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## **Test Report**

### **Tru-Test XRP2i-1 Low Frequency Electronic ID (EID) Reader**

*tested to*

**47 Code of Federal Regulations  
Part 15 - Radio Frequency Devices  
Subpart A + B (Unintentional) and C (Intentional) Radiators**

*and*

**RSS-GEN, Issue 5, March 2019  
RSS-210, Issue 10, December 2019**

*for*

**Datamars SA**

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 **Tru-Test XRP2i-1 Low Frequency Electronic ID (EID) Reader** complies with FCC Part 15 Subpart C as an Intentional Radiator when the methods as described in ANSI C63.10 - 2020 are applied and complies with FCC Part 15 Subpart Subpart A + B as Class B devices when the methods as described in ANSI C63.4 - 2014

The product complies with RSS-GEN, Issue 5, March 2019 and RSS-210, Issue 10, December 2019 when the methods as described in ANSI C63.10 - 2020 are applied.

## 2. RESULTS SUMMARY

The results of the testing carried out on 9<sup>th</sup> February 2022 are summarised in the following table:

Sr.no	Parameter	Result
1	Equipment authorisation requirement	The product is certified by FCC ID: XOQXRP2-1
2	Antenna requirement	Complies. Antenna connects externally to the device and has a unique non standard fitting. A Large and Small antenna can be connected with this device. Large EID Antenna (87 x 60 cm). Small EID Antenna (43 x 40 cm). For FCC permissive changes, the testing was performed using large EID antenna.
3	External PA and antenna modifications	Noted.
4	Restricted bands of operation	Complies. Device transmits on 134.2 kHz and contains a Bluetooth 2.4 GHz module transmitter.
5	Conducted limits	Not Tested
6	Radiated emission limits - Fundamental	Complies.
7	Radiated emission limits - Spurious emissions <30 MHz	Complies.
8	Radiated emission limits – Spurious emissions >30 MHz	Complies.

### 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 erasures.**

**This report contains corrections;** the typographical changes have been made to product name on page 5 in the test report no 211207.1b.

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.

All compliance statements have been made with respect of the specification limit with no reference to the measurement uncertainty.

### 4. CLIENT INFORMATION

<b>Company Name</b>	Datamars SA
<b>Address</b>	25 Carbine Road Mt. Wellington
<b>City</b>	Auckland 1060
<b>Country</b>	New Zealand
<b>Contact</b>	Mr Jacky Chou

## 5. DESCRIPTION OF TEST SYSTEM

<b>Brand Name</b>	Tru-Test
<b>Model Number</b>	XRP2i-1
<b>Product</b>	Tru-Test XRP2i-1 Low Frequency Electronic ID (EID) Reader
<b>Product Description</b>	Low Frequency Electronic ID (EID) Reader System
<b>Serial Number</b>	Not Serialized
<b>Antenna</b>	Large EID Antenna (87 x 60 cm) that would be typically used for cattle.
<b>Manufacturer</b>	Datamars Ltd
<b>Country of Origin</b>	New Zealand
<b>FCC ID</b>	XOQXRP2-1
<b>Supply Voltage</b>	120 Vac to 12 Vdc supply provided
<b>Modulation</b>	AM (FDX tag), FSK (HDX tag)
<b>Bandwidth</b>	10 kHz (Receiver bandwidth)
<b>Frequencies</b>	Processor 17.1776 MHz Transmitter 134.2 kHz Bluetooth 2402 - 2480 MHz
<b>Duty Cycle</b>	50 ms on, 4 ms off
<b>Ports</b>	Product has an antenna port, power port and a com port

### **Bluetooth Identification** FCC ID: WAP3026 (IC ID: 7922A-3026)

The Tru Test XRP2i-1 EID Reader is a dual mode FDX-B / HDX low frequency EID reader 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 1 m.

The Reader System identifies and reads electronic tags on individual animals when either the Large Antenna or the Small Antenna is attached.

The product is a FCC Certified product with FCC ID: XOQXRP2-1. The device was earlier tested with Bluetooth module transmitter that has modular approval, The FCC ID of this module is FCC ID: POOWML-C40.

