

# TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: XT3318

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

**Test Report Serial No:**  
RFI/SAR1/RP75527JD14A

<b>This Test Report Is Issued Under The Authority Of Scott D'Adamo, Group Service Manager Global Approvals:</b>	
<b>Checked By:</b> Scott D'Adamo  	<b>Report Copy No:</b> PDF01
<b>Issue Date:</b> 24 November 2009	<b>Test Dates:</b> 12 September 2009 to 12 October 2009

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## 1. Customer Information

<b>Company Name:</b>	Pro Tech Monitoring Inc.
<b>Address:</b>	2549 Success Dr Odessa, FL 33556, USA

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## **2. Equipment Under Test (EUT)**

### **2.1. Identification of Equipment Under Test (EUT)**

<b>Description:</b>	Tracking Device
<b>Brand Name:</b>	X - Tech
<b>Model Name or Number:</b>	XT3318
<b>Serial Number:</b>	36984440
<b>IMEI Number:</b>	01 1526000261272
<b>Hardware Version Number:</b>	A00.00
<b>Software Version Number:</b>	5.0.0.14
<b>Hardware Revision of GSM Module:</b>	Not Applicable
<b>Software Revision of GSM Module:</b>	Not Applicable
<b>FCC ID Number:</b>	NC3FTD3318
<b>Country of Manufacture:</b>	None Stated
<b>Date of Receipt:</b>	12 September 2009

### **2.2. Description of EUT**

The equipment under test is a tracking device operating at GSM/GPRS 850/1900 and ISM318 band.

### **2.3. Modifications Incorporated in the EUT**

There were no modifications incorporated in the EUT.

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**2.4. Accessories**

The following accessories were supplied with the EUT during testing:

<b>Description:</b>	AC Charger
<b>Brand Name:</b>	Elmo Tech
<b>Model Name or Number:</b>	SE120100
<b>Serial Number:</b>	None Stated
<b>Cable Length and Type:</b>	~2.0m
<b>Country of Manufacture:</b>	None Stated
<b>Connected to Port</b>	Unique to manufacturer

**2.5. Support Equipment**

The following support equipment was used to exercise the EUT during testing:

<b>Description:</b>	Communication Test Set
<b>Brand Name:</b>	Will'tek
<b>Model Name or Number:</b>	4202S
<b>Serial Number:</b>	513018
<b>Cable Length and Type:</b>	1.5m Utiflex Cable
<b>Connected to Port:</b>	RF (Input/Output) Air Link

<b>Description:</b>	Infra Red Wireless Interface
<b>Brand Name:</b>	ACTiSYS
<b>Model Name or Number:</b>	ACT-IR220LN57
<b>Serial Number:</b>	LN001162
<b>Cable Length and Type:</b>	1.2m / Multicore
<b>Connected to Port:</b>	Wireless (Infra Red)

<b>Description:</b>	Wireless Communication Test Set
<b>Brand Name:</b>	Agilent
<b>Model Name or Number:</b>	8960 Series 10
<b>Serial Number:</b>	GB46311280
<b>Cable Length and Type:</b>	1.5m Utiflex Cable
<b>Connected to Port:</b>	RF (Input/Output) Air Link

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**2.6. Additional Information Related to Testing**

<b>Equipment Category</b>	GSM850 / PCS1900 / GPRS850/1900 / ISM318		
<b>Type of Unit</b>	Portable Transceiver		
<b>Intended Operating Environment:</b>	Within GSM and ISM Coverage		
<b>Transmitter Maximum Output Power Characteristics:</b>	GSM/ GPRS850	Communication Test Set was configured to allow the EUT to transmit at a maximum power of 33 dBm	
	PCS/ GPRS1900	Communication Test Set was configured to allow the EUT to transmit at a maximum power of 30 dBm	
	ISM	1.2 dBm	
<b>Transmitter Frequency Range:</b>	GSM/ GPRS850	(880 to 915) MHz	
	PCS/ GPRS1900	(1850 to 1910) MHz	
	ISM	318 MHz	
<b>Transmitter Frequency Allocation of EUT When Under Test:</b>	<b>Channel Number</b>	<b>Channel Description</b>	<b>Frequency (MHz)</b>
	128	Low	824.2
	189	Middle	836.4
	251	High	848.8
	512	Low	1850.2
	660	Middle	1879.8
	810	High	1909.8
	318	Fixed Frequency	318.0
<b>Modulation(s):</b>	GMSK: 217 Hz		
<b>Modulation Scheme (Crest Factor):</b>	GMSK(GSM): 8.3 GMSK(GPRS):4		
<b>Antenna Type:</b>	Internal		
<b>Antenna Length:</b>	Unknown		
<b>Number of Antenna Positions:</b>	1 Fixed		
<b>Power Supply Requirement:</b>	3.7V		
<b>Battery Type(s):</b>	Li-ion		

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### **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 met the basic restrictions as defined in OET Bulletin 65 Supplement C: (2001-01) using the SAR averaging method as described in the test specification above.

#### **3.2. Methods and Procedures Reference Documentation**

The methods and procedures used were as detailed in:

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 known 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 of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

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#### **4. Deviations from the Test Specification**

Test was performed as per the head and body-worn procedures in IEEE Std 1528-2003, OET Bulletin 65 Supplement C 01-01 and the specific FCC test procedures.

SAR test was performed in the middle channel only as the measured levels were <50% of the SAR limit as stated in the FCC Public Notice DA 02-1438 by the SCC-34/SC-2.

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## **5. Operation and Configuration of the EUT during Testing**

### **5.1. Operating Modes**

The EUT was tested in the following operating mode(s) unless otherwise stated:

- SAR test was performed in the middle channel only as the measured levels were <50% of the SAR limit as stated in the FCC Public Notice DA 02-1438 by the SCC-34/SC-2.
- GSM850 Call allocated mode with the Communication Test Set configured to allow the EUT to transmit at a maximum power of up to 33 dBm.
- GPRS850 Data allocated mode with the Communication Test Set configured to allow the EUT to transmit at a maximum power of up to 33 dBm.
- PCS1900 call allocated mode with the Communication Test Set configured to allow the EUT to transmit at a maximum power of up to 30 dBm.
- GPRS1900 Data allocated mode with the Communication Test Set configured to allow the EUT to transmit at a maximum power of up to 30 dBm.
- ISM band was not evaluated as the maximum output power was < 60/f(GHz)

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## **5.2. Configuration and Peripherals**

The EUT was tested in the following configuration(s) unless otherwise stated:

- The EUT was tested in the Head and Body-worn configuration. The applied configurations for body-worn orientation where the corresponding edge(s) is closest to the used with the most conservative exposure condition.
- Standalone battery powered

### **Head Configuration**

- a) The handset was placed in a normal operating position with the centre of the ear-piece aligned with the ear canal on the phantom.
- b) With the ear-piece touching the phantom the centre line of the handset was aligned with an imaginary plane (X and Y axis) consisting of three lines connecting both ears and the mouth.
- c) For the cheek position the handset was gradually moved towards the cheek until any point of the mouth-piece or keypad touched the cheek.
- d) For the tilted position the EUT was positioned as for the cheek position, and then the horizontal angle was increased by fifteen degrees (the phone keypad was moved away from the cheek by fifteen degrees).
- 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.
- g) The location of the maximum spatial SAR distribution (hot spot) was determined relative to the handset and its antenna.
- h) The EUT was transmitting at full power throughout the duration of the test powered by a fully charged battery.

### **Body Configuration**

- a) The EUT was placed in a normal operating position where the centre of EUT was aligned with the centre reference point on the flat section of the 'SAM' phantom.
- b) With the EUT touching the phantom at an imaginary centre line. The EUT was aligned with a marked plane (X and Y axis) consisting of two lines.
- c) For the touch-safe position the handset was gradually moved towards the flat section of the 'SAM' phantom until any point of the EUT touched the phantom.
- d) For position(s) greater than 0mm separation the EUT was positioned as per the touch-safe position, and then the vertical height was decreased/adjusted as required.
- 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.
- g) The location of the maximum spatial SAR distribution (hot spot) was determined relative to the handset and its antenna.
- h) The EUT was transmitting at full power throughout the duration of the test powered by a Fully charged battery.

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## 6. Summary of Test Results

Test Name	Specification Reference	Result
Specific Absorption Rate-GSM850 Head Configuration 1g	OET Bulletin 65 Supplement C: 2001	Complied
Specific Absorption Rate-GSM850 Body Configuration 1g	OET Bulletin 65 Supplement C: 2001	Complied
Specific Absorption Rate-GPRS850 Body Configuration 1g	OET Bulletin 65 Supplement C: 2001	Complied
Specific Absorption Rate-PCS1900 Head Configuration 1g	OET Bulletin 65 Supplement C: 2001	Complied
Specific Absorption Rate-PCS1900 Body Configuration 1g	OET Bulletin 65 Supplement C: 2001	Complied
Specific Absorption Rate-GPRS1900 Body Configuration 1g	OET Bulletin 65 Supplement C: 2001	Complied

### SAR Individual Transmitter Evaluation

device, mode	Frequency, (MHz)	P <sub>x</sub> (mW)	P <sub>REF</sub> (mW)	single SAR, W/kg	remarks
WWAN, GSM	850	25.7	71	0.097	Routine Evaluation
WWAN, GSM	1900	22.4	32	0.096	Routine Evaluation
RF, ISM	400	0.05	150	:=0	{P <sub>ISM</sub> ≤ 2P <sub>REF</sub> } {d <sub>GSM, ISM</sub> > 5cm}

### SAR Simultaneous Transmitter Evaluation

(x,y)	D(x,y) cm	L(x,y) cm	SPLSR <sub>xy</sub>	Sim-Tx SAR	remarks
(WWAN <sub>GSM</sub> , ISM)	>5	n/a	n/a	n/a	{no stand-alone SAR for ISM}

#### Note(s):

1. Simultaneous transmission evaluation was not required as the output power for ISM band was < (60/f) and the Sum of all antenna < 1.6 W/kg.
2. Px: power level is the device maximum measured output power, measured by RFI and verify by the customer.
3. Single SAR value was measured by RFI.
4. The "Antenna-to-Antenna distance and Antenna-to-User distance were provided by the customer.

### 6.1. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG United Kingdom

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## **7. Measurements, Examinations and Derived Results**

### **7.1. General Comments**

This section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to section 8 for details of measurement uncertainties.

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**7.2. Test Results****7.2.1. Specific Absorption Rate - GSM850 Head Configuration 1g****Test Summary:**

Tissue Volume:	1g
Maximum Level (W/kg):	0.057

**Environmental Conditions:**

Temperature Variation in Lab (°C):	24.0 to 24.0
Temperature Variation in Liquid (°C):	22.9 to 22.9

**Results:**

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
Touch	Left	189	0.057	1.600	1.543	1	Complied
Tilt	Left	189	0.020	1.600	1.580	1	Complied
Touch	Right	189	0.056	1.600	1.544	1	Complied
Tilt	Right	189	0.021	1.600	1.579	1	Complied

**Note(s):**

1. SAR test was performed in the middle channel only as the measured levels were < 50% of the SAR limit as stated in the FCC Public Notice DA 02-1438 by the SCC-34/SC-2.

\*The manufacturer has confirmed the low levels measured for the ERP/EIRP at 850MHz and 1900MHz were expected for his device due to a 10dB attenuator incorporated on the antenna track. The SAR levels are correspondingly lower at both 850MHz and 1900MHz. See above for measured power values

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**7.2.2. Specific Absorption Rate - GSM850 Body Configuration 1g****Test Summary:**

Tissue Volume:	1g
Maximum Level (W/kg):	0.095

**Environmental Conditions:**

Temperature Variation in Lab (°C):	24.0 to 24.0
Temperature Variation in Liquid (°C):	23.1 to 23.1

**Results:**

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
Front of EUT Facing Phantom	Flat (SAM)	189	0.085	1.600	1.515	1, 2	Complied
Rear of EUT Facing Phantom	Flat (SAM)	189	0.095	1.600	1.505	1, 2	Complied

**Note(s):**

1. SAR measurements were performed with the EUT at a separation distance of 0mm from the 'SAM' phantom flat section
2. SAR test was performed in the middle channel only as the measured levels were < 50% of the SAR limit as stated in the FCC Public Notice DA 02-1438 by the SCC-34/SC-2.

\*The manufacturer has confirmed the low levels measured for the ERP/EIRP at 850MHz and 1900MHz were expected for his device due to a 10dB attenuator incorporated on the antenna track. The SAR levels are correspondingly lower at both 850MHz and 1900MHz. See above for measured power values

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**7.2.3. Specific Absorption Rate - GPRS850 Body Configuration 1g****Test Summary:**

Tissue Volume:	1g
Maximum Level (W/kg):	0.094

**Environmental Conditions:**

Temperature Variation in Lab (°C):	24.0 to 24.0
Temperature Variation in Liquid (°C):	23.4 to 23.4

**Results:**

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
Front of EUT Facing Phantom	Flat (SAM)	189	0.070	1.600	1.530	1, 2	Complied
Rear of EUT Facing Phantom	Flat (SAM)	189	0.094	1.600	1.506	1, 2	Complied

**Note(s):**

1. SAR measurements were performed with the EUT at a separation distance of 0mm from the 'SAM' phantom flat section
2. SAR test was performed in the middle channel only as the measured levels were < 50% of the SAR limit as stated in the FCC Public Notice DA 02-1438 by the SCC-34/SC-2.

\*The manufacturer has confirmed the low levels measured for the ERP/EIRP at 850MHz and 1900MHz were expected for his device due to a 10dB attenuator incorporated on the antenna track. The SAR levels are correspondingly lower at both 850MHz and 1900MHz. See above for measured power values

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**7.2.4. Specific Absorption Rate - PCS1900 Head Configuration 1g****Test Summary:**

Tissue Volume:	1g
Maximum Level (W/kg):	0.009

**Environmental Conditions:**

Temperature Variation in Lab (°C):	24.0 to 24.0
Temperature Variation in Liquid (°C):	23.1 to 23.1

**Results:**

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
Touch	Left	660	0.009	1.600	1.591	1	Complied
Tilt	Left	660	0.005	1.600	1.595	1	Complied
Touch	Right	660	0.007	1.600	1.593	1	Complied
Tilt	Right	660	0.004	1.600	1.596	1	Complied

**Note(s):**

1. SAR test was performed in the middle channel only as the measured levels were < 50% of the SAR limit as stated in the FCC Public Notice DA 02-1438 by the SCC-34/SC-2.

\*The manufacturer has confirmed the low levels measured for the ERP/EIRP at 850MHz and 1900MHz were expected for his device due to a 10dB attenuator incorporated on the antenna track. The SAR levels are correspondingly lower at both 850MHz and 1900MHz. See above for measured power values

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**7.2.5. Specific Absorption Rate - PCS1900 Body Configuration 1g****Test Summary:**

Tissue Volume:	1g
Maximum Level (W/kg):	0.096

**Environmental Conditions:**

Temperature Variation in Lab (°C):	25.0 to 25.0
Temperature Variation in Liquid (°C):	23.4 to 23.4

**Results:**

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
Front of EUT Facing Phantom	Flat (SAM)	660	0.096	1.600	1.504	1, 2	Complied
Rear of EUT Facing Phantom	Flat (SAM)	660	0.039	1.600	1.561	1, 2	Complied

**Note(s):**

1. SAR measurements were performed with the EUT at a separation distance of 0mm from the 'SAM' phantom flat section
2. SAR test was performed in the middle channel only as the measured levels were < 50% of the SAR limit as stated in the FCC Public Notice DA 02-1438 by the SCC-34/SC-2.

\*The manufacturer has confirmed the low levels measured for the ERP/EIRP at 850MHz and 1900MHz were expected for his device due to a 10dB attenuator incorporated on the antenna track. The SAR levels are correspondingly lower at both 850MHz and 1900MHz. See above for measured power values

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**7.2.6. Specific Absorption Rate - GPRS1900 Body Configuration 1g****Test Summary:**

Tissue Volume:	1g
Maximum Level (W/kg):	0.075

**Environmental Conditions:**

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

**Results:**

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
Front of EUT Facing Phantom	Flat (SAM)	660	0.075	1.600	1.525	1, 2	Complied
Rear of EUT Facing Phantom	Flat (SAM)	660	0.029	1.600	1.571	1, 2	Complied

**Note(s):**

1. SAR measurements were performed with the EUT at a separation distance of 0mm from the 'SAM' phantom flat section
2. SAR test was performed in the middle channel only as the measured levels were < 50% of the SAR limit as stated in the FCC Public Notice DA 02-1438 by the SCC-34/SC-2.

\*The manufacturer has confirmed the low levels measured for the ERP/EIRP at 850MHz and 1900MHz were expected for his device due to a 10dB attenuator incorporated on the antenna track. The SAR levels are correspondingly lower at both 850MHz and 1900MHz. See above for measured power values

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**7.2.7. EIRP/ERP Measurement**

Channel Number	Frequency (MHZ)	ISM - TX Power before Test (dBm)	Note
318	318	-48.5	ERP

Channel Number	Frequency (MHZ)	GSM TX Power Test (dBm)	GPRS TX Power Test (dBm)	Note
128	824.2	13.7	12.7	ERP*
189	836.4	13.6	12.7	ERP*
251	848.8	14.1	13.0	ERP*
512	1850.2	13.5	11.4	EIRP*
660	1879.8	13.2	10.2	EIRP*
810	1909.8	11.0	9.8	EIRP*

**Note(s):**

\*The manufacturer has confirmed the low levels measured for the ERP/EIRP at 850MHz and 1900MHz were expected for his device due to a 10dB attenuator incorporated on the antenna track. The SAR levels are correspondingly lower at both 850MHz and 1900MHz. See above for measured power values

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## **8. Measurement Uncertainty**

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.

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

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

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".

Test Name	Confidence Level	Calculated Uncertainty
Specific Absorption Rate- GSM850 Head Configuration 1g	95%	18.02%
Specific Absorption Rate- GSM/GPRS850 Body Configuration 1g	95%	18.03%
Specific Absorption Rate- PCS1900 Head Configuration 1g	95%	18.44%
Specific Absorption Rate- PCS/GPRS1900 Body Configuration 1g	95%	18.30%

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.

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**Measurement Uncertainty (Continued)****8.1. Specific Absorption Rate Uncertainty at 850 MHz Head 1g, GSM Modulation Scheme calculated in accordance with IEC 62209-1 & IEEE 1528**

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	C <sub>i</sub> (10g)	Standard Uncertainty		u <sub>i</sub> or u <sub>eff</sub>
							+ u (%)	- u (%)	
B	Probe calibration	11.000	11.000	normal (k=2)	2.0000	1.0000	5.500	5.500	∞
B	Axial Isotropy	0.500	0.500	normal (k=2)	2.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	2.600	2.600	normal (k=2)	2.0000	1.0000	1.300	1.300	∞
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	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.560	0.560	normal (k=2)	2.0000	1.0000	0.280	0.280	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient 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
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift 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	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	3.410	3.410	normal (k=1)	1.0000	0.6400	2.182	2.182	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	4.140	4.140	normal (k=1)	1.0000	0.6000	2.484	2.484	5
	Combined standard uncertainty			t-distribution			9.19	9.19	>500
	Expanded uncertainty			k = 1.96			18.02	18.02	>500

Test of: XT3318

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

**Measurement Uncertainty (Continued)****8.2. Specific Absorption Rate Uncertainty at 850 MHz Body 1g, GSM/GPRS Modulation Scheme calculated in accordance with IEC 62209-1 & IEEE 1528**

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	C <sub>i</sub> (10g)	Standard Uncertainty		u <sub>i</sub> or u <sub>eff</sub>
							+ u (%)	- u (%)	
B	Probe calibration	11.000	11.000	normal (k=2)	2.0000	1.0000	5.500	5.500	∞
B	Axial Isotropy	0.500	0.500	normal (k=2)	2.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	2.600	2.600	normal (k=2)	2.0000	1.0000	1.300	1.300	∞
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	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.560	0.560	normal (k=2)	2.0000	1.0000	0.280	0.280	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient 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
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift 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	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	3.600	3.600	normal (k=1)	1.0000	0.6400	2.304	2.304	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	4.000	4.000	normal (k=1)	1.0000	0.6000	2.400	2.400	5
	Combined standard uncertainty			t-distribution			9.20	9.20	>500
	Expanded uncertainty			k = 1.96			18.03	18.03	>500

Test of: XT3318

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

**Measurement Uncertainty (continued)****8.3. Specific Absorption Rate Uncertainty at 1900 MHz Head 1g, PCS Modulation Scheme calculated in accordance with IEC 62209-1 & IEEE 1528**

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	C <sub>i</sub> (10g)	Standard Uncertainty		u <sub>i</sub> or u <sub>eff</sub>
							+ u (%)	- u (%)	
B	Probe calibration	11.000	11.000	normal (k=2)	2.0000	1.0000	5.500	5.500	∞
B	Axial Isotropy	0.500	0.500	normal (k=2)	2.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	2.600	2.600	normal (k=2)	2.0000	1.0000	1.300	1.300	∞
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	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.560	0.560	normal (k=2)	2.0000	1.0000	0.280	0.280	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient 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
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift 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	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	4.370	4.370	normal (k=1)	1.0000	0.6400	2.797	2.797	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	4.450	4.450	normal (k=1)	1.0000	0.6000	2.670	2.670	5
	Combined standard uncertainty			t-distribution			9.41	9.41	>300
	Expanded uncertainty			k = 1.96			18.44	18.44	>300

Test of: XT3318

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

**Measurement Uncertainty (Continued)****8.4. Specific Absorption Rate Uncertainty at 1900 MHz Body 1g, PCS/GPRS Modulation Scheme calculated in accordance with IEC 62209-1 & IEEE 1528**

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	C <sub>i</sub> (10g)	Standard Uncertainty		u <sub>i</sub> or u <sub>eff</sub>
							+ u (%)	- u (%)	
B	Probe calibration	11.000	11.000	normal (k=2)	2.0000	1.0000	5.500	5.500	∞
B	Axial Isotropy	0.500	0.500	normal (k=2)	2.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	2.600	2.600	normal (k=2)	2.0000	1.0000	1.300	1.300	∞
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	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.560	0.560	normal (k=2)	2.0000	1.0000	0.280	0.280	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient 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
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift 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	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	4.170	4.170	normal (k=1)	1.0000	0.6400	2.669	2.669	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	4.230	4.230	normal (k=1)	1.0000	0.6000	2.538	2.538	5
	Combined standard uncertainty			t-distribution			9.34	9.34	>500
	Expanded uncertainty			k = 1.96			18.30	18.30	>500

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**Appendix 1. Test Equipment Used**

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval Months
A034	Narda 20W Termination	Narda	374BNM	8706	Calibrated as part of system	-
A1094	Digital Camera	Sony	MVC - FD81	125805	-	-
A1097	SMA Directional Coupler	MiDISCO	MDC6223-30	None	Calibrated as part of system	-
A1137	3dB Attenuator	Narda	779	4690	Calibrated as part of system	-
A1174	Dielectric Probe Kit	Agilent Technologies	85070C	Us99360072	Calibrated before use	-
A1234	Data Acquisition Electronics	Schmid & Partner	DAE3	450	30/04/2009	12
A1237	1900 MHz Dipole Kit	Schmid & Partner Engineering AG	D1900V2	540	26/06/2009	24
A1238	SAM Phantom	Schmid & Partners	SAM b	001	Calibrated as part of system	-
A1328	Handset Positioner	Schmid & Partners	Modificatio n	SD 000 H01 DA	-	-
A1329	900 MHz Dipole Kit	Schmid & Partner Engineering AG	D900V2	185	18/08/2009	24
A1378	Probe	Schmid & Partner	EX3 DV3	3508	26/06/2009	12
A1497	Amplifier	Mini-Circuits	zhl-42w (sma)	e020105	Calibrated as part of system	-
A1531	Antenna	AARONIA AG	7025	2458	-	-
A1566	SAM Phantom	Schmid & Partners	SAM a	002	Calibrated before use	-
A215	20 dB Attenuator	Narda	766-20	9402	Calibrated as part of system	-
C1144	Cable	Rosenberger MICRO-COAX	FA147AF0 01503030	41842-1	Calibrated as part of system	-
C1145	Cable	Rosenberger MICRO-COAX	FA147AF0 03003030	41843-1	Calibrated as part of system	-
C1146	Cable	Rosenberger MICRO-COAX	FA147AF0 30003030	41752-1	Calibrated as part of system	-
G0528	Robot Power Supply	Schmid & Partner	DASY	None	Calibrated before use	-
G087	PSU	Thurlby Thandar	CPX200	100701	Calibrated before use	-

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RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval Months
M1015	Network Analyser	Agilent Technologies	8753ES	US39172406	18/09/2009	12
M1047	Robot Arm	Staubli	RX908 L	F00/SD89A1/A/01	Calibrated before use	-
M1159	Signal Generator	Agilent Technologies	E8241A	US42110332	Internal Checked 07/08/2009	4
M509	Thermometer	Testo	110	40378800433	21/05/2009	12
A1410	Attenuator	Omni Spectra	FSC16179	20510-3	-	-
A1474	Broadband Amplifier –SMA	Mini-Circuits	ZVE-8G	638700305	Calibrated as part of system	-
A1475	Attenuator – SMA 20dB 2W DC- 18GHz	Mini-Circuits	BW-S20W2	0412	-	-
A1476	Attenuator – SMA 3dB 2W DC- 18GHz	Mini-Circuits	BW-S3W2	0425	-	-
M1071	Spectrum Analyzer	Agilent	HP8590E	3647U00514	(Monitoring use only)	-
M1044	Diode Power Sensor	Rohde & Schwarz	NRV-Z1	893350/019	19/05/2009	12
M265	Diode Power Sensor	Rohde & Schwarz	NRV-Z1	893350/017	19/05/2009	12
M263	Dual Channel Power Meter	Rohde & Schwarz	NRVD	826558/004	20/05/2009	12
S256	SAR lab	RFI	Chamber	Site 4405	Calibrated before use	-

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**A.1.1. Calibration Certificates**

This section contains the calibration certificates and data for the Probe(s) and Dipole(s) used, which are not included in the total number of pages for this report.



