

EMC Technologies (NZ) Ltd

Test Report No 30826.2
Report date: 8th September 2003

TEST REPORT

Tait TMAB12-H604 UHF Mobile Transceiver (FCC ID: CASTMAH6A)

tested to

47 Code of Federal Regulations

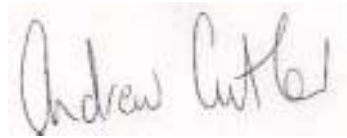
Part 22 – Public Mobile Services

Part 90 – Private Land Mobile Service

for

Tait Electronics Ltd

This Test Report is issued with the authority of:



Andrew Cutler - General Manager



Karen Miller - Office Administrator

Prepared By:



All tests reported
herein have been
performed in accordance
with the laboratory's
scope of accreditation

EMC Technologies (NZ) Ltd

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1. STATEMENT OF COMPLIANCE

The Tait TMAB12-H604 UHF Mobile Station Transceiver complies with:

- FCC Part 22 Section 22.359 when tested in accordance with FCC Part 2 Section 2.1053
- FCC Part 90 Section 90.210 when tested in accordance with FCC Part 2 Section 2.1053

2. RESULTS SUMMARY

The results from testing are summarised in the following table:

Section	Result
22.359 and 90.210 when tested to 2.1053 – Radiated spurious emissions	Complies with a 21.2 dB margin at 1380.3000 MHz (Vertical) when transmitting on 460.1000 MHz in high power mode.

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3. CLIENT INFORMATION

Company Name	Tait Electronics Ltd
Address	PO Box 1645
City	Christchurch
Country	New Zealand
Contact	Mr Des Fox

4. DESCRIPTION OF TEST SAMPLE

Brand Name	Tait
Model Number	TMAB12-H604
Product	UHF Mobile Transceiver
Manufacturer	Tait Electronics Ltd
Country of Origin	New Zealand
Serial Number	19001117
FCC ID	CASTMAH6A

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5. TEST SAMPLE SPECIFICATIONS

Transmit frequency

460.1000 MHz, 480.1000 MHz

Band of operation

450 – 530 MHz

FCC bands

Part 90: 421 – 512 MHz.

Power Supply

13.8 Vdc from a DC power supply (lead acid battery)

Power Output

High power 25 watts

Low power approximately 1 watt.

Attachments

- DTMF microphone
- External options board
- An external speaker

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6. ATTESTATION

This report describes the tests and measurements performed for the purpose of determining compliance with the specification with the following conditions:

The client selected the test sample.

The report relates only to the sample tested.

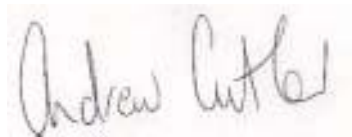
This report does not contain corrections or erasures.

Measurement uncertainties with statistical confidence intervals of 95% are shown below test results. Both Class A and Class B uncertainties have been accounted for, as well as influence uncertainties where appropriate.

In addition this equipment has been tested in accordance with the requirements contained in the appropriate Commission regulations.

To the best of my knowledge, these tests were performed using measurement procedures that are consistent with industry or Commission standards and demonstrate that the equipment complies with the appropriate standards.

I further certify that the necessary measurements were made by EMC Technologies NZ Ltd, 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand.



Andrew Cutler
General Manager
EMC Technologies NZ Ltd

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7. TEST RESULTS

Field strength of spurious emissions

Transmitter in stand by – Non specific emissions observed

Emission frequency (MHz)	Level (dBuV/m)	Power (dBm)	Limit (dBm)	Polarity	Margin (dB)
49.1500	15.0	-82.4	-20.0	Vertical	62.4
73.7275	21.2	-76.2	-20.0	Vertical	56.2
86.0145	10.5	-86.9	-20.0	Vertical	66.9
98.3025	22.3	-75.1	-20.0	Vertical	55.1
108.9900	20.0	-77.4	-20.0	Vertical	57.4
110.5900	25.0	-72.4	-20.0	Vertical	52.4
122.8775	26.5	-70.9	-20.0	Vertical	50.9
135.1650	19.4	-78.0	-20.0	Vertical	58.0
208.8900	19.0	-78.4	-20.0	Vertical	58.4

