TEST REPORT

TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: Blu+

FCC ID: S5E1106MM1

To: OET Bulletin 65 Supplement C: (2001-01)
IEEE 1528: 2003

Test Report Serial No:
RFI-SAR-RP80655JD22A V7.0

Version 7.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of Chris Guy, Head of Global Approvals:	(APPROVED SIGNATORY)
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1. Customer Information

Company Name:	Satellite Tracking of People LLC
Address:	1212 North Post Oak Road Suite 100 Houston Texas 77055

2. Equipment Under Test (EUT)

2.1. Identification of Equipment Under Test (EUT)

Description:	Ankle-Worn Tracking Device
Brand Name:	Blutag
Model Name or Number:	Blu+
Serial Number:	None Stated
IMEI Number:	353197040010826
Hardware Version Number:	GG79-009
Software Version Number:	V2_01
Hardware Revision of GSM Module:	None Stated
Software Revision of GSM Module:	None Stated
FCC ID Number:	S5E1106MM1
IC ID Number:	9086A-BT70212
Country of Manufacture:	USA
Date of Receipt:	20 February 2012

2.2. Description of EUT

The equipment under test was an ankle worn tracker fitted with an inductive transmitter and a 915 MHz transmitter. The EUT has supports GSM850, PCS1900 and ISM bands with GPRS class 10 capabilities.

2.3. Modifications Incorporated in the EUT

The plastic handles on the EUT was removed to allow the Back of the EUT to be in direct contact with the ‘SAM’ phantom. This orientation represents the most conservative when the Back of the EUT faces the ankle as it allows the antenna to be closer to the ankle.

2.4. Accessories

The following accessories were supplied with the EUT during testing:

Description:	Battery
Brand Name:	None Stated
Model Name or Number:	None stated
Serial Number:	None Stated
Cable Length and Type:	Not Applicable
Country of Manufacture:	None Stated
Connected to Port	3 pin Molex

2.5. Support Equipment

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

Description:	Wireless Communication Test Set
Brand Name:	Agilent
Model Name or Number:	8960 Series 10
Serial Number:	GB46311280
Cable Length and Type:	~2.0m Utiflex Cable
Connected to Port:	RF Input/Output Port

2.6. Additional Information Related to Testing

Equipment Category	GPRS850 / GPRS1900 / ISM at 915 MHz		
Type of Unit	Short Range Device		
Intended Operating Environment:	Within GSM coverage and 915 MHz frequency range		
Transmitter Maximum Output Power Characteristics:	GPRS850	Communication Test Set was configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 5.	
	GPRS1900	Communication Test Set was configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 0.	
	ISM915	Class 3 (:<10mW)	
Transmitter Frequency Range:	GPRS850	(824 to 850) MHz	
	GPRS1900	(1850 to 1910) MHz	
	ISM915	(915) MHz	
Transmitter Frequency Allocation of EUT When Under Test:	**Channel Number**	**Channel Description**	**Frequency (MHz)**
	128	Low	824.2
	189	Middle	836.4
	251	High	848.8
	512	Low	1850.2
	660	Middle	1879.8
	810	High	1909.8
Modulation(s):	GMSK (GPRS): 217 Hz		
Modulation Scheme (Crest Factor):	GMSK (GPRS): 4		
Antenna Type:	Internal		
Antenna Length:	Unknown		
Number of Antenna Positions:	1 Fixed		
Power Supply Requirement:	3.7 V		
Battery Type(s):	Li-ion		

3. Test Specification, Methods and Procedures

3.1. Test Specification

Reference:	OET Bulletin 65 Supplement C: (2001-01)
Title:	Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
Purpose of Test:	To determine whether the equipment met the basic restrictions as defined in OET Bulletin 65 Supplement C: (2001-01) using the SAR averaging method as described in the test specification above.

3.2. Methods and Procedures Reference Documentation

The methods and procedures used were as detailed in:

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

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

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

KDB 447498 D01 “Mobile Portable RF Exposure v04”

KDB 941225 D03 ‘’ SAR Test Reduction GSM/GPRS/EDGE v01’’

The version of DASY system used by RFI for SAR measurements is v4.7.

The SAR probe for the DASY v4.4 and higher has a validity of +/- 100 MHz from the spot frequency at which the system is calibrated.

The system validation performed at 900 MHz is valid for 800 MHz to 1000 MHz which covers the 850 MHz band. The probe calibration for SN3814 was performed at the spot frequencies of 750 MHz and 900 MHz. The SAR software selects the conversion factor based on the following attributes; 1. The operating frequency 2. The measured permittivity imported to the software and 3. The measured conductivity imported to the software.

The 900 MHz system check is applicable for the 850 band as this is within 100 MHz of the of the 850 MHz spot frequency.

As per FCC KDB pub 450824 for SAR probe calibration; The following procedures are recommended for DUT measurements at 150 MHz to 3 GHz to minimize probe calibration and tissue dielectric parameter discrepancies. Measurements exceeding 50 % of these intervals, in this case +/- 50 MHz, EUT frequency greater than or equal to 300 MHz, shall apply method 1 of the steps.
1) When the actual tissue dielectric parameters used for probe calibration are available the differences for relative permittivity and conductivity between probe calibration and routine measurements should each be less than or equal to 5 % while also satisfying the required +/- 5 % tolerances in target dielectric parameters.

The simulation liquid used satisfies both 835 MHz and 900 MHz target values for all channels in the GSM850 band. The SAR probe coverage and conversion factor has been calibrated to ensure this condition is met and the appropriate conversion factor is used in the frequency range for up to +/- 100 MHz.

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

4. Deviations from the Test Specification

Test was performed according to the ankle-worn procedures in consideration with FCC OET Bulletin 65 Supplement C 01-01 specific FCC test procedures, KDB 447498 D01 “Mobile Portable RF Exposure v04”, KDB 941225 D03 ‘’ SAR Test Reduction GSM/GPRS/EDGE v01’’ and tracking number KDB 407931 were taken into consideration.

The samples used for SAR assessment were as per section 2 of this report.

GPRS class 10-uplink setup, with 1-uplink, 2-uplink were evaluated to find the setting with the highest power reference point measurements (units v/m). 2-uplink for GPRS850 / GPRS1900 was found to give the highest power reference point measurement on the DASY4 system. All settings were performed with the device in a fixed position to ensure there were no positioning errors. The following values were measured relative to the uplink settings:

GPRS Mode	GPRS850 Band Power (v/m)	GPRS1900 Power (v/m)
1 uplink	35.67	19.87
2 uplink	**50.43**	**28.36**

SAR test was not evaluated on ‘Top-Edge’ or ‘Bottom-Edge’ of EUT as the user-to-edge is not in direct contact to the user. To demonstrate these pictures ***PHT/87453JD01/009*** & ***PHT/87453JD01/010*** are included in the report in appendix 4.

Prior to commencing the test, the test set up was confirmed for this product under FCC enquiry KDB 407931.

As per FCC KDB 447498, SAR test was performed for the GSM850 and PCS1900 bands, as the power levels were above $60/f_{GHz}$. For the ISM915 band SAR test was not required, as the power level was below $60/f_{GHz}$.

Blu+ can be operated as a stand-alone device in GPS / GSM modes only or with other accessories to include RF mode using 915 MHz. Blu+ also contains a sensor to detect the presence of metal being wrapped around the case. The Device uses the Cinterion BG2 GSM module to transmit data or alarms via the wireless network. The RF functionality in Blu+ enables the short range communication between Blu+ and its accessories when used. Blu+ will transmit its ID and limited status data. The main Blu+ application processor controls the operation of the modem, cycling its operation to ensure that it is not active and transmitting if the RF 915 MHz or metal detection sensor is in use. In the event of a connection not being established the Blu+ device will store the data and retry at frequent intervals.

GSM Operation

The Blu+ device contains a GSM modem to communicate data and alarms to the central communications gateway. The frequency of these calls can be set remotely or triggered by an internal alarm. The modem is used to establish a data session over the wireless network using TCP/IP. Voice communications is not supported on the Blu+ device.

The BG2 module use for the GPRS class-10/8 functionality has a conducted average output power of 2watts and transmits a GPRS data burst worst-case every 60 seconds. The BG2 transmits for 10 seconds. As a single GPRS time slot takes 570 microseconds. The BG2 uses
17544 time slots to in its transmission that is 17544 in 105264 time slots. In normal operation the BG2 module transmits a GPRS data burst every 600 seconds and the transmission last for 20 seconds.

The Worst-case Duty factor = worst-case transmission time / repetition interval = 10/60 = 0.167
Average out power in the BG2 transmission = 2watts (worst-case conducted output Power from the BG2 module GPRS Class 10)* 0.167 (Duty factor) = 0.33watts
The main Blu+ application processor controls the operation of the modem, cycling its operation to ensure that it is not active and transmitting if the RF 915 MHz or metal detection sensor is in use.

In the event of a connection not being established the Blu+ device will store the data and retry at frequent intervals.

Calculations:
GPRS Class 10 operation is 2 out of 8 uplink slots = 0.25 = 25 %
(0.167)(0.25) = 0.042 = 4.2 % **maximum duty factor**

SAR test was performed for GSM850 and PCS1900 bands because the power levels were above 60/f, therefore SAR testing was necessary. For the ISM915 band SAR test was not performed as the power level was below 60/f

60/f at 850 MHz: 60/0.85 = 70.6 mw
60/f at 915 MHz: 60/0.915 = 65.6 mw
60/f at 1900 MHz: 60/1.9 = 31.6 mw

For this device with maximum duty factor applied the following are true:

850 MHz: 2 watts (0.042) = 84 mw and above threshold
915 MHz: < 10 mw, below threshold, SAR testing not required
1900 MHz: 1 watt (0.042) = 42 mw and above threshold

SAR measurement in this report is perform using the normal GSM transmission and duty factor for 2uplink time slot 12.5%. The SAR measurement system crest factor was setup as 4 (8/2 slots). The measured SAR is therefore the maximum worst case the most conservative value.

RF Hardware Operational Description

The Blu+ RF functionality is primarily designed to broadcast a signal to Blu+ accessories. These accessories are primarily designed to assist in areas of poor GPS areas to provide an alternative method of ensuring The Blu+ location. In certain areas of poor GSM coverage the accessory can receive data from the Blu+ and re-transmit it via a PSTN line to a main communications gateway. The accessories are not design to be used within 20cm of the user. Under normal operation the Blu+ transceiver is off. The Blu+ will periodically (random period between 57 and 63 seconds) switch on the transceiver and transmit a short message before switching to receive and waiting for a reply before switching off again. In this mode the transmit duty cycle of the Blu+ is 0.017 - 0.020%. The maximum duration of the Blu+ message is 11ms as is any reply. Both the Blu+ and the accessories have a conducted average power of <10mW

Blu+ employs a Micrel RF505 multichannel FSK transceiver IC designed to operate in the 902- 928 MHz ISM band. All frequencies are generated from a 16 MHz crystal oscillator. The operation of the transceiver is controlled by the main application processor of the Blu+ device. The application uses a single channel (13) at 915 MHz for all half duplex communications. The RF circuit is powered by a 2.5V linear regulator connected to the main battery voltage (3.3 – 4.2V). This can be switched on and off by the main application processor. The Blu+ 915 MHz transceiver only transmits when the GSM modem is off or in sleep mode. In sleep mode the transmissions are synchronized with any modem transmits to ensure the two do not happen simultaneously.

5. Operation and Configuration of the EUT during Testing

5.1. Operating Modes

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

- ISM band was not evaluated as the maximum output power was < 60/f(GHz) in accordance with KDB447498.D4
- Simultaneous transmission was not evaluated as the EUT did not support this feature.
- GPRS850 - Data allocated mode with Communication Test Set configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 5.
- GPRS1900 - Data allocated mode with Communication Test Set configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 0.
- GPRS850/GPRS1900 was tested using 2 Uplink allocated time slots with coding scheme CS1.

GSM850– Power Table Settings used for Test Set	
Power Control Level PCL	Nominal Power (dBm)
0 … 2	39
3	37
4	35
5	**33**
6	31
7	29
8	27
9	25
10	23
11	21
12	19
13	17
14	15
15	13
16	11
17	9
18	7
19 ... 31	5

PCS1900 – Power Table Settings used for Test Set	
Power Control Level PCL	Nominal Power (dBm)
22 … 29	Reserved
30	33
31	32
0	**30**
1	28
2	26
3	24
4	22
5	20
6	18
7	16
8	14
9	12
10	10
11	8
12	6
13	4
14	2
15	0
16 … 21	Reserved

5.2. Configuration and Peripherals

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

- Standalone fully charged battery powered.
- EUT was positioned with the front and Back in direct contact with the 'SAM' phantom. The Back configuration was achieved by removing the plastic handles from the EUT to allow the most conservative position for SAR evaluation on the Back of the EUT.
- SAR test was not evaluated on 'Top-Edge' or 'Bottom-Edge' of EUT as the user-to-edge is not in direct contact to the user. To demonstrate these pictures ***PHT/87453JD01/009*** & ***PHT/87453JD01/010*** are included in the report in appendix 4.

