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TEST REPORT

REGULATION : **FCC Part 2, 22, 74, 80, 90**

Applicant	Testing Laboratory
JVC KENWOOD Corporation 1-16-2, Hakusan, Midori-ku, Yokohama-shi Kanagawa, 226-8525 Japan Tel.: +81 45 939 6254 Fax.: +81 45 939 6261	Intertek Japan K.K. Kashima Laboratory URL: http://www.japan.intertek-etlsemko.com (No.12 Test site) 298-6 Sada, Kashima, Ibaraki 314-0027 Japan Tel. +81 299 82 8464

Equipment type	VHF DIGITAL TRANSCEIVER
Trademark	KENWOOD
FCC Model(s)	NX-5700H-F, VM5730H-F
Serial No.	No.43
FCC ID	K44499200
Test Result	Complied
Report Number	18090080JKA-002
Original Issue Date	October 17, 2018
Revised Issue Date	November 21, 2018

Approved by

H. Kosemura

Hideaki Kosemura

[Technical Manager]

Tested by

K. Wagatsuma

Koichi Wagatsuma

[Engineer]

ilac-MRA VLAC Lab Accreditation
VLAC-008-1

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

Sub-part 2.1033

Applicant and Manufacture Information		
APPLICANT		
Company	:	JVC KENWOOD Corporation
Address	:	1-16-2, Hakusan, Midori-ku, Yokohama-shi Kanagawa, 226-8525 Japan
Contact Person	:	Tamaki Shimamura Manager, Communications Systems Devision
MANUFACTURER		
Company	:	JVC KENWOOD Corporation
Address	:	1-16-2, Hakusan, Midori-ku, Yokohama-shi Kanagawa, 226-8525 Japan
(c)(2) FCC ID		
FCC ID	:	K44499200
Model number	:	NX-5700H-F, VM5730H-F
Serial number	:	No.43
Instruction Manual(S)		
Instruction manual(s)	:	Please refer to attached Exhibits F
Type of Emission		
Emission Designation	:	16K0F3E(Wide) 11K0F3E(Narrow) 8K30F1E(Narrow) / 8K30F1D(Narrow) / 8K30F7W(Narrow) 8K10F1E(Narrow) / 8K10F1D(Narrow) / 8K10F1W(Narrow) 4K00F1E(Very Narrow) / 4K00F1D(Very Narrow) / 4K00F7W(Very Narrow) 4K00F2D(Very Narrow)
Frequency range		
Frequency Range	:	FCC: 150 to 174 MHz
Power Rating		
Output Power	:	25 to 110 W (Part 74: 25 to 100W)
Type	:	Continuously Variable
Maximum Power Rating		
Output Power	:	110W (Part 74: 100W)
Voltages & currents in all elements in final RF stage, including final transistor or solid-state device		
Collector Current, A	:	30.0 A Maximum
Collector Voltage, Vdc	:	13.4 Vdc
Supply Voltage, Vdc	:	13.4 Vdc
Other Information		
Number of Channel	:	Zone 128max. Cannels 512 max.(per Zone)
Maximum Deviation	:	± 5 kHz (16K0F3E), ± 2.5 kHz (11K0F3E)
Frequency Stability	:	1.0 ppm
	:	
Antenna Impedance	:	50 Ω Norminal
Note		

TABLE OF CONTENTS

SECTION 1. GENERAL INFORMATION

TEST PERFORMED

Location	Kashima No.12 Test Site		
EUT Received	September 14, 2018		
Date of Test	September 14, 2018	to	October 02, 2018
Standard Applied	FCC Part 2, 22, 74, 80, 90		
Measurement Method	ANSI/TIA-603-E-2016		
Deviation from Standard(s)	Not applicable		

QUALIFICATIONS OF TESTING LABORATORY (Kashima Lab.)

ACCREDITATION	SCOPE	LAB. CODE	Remarks
VLAC	EMC Testing	VLAC-008-1	JAPAN
FILING			
VCCI	EMC Testing	A-0126	JAPAN
FCC	EMC Testing	JP0008	
IC	EMC Testing	IC-2042Q-12	CANADA
CB-Scheme	EMC Testing	TL222	IECEE

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

Revision Summary

Revised Date	Section	Description of Changes
Nov 16, 2018	Page 2	add : Power Rating (Part 74: 25 to 100W)
Nov 16, 2018	Page 2	add : Maximum Power Rating (Part 74: 100W)
Nov 21, 2018		add: 100W data

SECTION 2. SUMMARY OF TEST RESULT

FCC Part2	Part22	Part74	Part80	Part90	TEST ITEM	RESULTS	Comments
2.1046 (a)	-	74.461	-	-	Carrier Output Power (Conducted)	**PASS**	
2.1051	-	-	80.211	90.210	Unwanted Emissions (Transmitter Conducted)	**PASS**	
2.1053 (a)	-	-	80.211	90.210	Field Strength of Spurious Radiation	**PASS**	
2.1049 (c) (1)	22.359, 357 (a)	74.462	80.211	90.210	Emission Masks (Occupied Bandwidth)	**PASS**	
-	-	-	-	90.214	Transient Frequency Behavior	**PASS**	
2.1047 (a)	-	-	80.213	-	Audio Low Pass Filter (Voice Input)	**PASS**	
2.1047 (a)	-	-	80.213	-	Audio Frequency Response	**PASS**	
2.1047 (b)	-	-	80.213	-	Modulation Limiting	**PASS**	
2.1055 (a) (1)	22.355	74.464	80.209	90.213 (a)	Frequency Stability (Temperature Variation)	**PASS**	
2.1055 (d) (1)	22.355	74.464	80.209	90.213 (a)	Frequency Stability (Voltage Variation)	**PASS**	
-	-	-		-	Receiver Spurious Emissions	**PASS**	
-	-	-	-	90.203 (j)(3)	Certification required (FCC Part 90.203(j)(3))	**Complied**	
-	-	-	-	90.203 (j)(4)	Certification required (FCC Part 90.203(j)(4))	**Complied**	
-	-	-	-	90.203 (j)(5)	Certification required (FCC Part 90.203(j)(5))	**Complied**	
-	-	-	-	90.203 (e)	Certification required (FCC Part 90.203(e))	**Complied**	
-				-	99% Occupied Bandwidth	**PASS**	

Limitation on Results

The test result of this report is effective equipment under test itself and under the test configuration descried on the report.
This test report dose 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 Subport B-Unintentional Radiators, the EUT has been measured and declared as SDoC by JVC Kenwood Corporation.

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 22	**Non Cellular**	**YES**
Part 74	**Experimental Radio Auxiliary , Special Broadcast and Other Program Distributional Services**	**YES**
Part 80	**Stations in the Maritime Services**	**YES**
Part 90	**Private Land Mobile radio Services**	**YES**

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	N.A.
RSS-134	900MHz Narrowband Personal Communication Service	N.A.
RSS-Gen	General Requirements for Conpliance of Radio Apparatus	N.A.

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

4.1 List of System Configuration

Symbol	Item	Model No.	Serial No.	Manufacture	Remarks
A	VHF DIGITAL TRANSCEIVER	NX-5700H-F, VM5730H-F	No.43	JVC KENWOOD Corporation	EUT

Power Ratings of EUT :	DC 13.4V ± 15%	30.0 A Maximum	
Power Supply :	DC 13.4 V		
Condition of Equipment	Proto type		
Type	Mobile 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
RF Antenna	M	2pin	
GPS Antenna	SMA	2 pin	
ACC	Molex9P	9 pin	
ACC	D-sub	25pin	
ACC	B to B connector	16pin	
USB	Micro AB	5pin	For maintenance

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

Operating Frequency	Board Name	Remarks
348 MHz	TXRX UNIT	
4960 MHz	Bluetooth UNIT	
3142.648 MHz	GPS 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	REMOTE CONTROL HEAD	KCH-20R	B8310057	JVC KENWOOD	K44473100
C	SECURE CRYPTOGRAPHIC MODULE	KWD-AE30	No.37	JVC KENWOOD	N/A
D	Micro SD card	THNSQ008GCB6 KE(LB6	None	TOSHIBA DEVICE CORPORATION	DoC
E	TX Jig	None	None	JVC KENWOOD	N/A
F	External Speaker	KES-5	None	JVC KENWOOD	N/A
G	External Speaker	KES-5	None	JVC KENWOOD	N/A
H	Dummy Load	CT-150NP	1138693	TME	N/A
I	DC Power Supply	GZV4000	90290931	Daiichi denpa kogyo	N/A
J	GPS Antenna	KRA-40G	None	JVC KENWOOD	N/A
K	External MIC KIT	KCT-73MIC	None	JVC KENWOOD	N/A
L	External PTT KIT	KCT-74PTT	None	JVC KENWOOD	N/A
M	External Speaker	KES-5	None	JVC KENWOOD	N/A

Supplied Power:

I	AC 100V,60Hz

SECTION 6. USED CABLE(S)

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

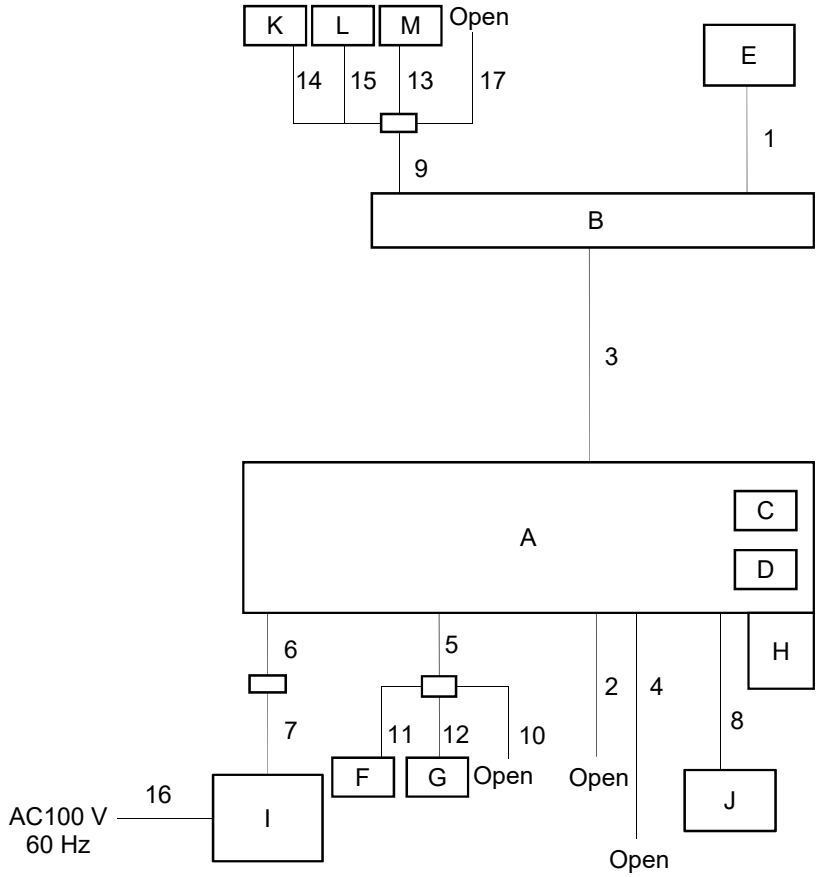
No.	Name	Length (m)	Shield	Metal Connector	Ferrite core
1	TX Jig CABLE	0.50	No	No	
2	USB Cable	0.22	Yes	Yes	
3	REMOTE CABLE (KCT-71 M3)	7.60	Yes	Yes	
4	ACC Cable	2.00	Yes	Yes	
5	ACC Cable	0.20	No	No	
6	DC cable	0.25	No	No	
7	DC cable	3.00	No	No	
8	GPS Antenna cable	2.00	Yes	Yes	
9	ACC Cable	0.32	No	No	
10	Ignition sense cable (KCT-18)	3.20	No	No	
11	Speaker cable	3.00	No	No	
12	Speaker cable	3.00	No	No	
13	Speaker cable	3.00	No	No	
14	External MIC KIT cable	3.00	No	No	
15	External PTT KIT cable	3.00	No	No	
16	Power cable for DC Power Supply	1.50	No	No	
17	Ignition sense cable (KCT-18)	3.20	No	No	

SECTION 7. TEST CONFIGURATION

Details of Configuration and Connection

Example: Case of Section 10.3Test

* : EUT
■ : Ferrite core
▭ : Joint Connecter



SECTION 8. OPERATING CONDITION

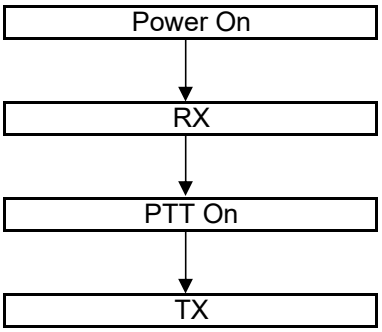
The EUT was operated under the following condition during the test.

8.1 Operating Condition

The test was carried out under Transmit mode.
(FCC:150.05MHz, 162.05MHz, 173.95MHz)
(High Power : 110W, Low Power : 25W)

8.2 Operating Flow [Transmit 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			
	+/- 2.78dB (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)	+/- 1.0	%
Frequency Stability (Temperature Variation)			
	+/- 10.1Hz (k=2)	+/-34.2	Hz
Frequency Stability (Voltage Variation)			
	+/- 10.1Hz (k=2)	+/-34.2	Hz
Receiver Spurious Emissions	U_{lab}	Ucispr	
30-1000MHz	+/- 4.38dB (k = 2)	+/- 6.3	dB
abobe 1GHz	+/- 4.33dB (k = 2)	+/- 5.2	dB
Bandwidth			
	+/- 1.02% (k = 2)	-	

SECTION 10. TEST DATA

10.1 Carrier Output Power (Conducted)

REGULATIONS	:	FCC Part 2 Section 1046 (a)
TEST METHOD/GUIDE	:	ANSI/TIA-603-E Section 2.2.1.2

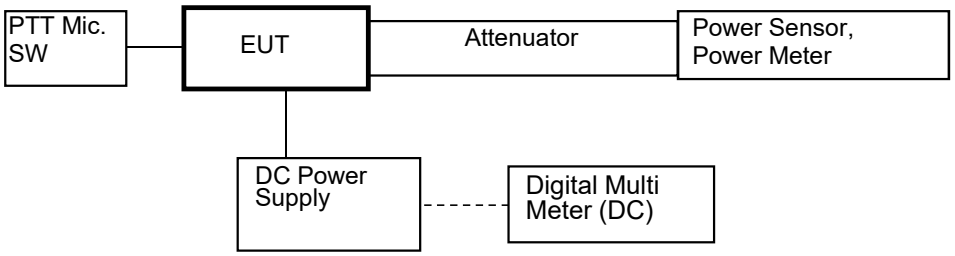
Test Procedure

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. Interval	Effective period
1	Power Meter	Hewlett Packard	E4418B	GB38410265	1Y	Sep. 30, 19
2	Power Sensor	Hewlett Packard	8482A	US37292237	1Y	Sep. 30, 19
3	Attenuator (30dB)	Weinschel	WA-29-30-34	8923	1Y	Jul. 31, 19
4	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290931	None	None
5	Digital Multi Meter	FLUKE	8846A	9642018	1Y	Sep. 30, 19

Measuring Equipment Configuration



Test Results

	Test date	Sep. 14, 2018	and		Nov. 21, 2018
	Location	Kashima No.12 Test Site			
	temperature	20.0	to	26.0	[degree C]
	Humidity Variation	50.0	to	60.0	[%]
	Atmospheric Pressure	101.4	to	101.6	[kPa]
	Test Engineer	Koichi Wagatsuma			

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

No.	Frequency (MHz)	Band	Setting	RF Power (W)
1	150.05	Low	High Power	110
2	162.05	Middle	High Power	110
3	173.95	High	High Power	110
4	150.05	Low	Low Power	25
5	162.05	Middle	Low Power	25
6	173.95	High	Low Power	25

RF Power: Peak reading

No.	Frequency (MHz)	Band	Setting	RF Power (W)
1	150.05	Low	High Power 2	100
2	162.05	Middle	High Power 2	100
3	173.95	High	High Power 2	100

RF Power: Peak reading

10.2 Unwanted Emissions (Transmitter Conducted)

REGULATIONS	:	FCC Part 2 Section 1051, Part 80 Section 211, Part 90 Section 210
TEST METHOD/GUIDE	:	ANSI/TIA-603-E Section 2.2.13.2

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 : 100 kHz (< 1 GHz), 1 MHz (> 1 GHz).
b) VBW : 300 kHz (< 1 GHz), 3 MHz (> 1 GHz).
c) 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.

