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*

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# 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<br>Aural Carrier 65.75MHz |
| | CH.4 | Visual Carrier 67.25MHz<br>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.

## 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 | - |

### 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 |

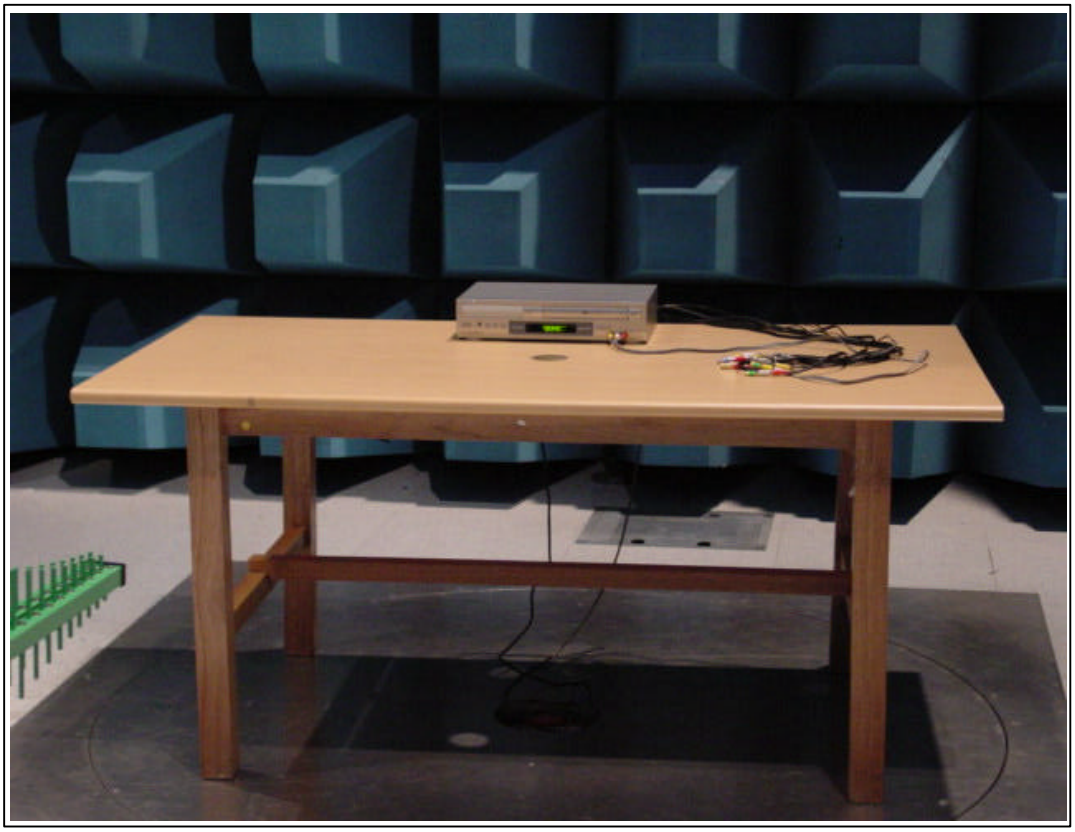
# 3. Test Results

## 3.1 RADIATED EMISSION MEASUREMENT

### 3.1.1 Test Procedure

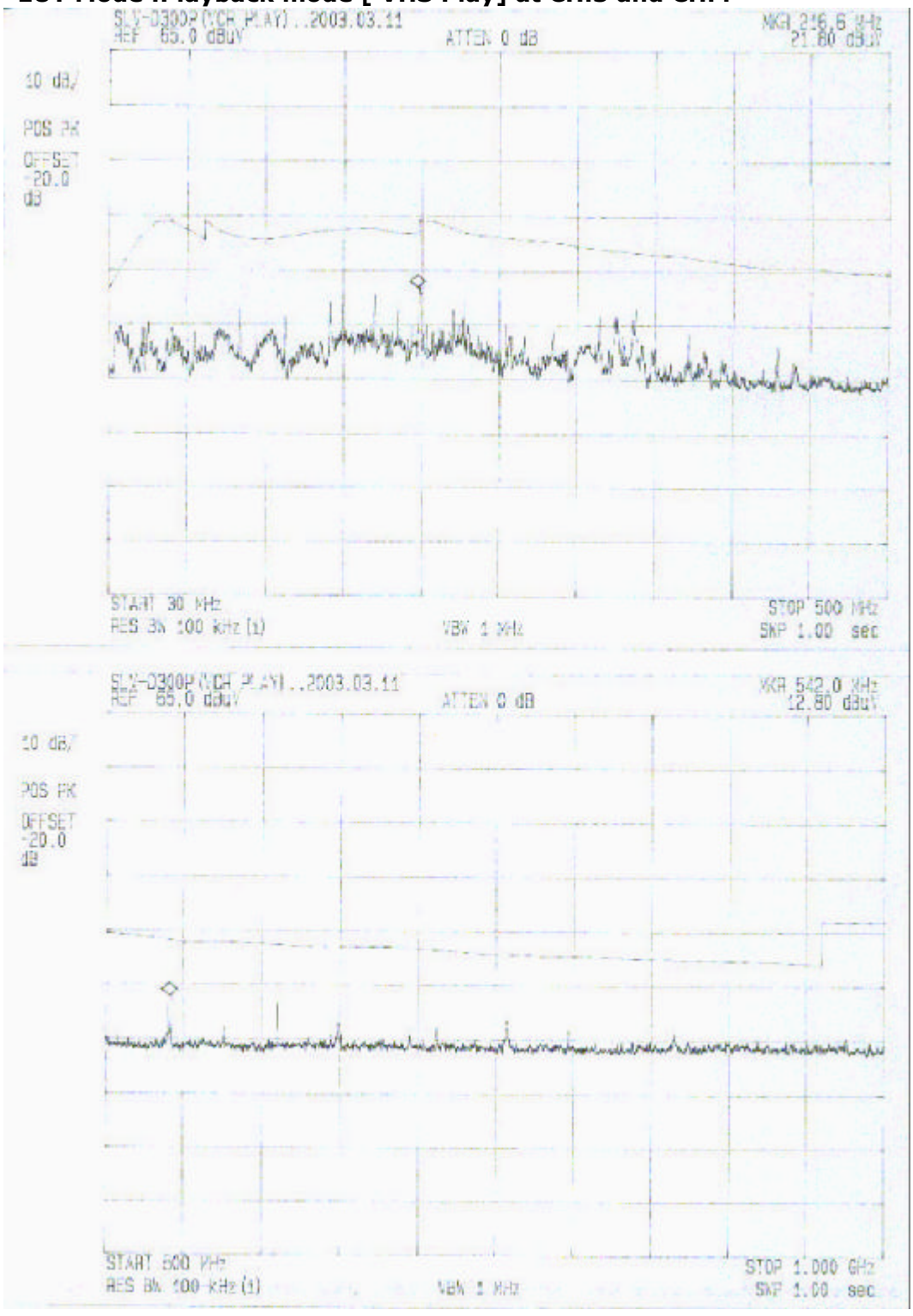
Configurate the EUT System in accordance with ANSI C63.4-1992section 8 and 12.2.
Power cords for the EUT System are connected the receptacle on the ground plane.
The output ports are connected to the cable provided with the device and the ending port of the cable are terminated in the proper impedance.
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

