

# EMC Technologies (NZ) Ltd

Test Report No 80137.2

Report date: 30 January 2008

---

## **TEST REPORT**

### **Zephyr Technology Ltd BioHarness Physiological Monitoring Device USB Dongle Receiver**

*tested to the*

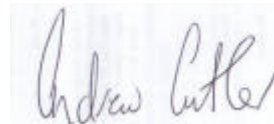
**Code of Federal Regulations (CFR) 47**

**Part 15 – Radio Frequency Devices,**

*for*

**Zephyr Technology Ltd**

This Test Report is issued with the authority of:



---

**Andrew Cutler - General Manager**



# EMC Technologies (NZ) Ltd

Test Report No **80137.2**

Report date: 30 January 2008

---

## Table of Contents

1. CLIENT INFORMATION	3
2. DESCRIPTION OF TEST SAMPLE	3
3. COMPLIANCE STATEMENT	4
4. TEST SAMPLE DESCRIPTION	4
5. ATTESTATION	5
6. TRANSMITTER TEST RESULTS	6
7. TEST EQUIPMENT USED	10
8. ACCREDITATIONS	10
9. PHOTOGRAPHS	11

# EMC Technologies (NZ) Ltd

Test Report No **80137.2**

Report date: 30 January 2008

---

## 1. CLIENT INFORMATION

**Company Name** Zephyr Technology Ltd

**Address** 31 Carbine Road  
Mount Wellington

**City** Auckland

**Country** New Zealand

**Contact** Mr James Sirois

## 2. DESCRIPTION OF TEST SAMPLE

**Brand Name** Zephyr Technology Ltd

**Model Number** BioHarness

**Product** Physiological Monitoring Device USB Dongle Receiver

**Manufacturer** Zephyr Technology Ltd

**Country of Origin** New Zealand

**Serial Numbers** ZD000075

**Ancillary Equipment**

- ASUS A3F Laptop Computer SN# 65N0AG003012

# EMC Technologies (NZ) Ltd

Test Report No **80137.2**

Report date: 30 January 2008

---

## 3. COMPLIANCE STATEMENT

The **Zephyr Technology Ltd BioHarness** Physiological Monitoring Device complies with 47 CFR Part 15 Subpart B as an Unintentional Radiator, as detailed below, when the methods as described in ANSI 63.4 - 2003 are applied.

Clause	Parameter	Result
15.101	Equipment authorisation requirement.	Certification or Declaration of Conformity required for receivers.
15.103	Exempted devices.	Not applicable as the device is a receiver and is not a digital device.
15.107	Conducted limits	Complies.
15.109	Radiated emission limits	Complies.
15.111	Antenna power conduction limit for receivers.	Not applicable. The antenna is permanently attached to the receiver.

## 4. TEST SAMPLE DESCRIPTION

The Zephyr BioHarness™ product provides bio telemetry data of human vital signs over time. The bio telemetry data includes measurements such as heart rate, breathing rate, body temperature, posture and activity levels.

The system consists of an electronic transmitting module that snaps onto a garment strap, a receiver module that plugs into a USB port on a computer and application software.

In normal operation, a user wears the strap on his or her torso during physical activity and either transmits data to a PC via the USB receiver or logs data using the electronic module's internal memory.

Logged data may be uploaded using a USB cradle.

The USB cradle is also used to charge the internal polymer lithium ion battery.

# EMC Technologies (NZ) Ltd

Test Report No **80137.2**

Report date: 30 January 2008

---

## 5. ATTESTATION

This report describes the tests and measurements performed for the purpose of determining compliance with the specification with the following conditions:

**The client selected the test sample.**

**The report relates only to the sample tested.**

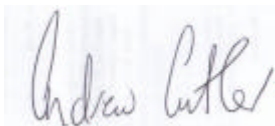
**This report does not contain corrections or erasures.**

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.

In addition this equipment has been tested in accordance with the requirements contained in the appropriate Commission regulations.

To the best of my knowledge, these tests were performed using measurement procedures that are consistent with industry or Commission standards and demonstrate that the equipment complies with the appropriate standards.

I further certify that the necessary measurements were made by EMC Technologies NZ Ltd, 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand.



Andrew Cutler  
General Manager  
EMC Technologies NZ Ltd

# EMC Technologies (NZ) Ltd

Test Report No **80137.2**

Report date: 30 January 2008

---

## 6. TEST RESULTS

### Legislation

The limits contained within 47 CFR Part 15 Subpart A and B were applied to this device.

### Methods and Procedures

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

### Section 15.207: Conducted limits

Conducted emission testing has been carried out as the device is powered indirectly using the USB power on a computer that would normally be powered at 110 Vac.

Testing has been carried out using a representative 110 Vac AC adaptor.

Device was tested while continuously receiving data from a Bio Harness transmittter.

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.

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.

