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## SAR EVALUATION TO FCC REQUIREMENTS

TOP-J2620 Hand Portable Transceiver

for

Tait Electronics Ltd (NZ)

Report Number: M010547A

Issue Date: 20<sup>th</sup> July 2001

**This report is not an endorsement of the subject product.  
The results within apply to the test sample as tested.**

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**SAR EVALUATION TO FCC REQUIREMENTS**  
**Report Number: M010547A**

**1.0 GENERAL INFORMATION**

**Test Sample:** Hand-Portable Transceiver  
**Model Number:** TOP-J2620  
**Serial Number:** 14084818  
**FCC ID:** CASTEL0032  
**Manufacturer:** Tait Electronics Ltd - New Zealand  
  
**Test Standard/s:** FCC – Supplement C (OET Bulletin 65): 1997  
FCC Guidelines for Human Exposure to Radiofrequency  
Electromagnetic Field.  
FCC Rule Part – 2.1093, Docket 96-326  
  
**Test Dates:** 28<sup>th</sup> May to 13<sup>th</sup> June  
  
**Tested for:** Tait Electronics Ltd  
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## Executive Summary

This report contains the results of the SAR evaluation performed on the Tait Hand-Portable Transceiver Model TOP-J2620. The EUT (Equipment Under Test) was tested in accordance with FCC requirements. The SAR was performed at its maximum transmitted power level ( 3 Watts).

The test sample is a Push To Talk (PTT) device, which operates in the frequency range 806.1 MHz to 869.9 MHz with the maximum transmit power of 3 Watts. The design of the device limits the transmit-receive duty cycle to a maximum of 25%, with a maximum transmit time limited to one minute.

Channel	Rx Frequency (MHz)	Tx Frequency (MHz)	Tx Power (Watts)
1	819.9	806.1	3
2	865.9	838.1	3
3	849.9	869.9	3

The EUT was tested at channels 1,2 and 3, which are the low, middle and high frequencies of 806.1 MHz to 869.9 MHz band of operation. The SAR was performed at the following positions:

- Left Ear – Touch Position
- Right Ear – Touch Position
- Nose tip position (25 mm Separation)
- Belt Clip Position

Test Position	SAR Level for (1g) mW/g (100% duty Cycle)	Extrapolated SAR for (1g) mW/g (50% duty Cycle)	Extrapolated SAR for (1g) mW/g (25% duty Cycle)	SAR Level for (10g) mW/g (100% Duty Cycle)	Extrapolated SAR for (10g) mW/g (50% duty Cycle)	Extrapolated SAR for (10g) mW/g (25% duty Cycle)
<b>The highest SAR for Touch Position</b>						
Touch Right	2.22	1.11	0.56	1.63	0.82	0.41
<b>The highest SAR for Nose Tip Position (25 mm separation)</b>						
EUT - Case	2.74	1.37	0.69	2.03	1.02	0.51
<b>The highest SAR for Belt Clip Position</b>						
EUT - Antenna	2.75	1.38	0.69	1.86	0.93	0.47

The maximum measured SAR level was found to be at the “Belt Clip Position” at a frequency of 869.9MHz (channel 3). The test sample complied with the 1.6 mW/g SAR limit for an uncontrolled RF exposure, when the continuous transmit results are adjusted for a 50% transmit duty cycle. It complied with the controlled RF exposure limits, even for continuous transmit mode.

## 2.0 DESCRIPTION OF DEVICE

### 2.1 Description of Test Sample

The device tested was a Hand-Portable Transceiver employing frequency modulation (FM). It has an integral fixed antenna (non-retractable). The specifications are as follows.

