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# TEST REPORT

## Define Point 2 Point Remote Monitoring Transceiver

*tested to*

## 47 Code of Federal Regulations

## Part 15 - Radio Frequency Devices

## Subpart C – Intentional Radiators

*including*

## Section 15.247 - Operation in the band 2400 – 2483.5 MHz

*for*

## Define Instruments 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

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# 1. STATEMENT OF COMPLIANCE

The **Define Instruments Point 2 Point (P2P) Remote Monitoring Transceiver** complies with FCC Part 15 Subpart C including Section 15.247 as an Intentional Radiator when the methods as described in ANSI C63.4 - 2003 and those defined in FCC KDB 558074 D01 v03r02.

# 2. RESULTS SUMMARY

The results of testing carried out during April 2014 are detailed below:

| Clause | Parameter | Result |
|---|---|---|
| 15.201 | Equipment authorisation requirement | Certification required. |
| 15.203 | Antenna requirement | Complies. |
| 15.204 | External PA and antenna modifications | Noted. |
| 15.205 | Restricted bands of operation | Complies. |
| 15.207 | Conducted limits | Complies |
| 15.209 | Radiated emission limits | Complies. |
| 15.247 | | |
| (a)(2) | Minimum bandwidth | Complies |
| (b)(3) | Peak output power | Complies |
| (b)(4) | Antenna gain less than 6 dBi | Complies |
| (c) | Operation with directional antenna | Not applicable |
| (d) | Out of band emissions | Complies |
| (e) | Power spectral density | Complies |
| (f) | Hybrid systems | Not applicable |
| (g) | Use of all channels | Not applicable |
| (h) | Intelligent frequency hopping | Not applicable |
| (i) | Radio frequency hazards | Complies |

# 3. INTRODUCTION

This report describes the tests and measurements performed for the purpose of determining compliance with the specification.

**The client selected the test sample.**

**This report relates only to the sample tested.**

**This report contains no 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.

# 4. CLIENT INFORMATION

| | |
|---|---|
| **Company Name** | Define Instruments Ltd |
| **Address** | 10B Vega Place<br>Mairangi Bay |
| **City** | Auckland |
| **Country** | New Zealand |
| **Contact** | Mr Anthony Glucina |

# 5. DESCRIPTION OF TEST SYSTEM

| | |
|---|---|
| **Brand Name** | Define |
| **Model Number** | Point 2 Point (P2) |
| **Product** | Remote Monitoring Transceiver |
| **Manufacturer** | Define Instruments Ltd |
| **Country of Origin** | New Zealand |
| **Serial Number** | Sample not serialized |
| **FCC ID** | 2ACTT-1409 |

**Product Description**

The transceiver tested would typically have an environmental sensor attached to it, for example a temperature probe, that collects various data which is then periodically sent to an identical transceiver which would be attached to a recording / indicating / storage device of some sort.

Testing was carried out with one transceiver that was marked as the receiver and the other transceiver was marked as the transmitter.

The only difference between the test configurations was the input and output port configurations.

The device can be configured to operate on one of 15 channels using configuration software.

| | |
|---|---|
| **Band of Operation:** | 2400-2483.5 MHz |
| **Number of channels:** | 15 |
| **Operating frequencies:** | 2405 – 2475 MHz |
| **Channel spacing:** | 5 MHz |
| **Rated Conducted Power:** | +20 dBm |
| **Antenna Type:** | Omni-directional whip with unique standard SMA connector |
| **Power Supply:** | External dc supply between 9 - 36 Vdc.<br>Typically a 12 or 24 Vdc battery |
| **Ports:** | No specific ports however provision was made for the attachment of either a temperature senor or a temperature recording / indicating / storage device. |

# 6. RESULTS

**Standard**

The sample was tested in accordance with 47 CFR Part 15 Subpart C.

**Methods and Procedures**

The following measurement methods and procedures have been applied:

- ANSI C63.4 – 2003
- FCC KDB 558074 D01 v03r02

**Section 15.201: Equipment authorisation requirement**

Certification as detailed in Subpart J of Part 2 is required for this device.

**Section 15.203: Antenna requirement**

The base station uses a detachable dipole with a reverse SMA connector which meets the definition of a unique connector.

**Result:** Complies.

**Section 15.204: External radio frequency power amplifiers and antenna modifications**

An external power amplifier is provided for use with this transmitter.

Suitable warning will be placed in the user manual regarding the modification of the device.

**Result:** Complies.

**Section 15.205: Restricted bands of operation**

The device tested transmits on 15 channels between 2405 MHz and 2475 MHz using digital modulation spread spectrum techniques.

Section 15.247 allows this between 2400 – 2483.5 MHz

**Result:** Complies.

**Section 15.107: Conducted limits**

Conducted emission testing has been carried out when the device was powered at 120 Vac 60 Hz using a representative AC power supply.

Conducted emission testing was carried out over the frequency range of 150 kHz to 30 MHz at the Laboratory's MacKelvie Street premises in a 2.4 m x 2.4 m x 2.4 m screened room.

Testing was carried out in accordance with section 15.207(a) using a measuring receiver and a 50 uH / 50 ohm artificial mains network which is also known as a line impedance stabilisation network (LISN).

Measurements on both the phase and neutral lines were made using either a Quasi Peak or an Average detector with a 9 kHz bandwidth.

The supplied conducted emission plot is a combined plot showing the worst case of the Peak, Quasi Peak and Average levels for both phase and neutral.

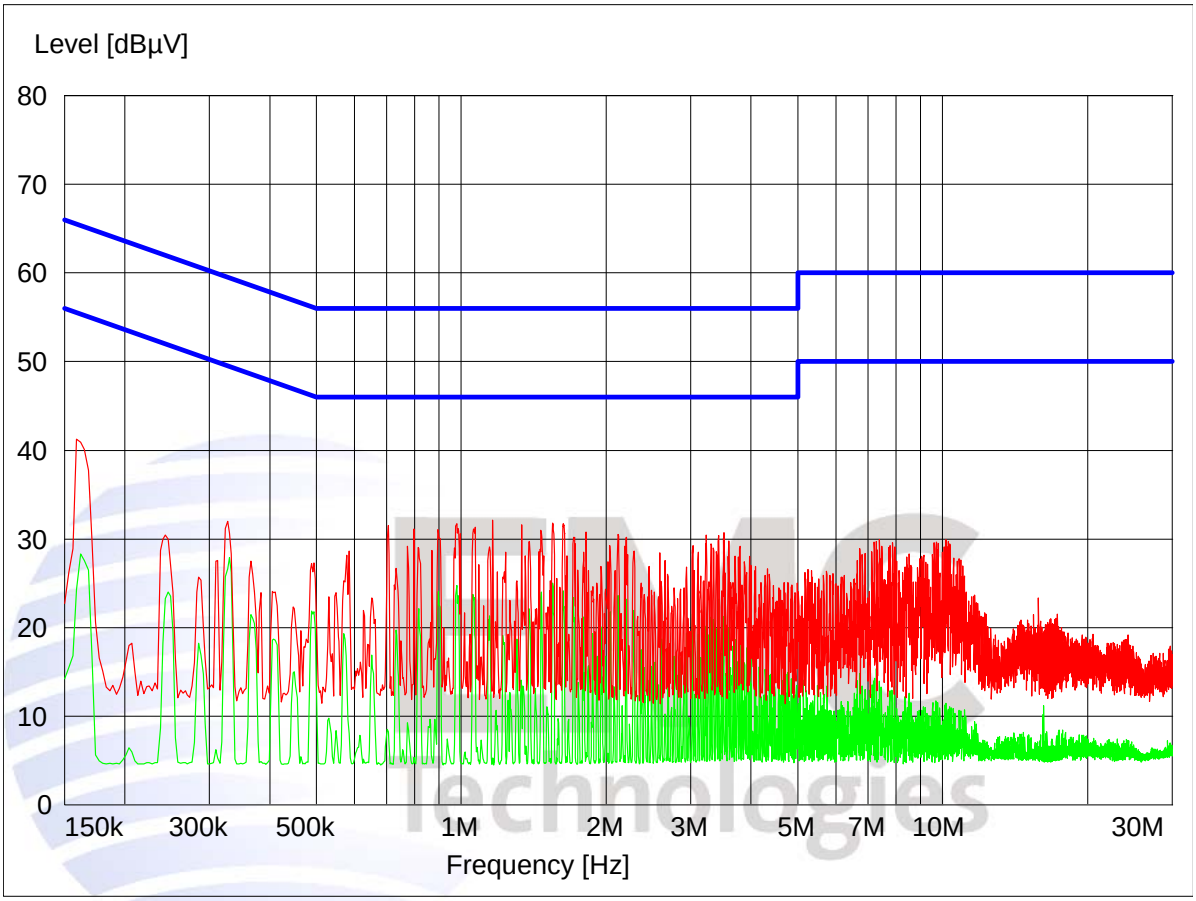
The Class B conducted limits have been applied.

**Result:** Complies
Measurement uncertainty with a confidence interval of 95% is:
Conducted emissions tests (0.15 - 30 MHz) ± 2.2 dB

## Conducted Emissions – AC Input Power Port

| | |
|---|---|
| **Setup:** | Transceiver was tested when powered at 12 Vdc using a representative AC power supply that was powered at 120 Vac 60 Hz. The transceiver was transmitting and receiving periodically on 2475 MHz. |

| Peak --- | Average -- | Quasi Peak X | Average + |
|---|---|---|---|




Final Quasi-Peak Measurements

| Frequency MHz | Level dBµV | Limit dBµV | Margin dB | Phase | Rechecks dBµV |
|---|---|---|---|---|---|
| | No measurements recorded | | | | |

Final Average Measurements

| Frequency MHz | Level dBµV | Limit dBµV | Margin dB | Phase | Rechecks dBµV |
|---|---|---|---|---|---|
| | No measurements recorded | | | | |

**Section 15.209 – Radiated emissions**

As this device contains digital devices that operate using frequencies below 30 MHz, low frequency measurements were attempted between 9 kHz – 30 MHz at the open area test site over a distance of 10 metres using a loop antenna the centre of which was 1 metre above the ground.

