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TEST REPORT

JANUS Short Range Receiver

tested to

47 Code of Federal Regulations

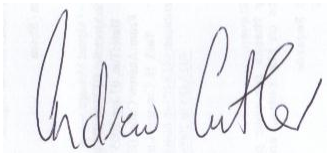
Part 15 - Radio Frequency Devices

Subpart A and B – Unintentional Radiators

for

MAS Zengrange 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 **JANUS Short Range Transmitter** comply with FCC Part 15 Subparts A and B as a Class B Unintentional Radiator when the methods as described in ANSI C63.4 - 2003 are applied.

2. RESULTS SUMMARY

The results of testing, carried out on 30th May 2012, are summarised below.

Clause	Parameter	Result
15.101	Equipment authorisation requirement.	Either Certification or Declaration of Conformity required for this device as it would be classed as receiver operating below 960 MHz.
15.103	Exempted devices.	Device is not exempt as it is a receiver that contains a digital device.
15.107	Conducted Emissions 0.15 - 30 MHz	Not applicable. Device is powered using an internal battery that cannot be connected directly or indirectly to the AC mains.
15.109	Radiated Emissions 30 - 2000 MHz	Complies. No emissions detected
15.111	Antenna Terminal Disturbance 30 – 950 MHz	Not applicable. Device has an internal antenna and no antenna terminals.

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	MAS Zengrange NZ Ltd
Address	PO Box 30-448
City	Lower Hutt 5010
Country	New Zealand
Contact	Mr Adam Holdaway

5. DESCRIPTION OF TEST SAMPLE

Brand Name	JANUS
Model Number	-
Product	Short Range Receiver
Manufacturer	MAS Zengrange NZ Ltd
Country of Origin	New Zealand
Serial Number	278110369
FCC ID	QVG173M1RX
FCC Band:	902 – 928 MHz
Band of operation:	904.425 – 909.675 MHz using 16 channels with a spacing of 350 kHz
Test Frequencies:	904.425 MHz and 909.325 MHz
Antenna Type:	Integral antenna
Power Supply:	Internal battery
Ports:	Portable device that has no external ports

The receiver tested is part of a radio controlled initiation system designed to initiate a shock tube located within the device.

The shock tube within the receiver in turn detonates an explosive device.

The system is intended for use by specialist demolition experts and by law enforcement agencies for explosive methods of entry.

6. RESULTS

Standard

The sample was tested in accordance with 47 CFR Part 15 Subparts A and B as a receiver.

Methods and Procedures

The measurement methods and procedures as described in ANSI C63.4 - 2003 were used.

Section 15.109: Radiated emission limits

Radiated emissions testing was carried out over the frequency range of 30 to 2000 MHz as this device is a receiver with measurements being required between 30 MHz (lowest radiated emission limit frequency) and the 2nd harmonic of the receiver local oscillator.

The device also contains a digital device which operates with frequencies of 10 MHz and 19.2 MHz which would give an upper frequency of measurement of 1000 MHz.

Testing was carried out at the laboratory's open area test site - located at 670 Kawakawa-Orere Road, Orere Point, Auckland, New Zealand.

This site conforms to the requirements of CISPR 16 and ANSI C63.4 - 2003.

Before testing was carried out, a receiver Self Test and Internal Calibration was undertaken along with a check of all connecting cables and programmed antenna factors.

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

Measurements of the radiated field were made with the antenna located at a 3 metre horizontal distance from the boundary of the devices under test.

Testing is carried out by manually scanning between 30 and 2000 MHz in 100 kHz steps while aurally and visually monitoring for emissions.

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.

During the test, a number of ambient emissions are identified (list of which can be provided upon request).

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)

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests (30 – 2000 MHz) ± 4.1 dB

Radiated Emissions: 30 – 2000 MHz:

The device was powered using internal batteries.

Testing was attempted when the receiver was tuned to 904.425 MHz and 909.325 MHz when standing upright, laying flat and when standing on its edge.

