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ENSAYOS Nº 51/LE342

TEST REPORT

REFERENCE STANDARDS:

FCC 47CFR Part 2.1093 (10-1-09 Edition)

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

NIE ..... :	31473RET.002
Approved by (name / position & signature) ..... :	A. Llamas / RF Lab Manager
Elaboration date ..... :	2010-06-29

Alejandro Llamas Rodríguez
Firmado digitalmente por Alejandro Llamas Rodríguez
Fecha: 2010.06.29 09:59:33 +02'00'

Identification of item tested ..... :	PDA with external satellite antenna
Trademark ..... :	Genus
Model and/or type reference ..... :	TSN-1.1
Serial number ..... :	Serial number (PSN): EBL 0002205
Other identification of the product ..... :	Commercial name: TERRESTAR GENUS HW version: PDA HWID 5.19.00, Ext Ant. HWID 20.10.01 SW version: SG65 FCC ID: OBW120897
Features ..... :	GSM850/GSM900/GSM1800/GSM1900/WCDMA FDD V/ WCDMA FDD II / GMR-1 3G / BT / WiFi / A-GPS
Description ..... :	PDA + External Satellite Antenna

Applicant ..... :	Elektrobit Inc.
Address ..... :	22745 29th Drive SE, Suite 200 / Bothell, Washington 98021 / USA
CIF/NIF/Passport ..... :	91-1746142
Contact person:	Tuomo Väinämö
Telephone / Fax ..... :	Phone: +358 40 3442000 / Fax: +358 8 343 032
e-mail: ..... :	tuomo.vainamo@elektrobit.com

Test samples supplier ..... :	Same as applicant

Manufacturer ..... :	Same as applicant

Test method requested .....:	See Standard
Standard .....:	1. FCC 47 CFR Part 2.1093 (10-1-09 Edition). Radiofrequency radiation exposure evaluation: portable devices. 2. FCC OET Bulletin 65, Supplement C (Edition 01-01), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields".
Application Notes .....:	1. FCC OET KDB 450824 – SAR Probe Calibration and System Verification Considerations for measurements at 150 MHz – 3 GHz (January 2007). 2. FCC OET KDB 941225 D01 – SAR Measurement Procedures for 3G Devices (October 2007). 3. FCC OET KDB 941225 D03 – Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE. 4. FCC OET KDB 248227 – SAR Measurements Procedures 802.11a/b/g Transmitters (May 2007 – Revised). 5. FCC OET KDB 648474 D01 – SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas (Sept 2008). 6. FCC OET KDB Inquiry 654565.
Test procedure .....:	PERF062
Non-standardized test method .....:	N/A
Used instrumentation .....:	1. Dosimetric E-fierd probe SPEAG ES3DV3 2. Data acquisition device SPEAG DAE4 3. Electro-optical converter SPEAG EOC3 4. 900 MHz dipole validation kit SPEAG D900V2 5. 1800MHz dipole validation kit SPEAG D1800V2 6. 2000MHz dipole validation kit SPEAG D2000V2 7. 2450 MHz dipole validation kit SPEAG D2450V2 8. Robot STÄUBLI RX60BL 9. Robot controller STÄUBLI CM7MB 10. SAM head-body simulator SPEAG Twin SAM V4.0 11. Oval flat phantom SPEAG ELI 4 12. SAR measurement software SPEAG DASY4 V4.7 Build 80 13. Measurement server SPEAG DASY4 SE UMS 001 DC 14. Head and Body Tissue Equivalent Liquids for 900MHz, 1800MHz and 2450MHz bands 15. Universal Radio Communication Tester R&S CMU 200 16. Vector network analyzer Agilent E5071C 17. Dielectric probe kit Agilent 85070C 18. Power meter R&S NRVD 19. Power sensor R&S NRV-Z51 20. Power sensor R&S NRV-Z1 21. RF Generator Agilent ESG E4438C 22. Dual directional coupler NARDA FSCM 99899 23. Dual directional coupler HP 778D. 24. Power amplifier MITEQ AMF-4D-00400600-50-30P 25. Handset positioner SPEAG Device Holder
Report template No. .....:	FDT08_11

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AT4 wireless is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 342.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance programme for its measurement equipment.

AT4 wireless guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at AT4 wireless at the time of performance of the test.

AT4 wireless is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

General conditions

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2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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Uncertainty

Uncertainty (factor k=2) was calculated according to the following documents:

1. FCC OET Bulletin 65, Supplement C (Edition 01-01), “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields”.

Usage of samples

Samples undergoing test have been selected by: **the client**.

Sample M/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
30931/22	PDA	TSN-1.1	EBL0002205	2009-12-21
30931/09	Battery	--	--	2009-12-21
31473/01	External antenna + belt clip	SC-A1	--	2010-05-13
30931/05	PDA satellite conducted sample	TSN-1.1	EBL0002154	2009-12-21
30051/19	Dummy Battery	--	--	2009-07-29

Sample M/02 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
30931/27	PDA	TSN-1.1	EBL0002270	2010-01-14
31473/01	External antenna + belt clip	SC-A1	--	2010-05-13
30931/09	Battery	--	--	2009-12-21

1. Sample M/01 has undergone the test(s) specified in subclause “Test method requested”: SAR evaluation for satellite and cellular modes.
2. Sample M/02 has undergone the test(s) specified in subclause “Test method requested”: SAR evaluation for 802.11 b/g modes.

Testing period

The performed test started on 2010-05-17 and finished on 2010-05-25.

The tests have been performed at AT4 wireless.

Environmental conditions

In the chamber for measurements, the following limits were not exceeded during the test:

Temperature	Min. = 21.51 ºC Max. = 23.82 ºC
Relative humidity	Min. = 33.31 % Max. = 49.82 %

Summary

Considering the results of the performed test according to FCC 47CFR Part 2.1093, the item under test is **IN COMPLIANCE** with the requested specifications specified in the standards.

The maximum 1g volume averaged SAR found during this test has been 0.893 W/kg, for the body with beltclip position and GPRS 850 MHz band.

NOTE: The results presented in this Test Report apply only to the particular item under test established in page 1 of this document, as presented for test on the date(s) shown in section, "USAGE OF SAMPLES, TESTING PERIOD AND ENVIRONMENTAL CONDITIONS".

Remarks and comments

1: Testing of the lowest and highest channels is not necessary according to the "2 dB" rule specified in the FCC OET Bulletin 65, Supplement C (Edition 01-01), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields".

2: Testing of Bluetooth mode is not required according to FCC OET KDB 648474 D01 – SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas (Sept 2008), paragraph "Individual Transmitters".

3: This band was only tested for the worst operational mode found in the previous report 29742RET005 to verify that the DUT still complies with the limit.

4: For satellite mode, and according to FCC OET KDB Inquiry 654565, testing over other modulation than π/2 BPSK is required only for the worst configuration found using π/2 BPSK, and those positions that produce a SAR > 1.2 W/kg.

Testing verdicts

Not applicable ..... : NA

Pass..... : P

Fail ..... : F

Not measured..... : NM

850 MHz band [3]

FCC 47CFR Part 2.1093 Paragraph	VERDICT			
	NA	P	F	NM
(d)(2) GSM				NM[3]
(d)(2) GPRS		P		
(d)(2) EDGE				NM[3]
(d)(2) WCDMA Band V		P		
(d)(2) HSDPA Band V				NM[3]

3: See Remarks and Comments.

1900 MHz band [3]

FCC 47CFR Part 2.1093 Paragraph	VERDICT			
	NA	P	F	NM
(d)(2) GSM				NM[3]
(d)(2) GPRS				NM[3]
(d)(2) EDGE				NM[3]
(d)(2) WCDMA Band II		P		
(d)(2) HSDPA Band II				NM[3]

3: See Remarks and Comments.

2000 MHz band

FCC 47CFR Part 2.1093 Paragraph	VERDICT			
	NA	P	F	NM
(d)(2) Satellite		P		

2450 MHz band [3]

FCC 47CFR Part 2.1093 Paragraph	VERDICT			
	NA	P	F	NM
(d)(2) 802.11b		P		
(d)(2) 802.11g				NM[3]
(d)(2) Bluetooth				NM[2]

2 and 3: See Remarks and Comments.

APPENDIX A: Test Configuration

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1. GENERAL INTRODUCTION

1.1. Application Standard

The Federal Communications Commission (FCC) sets the limits for General Population / Uncontrolled exposure to radio frequency electromagnetic fields for transmitting devices designed to be used within 20 centimetres of the body of the user under FCC 47 CFR Part 2.1093 - "Radiofrequency radiation exposure evaluation: portable devices", paragraph (d)(2).

Specific requirements and procedure for SAR assessment are describe under FCC OET Bulletin 65, Supplement C (Edition 01-01), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields", and all the documents referred at the beginning of this document.

1.2. General requirements

The SAR measurement has been performed continuing the following considerations and environment conditions:

- The ambient temperature shall be in the range of 18ºC to 25ºC and the variation shall not exceed +/-2ºC during the test.
- The ambient humidity shall be in the range of and 30% - 70%.
- The device battery shall be fully charged before each measurement.

1.3. Measurement system requirements

The measurement system used for SAR tests fulfils the procedural and technical requirements described at the reference standards used.

1.4. Phantom requirements

The phantom is a simplified representation of the human anatomy and comprised of material with electrical properties similar to the corresponding tissues in human body. The human model has the following proportions:

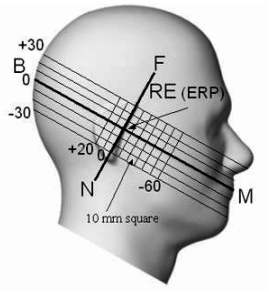

Figure 1: Proportions of Phantom

The shell model is a shaped container and it has the representation shown in the following figure:

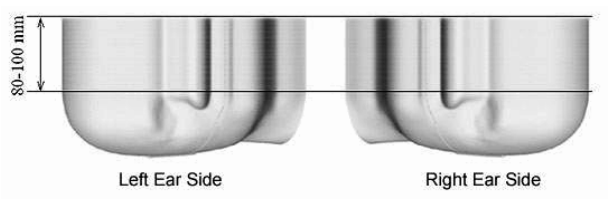

Figure 2: Proportions and shape of Phantom shell

1.5. Measurement Liquids requirements.

The liquids used to simulate the human tissues, must fulfils the requirements of the dielectric properties required. These target dielectric properties per FCC OET KDB 450824 instructions come from the dipole and probe calibration data which are included in Appendix B, Section 3, of this document.

2. MEASUREMENT SYSTEM

2.1. Measurement System

Manufacturer	Device	Type
Schmid & Partner Engineering AG	Dosimetric E-Fiel Probe	ES3DV3
Schmid & Partner Engineering AG	Data Acquisition Electronics	DAE4
Schmid & Partner Engineering AG	Electro-Optical Converter	EOC5
Schmid & Partner Engineering AG	900 MHz System Validation Dipole	D900V2
Schmid & Partner Engineering AG	1800 MHz System Validation Dipole	D1800V2
Schmid & Partner Engineering AG	2000 MHz System Validation Dipole	D2000V2
Schmid & Partner Engineering AG	2450 MHz System Validation Dipole	D2450V2
Stäubli	Robot	RX60BL
Stäubli	Robot controller	CM7MB
Schmid & Partner Engineering AG	SAM head-body simulator	TWIN SAM V4.0
Schmid & Partner Engineering AG	Measurement Software	DASY V4.7 Build 80
Schmid & Partner Engineering AG	Measurement Server	DASY4 SE UMS 001 DC
Rohde & Schwarz	Universal Radio Communication Tester	CMU 200
Agilent	Vector Network Analyser	E5071C
Agilent	Dielectric Probe Kit	85070C
Rohde & Schwarz	Power Meter	NRVD
Rohde & Schwarz	Power Sensor	NRV-Z51
Rohde & Schwarz	Power Sensor	NRV-Z1
Agilent	RF Generator	ESG E4438C
NARDA	Dual directional coupler	FSCM 99899
HP	Dual directional coupler	778D
MITEQ	Power amplifier	AMF-4D-00400600-50-30P
Schmid & Partner Engineering AG	Handset Positioner	SD000 HD1 HA

Table 1: Measurement Equipment

2.2. Test Positions

The standard FCC OET Bulletin 65, Supplement C (Edition 01-01) requires two test positions for the handset in the head. These positions are the "cheek" position and the “tilted” position. The tests positions used are described below. The handset should be tested in both positions (left and right sides) in the SAM phantom.

The EUT shall be placed in the Phantom in such way that the main point of the mobile terminal (acoustic output) coincides with the reference point located at the Phantom’s ear.

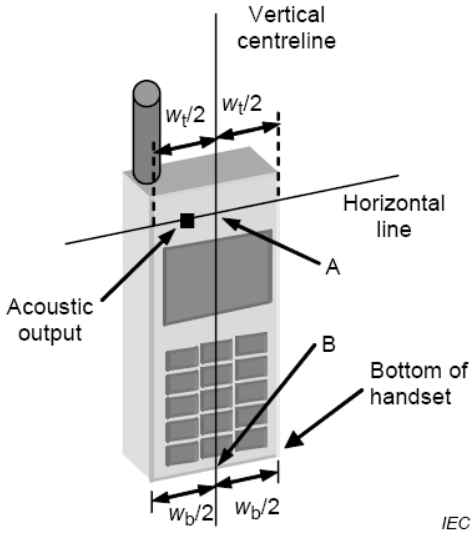

Figure 3: EUT’s basic scheme

SAR measurements will be performed for the following configurations as indicated in the reference standard:

- Right side of Phantom, Cheek position.
- Right side of Phantom, 15º Tilted position.
- Left side of Phantom, Cheek position.
- Left side of Phantom, 15º Tilted position.

Definition of the “cheek” position

The "cheek" position relative to Phantom is described as follows:

1. - Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagital plane of the Phantom. While maintaining the device in this plane, aligning the centre line with the reference plane containing the three ear and mouth reference points (M, RE and LE).

2. - Translate the mobile phone box towards the Phantom until the ear-piece touches the ear reference point (RE or LE). While maintaining the device in the reference plane, move the bottom of the box until any point of the front side is in contact with the cheek of the Phantom.

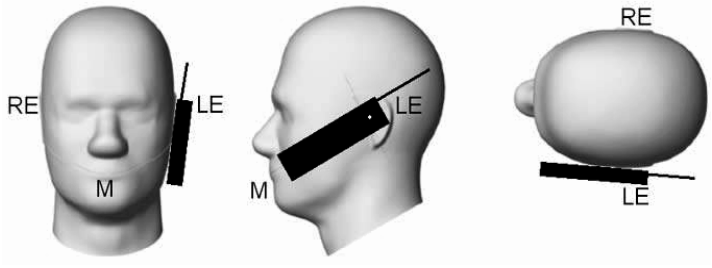

Figure 4: "Cheek" position of EUT

Definition of the tilted position:

The "15º tilted" position relative to Phantom is described as follows:

1. - Position the device in the "cheek" position described above.

