SAMSUNG ELECTRONICS CO., LTD.
416 Maetan 3 Dong, Paldal-Ku,
Suwon City, Kyungki Do, Korea,
441-742

CS Center
EMC Testing Laboratory
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REPORT OF MEASUREMENTS FOR TV INTERFACE DEVICE

¡Û SAMSUNG Reference NO. : 981220 *¡Û Job No. : SEMC189*

This test report is to certify that the tested device properly complies with the requirements of FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators. All tests necessary to show compliance to the requirements were and these results met the specifications requirement.

1. Applicant Name (Company name & Address)	: SAMSUNG ELECTRONICS CO., LTD. 416 Maetan 3 Dong, Paldal-Ku, Suwon City, Kyungki Do, Korea, 441-742
2. Identification of tested device	
2.1 Device Name	: Video Cassette Recorder
2.2 Brand (Trade Name)	: SAMSUNG
2.3 Model Number	: SV-C90P
2.4 Product Type	: MVP
3. Test Procedure and Items	
3.1 AC Powerline Conducted Emissions Measurement	: ANSI C63.4-1992
3.2 Radiated Emissions Measurement	: ANSI C63.4-1992
3.3 Output Signal Level Measurement	: ANSI C63.4-1992
3.4 Output Terminal Conducted Spurious Emission Measurement	: ANSI C63.4-1992
3.5 Antenna Transfer Switch Measurement	: ANSI C63.4-1992
3.6 Receiver Radiated Emissions Measurement	: IEEE Std 187-1990
4. Date of Measurement	: December 4, 1998
5. Issued Date	: December 11, 1998

Tested by : Choon-Kil, Kim
Test Engineer

Approved by : Teak-Jeong, Shin
Chief of EMC Testing Laboratory

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1. GENERAL INFORMATION

1.1 Description for Equipment Authorization

1.1.1 Rules Part(s) under which Equipment Authorization

FCC Rule Part 15, Subpart B : Unintentional Radiators
TV Interface Devices.
This Product is a Video Cassette Recorder containing RF modulator.

1.1.2 Kind of Equipment Authorization : CERTIFICATION

1.1.3 FCC ID Number : A3LCOBRA2

1.1.4 Applied TM-BLOCK : RF Units

Made by Sanyo : AC40-30071X

1.1.5 RF Modulator Frequency :

US CH.3 Visual Carrier 61.25MHz,
Aural Carrier 65.75MHz
US CH.4 Visual Carrier 67.25MHz,
Aural Carrier 71.75MHz

1.1.6 Rate Power Supply : AC 120V, 60Hz

1.1.7 Type of RF Output Connector : Type "F" Connector 75§Ù(Unbalanced)

1.2 Test Facility

All test described in this report were performed by :

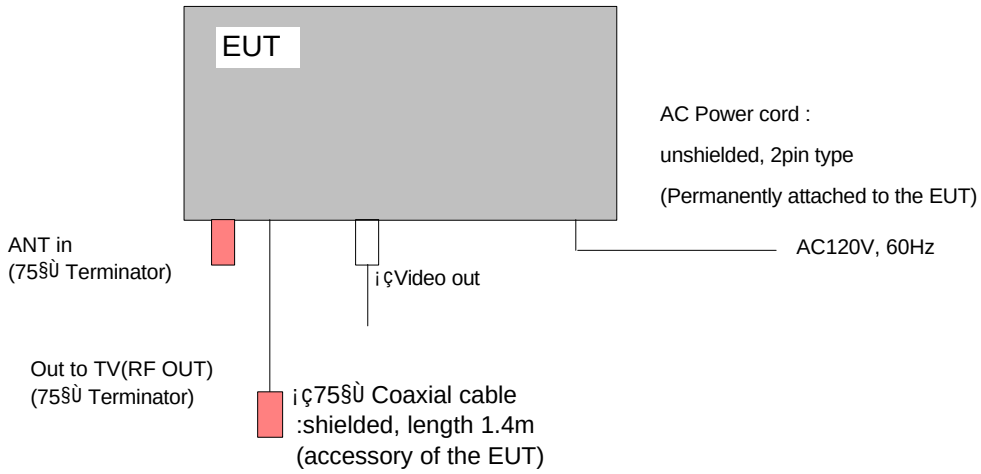
SAMSUNG ELECTRONICS CO., LTD.
EMC TESTING LABORATORY
416 Maetan 3 Dong, Paldal-Ku,
Suwon City, Kyungki Do, Korea, 441-742
Anechoic Chamber #1(3 meter) and Shielded Room.

This test facility has been filed in FCC under the criteria
in ANSI C63.4-1992.

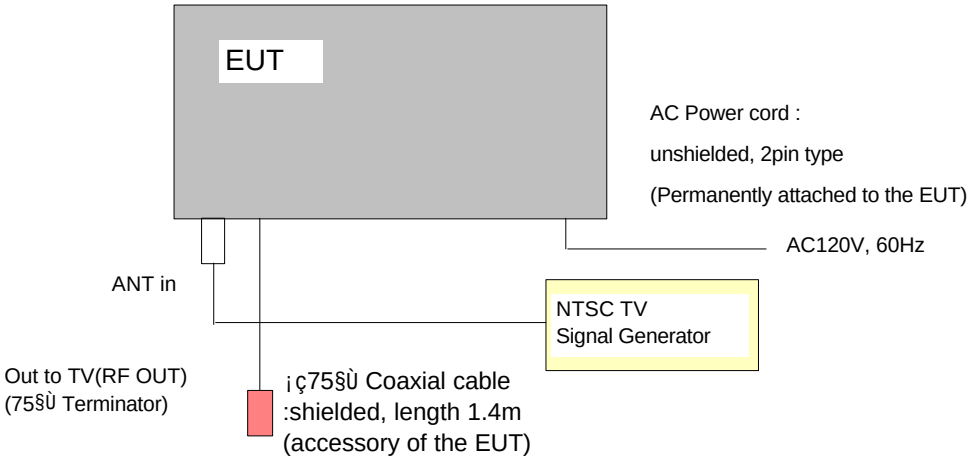
2. TESTED SYSTEM

2.1 Block Diagram of Tested Device System for Conducted and Radiated Emission Measurements

2.1.1 With the VITS Signal Generator



2.1.2 With the NTSC TV Signal Generator



2.2 Test Planning and Test Mode

In each measurement(except antenna transfer switch measurement and receiver radiated emission measurement), the preliminary tests were performed under following two EUT operation modes. In antenna transfer switch measurement, it was done under 3 modes(A,B and C).

A. Playback mode

Playback the video tape that is recorded VITS signal.

B. Record mode(NTSC TV signal input)

NTSC TV RF signal is supplied through the Antenna input terminal.

In each mode, the spectrum was checked and the data of maximum EUT operation was reported.

3. AC POWERLINE CONDUCTED EMISSION MEASUREMENT

3.1 Reference Rule and Specification

FCC Rule Part 15, Section 15.107(a)

3.2 Test Procedure

3.2.1 Configurate the EUT System in accordance with ANSI C63.4 -1992 section 7 and 12.2.
See also the block diagram of tested device configuration in this report.

3.2.2 Connect the EUT's AC line cord to the EUT port of one LISN.

3.2.3 Any other equipment line cord are connected to an LISN different from LISN used for EUT.

3.2.4 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.

3.2.5 Activates the EUT system

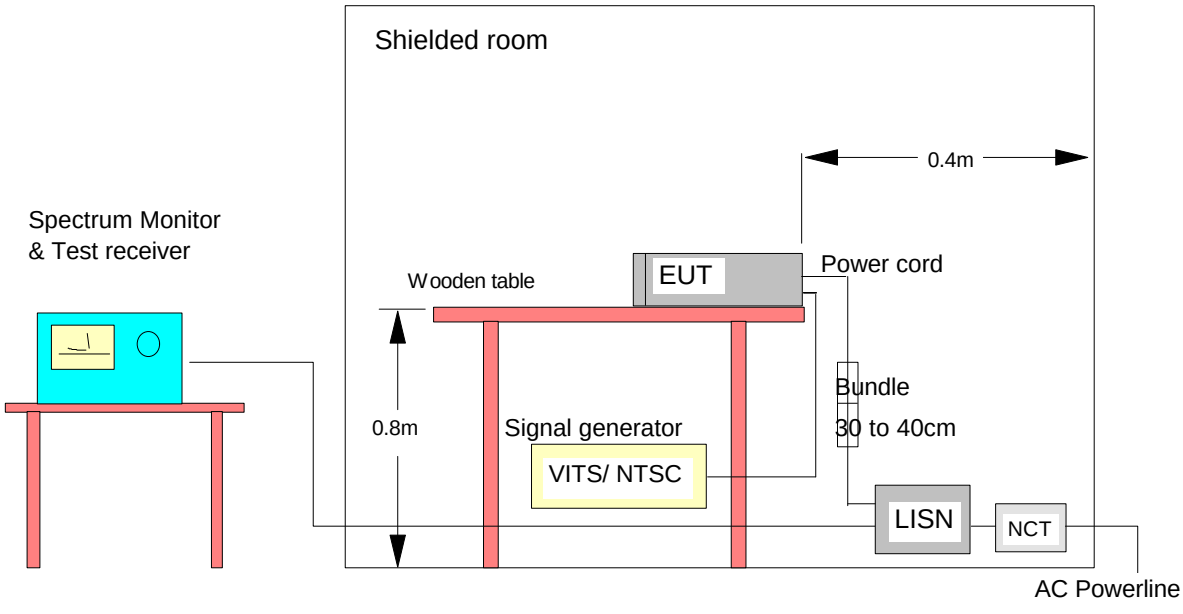
3.2.6 Using a calibrated coaxial cable, the TEST RECEIVER(ESS) is connected to the measuring port of the LISN for EUT.
The spectrum monitor function are set as follows.

