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TEST REPORT

Millar TR190 Configurator USB Transceiver

tested to the

Code of Federal Regulations (CFR) 47

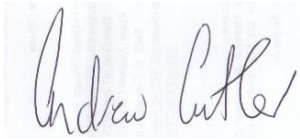
Part 15 – Radio Frequency Devices, Subpart C – Intentional Radiators

Section 15.249 – Operation in the band 2400 – 2483.5 MHz

for

Millar Instruments Ltd

This Test Report is issued with the authority of:



Andrew Cutler - General Manager

IANZ ACCREDITED LABORATORY

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

Table of Contents

1. STATEMENT OF COMPLIANCE

The **Millar TR190 Configurator USB Transceiver** complies with 47 CFR Part 15 and in particular Sections, 15.205, 15.207, 15.209, 15.215 and 15.249 as detailed below when tested in accordance with ANSI C63.10 – 2013.

2. RESULTS SUMMARY

The results of testing carried out in May 2016 are detailed below.

Clause	Description	Result
15.201	Equipment authorisation requirement	Class 2 permissive change applied
15.203	Antenna requirement	Complies
15.204	External power amplifiers	Not applicable
15.205	Operation in restricted bands	Complies
15.207	Conducted emissions	Complies
15.209	Radiated emissions	See below
15.215	Additional provisions	Complies
15.249 (a)	Field strength of fundamental	Complies
15.249 (a)	Field strength of harmonics	Complies
15.249 (b)	Fixed, point to point operations	Not applicable
15.249 (c)	3 metre measurement distance	Noted
15.249 (d)	Spurious emission levels except harmonics	Complies
15.249 (e)	Detectors above 1000 MHz	Noted
15.249 (f)	Reference to section 15.37(d)	Noted

3. CLIENT INFORMATION

Company Name	Millar Instruments Ltd
Address	Level 1, 70 Symonds Street Grafton
City	Auckland 1010
Country	New Zealand
Contact	Mr Daniel McCormick

4. DESCRIPTION OF TEST SAMPLE

Brand Name	Millar
Model	TR190
Product	Configurator USB Transceiver
Manufacturer	Millar Ltd
Country of Origin	New Zealand
Serial Number	9814
FCC ID	V58HU72

5. EQUIPMENT PARAMETERS

The 2.4 GHz transceiver in this device has the following RF specifications:

FCC Band:	2400 MHz – 2483.5 MHz
Test Frequencies:	2402 MHz
Operating Range:	2402 – 2480 MHz
Rated Power:	1.00 mW (+0 dBm)
Modulation Type:	38 ms GFSK packet sent every 66 ms
Antenna Type:	External whip
Power Supply:	USB port supplied by a laptop computer
Clock frequencies	16 MHz for microcontroller 48 MHz for USB controller

This device has previously been tested and certified with 2405 MHz being the lowest operating frequency.

Re-testing has been carried out with 2402 MHz now being the lowest operating frequency.

The device tested is a 2.4 GHz transceiver that is used to communicate with the Smartpad charging pad and the Telemeter animal monitoring devices.

This device controls the operation of these devices and collects data from them.

Typically the device would be used in a laboratory environment and would used to monitor telemeter devices that are attached to rats and mice and to control the smart charger device that charges the telemeter devices.

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.

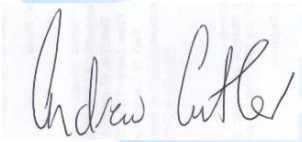
This report contains no corrections or erasures.

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.

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

Section 15.201: Equipment authorisation requirement

Certification as detailed in Subpart J of Part 2 has previously been granted for this device as it contains a 2.4 GHz transmitter.

The lowest frequency of operation has been changed from 2405 MHz to 2402 MHz hence a Class 2 permissive change will be required.

Section 15.203 – Antenna requirement

This device uses a 2.4 GHz external whip antenna that has a reverse SMA connector

Result: Complies

Section 15.204: External radio frequency power amplifiers and antenna modifications

An external power amplifier is NOT supplied with this device.

Result: Complies.

Section 15.205 – Restricted bands of operation

Refer to measurements made with reference to Section 15.249 (a).

This device operates in the 2400 – 2483.5 MHz which is not a restricted band.

Result: Complies.

Section 15.207: Conducted limits

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

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

Testing was carried out when the device was operating in standby mode and when transmitting continuously on 2402 MHz (channel 1).