Body Configuration

a) The EUT was placed in a normal operating position where the centre of EUT was aligned with the centre reference point on the flat section of the 'SAM' phantom.

b) With the EUT touching the phantom at an imaginary centre line. The EUT was aligned with a marked plane (X and Y axis) consisting of two lines.

c) For the touch-safe position the EUT was gradually moved towards the flat section of the 'SAM' phantom until any point of the EUT touched the phantom.

d) For position(s) greater then 0mm separation the EUT was positioned as per the touch-safe position, and then the vertical height was decreased/adjusted as required.

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

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

g) The location of the maximum spatial SAR distribution (hot spot) was determined relative to the EUT and its antenna.

h) The EUT was transmitting at full power throughout the duration of the test powered by a fully charged battery.

6. Summary of Test Results

Test Name	Specification Reference	Result
Specific Absorption Rate-GPRS 850 Ankle-worn Configuration 10g	OET Bulletin 65 Supplement C: (2001-01)	Complied
Specific Absorption Rate-GPRS 1900 Ankle-worn Configuration 10g	OET Bulletin 65 Supplement C: (2001-01)	Complied

Note(s):

The Simultaneous Transmission was not evaluated, as the EUT did not support this feature.

6.1. Location of Tests

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

7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

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

7.2. Test Results

7.2.1.Specific Absorption Rate - GPRS 850 Ankle-Worn Configuration 10g

Test Summary:

Tissue Volume:	10g
SAR Limit (W/Kg):	4.000
Maximum Level (W/kg):	3.120

Environmental Conditions:

Temperature Variation in Lab (℃):	23.0 to 23.0
Temperature Variation in Liquid (℃):	22.4 to 22.4

Results:

EUT Position	Phantom Configuration	Channel Number	ERP Burst Avg. Power (dBm)	MPR (dB)	Measured Level (W/kg)	Note(s)	Modulation
Front of EUT Facing Phantom	Flat (SAM)	189	21.4	N/A	0.588	1, 2	GMSK
Back of EUT Facing Phantom	Flat (SAM)	189	21.4	N/A	2.440	1, 2	GMSK
Back of EUT Facing Phantom	Flat (SAM)	128	19.4	N/A	1.840	1, 2	GMSK
Back of EUT Facing Phantom	Flat (SAM)	251	23.5	N/A	3.120	1, 2	GMSK

Note(s):

1. Data - SAR measurements were performed using 2 uplink timeslots
2. SAR measurements were performed with the EUT at a separation distance of 0mm from the ‘SAM’ phantom flat section.

7.2.2.Specific Absorption Rate - GPRS 1900 Ankle-Worn Configuration 10g

Test Summary:

Tissue Volume:	10g
SAR Limit (W/Kg):	4.000
Maximum Level (W/kg):	3.170

Environmental Conditions:

Temperature Variation in Lab (℃):	23.0 to 23.0
Temperature Variation in Liquid (℃):	23.5 to 23.5

Results:

EUT Position	Phantom Configuration	Channel Number	EIRP Burst Avg. Power (dBm)	MPR (dB)	Measured Level (W/kg)	Note(s)	Modulation
Front of EUT Facing Phantom	Flat (SAM)	660	23.6	N/A	0.786	1, 2	GMSK
Back of EUT Facing Phantom	Flat (SAM)	660	23.6	N/A	2.900	1, 2	GMSK
Back of EUT Facing Phantom	Flat (SAM)	512	22.5	N/A	3.170	1, 2	GMSK
Back of EUT Facing Phantom	Flat (SAM)	810	21.9	N/A	2.020	1, 2	GMSK

Note(s):

1. Data - SAR measurements were performed using 2 uplink timeslots
2. SAR measurements were performed with the EUT at a separation distance of 0mm from the ‘SAM’ phantom flat section.

7.2.3.ERP/EIRP Average Power Measurement

CH. #	Freq. (MHZ)	Average ERP/EIRP Power Meas. (dBm)	2 Uplink ERP/EIRP Burst Avg. Power (dBm)	Note
128	824.2	25.4	19.4	1, 2
189	836.6	27.4	21.4	1, 2
251	848.8	29.5	23.5	1, 2
512	1850.2	28.5	22.5	1, 2
660	1879.8	29.6	23.6	1, 2
810	1909.8	27.9	21.9	1, 2

Note:

1. ERP/EIRP power measurements were performed by RFI.
2. 2 Uplink: time slot ratio = 8:2 => 10*log(8/2) = **6.02 dB**

8. Measurement Uncertainty

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

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

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

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

Test Name	Confidence Level	Calculated Uncertainty
Specific Absorption Rate - GPRS 850 Ankle-worn Configuration 10g	95%	±18.53%
Specific Absorption Rate- GPRS 1900 Ankle-worn Configuration 10g	95%	±18.38%

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

8.1. Specific Absorption Rate - GPRS 850 Ankle-worn Configuration 10g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\ (10g)}$	Standard Uncertainty + u (%)	Standard Uncertainty - u (%)	υ_i or υ_{eff}
B	Probe calibration	6.000	6.000	normal (k=1)	1.0000	1.0000	6.000	6.000	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration /Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	1.900	1.900	normal (k=1)	1.0000	1.0000	1.900	1.900	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.4300	1.241	1.241	∞
A	Liquid Conductivity (measured value)	4.690	4.690	normal (k=1)	1.0000	0.4300	2.017	2.017	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.4900	1.415	1.415	∞
A	Liquid Permittivity (measured value)	4.860	4.860	normal (k=1)	1.0000	0.4900	2.381	2.381	5
	Combined standard uncertainty			t-distribution			9.46	9.46	>500
	Expanded uncertainty			k = 1.96			18.53	18.53	>500

8.2. Specific Absorption Rate - GPRS1900 Ankle-worn Configuration 10g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\ (10g)}$	Standard Uncertainty + u (%)	Standard Uncertainty - u (%)	υ_i or υ_{eff}
B	Probe calibration	6.000	6.000	normal (k=1)	1.0000	1.0000	6.000	6.000	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration / Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	1.200	1.200	normal (k=1)	1.0000	1.0000	1.200	1.200	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.4300	1.241	1.241	∞
A	Liquid Conductivity (measured value)	4.940	4.940	normal (k=1)	1.0000	0.4300	2.124	2.124	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.4900	1.415	1.415	∞
A	Liquid Permittivity (measured value)	4.980	4.980	normal (k=1)	1.0000	0.4900	2.440	2.440	5
	Combined standard uncertainty			t-distribution			9.38	9.38	>500
	Expanded uncertainty			k = 1.96			18.38	18.38	>500

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A034	Narda 20W Termination	Narda	374BNM	8706	Calibrated as part of system	-
A1097	SMA Directional Coupler	MiDISCO	MDC6223-30	None	Calibrated as part of system	-
A1137	3dB Attenuator	Narda	779	04690	Calibrated as part of system	-
A1174	Dielectric Probe Kit	Agilent Technologies	85070C	Us99360072	Calibrated before use	-
A1328	Handset Positioner	Schmid & Partner Engineering AG	Modification	SD 000 H01 DA	-	-
A1182	Handset Positioner	Schmid & Partner Engineering AG	V3.0	None	-	-
A1234	Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE3	392	26 Jan 2012	12
A2077	Probe	Schmid & Partner Engineering AG	EX3 DV4	3814	22 Sep 2011	12
A1235	900 MHz Dipole Kit	Schmid & Partner Engineering AG	D900V2	124	09 Feb 2011	24
A1237	1900 MHz Dipole Kit	Schmid & Partner Engineering AG	D1900V2	540	08 Feb 2011	24
A1238	SAM Phantom	Schmid & Partner Engineering AG	SAM b	001	Calibrated before use	-
A1497	Amplifier	Mini-Circuits	zhl-42w (sma)	e020105	Calibrated as part of system	-
A1566	SAM Phantom	Schmid & Partner Engineering AG	SAM a	002	Calibrated before use	-
A1990	Digital Camera	Samsung	E515	A23WC90 8A05431K	-	-
A215	20 dB Attenuator	Narda	766-20	9402	Calibrated as part of system	-
A1531	Antenna	AARONIA AG	7025	02458	-	-
C1145	Cable	Rosenberger MICRO-COAX	FA147A F003003030	41843-1	Calibrated as part of system	-
C1146	Cable	Rosenberger MICRO-COAX	FA147A F030003030	41752-1	Calibrated as part of system	-
G0528	Robot Power Supply	Schmid & Partner Engineering AG	DASY4	None	Calibrated before use	-

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
G087	PSU	Thurlby Thandar	CPX200	100701	Calibrated before use	-
M1047	Robot Arm	Staubli	RX908 L	F00/SD8 9A1/A/01	Calibrated before use	-
M1159	Signal Generator	Agilent Technologies	E8241A	US42110332	Internal Checked 15 Dec 2011	4
M1071	Spectrum Analyzer	Agilent	HP8590E	3647U00514	(Monitoring use only)	-
M1044	Diode Power Sensor	Rohde & Schwarz	NRV-Z1	893350/019	26 May 2011	12
M265	Diode Power Sensor	Rohde & Schwarz	NRV-Z1	893350/017	26 May 2011	12
M263	Dual Channel Power Meter	Rohde & Schwarz	NRVD	826558/004	25 May 2011	12
M509	Thermometer	Testo 110 Immersion Probe & Thermometer	Testo 110	03100047	25 May 2011	12
M1270	Digital Thermometer	RS	N/A	N/A	Internal Checked 13 May 2011	12
S256	SAR Lab	RFI	Site 56	N/A	Calibrated before use	-

Note: All assets were in calibration during the course of testing.

A.1.1. Calibration Certificates

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

The following information is justification to why the listed dipoles calibration period has been extended. This address FCC KDB 450824 D02

Cal Date	Dipole Calibration History									
	Dipole SN: 124, Frequency 900 MHz									
	Head Parameters					Body Parameters				
	1g (W/Kg)	10g (W/Kg)	Return loss (dB)	Real (Ω)	Imaginary (Ω)	1g (W/Kg)	10g (W/Kg)	Return loss (dB)	Real (Ω)	Imaginary (Ω)
27-Jun-12	Lab Annual Check of dipole		-24.73	49.56	-7.4	Lab Annual Check of dipole		-21.92	48.18	-8.03
09-Feb-11	11.00	7.01	-21.60	48.90	-8.20	11.10	7.14	-20.20	46.10	-8.60
23-Aug-07	10.20	6.56	-21.20	48.60	-8.50	10.50	6.89	-20.20	45.40	-8.10
31-Aug-05	10.60	6.78	-24.70	49.10	-5.70	10.50	6.77	-18.90	44.90	-8.90
13-May-03	10.60	6.76	-24.00	50.30	-6.40	11.00	7.12	-20.60	46.20	-8.20
03-Aug-01	11.28	7.16	-25.40	50.80	-5.60	Dipole calibrated for Head only				
Standard Deviation	**0.42**	**0.23**	**1.77**	**0.85**	**1.25**	**0.32**	**0.18**	**1.08**	**1.25**	**0.37**
|Mean Value|	**10.74**	**6.85**	**23.61**			**10.78**	**6.98**	**20.36**		
Relative standard deviation %	**3.87%**	**3.41%**	**7.49%**			**2.97%**	**2.58%**	**5.31%**		

Cal Date	Dipole Calibration History									
	Dipole SN: 540, Frequency 1900 MHz									
	Head Parameters					Body Parameters				
	1g (W/Kg)	10g (W/Kg)	Return loss (dB)	Real (Ω)	Imaginary (Ω)	1g (W/Kg)	10g (W/Kg)	Return loss (dB)	Real (Ω)	Imaginary (Ω)
27-Jun-12	Lab Annual Check of dipole		-30.57	49.54	1.41	Lab Annual Check of dipole		-29.80	50.34	2.37
08-Feb-11	40.30	21.00	-27.60	50.50	4.20	40.70	21.60	-23.10	45.60	5.00
26-Jun-09	40.30	21.10	-30.00	48.50	2.70	40.90	21.50	-24.30	44.90	2.80
11-Jun-07	36.10	19.30	-25.40	51.90	5.10	38.00	20.70	-25.30	47.70	4.80
14-Jun-05	38.1	19.90	-25.40	51.90	5.20	39.10	20.70	-24.00	48.10	5.90
04-Jun-03	41.20	21.20	-28.50	50.30	3.80	Dipole calibrated for Head only				
Standard Deviation	**2.08**	**0.85**	**2.21**	**1.33**	**1.46**	**1.38**	**0.49**	**2.64**	**2.16**	**1.52**
|Mean Value|	**39.20**	**20.50**	**27.91**			**39.68**	**21.13**	**25.30**		
Relative standard deviation %	**5.30%**	**4.15%**	**7.93%**			**3.47%**	**2.33%**	**10.42%**		

Note(s):

1. SAR lab has more than one dipole, the 900 MHz calibration gap is 24 months from 2007 and a second dipole was use after this period.
2. The dipole history shows that the measured SAR relative standard deviation was all less than 10% for the calibration period. The return loss relative standard deviation was all less than 10 %. And the real and imaginary impedance standard deviation is within 5 **(Ω).**

Appendix 2. Measurement Methods

A.2.1. Evaluation Procedure

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

a) (i) The evaluation was performed in an applicable area of the phantom depending on the type of device being tested. For devices worn about the ear during normal operation, both the left and right ear positions were evaluated at the centre frequency of the band at maximum power. The side, which produced the greatest SAR, determined which side of the phantom would be used for the entire evaluation. The positioning of the head worn device relative to the phantom was dictated by the test specification identified in section 3.1 of this report.

