JAPAN QUALITY ASSURANCE ORGANIZATION
KITA-KANSAI TESTING CENTER
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EMC EMISSION – TEST REPORT

JQA APPLICATION No. : KL8080393

Mode 1 /Type No. : IC-T7H

Name of Product : Receiver portion of Dual Band FM Receiver

FCC ID : AFJ IC-T7H

Applicant : ICOM Corporation

Address : 1-6-19, Kami-Kuratsukuri, 547-0004, JAPAN

Manufacturer : ICOM Corporation

Address : 1-6-19, Kmi-Kuratsukuri, 547-0004, JAPAN

Final Judgement : Passed

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

THE TEST RESULTS only responds to the test sample. It is not allowed to copy this report even partly without the allowance of the JQA Kita-Kansai Testing Center.

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

NVLAP®

LAB CODE: 200191-o

DIRECTORY

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TEST REGULATION

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

● - Superheterodyne Receiver

Test procedure:

Conducted and radiated emission test were performed according to the procedures in ANSIC63.4-1992.

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 Lavoratory Accreditation Program for satisfactory compliance established in Title 15, Part 285 Code of Federal Regurations.
NAVLAP Lab Code: 200191-o

3) Average Measurement Method
FCC filing No. : 950523A 1300F2

Description of the Equipment Under Test (EUT):

1) Name	:	Receiver portion of DUAL BAND FM TRANSCEIVER
2) Model/Type No.	:	IC-T7H
3) Product Type	:	Pre-Production(S/N 00006)
4) Category	:	Doule Conversion Superheterodyne Receiver
5) EUT Authorization	:	0 - Verification ● - Notification 0 - Certification
6) Highest frequency used/generated	:	424.85 MHz
4) Tunig Freqency	:	118.0 MHz - 174.0 MHz/400.0 MHz - 470.0 MHz(Refer to page 9)
4) Accessories	:	VHF/UHF ANTENNA, AC ADAPTER
7) Power Rating	:	DC13.5V(AC120V,60Hz)/Ni-Cd Battery 1.2Vx8(AC Adapter:BC-110A)

Definitions for symbols used in this test report:

● - Black box indicates that the listed condition, standard or equipment is applicable for this Report.
0 - 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
0 - Shielded room
0 - On metal plane of open site

Used test instruments and sites:

	Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
0	ESH 3	A- 1		
●	ESH 2	A - 2	December, 1997	1 Year
0	ESH 2	A - 3		
●	KNW-407	D - 6	February, 1998	1 Year
0	KNW-242	D - 7		
0	KNW-408	D - 14		
0	KNW-341C	D - 13		
0	IEEE	D - 1		
0	ESH2-Z5	D - 10		
0	ESH3-Z5	D - 12		
0	ESH2-Z3	D - 17		
0	8568B	A - 10		
0	8566B	A - 13		
0	8593A	A - 15		
●	6062A	B - 44	October , 1997	1 Year
0	Cable	H - 5		
●	Cable	H - 8	February, 1998	1 Year

Environmental conditions:

Temperature : 21 ℃ Humidity: 64 %

The measurement of the Radiated Emission (Electric Field)
was performed under the terminated condition with a resistive termination, 50Ω, as radiation from chassis 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 l-Chome, Minoh-Shi, Osaka 562-0027 Japan
0 - 1st site (3 meters)
● - 2nd site (3 meters)
KAMEOKA EMC Branch
9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto 621-0126 Japan
0 - 3 meters
0 - 10 meters

Validation of Site Attenuation:

1) Last Confirmed Date: December 8, 1997
2) Interval : 1 Year

Used test instruments:

	Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
0	ESV/ESV-Z3	A - 7 / A - 17		
●	ESV/ESV-Z3	A - 6 / A - 18	December, 1997	1 Year
0	ESV/ESV-Z3	A - 5 / A - 16		
0	ESV/ESV-Z3	A - 4 / A - 20		
0	ESV/ESV-Z3	A - 8 / A - 19		
●	KBA-511A	c - 13	December, 1997	1 Year
●	KBA-611	c - 19	December, 1997	1 Year
●	Cable	H - 6	November, 1997	1 Year
○	-			

Environmental conditions:

Temperature : 31 ℃ Humidity: 29 %

The measurement of the Radiated Emission (Electric Field)
was performed in horizontal and vertical polarization, in the frequency range of 1 GHz - 2.2 GHz, in the following test site.