FREQUENCY RANGE	: 0.45 - 30MHz
BANDWITH	: 10kHz
OTHER FUNCTION	: Auto

3.2.7 To the find out an EUT condition procedures the maximum emission, the position of cables, EUT operations mode are checked under normal usage of EUT.

3.2.8 Then, the emission are scanned from 0.45MHz to 30MHz relative to the limit are recorded.

3.3 Test Arrangement



¡Ü TM-Block Type : ***AC40-30071X***

3.4.1 EUT Mode : Playback (CH.3 and CH.4)

Tested Frequency [MHz]	Meter Reading (Quasi-Peak) [A] [dBuV]	Total Loss [B] [dB]	Results [A+B] [dBuV]	Limits [dBuV]	FCC Margin [dB]
0.612	36.9	0.2	**37.1**	48.0	10.9
0.816	37.6	0.2	**37.8**	48.0	10.2
1.27	38.4	0.2	**38.6**	48.0	9.4
1.99	38	0.2	**38.2**	48.0	9.8
3.51	36.5	0.2	**36.7**	48.0	11.3
29.5	36.5	0.2	**36.7**	48.0	11.3

3.4.2 EUT Mode : Recording(CH.3 and CH.4)/ NTSC

Tested Frequency [MHz]	Meter Reading (Quasi-Peak) [A] [dBuV]	Total Loss [B] [dB]	Results [A+B] [dBuV]	Limits [dBuV]	FCC Margin [dB]
0.561	28.5	0.2	**28.7**	48.0	19.3
1.221	44.1	0.2	**44.3**	48.0	3.7
1.27	42.5	0.2	**42.7**	48.0	5.3
3.52	40.7	0.2	**40.9**	48.0	7.1
5.5	39.8	0.2	**40.0**	48.0	8.0
29.32	33.9	0.2	**34.1**	48.0	13.9

4. RADIATED EMISSION MEASUREMENT

4.1 Reference Rule and Specification

FCC Rule Part 15, Section 15.109(a) and (c)

4.2 Test Procedure

4.2.1 Configurate the EUT System in accordance with ANSI C63.4-1992 section 8 and 12.2.
See also the block diagram and photographs of tested configuration for radiated emission measurement in this report.

4.2.2 All power cords for the EUT System are connected the receptacle on the ground plane.

4.2.3 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 of the cable are terminated in the proper impedance.

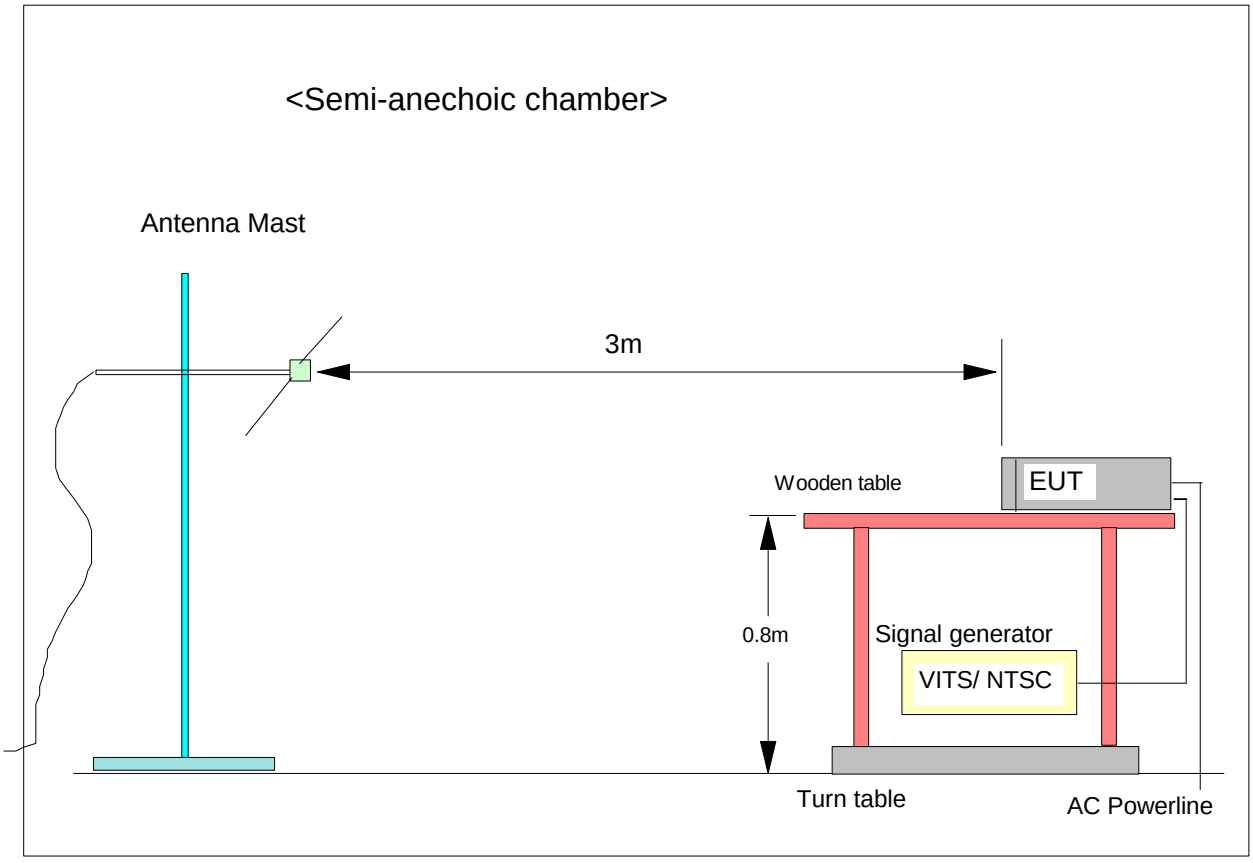
4.2.4 Activates the EUT system

4.2.5 To find out the emission of the EUT system, preliminary radiated measurement are performed at a closer distance than that specified for final radiated measurement.

4.2.6 To determine the EUT condition produces the maximum emission, the cable positions are checked under normal usage.

4.2.7 In final compliance test, the maximum emissions recorded above are measured at the specified distance.

4.3 Test Arrangement



4.4 Test Results

¡Ü TM-Block Type : ***AC40-30071X***

4.4.1 EUT Mode : Playback(CH.3 and CH.4)

1) Test range : 30 - 300MHz

2) Sample Calculation

Frequency	:	71.9	[MHz]
Meter Reading	:	22.8	[dBuV] <--- Maximum Meter Reading
Antenna Factor	:	9.2	[dB]

* The antenna factor includes the loss of coaxial cable used for the test.

Then, Result is calculated as follows.

