SAMSUNG ELECTRONICS

EMC TEST REPORT

Project No. :LBE030608

Product : Video Cassette Recorder

Model No. : SLV-D300P

Date of test : March 11 ~ 18, 2003

Issued Date : March 18, 2003

Tested by:
Kyung Chul , Min / Test Engineer

Reviewed by:
No Cheon, PARK / Test Engineer

Authorized by:
Kyu Baek, CHUNG / Chief of EMC Lab.

SAMSUNG ELECTRONICS Co., Ltd.
EMC Test Laboratory
416 Maetan-3 Dong, Paldal-Ku, Suwon City, Kyungki-Do, Korea,442-742
Tel. : 81-31-200-2185 Fax. : 81-31-200-2189

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

Table of Contents

1. Introduction & Summary
1.1 Description of the EUT
1.2 Test facility
1.3 Test mode
1.4 Measuring instrument setup
1.5 Test rule and Procedure
1.6 Test Summary

2. Test equipment

3. Test Results
3.1 RADIATED EMISSION MEASUREMENT
3.2 AC POWERLINE CONDUCTED EMISSION MEASUREMENT
3.3 OUTPUT SIGNAL LEVEL MEASUREMENT
3.4 OUTPUT TERMINAL CONDUCTED SPURIOUS EMISSION MEASUREMENT
3.5 ANTENNA TRANSFER SWITCH ISOLATION MEASUREMENT

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

1. Introduction & Summary

1.1 Description of the EUT

Applicant	SAMSUNG ELECTRONICS Co., Ltd.	
Project Number	LBE030608	
Equipment Under Test	Video Cassette Recorder	
Trade Name	SAMSUNG	
Model Number	SLV-D300P	
Variant Model	None	
Type of RF Output Connector	Type "F" Connector 75ohm(Unbalanced)	
FCC ID Number	A3LDIVA2BD	
Operating(RF Modulator) Frequency	CH.3	Visual Carrier 61.25MHz Aural Carrier 65.75MHz
	CH.4	Visual Carrier 67.25MHz Aural Carrier 71.75MHz
Mains input	120V 60Hz	

1.2 Test facility

The EMI/EMS measurement facilities used to collect the tested data are located at 416 Maetan 3 Dong, Paldal-Ku, Suwon City, Kyungki Do, Korea.

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1 & 16-2.
SAMSUNG Electronics Co.,Ltd is accredited by Korea Laboratory Accreditation Scheme(KOLAS) which signed the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the above test item(s) and test method(s).

Measured in Semi-anechoic chamber #1 that is FCC Registration Number 98856.

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

1.3 Test mode

The EUT was tested in the following operating modes(at both channel 3 and 4) for the tests mention in this report:

1) Playback mode [VHS Play]
A video tape recorded with VITS signal was played on the EUT.

2) Record mode [NTSC Signal Input]
A NTSC signal(Color bar with grea lines) was supplied at ch. 5(77.25MHz) through the Ant. input connector for recording.

3) Record mode [1V VITS Signal Input]
A 1V peak-to-peak VITS signal was supplied through the video input connector for recording.

4) Record mode [5V VITS Signal Input]
A 5V peak-to-peak VITS signal was supplied through the video input connector for recording.

5) Playback mode [DVD Play]

Note: The NTSC TV signal input record mode is not applicable to the antenna transfer switch test.

1.4 Measuring instrument setup

The explanation of measuring instrument setup when respective function is used in any frequency band is as following:

Frequency Band [MHz]	Instrument	Detector function	Resolution Bandwidth	Video Bandwidth
30 to 1000	Spectrum analyzer	Peak	100kHz (1MHz)	1MHz
	EMI Test receiver	Quasi-Peak	120kHz	-
Above 1000	EMI Test receiver	Average	1MHz	-

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

1.5 Test rule and Procedure

FCC Rule Part 15, Subpart B : Unintentional Radiators
TV Interface Devices.
Test Procedure : ANSI C63.4-1992

1.6 Test Summary

Test item	Applied Standards	Result
AC POWERLINE CONDUCTED EMISSION	ANSI C63.4-1992	Pass
RADIATED EMISSION	ANSI C63.4-1992	Pass
OUTPUT SIGNAL LEVEL	ANSI C63.4-1992	Pass
OUTPUT TERMINAL CONDUCTED SPURIOUS EMISSION	ANSI C63.4-1992	Pass
ANTENNA TRANSFER SWITCH ISOLATION	ANSI C63.4-1992	Pass

* N/A : Test not applicable

2. Test equipment

Equipment	Model No.	Serial No.	Makers	Last calibration and Interval
Spectrum analyzer	8566B	3340A21744	H.P	03/03/04, 12Months
	Firmware versions : Rev.29.9.86			
Quasi-peak adapter	85650A	2521A00687	H.P	02/10/09, 12Months
RF Preselector	85685A	2602A00224	H.P	02/10/09, 12Months
Field strength meter	ESCS30	839809/022	R & S	02/06/18, 12Months
	Firmware versions : Main 1.08, OTP 02.01, GRA 02.03			
Field strength meter	ESVP	860688/015	R & S	03/02/28, 12Months
L.I.S.N	ESH3-Z5	847265/028	R & S	02/12/03, 12Months
Pattern Generator	PM5418-TDSI	LO627116	PHILIPS	03/12/07, 12Months
VITS Generator	MG318A	M08643	ANRITSU	03/02/18, 12Months
Matching PAD	9730	-	NIHON	-
Bi-Log Antenna	CBL6112B	2767	SCHAFFNER	02/ 04/26, 12Months

