

EMC TEST REPORT

JOB Nunber : SEMC853B

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2. Identification of tested device

2.1 FCC ID : A3LSCORPIO
2.2 Device Name : VIDEO CASSETTE RECORDER
2.3 Trade Name : RCA
2.4 Model Number : VR4AH

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 : EN55013:1990+A12:1994+A13:1996

4. Issued Date : September 26, 2000

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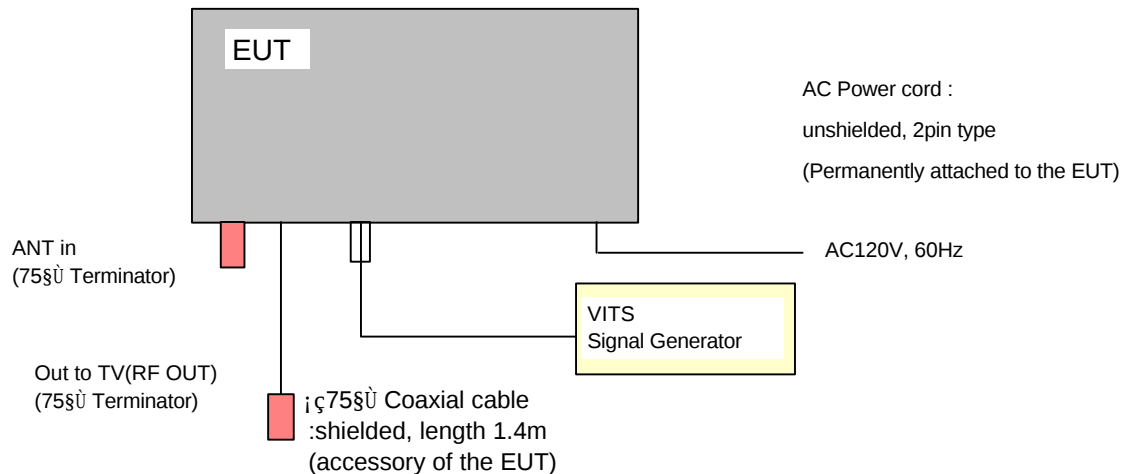
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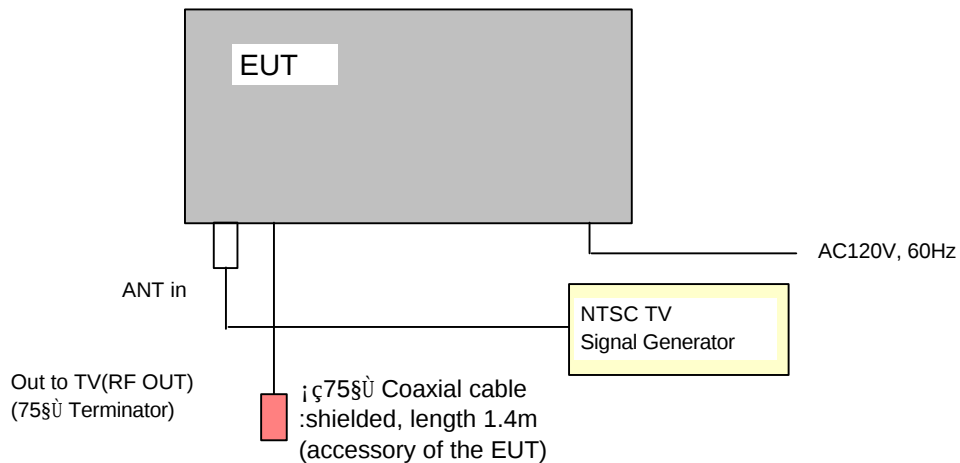
2. TESTED SYSTEM

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



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 Configure 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 LISN.

3.2.3 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 are terminated in the proper impedance.

3.2.4 Activates the EUT system

3.2.5 Using a calibrated coaxial cable, the TEST RECEIVER is connected to the measuring port of the LISN for EUT.

3.2.6 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.

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

3.3 Test Results

3.3.1 EUT Mode : Playback

Frequency [MHz]	Meter reading(a)		Total Loss(b) [dB]	Results (a) + (b) [dB&A]	Limits [dB&A]	Margin [dB]
	LISN Port					
	L1	L2				
0.475	35.6	37.2	0.1	37.3	48	-10.7
1.305	37.3	37.6	0.1	37.7	48	-10.3
1.59	36.2	32.9	0.1	36.3	48	-11.7
2.379	32.8	32.6	0.1	32.9	48	-15.1
14.317	30.7	30.1	0.3	31	48	-17
28.635	43.5	42.7	0.3	43.8	48	-4.2

* Margin = Result - Limits

3.3.2 EUT Mode : Recording(VITS 1Vp-p & 5Vp-p)

Frequency [MHz]	Meter reading(a)		Total Loss(b) [dB]	Results (a) + (b) [dB&A]	Limits [dB&A]	Margin [dB]
	LISN Port					
	L1	L2				
0.475	25.5	26.6	0.1	26.7	48	-21.3
1.512	26.8	28.3	0.1	28.4	48	-19.6
3.141	23.4	25.7	0.1	25.8	48	-22.2
6.741	38.1	39.1	0.2	39.3	48	-8.7
14.316	33.5	33.1	0.3	33.8	48	-14.2
28.635	45.3	44.6	0.3	45.6	48	-2.4

* Margin = Result - Limits

3.3.3 EUT Mode : Recording(NTSC Signal)

Frequency [MHz]	Meter reading(a)		Total Loss(b) [dB]	Results (a) + (b) [dB&A]	Limits [dB&A]	Margin [dB]
	LISN Port					
	L1	L2				
0.555	27	23.8	0.1	27.1	48	-20.9
1.347	23.3	25.2	0.1	25.3	48	-22.7
1.977	30.5	27.5	0.1	30.6	48	-17.4
5.844	38.8	39.1	0.2	39.3	48	-8.7
14.319	45.2	45.3	0.3	45.6	48	-2.4
28.639	43.5	43.2	0.3	43.8	48	-4.2

* Margin = Result - Limits

4. RADIATED EMISSION MEASUREMENT

4.1 Reference Rule and Specification

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

4.2 Test Procedure

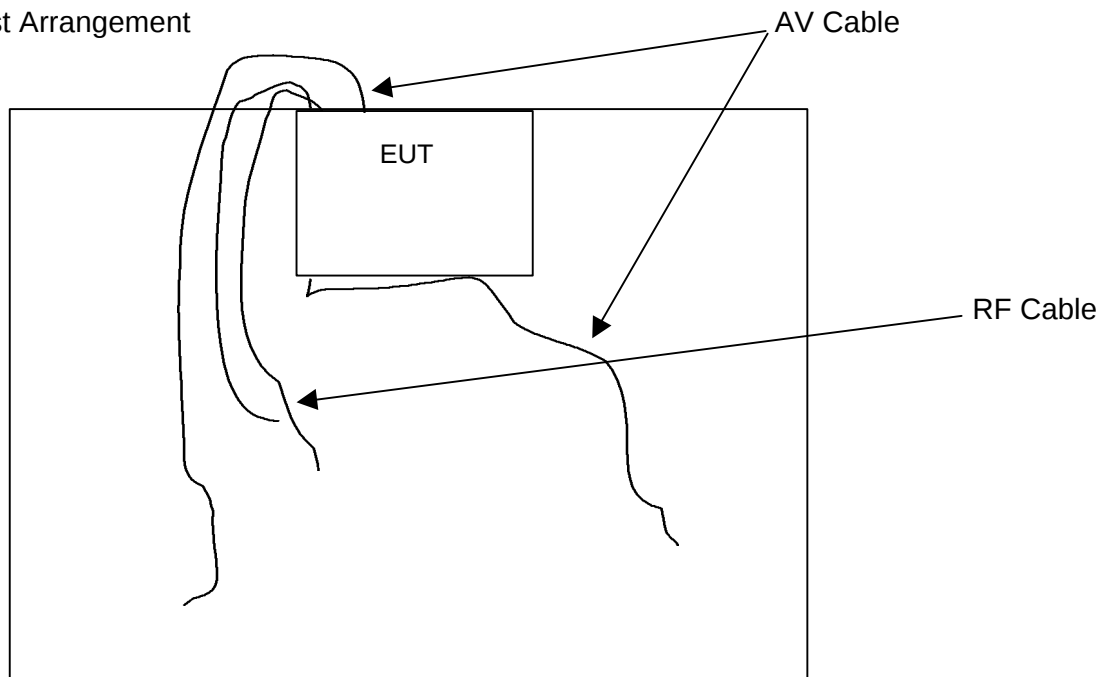
4.2.1 Configure the EUT System in accordance with ANSI C63.4-1992 section 8 and 12.2. See also the block diagram and photographs of tested configuration for radiated emission measurement in this report.

