



TEST REPORT

REGULATION : FCC Part 2, 22, 74, 90, 90.210
 RSS-119 Issue 11

Applicant	Testing Laboratory
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Equipment type	Rack Mount Repaeter
Trademark	Vertex Standard
Model(s)	VXR-9000V-H
Serial No.	1L000010
FCC ID	K6610443250
IC CN and UPN	511B-10443250
Test Result	Complied
Report Number	JK11100006
Report issue date	November 02, 2011

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Approved by

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Tested by

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In Accordance with FCC Rules and Regulations, Volume II, Part 2 and 90

Sub-part 2.1033

(c)(1) Applicant and Manufacture Information	
APPLICANT	
Company	: Vertex Standard Co., Ltd.
Address	: 4-8-9, Nakameguro, Meguro-Ku, Tokyo 153-8645 Japan
Contact Person	: Shigematu Takahashi Engineering Division
MANUFACTURER	
Company	: Yaesu Musen Co., Ltd.
Address	: 43 Uturoda, Morijuku, Sukagawa, Fukushima, 962-0001 Japan
(c)(2) FCC ID	
FCC ID	: K6610443250
Model number	: VXR-9000V-H
Serial number	: 1L000010
(c)(3) Instruction Manual(S)	
Instruction manual(s)	: Please refer to attached Exhibits F
(c)(4) Type of Emission	
Emission Designation	: 16K0F3E(Wide) / 11K0F3E(Narrow)
(c)(5) Frequency range	
Frequency Range	: 150MHz to 174MHz (FCC) , and 148MHz to 174MHz (RSS)
(c)(6) Power Rating	
Output Power	: 50 to 100 W
Type	: Continuously Variable
(c)(7) Maximum Power Rating	
Output Power	: 100 W
(c)(8): Voltages & currents in all elements in final RF stage, including final transistor or solid-state device	
Collector Current, A	: 30 amps (Maximum)
Collector Voltage, Vdc	: 13.6 vdc
Supply Voltage, Vdc	: 13.6 vdc
Other Information	
Number of Channel	: Channel: 32 max.
Maximum Deviation	: 5 kHz / 2.5kHz
Frequency Stability	: 1.5 ppm
Antenna Impedance	: 50 Ω Norminal
Note	

TABLE OF CONTENTS

	Page
SECTION 1. GENERAL INFORMATION	4
SECTION 2. SUMMARY OF TEST RESULT	5
SECTION 3. TEST AND MEASUREMENT DATA	6
SECTION 4. INFORMATION ABOUT EUT AND SUPPORT EQUIPMENT(S)	7
SECTION 5. SUPPORT EQUIPMENT	8
SECTION 6. USED CABLE(S)	9
SECTION 7. TEST CONFIGURATION	10
SECTION 8. OPERATING CONDITION	11
SECTION 9. MEASUREMENT UNCERTAINTY	12
SECTION 10. TEST DATA	
10.1 Carrier Output Power (Conducted)	13
10.2 Unwanted Emissions (Transmitter Conducted)	15
10.3 Field Strength of Spurious Radiation	19
10.4 Emission Masks (Occupied Bandwidth)	23
10.5 Transient Frequency Behavior	29
10.6 Audio Frequency Response / Audio Low Pass Filter (Voice Input)	33
10.7 Modulation Limiting	37
10.8 Frequency Stability (Temperature Variation)	41
10.9 Frequency Stability (Voltage Variation)	44
10.10 Receiver Spurious Emissions(Radiated)	46
10.11 Necessary Bandwidth and Emission Bandwidth	50
APPENDIX PHOTOGRAPHS	

SECTION 1. GENERAL INFORMATION

TEST PERFORMED

Location	Kashima No.1 Test Site, Tochigi No.1 Test Site
EUT Received	October 13, 2011
Date of Test	October 13, 2011 to October 28, 2011
Standard Applied	FCC Part 2, 22, 74, 90, 90.210 RSS-119 Issue 11
Measurement Method	ANSI/TIA-603-D-2010 / RSS-119 Issue 11(2011), RSS-Gen Issue 3(2010)
Deviation from Standard(s)	Not applicable

QUALIFICATIONS OF TESTING LABORATORY (Kashima Lab.)

ACCREDITATION	SCOPE	LAB. CODE	Remarks
NVLAP	EMC Testing	100290-0	USA
VLAC	EMC Testing	VLAC-008-1	JAPAN
BSMI	EMC Testing	SL2-IN-E-6008	TAIWAN
FILING			
VCCI	EMC Testing	R-788, C-278, C-279, T-1716, T-1717, G-119 R-272, C-276, C-277, T-1720, T-1721 R-576, C-590, T-1722, G-121	JAPAN
FCC	EMC Testing	Designation Number: JP0008	
IC	EMC Testing	IC-2042K-1, IC-2042K-3	CANADA
CB-Scheme	EMC Testing	TL222	IECEE
SAUDI ARABIA	EMC Testing	N/A	

QUALIFICATIONS OF TESTING LABORATORY (Tochigi Lab.)

ACCREDITATION	SCOPE	LAB. CODE	Remarks
VLAC	EMC Testing	VLAC-008-5	JAPAN
BSMI	EMC Testing	SL2-IN-E-6017, SL2-A-E-6017	TAIWAN
FILING			
VCCI	EMC Testing	R-257, C-260, C-284, T-1736, T-1737, G-124 R-258, C-261, C-285, T-1738, T-1739 R-259, C-262, T-1740, G-125	JAPAN
FCC	EMC Testing	Designation Number: JP0011	USA
IC	EMC Testing	IC-2042P-1, IC-2042P-2	CANADA
SAUDI ARABIA	EMC Testing	N/A	

ABBREVIATIONS

EUT	Equipment Under Test	DoC	Declaration of Conformity
AMN	Artificial Mains Network	ISN	Impedance Stabilization Network
LISN	Line Impedance Stabilization Network	Q-P	Quasi-peak
AMP	Amplifier	AVG	Average
ATT	Attenuator	PK	Peak
ANT	Antenna	Cal	Calibration
BBA	Broadband Antenna	N/A	Not applicable or Not available
DIP	Dipole Antenna	LCD	Liquid-Crystal Display
AE	Associated Equipment	4LEVEL FSK	4LEVEL Frequency Shift Key
GMSK	Gaussian Maximum Shift Key	CW ID	Continuously Repeating bit stream
FM	Frequency Modulation	C4FM	Constant envelope 4 Level FM
PTT	Push to Talk	AFC	Automatic frequency control

SECTION 2. SUMMARY OF TEST RESULT

FCC Part2	Part22	Part74	Part90	IC RSS-119	TEST ITEM	RESULTS
2.1046 (a)	-	74.461	-	5.4	Carrier Output Power (Conducted)	PASS
2.1051	-	-	90.210	5.8	Unwanted Emissions (Transmitter Conducted)	PASS
2.1053 (a)	-	-	90.210	5.8	Field Strength of Spurious Radiation	PASS
2.1049 (c) (1)	22.359, 357 (a)	74.462	90.210	5.8	Emission Masks (Occupied Bandwidth)	PASS
-	-	-	90.214	5.9	Transient Frequency Behavior	PASS
2.1047 (a)	-	-	-	-	Audio Low Pass Filter (Voice Input)	PASS
2.1047 (a)	-	-	-	-	Audio Frequency Response	PASS
2.1047 (b)	-	-	-	-	Modulation Limiting	PASS
2.1055 (a) (1)	22.355	74.464	90.213 (a)	5.3	Frequency Stability (Temperature Variation)	PASS
2.1055 (d) (1)	22.355	74.464	90.213 (a)	5.3	Frequency Stability (Voltage Variation)	PASS
-	-	-	-	5.11	Receiver Spurious Emissions	PASS
-	-	-	90.203 (j)(3)	-	Certification required (FCC Part 90.203(j)(3))	Complied
-	-	-	90.203 (i)	-	Certification required (FCC Part 90.203(i))	Complied

Limitation on Results

The test result of this report is effective equipment under test itself and under the test configuration described on the report. This test report does not assure that whether the test result taken in other testing laboratory is compatible or reproducible to the test result on this report or not.

Note:

As for the FCC Part 15 Subpart B-Unintentional Radiators, the EUT has been measured and declared as Verification by Vertex Standard Co., Ltd.

SECTION 3. TEST AND MEASUREMENT DATA

All test and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J and Industry Canada as the following individual parts:

FCC Rule	Test Item	Tested
Part 21	Domestic Public Fixed radio Services	N.A.
Part 22	Non Cellular	YES
Part 22	Public Mobile Services	N.A.
Part 22	Subpart H - Cellular Radiotelephone Service	N.A.
Part 22	Alternative technologies and auxiliary service	N.A.
Part 23	International Fixed Public Radiocommunication service	N.A.
Part 24	Personal Communications Services	N.A.
Part 74	Experimental Radio Auxiliary , Special Broadcast and Other Program Distributional Services	YES
Part 80	Stations in the Maritime Services	N.A.
Part 80	Subpart E - general Technical Standards	N.A.
Part 80	Subpart F - Equipment Authorization for Compulsory Ships	N.A.
Part 80	Subpart K - Private Coast Stations and Marine Utility Stations	N.A.
Part 80	Subpart S - Compulsory radiotelephone Installations for Small Passenger Boats	N.A.
Part 80	Subpart T - Radiotelephone Installation Required for Vessels on the Great Lakes	N.A.
Part 80	Subpart U - Radiotelephone Installations Required by the Bridge-to- Bridge Act	N.A.
Part 80	Subpart V - Emergency Position Indicating Radiobeacons (EPIRB'S)	N.A.
Part 80	Subpart W - Global Maritime Distress and Safety System (GMDSS)	N.A.
Part 80	Subpart X - Voluntary Radio Installations	N.A.
Part 87	Aviation Services	N.A.
Part 90	Private Land Mobile radio Services	YES
Part 94	Private Operational - Fixed Microwave Service	N.A.
Part 95	Subpart A - General Mobile radio Service	N.A.
Part 95	Subpart C - Radio Control (R/C) radio Service	N.A.
Part 95	Subpart D - Citizens Band (CB) Radio Service	N.A.
Part 95	Subpart E -Family radio Service	N.A.
Part 95	Subpart F -Interactive Video and Data Service (IVDS)	N.A.
Part 97	Amateur Radio Service	N.A.
Part 101	Fixed Microwave Service	N.A.

IC Rule	Test Item	Tested
RSS-119	Radio Ttansmitters and Receivers Operating in the Land Mobile and Fixed Services in the Frequency Range 27.4-960 MHz	YES
RSS-Gen	General Requirements and Information for the Certification of RadioApparatus	YES

SECTION 4. INFORMATION ABOUT EUT AND SUPPORT EQUIPMENT(S)

4.1 List of System Configuration

Symbol	Item	Model No.	Serial No.	Manufacture	Remarks
A1	Rack Mount Repaeter	VXR-9000V-H	1L000010	Yaesu Musen Co.,Ltd.	EUT
Power Ratings of EUT :		DC 13.6 V +/- 10%		30 A Maximum	
Power Supply :		DC 13.6 V +/- 15 %			
Condition of Equipment		Preproduction			
Type		Rack Mount type			
Suppression Devices		No Modifications by the laboratory were made to the device			

4.2 Port(s)/Connector(s)

Port Name	Connector Type	Connector Pin	Remarks
Mic	Modular	8 pin	
RX Antenna	BNC	1 pin	
TX Antenna	N	1 pin	
External Speaker	3.5φ	1 pin	
Accessory	D-sub	25 pin	
4-wire	Modular	8 pin	

4.3 Highest Frequency Oscillator(s)/Crystal(s)

Base Clock	Operating Frequency	Board Name	Remarks
247.35 MHz	247.35 MHz	MAIN-UNIT	

SECTION 5. SUPPORT EQUIPMENT

The EUT was supported by the following equipment during the test.

Symbol	Item	Model No.	Serial No.	Manufacture	FCC ID
B	Microphone	MD-12A8J	None	Vertex Standard	N/A
C	Microphone	MH-67A8J	0M053	Vertex Standard	N/A
D	Speaker	MLS-100	8D059	Vertex Standard	N/A
E	DC Power Supply	PA-1030A	1102117027	Vertex Standard	N/A
F	Terminator	CT-01	None	TME	N/A
G	Terminator	M1404N	6634	Lucas Weinschel	N/A
Supplied Power:					
E	AC	120V,60Hz			

SECTION 6. USED CABLE(S)

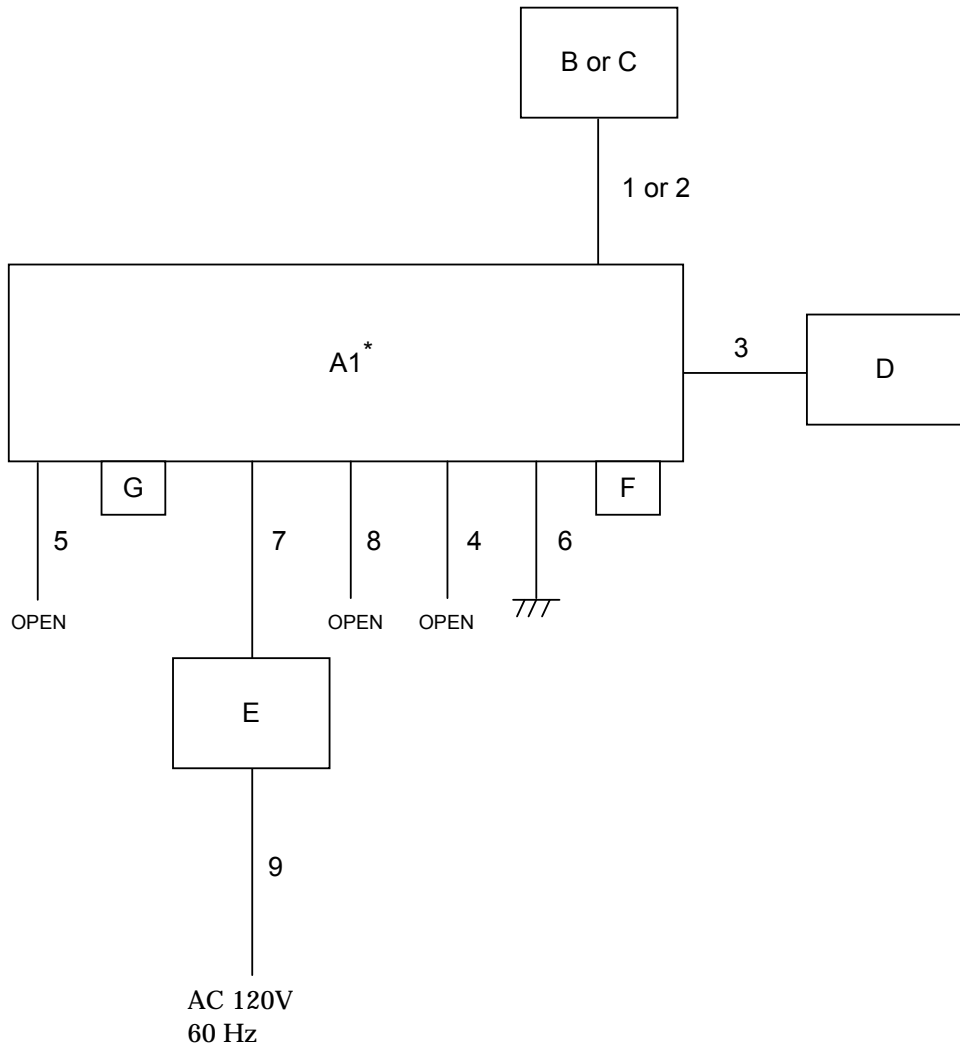
The following cable(s) was used for the test.

