ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CERTIFICATION

Test Report No.	**: E055R-032**
Applicant	**: MIRAI Audio & Video Co., Ltd.**
Address	**: 706-4 Daerim 2Dong, YoungDeungpo-Gu, Seoul, Korea**
Manufacturer	**: MIRAI Audio & Video Co., Ltd.**
Address	**: 706-4 Daerim 2Dong, YoungDeungpo-Gu, Seoul, Korea**
Type of Equipment	**: 7" TFT LCD Half-Din Monitor with TV**
FCC ID.	**: S93UMTVH-2100**
Model Name	**: UMTVH-2100**
Multiple Model Name	**: UMTVH-2200, UMTVH-2300**
Serial number	**: 05020167**
Total page of Report	**: 13 pages (including this page)**
Date of Incoming	**: March 16, 2005**
Date of Issuing	**: May 10, 2005**

SUMMARY

The equipment complies with the regulation of ***FCC CRF 47 PART 15, SUBPART C, SECTION 15.239***.

This test report contains only the results of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

Prepared by:
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ONETECH Corp.

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EMC Testing Dept : 426-1 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-860, Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-2904)

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1. VERIFICATION OF COMPLIANCE

-. APPLICANT : MIRAI Audio & Video Co., Ltd.
-. ADDRESS : 706-4 Daerim 2Dong, YoungDeungpo-Gu, Seoul, Korea
-. CONTACT PERSON : Mr. Bong-Soo, Kim / General Manager
-. TELEPHONE NO : +82-2-846-1639
-. BRAND NAME : Audiovox, Pyle
-. FCC ID : S93UMTVH-2100
-. MODEL NAME : UMTVH-2100
-. SERIAL NUMBER : 05020167
-. DATE : May 10, 2005

DEVICE TYPE	Low Power Communication Device Transmitter
E.U.T. DESCRIPTION	7" TFT LCD Half-Din Monitor with TV
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	Charter 13 of ANSI C63.4: 2001
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SECTION 15.239
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. GENERAL INFORMATION

2.1 Product Description

The MIRAI Audio & Video Co., Ltd., Model UMTVH-2100 (referred to as the EUT in this report) is 7" TFT LCD Half-Din Monitor with TV that has the FM transmitter from 89.5MHz to 90.2MHz for audio signal of FM radio receiver. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	-
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	Main Board : 8 MHz, 30.55MHz and 7.6 MHz Control Board : 3.579545 MHz, 4.433619 MHz
POWER REQUIREMENT	DC10.6 ~ 15V from vehicle
TX FREQUENCY RANGE	89.5MHz ~ 90.2MHz by 100kHz step
NUMBER OF LAYERS	2 Layers
EXTERNAL CONNECTOR	Video In (AV1, AV2, AV3, AV4), Video Out, Navi In, DC In (12V)

2.2 Model Differences

-. The difference(s) compared to the EUT is as follows:

	Model Name	Differences
Basic Model Name	UMTVH-2100	-
Multiple Model Name	UMTVH-2200 UMTVH-2300	Only type designation except for shape of front button.

2.3 Related Submittal(s) / Grant(s)

-. Original submittal only

2.4 Test System Details

The model numbers for all the equipments which were used in the tested system is:

Model	Manufacturer	FCC ID	Description	Connected to
UMTVH-2100	MIRAI Audio & Video Co., Ltd.	S93UMTVH-2100	7" TFT LCD Half-Din Monitor with TV(EUT)	-
LT416	LEADER	N/A	Pattern Generator	EUT
GHV-S9990	GoldStar	N/A	VCR	EUT

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2.5 Test Methodology

Radiated testing was performed according to the procedures in chapter 13 of ANSI C63.4: 2001. Radiated testing was performed at a distance of 3 meters from the EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 307-51 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on April 04, 2003. (Registration Number: 340658)

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3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	MIRAI Audio & Video Co., Ltd.	UMTVH	N/A
Control Board	MIRAI Audio & Video Co., Ltd.	MCD-44D	N/A

3.2 Mode of operation during the test

The EUT (UMTVH-2100) has been tested under normal operating condition.

The EUT stay in continuous transmitting mode. The Frequency 89.90MHz is chosen for testing.

3.3 Cable Description

Product Name	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
7" TFT LCD Half-Din Monitor with TV(EUT)	N/A	N	1.5(D)
VCR	N	N	1.5(P), 1.5(D)

* The marked “(D)” means the Data Cable and “(P)” means the Power Cable.