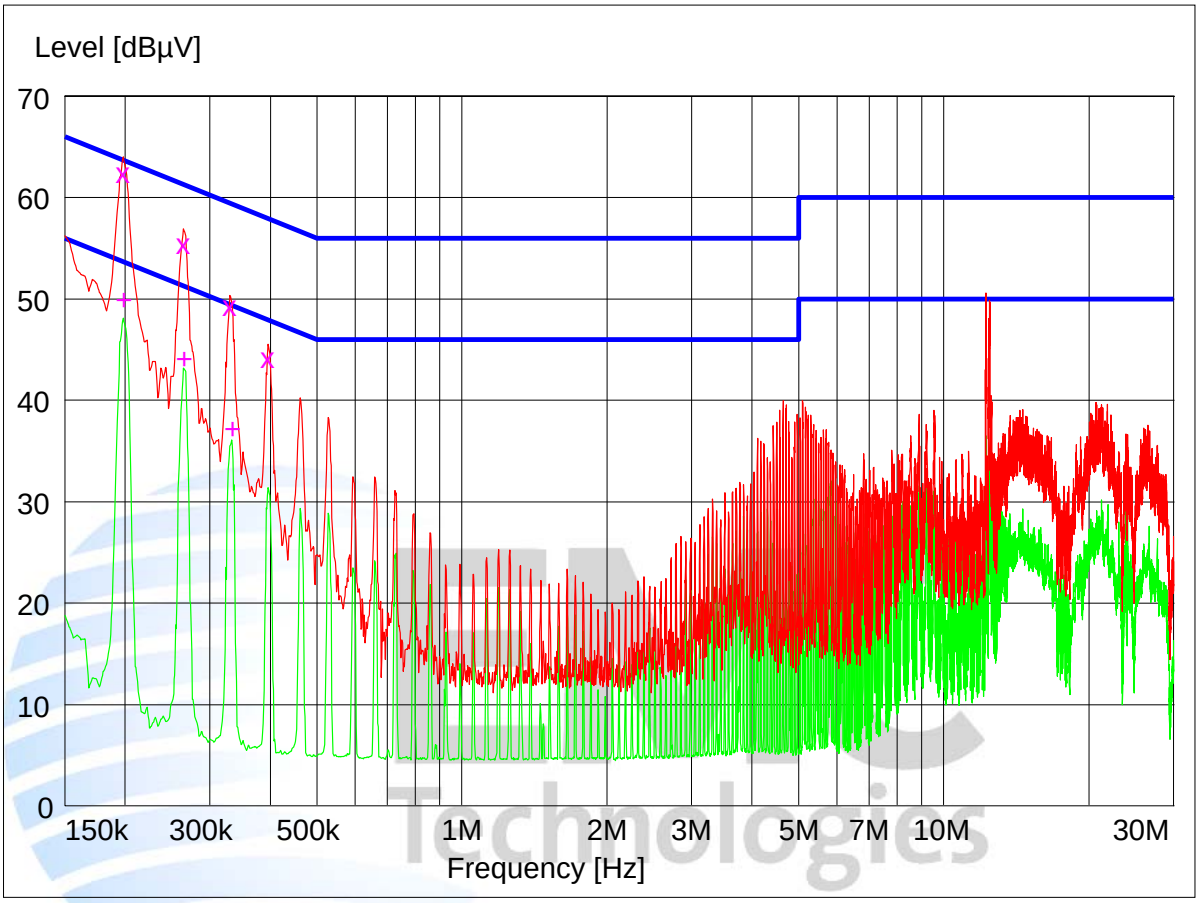
Result: Complies.

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:	Device tested when operating in standby mode when attached to a laptop computer that was powered at 120 Vac 60 Hz.

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



Final Quasi-Peak Measurements

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Phase	Rechecks (dBµV)
0.198000	62.60	63.7	1.1	L1	
0.264000	55.60	61.3	5.7	N	
0.330000	49.50	59.5	10.0	N	
0.396000	44.40	58.0	13.6	L1	
12.237500	32.50	60.0	27.5	L1	
12.372500	31.60	60.0	28.4	L1	
12.422000	35.70	60.0	34.3	L1	
12.462500	29.40	60.0	30.6	L1	

