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FCC ID : AK8SLVM20HF

REPORT OF MEASUREMENTS

Date : June 23, 1998  
Issue in : Tokyo, Japan

JQA APPLICATION NO. : 80-80251

1. Applicant : Sony Corporation  
7-35, 6-chome, Kitashinagawa,  
Shinagawa-ku, Tokyo 141-0001, Japan
2. Manufacturer : Sony Corporation  
7-35, 6-chome, Kitashinagawa,  
Shinagawa-ku, Tokyo 141-0001, Japan
3. Description of Equipment : Transmitter
  - a) FCC ID : AK8SLVM20HF
  - b) Trade Name : SONY
  - c) Model No. : SLV-M20HF
  - d) Operating Frequency : 13.56 MHz
  - e) Power Supply : 120 VAC 60 Hz
4. Applicable Rule : FCC Rules & Regulations Part 15  
Subpart C (June 23, 1989)
5. Place of Measurement : JQA EMC Engineering Dept.
6. Date of Measurement : June 19, 1998 (Completed)
7. Total Pages of This Report : 28 (including this page)
8. I certify that I am authorized to sign for the report and that all the statement in this report and in the exhibits hereto are true and correct to the best my knowledge and belief.

  
Shigeru Osawa, Assistant Manager  
Testing Div.  
EMC Engineering Dept.

## 1. Transmitter Fundamental and Spurious Emission: [§15.225 &amp; §15.209]

Measurement Method Employed:

Measurements were made under the conditions specified ANSI C63.4.

The transmitter under test was operated continuously in its normal operating mode for the purpose of the measurements. In order to secure the continuous operation of the EUT, rewiring in the circuit was done by the manufacturer so as to affect its intended operation.

The receiving loop antenna was positioned with its plane vertical at 30 meters from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT.

The center of the loop antenna was 1 meter above ground. The wooden turntable was rotated 360 degrees to obtain the highest reading on the field strength meter or on the display of the spectrum analyzer.

The results were shown the maximum value.

Measurement Results:

- Internal Large Antenna -  
Operating Frequency : 13.56 MHz  
Distance of Measurement : 30 meters

Frequency (MHz)	Field Strength (dB/uV/m)
Fundamental 13.56	< 27.0
Harmonic Frequency 27.12	< 27.0

- Internal Small Antenna -  
Operating Frequency : 13.56 MHz  
Distance of Measurement : 30 meters

Frequency (MHz)	Field Strength (dB/uV/m)
Fundamental 13.56	< 27.0
Harmonic Frequency 27.12	< 27.0

The distance of measurements was reduced to 10 meters.

- Internal Large Antenna -  
Operating Frequency : 13.56 MHz  
Distance of Measurement : 10 meters

Frequency (MHz)	Field Strength (dB/uV/m)
Fundamental 13.56	40.7
Harmonic Frequency 27.12	< 27.0

- Internal Small Antenna -  
Operating Frequency : 13.56 MHz  
Distance of Measurement : 10 meters

Frequency (MHz)	Field Strength (dB/uV/m)
Fundamental 13.56	< 27.0
Harmonic Frequency 27.12	< 27.0

- Note: 1. Meter reading value shows field strength, because the value includes antenna factor.
2. The symbol of "<" means "or less".
3. Measuring Instrument Setting:

Detector Function : CISPR Quasi-peak Peak  
IF Band width : 9 kHz

For fundamental, the measured field strength was extrapolated to distance 30 meters, using the formula that field strength varies as the inverse distance square (40 dB per decade of distance).

Calculation :

$$40.7 \text{ dB/uV/m} - 20\log_{10}\left(\left(\frac{30}{10}\right)^2\right) = 40.7 - 19.1 \\ = 21.6 \text{ dB/uV/m at 30 meters}$$

Limits for fundamental (§ 15.225(a)) =  $20\log_{10}(10000) = 80 \text{ dB/uV/m}$

## 2. Radiated Spurious Emission: [ §15.209]

### Measurement Method Employed:

Measurements were made under the conditions specified ANSI C63.4.

The transmitter under test was operated continuously in its normal operating mode for the purpose of the measurements. In order to secure the continuous operation of the device under test, rewiring in the circuit was done by the manufacturer so as to affect its intended operation.

The receiving antenna polarized horizontally was varied from 1 to 4 meters and the wooden turntable was rotated 360 degrees to obtain the highest reading on the field strength meter or on the display of the spectrum analyzer. These measurements were repeated with the receiving antenna polarized vertically.

Measurement Results:

- Internal Large Antenna -  
Operating Frequency : 13.56 MHz  
Distance of Measurement : 3 meters

Frequency (MHz)	Antenna Factor (dB)	Meter Reading		Field Strength at 3 m	
		Horizontal (dB/uV)	Vertical (dB/uV)	Horizontal (uV/m)	Vertical (uV/m)
40.680	2.3	18.4	28.3	10.8	33.9
54.240	5.0	18.5	12.4	15.0	7.4
67.800	7.1	18.6	19.6	19.3	21.6
81.360	8.9	9.5	7.3	8.3	6.5
94.920	10.4	12.0	10.2	13.2	10.7
108.480	11.7	14.1	11.0	19.5	13.6
122.040	12.9	19.7	14.0	42.7	22.1
135.600	14.0	12.1	12.4	20.2	20.9
149.160	15.0	15.8	10.1	34.7	18.0
162.720	15.9	12.9	7.6	27.5	15.0
176.280	16.7	12.7	6.6	29.5	14.6
189.840	17.5	9.7	4.3	22.9	12.3
203.400	18.2	10.3	5.1	26.6	14.6
216.960	18.9	10.4	4.2	29.2	14.3
230.520	19.6	18.5	14.3	80.4	49.5
244.080	20.2	12.6	17.3	43.7	75.0
257.640	20.8	15.8	17.4	67.6	81.3
271.200	21.3	17.2	18.4	84.1	96.6
284.760	21.9	16.8	13.3	86.1	57.5
298.320	22.4	15.4	10.7	77.6	45.2
311.880	22.9	11.8	4.0	54.3	22.1
325.440	23.3	10.6	6.9	49.5	32.4
339.000	23.8	11.0	6.3	55.0	32.0
352.560	24.2	10.8	10.9	56.2	56.9
366.120	24.6	10.4	9.3	56.2	49.5
379.680	25.0	10.6	11.2	60.3	64.6
393.240	25.4	7.5	8.7	44.2	50.7
406.800	25.8	5.7	9.5	37.6	58.2
420.360	26.2	1.3	3.3	23.7	29.9
433.920	26.5	1.2	-0.1	24.3	20.9
447.480	26.9	1.8	0.3	27.2	22.9
461.040	27.2	0.8	2.6	25.1	30.9
474.600	27.5	-1.5	-0.4	20.0	22.6
488.160	27.9	-0.1	0.5	24.5	26.3
501.720	28.2	-1.0	-1.6	22.9	21.4
515.280	28.5	-0.5	-1.3	25.1	22.9
528.840	28.9	-1.5	-0.7	23.4	25.7
542.400	29.2	1.0	4.3	32.4	47.3
555.960	29.5	< -5.0	< -5.0	< 16.8	< 16.8
569.520	29.9	1.6	1.1	37.6	35.5
583.080	30.2	< -5.0	-0.9	< 18.2	29.2
596.640	30.5	1.0	-0.2	37.6	32.7
610.200	30.8	-1.9	< -5.0	27.9	< 19.5

Frequency (MHz)	Antenna Factor (dB)	Meter Reading		Field Strength at 3 m	
		Horizontal (dB/uV)	Vertical (dB/uV)	Horizontal (uV/m)	Vertical (uV/m)
623.760	31.1	1.3	-0.1	41.7	35.5
637.320	31.3	-1.5	-1.9	30.9	29.5
650.880	31.6	0.8	1.1	41.7	43.2
664.440	31.9	-0.5	-1.5	37.2	33.1
678.000	32.2	3.5	0.2	61.0	41.7
691.560	32.4	0.0	< -5.0	41.7	< 23.4
705.120	32.7	3.3	0.7	63.1	46.8
718.680	32.9	0.5	-1.3	46.8	38.0
732.240	33.2	2.1	1.3	58.2	53.1
745.800	33.4	-1.1	-1.9	41.2	37.6
759.360	33.7	0.7	-0.5	52.5	45.7
772.920	33.9	-1.4	< -5.0	42.2	< 27.9
786.480	34.1	-0.7	-1.4	46.8	43.2
800.040	34.4	< -5.0	< -5.0	< 29.5	< 29.5
813.600	34.6	< -5.0	-0.3	< 30.2	51.9
827.160	34.8	< -5.0	-1.7	< 30.9	45.2
840.720	35.0	< -5.0	0.2	< 31.6	57.5
854.280	35.3	< -5.0	< -5.0	< 32.7	< 32.7
867.840	35.5	-1.5	-0.2	50.1	58.2
881.400	35.7	-1.5	-1.1	51.3	53.7
894.960	35.9	< -5.0	-0.9	< 35.1	56.2
908.520	36.1	< -5.0	-1.4	< 35.9	54.3
922.080	36.3	< -5.0	-1.5	< 36.7	55.0
935.640	36.5	< -5.0	< -5.0	< 37.6	< 37.6
949.200	36.7	< -5.0	< -5.0	< 38.5	< 38.5
962.760	36.9	< -5.0	< -5.0	< 39.4	< 39.4
976.320	37.1	< -5.0	< -5.0	< 40.3	< 40.3
989.880	37.3	< -5.0	< -5.0	< 41.2	< 41.2

- Notes: 1. The spectrum was checked from 30 MHz to 1000 MHz.  
All emissions not listed were found to be more than 20 dB below the limits.
2. The symbol of "<" means "or less".
3. The cable loss was including in the antenna factor.
4. Sample calculation:

At 40.680 MHz

$$10^{(Af + Mr)/20} = 10^{(2.3 + 28.3)/20} = 33.9 \text{ uV/m}$$

$$33.9 \times (D-1 / D-2) \text{ in meter} = 33.9 \text{ uV/m}$$

Where,

Af = Antenna Factor including the cable loss

Mr = Meter reading

D-1 = Measured distance in meter : 3 m

D-2 = Specified distance in meter : 3 m

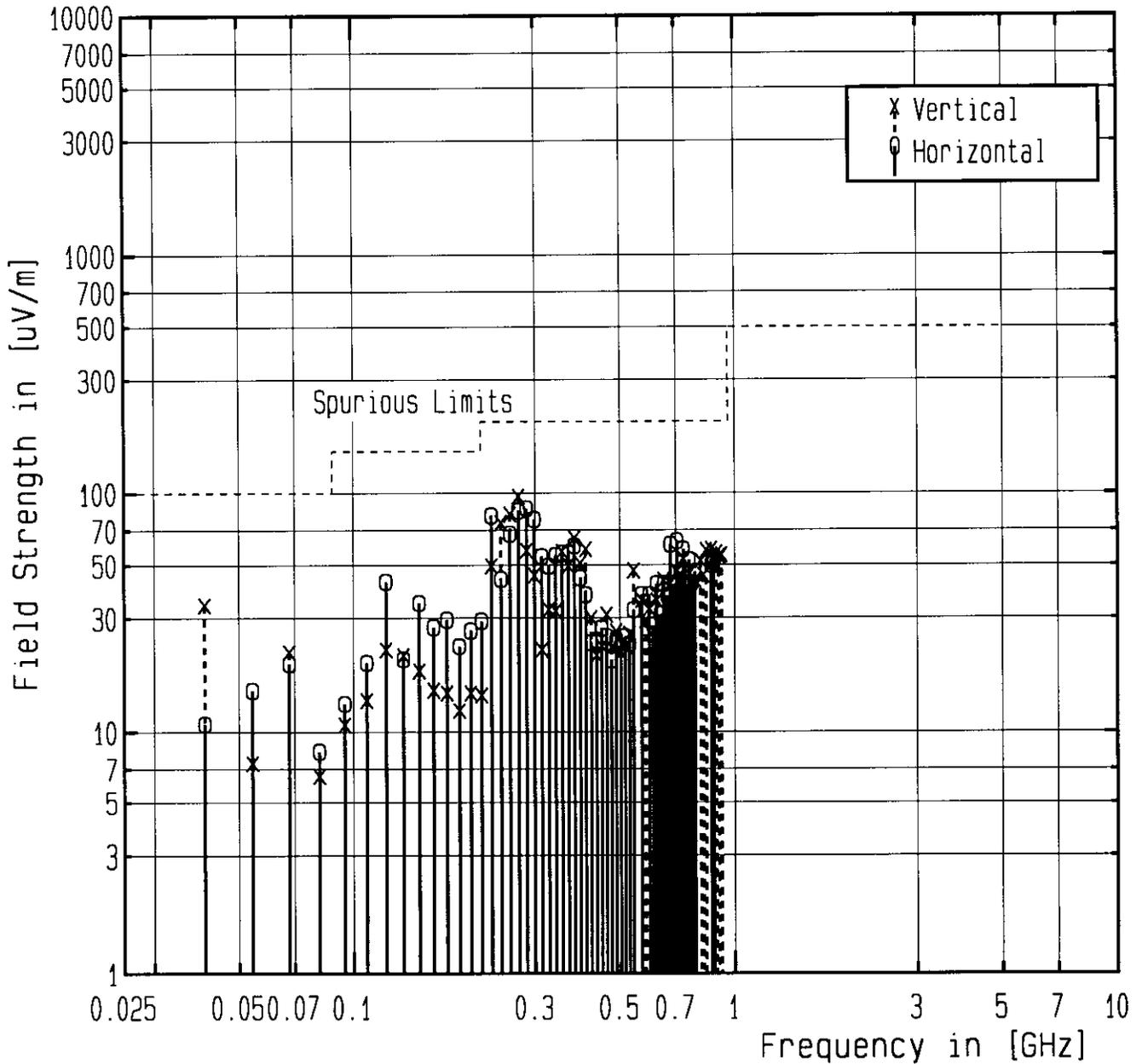
5. Measuring Instrument Setting:

Detector function : CISPR quasi-peak

IF Bandwidth : 120 kHz

## Radiated Spurious Emissions

FCC ID : AK8SLVM20HF  
Operating Frequency : 13.56 MHz  
Test Condition : Internal Large Antenna



Measurement Results:

- Internal Small Antenna -  
 Operating Frequency : 13.56 MHz  
 Distance of Measurement : 3 meters

Frequency (MHz)	Antenna Factor (dB)	Meter Reading		Field Strength at 3 m	
		Horizontal (dB/uV)	Vertical (dB/uV)	Horizontal (uV/m)	Vertical (uV/m)
40.680	2.3	6.9	19.2	2.9	11.9
54.240	5.0	11.9	9.1	7.0	5.1
67.800	7.1	7.6	3.9	5.4	3.5
81.360	8.9	11.3	10.1	10.2	8.9
94.920	10.4	11.1	13.7	11.9	16.0
108.480	11.7	10.8	8.0	13.3	9.7
122.040	12.9	19.0	12.8	39.4	19.3
135.600	14.0	16.4	14.6	33.1	26.9
149.160	15.0	16.8	10.6	38.9	19.1
162.720	15.9	16.2	11.0	40.3	22.1
176.280	16.7	8.5	3.5	18.2	10.2
189.840	17.5	8.7	4.4	20.4	12.4
203.400	18.2	12.2	6.3	33.1	16.8
216.960	18.9	9.7	2.9	26.9	12.3
230.520	19.6	14.6	13.9	51.3	47.3
244.080	20.2	14.2	14.9	52.5	56.9
257.640	20.8	13.2	15.8	50.1	67.6
271.200	21.3	15.3	14.9	67.6	64.6
284.760	21.9	15.9	12.3	77.6	51.3
298.320	22.4	14.6	8.7	70.8	35.9
311.880	22.9	12.6	3.9	59.6	21.9
325.440	23.3	9.5	6.6	43.7	31.3
339.000	23.8	11.0	6.2	55.0	31.6
352.560	24.2	7.0	7.0	36.3	36.3
366.120	24.6	10.0	9.2	53.7	49.0
379.680	25.0	8.9	7.8	49.5	43.7
393.240	25.4	6.5	7.5	39.4	44.2
406.800	25.8	3.8	6.0	30.2	38.9
420.360	26.2	2.5	4.0	27.2	32.4
433.920	26.5	3.2	2.7	30.5	28.8
447.480	26.9	2.2	0.6	28.5	23.7
461.040	27.2	2.2	-0.1	29.5	22.6
474.600	27.5	0.4	-0.8	24.8	21.6
488.160	27.9	1.1	-0.6	28.2	23.2
501.720	28.2	1.2	0.7	29.5	27.9
515.280	28.5	1.4	2.1	31.3	33.9
528.840	28.9	1.8	1.1	34.3	31.6
542.400	29.2	3.0	5.0	40.7	51.3
555.960	29.5	-0.4	0.5	28.5	31.6
569.520	29.9	2.5	1.7	41.7	38.0
583.080	30.2	0.6	0.5	34.7	34.3
596.640	30.5	1.8	1.4	41.2	39.4
610.200	30.8	1.1	-0.7	39.4	32.0

Frequency (MHz)	Antenna Factor (dB)	Meter Reading		Field Strength at 3 m	
		Horizontal (dB/uV)	Vertical (dB/uV)	Horizontal (uV/m)	Vertical (uV/m)
623.760	31.1	3.0	0.4	50.7	37.6
637.320	31.3	1.2	-0.6	42.2	34.3
650.880	31.6	1.2	0.3	43.7	39.4
664.440	31.9	0.2	-0.7	40.3	36.3
678.000	32.2	2.3	0.6	53.1	43.7
691.560	32.4	1.1	0.0	47.3	41.7
705.120	32.7	2.8	1.8	59.6	53.1
718.680	32.9	0.7	-0.1	47.9	43.7
732.240	33.2	1.2	-0.1	52.5	45.2
745.800	33.4	0.0	-1.4	46.8	39.8
759.360	33.7	0.2	-1.8	49.5	39.4
772.920	33.9	-0.8	< -5.0	45.2	< 27.9
786.480	34.1	-1.0	< -5.0	45.2	< 28.5
800.040	34.4	-1.8	< -5.0	42.7	< 29.5
813.600	34.6	-1.5	-1.1	45.2	47.3
827.160	34.8	< -5.0	-1.5	< 30.9	46.2
840.720	35.0	< -5.0	-1.2	< 31.6	49.0
854.280	35.3	< -5.0	-1.5	< 32.7	49.0
867.840	35.5	< -5.0	-1.5	< 33.5	50.1
881.400	35.7	-1.4	-1.1	51.9	53.7
894.960	35.9	< -5.0	< -5.0	< 35.1	< 35.1
908.520	36.1	-1.9	-1.7	51.3	52.5
922.080	36.3	< -5.0	< -5.0	< 36.7	< 36.7
935.640	36.5	-1.9	-1.8	53.7	54.3
949.200	36.7	< -5.0	< -5.0	< 38.5	< 38.5
962.760	36.9	< -5.0	< -5.0	< 39.4	< 39.4
976.320	37.1	< -5.0	< -5.0	< 40.3	< 40.3
989.880	37.3	< -5.0	< -5.0	< 41.2	< 41.2

- Notes: 1. The spectrum was checked from 30 MHz to 1000 MHz.  
All emissions not listed were found to be more than 20 dB below the limits.
2. The symbol of "<" means "or less".
3. The cable loss was including in the antenna factor.
4. Sample calculation:

At 40.680 MHz

$$10^{(Af + Mr)/20} = 10^{(2.3 + 19.2)/20} = 11.9 \text{ uV/m}$$

$$11.9 \times (D-1 / D-2) \text{ in meter} = 11.9 \text{ uV/m}$$

Where,

Af = Antenna Factor including the cable loss

Mr = Meter reading

D-1 = Measured distance in meter : 3 m

D-2 = Specified distance in meter : 3 m

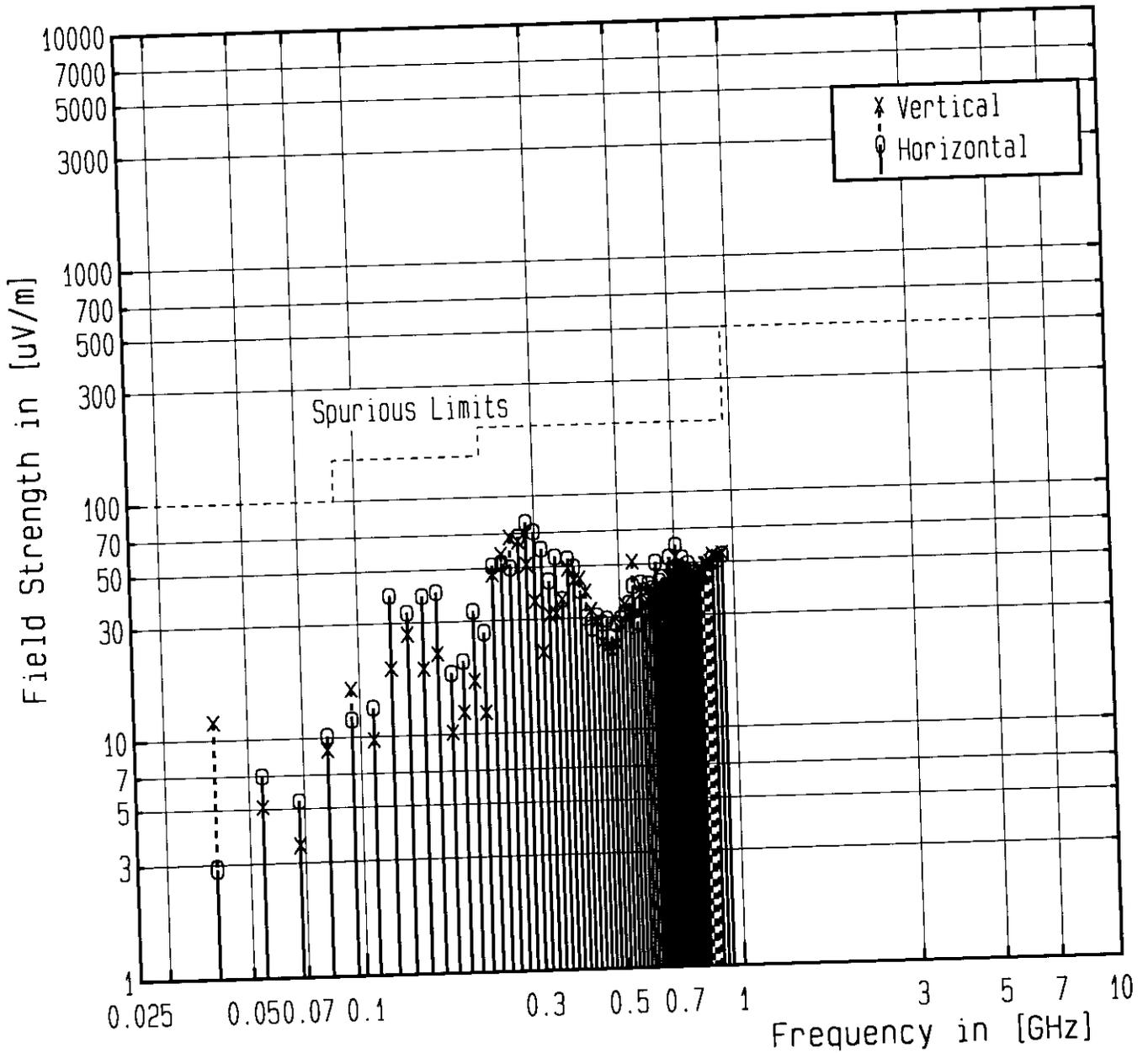
5. Measuring Instrument Setting:

Detector function : CISPR quasi-peak

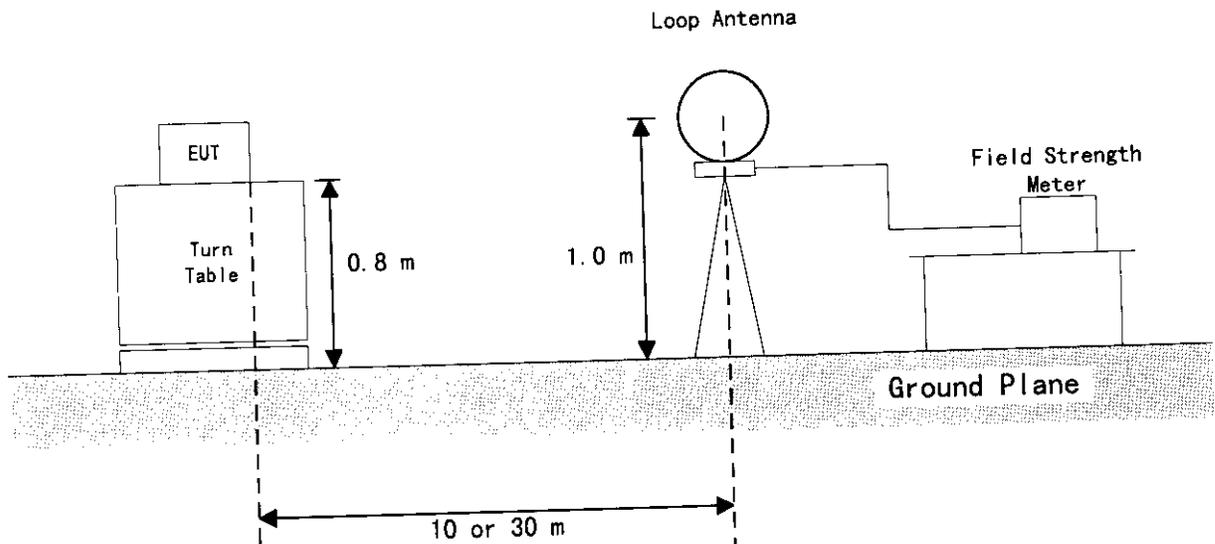
IF Bandwidth : 120 kHz

## Radiated Spurious Emissions

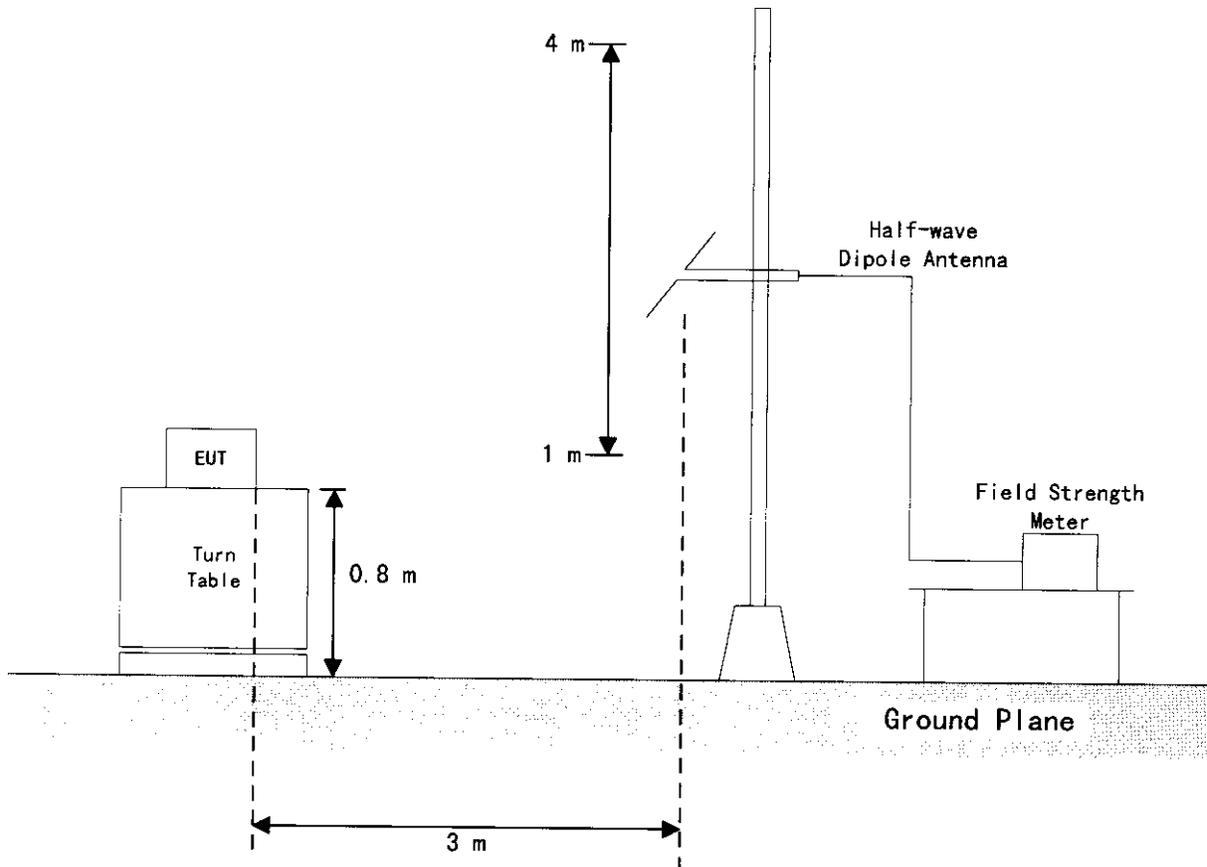
FCC ID : AK8SLVM20HF  
Operating Frequency : 13.56 MHz  
Test Condition : Internal Small Antenna



## MEASUREMENT SET-UP FOR UP TO 30 MHz



## MEASUREMENT SET-UP FOR RADIATED EMISSIONS



### 3. Emission Limitation: [ §15.231(c) ]

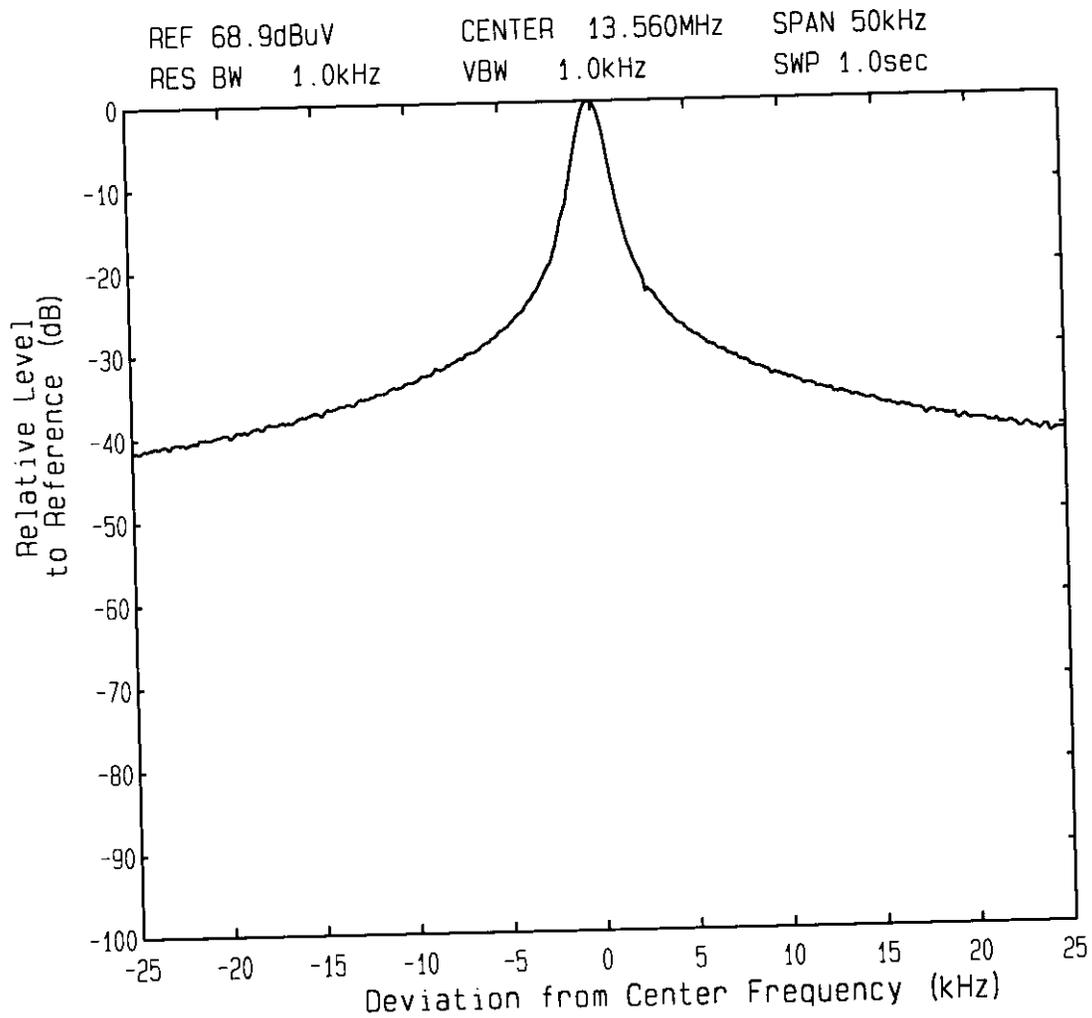
Measurement Method Employed: By using a spectrum analyzer with a vertical antenna for picking up the signal, the measurements of the fundamental frequency were made under the following transmitting modes of the EUT.

Measurements Results :  
Refer to the attached graphs.

## Emission Limitation

FCC ID : AK8SLVM20HF  
Model : SLV-M20HF

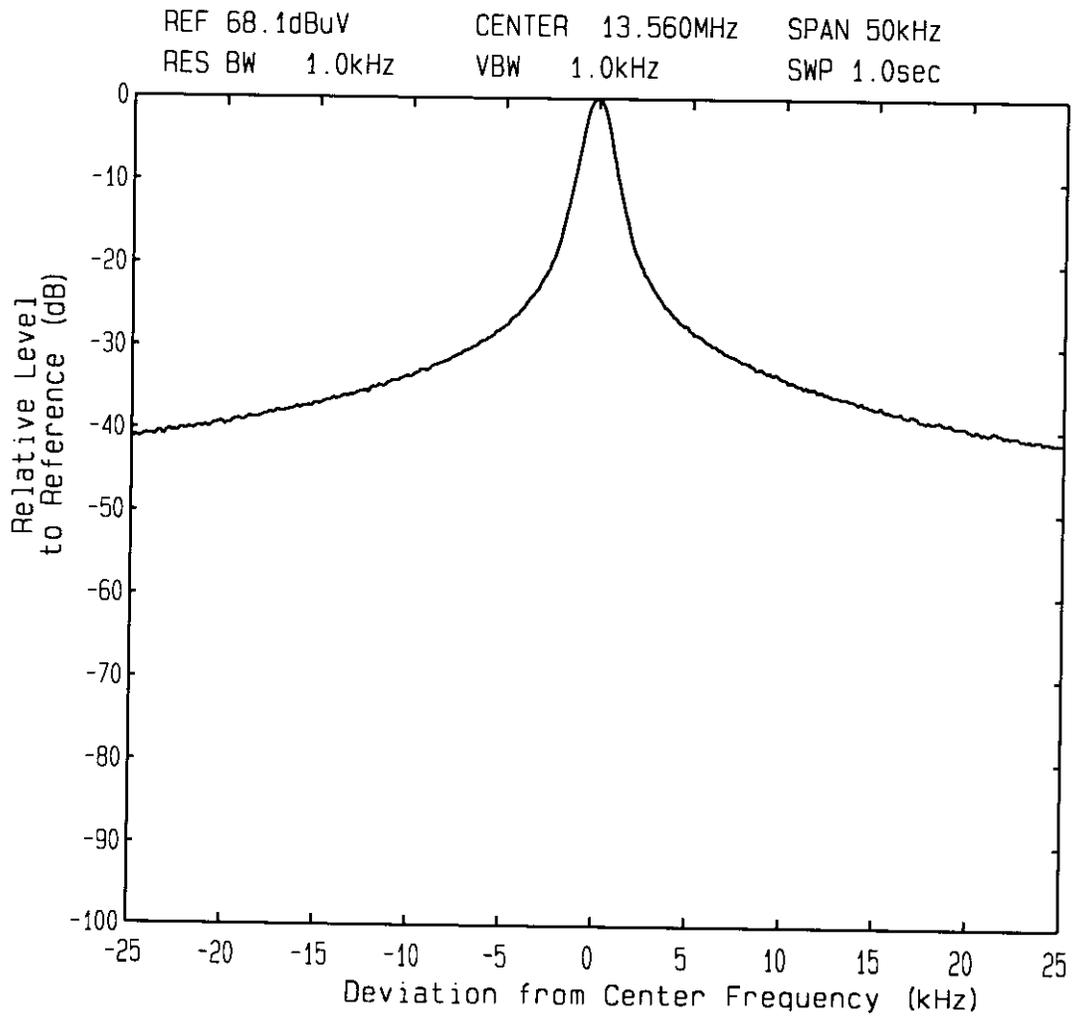
Mode of EUT : Internal Large Antenna  
Internal Modulation



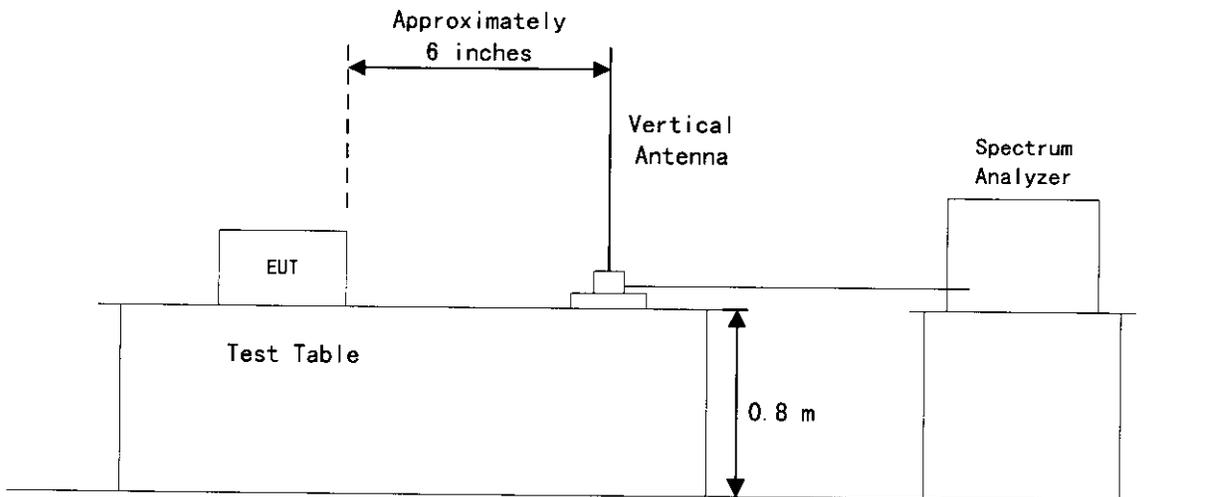
## Emission Limitation

FCC ID : AK8SLVM20HF  
Model : SLV-M20HF

Mode of EUT : Internal Small Antenna  
Internal Modulation



## MESUREMENT SET-UP FOR BAND WIDTH



4. Power Line Conducted Interference Voltage : [ §15.207]

- Internal Large Antenna -

Frequency (MHz)	LISN Factor (dB)	Meter Reading (dB)		Results (dB/uV)	
		One end & grounded	Other end & Grounded	One end & Grounded	Other end & Grounded
0.46	0.2	26.4	26.3	26.6	26.5
0.55	0.2	37.4	37.3	37.6	37.5
0.64	0.2	35.6	35.8	35.8	36.0
0.82	0.2	37.8	38.1	38.0	38.3
1.09	0.2	37.8	38.4	38.0	38.6
2.09	0.2	32.2	32.0	32.4	32.2
2.82	0.2	33.8	33.7	34.0	33.9
3.54	0.2	30.8	30.0	31.0	30.2
5.27	0.2	29.5	28.3	29.7	28.5
6.65	0.2	27.8	26.0	28.0	26.2
8.20	0.2	18.5	16.4	18.7	16.6
10.19	0.2	14.6	13.2	14.8	13.4
11.21	0.2	15.5	12.5	15.7	12.7
13.56	0.3	22.3	21.7	22.6	22.0
15.25	0.3	9.2	9.2	9.5	9.5
21.00	0.4	7.8	8.0	8.2	8.4
23.60	0.5	13.7	14.5	14.2	15.0
27.12	0.5	20.0	20.4	20.5	20.9
29.06	0.6	6.7	6.5	7.3	7.1

Note: 1. The symbol of "<" means "or less".

2. Sample calculation at 0.46 MHz:

$$\text{Lisn Factor} + \text{Meter Reading} = 0.2 + 26.4 = 26.6 \text{ (dB/uV)}$$

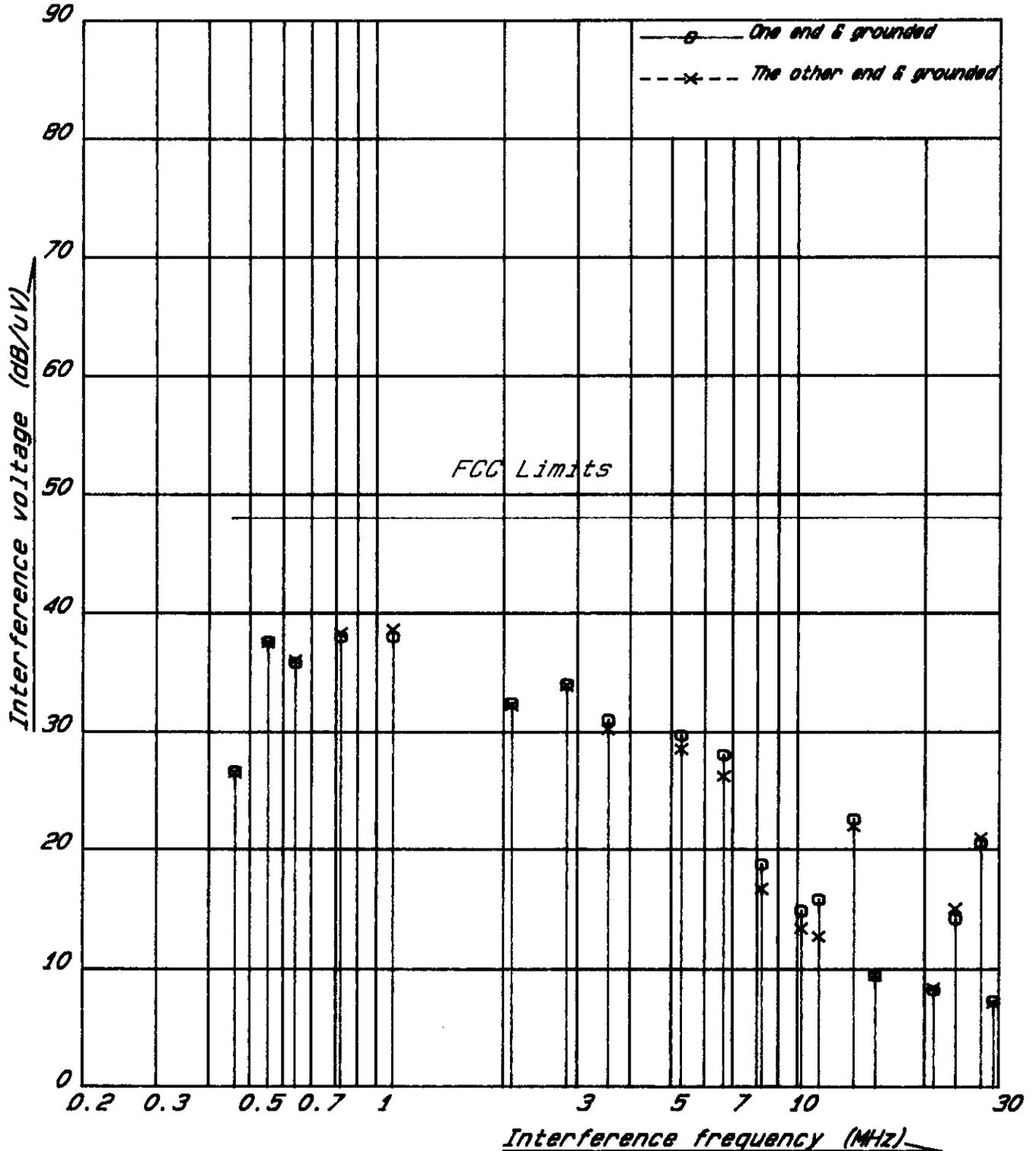
## CONDUCTED RADIO NOISE MEASUREMENTS

MODEL NO.: SLV-M20HF

- Internal Large Antenna -

FCC ID : AK8SLVM20HF

Function of EUT : TX



- Internal Small Antenna -

Frequency (MHz)	LISN Factor (dB)	Meter Reading(dB)		Results (dB/uV)	
		One end & grounded	Other end & Grounded	One end & Grounded	Other end & Grounded
0.46	0.2	26.0	26.0	26.2	26.2
0.54	0.2	36.7	36.6	36.9	36.8
0.64	0.2	35.7	35.6	35.9	35.8
0.82	0.2	37.4	37.8	37.6	38.0
1.09	0.2	37.5	38.2	37.7	38.4
2.08	0.2	31.7	31.5	31.9	31.7
2.81	0.2	34.7	34.6	34.9	34.8
3.53	0.2	31.0	30.0	31.2	30.2
5.24	0.2	28.7	27.5	28.9	27.7
6.62	0.2	28.3	26.0	28.5	26.2
8.25	0.2	17.8	15.6	18.0	15.8
10.45	0.2	13.4	11.8	13.6	12.0
11.22	0.2	16.3	13.5	16.5	13.7
13.56	0.3	29.2	23.5	29.5	23.8
16.00	0.3	9.7	9.8	10.0	10.1
21.00	0.4	9.6	9.8	10.0	10.2
23.73	0.5	14.5	15.0	15.0	15.5
27.12	0.5	8.0	6.3	8.5	6.8
29.06	0.6	7.2	6.6	7.8	7.2

Note: 1. The symbol of "<" means "or less".

