

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B VERIFICATION

Test report file number : E028R-059

Applicant : KAIROS TECHNOLOGY CO., LTD.

Address : #201-901 Techno Park, 192 Yakdae-Dong, Wonmi-Gu, Buchun-Si, Gyunggi-Do, Korea

Manufacturer : KAIROS TECHNOLOGY CO., LTD.

Address : #201-901 Techno Park, 192 Yakdae-Dong, Wonmi-Gu, Buchun-Si, Gyunggi-Do, Korea

Type of Equipment : 7inch LCD CAR TV

Model name : MM70TV

Serial number : N/A

Total page of Report : 24 pages (including this page)

Date of Incoming : August 1, 2002

Date of issuing : August 29, 2002

SUMMARY

The equipment complies with the standard; **FCC Part 15 Subpart B, Class B (Verification)**.

This test report contains only the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Prepared by:



Y. K. Nam / Assistant Chief Engineer
EMC Div.
ONETECH Corp.

Reviewed by:



Y. K. Kwon / Chief Engineer
EMC Div.
ONETECH Corp.

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1. VERIFICATION OF COMPLIANCE

APPLICANT : KAIROS TECHNOLOGY CO., LTD.
ADDRESS : #201-901 Techno Park, 192 Yakdae-Dong, Wonmi-Gu, Buchun-Si, Gyunggi-Do, Korea
CONTACT PERSON : Sang-Won, Yoo / Engineer
TELEPHONE NO : +82-32-322-7851
MODEL NAME : MM70TV
BRAND NAME : AUDIO VOX
SERIAL NUMBER : N/A
DATE : August 29, 2002

DEVICE TYPE	TV Broadcast Receiver - UNINTENTIONAL RADIATOR
E.U.T. DESCRIPTION	7inch LCD CAR TV
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	IEEE Std 187-1990, IEEE Std 213-1987, MP-2, ANSI C63.4/2000
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	VERIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART B SECTION 15.101
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.



2. GENERAL INFORMATION

2.1 Product Description

The KAIROS TECHNOLOGY CO., LTD., Model MM70TV (referred to as the EUT in this report) is the 7inch LCD CAR TV, which consists of the Antenna port, AV input 2ports, and Monitor Output port. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic – Non coated
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	3.579545MHz, 7.60MHz, 8.00MHz on the main board
POWER REQUIREMENT	DC 12V, 650mA, 8W
SYSTEM	NTSC
NUMBER OF LAYERS	Main Board: 2 Layers
TV TUNER Type NO. / MFR	TCPN9081DA10D / Samsung Electro-Mechanics Co., Ltd.
EXTERNAL CONNECTORS	Antenna 1 Port, AV input 2 Ports, Monitor Out 1 Port, DC Input

Model Differences:

-. None

2.2 Related Submittal(s) / Grant(s)

-. Original submittal only

2.3 Test System Details

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

Model	Manufacturer	Description	FCC ID	Connected to
MM70TV	KAIROS TECHNOLOGY CO., LTD.	7inch LCD CAR TV (EUT)	N/A	-
GHV-S9990	GOLDSTAR	VCR	DOC	EUT
CTV-1010XK	KEC	CCTV MONITOR	N/A	EUT
LT 416	Leader Electronics Corp	COLOR TV PATTERN GENERATOR	N/A	ANTENNA
3033B	PROTEK	DC POWER SUPPLY	N/A	EUT
N/A	N/A	ANTENNA	N/A	EUT

2.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in IEEE STD 213-1987[14], IEEE STD 187-1990[13], ANSI C63.4/2000. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.5 Test Facility

The open area test site and conducted measurement facilities are located on 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Si, Kyunggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Commission on January 18, 2002. (Registration Number: 92819)

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	KAIROS TECHNOLOGY CO., LTD.	NEW7INCH	N/A

3.2 EUT exercise Software

The EUT and peripheral equipments were connected as follows;

The antenna port on the EUT was connected to antenna, which is TV Antenna, also signal port on the pattern generator was connected to dipole antenna for transferring color pattern signal to antenna of the EUT, and monitor output port on the EUT was connected to CCTV Monitor for transferring video image to CCTV Monitor, and video/audio ports on the EUT were connected to VCR for termination by using RCA cables.

