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SAR Test Report

Report Number: M070915

Test Sample: Flaik GSM v1.00

Model Number: Q24 Plus

Tested For: Snowsports Interactive

Date of Issue: 5th October 2007

NATA Accredited Laboratory
Number: 5292

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SAR Test Report
Flaik GSM v1.00, Model: Q24 Plus
Report Number: M070915

1.0 GENERAL INFORMATION

Test Sample:	Flaik GSM v1.00
Model Number:	Q24 PLUS
FCC ID:	09EQ24PL003
IC ID:	3651C-Q24PL003
IMEI:	353806010006800
Manufacturer:	Snowsports Interactive
Device Category:	Portable Transmitter
Test Device:	Production Unit
RF exposure Category:	General Public/Unaware user
Tested for:	Snowsports Interactive
Address:	Level 1, Data 3 House 80 Jephson St. Toowong QLD 4066
Contact:	Chris Uroda
Phone:	(07) 3327 9708
Fax:	(07) 3217 8738

Test Standard/s:

1. Evaluating Compliance with FCC Guidelines For Human Exposure to Radiofrequency Electromagnetic Fields Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01)
2. IEEE1528:2003. Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head Due to Wireless Communications Devices: Measurement Techniques.

Statement Of Compliance: The "Flaik GSM v1.00, Model Q24" Plus complied with the FCC General public/uncontrolled RF exposure limits of 1.6mW/g for 1g cube of tissue per requirements of 47CFR2.1093(d).

Test Dates: 1st & 4th October 2007

Test Officer:

Kim H. Long
Test Engineer

Authorised Signature:

Chris Zombolas
Technical Director

2.0 DESCRIPTION OF DEVICE

2.1 Description of Test Sample

The Flaik GSM v1.00 is a locating device use by skiers and snowboards. It is a Quad-Band Mobile Phone operating in the PCS and GSM, DCS (Europe) frequency bands. It has one internal antenna. It will be referred to as the Device Under Test (DUT) through out this report. The DUT was tested in the Body Worn Position.

Table: EUT Parameters

Operating Mode during Testing	: See Clause 2.3
Operating Mode production sample	: Standard GSM and GPRS Class 10
Modulation:	: Standard TDMA
Antenna type	: Internal
Applicable Head Configurations	: N/A
Applicable Body Worn-Configurations	: Back
Battery Options	: One Battery Type

Diagram: Snowsports Interactive GSM Location Device

2.2 Test sample Accessories

2.2.1 Battery Types

SAR measurements were performed with the standard battery supplied by the manufacturer.

2.3 Test Signal, Frequency and Output Power

The DUT was provided by Snowsports Interactive. It was put into operation using a Rhodes & Schwarz Radio Communication Tester CMU200. The channels utilised in the measurements were the traffic channels shown in the table below. The power level was set to Class 4 for 850 MHz and Class 1 for 1900 MHz band.

The SAR level of the test sample was measured for all frequency bands of operation as per the table below. Communication between the tester and the DUT was maintained by an air link.

Table: Test Frequencies

Band	Frequency Range	Traffic Channels	Band Power Class	Nominal Power (dBm)
1	824 – 849 MHz	128, 190 and 251	4	33
2	1850 – 1910 MHz	512, 661 and 810	1	30

2.4 Conducted Power Measurements

The conducted power of the DUT was measured in the 850 MHz and 1900 MHz frequency range(s). The measurements were performed on a second unit since the test unit did not have an RF port. The table below lists the results of the conducted power measurements.

Table: Conducted Power Measurements

Frequency	RF Channel	Measured Power (dBm)
836 MHz	190	32.2
1880 MHz	661	30.3

Note: The attenuation due to cable loss has been taken into account.

2.5 Battery Status

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

Table: Battery Details

Battery:	Lithium-ion Polymer Battery
Max Operating Voltage:	4.2V
Nominal Operating Voltage:	3.7V
Min Operating Voltage:	3.35V
Rated Capacity:	1250 mAh
Typical Capacity:	1300 mAh

2.6 Details of Test Laboratory

2.6.1 Location

EMC Technologies Pty Ltd
176 Harrick Road
Keilor Park, (Melbourne) Victoria
Australia 3042

Telephone: +61 3 9365 1000
Facsimile: +61 3 9331 7455
email: melb@emctech.com.au
website: www.emctech.com.au

2.6.2 Accreditations

EMC Technologies Pty. Ltd. is accredited by the National Association of Testing Authorities, Australia (NATA). **NATA Accredited Laboratory Number: 5292**

EMC Technologies Pty Ltd is NATA accredited for the following standards:

ARPANSA Standard	Maximum exposure levels to Radio Frequency fields, 3 kHz – 300 GHz.
AS/NZS 2772.2:	RF and microwave radiation hazard measurement methods.
ACMA:	Radio communications (Electromagnetic Radiation - Human Exposure) Standard 2003
FCC:	Guidelines for Human Exposure to RF Electromagnetic Field OET65C 01/01
EN 50360: 2001	Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz – 3 GHz)
EN 50361: 2001	Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300MHz – 3GHz)
IEEE 1528: 2003	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head Due to Wireless Communications Devices: Measurement Techniques.

Refer to NATA website www.nata.asn.au for the full scope of accreditation.

2.6.3 Environmental Factors

The measurements were performed in a shielded room with no background RF signals. The temperature in the laboratory was controlled to within 20± 1 °C, the humidity was in the range 46% to 51%. See section 3.5.1 for measured temperature and humidity. The liquid parameters were measured daily prior to the commencement of each test. Tests were performed to check that reflections within the environment did not influence the SAR measurements. The noise floor of the DASY4 SAR measurement system using the SN1377 and SN1380 probe are less than 5μV in both air and liquid mediums.

3.0 DESCRIPTION OF SAR MEASUREMENT SYSTEM

3.1 Probe Positioning System

The measurements were performed with the state of the art automated near-field scanning system **DASY4 Version V4.7 Build 53** from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision 6-axis robot (working range greater that 1.1m), which positions the SAR measurement probes with a positional repeatability of better than ±0.02 mm. The DASY4 fully complies with the OET65 C (01-01), IEEE 1528 and EN50361 SAR measurement requirements.

3.2 E-Field Probe Type and Performance

The SAR measurements were conducted with the dosimetric probe ET3DV6 Serial: 1377 & 1380 (manufactured by SPEAG) designed in the classical triangular configuration and optimised for dosimetric evaluation. The probe has been calibrated and found to be accurate to better than ±0.25 dB. The probe is suitable for measurements close to material discontinuity at the surface of the phantom.

3.3 Data Acquisition Electronics

The data acquisition electronics (DAE3) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. The input impedance of the DAE3 box is 200 MΩ; the inputs are symmetrical and floating. Common mode rejection is above 80dB.Transmission to the PC-card is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

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

3.4 Calibration and Validation Procedures and Data

Prior to the SAR assessment, the system validation kit was used to verify that the DASY4 was operating within its specifications. The validation was performed at 900 MHz and 1800 MHz with the SPEAG calibrated dipoles. The validation dipoles are highly symmetric and matched at the centre frequency for the specified liquid and distance to the phantom. The accurate distance between the liquid surface and the dipole centre is achieved with a distance holder that snaps onto the dipole. System validation is performed by feeding a known power level into a reference dipole, set at a know distance from the phantom. The measured SAR is compared to the theoretically derived level, and must be within 10%.

3.4.1 Validation Results (900 MHz and 1800 MHz)

The following table lists the dielectric properties of the tissue simulating liquid measured prior to each SAR validation. The results of the validation for each day are listed in columns 5 and 6. The forward power into the reference dipole for each SAR validation was adjusted to 250 mW.

Table: Validation Results (SPEAG calibrated dipoles)

1. Validation Date	2. Frequency (MHz)	3. ∈r (measured)	4. σ (mho/m) (measured)	5. Measured SAR 1g	6. Measured SAR 10g
1st October 2007	1800	39.0	1.40	8.89	4.75
4th October 2007	900	40.8	0.97	2.74	1.75

3.4.2 Deviation from reference validation values

The reference SAR values are derived using a reference dipole and flat phantom suitable for centre frequencies of 900 MHz and 1800 MHz. These reference SAR values are obtained from the IEEE Std 1528-2003 and are normalized to 1W.

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

Table: Deviation from reference validation values

Validation Frequency (MHz)	Measured SAR 1g (input power = 250mW)	Measured SAR 1g (Normalized to 1W)	SPEAG Calibration Reference SAR Value 1g (mW/g)	Deviation From SPEAG 1g (%)	IEEE Std 1528 Reference SAR Value 1g (mW/g)	Deviation From IEEE 1g (%)
900 MHz	2.74	10.96	10.9	0.55	10.8	1.48
1800 MHz	8.89	35.6	39.3	-9.51	38.1	-6.66

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

3.4.3 Liquid Depth 15cm

During the SAR measurement process the liquid level was maintained to a level of a least 15cm with a tolerance of ± 0.5cm.

3.5 Phantom Properties (Size, Shape, Shell Thickness, Tissue Material Properties)

The phantom used during the SAR testing and validation was the "SAM" phantom from SPEAG. The phantom thickness is 2.0mm+/-0.2 mm and was filled with the required tissue simulating liquid.

For SAR testing in the Body Worn positions an AndreT Flat Phantom V10.1 was used. The phantom thickness is 2.0mm +/-0.2 mm and the phantom was filled with the required tissue simulating liquid.

The dielectric parameters of the simulating liquid were measured prior to SAR assessment using the HP85070A dielectric probe kit and HP8714B Network Analyser. The actual dielectric parameters are shown in the following table.