   (ii) For body worn devices or devices which can be operated within 20 cm of the body, the flat section of the SAM phantom was used were the size of the device(s) is normal. for bigger devices and base station the 2mm Oval phantom is used for evaluation. The type of device being evaluated dictated the distance of the EUT to the outer surface of the phantom flat section.

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

c) A 5x5x7 matrix was performed around the greatest spatial SAR distribution found during the area scan of the applicable exposed region. SAR values were then calculated using a 3-D spline interpolation algorithm and averaged over spatial volumes of 1 and 10 grams.

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

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

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

SAR measurements were performed in accordance with Appendix D of the standard FCC OET Bulletin 65 Supplement C: 2001, IEEE 1528 and FCC KDB procedures, against appropriate limits for each measurement position in accordance with the standard. In some cases the FCC was contacted using a PBA or KDB process to ensure test is performed correctly.

The test was performed in a shielded enclosure with the temperature controlled to remain between +18.0ºC and +25.0ºC. The tissue equivalent material fluid temperature was controlled to give a maximum variation of ± 2.0ºC

Prior to any SAR measurements on the EUT, system validation and material dielectric property measurements were conducted. In the absence of a detailed procedure within the specification, system validation and material dielectric property measurements were performed in accordance with Appendix C and Appendix D of FCC OET Bulletin 65 Supplement C: 2001 and FCC KDB publication 450824.

Following the successful system validation and material dielectric property measurements, a SAR versus time sweep shall be performed within 10 mm of the phantom inner surface. If the EUT power output is stable after three minutes then the measurement probe will perform a coarse surface level scan at each test position in order to ascertain the location of the maximum local SAR level. Once this area had been established, a 5x5x7 cube of 175 points (5 mm spacing in each axis ≈ 27g) will be centred at the area of concern. Extrapolation and interpolation will then be carried out on the 27g of tissue and the highest averaged SAR over a 10g cube determined.

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

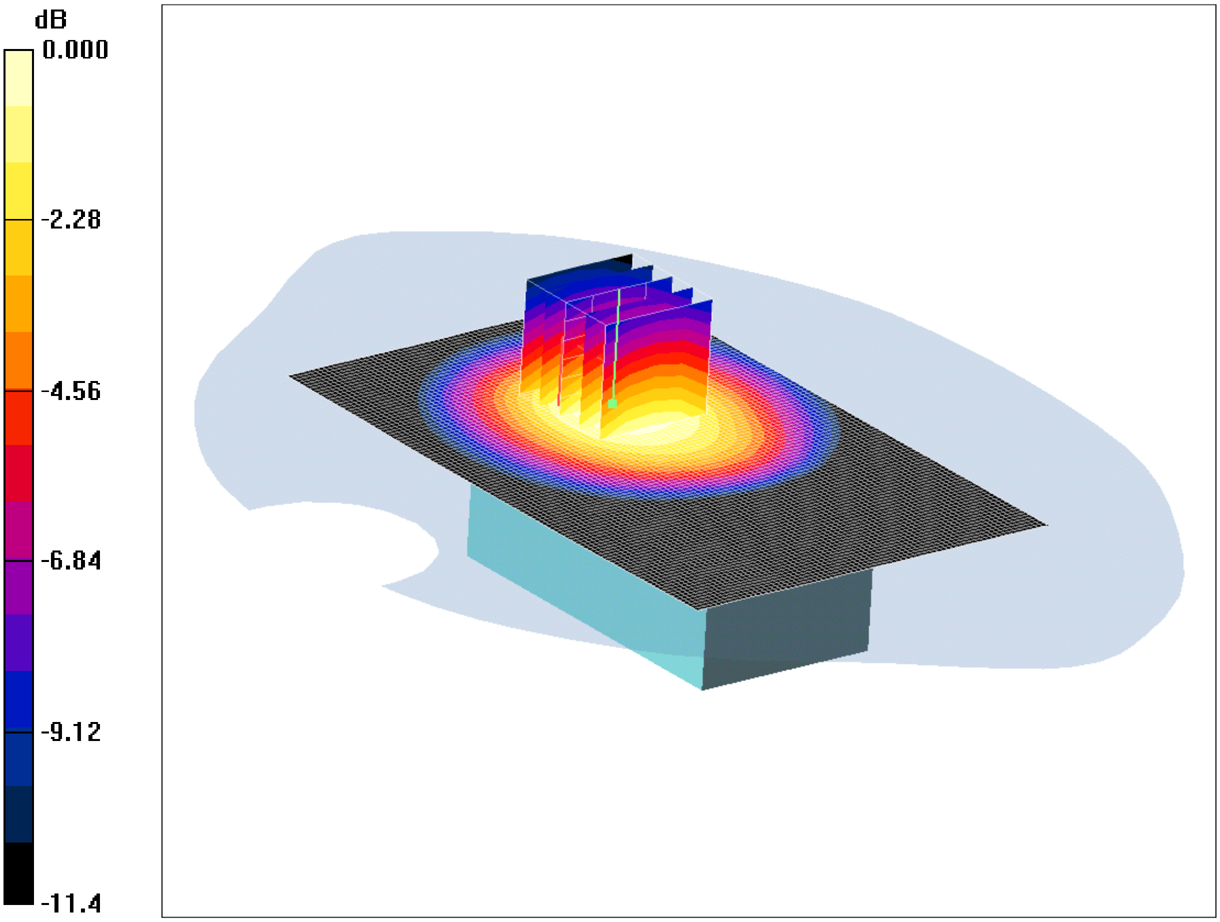
At the end of each position test case a second time sweep shall be performed to check whether the EUT has remained stable throughout the test.

Appendix 3. SAR Distribution Scans

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

Scan Reference Number	Title
SCN/80655JD16/001	Front of EUT Facing Phantom GPRS CH189
SCN/80655JD16/002	Back of EUT Facing Phantom GPRS CH189
SCN/80655JD16/003	Back of EUT Facing Phantom GPRS CH128
SCN/80655JD16/004	Back of EUT Facing Phantom GPRS CH251
SCN/80655JD16/005	Front of EUT Facing Phantom GPRS CH660
SCN/80655JD16/006	Back of EUT Facing Phantom GPRS CH660
SCN/80655JD16/007	Back of EUT Facing Phantom GPRS CH512
SCN/80655JD16/008	Back of EUT Facing Phantom GPRS CH810
SCN/87453JD01/009	System Performance Check 900MHz Body 29 03 12
SCN/87453JD01/010	System Performance Check 1900MHz Body 29 03 12

SCN/87453JD01/001: Front of EUT Facing Phantom GPRS CH189
Date 29/03/2012
DUT: Satellite Tracking of People LLC; Type: Blutag BLU+; Serial: 353197040010826

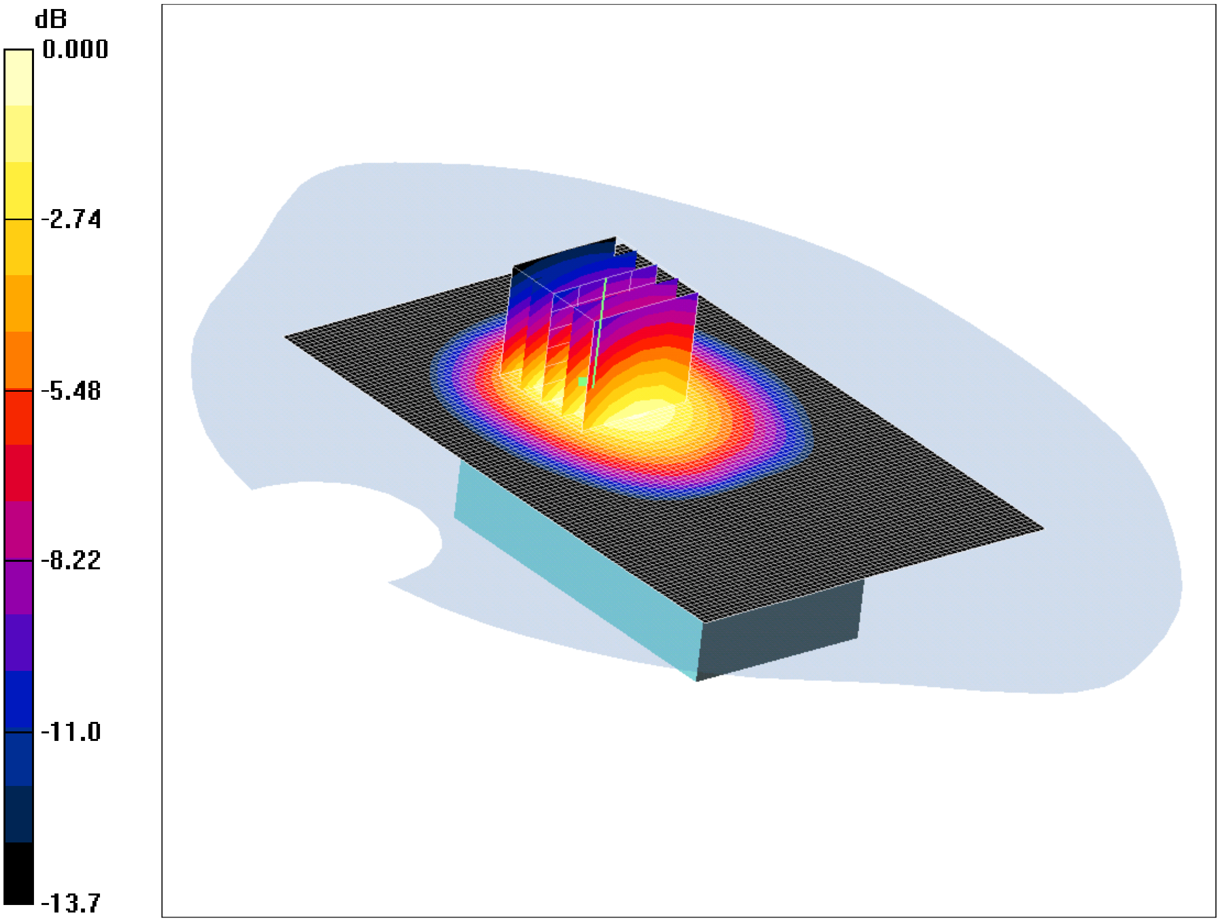


0 dB = 0.894mW/g

Communication System: GPRS 850 MHz 2TX; Frequency: 836.4 MHz;Duty Cycle: 1:4
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 836.4 MHz; σ = 1.01 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(8.92, 8.92, 8.92); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 26/01/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Front of EUT Facing Phantom - Middle/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.882 mW/g
Front of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.6 V/m; Power Drift = -0.193 dB
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.842 mW/g; SAR(10 g) = 0.588 mW/g
Maximum value of SAR (measured) = 0.894 mW/g

SCN/87453JD01/002: Back of EUT Facing Phantom GPRS CH189
Date 29/03/2012
DUT: Satellite Tracking of People LLC; Type: Blutag BLU+; Serial: 353197040010826

