HCT CO., LTD.

CERTIFICATE OF COMPLIANCE

FCC Certification

Applicant Name:
JVC KENWOOD Corporation

Address:
1-16-2, Hakusan, Midori-ku, Yokohama-shi, Kanagawa, 226-8525 Japan

Date of Issue:
July 31, 2014

Test Site/Location:
HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

Report No.: HCT-R-1407-F035-1

HCT FRN: 0005866421

FCC ID	**: K44431500**
APPLICANT	**: JVC KENWOOD Corporation**
FCC Model(s):	NX-5300-K2, NX-5300-K3, NX-5300-F2, NX-5300-F3
EUT Type:	UHF DIGITAL TRANSCEIVER
Frequency Range:	450 – 512 MHz
FCC Rule Part(s):	Part 90 and Part 2

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Report prepared by
: Kwon Jeong
Test Engineer of RF Team

Approved by
: Chang Seok Choi
Manager of RF Team

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1407-F035	July 24, 2014	- First Approval Report
HCT-R-1407-F035-1	July 31, 2014	-Revised the 4K00F2D Frequency on page 9

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1. GENERAL INFORMATION

Applicant:	JVC KENWOOD Corporation
Address:	1-16-2, Hakusan, Midori-ku, Yokohama-shi, Kanagawa, 226-8525 Japan
FCC ID:	K44431500
EUT Type:	UHF DIGITAL TRANSCEIVER
Model name(s):	NX-5300-K2, NX-5300-K3, NX-5300-F2, NX-5300-F3
Date(s) of Tests:	June 30, 2014 ~ July 13, 2014
Place of Tests:	HCT Co., Ltd. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea (IC Recognition No. : 5944A-3)

2. EUT DESCRIPTION

EUT Type	UHF DIGITAL TRANSCEIVER
FCC Model Name	NX-5300-K2, NX-5300-K3, NX-5300-F2, NX-5300-F3
Power Supply	DC 7.5 V
Battery type	Li-ion Battery (KNB-L1, KNB-L2, KNB-L3)
Channel Bandwidth	25 kHz / 12.5 kHz / 6.25 kHz
Frequency Range	450 – 512 MHz (25 kHz: 470 – 512 MHz)

3. TEST METHODOLOGY

TIA-603-D dated June 24, 2010 entitled “Land Mobile FM or PM Communications Equipment Measurement and Performance Standards” were used in the measurement.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the FCC Rules Part 2 and Part 90.

3.3 GENERAL TEST PROCEDURES

Radiated Emissions

Radiated emission measurements are performed in the Fully-anechoic chamber. The equipment under test is placed on a non-conductive table 3-meters away from the receive antenna in accordance with ANSI/TIA-603-D-2010 Clause 2.2.17. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission. The level and position of the maximized emission is recorded with the spectrum analyzer using a positive peak detector.

A half wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

The power is calculated by the following formula;

$$P_{d(dBm)} = Pg_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dB)}$$

Where: P_d is the dipole equivalent power and P_g is the generator output power into the substitution antenna.

The maximum EIRP is calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference between the gain of the horn and an isotropic antenna are taken into consideration

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting is programmed.

3.5 Type of Emission

16K0F3E	(Analogue)
11K0F3E	(Analogue)
8K10F1E, 8K10F1D	(P25 phase1)
8K10F1W	(P25 phase 2, TDMA)
8K30F1E, 8K30F1D, 8K30F7W	(NXDN)
4K00F1E, 4K00F1D, 4K00F7W	(NXDN)
4K00F2D	(CWID) : Use only low power

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

6. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
Carrier Output Power	§90.205(i) §2.1046(a)	Varies	CONDUCTED	PASS
Unwanted Emissions	§2.1051			PASS
Carrier Frequency Stability	§90.213(a), §2.1055	Channel Spacing : 6.25 kHz = 1 ppm Channel Spacing : 12.5 kHz = 2.5 ppm Channel Spacing : 25 kHz = 5 ppm		PASS
Audio Frequency Response	§2.1047(a)	Varies		PASS
Audio Low Pass Filter	§2.1047(a)			PASS
Modulation Limiting	§2.1047(b)			PASS
Transient Frequency Behavior	§90.214	Varies		PASS
Emission Mask	§90.210, §2.1049(c)(1)	Varies		PASS
Field Strength of Spurious Radiation	§2.1053	Varies	RADIATED	PASS
Necessary Bandwidth	§2.202(g)		-	-

7. TEST RESULT

7.1 Carrier Output Power

▣ Definition

The conducted carrier power output rating for a transmitter is the power available at the output terminals of the transmitter when the output terminals are connected to the standard transmitter load.

▣ TEST CONFIGURATION

▣ TEST PROCEDURE

According to 2.2.1 in TIA-603-D Standard.

a) Connect the equipment as illustrated.
b) Measure the transmitter output power during the defined duty cycle(see 1.3.2).
Correct for all losses in the RF path.
c) The value recorded in step b) is the conducted carrier output power rating.