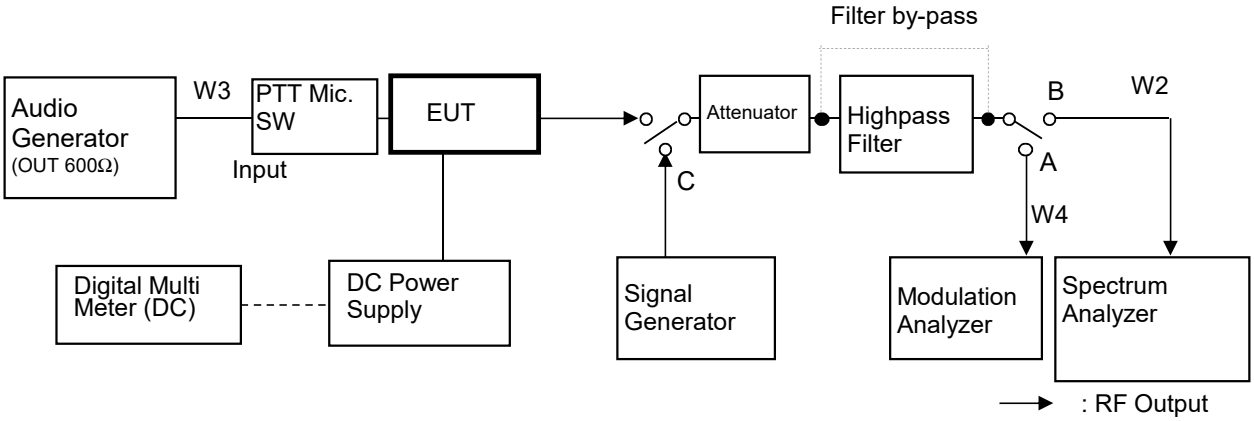
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
1	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4357	1Y	Jul. 31, 19
2	Attenuator (30dB)	Weinschel	WA-29-30-34	8923	1Y	Jul. 31, 19
3	Highpass Filter	Anritsu	MP526B	6200220636	1Y	Feb. 28, 19
4	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	1Y	Dec. 31, 18
5	Signal Generator	Rohde&Schwarz	SMB 100A	105709	1Y	Apr. 30, 19
6	Audio Generator	Anritsu	MG443B	M70150	1Y	Sep. 30, 19
7	Spectrum Analyzer	Agilent	N9030A	US51350220	1Y	Mar. 31, 19
8	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290931	None	None
9	Digital Multi Meter	FLUKE	8846A	9642018	1Y	Sep. 30, 19

Measuring Cables

No.	Cable	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
W3	Balance Cable	Nicoon	3D-2V	KSR00092	1Y	Feb. 28, 19
W4	Coaxial Cable	Pacific custom	RG-58 C/U	AM90C04	1Y	Feb. 28, 19
W2	Coaxial Cable	Suhner	SUCOFLEX104	F0000017	1Y	Jul. 31, 19

Measuring Equipment Configuration



Note: Configuration of other Modulation test is composed without the Audio Generator.

Test Results

	Test date	Sep. 28, 2018	and	Nov. 21, 2018	
	Location	Kashima No.12 Test Site			
	temperature	20.0	to	26.0	[degree C]
	Humidity Variation	50.0	to	62.0	[%]
	Atmospheric Pressure	101.2	to	101.6	[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	150.05	Low	300.10	-32.96	**-83.37**	-70.0	13.4
2	162.05	Middle	324.10	-32.68	**-83.09**	-70.0	13.1
3	173.95	High	347.90	-32.88	**-83.29**	-70.0	13.3
There is the margin of 20dB over except for the above points.							

Mask D Limit (dBc) = whichever is the lesser attenuation ; -(50+10Log(P)) or -70
Correct Level (dBm) = Substitute SG Level (dBm)
Emission Level (dBc) = Correct Level (dBm) - 10Log(P*1000)
P = Carrier Level (W)
" - " = Measurement Limit

State : Low Power / Authorized Bandwidth 6 kHz

No.	Tuned Frequency (MHz)	Band	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Mask E Limit (dBc)	Margin (dB)
1	150.05	Low	300.10	-40.91	**-84.89**	-65.0	19.9
2	162.05	Middle	324.10	-41.65	**-85.63**	-65.0	20.6
3	173.95	High	347.90	-41.30	**-85.28**	-65.0	20.3
There is the margin of 20dB over except for the above points.							

Mask E Limit (dBc) = whichever is the lesser attenuation ; -(55+10Log(P)) or -65
Correct Level (dBm) = Substitute SG Level (dBm)
Emission Level (dBc) = Correct Level (dBm) - 10Log(P*1000)
P = Carrier Level (W)
" - " = Measurement Limit

State : High Power 2 / 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	150.05	Low	300.10	-32.96	**-82.96**	-70.0	13.0
2	162.05	Low	324.10	-32.68	**-82.68**	-70.0	12.7
3	173.95	Low	347.90	-32.88	**-82.88**	-70.0	12.9
There is the margin of 20dB over except for the above points.							

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

10.3 Field Strength of Spurious Radiation

REGULATIONS	:	FCC Part 2 Section 1053 (a), Part 80 Section 211 , Part 90 Section 210
TEST METHOD/GUIDE	:	ANSI/TIA-603-E Section 2.2.12.2

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 : 100 kHz (< 1 GHz), 1 MHz (> 1 GHz).
b) VBW : 300 kHz (< 1 GHz), 3 MHz (> 1 GHz).
c) 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

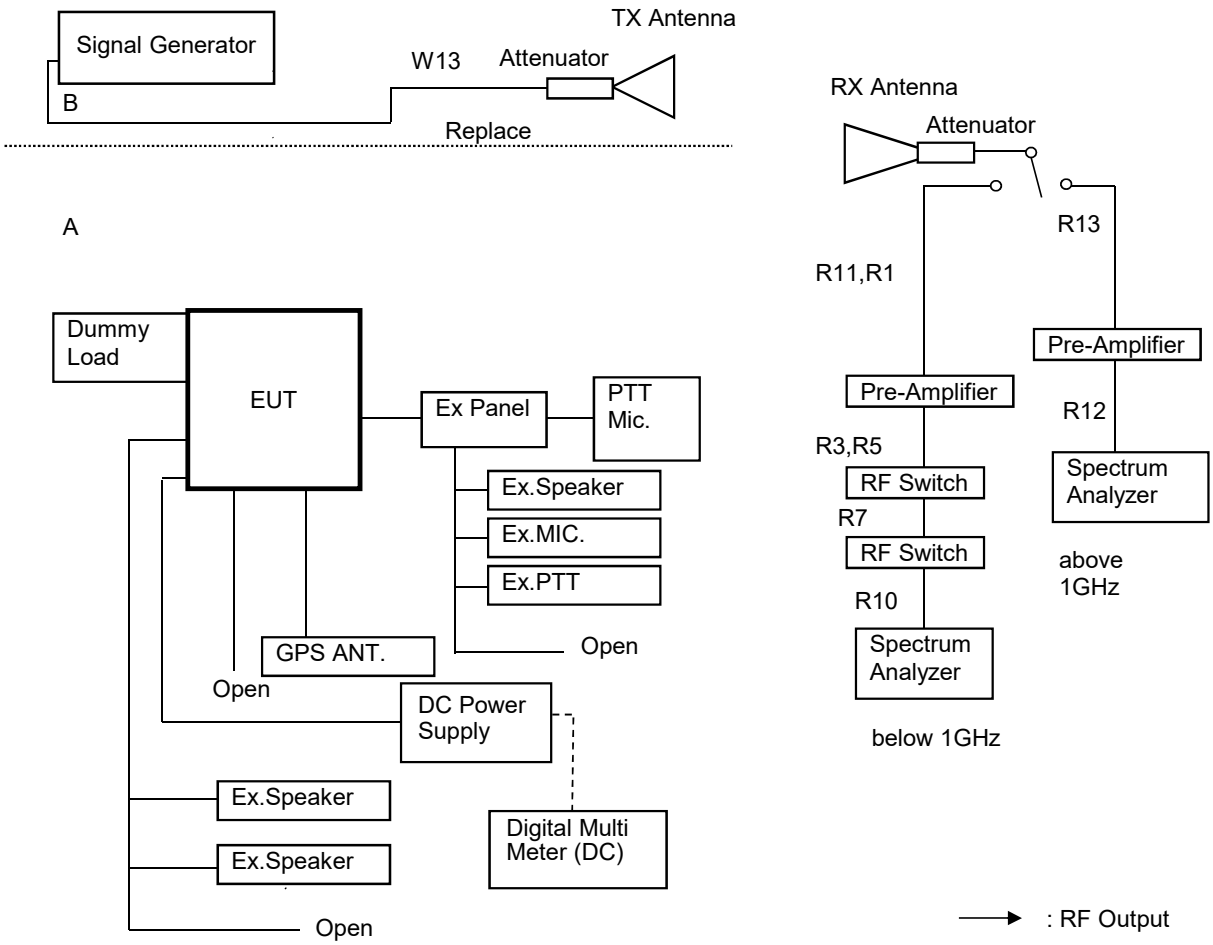
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
1	Attenuator(10dB)	HUBER+SUHNER	6810.17B	5061	1Y	Jan. 31, 19
2	Dummy Load	TME	CT-150NP	1138693	1Y	Feb. 28, 19
3	Signal Generator	Rohde&Schwarz	SMB 100A	105709	1Y	Apr. 30, 19
4	Spectrum Analyzer	Agilent	N9030A	US51350220	1Y	Mar. 31, 19
5	D.R.G Antenna(TX)	Schwarzbeck	3115	5044	1Y	Apr. 30, 19
6	D.R.G Antenna(RX)	Schwarzbeck	3115	5045	1Y	Apr. 30, 19
7	Dipole Antenna(TX)	Schwarzbeck	UHA9105	AM0082002	1Y	May. 31, 19
8	Dipole Antenna(TX)	Schwarzbeck	VHA9103	C01082007	1Y	May. 31, 19
9	Tri-log Antenna(RX)	Schwarzbeck	VULB9168WP	288	1Y	Jul. 31, 19
10	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290931	None	None
11	Digital Multi Meter	FLUKE	8846A	9642018	1Y	Sep. 30, 19
12	Amplifier	TOYO	TPA0118-30	0402	1Y	May. 31, 19
13	Attenuator	HUBER + SUHNER	6803.17.B	5111	1Y	May. 31, 19
14	Amplifier	Intertek Japan	ZX60-3018G	002	1Y	Aug. 31, 19
15	Attenuator	TAMAGAWA	CFA-01	A00040805	1Y	Aug. 31, 19
16	RF Switch	Intertek Japan	ACX-150-1	A12301501	1Y	Aug. 31, 19

Measuring Cables

No.	Cable	Manufacturer	Model No.	Serial No.	Cal. Interval	Effective period
R11	Coaxial Cable	FUJIKURA	5D-2W	R11	1Y	Aug. 31, 19
R1	Coaxial Cable	FUJIKURA	5D-2W	R1	1Y	Aug. 31, 19
R3	Coaxial Cable	FUJIKURA	10D-2W	R3	1Y	Aug. 31, 19
R5	Coaxial Cable	FUJIKURA	RG-5A/U	R5	1Y	Aug. 31, 19
R7	Coaxial Cable	MIYAZAKI	5D-2W	R7	1Y	Aug. 31, 19
R10	Coaxial Cable	FUJIKURA	5D-2W	R10	1Y	Aug. 31, 19
R13	Coaxial Cable	SUHNER	SUCOFLEX 104	229603	1Y	May. 31, 19
R12	Coaxial Cable	Candox	5B-048-98-98-5000	111130	1Y	May. 31, 19
W13	Coaxial Cable	Suhner	SUCOFLEX106	KSR00207	1Y	Jan. 31, 19

Measuring Equipment Configuration



Test Results

Test date	Sep 15, 2018	to	Sep 16, 2018	and	Nov 21, 2018
Location	Kashima No.12 Test Site				
temperature	19.0 to 26	[degree C]			
Humidity Variation	45 to 60	[%]			
Atmospheric Pressure	101 to 109	[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 / 150.05MHz

No	Frequency (MHz)	Pol	Reading Level (dBm)	SG Out Level (dBm)	Antenna Gain (dBd)	Loss (dB)	Correct Level (dBm)	Emission Level (dBc)	MASK D Limit Level (dBc)	Margin (dB)
1	300.10	Hor.	-61.82	-43.26	-0.38	11.41	-55.0	**-105.5**	-70.0	35.5
		Ver.	-59.87	-36.06	-0.38	11.41	-47.8	**-98.3**	-70.0	28.3
2	450.15	Hor.	-61.70	-37.52	-0.46	11.72	-49.7	**-100.1**	-70.0	30.1
		Ver.	-65.83	-39.16	-0.46	11.72	-51.3	**-101.8**	-70.0	31.8
3	600.20	Hor.	-	-	-0.46	12.00	-	**-**	-70.0	-
		Ver.	-	-	-0.46	12.00	-	**-**	-70.0	-
4	750.25	Hor.	-	-	-0.62	12.26	-	**-**	-70.0	-
		Ver.	-	-	-0.62	12.26	-	**-**	-70.0	-
5	900.30	Hor.	-	-	-1.03	12.50	-	**-**	-70.0	-
		Ver.	-	-	-1.03	12.50	-	**-**	-70.0	-
6	1050.35	Hor.	-	-	3.92	12.73	-	**-**	-70.0	-
		Ver.	-	-	3.92	12.73	-	**-**	-70.0	-
7	1200.40	Hor.	-	-	4.75	12.91	-	**-**	-70.0	-
		Ver.	-	-	4.75	12.91	-	**-**	-70.0	-
8	1350.45	Hor.	-57.92	-40.99	5.44	13.09	-48.6	**-99.1**	-70.0	29.1
		Ver.	-56.98	-40.48	5.44	13.09	-48.1	**-98.5**	-70.0	28.5
9	1500.50	Hor.	-	-	6.02	13.27	-	**-**	-70.0	-
		Ver.	-	-	6.02	13.27	-	**-**	-70.0	-

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

Mask D Limit (dBc) = whichever is the lesser attenuation ; -(50+10Log(P)) or -70
Correct Level (dBm) = Substitute SG Level (dBm) + ANT Gain (dBd) - Loss (Cable, Attenuator) (dB)
Emission Level (dBc) = Correct Level (dBm) - 10Log(P*1000)
P = Carrier Level (W)
" - " = Measurement Limit

