VRE4222 Test Report

Test Report No. : 4521-011029D

CERTIFICATE

Issued date	: October 29, 2001		
EUT	: Video Cassette Recorder		
Model No.	: VRE4222	Serial No. : N / A	
FCC ID No.	: BEJ9QKE40210		
Manufacture	: LG ELECTRONICS INC.	Trade name : Zenith	
Applicant& Address	: LG Electronics Inc, 20 Yoido-Dong Youngdungpo-Gu, Seoul, 150-721 Korea		
Regulation	: Subpart B of Part 15, 47 C.F.R; FCC Rules (Docket 87-389)		
Procedure	: MP-3 ; ANSI C63.4		
Test Location	: LG Electronics Digital-media Research Lab. Measurement facility (3 & 10 m site)		

I hereby certify that the measurements shown in Part II of this report were made in accordance with the procedures indicated and energy emitted by this equipment was found to be within the limits applicable.

I further certify that on the basis of the measurements, the equipment tested is capable of operation in accordance with the requirements set forth in Part 15 of the FCC rules & Regulations under normal use and maintenance.

LG Electronics Inc. hereby assumes responsibility for the certification of compliance to applicable FCC limits in every measurements.

ISSUED BY	REVIEWED BY
Daehwan Kim	Taekwang LEE
RESEARCH ENGINEER	TEAM LEADER

LG Electronics Inc.
Pyungtaek Research Lab. Standards Team

19-1, Cheongho-Ri, Jinwuy-Myun, Pyungtaek-Shi, Kyunggi-Do, 451-713, KOREA
Tel.: 82-031-610-5336, FAX: 82-031-610-5355

REPORT FOR A TV INTERFACE DEVICE

Scope – Measurement and determination of electromagnetic emission (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

RF MODULATOR

Manufacturer 1 : LG Innotek Co., Ltd.
Model No. : TADC-H202F
Manufacturer 2 : LG Innotek Co., Ltd.
Model No. : TADC-H302F
Manufacturer 3 : Sanyo Tuner Industries Co., Ltd.
Model No. : 115-V-D025AN
Manufacturer 4 : Sanyo Tuner Industries Co., Ltd.
Model No. : 115-V-D025AH

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PART I

INTRODUCTION

1. GENERAL INFORMATION

1.1 DESCRIPTIONS OF EQUIPMENT UNDER TEST(EUT)

1.1.1 Manufacture	LG ELECTRONICS INC.; 19-1, CHEONGHO-RI JINWUY-MYUN,PYUNGTAEK-SHI,KYUNGGI-DO 451-713, KOREA
1.1.2 Applicant	LG ELECTRONICS INC.; 20, YOIDO-DONG YOUNGDUNGPO-GU, SEOUL, 150-721, KOREA
1.1.3 MODEL Name	VRE4222
1.1.4 SERIAL NO	NOT ATTACHED
1.1.5 TRADE NAME	Zenith
1.1.6 FCC ID NO	BEJ9QKE40210

1.1.7 DESCRIPTIONS

a) Product Type	Video Cassette Recorder
b) RF Output Channel	Channel 3 and 4
c) RF IN/OUT Terminal Impedance	75 ohms (Unbalance F-type coaxial)
d) Number of RF IN/OUT terminal	1EA at each
e) Terminal for signal	Video/Audio in/out with RCA-type jacks
f) Power Supply	AC120V , 60Hz

1.1.8 Accessories connected to the EUT

a) Video Coaxial cable for RF-OUT terminal provided by manufacture

b) Video/Audio cables

1.2 Regulations applied to the EUT .. FCC Part 15.115

1.3 Measurement Procedure ….MP-3 : ANSIC 63.4

1.4 Measurement site description

- Location of measurement facility

  LG Electronics Inc : Pyungtaek plant

  Digital-Media Standards Team

  19-1, Cheongho-Ri,Jinwuy-Myun,Pyungtak - Shi, 451-713 Korea

Note;

The detailed description of measuring facility was found to be in compliance With Federal Communications Commission requirements of 2.948 according to ANSI C63.4 on June 29, 2000 (Registration No. ; 90759)

2. GENERAL TEST CONDITIONS

The test data contained in this report was obtained by use of the measurement method recommended in FCC Rules, 47 C.F.R. 15.31(a)(3), with equipment and at the test site filed by the Federal Communications Commission (FCC). The technical standard for a TV interface device are set forth in Subpart B of Part 15 of FCC Rules and regulation. The measurement for Radiated Emissions, Power 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.

2. 1 OPERATING CONDITIONS OF THE EUT

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, VRE4222 has either a video/audio output terminal in RCA-type plugs and antenna input terminal. Therefore, every measurement was investigated in the operation modes, 1)Playing VITS 1Vp-p recorded tape, 2) Recording 1 &5 Vp-p VITS signal supplied through the video input terminal, 3) Recording NTSC TV signal supplied through the at antenna input terminal at each Ch. 3 or/and 4 for each mode applicable.

2. 2 STABILIZATION OF EUT OPERATION

The EUT was operated for sufficient minutes before testing to make it stabilized in a normal operating condition. The power supplied to the EUT was filtered to meet the requirements.

2. 3 TEMPERATURE

Measurement procedure recommended by FCC requires the test to be performed at the site with ambient temperature within 10 to 40 degrees centigrade (50 to 104 F). The specification for operating temperature of EUT is from 5 to 35 degrees centigrade (41 to 95 F) as described in owner's manual. The measurement data in this report was obtained at the temperature in the range of 15 ~ 20 degrees centigrade.

3. TEST SITE

3. 1 OPEN AREA TEST SITE

Measurement of radiated emissions from EUT was made at open area test site, a description of which has been submitted to the FCC pursuant to Part 15 of 47 C.F.R., 2.948.

3 .2 A SHIELDED ENCLOSURE.

All other measurements, including power line conducted emissions, output signal levels, and transfer switch isolation, and transfer switch isolation were made in a shielded enclosure providing sufficient shielding effectiveness.

4. MEASURING INSTRUMENTATIONS AND CALIBRATIONS.

Measurements of output signal level, output terminal conducted spurious emissions, and transfer switch isolation (if applicable) were made with instruments calibrated according to the recommendation by manufacturer. Measurement of radiated emissions and power line conducted emissions were made with instruments conforming to American National Standard Specification, ANSI C63.4 (1992). The calibration of measuring instrument, including any accessories that may affect test results, was performed according to the recommendation by manufactures.

5. DESCRIPTION OF TEST CONDITION.

5.1 POWERLINE CONDUCTED EMISSION MEASUREMENT.

5 .1. 1 SHIELDED ENCLOSURE.

The measurement for power-line emissions from EUT was made in shielded enclosure which provides sufficient shielding effectiveness enough not to affect test results.

5. 1. 2 DETECTOR FUNCTION SELECTION AND BANDWIDTH.

During conducted emission measurement, a radio noise meter (ESH-3, Rohde & Schwarz) that has a CISPR quasi-peak detector with 9 KHz IF bandwidth of 6 dB was utilized.

5.1.3 FREQUENCY RANGE TO BE SCANNED.

For conducted emissions measurement, frequency range of 450 KHz to 30 MHz, included, was investigated.

5.1.4 UNIT OF MEASUREMENT.

Test results for conducted emissions are reported in micro-volts.

5. 1. 5 LINE IMPEDANCE STABILIZATION NETWORK

A LISN with characteristics that conform to the requirements of Part 15 of FCC Rules was used for the measurement of conducted power-line radio noise; (50 micro-henries /50 ohms). Chassis and earth-points for grounding of the LISN were earth-grounded.

5.1.6 TEST CONDITIONS AND CONFIGURATION OF THE EUT.

The EUT was configured and operated in all modes of operation so as to find the maximum emanation of emissions from EUT.

The EUT has designed to use the public AC lines with rated AC voltage as specified in Owner 's Manual of EUT and filtered to meet the requirement. AC power was supplied to the EUT through LISN with characteristics described in 5.1.5 of part I of this report.

The EUT was placed on a 1m *1.5m * 80Cm high of wooden table which is place on the earth-grounded conducting surface larger than 2 square-meter. The vertical conducting surface was located 40Cm to the EUT. Length of the power lead in excess of 80 Cm horizontally separating the EUT from LISN was folded back-and-forth form at the center of the power cord not exceeding 40 Cm in length.

Each type of accessory provided by manufacturer or typically used and support equipment were connected to the EUT during measurement to the typical usage and applicable as nearly as practicable.

5.2 RADIATED EMISSIONS MEASUREMENT..

5.2.1 TEST SITE.

Preliminary measurements were performed in the anechoic chamber to determine the emissions characteristics of the EUT. Final measurements were made in outdoors as described at 3.1 of Part I in this report.

5. 2. 2 DETECTOR FUNCTION SELECTION AND BANDWIDTH.

In radiated emissions measurement, a field strength meter (ESVP, Rohde & Schwarz) that has a CISPR quasi-peak detector was used. The 6dB bandwidth of the detector of instrument is 120 KHz over frequency range of 30 to 1000 MHz. Emissions to be scanned above 1000 MHz may be detected in peak mode.

5. 2. 3 UNIT OF MEASUREMENT.

Test results of radiated emissions measurement are reported in micro-volts per meter at the specific distance. Using the unit of dBuV on the test instrument, the indication unit was converted to field strength unit of uV/m as following method;

$$F(uV/m) = 10^{(R+CL+AF)/20} \ (dBuV/m)$$

here, F : Field Strength in uV/m
R : Meter Reading Level in dBuV,
CL : Cable Loss from antenna to meter in dB,
AF : Antenna Factor of receiving antenna in dB(/m)

5. 2. 4 ANTENNAS.

Measurements were made using calibrated half-wave tuned Bi-log antenna in range of 30 to 1000 MHz that are correctable to levels obtained with a tuned dipole antenna.
For emissions above 1000MHz, horn antenna may be used.
Measurements were also made for both horizontal and vertical polarization.

The horizontal distance between the receiving antenna and the closest periphery of the EUT was 3 meters as described in 8.2.3 of ANSI C63.4-1992.

5. 2. 5 FREQUENCY RANGE TO BE SCANNED.

For radiated emissions measurements, the spectrum in the range of 30 to 1000 MHz and above, if found, was investigated. The measurement for power-line emissions from EUT was made in shielded enclosure which provides

5. 2. 6 TEST CONDITIONS AND CONFIGURATION OF EUT.

The EUT was configured and operated in all modes of operation so as to find the maximum emanation of emissions from EUT.

The power was furnished with rated (normal) AC 120 volts, as specified in the Owner's Manual of EUT. The EUT was placed on the 80 Cm high of non-metallic table(1 *1.5 meter). The turn table containing the system was rotated and the antenna height was varied 1~4 m to find the maximum emanation of emissions from EUT.

