KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

HEAD OFFICE
6-8-7 NISHITENMA
KITA-KU OSAKA 530-0047 JAPAN

KEC

IKOMA TESTING LABORATORY
12128 TAKAYAMA-CHO
IKOMA-CITY NARA 630-0101 JAPAN

Corporate Juridical Person

TEST REPORT

Report No. A-007-06-C Date: 5 May 2006

This test report is to certify that the tested device properly complies with the requirements of:

FCC Rules and Regulations Part 74 Subpart H : Low Power Auxiliary Stations.

All the tests necessary to show compliance to the requirements were performed and these results met the specifications of requirement. The results of this report should not be construed to imply compliance of equipment other than that, which was tested. Unless the laboratory permission, this report should not be copied in part.

1. Applicant

Company Name : TOA Corporation

Mailing Address : 2-1 Takamatsu-cho, Takarazuka City, Hyogo Pref. 665-0043 Japan

2. Identification of Tested Device

Type of Device : Low Power Auxiliary Stations
Kind of Equipment Authorization : ☐: DoC ☒: Certification ☐: Verification
FCC ID : DLAWM-5220
Device Name : Wireless Microphone
Trade Name : TOA
Model Number : WM-5220
Serial Number : No.1 ☐: Production ☐: Pre-production ☒: Prototype
Date of Manufacture : February 2006

3. Test Items and Procedure

☒: Measurement of RF Power Output (Substitution Method)
☒: Modulation Characteristics
☒: Emission Bandwidth
☒: Measurement of Field Strength of Spurious Radiation (Substitution Method)
☐: Measurement of Spurious Emission at Antenna Terminal
☒: Frequency Stability Measurement

Above all tests were performed under: FCC Part 2 Sec2.1046, Sec2.1047, Sec2.1049, Sec2.1051, Sec2.1053, Sec2.1055 and Sec2.1057.

☒: without deviation, ☐: with deviation (details are found inside of this report)

4. Date of Test

Receipt of Test Sample : 7 February 2006
Condition of Test Sample : ☒: Damage is not found on the set.
☐: Damage is found on the set. (Details are described in this report)
Test Completed on : 26 April 2006

Seiichi Izumi
General Manager / Ikoma Testing Laboratory

Table of Contents

0. LABORATORY ACCREDITATION AND MEASUREMENT UNCERTAINTY

0.1. Laboratory Accreditation

KEC is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for the specific scope of accreditation under Lab Code: 200207-0.

When the test report concerns with the NVLAP accreditation test, the first page of the test report is signed by NVLAP Approved Signatory accompanied by the NVLAP logo.

The report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

0.2. Measurement Uncertainty

The result of a measurement is only an approximation or estimate of the value of a specific quantity. And thus the measurand is complete only when a statement of uncertainty is given.
KEC quotes Measurement Uncertainty (U)

of +/- 4.9 dB for Radiated Emissions
of +/- 2.2 dB for Conducted Emissions

1. CERTIFICATION OF THE COMPLIANCE

This test report is to certify that the tested device properly complies with the requirements of FCC Rules and Regulations Part 74 Subpart H and Part 2.

2. GENERAL INFORMATION

2.1. Product Description

The TOA Model No. WM-5220 (referred to as the EUT in this report) is a Wireless Microphone.

(1) Technical Specification

- Microphone Element : Electret condenser type Cardioid pattern
- Emission : F3E
- Frequency Range : 690.0 ~ 806.0MHz, UHF
- Selectable Channel : 16 channels
- RF Carrier Power : Less than 50mW
- Tone Frequency : 32.768kHz
- Maximum Input Level : 126dB SPL
- Maximum Deviation : ±40kHz
- Audio Frequency Response : 200 ~ 15000Hz
- Dynamic Range (AF Circuit) : More than 95dB (with WT-5800)
- Battery : LR6 (AA)
- Battery Life : More than 10 hours (alkaline)
- Indicator : Power / Battery lamps
- Antenna : Built-in type
- Operating Temperature : -10 to + 50°C
- Finish : Resin, coating
- Dimensions : ø43.6 × 231.5mm
- Weight : 180g (with battery)

(2) Used Oscillators Frequencies

・A, B Band	Setting 1	: 692.00MHz
	Setting 2	: 707.00MHz
	Setting 3	: 722.00MHz
	Setting 4	: 737.00MHz
	Setting 5	: 752.00MHz
・C, D Band	Setting 6	: 794.00MHz
・Tone		: 32.768kHz

(3) Rated Power Supply : DC 1.5V (“AA” Dry Battery)

2.2. Description for Equipment Authorization

(1) Reference Rule and Specification	: FCC Rule Part 74 Subpart H Low Power Auxiliary Stations
(2) Kind of Equipment Authorization	: ☒ Certification ☐ Verification
(3) Procedure of Application	: ☒ Original Equipment ☐ Modification

2.3. Test Facility

All tests described in this report were performed by:

Name: KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER (KEC)
IKOMA TESTING LABORATORY

Open Area Test Site	☐ No.1	☐ No.4	
Anechoic Chamber	☐ No.1	☒ No.3	
Shielded Room	☐ No.1	☐ No.2	☒ No.4

Address: 12128, Takayama-cho Ikoma-city, Nara, 630-0101 Japan

These test facilities have been filed with the FCC under the criteria of ANSI C63.4-2003.
The KEC has been accredited by the NVLAP (Lab. Code: 200207-0) based on ISO/IEC 17025.
Also the laboratory has been authorized by TUV Product Service (GER) and TUV Rheinland (GER) based on their criteria for testing laboratory (ISO/IEC 17025).

3. TESTED SYSTEM

3.1. Test Mode

The compliance tests were performed under the following operation mode.

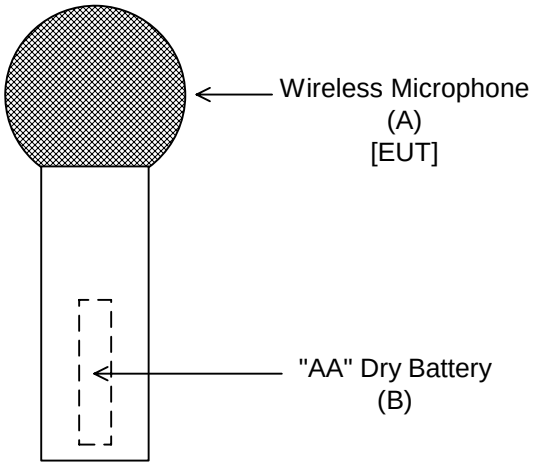
· Continuous Tx

[Note]
In RF output power and Spurious emission measurement, the compliance tests were performed both of horizontally placed and vertically placed in EUT. As a results, the data of operation mode that produce the maximum emission were reported.

3.2. Characterization and condition of EUT System

☒ : normal, ☐ : not normal (that is)

3.3. Block Diagram of EUT System



[Note]
See 3.4. List of EUT System.

3.4. List of EUT System

No	Device Name	Model Number (Serial Number)	FCC ID (Trade Name)	Note
A	Wireless Microphone	WM-5220 (No.1)	DLAWM-5220 (TOA)	EUT
B	“AA” Dry Battery	LR6 (G) (–)	N/A (Panasonic)	

