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REPORT OF MEASUREMENTS FOR TV INTERFACE DEVICE

○ SAMSUNG Reference NO. : 980729

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) | : JENSEN |
| 2.3 Model Number | : KVC1000H |
| 2.4 Product Type | : MP |
| 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 | : July 10, 1998 |
| 5. Issued Date | : July 10, 1998 |

Tested by : NO-CHEON, PARK
Test Engineer

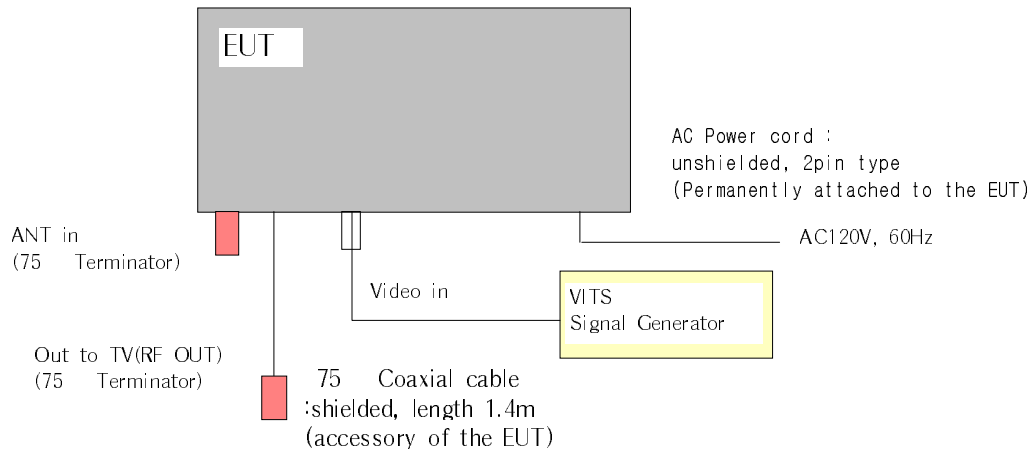
Approved by : SANG-KYU, LEE
Manager of EMC Testing Laboratory

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2. TESTED SYSTEM

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



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 four 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(1V VITS signal input)

1V Peak-to-peak VITS signal is supplied through the video input terminal.

C. Record mode(5V VITS signal input)

5V Peak-to-peak VITS signal is supplied through the video input terminal.

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

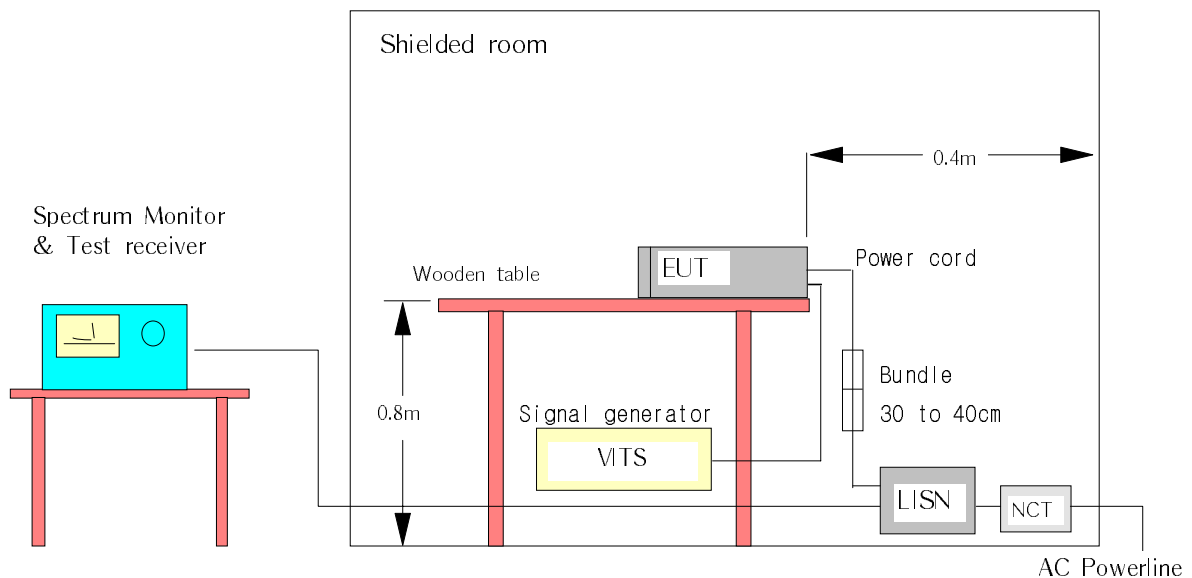
3.2.6 Using a calibrated coaxial cable, the TEST RECEIVER is connected to the measuring port of the LISN for EUT. The spectrum monitor function are set as follows.

FREQUENCY RANGE	: 0.45 - 30MHz
BANDWIDTH	: 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



3.4 Test Results

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

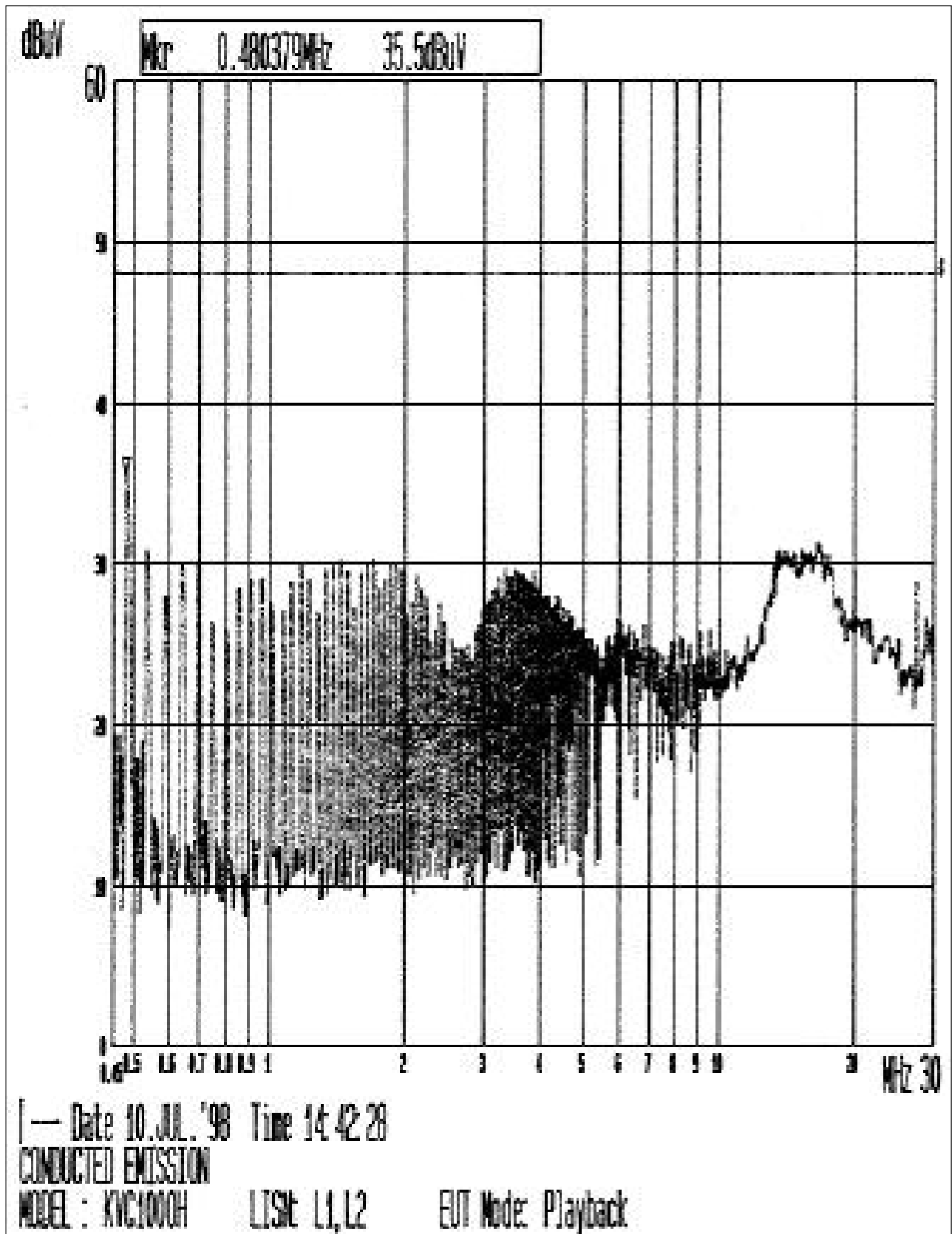
Tested Frequency [MHz]	Meter Reading (Quasi-Peak) [A]	Total Loss [B]	Results [A+B]	Limits [dBuV]	FCC Margin [dB]
	[dBuV]	[dB]	[dBuV]		
0.480	33.4	0.2	33.6	48.0	14.4
0.533	31.4	0.2	31.6	48.0	16.4
0.587	32.9	0.2	33.1	48.0	14.9
1.707	29.3	0.2	29.5	48.0	18.5
3.575	28.9	0.2	29.1	48.0	18.9
14.195	28.1	0.2	28.3	48.0	19.7

