



EMI TEST REPORT

JQA APPLICATION NO. : 80-90144

Model No. : TN6500H

Type of Equipment : Radio Controlled Toy

Regulations Applied : CFR 47 FCC Rules and Regulations Part 15

FCC ID : CVTTN6500H

Applicant : NIKKO CO., LTD.

Address : 1-7-14, Mizumoto, Katsushika-ku,
Tokyo 125-0032, Japan

Manufacture : NIKKO Electronics Sdn. Bhd.

Address : Plot 497, Prai Free Trade Zone,
Prai Industrial Estate, Prai, Penang, Malaysia, 13600

Final Judgment : Passed

TEST RESULTS IN THIS REPORT are obtained in use of equipment that is traceable to Electrotechnical Lab. of MITI Japan and Communications Research Lab. of MPT Japan.

The test results only respond to the tested sample. It is not allowed to copy this report even partly without the allowance of the JQA EMC Engineering Dept. Testing Div.

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1 DOCUMENTATION**1.1 TEST REGULATION**

FCC Rules and Regulations Part 15 Subpart A and C (June 23, 1989) Intentional Radiators

Test procedure :

AC power line conducted emission, radiated emission, frequency stability and occupied bandwidth tests were performed according to the procedures in ANSI C63.4-1992.

1.2 GENERAL INFORMATION**1.2.1 Test facility :**

1) Test Facility located at EMC Engineering Dept. Testing Div. : No.2 and 3 Anechoic Chambers(3 meters Site)

FCC filing No. : 31040/SIT 1300F2

2) EMC Engineering Dept. Testing Div. is recognized under the National Voluntary Laboratory accreditation Program for satisfactory compliance established in title 15, Part 285 Code of Federal Regulations.

NVLAP Lab Code : 200189-0 (Effective through : June 30, 1999)

1.2.2 Description of the Equipment Under Test (EUT) :

1) Type of Equipment	: Radio Controlled Toy
2) Product Type	: Pre-Production
3) Category	: Low Power Communication Device Transmitter
4) EUT Authorization	: Certification
5) FCC ID	: CVTTN6500H
6) Trade Name	: NIKKO
7) Model No.	: TN6500H
8) Operating Frequency Range	: 49.830 MHz - 49.890 MHz
9) Highest Frequency Used in the EUT	: 49.860 MHz
10) Serial No.	: None
11) Date of Manufacture	: -
12) Power Rating	: DC 9.0V(Battery)
13) EUT Grounding	: None

1.2.3 Definitions for symbols used in this test report :

x - indicates that the listed condition, standard or equipment is applicable for this report.

___ - indicates that the listed condition, standard or equipment is not applicable for this report.

1.3 TEST CONDITION

1.3.1 The measurement of the AC Power Line Conducted Emission

- was performed in the following test site.

- was not applicable.

Test location :

Safety Testing Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

- Shielded Enclosure

- Anechoic Chamber No. 2 (portable Type)

Used test instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
<input type="checkbox"/> - Field Strength Meter	ESH-2	Rohde & Schwarz	872280/011	Sep. 1998	1 Year
<input type="checkbox"/> - Field Strength Meter	ESH-2	Rohde & Schwarz	880370/016	May 1999	1 Year
<input type="checkbox"/> - Field Strength Meter	ESH-3	Rohde & Schwarz	881460/016	May 1999	1 Year
<input type="checkbox"/> - Field Strength Meter	ESH-3	Rohde & Schwarz	881460/030	Nov 1999	1 Year
<input type="checkbox"/> - LISN	KNW-407	Kyoritsu Electrical	8-833-6	Apr. 1999	1 Year
<input type="checkbox"/> - LISN	KNW-407	Kyoritsu Electrical	8-855-2	Apr. 1999	1 Year
<input type="checkbox"/> - LISN	KNW-407	Kyoritsu Electrical	8-757-1	Apr. 1999	1 Year
<input type="checkbox"/> - RF Cable	3D-2W	Fujikura	155-21-005	Apr. 1999	1 Year
<input type="checkbox"/> - RF Cable	3D-2W	Fujikura	155-21-006	Apr. 1999	1 Year

1.3.2 The measurement of the Radiated Emission(30 MHz - 1000 MHz)x - was performed in the following test site.

___ - was not applicable.

Test location :

Safety Testing Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

x - Anechoic Chamber No. 2 (3 meters)

___ - Anechoic Chamber No. 3 (3 meters)

Validation of Site Attenuation :

1) Last Confirmed Date :March, 1999

2) Interval :1 year

Used test instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
___ - Field Strength Meter	ESV	Rohde & Schwarz	872148/039	May 1999	1 Year
___ - Field Strength Meter	ESVP	Rohde & Schwarz	879783/030	May 1999	1 Year
<u>x</u> - Field Strength Meter	ESVP	Rohde & Schwarz	881478/004	May 1999	1 Year
___ - Field Strength Meter	ESVP	Rohde & Schwarz	881478/005	May 1999	1 Year
___ - Antenna	KBA-511A	Kyoritsu Electrical	0-201-13	Nov. 1998	1 Year
<u>x</u> - Antenna	KBA-511A	Kyoritsu Electrical	0-170-1	Nov. 1998	1 Year
___ - Antenna	KBA-611	Kyoritsu Electrical	0-210-5	Nov. 1998	1 Year
<u>x</u> - Antenna	KBA-611	Kyoritsu Electrical	0-147-14	Nov. 1998	1 Year
<u>x</u> - RF Cable	5D-2W	Fujikura	155-21-001	Feb. 1999	1 Year
___ - RF Cable	5D-2W	Fujikura	155-21-002	Feb. 1999	1 Year

1.3.3 The measurement of the Radiated Emission(Above 1000 MHz)

- was performed in the following test site.

- was not applicable.

Test location :

Safety Testing Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

- No. 2 site (3 meters)

- No. 3 site (3 meters)

Validation of Site Attenuation :

1) Last Confirmed Date :March, 1999

2) Interval :1 year

Used test instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
<input type="checkbox"/> - Spectrum Analyzer	8560E	Hewlett Packard	3240A00189	May 1999	1 Year
<input type="checkbox"/> - Spectrum Analyzer	8563E	Hewlett Packard	3221A00201	May 1999	1 Year
<input type="checkbox"/> - Spectrum Analyzer	8566B	Hewlett Packard	2140A01091	Apr. 1999	1 Year
<input type="checkbox"/> - Spectrum Analyzer	8566B	Hewlett Packard	2747A05855	Jul. 1998	1 Year
<input type="checkbox"/> - Log-Periodic Antenna	HL 025	Rohde & Schwarz	340182/015	Nov. 1998	1 Year
<input type="checkbox"/> - RF Cable	S 04272B	Suhner	155-21-011	May 1999	1 Year

1.3.4 The measurement of the Frequency Stability

- was performed.
 - was not applicable.

Used test instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
<input type="checkbox"/> - Frequency Counter	53131A	Hewlett Packard	3546A11807	June 1998	1 Year
<input type="checkbox"/> - Oven	-	Ohnishi Co. Ltd.	-	July 1998	1 Year
<input type="checkbox"/> - DC Power Supply	6628A	Hewlett Packard	3224A00284	July 1998	1 Year

1.3.5 The measurement of the Occupied Bandwidth

- was performed.
 - was not applicable.

Used test instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
<input type="checkbox"/> - Spectrum Analyzer	8560E	Hewlett Packard	3240A00189	Apr. 1999	1 Year
<input type="checkbox"/> - Spectrum Analyzer	8563E	Hewlett Packard	3221A00201	Apr. 1999	1 Year
<input checked="" type="checkbox"/> - Spectrum Analyzer	8566B	Hewlett Packard	2140A01091	Apr. 1999	1 Year
<input type="checkbox"/> - Spectrum Analyzer	8566B	Hewlett Packard	2747A05855	Jul. 1998	1 Year
<input type="checkbox"/> - Function Generator	3325A	Hewlett Packard	2512A21776	June 1998	1 Year
<input type="checkbox"/> - FM Linear Detector	MS61A	Anritsu Corp.	M77486	Sep. 1998	1 Year
<input type="checkbox"/> - Level Meter	ML422C	Anritsu Corp.	M87571	June 1998	1 Year



1.4 EUT MODIFICATION

- No modifications were conducted by JQA to achieve compliance to Class B levels.
- To achieve compliance to Class B levels, the following changes were made by JQA during the compliance test.

The modifications will be implemented in all production models of this equipment.

Applicant : Date :

Typed Name : Position :



1.5 TEST RESULTS

AC Power Line Conducted Emission - **Applicable** x - **NOT Applicable**

The requirements are - **PASSED** - **NOT PASSED**

Remarks :

Radiated Emission [§15.235(a)(b)] x - **Applicable** - **NOT Applicable**

The requirements are x - **PASSED** - **NOT PASSED**

Remarks:

Frequency Stability - **Applicable** x - **NOT Applicable**

The requirements are - **PASSED** - **NOT PASSED**

Remarks:

Occupied Bandwidth [§15.235(b)] x - **Applicable** - **NOT Applicable**

The requirements are x - **PASSED** - **NOT PASSED**

Remarks:

1.6 SUMMARY**General Remarks :**

The EUT was tested according to the requirements of FCC Rules and Regulations Part 15 Subpart A and C (June 23, 1989) under the test configuration, as shown in clause 1.7 to 1.9.