Transmitter transmitting

Frequency: 460.1000 MHz

Power: 25 watts

Frequency (MHz)	Level (dBuV/m)	Power (dBm)	Limit (dBm)	Polarity	Margin (dB)
920.2000	47.1	-50.3	-20.0	Vertical	30.3
920.2000	49.1	-48.3	-20.0	Horizontal	28.3
1380.3000	56.2	-41.2	-20.0	Vertical	21.2
1380.3000	54.9	-42.5	-20.0	Horizontal	22.5
1840.4000	55.4	-42.0	-20.0	Vertical	22.0
1840.4000	51.1	-46.3	-20.0	Horizontal	26.3
2300.5000	48.6	-48.8	-20.0	Vertical	28.8
2300.5000	45.6	-51.8	-20.0	Horizontal	31.8
2760.6000	-	-	-20.0	Vertical	-
2760.6000	-	-	-20.0	Horizontal	-
3220.7000	-	-	-20.0	Vertical	-
3220.7000	-	-	-20.0	Horizontal	-
3680.8000	-	-	-20.0	Vertical	-
3680.8000	-	-	-20.0	Horizontal	-
4140.9000	-	-	-20.0	Vertical	-
4140.9000	-	-	-20.0	Horizontal	-
4601.0000	-	-	-20.0	Vertical	-
4601.0000	-	-	-20.0	Horizontal	-

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Frequency: 460.1000 MHz

Power: low

Frequency (MHz)	Level (dBuV/m)	Power (dBm)	Limit (dBm)	Polarity	Margin (dB)
920.2000	36.1	-61.3	-20.0	Vertical	41.3
920.2000	37.1	-60.3	-20.0	Horizontal	40.3
1380.3000	37.2	-60.2	-20.0	Vertical	40.2
1380.3000	35.6	-61.8	-20.0	Horizontal	41.8
1840.4000	47.9	-49.5	-20.0	Vertical	29.5
1840.4000	43.9	-53.5	-20.0	Horizontal	33.5
2300.5000	42.9	-54.5	-20.0	Vertical	34.5
2300.5000	42.6	-54.8	-20.0	Horizontal	34.8
2760.6000	-	-	-20.0	Vertical	-
2760.6000	-	-	-20.0	Horizontal	-
3220.7000	-	-	-20.0	Vertical	-
3220.7000	-	-	-20.0	Horizontal	-
3680.8000	-	-	-20.0	Vertical	-
3680.8000	-	-	-20.0	Horizontal	-
4140.9000	-	-	-20.0	Vertical	-
4140.9000	-	-	-20.0	Horizontal	-
4601.0000	-	-	-20.0	Vertical	-
4601.0000	-	-	-20.0	Horizontal	-

Frequency: 480.1000 MHz

Power: 25 watts

Frequency (MHz)	Level (dBuV/m)	Power (dBm)	Limit (dBm)	Polarity	Margin (dB)
960.2000	42.3	-55.1	-20.0	Vertical	35.1
960.2000	43.2	-54.2	-20.0	Horizontal	34.2
1440.3000	49.6	-47.8	-20.0	Vertical	27.8
1440.3000	47.9	-49.5	-20.0	Horizontal	29.5
1920.4000	44.1	-53.3	-20.0	Vertical	33.3
1920.4000	41.0	-56.4	-20.0	Horizontal	36.4
2400.5000	49.6	-47.8	-20.0	Vertical	27.8
2400.5000	50.1	-47.3	-20.0	Horizontal	27.3
2880.6000	-	-	-20.0	Vertical	-
2880.6000	-	-	-20.0	Horizontal	-
3360.7000	-	-	-20.0	Vertical	-
3360.7000	-	-	-20.0	Horizontal	-
3840.8000	-	-	-20.0	Vertical	-
3840.8000	-	-	-20.0	Horizontal	-
4320.9000	-	-	-20.0	Vertical	-
4320.9000	-	-	-20.0	Horizontal	-
4801.0000	-	-	-20.0	Vertical	-
4801.0000	-	-	-20.0	Horizontal	-