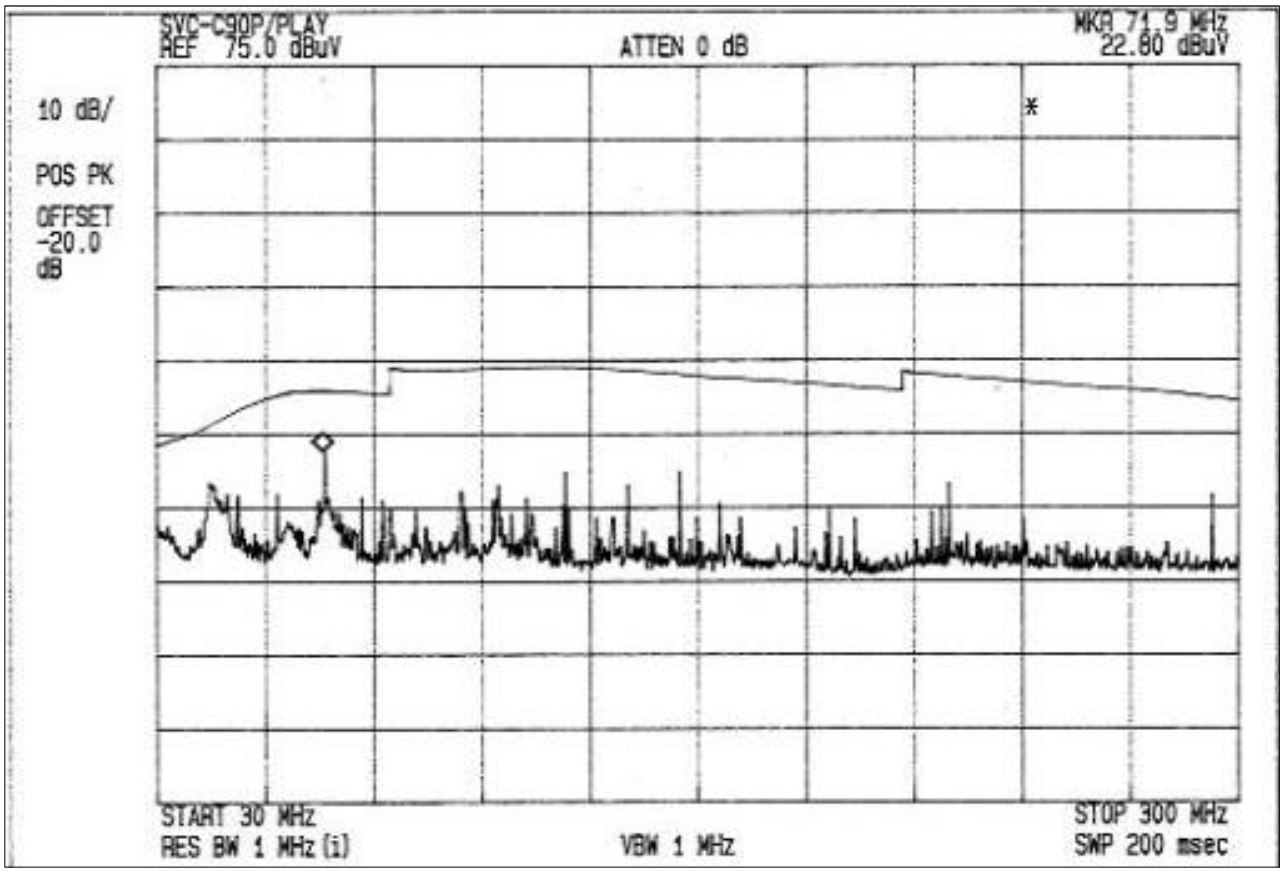
22.8 + 9.2 = 32 [dBuV]

3) Summary of Test Result

Below data shows that the test device complies with FCC rules.

Minimum margin was 8 dB at 71.9 MHz.

4) Data graph



4.4.1 EUT Mode : Playback(CH.3 and CH.4)

1) Test range : 300 - 1000MHz

2) Sample Calculation

Frequency : 356.7 [MHz]

Meter Reading : 15.3 [dBuV] <--- Maximum Meter Reading

Antenna Factor : 17.2 [dB]

* The antenna factor includes the loss of coaxial cable used for the test.

Then, Result is calculated as follows.

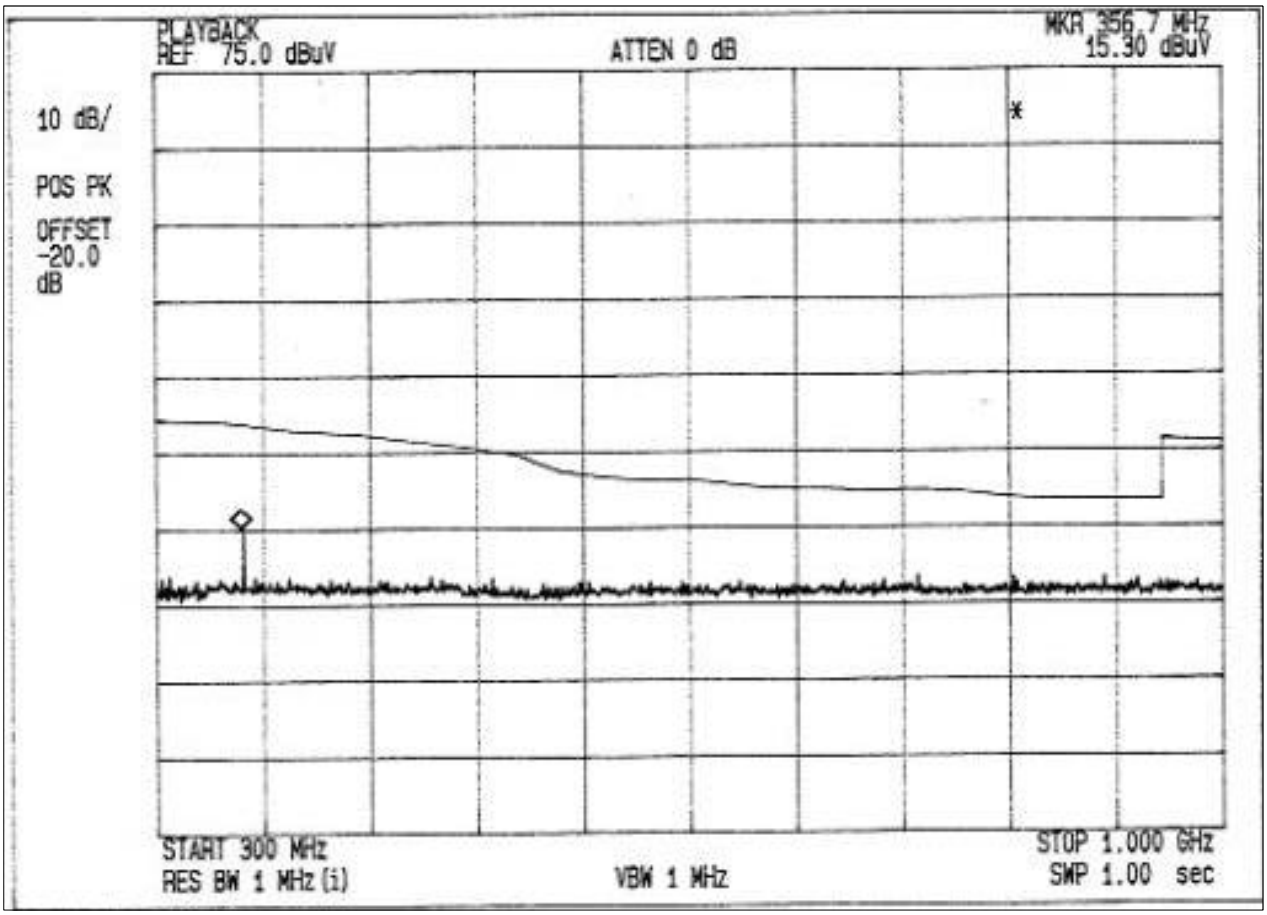
15.3 + 17.2 = 32.5 [dBuV]

3) Summary of Test Result

Below data shows that the test device complies with FCC rules.

Minimum margin was 13.5 dB at 356.7 MHz.

4) Data graph



4.4.3 EUT Mode : Recording(CH.3 and CH.4)/ NTSC TV Signal

1) Test range : 30 - 300MHz

2) Sample Calculation

Frequency	:	135.3	[MHz]
Meter Reading	:	19	[dBuV] <--- Maximum Meter Reading
Antenna Factor	:	9.5	[dB]

* The antenna factor includes the loss of coaxial cable used for the test.

Then, Result is calculated as follows.