2. Sample calculation at 0.46 MHz:

$$\text{Lisn Factor} + \text{Meter Reading} = 0.2 + 26.0 = 26.2 \text{ (dB/uV)}$$

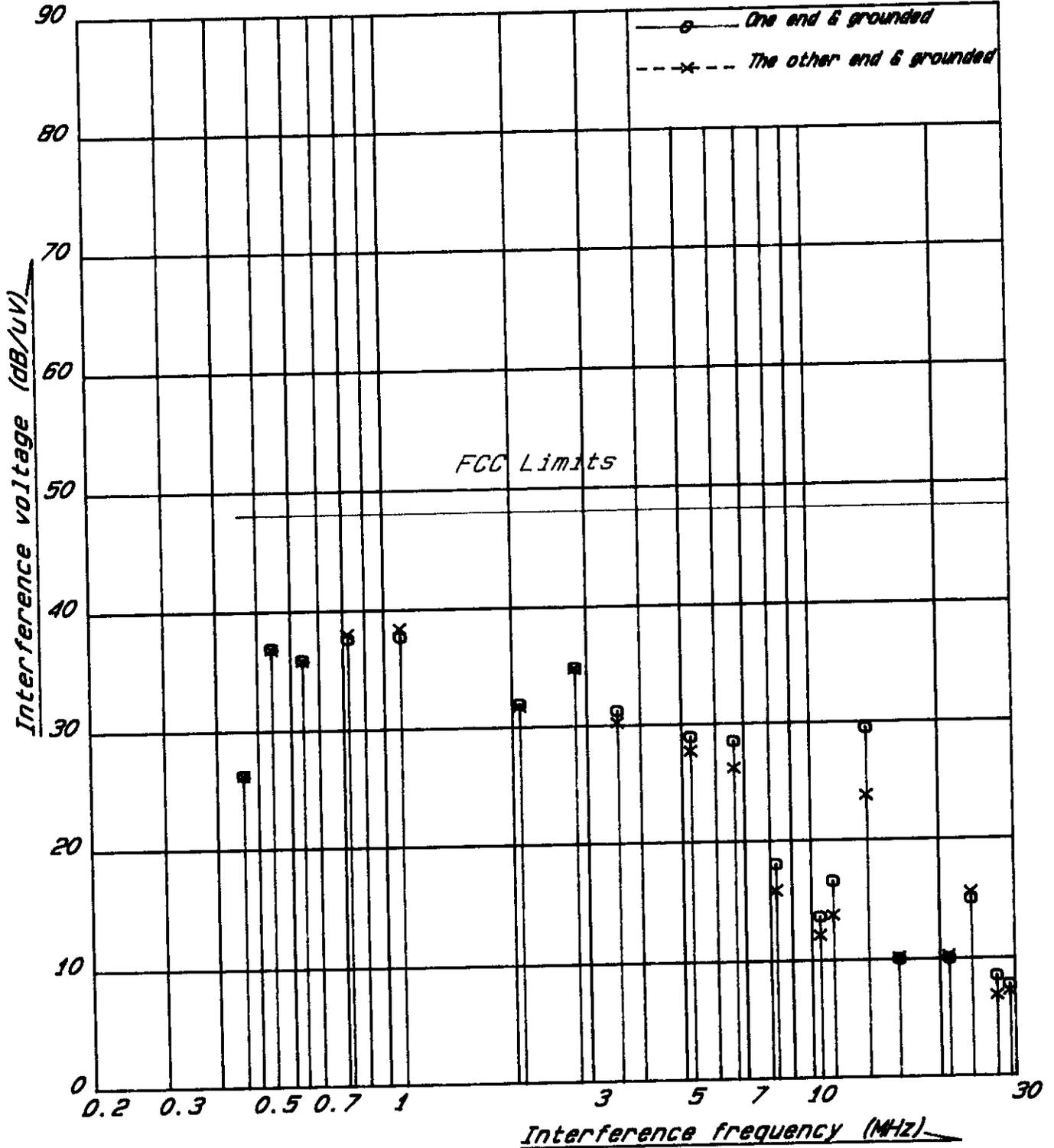
## CONDUCTED RADIO NOISE MEASUREMENTS

MODEL NO.: SLV-M20HF

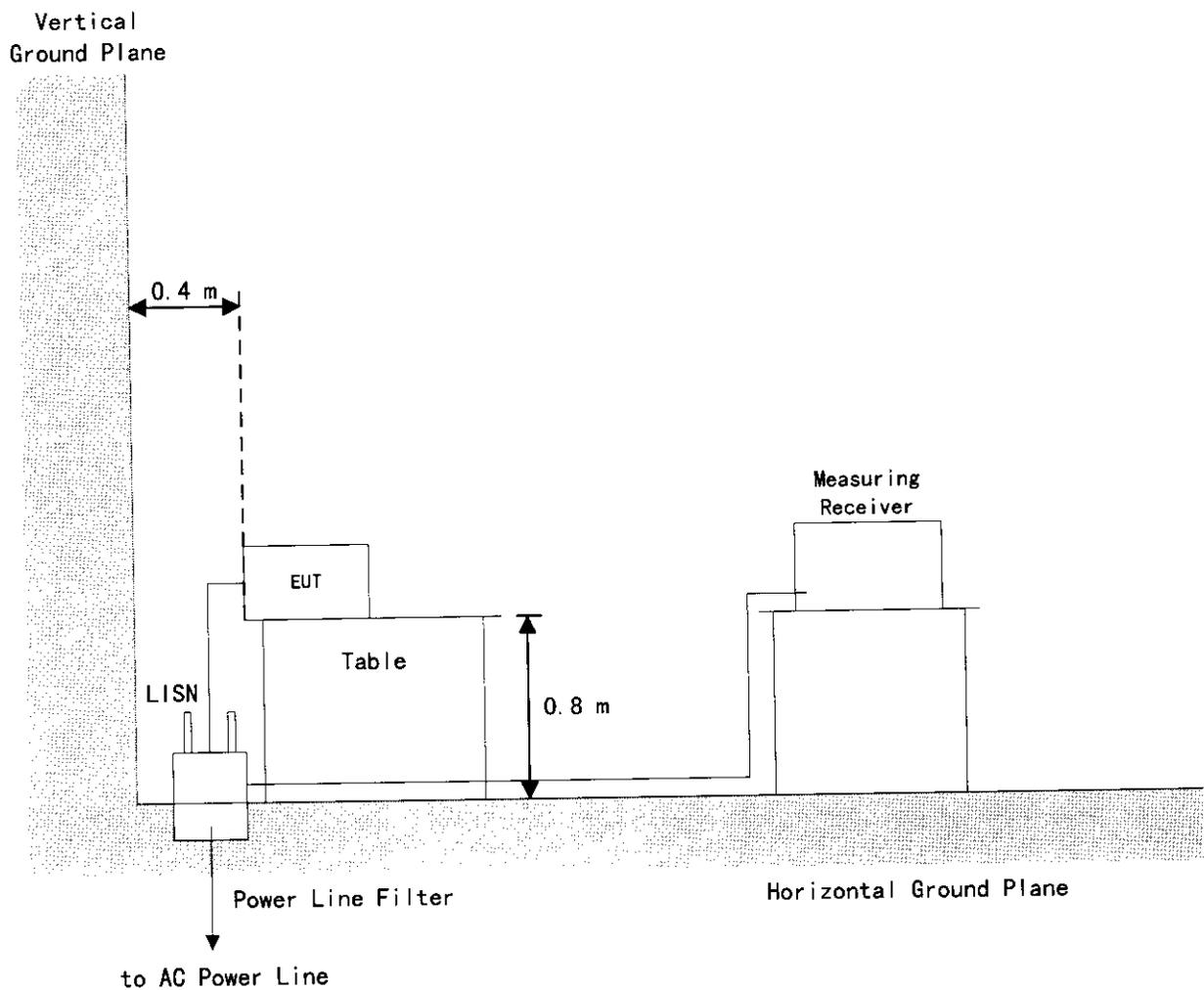
- Internal Small Antenna -

FCC ID : AK8SLVM20HF

Function of EUT : TX



## MEASUREMENT SET-UP FOR LINE CONDUCTED RF VOLTAGE



## 5. Frequency Stability : [ §15.225(c) ]

Measurement Method Employed:

By using frequency counter with suitable RF amplifier, the carrier frequency of the transmitter under test was measured with a temperature variation of  $-20^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at the normal supply voltage, and with a variation in the primary voltage from 85 % to 115 % the rated supply voltage at the temperature of  $+20^{\circ}\text{C}$ .

Measurement Results :

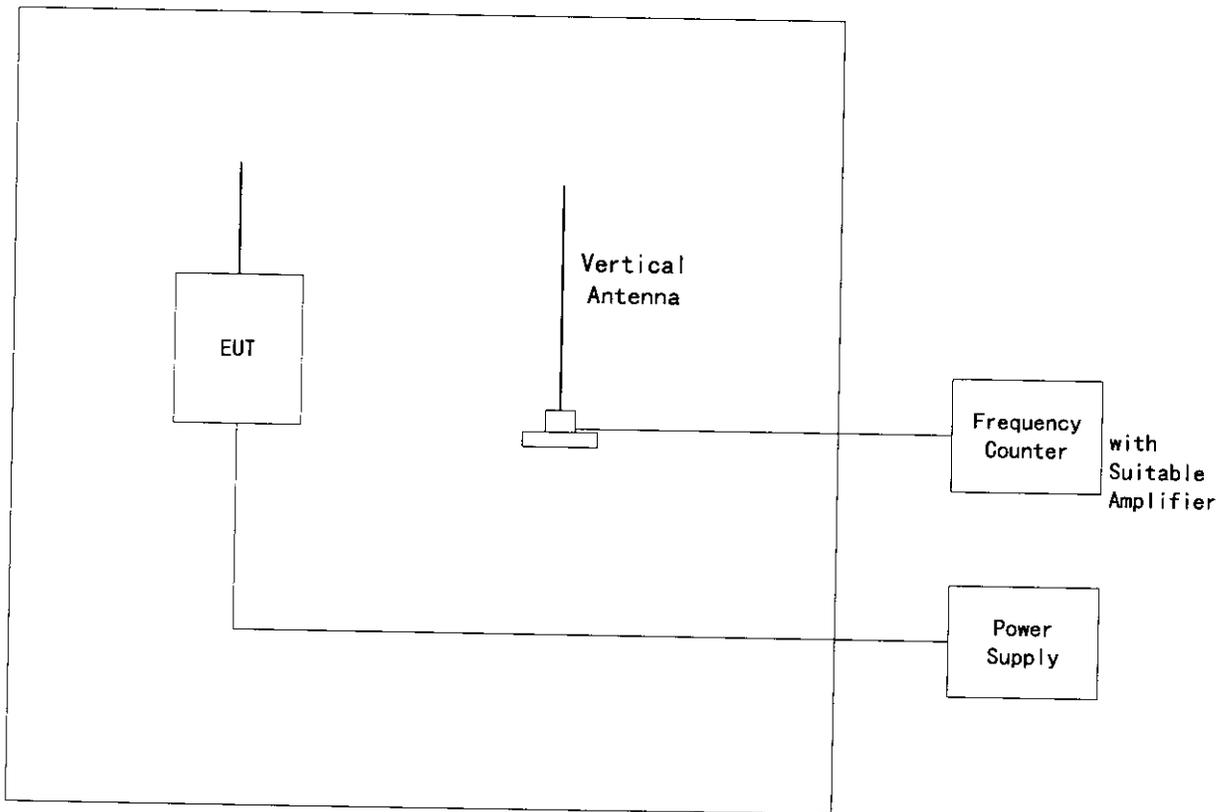
OPERATING FREQUENCY : 13.56 MHz

Ambient Temperature ( $^{\circ}\text{C}$ )	Frequency tolerance with time elapse(%)			
	0 minute	2 minutes	5 minutes	10 minutes
-20	-0.00394	-0.00367	+0.00341	+0.00313
+50	+0.00069	+0.00072	+0.00080	+0.00087

Primary Supply Voltage (V)	Frequency tolerance with time elapse(%)			
	0 minute	2 minutes	5 minutes	10 minutes
at $20^{\circ}\text{C}$ 102 (85%)	-0.00086	-0.00084	-0.00080	-0.00073
120 (100%)	-0.00081	-0.00080	-0.00076	-0.00073
138 (115%)	-0.00086	-0.00083	-0.00080	-0.00073

Specified Limit  $\pm 0.01\%$

## MESUREMENT SET-UP FOR FREQUENCY STABILITY TOLERANCE



## LIST OF MEASUREMENT EQUIPMENT

<u>Equipment (Model No.)</u>	<u>Manufacturer</u>	<u>Date of Cal.</u>
1. Field Strength Meter		
ESVP	Rohde & Schwarz	May 1998
ESH3	Rohde & Schwarz	May 1998
2. Spectrum Analyzer		
8566B	Hewlett Packard	April 1998
3. Tuned Dipole Antenna		
KBA-511	Kyoritsu Electrical Works	November 1997
KBA-611	Kyoritsu Electrical Works	November 1997
4. Vertical Antenna		
91972-2	Stoddard Aircraft Radio Co., Ltd.	-
5. LISN		
KNW-407	Kyoritsu	March 1998
6. Frequency Counter		
53131A	Hewlett Packard	June 1998
7. Oven		
-	Ohnishi Co., Ltd.	July 1997
8. Loop Antenna		
HFH2-Z2	Rohde & Schwarz	November 1997

**SONY**

Sony Electronics Inc.  
1 Sony Drive, Park Ridge, New Jersey 07659

Our Ref. LHV5706  
July 14, 1998

Authorizations and Evaluation Division  
Federal Communications Commission Laboratory  
7435 Oakland Mills Road  
Columbia, Maryland 21045

Gentlemen:

Re: FCC Class II Permissive Change Application for Video Cassette Recorder  
Model SLV-M20HF;  
FCC ID: AK8SLVM20HF

In accordance with the requirements of the Federal Communications Commission Rules and regulations, Part 15 and the new rules per Docket 93-235, we herein enclose the application for the Class II Permissive Change of the subject Video Cassette Recorder Model SLV-M20HF. The original grant date for the subject model is June 4, 1998.

Please note that the subject model was granted under two categories (TV Interface Device and Transmitter) and this application is for Transmitter. We are going to send application documents for TV Interface to you shortly.

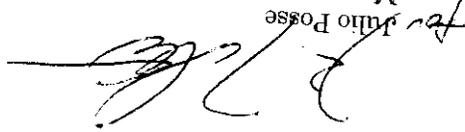
One check No. 40402290 in amount of \$45.00 is enclosed to cover application filing.

If you have any questions on this matter, please contact the undersigned at (201) 930-6974 or FAX No. (201) 358-4055.

Thank you very much for your continued cooperation.

Very truly yours,

  
Nobuo Tanaka  
Senior Compliance Engineer  
Product Safety & Compliance

  
Julio Posse  
Manager  
Product Safety & Compliance

LHV-5706/Job-LHV5706-5873

cc: Sony Tokyo

NT/  
Enclosure

## Circuit description for SLV-M20HF (1/2)

### TV Recording ;

UHF/VHF signal from the antenna is fed to BTF-MA401 (Antenna SW/ RF modulator/TUNER) on MA-335 board, and converted to VIF and SIF , then detected to video and audio signals in BTF-MA401.

The video signal is processed in IC201 on MA-335 board , and amplified in IC260 on MA-335 board , then fed to rotary-video head for recording. The audio signal , on the other hand , is processed in IC360 on MA-335 board , and amplified in IC340 on MA-335 board , then fed to rotary-audio head for recording.

### Video / Audio Signal Recording ;

The video signal supplied to the video-in terminal is fed to IC201 on MA-335 board for signal processing and recording.

The audio signal supplied to the audio-in terminal is fed to IC360 on MA-335 board for signal processing and recording.

### Playback ;

The recording signal picked by the rotary-video head is amplified in IC260 on MA-335 board and processed in IC201 on MA-335 board , then fed to video-out terminal for monitor and BTF-MA401 for modulation.

The recorded signal picked by the rotary-audio head is amplified in IC340 on MA-335 board and processed in IC360 on MA-335 board , then fed to audio-out terminal for monitor and BTF-MA401 for modulation.

The audio and video signals are modulated by BTF-MA401 then fed to UHF/VHF-out terminal.

## Circuit description for SLV-M20HF (2/2)

### Power Supply and Motor Control ;

The +B line voltage are produced by the power section employing isolation transformer.

Motors are controlled by the system control section consisting of IC101, IC161, etc. on MA-335 board.

### Smart File ;

The circuits of Smart File are on MG-21 board. All processes of Smart File are controlled by IC003. Smart File data is encoded by IC002. Carrier frequency is 13.56MHz that oscillated by IC002. The encoded data is modulated by IC002, then modulated carrier is transmitted from Smart File antenna. The VCR has two antennas. One antenna (large antenna) works against the Smart File label of outside cassette, and the other (small antenna) works against inside cassette. These antenna do not work at the same time. The small antenna works only in a moment when the cassette is put in or put out the VCR, and the large antenna works the other time.

The Smart File label is passive, it does not have a battery. It get power by rectifying the receiving carrier, and it write the data to memory.

The VCR get the data from Smart File label by changing amplitude caused by changing impedance of Smart File label. The data is detected by IC001, and decoded by IC002. The micro-processor read the decoded data, and display the information of cassette.

## Countermeasure parts list

Parts	Maker	Parts-number	Remarks
Ferrite beads inductor	Taiyo-yuden	BK2125HS102	Used on MG-21 board
		BK2125HM601	Used on MG-21 board
		BK2125HS601	Used on MG-21 board
Ferrite core	TDK	HF70RH 16x12x9.1	Located on Harness (FR-62) and (NL-50)
		HF70RH 41x0.8x12	Located on FFC(FFM-25)
AC power-supply cord (with Noise filter)	Hirakawa	1-783-605-11	Parts-No. for SONY Plug with a built-in noise filter



Harmonic Frequency List(2/2)

CPU Clock	Guide Plus+	Smart File	CPU Clock	Guide Plus+	Smart File	CPU Clock	Guide Plus+	Smart File	CPU Clock	Guide Plus+	Smart File	CPU Clock	Guide Plus+	Smart File
501.72	503.75	501.72	600.47	600.47	701.22	701.22	800.04	800.04	904.00	902.72	902.72	904.00	902.72	902.72
504.00	507.78	504.00	604.50	604.50	705.12	705.12	801.97	801.97	906.75	906.75	906.75	906.75	906.75	906.75
511.81	519.87	511.81	608.53	608.53	709.28	709.28	810.03	810.03	910.78	910.78	910.78	910.78	910.78	910.78
515.28	523.90	515.28	612.56	612.56	713.31	713.31	814.06	814.06	914.81	914.81	914.81	914.81	914.81	914.81
519.87	527.93	519.87	616.59	616.59	717.34	717.34	818.09	818.09	918.84	918.84	918.84	918.84	918.84	918.84
528.00	536.00	528.00	620.62	620.62	721.37	721.37	822.12	822.12	922.08	922.08	922.08	922.08	922.08	922.08
531.96	540.02	531.96	624.00	624.00	725.40	725.40	826.15	826.15	928.00	928.00	928.00	928.00	928.00	928.00
535.99	544.05	535.99	628.68	628.68	729.43	729.43	830.18	830.18	930.93	930.93	930.93	930.93	930.93	930.93
542.40	548.08	542.40	632.71	632.71	733.46	733.46	834.21	834.21	934.96	934.96	934.96	934.96	934.96	934.96
549.02	552.11	549.02	636.74	636.74	737.49	737.49	838.24	838.24	936.00	936.00	936.00	936.00	936.00	936.00
555.96	556.14	555.96	640.77	640.77	741.52	741.52	842.27	842.27	944.00	944.00	944.00	944.00	944.00	944.00
560.00	568.23	560.00	644.80	644.80	745.55	745.55	846.30	846.30	947.05	947.05	947.05	947.05	947.05	947.05
569.52	572.26	569.52	648.83	648.83	749.58	749.58	850.33	850.33	951.08	951.08	951.08	951.08	951.08	951.08
576.00	584.35	576.00	652.86	652.86	753.61	753.61	854.36	854.36	955.11	955.11	955.11	955.11	955.11	955.11
580.32	588.38	580.32	656.89	656.89	757.64	757.64	858.39	858.39	959.14	959.14	959.14	959.14	959.14	959.14
584.00	592.41	584.00	660.92	660.92	761.67	761.67	862.42	862.42	963.17	963.17	963.17	963.17	963.17	963.17
588.38	596.44	588.38	664.44	664.44	765.70	765.70	866.45	866.45	967.20	967.20	967.20	967.20	967.20	967.20
596.64	600.00	596.64	668.98	668.98	769.73	769.73	870.48	870.48	971.23	971.23	971.23	971.23	971.23	971.23
600.00	604.50	600.00	673.01	673.01	773.76	773.76	874.51	874.51	975.26	975.26	975.26	975.26	975.26	975.26
604.50	608.53	604.50	677.04	677.04	777.79	777.79	878.54	878.54	976.00	976.00	976.00	976.00	976.00	976.00
608.53	612.56	608.53	681.07	681.07	781.82	781.82	882.57	882.57	979.29	979.29	979.29	979.29	979.29	979.29
612.56	616.59	612.56	685.10	685.10	785.85	785.85	886.60	886.60	983.32	983.32	983.32	983.32	983.32	983.32
616.59	620.62	616.59	689.13	689.13	789.88	789.88	891.38	891.38	987.35	987.35	987.35	987.35	987.35	987.35
620.62	624.00	620.62	693.16	693.16	793.91	793.91	895.41	895.41	991.38	991.38	991.38	991.38	991.38	991.38
624.00	628.68	624.00	697.19	697.19	797.94	797.94	899.44	899.44	995.41	995.41	995.41	995.41	995.41	995.41
628.68	632.71	628.68	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
632.71	636.74	632.71	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
636.74	640.77	636.74	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
640.77	644.80	640.77	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
644.80	648.83	644.80	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
648.83	652.86	648.83	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
652.86	656.89	652.86	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
656.89	660.92	656.89	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
660.92	664.44	660.92	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
664.44	668.98	664.44	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
668.98	673.01	668.98	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
673.01	677.04	673.01	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
677.04	681.07	677.04	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
681.07	685.10	681.07	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
685.10	689.13	685.10	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
689.13	693.16	689.13	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
693.16	697.19	693.16	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
697.19	701.22	697.19	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
701.22	705.12	701.22	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
705.12	709.28	705.12	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
709.28	713.31	709.28	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
713.31	717.34	713.31	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
717.34	721.37	717.34	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
721.37	725.40	721.37	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
725.40	729.43	725.40	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
729.43	733.46	729.43	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
733.46	737.49	733.46	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
737.49	741.52	737.49	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
741.52	745.55	741.52	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
745.55	749.58	745.55	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
749.58	753.61	749.58	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
753.61	757.64	753.61	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
757.64	761.67	757.64	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
761.67	765.70	761.67	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
765.70	769.73	765.70	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
769.73	773.76	769.73	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
773.76	777.79	773.76	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
777.79	781.82	777.79	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
781.82	785.85	781.82	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
785.85	789.88	785.85	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
789.88	793.91	789.88	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
793.91	797.94	793.91	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
797.94	800.00	797.94	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44
800.00	800.00	800.00	800.00	800.00	800.00	800.00	899.44	899.44	999.44	999.44	999.44	999.44	999.44	999.44

单位:MHz  
CPU Clock : harmony of 8MHz & 16MHz

Model No. : SLV-M20HF  
Serial No. : None

## 7. Summary of Measurement Result

The EUT complied with the requirement of FCC Rules and Regulations Part 15 Subpart B (1989) as detailed from page 7 to page 48.

