



SGS-CSTC Standards Technical Services Ltd.

1/F., Building No. 1 Building, Agriculture Machinery Materials Co.
Wushan Road, Shipai, Tianhe District, Guangzhou, China
Telephone: +86 (0) 20 3848 1001 Fax: +86 (0) 20 3848 1006
Email: sgs_internet_operations@sgs.com

FEDERAL COMMUNICATIONS COMMISSION
Registration number: 282399

Report No.: GLEMO050501250RFF
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FCC ID: Q6N093EL

TEST REPORT

Application No. : GLEMO050501250RF
Applicant: Edu-Science (HK) Ltd.
FCC ID: Q6N093EL
Fundamental Frequency : 27.145MHz

Equipment Under Test (EUT):

Name: Wireless Submarine
Model No.: EL093

Standards: FCC PART 15, SUBPART C : 2004
Section 15.227

Date of Receipt: 10 May 2005
Date of Test: 12 to 13 May 2005
Date of Issue: 17 May 2005

Test Result :	PASS *
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Kent Hsu
Laboratory Manager

This report refers to the General Conditions for Inspection and Testing Services, printed overleaf
This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the SGS PRODUCT CERTIFICATION MARK.. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
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The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.
All test results in this report can be traceable to National or International Standards.



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2 Test Summary

Test	Test Requirement	Stanadard Paragraph	Result
Radiated Emission (30MHz to 1000MHz)	FCC PART 15 :2004	Section 15.227	PASS
Occupied Bandwidth	FCC PART 15 :2004	Section 15.227	PASS



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4 General Information

4.1 Client Information

Applicant Name: Edu-Science (HK) Ltd.

Applicant Address: Suite 701-703 Wing On Plaza TST East, Kowloon Hong Kong.

4.2 Details of E.U.T.

Name: Wireless Submarine

Model No.: EL093

Power Supply: 9V DC (1 x '6F 22' Size Battery)

Power Cord: N/A-

4.3 Description of Support Units

The EUT was tested as an independent unit: a 27MHz radio transmitter.

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Ltd., Guangzhou EMC Laboratory, 1/F, Building No. 1, Agriculture Machinery Materials Company Warehouse Ltd., Wushan Road Shipai, Tianhe District, Guangzhou, China. P.C. 510630.

Tel: +86 20 3848 1001

Fax: +86 20 3848 1006

4.5 Other Information Requested by the Customer

None.



4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP – Lab Code: 200611-0**
SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0. Effective through December 31, 2005.
- **ACA**
SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.
- **VCCI**
The 3m Semi-anechoic chamber and Shielded Room (11.5m x 4m x 4m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-1599 and C-1706 respectively.
Date of Registration: February 28, 2003. Valid until May 30, 2005
- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**
Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.
- **CNAL – LAB Code: L0141**
SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of Testing Laboratories.
- **FCC – Registration No.: 282399**
SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002. With the above and NVLAP's accreditation, SGS-CSTC is an authorised test laboratory for the DoC process.
- **Industry Canada (IC)**
The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5169.



5 Test Results

5.1 Test Instruments

RE in Chamber						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi- Anechoic Chamber	Frankonia	N/A	N/A	31-01-2005	30-01-2006
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	100085	10-10-2004	09-10-2005
3	EMI Test Software	Rohde & Schwarz	ES-K1	N/A	N/A	N/A
4	Coaxial cable	SGS	N/A	N/A	05-12-2003	04-12-2005
5	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	17-01-2005	16-01-2006
6	Horn Antenna	Rohde & Schwarz	HF906	100095	02-04-2004	01-04-2005
7	Spectrum Analyzer	Rohde & Schwarz	FSP30	100324	29-10-2004	28-10-2005
8	0.1-1300 MHz Pre-Amplifier	HP	8447D OPT 010	2944A06252	31-05-2004	30-05-2005
9	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	26-01-2004	25-01-2006
10	Active Loop Antenna	EMCO	6502	00042963	14-Jan-2005	14-Jan-2006

5.2 E.U.T. Operation

Input voltage:	9V DC (1 x '6F 22' Size Battery)
Operating Environment:	
Temperature:	24.0 °C
Humidity:	53 % RH
Atmospheric Pressure:	1001 mbar
EUT Operation:	Test the EUT in transmitting mode.

5.3 Test Procedure & Measurement Data

5.3.1 Radiated Emissions

Test Requirement:	FCC Part15 C Section 15.227
Test Method:	ANSI C63.4
Test Date:	13 May 2005
Measurement Distance:	3m (Semi-Anechoic Chamber)
Requirements:	Carrier frequency will not exceed 80dBuV/m AT 3m. Out of band emissions shall not exceed: 40.0 dBμV/m between 30MHz & 88MHz 43.5 dBμV/m between 88MHz & 216MHz 46.0 dBμV/m between 216MHz & 960MHz 54.0 dBμV/m above 960MHz



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Detector:

Peak Scan (120kHz resolution bandwidth)



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Test Procedure: The procedure used was ANSI Standard C63.4-2003. The receive was scanned from 30MHz to 1000MHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. The worst case emissions were reported.

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. The EUT was measured by Bilog antenna with 2 orthogonal polarities and peak emissions from the EUT were detected within 6dB of the class B limit line.

The following measurements were performed on the EUT on 13 May 2005:

Test the EUT in transmitting mode.