Test location:

KITA-KANSAI Testing Center
7-7, Ishimaru 1-Chome, Minoh-Shi, Osaka 562-0027 Japan
0 - 1st site (3 meters)
0 - 2nd site (3 meters)
KAMEOKA EMC Branch
9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto 621-0126 Japan
0 - 3 meters
0 - 10 meters

Used test instruments:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
0 - 8566B	A - 13		
0 - 8593A	A - 15		
0 - 4T-10	D - 73		
0 - 4T-10	D - 74		
0 - WJ-6611-513	A - 23		
0 - WJ-6882-824	A - 21		
0 - 91888-2	c - 41-1		
0 - 91889-2	c - 40		
0 - 94613-1	c - 40		
0 - Cable	H - 9		
0 - Cable	H - 10		
○ -			

Setting of the spectrum analyzer:

RES B.W : 1 MHz Video B.W : 1 MHz
SCALE : LIN Sweep Time: 20 msec.

Environmental conditions: Temperature : _____℃ Humidity: _____%

The measurement of the Antenna-Conducted Power
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
0 - Anechoic Chamber
KAMEOKA EMC Branch
9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto 621-0126 Japan
0 - Shielded room

Used test instruments:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
● - ESV/ESV-Z3	A - 7 / A - 1 7	December, 1997	1 Year
0 - ESV/ESV-Z3	A - 6 / A - 18		
0 - ESV/ESV-Z3	A - 5 / A - 1 6		
0 - ESV/ESV-Z3	A - 4 / A - 20		
0 - ESV/ESV-Z3	A - 8 / A - 19		
0 - 8566B	A - 13		
● - 4T-10	D - 73	May, 1998	1 Year

Environmental conditions:

Temperature : 21 ℃ Humidity: 64 %

CONFIGURATION OF EUT

The Equipment Under Test (EUT) consists of:

Description	Applicant (Manufacturer)	Model No. (Serial No.)	FCC ID
DUAL BAND FM TRANSCEIVER	ICOM INCORPORATED (ICOM INCORPORATE)	IC-T7H (00006)	AFJ IC-T7H
VHF/UHF ANTENNA	ICOM INCORPORATED (ICOM INCORPORATED)	FA-1443B (---)	N/A
BATTERY CASE	ICOM INCORPORATED (ICOM INCORPORATED)	BP- 173 (---)	N/A
AC ADAPTER	ICOM INCORPORATED (ICOMINCORPORATED)	BC-110A (---)	N/A

The measurement was carried out with the following equipment connected:

Description	Applicant (Manufacturer)	Model No. (Serial No.)	FCC ID
SPEAKER MICROPHONE	ICOM INCORPORATED (ICOM INCORPORATED)	HM-75A (---)	N/A

None

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

No.	Cable	Shielded	Ferrite Core	Length
1	EUT"MIC/SP"/Speaker Microphone	NO	NO	0.4m
2	EUT"CHARGER"/AC Adapter(DC Power Cord with 2-pin plug)	NO	NO	1.9m

Detailed receiver portion:

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

No.	Receiving Frequency Band [MHz]	1st Local Frequency [MHz]	2nd Local Frequency [MHz]
1	118.000 - 174.000	163.150 - 219.150(F+IF)	45.600
2	400.000 - 470.000	354.850 - 424.850(F+IF)	45.600

1st IF : 45.150 MHz / 2nd IF : 0.45 MHz

2) The highest generated frequency : 424.850 MHz

3) Type of Antenna :

BNC Connector / 50 Ω (Unbalanced)

4) Receiving Mode :

FM

5) The used(generated) frequencies used the EUT :

CPU : 5.039 MHz
PLL : 15.200 MHz
Local frequency : Refer to above Item 1)

EUT Modification

● - No modifications were conducted by JQA to achive compliance to the applied limits.