Details of the general test set up are provided in the photograph section of this report.

The general limits described in 15.209 have been applied with the 300 metre and 30 metre limits being extrapolated by a factor of 40 dB per decade as allowed for in section 15.31(d)(2).

Between 9 – 90 kHz and between 110 – 490 kHz an Average detector and a Peak detector were used.

Where a peak detector was used the limit was increased by +20 dB.

Between 90 kHz and 110 kHz band between 490 kHz and 30 MHz a Quasi Peak detector was used.

No emissions were detected on these frequencies of interest and no other emissions were detected from this device over the range of 9 kHz – 30 MHz

**Result:** Complies
Measurement uncertainty with a confidence interval of 95% is:
- Free radiation tests (9 kHz – 30 MHz) ± 4.8 dB

**Section 15.247(a)(2) - Minimum bandwidth**

Digital devices operating in the 2400 - 2483.5 MHz band are required to have a minimum 6 dB bandwidth of 500 kHz.

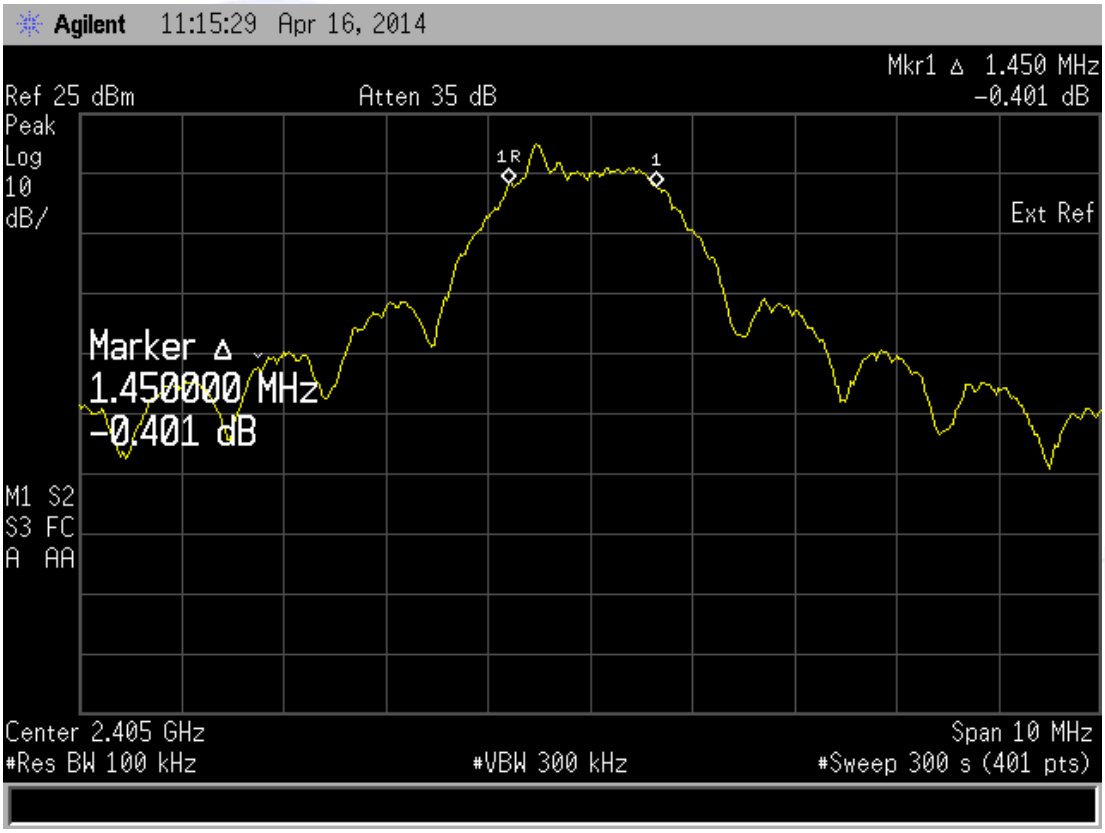
Measurements were made using a spectrum analyser operating in peak hold with a resolution bandwidth of 100 kHz.

The results are summarised as follows:

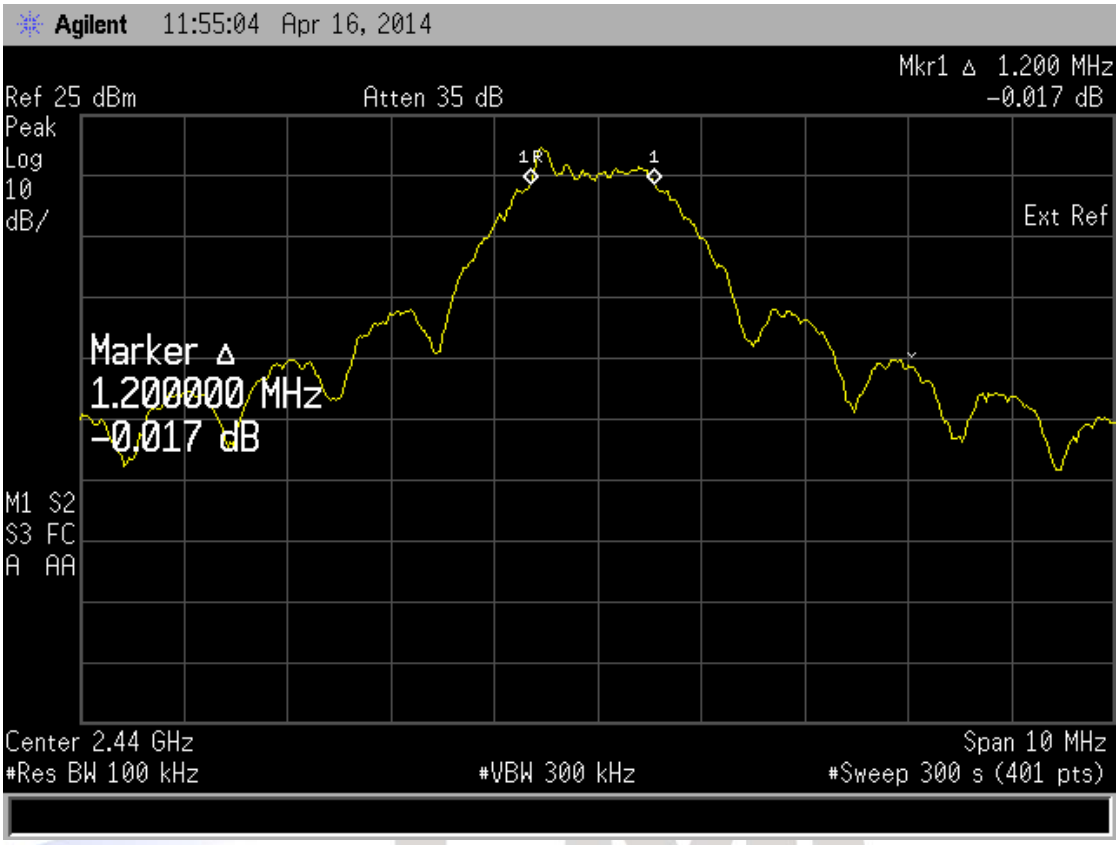
| Frequency (MHz) | Bandwidth (kHz) |
|---|---|
| 2405.000 | 1450 |
| 2440.000 | 1200 |
| 2475.000 | 1225 |

**Result:** Complies

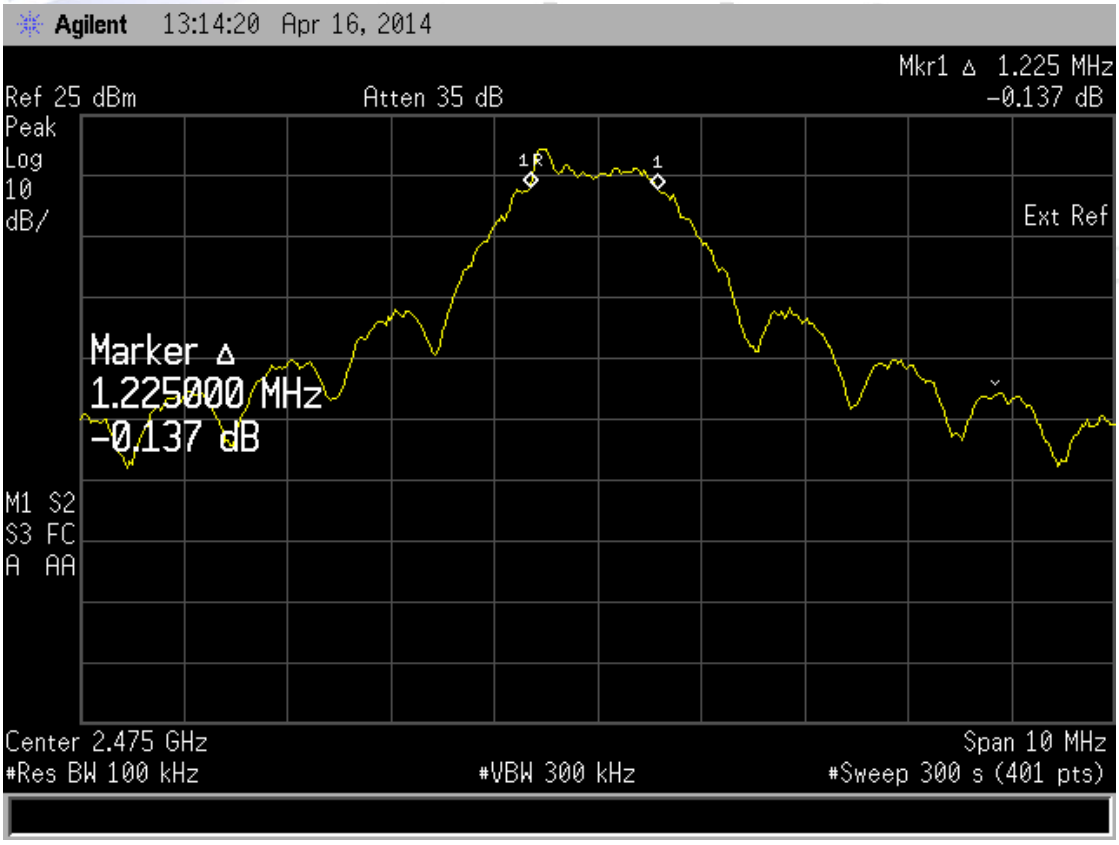
**2405 MHz**



**2440 MHz**




**2475 MHz**



**Section 15.247(b)(3)– Peak output power**

Measurements were made at the antenna port using a measuring receiver with a peak detector and a resolution bandwidth of 3 MHz.

| Frequency (MHz) | Level (dBm) | Power (Watts) | Limit (Watts) |
|---|---|---|---|
| 2405.000 | 20.6 | 0.115 | 1.000 |
| 2440.000 | 20.1 | 0.102 | 1.000 |
| 2475.000 | 20.0 | 0.100 | 1.000 |

A conducted limit of 1.0 watt (+30 dBm) has been applied.