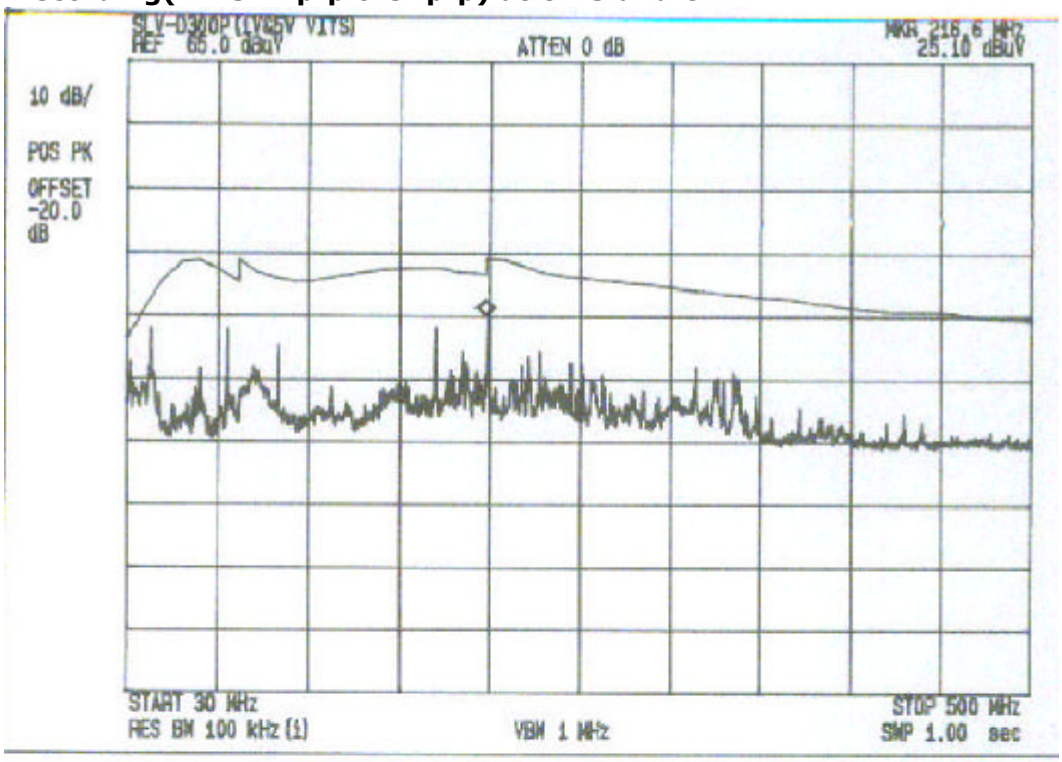


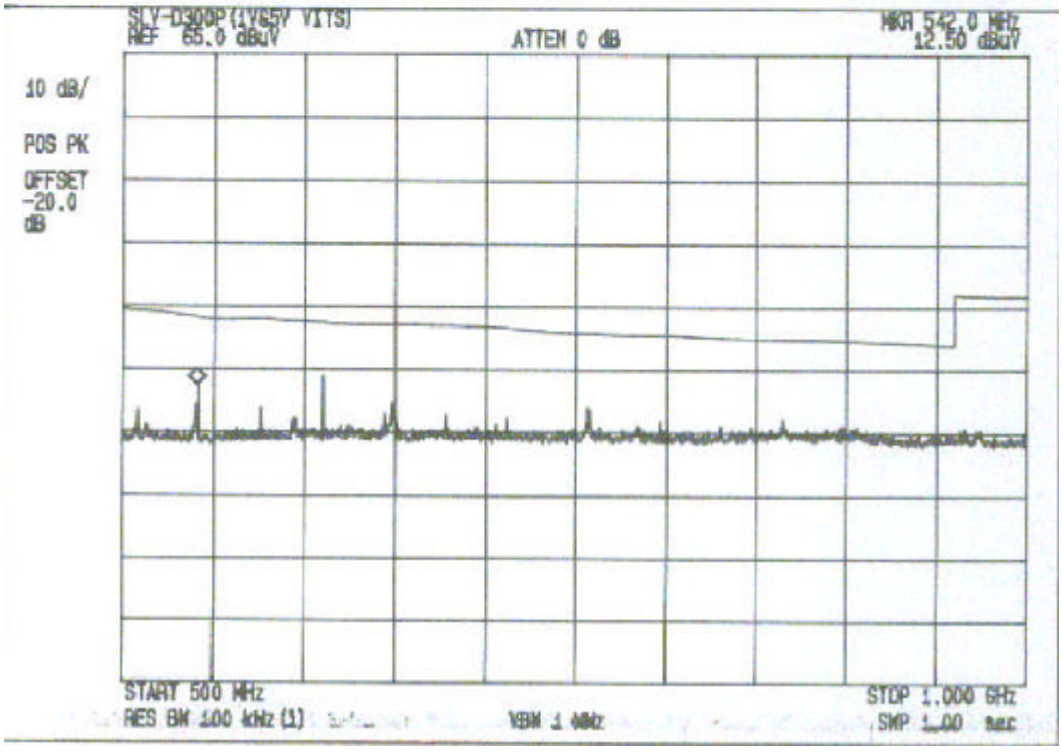
### 3.1.3 Test Results

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

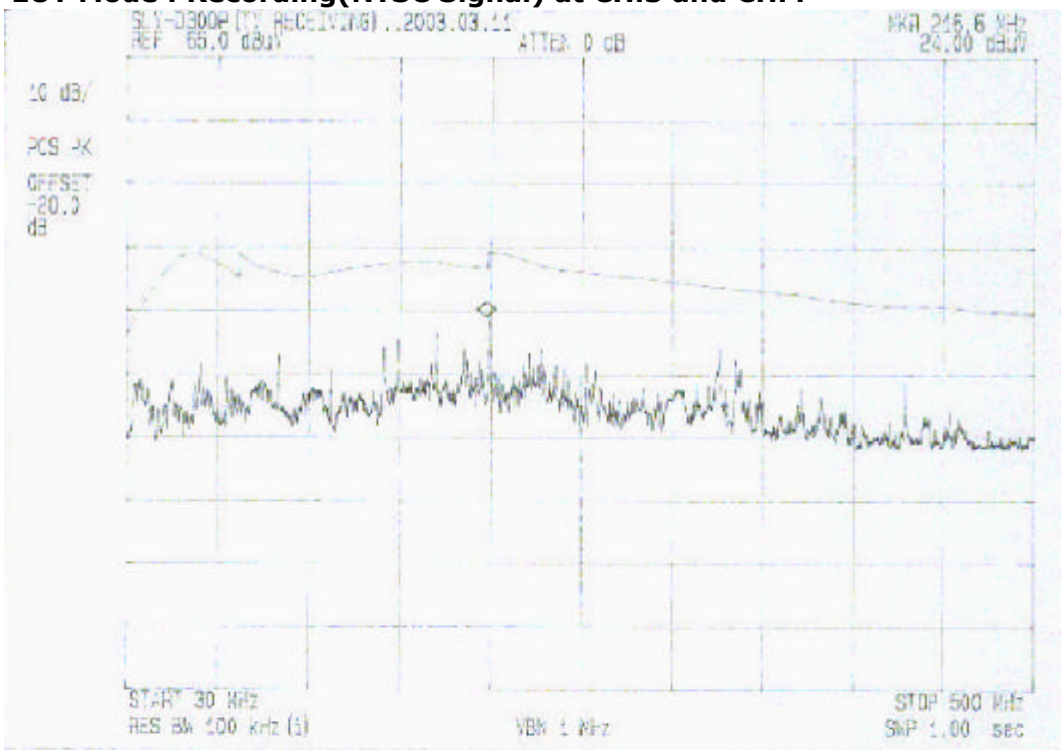