Intentional emission

Test Frequency (MHz)	Peak (dB μ V/m)		Limits (dB μ V/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
27.145	28.1	37.9	100.0	71.9	62.1

Test Frequency (MHz)	Average (dB μ V/m)		Limits (dB μ V/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
27.145	19.2	31.3	80.0	60.8	48.7



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Other emissions

Vertical:

Frequency (MHz)	Level (dB μ V/m)	Limit Line (dB μ V/m)	Over Limit (dB)	Read Level (dB μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)
54.290	27.7	40.0	-12.3	40.7	11.8	0.4	25.2
81.290	5.6	40.0	-34.4	22.4	7.7	0.7	25.1
108.580	15.1	43.5	-28.4	27.7	11.7	0.8	25.1
135.725	14.9	43.5	-28.6	25.8	13.3	1.0	25.1
162.870	16.7	43.5	-26.8	29.6	10.9	1.1	24.9
190.015	18.5	43.5	-25.0	30.3	11.6	1.3	24.7
217.160	13.4	46.0	-32.6	25.1	11.4	1.4	24.5
244.305	14.6	46.0	-31.4	25.3	12.3	1.5	24.4
271.450	16.7	46.0	-29.3	26.2	13.4	1.6	24.4

Horizontal:

Frequency (MHz)	Level (dB μ V/m)	Limit Line (dB μ V/m)	Over Limit (dB)	Read Level (dB μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)
54.290	16.3	40.0	-23.7	28.8	12.3	0.4	25.2
81.435	11.8	40.0	-28.2	27.4	8.8	0.7	25.1
108.580	12.8	43.5	-30.7	24.6	12.5	0.8	25.1
135.725	13.2	43.5	-30.3	23.5	13.8	1.0	25.1
162.870	13.7	43.5	-29.8	25.8	11.7	1.1	24.9
190.015	14.3	43.5	-29.2	26.0	11.7	1.3	24.7
217.160	13.4	46.0	-32.7	23.3	13.2	1.4	24.5
244.305	15.0	46.0	-31.0	23.0	14.9	1.5	24.4
271.450	17.1	46.0	-28.9	23.5	16.4	1.6	24.4

Remark:

According to 15.35 (b) When average radiated emission measurements are specified in the regulations, including emission measurements below 1000 MHz, there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules, e.g., see Section 15.255.

Test Results: The unit does meet the FCC Part 15 C Section 15.227 requirements.

5.3.2 Occupied Bandwidth

Test Requirement: FCC Part 15 C Section 15.227

Test Method: ANSI C63.4

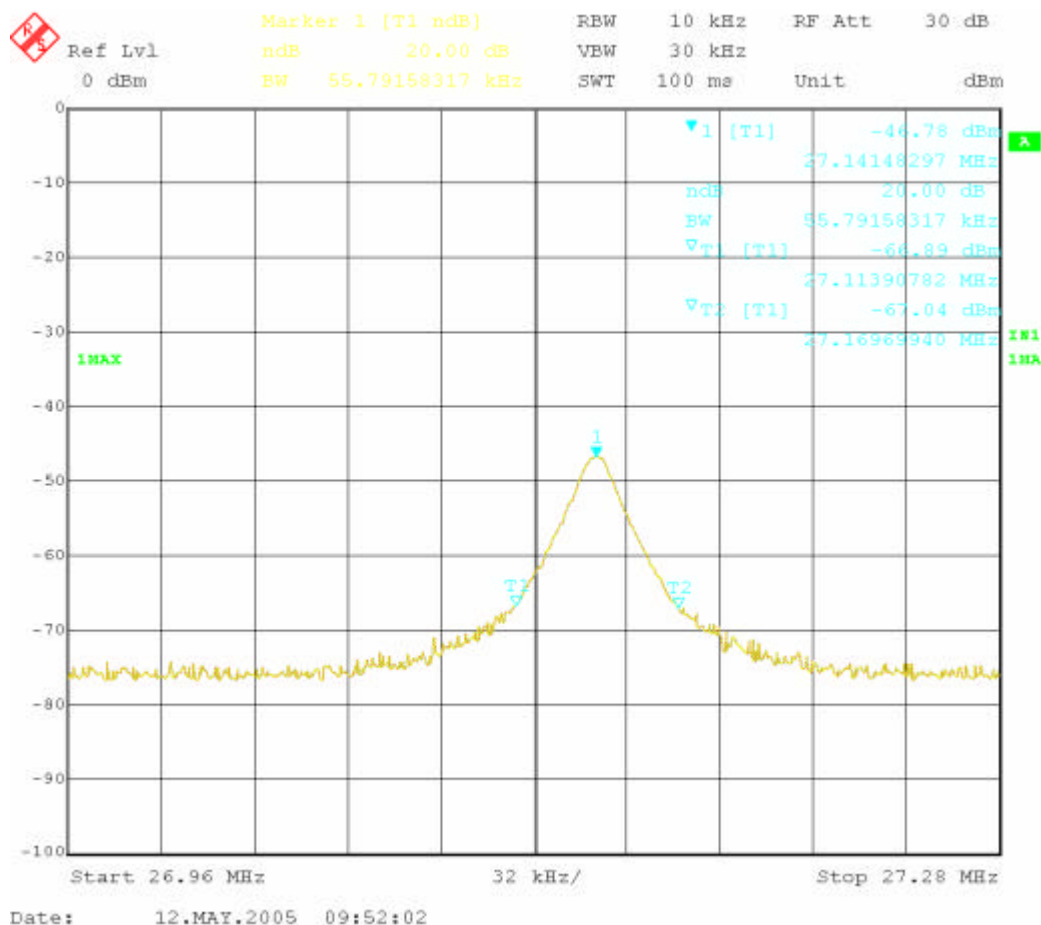
Operation within the band 26.960 – 27.280 MHz

Test Date: 12 May 2005

Requirements: The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

Method of measurement: The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector. The vertical Scale is set to – 10dB per division. The horizontal scale is set to 5KHz per division.

The graph as below, represents the emissions take for this device.



The results: The unit does meet the FCC Part 15 C Section 15.227 requirements.