Radiated power measurements were also made using the supplied whip antenna on the lowest, middle and highest frequency channel using both vertical and horizontal polarisations.

Only vertical emissions have been recorded as this polarisation gave the worst case result.

| Frequency (MHz) | Field Strength (dBµV/m) | Radiated Power (dBm) | Conducted Power (dBm) | Antenna Gain (dB) |
|---|---|---|---|---|
| 2405.000 | 118.3 | 23.1 | 20.6 | 2.5 |
| 2440.000 | 118.4 | 23.2 | 20.1 | 3.1 |
| 2475.000 | 118.3 | 23.1 | 20.0 | 3.1 |

The radiated power level in dBm was determined by formula from the field strength using the formula Field strength (V/m) = (square root of (30 x transmitter power (watts))) / distance (metres)

These calculations have been included to determine the gain / loss due to the antenna and cabling.

Testing was carried out at EMC Technologies NZ Ltd Open Area Test Site, which is located at Orere Point, Auckland, with the device being placed in the centre of the test table at a height of 80 cm above the ground plane.

**Result:** Complies.
**Measurement Uncertainty**: ± 4.1 dB

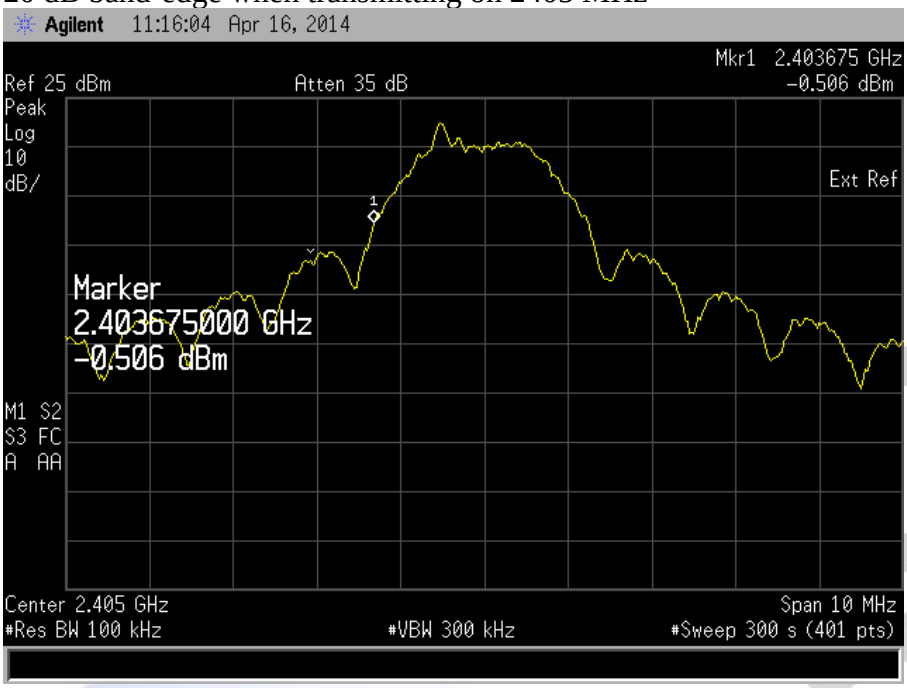
**Section 15.247 (d) – Out of band emissions**

**Band edge measurements:**

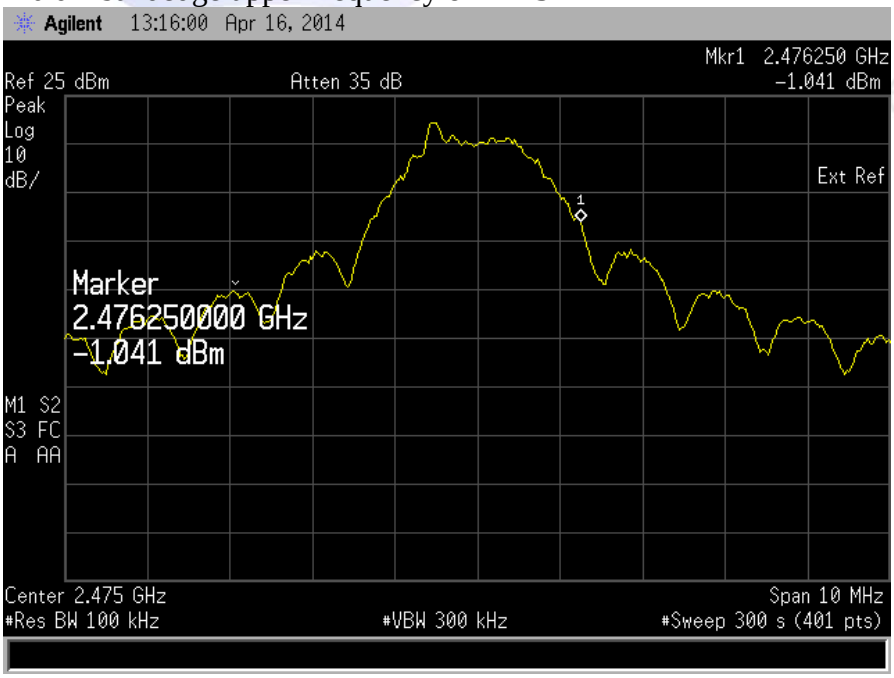
Testing was initially carried out at the antenna port with the -20 dB band-edge points being determined using a spectrum analyser with a 100 kHz resolution bandwidth when transmitting on 2405 MHz and 2475 MHz

The -20 dB band edge points were determined to be 2403.675 MHz and 2476.250 MHz

20 dB band-edge when transmitting on 2405 MHz




-20 dB bandedge upper frequency on 2475 MHz




The device is required to remain within the band of 2400 – 2483.5 MHz.

In addition radiated measurements were made in the restricted bands of 2310 – 2390 MHz and between 2483.5 – 2500 MHz where the limits as defined in section 15.209 were applied.

The following emissions were detected at the band edges when measured at a distance of three metres

The highest emission observed was on 2440 MHz using vertical polarisation with a level of 118.4 dBuV/m being recorded when a 100 kHz bandwidth peak detector was used

**Transmitting on 2405 MHz**

Observations made in the 2200 – 2300 MHz and 2310 – 2390 MHz restricted bands.

| Frequency MHz | Vertical dBuV/m | Horizontal dBuV/m | Limit dBuV/m | Margin dB | Result | Antenna | Detector |
|---|---|---|---|---|---|---|---|
| 2400.000 | 71.3 | 571 | 98.4 | 27.1 | Pass | Vertical | Peak |
| | | | | | | | |
| 2395.000 | 68.8 | 57.7 | 74.0 | 5.2 | Pass | Vertical | Peak |
| | 43.5 | 43.1 | 54.0 | 10.5 | Pass | Vertical | Average |
| 2320.000 | 64.1 | 55.3 | 74.0 | 9.9 | Pass | Vertical | Peak |
| | 41.9 | 41.9 | 54.0 | 12.1 | Pass | Vertical | Average |
| 2310.000 | 62.5 | 55.1 | 74.0 | 11.5 | Pass | Vertical | Peak |
| | 41.8 | 41.7 | 54.0 | 12.2 | Pass | Vertical | Average |

**Transmitting on 2475 MHz**

Observations made in the 2483.5 – 2500 MHz restricted band.

| Frequency MHz | Vertical dBuV/m | Horizontal dBuV/m | Limit dBuV/m | Margin dB | Result | Antenna | Detector |
|---|---|---|---|---|---|---|---|
| 2483.500 | 68.5 | 62.9 | 74.0 | 5.5 | Pass | Vertical | Peak |
| | 46.1 | 46.3 | 54.0 | 7.7 | Pass | Horizontal | Average |
| 2484.000 | 65.8 | 60.7 | 74.0 | 8.2 | Pass | Vertical | Peak |
| | 46.1 | 46.3 | 54.0 | 7.7 | Pass | Horizontal | Average |
| 2485.000 | 61.3 | 55.6 | 74.0 | 12.7 | Pass | Vertical | Peak |
| | 46.1 | 46.3 | 54.0 | 7.7 | Pass | Horizontal | Average |
| 2487.000 | 55.1 | | 74.0 | 18.9 | Pass | Vertical | Peak |
| | 46.1 | | 54.0 | 7.9 | Pass | Vertical | Average |
| 2500.000 | 43.8 | | 74.0 | 30.2 | Pass | Vertical | Peak |
| | 43.5 | | 54.0 | 10.5 | Pass | Vertical | Average |

Testing was carried out at EMC Technologies NZ Ltd Open Area Test Site, which is located at 670 Kawakawa Orere Road, Orere Point, Auckland.