No.	Name	Length (m)	Shield	Connector	Ferrite core
1	Microphone Cable	0.55	Yes	Plastic	
2	Microphone Cable	0.50	Yes	Plastic	
3	Speaker Cable	2.00	No	Metal	
4	ACC Cable	2.00	Yes	Metal	
5	4-wire Cable	2.00	No	Plastic	
6	Earth Cable	1.00	No	Plastic	
7	Power Cable for EUT (DC)	3.00	No	Plastic	
8	Backup Power Cable	1.00	No	Plastic	
9	Power Cable for DC Power Supply (AC)	1.80	No	-	

SECTION 7. TEST CONFIGURATION

Details of Configuration and Connection
Example: Case of Section 10.10 Test

- * : EUT
- : Ferrite core
- : Joint Connector



SECTION 8. OPERATING CONDITION

The EUT was operated under the following condition during the test.

8.1 Operating Condition

The test was carried out under Transmit mode.

(FCC: 150.5MHz, 161.5MHz, 173.5MHz)

(RSS: 148.5MHz, 161.5MHz, 173.5MHz)

(High Power : 100 W, Low Power : 50 W)

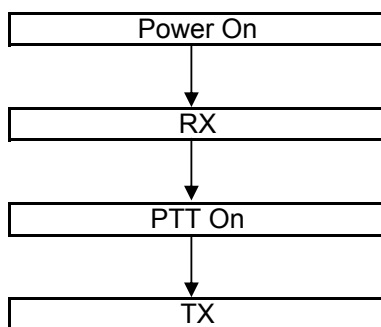
The test was carried out under Receive mode.

(RSS: 148.5MHz, 161.5MHz, 173.5MHz)

EUT was examined in the operating conditions that had maximum emissions.

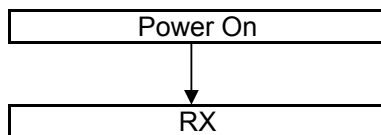
8.2 Operating Flow [Transmit mode]

Following operations were performed continuously.



8.3 Operating Flow [Receive mode]

Following operations were performed continuously.



SECTION 9. MEASUREMENT UNCERTAINTY

Carrier Output Power (Conducted)	U _{lab}	Utia-603-d
	+/- 0.29dB (k = 2)	+/- 0.59 dB
Unwanted Emissions (Transmitter Conducted)		
	+/- 2.19 dB (k = 2)	+/- 1.1 dB
Field Strength of Spurious Radiation		
	+/- 4.53dB (k = 2)	+/- 3.3 dB
Emission Masks (Occupied Bandwidth)		
	+/- 0.5dB (k = 2)	+/- 2.1 dB
Transient Frequency Behavior		
	+/- 1.10% (k = 2)	+/- 21.6 %
Audio Low Pass Filter (Voice Input)		
	+/- 0.1dB (k = 2)	+/- 1.2 dB
Audio Frequency Response		
	+/- 0.1dB (k = 2)	+/- 1.2 dB
Modulation Limiting		
	+/- 1% (k = 2)	+/- 1 %
Frequency Stability (Temperature Variation)		
	+/- 10.1Hz (k=2)	+/-34.2 Hz
Frequency Stability (Voltage Variation)		
	+/- 10.1Hz (k=2)	+/-34.2
Receiver Spurious Emissions	U _{lab}	Ucisp
30-1000MHz	+/- 4.53dB (k = 2)	+/- 5.2 dB
abobe 1GHz	+/- 5.04dB (k = 2)	

SECTION 10. TEST DATA

10.1 Carrier Output Power (Conducted)

REGULATIONS	: FCC Part 2 Section 1046 (a) / FCC Part 74 Section 461 / RSS-119 Section 5.4
TEST METHOD/GUIDE	: ANSI/TIA-603-D Section 2.2.1.2 / RSS-119 Section 4.1

Test Procedure

- 1 The EUT and test equipment were set up as shown on the following page.
- 2 The EUT was conducted to a resistive coaxial attenuator of normal load impedance.
 $RF\ Power\ (dBm) = Power\ Meter\ reading\ (dBm) + Attenuator\ Loss\ (dB) + Cable\ Loss\ (dB)$
 $RF\ Power\ (W) = 10^{(RF\ Power\ (dBm)/10)}/1000$
- 3 Modulate the transmitter with a 2.5 kHz sine wave at an input Level of 16 dB greater than that necessary to produce 50 % of rated system deviation. (Only as for the test of RSS)

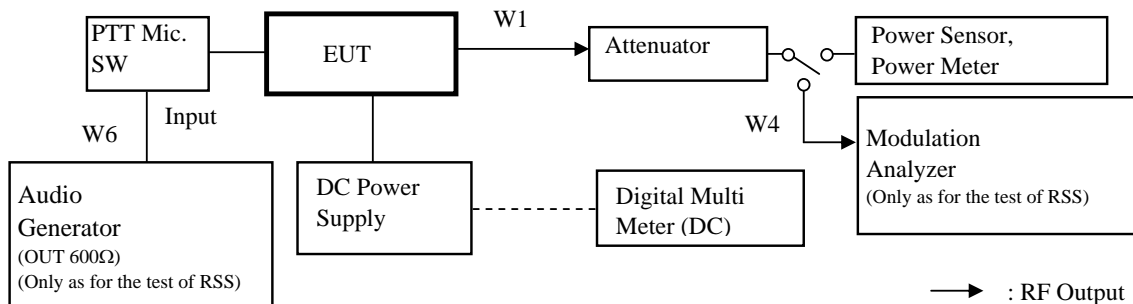
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
1	Power Meter	Hewlett Packard	E4418B	GB38410265	May 23, 11	May 31, 12
2	Power Sensor	Hewlett Packard	8482A	US37292237	May 23, 11	May 31, 12
3	Attenuator (20dB)	Aeroflex/Wenschel	66-20-34	BY4537	May 30, 11	May 31, 12
4	Attenuator (30dB)	Weinschel	WA-29-30-34	8923	May 30, 11	May 31, 12
5	Audio Generator	Anritsu	MG443B	M70150	Apr. 15, 11	Apr. 30, 12
6	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	Jul. 07, 11	Jul. 31, 12
7	Digital Multi Meter	FLUKE	8846A	9642018	Jun. 28, 11	Jun. 30, 12
8	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290932	None	None

Measuring Cables

No.	Cable	Manufacturer	Model No.	Serial No.	Cal Date	Cal Exp.
W1	Coaxial Cable	Suhner	SUCOFLEX104	KSR00211	Sep. 02, 11	Sep. 30, 12
W4	Coaxial Cable	Pacific custom	RG-58 C/U	AM90C04	Mar. 02, 11	Mar. 31, 12
W6	Balance Cable	Nicoon	3D-2V	KSR00092	Oct. 14, 11	Oct. 31, 12

Measuring Equipment Configuration



Test Results

Test date	Oct. 18, 2011		
Location	Tochigi No.1 Test Site		
temperature	25.0 to 26.0	[degree C]	
Humidity Variation	50 to 51	[%]	
Atmospheric Pressure	99.3	[kPa]	
Test Engineer	Koichi Wagatsuma		

Test was carried out for all the Authorized Bandwidth.
 State the worst case (below).

No.	Frequency (MHz)	Setting		RF Power (W)
1	148.50	Low (RSS)	High Power	100
2	150.50	Low (FCC)	High Power	100
3	161.50	Middle (FCC/RSS)	High Power	100
4	173.50	High (FCC/RSS)	High Power	100
5	148.50	Low (RSS)	Low Power	50
6	150.50	Low (FCC)	Low Power	50
7	161.50	Middle (FCC/RSS)	Low Power	50
8	173.50	High (FCC/RSS)	Low Power	50

RF Power: Peak reading

10.2 Unwanted Emissions (Transmitter Conducted)

REGULATIONS	: FCC Part 2 Section 1051, Part 90 Section 210 / RSS-119 Section 5.8
TEST METHOD/GUIDE	: ANSI/TIA-603-D Section 2.2.13.2 / RSS-119 Section 4.2, RSS-Gen Section 4.9

Test Procedure

- 1 The EUT and test equipment were set up as shown on the following page.
- 2 Modulate the transmitter with a 2.5 kHz sine wave at an input Level of 16 dB greater than that than that necessary to produce 50 % of rated system deviation.
- 3 Adjust the spectrum analyzer for the following setting:
 - a) RBW : 10 kHz (< 1 GHz), 1 MHz (> 1 GHz).
 - b) VBW : 30 kHz (< 1 GHz), 3 MHz (> 1 GHz).
 - c) Sweep Speed : 50 msec.
 - d) Detector mode : Average power (FM Modulation) , Positive peak with peak hold (Digital Modulation)
- 4 The emissions were measured for the worst case as follows:
 - a) : within a band of frequencies defined by the carrier frequency plus and minus one channel.
 - b) : from the lowest frequency generated in the EUT and to at least the 10th harmonic of the carrier frequency, or 40 GHz, whichever is lower.

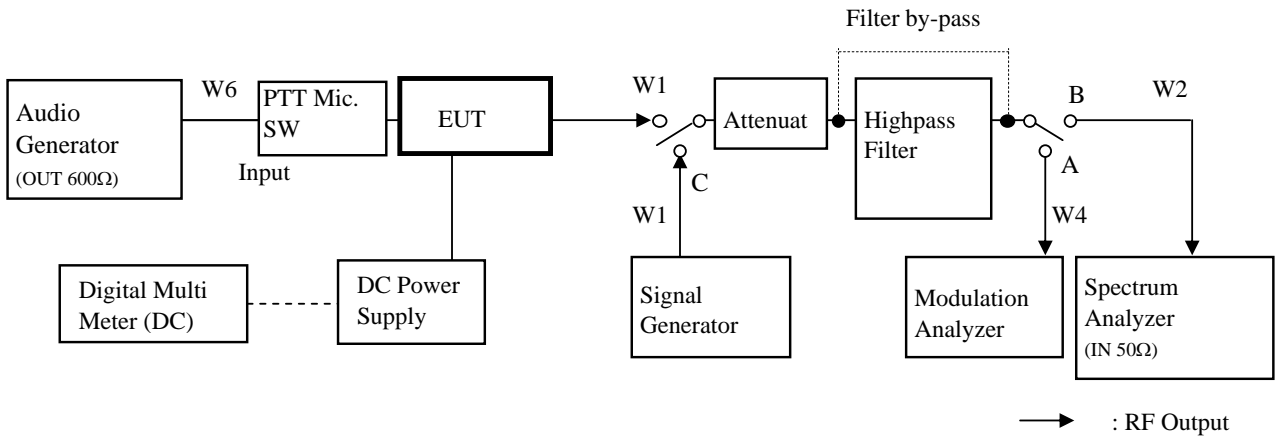
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
1	Audio Generator	Anritsu	MG443B	M70150	Apr. 15, 11	Apr. 30, 12
2	Attenuator (20dB)	Aeroflex/Wenschel	66-20-34	BY4537	May 30, 11	May 31, 12
3	Attenuator (30dB)	Weinschel	WA-29-30-34	8923	May 30, 11	May 31, 12
4	Highpass Filter	Anritsu	MP526B	6200220636	Dec. 08, 10	Dec. 31, 11
5	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	Jul. 07, 11	Jul. 31, 12
6	Signal Generator	Rohde&Schwarz	SMT03	841733/010	Sep. 13, 11	Sep. 30, 12
7	Spectrum Analyzer	Agilent	E4407B	MY45102460	May 25, 11	May 31, 12
8	Digital Multi Meter	FLUKE	8846A	9642018	Jun. 28, 11	Jun. 30, 12
9	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290932	None	None

Measuring Cables

No.	Cable	Manufacturer	Model No.	Serial No.	Cal Date	Cal Exp.
W1	Coaxial Cable	Suhner	SUCOFLEX104	KSR00211	Sep. 02, 11	Sep. 30, 12
W2	Coaxial Cable	Suhner	SUCOFLEX104	KSR00217	Sep. 02, 11	Sep. 30, 12
W4	Coaxial Cable	Pacific custom	RG-58 C/U	AM90C04	Mar. 02, 11	Mar. 31, 12
W6	Balance Cable	Nicoon	3D-2V	KSR00092	Oct. 14, 10	Oct. 31, 11

Measuring Equipment Configuration



Test Results

Test date	Oct. 19, 2011	
Location	Tochigi No.1 Test Site	
temperature	25.0 to 26.0	[degree C]
Humidity Variation	50 to 54	[%]
Atmospheric Pressure	100.1	[kPa]
Test Engineer	Koichi Wagatsuma	

Test was carried out for all the frequency band of section 10.1
 State the worst case (below).

State : High Power / Authorized Bandwidth 11.25 kHz

No.	Tuned Frequency (MHz)	Band	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Mask D Limit (dBc)	Margin (dB)
1	148.50 (RSS)	Low	297.00	-44.10	-94.10	-70.0	24.1
2	150.50 (FCC)	Low	301.00	-36.50	-86.50	-70.0	16.5
3	161.50 (FCC / RSS)	Middle	323.00	-35.80	-85.80	-70.0	15.8
4	173.50 (FCC / RSS)	High	347.00	-36.40	-86.40	-70.0	16.4

There is the margin of 20dB over except for the above points.

