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TEST REPORT

Tru-Test XRS2-1 Handheld Low Frequency Electronic ID (EID) Reader

tested to

47 Code of Federal Regulations

Part 15 - Radio Frequency Devices

Subpart A and B – Unintentional Radiators

for

Tru-Test 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

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1. STATEMENT OF COMPLIANCE

The **Tru-Test XRS2-1 Handheld Low Frequency Electronic ID (EID) Reader** complies with FCC Part 15 Subpart A and B as a Computer Peripheral when the methods as described in ANSI C63.4 - 2014 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	Tru-Test Ltd
Address	PO Box 51078 Pakuranga
City	Auckland 2140
Country	New Zealand
Contact	Mr Jason Crozier

5. DESCRIPTION OF TEST SAMPLE

Brand Name	Tru-Test
Product	Handheld Low Frequency Electronic ID (EID) Reader
Model Number	XRS2-1
Serial Number	500033
Manufacturer	Tru-Test Ltd
Country of Origin	New Zealand
FCC ID	XOQXRS21
Supply Voltage	5V
Modulation	AM (FDX tag), FSK (HDX tag)
Bandwidth	10 kHz (Receiver bandwidth)
Frequencies	Processor 17.1776 MHz Transmitter 134.2 kHz Bluetooth 2402 - 2480 MHz
Duty Cycle	50 ms on, 4 ms off
Ports	USB

The Tru-Test XRS2-1 Handheld Low Frequency Electronic ID (EID) Reader is a dual mode FDX (AM) / HDX (FSK) tag reading device that is optimized for high performance with animal tags that comply with ISO 11784/11785.

The Reader operates on 134.2 kHz and is designed to operate with read distances of up to 0.5 m.

The Reader System identifies and reads electronic tags on individual animals.

The device also contains a Bluetooth module transmitter that has modular approval.

The FCC ID of this module is FCC ID: QOQWT11IA

The device has a USB port which can be used to power the device and to also charge the internal battery.

Data can be retrieved from the device using either the Bluetooth connection or the USB port.

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 - 2014 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 attached to a representative laptop computer, that was powered at 120 Vac 60 Hz, using a 1 metre long USB cable that was attached to the USB port.

While attached to the laptop computer the device was being charged at the same time.