4.2.2 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.

4.2.3 Activates the EUT system. 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.

4.2.4 To determine the EUT condition produces the maximum emission, the cable positions are checked under normal usage. In final compliance test, the maximum emissions recorded above are measured at the specified distance.

4.3 Test Arrangement



4.4 Test Results

4.4.1 EUT Mode : Playback

[Test range : 30 - 500MHz]

1) Sample Calculation

Frequency : 115.1 [MHz]
Meter Reading : 31.8 [dBuV] <----- Maximum Meter Reading
Antenna Factor : 8.6 [dB]

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

Then, Result is calculated as follows.

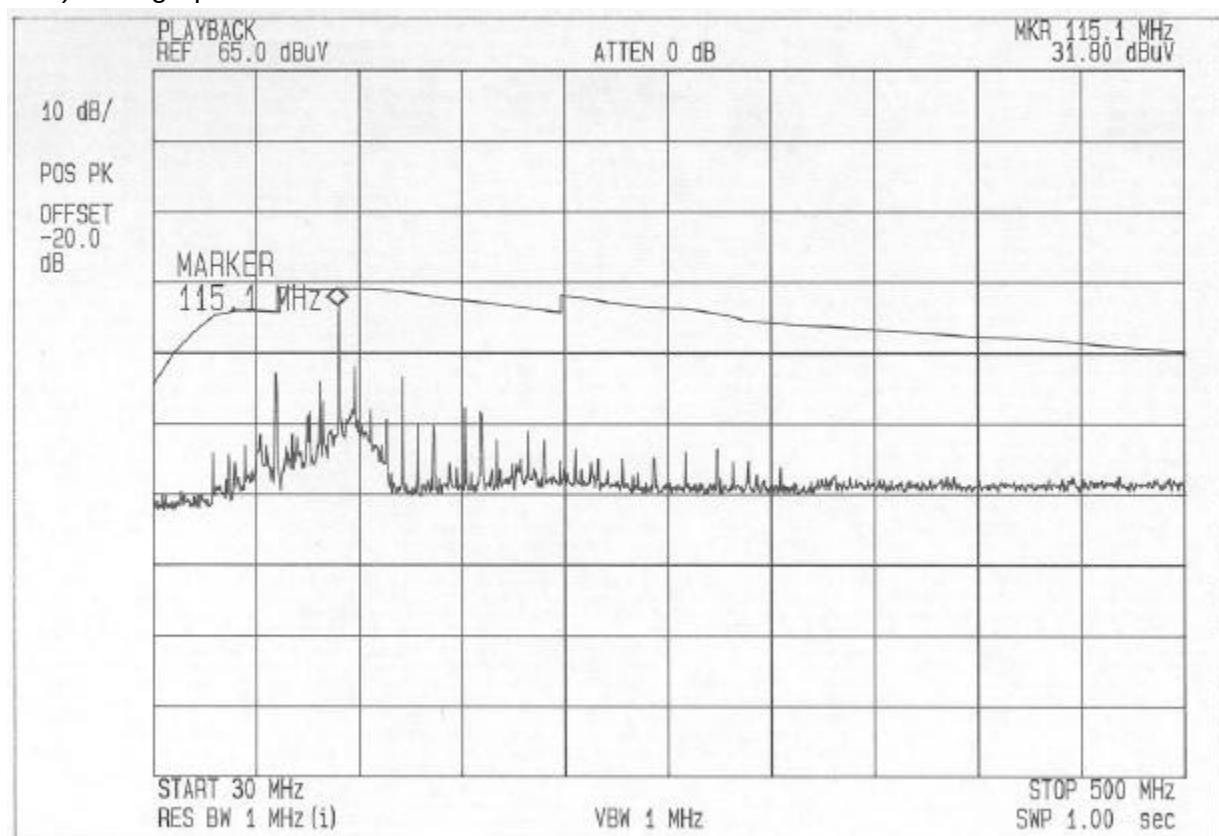
$$31.8 + 8.6 = 40.4 \text{ [dBuV/m]}$$

2) Summary of Test Result

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

Minimum margin was 3.1 dB at 115.1 MHz.

3) Data graph



4.4.1 EUT Mode : Playback

[Test range : 500 - 1300MHz]

1) Sample Calculation

Frequency : 862.4 [MHz]
Meter Reading : 8 [dBuV] <----- Maximum Meter Reading
Antenna Factor : 26.5 [dB]

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

Then, Result is calculated as follows.

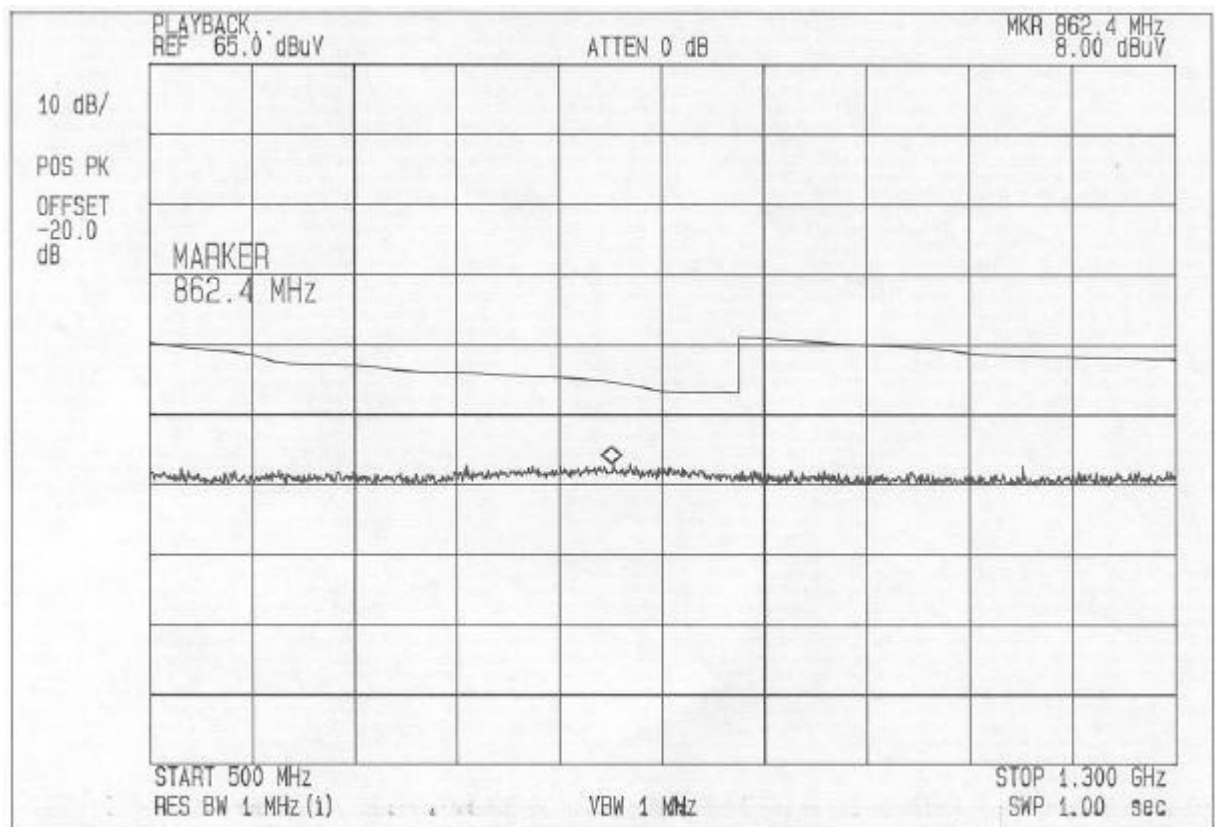
$$8 + 26.5 = 34.5 \text{ [dBuV/m]}$$

2) Summary of Test Result

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

Minimum margin was 11.5 dB at 862.4 MHz.