3.4 Noise Suppression Parts on Cable

Product Name	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
7" TFT LCD Half-Din Monitor with TV(EUT)	Y	EUT END (DC IN)	Y	BOTH END
VCR	N	N/A	Y	BOTH END

3.5 Equipment Modifications

To achieve compliance to FCC part 15 rules, the following change(s) was made by ONETECH Corp. during compliance testing:

“There were no Modified items during EMI test”

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3.6 Configuration of Test System

Line Conducted Test: This test is not required because the EUT's power is supplied by DC battery.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4: 2001 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter open area test site.

Occupied Bandwidth Measurement:

This measurement is performed with a probe located close enough to give a full-scale deflection of the modulated carrier on the spectrum analyzer.

3.7 Antenna Requirement

For intentional device, according to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Construction:

FM transmitter antenna of the EUT is fixed inside the EUT, no consideration of replacement by the user.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
-	N/A

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Transmit the RF Signal continuously (AV mode)	
Transmit the RF Signal continuously (TV mode)	X

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5. FINAL RESULT OF MEASURMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level

5.1 Radiated Emission Test (Within the permitted 200 kHz band)

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 43 % Temperature: 21 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.239 (b)
Type of Test : Low Power Communication Device Transmitter
Result : PASSED BY – 4.12 dB at 89.90 MHz

EUT : 7" TFT LCD Half-Din Monitor with TV Date: April 29, 2005
Operating Condition : Transmit the RF signal (TV mode)
Distance : 3 Meter

Radiated Emission			Ant	Correction Factors		Total	Limit	Margin
Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	(dBuV/m)	(dB)
89.90	35.10	Peak	V	8.18	1.70	44.98	68.00	-23.02
89.90	34.80	AVG	V	8.18	1.70	44.68	48.00	-3.32

Radiated Emission Tabulated Data

Remark: Per 15.31(m), because the EUT's frequency range is less than 1.0 MHz, one channel (near middle) was tested.

Tested by: Hyun-Suck, Lee/ Test Engineer

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5.2 Radiated Emission Test (Outside of the specified 200 kHz band)

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 52 % Temperature: 18 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209 (a)
Type of Test : Low Power Communication Device Transmitter
Result : PASSED BY –2.16dB at 170.30MHz

EUT : 7" TFT LCD Half-Din Monitor with TV Date: April 29, 2005
Operating Condition : Transmit the RF signal (TV mode)
Frequency range : 30MHz – 1000MHz
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
Distance : 3 Meter

Radiated Emission		Ant	Correction Factors		Total	FCC	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
77.05	24.80	V	6.41	1.64	32.85	40.00	-7.15
110.63	25.80	V	11.65	1.91	39.36	43.52	-4.16
113.60	20.10	V	12.06	1.94	34.10	43.52	-9.42
142.40	21.40	V	14.83	2.38	38.61	43.52	-4.91
148.25	23.90	V	14.99	2.32	41.21	43.52	-2.31
170.30	23.30	V	15.65	2.41	41.36	43.52	-2.16
179.57 *	20.40	H	15.96	2.78	39.14	43.52	-4.38
198.89	19.69	V	15.88	2.80	38.37	43.52	-5.15
225.10	21.00	V	16.62	3.00	40.62	46.02	-5.40
242.00	22.60	H	16.80	3.27	42.67	46.02	-3.35
270.40 *	8.10	H	17.78	3.48	29.36	46.02	-16.66
283.60	13.80	H	20.04	3.60	37.44	46.02	-8.58
311.70	13.90	H	13.89	3.89	31.68	46.02	-14.34
340.50	13.00	H	14.23	4.12	31.35	46.02	-14.67
359.60 *	6.30	H	14.56	4.24	25.10	46.02	-20.92
397.20	13.00	H	15.40	4.39	32.79	46.02	-13.23
449.60 *	3.20	H	16.76	4.50	24.46	46.02	-21.56
453.60	18.90	H	16.80	4.57	40.27	46.02	-5.75
539.90 *	-	H					
602.40	16.70	H	18.68	5.32	40.70	46.02	-5.32
629.30 *	-	H					
728.40	15.80	H	20.95	6.68	43.43	46.02	-2.59
818.80	12.20	H	21.20	7.16	40.56	46.02	-5.46
863.60	11.60	H	22.66	7.10	41.36	46.02	-4.66
897.69	10.59	H	22.92	7.10	40.61	46.02	-5.41

Remark: 1. * denote the harmonics of the fundamental frequency.
2. Datas of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

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Tested by: Hyun-Suck, Lee/ Test Engineer

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5.3 Bandwidth of the operating frequency

Humidity Level	: 52 %	Temperature: 21 °C
Limits apply to	: FCC CFR 47, PART 15, SUBPART C, SECTION 15.239 (a)	
Result	: PASSED	

EUT	: 7" TFT LCD Half-Din Monitor with TV	Date: April 29, 2005
Operating Condition	: Transmit the RF signal (TV mode)	
Minimum Resolution Bandwidth	: 10 kHz	
Remark	: Refer to test data in next page.	

