EXHIBIT 4. TECHNICAL INFORMATION :

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

TV INTERFACE DEVICE
CERTIFICATION TO FCC PART 15 REQUIREMENT
CLASS II PERMISSIVE CHANGE

PRODUCT	VIDEO CASSETTE PLAYER		
FCC ID	BRFKVP11KU		
MODEL NO.	MA/2X-1	SERIAL NO.	N/A
APPLICANT & ADDRESS	KOREA ELECTRONICS CO., LTD. 275-7, YANGJAE-DONG, SEOCH-KU, SEOUL, 137-130, KOREA		

REPORT NO.	OTC-RF-9802028	ISSUE DATE	February 19, 1998
PREPARED BY :	ONETECH CORPORATION 2 F. KUNHAN B/D, 1557-11, SEOCHO-DONG, SEOCHO-KU, SEOUL 137-070 KOREA (TEL)02-587-9037(FAX)02-587-9039		

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1. VERIFICATION OF COMPLIANCE

APPLICANT : KOREA ELECTRONICS CO., LTD.
275-7, YANGJAE-DONG, SEOCH-KU, SEOUL, 137-130, KOREA
CONTACT PERSON : Eui-Yeun, Kim / Associate engineer
TELEPHONE NO : 82-546-467-3553
FCC ID : BRFKVP11KU MODEL NO/NAME : MA/2X-1
SERIAL NUMBER : N/A
DATE : February 19, 1998

DEVICE TYPE	TV Interface Device-Unintentional Radiator
E.U.T. DESCRIPTION	VIDEO CASSETTE PLAYER
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	MP-3, ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION CLASS II PERMISSIVE CHANGE
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	PART 15
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	NO
FINAL TEST WERE CONDUCTED ON	3 METER OPEN TEST SITE

The above equipment was tested by ONETECH CORPORATION 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.

YONG KWANG KWON / CHIEF ENGINEER
EMC TESTING DEPARTMENT
ONETECH Testing & Eval. Lab.
SEOUL KOREA

2. GENERAL INFORMATION

2.1 Product Description

The KOREA ELECTRONICS CO., LTD., Model MA/2X-1(referred to as the EUT in the this report) is a VIDEO CASSETTE PLAYER. Product specification information described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	3.58㎒, 10㎒
POWER REQUIREMENT	12V DC(CAR BATTERY)
TELEVISION SYSTEM	EIA Standard 525 Lines/60 Fields, NTSC Color System
CASSETTE TYPE	1/2" Video-VHS Type
RF-OUTPUT CHANNEL(s)	CHANNEL 3 AND 4
RF IN/OUT TERMINAL IMPEDANCE	75 OHM (Unbalanced F-Type coaxial)
NUMBER OF RF IN/OUT TERMINAL	1 EA AT EACH
TERMINAL(S) FOR SIGNAL	VIDEO/AUDIO OUT WITH RCA-TYPE JACK
ACCESSORIES CONNECTED TO THE EUT	Video Coaxial cable for RF-OUT terminal provided by manufacturer, DC Car cord

* The model MA/2X-1 was granted in FCC ID BRFKVP11KU on July 18, 1994, but the model MA/2X-1 will be modified as below description.

Video RF Modulator	Before	Change
Type	MDLA2-115A	KCR101N
Manufacturer	LG Electronics Component Ltd.	Korea Electronics Co., Ltd.

2.2 Related Submittal(s) / Grant(s)

Submittal for Class II Permissive Change.

2.3 Test System Details

The Model numbers for all equipment used in the tested system are:

Model	Manufacturer	FCC ID	Description	Connected to
MA/2X-1	KOREA ELECTRONICS	BRFKVP11KU	Video Cassette Player (EUT)	N/A
CT-1447	SAMSUNG ELECTRONICS	N/A	TELEVISION	EUT
GLOBAL400L	SAEBANG BATTERY	N/A	DC BATTERY	EUT

2.4 Test Methodology

The measurement for Radiated Emissions, Line Conducted Emissions, Output signal levels, Output Terminal Conducted Spurious Emissions and Transfer Switch Isolation were performed in accordance with the procedures described in MP-3 and ANSI C63.4/1992. Radiated testing was performed at an antenna to EUT distance of 3 meters.