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

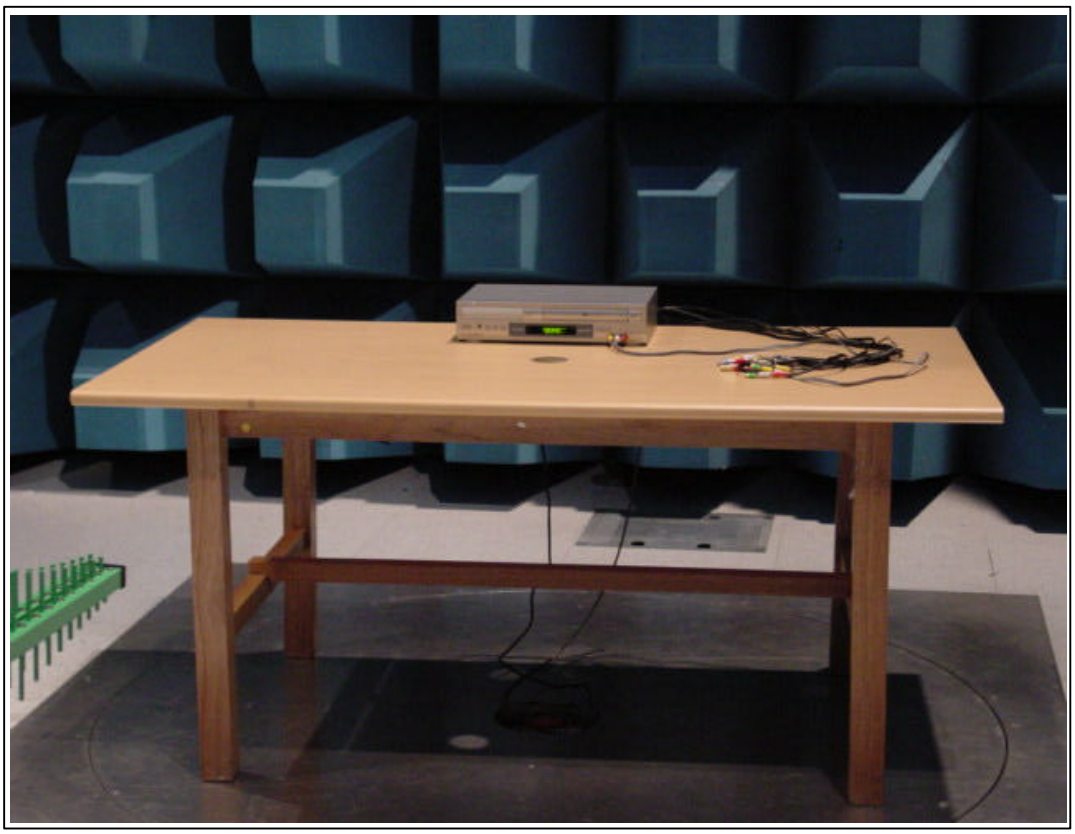
3. Test Results

3.1 RADIATED EMISSION MEASUREMENT

3.1.1 Test Procedure

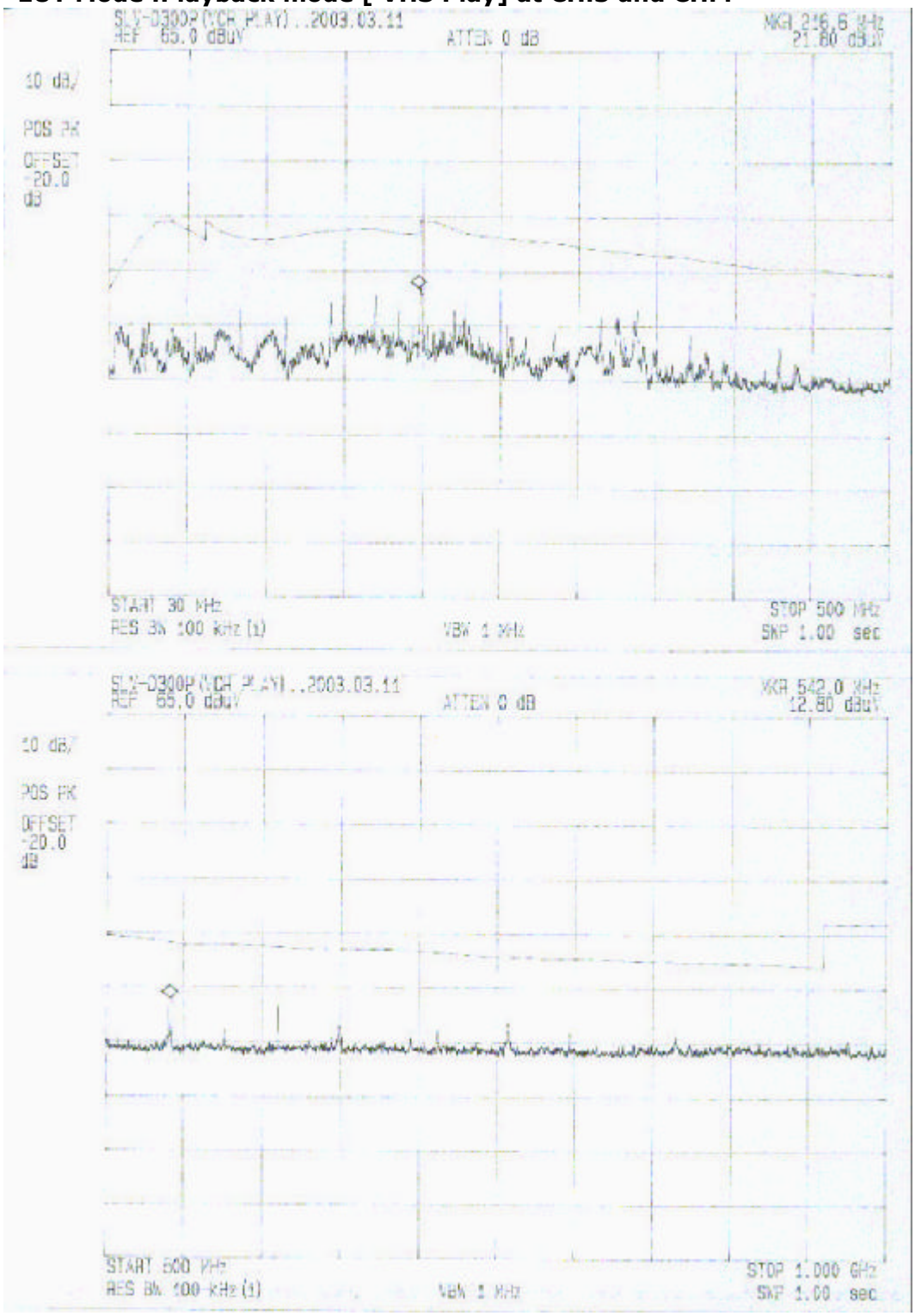
Configurate the EUT System in accordance with ANSI C63.4-1992section 8 and 12.2.
Power cords for the EUT System are connected the receptacle on the ground plane.
The output ports are connected to the cable provided with the device and the ending port of the cable are terminated in the proper impedance.
To find out the maximum emission, change the position of the cable, and the EUT operation mode under normal usage of the EUT.
The spectrum analyzer are scanned from 30MHz to 1,000MHz in channel 3 and 4.

3.1.2 Setup Photograph

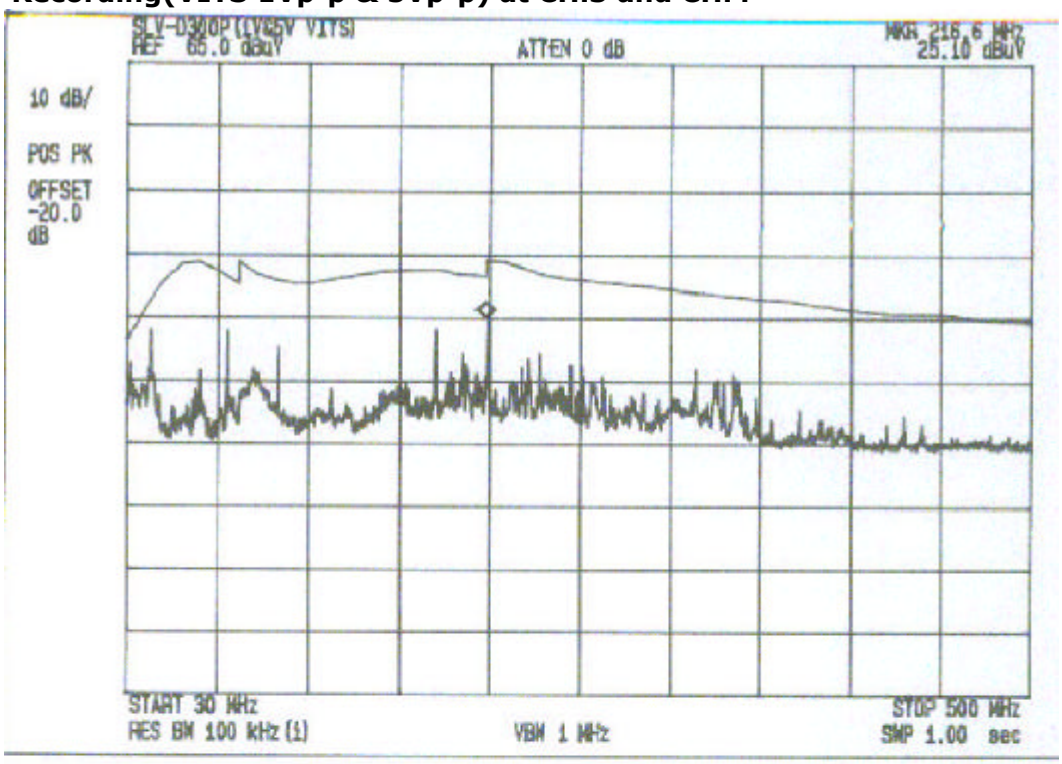


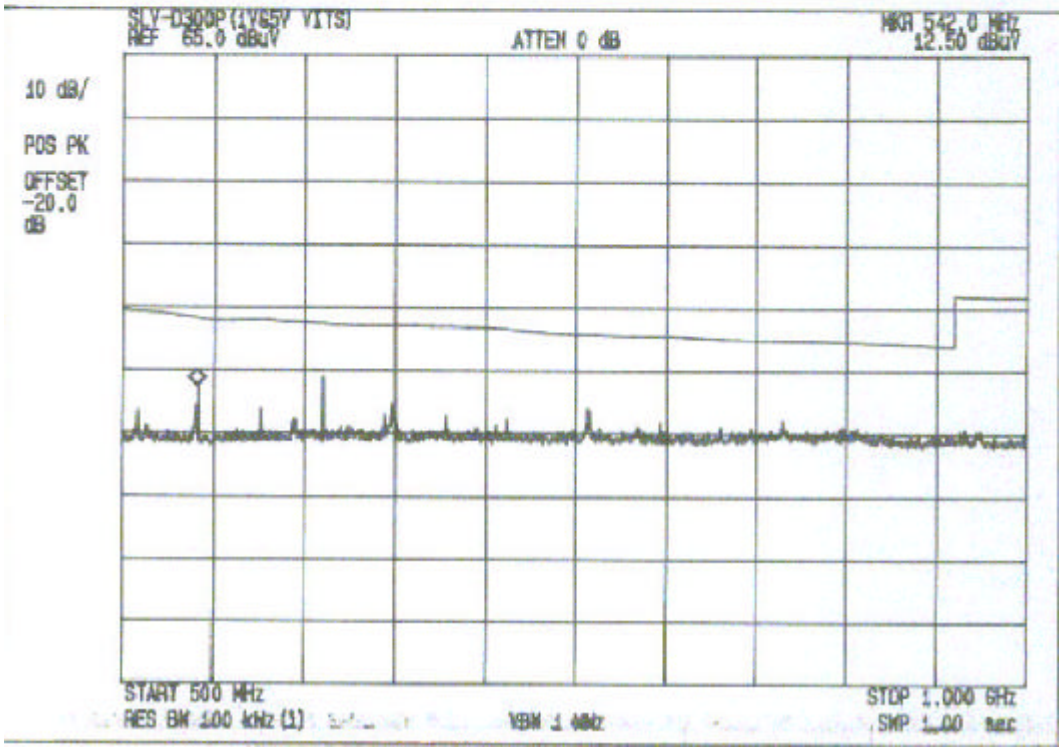
3.1.3 Test Results

EUT Mode :Playback mode [VHS Play] at CH.3 and CH.4



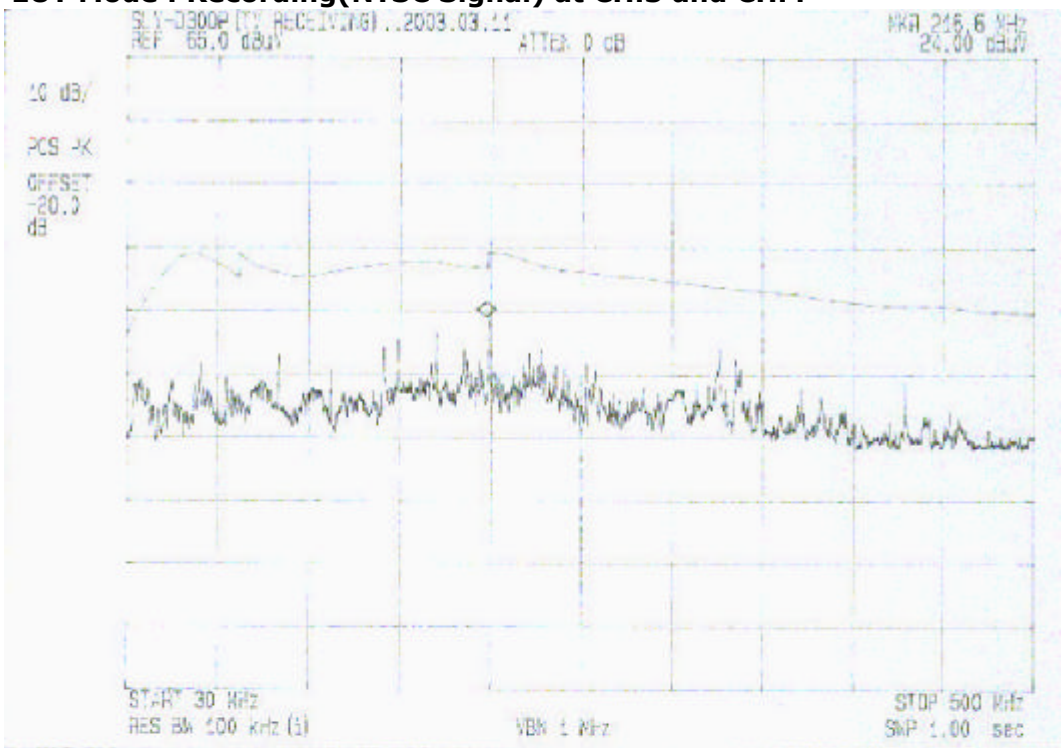
Recording(VITS 1Vp-p & 5Vp-p) at CH.3 and CH.4

