



The Hong Kong Standards and Testing Centre Ltd.

Date: 1998-08-04
No.: HM1197/504

TEST REPORT

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APPLICANT: (CODE : 017107)

STD MANUFACTURING LTD.

Unit F-J, 5/F, Block 2, Kwai Tak Ind. Centre, 15-33 Kwai Tak Street, Kwai Chung, N.T., Hong Kong.

DATE OF SAMPLES RECEIVED: 1998.07.18.

DATE OF TESTING: 1998.07.31. to 1998.08.03

DESCRIPTION OF SAMPLE(S):

A sample of product said to be:

Product: Fx Racing Wheel
Manufacturer: STD Manufacturing Ltd.
Model Number: SV-281
Brand Name: STD
Origin : China

INVESTIGATIONS REQUESTED:

Measurement to the relevant clauses of F.C.C. Rules and Regulations Part 15 Subpart B - Unintentional Radiators. The results obtained are to compare with the class B digital device limit.

REMARK : This product was tested as a system using the Ancillary Equipment listed & Photographs in Appendix B.

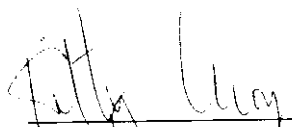
RESULTS: Please see attached sheet(s).

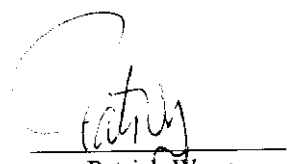
CONCLUSION:

From the measurement data obtained, the tested sample was considered to have COMPLIED with the requirement for the relevant clauses of Federal Communications Commission Rules for Class B digital device.

TEST EQUIPMENT AUDIT: Please see Appendix A


Testing Engineer


Verify by


Patrick Wong
for Managing Director

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TEST SUMMARY

(A) Measurement of Radiated Emission

Result -- Satisfactory

Data -- See the attached data

(B) Measurement of Line-Conducted Voltage Test

Result -- Satisfactory

Data -- See the attached data



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(A) Measurement of Radiated Interference

TEST REFERENCE: FCC Rules Part 15 Subpart B Section 15.109(a)
(Class B)

TEST CONDITION : Worst case Monitor Power supplied by computer & separately

TEST DATE : 1998.08.03

Emission Frequency	Meter Reading	Polarization (including antenna factor)	Field Strength (at 3m)	FCC Limit
MHz	dB(μ V)		μ V/m	μ V/m
*66.663	32.7	V	43.2	100
66.665	24.7	H	17.2	100
112.064	31.0	V	35.5	150
125.283	33.0	H	44.7	150
144.006	29.1	H	28.5	150
175.395	36.9	H	70.0	150
225.510	31.3	H	36.7	200
225.510	27.3	V	23.2	200
286.425	36.0	V	63.1	200
286.428	10.0	H	3.2	200
300.747	32.5	H	42.2	200
315.028	34.0	V	50.1	200
433.316	28.0	H	25.1	200

- End -

SUMMARY

All data is within limits

Broad-band Antennas were used and both polarizations of emissions were measured.
polarizations at highest reading indicated as:
H -- Horizontal V -- Vertical

Quasi-peak measurements were performed if the maximised measurements
were less than 6dB below the quasi-peak limit line.
Quasi-peak measurements are denoted by * in the table above.



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APPENDIX A

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TEST EQUIPMENT AUDIT

Pre-scan

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM131	PORTABLE SPECTRUM ANALYSER	HP	8595EM	3710A00155	27/10/97
EM017	ANTENNA	ARA INC.	LPB-2513/A	1069	30/12/97
EM034	AMPLIFIER	HP	8447F OPT 1664	2944A04240	25/06/98
EM082	ANECHOIC CHAMBER	FELIAS & MASSON	N/A	N/A	05/06/98

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM007	SPECTRUM ANALYZER	HP	HP85660B	3144A21192	29/05/98
EM008	SPECTRUM ANALYZER DISPLAY	HP	HP85662A	3144A20514	29/05/98
EM009	QUASI PEAK ADAPTOR	HP	HP85650A	3303A01702	29/05/98
EM010	RF PRESELECTOR	HP	HP85685A	3221A01410	29/05/98
EM011	ATTENUATOR/SWITCH	HP	HP11713A	2508A10595	29/05/98
EM012	PRE-AMPLIFIER	HP	HP8449B	3008A00262	29/05/98
EM013	CONTROLLER (COMPUTER), COLOR MONITOR, KEYBOARD & MOUSE FLOPPY DRIVE	HP HP HP	HP9000 HPA1097C HP9133L	6226A60314 3151J39517 2623A02468	CM
EM017	ANTENNA	ARA INC.	LPB-2513/A	1069	31/12/97
EM072	SIGNAL GENERATOR	HP	8640B	1948A11892	30/03/98
EM083	HKSTC OPEN AREA TEST SITE	HKSTC	N/A	N/A	16/02/98