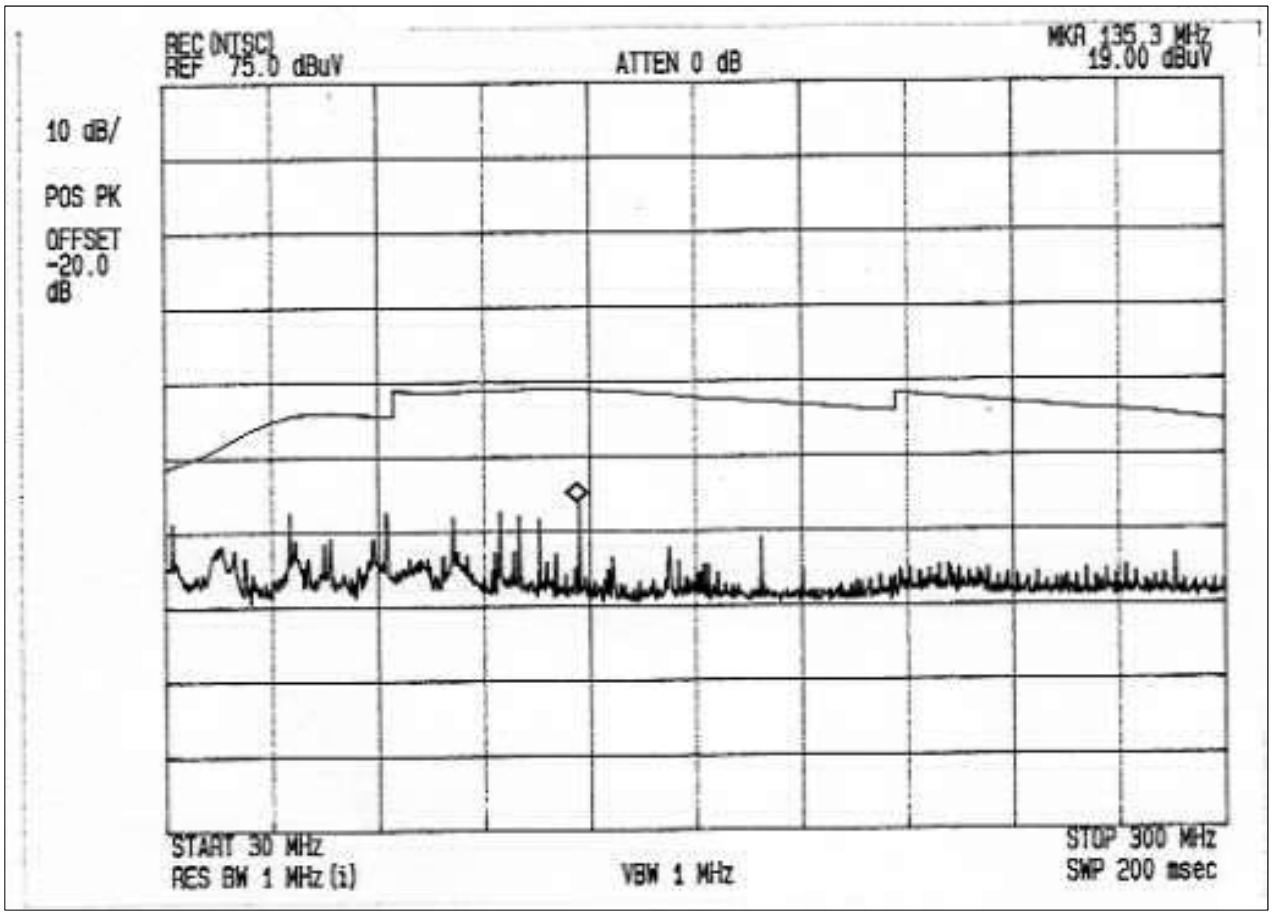
19	+	9.5	=	28.5 [dBuV]

3) Summary of Test Result

Below data shows that the test device complies with FCC rules.

Minimum margin was 15 dB at 135.3 MHz.

4) Data graph



4.4.3 EUT Mode : Recording(CH.3 and CH.4)/ NTSC TV Signal

1) Test range : 300 - 1000MHz

2) Sample Calculation

Frequency	:	328	[MHz]
Meter Reading	:	11.5	[dBuV] <--- Maximum Meter Reading
Antenna Factor	:	26.2	[dB]

* The antenna factor includes the loss of coaxial cable used for the test.

Then, Result is calculated as follows.

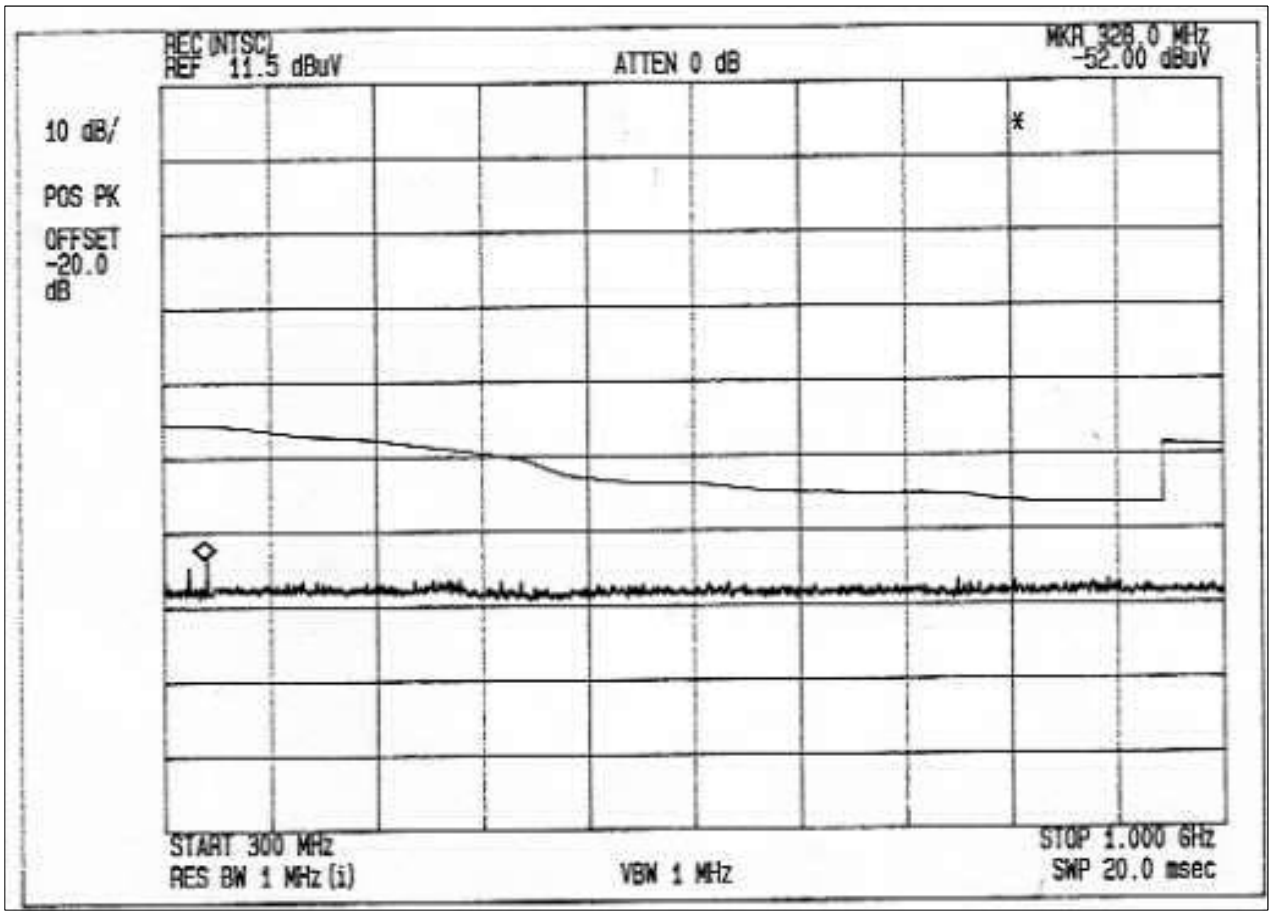
11.5	+	26.2	=	37.7	[dBuV]

3) Summary of Test Result

Below data shows that the test device complies with FCC rules.

Minimum margin was 8.3 dB at 328 MHz.

4) Data graph



5. OUTPUT SIGNAL LEVEL MEASUREMENT

5.1 Reference Rule and Specification

FCC Rule Part 15, Section 15.115(b)(1)(ii)

5.2 Test Procedure

5.2.1 Configurate the EUT System in accordance with ANSI C63.4-1992 section 12.2.

5.2.2 Activates the EUT system

5.2.3 Set the spectrum analyzer as follows.

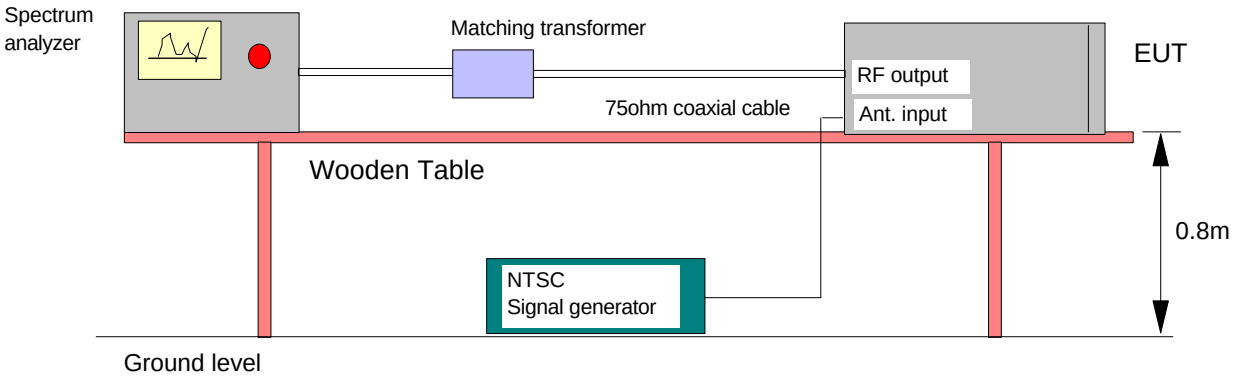
FREQUENCY SPAN	: 1MHz
RESOLUTION BANDWITH	: 100kHz
VIDEO BANDWITH	: 3MHz
DETECTOR FUNCTION	: Peak mode

5.2.4 The RF output terminal is connected is to the spectrum analyzer through the matching transformer with a calibrated 75 ohms coaxial cable.