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

Final Judgment :

The "as received" sample;

 x - fulfill the test requirements of the regulation mentioned on clause 1.1.

 - fulfill the test requirements of the regulation mentioned on clause 1.1,
but with certain qualifications.

 - doesn't fulfill the test regulation mentioned on clause 1.1.

Begin of testing : June 11, 1999

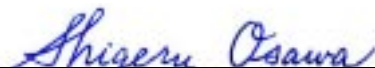
End of testing : June 14, 1999

- JAPAN QUALITY ASSURANCE ORGANIZATION -

Signatories:



Masaaki Takahashi
Manager
JQA EMC Engineering Dept.



Shigeru Osawa
Assistant Manager
JQA EMC Engineering Dept.

1.7 TEST CONFIGURATION / OPERATION OF EUT**1.7.1 Test Configuration**

The equipment under test (EUT) consists of :

Item	Manufacturer	Model No.	FCC ID	Serial No.
Radio Controlled Toy	NIKKO Electronics Sdn. Bhd.	TN6500H	CVTTN6500H	-

1.7.2 Operating condition

Power supply Voltage : 9.0 VDC(Battery)

The tests have been carried out under the transmitting condition.

1.8 PRELIMINARY TEST AND TEST-SETUP (DRAWINGS)

1.8.1 AC Power Line Conducted Emission (450 kHz - 30 MHz) :

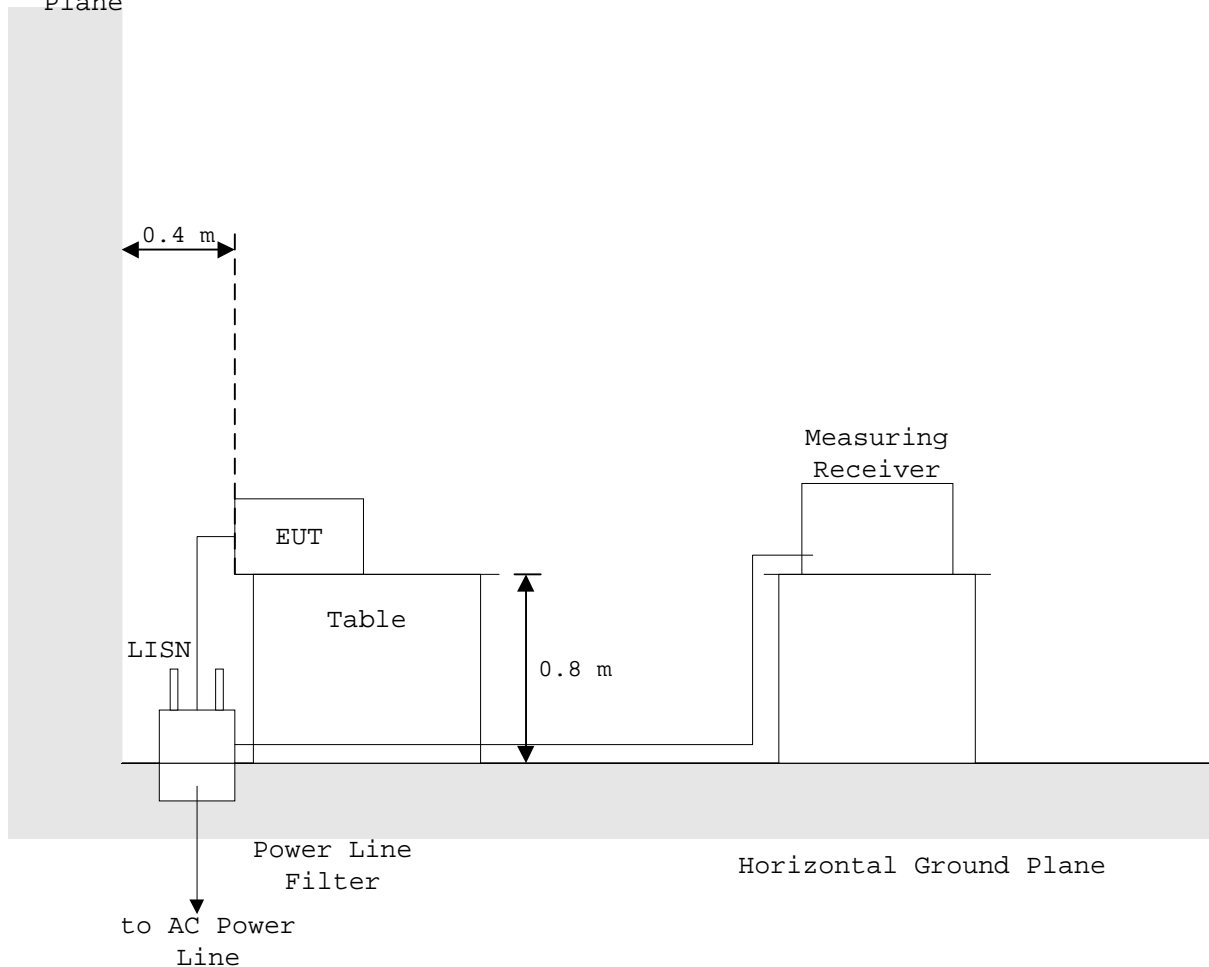
According to description of ANSI C63.4-1992 sec.13.1.3.1, the AC power line preliminary conducted emissions measurements were carried out.

The preliminary conducted measurements were performed using the spectrum analyzer to observe the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for final AC power line conducted emissions measurements.

Shielded Enclosure

- Side View -
 Vertical
 Ground
 Plane



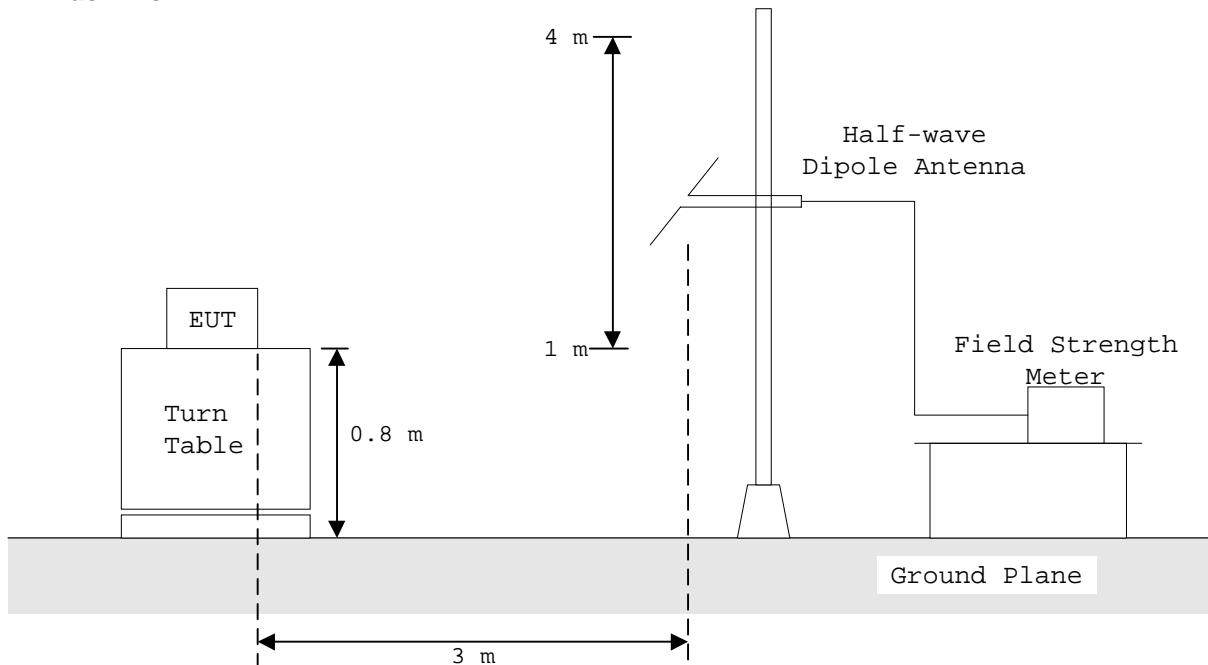
1.8.2 Radiated Emission (30 MHz - 1000 MHz) :