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM003	SIGNAL GENERATOR	R & S	SMS	871603/529	TBD
EM117	IMPULSE LIMITER	R & S	ESH3Z2	0357.8810.52	05/02/98
EM002	LISN	R & S	EMCO	3825-2	20/06/97
EM120	EMI TEST RECEIVER	R & S	ESHS10	1004.0401.10	TBD
EM081	SMALL SCREENED ROOM	MIKO INST. HK	N/A	N/A	23/08/97

ABBREVIATIONS:

CM = Corrective Maintenance
N/A = Not Applicable or Not Available
TBD = To Be Determined



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TEST REPORT **APPENDIX B**

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ANCILLARY EQUIPMENT

ITEM NO.	DESCRIPTION	MODEL NO.	FCC ID	REMARK
1	AST COMPUTER	AST PREMIUM II 486/33	DJKASTPI486-33	1.92m SVT SHIELED CABLE
2	SVGA MONITOR	CM6P	GDRCM6P	RESOLUTION : 720*400 (DURING TESTING) 1.0M UNSHIEDED POWER CORD CONNECTED TO THE COMPUTER 1.8M SHIEDED CABLE CONNECTED TO THE COMPUTER
3	AST KEYBOARD	KB-101	AQ6MEMB-74004	1.8 SHIEDED COILED CABLE CONNECTED TO THE COMPUTER
4	MOUSE	PS12	FSUGMZC8	2.4M UNSHIEDED CABLE CONNECTED TO THE COMPUTER
5	SERIAL PROGRAM PAD (EUT)	SV-284	KYISV-284	2.6M SHIEDED CABLE CONNECTED TO COMPUTER KEYBOARD SOCKET 2.3M SHIEDED CABLE CONNED TO SOUND CARD SOCKET OF THE COMPUTER
6	PARALLEL PRINTER	DMP3000	DE2850CDMP3000	1.8M UNDHIEDED POWER CORD 2.8M SHIEDED CABLE (BUNDLED TO 1M) CONNTCTED TO THE COMPUTER
7	SERIAL PRINTER	N/A	N/A	SAME AS PARALLED PRINTER



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NOTES FOR THE RADIATION MEASUREMENT

(1) Test site facility:

Open field test site located at Taipo (Hong Kong) with a metal ground plane in compliance with the requirements of ANSI C63.4:1992.

(2) Test Equipment

HP 8572A EMI receiver was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 100KHz or 1MHz depending on the type of signal. A biconical log-periodic antenna was used for frequency range from 30MHz to 1000MHz.

(3) Test Set-Up:

The EUT and support equipment are placed in accordance with ANSI C63.4.

(4) Measuring Procedure:

An initial pre-scan measurement was performed in a semi-anechoic chamber using a 25dB gain pre-amplifier. The receive antenna in the chamber was 1.5m above the groundplane and 3m from the sample. The sample was placed 0.8m above the groundplane. Measurements in both horizontal and vertical polarities were performed. All emissions recorded during the prescan were subsequently remeasured on the open field test site (described in 1 above) using the following procedure: The ambient noise scanning was made before powering on the EUT and support equipment to identify the emissions from the environment. During the test, each emission was maximized by: having the Fx Racing Wheel continuously working by running a special test program (PCB.exe) supplied by the customer, arranging and manipulating in interconnecting cables, rotating turntable and varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The frequency range tested is from 30MHz to 1000MHz and the worst-case emissions are shown in Test Results.

(5) Measuring Uncertainty:

The calculated uncertainty for measurement performed at 3M test distance are:-
30MHz to 200MHz = $\pm 3.7\text{dB}$, 200MHz to 1000MHz = $\pm 3.0\text{dB}/-2.7\text{dB}$.

Remark : Purpose of this test is to provide the Applicant with the necessary test data of their device for the submission to FCC with application for Equipment Authorization under FCC's Equipment Authorization Program. This test itself is not an Approval Test.



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(B) Measurement of Line-Conducted Voltage onto AC Power Line

TEST REFERENCE : FCC Rules Part 15 Subpart B Section 15.107(a)
(Class B)

TEST CONDITION : Worst Case of Monitor Power Cable connected to
2nd Lisc & through computer

TEST DATE : 1998.08.05

(1) Between "Live" and "Ground"