[Attention]
N/A : Not Applicable

4. RF POWER OUTPUT

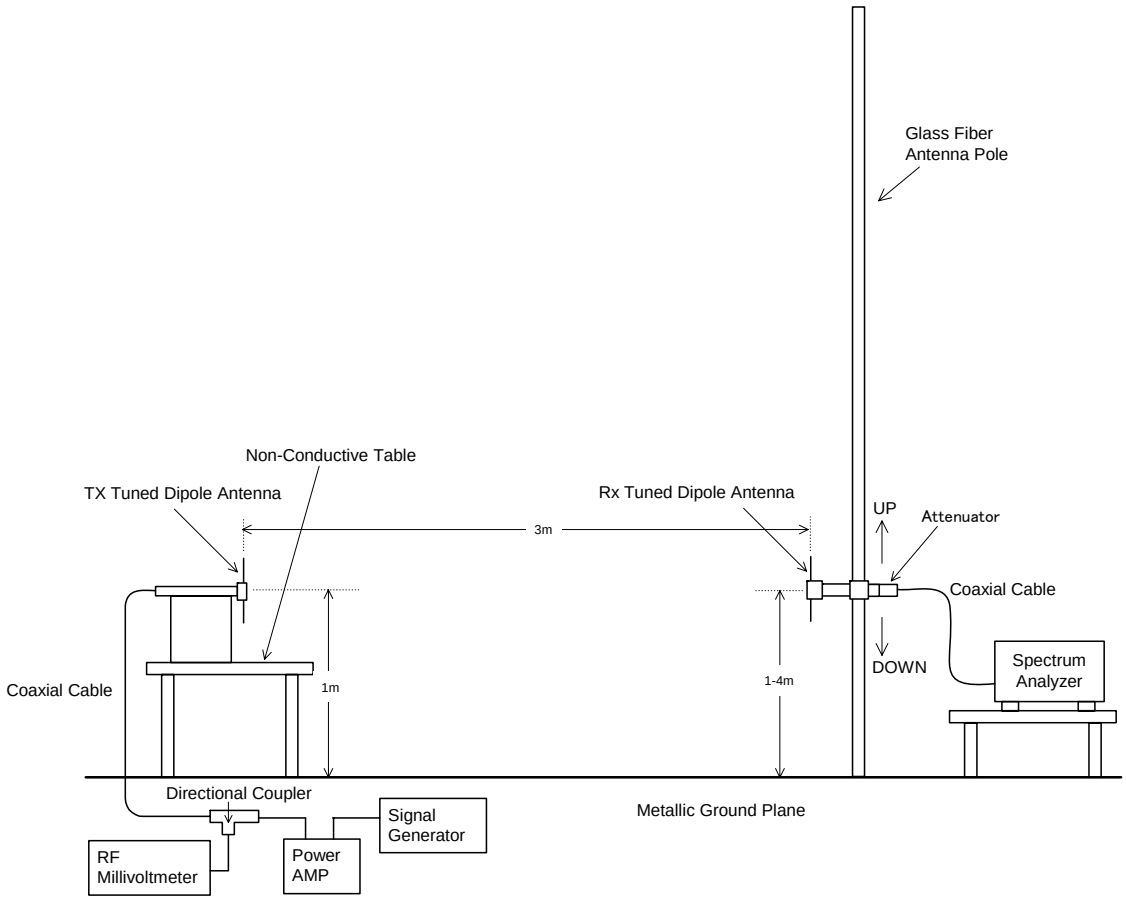
4.1. Reference Rule and Specification

FCC Rule Part 74 Subpart H [Section74.861 (e) (1) (ii)]
and Part 2 Subpart J [Section2.1046],[Section2.1053]

4.2. Test Procedure

(1) Tune-up the transmitter.
(2) The receiving antenna is adjusted to the correct length for the carrier frequency.
(3) Raise and lower the receiving antenna to obtain a maximum reading on the Spectrum Analyzer with the antenna at horizontal polarity. Then the turntable is rotated to further increase this maximum reading. Repeat this procedure of raising and lower the antenna and rotating the turntable until the highest possible signal has been obtain. Record this maximum reading.
(4) Repeat step3 with the antenna polarized vertically.
(5) Remove the transmitter and replace it with the half-wave antenna. The center of these antennas are approximately at the same location as the center of the transmitter.
(6) Feed the half-wave antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to the carrier frequency, raise and lower the receiver antenna to obtain a maximum reading at the Spectrum Analyzer. Adjust the level of the signal generator output until the previous recording maximum reading for this set of conditions its obtained.
(7) Repeat step6 with both antennas vertically polarized.

4.3. Test Configuration



4.4. Test Results

(1) A, B Band

1) Setting 1 (692MHz)

Carrier Emission Frequency	Spectrum Analyzer Reading		RF Meter Reading		Cable Loss	ERP	RF Output Power	Limit
	Horizontal	Vertical	Horizontal	Vertical				
(MHz)	(dBuV)	(dBuV)	(dBm)	(dBm)	(dB)	(dBm)	(mW)	(mW)
692.00	81.5	78.3	10.7	11.7	0.9	10.8	12.0	250.0

2) Setting 3 (722MHz)

Carrier Emission Frequency	Spectrum Analyzer Reading		RF Meter Reading		Cable Loss	ERP	RF Output Power	Limit
	Horizontal	Vertical	Horizontal	Vertical				
(MHz)	(dBuV)	(dBuV)	(dBm)	(dBm)	(dB)	(dBm)	(mW)	(mW)
722.00	80.8	78.3	11.1	12.2	0.9	11.3	13.5	250.0

3) Setting 5 (752MHz)

Carrier Emission Frequency	Spectrum Analyzer Reading		RF Meter Reading		Cable Loss	ERP	RF Output Power	Limit
	Horizontal	Vertical	Horizontal	Vertical				
(MHz)	(dBuV)	(dBuV)	(dBm)	(dBm)	(dB)	(dBm)	(mW)	(mW)
752.00	82.0	79.4	13.0	14.7	1.0	13.7	23.4	250.0

(2) C, D Band

1) Setting 6 (794MHz)

Carrier Emission Frequency	Spectrum Analyzer Reading		RF Meter Reading		Cable Loss	ERP	RF Output Power	Limit
	Horizontal	Vertical	Horizontal	Vertical				
(MHz)	(dBuV)	(dBuV)	(dBm)	(dBm)	(dB)	(dBm)	(mW)	(mW)
794.00	83.0	79.3	13.8	14.1	1.0	13.1	20.4	250.0

[Calculation method]

The RF Power Output can be calculated from following formula:

$$RFPower(mW) = 10^{(Mr-Lo)\div 10}$$

where,
Mr : RF Meter Reading (dBm)
Lo : Loss of Cable (dB)

[Environment]

Temperature: 23 °C Humidity: 45 %

[Tested Date / Tester]

7 March 2006 Signature

Hironobu Matsuyama

5. MODULATION CHARACTERISTICS

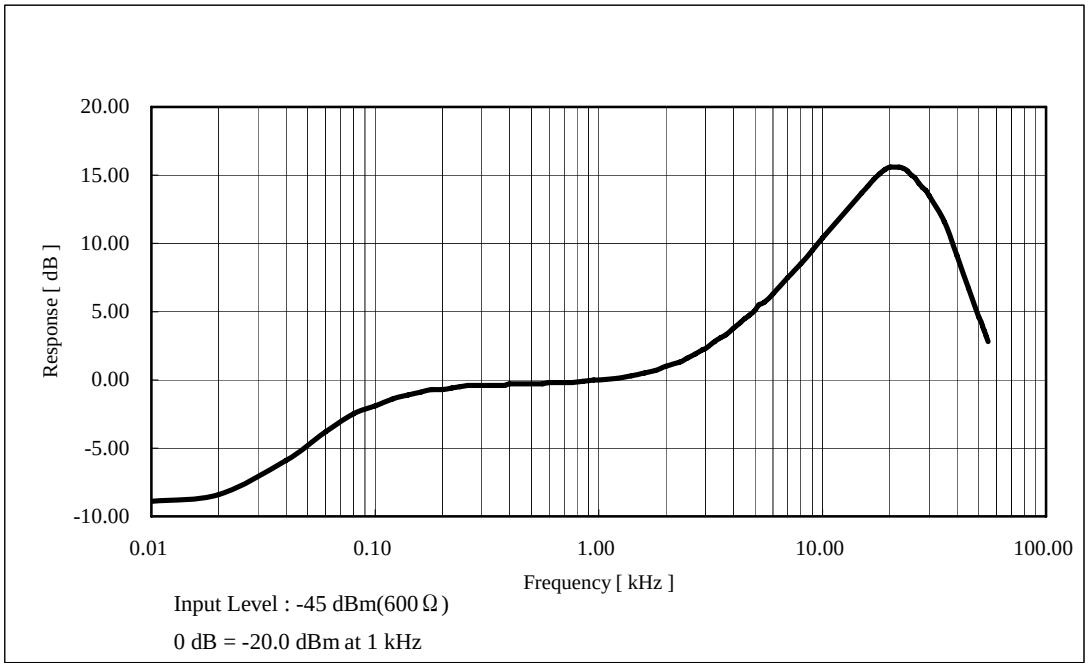
5.1. Reference Rule and Specification

FCC Rule Part 2 Subpart J [Section 2.1047 (a), (b)]
FCC Rule Part 74 Subpart H [Section 74.861 (e) (3)]

