Korea Technology Institute Co., Ltd.

Test Report

Test Report No.:	**KTI04EF07007**		
Registration No.:	**99058**		
Applicant:	**Fine Future Co., Ltd.**		
Applicant Address:	**#809, Rosen Vill B/D 1588-3, Seocho-Dong, Seocho-Gu, SEOUL, KOREA, 135-010**		
Product:	**Poot Fedal Transmitter**		
FCC ID:	**SDUFFMT-001T**	**Model No.**	**FFMT-001T**
Receipt No.:	**04-0724**	**Date of receipt:**	**July 12, 2004**
Date of Issue:	**July 29, 2004**		
Testing location	**Korea Technology Institute Co., Ltd. 51-19, Sanglim3-Ri, Docheok-Myeun, Gwangju-Shi, Gyeungki-Do, Korea**		
Test Standards:	**FCC/ANSI. C63.4: 2001**		
Rule Parts: FCC	**Part 15, Subpart C**		
Equipment Class:	**Remote Control Transmitter**		
Test Result:	**The above-mentioned product has been tested with compliance.**		

Tested by: Hyun, Kim / Engineer

Signature **Date**

Approved by: G. C, Min /President

Signature **Date**

Other Aspects:	
Abbreviations:	*** OK, Pass=passed * Fail=failed * N/A=not applicable**

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1. General

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

We attest to the accuracy of data. Korea Technology Institute Co., Ltd. performed all measurements reported herein. And were made under Chief Engineer's supervisor.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Test Site

Korea Technology Institute Co., Ltd.

2.1 Location

51-19, Sanglim3-Ri, Docheok-Myeun, Gwangju-Shi, Gyeungki-Do, Korea

The test site is in compliance with ANSI C63.4/2001 for measurement of radio interference.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

- Conducted Emissions

Kind of Equipment	Type	S/N	Calibrated until
Spectrum Analyzer	R3261C	61720417	11.2004
Field Strength Meter	ESPC	832827/011	9.2004
LISN	KNW407	8-1157-2	10.2004
LISN	EM-7823	115019	4.2005
Conducted Cable	N/A	N/A	11.2004

- Radiated Emissions

Kind of Equipment	Type	S/N	Calibrated until
Field Strength Meter	ESIB40	100093	3.2005
Spectrum Analyzer	R3261C	61720417	11.2004
Pre Amplifier	8447D	2944A06874	11.2004
BiconiLog Antenna	3142B	1705	2.2005
Horn Antenna	3115	6443	6.2005
Open Site Cable	N/A	N/A	11.2004
Antenna Mast	DETT-03	N/A	N/A
Antenna & Turntable controller	DETT-04	91X519	N/A

2.3 Test Date

Date of Application: July 12, 2004

Date of Test: July 26, 2004

2.4 Test Environment

Temperature: 25 °C

Humidity: 44%

3. Description of the tested samples

The EUT is a Foot Pedal transmitter.

3.1. Rating and Physical Characteristics

Model Name		**MusicTurner™** FM-1R
Weight	MuscTurner	500 g (17.64 oz) (without batteries)
	Foot Pedal	100 g (3.53 oz) (including batteries)
Power Supply	MuscTurner	DC 6V (4 AA 1.5V alkaline batteries) Optional: 6V AC Adapter
	Foot Pedal	DC 6V (2 button type 3V lithium batteries (CR2032))
Power Consumption	Operating Mode	Up to 250mA
	Standing-by Mode	50mA
Page Turning Speed		1 page / 1.5 second
Maximum Wireless signal (RF) Operating Distance		5 m (16')
RF Radio Frequency Rage		433MHz (Europe)
Operating Temperature / Humidity		15°C ~ 32°C (59°F ~ 90°F) / 15% ~ 85%
Battery Life		Approximately 500 pages (when using the alkaline batteries)
Turning Arm Rubber Life		100,000 page-urns

3.2. Submitted Documents

- User's Guide
- Block Diagram

4. Measurement Conditions

Testing Input Voltage: DC 6V

4.1 Modes of Operation

The EUT was in the following operation mode during all testing;

1) Normal mode.

