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Global Product Certification
EMC-EMF-Safety Approvals

SAR Test Report

Report Number: M121023R
Replacement for Report Number: M121023

Test Sample: Tait Push to Talk Transceiver

Type: TPDK5A

FCC ID: CASTPDK5A
IC ID: 737A-TPDK5A

Tested For: TAIT Limited

Date of Issue: 27 February 2013

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SAR EVALUATION

TAIT Push to Talk Transceiver, **Type:** TPDK5A **Report Number:** M121023R

1.0 GENERAL INFORMATION

Test Sample:		TAIT Push to Talk Transceiver
Type:		TPDK5A
Serial Number:	**16-Key**	25383160
	4-Key	25403198
FCC ID:		CASTPDK5A
IC ID:		737A-TPDK5A
Hardware Version:		0004, band K5
Software Version:		0.08.00.0023
Manufacturer:		Tait Limited
Device Category:		Portable Transmitter
Test Device:		Production Unit / Prototype Sample
RF exposure Category:		Occupational/Aware user
Tested for:		Tait Limited
Address:		558 Wairakei Road Christchurch 8140 New Zealand
Contact:		Bruce Jensen
Phone:		+64-3-357 0805
Fax:		+64-3-359 4632
Email:		bruce.jensen@taitradio.com

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)

IEEE 1528: 2003
Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
RSS-102 Issue 4

IEC 62209-1:2006 and IEC 62209-2:2010
Human exposure to radio frequency fields from hand-held and body-mounted devices-Human models, instrumentation and procedures.
Part 1: Procedure to determine the specific absorption rate (SAR) for hand- held devices used in close proximity to the ear (frequency range 300 MHz to 3 GHz)
Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz

Statement Of Compliance: The TAIT Push to Talk Transceiver, Type TPDK5A. Complied with FCC and IC Occupational/controlled RF exposure limits of 8.0mW/g per requirements of 47CFR2.1093(d).

Test Dates: 19th October 2012 till 26th October 2012
25th January till 12th February 2013

Test Officer:

Peter Jakubiec

Authorised Signature:

Chris Zombolas
Technical Director

2.0 DESCRIPTION OF DEVICE

2.1 Description of Test Sample

The device tested was a TAIT Push to Talk Transceiver, Type: TPDK5A operating in 800 MHz frequency band. It will be referred to as the device under test (DUT) throughout this report. The DUT has a set of external fixed length antennas and was tested in the Face Frontal and Belt Clip configurations of the phantom. There are two variants of the DUT available, one with 4 keys and one with 16 keys present on the outer case. The differences in construction are limited to the presence or lack thereof of some of the plastic keys, (i.e. the PCB and other internal electronics are identical). SAR testing was conducted on the 16-Key variant. Some SAR testing was done on the 4-key variant to confirm the SAR distribution is the same for both variants.

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)	: 137 x 60 x 32mm
Antenna types	: Helical- Half wave – quarter wave
Applicable Head Configurations	: Face Frontal
Applicable Body Configurations	: Belt Clip Position
Battery Options	: 7.4V 1880mAh Low Capacity Li-ion : 7.4V 2400mAh High Capacity Li-ion

2.2 Test sample Accessories

The radios are not shipped with any particular default battery or accessory. It is up to the customer to choose the combination of batteries and accessories which best fits the intended the use for the radio. See section 7.2 for an explanation of how the default accessories were selected for the purposes of testing to KDB643646.

2.2.1 Battery Types

Both 7.4 V 2400 mAh Li-ion and 7.4V 1880mAh Li-ion Battery Packs are used to power the DUT. SAR measurements were performed with both 7.4 V battery packs.

2.2.2 Antenna Description and Characteristics

The device was supplied with three sizes/types of antennas each to cover the full operating frequency range.

Product Code	IPN	Type	Antenna Length (mm)	Report Reference	Frequency Range
TPA-AN-022	007-00025-00	½Wave Whip	181	Wide	762-870 MHz
TPA-AN-023	007-00030-01	¼ Wave Whip	96	Wide	762-870 MHz
TPA-AN-028	007-00042-01	Helical	63	Wide	762-870 MHz

2.2.3 Body Worn Accessories

Number of body worn accessories containing small metallic parts is sold with the DUT, which are listed in the table below. All of the listed accessories can be used in any combination of battery mentioned in section 2.2.1 above and any Audio Accessory mentioned in section 2.2.3 below.

Body Worn Accessory	**Part Number**	**Spacing between the phantom and the back of the DUT**
Nylon Case	T03-00038-0014	10 mm
Battery Clip	TPA-CA-201	14 mm
Leather Case with Battery Clip	T03-00038-0021	14 mm
Leather Case with Spring Clip	T03-00038-0005	17 mm
Leather Case D-Stud with Spring Clip	T03-00038-0007 + T03-00038-0023	31 mm
Leather Case D-Stud with Belt Loop	T03-00038-0007 + T03-00038-0022	42 mm

2.2.4 Audio Accessories

There are seven audio accessories available for DUT:
According to KDB643646 publication "For audio accessories with similar construction and operating requirements, test only the audio accessory within the group that is expected to result in the highest SAR, with respect to changes in RF characteristics and exposure conditions for the combination. If it is unclear which audio accessory within a group of similar accessories is expected to result in the highest SAR, good engineering judgment and preliminary testing should be applied to select the accessory that is expected to result in the highest SAR."
For the Speaker – Microphone group T03-00045-CFAA audio accessory was chosen which represents typical accessory of this type, there is very minor difference in connector/cable assembly between T03-00045-CFAA and other Speaker – Microphones. For Headset-Microphone and for Earphone-Microphone combined audio accessory group, two representative models were chosen based on the connector and cable shape and size - T03-00046-EFAA and T03-00046-DEAA, the other two accessories of this group have very similar construction respectively.

Audio Accessory	**Part Number**
Speaker- Microphone	T03-00045-CFAA
Speaker- Microphone	T03-00045-DMAA
Speaker- Microphone	T03-00045-BFAA
Headset-Microphone	T03-00046-EFAA
Headset-Microphone	T03-00046-DEAA
Earphone-Microphone	T03-00047-CBAA
Earphone-Microphone	T03-00047-BAAA

2.3 Test Signal, Frequency and Output Power

The DUT is operating in the 800 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. FCC guidelines (KDB 643646 and a device specific KDB) were followed to determine the required SAR testing configurations. The device has an audio accessory output to which a supplied hands free speaker/microphone was connected during all testing in the body positions. Excluding the audio accessory there were no wires or other connections to the DUT during the SAR measurements.

