

Issue Date : February 8, 1999
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***EMC*_{EMISSION} - TEST REPORT**

JQA APPLICATION No. : KL8080686

Model/Type No. : IC-2800H

Name of Product : VHF/UHF DUALBAND FM Transceiver

FCC ID : AFJ IC-2800H

Applicant : ICOM Incorporated

Address : 1-6-19, Kuratsukuri, Kami, Hirano-ku, Osaka, Japan

Manufacturer : ICOM Incorporated

Address : 1-6-19, Kuratsukuri, Kami, Hirano-ku, Osaka, Japan

Final Judgement : Passed

TEST RESULTS IN THIS REPORT are obtained in use of equipment that is traceable to Electro-technical Lat. of MITI Japan and Communications Research Lab. of PTT Japan.

THE TEST RESULTS only responds to the test sample. This test report shall not be reproduced except in full.

JAPAN QUALITY ASSURANCE ORGANIZATION (JQA)
KITA-KANSAI TESTING CENTER
EMC DIVISION

NVLAP[®]

LAB CODE: 200191-0

DIRECTORY

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TEST REGULATION

FCC Rules and Regulations Part 15 Subpart A and B (April 17, 1997)

- Class A Digital Device
- Class B Digital Device
- Scanning Receiver (employing superheterodyne techniques)

Test procedure:

Conducted emission, radiated emission and antenna conducted power test were performed according to the procedures in ANSI C63.4-1992.

GENERAL INFORMATION

Test facility:

- 1) Test Facility located at Kita-Kansai : 1st and 2nd Open Sites (3 m Site)
Test Facility located at Kameoka Open Site (3, 10 and 30 m, on common plane)
FCC filing No. : 31040/SIT 1300F2
- 2) KITA-KANSAI TESTING CENTER is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance established in Title 15, Part 285 Code of Federal Regulations.
NAVLAP Lab Code: 200191-0

Description of the Equipment Under Test (EUT):

1) Name	:	VHF/UHF DUALBAND FM Transceiver
2) Model/Type No.	:	IC-2800H
3) Product Type	:	Pre-Production (S/N C005)
4) Category	:	Scanning Receiver
5) EUT Authorization	:	<input checked="" type="radio"/> - Verification <input type="radio"/> - Certification <input type="radio"/> - D.o.C.
6) Highest frequency used/generated	:	403.950 MHz
7) Power Rating	:	DC 13.8 V (DC Power Supply IC-5P : AC120V 60Hz)

Definitions for symbols used in this test report:

- Black box indicates that the listed condition, standard or equipment is applicable for this Report.
- Blank box indicates that the listed condition, standard or equipment is not applicable for this Report.

TEST CONDITIONS

The measurement of the Conducted Emission (Disturbance Voltage)
was performed in the following test site.

Test location:

KITA-KANSAI Testing Center
7-7, Ishimaru, 1-Chome, Minoh-Shi, Osaka, 562-0027, Japan

● - Shielded room

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

○ - Shielded room

○ - On metal plane of open site

Used test instruments and sites:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
○ - ESH 3	A - 1		
● - ESH 2	A - 2	December, 1998	1 Year
○ - ESH 2	A - 3		
● - KNW-407	D - 6	February, 1998	1 Year
○ - KNW-408	D - 11		
○ - KNW-242	D - 7		
○ - ESH3-Z5	D - 12		
○ - KNW-341C	D - 13		
○ - KNW-408	D - 14		
○ - KNW-244C	D - 77		
○ - KNW-408	D - 78		
○ - ESH2-Z5	D - 10		
○ - ESH2-Z3	D - 17		
○ - 8568B	A - 10		
○ - 8566B	A - 13		
○ - 8593A	A - 15		
● - Cable	H - 8	February, 1998	1 Year

Environmental conditions:

Temperature: 21 °C Humidity: 34 %

The measurement of the Radiated Emission (Electric Field)

was performed in horizontal and vertical polarization, in the frequency range of 30 MHz - 1000 MHz, in the following test site.

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Minoh-Shi, Osaka, 562-0027, Japan

- 1st site (3 meters)
- 2nd site (3 meters)

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

- 3 meters
- 10 meters

Validation of Site Attenuation:

1) Last Confirmed Date: November 27, 1998

2) Interval : 1 Year

Used test instruments:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
<input checked="" type="radio"/> - ESV/ESV-Z3	A - 7 / A - 17	December, 1998	1 Year
<input type="radio"/> - ESV/ESV-Z3	A - 6 / A - 18		
<input type="radio"/> - ESV/ESV-Z3	A - 5 / A - 16		
<input type="radio"/> - ESV/ESV-Z3	A - 4 / A - 20		
<input type="radio"/> - ESV/ESV-Z3	A - 8 / A - 19		
<input checked="" type="radio"/> - KBA-511A	C - 12	November, 1998	1 Year
<input checked="" type="radio"/> - KBA-611	C - 22	November, 1998	1 Year
<input type="radio"/> - KBA-511A	C - 13		
<input type="radio"/> - KBA-611	C - 19		
<input type="radio"/> - KBA-511A	C - 11		
<input type="radio"/> - KBA-611	C - 21		
<input checked="" type="radio"/> - Cable	H - 5	November, 1998	1 Year

Environmental conditions:

Temperature: 12 °C Humidity: 40 %

The measurement of the Radiated Emission (Electric Field)

was performed in horizontal and vertical polarization, in the frequency range of 1000 MHz - 2000 MHz, in the following test site.

