EMC Technologies (NZ) Ltd

Test Report No **70232.1B**
Report date: 26 March 2007

TEST REPORT

Team Simoco
Power Blade TU 100 Watt Trunked Site Controller

tested to the

Code of Federal Regulations (CFR) 47

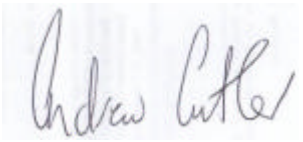
Part 90 –Private Land Mobile Services

Part 22 – Public Mobile Services

Part 15 – Radio Frequency Device

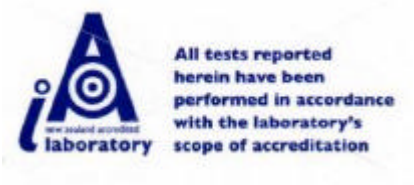
for

Team Simoco Ltd



This Test Report is issued with the authority of:

_____
Andrew Cutler - General Manager



EMC Technologies (NZ) Ltd

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1. CLIENT INFORMATION

Company Name	Team Simoco Ltd
Address	Field House Uttoxeter Old Road
City	Derby DE1 1NH
Country	England
Contact	Mr Andy Grimmett

2. DESCRIPTION OF TEST SAMPLE

Brand Name	Team Simoco
Model Number	Power Blade TU
Product	100 Watt Trunked Site Controller
Manufacturer	Team Simoco Ltd
Designed in	England
Serial Number	XBP1200TU07022VX
FCC ID	U89XFINBLATU

3. COMPLIANCE STATEMENT AND RESULT SUMMARY

The **Team Simoco Power Blade TU 100 Watt Trunked Site Controller** complies with the limits defined in 47CFR 15, 47CFR22, 47 CFR Part 90 and 47 CFR Part 2 when tested in-accordance with the test methods described in 47 CFR Part 2.

CLAUSE	TEST PERFORMED	RESULT
90.203	Certification required	Complies
2.1046	RF power output	Noted
90.205	Power and antenna height limits	Complies
2.1047	Modulation Characteristics	
2.1047(a)	Low pass filter response	Complies
2.1047(b)	Modulation limiting characteristics	Complies
90.211(a)	Modulation characteristics	Complies
2.1049	Occupied bandwidth	Noted
2.202	Bandwidths	Noted
22.357	Emission types	Complies
22.359(a)	Emission masks	Complies
90.207	Types of emissions	Complies
90.209	Bandwidth limitations	Complies
90.210	Emission masks	Complies
2.1051	Spurious emissions at antenna terminals	Complies
2.1053	Field strength of spurious radiation	Complies
2.1055	Frequency stability	Noted
22.355	Frequency tolerance	Complies
90.213	Frequency stability	Complies
90.214	Transient frequency behaviour	Complies
15.109	Radiated emission limits	Complies
15.111	Antenna conducted power measurement	Complies
1.1310	Radio frequency radiation exposure limits	Complies

4. TEST SAMPLE DESCRIPTION

The sample tested has the following specifications:

Rated Transmitter Output Power

100 Watts (50.0 dBm)

Transmitter frequency range in the USA

421 – 480 MHz

Test frequencies

Frequency MHz	**Power Watts**	**Spacing kHz**
440.000	100.0	12.5
440.000	100.0	25.0

This transmitter can operate over the range of 400 – 480 MHz and hence testing has been carried out on 440 MHz which is in the centre of this range

FCC Bands

Part 90: 421 – 512 MHz
Part 22: 450 – 512 MHz

Emission Designators / Modes of operation

11k0F3E – Analogue speech
16k0F3E – Analogue speech
8k50F3D – FFSK at 1200 and 1800 baud
12k0F3D – FFSK at 1200 and 1800 baud

Power Supply

External DC voltage supply.

Transmitter / Receiver 12.0 Vdc
Power Amplifier 24.0 Vdc

5. TEST CONDITIONS

Standard Temperature and Humidity

Temperature: +25°C ± 4° maintained.
Relative Humidity: 60% ± 10% observed.

Standard Test Power Source

Standard Test Voltage: 12.0 and 24.0 Vdc.

Extreme Temperature

High Temperature: + 50°C maintained.
Low Temperature: - 30 °C maintained.

Extreme Test Voltages

High Voltage:	13.8 Vdc	27.6 Vdc
Low Voltage:	10.2 Vdc	20.4 Vdc

6. ATTESTATION

The **Team Simoco Power Blade TU 100 Watt Trunked Site Controller** complies with the Code of Federal Regulations (CFR) 47 Part 90 –Private Land Mobile Services , Part 22 – Public Land Mobile Services and 47 Part 15 – Radio Frequency Devices.

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.

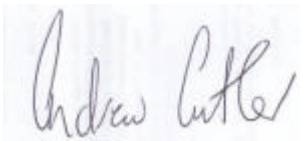
Measurement uncertainties with statistical confidence intervals of 95% are shown below test results. Both Class A and Class B uncertainties have been accounted for, as well as influence uncertainties where appropriate.

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.

This report replaces report number 70232.1 in order to correctly classify the device as a base station transmitter for frequency stability purposes and to apply a limit of 1.5 ppm.



Andrew Cutler
General Manager
EMC Technologies NZ Ltd

7. TEST RESULTS

Certification required

Certification of this device for analogue speech and FFSK data transmissions using 12.5 kHz and 25.0 kHz channelling is sought.

25 kHz channel bandwidth certification is sought for this transmitter under section 90.203(j)(2) and (j)(3) as:

- certification has been sought after February 14th, 1997
- the equipment is multi-bandwidth and can operate on 12.5 kHz and 25 kHz channel bandwidths
- the equipment can operate with an efficiency of one voice channel per 12.5 kHz of channel bandwidth
- the equipment can operate with a data rate greater than 4.8 kbps per 6.25 kHz
- reference has been made to FCC document 04-292

RF power output

Measurements were carried out at the RF output terminals of the transmitter using a 30 dB power attenuator and a 50 O dummy load. Measurements were carried out when the transmitter was not being modulated. Measurements were made with the input voltage set to 13.8 Vdc and when varied +/- 15%. Testing was carried out at maximum power output.

Frequency	Voltage (Vdc)	Rated (dBm)	Measured (dBm)
440.000	10.2/20.4	50.0	49.6
440.000	12.0/24.0	50.0	49.8
440.000	13.8/27.2	50.0	49.9

Limits:
Clause 90.205(g) of Part 90 specifies that in the band 450 – 470 MHz the maximum allowable station effective radiated power (ERP) is dependent upon the station's antenna HAAT and the required service area.
Part 22 does not specify the transmitter output power.

Result: Complies
Measurement Uncertainty: *±0.5 dB*

Modulation Characteristics

This transmitter is capable of producing analogue speech and digital speech modulations.

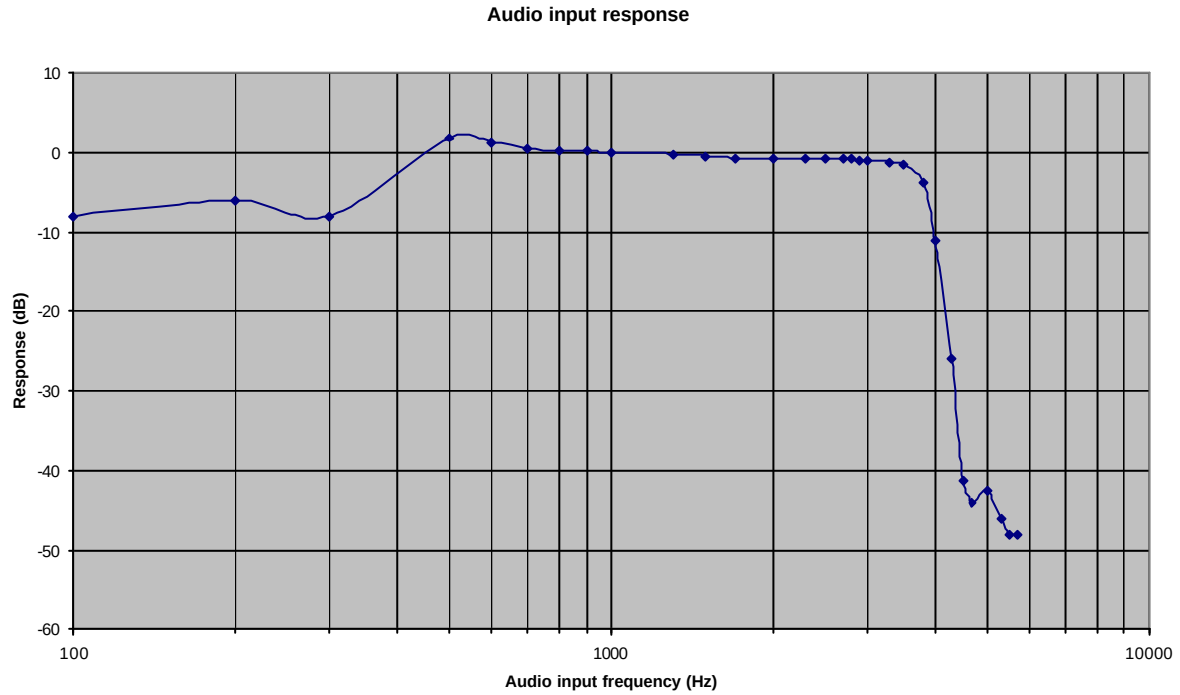
(a) Frequency response of the audio frequency low pass filter between 100 Hz and 15 kHz.

This measurement was carried out using an audio signal generator and an audio modulation analyser.

At 1 kHz an audio signal was applied which was used as a 0 dB response reference.

The frequency of the input signal was then varied and the output response noted. This measurement was carried out from 100 Hz to 10000 Hz as required by Part 2 with further measurements carried out in order to show the full range of this filter.

