

EMC Technologies (NZ) Ltd

Test Report No 50535.1
Report date: 3rd June 2005

TEST REPORT

SPEDA Awning Remote Control System

tested to

47 Code of Federal Regulations

Part 15 - Radio Frequency Devices

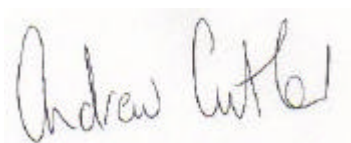
Subpart B – Unintentional Radiators

Subpart C – Intentional Radiators

for

South Pacific Electronic Design Associates (SPEDA) Ltd

This Test Report is issued with the authority of:



Andrew Cutler - General Manager



EMC Technologies (NZ) Ltd

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Test Report No **50535.1**
Report date: 3rd June 2005

Table of Contents

1.	STATEMENT OF COMPLIANCE	3
2.	RESULTS SUMMARY	3
3.	INTRODUCTION	5
4.	CLIENT INFORMATION	5
5.	DESCRIPTION OF TEST SAMPLE	6
6.	METHODS AND PROCEDURES	7
7.	RESULTS	7
8.	TEST EQUIPMENT USED	18
9.	ACCREDITATIONS	18
10.	PHOTOGRAPHS	19

EMC Technologies (NZ) Ltd

Test Report No **50535.1**
Report date: 3rd June 2005

1. STATEMENT OF COMPLIANCE

The **SPEDA Awning Remote Control System** complies with FCC Part 15 Subpart B as an Unintentional Radiator and Subpart C as an Intentional Radiator when the methods, as described in ANSI C63.4 - 1992, are applied.

2. RESULTS SUMMARY

The results from testing are summarised in the following table:

Receiver

Clause	Parameter	Result
15.101	Equipment authorisation requirement.	Certification or Declaration of Conformity required for receivers.
15.103	Exempted devices.	Not applicable as the device is a receiver and is not a digital device.
15.107	Conducted limits	Complies.
15.109	Radiated emission limits	Complies.
15.111	Antenna power conduction limit for receivers.	Not applicable. Receiver does not have terminals for the connection of an external antenna.

EMC Technologies (NZ) Ltd

Test Report No **50535.1**
Report date: 3rd June 2005

Transmitter

Clause	Parameter	Result
15.201	Equipment authorisation requirement.	Certification required.
15.203	Antenna requirement	Complies. Antenna integral.
15.204	External PA and antenna modifications	Not applicable. No external devices.
15.205	Restricted bands of operation	Complies. Device transmits periodically on 316.050 MHz.
15.207	Conducted limits	Not applicable. Device is powered using an internal battery.
15.209	Radiated emission limits.	Not applicable. All emissions from the device are related to the transmitter fundamental and the resulting harmonic emissions.
15.231(a)	General requirements	Transmitter is operated manually with a switch that deactivates the transmitter within 5 seconds of being released.
15.231(b)	Field strength of emissions	Complies with a 0.2 dB margin at 316.1300 MHz (Horizontal), with measurements falling within the window of uncertainty.
15.231(c)	Bandwidth	Complies.

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Test Report No **50535.1**
Report date: 3rd June 2005

3. INTRODUCTION

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

The test sample was selected by the client.

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	South Pacific Electronic Design Associates (SPEDA)Ltd
Address	PO Box 20253
City	Christchurch
Country	New Zealand
Contact	Mr Russell Hocken

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Test Report No **50535.1**
Report date: 3rd June 2005

5. DESCRIPTION OF TEST SAMPLE

Brand Name	SPEDA
Model Number	See below
Product	Awning Remote Control System
Manufacturer	South Pacific Electronic Design Associates Ltd
Country of Origin	New Zealand
Serial Number	Not serialised
FCC ID	TX8

This system consists of the following items which will be covered by the same FCC ID:

- ACS 316.0505 MHz remote control transmitter
- APMC1 115 Vac remote control receiver and motor controller
- ACSRF 115 Vac remote control receiver and existing ACS controller

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Test Report No 50535.1
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6. METHODS AND PROCEDURES

Standard

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

Methods and Procedures

The measurement methods and procedures as described in ANSI C63.4 - 1992 were used.

7. RESULTS

Section 15.107 Conducted emission limits.

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

The device was placed on top of the emissions table, which is 1m x 1.5m, 80cm above the screened room floor which acts as the horizontal ground plane.

In addition the device was positioned 40cm away from the screened room wall which acts as the vertical ground plane.

The artificial mains network was bonded to the screened room floor.

At all times the device was kept more than 80cm from the artificial mains network.