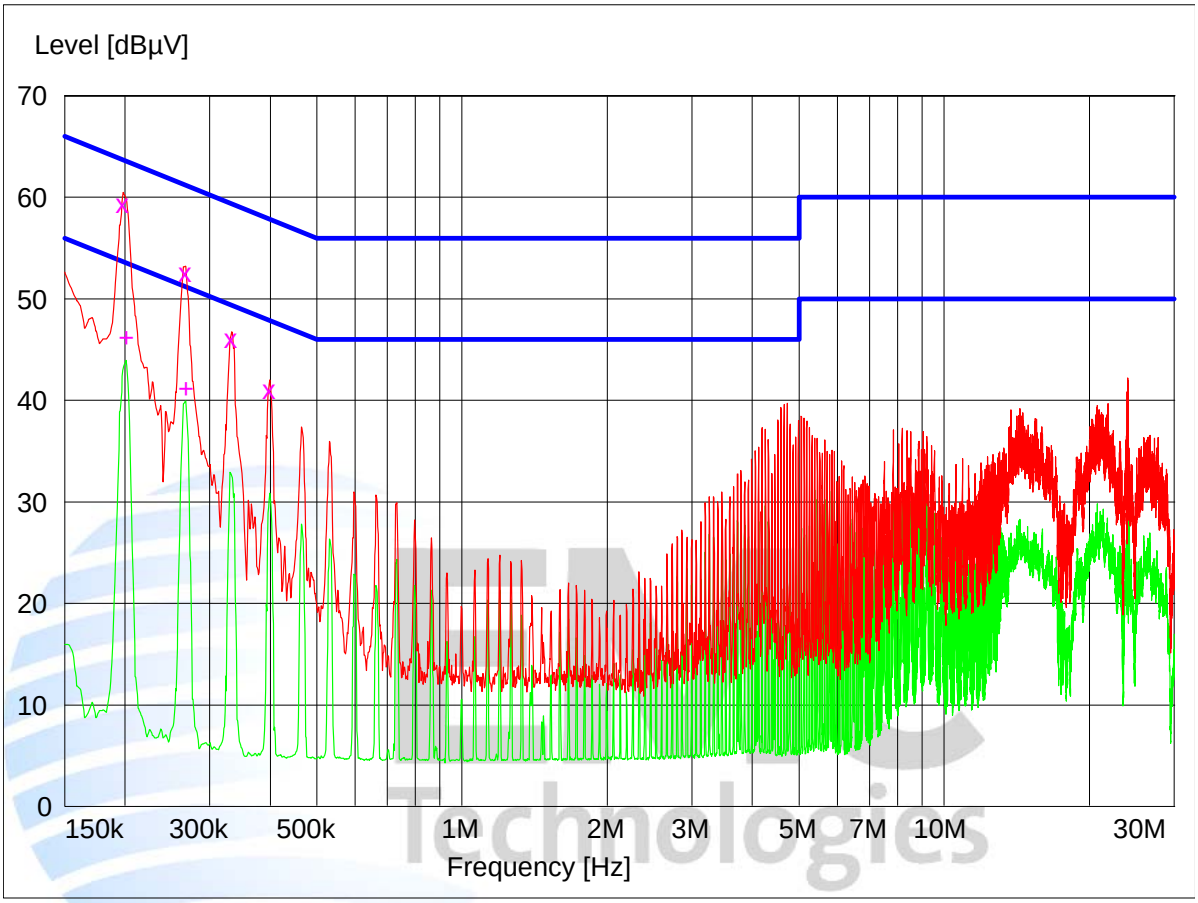
Final Average Measurements

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Phase	Rechecks (dBµV)
0.198000	50.10	53.7	3.6	N	
0.264000	44.30	51.3	7.0	N	
0.333000	37.40	49.4	12.0	N	
12.237500	25.50	50.0	24.5	L1	
12.462500	32.00	50.0	18.0	L1	

Conducted Emissions – AC Input Power Port

Setup:	Device tested when transmitting continuously on channel 1 (2402 MHz) when attached to a laptop computer that was powered at 120 Vac 60 Hz.

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



Final Quasi-Peak Measurements

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Phase	Rechecks (dBµV)
0.198000	59.40	63.7	4.3	L1	
0.267000	52.60	61.2	8.6	L1	
0.333000	46.10	59.4	13.3	L1	
0.399000	41.10	57.8	16.7	N	

Final Average Measurements

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Phase	Rechecks (dBµV)
0.201000	46.20	53.6	7.4	N	
0.267000	41.20	51.2	10.0	N	

Section 15.209 – Radiated emissions below 30 MHz

In accordance with section 15.249 (d) the general emission limits specified in Section 15.209 (a) have been applied to all emissions except the transmitter harmonics.

See Section 15.249 (a) for further details.

As this device contains digital devices that operate using frequencies below 30 MHz (16 MHz clock), 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.

Testing was carried out using when the device was attached to a representative Laptop Computer that was powered at 120 Vac 60 Hz.

Testing was carried out with the device being placed in the centre of the test table laying flat with the antenna vertical and it was placed to the right hand side of the laptop computer.

The device under test and the laptop were connected using a USB cable that was approximately 50 cm long.

The device was tested transmitting continuously on 2402 MHz.

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 15.209 – Radiated emissions above 30 MHz

In accordance with section 15.249 (d) the general emission limits specified in Section 15.209 (a) have been applied to all emissions except the transmitter harmonics.

See Section 15.249 (a) for further details.

Testing for general radiated emissions was carried out over the frequency range of 30 MHz to 1000 MHz as the highest frequency in use by the digital device in this device is less than 108 MHz (16 MHz and 48 MHz).

Testing was carried out at the laboratory's open area test site - located at Driving Creek, Orere Point, Auckland, New Zealand. This site conforms to the requirements of CISPR 16 and ANSI C63.4 - 2003.

Testing was carried out using when the device was attached to a representative Laptop Computer that was powered at 120 Vac 60 Hz.

Testing was carried out with the device being placed in the centre of the test table laying flat with the antenna vertical and it was placed to the right hand side of the laptop computer.

The device under test and the laptop were connected using a USB cable that was approximately 50 cm long.

The device was tested running supplied diagnostic software which monitored the charge level of a telemeter that had been placed on the Smart Pad and was being charged

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, where appropriate, with an automated antenna tower.

Above 30 MHz the emission is measured in both vertical and horizontal antenna polarisations, where appropriate, using a quasi peak detector.

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

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

Result: Complies.

Measurement uncertainty with a confidence interval of 95% is:
- Free radiation tests (30 – 1000 MHz) ± 4.1 dB

Results:

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna	Detector	BW
31.800	33.2		40.0	6.8	Vertical	QP	120k
36.000	36.0	36.5	40.0	3.5	Horizontal	QP	120k
40.810	36.1		40.0	3.9	Vertical	QP	120k
43.200	35.3		40.0	4.7	Vertical	QP	120k
48.000	38.5	35.7	40.0	1.5	Vertical	QP	120k
60.000	28.8	32.4	40.0	7.6	Horizontal	QP	120k
87.900	25.1		40.0	14.9	Vertical	QP	120k
108.000		29.9	43.5	13.6	Horizontal	QP	120k
120.000	26.8	37.8	43.5	5.7	Horizontal	QP	120k
132.000		37.0	43.5	6.5	Horizontal	QP	120k
144.000	29.4	37.3	43.5	6.2	Horizontal	QP	120k
168.000	29.6		43.5	13.9	Vertical	QP	120k
180.000	25.7		43.5	17.8	Vertical	QP	120k
192.000	35.5	37.1	43.5	6.4	Horizontal	QP	120k
216.000		32.8	43.5	10.7	Horizontal	QP	120k
240.000	30.5	35.1	46.0	10.9	Horizontal	QP	120k
250.000	27.2		46.0	18.8	Vertical	QP	120k
264.000	30.2	35.5	46.0	10.5	Horizontal	QP	120k
288.000	31.3	38.3	46.0	7.7	Horizontal	QP	120k
311.851		32.1	46.0	13.9	Horizontal	QP	120k
336.000	31.5	40.3	46.0	5.7	Horizontal	QP	120k
384.000	28.7		46.0	17.3	Vertical	QP	120k
432.000	34.5	38.6	46.0	7.4	Horizontal	QP	120k
528.000	32.1		46.0	13.9	Vertical	QP	120k

All further emissions observed from the system tested had a margin to the limit that exceeded 20 dB when measurements were attempted up to 1000 MHz using either horizontal or vertical polarisations.

