EXHIBIT E

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

REPORT OF MEASUREMENT

Date: July 28, 1998
Issued in: Tokyo, Japan

JQA APPLICATION NO.: 80-80283

1. Applicant	: YUPITERU INDUSTRIES CO., LTD. 12-18, Shibaura 4-chome, Minato-ku Tokyo 108-0023, Japan
2. Manufacturer	: YUPITERU INDUSTRIES CO., LTD. 12-18, Shibaura 4-chome, Minato-ku Tokyo 108-0023, Japan
3. Commodity	: Family Radio Service(Transmitter portion)
a) FCC ID	: AAO21Ø1812
b) Trade Name	: RadioShack
c) Model No.	: WH020-A1US
d) Operating Frequency	: 462.5625 - 467.7125 MHz
e) Power Supply	: 4.5 VDC
4. Applicable Rules	: FCC Rules & Regulations Parts 2 & 95
5. Place of Measurements	: JQA EMC Engineering Department

6. I certify that I am authorized to sign for the report and that all the statements in this report and in the exhibits hereto are true and correct to the best of my knowledge and belief.

7. I further certify that appropriate arrangements have been made with the person in charge of the production assure that production units of this equipment bearing the FCC ID number specified by the applicant will continue to comply with the Commission's technical requirements.

Shigeru Osawa, Assistant Manager
Testing Div. EMC Engineering Dept.

1. Radio Frequency Output Power: [§2.985(a)]

Measurement Procedure:

A receiving antenna was located at the distance of 3 meters and the interference signal derived from the antenna was fed to a spectrum analyzer.
The fixed antenna of the transmitter under test was pulled out for its length.
It specifies the use of a half-wave dipole antenna in order to determine ERP of the transmitter under test, a log-periodic antenna as a radiation antenna was used and the difference between the gain of the log-periodic antenna and a half-wave dipole antenna was taken into consideration.
(Refer to a document CISPR/B (Secretariat) 25)

Measurement Results:

Frequency Range: 462.5625 - 467.7125 MHz

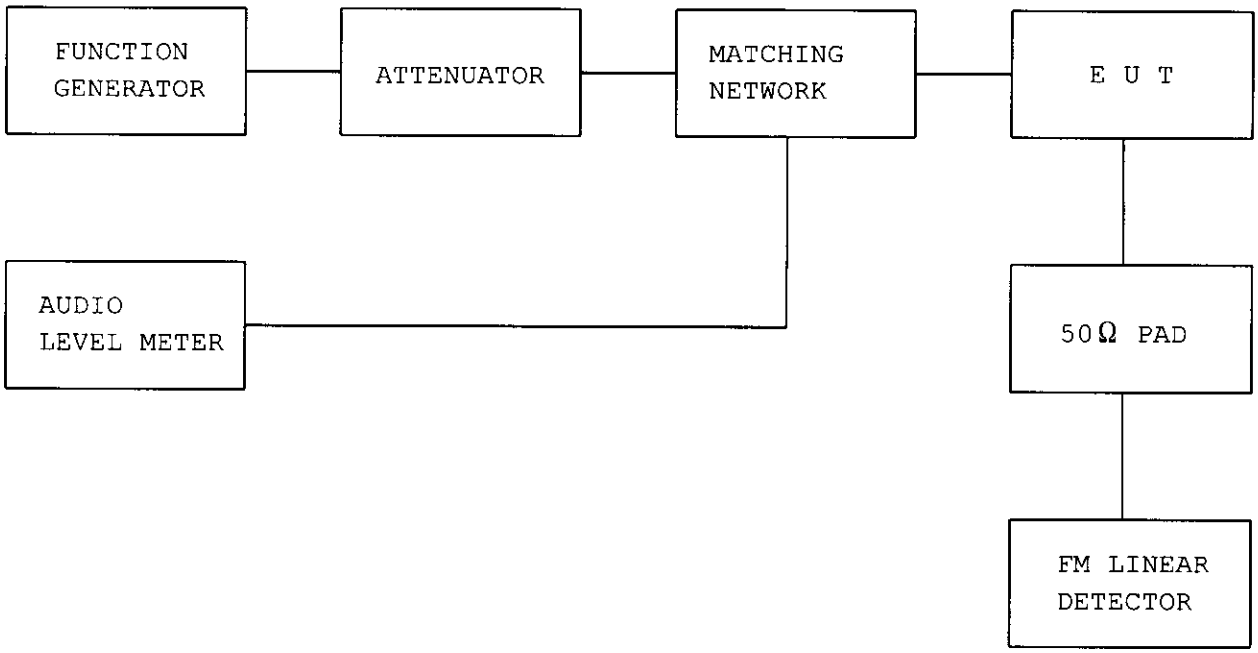
Frequency (MHz)	Output Power ERP(W)
462.6375	0.253
467.6375	0.255

Note: Specified limit(§95.639(d)); 0.500 W

2. Modulation Frequency Response: [§2.987(a)]

Measurement Procedure:

The audio signal generator was connected to the microphone input circuit of the unit under test through a matching network. The audio signal input was adjusted to obtain 50% modulation at the maximum audio frequency response of the transmitter, and this point was taken as the 0 dB reference level. The frequency of the input signal was changed from 100 Hz to 10 kHz and the input level to obtain 50% modulation was plotted.

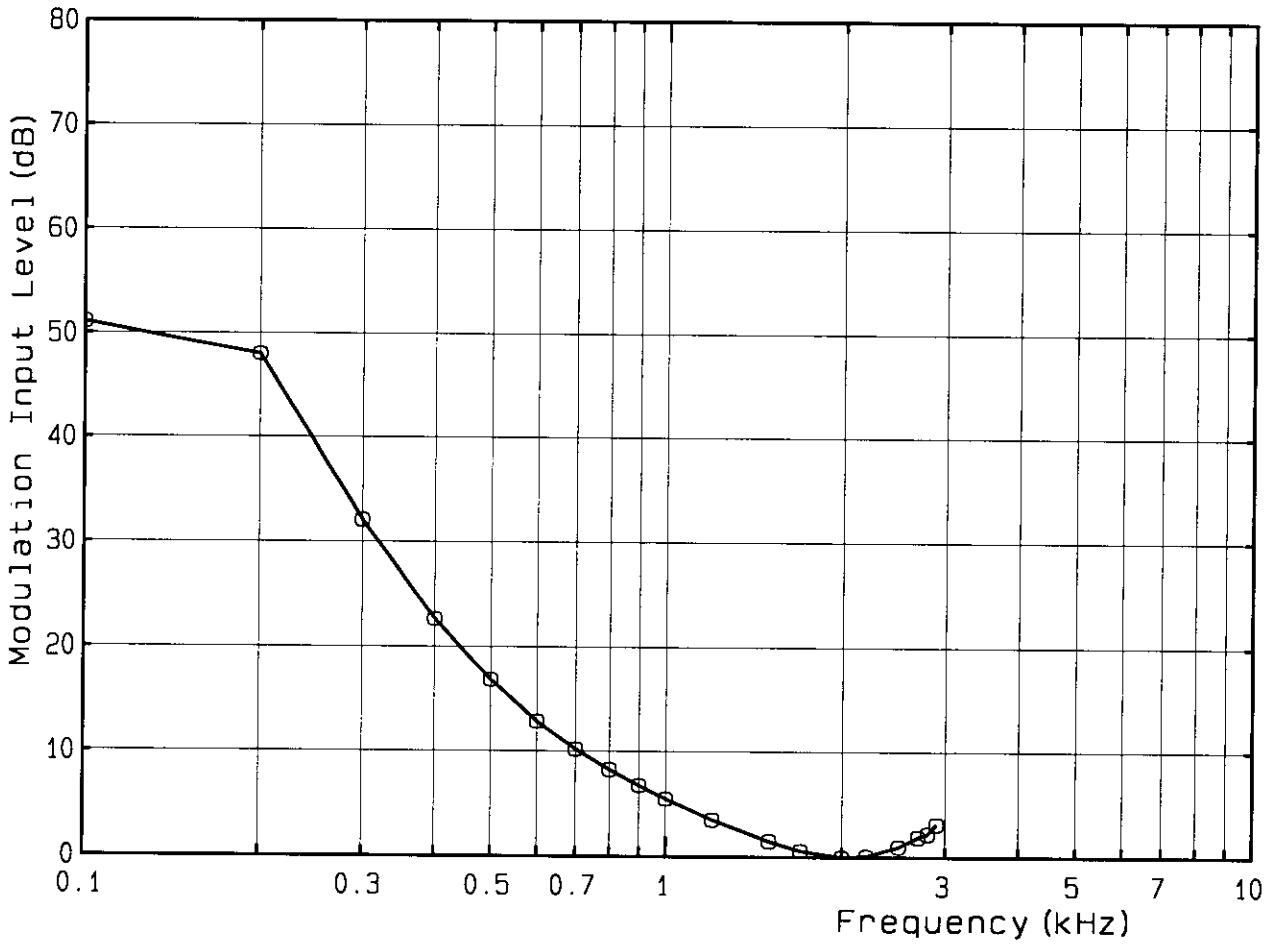


Note: Specified limit(§95.637(a)); 3.125 kHz

Modulation Frequency Response

FCC ID : AAO21Ø1812
Model : WH020-A1US
Test Frequency : 462.6375 MHz

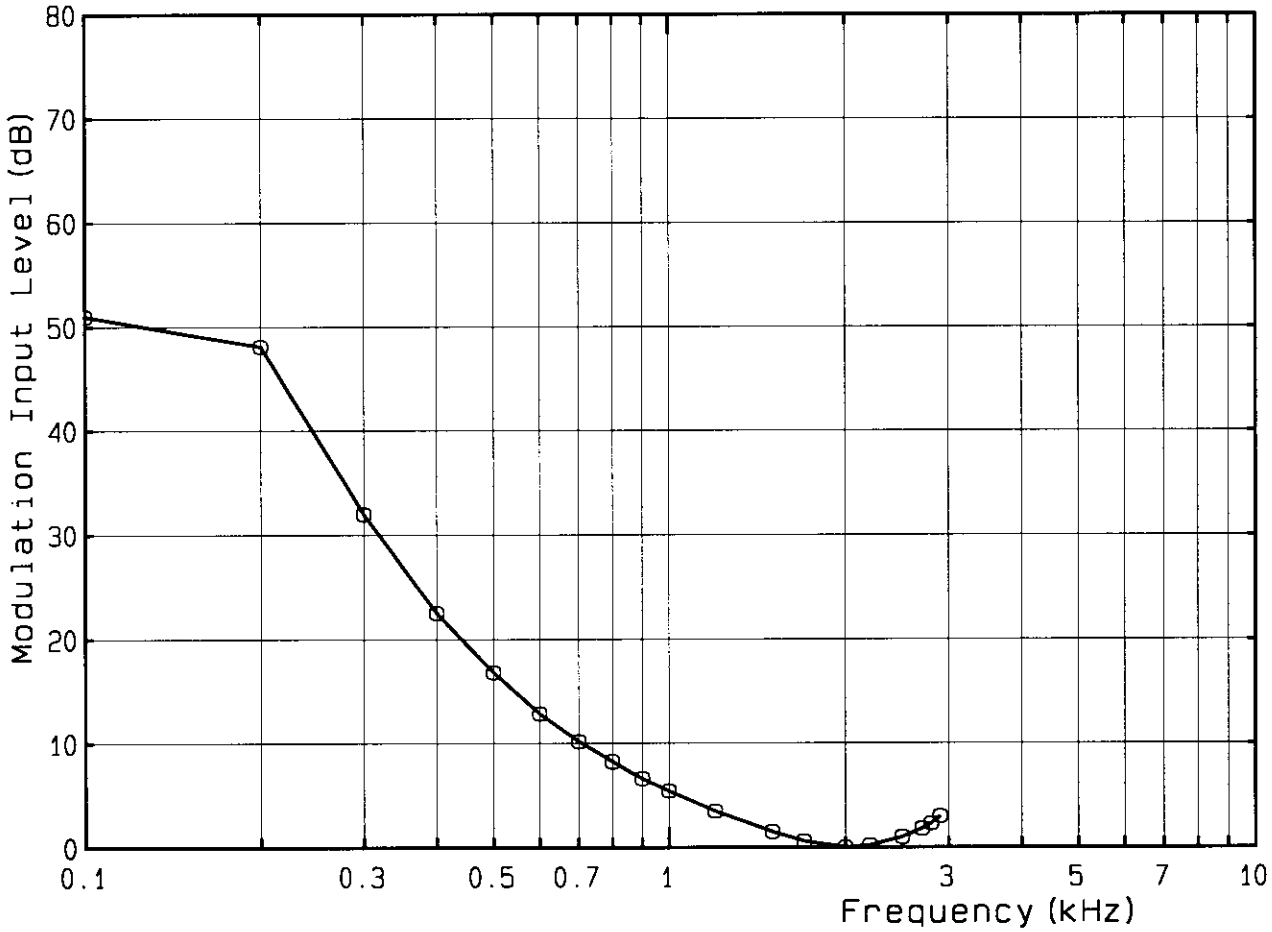
0 dB = -56.2 dBV



Modulation Frequency Response

FCC ID : AAO2101812
Model : WH020-A1US
Test Frequency : 467.6375 MHz

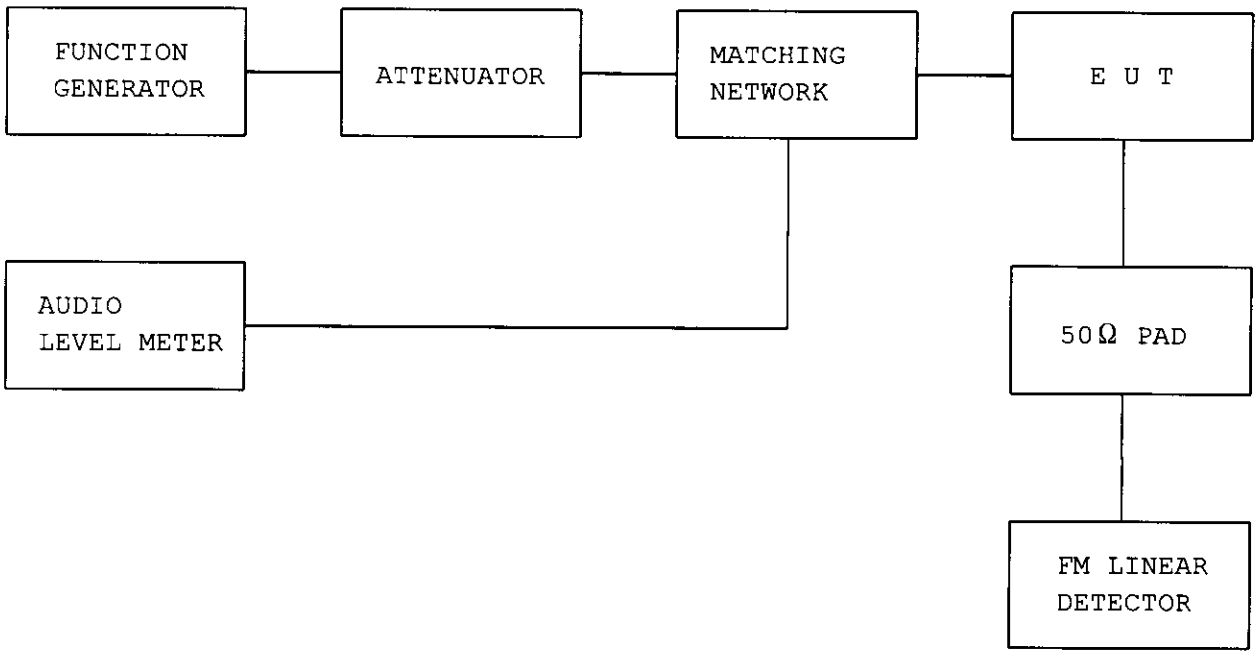
0 dB = -56.2 dBV



3. Modulation Limiting Test: [§2.987(b)]

Measurement Procedure:

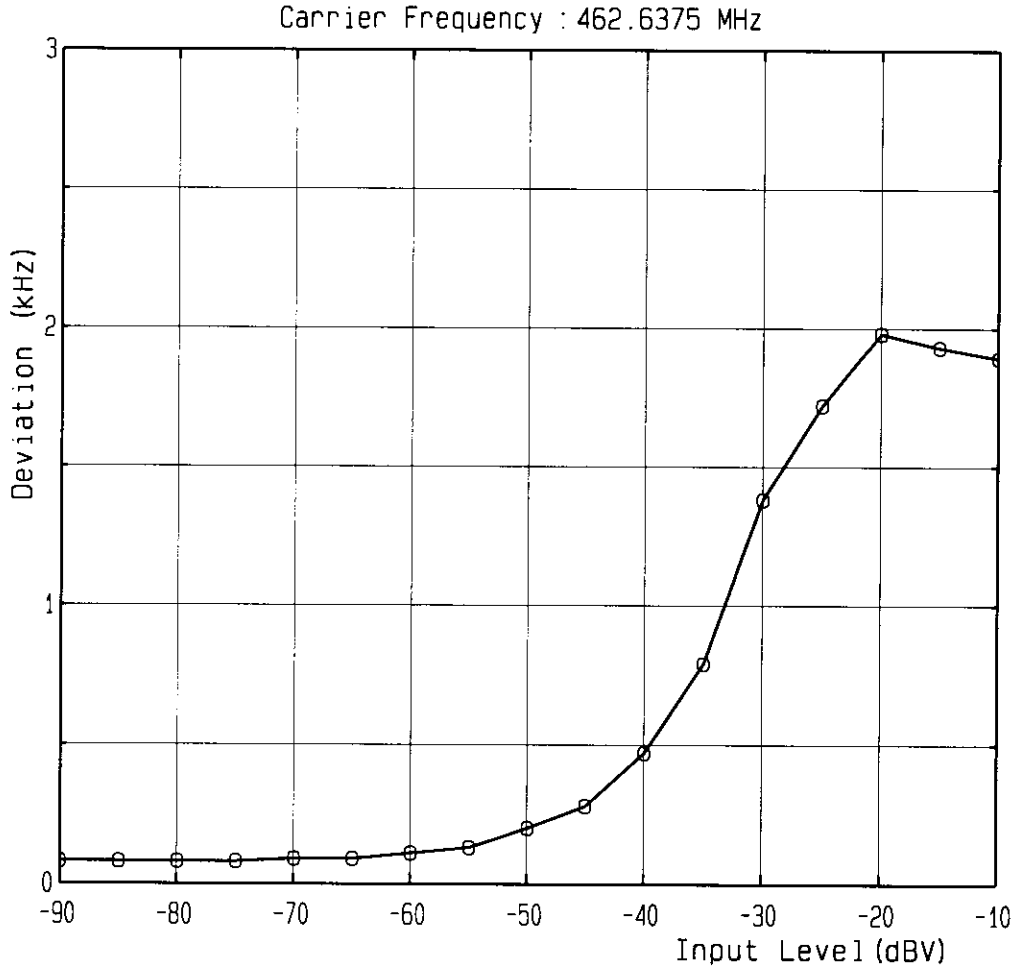
The audio input to be used is that described in "Audio Frequency Response [§ 2.987(a)]". The modulation response was measured up to maximum modulation for each of four tones: 400 Hz, 1000 Hz, frequency of maximum response, 2000 Hz and 2500 Hz. The audio input level was changed from 10% modulation up to approximately 20 dB higher than the saturation point. The measurements were performed for both negative and positive modulations and the respective results were recorded.



Note: Specified limit(§95.637(a)); ±2.5 kHz

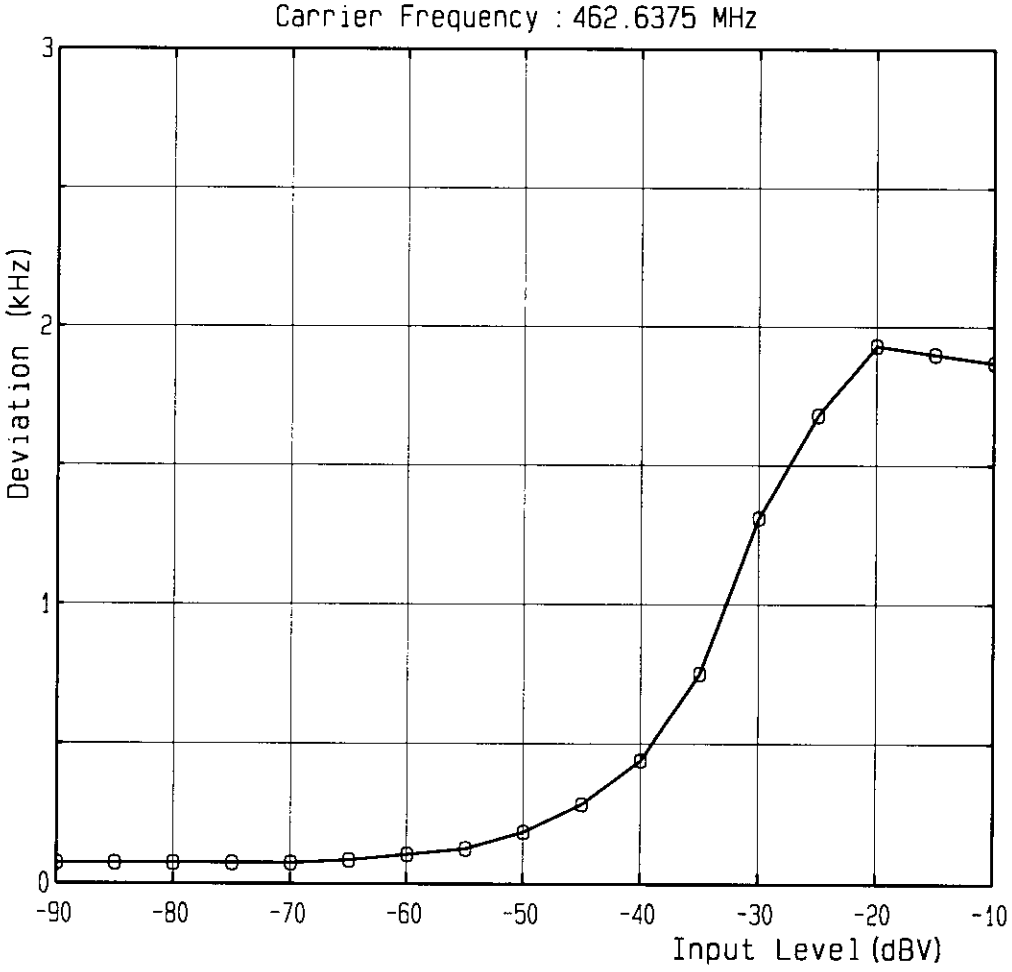
Modulation Characteristics

FCC ID : AAO21Ø1812
Model : WH020-A1US
Plus deviation (400 Hz)
Mode of EUT : Transmit (4CH)
Input Terminal : Microphone
Input Level (50% modulation) : -32.9 dBV



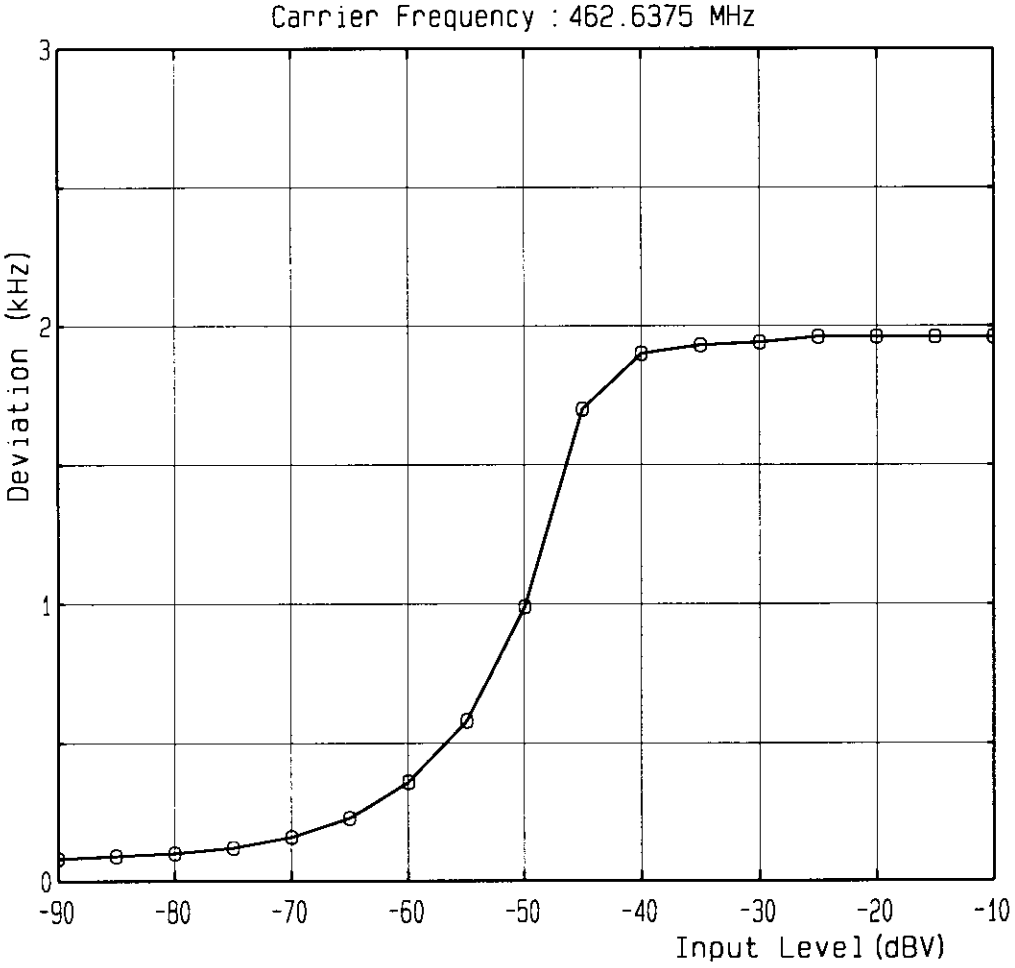
Modulation Characteristics

FCC ID : AAO2101812
Model : WH020-A1US
Minus deviation (400 Hz)
Mode of EUT : Transmit (4CH)
Input Terminal : Microphone
Input Level (50% modulation) : -32.8 dBV



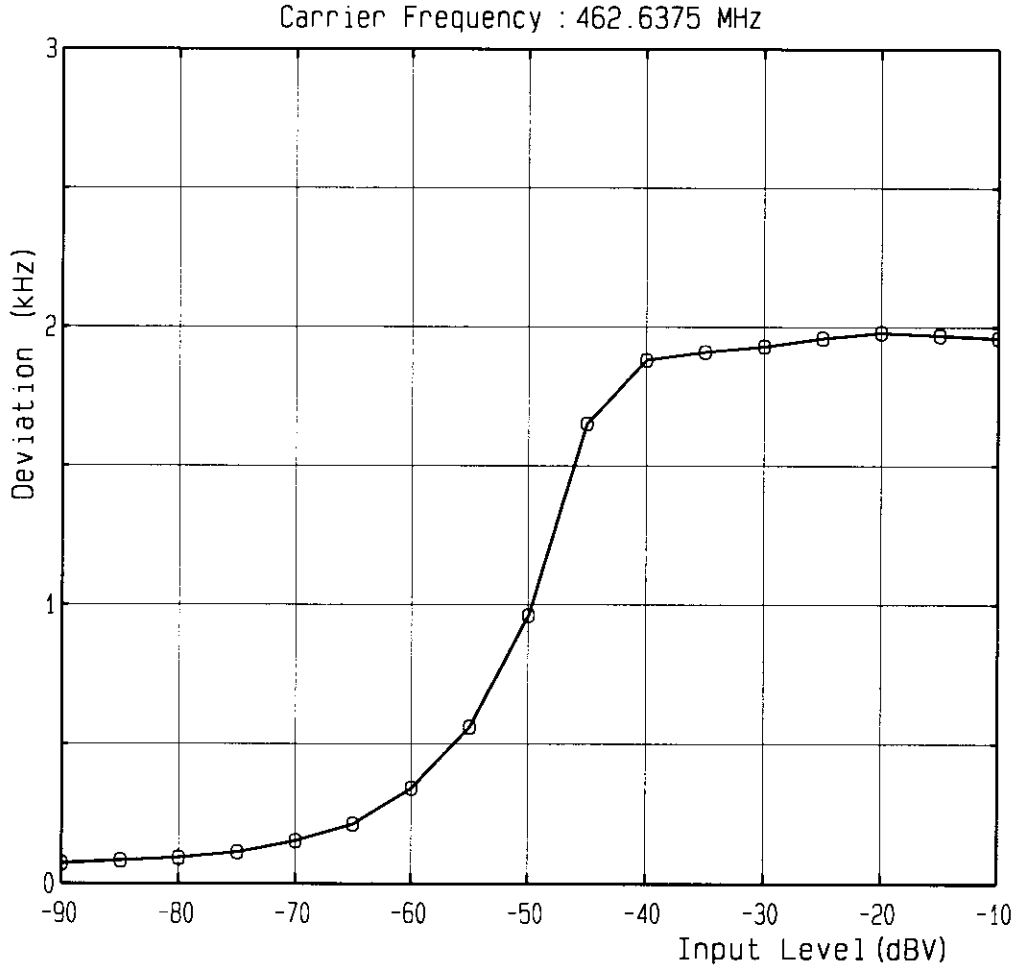
Modulation Characteristics

FCC ID : AAO2101812
Model : WH020-A1US
Plus deviation (1 kHz)
Mode of EUT : Transmit (4CH)
Input Terminal : Microphone
Input Level (50% modulation) : -50.1 dBV



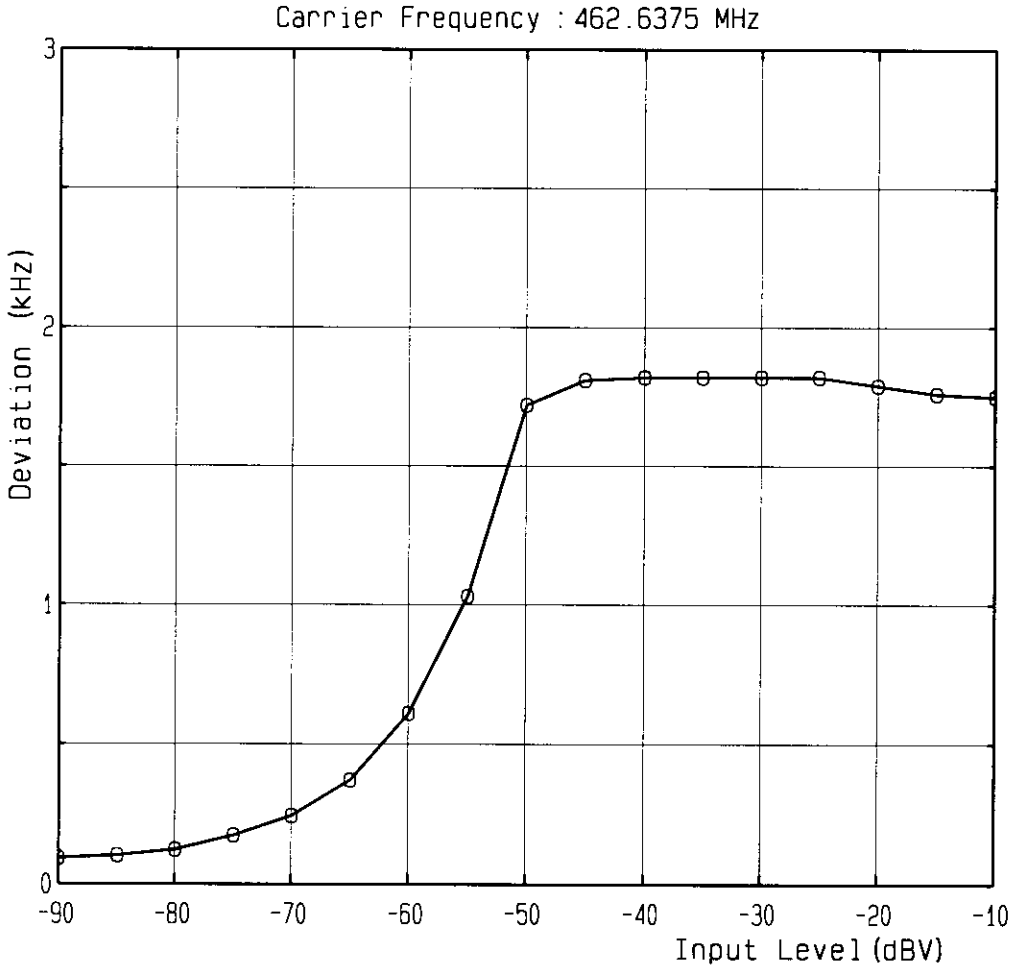
Modulation Characteristics

FCC ID : AAO21Ø1812
Model : WH020-A1US
Minus deviation (1 kHz)
Mode of EUT : Transmit (4CH)
Input Terminal : Microphone
Input Level (50% modulation) : -49.8 dBV



