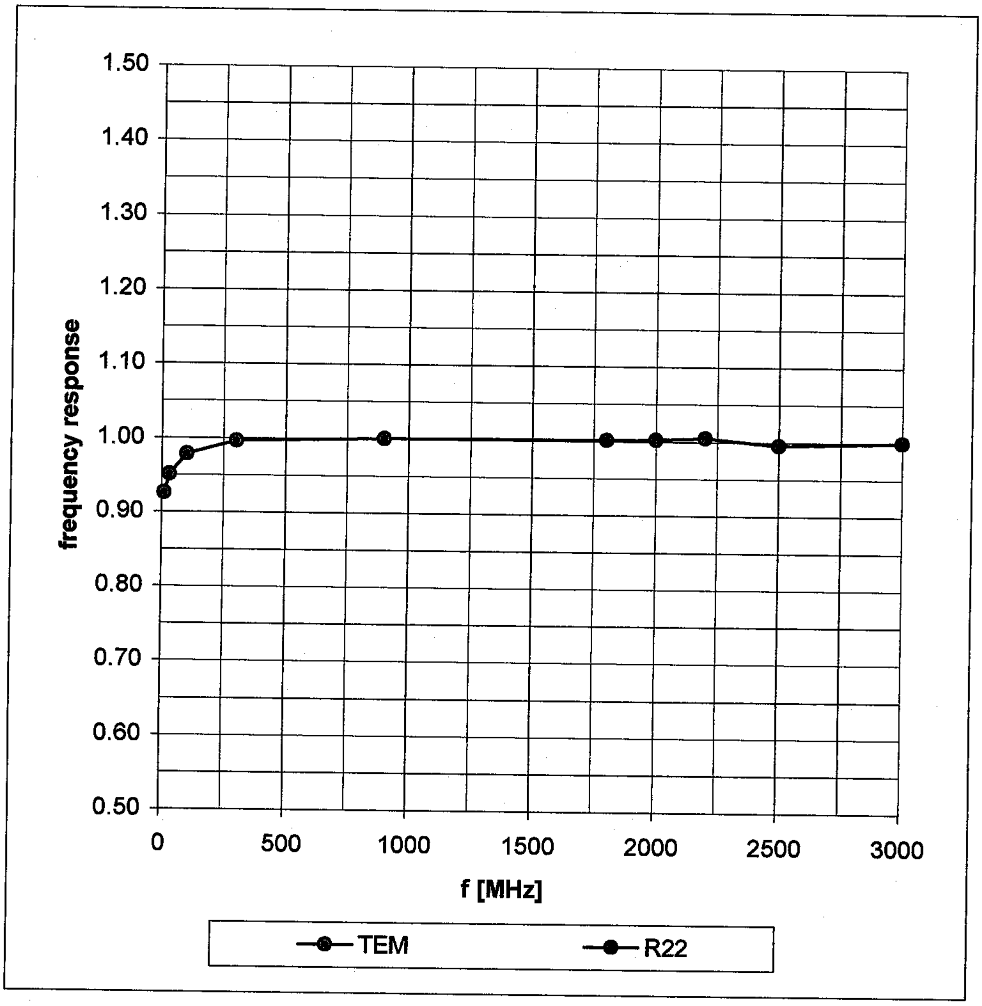


Isotropy Error (ϕ), θ = 0°



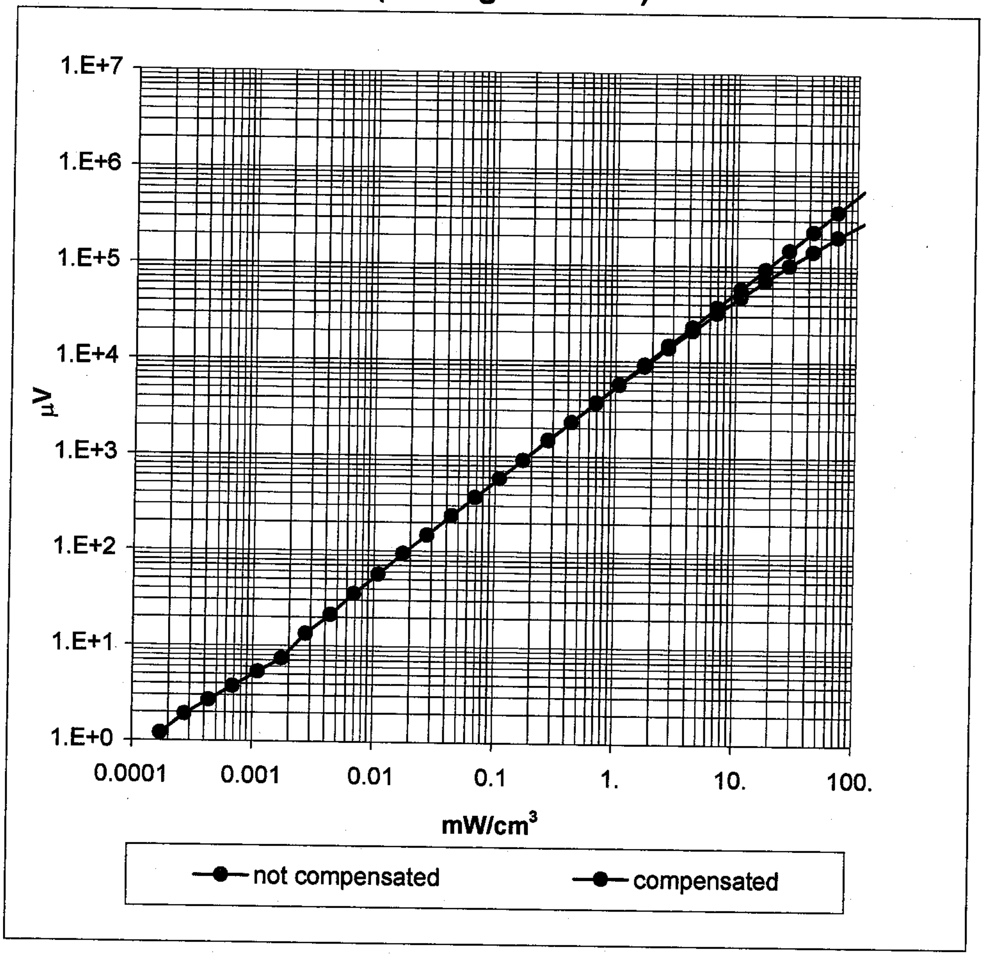
Frequency Response of E-Field

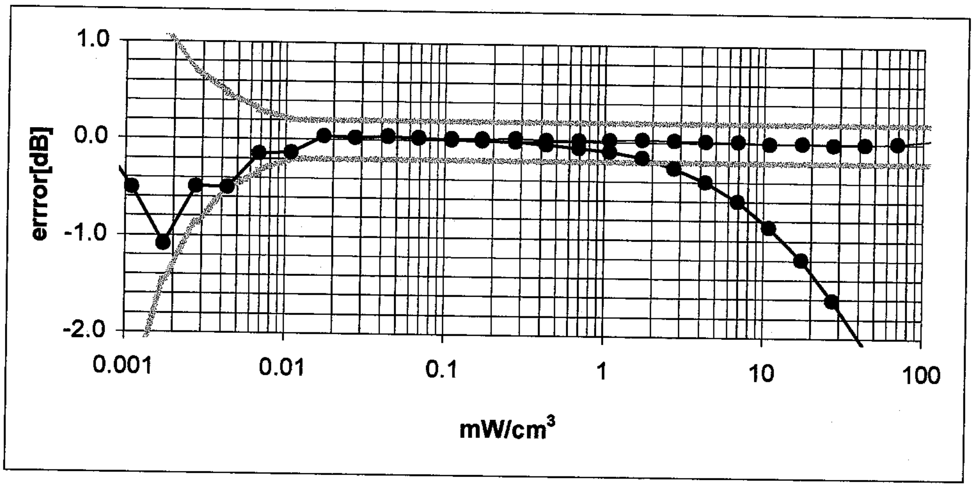
(TEM-Cell:ifi110, Waveguide R22)



