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SAR Test Report

Report Number: M060507

Test Sample:	Duncan Technologies GPRS Handheld Transmitter
Model Number:	AutoCite X3CIW
Tested For:	Duncan Technologies International
Date of Issue:	29th August 2006

CONTENTS

SAR EVALUATION

Duncan Technologies GPRS Handheld Transmitter, **Model:** AutoCite X3CIW

Report Number: M060507

1.0 GENERAL INFORMATION

Test Sample:	Duncan Technologies GPRS Handheld Transmitter
Model Number:	AutoCite X3CIW
Serial Number:	75503
Manufacturer:	Duncan Technologies International
FCC ID:	UIB-X3
Device Category:	Portable Transmitter
Test Device:	Production Unit / Prototype Sample
RF exposure Category:	General Public/Unaware user

Tested for:	Duncan Technologies International
Address:	15/39 Herbert Street, St. Leonards NSW 2065
Contact:	Pejman Mansouri
Phone:	(02) 9432 0500
Fax:	(02) 9432 0501
Email:	Pejman.mansouri@Duncan Technologies.com.au

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)

SAR References:

2. Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.

Statement Of Compliance: The Duncan Technologies GPRS Handheld Transmitter, Model: AutoCite X3CIW. 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: 15th – 16th June 2006

Test Officer:

Peter Jakubiec
Assoc Dip Elec Eng

Authorised Signature:

Aaron Sargent B.Eng
EMR Engineer

2.0 DESCRIPTION OF DEVICE

2.1 Description of Test Sample

The device tested was a Quad Band Mobile Phone operating in the GSM and DSC frequency bands. It has one external antenna. The test device was tested Body Worn Back and Edge -On Positions

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	: External
Applicable Head Configurations	: None
Applicable Body Worn-Configurations	: Body Worn Back Position : Edge-On Position
Battery Options	: One Battery Type

2.2 Test sample Accessories

2.2.1 Battery Types

One type of battery can be used with Cellular Phone. SAR measurements were performed with the standard 6V battery.

2.3 Test Signal, Frequency and Output Power

The test was performed on Duncan Technologies GPRS Handheld Transmitter, provided by Duncan Technologies International, for this evaluation. The GPRS PC Transmitter 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 Band and Class 1 for 1900 MHz band. Communication between the tester and the GPRS PC Transmitter 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	1850.2 – 1909.8 MHz	512, 661 and 810	1	30

2.4 Conducted Power Measurements

The conducted power of the EUT was measured in the 850 and 1900 MHz frequency range. The following table lists the results of the conducted power measurements performed with a power meter. Note: Measurement of conducted power was not possible before and after each SAR test, because the battery obstructs the phone's RF output connector - see photo:

Table: Conducted Power Measurements

Frequency (MHz)	RF Channel	Measured Power (dBm)
824.2	128	31.2
836.6	190	31.3
848.8	251	31.6
1850.2	512	29.1
1880	661	29.0
1909.8	810	28.7

Note: The loss's due to cabling and attenuation has been taken into account.

2.5 Battery Status

The Cellular Phone 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 #1:	Rechargeable Nickel-Cadmium	**Battery #2:**	Rechargeable Nickel-Cadmium
Type:	6V -1.5Ah	**Type:**	6V -1.5Ah
Serial No:	0613	**Serial No:**	0544

2.6 Details of Test Laboratory

2.6.1 Location

EMC Technologies Pty Ltd
57 Assembly Drive
Tullamarine, (Melbourne) Victoria
Australia 3043

Telephone: +61 3 9335 3333
Facsimile: +61 3 9338 9260
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 AS/NZS 2772.2:	RF and microwave radiation hazard measurement
ACA:	Radio communications (Electromagnetic Radiation - Human Exposure) Standard 2003
FCC:	Guidelines for Human Exposure to RF Electromagnetic Field OET65C 01/01
CENELEC:	ES59005: 1998
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 37% to 43%. 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 SN1380 probe is 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 V4.6 Build 23.7** 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: 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 dipole. The validation dipoles are highly symmetric and matched at the centre frequency for the specified liquid and distance to the phantom. The accurate distance between the liquid surface and the dipole centre is achieved with a distance holder that snaps onto the dipole. System validation is performed by feeding a known power level into a reference dipole, set at a know distance from the phantom. The measured SAR is compared to the theoretically derived level, and must be within 10%.