**Result:** Complies with a 3.5 dB margin at 195.0 kHz (Average).

Measurement uncertainty with a confidence interval of 95% is:

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

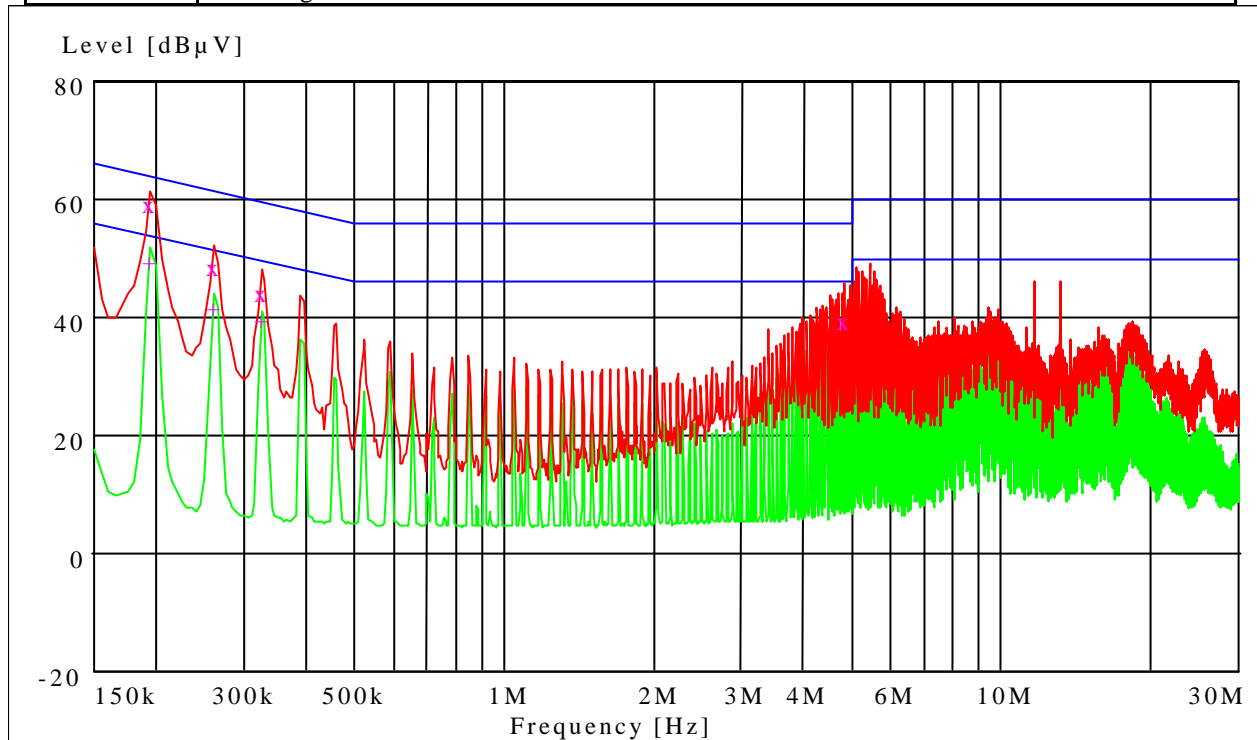
# EMC Technologies (NZ) Ltd

Test Report No **80137.2**

Report date: 30 January 2008

## Conducted emissions

Comments:	Device when powered at 110 Vac when attached to a representative laptop computer while receiving data from a Bio Harness transmitter
-----------	--



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

### Quasi-Peak Measurements

Frequency MHz	Level dB $\mu$ V	Limit dB $\mu$ V	Margin dB	Phase	Rechecks dB $\mu$ V
0.195000	59.90	63.8	3.9	N	58.0
0.260000	49.60	61.4	11.8	N	
0.325000	45.00	59.5	14.5	N	
4.850000	40.20	56.0	15.8	L1	
4.980000	38.30	56.0	17.7	L1	
5.430000	39.80	60.0	20.2	N	

### Average Measurements

Frequency MHz	Level dB $\mu$ V	Limit dB $\mu$ V	Margin dB	Phase	Rechecks dB $\mu$ V
0.195000	50.30	53.8	3.5	N	49.0
0.260000	42.60	51.4	8.8	N	
0.325000	40.40	49.5	9.1	N	
4.580000	34.10	46.0	11.9	N	
4.850000	34.10	46.0	11.9	L1	
4.980000	30.50	46.0	15.5	L1	

**EMC Technologies (NZ) Ltd**

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au

# EMC Technologies (NZ) Ltd

Test Report No **80137.2**

Report date: 30 January 2008

---

## Section 15.109: Receiver radiated emissions

Device tested continuously when receiving data from the Bio Harness transmitter on 922 MHz.