Tested by: Hyun-Suck, Lee/ Test Engineer

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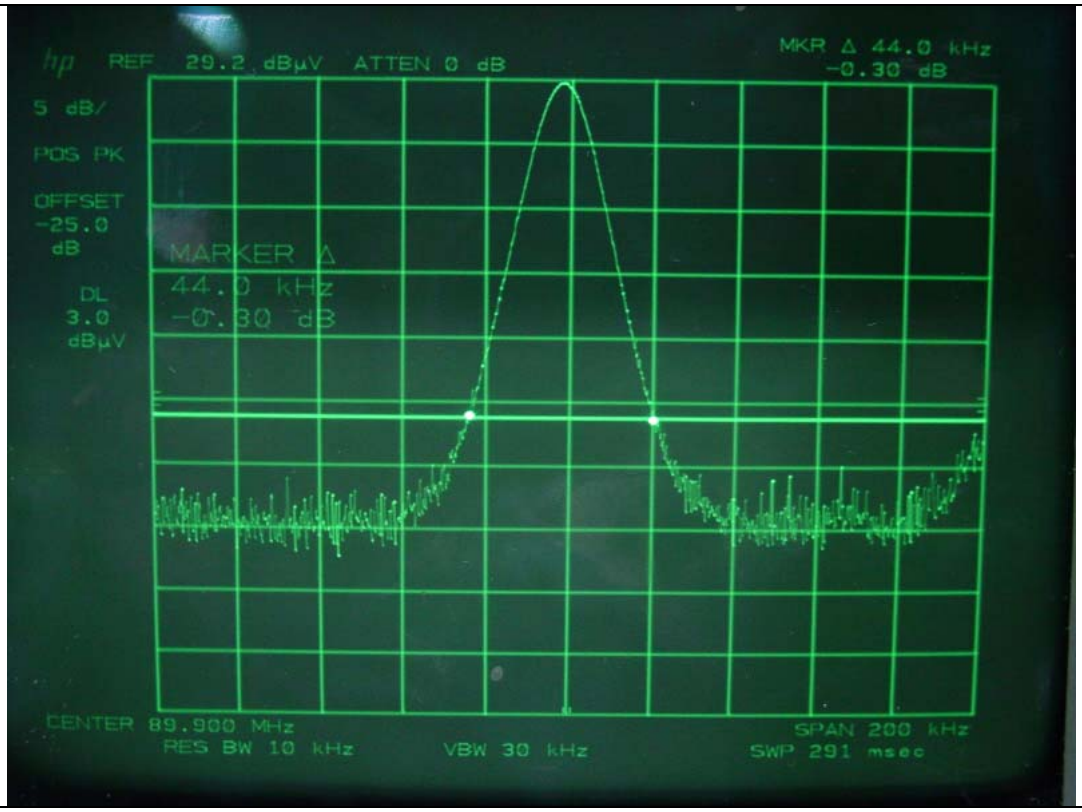

Middle Frequency (89.9MHz)

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6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+	Meter reading	(dBuV)
+	Cable Loss	(dB)
+	Antenna Factor (Loss)	(dB/meter)
=	Corrected Reading	(dBuV/meter)
-	Specification Limit	(dBuV/meter)
=	dB Relative to Spec	(+/- dB)

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7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	DEC/04	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	MAY/04	12MONTH	
3.	Spectrum analyzer	HP	8566B	3407A08547	JUL/04	12MONTH	
4.	Spectrum analyzer	HP	8568B	3109A05456	MAR/05	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	MAR/05	12MONTH	■
6.	Quasi-Peak Adapter	HP	85650A	3107A01542	MAR/05	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163-202	JUN/04	12MONTH	
8.	Biconical antenna	EMCO	3104C	9109-4443	MAY/04	12MONTH	
		Schwarzbeck	VHA9103	91031852	JAN/05		■
9.	Log Periodic antenna	EMCO	3146	9109-3217	MAY/04	12MONTH	
		Schwarzbeck	9108-A(494)	62281001	FEB/05		■
10.	LISN	EMCO	3825/2	9109-1867	JUL/04	12MONTH	
				9109-1869	OCT/04		
11.	Position Controller	HD GmbH	HD100	N/A	N/A	N/A	■
12.	Turn Table	HD GmbH	DS420S	N/A	N/A	N/A	■
13.	Antenna Master	HD GmbH	MA240	N/A	N/A	N/A	■

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