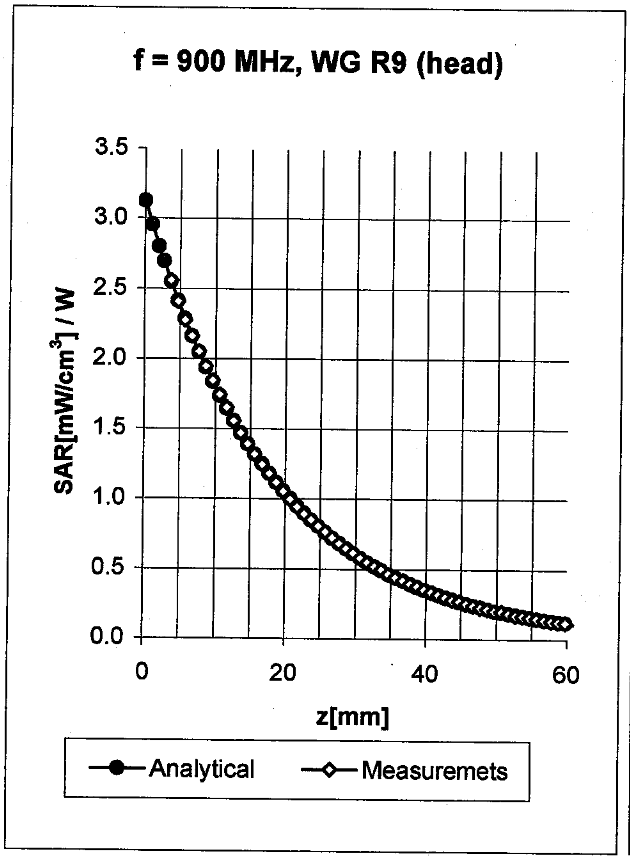
Dynamic Range f(SAR_{brain})

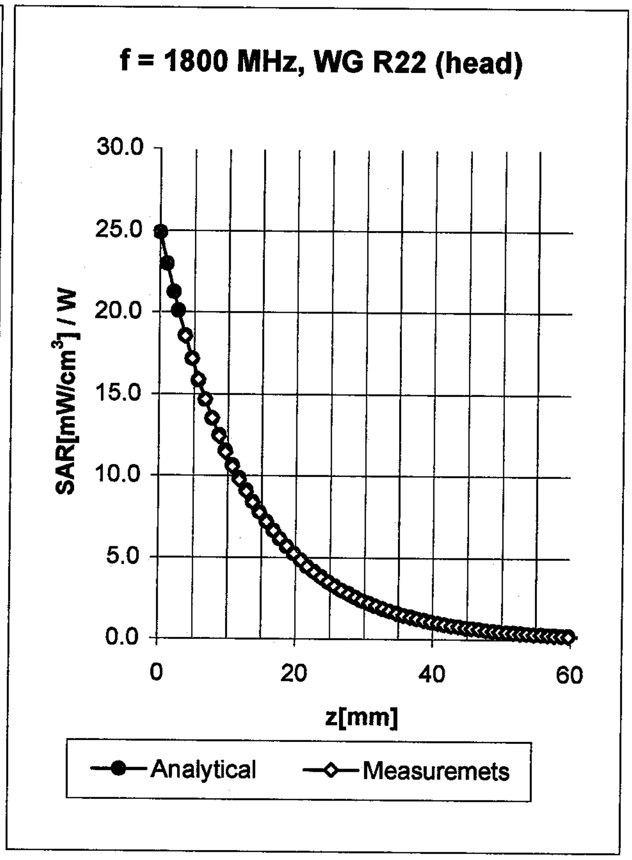
(Waveguide R22)





Conversion Factor Assessment





Head **900 MHz** $\varepsilon_r = 41.5 \pm 5\%$ $\sigma = 0.97 \pm 5\%$ **mho/m**

Valid for f=855-945 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

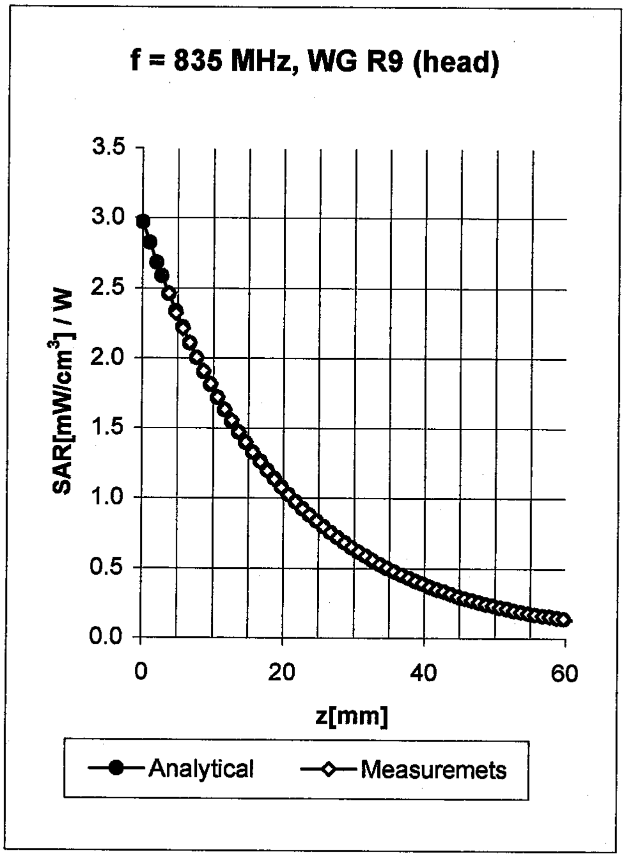
ConvF X	**6.3**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.3**	± 9.5% (k=2)	Alpha	**0.41**
ConvF Z	**6.3**	± 9.5% (k=2)	Depth	**2.46**

