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TEST REPORT

Heyrex Rexnet v3 Animal Biometrics Monitoring Device

tested to

47 Code of Federal Regulations

Part 15 - Radio Frequency Devices

Subpart A + B

for

Say Systems

A handwritten signature in blue ink, appearing to read "Andrew Cutler", is placed over a light blue rectangular background.

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 **Heyrex Rexnet v3 Animal Biometrics Monitoring Device** complies with FCC Part 15 Subpart A + B as a Class B Computing Peripheral Device when the methods as described in ANSI C63.4 - 2003 are applied.

2. RESULTS SUMMARY

The results of testing carried out between September 2012 and December 2012 are detailed below:

Clause	Parameter	Result
15.101	Equipment authorisation requirement.	Certification required as the device would be categorised as a “Class B computer peripheral”.
15.103	Exempted devices.	Device is not exempt as it contains a digital device.
15.107	Conducted Emissions 0.15 - 30 MHz	Complies with a 1.0 dB margin at 477 kHz (Average).
15.109	Radiated Emissions 30 - 1000 MHz	Complies with a 4.9 dB margin at 250 MHz (Horizontal)
15.111	Antenna Terminal Disturbance 30 – 950 MHz	Not applicable. Device is not a receiver.

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	Say Systems Ltd
Address	Level 1, 236-256 Karori Rd, Karori
City	Wellington
Country	New Zealand
Contact	Mr Mark Solly

5. DESCRIPTION OF TEST SYSTEM

Brand Name	Heyrex
Model Number	Rexnet v3
Product	Animal Biometrics Monitoring Device
Manufacturer	Say Systems Ltd
Country of Origin	New Zealand
Serial Number	Sample not serialized
FCC ID	RGZ-R3

Product Description

The Heyrex animal biometrics and telemetry system consists of a base station (Rexnet v3) that communicates with a battery powered sensor module (Collar Biosensor Capsule v6) which is attached to the animal that is to be monitored.

The base station is powered with using an ac adapter and is connected to an Ethernet network (Internet etc) using the RJ45 Ethernet port.

The base station stores and relays data from the collar sensor to an external location.

This report has been prepared as this device can be connected to a computing device using the RJ-45 port.

Testing of the 2.4 GHz device is covered in test report number 120810.3.

6. RESULTS

Standard

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

Methods and Procedures

The following measurement methods and procedures have been applied:

- ANSI C63.4 – 2003

Section 15.101: Equipment authorisation requirement

Certification as detailed in Subpart J of Part 2 is required for this device as it would be classed as a Class B computer peripheral.

Section 15.107: Conducted limits

Conducted emission testing has been carried out when the device was powered at 120 Vac 60 Hz using the supplied AC power supply.

Conducted emission 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 m screened room.

Testing was carried out in accordance with section 15.107(a) using a measuring receiver and a 50 μ H / 50 ohm artificial mains network which is also known as a line impedance stabilisation network (LISN).

Attached to the RJ-45 port was a laptop computer that was running control software supplied by the client.

This device was also powered at 120 Vac 60 Hz via a secondary artificial mains network (LISN).

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 Class B conducted limits have been applied

Result: Complies

Measurement uncertainty with a confidence interval of 95% is:

Conducted emissions tests (0.15 - 30 MHz) $\pm$ 2.2 dB

Conducted Emissions – AC Input Power Port

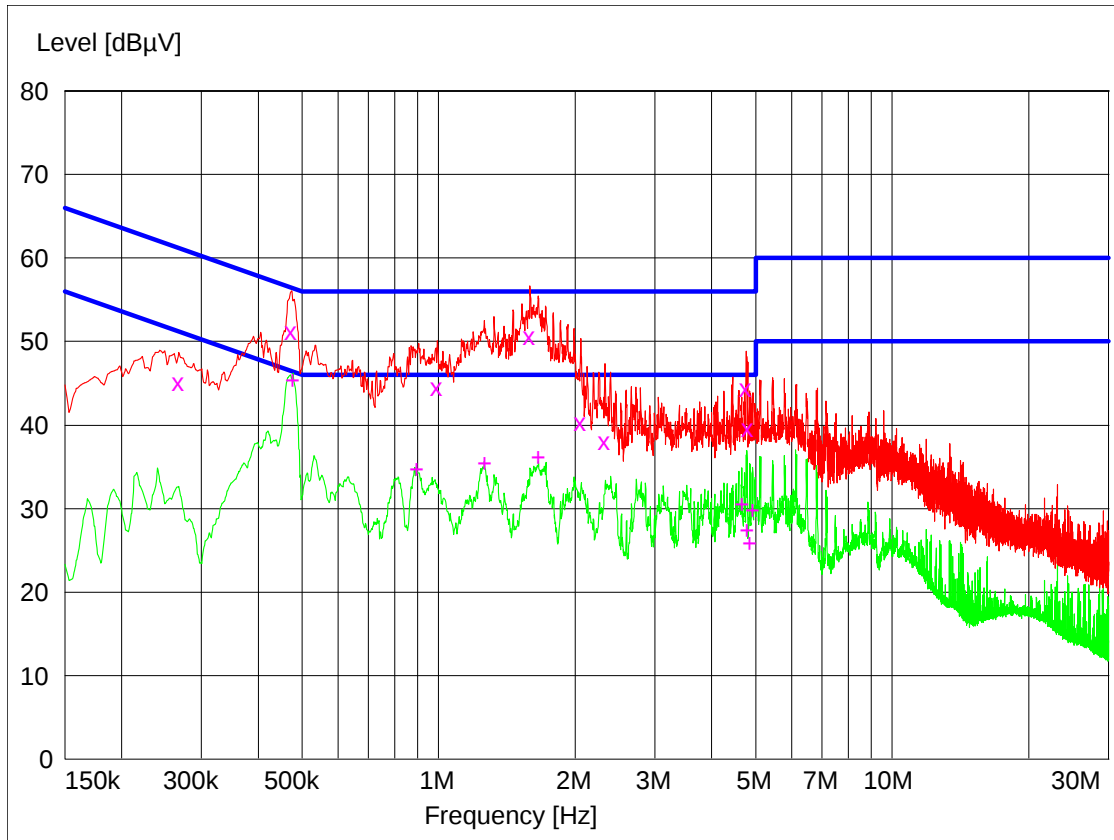
Setup: Device tested when powered at 120 Vac 60 Hz when frequency hopping continuously.

Peak ---

Average --

Quasi Peak X

Average +



Final Quasi-Peak Measurements

Frequency MHz	Level dBμV	Limit dBμV	Margin dB	Phase	Rechecks dBμV
0.267000	45.10	61.3	16.2	N	
0.474000	51.20	56.0	5.3	N	
0.993000	44.50	56.0	11.5	N	
1.590000	50.70	56.0	5.3	N	
2.058500	40.40	56.0	15.7	N	
2.324000	38.10	56.0	17.9	N	
4.767500	44.40	56.0	11.6	L1	
4.803500	39.60	56.0	16.4	N	

Final Average Measurements

Frequency MHz	Level dBμV	Limit dBμV	Margin dB	Phase	Rechecks dBμV
0.477000	45.40	46.0	1.0	L1	45.4
0.894000	34.80	46.0	11.2	L1	
1.260000	35.50	46.0	10.5	L1	
1.659000	36.20	46.0	9.8	L1	
4.659500	30.50	46.0	15.5	L1	
4.785500	27.50	46.0	18.6	N	
4.848500	25.90	46.0	20.1	N	
4.925000	29.80	46.0	16.2	L1	

Section 15.109 – Radiated emissions

Radiated emission testing was carried out over the frequency range of 30 to 1000 MHz as the highest digital device frequency is less than 108 MHz.

The client has declared that the digital device operates using frequencies of 4.19, 16, 25, 48 and 50 MHz

Testing was carried out at the laboratory's open area test site - located at 670 Kawakawa Orere Rd, RD3, Papakura, 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 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.

The emission is measured in both vertical and horizontal antenna polarisations using a Quasi Peak detector with a bandwidth of 120.

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)

Radiated Emissions 30 – 1000 MHz

The device was powered at 120 Vac 60 Hz

Attached to the RJ-45 port on the device was a laptop computer that was running software provided by the client.

The device as tested when transmitting continuously in frequency hopping mode.

The device was placed flat on the test table with the laptop computer placed next to it.

The antenna of the device was placed vertically upright.

Frequency MHz	Vertical dBuV/m	Horizontal dBuV/m	Limit dBuV/m	Margin dB	Detector	Antenna
85.500	30.1		40.0	9.9	QP	Vertical
110.815	25.8		43.5	17.7	QP	Vertical
165.750		26.2	43.5	17.3	QP	Horizontal
168.100	27.3		43.5	16.2	QP	Vertical
250.000	32.8	41.1	46.0	4.9	QP	Horizontal

No further emissions were detected within 15 dB of the specified limit when measurements were attempted up to 1000 MHz using both vertical and horizontal polarisations.

Result: Complies

Measurement uncertainty with a confidence interval of 95% is:

Radiated emission tests (30 - 1000 MHz) ± 4.1 dB

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
Receiver	R & S	ESHS 10	828404/005	RFS 3728	2 Dec 2012
Mains Network	R & S	ESH2-Z5	881362/034	3628	29 Jul 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

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 15 February, 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.