0 - To achieve compliance to the applied limits, 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 : _____ Date :

Typed Name : Position :

Responsible Party

Responsible Party of Test Item(Product)

Responsibe party :

Contact Person : _____
Signatory

TEST RESULTS

Conducted Emission 450 kHz - 30 MHz

The requirements are ● - KEPT ○ - NOT KEPT

Min. limit margin More than 37.1 dB t 29.90 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 - 1.0 GHz

The requirements are ● - KEPT ○ - NOT KEPT

Min. limit margin 9.5 dB at 657.45 MHz

Max. limit exceeding _____ dB at _____ MHz

Uncertainty of measurement results +4.9 dB(2σ) -5.0 dB(2σ)

Remarks: _____

Antenna-Conducted Power 30 MHz - 1.0 GHz

The requirements are ● - KEPT ○ - NOT KEPT

Min. limit margin 15.0 dB at 657.45 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 13.
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.

0 - fulfill the test requirements of the regulation mentioned on page 3, but with certain qualifications.

0 - doesn't fulfill the test regulation mentioned on page 3.

Begin of testing : September 9, 1998

End of testing : September 9, 1998

- JAPAN QUALITY ASSURANCE ORGANIZATION -

T. Yamanaka

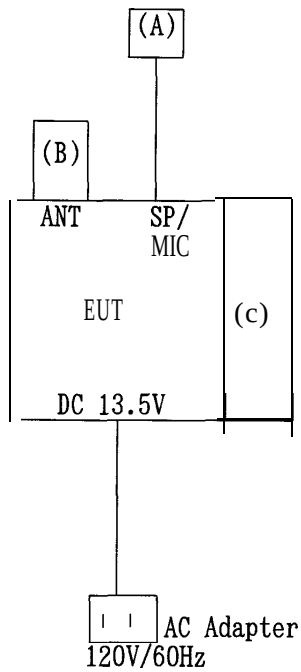
Takashi Yamanaka
Manager
EMC Div.
JQA KITA-KANSAI Testing Center

Approved Signatory :

A. Hosoda

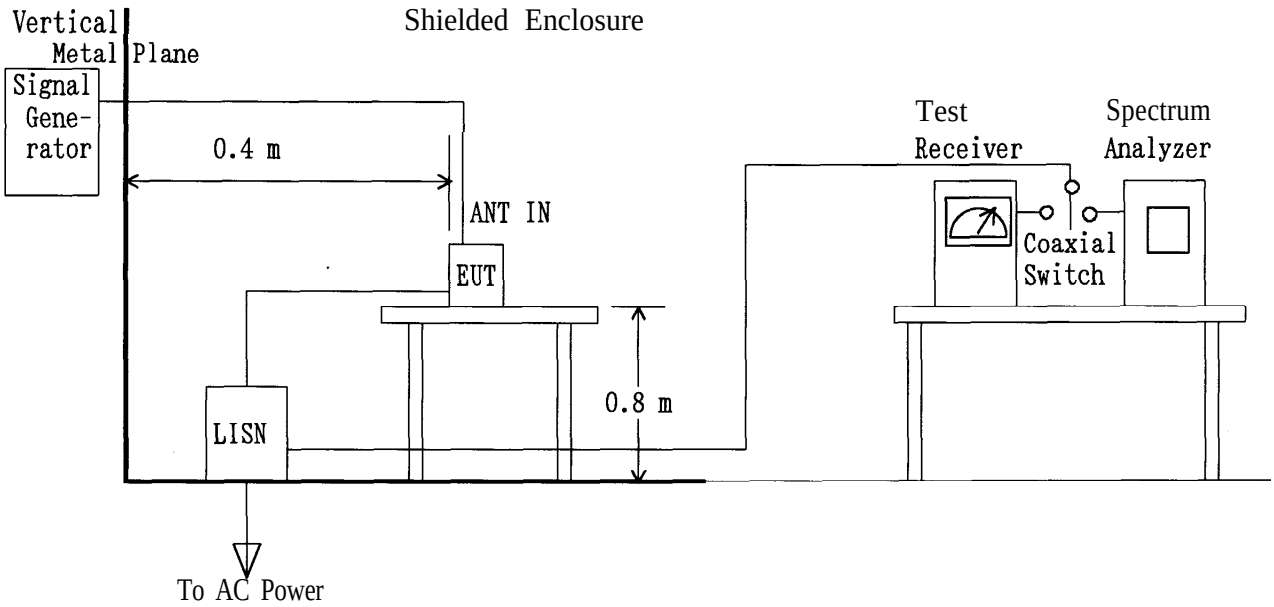
Akio Hosoda
Project Manager
EMC Div.
JQA KITA-KANSAI Testing Center

