TEST REPORT

Zephyr Technology Ltd BioHarness Physiological Monitoring Device Transmitter

tested to the

Code of Federal Regulations (CFR) 47

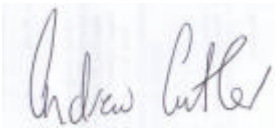
Part 15 – Radio Frequency Devices, Subpart C – Intentional Radiators

Section 15.249 – Operation in the band 902 - 928 MHz

for

Zephyr Technology Ltd

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. 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 Transmitter
Manufacturer	Zephyr Technology Ltd
Country of Origin	New Zealand
Serial Numbers	ZBH000287

Ancillary Equipment

- ASUS A3F Laptop Computer SN# 65N0AG003012

3. COMPLIANCE STATEMENT

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

CLAUSE	TEST PERFORMED	RESULT
15.203	Antenna requirement	Complies
15.205	Operation in restricted bands	Complies
15.207	Conducted emissions	Complies
15.209	Radiated emissions	Complies
15.215	Additional provisions	Complies
15.249:		
(a)	Field strength of fundamental	Complies
(a)	Field strength of harmonics	Complies
(b)	Fixed, point to point operations	Not applicable
(c)	3 metre measurement distance	Noted
(d)	Spurious emission levels except harmonics	Complies
(e)	Detectors above 1000 MHz	Noted
(f)	Reference to section 15.37(d)	Noted
15.35(c)	Pulse modulation factor	Applied

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.

Parameter	Value
FCC Band	902 – 928 MHz
Test frequency	922.9500 MHz
Transmission Type	Intermittent & One-way Transmitter is TX only, Receiver is RX only
Modulation	GFSK
Transmission Duty Cycle	3 ms / 56 ms TX is OFF during non-transmit part of cycle)
Max Transmission Power	+10 dBm
Channel Width	250 kHz
Bandwidth	200 kHz

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.

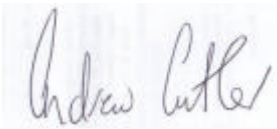
This report does not contain corrections or erasures.

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

6. TRANSMITTER TEST RESULTS

Section 15.203 – Antenna requirement

Not applicable. The antenna for this device is integral to the device and it is permanently attached

Section 15.205 – Restricted bands of operation

Refer to measurements made with reference to Section 15.249 (a).

Section 15.207 – Conducted emissions

Conducted emission testing has been carried out as the device is charged 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.

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.