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Minoh-Shi, Osaka, 562-0027, Japan

- 1st site (3 meters)
- 2nd site (3 meters)

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

- 3 meters
- 10 meters

Used test instruments:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
<input type="radio"/> - 8566B	A - 13		
<input type="radio"/> - 8593A	A - 15		
<input type="radio"/> - ESV	A - 5		
<input type="radio"/> - 4T-10	D - 73		
<input type="radio"/> - 4T-10	D - 74		
<input type="radio"/> - WJ-6611-513	A - 23		
<input type="radio"/> - WJ-6882-824	A - 21		
<input type="radio"/> - DBL-0618N515	A - 33		
<input type="radio"/> - 91888-2	C - 41 - 1		
<input type="radio"/> - 91889-2	C - 41 - 2		
<input type="radio"/> - 94613-1	C - 41 - 3		
<input type="radio"/> - 91891-2	C - 41 - 4		
<input type="radio"/> - 94614-1	C - 41 - 5		
<input type="radio"/> - 3160-09	C - 48		
<input type="radio"/> - TRA-603D	D - 24		
<input type="radio"/> - 8494H/8595H	D - 76		
<input type="radio"/> - MZ5010C	D - 81		
<input type="radio"/> - Cable	C - 40 - 11		
<input type="radio"/> - Cable	C - 40 - 12		

Setting of the spectrum analyzer:

RES B.W : Video B.W :
SCALE : Sweep Time:

Environmental conditions:

Temperature: ____ °C Humidity: ____ %

The measurement of the Antenna Conducted Power

was performed in the frequency range of 30 MHz - 1000 MHz, in the following test site.

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Minoh-Shi, Osaka, 562-0027, Japan

● - Shielded Room

○ - Anechoic Chamber

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

○ - Shielded Room

Used test instruments:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
● - ESV	A - 5	December, 1998	1 Year
○ - 8568B	A - 10		
○ - 8566B	A - 13		
○ - 8593A	A - 15		
○ - LSG-221	B - 15		
○ - 216/1	B - 16		
○ - MP614A	D - 56		
○ - 12B50/75	D - 55		
○ - 12N50/75B	D - 72		
● - 2-10	D - 40	June, 1998	1 Year
○ - 1506A	D - 21		
● - Cable	C - 41 - 9	June, 1998	1 Year

Environmental conditions:

Temperature: 23 °C Humidity: 29 %

CONFIGURATION OF EUT

The Equipment Under Test (EUT) consists of:

Description	Applicant (Manufacturer)	Model No. (Serial No.)	FCC ID
VHF/UHF DUALBAND FM Transceiver (Base and Display)	ICOM Incorporated (ICOM Incorporated)	IC-2800H (C005)	AFJ IC-2800H
Microphone	ICOM Incorporated	HM-118TA (--)	N/A

The measurement was carried out with the following equipment connected:

Description	Grantee/Distributor	Model No. (Serial No.)	FCC ID
DC Power Supply	ICOM Incorporated	IC-5P (1793)	N/A
Telereader	TASCO ELECTRONIC CO., LTD.	TNC-291G (3911245)	N/A
External Speaker	ICOM Incorporated	SP-12 (--)	N/A

Type of Interference Cable(s) and the AC Power Cord used with the EUT:

No.	Cable	Shielded	Ferrite Core	Length
1	EUT(Base) "DATA" / Telereader "RADIO"	YES	NO	3.8m
2	EUT(Base) "MIC" / Microphone	NO	NO	0.4m
3	EUT(Base) "440MHz SP" / External Speaker	NO	NO	2.2m
4	EUT(Base) "144MHz SP" / No terination	--	--	--
5	EUT(Base) "ANT" / 50Ω terination	--	--	--
6	EUT(Base) "CONTROLLER" / EUT(Display)	YES	YES (1 pcs.)	3.5m
7	EUT(Display) "VIDEO IN" / No termination	YES	NO	1.0m
8	DC Power Cord (EUT / DC Power Supply)	NO	NO	3.2m
9	DC Power Cord (Telereader / DC Power Supply)	NO	NO	1.7m
10	AC Power Cord (DC Power Supply) with 2-pin plug	NO	NO	1.6m
11	Earth Cord (DC Power Supply)	NO	NO	1.4m

Detailed receiver portion:

1) Relation between Receiving Frequency, Local Frequency and Intermediate Frequency