3) Data graph



4.4.2 EUT Mode : Recording(VITS 1Vp-p & 5Vp-p)

[Test range : 30 - 500MHz]

1) Sample Calculation

Frequency : 115.1 [MHz]
Meter Reading : 30.3 [dBuV] <----- Maximum Meter Reading
Antenna Factor : 8.6 [dB]

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

Then, Result is calculated as follows.

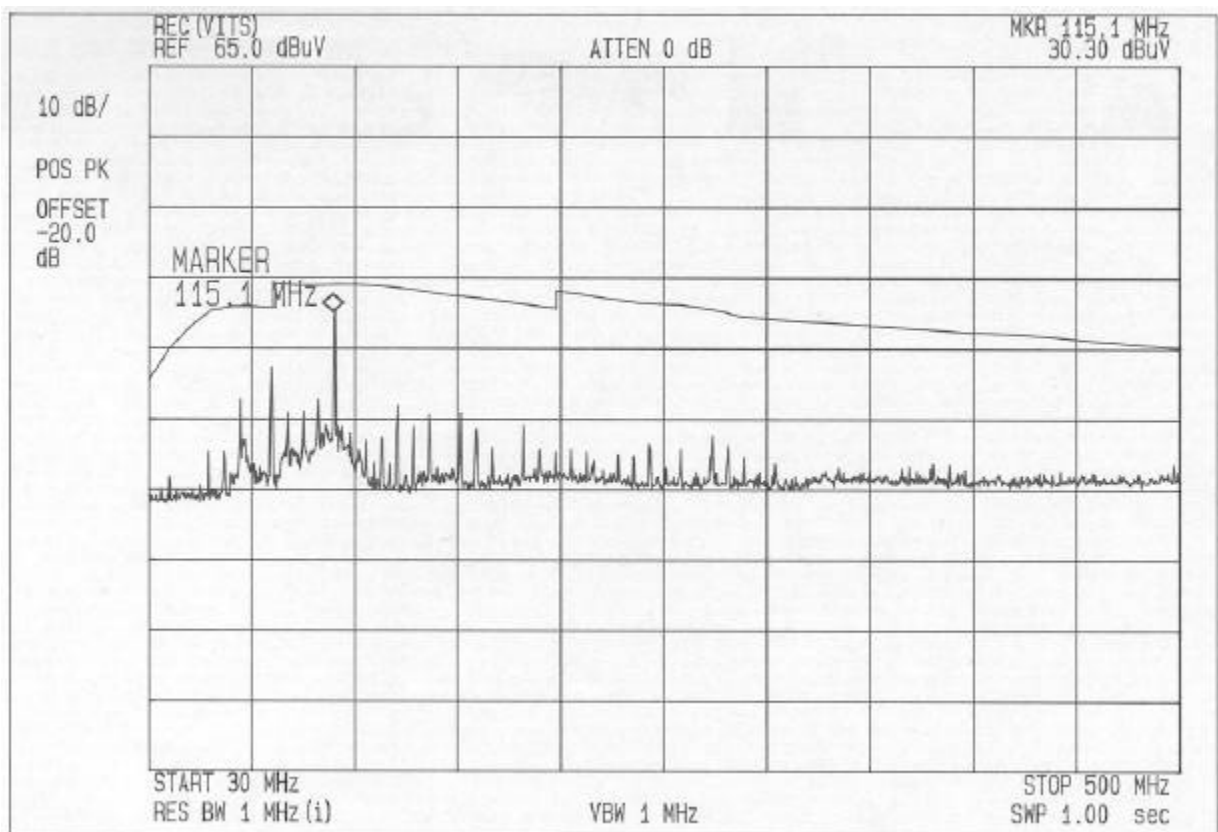
$$30.3 + 8.6 = 38.9 \text{ [dBuV/m]}$$

2) Summary of Test Result

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

Minimum margin was 4.6 dB at 115.1 MHz.

3) Data graph



4.4.2 EUT Mode : Recording(VITS 1Vp-p & 5Vp-p)

[Test range : 500 - 1300MHz]

1) Sample Calculation

Frequency : 845.6 [MHz]
Meter Reading : 14.7 [dBuV] <----- Maximum Meter Reading
Antenna Factor : 26.09 [dB]

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

Then, Result is calculated as follows.

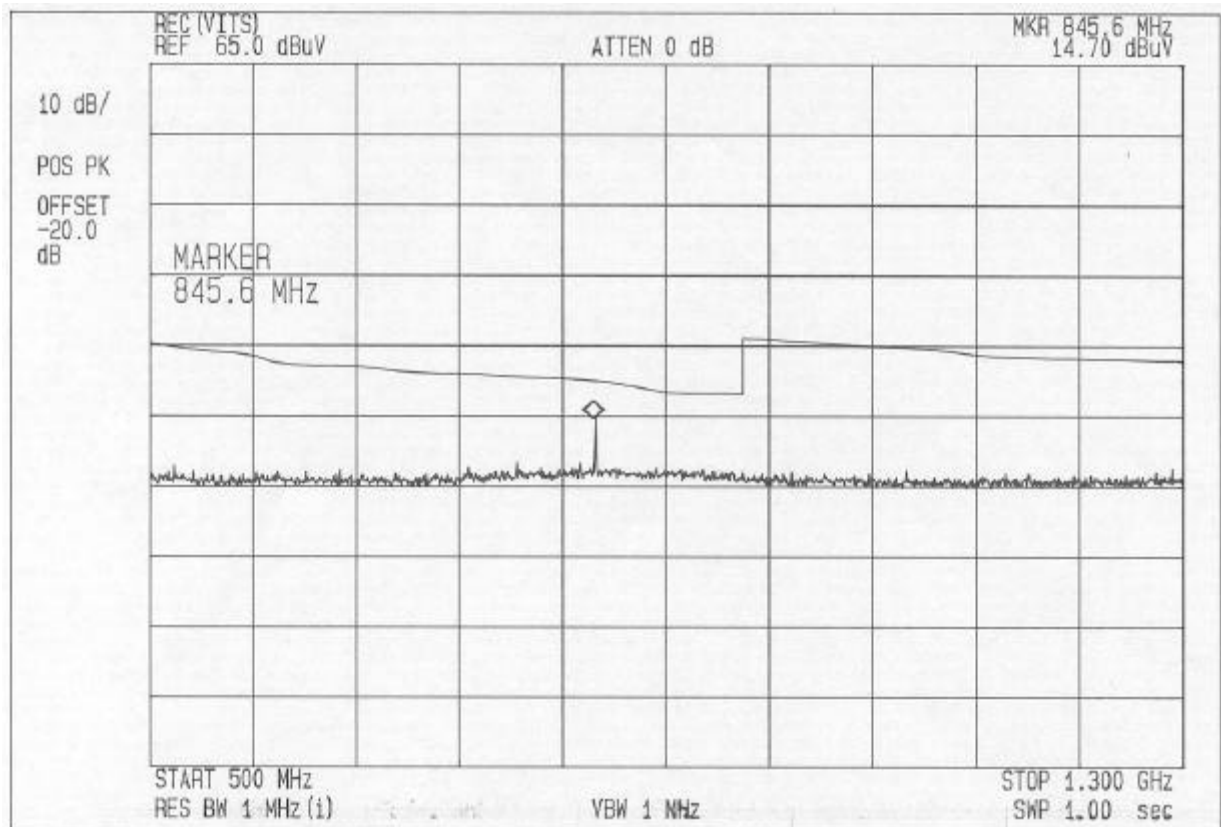
$$14.7 + 26.09 = 40.79 \text{ [dBuV/m]}$$

2) Summary of Test Result

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

Minimum margin was 5.21 dB at 845.6 MHz.