Measurement uncertainty with a confidence interval of 95% is:

- Conducted emissions (0.15-30 MHz) \pm 2.8 dB

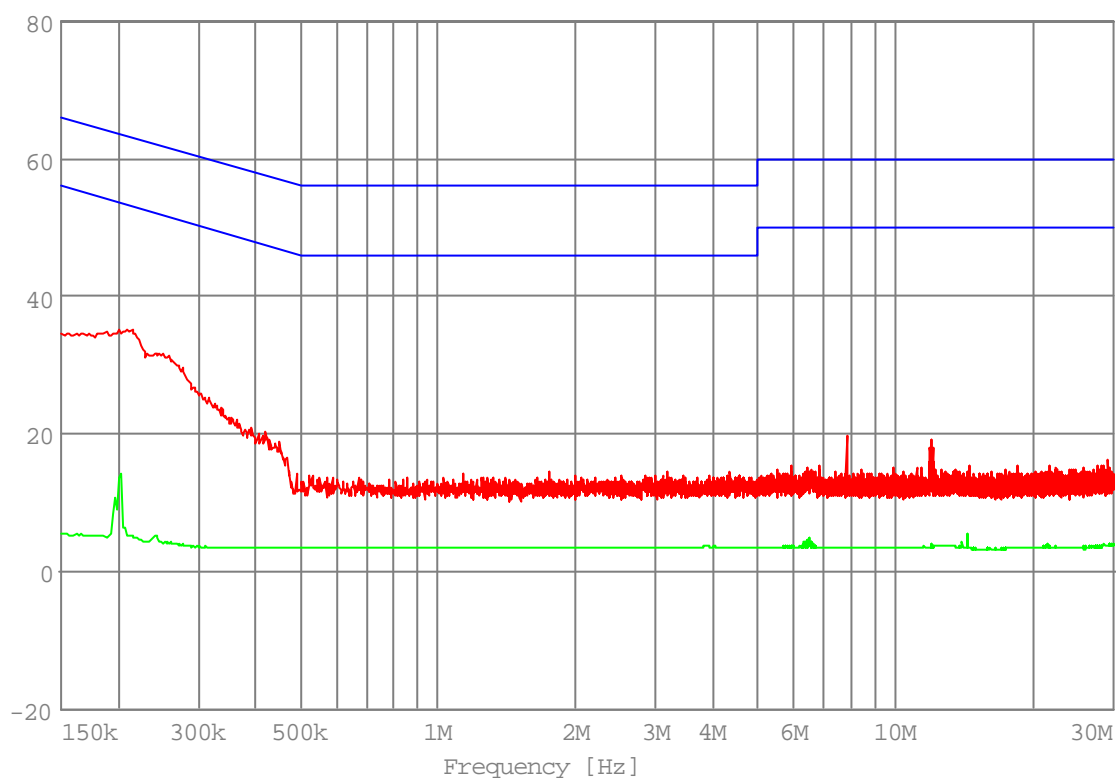
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Test Report No 50535.1
Report date: 3rd June 2005

Conducted emissions

Comments:	ACMC1 receiver tested receiving continuously when powered at 115 Vac.
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Level [dBμV]



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

Frequency MHz	Level dBmV	Limit dBmV	Margin dB	Exceed	Phase	Rechecks dBmV
No results recorded						

Average Measurements

Frequency MHz	Level dBmV	Limit dBmV	Margin dB	Exceed	Phase	Rechecks dBmV
No results recorded						

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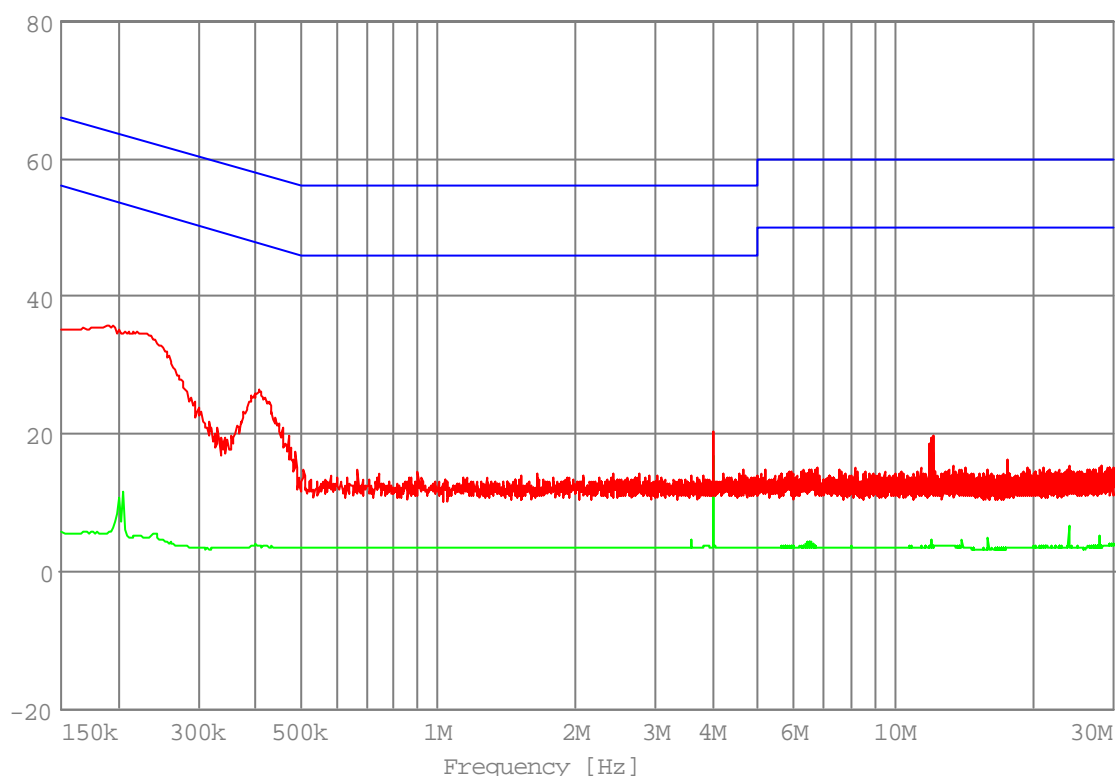
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Conducted emissions

