EMC Technologies (NZ) Ltd

Test Report No **61121.1**
Report date: 25 November 2006

TEST REPORT

4RF Aprisa XE 400-025-vv
QJET Point-to-Point Digital Radio

tested to the

Code of Federal Regulations (CFR) 47

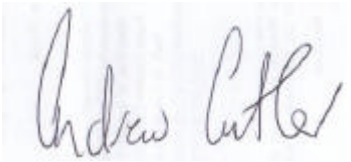
Part 90 –Private Land Mobile Services

Part 15 – Radio Frequency Device

for

4RF Communications Ltd

This Test Report is issued with the authority of:



Andrew Cutler - General Manager

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

EMC Technologies (NZ) Ltd

47 MacKelvie Street, Grey Lynn, Auckland, New Zealand Telephone: +64 9 360 0862 Fax: +64 9 360 0861
PO Box 68 307, Newton, Auckland, New Zealand E-mail: aucklab@ihug.co.nz www.emctech.com.au

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1. CLIENT INFORMATION

Company Name	4RF Communications Ltd
Address	PO Box 13-506
City	Wellington
Country	New Zealand
Contact	Mr Alan Turner

2. DESCRIPTION OF TEST SAMPLE

Brand Name	4RF
Model Number	Aprisa XE 400-025-vv QJET
Product	Point-to-Point Digital Radio
Manufacturer	4RF Communications Ltd
Manufactured in	New Zealand
Serial Number	21804360
FCC ID	UIPN0400025A0200A

3. COMPLIANCE STATEMENT AND RESULT SUMMARY

The **4RF Aprisa XE 400-025-vv QJET Point-to-Point Digital Radio** complies with the limits defined in 47CFR 15, 47 CFR Part 90 and 47 CFR Part 2 when tested in-accordance with the test methods described in 47 CFR Part 2 and ANSI C63.4 – 2003 where appropriate.

CLAUSE	TEST PERFORMED	RESULT
2.1041	Measurement procedures	Noted
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
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
90.213	Frequency stability	Complies
2.1057	Frequency spectrum to be investigated	Noted
90.214	Transient frequency behaviour	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:

Transmitter Output Powers and Modulation Types

16QAM	+17 dBm to +31 dBm in 1 dB steps
32QAM	+16 dBm to +30 dBm in 1 dB steps
64QAM	+15 dBm to +29 dBm in 1 dB steps

Transmitter frequency range

421 – 512 MHz

Test frequencies

Transmit:	481.5000 MHz
Receive:	478.5000 MHz

FCC Bands

Part 90:	421 – 512 MHz

Channel Spacing

6.25 kHz

Occupied Bandwidth

20 kHz

Power Supply

External 48 Vdc supply.

5. TEST CONDITIONS

Standard Temperature and Humidity

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

Standard Test Power Source

Standard Test Voltage: 48 Vdc.

Extreme Temperature

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

Extreme Test Voltages

High Voltage: 55.2 Vdc
Low Voltage: 40.8 Vdc

6. ATTESTATION

The **4RF Aprisa XE 400-025-vv QJET Point to Point Digital Radio** complies with the Code of Federal Regulations (CFR) 47 Part 90 –Private 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.

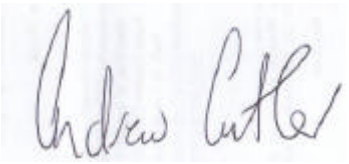
This report does not contain corrections or erasures.

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.



Andrew Cutler
General Manager
EMC Technologies NZ Ltd

7. TEST RESULTS

Certification required

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

- certification has been sought after Feb 14th, 1997
- the equipment can operate with a data rate greater than 4.8 kbps per 6.25 kHz

The client states that the following bit rates are available:

Modulation	Available	Per 6.25 kHz
16QAM	56 kbps	14 kbps
32QAM	72 kbps	18 kbps
64QAM	88 kbps	22 kbps

Result: Complies.

RF power output

Measurements were carried out at the RF output terminals of the transmitter using a 30 dB power attenuator and a 50 ohm dummy load when the transmitter was being modulated by the various modulation types at maximum power output.

Rated maximum powers:	16QAM:	+31 dBm,
	32QAM:	+30 dBm,
	64QAM:	+29 dBm

The client has rated the output powers based upon testing with a true RMS power meter.

A true r.m.s power meter should be used due to the high alpha that is used by the equipment to achieve a rectangular spectrum output which results in a high peak to average ratio.

Part 2 and Part 90 of the FCC rules do not define the type of detector that should be used to make these measurements and this laboratory presently does not have a true RMS power meter

Power measurements have therefore been made using a spectrum analyser operating in peak hold mode and average mode with both levels recorded in order to confirm the clients rated power outputs.

Measurements were made with modulation applied as it was not possible to operate that transmitter without modulation in order to give a correct indication of the output power.

All measurements were carried out on 481.5000 MHz at the highest rated power using a resolution bandwidth of 5 MHz with the input voltage set to 48 Vdc that was then varied by +/- 15%.

Power (dBm) – Peak			
Modulation	**Low**	**Nominal**	**High**
16QAM	36.8	36.7	36.5
32QAM	35.7	36.3	35.9
64QAM	35.6	35.6	35.7

Power (dBm) – Average			
Modulation	**Low**	**Nominal**	**High**
16QAM	30.8	30.8	30.8
32QAM	29.1	29.1	29.1
64QAM	28.1	28.1	28.3

Limits:
Clause 90.205(d) of Part 90 specifies that in the bands 421 – 430 MHz and 450 – 470 MHz the maximum allowable station effective radiated power (ERP) is dependent upon the station's antenna HAAT and the required service area.

Result: Complies
Measurement Uncertainty: ±0.5 dB

Modulation Characteristics

This transmitter is not capable of producing analogue speech and therefore the following tests are not applicable.

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

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

As this transmitter is a digital transmitter Occupied Bandwidth measurements have been made that are listed further in this report.

Limit: Part 90.211 – Modulation requirements states the transmitter must meet 90.210.

Result: Complies
Measurement Uncertainty: ±1%.

Emission designator

The client has declared that the emission designator will be

- 20K0D7W

Emission types:

The following emission type is used:

- D7W

QAM modulation is used which comprises 2 channels (I and Q) that are in quadrature to each other (90 degrees out of phase).

Each channel is independently amplitude modulated and passed through band limiting filters before being combined to produce the modulated signal.

The modulation can therefore be expressed as 2 channels (I and Q) that simultaneously phase and amplitude modulate the carrier.

The data that the end customer may send cannot be defined hence the use of the final character W.

Bandwidth limitations:

Using the formulas contained in Part 2.202 the necessary bandwidth cannot be easily calculated as the emission is a digital emission.

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

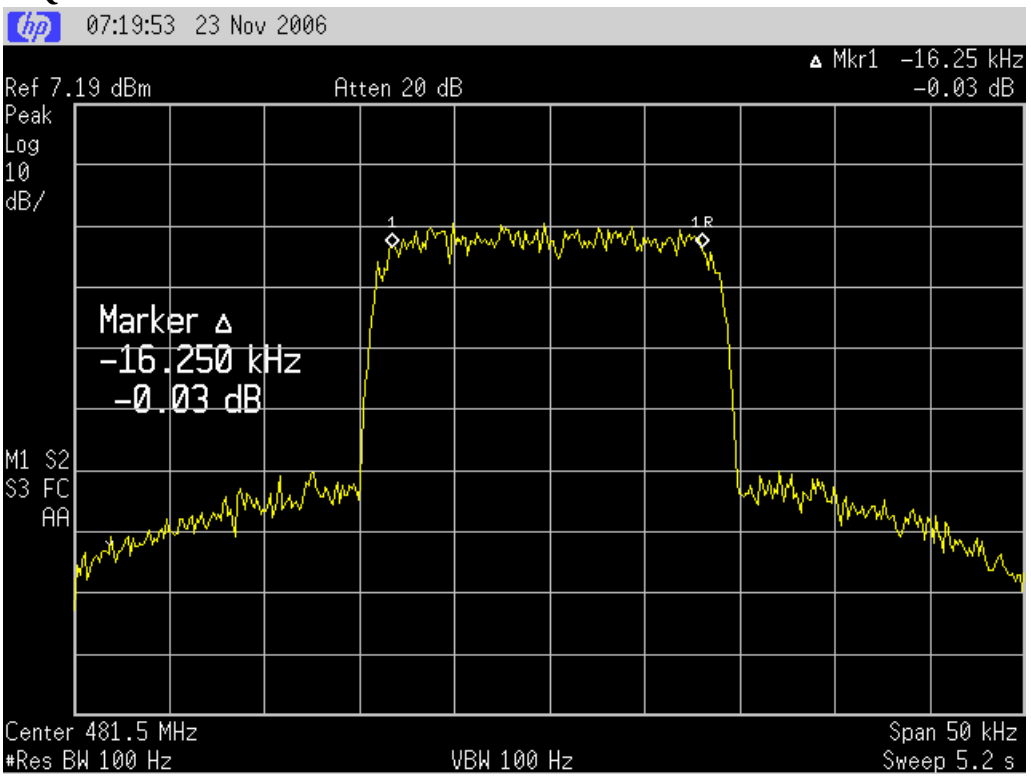
Measurements have been made of each modulation type using a spectrum analyser operating in peak hold mode and a 30 dB attenuator.