No.	Receiving Frequency [MHz]	1st Local Frequency [MHz]	VCO Frequency [MHz]	2nd Local Frequency [MHz]
1	118.000 - 135.995	133.650 - 151.645	133.650 - 151.645	15.200
2	136.000 - 174.000	120.350 - 158.350	120.350 - 158.350	15.200
3	430.000 - 450.000	383.950 - 403.950	383.950 - 403.950	45.600

2) Respective Intermediate Frequency

No.	Receiving Frequency [MHz]	1st IF [MHz]	2nd IF [MHz]
1	118.000 - 135.995	15.65 (Upper)	0.45 (Lower)
2	136.000 - 174.000	15.65 (Lower)	0.45 (Lower)
3	430.000 - 450.000	46.05 (Lower)	0.45 (Lower)

3) The highest Local Frequency : 403.950 MHz

4) Type of Antenna Terminal : M-Type connector / 50Ω (Unbalanced)

5) Receiving Mode : FM

Test system:

The EUT consists of a Base Unit and a Display Unit.

The Base Unit has an ANT terminal, a DATA port, a MIC port, a CONTROLLER port, a 144MHz SP port, a 440MHz SP port and a DC POWER port.

The Display Unit has a VIDEO IN port and a CONTROLLER port.

Special accessories:

The controller cable with a ferrite core is an exclusive use of one as the special accessory of which is defined §15.27 in FCC rule.

The controller cable is to be marketed together with the EUT.

The used (generated) frequencies in the EUT:

Intermediate Frequency 1st IF : 15.650 MHz / 46.050 MHz
2nd IF : 0.450 MHz

PLL : 0.45 MHz, 15.2 MHz
CPU : 10.000 MHz, 12.288 MHz
NTSC/PAL VIDEO CHROMA : 3.579545 MHz
INVERTER : 26.258 MHz

Local Frequency : Refer to the top of this page.

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EUT Modification

- - No modifications were conducted by JQA to achieve compliance to applied levels.
- - To achieve compliance to applied levels, the following change(s) were made by JQA during the compliance test.

The modification(s) will be implemented in all production models of this equipment.

Applicant : N/A Date : N/A
Typed Name : N/A Position : N/A

Responsible Party

Responsible Party of Test Item(Product)

Responsible party :

Contact Person :

Signatory

TEST RESULTS

Conducted Emission 450 kHz - 30 MHz

The requirements are

● - KEPT ○ - NOT KEPT

Min. limit margin +28.3 dB at 15.65 MHz

Max. limit exceeding dB at MHz

Uncertainty of measurement results + 2.1 dB(2σ) - 2.1 dB(2σ)

Remarks: _____

Radiated Emission (Electric Field) 30 MHz - 1000 MHz

The requirements are

● - KEPT ○ - NOT KEPT

Min. limit margin +13.0 dB at 178.200 MHz

Max. limit exceeding dB at MHz

Uncertainty of measurement results + 4.1 dB(2σ) - 4.2 dB(2σ)

Remarks: _____

Antenna Conducted Power 30 MHz - 1000 MHz

The requirements are

● - KEPT ○ - NOT KEPT

Min. limit margin +13.0 dB at 383.950 MHz

Max. limit exceeding dB at MHz

Uncertainty of measurement results + 2.3 dB(2σ) - 2.3 dB(2σ)

Remarks: _____

SUMMARY

GENERAL REMARKS :

The EUT was tested according to the requirements of FCC Rules and Regulations Part 15 Subpart A and B (April 17, 1997) under the test configuration, as shown in page 14.

The conclusion for the test items of which are required by the applied regulation is indicated under the final judgement.

FINAL JUDGEMENT :

The "as received" sample;

- - fulfill the test requirements of the regulation mentioned on page 3.
- - fulfill the test requirements of the regulation mentioned on page 3, but with certain qualifications.
- - doesn't fulfill the test regulation mentioned on page 3.