3) Data graph



4.4.3 EUT Mode : Recording(NTSC Signal)

[Test range : 30 - 500MHz]

1) Sample Calculation

Frequency : 115.1 [MHz]
Meter Reading : 32.1 [dBuV] <----- Maximum Meter Reading
Antenna Factor : 8.6 [dB]

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

Then, Result is calculated as follows.

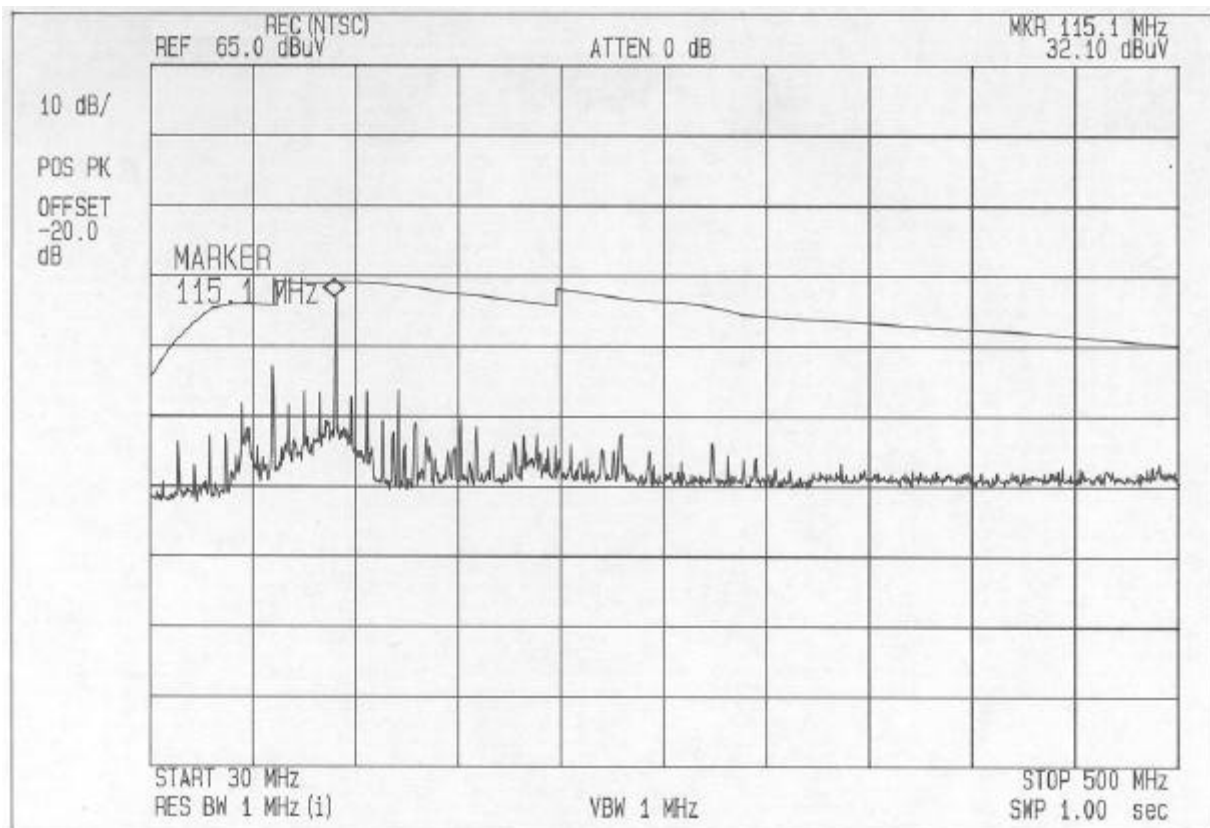
$$32.1 + 8.6 = 40.7 \text{ [dBuV/m]}$$

2) Summary of Test Result

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

Minimum margin was 2.8 dB at 115.1 MHz.

3) Data graph



4.4.3 EUT Mode : Recording(NTSC Signal)

[Test range : 500 - 1300MHz]

1) Sample Calculation

Frequency : 811.2 [MHz]
Meter Reading : 8.4 [dBuV] <----- Maximum Meter Reading
Antenna Factor : 25.57 [dB]

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

Then, Result is calculated as follows.

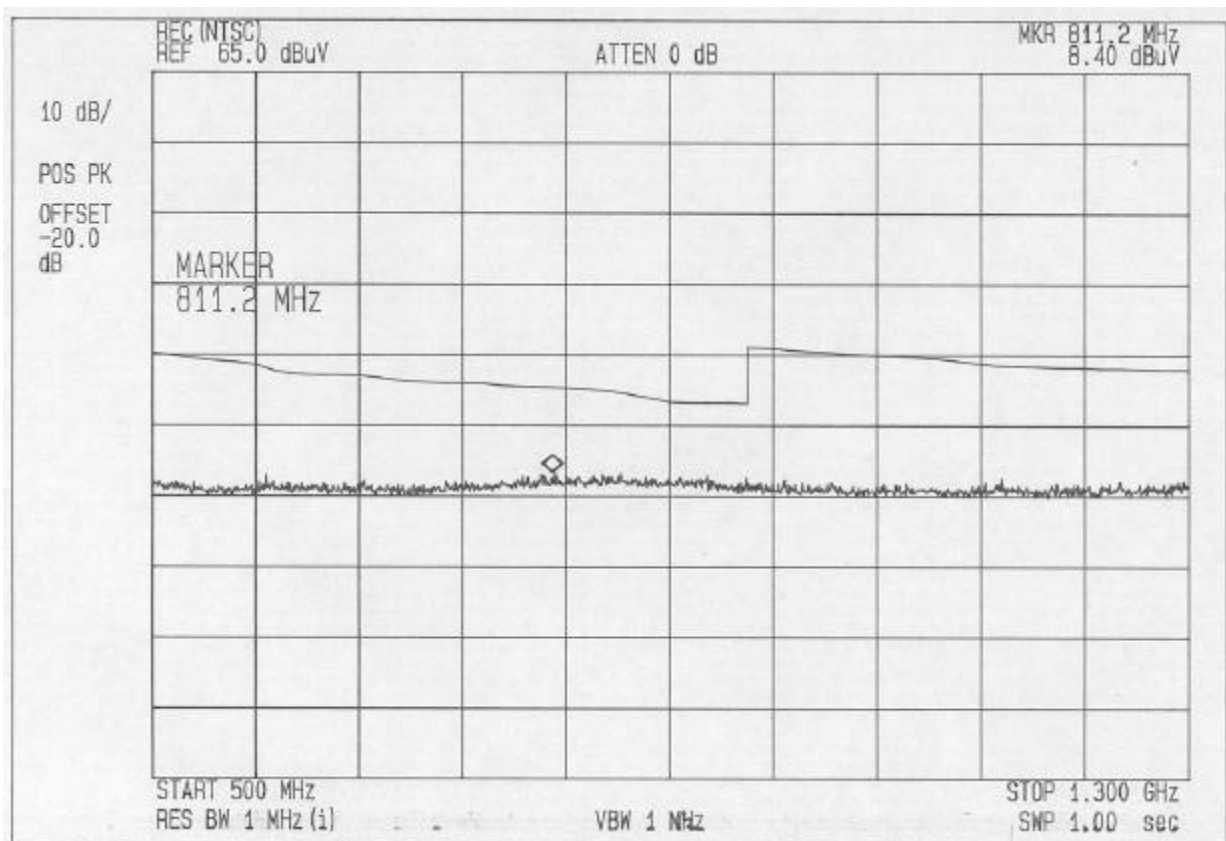
$$8.4 + 25.57 = 33.97 \text{ [dBuV/m]}$$

2) Summary of Test Result

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

Minimum margin was 12.03 dB at 811.2 MHz.

3) 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 Configure the EUT System in accordance with ANSI C63.4-1992 section 12.2.

