JAPAN QUALITY ASSURANCE ORGANIZATION
21-25, KINUTA 1-CHOME, SETAGAYA-KU, TOKYO 157-8573 JAPAN
PHONE (03) 3416-0111, TELEX 242-2531 JQA J FAX (03) 3416-9691

EMI TEST REPORT

JQA APPLICATION NO.	: 400-90679
Model No.	: TD3531H
Type of Equipment	: Radio Controlled Toy
Regulations Applied	: CFR 47 FCC Rules and Regulations Part 15
FCC ID	: CVTTD3531H
Applicant	: NIKKO CO., LTD.
Address	: 1-7-14, Mizumoto, Katsushika-ku, Tokyo 125-0032, Japan
Manufacture	: NIKKO TEC INTERNATIONAL LTD.
Address	: Room 812, Houston Center, 63 Mody Road, Tsimshatsui, Kowloon, Hong Kong
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, 2000)

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	: CVTTD3531H
6)	Trade Name	: NIKKO
7)	Model No.	: TD3531H
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.
_x_ - 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
___	Field Strength Meter	ESH-2	Rohde & Schwarz	880370/016	May 1999	1 Year
___	Field Strength Meter	ESH-3	Rohde & Schwarz	881460/016	May 1999	1 Year
___	Field Strength Meter	ESH-3	Rohde & Schwarz	881460/030	Nov 1999	1 Year
___	LISN	KNW-407	Kyoritsu Electrical	8-833-6	Apr. 1999	1 Year
___	LISN	KNW-407	Kyoritsu Electrical	8-855-2	Apr. 1999	1 Year
___	LISN	KNW-407	Kyoritsu Electrical	8-757-1	Apr. 1999	1 Year
___	RF Cable	3D-2W	Fujikura	155-21-005E0	Apr. 1999	1 Year
___	RF Cable	3D-2W	Fujikura	155-21-006E0	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
_x_	Field Strength Meter	ESVP	Rohde & Schwarz	881487/004	May 1999	1 Year
___	Field Strength Meter	ESVP	Rohde & Schwarz	881487/005	May 1999	1 Year
___	Antenna	KBA-511A	Kyoritsu Electrical	0-201-13	Nov. 1999	1 Year
_x_	Antenna	KBA-511A	Kyoritsu Electrical	0-170-1	Nov. 1999	1 Year
___	Antenna	KBA-611	Kyoritsu Electrical	0-210-5	Nov. 1999	1 Year
_x_	Antenna	KBA-611	Kyoritsu Electrical	0-147-14	Nov. 1999	1 Year
_x_	RF Cable	5D-2W	Fujikura	155-21-001E0	Feb. 1999	1 Year
___	RF Cable	5D-2W	Fujikura	155-21-002E0	Feb. 1999	1 Year

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

___ - was performed in the following test site.
_x_ - 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
___	Spectrum Analyzer	8566B	Hewlett Packard	2140A01091	Apr. 1999	1 Year
___	Spectrum Analyzer	8566B	Hewlett Packard	2747A05855	May 1999	1 Year
___	Log-Periodic Antenna	HL 025	Rohde & Schwarz	340182/015	Nov. 1999	1 Year
___	RF Cable	S 04272B	Suhner	155-21-011E0	May 1999	1 Year

1.3.4 The measurement of the Frequency Stability

___ - was performed.
_x_ - was not applicable.

Used test instruments :

	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
___	Frequency Counter	53131A	Hewlett Packard	3546A11807	June 1999	1 Year
___	Oven	-	Ohnishi Co. Ltd.	-	Aug. 1999	1 Year
___	DC Power Supply	6628A	Hewlett Packard	3224A00284	July 1999	1 Year

1.3.5 The measurement of the Occupied Bandwidth

_x_ - was performed.
___ - was not applicable.

Used test instruments :

	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
_x_	Spectrum Analyzer	8566B	Hewlett Packard	2140A01091	Apr. 1999	1 Year
___	Spectrum Analyzer	8566B	Hewlett Packard	2747A05855	May 1999	1 Year
___	Function Generator	3325A	Hewlett Packard	2512A21776	June 1999	1 Year
___	FM Linear Detector	MS61A	Anritsu Corp.	M77486	Sep. 1999	1 Year
___	Level Meter	ML422C	Anritsu Corp.	M87571	June 1999	1 Year

1.4 EUT MODIFICATION

_x_ -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 : January 20, 2000

End of testing : January 24, 2000

- 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 TEC INTERNATIONAL LTD.	TD3531H	CVTTD3531H	None

1.7.2 Operating condition

Power supply Voltage : 9.0 VDC(Battery)
The tests have been carried out under the transmitting condition.