▣ TEST RESULTS

Mode	Type of Emission	Channel Spacing	Freq.(MHz)	Carrier Output Power			
				Low		High	
				dBm	W	dBm	W
Analog	11K0F3E	12.5 kHz	450.05	30.24	1.057	36.80	4.786
			481.05	29.92	0.982	36.73	4.710
			511.95	30.17	1.040	36.92	4.920
	16K0F3E	25.0 kHz	470.05	29.56	0.904	36.60	4.571
			491.05	29.45	0.881	36.38	4.345
			511.95	30.07	1.016	36.70	4.677
Digital	8K10F1E, 8K10F1D	12.5 kHz	450.05	30.15	1.035	36.86	4.853
			481.05	30.00	1.000	36.74	4.721
			511.95	30.24	1.057	36.92	4.920
	8K10F1W	12.5 kHz	450.05	30.06	1.014	36.79	4.775
			481.05	29.92	0.982	36.67	4.645
			511.95	30.18	1.042	36.87	4.864
	8K30F1E, 8K30F1D, 8K30F7W	12.5 kHz	450.05	30.44	1.107	37.00	5.012
			481.05	30.18	1.042	36.90	4.898
			511.95	30.35	1.084	37.00	5.012
	4K00F1E, 4K00F1D, 4K00F7W	6.25 kHz	450.05	30.31	1.074	36.74	4.721
			481.05	30.14	1.033	36.87	4.864
			511.95	30.38	1.091	36.98	4.989
	4K00F2D	6.25 kHz	450.05	30.52	1.127	N/A	
			481.05	30.14	1.033		
			511.95	30.41	1.099		

7.2 Carrier Frequency Stability

▣ Definition

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

▣ TEST CONFIGURATION

▣ TEST PROCEDURE

According to 2.2.2 in TIA-603-D Standard.

a) Connect the equipment as illustrated.

b) Operate the equipment in standby conditions for 15 minutes before proceeding.

c) Record the carrier frequency of the transmitter as MCF_{MHz}

d) Calculate the ppm frequency error by the following:

ppm error = ((MCF_{MHz} / ACF_{MHz})-1)*10^6

where

MCF_{MHz} is the Measured Carrier Frequency in MHz

ACF_{MHz} is the Assigned Carrier Frequency in MHz

e) The value recorded in step d) is the carrier frequency stability.

*Note: In order to simplify the report, attached data were only the worst case frequency stability.

▣ TEST RESULTS - 11K0F3E

(1) Frequency Stability (Temperature Variation)

450.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	450.049847281	-0.339
-20	450.049867193	-0.295
-10	450.049872672	-0.283
0	450.049888888	-0.247
10	450.049913282	-0.193
20	450.049971573	-0.063
30	450.049963134	-0.082
40	450.049966274	-0.075
50	450.049954113	-0.102

481.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	481.049848293	-0.315
-20	481.049868272	-0.274
-10	481.049870367	-0.269
0	481.049903668	-0.200
10	481.049928870	-0.148
20	481.049969833	-0.063
30	481.049962034	-0.079
40	481.049964093	-0.075
50	481.049951908	-0.100

511.95 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	511.949850273	-0.292
-20	511.949871281	-0.251
-10	511.949883106	-0.228
0	511.949902658	-0.190
10	511.949912534	-0.171
20	511.949962109	-0.074
30	511.949981441	-0.036
40	511.949971472	-0.056
50	511.949953044	-0.092

450.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	450.049846281	-0.342
-20	450.049864103	-0.302
-10	450.049890281	-0.244
0	450.049911333	-0.197
10	450.049917349	-0.184
20	450.049962104	-0.084
30	450.049963291	-0.082
40	450.049964384	-0.079
50	450.049950767	-0.109

481.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	481.049846263	-0.320
-20	481.049850281	-0.311
-10	481.049871734	-0.267
0	481.049893799	-0.221
10	481.049940801	-0.123
20	481.049961904	-0.079
30	481.049964901	-0.073
40	481.049967763	-0.067
50	481.049952634	-0.098

511.95 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	511.949849281	-0.294
-20	511.949866637	-0.261
-10	511.949879469	-0.235
0	511.949905531	-0.185
10	511.949937903	-0.121
20	511.949956710	-0.085
30	511.949948864	-0.100
40	511.949961871	-0.074
50	511.949957634	-0.083

(2) Frequency Stability (Voltage Variation)

450.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	450.049973438	-0.059
25	100	7.50	450.049972718	-0.061
25	115	8.63	450.049973643	-0.059

481.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	481.049968690	-0.065
25	100	7.50	481.049969446	-0.064
25	115	8.63	481.049967880	-0.067

511.95 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	511.949958214	-0.082
25	100	7.50	511.949958785	-0.081
25	115	8.63	511.949960111	-0.078

450.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	450.049961990	-0.084
25	100	7.50	450.049962071	-0.084
25	115	8.63	450.049962079	-0.084

481.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	481.049959348	-0.085
25	100	7.50	481.049959631	-0.084
25	115	8.63	481.049960237	-0.083