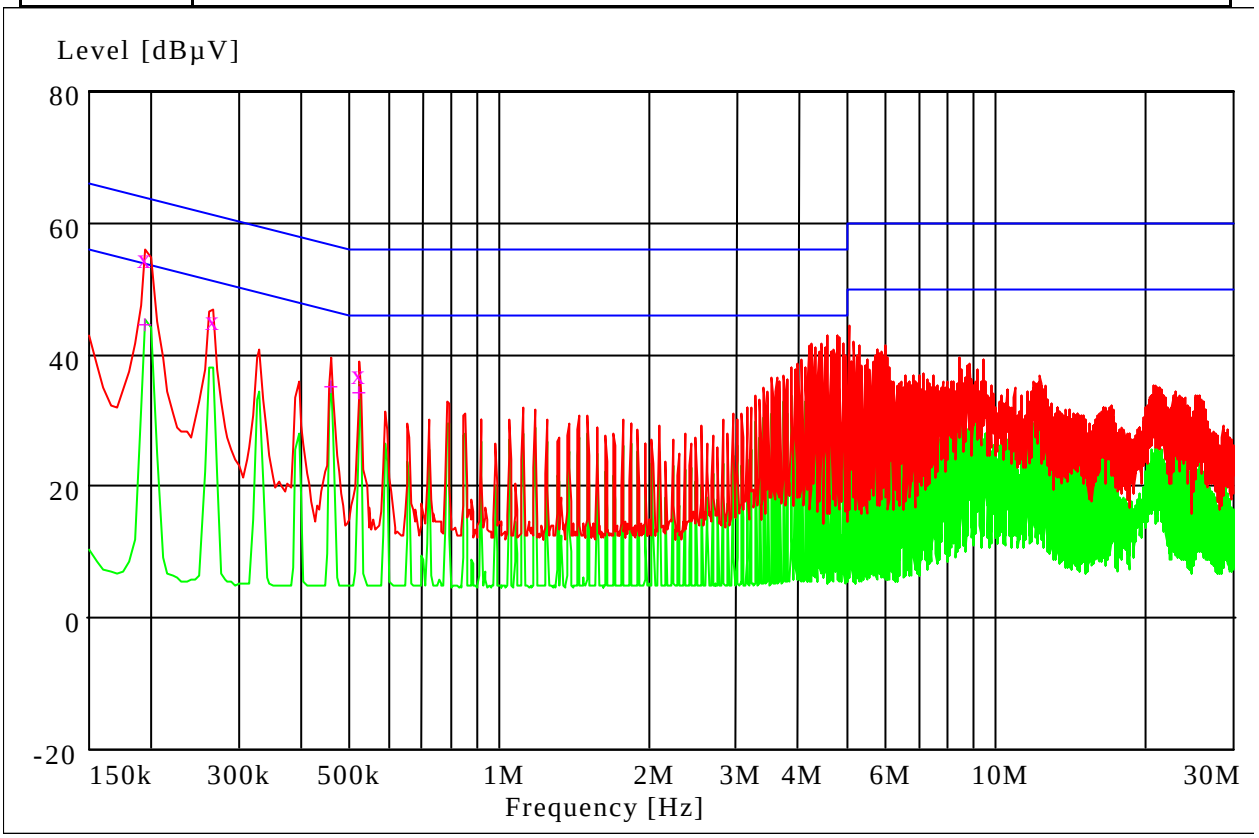
The supplied conducted emission plot is a combined plot showing the worst case of the Peak, Quasi Peak and Average levels for both phase and neutral.

Result: Complies with a 8.3 dB margin at 195.0 kHz (Quasi Peak).

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

Conducted emissions

Comments:	Device tested when powered at 110 Vac when attached to the USB port of a representative laptop computer while being charged



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

Quasi-Peak Measurements

Frequency MHz	Level dBµV	Limit dBµV	Margin dB	Phase	Rechecks dBµV
0.195000	55.40	63.8	8.4	L1	52.5
0.265000	46.00	61.2	15.2	N	
0.525000	37.60	56.0	18.4	N	
4.590000	36.70	56.0	19.3	L1	
4.790000	35.10	56.0	20.9	L1	
4.850000	36.70	56.0	19.3	L1	

Average Measurements

Frequency MHz	Level dBµV	Limit dBµV	Margin dB	Phase	Rechecks dBµV
0.195000	45.50	53.8	8.3	N	43.5
0.460000	35.90	46.6	10.7	L1	
0.525000	35.10	46.0	10.9	N	
4.000000	33.90	46.0	12.1	L1	
4.330000	32.30	46.0	13.7	N	
4.530000	24.00	46.0	22.0	N	

Section 15.209 – Radiated emissions

In accordance with section 15.249(d) the general emission limits specified in Section 15.209(a) have been applied to all emissions except the transmitter harmonics.

Section 15.215 (c) – Additional provisions to the general radiated emission limitations

The device operates in the 902 – 928 MHz band.

Testing was carried out on 922.950 MHz.

Spectrum mask measurements have been made when the transmitters was operating continuously to determine the 20 dB bandwidth of the emission.

The 20 dB bandwidth of this emission is completely contained within the band of operation.