2.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-080 Korea. Detailed description of test facility was submitted to the Commission on January 24, 1996(31040/SIT, 1200F2).

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The device was configured for testing in a typical fashion (as a customer would normally use it). During the test, the following components inside the EUT were installed.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
RF MODULATOR	KOREA ELECTRONICS	KCR101N	N/A
MAIN BOARD	KOREA ELECTRONICS	PVBM01-1	N/A
CTL/Audio/H-Amp B'D	KOREA ELECTRONICS	PVBM01-3	N/A

3.2 EUT exercise Software

According to the requirements in Subpart B of Part 15, the measurement is made at each function of the EUT being connected with appropriate cables and loads.

The model MA/2X-1 has a video/audio output terminal in RCA-type plugs, antenna input and RF output terminal. Therefore, every measurement was investigated in the operation modes, Playing VITS 1 Vp-p recorded tape at each ch. 3 or/and 4 for each mode applicable.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
Video Cassette Player(EUT)	N	N	1.5(P),1.2(D)
TELEVISION	N	N	1.2(P),1.2(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
Video Cassette Player(EUT)	N	N/A	Y	BOTH END
TELEVISION	N	N/A	Y	BOTH END

3.5 Equipment Modifications

-. There was no modified items during EMI test

3.6 Configuration of Test System

3.6.1 Line Conducted Test

EUT was connected to LISN, all supporting equipments were connected to another LISN. Preliminary Powerline Conducted Emission test were performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

* (Note: There is not need to test this requirement because the power of the EUT was supplied from DC battery.)

3.6.2 Radiated Emission Test

Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4/1992 8.3.1.1 to determine the worse operating conditions. Final radiated emission test were conducted at 3 meter open area test site.

3.6.3 Output Signal Level Test

The output voltage of video carrier frequency at the RF-output terminal of the EUT was measured at each channel (CH. 3 & 4) connecting directly to a spectrum analyzer with 50Ω input impedance via 75-to-50Ω matching pad. Indicated voltage on screen of measuring instrument was converted to the voltage of 75Ω system.

Data conversion method are as follows.

$$V_{75}[uV] = 10^{(Vr+CF)/20}[uV]$$

here, V_{75} : Voltage at the RF-out terminal of 75Ω in μV,

Vr : Voltage read at analyzer with 50Ω input-impedance in dBμV,

CF : Conversion Factor of the matching pad in dB.

3.6.4 Output Terminal Conducted Spurious Emission test :

Any other spectrum at RF-output terminal appearing on frequencies removed by more than 4.6MHz below or 7.4 MHz above the video carrier frequency of EUT was searched at each channel.

Data conversion method are as follows.

$$V_{75}[uV] = 10^{(Vr+CF+AT)/20}[uV]$$

here, V_{75} :Voltage at the RF-out terminal of 75 Ω in μV,

V_r : Voltage read at analyzer with 50 Ω input-impedance in dBμV,

CF : Conversion Factor of the matching pad in dB,

AT: Attenuation of attenuator in dB.

3.6.5 Transfer Switch Isolation Test

As a transfer switch was equipped with EUT as an antenna-in, measurement of isolation were made at RF-input terminal with rated input impedance.

The maximum voltage of video carrier frequency of the EUT at the antenna input(RF-in) terminal of the switch was measured for both channels.

Data conversion method are as follows.

$$V_{75}[uV] = 10^{(Vr+CF-PG+AT)/20}[uV]$$

here, V_{75} : Voltage at the RF-out terminal of 75 Ω in μV,

V_r : Voltage read at analyzer with 50 Ω input-impedance in dBμV,

CF : Conversion Factor of the matching pad in dB,

PG : Gain of pre-amplifier in dB,

AT: Attenuation of attenuator in dB.

4. PRELIMINARY TEST

4.1 AC Powerline Conducted Emissions Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
CH. 3	X
CH. 4	

4.2 Radiated Emissions Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
CH. 3	X
CH. 4	

Tested by : Gea Won, Lee

Date : February 12. 1998

5. CONDUCTED AND RADIATED MEASUREMENT PHOTOS

<Conducted Measurement Photos>

"Not applicable"

"Not applicable"

6. FINAL TEST DATA SUMMARY

Per preliminary test, the following normal mode of operations were selected which shown the maximum emissions level.

