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TEST REPORT

Amp Annealing 001 Induction Heater

tested to

47 Code of Federal Regulations

Part 15 - Radio Frequency Devices

Subpart A and B – Unintentional Radiators

for

Amp Annealing Ltd

This Test Report is issued with the authority of:

A handwritten signature in black ink, appearing to read "Andrew Cutler".

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 **Amp Annealing 001 Induction Heater** complies 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 in January 2016 are summarised below.

Clause	Parameter	Result
15.101	Equipment authorisation requirement.	The device tested would be classed as a Class B computer peripheral when the USB port is attached to a personal computer. Certification or Declaration of Conformity authorisations will apply. The Certification process has been applied to this device.
15.103	Exempted devices.	Device is not exempt as it contains a digital device and connects to a personal computer using the USB port.
15.107	Conducted Emissions 0.15 - 30 MHz	Complies.
15.109	Radiated Emissions 30 - 1000 MHz	Complies.
15.111	Antenna Terminal Disturbance 30 – 950 MHz	Not applicable. This device does not have an antenna port.

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	Amp Annealing Ltd
Address	40 Mile Rd, Bombay
City	Auckland 2675
Country	New Zealand
Contact	Alex Findlay

5. DESCRIPTION OF TEST SAMPLE

Brand Name	Amp Annealing
Model	001
Product	Induction Heater
Manufacturer	Amp Annealing Ltd
Country of Origin	New Zealand
Serial Number	001
FCC ID	2AGVJ-ANNEALING1

The device contains an induction heater that operates on a nominal frequency of 116 kHz.

The device is used for the sealing ammunition cartridges with the induction heater operating on demand for short periods of time.

The device also has a USB port which allows a personal computer to be attached to the device.

A typical use of this connection would be to upgrade or modify the operating software.

Certification of this device has also been sought in accordance with FCC part 18 as Consumer ISM equipment.

The client advises that the highest frequency in use in this device is 21 MHz.

6. RESULTS

Standard

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

Methods and Procedures

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

Section 15.107: Conducted limits

Conducted emissions 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 screened room.

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

In addition the device was positioned 40 cm 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 80 cm from the artificial mains network.

Testing was carried out while the device was operating in PC Connect mode which was achieved when a personal computer was attached to the USB port and an appropriate programme was enabled.

When operating in PC Connect mode the ISM device is de-activated and none of the controls on the device can be activated.

Result: Complies

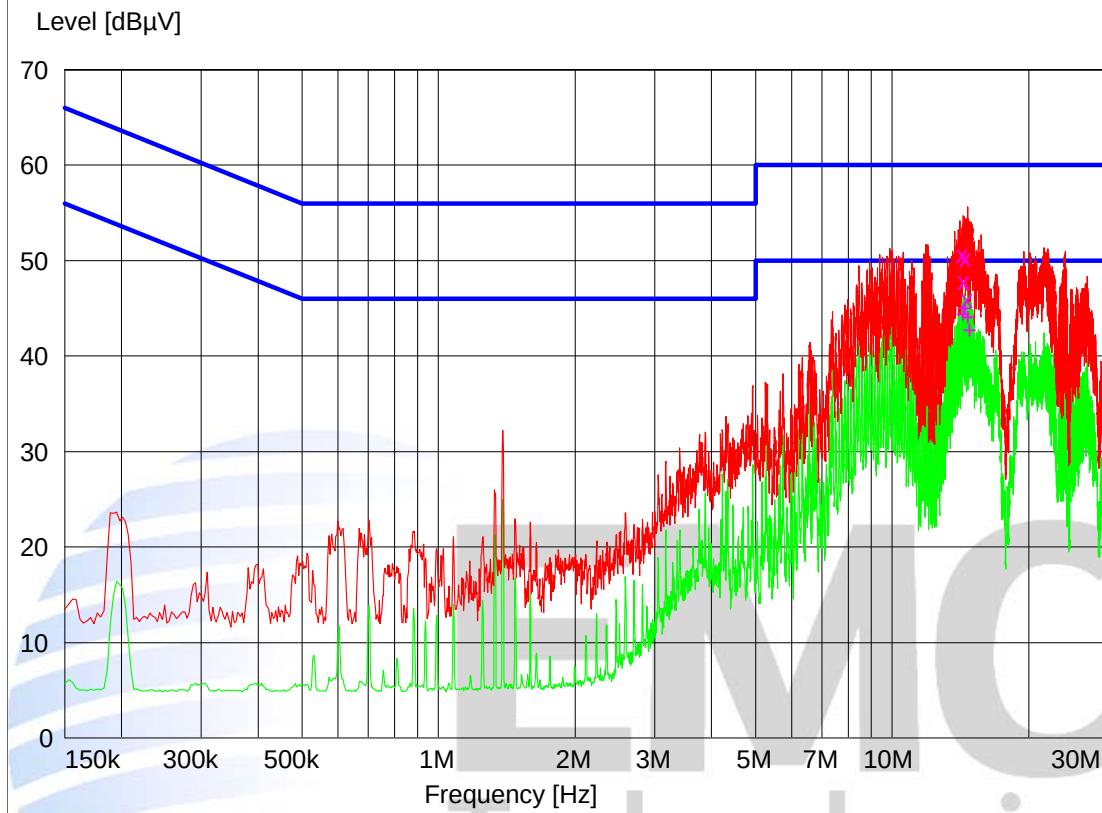
Measurement uncertainty with a confidence interval of 95% is:

- Mains terminal tests $(0.15 - 30 \text{ MHz}) \pm 2.2 \text{ dB}$

Conducted Emissions – AC Input Power Port

Setup: Device tested in PC Connect mode when a Laptop Computer running analysis software was attached to the device when the device 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
14.339000	50.70	60.0	9.3	N	
14.438000	47.90	60.0	12.1	L1	
14.568500	50.30	60.0	9.7	L1	
14.672000	46.00	60.0	14.0	N	

Final Average Measurements

Frequency MHz	Level dBμV	Limit dBμV	Margin dB	Phase	Rechecks dBμV
14.334500	44.40	50.0	5.6	L1	
14.456000	45.00	50.0	5.0	N	45.0
14.690000	44.10	50.0	5.9	N	
14.807000	42.80	50.0	7.2	N	

Section 15.109: Radiated emission limits

Radiated emissions testing was carried out over the frequency range of 30 to 1000 MHz as the highest frequency in use in the device is less than 108 MHz (21 MHz).

Testing was carried out while the device was operating in PC Connect mode which was achieved when a personal computer was attached to the USB port and an appropriate programme was enabled.

When operating in PC Connect mode the ISM device is de-activated and none of the controls on the device can be activated.

When operating in PC Connect mode the ISM device is de-activated and none of the controls on the device can be activated.

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

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 1000 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)

Result: Complies

Measurement Uncertainty: ± 4.1 dB

Radiated Emission Results: 30 – 1000 MHz:

Testing was carried out when the device was connected to a representative laptop computer (Dell Inspiron 15 300 series serial number HKR1412) using a 1 metre length of USB cable that were supplied by the client.

Testing was carried out with both the device and the laptop computer being powered using 120 Vac 60 Hz.

Testing was carried out when the Amp Annealing supplied software was running with the Read Cal and Auto Tune functions activated.

Frequency (MHz)	Vertical (dBµV/m)	Horizontal (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result	Antenna
31.162	39.9		40.0	0.1	Pass	Vertical
32.673	38.7		40.0	1.3	Pass	Vertical
35.928	33.8		40.0	6.2	Pass	Vertical
47.899	28.3		40.0	11.7	Pass	Vertical
59.755	38.3	31.8	40.0	1.7	Pass	Vertical
62.777	38.3	31.9	40.0	1.7	Pass	Vertical
67.194	36.6	33.2	40.0	3.4	Pass	Vertical
71.843	36.9	32.7	40.0	3.1	Pass	Vertical
83.931	34.0	32.1	40.0	6.0	Pass	Vertical
107.830	33.8	29.8	43.5	9.7	Pass	Vertical
119.863	39.6	36.1	43.5	3.9	Pass	Vertical
131.623	38.1	32.8	43.5	5.4	Pass	Vertical
143.367	33.1	32.5	43.5	10.4	Pass	Vertical
203.511		30.1	43.5	13.4	Pass	Horizontal
327.849	24.3	29.5	46.0	16.5	Pass	Horizontal
339.972		27.3	46.0	18.7	Pass	Horizontal
363.651		27.1	46.0	18.9	Pass	Horizontal

All other emissions observed were observed to have a margin to the limit that exceeded at least 15 dB when observations were made in both vertical and horizontal polarisations between 30 – 1000 MHz.

7. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial No	Asset Ref	Period	Cal Due
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	9594	3680	3 years	3 Feb 2018
Log Periodic	Schwarzbeck	VUSLP 9111	9111-228	3785	3 years	1 Dec 2017
Mains Network	Rohde & Schwarz	ESH 2-Z5	881362/034	3628	2 years	23 Oct 2016
Receiver	Rohde & Schwarz	ESHS 10	838693/002	3800	1 year	30 June 2016
Software	Rohde & Schwarz	ESKI 140	-	-	-	-
Receiver	Rohde & Schwarz	ESIB 40	100171	EMC 4003	1 year	16 Apr 2016
Turntable	EMCO	1080-1-2.1	9109-1578	RFS 3709	Not applic	Not applic
VHF Balun	Schwarzbeck	VHA 9103	9594	3696	3 years	3 Feb 2018

8. ACCREDITATIONS

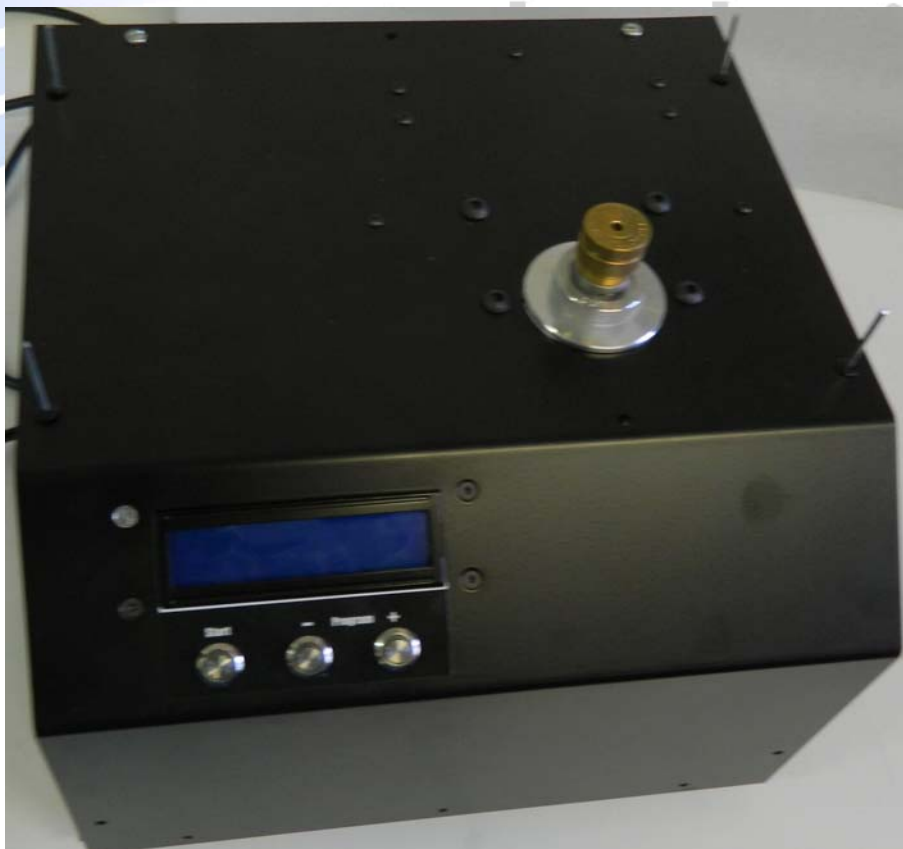
Testing was carried out in accordance with EMC Technologies Ltd registration with the Federal Communications Commission as a listed facility, registration number: 90838, which was updated in June 2014.

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.