Test System-Arrangement (Drawings)

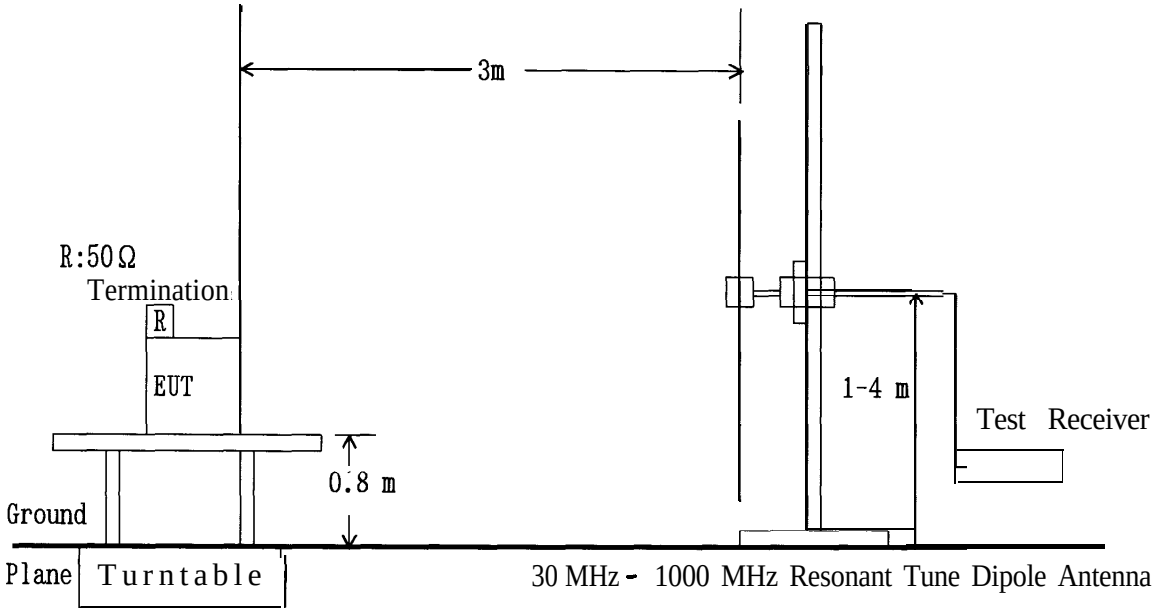


(A) Speaker/Microphone
(B) Antenna terminal (BNC-type/50 Ω unbalanced)
(C) Battery Pack(Ni-Cd Battery 9.6V)

Test-setup(Drawings)