Mask D Limit (dBc) = $-(50+10\log(P))$
 Correct Level (dBm) = Substitute SG Level (dBm)
 Emission Level (dBc) = Correct Level (dBm) - $10\log(P*1000)$
 P = Carrier Level (W)
 " - " = Measurement Limit

State : Low Power / Authorized Bandwidth 11.25kHz

No.	Tuned Frequency (MHz)	Band	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Mask D Limit (dBc)	Margin (dB)
1	148.50 (RSS)	Low	297.00	-44.10	-91.09	-67.0	24.1
2	150.50 (FCC)	Low	301.00	-43.70	-90.69	-67.0	23.7
3	161.50 (FCC / RSS)	Middle	323.00	-40.80	-87.79	-67.0	20.8
4	173.50 (FCC / RSS)	High	347.00	-43.30	-90.29	-67.0	23.3

There is the margin of 20dB over except for the above points.

Mask D Limit (dBc) = $-(50+10\log(P))$
 Correct Level (dBm) = Substitute SG Level (dBm)
 Emission Level (dBc) = Correct Level (dBm) - $10\log(P*1000)$
 P = Carrier Level (W)
 " - " = Measurement Limit

10.3 Field Strength of Spurious Radiation

REGULATIONS	:	FCC Part 2 Section 1053 (a), Part 90 Section 210 / RSS-119 Section 5.8
TEST METHOD/GUIDE	:	ANSI/TIA-603-D Section 2.2.12.2 / RSS-119 Section 4.2, RSS-Gen Section 4.9

Test Procedure

- 1 The EUT and test equipment were set up as shown on the following page.
- 2 Adjust the spectrum analyzer for the following setting:
 - a) RBW : 10 kHz (< 1 GHz), 1 MHz (> 1 GHz).
 - b) VBW : 300 kHz (< 1 GHz), 3 MHz (> 1 GHz).
 - c) Sweep Speed : 50ms.
 - d) Detector mode : Positive Peak
- 3 The transmitter was placed on a wooden turntable, and it was transmitting into non-radiating load which was also placed on the turntable.
- 4 The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
- 5 The frequency range up to tenth harmonic of the fundamental frequency was investigated.
- 6 Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.
- 7 Spurious emissions in dB = 10 Log (TX power in Watts/0.001) – the absolute level

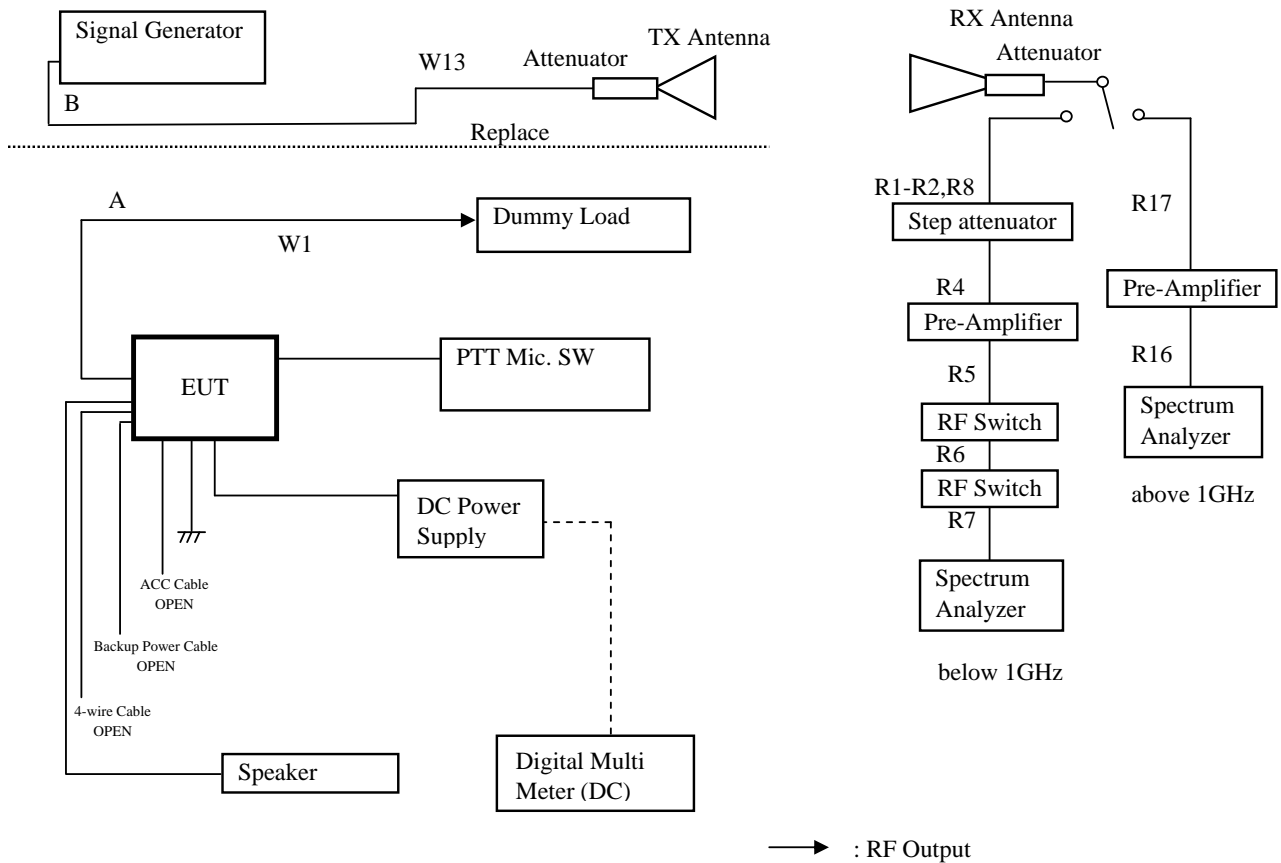
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
1	Dipole Antenna(TX)	Schwarzbeck	UHA9105	AM0082002	Aug. 06, 11	Aug. 31, 12
2	D.R.G Antenna(TX)	Schwarzbeck	BBHA9126	457	Sep. 05, 11	Sep. 30, 12
3	Broad Band antenna(RX)	Schwarzbeck	VULB9168	217	Apr. 25, 11	Apr. 30, 12
4	D.R.G Antenna(RX)	EMCO	3115	9903-5699	May 18, 11	May 31, 12
5	Pre-Amplifier	Hewlett Packard	8447D	2727A05322	Apr. 14, 11	Apr. 30, 12
6	Pre-Amplifier	Hewlett Packard	8449B	3008A01182	Apr. 19, 11	Apr. 30, 12
7	Step Attenuator	Hewlett Packard	8494B	2805A14560	Apr. 14, 11	Apr. 30, 12
8	Attenuator(10dB)	HUBER+SUHNER	6810.17B	KSR0044	Feb. 14, 11	Feb. 29, 12
9	Attenuator(6dB)	TAMAGAWA	CFA-01(NPJ-6)	None	Apr. 14, 11	Apr. 30, 12
10	Attenuator(6dB)	Agilent	8493C	75550	Apr. 19, 11	Apr. 30, 12
11	Signal Generator	Rohde&Schwarz	SMT03	841733/010	Apr. 19, 11	Apr. 30, 12
12	Spectrum Analyzer	Hewlett Packard	8563E	3821A09565	May 02, 11	May 31, 12
13	RF Switch	Intertek Japan	ACX-150	None	Apr. 14, 11	Apr. 30, 12
14	Dummy Load	TME	CT-150NP	1138693	Oct. 14, 10	Oct. 31, 11
15	Digital Multi Meter	FLUKE	8846A	9642018	Jun. 28, 11	Jun. 30, 12
16	DC Power Supply	Vertex	FP1030E	1102117027	None	None

Measuring Cables

No.	Cable	Manufacturer	Model No.	Serial No.	Cal Date	Cal Exp.																					
W1	Coaxial Cable	Suhner	SUCOFLEX104	KSR00211	Sep. 02, 11	Sep 30, 12																					
W13	Coaxial Cable	Suhner	SUCOFLEX104	KSR00207	Jun. 27, 11	Jun. 30, 12																					
R1	Coaxial Cable	Intertek Japan	5D-2W	1R1001a	Apr. 14, 11	Apr. 30, 12																					
R2	Coaxial Cable	Intertek Japan	RG-177/U	1R1002	Apr. 14, 11	Apr. 30, 12																					
R3	Coaxial Cable	Intertek Japan	RG-5A/U	1R1003	Apr. 14, 11	Apr. 30, 12																					
R4	Coaxial Cable	Intertek Japan	RG-5A/U	1R1004	Apr. 14, 11	Apr. 30, 12																					
R5	Coaxial Cable	Intertek Japan	5D-2W	1R1005	Apr. 14, 11	Apr. 30, 12																					
R6	Coaxial Cable	Intertek Japan	5D-2W	1R1006	Apr. 14, 11	Apr. 30, 12																					
R7	Coaxial Cable	Intertek Japan	5D-2W	1R1007	Apr. 14, 11	Apr. 30, 12 </tr <tr> <td>R8</td> <td>Coaxial Cable</td> <td>Intertek Japan</td> <td>5D-2W</td> <td>1R1008a</td> <td>Apr. 14, 11</td> <td>Apr. 30, 12</td> </tr> <tr> <td>R16</td> <td>Coaxial Cable</td> <td>Suhner</td> <td>SUCOFLEX</td> <td>290799/4</td> <td>Apr. 19, 11</td> <td>Apr. 30, 12</td> </tr> <tr> <td>R17</td> <td>Coaxial Cable</td> <td>Suhner</td> <td>SUCOFLEX</td> <td>290800/4</td> <td>Apr. 19, 11</td> <td>Apr. 30, 12</td> </tr>	R8	Coaxial Cable	Intertek Japan	5D-2W	1R1008a	Apr. 14, 11	Apr. 30, 12	R16	Coaxial Cable	Suhner	SUCOFLEX	290799/4	Apr. 19, 11	Apr. 30, 12	R17	Coaxial Cable	Suhner	SUCOFLEX	290800/4	Apr. 19, 11	Apr. 30, 12
R8	Coaxial Cable	Intertek Japan	5D-2W	1R1008a	Apr. 14, 11	Apr. 30, 12																					
R16	Coaxial Cable	Suhner	SUCOFLEX	290799/4	Apr. 19, 11	Apr. 30, 12																					
R17	Coaxial Cable	Suhner	SUCOFLEX	290800/4	Apr. 19, 11	Apr. 30, 12																					

Measuring Equipment Configuration



Test Results

Test date	Oct. 17, 2011	to	Oct. 18, 2011
Location	Tochigi No.1 Test Site		
temperature	19.7 to 20.5	[degree C]	
Humidity Variation	60 to 67	[%]	
Atmospheric Pressure	98.6 to 99.4	[kPa]	
Test Engineer	Koichi Wagatsuma		

Test was carried out for all the frequency band of section 10.1
 State the worst case (below).

State : High Power / Authorized Bandwidth 11.25 kHz / 173.50MHz(FCC/RSS)

No	Frequency (MHz)	Pol	Reading Level (dBm)	SG Out Level (dBm)	Antenn a Gain (dBi)	Loss (dB)	Correct Level (dBm)	Emission Level (dBc)	MASK D Limit Level (dBc)	Margin (dB)
1	347.00	Hor.	-50.33	-32.00	2.15	11.41	-41.3	-91.3	-70.0	21.3
		Ver.	-54.00	-30.70	2.15	11.41	-40.0	-90.0	-70.0	20.0
2	520.50	Hor.	-53.50	-31.70	2.15	11.75	-41.3	-91.3	-70.0	21.3
		Ver.	-52.42	-29.60	2.15	11.75	-39.2	-89.2	-70.0	19.2
3	694.00	Hor.	-78.83	-53.50	2.15	12.04	-63.4	-113.4	-70.0	43.4
		Ver.	-77.00	-51.80	2.15	12.04	-61.7	-111.7	-70.0	41.7
4	867.50	Hor.	-72.33	-43.00	2.15	12.28	-53.1	-103.1	-70.0	33.1
		Ver.	-72.08	-41.20	2.15	12.28	-51.3	-101.3	-70.0	31.3
5	1041.00	Hor.	-59.25	-55.80	6.06	12.50	-62.2	-112.2	-70.0	42.2
		Ver.	-58.50	-54.40	6.06	12.50	-60.8	-110.8	-70.0	40.8
6	1214.50	Hor.	-59.20	-54.80	6.62	12.67	-60.9	-110.9	-70.0	40.9
		Ver.	-59.00	-54.50	6.62	12.67	-60.6	-110.6	-70.0	40.6
7	1388.00	Hor.	-56.33	-45.55	7.30	12.84	-51.1	-101.1	-70.0	31.1
		Ver.	-55.42	-46.00	7.30	12.84	-51.5	-101.5	-70.0	31.5
8	1561.50	Hor.	-	-	8.82	13.01	-	-	-70.0	-
		Ver.	-	-	8.82	13.01	-	-	-70.0	-
9	1735.00	Hor.	-59.80	-51.40	9.86	13.19	-54.7	-104.7	-70.0	34.7
		Ver.	-57.75	-48.20	9.86	13.19	-51.5	-101.5	-70.0	31.5

There is the margin of 20dB over except for the above points.

Mask D Limit (dBc) = $-(50+10\log(P))$

Correct Level (dBm) = Substitute SG Level (dBm) + ANT Gain (dBi) - Loss (Cable, Attenuator) (dB)

Emission Level (dBc) = Correct Level (dBm) - $10\log(P*1000)$

P = Carrier Level (W)

" - " = Measurement Limit

State : Low Power / Authorized Bandwidth 11.25 kHz / 173.50MHz(FCC/RSS)

No	Frequency (MHz)	Pol	Reading Level (dBm)	SG Out Level (dBm)	Antenn a Gain (dBi)	Loss (dB)	Correct Level (dBm)	Emission Level (dBc)	MASK Limit (dBc)	D Level	Margin (dB)
1	347.00	Hor.	-55.83	-37.60	2.15	11.41	-46.9	-93.8	-67.0		26.9
		Ver.	-58.58	-35.20	2.15	11.41	-44.5	-91.4	-67.0		24.5
2	520.50	Hor.	-55.58	-33.80	2.15	11.75	-43.4	-90.4	-67.0		23.4
		Ver.	-55.17	-32.50	2.15	11.75	-42.1	-89.1	-67.0		22.1
3	694.00	Hor.	-76.67	-51.20	2.15	12.04	-61.1	-108.1	-67.0		41.1
		Ver.	-75.00	-49.50	2.15	12.04	-59.4	-106.4	-67.0		39.4
4	867.50	Hor.	-72.58	-43.20	2.15	12.28	-53.3	-100.3	-67.0		33.3
		Ver.	-73.42	-42.50	2.15	12.28	-52.6	-99.6	-67.0		32.6
5	1041.00	Hor.	-60.00	-56.50	6.06	12.50	-62.9	-109.9	-67.0		42.9
		Ver.	-59.20	-55.40	6.06	12.50	-61.8	-108.8	-67.0		41.8
6	1214.50	Hor.	-60.00	-55.60	6.62	12.67	-61.7	-108.6	-67.0		41.7
		Ver.	-60.00	-55.50	6.62	12.67	-61.6	-108.5	-67.0		41.6
7	1388.00	Hor.	-60.00	-52.50	7.30	12.84	-58.0	-105.0	-67.0		38.0
		Ver.	-59.10	-51.30	7.30	12.84	-56.8	-103.8	-67.0		36.8
8	1561.50	Hor.	-	-	8.82	13.01	-	-	-67.0		-
		Ver.	-	-	8.82	13.01	-	-	-67.0		-
9	1735.00	Hor.	-	-	9.86	13.19	-	-	-67.0		-
		Ver.	-	-	9.86	13.19	-	-	-67.0		-

There is the margin of 20dB over except for the above points.