Each type of accessory provided by manufacturer or typically used and support equipment were connected to the EUT during measurement to the typical usage and applicable as nearly as practicable.

5. 3 OUTPUT SIGNAL MEASUREMENT.

During measurements for output signal levels as the RF-out terminal, a spectrum analyzer was used with characteristics described at 4 and 9.3 of part I in this report.

5. 3. 1 OUTPUT SIGNAL LEVEL MEASUREMENT.

RF-out terminal of EUT is designed to feed modulated signals to a TV broadcast receiver via coaxial cable with 75 ohm of rated output impedance.

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 50 ohm input impedance via 75-to-50 ohm matching pad. Indicated voltage on screen of measuring instrument was converted to the voltage of 75 ohm system.

- Data conversion method.

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

here,: V_{75} : Voltage at the RF-out terminal of 75 ohm in uV
Vr : Voltage read at analyzer with 50 ohm input-impedance in dBuV
CF : Conversion Factor of the matching pad in dB.

5.3.2 OUTPUT TERMINAL CONDUCTED SPURIOUS EMISSION MEASUREMENT.

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

To clarify the emissions emanated from RF output terminal of the EUT, RF pre-amplifier was utilized. The gain of pre-amplifier at each frequency measured from EUT were obtained after sufficient warm-up for stabilization of gain.

* Data conversion method.

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

Where, V_{75} : Voltage at the RF-out terminal of 75 ohm in uV,
Vr : Voltage read at analyzer with 50 ohm input-impedance in dBuV
CF : Conversion Factor of the matching pad in dB,.
PG : Gain of pre-amplifier in dB,
AT : Attenuation of attenuator in dB.

5. 4 TRANSFER SWITCH ISOLATION MEASUREMENT.

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.

To clarify the emissions emanated from RF output terminal of the EUT, RF pre-amplifier was utilized. The gain of pre-amplifier at each frequency measured from EUT were obtained after sufficient warm-up for stabilization of gain.

* DATA CONVERSION METHOD.

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

where, V_{75} : Voltage at the RF-out terminal of 75 ohm in uV
Vr : Voltage read at analyzer with 50 ohm input-impedance in dBuV
CF : Conversion Factor of the matching pad in dB,.
PG : Gain of pre-amplifier in dB,
AT : Attenuation of attenuator in dB.

6. MEASURING INSTRUMENTS AND SET-UP.

6. 1 POWERLINE CONDUCTED EMISSIONS.

6. 1. 1 Radio Noise Meter.

Rohde & Schwarz, Model ESH-3{ 9 KHz to 30 MHz }

Detector function : CISPR Quasi-Peak
IF Bandwidth : 9 KHz

6. 1. 2 Line Impedance Stabilization Network (LISN).

Kyoritsu, Model KNW-407
Impedance Characteristic : 50 uH / 50 ohm

6. 2 RADIATED EMISSIONS.

6 2. 1 Field Strength Meter.

Rohde & Schwarz, Model ESVP { 20 MHz to 1300 MHz }
ESMI { 20 Hz to 26.5 GHz }

Detector function : CISPR Quasi-Peak
IF Bandwidth : 120 KHz

6. 2. 2 Receiving Antennas.

a) Chase, Model CBL611A : Bilog antenna { 30 to 1000 MHz }
b) Schwarzbeck, Model BBA9102-B : Horn antenna { 1 GHz to 9.5 GHz }

6 . 3 OUTPUT SIGNAL MEASUREMENTS.

6. 3. 1 Spectrum Analyzer.

Hewlett-Packard, Model HP8568B
Span : 10 MHz SWP : 20 msec.
RBW : 100 KHz VBW : 300 KHz

6 . 3 . 2 RF Pre-amplifier.

Hewlett-Packard, Model HP8447F : 25 dB (typical gain)

6 . 3 . 3 Impedance matching pad.

Rohde & Schwarz, Model RAM : 7.5 dB loss , from 75 ohm to 50 ohm

6 . 3 . 4 Attenuator.

Rohde & Schwarz, Model DNF (N type) : 3 dB attenuation

6 . 4 TRANSFER SWITCH ISOLATION MEASUREMENTS.

6 . 4 . 1 Spectrum Analyzer.

Hewlett-Packard, Model HP8568B

Span : 1 MHz SWP : 30 msec.

RBW : 10 KHz VBW : 30 KHz

6 . 4 . 2 RF Pre-amplifier.

Hewlett-Packard, Model HP8447F : About 25 dB

6 . 4 . 3 Impedance matching pad.

Rohde & Schwarz, Model RAM : 7.5 dB loss , from 75 ohm to 50 ohm

6 . 4 . 4 Attenuator.

Rohde & Schwarz, Model DNF (N type) : 3 dB attenuation

6 . 5 VITS SIGNAL GENERATOR ; COMMONLY USED.

Anritsu, Model MG-318A : VITS 1 Vp-p, 5 Vp-p Generator.

[NOTE] 1) The list of instruments and accessories used the measurements are attached at the end of the report, Appendix A and B

2) In every test results, the margins against the limits are shown.
The margins are calculated as following;

$$MARGIN[dB] = 20\log(R/L)$$

where, R : Corrected Results, [uV] or [uV/m],
L : Corresponding Limit, [uV] or [uV/m]

3) The tight limit is applied at the edge of two frequency band.

Part II

TEST DATA

1.POWER LINE CONDUCTED EMISSIONS (*15.107)

PRODUCT : Video Cassette Recorder
MODEL Name : VRE4222
Modulator Maker : LG Innotek Co., Ltd. / Sanyo Tuner Industries Co., Ltd.
Modulator type : TADC-H202F / TADC-H302F / 115-V-D025AN / 115-V-D025AH
TEST DATE : Oct. 23th 2001

1.1) LG IT Modulator(TADC-H202F) Data;

Frequency (MHz)	*Reading [dBuV]*	*RF Voltage [uV]*	*Phase (A/B)*	*Limit [uV]*	*Margin [dB] Q-peak*
0.740	35.2	57.5	B	250.0	-12.8
0.940	34.8	55.0	A	250.0	-13.2
2.390	41.2	114.8	B	250.0	-6.8
2.460	40.8	109.6	A	250.0	-7.2
23.500	27.4	23.4	B	250.0	-20.6
28.600	37.3	73.3	A	250.0	-10.7

*** Sample Calculation at 0.74MHz = $10^{(35.2/20)}$ = 57.5 uV**

NOTES:

1. ***All modes of operation were investigated. The RF modulator was switched to Channel 3 or 4 and worst-case emissions are reported***
2. ***All other emissions are non-significant.***
3. ***Phase A = Hot Phase B = Neutral***

1.2) LG IT Modulator(TADC-H302F) Data;

Frequency (MHz)	*Reading [dBuV]*	*RF Voltage [uV]*	*Phase (A/B)*	*Limit [uV]*	*Margin [dB] Q-peak*
0.460	32.8	43.7	A	250.0	-15.2
2.240	34.4	52.5	B	250.0	-13.6
10.880	28.3	26.0	B	250.0	-19.7
18.670	35.6	60.3	B	250.0	-12.4
28.640	35.4	58.9	A	250.0	-12.6

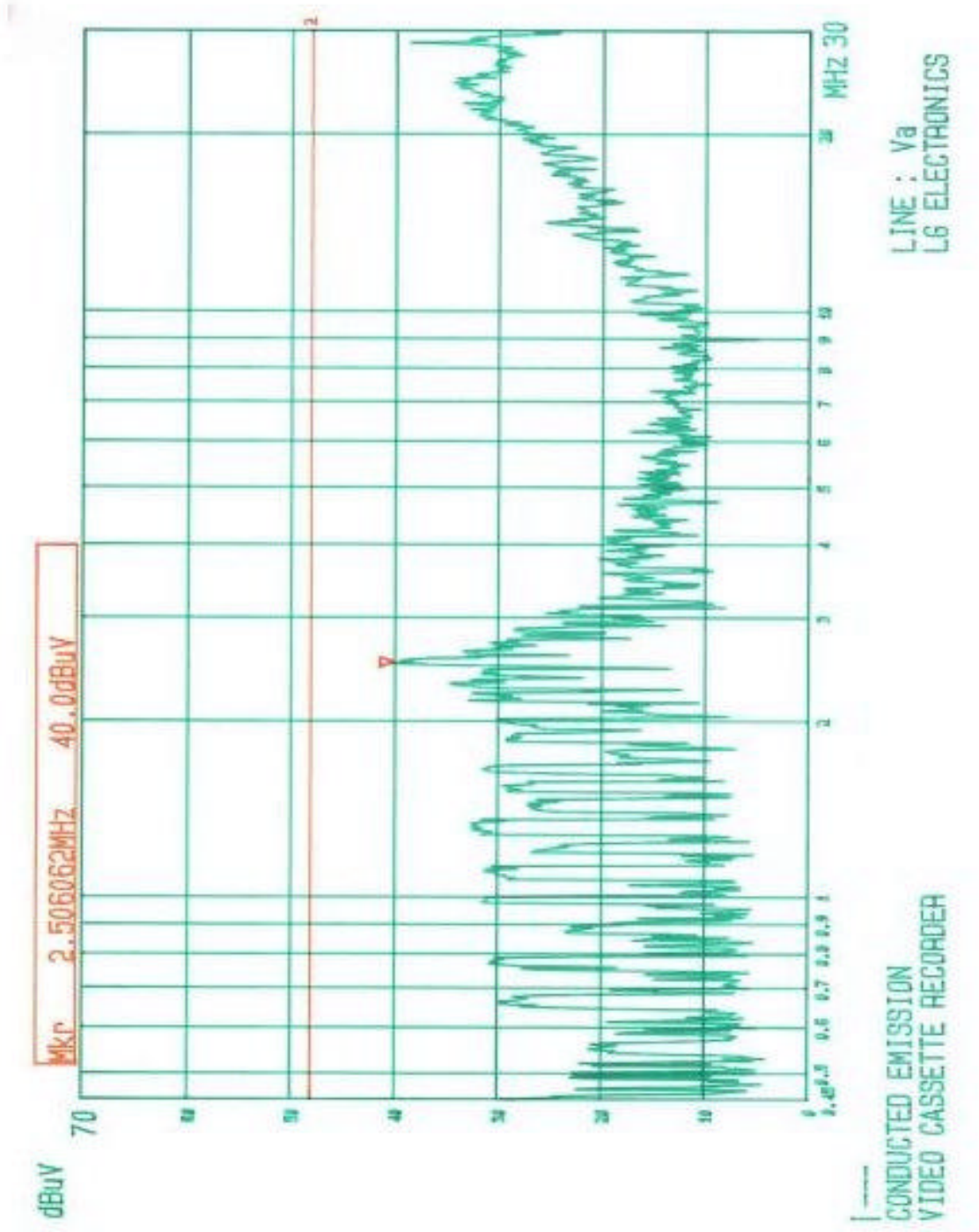
1.3) SANYO Modulator (115-V-D025AN) Data ;