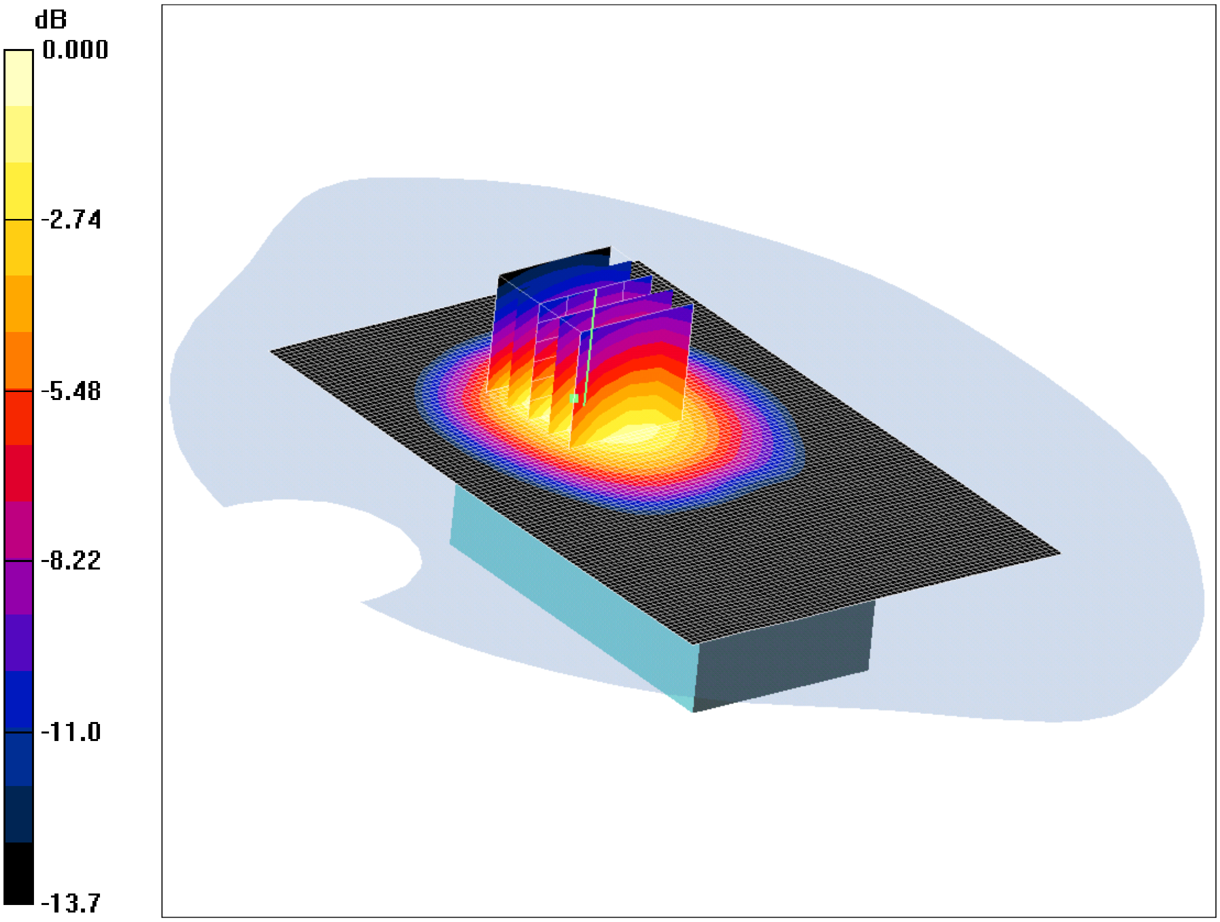


0 dB = 3.94mW/g

Communication System: GPRS 850 MHz 2TX; Frequency: 836.4 MHz;Duty Cycle: 1:4
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 836.4 MHz; σ = 1.01 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(8.92, 8.92, 8.92); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 26/01/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Back of EUT Facing Phantom - Middle/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.03 mW/g
Back of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.3 V/m; Power Drift = 0.045 dB
Peak SAR (extrapolated) = 5.83 W/kg
SAR(1 g) = 3.69 mW/g; SAR(10 g) = 2.44 mW/g
Maximum value of SAR (measured) = 3.94 mW/g

SCN/87453JD01/003: Back of EUT Facing Phantom GPRS CH128
Date 29/03/2012
DUT: Satellite Tracking of People LLC; Type: Blutag BLU+; Serial: 353197040010826

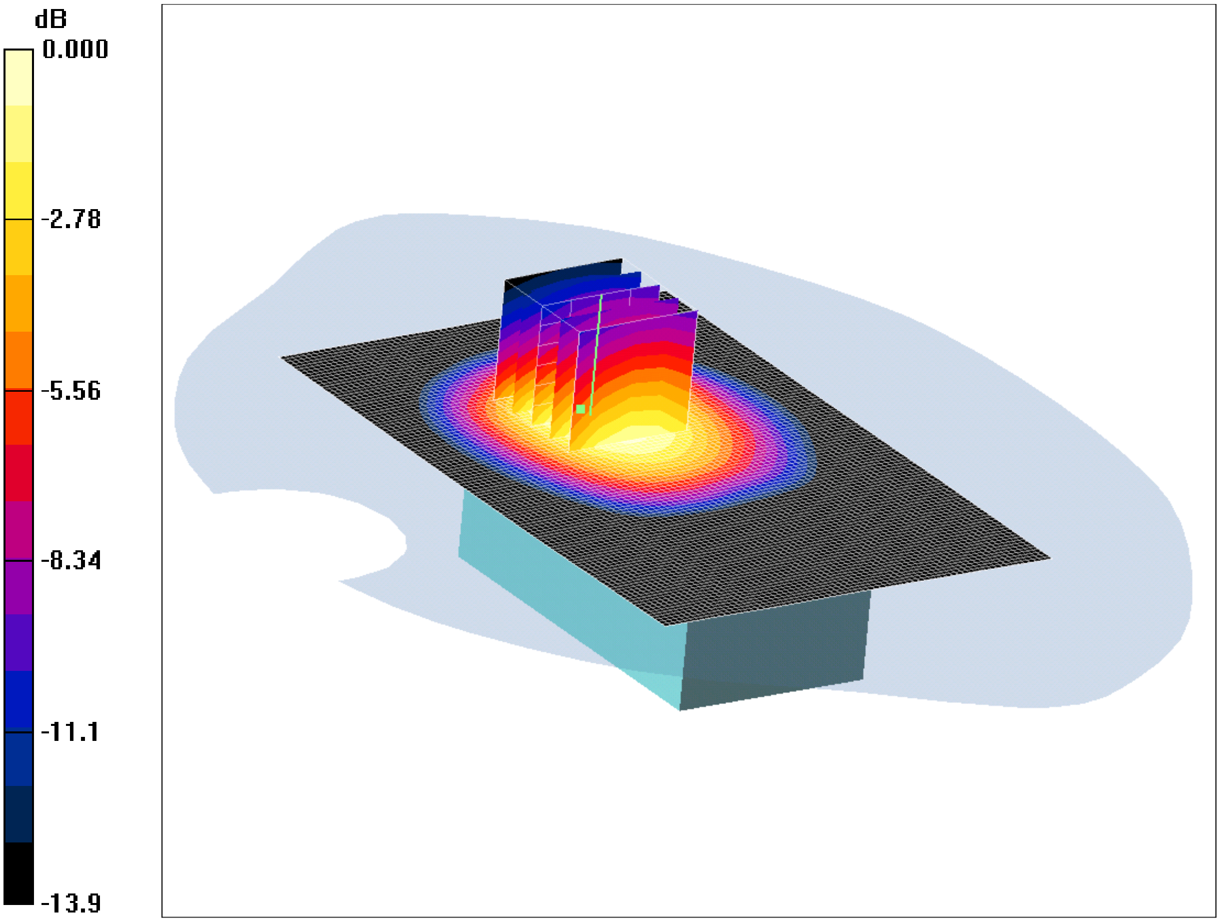


0 dB = 3.10mW/g

Communication System: GPRS 850 MHz 2TX; Frequency: 824.2 MHz;Duty Cycle: 1:4
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.999 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(8.92, 8.92, 8.92); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 26/01/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Back of EUT Facing Phantom - Low/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.25 mW/g
Back of EUT Facing Phantom - Low/Zoom Scan (5x5x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 40.1 V/m; Power Drift = -0.216 dB
Peak SAR (extrapolated) = 4.61 W/kg
SAR(1 g) = 2.88 mW/g; SAR(10 g) = 1.84 mW/g
Maximum value of SAR (measured) = 3.10 mW/g

SCN/87453JD01/004: Back of EUT Facing Phantom GPRS CH251
Date 29/03/2012
DUT: Satellite Tracking of People LLC; Type: Blutag BLU+; Serial: 353197040010826

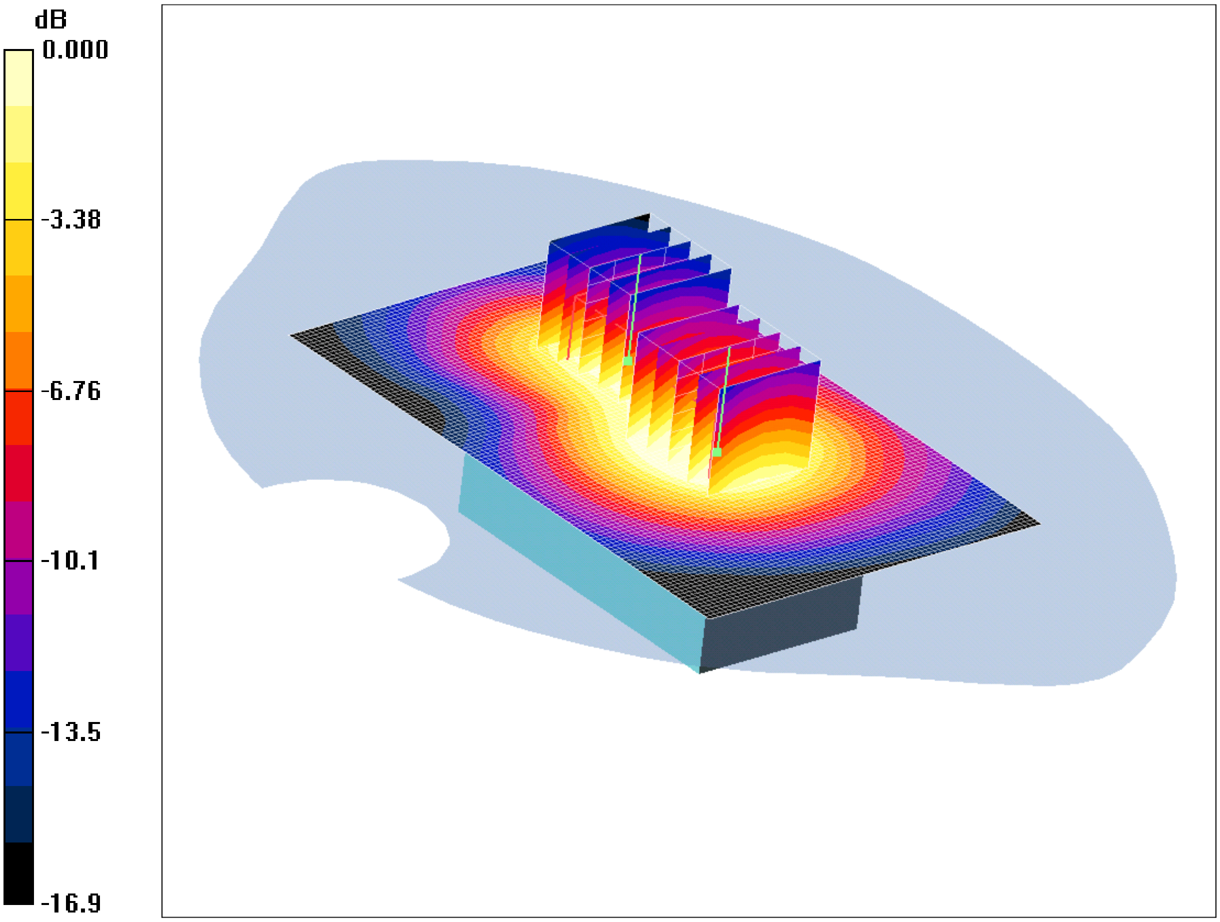


0 dB = 5.12mW/g

Communication System: GPRS 850 MHz 2TX; Frequency: 848.8 MHz;Duty Cycle: 1:4
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 848.8 MHz; σ = 1.01 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(8.92, 8.92, 8.92); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 26/01/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Back of EUT Facing Phantom - High/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 5.34 mW/g
Back of EUT Facing Phantom - High/Zoom Scan (5x5x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.7 V/m; Power Drift = 0.006 dB
Peak SAR (extrapolated) = 7.59 W/kg
SAR(1 g) = 4.76 mW/g; SAR(10 g) = 3.12 mW/g
Maximum value of SAR (measured) = 5.12 mW/g

SCN/87453JD01/005: Front of EUT Facing Phantom GPRS CH660
Date 29/03/2012
DUT: Satellite Tracking of People LLC; Type: Blutag BLU+; Serial: 353197040010826