Mask D Limit (dBc) = $-(50+10\log(P))$

Correct Level (dBm) = Substitute SG Level (dBm) + ANT Gain (dBi) - Loss (Cable, Attenuator) (dB)

Emission Level (dBc) = Correct Level (dBm) - $10\log(P*1000)$

P = Carrier Level (W)

" - " = Measurement Limit

10.4 Emission Masks (Occupied Bandwidth)

REGULATIONS	: FCC Part 2 Section 1049 (c) (1), Part 22 Section 359, 357 (a) (1) Part 74 Section 462, Part 90 Section 210 / RSS-119 Section 5.8
TEST METHOD/GUIDE	: ANSI/TIA-603-D Section 2.2.11.2 / RSS-119 Section 4.2.1, 4.2.2

Test Procedure

- 1 The EUT and test equipment were set up as shown on the following page.
- 2 For EUT supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for +/- 2.5 kHz deviation (or 50 % modulation). (FM modulation).
- 3 With level constant, the signal level was increased 16 dB.
- 4 For EUT supporting digital modulation, the digital modulation mode was operated to its maximum extent.
- 5 Adjust the spectrum analyzer for the following setting:
 - a) RBW : 100Hz (Non modulation and Authorized Band 6 kHz),
 100Hz (Non modulation and Authorized Band 11.25 kHz),
 300Hz (Non modulation and Authorized Band 20 kHz).
 - b) VBW : 10times the RBW (Non modulation , Authorized Band 11.25 kHz and Authorized Band 20 kHz).
 - c) Sweep Speed : 8 sec.
 - d) Sampling Time : 10 times
- 6 The occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

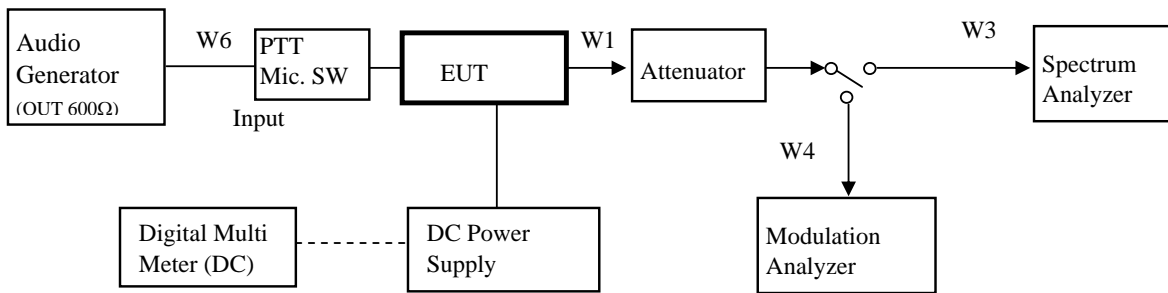
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
1	Audio Generator	Anritsu	MG443B	M70150	Apr. 15, 11	Apr. 30, 12
2	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4537	May 30, 11	May 31, 12
3	Attenuator (30dB)	Weinschel	WA-29-30-34	8923	May 30, 11	May 31, 12
4	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	Jul. 07, 11	Jul. 31, 12
5	Spectrum Analyzer	Agilent	E4407B	MY45102460	May 25, 11	May 31, 12
6	Digital Multi Meter	FLUKE	8846A	9642018	Jun. 28, 11	Jun. 30, 12
7	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290932	None	None

Measuring Cables

No.	Cable	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
W1	Coaxial Cable	Suhner	SUCOFLEX104	KSR00211	Sep. 02, 11	Sep. 30, 12
W3	Coaxial Cable	Suhner	SUCOFLEX104	KSR00217	Sep. 02, 11	Sep. 30, 12
W4	Coaxial Cable	Pacific custom	RG-58 C/U	AM90C04	Mar. 02, 11	Mar. 31, 12
W6	Balance Cable	Nicoon	3D-2V	KSR00092	Oct. 14, 10	Oct. 31, 11

Measuring Equipment Configuration

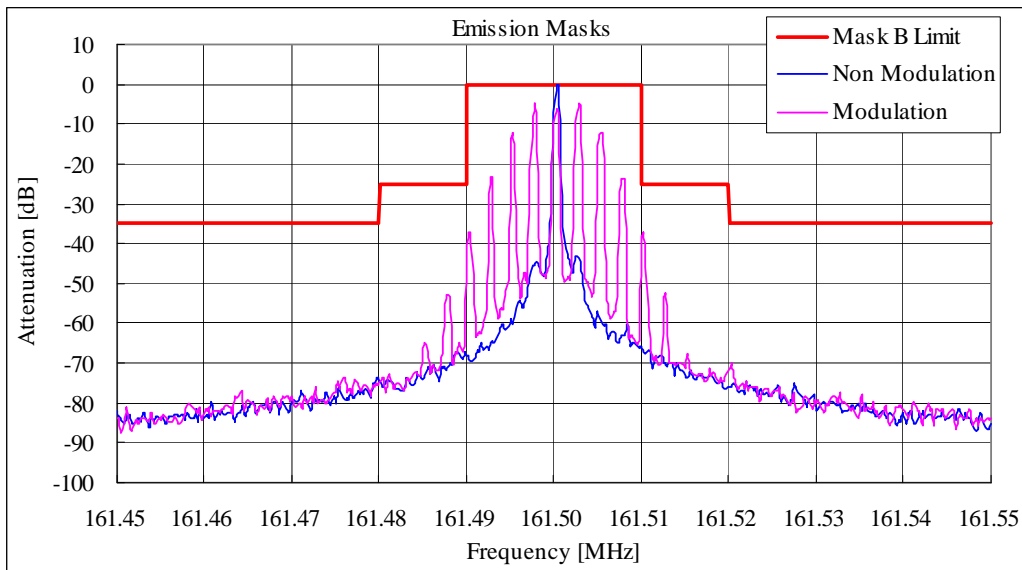


Test Results

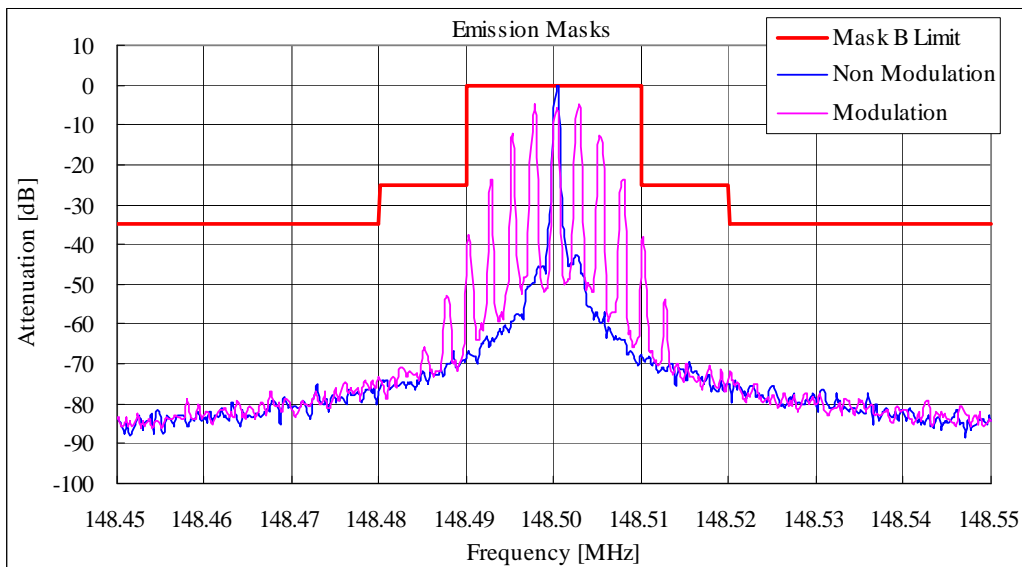
Test date	Oct. 20, 2011	
Location	Tochigi No.1 Test Site	
temperature	19.0 to 20.0	[degree C]
Humidity Variation	48 to 53	[%]
Atmospheric Pressure	100.2	[kPa]
Test Engineer	Koichi Wagatsuma	

Test was carried out for all the frequency band of section 10.1
 State the worst case (below).

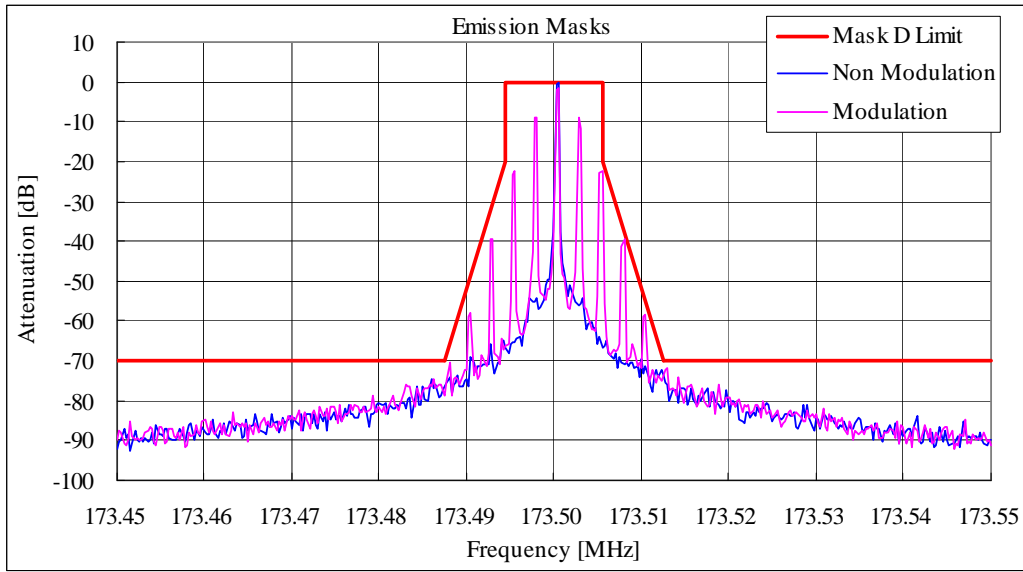
State : High Power / Authorized Bandwidth 20 kHz/ 16K0F3E/ 161.50 MHz (FCC)
 FCC Limit : Mask B



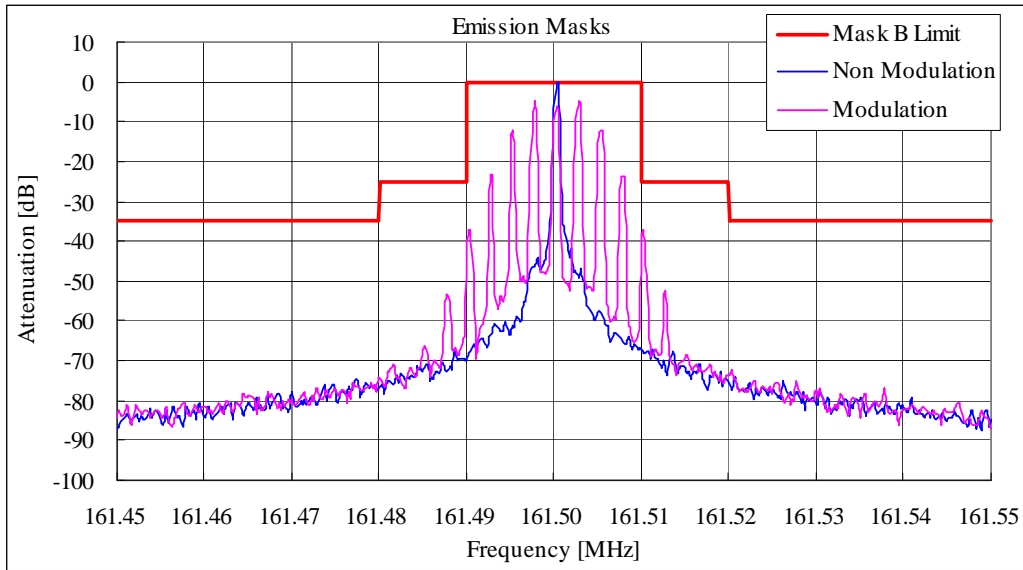
State : High Power / Authorized Bandwidth 20 kHz/ 16K0F3E/ 148.50 MHz (RSS)
 RSS Limit : Mask B



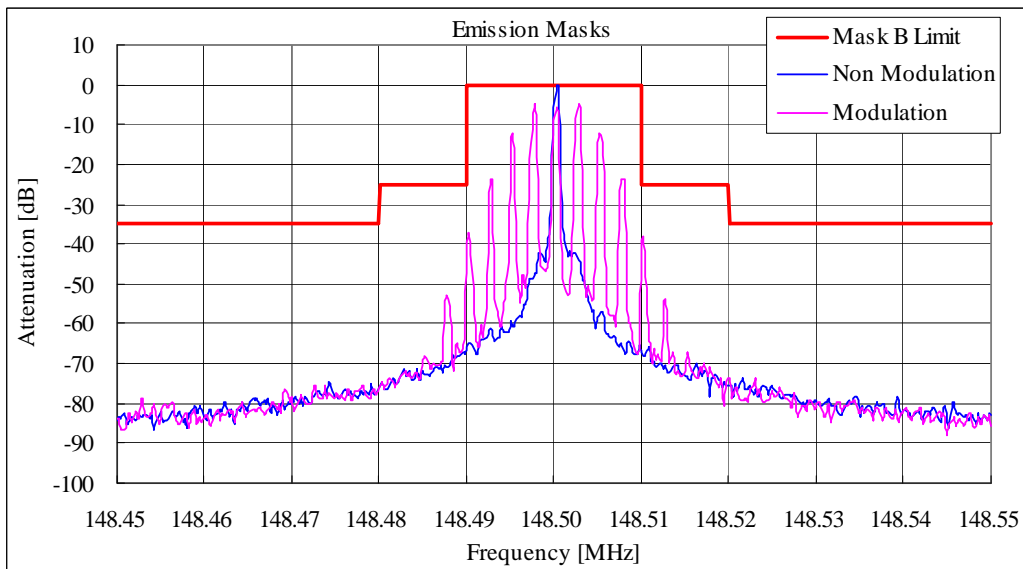
State : High Power / Authorized Bandwidth 11.25 kHz/ 11K0F3E/ 173.50 MHz (FCC / RSS)
FCC Limit : Mask D , RSS Limit : Mask D