USB dongle receiver was attached to a representative laptop computer

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
114.500	24.8		43.5	18.7	QP
171.813	26.6	27.7	43.5	16.9	QP
229.000		34.9	46.0	11.1	QP
249.000		30.2	46.0	15.8	QP
259.500		30.7	46.0	15.3	QP
285.500		29.1	46.0	16.9	QP
314.995		29.5	46.0	16.5	QP
320.300	32.7		46.0	13.3	QP
320.448		36.7	46.0	9.3	QP
342.200		33.7	46.0	12.3	QP
343.500	33.3		46.0	12.7	QP
400.500	33.0		46.0	13.0	QP
415.218	32.5		46.0	13.5	QP
432.000	32.9		46.0	13.1	QP
448.628	32.1		46.0	13.9	QP
474.800		32.6	46.0	13.4	QP
480.938		35.1	46.0	10.9	QP
513.000	33.9		46.0	12.1	QP
577.500		33.6	46.0	12.4	QP
630.800	33.5		46.0	12.5	QP
684.100	34.2		46.0	11.8	QP
995.700	39.9	38.5	54.0	14.1	QP

All other emissions observed had a 20 dB margin below the limit when measurements were attempted up to 9 GHz in either horizontal or vertical antenna polarisations.

Radiated emissions testing was carried out over the frequency range of 30 MHz to 9 GHz as this receiver operates in the 900 MHz band.

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

# EMC Technologies (NZ) Ltd

Test Report No **80137.2**

Report date: 30 January 2008

---

This site conforms to the requirements of CISPR 16, Part 1, Clause 16, and ANSI C63.4 - 2003.

The device was placed on the test table which is a total of 0.8 m above the test site ground plane with testing being carried out over a distance of 3 metres.

As the device is relatively fixed as it needs to be inserted into a laptop computer testing was carried out in a single orthogonal polarity.

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 is measured in both vertical and horizontal antenna polarisations, where appropriate.

Below 1000 MHz a quasi peak detector was used with a bandwidth of 120 kHz.

Above 1 GHz an average and a peak detector were used with a bandwidth of 1 MHz.

The emission level is determined in field strength by taking the following into consideration:

Level (dB $\mu$ V/m) = Receiver Reading (dB $\mu$ V) + Antenna Factor (dB) + Coax Loss (dB) – Microwave Preamplifier Gain (dB)

**Result:** Complies with a 9.3 dB margin at 320.448 MHz

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests (30 – 18,000 MHz)  $\pm$  4.1 dB

# EMC Technologies (NZ) Ltd

Test Report No **80137.2**

Report date: 30 January 2008

---

## 7. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial No	Asset Ref
Aerial Controller	EMCO	1090	9112-1062	RFS 3710
Aerial Mast	EMCO	1070-1	9203-1661	RFS 3708
Turntable	EMCO	1080-1-2.1	9109-1578	RFS 3709
VHF Balun	Schwarzbeck	VHA 9103	-	RFS 3603
Biconical Antenna	Schwarzbeck	BBA 9106	-	RFS 3612
Log Periodic Antenna	Schwarzbeck	VUSLP 9111	9111-228	3785
Horn Antenna	Electrometrics	RGA-60	6234	E1494
Measurement Receiver	Rohde & Schwarz	ESCS 30	847124/020	E1595
Spectrum Analyser	Hewlett Packard	E7405A	US39150142	3776
Microwave Pre Amp	Hewlett Packard	8349B	2644A01659	-
Measurement Receiver	Rohde & Schwarz	ESHS-10	828404/005	3728
Mains Network	Rohde & Schwarz	ESH2-Z5	881362/032	3628

## 8. ACCREDITATIONS

Testing was carried out in accordance with EMC Technologies NZ Ltd registration with the Federal Communications Commission as a listed facility, Registration Number: 90838, which was updated on January 27<sup>th</sup>, 2007.

In addition 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: 2005.

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: 2005.

International Accreditation New Zealand has Mutual Recognition Arrangements for testing and calibration with 46 accreditation bodies in 34 economies. This includes NATA (Australia), UKAS (UK), SANAS (South Africa), NVLAP (USA), A2LA (USA), SWEDAC (Sweden). Further details can be supplied on request.

# EMC Technologies (NZ) Ltd

Test Report No **80137.2**

Report date: 30 January 2008

## 9. PHOTOGRAPHS - External View



**EMC Technologies (NZ) Ltd**

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: [aucklab@ihug.co.nz](mailto:aucklab@ihug.co.nz)

Web Site: [www.emctech.com.au](http://www.emctech.com.au)

# EMC Technologies (NZ) Ltd

Test Report No 80137.2

Report date: 30 January 2008

---

## Conducted Emissions Test Set Up Photos



---

### EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Page 12 of 14

This report may not be reproduced except in full

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: [aucklab@ihug.co.nz](mailto:aucklab@ihug.co.nz)

Web Site: [www.emctech.com.au](http://www.emctech.com.au)

# EMC Technologies (NZ) Ltd

Test Report No **80137.2**

Report date: 30 January 2008

---

## Radiated emissions test set up



---

### **EMC Technologies (NZ) Ltd**

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Page 13 of 14

This report may not be reproduced except in full

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: [aucklab@ihug.co.nz](mailto:aucklab@ihug.co.nz)

Web Site: [www.emctech.com.au](http://www.emctech.com.au)

# EMC Technologies (NZ) Ltd

Test Report No **80137.2**

Report date: 30 January 2008

---



---

**EMC Technologies (NZ) Ltd**

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: [aucklab@ihug.co.nz](mailto:aucklab@ihug.co.nz)

Web Site: [www.emctech.com.au](http://www.emctech.com.au)