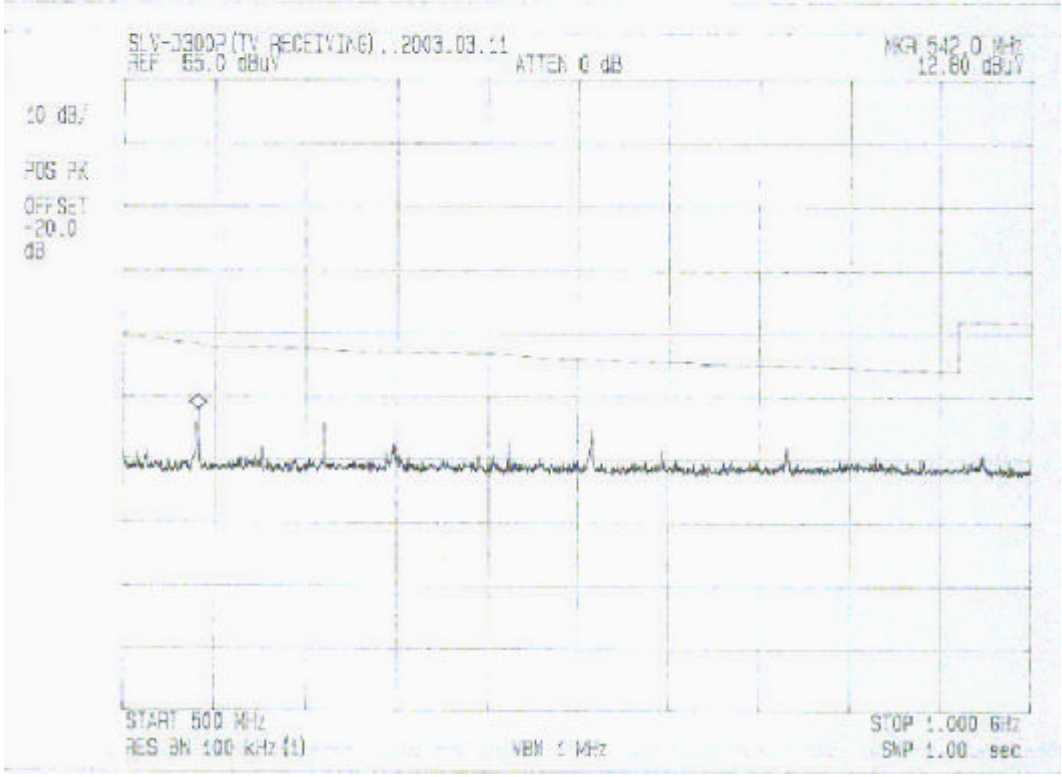




This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

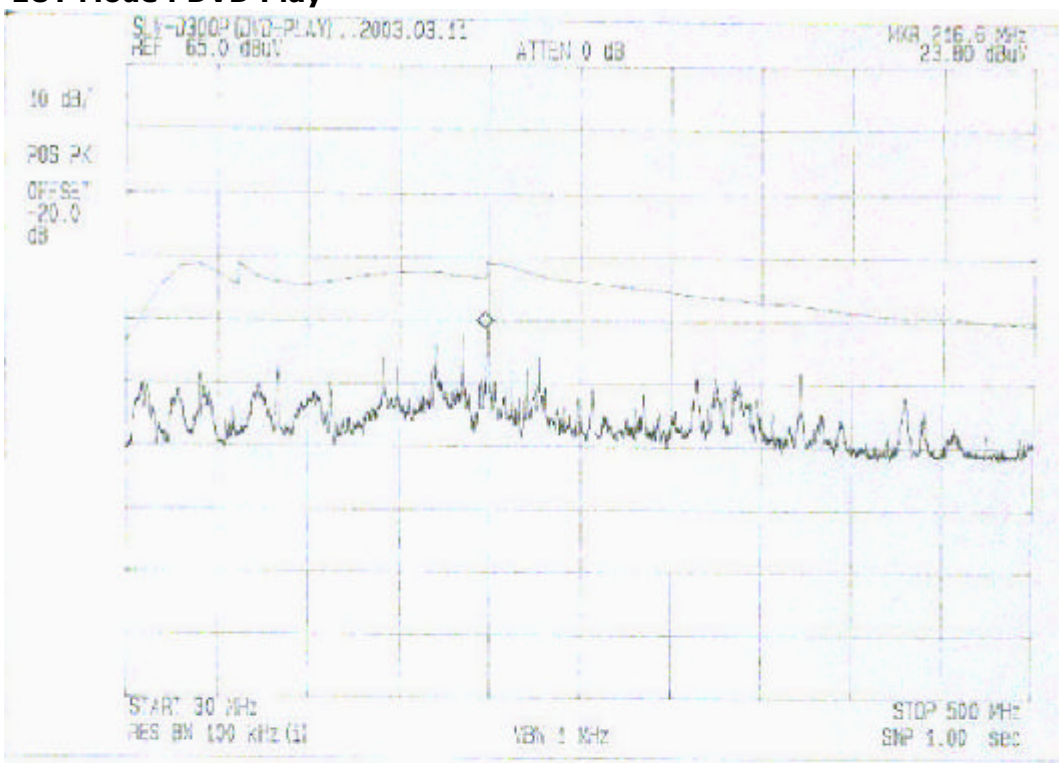
EUT Mode : Recording(NTSC Signal) at CH.3 and CH.4