2. - While maintaining the device in the reference plane described above and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees.

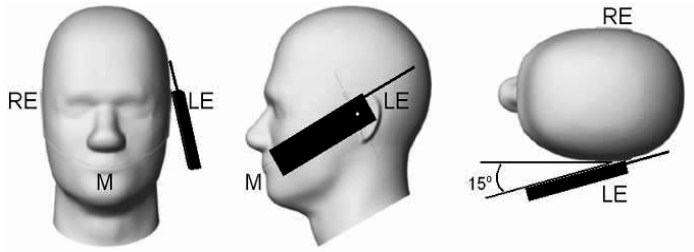

Figure 5: "Tilted" position of EUT

Also, according to the FCC OET Bulletin 65, Supplement C (Edition 01-01), for devices that are designed to operate in body-worn configurations SAR compliance should be evaluated using a flat phantom.

2.3. Test to be performed

Test shall be performed at both phone positions previously described, on each side of the head (left and right side) and using the centre frequency of each operating band.

Additionally, the configuration giving to the maximum mass averaged SAR shall be used to test the low-end and the high-end frequencies of each transmitting band. Thus, the tests to be performed in mobile phones are as follows:

- Measurements at Central Channel of application band:
  1. SAR measurement at the left side of Phantom and the cheek position of the EUT.
  2. SAR measurement at the left side of Phantom and the tilted 15º position of the EUT.
  3. SAR measurement at the right side of Phantom and the cheek position of the EUT.
  4. SAR measurement at the right side of Phantom and the tilted 15º position of the EUT.
- Measurements at Low Channel of application band:

  SAR measurement at the side and position where the maximum SAR level, measured at Central channel, was found.
- Measurements at High Channel of application band:

  SAR measurement at the side and position where the maximum SAR level, measured at Central channel, was found.

As noted above, measurements shall be performed using a flat phantom for body worn configuration. EUT will be placed at the center of flat phantom. The EUT position using during the body SAR tests will be that where maximum peak SAR was found. Low and high channels for each band should be tested at this position.

If the mobile phone is also designed to transmit with other configurations (antenna fully extended/retracted, keypad cover opened/closed…), all tests described above shall be performed for each configuration. When considering multi-mode and multi-band mobile phones, all of the above tests shall be performed at each transmitting mode/band with the corresponding maximum peak power level.

2.4. Description of interpolation/extrapolation scheme

The local SAR inside the Phantom is measured using small dipole sensing elements inside a probe element. The probe tip must not be in contact with the Phantoms surface in order to minimise measurement errors, but the highest local SAR is obtained from measurements at a certain distances from the shell trough extrapolation. The accurate assessment of the maximum SAR averaged over 1gr. requires a very fine resolution in the three dimensional scanned data array. Since the measurements have to be performed over a limited time, the measured data have to be interpolated to provide an array of sufficient resolution.

The interpolation of 2D area scan is used after the initial area scan, at a fixed distance from the Phantom shell wall. The initial scan data are collected with approx. 15 mm spatial resolution and this interpolation is used to find the location of the local maximum for positioning the subsequent 3D scanning to within a 1mm resolution.

For the 3D scan, data are collected on a spatially regular 3D grid having 5 mm steps in both directions. After the data collection by the SAR probe, the data are extrapolated in the depth direction to assign values to points in the 3D array closer to the shell wall. A notional extrapolation value is also assigned to the first point outside the shell wall so that subsequent interpolation schemes will de applicable right up to the shell wall boundary.

2.5. Determination of the largest peak spatial-average SAR

To determine the maximum value of the peak spatial-average SAR of a EUT, all device positions, configurations and operational modes should be tested for each frequency band.

According to FCC OET Bulletin 65, Supplement C (Edition 01-01), the averaging volume shall be chosen as 1gr. of contiguous tissue. The cubic volumes, over which the SAR measurements are averaged after extrapolation and interpolation, are chosen in order to include the highest values of local SAR.

The maximum SAR level for the EUT will be the maximum level obtained of the performed measurements, and indicated in the previous points.

2.6. System Validation

Prior to the SAR measurements, system verification is done daily to verify the system accuracy. FCC OET Bulletin 65 – Supplement C, Appendix D “SAR measurement procedures” Paragraph “System Verification” specifies, a complete SAR evaluation is done using a half-wavelength dipole as source with the frequency of the mid-band channel of the operating band, or within 10% of this channel.

The measured one-gram SAR should be within 10% of the expected target values specified in the calibration certificate of the dipole, for the specific tissue and frequency used.

3. UNCERTAINTY

Uncertainty for 300 MHz – 6 GHz

ERROR SOURCES	Uncertainty value (%)	Probability distribution	Divisor	(c_i) 1g	(c_i) 10g	Standard uncertainty (1g) (%)	Standard uncertainty (10g) (%)	v_i v_{eff}
Measurement Equipment								
Probe Calibration	±4.480	Normal	1	1	1	±4.480	±4.480	∞
Axial Isotropy	±7.558	Rectangular	$\sqrt{3}$	1	1	±4.364	±4.364	∞
Hemispherical Isotropy	±2.000	Rectangular	$\sqrt{3}$	1	1	±1.155	±1.155	∞
Boundary effect	±4.700	Rectangular	$\sqrt{3}$	1	1	±2.714	±2.714	∞
Linearity	±1.000	Rectangular	$\sqrt{3}$	1	1	±0.577	±0.577	∞
System detection limits	±0.300	Rectangular	$\sqrt{3}$	1	1	±0.300	±0.300	∞
Readout electronics	±1.010	Normal	1	1	1	±0.583	±0.583	∞
Response time	±2.600	Rectangular	$\sqrt{3}$	1	1	±1.501	±1.501	∞
Integration time	±3.000	Rectangular	$\sqrt{3}$	1	1	±1.732	±1.732	∞
RF Ambien conditions	±3.000	Rectangular	$\sqrt{3}$	1	1	±1.732	±1.732	∞
Probe positioner	±0.800	Rectangular	$\sqrt{3}$	1	1	±0.462	±0.462	∞
Probe positioning	±9.900	Rectangular	$\sqrt{3}$	1	1	±5.716	±5.716	∞
Maximum SAR evaluation	±1.000	Rectangular	$\sqrt{3}$	1	1	±0.577	±0.577	∞
Test Sample Related								
Device positioning	±2.900	Normal	1	1	1	±2.900	±2.900	145
Device Holder	±3.600	Normal	1	1	1	±3.600	±3.600	5
Power Drift	±5.000	Rectangular	$\sqrt{3}$	1	1	±2.887	±2.887	∞
Phantom and Setup								
Phantom uncertainty	±4.000	Rectangular	$\sqrt{3}$	1	1	±2.309	±2.309	∞
Liquid conductivity (deviation from target)	±5.000	Rectangular	$\sqrt{3}$	0.64	0.43	±1.848	±1.241	∞
Liquid conductivity (measurement error)	±3.100	Normal	1	0.64	0.43	±1.984	±1.333	∞
Liquid permittivity (deviation from target)	±5.000	Rectangular	$\sqrt{3}$	0.64	0.43	±1.848	±1.241	∞
Liquid permittivity (measurement error)	±4.410	Normal	1	0.64	0.43	±2.822	±1.896	∞
Combined standard uncertainty	$u_c = \sqrt{\sum_{1=1}^{m} c_i^2 \cdot u_i^2}$					**±11.99**	**±11.56**	330
Expanded uncertainty (confidence interval of 95%)	*ue =2.00 uc*					**±23.98**	**±23.11**	

Table 2: Uncertainty Assessment for 300 MHz - 6 GHz

4. SAR LIMIT

Having a worst case measurement, the SAR limit is valid for general population/uncontrolled exposure.

The SAR values have to be averaged over a mass of 1 gr. ($SAR_{1\ gr.}$) with the shape of a cube. This level couldn't exceed the values indicated in the application Standard:

Standard	SAR	SAR Limit (W/Kg)
FCC 47 CFR Part 2.1093 Paragraph (d)(2)	$SAR_{1\ gr.}$	1.6

Table 3: SAR limit

APPENDIX B: Test results

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1. TEST CONDITIONS

1.1. Power supply (V):

V_n = 3.7 Li-ion polymer rechargeable battery
Type of power supply = DC Voltage from rechargeable Li-Ion 3.7 V battery.

1.2. Temperature (ºC):

T_n = +21.51 to +23.82 ºC
The subscript n indicates normal test conditions.

1.3. Test signal, Output Power and Frequencies

For the GSM/GPRS/EDGE and WCDMA modes, the device was put into operation by using a R&S CMU 200 as base station simulator. The output power of the device was set to Power Control Level (PCL) maximum for all tests.

For the 802.11b/g and Satellite modes, the device was put into operation by using a manufacturer proprietary test mode, setting the maximum output power for each mode. For 802.11b/g mode, the duty factor is set to maximum (aprox. 100%). For Satellite mode the duty factor is fixed at 25% (10ms transmission slot from 40ms frame duration), as the actual use.

A fully charged battery was used for every test sequence.

For satellite band and test position, the measurements were performed on middle channels. In each band, for those positions with the maximum averaged SAR was found, measurements were performed on lowest and highest channels except those with applicable test reductions.

For the other bands, the measurement was performed using the worst configuration found in the previous report (29742RET.005).

The maximum time-average conducted power of the device for satellite mode was measured with a Power meter R&S NRVD and a thermocoupled power sensor NRV-Z51. It was measured using another sample (S/N: EBL0002154). See ‘usage of samples’ paragraph of this report.

The actual SAR samples does not have accessible antenna connectors for conducted measurements, so the conducted average output power was measured using another identical sample provided by the manufacturer with auxiliary external connectors that makes the measurements representative and applicable for all the tested samples.

No simultaneous transmission evaluation was performed following the FCC OET KDB 648474 D01 – SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas (Sept 2008), because the EUT does not admit the simultaneous operation of any mode combination except the Bluetooth with the other ones. The detailed simultaneous transmission combination is:

	GSM / GPRS / EDGE	WCDMA / HSDPA	Satellite	802.11b/g	Bluetooth
GSM / GPRS / EDGE		Not supported	Not supported	Not supported	Supported
WCDMA / HSDPA	Not supported		Not supported	Not supported	Supported
Satellite	Not supported	Not supported		Not supported	Supported
802.11b/g	Not supported	Not supported	Not supported		Supported

The distances between antennas are (please check the antennas location diagram in the appendix D):

- Bluetooth and Satellite antenna → 6 cm.
- Bluetooth and GSM/WCDMA antenna → 6.4 cm.
- Satellite and GSM/WCDMA antenna → 9 cm.

1.4. EUT and test-site configurations

For only-data modes (GPRS, EDGE, 802.11b/g, Satellite 62.5kHz BW and Satellite 156.25kHz BW), the EUT was test only over body worn positions because it does not admit voice mode over only-data transmissions.

For head tests, only 2 external satellite antenna rotations (30º and 60º) were tested because they were found the worst cases. Both rotations are shown in the Appendix D.

For body worn tests, the EUT was placed using the belt clip provided by the manufacturer in direct contact with the phantom. Only 2 external satellite antenna rotations (0º and 180º) were tested because they were found the most representative ones.

2. CONDUCTED AVERAGE POWER MEASUREMENTS

		Average Conducted Power (dBm)		
Band	**Mode**	**CH Low**	**CH Mid**	**CH High**
2000 MHz	π/2 BPSK (31.25KHz BW)	26.76	26.65	26.54
	π/4 QPSK (31.25KHz BW)	26.68	26.70	26.63
	π/4 QPSK (62.5KHz BW)	26.90	26.82	26.75
	π/4 QPSK (156.25KHz BW)	24.84	24.79	24.73

3. TISSUE PARAMETERS MEASUREMENTS

Frequency (MHz)	**Target Head Tissue: Parameters used in Probe Calibration**		**Target Head Tissue: Parameters used in Dipole Calibration**		**Measured Head Tissue**		**Measured Date**
	Permittivity	**Conductivity [S/m]**	**Permittivity**	**Conductivity [S/m]**	**Permittivity**	**Conductivity [S/m]**	
900	41.5 ± 5%	0.97 ± 5%	39.8 ± 6%	0.94 ± 6%	39.69	0.96	2010-05-19
1800	40.0 ± 5%	1.40 ± 5%	41.1 ± 6%	1.37 ± 6%	38.70	1.39	2010-05-19
2000	40.0 ± 5%	1.40 ± 5%	39.3 ± 6%	1.43 ± 6%	38.22	1.35	2010-05-17

Frequency (MHz)	**Target Body Tissue: Parameters used in Probe Calibration**		**Target Body Tissue: Parameters used in Dipole Calibration**		**Measured Body Tissue**		**Measured Date**
	Permittivity	**Conductivity [S/m]**	**Permittivity**	**Conductivity [S/m]**	**Permittivity**	**Conductivity [S/m]**	
900	55.0 ± 5%	1.05 ± 5%	52.4 ± 6%	1.06 ± 6%	55.51	1.04	2010-05-25
1800	53.3 ± 5%	1.52 ± 5%	54.0 ± 6%	1.49 ± 6%	52.20	1.44	2010-05-24
2000	53.3 ± 5%	1.52 ± 5%	52.9 ± 6%	1.59 ± 6%	51.95	1.57	2010-05-20
2450	52.7 ± 5%	1.95 ± 5%	53.2 ± 6%	2.00 ± 6%	50.10	1.99	2010-05-25

Note: The dielectric properties have been measured by the contact probe method at 22° C.

