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TEST REPORT

VX Sport VX Log-M1b Data Logging Transceiver

tested to

47 Code of Federal Regulations

Part 15 - Radio Frequency Devices

Subpart A + B

for

Visuallex Sport International Ltd

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 **VX Sport VX Log-M1b Data Logging Transceiver** 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 from testing, carried out between October 23rd and November 2nd 2012, and 4th April 2013 are summarised in the following table:

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 9.5 dB margin at 258.0 kHz (Quasi Peak)
15.109	Radiated Emissions 30 - 1000 MHz	Complies with a 2.9 dB margin at 99.220 MHz (Vertical)
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 Visuallex Sport International Ltd

Address PO Box 27054
Marion Square
Wellington 6141

Country New Zealand

Contact Mr Robert Snow

5. DESCRIPTION OF TEST SAMPLE

Brand Name VX Sport

Model Number VX Log-M1b

Product Data Logging Transceiver

Manufacturer Visuallex Sport International Ltd

Country of Origin New Zealand

Serial Number 1395010 & 23950

FCC ID SR2VSILM1B

The device that was tested is a 900 MHz frequency hopping spread spectrum transmitter that is powered using a Class B computer USB power supply and contains digital devices.

6. SETUPS AND PROCEDURES

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

This device cannot be operated without an external power supply.

Typically it would be operated when attached to a laptop computer using the USB port power supply and therefore it can be indirectly powered using the AC public mains.

Conducted emission testing has been carried out when the device was attached to a laptop computer that was powered at 120 Vac 60 Hz.

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 m screened room.

Testing was carried out in accordance with section 15.207(a) using a measuring receiver and a 50 uH / 50 ohm artificial mains network which is also known as a line impedance stabilisation 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

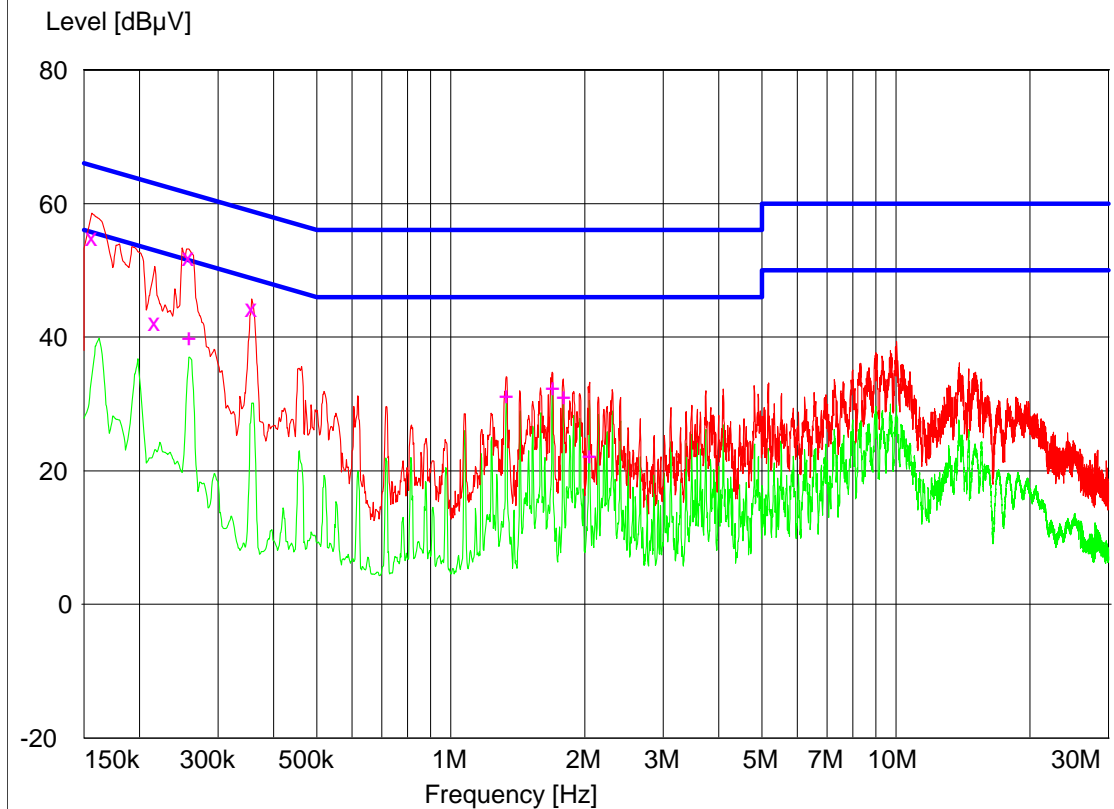
Measurement uncertainty with a confidence interval of 95% is:

Conducted emissions tests (0.15 - 30 MHz) ± 2.2 dB

Conducted Emissions – AC Input Power Port

Setup: Device tested when transmitting continuously on 924 MHz when attached to the USB port of a laptop computer that was powered at 120 Vac.