5.2. Test Results

(A) Overall Audio Frequency Response

A, B Band / C, D Band



[Environment]
Temperature: 23 °C Humidity: 50 %

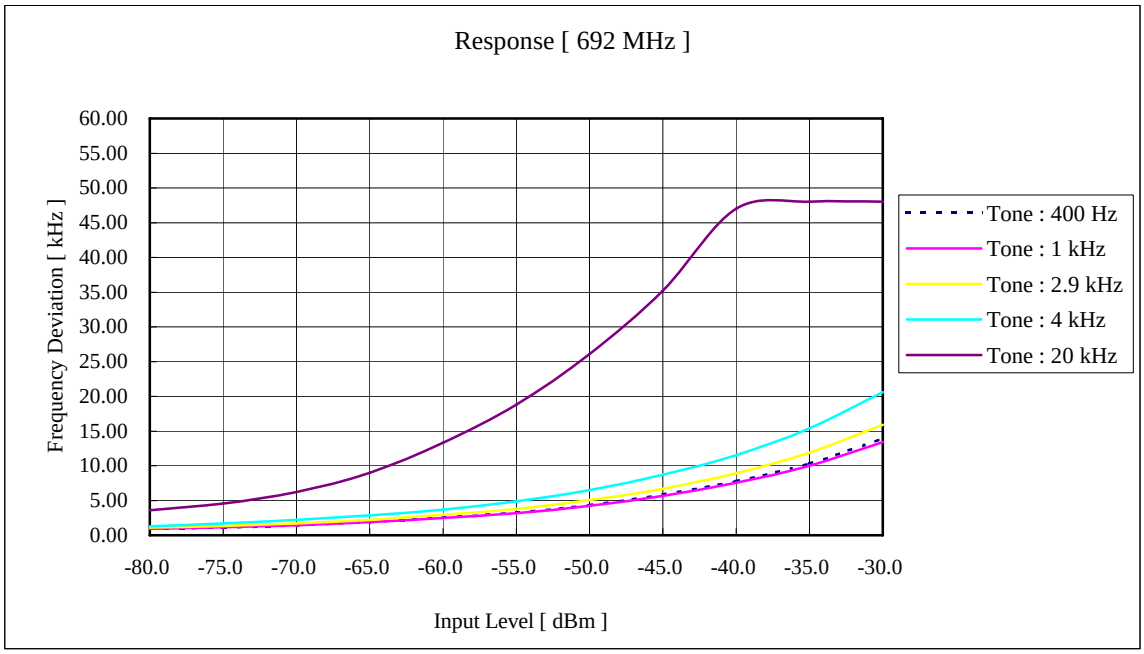
[Tested Date / Tester]
26 April 2006 Signature

Hironobu Matsuyama

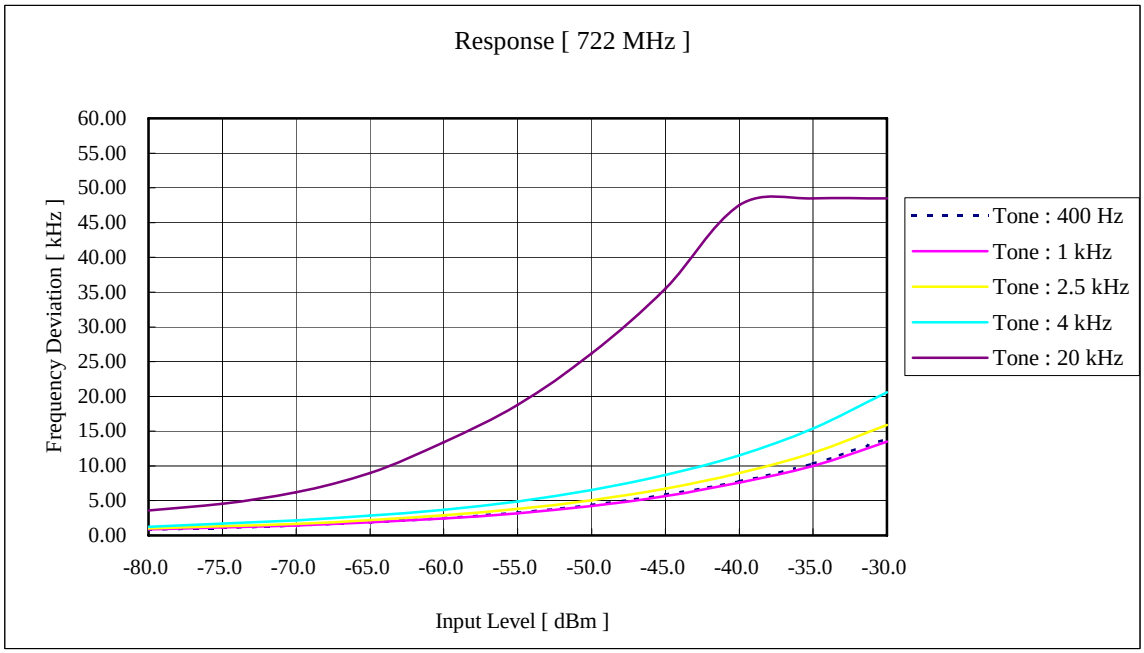
(b) Transmitter Deviation for a Range of Input Signal Level and Modulating Frequencies

(1) A, B Band

1) Setting 1 (692MHz)

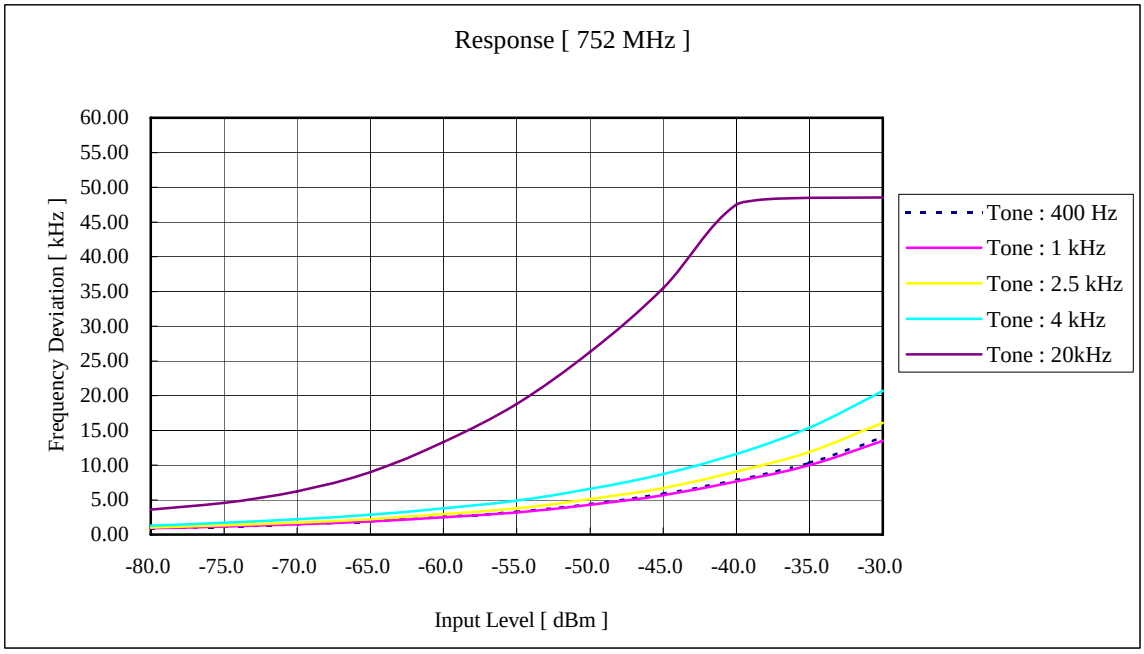


2) Setting 3 (722MHz)



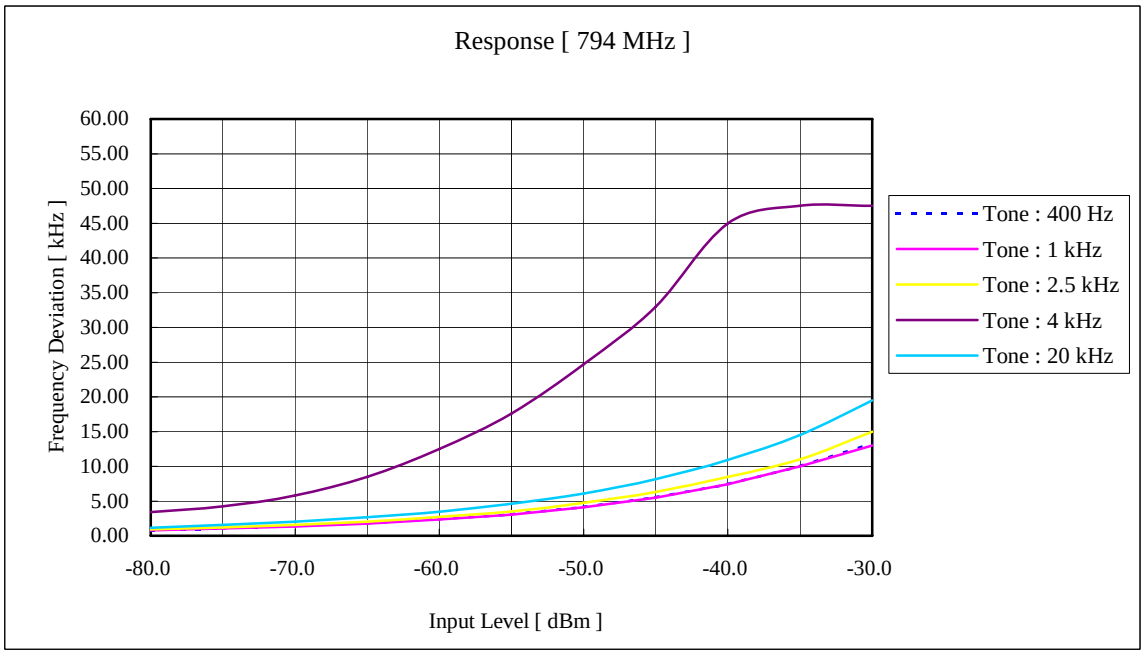
- Continued -

3) Setting 5 (752MHz)