**Antenna Type:** Dipole  
**Antenna Location:** Top Left  
**Antenna Dimensions:** Length 200 mm  
 Diameter at base 13 mm  
 Diameter of whip 7 mm

**Antenna Gain:**

Elevation 1	Test Condition	Gain Test Result (dBi)					
		Peak (dBi)			Average (dBi)		
Side - Side	Radio Position	806MHz	836MHz	870MHz	806MHz	836MHz	870MHz
	Free Space	2.39	3.40	2.83	-1.68	-1.53	-2.55

Elevation 1	Test Condition	Gain Test Result (dBi)					
		Peak (dBi)			Average (dBi)		
Azimuth	Radio Position	806MHz	836MHz	870MHz	806MHz	836MHz	870MHz
	Free Space	2.10	2.63	2.31	1.72	2.42	1.69

### 2.2 Test Signal, Frequency and Output Power

The transceiver employs frequency modulation (FM). The Transceiver was set to transmit continuously at its maximum output power of 3 Watts. The channels utilised in the measurements are shown in the table below.

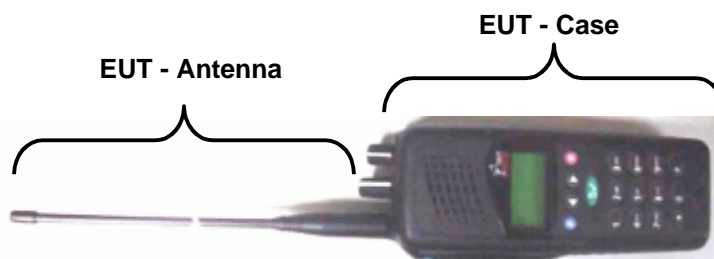
Channel	Frequency	Tx Power
1	806.1 MHz	3 Watts
2	838.2 MHz	3 Watts
3	869.9 MHz	3 Watts

The SAR was measured at the three test frequencies for each of the four test positions:

1. Left Ear
2. Right Ear
3. Nose tip position (25 mm Separation)
4. Belt Clip Position

Preliminary SAR tests performed on test positions 3 to 4, indicated there were two hot spots, one on the unit (keypad, mouthpiece and earpiece) and the other at the antenna. Hence SAR tests were performed in two parts (EUT – Case and EUT – Antenna) for test positions 3 to 4.

**EUT – Case:** SAR measurement was performed on the unit of the EUT.  
**EUT – Antenna:** SAR measurement was performed at the antenna of the EUT.



## 2.3 Battery Status

The phone battery was fully charged prior to commencement of each measurement. Each SAR test was completed within 40 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.

The conducted power of the transceiver was measured immediately before and after each SAR test using a calibrated Giga-tronics 8542B power meter.

Touch Position					
Test Position	Test Freq. (MHz)	Power Measured before SAR test (W)	Power measured after SAR test (W)	Drift $\Delta$ Watts	Drift %
Touch Left	806.1	3.00	2.86	-0.14	4.6%
Touch Left	838.2	2.85	2.84	-0.01	0.35%
Touch Left	869.9	2.92	2.47	-0.45	15.4%
Touch Right	806.1	2.80	2.75	-0.05	1.8%
Touch Right	838.2	3.06	2.76	-0.30	9.8%
Touch Right	869.9	2.95	2.68	-0.27	9.2%

Nose Tip Position (25 mm Separation)					
Test Position	Test Freq. (MHz)	Power Measured before SAR test (W)	Power measured after SAR test (W)	Drift $\Delta$ Watts	Drift %
EUT - Case	806.1	2.82	2.77	-0.05	1.8%
EUT - Case	838.2	3.04	2.80	-0.24	7.9%
EUT - Case	869.9	3.03	2.67	-0.36	11.9%
EUT - Antenna	806.1	3.18	3.00	-0.18	5.7%
EUT - Antenna	838.2	3.04	2.75	-0.29	9.5%
EUT - Antenna	869.9	2.96	2.85	-0.11	3.7%