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



Final Quasi-Peak Measurements

Frequency MHz	Level dBμV	Limit dBμV	Margin dB	Phase	Rechecks dBμV
0.156000	54.90	65.7	10.8	N	
0.216000	42.30	63.0	20.7	N	
0.258000	52.00	61.5	9.5	N	
0.357000	44.40	58.8	14.4	N	

Final Average Measurements

Frequency MHz	Level dBμV	Limit dBμV	Margin dB	Phase	Rechecks dBμV
0.258000	40.00	51.5	11.5	N	
1.332000	31.40	46.0	14.6	N	
1.689000	32.50	46.0	13.5	N	
1.788000	31.10	46.0	14.9	N	
2.045000	22.40	46.0	23.6	N	

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 7.3728 MHz, 16.0 MHz, and 23.1 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.

Pretesting of the device in a number of typical orientations was carried out with the worst case radiated emission results being obtained with the antenna vertical and with the device laying flat as per the photographs at the rear of this test report.

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 kHz.

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

Testing was carried with the transmitter operating in spread spectrum mode.

Device was powered using the USB port of a laptop computer that was attached using a 1.5 metre long data cable.

The transmitter and computer was placed either side of the centre of the test table.

The transmitter was placed laying flat on the test table with the antenna vertical

The laptop computer was powered at 120 Vac 60 Hz.

Frequency (MHz)	Vertical (dB μ V/m)	Horizontal (dB μ V/m)	Limit (dB μ V/m)	Antenna	Margin (dB)	Result
46.950	22.5		40.0	Vertical	17.5	Pass
72.100	27.1		40.0	Vertical	12.9	Pass
84.000	28.1		40.0	Vertical	11.9	Pass
87.412	32.1	26.2	40.0	Vertical	7.9	Pass
99.220	40.6	37.3	43.5	Vertical	2.9	Pass
100.000	36.1		43.5	Vertical	7.4	Pass
101.600	39.0		43.5	Vertical	4.5	Pass
102.800	39.6		43.5	Vertical	3.9	Pass
108.000	32.1	31.4	43.5	Vertical	11.4	Pass
233.330	28.0		46.0	Vertical	18.0	Pass
250.000	30.1		46.0	Vertical	15.9	Pass
264.369	31.7	28.8	46.0	Vertical	14.3	Pass
298.547	29.5	30.1	46.0	Horizontal	16.5	Pass
364.949	34.1		46.0	Vertical	11.9	Pass
422.095	28.1		46.0	Vertical	17.9	Pass
431.272	27.9		46.0	Vertical	18.1	Pass
566.312	28.1		46.0	Vertical	17.9	Pass
633.165	30.1		46.0	Vertical	15.9	Pass
703.378	26.5		46.0	Vertical	19.5	Pass

Result: Complies.

Measurement uncertainty with a confidence interval of 95% is:

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

7. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial No	Asset Ref	Cal Due
Aerial Controller	EMCO	1090	9112-1062	RFS 3710	N/a
Aerial Mast	EMCO	1070-1	9203-1661	RFS 3708	N/a
Biconical Antenna	Schwarzbeck	BBA 9106	-	RFS 3613	17 Jan 2014
Receiver	R & S	ESCS 30	847124/020	E1595	22 Aug 2013
Receiver	R & S	ESIB-40	100171	R-27-1	20 Oct 2013
Receiver	R & S	ESHS 10	828404/005	RFS 3728	22 Aug 2013
Spectrum Analyser	Hewlett Packard	E7405A	US39150142	3776	26 Feb 2015
Log Periodic	Schwarzbeck	VUSLP 9111	9111-228	3785	30 Jan 2015
Horn Antenna	EMCO	3115	9511-4629	E1526	21 Feb 2014
Mains Network	R & S	ESH2-Z5	881362/034	3628	29 Jul 2014
Variac	General Radio	1592	-	RFS 3690	N/a
Turntable	EMCO	1080-1-2.1	9109-1578	RFS 3709	N/a
VHF Balun	Schwarzbeck	VHA 9103	-	RFS 3613	30 Jan 2014

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 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.