(2) C, D Band

1) Setting 6 (794MHz)



[Environment]

Temperature: 23 °C Humidity: 50 %

[Tested Date / Tester]

26 April 2006 Signature

Hironobu Matsuyama

6. EMISSION BANDWIDTH

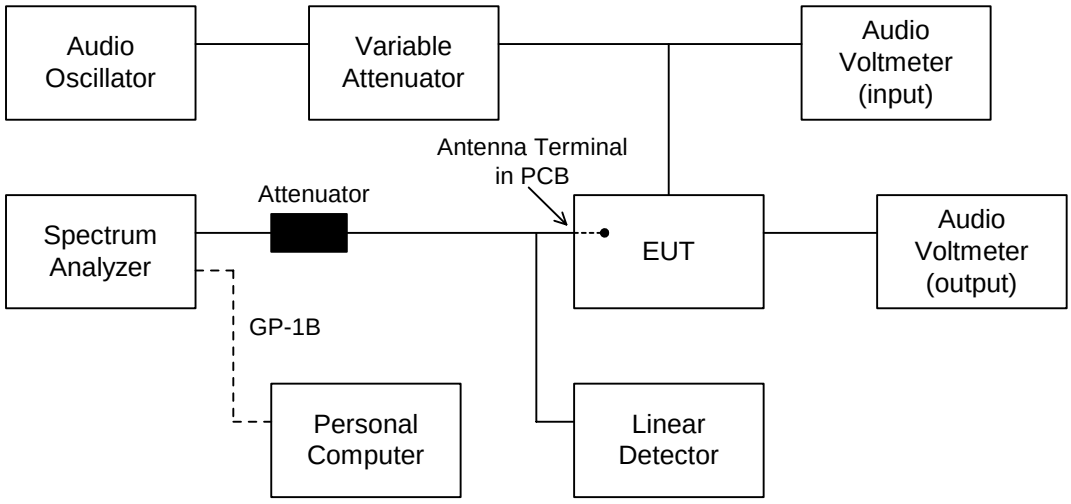
6.1. Reference Rule and Specification

FCC Part 74 Subpart H [Section (e) (5)] and [Section (6) (i) (ii)]
FCC Part 2 Subpart J [Section 2.1049]

6.2. Test Procedure

(1)	Set the reference level of the spectrum analyzer to the unmodulated carrier level of the EUT.
(2)	Searched maximum response of audio frequency and read maximum frequency deviation. Then set the frequency deviation to 50% and read audio input level.
(3)	Then EUT was modulated by 2.5kHz and it's level was increased 16dB.

6.3. Test Configuration



6.4. Test Results

See next figure (the picture of spectrum analyzer)

Occupied Bandwidth

The OBW was measured by the spectrum analyzer which could measure 99% occupied bandwidth (OBW).

There are 1001 data on horizontal axis of display.
One of them is Vn. Then total power P can be calculated from the following formula.

$$P = \sum_{n=1}^{1001} \frac{Vn^2}{R} \qquad \text{(1)}$$

where, R is input impedance of R3261B.

Let, x is the point which gives 0.5% of the total power and Y is the point which gives 99.5% of the total power. Then we can get the following formula.

$$0.005P = \sum_{n=1}^{x} \frac{Vn^2}{R} \qquad \text{(2)}$$

$$0.995P = \sum_{n=1}^{y} \frac{Vn^2}{R} \qquad \text{(3)}$$

From (1)- (3), OBW becomes.

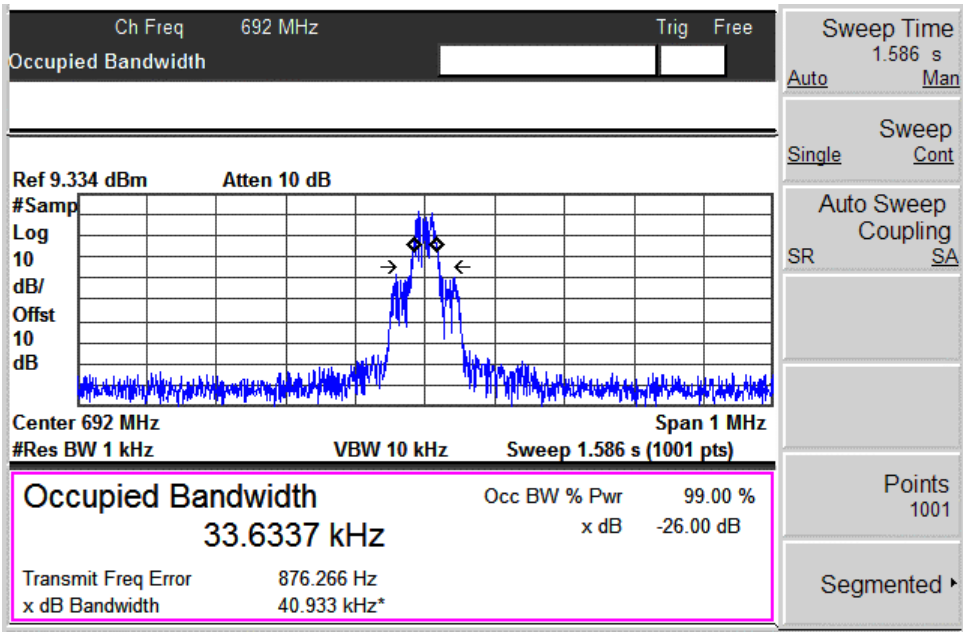
$$OBW = \frac{Fspan(Y - X)}{1000}$$

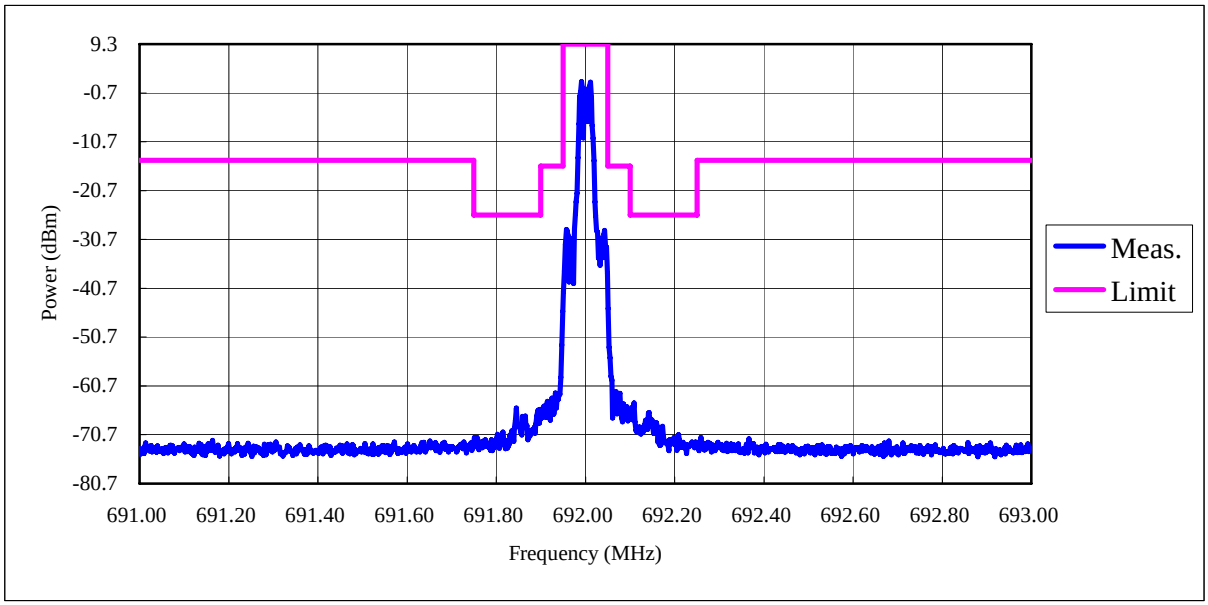
where, F_{span} is frequency span of the spectrum analyzer.