State : Low Power / Authorized Bandwidth 6 kHz / 150.05MHz

No	Frequency (MHz)	Pol	Reading Level (dBm)	SG Out Level (dBm)	Antenna Gain (dBd)	Loss (dB)	Correct Level (dBm)	Emission Level (dBc)	MASK E Limit Level (dBc)	Margin (dB)
1	300.10	Hor.	-70.75	-52.18	-0.38	11.41	-64.0	**-107.9**	-65.0	42.9
		Ver.	-69.02	-45.21	-0.38	11.41	-57.0	**-101.0**	-65.0	36.0
2	450.15	Hor.	-73.41	-49.22	-0.46	11.72	-61.4	**-105.4**	-65.0	40.4
		Ver.	-74.51	-47.84	-0.46	11.72	-60.0	**-104.0**	-65.0	39.0
3	600.20	Hor.	-	-	-0.46	12.00	-	-	-65.0	-
		Ver.	-	-	-0.46	12.00	-	-	-65.0	-
4	750.25	Hor.	-	-	-0.62	12.26	-	-	-65.0	-
		Ver.	-	-	-0.62	12.26	-	-	-65.0	-
5	900.30	Hor.	-	-	-1.03	12.50	-	-	-65.0	-
		Ver.	-	-	-1.03	12.50	-	-	-65.0	-
6	1050.35	Hor.	-	-	3.92	12.73	-	-	-65.0	-
		Ver.	-	-	3.92	12.73	-	-	-65.0	-
7	1200.40	Hor.	-	-	4.75	12.91	-	-	-65.0	-
		Ver.	-	-	4.75	12.91	-	-	-65.0	-
8	1350.45	Hor.	-	-	5.44	13.09	-	-	-65.0	-
		Ver.	-	-	5.44	13.09	-	-	-65.0	-
9	1500.50	Hor.	-	-	6.02	13.27	-	-	-65.0	-
		Ver.	-	-	6.02	13.27	-	-	-65.0	-

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

Mask E Limit (dBc) = whichever is the lesser attenuation ; -(55+10Log(P)) or -65
Correct Level (dBm) = Substitute SG Level (dBm) + ANT Gain (dBd) - Loss (Cable, Attenuator) (dB)
Emission Level (dBc) = Correct Level (dBm) - 10Log(P*1000)
P = Carrier Level (W)
" - " = Measurement Limit

State : High Power 2/ Authorized Bandwidth 11.25 kHz / 150.05MHz

No	Frequency (MHz)	Pol	Reading Level (dBm)	SG Out Level (dBm)	Antenna Gain (dBd)	Loss (dB)	Correct Level (dBm)	Emission Level (dBc)	MASK D Limit Level (dBc)	Margin (dB)
1	300.10	Hor.	-61.82	-43.26	-0.38	11.41	-55.0	**-105.0**	-70.0	35.0
		Ver.	-59.87	-36.06	-0.38	11.41	-47.8	**-97.8**	-70.0	27.8
2	450.15	Hor.	-61.70	-37.52	-0.46	11.72	-49.7	**-99.7**	-70.0	29.7
		Ver.	-65.83	-39.16	-0.46	11.72	-51.3	**-101.3**	-70.0	31.3
3	600.20	Hor.	-	-	-0.46	12.00	-	**-**	-70.0	-
		Ver.	-	-	-0.46	12.00	-	**-**	-70.0	-
4	750.25	Hor.	-	-	-0.62	12.26	-	**-**	-70.0	-
		Ver.	-	-	-0.62	12.26	-	**-**	-70.0	-
5	900.30	Hor.	-	-	-1.03	12.50	-	**-**	-70.0	-
		Ver.	-	-	-1.03	12.50	-	**-**	-70.0	-
6	1050.35	Hor.	-	-	3.92	12.73	-	**-**	-70.0	-
		Ver.	-	-	3.92	12.73	-	**-**	-70.0	-
7	1200.40	Hor.	-	-	4.75	12.91	-	**-**	-70.0	-
		Ver.	-	-	4.75	12.91	-	**-**	-70.0	-
8	1350.45	Hor.	-57.92	-40.99	5.44	13.09	-48.6	**-98.6**	-70.0	28.6
		Ver.	-56.98	-40.48	5.44	13.09	-48.1	**-98.1**	-70.0	28.1
9	1500.50	Hor.	-	-	6.02	13.27	-	**-**	-70.0	-
		Ver.	-	-	6.02	13.27	-	**-**	-70.0	-

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

Mask D Limit (dBc) = whichever is the lesser attenuation ; -(50+10Log(P)) or -70
Correct Level (dBm) = Substitute SG Level (dBm) + ANT Gain (dB) - Loss (Cable, Attenuator) (dB)
Emission Level (dBc) = Correct Level (dBm) - 10Log(P*1000)
P = Carrier Level (W)
" - " = Measurement Limit

10.4 Emission Masks (Occupied Bandwidth)

REGULATIONS	: FCC Part 2 Section 1049 (c) (1), Part 80 Section 211, Part 90 Section 210
TEST METHOD/GUIDE	: ANSI/TIA-603-E Section 2.2.11.2

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 6kHz, 11.25 kHz and 20 kHz).
c) RBW and VBW : 30 kHz (Non modulation(Digital Modulation)).
6 The occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

The selection of Emission Mask

No.	Frequency (MHz)	Audio Filter	Channel Bandwidth (kHz)	Authorized Bandwidth (kHz)	Selection of Emission Mask FCC	IC
Emission Designation :		16K0F3E				
1	150.05	With	25	20	B	-
2	162.05	With	25	20	B	-
3	173.95	With	25	20	B	-
Emission Designation :		11K0F3E				
1	150.05	With	12.5	11.25	D	-
2	162.05	With	12.5	11.25	D	-
3	173.95	With	12.5	11.25	D	-
Emission Designation :		8K30F1E / F1D / F7W				
1	150.05	Without	12.5	11.25	D	-
2	162.05	Without	12.5	11.25	D	-
3	173.95	Without	12.5	11.25	D	-
Emission Designation :		8K10F1E / F1D / F1W				
1	150.05	Without	12.5	11.25	D	-
2	162.05	Without	12.5	11.25	D	-
3	173.95	Without	12.5	11.25	D	-
Emission Designation :		4K00F1E / F1D / F7W				
1	150.05	Without	6.25	6	E	-
2	162.05	Without	6.25	6	E	-
3	173.95	Without	6.25	6	E	-
Emission Designation :		4K00F2D				
1	150.05	Without	6.25	6	E	-
2	162.05	Without	6.25	6	E	-
3	173.95	Without	6.25	6	E	-

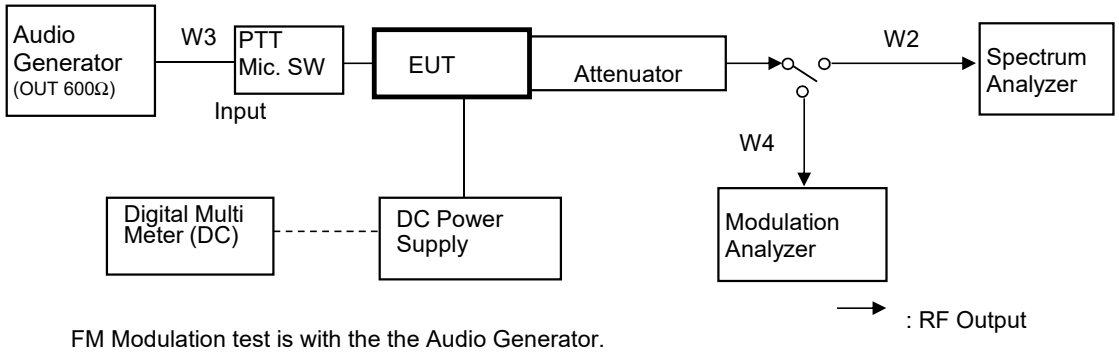
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
1	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4357	1Y	Jul. 31, 19
2	Attenuator (30dB)	Weinschel	WA-29-30-34	8924	1Y	Jul. 31, 19
3	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	1Y	Dec. 31, 18
4	Audio Generator	Anritsu	MG443B	M70150	1Y	Sep. 30, 19
5	Spectrum Analyzer	Agilent	N9030A	US51350220	1Y	Mar. 31, 19
6	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290931	None	None
7	Digital Multi Meter	FLUKE	8846A	9642018	1Y	Sep. 30, 19

Measuring Cables

No.	Cable	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
W3	Balance Cable	Nicoon	3D-2V	KSR00092	1Y	Feb. 28, 19
W4	Coaxial Cable	Pacific custom	RG-58 C/U	AM90C04	1Y	Feb. 28, 19
W2	Coaxial Cable	Suhner	SUCOFLEX104	F0000017	1Y	Jul. 31, 19

Measuring Equipment Configuration



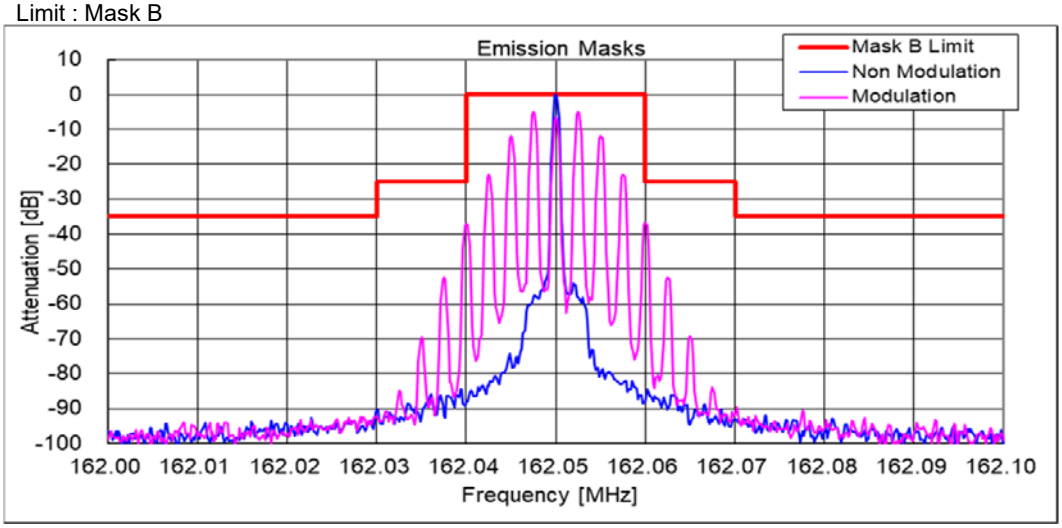
FM Modulation test is with the the Audio Generator.
Configuration of other Modulation test is composed without the Audio Generator.

Test Results

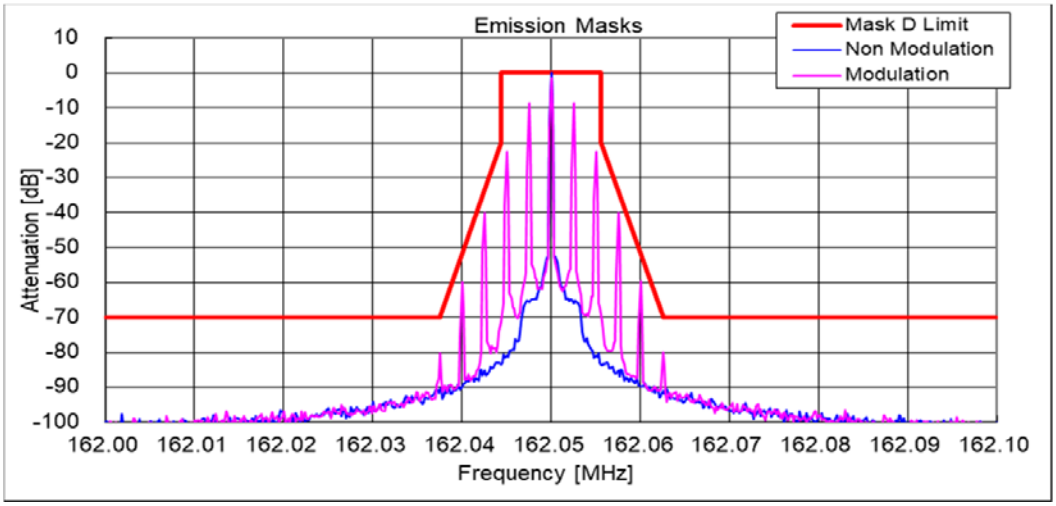
Test date	Oct. 01, 2018	and	Nov. 21, 2018	
Location	Kashima No.12 Test Site			
temperature	25.7	to	26	[degree C]
Humidity Variation	50	to	54	[%]
Atmospheric Pressure	99.2	to	101.6	[kPa]
Test Engineer	Koichi Wagatsuma			

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

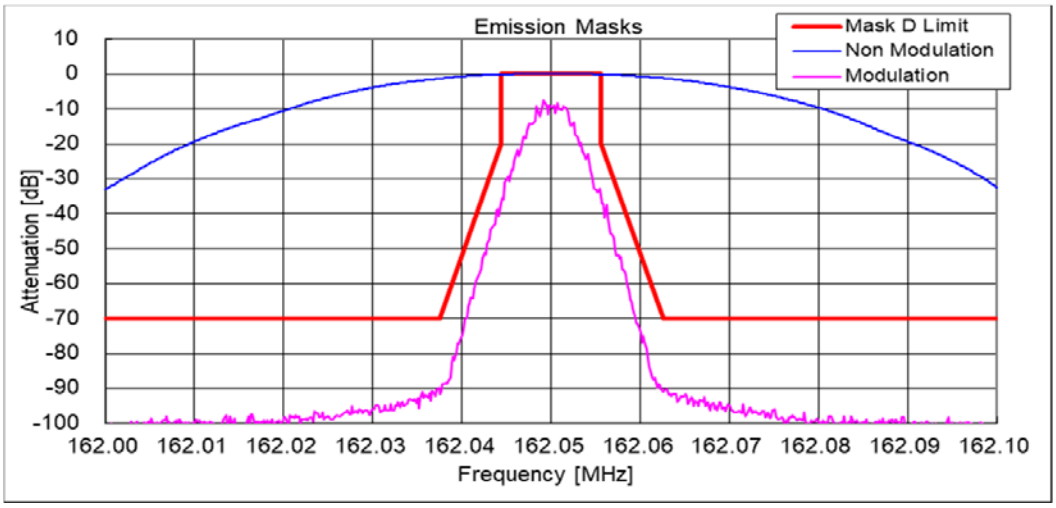
State : High Power / Authorized Bandwidth 20 kHz/ 16K0F3E / 162.05 MHz
Limit : Mask B



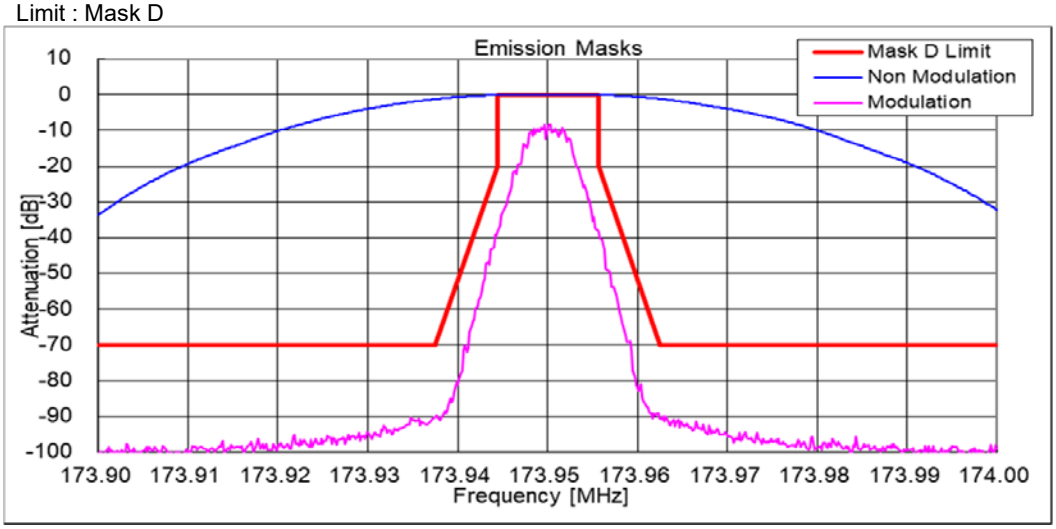
State : High Power / Authorized Bandwidth 11.25 kHz/ 11K0F3E / 162.05 MHz
Limit : Mask D