5.2.5 Then, the RF output signal level is measured under the EUT condition produces the maximum signal level.

5.3 Test arrangement

5.3.1 With the NTSC Signal generator



5.4 Test Results

¡Ü TM-Block Type : ***AC40-30071X***

1) EUT Mode : Playback

RF Output channel	Measured carrier frequency[MHz]		Matching Transformer [dB]	Meter reding [dBuV/50ohm]		RF Output signal level [dBuV/75ohm]			
	Visual	Aural		Visual	Aural	Visual	Limit	Aural	Limit
3	61.3	65.82	0.3	62.4	46.7	62.7	69.54	47	56.53
4	67.3	71.82		62.1	47.9	62.4		48.2	

2) EUT Mode : Recording / NTSC TV Signal

RF Output channel	Measured carrier frequency[MHz]		Matching Transformer [dB]	Meter reding [dBuV/50ohm]		RF Output signal level [dBuV/75ohm]			
	Visual	Aural		Visual	Aural	Visual	Limit	Aural	Limit
3	61.3	65.82	0.3	62.6	46.5	62.9	69.54	46.8	56.53
4	67.3	71.82		63.1	47.2	63.4		47.5	

<NOTES>

- Sample calculation :
  Matching Transformer loss + Meter reading = RF Output signal level

  61.3 MHz : 0.3 + 62.6 = 62.9 [dBuV/75ohm]

6. OUTPUT TERMINAL CONDUCTED SPURIOUS EMISSION MEASUREMENT

6.1 Reference Rule and Specification

FCC Rule Part 15, Section 15.115(b)(2)(ii)

6.2 Test Procedure

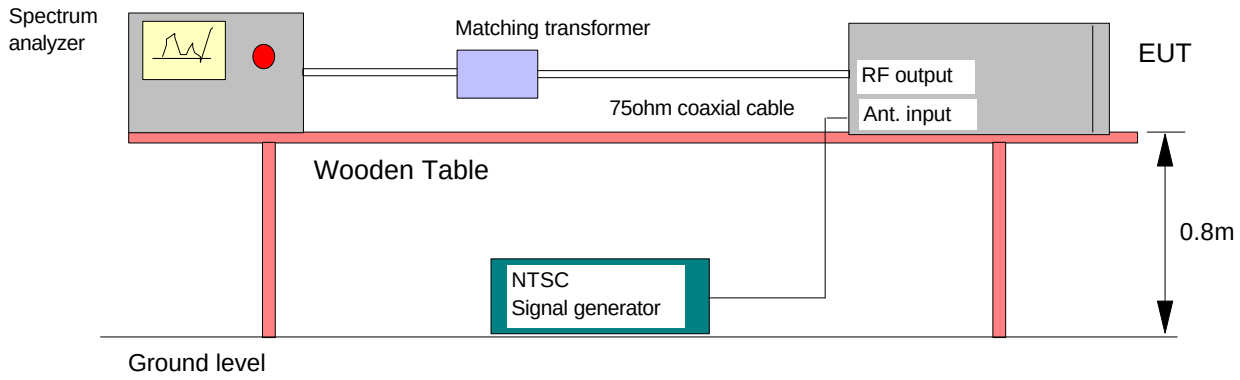
6.2.1 The EUT system and measuring instrument are set up in the same manner of the output signal measurement.

6.2.2 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.

6.2.3 Then, the significant spurious emissions are measured at the output terminal.

6.3 Test arrangement

6.3.1 With the NTSC TV Signal generator



6.4 Test Results

¡Ü TM-Block Type : ***AC40-30071X***

6.4.1 Test channel : 3

1) Test mode : Playback / NTSC TV Signal
(From 30MHz to more than 4.6MHz below the visual carrier frequency)

2) Sample Calculation

Frequency	:	55.51	[MHz]
Meter Reading	:	29.9	[dBuV] <--- Maximum Meter Reading
Correction Factor	:	0.3	[dB]

* The correction factor consist of the voltage loss of the impedance matching transformer and the coaxial cable used for the test.
Then, Result is calculated as follows.

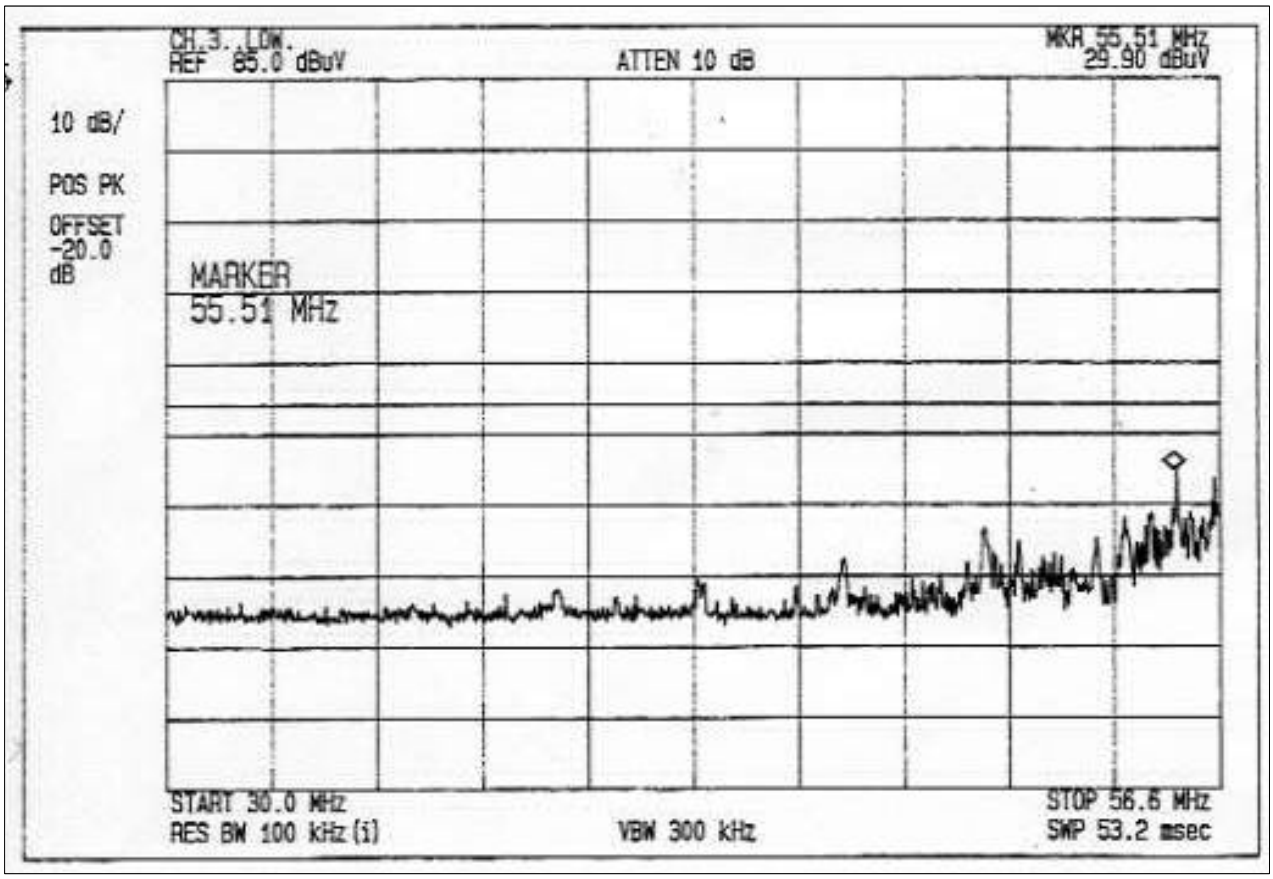
29.9 + 0.3 = 30.2 [dBuV]

3) Summary of Test Result

Below data shows that the test device complies with FCC rules.

Minimum margin was 9.29 dB at 55.51 MHz.

4) Data graph



6.4.1 Test channel : 3

1) Test mode : Playback / NTSC TV Signal
(From more than 7.4MHz above the visual carrier frequency)

2) Sample Calculation

Frequency	:	71.4	[MHz]
Meter Reading	:	19.3	[dBuV] <--- Maximum Meter Reading
Correction Factor	:	0.3	[dB]

* The correction factor consist of the voltage loss of the impedance matching transformer and the coaxial cable used for the test.
Then, Result is calculated as follows.