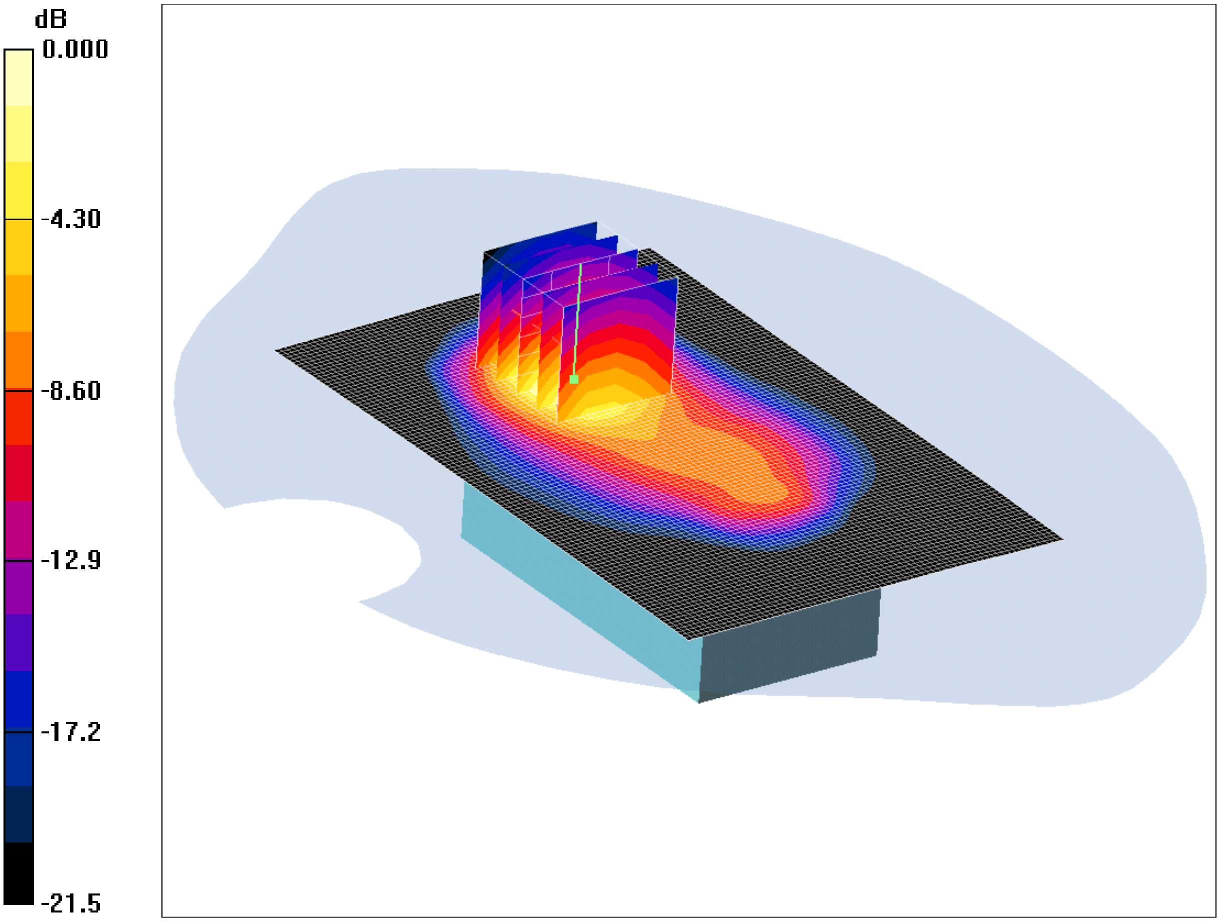
0 dB = 0.909mW/g

Communication System: GPRS 1900 2Tx; Frequency: 1879.8 MHz;Duty Cycle: 1:4
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1879.8 MHz; σ = 1.56 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(7.31, 7.31, 7.31); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 26/01/2012
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Front of EUT Facing Phantom - Middle/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.42 mW/g
Front of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.3 V/m; Power Drift = -0.168 dB
Peak SAR (extrapolated) = 1.97 W/kg
SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.786 mW/g
Maximum value of SAR (measured) = 1.39 mW/g
Front of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.3 V/m; Power Drift = -0.168 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.840 mW/g; SAR(10 g) = 0.498 mW/g
Maximum value of SAR (measured) = 0.909 mW/g

Note: DASY system is configured to measure any secondary maxima that are within 2dB of the measured SAR level.

SCN/87453JD01/006: Back of EUT Facing Phantom GPRS CH660
Date 29/03/2012
DUT: Satellite Tracking of People LLC; Type: Blutag BLU+; Serial: 353197040010826

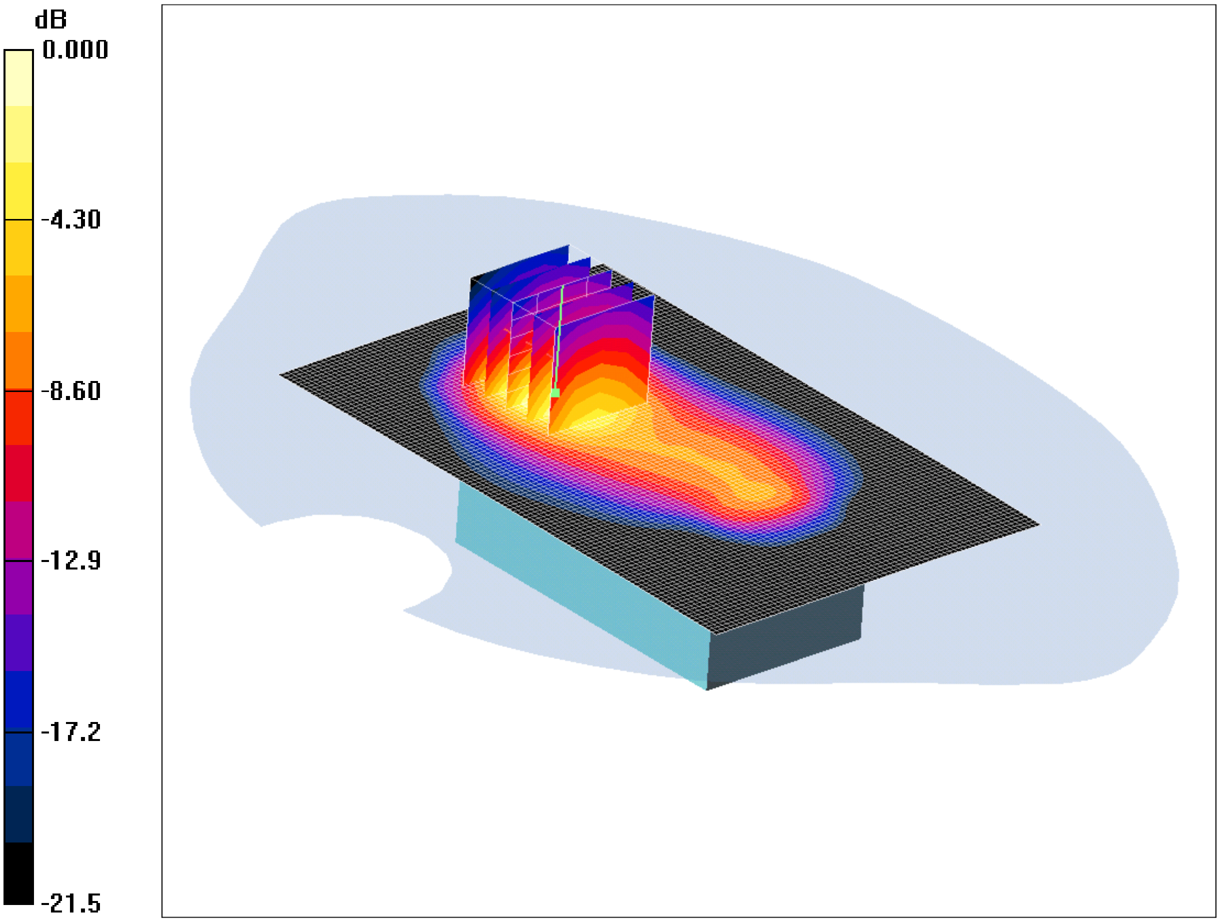


0 dB = 6.25mW/g

Communication System: GPRS 1900 2Tx; Frequency: 1879.8 MHz;Duty Cycle: 1:4
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1879.8 MHz; σ = 1.56 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(7.31, 7.31, 7.31); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 26/01/2012
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Back of EUT Facing Phantom - Middle/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 7.07 mW/g
Back of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.3 V/m; Power Drift = -0.034 dB
Peak SAR (extrapolated) = 11.9 W/kg
SAR(1 g) = 5.81 mW/g; SAR(10 g) = 2.9 mW/g
Maximum value of SAR (measured) = 6.25 mW/g

SCN/87453JD01/007: Back of EUT Facing Phantom GPRS CH512
Date 29/03/2012
DUT: Satellite Tracking of People LLC; Type: Blutag BLU+; Serial: 353197040010826

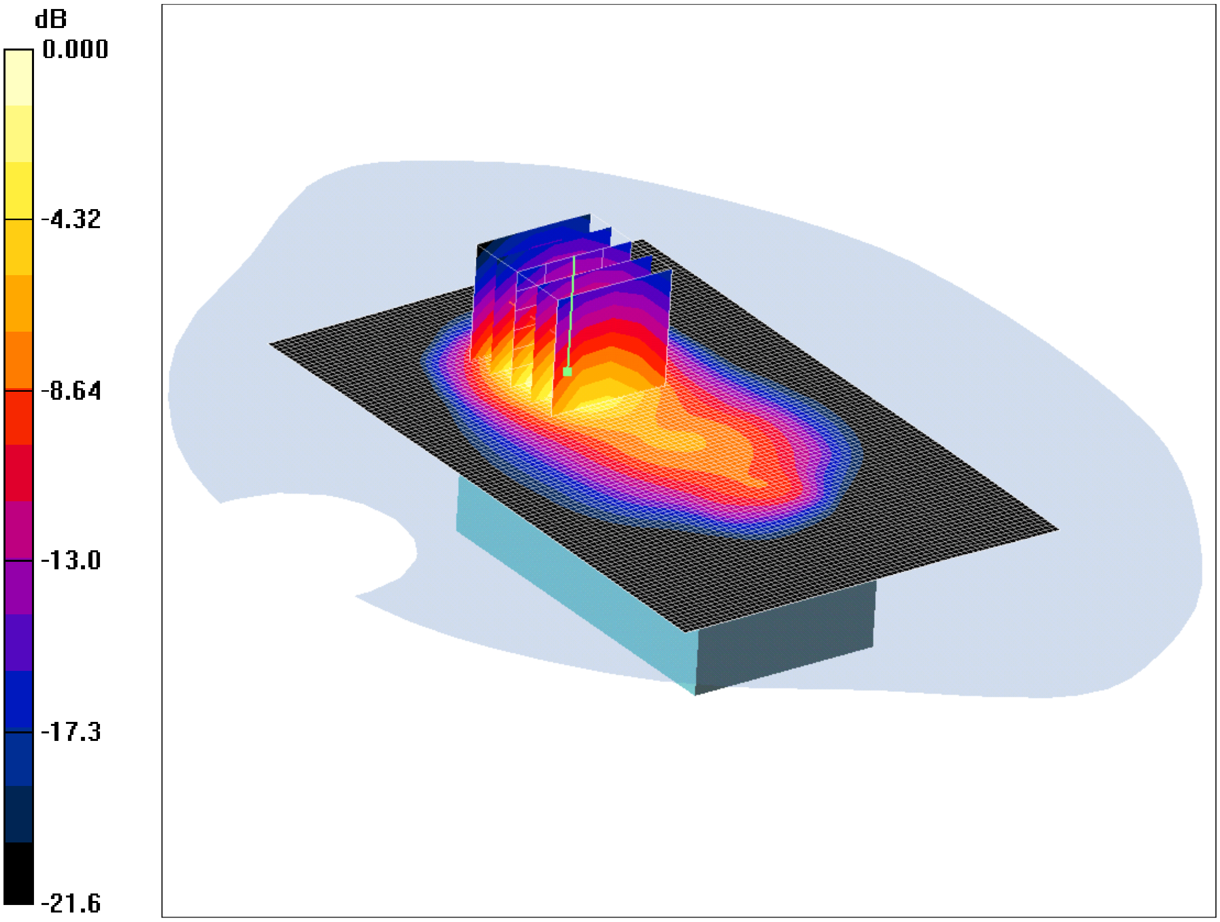


0 dB = 6.89mW/g

Communication System: GPRS 1900 2Tx; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.53 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(7.31, 7.31, 7.31); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 26/01/2012
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Back of EUT Facing Phantom - Low/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 7.72 mW/g
Back of EUT Facing Phantom - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.9 V/m; Power Drift = -0.017 dB
Peak SAR (extrapolated) = 12.0 W/kg
SAR(1 g) = 6.23 mW/g; SAR(10 g) = 3.17 mW/g
Maximum value of SAR (measured) = 6.89 mW/g

SCN/87453JD01/008: Back of EUT Facing Phantom GPRS CH810
Date 29/03/2012
DUT: Satellite Tracking of People LLC; Type: Blutag BLU+; Serial: 353197040010826