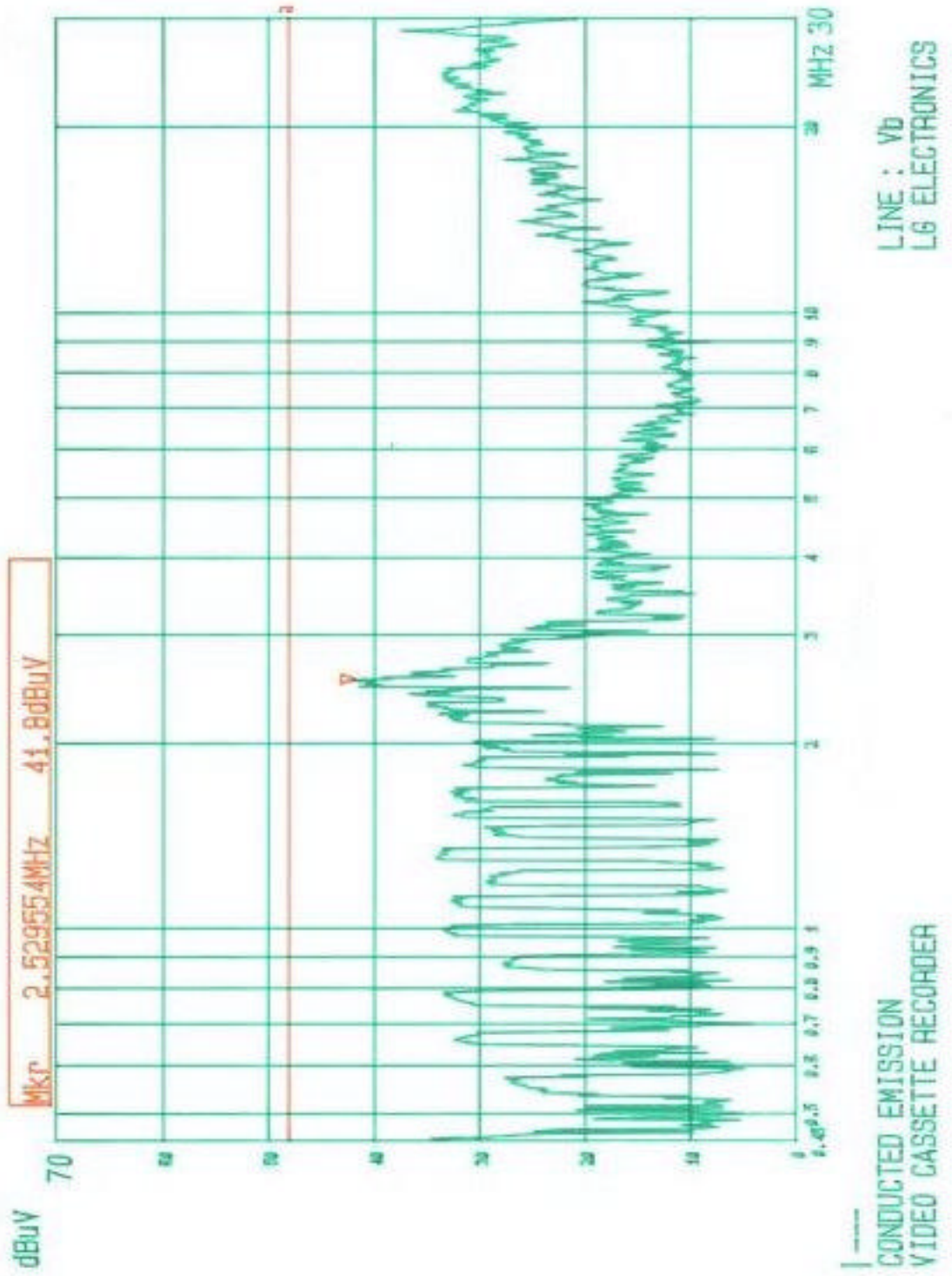
Frequency (MHz)	*Reading [dBuV]*	*RF Voltage [uV]*	*Phase (A/B)*	*Limit [uV]*	*Margin [dB] Q-peak*
0.460	34.1	50.7	B	250.0	-13.9
2.180	35.7	61.0	B	250.0	-12.3
3.910	29.8	30.9	B	250.0	-18.2
18.660	35.9	62.4	B	250.0	-12.1
28.640	35.4	58.9	A	250.0	-12.6

1.4) SANYO Modulator (115-V-D025AH) Data ;

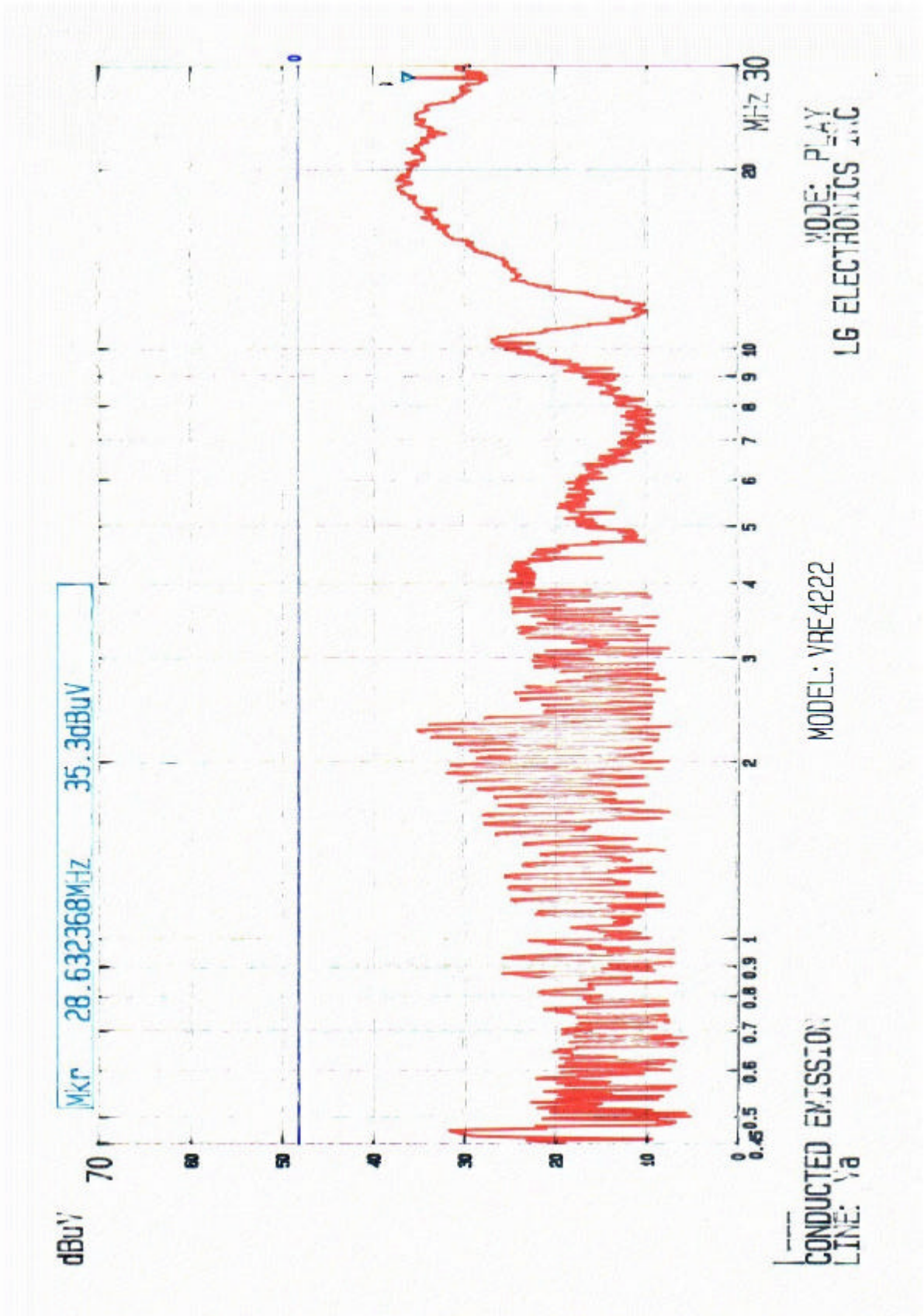
Frequency (MHz)	*Reading [dBuV]*	*RF Voltage [uV]*	*Phase (A/B)*	*Limit [uV]*	*Margin [dB] Q-peak*
0.460	34.1	50.7	B	250.0	-13.9
2.180	35.7	61.0	B	250.0	-12.3
3.910	29.8	30.9	B	250.0	-18.2
18.660	35.9	62.4	B	250.0	-12.1
28.640	35.4	58.9	A	250.0	-12.6