4. SYSTEM VALIDATION MEASUREMENTS

4.1. Validation results in 900 MHz Band for Head TSL

SAR	Target SAR	Measured SAR	Drift (%)	Limit (%)
1 gr.	10.70	10.71	0.08	± 10
10 gr.	6.92	6.87	-0.69	± 10

4.2. Validation results in 900 MHz Band for Body TSL

SAR	Target SAR	Measured SAR	Drift (%)	Limit (%)
1 gr.	11.00	10.84	-1.45	± 10
10 gr.	7.16	7.12	-0.56	± 10

4.3. Validation results in 1800 MHz Band for Head TSL

SAR	Target SAR	Measured SAR	Drift (%)	Limit (%)
1 gr.	38.90	38.74	-0.40	± 10
10 gr.	20.50	20.15	-1.70	± 10

4.4. Validation results in 1800 MHz Band for Body TSL

SAR	Target SAR	Measured SAR	Drift (%)	Limit (%)
1 gr.	39.20	36.48	-6.94	± 10
10 gr.	20.80	19.24	-7.50	± 10

4.5. Validation results in 2000 MHz Band for Head TSL

SAR	Target SAR	Measured SAR	Drift (%)	Limit (%)
1 gr.	42.70	41.25	-3.41	± 10
10 gr.	22.00	21.30	-3.17	± 10

4.6. Validation results in 2000 MHz Band for Body TSL

SAR	Target SAR	Measured SAR	Drift (%)	Limit (%)
1 gr.	42.70	40.44	-5.28	± 10
10 gr.	22.40	21.10	-5.79	± 10

4.7. Validation results in 2450 MHz Band for Body TSL

SAR	Target SAR	Measured SAR	Drift (%)	Limit (%)
1 gr.	53.00	50.40	-4.91	± 10
10 gr.	25.00	23.44	-6.24	± 10

5. MEASUREMENT RESULTS FOR SAR (SPECIFIC ABSORPTION RATE)

5.1. Summary maximum results for head measurements

Band	Mode	Side / Position	Sat. Antenna rotation	Channel (Frequency)	Measured SAR (1g avg) (W/Kg)	SAR limit (1g avg) (W/Kg)
850 MHz	WCDMA Band V	Right / Cheek	30º	CH 4183 (836.6 MHz)	0.873	1.6
1900 MHz	WCDMA Band II	Left / Cheek	30º	CH 9262 (1852.4 MHz)	0.872	1.6
2000 MHz	π/2 BPSK (31.25KHz BW)	Left / 15º Tilted	30º	Mid (2009.984375 MHz)	0.374	1.6

5.2. Summary maximum results for body measurements

Band	Mode	Side / Position	Sat. Antenna rotation	Channel (Frequency)	Measured SAR (1g avg) (W/Kg)	SAR limit (1g avg) (W/Kg)
850 MHz	GPRS 2slots	Body with beltclip	0º	CH 190 (836.6 MHz)	0.893	1.6
1900 MHz	WCDMA Band II	Body with beltclip	0º	CH 9400 (1880 MHz)	0.197	1.6
2000 MHz	π/4 BPSK (62.5 KHz BW)	Body with beltclip	0º	Mid (2010.0 MHz)	0.143	1.6
2450 MHz	802.11b	Body with beltclip	0º	CH 6 (2437 MHz)	0.015	1.6

5.3. Results for GPRS 850 MHz band – 2 slots.

- **Body measurements**

Position	Sat. Antenna rotation	Channel (Frequency)	SAR Max. over 1gr (W/Kg)	Power Drift (%)	Limit (%)	Verdict
Body with beltclip	0º	CH 190 (836.6 Mhz)	0.893	-2.38	±5	Pass
-		CH 128 (824.2 Mhz)	NM[3]	-	±5	Pass
-		CH 251 (848.8 Mhz)	NM[3]	-	±5	Pass

3: See remarks and comments

5.4. Results for WCDMA Band V

- **Head measurements**

Side / Position	Sat. Antenna rotation	Channel (Frequency)	SAR Max. over 1gr (W/Kg)	Power Drift (%)	Limit (%)	Verdict
Right / Cheek	30º	CH 4183 (836.6 Mhz)	0.873	0.94	±5	Pass
Right / 15º Tilted	-	CH 4183 (836.6 Mhz)	NM[3]	-	±5	Pass
Left / Cheek	-	CH 4183 (836.6 Mhz)	NM[3]	-	±5	Pass
Left / 15º Tilted	-	CH 4183 (836.6 Mhz)	NM[3]	-	±5	Pass
-	-	CH 4132 (826.4 Mhz)	NM[3]	-	±5	Pass
-	-	CH 4233 (846.6 Mhz)	NM[3]	-	±5	Pass

3: See remarks and comments

5.5. Results for WCDMA Band II

- **Head measurements**

Side / Position	Sat. Antenna rotation	Channel (Frequency)	SAR Max. over 1gr (W/Kg)	Power Drift (%)	Limit (%)	Verdict
Right / Cheek	-	CH 9400 (1880 Mhz)	NM[3]	-	±5	Pass
Right / 15º Tilted	-	CH 9400 (1880 Mhz)	NM[3]	-	±5	Pass
Left / Cheek	-	CH 9400 (1880 Mhz)	NM[3]	-	±5	Pass
Left / 15º Tilted	-	CH 9400 (1880 Mhz)	NM[3]	-	±5	Pass
Left / Cheek	30º	CH 9262 (1852.4 Mhz)	0.872	-1.24	±5	Pass
Left / Cheek	-	CH 9538 (1907.6 Mhz)	NM[3]	-	±5	Pass

3: See remarks and comments

- **Body measurements**

Position	Sat. Antenna rotation	Channel (Frequency)	SAR Max. over 1gr (W/Kg)	Power Drift (%)	Limit (%)	Verdict
Body with beltclip	0º	CH 9400 (1880 Mhz)	0.197	-2.81	±5	Pass
-	-	CH 9262 (1852.4 Mhz)	NM[3]	-	±5	Pass
-	-	CH 9538 (1907.6 Mhz)	NM[3]	-	±5	Pass

3: See remarks and comments

5.6. Results for Satellite π/2 BPSK (31.25kHz BW)

- **Head measurements**

Side / Position	Sat. Antenna rotation	Channel (Frequency)	SAR Max. over 1gr (W/Kg)	Power Drift (%)	Limit (%)	Verdict
Right / Cheek	30º	Mid (2009.984375 MHz)	0.123	2.47	±5	Pass
Right / 15º Tilted	30º	Mid (2009.984375 MHz)	0.256	-0.84	±5	Pass
Right / Cheek	60º	Mid (2009.984375 MHz)	0.135	4.69	±5	Pass
Right / 15º Tilted	60º	Mid (2009.984375 MHz)	0.185	-0.97	±5	Pass
Left / Cheek	30º	Mid (2009.984375 MHz)	0.144	0.40	±5	Pass
Left / 15º Tilted	30º	Mid (2009.984375 MHz)	0.374	-2.44	±5	Pass
Left / Cheek	60º	Mid (2009.984375 MHz)	0.162	-0.20	±5	Pass
Left / 15º Tilted	60º	Mid (2009.984375 MHz)	0.257	2.52	±5	Pass
Left / Cheek	-	Low (2000.015625 MHz)	NM[1]	-	±5	Pass
Left / Cheek	-	High (2019.984375 MHz)	NM[1]	-	±5	Pass

1: See remarks and comments

- **Body measurements**

Position	Sat. Antenna rotation	Channel (Frequency)	SAR Max. over 1gr (W/Kg)	Power Drift (%)	Limit (%)	Verdict
Body with beltclip	0º	Mid (2009.984375 MHz)	0.134	3.84	±5	Pass
Body with beltclip	180º	Mid (2009.984375 MHz)	0.078	-2.27	±5	Pass
-	-	Low (2000.015625 MHz)	NM[1]	-	±5	Pass
-	-	High (2019.984375 MHz)	NM[1]	-	±5	Pass

1: See remarks and comments

5.7. Results for Satellite π/4 QPSK (31.25kHz BW)

- **Head measurements**

Side / Position	Sat. Antenna rotation	Channel (Frequency)	SAR Max. over 1gr (W/Kg)	Power Drift (%)	Limit (%)	Verdict
Right / Cheek	30º	Mid (2009.984375 MHz)	NM[4]	-	±5	Pass
Right / 15º Tilted	30º	Mid (2009.984375 MHz)	NM[4]	-	±5	Pass
Right / Cheek	60º	Mid (2009.984375 MHz)	NM[4]	-	±5	Pass
Right / 15º Tilted	60º	Mid (2009.984375 MHz)	NM[4]	-	±5	Pass
Left / Cheek	30º	Mid (2009.984375 MHz)	NM[4]	-	±5	Pass
Left / 15º Tilted	30º	Mid (2009.984375 MHz)	0.371	1.66	±5	Pass
Left / Cheek	60º	Mid (2009.984375 MHz)	NM[4]	-	±5	Pass
Left / 15º Tilted	60º	Mid (2009.984375 MHz)	0.224	2.24	±5	Pass
Left / Cheek	-	Low (2000.015625 MHz)	NM[4]	-	±5	Pass
Left / Cheek	-	High (2019.984375 MHz)	NM[4]	-	±5	Pass

4: See remarks and comments

- **Body measurements**

Position	Sat. Antenna rotation	Channel (Frequency)	SAR Max. over 1gr (W/Kg)	Power Drift (%)	Limit (%)	Verdict
Body with beltclip	0º	Mid (2009.984375 MHz)	0.137	0.35	±5	Pass
Body with beltclip	180º	Mid (2009.984375 MHz)	0.060	-2.61	±5	Pass
-	-	Low (2000.015625 MHz)	NM[1]	-	±5	Pass
-	-	High (2019.984375 MHz)	NM[1]	-	±5	Pass

1: See remarks and comments

5.8. Results for Satellite π/4 QPSK (62.5kHz BW)

- **Body measurements**

Position	Sat. Antenna rotation	Channel (Frequency)	SAR Max. over 1gr (W/Kg)	Power Drift (%)	Limit (%)	Verdict
Body with beltclip	0º	Mid (2010.0 MHz)	0.143	0.05	±5	Pass
Body with beltclip	180º	Mid (2010.0 MHz)	0.067	0.15	±5	Pass
-	-	Low (2000.03125 MHz)	NM[1]	-	±5	Pass
-	-	High (2019.96875 MHz)	NM[1]	-	±5	Pass

1: See remarks and comments

5.9. Results for Satellite π/4 QPSK (156.25kHz BW)

- **Body measurements**

Position	Sat. Antenna rotation	Channel (Frequency)	SAR Max. over 1gr (W/Kg)	Power Drift (%)	Limit (%)	Verdict
Body with beltclip	0º	Mid (2009.984375 MHz)	0.143	0.23	±5	Pass
Body with beltclip	180º	Mid (2009.984375 MHz)	0.069	-0.68	±5	Pass
-	-	Low (2000.078125 MHz)	NM[1]	-	±5	Pass
-	-	High (2019.921875 MHz)	NM[1]	-	±5	Pass

1: See remarks and comments

5.10. Results for 802.11b

- **Body measurements**

Position	Sat. Antenna rotation	Channel (Frequency)	SAR Max. over 1gr (W/Kg)	Power Drift (%)	Limit (%)	Verdict
Body with beltclip	0º	CH 6 (2437 Mhz)	0.015	-3.03	±5	Pass
-		CH 1 (2412 Mhz)	NM[3]	-	±5	Pass
-		CH 11 (2462 Mhz)	NM[3]	-	±5	Pass

3: See remarks and comments

APPENDIX C: Measurements Reports

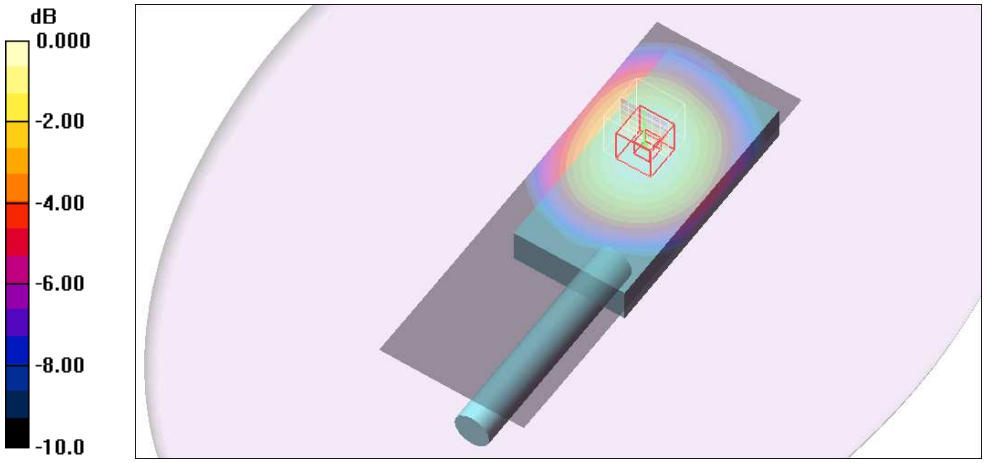
GPRS 850 MHz (2 slots) – Body – 0º with beltclip – Middle Channel

DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: GPRS 850 2 slots (Body)

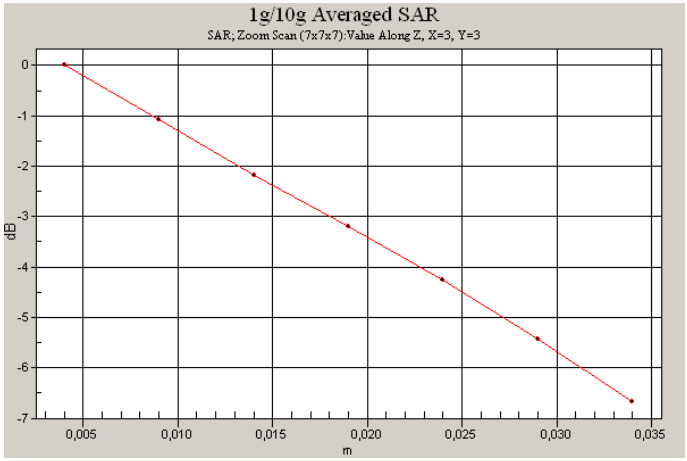
Communication System: GPRS 850 (2 Timeslots); Frequency: 836.6 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(5.71, 5.71, 5.71); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

0º with belt-clip, Middle CH/Area Scan (61x171x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.948 mW/g
0º with belt-clip, Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.2 V/m; Power Drift = -0.209 dB
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.893 mW/g; SAR(10 g) = 0.678 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.935 mW/g



0 dB = 0.935mW/g



WCDMA Band V – Right hand side – 30º Cheek position – Middle Channel

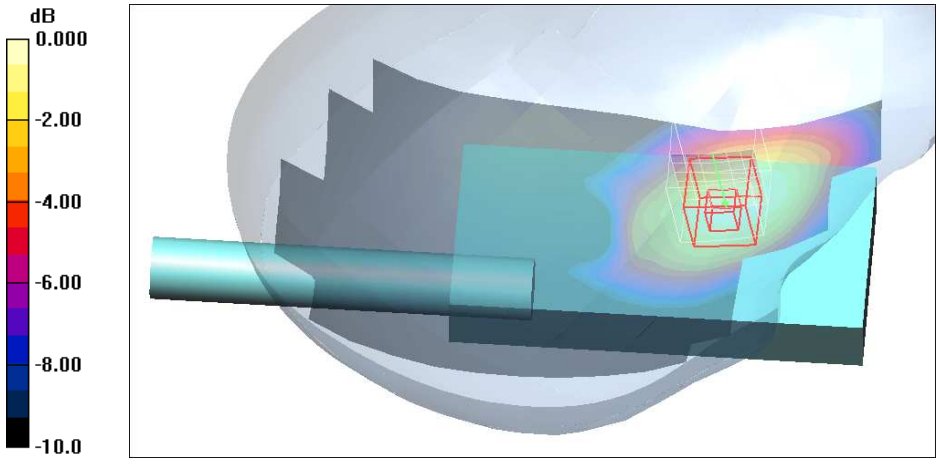
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: UMTS BAND V (Right-Hand Side)

Communication System: W-CDMA 850 (Band V); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.913 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Right Section