S15.107(a) AC Powerline Conducted Emissions Measurement Margins with respect to the Limit	: PASSED : 8.6 dB at 0.65 MHz
S15.109(a) Radiated Emissions Measurement Margins with respect to the Limit	: PASSED : 2.8 dB at 338.1 MHz
S15.115(b)(1)(ii) Output Signal Level Measurement Margins with respect to the Limit	: PASSED : 2.4 dB at 61.30 MHz
S15.115(b)(2)(ii) Spurious Conducted Level Measurement Margins with respect to the Limit	: PASSED : 7.5 dB at 53.1 MHz
S15.115(c)(1)(ii) Antenna Transfer Switch Measurement Margins with respect to the Limit	: PASSED : 5.8 dB at 67.25 MHz

### I HEREBY STATE THAT:

The measurements shown in the reports of this form were made in accordance with the procedures indicated and the energy emitted by this equipment was found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualification of all persons taking them.

Testing Supervisor : Toshiyuki Itoi

Toshiyuki Itoi, Deputy Manager  
Testing Division  
EMC Engineering Department

---

Model No. : SLV-M20HF  
Serial No. : None

Date : June 29, 1998  
Temp. : 24 °C; Humi. : 42 %

## 8. §15.107(a) AC Powerline Conducted Emissions Measurement

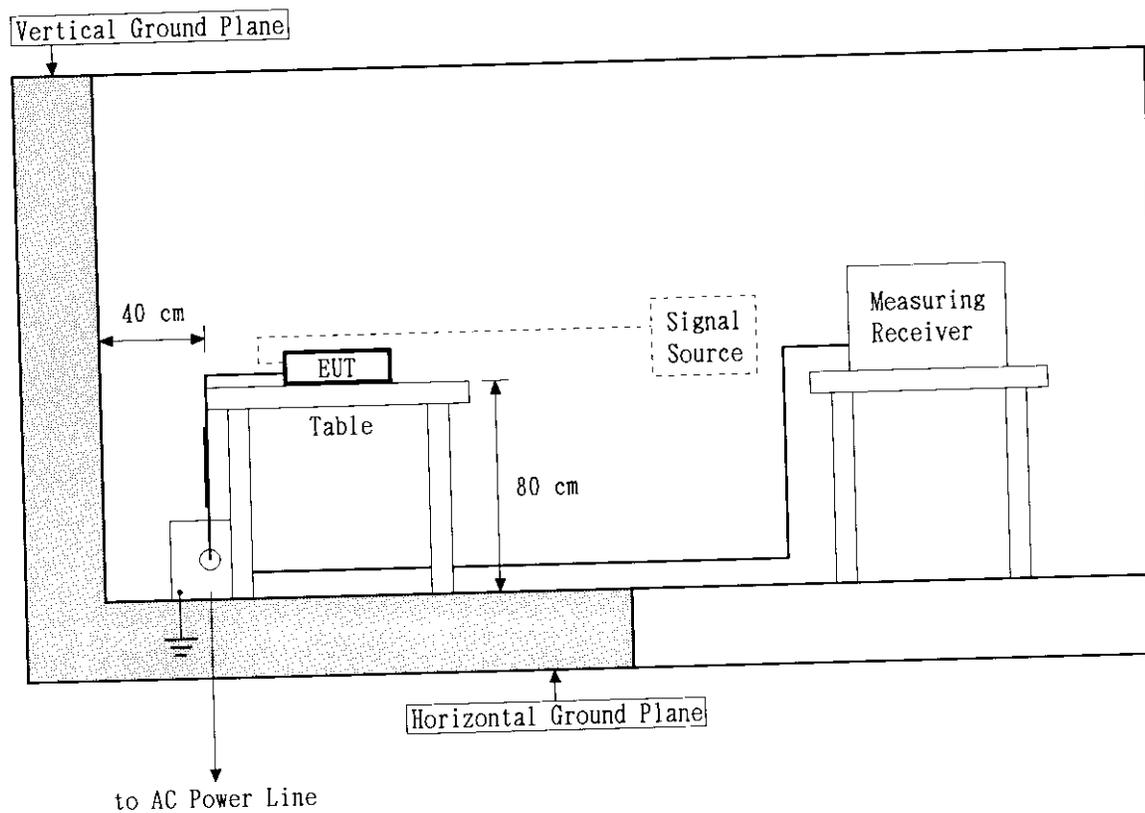
Tested by : Toshiyuki Itoi  
Toshiyuki Itoi, Deputy Manager  
Testing Division  
EMC Engineering Department

Model No. : SLV-M20HF  
Serial No. : None

## S15.107(a) AC Powerline Conducted Emissions Measurement

## Configuration of EUT

Side View



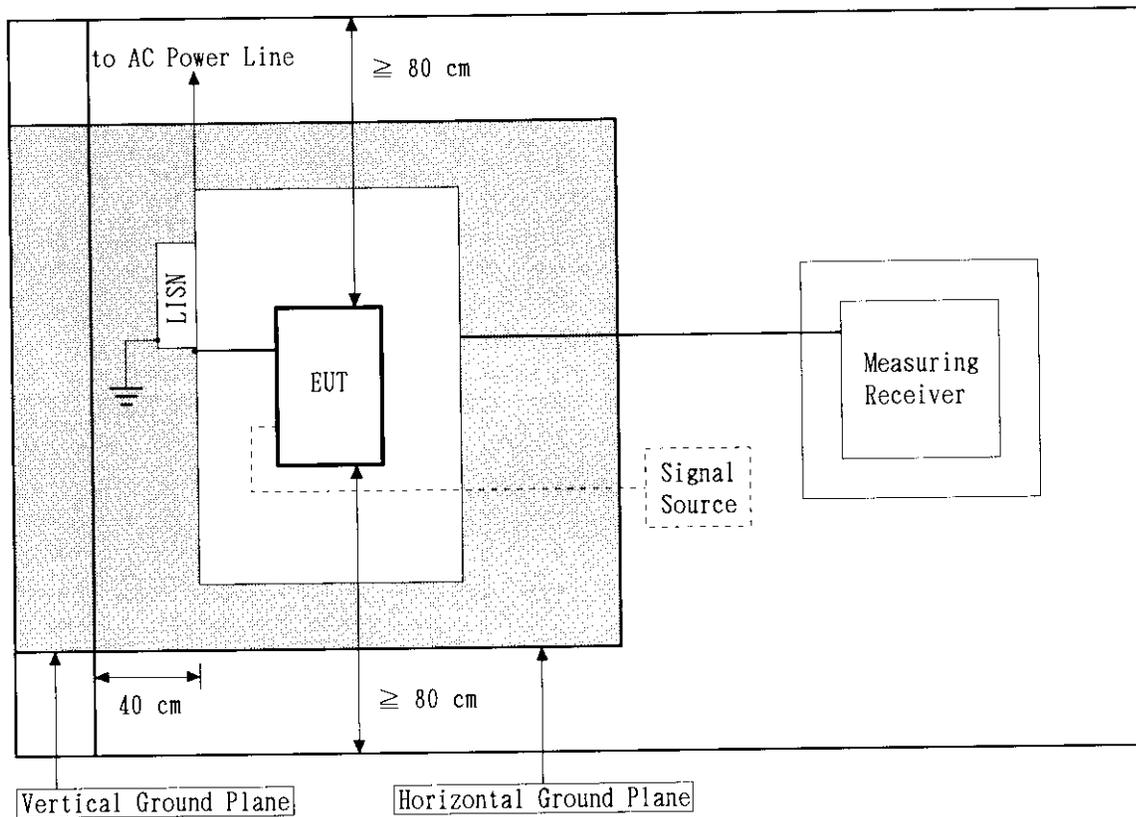
Note: The same configuration of cables and terminators which were connected to VCR was applied to all applicable measurements, shown as photograph in page 19 and 20.

Model No. : SLV-M20HF  
Serial No. : None

## §15.107(a) AC Powerline Conducted Emissions Measurement

### Configuration of EUT

Top View



Note: The same configuration of cables and terminators which were connected to VCR was applied to all applicable measurements, shown as photograph in page 19 and 20.

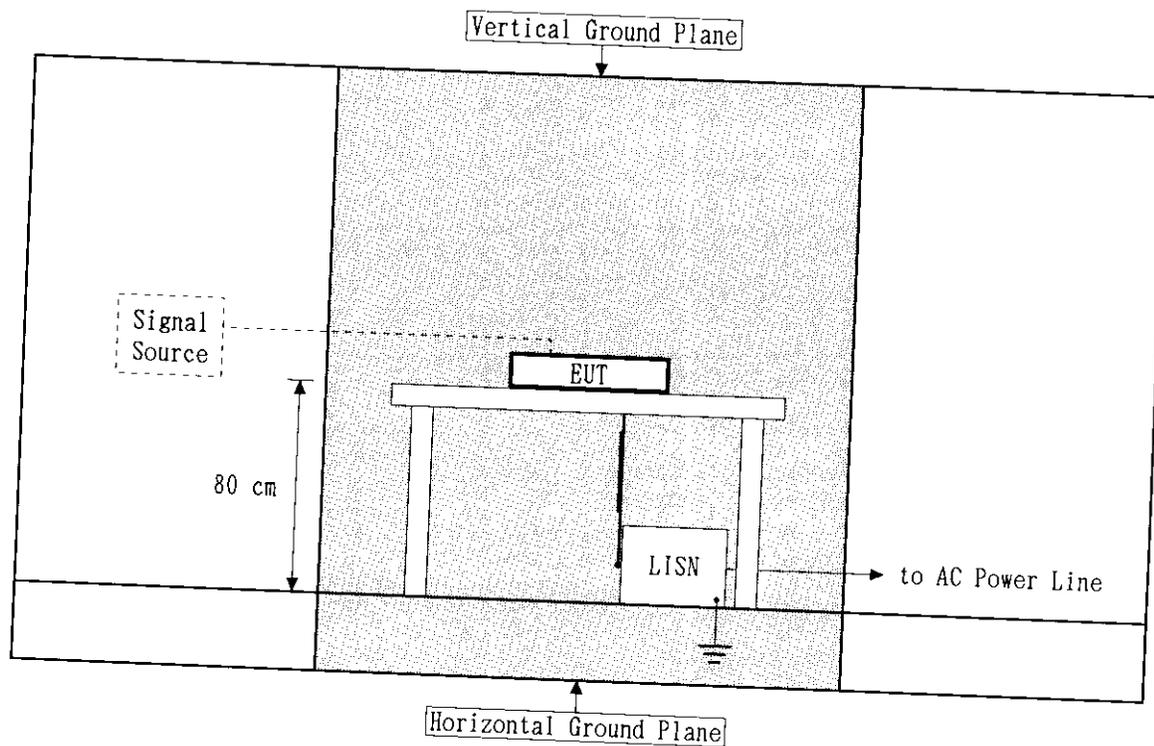
Model No. : SLV-M20HF

Serial No. : None

## §15.107(a) AC Powerline Conducted Emissions Measurement

## Configuration of EUT

## Front View



Note: The same configuration of cables and terminators which were connected to VCR was applied to all applicable measurements, shown as photograph in page 19 and 20.

Model No. : SLV-M20HF  
 Serial No. : None

S15.107(a) AC Powerline Conducted Emissions Measurement

Testing Signal Sources : Internal Modulation Sources (NTSC TV Signal Recording Tape)  
 Operating Condition : Playing Mode

Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)		Result (dB/uV)		Limit (dB/uV)
		V-A	V-B	V-A	V-B	
0.45	0.2	35.5	35.3	35.7	35.5	48.0
0.54	0.2	32.4	32.7	32.6	32.9	48.0
0.61	0.2	32.8	33.5	33.0	33.7	48.0
0.68	0.2	36.3	36.8	36.5	37.0	48.0
0.84	0.2	34.7	35.7	34.9	35.9	48.0
1.05	0.2	35.4	36.1	35.6	36.3	48.0
1.51	0.2	31.3	32.3	31.5	32.5	48.0
2.03	0.2	27.5	28.3	27.7	28.5	48.0
2.60	0.2	31.6	30.8	31.8	31.0	48.0
3.62	0.2	27.7	26.1	27.9	26.3	48.0
5.79	0.2	28.6	25.2	28.8	25.4	48.0
7.00	0.2	22.7	19.8	22.9	20.0	48.0
10.04	0.2	15.8	12.9	16.0	13.1	48.0
12.00	0.2	16.8	12.7	17.0	12.9	48.0
13.18	0.3	10.2	< 10.0	10.5	< 10.3	48.0
15.00	0.3	< 10.0	< 10.0	< 10.3	< 10.3	48.0
17.00	0.3	< 10.0	< 10.0	< 10.3	< 10.3	48.0
20.00	0.4	< 10.0	< 10.0	< 10.4	< 10.4	48.0
23.00	0.5	< 10.0	< 10.0	< 10.5	< 10.5	48.0
24.68	0.5	13.5	13.6	14.0	14.1	48.0
27.01	0.5	14.6	14.6	15.1	15.1	48.0
30.00	0.6	< 10.0	< 10.0	< 10.6	< 10.6	48.0

- Notes:
- 1) The spectrum was checked from 0.45 MHz to 30 MHz.
  - 2) V-A : One end & Grounded ; V-B : The other end & Grounded
  - 3) The symbol of '<' means 'or less'.
  - 4) Correction Factor includes a LISN factor and a cable (2.0 m) loss.
  - 5) A sample calculation was made at 0.68 MHz.  
 Correction Factor + Meter Reading = 0.2 + 36.8 = 37.0 dB/uV

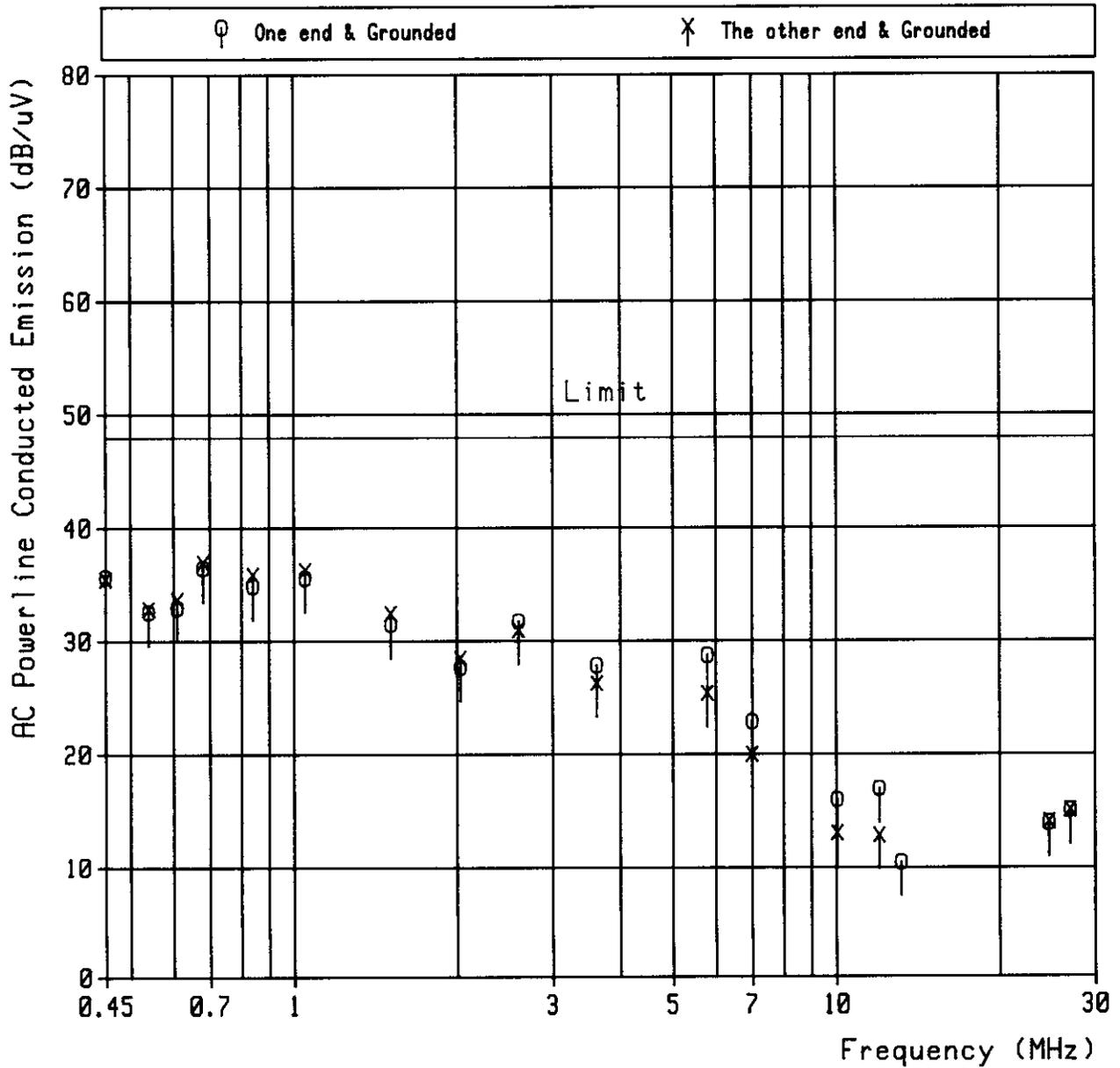
Model No. : SLV-M20HF

Serial No. : None

## §15.107(a) AC Powerline Conducted Emissions Measurement

Testing Signal Sources : Internal Modulation Sources (NTSC TV Signal Recording Tape)

Operating Condition : Playing Mode



Model No. : SLV-M20HF

Serial No. : None

§15.107(a) AC Powerline Conducted Emissions Measurement

Testing Signal Sources : Video Modulation Sources (VITS : 1 Vp-p and 5 Vp-p)