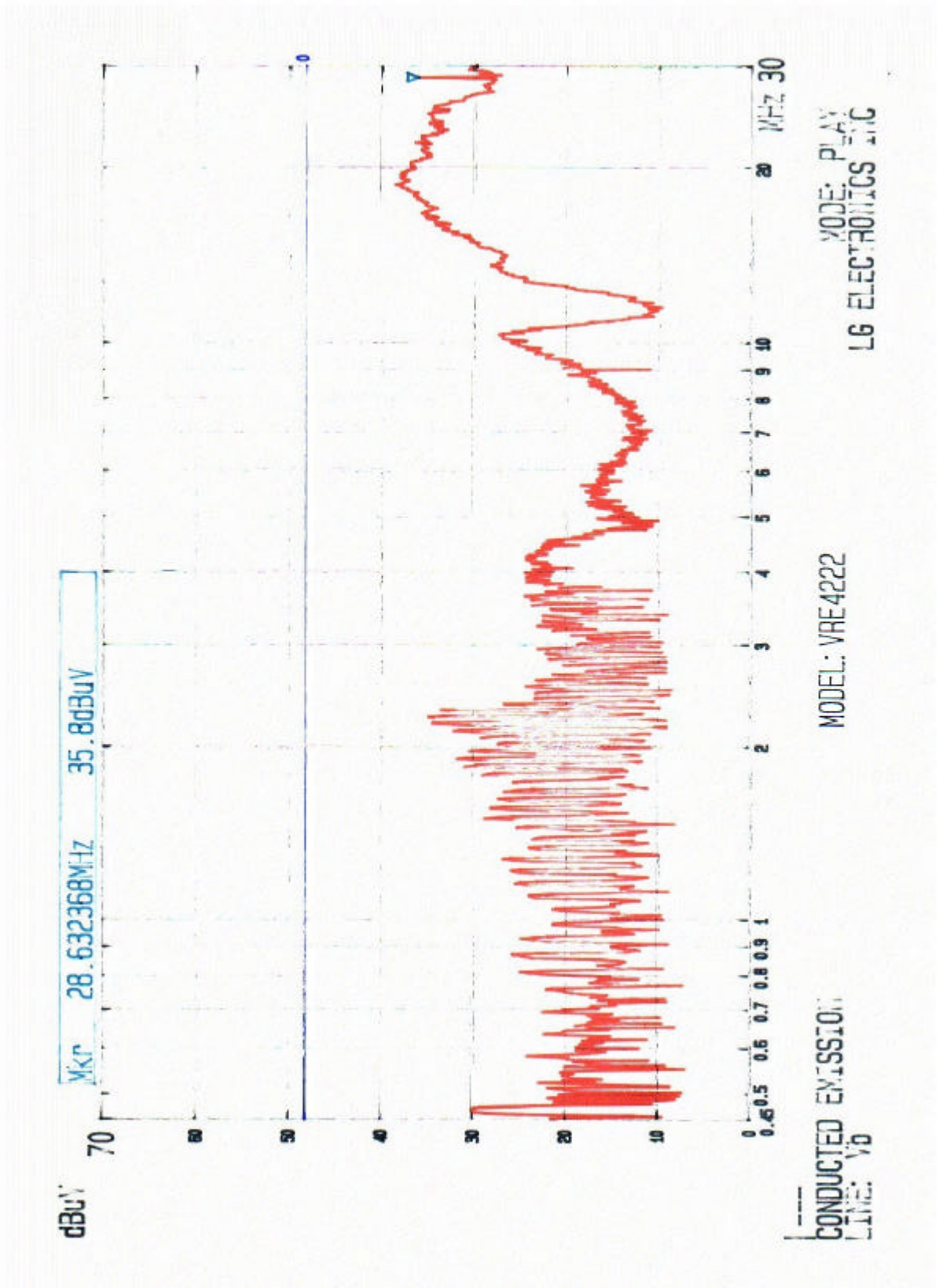
1.5) LG IT Modulator(TADC-H202F) Data;



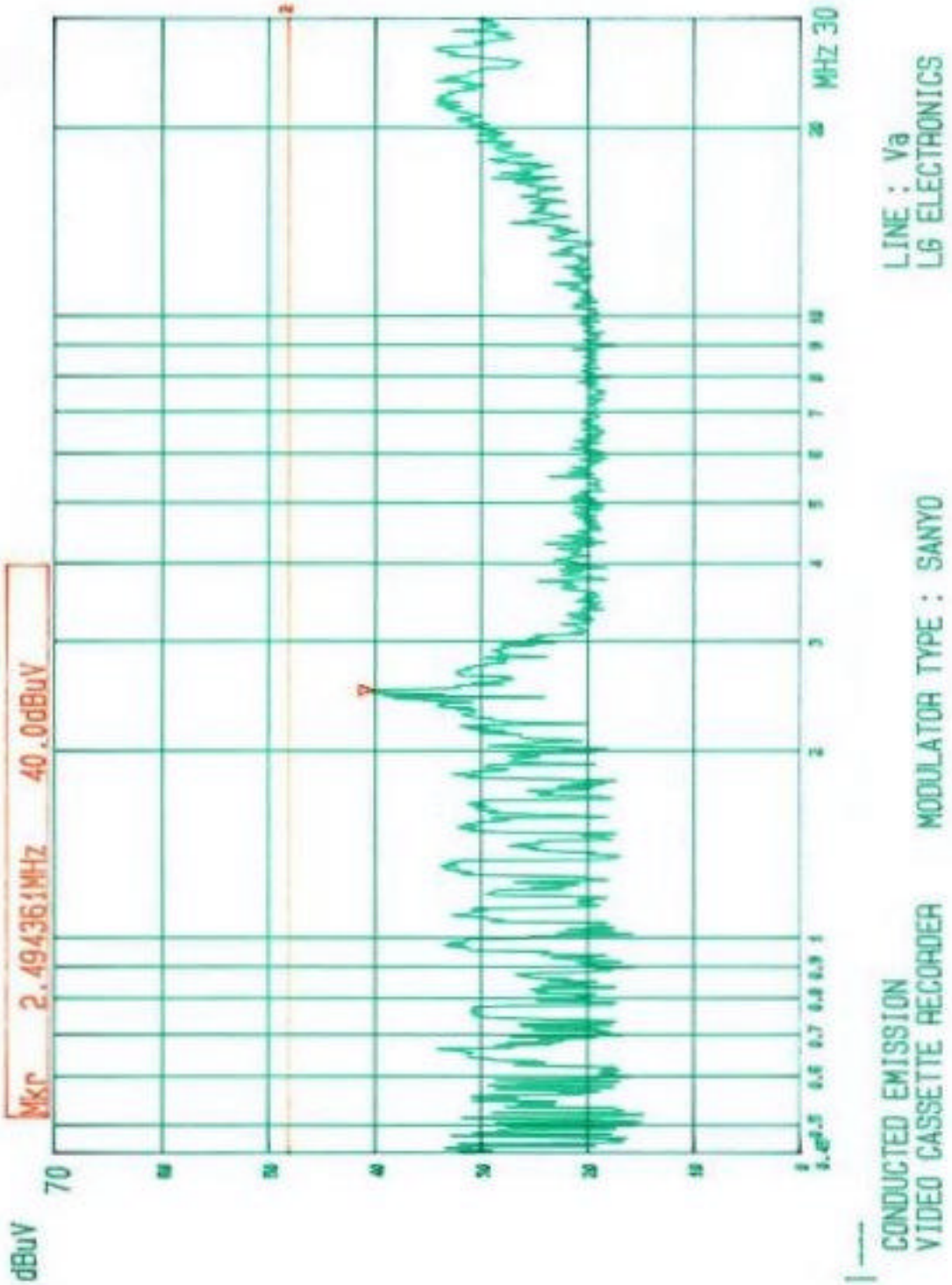

dBuV
70
Mkr 2.529554MHz 41.8dBuV
MHz 30
LINE : Vb
LG ELECTRONICS
CONDUCTED EMISSION
VIDEO CASSETTE RECORDER

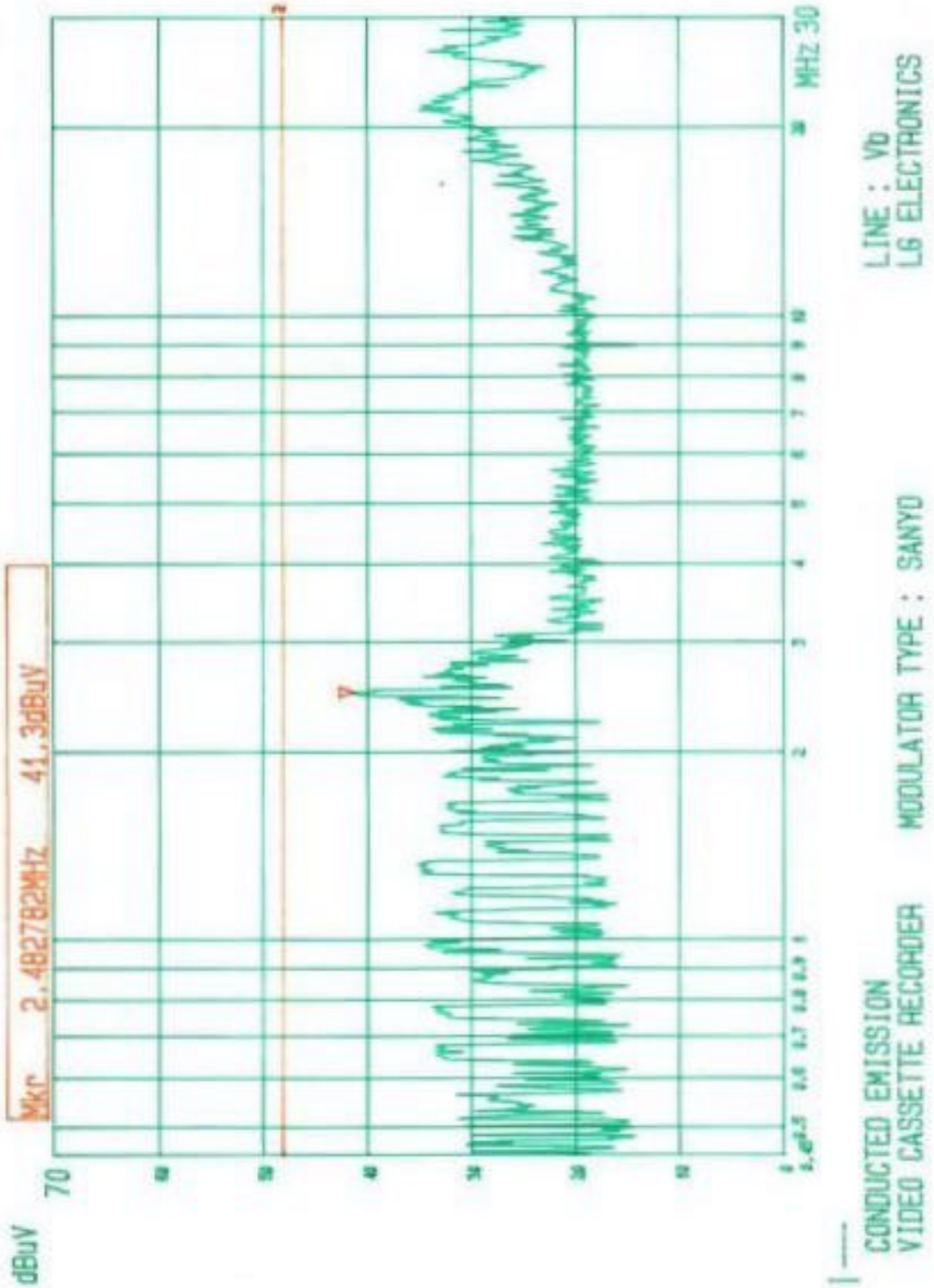
1.6) LG IT Modulator(TADC-H302F) Data;