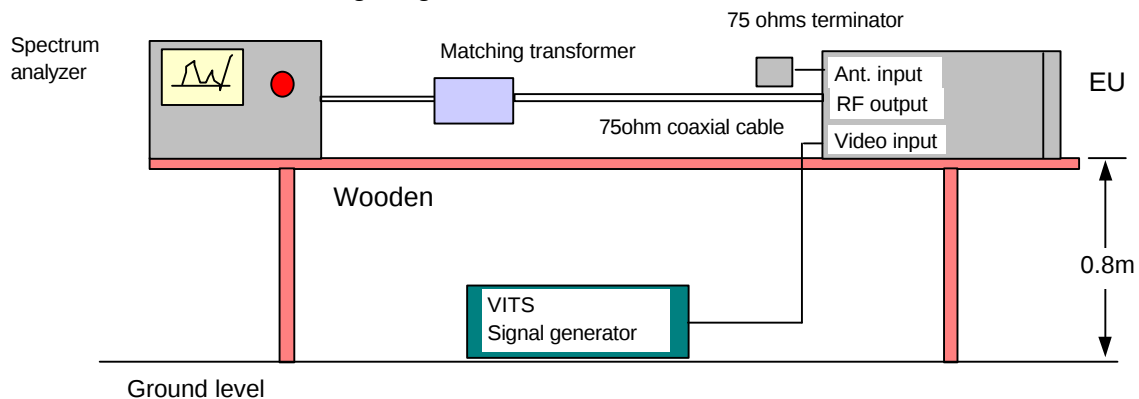
5.2.2 Activates the EUT system

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.

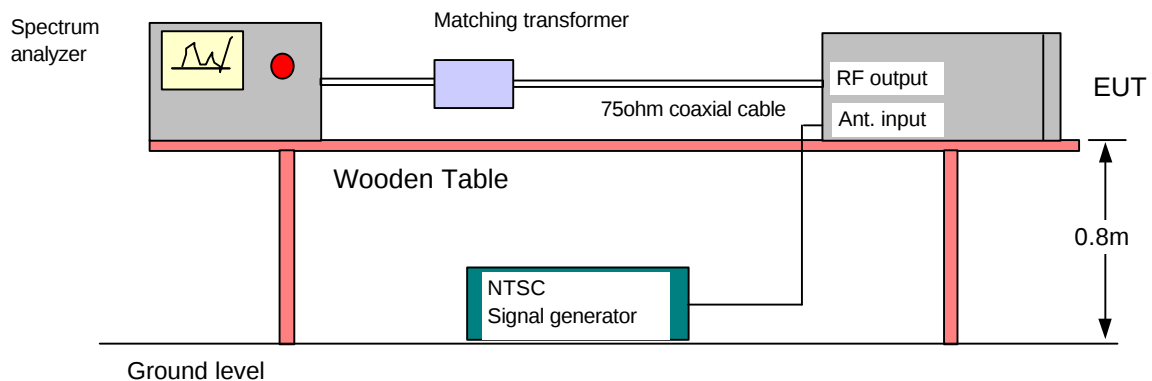
5.2.5 Then, the RF output signal level is measured under the EUT condition produces the maximum signal level.

5.3 Test arrangement

5.3.1 With the VITS Signal generator



5.3.2 With the NTSC TV Signal generator



5.4 Test results

1) EUT Mode : Playback

RF Output channel	Measured carrier frequency[MHz]		Matching Pad [dB]	Meter reading [dBuV/50ohm]		RF Output signal level [dBuV/75ohm]			
	Visual	Aural		Visual	Aural	Visual	Limit	Aural	Limit
3	61.32	65.82	0.3	61.7	47.8	62	69.54	48.1	56.53
4	67.34	71.86	0.3	63.1	47.8	63.4	69.54	48.1	56.53

* Matching Pad Loss + Meter reading = RF Output signal level

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

RF Output channel	Measured carrier frequency[MHz]		Matching Pad [dB]	Meter reading [dBuV/50ohm]		RF Output signal level [dBuV/75ohm]			
	Visual	Aural		Visual	Aural	Visual	Limit	Aural	Limit
3	61.32	65.82	0.3	64.2	48.4	64.5	69.54	48.7	56.53
4	67.34	71.86	0.3	62.1	47.7	62.4	69.54	48	56.53

* Matching Pad Loss + Meter reading = RF Output signal level

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

RF Output channel	Measured carrier frequency[MHz]		Matching Pad [dB]	Meter reading [dBuV/50ohm]		RF Output signal level [dBuV/75ohm]			
	Visual	Aural		Visual	Aural	Visual	Limit	Aural	Limit
3	61.32	65.82	0.3	62.9	48.9	63.2	69.54	49.2	56.53
4	67.34	71.86	0.3	62.1	48	62.4	69.54	48.3	56.53

* Matching Pad Loss + Meter reading = RF Output signal level

4) EUT Mode : Recording / NTSC TV Signal

RF Output channel	Measured carrier frequency[MHz]		Matching Pad [dB]	Meter reading [dBuV/50ohm]		RF Output signal level [dBuV/75ohm]			
	Visual	Aural		Visual	Aural	Visual	Limit	Aural	Limit
3	61.32	65.82	0.3	63.1	48.2	63.4	69.54	48.5	56.53
4	67.34	71.86	0.3	63.1	47.5	63.4	69.54	47.8	56.53

* Matching Pad Loss + Meter reading = RF Output signal level

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

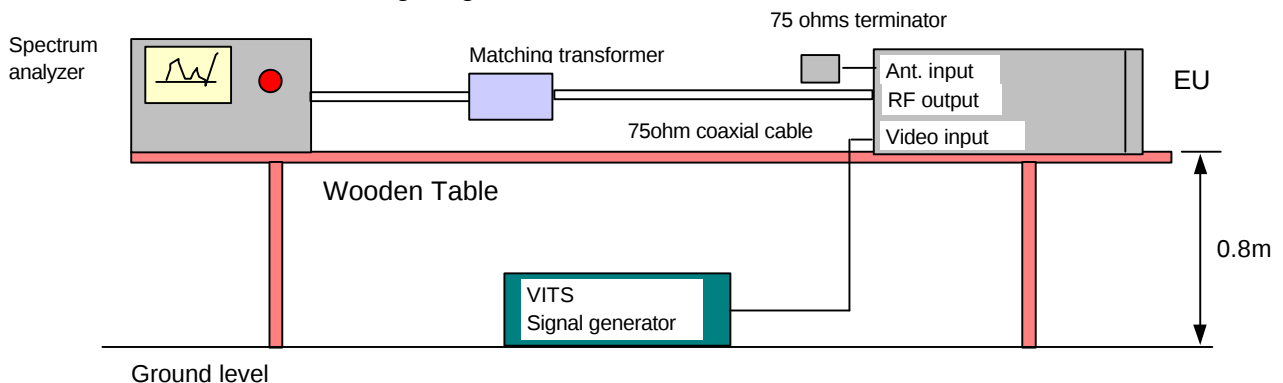
6.2.1 The EUT system and measuring instrument are set up in the same manner of the output signal measurement.

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.

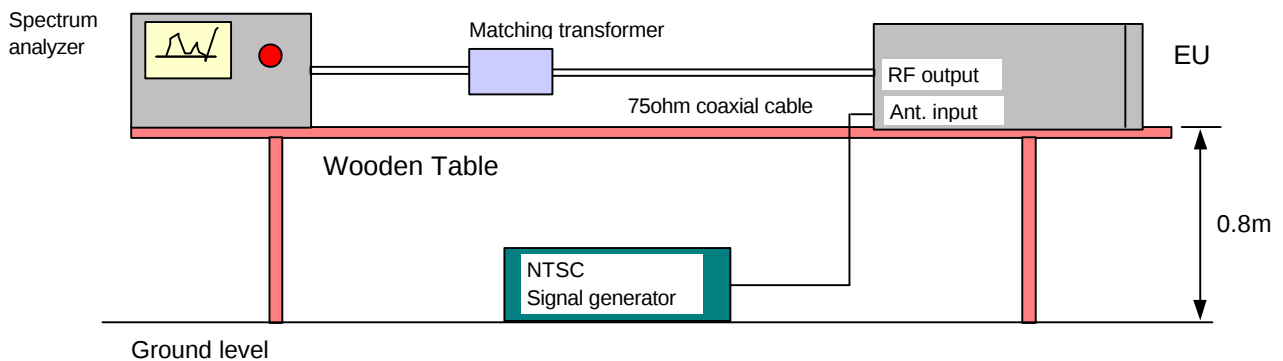
6.2.3 Then, the significant spurious emissions are measured at the output terminal.