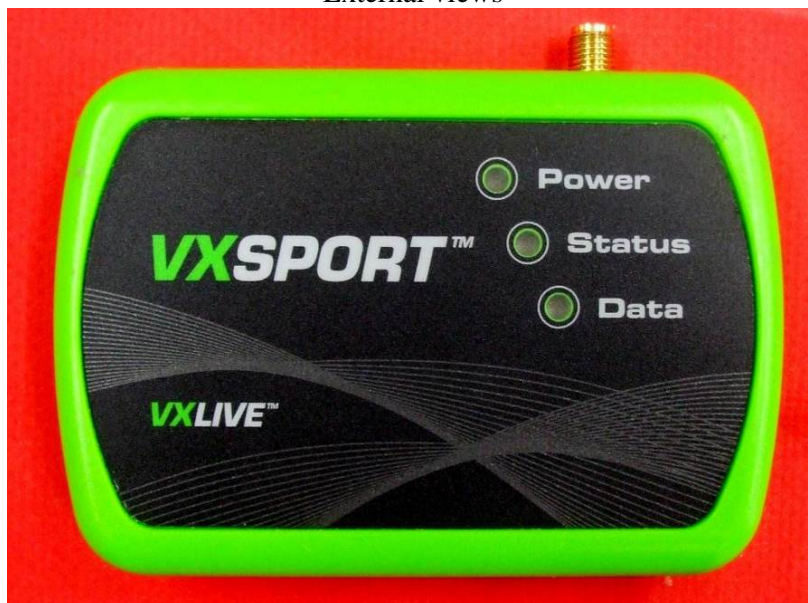
All measurement equipment has been calibrated in accordance with the terms of the EMC Technologies (NZ) Ltd International Accreditation New Zealand (IANZ) Accreditation to NZS/ISO/IEC 17025, 2005

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

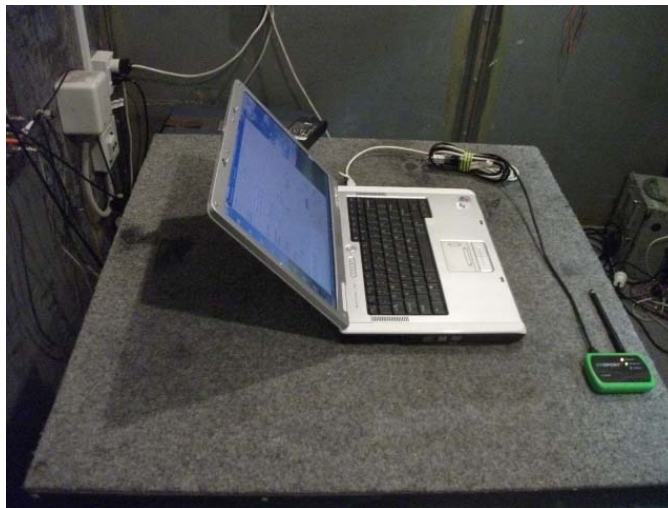
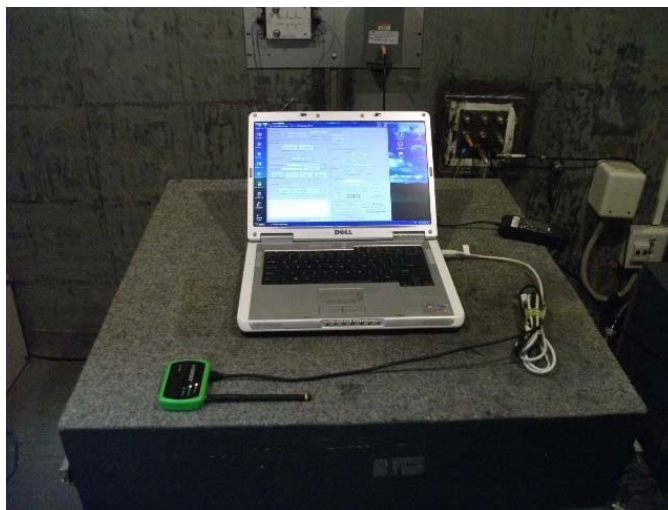
External views



SMA connector



Conducted emissions test setup



Radiated emissions setup



