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SAR Test Report

Report Number: M050922

Test Sample: Tait Electronics Portable Transceiver

Model Number: TPAB11 (12)-K500A

Tested For: Tait Electronics Ltd

Date of Issue: 7th October 2005

Nata Accredited Laboratory
Number: 5292

CONTENTS

SAR EVALUATION
Tait Electronics Portable Transceiver, **Model:** TPAB11 (12)-K500A
Report Number: M050922

1.0 GENERAL INFORMATION

Test Sample:	Tait Electronics Portable Transceiver
Model Number (s):	TPAB11 -K500A and TPAB12 -K500A
Serial Number:	21001665 - TPAB11-K500A and 21001670 - TPAB12-K500A
Manufacturer:	Tait Electronics Ltd
Device Category:	Portable Transmitter
Test Device:	Production Unit
RF exposure Category:	Occupational/Controlled
Tested for:	Tait Electronics Ltd
Address:	558 Wairakei Road, Christchurch 8005, New Zealand PO Box 1645, Christchurch 8005, New Zealand
Contact:	Bruce Jensen
Phone:	+64 3 358 1026
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Test Standard/s:	Evaluating Compliance with FCC Guidelines For Human Exposure to Radiofrequency Electromagnetic Fields Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01)
Statement Of Compliance:	The Tait Electronics Portable Transceiver, model TPAB11 (12)-K500A. Complied with the FCC controlled RF exposure limits of 8.0mW/g.
Test Dates:	20th to 26th September 2005
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 Tait Electronics Portable Transceiver, Model: TPAB11 (12)-K500A operating in 825 MHz frequency band. It has an external integral fixed length antenna and was tested in the Face Frontal and Belt Clip configurations of the phantom. The TPAB12-K500A version is fitted with a twelve button keypad, results for this model are included in the report.

Operating Mode during Testing	: Continuous Wave 100% duty cycle
Operating Mode production sample	: 50% duty cycle
Modulation:	: FM
Device Power Rating for test sample and identical production unit	: 3 W
Device Dimensions (LxWxH)	: 160 x 60 x 45 mm
Antenna type	: Whip
Applicable Head Configurations	: Face Frontal
Applicable Body Configurations	: Belt Clip Position
Battery Options	: Ni-MH and Ni-Cd Battery Packs

2.2 Test sample Accessories

2.2.1 Battery Types

A Ni-MH or Ni-Cd Battery Pack is used to power the Tait Electronics Portable Transceiver, Model: TPAB11(12)-K500A. The maximum rated power is 3 W.

2.2.2 Belt Clip

One type of metallic belt clip is sold with the device. The belt clip is fixed to the back of the device and provides a spacing of 10 mm between the device and flat phantom. This metallic belt-clip was attached to the device during testing in the Belt-Clip position.

2.3 Test Signal, Frequency and Output Power

The Tait Electronics Portable Transceiver is programmed with 16-channels (Channel 1 low, channel 5 mid and channel 7 high). This device operates in the 825 MHz frequency band. The frequency range is 762 MHz to 870 MHz. The transmitter was configured into a test mode that ensured a continuous RF transmission for the duration of each SAR scan. The device transmission characteristics were also monitored during testing to confirm the device was transmitting continuously. The device has a headset output to which a supplied Hands free speaker/microphone was connected to the device during all testing in the belt-clip position. Excluding the speaker/microphone accessory there were no wires or other connections to the Handheld Transceiver during the SAR measurements.

Table: Test Frequencies

Frequency Range	Traffic Channels	Nominal Power (W)
762 – 870 MHz	1 to 7	3

2.4 Conducted Power Measurements

The conducted power of the EUT was measured in the 762 MHz to 870 MHz frequency range with a calibrated Power Meter. The results of this measurement are listed in table below. The conducted power was measured at the beginning and end of each test.

Table: Frequency and Output Power

Channel	Channel Frequency MHz	Battery Type	Maximum Conducted Output Power dBm
1	762MHz	Ni-MH	34.76
5	825MHz	Ni-MH	34.55
7	870MHz	Ni-MH	34.87

2.5 Battery Status

The device battery was fully charged prior to commencement of measurement. Each SAR test was completed within 30 minutes. The battery condition was monitored by measuring the conducted RF at the antenna port before the commencement of each test and again after the completion of the test.