Roll off appears to be at approximately 3500 Hz

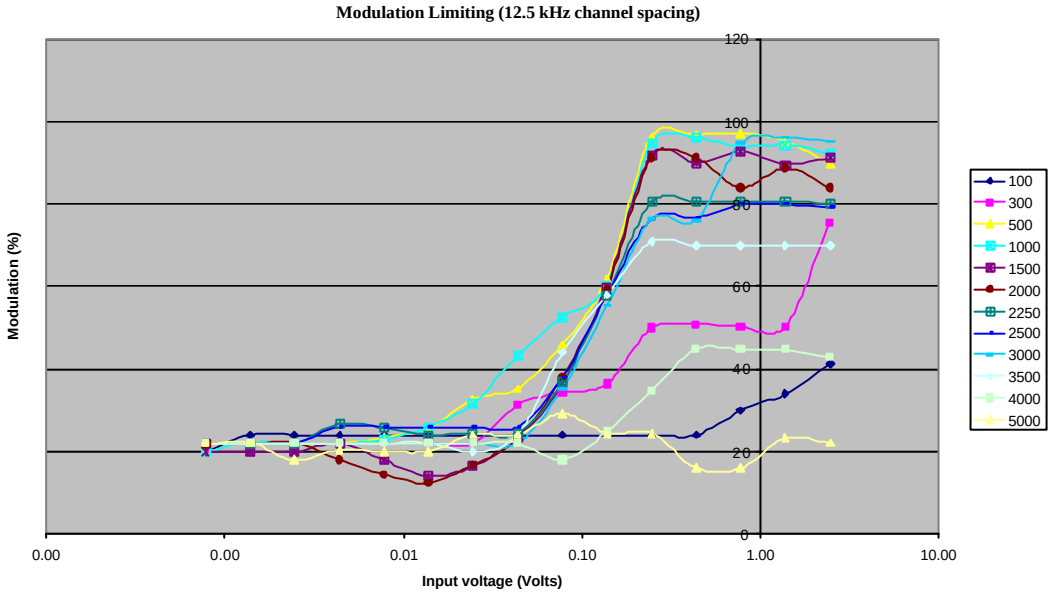


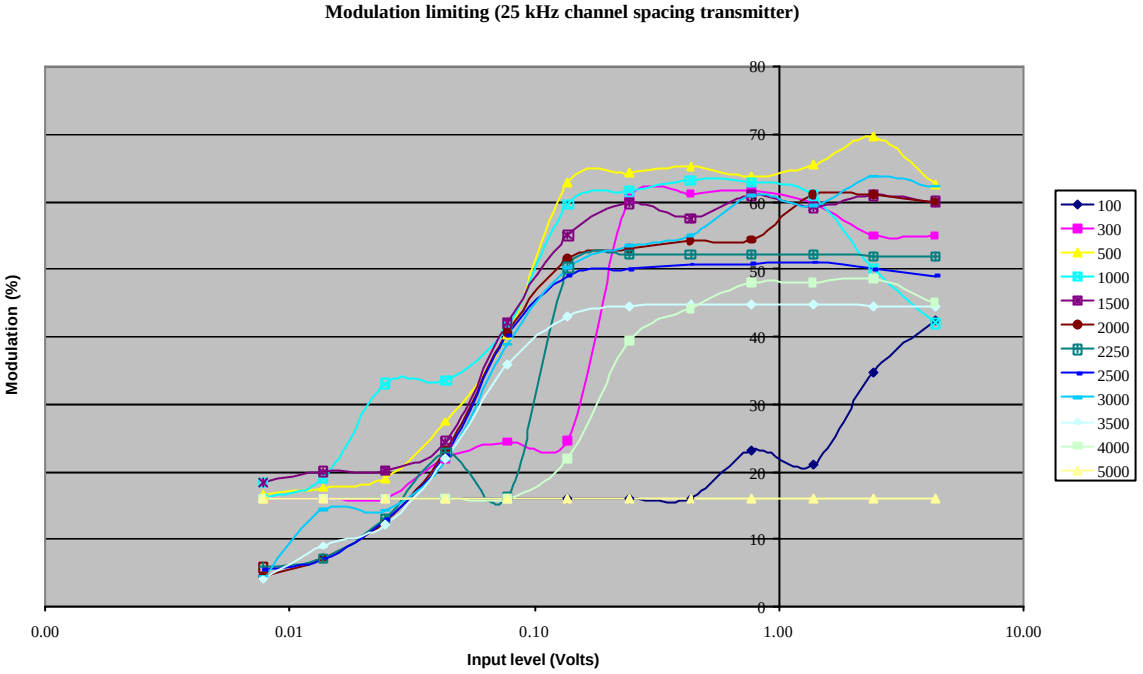
(b) A family of curves showing the percentage of modulation versus the modulation input voltage.

Measurements were made between 100 Hz to 4 kHz.

At each frequency the input voltage was slowly increased with the resulting frequency deviation of the transmitter being recorded.

This deviation was then converted to a modulation percentage where 5 kHz deviation is 100% for 25 kHz channels and 2.5 kHz deviation is 100% for 12.5 kHz channels.





Details of the FFSK emissions are detailed in the bandwidth and emission mask sections of this report.

Limit:
Modulation requirements states the transmitter must meet the emission requirements of 90.210. Refer to the Occupied Bandwidth measurements in this report.

Result: Complies

Measurement Uncertainty: ±1%.

Part 90.207 – Emission types:

The following emission types are used:

- F3E: Frequency modulation with analogue speech.
- F3D: Frequency modulation with Fast Frequency Shift Keying (FFSK).

Part 90.209 – Bandwidth limitations:

The authorised bandwidth is taken to be the necessary bandwidth.

Using the formulas contained in Part 2.202 the necessary bandwidth calculation for the 25 kHz channel step emission is:

$B_n = 2 \times D + 2 \times M$
Where D = maximum deviation: 5.0 kHz * 70% = 3.5 kHz
Where M = maximum modulation frequency: 3.5 kHz
$B_n = 14$ kHz

This approximates the emission designation, 16k0F3E, declared by the client.

Using the formulas contained in Part 2.202 the necessary bandwidth calculation for the 12.5 kHz channel step emission is:

$B_n = 2 \times D + 2 \times M$
Where D = maximum deviation: 2.5 kHz
Where M = maximum modulation frequency: 3.5 kHz
$B_n = 12$ kHz

This approximates the emission designation, 11k0F3E, declared by the client.

Using the formulas contained in Part 2.202 the necessary bandwidth cannot be easily calculated as the FFSK emissions.

Therefore the occupied bandwidth has been measured and compared against the occupied bandwidth declared by the client.

Measurements have been made using a spectrum analyser operating in peak hold mode and a 30 dB attenuator.

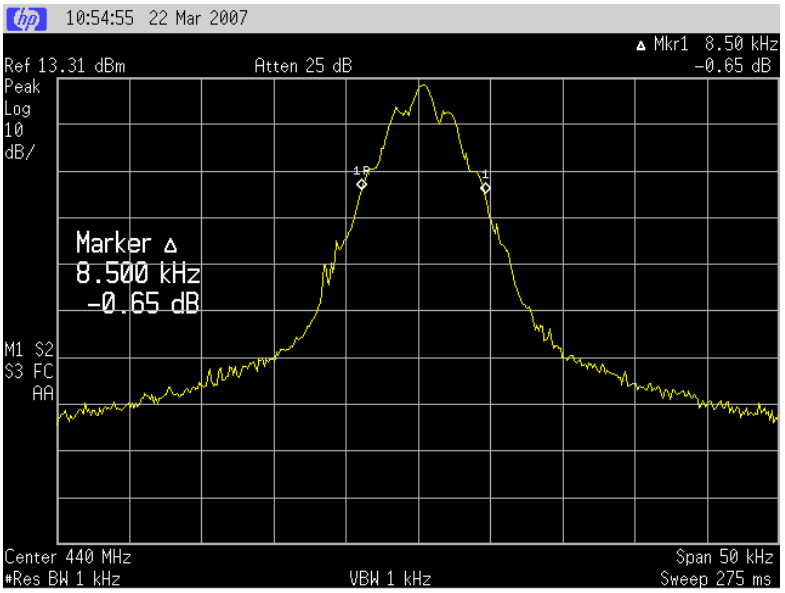
Initially power measurements are made using a resolution bandwidth of 1.0 MHz.

This level is used as a reference level on the spectrum analyser.

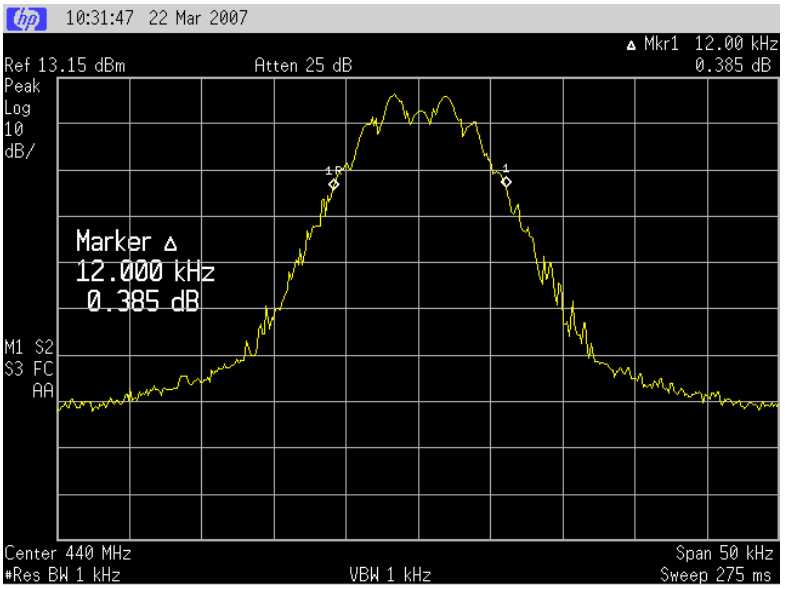
The resolution bandwidth is then changed to 1 kHz and the reference level minus 23 dB (99%) absolute bandwidth points determined.

Measurements were made using the internal FFSK test generator in the device which modulated the transmitter using a random selection of 0's, 1's and reversals.