**Result:** Complies.
**Measurement Uncertainty**: ± 4.1 dB

**Spurious emissions and restricted band radiated emission measurements**

Testing was carried out at EMC Technologies NZ Ltd Open Area Test Site, which is located at Driving Creek, Orere Point, Auckland.

Radiated emission measurements were carried out with the limits as per section 15.209 applied when these emissions fell within the restricted bands.

All other emissions are required to meet a limit of -20 dBc with relation to the highest in band emission.

The highest emission observed was on 2440 MHz using vertical polarisation with a level of 118.4 dBuV/m recorded being recorded when a 100 kHz bandwidth peak detector was used

The transmitter was placed on the test table top which was a total of 0.8 m above the test site ground plane.

Measurements of the radiated field were attempted at 3 metres from the device with no emission being detected.

Measurements below 1000 MHz were made using a Quasi Peak Detector with a bandwidth of 120 kHz.

Measurements above 1000 MHz were made using an average detector with a bandwidth of 1.0 MHz and also a peak detector with a bandwidth of 1.0 MHz.

When an emission is located, it is positively identified and its maximum level is found by rotating the automated turntable, and by varying the antenna height with an automated antenna tower.

All emissions were measured in both vertical and horizontal antenna polarisations.

The emission level is determined in field strength by taking the following into consideration:

Level (dBμV/m) = Receiver Reading (dBμV) + Antenna Factor (dB/m) + Coax Loss (dB) – Amplifier Gain (dB)

**Result:** Complies
**Measurement uncertainty:** ± 4.1 dB

Transmitting continuously on 2405 MHz

| Frequency MHz | Vertical dBuV/m | Horizontal dBuV/m | Limit dBuV/m | Margin dB | Result | Antenna | Detector |
|---|---|---|---|---|---|---|---|
| 4808.920 | 61.3 | 59.2 | 74.0 | 12.7 | Pass | Vertical | Peak |
| | 44.0 | 42.1 | 54.0 | 10.0 | Pass | Vertical | Average |
| | | | | | | | |
| 7213.380 | 58.0 | 58.2 | 74.0 | 15.8 | Pass | Horizontal | Peak |
| | 43.0 | 43.0 | 54.0 | 11.0 | Pass | Vertical | Average |
| | | | | | | | |
| 9617.840 | 59.2 | 61.3 | 98.3 | 37.0 | Pass | Horizontal | Peak |
| | | | | | | | |
| 12022.300 | < 59.0 | < 59.0 | 74.0 | > 15.0 | Pass | Vert/Hort | Peak |
| | < 46.0 | < 46.0 | 54.0 | > 8.0 | Pass | Vert/Hort | Average |
| | | | | | | | |
| 14426.760 | < 59.0 | < 59.0 | 98.3 | > 39.3 | Pass | Vert/Hort | Peak |
| | | | | | | | |
| 16831.220 | < 59.0 | < 59.0 | 98.3 | > 39.3 | Pass | Vert/Hort | Peak |
| | | | | | | | |
| 19235.680 | < 59.0 | < 59.0 | 74.0 | > 15.0 | Pass | Vert/Hort | Peak |
| | < 46.0 | < 46.0 | 54.0 | > 8.0 | Pass | Vert/Hort | Average |
| | | | | | | | |
| 21640.140 | < 59.0 | < 59.0 | 98.3 | > 39.3 | Pass | Vert/Hort | Peak |
| | | | | | | | |
| 24044.600 | < 59.0 | < 59.0 | 74.0 | > 15.0 | Pass | Vert/Hort | Peak |
| | < 46.0 | < 46.0 | 54.0 | > 8.0 | Pass | Vert/Hort | Average |

Transmitting continuously on 2440 MHz

| Frequency MHz | Vertical dBuV/m | Horizontal dBuV/m | Limit dBuV/m | Margin dB | Result | Antenna | Detector |
|---|---|---|---|---|---|---|---|
| 4878.920 | 63.5 | 62.6 | 74.0 | 10.5 | Pass | Vertical | Peak |
| | 44.0 | 42.1 | 54.0 | 10.0 | Pass | Vertical | Average |
| | | | | | | | |
| 7318.380 | 61.5 | 61.3 | 74.0 | 12.5 | Pass | Vertical | Peak |
| | 43.0 | 43.0 | 54.0 | 11.0 | Pass | Vertical | Average |
| | | | | | | | |
| 9757.840 | 63.3 | 64.1 | 98.3 | 34.2 | Pass | Horizontal | Peak |
| | | | | | | | |
| 12197.300 | < 59.0 | < 59.0 | 74.0 | > 15.0 | Pass | Vert/Hort | Peak |
| | < 46.0 | < 46.0 | 54.0 | > 8.0 | Pass | Vert/Hort | Average |
| | | | | | | | |
| 14636.760 | < 59.0 | < 59.0 | 98.3 | > 39.3 | Pass | Vert/Hort | Peak |
| | | | | | | | |
| 17076.220 | < 59.0 | < 59.0 | 98.3 | > 39.3 | Pass | Vert/Hort | Peak |
| | | | | | | | |
| 19515.680 | < 59.0 | < 59.0 | 74.0 | > 15.0 | Pass | Vert/Hort | Peak |
| | < 46.0 | < 46.0 | 54.0 | > 8.0 | Pass | Vert/Hort | Average |
| | | | | | | | |
| 21955.140 | < 59.0 | < 59.0 | 98.3 | > 39.3 | Pass | Vert/Hort | Peak |
| | | | | | | | |
| 24394.600 | < 59.0 | < 59.0 | 74.0 | > 15.0 | Pass | Vert/Hort | Peak |
| | < 46.0 | < 46.0 | 54.0 | > 8.0 | Pass | Vert/Hort | Average |

Transmitting continuously on 2475 MHz

| Frequency MHz | Vertical dBuV/m | Horizontal dBuV/m | Limit dBuV/m | Margin dB | Result | Antenna | Detector |
|---|---|---|---|---|---|---|---|
| 4948.920 | 62.7 | 62.6 | 74.0 | 11.3 | Pass | Vertical | Peak |
| | 44.0 | 42.1 | 54.0 | 10.0 | Pass | Vertical | Average |
| | | | | | | | |
| 7423.380 | 61.5 | 61.3 | 74.0 | 12.5 | Pass | Vertical | Peak |
| | 43.0 | 43.0 | 54.0 | 11.0 | Pass | Vertical | Average |
| | | | | | | | |
| 9897.840 | 61.9 | 64.1 | 98.3 | 34.2 | Pass | Horizontal | Peak |
| | | | | | | | |
| 12372.300 | < 59.0 | < 59.0 | 74.0 | > 15.0 | Pass | Vert/Hort | Peak |
| | < 46.0 | < 46.0 | 54.0 | > 8.0 | Pass | Vert/Hort | Average |
| | | | | | | | |
| 14846.760 | < 59.0 | < 59.0 | 98.3 | > 39.3 | Pass | Vert/Hort | Peak |
| | | | | | | | |
| 17321.220 | < 59.0 | < 59.0 | 98.3 | > 39.3 | Pass | Vert/Hort | Peak |
| | | | | | | | |
| 19795.680 | < 59.0 | < 59.0 | 74.0 | > 15.0 | Pass | Vert/Hort | Peak |
| | < 46.0 | < 46.0 | 54.0 | > 8.0 | Pass | Vert/Hort | Average |
| | | | | | | | |
| 22270.140 | < 59.0 | < 59.0 | 74.0 | > 15.0 | Pass | Vert/Hort | Peak |
| | < 46.0 | < 46.0 | 54.0 | > 8.0 | Pass | Vert/Hort | Average |
| | | | | | | | |
| 24744.600 | < 59.0 | < 59.0 | 74.0 | > 15.0 | Pass | Vert/Hort | Peak |
| | < 46.0 | < 46.0 | 54.0 | > 8.0 | Pass | Vert/Hort | Average |

**Section 15.247(e) – Power Spectral Density**

Power spectral density measurements were made at the antenna port of this transmitter.

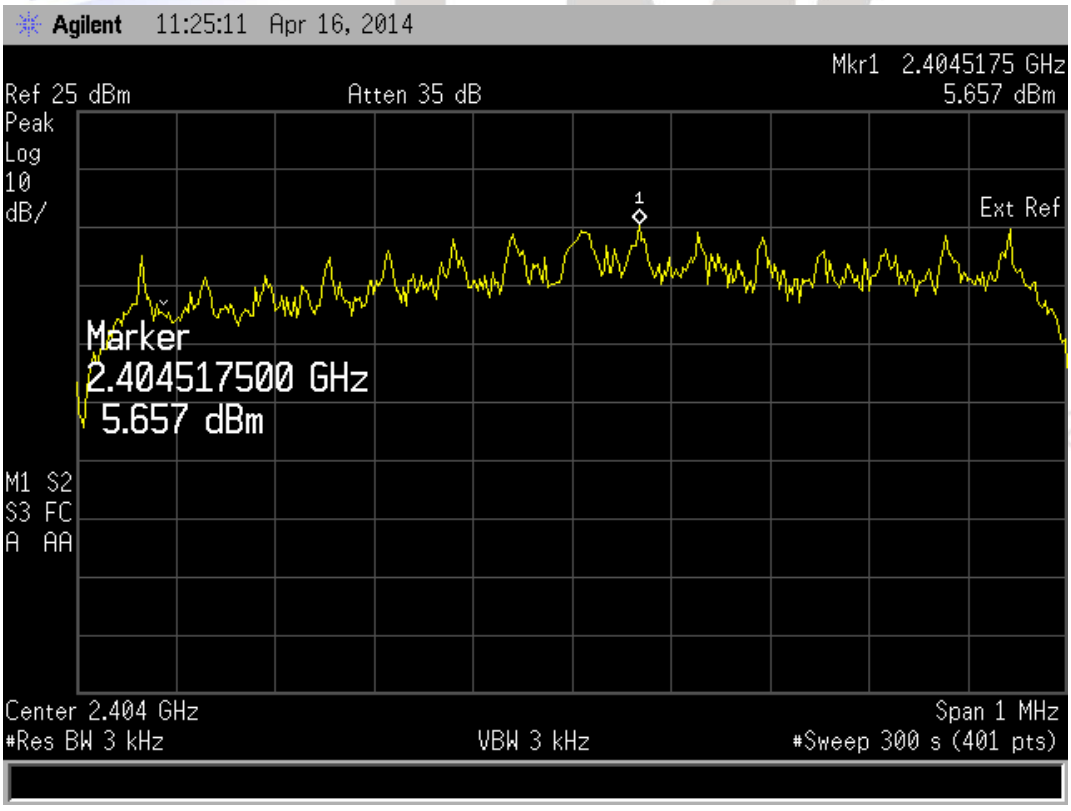
The frequency of the highest emission was determined using a spectrum analyser with a resolution bandwidth that was slowly decreased from 1 MHz down to 3 kHz.