Comments:	ACSRF receiver tested when receiving continuously when powered at 115 Vac.
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Level [dBμV]



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

Frequency MHz	Level dBmV	Limit dBmV	Margin dB	Exceed	Phase	Rechecks dBmV
No results recorded						

Average Measurements

Frequency MHz	Level dBmV	Limit dBmV	Margin dB	Exceed	Phase	Rechecks dBmV
No results recorded						

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Test Report No 50535.1

Report date: 3rd June 2005

Section 15.109 Radiated emission limits.

Radiated emissions testing was carried out over the frequency range of 30 MHz to 2750 MHz as the ACOM1 and ASCRF receivers operate on 316 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, Part 1, Clause 16, and ANSI C63.4 - 1992.

The receivers were placed on the test tabletop, which is a total of 0.8 m above the test site ground plane.

The receivers were both tested while receiving continuously when powered at 115 Vac.

Testing was carried out over a distance of 3 metres.

Below 1000 MHz a Quasi Peak detector with a bandwidth of 120 kHz was utilised.

Above 1000 MHz a Peak detector with a bandwidth of 1 MHz was utilised.

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.

The emission is measured in both vertical and horizontal antenna polarisations, where appropriate.

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

$$\text{Level (dB}\mu\text{V/m)} = \text{Receiver Reading (dB}\mu\text{V)} + \text{Antenna Factor (dB)} + \text{Coax Loss (dB)}$$

EMC Technologies (NZ) Ltd

Test Report No **50535.1**
Report date: 3rd June 2005

The limits as described in Section 15.109 have been applied as follows:

30 – 88 MHz	100 uV/m	40.0 dBuV/m
88 – 216 MHz	150 uV/m	43.5 dBuV/m
216 – 960 MHz	200 uV/m	46.0 dBuV/m
above 960 MHz	500 uV/m	54.0 dBuV/m

No emissions could be detected from either receiver over the range of 30 MHz to 2750 MHz when either a Quasi Peak, Average or Peak detector was utilised.

Result: Complies.

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests (30 - 2750 MHz) \pm 4.1 dB

EMC Technologies (NZ) Ltd

Test Report No 50535.1
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Section 15.205: Restricted bands of operation.

The transmitter transmits on 316.050 MHz.

This falls between the restricted bands of 240 – 285 MHz and 322 – 335.4 MHz.

Result: Complies.

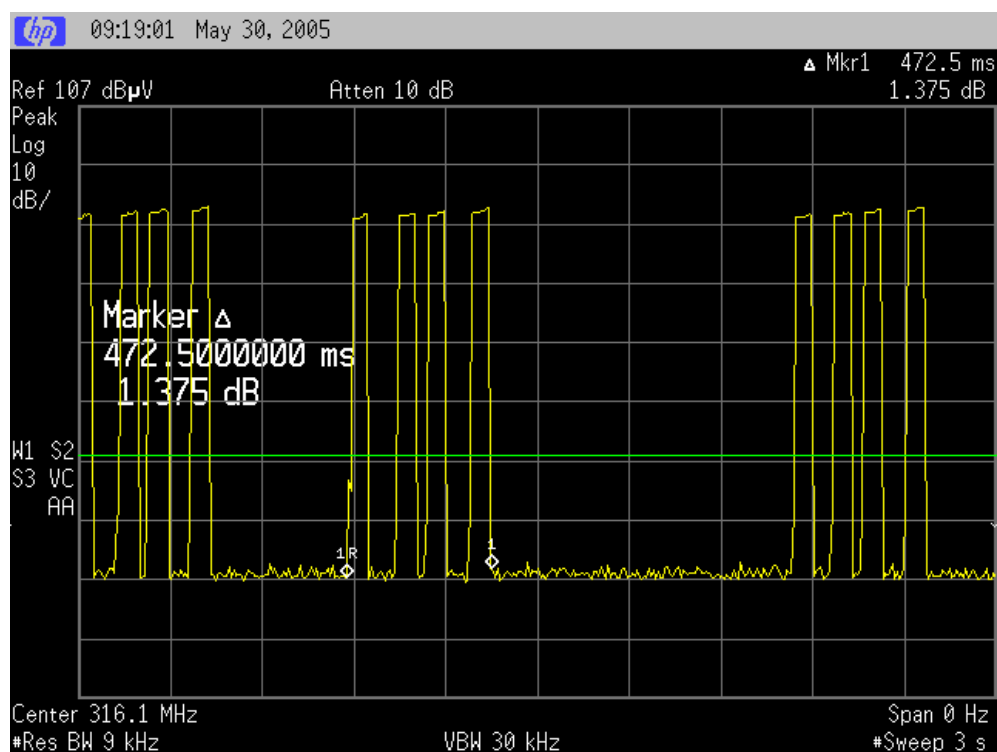
Section 15.231(a) General requirements and field strength of emissions.