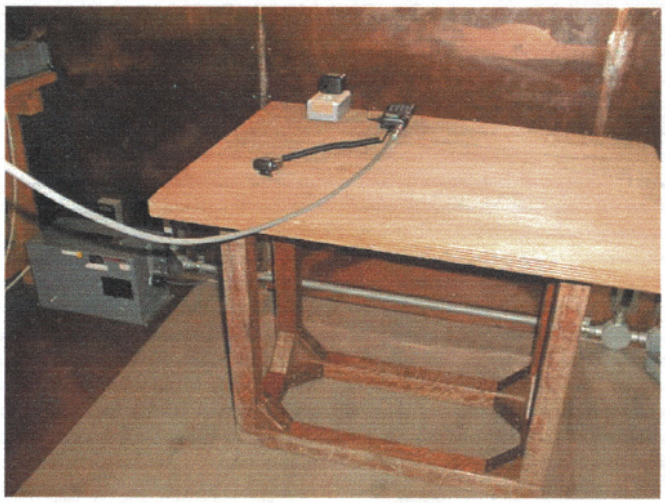


Radiated Emission (Electric Field) 30 MHz - 1000 MHz:

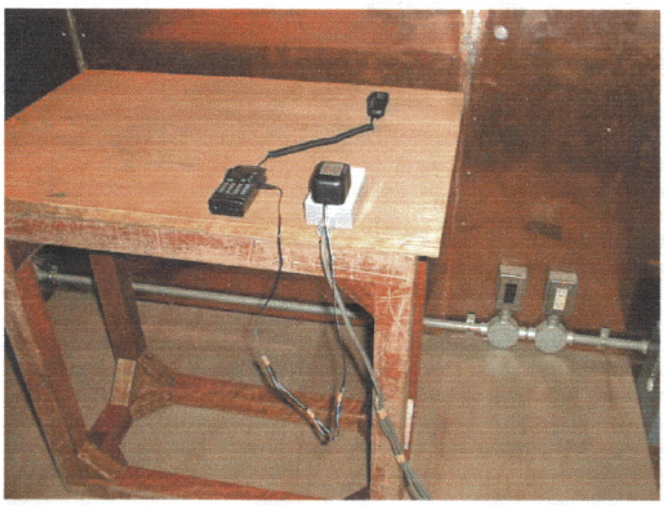


Test-Setup (Photographs) at worst case

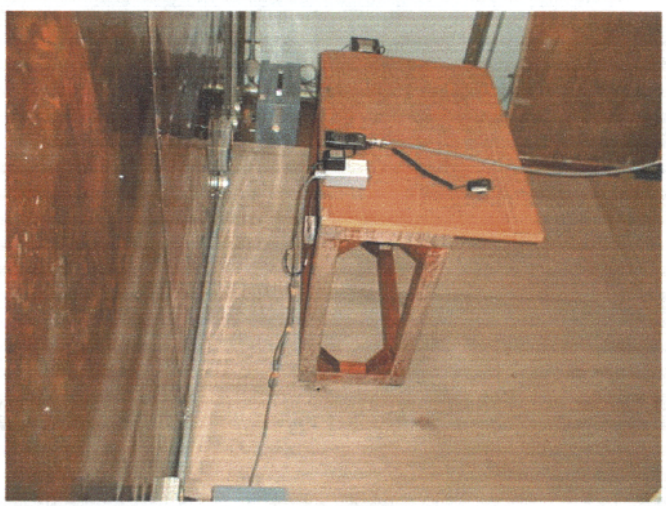
Conducted Emission 450kHz - 30MHz:



Front View

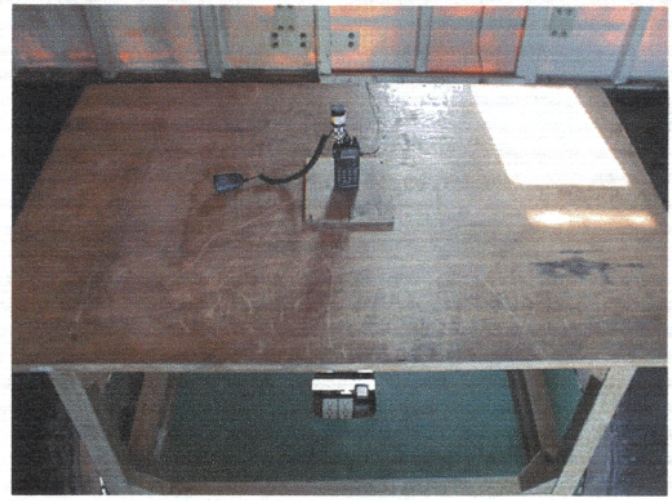


Rear View

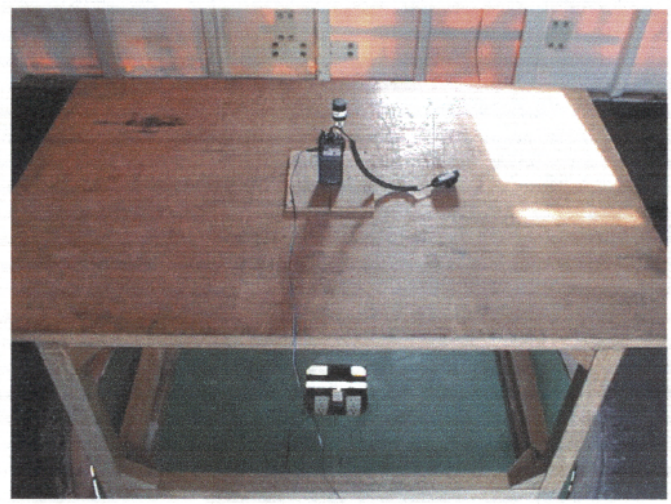


Side View

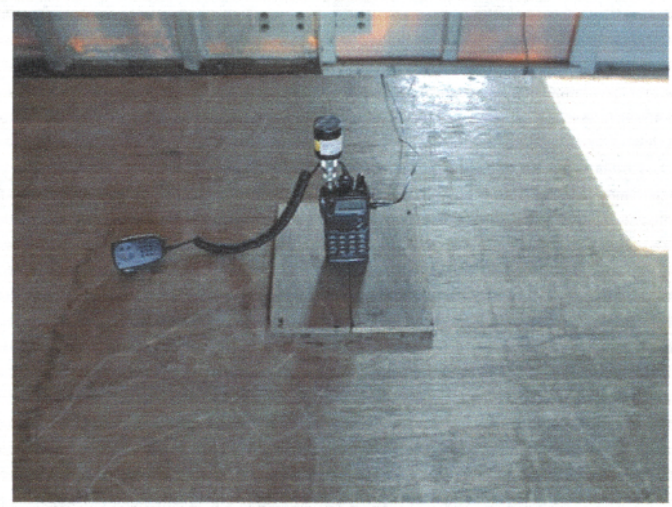
Radiated Emission 30MHz - 1000MHz:



Front View



Rear View



Close-up of EUT

Mains terminal Disturbance Measurement

Test Date: September 9, 1998
Temp. : 21°C; Hum.: 64%

Frequency to which tuned : 146.00 MHz and 435.00 MHz
Operating Condition : Receiving and Charging

Frequency [MHz]	Correction Factor [dB]	Meter Readings dB(uV) VA-QP	VA-AV	VB-Ql'	VB-AV	Limits dB(uV)	Results dB(uV) QP	AV	Remarks (Note 2)
0.45	0.1	<10.0	-	<10.0		48.0	<10.1	-	A
1.00	0.1	<10.0	-	<10.0	-	48.0	<10.1	-	A
3.00	0.3	<10.0	-	<10.0	-	48.0	<10.3	-	A
5.00	0.4	<10.0	-	<10.0	-	48.0	<10.4	-	A
7.55	0.4	<10.0	-	<10.0	-	48.0	<10.4	-	A
10.00	0.5	<10.0	-	<10.0	-	48.0	<10.5	-	A
13.30	0.6	<10.0	-	<10.0	-	48.0	<10.6	-	A
22.00	0.8	<10.0	-	<10.0	-	48.0	<10.8	-	A
29.90	0.9	<10.0	-	<10.0	-	48.0	<10.9	-	A