Table: Measured Simulating Liquid Dielectric Values at 850MHz

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
824 MHz Body	53.3	55.2 ±5% (52.4 to 58.0)	0.95	0.97 ±5% (0.92 to 1.02)	1000
836 MHz Body	53.2	55.2 ±5% (52.4 to 58.0)	0.96	0.97 ±5% (0.92 to 1.02)	1000
849 MHz Body	53.1	55.2 ±5% (52.4 to 58.0)	0.98	0.97 ±5% (0.92 to 1.02)	1000

Note: The liquid parameters were within the required tolerances of ±5%.

Table: Measured Simulating Liquid Dielectric Values at 1900MHz

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
1850.2 MHz Body	51.6	53.3 ±5% (50.6 to 56.0)	1.56	1.52 ±5% (1.44 to 1.60)	1000
1880 MHz Body	51.5	53.3 ±5% (50.6 to 56.0)	1.58	1.52 ±5% (1.44 to 1.60)	1000
1909.8 MHz Body	51.4	53.3 ±5% (50.6 to 56.0)	1.59	1.52 ±5% (1.44 to 1.60)	1000

Note: The liquid parameters were within the required tolerances of ±5%.

3.5.1 Temperature and Humidity

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

Table: Temperature and Humidity recorded for each day

Date	Ambient Temperature (°C)	Liquid Temperature (°C)	Humidity (%)
1st October 2007	20.4	20.1	51.0
4th October 2007	19.7	19.4	46.0

3.6 Simulated Tissue Composition Used for SAR Test

The tissue simulating liquids are created prior to the SAR evaluation and often require slight modification each day to obtain the correct dielectric parameters.

Table: Tissue Type: Brain @ 900MHz
Volume of Liquid: 30 Litres

Approximate Composition	% By Weight
Distilled Water	41.05
Salt	1.35
Sugar	56.5
HEC	1.0
Bactericide	0.1

Table: Tissue Type: Brain @ 1800MHz
Volume of Liquid: 30 Litres

Approximate Composition	% By Weight
Distilled Water	61.17
Salt	0.31
Bactericide	0.29
Triton X-100	38.23

Table: Tissue Type: Body @ 900MHz
Volume of Liquid: 30 Litres

Approximate Composition	% By Weight
Distilled Water	56
Salt	0.76
Sugar	41.76
HEC	1.21
Bactericide	0.27

*Refer "OET Bulletin 65 97/01 P38"

Table: Tissue Type: Body @ 1800MHz
Volume of Liquid: 30 Litres

Approximate Composition	% By Weight
Distilled Water	40.4
Salt	0.5
Sugar	58
HEC	1
Bactericide	0.1

3.7 Device Holder for DASY4

The DASY4 device holder supplied by SPEAG is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The rotation centres for both scales is the ear opening. Thus the device needs no repositioning when changing the angles.

The DASY4 device holder is made of low-loss material having the following dielectric parameters: relative permittivity ε=3 and loss tangent δ=0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, to reduce the influence on the clamp on the test results.

Refer to Appendix A for photograph of device positioning.

4.0 SAR MEASUREMENT PROCEDURE USING DASY4

The SAR evaluation was performed with the SPEAG DASY4 System (**Version V4.7 Build 53**). A summary of the procedure follows:

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

b) The SAR distribution at the exposed side of the head or the flat section of the flat phantom is measured at a distance of 3.9 mm from the inner surface of the shell. The area covers the entire dimension of the head and the horizontal grid spacing is 15 mm x 15 mm. The actual Area Scan has dimensions of 111 mm x 111 mm surrounding the test device. Based on this data, the area of the maximum absorption is determined by Spline interpolation.

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

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

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

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

   (iv) The SAR value at the same location as in Step (a) is again measured and the power drift is recorded.

5.0 MEASUREMENT UNCERTAINTY

The uncertainty analysis is based on the template listed in the IEEE Std 1528-2003 for both Handset SAR tests and Validation uncertainty. The measurement uncertainty of a specific device is evaluated independently and the total uncertainty for both evaluations (95% confidence level) must be less than 30%.

Table: Uncertainty Budget for DASY4 Version V4.7 Build 53 – EUT SAR test

a	b	c	d	e= f(d,k)	f	g	h=cxf/e	i=cxg/e	k
Uncertainty Component	Sec.	Tol. (%)	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i (%)	10g u_i (%)	v_i
Measurement System									
Probe Calibration (k=1) (standard calibration)	7.2.1	4.8	N	1	1	1	4.8	4.8	∞
Axial Isotropy	7.2.1	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	7.2.1	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	7.2.1	1	R	1.73	1	1	0.6	0.6	∞
Linearity	7.2.1	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	7.2.1	1	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	7.2.1	1	N	1	1	1	1.0	1.0	∞
Response Time	7.2.1	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	7.2.1	2.6	R	1.73	1	1	1.5	1.5	∞
RF Ambient Conditions	7.2.3	0.05	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mechanical Tolerance	7.2.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	7.2.2	2.9	R	1.73	1	1	1.7	1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	7.2.4	1	R	1.73	1	1	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	7.2.2	1.61	N	1	1	1	1.6	1.6	11
Device Holder Uncertainty									
Output Power Variation – SAR Drift Measurement	7.2.3	12.2	R	1.73	1	1	7.0	7.0	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	7.2.2	4	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity – Deviation from target values	7.2.3	5	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity – Measurement uncertainty	7.2.3	4.3	N	1	0.64	0.43	2.8	1.8	5
Liquid Permittivity – Deviation from target values	7.2.3	5	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity – Measurement uncertainty	7.2.3	4.3	N	1	0.6	0.49	2.6	2.1	5
Combined standard Uncertainty			RSS				11.6	11.2	154
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				23.2	22.42	

Estimated total measurement uncertainty for the DASY4 measurement system was ± 11.6 %. The extended uncertainty (K = 2) was assessed to be ± 23.2% based on 95% confidence level. The uncertainty is not added to the measurement result.

Table: Uncertainty Budget for DASY4 Version V4.7 Build 53 - Validation

a	b	c	d	e= f(d,k)	f	g	h=cxf/e	i=cxg/e	k
Uncertainty Component	Sec.	Tol. (%)	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i (%)	10g u_i (%)	v_i
Measurement System									
Probe Calibration (k=1) (standard calibration)	E.2.1	4.8	N	1	1	1	4.8	4.8	∞
Axial Isotropy	E.2.2	4.7	R	1.73	1	1	2.7	2.7	∞
Hemispherical Isotropy	E.2.2	0	R	1.73	1	1	0.0	0.0	∞
Boundary Effect	E.2.3	1	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	1	N	1	1	1	1.0	1.0	∞
Response Time	E.2.7	0	R	1.73	1	1	0.0	0.0	∞
Integration Time	E.2.8	0	R	1.73	1	1	0.0	0.0	∞
RF Ambient Conditions	E.6.1	0.05	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	2.9	R	1.73	1	1	1.7	1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	1	R	1.73	1	1	0.6	0.6	∞
Test Sample Related									
Dipole Axis to Liquid Surface		2	R	1.73	1	1	1.2	1.2	∞
Power Drift		4.7	R	1.73	1	1	2.7	2.7	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity – Deviation from target values	E.3.2	5	R	1.73	0.6	0.43	1.7	1.2	∞
Liquid Conductivity – Measurement uncertainty	E.3.3	2.5	N	1.73	0.6	0.43	0.9	0.6	5
Liquid Permittivity – Deviation from target values	E.3.2	5	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity – Measurement uncertainty	E.3.3	2.5	N	1.73	0.6	0.49	0.9	0.7	5
Combined standard Uncertainty			RSS				8.0	7.8	154
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				16.0	15.63	

Estimated total measurement uncertainty for the DASY4 measurement system was ±7.8%. The extended uncertainty (K = 2) was assessed to be ±15.63% based on 95% confidence level. The uncertainty is not added to the Validation measurement result.

6.0 EQUIPMENT LIST AND CALIBRATION DETAILS

Table: SPEAG DASY4 Version V4.7 Build 53

Equipment Type	Manufacturer	Model Number	Serial Number	Calibration Due	Used For this Test?
Robot - Six Axes	Staubli	RX90BL	N/A	Not applicable	Yes
Robot Remote Control	SPEAG	CS7MB	RX90B	Not applicable	Yes
SAM Phantom	SPEAG	N/A	1260	Not applicable	Yes
SAM Phantom	SPEAG	N/A	1060	Not applicable	Yes
Flat Phantom	AndreT	10.1	P 10.1	Not Applicable	Yes
Flat Phantom	AndreT	9.1	P 9.1	Not Applicable	Yes
Flat Phantom	SPEAG	PO1A 6mm	1003	Not Applicable	No
Data Acquisition Electronics	SPEAG	DAE3 V1	359	12-July-2007	No
Data Acquisition Electronics	SPEAG	DAE3 V1	442	13-Oct-2007	Yes
Probe E-Field - Dummy	SPEAG	DP1	N/A	Not applicable	No
Probe E-Field	SPEAG	ET3DV6	1380	12-Dec-2007	Yes
Probe E-Field	SPEAG	ET3DV6	1377	9-July-2008	Yes
Probe E-Field	SPEAG	ES3DV6	3029	Not Used	No
Antenna Dipole 300 MHz	SPEAG	D300V2	1005	14-July-2007	No
Antenna Dipole 450 MHz	SPEAG	D450V2	1009	26-Oct-2007	No
Antenna Dipole 900 MHz	SPEAG	D900V2	047	14-Dec-2008	Yes
Antenna Dipole 1640 MHz	SPEAG	D1640V2	314	6-July-2008	No
Antenna Dipole 1800 MHz	SPEAG	D1800V2	242	30-June-2008	Yes
Antenna Dipole 1950 MHz	SPEAG	D1950V3	1113	5-March-2009	No
Antenna Dipole 2450 MHz	SPEAG	D2450V2	724	3-July-2008	No
Antenna Dipole 5600 MHz	SPEAG	D5GHzV2	1008	13-Dec-2008	No
RF Amplifier	EIN	603L	N/A	1-July-2007	No
RF Amplifier	Mini-Circuits	ZHL-42	N/A	27-Oct-2007	Yes
RF Amplifier	Mini-Circuits	ZVE-8G	N/A	*In test	No
Synthesized signal generator	Hewlett Packard	ESG-D3000A	GB37420238	*In test	Yes
RF Power Meter Dual	Hewlett Packard	437B	3125012786	*In test	Yes
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481H	1545A01634	30-May-2008	Yes
RF Power Meter Dual	Gigatronics	8542B	1830125	30-May-2008	Yes
RF Power Sensor	Gigatronics	80301A	1828805	30-May-2008	Yes
RF Power Meter Dual	Hewlett Packard	435A	1733A05847	11-May-2008	Yes
RF Power Sensor	Hewlett Packard	8482A	2349A10114	11-May-2008	Yes
Network Analyser	Hewlett Packard	8714B	GB3510035	08-Sept-2008	Yes
Network Analyser	Hewlett Packard	8753ES	JP39240130	30-Sept-2007	No
Dual Directional Coupler	Hewlett Packard	778D	1144 04700	Not Applicable	No
Dual Directional Coupler	NARDA	3022	75453	Not Applicable	Yes