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The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client RFI

Certificate No: D1900V2-540-Jun09

## CALIBRATION CERTIFICATE

Object D1900V2 - SN: 540

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

Calibration date: June 26, 2009

Condition of the calibrated item In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

### Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

Calibrated by:	Name	Function	Signature
	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 29, 2009

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



Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

#### Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

#### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz)", July 2001
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

#### Additional Documentation:

- d) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

## Measurement Conditions

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

<b>DASY Version</b>	DASY5	V5.0
<b>Extrapolation</b>	Advanced Extrapolation	
<b>Phantom</b>	Modular Flat Phantom V5.0	
<b>Distance Dipole Center - TSL</b>	10 mm	with Spacer
<b>Zoom Scan Resolution</b>	dx, dy, dz = 5 mm	
<b>Frequency</b>	1900 MHz $\pm$ 1 MHz	

## Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
<b>Nominal Head TSL parameters</b>	22.0 °C	40.0	1.40 mho/m
<b>Measured Head TSL parameters</b>	(22.0 $\pm$ 0.2) °C	41.0 $\pm$ 6 %	1.42 mho/m $\pm$ 6 %
<b>Head TSL temperature during test</b>	(22.0 $\pm$ 0.2) °C	----	----

## SAR result with Head TSL

<b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b>	condition	
SAR measured	250 mW input power	10.1 mW / g
SAR normalized	normalized to 1W	40.4 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	40.3 mW / g $\pm$ 17.0 % (k=2)

<b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b>	Condition	
SAR measured	250 mW input power	5.29 mW / g
SAR normalized	normalized to 1W	21.2 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	21.1 mW / g $\pm$ 16.5 % (k=2)

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

## Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
<b>Nominal Body TSL parameters</b>	22.0 °C	53.3	1.52 mho/m
<b>Measured Body TSL parameters</b>	(22.0 ± 0.2) °C	53.9 ± 6 %	1.55 mho/m ± 6 %
<b>Body TSL temperature during test</b>	(21.2 ± 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	10.3 mW / g
SAR normalized	normalized to 1W	41.2 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	40.9 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.40 mW / g
SAR normalized	normalized to 1W	21.6 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	21.5 mW / g ± 16.5 % (k=2)

<sup>2</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

## Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	$48.5 \Omega + 2.7 j\Omega$
Return Loss	- 30.0 dB

### Antenna Parameters with Body TSL

Impedance, transformed to feed point	$44.9 \Omega + 2.8 j\Omega$
Return Loss	- 24.3 dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.198 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 26, 2001

# DASY5 Validation Report for Head TSL

Date/Time: 26.06.2009 12:43:03

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:540**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL U11 BB

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.42$  mho/m;  $\epsilon_r = 41$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.88, 4.88, 4.88); Calibrated: 30.04.2009
- Sensor-Surface: 3mm (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

**Pin = 250 mW; dip = 10 mm/Zoom Scan (dist=3.0 mm, probe 0deg) (7x7x7)/Cube 0:**

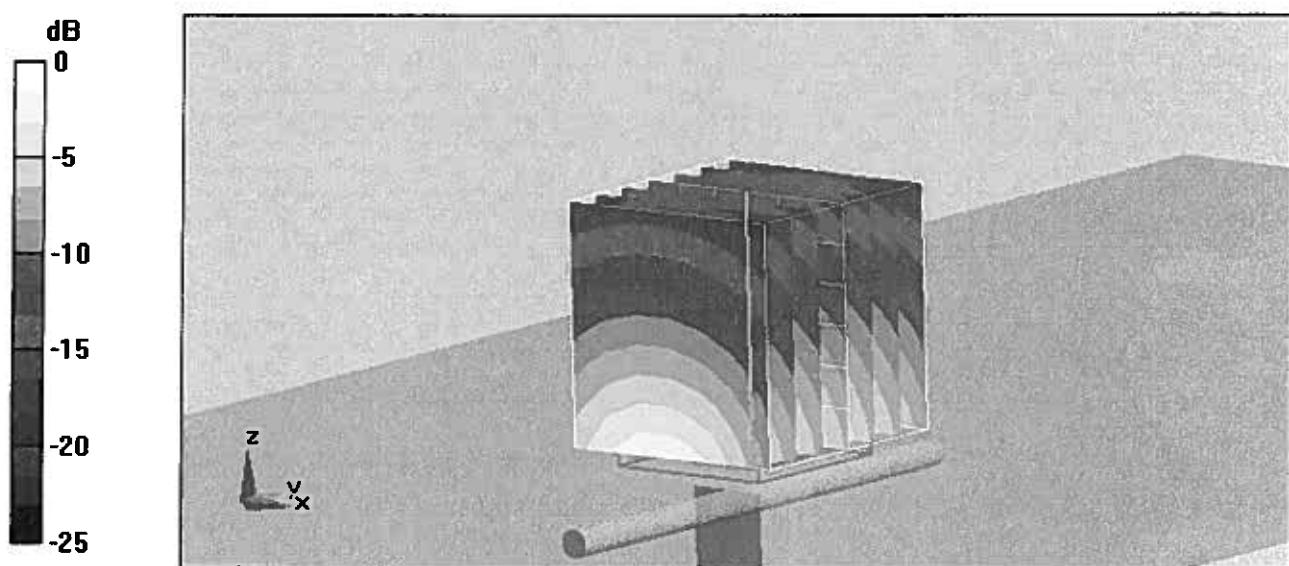
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.9 V/m; Power Drift = 0.037 dB

Peak SAR (extrapolated) = 18.4 W/kg

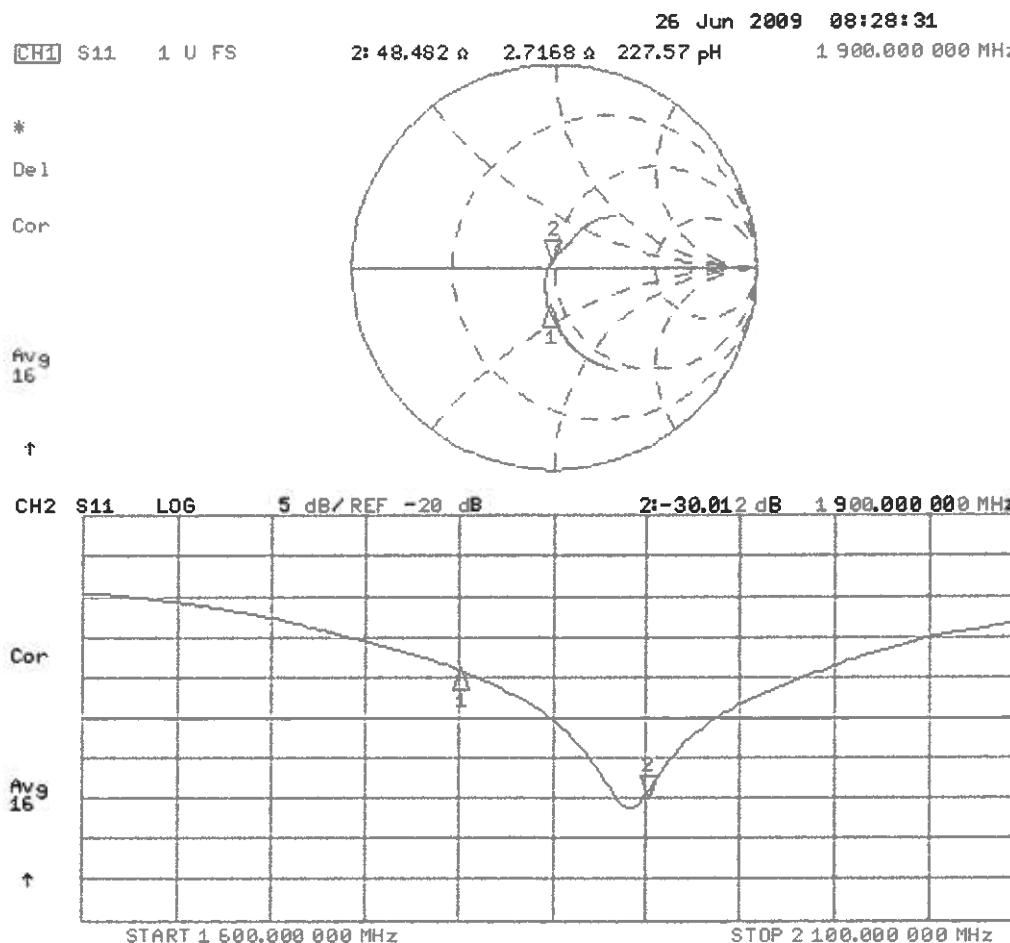
**SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.29 mW/g**

Maximum value of SAR (measured) = 12.5 mW/g



0 dB = 12.5mW/g

## Impedance Measurement Plot for Head TSL



# DASY5 Validation Report for Body TSL

Date/Time: 26.06.2009 14:10:45

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:540**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL U10 BB

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.55$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.46, 4.46, 4.46); Calibrated: 30.04.2009
- Sensor-Surface: 3mm (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

**Pin = 250 mW; dip = 10 mm/Zoom Scan (dist=3.0mm, probe 0deg) (7x7x7)/Cube 0:**

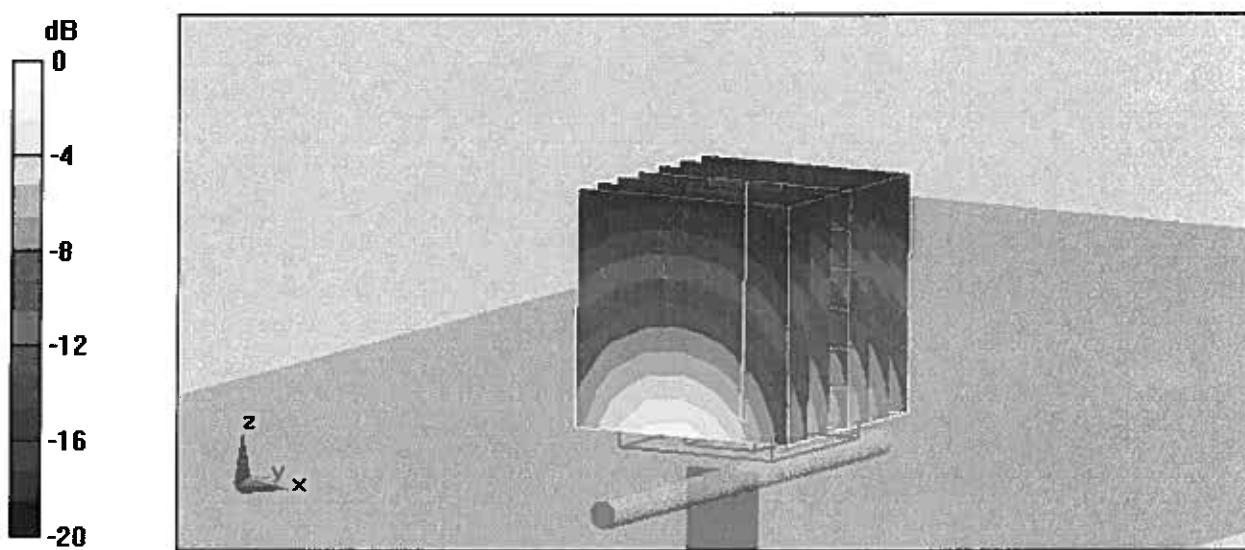
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.1 V/m; Power Drift = 0.011 dB

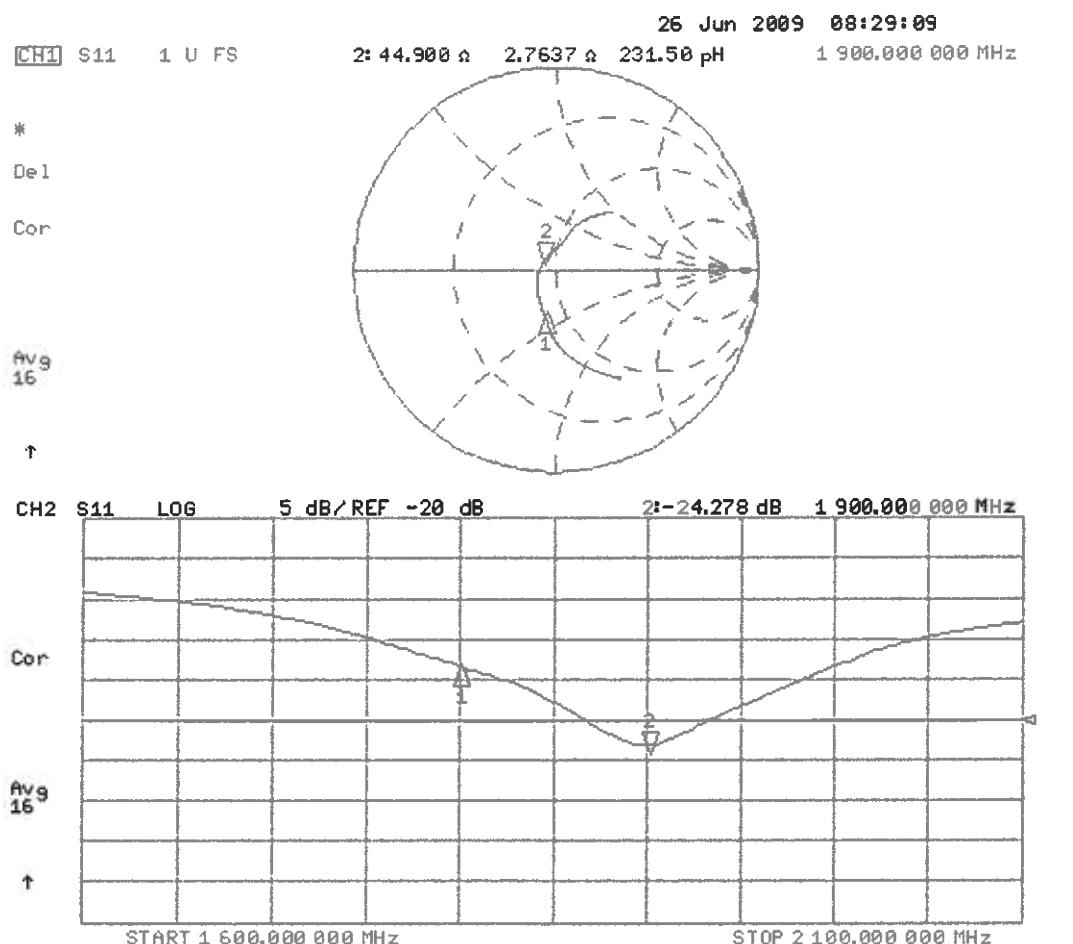
Peak SAR (extrapolated) = 18.1 W/kg

**SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.4 mW/g**

Maximum value of SAR (measured) = 12.9 mW/g



## Impedance Measurement Plot for Body TSL





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 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client

**RFI**

Certificate No: **D900V2-185\_Aug09**

## **CALIBRATION CERTIFICATE**

Object	D900V2 - SN: 185					
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits					
Calibration date:	August 18, 2009					
Condition of the calibrated item	In Tolerance					
<p>This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (<math>22 \pm 3</math>°C) and humidity &lt; 70%.</p>						
Calibration Equipment used (M&TE critical for calibration)						
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration			
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09			
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09			
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10			
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10			
Reference Probe ES3DV3	SN: 3205	26-Jun-09 (No. ES3-3205_Jun09)	Jun-10			
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10			
Secondary Standards	ID #	Check Date (in house)	Scheduled Check			
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09			
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09			
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09			
Calibrated by:	Name Jeton Kastrati	Function Laboratory Technician	Signature 			
Approved by:	Katja Pokovic	Technical Manager				
Issued: August 18, 2009						
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.						



Accredited by the Swiss Accreditation Service (SAS)  
The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

### **Glossary:**

TS	tissue simulating liquid
ConvF	sensitivity in TS / 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 TS:* 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 TS parameters:* The measured TS parameters are used to calculate the nominal SAR result.

## Measurement Conditions

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

<b>DASY Version</b>	DASY5		V5.0
<b>Extrapolation</b>	Advanced Extrapolation		
<b>Phantom</b>	Modular Flat Phantom V4.9		
<b>Distance Dipole Center - TSL</b>	15 mm		with Spacer
<b>Zoom Scan Resolution</b>	dx, dy, dz = 5 mm		
<b>Frequency</b>	900 MHz ± 1 MHz		

## Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
<b>Nominal Head TSL parameters</b>	22.0 °C	41.5	0.97 mho/m
<b>Measured Head TSL parameters</b>	(22.0 ± 0.2) °C	40.4 ± 6 %	0.96 mho/m ± 6 %
<b>Head TSL temperature during test</b>	(22.4 ± 0.2) °C	---	---

## SAR result with Head TSL

<b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b>	Condition	
SAR measured	250 mW input power	2.75 mW / g
SAR normalized	normalized to 1W	11.0 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	11.0 mW /g ± 17.0 % (k=2)

<b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b>	condition	
SAR measured	250 mW input power	1.76 mW / g
SAR normalized	normalized to 1W	7.04 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	7.06 mW /g ± 16.5 % (k=2)

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

## Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
<b>Nominal Body TSL parameters</b>	22.0 °C	55.0	1.05 mho/m
<b>Measured Body TSL parameters</b>	(22.0 ± 0.2) °C	52.7 ± 6 %	1.06 mho/m ± 6 %
<b>Body TSL temperature during test</b>	(22.0 ± 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	2.80 mW / g
SAR normalized	normalized to 1W	11.2 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	11.0 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.81 mW / g
SAR normalized	normalized to 1W	7.24 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	7.16 mW / g ± 16.5 % (k=2)

<sup>2</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

## Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.5 $\Omega$ - 10.3 $j\Omega$
Return Loss	- 19.7 dB

### Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.5 $\Omega$ - 11.2 $j\Omega$
Return Loss	- 18.0 dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.403 ns
----------------------------------	----------

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 27, 2003

# DASY5 Validation Report for Head TSL

Date/Time: 18.08.2009 08:57:04

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:185**

Communication System: CW-900; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: HSL 900 MHz

Medium parameters used:  $f = 900$  MHz;  $\sigma = 0.96$  mho/m;  $\epsilon_r = 40.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.88, 5.88, 5.88); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

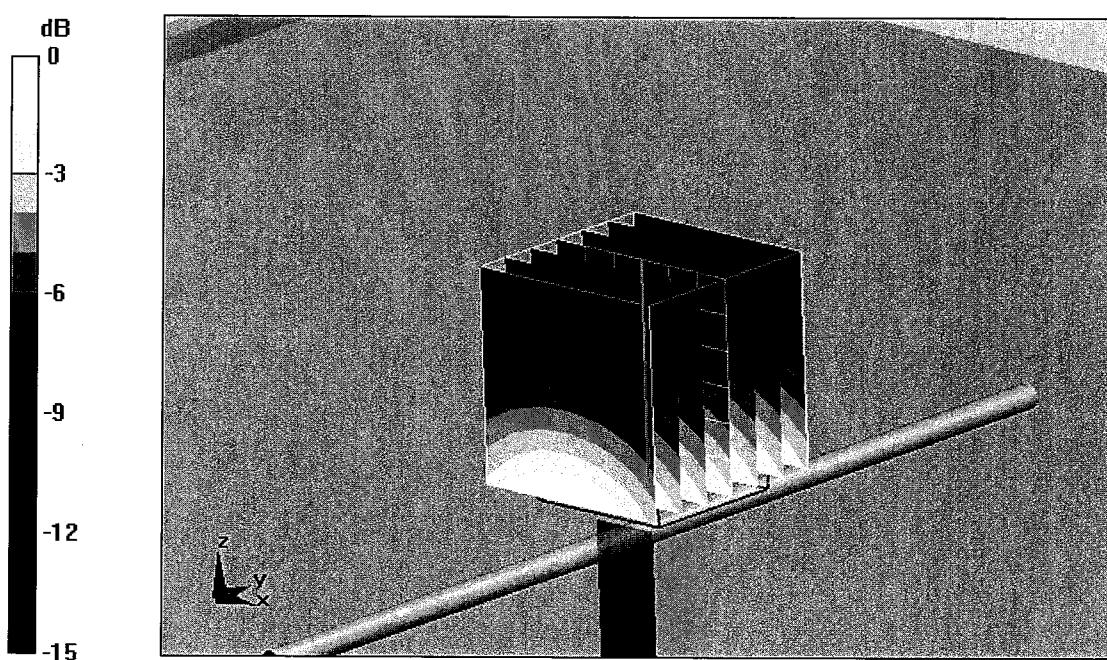
**Pin=250mW; dip=15mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 59.7 V/m; Power Drift = 0.015 dB

Peak SAR (extrapolated) = 4.17 W/kg

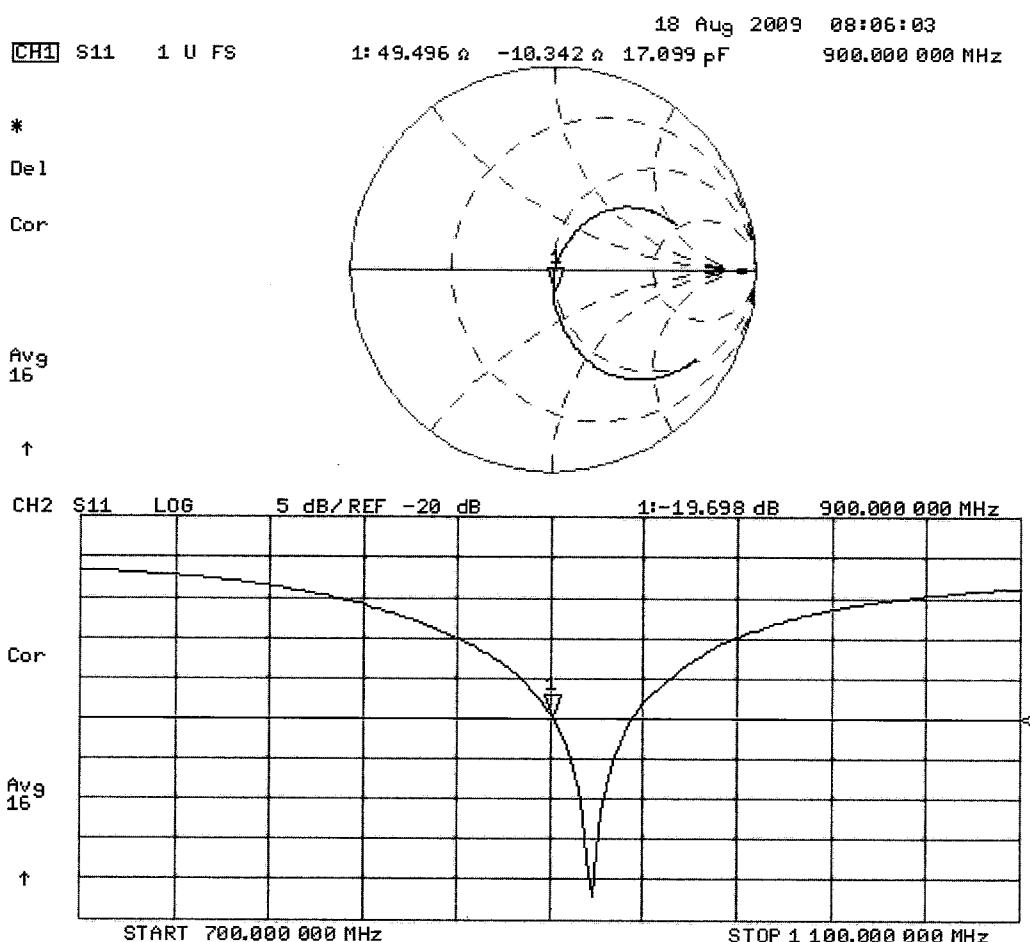
**SAR(1 g) = 2.75 mW/g; SAR(10 g) = 1.76 mW/g**

Maximum value of SAR (measured) = 3.23 mW/g



0 dB = 3.23mW/g

## Impedance Measurement Plot for Head TSL



# DASY5 Validation Report for Body

Date/Time: 17.08.2009 11:23:13

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:185**

Communication System: CW-900; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: MSL900

