SAR TEST REPORT

Ref. Report No.
06-PIS05016-5

Name and address of the applicant

Hitachi Cable, Ltd.

Takasago Works, 880 Lsagozawa-cho, Hitachi-shi, Ibaraki-ken, 319-1418 Japan

Standard / Test regulation

- FCC 47 CFR Part 2, § 2.1093
  /OET Bulletin 65-Supplement C(97-01)
- Industry Canada RSS-102 Issue 2(2005.11)

Test result

POSITIVE

Equipment Under Test ;
WLAN IP Phone

FCC ID. ;
S99WIRELESSIP5000

Model/type No. ;
WirelessIP 5000

Manufacturer ;
UniData Communication Systems, Inc.

Additional information ;

Incoming date : January 20, 2006
Test : January 24~26, 2006

Issue date : January 26, 2006

This test report only responds to the tested sample and shall not be reproduced except in full without written approval of the Korea Testing Laboratory.

Tested and reported by

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Reviewed by

Won-Seo Cho
Telecommunication Team Manager

KOREA TESTING LABORATORY

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1. EQUIPMENT UNDER TEST

1.1 General Information :

1) Test Sample : WLAN IP Phone

2) Device Category : Portable Device

3) Test Device : Production Unit

4) Model Number : WirelessIP 5000

5) FCC ID : S99WIRELESSIP5000

6) Applicant & Address : Hitachi Cable, Ltd.

Takasago Works, 880 Lsagozawa-cho,
Hitachi-shi, Ibaraki-ken, 319-1418 Japan

7) Manufacturer & Address : UniData Communication Systems Inc.

2F, OhSung-Bldg, 82-15, NonHyun-Dong, GangNam-Gu,
Seoul, 135-010 Korea

8) Rule and Test Standard :

- FCC 47 CFR § 2.1093,
  Evaluating Compliance with FCC Guidelines For Human Exposure to Radiofrequency Electromagnetic Fields Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01)
- Industry Canada RSS-102 Issue 2(2005.11)

9) RF exposure Category : General Population/Uncontrolled

1.2 Description of Device :

1) Description of Test Sample

The device tested was WLAN IP Phone operating in the 2412 ~ 2462 MHz frequency bands. It has one integral antenna and was tested in in the Belt-Clip and the Head configurations of the phantom.

Operating Mode during Testing	: Test Mode(Continuous Wave-Unmodulated)
Modulation Scheme	: DSSS(Direct Sequence Spread Spectrum), OFDM(Orthogonal Frequency Division Multiplexing)
Device Power Rating for test sample and identical production unit	: 16 ±2 dBm
Device Dimensions (L x W x H)	: 12.7 x 4.3 x 1.9 cm
Antenna Type	: Internal Type
Applicable Head Configurations	: Left and Right Position
Applicable Body Worn-Configurations	: Belt Position
Battery Type	: Rechargeable Battery Pack (DC 3.7 V, 1300 mAh, Li-ion)

2) Test sample Accessories

2.1) Battery Types

DC 3.7 V rechargeable battery pack is used to power the WLAN IP Phone Model: WirelessIP 5000. The maximum rated power is 16 dBm in the frequency band. SAR measurements were performed with a rechargeable battery pack .

2.2) Ear Microphone

The device has a ear microphone port which is useful for hands free way operaton. Any ear microphone is not supplied by the manufacturer. The following ear microphone is used only for the SAR testing.

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< **Photo 1. Battery Type** >

< **Photo 2. Ear Microphone used for SAR Test** >

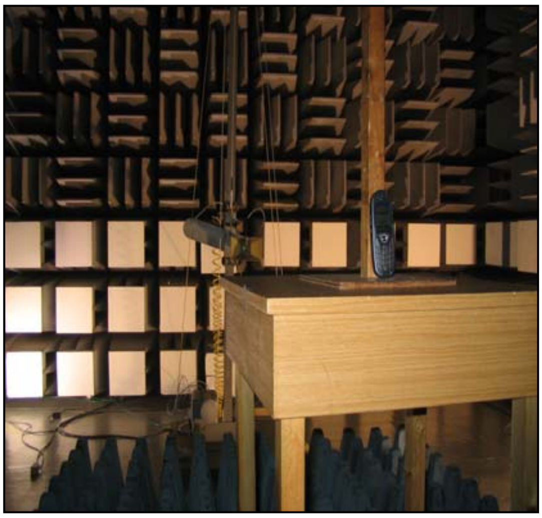
3) Test Signal, Frequency and Output Power

The WLAN IP Phone had a total of 11 channels within the frequency bands. The Tx frequency ranges of these modes are 2412 MHz to 2462 MHz. For the SAR measurements the device was operating in test mode(continuous wave-unmodulated). The fixed frequency channels used in the testing are shown in table 1. The frequency-span of each band was more than 10 MHz consequently; the SAR levels of the test sample were measured for the lowest, center and highest channels of the frequency band. There were no wires or other connections to the EUT except ear microphone during the SAR measurements.

The conducted power level of the EUT could not be measured due to the non-RF external output port. The EUT was evaluated for SAR at the EIRP level measured prior to SAR evaluations on a 3-meter Test Site using the signal substitution method in accordance with ANSI TIA/EIA-603-A-2001. The results of this measurement taken after the rechargeable battery pack was fitted are listed in table 1.

Table 1 : Test Frequency and Output Power

Channel	Channel Frequency MHz	Battery Type	EIRP Output Power Measured
Channel 01	2412	DC 3.7 V Rechargeable Battery pack	77.63 mW (18.90 dBm)
Channel 06	2437		77.27 mW (18.88 dBm)
Channel 11	2462		70.47 mW (18.48 dBm)



< Photo 3. EIRP Power meaurement Setup >

4) Battery Status

The device rechargeable battery pack was fully charged prior to commencement of measurement. Each SAR test was completed within 30 minutes. The battery condition was monitored by measuring the RF field at a defined position inside the phantom before the commencement of each test and again after the completion of the test.

5) Test Laboratory Environmental Factors

The measurements were performed in a shielded room with no background network signals. The temperature in the laboratory was controlled to within 22.0 ± 2.0 °C, the humidity was in the range 40 % to 60 %. The liquid parameters were measured daily prior to the commencement of each test. Tests were performed to check that reflections within the environment did not influence the SAR measurements. The noise floor of the DASY4 SAR measurement system using the ET3DV6(SN:1773) probe is less than 5 uV in both air and liquid mediums.

2. DESCRIPTION OF SAR MEASREMENT SYSTEM

2.1 Probe Positioning System

The measurements were performed with the state of the automated near-field scanning system **DASY4 V4.6 Build 23** from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision 6-axis robot (working range greater that 1.1 m), which positions the SAR measurement probes with a positional repeatability of better than ± 0.02 mm. The DASY4 fully complies with the OET 65 C (01-01), IEEE 1528 and EN50361 SAR measurement requirements.

2.2 E-Field Probe Type and Performance

The SAR measurements were conducted with the dosimetric probe ET3DV6, SN : 1773 (manufactured by SPEAG) designed in the classical triangular configuration and optimised for dosimetric evaluation. The probe has been calibrated and found to be accurate to better than ± 0.25 dB. The probe is suitable for measurements close to material discontinuity at the surface of the phantom. The sensors of the probe are directly loaded with Schottky diodes and connected via highly resistive lines (length = 300 mm) to the data acquisition unit.

2.3 Data Acquisition Electronics

The data acquisition electronics (DAE4) consists of 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. The input impedance of the DAE4 box is 200 Mohm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.Transmission to the PC-card is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The mechanical probe-mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

2.4 Validation Procedures and Data

Prior to the SAR assessment, the system validation kit was used to verify that the DASY4 was operating within its specifications. The validation was performed at 2450 MHz with the SPEAG D2450V2 calibrated dipole.

The validation dipoles are highly symmetric and matched at the centre frequency for the specified liquid and distance to the phantom. The accurate distance between the liquid surface and the dipole centre is achieved with a distance holder that snaps onto the dipole.

System validation is performed by feeding a known power level into a reference dipole, set at a know distance from the phantom. The measured SAR is compared to the theoretically derived level.

1) Tissue Material Properties

The dielectric parameters of the brain and muscle simulating liquid were measured prior to SAR assessment using the HP85070D dielectric probe kit and Agilent 8753ES Network Analyzer. The actual dielectric parameters are shown in the following table.

Table 2 : Measured Simulating Liquid Dielectric Values

Date	Frequency Band	ε_r (measured)	ε_r (target)	σ (mho/m) (measured)	σ (target)	ρ Kg/m^3
24th January 2006	2412 MHz Brain	41.9	-	1.95	-	1000
	2437 MHz Brain	41.4	-	1.84	-	1000
	2450 MHz Brain	40.8	39.2 ± 5 % (37.24 ~ 41.16)	1.80	1.80 ± 5 % (1.71 ~ 1.89)	1000
	2462 MHz Brain	40.1	-	1.80	-	1000
26th January 2006	2412 MHz Muscle	50.3	-	1.89	-	1000
	2437 MHz Muscle	50.1	-	1.98	-	1000
	2450 MHz Muscle	50.5	52.7 ± 5 % (50.06 ~ 55.3)	1.99	1.95 ± 5 % (1.85 ~ 2.04)	1000
	2462 MHz Muscle	50.9	-	1.97	-	1000

The humidity and dielectric/ambient temperatures are recorded during the assessment of the tissue material dielectric parameters. The difference between the ambient temperature of the liquid during the dielectric measurement and the temperature during tests was less than |2|°C.

Table 3 : Temperature and Humidity recorded

Date	Ambient Temperature(°C)	Liquid Temperature(°C)	Humidity(%)
24th January 2006	21.0	19.3	44
26th January 2006	21.0	20.1	46

The tissue simulating liquids are created prior to the SAR evaluation and often require slight modification each day to obtain the correct dielectric parameters(refer DASY4 manual V4.6 Build 23)

Table 4 : Volume of Brain Liquid @ 2450 MHz

Approximate Composotion	% By Weight
Distilled Water	55.00
DGMBE	45.00

Table 4 : Volume of Muscle Liquid @ 2450 MHz

Approximate Composotion	% By Weight
Distilled Water	68.64
DGMBE	31.37

2) Validation Results at 2450 MHz

The following table lists the dielectric properties of the tissue simulating brain liquid measured prior to each SAR validation. The results of the validation is listed in columns 4 and 5. The forward power into the reference dipole for each SAR validation was adjusted to 250 mW.

Table 5 : Validation Results (Dipole : SPEAG D2450V2, SN : 746)

1. Validation Date	2. ε_r (measured)	3. σ (mho/m) (measured)	4. Measured SAR 1 g (mW/g)	5. Measured SAR 10 g (mW/g)
24th January 2006	40.8	1.80	13.5	6.11

< **Photo 4. 2450 MHz Validation Setup** >

3) Deviation from Reference Validation Values

The reference SAR values are derived using a reference dipole and flat phantom suitable for a centre frequency of 2450 MHz. These reference SAR values are obtained from the IEEE Std 1528 and are normalized to 1 W.

The SPEAG calibration reference SAR value is the SAR validation result obtained in a specific dielectric liquid using the validation dipole (D2450V2) during calibration. The measured one-gram SAR should be within 10 % of the expected target reference values shown in table 6 below.

Table 6 : Deviation from Reference Validation Values

Date	Measured SAR 1 g (mW/g at 250 mW)	Measured SAR 1 g (mW/g at Normalized to 1 W)	IEEE Std 1528 reference SAR 1 g Target (mW/g)
24th January 2006	13.5	54.0	52.4 ± 10 % (47.2 ~ 57.6)

NOTE : All reference validation values are referenced to 1 W input power.

4) Liquid Depth 15 cm

During the SAR measurement process the liquid level was maintained to a level of a least 15 cm tolerance of ± 0.2 cm.The following photo shows the depth of the liquid maintained during the testing.

< Photo 5. Liquid Depth >

2.5 Phantom Properties (Size, Shape, Shell Thickness)

The phantom used during the validations was a flat section of SAM Twin Phantom from SPEAG. It is a strictly validation phantom with a single thickness of 2 mm and was filled with the required tissue simulating liquid. The phantom support structures were all non-metallic and spaced more than one device width away in transverse directions. For SAR testing in the head positions, a head section of SAM Twin Phantom from SPEAG was used and for SAR testing in the body worn positions, a flat section of SAM Twin Phantom was used. Table 4 provides a summary of the measured flat section phantom properties. The phantom was filled with the required tissue simulating liquid.

Table 4 : Flat Section Properties of SAM Twin Phantom

Phantom Properties	Requirement for specific EUT	Measured
Depth of Phantom	> 150 mm	200 mm
Width of flat section	> 10 cm (Twice EUT Width)	20 cm
Length of flat section	> 26 cm (Twice EUT Length)	30 cm
Thickness of fla section	2 mm ± 0.2 mm	2.08 ~ 2.20 mm

< Photo 6. SAM Twin Phantom >

2.6 Device Holder for DASY4

The DASY4 device holder supplied by SPEAG is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The rotation centres for both scales is the ear opening. Thus the device needs no repositioning when changing the angles.
The DASY4 device holder is made of low-loss material having the following dielectric parameters : relative permittivity $\varepsilon_r = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, to reduce the influence on the clamp on the test results. Refer to Appendix B of photograph of device positioning.

3. SAR MEASUREMENT PROCEDURE USING DASY4

The SAR evaluation was performed with the SPEAG DASY4 system. A summary of the procedure follows ;

a) A measurement of the SAR value at a fixed location is used as a reference value for assessing the power drop of the EUT. The SAR at this point is measured at the start of the test and then again at the end of the test.

b) The SAR distribution at the exposed side of the phantom is measured at a distance of 3.9 mm from the inner surface of the shell. The area covers the entire dimension of the EUT and the horizontal grid spacing is 15 mm x 15 mm. The actual Area Scan has dimensions of 75 mm x 105 mm surrounding the test device. Based on this data, the area of the maximum absorption is determined by Spline interpolation.

c) Around this point, a volume of 30 mm x 30 mm x 30 mm is assessed by measuring 7 x 7 x 7 points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure ;

(i) The data at the surface are extrapolated, since the centre of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation is based on a least square algorithm. A polynomial of the fourth order is calculated through the points in z-axes. This polynomial is then used to evaluate the points between the surface and the probe tip.