* Calibrated during the test for the relevant parameters.

7.0 SAR TEST METHOD

7.1 Description of the Test Positions (Body Sections)

The SAR measurements are performed on the body worn configuration. The DUT is intended to be worn on the arm with the flat section against the skin.
See Appendix A for photos of test positions.

7.1.1 "Body Worn Position"

The body-worn operating configuration was tested enclosed in the casing and positioned against a flat phantom in normal use configuration. The position chosen for testing was the "Body Worn Position", this position simulated the DUT placed against the body of a user.

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

The SAR was measured at three test channels for each band of operation with the test sample operating as maximum power, as specified in section 2.3.

7.3 FCC and RSS-102 RF Exposure Limits for Occupational/ Controlled Exposure

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

7.4 FCC and RSS-102 RF Exposure Limits for Un-controlled/Non–occupational

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

8.0 SAR TEST RESULTS

The SAR values averaged over 1 g and 10 g tissue masses were determined for the sample device for the "Body Worn position" and the results (850 MHz and 1900 MHz bands) are given in the three tables below. The plots with the corresponding SAR distributions are contained in Appendix B of this report.

8.1 SAR Measurement Results for 850 MHz

Table: SAR Measurement Results – 850 MHz Band

Test Position	Plot Number	Test Channel	Test Freq. (MHz)	SAR Level for (1g) mW/g	DASY4 Measured Drift (dB)
Body Worn Position					
Body (0 mm Spacing)	1	128	824	0.023	0.026
	2	190	836	0.024	0.014
	3	251	849	0.018	-0.45

Note: The uncertainty of the system (± 23.2%) has not been added to the result.

The maximum measured SAR level in the 850MHz band was 0.024 mW/g for a 1-gram cube. This value was measured in the "Body Worn" position at a frequency of 836 MHz (Channel 190).

The FCC and RSS-102 SAR limit for Non-occupational exposure is 1.6 mW/g measured in a 1g cube of tissue.

8.2 SAR Measurement Results for 1900 MHz

Table: SAR Measurement Results – 1900 MHz Band

Test Position	Plot Number	Test Channel	Test Freq. (MHz)	SAR Level for (1g) mW/g	DASY4 Measured Drift (dB)
Body Worn Position					
Body – 0 mm Spacing	4	512	1850.2	0.002	0.16
	5	661	1880.0	0.001	-0.36
	6	810	1909.8	0.001	0.14

Note: The uncertainty of the system (± 23.2%) has not been added to the result.

The maximum measured SAR level in the 1900MHz band was 0.002 mW/g for a 1-gram cube this value was measured in the "Body Worn" position at a frequency of 1850.2 MHz (Channel 512).

The FCC and RSS-102 SAR limit for Non-occupational exposure is 1.6 mW/g measured in a 1g cube of tissue.

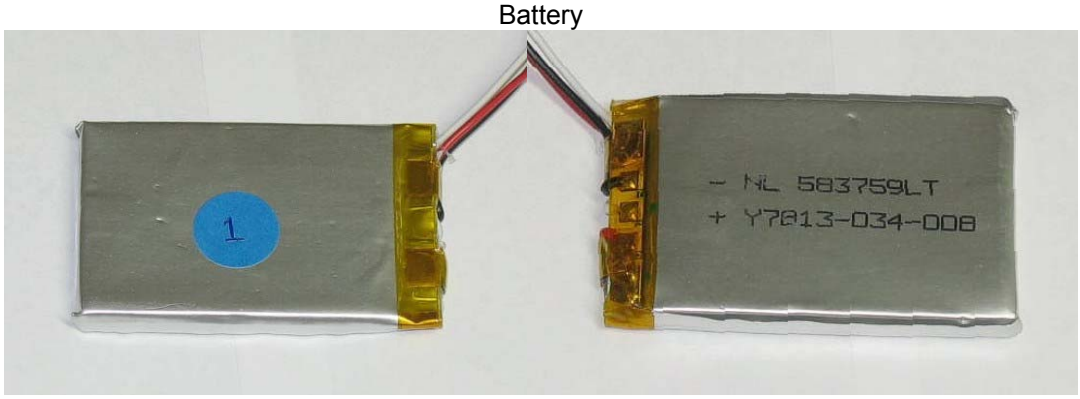
9.0 COMPLIANCE STATEMENT

The quad-band "Flaik GSM v1.00, model Q24 PLUS" was tested on behalf of Snowsports Interactive. It complied with the FCC and RSS-102 SAR requirements.

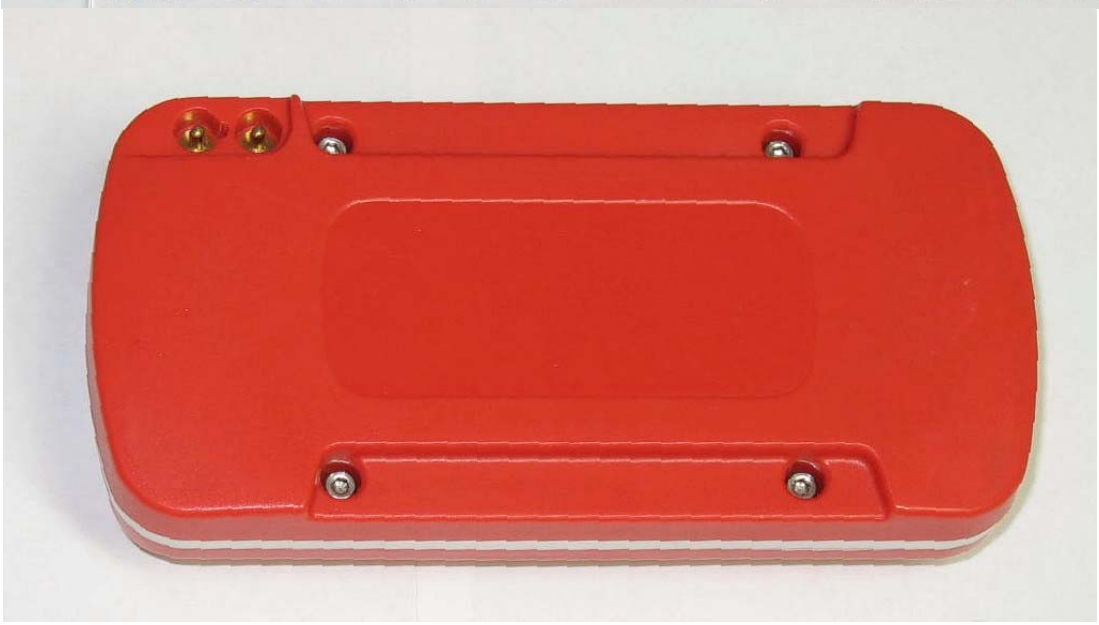
The highest SAR level recorded was 0.024 mW/g, which is below the uncontrolled limit of 1.6 mW/g, even taking into account the measurement uncertainty of 23.2 %.