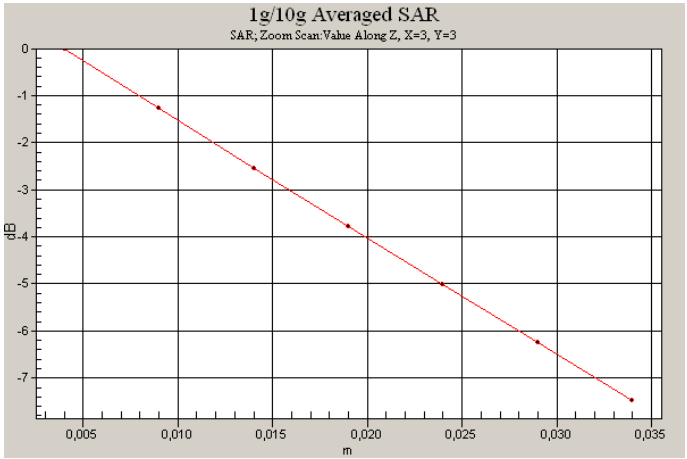
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(5.83, 5.83, 5.83); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: SAM head-body simulator ; Type: Twin SAM V4.0; Serial: ---
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

30º Touch position - Middle/Area Scan (81x151x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.919 mW/g

30º Touch position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30.2 V/m; Power Drift = 0.082 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.873 mW/g; SAR(10 g) = 0.620 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.926 mW/g



0 dB = 0.926mW/g



WCDMA Band II – Left hand side – 30º Cheek position – Lowest Channel

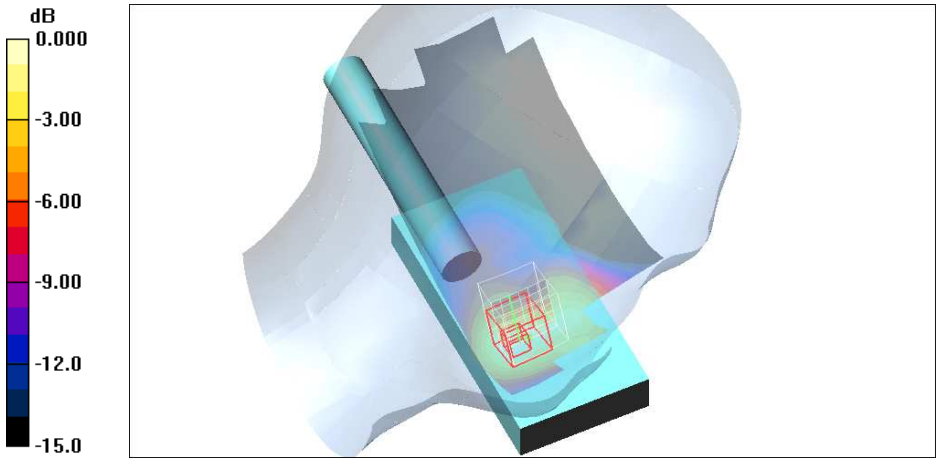
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: UMTS BAND II (Left-Hand Side)

Communication System: W-CDMA 1800 (Band II); Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.44 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Left Section

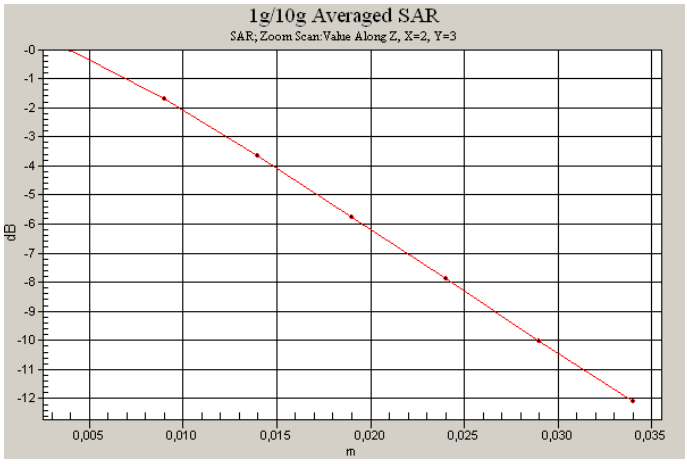
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.81, 4.81, 4.81); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: SAM head-body simulator ; Type: Twin SAM V4.0; Serial: ---
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

30º Touch position - Low/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.947 mW/g

30º Touch position - Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.5 V/m; Power Drift = -0.108 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.872 mW/g; SAR(10 g) = 0.517 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.946 mW/g



0 dB = 0.946mW/g



WCDMA Band II – Body – 0º with beltclip – Middle Channel

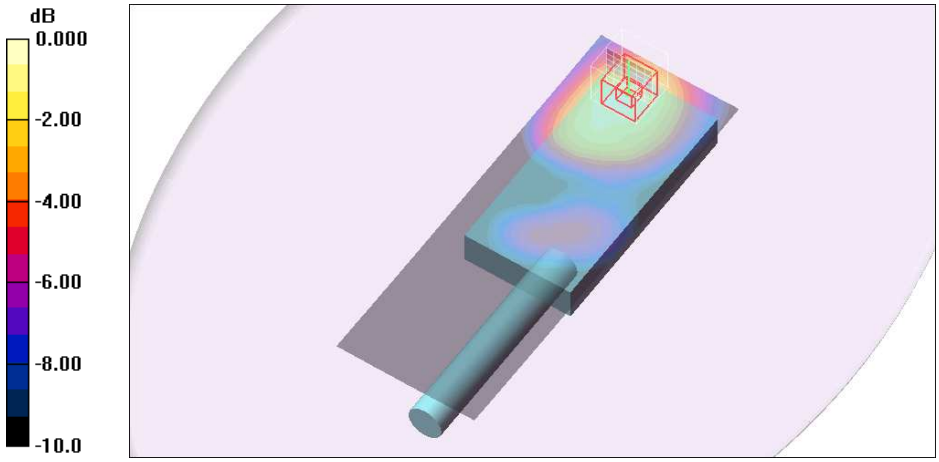
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: UMTS BAND II (Body)

Communication System: W-CDMA 1800 (Band II); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

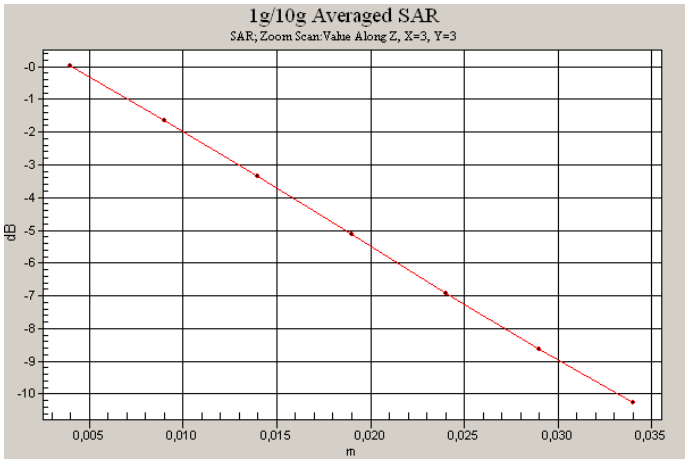
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.43, 4.43, 4.43); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

0º with belt-clip, Middle CH/Area Scan (61x171x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.211 mW/g

0º with belt-clip, Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.35 V/m; Power Drift = -0.248 dB
Peak SAR (extrapolated) = 0.283 W/kg
SAR(1 g) = 0.197 mW/g; SAR(10 g) = 0.128 mW/g
Maximum value of SAR (measured) = 0.213 mW/g



0 dB = 0.213mW/g



Satellite π/2 BPSK (31.25kHz BW) – 30° Right hand side – Cheek position – Middle Channel

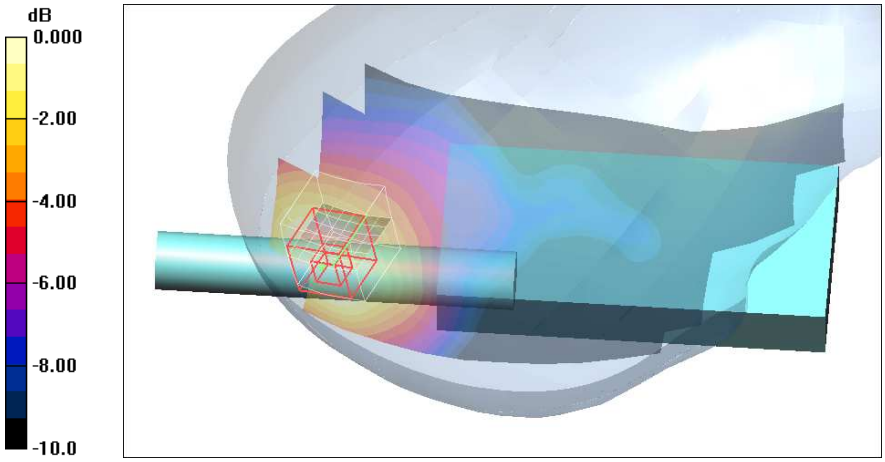
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/2 BPSK, 31.25kHz (Right-Hand Side)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.35 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Right Section

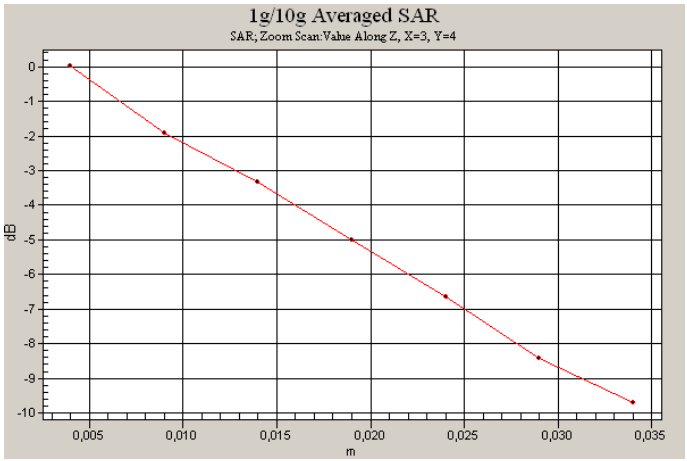
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.69, 4.69, 4.69); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: SAM head-body simulator ; Type: Twin SAM V4.0; Serial: ---
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

30° Touch position - Middle/Area Scan (81x151x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.129 mW/g

30° Touch position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.14 V/m; Power Drift = 0.212 dB
Peak SAR (extrapolated) = 0.194 W/kg
SAR(1 g) = 0.123 mW/g; SAR(10 g) = 0.082 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.133 mW/g



0 dB = 0.133mW/g



Satellite π/2 BPSK (31.25kHz BW) – 30° Right hand side – Tilt position – Middle Channel

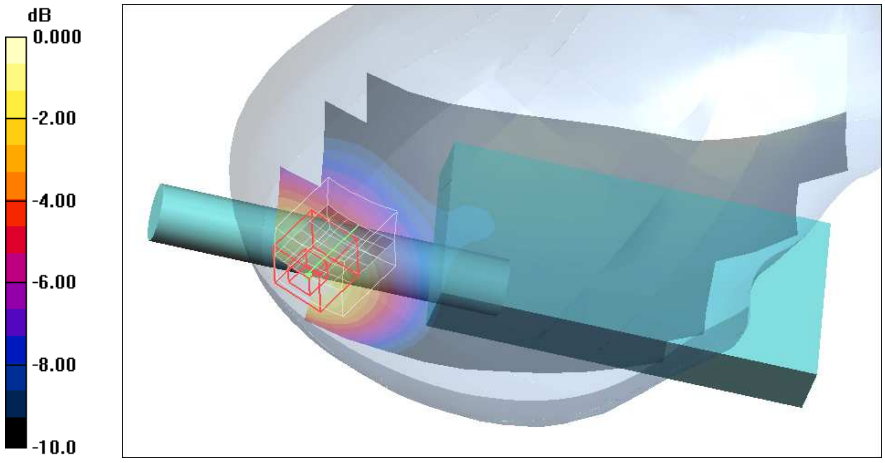
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/2 BPSK, 31.25kHz (Right-Hand Side)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.35 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Right Section

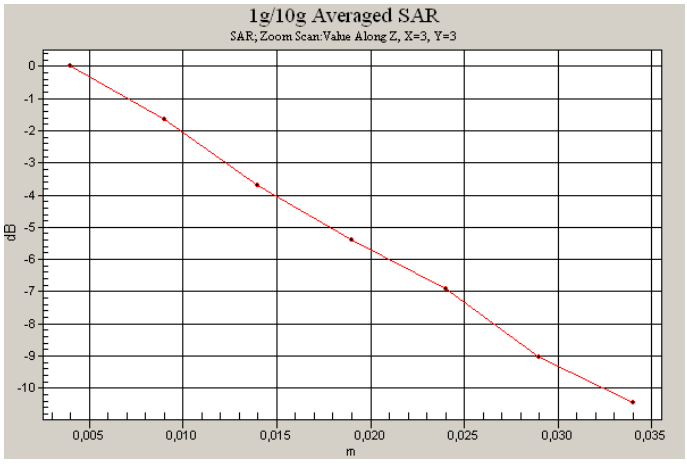
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.69, 4.69, 4.69); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: SAM head-body simulator ; Type: Twin SAM V4.0; Serial: ---
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

30° Tilt position - Middle/Area Scan (81x151x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.289 mW/g

30° Tilt position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.6 V/m; Power Drift = -0.073 dB
Peak SAR (extrapolated) = 0.375 W/kg
SAR(1 g) = 0.256 mW/g; SAR(10 g) = 0.163 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.279 mW/g



0 dB = 0.279mW/g



Satellite π/2 BPSK (31.25kHz BW) – 60° Right hand side – Cheek position – Middle Channel

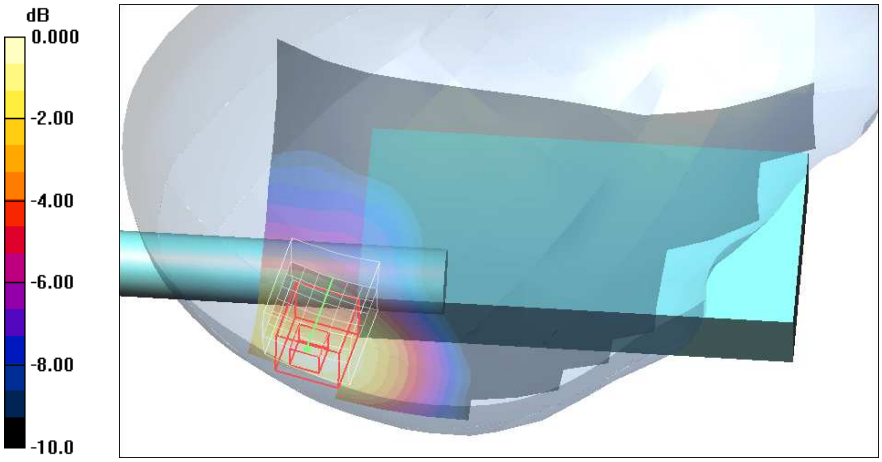
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/2 BPSK, 31.25kHz (Right-Hand Side)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.35 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Right Section