Frequency Range of Emission			Maximum Measured Radio Noise		FCC Limit (Class B)
MHz			dB(μ V)	μ V	μ V
0.45	-	0.8	22.96	14.06	250.00
0.8	-	1.6	38.09	80.26	250.00
1.6	-	3.0	33.01	44.72	250.00
3.0	-	5.0	30.43	33.23	250.00
5.0	-	7.0	29.04	28.31	250.00
7.0	-	9.0	29.64	30.34	250.00
9.0	-	11.0	35.36	58.61	250.00
11.0	-	13.0	37.22	72.61	250.00
13.0	-	15.0	0.00	1.00	250.00
15.0	-	17.0	24.57	16.92	250.00
17.0	-	19.0	0.00	1.00	250.00
19.0	-	21.0	23.35	14.71	250.00
21.0	-	23.0	22.43	13.23	250.00
23.0	-	25.0	0.00	1.00	250.00
25.0	-	27.0	0.00	1.00	250.00
27.0	-	30.0	26.18	20.37	250.00

- End -

SUMMARY

All data is within limits



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(B) Measurement of Line-Conducted Voltage onto AC Power Line

TEST REFERENCE : FCC Rules Part 15 Subpart B Section 15.107(a)
(Class B)
TEST CONDITION : Worst Case of Monitor Power Cable connected to
2nd Lisc & through computer
TEST DATE : 1998.08.05

(1) Between "Neutral" and "Ground"

Frequency Range of Emission			Maximum Measured Radio Noise		FCC Limit (Class B)
MHz			dB(μ V)	μ V	μ V
0.45	-	0.8	20.76	10.91	250.00
0.8	-	1.6	35.58	60.12	250.00
1.6	-	3.0	28.91	27.89	250.00
3.0	-	5.0	27.99	25.09	250.00
5.0	-	7.0	26.42	20.94	250.00
7.0	-	9.0	23.63	15.19	250.00
9.0	-	11.0	35.54	59.84	250.00
11.0	-	13.0	28.93	27.96	250.00
13.0	-	15.0	0.00	1.00	250.00
15.0	-	17.0	24.90	17.58	250.00
17.0	-	19.0	0.00	1.00	250.00
19.0	-	21.0	23.51	14.98	250.00
21.0	-	23.0	22.59	13.47	250.00
23.0	-	25.0	0.00	1.00	250.00
25.0	-	27.0	0.00	1.00	250.00
27.0	-	30.0	25.50	18.84	250.00

- End -

SUMMARY

All data is within limits



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NOTES FOR THE CONDUCTED POWER-LINE MEASUREMENT

(1) Test Facility :

The line conducted facility is located at a shielded enclosure. The 1m x 1.5m wooden table and the Line Impedance Stabilization Networks (LISNs) are placed in compliance with the requirement of ANSI C63.4 - 1992.

(2) Test Equipment:

The test receiver (R&S ESHS10) was set to CISPR quasi-peak mode. The bandwidth of the receiver was set to 10KHz.

(3) Test Set-Up :

The EUT and the support equipment are placed in accordance with ANSI C63.4-1992 (See appendix A). The computer with the add-on EUT is powered from R & S ESH3-Z5 LISN and the support equipment is powered from EMCO 3825-2 LISN. All interconnecting cables more than 1m were shortened by non-inductive bundling to 1m length.

(4) Measurement procedure :

An initial peak measurement was performed between Live & Ground. Any peak emissions within 20dB of the limit line were subsequently remeasured using quasi-peak detection. This procedure was followed for measurements between live and ground, neutral and ground, monitor powered through computer and monitor powered separately.

The worse case quasi-peak data for each frequency was then recorded in section B of this report.

The product was exercised as follows :-

Power on the computer and all the support equipment. The Fx Racing Wheel was exercised continuously working by running special program (PCB.exe) supplied by the customer. The frequency range tested is from 450KHz to 30MHz and the worst-case emissions are shown in Test Result.

(6) Measuring Uncertainty:

The calculated uncertainty for conducted power-line measurement is = $\pm 2.3\text{dB}$.

Remark :

Purpose of this test is to provide the Applicant with the necessary test data of their device for the submission to FCC with application for Equipment Authorization under the FCC's Equipment Authorization Program. This test itself is not an Approval Test.

**** End of document****



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APPENDIX A

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Date: 1998-08-12

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TEST EQUIPMENT AUDIT

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM007	SPECTRUM ANALYZER	HP	HP85660B	3144A21192	28/05/98
EM008	SPECTRUM ANALYZER DISPLAY	HP	HP85662A	3144A20514	28/05/98
EM009	QUASI PEAK ADAPTOR	HP	HP85650A	3303A01702	28/05/98
EM010	RF PRESELECTOR	HP	HP85685A	3221A01410	28/05/98
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EM012	PRE-AMPLIFIER	HP	HP8449B	3008A00262	28/05/98
EM013	CONTROLLER (COMPUTER), COLOR MONITOR, KEYBOARD & MOUSE FLOPPY DRIVE	HP HP HP	HP9000 HP A1097C HP9133L	6226A60314 3151J39517 2623A02468	CM
EM017	ANTENNA	ARA INC.	LPB-2513/A	1069	31/12/97
EM072	SIGNAL GENERATOR	HP	8640B	1948A11892	30/03/98
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