APPENDIX A1 Test Sample Photographs

Battery

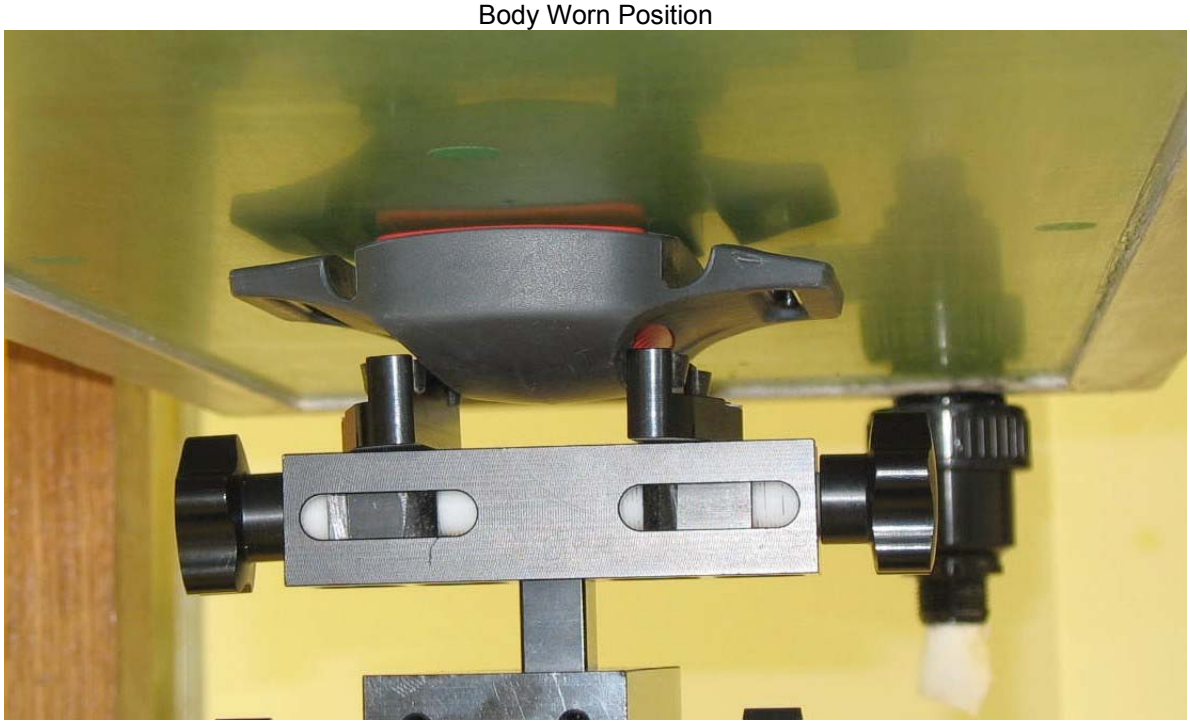


DUT

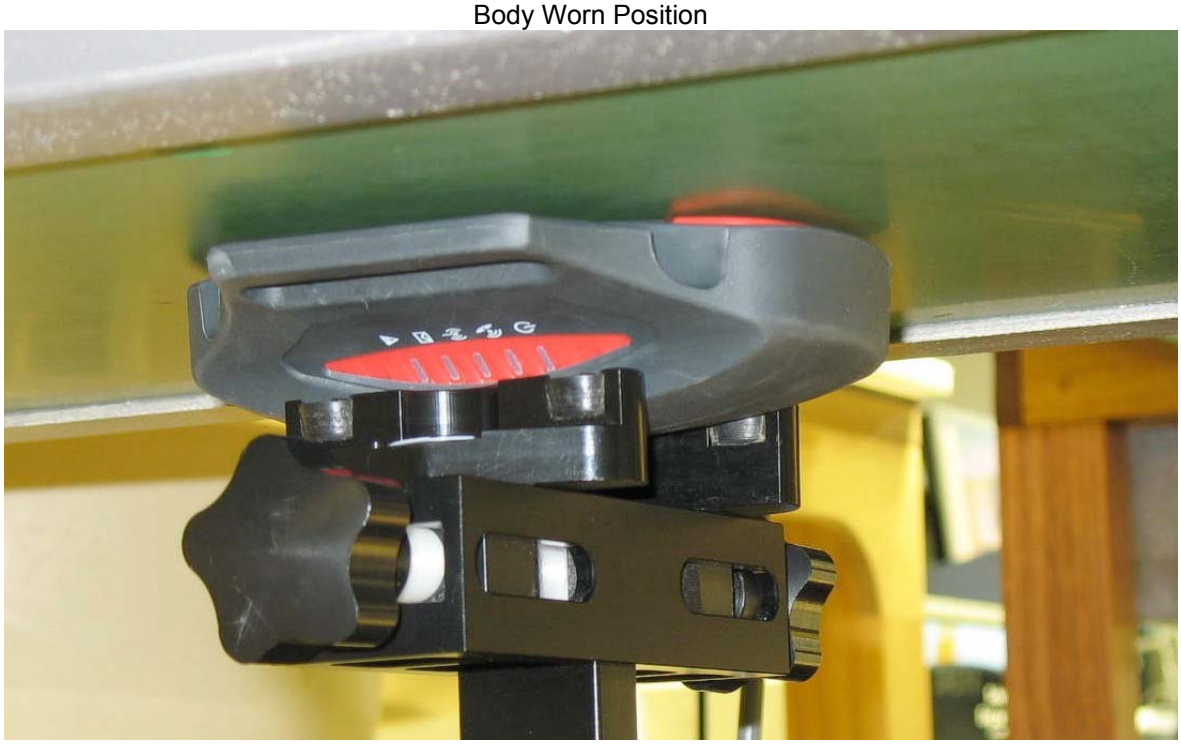


APPENDIX A2 Test Setup Photographs

Body Worn Position



Body Worn Position



APPENDIX B Plots Of the SAR Measurements

Plots of the measured SAR distributions inside the phantom are given in this Appendix for all tested configurations. The spatial peak SAR values were assessed with the procedure described in this report.

Table: 850 MHz band SAR Plots

Test Position	Plot Number	Test Channel
Body Worn Position		
Body – 0 mm Spacing	1	128
	2	190
	3	251
Z-axis Graph for Plots 1 - 3		

Table: 1900 MHz Band SAR Plots

Test Position	Plot Number	Test Channel
Body Worn Position		
Body - 0 mm Spacing	4	512
	5	661
	6	810
Z-axis Graph for Plots 4 - 6		

Table: Validation SAR Plots

Test Position	Plot Number	Validation Frequency
1st October 2007	7	1800 MHz
4th October 2007	8	900 MHz
Z-axis Graph for Plots 7-8		

Test Date: 04 October 2007

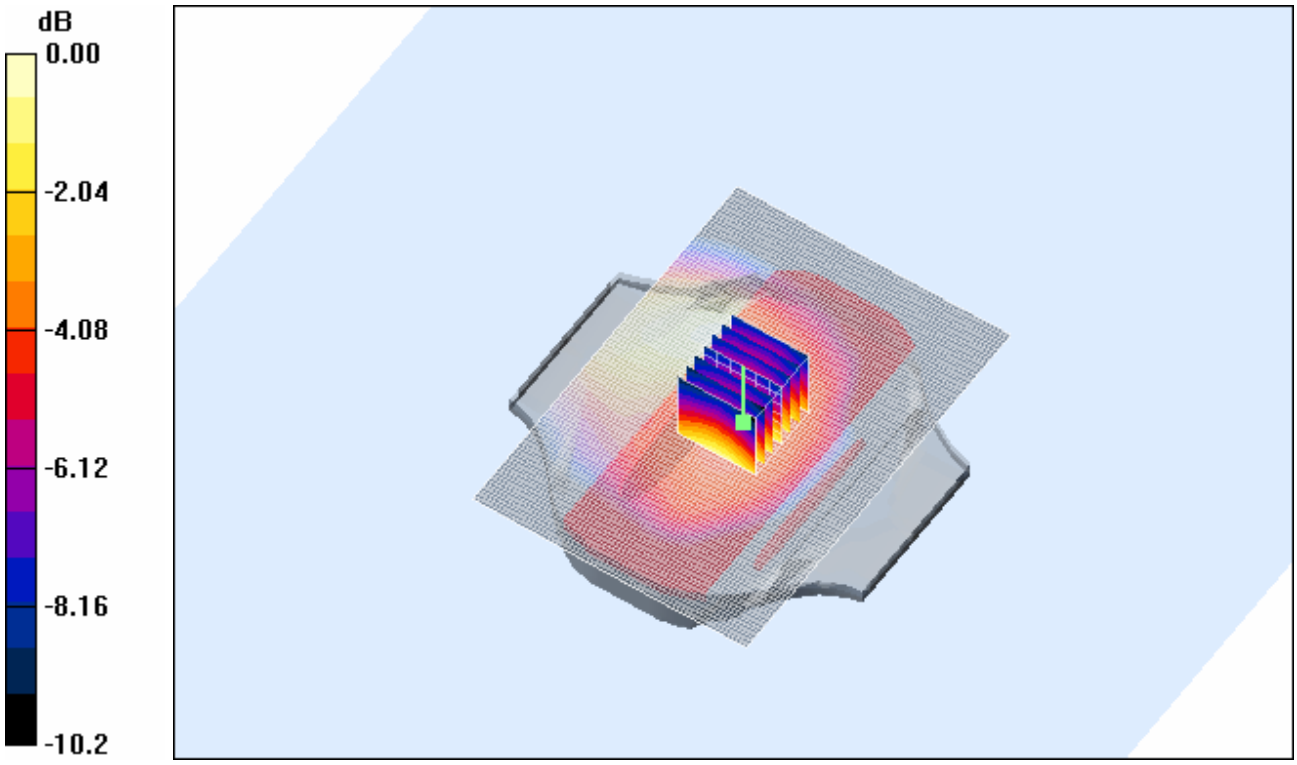
File Name: Body Worn Back 850 MHz (DAE442 Probe1377) 04-10-07.da4

DUT: Snowsports Interactive; Type: Q24 Plus; Serial: IMEI: 353806010006800

* Communication System: 850 MHz GPRS Class 10; Frequency: 824 MHz; Duty Cycle: 1:4.15
* Medium parameters used: σ = 0.951729 mho/m, ε_r = 53.3156; ρ = 1000 kg/m^3
- Electronics: DAE3 Sn442; Probe: ET3DV6 - SN1377; ConvF(6.03, 6.03, 6.03)
- Phantom: Flat Phantom 9.1; Serial: P 9.1; Phantom section: Flat 2.2 Section

Channel 128 Test/Area Scan (101x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.024 mW/g

Channel 128 Test/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.23 V/m; Power Drift = 0.026 dB
Peak SAR (extrapolated) = 0.029 W/kg
SAR(1 g) = 0.023 mW/g; SAR(10 g) = 0.016 mW/g
Maximum value of SAR (measured) = 0.024 mW/g