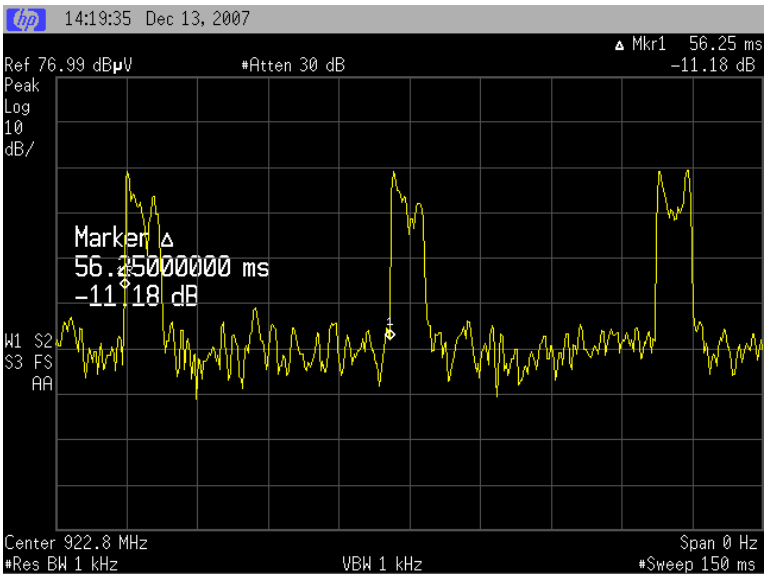
Result: Complies

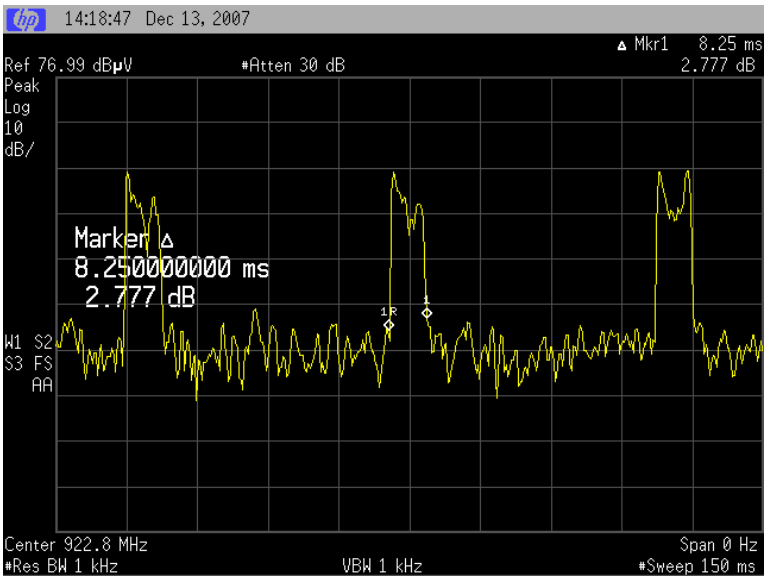
Section 15.249 (a) – Field strength of the Fundamental and Harmonics

This transmitter operates on 922.950 MHz using pulse modulation so Section 15.35(c) has been applied

The transmitter transmits an 8.25 ms pulse every 56 mS so in any 100 ms period the transmitter will transmit twice which gives a pulse length of 16.5 ms.

The average emission level has been calculated based upon the peak level less a factor equal to 20 * log (16.5 ms / 100 ms) which equates to -15.7 dB





Fundamental emission

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
922.800	99.2	103.1	112.4	9.3	Peak
	83.5	87.4	94.0	10.5	Average