The EUT was measured the local oscillator for each channel during the test.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
7inch LCD CAR TV (EUT)	N	N	1.2(P), 1.5(D)
VCR	N	N	1.5(P), 1.5(D)
CCTV MONITOR	N	N	1.5(P), 1.5(D)
COLOR TV PATTERN GENERATOR	N	Y	1.5(P), 3.0(D)
DC POWER SUPPLY	N	N/A	1.8(D)
ANTENNA	N/A	N	2.0(D)

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

3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
7inch LCD CAR TV (EUT)	N	N/A	Y	BOTH END
VCR	N	N/A	Y	BOTH END
CCTV MONITOR	N	N/A	Y	BOTH END
COLOR TV PATTERN GENERATOR	N	N/A	Y	BOTH END
DC POWER SUPPLY	N	N/A	Y	EUT END
ANTENNA	N	N/A	Y	EUT END

3.5 Equipment Modifications

- None

3.6 Configuration of Test System

Line Conducted Test: The line conducted test was not measured, because power supplied by DC 12V battery.

Radiated Emission Test: Preliminary radiated emission test was conducted using the procedure in IEEE STD 187-1990[13] to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.

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)
The color pattern receiving mode	X

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
The color pattern receiving mode	X

5. FINAL RESULT OF MEASUREMENT

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

5.1 Conducted Emission Test

Humidity Level : %

Temperature : °C

Limits apply to : FCC CFR 47, PART 15, SUBPART B

Type of Test : 7inch LCD CAR TV

Result : N/A

EUT : 7inch LCD CAR TV

Date:

Operating Condition : The Color pattern receiving mode

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Power Line Conducted Emission			FCC CLASS B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
The line conducted emission test was not measured, because the power supplied by DC 12V battery.				

Line Conducted Emission Tabulated Data



 Tested by: Seung-Hyun, Nam / Test Engineer



5.2 Radiated Emission Test

5.2.1 Measurement Data for Fundamental Frequencies

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

Humidity Level : 50 %

Temperature : 24° C

Limits apply to : FCC CFR 47, PART 15, SUBPART B

EUT : 7inch LCD CAR TV

Date: August 12, 2002

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

Distance : 3 Meter

Channel	Measured Freq.(MHz)	Measured Value(dBuV)	Ant. Pol.	Ant. Fact (dBuV)	Cable Loss (dBuV)	Total (dBuV)	Limit (dBuV)	Margin (dBuV)
V H F	2	101.0	-	-	-	-	43.5	-
	3	107.0	-	-	-	-		-
	4	113.0	-	-	-	-		-
	5	123.0	-	-	-	-		-
	6	129.0	-	-	-	-		-
	7	221.0	13.80	H	10.93	1.68	46.0	-19.59
	8	227.0	12.60	H	11.02	1.71		-20.67
	9	233.0	9.90	H	11.30	1.74		-23.06
	10	239.0	8.50	H	11.57	1.77		-24.16
	11	245.0	14.20	H	11.85	1.80		18.15
	12	251.0	12.20	H	12.11	1.83		-19.86
	13	257.0	10.20	H	12.31	1.85		-21.64
	14	517.0	13.70	V	17.53	2.71	46.0	-12.06
U H F	19	547.0	-	-	-	-		-
	28	601.0	-	-	-	-		-
	36	649.0	-	-	-	-		-
	44	697.0	-	-	-	-		-
	53	751.0	-	-	-	-		-
	61	799.0	-	-	-	-		-
	69	847.0	-	-	-	-		-



Radiated Emission Test: continued

5.2.2 Measurement Data for Harmonic

Channel	Harmonics	Measured Freq.(MHz)	Measured Value(dBuV)		Ant. Fact (dBuV)	Ca. Loss (dBuV)	Total (dBuV)	Limit (dBuV)	Margin (dBuV)
6	2	258.0	-	-	-	-	-	46.00	-
7	2	442.0	-	-	-	-	-	46.00	-
8	2	454.0	-	-	-	-	-	46.00	-
9	2	466.0	-	-	-	-	-	46.00	-
10	2	478.0	-	-	-	-	-	46.00	-
11	2	490.0	-	-	-	-	-	46.00	-
12	2	502.0	-	-	-	-	-	46.00	-
13	2	514.0	-	-	-	-	-	46.00	-
14	2	1034.0	-	-	-	-	-	54.00	-
19	2	1094.0	-	-	-	-	-	54.00	-
28	2	1202.0	-	-	-	-	-	54.00	-
36	2	1298.0	-	-	-	-	-	54.00	-
44	2	1394.0	-	-	-	-	-	54.00	-
53	2	1502.0	-	-	-	-	-	54.00	-
61	2	1598.0	-	-	-	-	-	54.00	-
69	2	1694.0	-	-	-	-	-	54.00	-