0 dB = 0.024mW/g

SAR MEASUREMENT PLOT 1

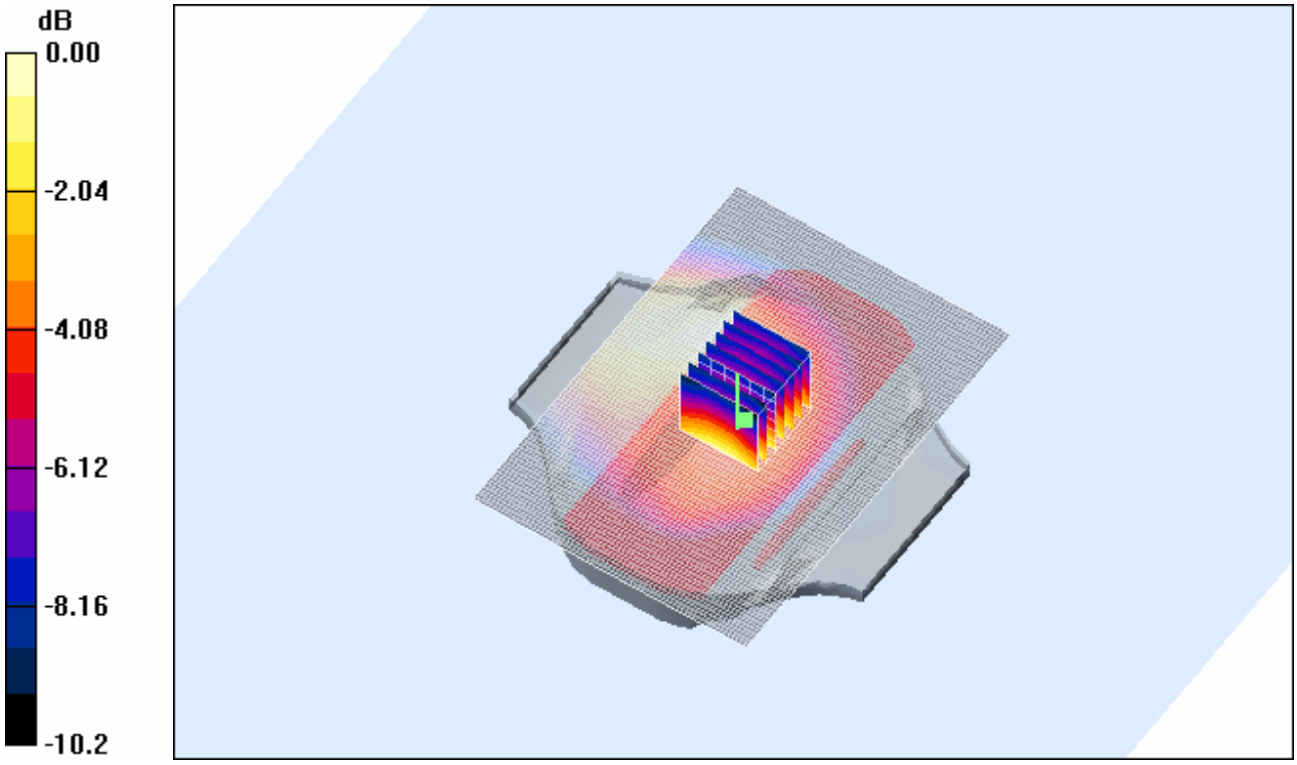
Ambient Temperature	**19.7 Degrees Celsius**
Liquid Temperature	**19.4 Degrees Celsius**
Humidity	**46.0 %**

Test Date: 04 October 2007
File Name: Body Worn Back 850 MHz (DAE442 Probe1377) 04-10-07.da4
DUT: Snowsports Interactive; Type: Q24 Plus; Serial: IMEI: 353806010006800

* Communication System: 850 MHz GPRS Class 10; Frequency: 836 MHz; Duty Cycle: 1:4.15
* Medium parameters used: σ = 0.961665 mho/m, ε_r = 53.1833; ρ = 1000 kg/m^3
- Electronics: DAE3 Sn442; Probe: ET3DV6 - SN1377; ConvF(6.03, 6.03, 6.03)
- Phantom: Flat Phantom 9.1; Serial: P 9.1; Phantom section: Flat 2.2 Section

Channel 190 Test/Area Scan (101x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.026 mW/g

Channel 190 Test/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.41 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 0.031 W/kg
SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.017 mW/g
Maximum value of SAR (measured) = 0.026 mW/g



0 dB = 0.026mW/g

SAR MEASUREMENT PLOT 2

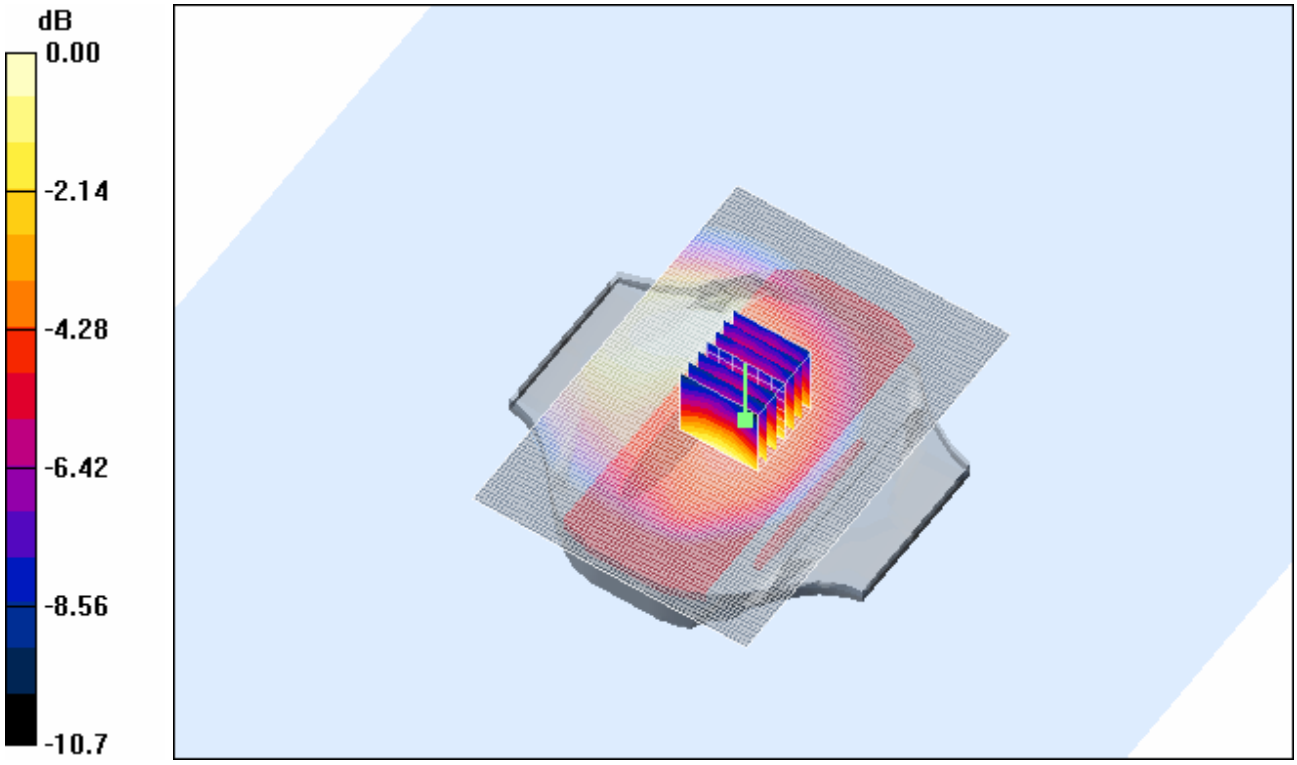
Ambient Temperature	**19.7 Degrees Celsius**
Liquid Temperature	**19.4 Degrees Celsius**
Humidity	**46.0 %**

Test Date: 04 October 2007
File Name: Body Worn Back 850 MHz (DAE442 Probe1377) 04-10-07.da4
DUT: Snowsports Interactive; Type: Q24 Plus; Serial: IMEI: 353806010006800

* Communication System: 850 MHz GPRS Class 10; Frequency: 849 MHz; Duty Cycle: 1:4.15
* Medium parameters used: σ = 0.980256 mho/m, ε_r = 53.1126; ρ = 1000 kg/m^3
- Electronics: DAE3 Sn442; Probe: ET3DV6 - SN1377; ConvF(6.03, 6.03, 6.03)
- Phantom: Flat Phantom 9.1; Serial: P 9.1; Phantom section: Flat 2.2 Section

Channel 251 Test/Area Scan (101x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.019 mW/g

