SAR TEST REPORT

REPORT NO.: SA960822L02A

MODEL NO.: Pegaso

RECEIVED: Aug. 22, 2007

TESTED: Sep. 13 ~ Sep. 20, 2007
Jan. 14 ~ Jan. 16, 2008

ISSUED: Mar. 26, 2008

APPLICANT: Datalogic Mobile Inc.

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ISSUED BY: Advance Data Technology Corporation

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1. CERTIFICATION

PRODUCT:	Portable Data Terminal
MODEL:	Pegaso
BRAND:	Datalogic
APPLICANT:	Datalogic Mobile Inc.
TESTED:	Sep. 13 ~ Sep. 20, 2007 Jan. 14 ~ Jan. 16, 2008
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 2 (Section 2.1093)** FCC OET Bulletin 65, Supplement C (01-01) RSS-102 IEEE 1528-2003

The above equipment (model: Pegaso) has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Rennie Wang / Senior Specialist , **DATE:** Mar. 25, 2008

TECHNICAL ACCEPTANCE : James Fan / Engineer , **DATE:** Mar. 25, 2008
Responsible for RF

APPROVED BY : Gary Chang / Assistant Manager , **DATE:** Mar. 25, 2008

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Portable Data Terminal
MODEL NO.	Pegaso
FCC ID	U4SPD
POWER SUPPLY	3.7Vdc from rechargeable lithium battery 5.0Vdc from power adapter
CLASSIFICATION	Portable device, production unit
MODULATION TYPE	Mobile phone: GMSK, 8PSK for GSM, GPRS, E-GPRS Wireless LAN: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM Bluetooth: GFSK, π/4-DQPSK, 8DPSK for FHSS
FREQUENCY RANGE	Mobile phone: 824MHz ~ 849MHz (GSM band) 1850MHz ~ 1909MHz (PCS band) Wireless LAN & Bluetooth: 2400.0MHz ~ 2483.5 MHz
CHANNEL FREQUENCIES UNDER TEST AND ITS CONDUCTED OUTPUT POWER	GSM band: 1.932Watts / 824.2MHz for channel 128 1.928Watts / 836.6MHz for channel 190 1.901Watts / 848.8MHz for channel 251
	PCS band: 0.832Watts / 1850.2MHz for channel 512 0.871Watts / 1880.0MHz for channel 661 0.832Watts / 1909.8MHz for channel 810
	WLAN-DSSS (802.11b): 50.699mW / 2412.0MHz for channel 1 50.816mW / 2437.0MHz for channel 6 51.050mW / 2462.0MHz for channel 11
	WLAN-OFDM (802.11g): 50.466mW / 2412.0MHz for channel 1 51.050mW / 2437.0MHz for channel 6 50.350mW / 2462.0MHz for channel 11
	Bluetooth-GFSK: 1.312mW / 2441.0MHz for channel 39 Bluetooth-8DPSK: 0.904mW / 2441.0MHz for channel 39

MAX. AVERAGE SAR (1g)	Body: 0.172W/kg (GSM band) 0.058W/kg (PCS band) 0.029W/kg (WLAN) 0.0000660W/kg (Bluetooth)
ANTENNA TYPE	Monopole antenna with 2.6dBi gain for GSM850 Monopole antenna with 2.8dBi gain for PCS1900 Wireless LAN: PCB antenna with 1.96dBi gain Wireless LAN: PIFA antenna with 2.69dBi gain Bluetooth: SMD antenna with 4.10dBi gain
DATA CABLE	1.5m shielded USB cable with charger port without core
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter, lithium battery x2

NOTE:

1. This report is issued as a supplementary report of ADT report no. SA960822L02. The difference is adding co-located test data for GSM, Wireless LAN and Bluetooth simultaneously.
2. The EUT is a Portable Data Terminal with wireless LAN, Bluetooth and mobile phone functions.
3. The communicated functions of EUT listed as below:

		GSM850MHz	PCS1900MHz	With 802.11b/g & bluetooth
2G	GPRS	√	√	
	EDGE	√	√	
*** Mobile function is for data transmission only.** ****GSM, BT and WLAN functions can use simultaneously**				

4. The EUT have two lithium batteries listed as below:

BATTERY 1:		BATTERY 2:	
BRAND:	ETI	**BRAND:**	ETI
MODEL:	4006-0337	**MODEL:**	4006-0338
RATING:	3.7Vdc, 3300mAh	**RATING:**	3.7Vdc, 2200mAh

   ****** After pre-tested both batteries, found battery 1 was the worse, therefore all the test results came out from this.

5. The EUT was operated with following power adapter:

BRAND:	PHIHONG
MODEL:	PSA15R-050P
INPUT:	100-240Vac, 50-60Hz, 0.5A
OUTPUT:	5.0Vdc, 3.0A
POWER LINE:	1.8m non-shielded cable with one core

6. The EUT operates in the 2.4GHz frequency spectrum and complies with 802.11b & 802.11g techniques.
7. Bluetooth technology is used in this EUT.
8. Hardware version: B2.11
9. Software version: B2.11
10. IMEI code: 355634*********
11. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

2.2 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to the specifications of the manufacturer, this product must comply with the requirements of the following standards:

FCC 47 CFR Part 2 (2.1093)

FCC OET Bulletin 65, Supplement C (01- 01)

RSS-102

IEEE 1528-2003

All test items have been performed and recorded as per the above standards.

2.3 GENERAL INOFRMATION OF THE SAR SYSTEM

DASY4 (software 4.7 Build 53) consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY4 software defined. The DASY4 software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

ET3DV6 ISOTROPIC E-FIELD PROBE

CONSTRUCTION	Symmetrical design with triangular core. Built-in optical fiber for surface detection system. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., glycolether).
FREQUENCY	10 MHz to 3 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)
DYNAMIC RANGE	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
OPTICAL SURFACE DETECTION	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
DIMENSIONS	Overall length: 330 mm (Tip Length: 16 mm) Tip diameter: 6.8 mm (Body diameter: 12 mm) Distance from probe tip to dipole centers: 2.7 mm
APPLICATION	General dosimetric measurements up to 3 GHz Fast automatic scanning in arbitrary phantoms (ET3DV6)

NOTE:

1. The Probe parameters have been calibrated by the SPEAG. Please reference “APPENDIX D” for the Calibration Certification Report.
2. For frequencies above 800 MHz, calibration in a rectangular wave-guide is used, because wave-guide size is manageable.
3. For frequencies below 800 MHz, temperature transfer calibration is used because the wave-guide size becomes relatively large.

TWIN SAM V4.0

CONSTRUCTION	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-2003, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.
SHELL THICKNESS	2 ± 0.2 mm
FILLING VOLUME	Approx. 25 liters
DIMENSIONS	Height: 810 mm; Length: 1000 mm; Width: 500 mm

SYSTEM VALIDATION KITS:

CONSTRUCTION	Symmetrical dipole with l/4 balun Enables measurement of feedpoint impedance with NWA Matched for use near flat phantoms filled with brain simulating solutions Includes distance holder and tripod adaptor
CALIBRATION	Calibrated SAR value for specified position and input power at the flat phantom in brain simulating solutions
FREQUENCY	835, 1900, 2450 MHz
RETURN LOSS	> 20 dB at specified validation position
POWER CAPABILITY	> 100 W (f < 1GHz); > 40 W (f > 1GHz)
OPTIONS	Dipoles for other frequencies or solutions and other calibration conditions upon request

DEVICE HOLDER FOR SAM TWIN PHANTOM

CONSTRUCTION

The device holder for the GSM900/DCS1800/PCS1900 GSM/GPRS/CDMA Mobile Phone device 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 reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles. The holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity ε =3 and loss tangent δ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered. The device holder for the portable device makes up of the polyethylene foam. The dielectric parameters of material close to the dielectric parameters of the air.

DATA ACQUISITION ELECTRONICS

CONSTRUCTION

The data acquisition electronics (DAE3) consists of a highly sensitive electrometer grade preamplifier with auto-zeroing, a channel and gain-switching multiplex, a fast 16 bit AD converter and a command decoder and control logic unit. Transmission to the measurement server 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 is mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of the DAE3 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

2.4 GENERAL DESCRIPTION OF THE SPATIAL PEAK SAR EVALUATION

The DASY4 post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the micro-volt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcp_i
Device parameters:	- Frequency	F
	- Crest factor	Cf
Media parameters:	- Conductivity	σ
	- Density	ρ

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \bullet \frac{cf}{dcp_i}$$

V_i	=compensated signal of channel i	(i = x, y, z)
U_i	=input signal of channel I	(i = x, y, z)
Cf	=crest factor of exciting field	(DASY parameter)
dcp_i	=diode compression point	(DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-fieldprobes: $E_i = \sqrt{\frac{V_1}{Norm_i \cdot ConvF}}$

H-fieldprobes: $H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}$

V_i	=compensated signal of channel I	(i = x, y, z)
$Norm_i$	=sensor sensitivity of channel i μV/(V/m)2 for E-field Probes	(i = x, y, z)
ConvF	= sensitivity enhancement in solution	
a_{ij}	= sensor sensitivity factors for H-field probes	
F	= carrier frequency [GHz]	
E_i	= electric field strength of channel i in V/m	
H_i	= magnetic field strength of channel i in A/m	

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{s}{r \cdot 1'000}$$

SAR	= local specific absorption rate in mW/g
E_{tot}	= total field strength in V/m
σ	= conductivity in [mho/m] or [Siemens/m]
ρ	= equivalent tissue density in g/cm3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid. The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. The generation of a high-resolution mesh within the measured volume
4. The interpolation of all measured values from the measurement grid to the high-resolution grid
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. The calculation of the averaged SAR within masses of 1 g and 10 g.

The probe is calibrated at the center of the dipole sensors that is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extreme of the SAR distribution. The uncertainty on the locations of the extreme is less than 1/20 of the grid size. Only local maximum within -2 dB of the global maximum are searched and passed for the Cube Scan measurement. In the Cube Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5mm.

The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1g and 10g peak evaluations are only available for the predefined cube 7 x 7 x 7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements. The measured volume of 30 x 30 x 30mm contains about 30g of tissue. The first procedure is an extrapolation (incl. boundary correction) to get the points between

the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume in a 1mm grid (42875 points). In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is the moved around until the highest averaged SAR is found. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

3. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
1	Universal Radio Communication Tester	R&S	CMU200	104484	Jan. 24, 2008

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

NOTE: All power cords of the above support units are non shielded (1.8m).

4. DESCRIPTION OF TEST POSITION

4.1 DESCRIPTION OF ANTENNA LOCATION

4.2 DESCRIPTION OF TEST POSITION

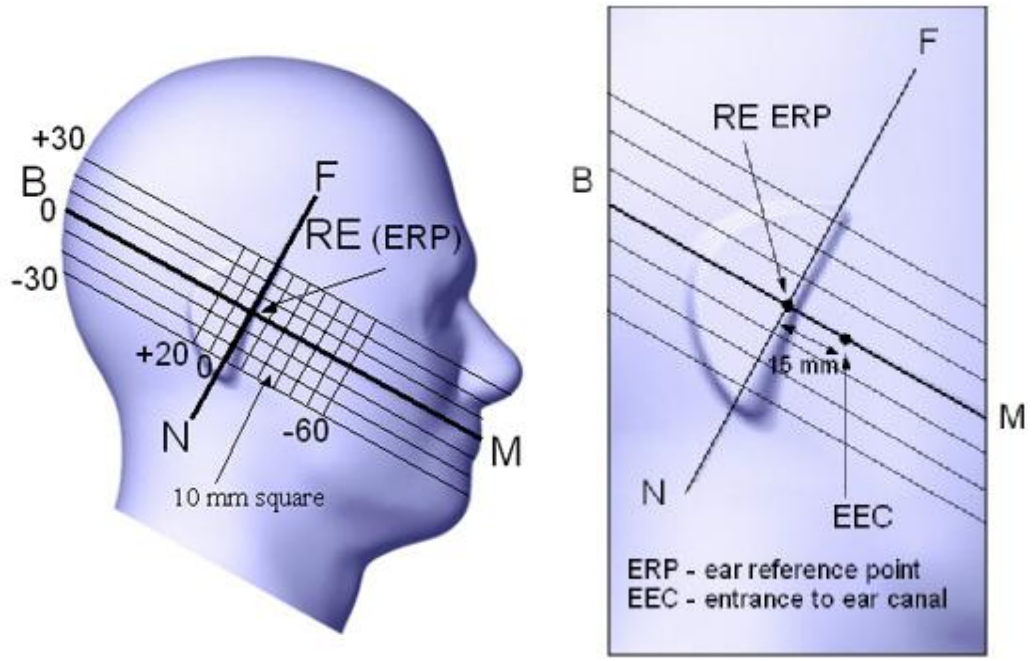


FIGURE 3.1

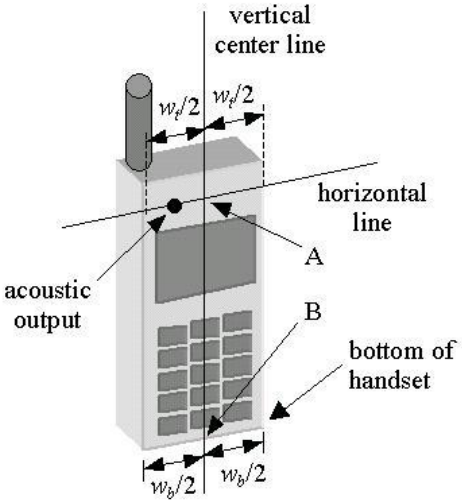


FIGURE 3.1a

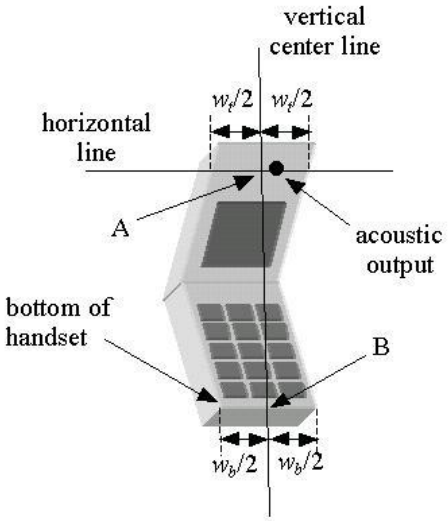
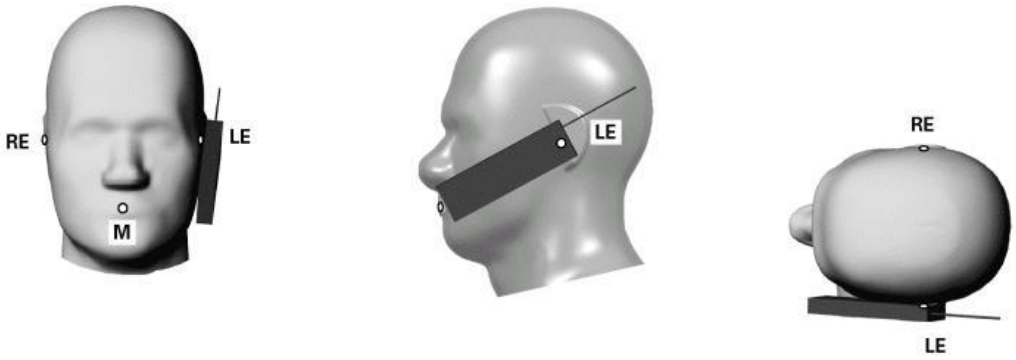


FIGURE 3.1b

4.1.1 TOUCH/CHEEK TEST POSITION

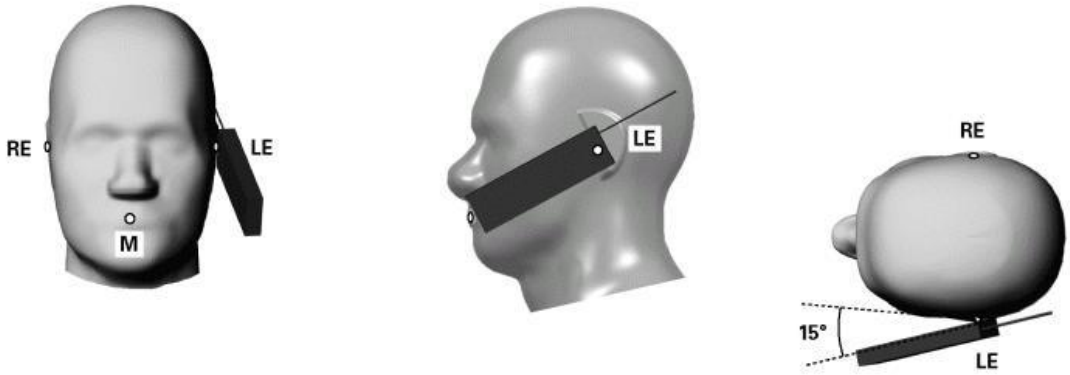
The head position in Figure 3.1, the ear reference points ERP are 15mm above entrance to ear canal along the B-M line. The line N-F (Neck-Front) is perpendicular to the B-M (Back Mouth) line. The handset device in Figure 3.1a and 3.1b,The vertical centerline pass through two points on the front side of handset: the midpoint of the width wt of the handset at the level of the acoustic output (point A) and the midpoint of the width Wb of the bottom of the handset (point B). The vertical centerline is perpendicular to the horizontal line and pass through the center of the acoustic output. The point A touches the ERP and the vertical centerline of the handset is parallel to the B-M line. While maintaining the point A contact with the ear(ERP), rotate the handset about the line NF until any point on handset is in contact with the cheek of the phantom



TOUCH/CHEEK POSITION FIGURE

4.1.2 TILT TEST POSITION

Adjust the device in the cheek position. While maintaining a point of the handset contact in the ear, move the bottom of the handset away from the mouth by an angle of 15 degrees.



TILT POSITION FIGURE

4.1.3 BODY-WORN CONFIGURATION

The handset device attached the belt clip or the holster. The keypad face of the handset is against with the bottom of the flat phantom face and the bottom of the keypad face contact to the bottom of the flat phantom.

When multiple accessories that do not contain metallic components are supplied with the device, the device may be tested with only the accessory that dictates the closest spacing to the body. When multiple accessories that contain metallic components are supplied with the device, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (e.g., the same metallic belt-clip used with different holsters with no other metallic components), only accessory that dictates the closest spacing to the body must be tested.

4.3 DESCRIPTION OF ASSESSMENT POSITION

The following test configuration had been applied in this test report:

4.4 DESCRIPTION OF TEST MODE

Refer to Appendix A-1 for test data:

TEST MODE	COMMUNICATION MODE	MODULATION TYPE	ASSESSMENT POSTITION	TESTED CHANNEL	REMARK
1	GSM850	GMSK	Body / Bottom	M	Battery 1
2	GPRS850 TS1	GPRS	Body / Bottom	L,M,H	Battery 1
3	GPRS850 TS1	GPRS	Body / Bottom	M	Battery 2
4	GPRS850 TS2	GPRS	Body / Bottom	M	Battery 1
5	GPRS850 TS3	GPRS	Body / Bottom	M	Battery 1
6	GPRS850 TS4	GPRS	Body / Bottom	M	Battery 1
7	E-GPRS850 TS1	8PSK	Body / Bottom	M	Battery 1
8	E-GPRS850 TS2	8PSK	Body / Bottom	M	Battery 1
9	E-GPRS850 TS3	8PSK	Body / Bottom	M	Battery 1
10	E-GPRS850 TS4	8PSK	Body / Bottom	M	Battery 1
11	PCS1900	GMSK	Body / Bottom	M	Battery 1
12	GPRS1900 TS1	GPRS	Body / Bottom	L,M,H	Battery 1
13	GPRS1900 TS2	GPRS	Body / Bottom	M	Battery 1
14	GPRS1900 TS3	GPRS	Body / Bottom	M	Battery 1
15	GPRS1900 TS4	GPRS	Body / Bottom	M	Battery 1
16	E-GPRS1900 TS1	8PSK	Body / Bottom	M	Battery 1
17	E-GPRS1900 TS2	8PSK	Body / Bottom	M	Battery 1
18	E-GPRS1900 TS3	8PSK	Body / Bottom	M	Battery 1
19	E-GPRS1900 TS4	8PSK	Body / Bottom	M	Battery 1
20	802.11b	DBPSK	Body / Bottom	L,M,H	PCB antenna Battery 1
21	802.11g	BPSK	Body / Bottom	L,M,H	PCB antenna Battery 1
22	802.11b	DBPSK	Body / Bottom	L	PIFA antenna Battery 1
23	802.11b	DBPSK	Body / Bottom	L	PCB antenna Battery 2

TEST MODE	COMMUNICATION MODE	MODULATION TYPE	ASSESSMENT POSTITION	TESTED CHANNEL	REMARK
24	BT	GFSK	Body / Bottom	M	Battery 1
25	BT	8DPSK	Body / Bottom	M	Battery 1
26	GPRS850 TS1 + 802.11b + BT	NOTE	Body / Bottom	NOTE	Co-located
27	GPRS1900 TS1 + 802.11b + BT	NOTE	Body / Bottom	NOTE	Co-located

NOTE: The combination is from the worst situation of each communication mode.

Refer to Appendix A-2 for test data:

TEST MODE	COMMUNICATION MODE	MODULATION TYPE	ASSESSMENT POSTITION	TESTED CHANNEL	REMARK
1	GSM850	GMSK	Body / Bottom	L,H	Battery 1
2	PCS1900	GMSK	Body / Bottom	L,H	Battery 1

4.5 SUMMARY OF TEST RESULTS

Refer to Appendix A-1 for test data:

THE EUT OF THIS MODE IS WITH BATTERY 1:

COMMUNICATION MODE	GSM 850								
	MEASURED VALUE OF 1g SAR (W/kg)								
	GSM	GPRS TS1	GPRS TS2	GPRS TS3	GPRS TS4	E-GPRS TS1	E-GPRS TS2	E-GPRS TS3	E-GPRS TS4
POSITION	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM
LOW CHANNEL	-	0.140	-	-	-	-	-	-	-
MID. CHANNEL	0.127	**0.172**	0.168	0.141	0.130	0.138	0.106	0.072	0.037
HIGH CHANNEL	-	0.166	-	-	-	-	-	-	-

NOTE: The worst value has been marked by boldface.

COMMUNICATION MODE	PCS 1900								
	MEASURED VALUE OF 1g SAR (W/kg)								
	PCS	GPRS TS1	GPRS TS2	GPRS TS3	GPRS TS4	E-GPRS TS1	E-GPRS TS2	E-GPRS TS3	E-GPRS TS4
POSITION	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM
LOW CHANNEL	-	0.040	-	-	-	-	-	-	-
MID. CHANNEL	0.038	**0.058**	0.045	0.038	0.034	0.045	0.039	0.033	0.016
HIGH CHANNEL	-	0.046	-	-	-	-	-	-	-

NOTE: The worst value has been marked by boldface.

COMMUNICATION MODE	WLAN_802.11b	WLAN_802.11g	WLAN_802.11b	BLUEOOTH	
	MEASURED VALUE OF 1g SAR (W/kg)				
ANTENNA	PCB ANT.	PCB ANT.	PIFA ANT.	GFSK	8DPSK
POSITION	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM
LOW CHANNEL	**0.029**	0.016	0.011	-	-
MID. CHANNEL	0.022	0.014	-	**0.0000660**	0.0000303
HIGH CHANNEL	0.020	0.015	**-**	**-**	-

NOTE: The worst value of each communication has been marked by boldface.

THE EUT OF THIS MODE IS WITH BATTERY 2:

COMMUNICATION MODE	GSM 850	WLAN_802.11b
	MEASURED VALUE OF 1g SAR (W/kg)	
	GPRS TS1	PCB ANT.
POSITION	BOTTOM	BOTTOM
LOW CHANNEL	-	0.024
MID. CHANNEL	0.169	-
HIGH CHANNEL	-	-

TEST RESULT OF MULTI-BANDS CO-LOCATED ASSESSMENT:

The worst situations had been chosen from the above table, and make up four combinations for the test of co-location listed as below.

TEST MODE	DESCRIPTION	MEASURED VALUE OF 1g SAR (W/kg)
26	GPRS850 TS1 middle channel + 802.11b low channel + Bluetooth middle channel	0.172
27	GPRS1900 TS1 middle channel + 802.11b low channel + + Bluetooth middle channel	0.058

Refer to Appendix A-2 for test data:

COMMUNICATION MODE	GSM 850	PCS 1900
	MEASURED VALUE OF 1g SAR (W/kg)	
POSITION	BOTTOM	BOTTOM
LOW CHANNEL	0.123	0.035
HIGH CHANNEL	0.118	0.031

5. TEST RESULTS

5.1 TEST PROCEDURES

FOR GSM:

The EUT makes a phone call to the GSM base station. Establish the simulation communication configuration rather the actual communication. Then the EUT could continuous the transmission mode. Adjust the PCL of the base station could controlled the EUT to transmitted the maximum output power. The base station also could control the transmission channel. The SAR value was calculated via the 3D spline interpolation algorithm that has been implemented in the software of DASY4 SAR measurement system manufactured and calibrated by SPEAG. According to the IEEE 1528, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

FOR WLAN & BLUETOOTH:

The EUT use the software to control the EUT channel and transmission power. Then record the conducted power before the testing. Place the EUT to the specific test location. After the testing, must writing down the conducted power of the EUT into the report. The SAR value was calculated via the 3D spline interpolation algorithm that has been implemented in the software of DASY4 SAR measurement system manufactured and calibrated by SPEAG. According to the IEEE 1528 / EN 50361 standards, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- Power reference measurement
- Verification of the power reference measurement
- Area scan
- Zoom scan
- Power reference measurement

The area scan with 15mm x 15mm grid was performed for the highest spatial SAR location. Consist of 11 x 13 points while the scan size is the 150mm x 180mm. The zoom scan with 30mm x 30mm x 30mm volume was performed for SAR value averaged over 1g and 10g spatial volumes.

In the zoom scan, the distance between the measurement point at the probe sensor location (geometric center behind the probe tip) and the phantom surface is 4.0 mm and maintained at a constant distance of ±1.0 mm during a zoom scan to determine peak SAR locations. The distance is 4mm between the first measurement point and the bottom surface of the phantom. The secondary measurement point to the bottom surface of the phantom is with 9mm separation distance. The cube size is 7 x 7 x 7 points consist of 343 points and the grid space is 5mm.

The measurement time is 0.5 s at each point of the zoom scan. The probe boundary effect compensation shall be applied during the SAR test. Because of the tip of the probe to the Phantom surface separated distances are longer than half a tip probe diameter.

In the area scan, the separation distance is 4mm between the each measurement point and the phantom surface. The scan size shall be included the transmission portion of the EUT. The measurement time is the same as the zoom scan. At last the reference power drift shall be less than ±5%.

5.2 MEASURED SAR RESULTS

Refer to Appendix A-1 for test data:

GSM 850 BAND BODY POSITION

ENVIRONMENTAL CONDITION	Air Temperature：23.1°C, Liquid Temperature：22.0°C Humidity：57%RH		
TESTED BY	Sam Onn	DATE	Sep. 13, 2007

CHAN.	FREQ. (MHz)	MODE	CONDUCTED POWER (W)		POWER DRIFT (%)	DEVICE USE POWER	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST				
190	**836.60 (Mid.)**	**GSM**	1.928	1.906	-1.14	Standard Battery	1	0.127
128	**824.20 (Low)**	**GPRS TS1**	1.897	1.873	-1.27	Standard Battery	2	0.140
190	**836.60 (Mid.)**	**GPRS TS1**	1.888	1.863	-1.32	Standard Battery	2	**0.172**
251	**848.80 (High)**	**GPRS TS1**	1.879	1.852	-1.44	Standard Battery	2	0.166
190	**836.60 (Mid.)**	**GPRS TS1**	1.888	1.859	-1.54	Standard Battery **(Battery 2)**	3	0.169
190	**836.60 (Mid.)**	**GPRS TS2**	1.245	1.229	-1.29	Standard Battery	4	0.168
190	**836.60 (Mid.)**	**GPRS TS3**	0.811	0.800	-1.36	Standard Battery	5	0.141
190	**836.60 (Mid.)**	**GPRS TS4**	0.527	0.520	-1.33	Standard Battery	6	0.130

NOTE:

1. Test configuration of each mode is described in section 3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A-1 for the data, and Appendix E for the photo of the test configuration.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

ENVIRONMENTAL CONDITION	Air Temperature：23.1°C, Liquid Temperature：22.0°C Humidity：57%RH		
TESTED BY	Sam Onn	DATE	Sep. 13, 2007

CHAN.	FREQ. (MHz)	MODE	CONDUCTED POWER (W)		POWER DRIFT (%)	DEVICE USE POWER	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST				
190	**836.60 (Mid.)**	**E-GPRS TS1**	0.433	0.429	-0.92	Standard Battery **(Battery 2)**	7	0.138
190	**836.60 (Mid.)**	**E-GPRS TS2**	0.265	0.263	-0.75	Standard Battery	8	0.106
190	**836.60 (Mid.)**	**E-GPRS TS3**	0.164	0.162	-1.22	Standard Battery	9	0.072
190	**836.60 (Mid.)**	**E-GPRS TS4**	0.103	0.102	-0.97	Standard Battery	10	0.037

NOTE:

1. Test configuration of each mode is described in section 3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A-1 for the data, and Appendix E for the photo of the test configuration.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

PCS 1900 BAND BODY POSITION

ENVIRONMENTAL CONDITION	Air Temperature：22.9°C, Liquid Temperature：21.8°C Humidity：63%RH		
TESTED BY	Sam Onn	DATE	Sep. 18, 2007

CHAN.	FREQ. (MHz)	MODE	CONDUCTED POWER (W)		POWER DRIFT (%)	DEVICE USE POWER	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST				
661	1880.00 (Mid.)	PCS	0.871	0.860	-1.26	Standard Battery	11	0.038
512	1850.20 (Low)	GPRS TS1	0.832	0.821	-1.32	Standard Battery	12	0.040
661	1880.00 (Mid.)	GPRS TS1	0.851	0.839	-1.41	Standard Battery	12	**0.058**
810	1909.80 (High)	GPRS TS1	0.832	0.820	-1.44	Standard Battery	12	0.046
661	1880.00 (Mid.)	GPRS TS2	0.550	0.542	-1.45	Standard Battery	13	0.045
661	1880.00 (Mid.)	GPRS TS3	0.355	0.351	-1.13	Standard Battery	14	0.038
661	1880.00 (Mid.)	GPRS TS4	0.224	0.221	-1.34	Standard Battery	15	0.034

NOTE:

1. Test configuration of each mode is described in section 3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A-1 for the data, and Appendix E for the photo of the test configuration.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

ENVIRONMENTAL CONDITION	Air Temperature：22.9°C, Liquid Temperature：21.8°C Humidity：63%RH		
TESTED BY	Sam Onn	DATE	Sep. 18, 2007

CHAN.	FREQ. (MHz)	MODE	CONDUCTED POWER (W)		POWER DRIFT (%)	DEVICE USE POWER	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST				
661	1880.00 (Mid.)	E-GPRS TS1	0.295	0.292	-1.02	Standard Battery	16	0.045
661	1880.00 (Mid.)	E-GPRS TS2	0.234	0.231	-1.28	Standard Battery	17	0.039
661	1880.00 (Mid.)	E-GPRS TS3	0.148	0.146	-1.35	Standard Battery	18	0.033
661	1880.00 (Mid.)	E-GPRS TS4	0.093	0.092	-1.08	Standard Battery	19	0.016

NOTE:

1. Test configuration of each mode is described in section 3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A-1 for the data, and Appendix E for the photo of the test configuration.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

WLAN BAND (802.11b & 802.11g) BAND BODY POSITION (PCB ANT., BATTERY 1)

ENVIRONMENTAL CONDITION	Air Temperature：23.2°C, Liquid Temperature：22.2°C Humidity：64%RH		
TESTED BY	Sam Onn	DATE	Sep. 20, 2007

CHAN.	FREQ. (MHz)	MODE	CONDUCTED POWER (mW)		POWER DRIFT (%)	DEVICE USE POWER	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST				
1	**2412.00 (Low)**	**DBPSK**	50.699	50.020	-1.34	Standard Battery	20	**0.029**
6	**2437.00 (Mid.)**	**DBPSK**	50.816	50.089	-1.43	Standard Battery	20	0.022
11	**2462.00 (High)**	**DBPSK**	51.050	50.274	-1.52	Standard Battery	20	0.020
1	**2412.00 (Low)**	**BPSK**	50.466	49.805	-1.31	Standard Battery	21	0.016
6	**2437.00 (Mid.)**	**BPSK**	51.050	50.351	-1.37	Standard Battery	21	0.014
11	**2462.00 (High)**	**BPSK**	50.350	49.615	-1.46	Standard Battery	21	0.015

NOTE:

1. Test configuration of each mode is described in section 3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A for the data.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

WLAN BAND (802.11b) BAND BODY POSITION (PIFA ANT. BATTERY 1)

ENVIRONMENTAL CONDITION	Air Temperature：23.2°C, Liquid Temperature：22.2°C Humidity：64%RH		
TESTED BY	Sam Onn	DATE	Sep. 20, 2007

CHAN.	FREQ. (MHz)	MODE	CONDUCTED POWER (mW)		POWER DRIFT (%)	DEVICE USE POWER	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST				
1	2412.00 (Low)	DBPSK	50.699	50.179	-1.03	Standard Battery	22	0.011

WLAN BAND (802.11b) BAND BODY POSITION (PCB ANT., BATTERY 2)

ENVIRONMENTAL CONDITION	Air Temperature：23.2°C, Liquid Temperature：22.2°C Humidity：64%RH		
TESTED BY	Sam Onn	DATE	Sep. 20, 2007

CHAN.	FREQ. (MHz)	MODE	CONDUCTED POWER (mW)		POWER DRIFT (%)	DEVICE USE POWER	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST				
1	2412.00 (Low)	DBPSK	50.699	50.131	-1.12	Standard Battery	23	0.024

NOTE:

1. Test configuration of each mode is described in section 3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A for the data.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

BLUETOOTH BAND BODY POSITION

ENVIRONMENTAL CONDITION	Air Temperature：23.2°C, Liquid Temperature：22.2°C Humidity：64%RH		
TESTED BY	Sam Onn	DATE	Sep. 20, 2007

CHAN.	FREQ. (MHz)	MODE	CONDUCTED POWER (mW)		POWER DRIFT (%)	DEVICE USE POWER	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST				
39	**2441.00 (Mid.)**	**GFSK**	1.312	1.295	-1.30	Standard Battery	24	**0.0000660**
39	**2441.00 (Mid.)**	**8DPSK**	0.904	0.891	-1.44	Standard Battery	25	0.0000303

NOTE:

1. Test configuration of each mode is described in section 3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A-1 for the data, and Appendix E for the photo of the test configuration.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

GPRS850 TS1 + WLAN 802.11b + BLUETOOTH BAND BODY POSITION

ENVIRONMENTAL CONDITION	Air Temperature：23.1°C, Liquid Temperature：22.0°C Humidity：57%RH		
TESTED BY	Sam Onn	DATE	Sep. 13, 2007

CHAN.	FREQ. (MHz)	MODE	CONDUCTED POWER		POWER DRIFT (%)	DEVICE USE POWER	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST				
190	836.60 (Mid.)	GPRS TS1	1.888 W	1.863 W	-1.32	Standard Battery	26	0.172
1	2412.00 (Low)	DBPSK	50.699	50.020	-1.34			
39	2441.00 (Mid.)	GFSK	1.312 mW	1.295 mW	-1.30			

NOTE:

1. Test configuration of each mode is described in section 3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A-1 for the data, and Appendix E for the photo of the test configuration.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

GPRS1900 TS1 + WLAN 802.11b + BLUETOOTH BAND BODY POSITION

ENVIRONMENTAL CONDITION	Air Temperature：22.9°C, Liquid Temperature：21.8°C Humidity：63%RH		
TESTED BY	Sam Onn	DATE	Sep. 18, 2007

CHAN.	FREQ. (MHz)	MODE	CONDUCTED POWER		POWER DRIFT (%)	DEVICE USE POWER	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST				
661	1880.00 (Mid.)	GPRS TS1	0.851 W	0.839 W	-1.41	Standard Battery	27	0.058
1	2412.00 (Low)	DBPSK	50.699	50.020	-1.34			
39	2441.00 (Mid.)	GFSK	1.312 mW	1.295 mW	-1.30			

NOTE:

1. Test configuration of each mode is described in section 3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A-1 for the data, and Appendix E for the photo of the test configuration.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

Refer to Appendix A-2 for test data:

GSM 850 BAND BODY POSITION

ENVIRONMENTAL CONDITION	Air Temperature：22.1°C, Liquid Temperature：21.1°C Humidity：62%RH		
TESTED BY	Sam Onn	**DATE**	Jan. 16, 2008

CHAN.	FREQ. (MHz)	MODE	CONDUCTED POWER (W)		POWER DRIFT (%)	DEVICE USE POWER	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST				
128	**824.20 (Low)**	**GSM**	1.932	1.924	-0.41	Standard Battery	1	0.123
251	**848.80 (High)**	**GSM**	1.901	1.886	-0.79	Standard Battery	1	0.118

NOTE:

1. Test configuration of each mode is described in section 3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A-1 for the data, and Appendix E for the photo of the test configuration.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

PCS 1900 BAND BODY POSITION

ENVIRONMENTAL CONDITION	Air Temperature：22.4°C, Liquid Temperature：21.3°C Humidity：60%RH		
TESTED BY	Sam Onn	DATE	Jan. 14, 2008

CHAN.	FREQ. (MHz)	MODE	CONDUCTED POWER (W)		POWER DRIFT (%)	DEVICE USE POWER	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST				
512	1850.20 (Low)	PCS	0.832	0.826	-0.72	Standard Battery	2	0.035
810	1909.80 (High)	PCS	0.832	0.824	-0.96	Standard Battery	2	0.031

NOTE:

1. Test configuration of each mode is described in section 3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A-1 for the data, and Appendix E for the photo of the test configuration.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

5.3 SAR LIMITS

HUMAN EXPOSURE	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	**(Occupational / controlled Exposure Environment)**
Spatial Average (whole body)	0.08	0.4
Spatial Peak (averaged over 1 g)	**1.6**	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

NOTE:

1. This limits accord to 47 CFR 2.1093 – Safety Limit.
2. The EUT property been complied with the partial body exposure limit under the general population environment.