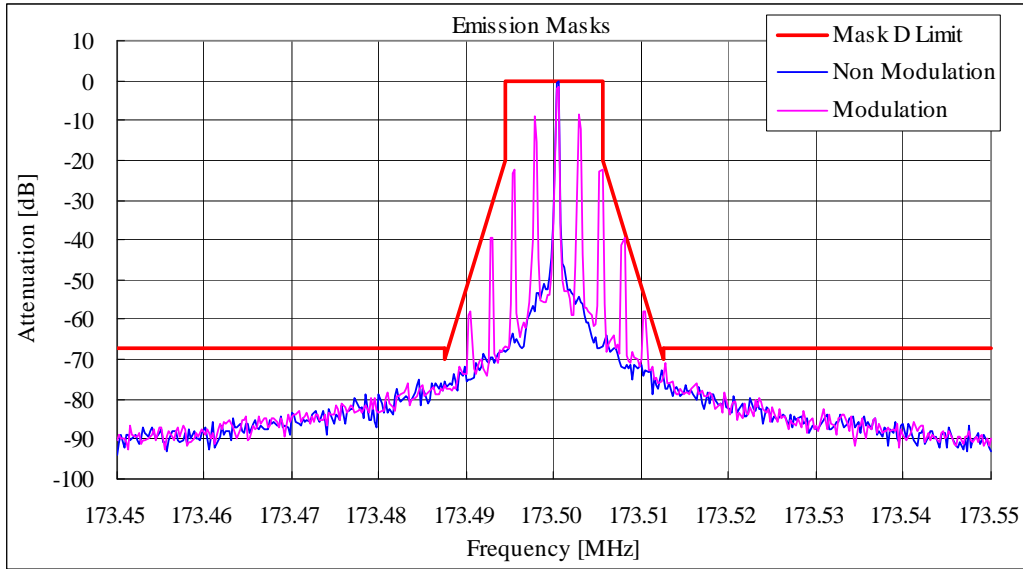
State : Low Power / Authorized Bandwidth 20 kHz / 16K0F3E / 161.50 MHz (FCC)
FCC Limit : Mask B



State : Low Power / Authorized Bandwidth 20 kHz / 16K0F3E / 148.50 MHz (RSS)
RSS Limit : Mask B



State : Low Power / Authorized Bandwidth 11.25 kHz / 11K0F3E / 173.50 MHz (FCC/RSS)
FCC Limit : Mask D, RSS Limit : Mask D



10.5 Transient Frequency Behavior

REGULATIONS	: FCC Part 90 Section 214 / RSS-119 Section 5.9
TEST METHOD/GUIDE	: ANSI/TIA-603-D, Section 2.2.19.3

Test Procedure

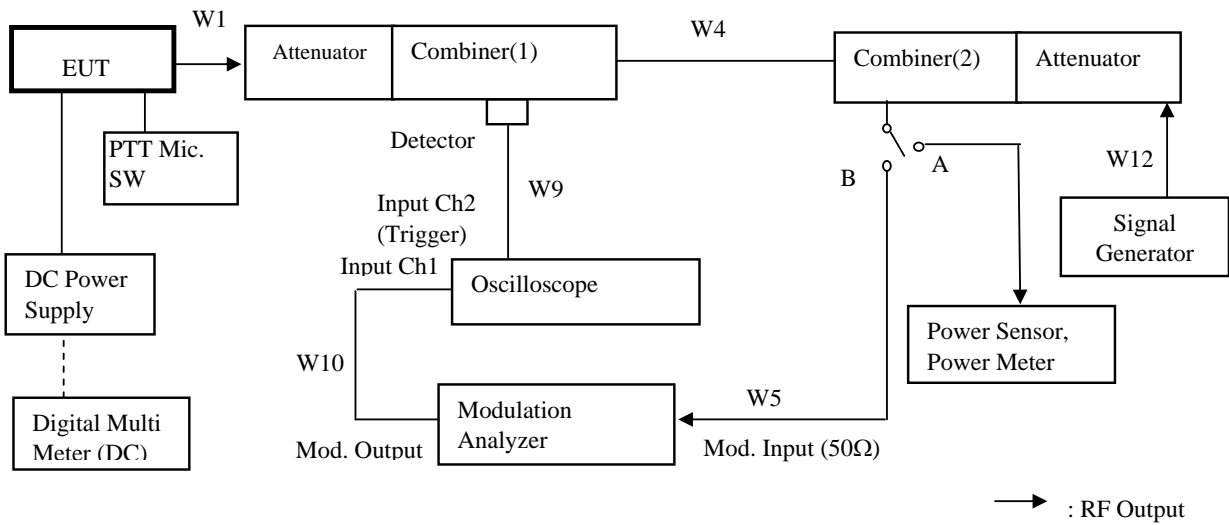
- 1 The EUT and test equipment were set up as shown on the following page.
- 2 The transmitter was turned on.
- 3 The transmitter carrier level was measured at the output of the combiner .
- 4 The transmitter was turned off.
- 5 An RF signal generator (1) modulated with a 1 kHz tone at either 25 kHz or 12.5 kHz or 6.25 kHz deviation, and set to the same frequency as the assigned transmitter frequency, (2) was adjusted to a level -30 dB below the level recorded in Procedure 3, as measured at the output of the combiner.
 This level was then fixed for the remainder of the test and is recorded at step h.
- 6 The oscilloscope was setup using TIA-603 steps j and k as a guide, however 1000 Hz tone was adjusted at +- 2.5 /div vertically centered on the display.
- 7 The transmitter was turned on, and the level of the carrier at the output of the combiner was recorded as step l.
- 8 The carrier on-time as referenced in TIA-603 steps m, n, and o was captured and plotted.
- 9 The carrier off-time as referenced in TIA-603 steps p, q, r, and s was captured and plotted.

No.	Equipment	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
1	Signal Generator	Rohde&Schwarz	SMT03	841733/010	Sep. 13, 11	Sep. 30, 12
2	Oscilloscope	LeCroy	9360	93601408	Apr. 11, 11	Apr. 30, 12
3	Power Meter	Hewlett Packard	E4418B	GB38410265	May 23, 11	May 31, 12
4	Power Sensor	Hewlett Packard	8482A	US37292237	May 23, 11	May 31, 12
5	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4537	May 30, 11	May 31, 12
6	Attenuator (30dB)	Weinschel	WA-29-30-34	8923	May 30, 11	May 31, 12
7	Attenuator (10dB)	TME	CFA-05NPJ-10	262856	Oct. 14, 10	Oct. 31, 11
8	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	Jul. 07, 11	Jul. 31, 12
9	Combiner(1)	Anritsu	Z-164A	M89549	Nov. 18, 11	Nov. 30, 12
10	Combiner(2)	Anritsu	Z-164A	M89249	Nov. 18, 11	Nov. 30, 12
11	Attenuator (3dB)	TME	CFA-20NPJ-3	679701	May 30, 11	May 31, 12
12	Digital Multi Meter	FLUKE	8846A	9642018	Jun. 28, 11	Jun. 30, 12
13	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290932	None	None

Measuring Cables

No.	Cable	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
W1	Coaxial Cable	Suhner	SUCOFLEX104	KSR00097	Sep 02, 11	Sep 30, 12
W4	Coaxial Cable	Suhner	SUCOFLEX104	KSR00217	Sep. 02, 11	Sep. 30, 12
W5	Coaxial Cable	Pacific custom	RG-58 C/U	AM90C04	Mar. 02, 11	Mar. 31, 12
W9	Coaxial Cable	Pacific custom	RG-58 C/U	KSR00094	Nov. 19, 10	Nov. 30, 11
W10	Coaxial Cable	Pacific custom	RG-58 C/U	KSR00091	Mar. 02, 11	Mar. 31, 12
W12	Coaxial Cable	Pacific custom	RG-58 C/U	AM90C02	Mar. 02, 11	Mar. 31, 12

Measuring Equipment Configuration

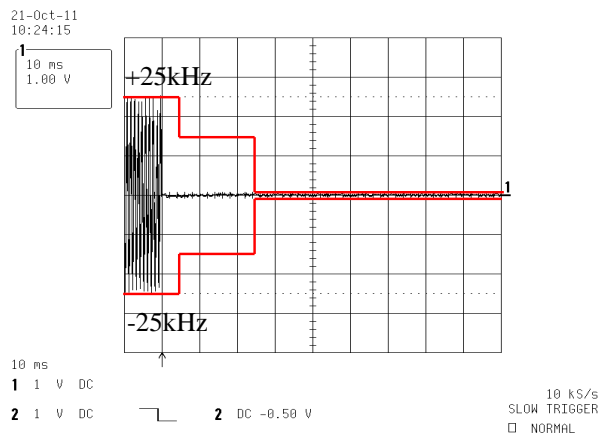


Test Results

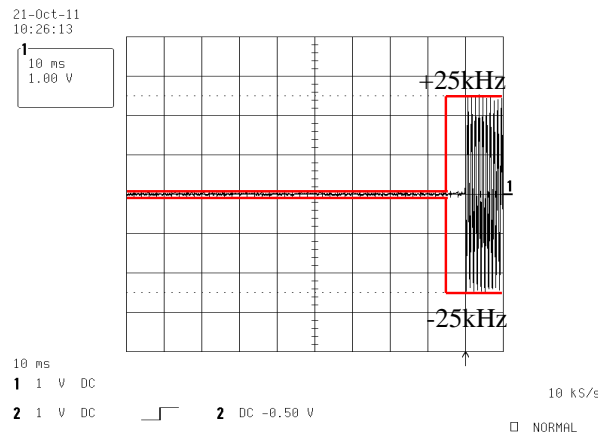
Test date	Oct. 21, 2011	
Location	Tochigi No.1 Test Site	
temperature	22.0 to 23.0	[degree C]
Humidity Variation	58 to 59	[%]
Atmospheric Pressure	99.9	[kPa]
Test Engineer	Koichi Wagatsuma	

Test was carried out for all the frequency band of section 10.1
 State the worst case (below).

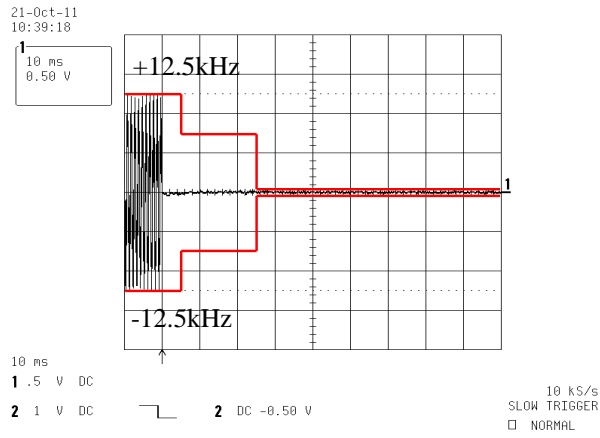
State : High Power / Authorized Bandwidth 20 kHz / 16K0F3E / 161.5 MHz (FCC/ RSS)/ PTT:OFF -ON



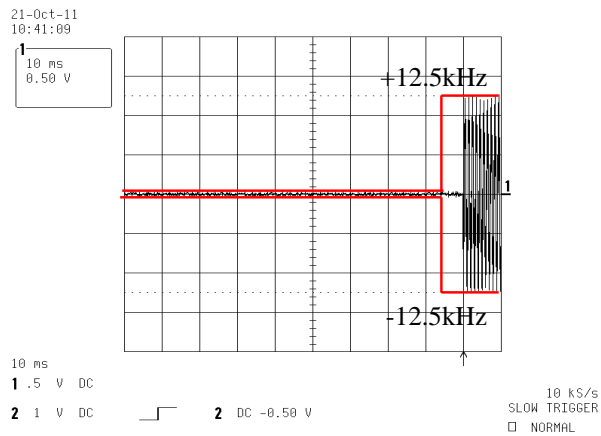
State : High Power / Authorized Bandwidth 20 kHz / 16K0F3E / 161.5 MHz (FCC/ RSS)/ PTT:ON -OFF



State : High Power / Authorized Bandwidth 11.25 kHz / 11K0F3E / 161.5 MHz (FCC/ RSS)/ PTT:OFF -ON



State : High Power / Authorized Bandwidth 11.25 kHz / 11K0F3E / 161.5 MHz (FCC/ RSS)/ PTT:ON -OFF



10.6 Audio Frequency Response / Audio Low Pass Filter (Voice Input)

REGULATIONS	: FCC Part 2 Section 1047 (a)
TEST METHOD/GUIDE	: ANSI/TIA-603-D Section 2.2.6.2.2, 3.2.6.2

Test Procedure

- 1 The EUT and test equipment were set up as shown on the following page.
- 2 Adjust the Modulation Analyzer for the following setting:
 - a) High-pass filter : 50 Hz
 - b) Low-pass filter : 15 kHz
 - c) Detector : positive peak
 - d) Function : FM
- 3 The audio signal input was adjusted to obtain 20 % modulation at 1 kHz, and this point was taken as the 0 dB reference level.
- 4 With input levels held constant and below limiting at all frequencies, the audio signal generator was varied from 300 Hz to 5 kHz.
- 5 The response in dB relative to 1 kHz was then measured, using the Modulation Analyzer.