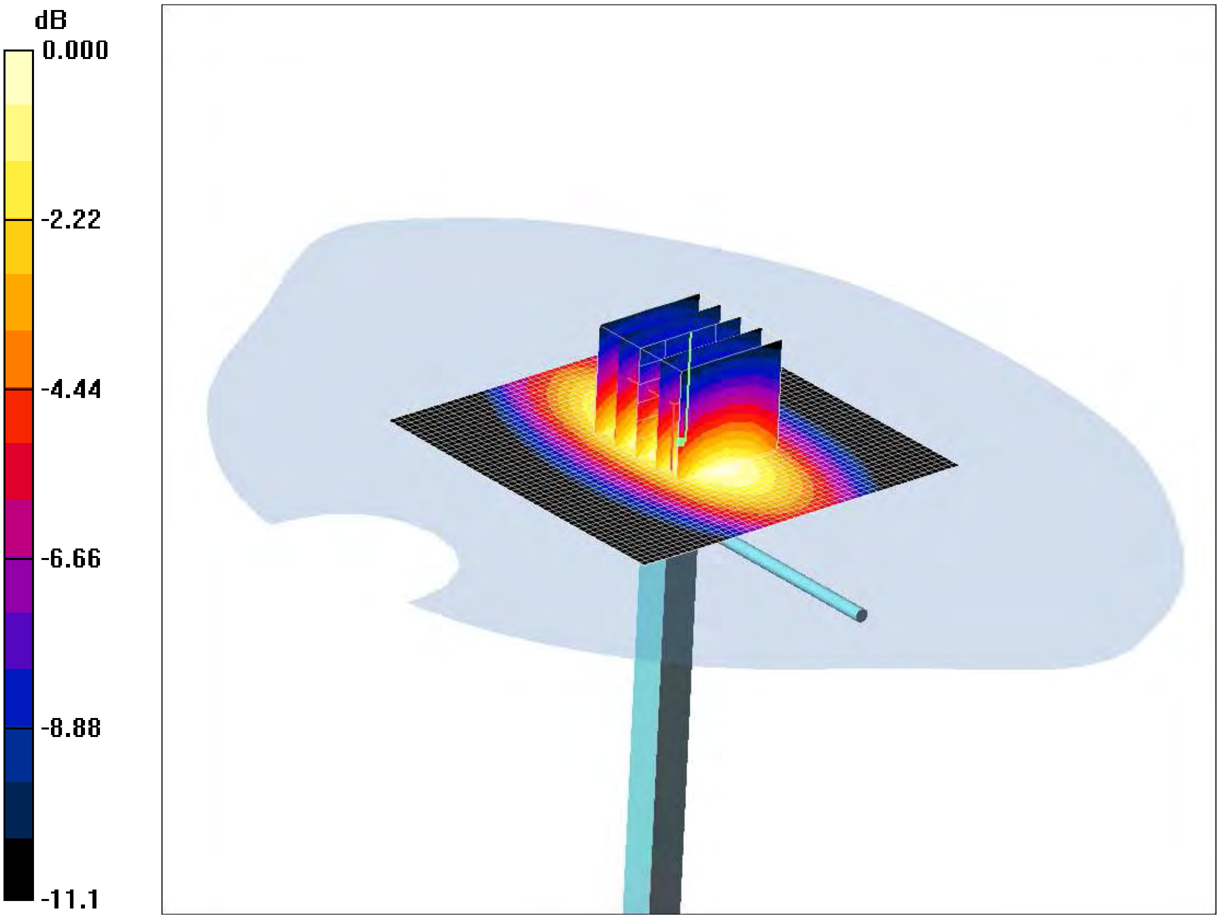


0 dB = 4.43mW/g

Communication System: GPRS 1900 2Tx; Frequency: 1909.8 MHz;Duty Cycle: 1:4
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.59 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(7.31, 7.31, 7.31); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 26/01/2012
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Back of EUT Facing Phantom - High/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 5.04 mW/g
Back of EUT Facing Phantom - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.6 V/m; Power Drift = -0.031 dB
Peak SAR (extrapolated) = 8.02 W/kg
SAR(1 g) = 4.06 mW/g; SAR(10 g) = 2.02 mW/g
Maximum value of SAR (measured) = 4.43 mW/g

SCN/87453JD01/009: System Performance Check 900MHz Body 29 03 12
Date 29/03/2012
DUT: Dipole 900 MHz; SN: 124; Type: D900V2; Serial: SN124

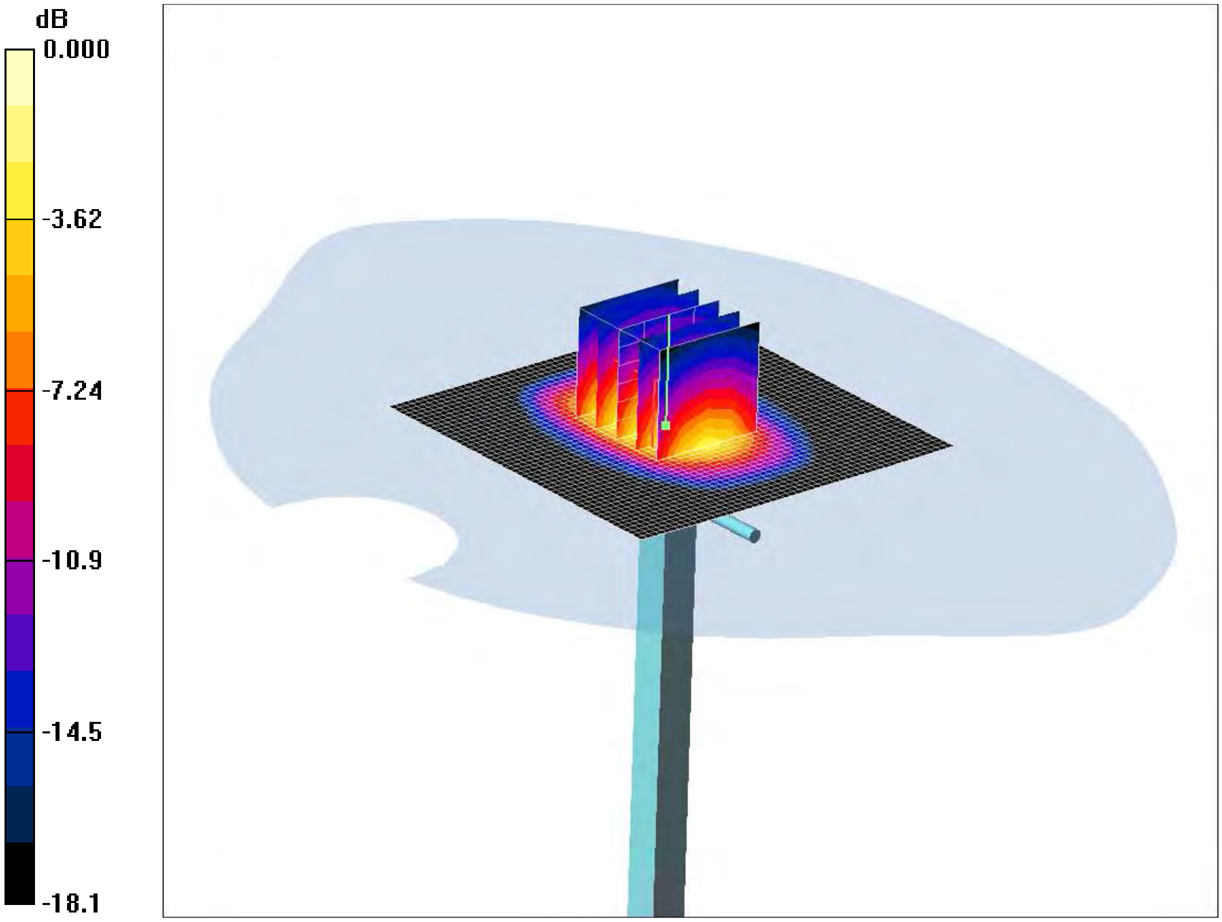


0 dB = 2.84mW/g

Communication System: CW; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used: f = 900 MHz; σ = 1.05 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(8.92, 8.92, 8.92); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 26/01/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

d=15mm, Pin=250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 3.00 mW/g
d=15mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 52.1 V/m; Power Drift = 0.009 dB
Peak SAR (extrapolated) = 3.99 W/kg
SAR(1 g) = 2.64 mW/g; SAR(10 g) = 1.71 mW/g
Maximum value of SAR (measured) = 2.84 mW/g

SCN/87453JD01/010: System Performance Check 1900MHz Body 29 03 12
Date 29/03/2012
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN540



0 dB = 11.7mW/g

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 MHz MSL Medium parameters used: f = 1900 MHz; σ = 1.58 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(7.31, 7.31, 7.31); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 26/01/2012
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

d=10mm, Pin=250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 15.3 mW/g
d=10mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 84.2 V/m; Power Drift = 0.033 dB
Peak SAR (extrapolated) = 19.8 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.38 mW/g
Maximum value of SAR (measured) = 11.7 mW/g

Appendix 4. Photographs

This appendix contains the following photographs:

Photo Reference Number	Title
PHT/87453JD01/001	Test configuration for the measurement of Specific Absorption Rate (SAR)
PHT/87453JD01/002	Front of EUT Facing Phantom
PHT/87453JD01/003	Back of EUT Facing Phantom
PHT/87453JD01/004	Front of EUT Facing Phantom
PHT/87453JD01/005	Front of EUT Facing Phantom with Handle Removed
PHT/87453JD01/006	Back of EUT Facing Phantom
PHT/87453JD01/007	Back of EUT Facing Phantom with Handle Removed
PHT/87453JD01/008	Internal view of EUT
PHT/87453JD01/009	User Setup 1 Worst Case EUT-to-User View
PHT/87453JD01/010	User Setup 2 Worst Case EUT-Next-to-Foot View
PHT/87453JD01/011	Internal View of EUT (Back) with Antenna-to-User Separation Distance
PHT/87453JD01/012	Internal View of EUT with Antenna-to-Top Edge Separation Distance
PHT/87453JD01/013	Battery View
PHT/87453JD01/014	900 MHz Body Fluid Level
PHT/87453JD01/015	1800 MHz Body Fluid Level

PHT/87453JD01/001: Test configuration for the measurement of Specific Absorption Rate (SAR)

PHT/87453JD01/002: Front of EUT Facing Phantom

Bottom-Edge

PHT/87453JD01/003: Back of EUT Facing Phantom

Bottom-Edge

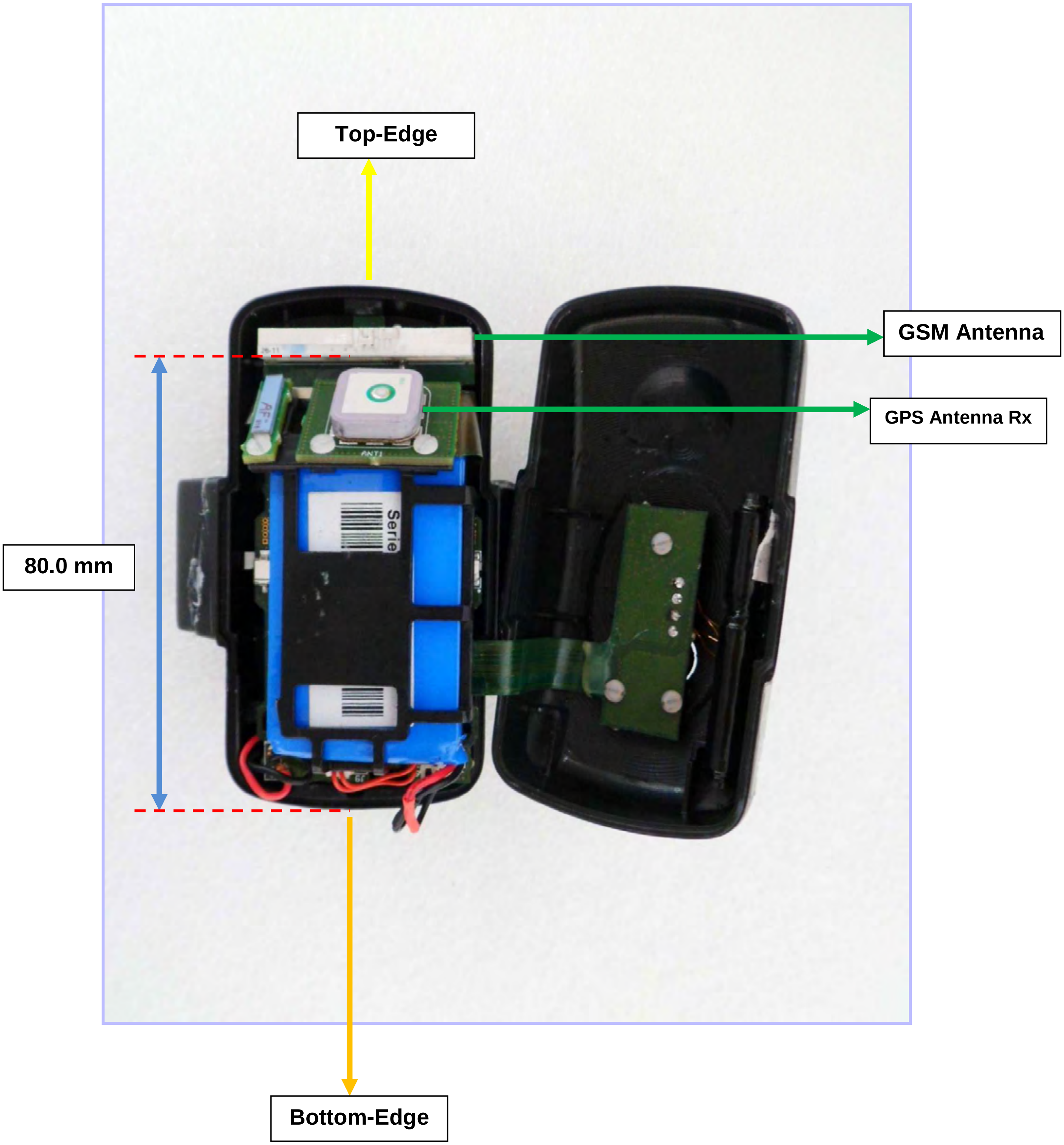
PHT/87453JD01/004: Front of EUT Facing Phantom