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

Anechoic Chamber

- Side View -



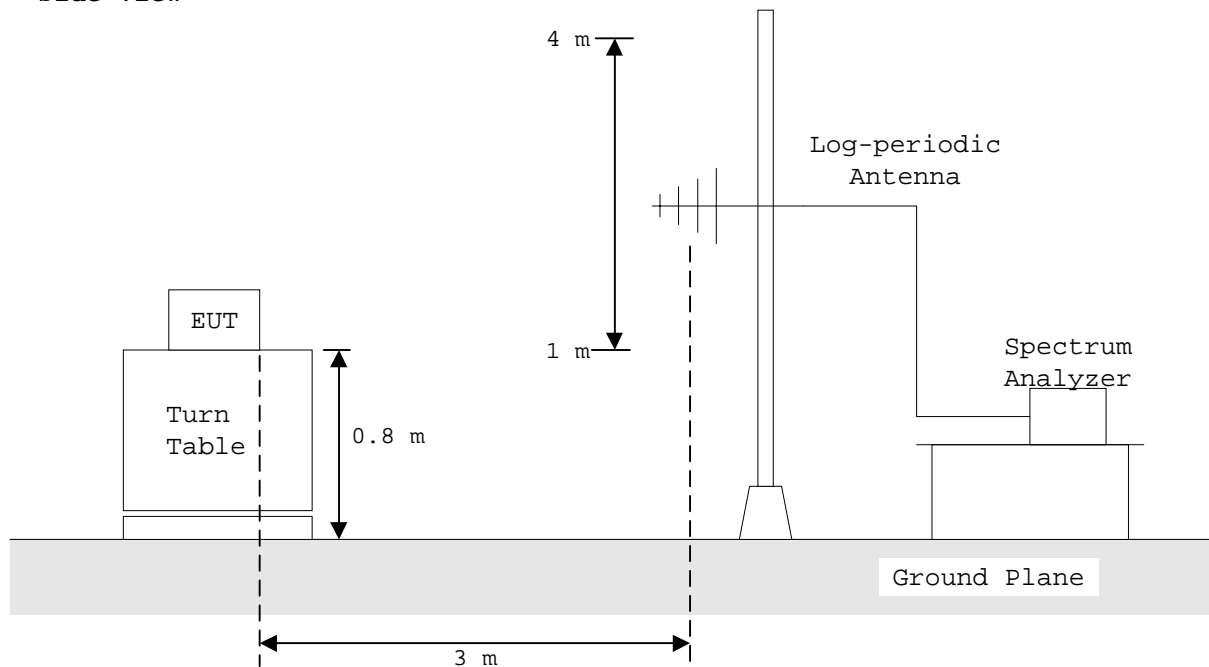
1.8.3 Radiated Emission (Above 1 GHz) :

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurements were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

Anechoic Chamber

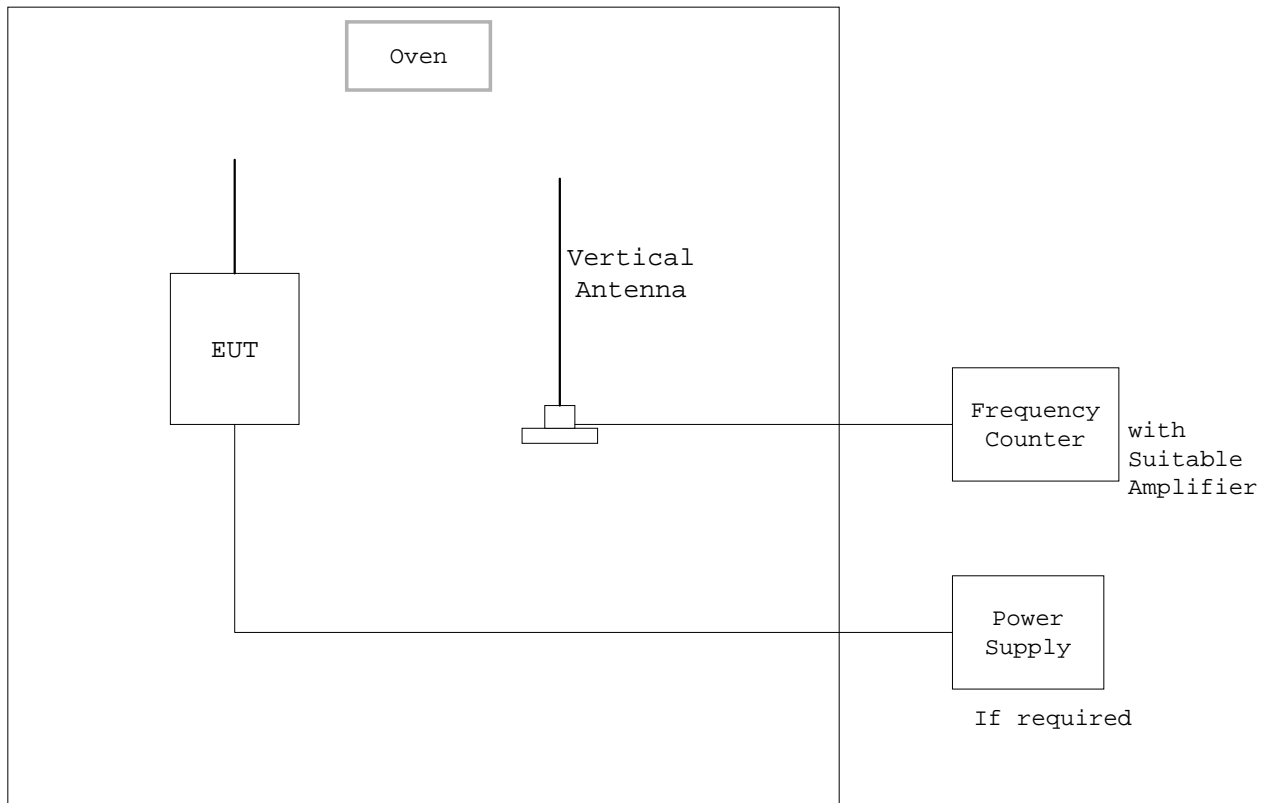
- Side View -



1.8.4 Frequency Stability :

According to description of ANSI C63.4-1992 sec.13.1.5 and sec.13.1.6, the frequency stability measurements were carried out. By using frequency counter with suitable RF amplifier, the carrier frequency of the transmitter under test was measured with a temperature variation of -20°C to $+50^{\circ}\text{C}$ at the normal supply voltage, and if required, with a variation in the primary voltage from 85 % to 115 % the rated supply voltage at the temperature of $+20^{\circ}\text{C}$.

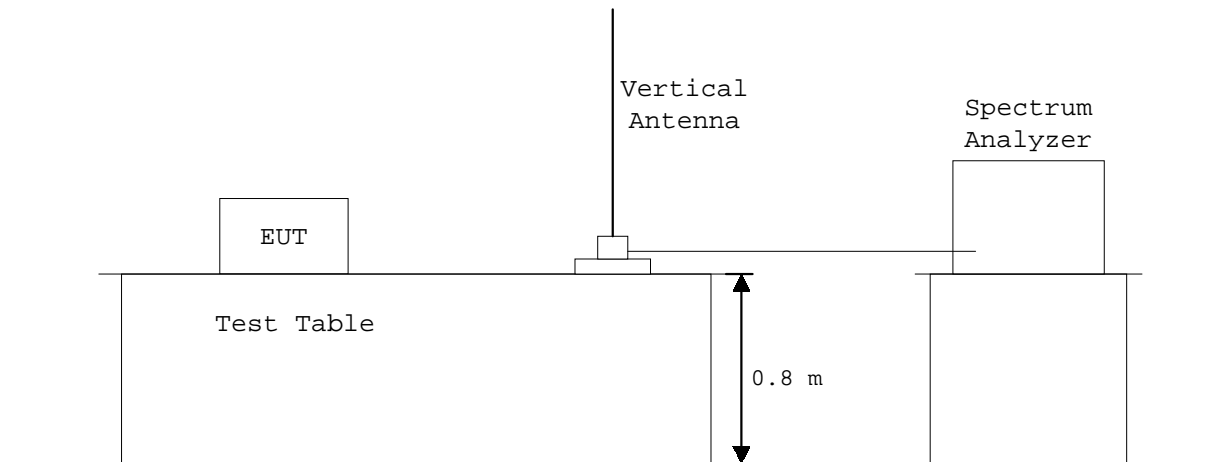
These measurements were carried out after allow sufficient time (approximately 1 hour) for the temperature of the chamber to stabilize.



1.8.5 Occupied Bandwidth :

According to description of ANSI C63.4-1992 sec.13.1.7, the occupied bandwidth measurements were carried out. By using a spectrum analyzer with a vertical antenna for picking up the signal, the measurements of the emission were made under the transmitting modes of the EUT.

The resolution bandwidth of spectrum analyzer was set to the value specified in sec.13.1.7.