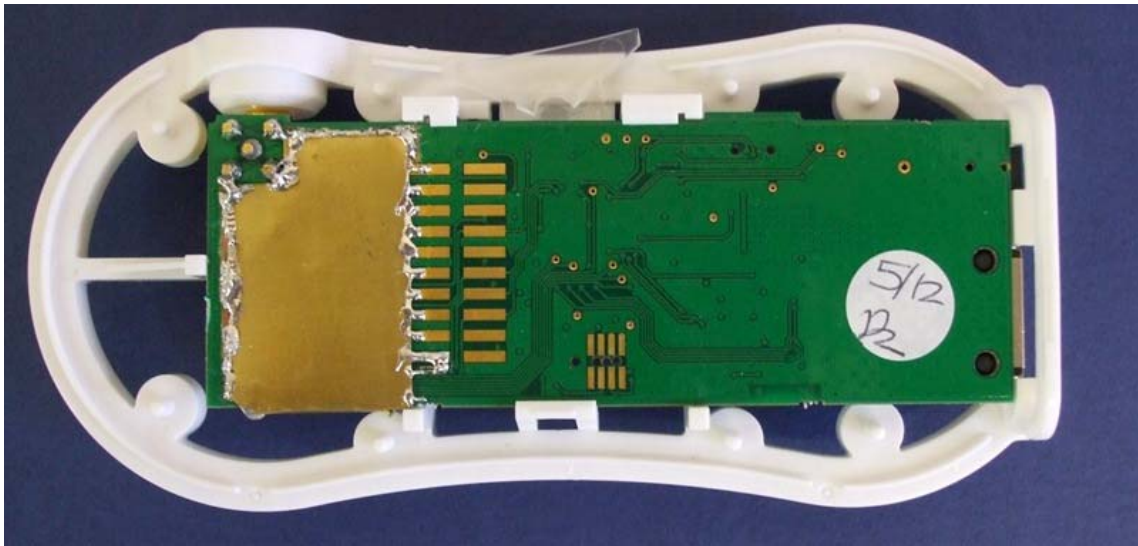
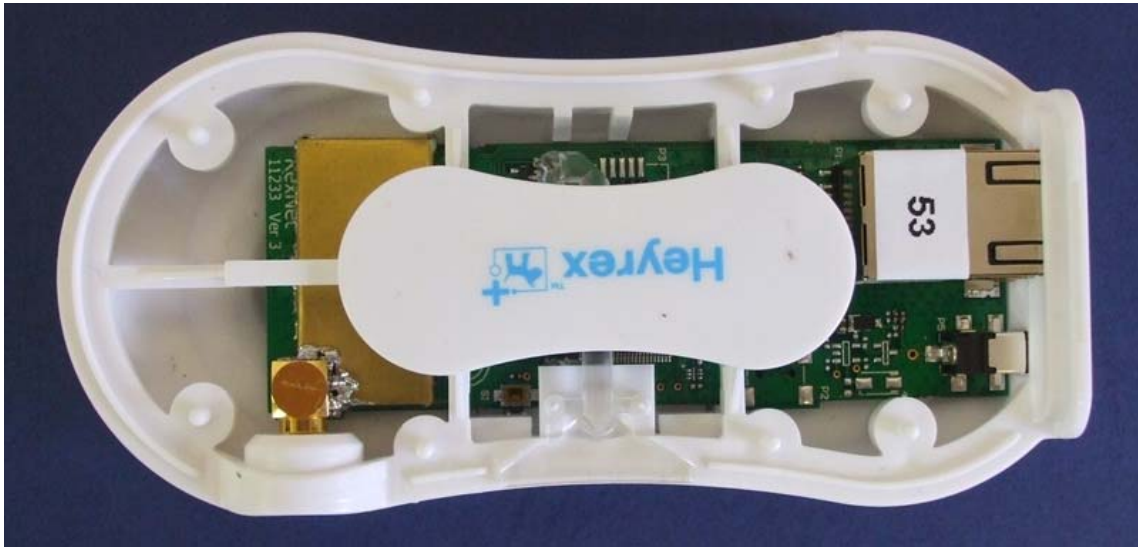
International Accreditation New Zealand has Mutual Recognition Arrangements for testing and calibration with various accreditation bodies in a number of economies. This includes NATA (Australia), UKAS (UK), SANAS (South Africa), NVLAP (USA), A2LA (USA), SWEDAC (Sweden). Further details can be supplied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

9. PHOTOGRAPHS





Internal Photos





Radiated emissions test set up photos – Above 30 MHz







Conducted Emissions Test Set Up