Operating Condition : Recording Mode

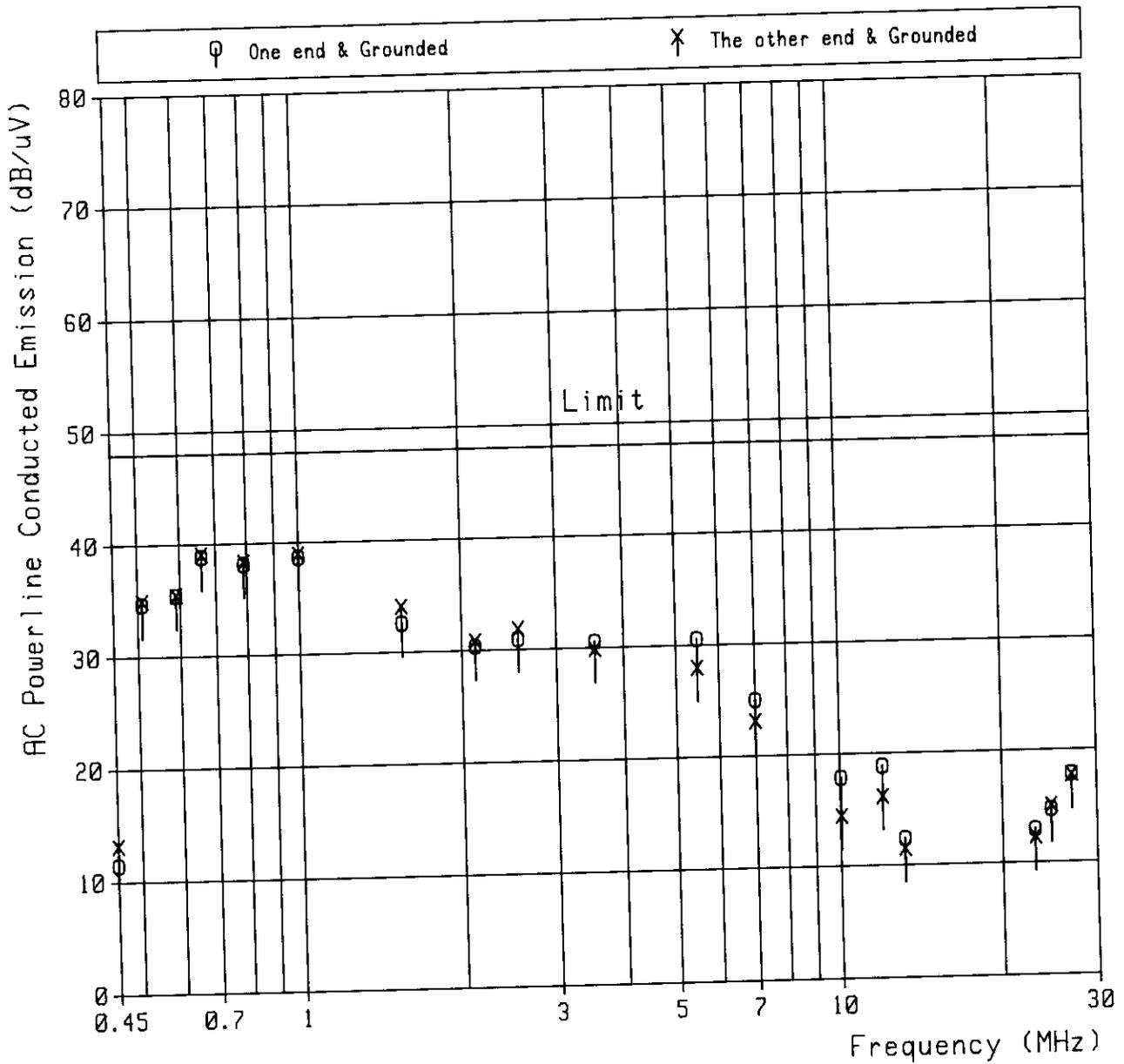
Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)		Result (dB/uV)		Limit (dB/uV)
		V-A	V-B	V-A	V-B	
0.45	0.2	11.3	13.0	11.5	13.2	48.0
0.51	0.2	34.5	34.8	34.7	35.0	48.0
0.59	0.2	35.3	35.3	35.5	35.5	48.0
0.66	0.2	38.7	38.9	38.9	39.1	48.0
0.79	0.2	38.0	38.2	38.2	38.4	48.0
1.00	0.2	38.5	38.8	38.7	39.0	48.0
1.55	0.2	32.4	33.9	32.6	34.1	48.0
2.12	0.2	30.2	30.7	30.4	30.9	48.0
2.55	0.2	30.8	31.7	31.0	31.9	48.0
3.54	0.2	30.4	29.7	30.6	29.9	48.0
5.48	0.2	30.4	27.8	30.6	28.0	48.0
7.00	0.2	24.8	22.9	25.0	23.1	48.0
10.04	0.2	17.7	14.3	17.9	14.5	48.0
12.00	0.2	18.7	16.0	18.9	16.2	48.0
13.16	0.3	12.1	11.2	12.4	11.5	48.0
15.00	0.3	< 10.0	< 10.0	< 10.3	< 10.3	48.0
17.00	0.3	< 10.0	< 10.0	< 10.3	< 10.3	48.0
20.00	0.4	< 10.0	< 10.0	< 10.4	< 10.4	48.0
23.00	0.5	12.5	11.8	13.0	12.3	48.0
24.68	0.5	14.3	14.6	14.8	15.1	48.0
27.01	0.5	17.4	17.3	17.9	17.8	48.0
30.00	0.6	< 10.0	< 10.0	< 10.6	< 10.6	48.0

- Notes:
- 1) The spectrum was checked from 0.45 MHz to 30 MHz.
  - 2) V-A : One end & Grounded ; V-B : The other end & Grounded
  - 3) The symbol of '<' means 'or less'.
  - 4) Correction Factor includes a LISN factor and a cable (2.0 m) loss.
  - 5) A sample calculation was made at 0.66 MHz.  
 $\text{Correction Factor} + \text{Meter Reading} = 0.2 + 38.9 = 39.1 \text{ dB/uV}$

Model No. : SLV-M20HF  
 Serial No. : None

§15.107(a) AC Powerline Conducted Emissions Measurement

Testing Signal Sources : Video Modulation Sources (VITS : 1 Vp-p and 5 Vp-p)  
 Operating Condition : Recording Mode



Model No. : SLV-M20HF

Serial No. : None

S15.107(a) AC Powerline Conducted Emissions Measurement

Testing Signal Sources : RF Modulation Sources (NTSC Colorbar : 70 dB/uV at 193.25 MHz)

Operating Condition : Recording Mode

Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)		Result (dB/uV)		Limit (dB/uV)
		V-A	V-B	V-A	V-B	
0.45	0.2	12.3	11.2	12.5	11.4	48.0
0.51	0.2	33.3	35.1	33.5	35.3	48.0
0.58	0.2	35.5	36.1	35.7	36.3	48.0
0.65	0.2	39.2	38.9	39.4	39.1	48.0
0.79	0.2	38.6	37.7	38.8	37.9	48.0
1.00	0.2	37.9	38.6	38.1	38.8	48.0
1.55	0.2	32.9	33.6	33.1	33.8	48.0
2.14	0.2	30.8	30.5	31.0	30.7	48.0
2.71	0.2	31.0	31.3	31.2	31.5	48.0
3.46	0.2	29.1	28.2	29.3	28.4	48.0
5.77	0.2	31.0	29.1	31.2	29.3	48.0
7.00	0.2	24.4	22.2	24.6	22.4	48.0
10.03	0.2	18.4	14.5	18.6	14.7	48.0
12.01	0.2	19.4	15.6	19.6	15.8	48.0
13.19	0.3	12.9	10.4	13.2	10.7	48.0
16.00	0.3	15.9	16.2	16.2	16.5	48.0
18.00	0.4	< 10.0	< 10.0	< 10.4	< 10.4	48.0
20.00	0.4	< 10.0	< 10.0	< 10.4	< 10.4	48.0
23.00	0.5	< 10.0	< 10.0	< 10.5	< 10.5	48.0
24.49	0.5	13.5	14.4	14.0	14.9	48.0
27.01	0.5	18.3	18.1	18.8	18.6	48.0
30.00	0.6	< 10.0	< 10.0	< 10.6	< 10.6	48.0

- Notes:
- 1) The spectrum was checked from 0.45 MHz to 30 MHz.
  - 2) V-A : One end & Grounded ; V-B : The other end & Grounded
  - 3) The symbol of '<' means 'or less'.
  - 4) Correction Factor includes a LISN factor and a cable (2.0 m) loss.
  - 5) A sample calculation was made at 0.65 MHz.  
Correction Factor + Meter Reading = 0.2 + 39.2 = 39.4 dB/uV

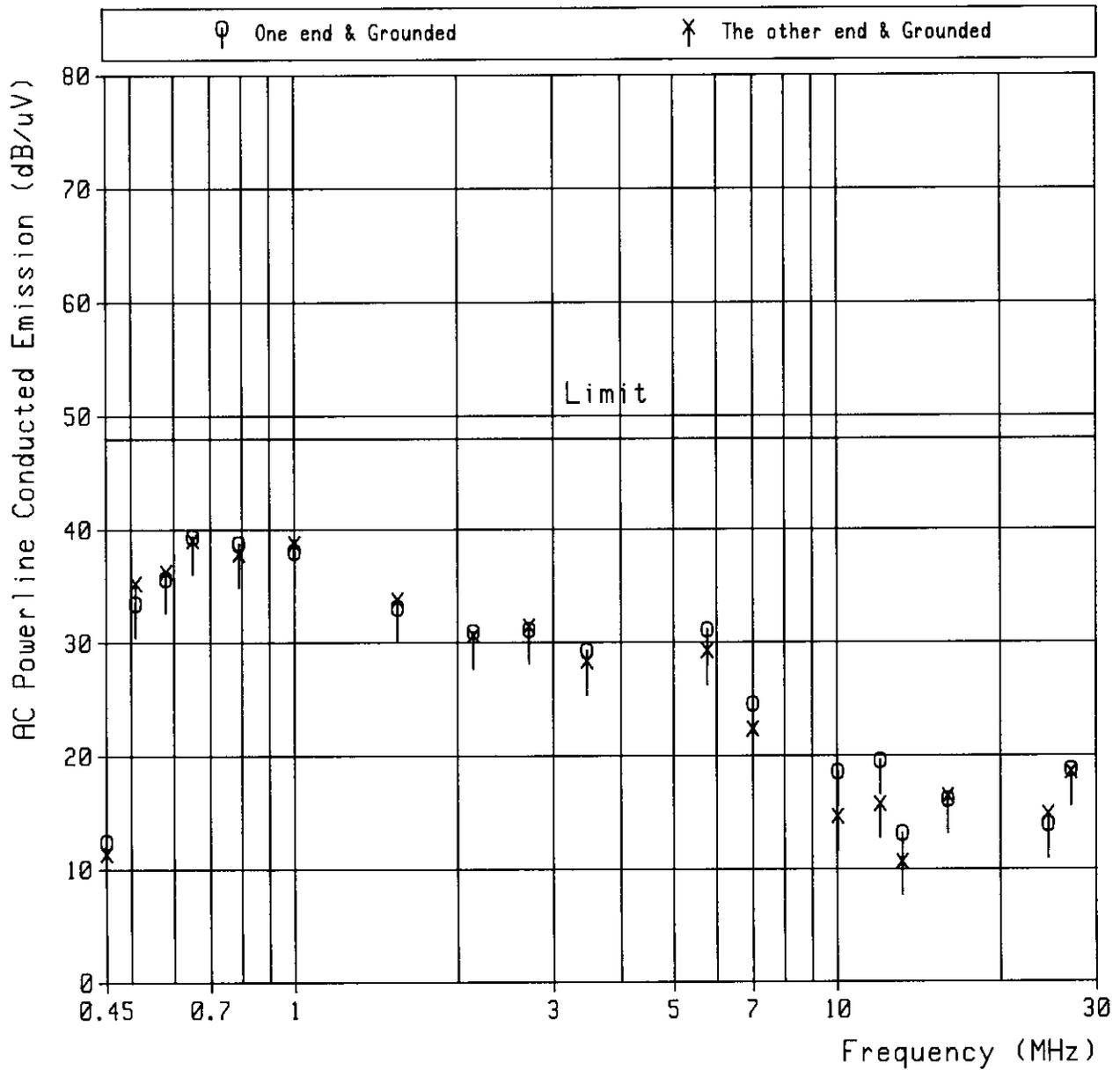
Model No. : SLV-M20HF

Serial No. : None

§15.107(a) AC Powerline Conducted Emissions Measurement

Testing Signal Sources : RF Modulation Sources (NTSC Colorbar : 70 dB/uV at 193.25 MHz)

Operating Condition : Recording Mode



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Model No. : SLV-M20HF  
Serial No. : None

Date : June 29, 1998  
Temp. : 24 °C; Humi. : 42 %

## 9. S15.109(a) Radiated Emissions Measurement

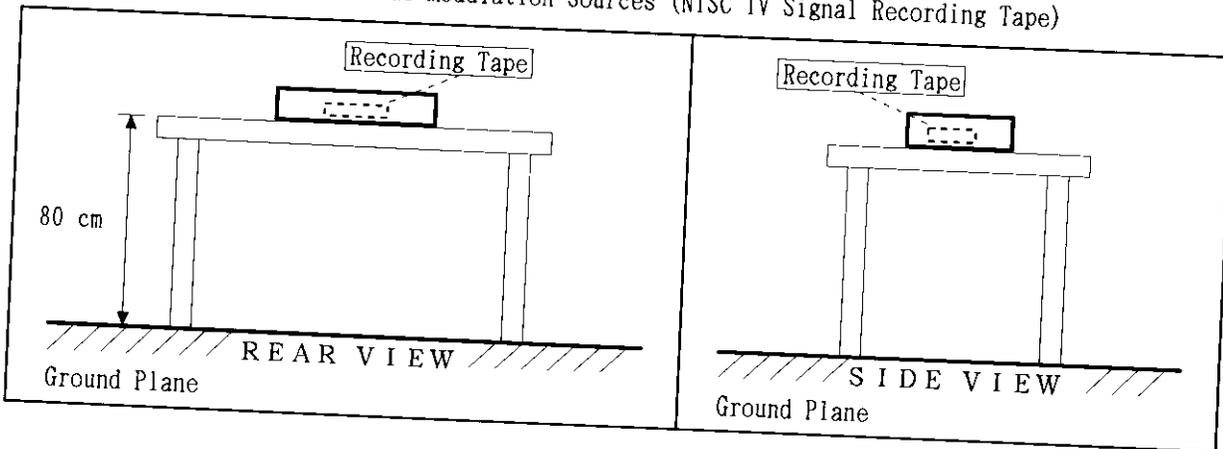
Tested by : Toshiyuki Itoi

Toshiyuki Itoi, Deputy Manager  
Testing Division  
EMC Engineering Department

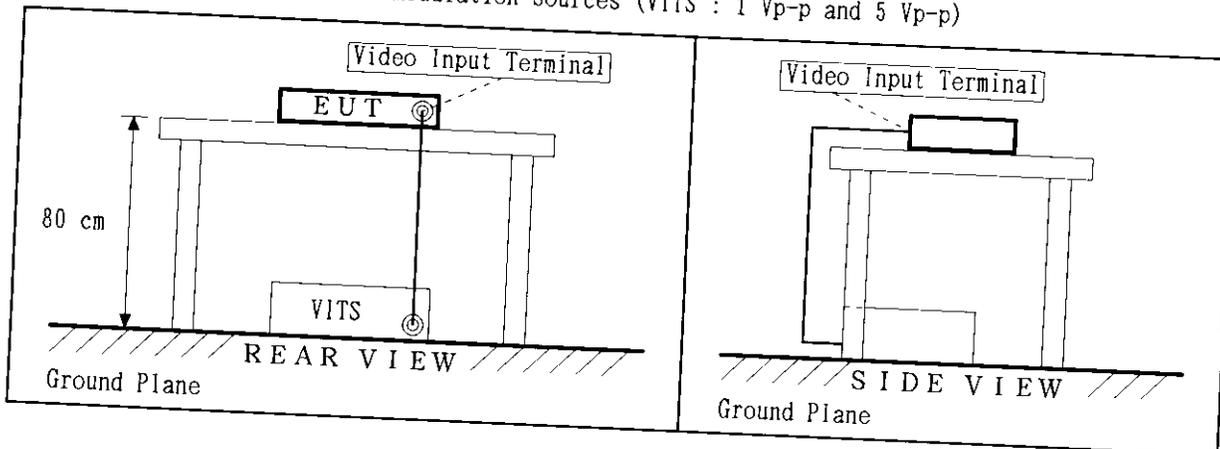
Model No. : SLV-M20HF  
Serial No. : None

## Configuration of Testing Signal Sources

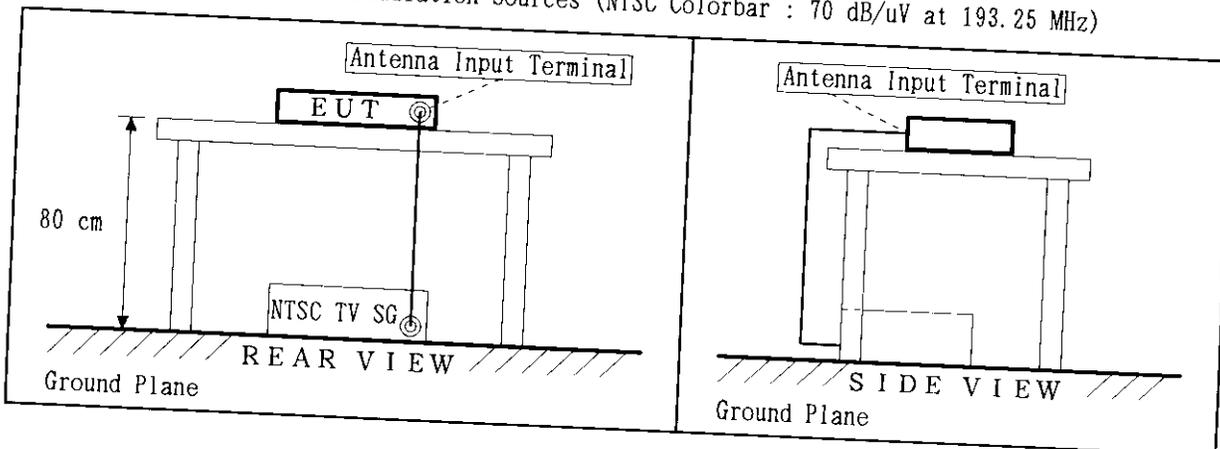
Testing Signal Sources : Internal Modulation Sources (NTSC TV Signal Recording Tape)



Testing Signal Sources : Video Modulation Sources (VITS : 1 Vp-p and 5 Vp-p)



Testing Signal Sources : RF Modulation Sources (NTSC Colorbar : 70 dB/uV at 193.25 MHz)



Model No. : SLV-M20HF

Serial No. : None

§15.109(a) Radiated Emissions Measurement

Testing Signal Sources : Internal Modulation Sources (NTSC TV Signal Recording Tape)

Operating Condition : Playing Mode

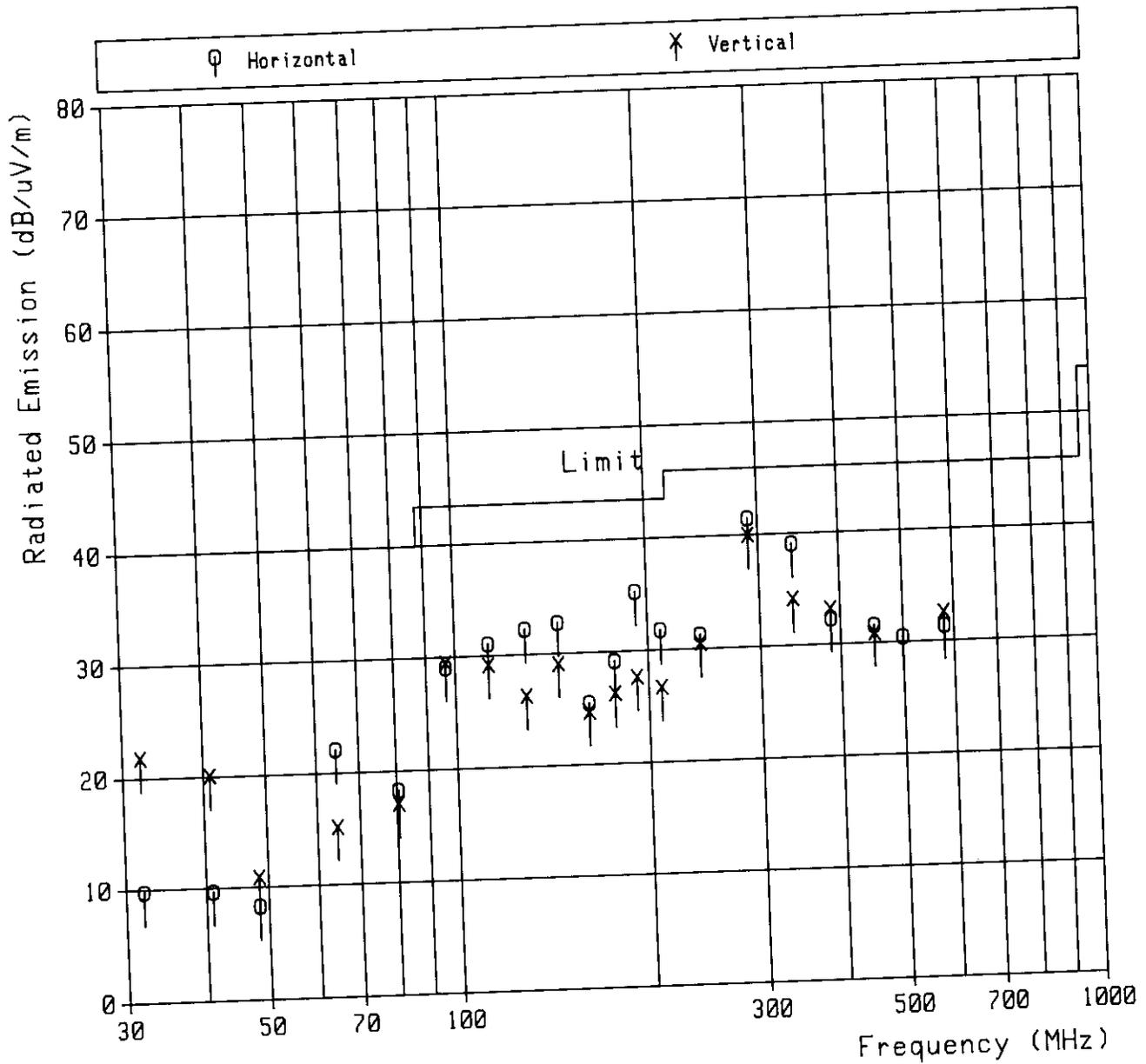
Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)		Result (dB/uV/m)		Limit (dB/uV/m)
		Horizontal	Vertical	Horizontal	Vertical	
32.0	0.1	9.7	21.7	9.8	21.8	40.0
41.0	2.3	7.4	17.8	9.7	20.1	40.0
48.4	3.9	4.4	7.0	8.3	10.9	40.0
64.5	6.6	15.5	8.6	22.1	15.2	40.0
80.5	8.8	9.5	8.3	18.3	17.1	40.0
96.7	10.6	18.5	18.9	29.1	29.5	43.5
112.8	12.1	19.0	17.1	31.1	29.2	43.5
128.9	13.5	18.8	12.8	32.3	26.3	43.5
145.0	14.7	18.1	14.4	32.8	29.1	43.5
161.2	15.8	9.7	8.9	25.5	24.7	43.5
177.2	16.8	12.4	9.5	29.2	26.3	43.5
192.0	17.6	17.7	10.1	35.3	27.7	43.5
209.5	18.5	13.3	8.2	31.8	26.7	43.5
241.7	20.1	11.2	10.4	31.3	30.5	46.0
290.0	22.1	19.4	17.9	41.5	40.0	46.0
338.3	23.7	15.4	10.5	39.1	34.2	46.0
386.7	25.2	7.1	8.0	32.3	33.2	46.0
451.2	27.0	4.6	3.9	31.6	30.9	46.0
499.5	28.1	2.4	< 0.0	30.5	< 28.1	46.0
580.1	30.1	1.3	2.5	31.4	32.6	46.0
700.0	32.6	< 0.0	< 0.0	< 32.6	< 32.6	46.0
800.0	34.4	< 0.0	< 0.0	< 34.4	< 34.4	46.0
1000.0	37.4	< 0.0	< 0.0	< 37.4	< 37.4	54.0

- Notes:
- 1) Measured Distance : 3.0 m
  - 2) The spectrum was checked from 30 MHz to 1000 MHz.
  - 3) The symbol of '<' means 'or less'.
  - 4) Correction Factor includes an antenna factor and a cable (14.0 m) loss.
  - 5) A sample calculation was made at 290.0 MHz.  
Correction Factor + Meter Reading = 22.1 + 19.4 = 41.5 dB/uV/m