Belt Clip Position					
Test Position	Test Freq. (MHz)	Power Measured before SAR test (W)	Power measured after SAR test (W)	Drift $\Delta$ Watts	Drift %
EUT - Case	806.1	3.21	3.05	-0.16	5%
EUT - Case	838.2	3.05	2.87	-0.18	6%
EUT - Case	869.9	3.05	2.80	-0.25	8.2%
EUT - Antenna	806.1	3.18	3.08	-0.10	3.1%
EUT - Antenna	838.2	2.98	2.82	-0.16	5.4%
EUT - Antenna	869.9	2.97	2.84	-0.13	4.4%

### Battery Details

<b>Battery #1:</b>	Tait - Made in NZ	<b>Battery #2:</b>	Tait - Made in NZ
<b>Type:</b>	TOPB700	<b>Type:</b>	TOPB700
<b>Serial No.:</b>	15125411	<b>Serial No.:</b>	15125427
	1500 mAh		1500 mAh
	Ni-MH Battery		Ni-MH Battery
<b>Battery #3:</b>	Tait - Made in NZ	<b>Battery #4:</b>	Tait - Made in NZ
<b>Type:</b>	TOPB700	<b>Type:</b>	TOPB700
<b>Serial No.:</b>	15103280	<b>Serial No.:</b>	15103281
	1500 mAh		1500 mAh
	Ni-MH Battery		Ni-MH Battery

## 2.4 Modulation scheme

The device employs standard frequency modulation (FM).

### 3.0 DESCRIPTION OF SAR MEASUREMENT SYSTEM

#### 3.1 Probe Positioning System

The measurements were performed with the automated near-field scanning system, the DASY3 from Schmid & Partner Engineering AG (SPEAG), also known as the Kuster System. The system is based on a high precision 6 axis robot (working range greater than 1.1m), which positions the SAR measurement probes with a positional repeatability of better than  $\pm 0.02$  mm. The DASY3 system meets the requirements of the FCC measurement method.

#### 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  $\pm 0.25$  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 electronics (DAE). The DAE is connected to the computer system via a fibre optic link

#### 3.3 Calibration and Validation Procedures and Data

Prior to the SAR assessment, the system validation kit was used to verify that DASY3 was operating within its specifications. The validation was performed at 900 MHz by feeding a known power level into a reference dipole, set at a known distance from the phantom. The measured SAR is compared to the theoretically derived value. If the measured SAR exceeds a tolerance of 5%, the cause is investigated and the system verification repeated. Final SAR measurements are not performed until the validation result is within the 5% tolerance.

#### 3.4 Phantom Properties (Size, Shape, Shell Thickness, Tissue Material Properties)

The phantom used was the "Homogeneous Generic Twin Phantom" from SPEAG. It has a thickness of 2.0 mm and was filled with a tissue simulating liquid. The ear was simulated by means of a spacer to give a spacing of 4.0 mm between the earpiece of the EUT and the tissue simulating liquid. The flat section was used to represent "Nose Tip Position" and "Belt Worn Position".

SAR measurements were performed first with the brain simulating liquid and then with muscle simulating liquid. The dielectric parameters of the tissue simulating liquid were measured daily prior to each SAR assessment using the HP85070A dielectric probe kit and HP8714B Network Analyser.

**Table 1A: Measured Dielectric Values - Brain Simulating Liquid**

Frequency Band	$\hat{\epsilon}_r$ (measured)	$\hat{\epsilon}_r$ (target)	s (mho/m) (measured)	s (target)	$\rho$ kg/m <sup>3</sup>
835 MHz	45.2	46.1 $\pm$ 5% (43.8 to 48.41)	0.80	0.74 $\pm$ 10% (0.666 to 0.814)	1030

**Table 1B: Measured Dielectric Values - Muscle Simulating Liquid**

Frequency Band	$\hat{\epsilon}_r$ (measured)	$\hat{\epsilon}_r$ (target)	s (mho/m) (measured)	s (target)	$\rho$ kg/m <sup>3</sup>
835MHz	55.16	56.1 $\pm$ 5% (53.3 to 58.9)	0.97	0.95 $\pm$ 10% (0.855 to 1.05)	1040