12.5 kHz channel – bandwidth = 8.5 kHz



25 kHz channel – bandwidth = 12.0 kHz



Result: Complies

Occupied Bandwidth

The spectrum masks are defined in:

Section 90.210(d) – Masks B and D have been applied as the transmitter can operate in the band 421 – 512 MHz using an authorised bandwidth of 20.0 kHz and 11.25 kHz as per Section 90.209(b)(5).

The reference level for the following emission mask measurements has been determined using a resolution bandwidth of 30 kHz with the transmitter not being modulated.

All measurements have been made with a 30 dB attenuator being placed between the ` transmitter and the spectrum analyser.

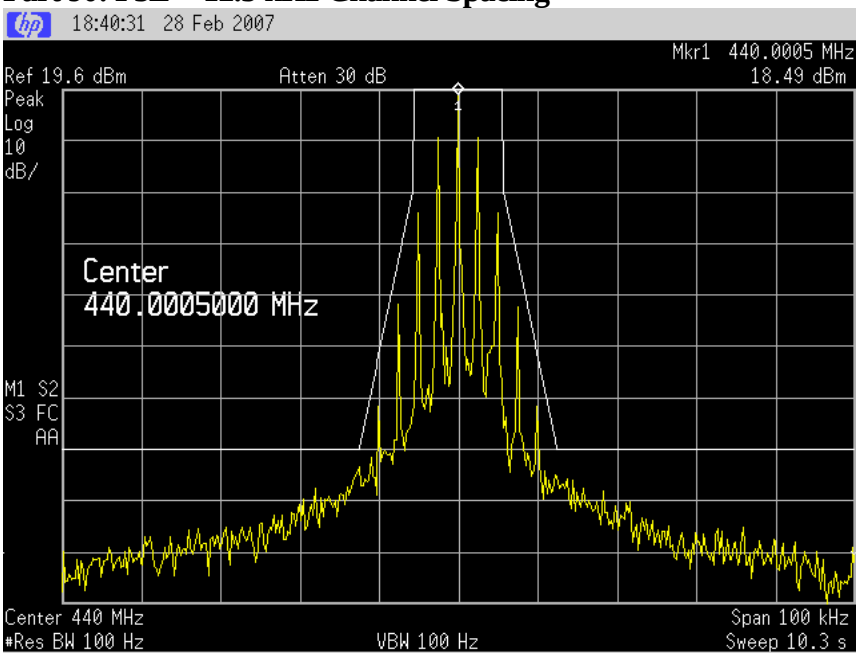
Measurements were made in peak hold with the transmitter operating on 440.000 MHz.

When operating in F3E mode a 2500 Hz tone, which was found to be the frequency of maximum response, that was applied at a level 16 dB higher than that required to achieve 50% modulation.

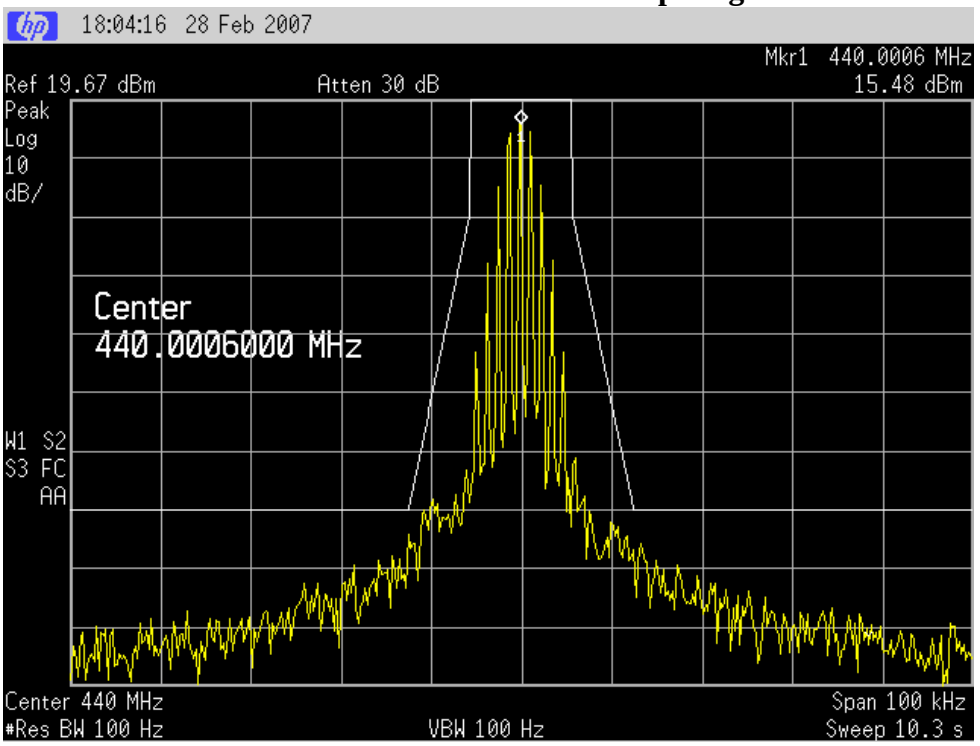
When operating in FSK mode an internally generated signal was applied was applied at a level 16 dB higher than that required to achieve 50% modulation.

Result: Complies

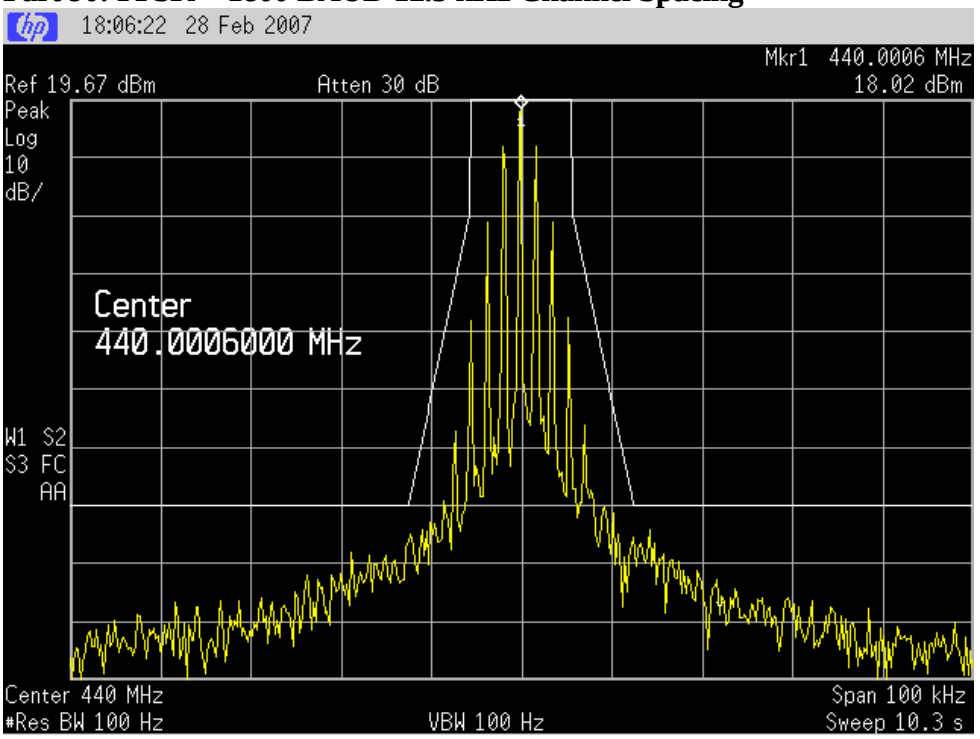
Part 90: F3E – 12.5 kHz Channel Spacing



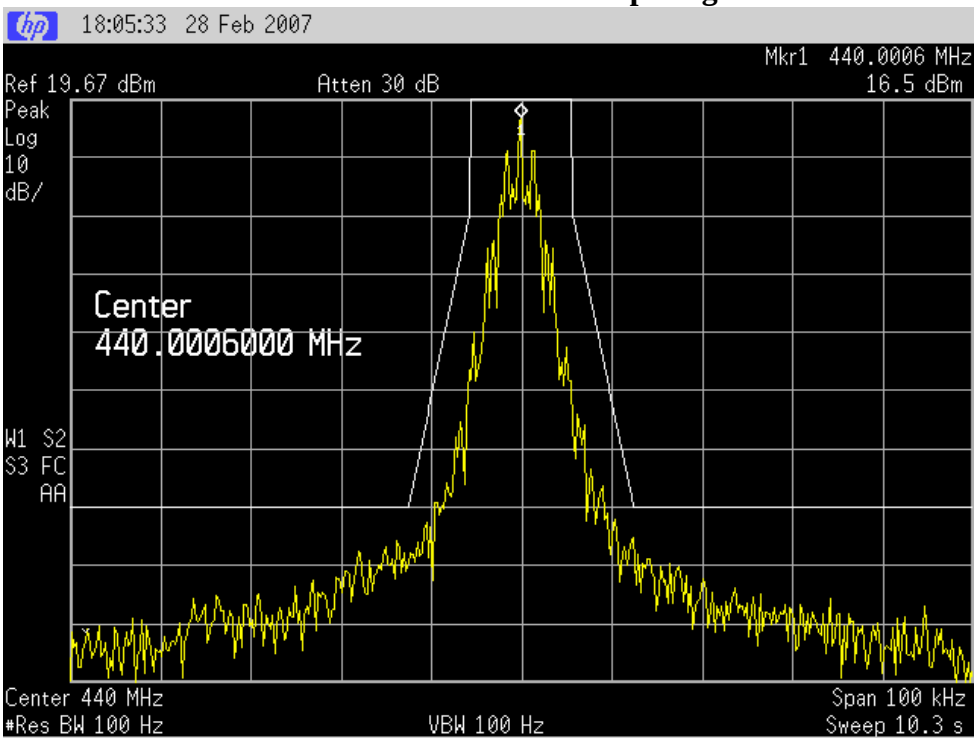
Part 90: FFSK – 1200 BAUD 12.5 kHz Channel Spacing