Table: Test Frequencies

Frequency Range	Traffic Channels	Nominal Power (dBm)
762MHz – 870MHz	1-5	34.77

2.4 Conducted Power Measurements

The conducted power of the DUT 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.

Table: Frequency and Output Power

Channel	Channel Frequency MHz	Battery Type	Maximum Conducted Output Power dBm
1	769.069	Li-ion	34.89
2	799.069	Li-ion	35.12
3	807.513	Li-ion	35.14
4	823.987	Li-ion	35.13
5	868.987	Li-ion	35.10

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:	Low Capacity Li-ion 7.4V 14Wh 1880mAh	**Battery #2:**	High Capacity Li-ion 7.4V 18Wh 2400mAh
Model No.:	T03-00011-AAAA	**Model No.:**	T03-00011-CAAA
Serial No.:	25368789	**Serial No.:**	25371663

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:

AS/NZS 2772.2:	RF and microwave radiation hazard measurement
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 62209-1:2006	Human Exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models instrumentation and procedures. **Part 1:** Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (300 MHz to 3 GHz)
EN 62209-2:2010	Human Exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models instrumentation and procedures **Part 2:** Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz
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 37 to 56 %. 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 DASY5 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 **DASY5 Version 52** 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 DASY5 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: 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. 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 DASY5 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

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

1. Validation Date and Frequency	2. ∈r (measured)	3. σ (mho/m) (measured)	4. Measured SAR 1g (mW/g)	5. Measured SAR 10g (mW/g)
19th Oct 2012 900MHz	39.5	0.97	2.73	1.78
22nd Oct 2012 900MHz	52.8	1.04	2.92	1.90
23rd Oct 2012 900MHz	55.8	1.06	2.91	1.90
23rd Oct 2012 750MHz	56.5	0.92	2.34	1.52
24th Oct 2012 900MHz	52.6	1.04	2.82	1.84
24th Oct 2012 750MHz	56.2	0.91	2.33	1.52
25th Oct 2012 900MHz	52.6	1.04	2.83	1.84
26th Oct 2012 900MHz	52.4	1.04	2.87	1.87
26th Oct 2012 750MHz	54.2	0.94	2.31	1.50
25th Jan 2013 750MHz	57.0	0.96	2.31	1.55
29th Jan 2013 750MHz	54.9	0.92	2.25	1.51
30th Jan 2013 750MHz	54.2	0.92	2.24	1.51
31st Jan 2013 900MHz	52.6	1.03	2.87	1.86
1st Feb 2013 900MHz	52.7	1.04	2.89	1.88
4th Feb 2013 750MHz	54.8	0.95	2.32	1.56
5th Feb 2013 900MHz	53.3	1.04	2.84	1.85
7th Feb 2013 900MHz	41.5	0.96	2.76	1.79
8th Feb 2013 750MHz	55.1	0.93	2.29	1.54
11th Feb 2013 750MHz	54.9	0.93	2.27	1.53

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 and D750V2) 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 head

Validation Date and Frequency	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 (%)
19th Oct 2012 900MHz	2.73	10.92	10.6	3.02	10.8	1.11
7th Feb 2013 900MHz	2.76	11.04	10.6	4.15	10.8	2.22

Table: Deviation from reference validation values body

Validation Date and Frequency	Measured SAR 1g (mW/g)	Measured SAR 1g (Normalized to 1W)	SPEAG Calibration reference SAR Value 1g (mW/g)	Deviation From SPEAG (%)
22nd Oct 2012 900MHz	2.92	11.68	11.1	5.23
23rd Oct 2012 900MHz	2.91	11.64	11.1	4.86
23rd Oct 2012 750MHz	2.34	9.36	8.8	6.36
24th Oct 2012 900MHz	2.82	11.28	11.1	1.62
24th Oct 2012 750MHz	2.33	9.32	8.8	5.91
25th Oct 2012 900MHz	2.83	11.32	11.1	1.98
26th Oct 2012 900MHz	2.87	11.48	11.1	3.42
26th Oct 2012 750MHz	2.31	9.24	8.8	5.00
25th Jan 2013 750MHz	2.31	9.24	8.8	5.00
29th Jan 2013 750MHz	2.25	9.00	8.8	2.27
30th Jan 2013 750MHz	2.24	8.96	8.8	1.82
31st Jan 2013 900MHz	2.87	11.48	11.1	3.42
1st Feb 2013 900MHz	2.89	11.56	11.1	4.14
4th Feb 2013 750MHz	2.32	9.28	8.8	5.45
5th Feb 2013 900MHz	2.84	11.36	11.1	2.34

8th Feb 2013 750MHz	2.29	9.16	8.8	4.09
11th Feb 2013 750MHz	2.27	9.08	8.8	3.18

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.

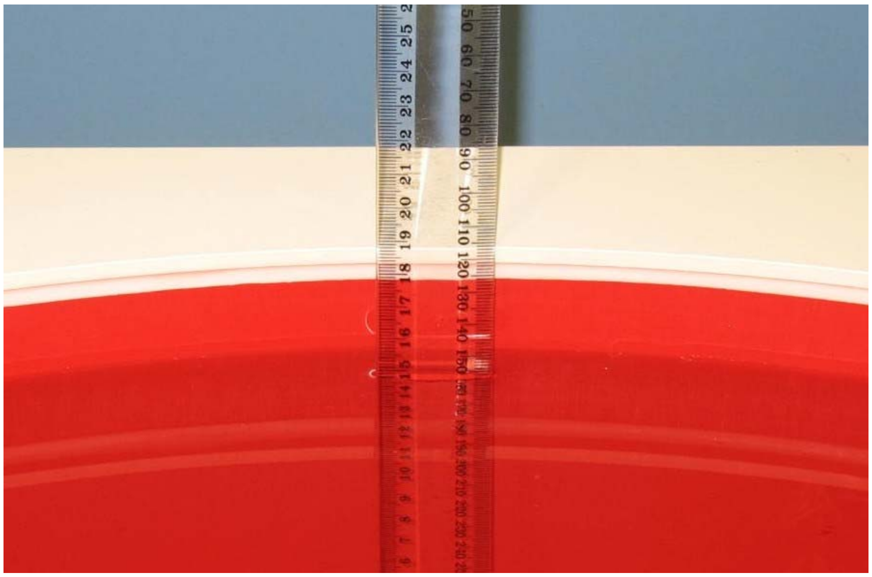


Photo of liquid Depth in Flat Phantom

3.5 Phantom Properties (Size, Shape, Shell Thickness)

For SAR testing in the Face Frontal and Belt Clip positions (also for the System Check) an SPEAG Flat Phantom ELI 4.0 and EMCT Andrey 9.1 w 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