### 3.5 Measurement Equipment Details

Equipment Type	Manufacturer	Model Number	Serial Number	Calibration Due
Robot - Six Axes	Staubli	RX90BL	N/A	Not applicable
Robot Remote Control	Schmid & Partner Engineering AG	CS7MB	RX90B	Not applicable
Generic Twin Phantom	Schmid & Partner Engineering AG	N/A	N/A	Not applicable
Data Acquisition Electronics	Schmid & Partner Engineering AG	DASE3 V1	359	24-Jun-01
Probe E-Field - Dummy	Schmid & Partner Engineering AG	DP1	N/A	Not applicable
Probe E-Field	Schmid & Partner Engineering AG	ET3DV6	1377	17-Aug-01
Probe E-Field	Schmid & Partner Engineering AG	ET3DV6	1380	17-Aug-01
Antenna Dipole 1800 MHz	Schmid & Partner Engineering AG	D1800V2	242	14-Dec-02
Antenna Dipole 900 MHz	Schmid & Partner Engineering AG	D900V2	047	12-Dec-02
RF Amplifier 600 MHz to 1100 MHz, 5W	Radio Technology	PAL1850-30B	813	Not applicable
Synthesized signal generator	Hewlett Packard	8662A	2222A00956	In test
RF Power Meter Dual	Giga-Tronics	8542B	1830125	21-June-01
RF Power Sensor 0.01 - 18 GHz	Giga-Tronics	80301A	1828782	21-June-01
RF Power Sensor 0.01 - 18 GHz	Giga-Tronics	80301A	1828805	21-June-01
Dual Directional Coupler	Hewlett Packard	778D	1144A04700	21-Aug-01
Spectrum Analyzer 9 kHz - 22 GHz	Hewlett Packard	8593EM	3412A00105	06-Apr-02



#### 4.0 SAR MEASUREMENT PROCEDURE USING DASY3

The SAR evaluation was performed with the SPEAG DASY3 system. A summary of the procedure follows:

- a) A measurement of the SAR value at a fixed location above the reference point 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 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. Based on this data, the area of the maximum absorption is determined by Spline interpolation.
- c) Around this point, a volume of 32 mm x 32 mm x 34 mm is assessed by measuring 5 x 5 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 or 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 (If the value changes by more than 5%, the entire measurement is repeated.)

## 4.1 Description of the Test Positions

### 4.1.1 Touch Left and Right

The SAR evaluations were performed on both left and right hand side of the “Touch Position”. The reference line of the phone lies in the reference plane of the head. The centre of the earpiece of the phone is placed at the entry of the auditory canal. The angle between the reference line of the phone and the connecting both auditory canal openings is reduced until the any point of the device touches the Cheek.

**Refer to Appendix A for test set up photos.**

### 4.1.2 Nose Tip Position (25mm Separation)

The SAR evaluation was performed at the flat section of the phantom. The EUT was placed 25 mm from the phantom; this position is equivalent to the EUT placed in front of the nose.

**Refer to Appendix A for test set up photos.**

### 4.1.3 Belt Clip Position

The EUT was connected with the lapel speaker microphone, the microphone was taped to the phantom. The transceiver was placed at the flat section of the phantom and suspended until the belt clip touched the phantom. This was equivalent to the device worn at the belt position with the speaker microphone at the shoulder.

**Refer to Appendix A for test set up photos.**

## 4.2 List of All Test Cases (Test Frequencies, User Modes etc)

For each test position, the SAR was measured at three test channels with the test sample operating at maximum power, as specified in section 2.2.