5.2.3 Measurement Data for the other Frequencies

Radiated Emissions		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.89	5.60	V	11.11	0.81	17.52	40.00	-22.48
59.25	6.50	V	9.51	0.98	16.99	40.00	-23.01
108.63	8.20	V	12.79	1.19	22.18	43.50	-21.32
250.46	10.40	H	12.10	1.83	24.33	46.00	-21.67
284.52	4.60	H	13.74	1.93	20.27	46.00	-25.73
300.12	5.20	H	15.11	2.00	22.31	46.00	-23.69
351.23	5.00	H	14.47	2.29	21.76	46.00	-24.24
400.32	6.20	H	15.23	2.43	23.86	46.00	-22.14

Tested by: Seung-Hyun, Nam / Test Engineer

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(TEL: +82-31-746-8500 FAX: +82-31-746-8700)

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

5.3 Antenna Power Conduction

5.3.1 Measurement Data for Fundamental Frequencies

Channel		Measured Freq.(MHz)	Measured Value(dBuV)	Imp. Mat. +Ca. Loss(dB)	Total (dBuV)	Limit (dBuV)	Margin (dB)
V H F	2	101.0	15.4	6.0	21.40	50.1	-28.70
	3	107.0	13.8	6.0	19.80	50.1	-30.30
	4	113.0	12.7	6.0	18.70	50.1	-31.40
	5	123.0	11.0	6.0	17.00	50.1	-33.10
	6	129.0	9.5	6.0	15.50	50.1	-34.60
	7	221.0	23.1	6.0	29.10	50.1	-21.00
	8	227.0	24.2	6.0	30.20	50.1	-19.90
	9	233.0	25.3	6.0	31.30	50.1	-18.80
	10	239.0	26.5	6.0	32.50	50.1	-17.60
	11	245.0	27.7	6.0	33.70	50.1	-16.40
	12	251.0	-	-	-	-	-
	13	257.0	30.2	6.0	36.20	50.1	-13.90
	U H F	14	517.0	29.4	6.0	35.40	50.1
19		547.0	-	-	-	-	-
28		601.0	25.6	6.0	31.60	50.1	-18.50
36		649.0	-	-	-	-	-
44		697.0	-	-	-	-	-
53		751.0	-	-	-	-	-
61		799.0	-	-	-	-	-
69		847.0	-	-	-	-	-

Total (dBuV) = Measured Value(dBuV) + Impedance Matching(dB) + Cable Loss(dB)

2.0nW=50.1dBuV


Tested by: Seung-Hyun, Nam / Test Engineer

5.3.2 Measurement Data for Harmonic and the other Frequencies

Channel		Measured Freq.(MHz)	Measured Value(dBuV)	Imp. Mat. +Ca. Loss(dB)	Total (dBuV)	Limit (dBuV)	Margin (dB)
V H F	2	202.0	4.8	6.0	10.80	50.1	-39.30
	3	214.0	4.9	6.0	10.90	50.1	-39.20
	4	226.0	4.7	6.0	10.70	50.1	-39.40
	5	246.0	4.1	6.0	10.10	50.1	-40.00
	6	258.0	4.9	6.0	10.90	50.1	-39.20
	7	442.0	7.9	6.0	13.90	50.1	-36.20
	8	454.0	7.7	6.0	13.70	50.1	-36.40
	9	466.0	7.6	6.0	13.60	50.1	-36.50
	10	478.0	7.7	6.0	13.70	50.1	-36.40
	11	490.0	8.0	6.0	14.00	50.1	-36.10
	12	502.0	-	-	-	50.1	-
	13	514.0	9.1	6.0	15.10	50.1	-35.00
	U H F	14	1034.0	18.4	6.0	24.40	50.1
19		1094.0	-	-	-	50.1	-
28		1202.0	29.5	6.0	35.50	50.1	-14.60
36		1298.0	-	-	-	50.1	-
44		1394.0	-	-	-	50.1	-
53		1502.0	-	-	-	50.1	-
61		1598.0	-	-	-	50.1	-
69		1694.0	-	-	-	50.1	-