1.9 TEST ARRANGEMENT (PHOTOGRAPHS)

PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT

Photograph present configuration with maximum emission
for Horizontal Plane



for Vertical Plane



TEST DATA

2.2 Radiated Emissions Measurement(30 MHz - 1000 MHz)

Date : June 11, 1999
 Temp.: 25 °C Humi.: 60 %

Operating Frequency : 49.860 MHz
 Distance of Measurement : 3.0 meters

Frequency (MHz)	Antenna	Meter Reading		Limits (dBμV/m)	Field Strength at 3 m		
	Factor (dB/m)	Horiz. (dBμV)	Vert. (dBμV)		Horiz. (dBμV/m)	Vert. (dBμV/m)	
Fundamental							
49.860	3.6	71.2	71.6	80.0	74.8	75.2	(Average)
49.860	3.6	72.5	73.0	100.0	76.1	76.6	(Peak)
Harmonics & other Frequency components							
99.720	9.9	29.1	26.3	43.5	39.0	36.2	
149.580	13.7	9.1	4.2	43.5	22.8	17.9	
199.440	16.4	4.8	4.8	43.5	21.2	21.2	
249.300	18.5	< 0.0	< 0.0	46.0	< 18.5	< 18.5	
299.160	20.3	11.1	7.9	46.0	31.4	28.2	
349.020	16.4	< 0.0	< 0.0	46.0	< 21.8	< 21.8	
398.880	16.4	< 0.0	< 0.0	46.0	< 23.1	< 23.1	
448.740	16.4	< 0.0	< 0.0	46.0	< 24.3	< 24.3	
498.600	16.4	< 0.0	< 0.0	46.0	< 25.4	< 25.4	
548.460	16.4	< 0.0	< 0.0	46.0	< 26.3	< 26.3	
598.320	16.4	< 0.0	< 0.0	46.0	< 27.2	< 27.2	
648.180	16.4	< 0.0	< 0.0	46.0	< 28.1	< 28.1	
698.040	16.4	< 0.0	< 0.0	46.0	< 29.0	< 29.0	
747.900	16.4	< 0.0	< 0.0	46.0	< 29.8	< 29.8	
797.760	16.4	< 0.0	< 0.0	46.0	< 30.6	< 30.6	
847.620	16.4	< 0.0	< 0.0	46.0	< 31.4	< 31.4	
897.480	16.4	< 0.0	< 0.0	46.0	< 32.2	< 32.2	
947.340	16.4	< 0.0	< 0.0	46.0	< 32.9	< 32.9	
997.200	16.4	< 0.0	< 0.0	54.0	< 33.6	< 33.6	

Note: 1. The spectrum was checked from 30 MHz to 1000 MHz.
All emissions not listed were found to be more than 20 dB below the limits.

2. The symbol of "<" means "or less".

3. The cable loss was included in the antenna factor.

4. Sample calculation :

at 49.860 MHz

$$Af + Mr = 3.6 + 71.6 = 75.2 \text{ dB}\mu\text{V/m}$$

Where,

Af = Antenna Factor including the cable loss.

Mr = Meter Reading

5. Measuring Instrument Setting:

Fundamental

Detector function : Average/Peak

IF Bandwidth : 120 kHz

Harmonics & other Frequency components

Detector function : CISPR quasi-peak

IF Bandwidth : 120 kHz

Tested by :

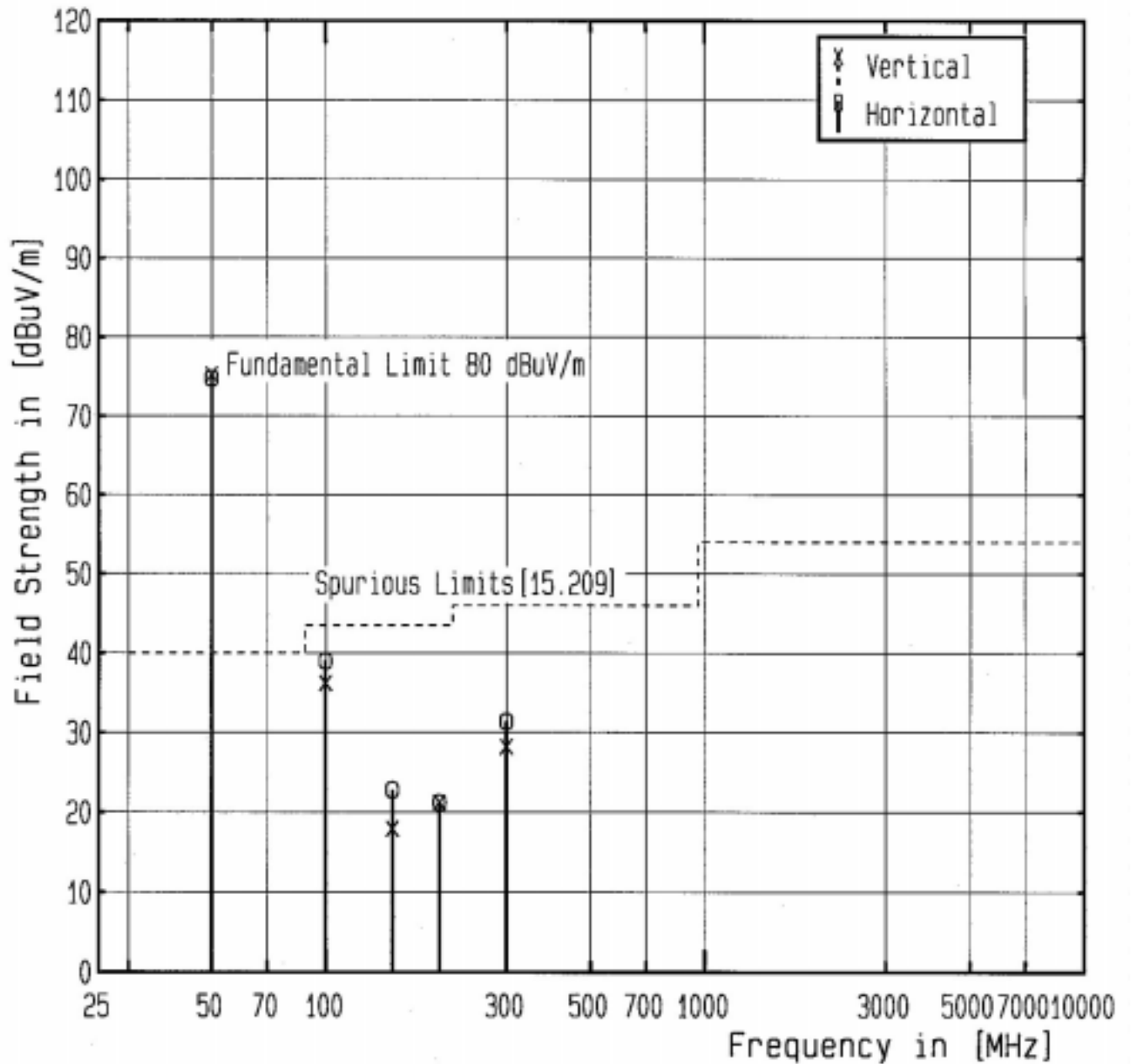
Shigeru Osawa

Shigeru Osawa

Testing Engineer

Transmitter Fundamental and Spurious Emissions

Model No. : TN6500H
 Operating Frequency : 49.86 MHz
 Test Condition :





JQA Application No. :80-90144

Model No. :TN6500H

Standard

:CFR 47 FCC Rules Part 15

FCC ID :CVTTN6500H

Issue Date :June 15, 1999

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2.4 Occupied Bandwidth Measurement

Date : June 14, 1999

Temp. : 26 °C Humi. : 50 %

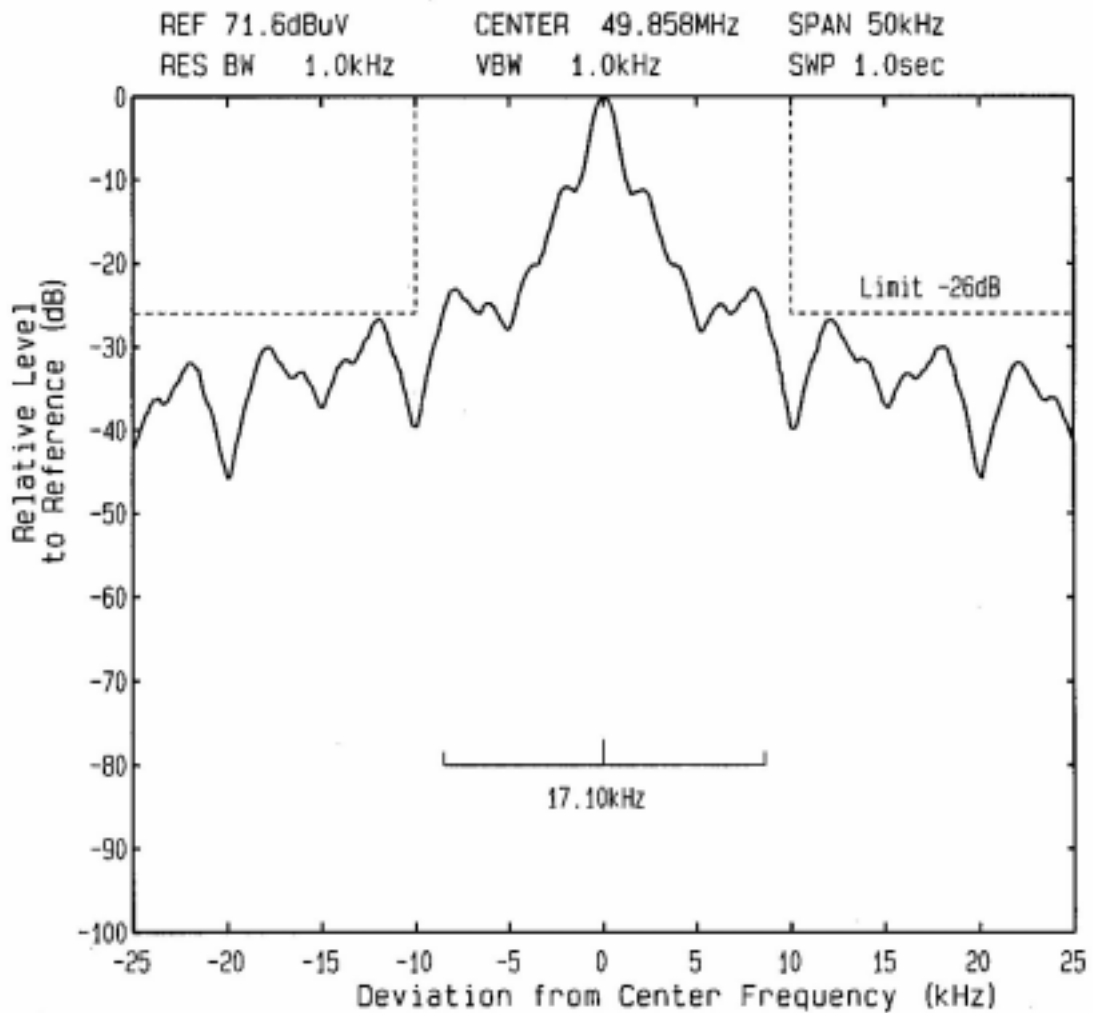
Measurements Results : Refer to the attached graphs.