## 4.3 FCC SAR Limits for RF Exposure

Peak SAR Limits	Uncontrolled Exposure	Controlled Exposure
Partial Body (Head and Torso)	1.6 mW/g (averaged over 1g cube of tissue)	8.0 mW/g (averaged over 1g cube of tissue)
Hands, Wrists, Feet and Ankles	4.0 mW/g (averaged over 10g cube of tissue)	20.0 mW/g (averaged over 10g cube of tissue)
Spatial Average SAR Limits for Whole Body	0.08 mW/g	0.4 mW/g

## 5.0 MEASUREMENT UNCERTAINTY

Table 2: Uncertainty Budget for DASY3

Uncertainty Description	Error	Distrib.	Weight	Std. Dev.	Offset
<b>Probe Uncertainty</b>					
axial isotropy	±0.2 dB	U-shaped	0.5	±2.4%	
Spherical isotropy	±0.4 dB	U-shaped	0.5	±4.8%	
Isotropy from gradient	±0.5 dB	U-shaped	0		
Spatial resolution	±0.5%	normal	1	±0.5%	
Linearity error	±0.2 dB	rectang.	1	±2.7%	
Calibration error	±3.3%	normal	1	±3.3%	
<b>SAR Evaluation Uncertainty</b>					
Data acquisition error	±1%	rectang.	1	±0.6%	
ELF and RF disturbances	±0.25%	normal	1	±0.25%	
Conductivity assessment	±10%	rectang.	1	±5.8%	
<b>Spatial Peak SAR Evaluation Uncertainty</b>					
Extrapol boundary effect	±3%	normal	1	±3%	5%
Probe positioning error	±0.1mm	normal	1	±1%	
Integrat. and cube orient	±3%	normal	1	±3%	
Cube shape inaccuracies	±2%	normal	1	±1.2%	
Device positioning	±6%	normal	1	±6%	
<b>Combined Uncertainties</b>				<b>±11.7%</b>	<b>±5%</b>

Estimated total measurement uncertainty for the DASY3 measurement system was ±11.7%. The extended uncertainty ( $K = 2$ ) was assessed to be ±23.5% based on 95% confidence level. The uncertainty is not added to the measurement result for FCC tests.

## 6.0 SAR EVALUATION RESULTS

The SAR values averaged over 1 g and 10 g tissue masses were determined for the test sample at the test positions described in Section 4.1.1 to 4.1.3. The results are given in Tables 3 to 12.

The plots with the corresponding SAR distributions, which reveal information about the location of the maximum SAR with respect to the device, are contained in Appendix B of this report.

### 6.1 SAR Measurement Results for Touch Position

In the following tables:

- 100% duty cycle is continuous transmit
- 50% duty cycle is a transmit / receive ratio of 50%.
- 25% duty cycle is a transmit / receive ratio of 25%

**Table 3A: SAR Measurement Results - Touch Position**

Test Position	Plot No.	Test Channel	Test Freq. (MHz)	SAR Level for (1g) mW/g (100% duty Cycle)	SAR Level for (10g) mW/g (100% Duty Cycle)
Touch Left	1	1	806.1	0.83	0.631
Touch Left	2	2	838.2	1.65	1.23
Touch Left	3	3	869.9	1.8	1.31
Touch Right	4	1	806.1	0.899	0.676
Touch Right	5	2	838.2	2.06	1.51
Touch Right	6	3	869.9	2.22	1.63

**Table 3B: The highest SAR for the “Touch Position” extrapolated to 50% duty cycle**

Test Position	SAR Level for (1g) mW/g (100% duty Cycle)	Extrapolated SAR for (1g) mW/g (50% duty Cycle)	SAR Level for (10g) mW/g (100% Duty Cycle)	Extrapolated SAR for (10g) mW/g (50% duty Cycle)
Touch Left	1.8	0.90	1.31	0.66
Touch Right	2.22	1.11	1.63	0.82