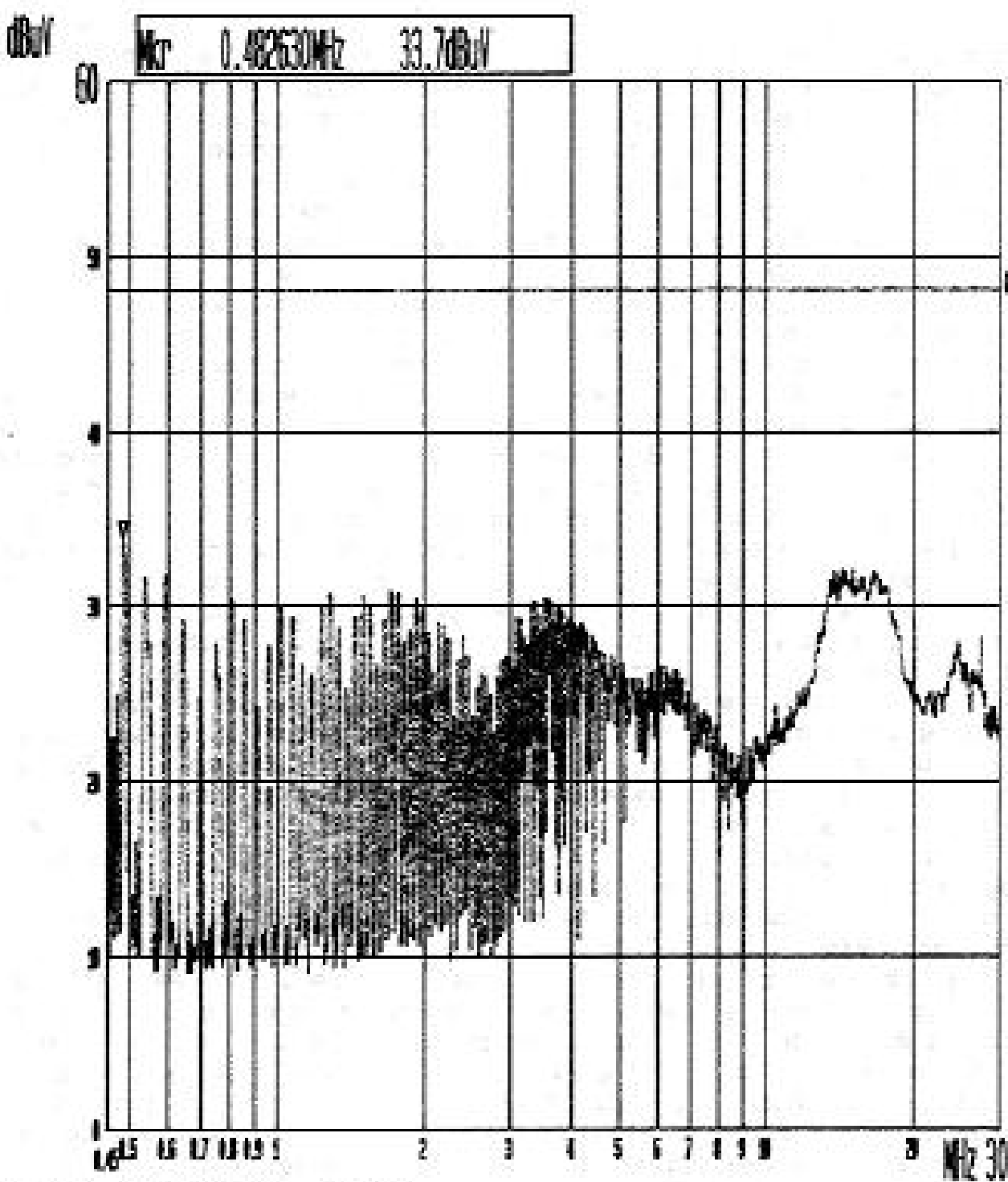
3.4.2 EUT Mode : Recording(CH.3 and CH.4)/ VITS 1Vp-p,5Vp-p

Tested Frequency [MHz]	Meter Reading (Quasi-Peak) [A]	Total Loss [B]	Results [A+B]	Limits [dBuV]	FCC Margin [dB]
	[dBuV]	[dB]	[dBuV]		
0.480	35.1	0.2	35.3	48.0	12.7
0.533	30	0.2	30.2	48.0	17.8
0.586	29.2	0.2	29.4	48.0	18.6
1.704	29.5	0.2	29.7	48.0	18.3
3.566	27.8	0.2	28.0	48.0	20.0
14.195	27.1	0.2	27.3	48.0	20.7

3.4.4 Data graphs

See attached the data





Date 10 JUL '98 Time 14:47:19

CONDUCTED EMISSION

MODEL : KVC1000H

LISN: L1, L2

EUT Mode: REC (VITS)

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 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.