511.95 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	511.949956152	-0.086
25	100	7.50	511.949956486	-0.085
25	115	8.63	511.949956817	-0.084

▣ TEST RESULTS - 16K0F3E

(1) Frequency Stability (Temperature Variation)

470.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	470.049838183	-0.344
-20	470.049841211	-0.338
-10	470.049854367	-0.310
0	470.049872284	-0.272
10	470.049912973	-0.185
20	470.049945966	-0.115
30	470.049943306	-0.121
40	470.049948082	-0.110
50	470.049941193	-0.125

491.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	491.049834274	-0.337
-20	491.049860682	-0.284
-10	491.049872773	-0.259
0	491.049879891	-0.245
10	491.049894406	-0.215
20	491.049942280	-0.118
30	491.049941263	-0.120
40	491.049950769	-0.100
50	491.049954541	-0.093

511.95 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	511.949842834	-0.307
-20	511.949864271	-0.265
-10	511.949893693	-0.208
0	511.949901266	-0.193
10	511.949911601	-0.173
20	511.949939734	-0.118
30	511.949941004	-0.115
40	511.949943072	-0.111
50	511.949960910	-0.076

470.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	470.049850273	-0.319
-20	470.049861280	-0.295
-10	470.049866902	-0.283
0	470.049894283	-0.225
10	470.049921111	-0.168
20	470.049946070	-0.115
30	470.049950272	-0.106
40	470.049958687	-0.088
50	470.049962763	-0.079

491.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	491.049868690	-0.267
-20	491.049870789	-0.263
-10	491.049878934	-0.247
0	491.049890108	-0.224
10	491.049921273	-0.160
20	491.049942285	-0.118
30	491.049954264	-0.093
40	491.049968450	-0.064
50	491.049973771	-0.053

511.95 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	511.949851288	-0.290
-20	511.949870364	-0.253
-10	511.949854108	-0.285
0	511.949912276	-0.171
10	511.949923910	-0.149
20	511.949938642	-0.120
30	511.949950339	-0.097
40	511.949955863	-0.086
50	511.949970701	-0.057

(2) Frequency Stability (Voltage Variation)

470.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	470.049945406	-0.116
25	100	7.50	470.049945964	-0.115
25	115	8.63	470.049946379	-0.114

491.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	491.049941549	-0.119
25	100	7.50	491.049941860	-0.118
25	115	8.63	491.049942442	-0.117

511.95 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	511.949939945	-0.117
25	100	7.50	511.949940441	-0.116
25	115	8.63	511.949940586	-0.116

470.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	470.049945582	-0.116
25	100	7.50	470.049946169	-0.115
25	115	8.63	470.049945692	-0.116

491.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	491.049941552	-0.119
25	100	7.50	491.049941816	-0.118
25	115	8.63	491.049941759	-0.119

511.95 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	511.949938346	-0.120
25	100	7.50	511.949938724	-0.120
25	115	8.63	511.949938550	-0.120

▣ TEST RESULTS - 4K00F1E, 4K00F1D, 4K00F7W

(1) Frequency Stability (Temperature Variation)

450.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	450.049850283	-0.333
-20	450.049877291	-0.273
-10	450.049884136	-0.257
0	450.049892043	-0.240
10	450.049918273	-0.182
20	450.049957768	-0.094
30	450.049957369	-0.095
40	450.049950663	-0.110
50	450.049953691	-0.103

481.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	481.049837379	-0.338
-20	481.049839393	-0.334
-10	481.049872281	-0.266
0	481.049894196	-0.220
10	481.049899334	-0.209
20	481.049965621	-0.071
30	481.049950203	-0.104
40	481.049958496	-0.086
50	481.049962912	-0.077

511.95 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	511.949840683	-0.311
-20	511.949886912	-0.221
-10	511.949892934	-0.209
0	511.949904182	-0.187
10	511.949921936	-0.152
20	511.949952333	-0.093
30	511.949954237	-0.089
40	511.949958664	-0.081
50	511.949950692	-0.096

450.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	450.049844683	-0.345
-20	450.049860534	-0.310
-10	450.049872491	-0.283
0	450.049894284	-0.235
10	450.049933632	-0.147
20	450.049955737	-0.098
30	450.049956731	-0.096
40	450.049960934	-0.087
50	450.049960092	-0.089

481.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	481.049851336	-0.309
-20	481.049872393	-0.265
-10	481.049893278	-0.222
0	481.049912694	-0.181
10	481.049934691	-0.136
20	481.049952053	-0.100
30	481.049950364	-0.103
40	481.049950108	-0.104
50	481.049949834	-0.104

511.95 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	511.949860063	-0.273
-20	511.949872084	-0.250
-10	511.949888123	-0.219
0	511.949916384	-0.163
10	511.949937961	-0.121
20	511.949948929	-0.100
30	511.949950344	-0.097
40	511.949951281	-0.095
50	511.949952343	-0.093

(2) Frequency Stability (Voltage Variation)

450.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	450.049957853	-0.094
25	100	7.50	450.049957860	-0.094
25	115	8.63	450.049958359	-0.093