5.4 RECIPES FOR TISSUE SIMULATING LIQUIDS

For the measurement of the field distribution inside the SAM phantom, the phantom must be filled with 25 litters of tissue simulation liquid.

The following ingredients are used：

- **WATER-** Deionized water (pure H20), resistivity _16 M - as basis for the liquid
- **SUGAR-** Refined sugar in crystals, as available in food shops - to reduce relative permittivity
- **SALT-** Pure NaCl - to increase conductivity
- **CELLULOSE-** Hydroxyethyl-cellulose, medium viscosity (75-125 mPa.s, 2% in water, 20_C),
  CAS # 54290 - to increase viscosity and to keep sugar in solution
- **PRESERVATIVE-** Preventol D-7 Bayer AG, D-51368 Leverkusen, CAS # 55965-84-9 - to prevent the spread of bacteria and molds
- **DGMBE-** Diethylenglycol-monobuthyl ether (DGMBE), Fluka Chemie GmbH, CAS # 112-34-5 - to reduce relative permittivity

THE RECIPES FOR 900MHz SIMULATING LIQUID TABLE

INGREDIENT	HEAD SIMULATING LIQUID 900MHz (HSL-900)	MUSCLE SIMULATING LIQUID 900MHz (MSL-900)
Water	40.28%	50.07%
Cellulose	02.41%	NA
Salt	01.38%	0.94%
Preventtol D-7	00.18%	0.09%
Sugar	57.97%	48.2%
Dielectric Parameters at 22℃	f = 900MHz ε= 41.5 ± 5% σ= 0.97 ± 5% S/m	f= 900MHz ε= 55.0 ± 5% σ= 1.05 ± 5% S/m

THE RECIPES FOR 1900MHz SIMULATING LIQUID TABLE

INGREDIENT	HEAD SIMULATING LIQUID 1900MHz (HSL-1900)	MUSCLE SIMULATING LIQUID 1900MHz (MSL-1900)
Water	55.24%	70.16%
DGMBE	44.45%	29.44%
Salt	0.306%	00.39%
Dielectric Parameters at 22℃	f= 1900MHz ε= 40.0 ± 5% σ= 1.40 ± 5% S/m	f= 1900MHz ε= 53.3 ± 5% σ= 1.52 ± 5% S/m

THE RECIPES FOR 2450MHz SIMULATING LIQUID TABLE

INGREDIENT	HEAD SIMULATING LIQUID 2450MHz (HSL-2450)	MUSCLE SIMULATING LIQUID 2450MHz (MSL-2450)
Water	45%	69.83%
DGMBE	55%	30.17%
Salt	NA	NA
Dielectric Parameters at 22℃	f= 2450MHz ε= 39.2 ± 5% σ= 1.80 ± 5% S/m	f= 2450MHz ε= 52.7 ± 5% σ= 1.95 ± 5% S/m

Testing the liquids using the Agilent Network Analyzer E8358A and Agilent Dielectric Probe Kit 85070D.The testing procedure is following as

1. Turn Network Analyzer on and allow at least 30 min. warm up.
2. Mount dielectric probe kit so that interconnecting cable to Network Analyzer will not be moved during measurements or calibration.
3. Pour de-ionized water and measure water temperature (±1°).
4. Set water temperature in Agilent-Software (Calibration Setup).
5. Perform calibration.
6. Validate calibration with dielectric material of known properties (e.g. polished ceramic slab with >8mm thickness ε'=10.0, ε''=0.0). If measured parameters do not fit within tolerance, repeat calibration (±0.2 for ε': ±0.1 for ε'').
7. Conductivity can be calculated from ε'' by $\sigma = \omega \varepsilon_0 \varepsilon'' = \varepsilon''$ f [GHz] / 18.
8. Measure liquid shortly after calibration. Repeat calibration every hour.
9. Stir the liquid to be measured. Take a sample (~50ml) with a syringe from the center of the liquid container.
10. Pour the liquid into a small glass flask. Hold the syringe at the bottom of the flask to avoid air bubbles.
11. Put the dielectric probe in the glass flask. Check that there are no air bubbles in front of the opening in the dielectric probe kit.
12. Perform measurements.
13. Adjust medium parameters in DASY4 for the frequencies necessary for the measurements (‘Setup Config’, select medium (e.g. Brain 900 MHz) and press ‘Option’-button.

Select the current medium for the frequency of the validation (e.g. Setup Medium Brain 900 MHz).

Refer to Appendix A-1 for test data:

FOR GSM BAND SIMULATING LIQUID

LIQUID TYPE		HSL-850		MSL-850	
SIMULATING LIQUID TEMP.		NA		22.0	
TESTED DATE		NA		Sep. 13, 2007	
TESTED BY		NA		Sam Onn	
FREQ. (MHz)	**LIQUID PARAMETER**	**STANDARD VALUE**	**MEASUREMENT VALUE**	**STANDARD VALUE**	**MEASUREMENT VALUE**
824.20	Permitivity (ε)	NA	NA	55.20	56.30
835.00		NA	NA	55.20	56.20
836.60		NA	NA	55.20	56.20
848.80		NA	NA	55.20	56.10
824.20	Conductivity (σ) S/m	NA	NA	0.97	0.98
835.00		NA	NA	0.97	0.99
836.60		NA	NA	0.97	0.99
848.80		NA	NA	0.99	1.01
Dielectric Parameters Required at 22℃		**f= 900MHz ε= 41.5 ± 5% σ= 0.97 ± 5% S/m**		**f= 900MHz ε= 55.0 ± 5% σ= 1.05 ± 5% S/m**	

FOR PCS BAND SIMULATING LIQUID

LIQUID TYPE		HSL-1900		MSL-1900	
SIMULATING LIQUID TEMP.		NA		21.8	
TESTED DATE		NA		Sep. 18, 2007	
TESTED BY		NA		Sam Onn	
FREQ. (MHz)	**LIQUID PARAMETER**	**STANDARD VALUE**	**MEASUREMENT VALUE**	**STANDARD VALUE**	**MEASUREMENT VALUE**
1850.2	Permitivity (ε)	NA	NA	53.30	54.00
1880.0		NA	NA	53.30	53.90
1900.0		NA	NA	53.30	53.90
1909.8		NA	NA	53.30	53.80
1850.2	Conductivity (σ) S/m	NA	NA	1.52	1.51
1880.0		NA	NA	1.52	1.55
1900.0		NA	NA	1.52	1.58
1909.8		NA	NA	1.52	1.59
Dielectric Parameters Required at 22℃		**f= 1900MHz ε= 40.0 ± 5% σ= 1.40 ± 5% S/m**		**f= 1900MHz ε= 53.3 ± 5% σ= 1.52 ± 5% S/m**	

FOR WLAN & BLUETOOTH BAND SIMULATING LIQUID

LIQUID TYPE		HSL-2450		MSL-2450	
SIMULATING LIQUID TEMP.		NA		22.2	
TEST DATE		NA		Sep. 20, 2007	
TESTED BY		NA		Sam Onn	
FREQ. (MHz)	**LIQUID PARAMETER**	**STANDARD VALUE**	**MEASUREMENT VALUE**	**STANDARD VALUE**	**MEASUREMENT VALUE**
2412.0	Permitivity (ε)	NA	NA	52.80	54.10
2437.0		NA	NA	52.70	54.00
2441.0		NA	NA	52.70	54.00
2450.0		NA	NA	52.70	53.90
2462.0		NA	NA	52.70	53.80
2412.0	Conductivity (σ) S/m	NA	NA	1.91	1.93
2437.0		NA	NA	1.94	1.97
2441.0		NA	NA	1.94	1.98
2450.0		NA	NA	1.95	2.00
2462.0		NA	NA	1.97	2.02
Dielectric Parameters Required at 22℃		**f= 2450MHz ε= 39.2 ± 5% σ= 1.80 ± 5% S/m**		**f= 2450MHz ε= 52.7 ± 5% σ= 1.95 ± 5% S/m**	

Refer to Appendix A-2 for test data:

FOR GSM BAND SIMULATING LIQUID

LIQUID TYPE		HSL-850		MSL-850	
SIMULATING LIQUID TEMP.		NA		21.1	
TESTED DATE		NA		Jan. 16, 2008	
TESTED BY		NA		Sam Onn	
FREQ. (MHz)	**LIQUID PARAMETER**	**STANDARD VALUE**	**MEASUREMENT VALUE**	**STANDARD VALUE**	**MEASUREMENT VALUE**
824.20	Permitivity (ε)	NA	NA	55.20	55.9
835.00		NA	NA	55.20	55.8
836.60		NA	NA	55.20	55.8
848.80		NA	NA	55.20	55.7
824.20	Conductivity (σ) S/m	NA	NA	0.97	0.98
835.00		NA	NA	0.97	0.99
836.60		NA	NA	0.97	0.99
848.80		NA	NA	0.99	1.00
Dielectric Parameters Required at 22℃		**f= 900MHz ε= 41.5 ± 5% σ= 0.97 ± 5% S/m**		**f= 900MHz ε= 55.0 ± 5% σ= 1.05 ± 5% S/m**	

FOR PCS BAND SIMULATING LIQUID

LIQUID TYPE		HSL-1900		MSL-1900	
SIMULATING LIQUID TEMP.		NA		21.3	
TESTED DATE		NA		Jan. 14, 2008	
TESTED BY		NA		Sam Onn	
FREQ. (MHz)	**LIQUID PARAMETER**	**STANDARD VALUE**	**MEASUREMENT VALUE**	**STANDARD VALUE**	**MEASUREMENT VALUE**
1850.2	Permitivity (ε)	NA	NA	53.30	54.10
1880.0		NA	NA	53.30	54.00
1900.0		NA	NA	53.30	53.90
1909.8		NA	NA	53.30	53.90
1850.2	Conductivity (σ) S/m	NA	NA	1.52	1.50
1880.0		NA	NA	1.52	1.53
1900.0		NA	NA	1.52	1.56
1909.8		NA	NA	1.52	1.57
Dielectric Parameters Required at 22℃		**f= 1900MHz ε= 40.0 ± 5% σ= 1.40 ± 5% S/m**		**f= 1900MHz ε= 53.3 ± 5% σ= 1.52 ± 5% S/m**	

5.5 TEST EQUIPMENT FOR TISSUE PROPERTY

ITEM	NAME	BAND	TYPE	SERIES NO.	CALIBRATED UNTIL
1	Network Analyzer	Agilent	E8358A	US41480538	Nov. 11, 2008
2	Dielectric Probe	Agilent	85070D	US01440176	NA

NOTE:

1. Before testing the measurement, all test equipment shall have 30 min warm up.
2. The tolerance (k=1) specified by Agilent for general dielectric measurements, deriving from inaccuracies in the calibration data, analyzer drift, and random errors, are usually ±2.5% and ±5% for measured permittivity and conductivity, respectively. However, the tolerances for the conductivity is smaller for material with large loss tangents, i.e., less than ±2.5% (k=1). It can be substantially smaller if more accurate methods are applied.

6. SYSTEM VALIDATION

The system validation was performed in the flat phantom with equipment listed in the following table. Since the SAR value is calculated from the measured electric field, dielectric constant and conductivity of the body tissue and the SAR is proportional to the square of the electric field. So, the SAR value will be also proportional to the RF power input to the system validation dipole under the same test environment. In our system validation test, 250mW RF input power was used.

6.1 TEST EQUIPMENT

For Appendix A-1 test equipment:

ITEM	NAME	BAND	TYPE	SERIES NO.	CALIBRATED UNTIL
1	SAM Phantom	S & P	QD000 P40 CA	PT-1150	NA
2	Signal Generator	Anritsu	68247B	984703	May 18, 2008
3	E-Field Probe	S & P	ET3DV6	1790	Nov. 22, 2007
5	DAE	S & P	DAE3 V1	579	Mar. 22, 2008
6	Robot Positioner	Staubli Unimation	NA	NA	NA
7	Validation Dipole	S & P	D835V2	4d021	May 28, 2008
		S & P	D1900V2	5d036	Apr. 22, 2008
		S & P	D2450V2	737	Apr. 23, 2008

NOTE: Before starting the measurement, all test equipment shall be warmed up for 30min.

For Appendix A-2 test equipment:

ITEM	NAME	BAND	TYPE	SERIES NO.	CALIBRATED UNTIL
1	SAM Phantom	S & P	QD000 P40 CA	PT-1150	NA
2	Signal Generator	Anritsu	68247B	984703	May 18, 2008
3	E-Field Probe	S & P	ET3DV6	1790	Nov. 19, 2008
5	DAE	S & P	DAE3 V1	579	Mar. 22, 2008
6	Robot Positioner	Staubli Unimation	NA	NA	NA
7	Validation Dipole	S & P	D835V2	4d021	May 28, 2008
		S & P	D1900V2	5d036	Apr. 22, 2008

6.2 TEST PROCEDURE

Before you start the system performance check, need only to tell the system with which components (probe, medium, and device) are performing the system performance check; the system will take care of all parameters. The dipole must be placed beneath the flat phantom section of the SAM Twin Phantom with the correct distance holder in place. The distance holder should touch the phantom surface with a light pressure at the reference marking (little cross) and be oriented parallel to the long side of the phantom. Accurate positioning is not necessary, since the system will search for the peak SAR location, except that the dipole arms should be parallel to the surface. The device holder for Tri-Band GSM900/DCS1800/PCS1900 GSM/GPRS/CDMA Mobile Phones can be left in place but should be rotated away from the dipole.

1.The ”Power Reference Measurement” and ”Power Drift Measurement” jobs are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the amplifier output power. If it is too high (above ±0.1 dB), the system performance check should be repeated; some amplifiers have very high drift during warm-up. A stable amplifier gives drift results in the DASY system below ±0.02 dB.

2.The ”Surface Check” job tests the optical surface detection system of the DASY system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ±0.1mm). In that case it is better to abort the system performance check and stir the liquid. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within $\pm 30^{O}$.) However, varying breaking indices of different liquid compositions might also influence the distance. If the indicated difference varies from the actual setting, the probe parameter ”optical surface

3. The ”Area Scan” job measures the SAR above the dipole on a plane parallel to the surface. It is used to locate the approximate location of the peak SAR. The proposed scan uses large grid spacing for faster measurement; due to the symmetric field, the peak detection is reliable. If a finer graphic is desired, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result.

4. The ”Zoom Scan” job measures the field in a volume around the peak SAR value assessed in the previous ”Area Scan” job (for more information see the application note on SAR evaluation).

About the validation dipole positioning uncertainty, the constant and low loss dielectric spacer is used to establish the correct distance between the top surface of the dipole and the bottom surface of the phantom, the error component introduced by the uncertainty of the distance between the liquid (i.e., phantom shell) and the validation dipole in the DASY4 system is less than ±0.1mm.

$$SAR_{tolerance}[\%] = 100 \times (\frac{(a+d)^2}{a^2} - 1)$$

As the closest distance is 10mm, the resulting tolerance $SAR_{tolerance}$[%] is <2%.

6.3 VALIDATION RESULTS

Refer to Appendix A-1 for test data:

SYSTEM VALIDATION TEST OF SIMULATING LIQUID					
FREQUENCY (MHz)	**REQUIRED SAR (mW/g)**	**MEASURED SAR (mW/g)**	**DEVIATION (%)**	**SEPARATION DISTANCE**	**TESTED DATE**
MSL 835	2.46 (1g)	2.30	-6.50	15mm	Sep. 13, 2007
MSL 1900	9.59 (1g)	9.17	-4.38	10mm	Sep. 18, 2007
MSL 2450	12.90 (1g)	12.80	-0.78	10mm	Sep. 20, 2007
TESTED BY	Sam Onn				

NOTE: Please sees Appendix for the photo of system validation test.

Refer to Appendix A-2 for test data:

SYSTEM VALIDATION TEST OF SIMULATING LIQUID					
FREQUENCY (MHz)	**REQUIRED SAR (mW/g)**	**MEASURED SAR (mW/g)**	**DEVIATION (%)**	**SEPARATION DISTANCE**	**TESTED DATE**
MSL 835	2.46 (1g)	2.38	-3.25	15mm	Jan. 16, 2008
MSL 1900	9.59 (1g)	9.61	0.21	10mm	Jan. 14, 2008
TESTED BY	Sam Onn				

NOTE: Please sees Appendix for the photo of system validation test.

6.4 SYSTEM VALIDATION UNCERTAINTIES

In the table below, the system validation uncertainty with respect to the analytically assessed SAR value of a dipole source as given in the IEEE 1528 standard is given. This uncertainty is smaller than the expected uncertainty for mobile phone measurements due to the simplified setup and the symmetric field distribution.

Error Description	Tolerance (±%)	Probability Distribution	Divisor	(C_i)		Standard Uncertainty (±%)		(v_i)
				(1g)	(10g)	(1g)	(10g)	
Measurement System								
Probe Calibration	4.8	Normal	1	1	1	4.8	4.8	∞
Axial Isotropy	4.7	Rectangular	√3	1	1	2.7	2.7	∞
Hemispherical Isotropy	0	Rectangular	√3	1	1	0	0	∞
Boundary effect	1.0	Rectangular	√3	1	1	0.6	0.6	∞
Linearity	4.7	Rectangular	√3	1	1	2.7	2.7	∞
System Detection Limit	1.0	Rectangular	√3	1	1	0.6	0.6	∞
Readout Electronics	1.0	Normal	1	1	1	1.0	1.0	∞
Response Time	0	Rectangular	√3	1	1	0	0	∞
Integration Time	0	Rectangular	√3	1	1	0	0	∞
RF Ambient Conditions	3.0	Rectangular	√3	1	1	1.7	1.7	∞
Probe Positioner	0.4	Rectangular	√3	1	1	0.2	0.2	∞
Probe positioning	2.9	Rectangular	√3	1	1	1.7	1.7	∞
Algorithms for Max. SAR Evaluation	1.0	Rectangular	√3	1	1	0.6	0.6	∞
Dipole								
Dipole Axis to Liquid Distance	2.0	Rectangular	√3	1	1	1.2	1.2	∞
Input power and SAR drift measurement	4.7	Rectangular	√3	1	1	2.7	2.7	∞
Phantom and Tissue Parameters								
Phantom Uncertainty	4.0	Rectangular	√3	1	1	2.3	2.3	∞
Liquid Conductivity (target)	5.0	Rectangular	√3	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	2.5	Normal	1	0.64	0.43	1.6	1.1	∞
Liquid Permittivity (target)	5.0	Rectangular	√3	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	2.5	Normal	1	0.6	0.49	1.5	1.2	∞
Combined Standard Uncertainty						8.4	8.1	∞
Coverage Factor for 95%						kp=2		
Expanded Uncertainty (K=2)						16.8	16.2	

NOTE: About the system validation uncertainty assessment, please reference the section 7.

7. MEASUREMENT SAR PROCEDURE UNCERTAINTIES

The assessment of spatial peak SAR of the hand handheld devices is according to IEEE 1528. All testing situation shall be met below these requirements.

- The system is used by an experienced engineer who follows the manual and the guidelines taught during the training provided by SPEAG.
- The probe has been calibrated within the requested period and the stated uncertainty for the relevant frequency bands does not exceed 4.8% (k=1).
- The validation dipole has been calibrated within the requested period and the system performance check has been successful.
- The DAE unit has been calibrated within the within the requested period.
- The minimum distance between the probe sensor and inner phantom shell is selected to be between 4 and 5mm.
- The operational mode of the DUT is CW, CDMA, FDMA or TDMA (GSM, DCS, PCS, IS136 and PDC) and the measurement/integration time per point is >500 ms.
- The dielectric parameters of the liquid have been assessed using Agilent 85070D dielectric probe kit or a more accurate method.
- The dielectric parameters are within 5% of the target values.
- The DUT has been positioned as described in section 3.

7.1 PROBE CALIBRATION UNCERTAINTY

SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528, EN 50361, IEC 62209, etc.) under ISO17025. The uncertainties are stated on the calibration certificate. For the most relevant frequency bands, these values do not exceed 4.8% (k=1). If evaluations of other bands are performed for which the uncertainty exceeds these values, the uncertainty tables given in the summary have to be revised accordingly.

7.2 ISOTROPY UNCERTAINTY

The axial isotropy tolerance accounts for probe rotation around its axis while the hemispherical isotropy error includes all probe orientations and field polarizations. These parameters are assessed by SPEAG during initial calibration. In 2001, SPEAG further tightened its quality controls and warrants that the maximal deviation from axial isotropy is ±0.20 dB, while the maximum deviation of hemispherical isotropy is ±0.40 dB, corresponding to ±4.7% and ±9.6%, respectively. A weighting factor of cp equal to 0.5 can be applied, since the axis of the probe deviates less than 30 degrees from the normal surface orientation.

7.3 BOUNDARY EFFECT UNCERTAINTY

The effect can be estimated according to the following error approximation formula

$$SAR_{tolerance}[\%] = SAR_{be}[\%] \times \frac{(d_{be} + d_{step})^2}{2d_{step}} \frac{e^{-\frac{d_{be}}{d/2}}}{d/2}$$

$$d_{be} + d_{step} < 10mm$$

The parameter d_{be} is the distance in mm between the surface and the closest measurement point used in the averaging process; d_{step} is the separation distance in mm between the first and second measurement points; δ is the minimum penetration depth in mm within the head tissue equivalent liquids (i.e., δ= 13.95 mm at 3GHz); SAR_{be} is the deviation between the measured SAR value at the distance d_{be} from the boundary and the wave-guide analytical value SAR_{ref}.DASY4 applies a boundary effect compensation algorithm according to IEEE 1528, which is possible since the axis of the probe never deviates more than 30 degrees from the normal surface orientation. SAR_{be}[%] is assessed during the calibration process and SPEAG warrants that the uncertainty at distances larger than 4mm is always less than 1%.In summary, the worst case boundary effect SAR tolerance[%] for scanning distances larger than 4mm is < ± 0.8%.

7.4 PROBE LINEARITY UNCERTAINTY

Field probe linearity uncertainty includes errors from the assessment and compensation of the diode compression effects for CW and pulsed signals with known duty cycles. This error is assessed using the procedure described in IEEE 1528. For SPEAG field probes, the measured difference between CW and pulsed signals, with pulse frequencies between 10 Hz and 1 kHz and duty cycles between 1 and 100, is < ±0.20 dB (< ±4.7%).

7.5 READOUT ELECTRONICS UNCERTAINTY

All uncertainties related to the probe readout electronics (DAE unit), including the gain and linearity of the instrumentation amplifier, its loading effect on the probe, and accuracy of the signal conversion algorithm, have been assessed accordingly to IEEE 1528.The combination (root-sum-square RSS method) of these components results in an overall maximum error of ±1.0%.

7.6 RESPONSE TIME UNCERTAINTY

The time response of the field probes is assessed by exposing the probe to a well-controlled electric field producing SAR larger than 2.0 W/kg at the tissue medium surface. The signal response time is evaluated as the time required by the system to reach 90% of the expected final value after an on/of switch of the power source. Analytically, it can be expressed as:

$$SAR_{tolerance}[\%] = 100 \times \left(\frac{T_m}{T_m + te^{-T_m/t} - t} - 1\right)$$

where Tm is 500 ms, i.e., the time between measurement samples, and $_T$ the time constant. The response time $_T$ of SPEAG's probes is <5 ms. In the current implementation, DASY4 waits longer than 100 ms after having reached the grid point before starting a measurement, i.e., the response time uncertainty is negligible.

7.7 INTEGRATION TIME UNCERTAINTY

If the device under test does not emit a CW signal, the integration time applied to measure the electric field at a specific point may introduce additional uncertainties due to the discretization and can be assessed as follows

$$SAR_{tolerance}[\%] = 100 \times \sum_{allsub-frames} \frac{t_{frame}}{t_{integration}} \frac{slot_{idle}}{slot_{total}}$$

The tolerances for the different systems are given in Table 7.1, whereby the worst-case $SAR_{tolerance}$ is 2.6%.

System	$SAR_{tolerance}$ %
CW	0
CDMA*	0
WCDMA*	0
FDMA	0
IS-136	2.6
PDC	2.6
GSM/DCS/PCS	1.7
DECT	1.9
Worst-Case	2.6

TABLE 7.1

7.8 PROBE POSITIONER MECHANICAL TOLERANCE

The mechanical tolerance of the field probe positioner can introduce probe positioning uncertainties. The resulting SAR uncertainty is assessed by comparing the SAR obtained according to the specifications of the probe positioner with respect to the actual position defined by the geometric enter of the probe sensors. The tolerance is determined as:

$$SAR_{tolerance}[\%] = 100 \times \frac{d_{ph}}{d/2}$$

The specified repeatability of the RX robot family used in DASY4 systems is ±25 µm. The absolute accuracy for short distance movements is better than ±0.1mm, i.e., the $SAR_{tolerance}$[%] is better than 1.5% (rectangular).

7.9 PROBE POSITIONING

The probe positioning procedures affect the tolerance of the separation distance between the probe tip and the phantom surface as:

$$SAR_{tolerance}[\%] = 100 \times \frac{d_{ph}}{d/2}$$

where d_{ph} is the maximum deviation of the distance between the probe tip and the phantom surface. The optical surface detection has a precision of better than 0.2 mm, resulting in an $SAR_{tolerance}$[%] of <2.9% (rectangular distribution). Since the mechanical detection provides better accuracy, 2.9% is a worst-case figure for DASY4 system.

7.10 PHANTOM UNCERTAINTY

The SAR measurement uncertainty due to SPEAG phantom shell production tolerances has been evaluated using

$$SAR_{tolerance}[\%] \cong 100 \times \frac{2d}{a}, \qquad d << a$$

For a maximum deviation d of the inner and outer shell of the phantom from that specified in the CAD file of ±0.2 mm, and a 10mm spacing a between source and tissue liquid, the calculated phantom uncertainty is ±4.0%.

7.11 DASY4 UNCERTAINTY BUDGET

Error Description	Tolerance (±%)	Probability Distribution	Divisor	(C_i)		Standard Uncertainty (±%)		(v_i)
				(1g)	(10g)	(1g)	(10g)	
Measurement Equipment								
Probe Calibration	4.8	Normal	1	1	1	4.8	4.8	∞
Axial Isotropy	4.7	Rectangular	√3	1	1	1.9	1.9	∞
Hemispherical Isotropy	9.6	Rectangular	√3	1	1	3.9	3.9	∞
Boundary effect	1.0	Rectangular	√3	1	1	0.6	0.6	∞
Linearity	4.7	Rectangular	√3	1	1	2.7	2.7	∞
System Detection Limit	1.0	Rectangular	√3	1	1	0.6	0.6	∞
Readout Electronics	1.0	Normal	1	1	1	1.0	1.0	∞
Response Time	0.8	Normal	1	1	1	0.8	0.8	∞
Integration Time	2.6	Normal	1	1	1	2.6	2.6	∞
Noise	0.0	Normal	1	0	0	0	0	∞
Mechanical Constraints								
Scanning System	0.4	Rectangular	√3	1	1	0.2	0.2	∞
Phantom Shell	4.0	Rectangular	√3	1	1	2.3	2.3	∞
Probe Positioning	2.9	Rectangular	√3	1	1	1.7	1.7	∞
Device Positioning	2.9	Normal	1	1	1	2.9	2.9	875
Physical Parameters								
Liquid Conductivity (target)	5.0	Rectangular	√3	0.7	0.5	2	1.4	∞
Liquid Conductivity (measurement)	4.3	Rectangular	√3	0.7	0.5	1.7	1.2	∞
Liquid Permittivity (target)	5.0	Rectangular	√3	0.6	0.5	1.7	1.4	∞
Liquid Permittivity (measurement)	4.3	Rectangular	√3	0.6	0.5	1.5	1.2	∞
Power Drift	5	Rectangular	√3	1	1	2.9	2.9	∞
RF Ambient Conditions	3.0	Rectangular	√3	1	1	1.7	1.7	∞
Post-Processing								
Extrapolation and Integration	1	Rectangular	√3	1	1	0.6	0.6	∞
Combined Standard Uncertainty						**9.9**	**9.7**	
Coverage Factor for 95%						**kp=2**		
Expanded Uncertainty (K=2)						**19.9**	**19.3**	

TABLE 7.2

The table 7.2: Worst-Case uncertainty budget for DASY4 assessed according to IEEE 1528. The budget is valid for the frequency range 300MHz ~ 3GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller.

8. INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC, UL, A2LA
GERMANY	TUV Rheinland
JAPAN	VCCI
NORWAY	NEMKO
CANADA	INDUSTRY CANADA , CSA
R.O.C.	TAF, BSMI, NCC
NETHERLANDS	Telefication
SINGAPORE	GOST-ASIA (MOU)
RUSSIA	CERTIS (MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

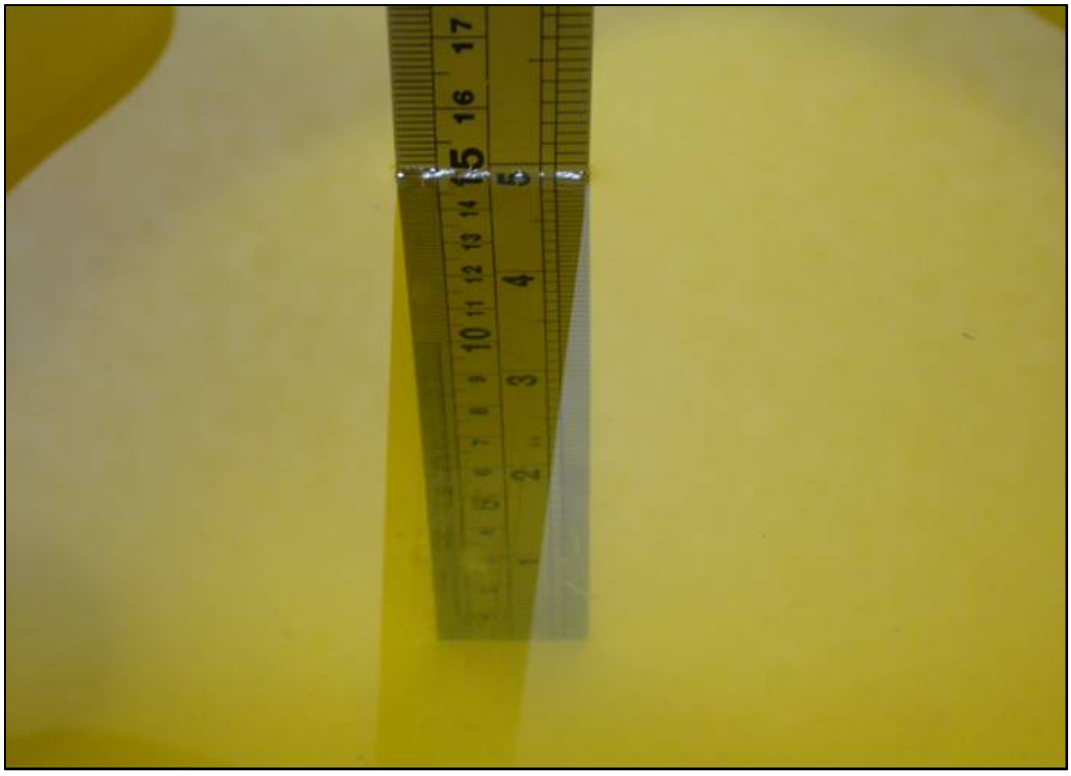
Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.