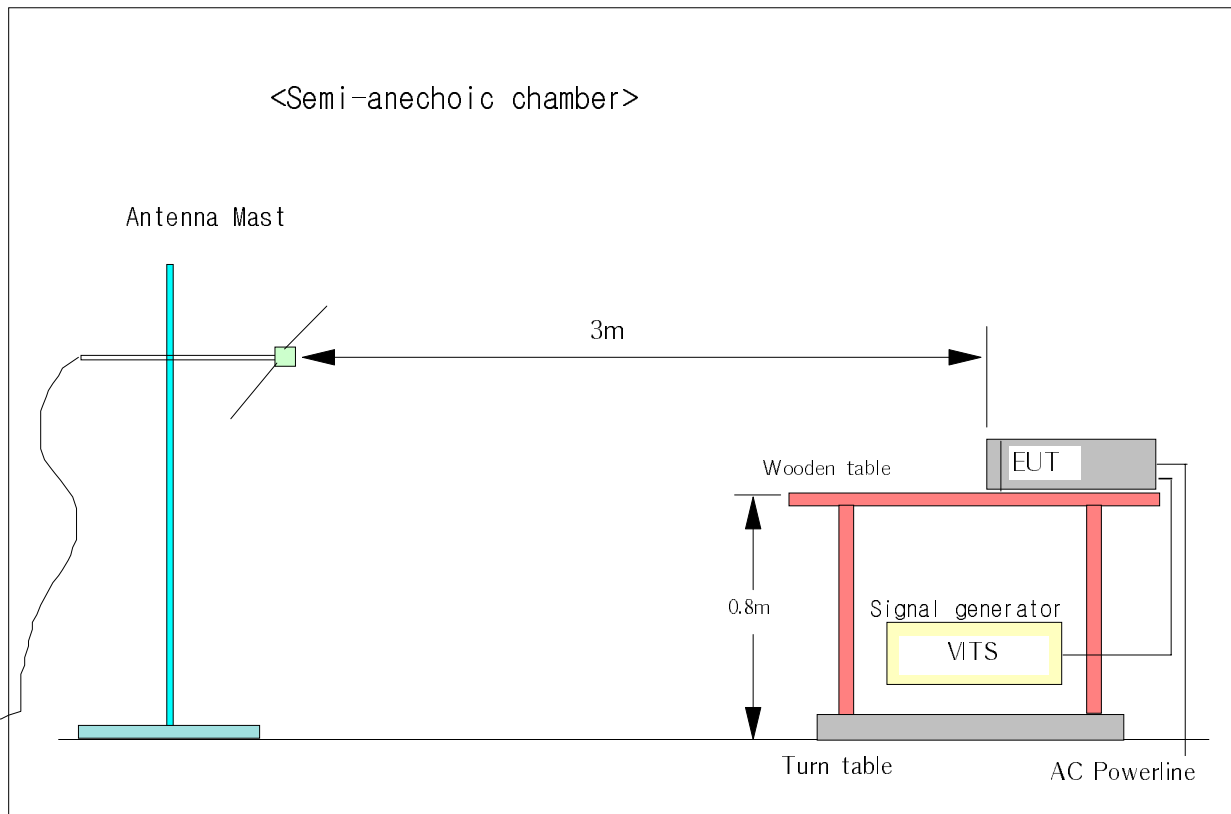
4.2.4 Activates the EUT system

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

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

● **Test range : 30 – 300MHz**

2) Sample Calculation

Frequency : 60.2 [MHz]
Meter Reading : 16.2 [dBuV] <--- Maximum Meter Reading
Antenna Factor : 9.6 [dB]

* The antenna factor includes the loss of coaxial cable used for the test.
Then, Result is calculated as follows.

$$16.2 + 9.6 = 25.8 \text{ [dBuV]}$$

3) Summary of Test Result

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

Minimum margin was 14.2 dB at 60.2 MHz.

● **Test range : 300 – 1000MHz**

2) Sample Calculation

Frequency : 314.7 [MHz]
Meter Reading : 11.6 [dBuV] <--- Maximum Meter Reading
Antenna Factor : 16.7 [dB]

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

Then, Result is calculated as follows.

$$11.6 + 16.7 = 28.3 \text{ [dBuV]}$$

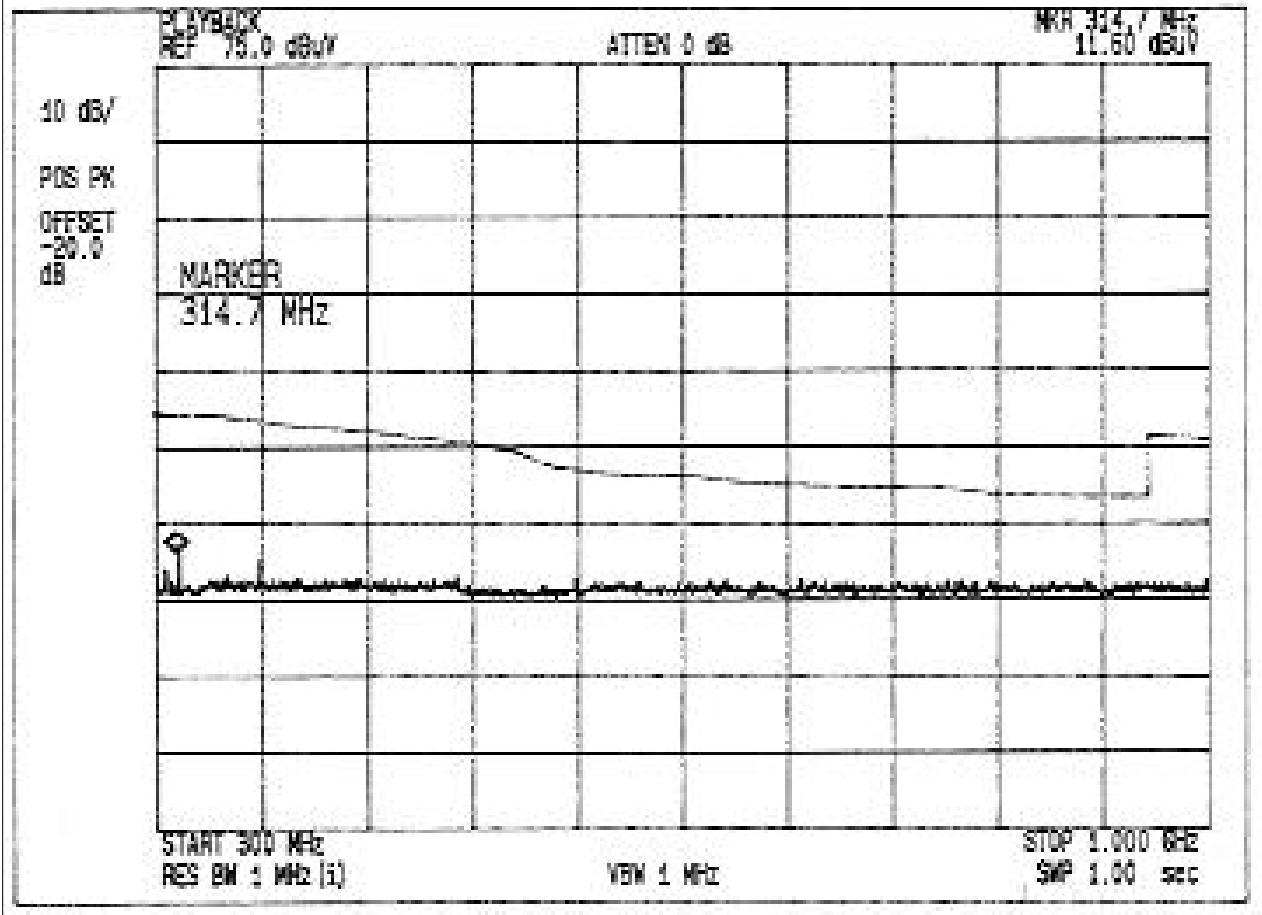
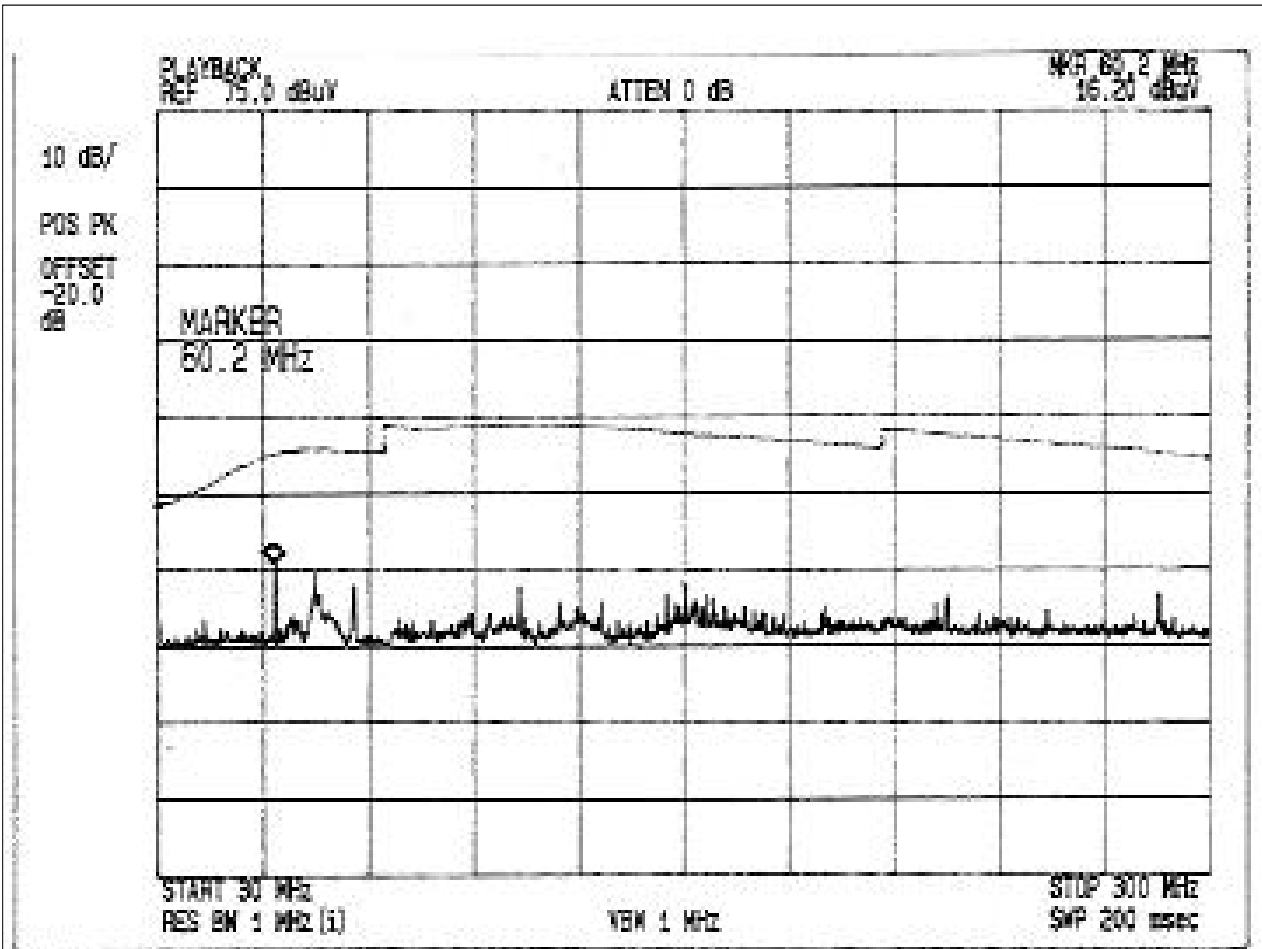
3) Summary of Test Result