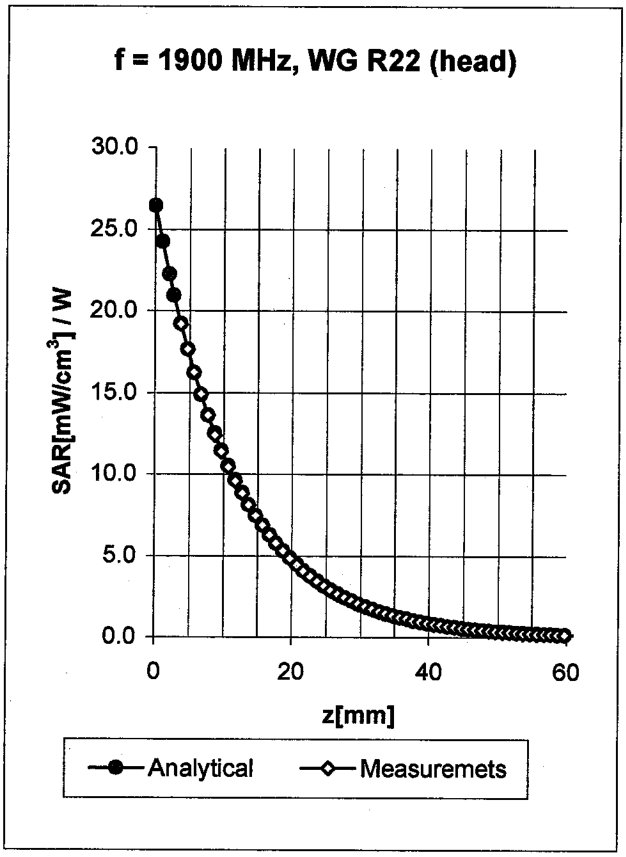
Head **1800 MHz** $\varepsilon_r = 40.0 \pm 5\%$ $\sigma = 1.40 \pm 5\%$ **mho/m**

Valid for f=1710-1890 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**5.0**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.0**	± 9.5% (k=2)	Alpha	**0.51**
ConvF Z	**5.0**	± 9.5% (k=2)	Depth	**2.62**

Conversion Factor Assessment





Head **835 MHz** ε_r **= 41.5 ± 5%** σ **= 0.90 ± 5% mho/m**

Valid for f=793-877 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

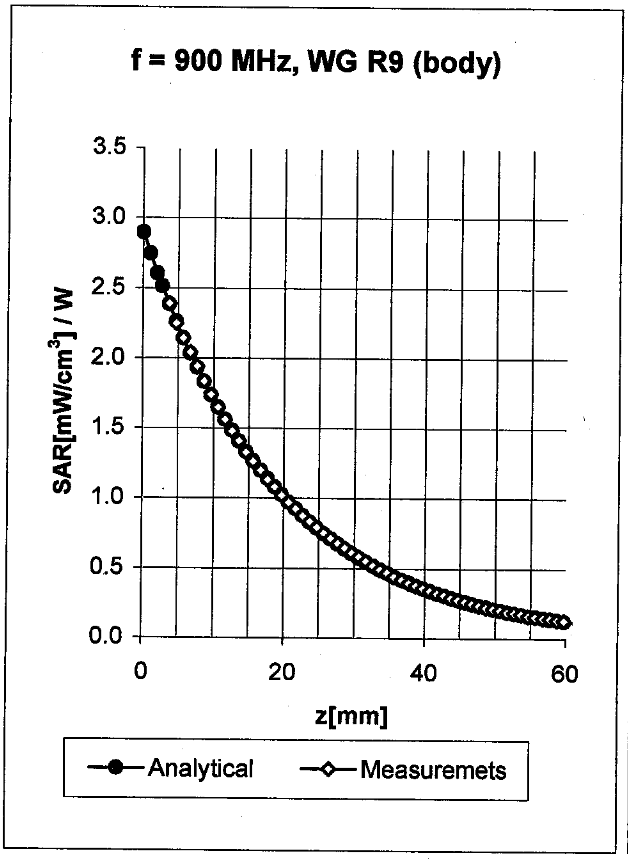
ConvF X	**6.4**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.4**	± 9.5% (k=2)	Alpha	**0.46**
ConvF Z	**6.4**	± 9.5% (k=2)	Depth	**2.20**

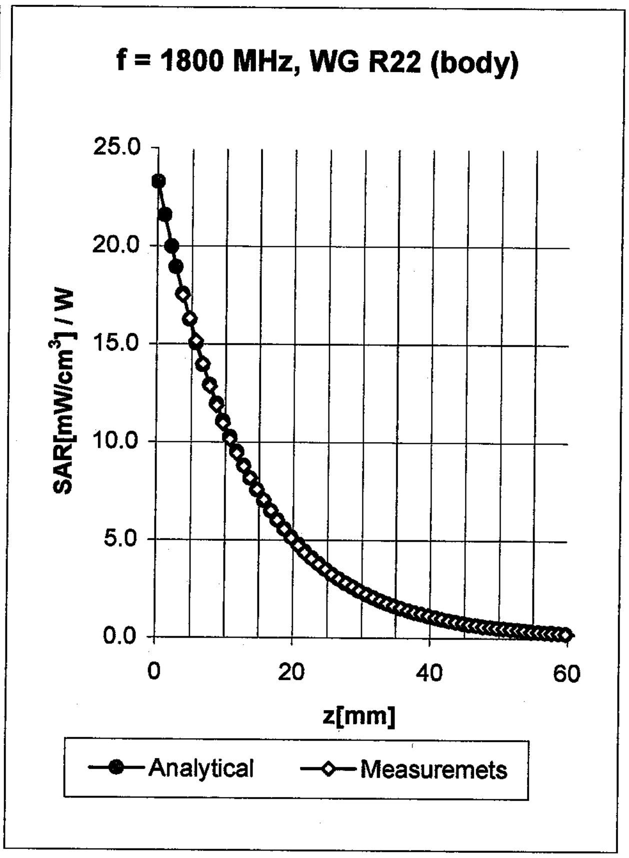
Head **1900 MHz** ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

Valid for f=1805-1995 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**4.8**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.8**	± 9.5% (k=2)	Alpha	**0.54**
ConvF Z	**4.8**	± 9.5% (k=2)	Depth	**2.58**

Conversion Factor Assessment





Body **900 MHz** ε_r **= 55.0 ± 5%** σ **= 1.05 ± 5% mho/m**

Valid for f=855-945 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

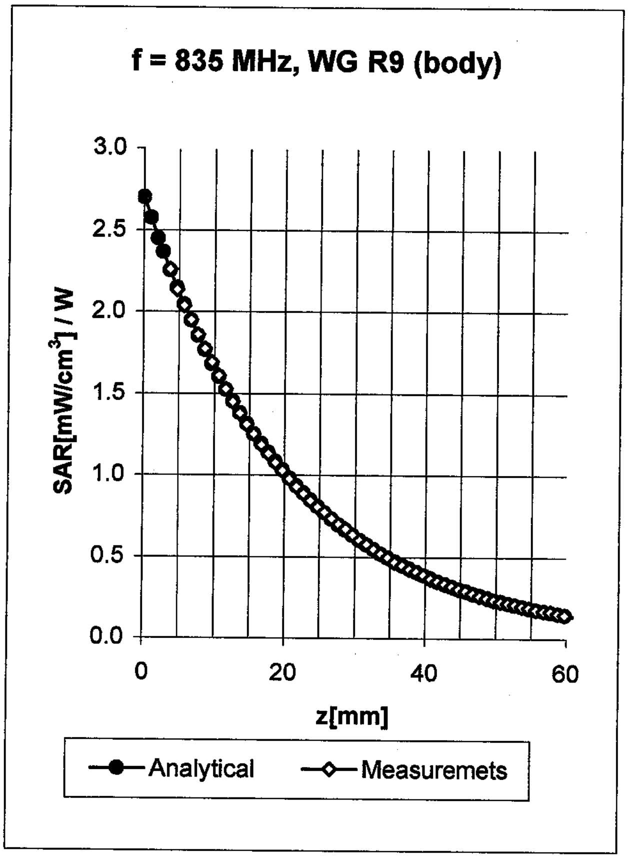
ConvF X	**6.2**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.2**	± 9.5% (k=2)	Alpha	**0.56**
ConvF Z	**6.2**	± 9.5% (k=2)	Depth	**2.08**