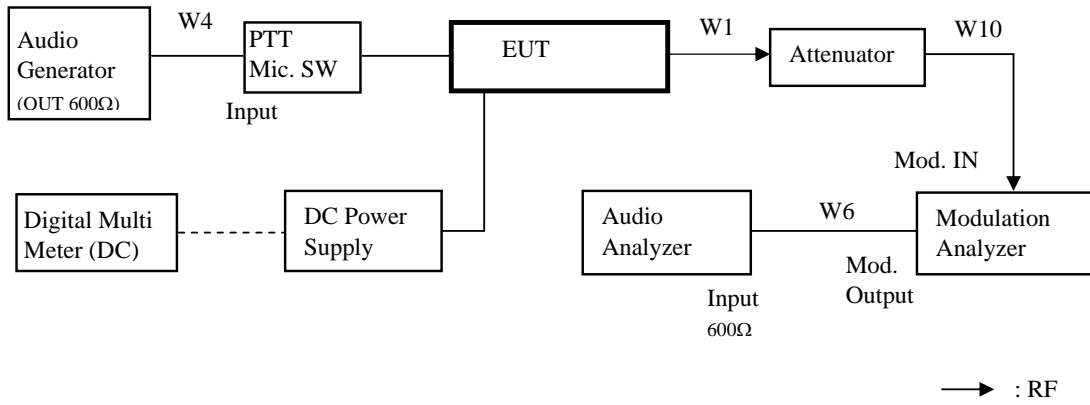
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
1	Audio Generator	Anritsu	MG443B	M70150	Apr. 15, 11	Apr. 30, 12
2	Audio Analyzer	Hewlett Packard	8903B	2948A07326	Mar. 18, 11	Mar. 31, 12
3	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4537	May 30, 11	May 31, 12
4	Attenuator (30dB)	Weinschel	WA-29-30-34	8923	May 30, 11	May 31, 12
5	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	Jul. 07, 11	Jul. 31, 12
6	Digital Multi Meter	FLUKE	8846A	9642018	Jun. 28, 11	Jun. 30, 12
7	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290932	None	None

Measuring Cables

No.	Cable	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
W1	Coaxial Cable	Suhner	SUCOFLEX104	KSR00211	Sep. 02, 11	Sep. 30, 12
W4	Balance Cable	Nicoon	3D-2V	KSR00092	Oct. 14, 10	Oct. 31, 11
W6	Coaxial Cable	Pacific custom	RG-58 C/U	KSR00094	Nov. 19, 10	Nov. 30, 11
W10	Coaxial Cable	Pacific custom	RG-58 C/U	AM90C04	Mar. 02, 11	Mar. 31, 12

Measuring Equipment Configuration



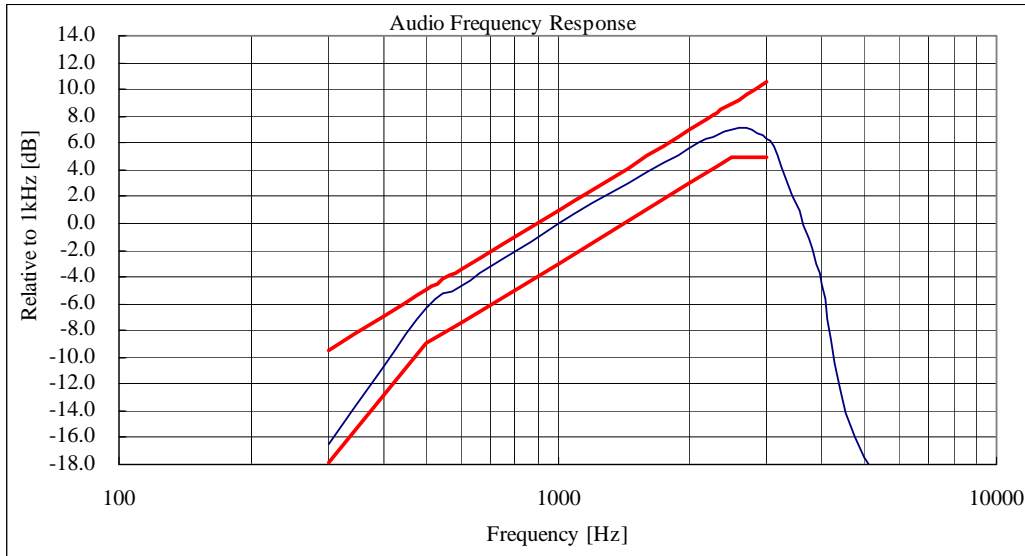
Test Results

Test date	Oct. 19, 2011	
Location	Tochigi No.1 Test Site	
temperature	25.0 to 26.0	[degree C]
Humidity Variation	50 to 54	[%]
Atmospheric Pressure	100.1	[kPa]
Test Engineer	Koichi Wagatsuma	

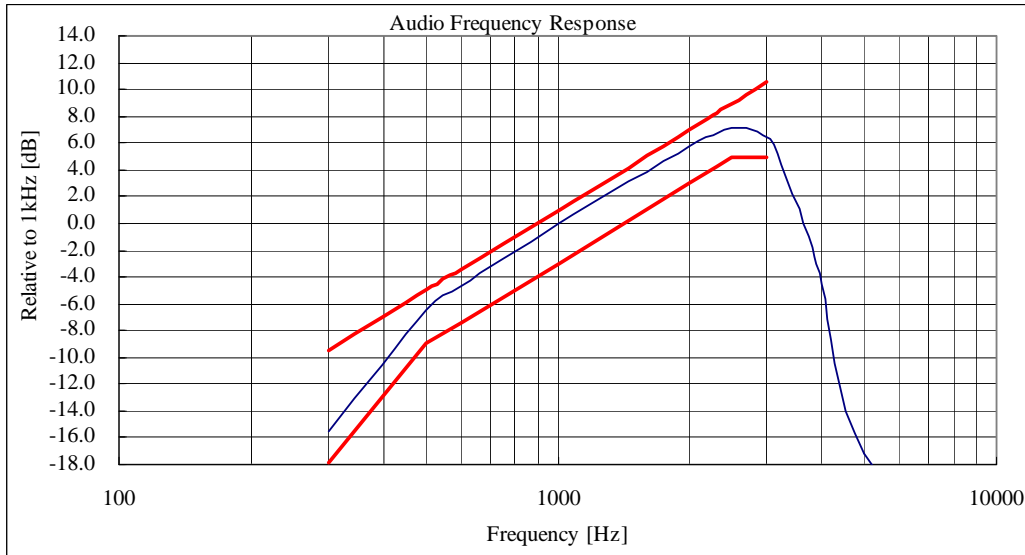
Test was carried out for all the frequency band of section 10.1

State the worst case (below).

State : High Power / Authorized Bandwidth 20 kHz / 16K0F3E / 150.50 MHz(FCC)



State : High Power / Authorized Bandwidth 20 kHz / 16K0F3E / 161.50 MHz(RSS)



Note:

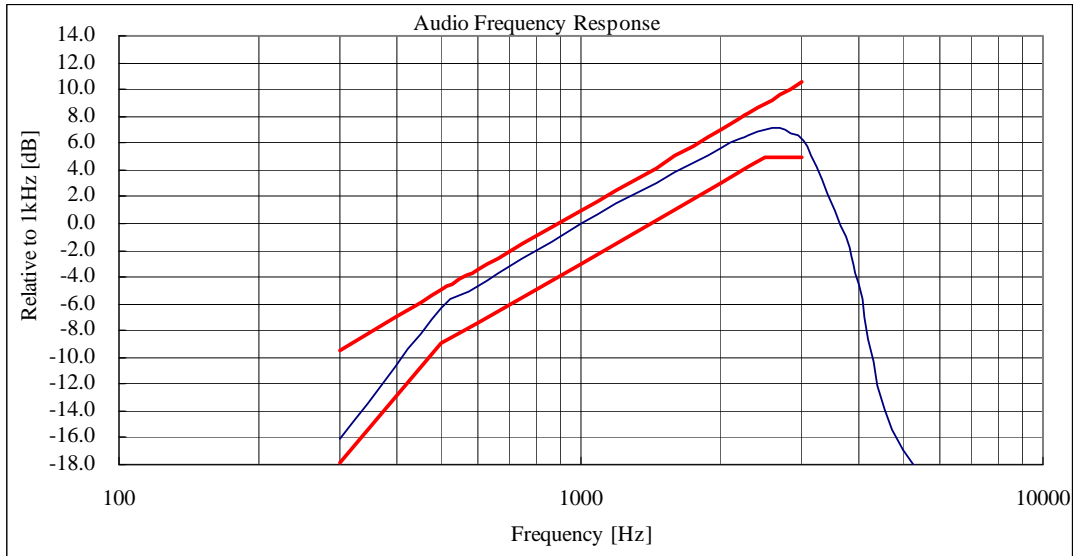
Audio Filter of the above result is substituted with the same structure as Audio Frequency Response.

On the transmission condition below 3kHz,

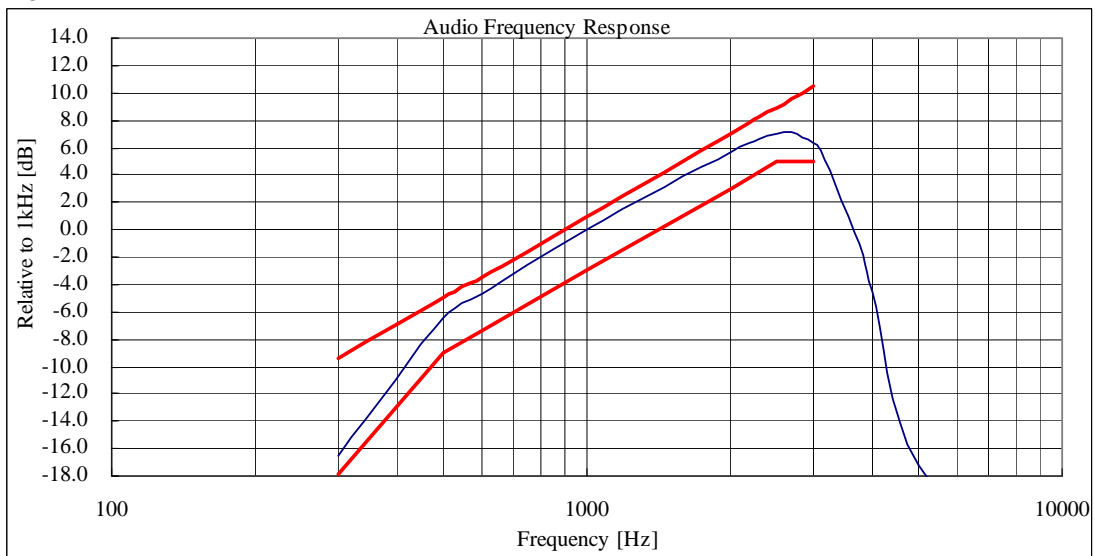
Transceiver shows pre-emphasis condition of transmission function.

On the transmission condition above 3kHz, Transceiver shows Audio Low Pass Filter.

State : High Power / Authorized Bandwidth 11.25 kHz / 11K0F3E / 150.50 MHz(FCC)



State : High Power / Authorized Bandwidth 11.25 kHz / 11K0F3E / 148.50 MHz(RSS)



Note:

Audio Filter of the above result is substituted with the same structure as Audio Frequency Response.

On the transmission condition below 3kHz,

Transceiver shows pre-emphasis condition of transmission function.

On the transmission condition above 3kHz, Transceiver shows Audio Low Pass Filter.

10.7 Modulation Limiting

REGULATIONS	: FCC Part 2 Section 1047 (b)
TEST METHOD/GUIDE	: ANSI/TIA-603-D Section 2.2.3.2, 1.3.4.4

Test Procedure

- 1 The EUT and test equipment were set up as shown on the following page.
- 2 Adjust the Modulation Analyzer for the following setting:
 - a) High-pass filter : off
 - b) Low-pass filter : 15 kHz
 - c) Detector : positive peak
 - d) Function : FM
- 3 Apply a 1kHz modulation signal to the transmitter from the audio generator, and adjust the level to obtain 60% of full rated system deviation.
- 4 Measure the modulation frequency that was showed on the Modulation Analyzer when the output levels of the Audio Generator were changed from -20 dB to +50 dB by 10 dB.
- 5 Set the output frequencies of the Audio Generator 300 Hz and 3 kHz, and repeat test procedure 4.
- 6 Set the Detector of the Modulation Analyzer Negative Peak.
- 7 Repeat test procedure 4 and 5.

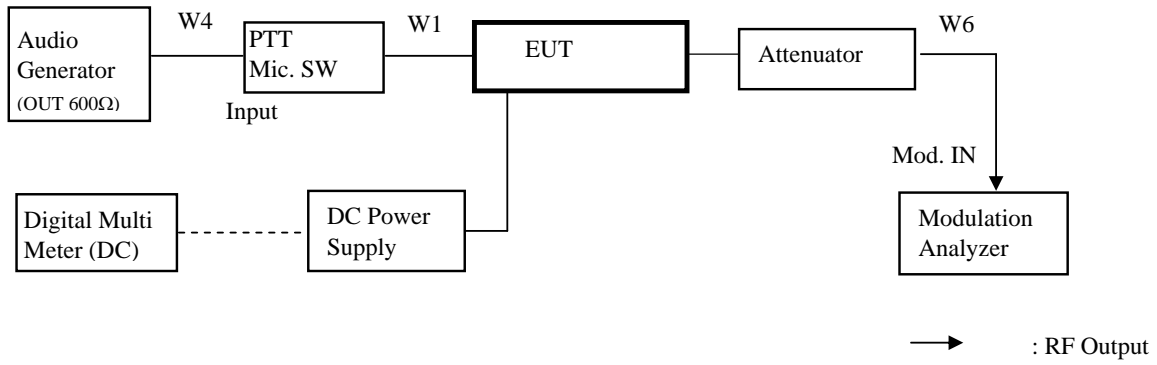
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
1	Audio Generator	Anritsu	MG443B	M70150	Apr. 15, 11	Apr. 30, 12
2	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4537	May 30, 11	May 31, 12
3	Attenuator (30dB)	Weinschel	WA-29-30-34	8923	May 30, 11	May 31, 12
4	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	Jul. 07, 11	Jul. 31, 12
5	Digital Multi Meter	FLUKE	8846A	9642018	Jun. 28, 11	Jun. 30, 12
6	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290932	None	None

Measuring Cables

No.	Cable	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
W1	Coaxial Cable	Suhner	SUCOFLEX104	KSR00211	Sep. 02, 11	Sep. 30, 12
W4	Balance Cable	Nicoon	3D-2V	KSR00092	Oct. 14, 10	Oct. 31, 11
W6	Coaxial Cable	Pacific custom	RG-58 C/U	AM90C04	Mar. 02, 11	Mar. 31, 12