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Frequency: 480.1000 MHz

Power: low

Frequency (MHz)	Level (dBuV/m)	Power (dBm)	Limit (dBm)	Polarity	Margin (dB)
960.2000	35.4	-62.0	-20.0	Vertical	42.0
960.2000	36.5	-60.9	-20.0	Horizontal	40.9
1440.3000	36.7	-60.7	-20.0	Vertical	40.7
1440.3000	35.8	-61.6	-20.0	Horizontal	41.6
1920.4000	43.6	-53.8	-20.0	Vertical	33.8
1920.4000	42.7	-54.7	-20.0	Horizontal	34.7
2400.5000	43.9	-53.5	-20.0	Vertical	33.5
2400.5000	43.1	-54.3	-20.0	Horizontal	34.3
2880.6000	-	-	-20.0	Vertical	-
2880.6000	-	-	-20.0	Horizontal	-
3360.7000	-	-	-20.0	Vertical	-
3360.7000	-	-	-20.0	Horizontal	-
3840.8000	-	-	-20.0	Vertical	-
3840.8000	-	-	-20.0	Horizontal	-
4320.9000	-	-	-20.0	Vertical	-
4320.9000	-	-	-20.0	Horizontal	-
4801.0000	-	-	-20.0	Vertical	-
4801.0000	-	-	-20.0	Horizontal	-

All other emissions observed are greater than 20 dB of the -20 dBm limit (ie all are less than -40 dBm) and have therefore not been recorded.

Device was tested on an open area test site at a distance of 3 metres.

Testing was carried out at EMC Technologies NZ Ltd Open Area Test Site, which is located at Driving Creek, Orere Point, Auckland. Details of this site have been filed with the Commission, Registration Number: 90838, which was last updated on May 12th, 2003.

The transmitter was tested with a resistive dummy load attached to the antenna terminal of the device.

Testing was carried out when the device was powered at 13.8 Vdc using a DC power supply (lead acid battery).

Also attached to the transceiver were a DTMF microphone kit, an external options board and an external speaker.

The power level of each emission was determined by replacing the transmitter with a dipole antenna that was connected to a signal generator.

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The signal generator output level was increased until the same field strength level was observed at each emission frequency.

The level recorded is the signal generator output level in dBm less any gains / losses due to the coax cable and the dipole antenna.

Limit:

All spurious emissions are to be attenuated by at least $50 + 10 \log (P)$.

This gives a limit of -20 dBm.

No measurements were made above the 10th harmonic.

Result: Complies

Measurement Uncertainty: ± 4.1 dB

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8. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial #	Asset
Aerial Controller	EMCO	1090	9112-1062	RFS 3710
Aerial Mast	EMCO	1070-1	9203-1661	RFS 3708
Turntable	EMCO	1080-1-2.1	9109-1578	RFS 3709
Biconical Antenna	Schwarzbeck	BBA 9106	-	RFS 3612
Log Periodic Antenna	Schwarzbeck	UHALP 9107	-	RFS 3702
UHF Dipole Antenna	Schwarzbeck	UHA 9105	-	RFS 3679
Horn Antenna	EMCO	3115	9511-4629	E1526
Horn Antenna	Electrometrics	RGA-60	6234	E1494
Coax Cable	Sucoflex	104PA	2736/4PA	-
Signal Generator	Rohde & Schwarz	SMHU.58	838923/028	E1493
Measurement Receiver	Rohde & Schwarz	ESCS 30	839873/1	
Measurement Receiver	Rohde & Schwarz	ESHS 10	828404/005	RFS 3728
Spectrum Analyzer	Hewlett Packard	E7405A	US39150142	3776
Artificial Mains Network	Rhode & Schwarz	ESH 2-Z5	881362/034	RFS 3628
Variac	General Radio	1592	-	RFS 3690

9. ACCREDITATIONS

Testing was carried out in accordance with EMC Technologies NZ Ltd registration with the Federal Communications Commission as a listed facility, Registration Number: 90838, which was updated on May 12th, 2003.

The tests were carried out in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to NZS/ISO/IEC 17025: 1999.

All measurement equipment has been calibrated in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to NZS/ISO/IEC 17025: 1999.

International Accreditation New Zealand has Mutual Recognition Arrangements for testing and calibration with 46 accreditation bodies in 34 economies. This includes NATA (Australia), UKAS (UK), SANAS (South Africa), NVLAP (USA), A2LA (USA), SWEDAC (Sweden). Further details can be supplied on request.

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10. PHOTOGRAPH(S)



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Radiated emissions test set up



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