Model No. : SLV-M20HF  
Serial No. : None

### §15.109(a) Radiated Emissions Measurement

Testing Signal Sources : Internal Modulation Sources (NTSC TV Signal Recording Tape)  
Operating Condition : Playing Mode



Model No. : SLV-M20HF

Serial No. : None

§15.109(a) Radiated Emissions Measurement

Testing Signal Sources : Video Modulation Sources (VITS : 1 Vp-p and 5 Vp-p)

Operating Condition : Recording Mode

Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)		Result (dB/uV/m)		Limit (dB/uV/m)
		Horizontal	Vertical	Horizontal	Vertical	
32.0	0.1	14.8	23.7	14.9	23.8	40.0
43.0	2.8	15.0	24.0	17.8	26.8	40.0
48.0	3.8	7.8	16.7	11.6	20.5	40.0
64.4	6.6	17.1	14.0	23.7	20.6	40.0
80.6	8.8	9.0	3.9	17.8	12.7	40.0
96.7	10.6	22.7	24.7	33.3	35.3	43.5
112.8	12.1	23.1	17.5	35.2	29.6	43.5
128.9	13.5	22.7	10.5	36.2	24.0	43.5
145.0	14.7	20.7	8.6	35.4	23.3	43.5
161.1	15.8	19.2	9.9	35.0	25.7	43.5
177.2	16.8	18.3	8.9	35.1	25.7	43.5
193.2	17.7	17.7	6.2	35.4	23.9	43.5
209.5	18.5	12.5	8.4	31.0	26.9	43.5
241.6	20.1	12.7	13.0	32.8	33.1	46.0
290.0	22.1	20.2	18.5	42.3	40.6	46.0
338.4	23.8	18.7	13.6	42.5	37.4	46.0
386.7	25.2	3.7	5.4	28.9	30.6	46.0
451.1	27.0	5.3	2.8	32.3	29.8	46.0
499.5	28.1	1.2	< 0.0	29.3	< 28.1	46.0
580.1	30.1	2.9	2.7	33.0	32.8	46.0
700.0	32.6	< 0.0	< 0.0	< 32.6	< 32.6	46.0
800.0	34.4	< 0.0	< 0.0	< 34.4	< 34.4	46.0
1000.0	37.4	< 0.0	< 0.0	< 37.4	< 37.4	54.0

- Notes:
- 1) Measured Distance : 3.0 m
  - 2) The spectrum was checked from 30 MHz to 1000 MHz.
  - 3) The symbol of '<' means 'or less'.
  - 4) Correction Factor includes an antenna factor and a cable (14.0 m) loss.
  - 5) A sample calculation was made at 338.4 MHz.  
 $Correction\ Factor + Meter\ Reading = 23.8 + 18.7 = 42.5\ dB/uV/m$

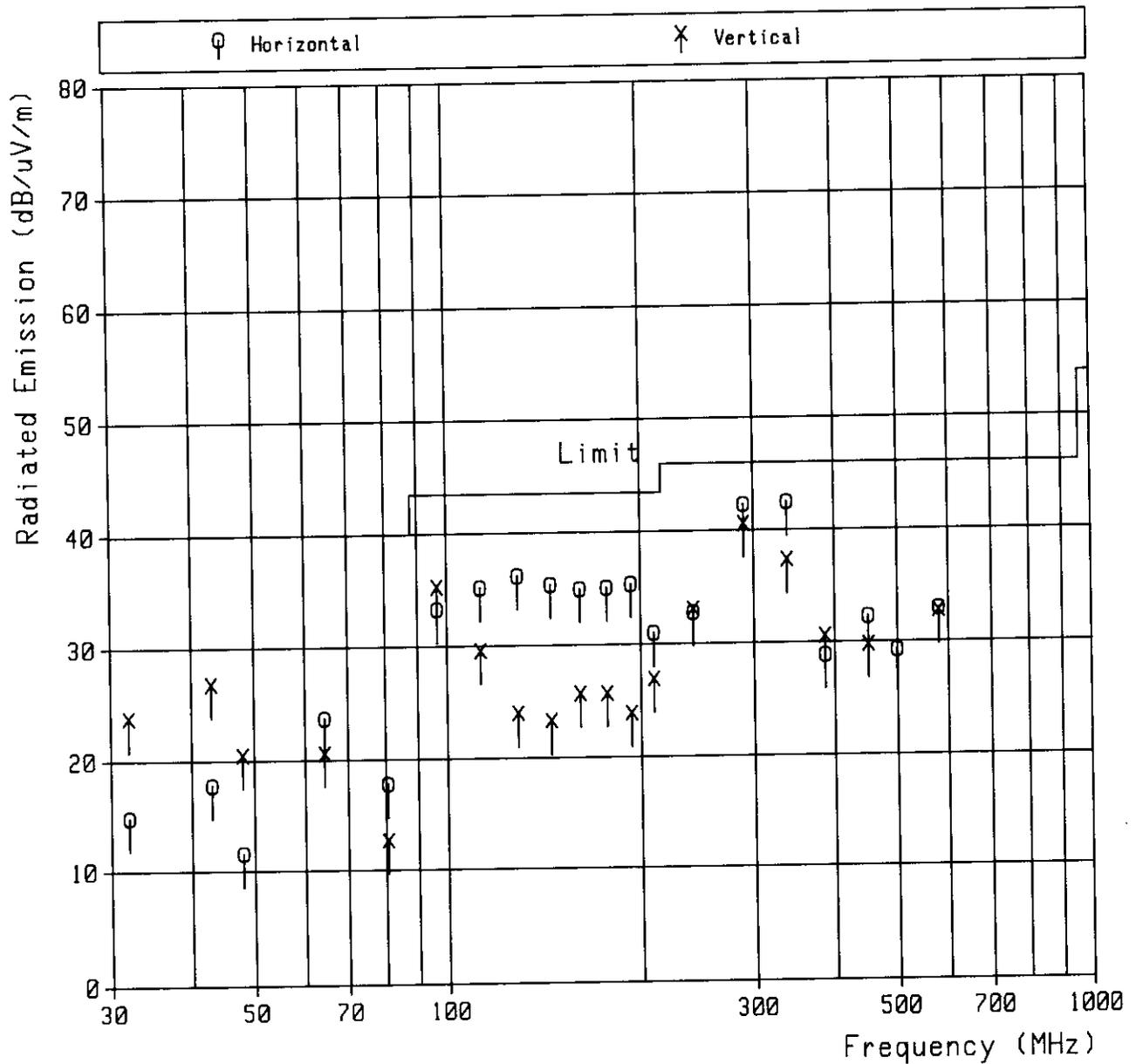
Model No. : SLV-M20HF

Serial No. : None

## §15.109(a) Radiated Emissions Measurement

Testing Signal Sources : Video Modulation Sources (VITS : 1 Vp-p and 5 Vp-p)

Operating Condition : Recording Mode



Model No. : SLV-M20HF  
Serial No. : None

S15.109(a) Radiated Emissions Measurement

Testing Signal Sources : RF Modulation Sources (NTSC Colorbar : 70 dB/uV at 193.25 MHz)  
Operating Condition : Recording Mode

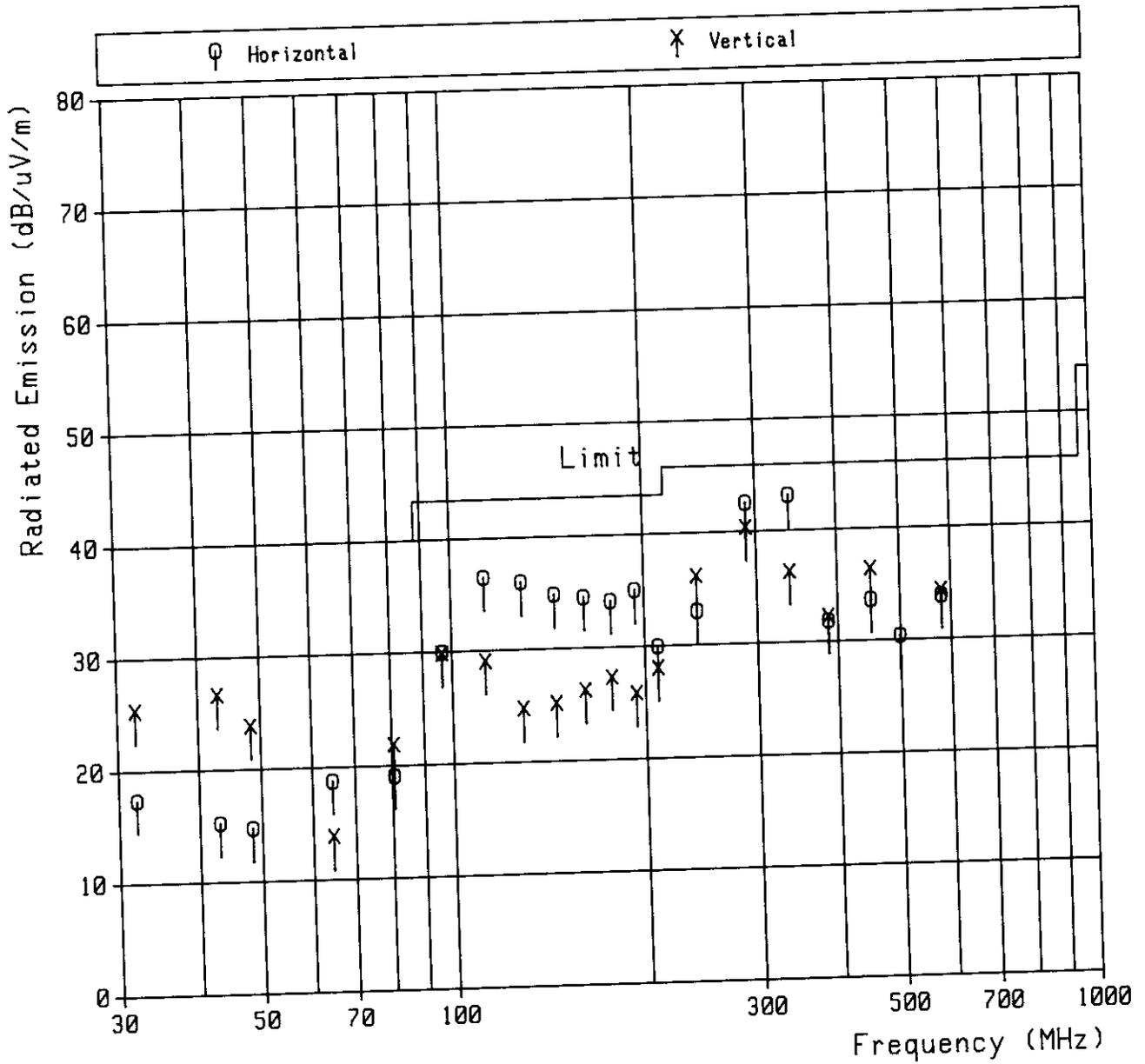
Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)		Result (dB/uV/m)		Limit (dB/uV/m)
		Horizontal	Vertical	Horizontal	Vertical	
32.0	0.1	17.3	25.3	17.4	25.4	40.0
43.0	2.8	12.4	23.9	15.2	26.7	40.0
48.3	3.9	10.8	20.0	14.7	23.9	40.0
64.5	6.6	12.2	7.2	18.8	13.8	40.0
80.6	8.8	10.3	13.1	19.1	21.9	40.0
96.6	10.6	19.4	19.3	30.0	29.9	43.5
112.8	12.1	24.5	17.0	36.6	29.1	43.5
128.9	13.5	22.6	11.3	36.1	24.8	43.5
145.0	14.7	20.2	10.5	34.9	25.2	43.5
161.1	15.8	18.8	10.5	34.6	26.3	43.5
177.3	16.8	17.4	10.6	34.2	27.4	43.5
193.4	17.7	17.4	8.2	35.1	25.9	43.5
209.4	18.5	11.5	9.6	30.0	28.1	43.5
241.7	20.1	13.0	16.1	33.1	36.2	46.0
290.0	22.1	20.5	18.3	42.6	40.4	46.0
338.1	23.7	19.5	12.7	43.2	36.4	46.0
386.7	25.2	6.7	7.1	31.9	32.3	46.0
451.1	27.0	6.7	9.5	33.7	36.5	46.0
499.4	28.1	2.3	< 0.0	30.4	< 28.1	46.0
580.1	30.1	3.8	4.3	33.9	34.4	46.0
700.0	32.6	< 0.0	< 0.0	< 32.6	< 32.6	46.0
800.0	34.4	< 0.0	< 0.0	< 34.4	< 34.4	46.0
1000.0	37.4	< 0.0	< 0.0	< 37.4	< 37.4	54.0

- Notes: 1) Measured Distance : 3.0 m  
 2) The spectrum was checked from 30 MHz to 1000 MHz.  
 3) The symbol of '<' means 'or less'.  
 4) Correction Factor includes an antenna factor and a cable (14.0 m) loss.  
 5) A sample calculation was made at 338.1 MHz.  
 Correction Factor + Meter Reading = 23.7 + 19.5 = 43.2 dB/uV/m

Model No. : SLV-M20HF  
Serial No. : None

§15.109(a) Radiated Emissions Measurement

Testing Signal Sources : RF Modulation Sources (NTSC Colorbar : 70 dB/uV at 193.25 MHz)  
Operating Condition : Recording Mode



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Model No. : SLV-M20HF  
Serial No. : None

Date : June 29, 1998  
Temp. : 24 °C; Humi. : 42 %

## 10. S15.115(b)(1)(ii) Output Signal Level Measurement

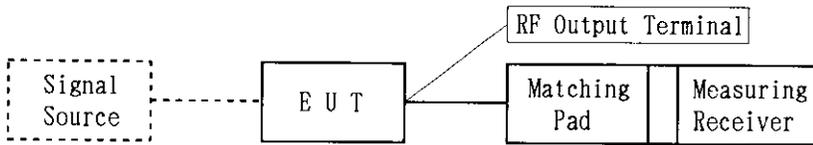
Tested by : *K. Hayashi*  
Kazuya Hayashi, Engineer  
Testing Division  
EMC Engineering Department

Model No. : SLV-M20HF

Serial No. : None

§15.115(b)(1)(ii) Output Signal Level Measurement

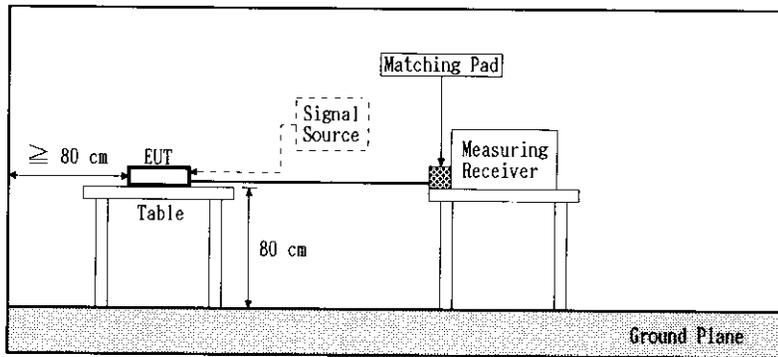
Block Diagram



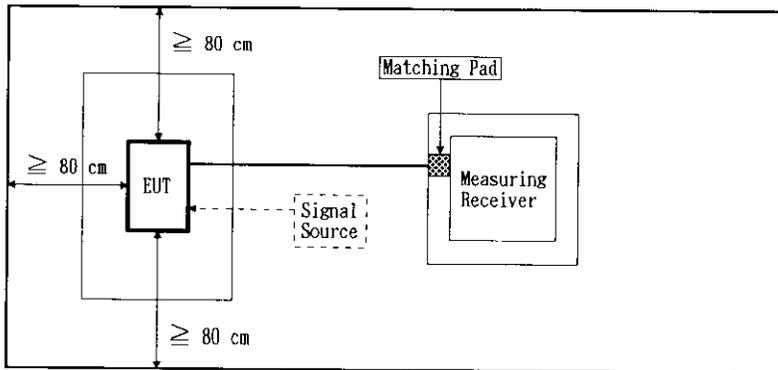
Note: Antenna input terminal of EUT was terminated with the terminator of specified impedances.

Configuration of EUT

Side View



Top View



Note: The same configuration of cables and terminators which were connected to VCR was applied to all applicable measurements, shown as photograph in page 19 and 20.

Model No. : SLV-M20HF  
Serial No. : None

### §15.115(b)(1)(ii) Output Signal Level Measurement (Visual)

Testing Signal Sources : Internal Modulation Sources (NTSC TV Signal Recording Tape)  
Operating Condition : Playing Mode

RF Output Channel	Frequency (MHz)	Matching Pad Loss (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
3	61.30	7.8	59.3	67.1	69.5
4	67.30	7.8	58.8	66.6	69.5

Testing Signal Sources : Video Modulation Sources (VITS : 1 Vp-p and 5 Vp-p)  
Operating Condition : Recording Mode

RF Output Channel	Frequency (MHz)	Matching Pad Loss (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
3	61.30	7.8	59.1	66.9	69.5
4	67.29	7.8	58.8	66.6	69.5

Testing Signal Sources : RF Modulation Sources (NTSC Colorbar : 70 dB/uV at 193.25 MHz)  
Operating Condition : Recording Mode

RF Output Channel	Frequency (MHz)	Matching Pad Loss (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
3	61.29	7.8	59.2	67.0	69.5
4	67.29	7.8	58.9	66.7	69.5

- Notes: 1) Spectrum Analyzer ; SPAN : 10 MHz, RES BW : 100 kHz, VBW : 300 kHz, SWP : 20 msec  
2) Impedance at the RF output terminal : 75 ohms (Unbalanced)  
3) A sample calculation was made at 61.30 MHz.  
Matching Pad Loss + Meter Reading = 7.8 + 59.3 = 67.1 dB/uV

Model No. : SLV-M20HF  
Serial No. : None

§15.115(b)(1)(ii) Output Signal Level Measurement (Aural)

Testing Signal Sources : Internal Modulation Sources (NTSC TV Signal Recording Tape)  
Operating Condition : Playing Mode

RF Output Channel	Frequency (MHz)	Matching Pad Loss (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
3	65.80	7.8	42.4	50.2	56.5
4	71.78	7.8	42.3	50.1	56.5

Testing Signal Sources : Video Modulation Sources (VITS : 1 Vp-p and 5 Vp-p)  
Operating Condition : Recording Mode

RF Output Channel	Frequency (MHz)	Matching Pad Loss (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
3	65.80	7.8	43.1	50.9	56.5
4	71.78	7.8	42.3	50.1	56.5

Testing Signal Sources : RF Modulation Sources (NTSC Colorbar : 70 dB/uV at 193.25 MHz)  
Operating Condition : Recording Mode

RF Output Channel	Frequency (MHz)	Matching Pad Loss (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
3	65.79	7.8	42.3	50.1	56.5
4	71.79	7.8	42.3	50.1	56.5

- Notes: 1) Spectrum Analyzer ; SPAN : 10 MHz, RES BW : 100 kHz, VBW : 300 kHz, SWP : 20 msec  
2) Impedance at the RF output terminal : 75 ohms (Unbalanced)  
3) A sample calculation was made at 65.80 MHz.  
Matching Pad Loss + Meter Reading = 7.8 + 43.1 = 50.9 dB/uV

---

Model No. : SLV-M20HF  
Serial No. : None

Date : June 29, 1998  
Temp. : 24 °C; Humi. : 42 %

## 11. §15.115(b)(2)(ii) Spurious Conducted Level Measurement

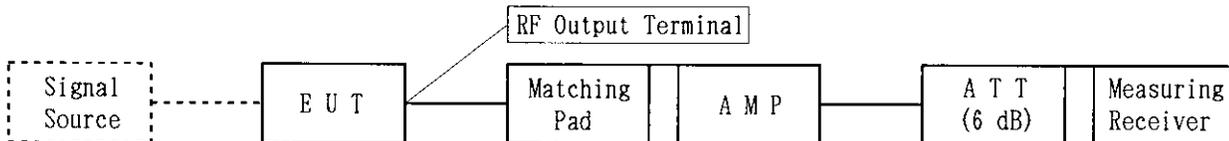
Tested by : *K. Hayashi*  
Kazuya Hayashi, Engineer  
Testing Division  
EMC Engineering Department

Model No. : SLV-M20HF

Serial No. : None

## S15.115(b)(2)(ii) Spurious Conducted Level Measurement

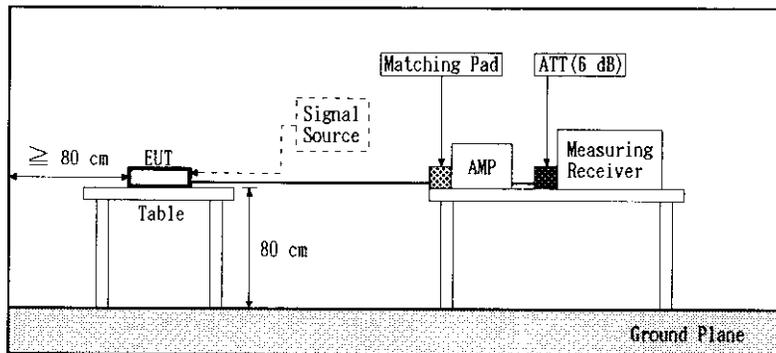
## Block Diagram



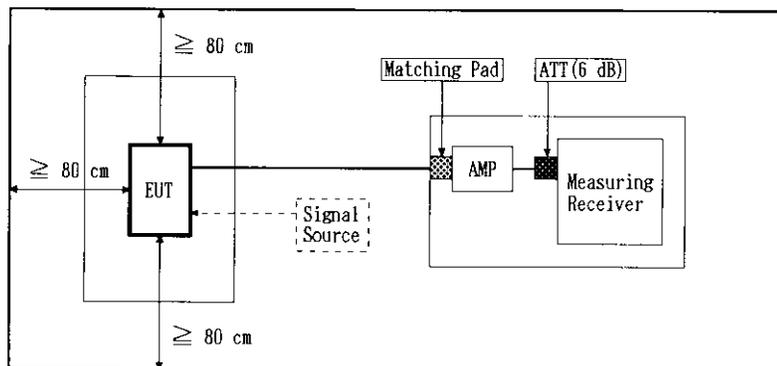
Note: Antenna input terminal of EUT was terminated with the terminator of specified impedances.

## Configuration of EUT

## Side View



## Top View



Note: The same configuration of cables and terminators which were connected to VCR was applied to all applicable measurements, shown as photograph in page 19 and 20.