481.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	481.049957912	-0.087
25	100	7.50	481.049958846	-0.086
25	115	8.63	481.049958091	-0.087

511.95 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	511.949948519	-0.101
25	100	7.50	511.949948694	-0.100
25	115	8.63	511.949949135	-0.099

450.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	450.049953452	-0.103
25	100	7.50	450.049953752	-0.103
25	115	8.63	450.049953999	-0.102

481.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	481.049950359	-0.103
25	100	7.50	481.049950279	-0.103
25	115	8.63	481.049950842	-0.102

511.95 MHz (Low Power)

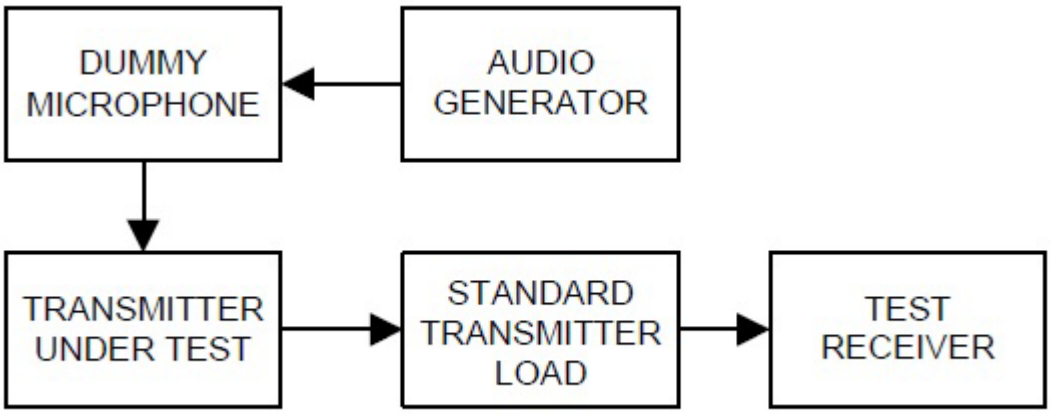
Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.38	511.949947249	-0.103
25	100	7.50	511.949947641	-0.102
25	115	8.63	511.949947685	-0.102

7.3 Modulation Limiting

▣ Definition

Modulation limiting is the transmitter circuit's ability to limit the transmitter from producing deviations in excess of a rated system deviation.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

According to 2.2.3 in TIA-603-D Standard.

a) Connect the equipment as illustrated.

b) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.

c) Set the test receiver to measure peak positive deviation.
Set the audio bandwidth for ≤0.25 Hz to ≥15,000 Hz.
Turn the de-emphasis function off.

d) Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and adjust the level obtain 60% of full rated system deviation.

e) Increase the level form the audio frequency generator by 20 dB in one step(rise time between the 10% and 90% points shall be 0.1 second maximum).

f) Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level.

g) With the level from the audio frequency generator held constant at the level obtained in step e), Slowly vary the audio frequency from 300 Hz to 3000 Hz and observe the steady-state deviation. Record the maximum deviation.

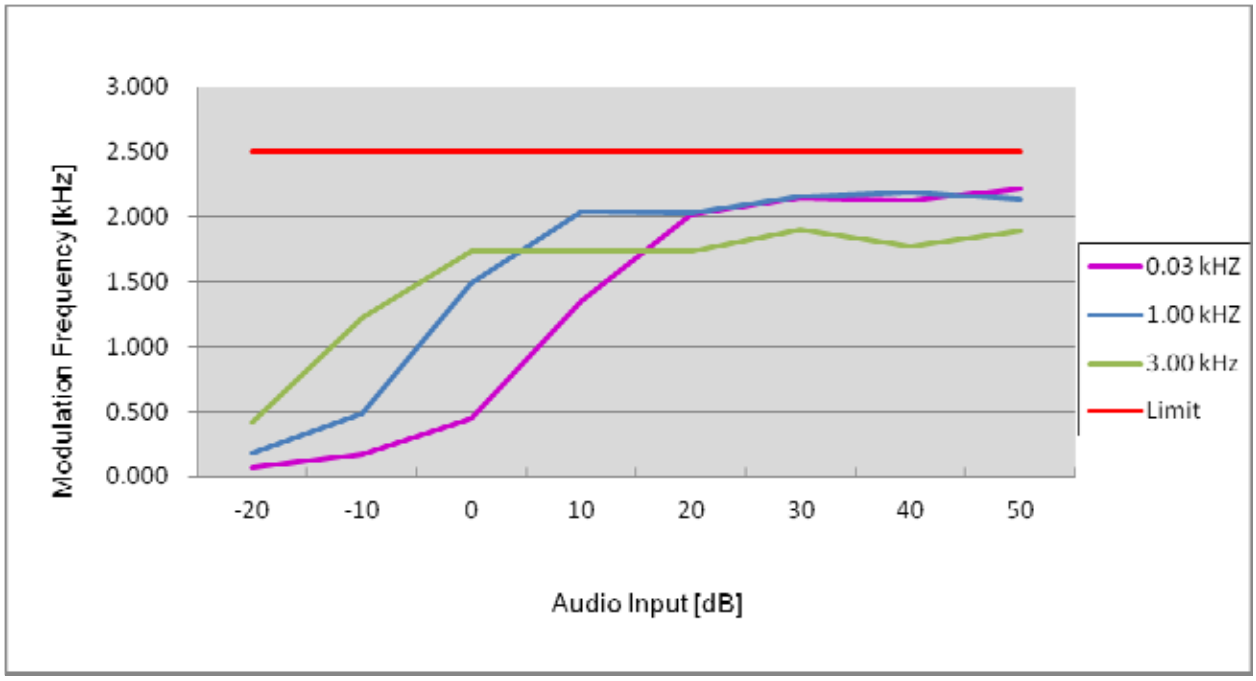
h) Set the test receiver to measure peak negative deviation and repeat steps d) through g).