PHT/87453JD01/005: Front of EUT Facing Phantom with Handle Removed

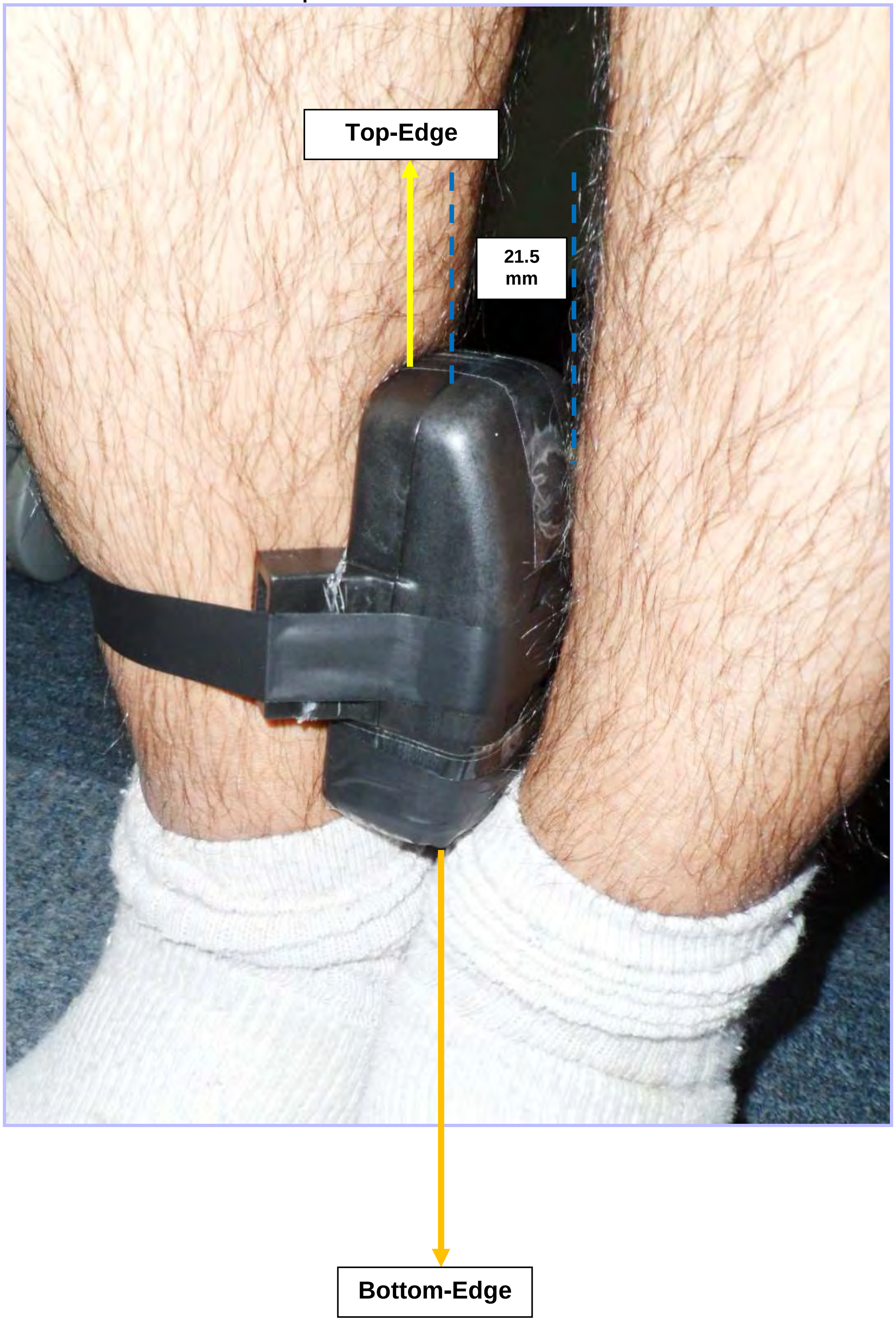
PHT/87453JD01/006: Back of EUT Facing Phantom

PHT/87453JD01/007: Back of EUT Facing Phantom with Handle Removed

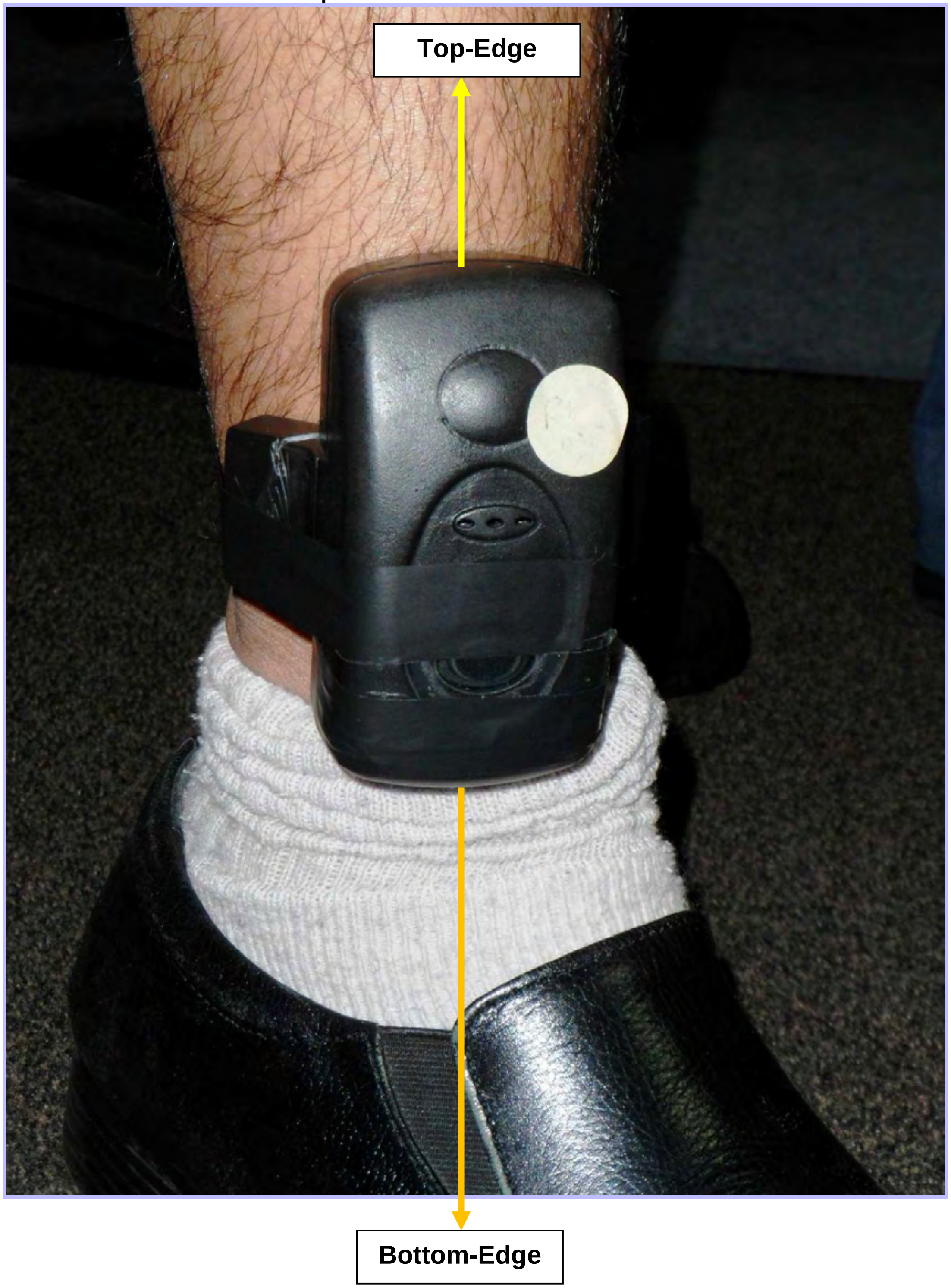
PHT/87453JD01/008: Internal view of EUT



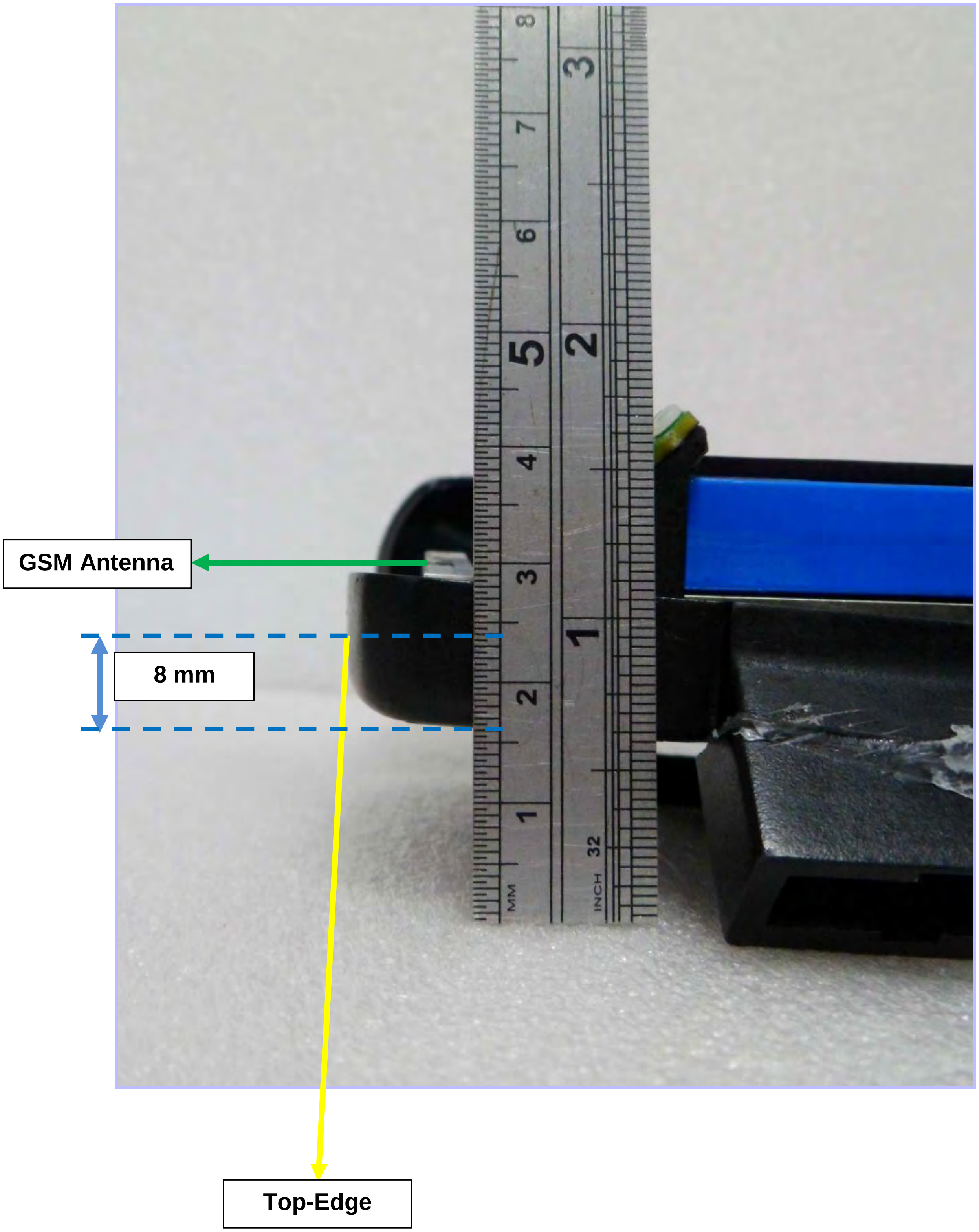
PHT/87453JD01/009: User Setup 1 Worst Case EUT-to-User View



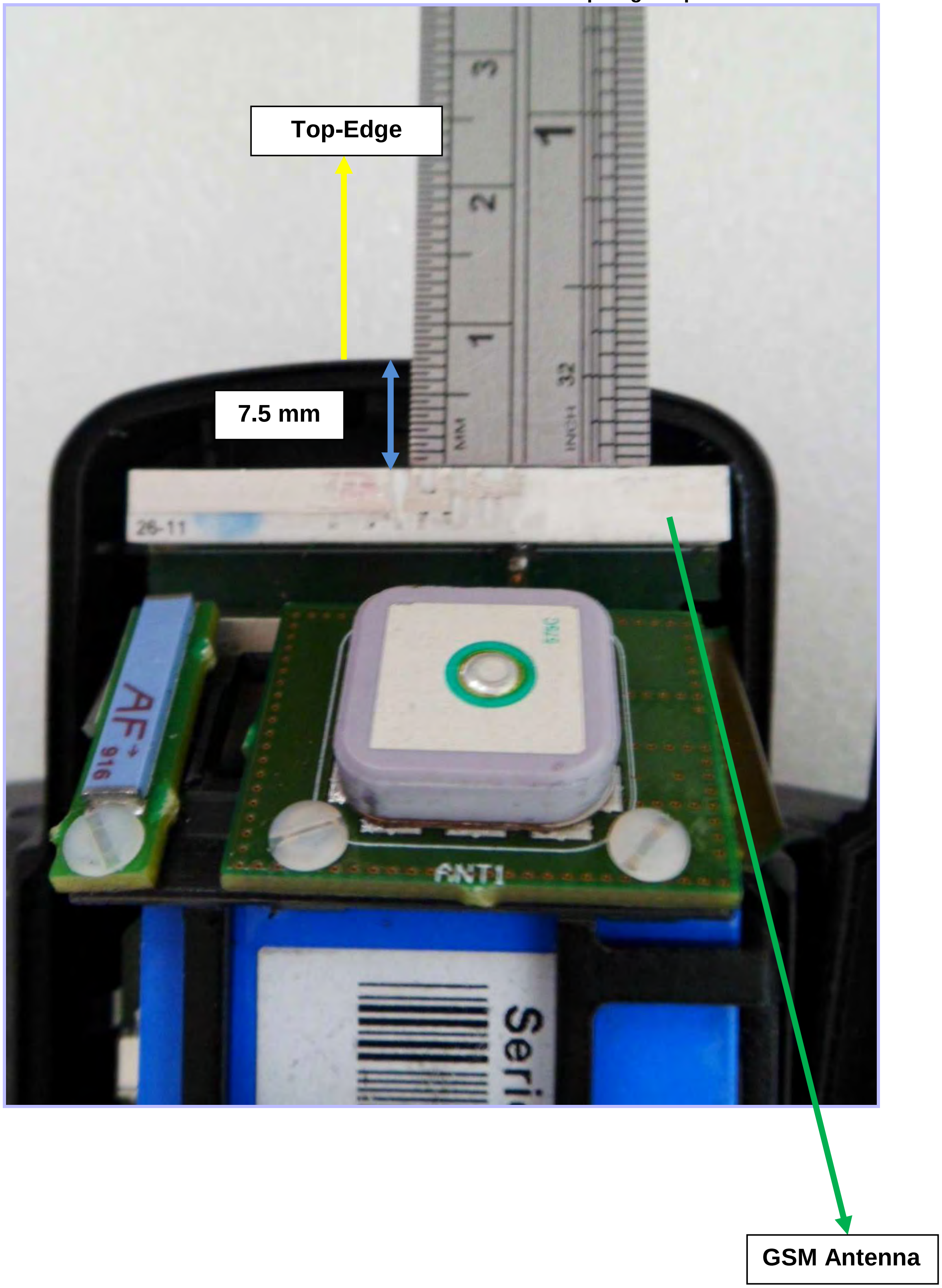
PHT/87453JD01/010: User Setup 2 Worst Case EUT-Next-to-Foot View