Sample of calculated result at 29.90 MHz (Tuning Frequency, l46.0 MHz), as the Minimum Margin point:

Corr. Factor = 0.9 dB
+)Meter Reading =<10.0 dB(uV)
Result =<10.9 dB(uV)

Minimum Margin : 48.0 -<10.9 =>37.1(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	9KHz
B	Average	10KHz

Tester Signature : A. Hosoda

Type Name : Akio Hosoda

Electromagnetic Radiation Disturbance Measurement (Chassis Radiation)

Test Date: September 9, 1998
Temp. : 31℃, Hum. : 29%

Frequency tuned [MHz]	Frequency emmision [MHz]	Correction Factor dB(1/m)	Meter reading at 3m dB(uV)	Polarization	Limits dB(uv/m)	Field Strength at 3m dB(uV/m)	Remarks (Note2)
Tuning Range : 118.000 MHz - 174.000 MHz							
118.000	163.150	15.0	< 0.0		43.5	< 15.0	A
	326.300	21.8	< 0.0		46.0	< 21.8	A
	489.450	26.3	6.0	V	46.0	32.3	A
	652.600	29.4	< 0.0		46.0	< 29.4	A
	815.750	32.1	< 0.0		46.0	< 32.1	A
	978.900	34.6	< 0.0		54.0	< 34.6	A
146.000	191.150	16.5	< 0.0		43.5	< 16.5	A
	382.300	23.5	< 0.0		46.0	< 23.5	A
	573.450	28.0	1.0	H	46.0	29.0	A
	764.600	31.2	< 0.0		46.0	< 31.2	A
	955.750	34.2	< 0.0		46.0	< 34.2	A
174.000	219.150	17.8	< 0.0		46.0	< 17.8	A
	438.300	25.0	< 0.0		46.0	< 25.0	A
	657.450	29.5	7.0	H	46.0	36.5	A
	876.600	32.9	< 0.0		46.0	< 32.9	A
Tuning Range : 400.000 MHz - 470.000 MHz							
400.000	354.850	22.7	5.0	V	46.0	27.7	A
	709.700	30.3	< 0.0		46.0	< 30.3	A
435.000	389.850	23.8	4.0	V	46.0	27.8	A
	779.700	31.4	< 0.0		46.0	< 31.4	A
470.000	424.850	24.7	3.0	V	46.0	27.7	A
	849.700	32.5	< 0.0		46.0	< 32.5	A
2nd Local and Other Oscillator							
400.000	30.234	0.2	< 0.0		40.0	< 0.2	A
	30.400	0.2	< 0.0		40.0	< 0.2	A
	35.273	0.9	< 0.0	-	40.0	< 0.9	A
	40.312	2.0	< 0.0	-	40.0	< 2.0	A
	45.600	3.0	< 0.0	-	40.0	< 3.0	A
	60.800	5.7	< 0.0		40.0	< 5.7	A
	76.000	7.7	< 0.0	-	40.0	< 7.7	A

Sample of calculated result at 657.45 MHz(Tuning Frequency,174.0MHz), as the Minimum Margin Point:

Corretion Factor	=	29.5 dB(1/m)
+)Meter Reading	=	7.0 dB(uV)
Result	=	36.5 dB(uV/m)

Minimum Margin : 46.0 - 36.5 = 9.5(dB)
The point shown on "___" is the Minimum Margin Point.

Note 1:
l)The highest frequency generated or used in the EUT: 424.850 MHz
2)The upper frequency of measurement range : 1.0 GHz
3)The spectrum was scanned 30 MHz to 1.0 GHz and all emissions not reported were more than 20dB below the applied limits.