Testing was carried out on two frequencies as the device operates over a range of between 1 – 10 MHz with section 15.31(m) specifying testing on a frequency near the top and on a frequency near the bottom of the operating frequency range.

While 909.325 MHz is not at the top of the band of operation, which is 909.675 MHz, it is one channel step from the top of the band and is considered to be near the top as per section 15.31(m).

The receiver uses an IF bandwidth of 100 kHz with the local oscillator being low side injected.

The highest local oscillator frequency will be 909.225 MHz so therefore measurements were required up to 1818.450 MHz at least.

A high frequency of 2000 MHz was selected to cover all eventualities.

Testing between 30 – 1000 MHz was attempted using a quasi peak detector with a 120 kHz bandwidth.

Testing between 1000 – 2000 MHz was attempted using a peak detector and an average detector which both had a bandwidth of 1 MHz.

Measurements were attempted using both vertical and horizontal polarisations over this frequency range.

No emissions were detected on either frequency and in any of the device orientations at a distance of 3 metres.

As a further test measurements were attempted at a distance of 50 cm but no additional emissions were detected.

No digital device emissions were detected from the receiver over this frequency range.

Result: Complies.

7. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial No	Asset Ref	Cal Due
Aerial Controller	EMCO	1090	9112-1062	RFS 3710	Not applic
Aerial Mast	EMCO	1070-1	9203-1661	RFS 3708	Not applic
Turntable	EMCO	1080-1-2.1	9109-1578	RFS 3709	Not applic
Receiver	R & S	ESIB 40	100171	R-27-1	10 Oct 2013
VHF Balun	Schwarzbeck	VHA 9103	-	RFS 3603	30 Jan 2013
Biconical Antenna	Schwarzbeck	BBA 9106	-	RFS 3612	30 Jan 2013
Log Periodic	Schwarzbeck	VUSLP 9111	9111-228	3785	30 Jan 2013
Horn Antenna	EMCO	3115	9511-4629	E1526	3 May 2013

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 on February 15th 2011.

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, 2005.

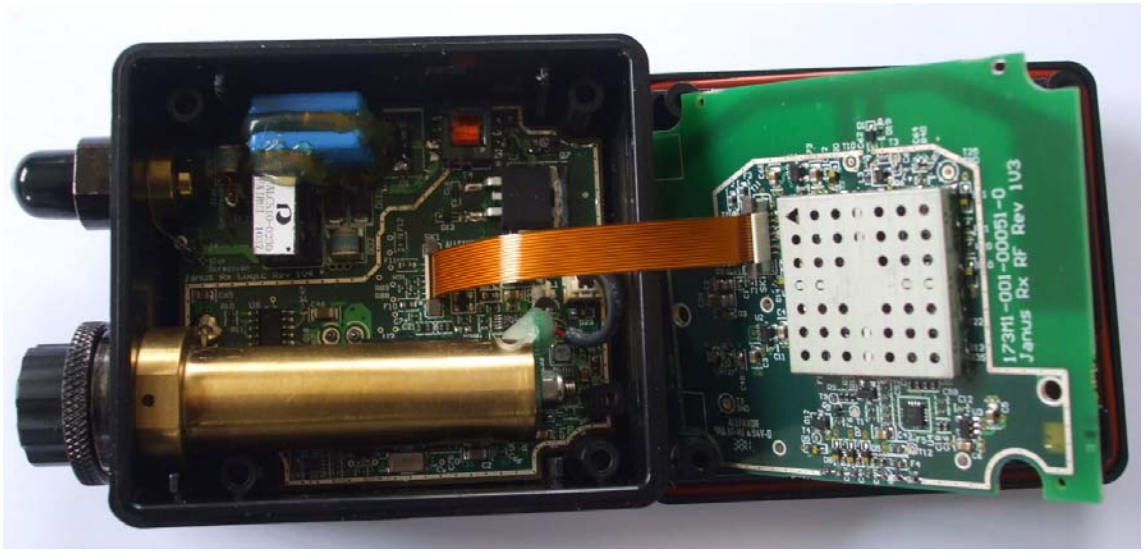
All measurement equipment has been calibrated in accordance with the terms of the EMC Technologies (NZ) Ltd International Accreditation New Zealand (IANZ) Accreditation to NZS/ISO/IEC 17025, 2005.