(ii) The maximum interpolated value is searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g and 10 g) are computed using the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one-dimensional splines with the “Not a knot”- condition (in x, y and z-direction). The volume is integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) are interpolated to calculate the averages.

(iii) All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

(iv) The SAR value at the same location as in Step (a) is again measured

4. MEASUREMENT UNCERTAINTY

The uncertainty analysis is based on the template listed in the IEEE Std 1528-2003 for both EUT SAR tests and Validation uncertainty. The measurement uncertainty of a specific device is evaluated independently and the total uncertainty for both evaluations (95 % confidence level) must be less than 25 %.

Table 10 : EUT SAR Test - Uncertainty Budget for DASY4 Version V4.6 Build 19

a	b	c	d	e= f(d,k)	f	g	h=cxf/e	i=cxg/e	k
Uncertainty Component	Sec.	Tol. **(%)**	Prob. Dist.	Div.	Ci (1 g)	Ci (10 g)	1 g Ui (± %)	10 g Ui (± %)	vi
Measurement System									
Probe Calibration (k=1)	E.2.1	5.9	N	1	1	1	5.9	5.9	∞
Axial lsotropy	E.2.2	4.7	R	√ 3	0.7	0.7	1.9	1.9	∞
Hemispherical lsotropy	E.2.2	9.6	R	√ 3	0.7	0.7	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	√ 3	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	√ 3	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	√ 3	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	√ 3	1	1	0.5	0.5	∞
lntegration Time	E.2.8	2.6	R	√ 3	1	1	1.5	1.5	∞
RF Ambient Noise	E.6.1	3.0	R	√ 3	1	1	1.7	1.7	∞
RF Ambient Refections	E.6.1	3.0	R	√ 3	1	1	1.7	1.7	∞
Probe Positioner	E.6.2	0.4	R	√ 3	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	2.9	R	√ 3	1	1	1.7	1.7	∞
Algorithms for Max. SAR Evaluation	E.5	1.0	R	√ 3	1	1	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	2.9	N	1	1	1	2.9	2.9	145
Device Holder Uncertainty	E.4.1	3.6	N	1	1	1	3.6	3.6	5
Output Power Variation — SAR Drift Measurement	6.6.2	5.0	R	√ 3	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	√ 3	1	1	2.3	2.3	∞
Liquid Conductivity — Deviation from target values	E.3.2	5.0	R	√ 3	0.64	0.43	1.8	1.2	∞
Liquid Conductivity — Measurement uncertainty	E.3.3	2.5	N	1	0.64	0.43	1.6	1.1	∞
Liquid Permititivity — Deviation from target values	E.3.2	5.0	R	√ 3	0.6	0.49	1.7	1.4	∞
Liquid Pemiittivity — Measurement uncertainty	E.3.3	2.5	N	1	0.6	0.49	1.5	1.2	∞
Cornbined standard Uncertainty			RSS				± 10.9	± 10.7	387
Expanded Uncertainty (95% CONFIDENCE LEVEL)			K=2				± 21.9	± 21.4	

Estimated total measurement uncertainity for the DASY4 measurement system was ± 10.9 %. The extended uncertainity (K=2) was assessed to be ± 21.9 % based on 95 % confidence level. The uncertainity is not added to the measurement result.

Table 11 : Validation - Uncertainty Budget for DASY4 Version V4.6 Build 19

a	b	c	d	e= f(d,k)	f	g	h=cxf/e	i=cxg/e	k
Uncertainty Component	Sec.	Tol. **(%)**	Prob. Dist.	Div.	Ci (1 g)	Ci (10 g)	1 g Ui (± %)	10 g Ui (± %)	vi
Measurement System									
Probe Calibration (k=1)	E.2.1	5.9	N	1	1	1	5.9	5.9	∞
Axial lsotropy	E.2.2	4.7	R	√ 3	1	1	2.7	2.7	∞
Hemispherical lsotropy	E.2.2	9.6	R	√ 3	0	0	0	0	∞
Boundary Effect	E.2.3	1.0	R	√ 3	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	√ 3	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	√ 3	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0	R	√ 3	1	1	0	0	∞
lntegration Time	E.2.8	0	R	√ 3	1	1	0	0	∞
RF Ambient Noise	E.6.1	3.0	R	√ 3	1	1	1.7	1.7	∞
RF Ambient Refections	E.6.1	3.0	R	√ 3	1	1	1.7	1.7	∞
Probe Positioner	E.6.2	0.4	R	√ 3	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	2.9	R	√ 3	1	1	1.7	1.7	∞
Algorithms for Max. SAR Evaluation	E.5.2	1.0	R	√ 3	1	1	0.6	0.6	∞
Dipole									
Dipole Axis to Liquid Distance	8, E.4.2	2.0	R	√ 3	1	1	1.2	1.2	∞
Input Power and SAR Drift Measurement	8, 6.6.2	4.7	R	√ 3	1	1	2.7	2.7	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	√ 3	1	1	2.3	2.3	∞
Liquid Conductivity — Deviation from target values	E.3.2	5.0	R	√ 3	0.64	0.43	1.8	1.2	∞
Liquid Conductivity — Measurement uncertainty	E.3.3	2.5	N	1	0.64	0.43	1.6	1.1	∞
Liquid Permititivity — Deviation from target values	E.3.2	5.0	R	√ 3	0.6	0.49	1.7	1.4	∞
Uquid Pemiittivity — Measurement unceilainty	E.3.3	2.5	N	1	0.6	0.49	1.5	1.2	∞
Cornbined standard Uncertainty			RSS				± 9.2	± 8.9	∞
Expanded Uncertainty (95% CONFIDENCE LEVEL)			K=2				± 18.4	± 17.8	

Estimated total measurement uncertainty for the DASY4 measurement system was ± 9.2 %.
The extended uncertainty (K = 2) was assessed to be ± 18.4 % based on 95 % confidence level.
The uncertainty is not added to the validation measurement result.

5. TEST METHOD

5.1 Description of the Test Positions

SAR measurements were performed in the “cheek” and “tilted” positions on left and right sides of the phantom. Both were measured in the head section of the SAM Twin Phantom . For the “Belt ” position , it was measured in the flat section of the SAM Twin Phantom . See Appendix B for photos of test positions.

1) “Cheek” Position

The device was positioned with the vertical center line of the body of the device and the horizontal line crossing the center of the ear piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, it was aligned the vertical center line with the reference plane containing the three ear and mouth reference points(M, RE and LE) and aligned the center of the ear piece with the line RE-LE. Then device was translated towards the phantom with the ear piece aligned with the line LE-RE until it touched the ear. While maintaining the device in the reference plane and maintaining the device contact with the ear, the bottom of the device was moved until any point on the front side is in contact with the cheek of the phantom.

2) “Tilted” Position

The device was positioned in the “Cheek” position. While maintaining the device in the reference plane described above cheek position and pivoting against the ear, device was moved outward away from the mouth by an angle of 15 degrees.

3) “Belt” Position

A belt position maintained a distance of approximately 15 mm between the back of the device and the flat phantom. The device was placed under the flat section of the phantom and suspended. The device was connected with the hands free earpiece/microphone.

5.2 List of All Test Cases (Antenna In/Out, Test Frequencies, User Modes)

The device has a internal antenna. The SAR was measured at three test channels with the test sample operating at maximum power, as specified in section 1.2. 3).

5.3 FCC RF Exposure Limits

1) For Occupational/ Controlled Exposure

Spatial Peak SAR Limits For:	
Partial-Body	8.0 W/kg (averaged over any 1 g cube of tissue)
Hands, Wrists, Feet and Ankles	20.0 W/kg (averaged over 10 g cube of tissue)

2) For General Population/Uncontrolled

Spatial Peak SAR Limits For :	
Partial-Body	1.6 W/kg (averaged over any 1 g cube of tissue)
Hands, Wrists, Feet and Ankles	4.0 W/kg (averaged over 10 g cube of tissue)

6. SAR MEASURMENT RESULTS

The SAR values averaged over 1 g tissue masses were obtained in the conditions of the head configurations of the phantom. Detailed measurement data and plots showing the maximum SAR location of the EUT are reported in Appendix C. Tests were performed with three positions on the left and right sides of head and belt side using the low-end, center and high-end frequency of operating band.

1) "Cheek" and "Tilted" Position Result

Test Channel	Device Power Source	Head Position	Device Test Position	Antenna Position	Measured 1 g SAR Results (mW/g)	Measured Power Drift (dB)	Plot No. Of APP.C
01 (2412 MHz)	DC 3.7 V Recha-rgeable Battery Pack	Right Side	Cheek	Internal	0.285	- 0.057	1
				-	-	-	-
			Tilted	Internal	0.195	0.010	2
				-	-	-	-
		Left Side	Cheek	Internal	0.254	0.013	3
				-	-	-	-
			Tilted	Internal	0.181	0.091	4
				-	-	-	-
06 (2437 MHz)		Right Side	Cheek	Internal	0.286	- 0.007	5
				-	-	-	-
			Tilted	Internal	0.204	0.168	6
				-	-	-	-
		Left Side	Cheek	Internal	0.248	0.004	7
				-	-	-	-
			Tilted	Internal	0.179	- 0.023	8
				-	-	-	-
11 (2462 MHz)		Right Side	Cheek	Internal	0.252	- 0.034	9
				-	-	-	-
			Tilted	Internal	0.186	0.022	10
				-	-	-	-
		Left Side	Cheek	Internal	0.266	- 0.093	11
				-	-	-	-
			Tilted	Internal	0.235	0.115	12
				-	-	-	-

2) "Belt" Position Result

Test Channel	Device Power Source	Position	Device Test Position	Antenna Position	Measured 1 g SAR Results (mW/g)	Measured Power Drift (dB)	Plot No. Of APP.C
01 (2412 MHz)	DC 3.7 V Recharg-eable Battery Pack	Body	Belt	Internal	0.216	- 0.029	13
06 (2437 MHz)		Body	Belt	Internal	**0.351**	0.076	14
11 (2462 MHz)		Body	Belt	Internal	0.253	- 0.043	15

7. COMPLIANCE STATEMENT

The WLAN IP phone, Model; WirelessIP 5000 was found to comply with the FCC SAR requirements. The highest SAR level recorded was **0.351 W/kg for a 1 g cube**. This value was measured on channel 06 in the belt position supplementing the DC 3.7 V Rechargeable Battery Pack . **This was below the uncontrolled limit of 1.6 W/kg.**

8. EQUIPMENT LIST AND CALIBRATION DETAILS

Equipment Type	Manufacturer	Model Number	Serial Number	Calibration Due	Used For this Test?
Robot - Six Axes	Staubli	RX60	N/A	N/A	Yes
Robot Remote Control	SPEAG	CS7MB	F03/5U96A1 /C/01	N/A	Yes
SAM Twin Phantom	SPEAG	TP1276	QD000P40CA	N/A	Yes
Flat Phantom	SPEAG	N/A	N/A	N/A	No
Data Acquisition Electronics	SPEAG	DAE4	559	05.03.22	Yes
Probe E-Field	SPEAG	ES3DV2	3020	05.07.20	No
Probe E-Field	SPEAG	ET3DV6	1773	05.05.26	Yes
Antenna Dipole 450 MHz	SPEAG	D450V2	1016	05.09.21	No
Antenna Dipole 835 MHz	SPEAG	D835V2	481	05.05.24	No
Antenna Dipole 900 MHz	SPEAG	D900V2	194	05.11.04	No
Antenna Dipole 1800 MHz	SPEAG	D1800V2	2d066	05.05.19	No
Antenna Dipole 1900 MHz	SPEAG	D1900V2	5d038	05.11.03	No
Antenna Dipole 1950 MHz	SPEAG	D1950V2	1027	04.03.02	No
Antenna Dipole 2450 MHz	SPEAG	D2450V2	746	04.02.25	Yes
High power RF Amplifier	EMPOWER	2057-BBS3Q5KCK	1002D/C0321	05.10.13	Yes
Signal Generator	Hewlett Packard	8648C	3629U00868	05.05.20	Yes
RF Power Meter Dual	Hewlett Packard	E4419A	GB37170495	05.04.30	Yes
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481A	US37299851	05.01.14	Yes
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481A	3318A92872	05.01.14	Yes
S-Parameter Network Analyzer	Agilent	8753ES	MY40002303	05.04.26	Yes
Dual Directional Coupler	Hewlett Packard	778D	1144AO4576	05.10.13	No
Directional Coupler	Agilent	773D	MY28390213	05.10.13	Yes

APPENDIX A : TEST SAMPLE PHOTOGRAPHS

< Photo A.1. Front View >

< Photo A.2. Rear View >

< Photo A.3. Rear Inside View >

< Photo A.4. Side View >

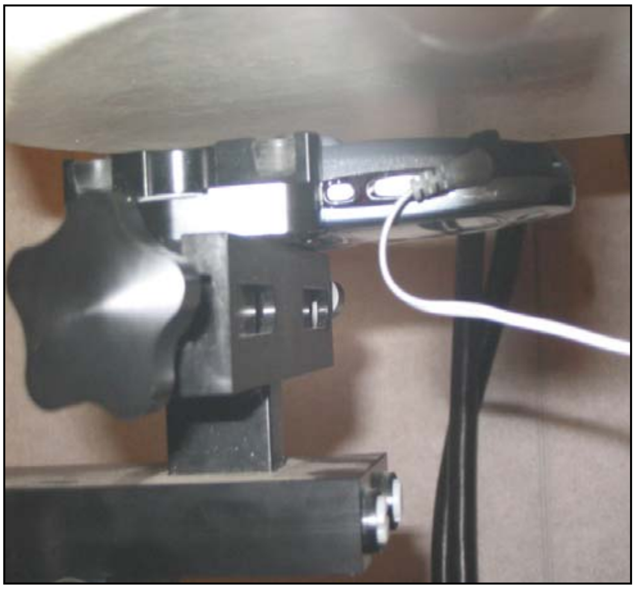
APPENDIX B : TEST SET-UP PHOTOGRAPHS

< Photo B.1. Right Head-Cheek >

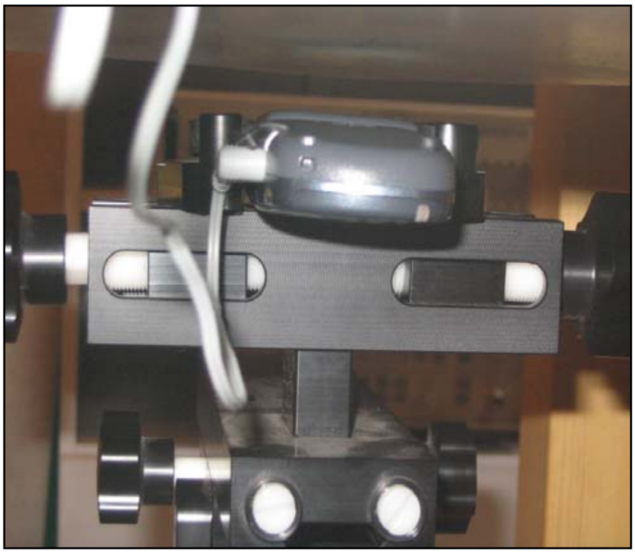
< Photo B.2. Right Head-Tilt >

< Photo B.3. Left Head-Cheek >

< Photo B.4. Left Head-Tilt >



< Photo B.5. Belt –Front View >



< Photo B.6. Belt-Side View >

APPENDIX C : PLOTS OF THE SAR MEASUREMENTS

CH01(2412 MHz) RIGHT HEAD-CHEEK

DUT: WLAN IP Phone; Type: WirelessIP 5000;