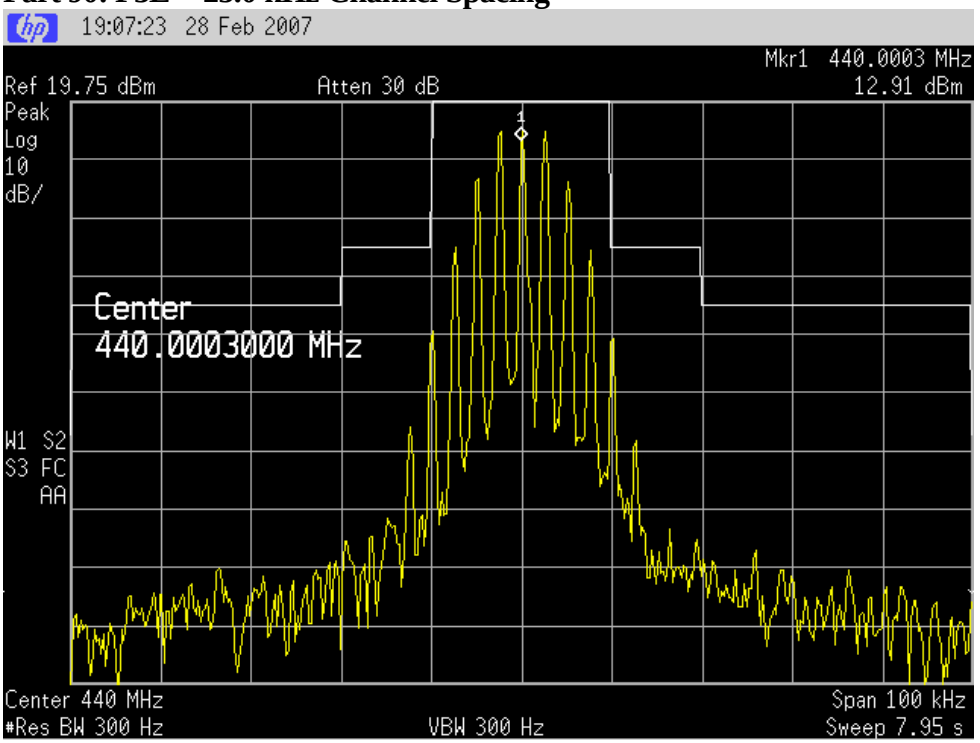
Part 90: FFSK – 1800 BAUD 12.5 kHz Channel Spacing



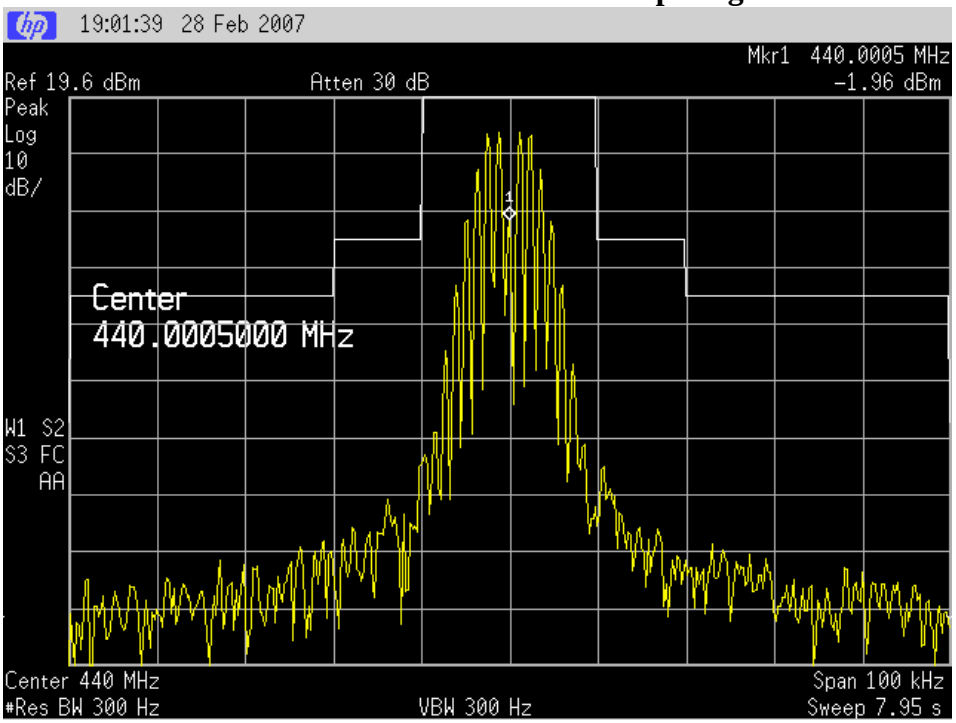
Part 90: FFSK – 1200/1800 12.5 kHz Channel Spacing



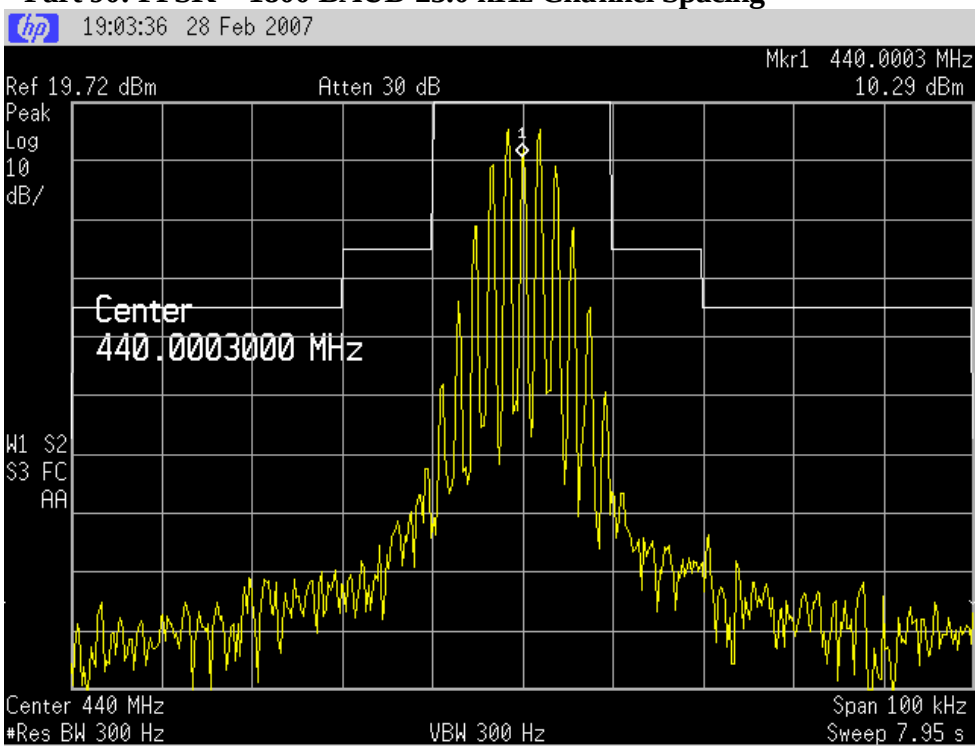
Part 90: F3E – 25.0 kHz Channel Spacing



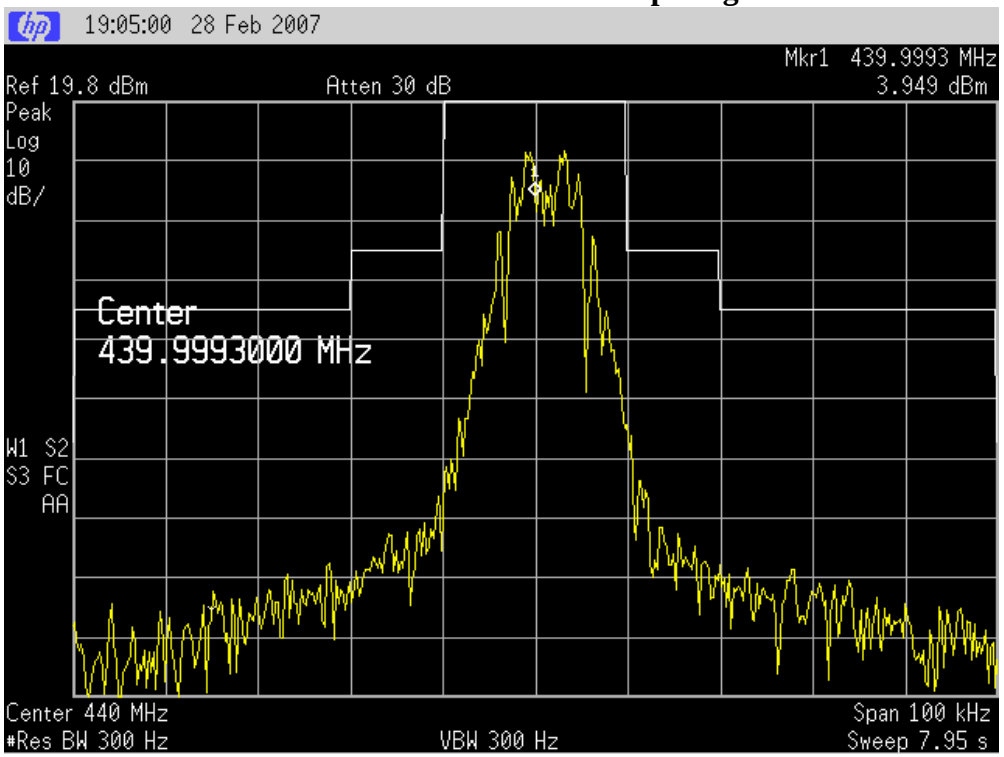
Part 90: FFSK – 1200 BAUD 25.0 kHz Channel Spacing



Part 90: FFSK – 1800 BAUD 25.0 kHz Channel Spacing



Part 90: FFSK – 1200/1800 25.0 kHz Channel Spacing



Transmitter spurious emissions at the antenna terminals

Frequency: 440.000 MHz

Spurious emission (MHz)	Emission level (dBm)	Limit (dBm)
880.000	-51.2	-20.0
1320.000	-51.0	-20.0
1760.000	Less than -70	-20.0
2200.000	-46.3	-20.0
2640.000	Less than -70	-20.0
3080.000	Less than -70	-20.0
3520.000	Less than -70	-20.0
3960.000	Less than -70	-20.0
4400.000	Less than -70	-20.0

Limit:

Part 90.210(d) Mask D, (3) on any frequency removed from the centre of the authorised bandwidth by a displacement frequency of more than 12.5 kHz shall be attenuated by at least 50 + 10 log (P) or 70 dB whichever is the lesser attenuation.