Table: Battery Details

Battery #1: **Model No.:** **Serial No.:**	Ni-MH TPA-BA-203 21001549	**Battery #2:** **Model No.:** **Serial No.:**	Ni-MH TPA-BA-203 21001535
Battery #3: **Model No.:** **Serial No.:**	Ni-MH IS TPA-BA-204 21001680	**Battery #4:** **Model No.:** **Serial No.:**	Ni-Cd IS TPA-BA-202 21001677
Battery #5: **Model No.:** **Serial No.:**	Ni-Cd TPA-BA-201 21001686		

2.6 DETAILS OF TEST LABORATORY

2.6.1 Location

EMC Technologies Pty Ltd - ACN/ABN: 82057105549
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:

AS/NZS 2772.1:	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 network signals. The temperature in the laboratory was controlled to within 20 ± 1 °C, the humidity was 44 to 58 %. The liquid parameters were measured prior to the commencement of the tests. 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 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 V4.5 Build 19** 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 EN50361SAR measurement requirements.

3.2 E-Field Probe Type and Performance

The SAR measurements were conducted with the dosimetric probe ET3DV6 Serial: 1377 (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. The sensors of the probe are directly loaded with Schottky diodes and connected via highly resistive lines (length = 300 mm) to the data acquisition unit.

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 with the SPEAG D900V2 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.

3.4.1 Validation Results @ 900 MHz

The following table lists the dielectric properties of the tissue simulating liquid measured prior to SAR validation. The results of the validation are listed in columns 4 and 5. The forward power into the reference dipole for each SAR validation was adjusted to 250mW.

Table: Validation Results (Dipole: SPEAG D900V2 SN: 047)

1. Validation Date	2. $\in r$ (measured)	3. σ (mho/m) (measured)	4. Measured SAR 1g (mW/g)	5. Measured SAR 10g (mW/g)
20th Sept 05	41.0	0.97	2.66	1.71
21st Sept 05	41.0	0.96	2.61	1.68
22nd Sept 05	41.8	0.98	2.67	1.72
23rd Sept 05	41.1	0.96	2.68	1.73
26th Sept 05	42.4	0.98	2.80	1.80

3.4.2 Deviation from reference validation values

The reference SAR values are derived using a reference dipole and flat phantom suitable for a centre frequency of 900 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 (D900V2) 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

Date	Measured SAR 1g (mW/g)	Measured SAR 1g (Normalized to 1W)	SPEAG Calibration reference SAR Value 1g (mW/g)	Deviation From SPEAG (%)	IEEE Std 1528 reference SAR value 1g (mW/g)	Deviation From IEEE (%)
20th Sept 05	2.66	10.64	11.1	-4.10	10.8	-1.48
21st Sept 05	2.61	10.44	11.1	-5.95	10.8	-3.33
22nd Sept 05	2.67	10.68	11.1	-3.78	10.8	-1.11
23rd Sept 05	2.68	10.72	11.1	-3.42	10.8	-0.74
26th Sept 05	2.80	11.20	11.1	0.90	10.8	3.70

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 15cm with a tolerance of ±0.5cm. The following photo shows the depth of the liquid maintained during the testing.