Photo 1: Flat_Phantom ELI 4.0 2mm

3.6 Tissue Material Properties

The dielectric parameters of the simulating liquid were measured prior to SAR assessment using the HP85070A dielectric probe kit and HP8753B 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
807.513 MHz	40.6 – 42.6	41.5 ±5% (39.4 to 43.6)	0.87 - 0.88	0.90 ±5% (0.86 to 0.95)	1000

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

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
769.069 MHz	53.9 – 56.8	55.4 ±5% (52.6 – 58.2)	0.92 - 0.98	0.96 ±5% (0.91 – 1.01)	1000
799.069 MHz	53.6 – 56.6	55.4 ±5% (52.6 – 58.2)	0.94 – 1.01	0.96 ±5% (0.91 – 1.01)	1000
807.513 MHz	53.3 – 54.3	55.2 ±5% (52.4 – 58.0)	0.94 – 0.99	0.97 ±5% (0.92 – 1.02)	1000
823.987 MHz	53.0 - 53.4	55.2 ±5% (52.4 – 58.0)	0.95 – 0.97	0.97 ±5% (0.92 – 1.02)	1000
868.987 MHz	52.5 - 52.9	55.2 ±5% (52.4 – 58.0)	1.00 - 1.01	0.97 ±5% (0.92 – 1.02)	1000

NOTE: The 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 (%)
19th Oct 2012	20.9	20.4	41
22nd Oct 2012	20.4	20.1	41
23rd Oct 2012	20.6	20.2	41
24th Oct 2012	20.4	20.0	37
25th Oct 2012	20.5	20.1	39
26th Oct 2012	20.4	20.0	42
25th Jan 2013	19.6	19.4	53
29th Jan 2013	20.2	19.8	56
30th Jan 2013	20.5	20.1	51
31st Jan 2013	20.3	19.9	50
1st Feb 2013	20.6	20.2	53
4th Feb 2013	20.4	20.0	53
5th Feb 2013	20.3	19.8	52
8th Feb 2013	20.3	20.0	55
11th Feb 2013	20.4	20.2	51

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 @ 850/900MHz
Volume of Liquid: 30 Litres

Table 1

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

Table: Tissue Type: Body @ 850/900MHz
Volume of Liquid: 30 Litres

Table 2

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"

3.8 Device Holder for DASY5

The DASY5 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 DASY5 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 DASY5

The SAR evaluation was performed with the SPEAG DASY5 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 DUT. 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 15 mm x 15 mm. The actual Area Scan has dimensions of 120 mm x 360 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 4 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 DASY5 Version 52– DUT SAR test FCC

Error Description	Uncert. Value	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i	10g u_i	v_i
Measurement System								
Probe Calibration	6.7	N	1.00	1	1	6.70	6.70	∞
Axial Isotropy	4.7	R	1.73	0.7	0.7	1.90	1.90	∞
Hemispherical Isotropy	9.6	R	1.73	0.7	0.7	3.88	3.88	∞
Boundary Effects	1	R	1.73	1	1	0.58	0.58	∞
Linearity	4.7	R	1.73	1	1	2.71	2.71	∞
System Detection Limits	1	R	1.73	1	1	0.58	0.58	∞
Readout Electronics	0.3	N	1.00	1	1	0.30	0.30	∞
Response Time	0.8	R	1.73	1	1	0.46	0.46	∞
Integration Time	2.6	R	1.73	1	1	1.50	1.50	∞
RF Ambient Noise	3	R	1.73	1	1	1.73	1.73	∞
RF Ambient Reflections	3	R	1.73	1	1	1.73	1.73	∞
Probe Positioner	0.4	R	1.73	1	1	0.23	0.23	∞
Probe Positioning	2.9	R	1.73	1	1	1.67	1.67	∞
Max. SAR Eval.	1	R	1.73	1	1	0.58	0.58	∞
Post Processing	2	R	1.73	1	1	1.15	1.15	∞
Test Sample Related								
Power Scaling	0	R	1.73	1	1	0.00	0.00	∞
Test Sample Positioning	2.9	N	1.00	1	1	2.90	2.90	145
Device Holder Uncertainty	3.6	N	1.00	1	1	3.60	3.60	5
Output Power Variation – SAR Drift Measurement	4.72	R	1.73	1	1	2.73	2.73	∞
Phantom and Setup								
Phantom Uncertainty	7.5	R	1.73	1	1	4.33	4.33	∞
Liquid Conductivity – Deviation from target values	5	R	1.73	0.64	0.43	1.85	1.24	∞
Liquid Permittivity – Deviation from target values	5	R	1.73	0.6	0.49	1.73	1.41	∞
Liquid Conductivity – Measurement uncertainty	2.5	N	1.00	0.64	0.71	1.60	1.78	∞
Liquid Permittivity – Measurement uncertainty	2.5	N	1.00	0.6	0.26	1.50	0.65	∞
Temp.unc. - Conductivity	1.7	R	1.73	0.78	0.71	0.77	0.70	∞
Temp. unc. - Permittivity	0.3	R	1.73	0.23	0.26	0.04	0.05	∞
Combined standard Uncertainty (u_c)						12.0	11.8	
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=	2		24.0	23.6	

Estimated total measurement uncertainty for the DASY5 measurement system was ±12%. The extended uncertainty (K = 2) was assessed to be ±24.0% based on 95% confidence level. The uncertainty is not added to the measurement result.