2.0 nW = 50.1dBuV

Tested by: Seung-Hyun, Nam / Test Engineer

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(TEL: +82-31-746-8500 FAX: +82-31-746-8700)

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



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)

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	OCT/01	12MONTH	■
2.	Test receiver	R/S	ESHS10	834467/007	APR/02	12MONTH	■
3.	Spectrum analyzer	HP	8568B	3026A0226	APR/02	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	APR/02	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	APR/02	12MONTH	■
6.	Dipole Antenna	EMCO	3121C	9107-745	JUN/02	12MONTH	
7.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	APR/02	12MONTH	■
8.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	APR/02	12MONTH	■
10.	Horn Antenna	EMCO	3115	9509-4563	MAR/02	12MONTH	
11.	LISN	EMCO	3825/2	9109-1867 9109-1869	JUL/02	12MONTH	■
12.	RF Amplifier	HP	8447F	3113A04554	JUN/02	N/A	
13.	Matching Pad	TME	ZT-130	9F954	N/A	N/A	■
14.	Spectrum Analyzer	HP	8561E	3350A00546	SEP/01	12MONTH	■
15.	Spectrum Analyzer	HP	8591A	3131A02312	APR/02	12MONTH	
16.	Computer System	HP	98581C	98543A	N/A	N/A	■
	Hard disk drive		9153C	CMC762Z9153	N/A	N/A	■
17.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
18.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
19.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
20.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■

* Remark ■ means used equipment.

APPENDIX I - TEST SET-UP PHOTOS (Radiated Emission)



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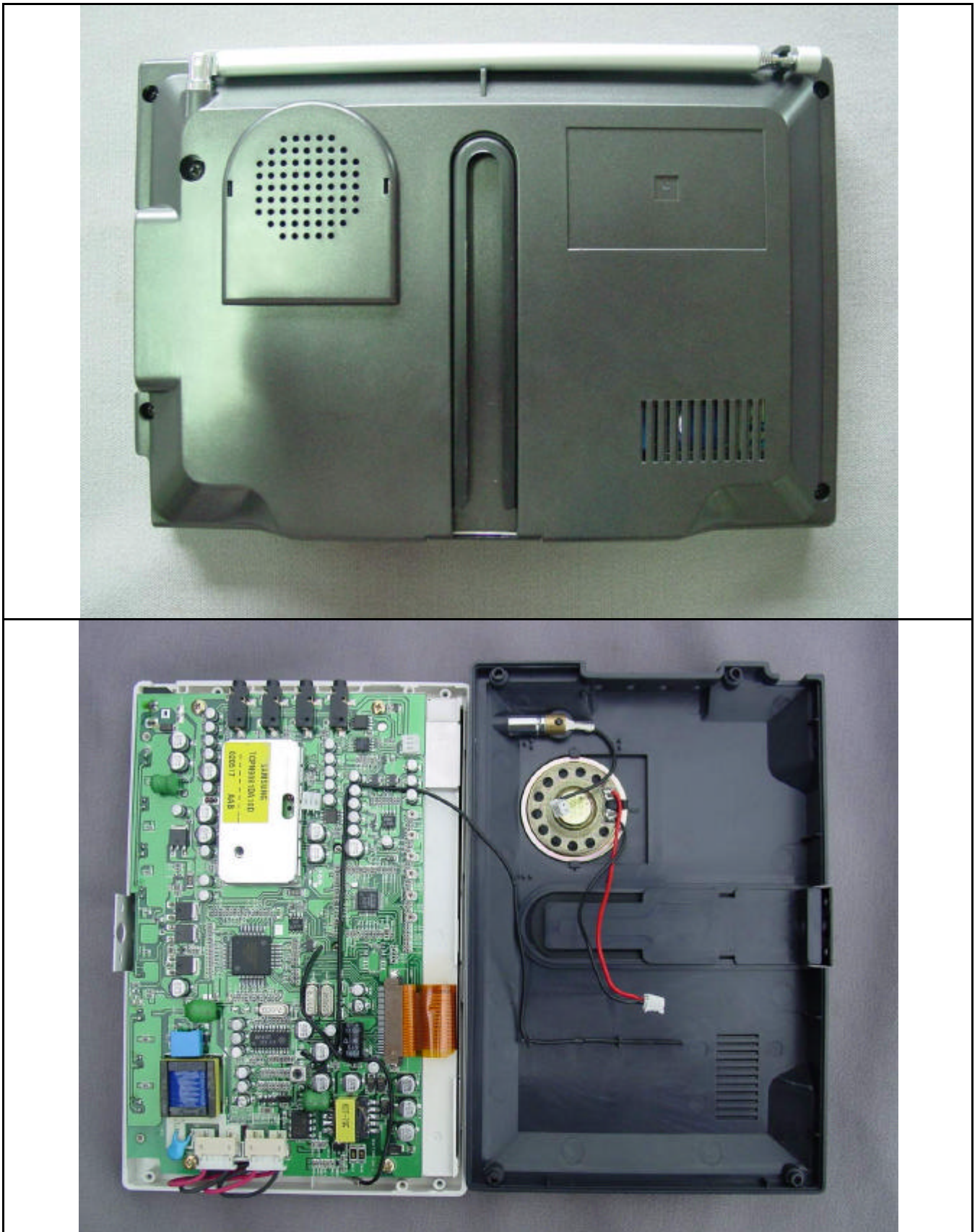
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APPENDIX II – PHOTOGRAPHS REPORT