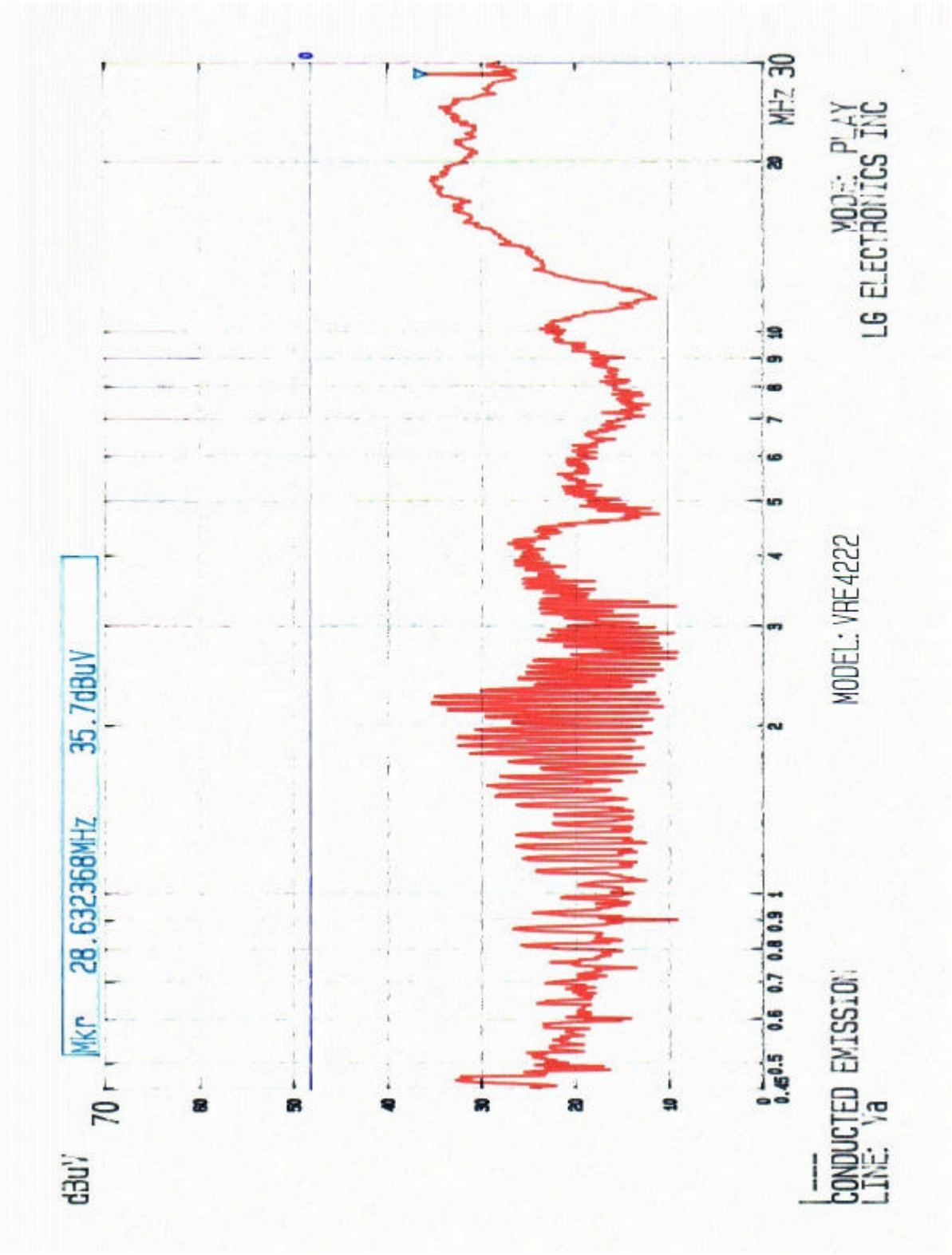

dBuV
70
60
50
40
30
20
10
0
Mkr 28.632368MHz 35.8dBuV
0.5 0.6 0.7 0.8 0.9 1 2 3 4 5 6 7 8 9 10 20 30
MHz
MODEL: VRE4222
LG ELECTRONICS INC
CONDUCTED EMISSION

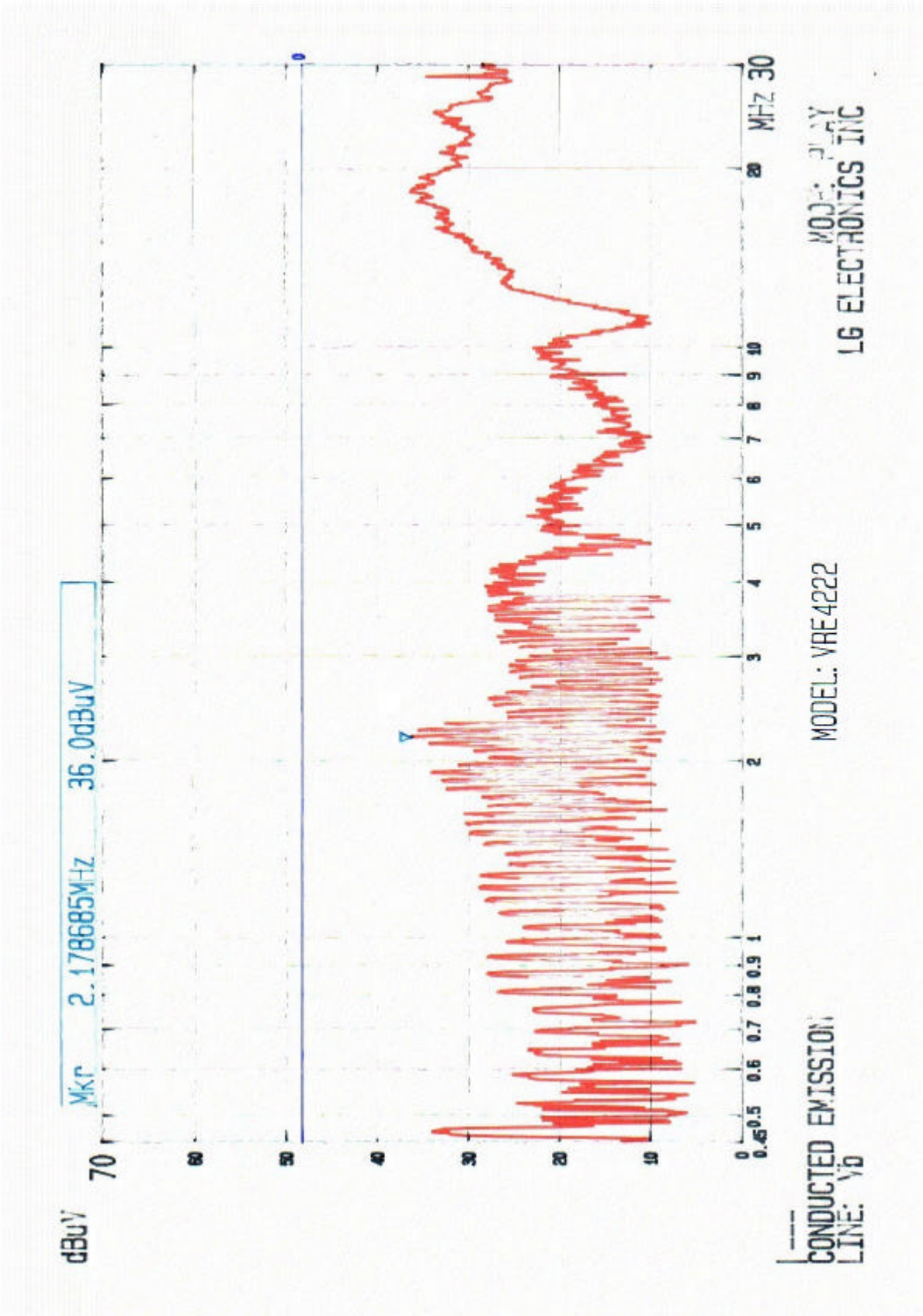
1.7) SANYO Modulator(115-V-D025AN) Data ;




dBuV
70
Mkr 2.482782MHz 41.3dBuV
MHz 30
LINE : Vo
LG ELECTRONICS
MODULATOR TYPE : SANYO
CONDUCTED EMISSION
VIDEO CASSETTE RECORDER

1.8) SANYO Modulator(115-V-D025AH) Data ;




dBuV
70
Mkr 2.178685MHz 36.0dBuV
60
50
40
30
20
10
0
0.45 0.5 0.6 0.7 0.8 0.9 1 2 3 4 5 6 7 8 9 10 20 30 MHz
MODEL: VRE4222
LG ELECTRONICS INC
CONDUCTED EMISSION
LINE: VD

2.RADIATED EMISSIONS (*15.109)

PRODUCT : Video Cassette Recorder
MODEL Name : VRE4222
Modulator Maker : LG Innotek Co., Ltd. / Sanyo Tuner Industries Co., Ltd.
Modulator type : TADC-H202F / TADC-H302F / 115-V-D025AN / 115-V-D025AH
TEST DATE : Oct. 24th, 2001

2.1) LG IT Modulator(TADC-H202F) Data ;

FREQ. [MHz]	*Reading [dBuV]*	*AF [dB/m]*	*CL [dB]*	*Pol. (Hor / Ver)*	*F/S [uV/m]*	*Limit [uV/m]*	*Margin [dB]*
57.2	24.8	6.20	1.56	*Ver*	42.5	100	-7.4
71.5	27.3	6.60	1.30	*Ver*	57.5	100	-4.8
78.7	25.9	6.70	1.31	*Hor*	49.6	100	-6.1
86.1	21.0	7.80	1.42	*Ver*	32.4	100	-9.8
100.2	20.0	10.20	1.51	*Ver*	38.5	150	-11.8
121.7	19.9	12.10	1.65	*Hor*	48.1	150	-9.9
229.0	28.2	10.20	2.30	*Hor*	108.4	200	-5.3
343.6	15.3	14.70	2.83	*Hor*	43.8	200	-13.2

* Sample Calculation at 57.2 MHz = $10^{[(24.8+6.2+1.56)/20]}$ = 42.5 uV/m

NOTES:

1. ***All modes of operation were investigated. The RF modulator was switched to Channel 3 or 4 and worst-case emissions are reported.***
2. ***All other emissions are non-significant.***
3. ***AF = Antenna factor CL = Cable loss F/S = Field Strength***

2.2) LG IT Modulator(TADC-H302F) Data ;

FREQ. [MHz]	*Reading [dBuV]*	*AF [dB/m]*	*CL [dB]*	*Pol. (Hor / Ver)*	*F/S [uV/m]*	*Limit [uV/m]*	*Margin [dB]*
93.06	26.52	8.8	1.48	*Ver*	69.2	150	-6.7
114.54	22.98	11.8	1.62	*Ver*	66.1	150	-7.1
164.65	23.18	10.7	1.92	*Ver*	61.7	150	-7.7
211.19	26.4	9.4	2.2	*Ver*	79.4	150	-5.5
344.3	14.47	14.6	2.83	*Hor*	39.4	200	-14.1