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

Minimum margin was 17.7 dB at 314.7 MHz.

4) Data graph

See Next Page



4.4.2 EUT Mode : Recording(CH.3 and CH.4)/ VITS 1Vp-p, 5Vp-p

● **Test range : 30 – 300MHz**

2) Sample Calculation

Frequency : 60.2 [MHz]
Meter Reading : 20.4 [dBuV] <--- Maximum Meter Reading
Antenna Factor : 9.6 [dB]

* The antenna factor includes the loss of coaxial cable used for the test.
Then, Result is calculated as follows.

$$20.4 + 9.6 = 30 \text{ [dBuV]}$$

3) Summary of Test Result

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

Minimum margin was 13.5 dB at 60.2 MHz.

● **Test range : 300 – 1000MHz**

2) Sample Calculation

Frequency : 314.7 [MHz]
Meter Reading : 10.9 [dBuV] <--- Maximum Meter Reading
Antenna Factor : 16.7 [dB]

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

Then, Result is calculated as follows.

$$10.9 + 16.7 = 27.6 \text{ [dBuV]}$$

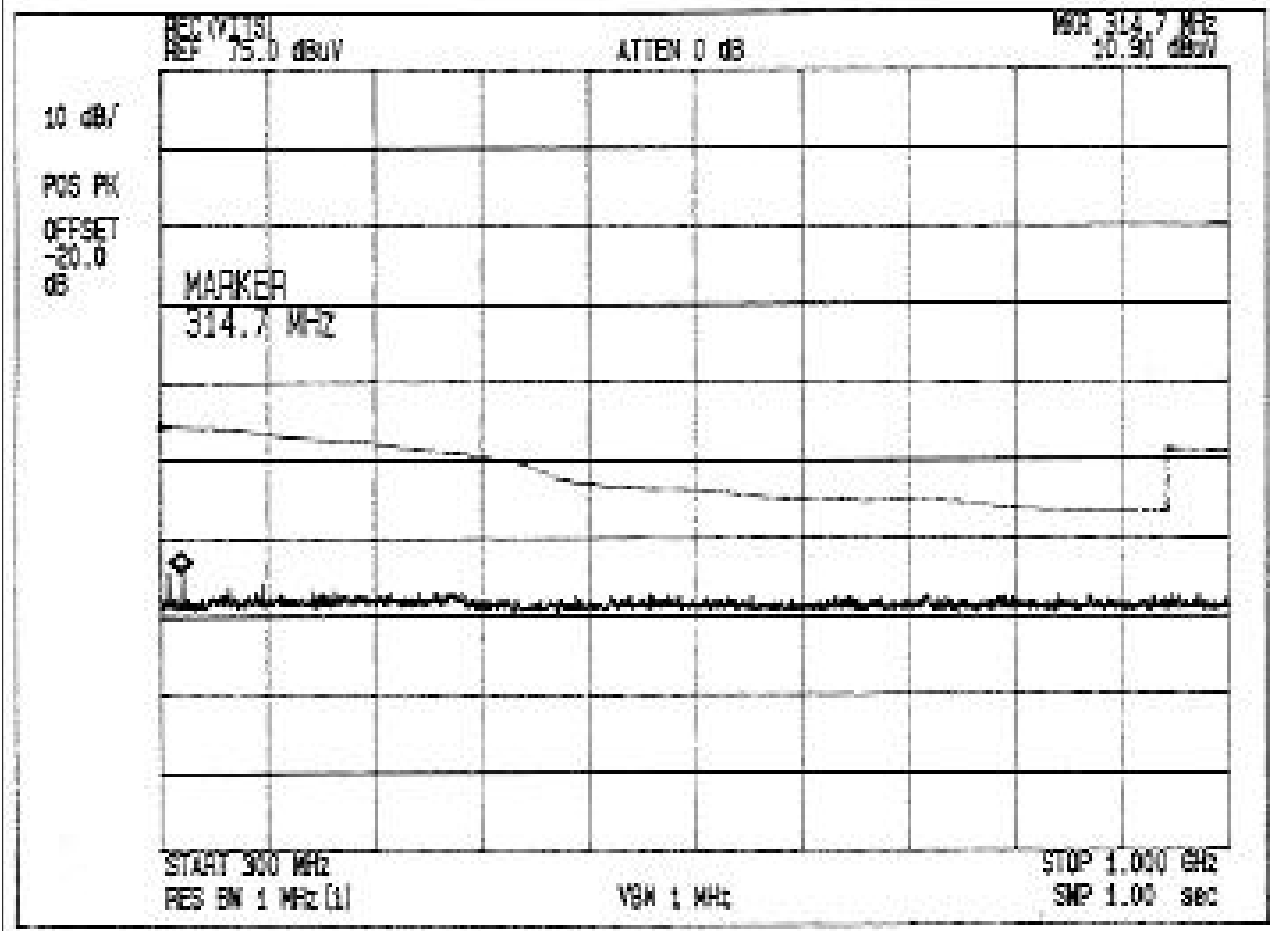
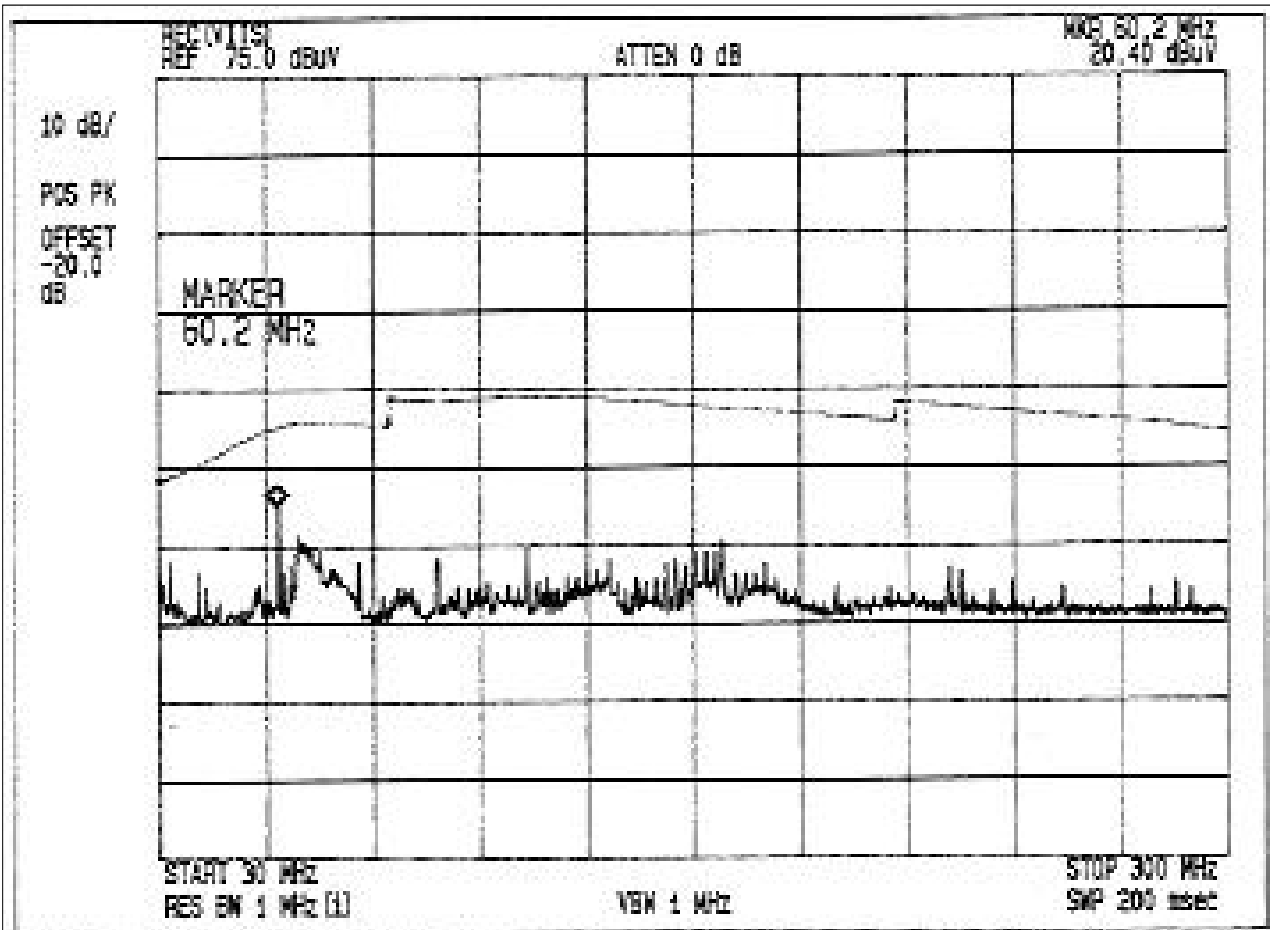
3) Summary of Test Result