Measuring Equipment Configuration

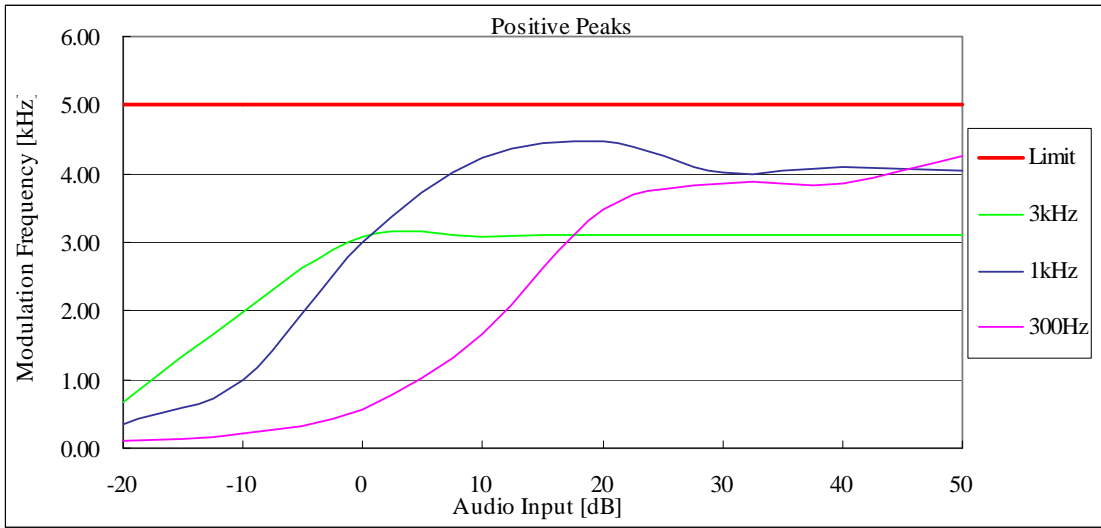


Test Results

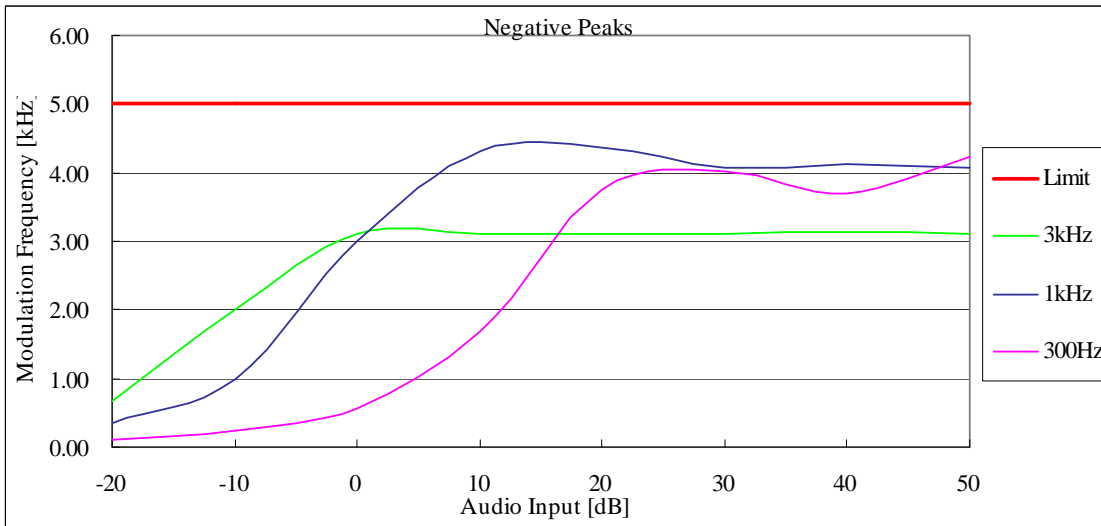
Test date	Oct. 19, 2011	
Location	Tochigi No.1 Test Site	
temperature	25.0 to 26.0	[degree C]
Humidity Variation	50 to 54	[%]
Atmospheric Pressure	100.1	[kPa]
Test Engineer	Koichi Wagatsuma	

Test was carried out for all the frequency band of section 10.1
 State the worst case (below).

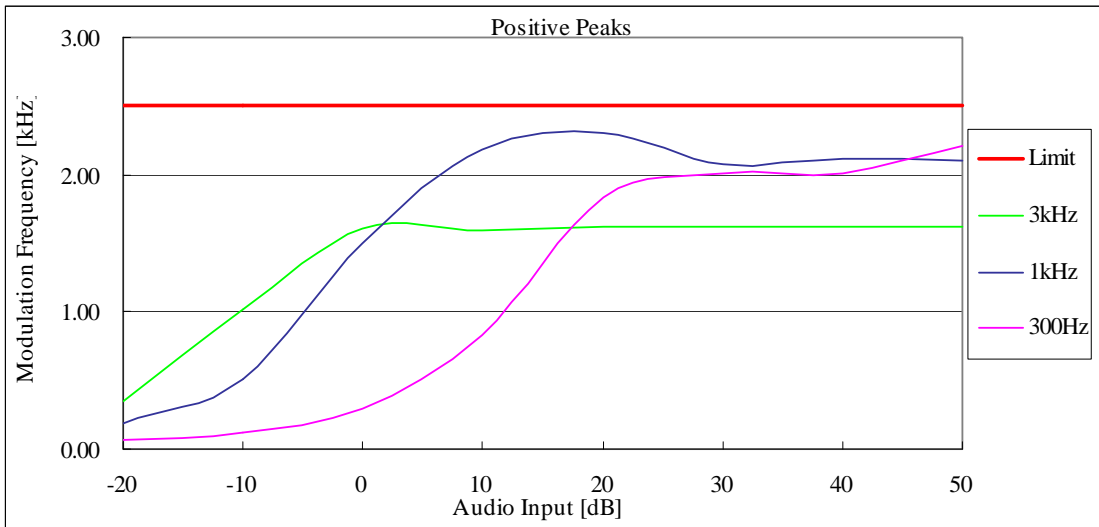
State : High Power / Authorized Bandwidth 20 kHz / 16K0F3E / 173.50 MHz(FCC/ RSS)



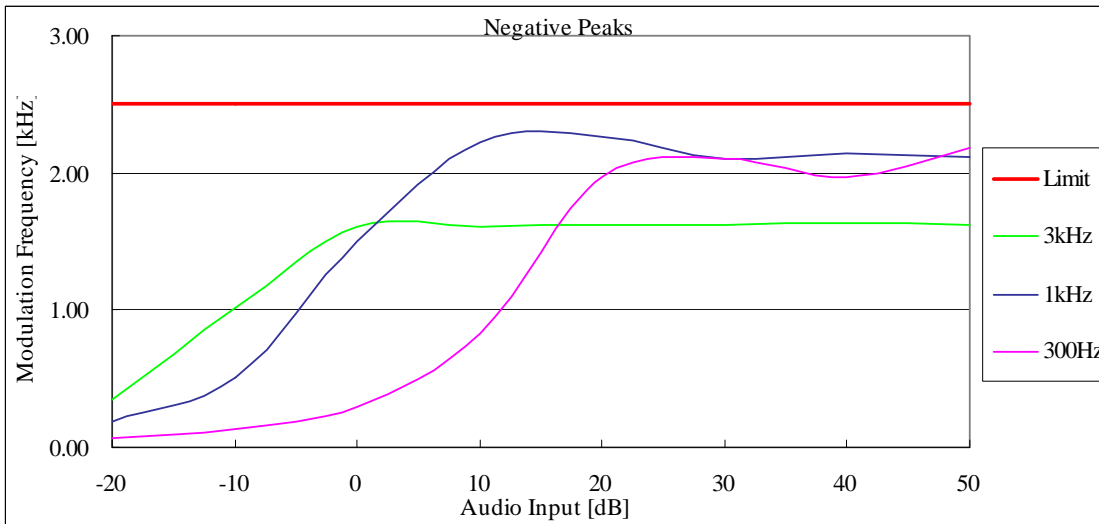
State : High Power / Authorized Bandwidth 20 kHz / 16K0F3E / 173.50 MHz(FCC/ RSS)



State : High Power / Authorized Bandwidth 11.25 kHz / 11K0F3E / 173.50 MHz(FCC/ RSS)



State : High Power / Authorized Bandwidth 11.25 kHz / 11K0F3E / 173.50 MHz(FCC/ RSS)



10.8 Frequency Stability (Temperature Variation)

REGULATIONS	: FCC Part 2 Section 1055 (a) (1), Part 22 Section 355 , Part 74Section 464 , Part 90 Section 213(a) / RSS-119 Section 5.3
TEST METHOD/GUIDE	: ANSI/TIA-603-D Section 2.2.2.2 / RSS-Gen Section 4.7(a)

Test Procedure

- 1 The EUT and test equipment were set up as shown on the following page.
- 2 Set the temperature -30 degrees C.
- 3 Leave the EUT for 1 hour after it became the temperature that was set up.
- 4 Make the EUT the transmitting state.
One minutes later, measure the output frequency.
- 5 Make the EUT the receiving state.
- 6 Set the temperature 50 degrees C by 10 degrees C.
And repeat test procedure 3 to 5.

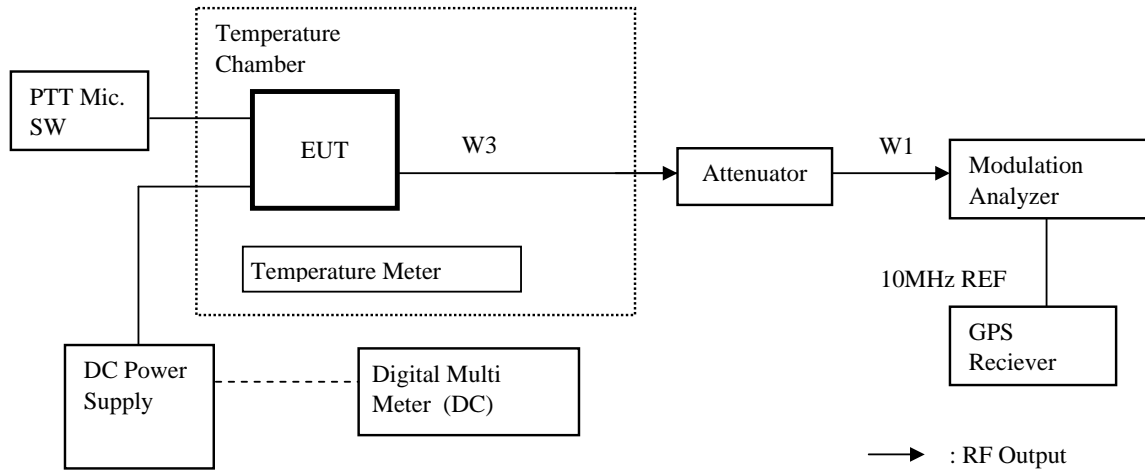
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
1	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4537	May 30, 11	May 31, 12
2	Attenuator (30dB)	Weinschel	WA-29-30-34	8923	May 30, 11	May 31, 12
3	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	Jul. 07, 11	Jul. 31, 12
4	Digital Multi Meter	FLUKE	8846A	9642018	Jun. 28, 11	Jun. 30, 12
5	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290932	None	None
6	Temperature Chamber	Tabai	PL-3F	5103661	None	None
7	Temperature Meter	Sato	PC-5000TRH-II	A11999972	Apr. 15, 11	Apr. 30, 12
8	GPS Receiver	Hewlett Packard	HP Z3801A	3542A02414	None	None

Measuring Cables

No.	Cable	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
W1	Coaxial Cable	Suhner	SUCOFLEX104	KSR00211	Sep. 02, 11	Sep. 30, 12
W3	Coaxial Cable	Suhner	SUCOFLEX104	KSR00042	Apr. 22, 11	Apr. 30, 12

Measuring Equipment Configuration



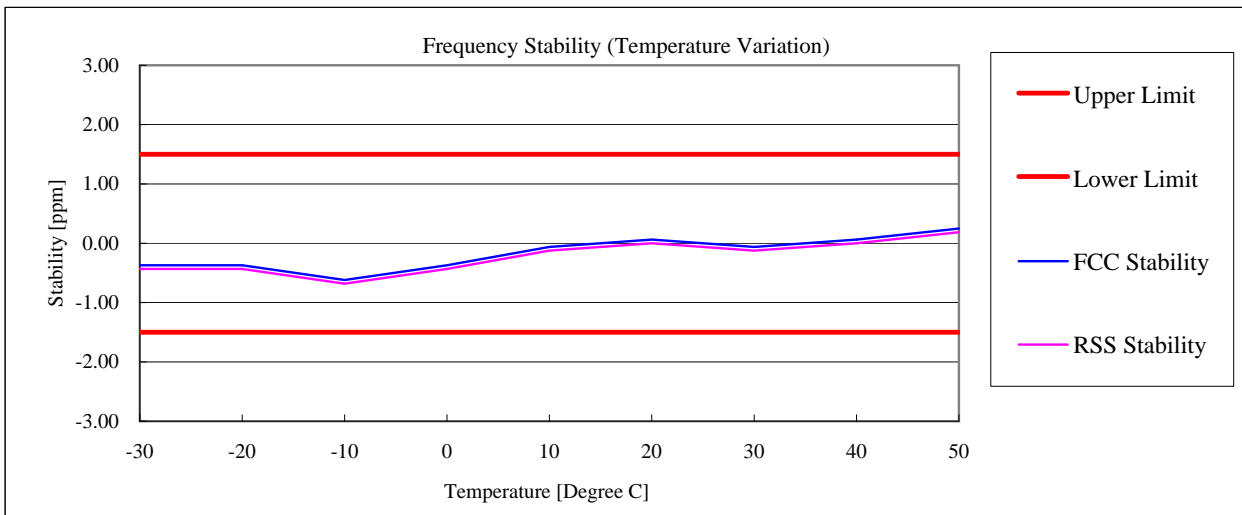
Test Results

Test date	Oct. 28, 2011
Location	Kashima No.1 Test Site
Test Engineer	Koichi Wagatsuma

Test was carried out for all the frequency band of section 10.1
 State the worst case (below).

State : High Power / Authorized Bandwidth 20 kHz / 161.50 MHz (FCC/RSS)
 Reference Frequency: 161.500000 MHz(FCC Stability)
 161.500010 MHz(RSS Stability)

No.	Temperature (Degree C)	Frequency (MHz)	FCC Stability (ppm)	RSS Stability (ppm)	Limit (+/- ppm)	Min. Margin (ppm)
1	-30	161.499940	-0.37	-0.43	1.5	1.07
2	-20	161.499940	-0.37	-0.43	1.5	1.07
3	-10	161.499900	-0.62	-0.68	1.5	0.82
4	0	161.499940	-0.37	-0.43	1.5	1.07
5	10	161.499990	-0.06	-0.12	1.5	1.38
6	20	161.500010	0.06	0.00	1.5	1.44
7	30	161.499990	-0.06	-0.12	1.5	1.38
8	40	161.500010	0.06	0.00	1.5	1.44
9	50	161.500040	0.25	0.19	1.5	1.25



10.9 Frequency Stability (Voltage Variation)

REGULATIONS	: FCC Part 2 Section 1055 (d) (1), Part 22 Section 355 , Part 74 Section 464 , Part 90 Section 213(a) / RSS-119 Section 5.3
TEST METHOD/GUIDE	: ANSI/TIA-603-D Section 2.2.2.2 / RSS-Gen Section 4.7(b)

Test Procedure

- 1 The EUT and test equipment were set up as shown on the following page.
- 2 The power supply voltage to the EUT was varied from 85 % to 115 % of the nominal value measured at the input to the EUT.