- Continued -

(1) A, B Band

1) Setting 1 (692MHz)





[Note]

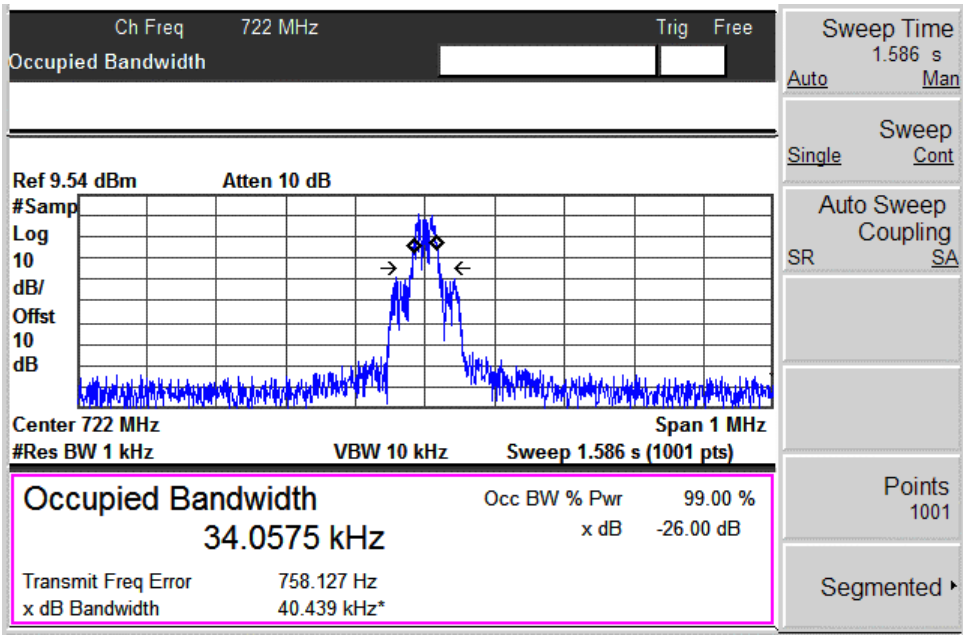
(1) Maximum response of audio frequency was 20kHz. and maximum frequency deviation was 48kHz.
(2) Then 50% of maximum frequency deviation was 24kHz. and input level became to –52.0dBm.
(3) Then EUT was modulated by 2.5kHz and audio input level became to -52.0 + 16 = -36.0dBm.
(4) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth : at least 25dB.
(5) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth : at least 35dB.
(6) One any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth at least 43 + 10 $\log_{10}$ (mean output power in watt) dB.

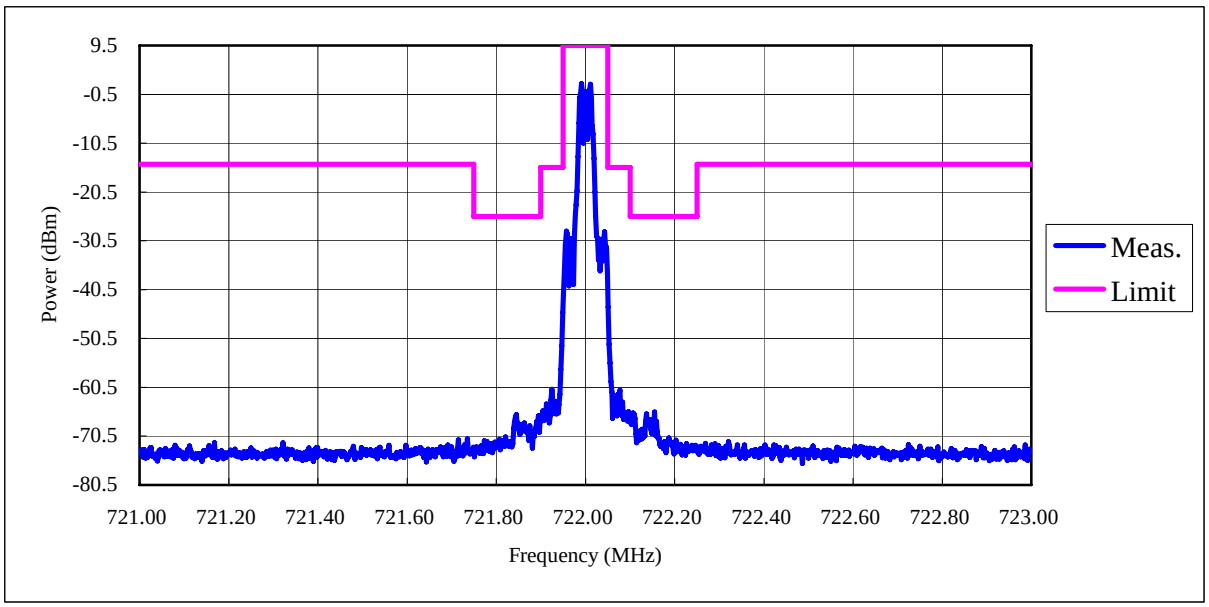
For 692MHz

Limit = 43 + (10.8 – 30) = 23.8dB (-23.8dBc)

- Continued -

2) Setting 3 (722MHz)





[Note]

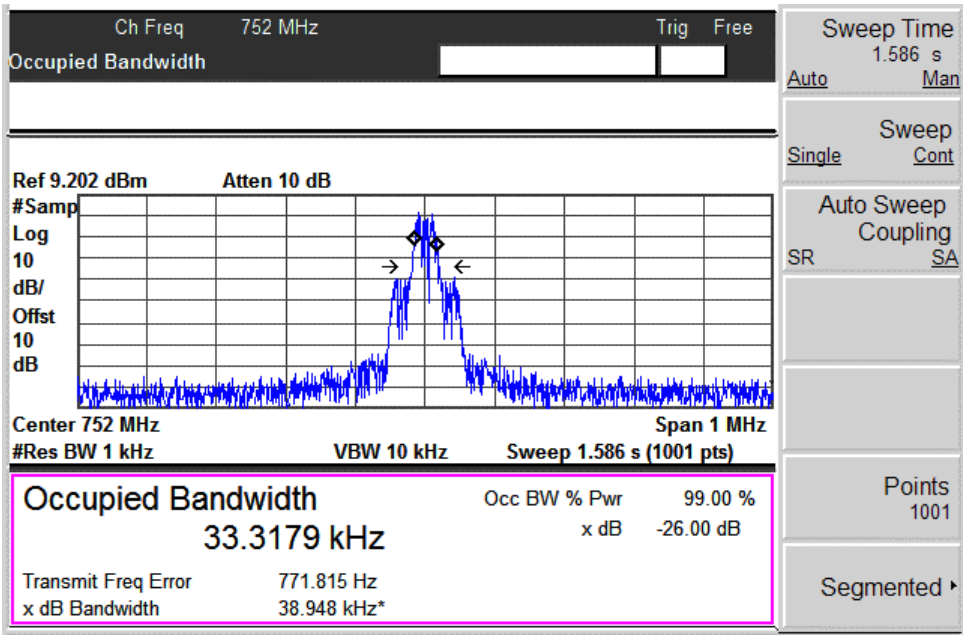
(1) Maximum response of audio frequency was 20kHz. and maximum frequency deviation was 49kHz.
(2) Then 50% of maximum frequency deviation was 24.5kHz. and input level became to –52.0dBm.
(3) Then EUT was modulated by 2.5kHz and audio input level became to -52.0 + 16 = -36.0dBm.
(4) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth : at least 25dB.
(5) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth : at least 35dB.
(6) One any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth at least 43 + 10 $\log_{10}$ (mean output power in watt) dB.

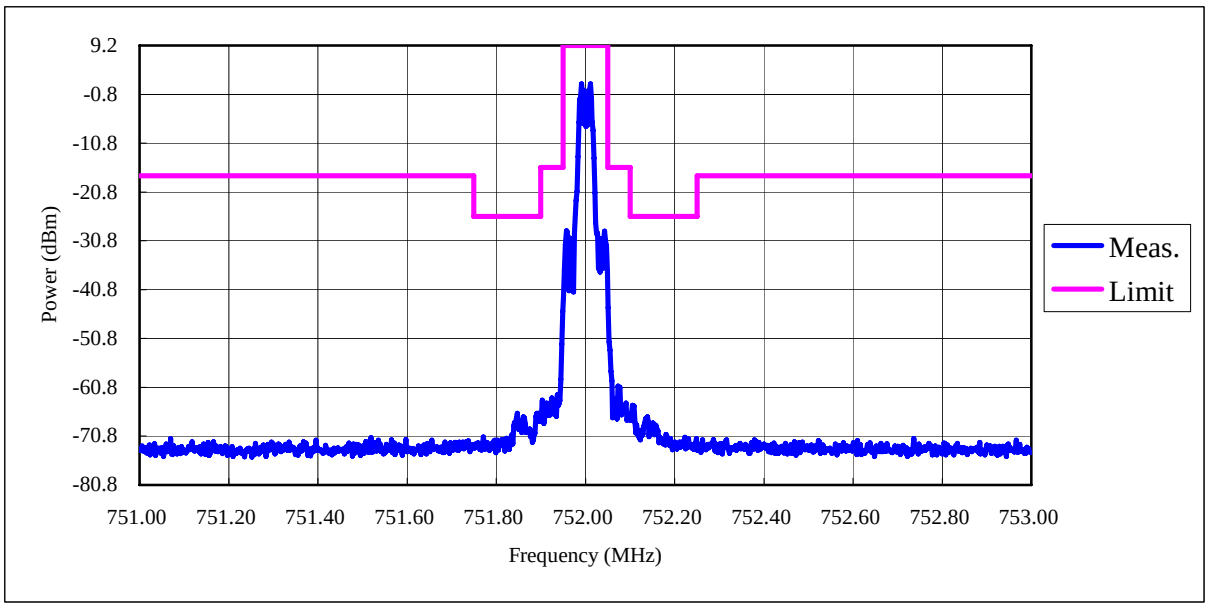
For 722MHz

Limit = 43 + (11.3 – 30) = 24.3dB (-24.3dBc)

- Continued -

3) Setting 5 (752MHz)





[Note]

(1) Maximum response of audio frequency was 20kHz. and maximum frequency deviation was 49kHz.
(2) Then 50% of maximum frequency deviation was 24.5kHz. and input level became to –52.0dBm.
(3) Then EUT was modulated by 2.5kHz and audio input level became to -52.0 + 16 = -36.0dBm.
(4) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth : at least 25dB.
(5) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth : at least 35dB.
(6) One any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth at least 43 + 10 $\log_{10}$ (mean output power in watt) dB.