2.3) SANYO Modulator(115-V-D025AN) Data ;

FREQ. [MHz]	*Reading [dBuV]*	*AF [dB/m]*	*CL [dB]*	*Pol. (Hor / Ver)*	*F/S [uV/m]*	*Limit [uV/m]*	*Margin [dB]*
57.2	24.9	6.20	1.56	*Ver*	43.0	100	-7.3
71.5	27.0	6.60	1.30	*Ver*	55.6	100	-5.1
78.7	26.0	6.70	1.31	*Hor*	50.2	100	-6.0
87.0	22.0	8.00	1.43	*Ver*	37.3	100	-8.6
100.2	21.1	10.20	1.51	*Ver*	43.7	150	-10.7
121.7	19.9	12.10	1.65	*Hor*	48.1	150	-9.9
229.0	28.0	10.20	2.30	*Hor*	105.9	200	-5.5
343.6	15.5	14.70	2.83	*Hor*	44.8	200	-13.0

2.4) SANYO Modulator(115-V-D025AH) Data ;

FREQ. [MHz]	*Reading [dBuV]*	*AF [dB/m]*	*CL [dB]*	*Pol. (Hor / Ver)*	*F/S [uV/m]*	*Limit [uV/m]*	*Margin [dB]*
71.59	26.44	6.4	1.26	*Hor*	50.7	100	-5.9
100.23	24.69	10.2	1.51	*Ver*	66.1	150	-7.1
193.3	25.73	9.1	2.37	*Hor*	72.4	150	-6.3
211.19	26.19	9.5	2.21	*Ver*	78.5	150	-5.6
344.3	18.13	14.8	2.84	*Hor*	61.4	200	-10.3

3.OUTPUT TERMINAL SIGNAL LEVEL (*15.115)

PRODUCT : Video Cassette Recorder
MODEL Name : VRE4222
Modulator Maker : LG Innotek Co., Ltd. / Sanyo Tuner Industries Co., Ltd.
Modulator type : TADC-H202F / TADC-H302F / 115-V-D025AN / 115-V-D025AH
TEST DATE : Oct. 25th 2001

3.1) LGIT Modulator(TADC-H202F) Data;

CH	*Frequency (MHz)*	*Reading [dBuV]*	*M/P Loss (dB)*	*RF Voltage [uV]*	*Limit [uV]*	*Margin [dB] Q-peak*
3 (Visual)	61.23	57.90	7.5	1862.09	3000	-4.1
3 (Aural)	65.80	45.10		426.58	671	-3.9
4 (Visual)	67.20	58.00	7.5	1883.65	3000	-4.0
4 (Aural)	71.80	44.80		412.10	671	-4.2

*** Sample Calculation at 61.23 MHz = $10^{[(57.9+7.5)/20]}$ = 1862.09 uV**

NOTES:

1. All modes of operation were investigated and worst-case emissions are reported.

2. Output Impedance of RF-Output Terminal : 75 ohm

3. MP = Impedance Matching Pad

3.2) LGIT Modulator(TADC-H302F) Data;

CH	*Frequency (MHz)*	*Reading [dBuV]*	*M/P Loss (dB)*	*RF Voltage [uV]*	*Limit [uV]*	*Margin [dB] Q-peak*
3 (Visual)	61.28	60.22	7.5	2432.20	3000	-1.8
3 (Aural)	65.83	45.70		457.09	671	-3.3
4 (Visual)	67.28	59.78	7.5	2312.06	3000	-2.3
4 (Aural)	71.81	45.42		442.59	671	-3.6

3.3) Sanyo Modulator (115-V-D025AN) Data;

CH	*Frequency (MHz)*	*Reading [dBuV]*	*M/P Loss (dB)*	*RF Voltage [uV]*	*Limit [uV]*	*Margin [dB] Q-peak*
3 (Visual)	61.23	59.60	7.5	2264.64	3000	-2.4
3 (Aural)	65.78	44.20		384.59	671	-4.8
4 (Visual)	67.23	59.00	7.5	2113.49	3000	-3.0
4 (Aural)	71.80	43.60		358.92	671	-5.4

3.4) Sanyo Modulator (115-V-D025AH) Data;

CH	*Frequency (MHz)*	*Reading [dBuV]*	*M/P Loss (dB)*	*RF Voltage [uV]*	*Limit [uV]*	*Margin [dB] Q-peak*
3 (Visual)	61.28	59.88	7.5	2338.84	3000	-2.2
3 (Aural)	65.83	45.45		444.12	671	-3.6
4 (Visual)	67.28	59.51	7.5	2241.30	3000	-2.5
4 (Aural)	71.81	45.17		430.03	671	-3.9

4. OUTPUT TERMINAL CONDUCTED SPURIOUS EMISSIONS

PRODUCT : Video Cassette Recorder
MODEL Name : VRE4222
Modulator Maker : LG Innotek Co., Ltd. / Sanyo Tuner Industries Co., Ltd.
Modulator type : TADC-H202F / TADC-H302F / 115-V-D025AN / 115-V-D025AH
TEST DATE : Oct. 25th 2001

4.1) LGIT Modulator(TADC-H202F) Data ;

CH	*Frequency (MHz)*	*Reading [dBuV]*	*M/P Loss [dB]*	*PreAmp Gain [dB]*	*Attn. [dB]*	*Output Level [uV]*	*Limit [uV]*	*Margin [dB]*
3	129.4	27.4	7.5	27.3	3.0	3.4	95	-29.0
	570.8	27.4		25.2		4.3		-26.9
	672.6	29.0		27.1		4.2		-27.2
	752.7	28.3		28.3		3.3		-29.1
	847.2	36.4		27.7		9.1		-20.4
	912.7	27.7		28.6		3.0		-30.0
4	425.8	26.7	7.5	27.7	3.0	3.0	95	-30.1
	444.2	27.5		27.7		3.3		-29.3
	461.7	28.9		25.6		4.9		-25.8
	546.5	28.1		29.2		3.0		-30.2
	704.2	27.6		27.7		3.3		-29.2
	847.2	32.8		27.7		6.0		-24.0

*** Sample Calculation at 129.4 MHz = $10^{[(27.4+7.5-27.3+3.0)/20]}$ = 3.4 uV**

NOTES:

1. ***Frequency range of 30 MHz to 1000 MHz removed by more than 4.6 MHz below or 7.4 MHz above the video carrier frequency of EUT was investigated at each channel.***
2. ***All other emissions are not significant.***

4.2) LGIT Modulator(TADC-H302F) Data ;

CH	Frequency (MHz)	Reading [dBuV]	M/P Loss [dB]	PreAmp Gain [dB]	Attn. [dB]	Output Level [uV]	Limit [uV]	Margin [dB]
3	127.0	31.7	7.5	27.5	3.0	5.4	95	-24.9
	413.2	36.4		25.3		12.0		-18.0
	641.1	33.2		27.4		6.5		-23.3
	825.4	37.6		26.1		12.6		-17.6
4	141.6	30.0	7.5	25.6	3.0	5.6	95	-24.7
	413.2	36.0		25.3		11.5		-18.3
	650.0	32.3		27.7		5.7		-24.5
	825.4	39.4		26.1		15.5		-15.8

4.3) Sanyo Modulator (115-V-D025AN) Data ;

CH	Frequency (MHz)	Reading [dBuV]	M/P Loss [dB]	PreAmp Gain [dB]	Attn. [dB]	Output Level [uV]	Limit [uV]	Margin [dB]
3	97.9	30.2	7.5	26.6	3.0	5.1	95	-25.5
	190.1	29.4		26.9		4.5		-26.6
	221.6	26.1		26.0		3.4		-29.0
	502.9	28.4		27.7		3.6		-28.4
	650.8	28.5		27.7		3.7		-28.3
	786.6	28.1		26.5		4.0		-27.5
4	141.6	28.2	7.5	25.6	3.0	4.5	95	-26.5
	207.0	30.8		24.6		6.8		-22.9
	240.5	25.7		27.0		2.9		-30.4
	580.5	28.0		25.9		4.3		-27.0
	898.1	28.3		27.3		3.8		-28.1
	963.6	29.0		27.2		4.1		-27.3

4.4) Sanyo Modulator (115-V-D025AH) Data ;

CH	*Frequency (MHz)*	*Reading [dBuV]*	*M/P Loss [dB]*	*PreAmp Gain [dB]*	*Attn. [dB]*	*Output Level [uV]*	*Limit [uV]*	*Margin [dB]*
3	192.5	33.5	7.5	26.5	3.0	7.5	95	-22.1
	362.2	29.1		25.5		5.1		-25.5
	716.3	37.3		26.3		11.9		-18.1
	910.3	41.3		28.6		14.5		-16.4
4	199.8	33.2	7.5	24.9	3.0	8.7	95	-20.8
	362.2	31.3		25.5		6.5		-23.3
	757.5	39.6		28.3		12.3		-17.8
	912.7	40.8		28.6		13.6		-16.9

5.TRANSFER SWITCH ISOLATION (*15.115)

PRODUCT : Video Cassette Recorder
MODEL Name : VRE4222
Modulator Maker :LG Innotek Co., Ltd. / Sanyo Tuner Industries Co., Ltd.
Modulator type : TADC-H202F / TADC-H302F / 115-V-D025AN / 115-V-D025AH
TEST DATE : Oct. 25th 2001

5-1) LGIT Modulator(TADC-H202F) Data;

CH	*Frequency (MHz)*	*Reading [dBuV]*	*M/P Loss [dB]*	*PreAmp Gain [dB]*	*Attn. [dB]*	*Output Level [uV]*	*Limit [uV]*	*Margin [dB]*
3	61.25	16.22	7.5	27.5	3.0	0.91	3.0	-10.3
4	67.25	15.12	7.5	27.6	3.0	0.80	3.0	-11.5

NOTES:

1. The transfer switch is internal to the device and is access automatically.
2. ***The transfer isolation switch provides automatic selection of either antenna/TV or VCR.***

*** Sample Calculation at 61.25 MHz = $10^{[(16.22+7.5-27.5+3.0)/20]}$ = 0.91 uV**

5-2) LGIT Modulator(TADC-H302F) Data;

CH	*Frequency (MHz)*	*Reading [dBuV]*	*M/P Loss [dB]*	*PreAmp Gain [dB]*	*Attn. [dB]*	*Output Level [uV]*	*Limit [uV]*	*Margin [dB]*
3	61.26	24.36	7.5	27.5	3.0	2.33	3.0	-2.2
4	67.25	23.05	7.5	27.6	3.0	1.98	3.0	-3.6