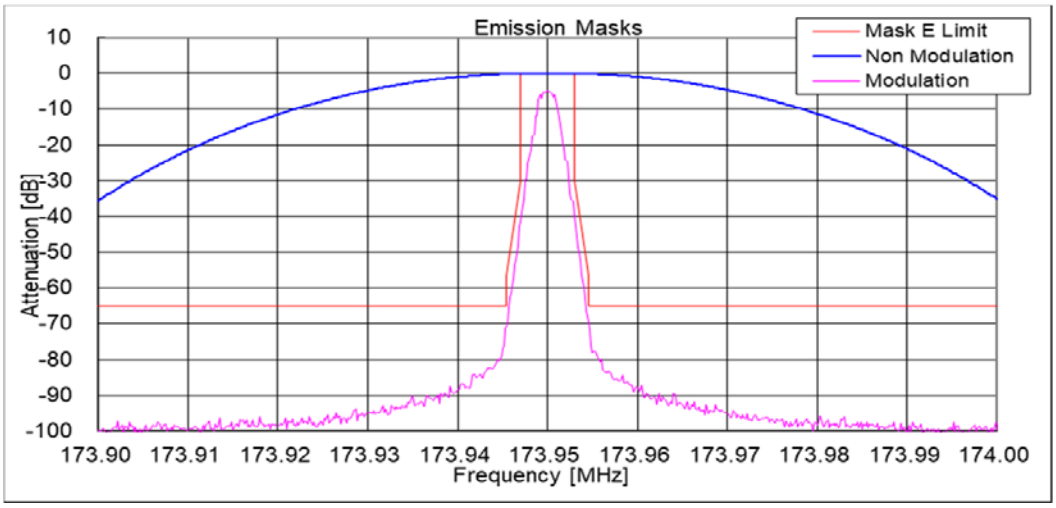
State : High Power / Authorized Bandwidth 11.25 kHz/ 8K10F1E / F1D / F1W / 162.05 MHz
Limit : Mask D



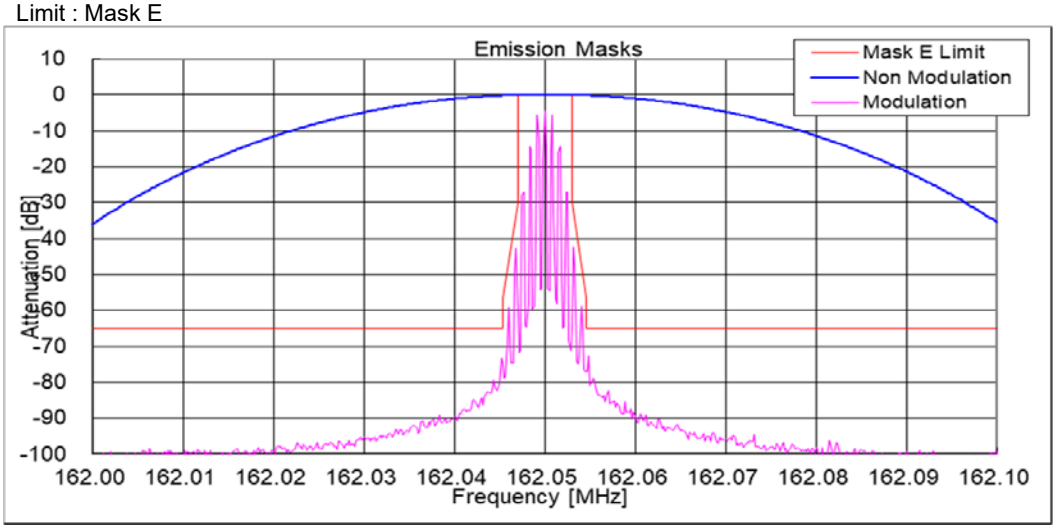
State : High Power / Authorized Bandwidth 11.25 kHz/ 8K30F1E/F1D/F7W / 173.95 MHz
Limit : Mask D



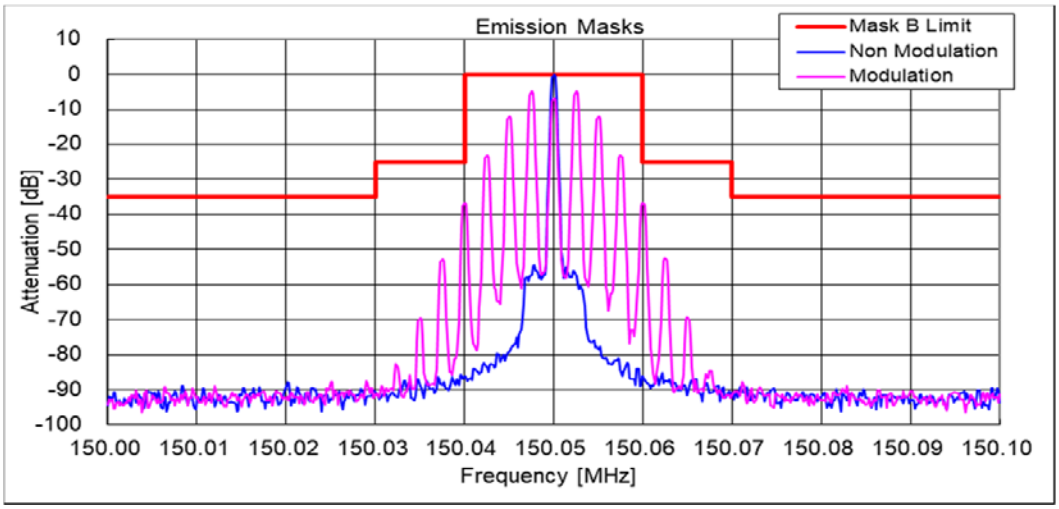
State : High Power / Authorized Bandwidth 6 kHz/ 4K00F1E / F1D / F7W / 173.95 MHz
Limit : Mask E



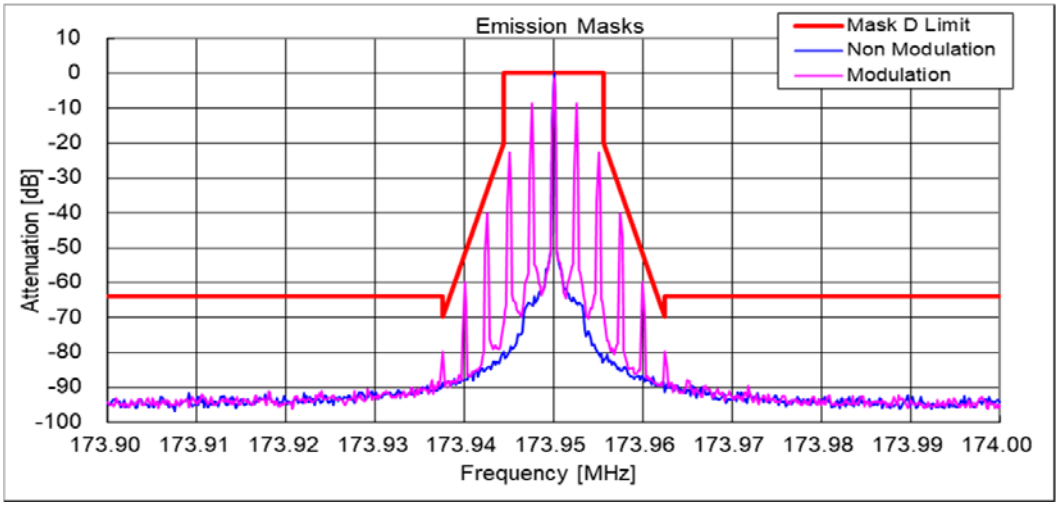
State : High Power / Authorized Bandwidth 6 kHz/ 4K00F2D / 162.05 MHz
Limit : Mask E



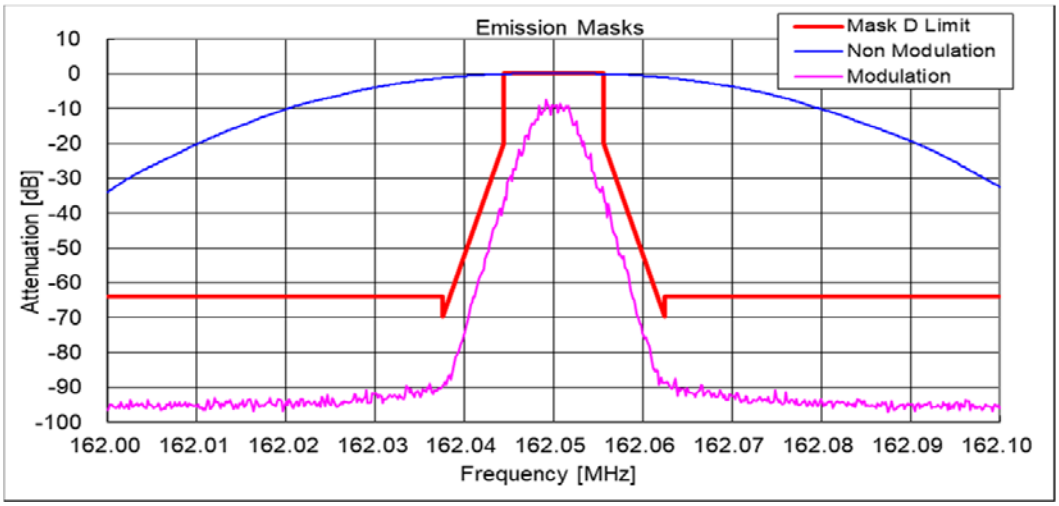
State : Low Power / Authorized Bandwidth 20 kHz/ 16K0F3E / 150.05 MHz
Limit : Mask B



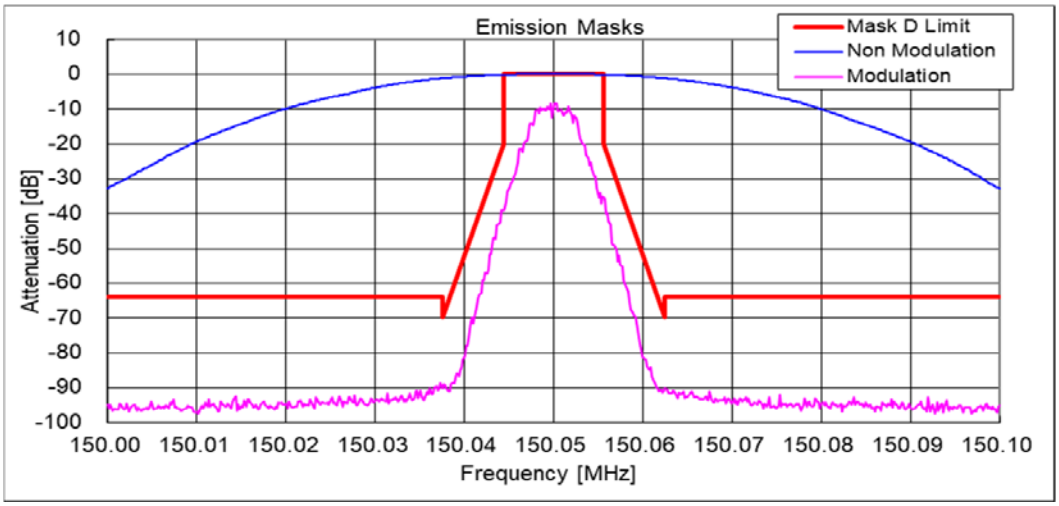
State : Low Power / Authorized Bandwidth 11.25 kHz/ 11K0F3E / 173.95 MHz
Limit : Mask D



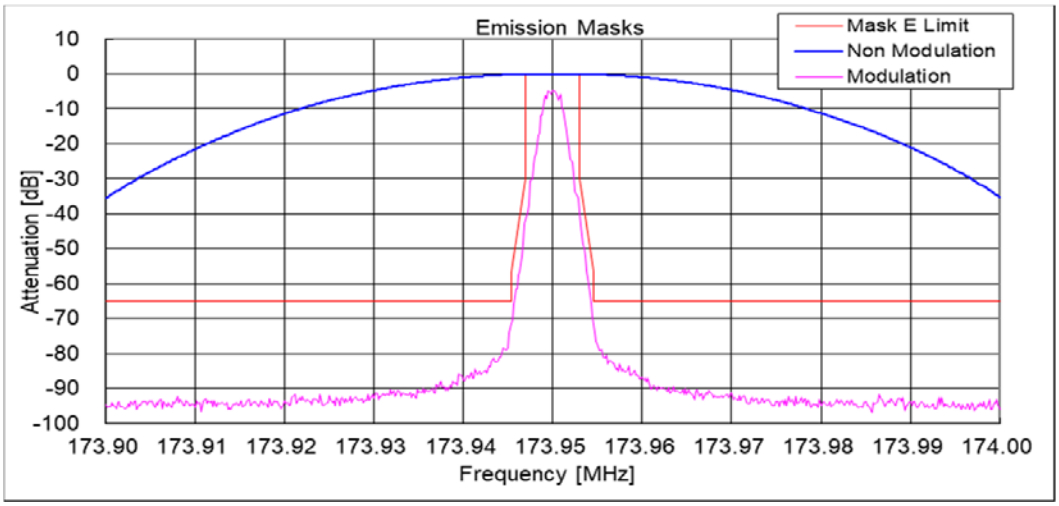
State : Low Power / Authorized Bandwidth 11.25 kHz/ 8K10F1E / F1D / F1W / 162.05 MHz
Limit : Mask D



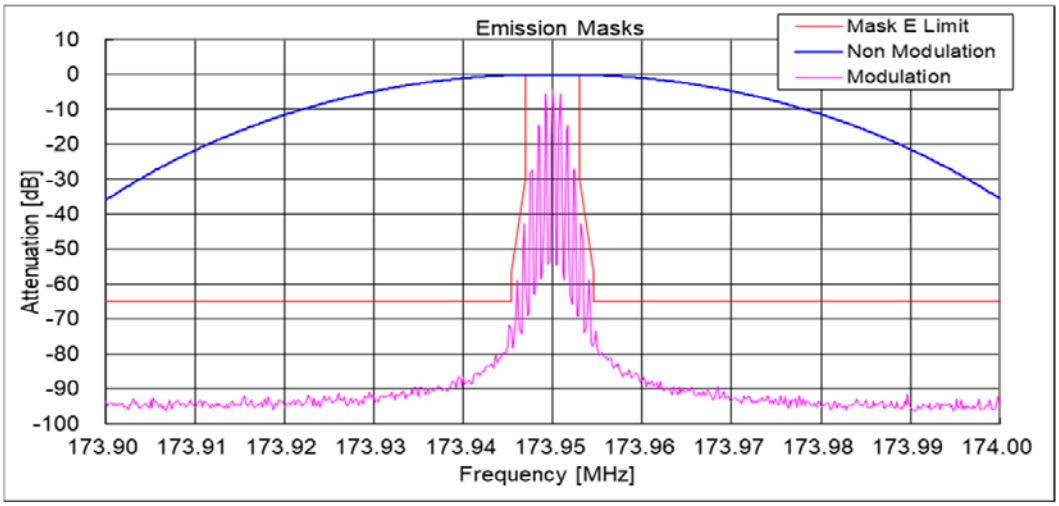
State : Low Power / Authorized Bandwidth 11.25 kHz/ 8K30F1E/F1D/F7W / 150.05 MHz
Limit : Mask D