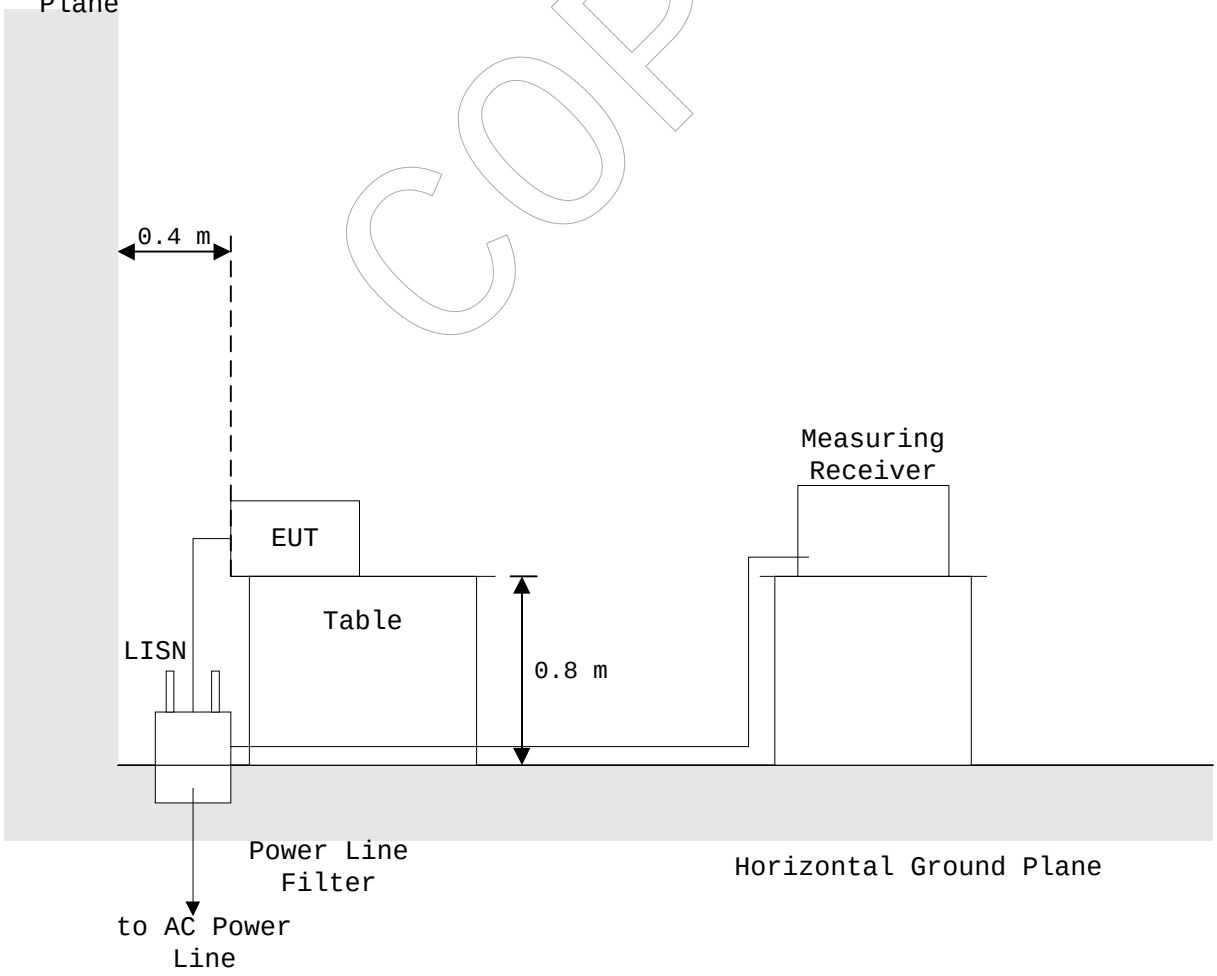
1.8 PRELIMINARY TEST AND TEST-SETUP (DRAWINGS)