“ATTACHMENT”



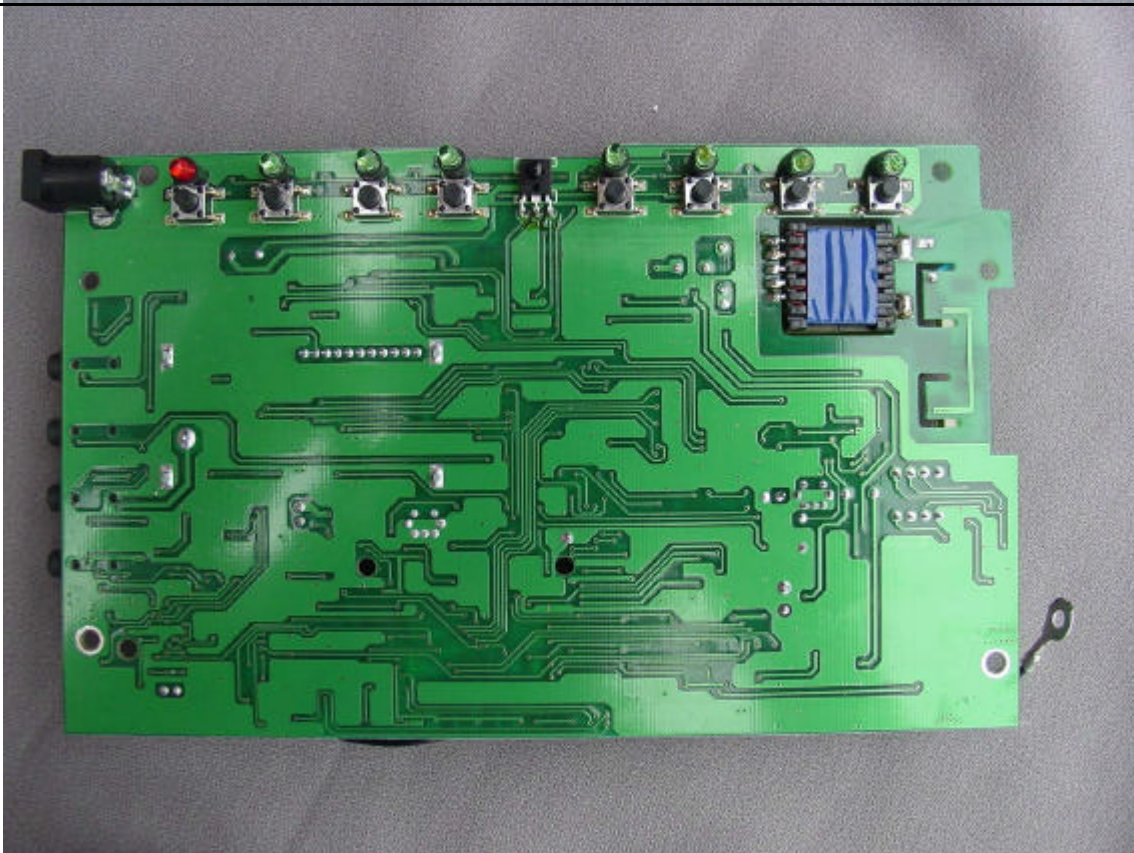