The spurious emission limit defined by Mask D has been applied as this transmitter can operate using channel spacings of 12.5 kHz.

Part 2.1051 states that emissions greater than 20 dB below the limit need not be specified.

Part 2.1057 states that the spectrum should be investigated up to the 10^{th} harmonic if the transmitter operates below 10 GHz.

A rated power of 100 watts gives a limit of –20 dBm.

Some emissions less that –40 dBm have been reported for completeness.

No measurements were made above the 10^{th} harmonic.

Result: Complies

Measurement Uncertainty: ±3.3 dB

Receiver spurious emissions at antenna terminals

Receive frequencies: 440.000 MHz

Intermediate frequency: 45.0 MHz

Measured Spurious Emission		
Spurious emission (MHz)	**Emission level (dBm)**	**Limit (dBm)**
395.000	-101.0	-57.0

All other emissions observed less than –100.0 dBm.

Limit:
In accordance with CFR 47 Part 15, section 15.111 the power of any emission at the antenna terminal should not exceed 2 nW (–57.0 dBm).

Result: Complies
Measurement Uncertainty: ±3.3 dB

Field strength of the transmitter spurious emissions

Frequency: 440.000 MHz

Device was tested at a distance of 3 metres when placed in the centre of the test table facing the test antenna.

The device powered by 2 x 12 Vdc lead acid batteries, whilst transmitting on 440.000 MHz at 100 watts into a dummy load.

The device was also tested in standby / receive mode.

Transmit Frequency 440.000MHz

Frequency (MHz)	Level (dBuV/m)	Power (dBm)	Limit (dBm)	Polarity	Margin (dB)
880.000	43.0	-54.4	-20.0	Vertical	34.4
	45.1	-52.3	-20.0	Horizontal	32.3
1320.000	50.1	-47.3	-20.0	Vertical	27.3
	49.3	-48.1	-20.0	Horizontal	28.1
1760.000	56.1	-41.3	-20.0	Vertical	21.3
	50.3	-47.1	-20.0	Horizontal	27.1
2200.000	56.9	-40.5	-20.0	Vertical	20.5
	53.5	-43.9	-20.0	Horizontal	23.9
2640.000	55.6	-41.8	-20.0	Vertical	21.8
	53.6	-43.8	-20.0	Horizontal	23.8
3080.000	48.8	-48.5	-20.0	Vertical	28.5
	49.5	-47.9	-20.0	Horizontal	27.9
3520.000	50.7	-46.7	-20.0	Vertical	26.7
	51.2	-46.2	-20.0	Horizontal	26.2
3960.000	48.6	-48.8	-20.0	Vertical	28.8
	46.8	-50.6	-20.0	Horizontal	30.6
4400.000	43.1	-54.3	-20.0	Vertical	34.3
	42.5	-54.9	-20.0	Horizontal	34.9

No significant emissions were detected between the harmonic emissions.

Standby emissions

Frequency (MHz)	Level (dBuV/m)	Power (dBm)	Limit (dBm)	Polarity	Margin (dB)
33.0000	25.0	-72.4	-20.0	Vertical	52.4
133.3300	37.5	-59.9	-20.0	Horizontal	39.9
133.3325	42.3	-55.1	-20.0	Vertical	35.1
249.9975	33.0	-64.4	-20.0	Horizontal	44.4
249.9975	42.2	-55.2	-20.0	Vertical	35.2
266.6500	44.9	-52.5	-20.0	Horizontal	32.5
299.9950	34.0	-63.4	-20.0	Horizontal	43.4
366.6500	37.2	-60.2	-20.0	Vertical	40.2
399.9925	44.4	-53.0	-20.0	Horizontal	33.0
399.9925	42.4	-55.0	-20.0	Vertical	35.0
433.3250	34.9	-62.5	-20.0	Vertical	42.5
437.4900	28.0	-69.4	-20.0	Vertical	49.4
442.3625	30.2	-67.2	-20.0	Vertical	47.2
466.6575	44.5	-52.9	-20.0	Horizontal	32.9
466.6575	48.5	-48.9	-20.0	Vertical	28.9
499.9900	27.2	-70.2	-20.0	Horizontal	50.2
499.9900	31.0	-66.4	-20.0	Vertical	46.4
533.3200	32.3	-65.1	-20.0	Horizontal	45.1
533.3200	45.3	-52.1	-20.0	Vertical	32.1
666.6500	45.6	-51.8	-20.0	Horizontal	31.8
666.6550	45.2	-52.2	-20.0	Vertical	32.2
799.9675	45.6	-51.8	-20.0	Horizontal	31.8
799.9675	39.5	-57.9	-20.0	Vertical	37.9
933.5000	47.6	-49.8	-20.0	Vertical	29.8
933.5000	46.9	-50.5	-20.0	Horizontal	30.5

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

No measurements were made above the 10th harmonic.

Result: Complies
Measurement Uncertainty: ±4.1 dB

Field strength of the receiver spurious emissions

Frequency: 440.000 MHz

Intermediate frequency: 45.0 MHz

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Polarity	Margin (dB)
395.000	38.4	46.0	Horizontal	7.6
395.000	36.8	46.0	Vertical	9.2
790.000	33.5	46.0	Vertical	12.5
790.000	34.2	46.0	Horizontal	11.8

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 January 18th, 2007.

Below 1000 MHz a quasi peak detector was used with a bandwidth of 120 kHz.

Above 1000 MHz an average detector was used with a bandwidth of 1 MHz.

The receiver was tested while receiving continuously while attached to a dummy load.

Limit:

The field strength limits as per CFR 47 Part 15, section 15.109 have been applied.

Result: Complies

Frequency Stability

Frequency stability measurements were between - 30 °C and + 50°C in 10°C increments.

At each temperature the transmitter was given a period of 30 minutes to stabilise. The transmitter was then turned on and the frequency error measured after a period of 1 minute.

Measurements were made with the supply varied between 115% and 85% of the nominal supply voltage (13.8 Vdc).

Nominal Frequency: 440.000 MHz

Frequency Error (Hz)

Temp.	11.7 Vdc	13.8 Vdc	15.9 Vdc
+50° C	-58.0	-45.0	-50.0
+40° C	-2.0	-1.0	-3.0
+30° C	-7.0	-11.0	-8.0
+20° C	-35.0	-35.0	-33.0
+10° C	-75.0	-84.0	-73.0
0° C	-98.0	-101.0	-105.0
-10° C	-270.0	-155.0	-200.0
-20° C	-229.0	-220.0	-227.0
-30° C	-222.0	-241.0	-248.0

Limit:
Part 22.355 and Part 90.213 state that base station transmitters operating between 421 – 512 MHz with 12.5 kHz channelling are required to have a frequency tolerance of 1.5 ppm.

This transmitter operates on 440.000 MHz. 1.5 ppm = 1.5 x 440 = 660 Hz.

Result: Complies
Measurement Uncertainty: ±30 Hz

Transient frequency behaviour

Transient frequency behaviour measurements are applicable to wide band and narrow band transmitters operating in the frequency band 421 – 512 MHz. Measurements were carried out at 440.000 MHz using the method described in TIA-603 and EN 300-086. In summary this method calls for the use of an external signal generator tuned to 440.000 MHz with a output level 0.1 % (-30 dB) of the level from the transmitter with a 1 kHz tone with a frequency deviation of 12.5 kHz being applied to the input of a modulation analyser along with the output from the transmitter.

The modulation analyser produces an amplitude difference signal and a frequency difference signal, which are applied to the input of a storage oscilloscope.

The unmodulated transmitter is then keyed which produces a trigger pulse that is AC coupled to the oscilloscope that produces a display on the screen.

The result of the change in the ratio of power between the test signal from the signal generator and the transmitter output will produce 2 separate sides on the oscilloscope picture. One will show the 1000 Hz test modulation and the other will be the frequency difference of the transmitter versus time.