The Bluetooth module has been changed by the client to FCC ID: WAP3026 (IC ID: 7922A-3026) and to demonstrate continued compliance to FCC and ISED, The product has been

retested for intentional emissions below 30 MHz and unintentional emissions from 30 MHz to 1 GHz.

## **6. RESULTS**

### **Standard, Methods and Procedures**

The sample was tested in accordance with RSS-GEN, FCC Part 15, ANSI C63.4 – 2020 and ANSI C63.10-2020 where applicable.

### **Equipment authorisation requirement**

Certification as detailed in Subpart J of Part 2 is available for the 134.2 kHz EID transmitter.

The Bluetooth transmitter has modular approval.

### **Antenna requirement**

This device operates with an external antenna using a unique custom connector that can be seen in the photographs at the rear of this report.

The product can mate with the antennas given below:

- Large EID Antenna
- Small EID Antenna

The product has been tested with a Large antenna.

### **External radio frequency power amplifiers and antenna modifications**

It is NOT possible to attach an external power amplifier to this transmitter.

**Result:** Complies.

### **Restricted bands of operation**

The EID transmitter transmits on 134.2 kHz.

This falls between the restricted bands of 90 – 110 kHz and 495 – 505 kHz.

The Bluetooth transmitter module operates in the 2400.0 – 2483.5 MHz band.

**Result:** Complies.

## Radiated emission limits, general requirements

Radiated emissions testing was carried out over the frequency range of 100 kHz to 1000 MHz.

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

Testing was carried out when the device was powered at 120 Vac 60 Hz using the supplied AC power supply.

Testing was carried out when the reader was continuously reading between two RFID tags with the green LED flashing, the audible tone could be heard and the tag id's output to a laptop computer, that was running Hyper terminal, using the serial port.

The device was placed in the centre of the test table, laying flat, face up with the antenna standing upright facing the test antenna and to the right of the device under test and with the laptop computer placed to the left of the device under test.

Below 30 MHz the centre of this loop antenna was placed 1 metre above the ground at a distance of 10 metres from the device under test with the loop antenna being placed in two orientations.

Low frequency measurements below 30 MHz for measuring the fundamental frequency were made on a grass test site at distances of 10 and 30 metres using a magnetic loop antenna.

The centre of this loop antenna was placed 1 metre above the ground.

Testing was carried out in this position as can be seen from the photographs.

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

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 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
- Free radiation tests (100 kHz – 30 MHz) ± 4.8 dB



### 134.2 kHz Fundamental emission:

Measurements were made using a magnetic loop antenna and a receiver with an average detector and a peak detector both using a 9 kHz bandwidth

Initial measurements were made at a distance of 10 metres with the limit being determined by using the extrapolation factor of 40 dB per decade limit, as detailed in section 15.31 f (2) however this showed that the device would exceed the average limit.

Measurements were then made at two points along the highest field strength radial and the level at 300 metres was then calculated using this roll off factor

The average limit at 300 m at 134.2 kHz is 17.8 uV/m or 25 dBuV/m and 45 dBuV/m in peak.

#### 300 metres extrapolation at 134.2 kHz (Peak Detector)

Level 10 m dBuV/m	Level 30 m dBuV/m	Roll off dB	No. half decades	Total Roll Off dB	Level 300 m dBuV/m	Limit 300 m dBuV/m	Margin dB
107.8	80.5	27.3	3.0	81.9	25.9	45.0	19.1

#### 300 metres extrapolation at 134.2 kHz (Average Detector)

Level 10 m dBuV/m	Level 30 m dBuV/m	Roll off dB	No. half decades	Total Roll Off dB	Level 300 m dBuV/m	Limit 300 m dBuV/m	Margin dB
104.3	77.7	26.6	3.0	79.8	24.5	25.0	0.5

**Result:** Complies.

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests (100 kHz – 30 MHz)  $\pm 4.8$  dB