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 -

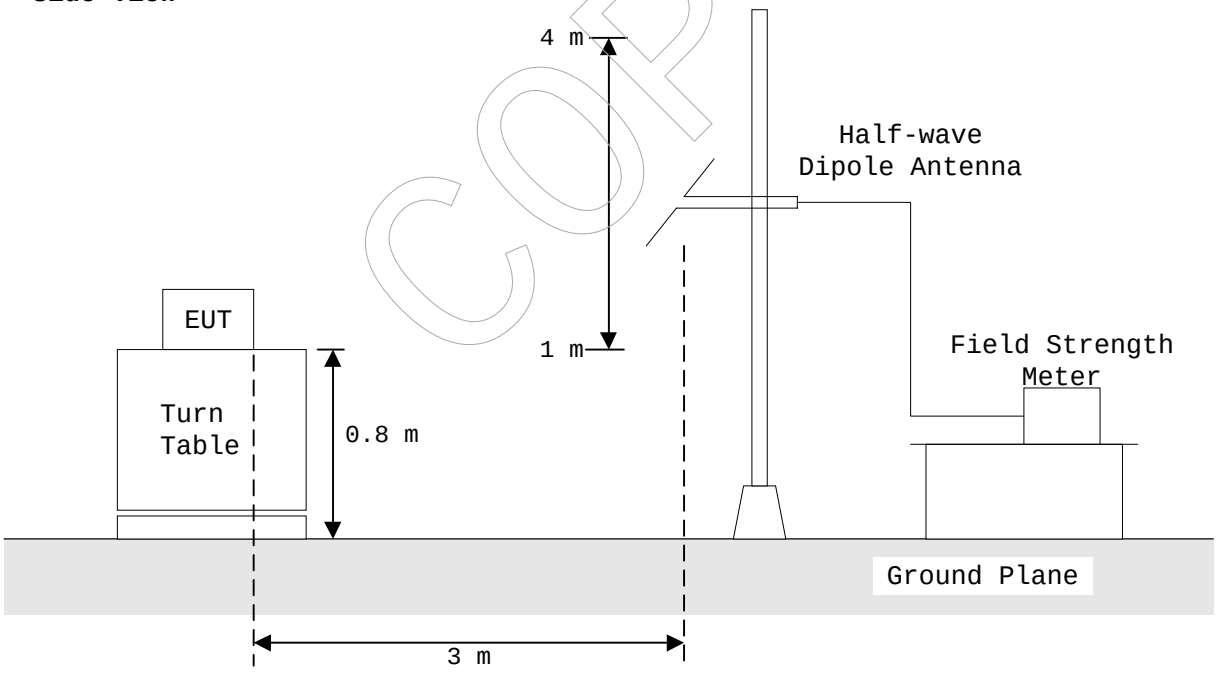


1.8.2 Radiated Emission (30 MHz – 1000 MHz) :

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 -

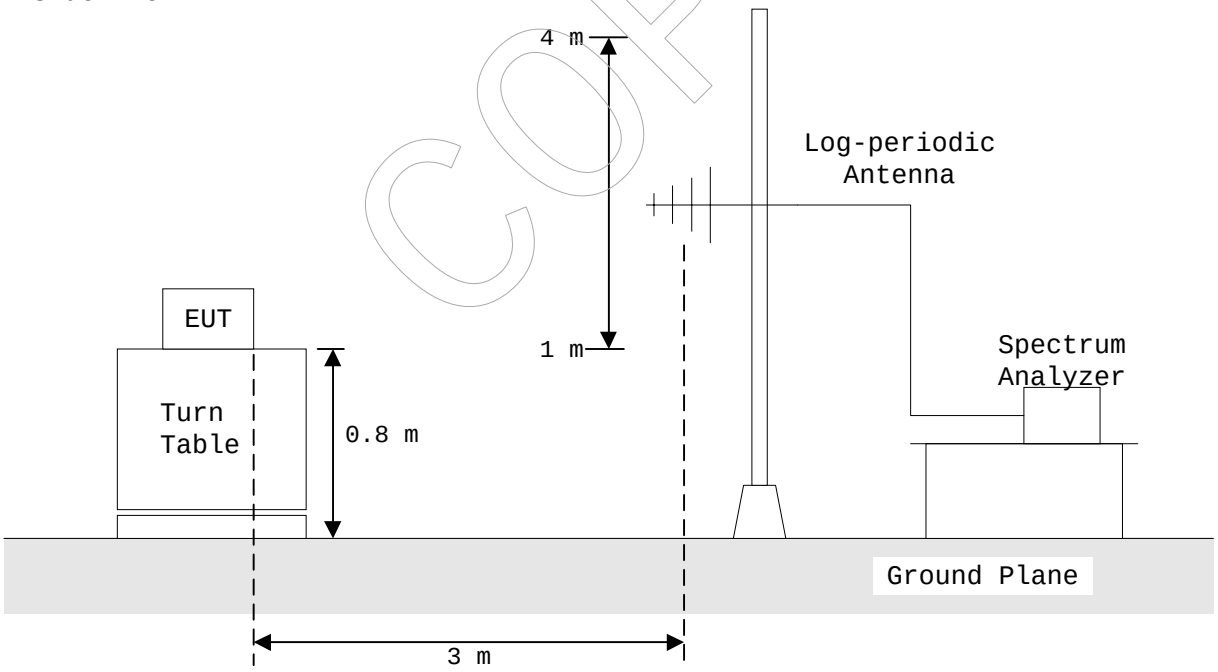


1.8.3 Radiated Emission (Above 1 GHz) :

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.