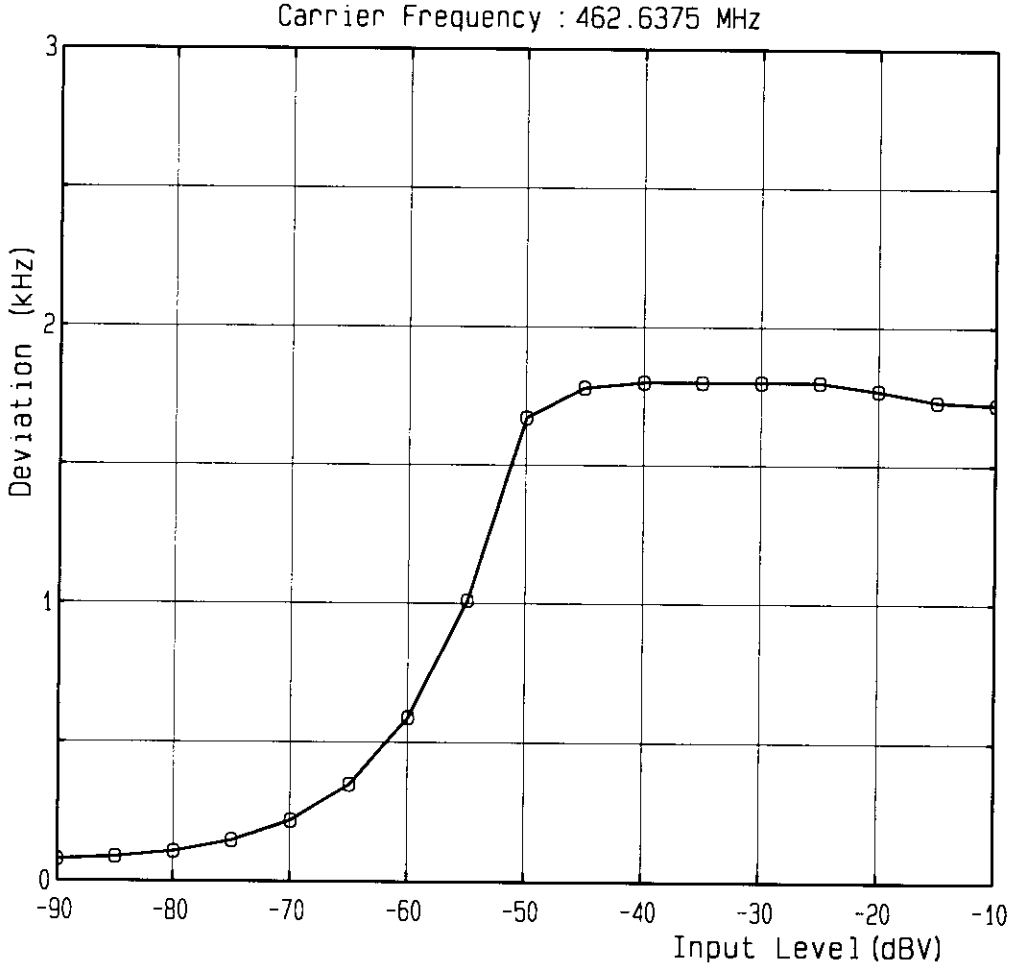
Modulation Characteristics

FCC ID : AAO2101812
Model : WHO20-A1US
Plus deviation (2 kHz)
Mode of EUT : Transmit (4CH)
Input Terminal : Microphone
Input Level (50% modulation) : -56.2 dBV



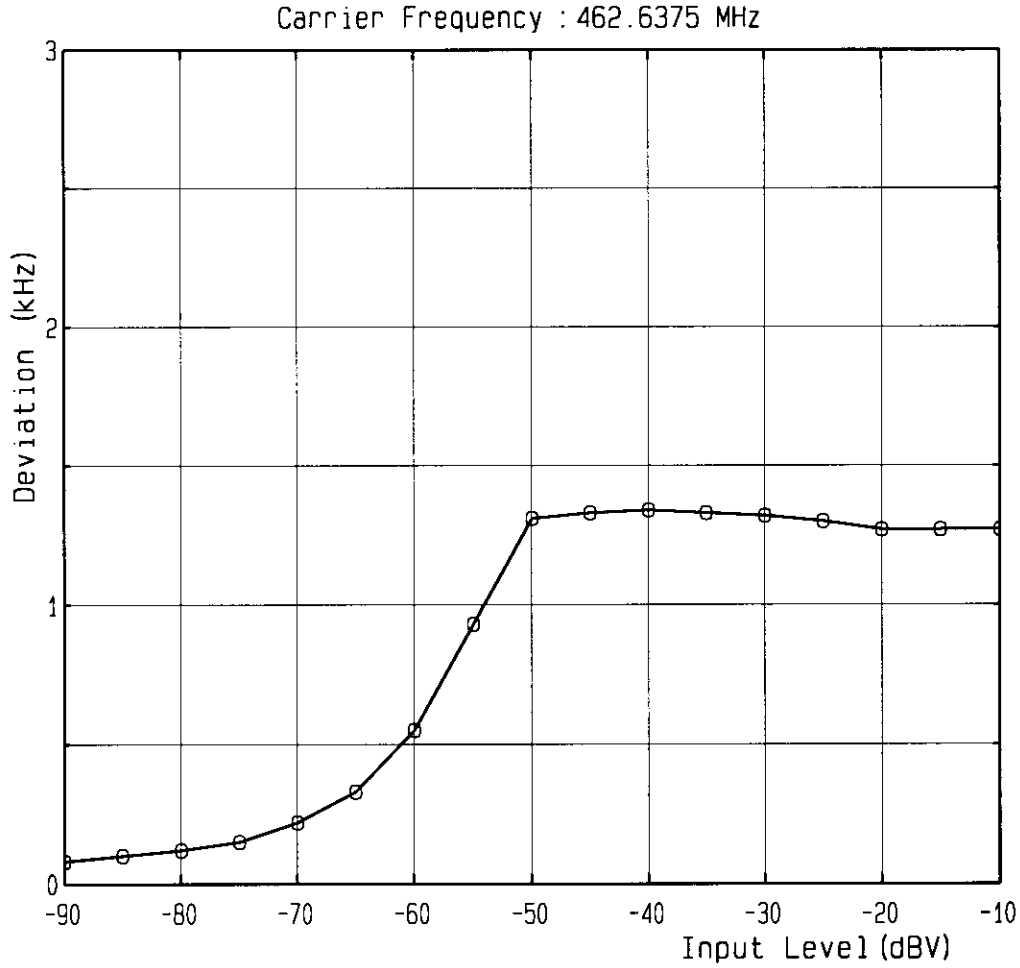
Modulation Characteristics

FCC ID : AAO21Ø1812
Model : WH020-A1US
Minus deviation (2 kHz)
Mode of EUT : Transmit (4CH)
Input Terminal : Microphone
Input Level (50% modulation) : -56.0 dBV



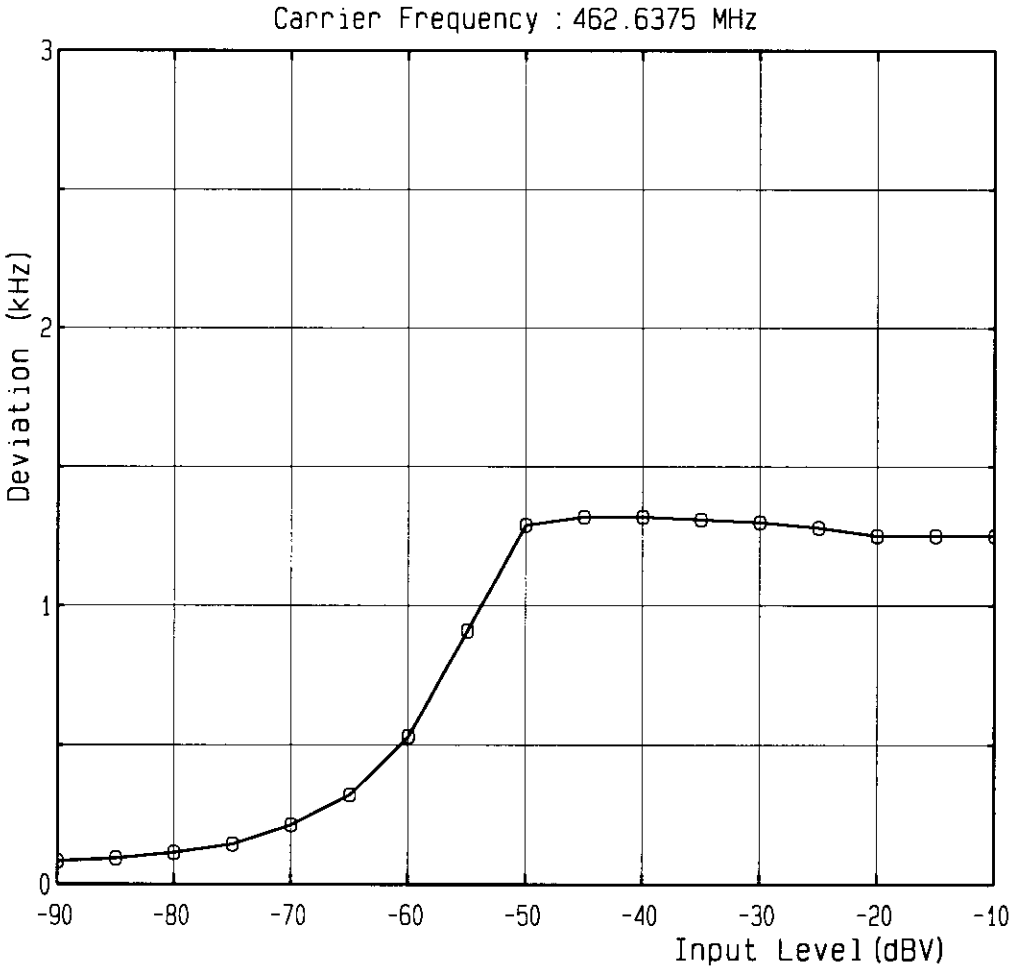
Modulation Characteristics

FCC ID : AAO2101812
Model : WHO2O-A1US
Plus deviation (2.5 kHz)
Mode of EUT : Transmit (4CH)
Input Terminal : Microphone
Input Level (50% modulation) : -58.1 dBV



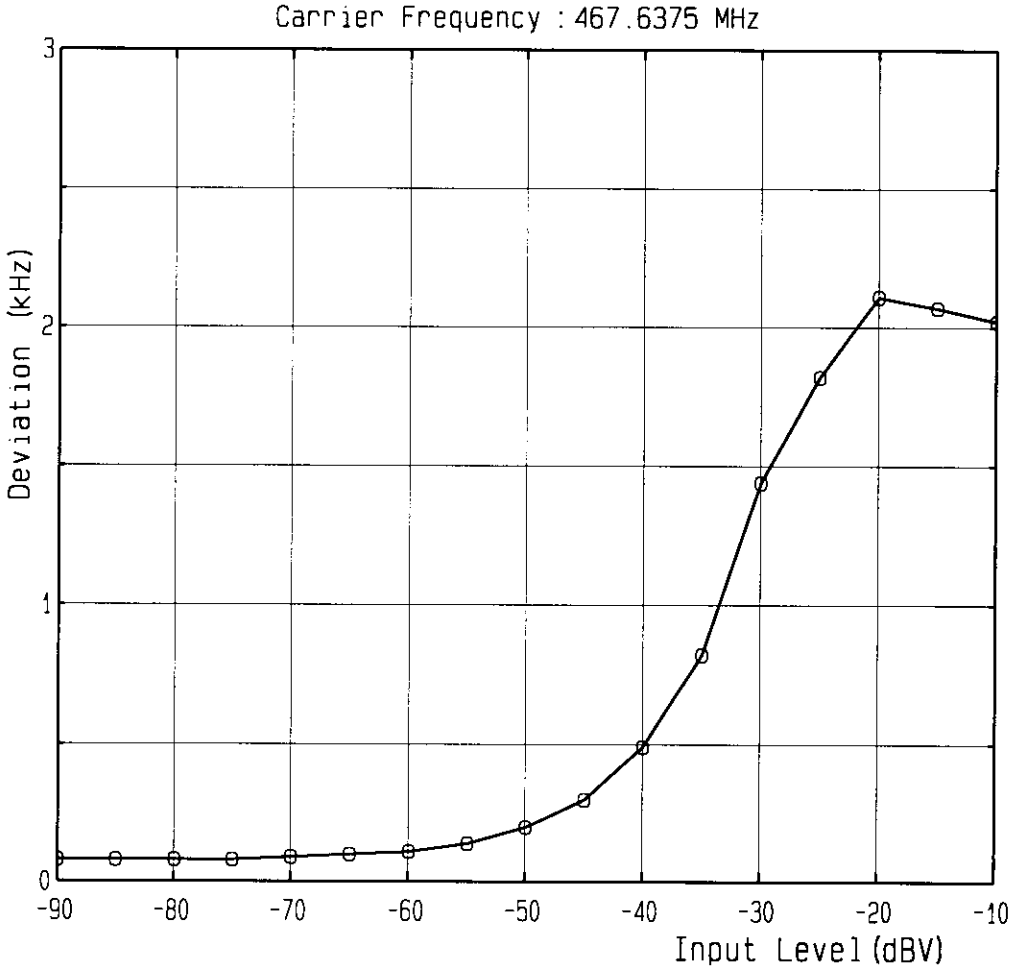
Modulation Characteristics

FCC ID : AAO21Ø1812
Model : WH020-A1US
Minus deviation (2.5 kHz)
Mode of EUT : Transmit (4CH)
Input Terminal : Microphone
Input Level (50% modulation) : -58.0 dBV