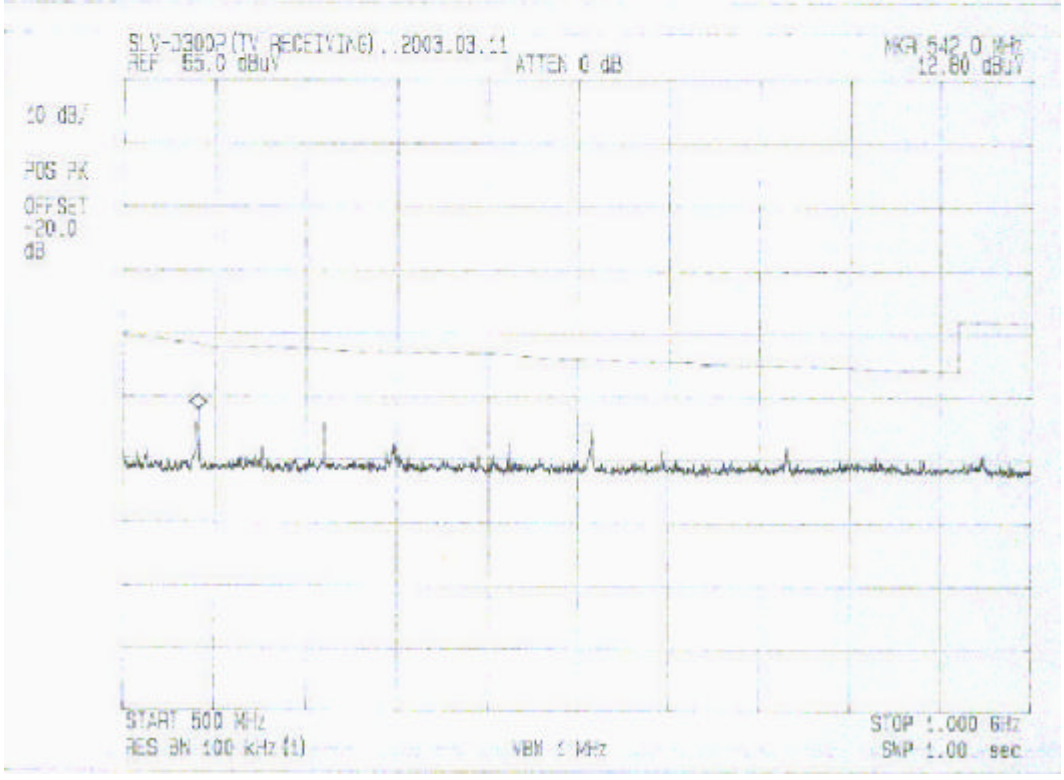
**Recording(VITS 1Vp-p & 5Vp-p) at CH.3 and CH.4**



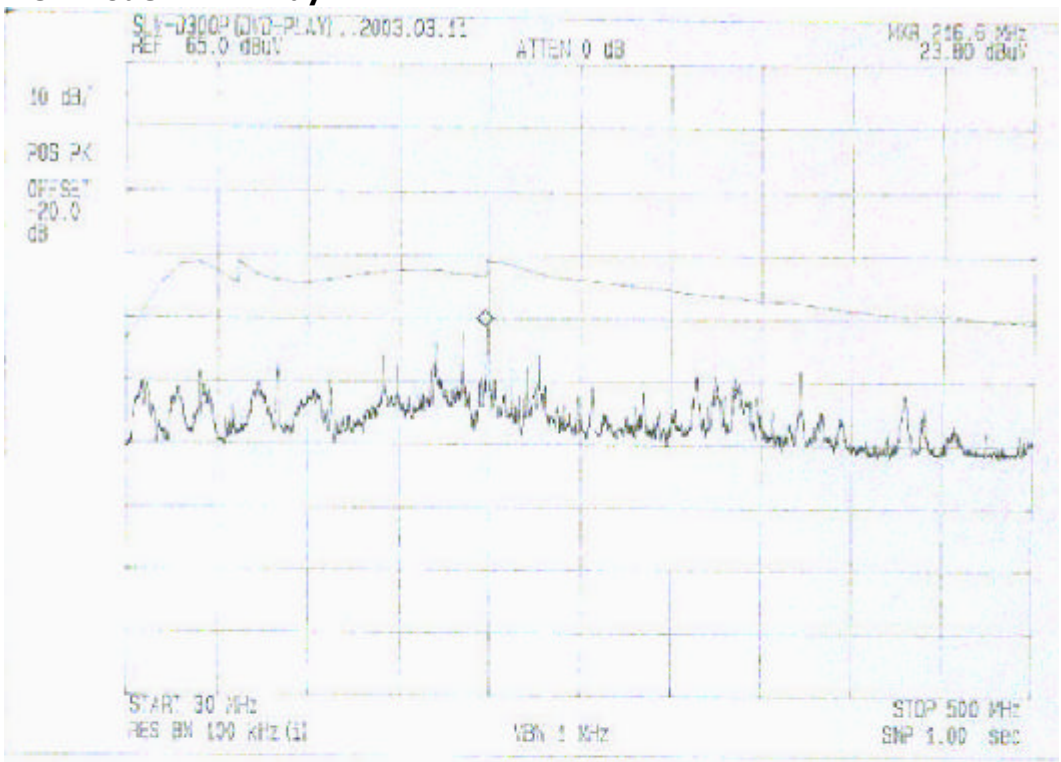



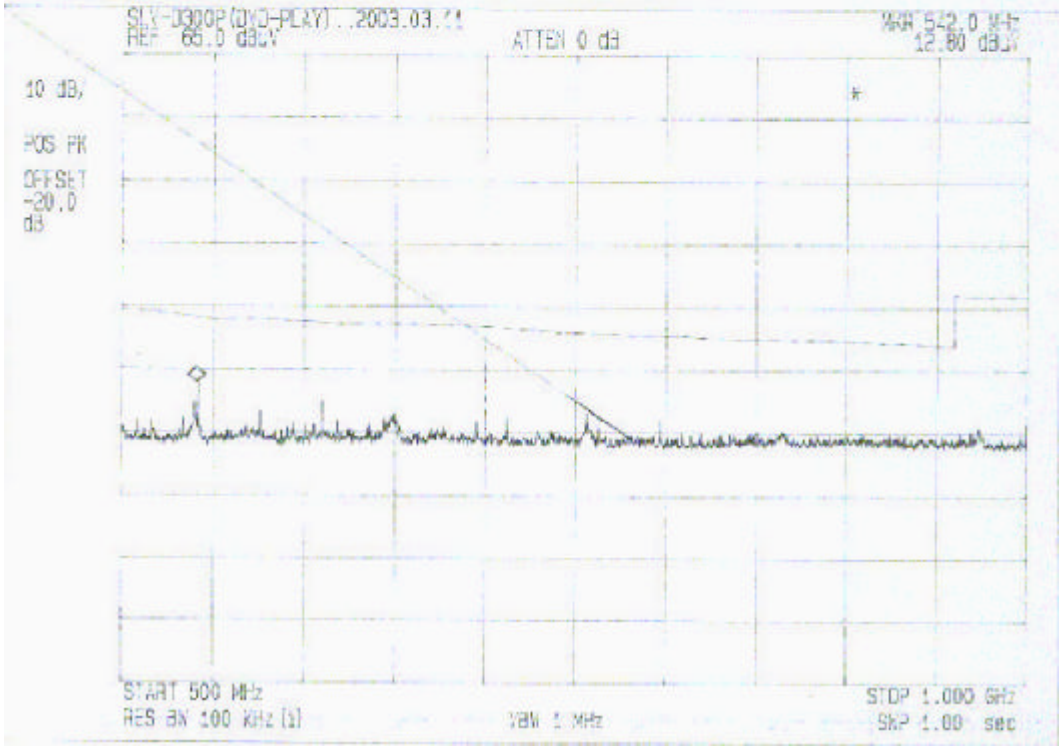
**EUT Mode : Recording(NTSC Signal) at CH.3 and CH.4**