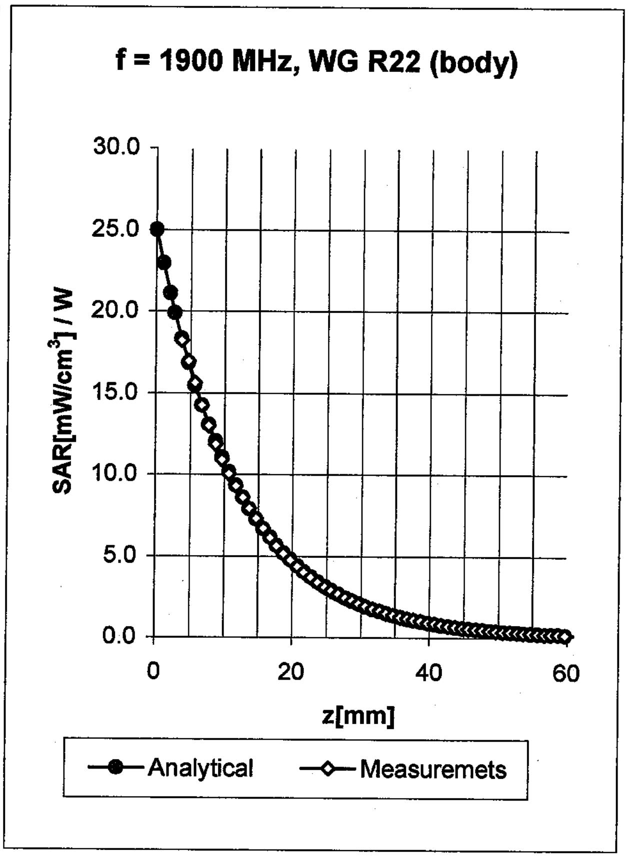
Body **1800 MHz** ε_r **= 53.3 ± 5%** σ **= 1.52 ± 5% mho/m**

Valid for f=1710-1890 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.7**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.7**	± 9.5% (k=2)	Alpha	**0.62**
ConvF Z	**4.7**	± 9.5% (k=2)	Depth	**2.59**

Conversion Factor Assessment





Body	**835 MHz**	**ε_r = 55.2 ± 5%**	**σ = 0.97 ± 5% mho/m**

Valid for f=793-877 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

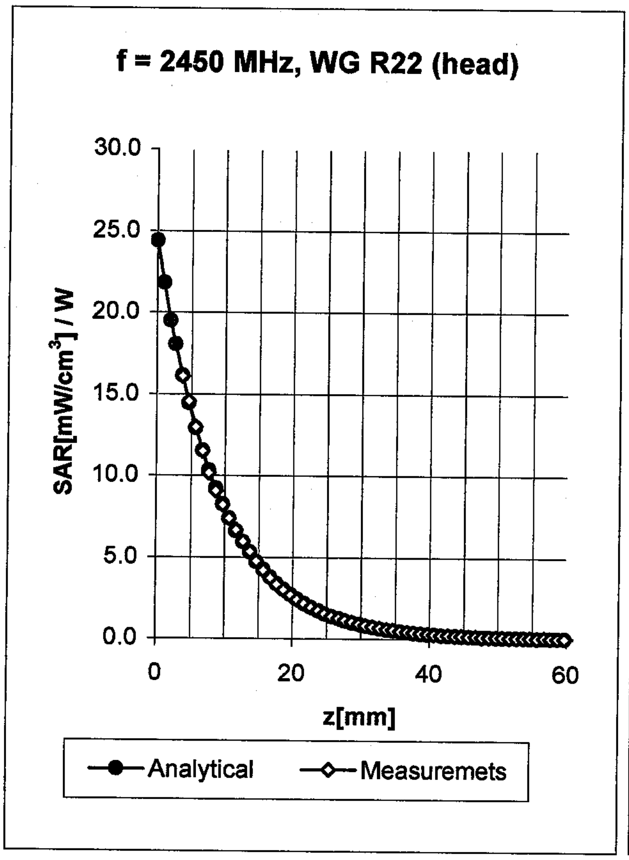
ConvF X	**6.3**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.3**	± 9.5% (k=2)	Alpha	**0.44**
ConvF Z	**6.3**	± 9.5% (k=2)	Depth	**2.40**

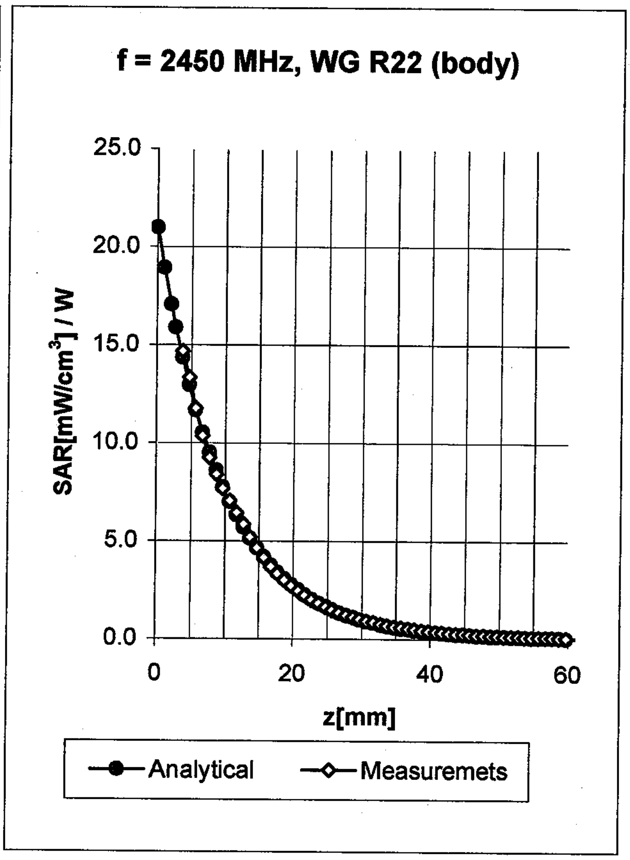
Body	**1900 MHz**	**ε_r = 53.3 ± 5%**	**σ = 1.52 ± 5% mho/m**

Valid for f=1805-1995 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.6**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.6**	± 9.5% (k=2)	Alpha	**0.65**
ConvF Z	**4.6**	± 9.5% (k=2)	Depth	**2.48**

Conversion Factor Assessment





Head **2450** **MHz** **ε_r = 39.2 ± 5%** **σ = 1.80 ± 5% mho/m**

Valid for f=2328-2573 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**4.6**	± 8.9% (k=2)	Boundary effect:	
ConvF Y	**4.6**	± 8.9% (k=2)	Alpha	**1.04**
ConvF Z	**4.6**	± 8.9% (k=2)	Depth	**1.85**