The power of the highest emission level was determined using a spectrum analyser with a resolution bandwidth of 3 kHz.

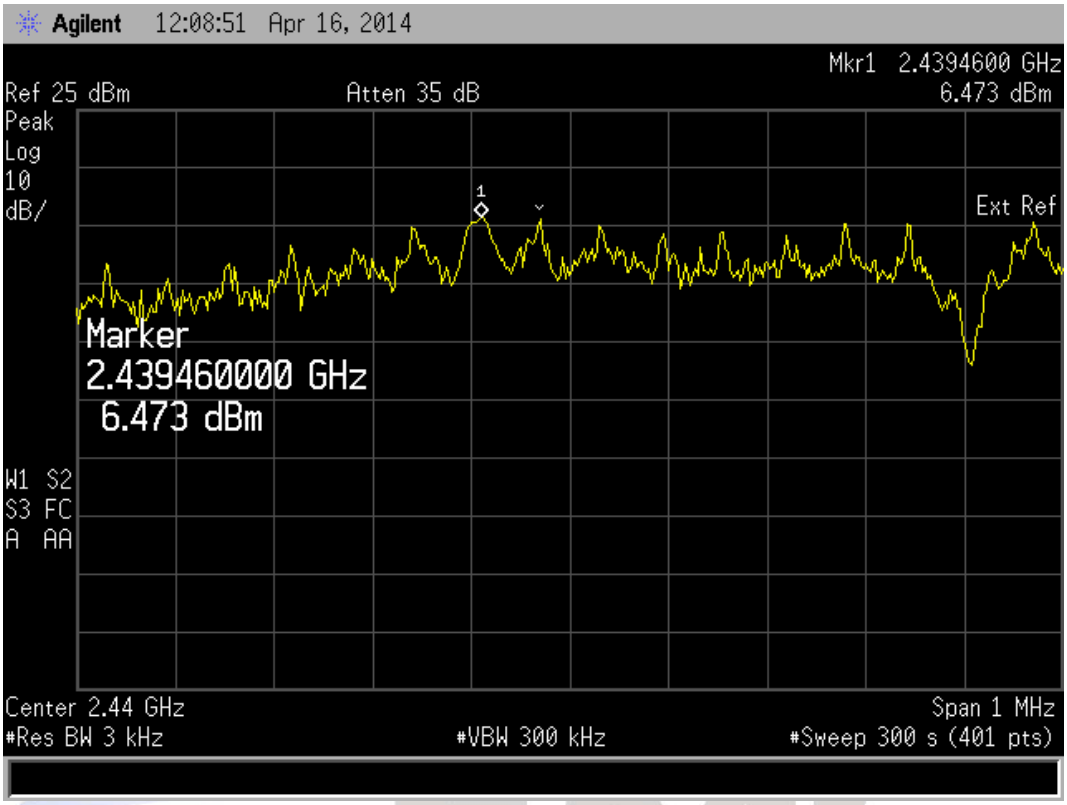
| Transmit Frequency (MHz) | Emission Frequency (MHz) | Power (dBm) | Limit (dBm) |
|---|---|---|---|
| 2405.000 | 2404.5175 | 5.7 | 8.0 |
| 2440.000 | 2439.4600 | 6.5 | 8.0 |
| 2475.000 | 2474.5225 | 5.1 | 8.0 |

**Result:** Complies.
Measurement uncertainty with a confidence interval of 95% is: ± 1.5 dB.

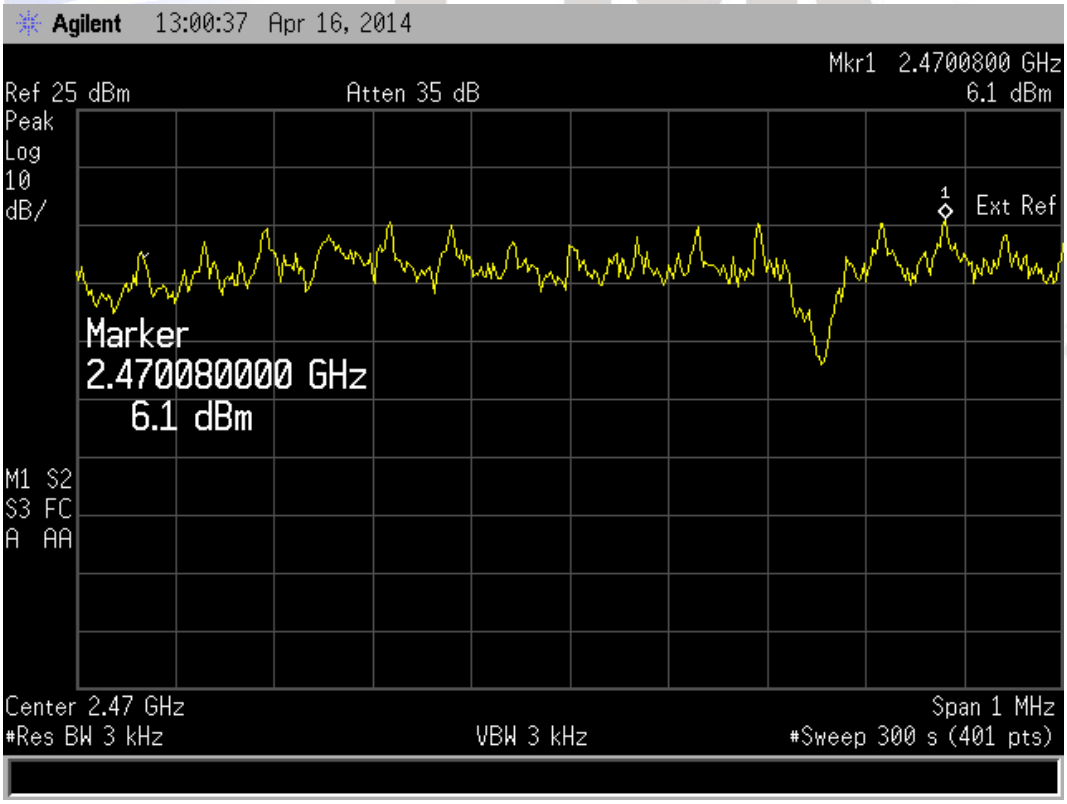
**2405 MHz**



**2440 MHz**




**2475 MHz**



**Section 15.247(i) – Radio Frequency Hazard Information**

As per Section 15.247 (i) spread spectrum transmitters operating in the 2400 – 2483.5 MHz band are required to be operated in a manner that ensures that the public is not exposed to RF energy levels in accordance with CFR 47, Section 1.1307(b)(1).

The device when in operation is fixed and a safe distance could be maintained when events are undertaken.

In accordance with Section 1.1310 the Maximum Permissible Exposure (MPE) limits for the General Population / Uncontrolled Exposure of 1 $mW/cm^2$ has been applied.

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

E, V/m = (√ (30 * P * G)) / d
Power density, $mW/cm^2 = E^2/3770$
E for MPE: $1 = E^2/3770$
E = √ 1*3770
E = 61.4 V/m

The highest radiated power has been measured to be +23.3 dBm or 0.2089 watts EIRP.

Therefore:
E = √ (30 * P * G) / d
d = √ (30 * P * G) / E
d = √ (30 * 0.2089) / 61.4
d = 0.041 m or 4.1 cm

**Result:** Complies if a minimum safe distance of 20 cm is specified in the set up instructions for this system.

# 7. TEST EQUIPMENT USED

| Instrument | Manufacturer | Model | Serial No | Asset Ref | Cal Due | Interval |
|---|---|---|---|---|---|---|
| Aerial Controller | EMCO | 1090 | 9112-1062 | RFS 3710 | N/A | - |
| Aerial Mast | EMCO | 1070-1 | 9203-1661 | RFS 3708 | N/A | - |
| Turntable | EMCO | 1080-1-2.1 | 9109-1578 | RFS 3709 | N/A | - |
| Receiver | R & S | ESHS 10 | 828404/005 | 3728 | 21 Aug 2014 | 1 year |
| Mains Network | R & S | ESH2-Z5 | 881362/032 | 3628 | 21 Aug 2014 | 1 year |
| Receiver | R & S | ESIB 40 | 100171 | R-27-1 | 29 Jan 2015 | 1 year |
| Spectrum Analyser | Hewlett Packard | E7405A | US39150142 | 3771 | 26 May 2014 | 1 year |
| VHF Balun | Schwarzbeck | VHA 9103 | - | RFS 3603 | 7 Feb 2015 | 1 year |
| Biconical Antenna | Schwarzbeck | BBA 9106 | - | RFS 3612 | 7 Feb 2015 | 1 year |
| Log Periodic | Schwarzbeck | VUSLP 9111 | 9111-228 | 3785 | 7 Feb 2015 | 1 year |
| Horn Antenna | EMCO | 3115 | 9511-4629 | E1526 | 10 May 2015 | 1 year |
| SG Horn Antenna | EMCO | 3160-04 | 00224819 | - | 11 Sept 2015 | 3 years |
| SG Horn Antenna | EMCO | 3160-05 | 00114635 | - | 11 Sept 2015 | 3 years |
| SG Horn Antenna | EMCO | 3160-06 | 00114821 | - | 11 Sept 2015 | 3 years |
| SG Horn Antenna | EMCO | 3160-07 | 00144919 | - | 11 Sept 2015 | 3 years |
| SG Horn Antenna | EMCO | 3160-08 | 00114637 | - | 11 Sept 2015 | 3 years |
| Horn Antenna | EMCO | 3116 | 92035 | - | 10 May 2015 | 1 year |
| Loop Antenna | EMCO | 6502 | 9003-2485 | 3798 | 12 Dec 2014 | 1 year |

# 8. ACCREDITATIONS

Testing was carried out in accordance with EMC Technologies Ltd registration with the Federal Communications Commission as a listed facility, registration number: 90838, which was updated in July, 2013.