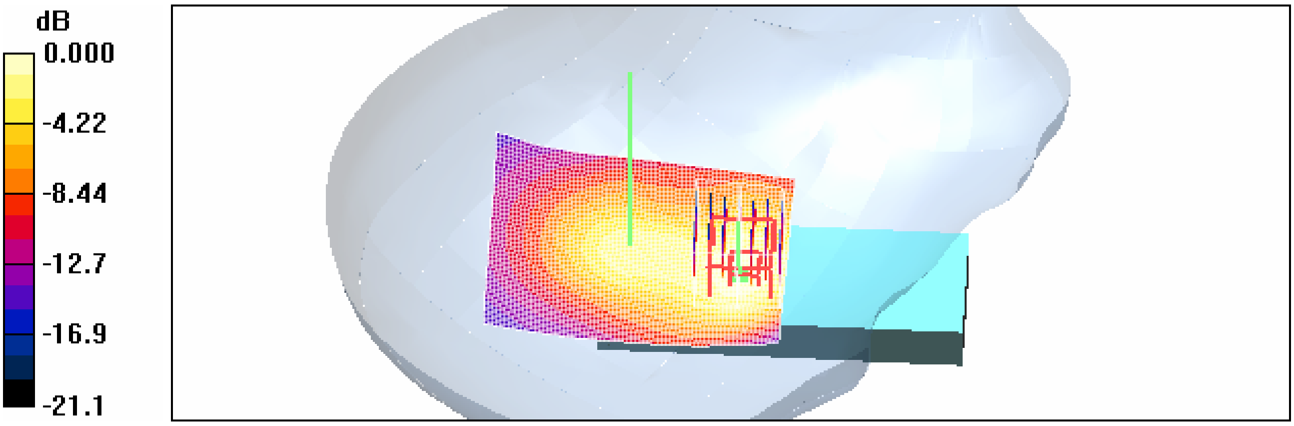
Communication System: CW; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2412 MHz; σ = 1.95 mho/m; ε_r = 41.9; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

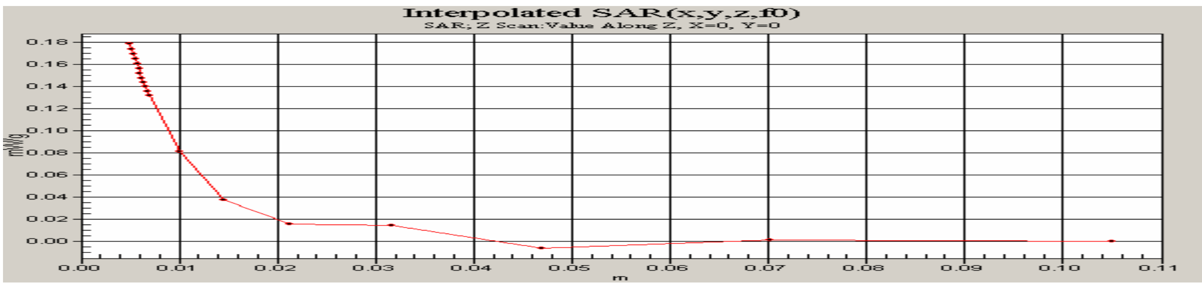
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM Twin;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.326 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.7 V/m; Power Drift = -0.057 dB
Peak SAR (extrapolated) = 0.510 W/kg
SAR(1 g) = 0.285 mW/g; SAR(10 g) = 0.152 mW/g
Maximum value of SAR (measured) = 0.323 mW/g



0 dB = 0.323mW/g



CH01(2412 MHz) RIGHT HEAD-TILT

DUT: WLAN IP Phone; Type: WirelessIP 5000;

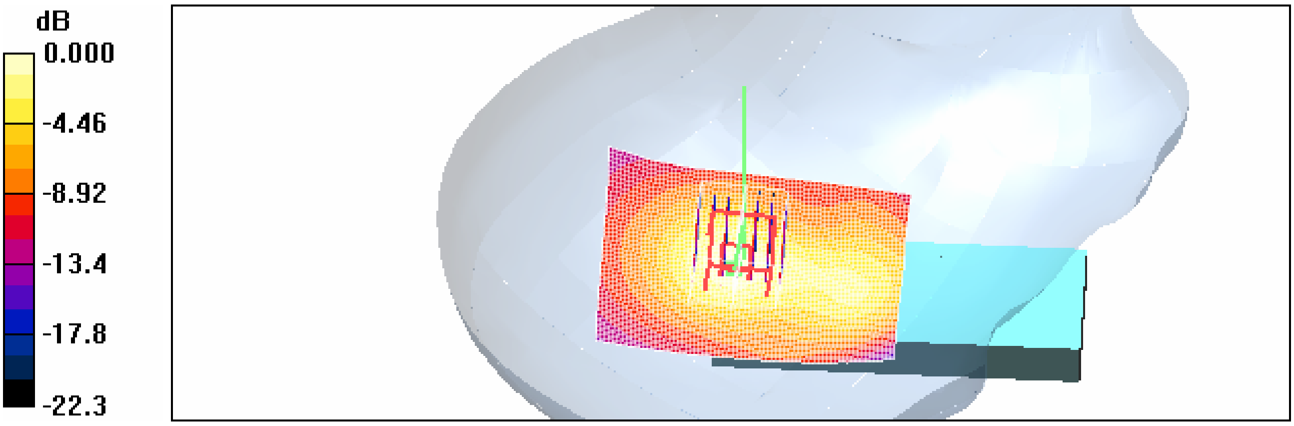
Communication System: CW; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2412 MHz; σ = 1.95 mho/m; ε_r = 41.9; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

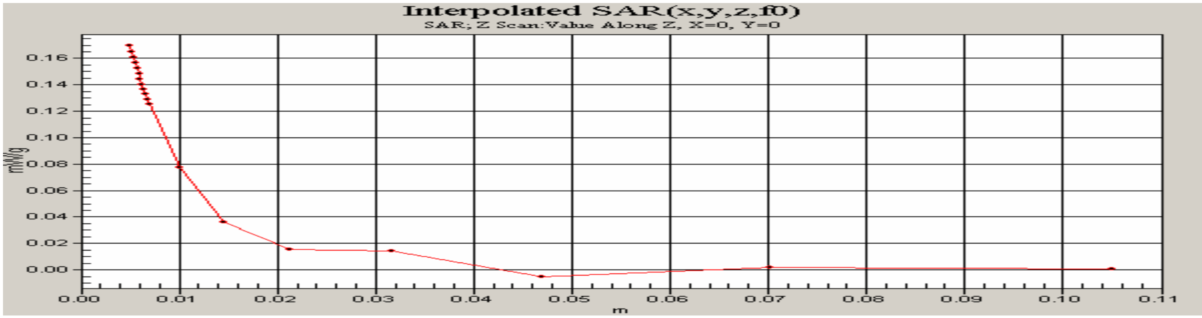
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM Twin;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.210 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.1 V/m; Power Drift = 0.010 dB
Peak SAR (extrapolated) = 0.435 W/kg
SAR(1 g) = 0.195 mW/g; SAR(10 g) = 0.096 mW/g
Maximum value of SAR (measured) = 0.215 mW/g



0 dB = 0.215mW/g



CH01(2412 MHz) LEFT HEAD-CHEEK

DUT: WLAN IP Phone; Type: WirelessIP 5000;

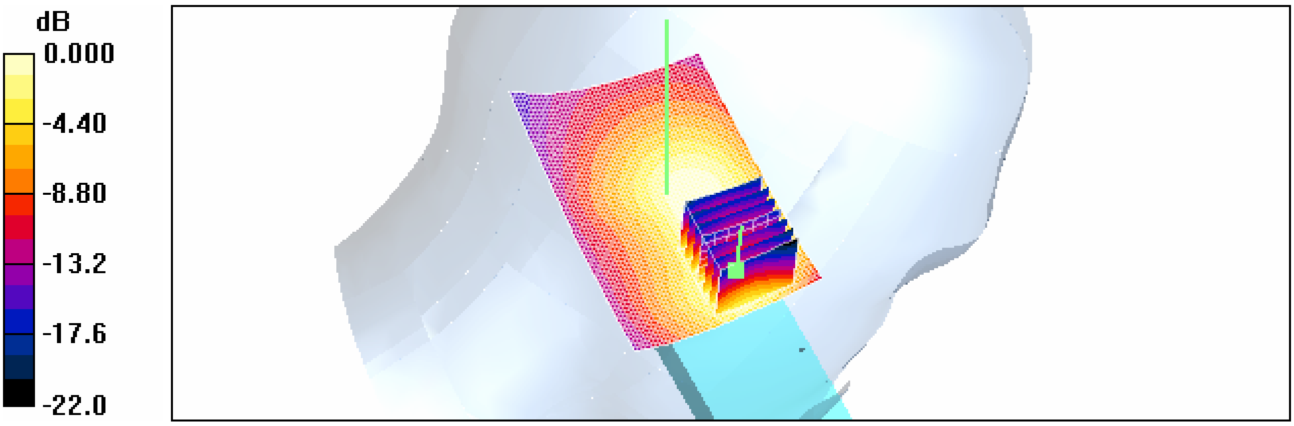
Communication System: CW; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2412 MHz; σ = 1.95 mho/m; ε_r = 41.9; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

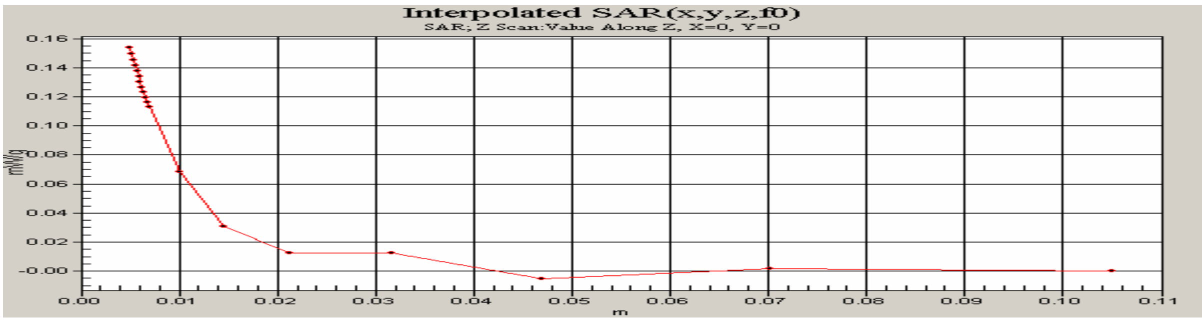
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM 12;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.288 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.2 V/m; Power Drift = 0.013 dB
Peak SAR (extrapolated) = 0.471 W/kg
SAR(1 g) = 0.254 mW/g; SAR(10 g) = 0.138 mW/g
Maximum value of SAR (measured) = 0.274 mW/g



0 dB = 0.274mW/g



CH01(2412 MHz) LEFT HEAD-TILT

DUT: WLAN IP Phone; Type: WirelessIP 5000;

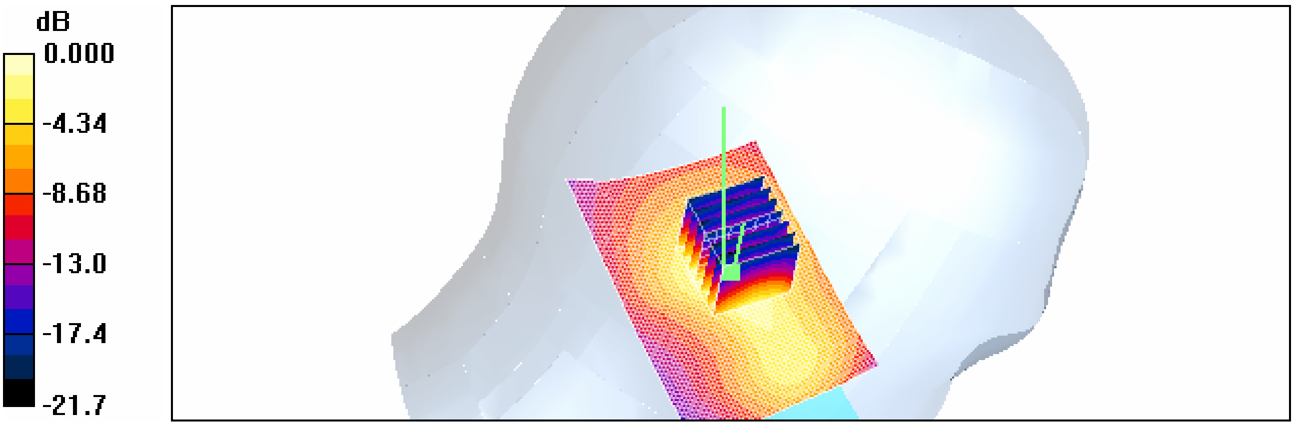
Communication System: CW; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2412 MHz; σ = 1.95 mho/m; ε_r = 41.9; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