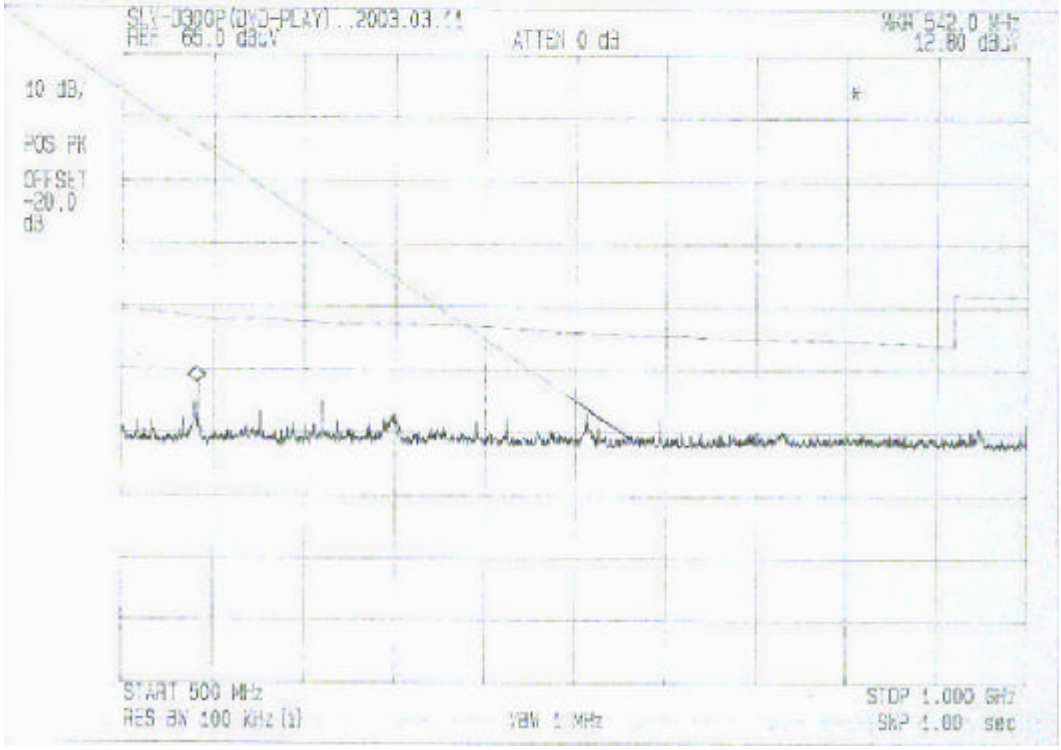




This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

EUT Mode : DVD Play





This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

3.2 AC POWERLINE CONDUCTED EMISSION MEASUREMENT

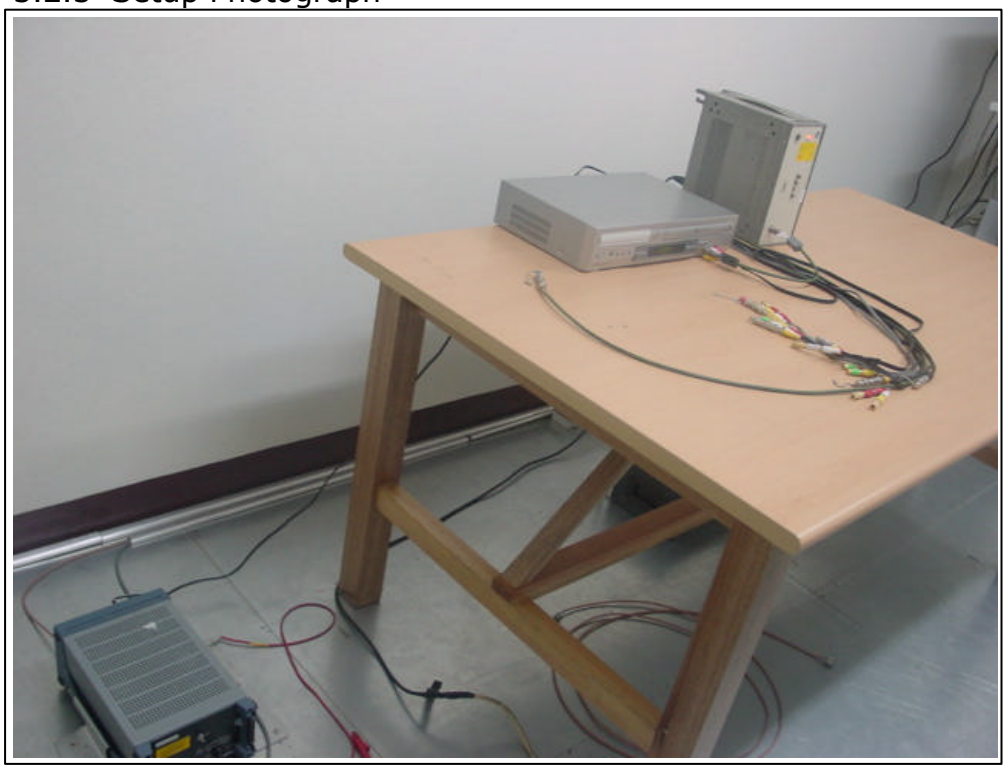
3.2.1 Reference Rule and Specification

FCC Rule Part 15, Section 15.107(a)

3.2.2 Test Procedure

1) Configurate the EUT System in accordance with ANSI C63.4-1992 section 7 and 12.2. Connect the EUT's AC line cord to the EUT port of LISN.
2) All input terminals are terminated in the proper impedance.
   The output ports are connected to the cable provided with the device and the ending port are terminated in the proper impedance.
3) Using a calibrated coaxial cable, the TEST RECEIVER is connected to the measuring port of the LISN for EUT. To the find out an EUT condition procedures the maximum emission, the position of cables, EUT operations mode are the position of cables, EUT operations mode are checked under normal usage of EUT.
   Then, the emission are scanned from 0.45MHz to 30MHz relative to the limit are recorded.

3.2.3 Setup Photograph



This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

3.2.4 Test Results

1) EUT Mode : Playback mode [VHS Play]

Frequency	Line	Meter reading (a)		Total Loss	Results (a) + (b)		Limits		Margin	
		QP	AV	(b)	QP	AV	QP	AV	QP	AV
[MHz]		[dBuV]		[dB]	[dBuV]		[dBuV]		[dB]	
0.192	Neutral	46.5	35.1	0.2	46.7	35.3	**63.9**	**53.9**	17.3	18.7
0.325	Neutral	32.3	28.9	0.2	32.5	29.1	**59.6**	**49.6**	27.1	20.5
0.654	Neutral	31.9	31.8	0.2	32.1	32.0	**56.0**	**46.0**	23.9	14.0
1.501	Neutral	33.2	32.1	0.3	33.5	32.5	**56.0**	**46.0**	22.5	13.5
4.056	Neutral	35.9	28.5	0.1	36.0	28.6	**56.0**	**46.0**	20.0	17.4
10.783	Neutral	42.0	33.0	0.3	42.3	33.3	**60.0**	**50.0**	17.7	16.7
13.919	Neutral	39.5	32.3	0.9	40.3	33.1	**60.0**	**50.0**	19.7	16.9
21.766	Neutral	32.9	28.5	0.9	33.8	29.4	**60.0**	**50.0**	26.2	20.6

* QP : Quasi-peak, AV: Average
* Results = Meter Reading(QP or AV) + Total Loss(LISN Insertion loss + Cable loss)

2) EUT Mode : Record [1V VITS Signal Input]

Frequency	Line	Meter reading (a)		Total Loss	Results (a) + (b)		Limits		Margin	
		QP	AV	(b)	QP	AV	QP	AV	QP	AV
[MHz]		[dBuV]		[dB]	[dBuV]		[dBuV]		[dB]	
0.199	Live	49.0	43.5	0.2	49.2	43.7	**63.7**	**53.7**	14.5	10.0
0.332	Neutral	34.6	33.1	0.1	34.7	33.2	**59.4**	**49.4**	24.7	16.2
0.465	Neutral	36.0	33.7	0.2	36.2	33.9	**56.6**	**46.6**	20.4	12.7
1.522	Neutral	38.2	38.2	0.3	38.5	38.5	**56.0**	**46.0**	17.5	7.5
4.035	Neutral	46.0	40.7	0.1	46.1	40.8	**56.0**	**46.0**	9.9	5.2
4.175	Neutral	45.7	38.7	0.1	45.8	38.8	**56.0**	**46.0**	10.2	7.2
5.806	Live	44.6	37.8	0.1	44.6	37.8	**60.0**	**50.0**	15.4	12.2
13.086	Neutral	37.9	27.7	0.7	38.6	28.4	**60.0**	**50.0**	21.4	21.6
19.729	Neutral	41.1	28.3	1.1	42.2	29.4	**60.0**	**50.0**	17.8	20.6

* QP : Quasi-peak, AV: Average
* Results = Meter Reading(QP or AV) + Total Loss(LISN Insertion loss + Cable loss)

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

3) EUT Mode : Record [5V VITS Signal Input]

Frequency [MHz]	Line	Meter reading (a) QP [dBuV]	Meter reading (a) AV [dBuV]	Total Loss (b) [dB]	Results (a) + (b) QP [dBuV]	Results (a) + (b) AV [dBuV]	Limits QP [dBuV]	Limits AV [dBuV]	Margin QP [dB]	Margin AV [dB]
0.199	Neutral	39.3	43.3	0.2	39.5	43.4	**63.7**	**53.7**	24.2	10.2
0.269	Neutral	35.7	29.5	0.1	35.9	29.7	**61.1**	**51.1**	25.3	21.5
0.395	Neutral	35.4	34.3	0.1	35.6	34.4	**58.0**	**48.0**	22.4	13.5
1.781	Neutral	39.4	35.6	0.3	39.7	35.9	**56.0**	**46.0**	16.3	10.2
2.243	Neutral	39.0	33.4	0.2	39.2	33.6	**56.0**	**46.0**	16.8	12.4
3.902	Neutral	45.7	38.7	0.1	45.8	38.9	**56.0**	**46.0**	10.2	7.1
5.813	Neutral	48.4	40.1	0.1	48.4	40.1	**60.0**	**50.0**	11.6	9.9
13.128	Neutral	37.2	29.6	0.7	37.9	30.3	**60.0**	**50.0**	22.1	19.8
19.631	Live	40.4	28.9	1.4	41.8	30.3	**60.0**	**50.0**	18.2	19.7

* QP : Quasi-peak, AV: Average
* Results = Meter Reading(QP or AV) + Total Loss(LISN Insertion loss + Cable loss)

4) EUT Mode : Record [NTSC Signal Input]

Frequency [MHz]	Line	Meter reading (a) QP [dBuV]	Meter reading (a) AV [dBuV]	Total Loss (b) [dB]	Results (a) + (b) QP [dBuV]	Results (a) + (b) AV [dBuV]	Limits QP [dBuV]	Limits AV [dBuV]	Margin QP [dB]	Margin AV [dB]
0.192	Live	36.4	28.9	0.2	36.6	29.1	**63.9**	**53.9**	27.4	24.9
0.262	Live	36.8	31.5	0.1	37.0	31.7	**61.4**	**51.4**	24.4	19.7
0.465	Neutral	35.6	33.3	0.2	35.8	33.5	**56.6**	**46.6**	20.8	13.1
0.598	Neutral	36.2	34.6	0.2	36.3	34.7	**56.0**	**46.0**	19.7	11.3
3.790	Neutral	49.1	35.0	0.1	49.3	35.1	**56.0**	**46.0**	6.8	10.9
4.154	Neutral	40.7	29.9	0.1	40.8	30.0	**56.0**	**46.0**	15.2	16.0
8.830	Neutral	38.2	28.5	0.1	38.3	28.6	**60.0**	**50.0**	21.7	21.4
14.969	Neutral	39.1	39.0	1.0	40.1	40.0	**60.0**	**50.0**	19.9	10.0
21.724	Neutral	38.8	27.3	0.9	39.7	28.2	**60.0**	**50.0**	20.3	21.8

* QP : Quasi-peak, AV: Average
* Results = Meter Reading(QP or AV) + Total Loss(LISN Insertion loss + Cable loss)

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

5) EUT Mode : DVD Play

Frequency [MHz]	Line	Meter reading (a) QP [dBuV]	Meter reading (a) AV [dBuV]	Total Loss (b) [dB]	Results (a) + (b) QP [dBuV]	Results (a) + (b) AV [dBuV]	Limits QP [dBuV]	Limits AV [dBuV]	Margin QP [dB]	Margin AV [dB]
0.199	Live	46.6	36.2	0.2	46.7	36.3	**63.7**	**53.7**	16.9	17.3
0.325	Neutral	32.9	28.8	0.1	33.0	28.9	**59.6**	**49.6**	26.5	20.6
0.521	Neutral	33.2	29.8	0.2	33.3	29.9	**56.0**	**46.0**	22.7	16.1
1.774	Neutral	34.3	23.1	0.3	34.6	23.3	**56.0**	**46.0**	21.4	22.7
4.056	Neutral	35.4	27.9	0.1	35.5	28.1	**56.0**	**46.0**	20.5	17.9
10.783	Neutral	41.6	32.6	0.3	42.0	32.9	**60.0**	**50.0**	18.0	17.1
19.645	Neutral	39.9	32.7	1.1	41.0	33.8	**60.0**	**50.0**	19.0	16.2
21.766	Neutral	33.5	27.6	0.9	34.4	28.5	**60.0**	**50.0**	25.6	21.5