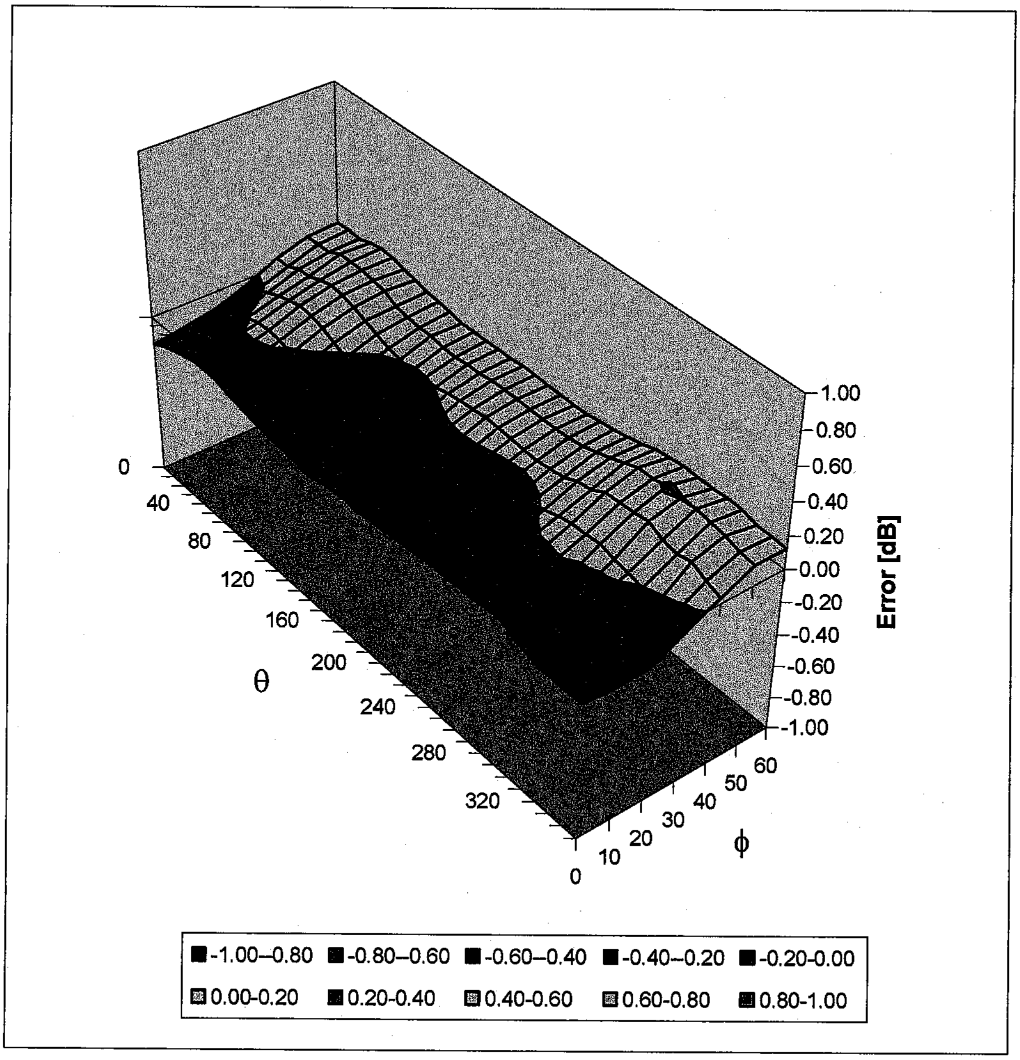
Body **2450** **MHz** **ε_r = 52.7 ± 5%** **σ = 1.95 ± 5% mho/m**

Valid for f=2328-2573 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.3**	± 8.9% (k=2)	Boundary effect:	
ConvF Y	**4.3**	± 8.9% (k=2)	Alpha	**1.10**
ConvF Z	**4.3**	± 8.9% (k=2)	Depth	**1.75**

Deviation from Isotropy in HSL

Error (θϕ), f = 900 MHz



A1235.

Fatto D'Adamo
Curcuso
23/05/03

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

Client RFI

CALIBRATION CERTIFICATE

Object(s)	D900V2 - SN 124
Calibration procedure(s)	QA CAL-05.v2 Calibration procedure for dipole validation kits
Calibration date:	May 13, 2003
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
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Network Analyzer HP 8753E	US38432426	3-May-00 (Agilent, No. 8702K064602)	In house check: May 03

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

Date issued: May 13, 2003

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: D900V2

Serial: 124

Manufactured: July 4, 2001
Calibrated: May 13, 2003

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with head simulating solution of the following electrical parameters at 900 MHz:

Relative Dielectricity	**42.1**	± 5%
Conductivity	**0.95 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.6 at 900 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 flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole center to the solution surface. The included distance holder 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 ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	**10.6 mW/g** ± 16.8 % (k=2)[1]
averaged over 10 cm^3 (10 g) of tissue:	**6.76 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:	**1.381 ns**	(one direction)
Transmission factor:	**0.989**	(voltage transmission, one direction)

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

Feedpoint impedance at 900 MHz:	Re{Z} = **50.3 Ω**
	Im {Z} = **-6.4 Ω**
Return Loss at 900 MHz	**-24.0 dB**

4. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with body simulating solution of the following electrical parameters at 900 MHz:

Relative Dielectricity	**53.5**	± 5%
Conductivity	**1.03 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.3 at 900 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 flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole center to the solution surface. The included distance holder 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.

5. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 4. 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 ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	**11.0 mW/g** ± 16.8 % (k=2)[2]
averaged over 10 cm^3 (10 g) of tissue:	**7.12 mW/g** ± 16.2 % (k=2)[2]

6. Dipole Impedance and Return Loss

The dipole was positioned at the flat phantom sections according to section 4 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 900 MHz:	Re{Z} = **46.2 Ω**
	Im {Z} = **-8.2 Ω**
Return Loss at 900 MHz	**-20.6 dB**

7. 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.

8. 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.

9. Power Test

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

[2] validation uncertainty

Date/Time: 05/09/03 15:50:49

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN0124_SN1507_HSL900_090503da4.da4

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN124
Program: Dipole Calibration

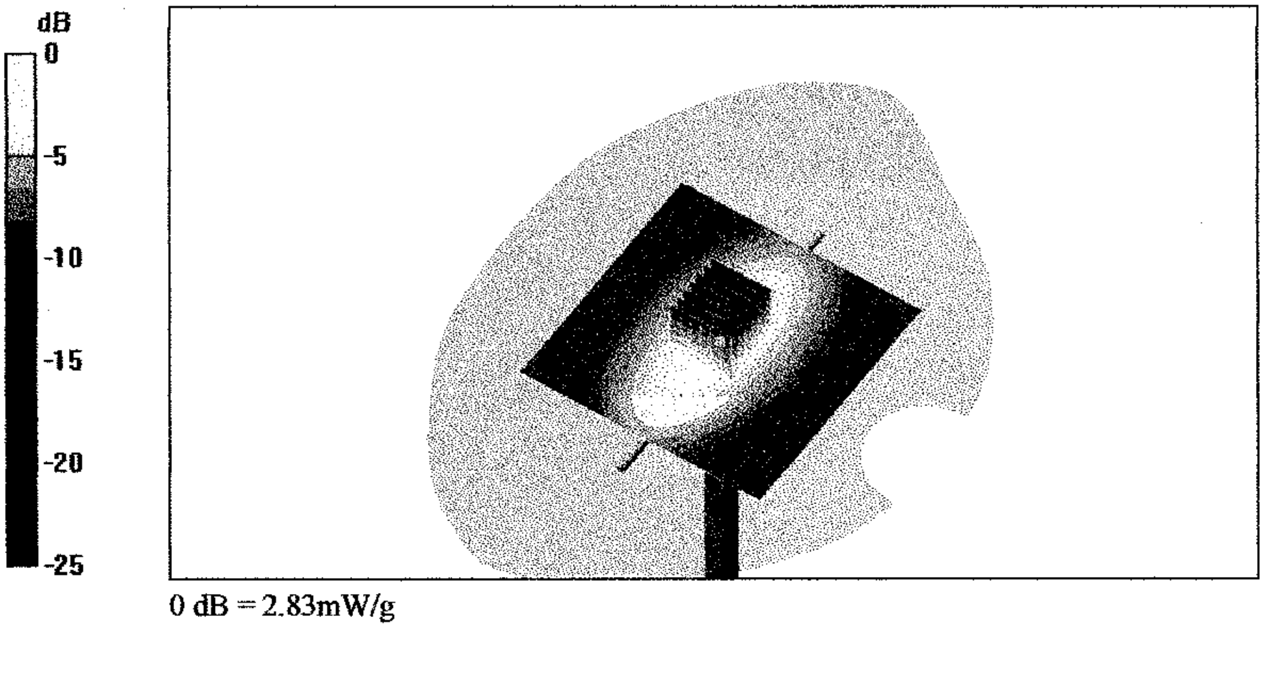
Communication System: CW-900; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: HSL 900 MHz (σ = 0.95 mho/m, ε_r = 42.07, ρ = 1000 kg/m^3)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