**EUT Mode : DVD Play**



## 3.2 AC POWERLINE CONDUCTED EMISSION MEASUREMENT

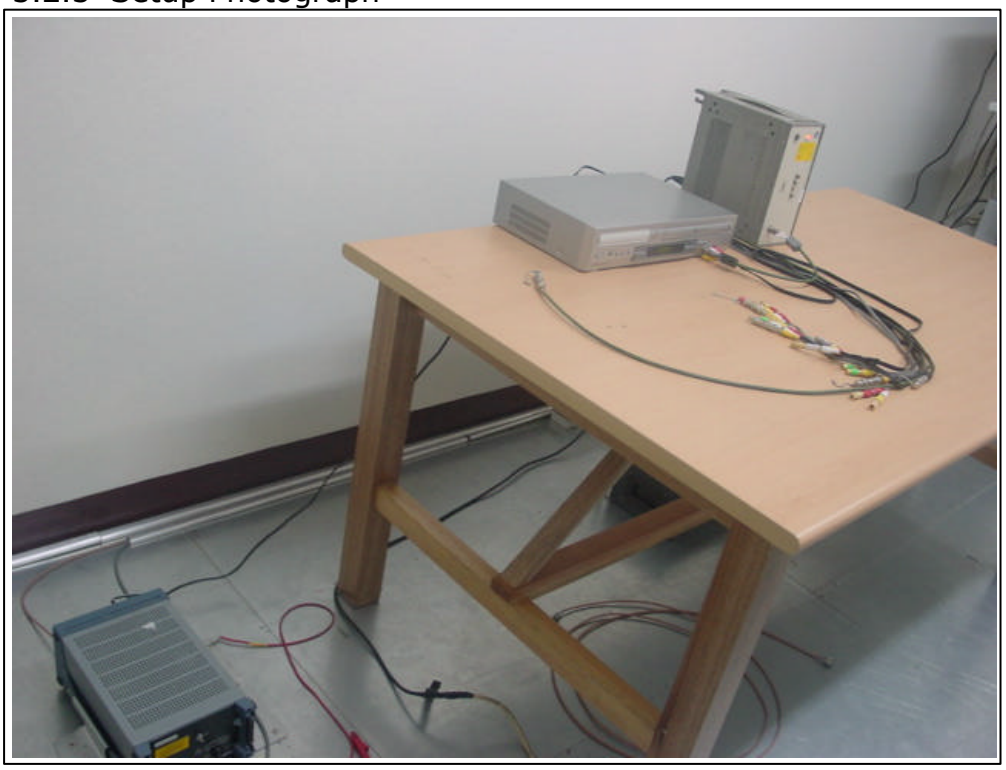
### 3.2.1 Reference Rule and Specification

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



### 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)

**3) EUT Mode : Record [ 5V 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 | 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 | 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 | 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)

**5) EUT Mode : DVD Play**

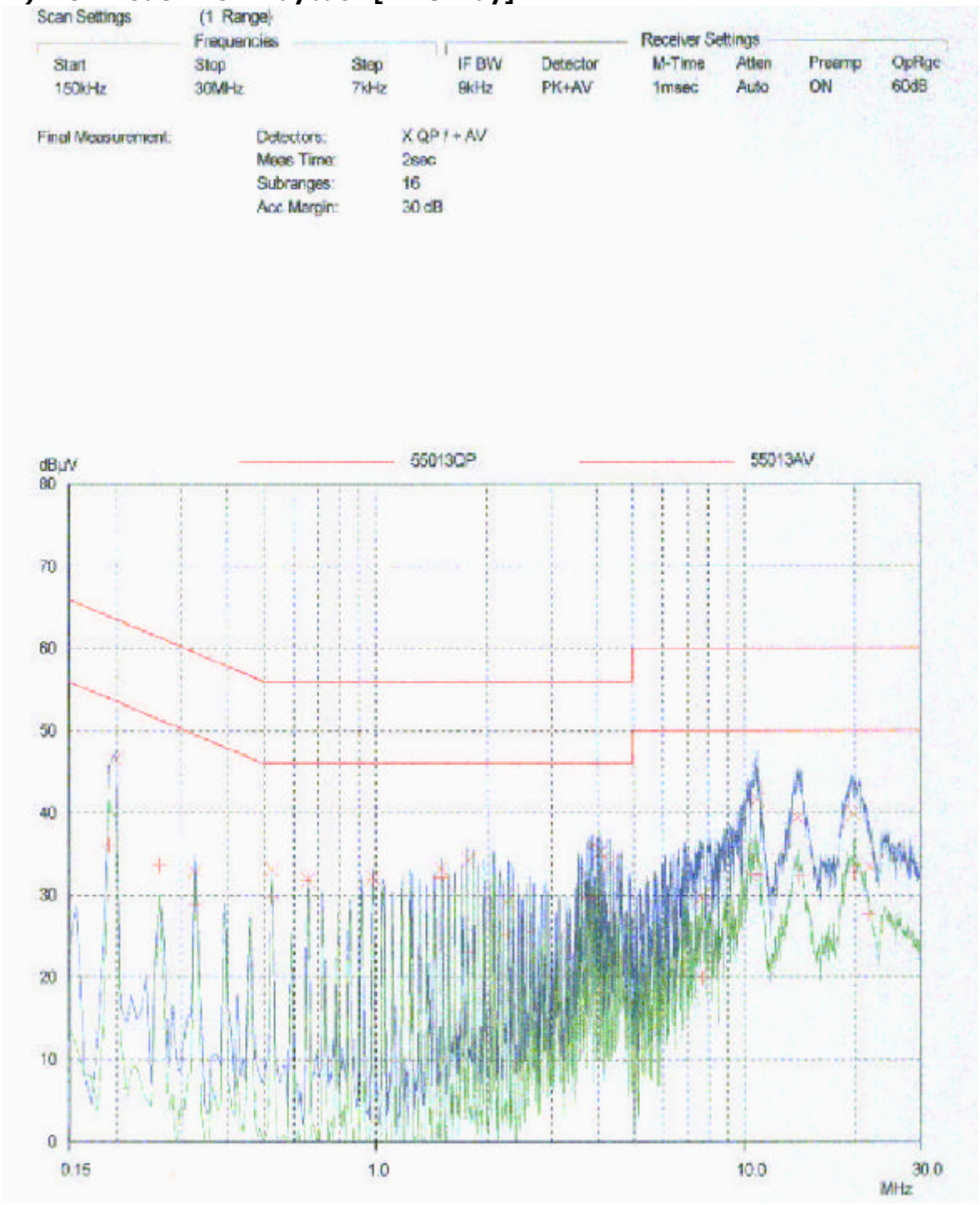
| Frequency | Line | Meter reading (a) | | Total Loss (b) | Results (a) + (b) | | Limits | | Margin | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | QP | AV | | QP | AV | QP | AV | QP | AV |
| [MHz] | | [dBuV] | | [dB] | [dBuV] | | [dBuV] | | [dB] | |
| 0.199 | Live | 46.6 | 36.2 | 0.2 | 46.7 | 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