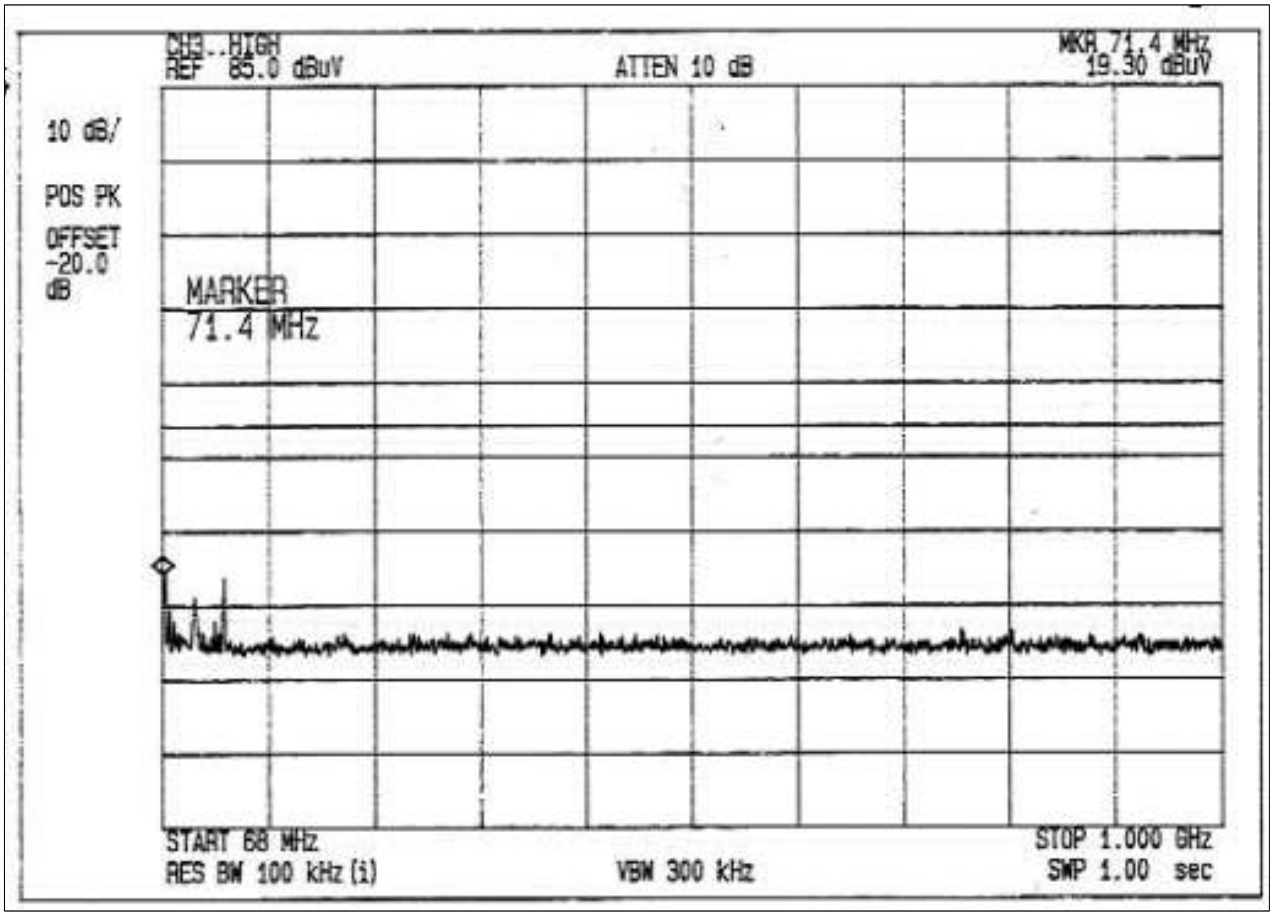
19.3	+	0.3	=	19.6	[dBuV]

3) Summary of Test Result

Below data shows that the test device complies with FCC rules.

Minimum margin was	19.89	dB at	71.4 MHz.

4) Data graph



6.4.2 Test channel : 4

1) Test mode : Playback / NTSC TV Signal
(From 30MHz to more than 4.6MHz below the visual carrier frequency)

2) Sample Calculation

Frequency	:	60.38	[MHz]
Meter Reading	:	19.3	[dBuV] <--- Maximum Meter Reading
Correction Factor	:	0.3	[dB]

* The correction factor consist of the voltage loss of the impedance matching transformer and the coaxial cable used for the test.
Then, Result is calculated as follows.

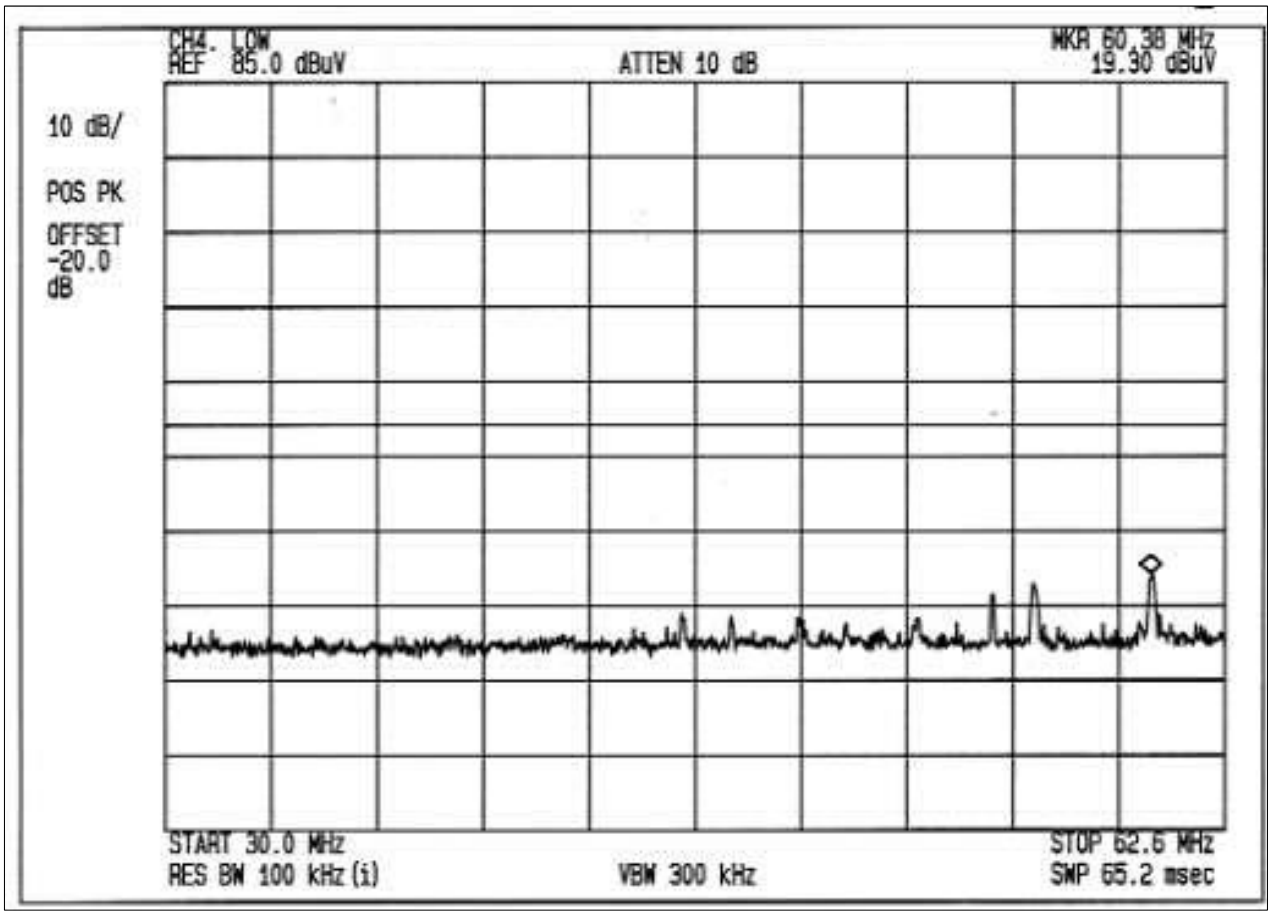
19.3 + 0.3 = 19.6 [dBuV]

3) Summary of Test Result

Below data shows that the test device complies with FCC rules.

Minimum margin was 19.89 dB at 60.38 MHz.

4) Data graph



6.4.2 Test channel : 4

1) Test mode : Playback / NTSC TV Signal
(From more than 7.4MHz above the visual carrier frequency)

2) Sample Calculation

Frequency	:	77.7	[MHz]
Meter Reading	:	27.9	[dBuV] <--- Maximum Meter Reading
Correction Factor	:	0.3	[dB]

* The correction factor consist of the voltage loss of the impedance matching transformer and the coaxial cable used for the test.
Then, Result is calculated as follows.