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

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

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

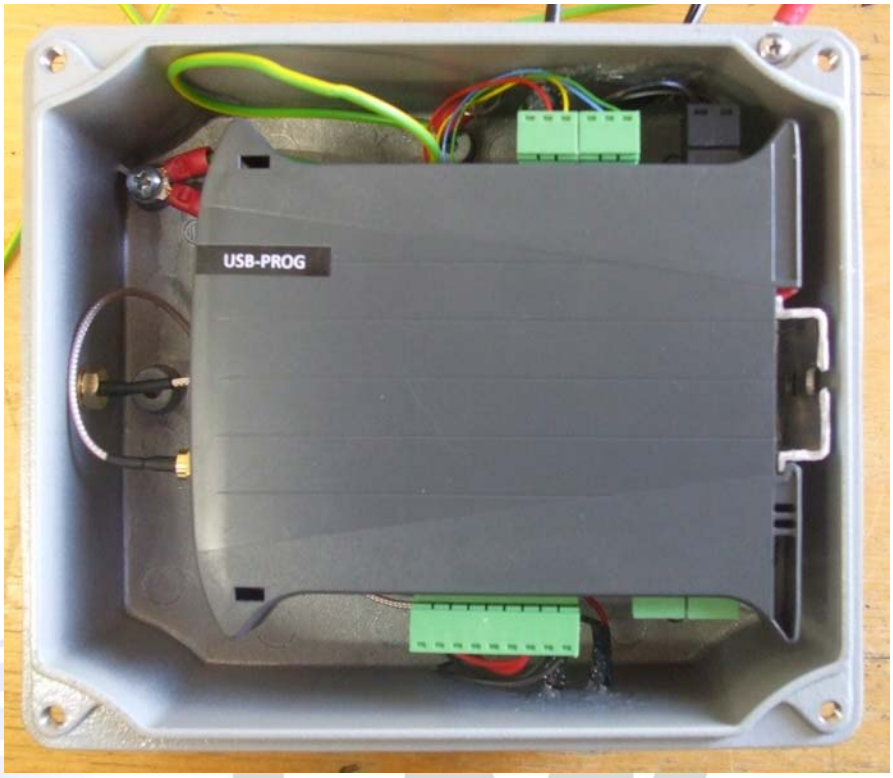
# 9. PHOTOGRAPHS

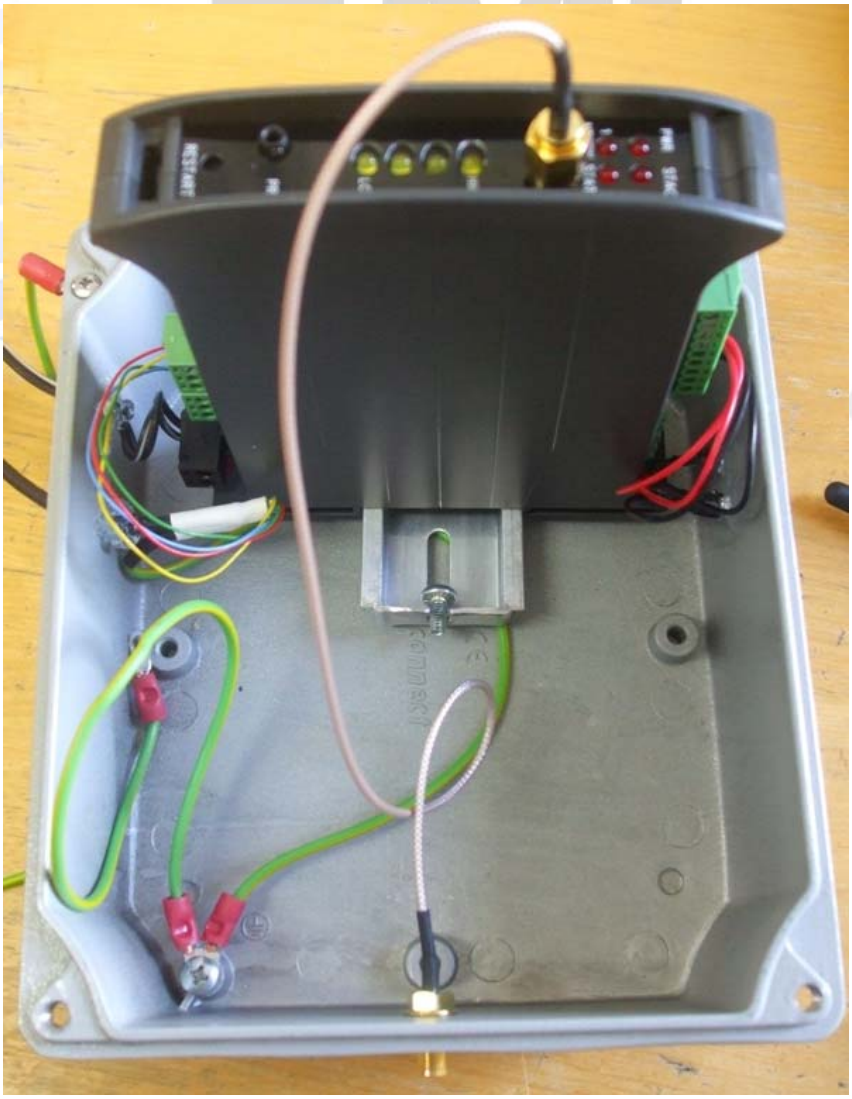
External Photos