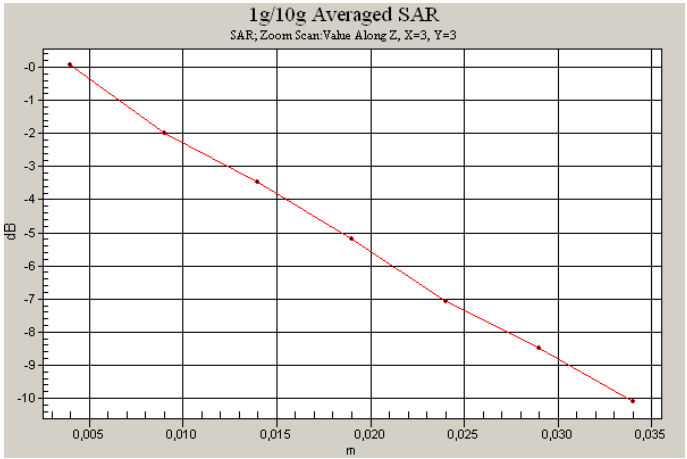
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.69, 4.69, 4.69); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: SAM head-body simulator ; Type: Twin SAM V4.0; Serial: ---
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

60° Touch position - Middle/Area Scan (111x121x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.148 mW/g

60° Touch position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = 0.398 dB
Peak SAR (extrapolated) = 0.220 W/kg
SAR(1 g) = 0.135 mW/g; SAR(10 g) = 0.089 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.148 mW/g



0 dB = 0.148mW/g



Satellite π/2 BPSK (31.25kHz BW) – 60° Right hand side – Tilt position – Middle Channel

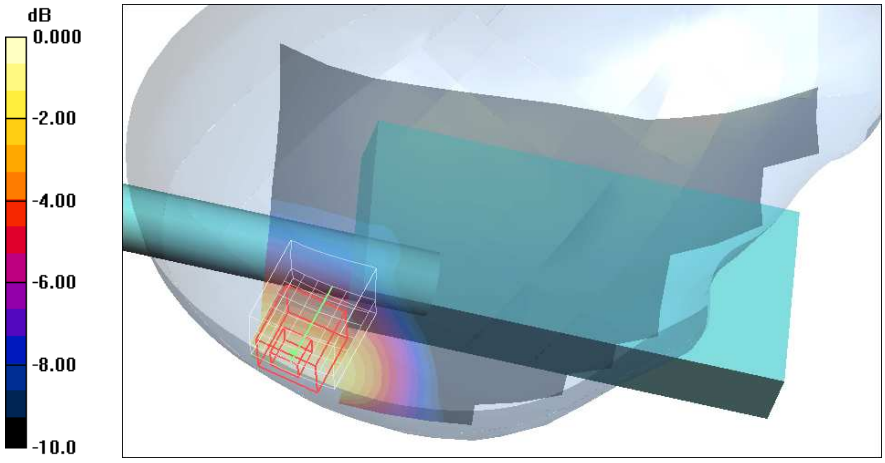
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/2 BPSK, 31.25kHz (Right-Hand Side)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.35 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Right Section

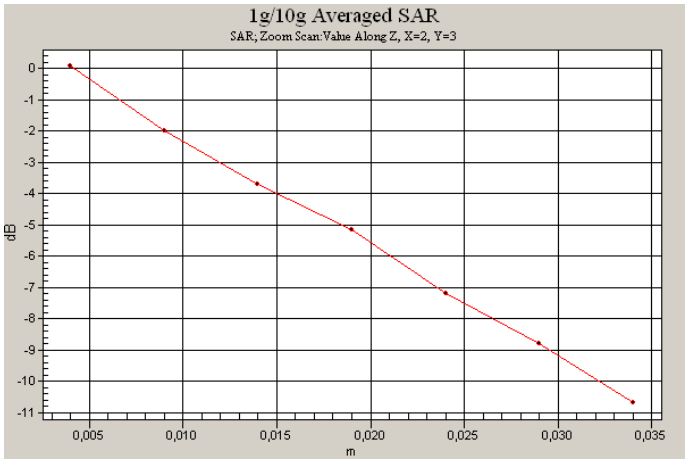
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.69, 4.69, 4.69); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: SAM head-body simulator ; Type: Twin SAM V4.0; Serial: ---
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

60° Tilt position - Middle/Area Scan (111x121x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.203 mW/g

60° Tilt position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.2 V/m; Power Drift = -0.085 dB
Peak SAR (extrapolated) = 0.296 W/kg
SAR(1 g) = 0.185 mW/g; SAR(10 g) = 0.120 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.197 mW/g



0 dB = 0.197mW/g



Satellite π/2 BPSK (31.25kHz BW) – 30º Left hand side – Cheek position – Middle Channel

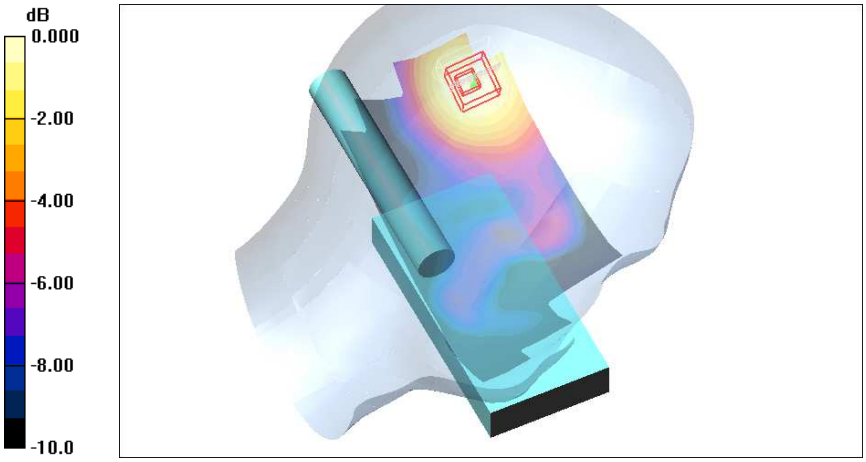
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/2 BPSK 31.25 kHz (Left-Hand Side)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.35 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Left Section

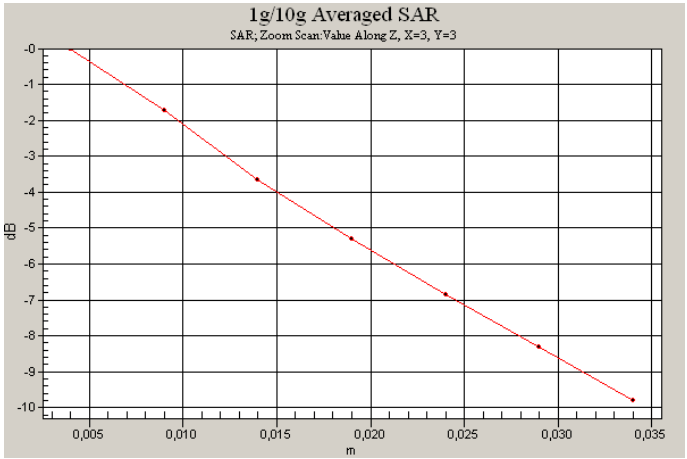
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.69, 4.69, 4.69); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: SAM head-body simulator ; Type: Twin SAM V4.0; Serial: ---
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

30º Touch position - Middle/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.152 mW/g

30º Touch position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 0.220 W/kg
SAR(1 g) = 0.144 mW/g; SAR(10 g) = 0.095 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.158 mW/g



0 dB = 0.158mW/g



Satellite π/2 BPSK (31.25kHz BW) – 30° Left hand side – Tilt position – Middle Channel

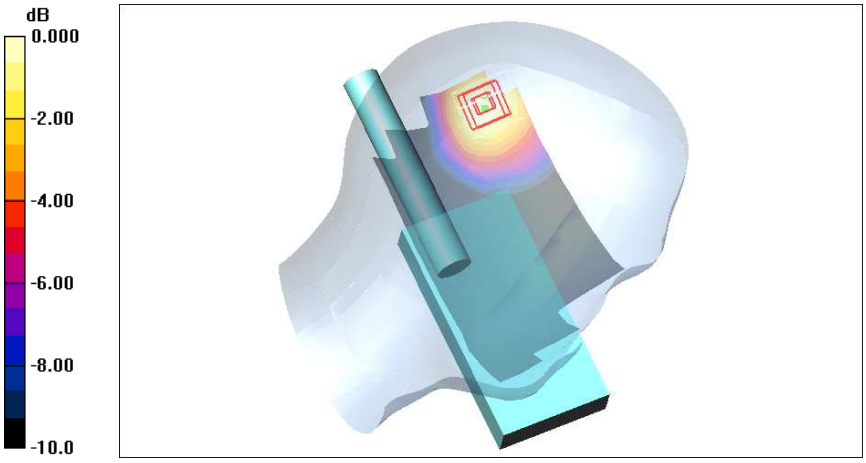
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/2 BPSK 31.25 kHz (Left-Hand Side)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.35 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Left Section

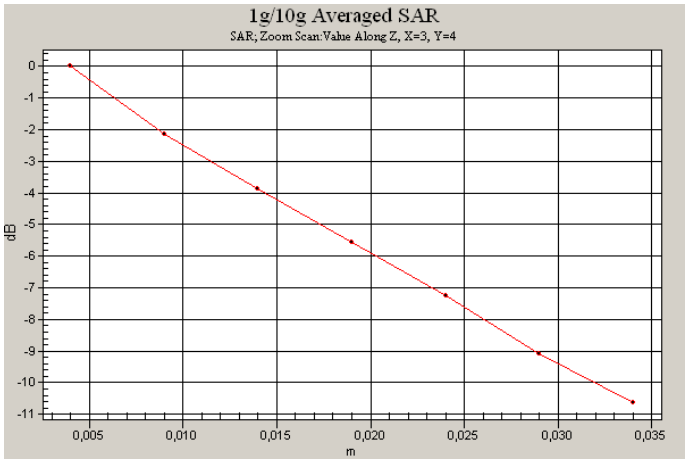
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.69, 4.69, 4.69); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: SAM head-body simulator ; Type: Twin SAM V4.0; Serial: ---
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

30° Tilt position - Middle/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.419 mW/g

30° Tilt position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.28 V/m; Power Drift = -0.215 dB
Peak SAR (extrapolated) = 0.591 W/kg
SAR(1 g) = 0.374 mW/g; SAR(10 g) = 0.236 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.408 mW/g



0 dB = 0.408mW/g



Satellite π/2 BPSK (31.25kHz BW) – 60º Left hand side – Touch position – Middle Channel

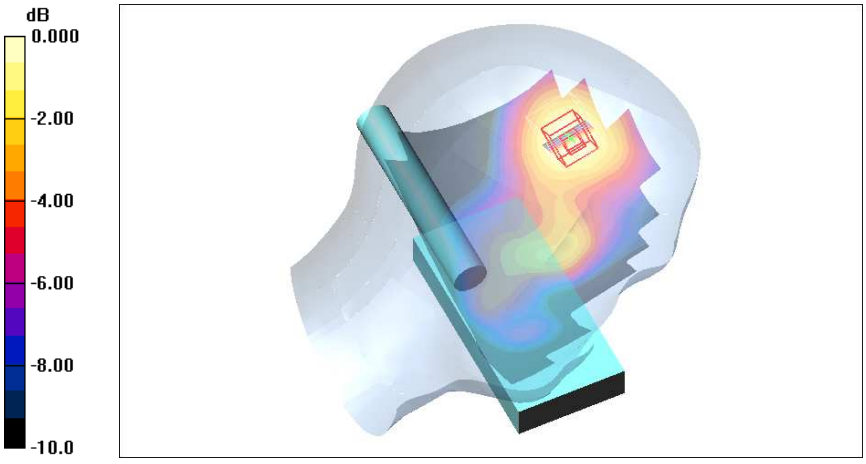
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/2 BPSK 31.25 kHz (Left-Hand Side)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.35 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Left Section

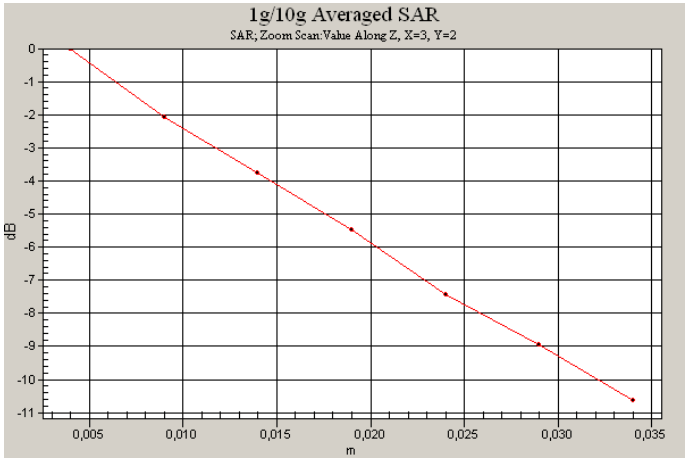
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.69, 4.69, 4.69); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: SAM head-body simulator ; Type: Twin SAM V4.0; Serial: ---
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

60º Touch position - Middle/Area Scan (101x131x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.178 mW/g

60º Touch position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.9 V/m; Power Drift = -0.017 dB
Peak SAR (extrapolated) = 0.252 W/kg
SAR(1 g) = 0.162 mW/g; SAR(10 g) = 0.104 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.178 mW/g



0 dB = 0.178mW/g



Satellite π/2 BPSK (31.25kHz BW) – 60º Left hand side – Tilt position – Middle Channel

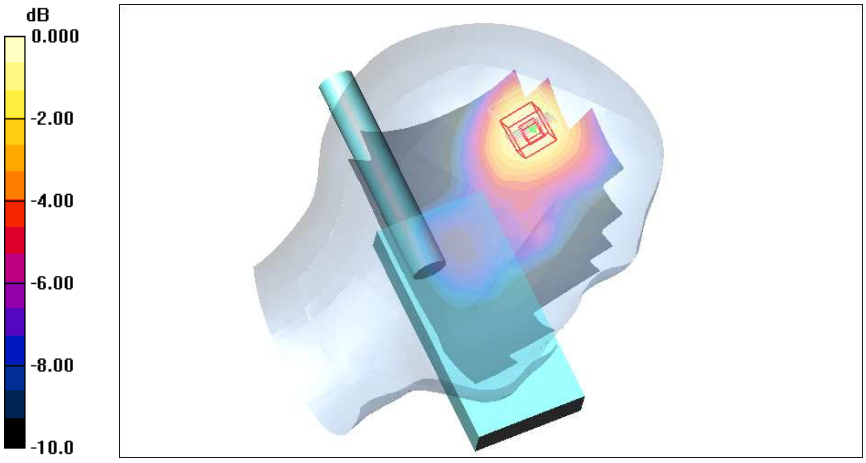
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/2 BPSK 31.25 kHz (Left-Hand Side)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.35 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Left Section