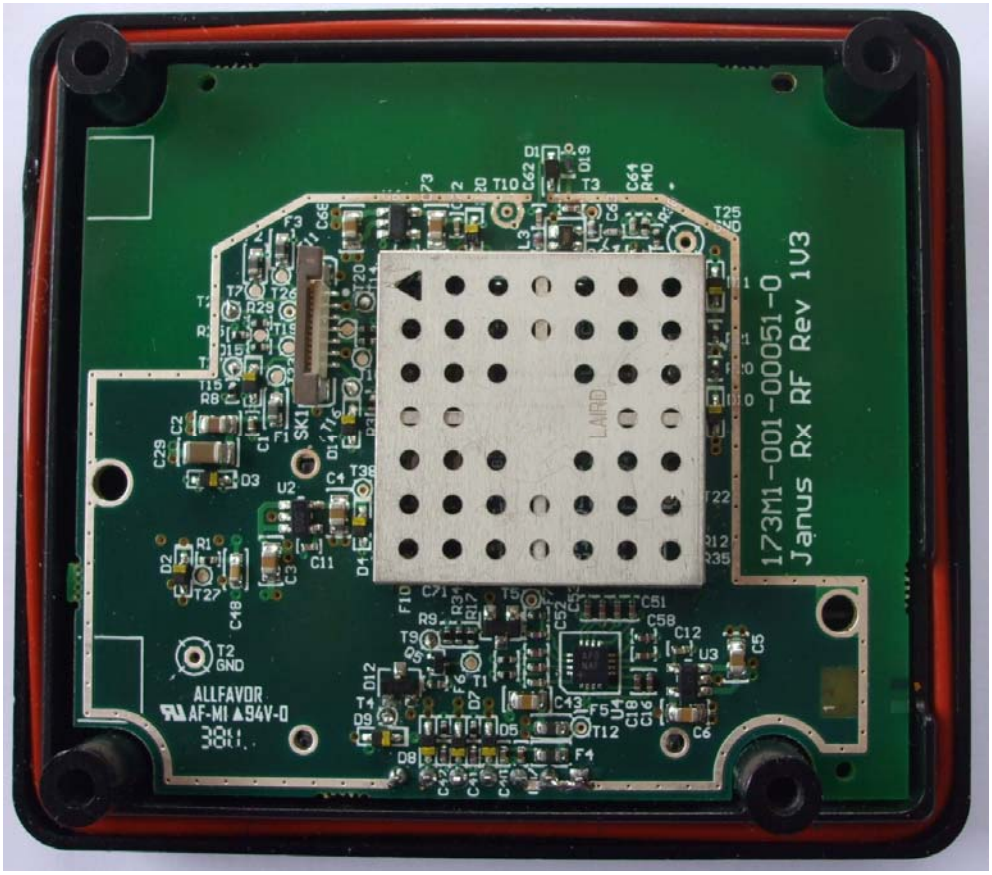
International Accreditation New Zealand has Mutual Recognition Arrangements for testing and calibration with accreditation bodies in a number of economies. This includes NATA (Australia), UKAS (UK), SANAS (South Africa), NVLAP (USA), A2LA (USA), SWEDAC (Sweden). Further details can be supplied on request.