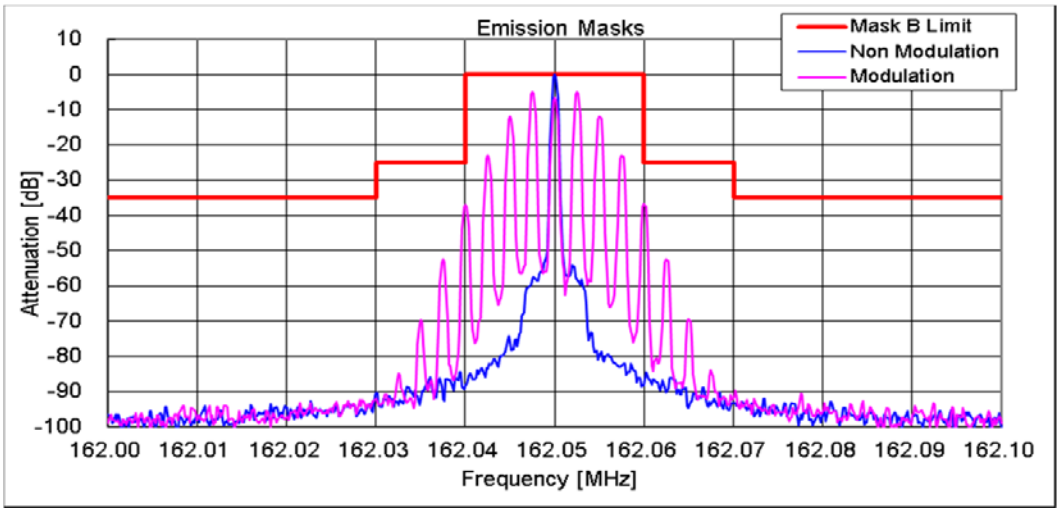
State : Low Power / Authorized Bandwidth 6 kHz/ 4K00F1E / F1D / F7W / 173.95 MHz
Limit : Mask E



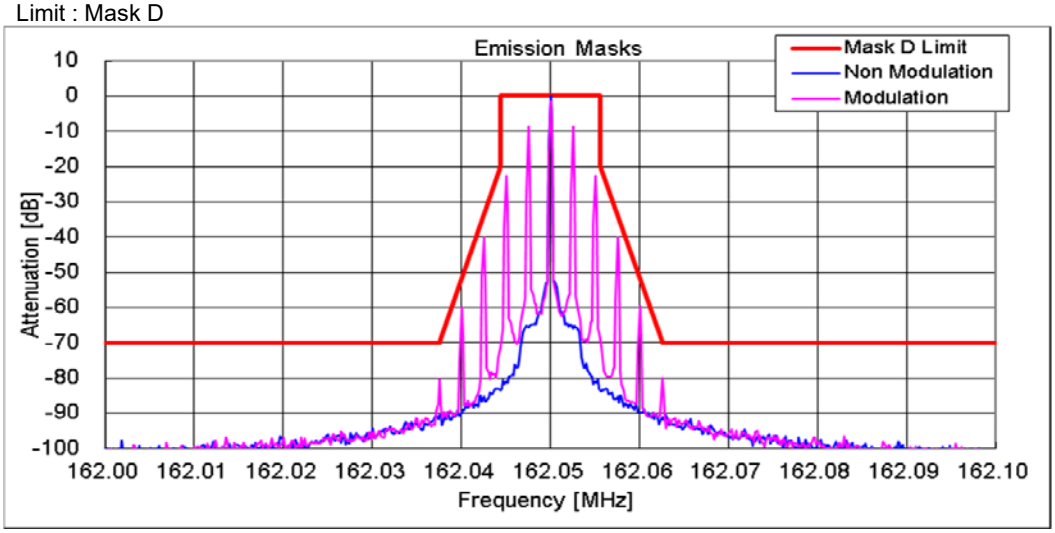
State : Low Power / Authorized Bandwidth 6 kHz/ 4K00F2D / 173.95 MHz
Limit : Mask E



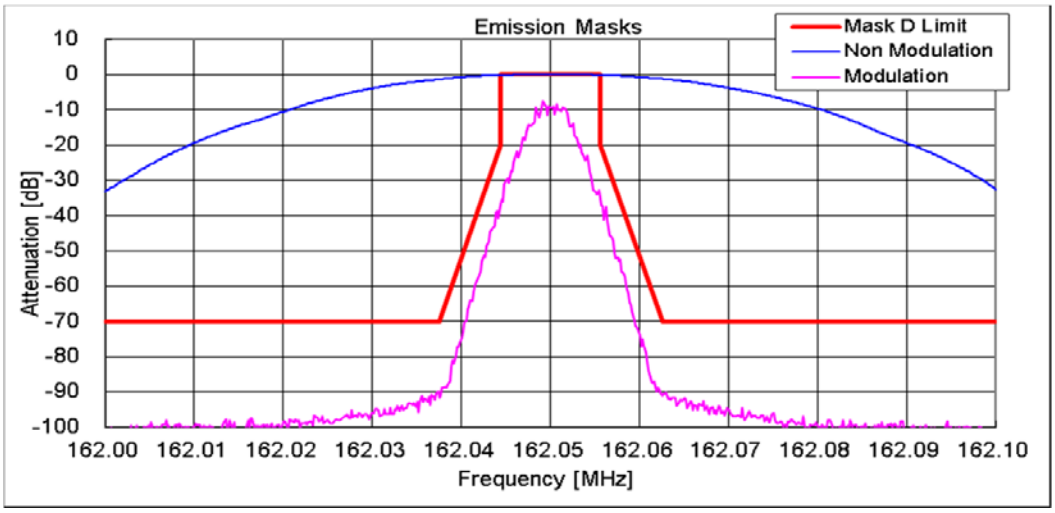
State : High Power 2/ Authorized Bandwidth 20 kHz/ 16K0F3E / 162.05 MHz
Limit : Mask B



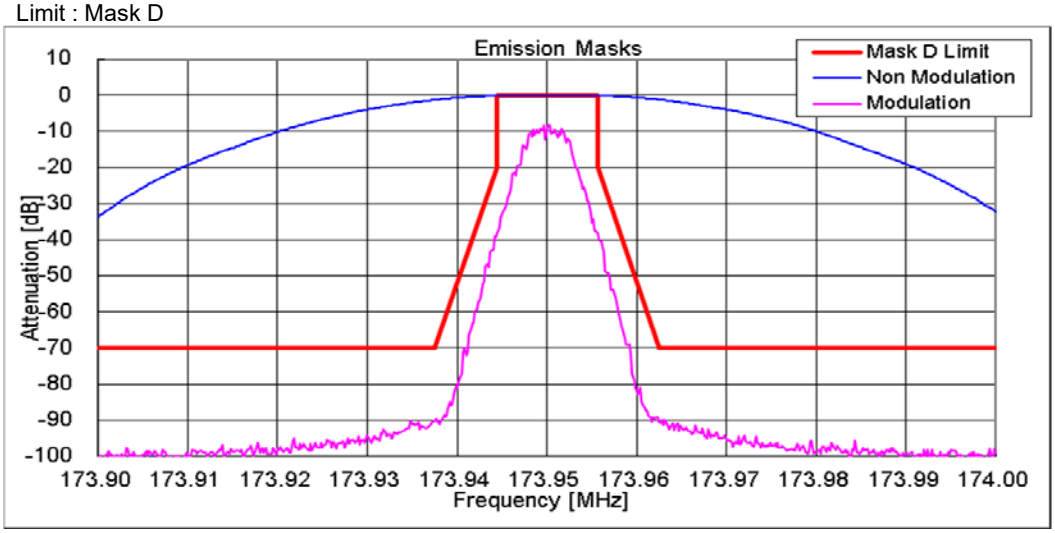
State : High Power 2/ Authorized Bandwidth 11.25 kHz/ 11K0F3E / 162.05 MHz
Limit : Mask D



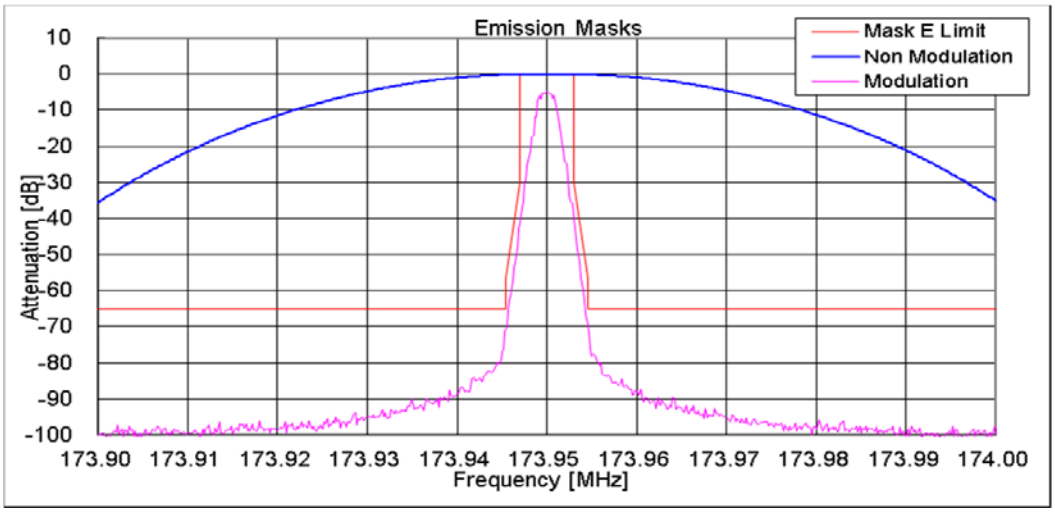
State : High Power 2/ Authorized Bandwidth 11.25 kHz/ 8K10F1E / F1D / F1W / 162.05 MHz
Limit : Mask D



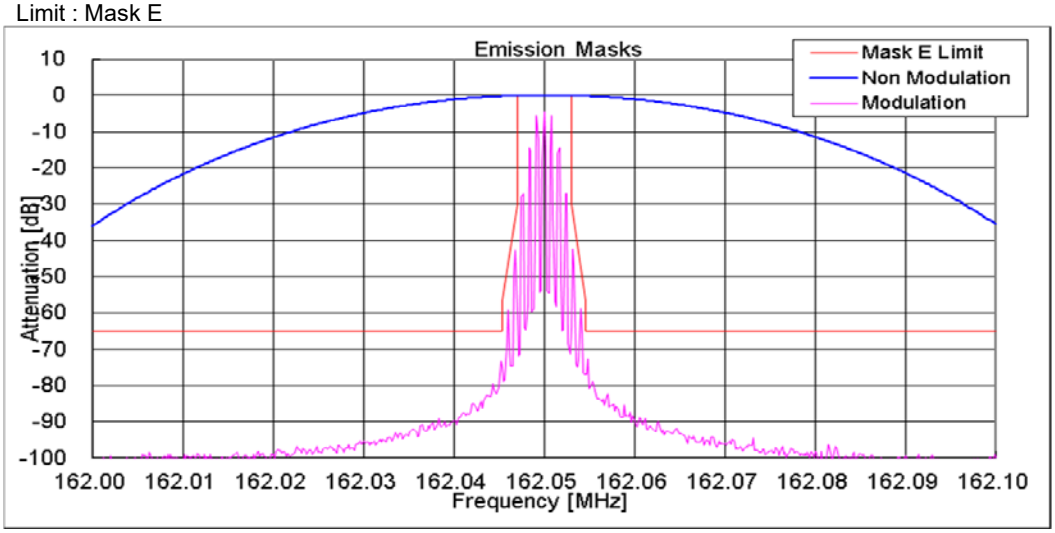
State : High Power 2/ Authorized Bandwidth 11.25 kHz/ 8K30F1E/F1D/F7W / 173.95 MHz
Limit : Mask D



State : High Power 2/ Authorized Bandwidth 6 kHz/ 4K00F1E / F1D / F7W / 173.95 MHz
Limit : Mask E



State : High Power 2/ Authorized Bandwidth 6 kHz/ 4K00F2D / 162.05 MHz
Limit : Mask E



10.5 Transient Frequency Behavior

REGULATIONS	: FCC Part 90 Section 214
TEST METHOD/GUIDE	: ANSI/TIA-603-E, Section 2.2.19.3

Test Procedure

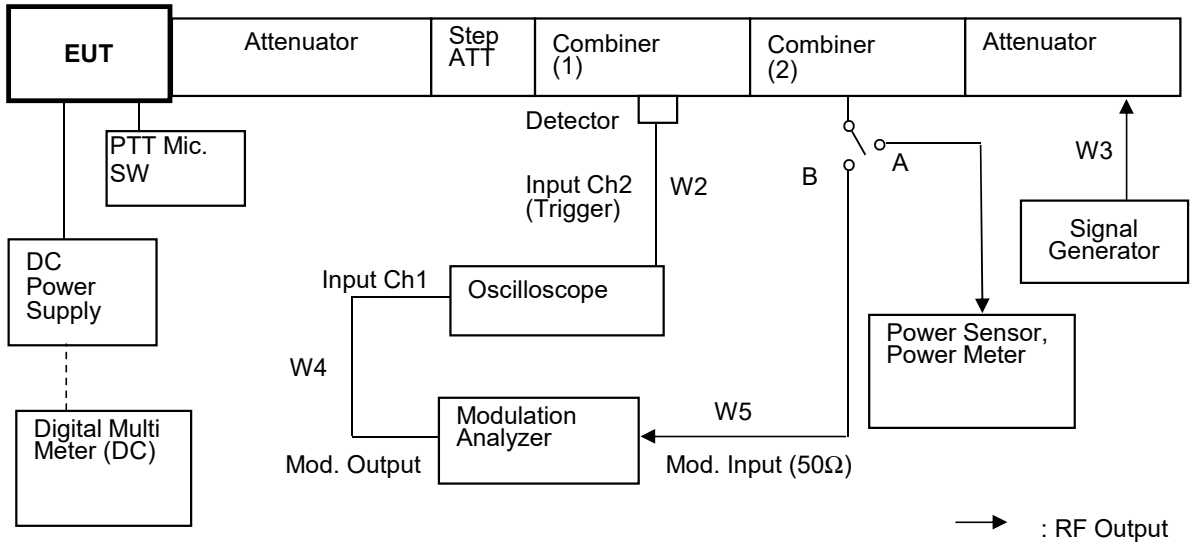
1 The EUT and test equipment were set up as shown on the following page.
2 The transmitter was turned on.
3 The transmitter carrier level was measured at the output of the combiner .
4 The transmitter was turned off.
5 An RF signal generator (1) modulated with a 1 kHz tone at either 25 kHz or 12.5 kHz 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. Interval	Effective period
1	Power Meter	Hewlett Packard	E4418B	GB38410265	1Y	Sep. 30, 19
2	Power Sensor	Hewlett Packard	8482A	US37292237	1Y	Sep. 30, 19
3	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4357	1Y	Jul. 31, 19
4	Attenuator (10dB)	TME	CFA-05NPJ-10	262843	1Y	May. 31, 19
5	Attenuator (30dB)	Weinschel	WA-29-30-34	8923	1Y	Jul. 31, 19
6	Step Attenuator	Hewlett Packard	8494B	272614515	1Y	Feb. 28, 19
7	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	1Y	Dec. 31, 18
8	Signal Generator	Rohde&Schwarz	SMB 100A	105709	1Y	Apr. 30, 19
9	Oscilloscope	Tektronix	TDS 680B	B010292	1Y	Mar. 31, 19
10	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290931	None	None
11	Digital Multi Meter	FLUKE	8846A	9642018	1Y	Sep. 30, 19