It is very likely that most of the emissions observed were from the laptop computer and not the device under test.

Section 15.215 (c) – Additional provisions to the general radiated emission limitations

The device operates in the 2400 – 2483.5 MHz band.

Relative spectrum mask measurements have been made when the device was operating on 2402 MHz, 2405 MHz and 2480 MHz.

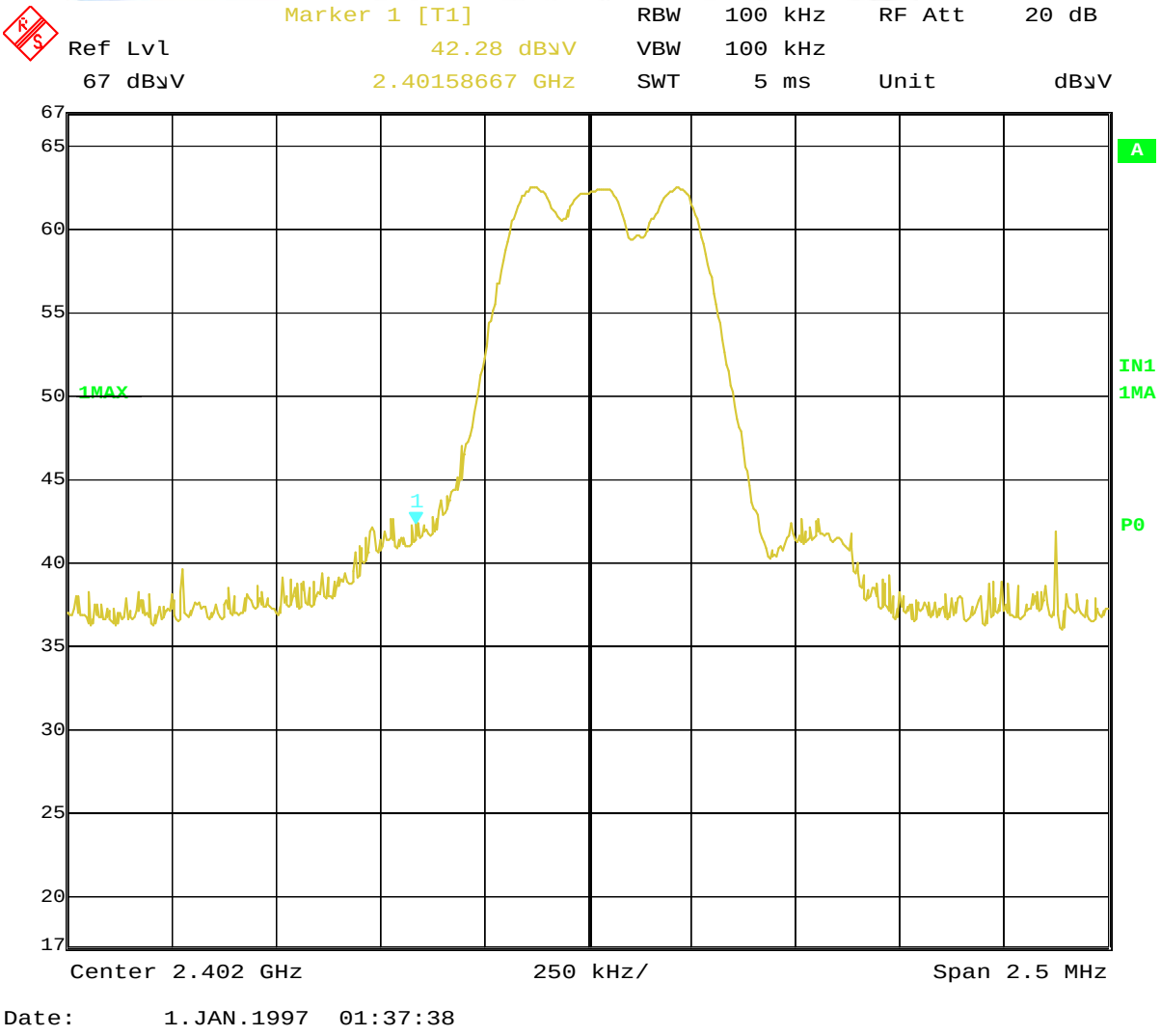
Measurements have actually been made at the -20 dB points.