Tested by : Shigeru Osawa
Shigeru Osawa
Testing Engineer

Emission Limitation

FCC ID : CVTTN6500H
Model : TN6500H

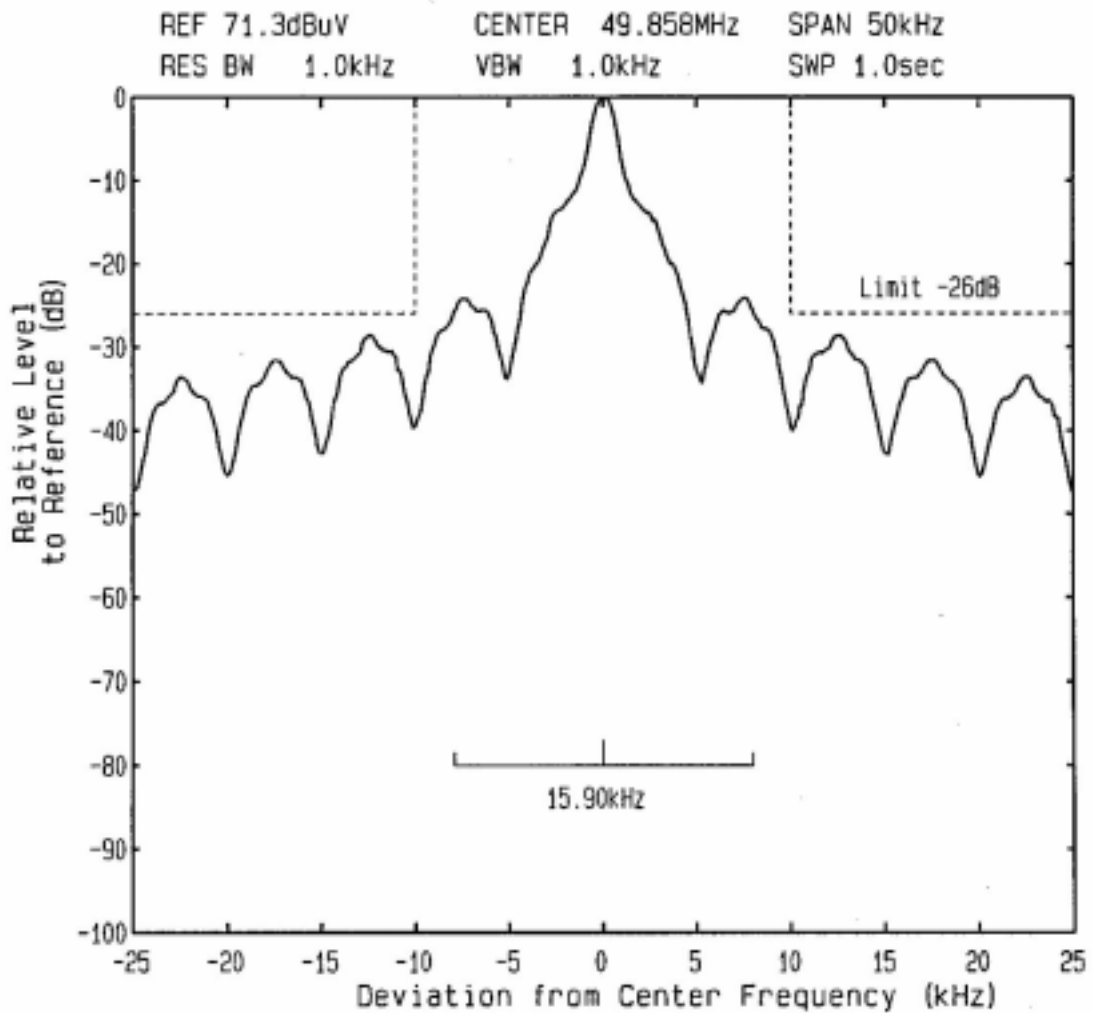
Mode of EUT : Forward



Emission Limitation

FCC ID : CVTTN6500H
Model : TN6500H

Mode of EUT : Reverse

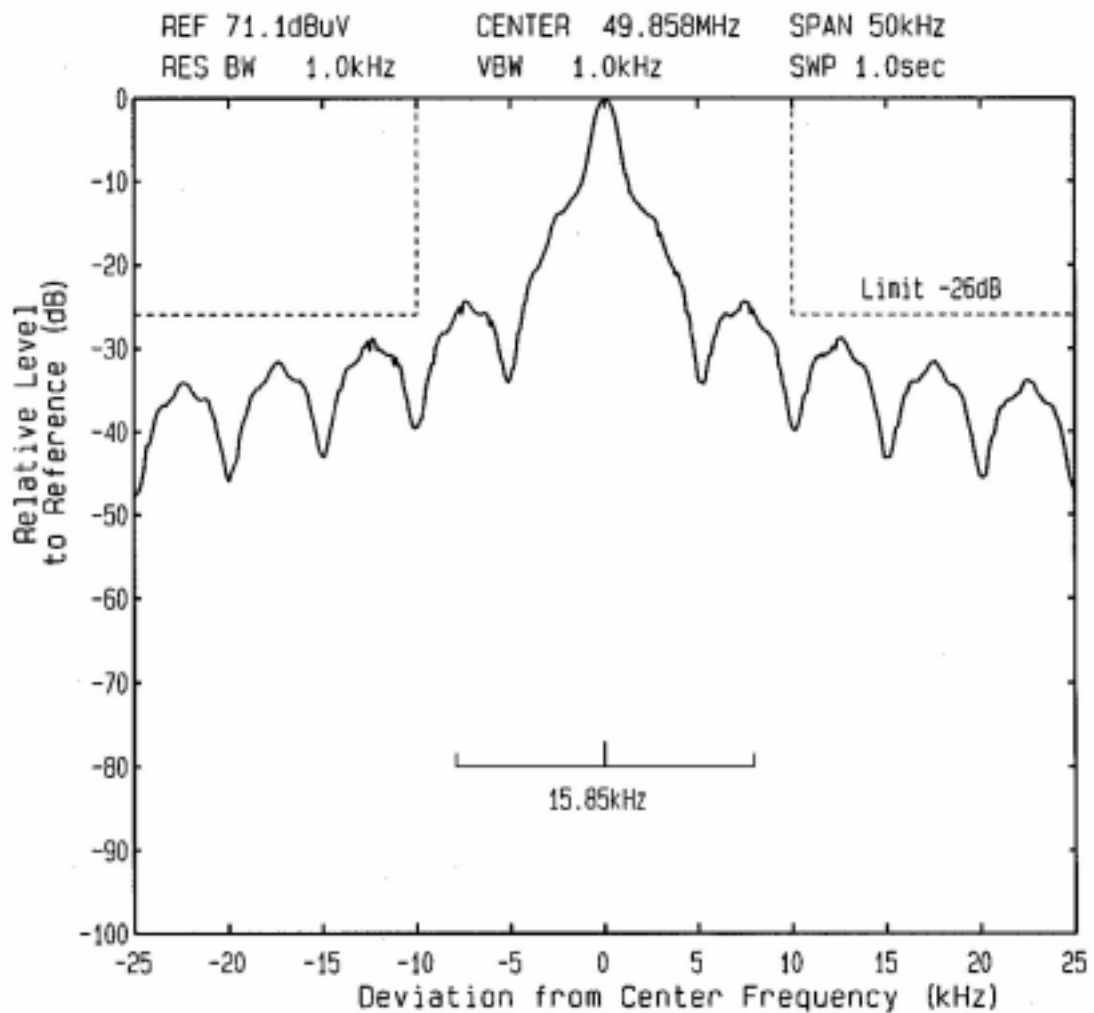


Emission Limitation

FCC ID : CVTTN6500H