Table: Uncertainty Budget for DASY5 Version 52– DUT SAR test IC Canada

Error Description	Uncert. Value	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i	10g u_i	v_i
Measurement System								
Probe Calibration	6	N	1	1	1	6	6	∞
Axial Isotropy	4.7	R	1.73	0.7	0.7	1.90	1.90	∞
Hemispherical Isotropy	9.6	R	1.73	0.7	0.7	3.88	3.88	∞
Linearity	4.7	R	1.73	1	1	2.71	2.71	∞
Modulation Response	2.4	R	1.73	1	1	1.39	1.39	∞
System Detection Limits	1	R	1.73	1	1	0.58	0.58	∞
Boundary Effects	1	R	1.73	1	1	0.58	0.58	∞
Readout Electronics	0.3	N	1.00	1	1	0.30	0.30	∞
Response Time	0.8	R	1.73	1	1	0.46	0.46	∞
Integration Time	2.6	R	1.73	1	1	1.50	1.50	∞
RF Ambient Noise	3	R	1.73	1	1	1.73	1.73	∞
RF Ambient Reflections	3	R	1.73	1	1	1.73	1.73	∞
Probe Positioner	0.4	R	1.73	1	1	0.23	0.23	∞
Probe Positioning	2.9	R	1.73	1	1	1.67	1.67	∞
Post Processing	2	R	1.73	1	1	1.15	1.15	∞
Test Sample Related								
Device Holder	3.6	N	1.00	1	1	3.60	3.60	5
Test Sample Positioning	2.9	N	1.00	1	1	2.90	2.90	145
Power Scaling	0	R	1.73	1	1	0.00	0.00	∞
Power Drift	4.72	R	1.73	1	1	2.73	2.73	∞
Phantom and Setup								
Phantom Uncertainty	7.5	R	1.73	1	1	4.33	4.33	∞
SAR Correction	1.9	R	1.73	1	0.84	1.10	0.92	∞
Liquid Conductivity – Measurement uncertainty	2.5	N	1.00	0.64	0.43	1.60	1.08	∞
Liquid Permittivity – Measurement uncertainty	2.5	N	1.00	0.26	0.26	0.65	0.65	∞
Temp.unc. - Conductivity	1.7	R	1.73	0.78	0.71	0.77	0.70	∞
Temp. unc. - Permittivity	0.3	R	1.73	0.23	0.26	0.04	0.05	∞
Combined standard Uncertainty (u_c)						11.4	11.3	748
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=	2		22.8	22.6	

Estimated total measurement uncertainty for the DASY5 measurement system was ±11.4%. The extended uncertainty (K = 2) was assessed to be ±22.8% based on 95% confidence level. The uncertainty is not added to the measurement result.

Table: Uncertainty Budget for DASY5 Version 52- Validation FCC

Error Description	Uncert. Value	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i	10g u_i	v_i
Measurement System								
Probe Calibration	6.7	N	1.00	1	1	6.70	6.70	∞
Axial Isotropy	4.7	R	1.73	1	1	2.71	2.71	∞
Hemispherical Isotropy	9.6	R	1.73	0	0	0.00	0.00	∞
Boundary Effects	1	R	1.73	1	1	0.58	0.58	∞
Linearity	4.7	R	1.73	1	1	2.71	2.71	∞
System Detection Limits	1	R	1.73	1	1	0.58	0.58	∞
Readout Electronics	0.3	N	1.00	1	1	0.30	0.30	∞
Response Time	0	R	1.73	1	1	0.00	0.00	∞
Integration Time	0	R	1.73	1	1	0.00	0.00	∞
RF Ambient Noise	1	R	1.73	1	1	0.58	0.58	∞
RF Ambient Reflections	1	R	1.73	1	1	0.58	0.58	∞
Probe Positioner	0.8	R	1.73	1	1	0.46	0.46	∞
Probe Positioning	6.7	R	1.73	1	1	3.87	3.87	∞
Max. SAR Eval.	2	R	1.73	1	1	1.15	1.15	∞
Post Processing	2	R	1.73	1	1	1.15	1.15	∞
Dipole Related								
Deviation of exp. dipole	5.5	R	1.73	1	1	3.18	3.18	∞
Dipole Axis to Liquid Dist.	2	R	1.73	1	1	1.15	1.15	∞
Input power & SAR drift	5.00	R	1.73	1	1	2.89	2.89	∞
Phantom and Setup								
Phantom Uncertainty	4	R	1.73	1	1	2.31	2.31	∞
Liquid Conductivity – Deviation from target values	5	R	1.73	0.64	0.43	1.85	1.24	∞
Liquid Permittivity – Deviation from target values	5	R	1.73	0.6	0.49	1.73	1.41	∞
Liquid Conductivity – Measurement uncertainty	2.5	N	1.00	0.78	0.71	1.95	1.78	∞
Liquid Permittivity – Measurement uncertainty	2.5	N	1.00	0.26	0.26	0.65	0.65	∞
Temp.unc. - Conductivity	1.7	R	1.73	0.78	0.71	0.77	0.70	∞
Temp. unc. - Permittivity	0.3	R	1.73	0.23	0.26	0.04	0.05	∞
Combined standard Uncertainty (u_c)						10.7	10.6	
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=	2		21.5	21.1	

Estimated total measurement uncertainty for the DASY5 measurement system was ±10.7%. The extended uncertainty (K = 2) was assessed to be ±21.5% based on 95% confidence level. The uncertainty is not added to the Validation measurement result.

Table: Uncertainty Budget for DASY5 Version 52- Validation IC Canada

Error Description	Uncert. Value	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i	10g u_i	v_i
Measurement System								
Probe Calibration	6	N	1	1	1	6	6	∞
Axial Isotropy	4.7	R	1.73	1	1	2.71	2.71	∞
Hemispherical Isotropy	9.6	R	1.73	0	0	0.00	0.00	∞
Linearity	4.7	R	1.73	1	1	2.71	2.71	∞
Modulation Response	0	R	1.73	1	1	0.00	0.00	∞
System Detection Limits	1	R	1.73	1	1	0.58	0.58	∞
Boundary Effects	1	R	1.73	1	1	0.58	0.58	∞
Readout Electronics	0.3	N	1.00	1	1	0.30	0.30	∞
Response Time	0	R	1.73	1	1	0.00	0.00	∞
Integration Time	0	R	1.73	1	1	0.00	0.00	∞
RF Ambient Noise	1	R	1.73	1	1	0.58	0.58	∞
RF Ambient Reflections	1	R	1.73	1	1	0.58	0.58	∞
Probe Positioner	0.8	R	1.73	1	1	0.46	0.46	∞
Probe Positioning	2.9	R	1.73	1	1	1.67	1.67	∞
Post Processing	2	R	1.73	1	1	1.15	1.15	∞
Dipole Related								
Deviation of exp. dipole	5.5	R	1.73	1	1	3.18	3.18	∞
Dipole Axis to Liquid Dist.	2	R	1.73	1	1	1.15	1.15	∞
Input Power and SAR Drift	5.00	R	1.73	1	1	2.89	2.89	∞
Phantom and Setup								
Phantom Uncertainty	4	R	1.73	1	1	2.31	2.31	∞
SAR Correction	1.9	R	1.73	1	0.84	1.10	0.92	∞
Liquid Conductivity – Measurement uncertainty	2.5	N	1.00	0.64	0.43	1.60	1.08	∞
Liquid Permittivity – Measurement uncertainty	2.5	N	1.00	0.26	0.26	0.65	0.65	∞
Temp.unc. - Conductivity	1.7	R	1.73	0.78	0.71	0.77	0.70	∞
Temp. unc. - Permittivity	0.3	R	1.73	0.23	0.26	0.04	0.05	∞
Combined standard Uncertainty (u_c)						9.3	9.2	748
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2			18.6	18.4	