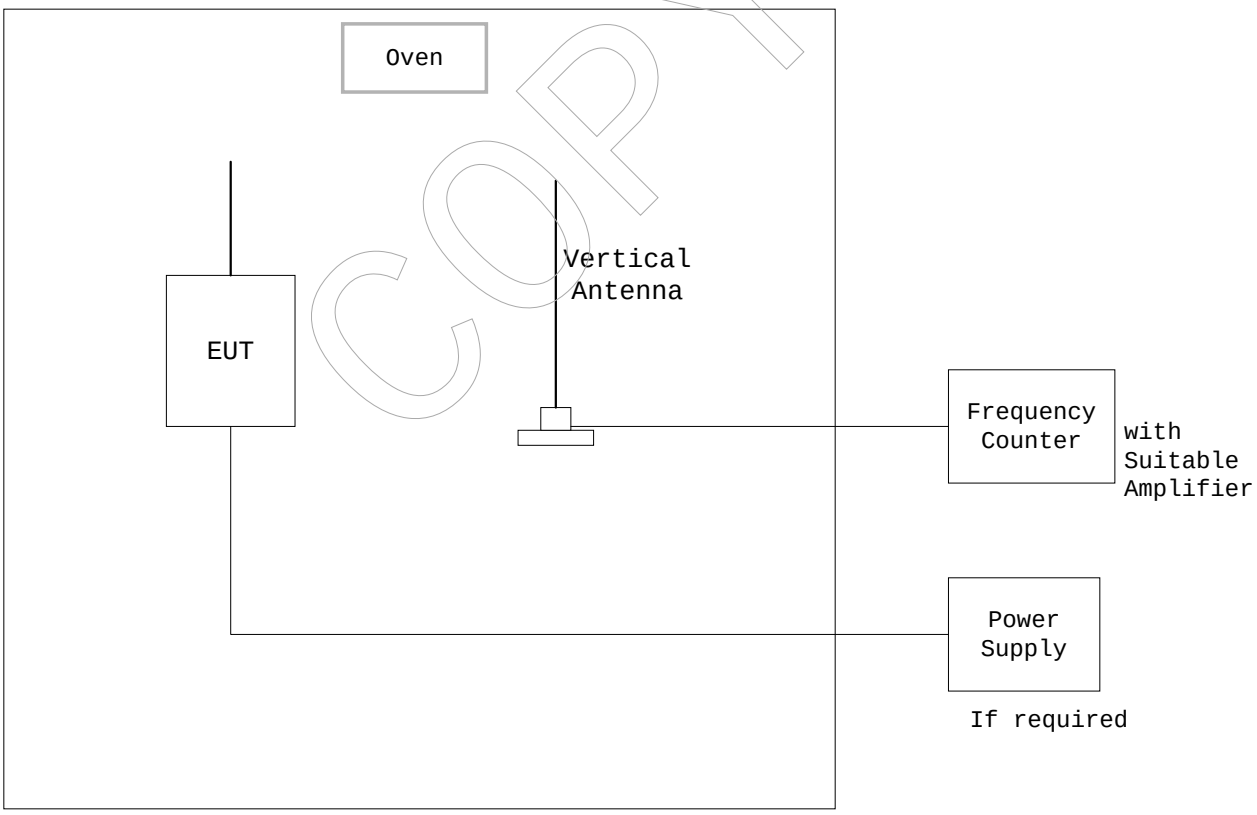
Anechoic Chamber

- Side View -



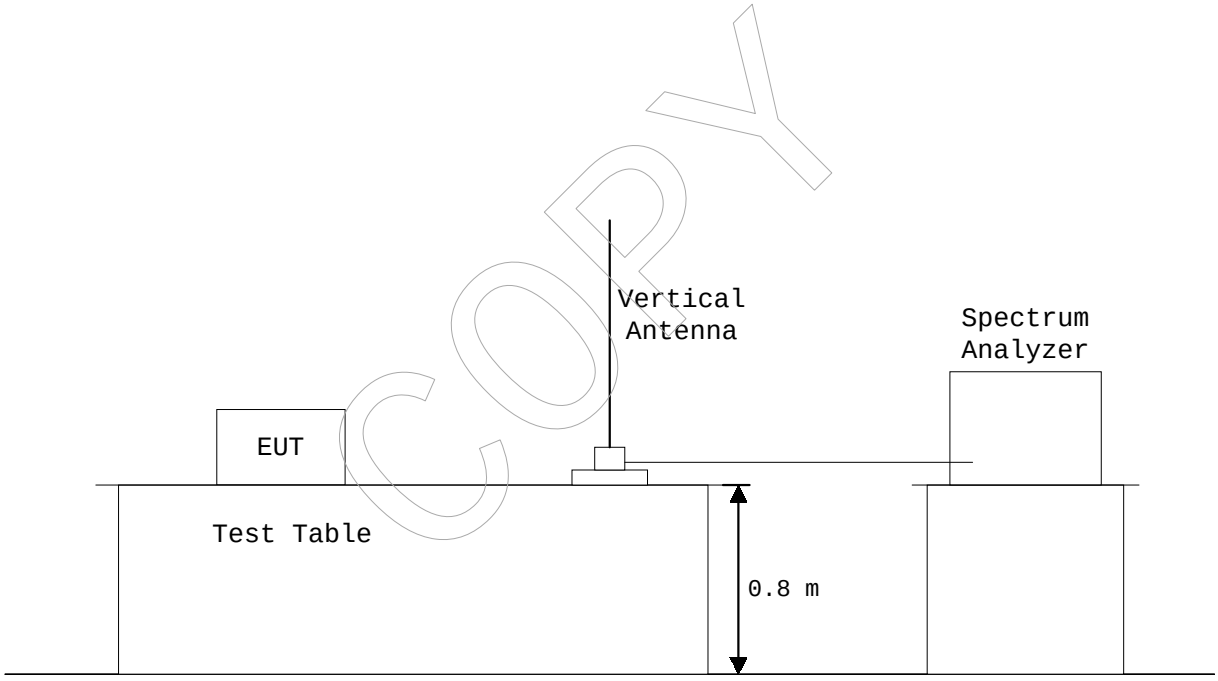
1.8.4 Frequency Stability :

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°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°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 :