Initially power measurements are made using a resolution bandwidth of 120 kHz.

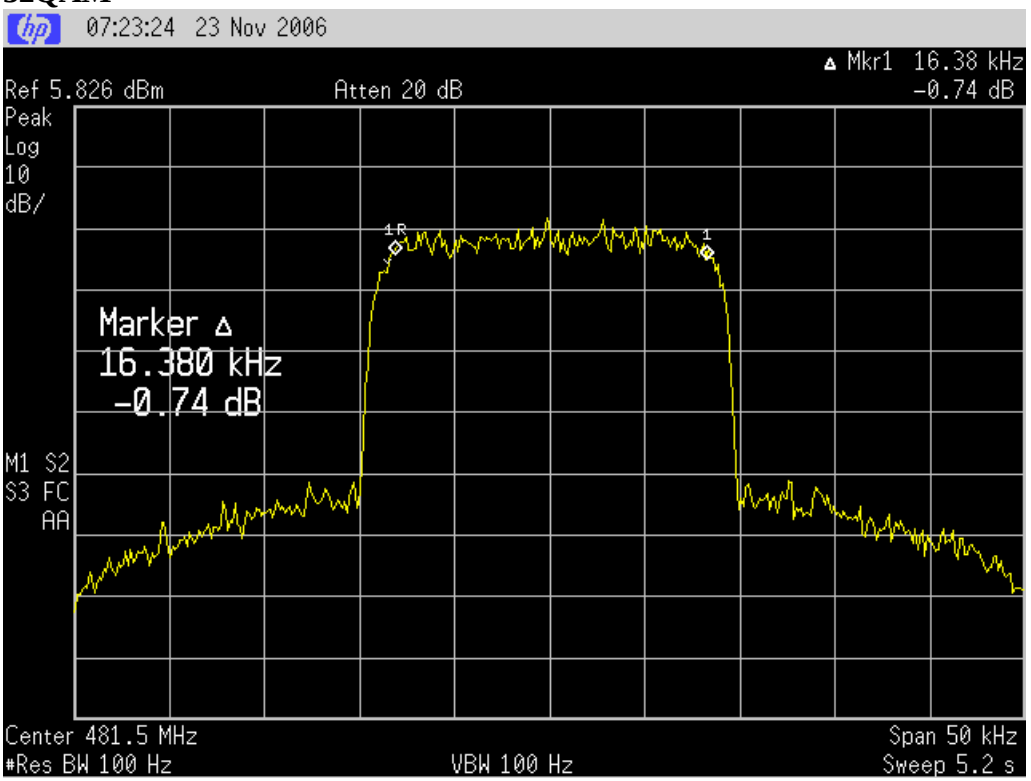
This level is used as a reference level on the spectrum analyser.

The resolution bandwidth is then changed to 100 Hz and the reference level minus 23 dB (99%) absolute bandwidth points determined.

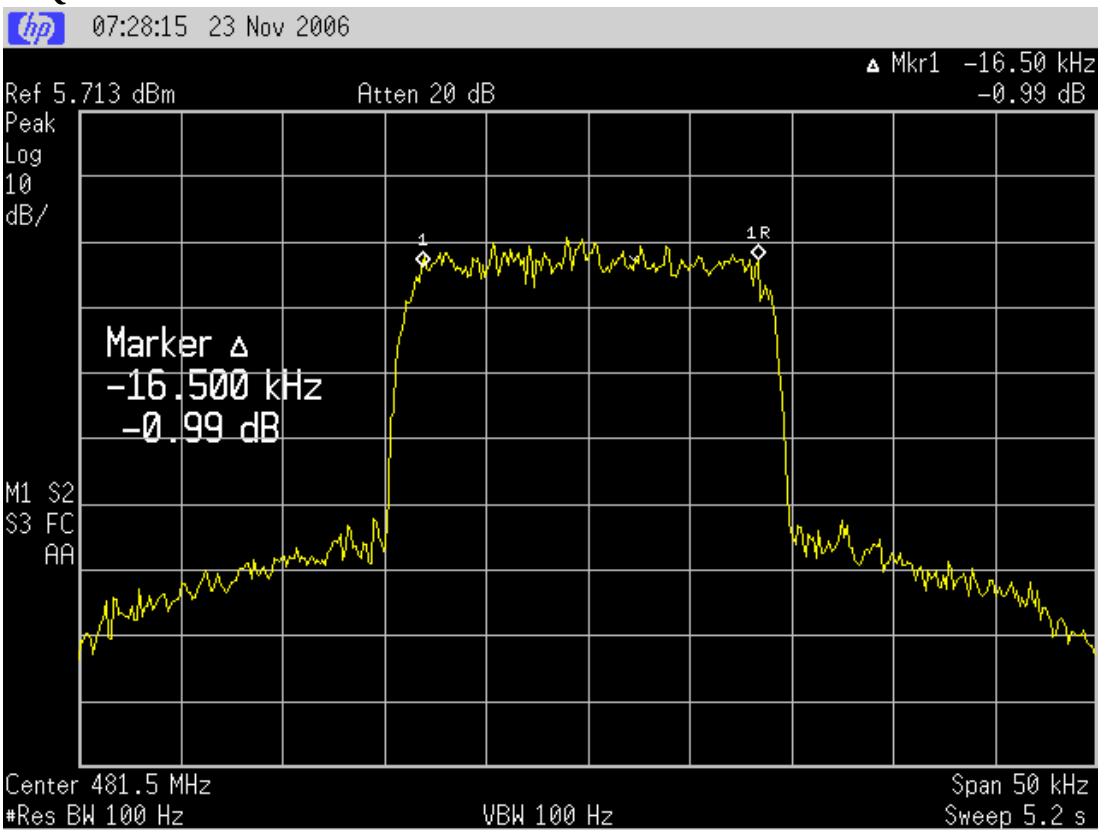
16QAM



32QAM



64 QAM



The client has declared an occupied bandwidth of 20 kHz which is confirmed by the attached measurements.

Result: Complies

Occupied Bandwidth

The spectrum mask is defined in:

Section 90.210 – Mask B has been applied as the transmitter can operate in the band 421 - 512 MHz using an authorised bandwidth of 20 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 1.0 MHz when the transmitter was being modulated.

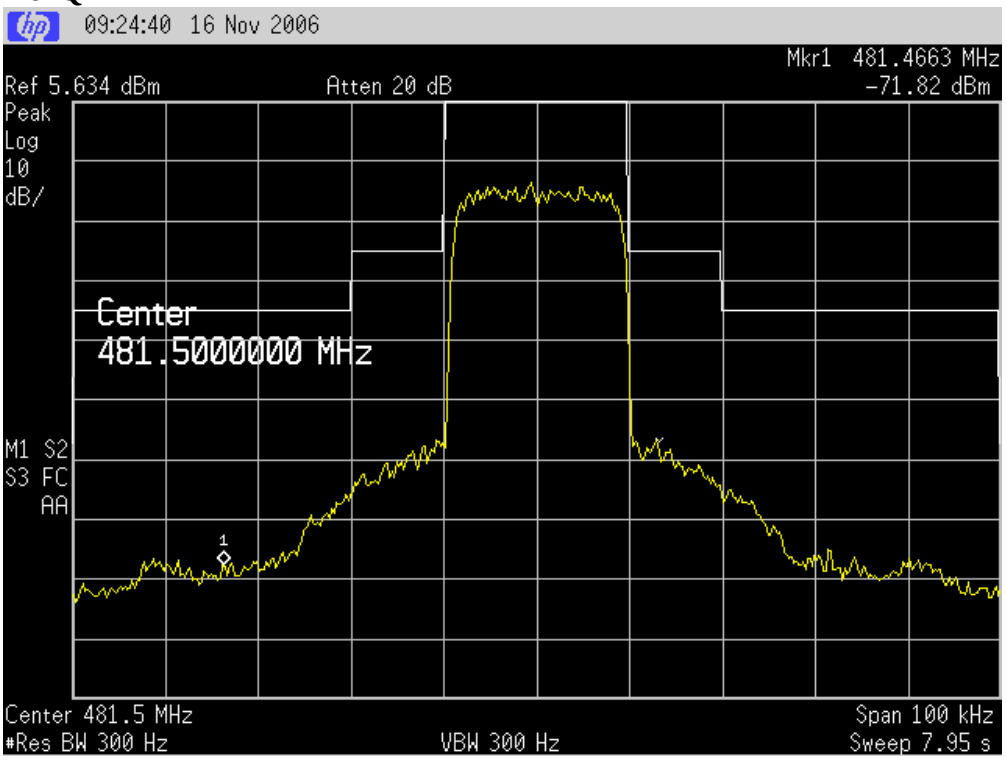
All measurements have been made with a 30 dB attenuator being placed between the transmitter and the spectrum analyser.

Measurements were made in peak hold, as allowed for in section 90.210, as carrier power measurements have been made using a peak detector using a 300 Hz resolution bandwidth.