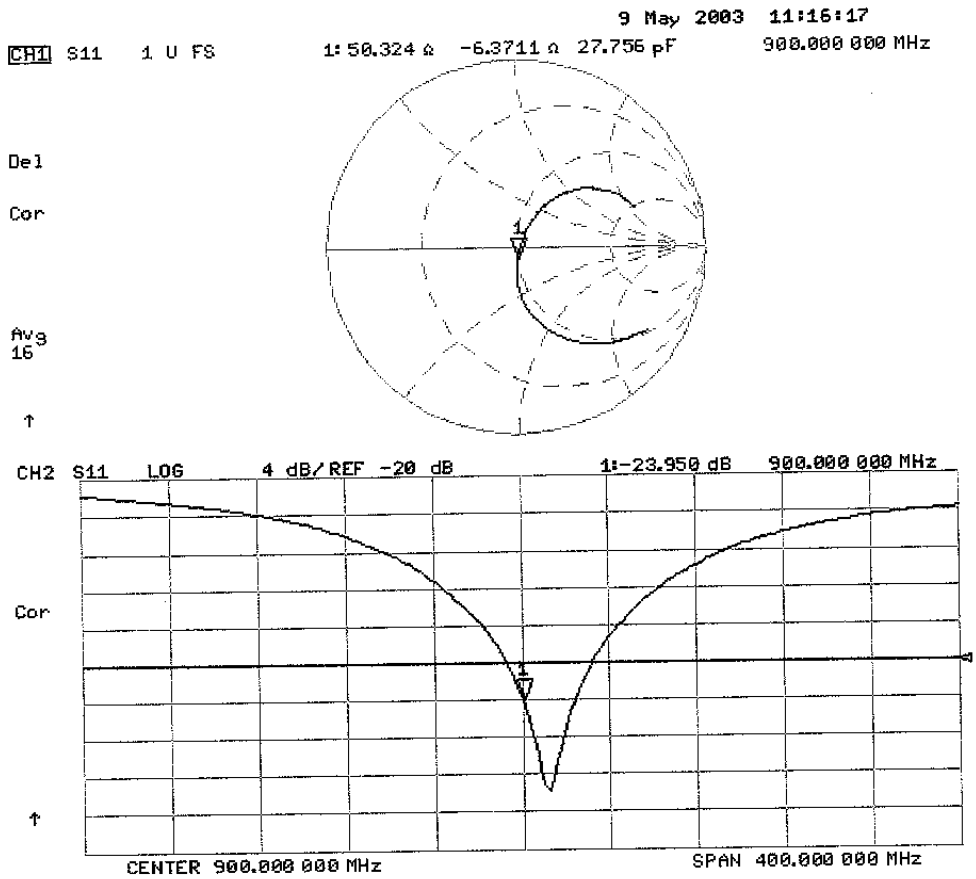
- Probe: ET3DV6 - SN1507; ConvF(6.6, 6.6, 6.6); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- *Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115*

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 57.1 V/m
Power Drift = 0.02 dB
Maximum value of SAR = 2.82 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 3.88 W/kg
SAR(1 g) = 2.64 mW/g; SAR(10 g) = 1.69 mW/g
Reference Value = 57.1 V/m
Power Drift = 0.02 dB
Maximum value of SAR = 2.83 mW/g



0 dB = 2.83mW/g


9 May 2003 11:16:17
CH1 S11 1 U FS
1: 50.324 Ω -6.3711 Ω 27.756 pF
900.000 000 MHz
Del
Cor
Avg
16
CH2 S11 LOG 4 dB/ REF -20 dB
1:-23.950 dB 900.000 000 MHz
Cor
CENTER 900.000 000 MHz
SPAN 400.000 000 MHz

Date/Time: 05/13/03 11:27:28

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN124_SN1507_M900_130503.da4

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN124
Program: Dipole Calibration

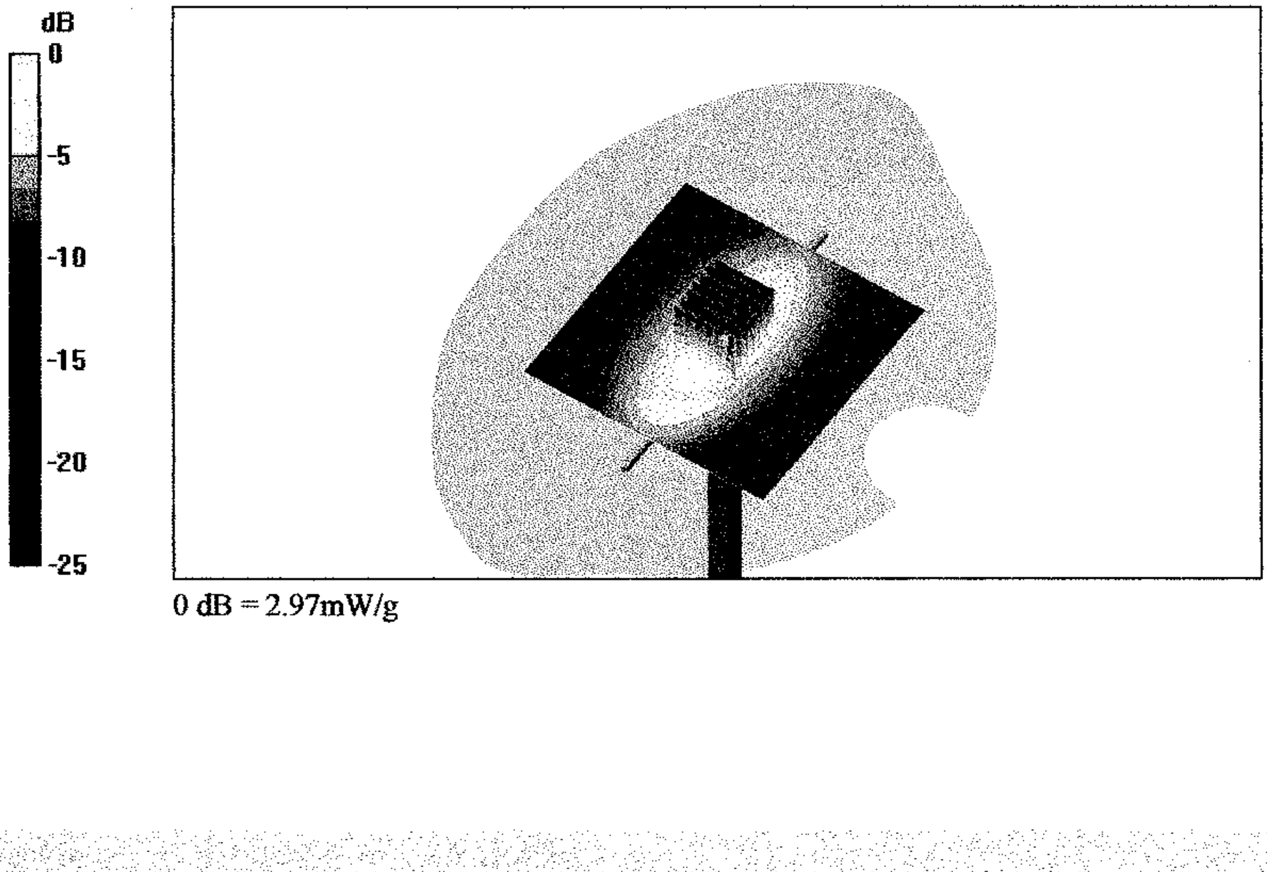
Communication System: CW-900; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz (σ = 1.03 mho/m, ε_r = 53.48, ρ = 1000 kg/m^3)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.3, 6.3, 6.3); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: *DASY4*, V4.1 *Build* 47; Postprocessing SW: *SEMCAD*, V1.6 *Build* 115