***5-3*) Sanyo Modulator(115-V-D025AN) Data;**

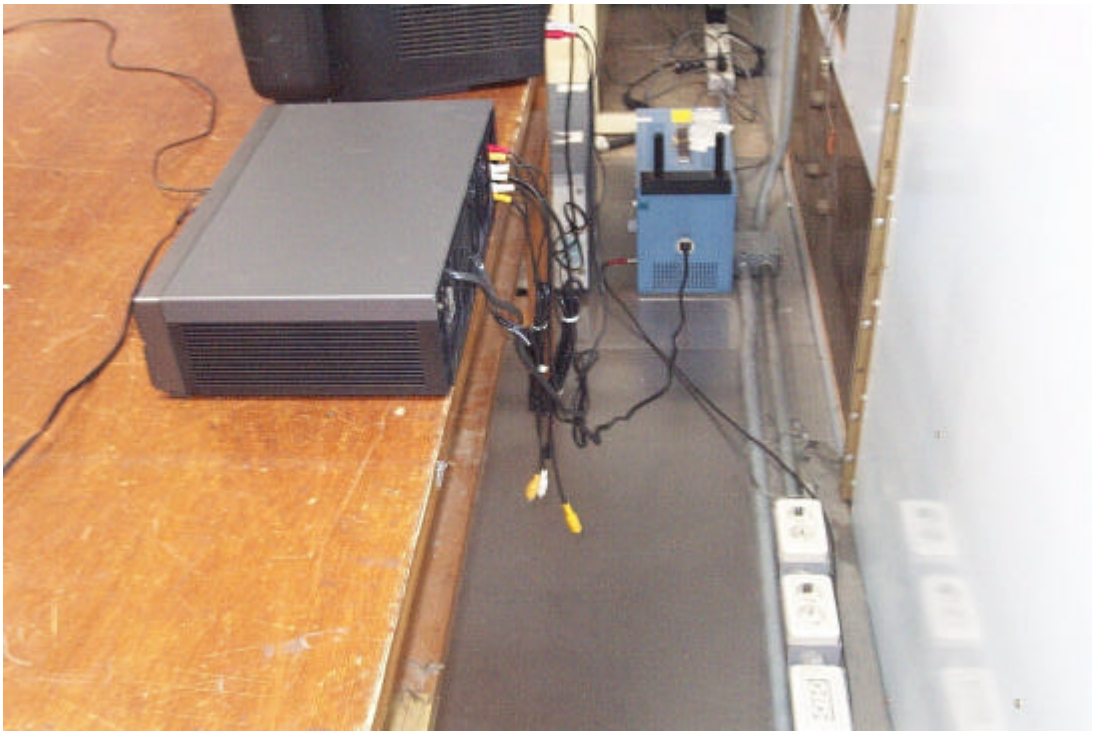
CH	*Frequency (MHz)*	*Reading [dBuV]*	*M/P Loss [dB]*	*PreAmp Gain [dB]*	*Attn. [dB]*	*Output Level [uV]*	*Limit [uV]*	*Margin [dB]*
3	61.25	16.73	7.5	27.5	3.0	0.97	3.0	-9.8
4	67.25	16.90	7.5	27.6	3.0	0.98	3.0	-9.7

***5-4*) Sanyo Modulator(115-V-D025AH) Data;**

CH	*Frequency (MHz)*	*Reading [dBuV]*	*M/P Loss [dB]*	*PreAmp Gain [dB]*	*Attn. [dB]*	*Output Level [uV]*	*Limit [uV]*	*Margin [dB]*
3	61.25	23.21	7.5	27.5	3.0	2.04	3.0	-3.3
4	67.25	21.01	7.5	27.6	3.0	1.57	3.0	-5.6

Appendix A

Photograph of Test Set-up (Power line conducted emissions)



Photographs of Test Set-up (Radiated emissions)

Appendix B

LIST OF TEST EQIPMENT

Type	Model	Cal. Due Date	S / N
EMI measurement system	R&S, ESMI	09/04/02	846064/004
Test receiver	R&S,ESVP	07/05/02	860688/020
Test receiver	R&S,ESH-3	07/05/02	860950/013
Spectrum monitor	R&S,EZM	07/05/02	862304/008
Spectrum monitor	R&S,EZM	07/05/02	862304/006
Spectrum Analyzer	HP8568B	07/03/02	3107A01571
Quasi-peak Adaptor	HP85650A	07/03/02	3107A01237
RF Pre-selector	HP85685A	07/03/02	3107A01237
Pre-Amplifier	HP8447F(BNC-ty	07/03/02	2805A02879
Pre-Amplifier	HP8447F (N-type)	07/01/02	3113A05259
Pre-Amplifier	HP8447C (N-type)	07/03/02	1937A00732
RF Signal Generator	Fluk, 6060B	07/03/02	5655209
IRE STD. signal Generator	Shibasoku,VG 40A	03/05/02	M-56221002
TV CH. Signal Generator	Shibasoku,363US	03/05/02	M-14817005
TV CH. Signal Generator	Shibasoku,363VS	03/05/02	M-12762002
NTSC Pattern Generator	Leader, LCG-400	03/14/02	705008
VITS Generator	Anritsu, MG318A	10/03/02	M11122
VITS Generator	Anritsu, MG318A	02/23/02	M10478
Tuned Dipole Antenna	EMCO, 3121C	07/26/02	9160-620
Tuned Dipole Antenna	EMCO, 3121C	07/26/02	9160-621
VHF Dipole Antenna	S/B, VHA9103		N/A
UHF Dipole Antenna	S/B, UHA9105		N/A
Bilog Antenna	Chase,CBL611A	10/11/02	1838
Biconical Antenna	R&S, HUF-Z2	10/11/02	N/A
Biconical Antenna	S/B, BBA9106	07/21/02	N/A
Biconical Antenna	S/B, BBA9106	07/21/02	N/A
Log-periodic Antenna	S/B, UHAL9107	10/11/02	N/A
Log-periodic Antenna	S/B, UHAL9107	07/21/02	N/A
Log-periodic Antenna	EMCO, 3146	07/21/02	1583
Horn Antenna	S/B, BBA 9102-B	10/11/02	106
Laurel Antenna			N/A
IEC 106 Antenna	HFU2-Z4		N/A
Absorbing Clamp	R&S, MDS21	10/25/02	860846/004
Absorbing Clamp	R&S, MDS21	07/21/02	301116/072
Kyoritsu LISN	KNW-407	07/05/02	8-6555-4
Shibasoku LISN	563	07/03/02	55416001
R & S LISN	ESH3-Z5	07/03/02	862770/013
Schwarzbeck LISN	NSLK8126	07/05/02	8126259

Appendix C

List of Support Device and Accessories in the test

1. EUT :

Video Cassette Recorder Model : VRE4222 S / N : N/A

2. Accessories

1.5 m. unshielded RF coaxial cable supplied by manufacturer (1 EA)

1.5 m. unshielded RCA cable for Video/Audio

IEC-106 Antenna

3. TV Monitor

Model : CRN-6285 S/N : 30600720

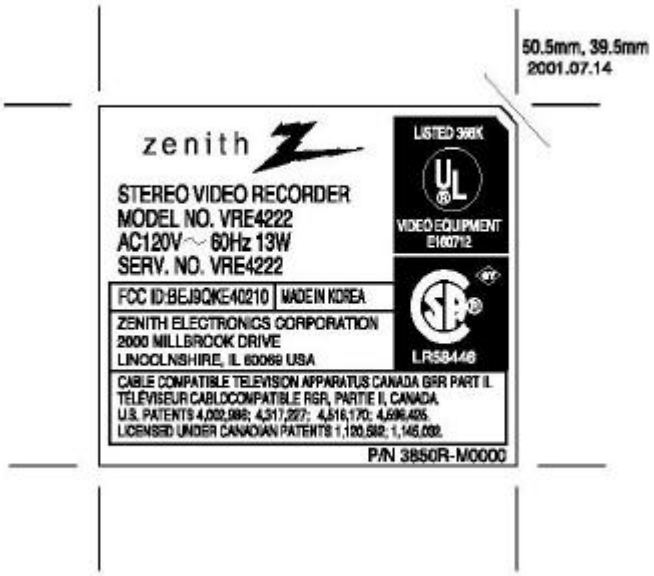
4. VITS Signal Generator

Anritsu, Model MG-318A : VITS 1 Vp-p, 5 Vp-p Generator.

Appendix D

SAMPLE LABEL :

According to Labeling Requirements per * 2.295 & * 15.19



The Label shown shall be affixed
On the rear of the device.
See the attached photograph.

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.

The statement is molded on the bottom of the device.
See the attached photograph

VRE4222 Test Report

Test Report No. : 4521-011029D

Report of Measurements for TV Interface Device under FCC Part 15

Manufacture : LG Electronics Inc
19-1, Cheongho-Ri, Jinwuy-Myun
Pyungtaek city, Kyunggi-Do,451-713, Korea

PRODUCT : Video Cassette Recorder
EUT Model Name : VRE4222
Serial No : N/A
Description of the Modulator & Tuner unit ;
Tuner Maker : LG Innotek Co., Ltd. / Sanyo Tuner Industries Co., Ltd.
Tuner type : TADC-H202F / TADC-H302F / 115-V-D025AN / 115-V-D025AH

Frequency range tuned by the receiver : 54 ~ 806 MHz

This receiver meets FCC Regulations covering comparable systems of VHF and UHF TV tuning .