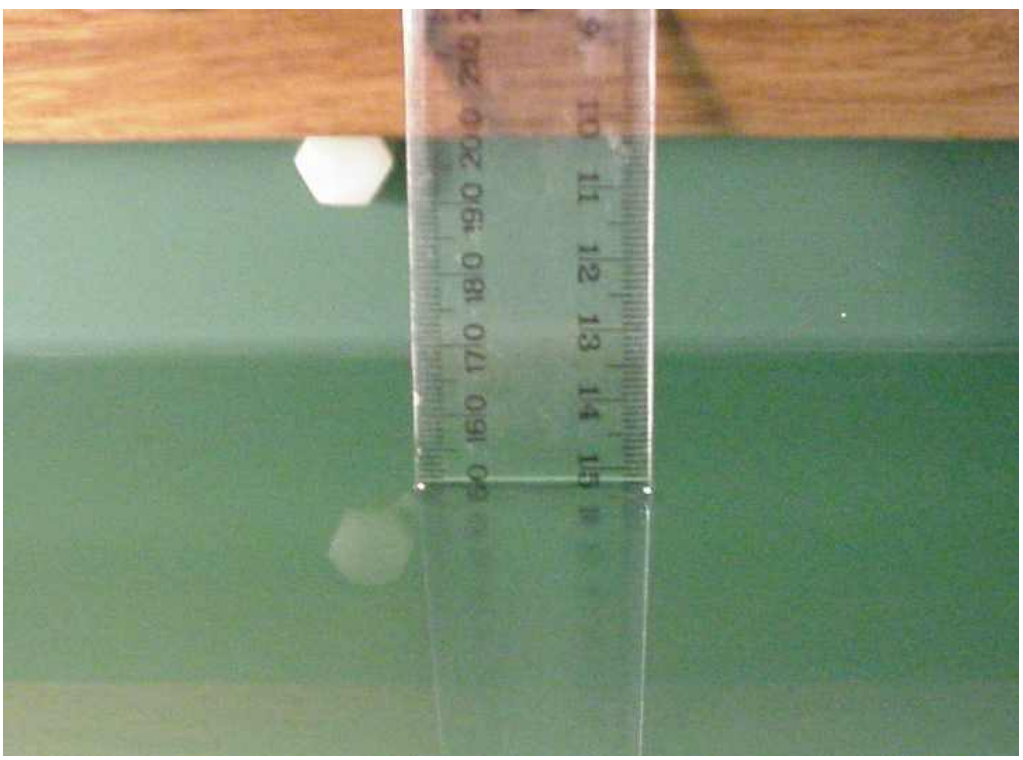

Photo of liquid Depth in Flat Phantom

3.5 Phantom Properties (Size, Shape, Shell Thickness)

The phantom used during the validations was the "Flat Phantom" model: PO1A V4.4e from SPEAG. It is a strictly validation phantom with a single thickness of 6mm and was filled with the required tissue simulating liquid. The flat phantom support structures were all non-metallic and spaced more than one device width away in transverse directions.

For SAR testing in the Face Frontal and Belt Clip positions an AndreT Flat Phantom V9.1 was used. The phantom thickness is 2.0mm +/-0.2 mm and the phantom was filled with the required tissue simulating liquid. Table below provides a summary of the measured phantom properties

Table: Phantom Properties (300MHz-2500MHz)

Phantom Properties	Requirement for specific EUT	Measured
Depth of Phantom	90mm	200mm
Width of flat section	120mm	540mm
Length of flat section	320mm	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 V9.1 2mm

3.6 Tissue Material Properties

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 table.

Table: Measured Brain Simulating Liquid Dielectric Values

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
762 MHz	42 to 42.4	41.8 ±5% (39.7 to 43.9)	0.88 to 0.89	0.90 ±5% (0.86 to 0.95)	1000
825 MHz	41.2 to 41.5	41.5 ±5% (39.4 to 43.6)	0.94 to 0.95	0.90 ±5% (0.86 to 0.95)	1000
870 MHz	40.7 to 41	41.5 ±5% (39.4 to 43.6)	0.98 to 0.99	0.97 ±5% (0.92 to 1.02)	1000

Table: Measured Body Simulating Liquid Dielectric Values

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
762 MHz	54.2 to 57.1	55.4 ±5% (52.6 to 58.2)	0.94	0.97 ±5% (0.92 to 1.02)	1000
825 MHz	53.5 to 56.5	55.2 ±5% (52.4 to 58.0)	1.01	0.97 ±5% (0.92 to 1.02)	1000
870 MHz	53.0 to 56.0	55.0 ±5% (52.3 to 57.8)	1.05 to 1.06	1.05 ±5% (0.98 to 1.10)	1000

NOTE: The brain and muscle liquid parameters were within the required tolerances of ±5%.

3.6.1 Liquid 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 (%)
20th Sept 05	20.1	19.8	46
21st Sept 05	19.7	19.5	44
22nd Sept 05	19.8	19.4	52
23rd Sept 05	20.1	19.5	58
26th Sept 05	20.0	19.6	48

3.7 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 @ 835MHz
Volume of Liquid: 60 Litres

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

Table: Tissue Type: Muscle @ 835MHz
Volume of Liquid: 60 Litres

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

3.8 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 A2-A3 for photographs of device positioning

4.0 SAR MEASUREMENT PROCEDURE USING DASY4

The SAR evaluation was performed with the SPEAG DASY4 system. A summary of the procedure follows:

a) A measurement of the conducted power value at the antenna port is used as a reference value for assessing the power drop of the EUT. Also a measurement of the SAR value at a fixed location is used. The power 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 20 mm x 20 mm. The actual Area Scan has dimensions of 51 mm x 191 mm surrounding the test device hot spot location. Based on this data, the area of the maximum absorption is determined by Spline interpolation. A pre-scan is performed for each phantom configuration to ensure that entire hot spot is identified.