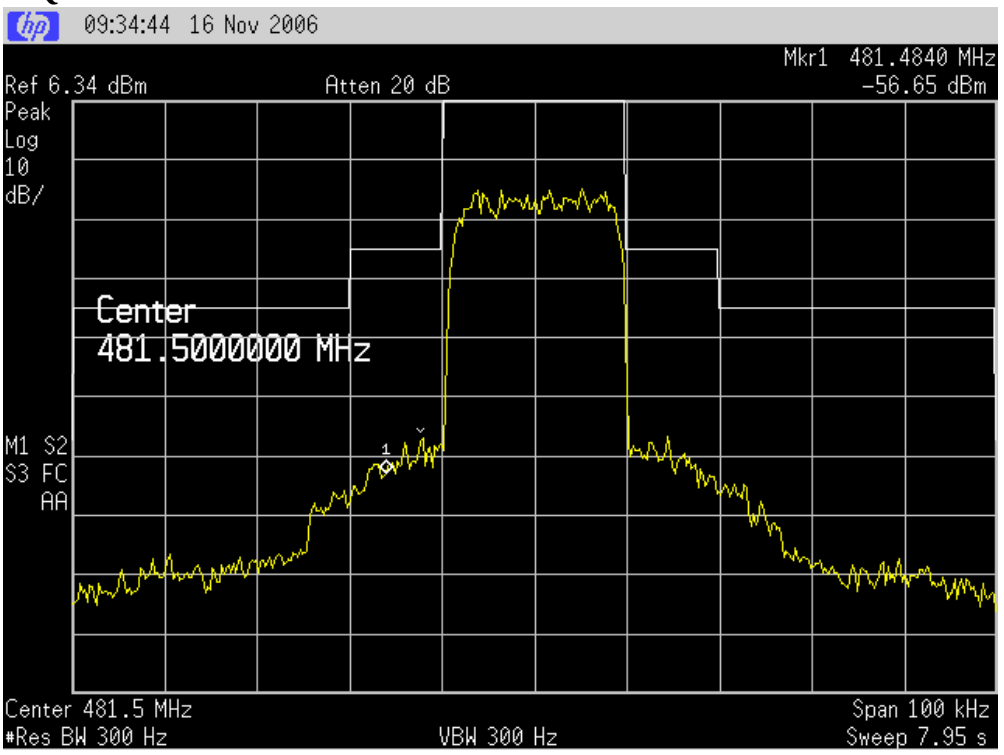
The transmitter was operating continuously on 481.5000 MHz with the various modulation types applied at the highest powers allowed

Result: Complies

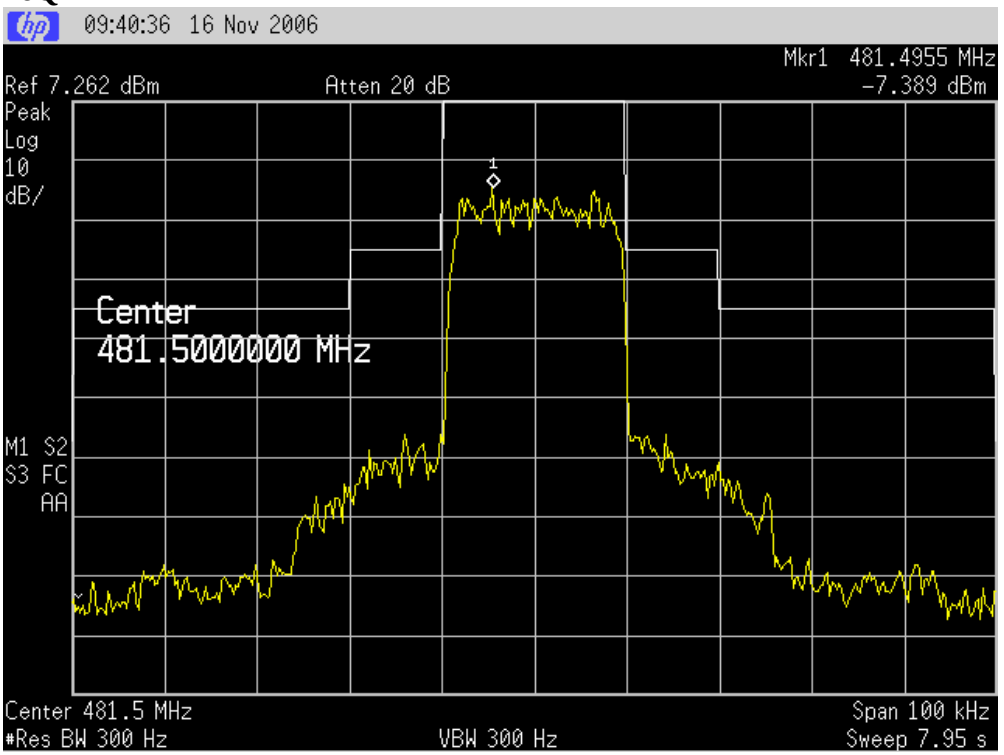
64QAM



32QAM



16QAM



Transmitter spurious emissions at the antenna terminals

Frequency: 481.5000 MHz

Spurious emission (MHz)	Emission level (dBm)	Limit (dBm)
963.000	-66.4	-13.0
1444.500	Less than -60.0	-13.0
1926.000	Less than -60.0	-13.0
2407.500	Less than -60.0	-13.0
2889.000	Less than -60.0	-13.0
3370.500	Less than -60.0	-13.0
3852.000	Less than -60.0	-13.0
4333.500	Less than -60.0	-13.0
4815.000	Less than -60.0	-13.0

Measurements were made when operating in 16QAM mode at the highest rated power with results being slightly lower when operated in 32QAM and 64QAM modes.

No other emissions observed between 9 kHz and 5 GHz.

Limit:
Part 90.210(d) Mask B, (3) On any frequency removed from the assigned frequency by more than 250% of the authorised bandwidth: At least 43 + 10 log (P).

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 maximum rated power of 1.3 watts (+31 dBm) gives a limit of –13 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

Frequency: 478.5000 MHz

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)
-	-	-57.0

Measurements were carried out with the transmitter not powered.

No emissions were detected between 100 kHz – 5 GHz when measurements were attempted at the antenna terminal

Any emissions were therefore less than approximately 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: 481.5000 MHz **Power:** +31 dBm

Frequency (MHz)	Level (dBuV/m)	Power (dBm)	Limit (dBm)	Polarity	Margin (dB)
963.000	29.6	-65.6	-20.0	Vertical	45.6
963.000	31.2	-64.0	-20.0	Horizontal	44.0
1444.500	47.5	-47.7	-20.0	Vertical	27.7
1444.500	47.1	-48.1	-20.0	Horizontal	28.1
1926.000	-	-	-20.0	Vertical	-
1926.000	-	-	-20.0	Horizontal	-
2407.500	-	-	-20.0	Vertical	-
2407.500	-	-	-20.0	Horizontal	-
2889.000	-	-	-20.0	Vertical	-
2889.000	-	-	-20.0	Horizontal	-
3370.500	-	-	-20.0	Vertical	-
3370.500	-	-	-20.0	Horizontal	-
3852.000	-	-	-20.0	Vertical	-
3852.000	-	-	-20.0	Horizontal	-
4333.500	-	-	-20.0	Vertical	-
4333.500	-	-	-20.0	Horizontal	-
4815.000	-	-	-20.0	Vertical	-
4815.000	-	-	-20.0	Horizontal	-

Other emissions observed

Frequency (MHz)	Level (dBuV/m)	Power (dBm)	Limit (dBm)	Polarity	Margin (dB)
37.538	30.1	-65.1	-20.0	Vertical	45.1
42.978	36.3	-58.9	-20.0	Vertical	38.9
50.195	35.2	-60.0	-20.0	Vertical	40.0
55.888	27.5	-67.7	-20.0	Vertical	47.7
64.193	31.8	-63.4	-20.0	Vertical	43.4
66.200	32.0	-63.2	-20.0	Vertical	43.2
106.693	35.8	-59.4	-20.0	Vertical	39.4
108.773	35.3	-59.9	-20.0	Vertical	39.9
110.785	36.4	-58.8	-20.0	Vertical	38.8
125.000	28.0	-67.2	-20.0	Vertical	47.2
134.178	29.3	-65.9	-20.0	Vertical	45.9
153.117	41.2	-54.0	-20.0	Vertical	34.0

Other emissions observed continued

Frequency (MHz)	Level (dBuV/m)	Power (dBm)	Limit (dBm)	Polarity	Margin (dB)
154.178	41.9	-53.3	-20.0	Vertical	33.3
155.000	41.8	-53.4	-20.0	Horizontal	33.4
155.180	41.7	-53.5	-20.0	Vertical	33.5
159.178	40.5	-54.7	-20.0	Vertical	34.7
160.000	47.1	-48.1	-20.0	Horizontal	28.1
166.000	50.2	-45.0	-20.0	Horizontal	25.0
168.000	50.0	-45.2	-20.0	Horizontal	25.2
172.000	49.4	-45.8	-20.0	Horizontal	25.8
177.000	47.9	-47.3	-20.0	Horizontal	27.3
185.000	43.5	-51.7	-20.0	Horizontal	31.7
188.000	38.9	-56.3	-20.0	Horizontal	36.3
226.000	44.5	-50.7	-20.0	Vertical	30.7
228.000	43.9	-51.3	-20.0	Vertical	31.3
228.500	47.5	-47.7	-20.0	Horizontal	27.7
230.500	48.5	-46.7	-20.0	Horizontal	26.7
236.000	41.5	-53.7	-20.0	Vertical	33.7
250.000	43.4	-51.8	-20.0	Vertical	31.8
250.000	42.5	-52.7	-20.0	Horizontal	32.7
278.000	39.9	-55.3	-20.0	Vertical	35.3
300.000	32.0	-63.2	-20.0	Vertical	43.2
300.000	40.6	-54.6	-20.0	Horizontal	34.6
345.500	41.5	-53.7	-20.0	Horizontal	33.7
375.000	36.5	-58.7	-20.0	Vertical	38.7
375.000	39.5	-55.7	-20.0	Horizontal	35.7
381.000	36.8	-58.4	-20.0	Vertical	38.4
382.500	38.5	-56.7	-20.0	Horizontal	36.7
500.000	31.5	-63.7	-20.0	Vertical	43.7
500.000	29.2	-66.0	-20.0	Horizontal	46.0

The transmitter was tested while transmitting continuously while attached to a dummy load.