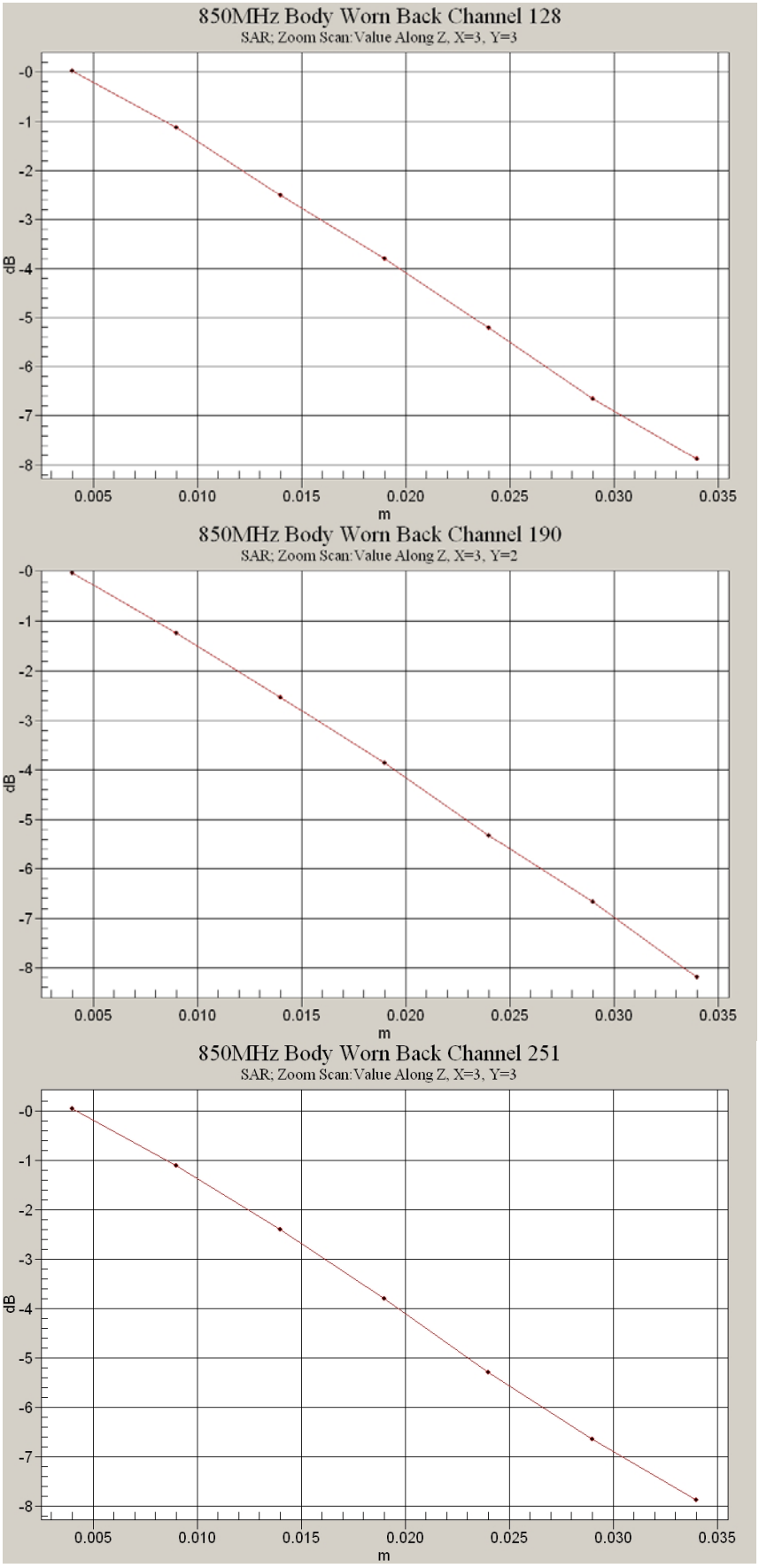
Channel 251 Test/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.82 V/m; Power Drift = -0.454 dB
Peak SAR (extrapolated) = 0.023 W/kg
SAR(1 g) = 0.018 mW/g; SAR(10 g) = 0.013 mW/g
Maximum value of SAR (measured) = 0.019 mW/g



0 dB = 0.019mW/g

SAR MEASUREMENT PLOT 3

Ambient Temperature	**19.7 Degrees Celsius**
Liquid Temperature	**19.4 Degrees Celsius**
Humidity	**46.0 %**

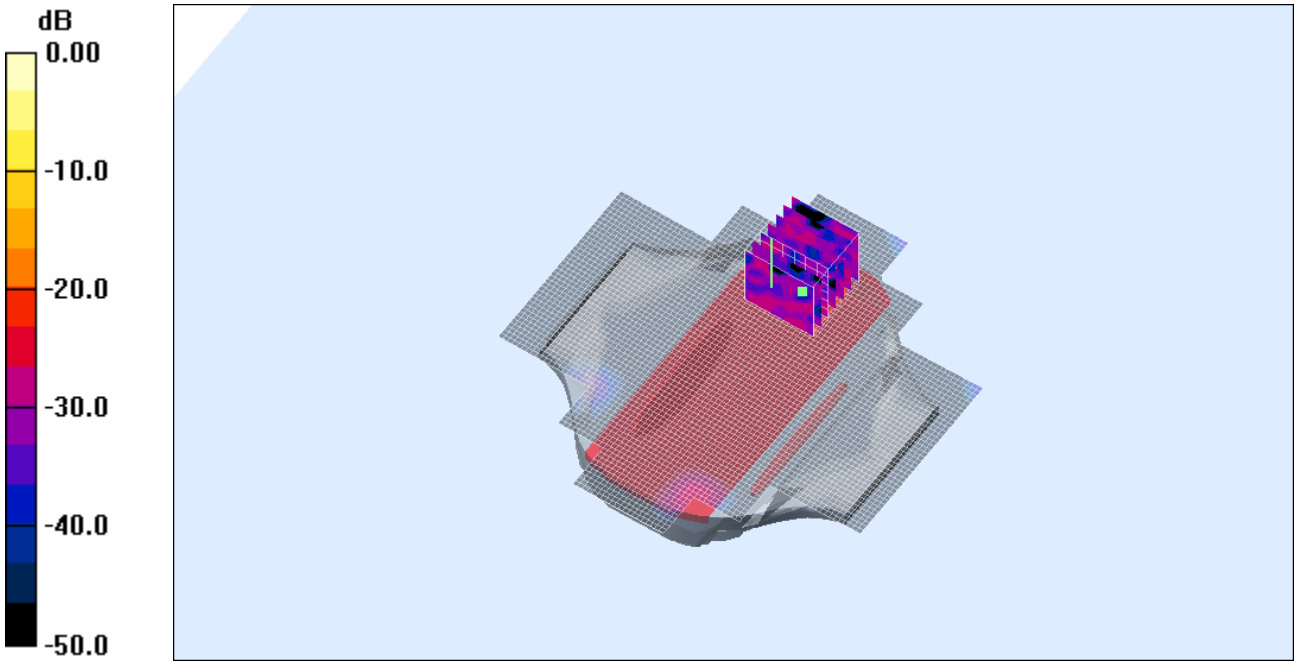


Test Date: 01 October 2007
File Name: Body Worn Back 1900 MHz GPRS Class 10 (DAE442 Probe1380) 01-10-07.da4
DUT: Snowsports Interactive; Type: Q24 Plus; Serial: IMEI: 353806010006800

* Communication System: 1900 MHz GPRS Class 10; Frequency: 1850.2 MHz; Duty Cycle: 1:4.15
* Medium parameters used: σ = 1.55849 mho/m, ε_r = 51.6426; ρ = 1000 kg/m^3
- Electronics: DAE3 Sn442; Probe: ET3DV6 - SN1380; ConvF(4.52, 4.52, 4.52)
- Phantom: Flat Phantom 10.1; Serial: P 10.1; Phantom section: Flat 2.2 Section

Channel 512 Test/Area Scan (81x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.00 mW/g

Channel 512 Test/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.362 V/m; Power Drift = 0.160 dB
Peak SAR (extrapolated) = 0.013 W/kg
SAR(1 g) = 0.00244 mW/g; SAR(10 g) = 0.000933 mW/g
Maximum value of SAR (measured) = 0.00 mW/g



0 dB = 0.00mW/g

SAR MEASUREMENT PLOT 4

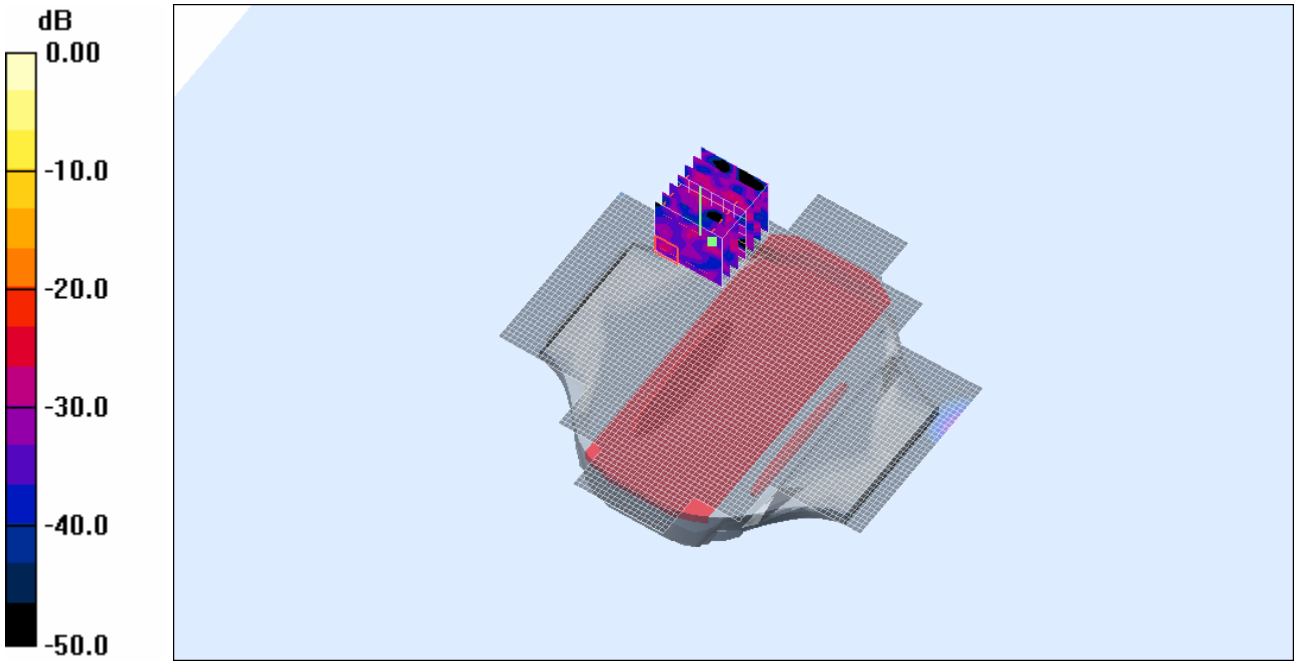
Ambient Temperature	**20.4 Degrees Celsius**
Liquid Temperature	**20.1 Degrees Celsius**
Humidity	**51.0 %**