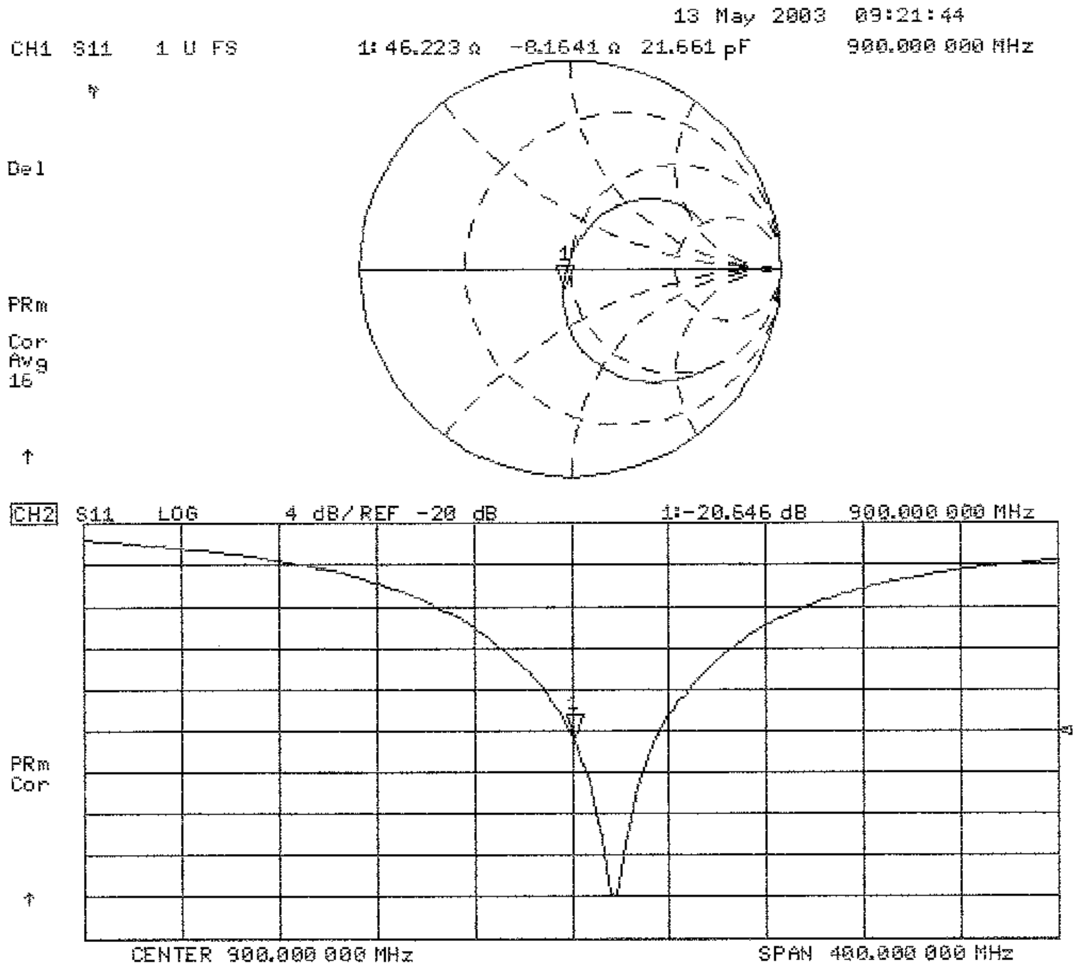
Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 56 V/m
Power Drift = 0.007 dB
Maximum value of SAR = 2.94 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 3.97 W/kg
SAR(1 g) = 2.75 mW/g; SAR(10 g) = 1.78 mW/g
Reference Value = 56 V/m
Power Drift = 0.007 dB
Maximum value of SAR = 2.97 mW/g



0 dB = 2.97mW/g

124
Body


13 May 2003 09:21:44
CH1 S11 1 U FS 1: 46.223 Ω -8.1641 Ω 21.661 pF 900.000 000 MHz
Del
PRm
Cor
Avg
16
CH2 S11 LOG 4 dB/ REF -20 dB 1:-20.646 dB 900.000 000 MHz
PRm
Cor
CENTER 900.000 000 MHz SPAN 400.000 000 MHz

Appendix 5. Photographs of EUT

This appendix contains the following photographs:

Photo Reference Number	Title
PHT/46050JD01/001	Close up view
PHT/46050JD01/002	EUT front facing phantom
PHT/46050JD01/003	EUT rear facing phantom
PHT/46050JD01/004	835MHz MSL Fluid level
PHT/46050JD01/005	Front of EUT
PHT/46050JD01/006	General view of set up
PHT/46050JD01/007	Rear of EUT