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

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.

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

No measurements were made above the 10th harmonic.

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 February 17th, 2004.

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

The rated power of +31 dBm gives a limit of –20 dBm.

Result: Complies

Measurement Uncertainty: *±4.1 dB*

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.

Measurements were made with the supply varied between 115% and 85% of the nominal supply voltage (48 Vdc).

Nominal Frequency: 481.500 MHz

	Frequency Error (Hz)		
Temp.	**40.8 Vdc**	**48.0 Vdc**	**55.2 Vdc**
+50° C	+54.0	+53.0	+53.0
+40° C	-51.0	-54.0	-57.0
+30° C	-78.0	-76.0	-75.0
+20° C	-91.0	-93.0	-92.0
+10° C	-83.0	-83.0	-82.0
0° C	-99.0	-99.0	-99.0
-10° C	-67.0	-70.0	-71.0
-20° C	+119.0	+119.0	+122.0
-30° C	+343.0	+343.0	+341.0

Part 90.213 states that base / fixed transmitters operating between 421 – 512 MHz with 25 kHz channelling are required to have a frequency tolerance of 2.5 ppm.

At 481.5 MHz the limit will be: 2.5 ppm = 2.5 x 481.5 = 1100 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 481.5000 MHz using the method described in TIA-603 and EN 300-086.

This transmitter is a fixed link transmitter which usually transmits continuously.

Measurements have been made by using an unmodulated carrier and by shifting the carrier frequency as it was not possible to turn the carrier on or off.

An external signal generator tuned to the transmitter frequency with an output level 0.1 % (-30 dB) of the level from the transmitter with a 1 kHz tone with a frequency deviation of 25 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 shifted in frequency which produces a trigger pulse that is 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		
nil	nil	nil

Limits:

Spacing	Period t_1	Period t_2	Period t_3
25 kHz	± 25 kHz	± 12.5 kHz	± 25 kHz

Result: Complies

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

25 kHz transmitter turn on (481.500 MHz)

Green Trace = 1 kHz tone with FM deviation of 25.0 kHz.

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.

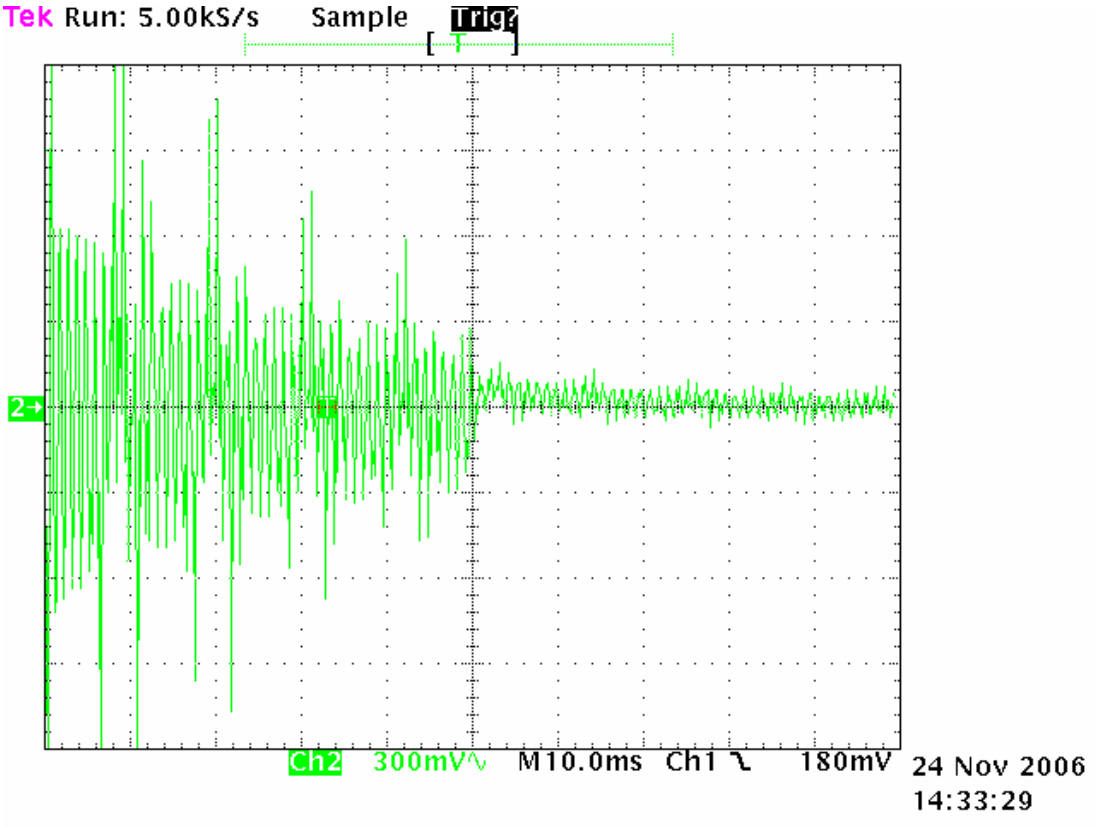
Triggering has been set to occur 5 divisions from the left hand edge (50 mS).

*t*on occurs at 50 mS.

*t*1 occurs between 5.0 and 6.0 divisions from the left hand edge.
t2 occurs between 6.0 and 8.5 divisions from the left hand edge.

When using this method the carrier power slowly increases which slowly diminishes the 1 kHz tone which can be seen between 0 – 5 divisions.

No transient responses can be observed during *t*1 and *t*2.



25 kHz transmitter turn off (481.500 MHz)

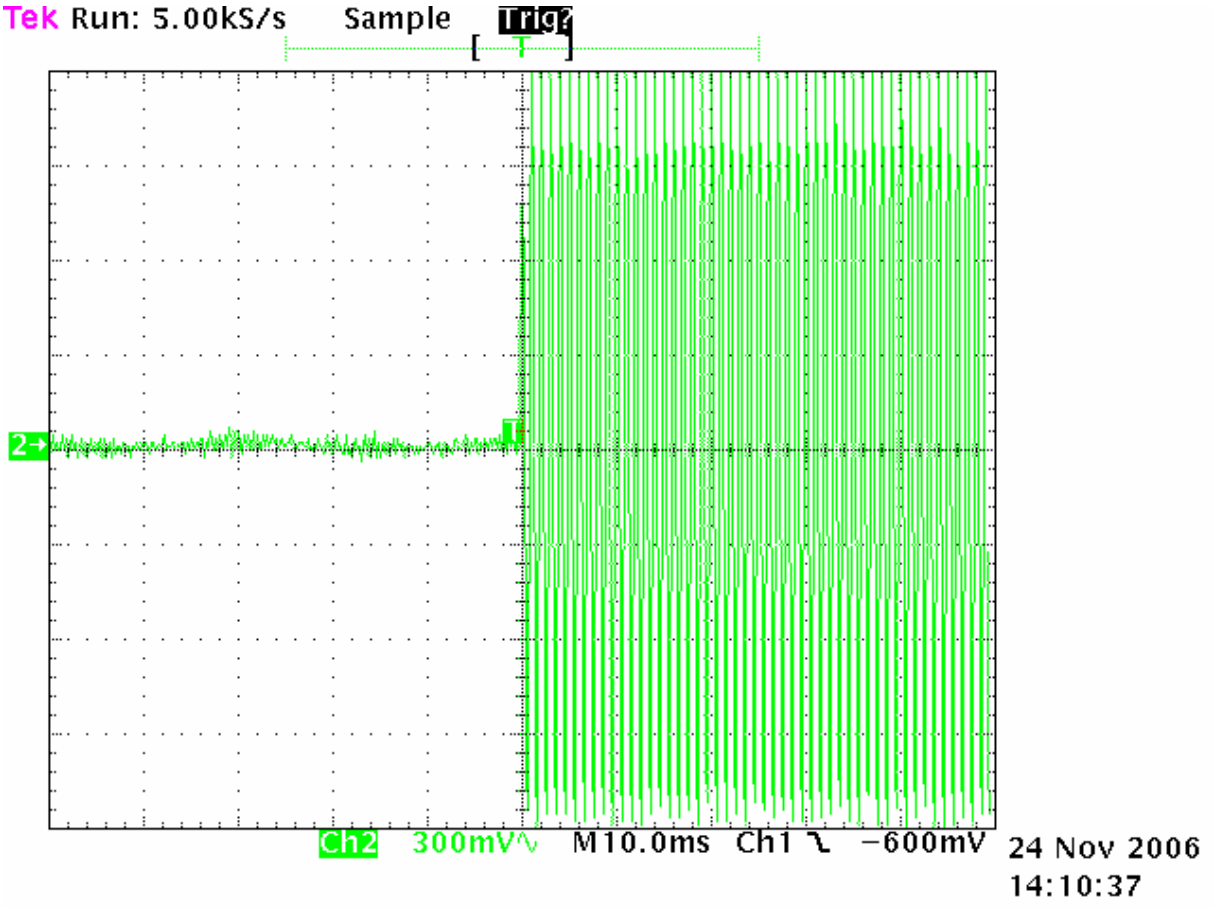
Green Trace = 1 kHz tone with FM deviation of 25.0 kHz.