Test Date: 01 October 2007
File Name: Body Worn Back 1900 MHz GPRS Class 10 (DAE442 Probe1380) 01-10-07.da4
DUT: Snowsports Interactive; Type: Q24 Plus; Serial: IMEI: 353806010006800

* Communication System: 1900 MHz GPRS Class 10; Frequency: 1880 MHz; Duty Cycle: 1:4.15
* Medium parameters used: σ = 1.57513 mho/m, ε_r = 51.4842; ρ = 1000 kg/m^3
- Electronics: DAE3 Sn442; Probe: ET3DV6 - SN1380; ConvF(4.52, 4.52, 4.52)
- Phantom: Flat Phantom 10.1; Serial: P 10.1; Phantom section: Flat 2.2 Section

Channel 661 Test/Area Scan (81x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.00 mW/g

Channel 661 Test/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.213 V/m; Power Drift = -0.356 dB
Peak SAR (extrapolated) = 0.00 W/kg
SAR(1 g) = 0.000101 mW/g; SAR(10 g) = 1.42e-005 mW/g
Maximum value of SAR (measured) = 0.00 mW/g



0 dB = 0.00mW/g

SAR MEASUREMENT PLOT 5

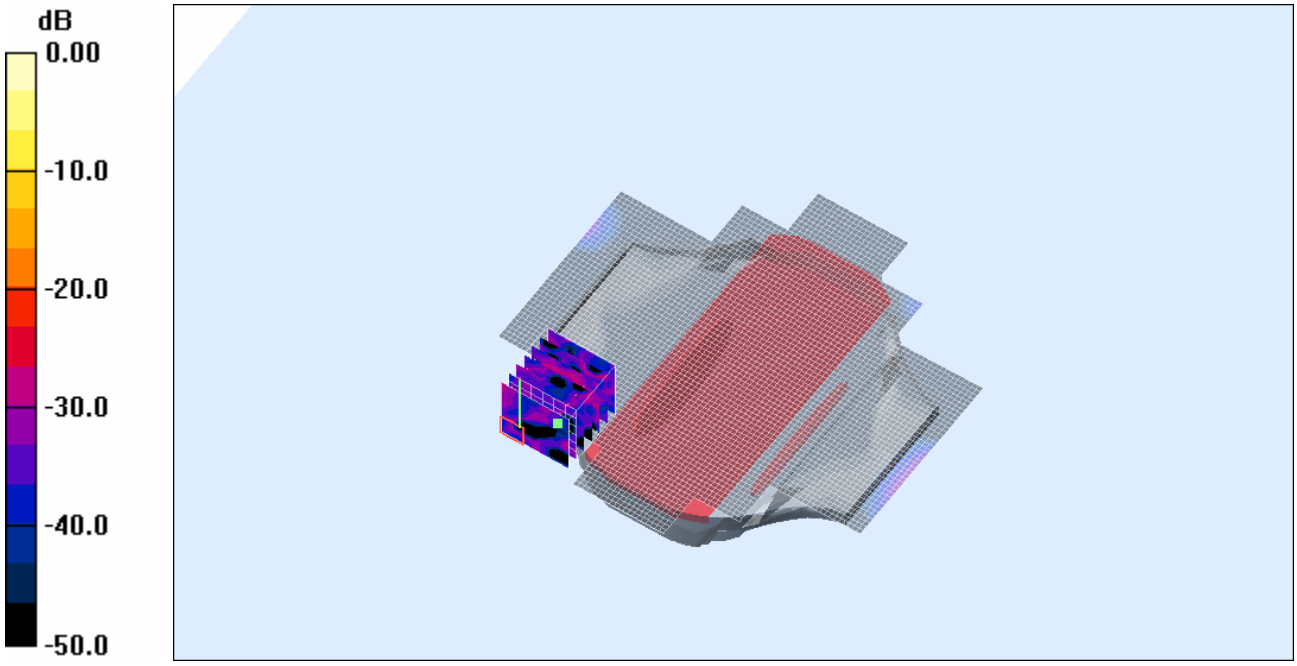
Ambient Temperature	**20.4 Degrees Celsius**
Liquid Temperature	**20.1 Degrees Celsius**
Humidity	**51.0 %**

Test Date: 01 October 2007
File Name: Body Worn Back 1900 MHz GPRS Class 10 (DAE442 Probe1380) 01-10-07.da4
DUT: Snowsports Interactive; Type: Q24 Plus; Serial: IMEI: 353806010006800

* Communication System: 1900 MHz GPRS Class 10; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15
* Medium parameters used: σ = 1.58948 mho/m, ε_r = 51.406; ρ = 1000 kg/m^3
- Electronics: DAE3 Sn442; Probe: ET3DV6 - SN1380; ConvF(4.52, 4.52, 4.52)
- Phantom: Flat Phantom 10.1; Serial: P 10.1; Phantom section: Flat 2.2 Section

Channel 810 Test/Area Scan (81x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.00 mW/g

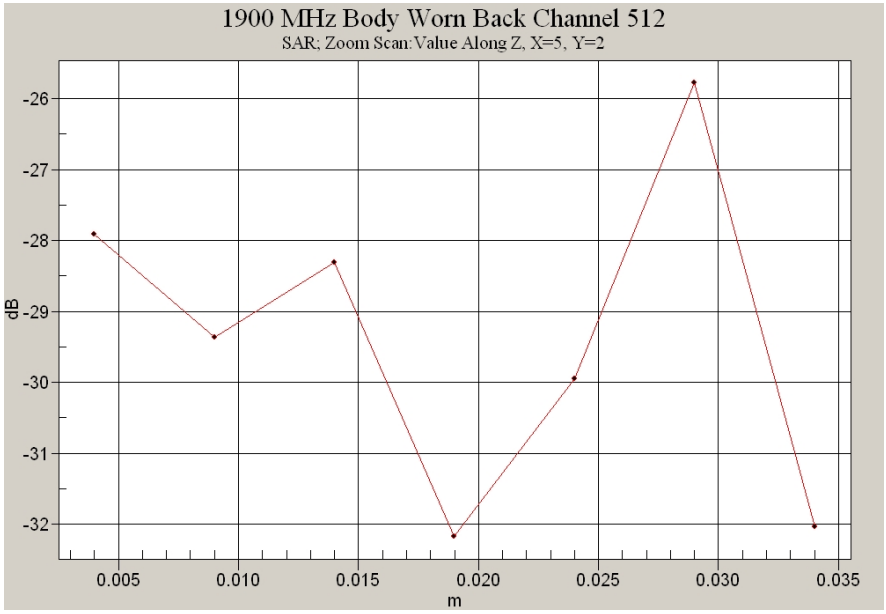
Channel 810 Test/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.335 V/m; Power Drift = 0.138 dB
Peak SAR (extrapolated) = 0.00 W/kg
SAR(1 g) = 3.93e-005 mW/g; SAR(10 g) = 9.88e-006 mW/g
Maximum value of SAR (measured) = 0.00 mW/g

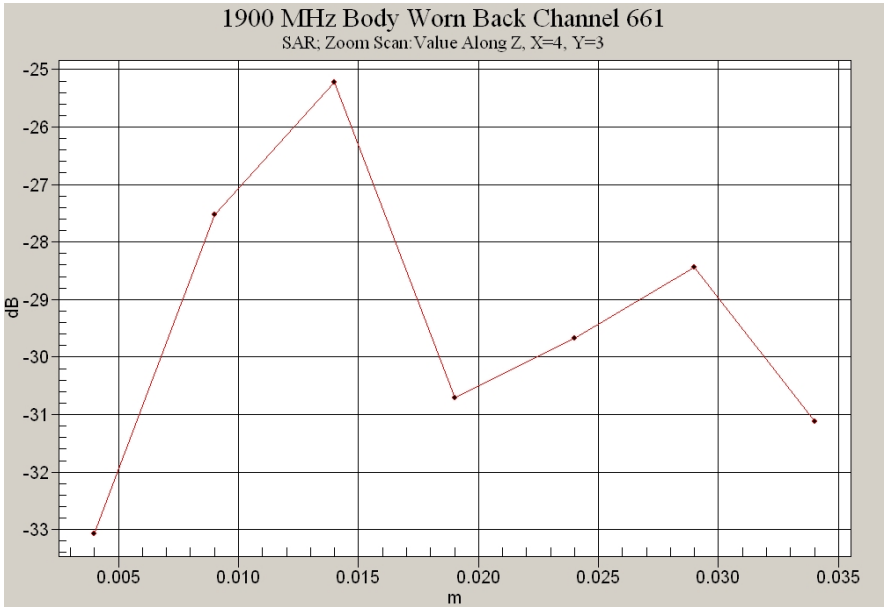


0 dB = 0.00mW/g

SAR MEASUREMENT PLOT 6

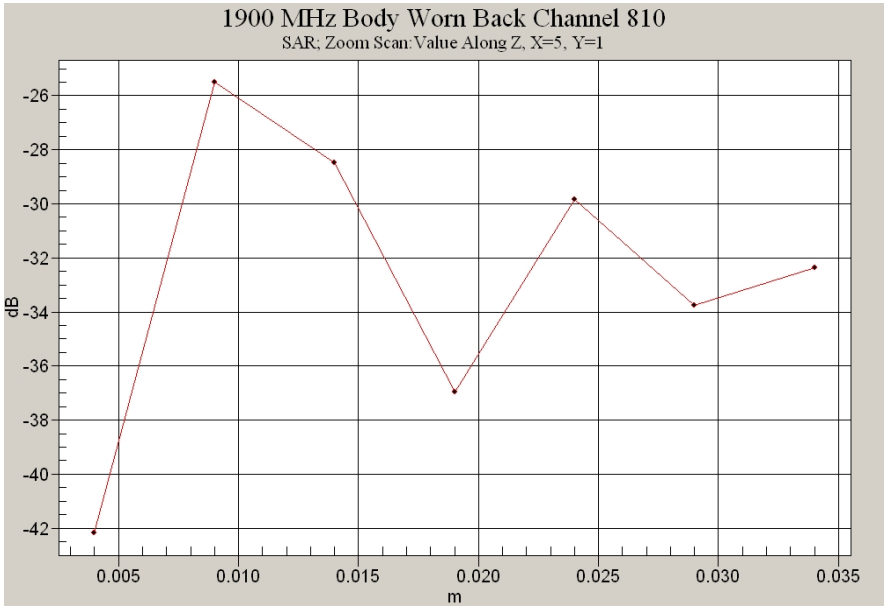
Ambient Temperature	**20.4 Degrees Celsius**
Liquid Temperature	**20.1 Degrees Celsius**
Humidity	**51.0 %**





Note:

Gradient not linear because SAR level is at System Noise Floor level.