APPENDIX A-1: TEST DATA

Liquid Level Photo

Tissue MSL835MHz D=151mm



Tissue MSL1900MHz D=155mm

Tissue MSL2450MHz D=150mm

Date/Time: 2007/9/13 15:14:55

Test Laboratory: Advance Data Technology

Body Worn-GSM850-Ch190-Mode 1

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 836.6 MHz

Communication System: PCS 850 ; Frequency: 836.6 MHz ; Duty Cycle: 1:8.3 ; Modulation type: GMSK

Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3 ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)

Antenna type : monopole Antenna ; Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 190/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.126 mW/g

Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.6 V/m

Peak SAR (extrapolated) = 0.150 W/kg

SAR(1 g) = 0.127 mW/g; SAR(10 g) = 0.093 mW/g

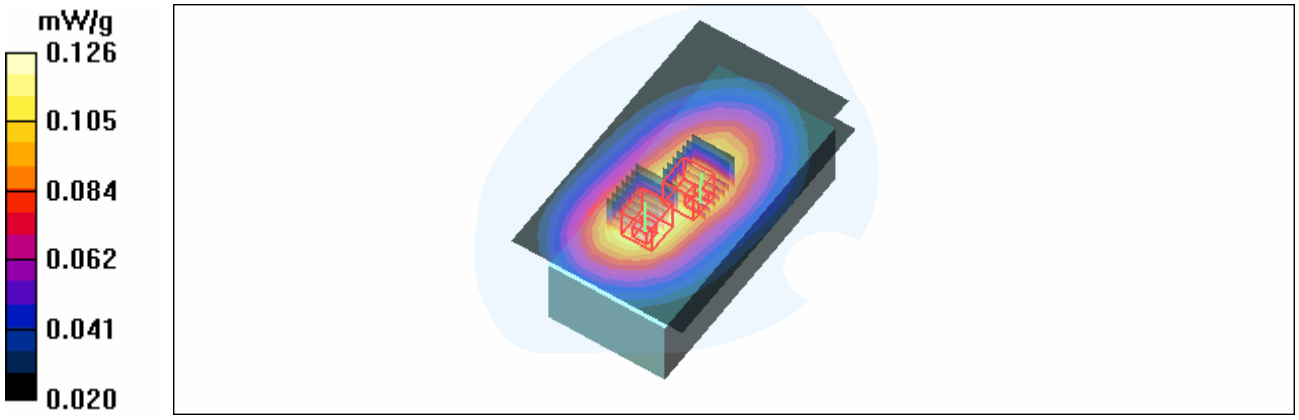
Maximum value of SAR (measured) = 0.135 mW/g

Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.6 V/m

Peak SAR (extrapolated) = 0.147 W/kg

SAR(1 g) = 0.115 mW/g; SAR(10 g) = 0.088 mW/g



Date/Time: 2007/9/13 16:17:54

Test Laboratory: Advance Data Technology

Body Worn-GPRS850 TS1-Ch128-Mode 2

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 824.2 MHz

Communication System: PCS 850 ; Frequency: 824.2 MHz ; Duty Cycle: 1:8.3 ; Modulation type: GMSK / UL 1 time slot

Medium: MSL835 Medium parameters used: f = 824.2 MHz; σ = 0.98 mho/m; ε_r = 56.3; ρ = 1000 kg/m^3 ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)

Antenna type : monopole Antenna ; Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Low Channel 128/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.151 mW/g

Low Channel 128/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.9 V/m

Peak SAR (extrapolated) = 0.165 W/kg

SAR(1 g) = 0.140 mW/g; SAR(10 g) = 0.104 mW/g

Maximum value of SAR (measured) = 0.148 mW/g

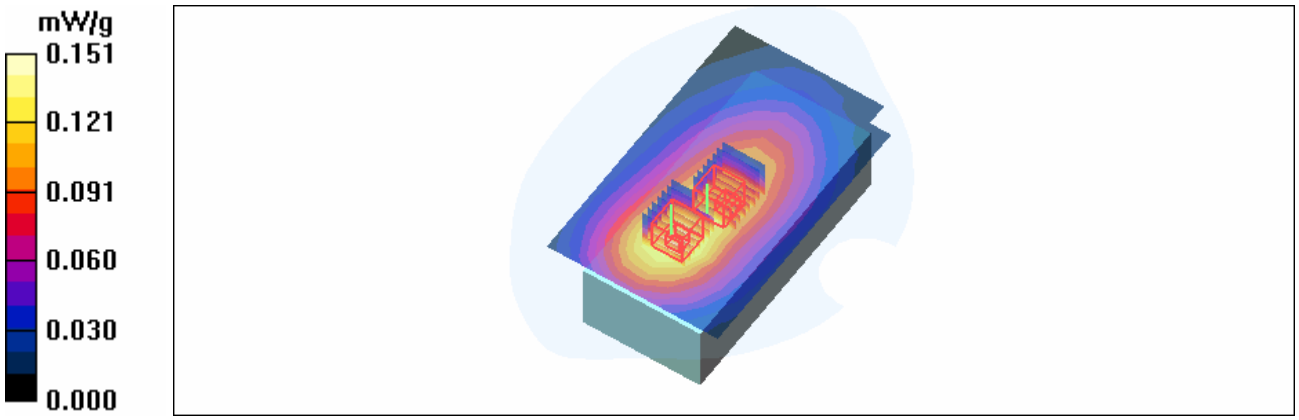
Low Channel 128/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.9 V/m

Peak SAR (extrapolated) = 0.141 W/kg

SAR(1 g) = 0.116 mW/g; SAR(10 g) = 0.090 mW/g

Maximum value of SAR (measured) = 0.125 mW/g



Date/Time: 2007/9/13 17:00:41

Test Laboratory: Advance Data Technology

Body Worn-GPRS850 TS1-Ch190-Mode 2

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 836.6 MHz

Communication System: PCS 850 ; Frequency: 836.6 MHz ; Duty Cycle: 1:8.3 ; Modulation type: GMSK / UL 1 time slot

Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3 ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)

Antenna type : monopole Antenna ; Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 190/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.175 mW/g

Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.7 V/m

Peak SAR (extrapolated) = 0.314 W/kg

SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.124 mW/g

Maximum value of SAR (measured) = 0.174 mW/g

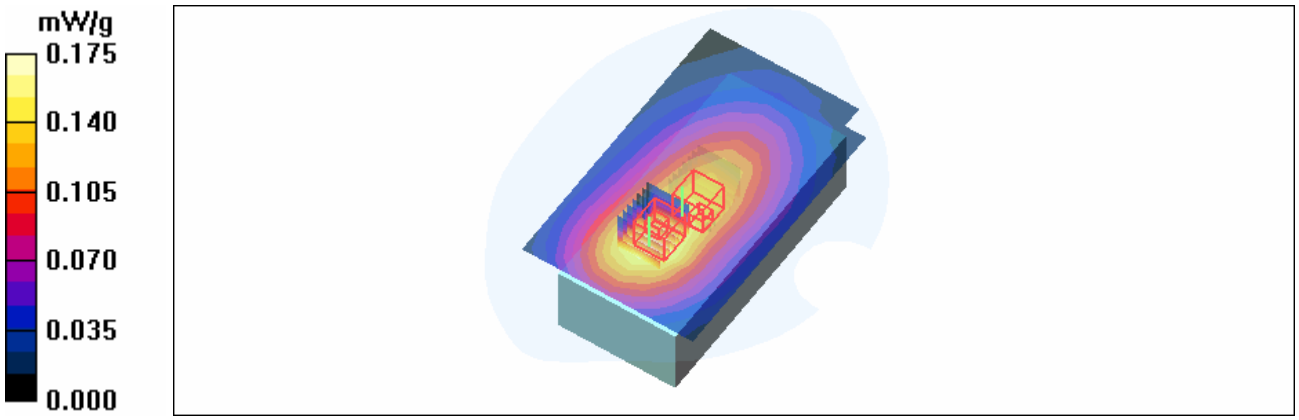
Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

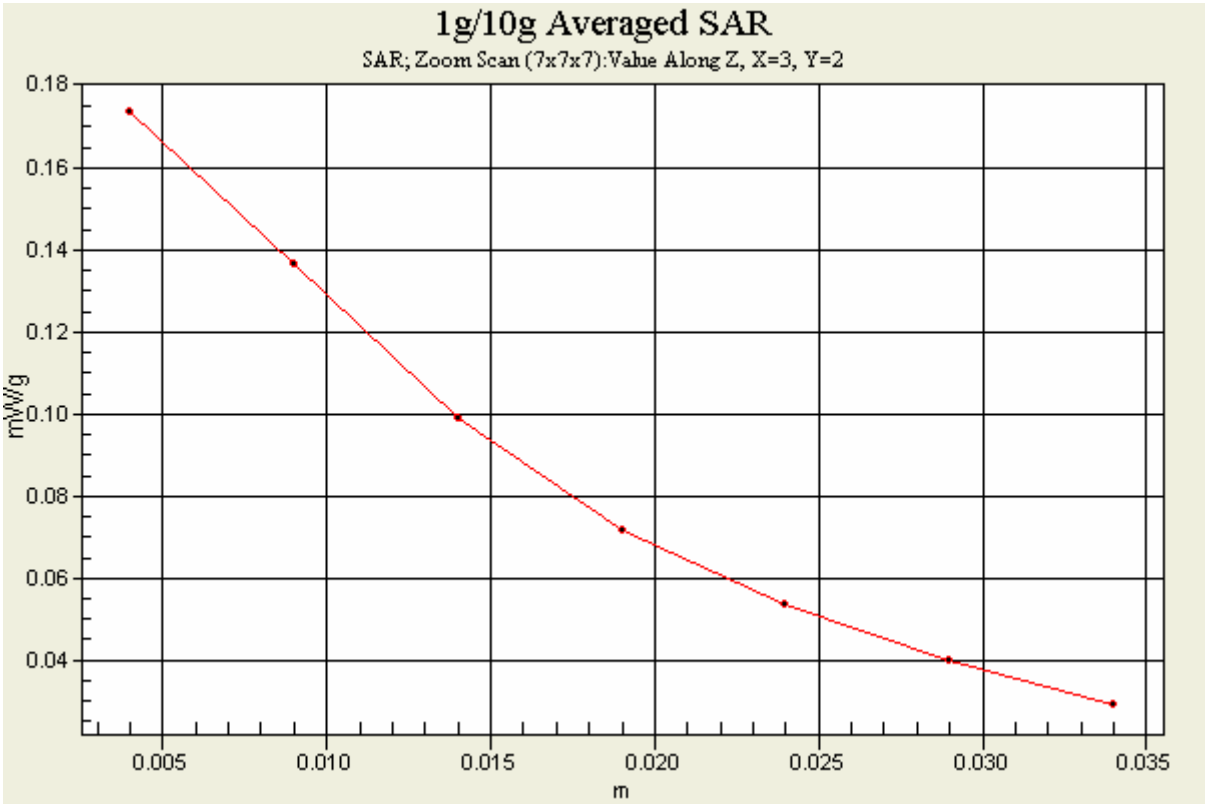
Reference Value = 12.7 V/m

Peak SAR (extrapolated) = 0.297 W/kg

SAR(1 g) = 0.150 mW/g; SAR(10 g) = 0.110 mW/g

Maximum value of SAR (measured) = 0.148 mW/g




1g/10g Averaged SAR
SAR; Zoom Scan (7x7x7):Value Along Z, X=3, Y=2
mW/g
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date/Time: 2007/9/13 17:36:00

Test Laboratory: Advance Data Technology

Body Worn-GPRS850 TS1-Ch251-Mode 2

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 848.8 MHz

Communication System: PCS 850 ; Frequency: 848.8 MHz ; Duty Cycle: 1:8.3 ; Modulation type: GMSK / UL 1 time slot

Medium: MSL835 Medium parameters used: f = 848.8 MHz; σ = 1.01 mho/m; ε_r = 56.1; ρ = 1000 kg/m^3 ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)

Antenna type : monopole Antenna ; Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

High Channel 251/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.172 mW/g

High Channel 251/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.0 V/m

Peak SAR (extrapolated) = 0.197 W/kg

SAR(1 g) = 0.166 mW/g; SAR(10 g) = 0.118 mW/g

Maximum value of SAR (measured) = 0.177 mW/g

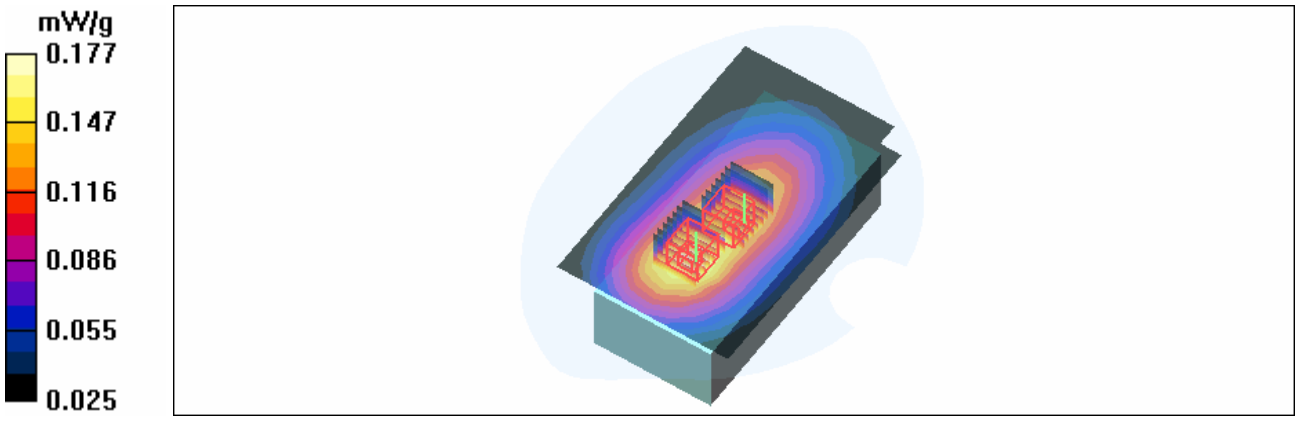
High Channel 251/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.0 V/m

Peak SAR (extrapolated) = 0.177 W/kg

SAR(1 g) = 0.149 mW/g; SAR(10 g) = 0.114 mW/g

Maximum value of SAR (measured) = 0.158 mW/g



Date/Time: 2007/9/13 18:25:41

Test Laboratory: Advance Data Technology

Body Worn-GPRS850 TS1-Ch190-Mode 3 bat.2

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 836.6 MHz

Communication System: PCS 850 ; Frequency: 836.6 MHz ; Duty Cycle: 1:8.3 ; Modulation type: GMSK / UL 1 time slot

Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3 ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)

Antenna type : monopole Antenna ; Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

High Channel 251/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.176 mW/g

High Channel 251/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.4 V/m

Peak SAR (extrapolated) = 0.201 W/kg

SAR(1 g) = 0.169 mW/g; SAR(10 g) = 0.123 mW/g

Maximum value of SAR (measured) = 0.180 mW/g

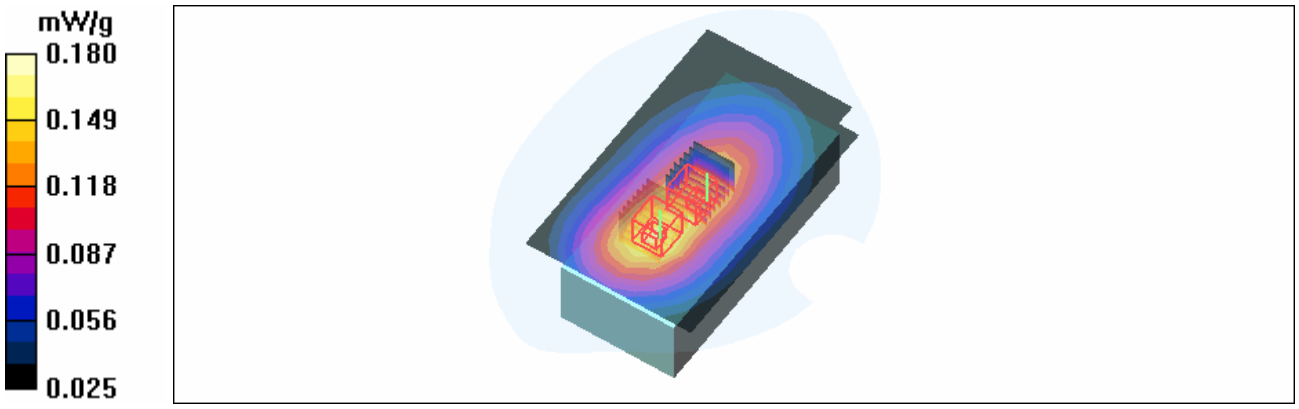
High Channel 251/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.4 V/m

Peak SAR (extrapolated) = 0.181 W/kg

SAR(1 g) = 0.152 mW/g; SAR(10 g) = 0.116 mW/g

Maximum value of SAR (measured) = 0.161 mW/g



Date/Time: 2007/9/13 19:12:03

Test Laboratory: Advance Data Technology

Body Worn-GPRS850 TS2-Ch190-Mode 4

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 836.6 MHz

Communication System: PCS 850 ; Frequency: 836.6 MHz ; Duty Cycle: 1:4 ; Modulation type: GMSK / UL 2 time slots

Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3 ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)

Antenna type : monopole Antenna ; Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 190/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.177 mW/g

Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.8 V/m

Peak SAR (extrapolated) = 0.198 W/kg

SAR(1 g) = 0.168 mW/g; SAR(10 g) = 0.121 mW/g

Maximum value of SAR (measured) = 0.178 mW/g

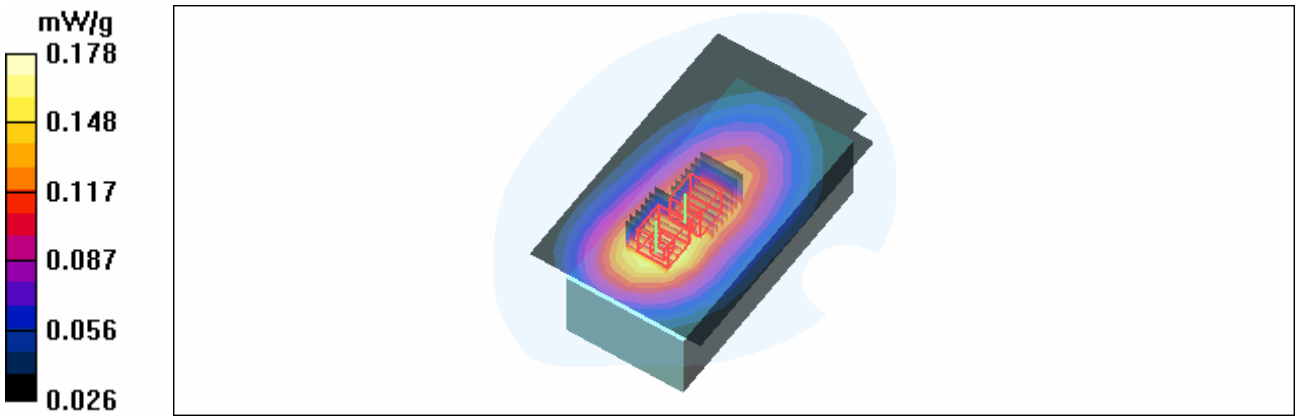
Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.8 V/m

Peak SAR (extrapolated) = 0.171 W/kg

SAR(1 g) = 0.144 mW/g; SAR(10 g) = 0.112 mW/g

Maximum value of SAR (measured) = 0.157 mW/g



Date/Time: 2007/9/13 19:56:21

Test Laboratory: Advance Data Technology

Body Worn-GPRS850 TS3-Ch190-Mode 5

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 836.6 MHz

Communication System: PCS 850 ; Frequency: 836.6 MHz ; Duty Cycle: 1:2.67 ; Modulation type: GMSK / UL 3 time slots

Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3 ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)

Antenna type : monopole Antenna ; Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 190/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.154 mW/g

Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.1 V/m

Peak SAR (extrapolated) = 0.166 W/kg

SAR(1 g) = 0.141 mW/g; SAR(10 g) = 0.104 mW/g

Maximum value of SAR (measured) = 0.151 mW/g

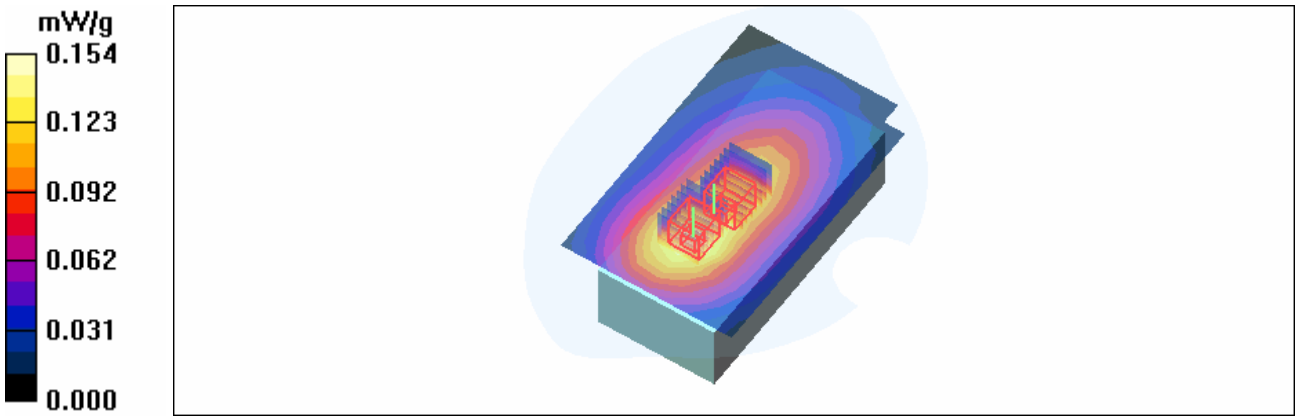
Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.1 V/m

Peak SAR (extrapolated) = 0.150 W/kg

SAR(1 g) = 0.122 mW/g; SAR(10 g) = 0.095 mW/g

Maximum value of SAR (measured) = 0.133 mW/g



Date/Time: 2007/9/13 20:54:23

Test Laboratory: Advance Data Technology

Body Worn-GPRS850 TS4-Ch190-Mode 6

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 836.6 MHz

Communication System: PCS 850 ; Frequency: 836.6 MHz ; Duty Cycle: 1:2 ; Modulation type: GMSK / UL 4 time slot

Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3 ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)

Antenna type : monopole Antenna ; Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 190/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.139 mW/g

Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.4 V/m

Peak SAR (extrapolated) = 0.154 W/kg

SAR(1 g) = 0.130 mW/g; SAR(10 g) = 0.096 mW/g

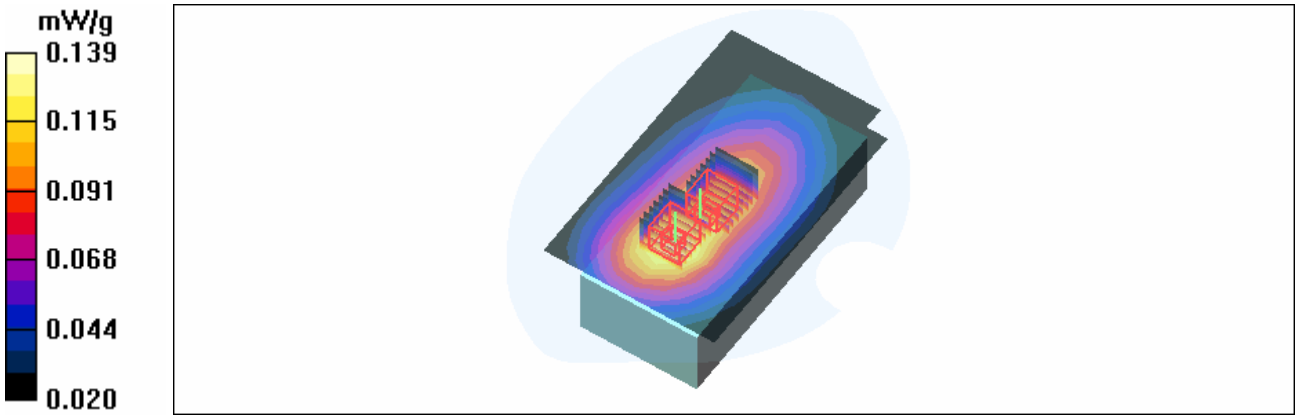
Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.4 V/m

Peak SAR (extrapolated) = 0.132 W/kg

SAR(1 g) = 0.110 mW/g; SAR(10 g) = 0.086 mW/g

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



Date/Time: 2007/9/13 21:44:30

Test Laboratory: Advance Data Technology

Body Worn-E-GPRS850 TS1-Ch190-Mode 7

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 836.6 MHz

Communication System: PCS 850 ; Frequency: 836.6 MHz ; Duty Cycle: 1:8.3 ; Modulation type: 8PSK / UL 1 time slot

Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3 ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)

Antenna type : monopole Antenna ; Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 190/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.143 mW/g

Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.0 V/m

Peak SAR (extrapolated) = 0.163 W/kg

SAR(1 g) = 0.138 mW/g; SAR(10 g) = 0.102 mW/g

Maximum value of SAR (measured) = 0.147 mW/g

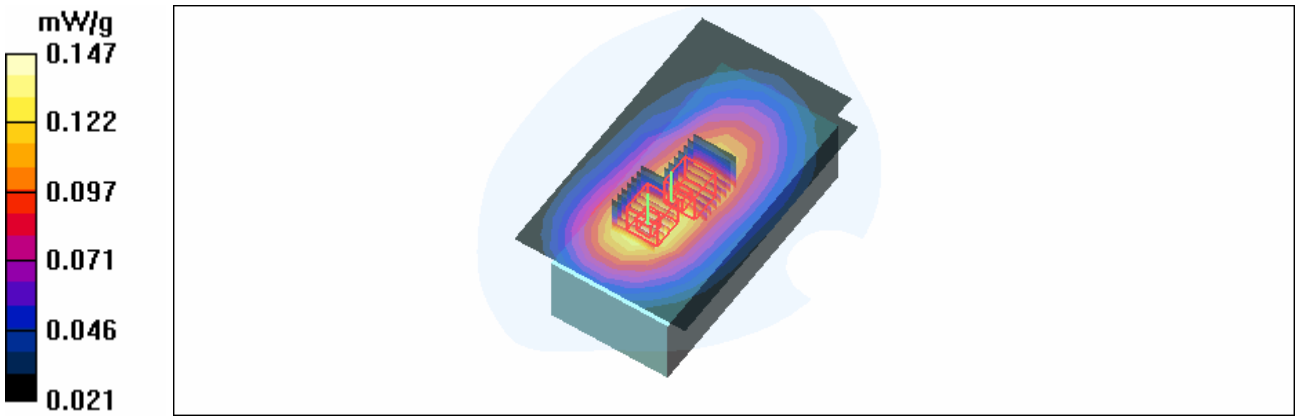
Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.0 V/m

Peak SAR (extrapolated) = 0.138 W/kg

SAR(1 g) = 0.119 mW/g; SAR(10 g) = 0.091 mW/g

Maximum value of SAR (measured) = 0.129 mW/g



Date/Time: 2007/9/13 22:21:43

Test Laboratory: Advance Data Technology

Body Worn-E-GPRS850 TS2-Ch190-Mode 8

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 836.6 MHz

Communication System: PCS 850 ; Frequency: 836.6 MHz ; Duty Cycle: 1:4 ; Modulation type: 8PSK / UL 2 time slots

Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3 ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)

Antenna type : monopole Antenna ; Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 190/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.108 mW/g

Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.3 V/m

Peak SAR (extrapolated) = 0.125 W/kg

SAR(1 g) = 0.106 mW/g; SAR(10 g) = 0.078 mW/g

Maximum value of SAR (measured) = 0.112 mW/g

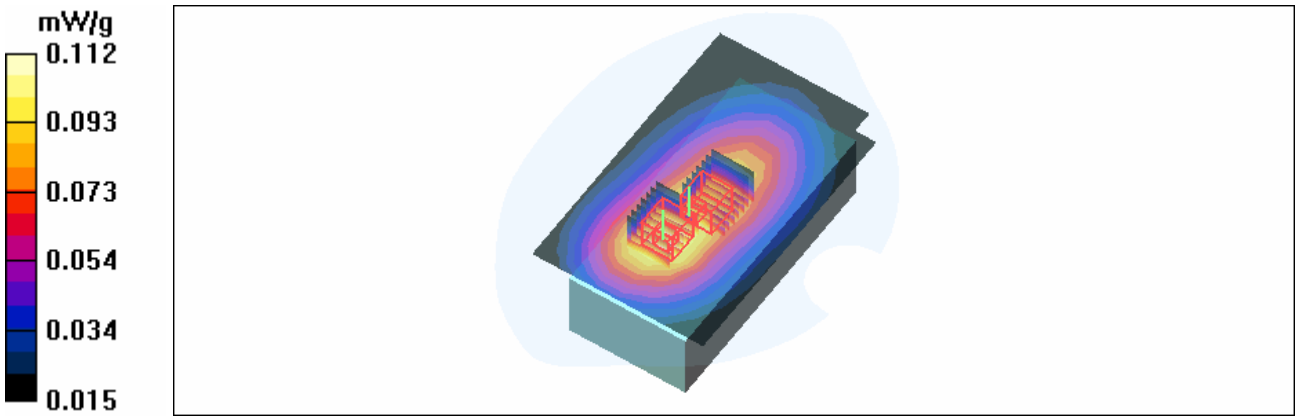
Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.3 V/m

Peak SAR (extrapolated) = 0.106 W/kg

SAR(1 g) = 0.091 mW/g; SAR(10 g) = 0.071 mW/g

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



Date/Time: 2007/9/13 22:56:38

Test Laboratory: Advance Data Technology

Body Worn-E-GPRS850 TS3-Ch190-Mode 9

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 836.6 MHz

Communication System: PCS 850 ; Frequency: 836.6 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 8PSK / UL 3 time slots

Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3 ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)

Antenna type : monopole Antenna ; Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 190/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.074 mW/g

Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.47 V/m

Peak SAR (extrapolated) = 0.085 W/kg

SAR(1 g) = 0.072 mW/g; SAR(10 g) = 0.053 mW/g

Maximum value of SAR (measured) = 0.076 mW/g

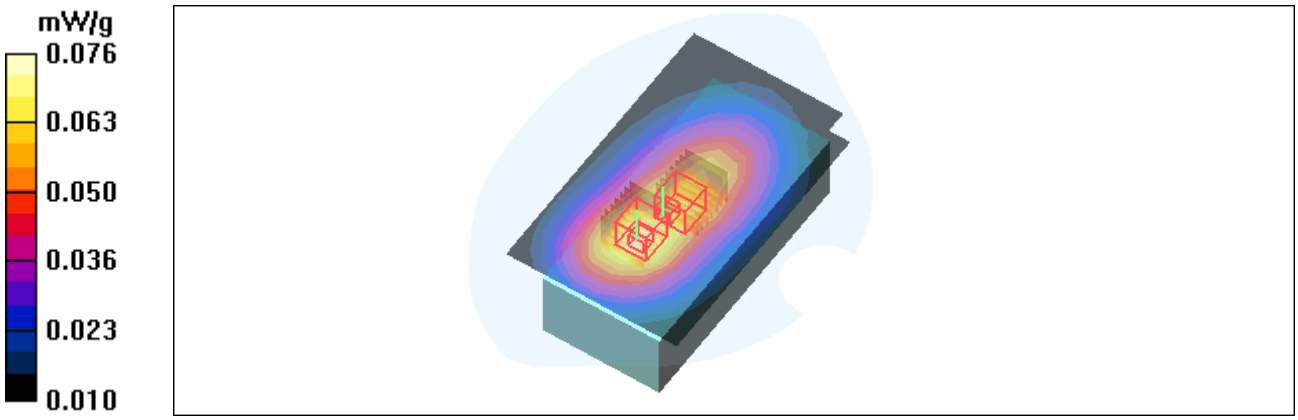
Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.47 V/m

Peak SAR (extrapolated) = 0.072 W/kg

SAR(1 g) = 0.062 mW/g; SAR(10 g) = 0.048 mW/g

Maximum value of SAR (measured) = 0.068 mW/g



Date/Time: 2007/9/13 23:33:02

Test Laboratory: Advance Data Technology

Body Worn-E-GPRS850 TS4-Ch190-Mode 10

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 836.6 MHz

Communication System: PCS 850 ; Frequency: 836.6 MHz ; Duty Cycle: 1:2 ; Modulation type: 8PSK / UL 4 time slots

Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3 ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)

Antenna type : monopole Antenna ; Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 190/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.038 mW/g

Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.05 V/m

Peak SAR (extrapolated) = 0.044 W/kg

SAR(1 g) = 0.037 mW/g; SAR(10 g) = 0.027 mW/g

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

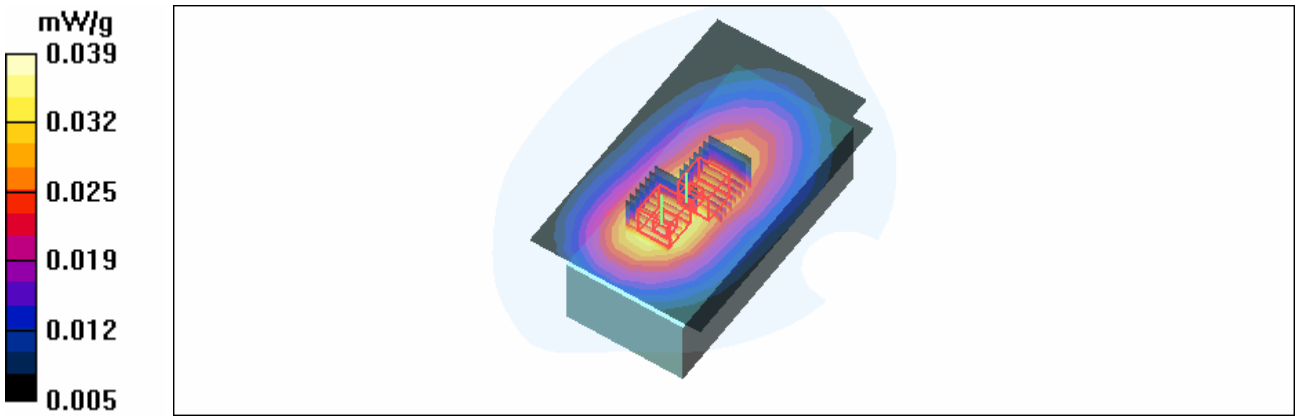
Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.05 V/m