6.3 Test arrangement

6.3.1 With the VITS Signal generator



6.3.2 With the NTSC TV Signal generator



6.4 Test Results

6.4.1 Test channel : 3

1) Test mode : Playback / VITS 1Vp-p / VITS 5Vp-p / NTSC TV Signal
(From 30MHz to more than 4.6MHz below the visual carrier frequency)

2) Sample Calculation

Frequency : 50.69 [MHz]
Meter Reading : 29.4 [dBuV] <--- Maximum Meter Reading
Correction Factor : 0.3 [dB]

* The correction factor consist of the voltage loss of the impedance matching pad and the coaxial cable used for the test.

Then, Result is calculated as follows.

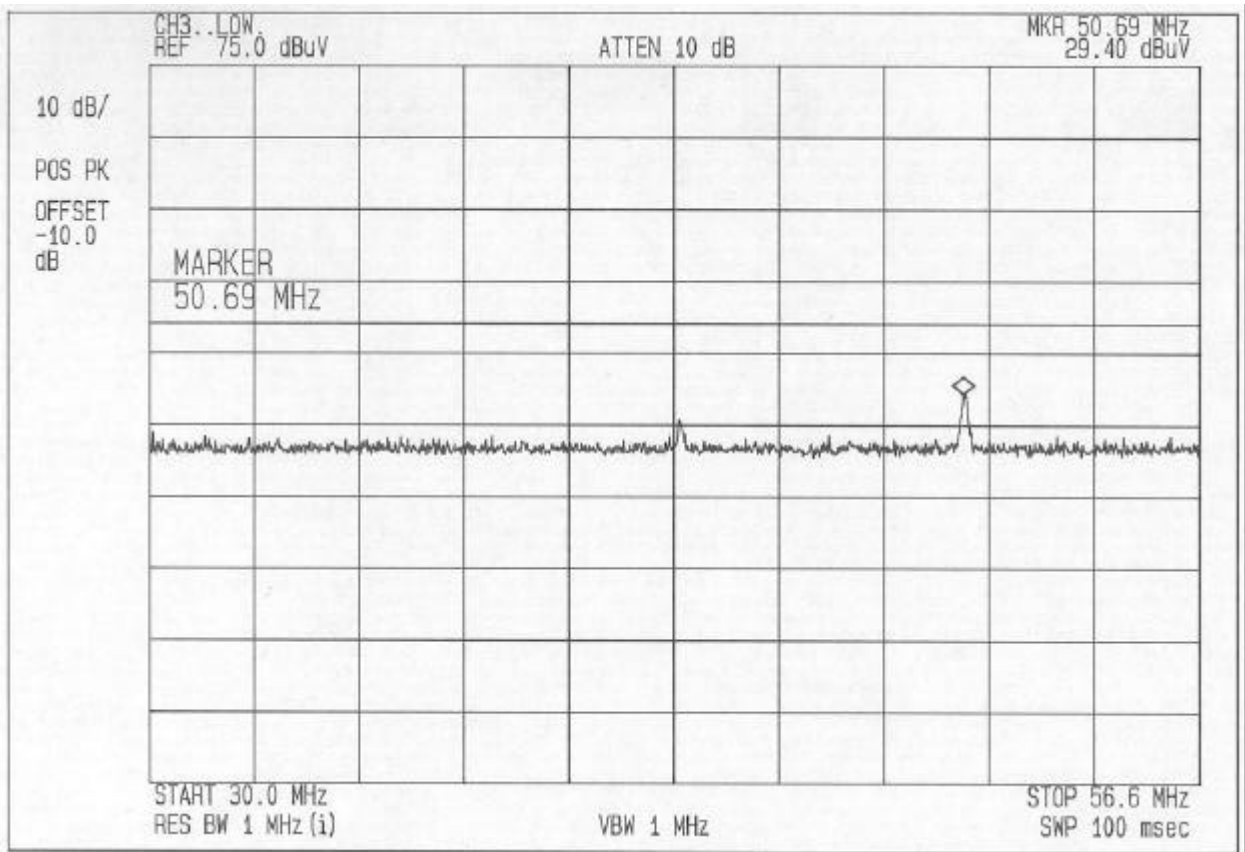
$$29.4 + 0.3 = 29.7 \text{ [dBuV]}$$

3) Summary of Test Result

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

Minimum margin was 9.79 dB at 50.69 MHz.

4) Data graph



6.4.2 Test channel : 3

1) Test mode : Playback / VITS 1Vp-p / VITS 5Vp-p / NTSC TV Signal
(From more than 7.4MHz above the visual carrier frequency)

2) Sample Calculation

Frequency : 71.4 [MHz]
Meter Reading : 28.1 [dBuV] <--- Maximum Meter Reading
Correction Factor : 0.3 [dB]

* The correction factor consist of the voltage loss of the impedance matching pad and the coaxial cable used for the test.

Then, Result is calculated as follows.

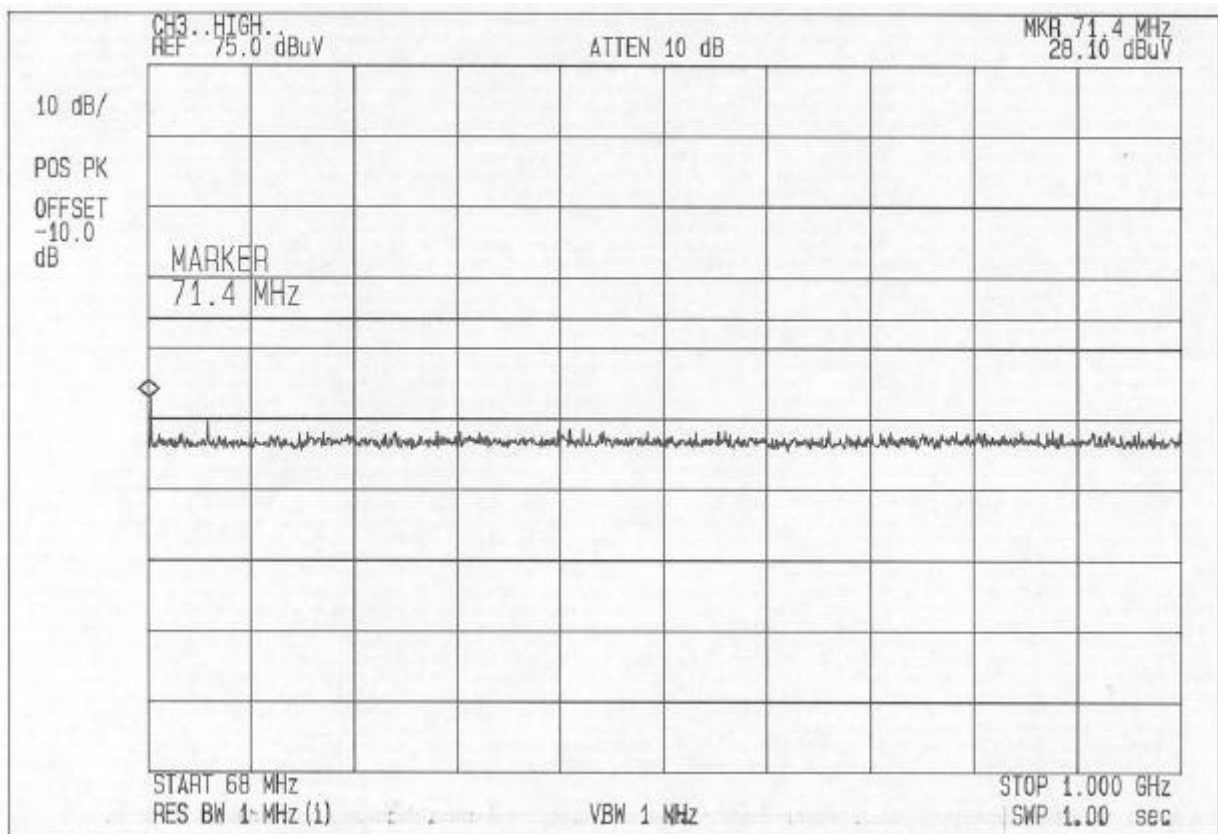
$$28.1 + 0.3 = 28.4 \text{ [dBuV]}$$

3) Summary of Test Result

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

Minimum margin was 11.09 dB at 71.4 MHz.