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

Minimum margin was 18.4 dB at 314.7 MHz.

4) Data graph

See Next Page



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

5.2.3 Set the spectrum analyzer as follows.

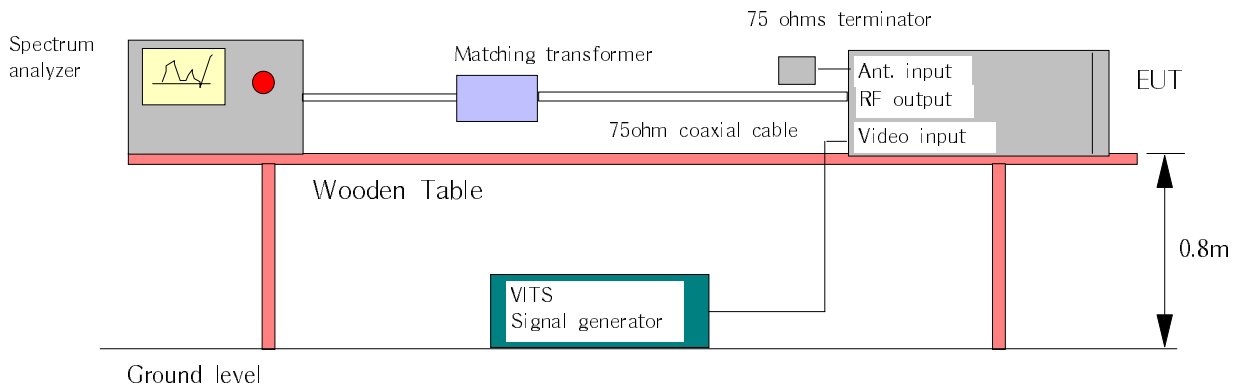
- FREQUENCY SPAN : 1MHz
- RESOLUTION BANDWIDTH : 100kHz
- VIDEO BANDWIDTH : 3MHz
- DETECTOR FUNCTION : Peak mode

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 VITS Signal generator



5.4 Test Results

1) EUT Mode : Playback

RF Output channel	Measured carrier frequency(MHz)		Matching Transformer [dB]	Meter reading [dBuV/50ohm]		RF Output signal level [dBuV/75ohm]			
	Visual	Aural		Visual	Aural	Visual	Limit	Aural	Limit
3	61.26	65.8	0.3	64.4	48.6	64.7	69.54	48.9	56.53
4	67.26	71.8		64.7	48.4	65			

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

RF Output channel	Measured carrier frequency(MHz)		Matching Transformer [dB]	Meter reading [dBuV/50ohm]		RF Output signal level [dBuV/75ohm]			
	Visual	Aural		Visual	Aural	Visual	Limit	Aural	Limit
3	61.26	65.8	0.3	63.3	48.6	63.6	69.54	48.9	56.53
4	67.26	71.8		64.7	48.4	65			

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

RF Output channel	Measured carrier frequency(MHz)		Matching Transformer [dB]	Meter reading [dBuV/50ohm]		RF Output signal level [dBuV/75ohm]			
	Visual	Aural		Visual	Aural	Visual	Limit	Aural	Limit
3	61.26	65.8	0.3	65.3	48.7	65.6	69.54	49	56.53
4	67.26	71.8		64.8	48.6	65.1			

<NOTES>



Sample calculation :

Matching Transformer loss + Meter reading = RF Output signal level

$$61.26 \text{ MHz} : \quad 0.3 \quad + \quad 65.3 \quad = \quad 65.6 \text{ [dBuV/75ohm]}$$

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

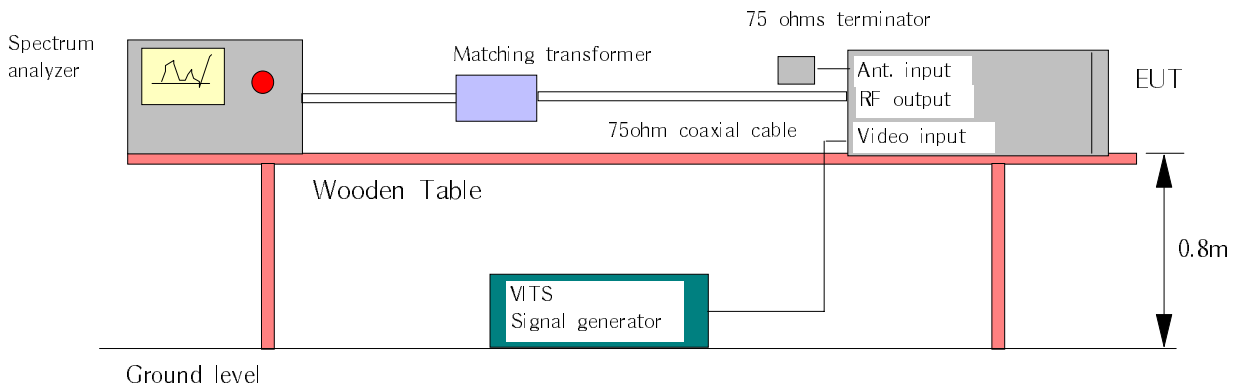
6.2.1 The EUT system and measuring instrument are set up in the same manner of the output signal measurement.

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 VITS Signal generator



6.4 Test Results

6.4.1 Test channel : 3

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

2) Sample Calculation

Frequency : 42 [MHz]
 Meter Reading : 22.1 [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.