Peak SAR (extrapolated) = 0.037 W/kg

SAR(1 g) = 0.032 mW/g; SAR(10 g) = 0.025 mW/g

Maximum value of SAR (measured) = 0.035 mW/g



Date/Time: 2007/9/18 10:50:56

Test Laboratory: Advance Data Technology

Body Worn-PCS1900-Ch661-Mode 11

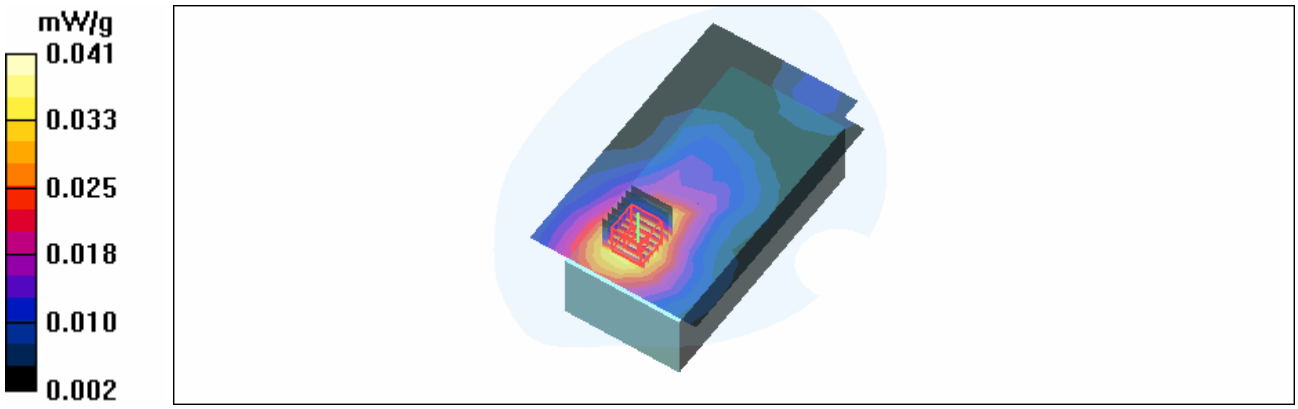
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1880 MHz

Communication System: PCS 1900 ; Frequency: 1880 MHz ; Duty Cycle: 1:8.3 ; Modulation type: GMSK
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : monopole Antenna ; Air temp. : 22.9 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 661/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.039 mW/g

Mid Channel 661/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.18 V/m
Peak SAR (extrapolated) = 0.061 W/kg
SAR(1 g) = 0.038 mW/g; SAR(10 g) = 0.025 mW/g
Maximum value of SAR (measured) = 0.041 mW/g



Date/Time: 2007/9/18 11:22:46

Test Laboratory: Advance Data Technology

Body Worn-GPRS1900 TS1-Ch512-Mode 12

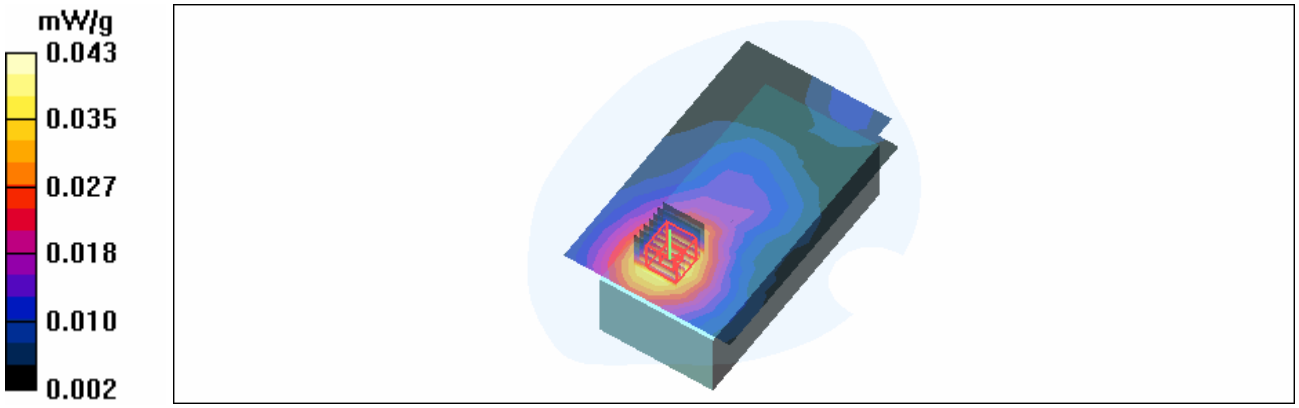
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1850.2 MHz

Communication System: PCS 1900 ; Frequency: 1850.2 MHz ; Duty Cycle: 1:8.3 ; Modulation type: GMSK / UL 1 time slot
Medium: MSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.51 mho/m; ε_r = 54; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : monopole Antenna ; Air temp. : 22.9 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Low Channel 512/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.041 mW/g

Low Channel 512/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.27 V/m
Peak SAR (extrapolated) = 0.062 W/kg
SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.027 mW/g
Maximum value of SAR (measured) = 0.043 mW/g



Date/Time: 2007/9/18 11:50:44

Test Laboratory: Advance Data Technology

Body Worn-GPRS1900 TS1-Ch661-Mode 12

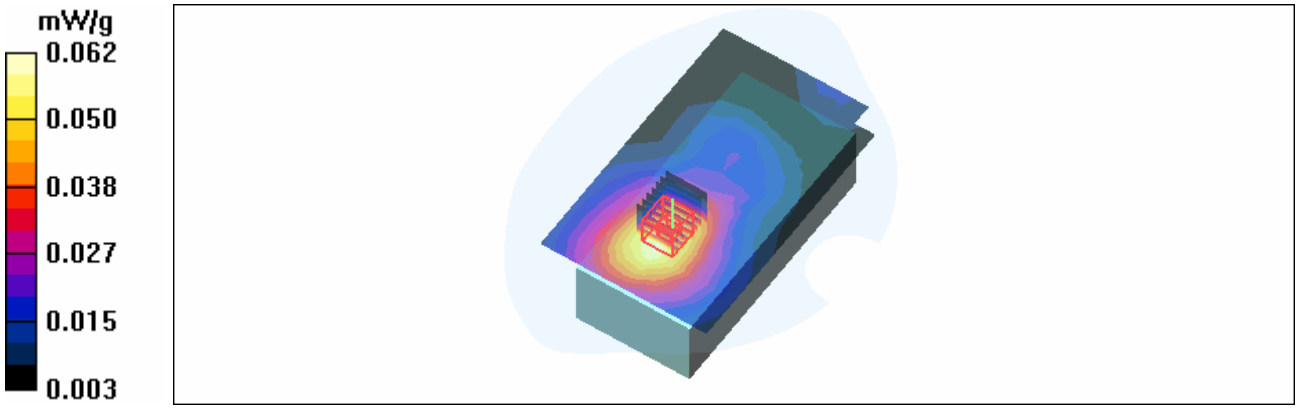
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1880 MHz

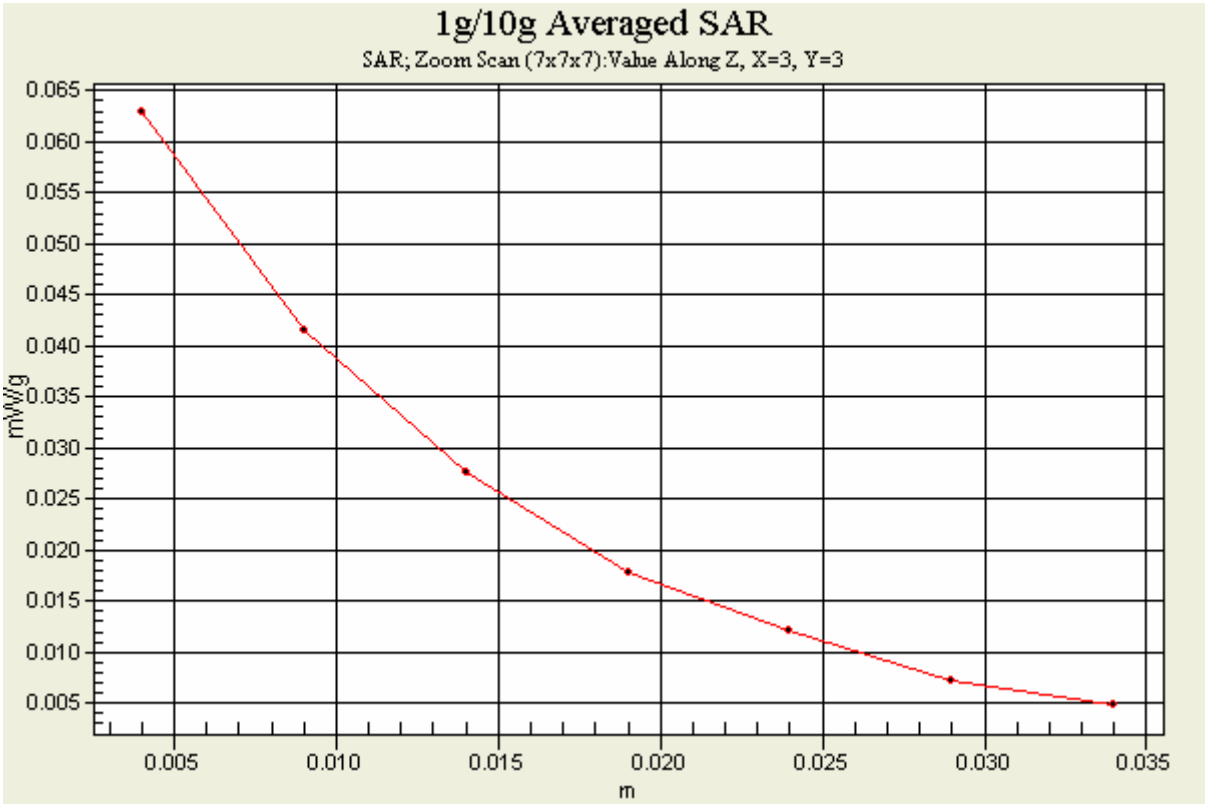
Communication System: PCS 1900 ; Frequency: 1880 MHz ; Duty Cycle: 1:8.3 ; Modulation type: GMSK / UL 1 time slot
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : monopole Antenna ; Air temp. : 22.9 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 661/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.061 mW/g

Mid Channel 661/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.02 V/m
Peak SAR (extrapolated) = 0.091 W/kg
SAR(1 g) = 0.058 mW/g; SAR(10 g) = 0.038 mW/g
Maximum value of SAR (measured) = 0.062 mW/g




1g/10g Averaged SAR
SAR; Zoom Scan (7x7x7):Value Along Z, X=3, Y=3
mW/g
0.065
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date/Time: 2007/9/18 12:13:09

Test Laboratory: Advance Data Technology

Body Worn-GPRS1900 TS1-Ch810-Mode 12

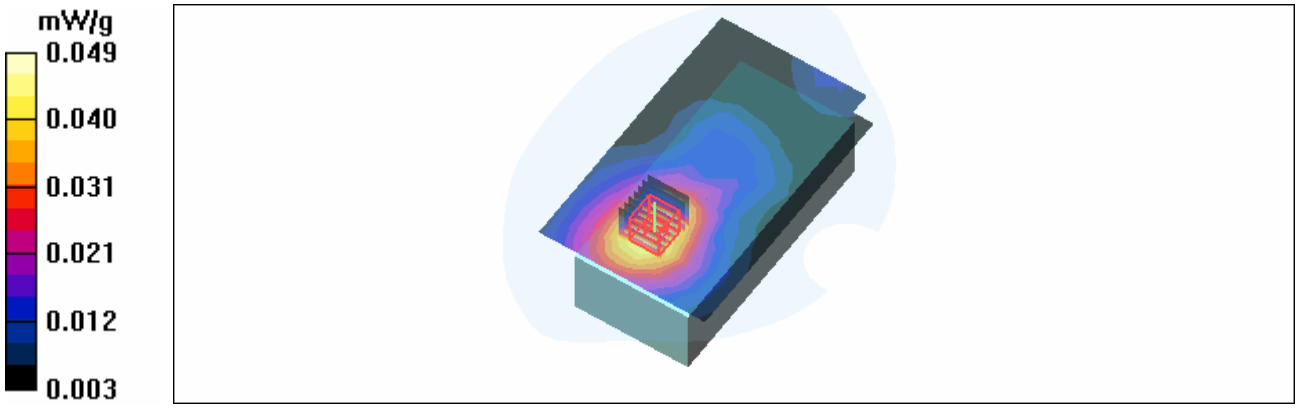
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1909.8 MHz

Communication System: PCS 1900 ; Frequency: 1909.8 MHz ; Duty Cycle: 1:8.3 ; Modulation type: GMSK / UL 1 time slot
Medium: MSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.59 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : monopole Antenna ; Air temp. : 22.9 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

High Channel 810/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.047 mW/g

High Channel 810/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.31 V/m
Peak SAR (extrapolated) = 0.071 W/kg
SAR(1 g) = 0.046 mW/g; SAR(10 g) = 0.030 mW/g
Maximum value of SAR (measured) = 0.049 mW/g



Date/Time: 2007/9/18 12:37:14

Test Laboratory: Advance Data Technology

Body Worn-GPRS1900 TS2-Ch661-Mode 13

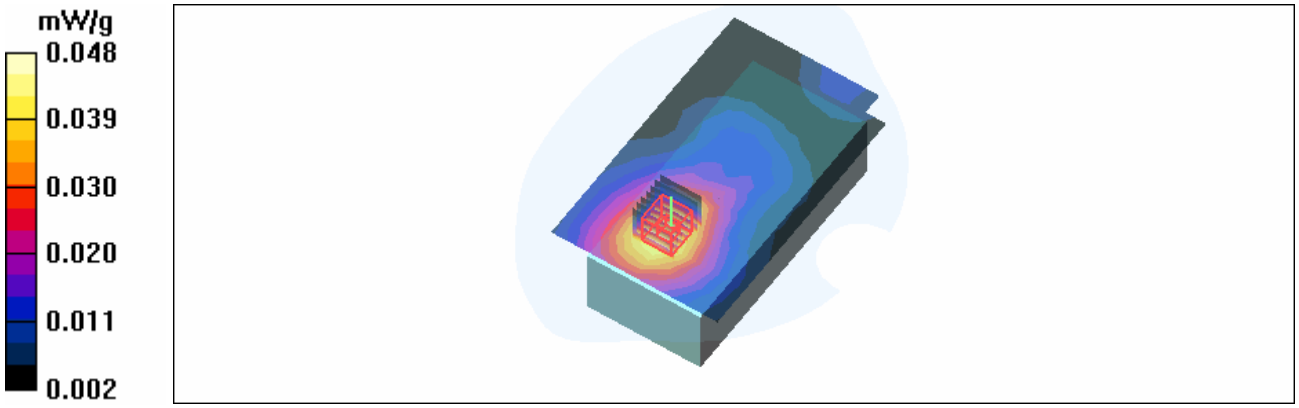
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1880 MHz

Communication System: PCS 1900 ; Frequency: 1880 MHz ; Duty Cycle: 1:4 ; Modulation type: GMSK / UL 2 time slots
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : monopole Antenna ; Air temp. : 22.9 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 661/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.046 mW/g

Mid Channel 661/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.38 V/m
Peak SAR (extrapolated) = 0.072 W/kg
SAR(1 g) = 0.045 mW/g; SAR(10 g) = 0.029 mW/g
Maximum value of SAR (measured) = 0.048 mW/g



Date/Time: 2007/9/18 13:00:59

Test Laboratory: Advance Data Technology

Body Worn-GPRS1900 TS3-Ch661-Mode 14

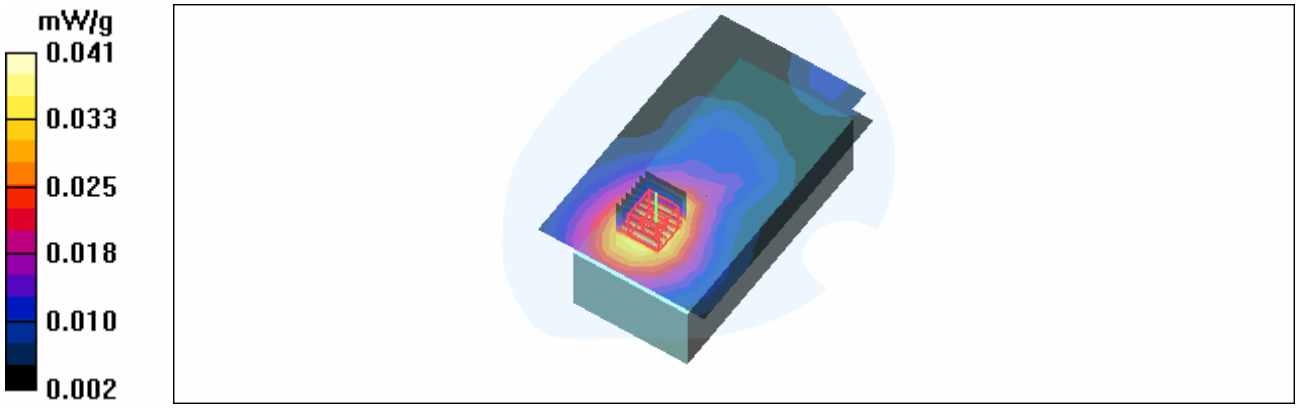
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1880 MHz

Communication System: PCS 1900 ; Frequency: 1880 MHz ; Duty Cycle: 1:2.67 ; Modulation type: GMSK / UL 3 time slots
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : monopole Antenna ; Air temp. : 22.9 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 661/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.039 mW/g

Mid Channel 661/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.14 V/m
Peak SAR (extrapolated) = 0.057 W/kg
SAR(1 g) = 0.038 mW/g; SAR(10 g) = 0.025 mW/g
Maximum value of SAR (measured) = 0.041 mW/g



Date/Time: 2007/9/18 13:24:24

Test Laboratory: Advance Data Technology

Body Worn-GPRS1900 TS4-Ch661-Mode 15

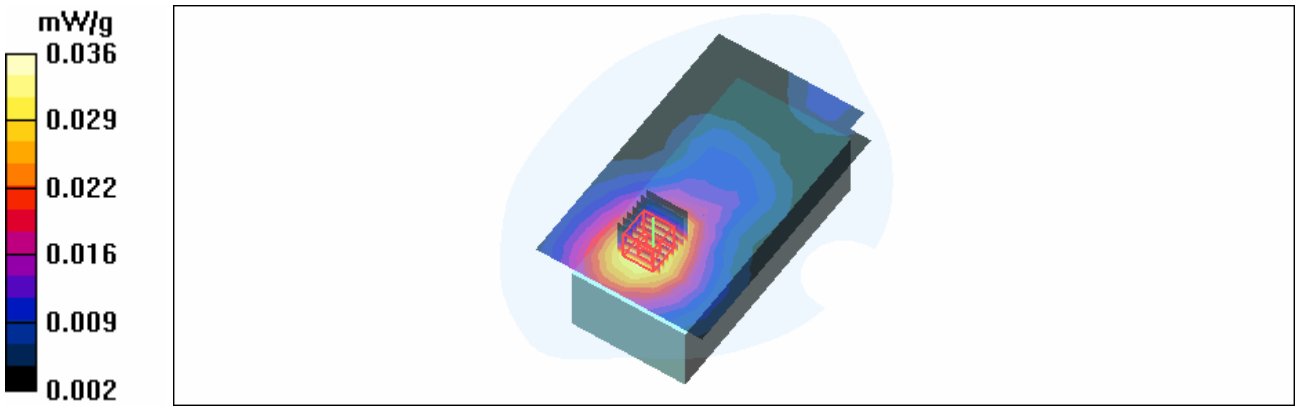
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1880 MHz

Communication System: PCS 1900 ; Frequency: 1880 MHz ; Duty Cycle: 1:2 ; Modulation type: GMSK / UL 4 time slots
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : monopole Antenna ; Air temp. : 22.9 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 661/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.036 mW/g

Mid Channel 661/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.87 V/m
Peak SAR (extrapolated) = 0.051 W/kg
SAR(1 g) = 0.034 mW/g; SAR(10 g) = 0.023 mW/g



Date/Time: 2007/9/18 13:49:24

Test Laboratory: Advance Data Technology

Body Worn-E-GPRS1900 TS1-Ch661-Mode 16

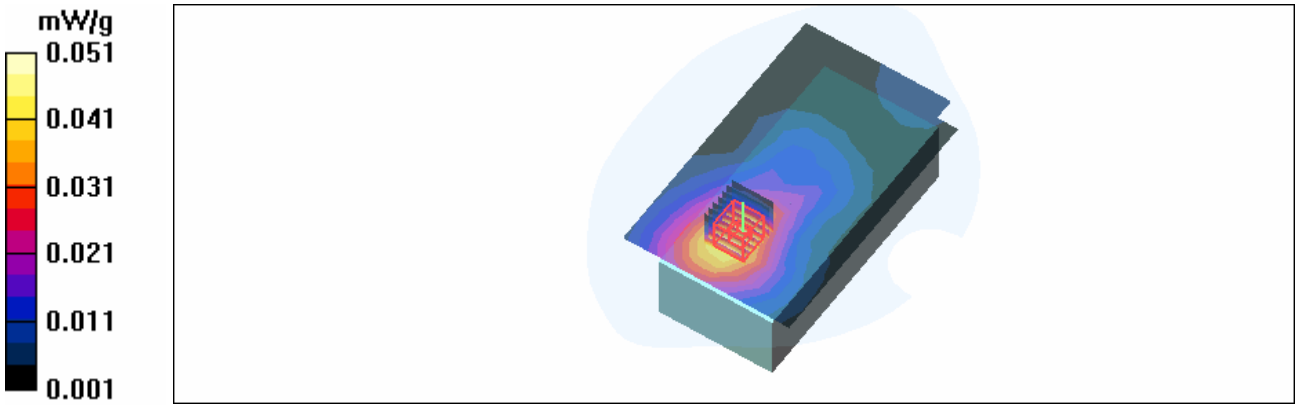
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1880 MHz

Communication System: PCS 1900 ; Frequency: 1880 MHz ; Duty Cycle: 1:8.3 ; Modulation type: 8PSK / UL 1 time slot
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : monopole Antenna ; Air temp. : 22.9 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 661/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.050 mW/g

Mid Channel 661/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.57 V/m
Peak SAR (extrapolated) = 0.075 W/kg
SAR(1 g) = 0.045 mW/g; SAR(10 g) = 0.026 mW/g
Maximum value of SAR (measured) = 0.051 mW/g



Date/Time: 2007/9/18 14:13:11

Test Laboratory: Advance Data Technology

Body Worn-E-GPRS1900 TS2-Ch661-Mode 17

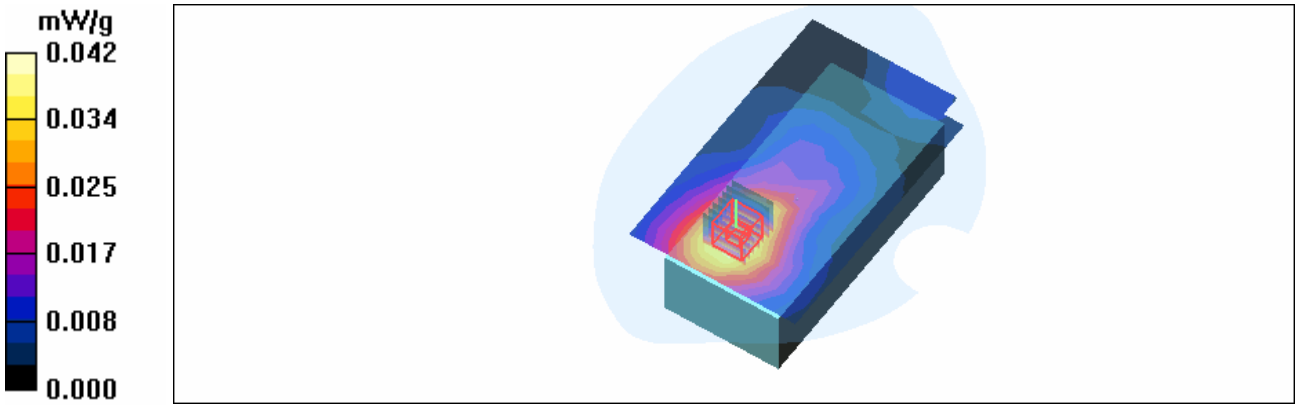
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1880 MHz

Communication System: PCS 1900 ; Frequency: 1880 MHz ; Duty Cycle: 1:4 ; Modulation type: 8PSK / UL 2 time slots
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : monopole Antenna ; Air temp. : 22.9 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 661/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.041 mW/g

Mid Channel 661/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.25 V/m
Peak SAR (extrapolated) = 0.067 W/kg
SAR(1 g) = 0.039 mW/g; SAR(10 g) = 0.023 mW/g
Maximum value of SAR (measured) = 0.042 mW/g



Date/Time: 2007/9/18 14:37:53

Test Laboratory: Advance Data Technology

Body Worn-E-GPRS1900 TS3-Ch661-Mode 18

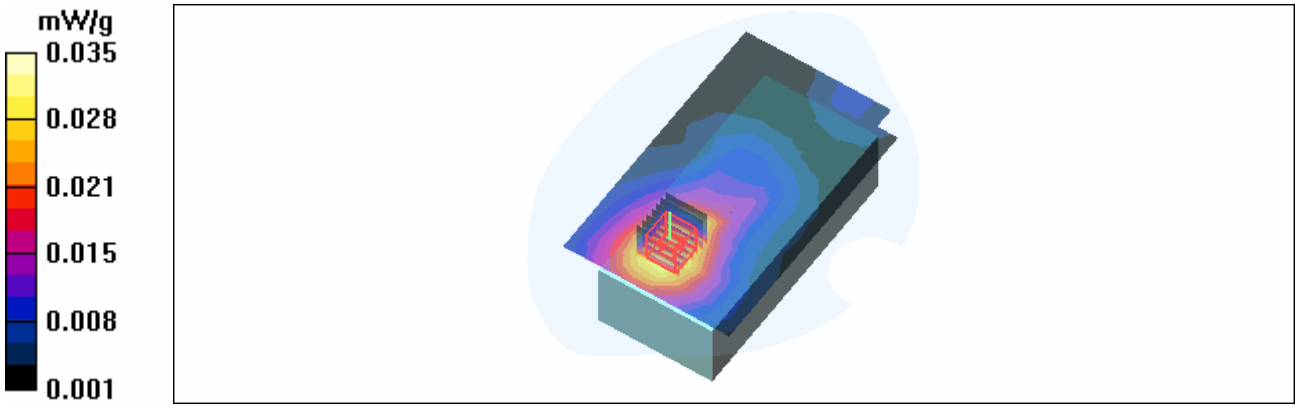
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1880 MHz

Communication System: PCS 1900 ; Frequency: 1880 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 8PSK / UL 3 time slots
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : monopole Antenna ; Air temp. : 22.9 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 661/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.034 mW/g

Mid Channel 661/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.92 V/m
Peak SAR (extrapolated) = 0.053 W/kg
SAR(1 g) = 0.033 mW/g; SAR(10 g) = 0.021 mW/g
Maximum value of SAR (measured) = 0.035 mW/g



Date/Time: 2007/9/18 15:05:50

Test Laboratory: Advance Data Technology

Body Worn-E-GPRS1900 TS4-Ch661-Mode 19

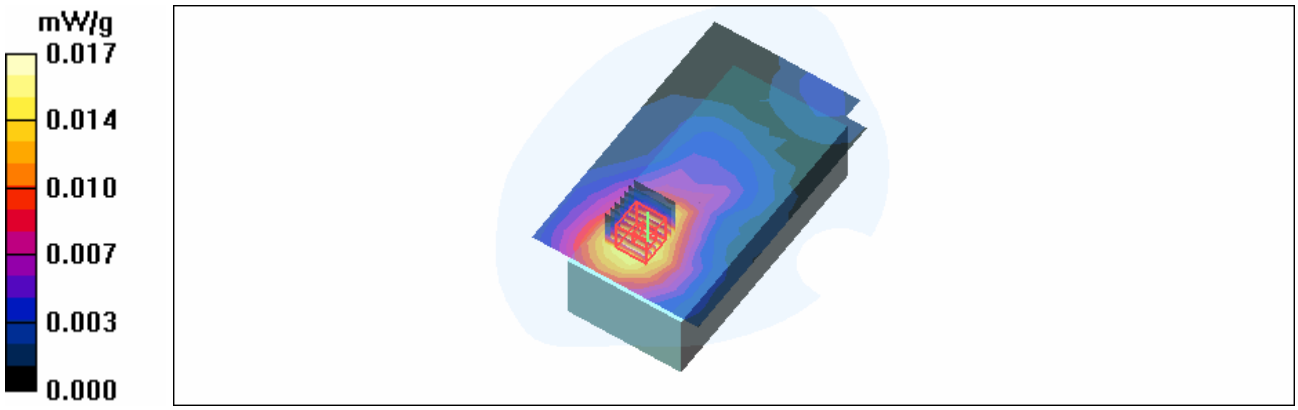
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1880 MHz

Communication System: PCS 1900 ; Frequency: 1880 MHz ; Duty Cycle: 1:2 ; Modulation type: 8PSK / UL 4 time slot
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : monopole Antenna ; Air temp. : 22.9 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 661/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.017 mW/g

Mid Channel 661/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.05 V/m
Peak SAR (extrapolated) = 0.026 W/kg
SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.010 mW/g



Date/Time: 2007/9/20 15:30:00

Test Laboratory: Advance Data Technology

Body Worn-11b-Ch1-Mode 20

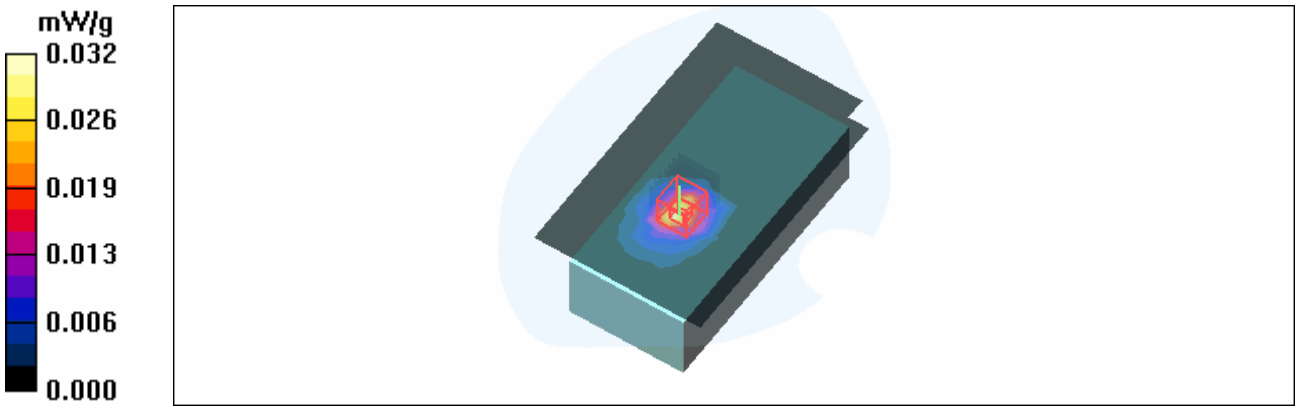
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 2412 MHz

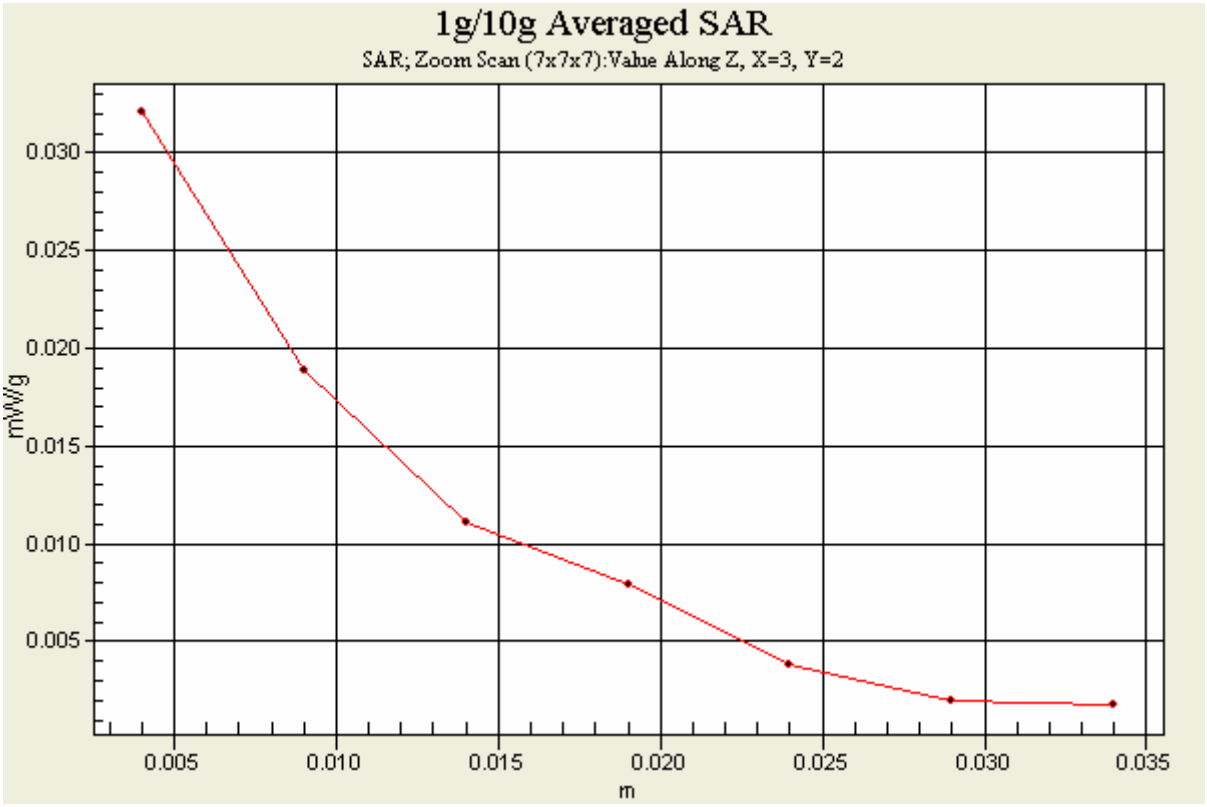
Communication System: 802.11b ; Frequency: 2412 MHz ; Duty Cycle: 1:1 ; Modulation type: DBPSK
Medium: MSL2450 Medium parameters used: f = 2412 MHz; σ = 1.93 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3 ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : Printed Antenna ; Air temp. : 23.2 degrees ; Liquid temp. : 22.2 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Low Channel 1/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.030 mW/g