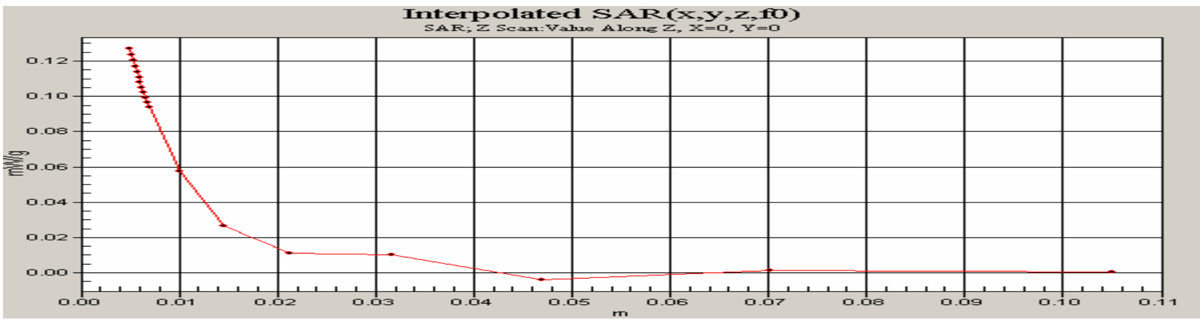
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM 12;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.206 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.99 V/m; Power Drift = -0.094 dB
Peak SAR (extrapolated) = 0.400 W/kg
SAR(1 g) = 0.181 mW/g; SAR(10 g) = 0.091 mW/g
Maximum value of SAR (measured) = 0.198 mW/g



0 dB = 0.198mW/g



CH06(2437 MHz) RIGHT HEAD-CHEEK

DUT: WLAN IP Phone; Type: WirelessIP 5000;

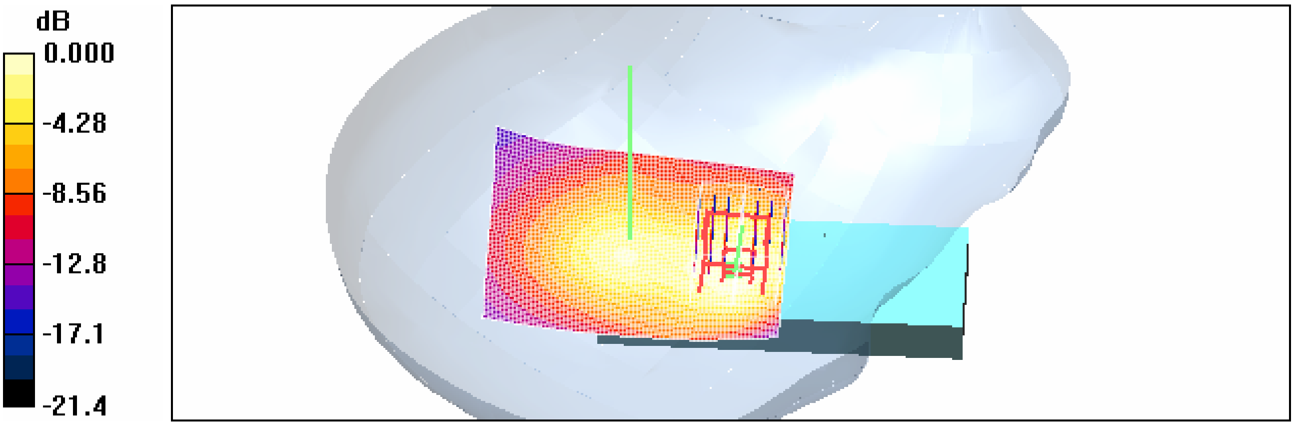
Communication System: CW; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2437 MHz; σ = 1.84 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

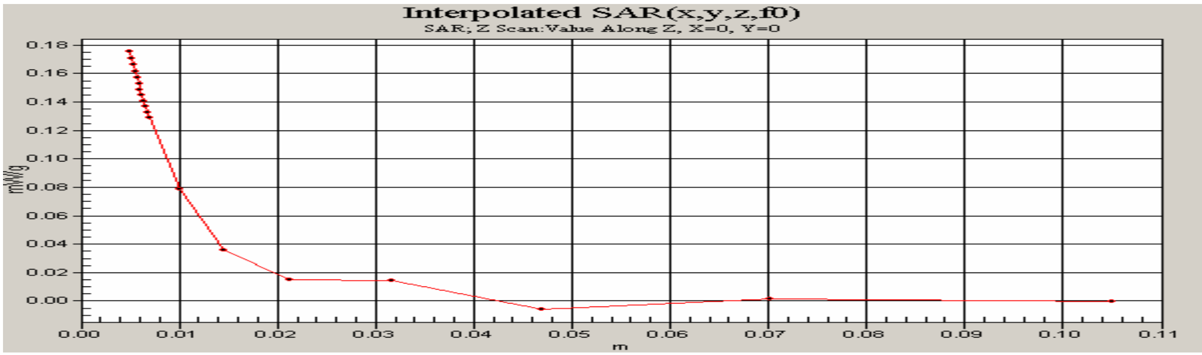
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM Twin;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.340 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.6 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 0.497 W/kg
SAR(1 g) = 0.286 mW/g; SAR(10 g) = 0.152 mW/g
Maximum value of SAR (measured) = 0.316 mW/g



0 dB = 0.316mW/g



CH06(2437 MHz) RIGHT HEAD-TILT

DUT: WLAN IP Phone; Type: WirelessIP 5000;

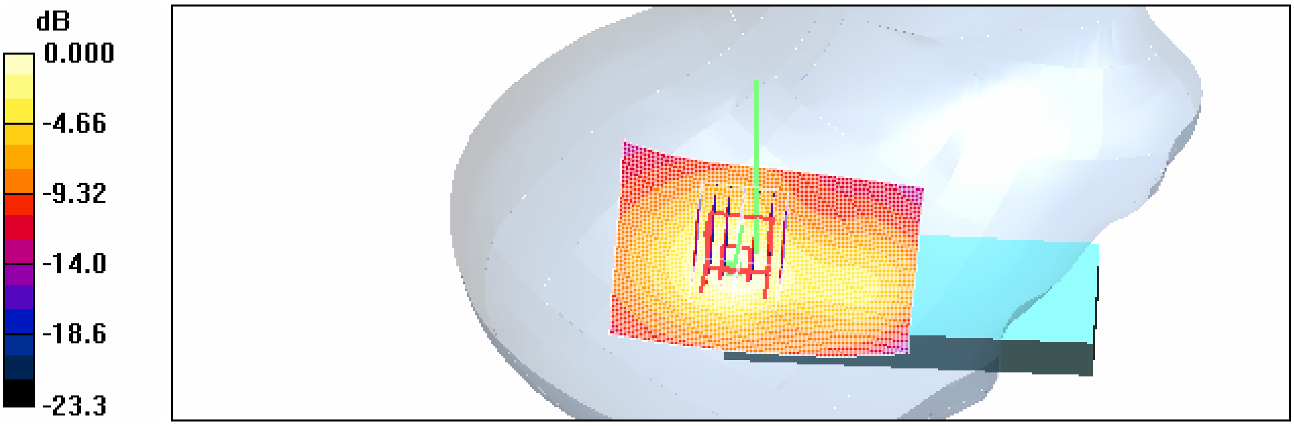
Communication System: CW; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2437 MHz; σ = 1.84 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

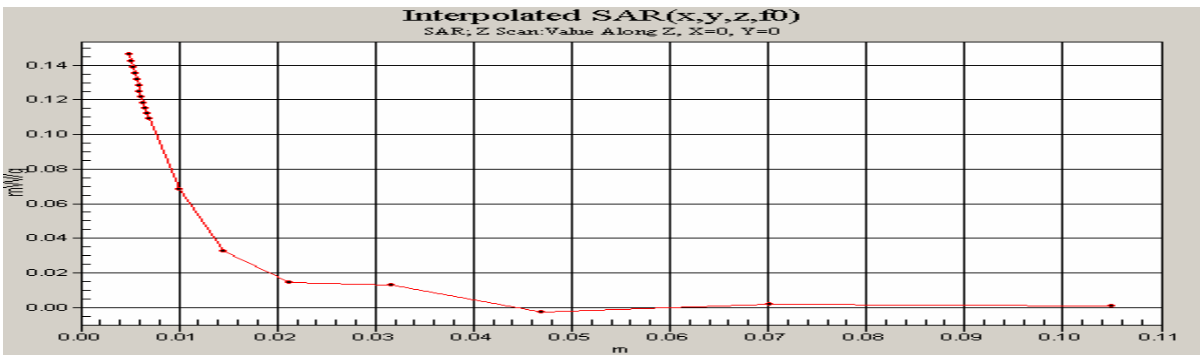
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM Twin;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.228 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = 0.168 dB
Peak SAR (extrapolated) = 0.456 W/kg
SAR(1 g) = 0.204 mW/g; SAR(10 g) = 0.100 mW/g
Maximum value of SAR (measured) = 0.220 mW/g



0 dB = 0.220mW/g



CH06(2437 MHz) LEFT HEAD-CHEEK

DUT: WLAN IP Phone; Type: WirelessIP 5000;

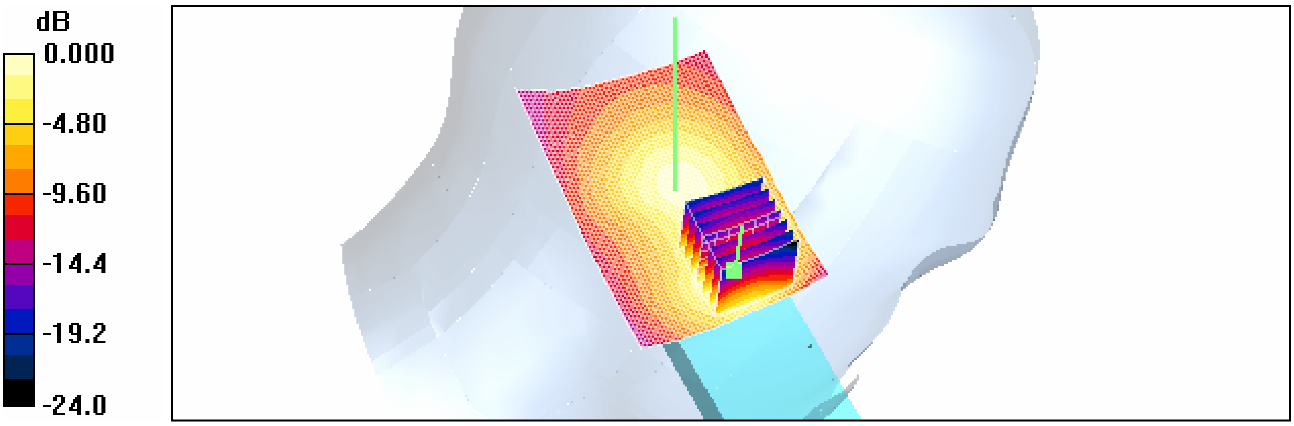
Communication System: CW; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2437 MHz; σ = 1.84 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

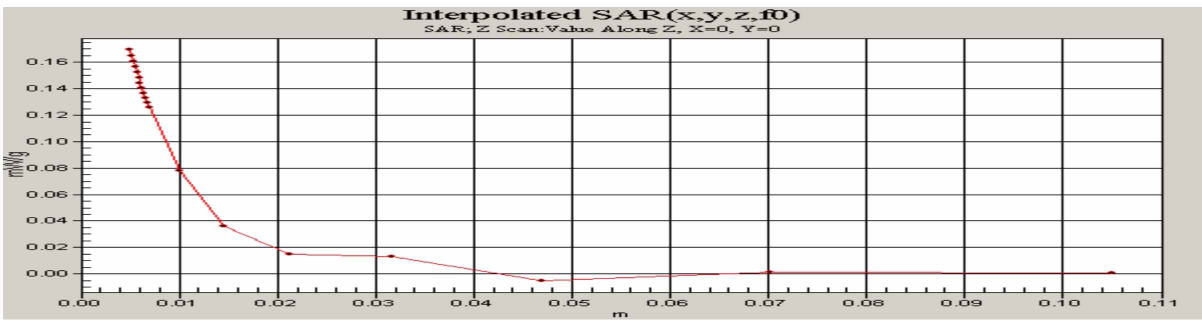
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM 12;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.293 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.5 V/m; Power Drift = 0.004 dB
Peak SAR (extrapolated) = 0.457 W/kg
SAR(1 g) = 0.248 mW/g; SAR(10 g) = 0.130 mW/g
Maximum value of SAR (measured) = 0.270 mW/g



0 dB = 0.270mW/g



CH06(2437 MHz) LEFT HEAD-TILT

DUT: WLAN IP Phone; Type: WirelessIP 5000;

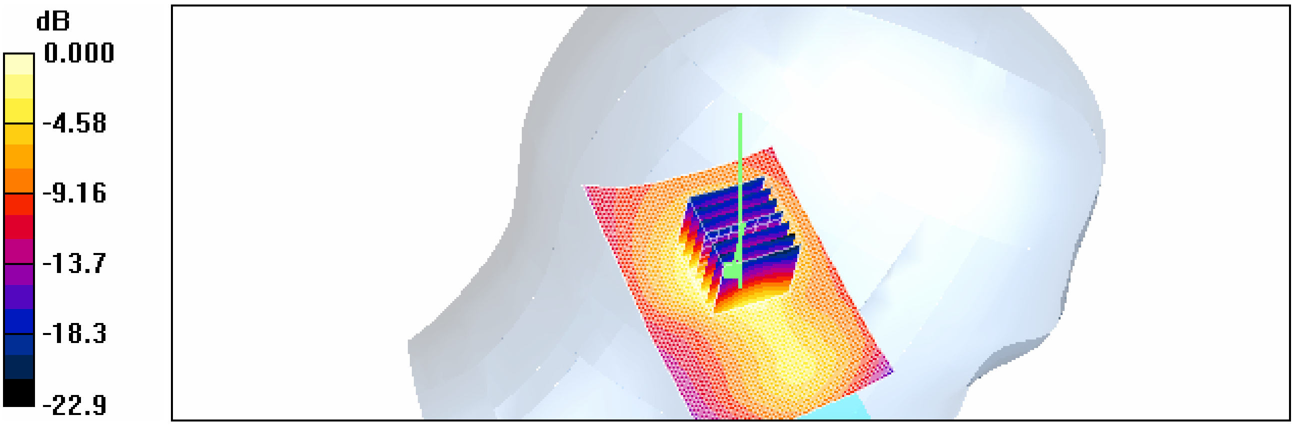
Communication System: CW; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2437 MHz; σ = 1.84 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