Estimated total measurement uncertainty for the DASY5 measurement system was ±9.3%. The extended uncertainty (K = 2) was assessed to be ±18.6% based on 95% confidence level. The uncertainty is not added to the Validation measurement result.

6.0 EQUIPMENT LIST AND CALIBRATION DETAILS

Table: SPEAG DASY5 Version 52

Equipment Type	Manufacturer	Model Number	Serial Number	Calibration Due	Used For this Test?
Robot - Six Axes	Staubli	RX90BL	N/A	Not applicable	✓
Robot Remote Control	SPEAG	CS7MB	RX90B	Not applicable	✓
SAM Phantom	SPEAG	N/A	1260	Not applicable	
SAM Phantom	SPEAG	N/A	1060	Not applicable	
Flat Phantom	AndreT	10.1	P 10.1	Not Applicable	
Flat Phantom	AndreT	9.1	P 9.1	Not Applicable	
Flat Phantom	SPEAG	ELI 4.0	1101	Not Applicable	✓
Data Acquisition Electronics	SPEAG	DAE3 V1	359	21-June-2013	
Data Acquisition Electronics	SPEAG	DAE3 V1	442	04-Dec-2013	✓
Probe E-Field - Dummy	SPEAG	DP1	N/A	Not applicable	
Probe E-Field	SPEAG	ET3DV6	1380	10-Dec-2013	✓
Probe E-Field	SPEAG	ET3DV6	1377	20-June-2013	
Probe E-Field	SPEAG	ES3DV6	3029	Not Used	
Probe E-Field	SPEAG	EX3DV4	3563	21-June-2013	
Probe E-Field	SPEAG	EX3DV4	3657	7-Dec-2013	
Antenna Dipole 300 MHz	SPEAG	D300V3	1012	11-Dec-2014	
Antenna Dipole 450 MHz	SPEAG	D450V3	1074	11-Dec-2014	
Antenna Dipole 750 MHz	SPEAG	D750V2	1051	9-Jan-2014	✓
Antenna Dipole 900 MHz	SPEAG	D900V2	047	22-June-2014	✓
Antenna Dipole 1640 MHz	SPEAG	D1640V2	314	20-June-2014	
Antenna Dipole 1800 MHz	SPEAG	D1800V2	242	20-June-2014	
Antenna Dipole 1950 MHz	SPEAG	D1950V3	1113	6-Dec -2014	
Antenna Dipole 2450 MHz	SPEAG	D2450V2	724	04-Dec-2014	
Antenna Dipole 2600 MHz	SPEAG	D2600V2	1044	10-Jan-2014	
Antenna Dipole 3500 MHz	SPEAG	D3500V2	1002	13-July-2013	
Antenna Dipole 5600 MHz	SPEAG	D5GHzV2	1008	14-Dec-2013	
RF Amplifier	EIN	603L	N/A	*In test	
RF Amplifier	Mini-Circuits	ZHL-42	N/A	*In test	✓
RF Amplifier	Mini-Circuits	ZVE-8G	N/A	*In test	
Synthesized signal generator	Hewlett Packard	ESG-D3000A	GB37420238	*In test	✓
RF Power Meter	Hewlett Packard	437B	3125012786	30-Aug-2013	✓
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481H	1545A01634	03-Sept-2013	✓
RF Power Meter	Rohde & Schwarz	NRP	101415	17-Sept-2013	
RF Power Sensor	Rohde & Schwarz	NRP - Z81	100174	17-Sept-2013	
RF Power Meter Dual	Hewlett Packard	435A	1733A05847	*In test	✓
RF Power Sensor	Hewlett Packard	8482A	2349A10114	*In test	✓
Network Analyser	Hewlett Packard	8714B	GB3510035	27-Sept-2013	
Network Analyser	Hewlett Packard	8753ES	JP39240130	5-Nov-2013	✓
Dual Directional Coupler	Hewlett Packard	778D	1144 04700	*In test	
Dual Directional Coupler	NARDA	3022	75453	*In test	✓

* Calibrated during the test for the relevant parameters.

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 SPEAG 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 SPEAG 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 SPEAG phantom for the "Belt Clip" position. Various belt clip accessories were assessed (see section 1656078672.32341648.2 for a list of the body worn accessories). The Transceiver was placed at the flat section of the phantom and suspended until the Belt Clip touched the phantom. The belt clips contained metal parts 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)

There are two radio options, three antenna options, seven audio accessory options, two battery options and six combinations of body worn accessories, for a total of 504 possible body configurations and 12 possible head configurations. The test configurations chosen were according to KDB 643646 and a device specific KDB. There is no default battery or audio accessory defined by the manufacturer for the DUT. The chosen defaults in accordance with KDB 643646 are as follows:

- Default battery for the head positions was the high capacity battery, as it may be capable of delivering more current to the amplifier.
- Default battery for the body positions was the low capacity battery, as it provides the least amount of spacing between the transmitting antenna and the phantom.
- Default audio accessory for the body positions was the speaker microphone ("CFAA"), because the coiled cable was expected to re-radiate energy over a smaller area.
- There is no default body worn accessory supplied with the radio, and all combinations of body worn accessories were assessed.

The 4-key and 16-key variants of the radio are expected to produce the same SAR due to only minor variances in construction. Selected (in the process of KDB enquiry) worst case configurations of the 16-Key variant were repeated with the 4-Key variant to confirm this.