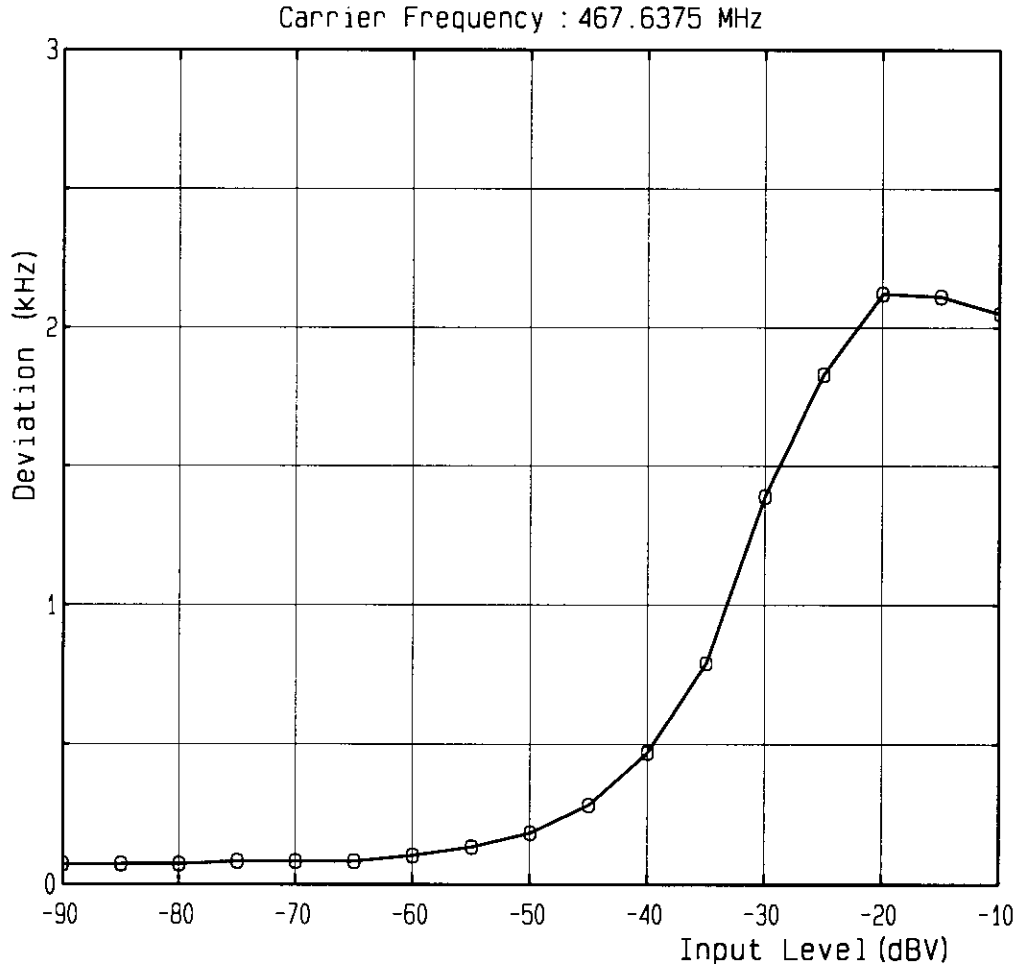
Modulation Characteristics

FCC ID : AAO21Ø1812
Model : WH020-A1US
Plus deviation (400Hz)
Mode of EUT : Transmit (11CH)
Input Terminal : Microphone
Input Level (50% modulation) : -32.9 dBV



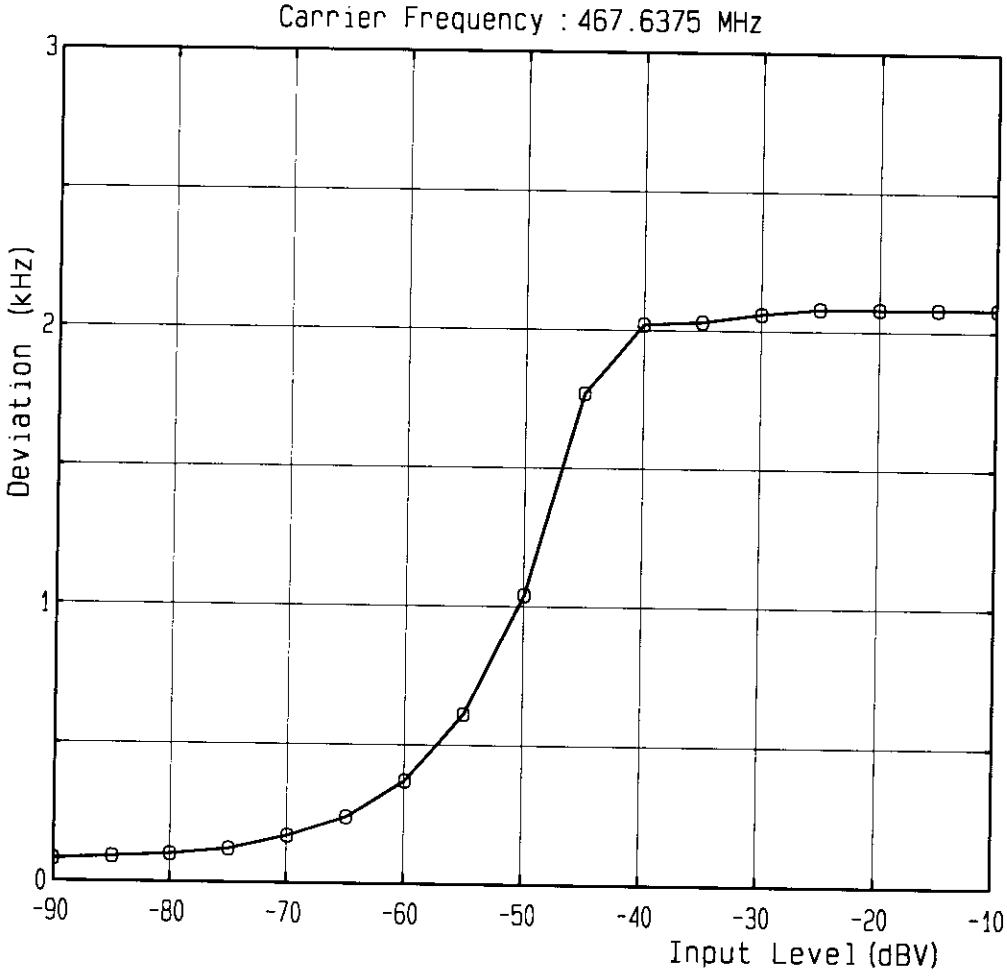
Modulation Characteristics

FCC ID : AAO21Ø1812
Model : WH020-A1US
Minus deviation (400Hz)
Mode of EUT : Transmit (11CH)
Input Terminal : Microphone
Input Level (50% modulation) : -32.4 dBV



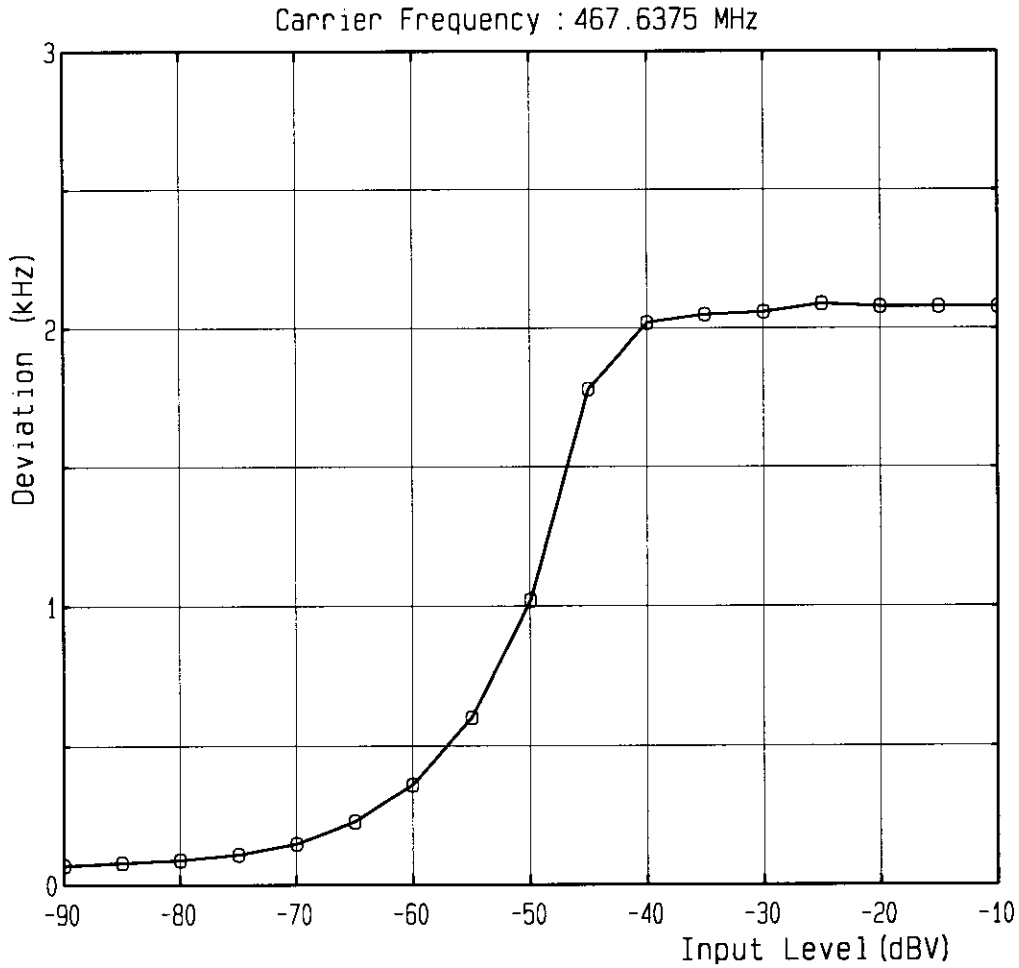
Modulation Characteristics

FCC ID : AAO21Ø1812
Model : WH020-A1US
Plus deviation (1000Hz)
Mode of EUT : Transmit (11CH)
Input Terminal : Microphone
Input Level (50% modulation) : -50.0 dBV



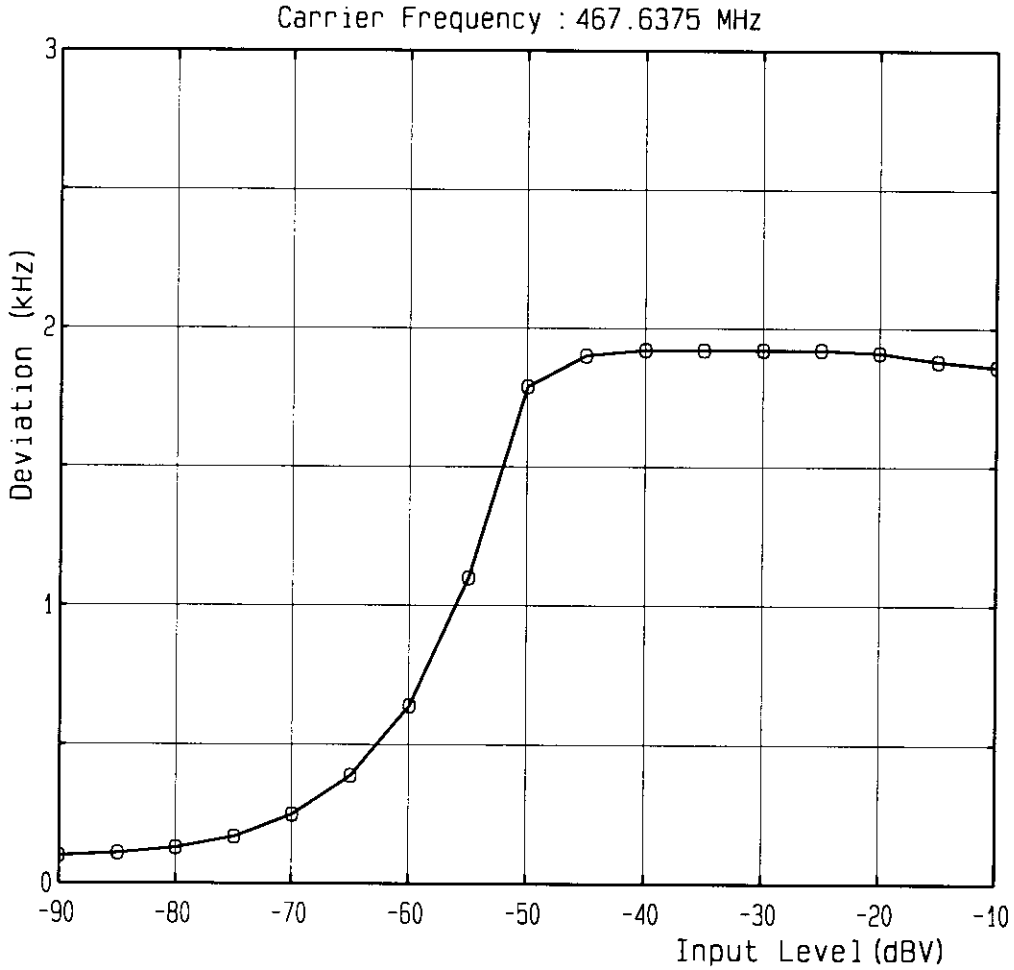
Modulation Characteristics

FCC ID : AAO21Ø1812
Model : WH020-A1US
Minus deviation (1000Hz)
Mode of EUT : Transmit (11CH)
Input Terminal : Microphone
Input Level (50% modulation) : -49.8 dBV



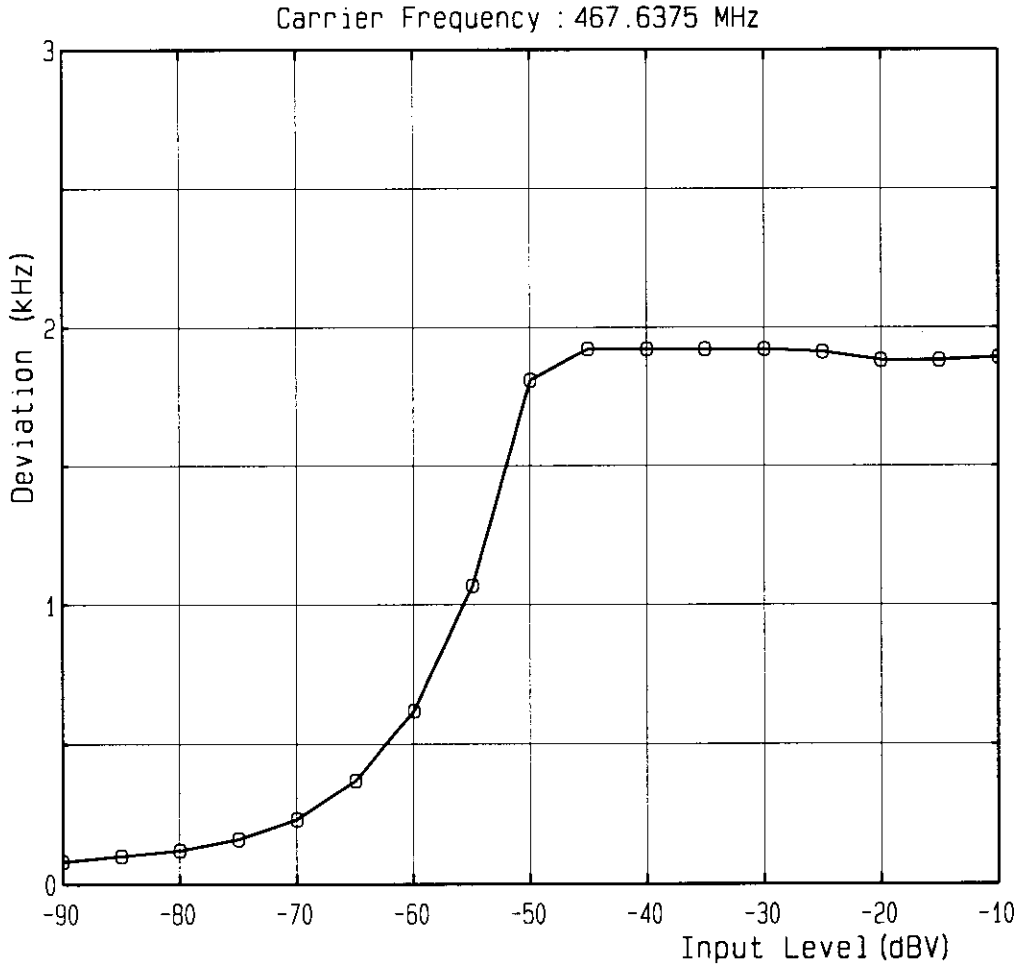
Modulation Characteristics

FCC ID : AAO21Ø1812
Model : WH020-A1US
Plus deviation (2000Hz)
Mode of EUT : Transmit (11CH)
Input Terminal : Microphone
Input Level (50% modulation) : -56.2 dBV