Low Channel 1/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.67 V/m
Peak SAR (extrapolated) = 0.065 W/kg
SAR(1 g) = 0.029 mW/g; SAR(10 g) = 0.015 mW/g
Maximum value of SAR (measured) = 0.032 mW/g




1g/10g Averaged SAR
SAR; Zoom Scan (7x7x7):Value Along Z, X=3, Y=2
mW/g
0.030
0.025
0.020
0.015
0.010
0.005
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date/Time: 2007/9/20 16:06:10

Test Laboratory: Advance Data Technology

Body Worn-11b-Ch6-Mode 20

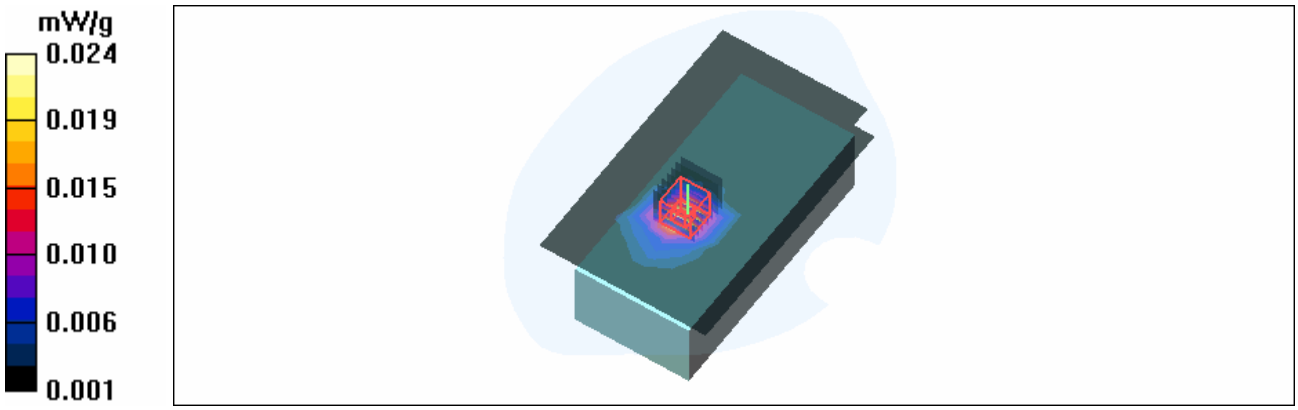
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 2437 MHz

Communication System: 802.11b ; Frequency: 2437 MHz ; Duty Cycle: 1:1 ; Modulation type: DBPSK
Medium: MSL2450 Medium parameters used: f = 2437 MHz; σ = 1.97 mho/m; ε_r = 54; ρ = 1000 kg/m^3 ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : Printed Antenna ; Air temp. : 23.2 degrees ; Liquid temp. : 22.2 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 6/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.022 mW/g

Mid Channel 6/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.27 V/m
Peak SAR (extrapolated) = 0.042 W/kg
SAR(1 g) = 0.022 mW/g; SAR(10 g) = 0.011 mW/g
Maximum value of SAR (measured) = 0.024 mW/g



Date/Time: 2007/9/20 16:29:22

Test Laboratory: Advance Data Technology

Body Worn-11b-Ch11-Mode 20

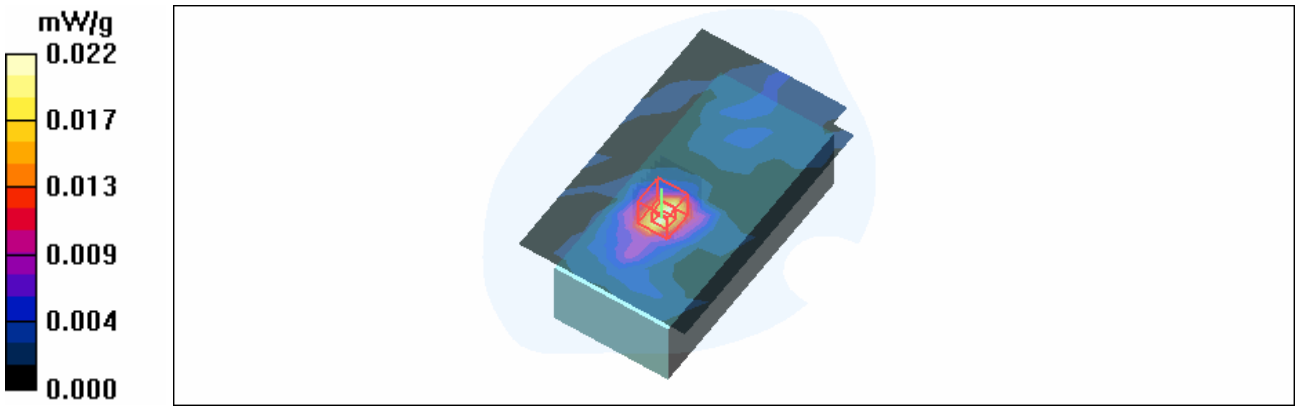
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 2462 MHz

Communication System: 802.11b ; Frequency: 2462 MHz ; Duty Cycle: 1:1 ; Modulation type: DBPSK
Medium: MSL2450 Medium parameters used: f = 2462 MHz; σ = 2.02 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3 ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : Printed Antenna ; Air temp. : 23.2 degrees ; Liquid temp. : 22.2 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

High Channel 11/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.021 mW/g

High Channel 11/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.03 V/m
Peak SAR (extrapolated) = 0.044 W/kg
SAR(1 g) = 0.020 mW/g; SAR(10 g) = 0.010 mW/g
Maximum value of SAR (measured) = 0.022 mW/g



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Test Laboratory: Advance Data Technology

Body Worn-11g-Ch1-Mode 21

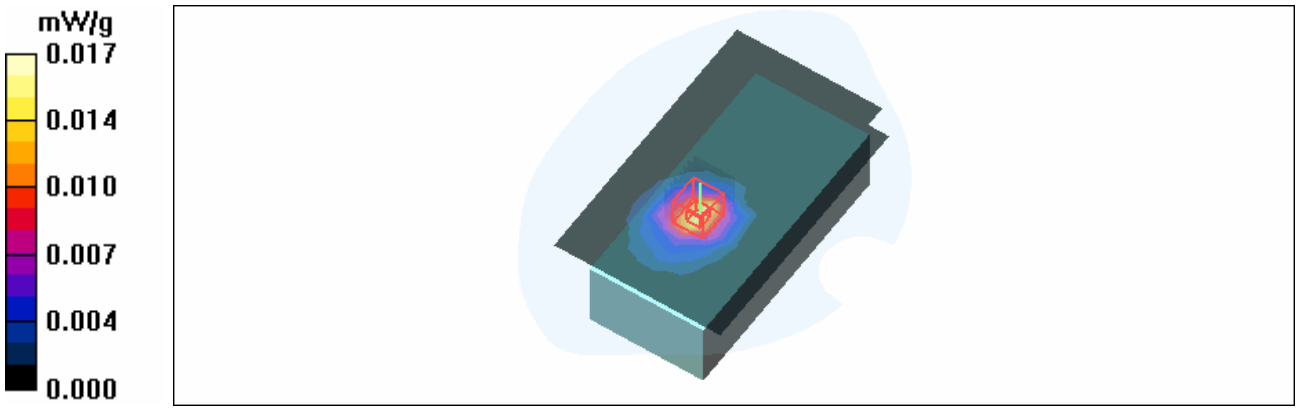
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 2412 MHz

Communication System: 802.11g ; Frequency: 2412 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK
Medium: MSL2450 Medium parameters used: f = 2412 MHz; σ = 1.93 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3 ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : Printed Antenna ; Air temp. : 23.2 degrees ; Liquid temp. : 22.2 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Low Channel 1/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.015 mW/g

Low Channel 1/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.36 V/m
Peak SAR (extrapolated) = 0.029 W/kg
SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.00847 mW/g
Maximum value of SAR (measured) = 0.017 mW/g



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Test Laboratory: Advance Data Technology

Body Worn-11g-Ch6-Mode 21

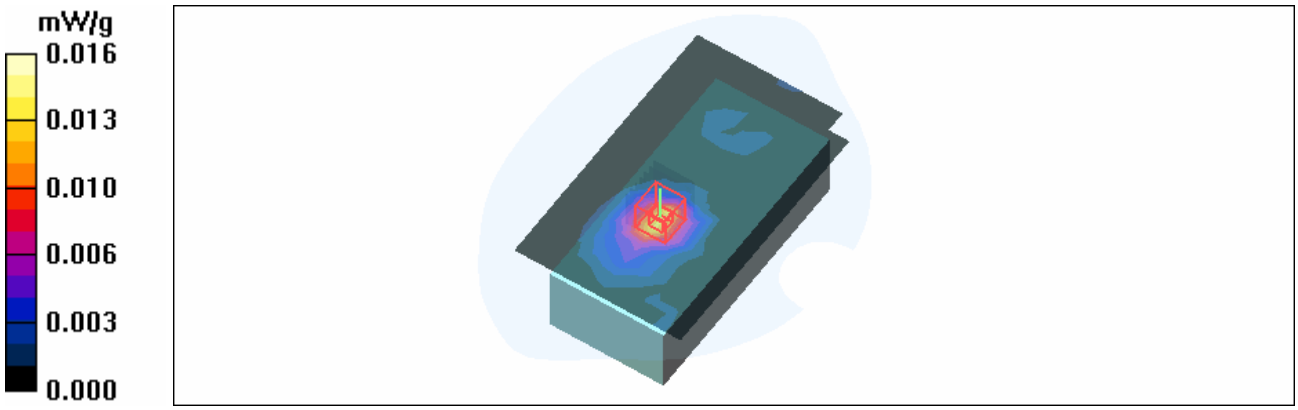
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 2437 MHz

Communication System: 802.11g ; Frequency: 2437 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK
Medium: MSL2450 Medium parameters used: f = 2437 MHz; σ = 1.97 mho/m; ε_r = 54; ρ = 1000 kg/m^3 ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : Printed Antenna ; Air temp. : 23.2 degrees ; Liquid temp. : 22.2 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 6/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.013 mW/g

Mid Channel 6/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.20 V/m
Peak SAR (extrapolated) = 0.029 W/kg
SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00736 mW/g
Maximum value of SAR (measured) = 0.016 mW/g



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Test Laboratory: Advance Data Technology

Body Worn-11g-Ch11-Mode 21

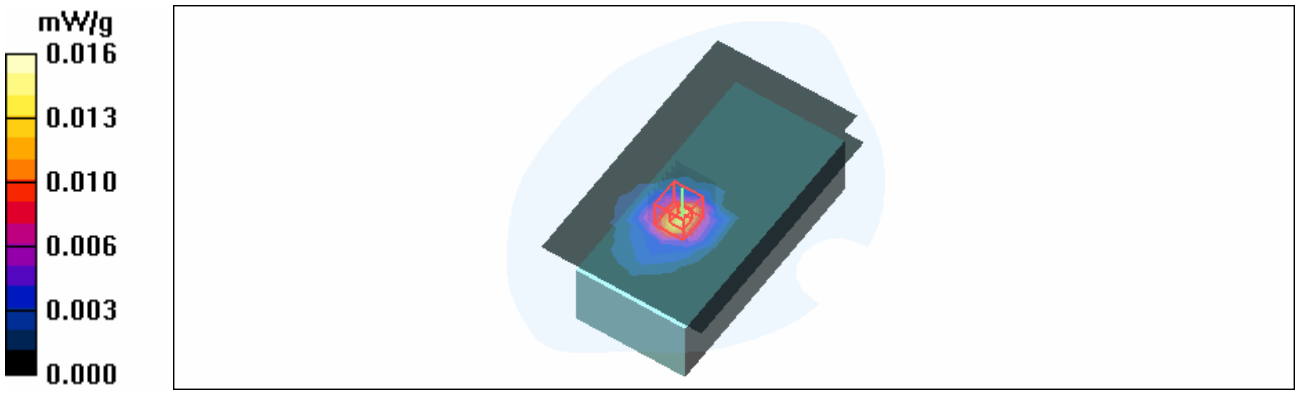
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 2462 MHz

Communication System: 802.11g ; Frequency: 2462 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK
Medium: MSL2450 Medium parameters used: f = 2462 MHz; σ = 2.02 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3 ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : Printed Antenna ; Air temp. : 23.2 degrees ; Liquid temp. : 22.2 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

High Channel 11/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.014 mW/g

High Channel 11/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.22 V/m
Peak SAR (extrapolated) = 0.030 W/kg
SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.00731 mW/g
Maximum value of SAR (measured) = 0.016 mW/g



Date/Time: 2007/9/20 19:11:32

Test Laboratory: Advance Data Technology

Body Worn-11b-Ch1-Mode 22

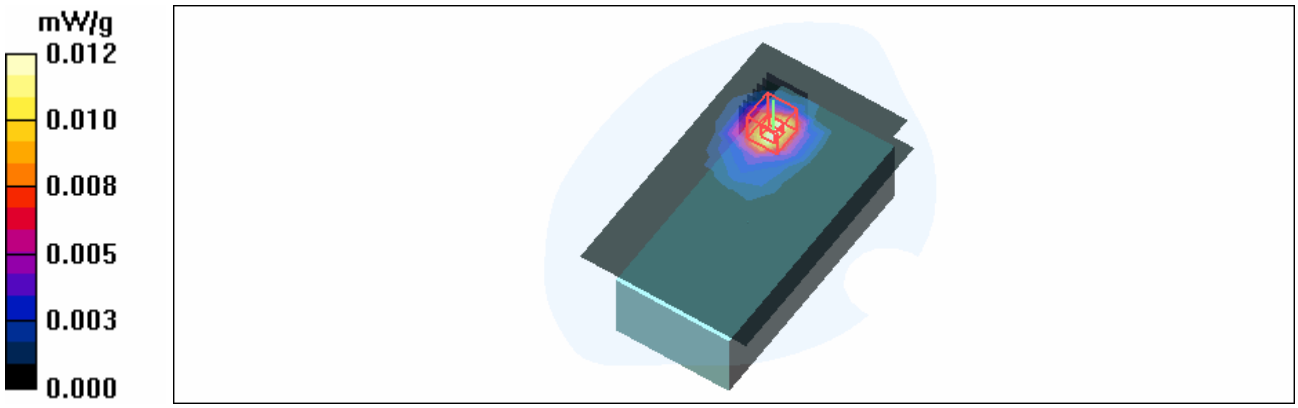
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 2412 MHz

Communication System: 802.11b ; Frequency: 2412 MHz ; Duty Cycle: 1:1 ; Modulation type: DBPSK
Medium: MSL2450 Medium parameters used: f = 2412 MHz; σ = 1.93 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3 ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : PIFA Antenna ; Air temp. : 23.2 degrees ; Liquid temp. : 22.2 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Low Channel 1/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.010 mW/g

Low Channel 1/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.04 V/m
Peak SAR (extrapolated) = 0.021 W/kg
SAR(1 g) = 0.011 mW/g; SAR(10 g) = 0.00576 mW/g
Maximum value of SAR (measured) = 0.012 mW/g



Date/Time: 2007/9/20 19:46:00

Test Laboratory: Advance Data Technology

Body Worn-11b-Ch1-Mode 23 bat.2

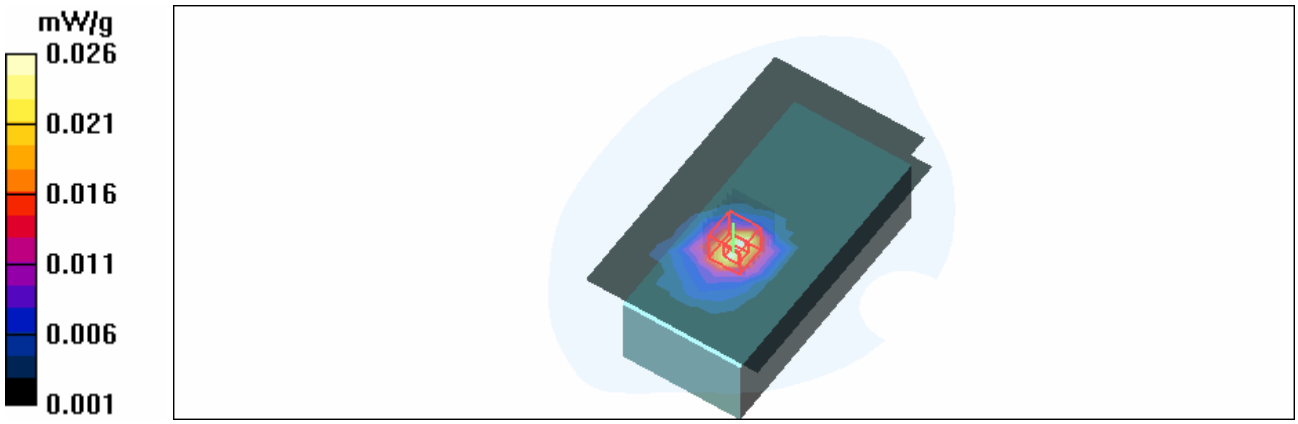
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 2412 MHz

Communication System: 802.11b ; Frequency: 2412 MHz ; Duty Cycle: 1:1 ; Modulation type: DBPSK
Medium: MSL2450 Medium parameters used: f = 2412 MHz; σ = 1.93 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3 ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : Printed Antenna ; Air temp. : 23.2 degrees ; Liquid temp. : 22.2 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Low Channel 1/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.024 mW/g

Low Channel 1/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.02 V/m
Peak SAR (extrapolated) = 0.045 W/kg
SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.012 mW/g
Maximum value of SAR (measured) = 0.026 mW/g



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Test Laboratory: Advance Data Technology

Body Worn-BT-Ch39-Mode 24

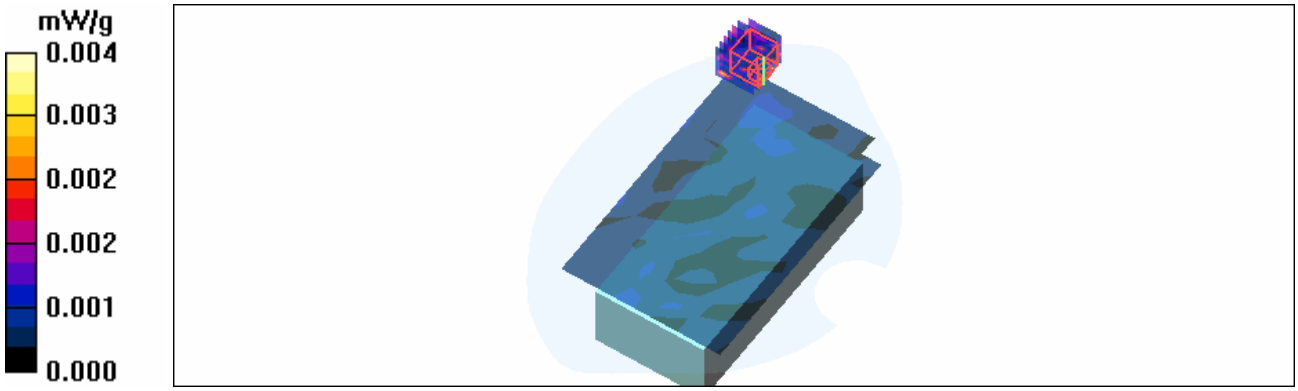
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 2441 MHz

Communication System: BlueTooth ; Frequency: 2441 MHz ; Duty Cycle: 1:1 ; Modulation type: GFSK
Medium: MSL2450 Medium parameters used: f = 2441 MHz; σ = 1.98 mho/m; ε_r = 54; ρ = 1000 kg/m^3 ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : SMD Antenna ; Air temp. : 23.2 degrees ; Liquid temp. : 22.2 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 39/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.001 mW/g

Mid Channel 39/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.477 V/m
Peak SAR (extrapolated) = 0.004 W/kg
SAR(1 g) = 6.6e-005 mW/g; SAR(10 g) = 1.1e-005 mW/g
Maximum value of SAR (measured) = 0.004 mW/g



Date/Time: 2007/9/20 21:03:01

Test Laboratory: Advance Data Technology

Body Worn-BT-Ch39-Mode 25

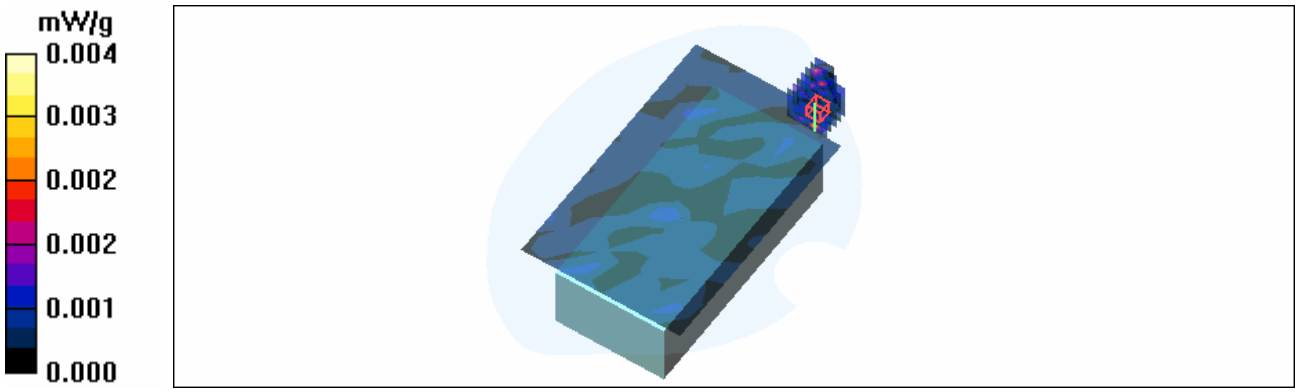
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 2441 MHz

Communication System: BlueTooth ; Frequency: 2441 MHz ; Duty Cycle: 1:1 ; Modulation type: 8DPSK
Medium: MSL2450 Medium parameters used: f = 2441 MHz; σ = 1.98 mho/m; ε_r = 54; ρ = 1000 kg/m^3 ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : SMD Antenna ; Air temp. : 23.2 degrees ; Liquid temp. : 22.2 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 39/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.001 mW/g

Mid Channel 39/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.216 V/m
Peak SAR (extrapolated) = 0.004 W/kg
SAR(1 g) = 3.03e-005 mW/g; SAR(10 g) = 8.13e-006
Maximum value of SAR (measured) = 0.004 mW/g



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Test Laboratory: Advance Data Technology

M26-Co-located-Body Worn-*GPRS850 TS1 Ch190+11b Ch1-BT Ch39*

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 836.6 MHz Frequency: 2412 MHz Frequency: 2441 MHz

Communication System: PCS 850Communication System: 802.11bCommunication System: GFSK ; Frequency: 836.6 MHz Frequency: 2412 MHz Frequency: 2441 MHz ; Duty Cycle: 1:8.3Duty Cycle: 1:1 Medium: MSL835Medium: MSL2450 Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3 Medium parameters used: f = 2412 MHz; σ = 1.93 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3 Medium parameters used: f = 2441 MHz; σ = 1.98 mho/m; ε_r = 54; ρ = 1000 kg/m^3 ; Liquid Level : 151 mm
Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: GMSK / UL 1 time slot
Separation Distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna Type : monopole Antenna ; Air Temp. : 23.1 degrees ; Liquid Temp. : 22.0 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35)ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

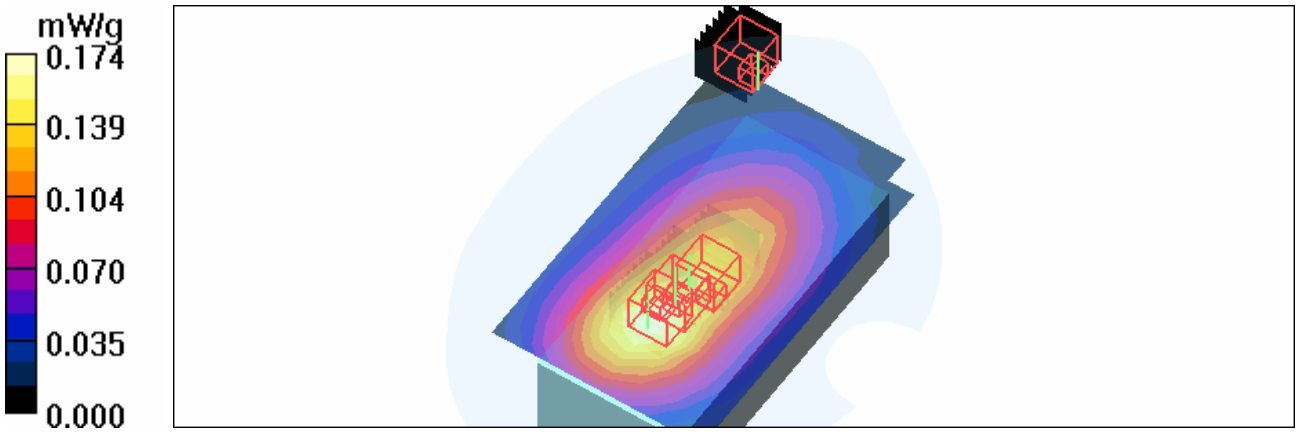
Mid Channel 190/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.175 mW/g

Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.7 V/m
Peak SAR (extrapolated) = 0.314 W/kg
SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.123 mW/g
Maximum value of SAR (measured) = 0.174 mW/g

Mid Channel 190/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.7 V/m
Peak SAR (extrapolated) = 0.297 W/kg
SAR(1 g) = 0.150 mW/g; SAR(10 g) = 0.110 mW/g
Maximum value of SAR (measured) = 0.148 mW/g

Low Channel 1/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.17 V/m
Peak SAR (extrapolated) = 0.065 W/kg
SAR(1 g) = 0.029 mW/g; SAR(10 g) = 0.015 mW/g
Maximum value of SAR (measured) = 0.032 mW/g

Mid Channel 39/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.477 V/m
Peak SAR (extrapolated) = 0.004 W/kg
SAR(1 g) = 6.6e-005 mW/g; SAR(10 g) = 1.1e-005 mW/g
Maximum value of SAR (measured) = 0.004 mW/g



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Test Laboratory: Advance Data Technology

M27-Co-located-Body Worn-*GPRS1900 TS1 Ch661+11b Ch1+BT Ch39*

DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1880 MHz Frequency: 2412 MHz Frequency: 2441 MHz

Communication System: PCS 1900Communication System: 802.11bCommunication System: GFSK ; Frequency: 1880 MHzFrequency: 2412 MHzFrequency: 2441 MHz ; Duty Cycle: 1:8.3Duty Cycle: 1:1 Medium: MSL1900Medium: MSL2450 Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 Medium parameters used: f = 2412 MHz; σ = 1.93 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3 Medium parameters used: f = 2441 MHz; σ = 1.98 mho/m; ε_r = 54; ρ = 1000 kg/m^3 ; Liquid Level : 155 mm
Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: GMSK / UL 1 time slot
Separation Distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna Type : monopole Antenna ; Air Temp. : 22.9 degrees ; Liquid Temp. : 21.8 degrees

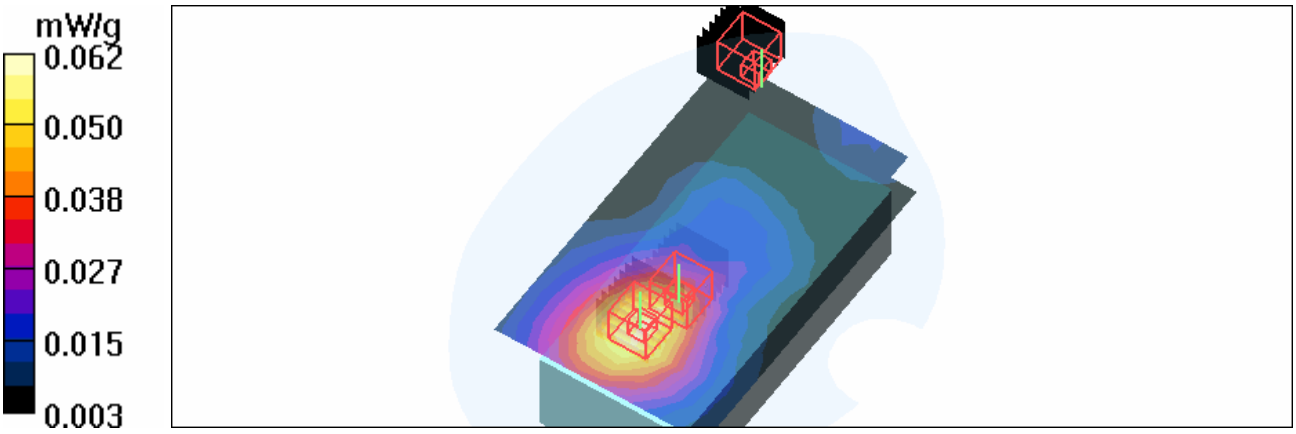
DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59)ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Mid Channel 661/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.061 mW/g

Mid Channel 661/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.02 V/m
Peak SAR (extrapolated) = 0.091 W/kg
SAR(1 g) = 0.058 mW/g; SAR(10 g) = 0.038 mW/g
Maximum value of SAR (measured) = 0.062 mW/g

Low Channel 1/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.17 V/m
Peak SAR (extrapolated) = 0.065 W/kg
SAR(1 g) = 0.029 mW/g; SAR(10 g) = 0.015 mW/g
Maximum value of SAR (measured) = 0.032 mW/g

Mid Channel 39/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.477 V/m
Peak SAR (extrapolated) = 0.004 W/kg
SAR(1 g) = 6.6e-005 mW/g; SAR(10 g) = 1.1e-005 mW/g
Maximum value of SAR (measured) = 0.004 mW/g


mW/g
0.062
0.050
0.038
0.027
0.015
0.003

Date/Time: 2007/9/13 14:18:27

Test Laboratory: Advance Data Technology

System Validation Check-MSL 835MHz

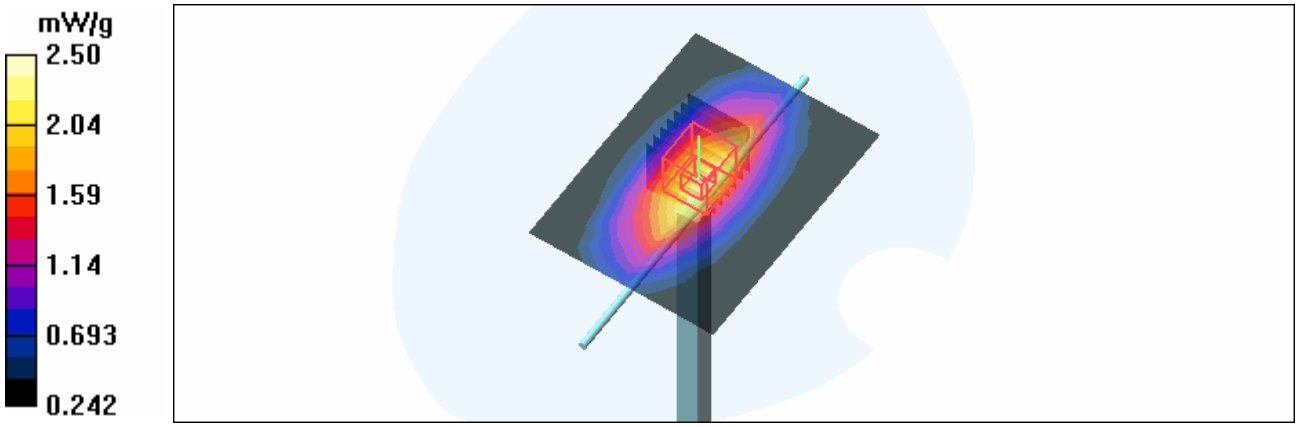
DUT: Dipole 850 MHz ; Type: D835V2 ; Serial: 4d021 ; Test Frequency: 835 MHz

Communication System: CW ; Frequency: 835 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: MSL835;Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3 ;
Liquid level : 151 mm
Phantom section: Flat Section ; Separation distance : 15 mm (The feetpoint of the dipole to the Phantom)Air temp. : 23.1 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.35, 6.35, 6.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2007/3/23
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

d=15mm, Pin=250mW/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.37 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.1 V/m; Power Drift = -0.041 dB
Peak SAR (extrapolated) = 2.95 W/kg
SAR(1 g) = 2.3 mW/g; SAR(10 g) = 1.53 mW/g
Maximum value of SAR (measured) = 2.50 mW/g



Date/Time: 2007/9/18 09:47:09

Test Laboratory: Advance Data Technology

System Validation Check-MSL 1900MHz

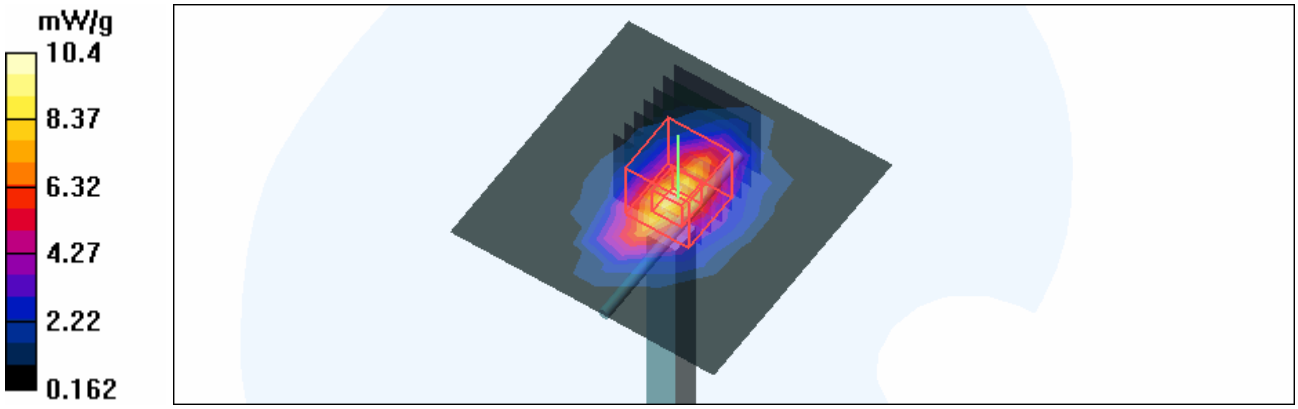
DUT: Dipole 1900 MHz ; Type: D1900V2 ; Serial: 5d036 ; Test Frequency: 1900 MHz