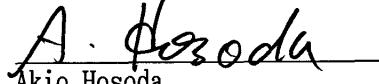
Begin of testing : January 27, 1999

End of testing : January 28, 1999

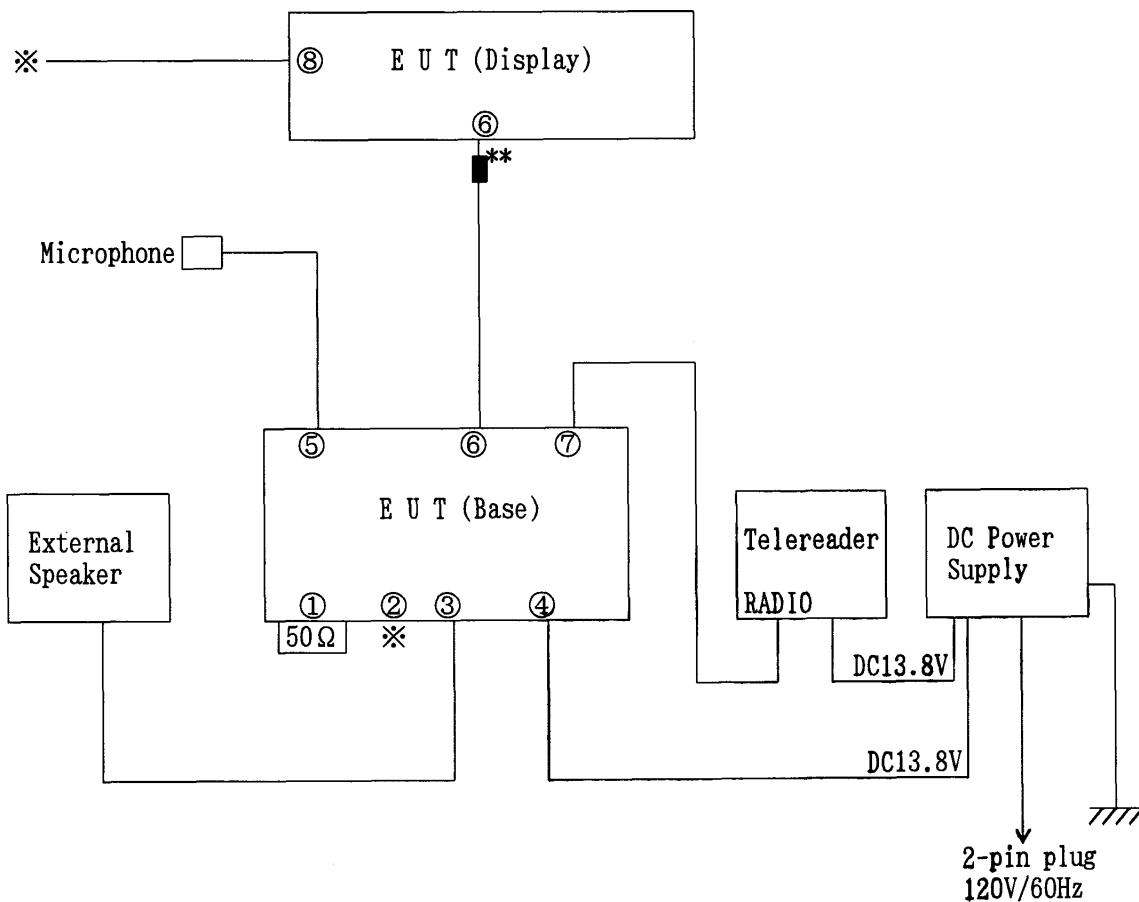
- JAPAN QUALITY ASSURANCE ORGANIZATION -

Approved Signatory :


Takashi Yamanaka
Manager
EMC Div.
JQA KITA-KANSAI Testing Center


Akio Hosoda
Project Manager
EMC Div.
JQA KITA-KANSAI Testing Center

Test System-Arrangement (Drawings)



Note)

※ - No termination	** - Applied Ferrite Core
① - ANT IN	⑤ - MIC
② - 144MHz SP	⑥ - CONTROLLER
③ - 440MHz SP	⑦ - DATA
④ - DC IN	⑧ - VIDEO IN

Preliminary Test and Test-setup(Drawings)

Conducted Emission 450 kHz - 30 MHz:

The preliminary test was performed according to the description of ANSI C63.4-1992 Sec.7.2.3 (Preliminary AC Powerline Conducted Emissions Tests) and Sec.6.2.1 (Tabletop Equipment Tests). The preliminary test was carried out to investigate the frequency of the emission that has the highest amplitude relative to the limits within normal operating modes, cable positions, and a typical system configuration. In order to find out to the maximum emission, the preliminary test and a final test were performed in accordance with the following steps.