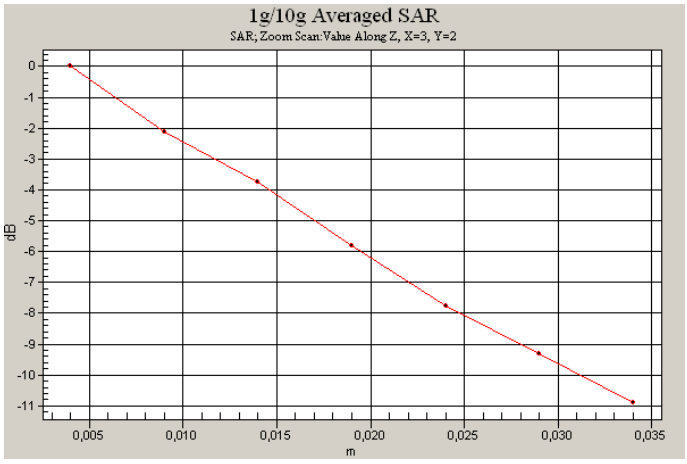
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.69, 4.69, 4.69); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: SAM head-body simulator ; Type: Twin SAM V4.0; Serial: ---
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

60º Tilt position - Middle/Area Scan (101x131x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.279 mW/g

60º Tilt position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.0 V/m; Power Drift = 0.216 dB
Peak SAR (extrapolated) = 0.438 W/kg
SAR(1 g) = 0.257 mW/g; SAR(10 g) = 0.162 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.280 mW/g



0 dB = 0.280mW/g



Satellite π/2 BPSK (31.25kHz BW) – Body – 0º with beltclip – Middle Channel

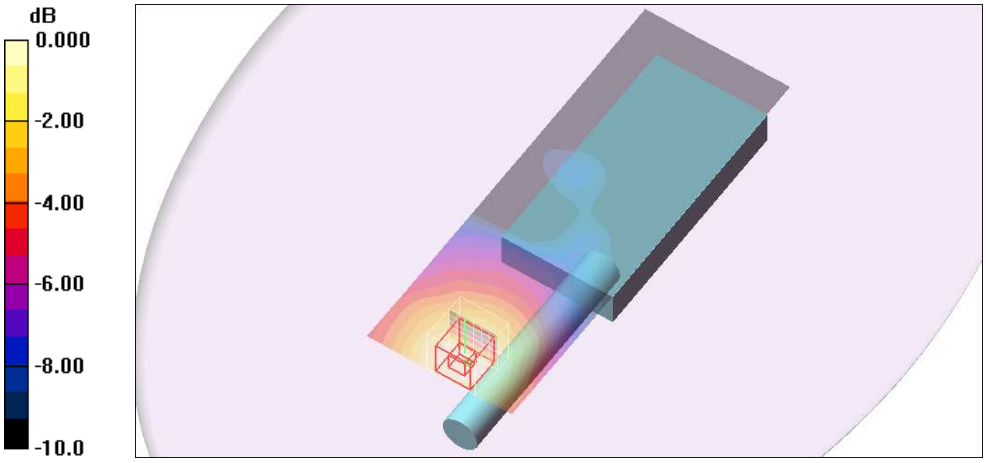
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/2 BPSK 31.25 kHz (Body)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.58 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

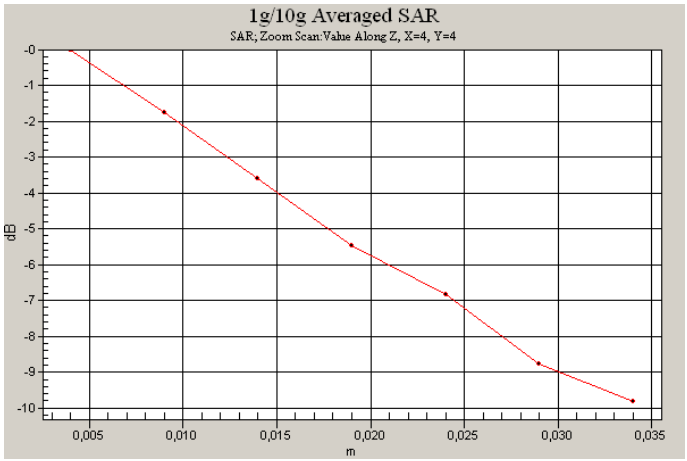
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.46, 4.46, 4.46); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

0º with belt-clip, Middle CH/Area Scan (61x171x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.139 mW/g

0º with belt-clip, Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.42 V/m; Power Drift = 0.327 dB
Peak SAR (extrapolated) = 0.204 W/kg
SAR(1 g) = 0.134 mW/g; SAR(10 g) = 0.090 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.145 mW/g



0 dB = 0.145mW/g



Satellite π/2 BPSK (31.25kHz BW) – Body – 180° with beltclip – Middle Channel

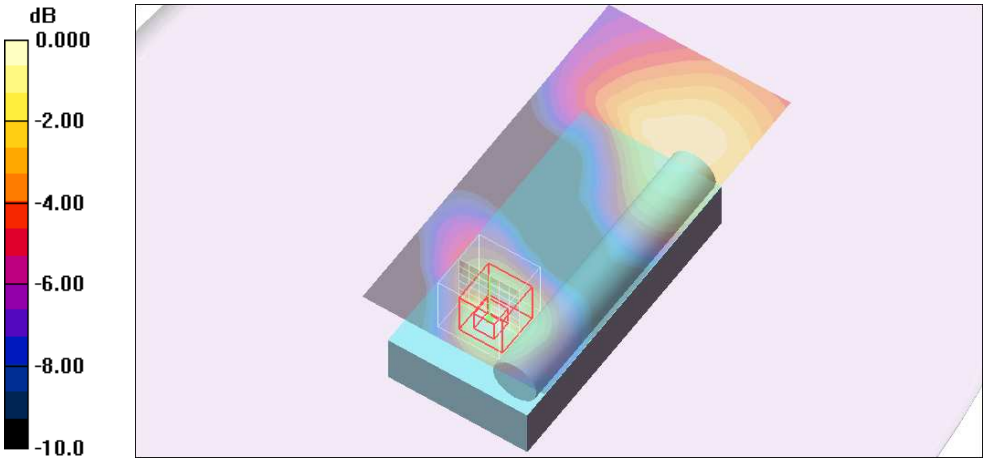
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/2 BPSK 31.25 kHz (Body)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.58 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

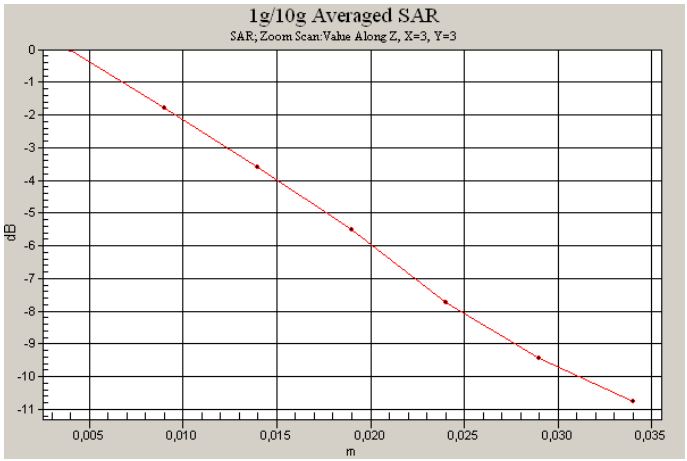
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.46, 4.46, 4.46); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

180° with belt-clip, Middle CH/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.089 mW/g

180° with belt-clip, Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.07 V/m; Power Drift = -0.199 dB
Peak SAR (extrapolated) = 0.127 W/kg
SAR(1 g) = 0.078 mW/g; SAR(10 g) = 0.047 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.088 mW/g



0 dB = 0.088mW/g



Satellite π/4 QPSK (31.25kHz BW) – 30º Left hand side – Tilt position – Middle Channel

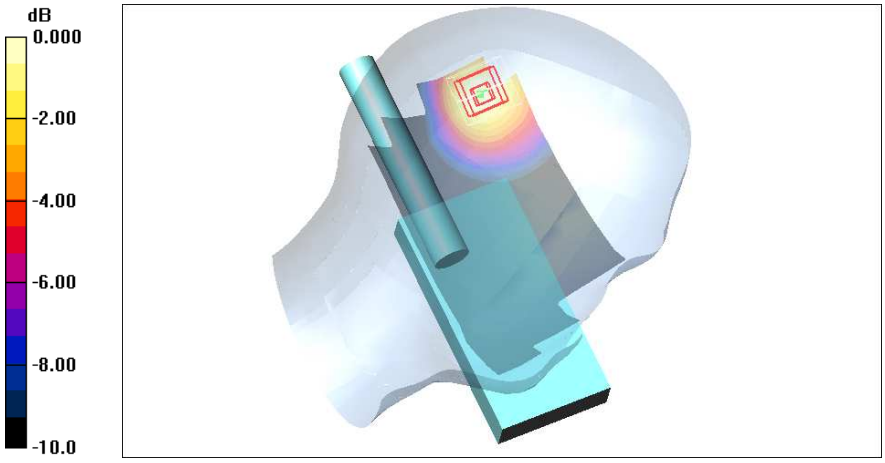
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/4 QPSK 31.25 kHz (Left-Hand Side)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.35 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Left Section

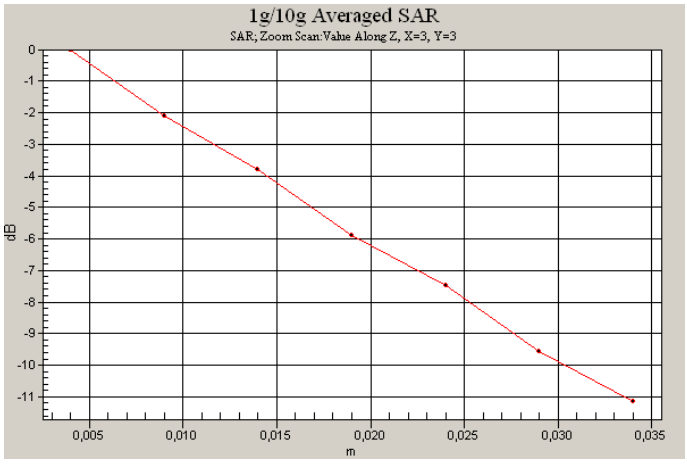
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.69, 4.69, 4.69); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: SAM head-body simulator ; Type: Twin SAM V4.0; Serial: ---
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

30º Tilt position - Middle/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.414 mW/g

30º Tilt position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.7 V/m; Power Drift = 0.143 dB
Peak SAR (extrapolated) = 0.621 W/kg
SAR(1 g) = 0.371 mW/g; SAR(10 g) = 0.230 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.411 mW/g



0 dB = 0.411mW/g



Satellite π/4 QPSK (31.25kHz BW) – 60º Left hand side – Tilt position – Middle Channel

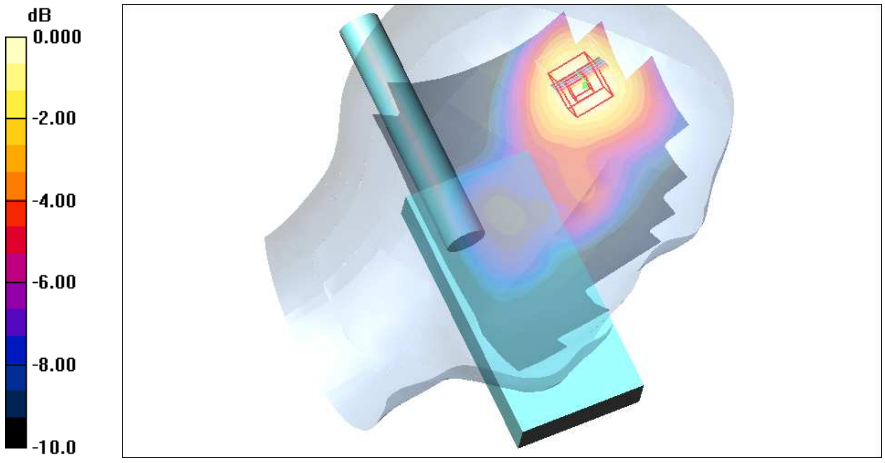
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/4 QPSK 31.25 kHz (Left-Hand Side)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.35 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Left Section

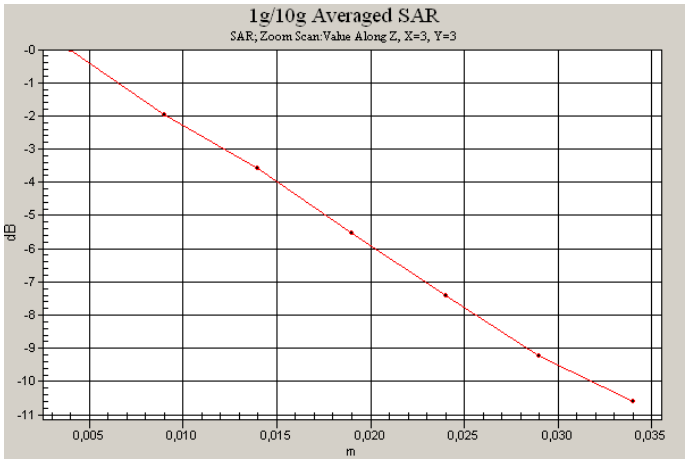
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.69, 4.69, 4.69); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: SAM head-body simulator ; Type: Twin SAM V4.0; Serial: ---
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

60º Tilt position - Middle/Area Scan (101x131x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.248 mW/g

60º Tilt position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.2 V/m; Power Drift = 0.192 dB
Peak SAR (extrapolated) = 0.370 W/kg
SAR(1 g) = 0.224 mW/g; SAR(10 g) = 0.142 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.240 mW/g



0 dB = 0.240mW/g



Satellite π/4 QPSK (31.25kHz BW) – Body – 0º with beltclip – Middle Channel

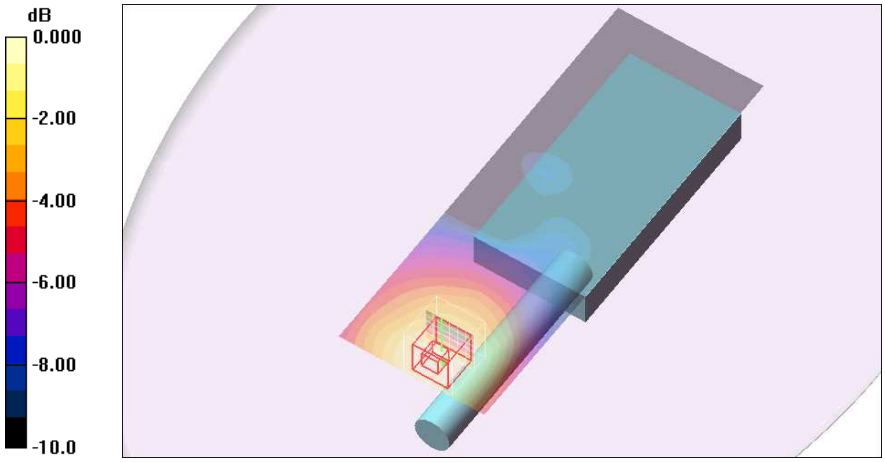
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/4 QPSK 31.25 kHz (Body)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.58 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