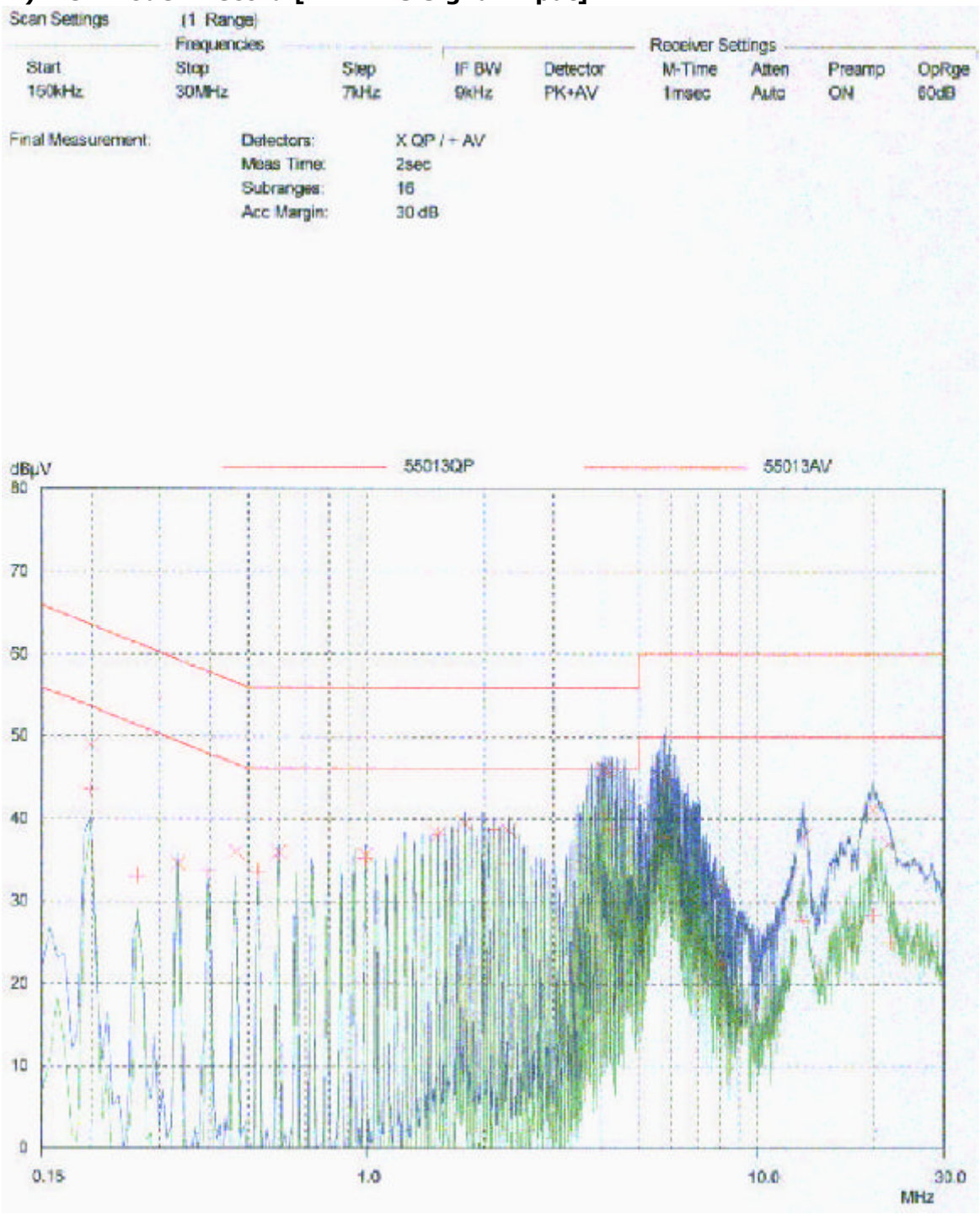
* Results = Meter Reading(QP or AV) + Total Loss(LISN Insertion loss + Cable loss)

## 3.2.5 Test Graphs

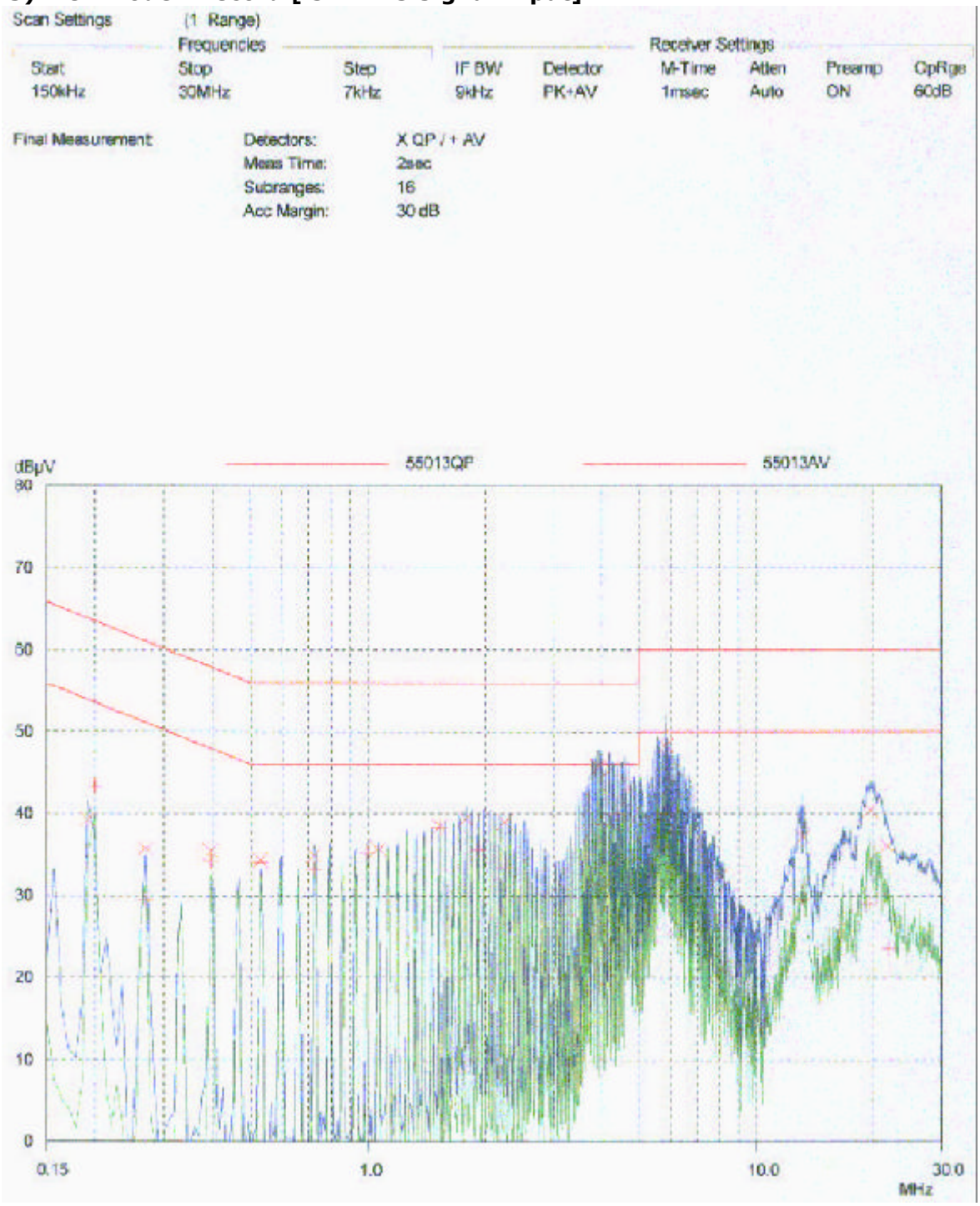
**1) EUT Mode : VCR Playback [ VHS Play]**