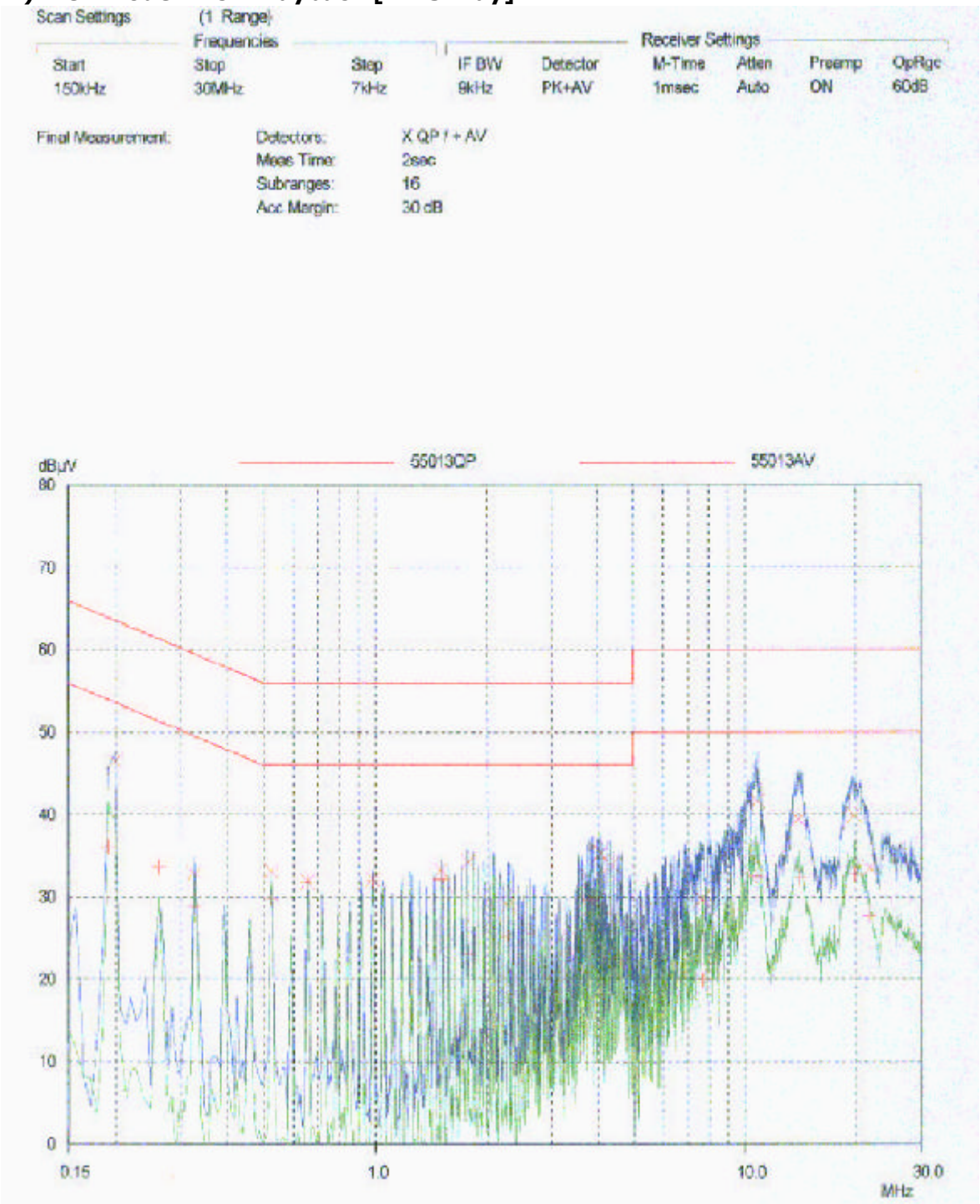
* QP : Quasi-peak, AV: Average

* Results = Meter Reading(QP or AV) + Total Loss(LISN Insertion loss + Cable loss)

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

3.2.5 Test Graphs

1) EUT Mode : VCR Playback [VHS Play]



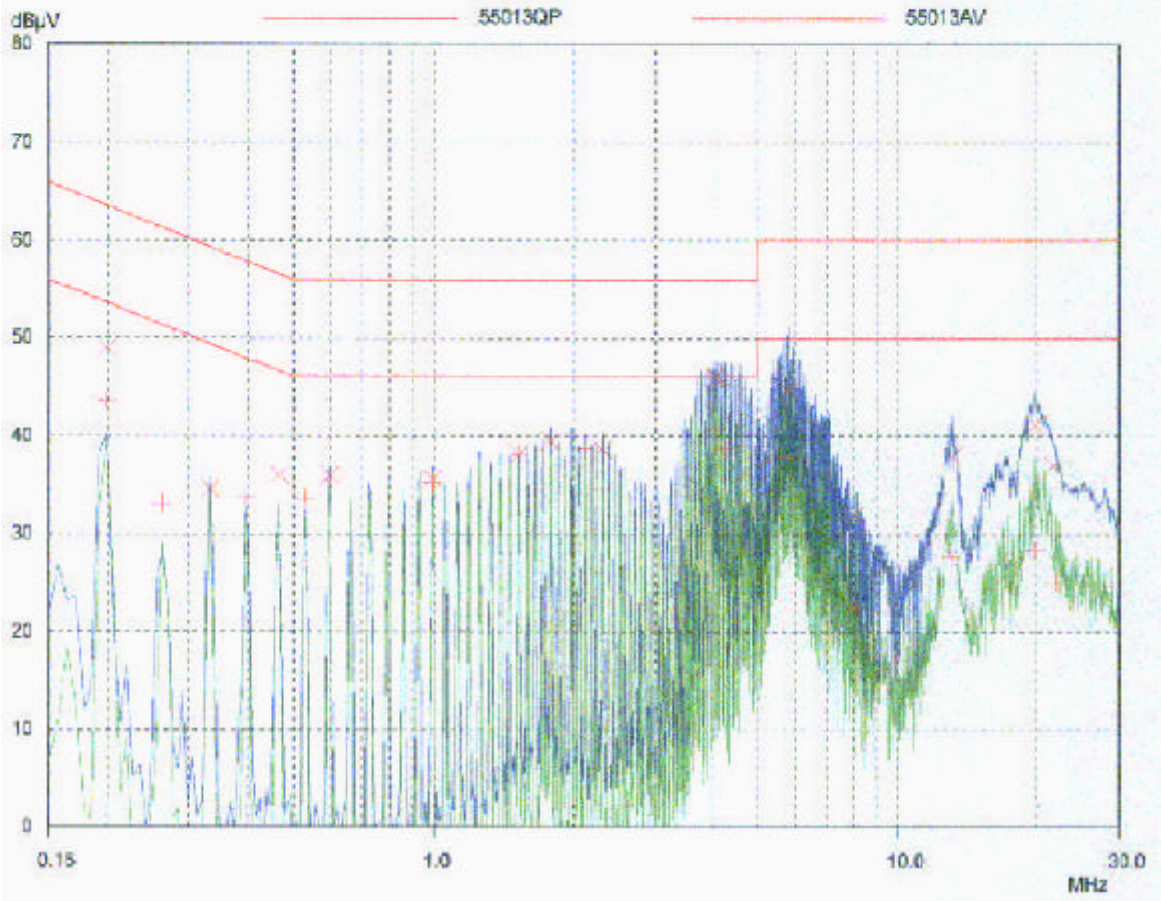
2) EUT Mode : Record [1V VITS Signal Input]

Scan Settings (1 Range)

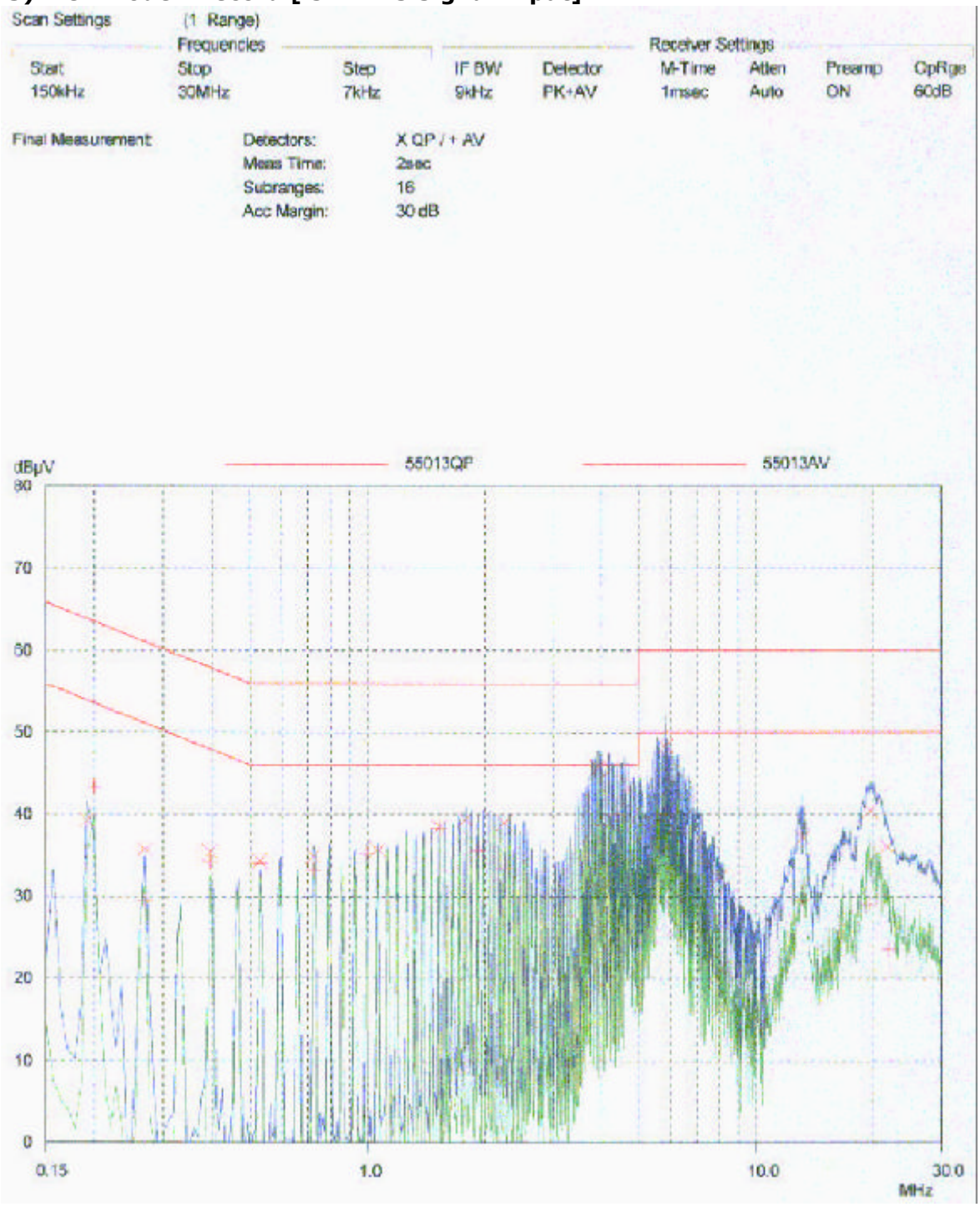
Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	7kHz	9kHz	PK+AV	1msec	Auto	ON	60dB