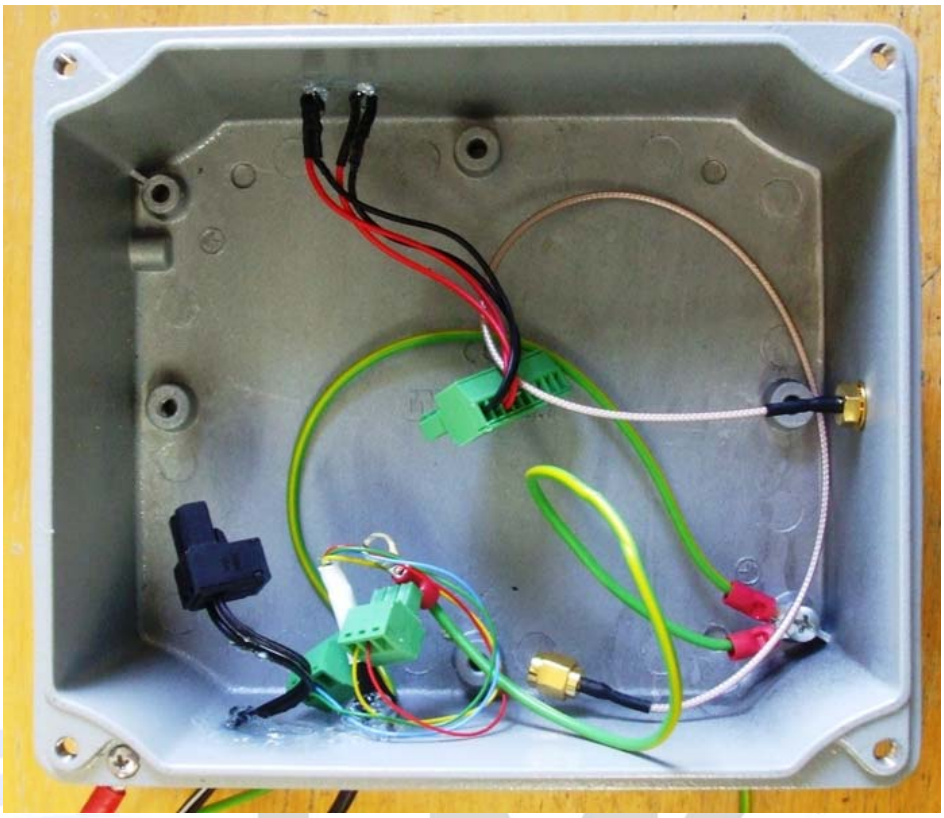


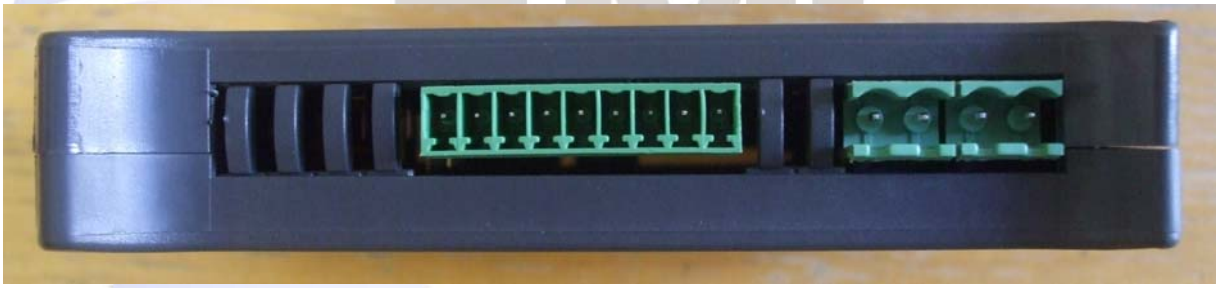

Antenna connector

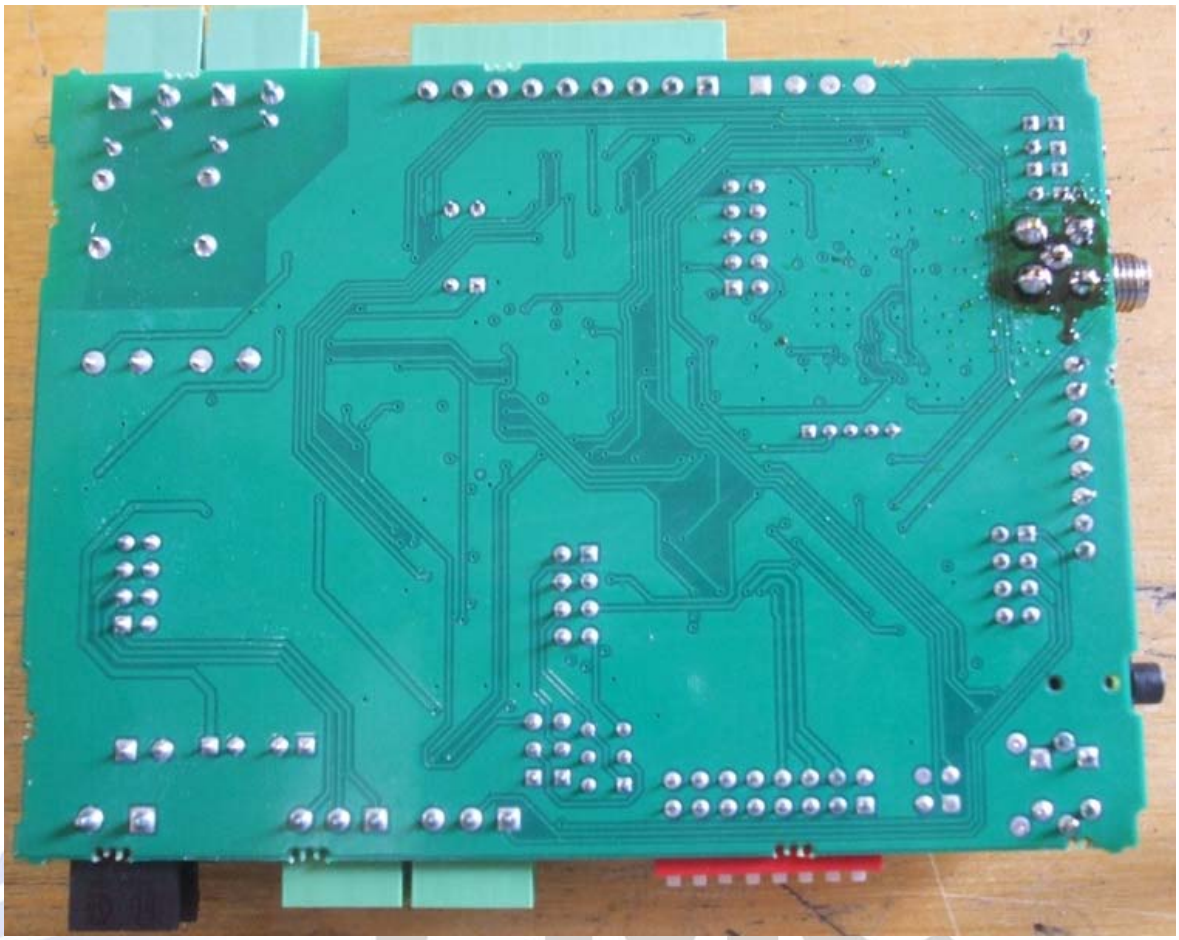
Internal photos

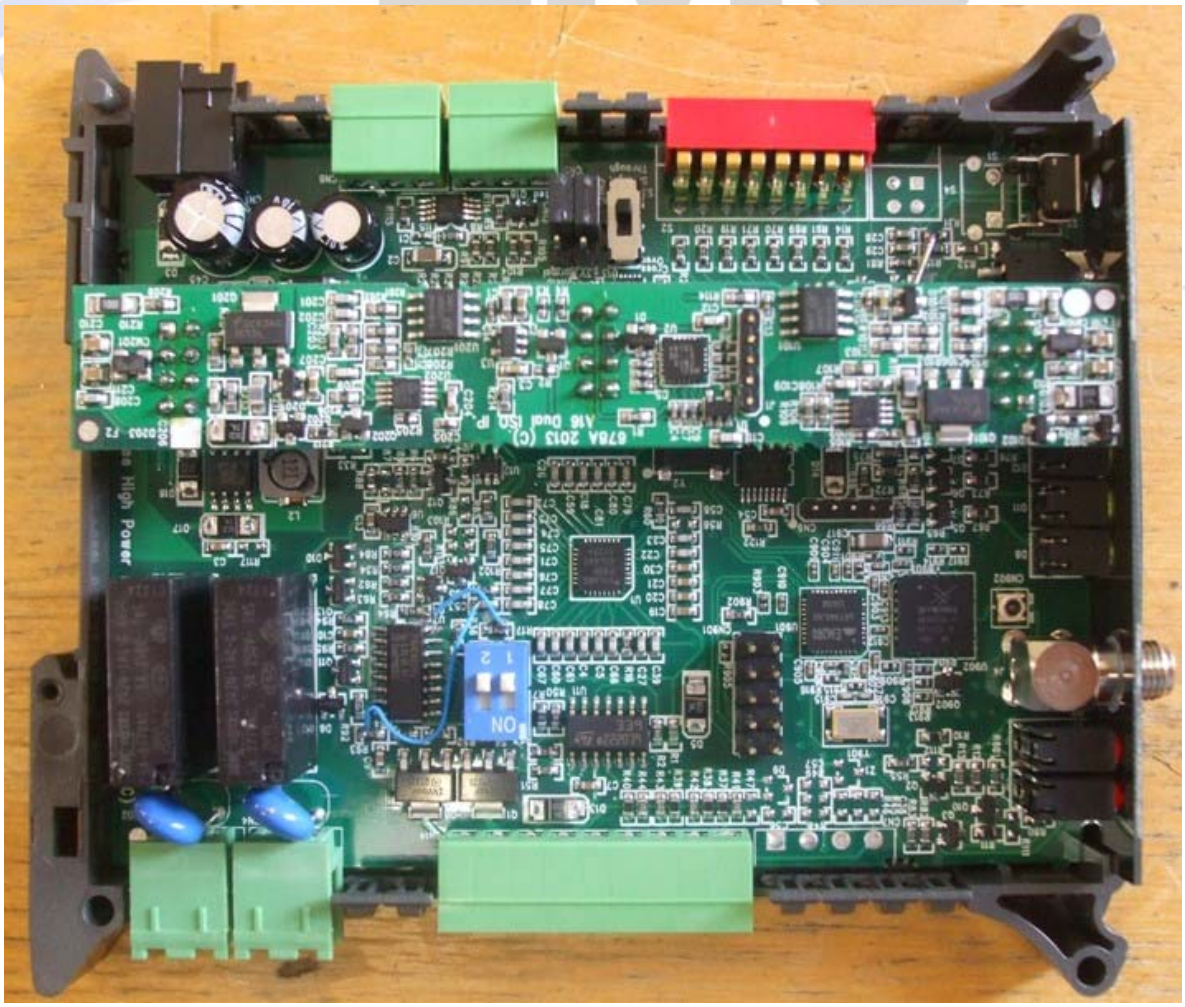


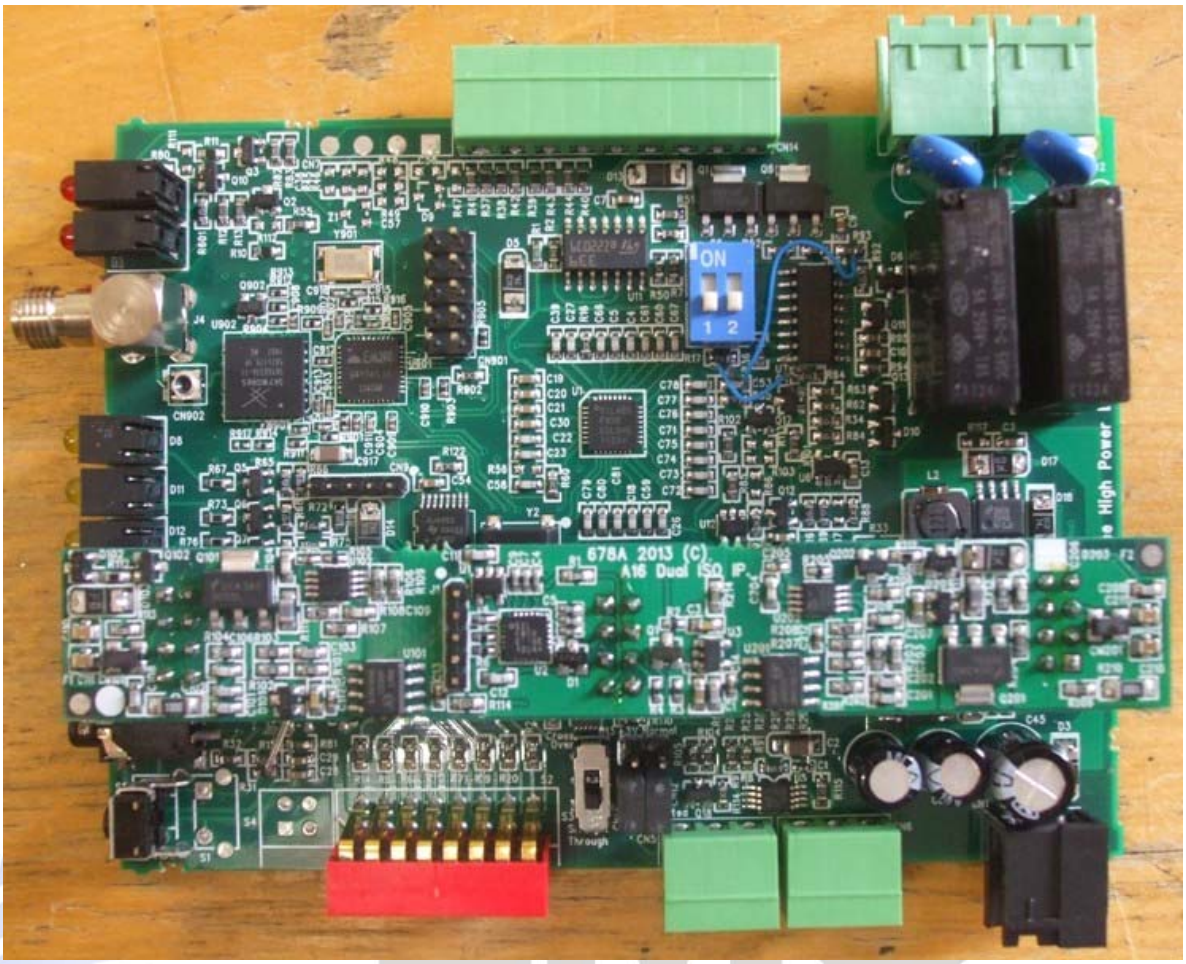



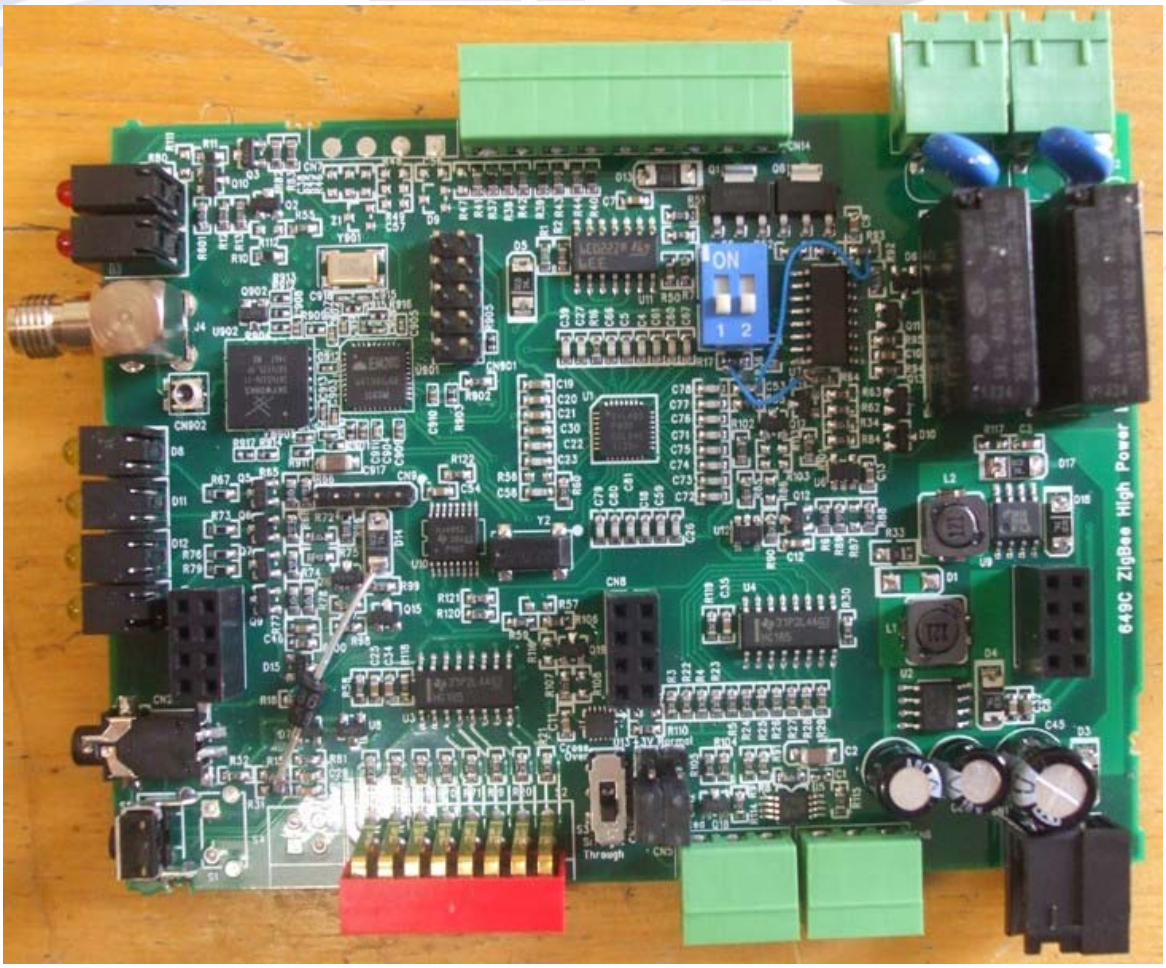