## Spurious Emissions (below 30 MHz)

Frequency (kHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
268.400	45.2	79.0	33.8	Average	-
268.400	51.4	99.0	47.6	Peak	-
402.600	40.0	75.5	35.5	Average	-
402.600	51.0	95.5	44.5	Peak	-
536.800	<49	53.0	>4.0	Quasi Peak	Ambient
671.000	39.6	51.1	11.5	Quasi Peak	-
805.200	<44	49.5	>5.5	Quasi Peak	Ambient
939.400	<42	48.1	>6.1	Quasi Peak	Ambient
1073.600	<43	47.0	>4.0	Quasi Peak	Ambient
1207.800	38.6	46.0	7.4	Quasi Peak	-
1342.000	29.5	45.0	15.5	Quasi Peak	-
1476.200	<40	44.2	>4.2	Quasi Peak	Ambient
1610.400	29.4	43.5	14.1	Quasi Peak	-

No emissions were observed.

Magnetic loop measurements were made a distance of 10 metres.

At each frequency the measurement antenna was further adjusted to give the highest field strength.

A receiver with an average detector and a peak detector using a 9 kHz bandwidth was used between 110 – 490 kHz and a quasi-peak detector with a 9 kHz bandwidth was used between 490 kHz – 30.0 MHz.

The 300 metre limit between 125 – 490 kHz has been scaled by a factor of 40 dB per decade, as per section 15.31 (f) (2). The 30 metre limit between 490 – 1705 kHz has been scaled by a factor of 40 dB per decade, as per section 15.31 (f) (2).

The limit between 110 – 490 kHz was increased by 20 dB when the peak detector was used.

**Result:** Complies.

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests (100 kHz – 30 MHz)  $\pm 4.8$  dB

## Spurious Emissions (above 30 MHz)

Measurements between 30 – 1000 MHz have been made at a distance of 3 metres.

A receiver with a quasi-peak detector with a 120 kHz bandwidth was used between 30 – 1000 MHz.

Measurements were carried out as the device contains a digital device that operates on 17.1776 MHz.

The device was tested transmitting continuously on 134.2 kHz while continuously reading 2 animal tags.

The Device was tested when powered through 120Vac to 12 Vdc client supplied power adapter.

The Bluetooth was turned on during the test.

The limits as described in Section 15.209 have been applied:

### 30 - 1000 MHz results

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Result	Antenna
31.320	24.3	24.0	40.0	15.7	Pass	Vertical
37.800	23.0	-	40.0	17.0	Pass	Vertical
45.400	27.6	23.6	40.0	12.4	Pass	Vertical
47.360	24.1	19.9	40.0	15.9	Pass	Vertical
54.560	25.1	18.8	40.0	14.9	Pass	Vertical
58.160	26.1	-	40.0	13.9	Pass	Vertical
65.200	22.5	16.4	40.0	17.5	Pass	Vertical
69.000	27.8	17.3	40.0	12.2	Pass	Vertical
77.300	24.5	18.4	40.0	15.5	Pass	Vertical
82.560	23.6	26.1	40.0	13.9	Pass	Horizontal
114.760	25.4	-	43.5	18.1	Pass	Vertical
120.000	34.5	32.1	43.5	9.0	Pass	Vertical
132.000	-	27.8	43.5	15.7	Pass	Horizontal
142.160	29.0	29.0	43.5	14.5	Pass	Vertical
194.200	-	26.5	43.5	17.0	Pass	Horizontal
202.600	-	27.9	43.5	15.6	Pass	Horizontal
213.200	-	25.8	43.5	17.7	Pass	Horizontal

All other emissions detected had a margin to limit that exceeded 15 dB when measurements were attempted up to 1 GHz using both vertical and horizontal polarisations.