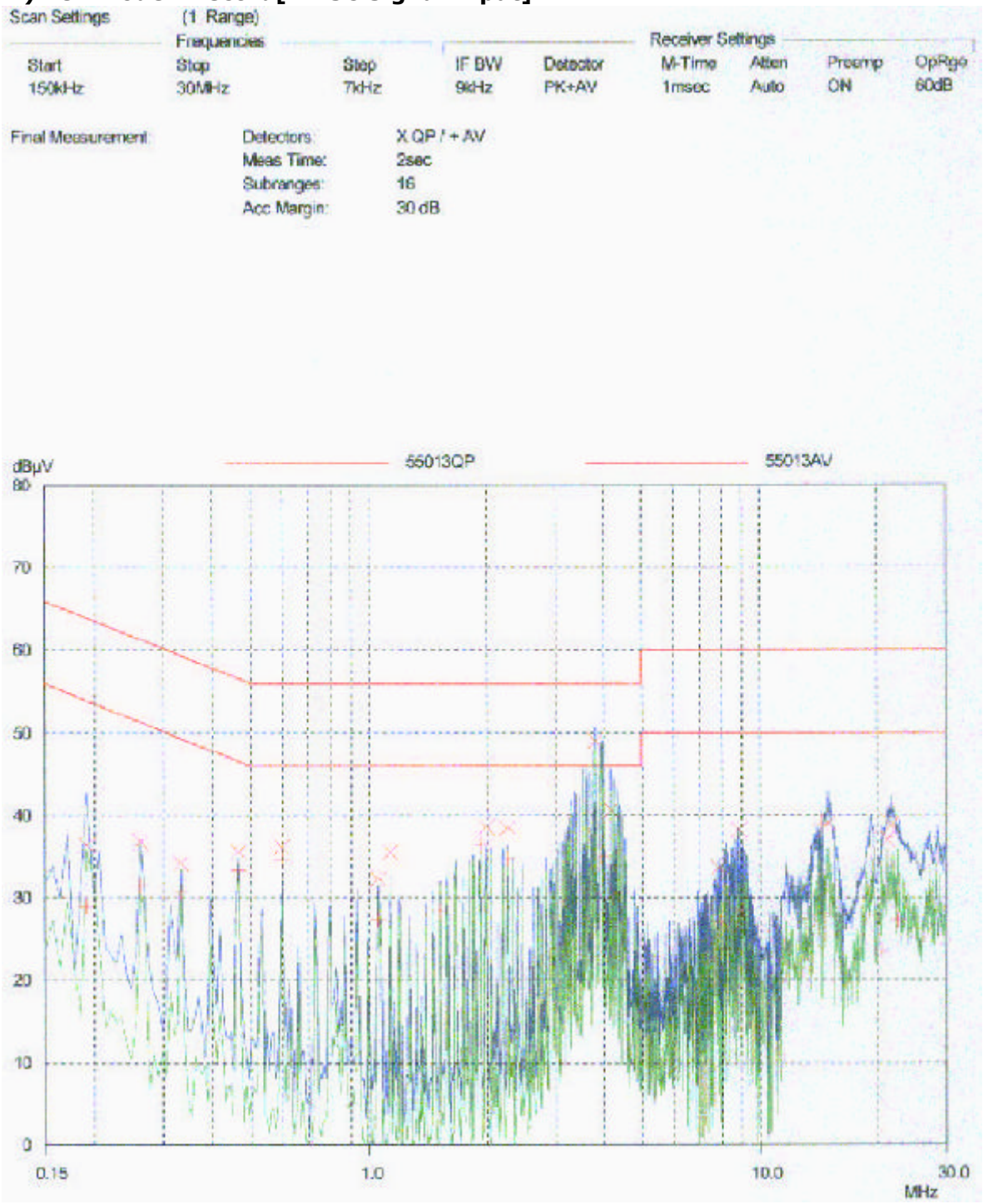
**2) EUT Mode : Record [ 1V VITS Signal Input]**



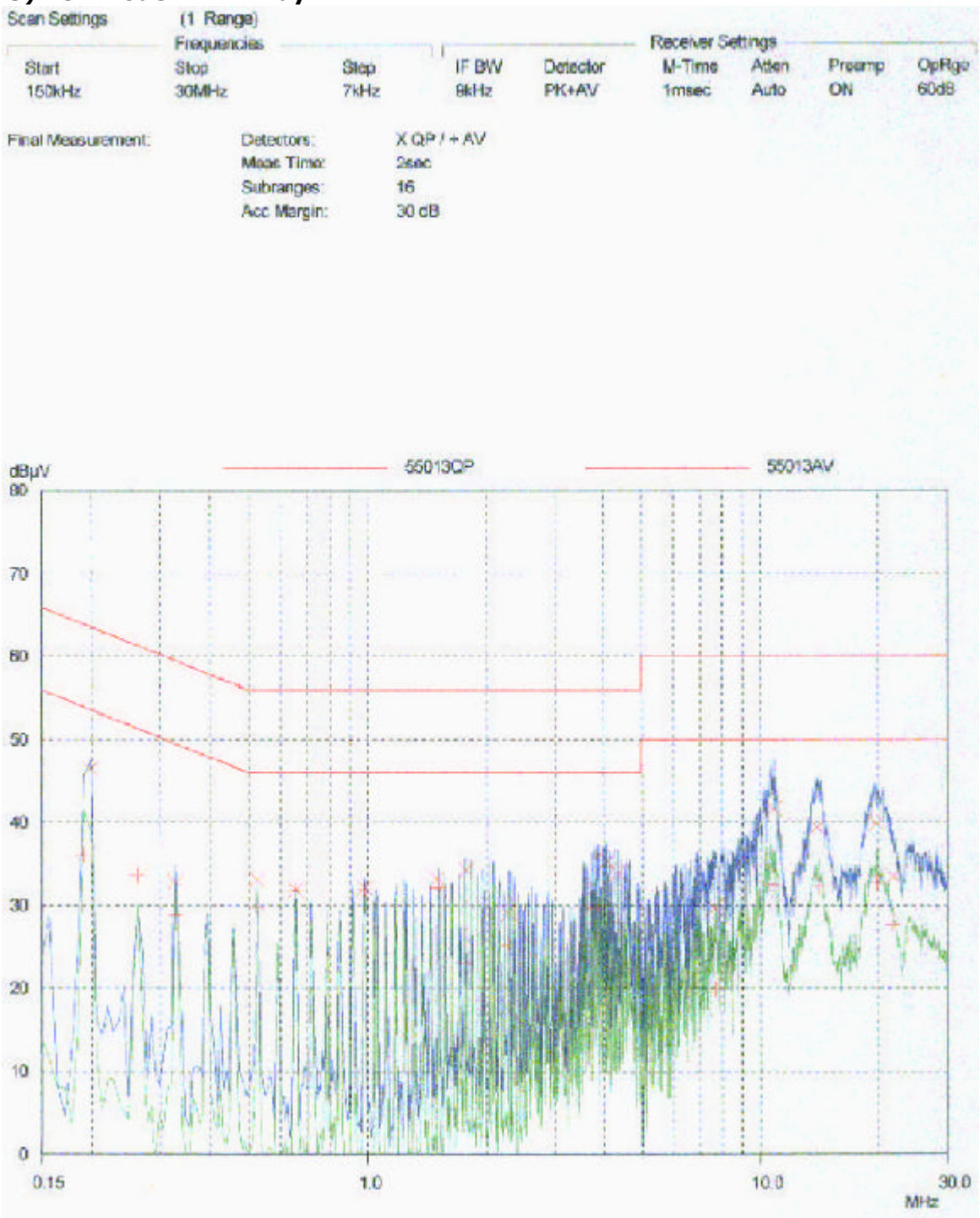
### 3) EUT Mode : Record [ 5V VITS Signal Input]