i) The values recorded in steps g) and h) are the modulation limiting.

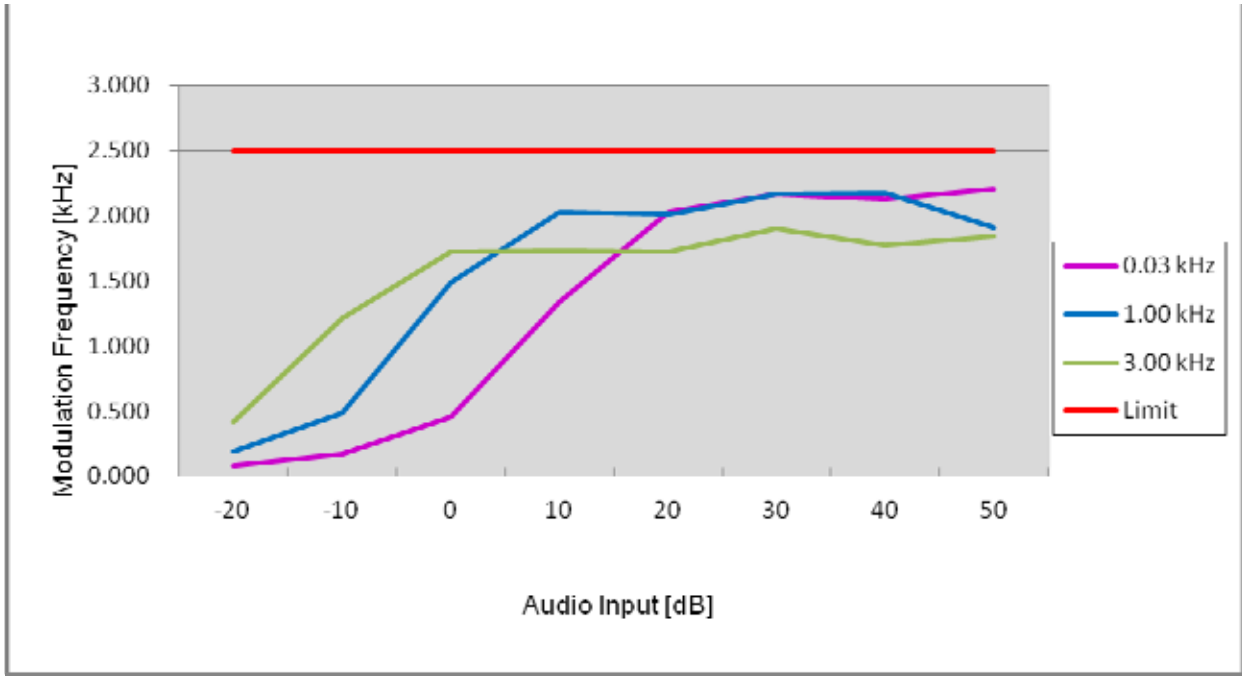
▣ TEST RESULTS

Positive Peaks