Final Measurement:

Detectors:	X QP / + AV
Meas Time:	2sec
Subranges:	16
Acc Margin:	30 dB



3) EUT Mode : Record [5V VITS Signal Input]



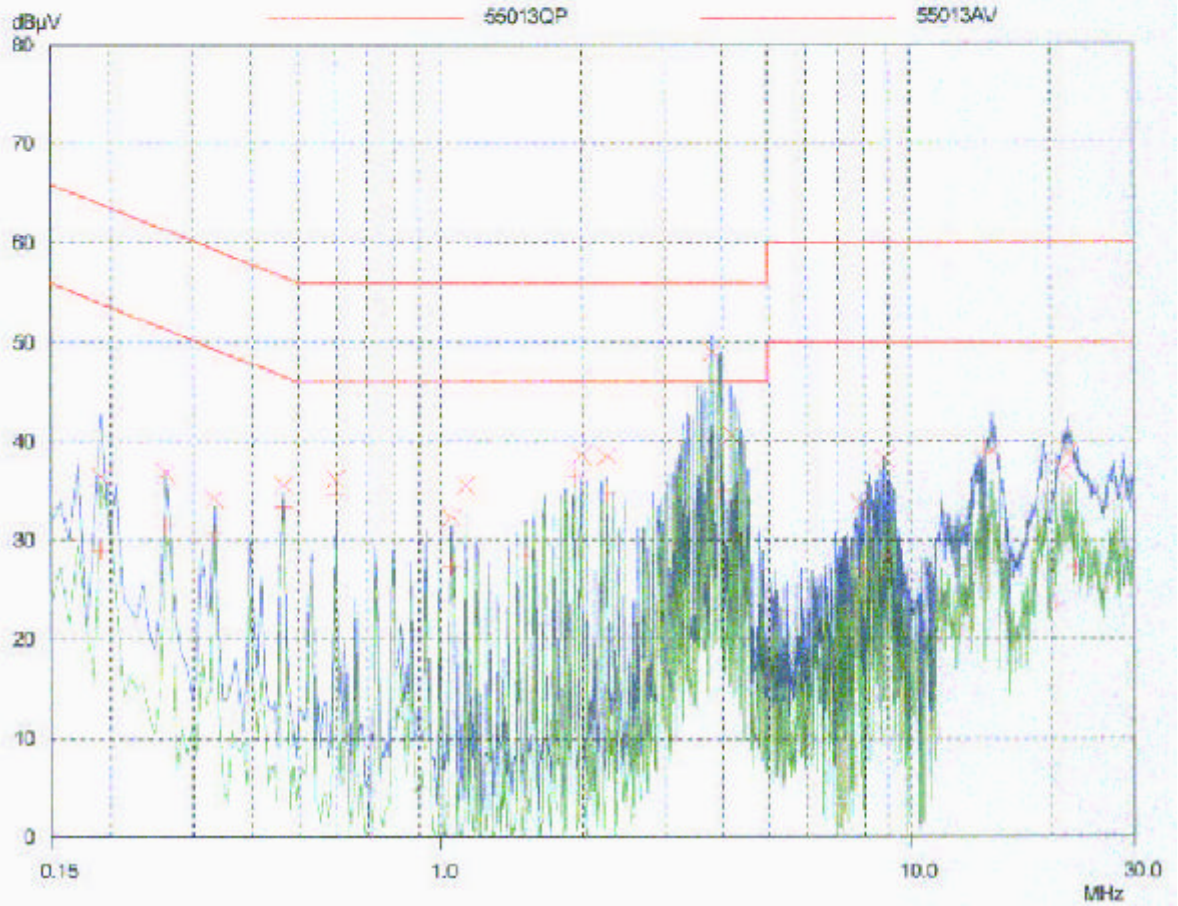
4) EUT Mode : Record[NTSC Signal Input]

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	7kHz	9kHz	PK+AV	1msec	Auto	ON	60dB

Final Measurement

Detectors:	X QP / + AV
Meas Time:	2sec
Subranges:	16
Acc Margin:	30 dB



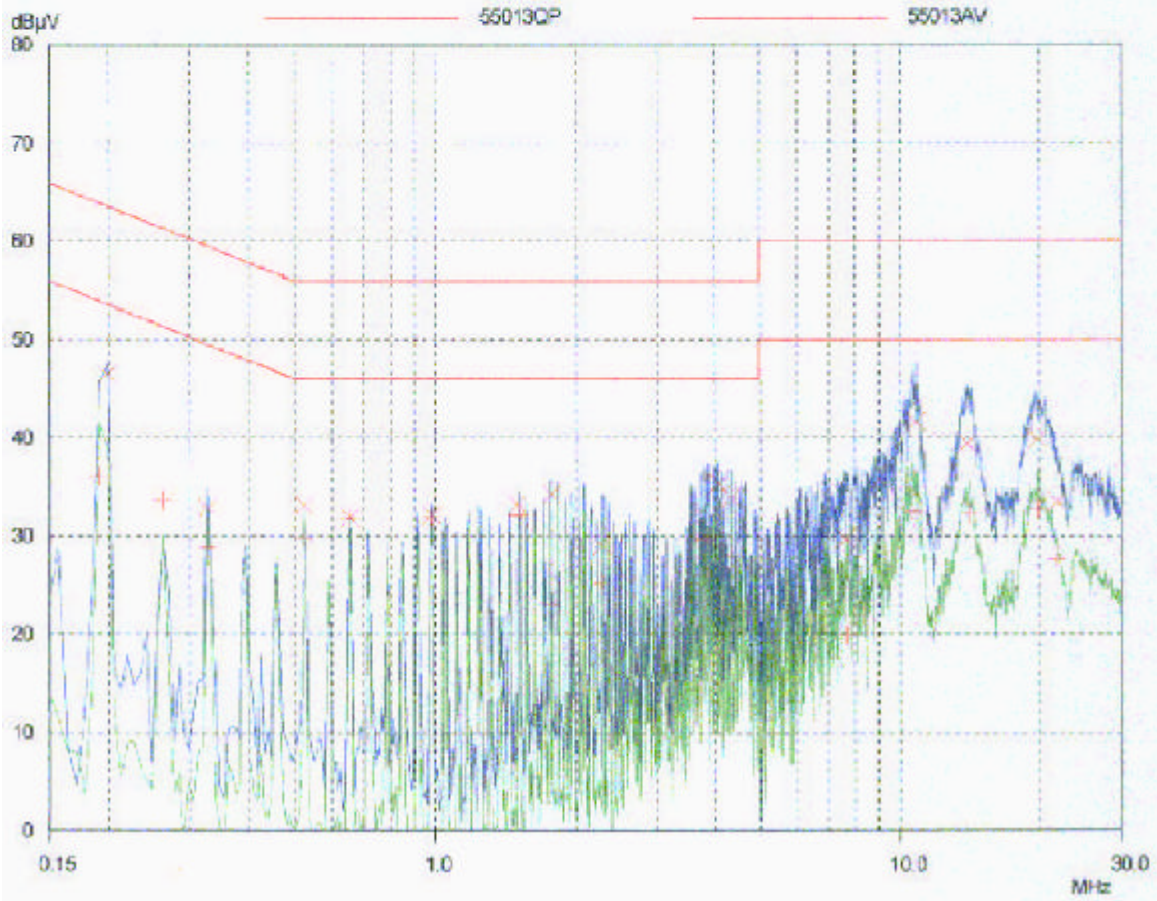
5) EUT Mode : DVD Play

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	7kHz	9kHz	PK+AV	1msec	Auto	ON	60dB

Final Measurement:

Detectors:	X QP / + AV
Meas Time:	2sec
Subranges:	16
Acc Margin:	30 dB

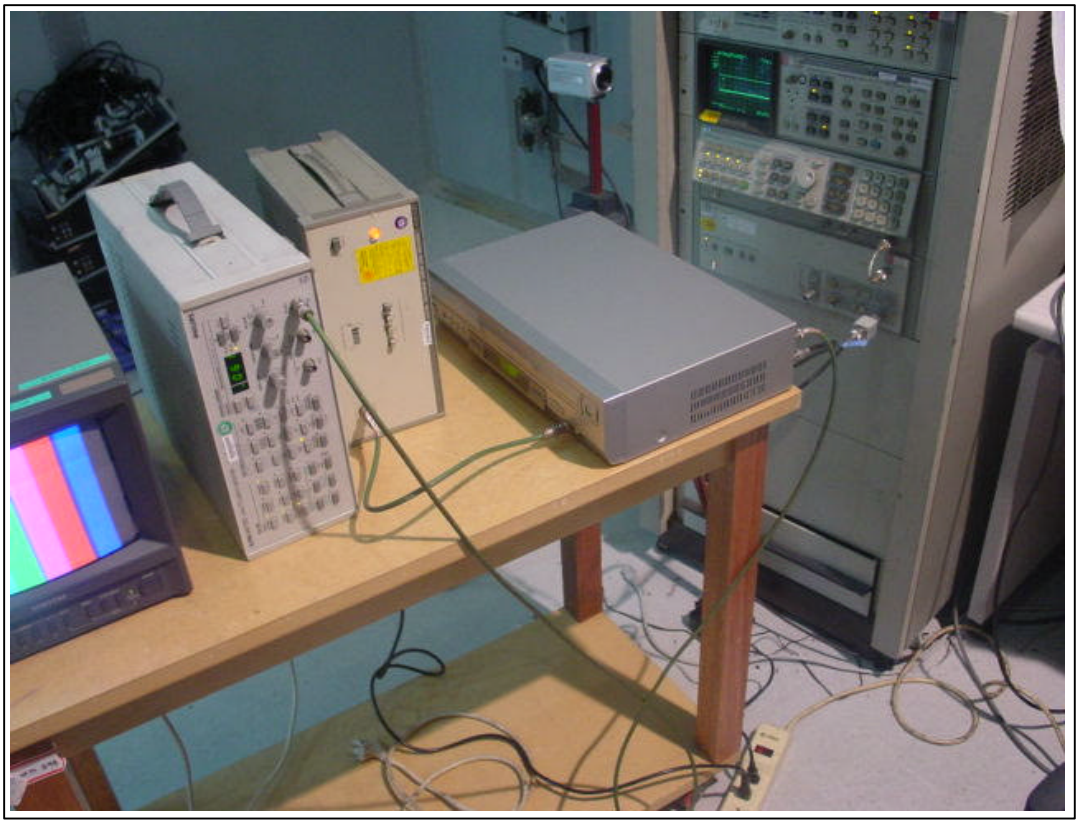


3.3 OUTPUT SIGNAL LEVEL MEASUREMENT

3.3.1 Test Procedure

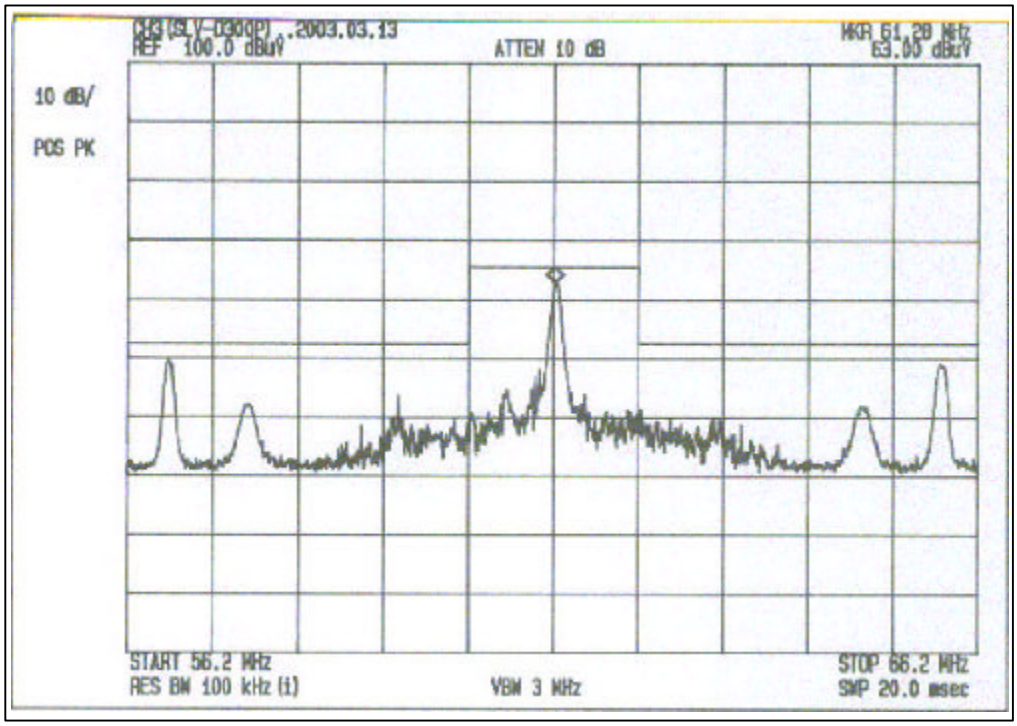
Configurate the EUT System in accordance with ANSI C63.4-1992 section 12.2.
The RF output terminal is connected is to the spectrum analyzer through the matching transformer with a calibrated 75 ohms coaxial cable.
Then, the RF output signal level is measured under the EUT condition produces the maximum signal level.

3.3.2 Setup Photograph

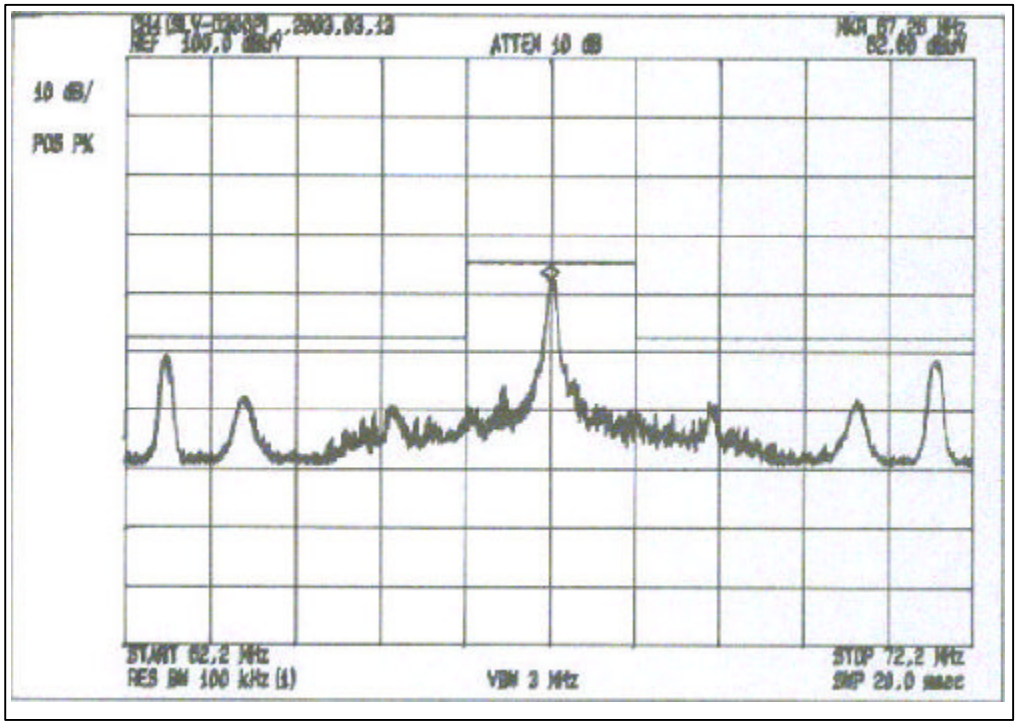


3.3.3 Test Results

Test channel : CH.3



Test channel : CH.4



3.4 OUTPUT TERMINAL CONDUCTED SPURIOUS EMISSION MEASUREMENT

3.4.1 Test Procedure

The EUT system and measuring instrument are set up in the same manner of the output signal measurement.
The spectrum was scanned from 30MHz to more than 4.6MHz below the visual carrier frequency, and from more than 7.4MHz above the visual carrier frequency to 1000MHz.
Then, the significant spurious emissions are measured at the output terminal.

3.4.2 Setup Photograph

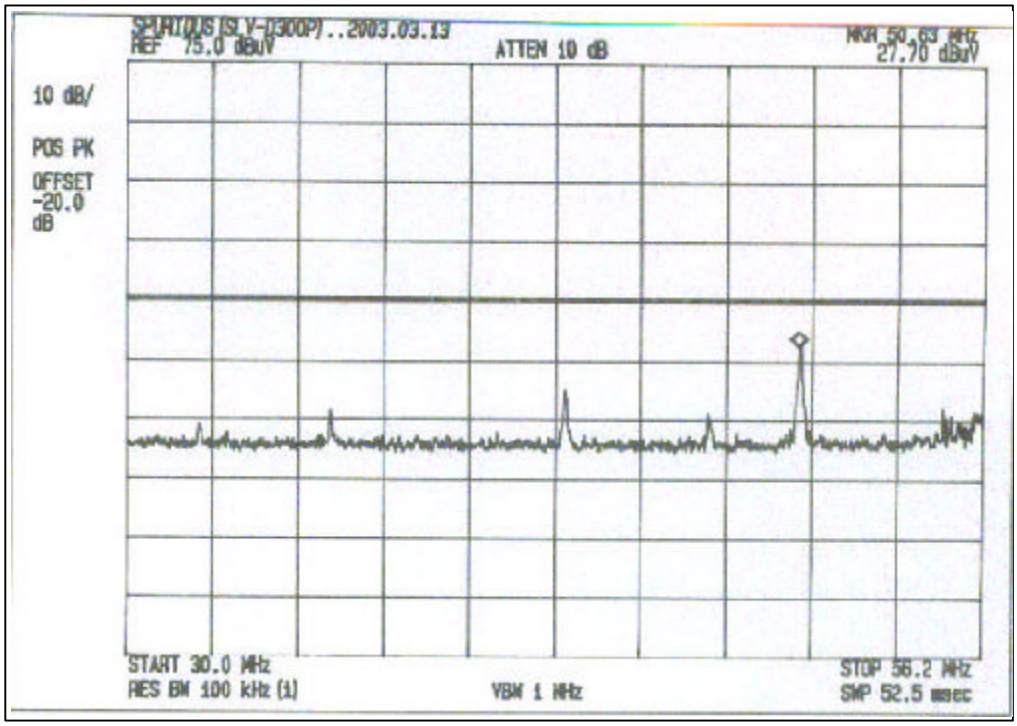
This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