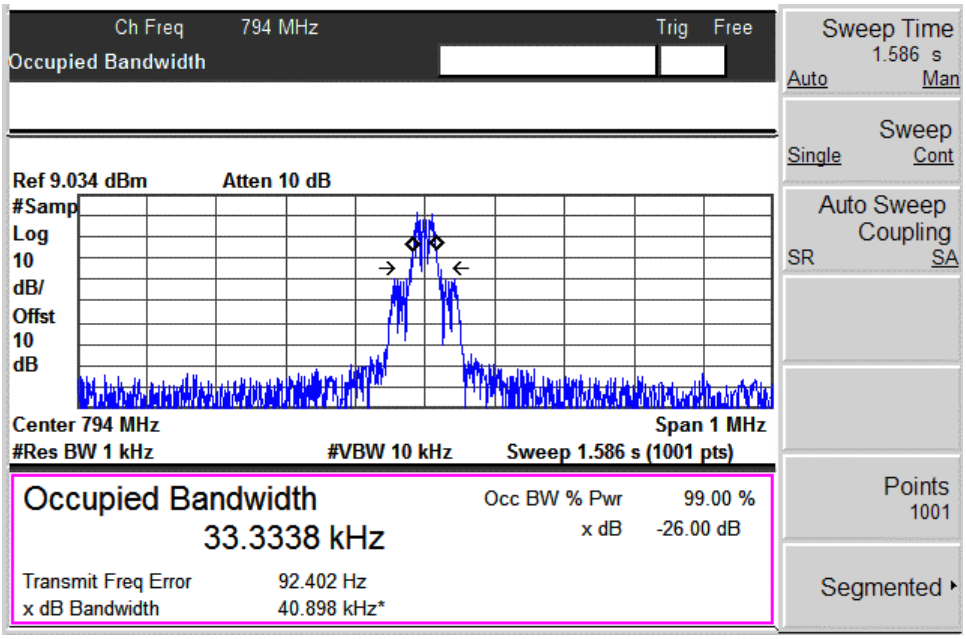
For 752MHz

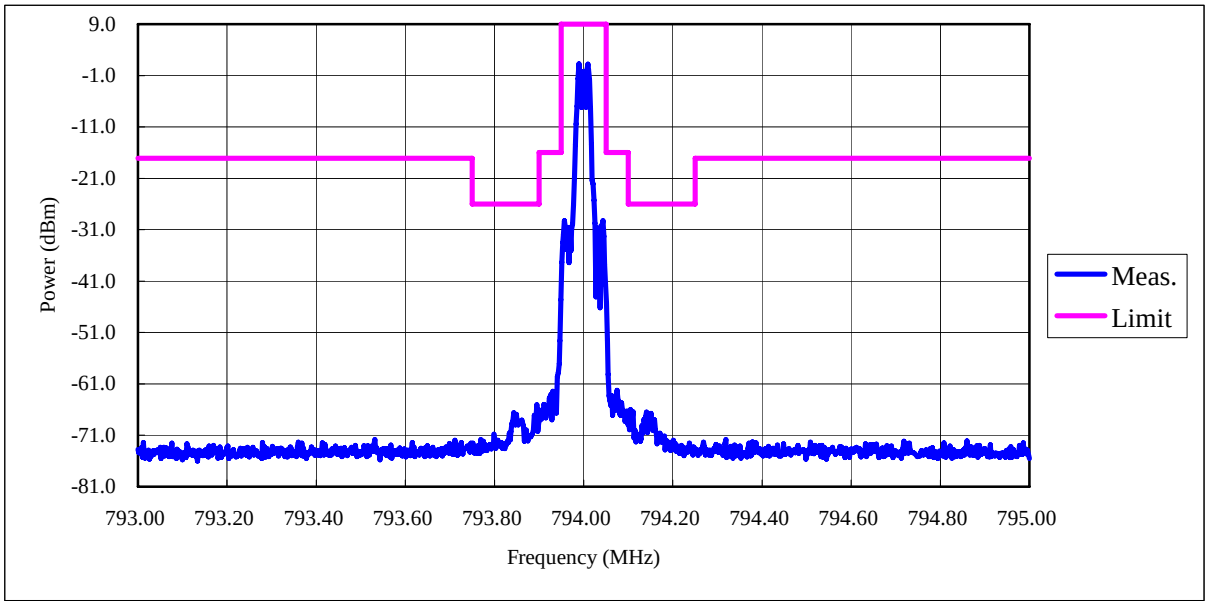
Limit = 43 + (13.7 – 30) = 26.7dB (-26.7dBc)

- Continued -

(2) C, D Band

1) Setting 6 (794MHz)





[Note]

(1) Maximum response of audio frequency was 20kHz. and maximum frequency deviation was 47.5kHz.
(2) Then 50% of maximum frequency deviation was 23.75kHz. and input level became to –52.0dBm.
(3) Then EUT was modulated by 2.5kHz and audio input level became to -52.0 + 16 = -36.0dBm.
(4) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth : at least 25dB.
(5) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth : at least 35dB.
(6) One any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth at least 43 + 10 $\log_{10}$ (mean output power in watt) dB.

For 794MHz

Limit = 43 + (13.1 – 30) = 26.1dB (-26.1dBc)

- Continued -

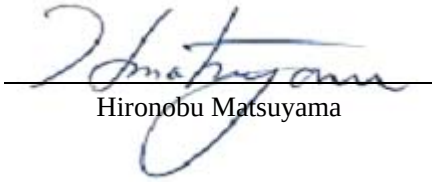
[Environment]

Temperature: 25 °C Humidity: 60 %

[Summary of Test Results]

Above data shows that the test device complies with the requirements.

[Tested Date / Tester]