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 1.3 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

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 V4.5 Build 19 – 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)	E.2.1	10	N	1	1	1	10.0	10.0	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	10	R	1.73	1	1	5.8	5.8	∞
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	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1	1	1.5	1.5	∞
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									
Test Sample Positioning	E.4.2	1.61	N	1	1	1	1.6	1.6	11
Device Holder Uncertainty	E.4.1	3.34	N	1	1	1	3.3	3.3	7
Output Power Variation – SAR Drift Measurement	6.6.2	5	R	1.73	1	1	2.9	2.9	∞
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	0.64	0.43	1.8	1.2	∞
Liquid Conductivity – Measurement uncertainty	E.3.3	2.5	N	1	0.64	0.43	1.6	1.1	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	0.6	0.49	1.5	1.2	5
Combined standard Uncertainty			RSS				14.3	14.2	154
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				28.7	28.31	

Estimated total measurement uncertainty for the DASY4 measurement system was ± 14.9. The extended uncertainty (K = 2) was assessed to be ±28.7 based on 95% confidence level. The uncertainty is not added to the measurement result.

Table: Uncertainty Budget for DASY4 Version V4.5 Build 19 - Validation

a	b	c	d	e= f(d,k)	f	g	h=cxf/e	i=cxg/e	k
Uncertainty Component	Sec.	Tol. (6%)	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i (6%)	10g u_i (6%)	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 V4.5 Build 19

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	No
SAM Phantom	SPEAG	N/A	1060	Not applicable	Yes
Flat Phantom	AndreT	10.1	P 10.1	Not Applicable	No
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	07-July-2006	No
Data Acquisition Electronics	SPEAG	DAE3 V1	442	06-Dec-2005	Yes
Probe E-Field - Dummy	SPEAG	DP1	N/A	Not applicable	No
Probe E-Field	SPEAG	ET3DV6	1380	14-Dec-2005	No
Probe E-Field	SPEAG	ET3DV6	1377	14-July-2006	Yes
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	27- Nov-2005	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	No
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	05-Oct-2005	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	28-May-2006	Yes
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481H	1545A01634	30-May-2006	Yes
RF Power Meter Dual	Gigatronics	8542B	1830125	13-April-2006	Yes
RF Power Sensor	Gigatronics	80301A	1828805	13-April-2006	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
Dual Directional Coupler	Hewlett Packard	778D	1144 04700	In test	Yes
Dual Directional Coupler	NARDA	3022	75453	In test	No

7.0 SAR TEST METHOD

7.1 Description of the Test Positions (Face Frontal and Belt Clip)

SAR measurements were performed in the "Face Frontal" and "Belt Clip" positions. Both the "Face Frontal" and "Belt Clip" positions were measured in the flat section of the AndreT 10.1 phantom.
See Appendix A for photos of test positions.

7.1.1 "Face Frontal Position"

The SAR evaluation was performed in the flat section of the AndreT phantom. The device was placed 25mm from the phantom, this position is equivalent to the device placed in front of the nose. The supporting hand was not used.

7.1.2 "Belt Clip" Position

The device was tested in the (2.00 mm) flat section of the AndreT phantom for the "Belt Clip" position. A belt clip maintained a distance of approximately 10 mm between the back of the device and the flat phantom. The Transceiver was placed at the flat section of the phantom and suspended until the Belt Clip touched the phantom. The belt clip was made of plastic and the device was connected with the hands free earpiece/microphone.

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

The device has a fixed antenna. The SAR was measured at three test channels with the test sample operating at maximum power, as specified in section 2.3.

7.3 FCC 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 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 MEASUREMENT RESULTS

The SAR values averaged over 1 g tissue mass were determined for the sample device for the Face Frontal and Belt Clip configurations of the phantom. All tests were conducted with TPA-BA-203 standard battery unless indicated.