Green trace has been maximised to give full screen indication of +/- 25.0 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 4.0 and 5.0 divisions from the left hand edge..

No transient response can be observed just before *t*off.



Radio Frequency Hazard Information

As per Section 1.1310 and Section 2.1091 certification of this transmitter is sought using the General Public exposure limits as detailed in OST/OET Bulletin Number 65 as an average power of +31 dBm (1.26 watts) is to be used in a base / fixed environment.

In accordance with Section 1.1310 the following Maximum Permissible Exposure (MPE) power density limits have been applied:

General Population / Uncontrolled exposure of 0.32 mW/cm^2 (f/1500 = 481.5 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:

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

$0.32\ mW/cm^2 = E^2/3770$

$E = \sqrt{}0.32*3770$

$E = 34.7\ V/m$

The measured transmitter average power = +30.8 dBm = 1.21 watts.

The transmitter can be operated using a range of antennas that are selected by the end client with a 100% duty cycle.

Therefore in order to maintain a minimum safe distance of 20 cm the antenna gain must be less than:

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

$G = (E * d)^2 / 30 * P$

$G = (34.7 * 0.2)^2 / (30 * 1.21)$

$G = 1.32$

If the gain of the antenna exceeds 1.32 the minimum safe distance will need to be recalculated.

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 30 dB	Weinschel	48-30-33	BA0707	-
Biconical Antenna	Schwarzbeck	BBA 9106		RFS 3612
Frequency Counter	Hewlett Packard	HP 5342A	1916A01713	E1224
Log Periodic Antenna	Schwarzbeck	VUSLP9111	9111-228	3785
Horn Antenna	Electrometrics	RGA-60	6234	E1494
Microwave Preamplifier	Hewlett Packard	6349B	2644A01659	-
Measurement Receiver	Rohde & Schwarz	ESCS 30	847124/020	E1595
Coax Cable	Sucoflex	104P	29861/4P	-
Modulation Analyzer	Rohde & Schwarz	FMA	837807/020	E1552
Oscilloscope	Tektronics	745A	B010643	1569
Power Supply	Hewlett Packard	6032A	2743A-02859	E1069
Rubidium Oscillator	Ball Efratom	FRS – C	4287	E1053
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

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 February 17th, 2004.

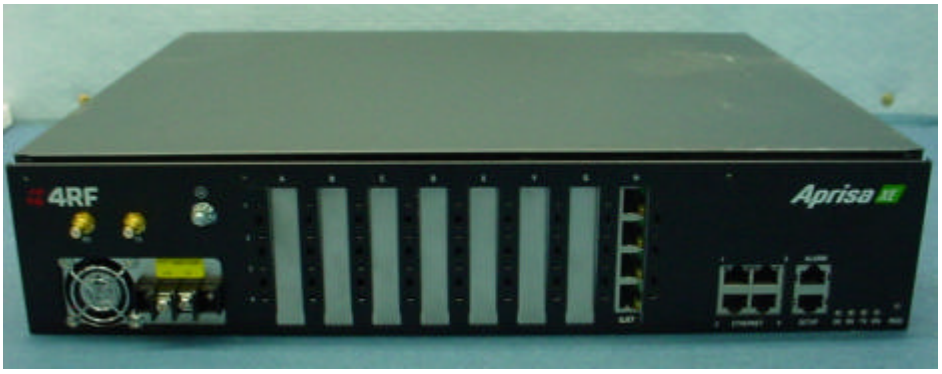
All testing has been carried out in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to ISO/IEC 17025.

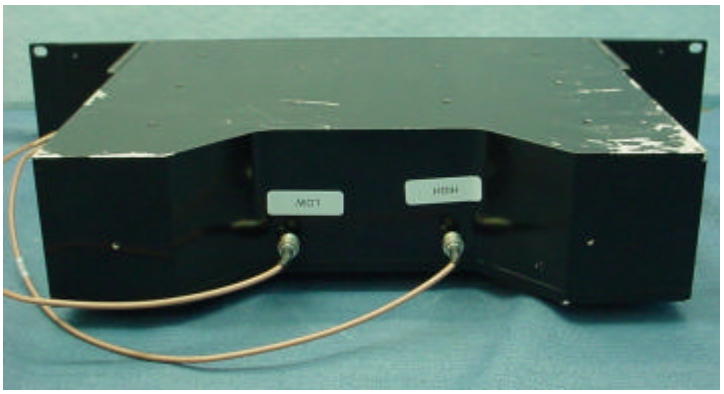
All measurement equipment has been calibrated in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to ISO/IEC 17025.

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.

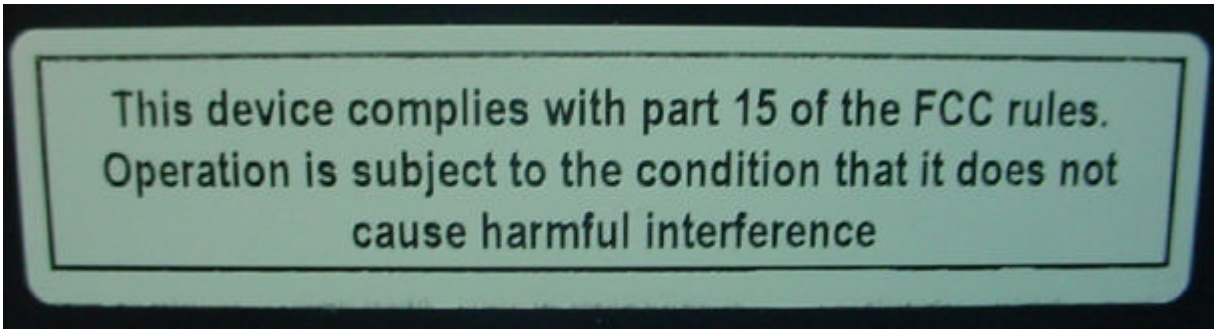
10. PHOTOGRAPH (S)