**Table 3C: The highest SAR for the “Touch Position” extrapolated to 25% duty cycle**

Test Position	SAR Level for (1g) mW/g (100% duty Cycle)	Extrapolated SAR for (1g) mW/g (25% duty Cycle)	SAR Level for (10g) mW/g (100% Duty Cycle)	Extrapolated SAR for (10g) mW/g (25% duty Cycle)
Touch Left	1.80	0.45	1.31	0.33
Touch Right	2.22	0.56	1.63	0.41

The maximum measured SAR level for “Touch Position” was 2.22 mW/g for a 1 gram cube of mass and 1.63 mW/g for a 10 gram cube of mass at 100% duty cycle. These values were measured in the “Touch Right Position” at a frequency of 869.9 MHz (Channel 3).

These SAR levels extrapolated for a 50% duty cycle were 1.11 mW/g (1g) and 0.82 mW/g (10g). The extrapolated values for a 25% duty cycle were 0.56 mW/g (1g) and 0.41 mW/g (10g).

## 6.2 SAR Measurement Results for Nose Tip Position

**Table 4A: SAR Measurement Results – Nose Tip Position (25 mm separation)**

Test Position	Plot No.	Test Channel	Test Freq. (MHz)	SAR Level for (1g) mW/g 100% duty Cycle	SAR Level for (10g) mW/g 100% Duty Cycle
EUT – Case	7	1	806.1	0.738	0.493
EUT – Case	8	2	838.2	0.598	0.450
EUT – Case	9	3	869.9	0.551	0.405
EUT – Antenna	10	1	806.1	2.74	2.03
EUT – Antenna	11	2	838.2	2.02	1.46
EUT – Antenna	12	3	869.9	1.42	1.04

**Table 4B: The highest SAR for the “Nose Tip Position (25 mm separation)” extrapolated to 50% duty cycle**

Test Position	SAR Level for (1g) mW/g (100% duty Cycle)	Extrapolated SAR for (1g) mW/g (50% duty Cycle)	SAR Level for (10g) mW/g (100% Duty Cycle)	Extrapolated SAR for (10g) mW/g (50% duty Cycle)
EUT – Case	0.738	0.37	0.493	0.25
EUT – Antenna	2.74	1.37	2.03	1.02

**Table 4C: The highest SAR for the “Nose Tip Position (25 mm separation)” extrapolated to 25% duty cycle**

Test Position	SAR Level for (1g) mW/g (100% duty Cycle)	Extrapolated SAR for (1g) mW/g (25% duty Cycle)	SAR Level for (10g) mW/g (100% Duty Cycle)	Extrapolated SAR for (10g) mW/g (25% duty Cycle)
EUT – Case	0.738	0.18	0.493	0.12
EUT - Antenna	2.74	0.69	2.03	0.51

The maximum measured SAR level for “Nose Tip Position (25 mm separation)” was 2.74 mW/g for a 1 gram cube of mass and 2.03 mW/g for a 10 gram cube of mass at 100% duty cycle. These values were measured at the “EUT - Antenna” at a frequency of 806.1 MHz (Channel 1).

These SAR levels extrapolated for a 50% duty cycle were 1.37 mW/g (1g) and 1.02 mW/g (10g). The extrapolated values for a 25% duty cycle were 0.69 mW/g (1g) and 0.51 mW/g (10g).

### 6.3 SAR Measurement Results for Belt Clip Position

**Table 7A: SAR Measurement Results – Belt Clip Position**

Test Position	Plot No.	Test Channel	Test Freq. (MHz)	SAR Level for (1g) mW/g	SAR Level for (10g) mW/g
EUT – Case	25	1	806.1	0.848	0.438
EUT – Case	26	2	838.2	0.323	0.232
EUT – Case	27	3	869.9	0.291	0.207
EUT - Antenna	28	1	806.1	2.23	1.57
EUT - Antenna	29	2	838.2	2.3	1.71
EUT - Antenna	30	3	869.9	2.75	1.86