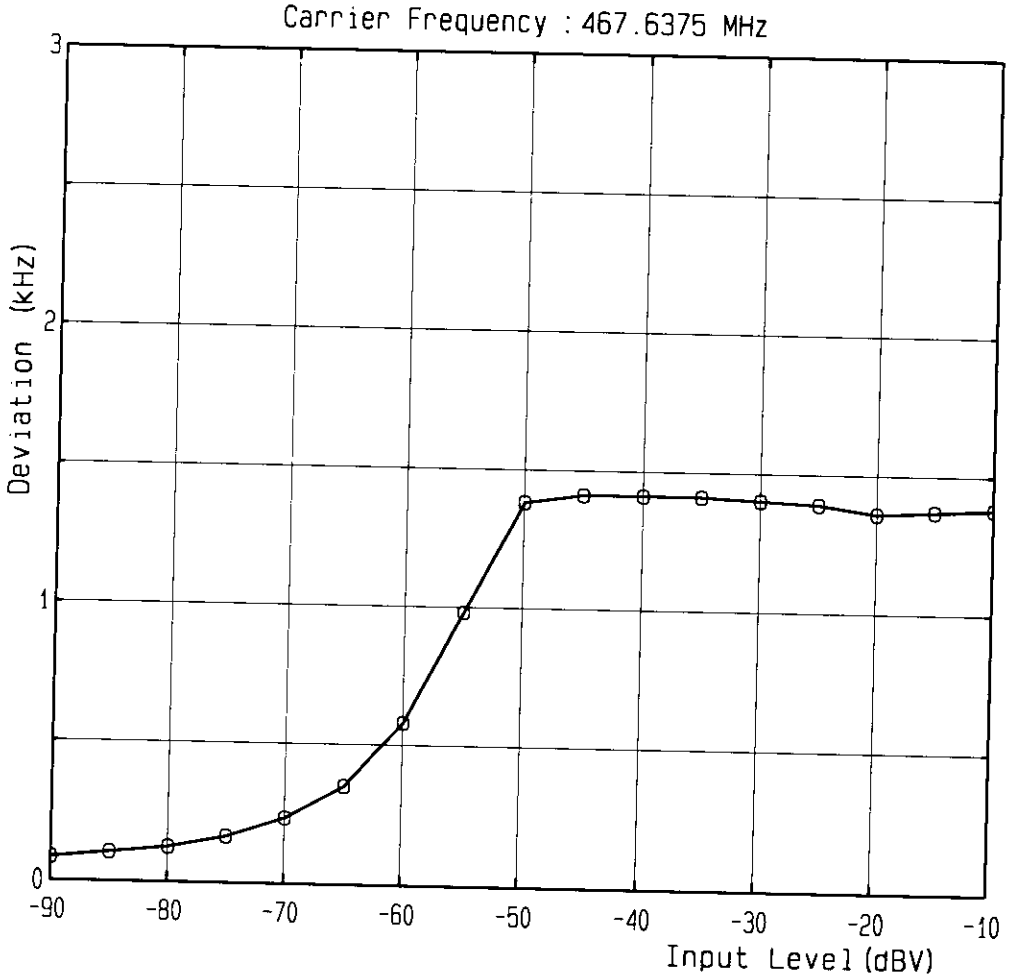
Modulation Characteristics

FCC ID : AAO21Ø1812
Model : WH020-A1US
Minus deviation (2000Hz)
Mode of EUT : Transmit (11CH)
Input Terminal : Microphone
Input Level (50% modulation) : -56.0 dBV



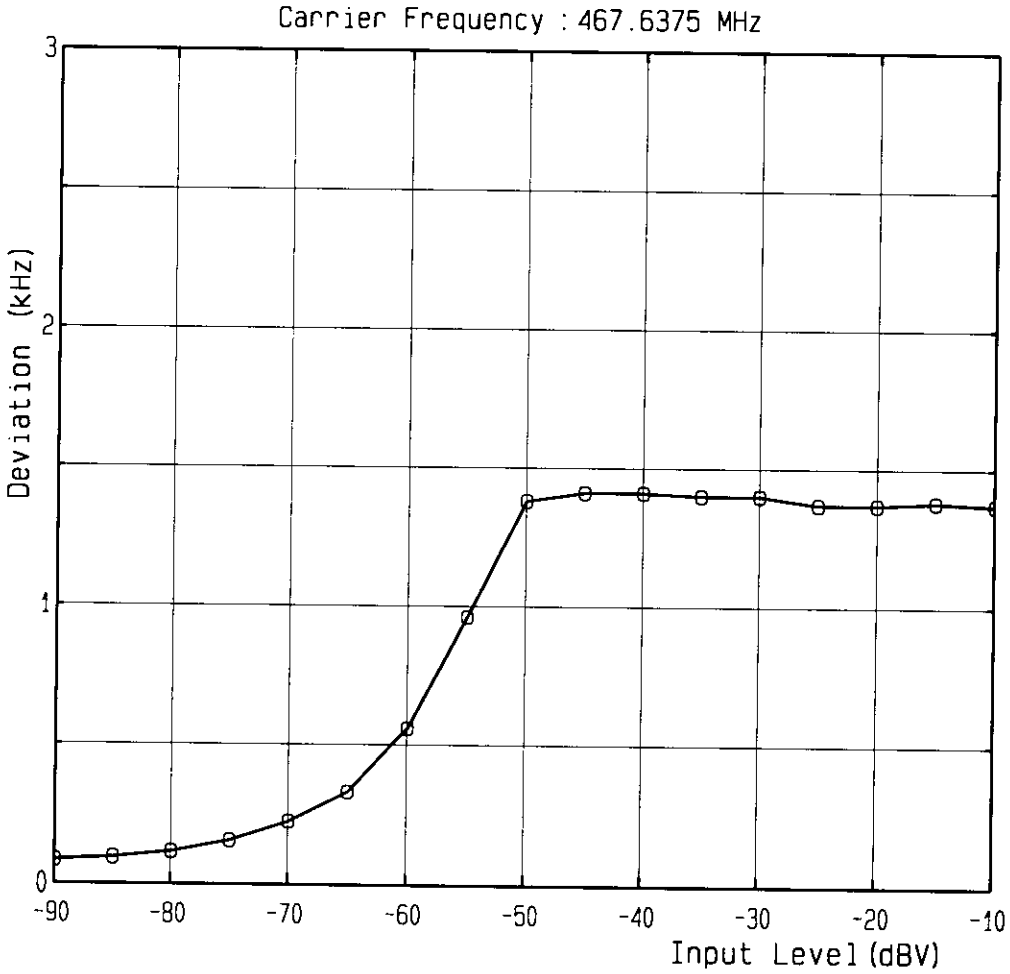
Modulation Characteristics

FCC ID : AAO21Ø1812
Model : WH020-A1US
Plus deviation (2500Hz)
Mode of EUT : Transmit (11CH)
Input Terminal : Microphone
Input Level (50% modulation) : -58.2 dBV



Modulation Characteristics

FCC ID : AAO21Ø1812
Model : WH020-A1US
Minus deviation (2500Hz)
Mode of EUT : Transmit (11CH)
Input Terminal : Microphone
Input Level (50% modulation) : -58.1 dBV



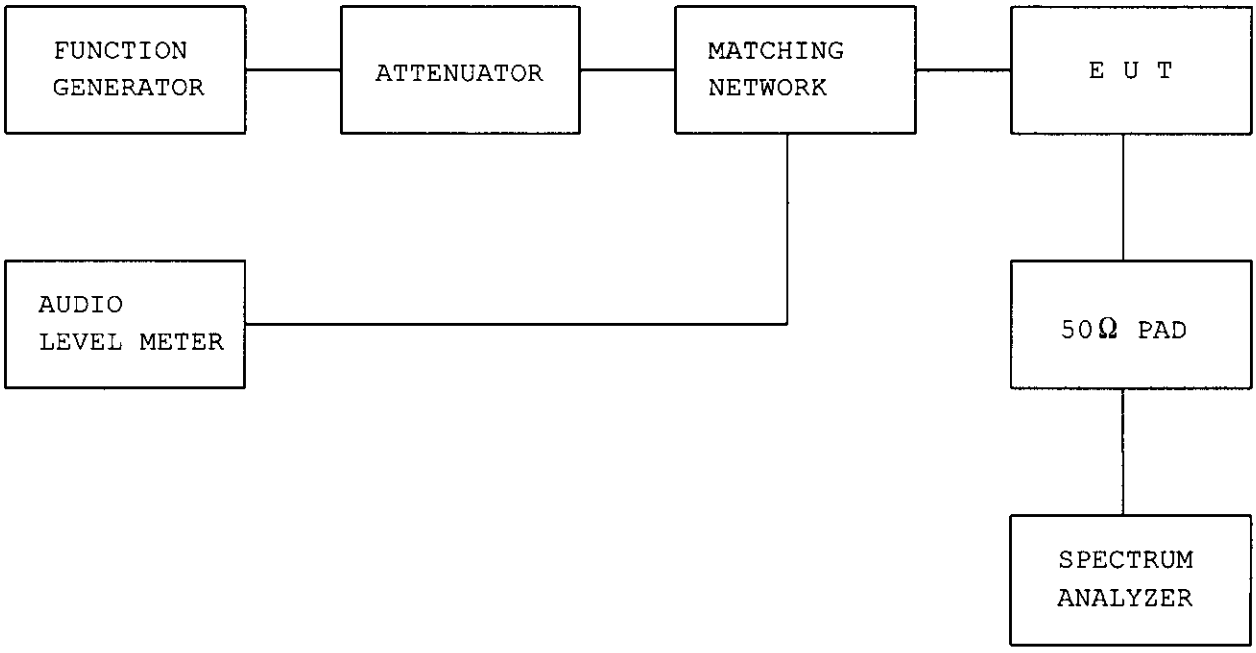
4. Occupied Bandwidth: [§2.989(c)]

Measurement Procedure:

(a) The Audio Input was adjusted as described in §2.989 "Occupied Bandwidth".

(b) The transmitter was modulated at a level 16 dB above the input level producing 50% modulation at the maximum response frequency, and with the frequency 2500 Hz.

(c) The occupied bandwidth was measured with Spectrum Analyzer set at 10 kHz/div. scan and 10 dB/div.

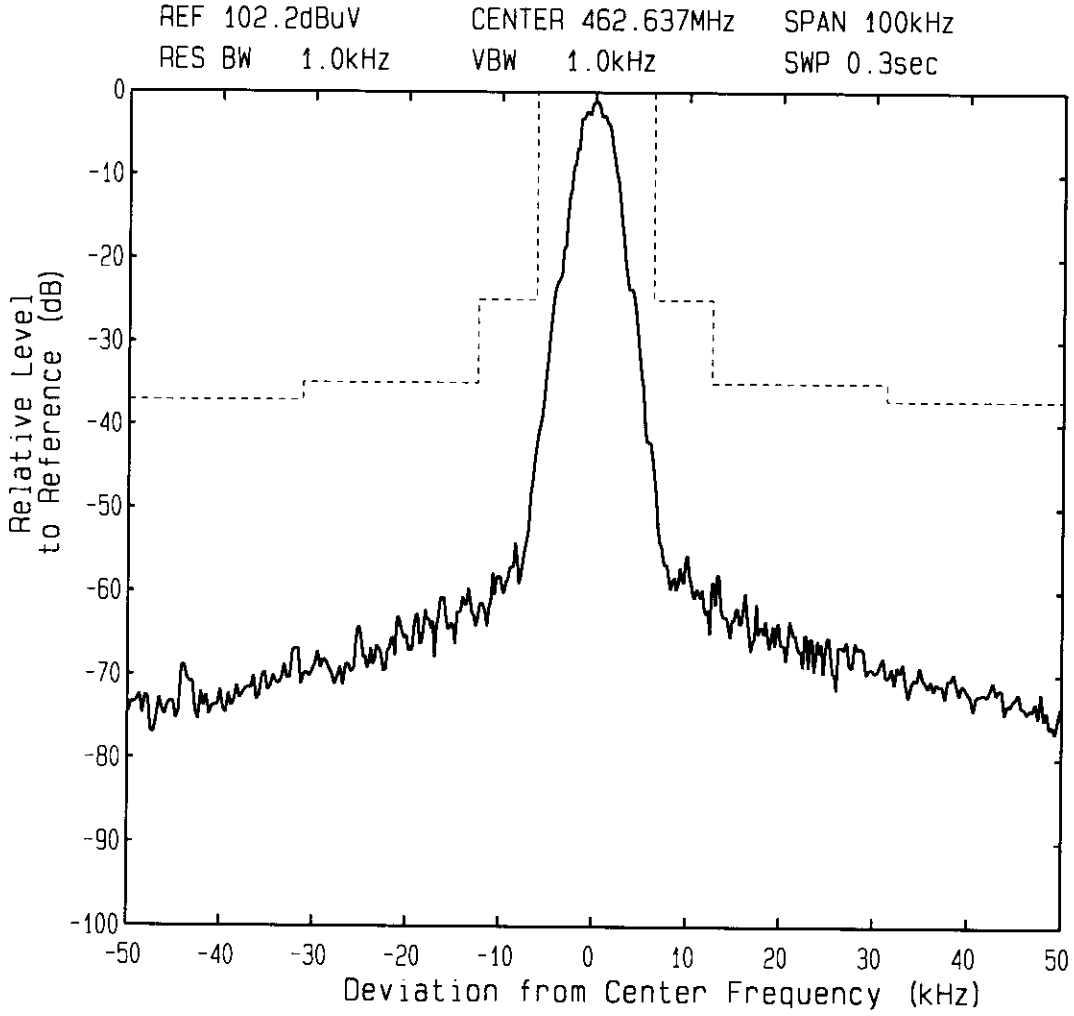


Note: Specified limits(§95.635(b))

Emission Limitation

FCC ID : AAO21Ø1812
Model : WH020-A1US

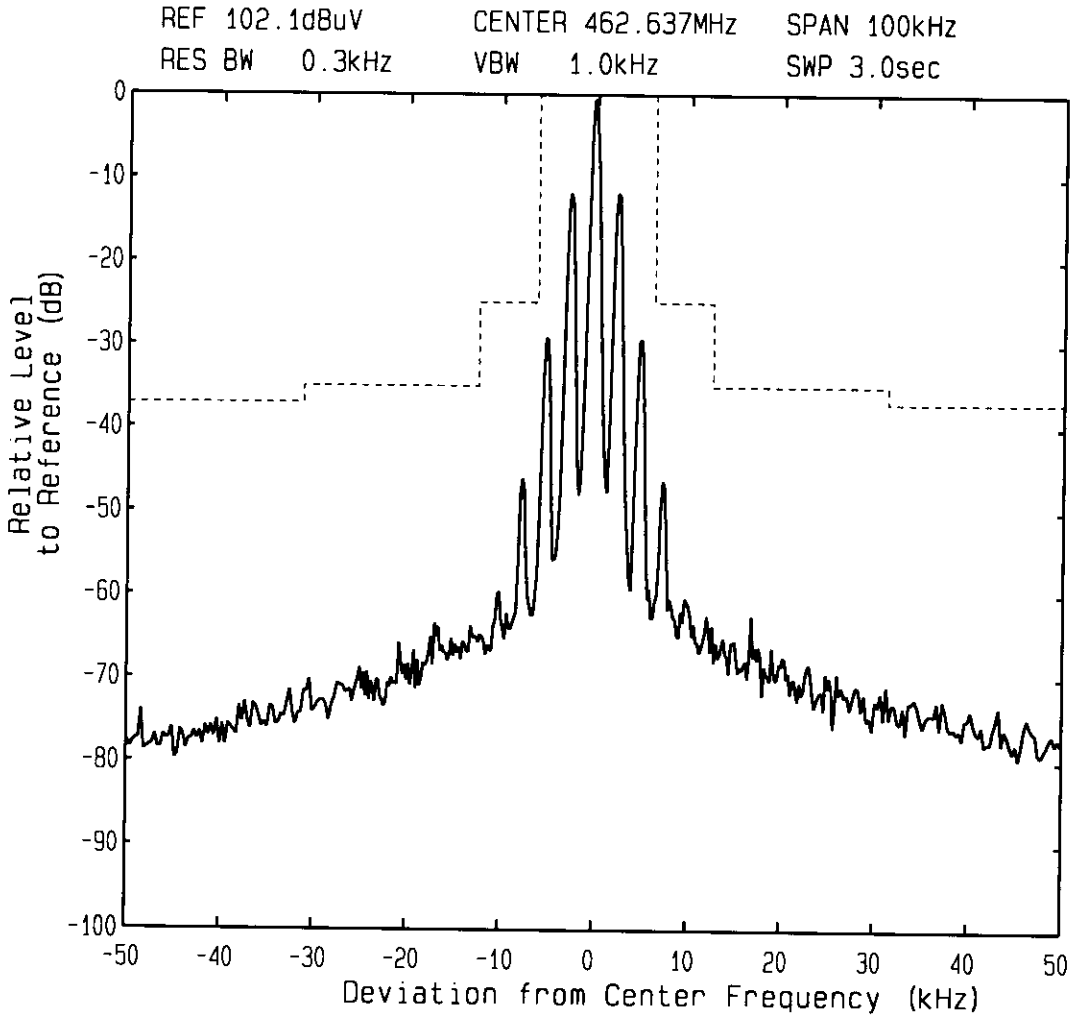
Mode of EUT : Transmit (4CH)
Internal Signal : Key 'CALL'