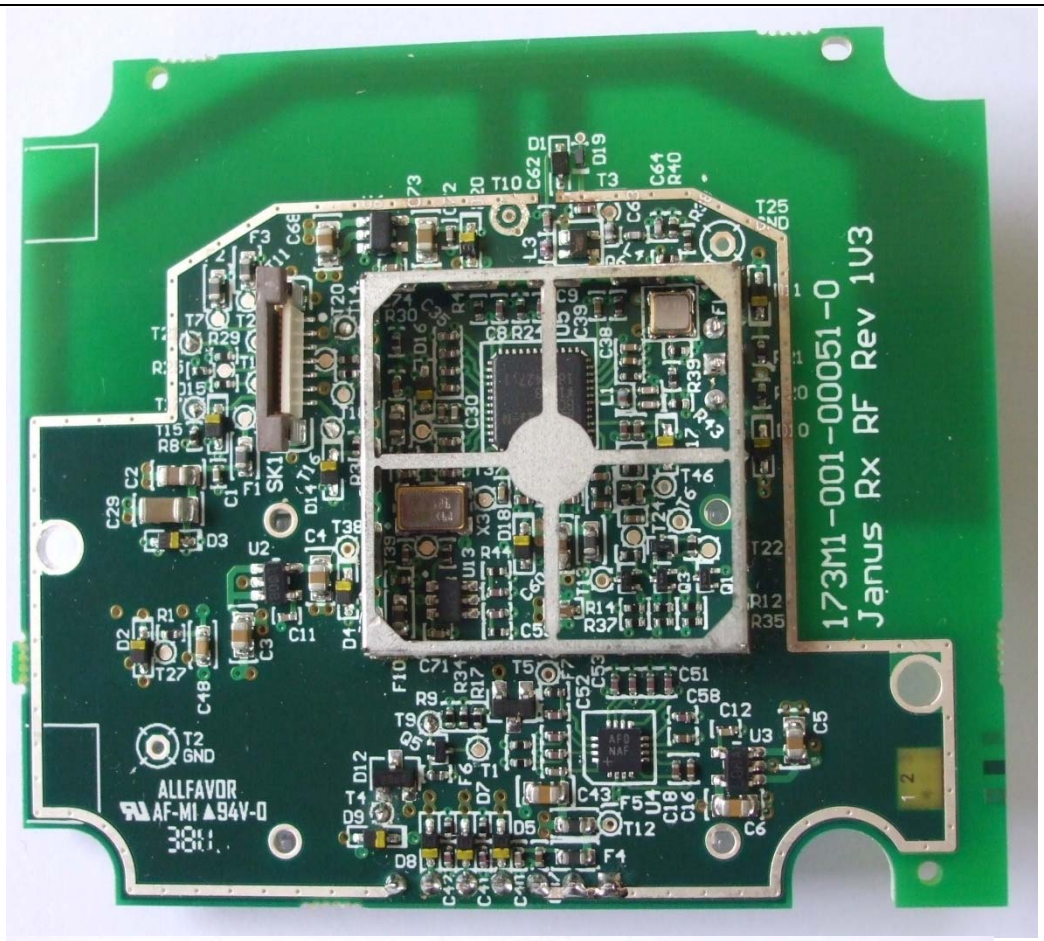
9. PHOTOGRAPHS

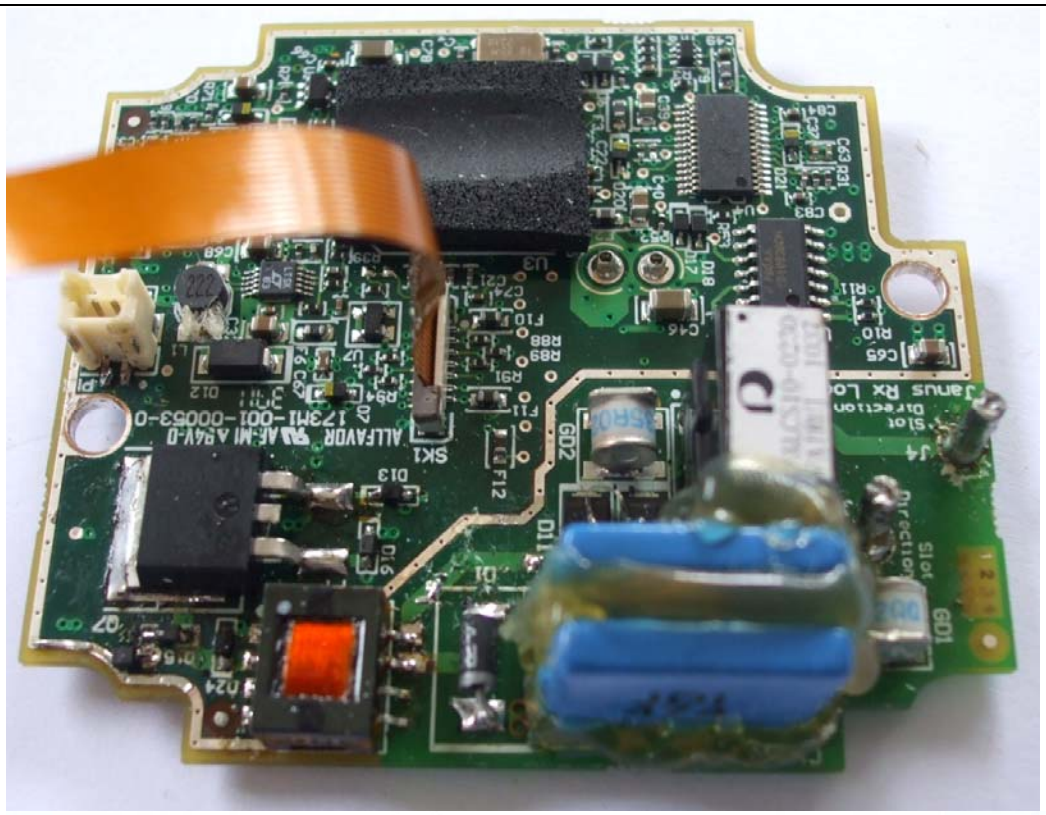