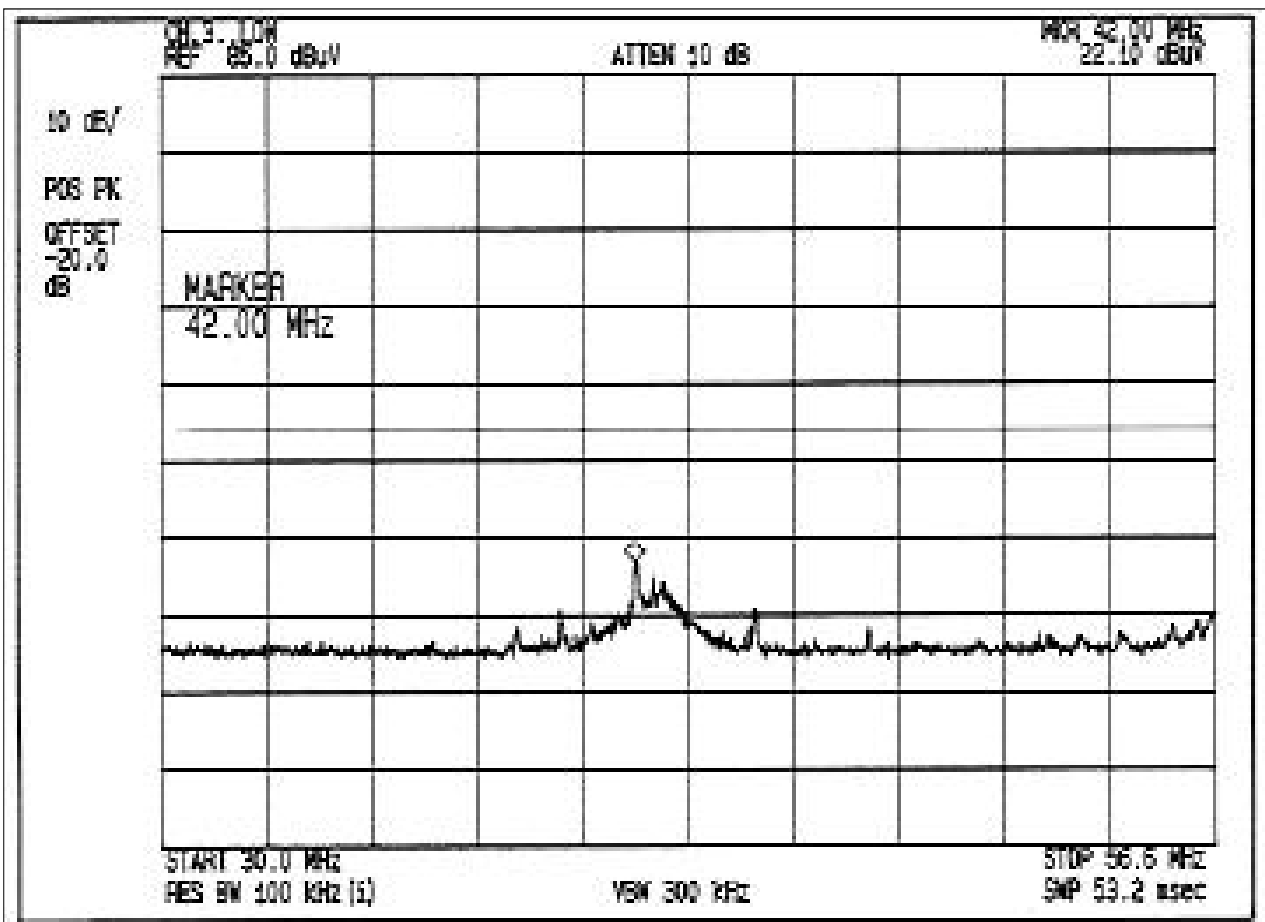
$$22.1 + 0.3 = 22.4 \text{ [dBuV]}$$

3) Summary of Test Result

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

Minimum margin was 17.09 dB at 42 MHz.

4) Data graph



6.4.1 Test channel : 3

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

2) Sample Calculation

Frequency : 122.6 [MHz]
 Meter Reading : 29 [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.

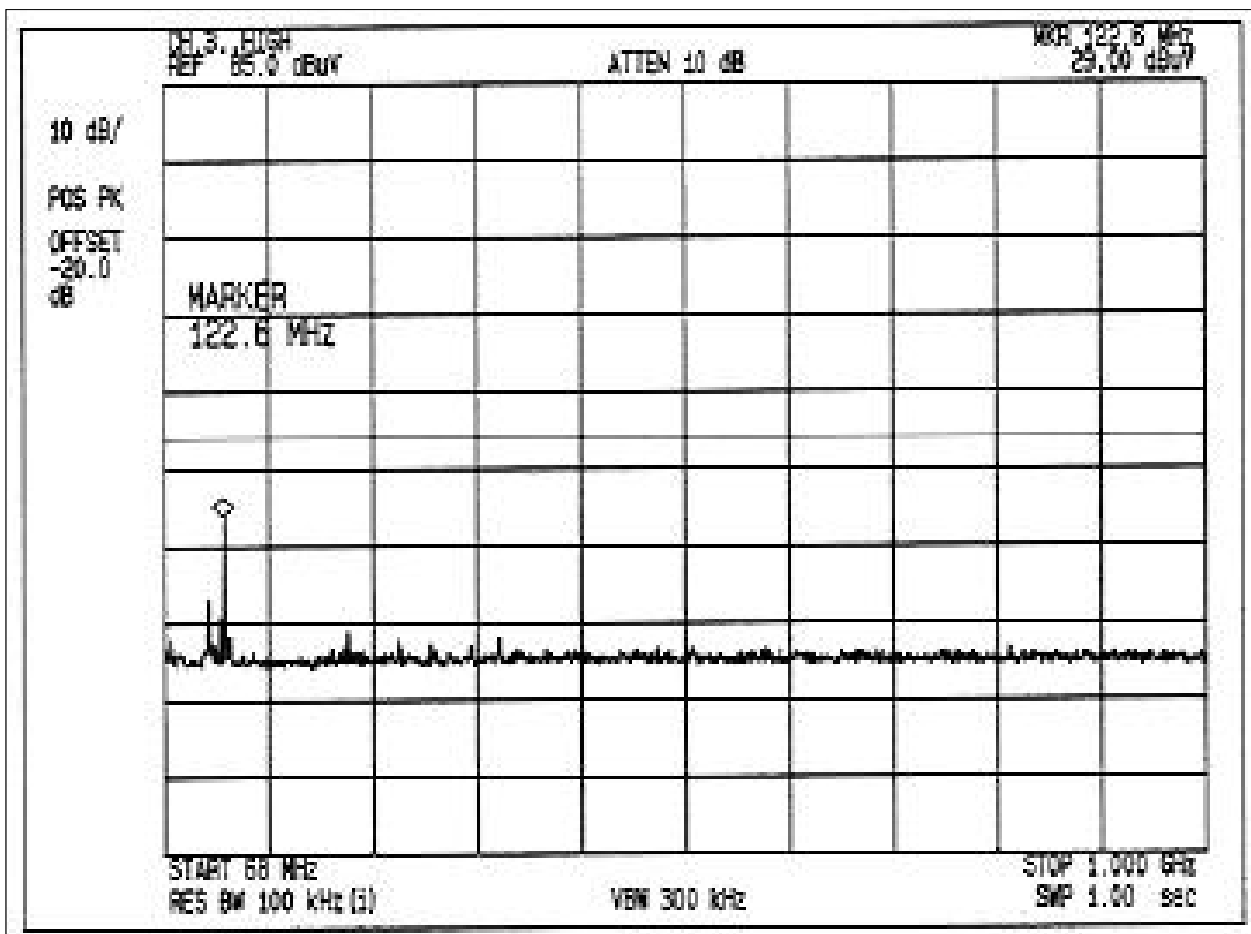
$$29 + 0.3 = 29.3 \text{ [dBuV]}$$

3) Summary of Test Result

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

Minimum margin was 10.19 dB at 122.6 MHz.

4) Data graph



6.4.2 Test channel : 4

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

2) Sample Calculation

Frequency : 42.03 [MHz]
 Meter Reading : 26.3 [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.