**Table 7B: The highest SAR for the “Belt Clip Position” extrapolated to 50% duty cycle**

Test Position	SAR Level for (1g) mW/g (100% duty Cycle)	Extrapolated SAR for (1g) mW/g (50% duty Cycle )	SAR Level for (10g) mW/g (100% Duty Cycle)	Extrapolated SAR for (10g) mW/g (50% duty Cycle)
EUT – Case	0.848	0.42	0.438	0.22
EUT - Antenna	2.75	1.38	1.86	0.93

**Table 7C: The highest SAR for the “Belt Clip Position” extrapolated to 25% duty cycle**

Test Position	SAR Level for (1g) mW/g (100% duty Cycle)	Extrapolated SAR for (1g) mW/g (25% duty Cycle)	SAR Level for (10g) mW/g (100% Duty Cycle)	Extrapolated SAR for (10g) mW/g (25% duty Cycle)
EUT – Case	0.848	0.21	0.438	0.11
EUT - Antenna	2.75	0.69	0.93	0.47

The maximum measured SAR level for “Belt Clip Position with Lapel Speaker Microphone” was 2.75 mW/g for a 1 gram cube of mass and 1.86 mW/g for a 10 gram cube of mass at 100% duty cycle. These values were measured at the “EUT - Antenna” at a frequency of 869.9 MHz (Channel 3).

These SAR levels extrapolated for a 50% duty cycle were 1.38 mW/g (1g) and 0.93 mW/g (10g). The extrapolated values for a 25% duty cycle were 0.69 mW/g (1g) and 0.47 mW/g (10g).

## 7.0 CONCLUSIONS

The TOP-J2620 Hand-Portable Transceiver was tested on behalf of Tait Electronics Ltd (NZ), in accordance with the SAR requirements of the Federal Communications Commission (FCC). The highest SAR levels are listed below.

**Table 8: The Highest SAR Summary**

Test 0 Position	SAR Level for (1g) mW/g (100% duty Cycle)	Extrapolated SAR for (1g) mW/g (50% duty Cycle)	Extrapolated SAR for (1g) mW/g (25% duty Cycle)	SAR Level for (10g) mW/g (100% Duty Cycle)	Extrapolated SAR for (10g) mW/g (50% duty Cycle)	Extrapolated SAR for (10g) mW/g (25% duty Cycle)
<b>The worst case for Touch Position (Ear)</b>						
Touch Left	1.80	0.90	0.45	1.31	0.66	0.33
Touch Right	2.22	1.11	0.56	1.63	0.82	0.41
<b>The worst case for Nose Tip Position (25 mm separation)</b>						
EUT - Case	2.74	1.37	0.69	2.03	1.02	0.51
<b>The worst case for Belt Clip Position</b>						
EUT - Antenna	2.75	1.38	0.69	1.86	0.93	0.47

The highest SAR levels was 2.75 mW/g for a 1g cube of mass respectively at 100% duty cycle. This is below the controlled RF exposure limit of 8.0 mW/g, even taking the measurement uncertainty into account.

### 7.1 Controlled Exposure

The highest SAR level at 50% duty cycle was 1.38 mW/g (1g) which is below the controlled RF exposure limit of 8.0 mW/g, even taking the measurement uncertainty into account.

### 7.2 Uncontrolled Exposure

The maximum SAR level of 50% duty cycle was 1.38 mW/g (1g) which is below the uncontrolled RF exposure limit of 1.6 mW/g. The maximum SAR level at 25% duty cycle was 0.69 mW/g (1g) which is below the uncontrolled RF exposure limit of 1.6 mW/g (1g), even taking the measurement uncertainty into account.

## 8.0 COMPLIANCE STATEMENT

The TOP-J2620 sample complied with the uncontrolled RF exposure limits when the continuous transmit results were adjusted for a 50% transmit duty cycle. It complied with the controlled RF exposure limits even for continuous transmit mode.