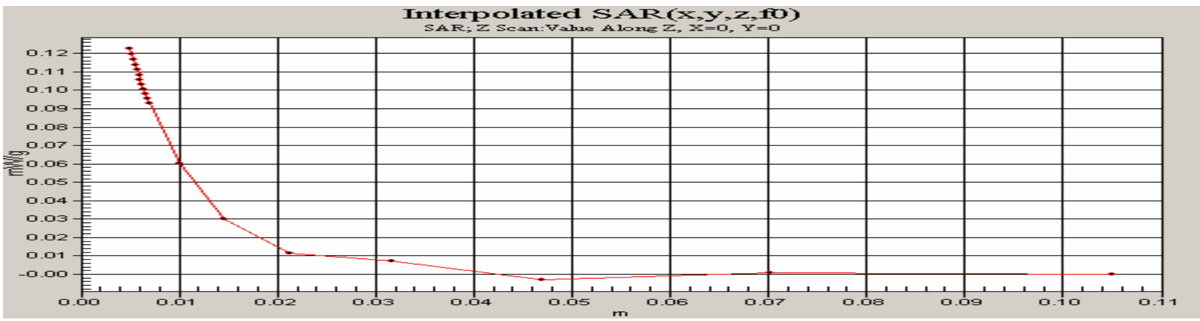
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM 12;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.202 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.58 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 0.390 W/kg
SAR(1 g) = 0.179 mW/g; SAR(10 g) = 0.088 mW/g
Maximum value of SAR (measured) = 0.197 mW/g



0 dB = 0.197mW/g



CH11(2462 MHz) RIGHT HEAD-CHEEK

DUT: WLAN IP Phone; Type: WirelessIP 5000;

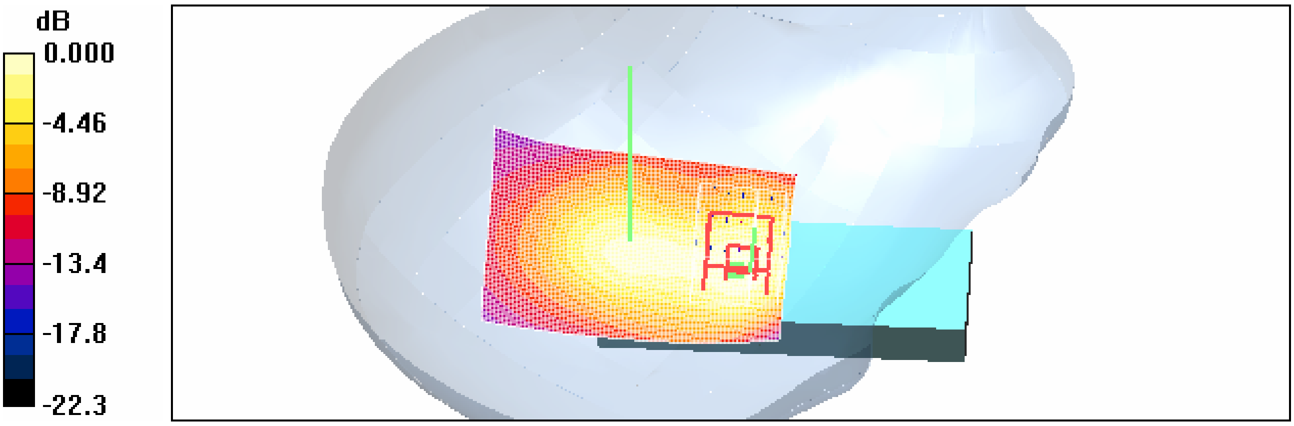
Communication System: CW; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2462 MHz; σ = 1.80 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

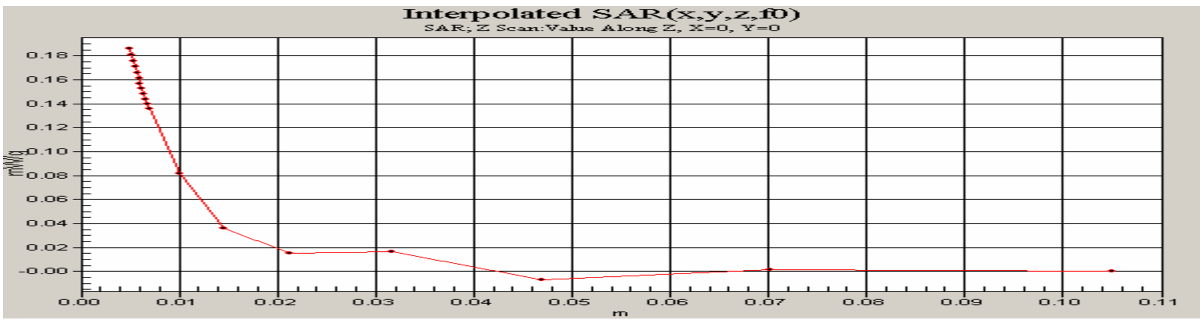
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM Twin;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.290 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.1 V/m; Power Drift = -0.034 dB
Peak SAR (extrapolated) = 0.438 W/kg
SAR(1 g) = 0.252 mW/g; SAR(10 g) = 0.135 mW/g
Maximum value of SAR (measured) = 0.274 mW/g



0 dB = 0.274mW/g



CH11(2462 MHz) RIGHT HEAD-TILT

DUT: WLAN IP Phone; Type: WirelessIP 5000;

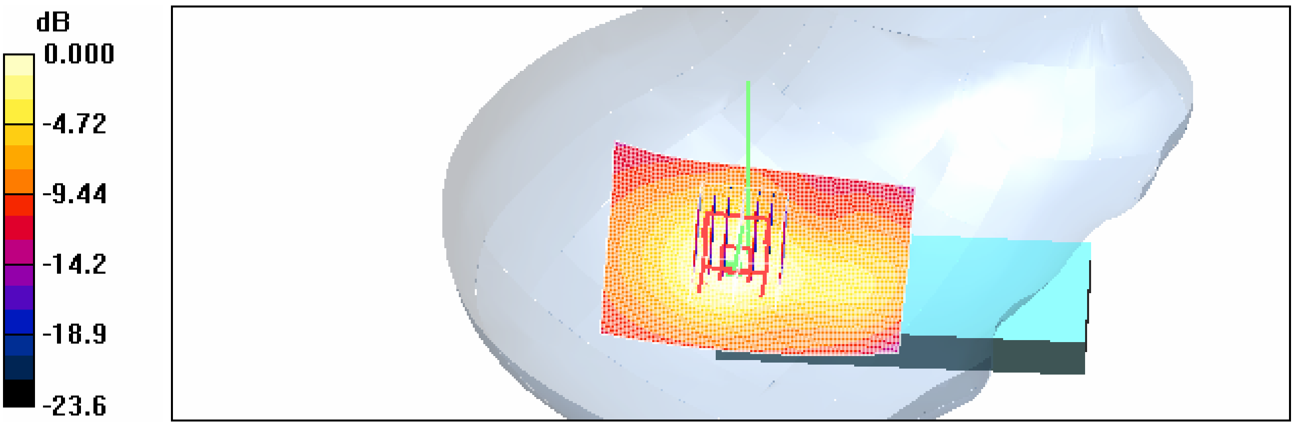
Communication System: CW; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2462 MHz; σ = 1.80 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

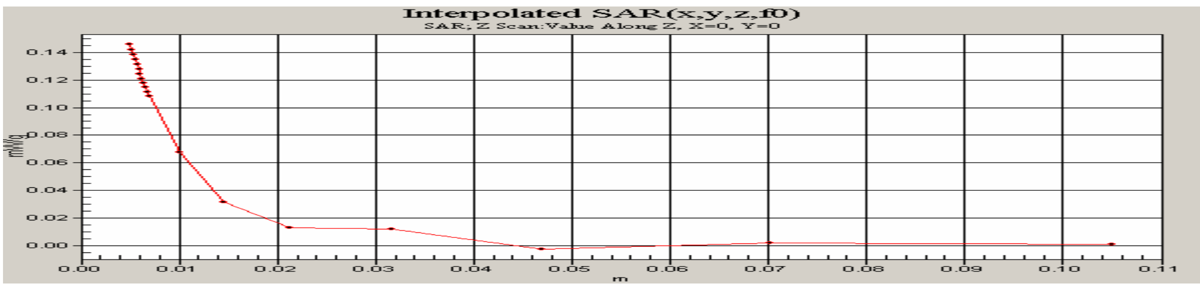
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM Twin;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.210 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.6 V/m; Power Drift = 0.022 dB
Peak SAR (extrapolated) = 0.414 W/kg
SAR(1 g) = 0.186 mW/g; SAR(10 g) = 0.092 mW/g
Maximum value of SAR (measured) = 0.202 mW/g



0 dB = 0.202mW/g



CH11(2462 MHz) LEFT HEAD-CHEEK

DUT: WLAN IP Phone; Type: WirelessIP 5000;

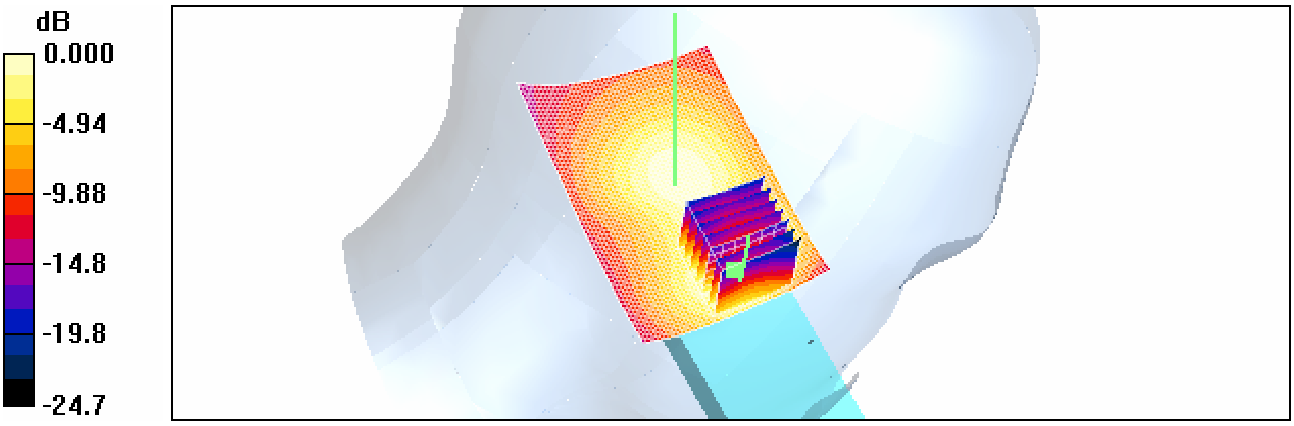
Communication System: CW; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2462 MHz; σ = 1.80 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

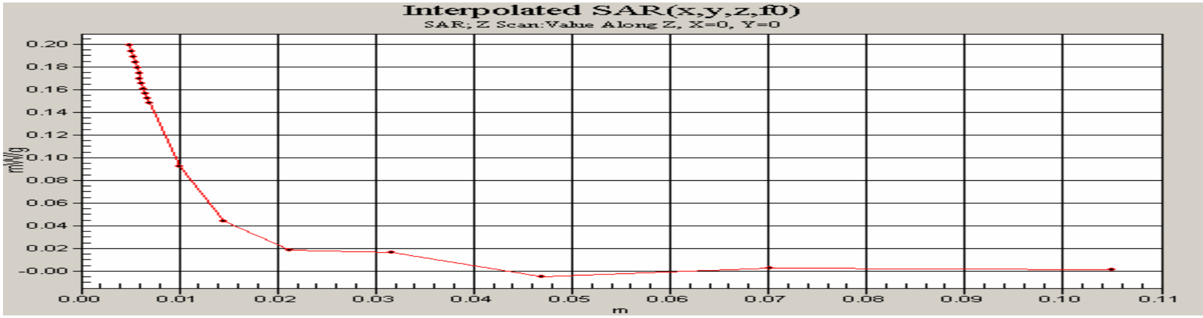
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM 12;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.323 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.7 V/m; Power Drift = -0.093 dB
Peak SAR (extrapolated) = 0.481 W/kg
SAR(1 g) = 0.266 mW/g; SAR(10 g) = 0.139 mW/g
Maximum value of SAR (measured) = 0.289 mW/g



0 dB = 0.289mW/g



CH11(2462 MHz) LEFT HEAD-TILT

DUT: WLAN IP Phone; Type: WirelessIP 5000;

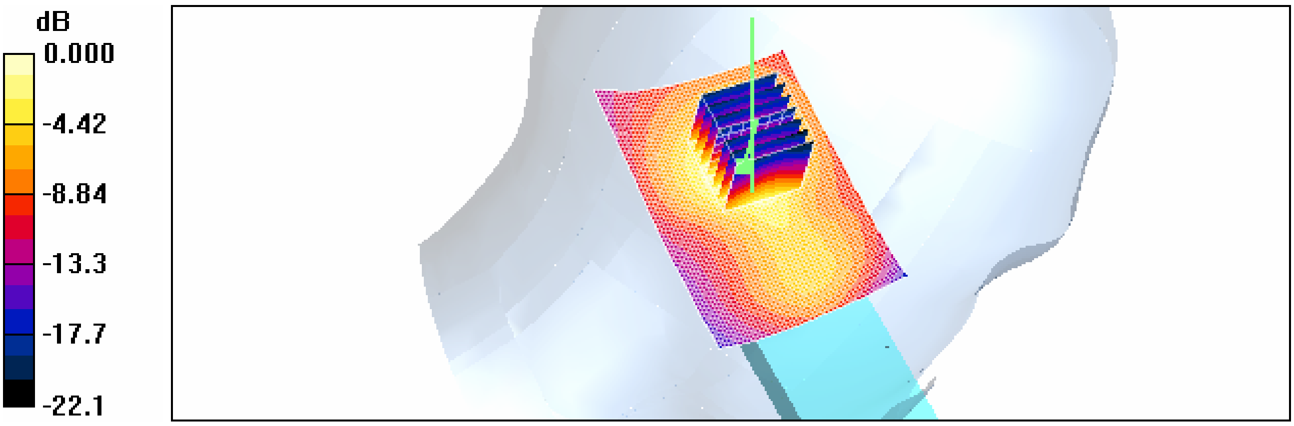
Communication System: CW; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2462 MHz; σ = 1.80 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