Measured Transient Deviation		
Period t_1 (ms)	period t_2 (ms)	period t_3 (ms)
10.0	25.0	10.0
Frequency Difference from the Nominal Frequency (kHz)		
12.5 kHz: Less than 3.0 25.0 kHz: Less than 6.0	Nil Nil	Less than 3.0 Less than 6.0

Limits:

Channel Spacing (kHz)	Transmitter Period t_1 (kHz)	Transmitter Period t_2 (kHz)	Transmitter Period t_3 (kHz)
12.5 25.0	± 12.5 ± 25.0	± 6.25 ± 12.5	± 12.5 ± 25.0

Result: Complies

Measurement Uncertainty: Frequency ±1.6 kHz, Time period ±1 ms

12.5 kHz transmitter turn on

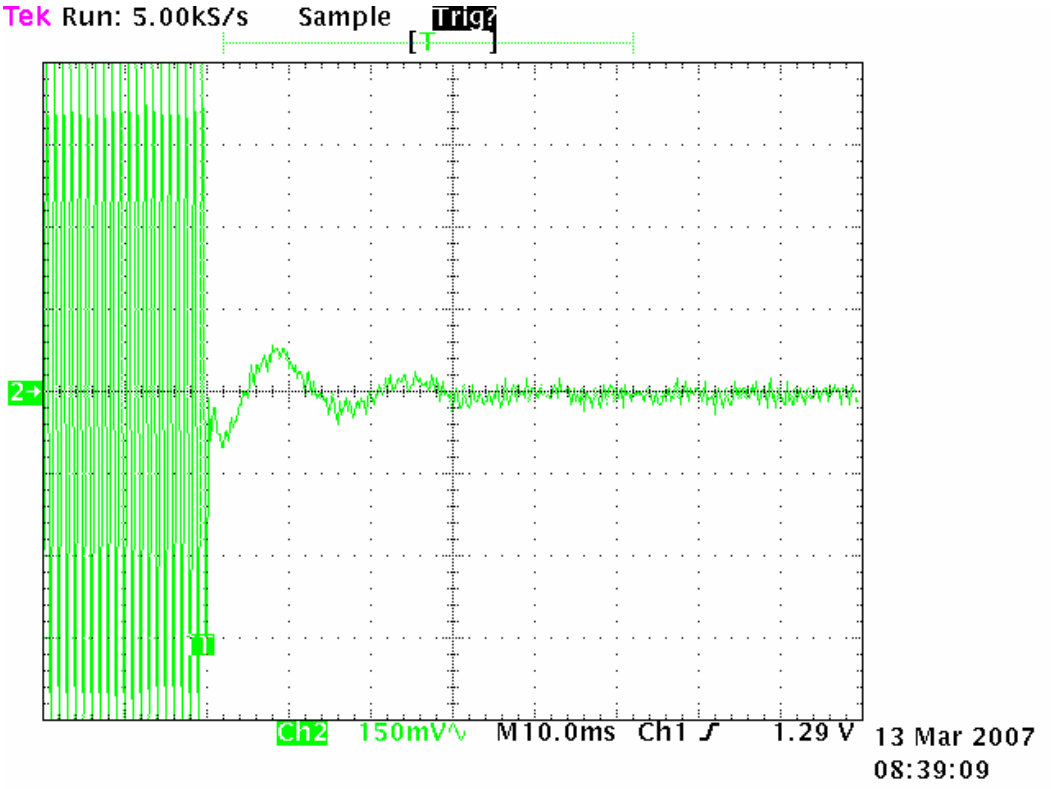
Green Trace = 1 kHz tone with FM deviation of 12.5 kHz and any transient.

Green trace has been maximised to give full screen indication of ±12.5 kHz.
Therefore each Y axis division = 3.125 kHz per division.
The X axis has been set to a sweep rate of 10 mS/division.

Triggering has been set to occur 2 divisions from the left hand edge (20 mS).
This is position *t*on.

*t*1 occurs between 2.0 and 2.5 divisions from the left-hand edge.
t2 occurs between 2.5 and 4.5 divisions from the left-hand edge.

A transient response can be observed just after *t*on.



12.5 kHz transmitter turn off

Green Trace = 1 kHz tone with FM deviation of 12.5 kHz and any transient.

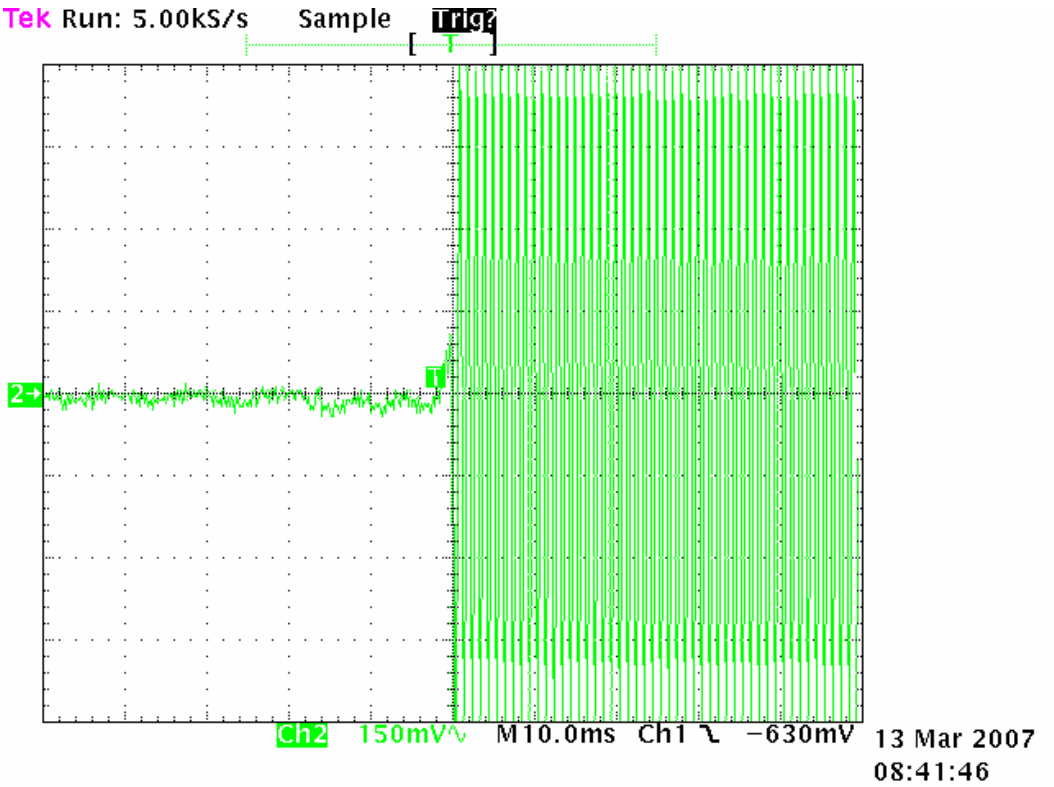
Green trace has been maximised to give full screen indication of ± 12.5 kHz.
Therefore each Y axis division = 3.125 kHz per division.
The X axis has been set to a sweep rate of 10 mS/division.

The display of the 1 kHz signal rising has been positioned 5 divisions from the left hand edge (50 mS).

This is position *t*off.

*t*3 occurs between 4.5 and 5.0 divisions from the left hand edge.

A transient response can be observed just before toff.



25 kHz transmitter turn on

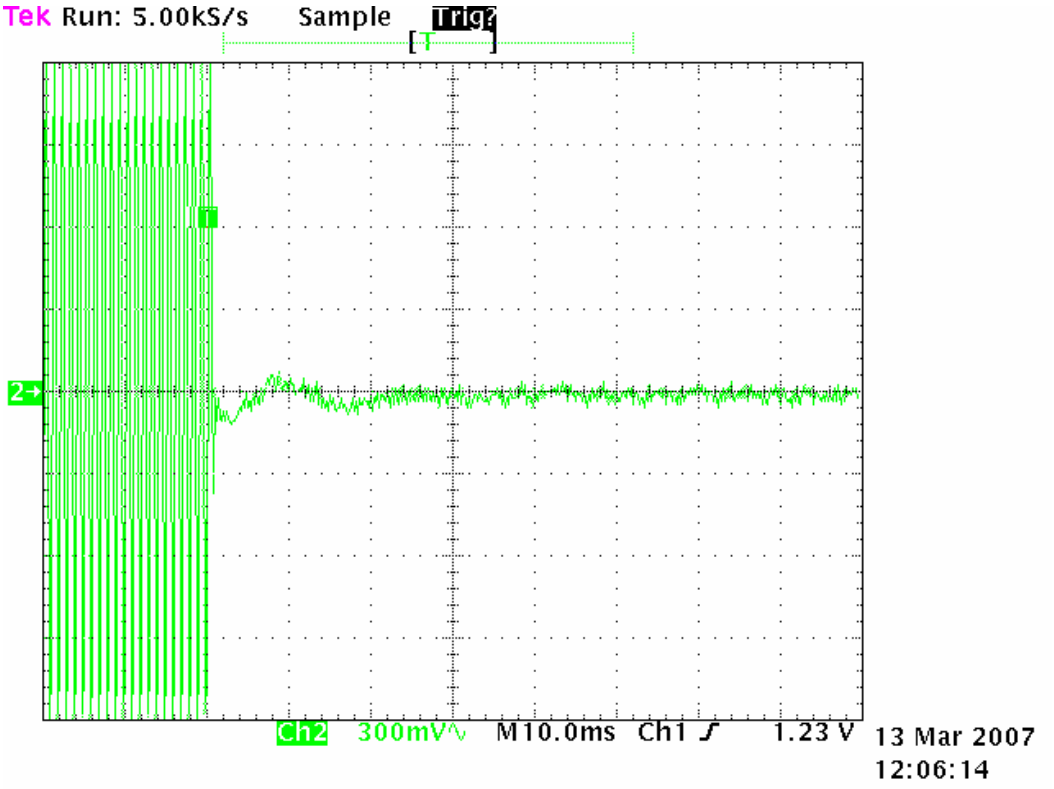
Green Trace = 1 kHz tone with FM deviation of 25 kHz and any transient.

Green trace has been maximised to give full screen indication of ±25 kHz.
Therefore each Y axis division = 6.25 kHz per division.
The X axis has been set to a sweep rate of 10 mS/division.

Triggering has been set to occur 2 divisions from the left hand edge (20 mS).
This is position *t*on.

*t*1 occurs between 2.0 and 2.5 divisions from the left-hand edge.
t2 occurs between 2.5 and 4.5 divisions from the left-hand edge.

A transient response can be observed just after *t*on.



25 kHz transmitter turn off

Green Trace = 1 kHz tone with FM deviation of 25 kHz and any transient.