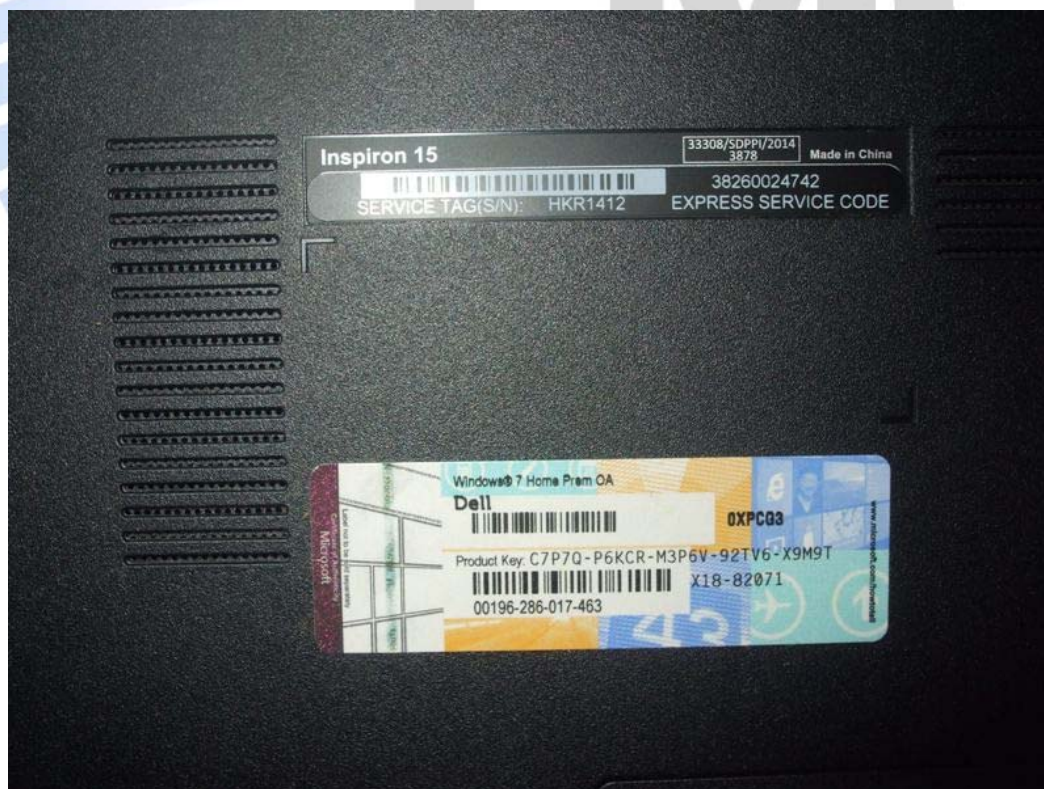
International Accreditation New Zealand has Mutual Recognition Arrangements for testing and calibration with various accreditation bodies in a number of economies. This includes NATA (Australia), UKAS (UK), SANAS (South Africa), NVLAP (USA), A2LA (USA), SWEDAC (Sweden). Further details can be supplied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

9. PHOTOGRAPHS



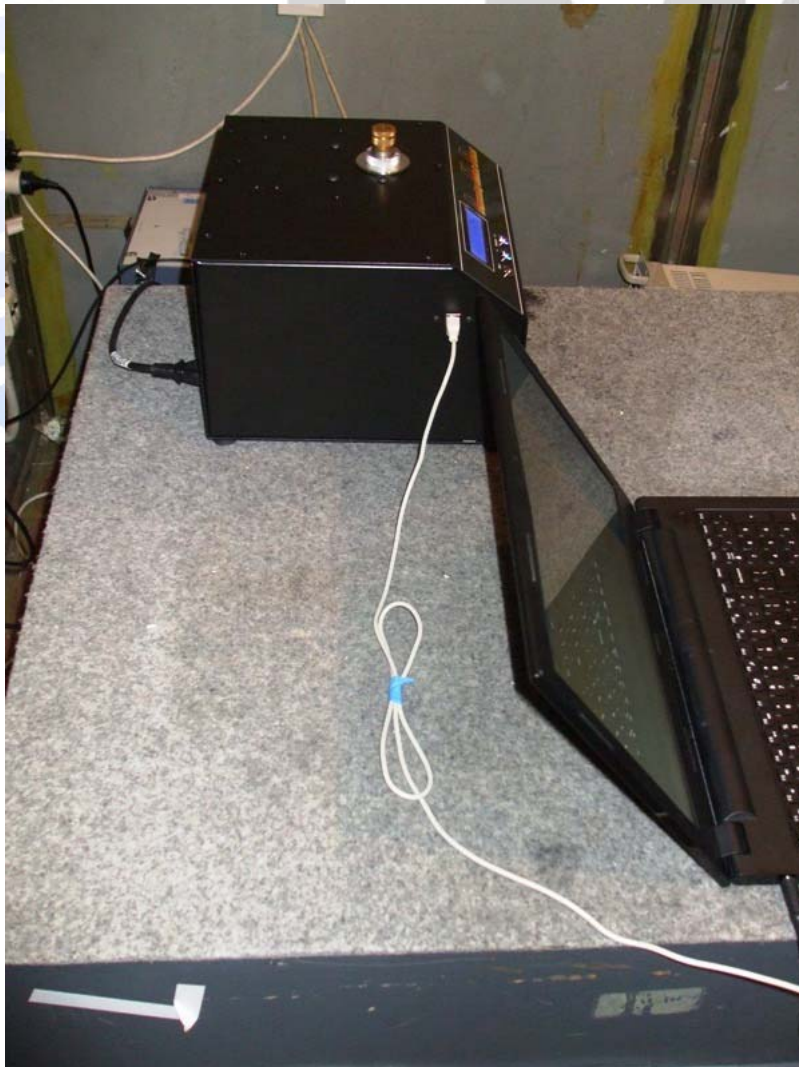


Ancillary equipment



Conducted emissions test set up





Radiated emissions test set up photos