Medium parameters used:  $f = 900$  MHz;  $\sigma = 1.06$  mho/m;  $\epsilon_r = 52.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.81, 5.81, 5.81); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

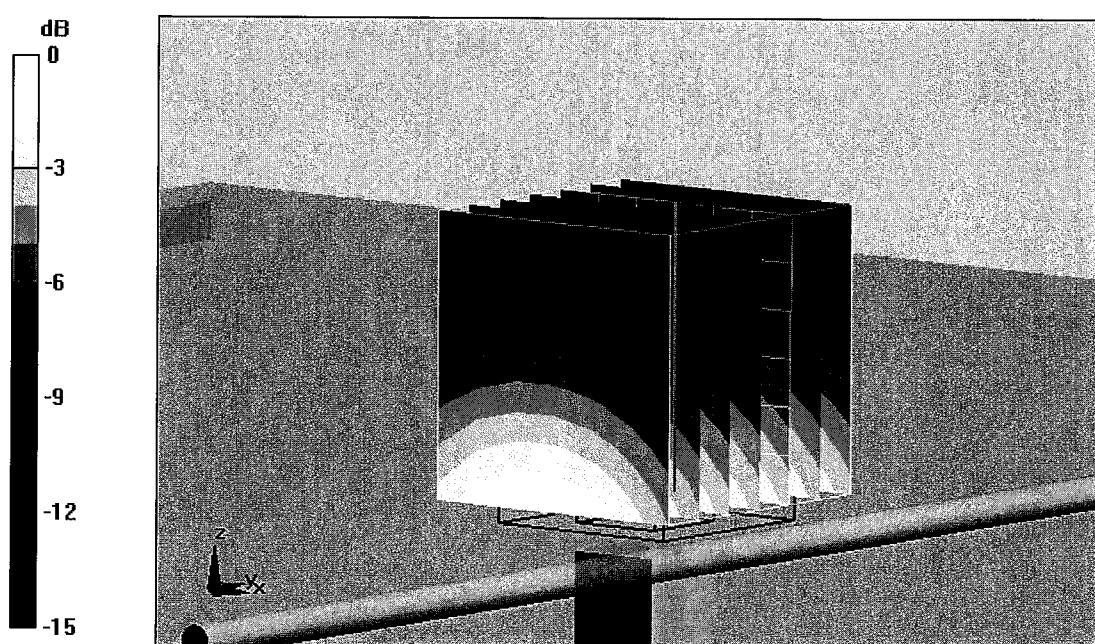
**Pin=250mW; dip=15mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.2 V/m; Power Drift = 0.00569 dB

Peak SAR (extrapolated) = 4.19 W/kg

**SAR(1 g) = 2.8 mW/g; SAR(10 g) = 1.81 mW/g**

Maximum value of SAR (measured) = 3.24 mW/g



0 dB = 3.24mW/g

## Impedance Measurement Plot for Body TSL

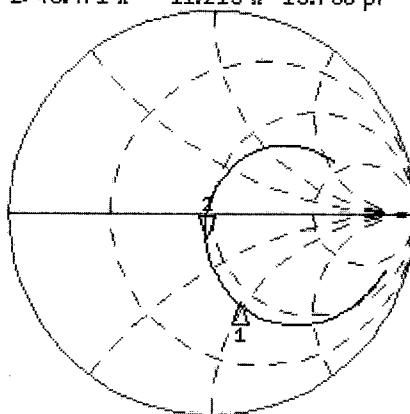
17 Aug 2009 08:58:55  
CH1 S11 1 U FS 2: 45.471  $\Omega$  -11.215  $\Omega$  15.768 pF 900.000 000 MHz

\*

Del

Cor

Avg  
16



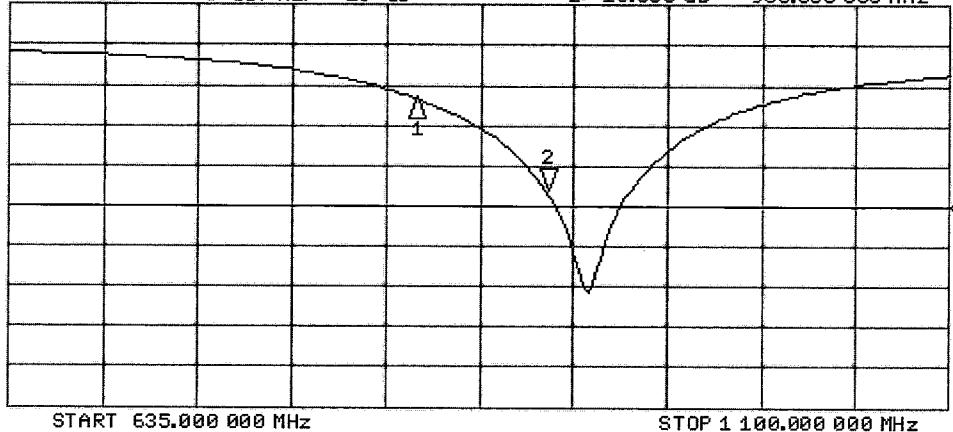
CH1 Markers

1: 41.352  $\Omega$   
-46.816  $\Omega$   
835.000 MHz

CH2 S11 LOG 5 dB/REF -20 dB 2:-18.006 dB 900.000 000 MHz

Cor

Avg  
16



CH2 Markers

1:-6.6738 dB  
835.000 MHz

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



A 1378  
Checked on 01/07/2009  
S Schweizerischer Kalibrierdienst  
C Service suisse d'étalonnage  
S Servizio svizzero di taratura  
S Swiss Calibration Service

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Client

RFI

Certificate No: EX3-3508\_Jun09

## CALIBRATION CERTIFICATE

Object EX3DV3 - SN:3508

Calibration procedure(s) QA CAL-01.v6, QA CAL-12.v5 and QA CAL-23.v3  
Calibration procedure for dosimetric E-field probes

Calibration date: June 26, 2009

Condition of the calibrated item In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09

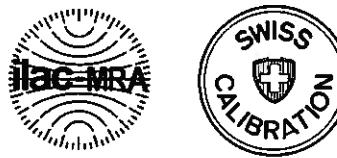
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

Calibrated by:	Name	Function	Signature
	Jeton Kastrati	Laboratory Technician	

Approved by:	Name	Function	Signature
	Katja Pokovic	Technical Manager	

Issued: June 26, 2009

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Accreditation No.: SCS 108

### Glossary:

TSL	tissue simulating liquid
NORM $x,y,z$	sensitivity in free space
ConvF	sensitivity in TSL / NORM $x,y,z$
DCP	diode compression point
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\vartheta$	$\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

### Calibration is Performed According to the Following Standards:

- 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
- 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

### Methods Applied and Interpretation of Parameters:

- $NORMx,y,z$ : Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide).  $NORMx,y,z$  are only intermediate values, i.e., the uncertainties of  $NORMx,y,z$  does not effect the  $E^2$ -field uncertainty inside TSL (see below ConvF).
- $NORM(f)x,y,z = NORMx,y,z * frequency\_response$  (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- $DCPx,y,z$ : DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to  $NORMx,y,z * ConvF$  whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

# Probe EX3DV3

SN:3508

Manufactured:	December 19, 2003
Last calibrated:	June 24, 2008
Recalibrated:	June 26, 2009

**Calibrated for DASY Systems**

(Note: non-compatible with DASY2 system!)

## DASY - Parameters of Probe: EX3DV3 SN:3508

Sensitivity in Free Space <sup>A</sup>			Diode Compression <sup>B</sup>	
NormX	<b>0.76</b> $\pm$ 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	<b>95</b> mV
NormY	<b>0.63</b> $\pm$ 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	<b>97</b> mV
NormZ	<b>0.66</b> $\pm$ 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	<b>94</b> mV

### Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

### Boundary Effect

**TSL**                   **900 MHz**           **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance	<b>2.0 mm</b>	<b>3.0 mm</b>
SAR <sub>be</sub> [%]      Without Correction Algorithm	7.8	4.6
SAR <sub>be</sub> [%]      With Correction Algorithm	0.5	0.3

**TSL**                   **1750 MHz**           **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance	<b>2.0 mm</b>	<b>3.0 mm</b>
SAR <sub>be</sub> [%]      Without Correction Algorithm	5.8	2.7
SAR <sub>be</sub> [%]      With Correction Algorithm	0.7	0.5

### Sensor Offset

Probe Tip to Sensor Center                   **1.0 mm**

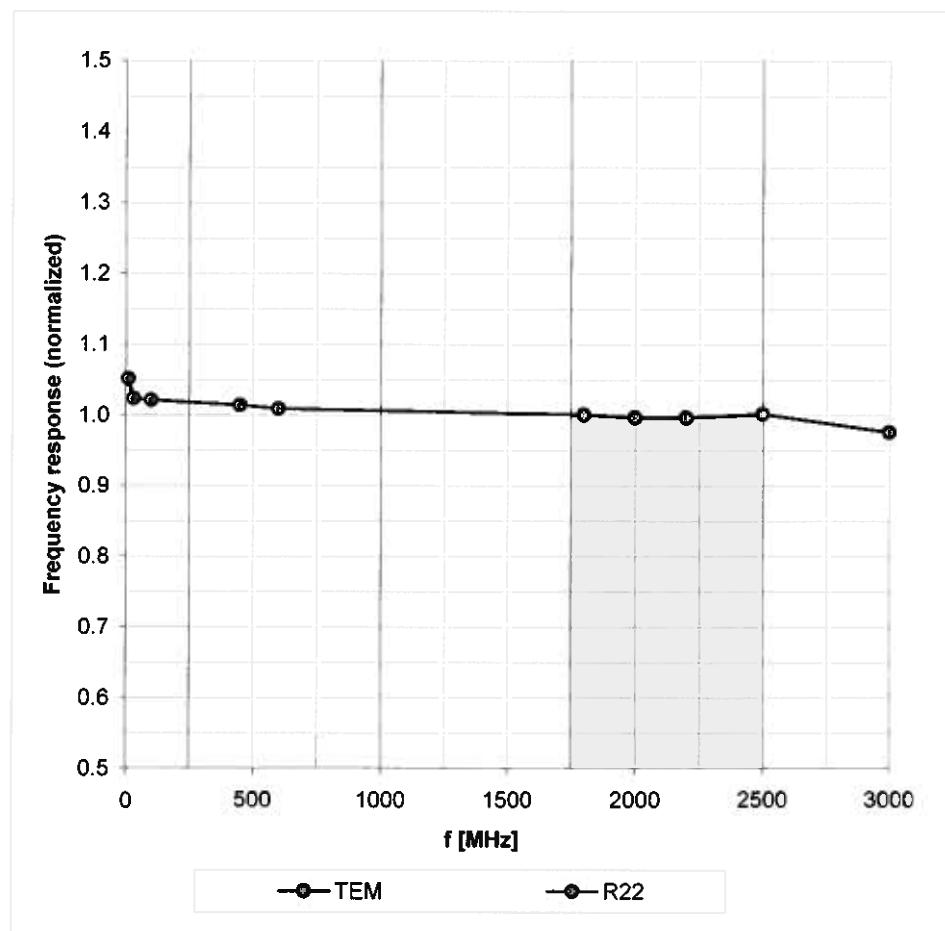
**The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.**

<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Page 8).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

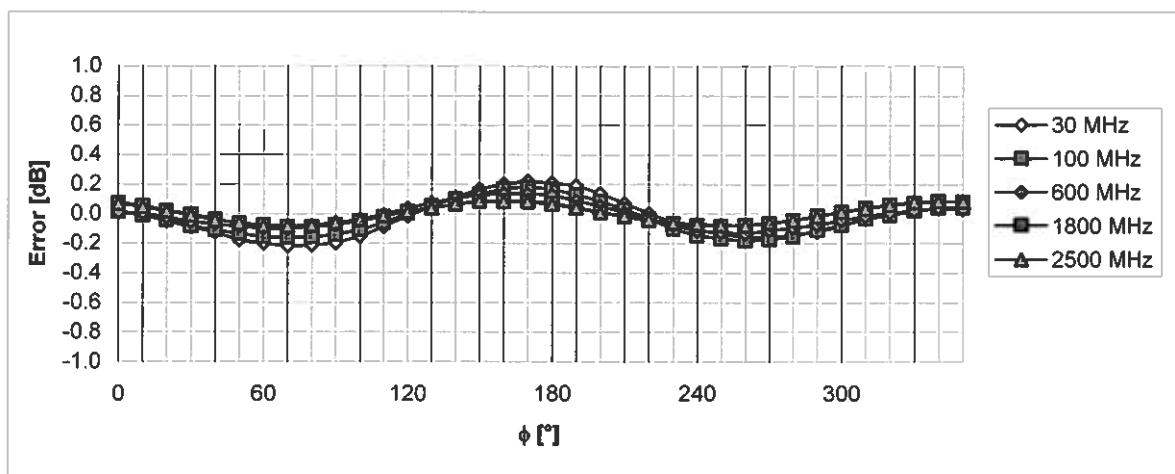
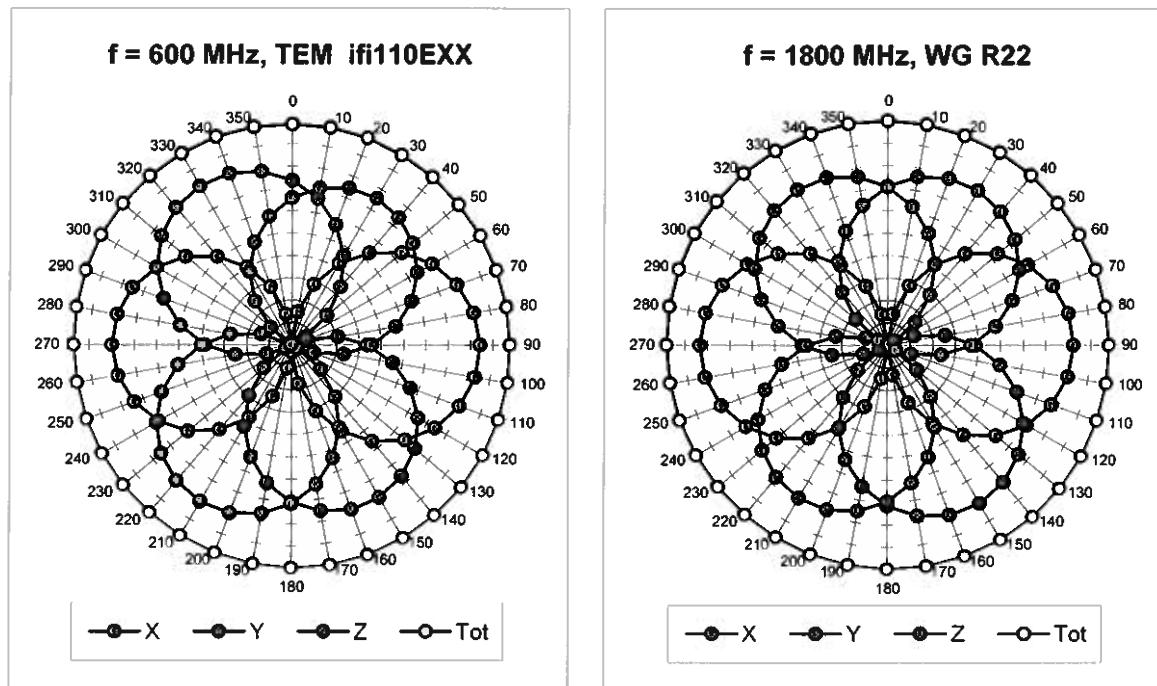
## Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

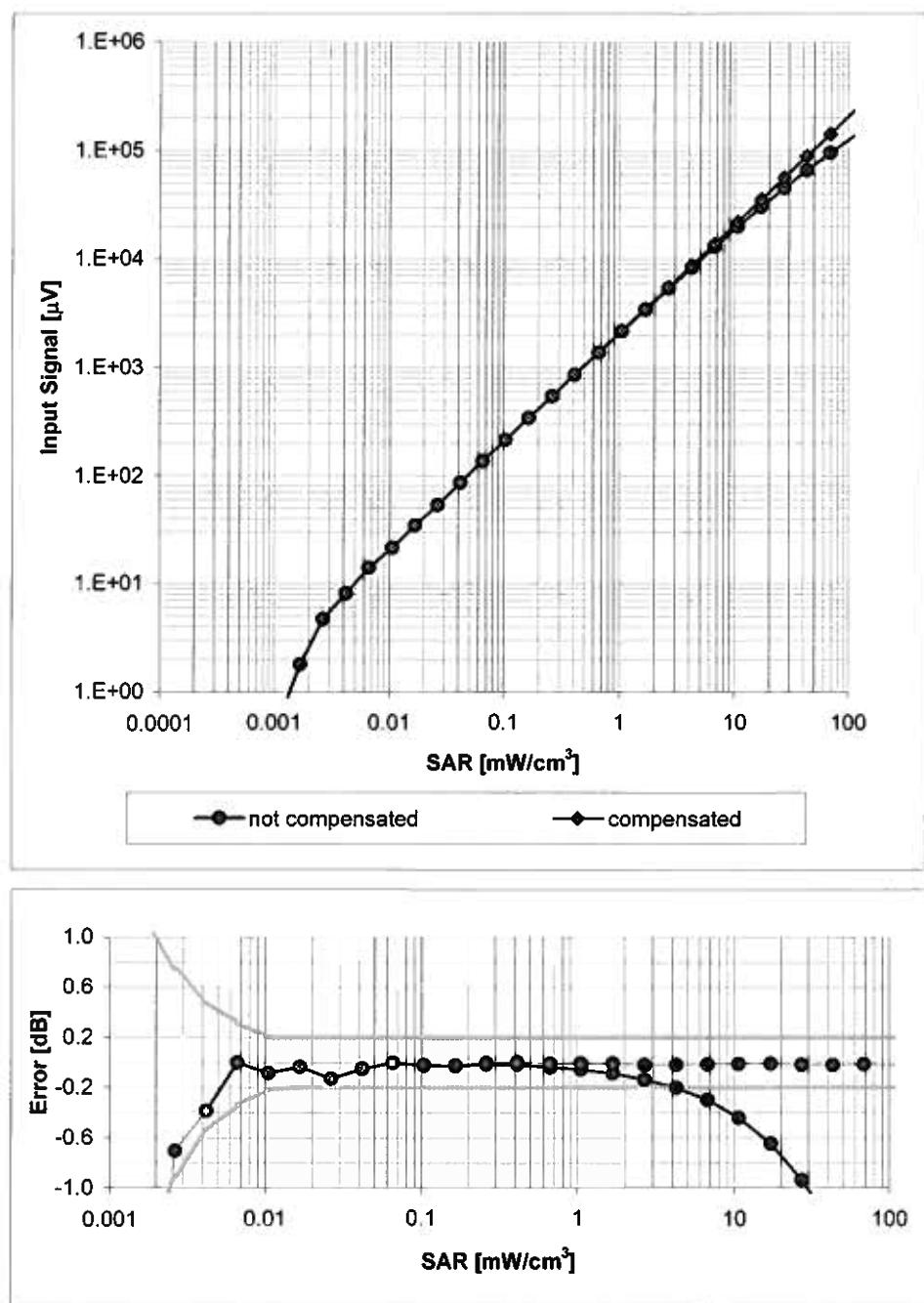
## Receiving Pattern ( $\phi$ ), $\vartheta = 0^\circ$



Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

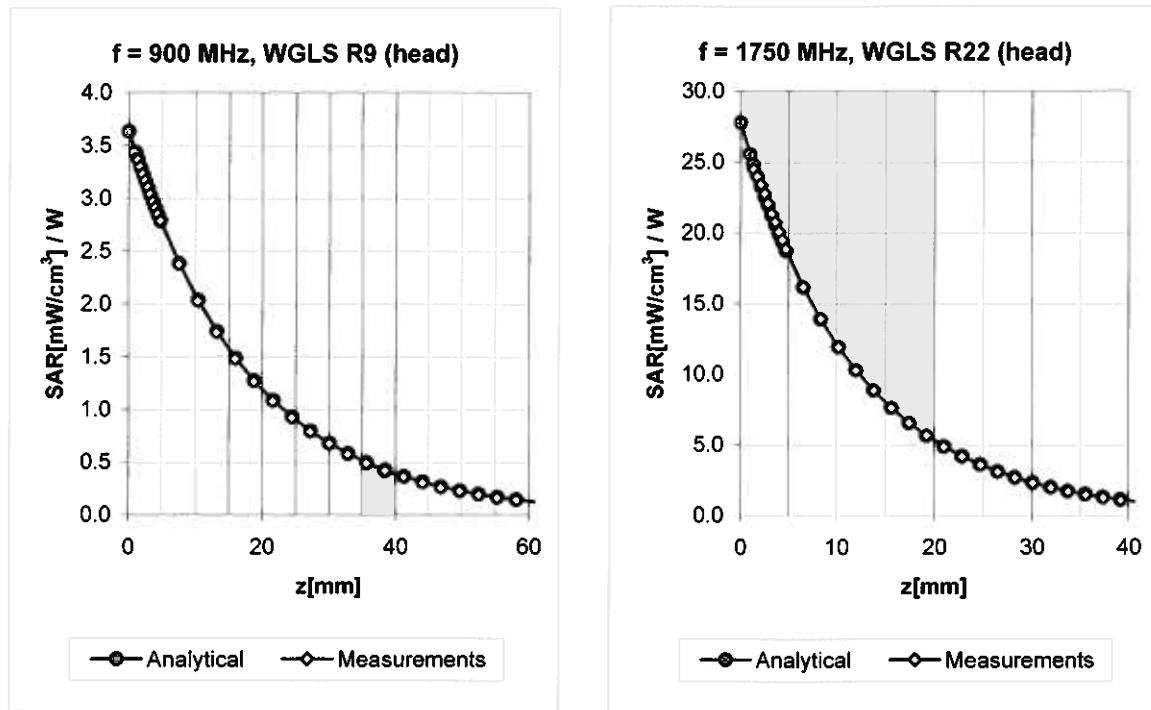
## Dynamic Range $f(\text{SAR}_{\text{head}})$

(Waveguide R22,  $f = 1800$  MHz)



Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

## Conversion Factor Assessment

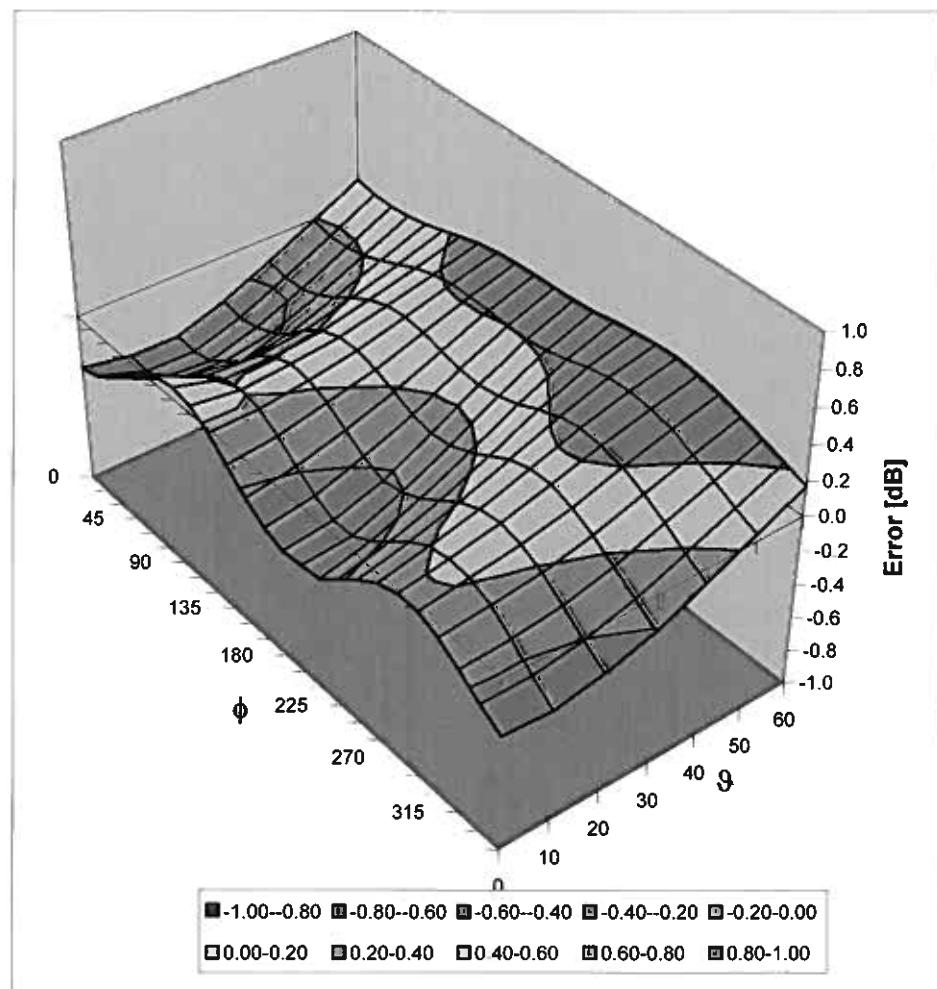


f [MHz]	Validity [MHz] <sup>c</sup>	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
450	± 50 / ± 100	Head	43.5 ± 5%	0.87 ± 5%	0.23	1.00	10.49	± 13.3% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.48	0.72	9.76	± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.57	0.63	8.82	± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.53	0.65	8.58	± 11.0% (k=2)
2150	± 50 / ± 101	Head	39.7 ± 5%	1.53 ± 5%	0.36	0.69	8.33	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.36	0.75	7.77	± 11.0% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.30	0.51	11.32	± 13.3% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.45	0.75	9.99	± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.55	0.63	8.59	± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.48	0.68	8.23	± 11.0% (k=2)
2150	± 50 / ± 100	Body	53.0 ± 5%	1.75 ± 5%	0.30	0.92	8.27	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.25	1.02	8.06	± 11.0% (k=2)

<sup>c</sup> The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

## Deviation from Isotropy in HSL

Error ( $\phi, \theta$ ),  $f = 900$  MHz



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )

Test of: XT3318

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

## **Appendix 2. Measurement Methods**

### **A.2.1. Evaluation Procedure**

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 the test specification identified in section 3.1 of this report.  
(ii) For body worn devices or devices which can be operated within 20 cm of the body, the flat section of the SAM phantom was used were the size of the device(s) is normal. for bigger devices and base station the 2mm Oval phantom is used for evaluation. 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 5x5x7 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.