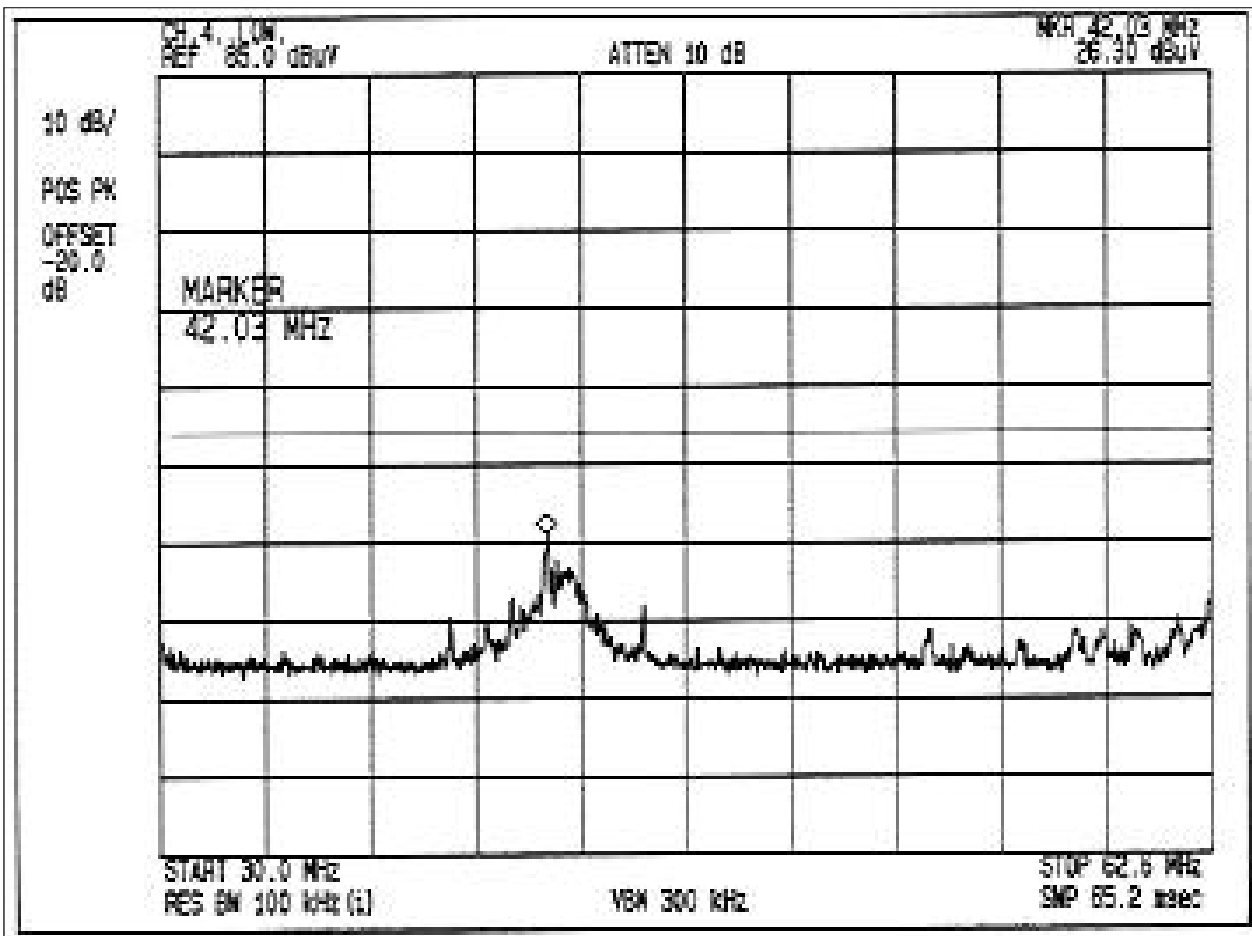
$$26.3 + 0.3 = 26.6 \text{ [dBuV]}$$

3) Summary of Test Result

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

Minimum margin was 12.89 dB at 42.03 MHz.

4) Data graph



6.4.2 Test channel : 4

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

2) Sample Calculation

Frequency : 134.8 [MHz]
 Meter Reading : 18.4 [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.

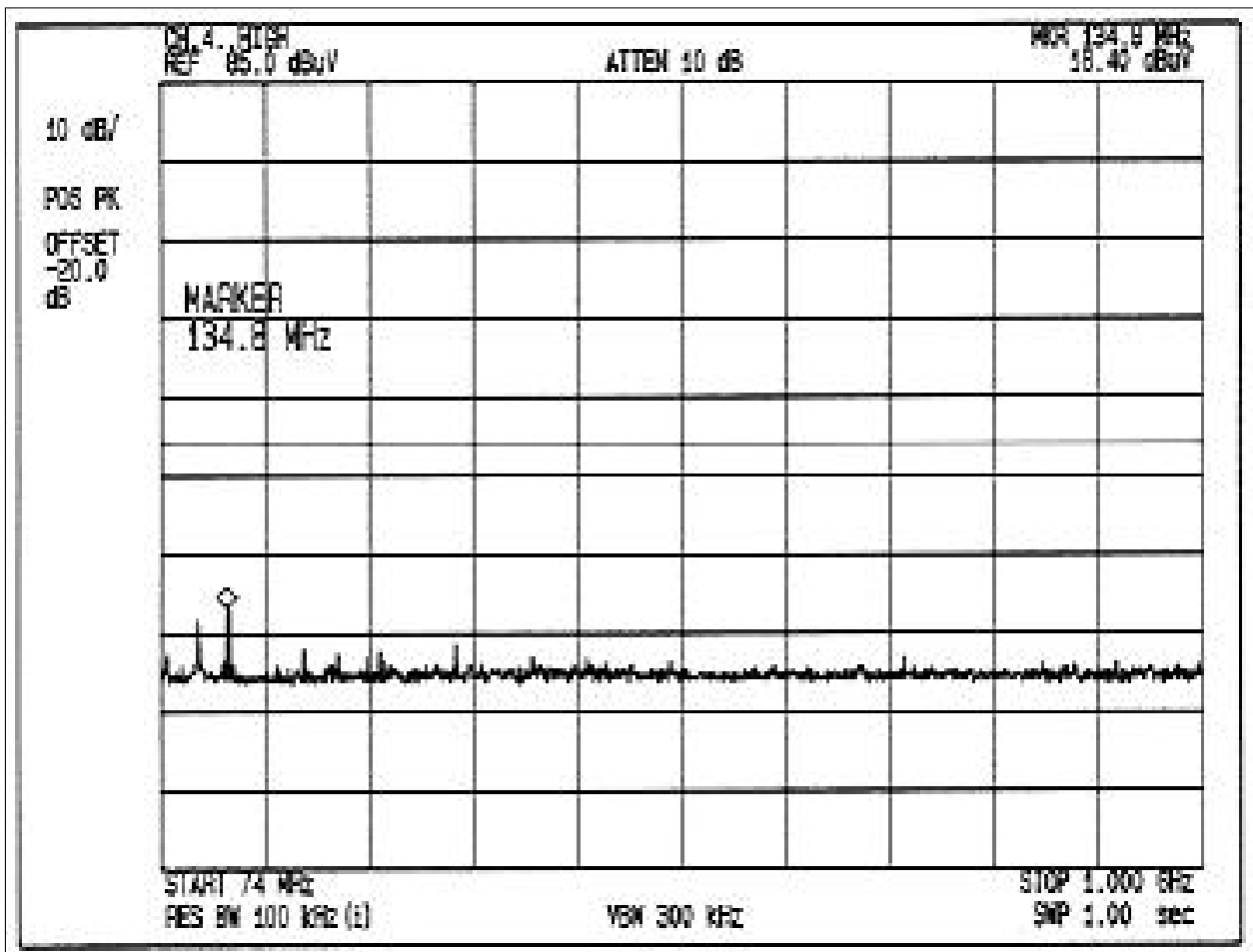
$$18.4 + 0.3 = 18.7 \text{ [dBuV]}$$

3) Summary of Test Result

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

Minimum margin was 20.79 dB at 134.8 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 Set the spectrum analyzer as follows.