The transmitter tested is a hand held remote control that is used for raising and lowering external awnings that are fitted mainly to mobile homes.

The remote control is powered using an internal battery.

The transmitter is activated manually and it deactivates automatically once the control switch is no longer being pressed.

This activation takes less than 1 second as can be seen from the attached plots.



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Section 15.231(b) Field strength of emissions.

Radiated emissions testing was carried out over the frequency range of 30 MHz to 3160 MHz as the transmitter operates on 316 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, Part 1, Clause 16, and ANSI C63.4 - 1992.

The device was placed on the test tabletop, which is a total of 0.8 m above the test site ground plane and was remotely activated.

Testing was carried out over a distance of 3 metres.

Below 1000 MHz a Quasi Peak detector with a bandwidth of 120 kHz was utilised.

Above 1000 MHz a Peak detector and an Average detector with a bandwidth of 1 MHz was utilised.

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.

The emission is measured in both vertical and horizontal antenna polarisations, where appropriate.

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

$$\text{Level (dB}\mu\text{V/m)} = \text{Receiver Reading (dB}\mu\text{V)} + \text{Antenna Factor (dB)} + \text{Coax Loss (dB)}$$

EMC Technologies (NZ) Ltd

Test Report No **50535.1**

Report date: 3rd June 2005

The limits as described in Section 15.231 have been applied as follows:

Fundamental $260 - 470 \text{ MHz} = 41.6667 \times 316 \text{ MHz} - 7083.3333 = 6083.3439 \text{ uV/m}$.

This is then convert to dBuV/m using $20 \times \log(6041.6772) = 75.7 \text{ dBuV/m}$

The spurious emission limit is 20 dB below the fundamental emission level.

Result: Complies.

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests $(30 - 4000 \text{ MHz}) \pm 4.1 \text{ dB}$

EMC Technologies (NZ) Ltd

Test Report No **50535.1**
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Fundamental emission.

Frequency MHz	Level dBuV/m	Limit dBuV/m	Margin dB	Antenna	Detector
316.130	74.3	75.7	1.4	Vertical	Quasi Peak
316.130	75.5	75.7	0.2	Horizontal	Quasi Peak

Spurious emissions

Frequency MHz	Level dBuV/m	Limit dBuV/m	Margin dB	Antenna	Detector
632.248	51.6	55.7	4.1	Vertical	Quasi Peak
632.248	50.2	55.7	5.5	Horizontal	Quasi Peak
948.365	39.0	55.7	16.7	Vertical	Quasi Peak
948.365	46.6	55.7	9.1	Horizontal	Quasi Peak
1264.483	44.0	55.7	11.7	Vertical	Average
1264.483	43.7	55.7	12.0	Horizontal	Average
1264.483	49.1	55.7	6.6	Vertical	Peak
1264.483	47.9	55.7	7.8	Horizontal	Peak
1580.650	-	55.7	-	Vert/Hort	Peak
1896.780	-	55.7	-	Vert/Hort	Peak
2212.910	-	55.7	-	Vert/Hort	Peak
2529.040	-	55.7	-	Vert/Hort	Peak
2845.170	-	55.7	-	Vert/Hort	Peak
3161.300	-	55.7	-	Vert/Hort	Peak

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Section 15.231(c) Bandwidth.