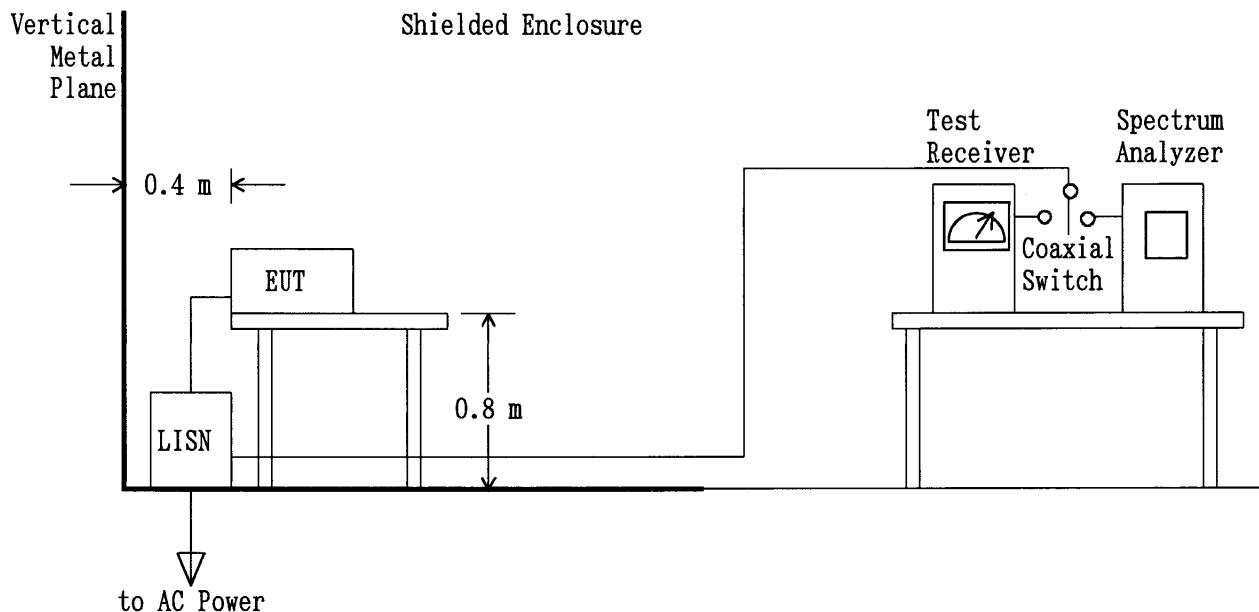
Step 1: One operation mode of the test system was setting.

Step 2: Using both of a spectrum analyzer and a test receiver, the emission's circumstance from the system was monitored in one of ten divided frequency bands of the specified frequency range (450 kHz - 30 MHz). The maximum emission in the band was found by changing the typical cable positions or cable manipulation under a typical system configuration and by selecting of current-carrying conductor. The level and the frequency at the one point which are regarded as relative high emission in the band was measured and recorded. This step was repeated until the ending frequency band.

Step 3: Return to step 1, if the other operation mode was possible to be setting.

Step 4: Based on the collected results, the operation mode produced the maximum emission was selected. The final test on the selected operation mode was performed. But if it was difficult to select the operation mode, the final tests on all operation modes were performed.

Step 5: Based on the same data, as result of the final measurement, at the worst point that has the highest amplitude relative to the limit the repeatability of the worst was reconfirmed. The photographs of the test system setup on the worst point were taken and recorded.



Radiated Emission (Electric Field) 30 MHz - 1000 MHz:

The preliminary test was performed according to the description of ANSI C63.4-1992 Sec.8.3.1.1 (Preliminary Radiated Emissions Tests) and Sec.6.2.1 (Tabletop Equipment Tests).

The preliminary test was carried out to investigate the frequency of the emission that has the highest amplitude relative to the limits within normal operating modes, cable positions, and a typical system configuration. In order to find out to the maximum emission, the preliminary test and a final test were performed in accordance with the following steps.

Step 1: One operation mode of the test system was setting.

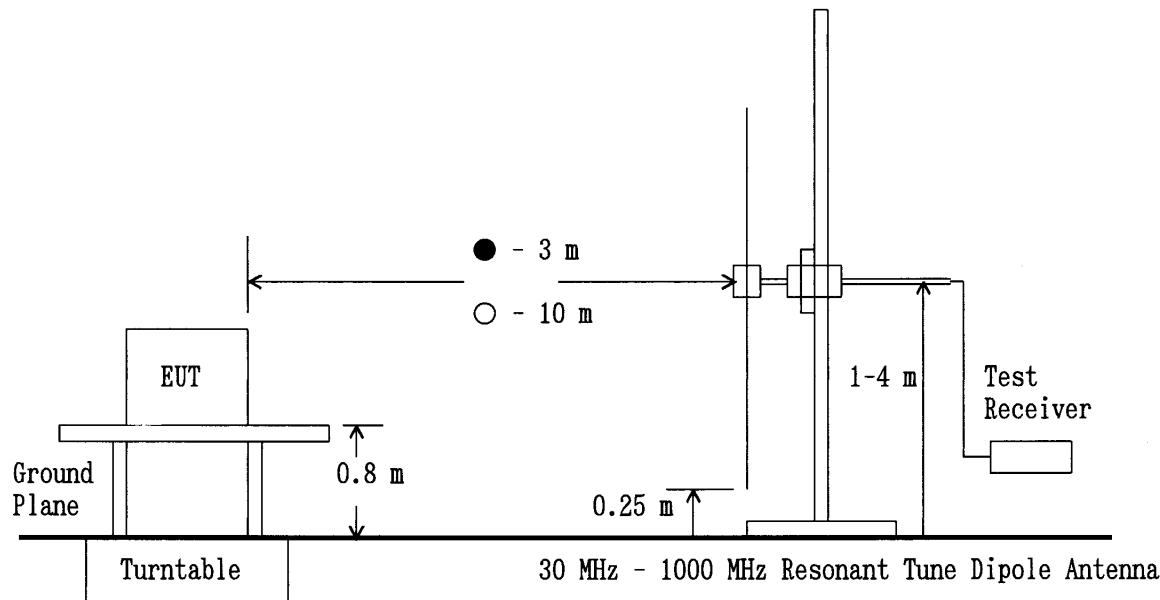
Step 2: Using a test receiver and a test antenna probe, the significant frequency of the emission's circumstance from the test system were investigated. These data were recorded every one of 22 divided bands in the specified frequency band (30 MHz - 1000 MHz).