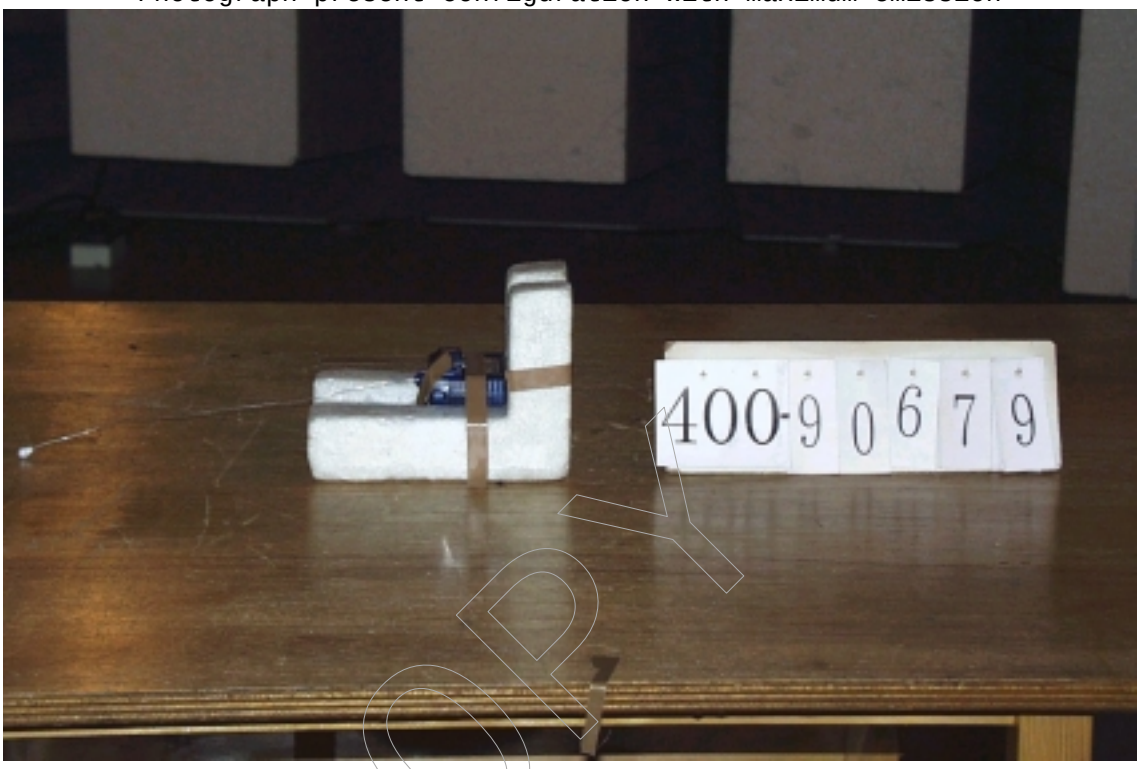
According to description of ANSI C63.4-1992 sec.13.1.7, the occupied bandwidth measurements were carried out. By using a spectrum analyzer with a vertical antenna for picking up the signal, the measurements of the emission were made under the transmitting modes of the EUT.
The resolution bandwidth of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