Model : TN6500H

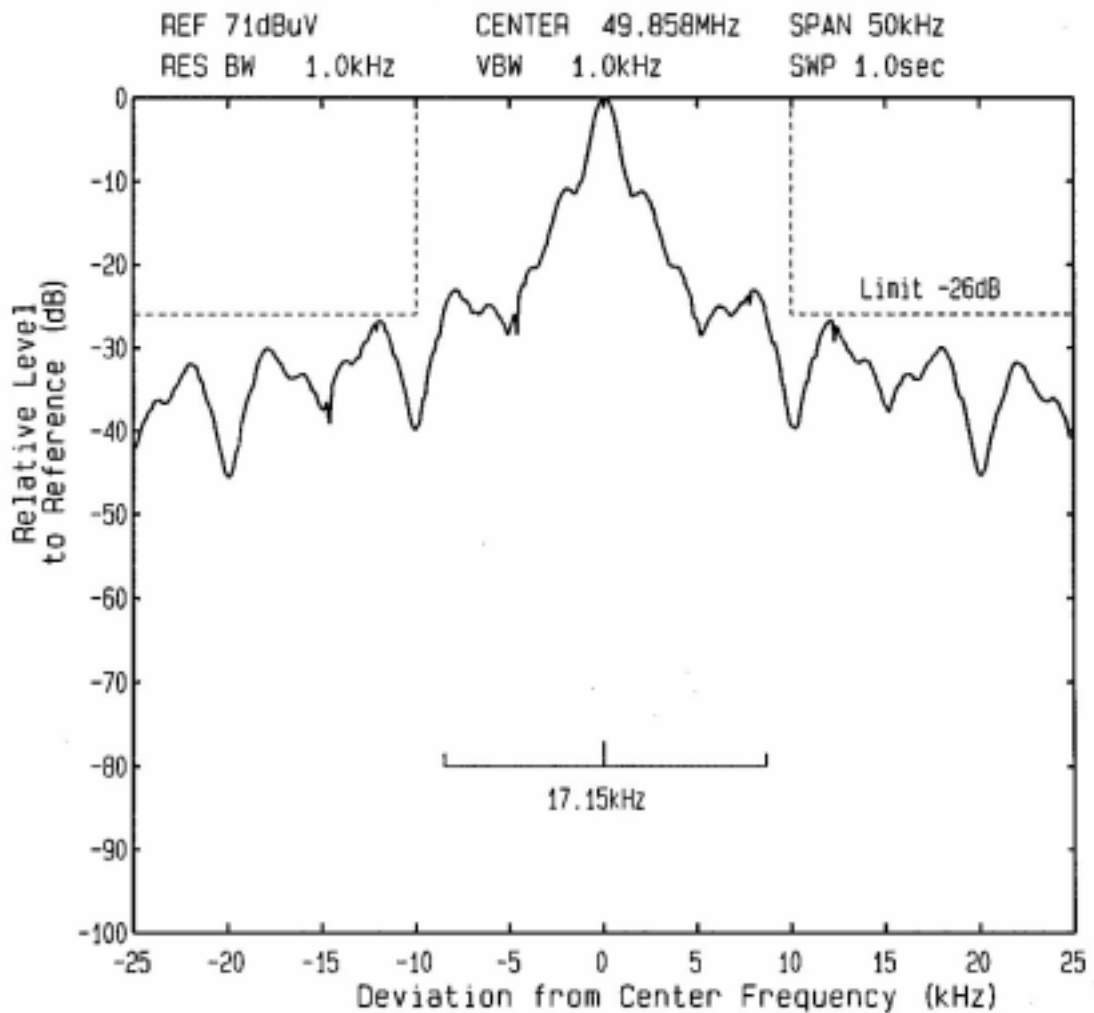
Mode of EUT : Right



Emission Limitation

FCC ID : CVTTN6500H
Model : TN6500H

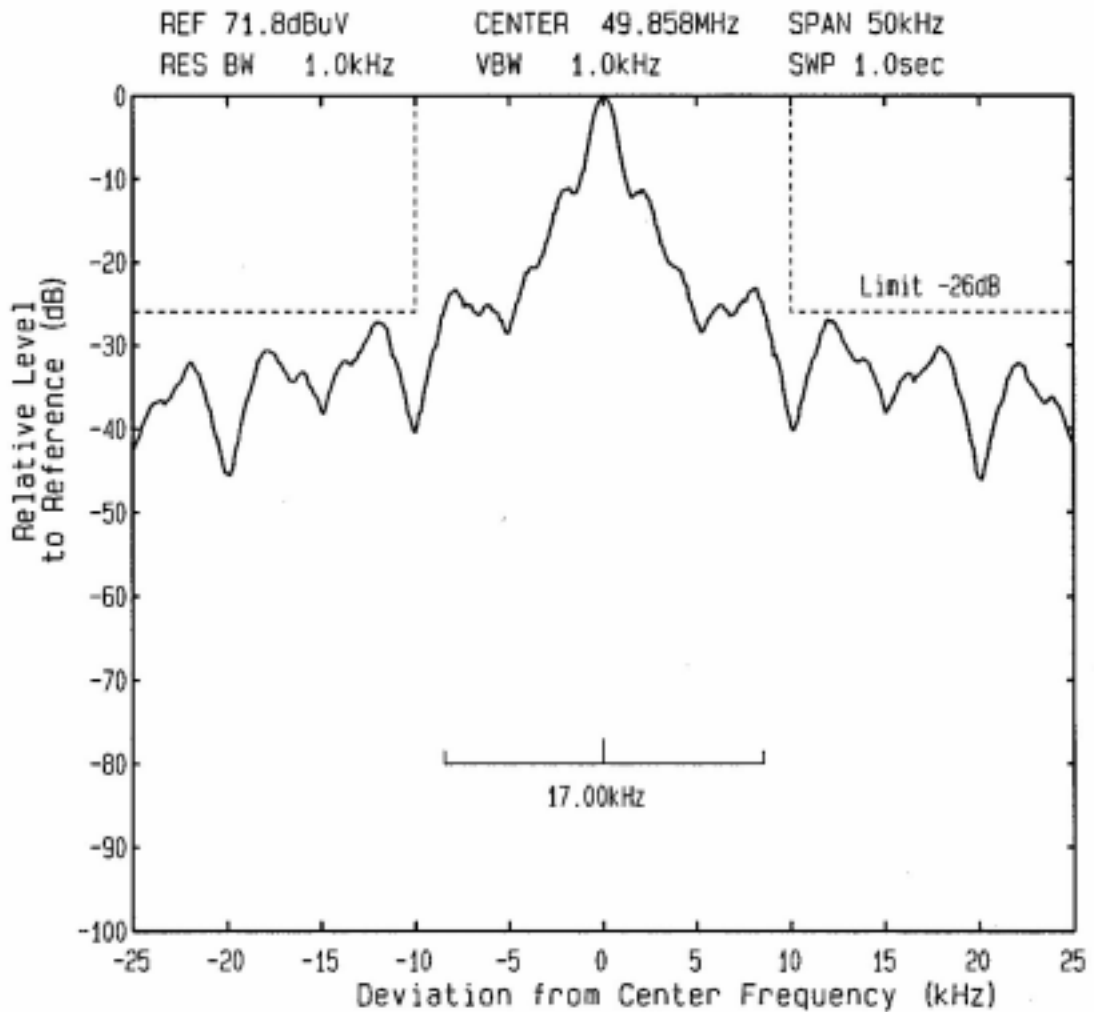
Mode of EUT : Left



Emission Limitation

FCC ID : CVTTN6500H
Model : TN6500H

Mode of EUT : Forward Right

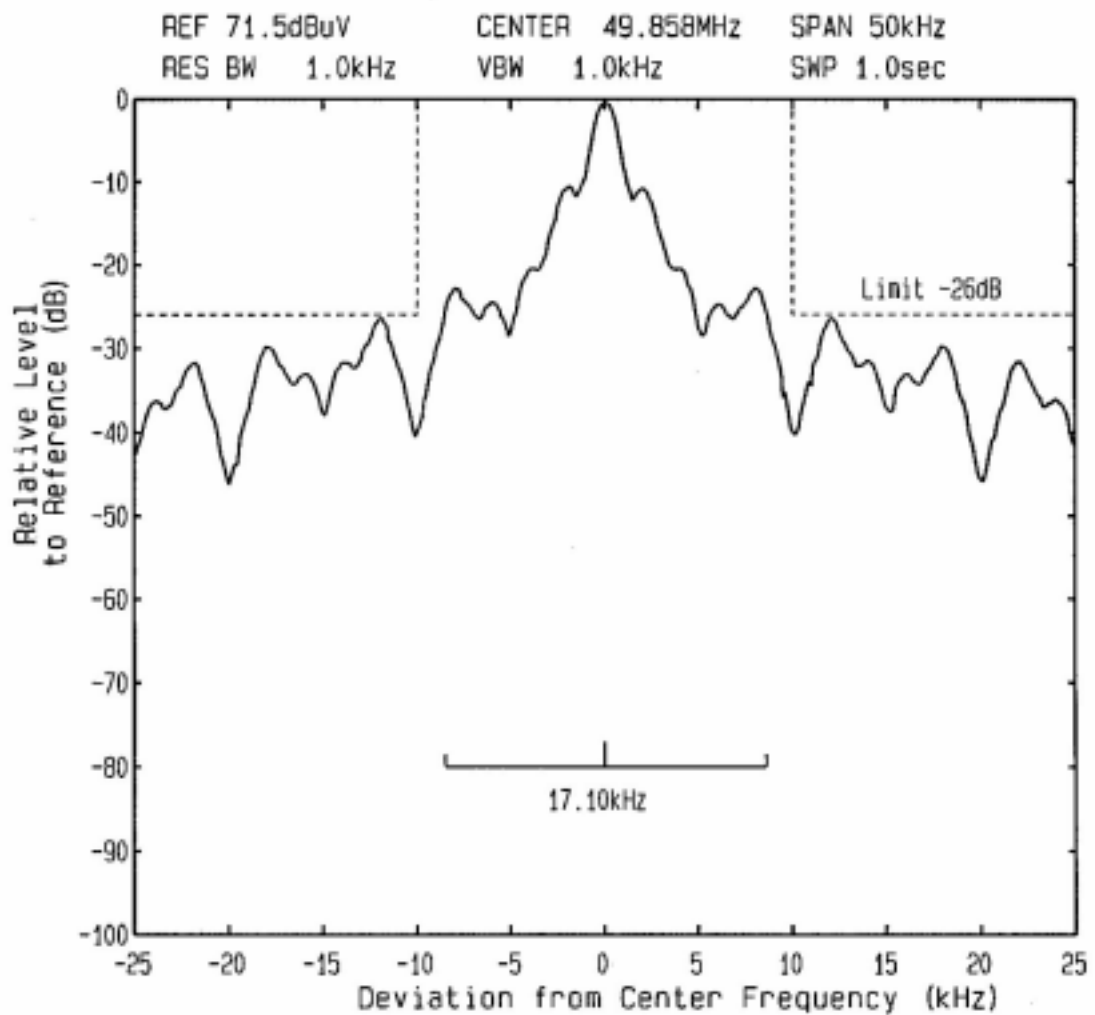