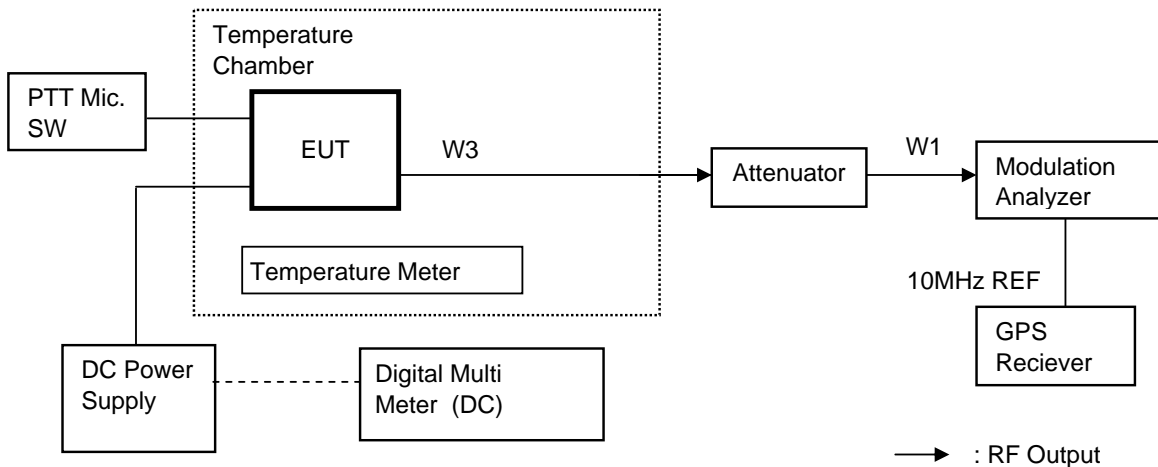
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
1	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4537	May 30, 11	May 31, 12
2	Attenuator (30dB)	Weinschel	WA-29-30-34	8923	May 30, 11	May 31, 12
3	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	Jul. 07, 11	Jul. 31, 12
4	Digital Multi Meter	FLUKE	8846A	9642018	Jun. 28, 11	Jun. 30, 12
5	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290932	None	None
6	Temperature Chamber	Tabai	PL-3F	5103661	None	None
7	Temperature Meter	Sato	PC-5000TRH-II	A11999972	Apr. 15, 11	Apr. 30, 12
8	GPS Reciever	Hewlett Packard	HP Z3801A	3542A02414	None	None

Measuring Cable:

No.	Cable	Manufacture	Model No.	Serial No.	Cal Date
W1	Coaxial Cable	Suhner	SUCOFLEX104	KSR00211	Sep. 02, 11
W3	Coaxial Cable	Suhner	SUCOFLEX104	KSR00042	Apr. 22, 11

Measuring Equipment Configuration



Test Results

Test date	Oct. 28, 2011
Location	Kashima No.1 Test Site
Test Engineer	Koichi Wagatsuma

Test was carried out for all the frequency band of section 10.1
State the worst case (below).

State : High Power / Authorized Bandwidth 20 kHz / 161.5 MHz (FCC/RSS)

No.	Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Stability (ppm)	Limit +/- (ppm)	Margin (ppm)
1	20+/-5	85	11.56	161.500000	0.00	1.5	1.50
2	20+/-5	100	13.60	161.500010	0.06	1.5	1.44
3	20+/-5	115	15.64	161.500010	0.06	1.5	1.44

10.10 Receiver Spurious Emissions(Radiated)

REGULATIONS	:	RSS-119 Section 5.11, RSS-Gen Section 6
TEST METHOD/GUIDE	:	RSS-Gen Section 4.10

TEST PROCEDURE

- 1 The EUT and test equipment were set up as shown on the following page.
- 2 Tabletop Equipment
EUT is placed on the wooden table, the top of which is 0.8 meter above the metal ground plane (turntable).
- 3 Interconnecting Cables
Excess part of the interconnecting cables longer than 1 meter are bundled in the center. Cables that hang closer than 40 cm to the ground plane are folded back and forth forming to 40 cm long, hanging approx, in the middle between ground plane and table.
- 4 Measuring Instruments
Measuring instruments list and their calibration schedule are shown on Measurement Equipment Configuration.
The brief description are as follows;
- 5 Antennas
The broadband Bi-cone antenna is used for measurement on the frequency range 30 – 1000 MHz.
The Double ridged guide antenna is used for frequency higher than 1000 MHz.
- 6 Pre-amplifier
The broadband pre-amplifier is used for radiated emission measurement.
The signal to noise ratio is improved by using pre-amplifier.
- 7 Spectrum Analyzer
The spectrum analyzer is used for preliminary measurement of frequency range 30 – 1000 MHz, and also used for final measurement of higher than 1000 MHz (RBW : 1 MHz).
- 8 EMI Test Receiver
The Quasi-peak detector (IF bandwidth : 120 kHz) built in test receiver is used for final measurement of the frequency 30 – 1000 MHz.
The test receiver is complied with the specification of the CISPR publication 16.
- 9 Turntable
The turntable is capable for EUT weight and rotatable 0 to 360 degree horizontally by remote control in the test room.
- 10 Antenna Mast
The antenna mast is attachable to all antennas described on antenna height is adjustable 1 to 4 meters continuously by remote control at the test room, and antenna polarization is also changed by the remote control.
- 11 Preliminary Measurement
EUT is tested on all operating conditions.
The spectrum analyzer is set max-hold mode and swept during turntable was rotated 0 to 360 degree. Then spectrum chart are plotted out to find the worst emission conditions in configuration, operating mode, or ambient noise notation.

12 Final Measurement

The EUT operated in the condition where maximum emission is found in the preliminary test.

The turntable azimuth(EUT direction) and antenna height are adjusted the position so that maximum field strength is obtained for each frequency spectrum to be measured.

The equipment and cables are arranged or manipulated within the range of the test standard in the above condition.

When the uncertain result was obtained, the measurement is retried by using the half wave dipole antenna instead of the broadband antenna.

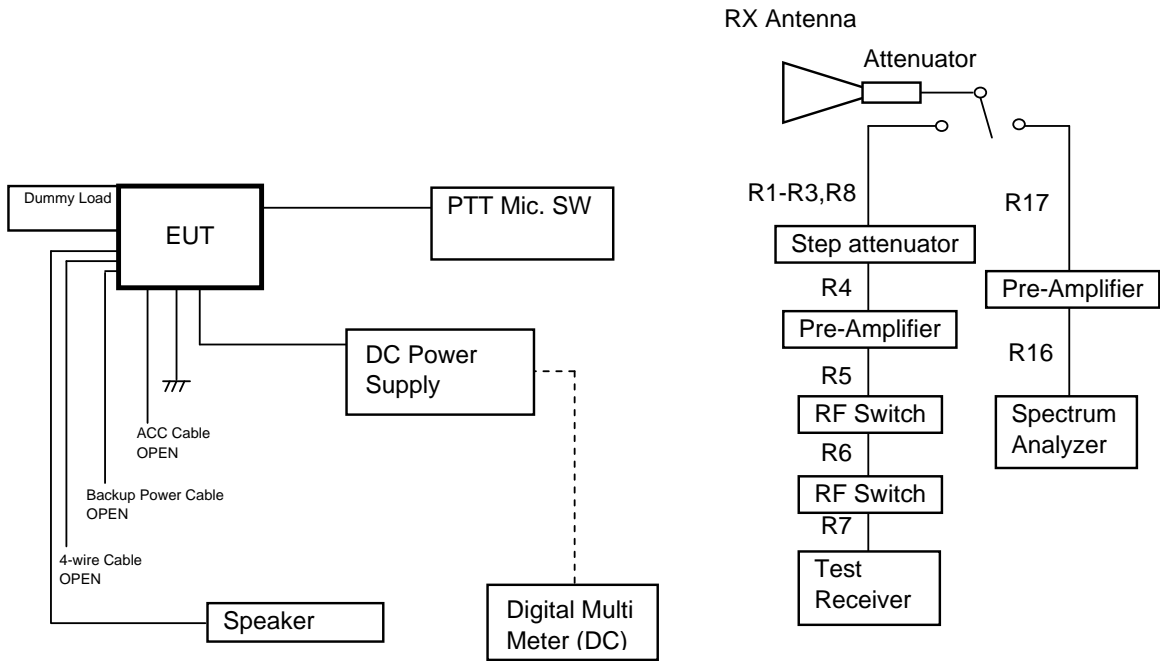
TEST EQUIPMENTS

No.	Equipment	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
1	Broad Band antenna	Schwarzbeck	VULB9168	217	Apr. 25, 11	Apr. 30, 12
2	D.R.G Antenna	EMCO	3115	9903-5699	May 18, 11	May 31, 12
3	Pre-Amplifier	Hewlett Packard	8447D	2727A05322	Apr. 14, 11	Apr. 30, 12
4	Pre-Amplifier	Hewlett Packard	8449B	3008A01182	Apr. 19, 11	Apr. 30, 12
5	Attenuator(6dB)	TAMAGAWA	CFA-01(NPJ-6)	None	Apr. 14, 11	Apr. 30, 12
6	Attenuator(6dB)	Agilent	8493C	75550	Apr. 19, 11	Apr. 30, 12
7	Spectrum Analyzer	Hewlett Packard	8563E	3821A09565	May 02, 11	May 31, 12
8	Test Receiver	Rohde & Schwarz	ESS	845420/009	Jul. 13, 11	Jul. 31, 12
9	Step Attenuator	Hewlett Packard	8494B	2805A14560	Apr. 14, 11	Apr. 30, 12
10	RF Switch	Intertek Japan	ACX-150	None	Apr. 14, 11	Apr. 30, 12
11	Digital Multi Meter	FLUKE	8846A	9642018	Jun. 28, 11	Jun. 30, 12
12	DC Power Supply	Vertex	FP1030E	1102117027	None	None

USED CABLES

No.	Cable	Manufacture	Model No.	Serial No.	Cal Date	Cal Exp.
R1	Coaxial Cable	Intertek Japan	5D-2W	1R1001a	Apr. 14, 11	Apr. 30, 12
R2	Coaxial Cable	Intertek Japan	RG-177/U	1R1002	Apr. 14, 11	Apr. 30, 12
R3	Coaxial Cable	Intertek Japan	RG-5A/U	1R1003	Apr. 14, 11	Apr. 30, 12
R4	Coaxial Cable	Intertek Japan	RG-5A/U	1R1004	Apr. 14, 11	Apr. 30, 12
R5	Coaxial Cable	Intertek Japan	5D-2W	1R1005	Apr. 14, 11	Apr. 30, 12
R6	Coaxial Cable	Intertek Japan	5D-2W	1R1006	Apr. 14, 11	Apr. 30, 12
R7	Coaxial Cable	Intertek Japan	5D-2W	1R1007	Apr. 14, 11	Apr. 30, 12
R8	Coaxial Cable	Intertek Japan	5D-2W	1R1008a	Apr. 14, 11	Apr. 30, 12
R16	Coaxial Cable	Suhner	SUCOFLEX	290799/4	Apr. 19, 11	Apr. 30, 12
R17	Coaxial Cable	Suhner	SUCOFLEX	290800/4	Apr. 19, 11	Apr. 30, 12

MEASUREMENT EQUIPMENT CONFIGURATION



TEST RESULTS

Test date	Oct. 13, 2011 to Oct. 17, 2011	
Location	Tochigi No.1 Test Site	
temperature	20.0 to 25.0	[degree C]
Humidity Variation	54 to 60	[%]
Atmospheric Pressure	98.5 to 99.6	[kPa]
Test Engineer	Koichi Wagatsuma	

Test was carried out for the RSS frequency band of section 10.1
 State the worst case (below).

State : 161.50 MHz Receiver Condition

No.	Frequency (MHz)	Pol	Mode	Level (dBuv)	Factor* (dB)	Emission Level (dBuV/m)	Limit Level (dBuV/m)	Margin (dB)
1	73.65	Hor.		-	-8.00	-	40.0	-
		Ver.		22.30	-8.00	14.30	40.0	25.7
2	234.85	Hor.		31.20	-5.30	25.90	46.0	20.1
		Ver.		25.80	-5.30	20.50	46.0	25.5
3	469.70	Hor.		24.80	1.60	26.40	46.0	19.6
		Ver.		25.60	1.60	27.20	46.0	18.8
4	704.56	Hor.		28.30	6.80	35.10	46.0	10.9
		Ver.		29.10	6.80	35.90	46.0	10.1
5	939.40	Hor.		21.10	11.80	32.90	46.0	13.1
		Ver.		21.50	11.80	33.30	46.0	12.7
6	983.20	Hor.		-	12.50	-	54.0	-
		Ver.		20.70	12.50	33.20	54.0	20.8
7	1174.21	Hor.	AVG	38.50	-1.90	36.60	54.0	17.4
		Ver.	AVG	38.90	-1.90	37.00	54.0	17.0
8	1408.87	Hor.	AVG	33.50	-0.90	32.60	54.0	21.4
		Ver.	AVG	36.60	-0.90	35.70	54.0	18.3
9	1878.66	Hor.	AVG	33.20	1.80	35.00	54.0	19.0
		Ver.	AVG	34.20	1.80	36.00	54.0	18.0

There is the margin of 20dB over except for the above points.

* Factor = Antenna, Antenna Pad, Cable, Preamp

Emission Level = Reading Level + Factor

Note:

- 1 Measurement distance is 3 metres.
- 2 Scanned frequency are 30 to 2000 MHz.
- 3 Highest oscillator frequency is 247.35 MHz.

10.11 Necessary Bandwidth and Emission Bandwidth

REGULATIONS	: FCC Part 2 Section 202 (g) & Federal Register/ Vol.68, No236 TRC 43
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Calculation Results

State : 16K0F3E (Authorized Bandwidth 20 kHz)

Item	Mark		
Maximum Modulation	(M)	3	kHz
Maximum Deviation	(D)	5	kHz
Constant Factor	(K)	1	
Necessary Bandwidth	(Bn)	16	kHz

$B_n = (2 \times M) + (2 \times D \times K)$

State : 11K0F3E (Authorized Bandwidth 11.25 kHz)

Item	Mark		
Maximum Modulation	(M)	3	kHz
Maximum Deviation	(D)	2.5	kHz
Constant Factor	(K)	1	
Necessary Bandwidth	(Bn)	11	kHz

$B_n = (2 \times M) + (2 \times D \times K)$