Communication System: CW ; Frequency: 1900 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: MSL1900;Medium parameters used: f = 1900 MHz; σ = 1.58 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 10 mm (The feetpoint of the dipole to the Phantom)Air temp. : 22.9 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.59, 4.59, 4.59) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2007/3/23
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

d=10mm, Pin=250mW/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 10.1 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.2 V/m; Power Drift = -0.094 dB
Peak SAR (extrapolated) = 15.7 W/kg
SAR(1 g) = 9.17 mW/g; SAR(10 g) = 4.91 mW/g
Maximum value of SAR (measured) = 10.4 mW/g



Date/Time: 2007/9/20 14:01:10

Test Laboratory: Advance Data Technology

System Validation Check-MSL 2450MHz

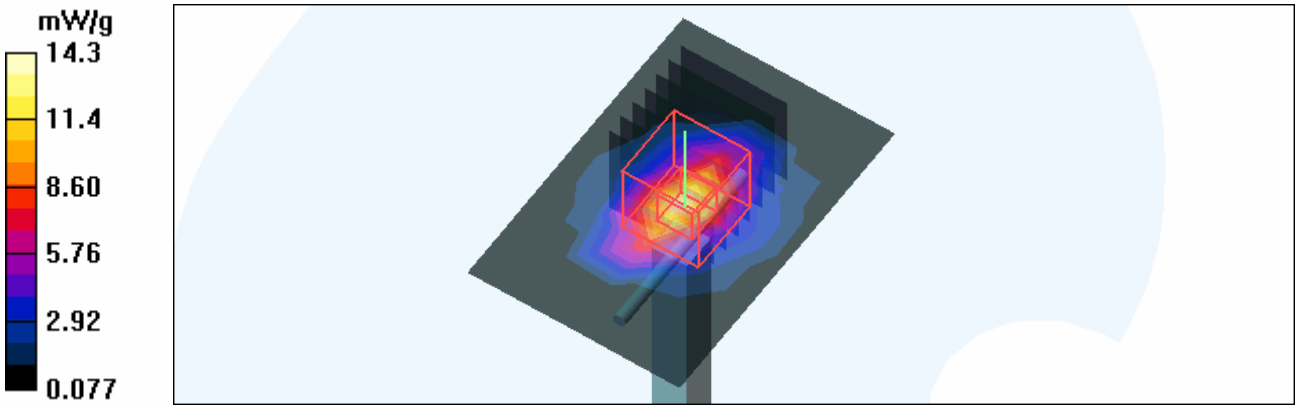
DUT: Dipole 2450 MHz ; Type: D2450V2 ; Serial: 737 ; Test Frequency: 2450 MHz

Communication System: CW ; Frequency: 2450 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: MSL2450;Medium parameters used: f = 2450 MHz; σ = 2 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ;
Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 10 mm (The feetpoint of the dipole to the Phantom)Air temp. : 23.2 degrees ; Liquid temp. : 22.2 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2007/3/23
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

d=10mm, Pin=250mW/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 14.3 mW/g

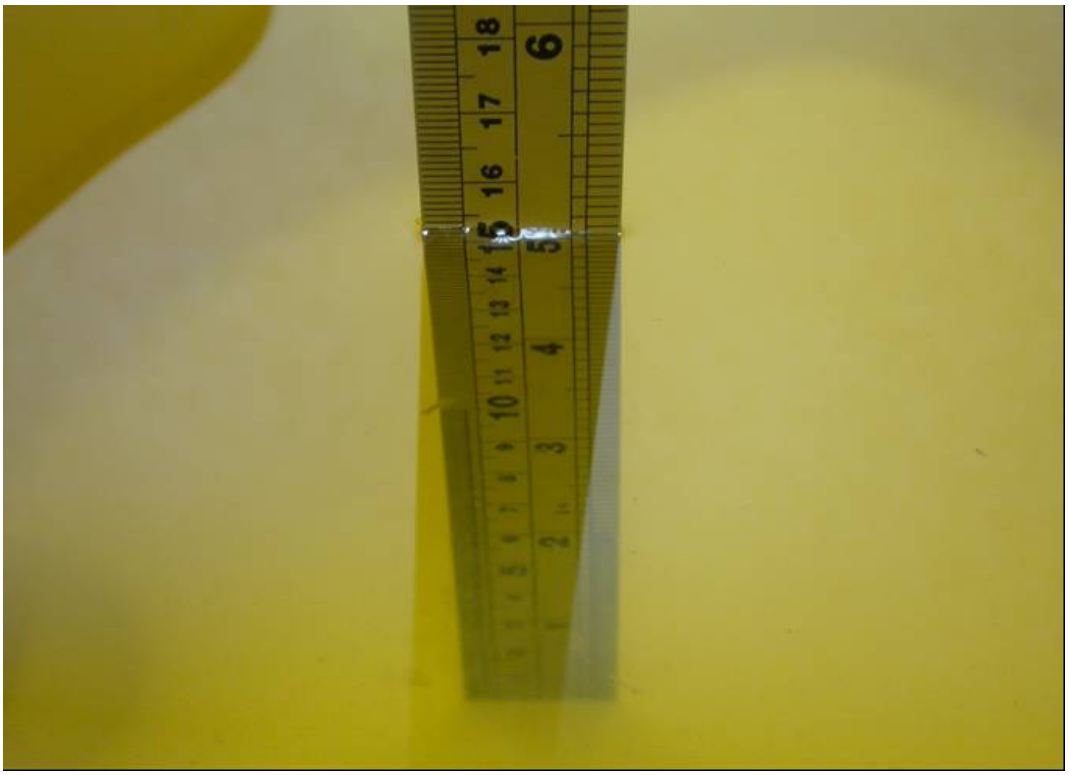
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.1 V/m; Power Drift = -0.108 dB
Peak SAR (extrapolated) = 29.2 W/kg
SAR(1 g) = 12.8 mW/g; SAR(10 g) = 5.88 mW/g



APPENDIX A-2: TEST DATA

Liquid Level Photo

Tissue MSL835MHz D=153mm



Tissue MSL1900MHz D=150mm

Date/Time: 2008/1/16 02:20:23

Test Laboratory: Advance Data Technology

Body Worn-GSM850-Ch128

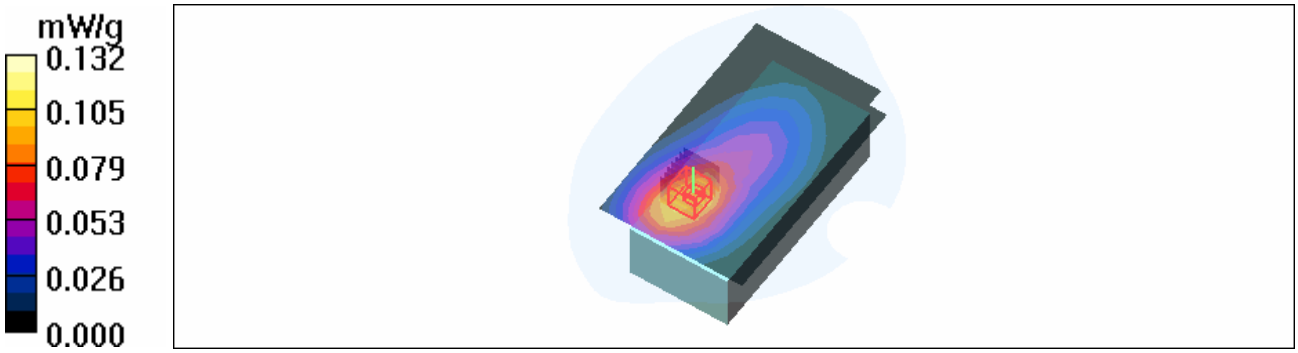
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 824.2 MHz

Communication System: PCS 850 ; Frequency: 824.2 MHz ; Duty Cycle: 1:8.3
Medium: MSL835 Medium parameters used: f = 824.2 MHz; σ = 0.98 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3 ; Liquid Level : 153 mm
Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: GMSK
Separation Distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna Type : monopole Antenna ; Air Temp. : 22.1 degrees ; Liquid Temp. : 21.1 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.15, 6.15, 6.15) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Low Channel 128/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.132 mW/g

Low Channel 128/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.2 V/m
Peak SAR (extrapolated) = 0.162 W/kg
SAR(1 g) = 0.123 mW/g; SAR(10 g) = 0.089 mW/g
Maximum value of SAR (measured) = 0.131 mW/g



Date/Time: 2008/1/16 02:44:07

Test Laboratory: Advance Data Technology

Body Worn-GSM850-Ch251

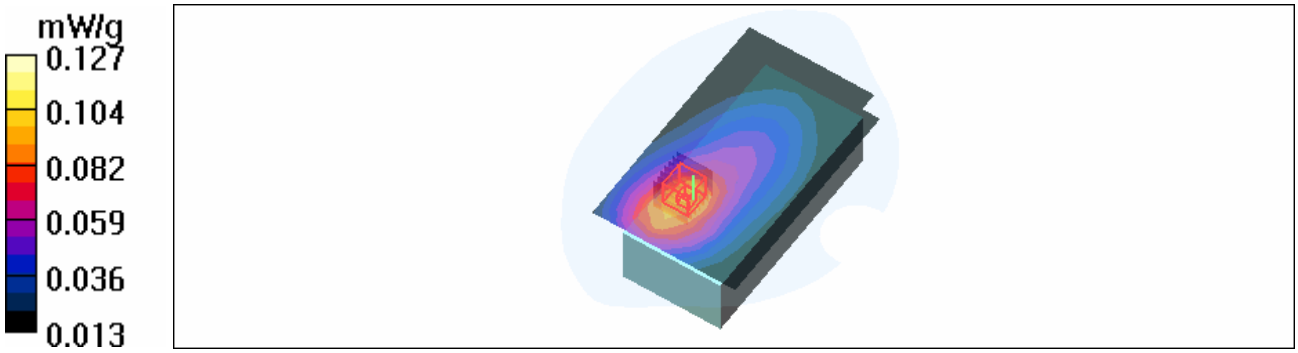
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 848.8 MHz

Communication System: PCS 850 ; Frequency: 848.8 MHz ; Duty Cycle: 1:8.3
Medium: MSL835 Medium parameters used: f = 848.8 MHz; σ = 1 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3 ; Liquid Level : 153 mm
Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: GMSK
Separation Distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna Type : monopole Antenna ; Air Temp. : 22.1 degrees ; Liquid Temp. : 21.1 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.15, 6.15, 6.15) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

High Channel 251/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.098 mW/g

High Channel 251/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.7 V/m
Peak SAR (extrapolated) = 0.160 W/kg
SAR(1 g) = 0.118 mW/g; SAR(10 g) = 0.080 mW/g
Maximum value of SAR (measured) = 0.127 mW/g



Date/Time: 2008/1/14 05:09:29

Test Laboratory: Advance Data Technology

Body Worn-PCS1900-Ch512

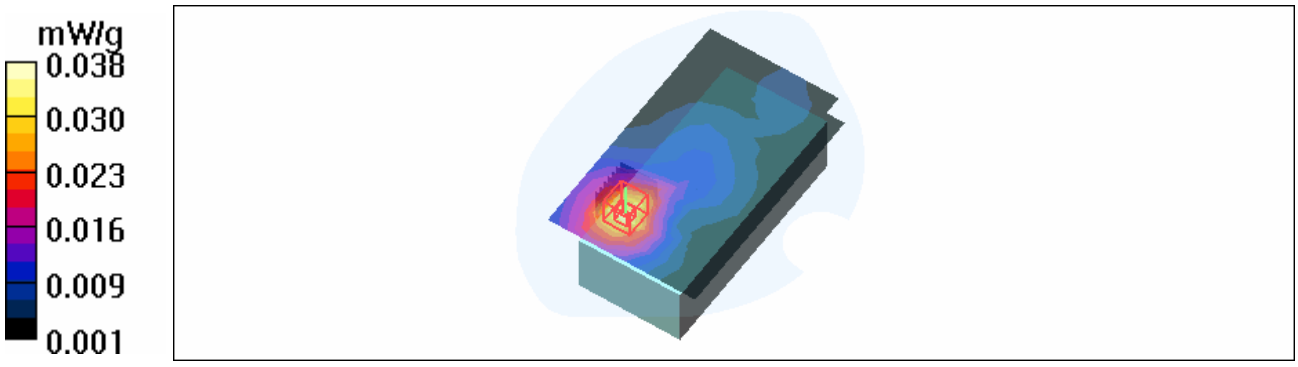
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1850.2 MHz

Communication System: PCS 1900 ; Frequency: 1850.2 MHz ; Duty Cycle: 1:8.3 ; Modulation type: GMSK
Medium: MSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.5 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3 ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna type : monopole Antenna ; Air temp. : 22.4 degrees ; Liquid temp. : 21.3 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.58, 4.58, 4.58) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

Low Channel 512/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.036 mW/g

Low Channel 512/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.50 V/m
Peak SAR (extrapolated) = 0.056 W/kg
SAR(1 g) = 0.035 mW/g; SAR(10 g) = 0.021 mW/g
Maximum value of SAR (measured) = 0.038 mW/g



Date/Time: 2008/1/14 06:46:31

Test Laboratory: Advance Data Technology

Body Worn-PCS1900-Ch810

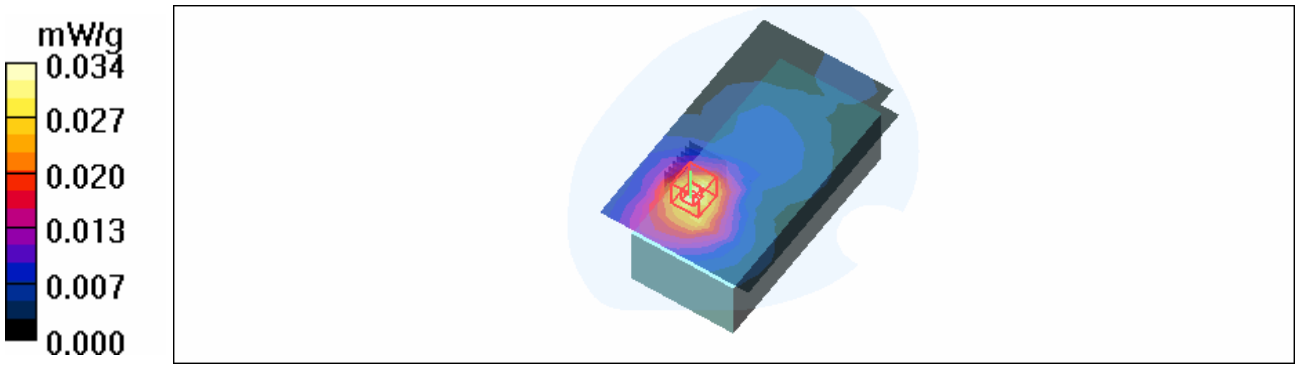
DUT: Portable Data Terminal ; Type: Pegaso ; Test Frequency: 1909.8 MHz

Communication System: PCS 1900 ; Frequency: 1909.8 MHz ; Duty Cycle: 1:8.3
Medium: MSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.57 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ; Liquid Level : 150 mm
Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: GMSK
Separation Distance : 0 mm (The bottom side of the EUT to the Phantom)
Antenna Type : monopole Antenna ; Air Temp. : 22.4 degrees ; Liquid Temp. : 21.3 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.58, 4.58, 4.58) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

High Channel 810/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.034 mW/g

High Channel 810/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.60 V/m
Peak SAR (extrapolated) = 0.050 W/kg
SAR(1 g) = 0.031 mW/g; SAR(10 g) = 0.019 mW/g
Maximum value of SAR (measured) = 0.033 mW/g



Date/Time: 2008/1/16 01:08:59

Test Laboratory: Advance Data Technology

System Validation Check-MSL 835MHz

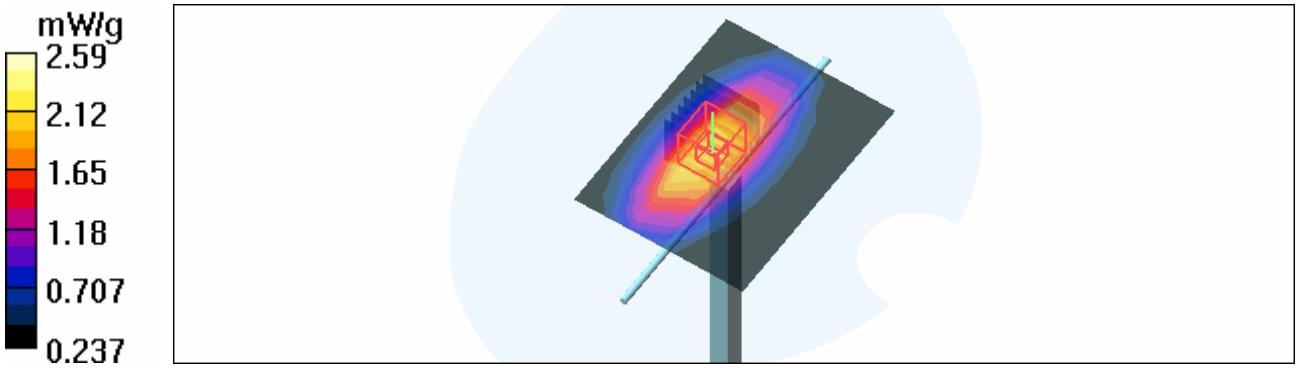
DUT: Dipole 850 MHz ; Type: D835V2 ; Serial: 4d021 ; Test Frequency: 835 MHz

Communication System: CW ; Frequency: 835 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: MSL835;Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 55.8; ρ = 1000 kg/m^3 ;
Liquid level : 153 mm
Phantom section: Flat Section ; Separation distance : 15 mm (The feetpoint of the dipole to the Phantom)Air temp. : 22.1 degrees ; Liquid temp. : 21.1 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.15, 6.15, 6.15) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2007/3/23
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

d=15mm, Pin=250mW/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.27 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.0 V/m; Power Drift = -0.090 dB
Peak SAR (extrapolated) = 3.33 W/kg
SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.57 mW/g
Maximum value of SAR (measured) = 2.59 mW/g



Date/Time: 2008/1/14 04:11:55

Test Laboratory: Advance Data Technology

System Validation Check-MSL 1900MHz

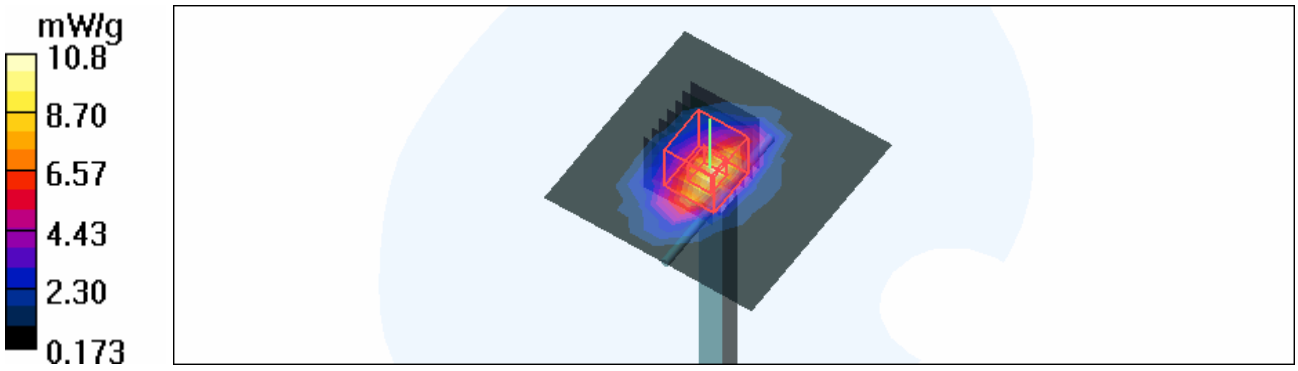
DUT: Dipole 1900 MHz ; Type: D1900V2 ; Serial: 5d036 ; Test Frequency: 1900 MHz

Communication System: CW ; Frequency: 1900 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: MSL1900;Medium parameters used: f = 1900 MHz; σ = 1.56 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3 ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 10 mm (The feetpoint of the dipole to the Phantom)Air temp. : 22.4 degrees ; Liquid temp. : 21.3 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(4.58, 4.58, 4.58) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2007/3/23
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

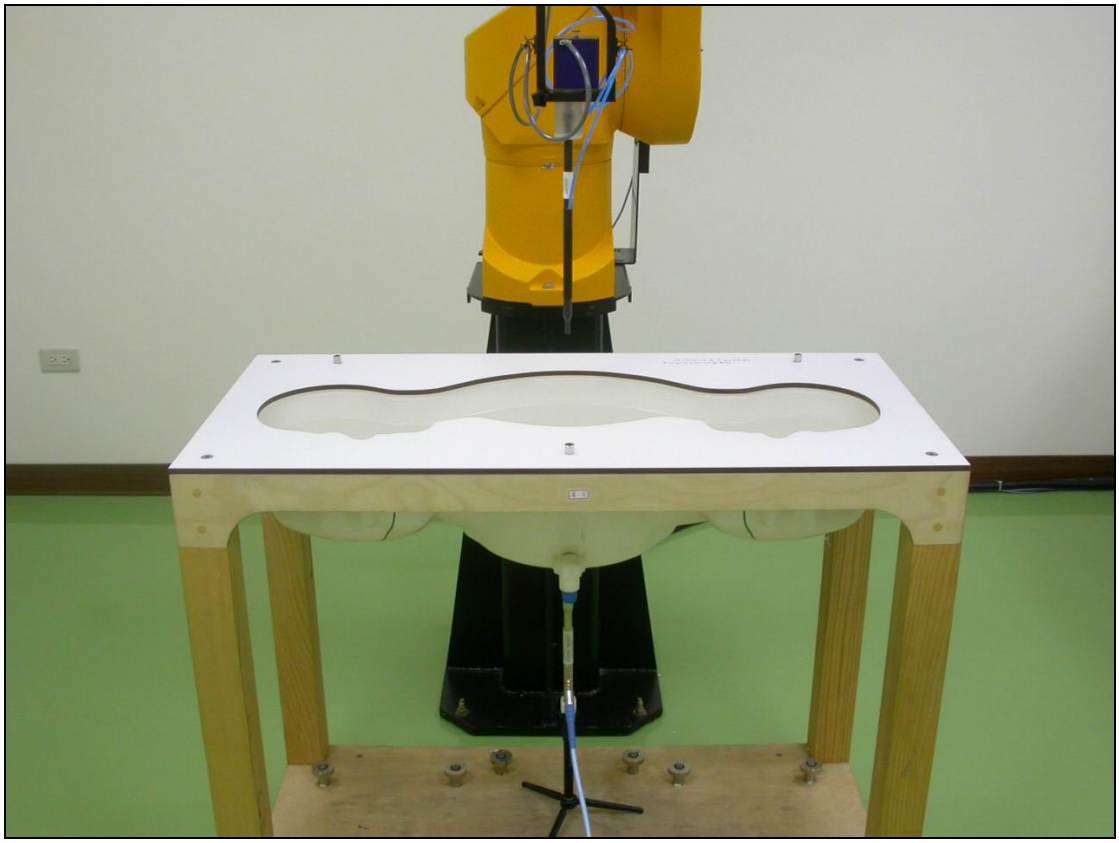
d=10mm, Pin=250mW/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 10.4 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.5 V/m; Power Drift = -0.108 dB
Peak SAR (extrapolated) = 17.3 W/kg
SAR(1 g) = 9.61 mW/g; SAR(10 g) = 5.05 mW/g
Maximum value of SAR (measured) = 10.8 mW/g



APPENDIX B: ADT SAR MEASUREMENT SYSTEM

APPENDIX C: PHOTOGRAPHS OF SYSTEM VALIDATION



APPENDIX D: SYSTEM CERTIFICATE & CALIBRATION

D1: SAM PHANTOM

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 CA
Series No	TP-1150 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

Tests

The series production process used allows the limitation to test of first articles.
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

Standards

[1] CENELEC EN 50361
[2] IEEE P1528-200x draft 6.5
[3] IEC PT 62209 draft 0.9
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date 28.02.2002

Signature / Stamp

Schmid & Partner Engineering AG
Zeughausstrasse 43, CH-8004 Zurich
Tel. +41 1 245 97 00, Fax +41 1 245 97 79

D2: DOSIMETRIC E-FIELD PROBE

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
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 ADT (Auden)

Certificate No: ET3-1790_Nov06

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1790
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	November 23, 2006
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 E4419B	GB41293874	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41495277	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41498087	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-06 (METAS, No. 217-00592)	Aug-07
Reference 20 dB Attenuator	SN: S5086 (20b)	4-Apr-06 (METAS, No. 251-00558)	Apr-07
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-06 (METAS, No. 217-00593)	Aug-07
Reference Probe ES3DV2	SN: 3013	2-Jan-06 (SPEAG, No. ES3-3013_Jan06)	Jan-07
DAE4	SN: 654	21-Jun-06 (SPEAG, No. DAE4-654_Jun06)	Jun-07

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: November 23, 2006

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
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
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ 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:

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

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 ± 50 MHz to ± 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 ET3DV6

SN:1790

Manufactured:	May 28, 2003
Last calibrated:	December 20, 2004
Recalibrated:	November 23, 2006

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1790

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**2.04** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**91** mV
NormY	**2.10** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**93** mV
NormZ	**1.84** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**98** 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	9.2	4.9
SAR_{be} [%]	With Correction Algorithm	0.1	0.2

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

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	12.6	8.4
SAR_{be} [%]	With Correction Algorithm	0.5	0.0

Sensor Offset

Probe Tip to Sensor Center	**2.7** mm

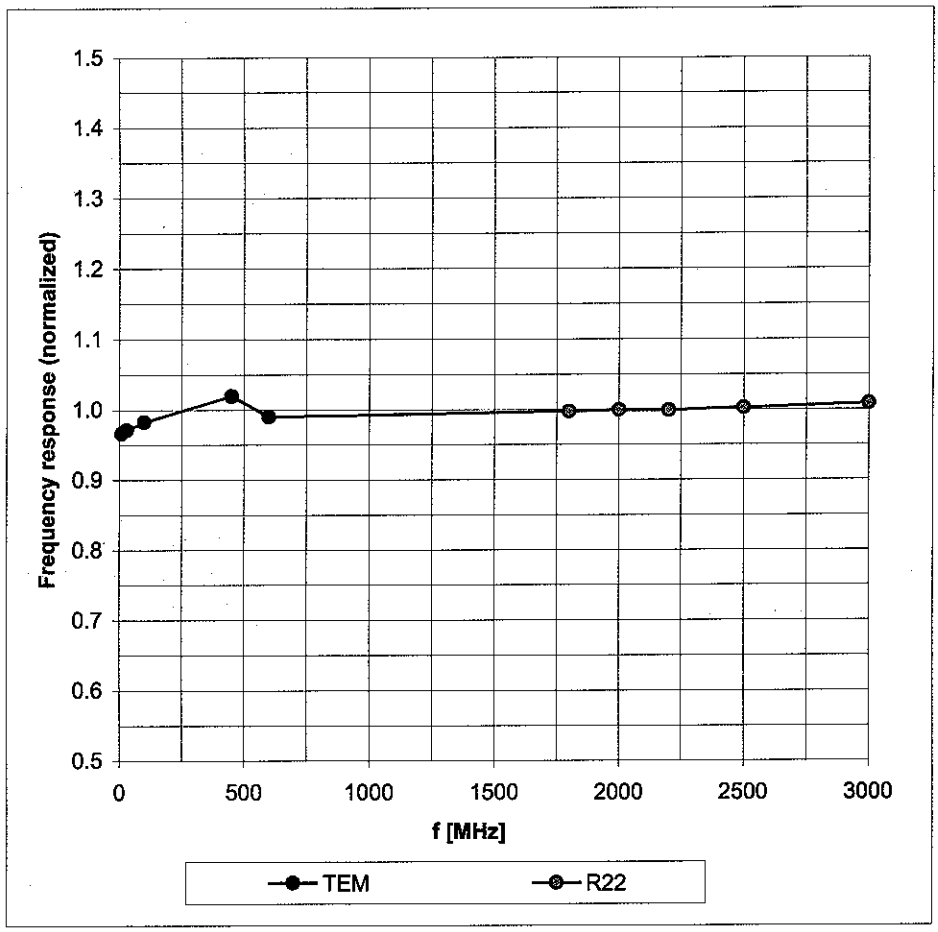
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

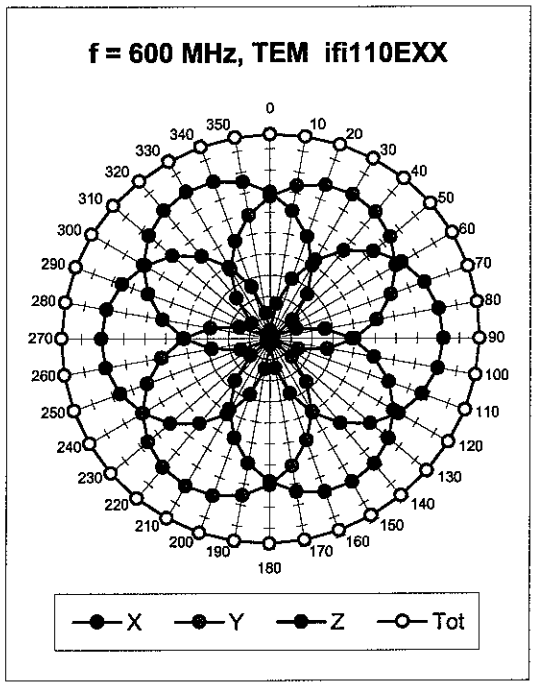
Frequency Response of E-Field

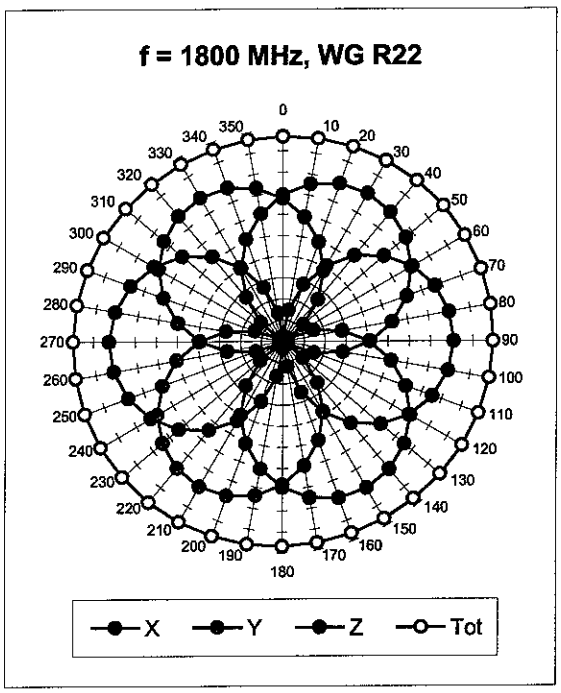
(TEM-Cell:ifi110 EXX, Waveguide: R22)