**4) EUT Mode : Record[ NTSC Signal Input]**



**5) EUT Mode : DVD Play**

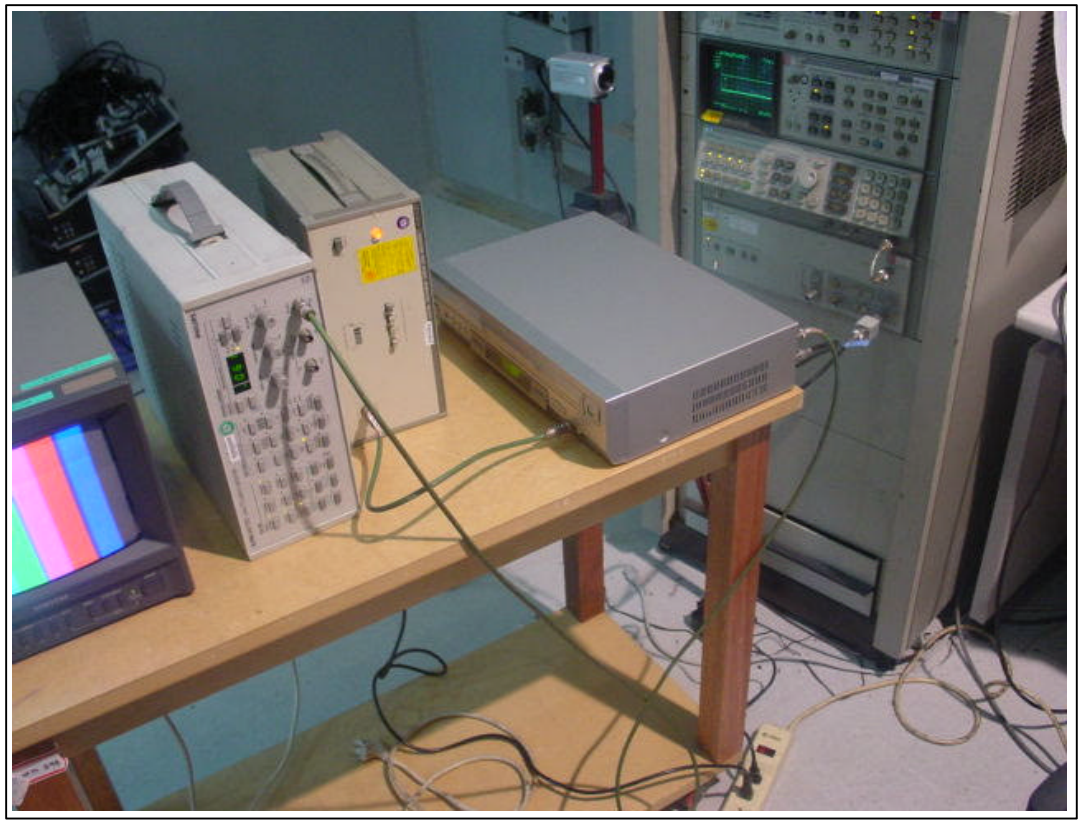


## 3.3 OUTPUT SIGNAL LEVEL MEASUREMENT

### 3.3.1 Test Procedure

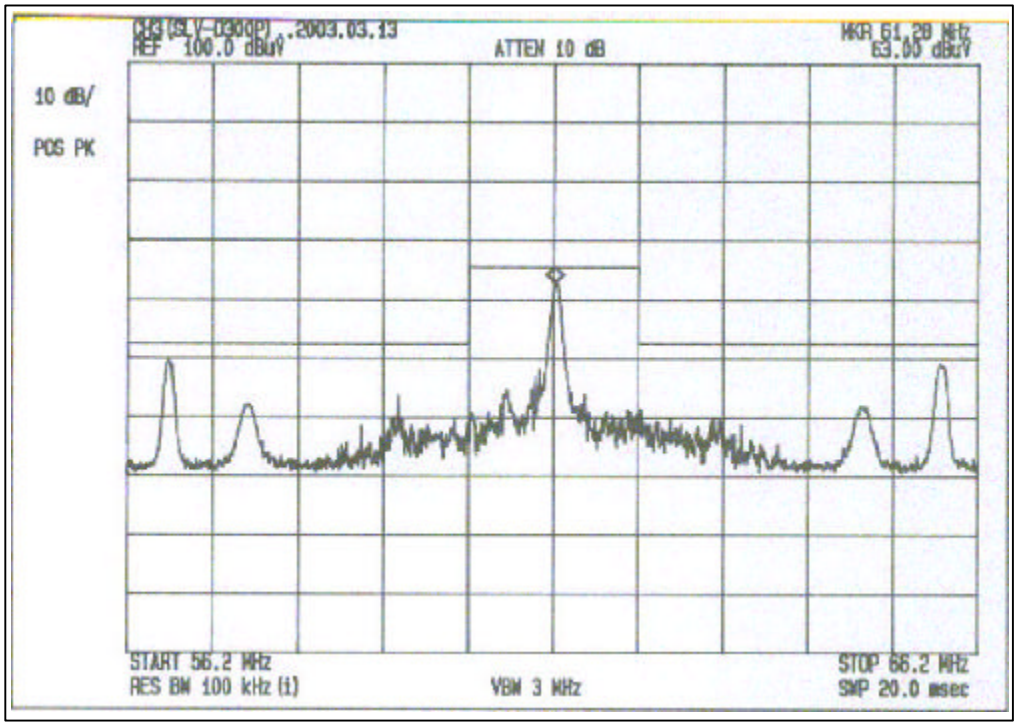
Configurate the EUT System in accordance with ANSI C63.4-1992 section 12.2.
The RF output terminal is connected is to the spectrum analyzer through the matching transformer with a calibrated 75 ohms coaxial cable.
Then, the RF output signal level is measured under the EUT condition produces the maximum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