Test of: XT3318

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

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#### **A.2.2. Specific Absorption Rate (SAR) Measurements to OET Bulletin 65 Supplement C: (2001-01)**

Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields

SAR measurements were performed in accordance with Appendix D of the standard FCC OET Bulletin 65 Supplement C: 2001, against appropriate limits for each measurement position in accordance with the standard.

The test was performed in a shielded enclosure with the temperature controlled to remain between +18.0°C and +25.0°C. The tissue equivalent material fluid temperature was controlled to give a maximum variation of  $\pm 2.0^{\circ}\text{C}$

Prior to any SAR measurements on the EUT, system validation and material dielectric property measurements were conducted. In the absence of a detailed procedure within the specification, system validation and material dielectric property measurements were performed in accordance with Appendix C and Appendix D of FCC OET Bulletin 65 Supplement C: 2001.

Following the successful system validation and material dielectric property measurements, a SAR versus time sweep shall be performed within 10 mm of the phantom inner surface. If the EUT power output is stable after three minutes then the measurement probe will perform a coarse surface level scan at each test position in order to ascertain the location of the maximum local SAR level. Once this area had been established, a 5x5x7 cube of 343 points (5 mm spacing in each axis  $\approx 27\text{g}$ ) will be centred at the area of concern. Extrapolation and interpolation will then be carried out on the 27g of tissue and the highest averaged SAR over a 10g cube determined.

Once the maximum interpolated SAR measurement is complete; the coarse scan is visually assessed to check for secondary peaks within 50% of the maximum SAR level. If there are any further SAR measurements required, extra 5x5x7 cubes shall be centred on each of these extra local SAR maxima.

At the end of each position test case a second time sweep shall be performed to check whether the EUT has remained stable throughout the test.

Test of: XT3318

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

### **Appendix 3. SAR Distribution Scans**

This appendix contains SAR distribution scans which are not included in the total number of pages for this report.

Scan Reference Number	Title
SCN/75527JD14/001	Touch Left GSM CH189
SCN/75527JD14/002	Tilt Left GSM CH189
SCN/75527JD14/003	Touch Right GSM CH189
SCN/75527JD14/004	Tilt Right GSM CH189
SCN/75527JD14/005	Touch Left PCS CH660
SCN/75527JD14/006	Tilt Left PCS CH660
SCN/75527JD14/007	Touch Right PCS CH660
SCN/75527JD14/008	Tilt Right PCS CH660
SCN/75527JD14/009	Front of EUT Facing Phantom GSM CH189
SCN/75527JD14/010	Rear of EUT Facing Phantom GSM CH189
SCN/75527JD14/011	Front of EUT Facing Phantom PCS CH660
SCN/75527JD14/012	Rear of EUT Facing Phantom PCS CH660
SCN/75527JD14/013	Front of EUT Facing Phantom GPRS CH189
SCN/75527JD14/014	Rear of EUT Facing Phantom GPRS CH189
SCN/75527JD14/015	Front of EUT Facing Phantom GPRS CH660
SCN/75527JD14/016	Rear of EUT Facing Phantom GPRS CH660
SCN/75527JD14/017	System Performance Check 900MHz Head 12 09 09
SCN/75527JD14/018	System Performance Check 1900MHz Head 12 09 09
SCN/75527JD14/019	System Performance Check 900MHz Body 14 09 09
SCN/75527JD14/020	System Performance Check 1900MHz Body 17 09 09
SCN/75527JD14/021	System Performance Check 1900MHz Body 26 09 09
SCN/75527JD14/022	System Performance Check 900MHz Body 12 10 09

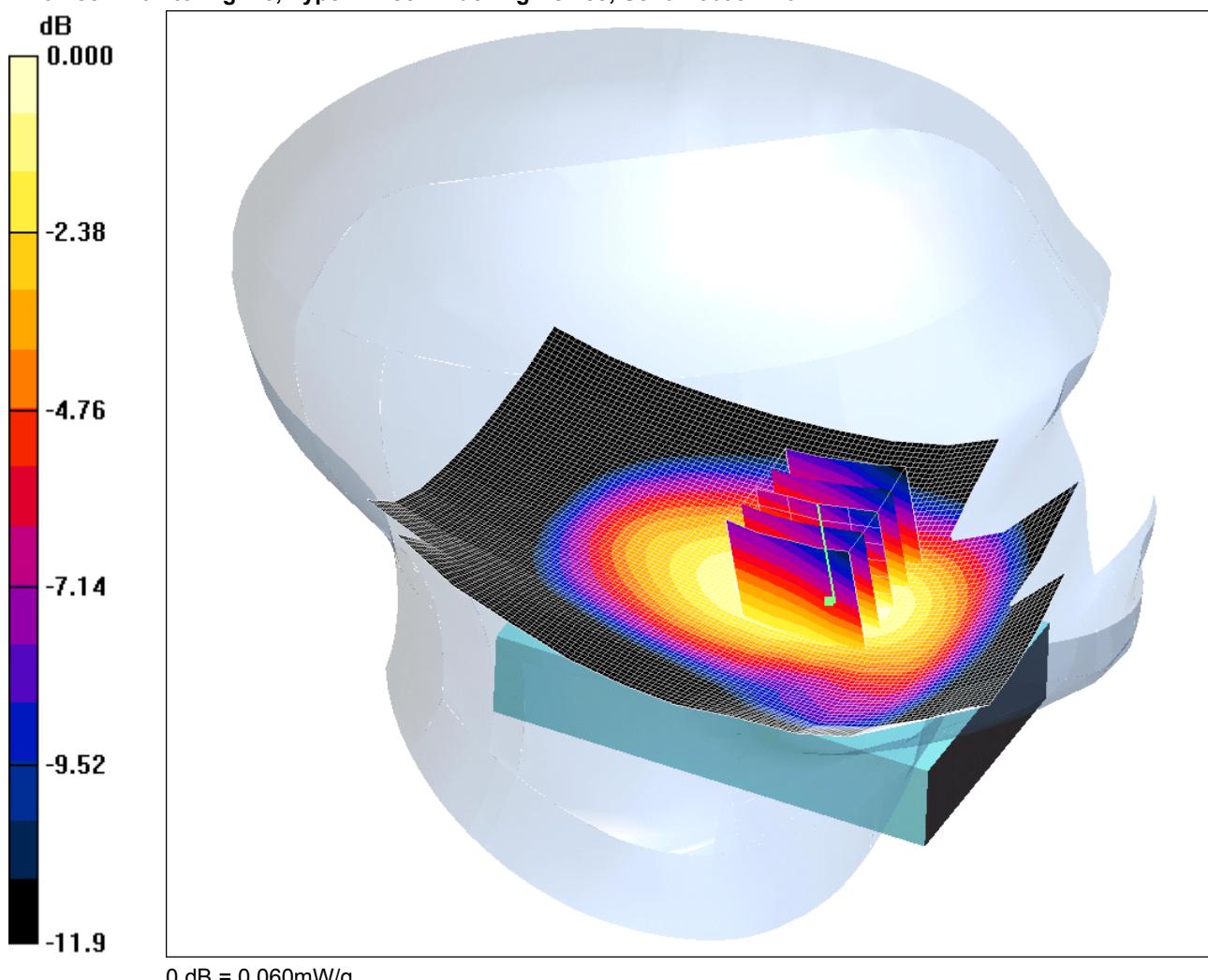
Test of: XT3318

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

SCN/75527JD14/001: Touch Left GSM CH189

Date 12/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: 850 MHz; Frequency: 836.4 MHz; Duty Cycle: 1:8.3

Medium: 900 MHz HSL Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 0.92$  mho/m;  $\epsilon_r = 41.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.76, 9.76, 9.76); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Touch Left- Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.061 mW/g

**Touch Left- Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.83 V/m; Power Drift = -0.006 dB

Peak SAR (extrapolated) = 0.076 W/kg

**SAR(1 g) = 0.057 mW/g; SAR(10 g) = 0.041 mW/g**

Maximum value of SAR (measured) = 0.060 mW/g

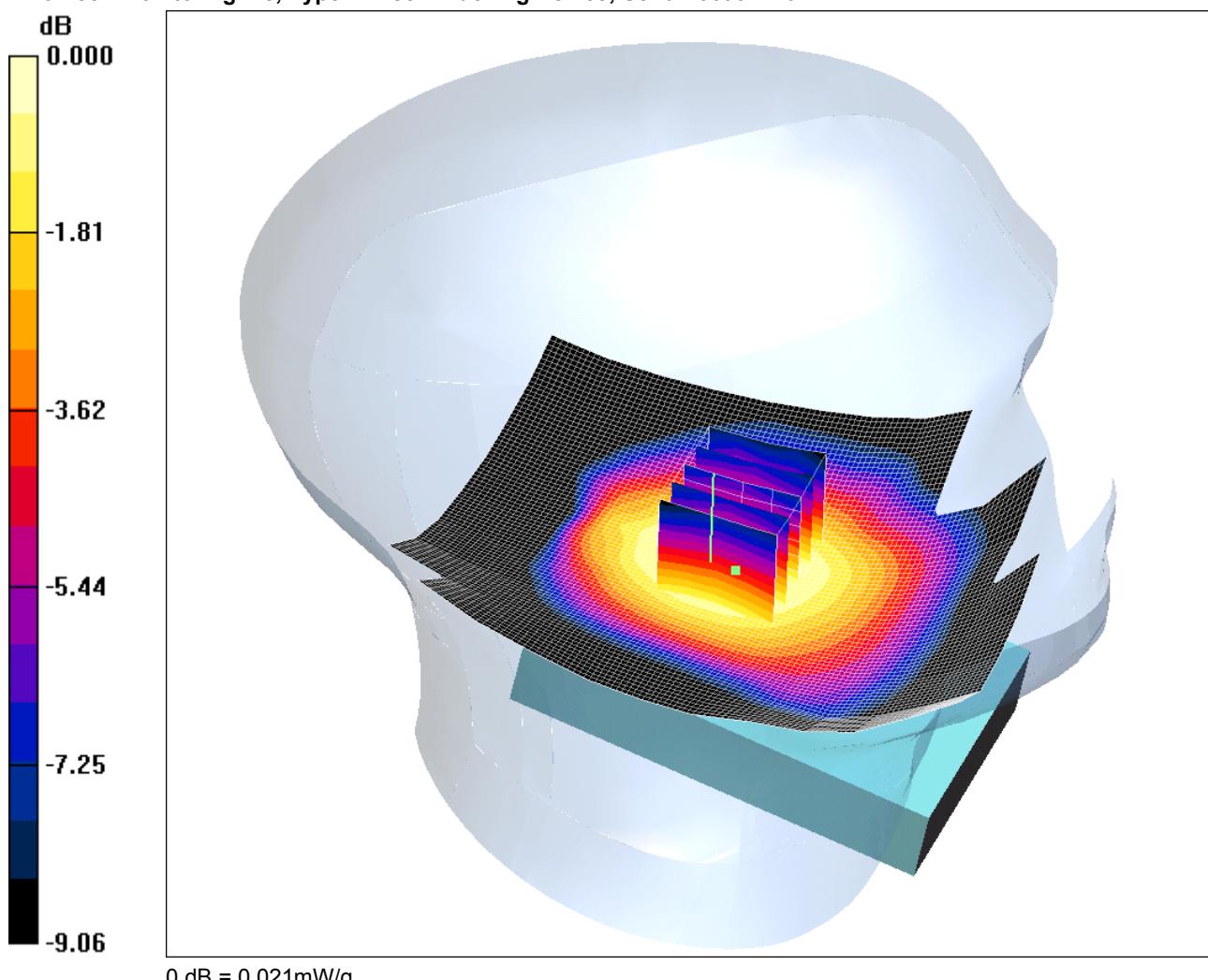
Test of: XT3318

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

SCN/75527JD14/002: Tilt Left GSM CH189

Date 12/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: 850 MHz; Frequency: 836.4 MHz; Duty Cycle: 1:8.3

Medium: 900 MHz HSL Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 0.92$  mho/m;  $\epsilon_r = 41.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.76, 9.76, 9.76); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Tilt Left- Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.021 mW/g

**Tilt Left- Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.93 V/m; Power Drift = 0.000 dB

Peak SAR (extrapolated) = 0.026 W/kg

**SAR(1 g) = 0.020 mW/g; SAR(10 g) = 0.015 mW/g**

Maximum value of SAR (measured) = 0.021 mW/g

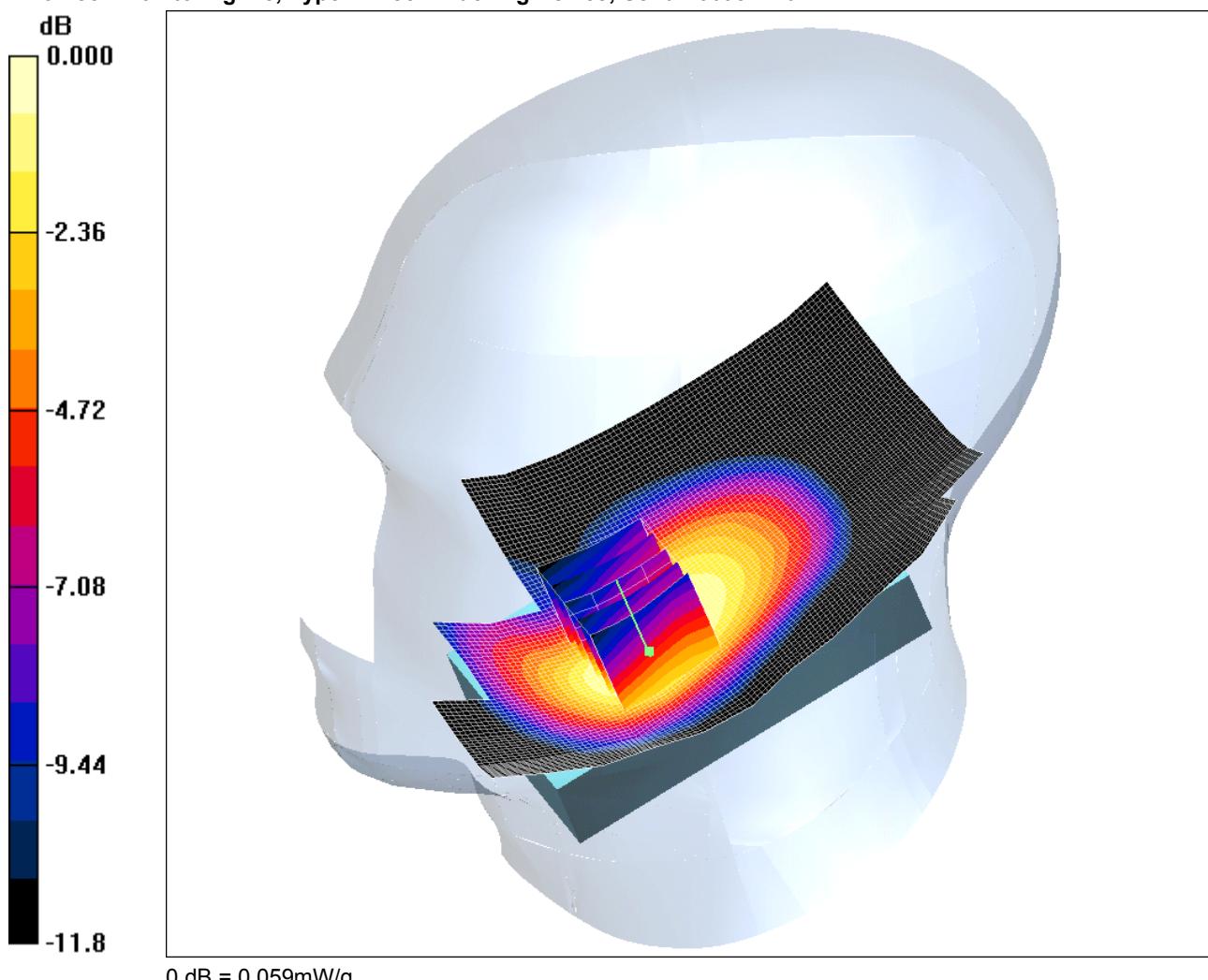
Test of: XT3318

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

SCN/75527JD14/003: Touch Right GSM CH189

Date 12/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: 850 MHz; Frequency: 836.4 MHz; Duty Cycle: 1:8.3

Medium: 900 MHz HSL Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 0.92$  mho/m;  $\epsilon_r = 41.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.76, 9.76, 9.76); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Touch Right- Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.061 mW/g

**Touch Right- Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.76 V/m; Power Drift = 0.310 dB

Peak SAR (extrapolated) = 0.077 W/kg

**SAR(1 g) = 0.056 mW/g; SAR(10 g) = 0.038 mW/g**

Maximum value of SAR (measured) = 0.059 mW/g

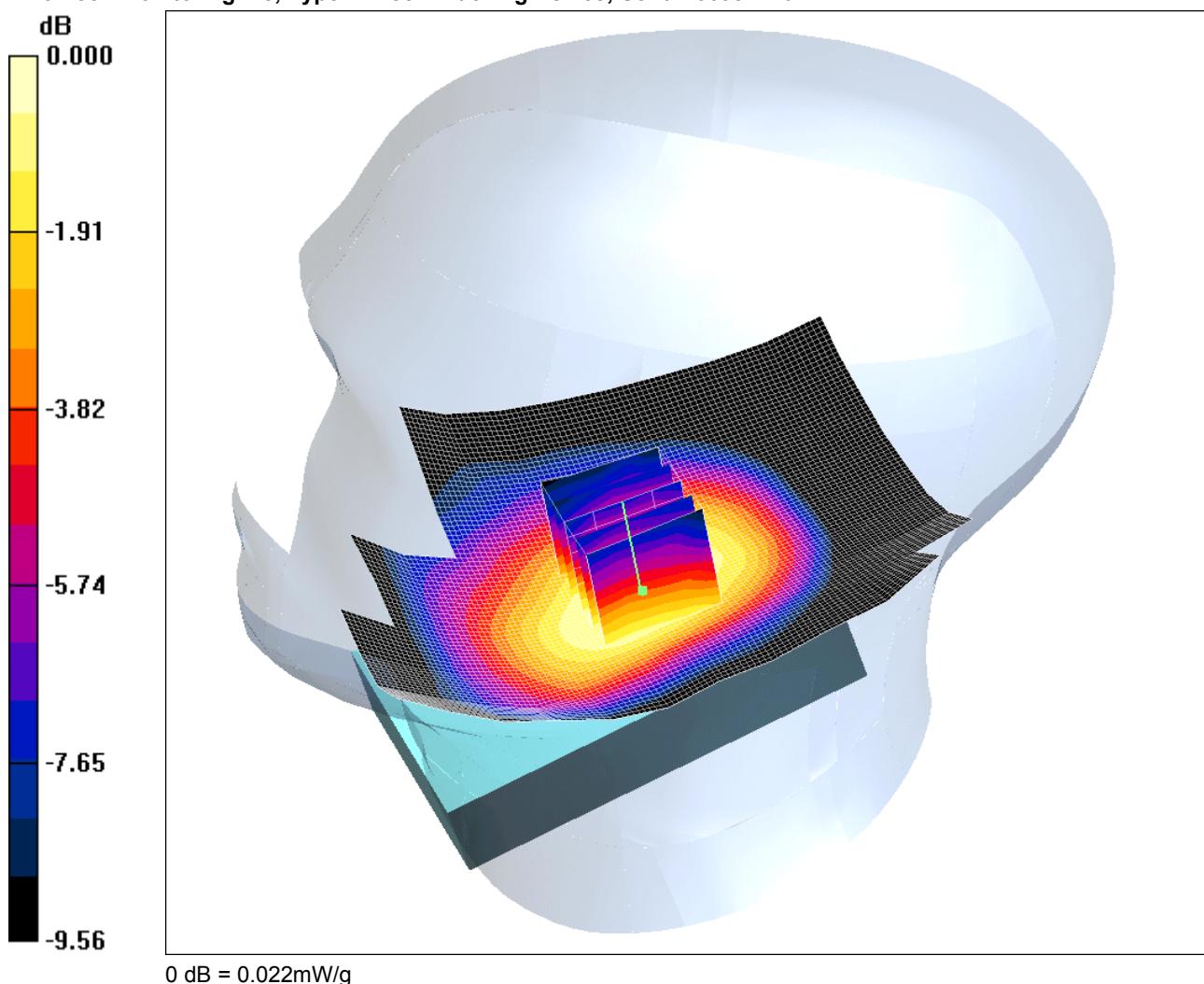
Test of: XT3318

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

SCN/75527JD14/004: Tilt Right GSM CH189

Date 12/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: 850 MHz; Frequency: 836.4 MHz; Duty Cycle: 1:8.3

Medium: 900 MHz HSL Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 0.92$  mho/m;  $\epsilon_r = 41.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.76, 9.76, 9.76); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Tilt Right- Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.022 mW/g

**Tilt Right- Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.57 V/m; Power Drift = 0.150 dB

Peak SAR (extrapolated) = 0.027 W/kg

**SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.015 mW/g**

Maximum value of SAR (measured) = 0.022 mW/g

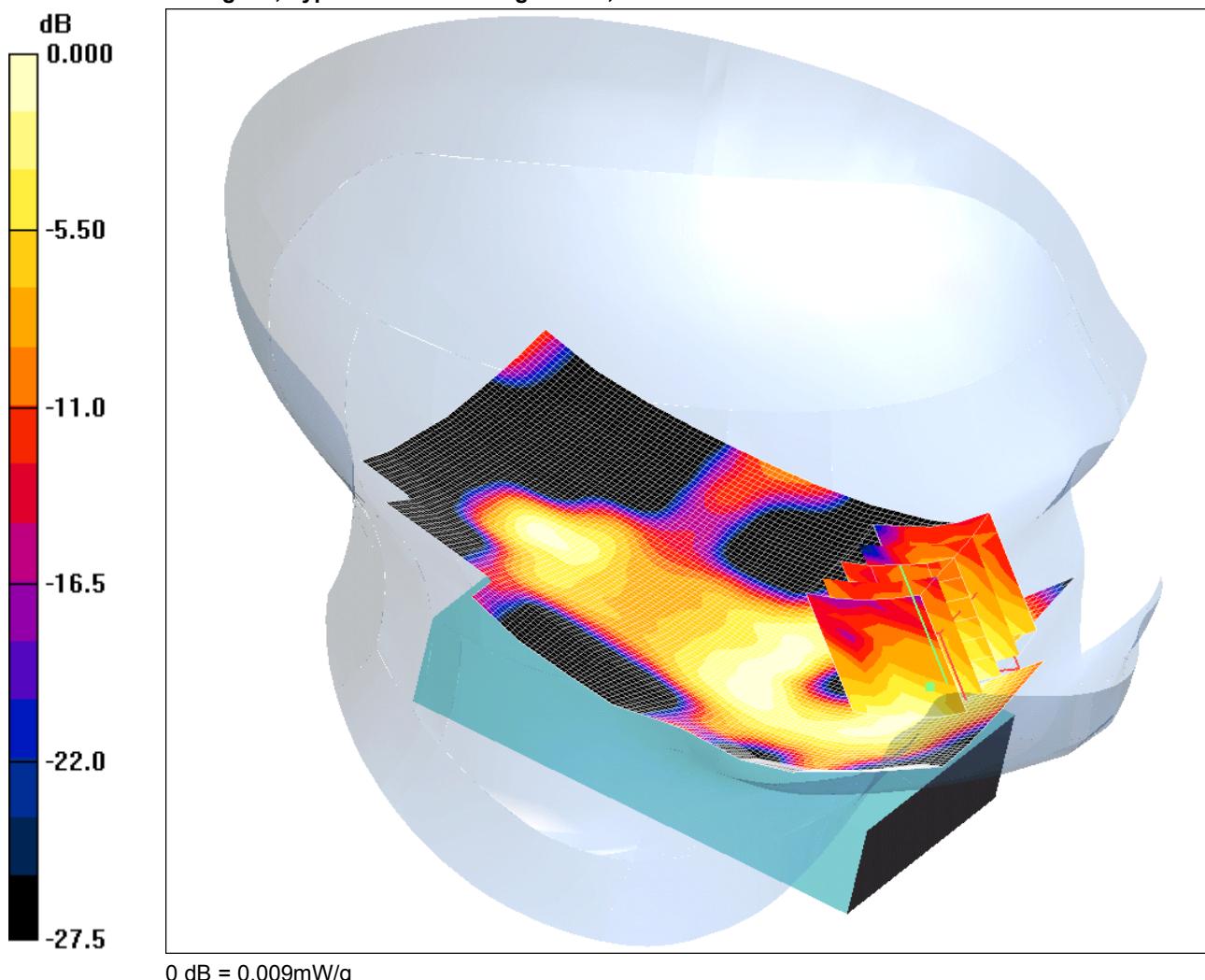
Test of: XT3318

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

SCN/75527JD14/005: Touch Left PCS CH660

Date 12/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: PCS 1900; Frequency: 1879.8 MHz; Duty Cycle: 1:8.3