6.1 Conducted Emissions Test

Humidity Level : ___ % Temperature : ___ ℃

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

Type of Test :

Result : PASSED BY ___ dB

EUT : VIDEO CASSETTE PLAYER Date :

Operating Condition :

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

Power Line Conducted Emissions			FCC CLASS B	
Frequency (㎒)	Amplitude (dB㎶)	conductor	Limit (dB㎶)	Margin (dB)
"There is not need to test this requirement because the power of the EUT was supplied from DC battery"				

Line Conducted Emissions Tabulated Data

Measuring by : Gea Won, Lee / Prj. Engineer

6.2 Radiated Emission Test

The following table shows the highest levels of radiated emissions on both polarization of horizontal and vertical.

Humidity Level : 50 % Temperature : 13℃

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

Type of Test : CLASS B

Result : PASSED BY -11.70dB

EUT : VIDEO CASSETTE PLAYER Date : February 12. 1998

Operating Condition : CH. 3, Playing VITS 1 V_{p-p} recorded tape

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

Distance : 3 Meter

Radiated Emissions		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBμV)	Pol.	Ant. (dBμV)	Cable (dB)	Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)
135.33	8.00	V	12.86	2.90	23.76	43.50	-19.74
200.60	13.70	H	10.44	3.21	27.35	43.50	-16.15
228.80	6.90	H	10.80	3.52	21.22	46.00	-24.78
286.40	4.30	H	12.83	4.04	21.17	46.00	-24.83
315.20	4.30	H	13.67	4.20	22.17	46.00	-23.83
344.00	4.60	H	14.00	4.35	22.95	46.00	-23.05
372.60	4.20	H	14.32	4.49	23.01	46.00	-22.99
547.20	10.80	H	18.02	5.48	34.30	46.00	-11.70

Measuring by : **Gea Won, Lee / Prj. Engineer**

6.3 Output Signal Level Test

The following table shows that the all modes of operation and worst-case emissions were investigated

Humidity Level : 50 % Temperature : 20℃

Limits apply to : FCC CFR 47, PART 15, SUBPART B (Section 15.115)

EUT : VIDEO CASSETTE PLAYER Date : February 12. 1998

Operating Condition : CH. 3 & CH. 4, Playing VITS 1 V_{p-p} recorded tape

Detector : Span : 10 ㎒ SWP : 20 msec

RBW : 100 ㎑ VBW : 300㎑

Output Impedance of RF-Output Terminal : 75Ω

CH	Freq.(㎒)	Reading(dBuV)	M/P Loss(dB)	Signal Level(uV)	Limit(uV)	Margin(dB)
3 (Visual)	61.25	57.4	6.0	1479	3000	-6.1
3 (Aural)	65.75	40.7	6.0	216	671	-9.8
4 (Visual)	67.25	57.4	6.0	1479	3000	-6.1
4 (Aural)	71.75	41.1	6.0	226	671	-9.4

MP = Impedance Matching Pad

*Sample Calculation at 61.25㎒ = $10^{[(57.4+6.0)/20]}$ = 1479 uV

*Margin[dB] = 20 log (R/L) where, R : Corrected Results, [uV] or [uV/m], L : Corresponding Limit, [uV] or [uV/m].

Measuring by : **Gea Won, Lee / Prj. Engineer**

6.4 Output Terminal Conducted Spurious Emissions Test

The following table shows that frequency range of 30㎒ to 1000㎒removed by more than 4.6㎒ below or 7.4㎒ above the video carrier frequency of EUT was investigated at each channel.

Humidity Level : 50 % Temperature : 20℃

Limits apply to : FCC CFR 47, PART 15, SUBPART B (Section 15.115)