### Result: Complies

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests (30 – 1000 MHz)  $\pm 4.1$  dB

## 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 Antenna	Schwarzbeck	BBA 9106	9594	E3680	4.5 years	29 Mar 2022
Log Periodic Antenna	Schwarzbeck	VUSLP 9111B	9111-112	EMC4025	4.5 years	25 Mar 22
Loop Antenna	EMCO	6502	9003-2485	E3798	4.5 years	12 Feb 2022
Receiver	R & S	ESIB-40	100295	E4030	2 year	3 Jun 2023
Turntable	EMCO	1080-1-2.1	9109-1578	RFS 3709	-	Not applicable
VHF Balun	Schwarzbeck	VHA 9103	-	E3696	4.5 years	29 Mar 2022

## 8. ACCREDITATIONS

Testing was carried out in accordance with EMC Technologies NZ Ltd designation as a FCC Accredited Laboratory by International Accreditation New Zealand, designation number: NZ0002 under the APEC TEL MRA.

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.

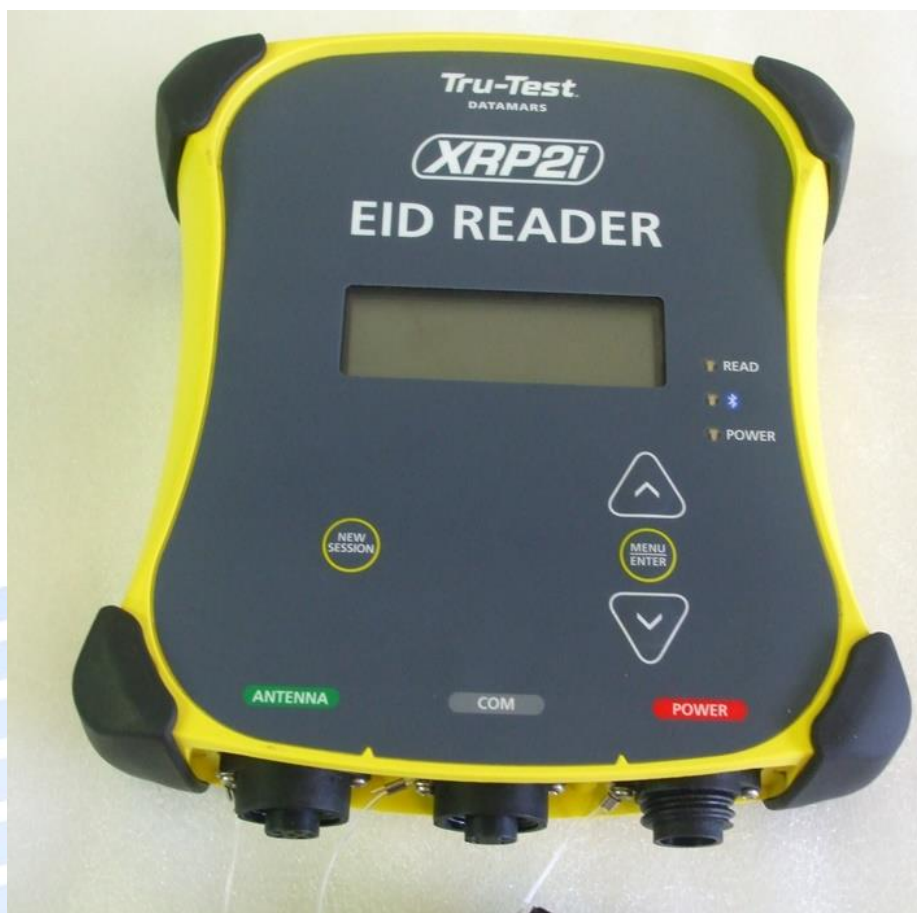
International Accreditation New Zealand has International Laboratory Accreditation Council (ILAC) Mutual Recognition Arrangements for testing and calibration with various accreditation bodies in a number of economies.

This includes NATA (Australia), UKAS (UK), SANAS (South Africa), NVLAP (USA), A2LA (USA), SWEDAC (Sweden).

Further details can be supplied on request.

## 9. PHOTOGRAPHS

### External Photos



Rear view



Power adapter used in testing





Large Antenna used in testing



Radiated emissions test set up photos

Product Setup for 3m and 10 m measurement



## Product setup for 30 m testing