### 3.3.2 Setup Photograph

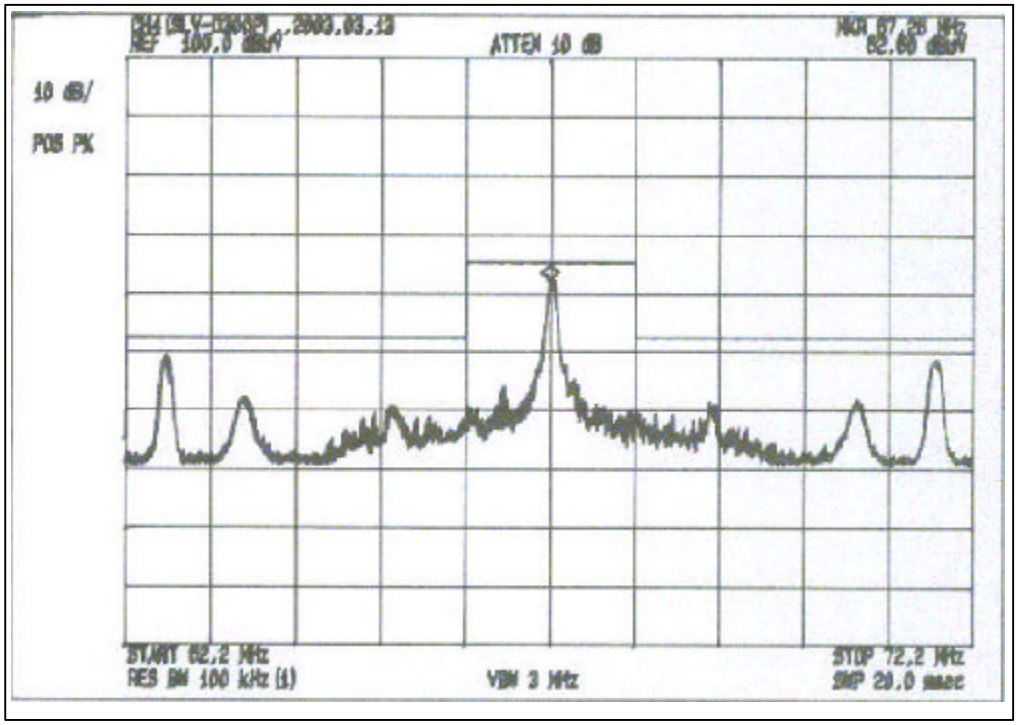


### 3.3.3 Test Results

**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.

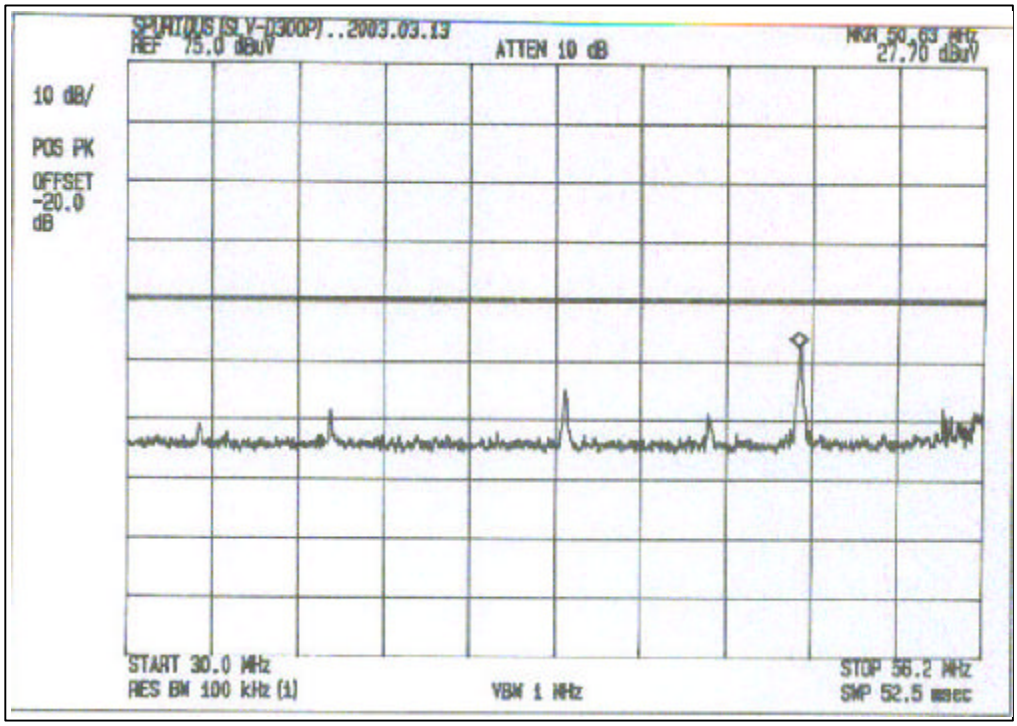
### 3.4.2 Setup Photograph

### 3.4.3 Test Results

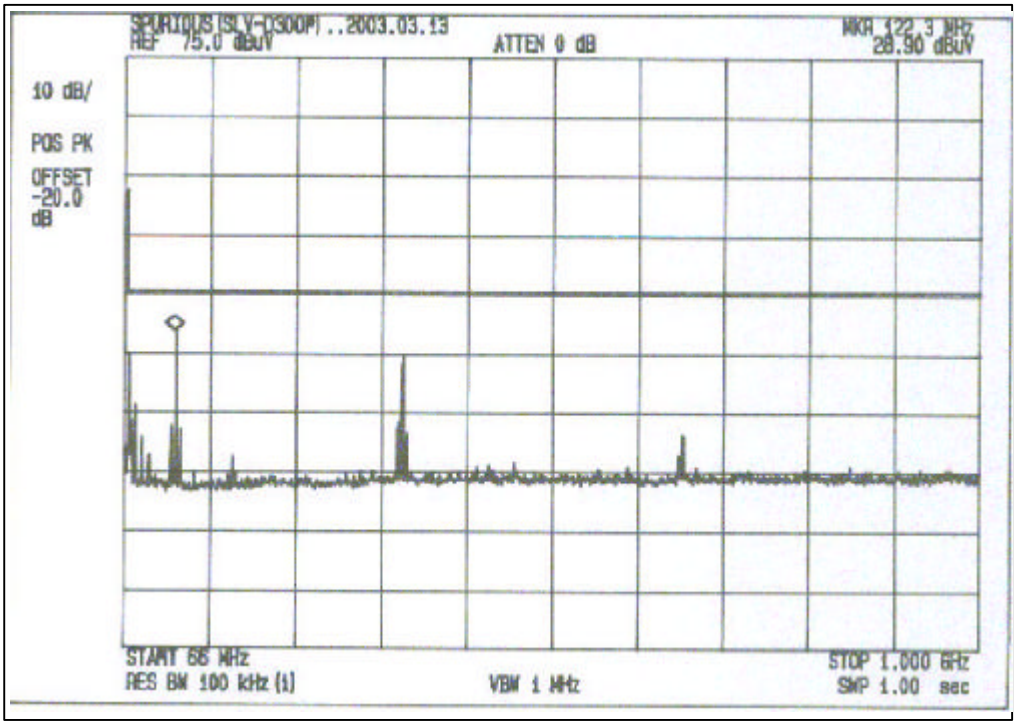
**Test channel : 3**

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

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



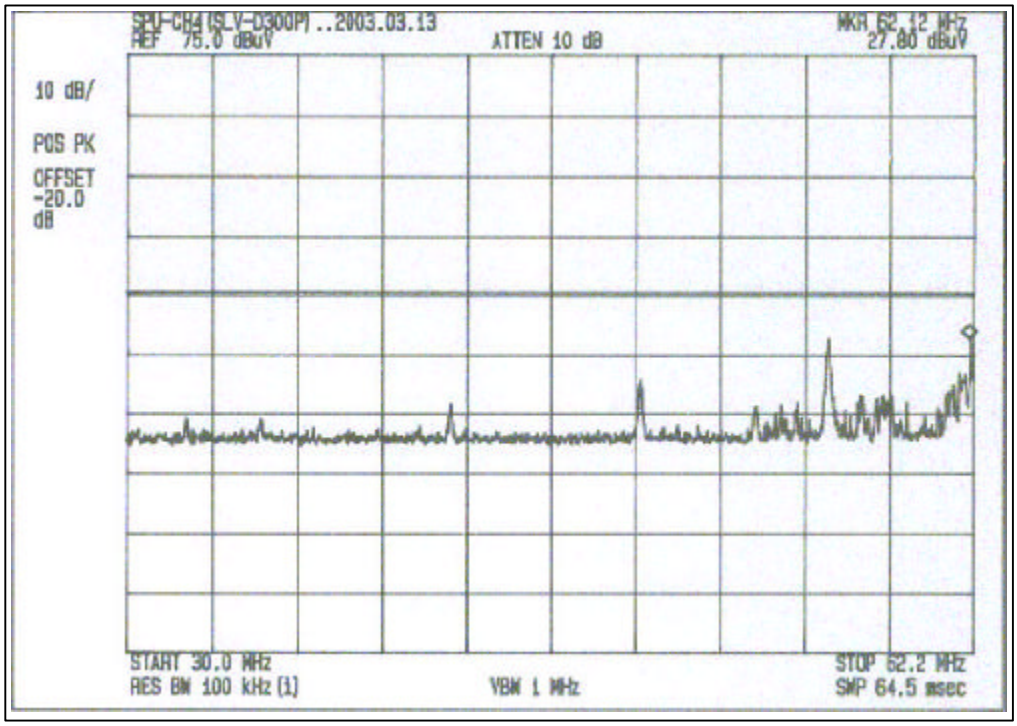

**From more than 7.4MHz above the visual carrier frequency**



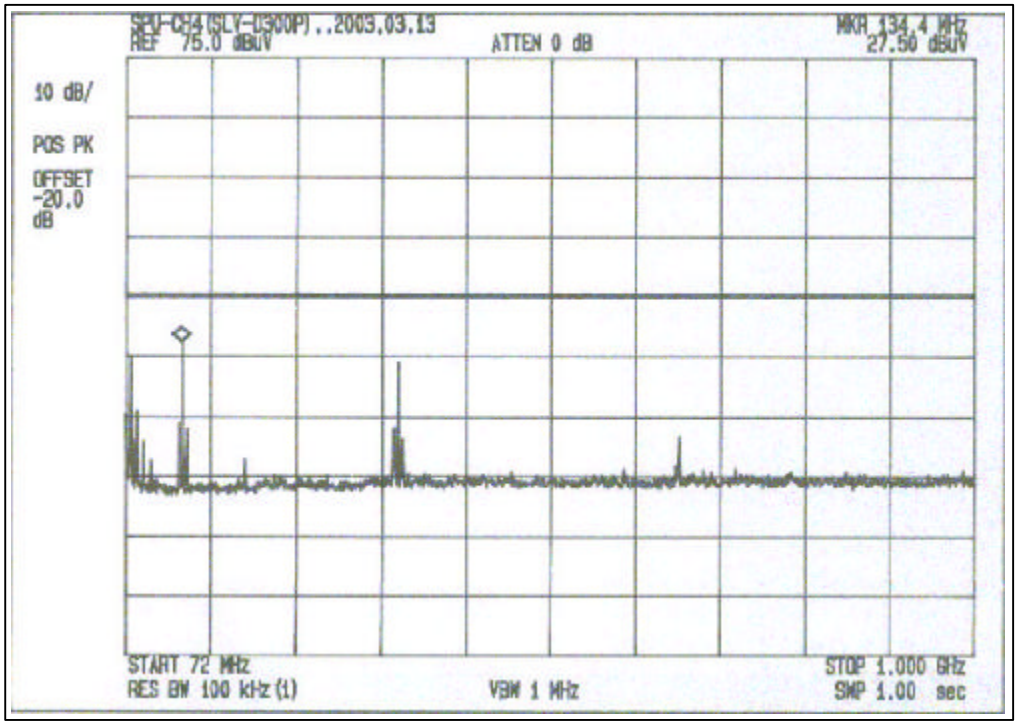
**Test channel : 4**

**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**



## 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 |