4) Data graph



6.4.3 Test channel : 4

1) Test mode : Playback / VITS 1Vp-p / VITS 5Vp-p / NTSC TV Signal
(From 30MHz to more than 4.6MHz below the visual carrier frequency)

2) Sample Calculation

Frequency : 56.73 [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 pad and the coaxial cable used for the test.

Then, Result is calculated as follows.

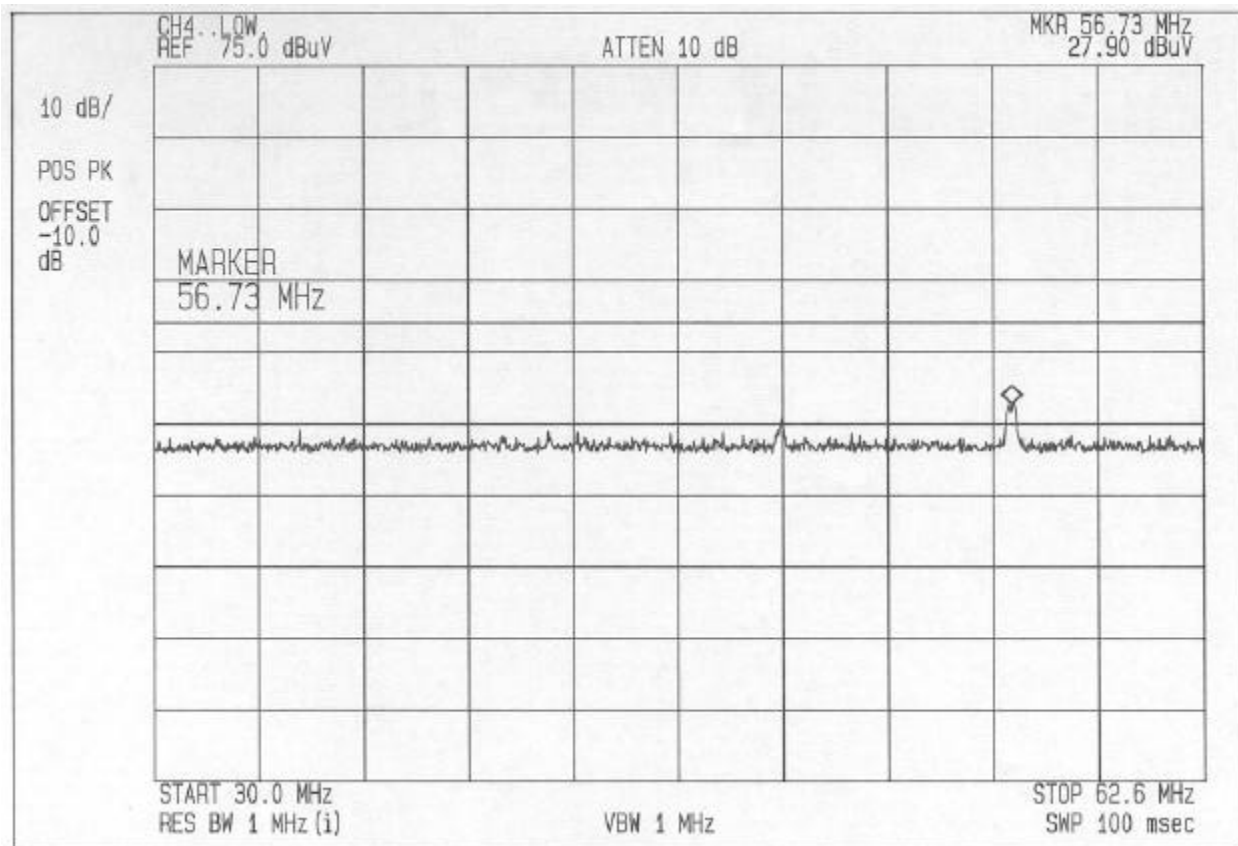
$$27.9 + 0.3 = 28.2 \text{ [dBuV]}$$

3) Summary of Test Result

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

Minimum margin was 11.29 dB at 56.73 MHz.

4) Data graph



6.4.4 Test channel : 4

1) Test mode : Playback / VITS 1Vp-p / VITS 5Vp-p / NTSC TV Signal
(From more than 7.4MHz above the visual carrier frequency)

2) Sample Calculation

Frequency : 77.7 [MHz]
Meter Reading : 28.2 [dBuV] <--- Maximum Meter Reading
Correction Factor : 0.3 [dB]

* The correction factor consist of the voltage loss of the impedance matching pad and the coaxial cable used for the test.

Then, Result is calculated as follows.

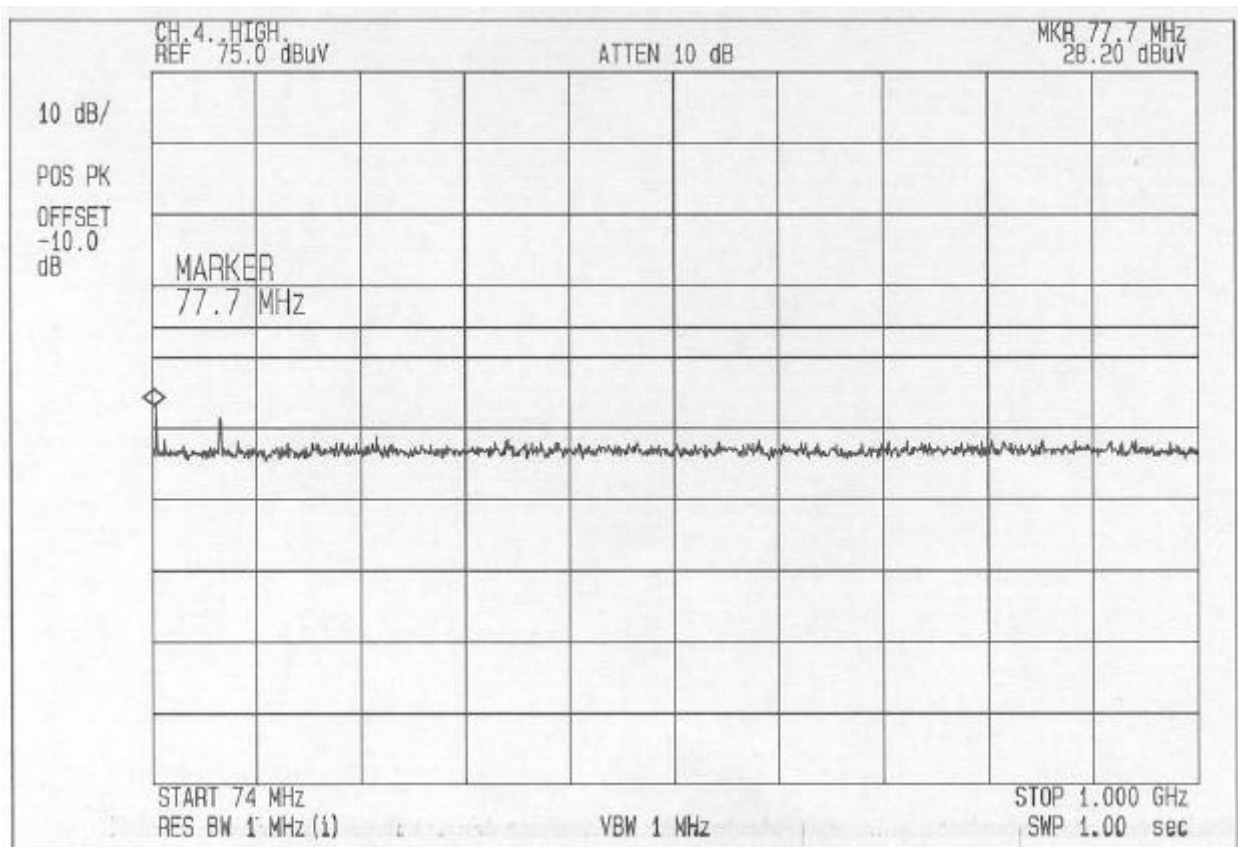
$$28.2 + 0.3 = 28.5 \text{ [dBuV]}$$

3) Summary of Test Result

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

Minimum margin was 10.99 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 Configure the EUT System in accordance with ANSI C63.4-1992 section 12.2.