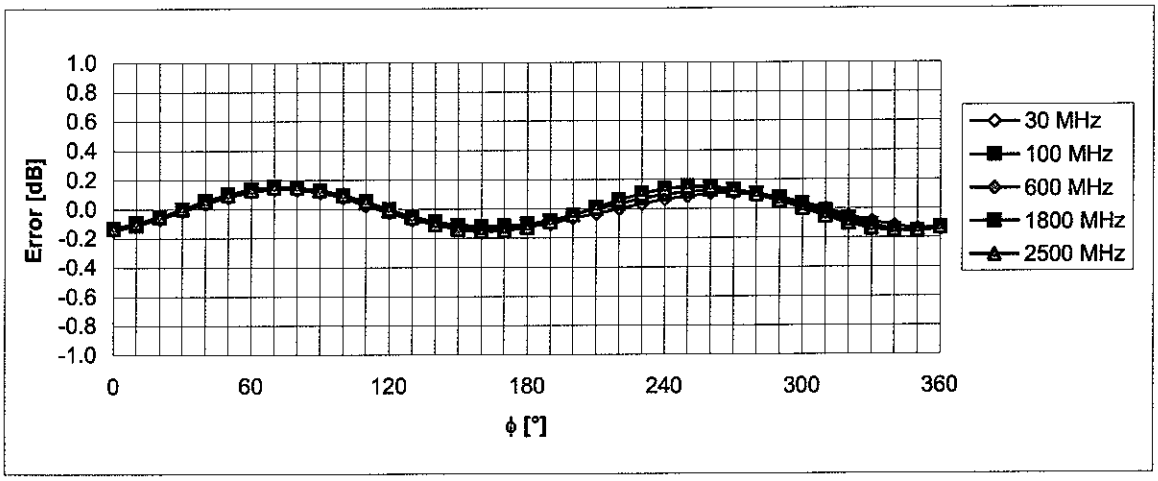


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



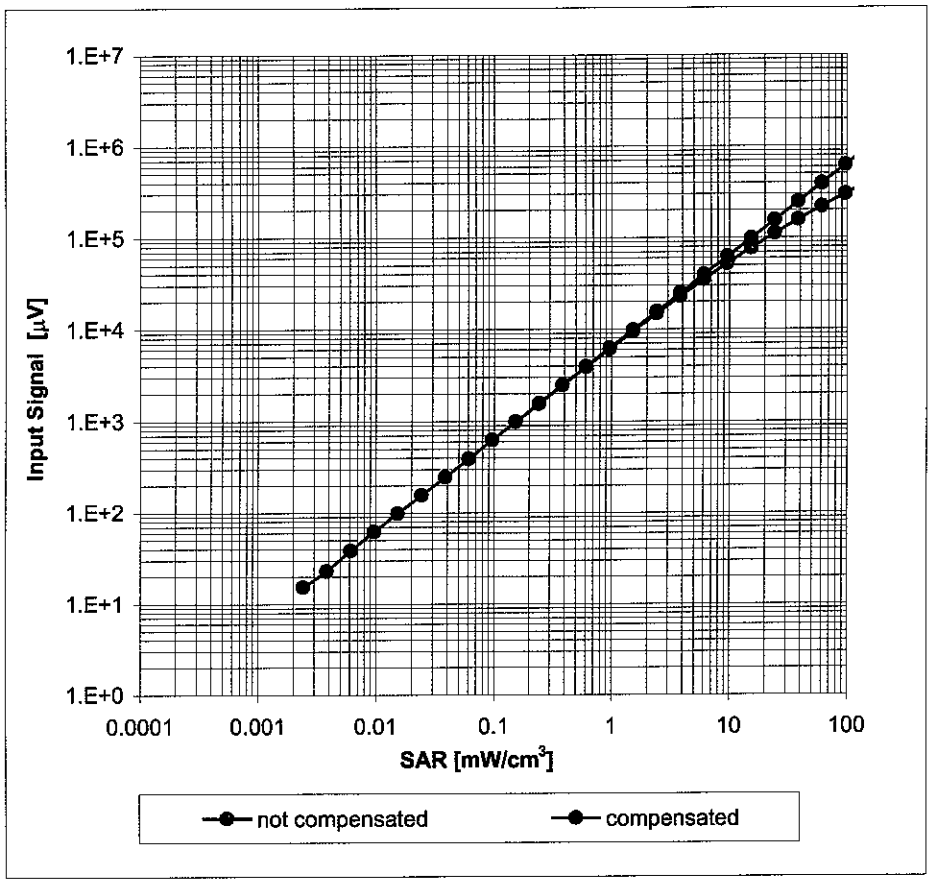


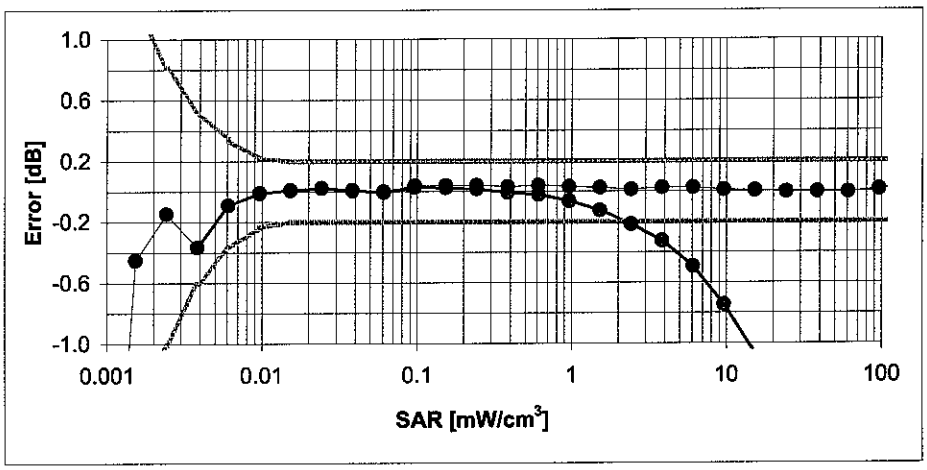


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

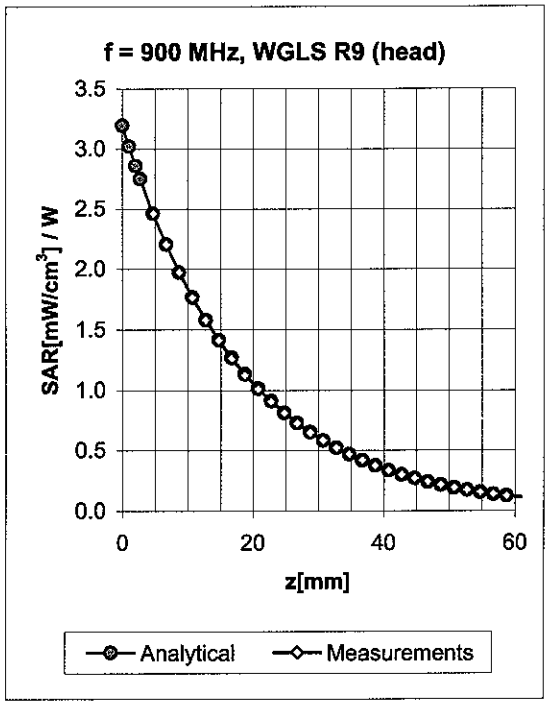
(Waveguide R22, f = 1800 MHz)

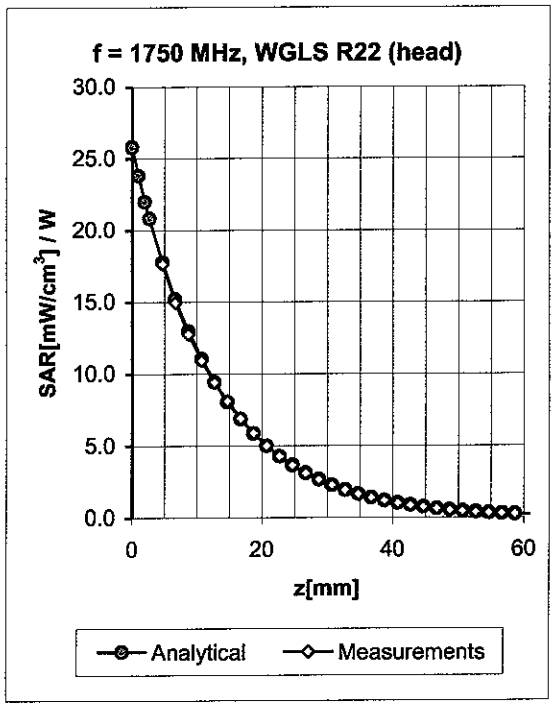




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



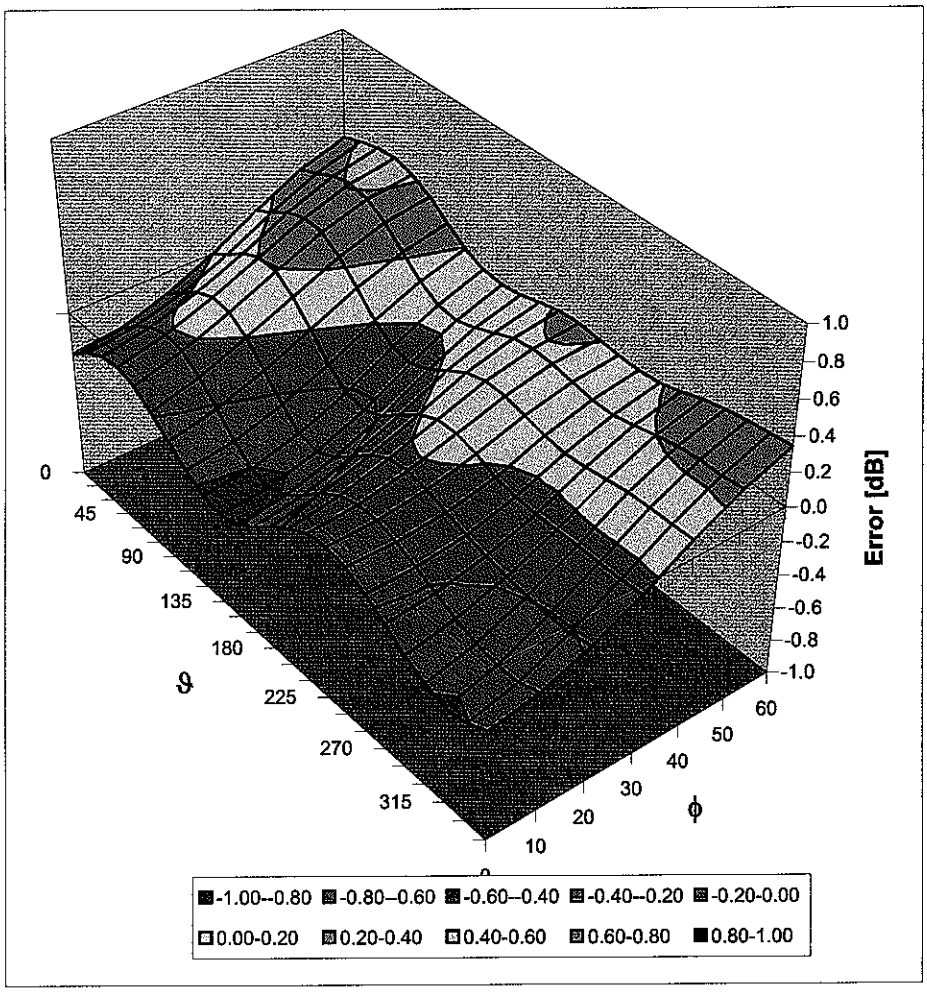


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.32	2.45	6.71 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.50	2.47	5.48 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.57	2.47	5.27 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.66	1.94	4.76 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.32	2.78	6.35 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.55	2.76	4.85 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.70	2.39	4.59 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.64	1.81	4.35 ± 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)

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Accreditation No.: SCS 108

Client ADT (Auden)

Certificate No: ET3-1790_Nov07

CALIBRATION CERTIFICATE

Object: ET3DV6 - SN:1790

Calibration procedure(s): QA CAL-01.v6
Calibration procedure for dosimetric E-field probes

Calibration date: November 20, 2007

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 E4419B	GB41293874	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41495277	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41498087	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (METAS, No. 217-00719)	Aug-08
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-07 (METAS, No. 217-00671)	Mar-08
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (METAS, No. 217-00720)	Aug-08
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	20-Apr-07 (SPEAG, No. DAE4-654_Apr07)	Apr-08

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

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: November 20, 2007

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

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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

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 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 ≤ 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 ± 50 MHz to ± 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 ET3DV6

SN:1790

Manufactured:	May 28, 2003
Last calibrated:	November 23, 2006
Recalibrated:	November 20, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1790

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**2.10** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**92** mV
NormY	**2.11** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**92** mV
NormZ	**1.77** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**92** 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	6.2	3.3
SAR_{be} [%]	With Correction Algorithm	0.8	0.5

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

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	12.2	8.1
SAR_{be} [%]	With Correction Algorithm	0.9	0.0

Sensor Offset

Probe Tip to Sensor Center	**2.7** mm

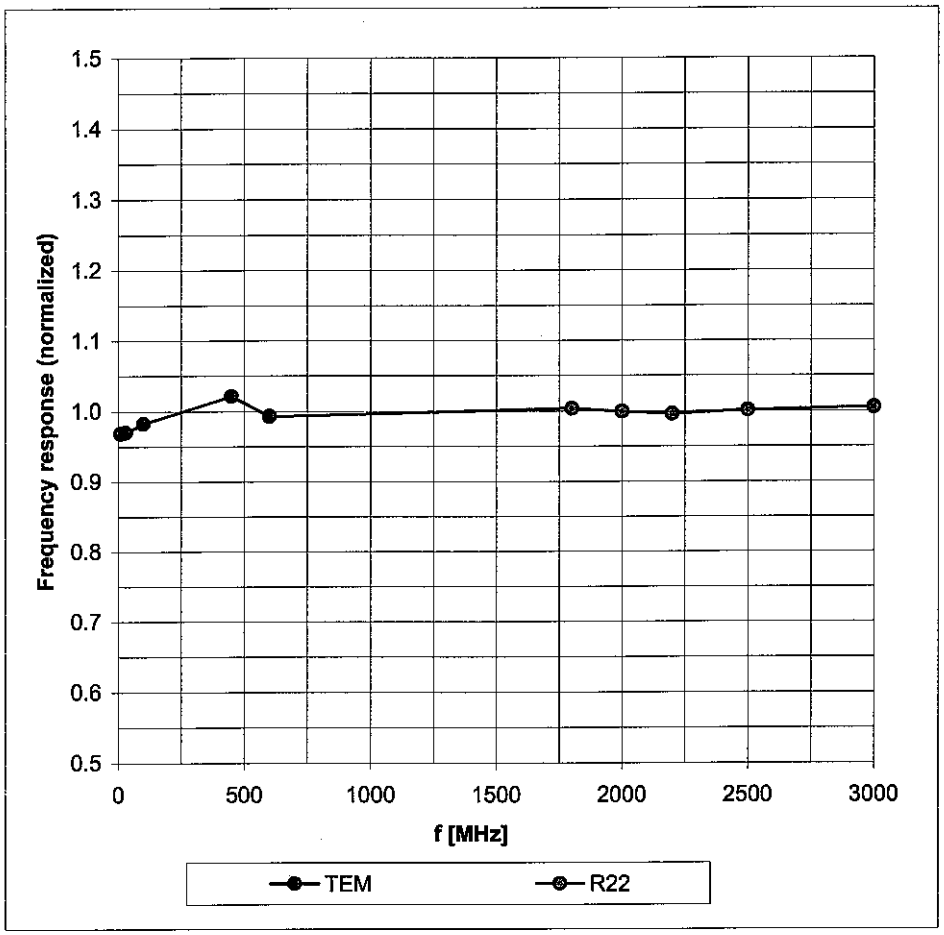
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

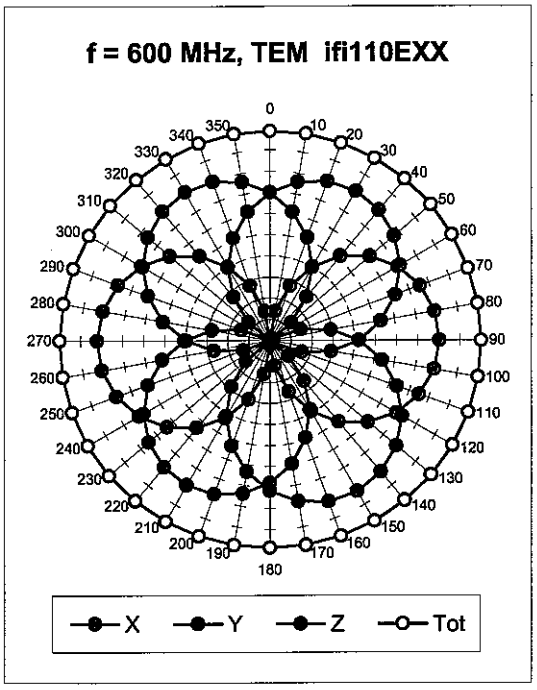
Frequency Response of E-Field

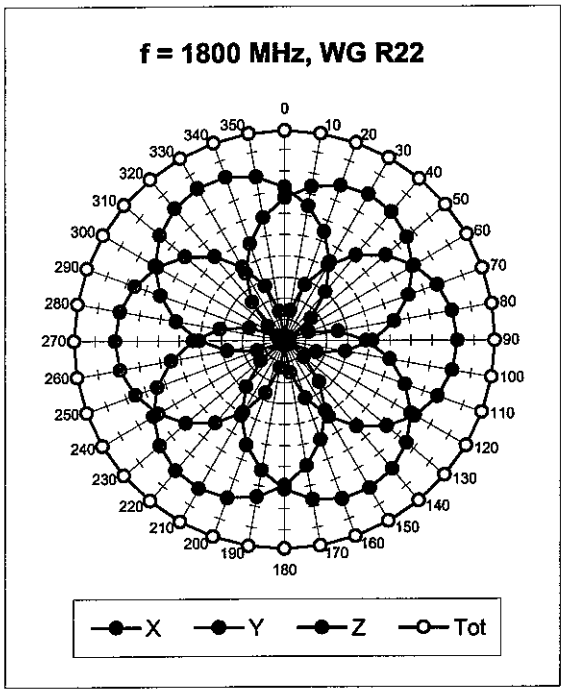
(TEM-Cell:ifi110 EXX, Waveguide: R22)

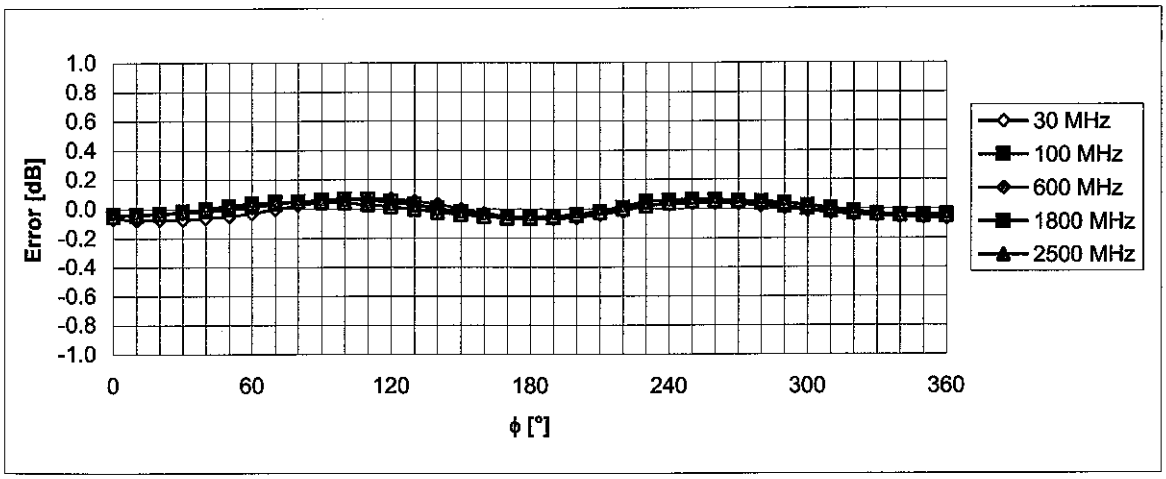


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



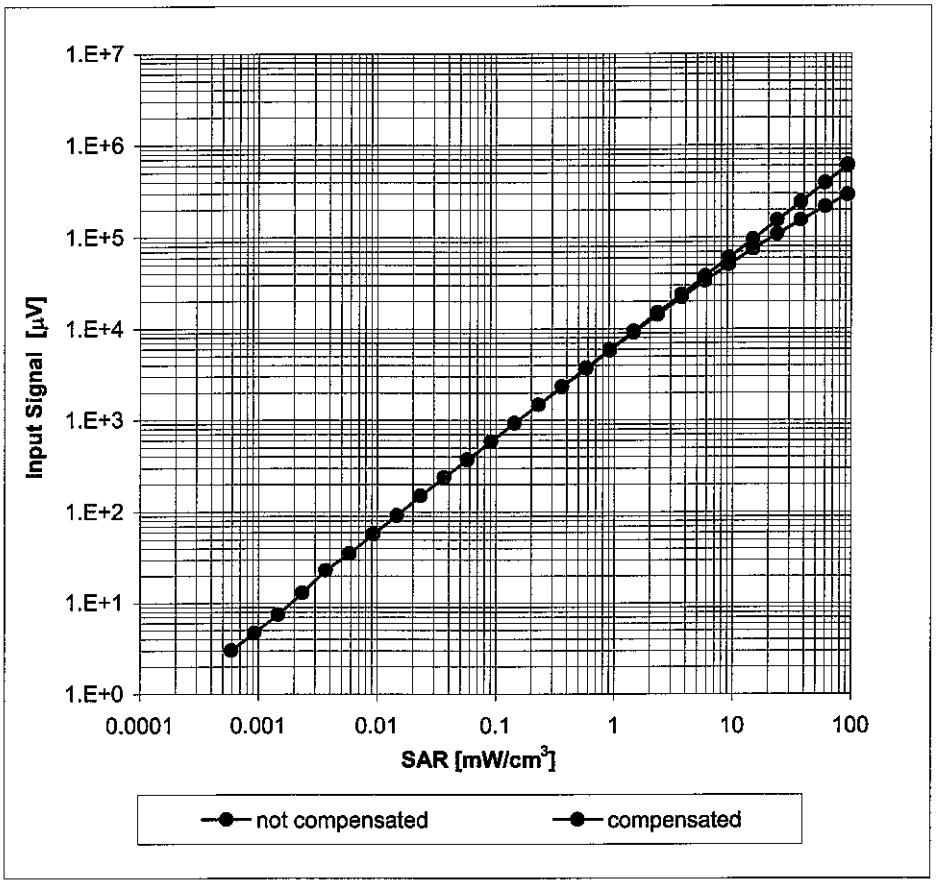


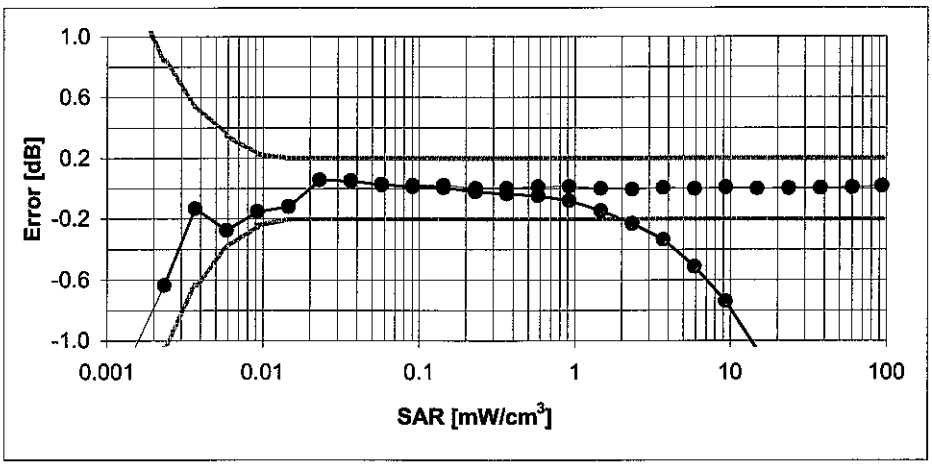


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

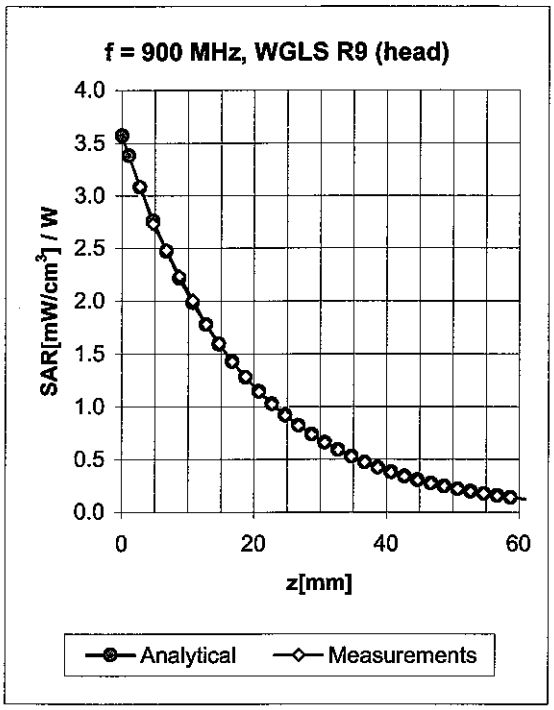
(Waveguide R22, f = 1800 MHz)

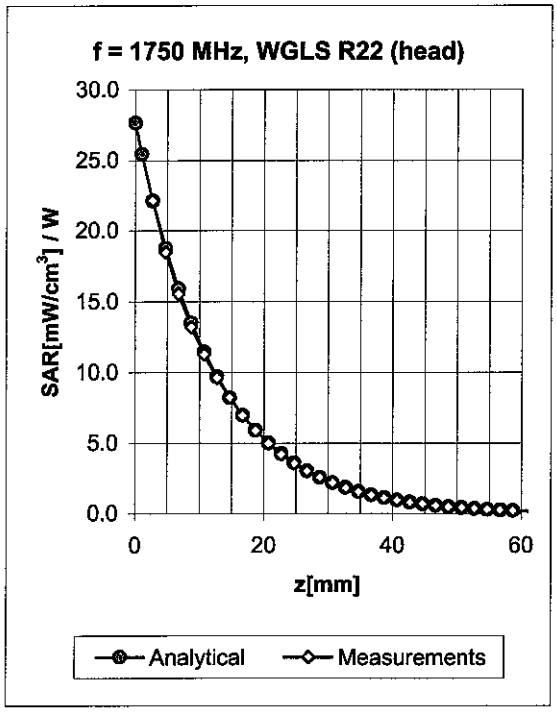




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



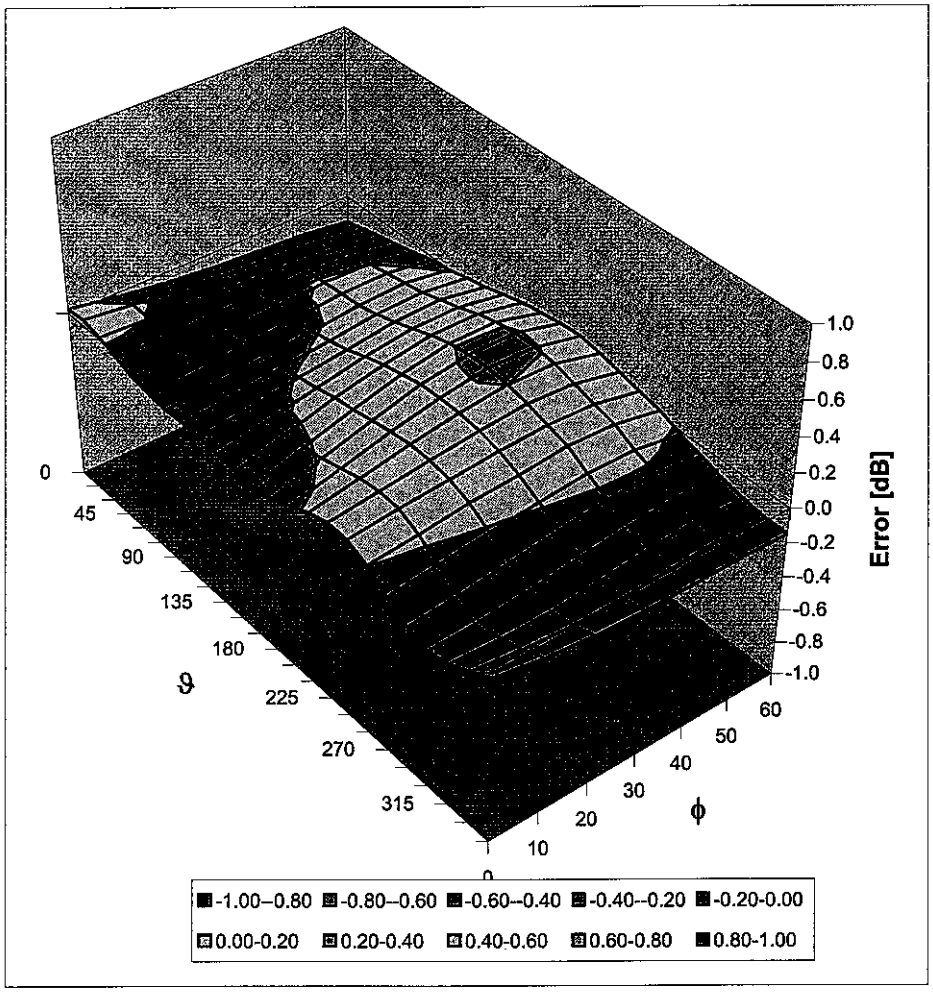


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.59	2.17	6.65 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.59	2.28	5.42 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.63	2.14	5.10 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.74	1.94	4.74 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.67	2.06	6.15 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.57	2.54	4.98 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.60	2.49	4.58 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.66	2.27	4.16 ± 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)

D3: DAE

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client ADT (Auden)

Certificate No: DAE3-579_Mar07

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AA - SN: 579
Calibration procedure(s)	QA CAL-06.v12 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	March 23, 2007
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
Fluke Process Calibrator Type 702	SN: 6295803	13-Oct-06 (Elcal AG, No: 5492)	Oct-07
Keithley Multimeter Type 2001	SN: 0810278	03-Oct-06 (Elcal AG, No: 5478)	Oct-07
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1002	15-Jun-06 (SPEAG, in house check)	In house check Jun-07

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Technician	
Approved by:	Fin Bomholt	R&D Director	

Issued: March 23, 2007

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters contain technical information as a result from the performance test and require no uncertainty.
- *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
- *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
- *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
- *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
- *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
- *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
- *Input resistance:* DAE input resistance at the connector, during internal auto-zeroing and during measurement.
- *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
- *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range:	1LSB =	6.1μV ,	full range =	-100...+300 mV
Low Range:	1LSB =	61nV ,	full range =	-1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.413 ± 0.1% (k=2)	404.494 ± 0.1% (k=2)	404.245 ± 0.1% (k=2)
Low Range	3.95259 ± 0.7% (k=2)	3.97903 ± 0.7% (k=2)	3.93943 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	0 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Input (μV)	Reading (μV)	Error (%)
Channel X	+ Input	200000	200000.1	0.00
Channel X	+ Input	20000	20006.33	0.03
Channel X	- Input	20000	-19997.11	-0.01
Channel Y	+ Input	200000	200000.5	0.00
Channel Y	+ Input	20000	20004.32	0.02
Channel Y	- Input	20000	-20000.97	0.00
Channel Z	+ Input	200000	199999.9	0.00
Channel Z	+ Input	20000	20004.59	0.02
Channel Z	- Input	20000	-19999.75	0.00

Low Range		Input (μV)	Reading (μV)	Error (%)
Channel X	+ Input	2000	2000	0.00
Channel X	+ Input	200	199.93	-0.03
Channel X	- Input	200	-200.74	0.37
Channel Y	+ Input	2000	2000	0.00
Channel Y	+ Input	200	199.24	-0.38
Channel Y	- Input	200	-200.94	0.47
Channel Z	+ Input	2000	2000	0.00
Channel Z	+ Input	200	199.04	-0.48
Channel Z	- Input	200	-201.32	0.66

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	6.88	6.91
	- 200	-5.38	-6.84
Channel Y	200	4.74	6.33
	- 200	-2.86	-7.65
Channel Z	200	8.17	8.22
	- 200	-9.67	-10.56

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	0.28	0.44
Channel Y	200	1.03	-	2.52
Channel Z	200	-2.54	0.78	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16336	17367
Channel Y	16187	16706
Channel Z	15808	16822

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-1.09	-2.34	-0.23	0.35
Channel Y	-2.38	-3.71	-1.13	0.33
Channel Z	0.31	-1.04	1.49	0.37

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)
Channel X	0.2001	201.8
Channel Y	0.2001	204.8
Channel Z	0.2001	206.1

8. Low Battery Alarm Voltage (verified during pre test)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (verified during pre test)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.0	+6	+14
Supply (- Vcc)	–0.01	-8	-9

D4: SYSTEM VALIDATION DIPOLE

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

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Accreditation No.: SCS 108

Client ADT (Auden)

Certificate No: D835V2-4d021_May07

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d021
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	May 29, 2007
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	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DV6 (HF)	SN 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
DAE4	SN 601	30-Jan-07 (SPEAG, No. DAE4-601_Jan07)	Jan-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 30, 2007

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

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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) 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 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.