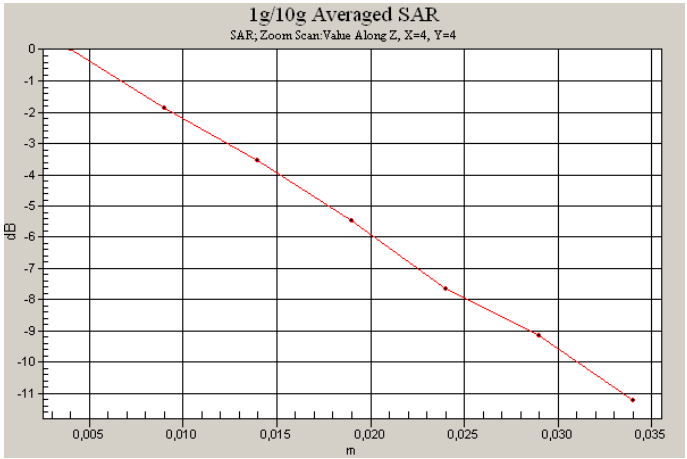
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.46, 4.46, 4.46); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

0º with belt-clip, Middle CH/Area Scan (61x171x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.147 mW/g

0º with belt-clip, Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.53 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 0.213 W/kg
SAR(1 g) = 0.137 mW/g; SAR(10 g) = 0.090 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.148 mW/g



0 dB = 0.148mW/g



Satellite π/4 QPSK (31.25kHz BW) – Body – 180º with beltclip – Middle Channel

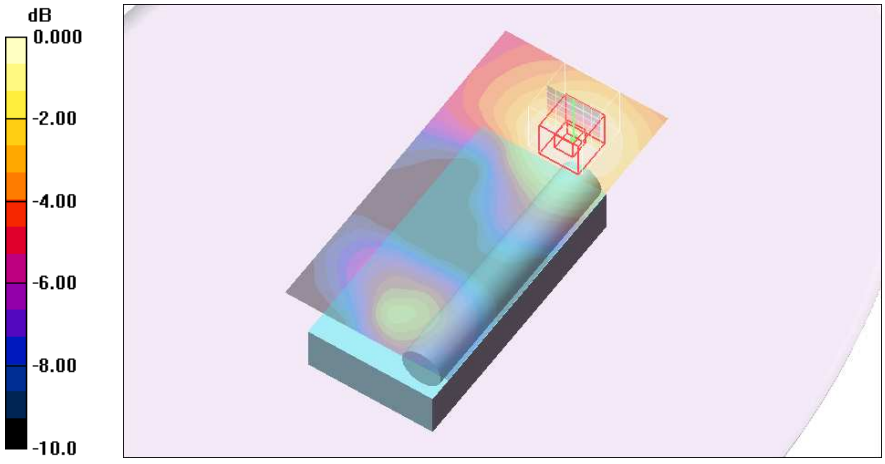
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/4 QPSK 31.25 kHz (Body)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.58 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

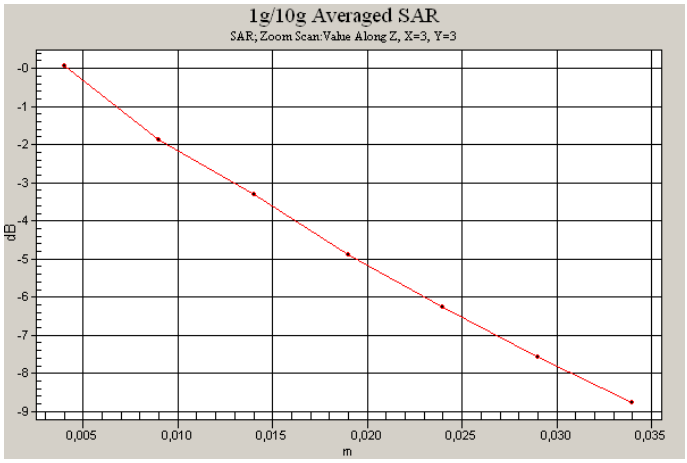
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.46, 4.46, 4.46); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

180º with belt-clip, Middle CH/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.066 mW/g

180º with belt-clip, Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.54 V/m; Power Drift = -0.230 dB
Peak SAR (extrapolated) = 0.093 W/kg
SAR(1 g) = 0.060 mW/g; SAR(10 g) = 0.041 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.065 mW/g



0 dB = 0.065mW/g



Satellite π/4 QPSK (62.5kHz BW) – Body – 0º with beltclip – Middle Channel

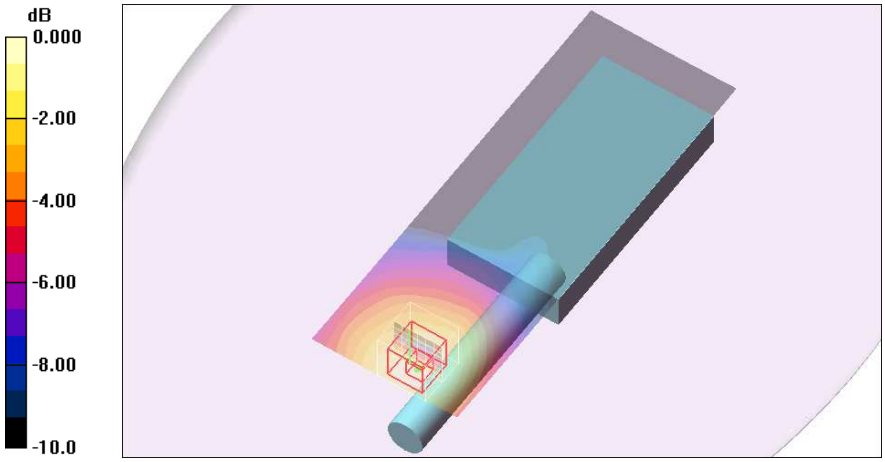
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/4 QPSK 62.5 kHz (Body)

Communication System: Satellite; Frequency: 2010 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2010 MHz; σ = 1.58 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

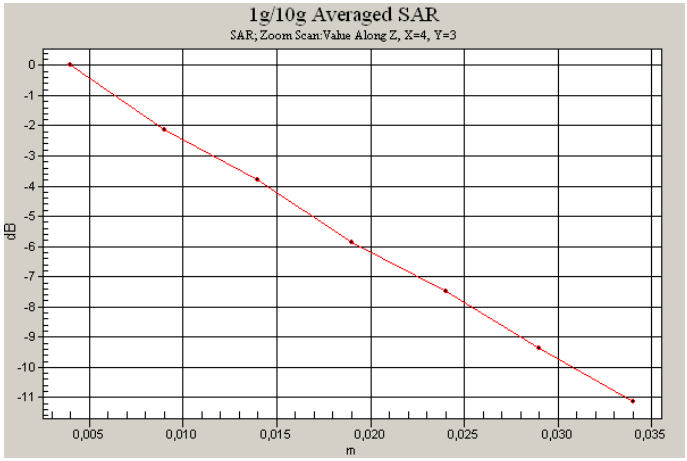
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.46, 4.46, 4.46); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

0º with belt-clip, Middle CH/Area Scan (61x171x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.151 mW/g

0º with belt-clip, Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = 0.004 dB
Peak SAR (extrapolated) = 0.224 W/kg
SAR(1 g) = 0.143 mW/g; SAR(10 g) = 0.093 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.156 mW/g



0 dB = 0.156mW/g



Satellite π/4 QPSK (62.5kHz BW) – Body – 180° with beltclip – Middle Channel

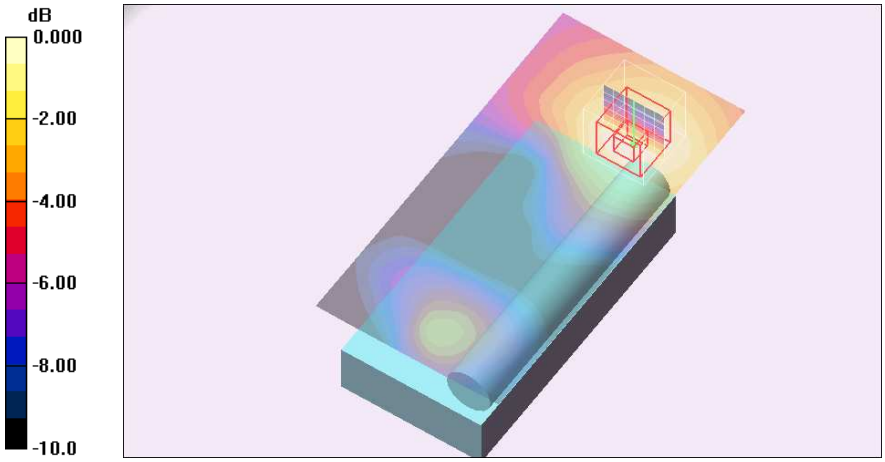
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/4 QPSK 62.5 kHz (Body)

Communication System: Satellite; Frequency: 2010 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2010 MHz; σ = 1.58 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

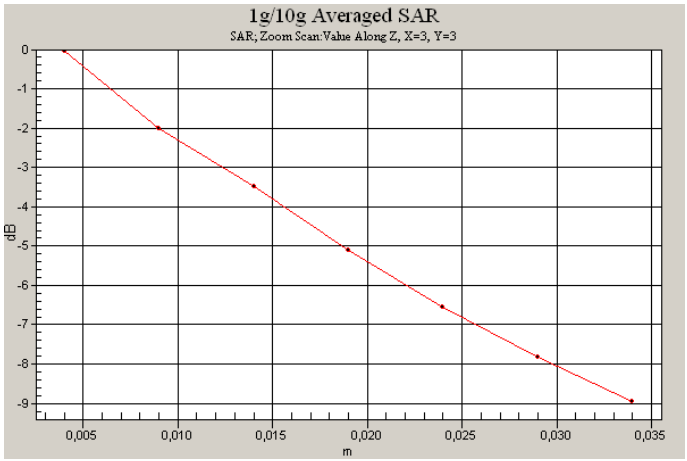
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.46, 4.46, 4.46); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

180° with belt-clip, Middle CH/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.071 mW/g

180° with belt-clip, Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.88 V/m; Power Drift = 0.013 dB
Peak SAR (extrapolated) = 0.105 W/kg
SAR(1 g) = 0.067 mW/g; SAR(10 g) = 0.045 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.074 mW/g



0 dB = 0.074mW/g



Satellite π/4 QPSK (156.25kHz BW) – Body – 0º with beltclip – Middle Channel

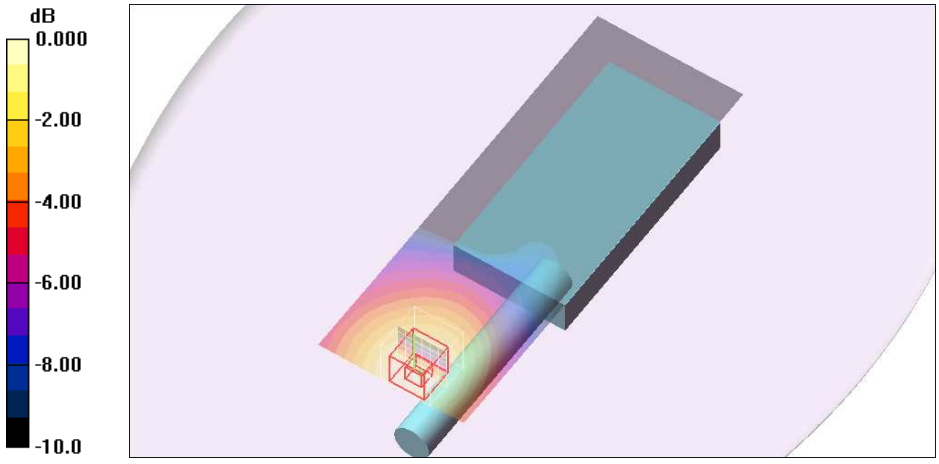
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/4 QPSK 156.25kHz (Body)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.58 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

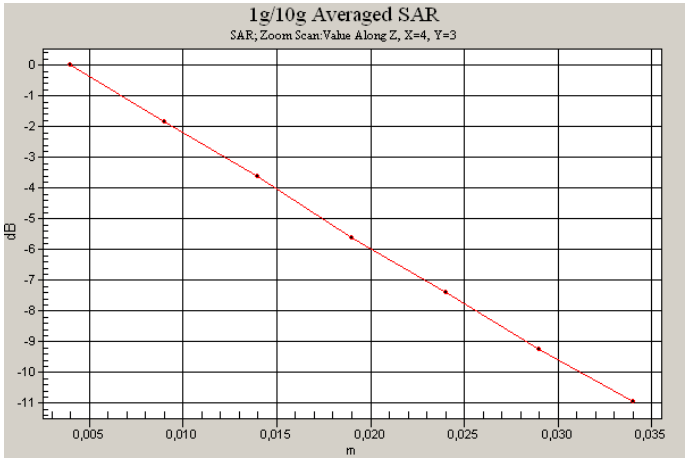
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.46, 4.46, 4.46); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

0º with belt-clip, Middle CH/Area Scan (61x171x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.153 mW/g

0º with belt-clip, Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.96 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 0.211 W/kg
SAR(1 g) = 0.143 mW/g; SAR(10 g) = 0.094 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.152 mW/g



0 dB = 0.152mW/g



Satellite π/4 QPSK (156.25kHz BW) – Body – 180º with beltclip – Middle Channel

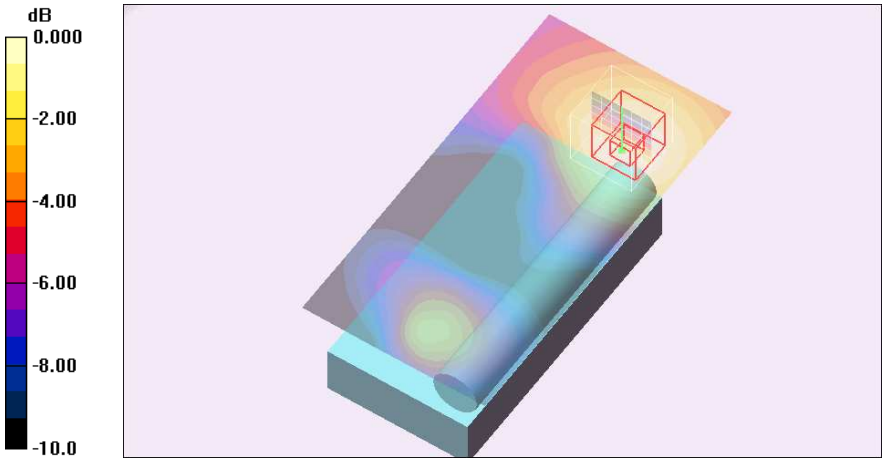
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: pi/4 QPSK 156.25kHz (Body)