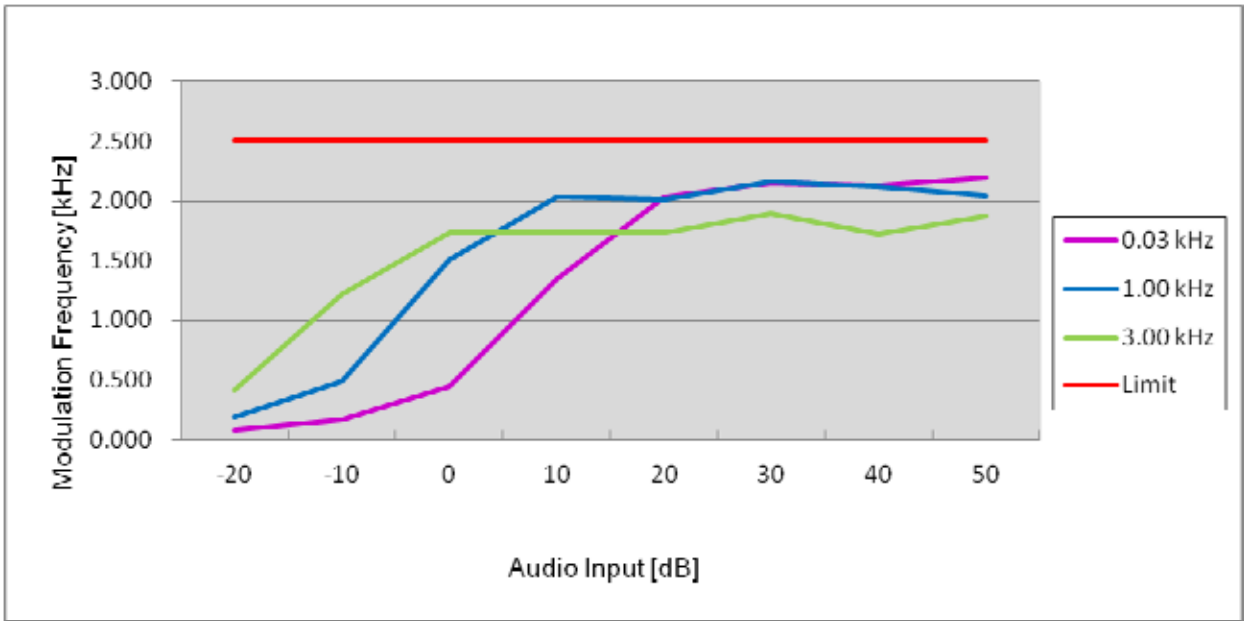
11K0F3E_450.05 MHz_HIGH POWER



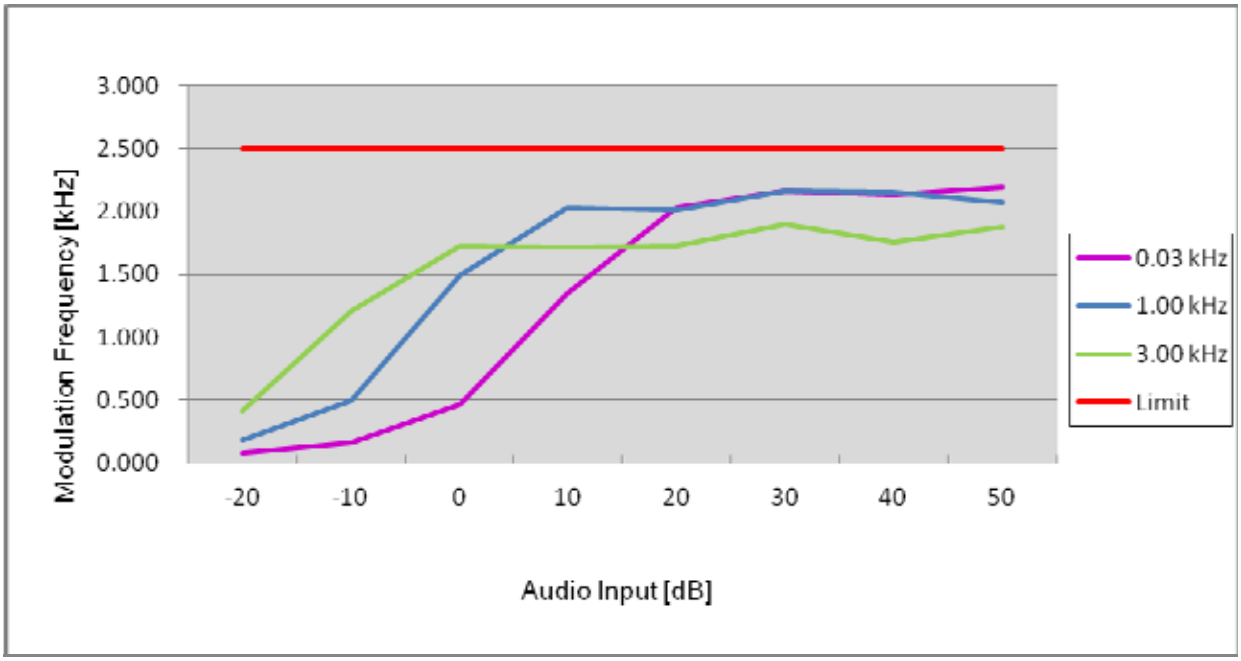
11K0F3E_481.05 MHz_HIGH POWER