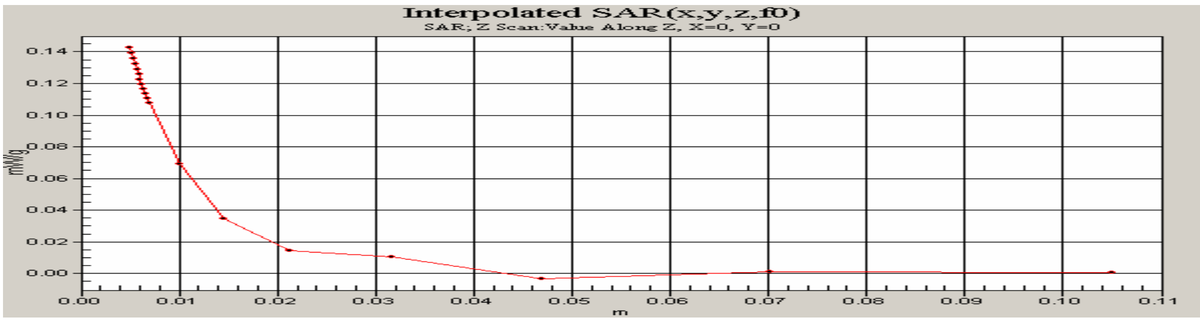
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM 12;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.261 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.4 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 0.509 W/kg
SAR(1 g) = 0.235 mW/g; SAR(10 g) = 0.115 mW/g
Maximum value of SAR (measured) = 0.254 mW/g



0 dB = 0.254mW/g



CH01(2412 MHz) BELT

DUT: WLAN IP Phone; Type: WirelessIP 5000;

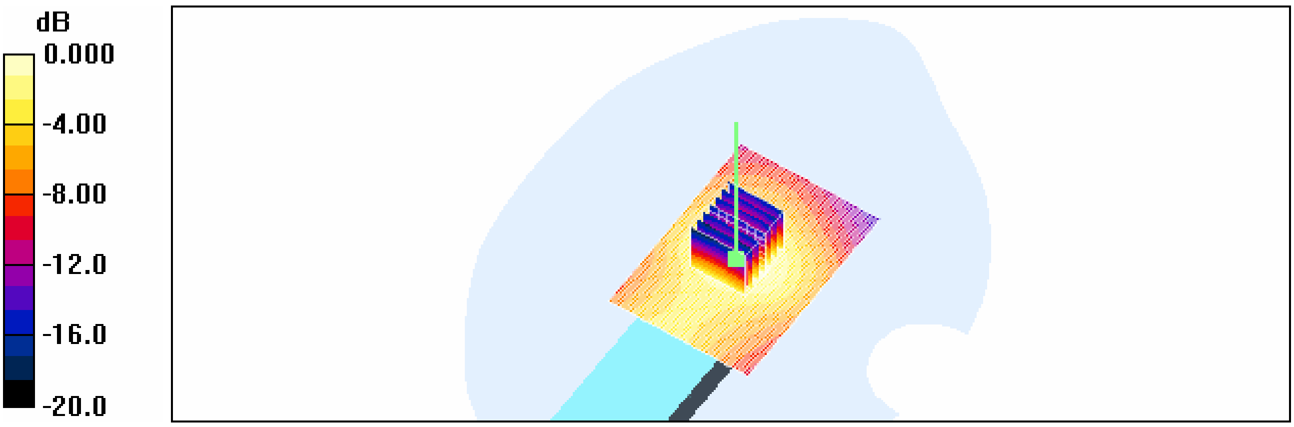
Communication System: CW; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2412 MHz; σ = 1.89 mho/m; ε_r = 50.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

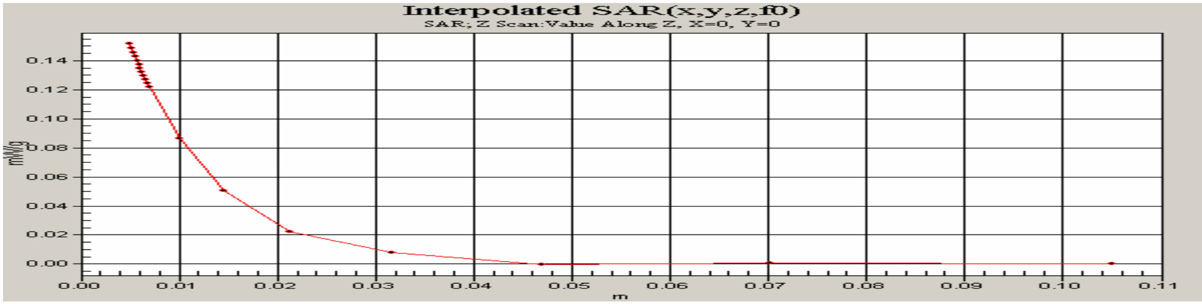
- Probe: ET3DV6 - SN1773; ConvF(4.06, 4.06, 4.06); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM 12;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.233 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.7 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 0.436 W/kg
SAR(1 g) = 0.216 mW/g; SAR(10 g) = 0.120 mW/g
Maximum value of SAR (measured) = 0.229 mW/g



0 dB = 0.229mW/g



CH06(2437 MHz) BELT

DUT: WLAN IP Phone; Type: WirelessIP 5000;

Communication System: CW; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2437 MHz; σ = 1.98 mho/m; ε_r = 50.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

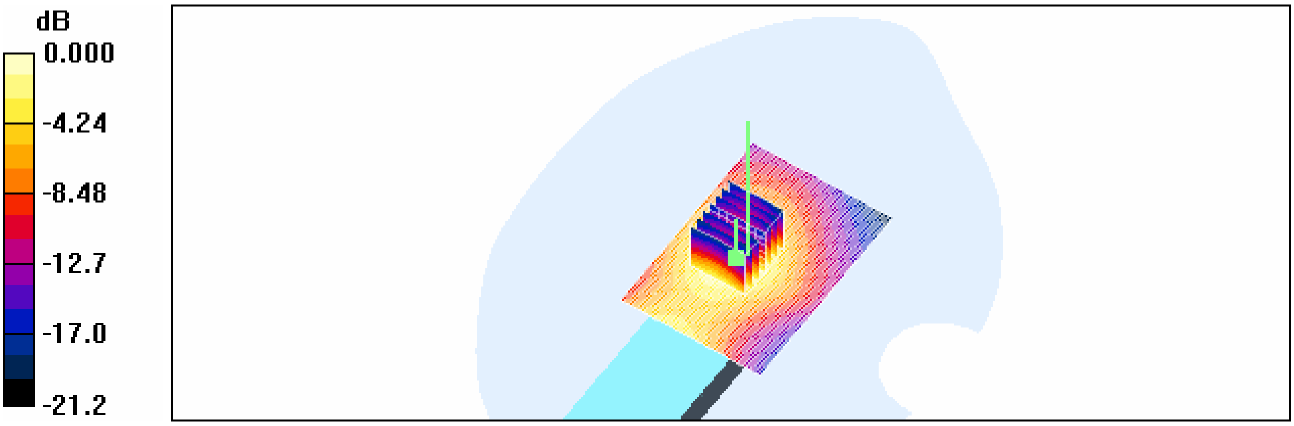
- Probe: ET3DV6 - SN1773; ConvF(4.06, 4.06, 4.06); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM 12;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.379 mW/g

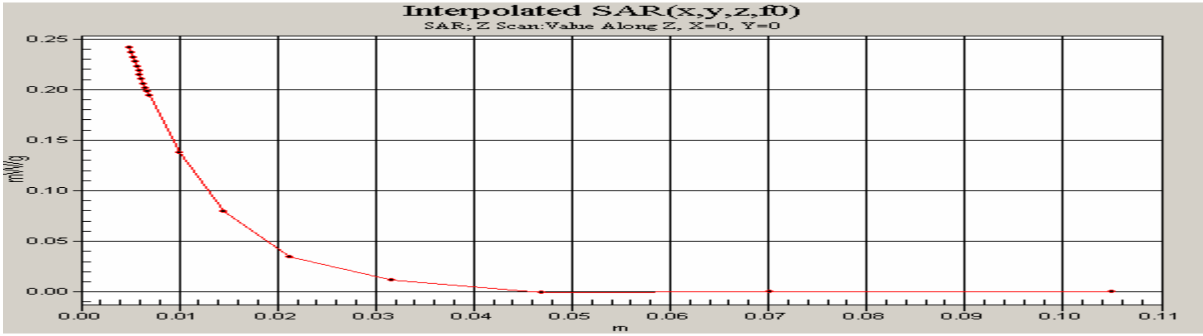
KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.0 V/m; Power Drift = 0.076 dB
Peak SAR (extrapolated) = 0.704 W/kg

SAR(1 g) = 0.351 mW/g; SAR(10 g) = 0.186 mW/g

Maximum value of SAR (measured) = 0.379 mW/g



0 dB = 0.379mW/g



CH11(2462 MHz) BELT

DUT: WLAN IP Phone; Type: WirelessIP 5000;

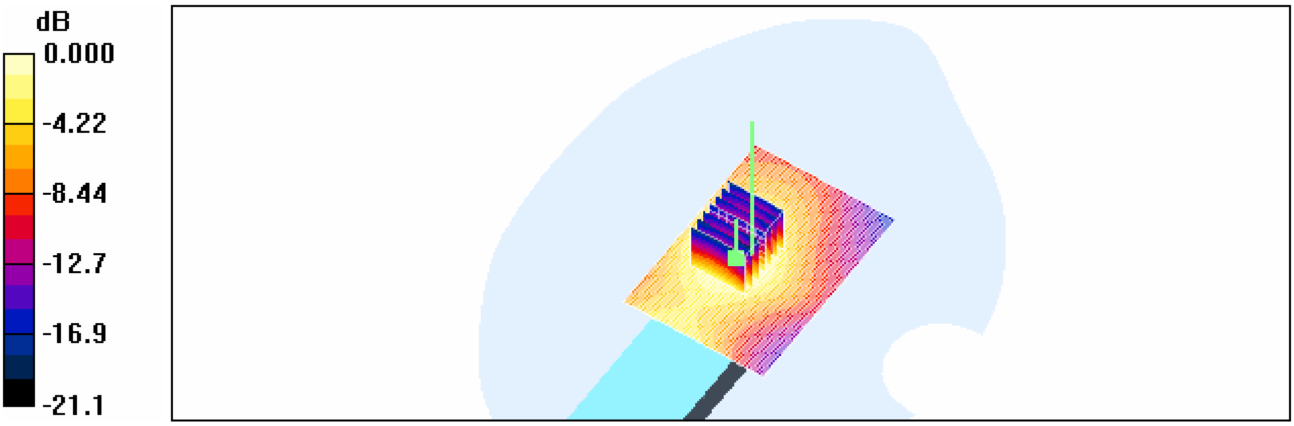
Communication System: CW; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2462 MHz; σ = 1.97 mho/m; ε_r = 50.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

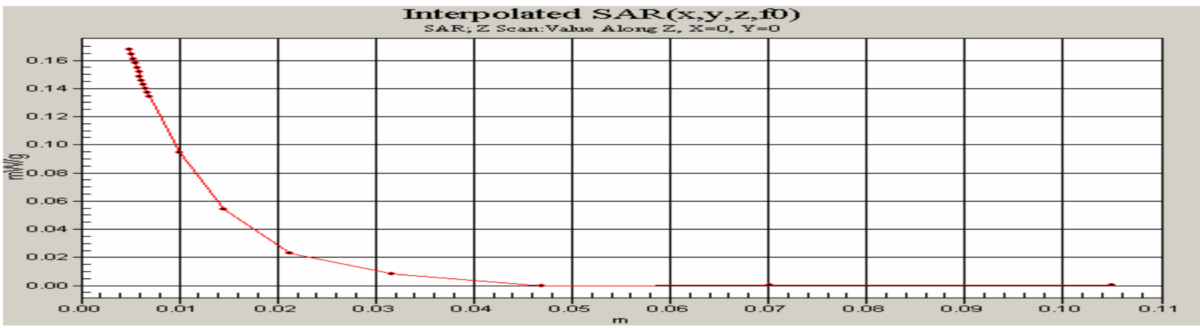
- Probe: ET3DV6 - SN1773; ConvF(4.06, 4.06, 4.06); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM 12;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.281 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.9 V/m; Power Drift = -0.043 dB
Peak SAR (extrapolated) = 0.508 W/kg
SAR(1 g) = 0.253 mW/g; SAR(10 g) = 0.137 mW/g
Maximum value of SAR (measured) = 0.267 mW/g



0 dB = 0.267mW/g



VALIDATION : 2450 MHz

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:746

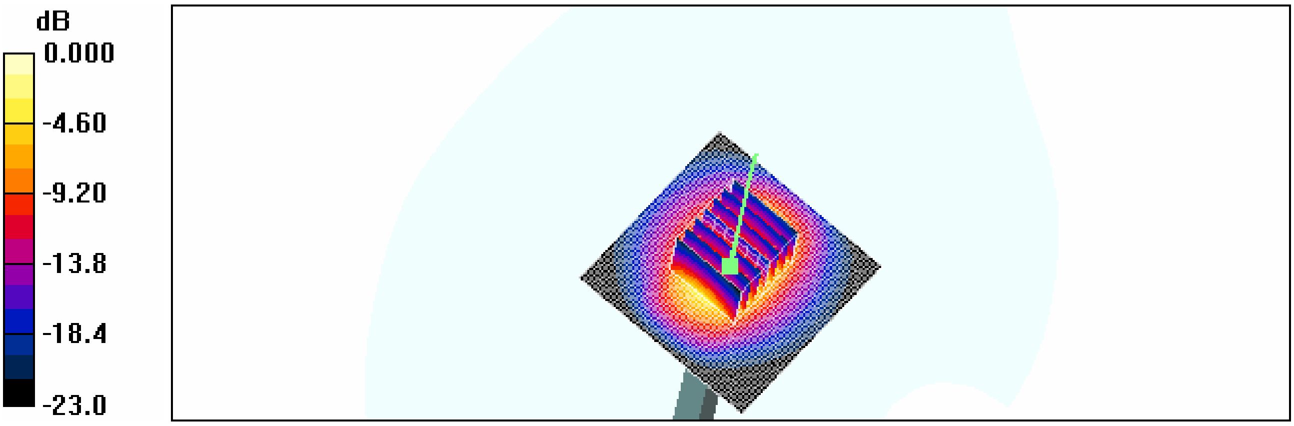
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: M2450 Medium parameters used: f = 2450 MHz; σ = 1.80 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