Measurement Procedure : EIA RS – 378 , MP – 2 , ANSI C 63.4

Date of Measurements : Oct. 23~25, 2001

Measurements Results :The results obtained from the measuring of this device
Are as shown in the attached sheets.
And comply with new rules adapted under Docket 87-389

1. Peak Picture Sensitivity : UHF – VHF < 8.0 dBuV
2. UHF Noise figure : Meet noise figure of 14 dB
3. Radiation of VHF/UHF Portion : Highest 40.9 dBuV/m at 601 MHz
4. Antenna Power conduction : Highest 45.0 dBuV at 1694 MHz

Daehwan Kim
Research engineer
Digital-media standards team

1. Peak Picture Sensitivity :

1) LGIT Tuner (TADC-H202F) : Limit UHF-VHF < 8 dBuV Result : O . K
2) LGIT Tuner (TADC-H302F) : Limit UHF-VHF < 8 dBuV Result : O . K
3) Sanyo Tuner (115-V-D025AN) : Limit UHF-VHF < 8 dBuV Result : O . K
4) Sanyo Tuner (115-V-D025AH) : Limit UHF-VHF < 8 dBuV Result : O . K

2. UHF Noise Figure ;

2-1) LGIT Tuner (TADC-H202F) ;

Channels (UHF)	Reading (dB)	Matching Loss(dB)	Noise Figure (dB)	Limit (dB)
14	9.9	1.75	7.65	14.0
19	10.2		7.95	
28	10.8		8.55	
36	9.9		7.65	
44	9.7		7.45	
53	9.6		7.35	
61	9.6		7.35	
69	10.0		7.75	
4.0dB subtracted for power splitter, < 0.3 dB added for IF amp contribution				

2-2) LGIT Tuner (TADC-H302F) ;

Channels (UHF)	Reading (dB)	Matching Loss(dB)	Noise Figure (dB)	Limit (dB)
14	9.6	1.75	7.35	14.0
19	9.7		7.45	
28	10.3		8.05	
36	10.2		7.95	
44	10.1		7.85	
53	10.1		7.85	
61	10.0		7.75	
69	9.9		7.65	
4.0dB subtracted for power splitter, < 0.3 dB added for IF amp contribution				

2-2) Sanyo Tuner (115-V-D025AN) ;

Channels (UHF)	Reading (dB)	Matching Loss(dB)	Noise Figure (dB)	Limit (dB)
14	10.4	1.75	8.15	14.0
19	10.5		8.25	
28	10.6		8.35	
36	10.4		8.15	
44	10.4		8.15	
53	10.3		8.05	
61	10.2		7.95	
69	10.2		7.95	
4.0dB subtracted for power splitter, < 0.3 dB added for IF amp contribution				

2-2) Sanyo Tuner (115-V-D025AH) ;

Channels (UHF)	Reading (dB)	Matching Loss(dB)	Noise Figure (dB)	Limit (dB)
14	9.7	1.75	7.45	14.0
19	9.6		7.35	
28	9.6		8.35	
36	9.6		7.35	
44	9.7		7.45	
53	10.1		7.85	
61	10.1		7.85	
69	10.5		8.25	
4.0dB subtracted for power splitter, < 0.3 dB added for IF amp contribution				

3. Radiated Emission Measurements

3-1) LGIT Tuner(TADC-H202F) ;

Frequency to which tuned		Frequency of the emission (MHz)	Result at 3 m (dBuV/m)	Limit at 3 m (dBuV/m)
Channel	(MHz)			
2	55.25	101	<20	43.5
3	61.25	107	<20	43.5
4	67.25	113	<20	43.5
5	77.25	123	<20	43.5
6	83.25	129	<20	43.5
7	175.25	221	<30	46.0
8	181.25	227	<30	46.0
9	187.25	233	<30	46.0
10	193.25	239	<30	46.0
11	199.25	245	<30	46.0
12	205.25	251	<30	46.0
13	211.25	257	<30	46.0
14	471.25	517	23.0	46.0
		1034	<40	54.0
19	501.25	547	27.3	46.0
		1094	<40	54.0
28	555.25	601	33.4	46.0
		1202	<40	54.0
36	603.25	649	29.4	46.0
		1298	<40	54.0
44	651.25	697	31.7	46.0
		1394	<40	54.0
53	705.25	751	29.3	46.0
		1502	<40	54.0
61	753.25	799	30.8	46.0
		1598	<40	54.0
69	801.25	847	33.6	46.0
		1694	<40	54.0

3-2) LGIT Tuner(TADC-H302F) ;

Frequency to which tuned		Frequency of the emission (MHz)	Result at 3 m (dBuV/m)	Limit at 3 m (dBuV/m)
Channel	(MHz)			
2	55.25	101	<20	43.5
3	61.25	107	<20	43.5
4	67.25	113	<20	43.5
5	77.25	123	<20	43.5
6	83.25	129	<20	43.5
7	175.25	221	<30	46.0
8	181.25	227	<30	46.0
9	187.25	233	<30	46.0
10	193.25	239	<30	46.0
11	199.25	245	<30	46.0
12	205.25	251	<30	46.0
13	211.25	257	<30	46.0
14	471.25	517	30.2	46.0
		1034	<40	54.0
19	501.25	547	32.7	46.0
		1094	<40	54.0
28	555.25	601	37.1	46.0
		1202	<40	54.0
36	603.25	649	36.6	46.0
		1298	<40	54.0
44	651.25	697	35.1	46.0
		1394	<40	54.0
53	705.25	751	35.0	46.0
		1502	<40	54.0
61	753.25	799	34.1	46.0
		1598	<40	54.0
69	801.25	847	33.3	46.0
		1694	<40	54.0

3-3) Sanyo Tuner(115-V-D025AN) ;

Frequency to which tuned		Frequency of the emission (MHz)	Result at 3 m (dBuV/m)	Limit at 3 m (dBuV/m)
Channel	(MHz)			
2	55.25	101	<20	43.5
3	61.25	107	<20	43.5
4	67.25	113	<20	43.5
5	77.25	123	<20	43.5
6	83.25	129	<20	43.5
7	175.25	221	<30	46.0
8	181.25	227	<30	46.0
9	187.25	233	<30	46.0
10	193.25	239	<30	46.0
11	199.25	245	<30	46.0
12	205.25	251	<30	46.0
13	211.25	257	<30	46.0
14	471.25	517	35.0	46.0
		1034	<40	54.0
19	501.25	547	34.9	46.0
		1094	<40	54.0
28	555.25	601	40.9	46.0
		1202	<40	54.0
36	603.25	649	39.3	46.0
		1298	<40	54.0
44	651.25	697	36.6	46.0
		1394	<40	54.0
53	705.25	751	32.8	46.0
		1502	<40	54.0
61	753.25	799	35.8	46.0
		1598	<40	54.0
69	801.25	847	35.5	46.0
		1694	<40	54.0

3-4) Sanyo Tuner(115-V-D025AH) ;

Frequency to which tuned		Frequency of the emission (MHz)	Result at 3 m (dBuV/m)	Limit at 3 m (dBuV/m)
Channel	(MHz)			
2	55.25	101	<20	43.5
3	61.25	107	<20	43.5
4	67.25	113	<20	43.5
5	77.25	123	<20	43.5
6	83.25	129	<20	43.5
7	175.25	221	<30	46.0
8	181.25	227	<30	46.0
9	187.25	233	<30	46.0
10	193.25	239	<30	46.0
11	199.25	245	<30	46.0
12	205.25	251	<30	46.0
13	211.25	257	<30	46.0
14	471.25	517	31.8	46.0
		1034	<40	54.0
19	501.25	547	30.7	46.0
		1094	<40	54.0
28	555.25	601	30.5	46.0
		1202	<40	54.0
36	603.25	649	30.0	46.0
		1298	<40	54.0
44	651.25	697	31.0	46.0
		1394	<40	54.0
53	705.25	751	35.1	46.0
		1502	<40	54.0
61	753.25	799	35.6	46.0
		1598	<40	54.0
69	801.25	847	39.2	46.0
		1694	<40	54.0

4. Antenna Power Conduction Measurements

4-1) LGIT Tuner(TADC-H202F) ;

Frequency to which tuned		Frequency of the emission (MHz)	Result (dBuV)	Limit (dBuV)
Channel	(MHz)			
2	55.25	101	<35.0	51.8
3	61.25	107	<35.0	
4	67.25	113	<35.0	
5	77.25	123	<35.0	
6	83.25	129	<35.0	
7	175.25	221	<35.0	
8	181.25	227	<35.0	
9	187.25	233	<35.0	
10	193.25	239	<35.0	
11	199.25	245	<35.0	
12	205.25	251	<35.0	
13	211.25	257	<35.0	
14	471.25	517 1034	30.2 32.0	
19	501.25	547 1094	33.8 34.0	
28	555.25	601 1202	33.3 34.3	
36	603.25	649 1298	35.0 34.0	
44	651.25	697 1394	36.3 35.0	
53	705.25	751 1502	36.8 36.0	
61	753.25	799 1598	36.9 38.0	
69	801.25	847 1694	36.0 42.0	

4-2) LGIT Tuner(TADC-H302F) ;

Frequency to which tuned		Frequency of the emission (MHz)	Result (dBuV)	Limit (dBuV)
Channel	(MHz)			
2	55.25	101	<35.0	51.8
3	61.25	107	<35.0	
4	67.25	113	<35.0	
5	77.25	123	<35.0	
6	83.25	129	<35.0	
7	175.25	221	<35.0	
8	181.25	227	<35.0	
9	187.25	233	<35.0	
10	193.25	239	<35.0	
11	199.25	245	<35.0	
12	205.25	251	<35.0	
13	211.25	257	<35.0	
14	471.25	517 1034	33.5 34.3	
19	501.25	547 1094	33.9 34.1	
28	555.25	601 1202	38.8 36.7	
36	603.25	649 1298	33.9 35.3	
44	651.25	697 1394	37.1 35.4	
53	705.25	751 1502	37.6 35.2	
61	753.25	799 1598	36.9 38.2	
69	801.25	847 1694	36.1 41.0	

4-3) Sanyo Tuner(115-V-D025AN) ;

Frequency to which tuned		Frequency of the emission (MHz)	Result (dBuV)	Limit (dBuV)
Channel	(MHz)			
2	55.25	101	<35.0	51.8
3	61.25	107	<35.0	
4	67.25	113	<35.0	
5	77.25	123	<35.0	
6	83.25	129	<35.0	
7	175.25	221	<35.0	
8	181.25	227	<35.0	
9	187.25	233	<35.0	
10	193.25	239	<35.0	
11	199.25	245	<35.0	
12	205.25	251	<35.0	
13	211.25	257	<35.0	
14	471.25	517 1034	30.0 30.0	
19	501.25	547 1094	30.0 32.0	
28	555.25	601 1202	34.0 33.2	
36	603.25	649 1298	33.4 34.0	
44	651.25	697 1394	36.1 33.0	
53	705.25	751 1502	36.2 35.0	
61	753.25	799 1598	36.7 40.0	
69	801.25	847 1694	37.3 45.0	

4-4) Sanyo Tuner(115-V-D025AH) ;

Frequency to which tuned		Frequency of the emission (MHz)	Result (dBuV)	Limit (dBuV)
Channel	(MHz)			
2	55.25	101	<35.0	51.8
3	61.25	107	<35.0	
4	67.25	113	<35.0	
5	77.25	123	<35.0	
6	83.25	129	<35.0	
7	175.25	221	<35.0	
8	181.25	227	<35.0	
9	187.25	233	<35.0	
10	193.25	239	<35.0	
11	199.25	245	<35.0	
12	205.25	251	<35.0	
13	211.25	257	<35.0	
14	471.25	517 1034	34.3 34.5	
19	501.25	547 1094	33.8 34.1	
28	555.25	601 1202	34.2 33.9	
36	603.25	649 1298	33.8 35.0	
44	651.25	697 1394	35.3 34.6	
53	705.25	751 1502	34.9 36.3	
61	753.25	799 1598	35.3 36.4	
69	801.25	847 1694	35.3 37.9	