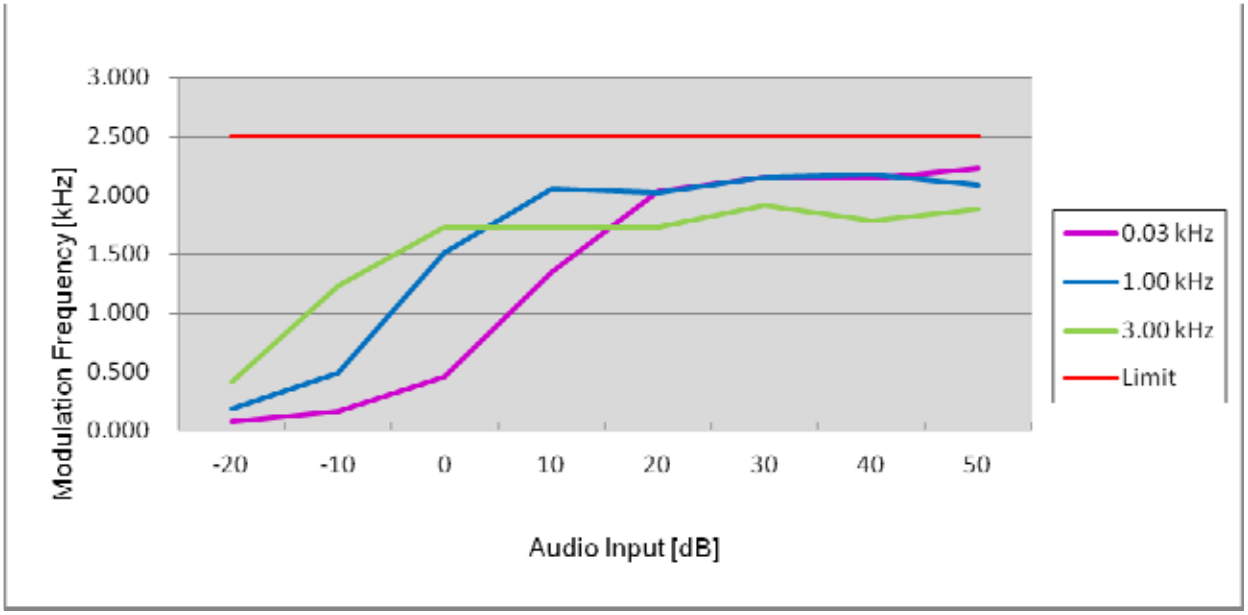
11K0F3E_511.95 MHz_HIGH POWER



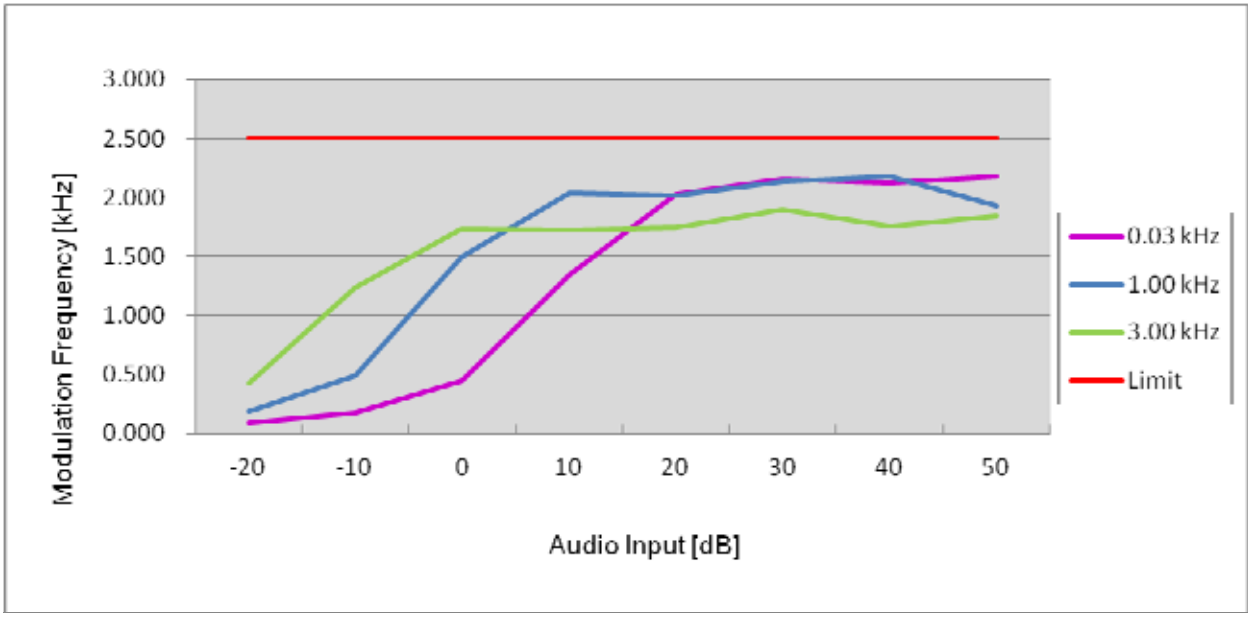
11K0F3E_450.05 MHz_LOW POWER