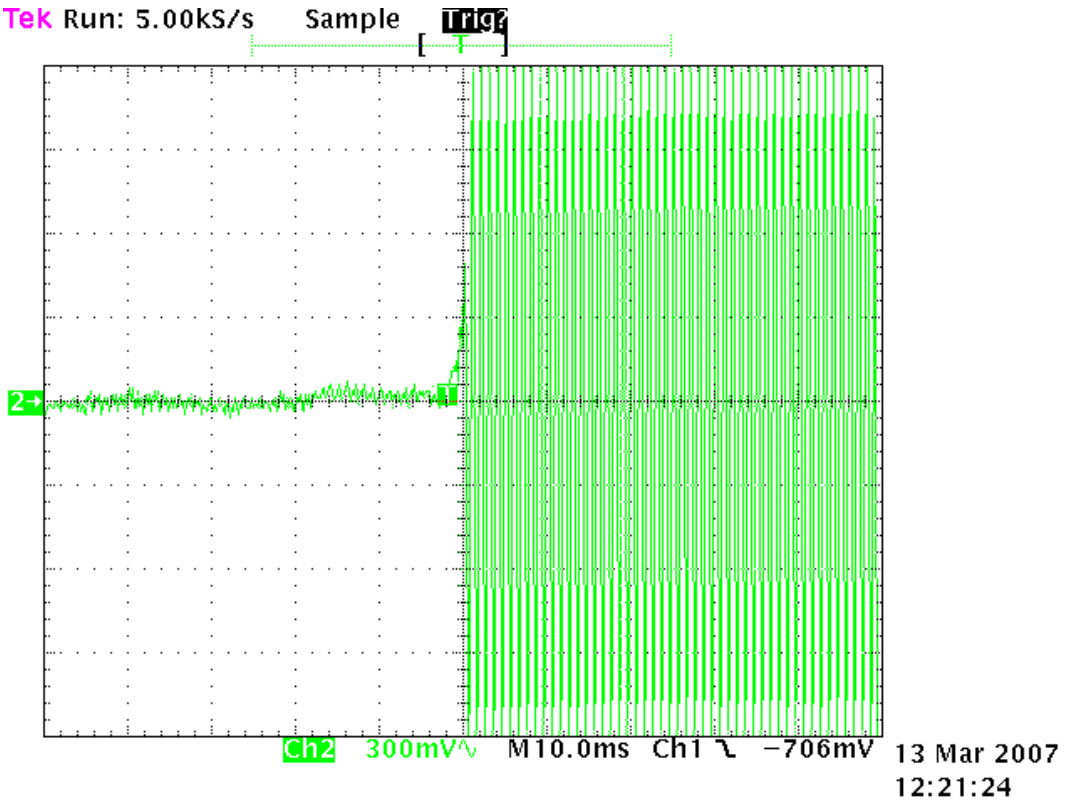
Green trace has been maximised to give full screen indication of ± 25 kHz.
Therefore each Y axis division = 6.25 kHz per division.
The X axis has been set to a sweep rate of 10 mS/division.

The display of the 1 kHz signal rising has been positioned 5 divisions from the left hand edge (50 mS).

This is position *t*off.

*t*3 occurs between 4.5 and 5.0 divisions from the left hand edge.

A transient response can be observed just before toff.



Radio Frequency Hazard Information

As per Section 1.1310 and Section 2.1091 certification of this transmitter is sought using the Controlled / Occupational exposure limits as detailed in OST/OET Bulletin Number 65 as a power of 100 watts is to be used in a fixed environment.

Calculations have been made using the General Public/Uncontrolled Exposure limits.

Minimum safe distances have been calculated below.

Power density, $W/m^2 = E^2/3770$

- Occupational / Controlled Exposure limit will be 1.46 mW/cm^2
  (f/300 = 440 MHz/300)
- General Population / Uncontrolled exposure limit will be 0.29 mW/cm^2
  (f/1500 = 440 MHz/1500)

The minimum distance from the antenna at which the MPE is met is calculated from the equation relating field strength in V/m, transmit power in watts, transmit antenna gain, transmitter duty cycle and separation distance in metres:

$E, V/m = (\sqrt{} (30 * P * G)) / d$

Controlled

$E = 1.46\ mW/cm^2 = E^2/3770$

$E = \sqrt{}1.46*3770$

$E = 74.2\ V/m$

Uncontrolled

$E = 0.29\ mW/cm^2 = E^2/3770$

$E = \sqrt{}0.29*3770$

$E = 33.1\ V/m$

The rated maximum transmitter power = 100.0 watts.

Transmitter operated using a quarter wave whip antenna with a gain of 2.15 dBi (1.64).

Controlled

$d = \sqrt{} (30 * P * G*DC) / E$

$d = \sqrt{} (30 * 100.0 * 1.64) / 74.2$

d = 0.94 metres or 94 cm

Uncontrolled

$d = \sqrt{} (30 * 25.0 * 1.64) / 33.1$

d = 2.11 metres or 211 cm

Result: Complies

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
Attenuator 10 dB	Hewlett Packard	HP8491A	24838	E1329
Attenuator 20 dB	Weinschel	49-20-43	GC-104	E1308
Audio Analyzer	Hewlett Packard	8903A	2216A01713	E1146
Biconical Antenna	Schwarzbeck	BBA 9106		RFS 3612
Frequency Counter	Hewlett Packard	HP 5342A	1916A01713	E1224
Level generator	Anritsu	MG443B	M61689	E1143
Log Periodic Antenna	Schwarzbeck	VUSLP9111	9111-228	3785
Measurement Receiver	Rohde & Schwarz	ESCS 30	847124/020	E1595
Modulation Analyzer	Rohde & Schwarz	FMA	837807/020	E1552
Modulation Analyzer	Hewlett Packard	8901B	2608A00782	E1090
Oscilloscope	Tektronics	745A	B010643	1569
Power Attenuator	Weinschel	49-20-43	GC104	E1308
Power Supply	Hewlett Packard	6032A	2743A-02859	E1069
RF Power Meter	Hewlett Packard	HP 436A	2512A22439	E1198
Rubidium Oscillator	Ball Efratom	FRS – C	4287	E1053
Selective Level Meter	Anritsu	ML422C	M35386	E1140
Signal Generator	Rohde & Schwarz	SMHU.58	838923/028	E1493
Spectrum Analyzer	Hewlett Packard	E7405A	US39150142	3776
Thermal chamber	Contherm	M180F	86025	E1129
Thermometer	DSIR	RT200	035	E1049
Turntable	EMCO	1080-1-2.1	9109-1578	RFS 3709
Horn antenna	Electrometrics	RGA-60	6234	E1494
Microwave Pre Amplifier	Hewlett Packard	8349B	2644A01659	-

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 last updated on January 18th, 2007.

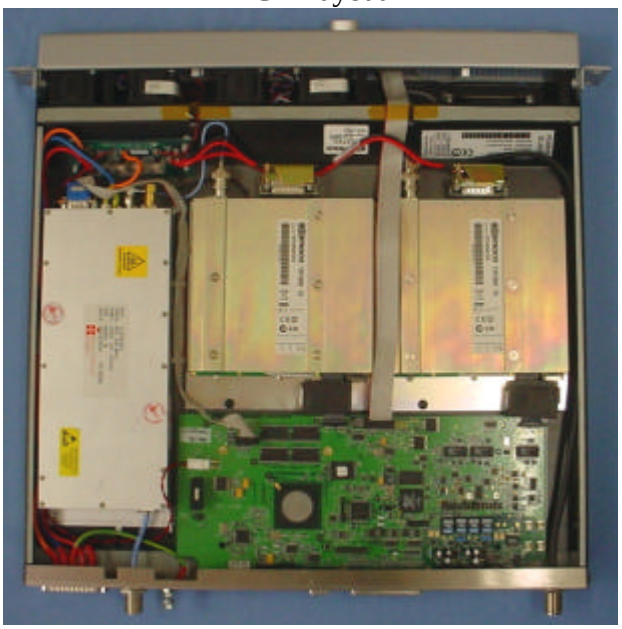
All testing has been carried out in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to ISO/IEC 17025.