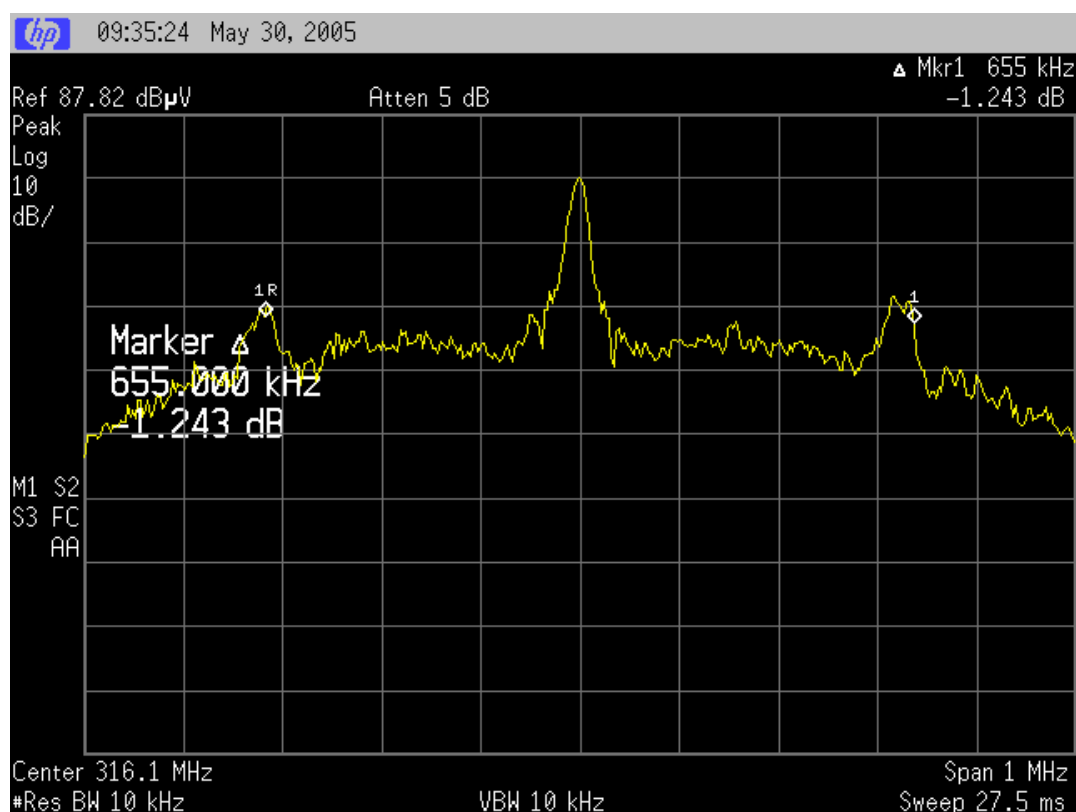
The bandwidth of the emission should not be greater than 0.25% of the centre frequency at the -20 dB points.

Centre frequency = 316 MHz.

0.25% of 316 MHz is 790 kHz.

The plot below shows a bandwidth of 655.0 kHz at the -20 dB points.

Result: Complies.



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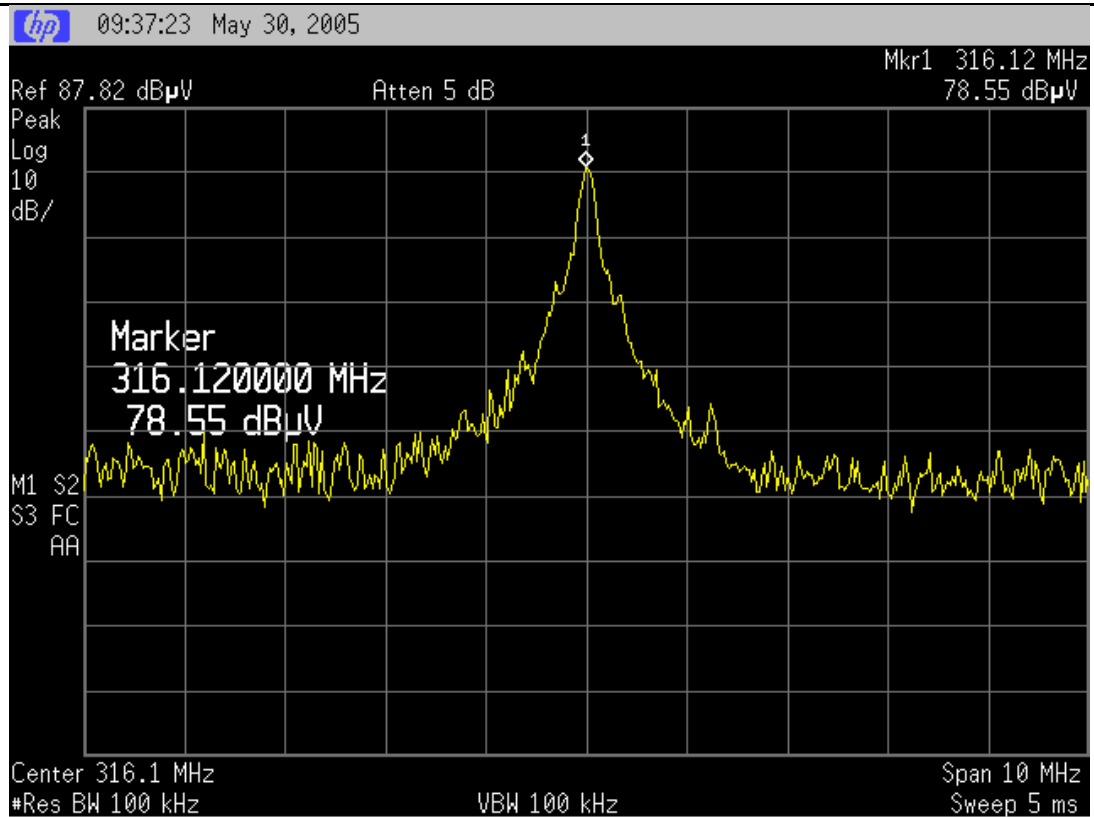
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8. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial No	Asset Ref
Aerial Controller	EMCO	1090	9112-1062	RFS 3710
Aerial Mast	EMCO	1070-1	9203-1661	RFS 3708
Biconical Antenna	Schwarzbeck	BBA 9106	-	RFS 3612
Log Periodic Antenna	Schwarzbeck	VUSLP 9111	9111-228	3785
Measurement Receiver	Rohde & Schwarz	ESCS 30	847124/020	E1595
Spectrum Analyser	Hewlett Packard	E7405A	US39150142	3776
Horn Antenna	Electrometrics	RGA -60	6234	E1494
Coax Cable	Sucoflex	104PA	2545/4PA	-
Turntable	EMCO	1080-1-2.1	9109-1578	RFS 3709
VHF Balun Antenna	Schwarzbeck	VHA 9103		RFS 3603

9. 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 on February 23rd, 2004.