Spurious emissions

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1845.600	57.0	58.0	74.0	17.0	Peak
	41.3	42.3	54.0	12.7	Average
2768.400	61.4	62.8	74.0	12.6	Peak
	45.7	47.1	54.0	8.3	Average
3691.200	68.6	68.9	74.0	5.1	Peak
	52.9	53.2	54.0	1.1	Average
4614.000	< 60.0	< 60.0	74.0	> 14.0	Peak
	< 44.3	< 44.3	54.0	> 9.7	Average
5536.800	< 60.0	< 60.0	74.0	> 14.0	Peak
	< 44.3	< 44.3	54.0	> 9.7	Average
6459.600	< 60.0	< 60.0	74.0	> 14.0	Peak
	< 44.3	< 44.3	54.0	> 9.7	Average
7382.400	< 60.0	< 60.0	74.0	> 14.0	Peak
	< 44.3	< 44.3	54.0	> 9.7	Average
8305.200	< 60.0	< 60.0	74.0	> 14.0	Peak
	< 44.3	< 44.3	54.0	> 9.7	Average
9228.000	< 60.0	< 60.0	74.0	> 14.0	Peak
	< 44.3	< 44.3	54.0	> 9.7	Average

The following other emissions were observed from the device when it was operated in the following modes:

Other emissions observed when the device was transmitting

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
302.000		17.2	46.0	28.8	QP
318.833		21.3	46.0	24.7	QP
335.500		22.4	46.0	23.6	QP
352.500		18.5	46.0	27.5	QP
461.465	32.8	42.0	46.0	4.0	QP

Device operating in logging mode

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
302.000		17.0	46.0	29.0	QP
318.833		21.0	46.0	25.0	QP
335.500		21.8	46.0	24.2	QP

Device charging with USB communications while attached to laptop computer

Frequency (MHz)	Vertical (dBuV/m)	Horizontal (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
34.000	26.0		40.0	14.0	QP
144.200	19.1	22.8	40.0	17.2	QP

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 (dBµV/m) = Receiver Reading (dBµV) + Antenna Factor (dB) + Coax Loss (dB) – Microwave Preamplifier Gain (dB)

Measurement uncertainty with a confidence interval of 95% is:
- Free radiation tests (30 – 18,000 MHz) ± 4.1 dB

Result: Complies

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 27th, 2007.

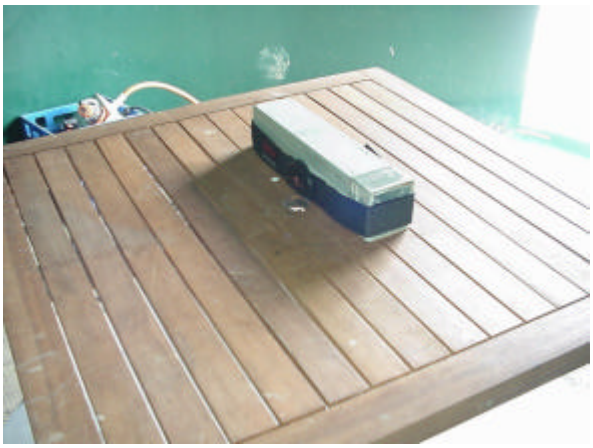
In addition testing was carried out in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to NZS/IEC/ISO 17025: 2005.

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.

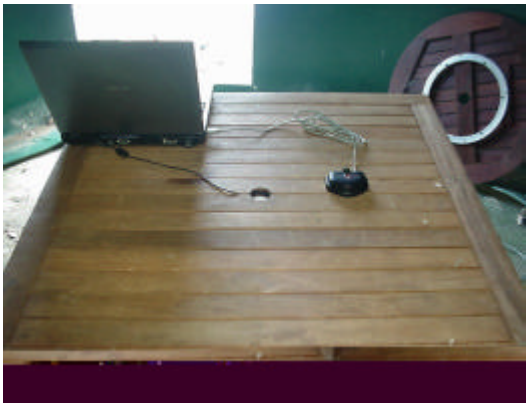
International Accreditation New Zealand has Mutual Recognition Arrangements for testing and calibration with 46 accreditation bodies in 34 economies. This includes NATA (Australia), UKAS (UK), SANAS (South Africa), NVLAP (USA), A2LA (USA), SWEDAC (Sweden). Further details can be supplied on request.

9. PHOTOGRAPHS - External View

Test Set Up Photos – Transmitting un-attached



Radiated emissions test set up – Attached to laptop computer



Conducted emissions test set up