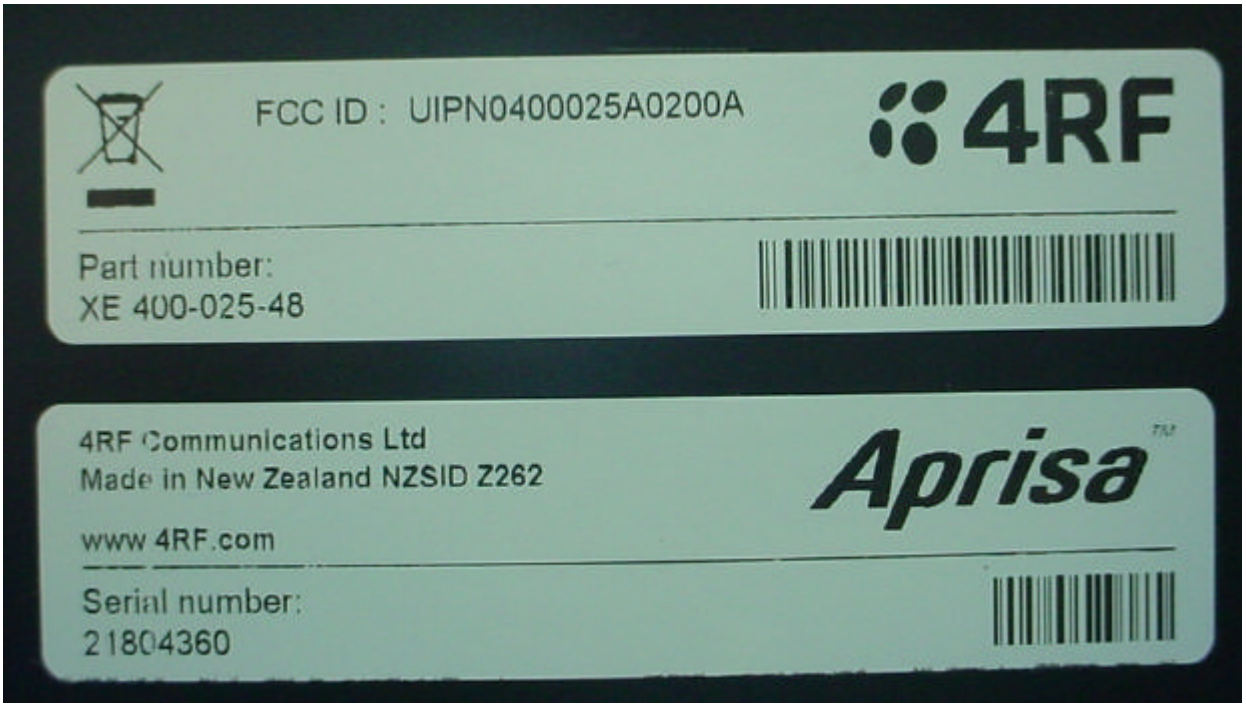
External views



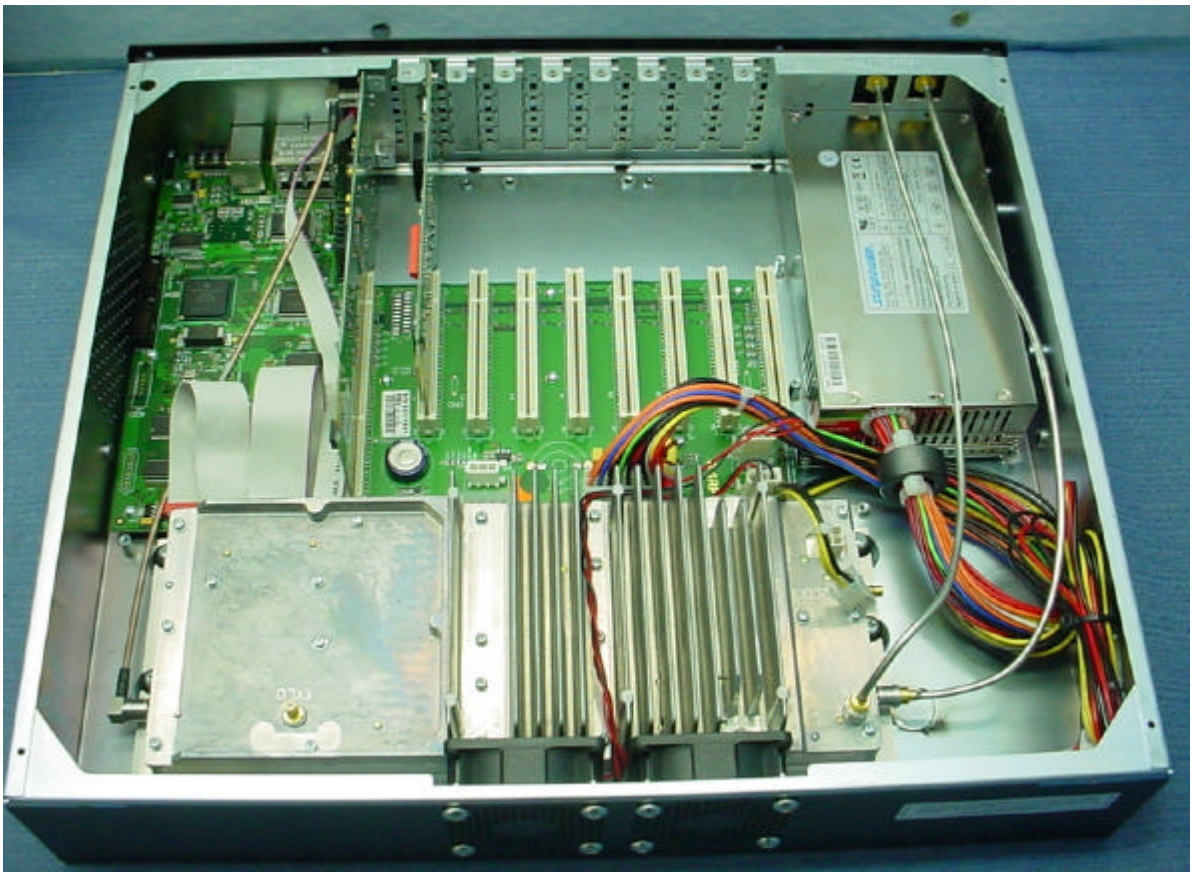


Labels

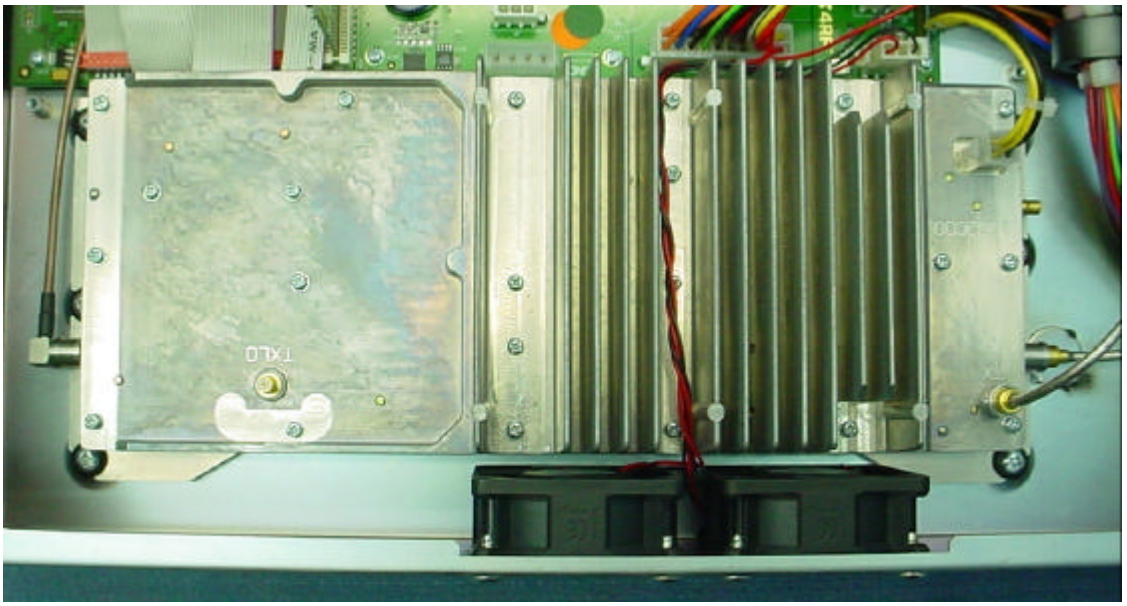




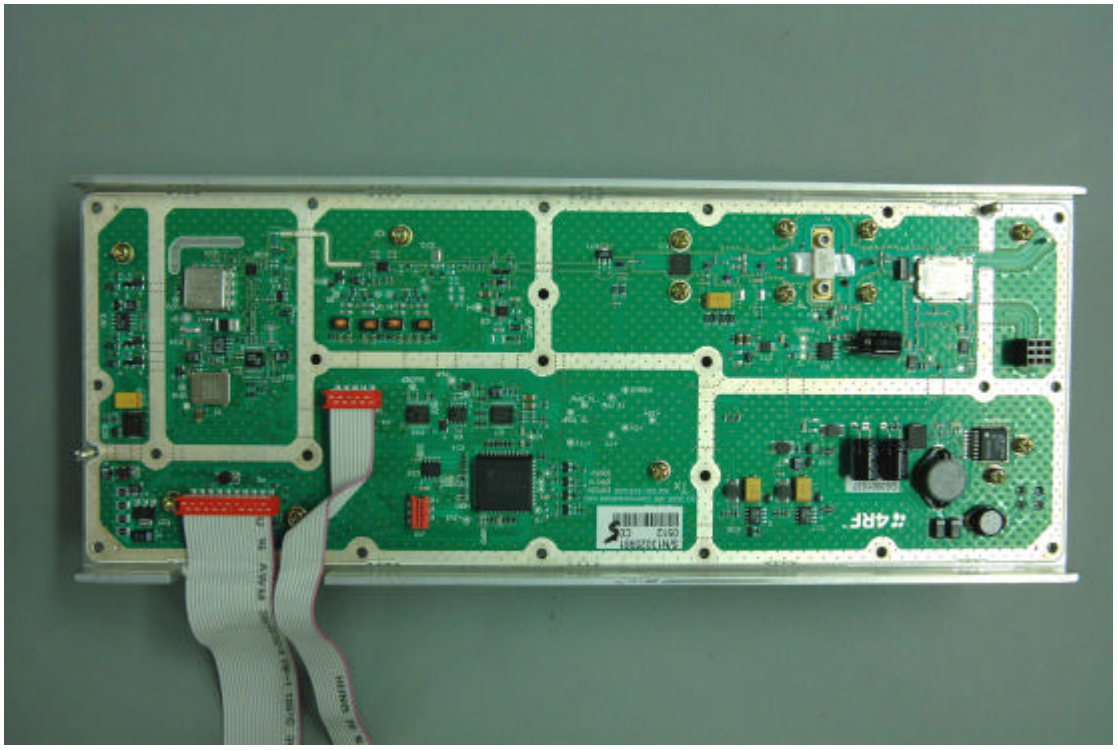
Overall Internal View



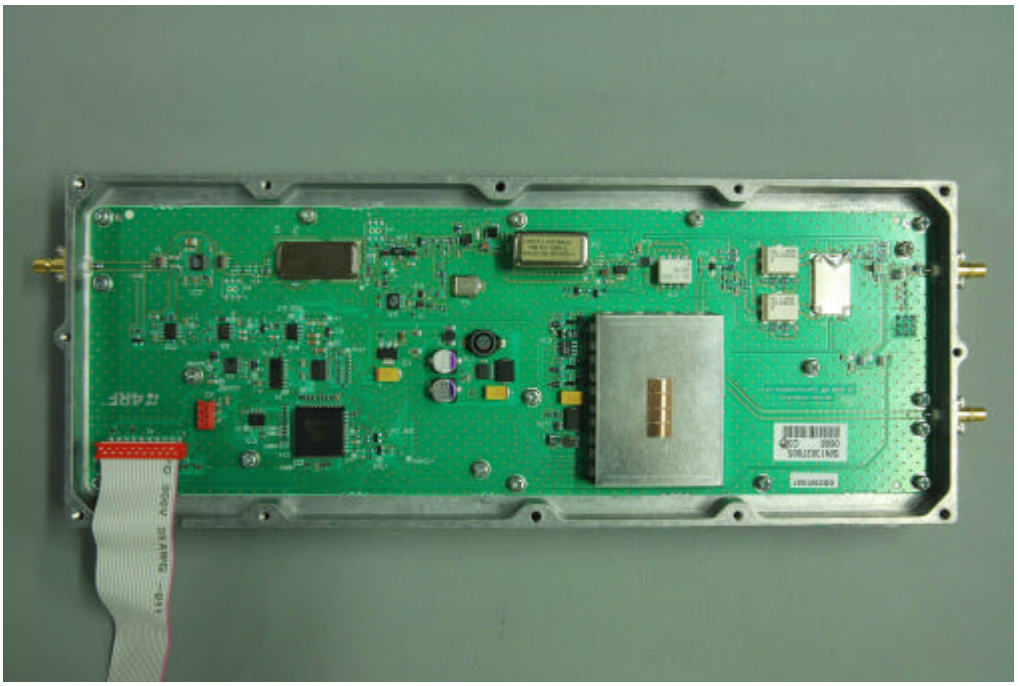