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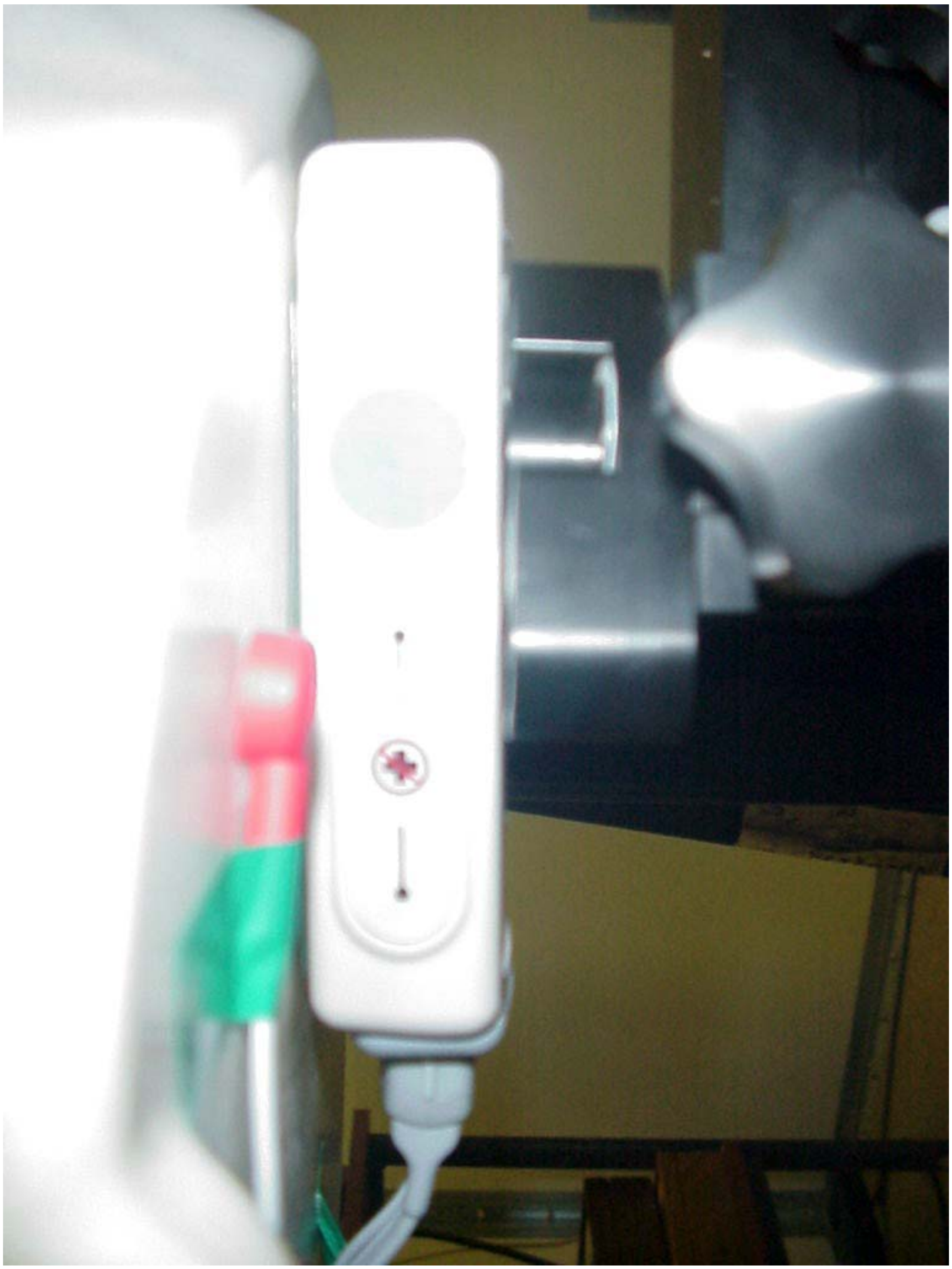
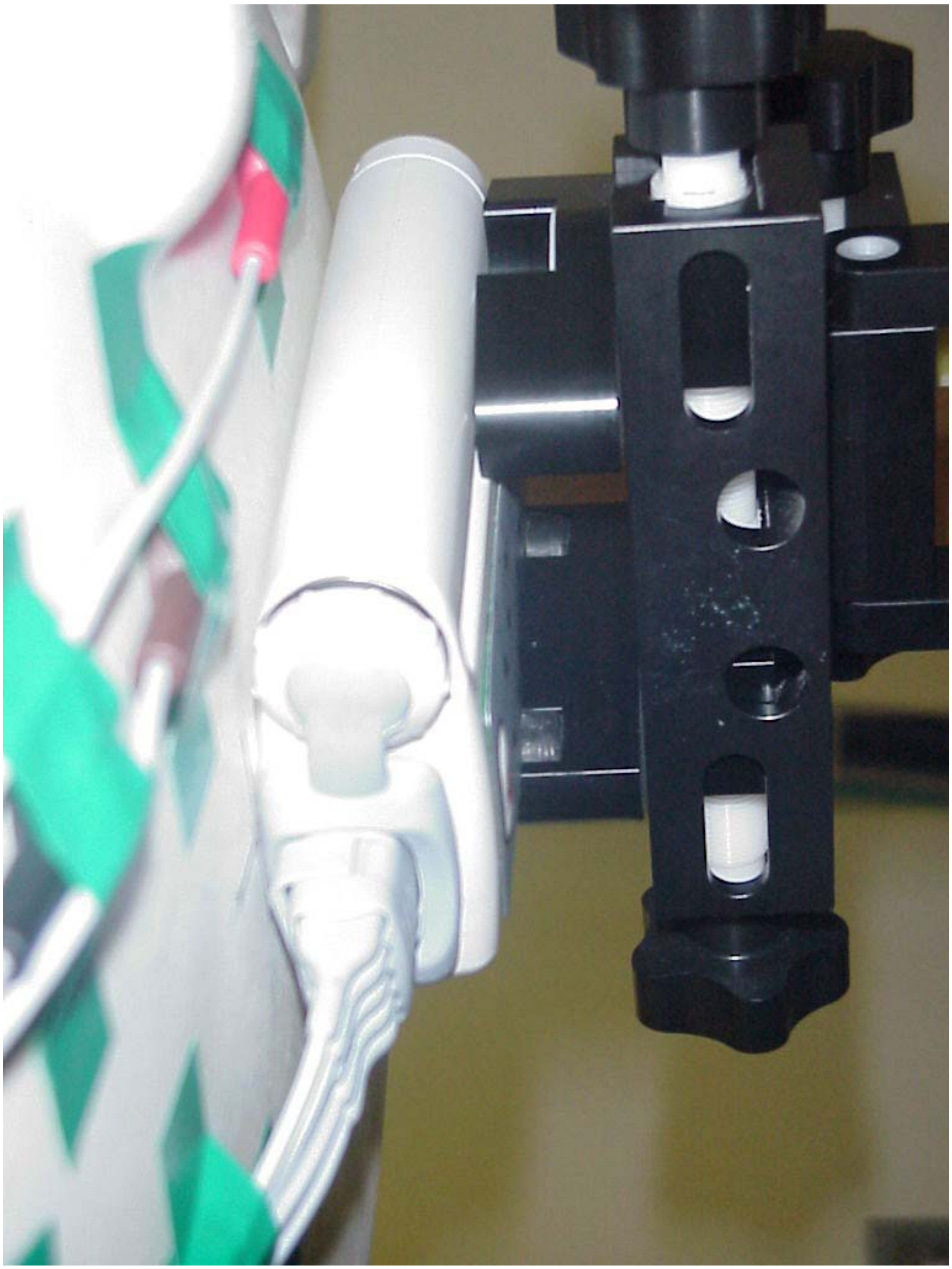
PHT/46050JD01/001 Close up view

PHT/46050JD01/002 EUT front facing phantom



PHT/46050JD01/003 EUT rear facing phantom



<u>PHT/46050JD01/004 Fluid level</u>

PHT/46050JD01/005 Front of EUT

PHT/46050JD01/006 General view of set up

PHT/46050JD01/007 Rear of EUT

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