Emission Limitation

FCC ID : CVTTN6500H

Model : TN6500H

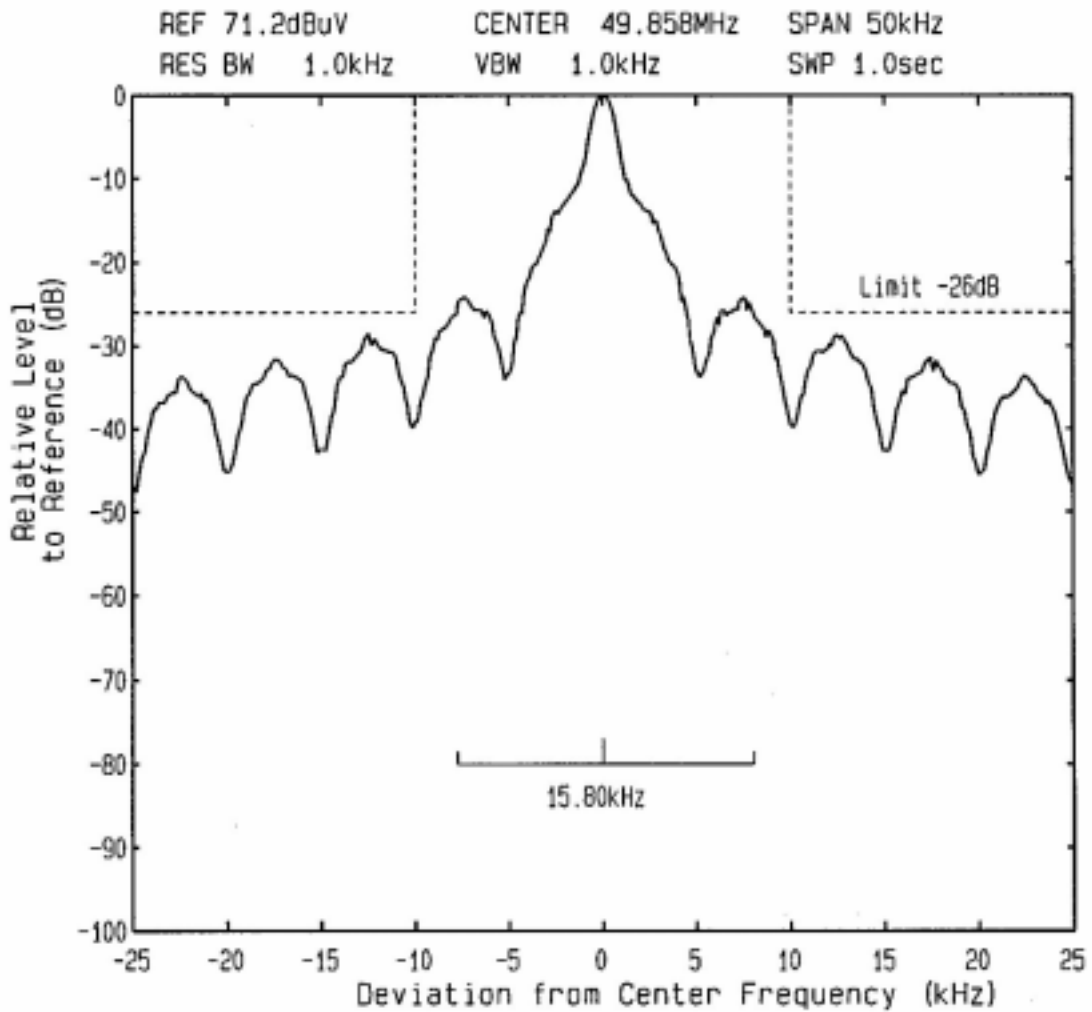
Mode of EUT : Forward Left



Emission Limitation

FCC ID : CVTTN6500H
Model : TN6500H

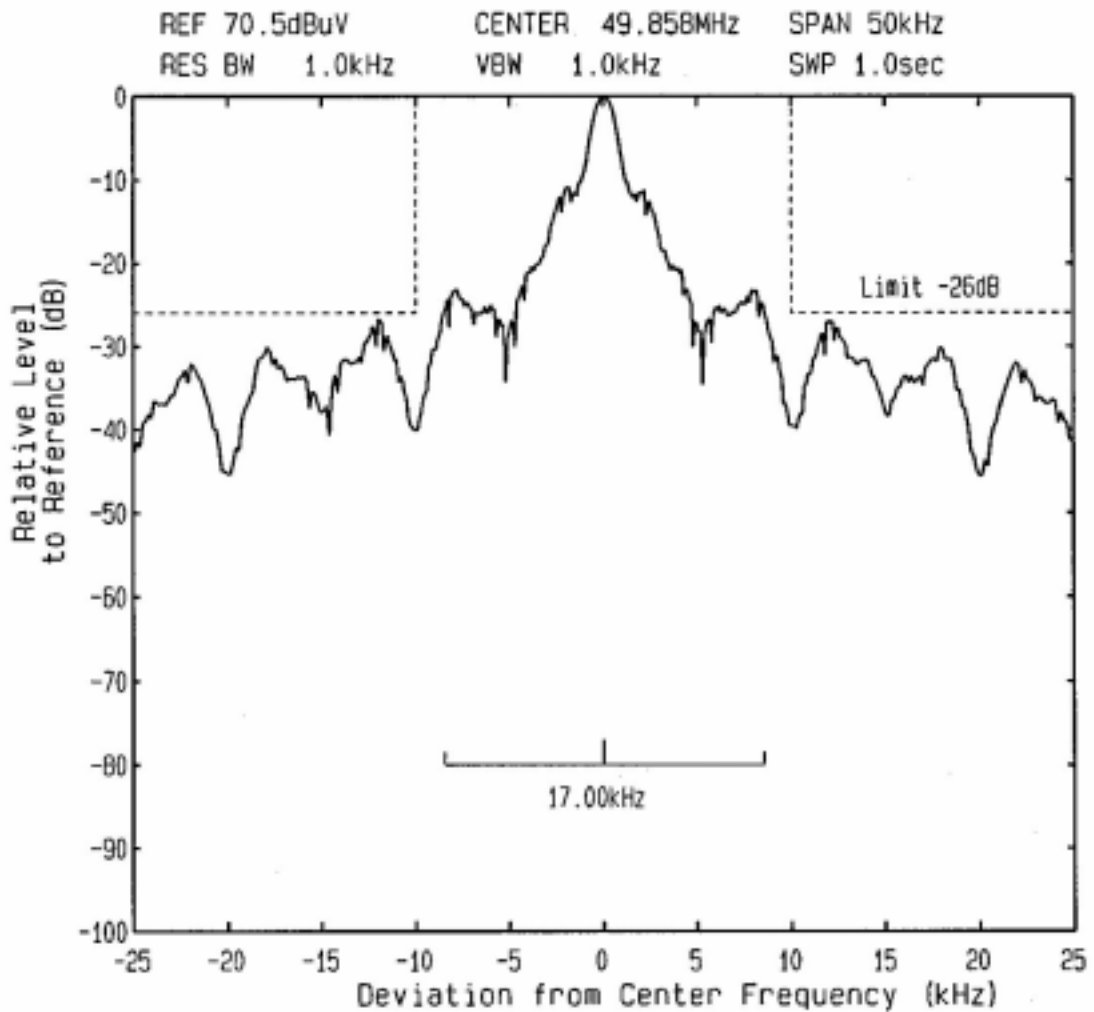
Mode of EUT : Reverse Right



Emission Limitation

FCC ID : CVTTN6500H
Model : TN6500H

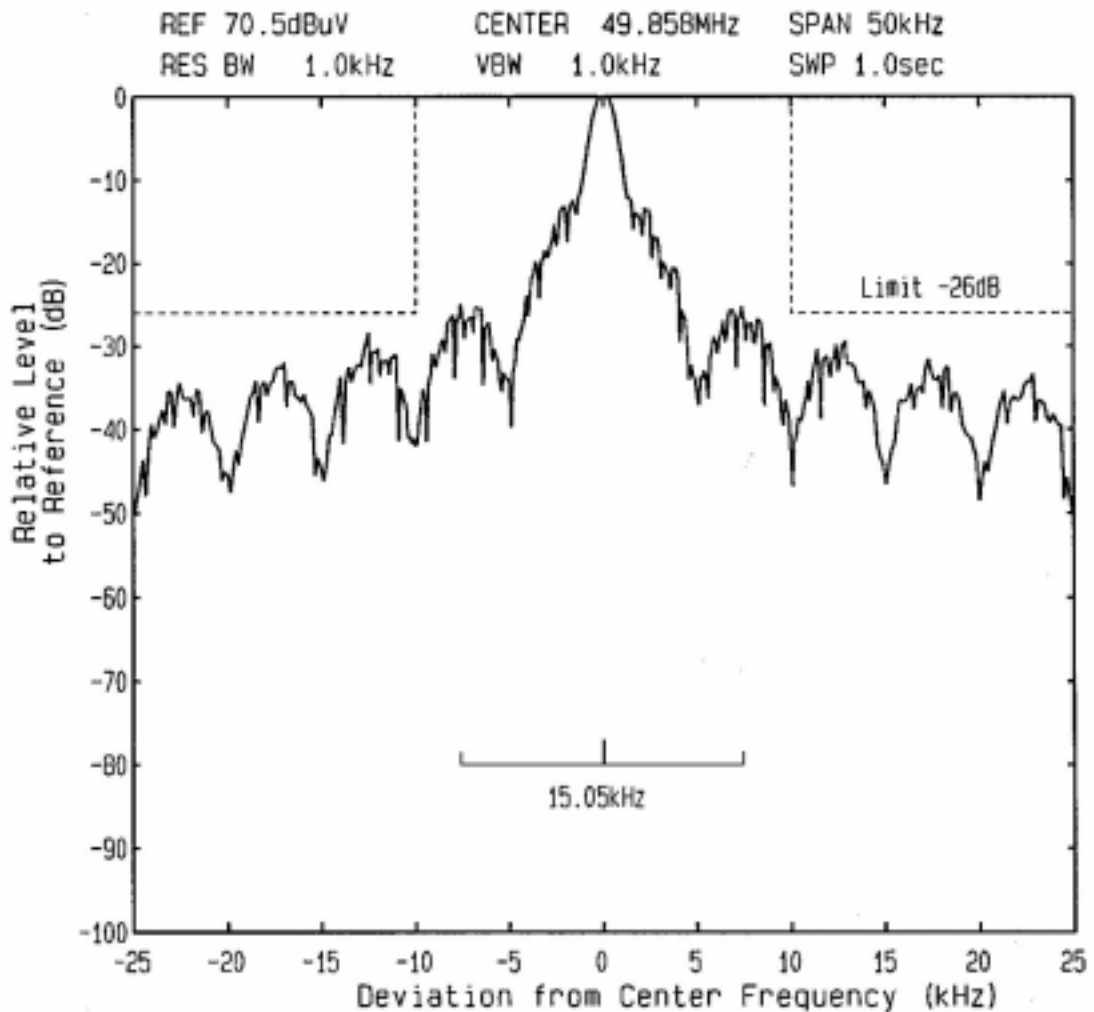