Medium: 1900 MHz HSL Medium parameters used (interpolated):  $f = 1879.8$  MHz;  $\sigma = 1.4$  mho/m;  $\epsilon_r = 38.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(8.58, 8.58, 8.58); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Touch Left- Middle /Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.012 mW/g

**Touch Left- Middle /Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.78 V/m; Power Drift = 0.363 dB

Peak SAR (extrapolated) = 0.040 W/kg

**SAR(1 g) = 0.00877 mW/g; SAR(10 g) = 0.00473 mW/g**

Maximum value of SAR (measured) = 0.009 mW/g

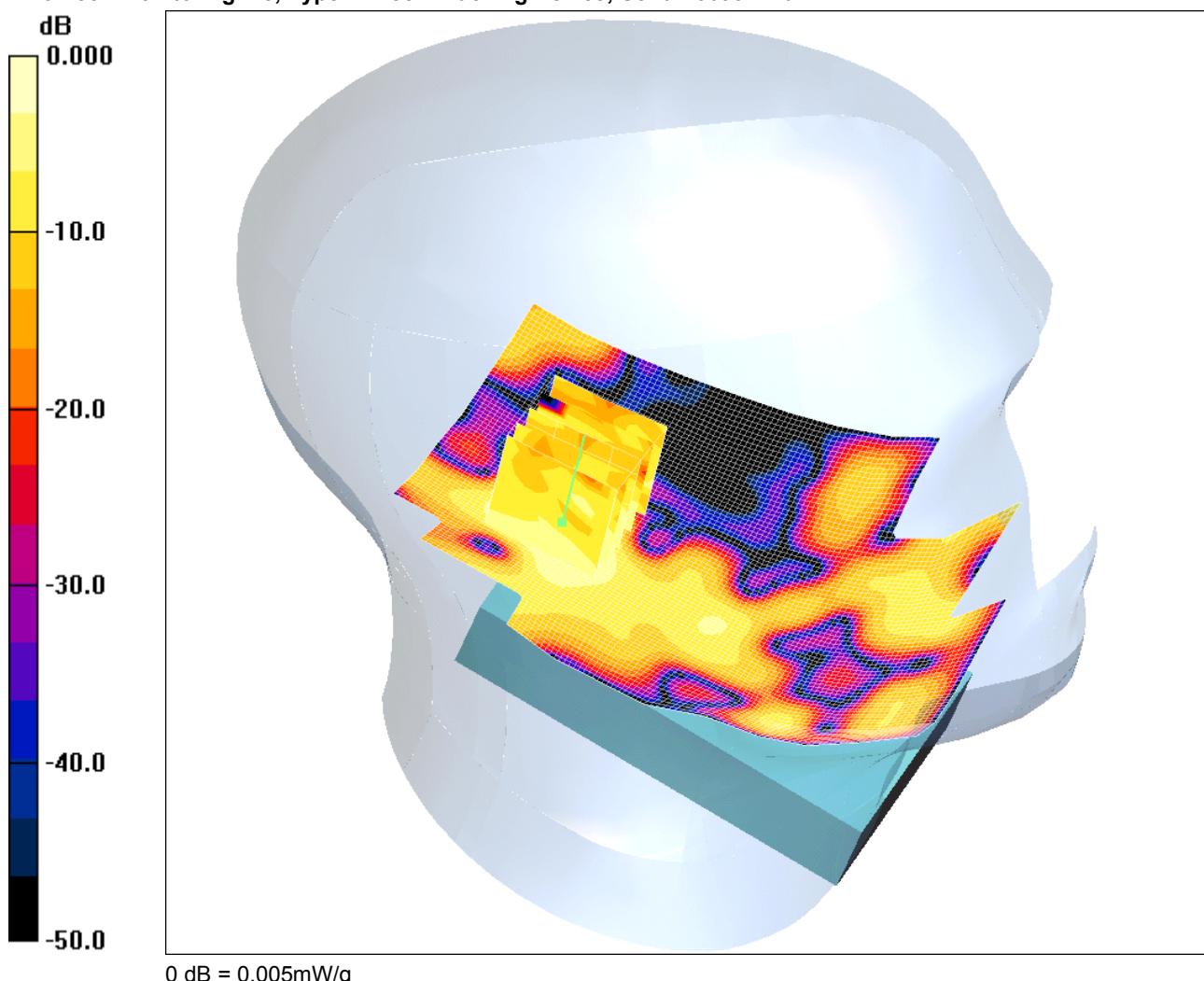
Test of: XT3318

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

SCN/75527JD14/006: Tilt Left PCS CH660

Date 12/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: PCS 1900; Frequency: 1879.8 MHz; Duty Cycle: 1:8.3

Medium: 1900 MHz HSL Medium parameters used (interpolated):  $f = 1879.8$  MHz;  $\sigma = 1.4$  mho/m;  $\epsilon_r = 38.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(8.58, 8.58, 8.58); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Tilt Left- Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.005 mW/g

**Tilt Left- Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.77 V/m; Power Drift = 0.099 dB

Peak SAR (extrapolated) = 0.008 W/kg

**SAR(1 g) = 0.00479 mW/g; SAR(10 g) = 0.0026 mW/g**

Maximum value of SAR (measured) = 0.005 mW/g

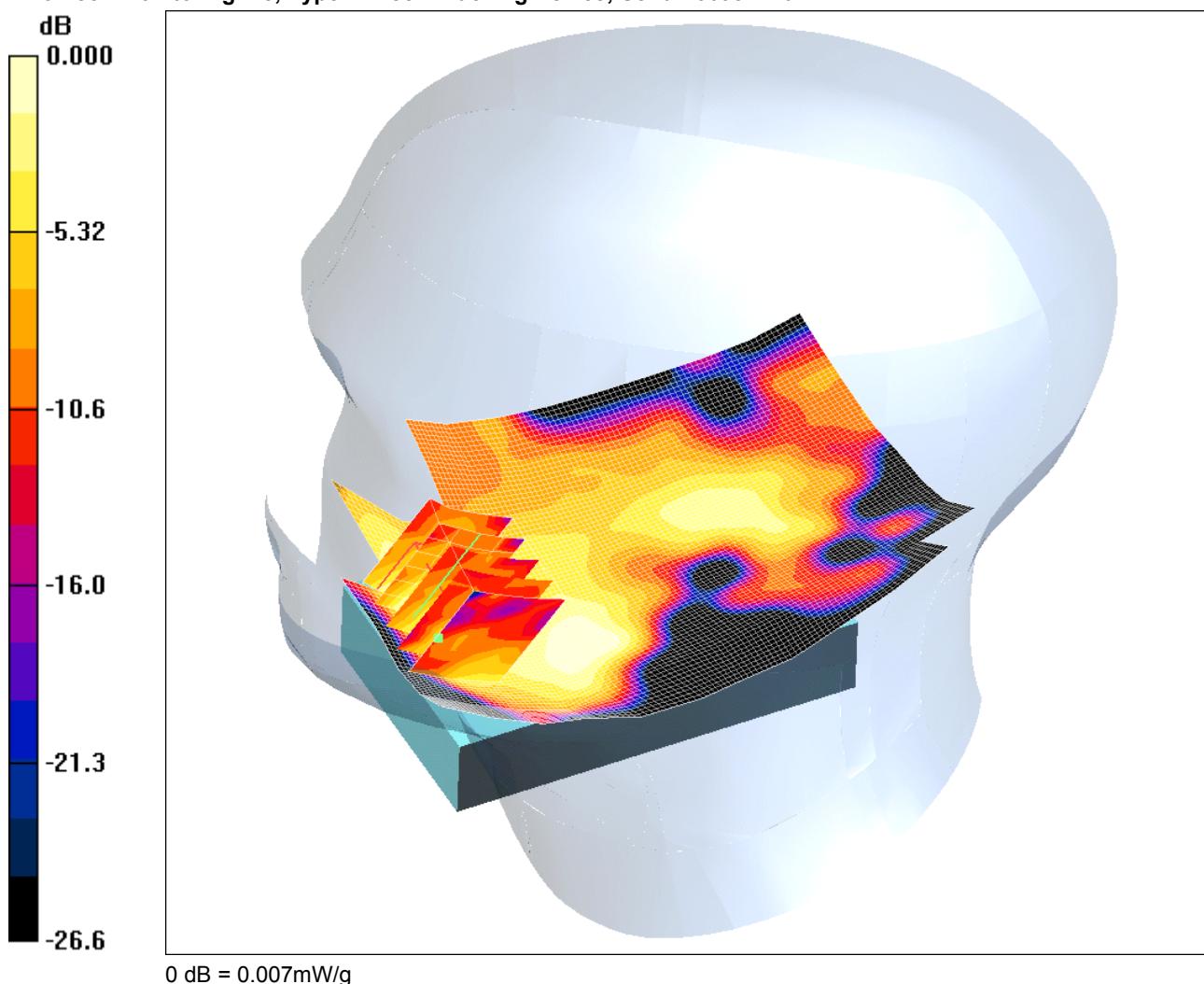
Test of: XT3318

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

SCN/75527JD14/007: Touch Right PCS CH660

Date 12/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: PCS 1900; Frequency: 1879.8 MHz; Duty Cycle: 1:8.3

Medium: 1900 MHz HSL Medium parameters used (interpolated):  $f = 1879.8$  MHz;  $\sigma = 1.4$  mho/m;  $\epsilon_r = 38.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(8.58, 8.58, 8.58); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Touch Right- Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.008 mW/g

**Touch Right- Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.81 V/m; Power Drift = -0.115 dB

Peak SAR (extrapolated) = 0.012 W/kg

**SAR(1 g) = 0.00688 mW/g; SAR(10 g) = 0.00366 mW/g**

Maximum value of SAR (measured) = 0.007 mW/g

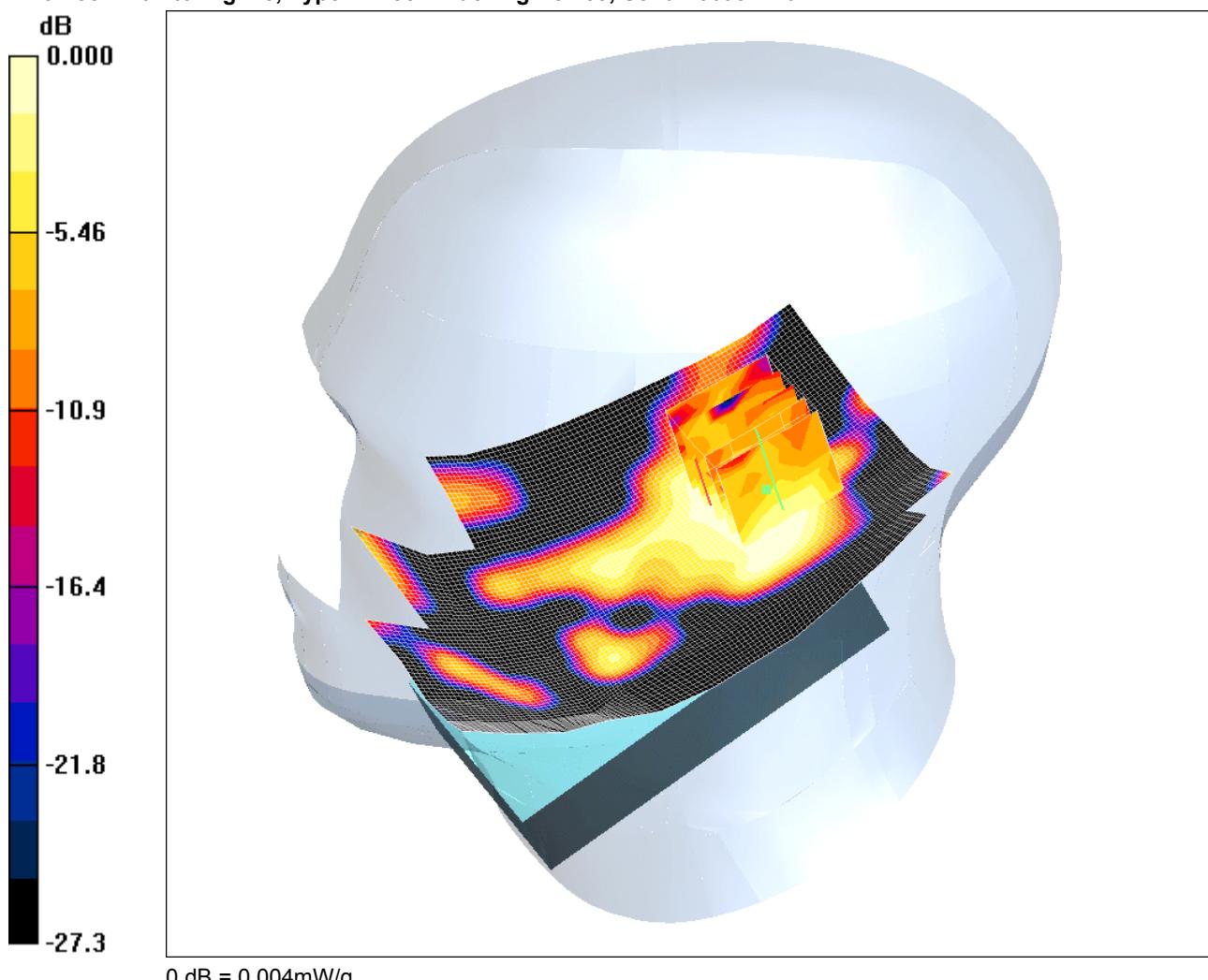
Test of: XT3318

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

SCN/75527JD14/008: Tilt Right PCS CH660

Date 12/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: PCS 1900; Frequency: 1879.8 MHz; Duty Cycle: 1:8.3

Medium: 1900 MHz HSL Medium parameters used (interpolated):  $f = 1879.8$  MHz;  $\sigma = 1.4$  mho/m;  $\epsilon_r = 38.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(8.58, 8.58, 8.58); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Tilt Right- Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.006 mW/g

**Tilt Right- Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.78 V/m; Power Drift = -0.113 dB

Peak SAR (extrapolated) = 0.007 W/kg

**SAR(1 g) = 0.00394 mW/g; SAR(10 g) = 0.00238 mW/g**

Maximum value of SAR (measured) = 0.004 mW/g

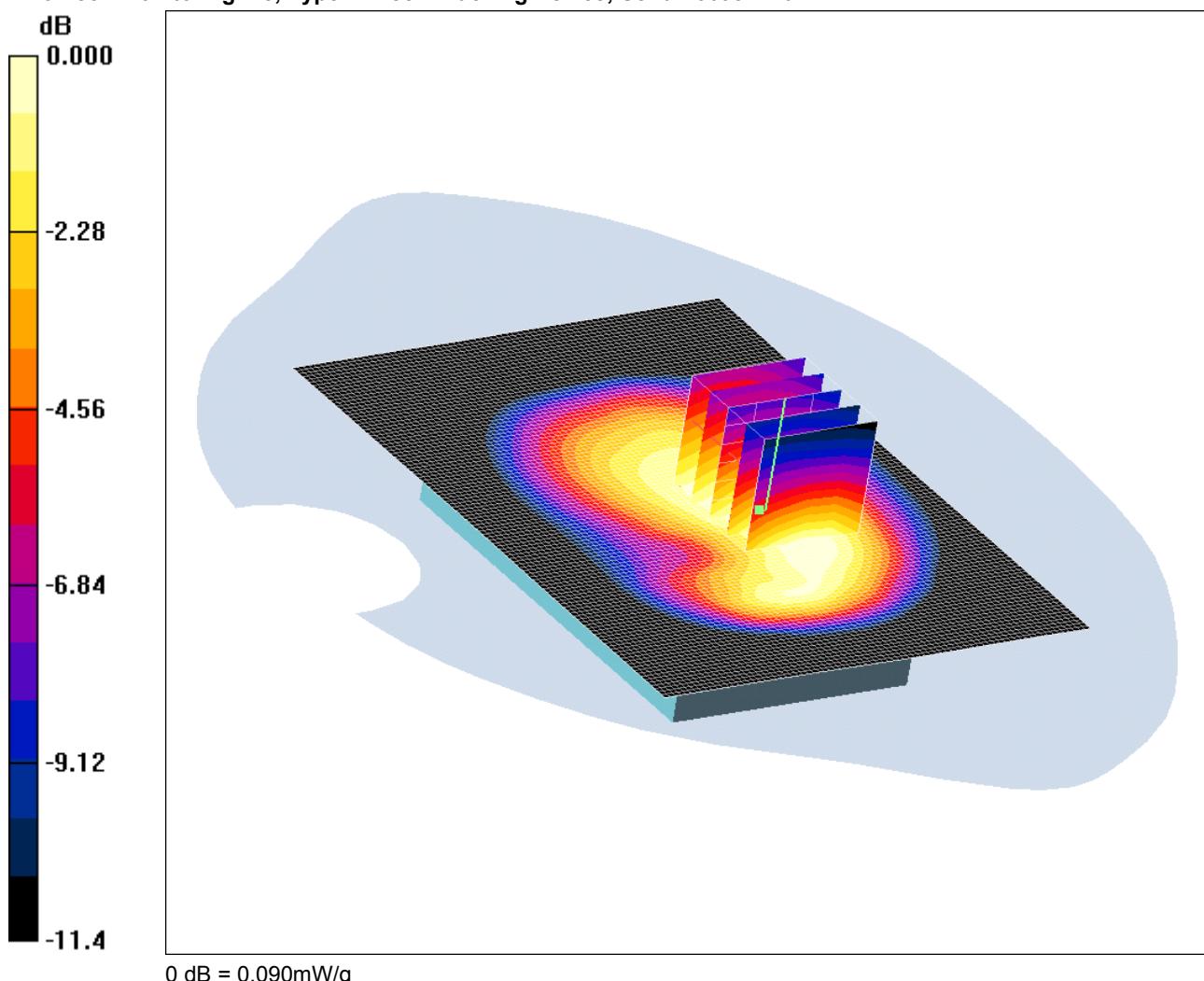
Test of: XT3318

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

SCN/75527JD14/009: Front of EUT Facing Phantom GSM CH189

Date 14/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: 850 MHz; Frequency: 836.4 MHz; Duty Cycle: 1:8.3

Medium: 900 MHz MSL Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 0.968$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.99, 9.99, 9.99); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn450; Calibrated: 30/04/2009

- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Front of EUT Facing Phantom - Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.091 mW/g

**Front of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.71 V/m; Power Drift = 0.047 dB

Peak SAR (extrapolated) = 0.124 W/kg

**SAR(1 g) = 0.085 mW/g; SAR(10 g) = 0.061 mW/g**

Maximum value of SAR (measured) = 0.090 mW/g

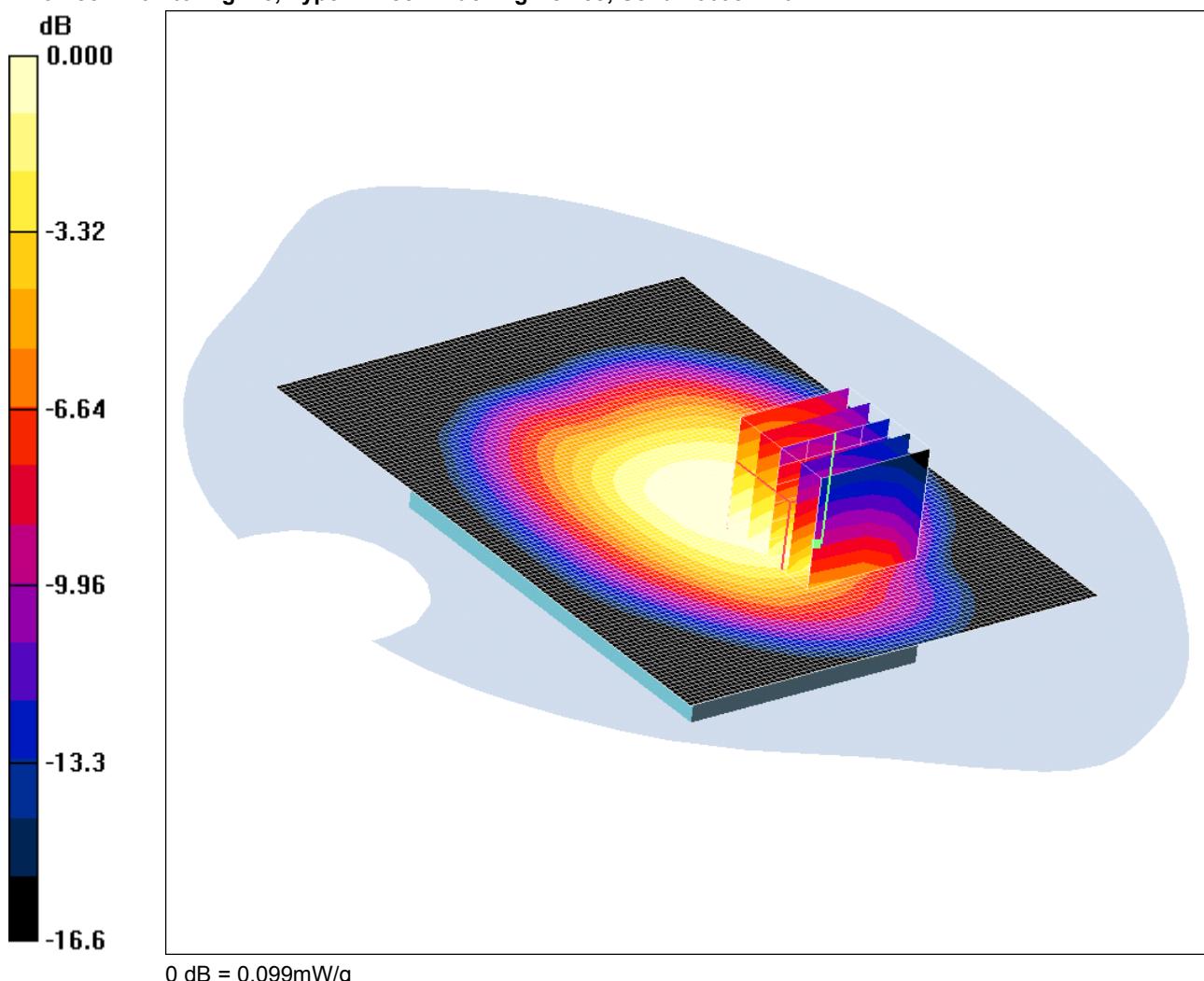
Test of: XT3318

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

SCN/75527JD14/010: Rear of EUT Facing Phantom GSM CH189

Date 14/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: 850 MHz; Frequency: 836.4 MHz; Duty Cycle: 1:8.3

Medium: 900 MHz MSL Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 0.968$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.99, 9.99, 9.99); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn450; Calibrated: 30/04/2009

- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Front of EUT Facing Phantom - Middle/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.124 mW/g

Front of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.34 V/m; Power Drift = -0.001 dB