Frequency (MHz)	F low (MHz)	F high (MHz)
2402.000	2401.58667	-
*2405.000	2404.40000	
*2480.000	-	2481.30000

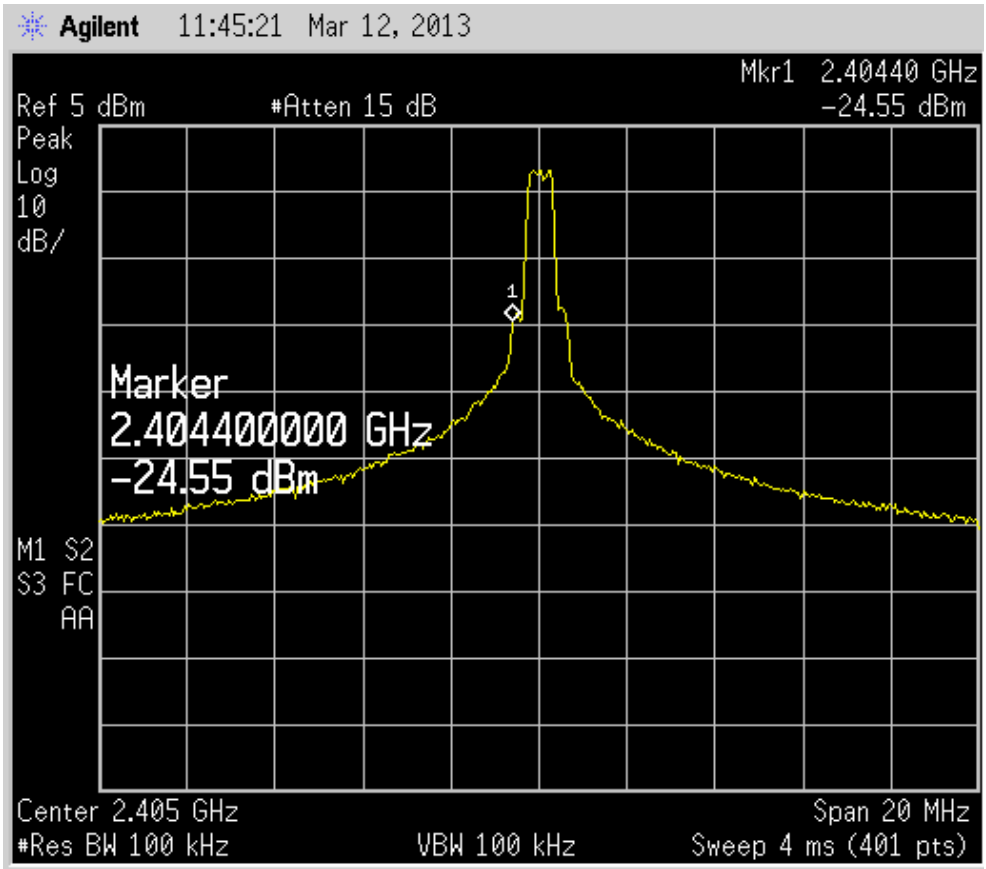
* Measurements on 2405 MHz and 2480 MHz were carried out in March 2013.

The device can be seen to stay within the band of 2400 – 2483.5 MHz at the -20 dB points

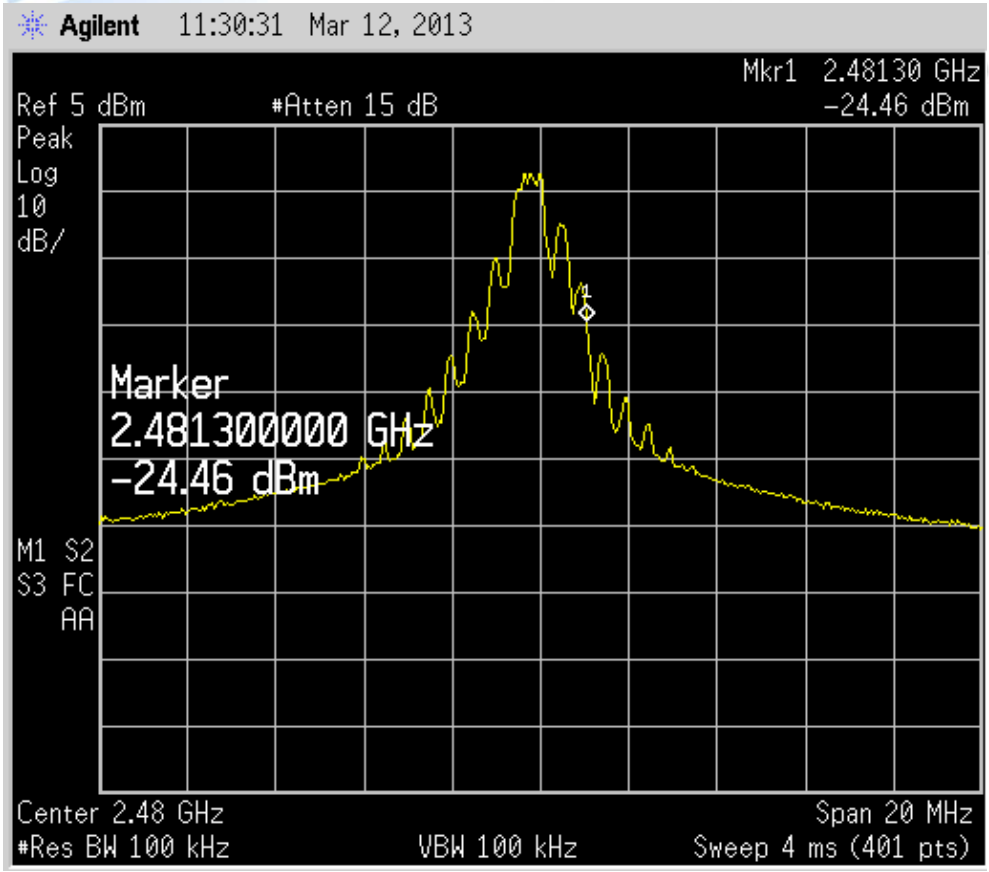
2402 MHz



2405 MHz



2480 MHz



Results: Complies

Section 15.249 (a) – Field strength of the Fundamental and Harmonics

Radiated emission measurements were carried out with the limits as per section 15.249 (a) being applied to the Fundamental and Harmonics of each transmitter.