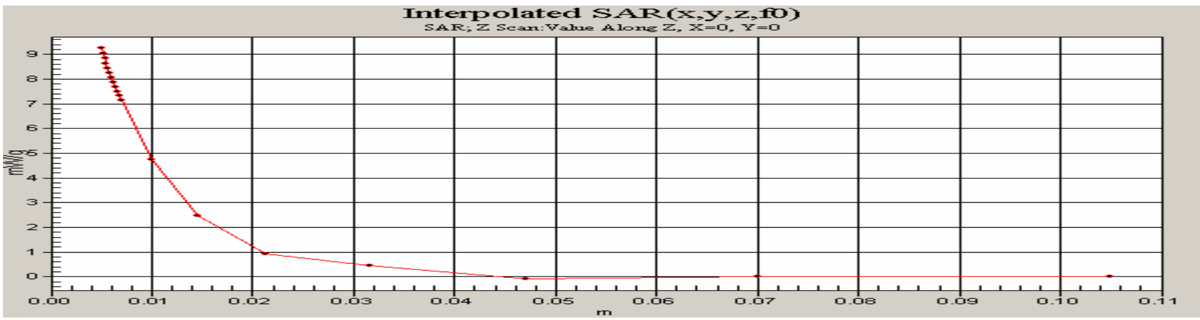
- Probe: ET3DV6 - SN1773; ConvF(4.39, 4.39, 4.39); Calibrated: 2005-05-26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2005-03-22
- Phantom: SAM 12;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

KTL procedure/Area Scan (5x5x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 18.6 mW/g

KTL procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.5 V/m; Power Drift = 0.006 dB
Peak SAR (extrapolated) = 30.3 W/kg
SAR(1 g) = 13.5 mW/g; SAR(10 g) = 6.11 mW/g
Maximum value of SAR (measured) = 14.9 mW/g



0 dB = 14.9mW/g



APPENDIX D : MEASURED TISSUE DIELECTRIC PARAMETERS

1. Head Tissue

Title
SubTitle
January 24, 2006 03:47 PM

Frequency	e'	e''
2.410000000 GHz	41.8596	14.3325
2.412000000 GHz	41.8661	14.3299
2.414000000 GHz	41.8879	14.3014
2.416000000 GHz	41.8909	14.2752
2.418000000 GHz	41.8817	14.2422
2.420000000 GHz	41.8645	14.1808
2.422000000 GHz	41.8460	14.1474
2.424000000 GHz	41.8125	14.0685
2.426000000 GHz	41.7565	14.0104
2.428000000 GHz	41.7183	13.9361
2.430000000 GHz	41.6713	13.8525
2.432000000 GHz	41.6274	13.7723
2.434000000 GHz	41.5649	13.6976
2.436000000 GHz	41.4940	13.6074
2.438000000 GHz	41.4129	13.5444
2.440000000 GHz	41.3381	13.4819
2.442000000 GHz	41.2420	13.4216
2.444000000 GHz	41.1523	13.3617
2.446000000 GHz	41.0412	13.3100
2.448000000 GHz	40.9229	13.2852
2.450000000 GHz	40.8186	13.2595
2.452000000 GHz	40.6833	13.2247
2.454000000 GHz	40.5616	13.2237
2.456000000 GHz	40.4317	13.2100
2.458000000 GHz	40.3127	13.1953
2.460000000 GHz	40.1940	13.2060
2.462000000 GHz	40.1008	13.2196
2.464000000 GHz	40.0035	13.2284
2.466000000 GHz	39.9091	13.2658
2.468000000 GHz	39.8491	13.2812
2.470000000 GHz	39.8100	13.3234
2.472000000 GHz	39.7887	13.3698
2.474000000 GHz	39.7705	13.4388
2.476000000 GHz	39.7773	13.5170
2.478000000 GHz	39.7997	13.5871

2. Muscle Tissue

Title
SubTitle
January 26, 2006 10:34 AM

Frequency	e'	e''
2.410000000 GHz	50.3431	13.8953
2.412000000 GHz	50.2832	13.8895
2.414000000 GHz	50.2224	13.9097
2.416000000 GHz	50.1905	13.9422
2.418000000 GHz	50.1457	13.9578
2.420000000 GHz	50.0990	14.0258
2.422000000 GHz	50.0894	14.0889
2.424000000 GHz	50.0829	14.1486
2.426000000 GHz	50.0599	14.2065
2.428000000 GHz	50.0598	14.3016
2.430000000 GHz	50.0659	14.3537
2.432000000 GHz	50.0513	14.4304
2.434000000 GHz	50.0930	14.4761
2.436000000 GHz	50.1024	14.5246
2.438000000 GHz	50.1349	14.5743
2.440000000 GHz	50.1799	14.6163
2.442000000 GHz	50.2346	14.6179
2.444000000 GHz	50.3036	14.6312
2.446000000 GHz	50.3783	14.6340
2.448000000 GHz	50.4638	14.6125
2.450000000 GHz	50.5301	14.6140
2.452000000 GHz	50.6307	14.5955
2.454000000 GHz	50.7052	14.5794
2.456000000 GHz	50.7842	14.5757
2.458000000 GHz	50.8594	14.5361
2.460000000 GHz	50.8972	14.5315
2.462000000 GHz	50.9490	14.5055
2.464000000 GHz	50.9647	14.4949
2.466000000 GHz	50.9663	14.4907
2.468000000 GHz	50.9387	14.4601
2.470000000 GHz	50.8982	14.4309
2.472000000 GHz	50.8361	14.3846
2.474000000 GHz	50.7563	14.3533
2.476000000 GHz	50.6601	14.2912
2.478000000 GHz	50.5521	14.2371

APPENDIX E : SAR TESTING EQUIPMENT CALIBRATION CERTIFICATE ATTACHMENTS

1. **2450 MHz Dipole Calibration Sheet (5 pages)**

2. **E-Field Probe Calibration Sheet (7 pages)**

Schmid & Partner Engineering AG

s p e a g

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Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

DASY

Dipole Validation Kit

Type: D2450V2

Serial: 746

Manufactured: December 1, 2003
Calibrated: February 25, 2004

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with **head simulating solution** of the following electrical parameters at 2450 MHz:

Relative Dielectricity	**37.6**	± 5%
Conductivity	**1.88 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ES3DV2 (SN:3013, Conversion factor 4.8 at 2450 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. The included distance spacer was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ES3DV2 SN:3013 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	**57.6 mW/g** ± 16.8 % (k=2)[1]
averaged over 10 cm^3 (10 g) of tissue:	**26.0 mW/g** ± 16.2 % (k=2)[1]

[1] validation uncertainty

3. Dipole Impedance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	**1.154 ns**	(one direction)
Transmission factor:	**0.981**	(voltage transmission, one direction)

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

Feedpoint impedance at 2450 MHz:	Re{Z} = **52.3 Ω**
	Im {Z} = **5.1 Ω**
Return Loss at 2450 MHz	**-25.3 dB**

4. Handling

Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

5. Design

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

Small end caps have been added to the dipole arms in order to improve matching when loaded according to the position as explained in Section 1. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

6. Power Test

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

Page 1 of 1

Date/Time: 02/25/04 14:43:37

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN746

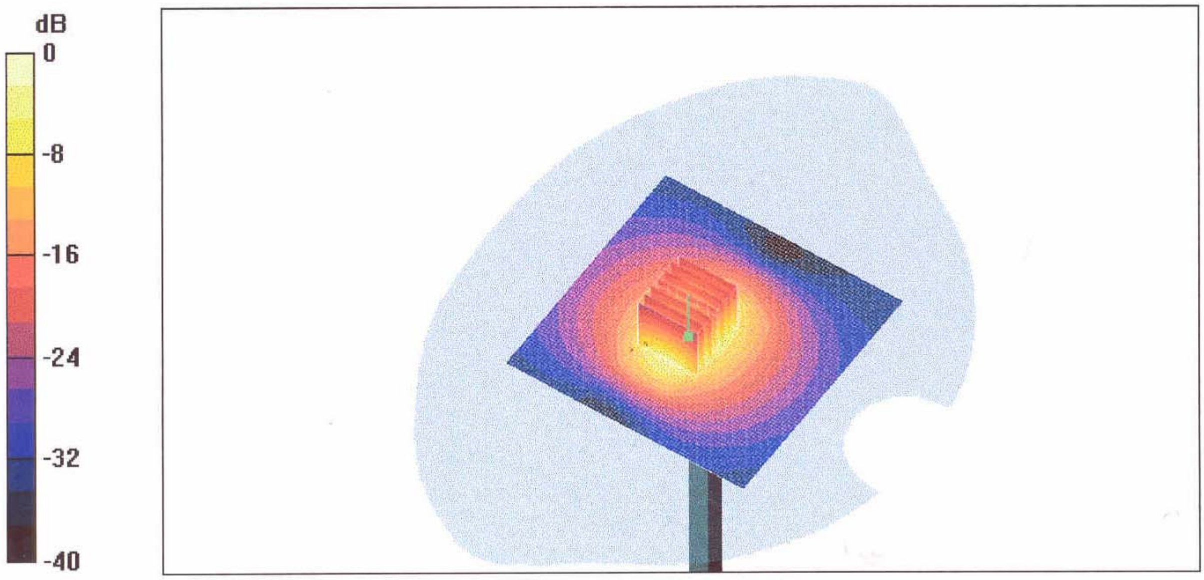
Communication System: CW-2450; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL 2450 MHz;
Medium parameters used: f = 2450 MHz; σ = 1.88 mho/m; ε_r = 37.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

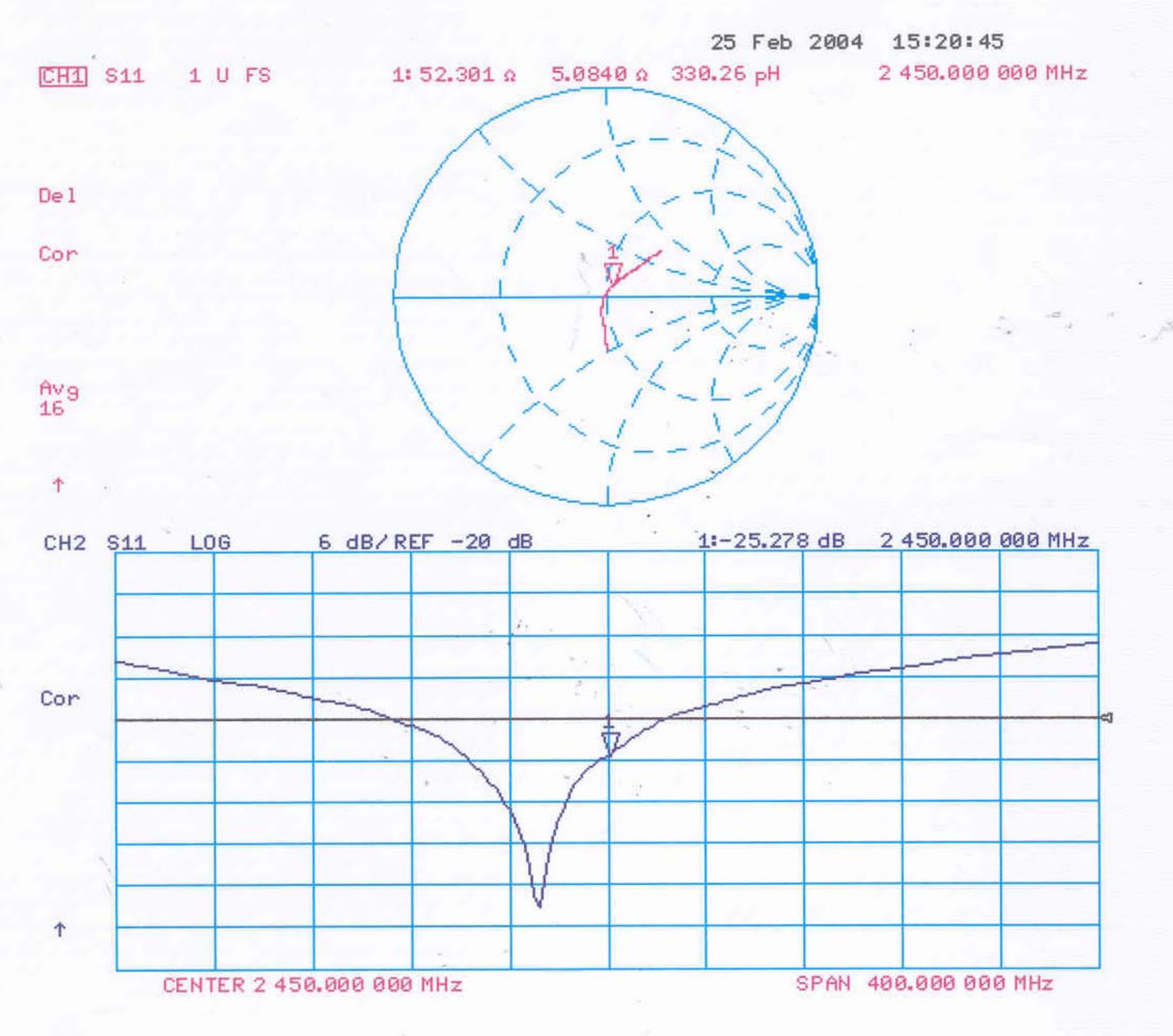
- Probe: ES3DV2 - SN3013; ConvF(4.8, 4.8, 4.8); Calibrated: 1/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn411; Calibrated: 11/6/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006;
- Measurement SW: DASY4, V4.2 Build 37; Postprocessing SW: SEMCAD, V1.8 Build 105

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 87.9 V/m; Power Drift = 0.0 dB
Maximum value of SAR (interpolated) = 16.4 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.9 V/m; Power Drift = 0.0 dB
Maximum value of SAR (measured) = 16.1 mW/g
Peak SAR (extrapolated) = 32.3 W/kg
SAR(1 g) = 14.4 mW/g; SAR(10 g) = 6.5 mW/g



0 dB = 16.1mW/g


25 Feb 2004 15:20:45
CH1 S11 1 U FS
1: 52.301 Ω 5.0840 Ω 330.26 pH
2 450.000 000 MHz
Del
Cor
Avg
16
CH2 S11 LOG 6 dB/ REF -20 dB
1:-25.278 dB 2 450.000 000 MHz
Cor
CENTER 2 450.000 000 MHz
SPAN 400.000 000 MHz