Measuring Cables

No.	Cable	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
W4	Coaxial Cable	Pacific custom	RG-58 C/U	KSR00096	1Y	Feb. 28, 19
W2	Coaxial Cable	Pacific custom	RG-58 C/U	KSR00097	1Y	Feb. 28, 19
W5	Coaxial Cable	Pacific custom	RG-58 C/U	AM90C04	1Y	Feb. 28, 19
W3	Coaxial Cable	Pacific custom	RG-58 C/U	KSR00041	1Y	Feb. 28, 19

Measuring Equipment Configuration

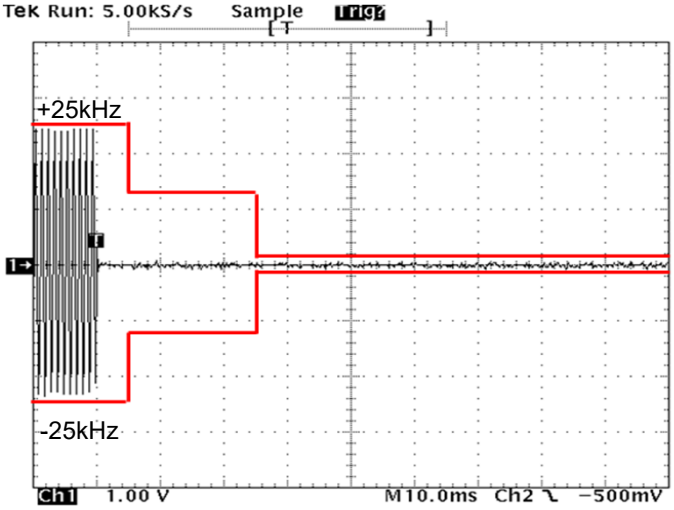


Test Results

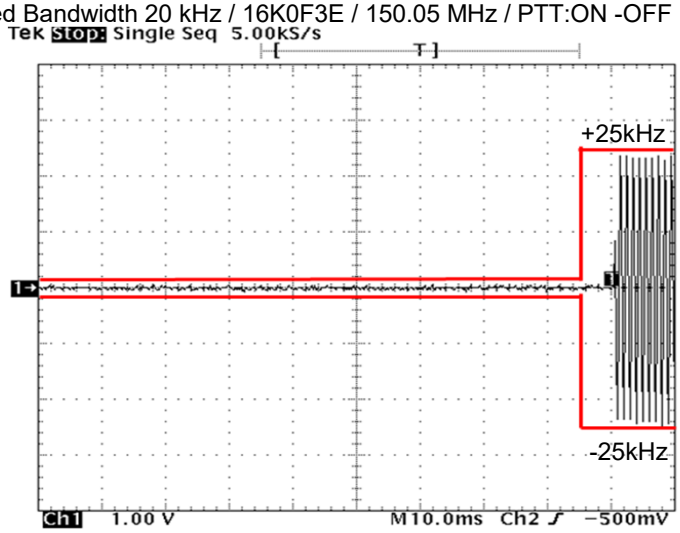
Test date	Sep 28, 2018	
Location	Kashima No.12 Test Site	
temperature	25	[degree C]
Humidity Variation	60	[%]
Atmospheric Pressure	101.3	[kPa]
Test Engineer	Koichi Wagatsuma	

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

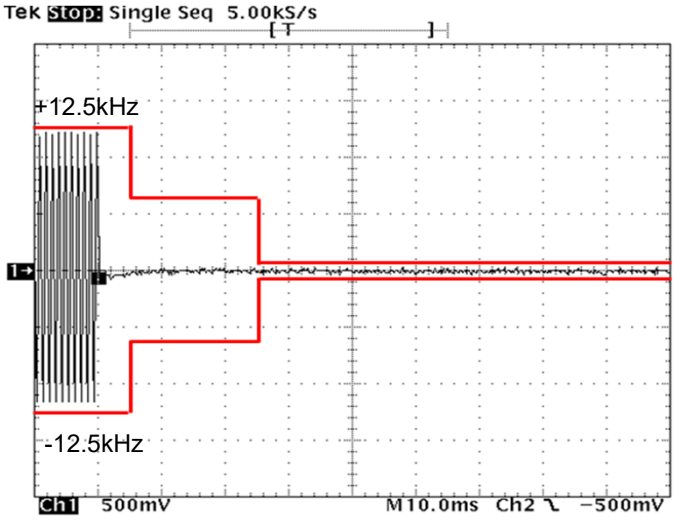
State : High Power / Authorized Bandwidth 20 kHz / 16K0F3E / 150.05 MHz / PTT:OFF -ON



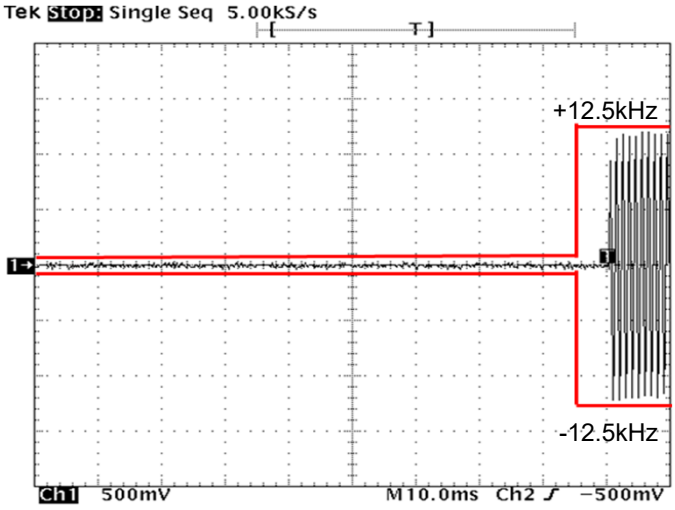
State : High Power / Authorized Bandwidth 20 kHz / 16K0F3E / 150.05 MHz / PTT:ON -OFF



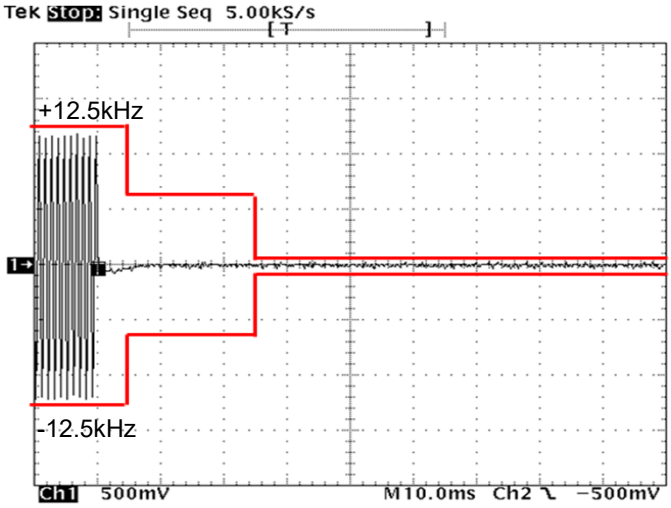
State : High Power / Authorized Bandwidth 11.25 kHz / 11K0F3E / 162.05 MHz / PTT:OFF -ON



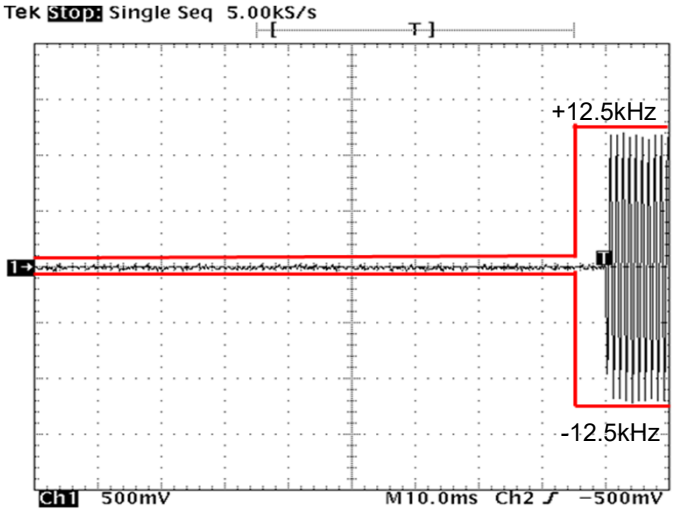
State : High Power / Authorized Bandwidth 11.25 kHz / 11K0F3E / 162.05 MHz / PTT:ON-OFF



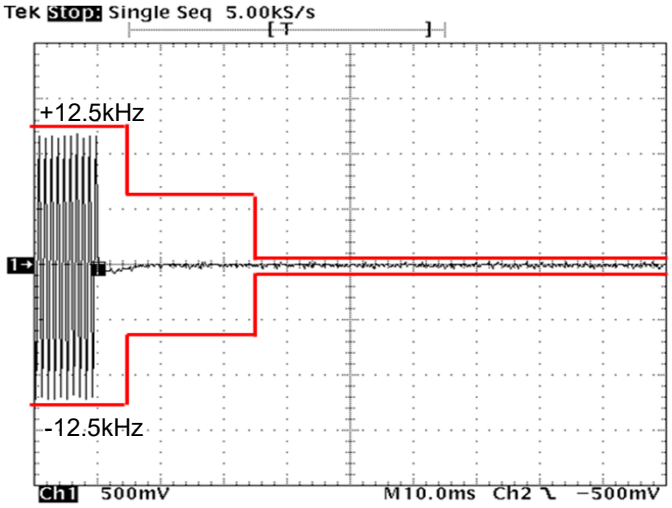
State : High Power / Authorized Bandwidth 11.25 kHz / 8K10F1E / F1D / F1W / 150.05 MHz / PTT:OFF -ON



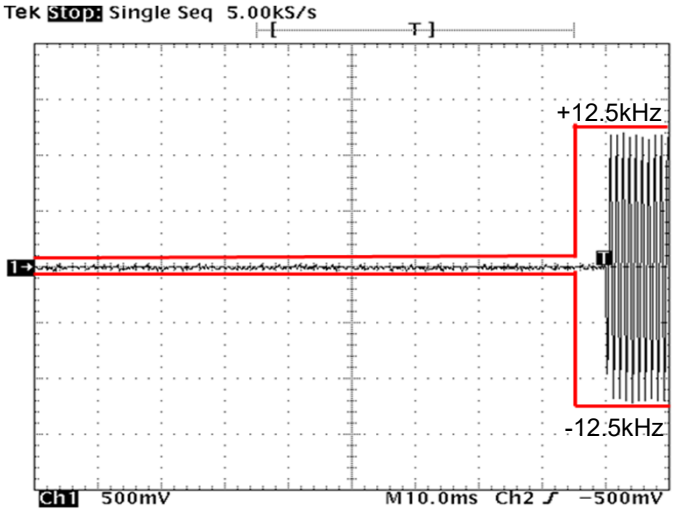
State : High Power / Authorized Bandwidth 11.25 kHz / 8K10F1E / F1D / F1W / 150.05 MHz / PTT:ON -OFF



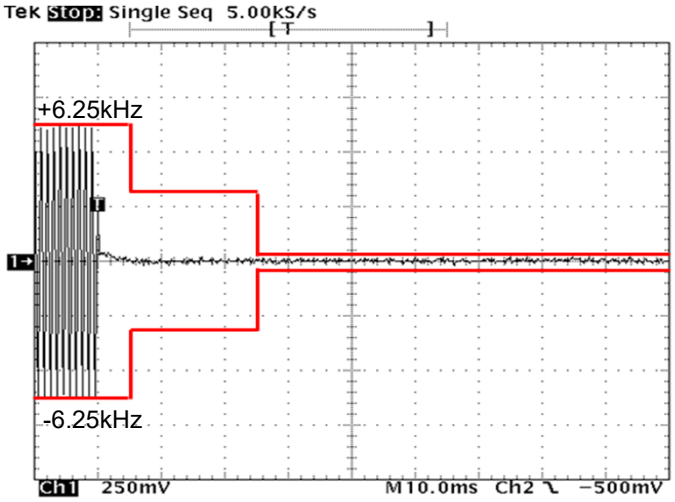
State : High Power / Authorized Bandwidth 11.25 kHz / 8K30F1E/F1D/F7W / 162.05 MHz / PTT:OFF -ON



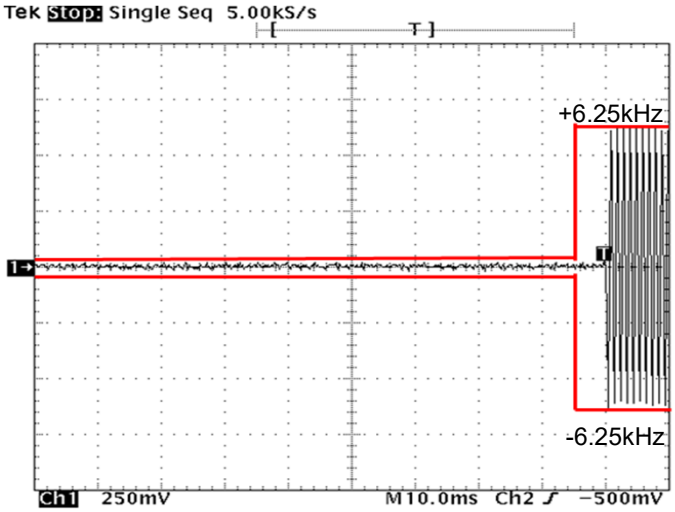
State : High Power / Authorized Bandwidth 11.25 kHz / 8K30F1E/F1D/F7W / 162.05 MHz / PTT:ON-OFF



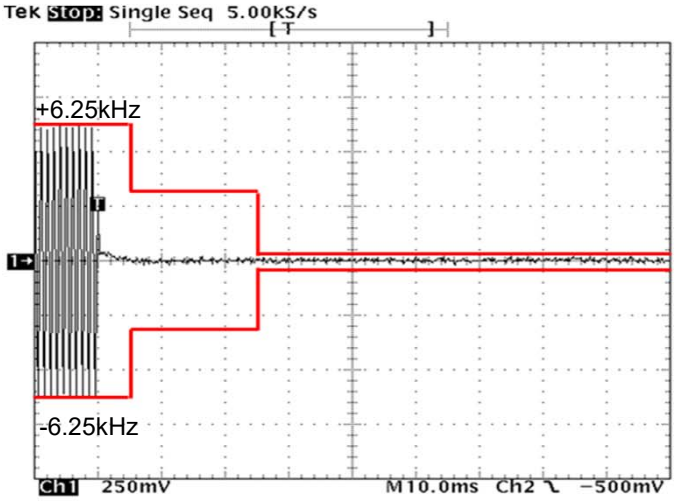
State : High Power / Authorized Bandwidth 6 kHz / 4K00F1E / F1D / F7W / 150.05 MHz / PTT:OFF -ON



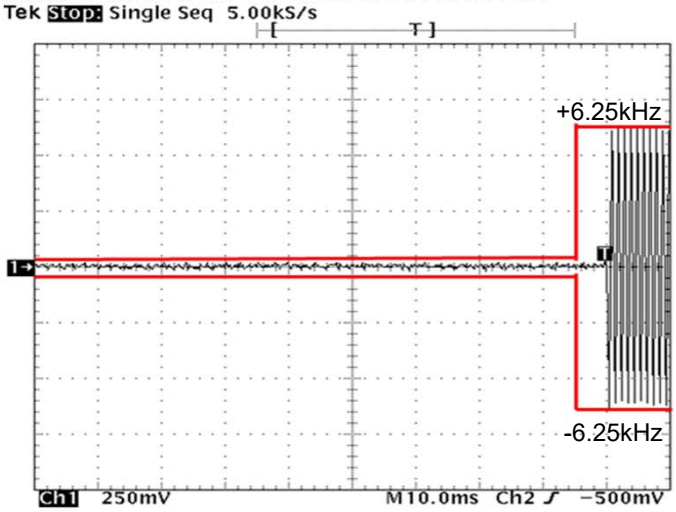
State : High Power / Authorized Bandwidth 6 kHz / 4K00F1E / F1D / F7W / 150.05 MHz / PTT:ON-OFF



State : High Power / Authorized Bandwidth 6 kHz / 4K00F2D / 150.05 MHz / PTT:OFF -ON



State : High Power / Authorized Bandwidth 6 kHz / 4K00F2D / 150.05 MHz / PTT:ON-OFF



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

REGULATIONS	:	FCC Part 2 Section 1047 (a) FCC Part 80 Section 213
TEST METHOD/GUIDE	:	ANSI/TIA-603-E 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 100 Hz to 5 kHz.
5 The response in dB relative to 1 kHz was then measured, using the Modulation Analyzer.