External views

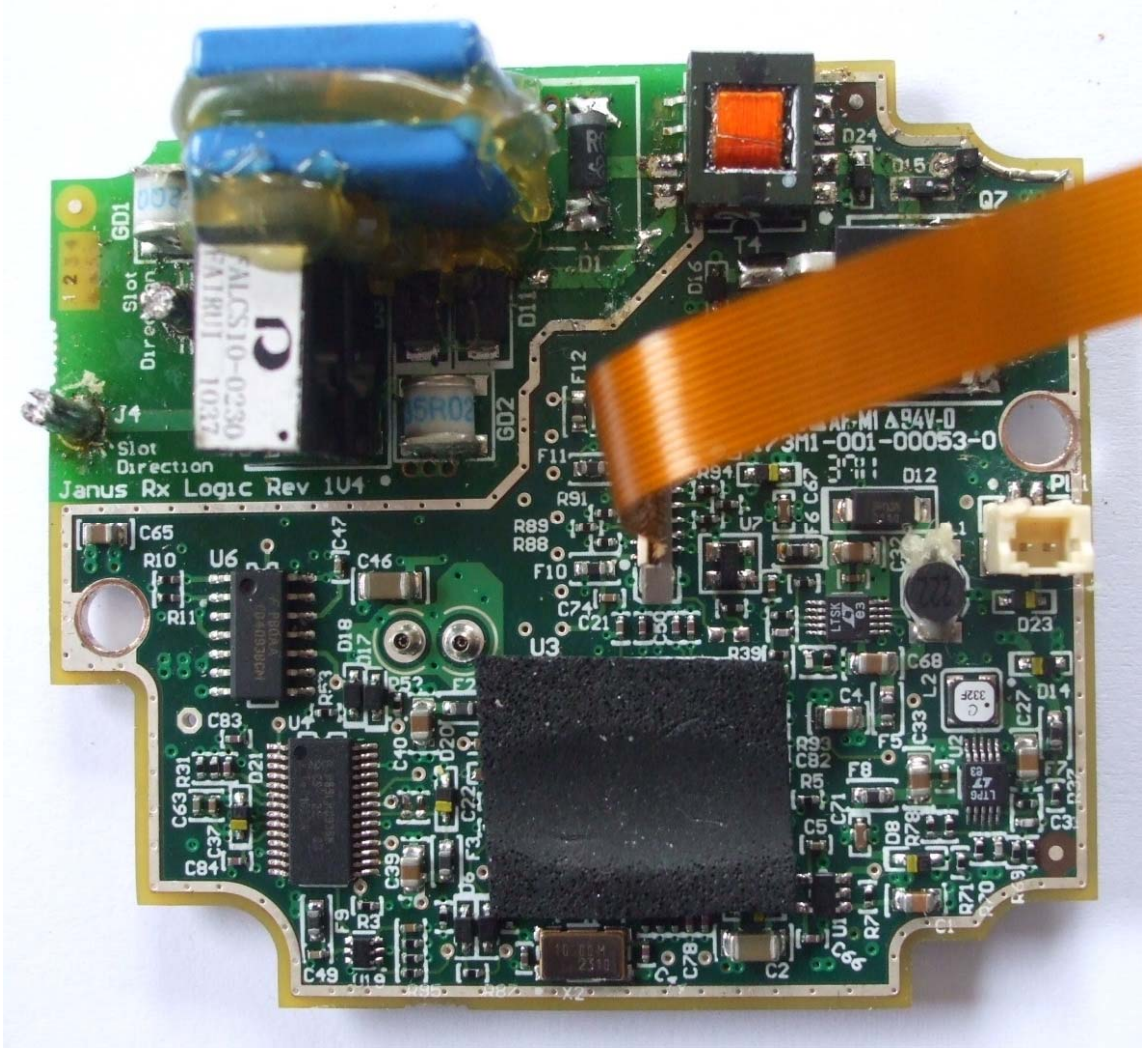
Internal views