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.6 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature during test	(21.9 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.30 mW / g
SAR normalized	normalized to 1W	9.20 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**9.21 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.52 mW / g
SAR normalized	normalized to 1W	6.08 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**6.09 mW / g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.0 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature during test	(22.5 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	condition	
SAR measured	250 mW input power	2.46 mW / g
SAR normalized	normalized to 1W	9.84 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**9.52 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.63 mW / g
SAR normalized	normalized to 1W	6.52 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**6.36 mW / g ± 16.5 % (k=2)**

[2] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.4 Ω - 3.6 jΩ
Return Loss	- 26.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.3 Ω - 5.7 jΩ
Return Loss	- 24.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.392 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	April 22, 2004

DASY4 Validation Report for Head TSL

Date/Time: 24.05.2007 12:05:47

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d021

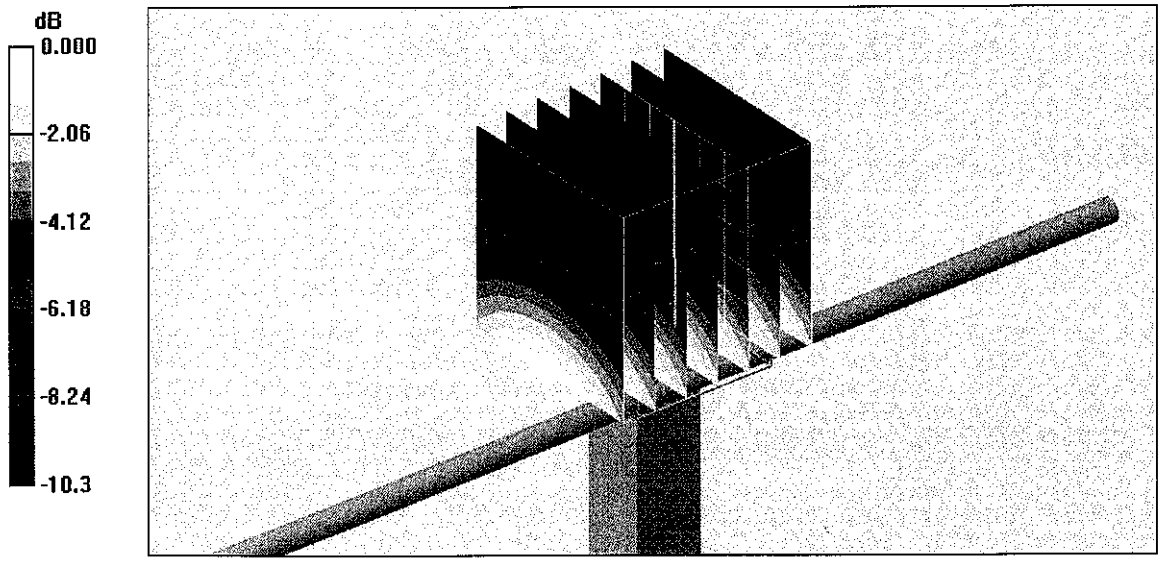
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL 900 MHz;
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 41.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

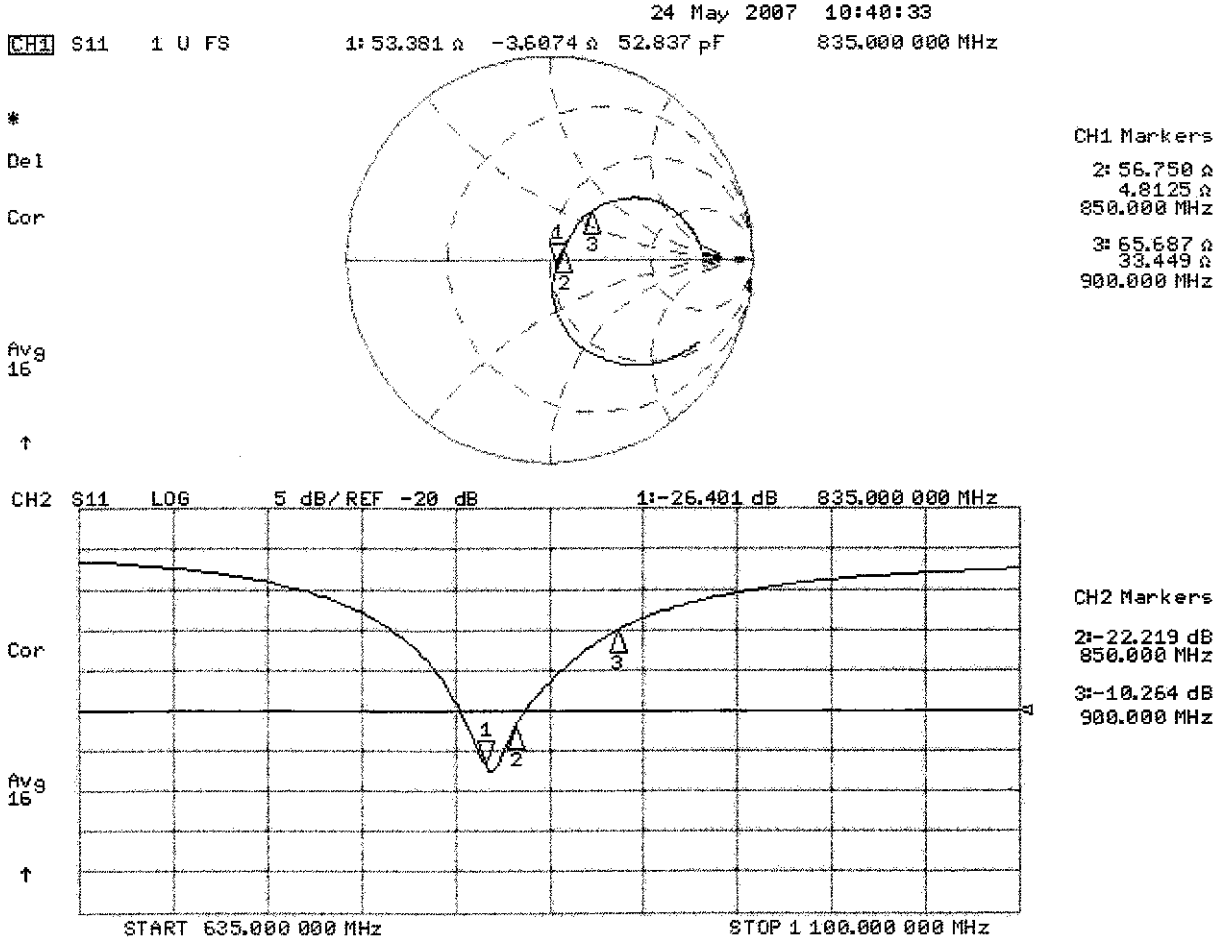
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.0 V/m; Power Drift = -0.013 dB
Peak SAR (extrapolated) = 3.30 W/kg
SAR(1 g) = 2.3 mW/g; SAR(10 g) = 1.52 mW/g
Maximum value of SAR (measured) = 2.49 mW/g



0 dB = 2.49mW/g

Impedance Measurement Plot for Head TSL



DASY4 Validation Report for Body TSL

Date/Time: 29.05.2007 13:00:23

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d021

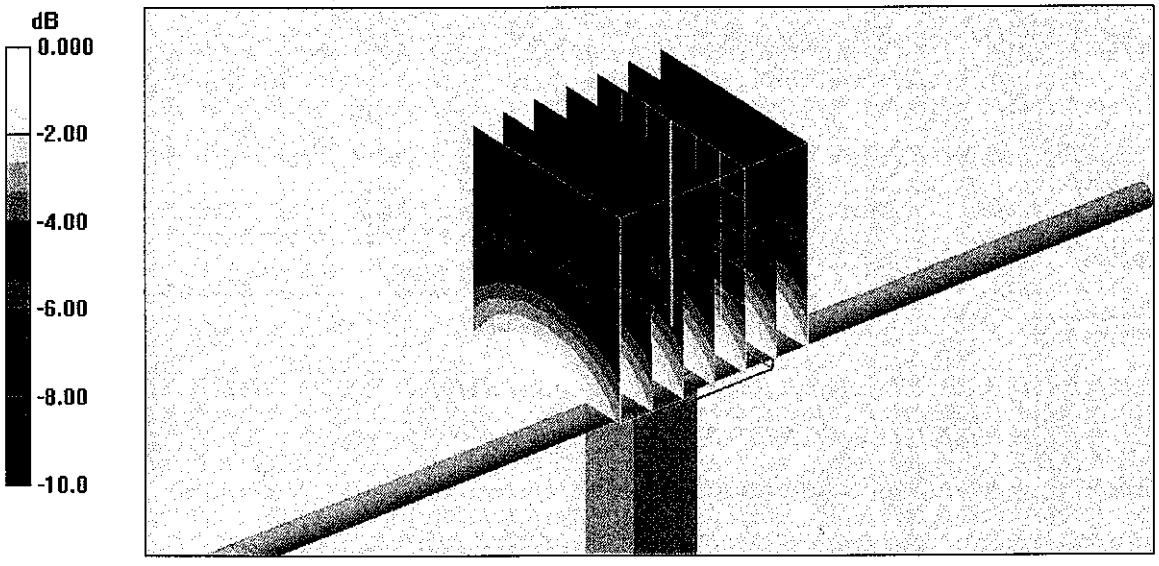
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900;
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(5.75, 5.75, 5.75); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

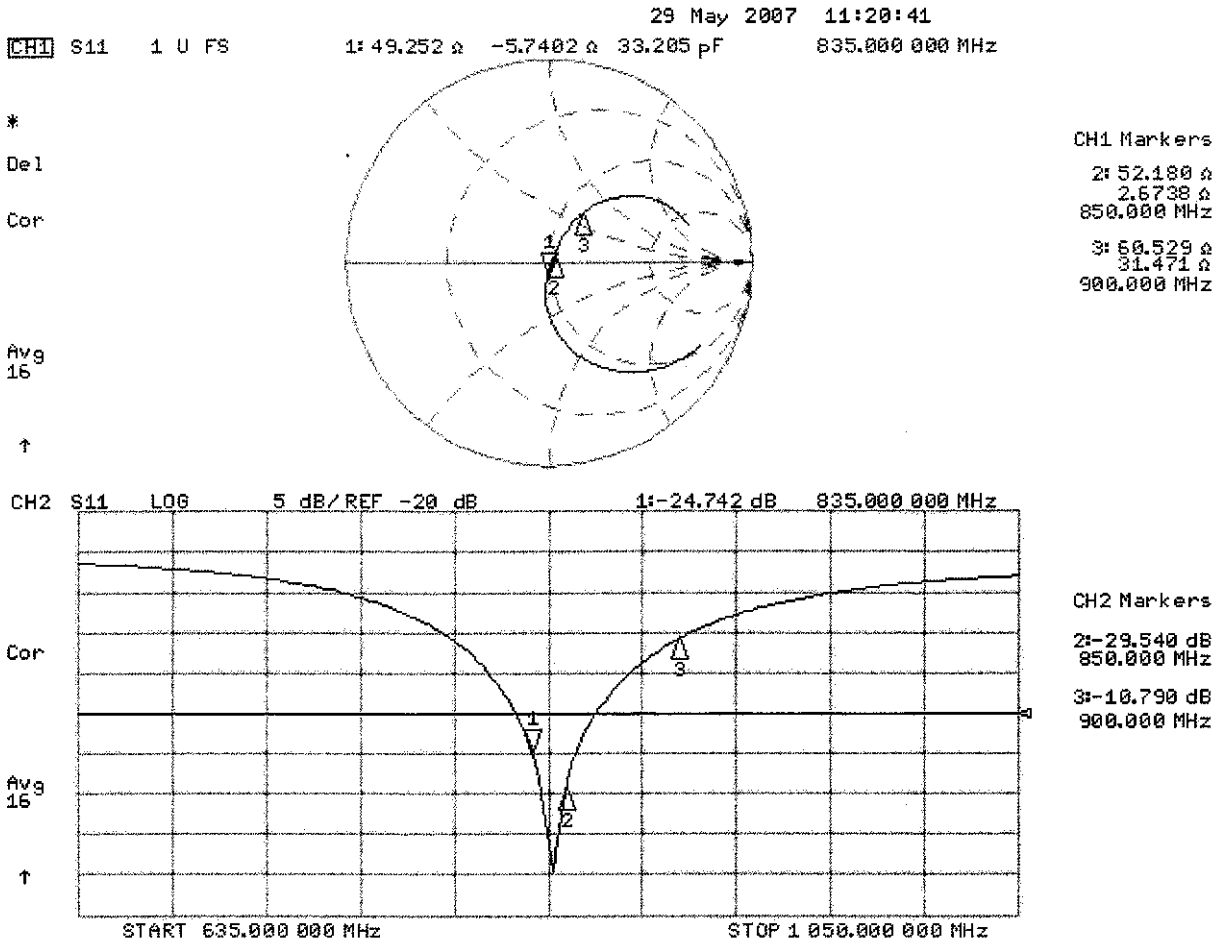
Pin = 250mW, d = 15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.6 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 3.42 W/kg
SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.63 mW/g
Maximum value of SAR (measured) = 2.66 mW/g



0 dB = 2.66mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client ADT (Auden)

Certificate No: D1900V2-5d036_Apr07

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d036
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	April 23, 2007
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	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DV6	SN: 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
Reference Probe ES3DV3	SN: 3025	19-Oct-06 (SPEAG, No. ES3-3025_Oct06)	Oct-07
DAE4	SN 601	30-Jan-07 (SPEAG, No. DAE4-601_Jan07)	Jan-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 26, 2007

Calibration Laboratory of
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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) 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 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.

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.5 ± 6 %	1.46 mho/m ± 6 %
Head TSL temperature during test	(21.5 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.44 mW / g
SAR normalized	normalized to 1W	37.8 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**36.7 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.01 mW / g
SAR normalized	normalized to 1W	20.0 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**19.8 mW / g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.0 ± 6 %	1.58 mho/m ± 6 %
Body TSL temperature during test	(21.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.59 mW / g
SAR normalized	normalized to 1W	38.4 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**36.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.21 mW / g
SAR normalized	normalized to 1W	20.8 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**20.4 mW / g ± 16.5 % (k=2)**

[2] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.3 Ω + 5.6 jΩ
Return Loss	- 24.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.3 Ω + 5.1 jΩ
Return Loss	- 25.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.197 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 8, 2003

DASY4 Validation Report for Head TSL

Date/Time: 23.04.2007 14:58:35

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d036

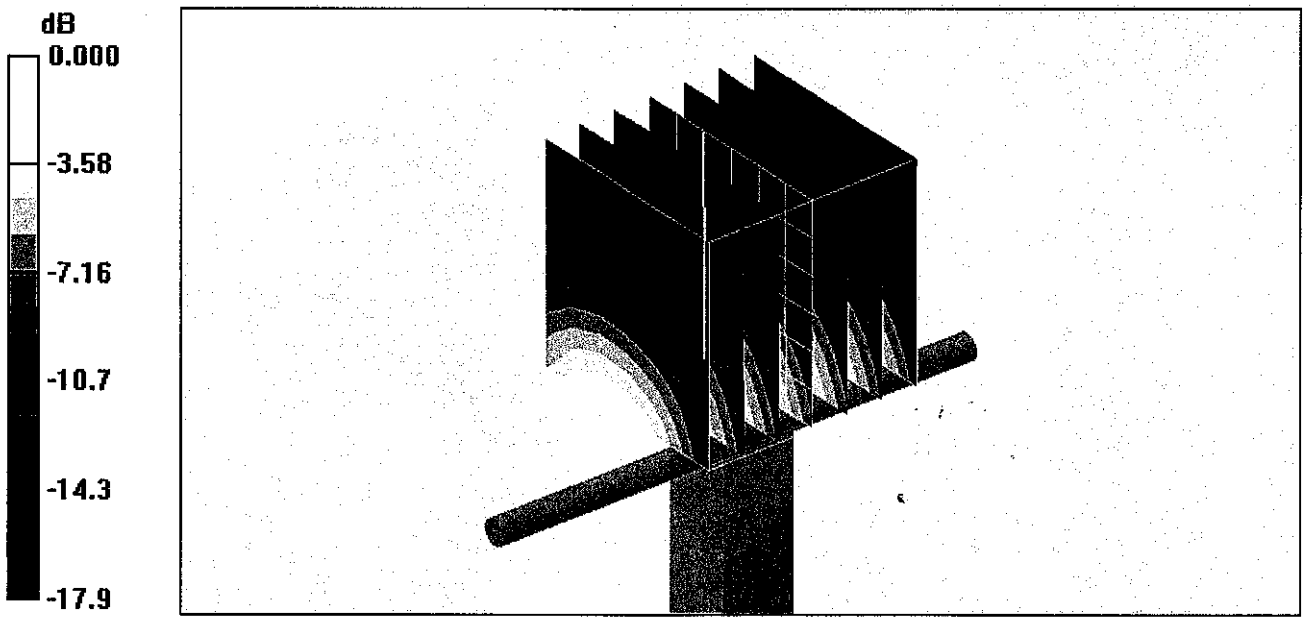
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL U10 BB;
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.97, 4.97, 4.97); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

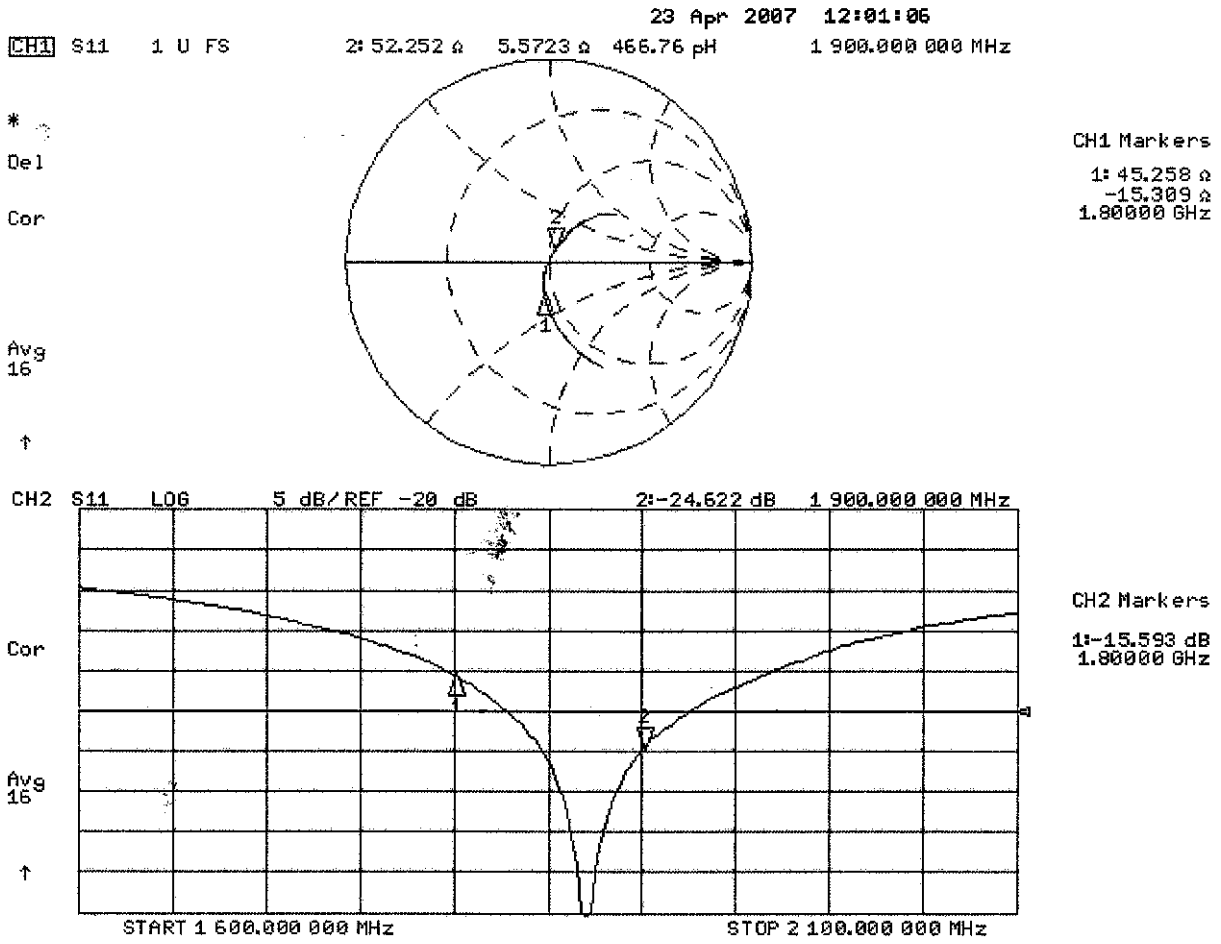
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.2 V/m; Power Drift = 0.040 dB
Peak SAR (extrapolated) = 16.0 W/kg
SAR(1 g) = 9.44 mW/g; SAR(10 g) = 5.01 mW/g
Maximum value of SAR (measured) = 10.5 mW/g



0 dB = 10.5mW/g

Impedance Measurement Plot for Head TSL



DASY4 Validation Report for Body TSL

Date/Time: 23.04.2007 16:40:49

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d036

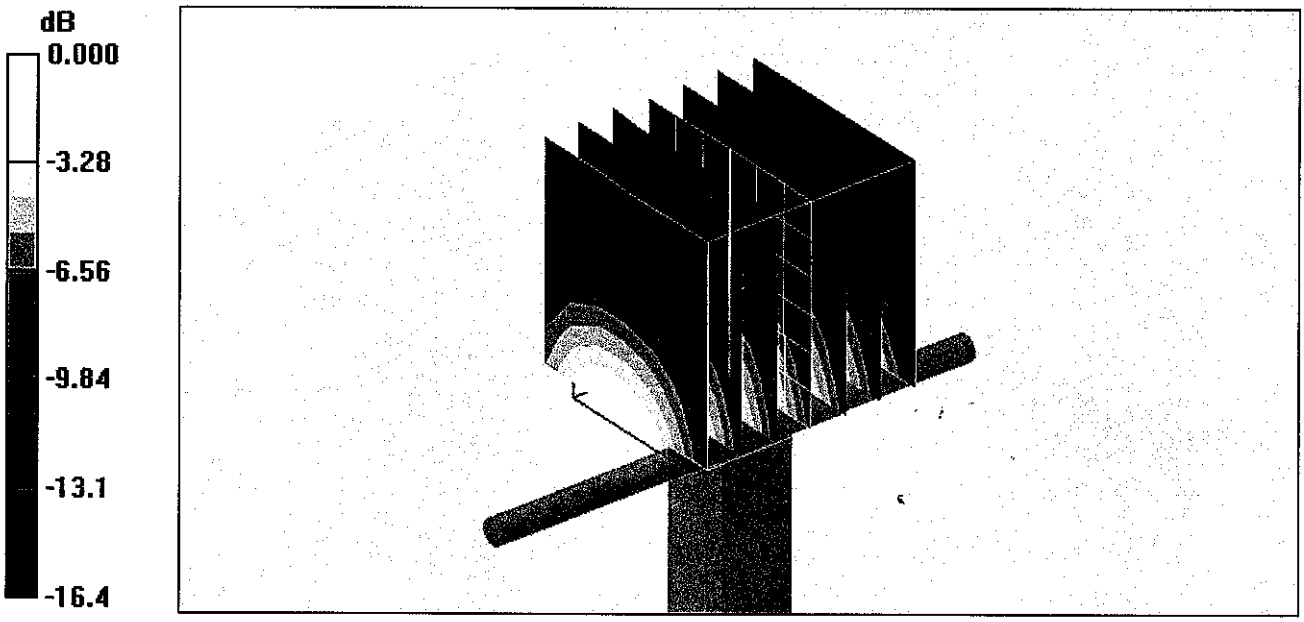
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: MSL U10 BB;
Medium parameters used: f = 1900 MHz; σ = 1.58 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.43, 4.43, 4.43); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

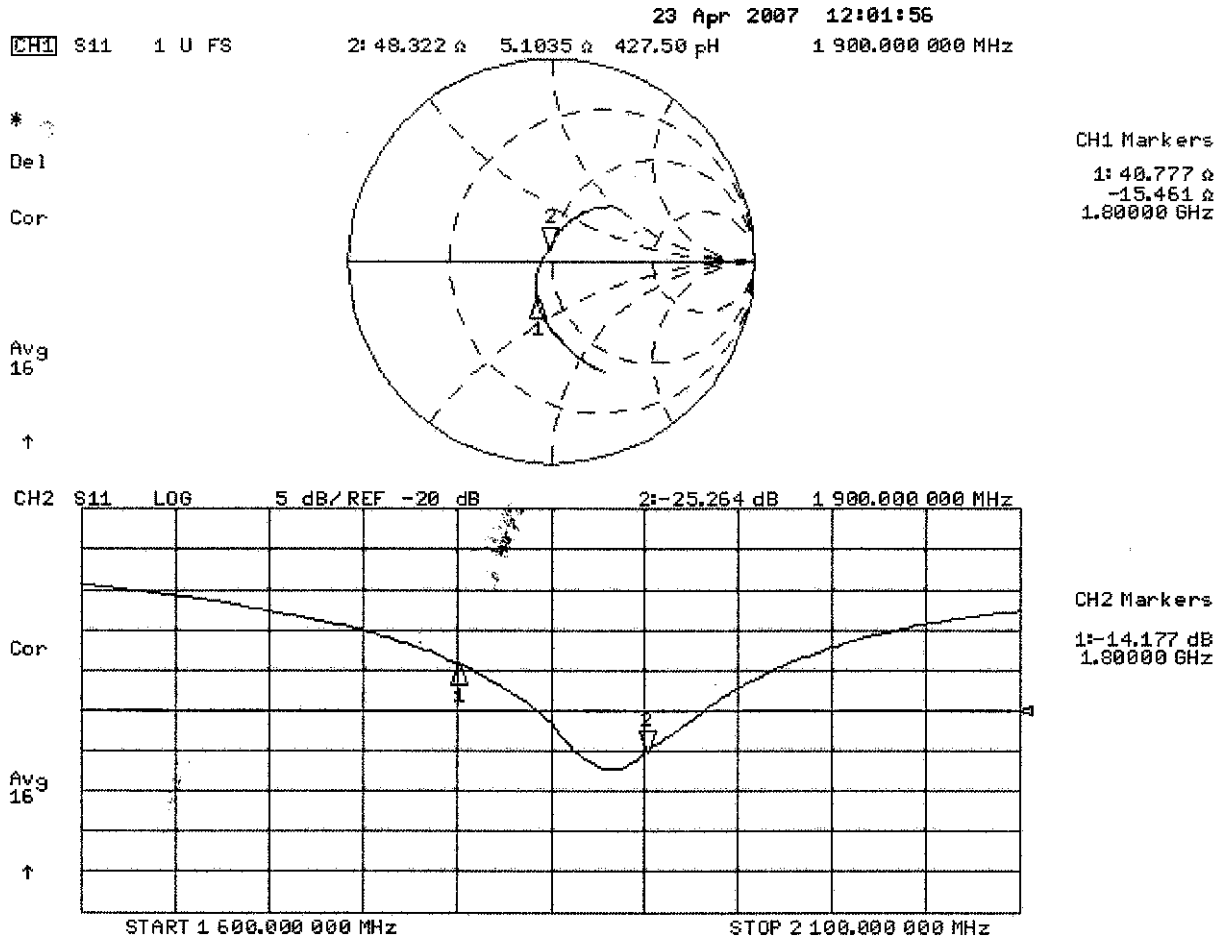
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.1 V/m; Power Drift = 0.023 dB
Peak SAR (extrapolated) = 15.8 W/kg
SAR(1 g) = 9.59 mW/g; SAR(10 g) = 5.21 mW/g
Maximum value of SAR (measured) = 10.7 mW/g



0 dB = 10.7mW/g

Impedance Measurement Plot for Body TSL



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Accredited by the Swiss Federal Office of Metrology and Accreditation
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 ADT (Auden)

Certificate No: D2450V2-737_Apr07

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 737
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	April 24, 2007
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	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ES3DV3	SN 3025	19-Oct-06 (SPEAG, No. ES3-3025_Oct06)	Oct-07
DAE4	SN 601	30-Jan-07 (SPEAG, No. DAE4-601_Jan07)	Jan-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Mike Meili	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 24, 2007

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) 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 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.

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.79 mho/m ± 6 %
Head TSL temperature during test	(23.0 ± 0.2) °C	------	-----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	condition	
SAR measured	250 mW input power	13.4 mW / g
SAR normalized	normalized to 1W	53.6 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**53.5 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.22 mW / g
SAR normalized	normalized to 1W	24.9 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**24.8 mW / g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	50.6 ± 6 %	1.91 mho/m ± 6 %
Body TSL temperature during test	(21.4 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.9 mW / g
SAR normalized	normalized to 1W	51.6 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**50.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.97 mW / g
SAR normalized	normalized to 1W	23.9 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**23.6 mW / g ± 16.5 % (k=2)**

[2] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.2 Ω + 4.7 jΩ
Return Loss	– 25.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	52.2 Ω + 2.1 jΩ
Return Loss	– 30.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.161 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	August 26, 2003

DASY4 Validation Report for Head TSL

Date/Time: 24.04.2007 10:42:44

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN737

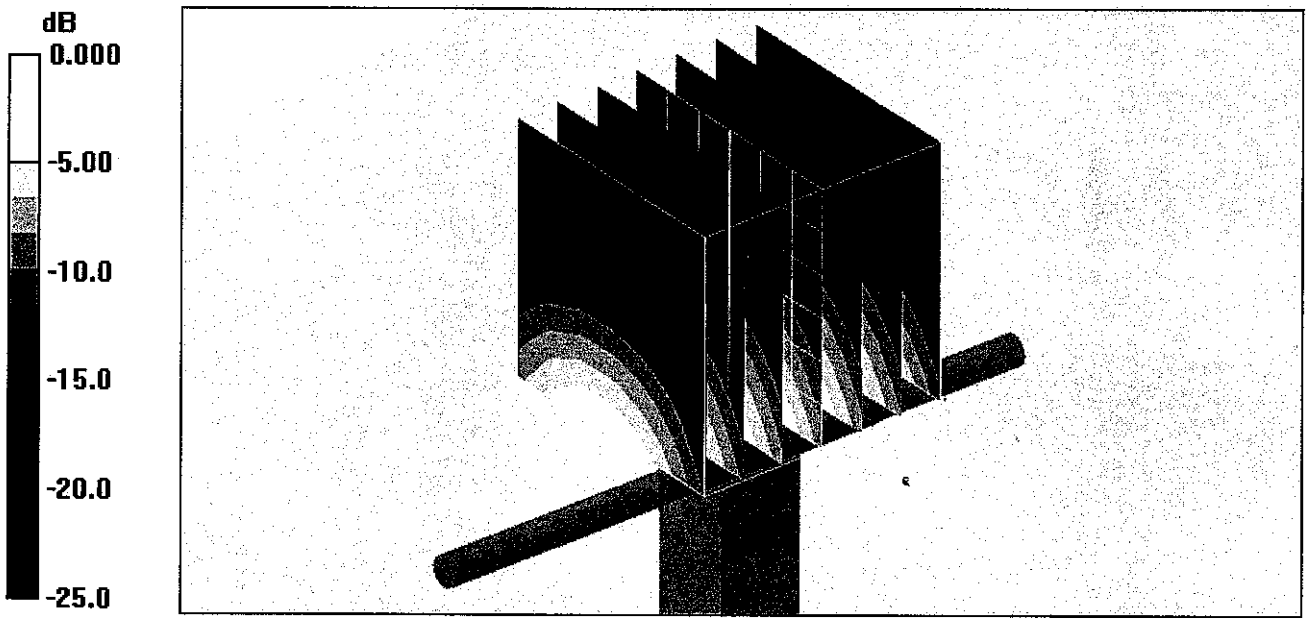
Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL U10 BB;
Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025 (HF); ConvF(4.5, 4.5, 4.5); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

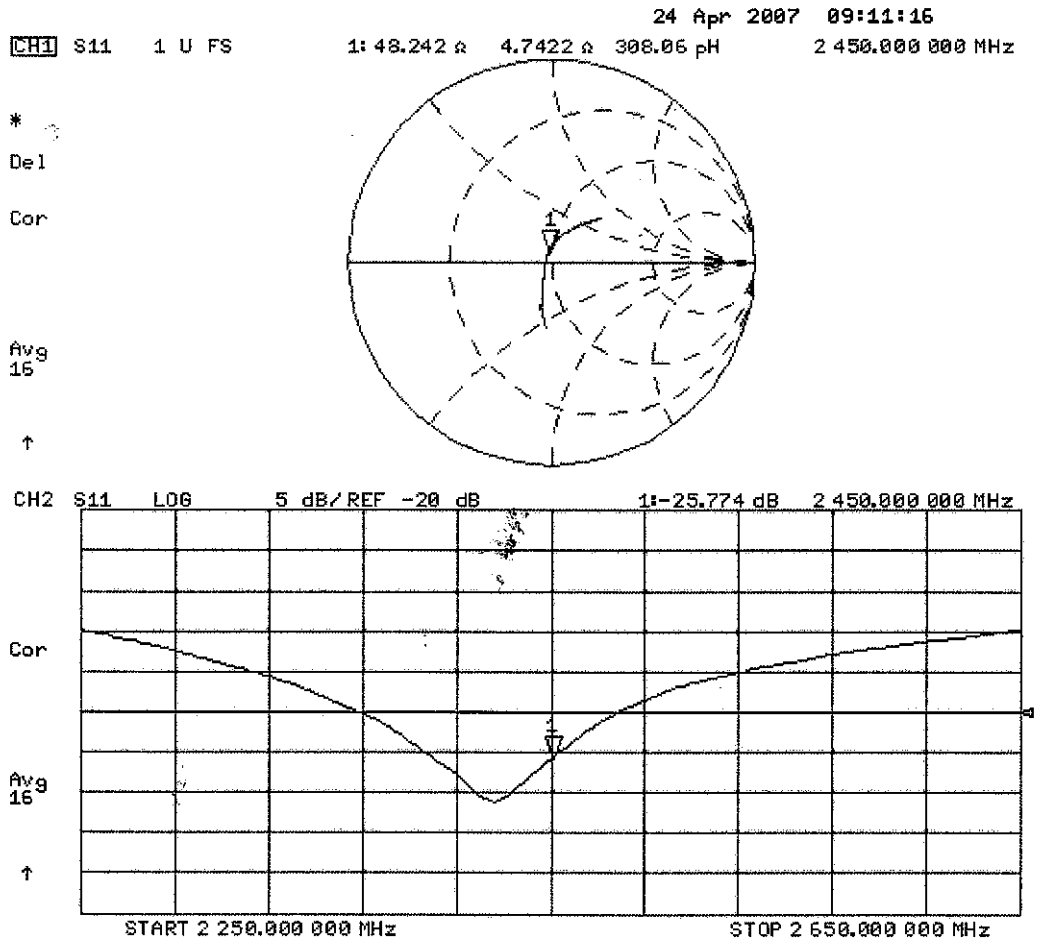
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.7 V/m; Power Drift = 0.049 dB
Peak SAR (extrapolated) = 27.9 W/kg
SAR(1 g) = 13.4 mW/g; SAR(10 g) = 6.22 mW/g
Maximum value of SAR (measured) = 14.9 mW/g



0 dB = 14.9mW/g

Impedance Measurement Plot for Head TSL



DASY4 Validation Report for Body TSL

Date/Time: 24.04.2007 14:24:46

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN737

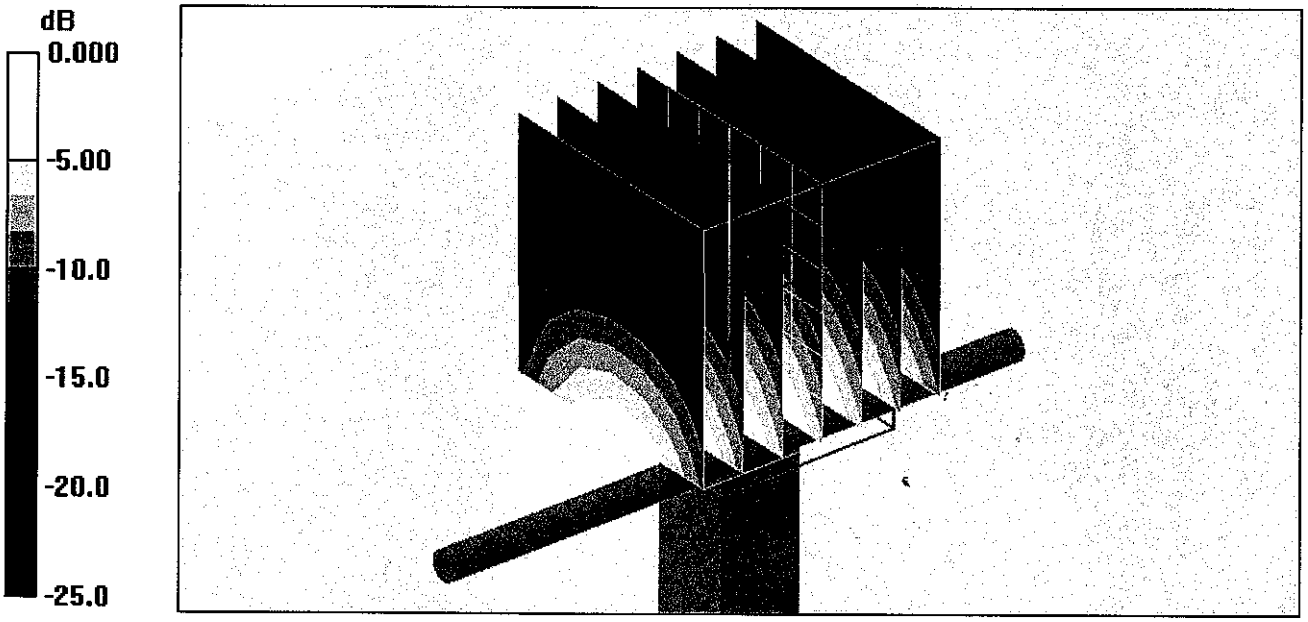
Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: MSL U10;
Medium parameters used: f = 2450 MHz; σ = 1.92 mho/m; ε_r = 50.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025 (HF); ConvF(4.16, 4.16, 4.16); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.2 V/m; Power Drift = -0.045 dB
Peak SAR (extrapolated) = 26.8 W/kg
SAR(1 g) = 12.9 mW/g; SAR(10 g) = 5.97 mW/g
Maximum value of SAR (measured) = 14.6 mW/g



0 dB = 14.6mW/g

Impedance Measurement Plot for Body TSL