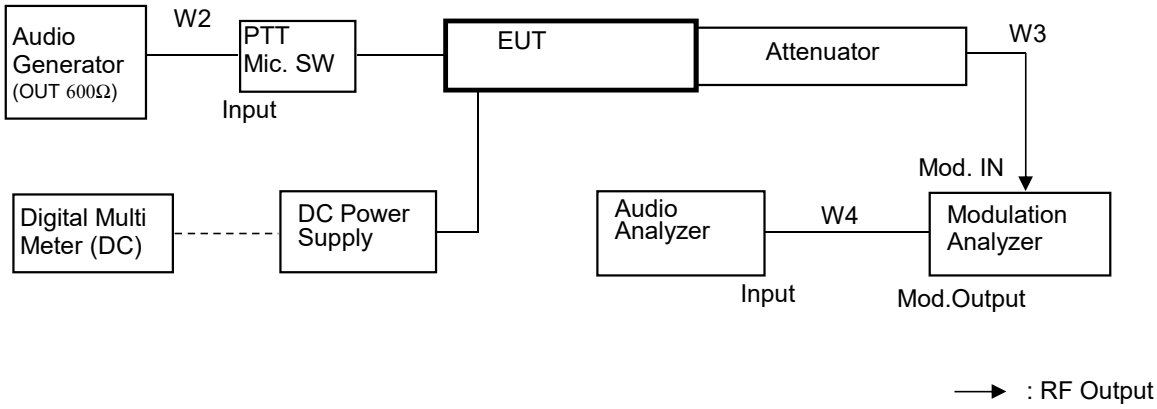
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
1	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4357	1Y	Jul. 31, 19
2	Attenuator (30dB)	Weinschel	WA-29-30-34	8924	1Y	Jul. 31, 19
3	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	1Y	Dec. 31, 18
4	Audio Generator	Anritsu	MG443B	M70150	1Y	Sep. 30, 19
5	Audio Analyzer	Hewlett Packard	8903B	2948A07326	1Y	Mar. 31, 19
6	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290931	None	None
7	Digital Multi Meter	FLUKE	8846A	9642018	1Y	Sep. 30, 19

Measuring Cables

No.	Cable	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
W2	Balance Cable	Nicoon	3D-2V	KSR00092	1Y	Feb. 28, 19
W4	Coaxial Cable	Pacific custom	RG-58 C/U	KSR00096	1Y	Feb. 28, 19
W3	Coaxial Cable	Pacific custom	RG-58 C/U	AM90C04	1Y	Feb. 28, 19

Measuring Equipment Configuration

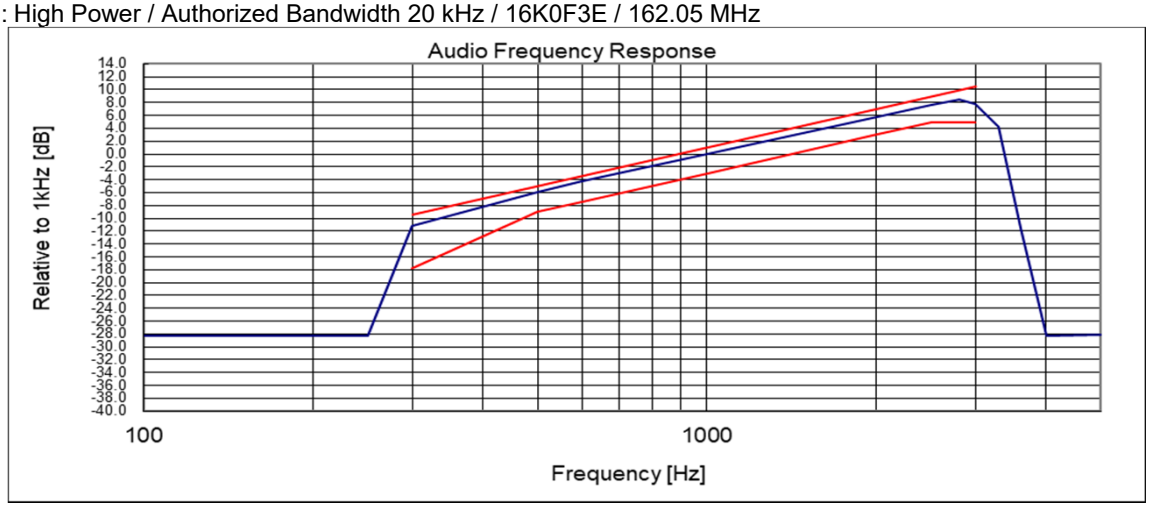


Test Results

Test date	Oct 01, 2018	
Location	Kashima No.12 Test Site	
temperature	24	[degree C]
Humidity Variation	57	[%]
Atmospheric Pressure	99.2	[kPa]
Test Engineer	Koichi Wagatsuma	

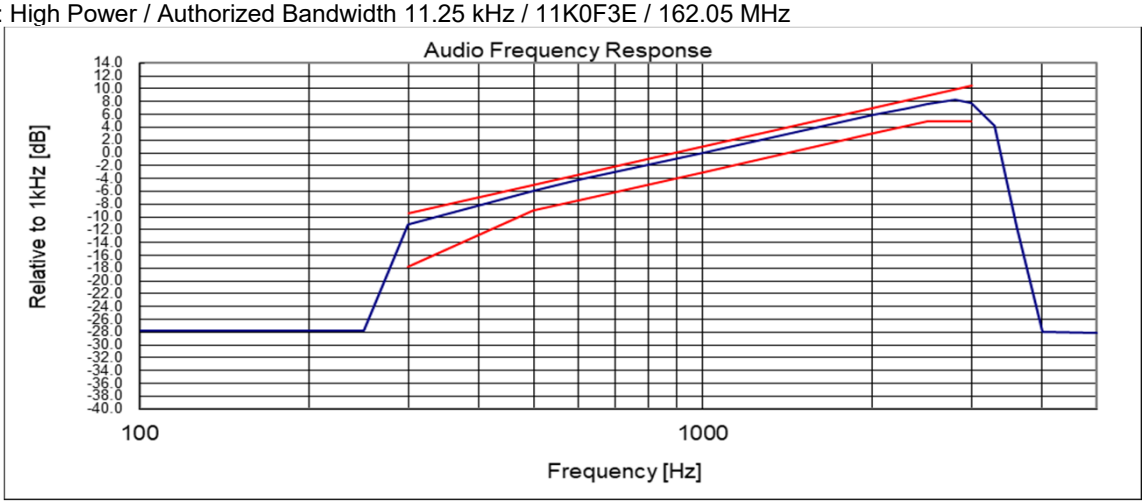
Test was carried out for all the frequency band of section 10.1
State the worst case (below).

State : High Power / Authorized Bandwidth 20 kHz / 16K0F3E / 162.05 MHz



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 / 162.05 MHz



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) FCC Part 80 Section 213
TEST METHOD/GUIDE	:	ANSI/TIA-603-E 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.

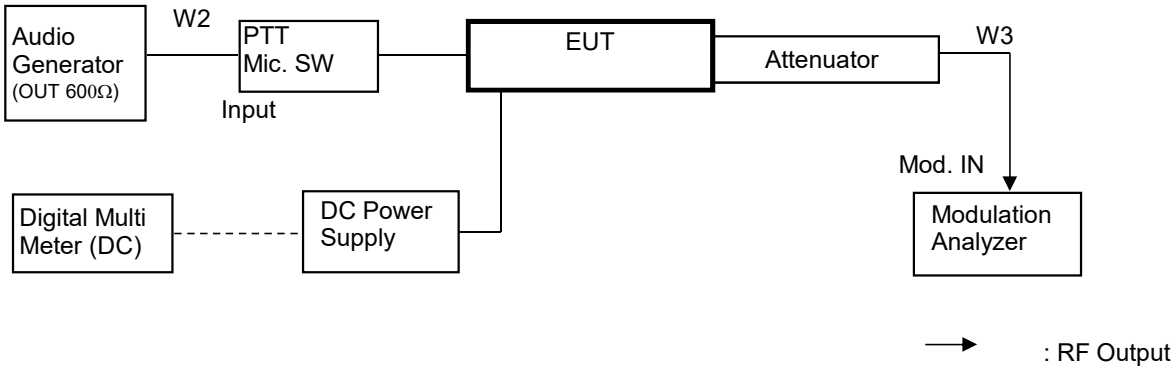
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
1	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4357	1Y	Jul. 31, 19
2	Attenuator (30dB)	Weinschel	WA-29-30-34	8924	1Y	Jul. 31, 19
3	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	1Y	Dec. 31, 18
4	Audio Generator	Anritsu	MG443B	M70150	1Y	Sep. 30, 19
5	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290931	None	None
4	Digital Multi Meter	FLUKE	8846A	9642018	1Y	Sep. 30, 19

Measuring Cables

No.	Cable	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
W2	Balance Cable	Nicoon	3D-2V	KSR00092	1Y	Feb. 28, 19
W3	Coaxial Cable	Pacific custom	RG-58 C/U	AM90C04	1Y	Feb. 28, 19

Measuring Equipment Configuration

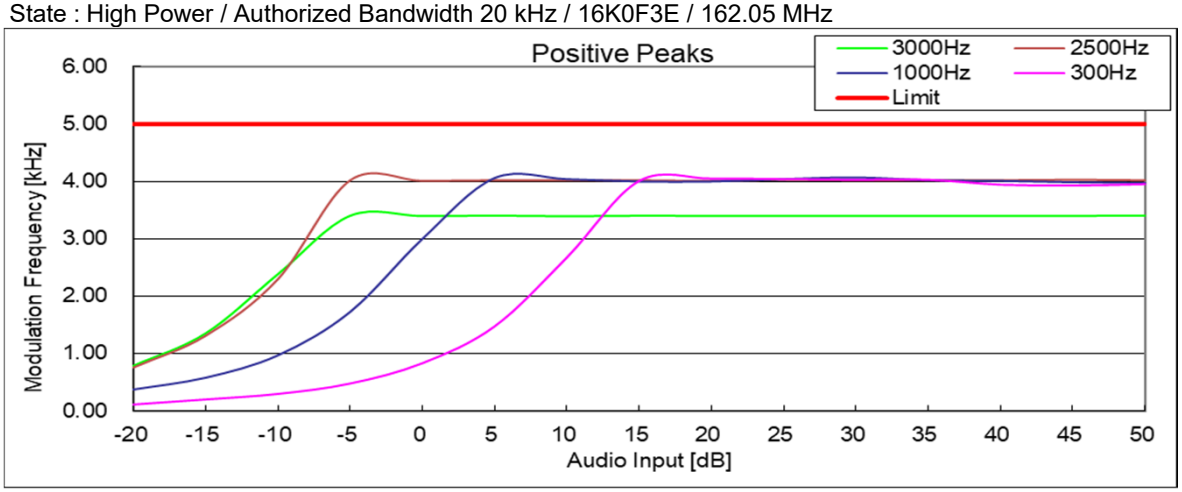


Test Results

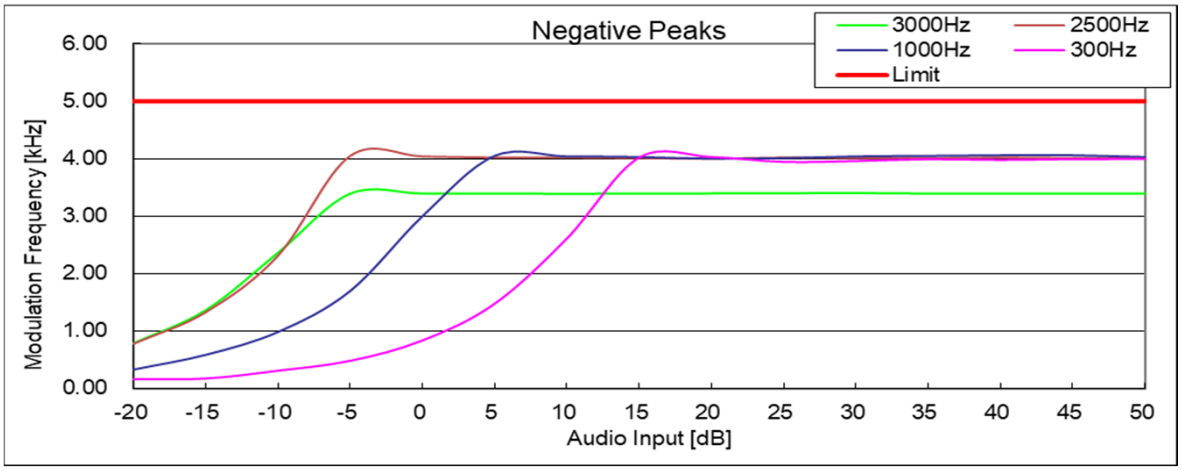
Test date	Oct. 01, 2018	
Location	Kashima No.12 Test Site	
temperature	24	[degree C]
Humidity Variation	58	[%]
Atmospheric Pressure	99.2	[kPa]
Test Engineer	Koichi Wagatsuma	

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

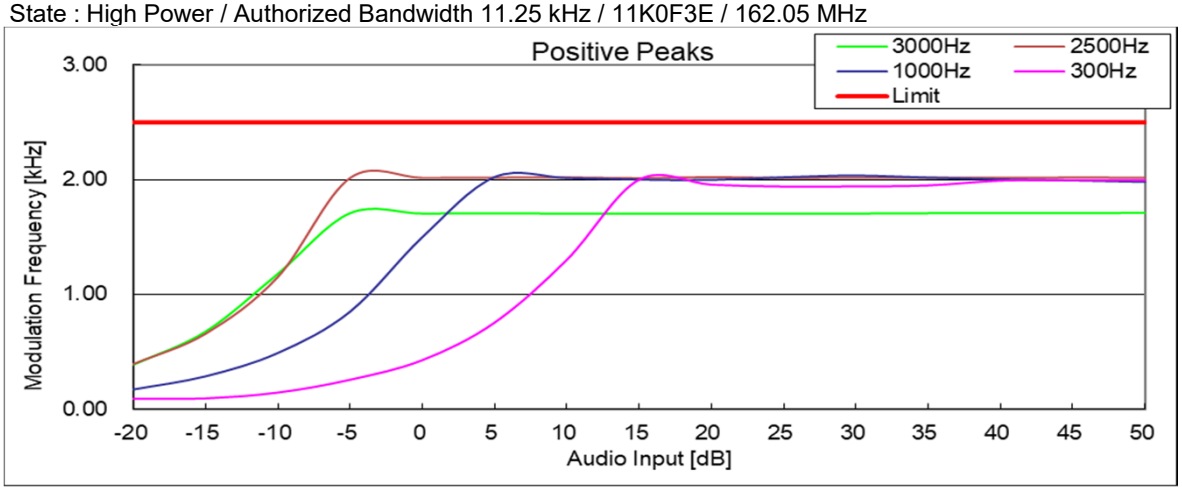
State : High Power / Authorized Bandwidth 20 kHz / 16K0F3E / 162.05 MHz