Only one antenna can be used at a time. Only one audio accessory can be used at a time. Only one battery option can be used at a time. Some body worn accessories are only designed to be used in conjunction with other body worn accessories, and some can be used on their own. The various combinations of body worn accessories available are labelled A – F below. Any combination of body worn accessories can be used with any antenna, any audio accessory and any battery.

Table: Body Accessory Combinations

	Battery Clip	Nylon Case	Leather Case	Leather Case Spring Clip	D-Stud Spring Clip	D-Stud Belt Loop
Battery Clip	A		C			
Nylon Case		B				
Leather Case Spring Clip				D		
Leather Case D-Stud					E	F

Applicable Duty Cycle for PTT Radios

KDB 447498 D01 v05 states that the RF exposure of a PTT device should be evaluated with a 50% duty cycle, if the actual duty cycle is <50%. The DUT operates in a half duplex mode, and is only transmitting while a mechanical PTT button is pressed. This is true for all modes of operation, including PABX/PSTN modes. The PTT button must be released periodically to facilitate two way communication, and during real world use the actual duty cycle would be much lower than 50%. The results in section 8.0 have been scaled to a 50% duty cycle, in accordance with KDB 447498.

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:	3.0 mW/g (averaged over 10g cube of tissue)

8.0 SAR MEASUREMENT RESULTS

The SAR values averaged over 1g tissue mass were determined for the sample device for the Face Frontal and Belt Clip configurations of the phantom.

8.1 SAR Measurement Results for 16 Key Radio

Table: SAR MEASUREMENT RESULTS– Face Frontal and Belt Clip positions

1. Test Position	2. Plot No.	3. Test Ch.	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)	7. Antenna	8. Measured RF Power (dBm)
Face Frontal	1	3	807.513	2.46	1.23	-0.10	Half Wave	35.12
	2	3	807.513	2.97	1.49	-0.15	Quarter Wave	35.05
	3	3	807.513	3.29	1.65	-0.20	Helical	35.07
Face Frontal*	4	3	807.513	3.22	1.61	-0.20	Helical	35.04
Body Worn Nylon Case*	5	1	769.069	9.12	4.56	0.06	Quarter Wave	34.84
	6	1	769.069	8.76	4.38	-0.20	Helical	34.81
	7	2	799.069	9.68	4.84	-0.20	Quarter Wave	35.10
	8	2	799.069	10.9	5.45	-0.12	Helical	35.10
	9	3	807.513	8.09	4.05	-0.18	Half Wave	35.15
	10	3	807.513	8.93	4.47	-0.12	Quarter Wave	35.10
	11	3	807.513	8.76	4.38	-0.14	Helical	35.13
	12	4	823.987	7.34	3.67	-0.12	Quarter Wave	35.12
	13	4	823.987	7.87	3.94	-0.18	Helical	35.12
Nylon Case	14	1	769.069	8.60	4.30	-0.09	Quarter Wave	34.87
	15	1	769.069	9.53	4.77	-0.18	Helical	34.87
	16	2	799.069	9.75	4.88	-0.11	Quarter Wave	35.11
	17	2	799.069	8.38	4.19	-0.19	Helical	35.13
	18	3	807.513	8.68	4.34	-0.20	Quarter Wave	34.98
	19	3	807.513	8.45	4.23	-0.13	Helical	34.81
	20	4	823.987	8.29	4.15	-0.12	Quarter Wave	35.01
Body Worn Battery Clip*	21	1	769.069	9.57	4.79	-0.07	Quarter Wave	34.80
	22	1	769.069	10.90	5.45	-0.14	Helical	34.74
	23	2	799.069	9.50	4.75	-0.07	Quarter Wave	35.10
	24	2	799.069	10.6	5.30	0.05	Helical	35.11
	25	3	807.513	7.58	3.79	-0.11	Half Wave	35.10
	26	3	807.513	9.27	4.64	-0.14	Quarter Wave	35.06
	27	3	807.513	9.90	4.95	-0.20	Helical	35.12
	28	4	823.987	8.35	4.18	-0.16	Quarter Wave	35.13
	29	4	823.987	8.90	4.45	-0.09	Helical	35.08
	30	5	868.987	7.35	3.68	-0.10	Helical	34-90
Battery Clip	31	1	769.069	8.84	4.42	-0.19	Quarter Wave	34.64
	32	1	769.069	8.78	4.39	-0.20	Helical	34.77
	33	2	799.069	10.4	5.20	-0.20	Quarter Wave	35.09
	34	2	799.069	10.8	5.40	-0.17	Helical	35.10
	35	3	807.513	7.90	3.95	-0.07	Quarter Wave	34.92
	36	3	807.513	8.06	4.03	-0.15	Helical	34.87

1. Test Position	2. Plot No.	3. Test Ch.	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)	7. Antenna	8. Measured RF Power (dBm)
Body Worn Leather Case Battery Clip*	37	1	769.069	9.58	4.79	-0.19	Quarter Wave	34.85
	38	1	769.069	8.89	4.45	-0.20	Helical	34.82
	39	2	799.069	10.4	5.20	-0.14	Quarter Wave	35.07
	40	2	799.069	11.4	5.70	-0.08	Helical	35.07
	41	2	799.069	7.64	3.82	-0.21	Half Wave	35.05
	42	3	807.513	7.54	3.77	-0.18	Half Wave	35.11
	43	3	807.513	9.14	4.57	-0.19	Quarter Wave	35.05
	44	3	807.513	8.88	4.44	-0.13	Helical	35.10
	45	4	823.987	8.45	4.23	-0.10	Quarter Wave	35.09
	46	4	823.987	8.95	4.48	-0.19	Helical	35.07
	47	4	823.987	6.52	3.26	-0.16	Half Wave	34.92
	48	5	868.987	5.52	2.76	-0.07	Quarter Wave	34.80
	49	5	868.987	6.85	3.43	-0.13	Helical	34.93
Leather Case Battery Clip	50	1	769.069	8.60	4.30	-0.15	Quarter Wave	34.87
	51	1	769.069	8.79	4.40	-0.10	Helical	34.86
	52	2	799.069	9.66	4.83	-0.14	Quarter Wave	35.10
	53	2	799.069	10.4	5.20	-0.16	Helical	35.11
	54	3	807.513	8.04	4.02	-0.16	Quarter Wave	34.91
	55	3	807.513	8.10	4.05	-0.12	Helical	34.91
Body Worn Leather Case Spring Clip*	56	1	769.069	10.7	5.35	-0.16	Quarter Wave	35.02
	57	1	769.069	13.0	6.50	-0.16	Helical	35.09
	58	2	799.069	13.0	6.50	-0.13	Quarter Wave	35.05
	59	2	799.069	13.3	6.65	-0.17	Helical	35.08
	60	3	807.513	6.14	3.07	-0.10	Half Wave	35.07
	61	3	807.513	13.0	6.50	-0.10	Quarter Wave	35.09
	62	3	807.513	13.5	6.75	-0.14	Helical	35.12
	63	4	823.987	10.8	5.40	-0.10	Quarter Wave	35.07
	64	4	823.987	11.1	5.55	-0.20	Helical	35.08
	65	5	868.987	8.16	4.08	-0.14	Quarter Wave	35.03
	66	5	868.987	8.80	4.40	-0.21	Helical	35.06