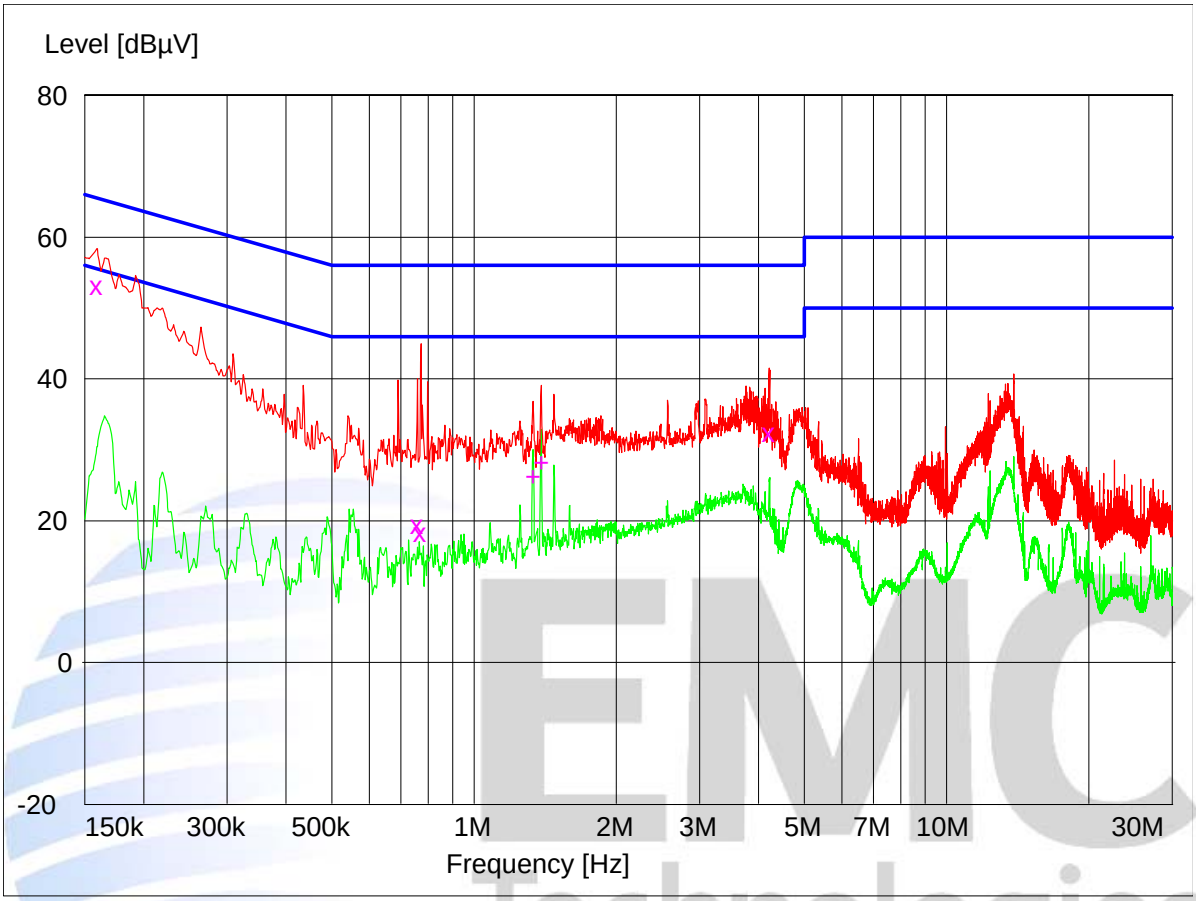
Result: Complies

Measurement uncertainty with a confidence interval of 95% is:
- Mains terminal tests (0.15 - 30 MHz) ± 2.2 dB

Conducted Emissions – AC Input Power Port

Setup:	Device tested when attached to a representative laptop computer that was powered at 120 Vac 60 Hz when the device was attached using the USB and when the device was also being charged.

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



Final Quasi-Peak Measurements

Frequency MHz	Level dBµV	Limit dBµV	Margin dB	Phase	Rechecks dBµV
0.159000	53.20	65.5	12.3	L1	
0.759000	19.50	56.0	36.5	L1	
0.771000	18.40	56.0	37.6	L1	
4.209500	32.40	56.0	23.6	N	

Final Average Measurements

Frequency MHz	Level dBµV	Limit dBµV	Margin dB	Phase	Rechecks dBµV
1.332000	26.30	46.0	19.7	N	
1.386000	28.20	46.0	17.8	N	

Section 15.109: Radiated emission limits

Radiated emissions testing was carried out over the frequency range of 30 MHz to 1000 MHz as the device contains a digital device that operates on 17.1776 MHz.

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

An enclosure containing absorber material, Panashield HYB-NF-12, has been placed between the turntable and the measurement antenna for when measurements are made above 1 GHz.

This material has no absorbing affect below 1 GHz with site verification measurements confirming this.

Testing was carried out when the device was powered using a USB port on the representative Class B laptop computer that was powered at 120 Vac 60 Hz. using the supplied AC power supply.

Investigations were carried out in the X, Y and Z planes as the device is portable.

Final testing was carried out in the Y place with the device placed flat on the test table with the LCD display facing upwards (see photos at the rear of this report).

Above 30 MHz testing was carried out at the test site where emissions were measured in both vertical and horizontal antenna polarisations.

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 using a 1 metre length of USB cable that were supplied by the client.

Testing was carried out when the device was powered using the laptop computer that was powered using 120 Vac 60 Hz.