Step 3: Using a test receiver and a resonant tuned dipole antenna, the emission's circumstance from the test system was measured in accordance with ANSI C63.4-1992 Sec.8.3.1.2 (Final Radiated Emissions Tests) at each frequency which was found the higher emission referred to level vs. frequency on the list and which was measured by the resonant tuned dipole antenna. The maximum emission was found by changing the cable positions or cable manipulation under a typical system configuration.

Step 4: Return to step 1, if the other operation mode was possible to be setting.

Step 5: The worst result was reported arranging data of which was obtained and performed by one or plural operation modes as the final test.

At the worst point that has the highest amplitude relative to the limit the repeatability of the level was reconfirmed. The photographs of the tests system setup on the worst point were taken and recorded.



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Antenna Conducted Power 30 MHz - 1000 MHz:

The test was performed according to the description of ANSI C63.4-1992 Sec.12.1.5 (Antenna-Conducted Power Measurements).



Mains terminal Disturbance Measurement
 Scanning Receiver

Tuning Frequency : 144.000 MHz

Test Date: January 28, 1999
 Temp.: 21 °C ; Humi.: 34 %

Frequency [MHz]	Correction Factor [dB]	Meter Readings [dB(μV)]			Limits [dB(μV)]	Results [dB(μV)]		Margin [dB]	Remarks (Note 2)
		VA-QP	VA-AV	VB-QP		QP	AV		
0.45	0.1	< 10.0	-	< 10.0	-	48.0	< 10.1	-	>+37.9 A
1.00	0.1	< 10.0	-	< 10.0	-	48.0	< 10.1	-	>+37.9 A
2.50	0.2	< 10.0	-	< 10.0	-	48.0	< 10.2	-	>+37.8 A
5.00	0.4	< 10.0	-	< 10.0	-	48.0	< 10.4	-	>+37.6 A
9.61	0.5	19.0	-	18.0	-	48.0	19.5	-	+28.5 A
12.29	0.6	17.0	-	16.0	-	48.0	17.6	-	+30.4 A
15.65	0.7	19.0	-	19.0	-	48.0	19.7	-	+28.3 A
19.53	0.8	< 10.0	-	< 10.0	-	48.0	< 10.8	-	>+37.2 A
24.58	0.9	16.0	-	15.0	-	48.0	16.9	-	+31.1 A
28.66	0.9	< 10.0	-	< 10.0	-	48.0	< 10.9	-	>+37.1 A

Sample of calculated result at 15.65 MHz, as the Minimum Margin point:

Correction Factor = 0.7 dB

+) Meter Reading = 19.0 dB(μV)

Result = 19.7 dB(μV)

Minimum Margin : 48.0 - 19.7 = 28.3(dB)

The point shown on " " is the Minimum Margin Point.

Note 1:

1. The correction factors includes the LISN insertion loss and the cable loss.

Remarks:

Note 2	Detector Function	IF Bandwidth
A	CISPR QP	9 kHz
B	Average	10 kHz

Tester Signature : A. Hosoda

Type Name : Akio Hosoda

Electromagnetic Radiation Disturbance Measurement
 Scanning Receiver

Test Date: January 27, 1999
 Temp.: 12 °C ; Humi.: 40 %

Tuning range : 118.000 MHz - 135.995 MHz

Frequency to which tuned [MHz]	Measured Frequency [MHz]	Correction Factor [dB(1/m)]	Meter Readings [dB(μV)]	Pola- rity	Limits [dB(μV/m)]	Results [dB(μV/m)]	Margin [dB]	Remarks (Note 2)
118.000	133.650	13.6	8.0	V	43.5	21.6	+21.9	A
	267.300	20.7	< 0.0	-	46.0	< 20.7	>+25.3	A
	400.950	25.4	< -5.0	-	46.0	< 20.4	>+25.6	A
	534.600	28.8	< -5.0	-	46.0	< 23.8	>+22.2	A
	668.250	31.5	< -5.0	-	46.0	< 26.5	>+19.5	A
	801.900	34.0	<-10.0	-	46.0	< 24.0	>+22.0	A
	935.550	36.2	<-10.0	-	46.0	< 26.2	>+19.8	A
127.000	142.650	14.3	6.0	V	43.5	20.3	+23.2	A
	285.300	21.5	< 0.0	-	46.0	< 21.5	>+24.5	A
	427.950	26.1	< -5.0	-	46.0	< 21.1	>+24.9	A
	570.600	29.6	< -5.0	-	46.0	< 24.6	>+21.4	A
	713.250	32.4	<-10.0	-	46.0	< 22.4	>+23.6	A
	855.900	34.9	<-10.0	-	46.0	< 24.9	>+21.1	A
	998.550	37.2	<-10.0	-	54.0	< 27.2	>+26.8	A
135.995	151.645	14.9	10.0	V	43.5	24.9	+18.6	A
	303.290	22.1	< -5.0	-	46.0	< 17.1	>+28.9	A
	454.935	26.9	< -5.0	-	46.0	< 21.9	>+24.1	A
	606.580	30.3	< -5.0	-	46.0	< 25.3	>+20.7	A
	758.225	33.3	<-10.0	-	46.0	< 23.3	>+22.7	A
	909.870	35.7	<-10.0	-	46.0	< 25.7	>+20.3	A