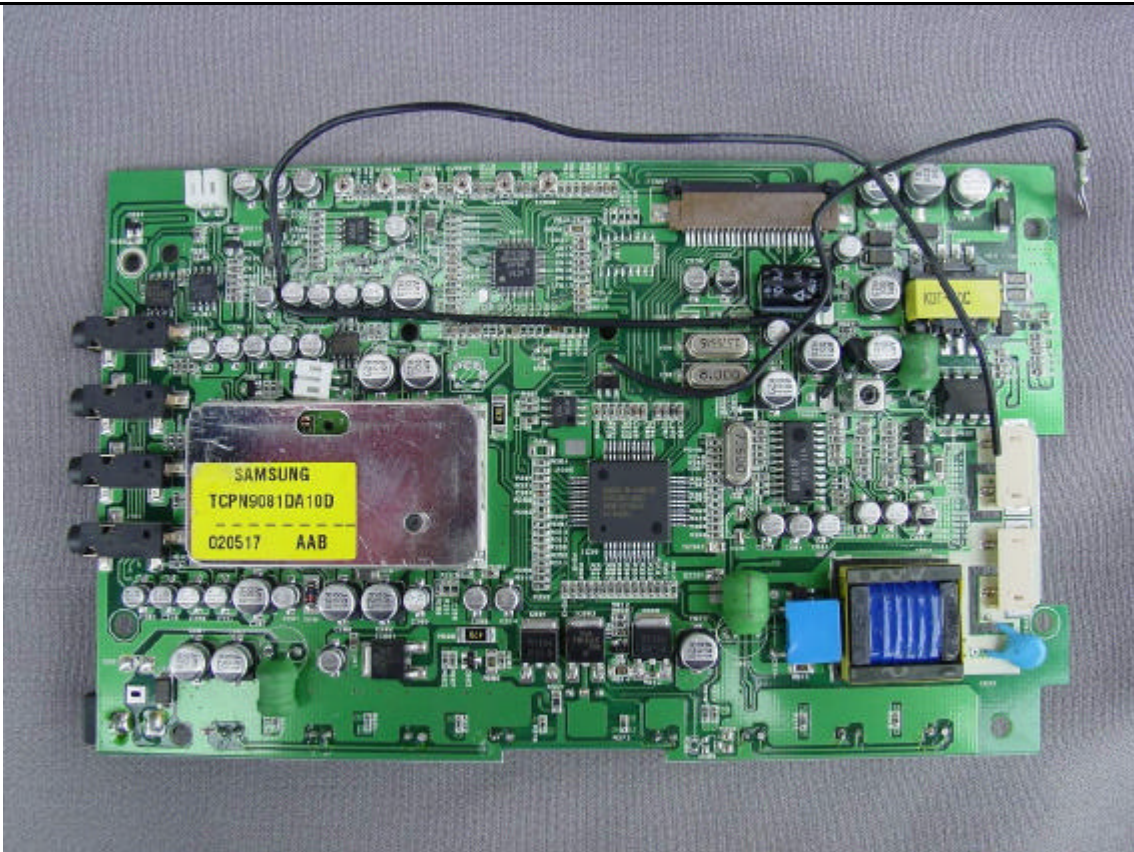