Model No. : SLV-M20HF  
Serial No. : None

S15.115(b)(2)(ii) Spurious Conducted Level Measurement

Testing Signal Sources : Internal Modulation Sources (NTSC TV Signal Recording Tape)  
Operating Condition : Playing Mode

RF Output Channel : No.3

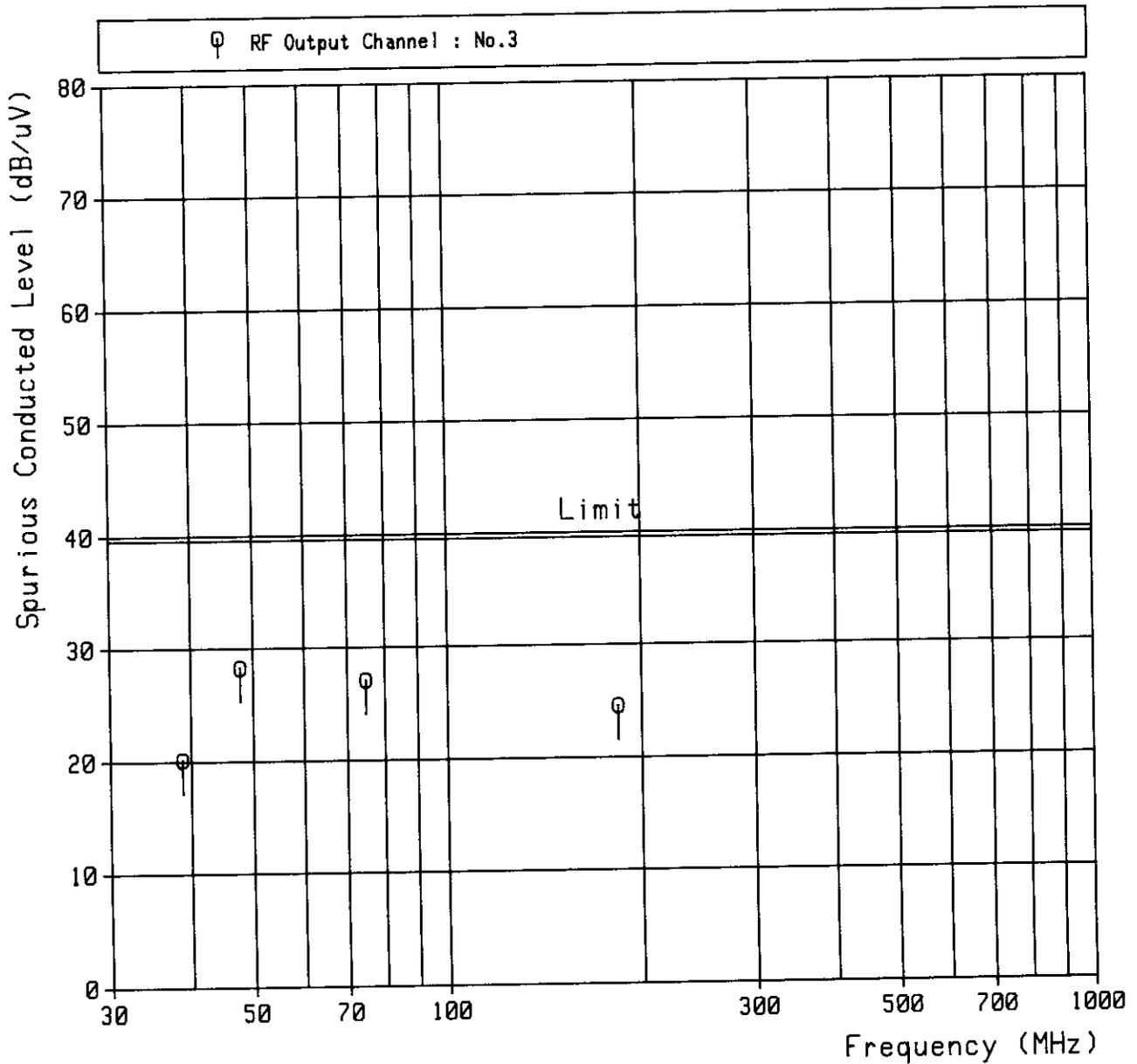
Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
30.0	-13.2	< 30.0	< 16.8	39.6
38.8	-13.2	33.4	20.2	39.6
47.8	-13.2	41.5	28.3	39.6
56.7	-13.2	< 30.0	< 16.8	39.6
74.8	-13.2	40.3	27.1	39.6
83.7	-13.2	< 30.0	< 16.8	39.6
122.5	-13.1	< 30.0	< 16.9	39.6
183.8	-13.0	37.6	24.6	39.6
245.0	-12.9	< 30.0	< 17.1	39.6
306.3	-12.9	< 30.0	< 17.1	39.6
367.5	-12.8	< 30.0	< 17.2	39.6
428.8	-12.8	< 30.0	< 17.2	39.6
490.0	-12.8	< 30.0	< 17.2	39.6
551.3	-12.7	< 30.0	< 17.3	39.6
612.5	-12.6	< 30.0	< 17.4	39.6
673.8	-12.4	< 30.0	< 17.6	39.6
735.0	-12.2	< 30.0	< 17.8	39.6
796.3	-12.0	< 30.0	< 18.0	39.6
857.5	-12.1	< 30.0	< 17.9	39.6
918.8	-12.4	< 30.0	< 17.6	39.6
980.0	-12.6	< 30.0	< 17.4	39.6

- Notes:
- 1) The spectrum was checked from 30 MHz to 1000 MHz.
  - 2) Spectrum Analyzer ; SPAN : 10 MHz, RES BW : 100 kHz, VBW : 300 kHz, SWP : 20 msec
  - 3) Impedance at the RF output terminal : 75 ohms (Unbalanced)
  - 4) The symbol of '<' means 'or less'.
  - 5) Correction Factor includes a gain of preamplifier, a matching pad loss and an attenuation pad loss.
  - 6) A sample calculation was made at 47.8 MHz.  
Correction Factor + Meter Reading = -13.2 + 41.5 = 28.3 dB/uV

Model No. : SLV-M20HF  
Serial No. : None

### §15.115(b)(2)(ii) Spurious Conducted Level Measurement

Testing Signal Sources : Internal Modulation Sources (NTSC TV Signal Recording Tape)  
Operating Condition : Playing Mode



Model No. : SLV-M20HF  
Serial No. : None

S15.115(b)(2)(ii) Spurious Conducted Level Measurement

Testing Signal Sources : Internal Modulation Sources (NTSC TV Signal Recording Tape)  
Operating Condition : Playing Mode

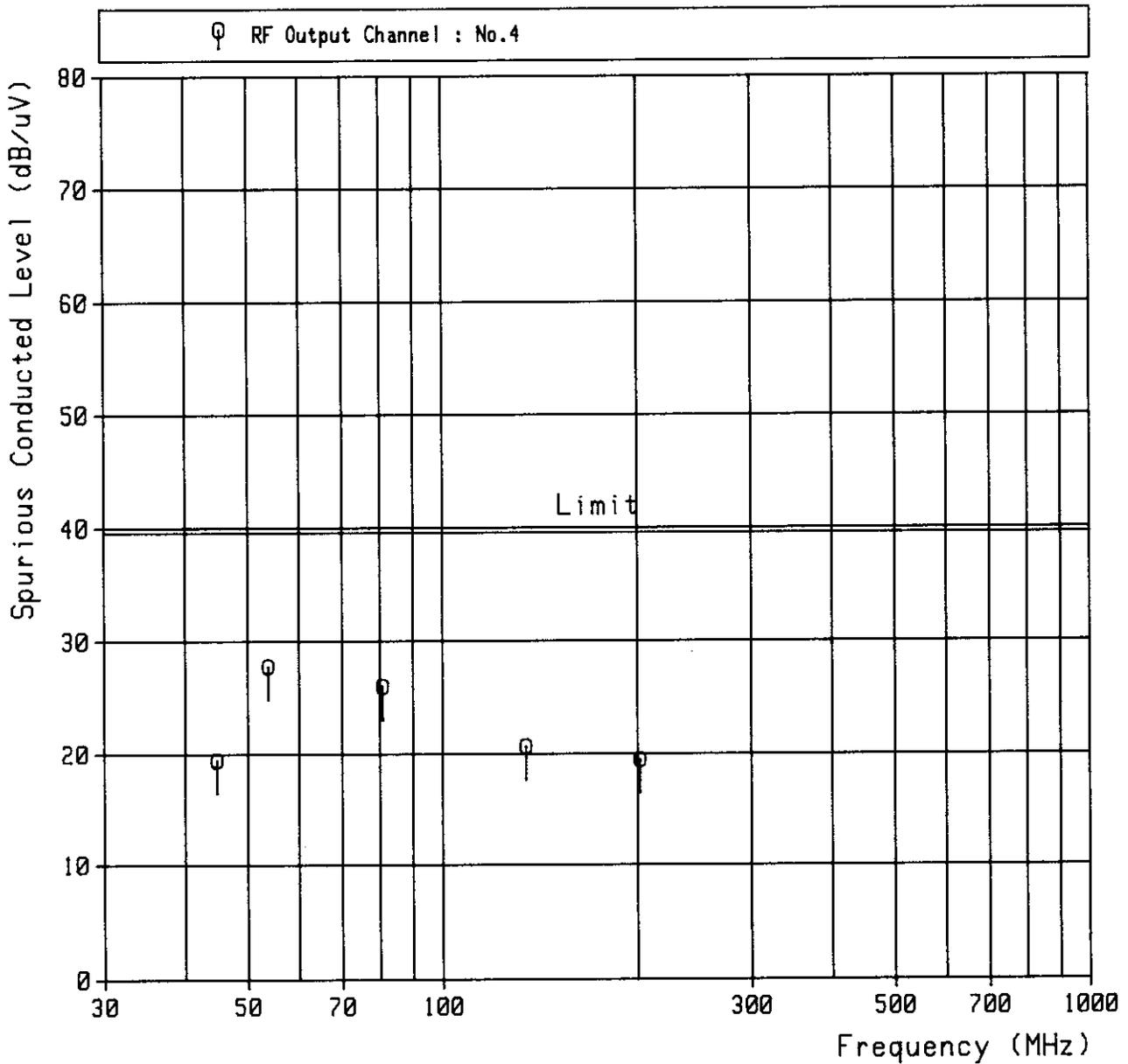
RF Output Channel : No. 4

Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
30.0	-13.2	< 30.0	< 16.8	39.6
35.0	-13.2	< 30.0	< 16.8	39.6
40.0	-13.2	< 30.0	< 16.8	39.6
44.8	-13.2	32.7	19.5	39.6
53.8	-13.2	41.0	27.8	39.6
62.7	-13.2	< 30.0	< 16.8	39.6
80.8	-13.2	39.2	26.0	39.6
89.8	-13.2	< 30.0	< 16.8	39.6
134.5	-13.1	33.8	20.7	39.6
201.8	-13.0	32.5	19.5	39.6
269.0	-12.9	< 30.0	< 17.1	39.6
336.3	-12.9	< 30.0	< 17.1	39.6
403.5	-12.8	< 30.0	< 17.2	39.6
470.8	-12.8	< 30.0	< 17.2	39.6
538.0	-12.7	< 30.0	< 17.3	39.6
605.3	-12.7	< 30.0	< 17.3	39.6
672.5	-12.4	< 30.0	< 17.6	39.6
739.8	-12.2	< 30.0	< 17.8	39.6
807.0	-11.9	< 30.0	< 18.1	39.6
874.3	-12.2	< 30.0	< 17.8	39.6
941.5	-12.5	< 30.0	< 17.5	39.6

- Notes:
- 1) The spectrum was checked from 30 MHz to 1000 MHz.
  - 2) Spectrum Analyzer ; SPAN : 10 MHz, RES BW : 100 kHz, VBW : 300 kHz, SWP : 20 msec
  - 3) Impedance at the RF output terminal : 75 ohms (Unbalanced)
  - 4) The symbol of '<' means 'or less'.
  - 5) Correction Factor includes a gain of preamplifier, a matching pad loss and an attenuation pad loss.
  - 6) A sample calculation was made at 53.8 MHz.  
Correction Factor + Meter Reading = -13.2 + 41.0 = 27.8 dB/uV

Model No. : SLV-M20HF  
Serial No. : None

## §15.115(b)(2)(ii) Spurious Conducted Level Measurement

Testing Signal Sources : Internal Modulation Sources (NTSC TV Signal Recording Tape)  
Operating Condition : Playing Mode

Model No. : SLV-M20HF

Serial No. : None

§15.115(b)(2)(ii) Spurious Conducted Level Measurement

Testing Signal Sources : Video Modulation Sources (VITS : 1 Vp-p and 5 Vp-p)

Operating Condition : Recording Mode

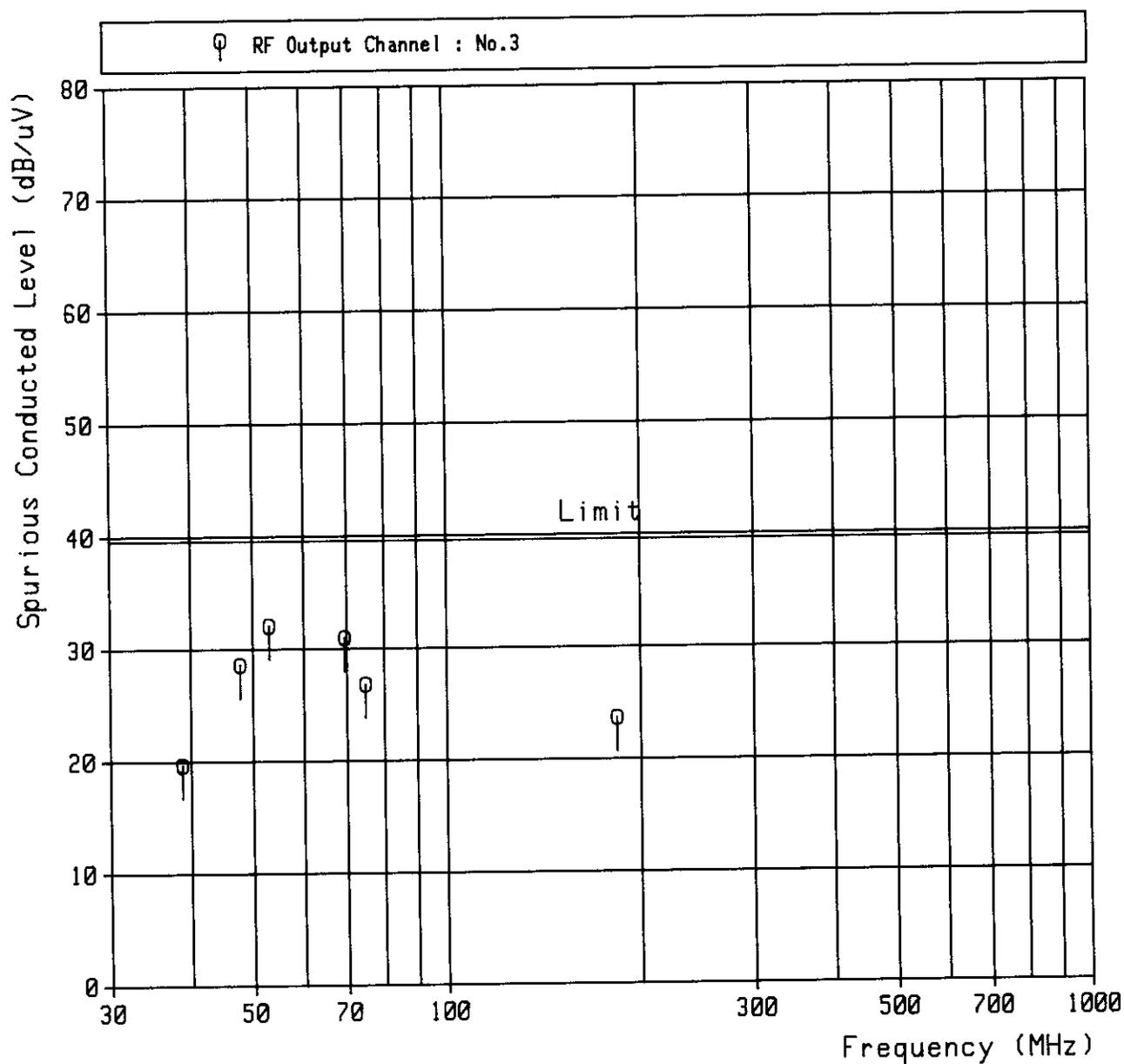
RF Output Channel : No.3

Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
30.0	-13.2	< 30.0	< 16.8	39.6
38.8	-13.2	32.9	19.7	39.6
47.8	-13.2	41.8	28.6	39.6
53.1	-13.2	45.3	32.1	39.6
56.7	-13.2	< 30.0	< 16.8	39.6
69.5	-13.2	44.2	31.0	39.6
74.8	-13.2	40.0	26.8	39.6
83.8	-13.2	< 30.0	< 16.8	39.6
122.5	-13.1	< 30.0	< 16.9	39.6
183.8	-13.0	36.7	23.7	39.6
245.0	-12.9	< 30.0	< 17.1	39.6
306.3	-12.9	< 30.0	< 17.1	39.6
367.5	-12.8	< 30.0	< 17.2	39.6
428.8	-12.8	< 30.0	< 17.2	39.6
490.0	-12.8	< 30.0	< 17.2	39.6
551.3	-12.7	< 30.0	< 17.3	39.6
612.5	-12.6	< 30.0	< 17.4	39.6
673.8	-12.4	< 30.0	< 17.6	39.6
735.0	-12.2	< 30.0	< 17.8	39.6
796.3	-12.0	< 30.0	< 18.0	39.6
857.5	-12.1	< 30.0	< 17.9	39.6
918.8	-12.4	< 30.0	< 17.6	39.6
980.0	-12.6	< 30.0	< 17.4	39.6

- Notes:
- 1) The spectrum was checked from 30 MHz to 1000 MHz.
  - 2) Spectrum Analyzer ; SPAN : 10 MHz, RES BW : 100 kHz, VBW : 300 kHz, SWP : 20 msec
  - 3) Impedance at the RF output terminal : 75 ohms (Unbalanced)
  - 4) The symbol of '<' means 'or less'.
  - 5) Correction Factor includes a gain of preamplifier, a matching pad loss and an attenuation pad loss.
  - 6) A sample calculation was made at 53.1 MHz.  
Correction Factor + Meter Reading = -13.2 + 45.3 = 32.1 dB/uV

Model No. : SLV-M20HF  
Serial No. : None

## §15.115(b)(2)(ii) Spurious Conducted Level Measurement

Testing Signal Sources : Video Modulation Sources (VITS : 1 Vp-p and 5 Vp-p)  
Operating Condition : Recording Mode

Model No. : SLV-M20HF  
Serial No. : None

§15.115(b)(2)(ii) Spurious Conducted Level Measurement

Testing Signal Sources : Video Modulation Sources (VITS : 1 Vp-p and 5 Vp-p)  
Operating Condition : Recording Mode

RF Output Channel : No. 4

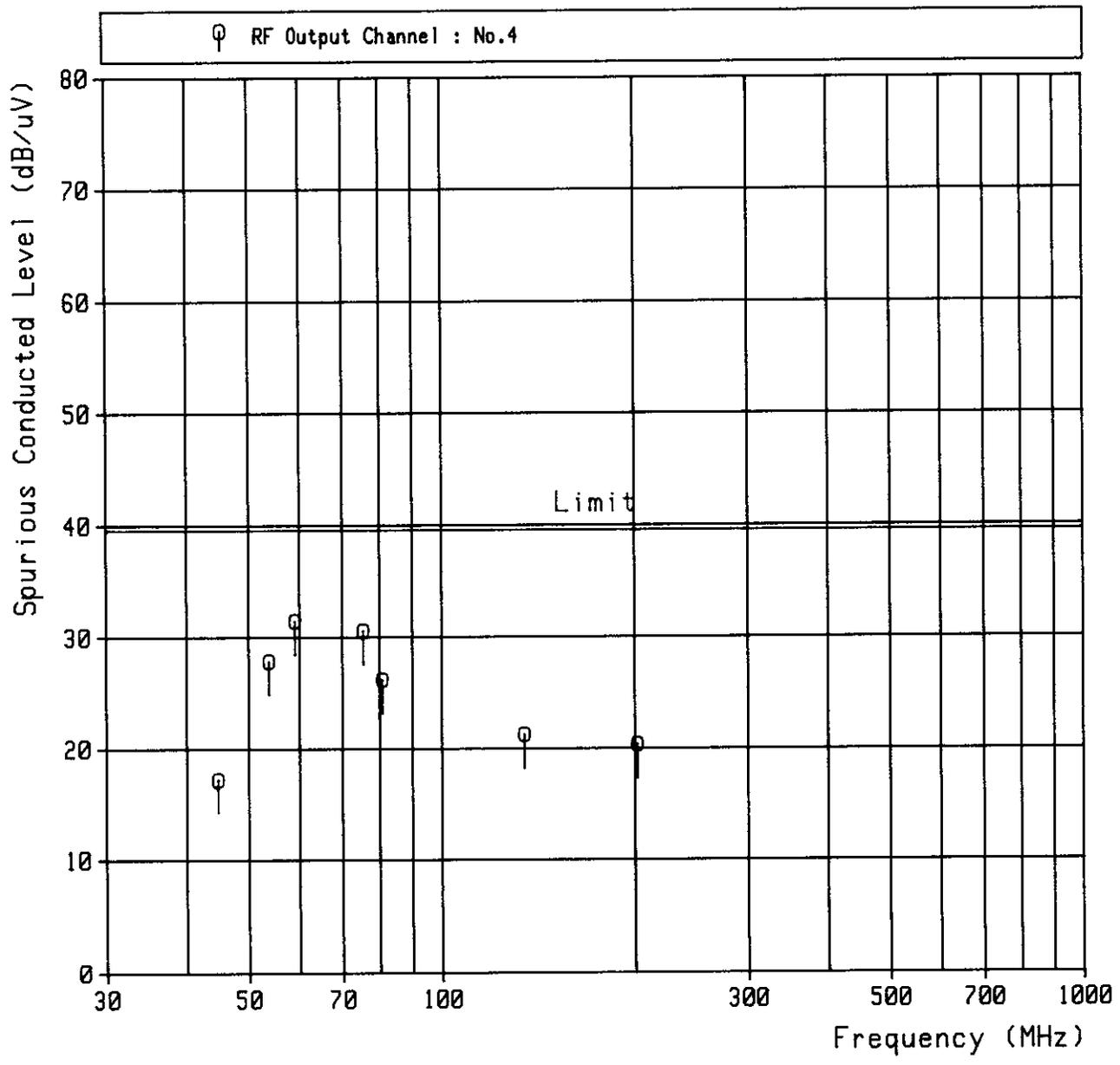
Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
30.0	-13.2	< 30.0	< 16.8	39.6
35.0	-13.2	< 30.0	< 16.8	39.6
40.0	-13.2	< 30.0	< 16.8	39.6
44.8	-13.2	30.5	17.3	39.6
53.8	-13.2	41.1	27.9	39.6
59.1	-13.2	44.7	31.5	39.6
62.7	-13.2	< 30.0	< 16.8	39.6
75.5	-13.2	43.8	30.6	39.6
80.8	-13.2	39.4	26.2	39.6
89.8	-13.2	< 30.0	< 16.8	39.6
134.5	-13.1	34.4	21.3	39.6
201.8	-13.0	33.4	20.4	39.6
269.0	-12.9	< 30.0	< 17.1	39.6
336.3	-12.9	< 30.0	< 17.1	39.6
403.5	-12.8	< 30.0	< 17.2	39.6
470.8	-12.8	< 30.0	< 17.2	39.6
538.0	-12.7	< 30.0	< 17.3	39.6
605.3	-12.7	< 30.0	< 17.3	39.6
672.5	-12.4	< 30.0	< 17.6	39.6
739.8	-12.2	< 30.0	< 17.8	39.6
807.0	-11.9	< 30.0	< 18.1	39.6
874.3	-12.2	< 30.0	< 17.8	39.6
941.5	-12.5	< 30.0	< 17.5	39.6