Remarks:

Note 2	Detector Function	IF Bandwidth
A	CISPR QP	120 KHz

Note 2	Detector Function	RES. B.W	V.B.W	Sweep Time	Span
B	Peak (SP)	1MHz	3MHz	20 msec	0 Hz
* c	Average(ESV)	1MHz(3MHZ)	3MHz	20 msec	0 Hz

( ):Setting of spectrum analyzer
*)For the avarage measurement method, it is made measurement using a test receiver, a step attenuator and a spectrum analyzer.

Tester Signature : A. Hosoda

Type Name : Akio Hosoda

Antenna-Conducted Power Measurement

Test Date: September 9, 1998
Temp. : 21°C; Hum.: 64%

Frequency tuned [MHz]	Frequency emmision [MHz]	Correction Factor dB	Meter Reading dB(uV)	Limits 2nW dB(uV)	Results dB(uV)	Remarks (Note2)
Tuning Range : 118.000 MHz - 174.000 MHz						
118.000	163.150	10.0	19.0	50.0	29.0	A
	326.300	10.0	< 10.0	50.0	< 20.0	A
	489.450	10.0	< 10.0	50.0	< 20.0	A
	652.600	10.0	18.0	50.0	28.0	A
	815.750	10.0	< 10.0	50.0	< 20.0	A
	978.900	10.0	14.0	50.0	24.0	A
146.000	191.150	10.0	19.0	50.0	29.0	A
	382.300	10.0	16.0	50.0	26.0	A
	573.450	10.0	17.0	50.0	27.0	A
	764.600	10.0	< 10.0	50.0	< 20.0	A
	955.750	10.0	16.0	50.0	26.0	A
174.000	219.150	10.0	< 10.0	50.0	< 20.0	A
	438.300	10.0	18.0	50.0	28.0	A
	657.450	10.0	25.0	50.0	35.0	A
	876.600	10.0	13.0	50.0	23.0	A
Tuning Range : 400.000 MHz - 470.000 MHz						
400.000	354.850	10.0	21.0	50.0	31.0	A
	709.700	10.0	16.0	50.0	26.0	A
435.000	389.850	10.0	< 10.0	50.0	< 20.0	A
	779.700	10.0	< 10.0	50.0	< 20.0	A
470 .	424.850	10.0	16.0	50.0	26.0	A
	849.700	10.0	< 10.0	50.0	< 20.0	A
2nd Local and Other Oscillator/						
400.000	30.234	10.0	< 10.0	50.0	< 20.0	A
	30.400	10.0	< 10.0	50.0	< 20.0	A
	35.273	10.0	< 10.0	50.0	< 20.0	A
	40.312	10.0	< 10.0	50.0	< 20.0	A
	45.600	10.0	< 10.0	50.0	< 20.0	A
	60.800	10.0	< 10.0	50.0	< 20.0	A
	76.000	10.0	< 10.0	50.0	< 20.0	A

Sample of calculated result at 657.450 MHz(Tuning Frequency, 174.0 MHz), as the Minimum Margin Point:

Correction Factor = 10.0 dB
+)Meter Reading = 25.0 dB(uV)
Result 35.0 dB(uV)

Minimum Margin : 50.0 - 35.0 =15.0(dB)
The point shown on "___ " is the Minimum Margin Point.

Note 1:
1)The highest frequency generated or used in the EUT: 424.850 MHz
2)The upper frequency of measurement range : 1.0 GHz
3)The spectrum was scanned 30 MHz to 1.0 GHz and all emissions not reported were more than 20dB below the applied limits. .

Remarks :

Note 2	Detector Function	IF Bandwidth
A	CISPR QP	120 KHz

Note 2	Detector Function	RES. B.W	V.B.W	Sweep Time	Span
B	Peak (SP)	100kHz	3ookHz	20 msec	1MHz
* C	Average (ESV)	1MHz(3MHZ)	3MHz	20 msec	0 Hz

( ):Setting of spectrum analyzer
*)For the avarage measurement method, it is made measurement using a test receiver, a step attenuator and a spectrum analyzer.

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