EUT : VIDEO CASSETTE PLAYER Date : February 12. 1998

Operating Condition : CH. 3 & CH. 4, Playing VITS 1 V_{p-p} recorded tape

Detector : Span : 10 ㎒ SWP : 20 msec

RBW : 100 ㎑ VBW : 300㎑

Output Impedance of RF-Output Terminal : 75Ω

CH.	Freq. (㎒)	Reading (dBuV)	M/P Loss (dB)	Attn. (dB)	Output Level(uV)	Limit (uV)	Margin (dB)
3	47.8	13.6	6.0	3.0	13.5	95	-16.9
	74.9	14.8			15.5		-15.7
	82.8	27.5			66.8		-3.1
	122.4	14.0			14.1		-16.6
	167.2	17.4			20.9		-13.2
	184.0	14.3			14.6		-16.3
4	53.8	12.7	6.0	3.0	12.2	95	-17.8
	80.8	13.8			13.8		-16.8
	134.5	21.1			32.0		-9.5
	201.6	19.2			25.7		-11.4
	269.1	14.9			15.7		-15.6
	543.2	13.3			13.0		-17.3

* Sample Calculation at 47.8㎒ = $10^{[(13.6 + 6.0 + 3.0)/20]}$ = 13.5 uV

*Margin[dB] = 20 log (R/L) where, R : Corrected Results, [uV] or [uV/m], L : Corresponding Limit, [uV] or [uV/m].

Measuring by : **Gea Won, Lee / Prj. Engineer**

6.5 Transfer Switch Isolation Test

The following table shows that the maximum voltage of video carrier frequency of the EUT at the antenna input(RF-in) terminal of the switch was measured for both channels.

Humidity Level : 50 % Temperature : 20℃

Limits apply to : FCC CFR 47, PART 15, SUBPART B (Section 15.115)

EUT : VIDEO CASSETTE PLAYER Date : February 12. 1998

Operating Condition : CH. 3 & CH. 4, Playing VITS 1 V_{p-p} recorded tape,

Detector : Span : 1 ㎒ SWP : 30 msec

RBW : 10 ㎑ VBW : 30 ㎑

Output Impedance of RF-Output Terminal : 75 Ω

CH.	Freq. (MHz)	Meter Reading (dBuV)	M/P Loss (dB)	PreAmp Gain(dB)	Attn. (dB)	Signal Level (uV)	Limit (uV)	Margin (dB)
3	61.25	10.5	6.0	25.0	3.0	0.5	3.0	-15.6
4	67.25	8.5	6.0	25.0	3.0	0.4	3.0	-17.5

* Sample Calculation at 61.25 MHz = $10^{[(10.5 + 6.0 - 25 + 3.0)/20]}$ = 0.5 uV

*Margin[dB] = 20 log (R/L) where, R : Corrected Results, [uV] or [uV/m], L : Corresponding Limit, [uV] or [uV/m].

Note : To clarify the emissions emanated from RF output terminal the EUT, RF pre-amplifier was utilized.

The gain of pre-amplifier at each frequency measured from the EUT were obtained after sufficient warm-up for stabilization of gain.

Measuring by : **Gea Won, Lee / Prj. Engineer**

7. FIELD STRENGTH CALCULATION

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

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

8. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	825120/006	AUG/97	12MONTH	■
2.	Spectrum analyzer	HP	8568B	3026A0226	AUG/97	12MONTH	■
3.	RF preselector	HP	85685A	3107A01264	AUG/97	12MONTH	■
4.	Quasi-Peak Adapter	HP	85650A	3107A01542	AUG/97	12MONTH	■
5.	Matching Pad	TME	ZT-130	9F 954	N/A	N/A	■
6.	Loop Antenna	EMCO	6502	9108-2668	DEC/96	12MONTH	
7.	Dipole Antenna	EMCO	3121C	9107-745	DEC/96	12MONTH	
8.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	FEB./97	12MONTH	■
9.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	FEB./97	12MONTH	■
10.	LISN	EMCO	3825/2	9109-1867 9109-1869	FEB/97	12MONTH	■
11.	RF Amplifier	HP	8447F	3113A04554	N/A	N/A	■
12.	3dB Attenuator	R/S	DNF	N/A	N/A	N/A	■
13.	Spectrum Analyzer	HP	8591A	3131A02312	APRIL/95	12MONTH	
14.	Computer System Hard disk drive	HP	98581C 9153C	98543A CMC762Z9153	N/A N/A	N/A N/A	■ ■
15.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
16.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
17.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
18.	Turn Table	ROBOTECH			N/A	N/A	
19.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■
20.	Antenna Master	COMPLIANCE DESIGN INC	CD M-100		N/A	N/A	

EXHIBIT 5. PHOTO REPORT

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