1. Test Position	2. Plot No.	3. Test Ch.	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)	7. Antenna	8. Measured RF Power (dBm)
Leather Case Spring Clip	67	1	769.069	13.6	6.80	0.01	Quarter Wave	35.08
	68	1	769.069	11.9	5.95	-0.09	Helical	34.94
	69	2	799.069	**14.0**	**7.00**	-0.18	Quarter Wave	35.04
	70	2	799.069	10.6	5.30	-0.06	Helical	35.02
	71	3	807.513	11.8	5.90	-0.21	Quarter Wave	35.06
	72	3	807.513	11.0	5.50	-0.16	Helical	34.93
	73	4	823.987	9.56	4.78	-0.12	Quarter Wave	35.12
	74	4	823.987	10.4	5.20	-0.16	Helical	34.95
	75	5	868.987	7.24	3.62	-0.10	Quarter Wave	35.06
	76	5	868.987	7.42	3.71	-0.15	Helical	34.96
Leather Case Spring Clip + DEAA	77	1	769.069	10.3	5.15	-0.16	Quarter Wave	34.88
	78	2	799.069	10.9	5.45	-0.06	Quarter Wave	34.83
	79	3	807.513	9.43	4.72	-0.16	Quarter Wave	35.02
	80	4	823.987	7.45	3.73	-0.20	Quarter Wave	34.93
	81	5	868.987	4.98	2.49	-0.09	Quarter Wave	34.95
Leather Case Spring Clip + EFAA	82	1	769.069	11.8	5.90	-0.14	Quarter Wave	34.91
	83	2	799.069	10.1	5.05	-0.19	Quarter Wave	35.00
	84	3	807.513	9.71	4.86	-0.11	Quarter Wave	35.01
	85	4	823.987	8.36	4.18	-0.12	Quarter Wave	34.90
	86	5	868.987	9.22	4.61	-0.19	Quarter Wave	34.97
Body Worn Leather Case D-Stud Clip*	87	3	807.513	3.35	1.68	-0.10	Half Wave	35.12
	88	3	807.513	7.62	3.81	-0.19	Quarter Wave	35.07
	89	3	807.513	7.96	3.98	-0.14	Helical	35.14
Body Worn Leather Case D-Stud Loop*	90	3	807.513	1.60	0.80	-0.08	Half Wave	35.09
	91	3	807.513	1.91	0.96	-0.15	Quarter Wave	35.06
	92	3	807.513	1.98	0.99	-0.10	Helical	35.09

Note: The uncertainty of the system (±24.0 %) has not been added to the results.
**Low capacity battery option used*
The FCC SAR limit for occupational exposure is 8.0mW/g measured in a 1g cube of tissue.

8.2 SAR Measurement Results for 4 Key Radio (Variant)

1. Test Position	2. Plot No.	3. Test Ch.	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)	7. Antenna	8. Measured RF Power (dBm)
Face Frontal	93	3	807.513	3.35	1.68	-0.16	Helical	34.97
Nylon Case*	94	2	799.069	9.41	4.71	-0.14	Helical	34.95
Body Worn Battery Clip*	95	1	769.069	10.8	5.40	-020	Helical	34.91
Body Worn Leather Case Battery Clip*	96	2	799.069	9.32	4.66	-0.19	Helical	34.93
Body Worn Leather Case Spring Clip*	97	1	769.069	11.6	5.80	-0.11	Helical	34.93
	98	2	799.069	10.8	5.40	-0.16	Quarter Wave	34.93
	99	2	799.069	13.8	6.90	-0.20	Helical	34.91
	100	3	807.513	11.4	5.70	-0.10	Helical	34.98
Body Worn Leather Case Spring Clip	101	1	769.069	13.1	6.55	-0.19	Helical	34.94
	102	2	799.069	11.9	5.95	-0.09	Quarter Wave	34.95
	103	2	799.069	10.0	5.00	-0.03	Helical	34.91
Leather Case Spring Clip + DEAA	104	2	799.069	9.81	4.91	-0.06	Quarter Wave	34.94
Leather Case Spring Clip + EFAA	105	1	769.069	9.63	4.82	-0.05	Quarter Wave	34.93

Note: The uncertainty of the system (±24.0 %) has not been added to the results.
Low capacity battery option used
The FCC SAR limit for occupational exposure is 8.0mW/g measured in a 1g cube of tissue.

9.0 COMPLIANCE STATEMENT

The TAIT Push to Talk Transceiver model TPDK5A was tested on behalf of TAIT Limited. It complied with the FCC SAR requirements. It also complied with IC RSS-102 requirements.

The highest SAR level recorded was 14.0 mW/g for a 1g cube. After extrapolating to a 50% duty cycle the highest SAR level recorded was 7.00 mW/g for a 1g cube. This value was measured in the “body worn” position with the leather case with spring clip accessory (T03-00038-0005), and the Quarter-wave antenna. The manufacturer’s tune up power is stated to be 3.19 W. Scaling the SAR value, the maximum SAR value is **7.44 mW/g**.The recorded SAR was below the limit. The recorded SAR level complied with the limit however the compliance margin was less than the measurement uncertainty of 24.0 %.