Emission Limitation

FCC ID : AAO21Ø1812
Model : WH020-A1US

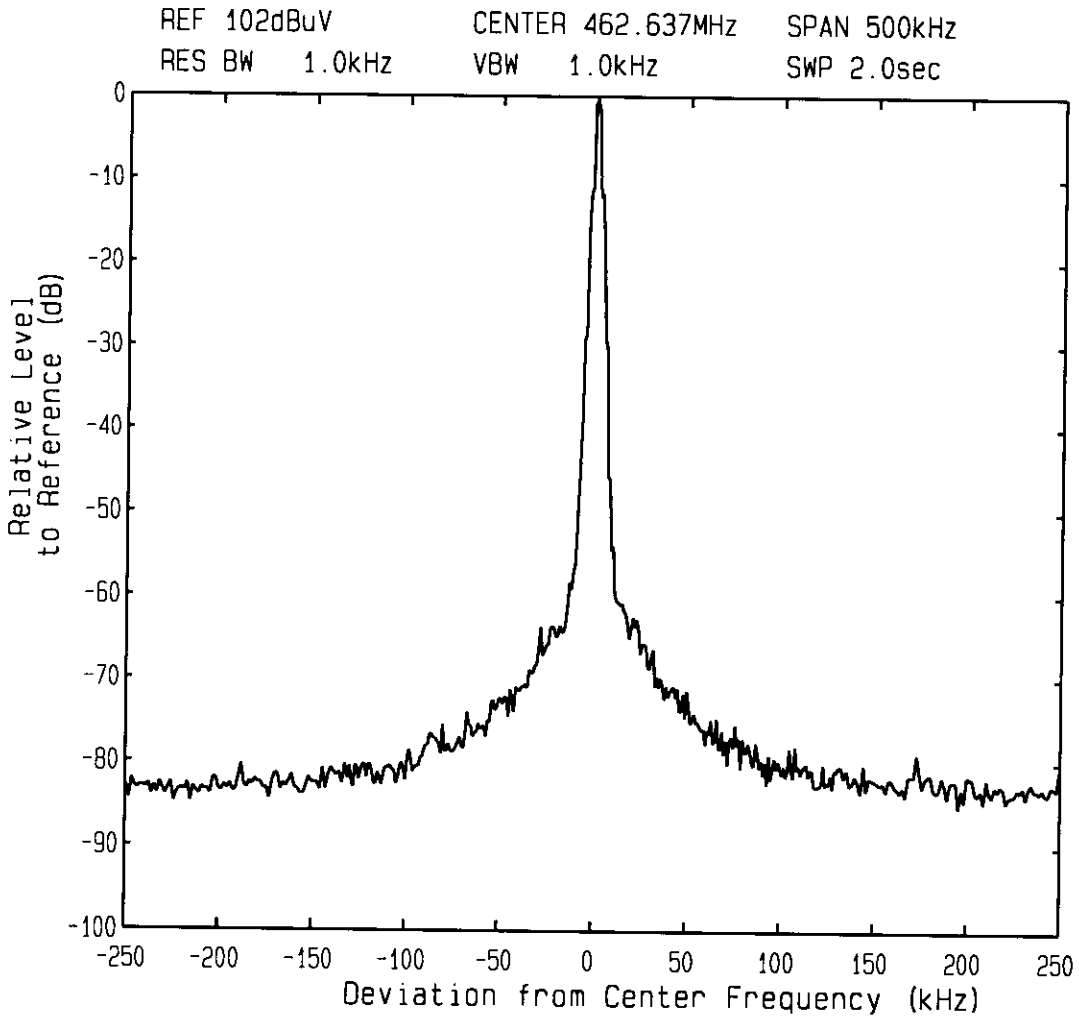
Mode of EUT : Transmit (4CH)
External Signal : Modulation 2.5 kHz tone



Emission Limitation

FCC ID : AAO21Ø1812
Model : WHO2O-A1US

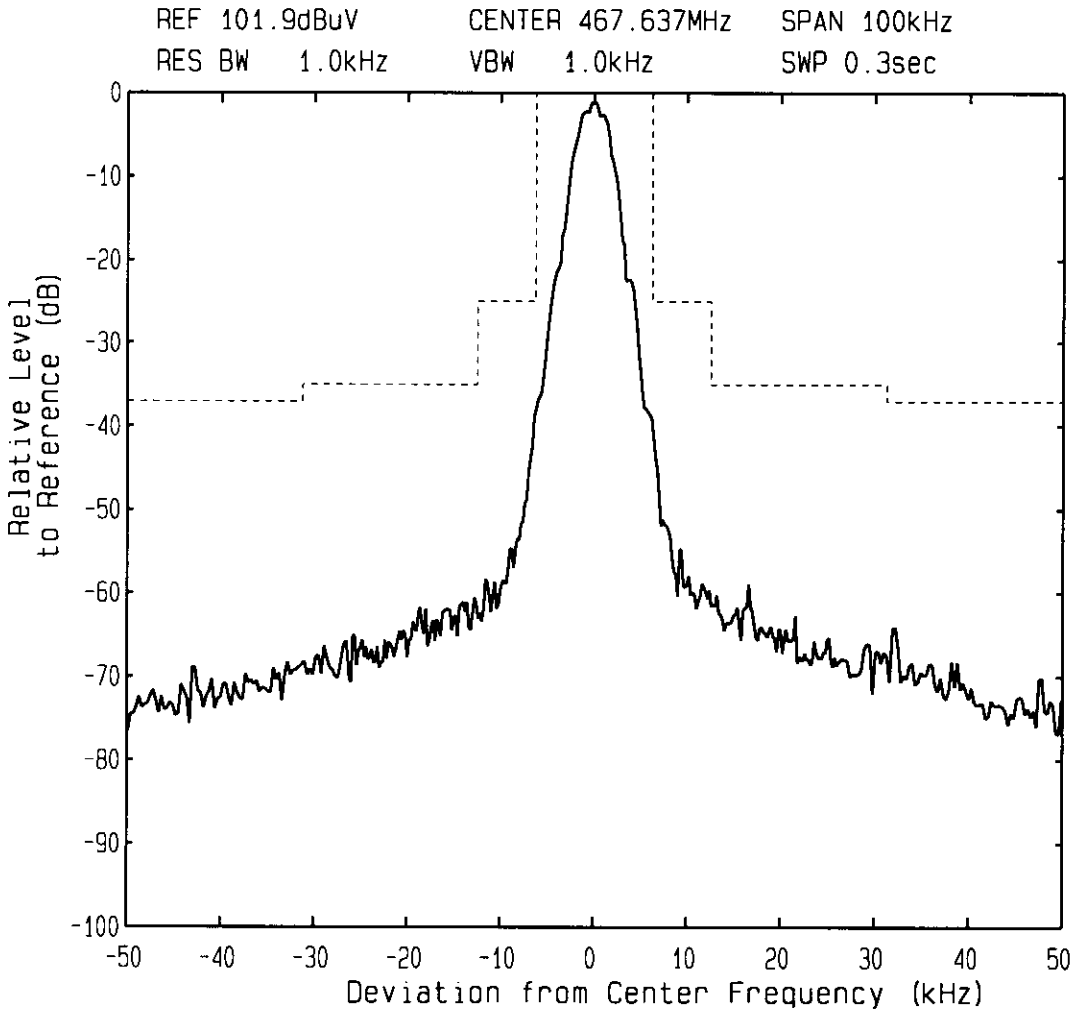
Mode of EUT : Transmit (4CH)
External Signal : Modulation 2.5 kHz tone



Emission Limitation

FCC ID : AAO21Ø1812
Model : WHO2O-A1US

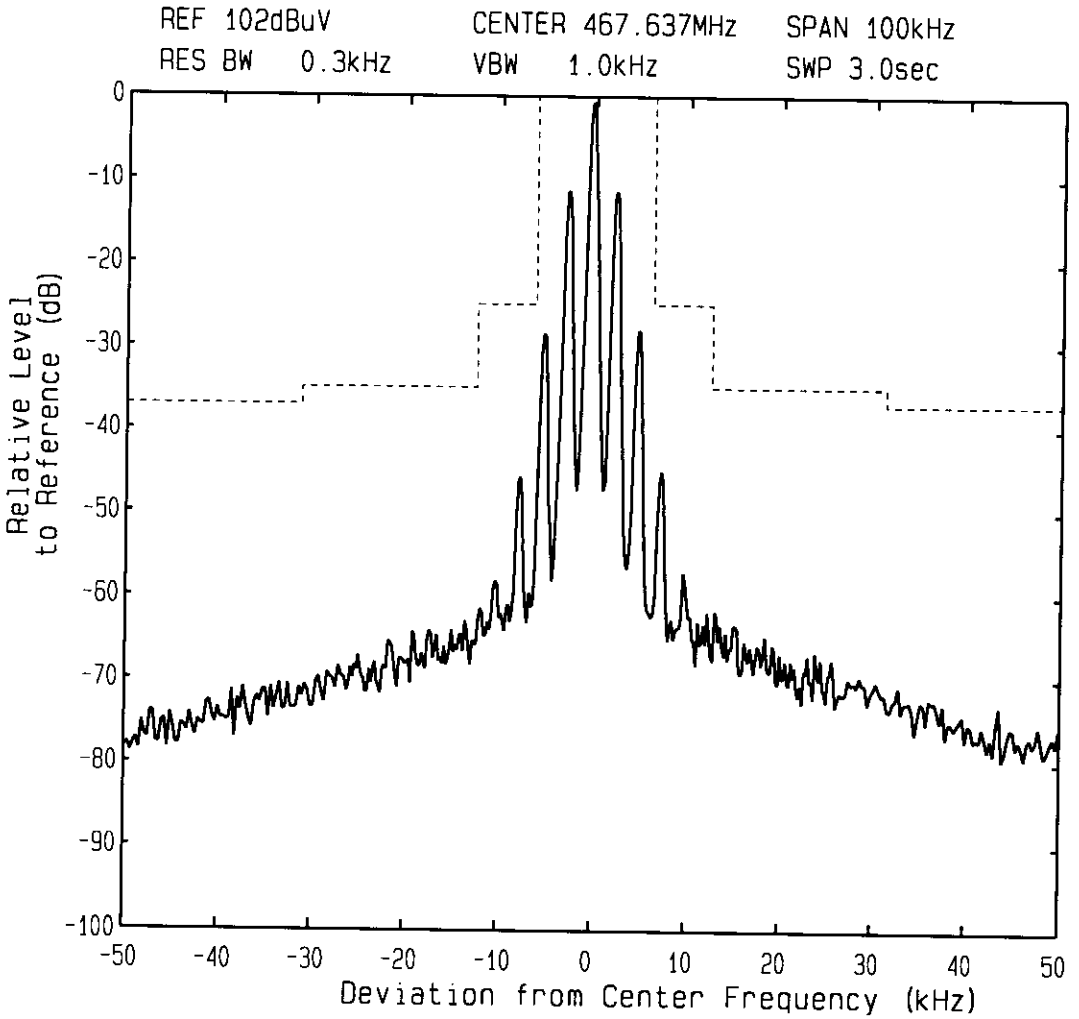
Mode of EUT : Transmit (11CH)
Internal Signal : Key 'CALL'



Emission Limitation

FCC ID : AAO21Ø1812
Model : WH020-A1US

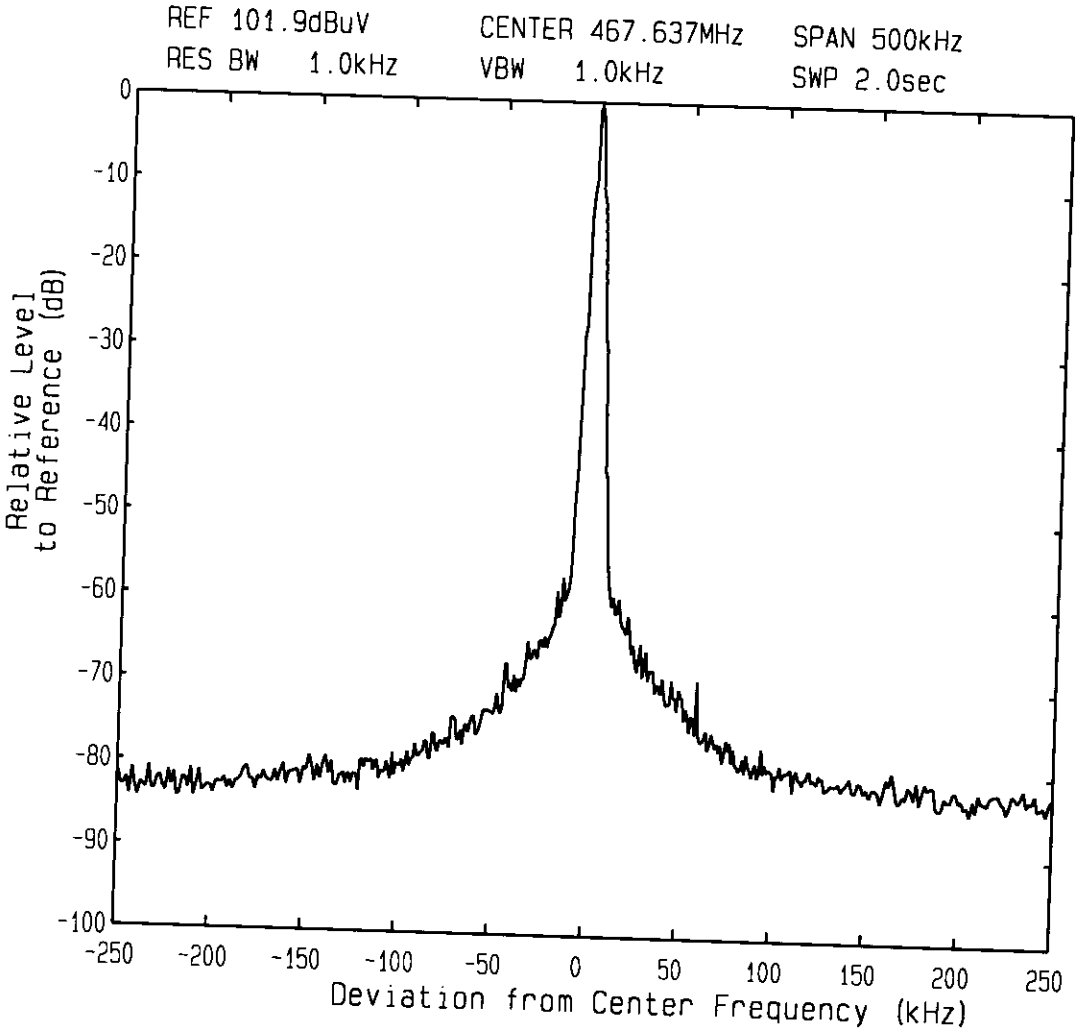
Mode of EUT : Transmit (11CH)
External Signal : Modulation 2.5 kHz tone



Emission Limitation

FCC ID : AAO21Ø1812
Model : WH020-A1US

Mode of EUT : Transmit (11CH)
External Signal : Modulation 2.5 kHz tone



5. Field Strength of Spurious Radiation: [§2.993(a)]

Measurement Procedure:

The field strength of the transmitter harmonic and spurious radiation were measured at the distance at 3 meters away from the transmitter under test which was placed on a wooden turntable 1 meter in height. The receiving antenna was oriented for vertical polarization and raised or lowered through 1 to 4 meters until the maximum signal level was detected on the measuring instrument. The transmitter under test was rotated through 360° until the maximum signal was received. The measurement was repeated with the receiving antenna in the horizontal polarization.