Probe ET3DV6

SN:1773

Manufactured:	February 22, 2003
Last calibrated:	June 3, 2004
Recalibrated:	May 26, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1773

Sensitivity in Free Space[A]

NormX	**1.76** ± 10.1%	$\mu V/(V/m)^2$
NormY	**1.59** ± 10.1%	$\mu V/(V/m)^2$
NormZ	**1.71** ± 10.1%	$\mu V/(V/m)^2$

Diode Compression[B]

DCP X	**94** mV
DCP Y	**94** mV
DCP Z	**94** 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		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	9.0	4.9
SAR_{be} [%]	With Correction Algorithm	0.7	0.0

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	13.2	9.0
SAR_{be} [%]	With Correction Algorithm	0.9	0.0

Sensor Offset

Probe Tip to Sensor Center **2.7** mm

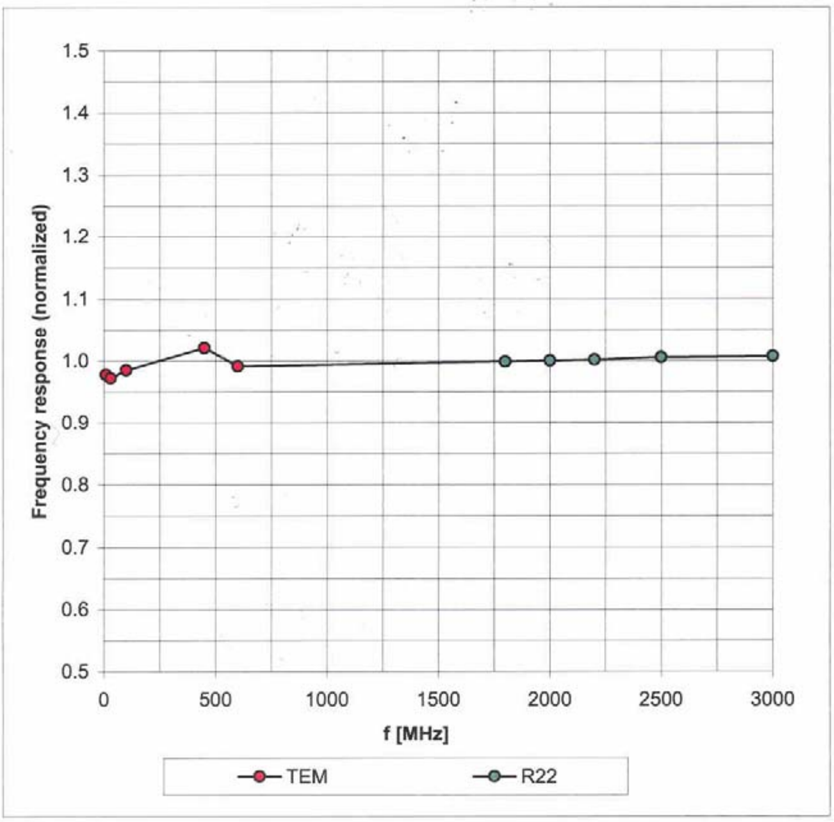
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

Frequency Response of E-Field

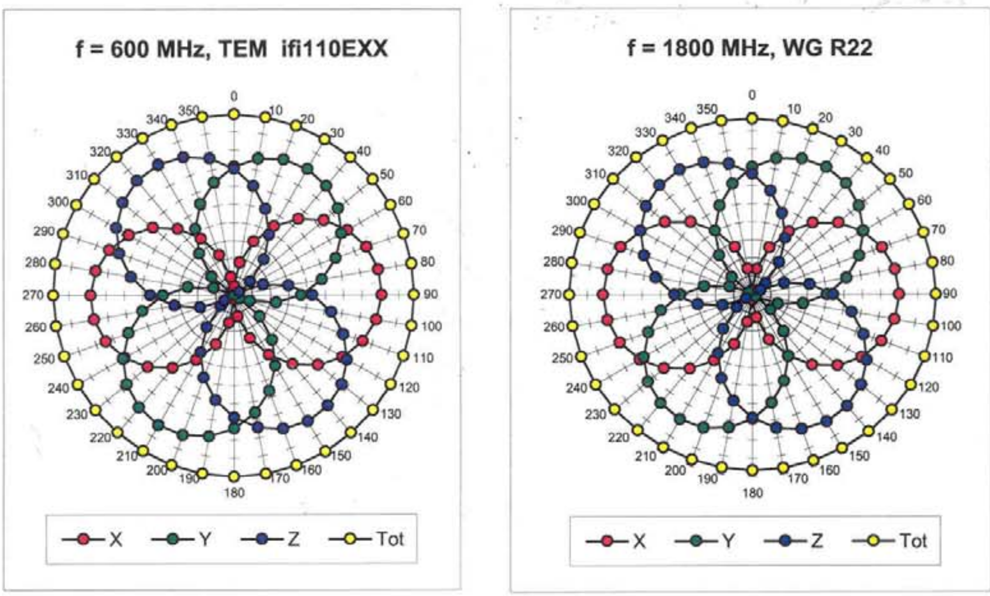
(TEM-Cell:ifi110 EXX, Waveguide: R22)

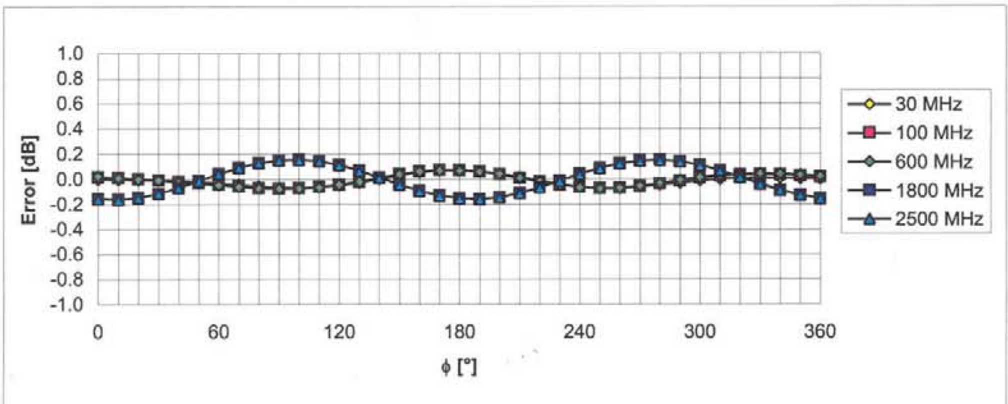


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ET3DV6 SN:1773 May 26, 2005

Receiving Pattern (φ), ϑ = 0°



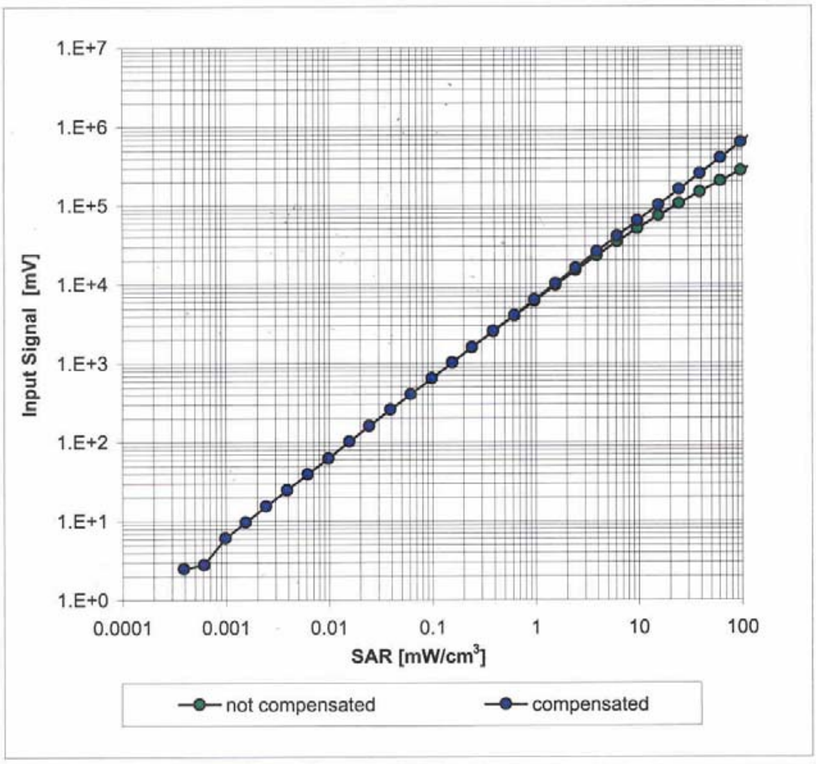


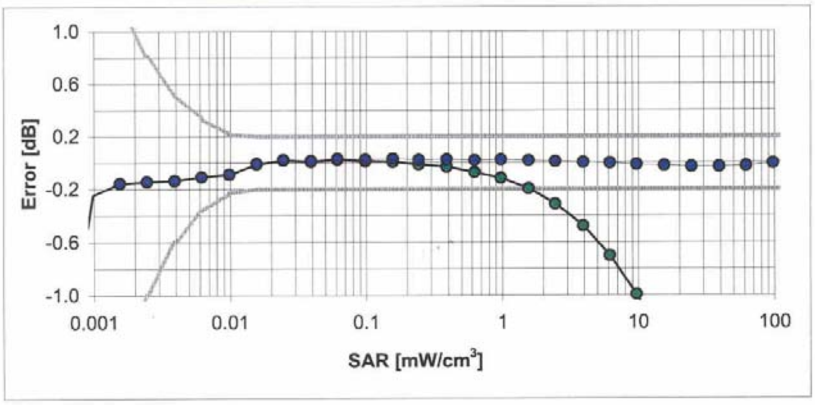
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6 SN:1773 May 26, 2005

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)

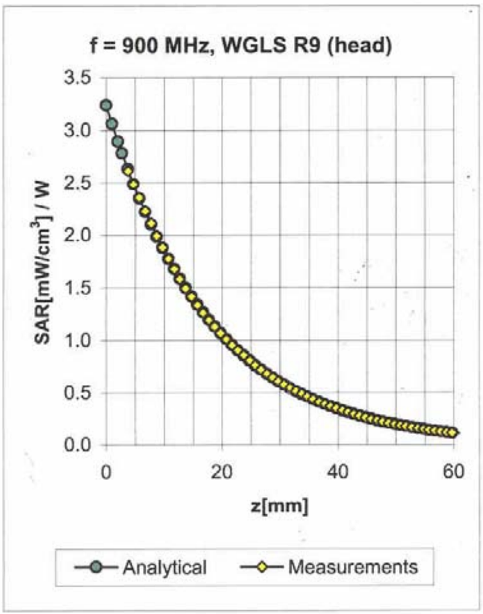


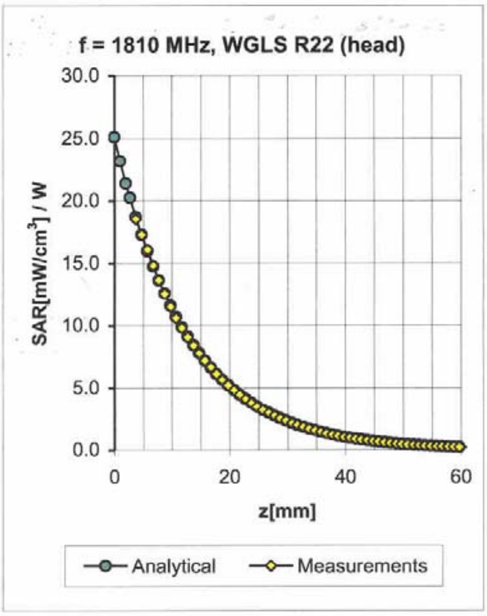


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ET3DV6 SN:1773 May 26, 2005

Conversion Factor Assessment



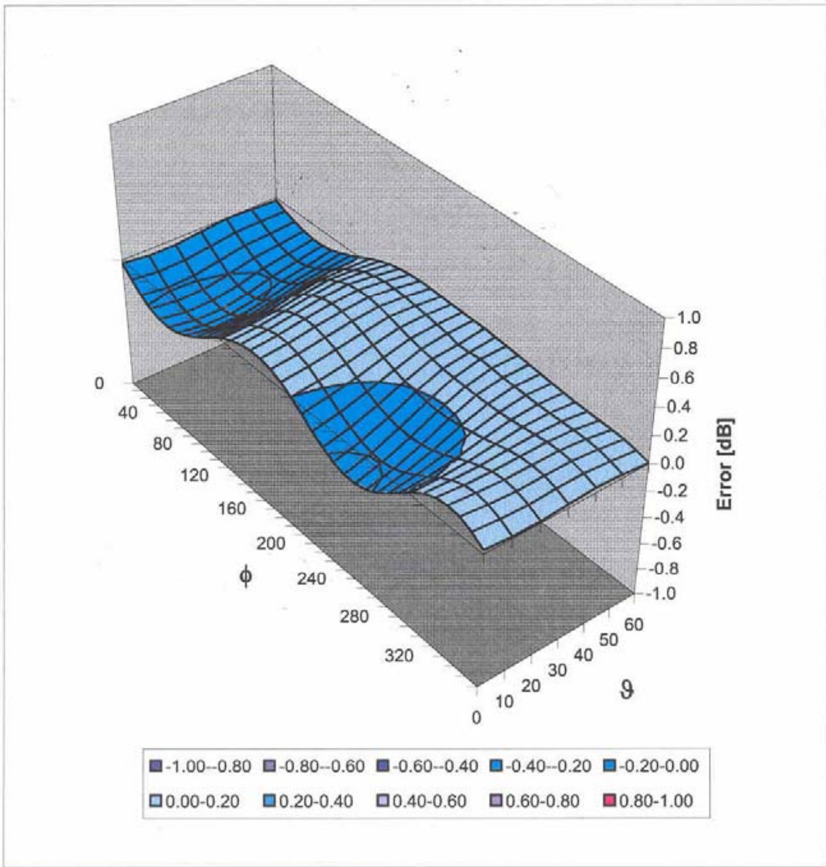


f [MHz]	Validity [MHz][c]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty	
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.99	1.54	6.25	± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.57	2.42	5.02	± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.56	2.52	4.73	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.65	2.24	4.39	± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.57	1.93	6.23	± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.56	2.84	4.39	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.72	2.02	4.06	± 11.8% (k=2)

[c] 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 (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)