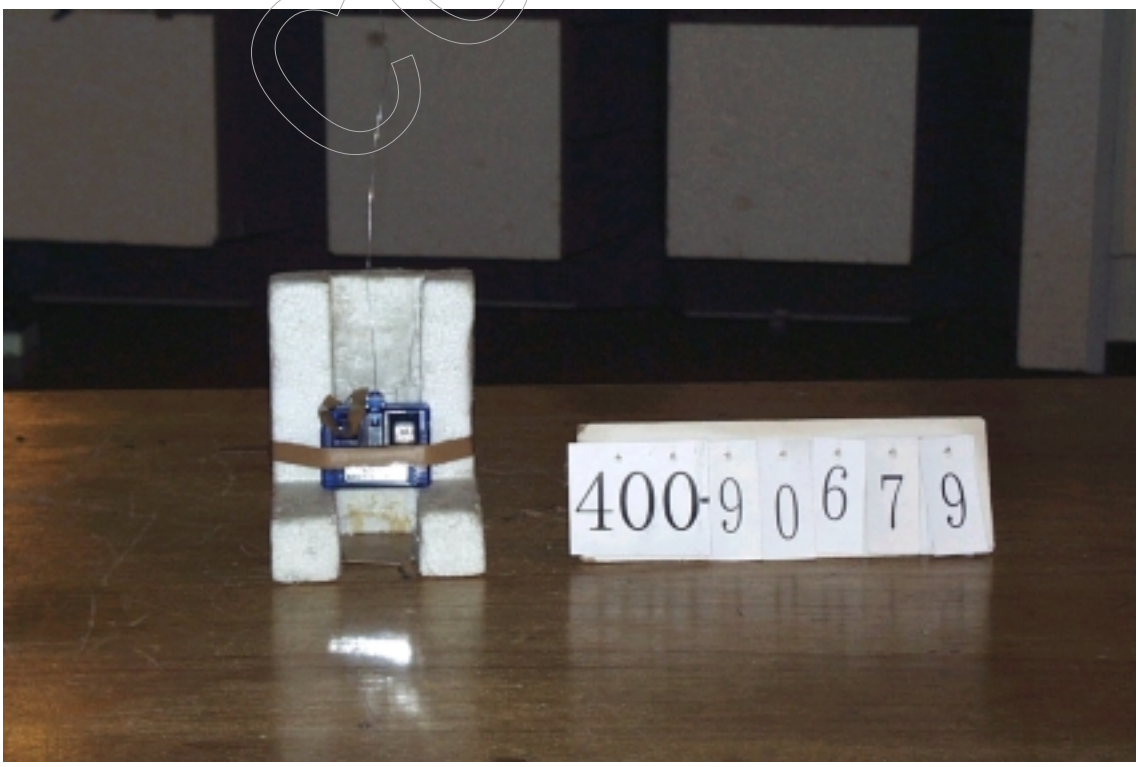


1.9 TEST ARRANGEMENT (PHOTOGRAPHS)

PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT

Photograph present configuration with maximum emission





TEST DATA

2.2 Radiated Emissions Measurement

Date : January 20, 2000
Temp.: 20 °C Humi.: 47 %

Operating Frequency : 49.860 MHz
Distance of Measurement : 3.0 meters

Frequency (MHz)	Antenna Factor (dB/m)	Meter Reading Horiz. (dBμV)	Meter Reading Vert. (dBμV)	Limits (dBμV/m)	Field Strength at 3 m Horiz. (dBμV/m)	Field Strength at 3 m Vert. (dBμV/m)	
Fundamental							
49.860	3.6	54.2	53.5	80.0	57.8	57.1	(Average)
49.860	3.6	58.8	58.2	100.0	62.4	61.8	(Peak)
Harmonics & other Frequency components							
99.720	9.9	19.6	17.8	43.5	29.5	27.7	
149.580	13.7	14.6	10.2	43.5	28.3	23.9	
199.440	16.4	9.9	5.7	43.5	26.3	22.1	
249.300	18.5	19.8	14.8	46.0	38.3	33.3	
299.160	20.3	8.4	6.9	46.0	28.7	27.2	
349.020	21.8	9.9	9.5	46.0	31.7	31.3	
398.880	23.1	< 0.0	< 0.0	46.0	< 23.1	< 23.1	
448.740	24.3	< 0.0	< 0.0	46.0	< 24.3	< 24.3	
498.600	25.4	< 0.0	< 0.0	46.0	< 25.4	< 25.4	
548.460	26.3	< 0.0	< 0.0	46.0	< 26.3	< 26.3	
598.320	27.2	< 0.0	< 0.0	46.0	< 27.2	< 27.2	
648.180	28.1	< 0.0	< 0.0	46.0	< 28.1	< 28.1	
698.040	29.0	< 0.0	< 0.0	46.0	< 29.0	< 29.0	
747.900	29.8	< 0.0	< 0.0	46.0	< 29.8	< 29.8	
797.760	30.6	< 0.0	< 0.0	46.0	< 30.6	< 30.6	
847.620	31.4	< 0.0	< 0.0	46.0	< 31.4	< 31.4	
897.480	32.2	< 0.0	< 0.0	46.0	< 32.2	< 32.2	
947.340	32.9	< 0.0	< 0.0	46.0	< 32.9	< 32.9	
997.200	33.6	< 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 + 54.2 = 57.8 dBμV/m
Where,
Af = Antenna Factor including the cable loss.
Mr = Meter Reading