4.2 Additional Equipment

DEVICE TYPE	Manufacturer	M/N	S/N	FCC ID
-	-	-	-	-
-	-	-	-	-

4.3 Uncertainty

1) Radiated disturbance

Uc (Combined standard Uncertainty) = ± 1.8dB

Expanded uncertainty U=KUc

K = 2

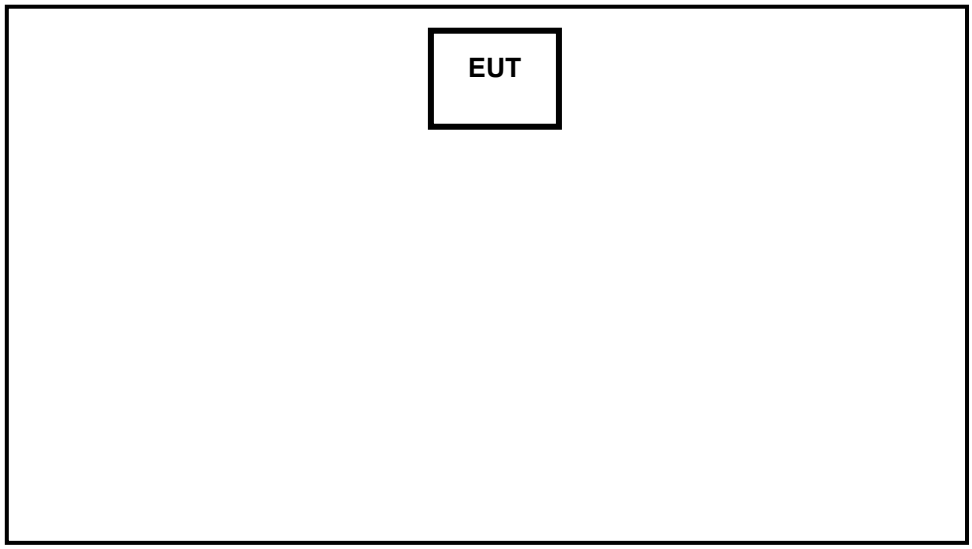
∴ U = ± 3.6dB

2) Conducted disturbance

Uc = ± 0.88dB

U = KUc=2 x Uc = ± 1.8dB

4.4 Test Setup



Signal Line

Power Line

5. Definition and Limits

5.1 Definition

Intentional radiator:

A device that intentionally generates and emits radio frequency energy by radiation or induction.

5.2 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.25
0.495 – 0.505 **	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 21.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
5.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2655 – 2900	22.01 – 23.12
8.41425 – 8.41475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3360 - 4400	Abobe 38.6
13.36 – 13.41			

Remark "**" : Until February 1, 1999, this restricted band shall be 0.490 – 0.510 MHz

5.3 Limitation

(1) Conducted Emission Limits

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the conducted limit is the following:

Frequency(MHz)	Emission(dBuV)
0.15 – 0.5	66dBuV – 56dBuV
0.5 – 5.0	56 dBuV
5.0 – 30.0	60 dBuV

(2) Radiated Emission Limits

According to 15.231, the field strength of emissions from intentional radiators operated under these frequency bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (uV/m)	Field Strength of Spurious (dBuV/m)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750**	125 to 375**
174-260	3,750	375
260-470	3,750 to 12,500**	375 to 1,250**
Above	12,500	1,250

** linear interpolations

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, μV/m at 3meters=56.81818(F)-6136.3636; For the band 260-470 MHz, μV/m at 3meters=41.6667(F)-7083.3333. The maximum permitted unwanted emission level is 20dB below the maximum permitted fundamental level.

(3) Emission Band Limits

According to 15.231, The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20dB down from the modulated carrier.

5.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

5.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

6. Conducted Emissions

Result: **N/A**

The line-conducted facility is located inside a 2.3M x 3.5M x 5.5M shielded closure.

The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 605-05. A 1m x 1.5m wooden table 80cm high is placed 80cm away from the conducting ground plane and 40cm away from the sidewall of the shielded room. Electro-Metroics Model EM-7823 (9kHz-30MHz)50ohm/50 uH Line-Impedance Stabilization Networks (LISN) are bonded to the shielded room.