The transmitter was removed and replaced with a half-wave dipole antenna. The center of the half-wave dipole antenna was placed approximately at the same location as the center of the transmitter. (In the case of the lower frequencies, where the half-wave dipole antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such a case the lower end of the antenna was adjusted to one foot above the ground). The half-wave dipole antenna was fed with a signal generator, and the output level of the signal generator was adjusted to obtain the previously recorded maximum reading at the particular harmonics and spurious frequency and recorded. This procedure was repeated with the receiving antenna and the half-wave dipole antenna in the orthogonal polarization.

The input power into the half-wave dipole antenna was calculated from the impedance and signal generator voltage obtained in these reading. The level of the harmonics and spurious emissions in dB were calculated from the following formula:

$$\text{Attenuation(dB)} = 10\log_{10}\frac{\text{Transmitter Power}}{\text{Calculated Spurious Power}}$$

Concerning the Test-site, refer to: JQA Measuring Site

Transmitter Test Condition:

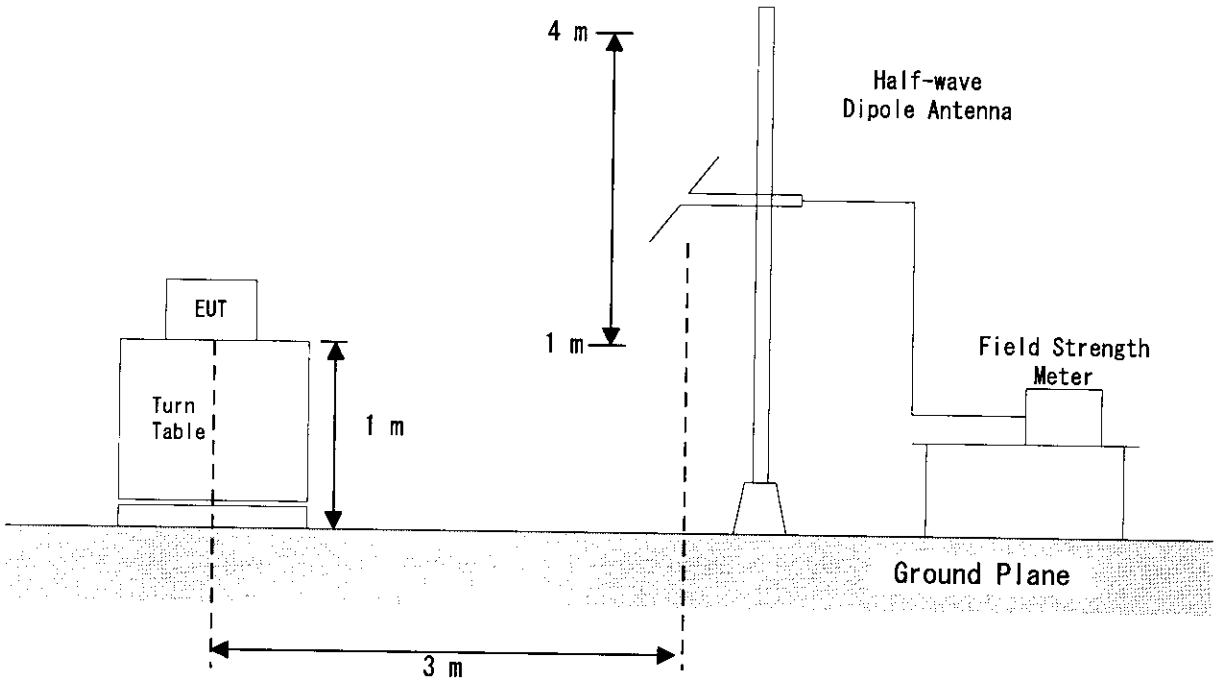
The transmitter was placed in its normal operating position on a wooden turntable 1 meter in height. The dummy load was directly connected to the output terminal.

One series of radiation measurements were made with no accessories attached to the transmitter. The transmitter was tuned to the frequency having the strongest emission observed in the test of "the transmitter emission at the antenna terminal".

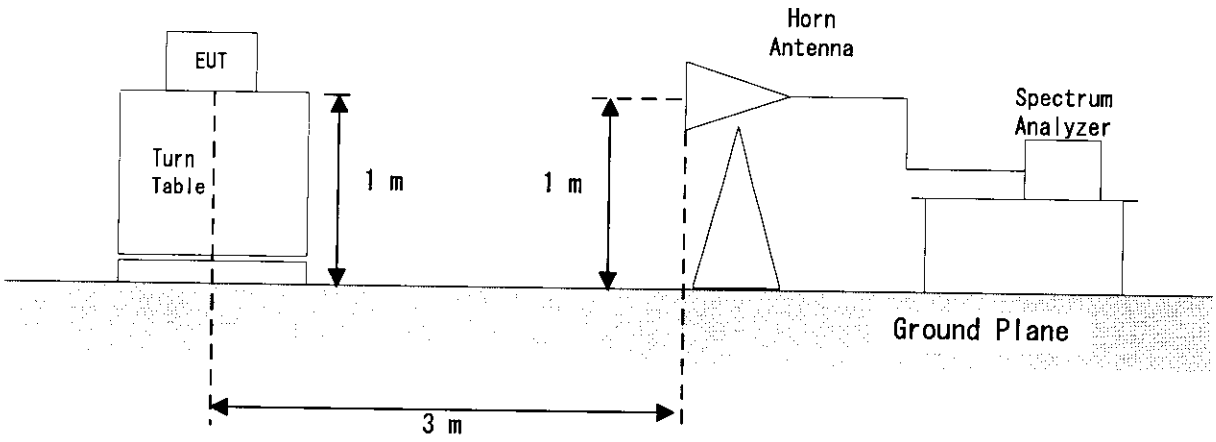
A second series of radiation measurements was made with the headset attached to the transmitter. The headset cable was extended vertically above the point where it connect to the transmitter.

Note: Specified limits(§95.635(b))

Measurement Set Up for up to 1 GHz



Measurement Set Up for over 1 GHz



Operating Frequency (MHz)	Reference Carrier ERP Power (W)*	Frequency (MHz)	Substituted Power (dBm) Horiz.	Vert.	Attenuation Ratio (dBm) Horiz.	Vert.
		441.338	-53.9	-55.8	77.9	79.8
		483.888	-48.2	-49.8	72.2	73.8
		925.275	-32.2	-32.2	56.2	56.2
		1387.913	-38.2	-34.3	62.3	58.4
		1850.550	-48.7	-48.1	72.8	72.2
462.6375	0.253	2313.188	-42.8	-39.8	66.9	63.9
		2775.825	-30.8	-32.0	54.8	56.0
		3238.463	-35.7	-38.0	59.8	62.1
		3701.100	-47.4	-45.9	71.4	69.9
		4163.738	-35.2	-39.3	59.2	63.3
		4626.375	-53.3	-53.2	77.3	77.2

Notes: 1. "*" Actually measured.

2. Specified Limits:

$$43 + 10 \log_{10}(0.253) = 37.0 \text{ dB for "462.6375 MHz"}$$

3. The spectrum was checked from 25 MHz up to the tenth harmonic frequency.

4. All emissions not listed were found to be more than 20 dB below the limit.

Operating Frequency (MHz)	Reference Carrier ERP Power (W)*	Frequency (MHz)	Substituted Power (dBm) Horiz.	Substituted Power (dBm) Vert.	Attenuation Ratio (dBm) Horiz.	Attenuation Ratio (dBm) Vert.
		446.388	-54.5	-56.4	78.6	80.5
		488.888	-50.0	-52.6	74.0	76.7
		935.275	-32.5	-30.2	56.6	54.3
		1402.913	-38.4	-34.6	62.5	58.7
		1870.550	-47.4	-39.9	71.5	64.0
467.6375	0.255	2338.188	-46.0	-39.8	70.1	63.9
		2805.825	-29.1	-29.5	53.1	53.5
		3273.463	-34.2	-35.1	58.3	59.2
		3741.100	-47.5	-45.2	71.6	69.3
		4208.738	-34.2	-38.1	58.3	62.2
		4676.375	-55.2	-54.5	79.3	78.6

Notes: 1. "*" Actually measured.

2. Specified Limits:

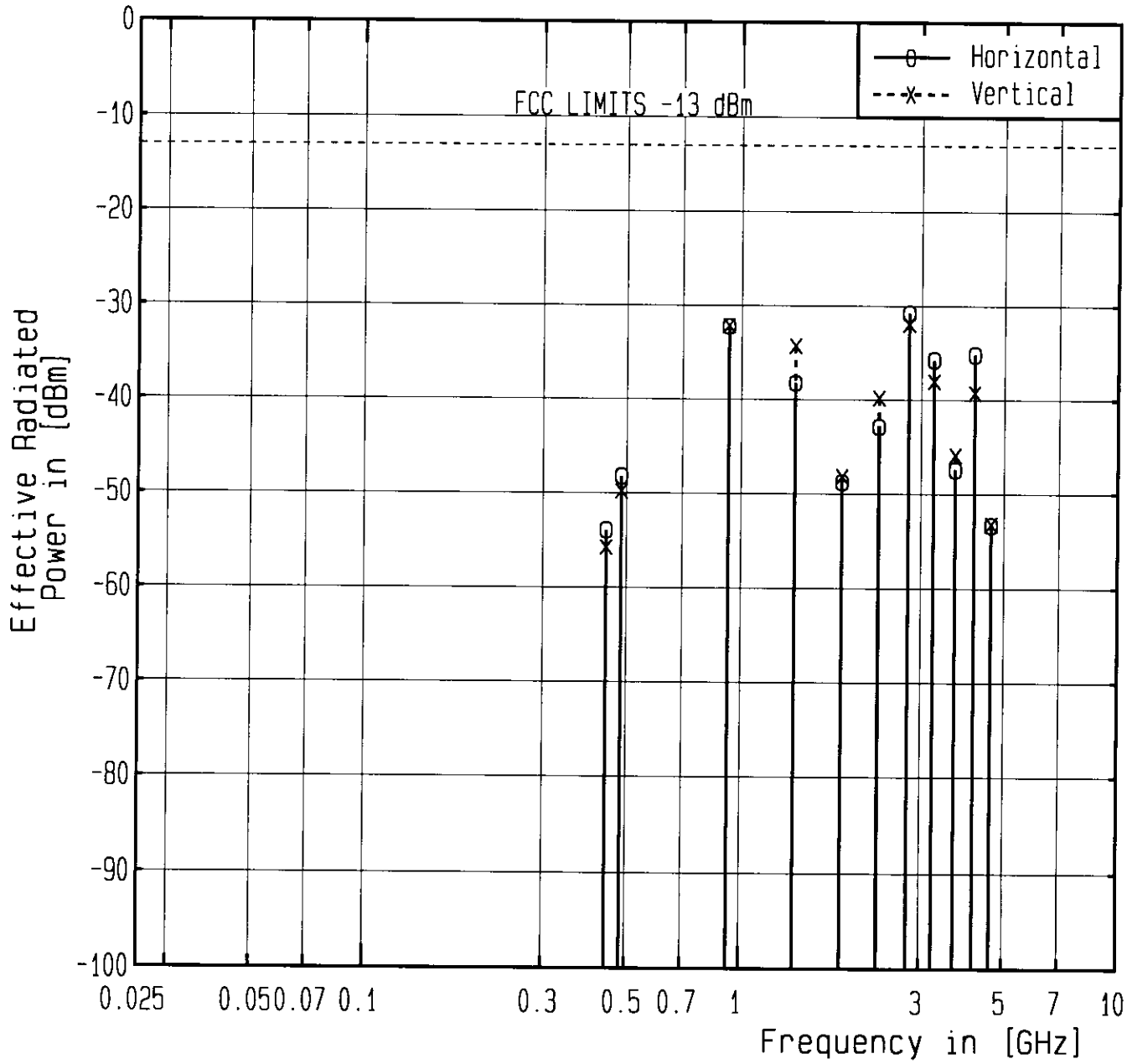
$$43 + 10 \log_{10}(0.255) = 37.1 \text{ dB for "467.6375 MHz"}$$

3. The spectrum was checked from 25 MHz up to the tenth harmonic frequency.

4. All emissions not listed were found to be more than 20 dB below the limit.

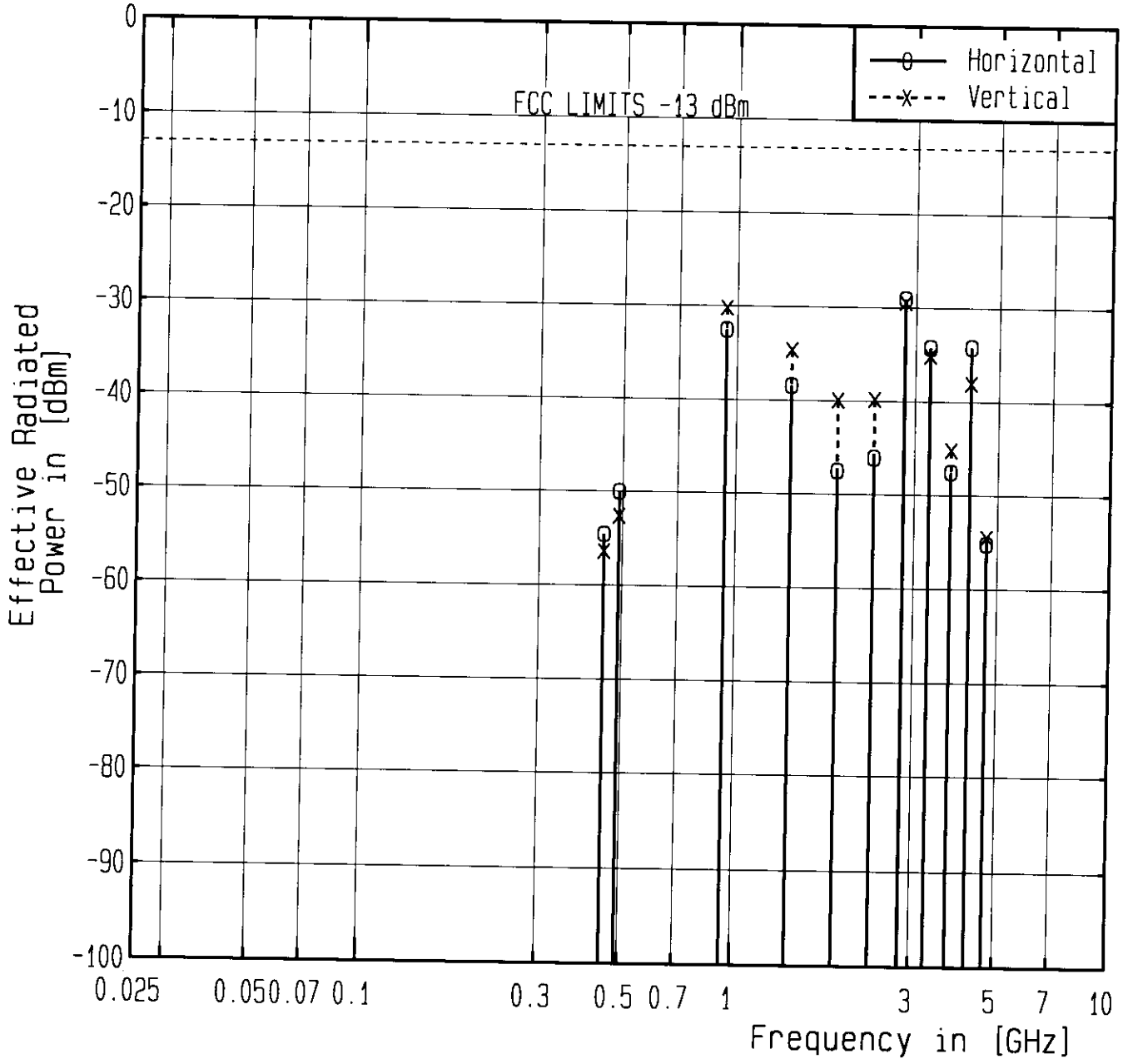
Radiated Spurious Emissions

FCC ID : AAO2101812
Serial No. :
Carrier : 0.253 [W] at 462.6375 [MHz]



Radiated Spurious Emissions

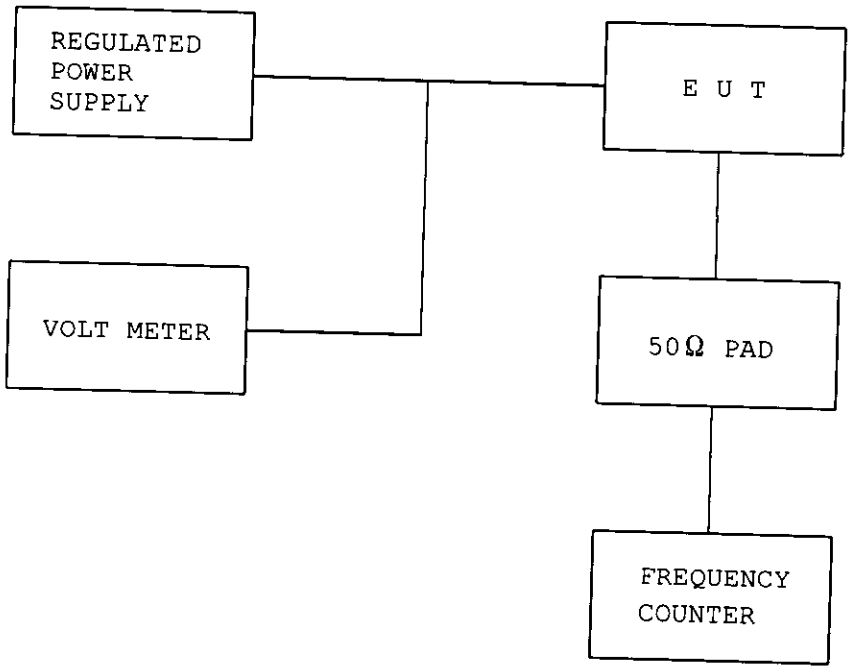
FCC ID : AAO21Ø1812
Serial No. :
Carrier : 0.255 [W] at 467.6375 [MHz]



6. Frequency Stability Measurement: [§95.627(b)]

Measurement Procedure:

Two transmit frequencies(462.6375 and 467.6375 MHz) were measured by means of the frequency counter connected to the output terminal, applying the rated test voltage.



