



TEST REPORT

Report No. : AF023095-001

Date : 2005 October 14

Application No. : LF217967(0)

Applicant : Swimways Corp.
5816 Ward Court,
Virginia Beach,
VA23455

Sample Description : One(1) submitted sample stated to be Cyborg Shark
of Model No. 17500
Rating : 1 x 9V size battery
No. of submitted sample : Two (2) piece(s) ***

Date Received : 2005 September 30

Test Period : 2005 September 30 – 2005 October 13

Test Requested : FCC Part 15 Certification

Test Method : FCC Rules and Regulations Part 15 – July 2004
ANSI C63.4 – 2003

Test Result : See attached sheet(s) from page 2 to 11.

Conclusion : The submitted sample was found to comply with requirement of FCC Part 15
Subpart C.

For and on behalf of
CMA Testing and Certification Laboratories

Authorized Signature :

Danny Chui
EMC Engineer - EL. Division

FCC ID : TB9-17500A

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1 General Information

1.1 General Description

The equipment under test (EUT) is a transmitter for Cyborg Shark. Operating at 27.145 MHz which is controlled by a crystal. The EUT is powered by 9V size battery. It has two control stick and a on/ off switch in the centre of EUT. When the control stick is pressed once, it can transmit difference radio signal to receiver.

The brief circuit description is listed as follows :

- Y1, Q1, Q2 and associated circuit act as oscillator.
- Q3, L3 and associated circuit act as RF amplifier and filter.
- U2 and associated circuit act as encoder.
- U1, Q4 and associated circuit act as voltage control.



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1.2 Location of the test site

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003. An open area Testing Site is set up for investigation and located at :

Top of the Roof, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
Hong Kong.

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2003. A shielded room is located at :

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
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1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Certification No.
EMI Test Receiver	R&S	ESCS30	100001	S43284
Broadband Antenna	Schaffner	CBL6112B	2692	CA3025
Signal Generator	IFR	2023B	202302/938	S43098
LISN	R&S	ESH3-Z5	100038	S43377
LISN	R&S	ESH3-Z5	100010	S43101
Pulse Limiter	R&S	ESH3-Z2	100001	S43325
Biconical Antenna	R&S	HK116	837414/004	2GB05000535-0001
Loop Antenna	EMCO	6502	00056620	49906



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2 Description of the radiated emission test

2.1 Test Procedure

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003.

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 1m and 0.8m high above the ground. 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was then moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

The device was rotated through three orthogonal axes to determine which attitude and configuration produce the highest emission during measurement.

2.2 Test Result

Peak Detector data was measured unless otherwise stated.

* Emissions appearing within the restricted bands shall follow the requirement of section 15.205.

It was found that the EUT meet the FCC requirement.



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2.3 Radiated Emission Measurement Data

Radiated emission
pursuant to
the requirement of FCC Part 15 subpart C

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dB μ V/m)	Antenna and Cable factor (dB)	Average Factor (dB)	Field Strength (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
27.145	V	56.1	18.4	-19.5	55.0	80.0	-25.0
54.290	H	16.5	8.1	-	24.6	40.0	-15.4
81.431	H	17.9	7.2	-	25.1	40.0	-14.9
*108.581	H	12.9	11.0	-	23.9	43.5	-19.6
*135.724	H	11.8	12.4	-	24.2	43.5	-19.3
*162.875	H	20.7	10.4	-	31.1	43.5	-12.4
190.021	H	23.2	9.2	-	32.4	43.5	-11.1
217.164	H	25.5	9.7	-	35.2	46.0	-10.8
*244.310	H	26.6	9.7	-	36.3	46.0	-9.7
*271.465	H	20.9	13.9	-	34.8	46.0	-11.2



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3 Description of the Line-conducted Test

3.1 Test Procedure

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2003. The EUT was setup as described in the procedures, and both lines were measured.

3.2 Test Result

No measurement is required as the EUT is a battery-operated product.

3.3 Graph and Table of Conducted Emission Measurement Data

Not Applicable



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4 Photograph

4.1 Photographs of the Test Setup for Radiated Emission and Conduction Emission

For electronic filing, the photos are saved with filename TSup1.jpg to TSup2.jpg

4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename ExPho1.jpg to ExPho2.jpg and InPho1.jpg to InPho2.jpg.



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5 Supplementary document

The following document were submitted by applicant, and for electronic filing, the document are saved with the following filenames:

Document	Filename
ID Label/Location	LabelSmp.jpg
Block Diagram	BlkDia.pdf
Schematic Diagram	Schem.pdf
Users Manual	UserMan.pdf
Operational Description	OpDes.pdf

5.1 Bandwidth

The plot on saved in TestRpt 2.pdf shows the fundamental emission is confined in the specified band. It also shows that the band edge met the 15.209 requirement at 26.9599 and 27.2801 MHz.

a. Duty Cycle

The duty cycle is simply the on-time divided by the period :

The duration of one cycle = 87.8ms

Effective period of the cycle = $(0.38 \times 23)\text{ms} + (0.57 \times 1)\text{ms}$
= 9.31ms

Duty Cycle = $9.31 / 87.8$
= 0.106

Therefore, the average factor is found by $20 \log_{10} 0.106 = -19.5 \text{ dB}$



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6 Appendices

A1	Photos of the set-up of Radiated Emissions	1 page
A2	Photos of External Configurations	1 page
A3	Photos of Internal Configurations	1 page
A4	ID Label/Location	1 page
A5	Bandwidth Plot	1 page
A6	Average Factor	2 pages
A7	Block Diagram	1 page
A8	Schematics	1 page
A9	User Manual	2 pages
A10	Operation Description	1 page

***** End of Report *****