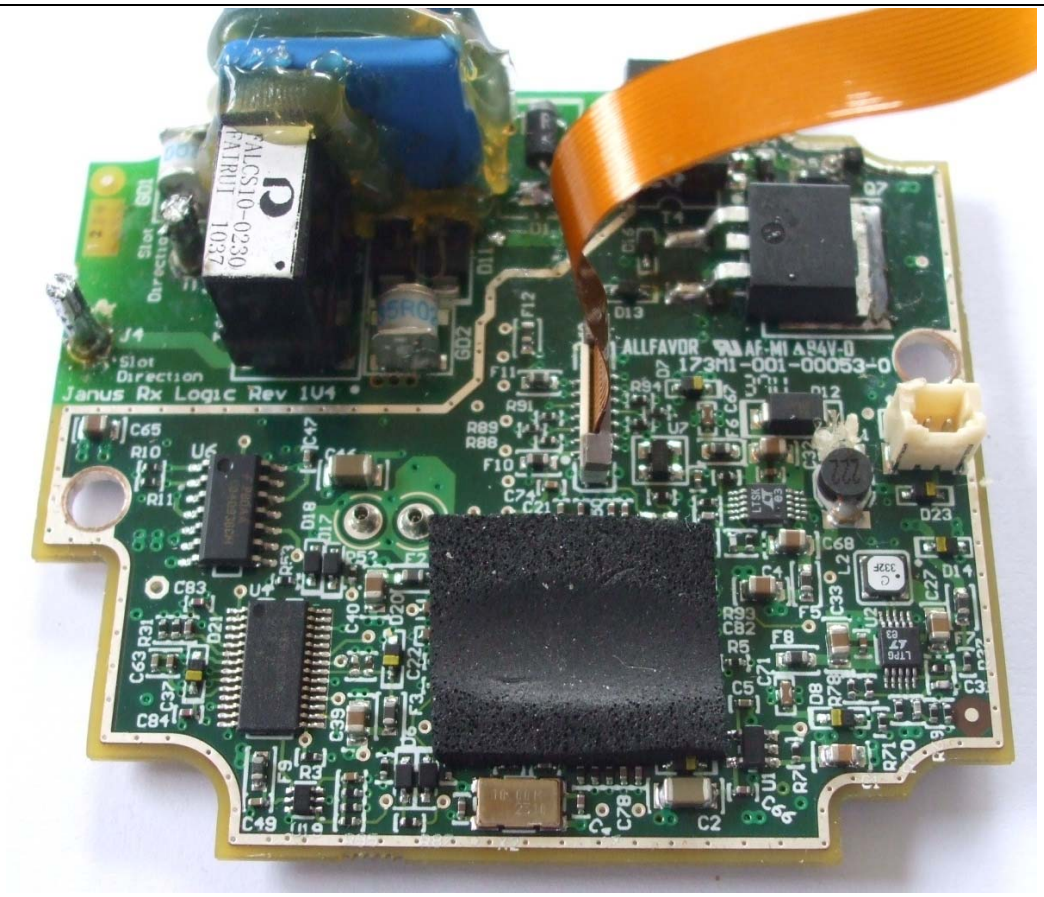


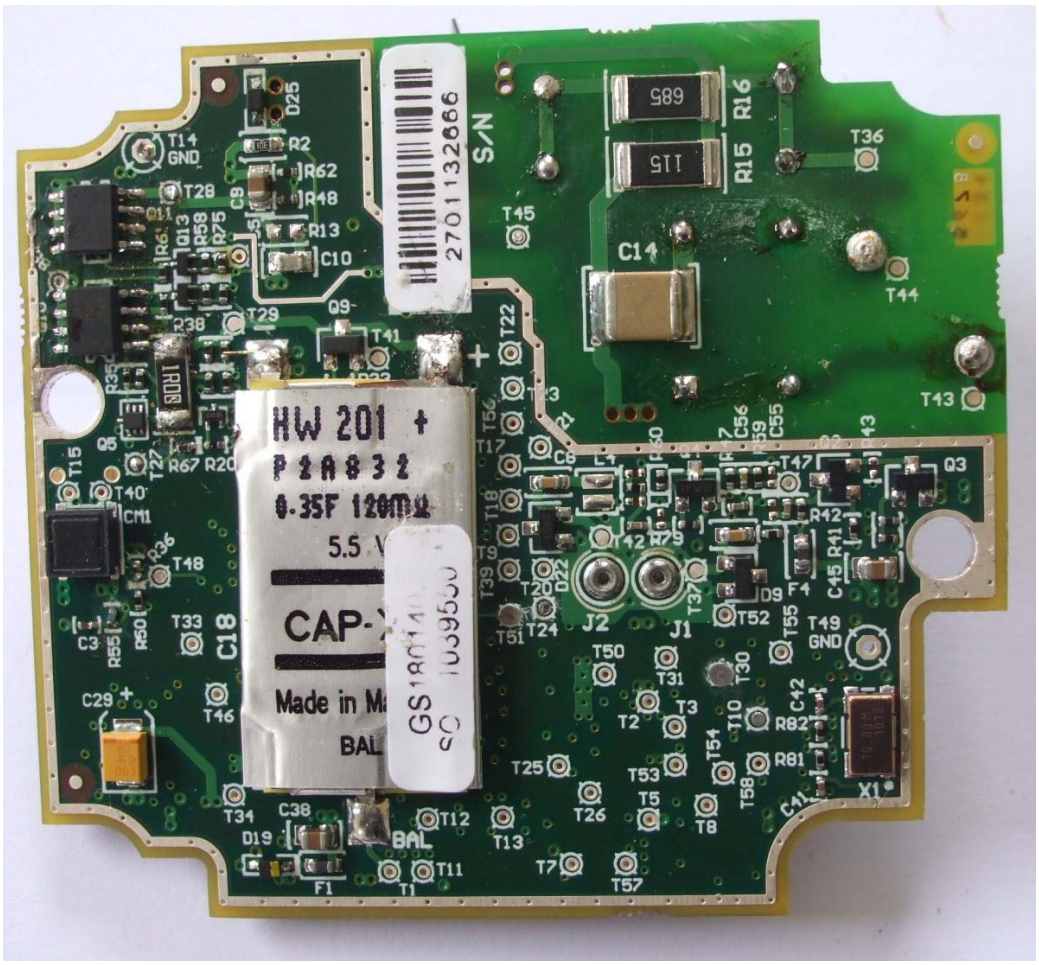












Radiated emissions test setups – Laying flat

Standing on its edge

Standing upright