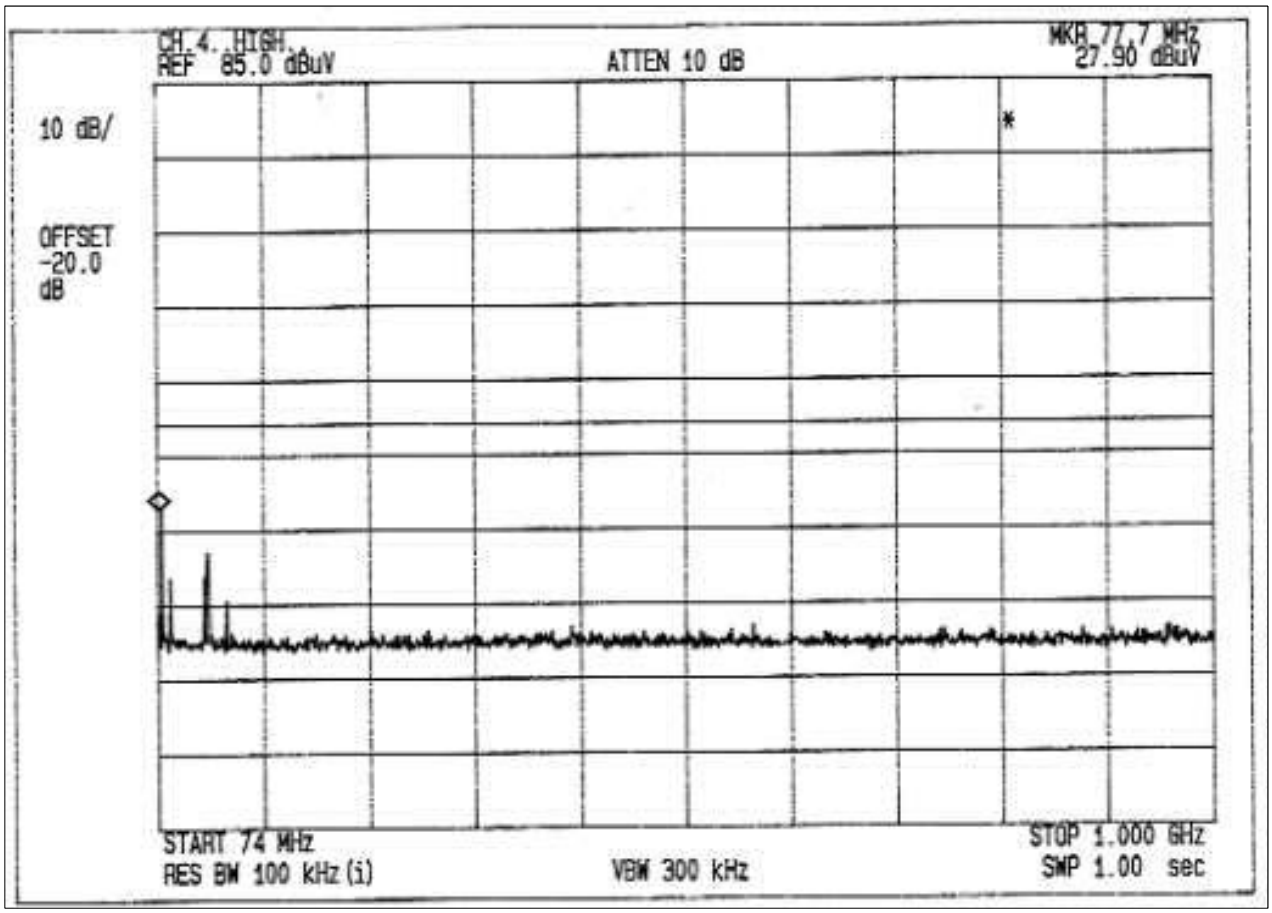
27.9 + 0.3 = 28.2 [dBuV]

3) Summary of Test Result

Below data shows that the test device complies with FCC rules.

Minimum margin was 11.29 dB at 77.7 MHz.

4) Data graph



7. ANTENNA TRANSFER SWITCH MEASUREMENT

7.1 Reference Rule and Specification

FCC Rule Part 15, Section 15.115(c)(1)(ii)

7.2 Test Procedure

7.2.1 Configurate the EUT System in accordance with ANSI C63.4 -1992 section 12.2.

7.2.2 Activates the EUT system

7.2.3 Set the spectrum analyzer as follows.

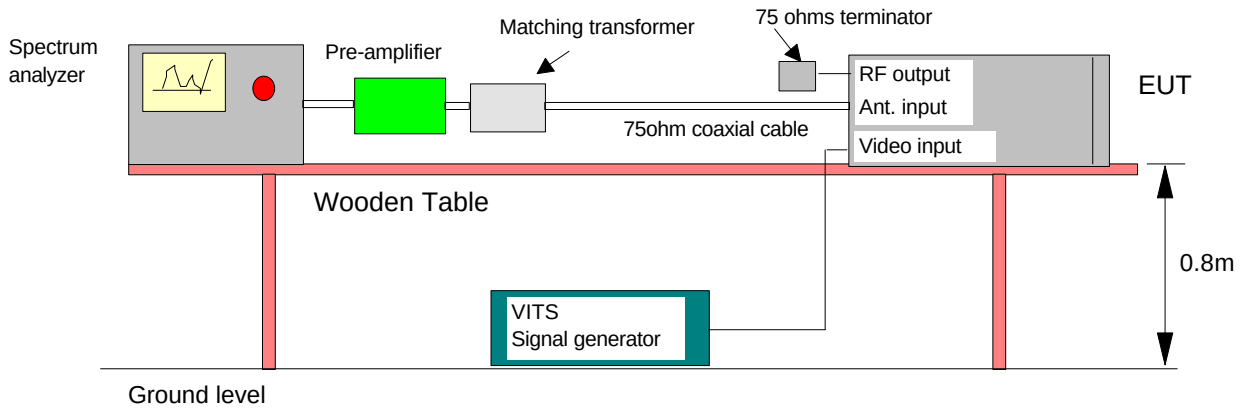
FREQUENCY SPAN	: 1MHz
RESOLUTION BANDWITH	: 100kHz
VIDEO BANDWITH	: 3MHz
DETECTOR FUNCTION	: Peak mode

7.2.4 The RF output terminal is terminated in the proper impedance.

7.2.5 The antenna terminal is connected to the input of pre-amplifier through the matching transformer with a calibrated 75 ohms coaxial cable. And the output of pre-amplifier is connected to the spectrum analyzer.

7.2.5 Then, the RF output leakage level is measured under the EUT condition produces the maximum signal level.

7.3 Test arrangement



7.4 Test Results

¡Ü TM-Block Type : ***AC40-30071X***

1) EUT Mode : Playback

RF Output channel	Measured frequency [MHz]	Meter reding [dBuV/50ohm]	Gain of pre-amplifier [dB]	Matching Transformer [dB]	Results [dBuV/75ohm]	Limits [dBuV/75ohm]
3	61.25	29.3	25	0.3	4.6	9.54
4	67.26	30.5			5.8	

<NOTES>

Sample calculation :

Meter reading - Gain of pre-amplifier + Matching Transformer loss

67.26 MHz : 29.3 - 25 + 0.3 = 4.6 [dBuV/75ohm]

8. RECEIVER RADIATED EMISSION MEASUREMENT

8.1 Reference Rule and Specification

FCC Rule Part 15, Section 15.33(b)(3)

8.2 Test Procedure

8.2.1 Configurate the EUT System in accordance with ANSI C63.4-1992 section 8, 12.1 and IEEE Std187-1990.
See also the block diagram of tested configuration for radiated emission measurement in this report.