Frequency (MHz)	Vertical (dBµV/m)	Horizontal (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result	Antenna
42.669	25.1		40.0	14.9	Pass	Vertical
104.030	29.4		43.5	14.1	Pass	Vertical
104.330	29.2		43.5	14.3	Pass	Vertical
116.152	31.7		43.5	11.8	Pass	Vertical
118.406	32.3		43.5	11.2	Pass	Vertical
120.661	34.4		43.5	9.1	Pass	Vertical
122.865	34.4		43.5	9.1	Pass	Vertical
123.066		31.6	43.5	11.9	Pass	Horizontal
125.120	33.9	33.6	43.5	9.6	Pass	Vertical
127.325	32.3	33.6	43.5	11.2	Pass	Horizontal
129.579	29.7		43.5	13.8	Pass	Vertical
134.088	29.9		43.5	13.6	Pass	Vertical
136.268	30.0		43.5	13.5	Pass	Vertical
138.547	30.5		43.5	13.0	Pass	Vertical
178.797		32.3	43.5	11.2	Pass	Horizontal
180.962		32.7	43.5	10.8	Pass	Horizontal
183.126		33.1	43.5	10.4	Pass	Horizontal
185.831		32.9	43.5	10.6	Pass	Horizontal
190.160		32.7	43.5	10.8	Pass	Horizontal
192.324		32.6	43.5	10.9	Pass	Horizontal
194.388		32.4	43.5	11.1	Pass	Horizontal
208.000	31.5	33.1	46.0	12.9	Pass	Horizontal
245.891		32.0	43.5	11.5	Pass	Horizontal
260.000		34.5	43.5	9.0	Pass	Horizontal
277.274		35.6	46.0	10.4	Pass	Horizontal
290.261		36.7	46.0	9.3	Pass	Horizontal
311.820	31.5	34.7	46.0	11.3	Pass	Horizontal
325.250	32.7	31.3	46.0	14.7	Pass	Vertical
332.264	30.6	32.5	46.0	13.5	Pass	Horizontal
346.460	35.8	38.1	46.0	7.9	Pass	Horizontal
381.062	33.9	35.5	46.0	10.5	Pass	Horizontal
398.196	30.3	31.2	46.0	14.8	Pass	Horizontal
415.640	32.1	32.8	46.0	13.2	Pass	Horizontal
588.978		32.5	46.0	13.5	Pass	Horizontal
623.580	31.3	33.6	46.0	12.4	Pass	Horizontal
692.860	31.1	37.5	46.0	8.5	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
AC Supply	APT	7008	4170003	-	-	Not applicable
Aerial Controller	EMCO	1090	9112-1062	RFS 3710	-	Not applicable
Aerial Mast	EMCO	1070-1	9203-1661	RFS 3708	-	Not applicable
Biconical	Schwarzbeck	BBA 9106	-	RFS 3612	3 years	5 Feb 2017
Log Periodic	Schwarzbeck	VUSLP 9111	9111-228	3785	3 years	5 Feb 2017
Loop Antenna	EMCO	6502	9003-2485	3798	3 years	7 Jul 2017
Mains Network	R & S	ESH2-Z5	881362/032	3628	2 years	2 Oct 2016
Receiver	R & S	ESHS 10	828404/005	3728	1 year	27 June 2017
Receiver	R & S	ESIB-40	100171	R-27-1	1 year	15 Feb 2017
Turntable	EMCO	1080-1-2.1	9109-1578	RFS 3709	-	Not applicable
VHF Balun	Schwarzbeck	VHA 9103	-	RFS 3603	3 years	5 Feb 2017

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.

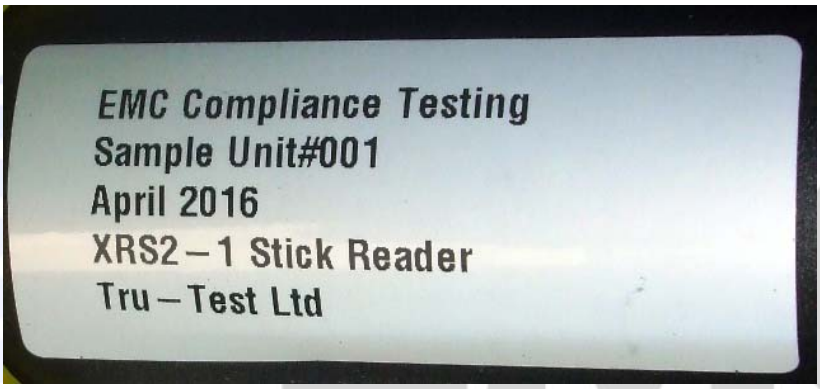
All testing was carried out in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to NZS/IEC/ISO 17025.