5. Measuring Instrument Setting:

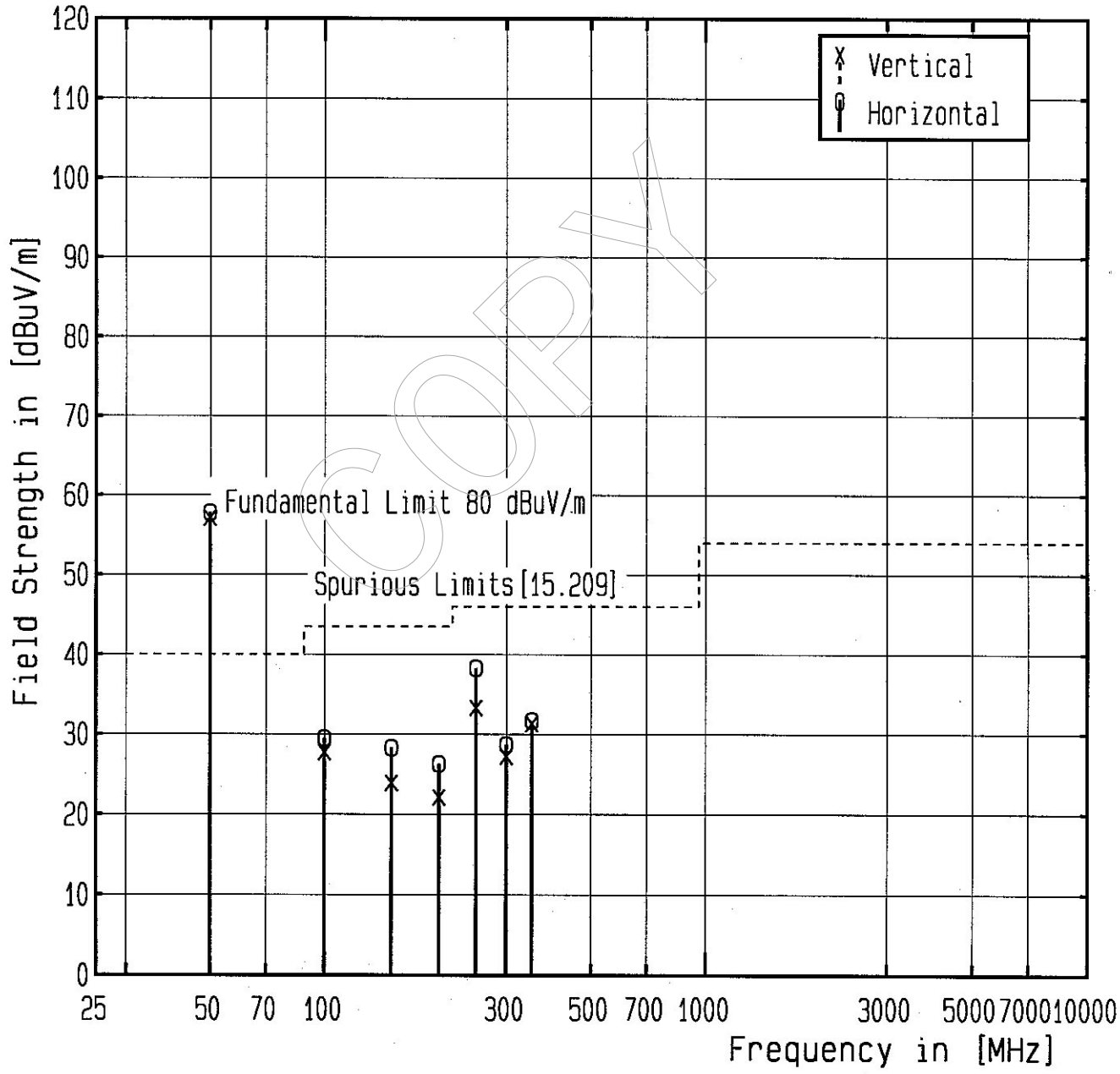
Fundamental
Detector function : Average/Peak
IF Bandwidth : 120 kHz

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. : TD3531H
Operating Frequency : 49.86 MHz
Test Condition :



2.4 Occupied Bandwidth Measurement

Date : January 24, 2000
Temp.: 23 °C Humi.: 31 %

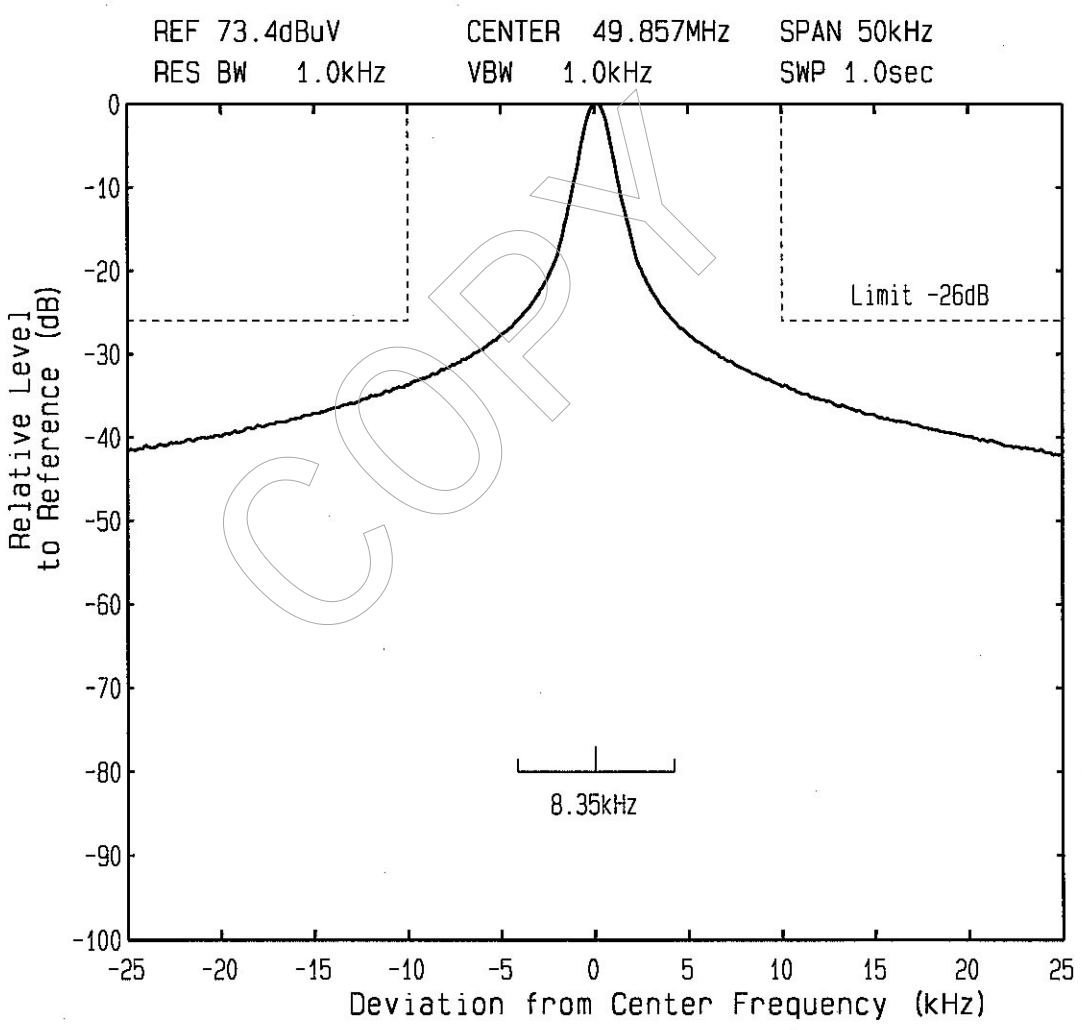
Measurements Results : Refer to the attached graphs.