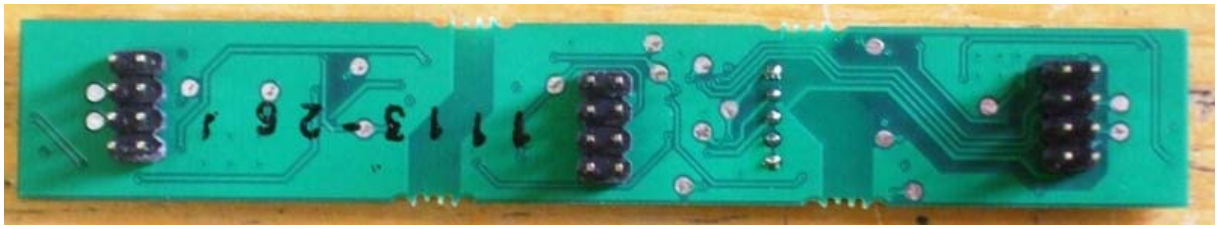


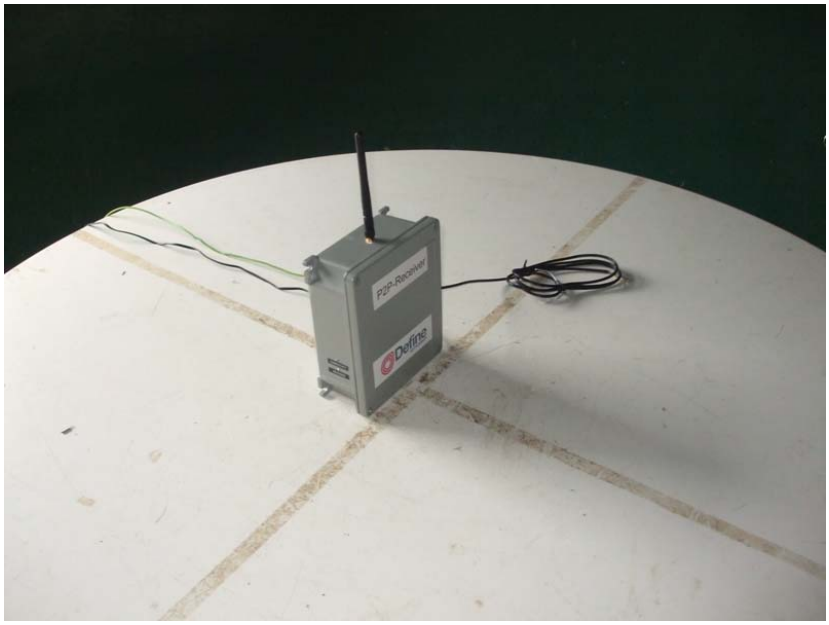




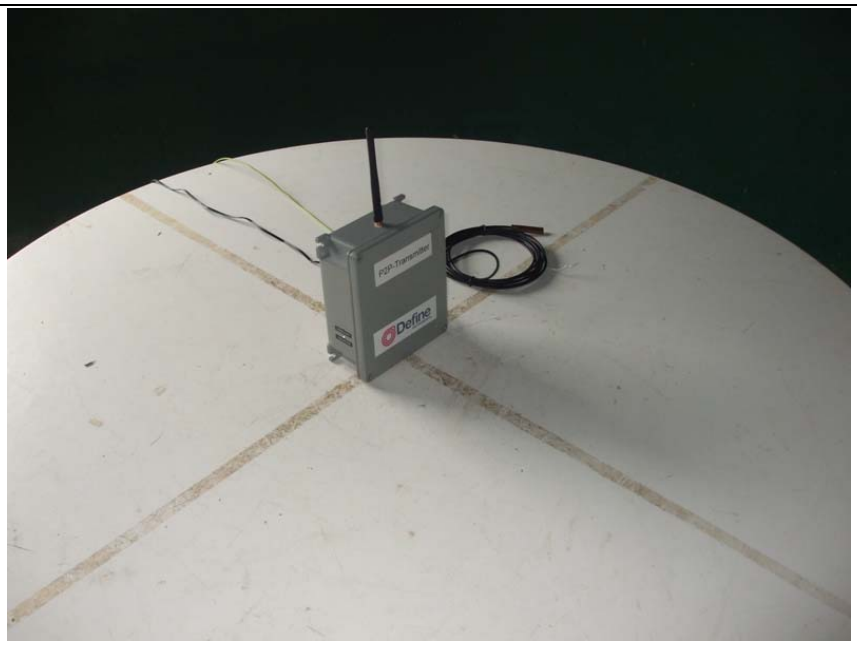





Radiated emissions test set up photos







Radiated emissions test set up photos – Below 30 MHz

Radiated emissions test set up photos – Above 30 MHz

Conducted Emissions Test Set Up