8.2.2 All power cords for the EUT System are connected the receptacle on the ground plane.

8.2.3 The RF output terminal is terminated in the proper impedance.

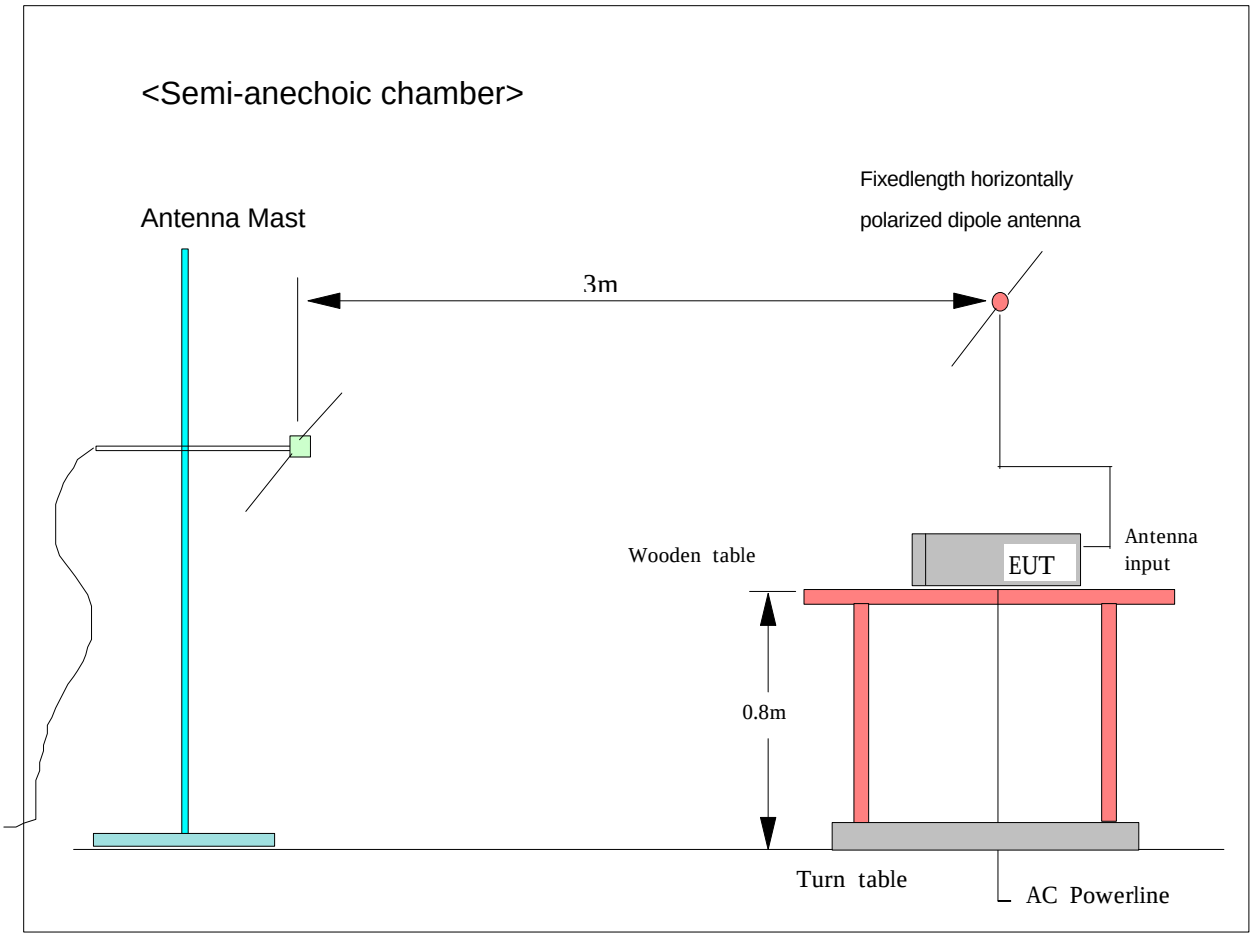
8.2.4 Using a fixedlength horizontally polarized dipole antenna is connected to the antenna terminal of EUT.

8.2.5 Activates the EUT system

8.2.6 To find out the emission of the EUT system, preliminary radiated measurement are performed at a closer distance than that specified for final radiated measurement.

8.2.7 In final compliance test, the antenna terminal emissions recorded above are measured at the specified distance using the field strength meter.

8.3 Test Arrangement



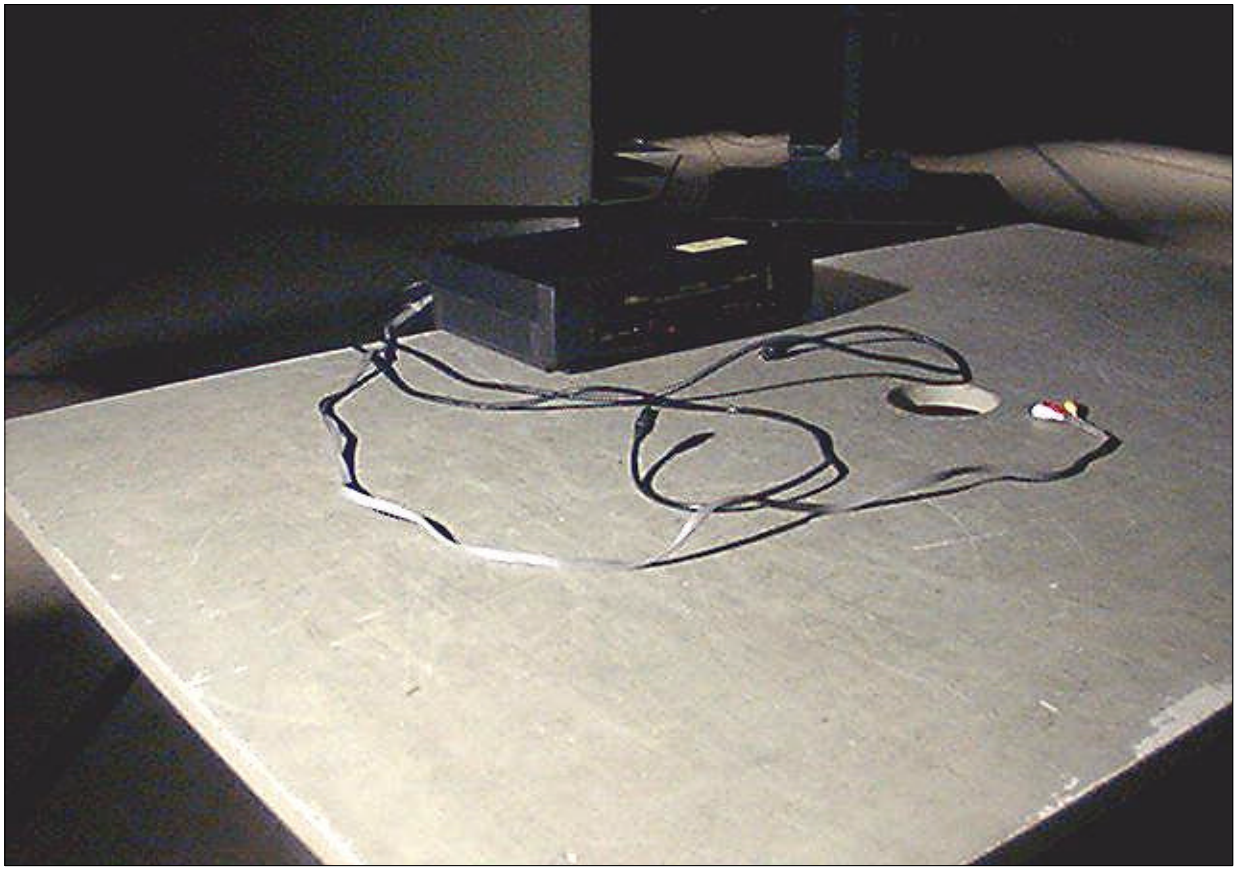
8.4 Test Results

¡Ü TM-Block Type : ***AC40-30071X***

Channel [No.]	Fundamantal or harmonics of local oscillator		Meter reading [dBuV/m]		Total loss	Result at 3m	Limits at 3m
	No	[MHz]	Hori.	Vert.	[dB]	[dBuv/m]	[dBuv/m]
3	1	107	21.3	11.7	9.7	31	43.5
	2	214	5.6	<5	13.2	18.8	43.5
	3	321	<5	<5	16.9	-	46
	4	428	<5	<5	19.4	-	46
	5	535	<5	<5	24	-	46
	6	642	5.9	5.8	25.7	31.5	46
	7	749	5.7	5.7	26	31.7	46
	8	856	8.2	8.1	27.5	35.7	46
	9	963	<5	<5	27.6	-	54
4	1	113	22.6	12.6	9.7	32.3	43.5
	2	226	<5	<5	12.8	-	46
	3	339	<5	<5	16.9	-	46
	4	452	<5	<5	19.4	-	46
	5	565	5.2	5.1	23.5	28.7	46
	6	678	5.9	5.9	25.5	31.4	46
	7	791	5.8	5.8	26.2	32	46
	8	904	8.2	8.2	27.5	35.7	54

9. PHOTOGRAPHS OF TESTED DEVICE CONFIGURATION

9.1 Radiated Emission Measurement



10. LIST OF TEST INSTRUMENTS

Equipment	Model No.	Serial No.	Makers	Calibration Last calibration and Interval
Spectrum analyzer	8566B	2611A02672	H.P	98/ 9/21, 12Months
Quasi-peak adapter	85650A	2521A00687	H.P	98/ 9/21, 12Months
RF Preselector	85685A	2602	H.P	97/ 9/25, 12Months
Radiation Test Signal generator(VITS)	MG318A	M08643	ANRITSU	97/12/26, 12Months
NTSC Signal Generator	PM5418-TDSI	LO612437	PHILIPS	98/ 3/27, 12Months
Field strength meter	ESS	844861/005	R & S	98/ 3/16, 12Months
	ESVP	860688/015	R & S	98/ 9/21, 12Months
Pre-amplifier	8447D	2443A04331	H.P	97/12/22, 12Months
L.I.S.N	3825-2	9208-1981	EMCO	98/ 9/ 5, 12Months
Bi-conical Antenna	3110B	2012	EMCO	98/12/ 1, 12Months
Log-periodic Antenna	3146A	1320	EMCO	98/12/ 1, 12Months