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 17025.1999.

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 17025.1999.

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

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10. PHOTOGRAPHS

Transmitter external view



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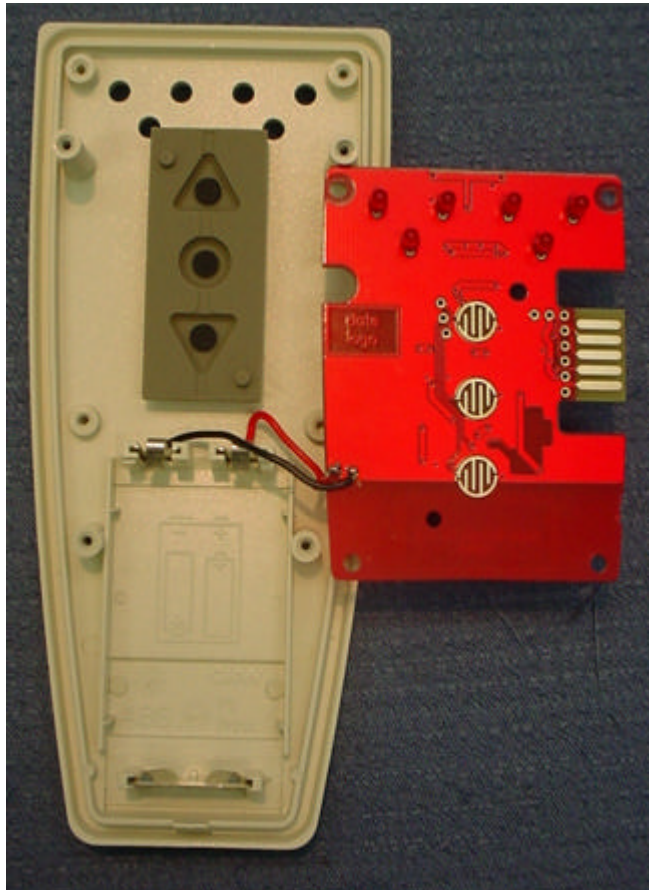
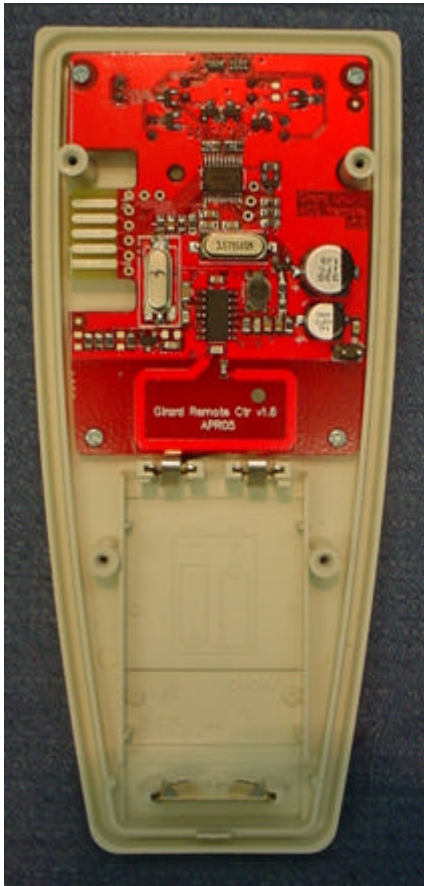
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Transmitter internal views



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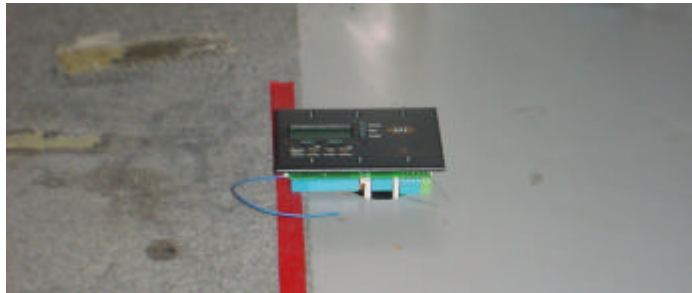
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Conducted emissions test set up – APMC1 Receiver