PHT/87453JD01/011: Internal View of EUT (Back) with Antenna-to-User Separation Distance

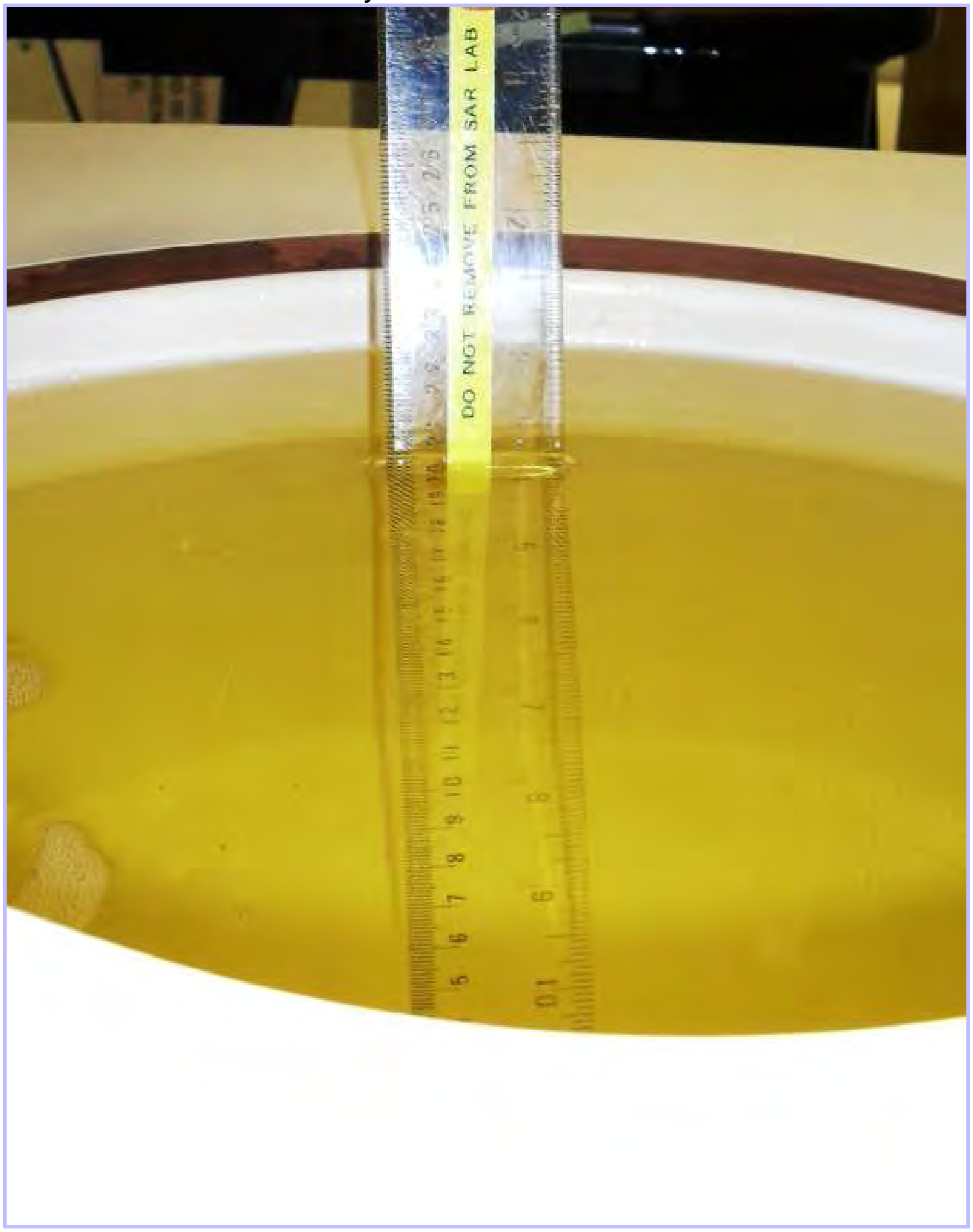


PHT/87453JD01/012: Internal View of EUT with Antenna-to-Top Edge Separation Distance

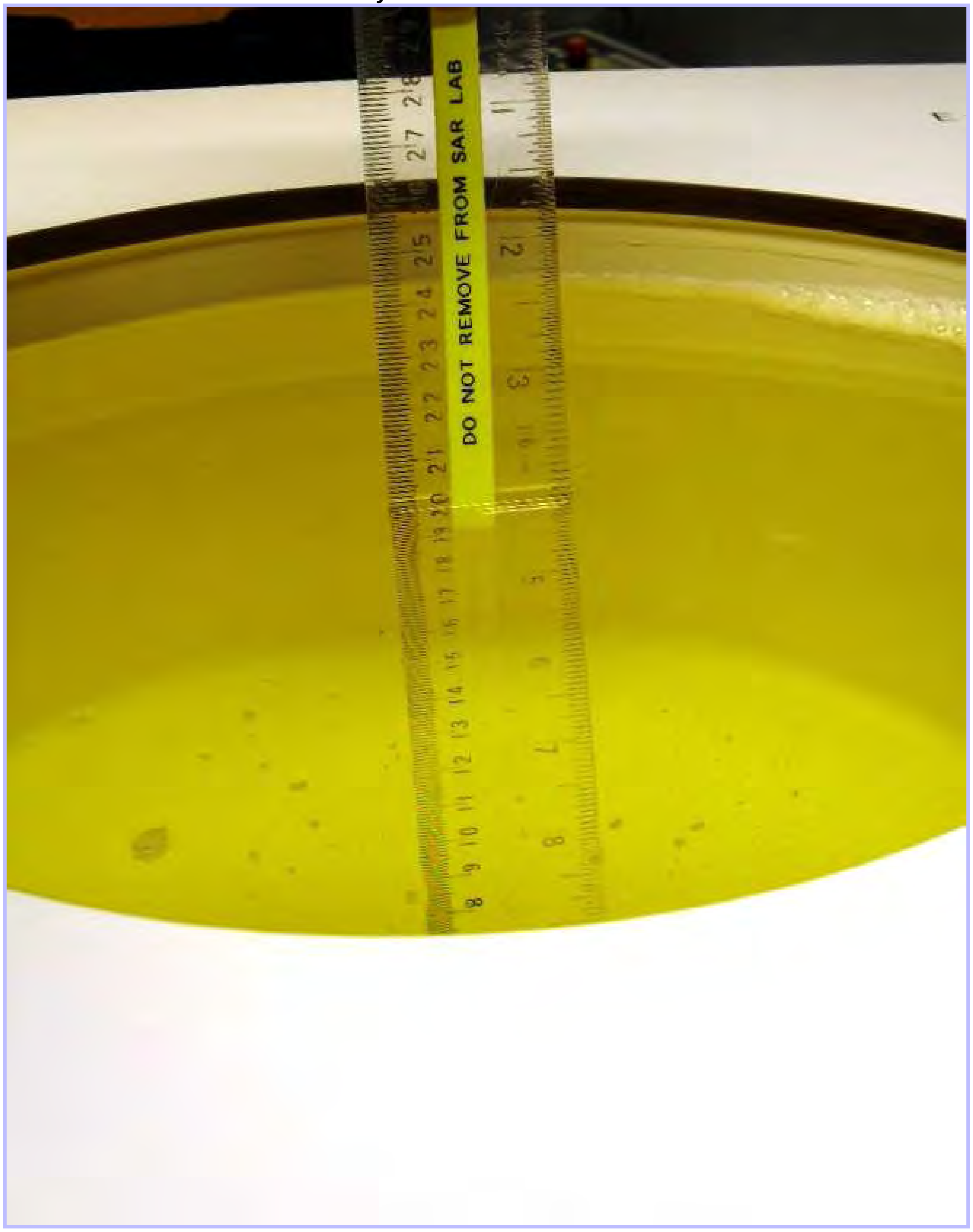


PHT/87453JD01/013: Battery View

PHT/87453JD01/014: 900 MHz Body Fluid Level



PHT/87453JD01/015: 1800 MHz Body Fluid Level



Appendix 5. System Check

Prior to the assessment, the system was verified in the flat region of the phantom.
A 900MHz, 1900MHz dipole was used. A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of ±5% for the 900MHz, 1900MHz dipole.

The applicable verification normalised to 1 Watt.

System Check 850/900 Body

Date: 29/03/2012
Validation Dipole and Serial Number: D900V2; SN: 124

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	900	23.0 ºC	22.4 ºC	ε_r	55.00	52.87	-3.87	5.00
				σ	1.05	1.05	-0.38	5.00
				1g SAR	11.10	10.56	-4.86	5.00
				10g SAR	7.14	6.84	-4.20	5.00

Dielectrics for Frequencies Tested

Channel Number	Channel Description	Frequency (MHz)	Parameters	
128	Low	826.4	ε_r	53.20
			σ	1.00
189	Middle	836.6	ε_r	53.20
			σ	1.01
251	High	846.6	ε_r	53.10
			σ	1.01

System Check 1900 Body

Date: 30/03/2012
Validation Dipole and Serial Number: D1900V2; SN: 540

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	1900	23.0 ºC	23.5 ºC	ε_r	53.30	52.13	-2.19	5.00
				σ	1.52	1.58	3.90	5.00
				1g SAR	40.70	42.00	3.19	5.00
				10g SAR	21.60	21.52	-0.37	5.00

Dielectrics for Frequencies Tested

Channel Number	Channel Description	Frequency (MHz)	Parameters	
512	Low	1850.2	ε_r	52.30
			σ	1.53
660	Middle	1879.8	ε_r	52.20
			σ	1.56
810	High	1909.8	ε_r	52.10
			σ	1.59

Appendix 6. Simulated Tissues

The body mixture consists of water, Polysorbate 20 and salt. Visual inspection is made to ensure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the tissue.

Ingredient	**Frequency**
	1800/1900 MHz Body
De-Ionized Water	71.50
Polysorbate 20 (Tween 20)	28.00
Salt	0.50
Ingredient	**Frequency**
	835/850/900 MHz Body
De-Ionized Water	71.30
Polysorbate 20 (Tween 20)	28.00
Salt	0.70

Appendix 7. DASY4 System Details

A.7.1. DASY4 SAR Measurement System

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

A.7.2. DASY4 SAR System Specifications

Robot System	
Positioner:	Stäubli Unimation Corp. Robot Model: RX90L
Repeatability:	0.025 mm
No. of Axis:	6
Serial Number:	F00/SD89A1/A/01
Reach:	1185 mm
Payload:	3.5 kg
Control Unit:	CS7
Programming Language:	V+
Data Acquisition Electronic (DAE) System	
Serial Number:	DAE3 SN:394
PC Controller	
PC:	Dell Precision 340
Operating System:	Windows 2000
Data Card:	DASY4 Measurement Server
Serial Number:	1080
Data Converter	
Features:	Signal Amplifier, multiplexer, A/D converted and control logic.
Software:	DASY4 Software
Connecting Lines:	Optical downlink for data and status info. Optical uplink for commands and clock.
PC Interface Card	
Function:	24 bit (64 MHz) DSP for real time processing Link to DAE3 16 nit A/D converter for surface detection system serial link to robot direct emergency stop output for robot.

DASY4 SAR System Specifications (Continued)	
E-Field Probe	
Model:	EX3DV4
Serial No:	3814
Construction:	Triangular core
Frequency:	10 MHz to >6 GHz
Linearity:	±0.2 dB (30 MHz to 6 GHz)
Probe Length (mm):	330
Probe Diameter (mm):	12
Tip Length (mm):	20
Tip Diameter (mm):	2.5
Sensor X Offset (mm):	1
Sensor Y Offset (mm):	1
Sensor Z Offset (mm):	1
Phantom	
Phantom:	SAM Phantom
Shell Material:	Fibreglass
Thickness:	2.0 ±0.1 mm