- Notes:
- 1) The spectrum was checked from 30 MHz to 1000 MHz.
  - 2) Spectrum Analyzer ; SPAN : 10 MHz, RES BW : 100 kHz, VBW : 300 kHz, SWP : 20 msec
  - 3) Impedance at the RF output terminal : 75 ohms (Unbalanced)
  - 4) The symbol of '<' means 'or less'.
  - 5) Correction Factor includes a gain of preamplifier, a matching pad loss and an attenuation pad loss.
  - 6) A sample calculation was made at 59.1 MHz.  
Correction Factor + Meter Reading = -13.2 + 44.7 = 31.5 dB/uV

Model No. : SLV-M20HF  
Serial No. : None

### §15.115(b)(2)(ii) Spurious Conducted Level Measurement

Testing Signal Sources : Video Modulation Sources (VITS : 1 Vp-p and 5 Vp-p)  
Operating Condition : Recording Mode



Model No. : SLV-M20HF

Serial No. : None

S15.115(b)(2)(ii) Spurious Conducted Level Measurement

Testing Signal Sources : RF Modulation Sources (NTSC Colorbar : 70 dB/uV at 193.25 MHz)

Operating Condition : Recording Mode

RF Output Channel : No.3

Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
30.0	-13.2	< 30.0	< 16.8	39.6
38.8	-13.2	33.4	20.2	39.6
47.8	-13.2	41.6	28.4	39.6
56.7	-13.2	< 30.0	< 16.8	39.6
74.8	-13.2	40.1	26.9	39.6
83.8	-13.2	< 30.0	< 16.8	39.6
122.5	-13.1	< 30.0	< 16.9	39.6
183.8	-13.0	36.9	23.9	39.6
245.0	-12.9	< 30.0	< 17.1	39.6
306.3	-12.9	< 30.0	< 17.1	39.6
367.5	-12.8	< 30.0	< 17.2	39.6
428.8	-12.8	< 30.0	< 17.2	39.6
490.0	-12.8	< 30.0	< 17.2	39.6
551.3	-12.7	< 30.0	< 17.3	39.6
612.5	-12.6	< 30.0	< 17.4	39.6
673.8	-12.4	< 30.0	< 17.6	39.6
735.0	-12.2	< 30.0	< 17.8	39.6
796.3	-12.0	< 30.0	< 18.0	39.6
857.5	-12.1	< 30.0	< 17.9	39.6
918.8	-12.4	< 30.0	< 17.6	39.6
980.0	-12.6	< 30.0	< 17.4	39.6

- Notes:
- 1) The spectrum was checked from 30 MHz to 1000 MHz.
  - 2) Spectrum Analyzer ; SPAN : 10 MHz, RES BW : 100 kHz, VBW : 300 kHz, SWP : 20 msec
  - 3) Impedance at the RF output terminal : 75 ohms (Unbalanced)
  - 4) The symbol of '<' means 'or less'.
  - 5) Correction Factor includes a gain of preamplifier, a matching pad loss and an attenuation pad loss.
  - 6) A sample calculation was made at 47.8 MHz.  
Correction Factor + Meter Reading = -13.2 + 41.6 = 28.4 dB/uV

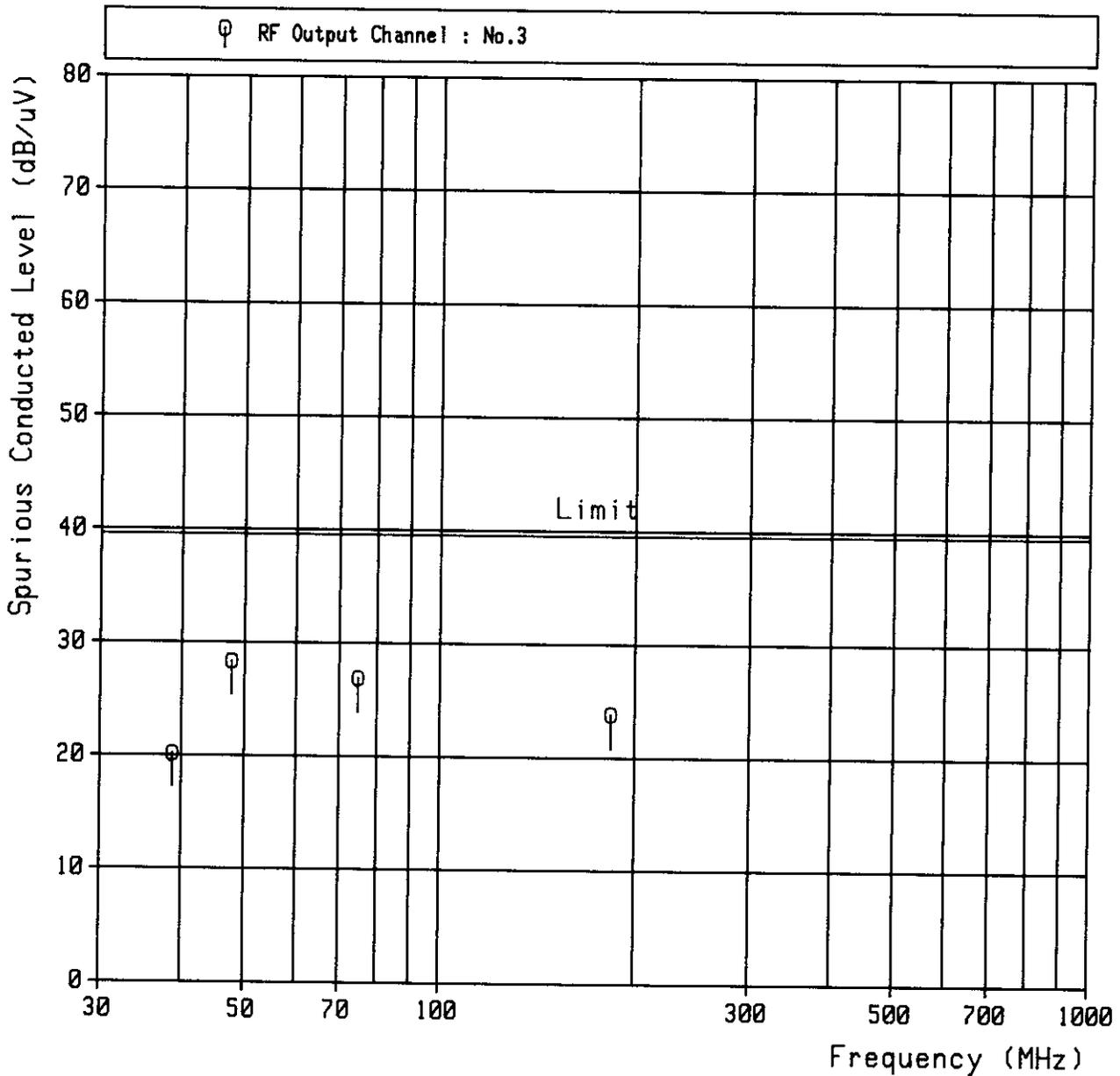
Model No. : SLV-M20HF

Serial No. : None

## §15.115(b)(2)(ii) Spurious Conducted Level Measurement

Testing Signal Sources : RF Modulation Sources (NTSC Colorbar : 70 dB/uV at 193.25 MHz)

Operating Condition : Recording Mode



Model No. : SLV-M20HF  
Serial No. : None

§15.115(b)(2)(ii) Spurious Conducted Level Measurement

Testing Signal Sources : RF Modulation Sources (NTSC Colorbar : 70 dB/uV at 193.25 MHz)  
Operating Condition : Recording Mode

RF Output Channel : No. 4

Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
30.0	-13.2	< 30.0	< 16.8	39.6
35.0	-13.2	< 30.0	< 16.8	39.6
40.0	-13.2	< 30.0	< 16.8	39.6
44.8	-13.2	34.1	20.9	39.6
53.8	-13.2	41.0	27.8	39.6
62.7	-13.2	< 30.0	< 16.8	39.6
80.8	-13.2	39.6	26.4	39.6
89.8	-13.2	< 30.0	< 16.8	39.6
134.5	-13.1	34.2	21.1	39.6
201.8	-13.0	33.6	20.6	39.6
269.0	-12.9	< 30.0	< 17.1	39.6
336.3	-12.9	< 30.0	< 17.1	39.6
403.5	-12.8	< 30.0	< 17.2	39.6
470.8	-12.8	< 30.0	< 17.2	39.6
538.0	-12.7	< 30.0	< 17.3	39.6
605.3	-12.7	< 30.0	< 17.3	39.6
672.5	-12.4	< 30.0	< 17.6	39.6
739.8	-12.2	< 30.0	< 17.8	39.6
807.0	-11.9	< 30.0	< 18.1	39.6
874.3	-12.2	< 30.0	< 17.8	39.6
941.5	-12.5	< 30.0	< 17.5	39.6

- Notes:
- 1) The spectrum was checked from 30 MHz to 1000 MHz.
  - 2) Spectrum Analyzer ; SPAN : 10 MHz, RES BW : 100 kHz, VBW : 300 kHz, SWP : 20 msec
  - 3) Impedance at the RF output terminal : 75 ohms (Unbalanced)
  - 4) The symbol of '<' means 'or less'.
  - 5) Correction Factor includes a gain of preamplifier, a matching pad loss and an attenuation pad loss.
  - 6) A sample calculation was made at 53.8 MHz.  
Correction Factor + Meter Reading = -13.2 + 41.0 = 27.8 dB/uV

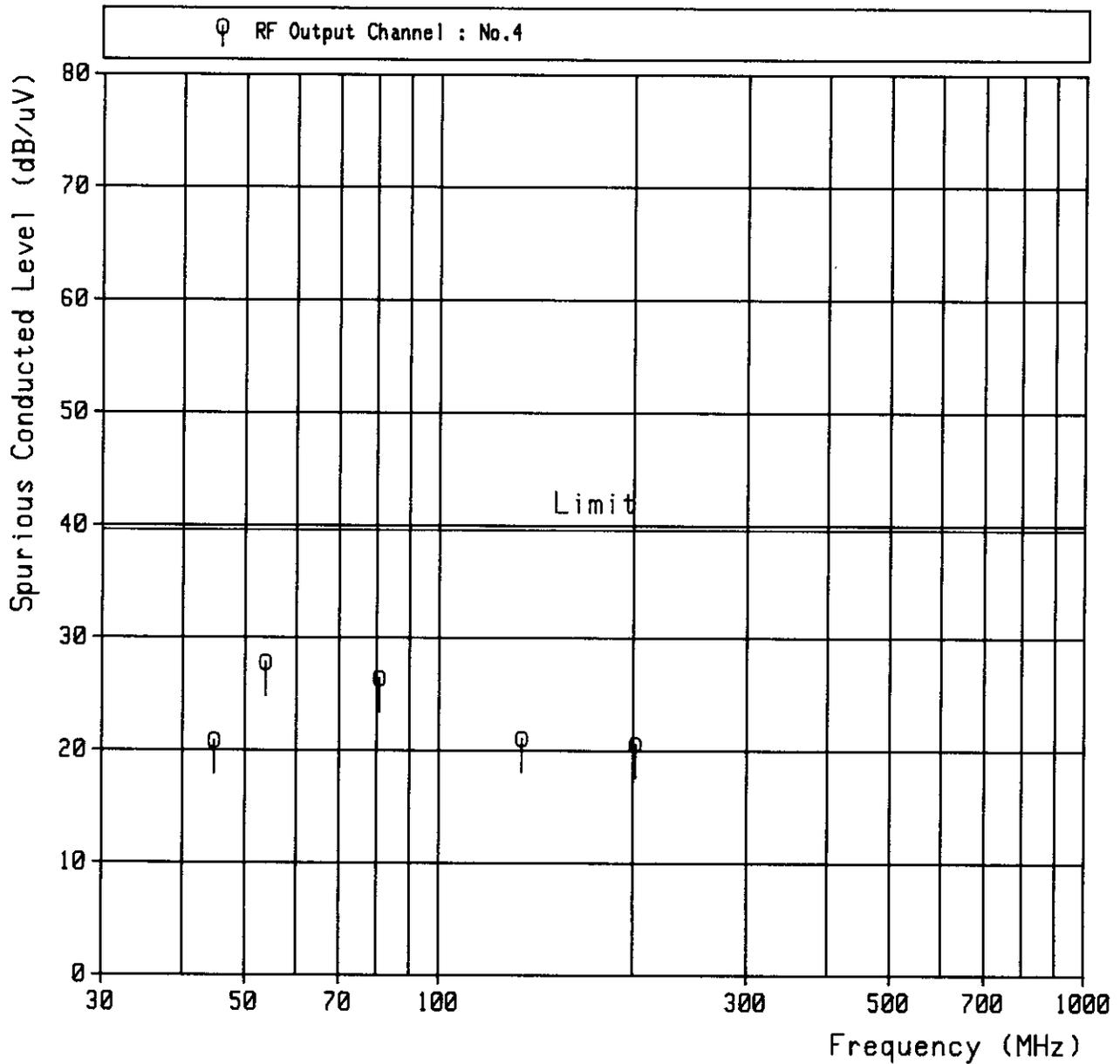
Model No. : SLV-M20HF

Serial No. : None

## §15.115(b)(2)(ii) Spurious Conducted Level Measurement

Testing Signal Sources : RF Modulation Sources (NTSC Colorbar : 70 dB/μV at 193.25 MHz)

Operating Condition : Recording Mode



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Model No. : SLV-M20HF  
Serial No. : None

Date : June 29, 1998  
Temp. : 24 °C; Humi. : 42 %

## 12. S15.115(c)(1)(ii) Antenna Transfer Switch Measurement

Tested by : \_\_\_\_\_



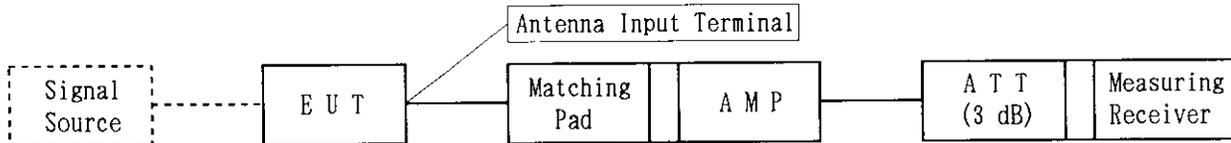
Kazuya Hayashi, Engineer  
Testing Division  
EMC Engineering Department

Model No. : SLV-M20HF

Serial No. : None

§15.115(c)(1)(ii) Antenna Transfer Switch Measurement

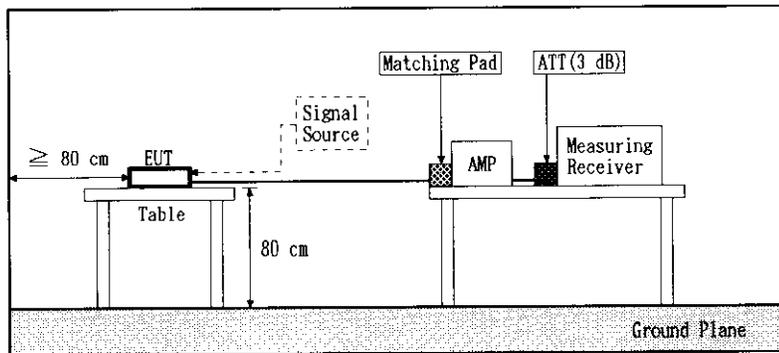
Block Diagram



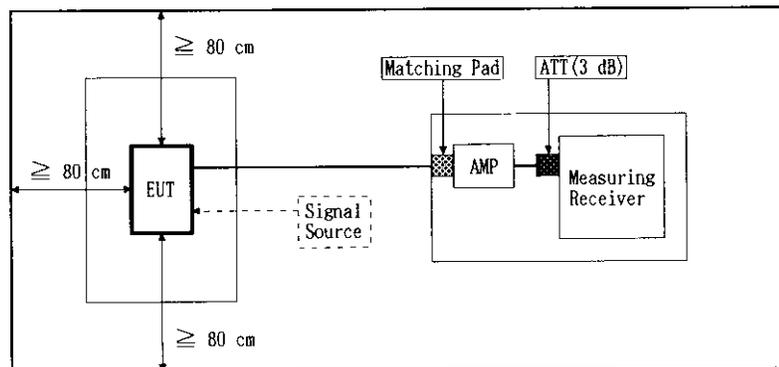
Note: RF output terminal of EUT was connected to the cable terminated with the specified impedances.

Configuration of EUT

Side View



Top View



Note: The same configuration of cables and terminators which were connected to VCR was applied to all applicable measurements, shown as photograph in page 19 and 20.

Model No. : SLV-M20HF

Serial No. : None

§15.115(c)(1)(ii) Antenna Transfer Switch Measurement

Testing Signal Sources : Internal Modulation Sources (NTSC TV Signal Recording Tape)

Operating Condition : Playing Mode

RF Output Channel	Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
3	61.25	-16.2	18.1	1.9	9.5
4	67.25	-16.2	19.9	3.7	9.5

Testing Signal Sources : Video Modulation Sources (VITS : 1 Vp-p and 5 Vp-p)

Operating Condition : Recording Mode

RF Output Channel	Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
3	61.25	-16.2	18.2	2.0	9.5
4	67.25	-16.2	19.5	3.3	9.5

Testing Signal Sources : RF Modulation Sources (NTSC Colorbar : 70 dB/uV at 193.25 MHz)

Operating Condition : Recording Mode

RF Output Channel	Frequency (MHz)	Correction Factor (dB)	Meter Reading (dB/uV)	Result (dB/uV)	Limit (dB/uV)
Not Applicable					

Not Applicable

- Notes:
- 1) Spectrum Analyzer ; SPAN : 1 MHz, RES BW : 10kHz, VBW : 10kHz, SWP : 30 msec
  - 2) Impedance at the Antenna input terminal : 75 ohms (Unbalanced)
  - 3) Correction Factor includes a gain of preamplifier, a matching pad loss and an attenuation pad loss.
  - 4) A sample calculation was made at 67.25 MHz.  
Correction Factor + Meter Reading = -16.2 + 19.9 = 3.7 dB/uV

Model No. : SLV-M20HF  
Serial No. : None

### 13. Test Equipment Used

Equipment	Manufacturer	Model No. [ Serial No. ]	Last Cal. [ Cal. Interval ]
Measuring Receiver	Rohde & Schwarz	ESH 3 [ 872994/035 ]	May, 1998 [ 1 year ]
Measuring Receiver	Rohde & Schwarz	ESVP [ 881487/004 ]	May, 1998 [ 1 year ]
Spectrum Analyzer	Hewlett Packard	8566B [ 2140A01091 ]	April, 1998 [ 1 year ]
Line Impedance Stabilized Network	Kyoritsu Electrical Works	KNW-407 [ 8-1130-6 ]	April, 1998 [ 1 year ]
Dipole Antenna	Kyoritsu Electrical Works	KBA-511 [ 0-170-1 ]	November, 1997 [ 1 year ]
Dipole Antenna	Kyoritsu Electrical Works	KBA-611 [ 0-147-14 ]	November, 1997 [ 1 year ]
Preamplifier	Hewlett Packard	8447D [ 1937A02168 ]	July, 1997 [ 1 year ]
Vertical Internal Test Signal Generator (VITS)	Anritsu	MG318A [ M08128 ]	June, 1998 [ 1 year ]
Color TV Pattern Generator	Philips Consumer Electronics	PM 5418 TNSI [ LO 609096 ]	June, 1998 [ 1 year ]
Matching Pad	Wiltron	12N50/75B [ 90400 ]	June, 1998 [ 1 year ]
6 dB Attenuation Pad	Weinschel	1 [ AD8054 ]	June, 1998 [ 1 year ]
3 dB Attenuation Pad	Weinschel	1 [ AD9615 ]	June, 1998 [ 1 year ]

# SONY

Sony Electronics Inc.

15500 Towne Centre Blvd., New Jersey 07066-8049 Telephone: (201) 930-1000

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Our Ref. LHV5706A

July 21, 1998

Authorizations and Evaluation Division  
Federal Communications Commission Laboratory  
7435 Oakland Mills Road  
Columbia, Maryland 21045

Gentlemen:

Re: **FCC Class II Permissive Change Application for Video Cassette Recorder  
Model SLV-M20HF;  
FCC ID: AK8SLVM20HF**

In accordance with the requirements of the Federal Communications Commission Rules and regulations, Part 15 and the new rules per Docket 93-235, we herein enclose the application for the Class II Permissive Change of the subject Video Cassette Recorder Model SLV-M20HF. The original grant date for the subject model is June 4, 1998.

Please note that the subject model was granted under two categories (TV Interface Device and Transmitter) and this application is for TV Interface. The application for Transmitter was sent to you on 7/14/98 with our reference LHV5706.

One check No. 40404396 in amount of \$45.00 is enclosed to cover application filing.

If you have any questions on this matter, please contact the undersigned at (201) 930-6974 or FAX No. (201) 358-4055.

Thank you very much for your continued cooperation.

Very truly yours,

Approved by:



Nobuo Tanaka  
Senior Compliance Engineer  
Product Safety & Compliance



Julio Posse  
Manager  
Product Safety & Compliance

NT/-  
Enclosure

cc: Sony Tokyo

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