Receiver and Transmitter Modules



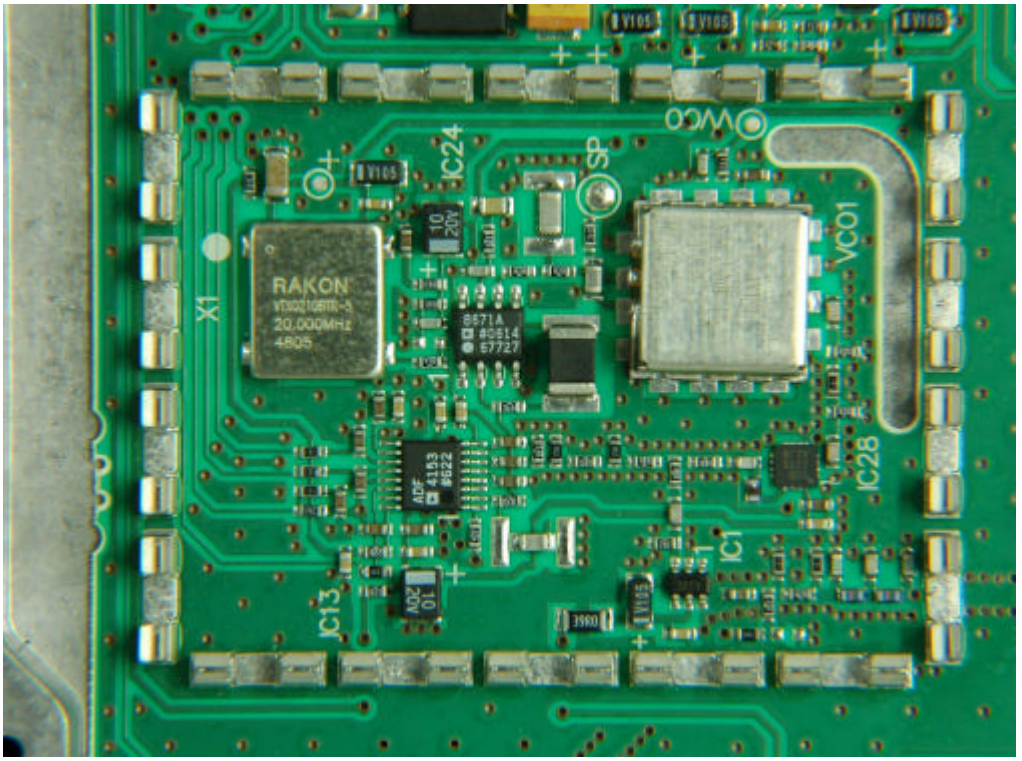
Transmitter Board



Receiver Board

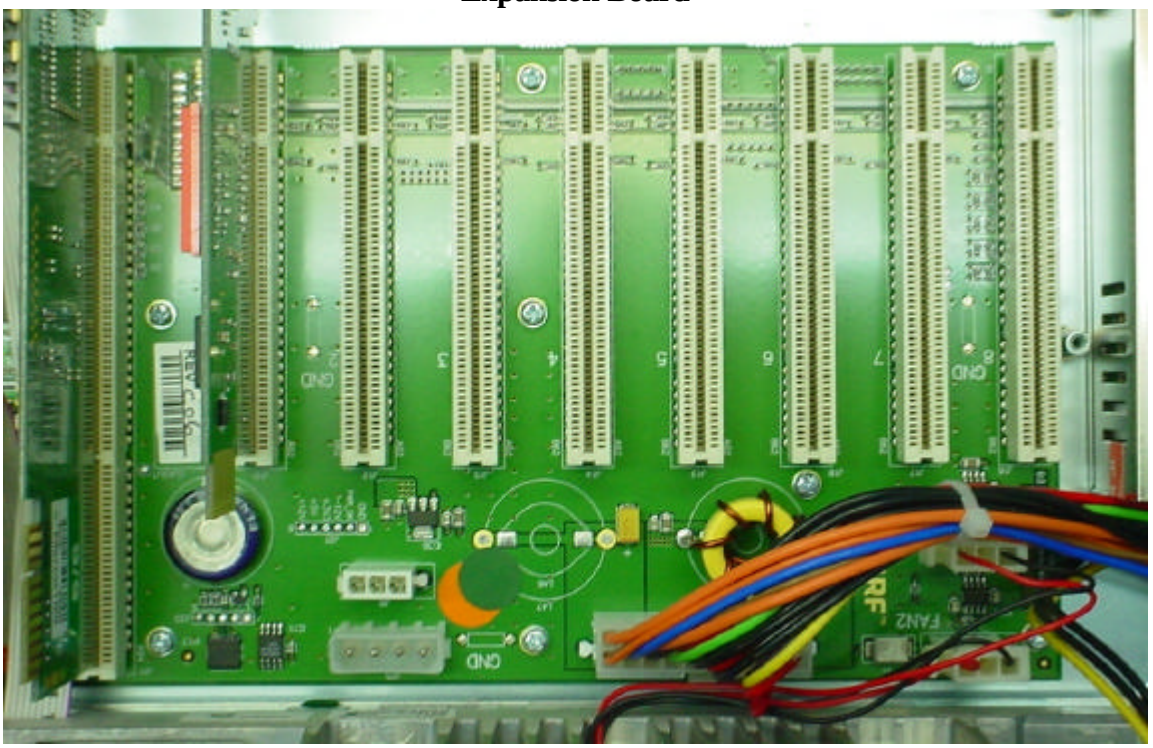


Under the RF Shield on the Receiver Board

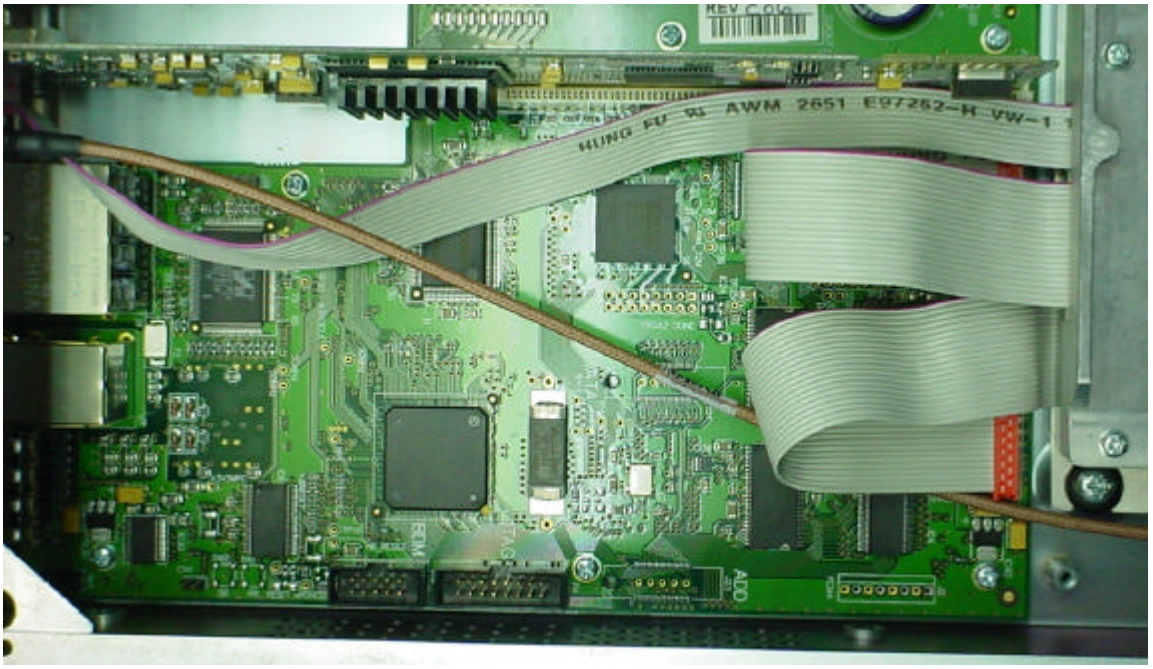