Peak SAR (extrapolated) = 0.212 W/kg

SAR(1 g) = 0.095 mW/g; SAR(10 g) = 0.062 mW/g

Maximum value of SAR (measured) = 0.099 mW/g

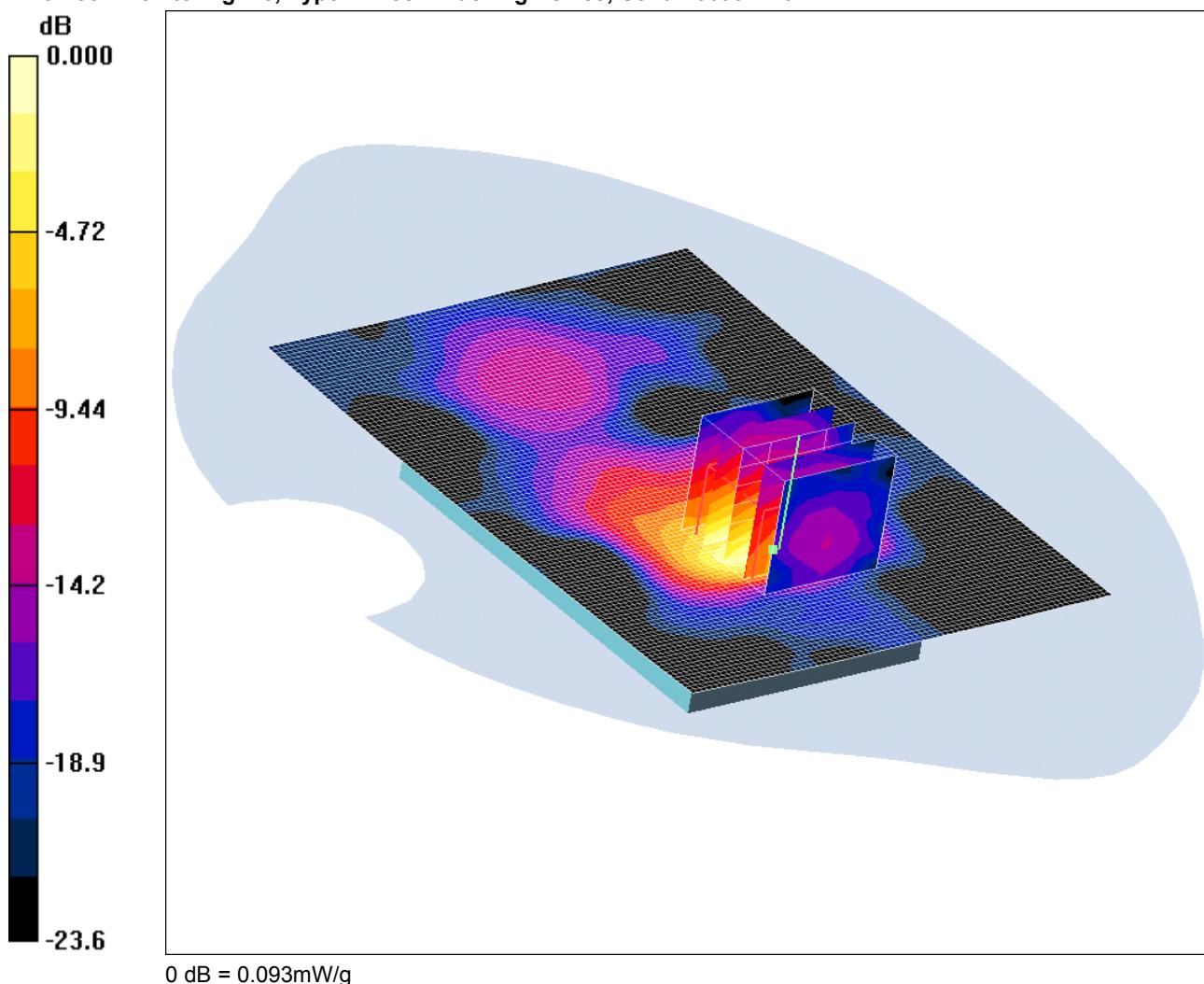
Test of: XT3318

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

SCN/75527JD14/011: Front of EUT Facing Phantom PCS CH660

Date 26/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: PCS 1900; Frequency: 1879.8 MHz; Duty Cycle: 1:8.3

Medium: 1900 MHz MSL Medium parameters used (interpolated):  $f = 1879.8$  MHz;  $\sigma = 1.54$  mho/m;  $\epsilon_r = 51.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(8.23, 8.23, 8.23); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn450; Calibrated: 30/04/2009

- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Front of EUT Facing Phantom - Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.094 mW/g

**Front of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.57 V/m; Power Drift = -0.205 dB

Peak SAR (extrapolated) = 0.235 W/kg

**SAR(1 g) = 0.096 mW/g; SAR(10 g) = 0.038 mW/g**

Maximum value of SAR (measured) = 0.093 mW/g

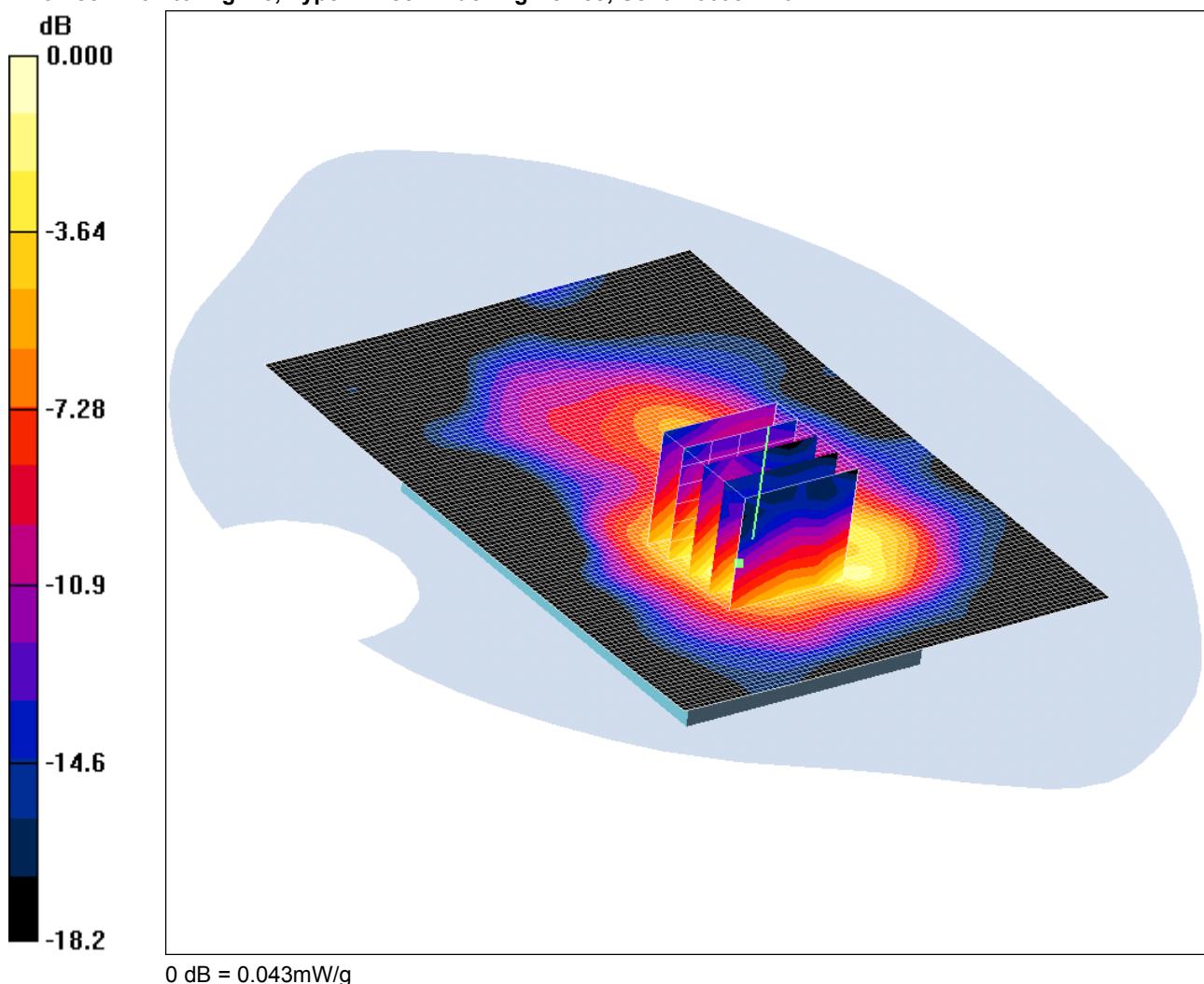
Test of: XT3318

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

SCN/75527JD14/012: Rear of EUT Facing Phantom PCS CH660

Date 26/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: PCS 1900; Frequency: 1879.8 MHz; Duty Cycle: 1:8.3

Medium: 1900 MHz MSL Medium parameters used (interpolated):  $f = 1879.8$  MHz;  $\sigma = 1.54$  mho/m;  $\epsilon_r = 51.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(8.23, 8.23, 8.23); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn450; Calibrated: 30/04/2009

- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Rear of EUT Facing Phantom - Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.039 mW/g

**Rear of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.12 V/m; Power Drift = 0.339 dB

Peak SAR (extrapolated) = 0.070 W/kg

**SAR(1 g) = 0.039 mW/g; SAR(10 g) = 0.022 mW/g**

Maximum value of SAR (measured) = 0.043 mW/g

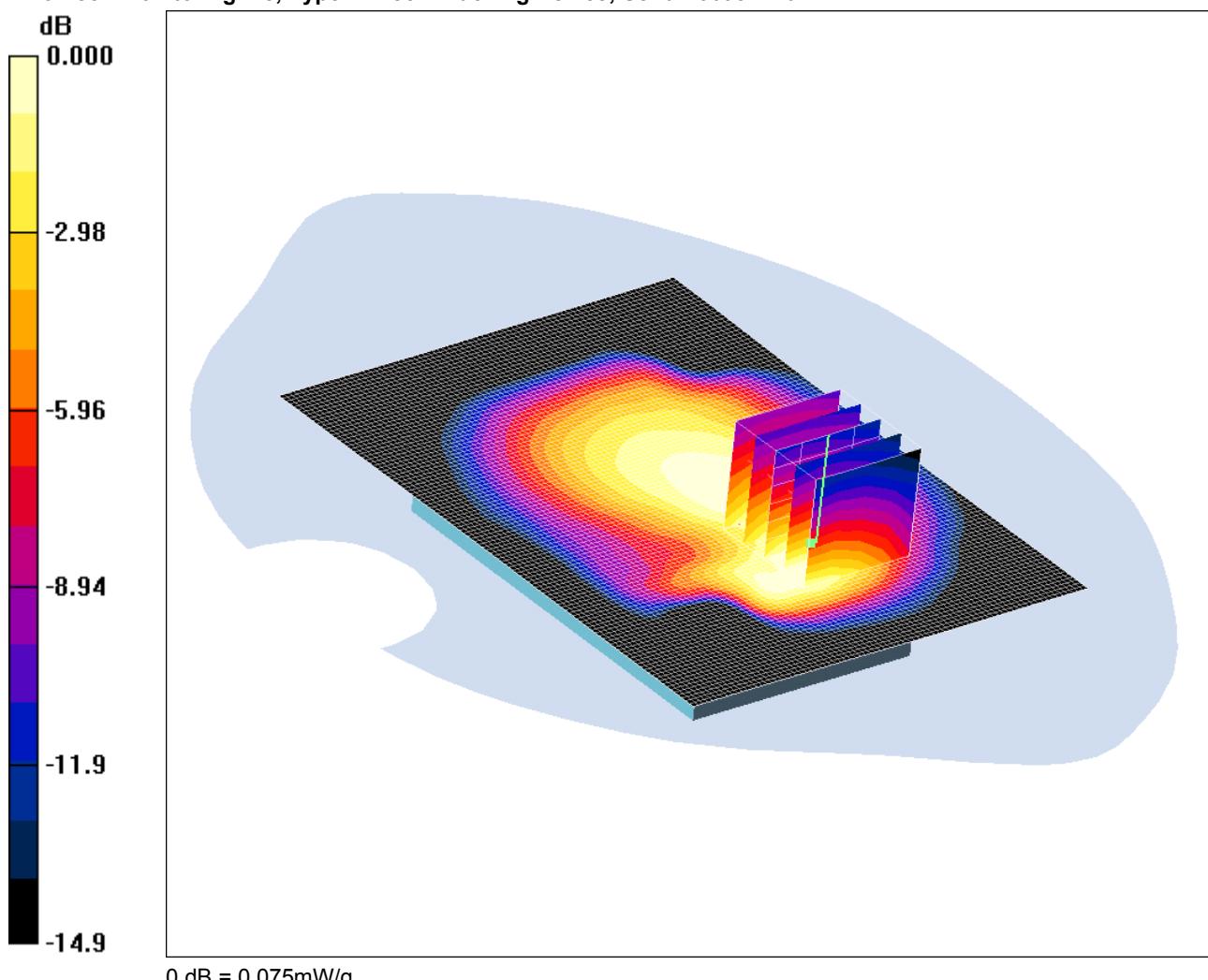
Test of: XT3318

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

SCN/75527JD14/013: Front of EUT Facing Phantom GPRS CH189

Date 12/10/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: GPRS 850 MHz; Frequency: 836.4 MHz; Duty Cycle: 1:4

Medium: 900 MHz MSL Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 0.957$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.99, 9.99, 9.99); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn450; Calibrated: 30/04/2009

- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Front of EUT Facing Phantom - Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.078 mW/g

**Front of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.93 V/m; Power Drift = -0.063 dB

Peak SAR (extrapolated) = 0.127 W/kg

**SAR(1 g) = 0.070 mW/g; SAR(10 g) = 0.043 mW/g**

Maximum value of SAR (measured) = 0.075 mW/g

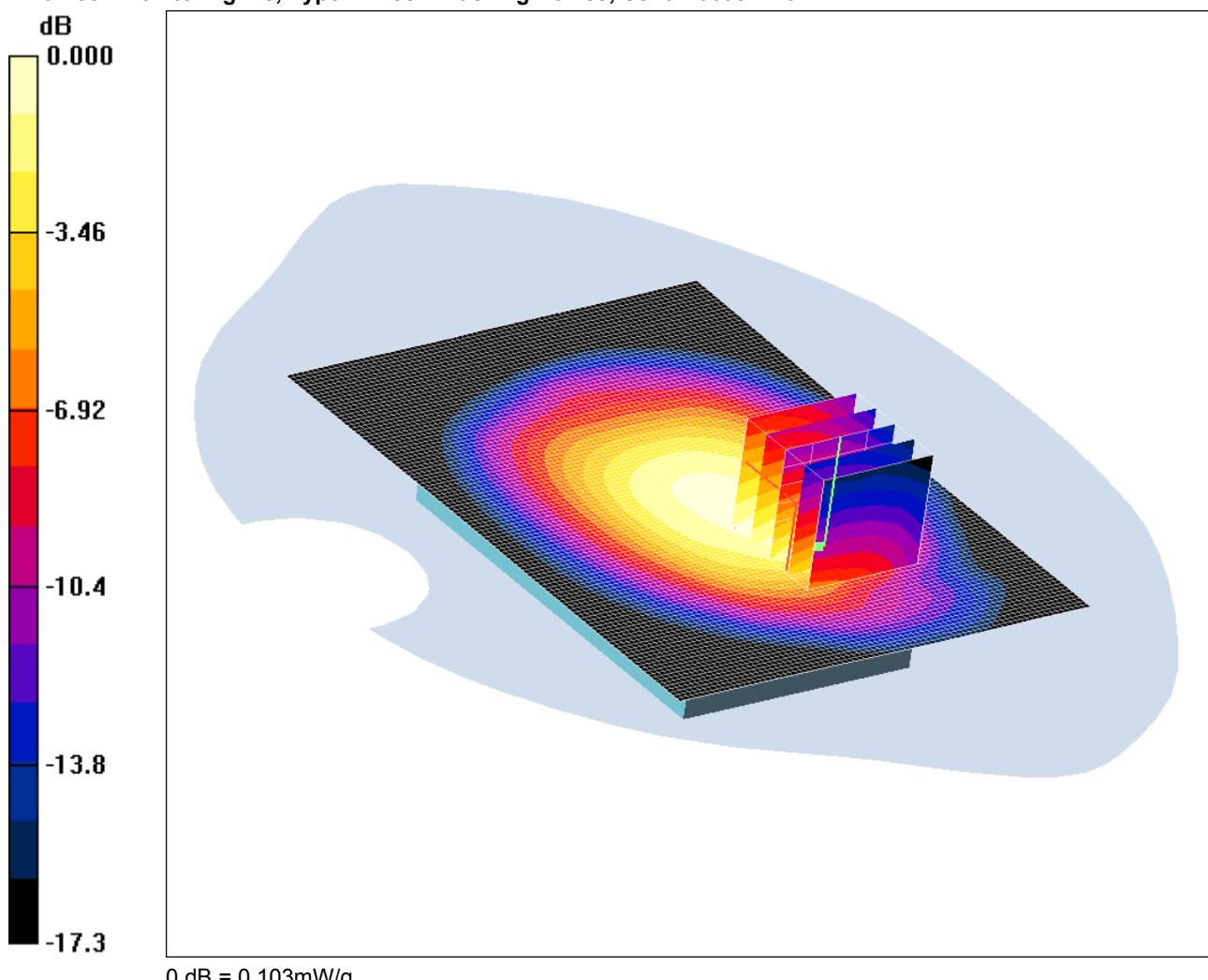
Test of: XT3318

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

SCN/75527JD14/014: Rear of EUT Facing Phantom GPRS CH189

Date 12/10/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: GPRS 850 MHz; Frequency: 836.4 MHz; Duty Cycle: 1:4

Medium: 900 MHz MSL Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 0.957$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.99, 9.99, 9.99); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn450; Calibrated: 30/04/2009

- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Rear of EUT Facing Phantom - Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.119 mW/g

**Rear of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.89 V/m; Power Drift = -0.034 dB

Peak SAR (extrapolated) = 0.205 W/kg

**SAR(1 g) = 0.094 mW/g; SAR(10 g) = 0.058 mW/g**

Maximum value of SAR (measured) = 0.103 mW/g

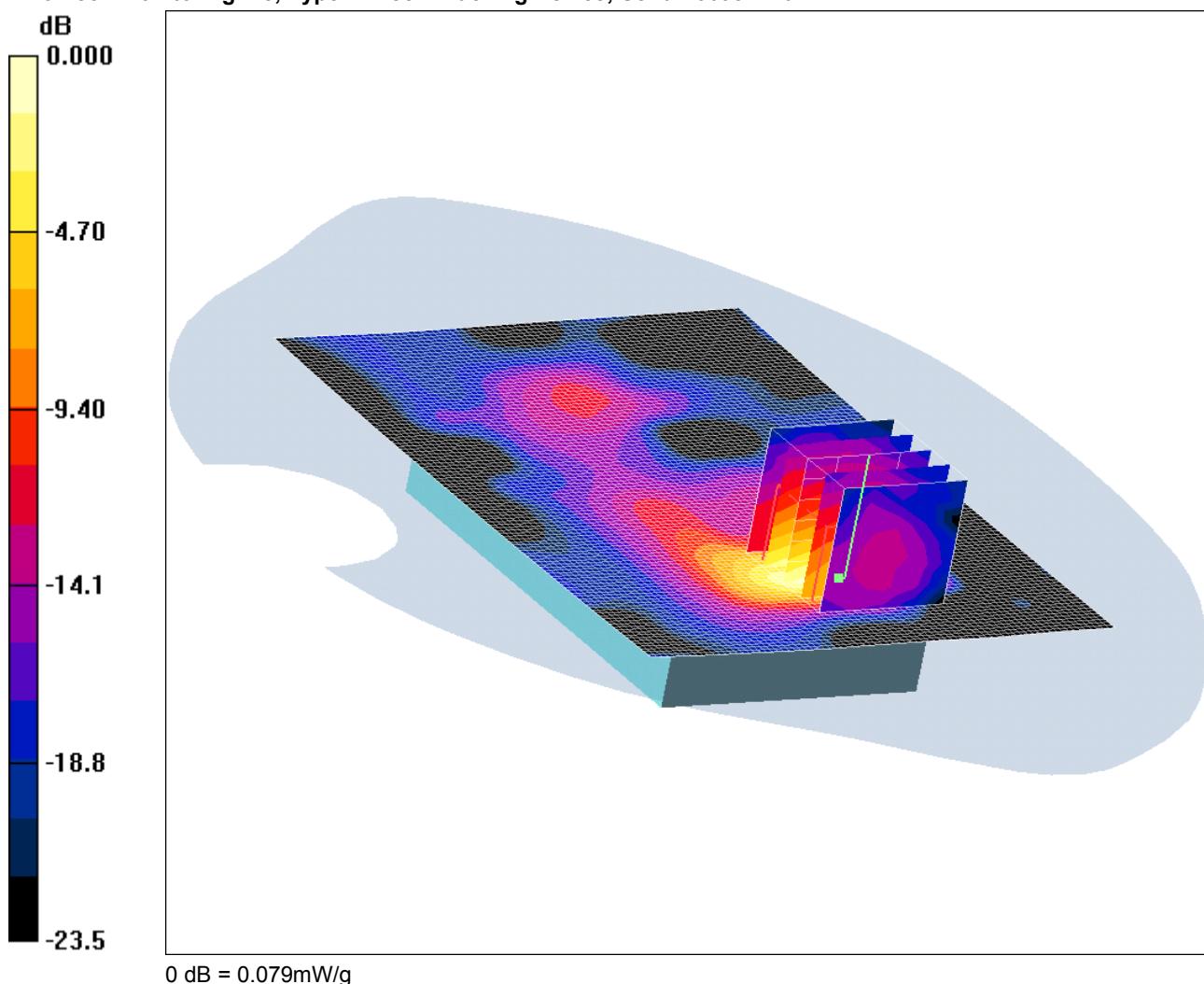
Test of: XT3318

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

SCN/75527JD14/015: Front of EUT Facing Phantom GPRS CH660

Date 17/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: GPRS 1900; Frequency: 1879.8 MHz; Duty Cycle: 1:4

Medium: 1900 MHz MSL Medium parameters used (interpolated):  $f = 1879.8$  MHz;  $\sigma = 1.56$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(8.23, 8.23, 8.23); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn450; Calibrated: 30/04/2009

- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Front of EUT Facing Phantom - Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.077 mW/g

**Front of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.11 V/m; Power Drift = 0.234 dB

Peak SAR (extrapolated) = 0.176 W/kg

**SAR(1 g) = 0.075 mW/g; SAR(10 g) = 0.031 mW/g**

Maximum value of SAR (measured) = 0.079 mW/g

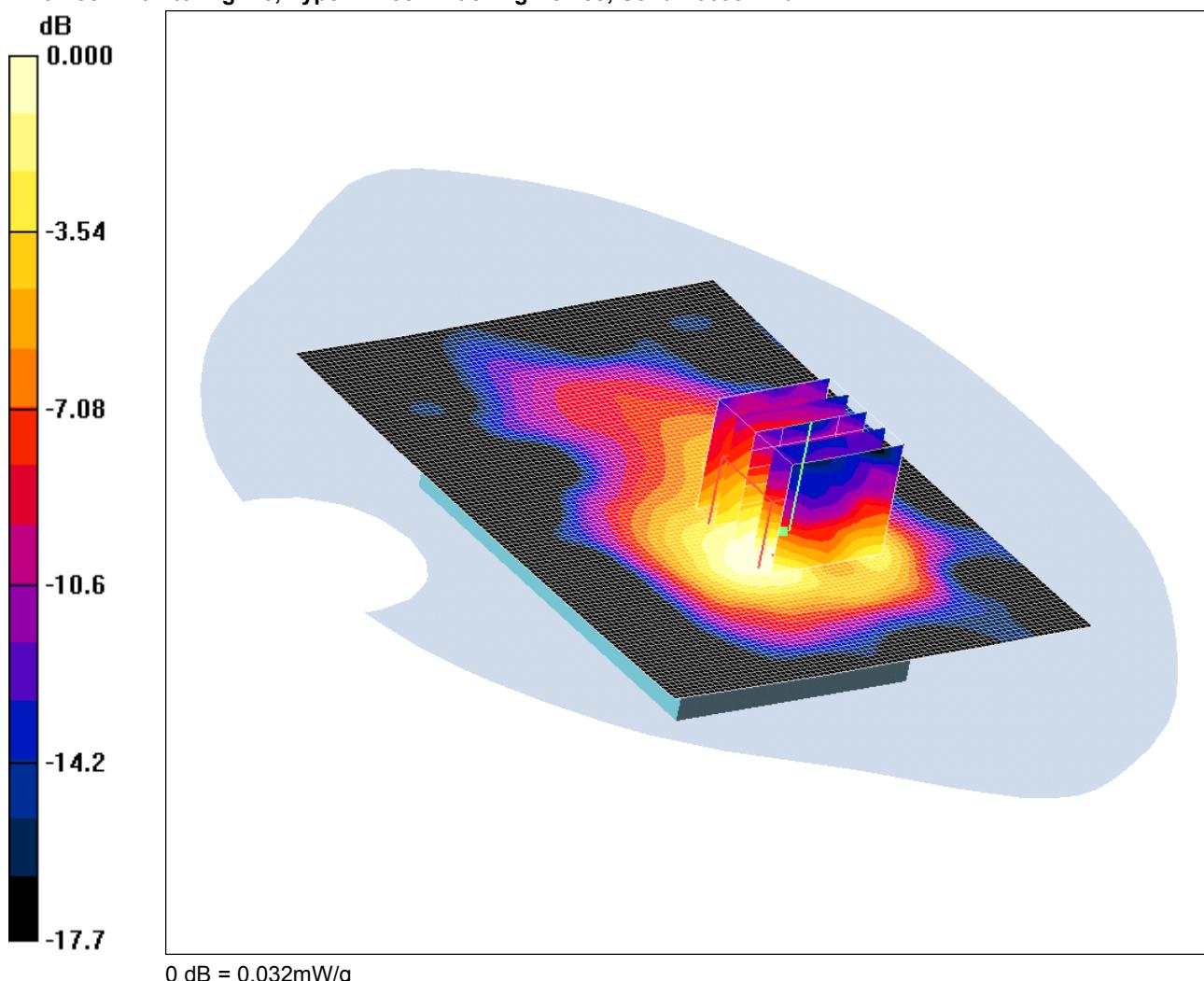
Test of: XT3318

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

SCN/75527JD14/016: Rear of EUT Facing Phantom GPRS CH660

Date 17/09/2009

DUT: Pro Tech Monitoring inc; Type: X-Tech Tracking Device; Serial: 36984440



Communication System: GPRS 1900; Frequency: 1879.8 MHz; Duty Cycle: 1:4

Medium: 1900 MHz MSL Medium parameters used (interpolated):  $f = 1879.8$  MHz;  $\sigma = 1.56$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(8.23, 8.23, 8.23); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn450; Calibrated: 30/04/2009

- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Rear of EUT Facing Phantom - Middle/Area Scan (81x111x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.032 mW/g

**Rear of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.16 V/m; Power Drift = 0.332 dB

Peak SAR (extrapolated) = 0.052 W/kg

**SAR(1 g) = 0.029 mW/g; SAR(10 g) = 0.017 mW/g**

Maximum value of SAR (measured) = 0.032 mW/g

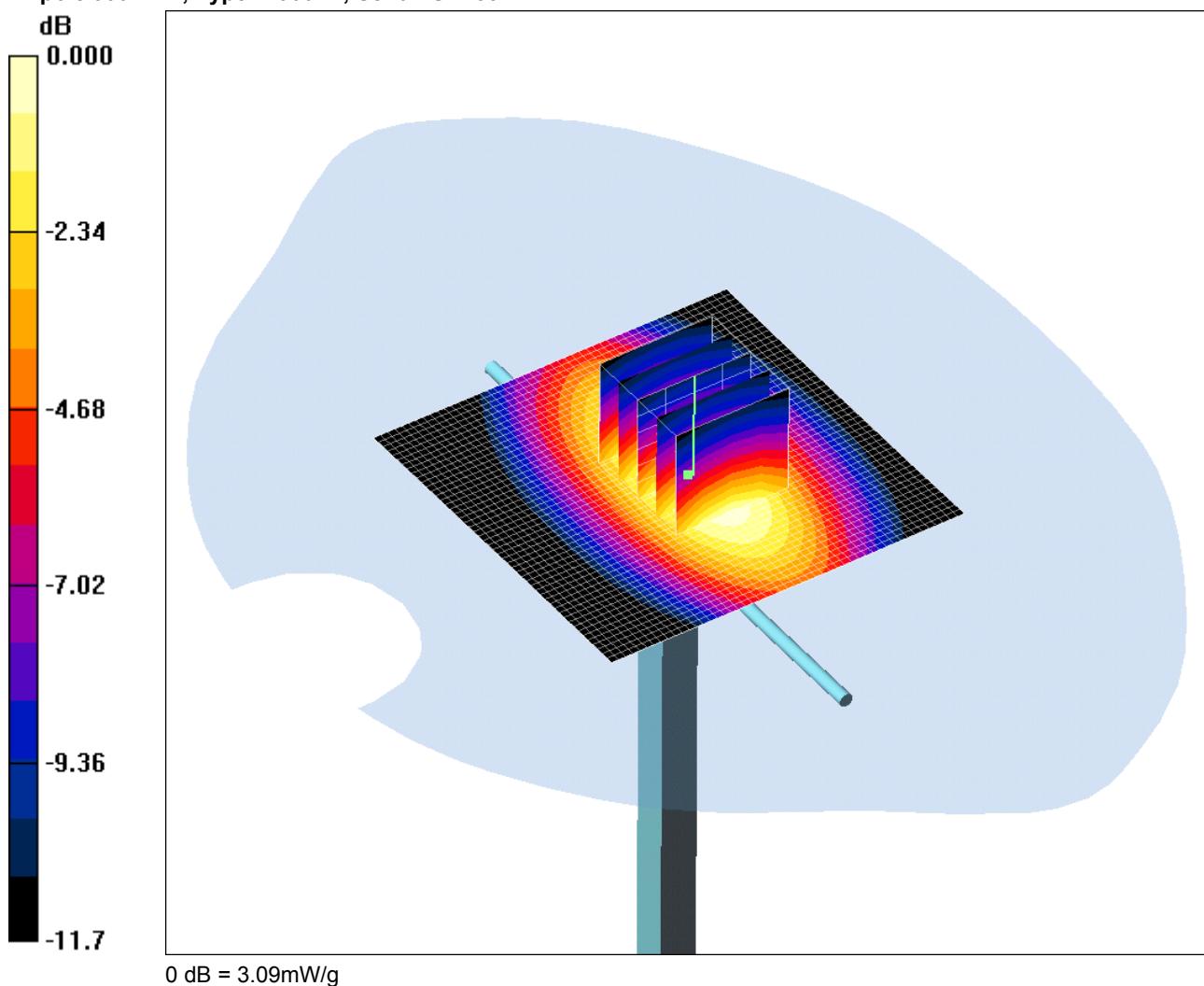
Test of: XT3318

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

SCN/75527JD14/017: System Performance Check 900MHz Head 12 09 09

Date 12/09/2009

DUT: Dipole 900 MHz; Type: D900V2; Serial: SN185



Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: 900 MHz HSL Medium parameters used:  $f = 900$  MHz;  $\sigma = 0.996$  mho/m;  $\epsilon_r = 40.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.76, 9.76, 9.76); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**d=15mm, Pin=250mW/Area Scan (51x51x1):** Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 3.12 mW/g

**d=15mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 53.7 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 4.42 W/kg

**SAR(1 g) = 2.85 mW/g; SAR(10 g) = 1.8 mW/g**

Maximum value of SAR (measured) = 3.09 mW/g

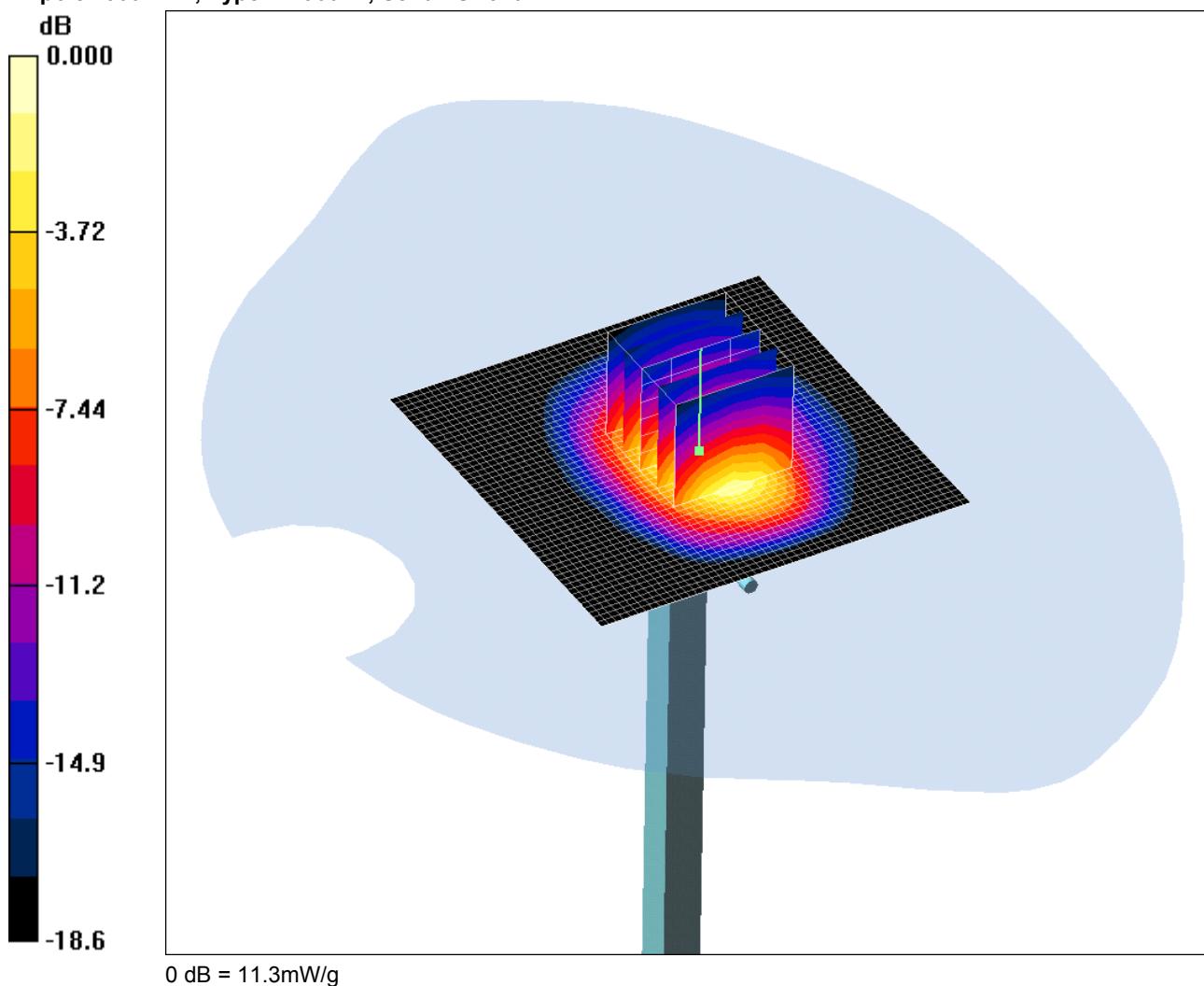
Test of: XT3318

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

SCN/75527JD14/018: System Performance Check 1900MHz Head 12 09 09

Date 12/09/2009

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN540



Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 MHz HSL Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.42$  mho/m;  $\epsilon_r = 38.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(8.58, 8.58, 8.58); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**d=10mm, Pin=250mW/Area Scan (51x51x1):** Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 13.7 mW/g

**d=10mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 82.7 V/m; Power Drift = 0.017 dB

Peak SAR (extrapolated) = 19.2 W/kg

**SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.2 mW/g**

Maximum value of SAR (measured) = 11.3 mW/g

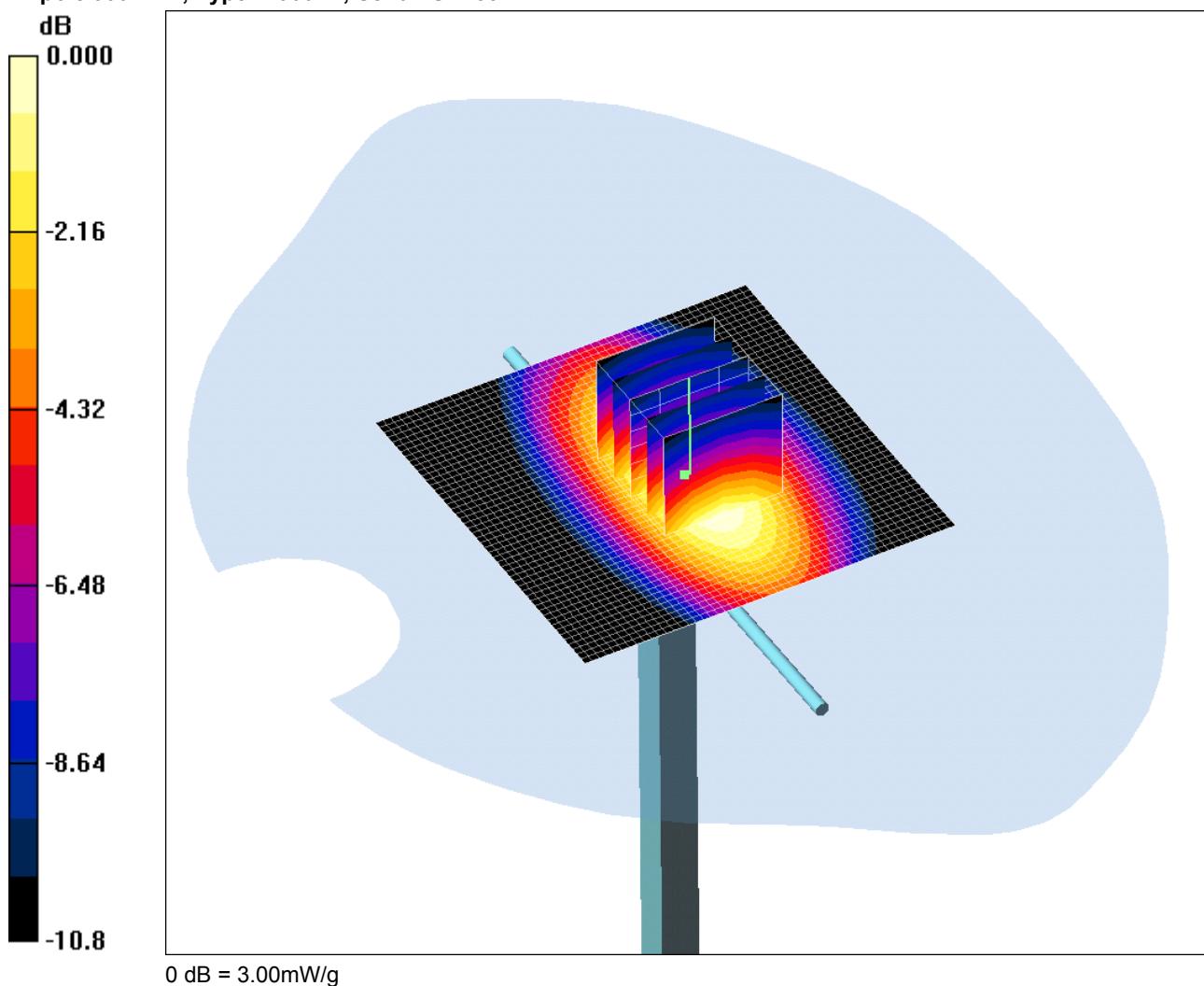
Test of: XT3318

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

SCN/75527JD14/019: System Performance Check 900MHz Body 14 09 09

Date 14/09/2009

DUT: Dipole 900 MHz; Type: D900V2; Serial: SN185



Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: 900 MHz MSL Medium parameters used:  $f = 900$  MHz;  $\sigma = 1.03$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.99, 9.99, 9.99); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**d=15mm, Pin=250mW/Area Scan (51x51x1):** Measurement grid: dx=20mm, dy=20mm  
Maximum value of SAR (interpolated) = 3.10 mW/g

**d=15mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 52.0 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 4.17 W/kg

**SAR(1 g) = 2.78 mW/g; SAR(10 g) = 1.8 mW/g**

Maximum value of SAR (measured) = 3.00 mW/g

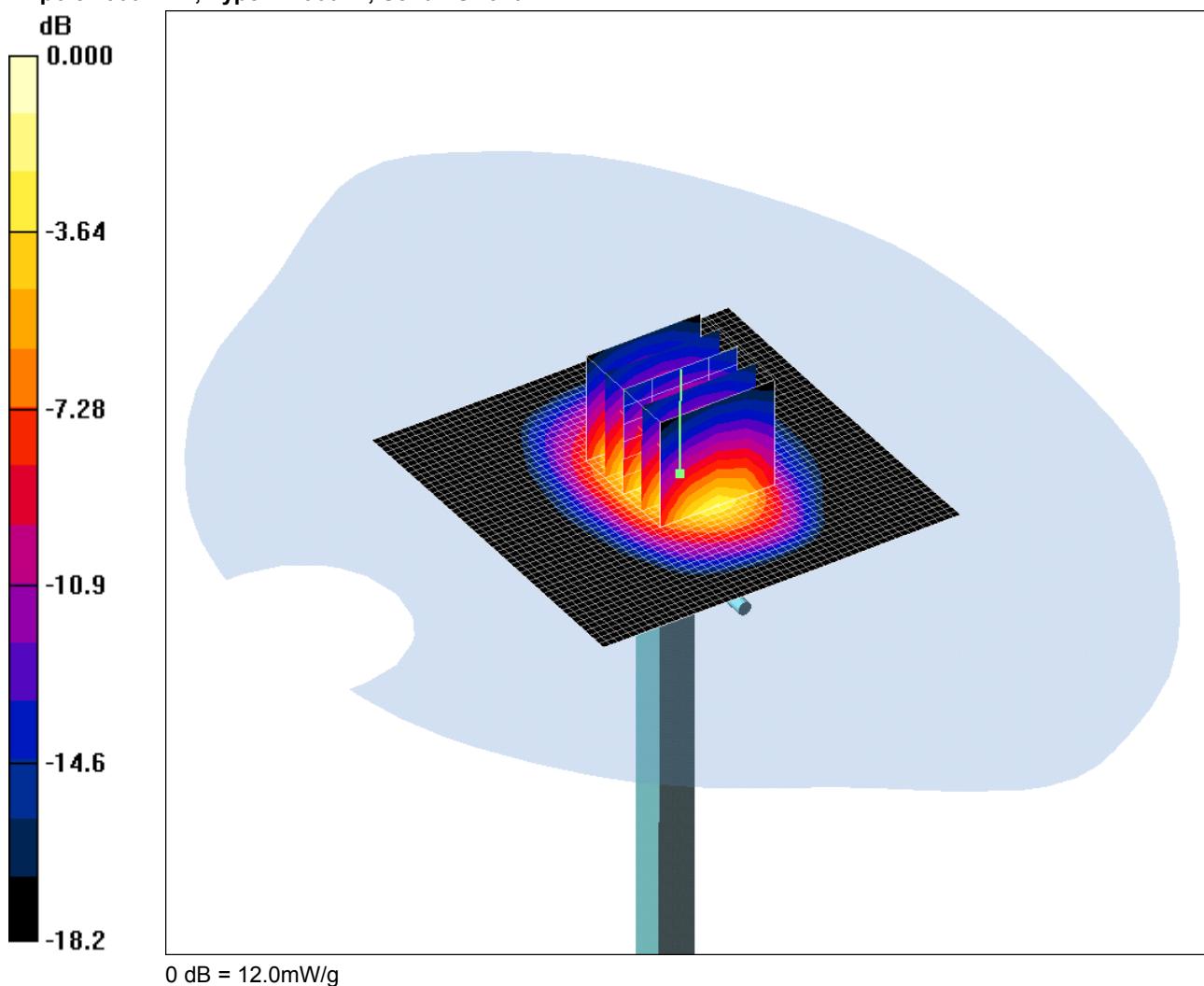
Test of: XT3318

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

SCN/75527JD14/020: System Performance Check 1900MHz Body 17 09 09

Date 17/09/2009

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN540



Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 53.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(8.23, 8.23, 8.23); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**d=10mm, Pin=250mW/Area Scan (51x51x1):** Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 14.6 mW/g

**d=10mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 83.6 V/m; Power Drift = 0.048 dB

Peak SAR (extrapolated) = 19.8 W/kg

**SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.38 mW/g**

Maximum value of SAR (measured) = 12.0 mW/g

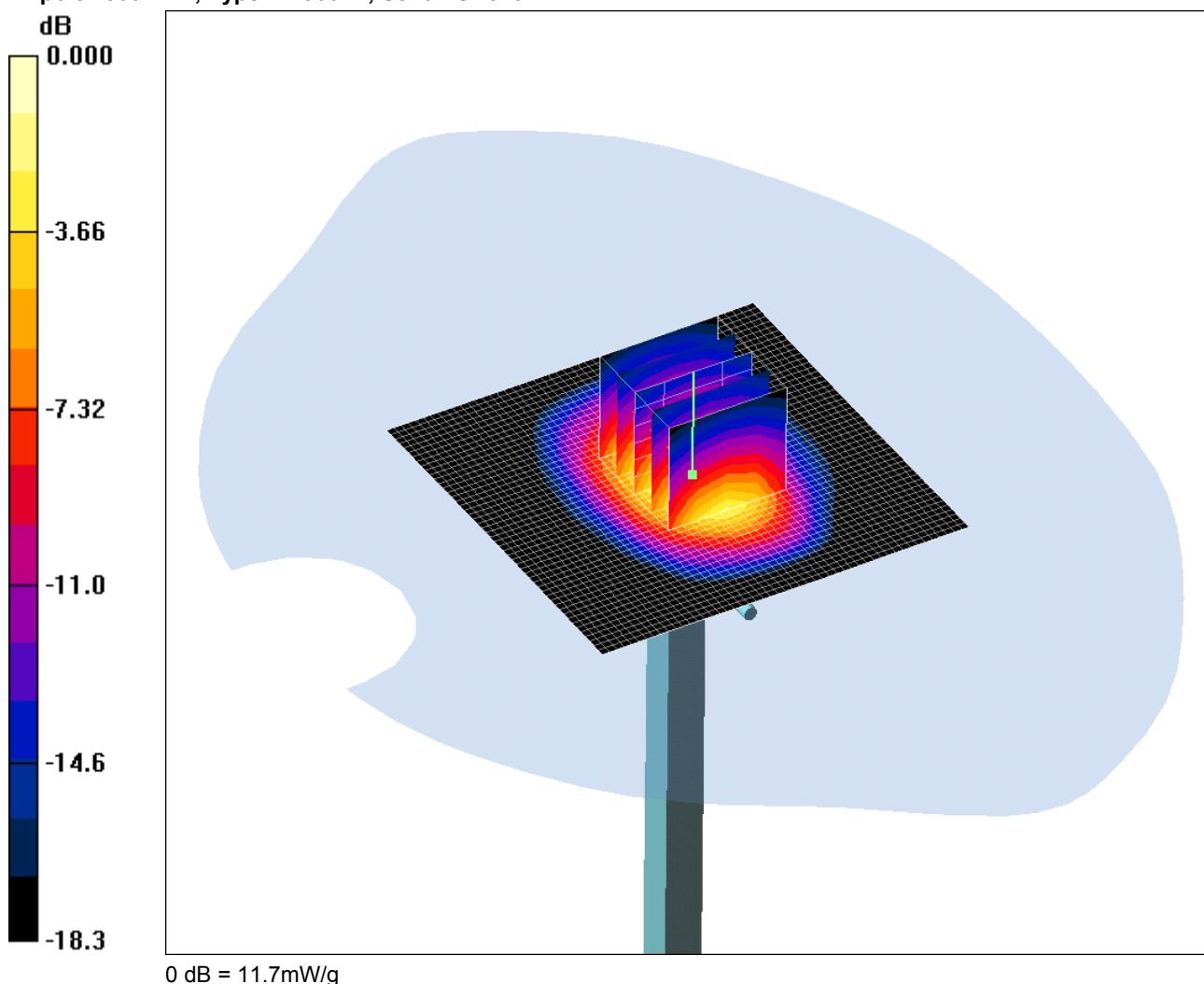
Test of: XT3318

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

SCN/75527JD14/021: System Performance Check 1900MHz Body 26 09 09

Date 26/09/2009

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN540



Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.56$  mho/m;  $\epsilon_r = 51.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(8.23, 8.23, 8.23); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**d=10mm, Pin=250mW/Area Scan (51x51x1):** Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 14.4 mW/g