3.4.3 Test Results

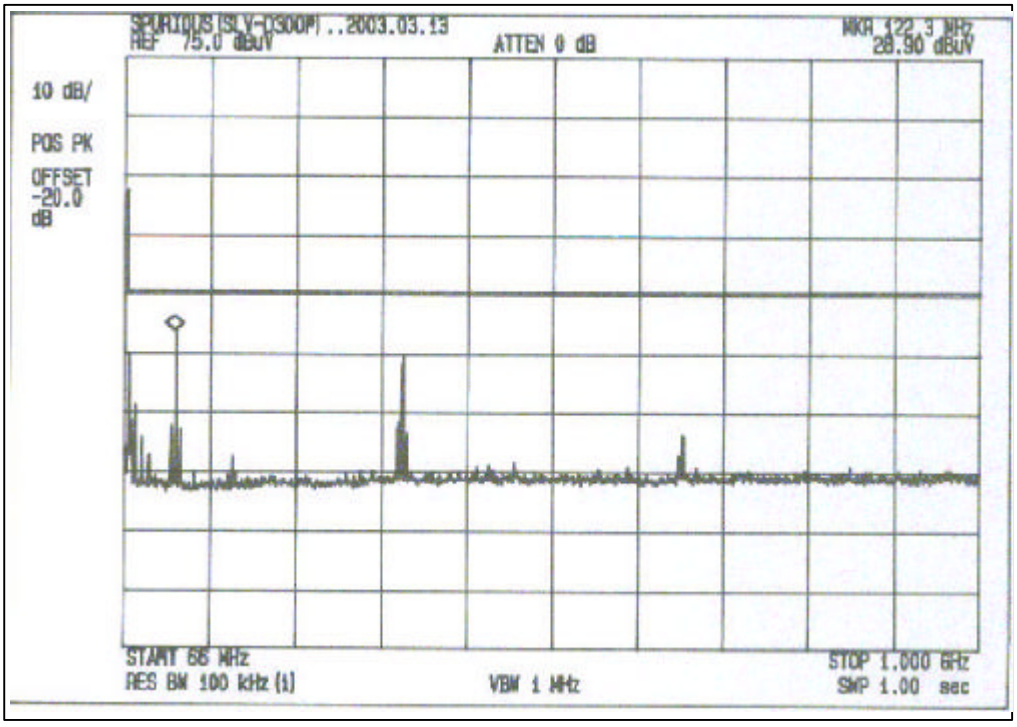
Test channel : 3

EUT mode : Playback / VITS 1Vp-p / VITS 5Vp-p / NTSC TV Signal

From 30MHz to more than 4.6MHz below the visual carrier frequency



From more than 7.4MHz above the visual carrier frequency

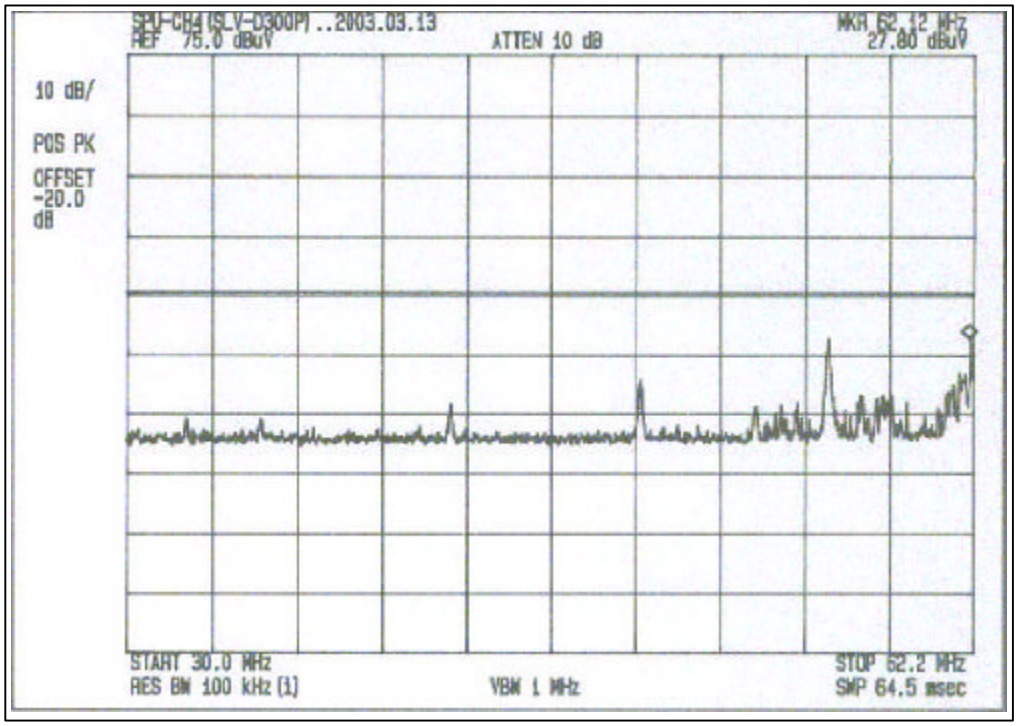


This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

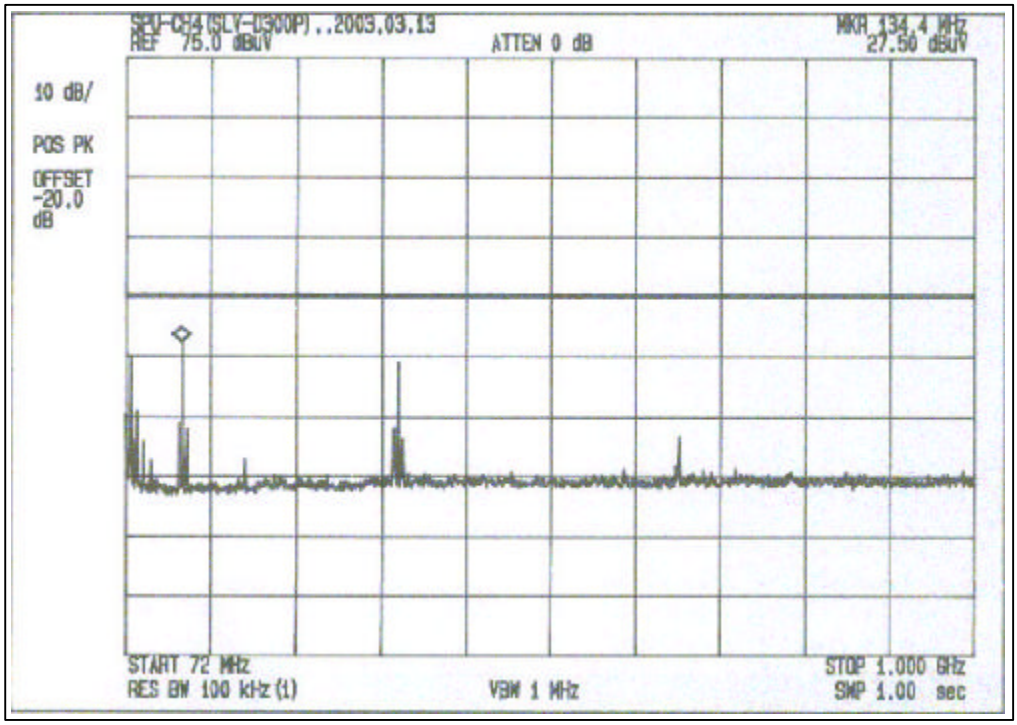
Test channel : 4

EUT mode : Playback / VITS 1Vp-p / VITS 5Vp-p / NTSC TV Signal

From 30MHz to more than 4.6MHz below the visual carrier frequency



From more than 7.4MHz above the visual carrier frequency



This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

3.5 ANTENNA TRANSFER SWITCH ISOLATION MEASUREMENT

3.5.1 Test Procedure

Configurate the EUT System in accordance with ANSI C63.4-1992 section 12.2.
The RF output terminal is terminated in the proper impedance.
The ANT input terminal is connected is to the spectrum analyzer through the matching transformer with a calibrated 75 ohms coaxial cable.
Then, the RF output leakage level is measured under the EUT condition produces the maximum signal level.

3.5.2 Setup Photograph

3.5.3 Test Results

1) EUT Mode : Playback[VHS Play]

RF Output channel	Measured frequency [MHz]	Meter reading [dBuV/50ohm]	Matching Pad [dB]	Results [dBuV/75ohm]	Limits [dBuV/75ohm]
3	61.23	0.1	4	4.1	9.5
4	6722	0.1	4	4.1	9.5

2) EUT Mode : Recording / VITS 1Vp-p

RF Output channel	Measured frequency [MHz]	Meter reading [dBuV/50ohm]	Matching Pad [dB]	Results [dBuV/75ohm]	Limits [dBuV/75ohm]
3	61.23	0.3	4	4.3	9.5
4	67.22	0.2	4	4.2	9.5

3) EUT Mode : Recording / VITS 5Vp-p

RF Output channel	Measured frequency [MHz]	Meter reading [dBuV/50ohm]	Matching Pad [dB]	Results [dBuV/75ohm]	Limits [dBuV/75ohm]
3	61.23	0.1	4	4.1	9.5
4	67.22	0.1	4	4.1	9.5

4) EUT Mode : DVD Play

RF Output channel	Measured frequency [MHz]	Meter reading [dBuV/50ohm]	Matching Pad [dB]	Results [dBuV/75ohm]	Limits [dBuV/75ohm]
3	61.23	0.1	4	4.1	9.5
4	67.22	0.1	4	4.1	9.5

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.