APPENDIX A1 Test Sample Photographs

Battery 1

Battery 2

DUT

APPENDIX A2 Test Sample Photographs

Antenna Options

Nylon Case (T03-00038-0014)

Battery Clip (TPA-CA-201)

Leather Case with Battery Clip (T03-00038-0021)

Leather Case with Spring Clip (T03-00038-0005)

Spring Clip for Leather Case with D-Stud (T03-00038-0023)

APPENDIX A3 Test Sample Photographs

Leather Case D-Stud with Belt Loop
(T03-00038-0007 + T03-00038-0022)

Speaker- Microphone (T03-00045-CFAA 1216)

Speaker- Microphone (T03-00045-DMAA)

Speaker- Microphone (T03-00045-BFAA)

Headset-Microphone (T03-00046-EFAA)

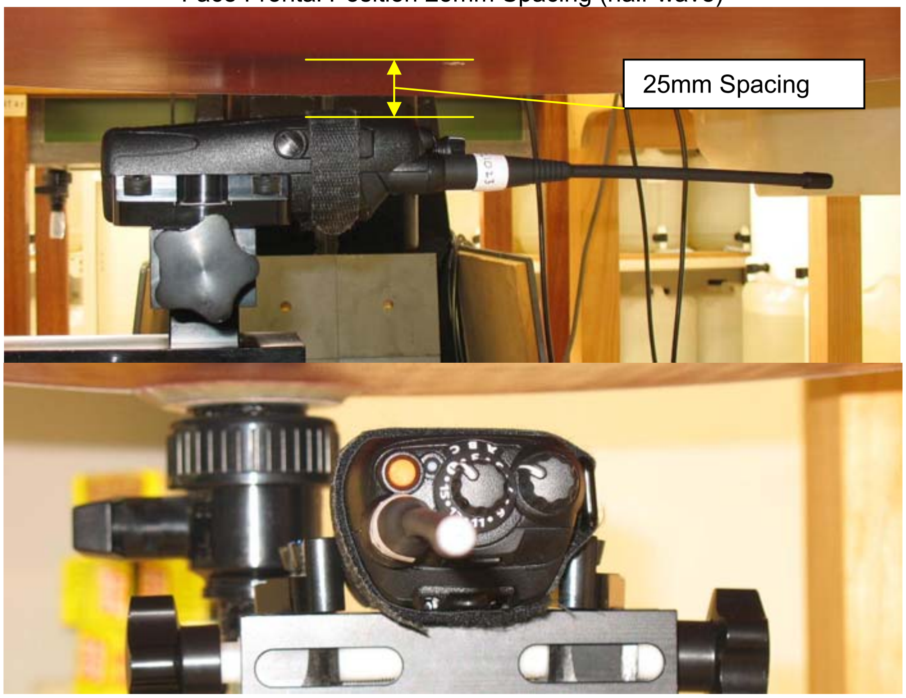
Headset-Microphone (T03-00046-DEAA)

Headset-Microphone (T03-00047-CBAA)

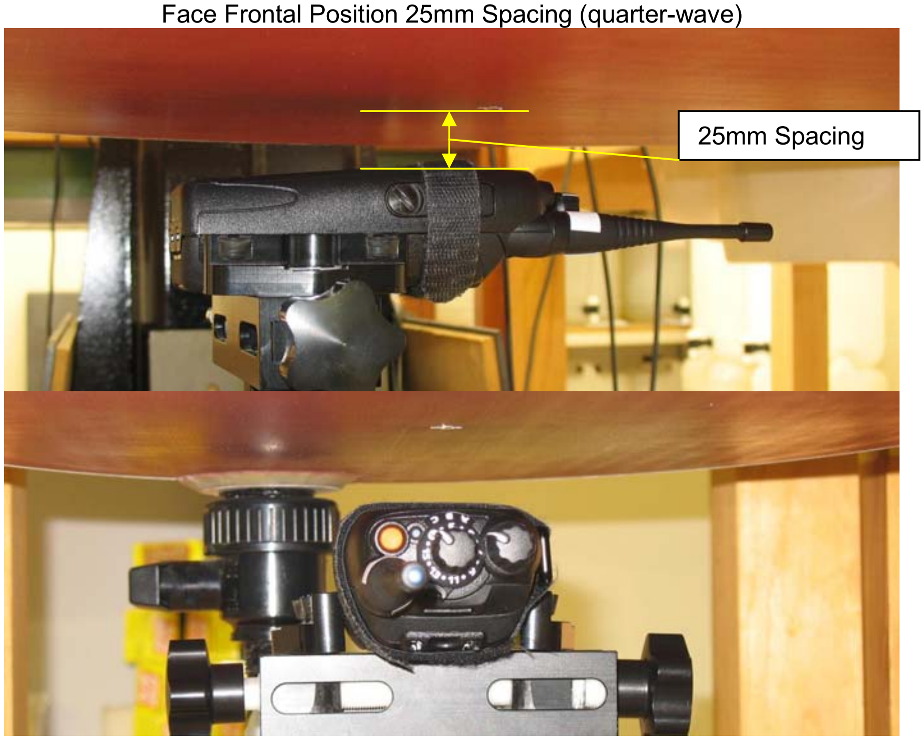
Headset-Microphone (T03-00047-BAAA)

APPENDIX A4 Test Setup Photographs

Face Frontal Position 25mm Spacing (half-wave)



Face Frontal Position 25mm Spacing (quarter-wave)



APPENDIX A5 Test Setup Photographs

Face Frontal Position 25mm Spacing (helical)

APPENDIX A6 Test Setup Photographs

Body Worn with Nylon Case (half-wave)

Body Worn with Nylon Case (quarter-wave)

Body Worn with Nylon Case (helical)

APPENDIX A7 Test Setup Photographs

Body Worn with Battery Clip (half-wave)

Body Worn with Battery Clip (quarter-wave)

Body Worn with Battery Clip (helical)

APPENDIX A8 Test Setup Photographs

Body Worn with Leather Case and Battery Clip (half-wave)

Body Worn with Leather Case and Battery Clip (quarter-wave)

Body Worn with Leather Case and Battery Clip (helical)

APPENDIX A9 Test Setup Photographs

Body Worn with Leather Case and Spring Clip (half-wave)

Body Worn with Leather Case and Spring Clip (quarter-wave)

Body Worn with Leather Case and Spring Clip (helical)

APPENDIX A10 Test Setup Photographs

Body Worn with Leather Case and D-Stud Clip (half-wave)

Body Worn with Leather Case and D-Stud Clip (quarter-wave)

Body Worn with Leather Case and D-Stud Clip (helical)

APPENDIX A11 Test Setup Photographs

Body Worn with Leather Case and D-Stud Loop (half-wave)

Body Worn with Leather Case and D-Stud Loop (quarter-wave)

Body Worn with Leather Case and D-Stud Loop (helical)