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

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 made 3 metres from the transmitting antenna.

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 is measured in both vertical and horizontal antenna polarisations with no measurements were made above the 10th harmonic

Testing was carried out using when the device was attached to a representative Laptop Computer that was powered at 120 Vac 60 Hz.

Testing was carried out with the device being placed in the centre of the test table laying flat with the antenna vertical and it was placed to the right hand side of the laptop computer.

The device under test and the laptop were connected using a USB cable that was approximately 50 cm long.

The device was tested running supplied diagnostic software which allowed the device to transmit continuously on either 2405, 2440 or 2480 MHz.

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)

Fundamental emission

Testing was carried out as detailed below

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna	Detector	BW
2402.000	99.7	84.8	114.0	14.3	Vertical	Peak	1 MHz
	93.6	76.3	94.0	0.4	Vertical	Average	1 MHz
*2405.000	99.1	93.8	114.0	14.9	Vertical	Peak	1 MHz
	93.1	85.1	94.0	0.9	Vertical	Average	1 MHz
*2440.000	99.6	96.1	114.0	14.4	Vertical	Peak	1 MHz
	92.9	87.1	94.0	1.1	Vertical	Average	1 MHz
*2480.000	98.1	94.1	114.0	15.9	Vertical	Peak	1 MHz
	92.7	85.7	94.0	1.3	Vertical	Average	1 MHz

* Measurements on 2405 MHz, 2440 MHz and 2480 MHz were carried out in March 2013.

Section 15.249 specifies a limit of 50 mV/m (94 dBuV/m) when an average detector is used for devices operating in the band of 2400 – 2483.5 MHz.

A peak limit of 114 dBuV/m has also been applied.

This limit has been converted to dBuV/m using the formula 20 * (log 0.050 / 0.000001)

Result: Complies.

Measurement uncertainty with a confidence interval of 95% is:
- Free radiation tests (30 – 25,000 MHz) ± 4.1 dB

Spurious emissions

Transmitting on 2402 MHz

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna	Detector	BW
4804.000	57.5	55.5	74.0	16.5	Vertical	Peak	1 MHz
	44.5	42.2	54.0	9.5	Vertical	Average	1 MHz
7206.000	< 59	< 59	74.0	> 15	Horizontal	Peak	1 MHz
	< 46	< 46	54.0	> 8	Horizontal	Average	1 MHz
9608.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
12010.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
14413.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
16814.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
19216.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
21618.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
24020.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz

***Transmitting on 2405 MHz**

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna	Detector	BW
4810.000	60.6	55.5	74.0	13.4	Vertical	Peak	1 MHz
	50.6	42.1	54.0	3.4	Vertical	Average	1 MHz
7215.000	< 59	< 59	74.0	> 15	Horizontal	Peak	1 MHz
	< 46	< 46	54.0	> 8	Horizontal	Average	1 MHz
9620.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
12025.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
14430.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
16835.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
19240.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
21645.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
24050.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz

***Transmitting on 2440 MHz**

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna	Detector	BW
4880.000	57.1	55.5	74.0	16.9	Vertical	Peak	1 MHz
	43.0	42.4	54.0	11.0	Vertical	Average	1 MHz
7320.000	< 59	< 59	74.0	> 15	Horizontal	Peak	1 MHz
	< 46	< 46	54.0	> 8	Horizontal	Average	1 MHz
9760.000	< 59	< 59	74.0	> 15	Horizontal	Peak	1 MHz
	< 46	< 46	54.0	> 8	Horizontal	Average	1 MHz
12200.000	< 59	< 59	74.0	> 15	Horizontal	Peak	1 MHz
	< 46	< 46	54.0	> 8	Horizontal	Average	1 MHz
14640.000	< 59	< 59	74.0	> 15	Horizontal	Peak	1 MHz
	< 46	< 46	54.0	> 8	Horizontal	Average	1 MHz
17080.000	< 59	< 59	74.0	> 15	Horizontal	Peak	1 MHz
	< 46	< 46	54.0	> 8	Horizontal	Average	1 MHz
19520.000	< 59	< 59	74.0	> 15	Horizontal	Peak	1 MHz
	< 46	< 46	54.0	> 8	Horizontal	Average	1 MHz
21960.000	< 59	< 59	74.0	> 15	Horizontal	Peak	1 MHz
	< 46	< 46	54.0	> 8	Horizontal	Average	1 MHz
24400.000	< 59	< 59	74.0	> 15	Horizontal	Peak	1 MHz
	< 46	< 46	54.0	> 8	Horizontal	Average	1 MHz

***Transmitting on 2480 MHz**

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna	Detector	BW
4960.000	56.5	55.4	74.0	17.5	Vertical	Peak	1 MHz
	43.0	42.4	54.0	11.0	Vertical	Average	1 MHz
7440.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
9920.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
12400.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
14880.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
17360.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
19840.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
22320.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz
24800.000	< 59	< 59	74.0	> 15	Vert/Hort	Peak	1 MHz
	< 46	< 46	54.0	> 8	Vert/Hort	Average	1 MHz

* Measurements on 2405 MHz, 2440 MHz and 2480 MHz were carried out in March 2013.

Measurements were attempted at a distance of 3 metres using vertical and horizontal polarisations with a peak and an average detector with a 1 MHz bandwidth being used.