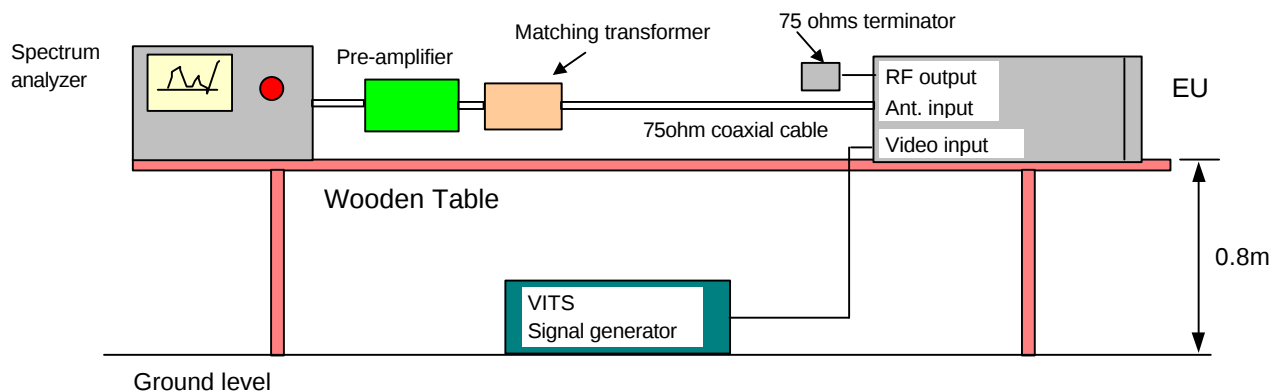
7.2.2 Activates the EUT system

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

7.2.4 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

1) EUT Mode : Playback

RF Output channel	Measured frequency [MHz]	Meter reding [dBuV/50ohm]	Matching Pad [dB]	Results [dBuV/75ohm]	Limits [dBuV/75ohm]
3	61.25	2.5	0.3	2.8	9.54
4	67.24	3.8	0.3	4.1	9.54

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

RF Output channel	Measured frequency [MHz]	Meter reding [dBuV/50ohm]	Matching Pad [dB]	Results [dBuV/75ohm]	Limits [dBuV/75ohm]
3	61.25	2.1	0.3	2.4	9.54
4	67.24	2.1	0.3	2.4	9.54

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

RF Output channel	Measured frequency [MHz]	Meter reding [dBuV/50ohm]	Matching Pad [dB]	Results [dBuV/75ohm]	Limits [dBuV/75ohm]
3	61.25	2.3	0.3	2.6	9.54
4	67.24	2.6	0.3	2.9	9.54

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 Configure the EUT System in accordance with ANSI C63.4-1992 section 8, 12.1 and EN55013:1990+A12:1994+A13:1996.

See also the block diagram of tested configuration for radiated emission measurement in this report.

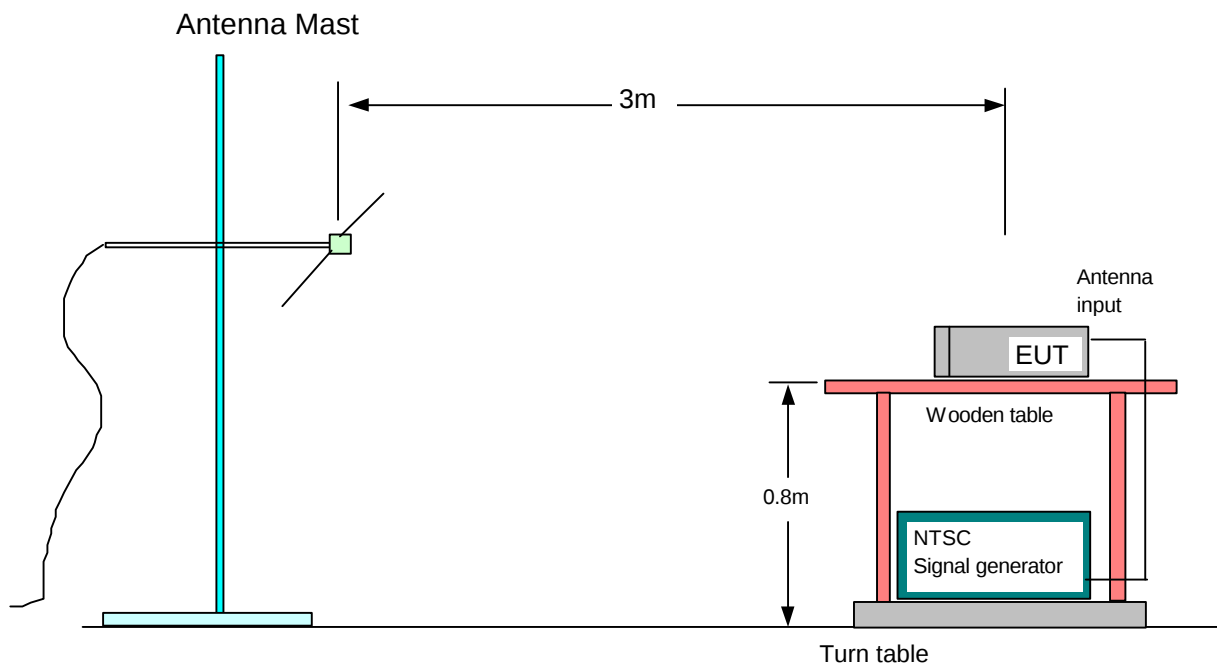
8.2.2 The RF output terminal is terminated in the proper impedance.

8.2.3 Using NTSC RF Signal is connected to the antenna terminal of EUT.

8.2.4 Activates the EUT system

8.2.5 The antenna terminal emissions recorded above are measured using the field strength meter.

8.3 Test Arrangement



8.3 Test results

Channel [No.]	Fundamental or harmonics		Meter reading [dBuV/m]		Total loss	Result at 3m	Limits at 3m
	No.	[MHz]	Hori.	Vert.	[dB]	[dBuV/m]	[dBuV/m]
3	1	107	5.1	<5	9.46	14.56	43.5
	2	214	<5	<5	13	-	43.5
	3	321	<5	<5	17.16	-	46
	4	428	<5	<5	18.91	-	46
	5	535	<5	<5	21.7	-	46
	6	642	<5	<5	23.7	-	46
	7	749	<5	<5	25.02	-	46
	8	856	<5	<5	26.5	-	46
	9	963	<5	<5	27.9	-	54
4	1	113	12.6	5.6	9.47	22.07	43.5
	2	226	<5	<5	13.37	-	46
	3	339	<5	<5	17.3	-	46
	4	452	<5	<5	19.54	-	46
	5	565	<5	<5	22	-	46
	6	678	<5	<5	24.32	-	46
	7	791	<5	<5	25.5	-	46
	8	904	<5	<5	27.73	-	54

9. LIST OF TEST INSTRUMENTS

Equipment	Model No.	Serial No.	Makers	Calibration Last calibration and Interval
Spectrum analyzer	8566B	3340A21744	H.P	00/ 3/15, 12Months
Quasi-peak adapter	85650A	3303A01784	H.P	99/12/30, 12Months
RF Preselector	85685A	3506A01500	H.P	99/12/30, 12Months
Radiation Test Signal generator (VITS)	MG318A	M08643	ANRITSU	00/ 2/15, 12Months
NTSC Signal Generator	PM5418-TDSI	LO612437	PHILIPS	00/ 8/29, 12Months
Field strength meter	ESS	844861/005	R & S	00/ 6/23, 12Months
L.I.S.N	3825-2R	9208-1981	EMCO	00/3/25, 12Months
Biconilog Antenna	3142	1237	EMCO	99/12/21, 12Months