Conducted emissions test set up – ACS Receiver



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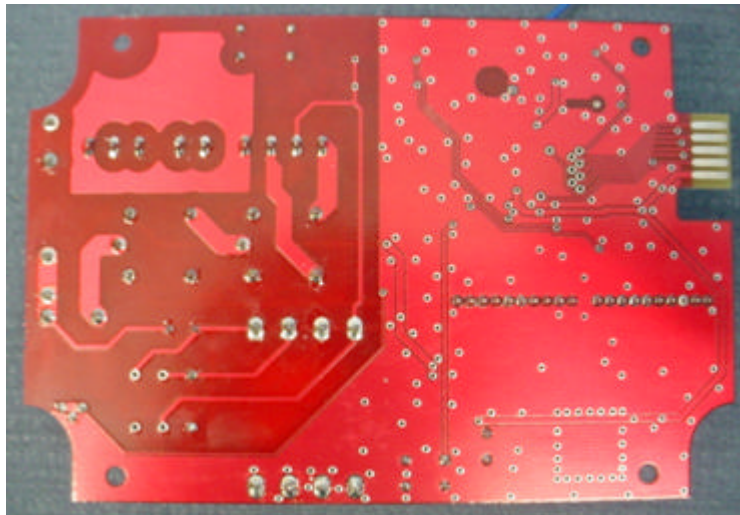
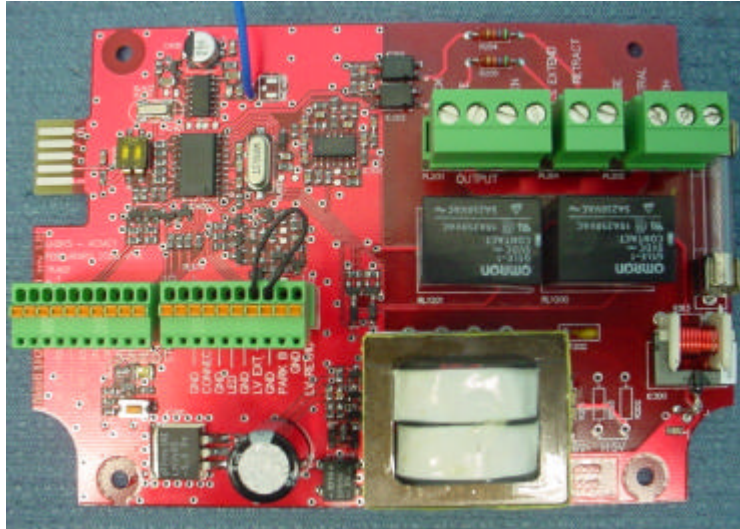
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ACMC1 Receiver Internal View



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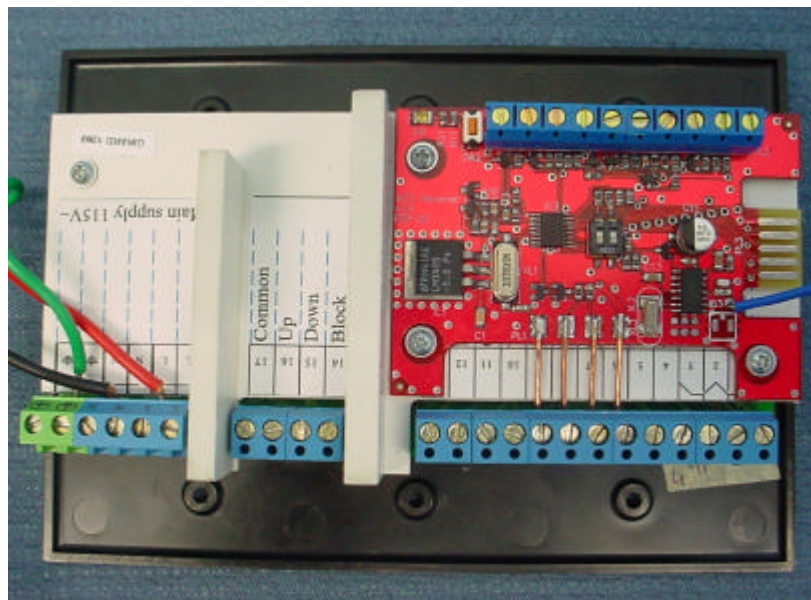
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ASCRF Receiver External View