As per section 15.249 a limit of 500 uV/m applies to the harmonic emissions when an average detector is used.

This limit has been converted to dBuV/m using the formula 20 * (log 500) with a factor of + 20 dB being added to determine the peak limit.

Result: Complies
Measurement uncertainty with a confidence interval of 95% is:
- Free radiation tests (30 – 25,000 MHz) ± 4.1 dB

8. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial No	Asset Ref	Cal Due	Period
Aerial Controller	EMCO	1090	9112-1062	RFS 3710	Not applic	Not applic
Aerial Mast	EMCO	1070-1	9203-1661	RFS 3708	Not applic	Not applic
Biconical Antenna	Schwarzbeck	BBA 9106	-	3680	3 Feb 2018	3 years
Horn Antenna	EMCO	3115	9511-4629	E1526	4 June 2017	3 years
Horn Antenna	EMCO	3116	92035	E1527	10 June 2016	3 years
Log Periodic	Schwarzbeck	VUSLP 9111	9111-228	3785	1 Dec 2017	3 years
Loop Antenna	EMCO	6502	9003-2485	3798	4 July 2017	3 years
Mains Network	R & S	ESH2-Z5	881362/032	3628	2 Oct 2016	2 years
Receiver	R & S	ESHS 10	828404/005	3728	27 June 2016	2 years
Receiver	R & S	ESIB 40	100171	EMC4003	15 Feb 2017	1 year
SG Horn Antenna	EMCO	3160-04	00224819	-	11 Sept 2018	3 years
SG Horn Antenna	EMCO	3160-05	00114635	-	11 Sept 2018	3 years
SG Horn Antenna	EMCO	3160-06	00114821	-	11 Sept 2018	3 years
SG Horn Antenna	EMCO	3160-07	00144919	-	11 Sept 2018	3 years
SG Horn Antenna	EMCO	3160-08	00114637	-	11 Sept 2018	3 years
Spectrum Analyser	Hewlett Packard	E7405A	US39150142	3776	1 Dec 2016	1 year
Turntable	EMCO	1080-1-2.1	9109-1578	RFS 3709	Not applic	Not applic
VHF Balun	Schwarzbeck	VHA 9103	9594	3696	3 Feb 2018	3 years

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 in February 2014.

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

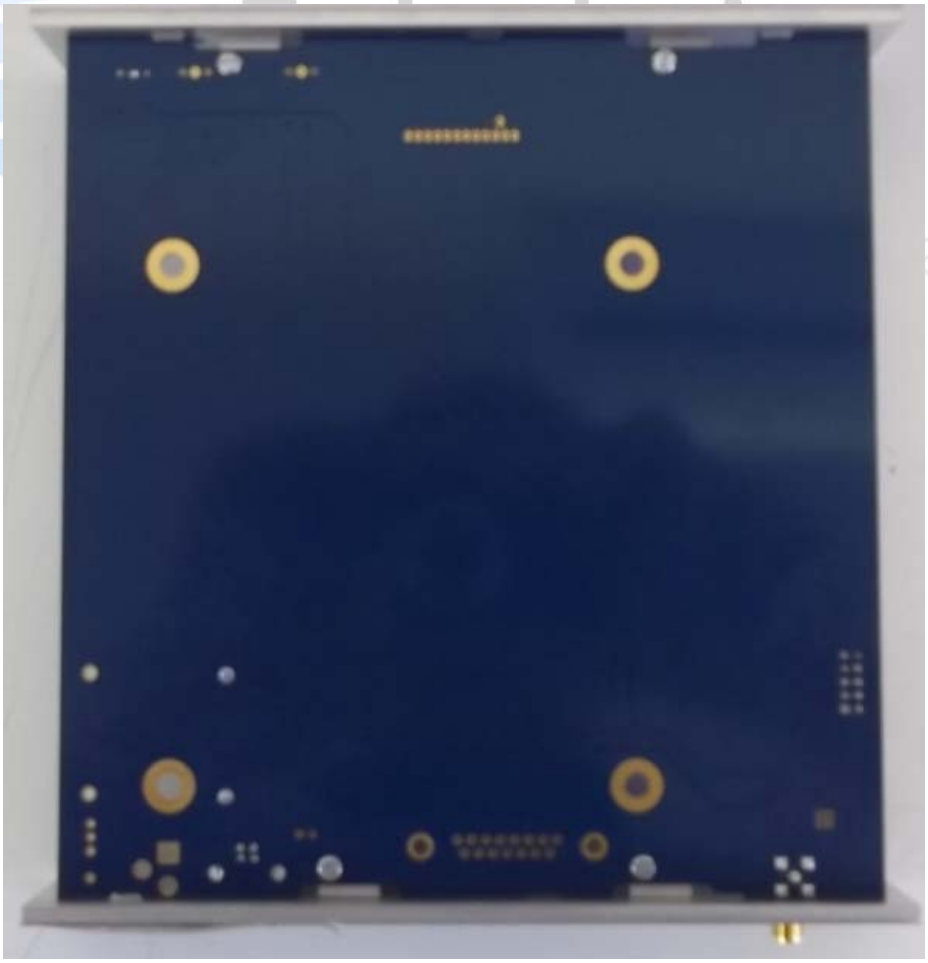
All measurement equipment has been calibrated in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to NZS/IEC/ISO 17025.