Mode of EUT : Reverse Left



Emission Limitation

FCC ID : CVTTN6500H
Model : TN6500H

Mode of EUT : RELEASE BUTTON

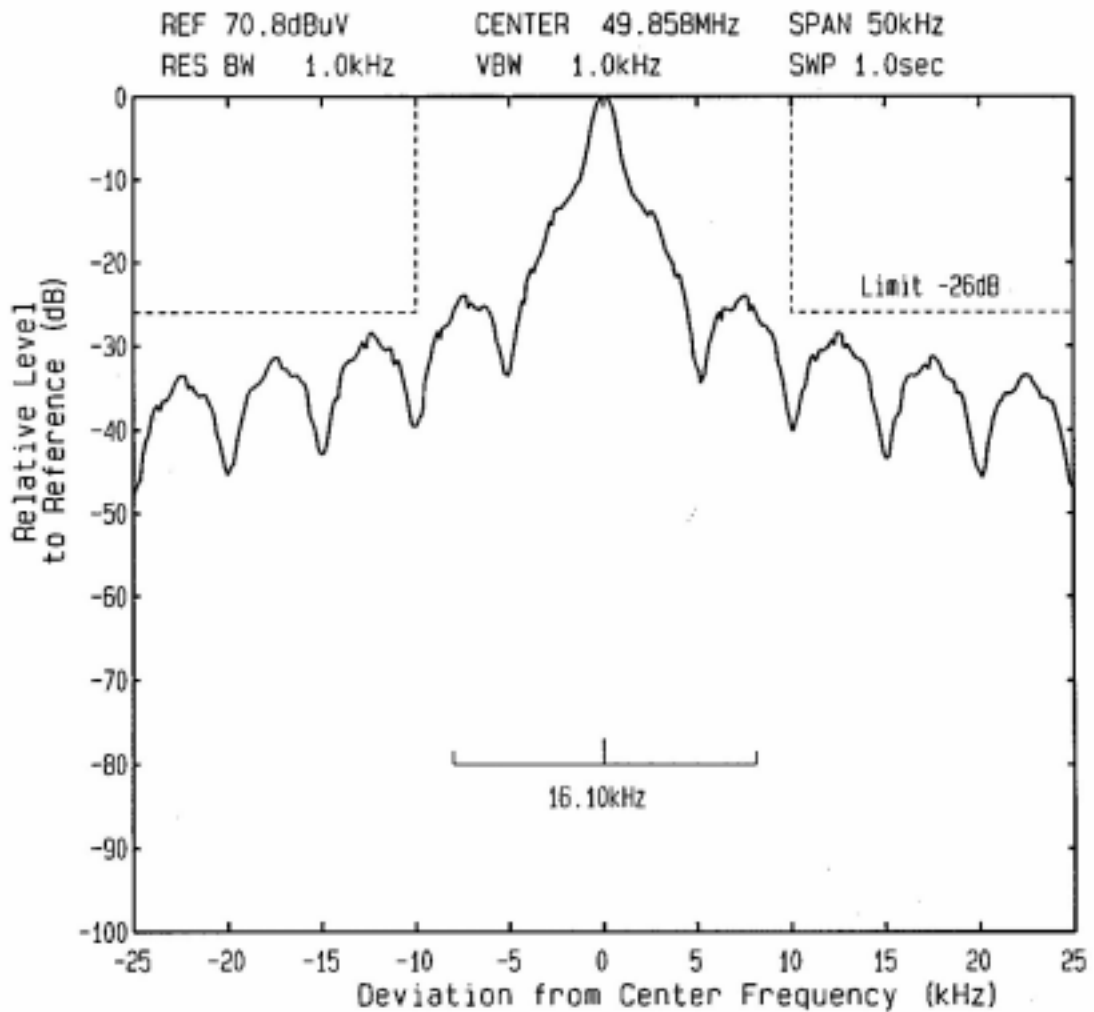


Emission Limitation

FCC ID : CVTTN6500H

Model : TN6500H

Mode of EUT : HORN



Emission Limitation

FCC ID : CVTTN6500H

Model : TN6500H

Mode of EUT : Left