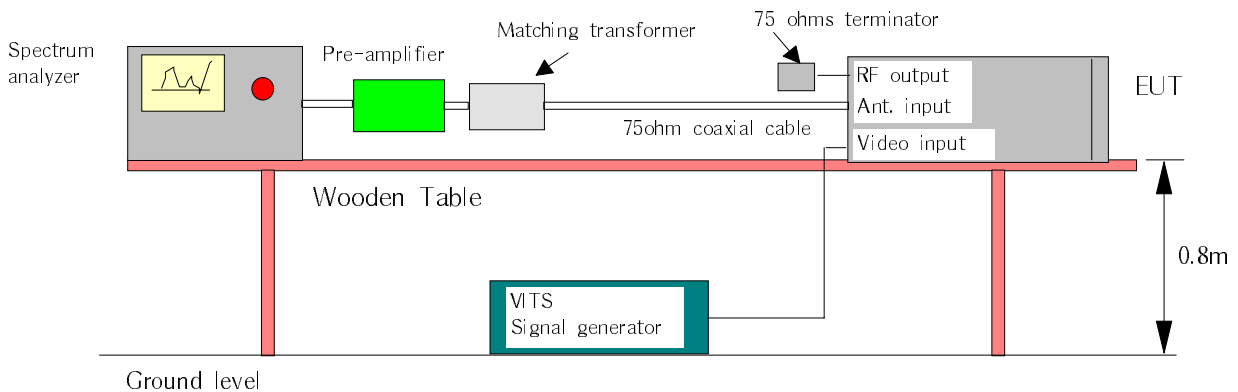
- FREQUENCY SPAN : 1MHz
- RESOLUTION BANDWIDTH : 100kHz
- VIDEO BANDWIDTH : 3MHz
- DETECTOR FUNCTION : Peak mode

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

1) EUT Mode : Playback

RF Output channel	Measured frequency [MHz]	Meter reading [dBuV/50ohm]	Gain of pre-amplifier [dB]	Matching Transformer [dB]	Results [dBuV/75ohm]	Limits [dBuV/75ohm]
3	61.25	30.6	25	0.3	5.9	9.54
4	67.24	30			5.3	

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

RF Output channel	Measured frequency [MHz]	Meter reading [dBuV/50ohm]	Gain of pre-amplifier [dB]	Matching Transformer [dB]	Results [dBuV/75ohm]	Limits [dBuV/75ohm]
3	61.25	30.6	25	0.3	5.9	9.54
4	67.24	30.5			5.8	

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

RF Output channel	Measured frequency [MHz]	Meter reading [dBuV/50ohm]	Gain of pre-amplifier [dB]	Matching Transformer [dB]	Results [dBuV/75ohm]	Limits [dBuV/75ohm]
3	61.25	30.8	25	0.3	6.1	9.54
4	67.24	31			6.3	

<NOTES>

● Sample calculation :

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

$$67.24 \text{ MHz} : \quad 30.8 - 25 + 0.3 = \quad 6.1 \text{ [dBuV/75ohm]}$$

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 Configure 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.

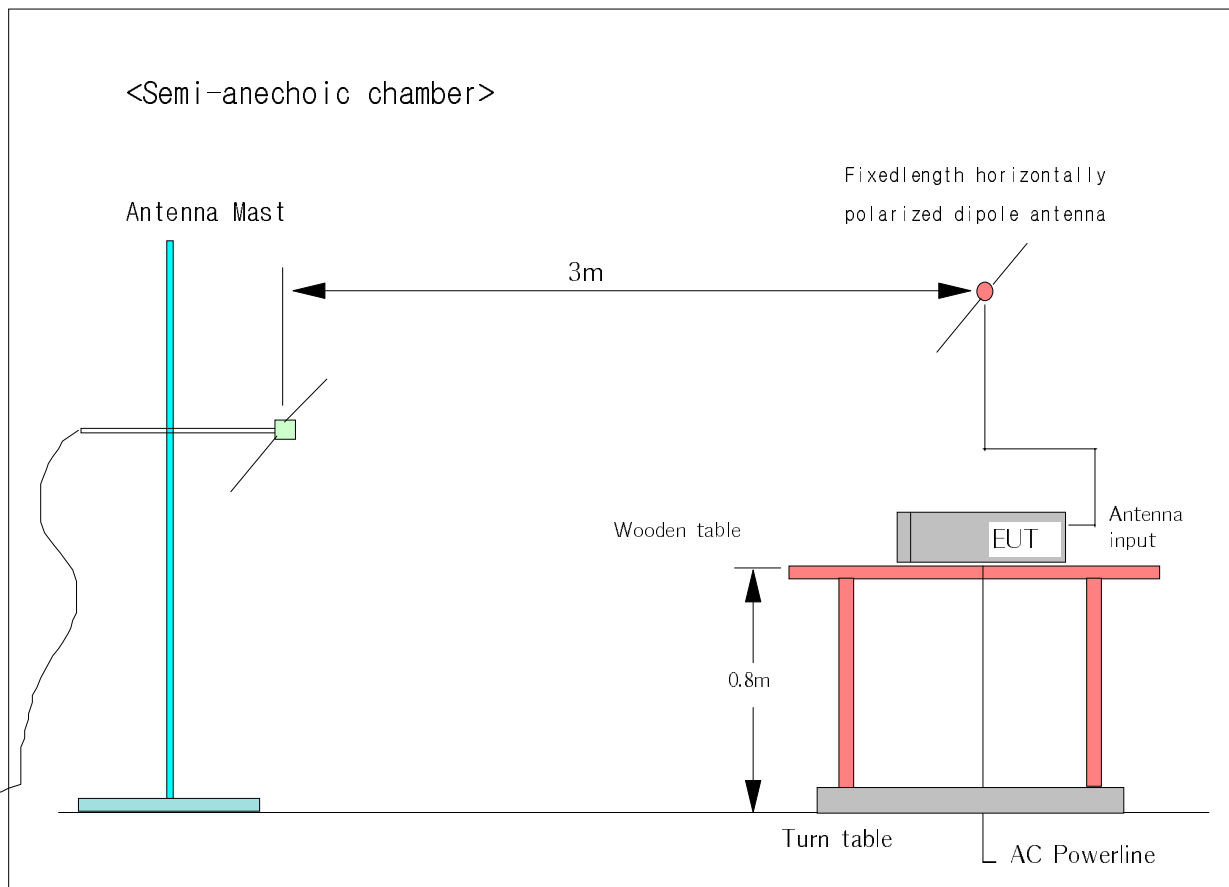
8.2.4 Using a fixedlength horizontally polarized dipole antenna is connected to the antenna terminal of EUT.

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

Channel [No.]	Fundamental 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	10.8	6.9	9.7	20.5	43.5
	2	214	<5	<5	12	-	43.5
	3	321	<5	<5	16.7	-	46
	4	428	<5	<5	18.5	-	46
	5	535	<5	<5	21.6	-	46
	6	642	<5	<5	24.7	-	46
	7	749	<5	<5	26	-	46
	8	856	<5	<5	27.2	-	46
	9	963	<5	<5	27.6	-	54
4	1	113	10.5	7.1	9.7	20.2	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	<5	23.5	-	46
	6	678	<5	<5	25.5	-	46
	7	791	<5	<5	26.2	-	46
	8	904	<5	<5	27.5	-	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	2607A2581	H.P	97/ 8/1, 12Months
Quasi-peak adapter	85650A	2521A00687	H.P	97/11/3, 12Months
RF Preselector	85685A	2602A00224	H.P	97/ 6/12, 12Months
Spectrum monitor	EZM	374.4019.03	R & S	98/ 4/15, 12Months
Field strength meter	ESS	882402/009	R & S	98/ 3/15, 12Months
	ESH3	860905/010	R & S	98/ 3/26, 12Months
Pre-amplifier	8447D	2443A04331	H.P	97/12/10, 12Months
L.I.S.N	3825/2R	1151	EMCO	97/ 7/24, 12Months
	KNW-404	8-507-5	Kyoritsu	97/ 7/24, 12Months
Biconilog antenna	3142	1118	EMCO	98/ 1/ 5, 12Months
Double ridged waveguide	3115	4028	EMCO	97/10/ 8, 12Months