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

10. PHOTOGRAPH (S)

Radiated emissions test set up

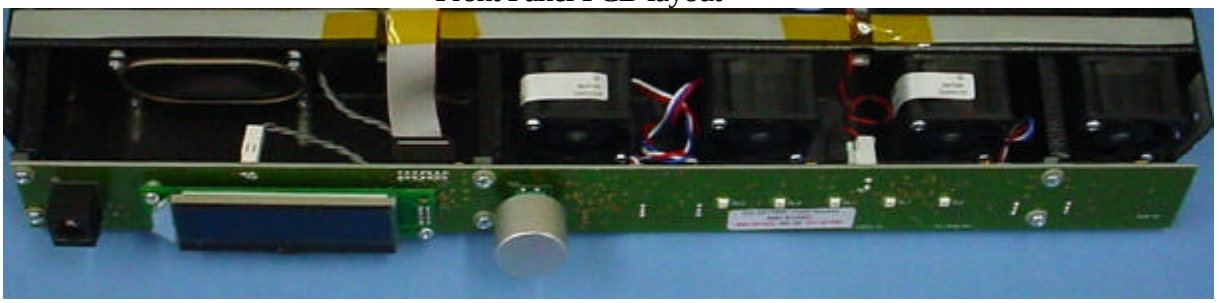
PCB Layout



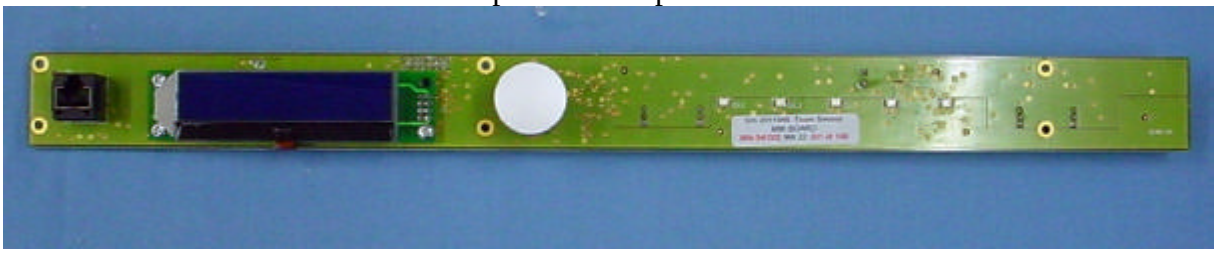
Front View

Rear View

Front Panel PCB layout



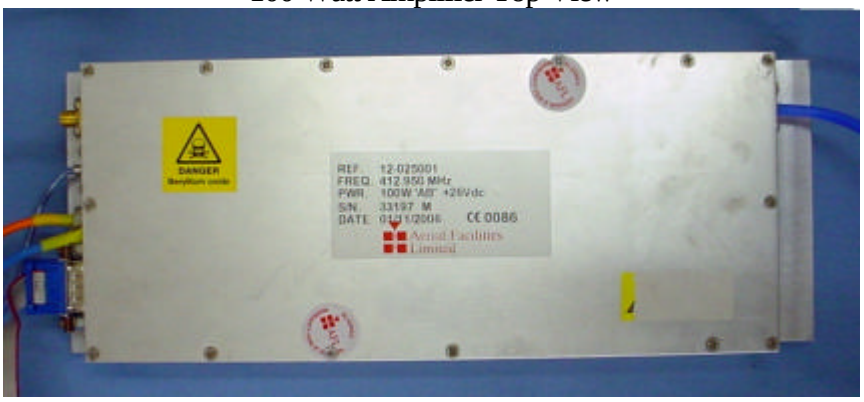
Front panel PCB top view



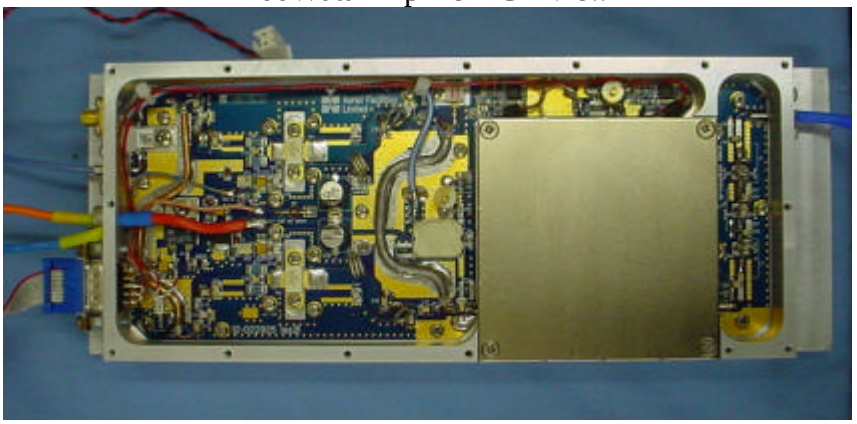
Front panel PCB bottom view

Label

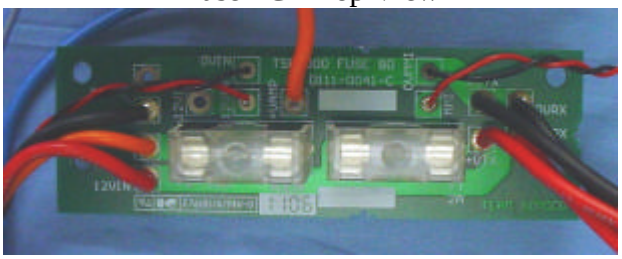
100 Watt Amplifier Top View



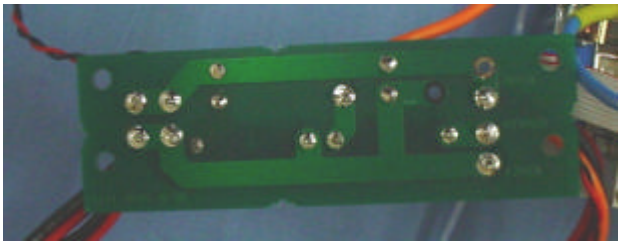
100Watt Amplifier PCB View



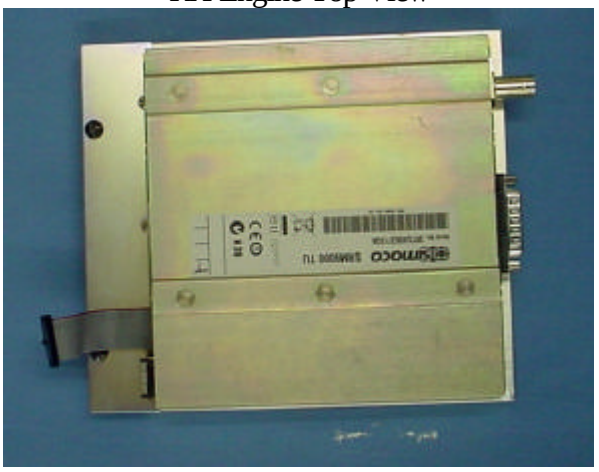
Fuse PCB Top View



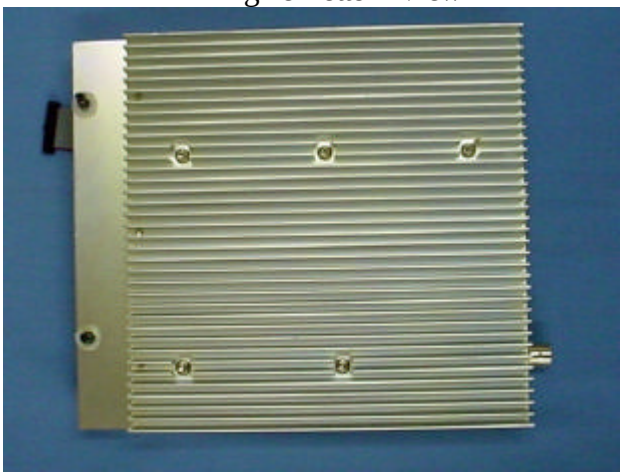
Fuse PCB Bottom View



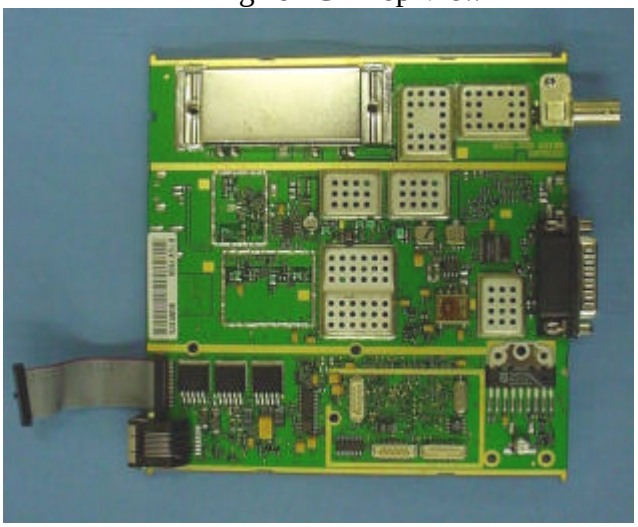
RX Engine Top View



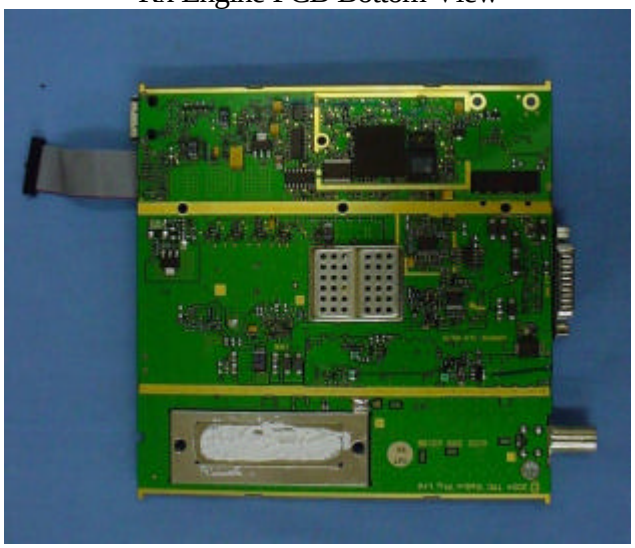
RX Engine Bottom View



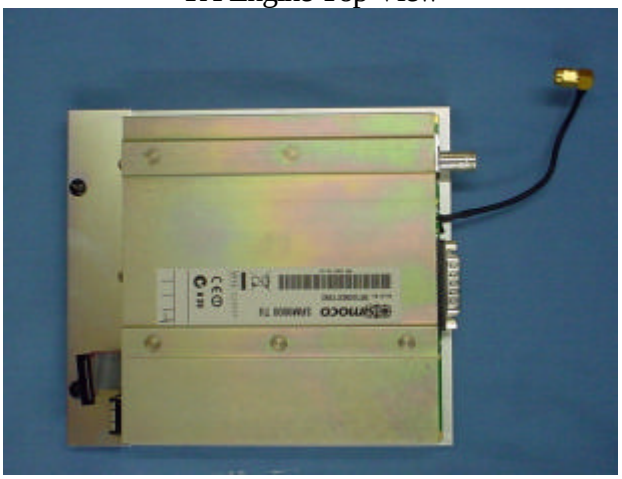
RX Engine PCB Top View



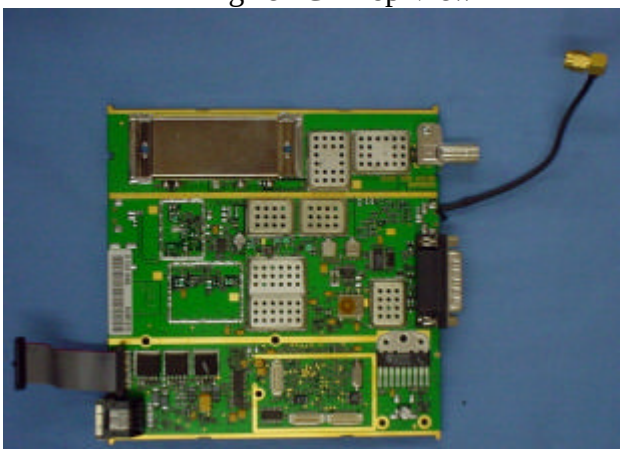
Rx Engine PCB Bottom View



TX Engine Top View



TX Engine PCB Top View



TX Engine PCB Bottom View

Control Board Top View

Control Board Bottom View