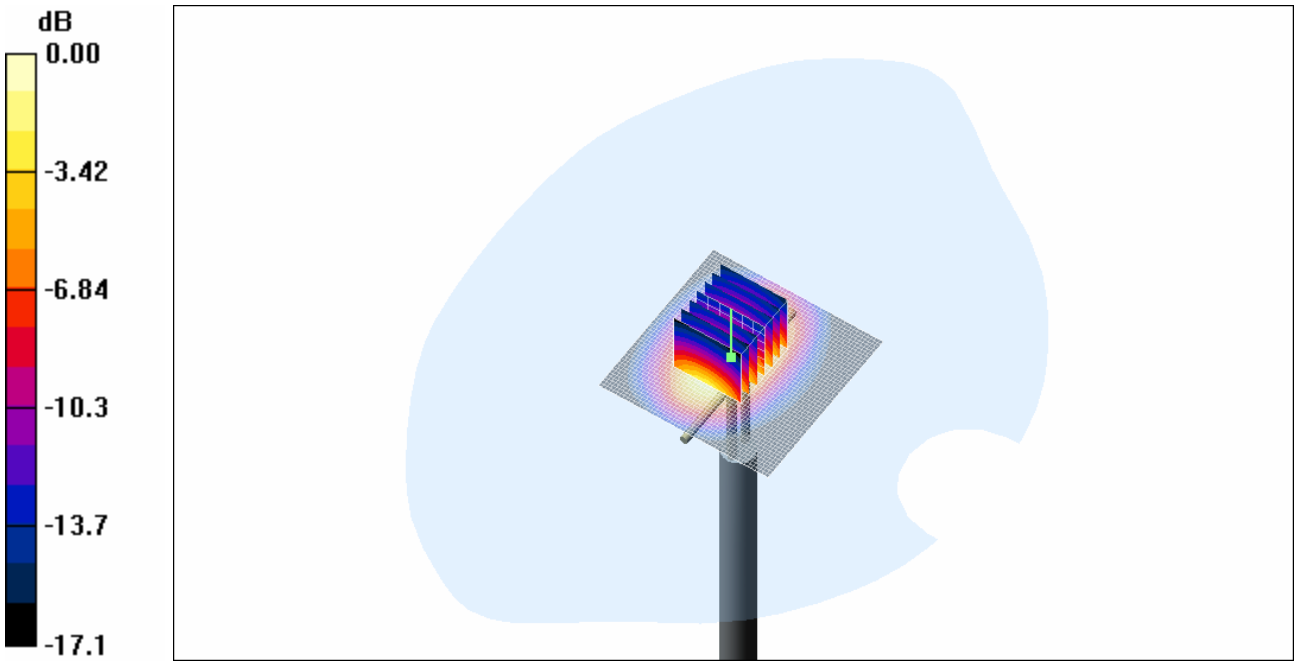


Test Date: 01 October 2007
File Name: Validation 1800 MHz (DAE442 Probe1380) 01-10-07.da4
DUT: Dipole 1800 MHz; Type: DV1800V2; Serial: 242

* Communication System: CW 1800 MHz; Frequency: 1800 MHz; Duty Cycle: 1:1
* Medium parameters used: σ = 1.40302 mho/m, ε_r = 39.0364; ρ = 1000 kg/m^3
- Electronics: DAE3 Sn442; Probe: ET3DV6 - SN1380; ConvF(5.19, 5.19, 5.19)
- Phantom: SAM 22; Serial: 1260; Phantom section: Flat Section

Channel 1 Test/Area Scan (51x51x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.2 mW/g

Channel 1 Test/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.2 V/m; Power Drift = -0.048 dB
Peak SAR (extrapolated) = 15.3 W/kg
SAR(1 g) = 8.89 mW/g; SAR(10 g) = 4.75 mW/g
Maximum value of SAR (measured) = 10.00 mW/g



0 dB = 10.0mW/g

SAR MEASUREMENT PLOT 7

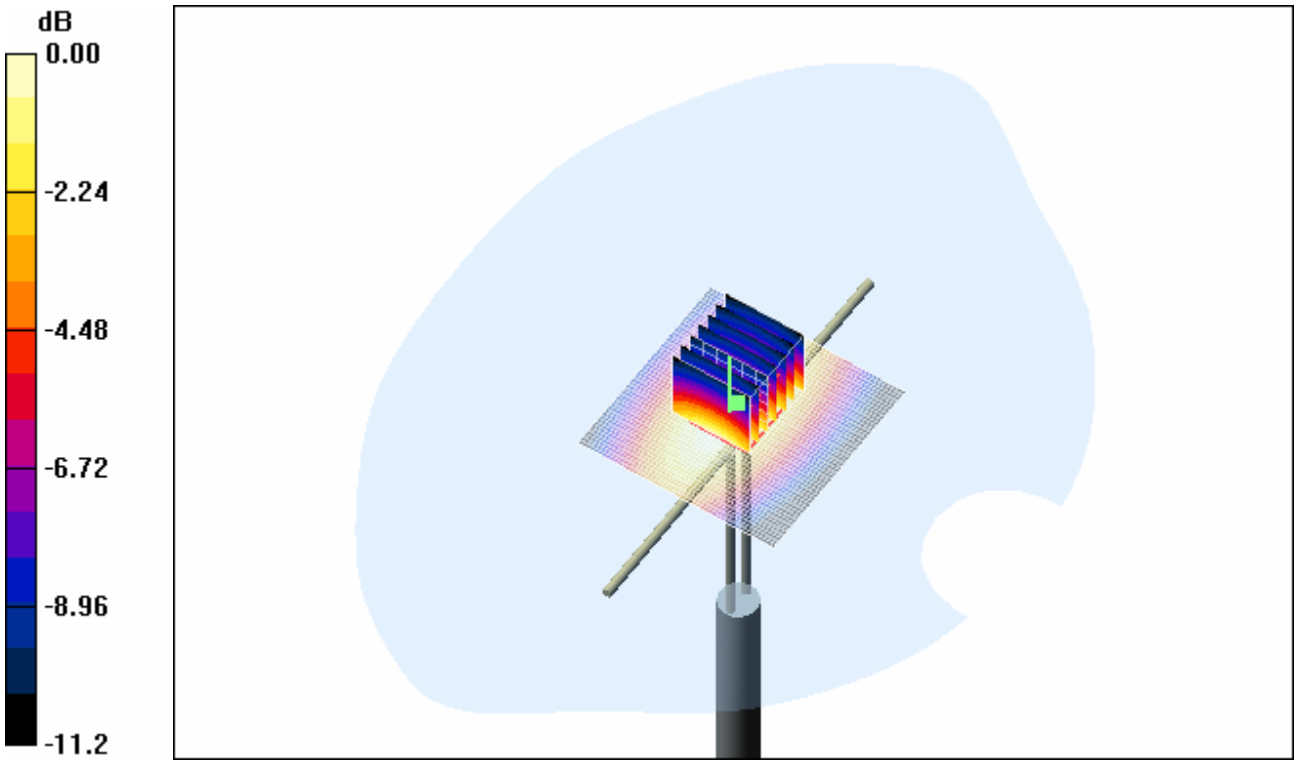
Ambient Temperature	**20.4 Degrees Celsius**
Liquid Temperature	**20.1 Degrees Celsius**
Humidity	**51.0 %**

Test Date: 04 October 2007
File Name: Validation 900 MHz (DAE442 Probe1377) 04-10-07.da4
DUT: Dipole 900 MHz; Type: DV900; Serial: 047

* Communication System: CW 900 MHz; Frequency: 900 MHz; Duty Cycle: 1:1
* Medium parameters used: σ = 0.9688 mho/m, ε_r = 40.8124; ρ = 1000 kg/m^3
- Electronics: DAE3 Sn442; Probe: ET3DV6 - SN1377; ConvF(6.43, 6.43, 6.43)
- Phantom: SAM 12; Serial: 1060; Phantom section: Flat Section

Channel 1 Test/Area Scan (51x51x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.97 mW/g

Channel 1 Test/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.6 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 4.17 W/kg
SAR(1 g) = 2.74 mW/g; SAR(10 g) = 1.75 mW/g
Maximum value of SAR (measured) = 2.96 mW/g



0 dB = 2.96mW/g

SAR MEASUREMENT PLOT 8

Ambient Temperature	**19.7 Degrees Celsius**
Liquid Temperature	**19.4 Degrees Celsius**
Humidity	**46.0 %**