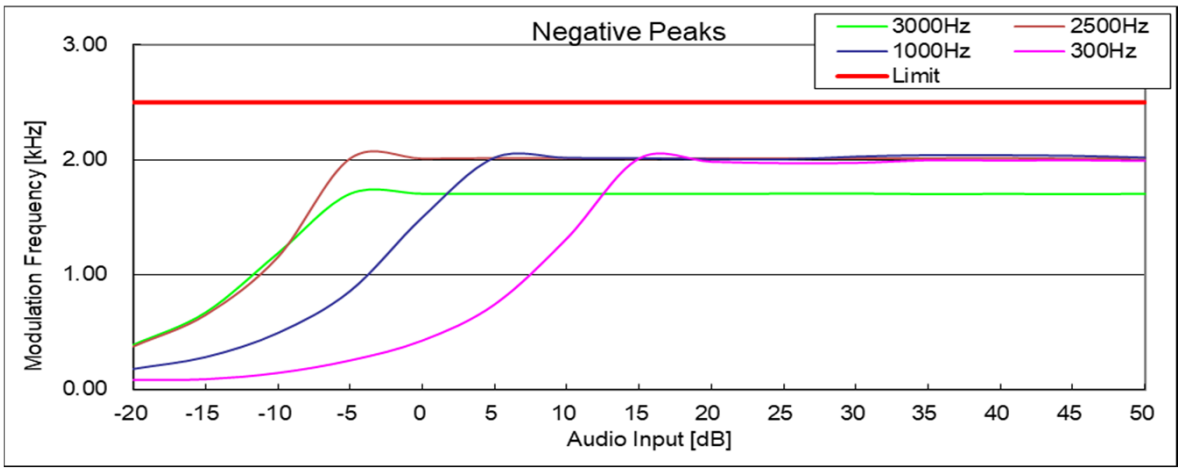
State : High Power / Authorized Bandwidth 20 kHz / 16K0F3E / 162.05 MHz



State : High Power / Authorized Bandwidth 11.25 kHz / 11K0F3E / 162.05 MHz



State : High Power / Authorized Bandwidth 11.25 kHz / 11K0F3E / 162.05 MHz



10.8 Frequency Stability (Temperature Variation)

REGULATIONS	:	FCC Part 2 Section 1055 (a) (1), Part 80 Section 209, Part 90 Section 213(a)
TEST METHOD/GUIDE	:	ANSI/TIA-603-E Section 2.2.2.2

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.
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 4 to 6.

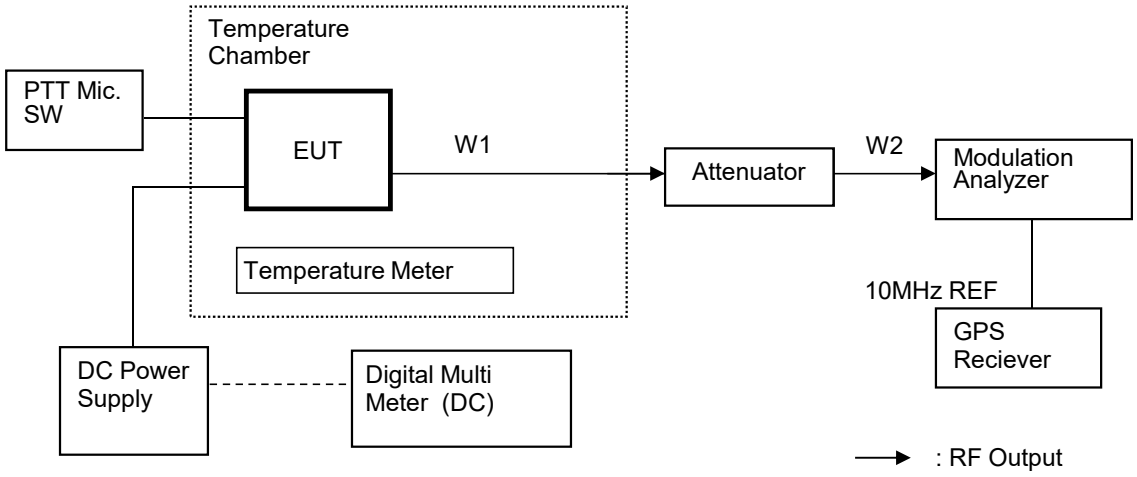
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
1	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4357	1Y	Jul. 31, 19
2	Attenuator (30dB)	Weinschel	WA-29-30-34	8924	1Y	Jul. 31, 19
3	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	1Y	Dec. 31, 18
4	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290931	None	None
5	Digital Multi Meter	FLUKE	8846A	9642018	1Y	Sep. 30, 19
6	Temperature Chamber	Tabai	PL-3F	5103661	None	None
7	Temperature Meter	T&D	TR-71nw	52160B67	1Y	Dec. 31, 18
8	GPS Receiver	Hewlett Packard	HP Z3801A	3542A02414	None	None

Measuring Cables

No.	Cable	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
W2	Coaxial Cable	Pacific custom	RG-58 C/U	KSR00041	1Y	Feb. 28, 19
W1	Coaxial Cable	Suhner	SUCOFLEX104	KSR00042	1Y	Jul. 31, 19

Measuring Equipment Configuration



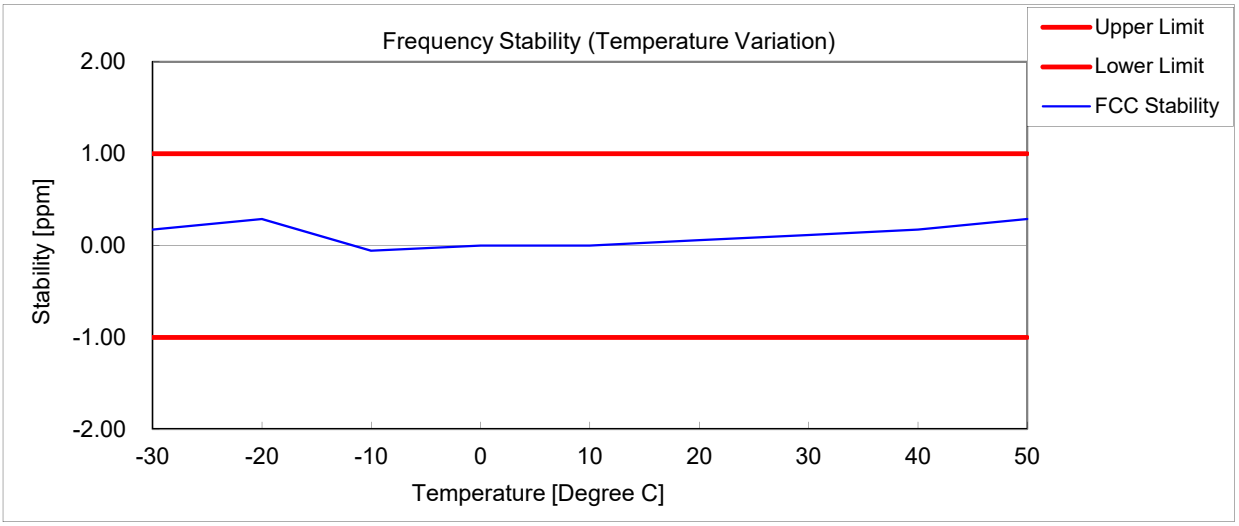
Test Results

Test date	Oct. 03, 2018
Location	Kashima No.12 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 / 173.95 MHz
Reference Frequency: 173.950000 MHz(FCC Stability)

No.	Temperature (Degree C)	Frequency (MHz)	FCC Stability (ppm)	Limit (+/- ppm)	Min. Margin (ppm)
1	-30	173.950030	0.17	1.0	0.83
2	-20	173.950050	0.29	1.0	0.71
3	-10	173.949990	-0.06	1.0	0.94
4	0	173.950000	0.00	1.0	1.00
5	10	173.950000	0.00	1.0	1.00
6	20	173.950010	0.06	1.0	0.94
7	30	173.950020	0.11	1.0	0.89
8	40	173.950030	0.17	1.0	0.83
9	50	173.950050	0.29	1.0	0.71



10.9 Frequency Stability (Voltage Variation)

REGULATIONS	: FCC Part 2 Section 1055 (a) (1), Part 80 Section 209, Part 90 Section 213(a)
TEST METHOD/GUIDE	: ANSI/TIA-603-E Section 2.2.2.2

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.

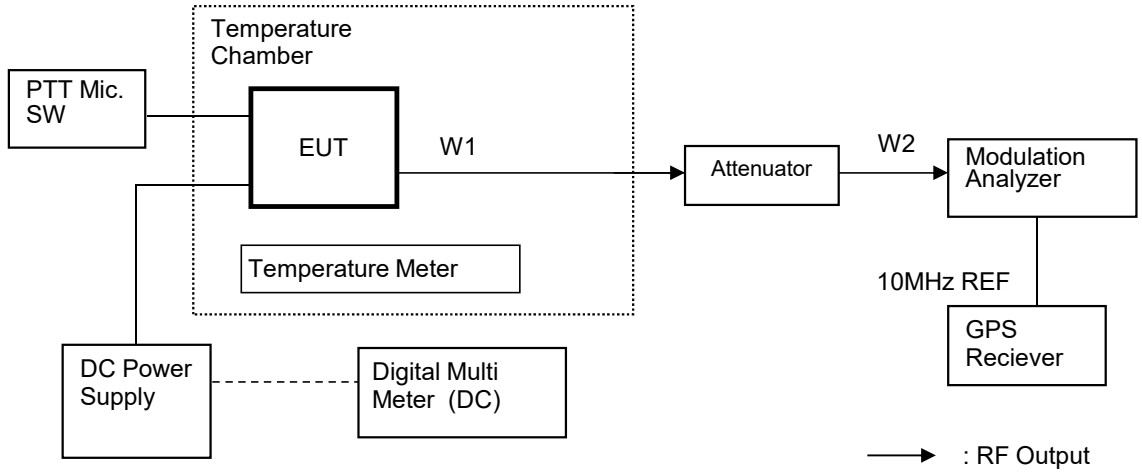
Measuring Equipments

No.	Equipment	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
1	Attenuator (20dB)	Aeroflex/Wenshel	66-20-34	BY4357	1Y	Jul. 31, 19
2	Attenuator (30dB)	Weinschel	WA-29-30-34	8924	1Y	Jul. 31, 19
3	Modulation Analyzer	Hewlett Packard	8901B	3403A04852	1Y	Dec. 31, 18
4	DC Power Supply	Daiichi denpa kogyo	GZV4000	90290931	None	None
5	Digital Multi Meter	FLUKE	8846A	9642018	1Y	Sep. 30, 19
6	Temperature Chamber	Tabai	PL-3F	5103661	None	None
7	Temperature Meter	T&D	TR-71nw	52160B67	1Y	Dec. 31, 18
8	GPS Receiver	Hewlett Packard	HP Z3801A	3542A02414	None	None

Measuring Cables

No.	Cable	Manufacture	Model No.	Serial No.	Cal. Interval	Effective period
W2	Coaxial Cable	Pacific custom	RG-58 C/U	KSR00041	1Y	Feb. 28, 19
W1	Coaxial Cable	Suhner	SUCOFLEX104	KSR00042	1Y	Jul. 31, 19

Measuring Equipment Configuration



Test Results

Test date	Oct 03, 2018
Location	Kashima No.12 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 / 150.05 MHz
Reference Frequency: 150.050000 MHz

No.	Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Stability (ppm)	Limit +/- (ppm)	Margin (ppm)
1	20+/-5	85	11.39	150.050010	0.07	1.0	0.93
2	20+/-5	100	13.40	150.050000	0.00	1.0	1.00
3	20+/-5	115	15.41	150.050010	0.07	1.0	0.93

10.10 Necessary Bandwidth and Emission Bandwidth

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

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

Bn = (2xM)+(2xDxK)

1.types of modulation of the main carrier : F= Frequency modulation
2.nature of signal(s) modulating the main carrier: 3= A single channel containing analog information
3.type of information to be transmitted: E= Telephony (including sound broadcasting)

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

Bn = (2xM)+(2xDxK)

1.types of modulation of the main carrier : F= Frequency modulation
2.nature of signal(s) modulating the main carrier: 3= A single channel containing analog information
3.type of information to be transmitted: E= Telephony (including sound broadcasting)

State: 8K10F1E / 8K10F1D (9600bps, Authorized Bandwidth 11.25 kHz)

Item	Mark			
Digital information rate	(R)	9600	bps	
Peak frequency deviation	(D)	3.111	kHz	
Signaling states	(S)	4		
Numerical factor	(K)	1		
Necessary Bandwidth	(Bn)	8.1	kHz	Measurements were done*

*Measurements per Rule 47CFR Part 2.202(c)(4) were done because Part 2.202(g) Table III-A.1. formulation produces an excessive result using the value of K recommended in th Table. Therefore the 99% energy rule (title 47CFR 2.202(a)) was used for digital mode and is more accurate than Carson's rule. It basically states that 99% of the modulation energy fails within X kHz, in this case, 8.10kHz Measurements were performed in accordance with TIA/EIA 102.CAAB Section 2.2.5.2. The emisson mask was obtained from 47CFR 90.210(d).

1.types of modulation of the main carrier : F= Frequency modulation
2.nature of signal(s) modulating the main carrier: 1= A single channel containing quantized or digital information without the use of a modulating sub-carrier
3.type of information to be transmitted: E= Telephony (including sound broadcasting)
D= Data transmission, telemetry, telecommand

State : 8K30F1E / 8K30F1D / 8K30F7W (4Level FSK / 9600bps, Authorized Bandwidth 11.25 kHz)

Item	Mark		
Digital information rate	(R)	9600	bps
Peak frequency deviation	(D)	3.391	kHz
Signaling states	(S)	4	
Numerical factor	(K)	0.516	
Necessary Bandwidth	(Bn)	8.3	kHz

$Bn = (R/\log_2 S)+2xDxK$

1.types of modulation of the main carrier : F= Frequency modulation
2.nature of signal(s) modulating the main carrier: 1= A single channel containing quantized or digital information without the use of a modulating sub-carrier
7= Two or more channels containing quantized or digital information
3.type of information to be transmitted: E= Telephony (including sound broadcasting)
D= Data transmission, telemetry, telecommand
W= Combination of the above

State : 4K00F1E / 4K00F1D / 4K00F7W (4Level FSK / 4800bps, Authorized Bandwidth 6 kHz)

Item	Mark		
Digital information rate	(R)	4800	bps
Peak frequency deviation	(D)	1.55	kHz
Signaling states	(S)	4	
Numerical factor	(K)	0.516	
Necessary Bandwidth	(Bn)	4	kHz

$Bn = (R/\log_2 S)+2xDxK$

1.types of modulation of the main carrier : F= Frequency modulation
2.nature of signal(s) modulating the main carrier: 1= A single channel containing quantized or digital information without the use of a modulating sub-carrier
7= Two or more channels containing quantized or digital information
3.type of information to be transmitted: E= Telephony (including sound broadcasting)
D= Data transmission, telemetry, telecommand
W= Combination of the above

State : 4K00F2D (CWID, Authorized Bandwidth 6 kHz)

Item	Mark		
Maximum Modulation	(M)	0.8	kHz
Maximum Deviation	(D)	1.2	kHz
Numerical factor	(K)	1	
Necessary Bandwidth	(Bn)	4	kHz

$Bn = (2xM)+(2xDxK)$

1.types of modulation of the main carrier : F= Frequency modulation
2.nature of signal(s) modulating the main carrier: 2= A single channel containing quantized or digital information with the
3.type of information to be transmitted: D= Data transmission, telemetry, telecommand