3.4.1 Validation Results (900MHz 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. ϵ_r (measured)	4. σ (mho/m) (measured)	5. Measured SAR 1g	6. Measured SAR 10g
15th June 2006	1800	38.5	1.41	9.81	5.23
16th June 2006	900	40.2	0.99	2.88	1.83

3.4.2 Deviation from reference validation values

The reference SAR values are derived using a reference dipole and flat phantom suitable for centre frequency of 900MHz and 1800 MHz. This reference SAR value is 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 & Date	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 (%)
16th June 2006 900MHz	2.88	11.5	11.1	3.78	10.8	6.66
15th June 2006 1800MHz	9.81	39.2	38.2	2.72	38.1	2.99

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. The following photo shows the depth of the liquid maintained during the testing.

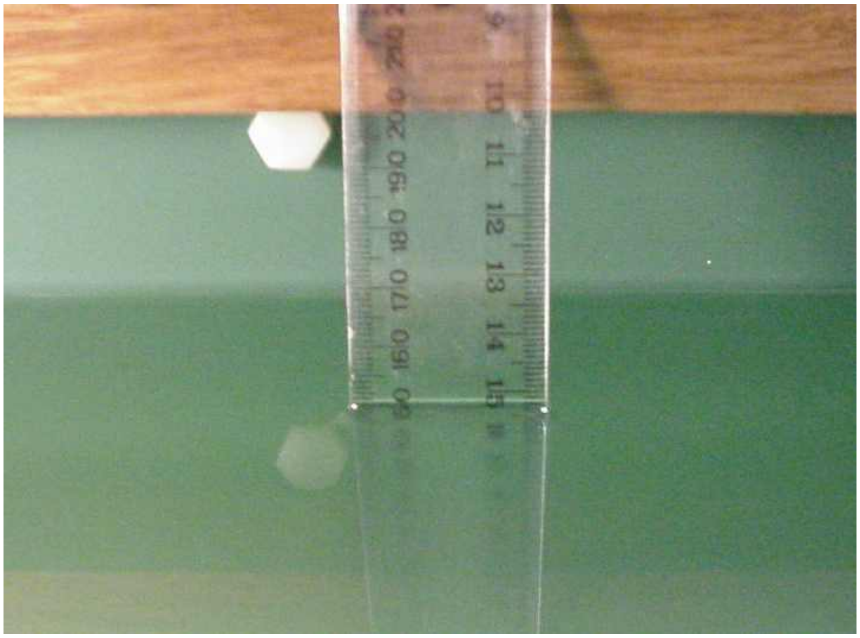


Photo of liquid Depth in Flat Phantom

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. Table 4 provides a summary of the measured phantom properties

Table: Phantom Properties (300MHz-2500MHz)

Phantom Properties	Requirement for specific EUT	Measured
Depth of Phantom	N/A	200mm
Width of flat section	N/A	540mm
Length of flat section	N/A	620mm
Thickness of flat section	2.0mm +/-0.2mm (flat section)	2.08 – 2.20mm
Dielectric Constant	<5.0	4.603 @ 300MHz (worst-case frequency)
Loss Tangent	<0.05	0.0379 @ 2500MHz (worst-case frequency)

Photo 1: Flat Phantom V10.1 (2mm)

The dielectric parameters of the brain 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 tables:

Table: Measured Simulating Liquid Dielectric Values at 900MHz

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
824 MHz Body	52.8	55.0 ±5% (52.3 to 57.8)	*0.98	1.05 ±5% (1.00 to 1.10)	1000
836 MHz Body	52.7	55.0 ±5% (52.3 to 57.8)	1.00	1.05 ±5% (1.00 to 1.10)	1000
949 MHz Body	52.6	55.0 ±5% (52.3 to 57.8)	1.01	1.06 ±5% (1.01 to 1.11)	1000

Note: The conductivity was just outside the 5% tolerance, however it did not influence the SAR results with respect to compliance.

Table: Measured Simulating Liquid Dielectric Values at 1800MHz

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
1850.2 MHz Body	50.9	53.3 ±5% (50.6 to 56.0)	1.52	1.52 ±5% (1.44 to 1.60)	1000
1880.0 MHz Body	50.8	53.3 ±5% (50.6 to 56.0)	1.54	1.52 ±5% (1.44 to 1.60)	1000
1909.8 MHz Body	50.7	53.3 ±5% (50.6 to 56.0)	1.56	1.52 ±5% (1.44 to 1.60)	1000

Note: The brain and body 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 (%)
15th June 2006	20.0	19.8	37.0
16th June 2006	20.1	19.9	43.0

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: Body @ 850MHz
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 @ 1900MHz
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 V4.6 Build 23.7**). 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 161 mm x 81 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 V4.6 Build 23.7 – 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	5.1	R	1.73	1	1	2.9	2.9	∞
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				9.7	9.2	154
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				19.4	18.41	

Estimated total measurement uncertainty for the DASY4 measurement system was ± 9.2 %. The extended uncertainty (K = 2) was assessed to be ± 19.4 % based on 95% confidence level. The uncertainty is not added to the measurement result.