Measurement Results:

Frequency(MHz)	Transmitting Frequency(MHz)	Tolerance(%)
462.6375	462.637861	+0.000078
467.6375	467.637865	+0.000078

Supply Voltage : 4.5 VDC
Ambient Temperature : 20 ℃

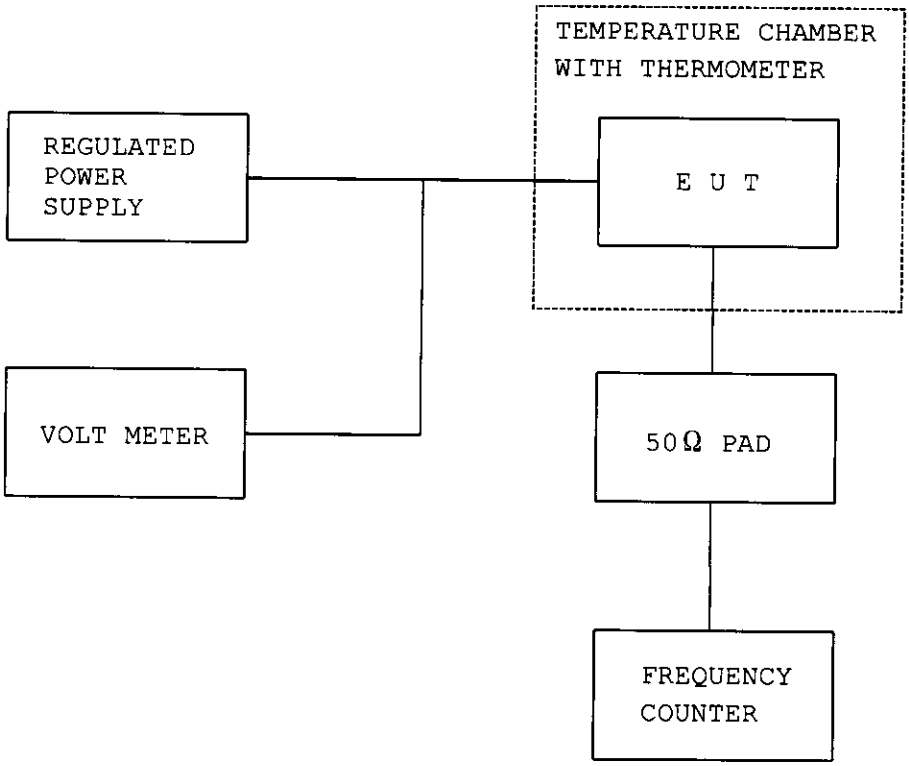
Specified Limit: 0.00025 % [§95.627(b)]

7. Frequency Stability Measurement: [§2.995(a),(b)]

a. Frequency vs Temperature Test

Measurement Procedure:

The transmitter was placed in the temperature cycle chamber and was kept at a temperature of -20℃ ± 1℃ for one hour. The rated test voltage was applied to the transmitter and the unit was turned on for two minutes. The transmit frequency was measured during this period and recorded. A similar measurement was performed with the temperatures changed from -10℃ to 50℃ at interval of 10℃. In the latter case, the unit was kept for one hour at the prescribed temperature after completion of the test preceding with it. The temperature tests were performed for the frequencies; 462.5625 MHz.



Measurement Results:

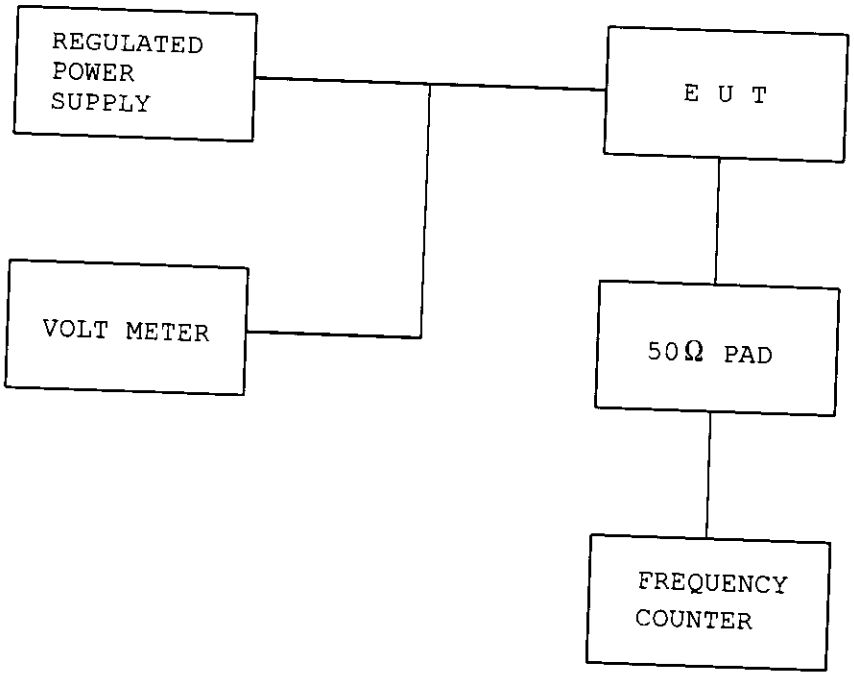
Ambient Temp. (℃)	Frequency (MHz)	Transmitting Frequency (MHz)	Tolerance (%)
-20	462.6375	462.637155	-0.000075
	467.6375	467.637151	-0.000075
-10	462.6375	462.637988	+0.000108
	467.6375	467.638000	+0.000107
0	462.6375	462.638083	+0.000126
	467.6375	467.638111	+0.000131
+10	462.6375	462.638000	+0.000108
	467.6375	467.637992	+0.000105
+20	462.6375	462.637861	+0.000078
	467.6375	467.637865	+0.000078
+30	462.6375	462.637341	-0.000034
	467.6375	467.637342	-0.000034
+40	462.6375	462.637638	+0.000030
	467.6375	467.637617	+0.000025
+50	462.6375	462.638477	+0.000211
	467.6375	467.637505	+0.000215

Supply Voltage: 4.5 VDC

b. Frequency vs Voltage Test

Measurement Procedure:

The power supply voltage to the transmitter was reduced to the battery operating end point which was specified by manufacturer.
The tests were performed for the frequencies; 462.6375 and 467.6375 MHz



Measurement Results:

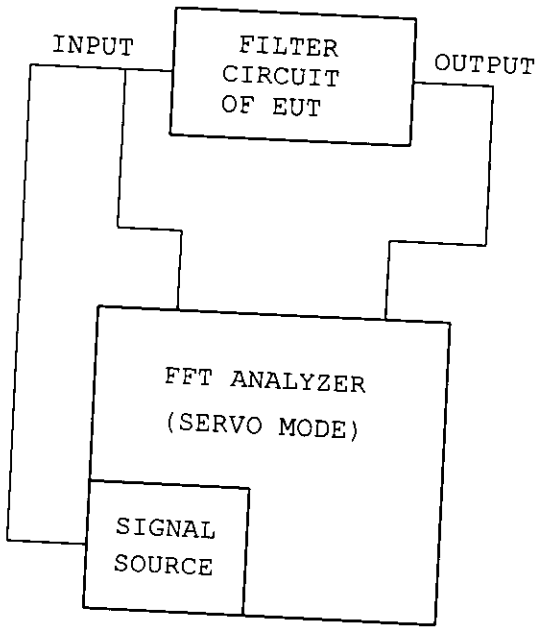
Supply Voltage (VDC)	Frequency (MHz)	Transmitting Frequency (MHz)	Tolerance (%)
3.50	462.6375	462.637850	+0.000076
	467.6375	467.637848	+0.000074

Ambient Temperature: 20 ℃

8. Audio Filter Frequency Response: [§2.987(a)]

Measurement Procedure:

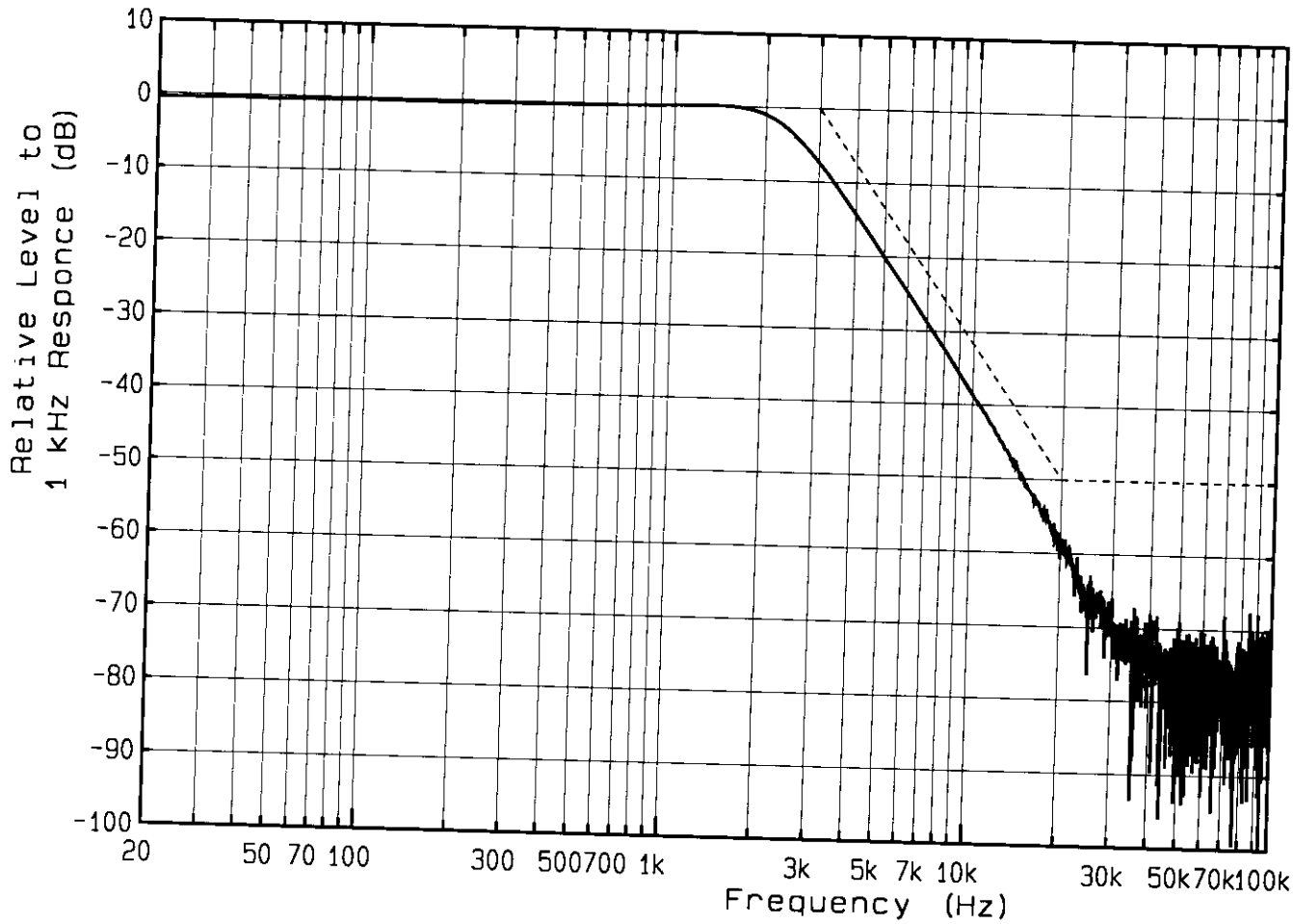
The audio signal source was connected to the input of filter circuit of the unit under test. The filter gain was measured from 20 Hz to 100 kHz, and 1 kHz point was taken as 0 dB reference level. The relative level to 1 kHz was plotted over this frequency range.



Note: Specified limit(§95.637(b))

Audio Filter Frequency Responce

FCC ID : AAO21Ø1812
Model : WH020-A1US



JQA

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LIST OF MEASURING EQUIPMENT

Equipment(Model No.)	Manufacturer	Date of Cal.
1. Field Strength Meter ESVP	Rohde & Schwarz	May 1998
2. Spectrum Analyzer 8566B	Hewlett Packard Inc.	April 1998
3. Function Generator 3325A	Hewlett Packard Inc.	June 1998
4. Frequency Counter 53131A	Hewlett Packard Inc.	June 1998
5. Oven -	Ohnishi Co., Ltd.	July 1997
6. Power Meter 436A	Hewlett Packard Inc.	May 1998
7. Power Sensor 8482A	Hewlett Packard Inc.	May 1998
8. 20dB Attenuator 49-20-43	Lucas Weinschel	June 1998
9. 30dB Attenuator 49-30-43	Lucas Weinschel	June 1998
10. Step Attenuator 355D	Hewlett Packard	June 1998
11. Selective Level Meter ML422C	Anritsu Corp.	June 1998
12. DC Power Supply 6628A	Hewlett Packard Inc.	July 1997

13. Dipole Antenna		
KBA-511	Kyoritsu Electrical Works.	November 1997
KBA-611	Kyoritsu Electrical Works.	November 1997
14. Horn Antenna		
1010	Singer	-
1020		-
1030		-
15. FM Linear Detector	Anritsu Corp.	September 1997
16. FFT Analyzer	ADVANTEST	June 1998

AUG 03 1998

EXHIBIT F

CERTIFICATION OF PART 95.647

THE ANTENNA USED FOR THIS UNIT IS 1/4 λ HELICAL ANTENNA, OF WHICH GAIN IS LOWER THAN A HALF WAVE DIPOLE ANTENNA.

AND THAT, AS SHOWN TABLE BELOW, THE EFECTIVE RADIATED POWER IS LOWER THAN THE POWER AT 50 Ω TERMINATED POINT.

THEREFOR THE ANTENNA HAS NO GAIN AND COMPLIES WITH FCC PART 95.647.

TABLE

RF POWER OF 50 Ω TERMINATED POINT		EFECTIVE RADIATED POWER	
462.6375MHz(4CH)	467.6375MHz(11CH)	462.6375MHz(4CH)	467.6375MHz(11CH)
26.30 dBm	26.16 dBm	24.03 dBm	24.06 dBm