22 April 2006 Signature 

Hironobu Matsuyama

7. FIELD STRENGTH OF SPURIOUS RADIATION

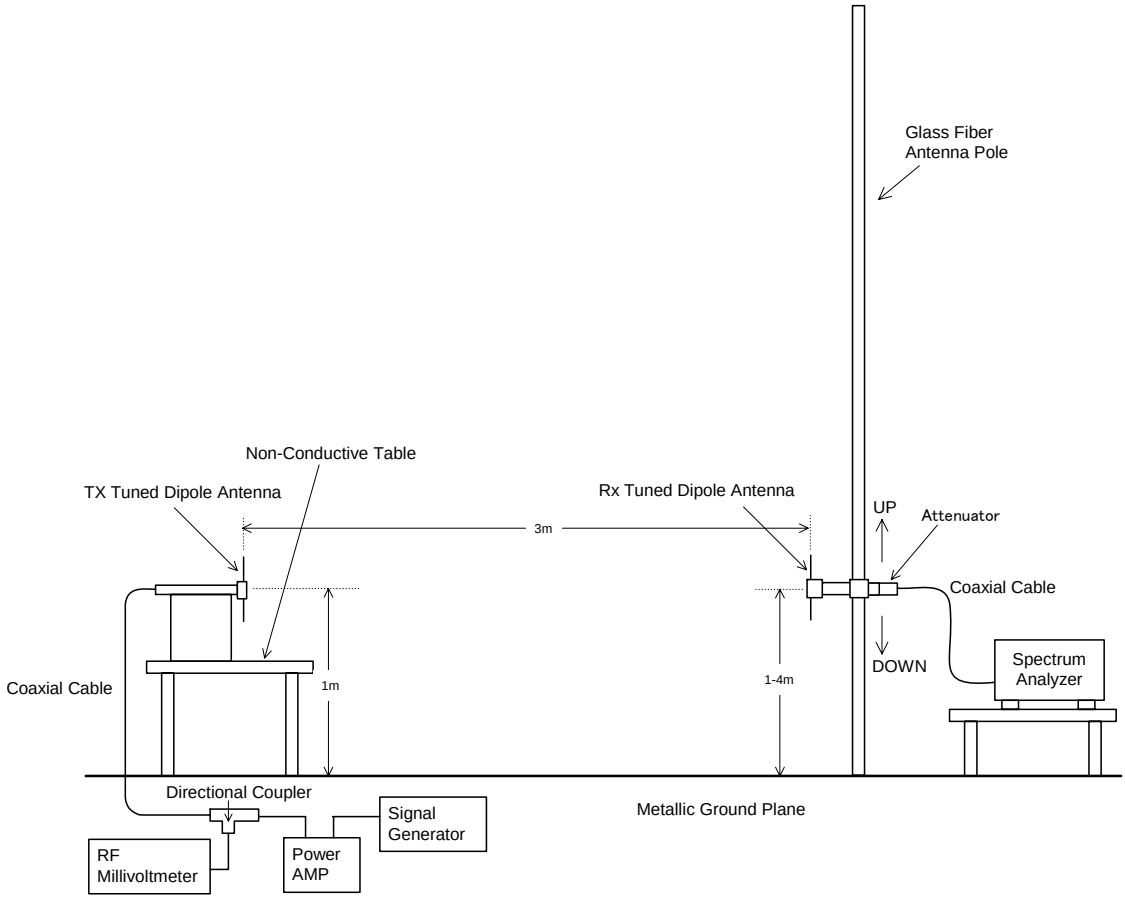
7.1. Reference Rule and Specification

FCC Rule Part 74 Subpart H [Section 74.861 (e) (6) (iii)] and Part 2 Subpart J [Section 2.1053]

7.2. Test Procedure

(1) Tune-up the transmitter (EUT).
(2) The device is arranged in X axis.
(3) For each spurious measurement the receiving antenna is adjusted to the correct length for the frequency involved. These measurements are made from the lowest radio frequency generated in the EUT or 25MHz to the tenth harmonic of the carrier.
(4) For each spurious frequency, raise and lower the receiving antenna to obtain a maximum reading on the spectrum analyzer with the antenna at horizontal polarity.
Then the turntable is rotated to further increase this maximum reading. Repeat this procedure of raising and lower the antenna and rotating the turntable until highest possible signal has been obtain.
Record this maximum reading.
(5) Repeat Step4 for each spurious frequency with the antennae polarized vertically.
(6) The device is arranged in Y axis.
(7) Repeat Step3, Step4, and Step5
(8) The attenuation of the spurious in dB can be calculated from the following formula:
Spurious Emission Attenuation [dB] = Carrier Power [dBm] - Spurious Emission Power [dBm]

7.3. Test Configuration



7.4. Test Results

(1) A, B Band

1) Setting 1 (692MHz)

Spurious Emission Frequency (MHz)	Spectrum Analyzer Reading Horizontal (dBuV)	Spectrum Analyzer Reading Vertical (dBuV)	RF Meter Reading Horizontal (dBm)	RF Meter Reading Vertical (dBm)	Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Spurious Attenuation (dBc)	Limit (dBc)	Margin (dB)
1384.00	22.2	22.8	-60.9	-60.3	11.7	1.3	-52.0	-62.8	-23.8	39.0
2076.00	38.4	40.7	-70.7	-68.4	15.7	1.6	-56.4	-67.2	-23.8	43.4
2768.00	42.5	44.9	-67.3	-64.9	17.9	1.9	-51.0	-61.8	-23.8	38.0
3460.00	36.1	37.4	-72.8	-71.5	19.5	2.2	-56.3	-67.1	-23.8	43.3
4152.00	35.1	33.6	-71.7	-73.2	20.3	2.4	-55.9	-66.7	-23.8	42.9
4844.00	35.2	35.0	-69.8	-70.0	20.9	2.6	-53.6	-64.4	-23.8	40.6
5536.00	36.5	40.2	-75.8	-72.1	19.2	2.8	-57.8	-68.6	-23.8	44.8
6228.00	38.7	41.4	-75.8	-73.1	21.8	3.0	-56.4	-67.2	-23.8	43.4
6920.00	42.4	43.0	-71.3	-70.7	22.0	3.4	-54.2	-65.0	-23.8	41.2

2) Setting 3 (722MHz)

Spurious Emission Frequency (MHz)	Spectrum Analyzer Reading Horizontal (dBuV)	Spectrum Analyzer Reading Vertical (dBuV)	RF Meter Reading Horizontal (dBm)	RF Meter Reading Vertical (dBm)	Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Spurious Attenuation (dBc)	Limit (dBc)	Margin (dB)
1444.00	28.1	26.7	-55.7	-57.1	12.2	1.4	-47.0	-58.3	-24.3	34.0
2166.00	33.9	40.0	-75.4	-69.3	16.0	1.7	-57.1	-68.4	-24.3	44.1
2888.00	42.0	44.3	-67.9	-65.6	18.3	1.9	-51.3	-62.6	-24.3	38.3
3610.00	34.3	38.5	-75.2	-71.0	19.6	2.2	-55.7	-67.0	-24.3	42.7
4332.00	36.1	36.4	-70.4	-70.1	20.3	2.4	-54.3	-65.6	-24.3	41.3
5054.00	39.6	40.8	-73.1	-71.9	18.8	2.6	-57.8	-69.1	-24.3	44.8
5776.00	35.1	38.1	-76.4	-73.4	19.3	2.8	-59.0	-70.3	-24.3	46.0
6498.00	35.6	36.1	-78.7	-78.2	21.9	3.2	-61.6	-72.9	-24.3	48.6
7220.00	31.2	32.5	-81.6	-80.3	22.0	3.5	-63.9	-75.2	-24.3	50.9

3) Setting 5 (752MHz)

Spurious Emission Frequency (MHz)	Spectrum Analyzer Reading Horizontal (dBuV)	Spectrum Analyzer Reading Vertical (dBuV)	RF Meter Reading Horizontal (dBm)	RF Meter Reading Vertical (dBm)	Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Spurious Attenuation (dBc)	Limit (dBc)	Margin (dB)
1504.00	26.5	26.0	-58.1	-58.6	12.9	1.4	-48.7	-62.4	-26.7	35.7
2256.00	41.6	39.2	-68.1	-70.5	16.3	1.7	-55.6	-69.3	-26.7	42.6
3008.00	39.9	41.3	-70.1	-68.7	18.7	2.0	-54.1	-67.8	-26.7	41.1
3760.00	37.2	41.1	-70.1	-66.2	19.6	2.3	-51.0	-64.7	-26.7	38.0
4512.00	31.8	35.2	-73.5	-70.1	20.4	2.5	-54.3	-68.0	-26.7	41.3
5264.00	40.0	39.6	-72.1	-72.5	18.9	2.7	-58.0	-71.7	-26.7	45.0
6016.00	43.0	43.4	-71.8	-71.4	21.0	2.9	-55.4	-69.1	-26.7	42.4
6768.00	32.9	35.2	-81.1	-78.8	21.9	3.4	-62.4	-76.1	-26.7	49.4
7520.00	32.1	29.4	-81.0	-83.7	22.3	3.6	-64.4	-78.1	-26.7	51.4

- Continued -

(2) C, D Band

1) Setting 6 (794MHz)

Spurious Emission Frequency (MHz)	Spectrum Analyzer Reading		RF Meter Reading		Antenna Gain	Cable Loss	ERP	Spurious Attenuation	Limit	Margin
	Horizontal (dBuV)	Vertical (dBuV)	Horizontal (dBm)	Vertical (dBm)	(dB)	(dB)	(dBm)	(dBc)	(dBc)	(dB)
1588.00	25.1	25.5	-60.2	-59.8	13.7	1.4	-49.6	-62.7	-26.1	36.6
2382.00	51.8	52.3	-58.2	-57.7	16.7	1.8	-44.9	-58.0	-26.1	31.9
3176.00	50.4	49.6	-58.8	-59.6	18.9	2.1	-44.1	-57.2	-26.1	31.1
3970.00	35.1	33.1	-72.7	-74.7	20.0	2.3	-57.1	-70.2	-26.1	44.1
4764.00	48.3	45.6	-56.4	-59.1	20.9	2.6	-40.2	-53.3	-26.1	27.2
5558.00	51.5	49.4	-60.6	-62.7	19.3	2.8	-46.2	-59.3	-26.1	33.2
6352.00	38.3	43.4	-75.5	-70.4	21.8	3.1	-53.8	-66.9	-26.1	40.8
7146.00	41.8	41.7	-71.0	-71.1	22.0	3.5	-54.6	-67.7	-26.1	41.6
7940.00	38.0	38.7	-73.8	-73.1	22.2	3.6	-56.6	-69.7	-26.1	43.6

[Calculation method]

Effective Radiated Power (Horizontal or Vertical Polarization) [dBm]
= Meter Reading (Horizontal or Vertical Polarization) [dBm] + Tx Ant. Gain [dBi] – 2.2 [dBi] (*)
– Cable loss [dB]

* : Half wave dipole antenna istropic gain

[Calculation of Limit]