NOTE: For SAR measurements performed at the head, the extended measurement uncertainty (K = 2) was assessed to be ± 18.4 % based on 95% confidence level.

Table: Uncertainty Budget for DASY4 Version V4.6 Build 23.7 - 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 ±8.0%. The extended uncertainty (K = 2) was assessed to be ±16.0% 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 V4.6 Build 23.7

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	No
Flat Phantom	SPEAG	PO1A 6mm	1003	Not Applicable	No
Data Acquisition Electronics	SPEAG	DAE3 V1	359	07-July-2006	No
Data Acquisition Electronics	SPEAG	DAE3 V1	442	08-Dec-2006	Yes
Probe E-Field - Dummy	SPEAG	DP1	N/A	Not applicable	No
Probe E-Field	SPEAG	ET3DV6	1380	14-Dec-2006	Yes
Probe E-Field	SPEAG	ET3DV6	1377	14-July-2006	No
Probe E-Field	SPEAG	ES3DV6	3029	1-Nov-2005	No
Probe E-Field	SPEAG	EX3DV4	3563	1-July-2006	No
Antenna Dipole 300 MHz	SPEAG	D300V2	1005	26-Oct-2007	No
Antenna Dipole 450 MHz	SPEAG	D450V2	1009	15-Dec-2006	No
Antenna Dipole 900 MHz	SPEAG	D900V2	047	12-July-2006	Yes
Antenna Dipole 1640 MHz	SPEAG	D1640V2	314	25-May-2006	No
Antenna Dipole 1800 MHz	SPEAG	D1800V2	242	13-July-2006	Yes
Antenna Dipole 2450 MHz	SPEAG	D2450V2	724	2-Nov-2006	No
Antenna Dipole 3500 MHz	SPEAG	D3500V2	1002	1-July-2007	No
Antenna Dipole 5600 MHz	SPEAG	D5GHzV2	1008	27-Oct-2007	No
RF Amplifier	EIN	603L	N/A	In test	No
RF Amplifier	Mini-Circuits	ZHL-42	N/A	In test	Yes
RF Amplifier	Mini-Circuits	ZVE-8G	N/A	In test	No
Synthesized signal generator	Hewlett Packard	ESG-D3000A	GB37420238	*Not Required	Yes
RF Power Meter Dual	Hewlett Packard	437B	3125012786	30-May-2007	Yes
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481H	1545A01634	30-May-2007	Yes
RF Power Meter Dual	Gigatronics	8542B	1830125	18-April-2007	Yes
RF Power Sensor	Gigatronics	80301A	1828805	18-April-2007	Yes
RF Power Meter Dual	Hewlett Packard	435A	1733A05847	*Not Required	Yes
RF Power Sensor	Hewlett Packard	8482A	2349A10114	*Not Required	Yes
Network Analyser	Hewlett Packard	8714B	GB3510035	31-Aug-2006	No
Network Analyser	Hewlett Packard	8753ES	JP39240130	11-Aug-2006	Yes

***Note:** Reference power meter only.

7.0 SAR TEST METHOD

7.1 Description of the Test Positions

SAR measurements were performed in the “Body worn back position” at the low, middle and high frequencies of operation. Additional SAR measurements were performed in the “Edge-On position” at the middle frequency of operation.
See Appendix A for photos of test positions.

7.1.1 “Body-Worn Back Position”

The body-worn operating configuration was tested with the device positioned against a flat phantom in normal use configuration. The position chosen for testing was the “Body Worn Position”, this position simulated the EUT placed against the body of a user.

7.1.2 “Edge-On Position”

The Edge-On operating configuration was tested with the device positioned against a flat phantom in normal use configuration. The position chosen for testing was the “Edge-On Position”, this position simulated the EUT 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 EVALUATION RESULTS

The SAR values averaged over 1 g and 10 g tissue masses were determined for the sample device for the “Body Worn Back position” and the “Edge-On position” and the results for 900 MHz and 1800 MHz for both positions are given in the two tables below respectively.
The plots with the corresponding SAR distributions, which reveal information about the location of the maximum SAR with respect to the devices, are contained in Appendix B of this report.

8.1 SAR Measurement Results for 850 MHz

Table: SAR Measurement Results – 850 MHz

Test Position	Plot Number	Test Channel	Test Freq. (MHz)	SAR Level for (1g) mW/g	DASY4 Measured Drift (dB)
Body Worn Back Position	1	128	824	1.04	0.01
	2	190	836	1.09	0.02
	3	251	849	1.06	-0.04
Edge-On	4	190	836	0.17	-0.06

Note: The uncertainty of the system (± 18.4%) has not been added to the result.