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.

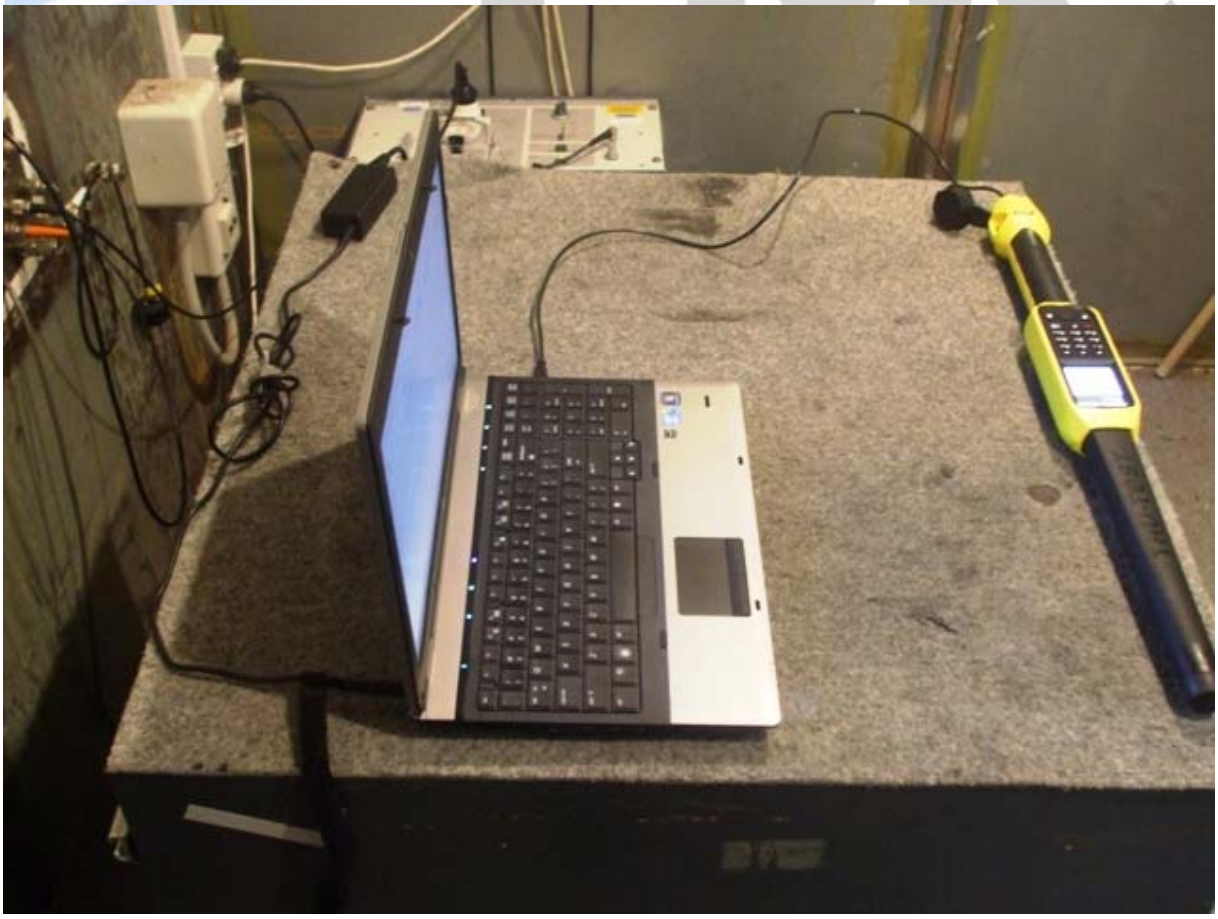
International Accreditation New Zealand has Mutual Recognition Arrangements for testing and calibration with a number of accreditation bodies in various economies. This includes NATA (Australia), UKAS (UK), SANAS (South Africa), NVLAP (USA), A2LA (USA), SWEDAC (Sweden). Further details can be supplied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

9. PHOTOGRAPHS

External Photos



Conducted emission



Radiated Emissions Test Set Up