Power Supply

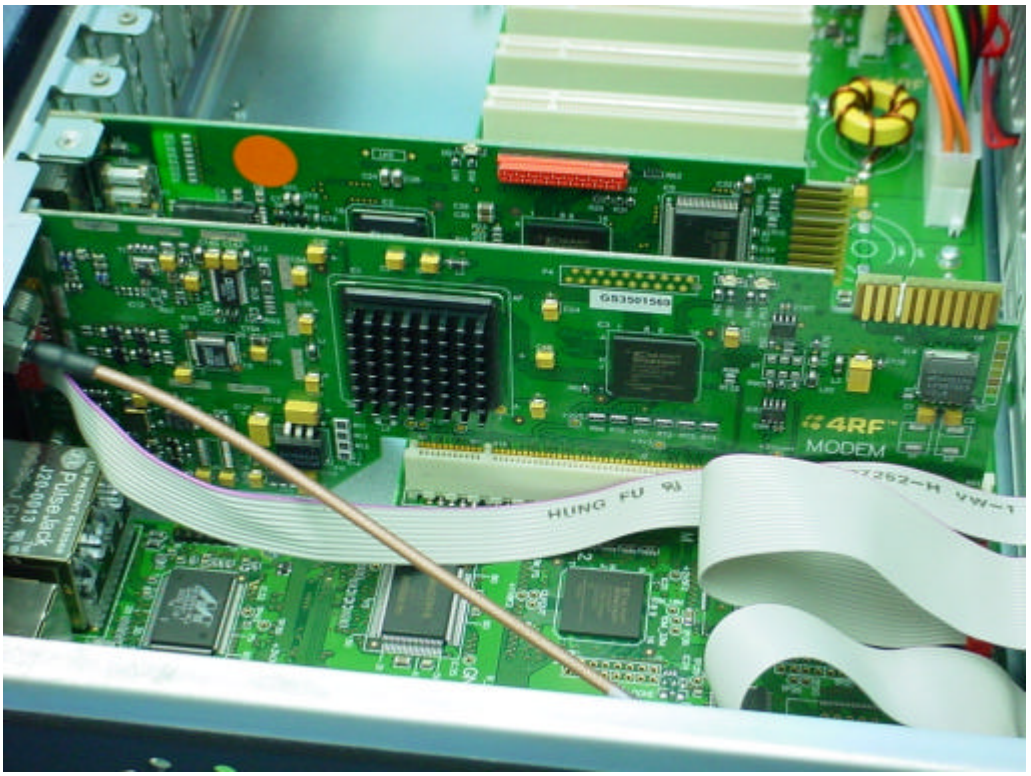
Expansion Board

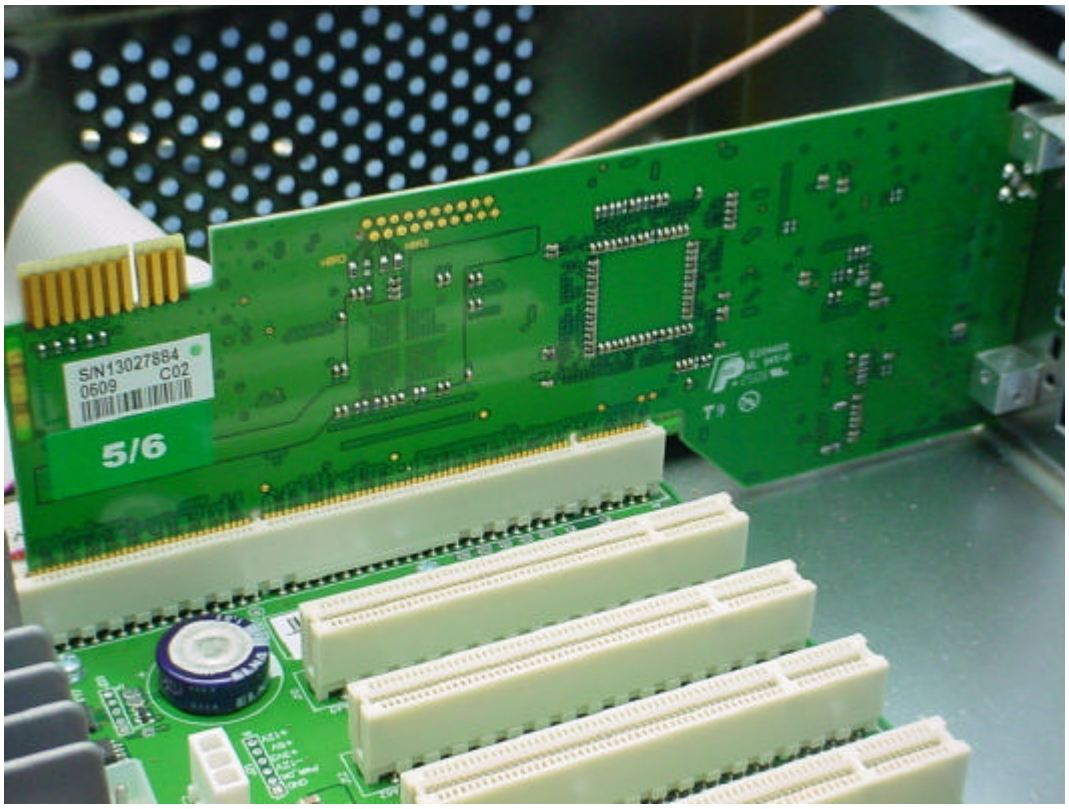


Processor Board

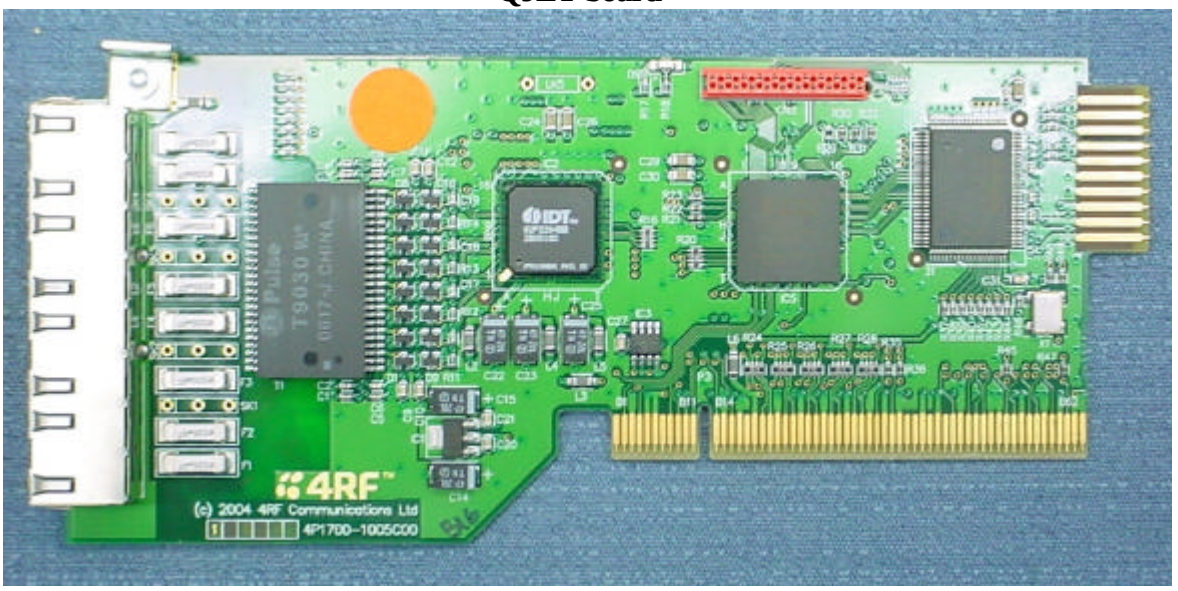


Modem board





QJET board



Radiated Emissions Test Set Up Photos