Tuning range : 136.000 MHz - 174.000 MHz

Frequency to which tuned [MHz]	Measured Frequency [MHz]	Correction Factor [dB(1/m)]	Meter Readings [dB(μV)]	Polarity	Limits [dB(μV/m)]	Results [dB(μV/m)]	Margin [dB]	Remarks (Note 2)
136.000	120.350	12.6	13.0	H	43.5	25.6	+17.9	A
	240.700	19.6	< 0.0	-	46.0	< 19.6	>+26.4	A
	361.050	24.1	< -5.0	-	46.0	< 19.1	>+26.9	A
	481.400	27.5	< -5.0	-	46.0	< 22.5	>+23.5	A
	601.750	30.2	< -5.0	-	46.0	< 25.2	>+20.8	A
	722.100	32.6	<-10.0	-	46.0	< 22.6	>+23.4	A
	842.450	34.7	<-10.0	-	46.0	< 24.7	>+21.3	A
	962.800	36.6	<-10.0	-	54.0	< 26.6	>+27.4	A
155.000	139.350	14.1	7.0	H	43.5	21.1	+22.4	A
	278.700	21.2	< 0.0	-	46.0	< 21.2	>+24.8	A
	418.050	25.9	< -5.0	-	46.0	< 20.9	>+25.1	A
	557.400	29.3	< -5.0	-	46.0	< 24.3	>+21.7	A
	696.750	32.1	< -5.0	-	46.0	< 27.1	>+18.9	A
	836.100	34.5	<-10.0	-	46.0	< 24.5	>+21.5	A
	975.450	36.8	<-10.0	-	54.0	< 26.8	>+27.2	A
	174.000	158.350	15.3	V	43.5	28.3	+15.2	A
	316.700	22.6	< -5.0	-	46.0	< 17.6	>+28.4	A
	475.050	27.4	< -5.0	-	46.0	< 22.4	>+23.6	A
	633.400	30.9	< -5.0	-	46.0	< 25.9	>+20.1	A
	791.750	33.8	<-10.0	-	46.0	< 23.8	>+22.2	A
	950.100	36.4	<-10.0	-	46.0	< 26.4	>+19.6	A

Tuning range : 430.000 MHz - 450.000 MHz

Frequency to which tuned [MHz]	Measured Frequency [MHz]	Correction Factor [dB(1/m)]	Meter Readings [dB(μV)]	Polarity	Limits [dB(μV/m)]	Results [dB(μV/m)]	Margin [dB]	Remarks (Note 2)
430.000	383.950	24.9	5.0	H	46.0	29.9	+16.1	A
	767.900	33.4	<-10.0	-	46.0	< 23.4	>+22.6	A
440.000	393.950	25.1	2.0	H	46.0	27.1	+18.9	A
	787.900	33.7	<-10.0	-	46.0	< 23.7	>+22.3	A
450.000	403.950	25.4	4.0	H	46.0	29.4	+16.6	A
	807.900	34.1	<-10.0	-	46.0	< 24.1	>+21.9	A

Other Disturbance Frequency

Frequency [MHz]	Correction Factor [dB(1/m)]	Meter Readings [dB(μV)]		Limits [dB(μV/m)]	Results [dB(μV/m)]		Margin [dB]	Remarks (Note 2)
		Hori.	Vert.		Hori.	Vert.		
49.2	4.2	15.0	16.0	40.0	19.2	20.2	+19.8	A
86.3	9.4	15.0	<10.0	40.0	24.4	< 19.4	+15.6	A
105.9	11.4	11.0	< 3.0	43.5	22.4	< 14.4	+21.1	A
159.8	15.5	7.0	< 0.0	43.5	22.5	< 15.5	+21.0	A
178.2	16.5	14.0	5.0	43.5	30.5	21.5	+13.0	A
215.1	18.5	9.0	< 0.0	43.5	27.5	< 18.5	+16.0	A
262.4	20.6	12.0	3.0	46.0	32.6	23.6	+13.4	A
314.9	22.6	6.0	<-5.0	46.0	28.6	< 17.6	+17.4	A
446.1	26.6	3.0	<-5.0	46.0	29.6	< 21.6	+16.4	A
524.9	28.6	<-5.0	<-5.0	46.0	< 23.6	< 23.6	>+22.4	A

Sample of calculated result at 178.2 MHz, as the Minimum Margin point:

Corretion Factor = 16.5 dB(1/m)

+)Meter Reading = 14.0 dB(μV)

Result = 30.5 dB(μV/m)

Minimum Margin : 43.5 - 30.5 = 13.0(dB)

The point shown on " " is the Minimum Margin Point.