$43 + 10 \log_{10} P (W)$ dB

- For 692MHz
  Limit = 43 + (10.8 – 30) = 23.8dB (-23.8dBc)
- For 722MHz
  Limit = 43 + (11.3 – 30) = 24.3dB (-24.3dBc)
- For 752MHz
  Limit = 43 + (13.7 – 30) = 26.7dB (-26.7dBc)
- For 794MHz
  Limit = 43 + (13.1 – 30) = 26.1dB (-26.1dBc)

[Environment]

Temperature: 23 °C Humidity: 45 %

[Tested Date / Tester]

7 March 2006 Signature

Hironobu Matsuyama

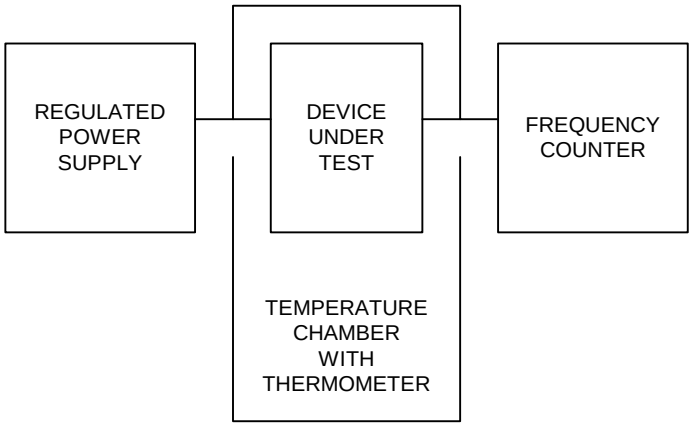
8. FREQUENCY STABILITY MEASUREMENT

8.1. Reference Rule and Specification

FCC Rule Part 74 Subpart H [Section 743.861 (e) (4)] and Part 2 Subpart J [Section 2.1055]

8.2. Frequency vs Temperature Test

Test Setup Diagram



(1) A, B Band

1) Setting 1 (692MHz)

Test Voltage : 1.50V

REFERENCE FREQUENCY [MHz]	TEMPERATURE [℃]	FREQUENCY DRIFT [%]	LIMIT [%]
692.00	-30	0.001251	±0.005
	-20	0.001637	
	-10	0.001652	
	0	0.001454	
	+10	0.001059	
	+20	0.000568	
	+30	0.000010	
	+40	-0.000603	
	+50	-0.001165	

- Continued -

2) Setting 3 (722MHz)

Test Voltage : 1.50V

REFERENCE FREQUENCY [MHz]	TEMPERATURE [℃]	FREQUENCY DRIFT [%]	LIMIT [%]
722.00	-30	0.001258	±0.005
	-20	0.001637	
	-10	0.001650	
	0	0.001453	
	+10	0.001062	
	+20	0.000568	
	+30	0.000000	
	+40	-0.000600	
	+50	-0.001175	

3) Setting 5 (752MHz)

Test Voltage : 1.50V

REFERENCE FREQUENCY [MHz]	TEMPERATURE [℃]	FREQUENCY DRIFT [%]	LIMIT [%]
752.00	-30	0.001258	±0.005
	-20	0.001636	
	-10	0.001650	
	0	0.001455	
	+10	0.001061	
	+20	0.000581	
	+30	0.000000	
	+40	-0.000593	
	+50	-0.001180	

- Continued -

(2) C, D Band

1) Setting 6 (794MHz)

Test Voltage : 1.50V

REFERENCE FREQUENCY [MHz]	TEMPERATURE [℃]	FREQUENCY DRIFT [%]	LIMIT [%]
794.00	-30	-0.000664	±0.005
	-20	-0.000040	
	-10	0.000380	
	0	0.000481	
	+10	0.000442	
	+20	0.000298	
	+30	0.000081	
	+40	-0.000161	
	+50	-0.000360	

[Environment]
Temperature: 20 °C Humidity: 47 %

[Tested Date / Tester]
3 April 2006 Signature

Hironobu Matsuyama

8.3. Frequency vs Voltage Test

(1) A, B Band

1) Setting 1 (692MHz)

Test Voltage : 1.13V

REFERENCE FREQUENCY [MHz]	TEMPERATURE [℃]	FREQUENCY DRIFT [%]	LIMIT [%]
692.00	-10	0.001650	±0.005
	+20	0.000566	
	+50	-0.001178	

[Note]
The test voltage is the lowest voltage of the manufacturer specification.

2) Setting 3 (722MHz)

Test Voltage : 1.13V

REFERENCE FREQUENCY [MHz]	TEMPERATURE [℃]	FREQUENCY DRIFT [%]	LIMIT [%]
722.00	-10	0.001650	±0.005
	+20	0.000571	
	+50	-0.001173	

[Note]
The test voltage is the lowest voltage of the manufacturer specification.

3) Setting 5 (752MHz)

Test Voltage : 1.13V

REFERENCE FREQUENCY [MHz]	TEMPERATURE [℃]	FREQUENCY DRIFT [%]	LIMIT [%]
752.00	-10	0.001650	±0.005
	+20	0.000576	
	+50	-0.001181	

[Note]
The test voltage is the lowest voltage of the manufacturer specification.

- Continued -

(2) C, D Band

1) Setting 6 (794MHz)

Test Voltage : 1.13V

REFERENCE FREQUENCY [MHz]	TEMPERATURE [℃]	FREQUENCY DRIFT [%]	LIMIT [%]
794.00	-10	0.000315	±0.005
	+20	0.000229	
	+50	-0.000423	

[Note]
The test voltage is the lowest voltage of the manufacturer specification.

[Environment]
Temperature: 20 °C Humidity: 47 %

[Tested Date / Tester]
3 April 2006 Signature

Hironobu Matsuyama

9. USED TEST EQUIPMENTS AND CALIBRATION STATUS

KEC No.	Equipment	Manufacturer	Model No.	Last Cal.	Next Cal.
SA-046	Spectrum Analyzer	Anritu	MS8608A	2005/08	2006/08
SA-054		Agilent	E4403B	2006/03	2007/03
SA-039		Hewlett Packard	8564E	2005/04	2006/04
AN-180	Biconical Antenna	Schwarzbeck	VHA9103/ BBA9106	20060/2	2007/02
AN-215	Log-Periodic	Schwarzbeck	UHALP9107	2006/02	2007/02
AN-135	Tuned Dipole Antenna	Kyoritsu	KBA-511AS	2005/02	2007/02
AN-137			KBA-611S	2005/02	2007/02
AT-034-3	Fixed Attenuator	Weinschel	44-3	2006/03	2007/03
AT-044-1		Anritsu	MP721A	2006/03	2007/03
FS-081	Test Receiver	Rhode& Schwarz	ESVS10	2006/03	2007/03
MM-211	RF Relay Matrix Unit	Techno Science Japan	RFM-E321	2006/03	2007/03
AM-069	Pre-Amplifier	SONOMA Instrument	310N	2005/08	2006/08
AM-052		Hewlett Packard	8449B	2006/02	2007/02
AN-167	Std. Gain Horn Antenna	Ravan	91888-2	2005/03	2007/03
AN-211				2005/10	2007/10
AN-168			91889-2	2005/03	2007/03
AN-212				2005/10	2007/10
AN-231		Scientific Atlanta	12-3.9	2005/03	2007/03
AN-142				2005/10	2007/10
AN-143			12-5.8	2005/03	2007/03
AN-104				2005/10	2007/10

- Continued -

KEC No.	Equipment	Manufacturer	Model No.	Last Cal.	Next Cal.
CL-042	Coaxial Cable	Suhner	SUCOFLEX104	2006/03	2007/03
CL-046				2006/03	2007/03
CL-03-05			SUCOFLEX100	2006/03	2007/03
VV-039	Power Meter	Hewlett Packard	E4419B	2005/10	2006/10
VV-039-1	Power Sensor	Hewlett Packard	E4412A	2005/10	2006/10
SF-004	Regurated DC Power Supply	Kikusui	PAS40-9	–	–
CH-031	Temperature Chamber With Thermometer	Tabai Mfg.	MC-710	2005/07	2006/07
CH-017	Frequency Counter	Anritsu	MF2412B	2005/06	2006/06
MM-091	Multimeter	John Fluke	37	2006/02	2007/02
SG-038	Signal Generator	Willtron	6759A-10	2005/12	2006/12
MG-041	Synthesized Level Generator	Anritsu	MG443B	2005/11	2006/11
MM-054	FM Linear Detector	Anritsu	MS61A	2006/04	2007/04
AT-020	Variable Attenuator	Tamagawa Electronics	TRA-603D	2006/04	2007/04
VV-019	AC Voltmeter	Matsushita Communication	VP-9690A	2005/07	2006/07
VV-020			VP-9631A	2005/07	2006/07
AX-062	Directional Coupler	Hewlett Packard	86205A	2005/08	2006/08

The overall program of calibration and verification of equipment is designed and operated so as to ensure that measurements made by KEC are traceable to national standards of measurement or equivalent abroad.