The maximum measured SAR level in the 900MHz band was 1.09 mW/g for a 1-gram cube this value was measured at a frequency of 836 MHz (Channel 190).

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

8.2 SAR Measurement Results for 1900 MHz

Table: SAR Measurement Results – 1900 MHz

Test Position	Plot Number	Test Channel	Test Freq. (MHz)	SAR Level for (1g) mW/g	DASY4 Measured Drift (dB)
Body Worn Back Position	5	512	1850.2	0.22	-0.17
	6	661	1880	0.26	0.06
	7	810	1909.8	0.22	0.21
Edge-On	8	661	1880	0.01	-0.22

Note: The uncertainty of the system (± 18.4%) has not been added to the result.

The maximum measured SAR level in the 1800MHz band was 0.26 mW/g for a 1-gram cube this value was measured at a frequency of 1880 MHz (Channel 661).

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

9.0 COMPLIANCE STATEMENT

The GSRS Quad Band Duncan Technologies GPRS Handheld Transmitter Model: AutoCite X3CIW (FCC ID: UIB-X3) , was tested on behalf of Duncan Technologies International It complied with the FCC and RSS-102 SAR requirements.

The highest SAR level recorded was 1.09 mW/g for a 1g cube. This value was measured in the "Body Worn Back" position, and was below the uncontrolled limit of 1.6 mW/g, even taking into account the measurement uncertainty of 19.4 %.

APPENDIX A1 Test Sample Photographs

Battery 1

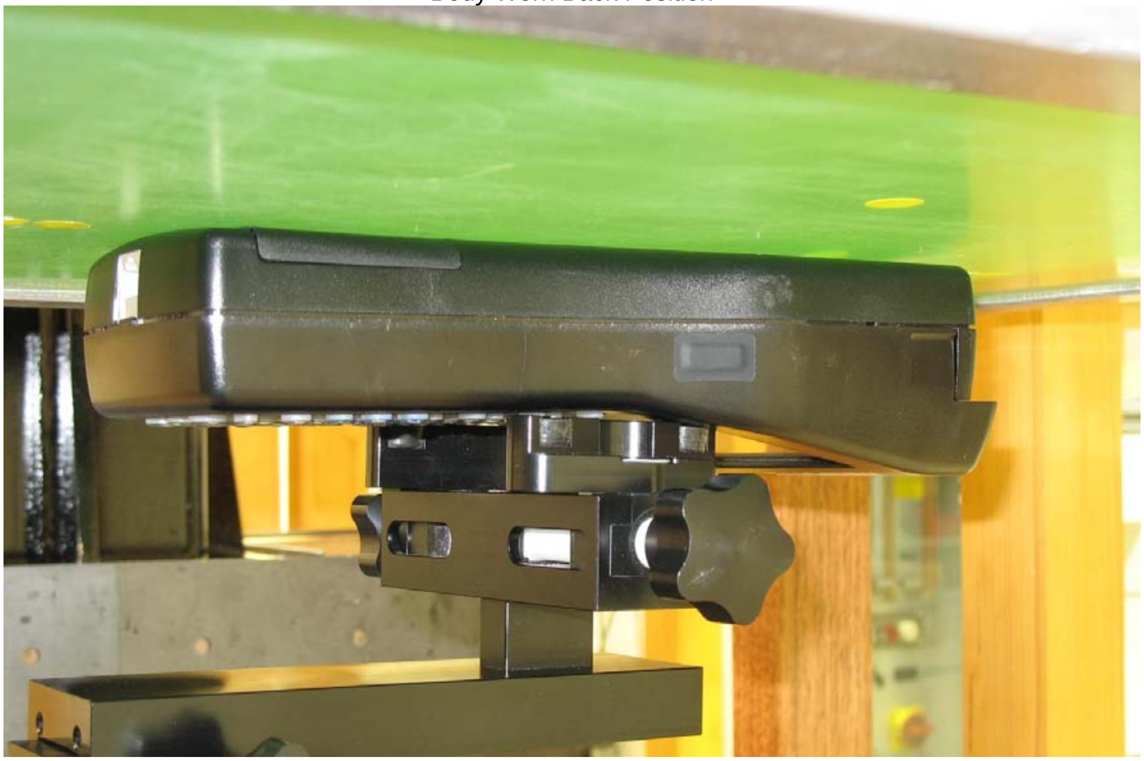
Battery 2

Duncan Technologies GPRS Handheld Transmitter, AutoCite X3CIW

Duncan Technologies GPRS Handheld Transmitter, AutoCite X3CIW

APPENDIX A2 Test Setup Photographs

Body Worn Back Position



Body Worn Back Position