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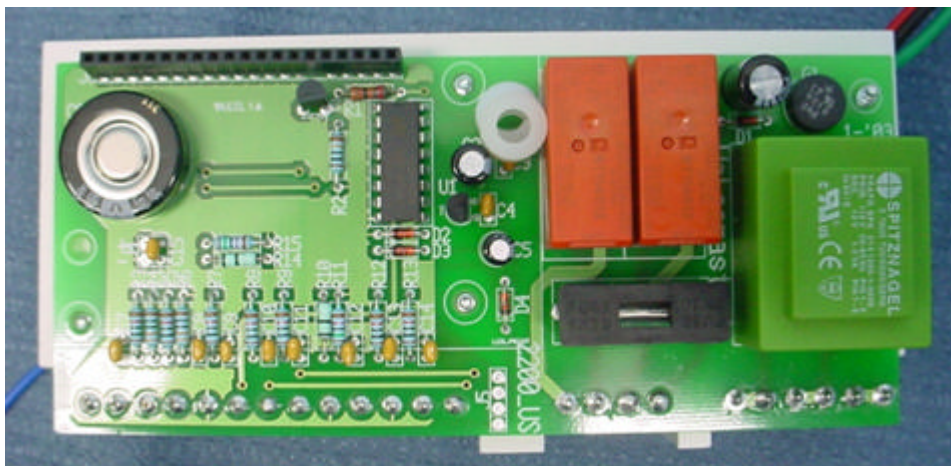
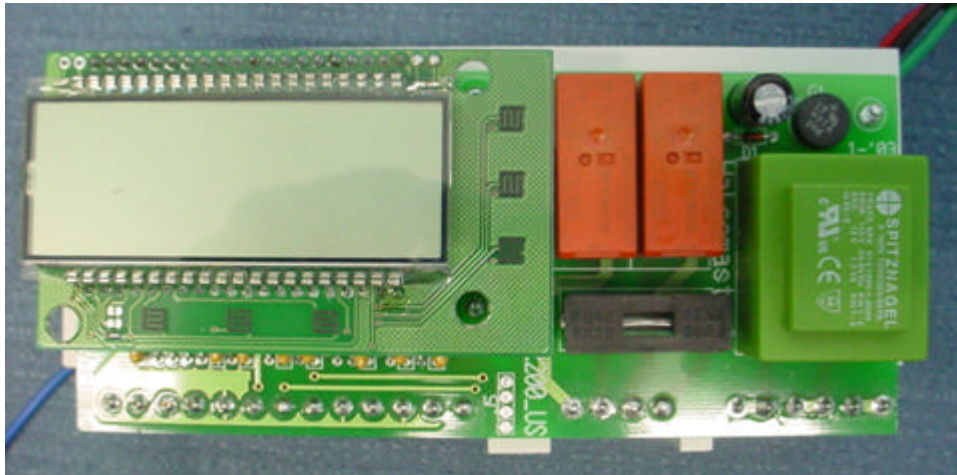
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ASCRF Receiver internal views



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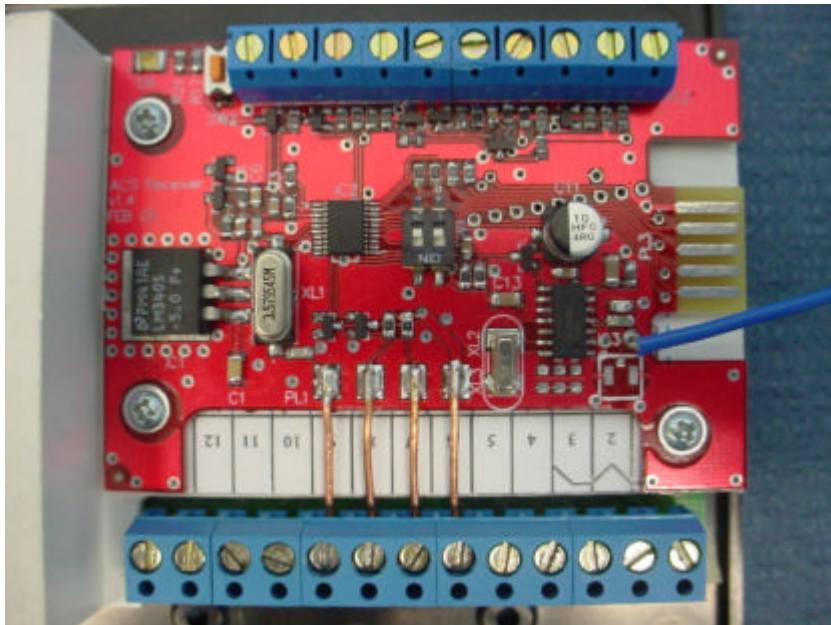
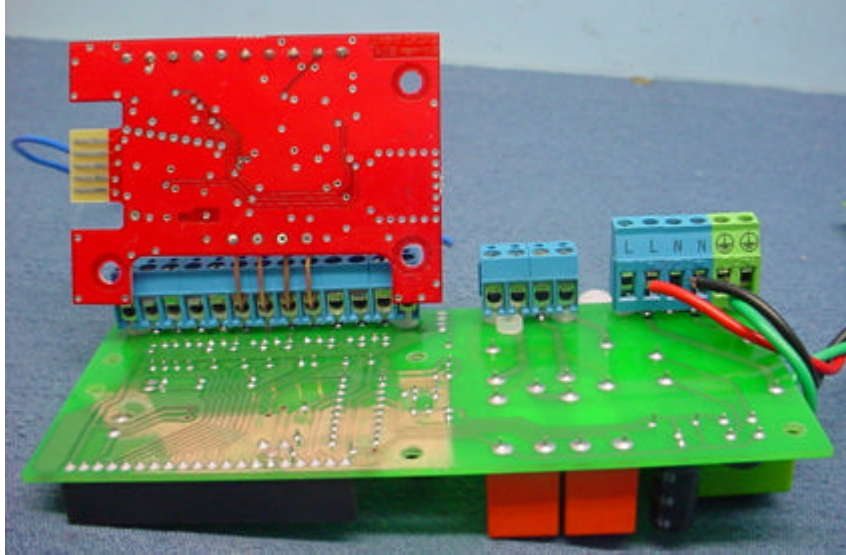
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Transmitter under test



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