The EUT is powered from the Electro-Metroics LISN and the support equipment is powered from the Kyoritsu LISN. Power to the LISN are filtered by a high-current high-insertion loss shield enclosures power line filters (100dB 14kHz-1GHz).

The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure.

All electrical cables are shielded by copper pipe with inner diameter of 1".

If the EUT is a DC-Powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the Rohde & Schwarz LISN.

All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length.

Sufficient time for the EUT, Support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.

The frequency producing the maximum level was reexamined using EMI field Intensity meter (ESPC). The detector function was set to CISPR quasi-peak mode.

The bandwidth of the receiver was set to 10kHZ. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; if applicable; whichever determined the worst-case emission.

Photographs of the worst-case emission can be seen in photograph of conducted test.

Each EME reported was calibrated using self-calibrating mode.

7. Radiated Emission Measurement

Result: **Pass**

Preliminary measurements were made indoors at 1 meter using broadband antennas, broadband Amplifier, and spectrum analyzer to determine the frequency producing the maximum EME.

Appropriate precaution was taken to ensure that all EME from the EUT were maximized and Investigated. The system configurations, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30MHz to 1GHz using BiconiLog Antenna. Above 1GHz, Double ridged horn Antenna was used.

Final measurements were made outdoors at 3-meter test range using EMCO antennas. The test equipment was placed on a wooden table situated on a 4x4 meter area adjacent to the measurement area. Turntable was to protect from weather in the dome that made with Polyethylene film. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter (ESIB40). The detector function was set to CISPR quasi-peak or peak mode as appropriate and the bandwidth of the receiver was set to 120kHz or 1 MHz depending on the frequency or type or signal.

The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8meter high non-metallic 1 x 1.5 meter table.

The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed, and/or support equipment, if applicable; and changing the polarity of the antenna and rotating the EUT in turns with three orthogonal axes for portable devices, whichever determined the worst-case emission.

Photographs of the worst-case emission can be seen in photograph of radiated emission test.

Each EME reported was calibrated using self-calibrating mode.

Table 2. Test Data, Radiated Emissions

Frequency (MHz)	Height [m]	Angle [°]	(1) Reading QP (dBμV)		(2) AFCL (dB/m)	(3) Actual (dBμV/m)		(4) Limit (dBμV/m)	(5)Margin (dB)	
			H	V		H	V		H	V
443.82	1.0	15	54.21	45.25	20.76	74.97	66.01	81.14	6.17	15.13
887.64	2.2	10	18.68	10.90	29.97	48.65	40.87	54.97	6.32	14.10
1331.46	-	-	-	-	-	-	-	-	-	-
1775.28	-	-	-	-	-	-	-	-	-	-
2219.10	-	-	-	-	-	-	-	-	-	-
2662.92	-	-	-	-	-	-	-	-	-	-
3106.74	-	-	-	-	-	-	-	-	-	-
3550.56	-	-	-	-	-	-	-	-	-	-
3994.38	-	-	-	-	-	-	-	-	-	-
4438.20	-	-	-	-	-	-	-	-	-	-

***Remark:** "-" means that the emission level is too low to be measured.

PK: Peak reading, QP: Quasi Peak reading, AV: Average reading

AFCL: Antenna factor + Cable loss

H: Horizontal, V: Vertical

Note :

1. Limit on the field strength of fundamental

   443.82MHz: 41.6667(443.82)-7083.3333 = 11,405μV/m (81.14dBμV/m)
2. Limit on the field strength of spurious less than limit value 20dB.
3. If the measured frequencies fall in the restricted frequency band, the limit employed is §15.209 general requirement when frequencies are below or equal to 1 GHz. And the measuring instrument is set to quasi peak detector function, no duty factor applied.

♠ Margin Calculation

(5) Margin = (4) Limit – (3) Actual

[(3) Actual = (1) Reading + (2) AFCL]

8. Emission Bandwidth Measurement

Result: **Pass**

The -20dB bandwidth was checked to see that it was within 0.25% of the fundamental frequency for the EUT.

The emission bandwidth limit for this transmitter is

A) 443.82MHz * 0.25 = 110.96kHz

B) Test result: 49.90kHz < 110.96 KHz

Note : Please see appendix 1 for Plotted Data

appendix 1 for Bandwidth Plotted Data