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

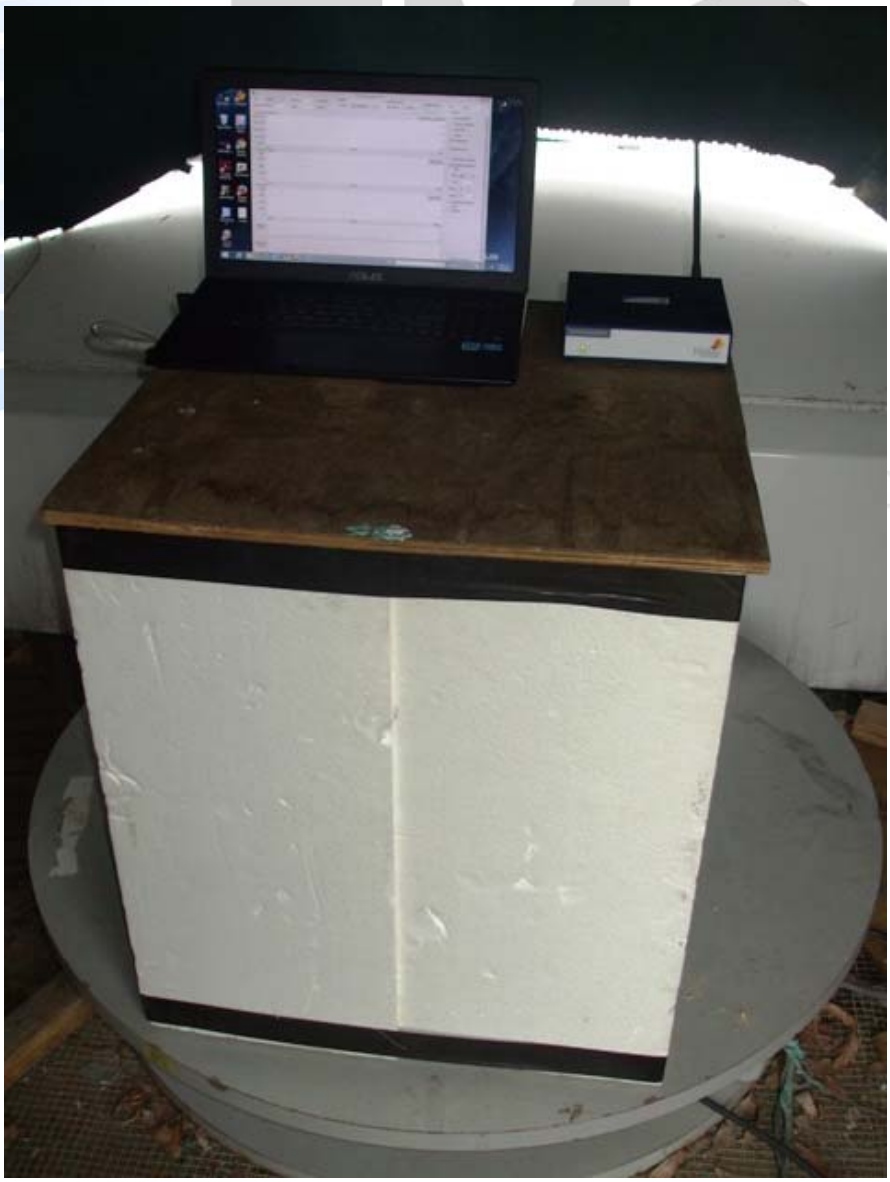
10. PHOTOGRAPHS

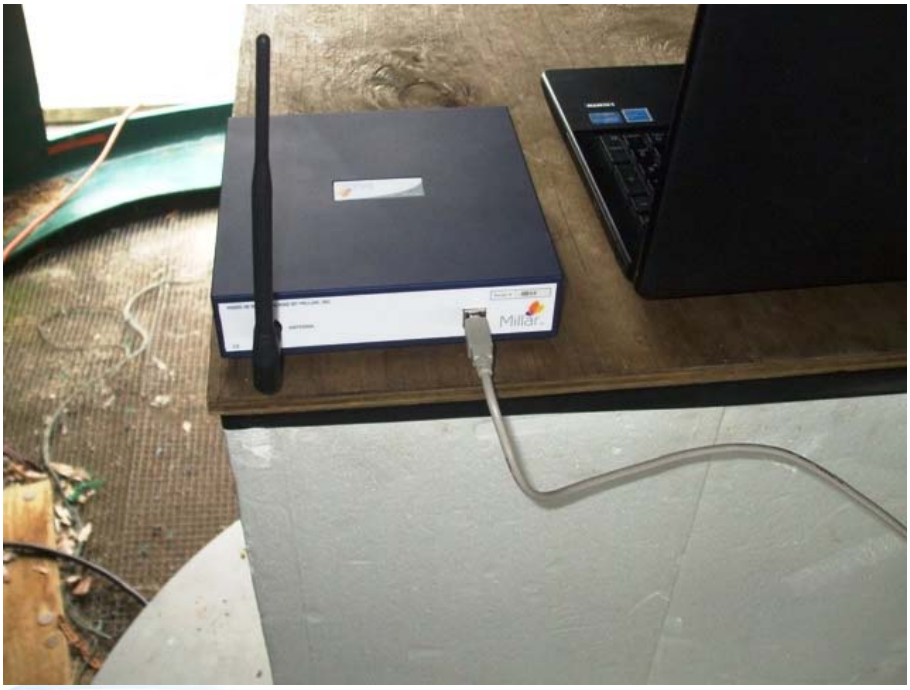
External photos

Internal Photos



Radiated emissions test set up





Conducted emissions test set up