Note 1:

- 1)The highest frequency generated or used in the EUT: 403.950 MHz
- 2)The upper frequency of measurement range : 1000 MHz
- 3)The spectrum was scanned 30 MHz to 1000 MHz and all emissions not reported were more than 20dB below the applied limits.
- 4)Correction Factor : Antenna Factor[dB(1/m)] + Cable Loss[dB]

Remarks:

Note 2	Detector Function	IF Bandwidth
A	CISPR QP	120 kHz
B	Average	120 kHz
C	Average	12 kHz
D	Average	7.5 kHz

Tester Signature : A. Hosoda

Type Name : Akio Hosoda

Antenna Terminal Disturbance Voltage Measurement
 Scanning Receiver

Test Date: January 28, 1999
 Temp.: 23 °C ; Humi.: 29 %

Tuning range : 118.000 MHz - 135.995 MHz

Frequency to which tuned [MHz]	Measured Frequency [MHz]	Correction Factor [dB]	Meter Readings [dB(µV)]	Limits at 50Ω [dB(µV)]	Results [dB(µV)]	Margin [dB]	Remarks (Note 2)
118.000	133.650	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	267.300	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	400.950	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	534.600	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	668.250	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	801.900	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	935.550	10.0	< 10.0	50.0	< 20.0	>+30.0	A
127.000	142.650	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	285.300	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	427.950	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	570.600	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	713.250	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	855.900	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	998.550	10.0	< 10.0	50.0	< 20.0	>+30.0	A
135.995	151.645	10.0	10.0	50.0	20.0	+30.0	A
	303.290	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	454.935	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	606.580	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	758.225	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	909.870	10.0	< 10.0	50.0	< 20.0	>+30.0	A

Tuning range : 136.000 MHz - 174.000 MHz

Frequency to which tuned [MHz]	Measured Frequency [MHz]	Correction Factor [dB]	Meter Readings [dB(µV)]	Limits at 50Ω [dB(µV)]	Results [dB(µV)]	Margin [dB]	Remarks (Note 2)
136.000	120.350	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	240.700	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	361.050	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	481.400	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	601.750	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	722.100	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	842.450	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	962.800	10.0	< 10.0	50.0	< 20.0	>+30.0	A
155.000	139.350	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	278.700	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	418.050	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	557.400	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	696.750	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	836.100	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	975.450	10.0	< 10.0	50.0	< 20.0	>+30.0	A
174.000	158.350	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	316.700	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	475.050	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	633.400	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	791.750	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	950.100	10.0	< 10.0	50.0	< 20.0	>+30.0	A

Tuning range : 430.000 MHz - 450.000 MHz

Frequency to which tuned [MHz]	Measured Frequency [MHz]	Correction Factor [dB]	Meter Readings [dB(µV)]	Limits at 50Ω [dB(µV)]	Results [dB(µV)]	Margin [dB]	Remarks (Note 2)
430.000	383.950	10.0	27.0	50.0	37.0	+13.0	A
	767.900	10.0	< 10.0	50.0	< 20.0	>+30.0	A
440.000	393.950	10.0	< 10.0	50.0	< 20.0	>+30.0	A
	787.900	10.0	< 10.0	50.0	< 20.0	>+30.0	A
450.000	403.950	10.0	13.0	50.0	23.0	+27.0	A
	807.900	10.0	11.0	50.0	21.0	+29.0	A

Sample of calculated result at 383.950 MHz, as the Minimum Margin point:

Correction Factor = 10.0 dB
+ Meter Reading = 27.0 dB(μV)
Result = 37.0 dB(μV)

Minimum Margin : 50.0 - 37.0 = 13.0(dB)

The point shown on " " is the Minimum Margin Point.

Conversion of applied limits (refer to § 15.111(a))

$$50.0 \text{ [dB(μV)]} = 20\log\{\sqrt{2[nW] \times 10^{-9}} \times 50[\Omega] \times 10^6\}$$

Note 1:

- 1)The highest frequency generated or used in the EUT: 403.950 MHz
- 2)The upper frequency of measurement range : 1000 MHz
- 3)The spectrum was scanned 30 MHz to 1000 MHz and all emissions not reported were more than 20dB below the applied limits.
- 4)Correction Factor = 10dB Pad Attenuator (dB)

Remarks:

Note 2	Detector Function	IF Bandwidth
A	CISPR QP	120 kHz
B	Average	120 kHz
C	Average	12 kHz
D	Average	7.5 kHz

Tester Signature : A. Hosoda

Type Name : Akio Hosoda