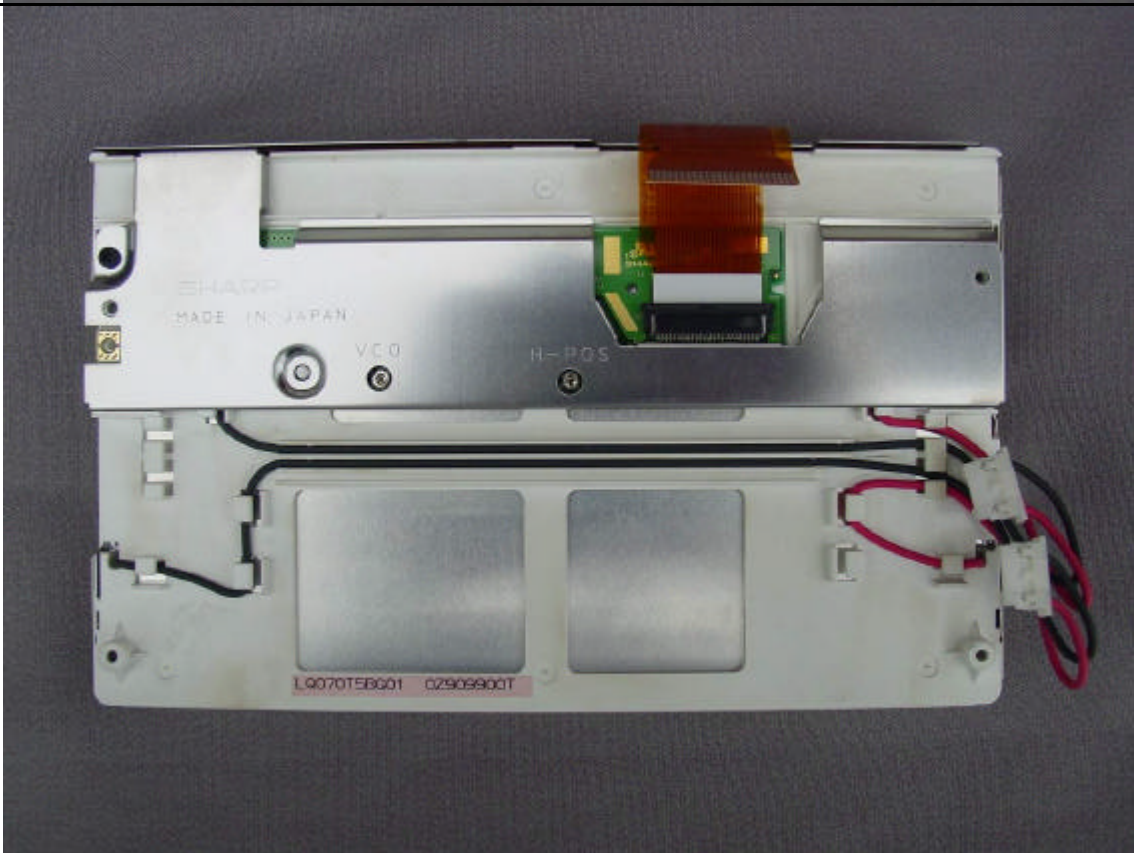
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APPENDIX III - IDENTIFICATION LABEL**SUGGESTED LABEL FORMAT FOR EQUIPMENT SUBJECT TO VERIFICATION
MAY 1995**

All devices subject to verification are required to have an identification label pursuant to Section 2.954 of the Rules. Additional labeling requirements may be specified in the particular sections of the FCC rules governing the specific class of equipment.

Under NO circumstances shall verified equipment be labeled with a FCC Identifier (FCC ID), or in any manner which implies that such equipment has been approved by the FCC.

Model No. 123 Company name or trade name Country of origin *
--

The label showing the equipment identification data may be combined with a label showing other information (serial numbers, other governments requirements, etc.), if desired. Compliance statements, when required, may be shown on the same label or a separate label. See the "Checksheet" for additional information concerning compliance statements.

* Country of origin - U.S. Customs and the Federal Trade Commission regulations require all equipment produced in foreign countries to be marked with the country of origin. Questions concerning marking of equipment with the country of origin should be directed to these agencies.

PROPOSED FCC LABEL (Part 15 sec. 15.19)

The label included following statement will be attached on product or the compliance statement can be observed in a prominent location in the instruction manual.

Model name: MM70TV KAIROS TECHNOLOGY CO., LTD.
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 operations.
Made in Korea



APPENDIX IV - USER'S MANUAL & SCHEMATIC (BLOCK DIAGRAM)

“ATTACHMENT”



LABELLING REQUIREMENTS (Part 15.19 (a)(3))

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 operations.

The instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

INFORMATION TO THE USER (15.105(a))

For Class B digital device

INFORMATION TO THE USER

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one more of the following measures:

- . Reorient or relocate the receiving antenna.
- . Increase the separation between the equipment and receiver.
- . Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- . Consult the dealer or an experienced radio/TV technician for help.

WARNING (Part 15.21)

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.