Tested by : Shigeru Osawa
Shigeru Osawa
Testing Engineer

Emission Limitation

FCC ID : CVTTD3531H
Model : TD3531H

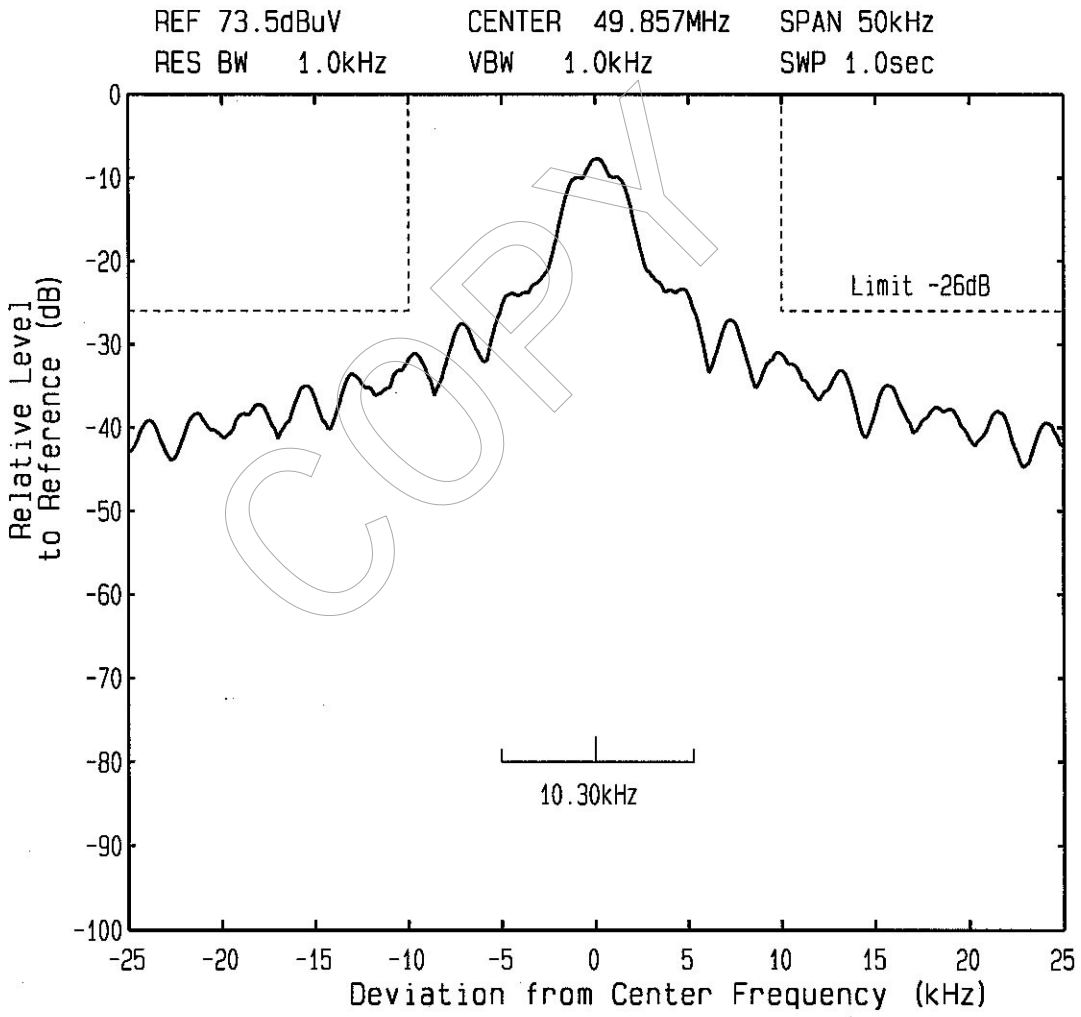
Mode of EUT : Forward



Emission Limitation

FCC ID : CVTTD3531H
Model : TD3531H

Mode of EUT : Reverse



Emission Limitation

FCC ID : CVTTD3531H
Model : TD3531H

Mode of EUT : Reverse