Communication System: Satellite; Frequency: 2009.98 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 2009.98 MHz; σ = 1.58 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

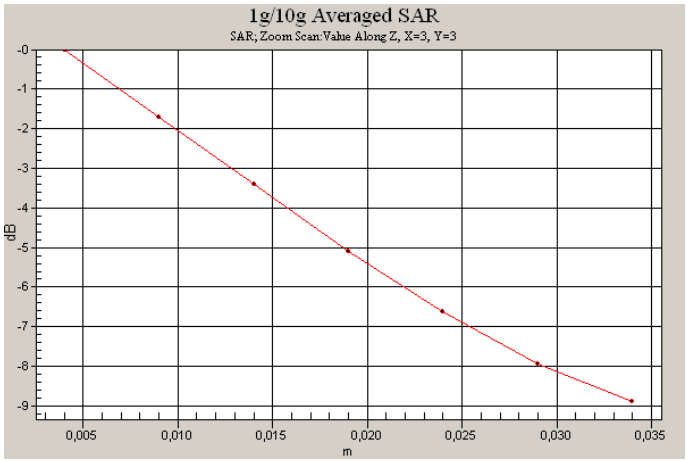
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.46, 4.46, 4.46); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

180º with belt-clip, Middle CH/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.074 mW/g

180º with belt-clip, Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.89 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 0.101 W/kg
SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.047 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.074 mW/g



0 dB = 0.074mW/g



802.11b – Body – 0º with beltclip – Channel 6

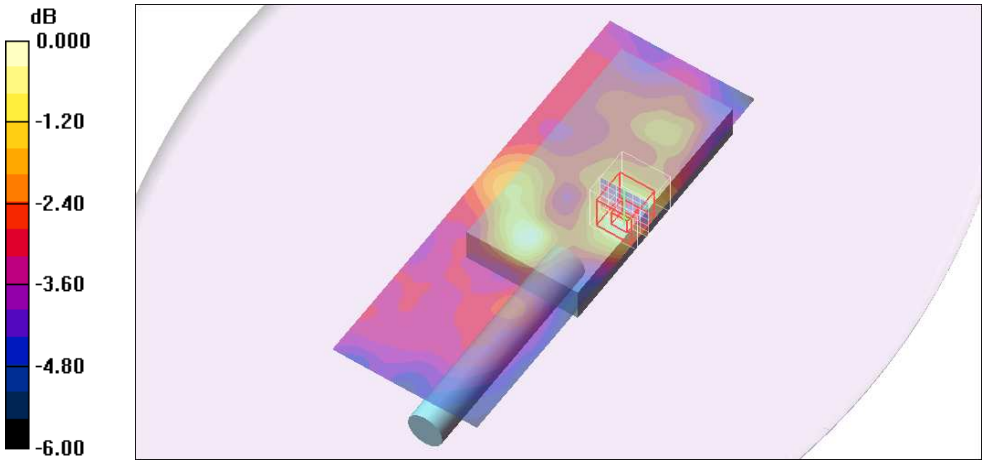
DUT: TSN-1.1, FF3.0; Type: Handset; Serial: EBL00002201
Program Name: 802.11b (Body)

Communication System: 802.11; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.98 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

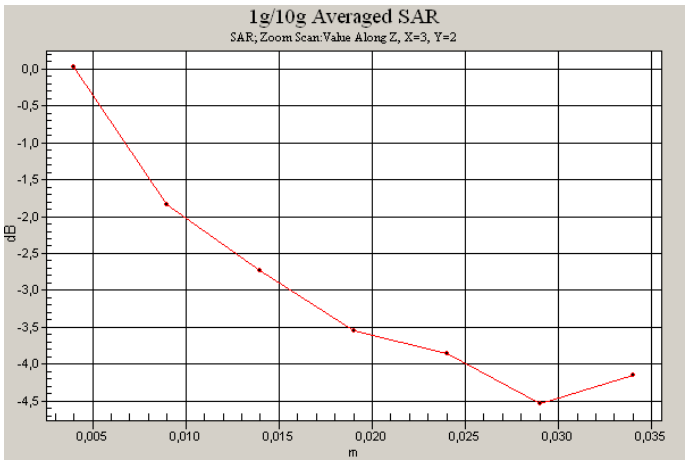
DASY4 Configuration:
- Probe: ES3DV3 - SN3052; ConvF(4.06, 4.06, 4.06); Calibrated: 27/10/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 26/10/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

0º with belt-clip, Middle CH/Area Scan (61x171x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.016 mW/g

0º with belt-clip, Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.36 V/m; Power Drift = -0.267 dB
Peak SAR (extrapolated) = 0.025 W/kg
SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.011 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.016 mW/g



0 dB = 0.016mW/g



APPENDIX D: Photographs

EUT Front face view:

EUT Back face view:

EUT for conducted measurements:

EUT - 0º Satellite Antenna configuration with beltclip:

EUT - 180º Satellite Antenna configuration with beltclip:

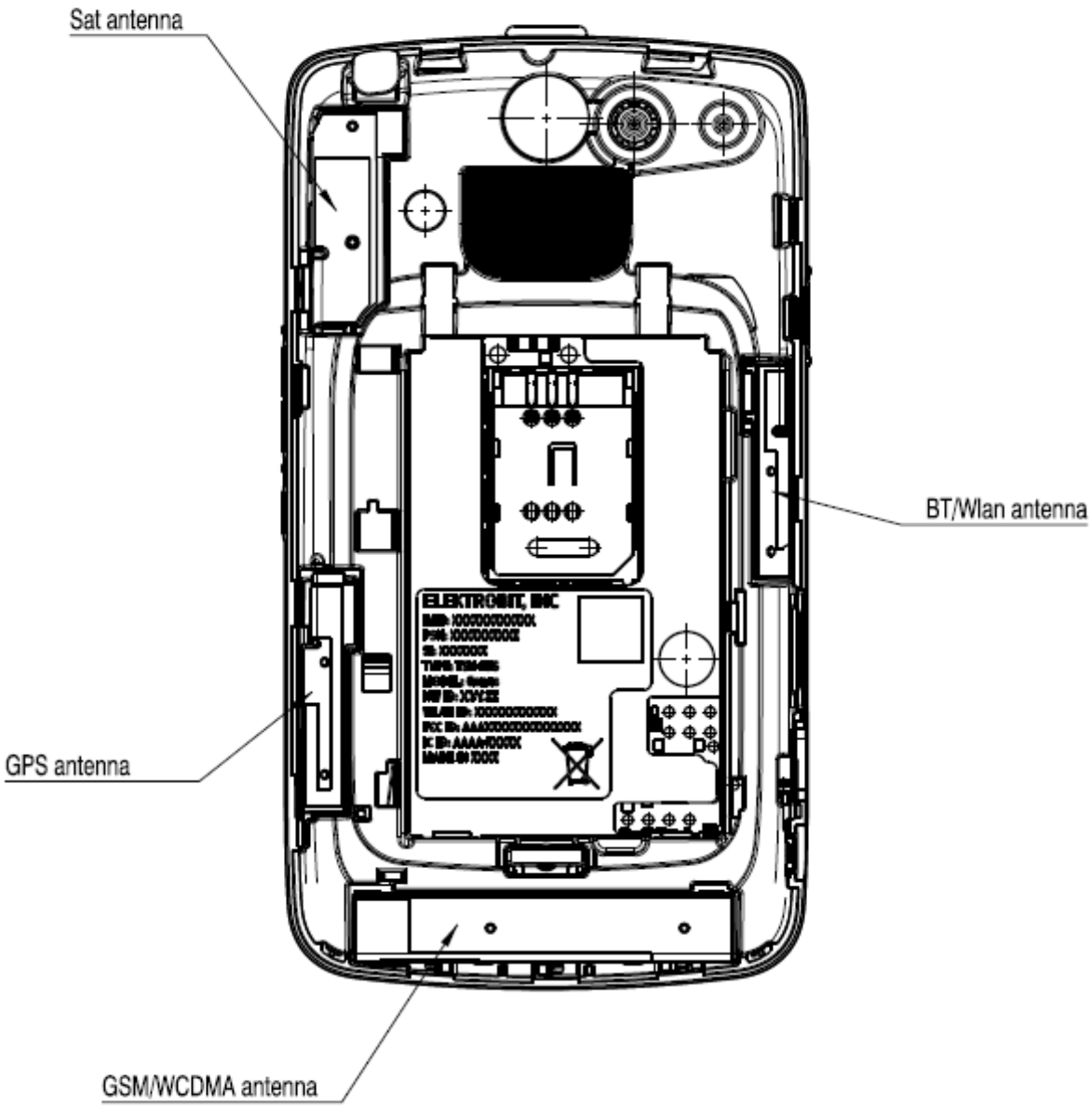
EUT - Righthand 30º Satellite Antenna configuration:

EUT - Righthand 60º Satellite Antenna configuration:

EUT - Lefthand 30º Satellite Antenna configuration:

EUT - Lefthand 60º Satellite Antenna configuration:

Antennas location diagram (EUT back face):



Test set views:

Head cheek position:

Head tilt position:

Body worn 0º with beltclip position:

Body worn 180º with beltclip position:

General test set for head positions:

General test set for body-worn positions:

APPENDIX E: Calibration Data

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

Accreditation No.: SCS 108

Client **AT4 wireless**

Certificate No: **ES3-3052_Oct09**

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3052

Calibration procedure(s) QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2
Calibration procedure for dosimetric E-field probes

Calibration date: October 27, 2009

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	29-Sep-09 (No. DAE4-660_Sep09)	Sep-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

	Name	Function	Signature
Calibrated by:	Marcel Fehr	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 27, 2009

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

DASY - Parameters of Probe: ES3DV3 SN:3052

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
835	± 50 / ± 100	41.5 ± 5%	0.90 ± 5%	5.83	5.83	5.83	0.76	1.13 ± 11.0%
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	5.65	5.65	5.65	0.69	1.17 ± 11.0%
1750	± 50 / ± 100	40.1 ± 5%	1.37 ± 5%	4.99	4.99	4.99	0.39	1.65 ± 11.0%
1900	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.81	4.81	4.81	0.43	1.61 ± 11.0%
2000	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.69	4.69	4.69	0.45	1.62 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.26	4.26	4.26	0.31	2.22 ± 11.0%

[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.

DASY - Parameters of Probe: ES3DV3 SN:3052

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
835	± 50 / ± 100	55.2 ± 5%	0.97 ± 5%	5.71	5.71	5.71	0.70	1.18 ± 11.0%
900	± 50 / ± 100	55.0 ± 5%	1.05 ± 5%	5.55	5.55	5.55	0.78	1.16 ± 11.0%
1750	± 50 / ± 100	53.4 ± 5%	1.49 ± 5%	4.66	4.66	4.66	0.26	2.59 ± 11.0%
1900	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.43	4.43	4.43	0.30	2.45 ± 11.0%
2000	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.46	4.46	4.46	0.25	2.90 ± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	4.06	4.06	4.06	0.49	1.49 ± 11.0%

[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.

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

Accreditation No.: SCS 108

Client AT4 Wireless

Certificate No: D900V2-1d007_Jun09

CALIBRATION CERTIFICATE

Object	D900V2 - SN: 1d007
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	June 16, 2009
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

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

Issued: June 17, 2009

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Measurement Conditions

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

DASY Version	DASY5	V5.0
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	900 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	0.97 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.8 ± 6 %	0.94 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 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	2.65 mW / g
SAR normalized	normalized to 1W	10.6 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**10.7 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.71 mW / g
SAR normalized	normalized to 1W	6.84 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**6.92 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	55.0	1.05 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.4 ± 6 %	1.06 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 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	2.80 mW / g
SAR normalized	normalized to 1W	11.2 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**11.0 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.81 mW / g
SAR normalized	normalized to 1W	7.24 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**7.16 mW / g ± 16.5 % (k=2)**

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

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Accreditation No.: SCS 108

Client: AT4 Wireless

Certificate No: D1800V2-2d099_Jun09

CALIBRATION CERTIFICATE

Object	D1800V2 - SN: 2d099
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	June 18, 2009
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

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

Issued: June 19, 2009

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Measurement Conditions

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

DASY Version	DASY5	V5.0
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	1800 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	41.1 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 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	9.53 mW /g
SAR normalized	normalized to 1W	38.1 mW /g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**38.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.07 mW /g
SAR normalized	normalized to 1W	20.3 mW /g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**20.5 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	54.0 ± 6 %	1.49 mho/m ± 6 %
Body TSL temperature during test	(22.2 ± 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	9.66 mW /g
SAR normalized	normalized to 1W	38.6 mW /g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**39.2 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.17 mW /g
SAR normalized	normalized to 1W	20.7 mW /g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**20.8 mW / g ± 16.5 % (k=2)**

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

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Accreditation No.: SCS 108

Client **AT4 Wireless**

Certificate No: **D2000V2-1021_Jun09**

CALIBRATION CERTIFICATE

Object	D2000V2 – SN:1021
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	June 22, 2009
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

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

Issued: June 22, 2009

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Measurement Conditions

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

DASY Version	DASY5	V5.0
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	2000 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	39.3 ± 6 %	1.43 mho/m ± 6 %
Head TSL temperature during test	(21.4 ± 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	10.9 mW / g
SAR normalized	normalized to 1W	43.6 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**42.7 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.57 mW / g
SAR normalized	normalized to 1W	22.3 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**22.0 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	52.9 ± 6 %	1.59 mho/m ± 6 %
Body TSL temperature during test	(21.6 ± 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	11.0 mW / g
SAR normalized	normalized to 1W	44.0 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**42.7 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.68 mW / g
SAR normalized	normalized to 1W	22.7 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**22.4 mW / g ± 16.5 % (k=2)**

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

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Accreditation No.: SCS 108

Client AT4wireless

Certificate No: D2450V2-756_Jun09

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 756
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	June 19, 2009
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	28-Apr-08 (No. ES3-3025_Apr08)	Apr-09
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

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

Issued: June 19, 2009

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Measurement Conditions

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

DASY Version	DASY5	V5.0
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	40.4 ± 6 %	1.78 mho/m ± 6 %
Head TSL temperature during test	(22.4 ± 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	13.3 mW / g
SAR normalized	normalized to 1W	53.2 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**53.9 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.29 mW / g
SAR normalized	normalized to 1W	25.2 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**25.3 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	53.2 ± 6 %	2.00 mho/m ± 6 %
Body TSL temperature during test	(21.5 ± 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	13.4 mW / g
SAR normalized	normalized to 1W	53.6 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**53.0 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.27 mW / g
SAR normalized	normalized to 1W	25.1 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**25.0 mW /g ± 16.5 % (k=2)**

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