Table: SAR MEASUREMENT RESULTS – Face Frontal positions TPAB11-K500A

1. Test Position	2. Plot No.	3. Test Channel	4. Test Freq (MHz)	5. Measured 1g SAR Results (mW/g)	5.1 Measured 1g SAR Results 50% Duty Cycle (mW/g)	6. Measured Drift (dB)
Face Frontal Antenna TPA-AN-023	1	1	762	3.19	1.60	-0.21
	2	5	825	2.59	1.30	-0.33
	3	7	870	2.22	1.11	-0.29
Face Frontal Antenna TPA-AN-021	4	1	762	3.53	1.77	-0.17
	5	5	825	2.30	1.15	-0.34
	6	7	870	2.36	1.18	-0.35
Speaker Microphone accessory TPA-AA-204						
Face Frontal Antenna TPA-AN-023	7	1	762	3.33	1.67	-0.15
	8	5	825	4.39	2.20	-0.32
	9	7	870	3.55	1.78	-0.20
Face Frontal Antenna TPA-AN-021	10	1	762	5.51	2.76	-0.31
	11	5	825	2.54	1.27	-0.31
	12	7	870	2.43	1.22	-0.29

Note: The uncertainty of the system (± 28.7 %) has not been added to the results.

Table: SAR MEASUREMENT RESULTS – Belt Clip and Holster Worn positions TPAB11-K500A

1. Test Position	2. Plot No.	3. Test Channel	4. Test Freq (MHz)	5. Measured 1g SAR Results (mW/g)	5.1 Measured 1g SAR Results 50% Duty Cycle (mW/g)	6. Measured Drift (dB)
Belt Clip Antenna TPA-AN-023	13	1	762	3.94	1.97	-0.27
	14	5	825	3.78	1.89	-0.36
	15	7	870	2.97	1.49	-0.27
Holster Ant. TPA-AN-023	16	5	825	1.81	0.91	-0.37
Belt Clip Antenna TPA-AN-021	17	1	762	4.60	2.30	-0.26
	18	5	825	3.85	1.93	-0.34
	19	7	870	4.67	2.34	-0.20
With Battery TPA-BA-204	20	7	870	4.11	2.06	-0.39
With Battery TPA-BA-202	21	7	870	3.14	1.57	-0.36
With Battery TPA-BA-201	22	7	870	2.66	1.33	-0.24
Holster Ant. TPA-AN-021	23	5	825	2.03	1.02	-0.28
Speaker Microphone accessory TPA-AA-204						
Belt Clip Antenna TPA-AN-023	24	1	762	5.02	3.07	-0.34
	25	5	825	7.29	3.65	-0.36
	26	7	870	6.13	2.51	-0.20
Belt Clip Antenna TPA-AN-021	27	1	762	8.59	4.30	-0.31
	28	5	825	5.79	2.90	-0.11
	29	7	870	8.93	4.47	-0.19

Note: The uncertainty of the system (± 28.7 %) has not been added to the results.

Table: SAR MEASUREMENT RESULTS – Belt Clip position TPAB12-K500A

1. Test Position	2. Plot No.	3. Test Channel	4. Test Freq (MHz)	5. Measured 1g SAR Results (mW/g)	5.1 Measured 1g SAR Results 50% Duty Cycle (mW/g)	6. Measured Drift (dB)
Belt Clip Antenna TPA-AN-021	30	1	762	5.42	2.71	-0.21
	31	5	825	3.36	1.68	-0.33
	32	7	870	2.84	1.42	-0.24

Note: The uncertainty of the system (± 28.7 %) has not been added to the results.

The FCC SAR limit for Occupational exposure is 8.0 mW/g measured in a 1g cube of tissue.

9.0 COMPLIANCE STATEMENT

The Tait Electronics Portable Transceiver model TPAB11 (12)-K500A was tested on behalf of Tait Electronics Ltd. It complied with the FCC SAR requirements.
The highest SAR level recorded was 8.93 mW/g for a 1g cube. After extrapolating to a 50% duty cycle the highest SAR level recorded was 4.47 mW/g for a 1g cube. This value was measured in the "Belt Clip position with TPA-AN-021 Antenna for Speaker Microphone accessory TPA-AA-204", and was below the controlled limit of 8.0 mW/g, even taking into account the measurement uncertainty of 28.7 %.