**d=10mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 84.1 V/m; Power Drift = 0.049 dB

Peak SAR (extrapolated) = 19.6 W/kg

**SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.3 mW/g**

Maximum value of SAR (measured) = 11.7 mW/g

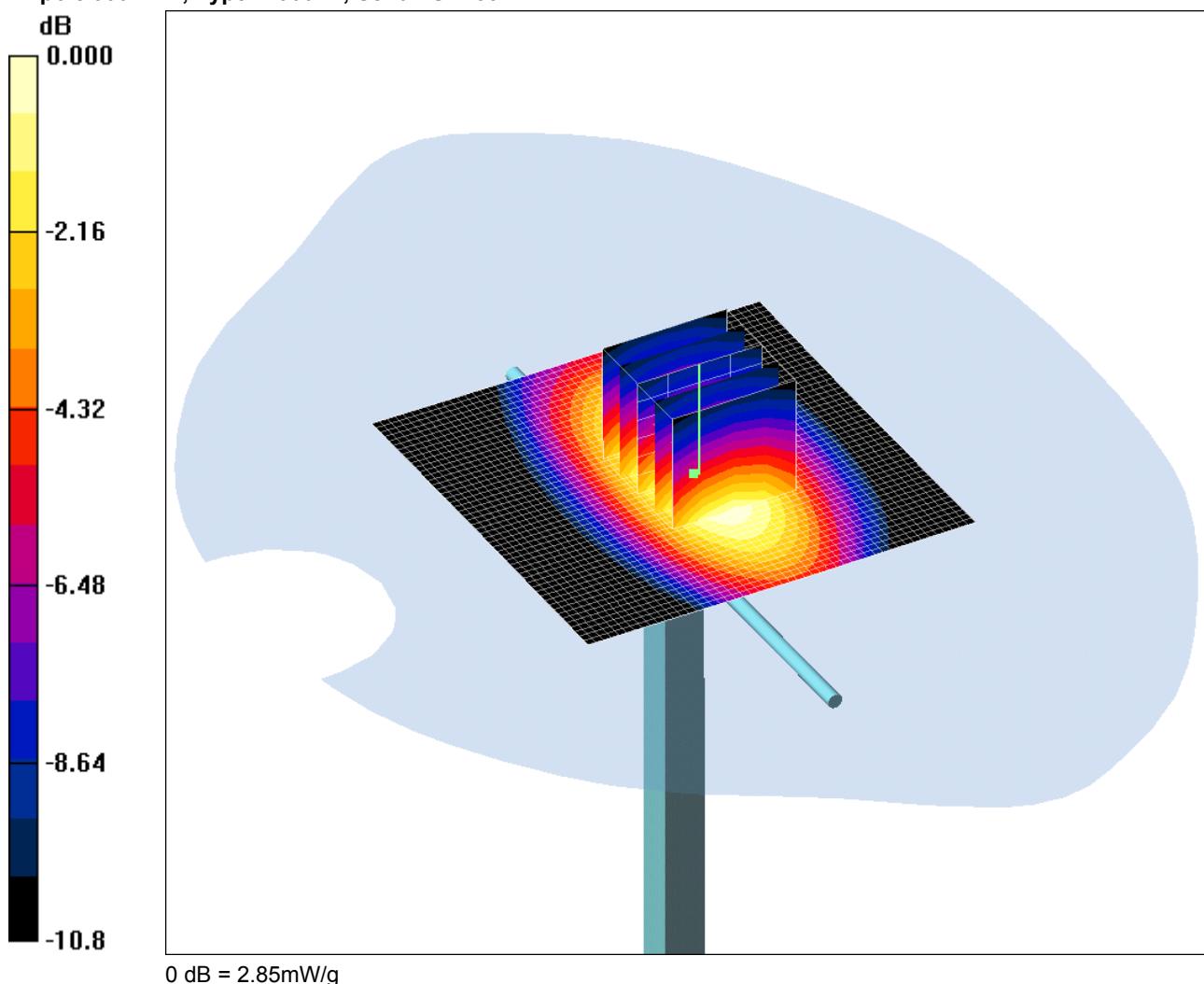
Test of: XT3318

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

SCN/75527JD14/022: System Performance Check 900MHz Body 12 10 09

Date 12/10/2009

DUT: Dipole 900 MHz; Type: D900V2; Serial: SN185



Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: 900 MHz MSL Medium parameters used:  $f = 900$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 52.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.99, 9.99, 9.99); Calibrated: 26/06/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 30/04/2009
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

d=15mm, Pin=250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 2.97 mW/g

d=15mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 51.5 V/m; Power Drift = 0.036 dB

Peak SAR (extrapolated) = 3.95 W/kg

**SAR(1 g) = 2.64 mW/g; SAR(10 g) = 1.71 mW/g**

Maximum value of SAR (measured) = 2.85 mW/g

Test of: XT3318

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

## Appendix 4. Photographs

This appendix contains the following photographs:

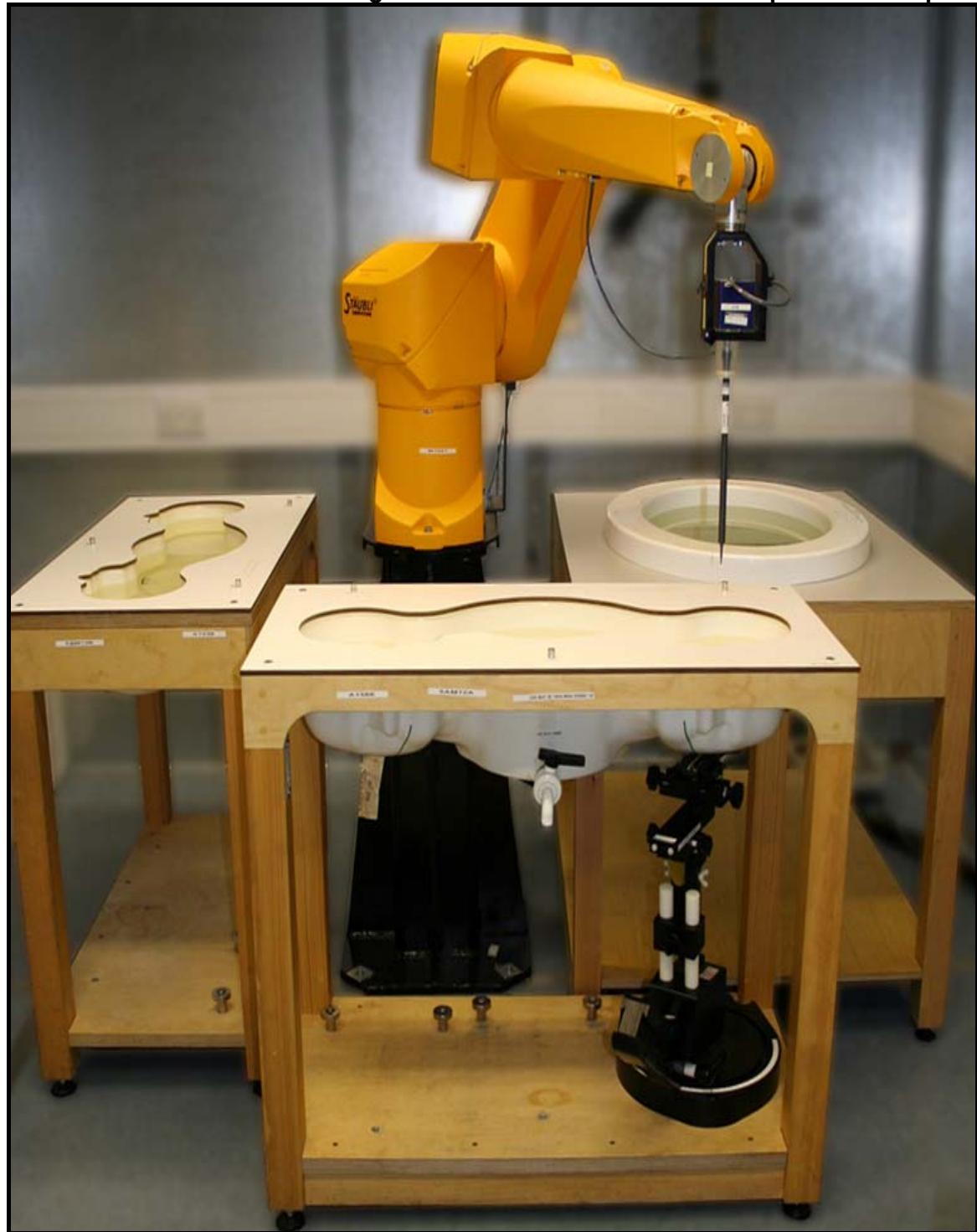
Photo Reference Number	Title
PHT/75527JD14/001	Test configuration for the measurement of Specific Absorption Rate (SAR)
PHT/75527JD14/002	Touch Left
PHT/75527JD14/003	Tilt Left
PHT/75527JD14/004	Touch Right
PHT/75527JD14/005	Tilt Right
PHT/75527JD14/006	Front of EUT Facing Phantom
PHT/75527JD14/007	Rear of EUT Facing Phantom
PHT/75527JD14/008	Front of EUT
PHT/75527JD14/009	Rear of EUT
PHT/75527JD14/010	900 MHz Head Fluid Level
PHT/75527JD14/011	900 MHz Body Fluid Level
PHT/75527JD14/012	1900 MHz Head Fluid Level
PHT/75527JD14/013	1900 MHz Body Fluid Level

Test of: XT3318

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

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PHT/75527JD14/001: Test configuration for the measurement of Specific Absorption Rate (SAR)



Test of: XT3318

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

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PHT/75527JD14/002: Touch Left

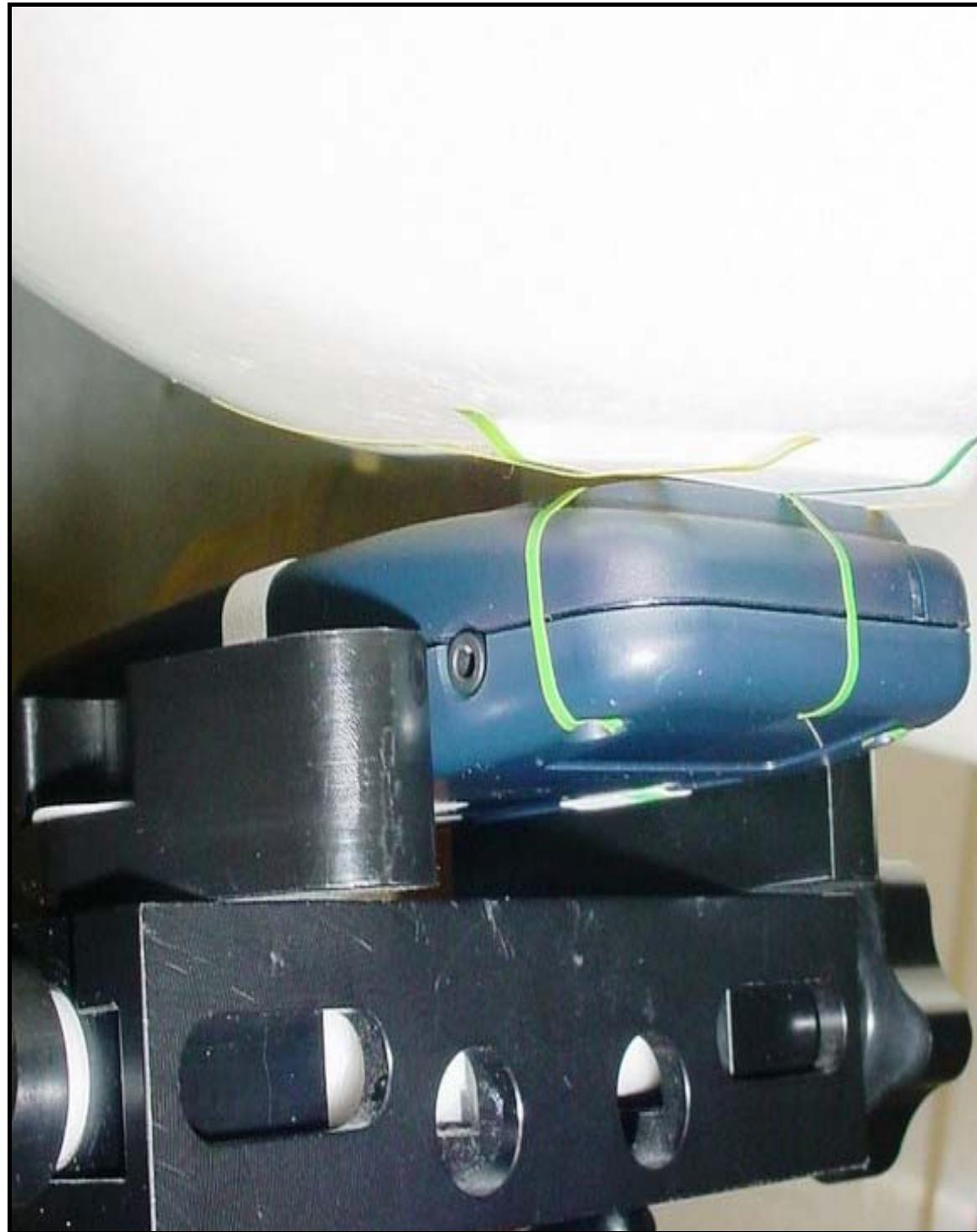


Test of: XT3318

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

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PHT/75527JD14/003: Tilt Left



Test of: XT3318

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

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**PHT/75527JD14/004: Touch Right**



Test of: XT3318

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

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PHT/75527JD14/005: Tilt Right



Test of: XT3318

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

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PHT/75527JD14/006: Front of EUT Facing Phantom



Test of: XT3318

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

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**PHT/75527JD14/007: Rear of EUT Facing Phantom**



Test of: XT3318

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

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PHT/75527JD14/008: Front of EUT



Test of: XT3318

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

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PHT/75527JD14/009: Rear of EUT



Test of: XT3318

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

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PHT/75527JD14/010: 900 MHz Head Fluid Level

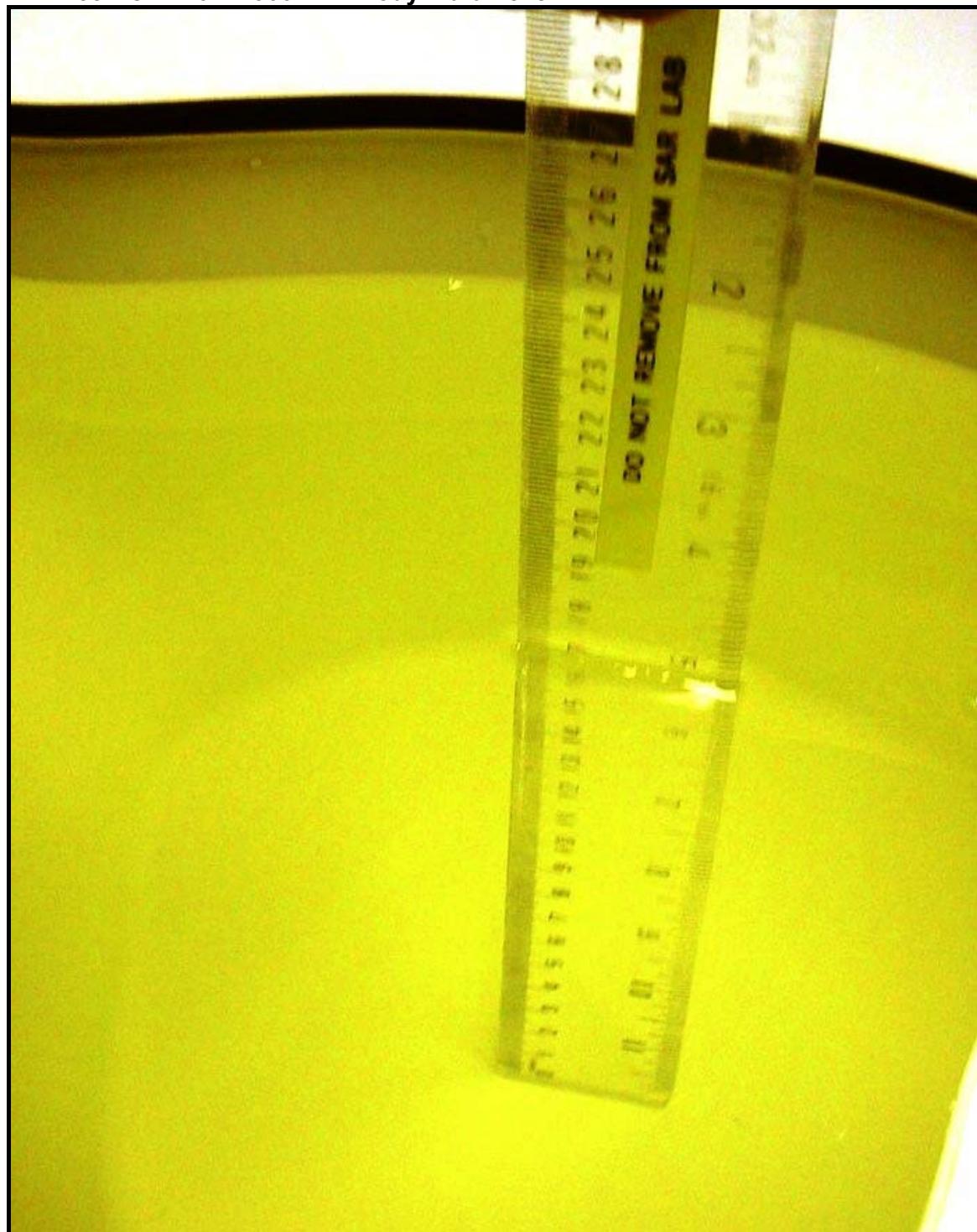


Test of: XT3318

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

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PHT/75527JD14/011: 900 MHz Body Fluid Level

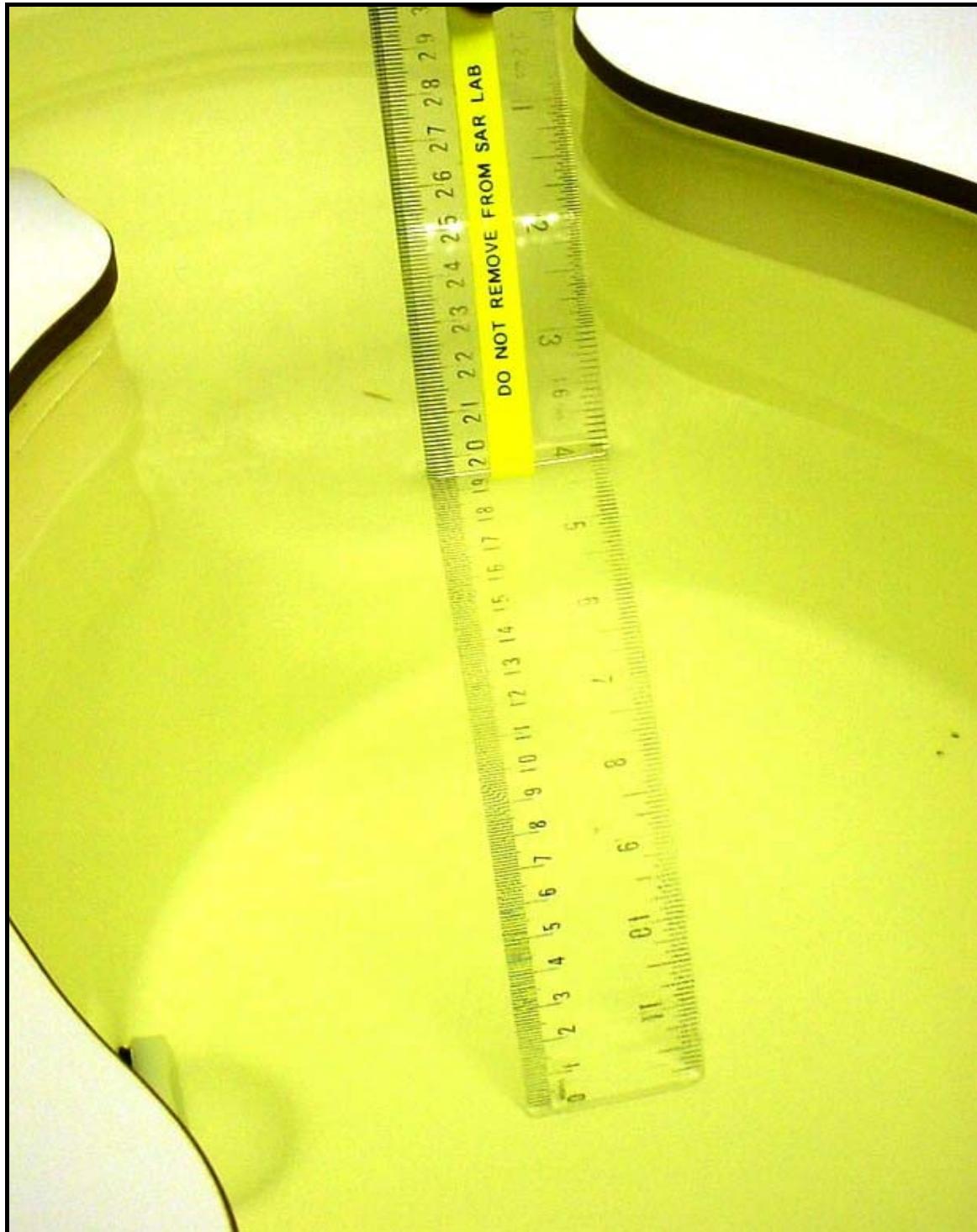


Test of: XT3318

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

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PHT/75527JD14/012: 1900 MHz Head Fluid Level



Test of: XT3318

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

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PHT/75527JD14/013: 1900 MHz Body Fluid Level



Test of: XT3318

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

## Appendix 5. Validation of System

Prior to the assessment, the system was verified in the flat region of the phantom.

A 900 MHz and 1900 MHz dipole were used. A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of  $\pm 5\%$  for the 900 MHz and 1900 MHz dipoles. The applicable verification (normalised to 1 Watt).

Date: 12/09/2009

Validation Dipole and Serial Number: D900V2 SN:124

Simulant	Frequency (MHz)	Room Temperature	Liquid Temperature	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	900	24.0 °C	22.9 °C	$\epsilon_r$	41.50	40.65	-2.06	5.00
				$\sigma$	0.97	0.99	2.49	5.00
				1g SAR	11.00	11.40	3.64	5.00
				10g SAR	7.06	7.20	1.98	5.00

Date: 12/09/2009

Validation Dipole and Serial Number: D1900V2:SN:540

Simulant	Frequency (MHz)	Room Temperature	Liquid Temperature	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	1900	24.0 °C	23.1 °C	$\epsilon_r$	40.00	38.42	-3.96	5.00
				$\sigma$	1.40	1.42	1.23	5.00
				1g SAR	40.30	40.40	0.25	5.00
				10g SAR	21.10	20.80	-1.42	5.00

Date: 14/09/2009

Validation Dipole and Serial Number: D900V2 SN:124

Simulant	Frequency (MHz)	Room Temperature	Liquid Temperature	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	900	24.0 °C	23.1 °C	$\epsilon_r$	55.00	53.34	-3.01	5.00
				$\sigma$	1.05	1.03	-1.76	5.00
				1g SAR	11.00	11.12	1.09	5.00
				10g SAR	7.16	7.20	0.56	5.00

Test of: XT3318

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

Date: 17/09/2009Validation Dipole and Serial Number: D1900V2:SN:540

Simulant	Frequency (MHz)	Room Temperature	Liquid Temperature	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	1900	24.0 °C	24.0 °C	$\epsilon_r$	53.30	53.44	0.27	5.00
				$\sigma$	1.52	1.58	3.75	5.00
				1g SAR	40.90	42.40	3.67	5.00
				10g SAR	21.50	21.52	0.09	5.00

Date: 26/09/2009Validation Dipole and Serial Number: D1900V2:SN:540

Simulant	Frequency (MHz)	Room Temperature	Liquid Temperature	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	1900	25.0 °C	23.4 °C	$\epsilon_r$	53.30	51.55	-3.28	5.00
				$\sigma$	1.52	1.56	2.53	5.00
				1g SAR	40.90	41.60	1.71	5.00
				10g SAR	21.50	21.20	-1.40	5.00

Date: 12/10/2009Validation Dipole and Serial Number: D900V2 SN:124

Simulant	Frequency (MHz)	Room Temperature	Liquid Temperature	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	900	24.0 °C	23.4 °C	$\epsilon_r$	55.00	52.69	-4.20	5.00
				$\sigma$	1.05	1.02	-3.10	5.00
				1g SAR	11.00	10.56	-4.00	5.00
				10g SAR	7.16	6.84	-4.47	5.00

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## **Appendix 6. Simulated Tissues**

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.

Ingredient	Frequency
	835/850/900 MHz Head
Propanediol	64.81%
De-Ionised Water	34.40%
Salt	0.79%

Ingredient	Frequency
	835/850/900 MHz Body
De-Ionised Water	50.75%
Sugar	48.21%
Salt	0.94%
Kathon	0.10%

Ingredient	Frequency
	1800/1900 MHz Head
De-Ionised Water	55.41%
Diglycol Butyl Ether (DGBE)	44.51%
Salt	0.08%

Ingredient	Frequency
	1800/1900 MHz Body
De-Ionised Water	69.79%
Diglycol Butyl Ether (DGBE)	30.00%
Salt	0.20%

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## **Appendix 7. DASY4 System Details**

### **A.7.1. DASY4 SAR Measurement System**

RFI Global Services Ltd, 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. This is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. The data acquisition electronics (DAE) performs signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection etc. The DAE 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 multiplexer, 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.

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**A.7.2. DASY4 SAR System Specifications****Robot System**

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

**Data Acquisition Electronic (DAE) System**

Serial Number:	DAE3 SN:450
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**PC Controller**

<b>PC:</b>	Dell Precision 340
<b>Operating System:</b>	Windows 2000
<b>Data Card:</b>	DASY4 Measurement Server
<b>Serial Number:</b>	1080

**Data Converter**

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

**PC Interface Card**

<b>Function:</b>	24 bit (64 MHz) DSP for real time processing Link to DAE3 16 bit A/D converter for surface detection system serial link to robot direct emergency stop output for robot.
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**DASY4 SAR System Specifications (Continued)****E-Field Probe**

<b>Model:</b>	EX3DV3
<b>Serial No:</b>	3508
<b>Construction:</b>	Triangular core
<b>Frequency:</b>	10 MHz to >6 GHz
<b>Linearity:</b>	±0.2 dB (30 MHz to 6 GHz)
<b>Probe Length (mm):</b>	330
<b>Probe Diameter (mm):</b>	12
<b>Tip Length (mm):</b>	20
<b>Tip Diameter (mm):</b>	2.5
<b>Sensor X Offset (mm):</b>	1
<b>Sensor Y Offset (mm):</b>	1
<b>Sensor Z Offset (mm):</b>	1

**Phantom**

<b>Phantom:</b>	SAM Phantom
<b>Shell Material:</b>	Fibreglass
<b>Thickness:</b>	2.0 ±0.1 mm