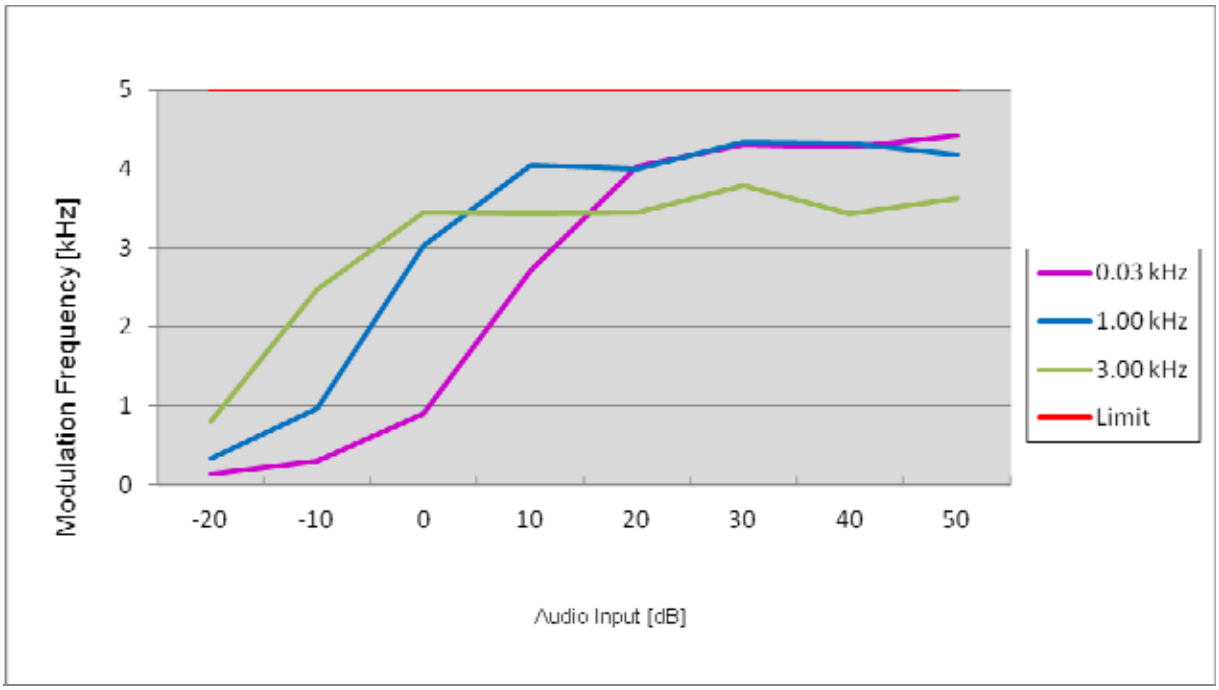
11K0F3E_481.05 MHz_LOW POWER



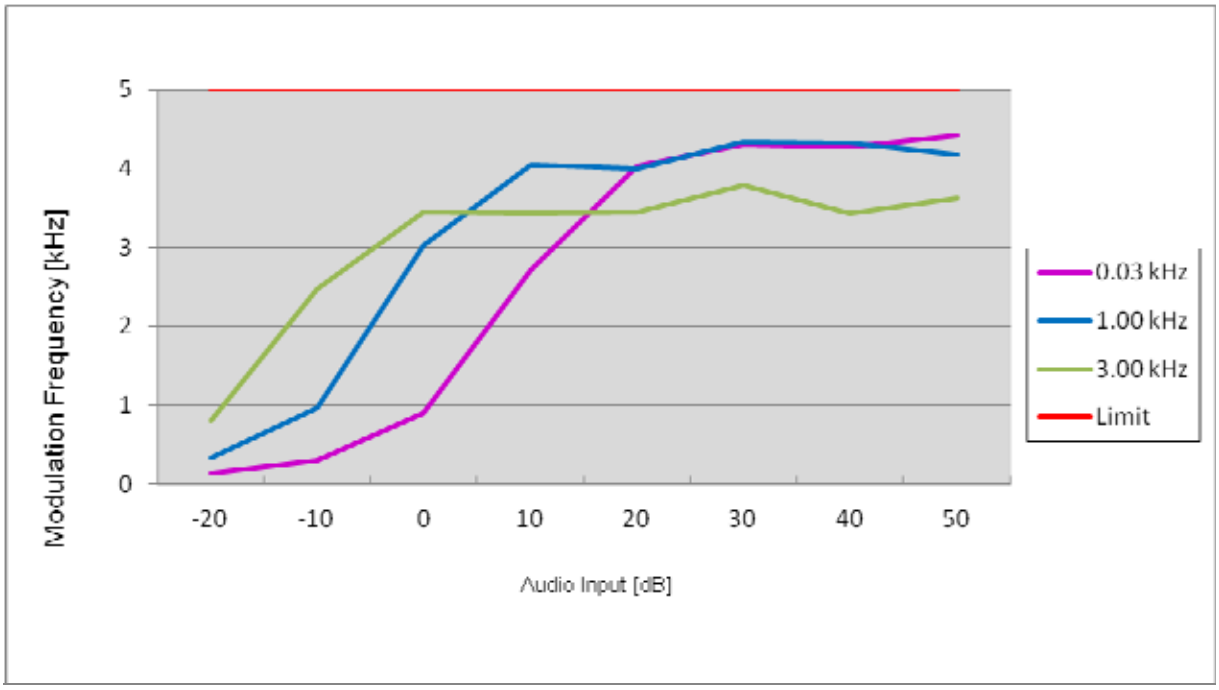
11K0F3E_511.95 MHz_LOW POWER



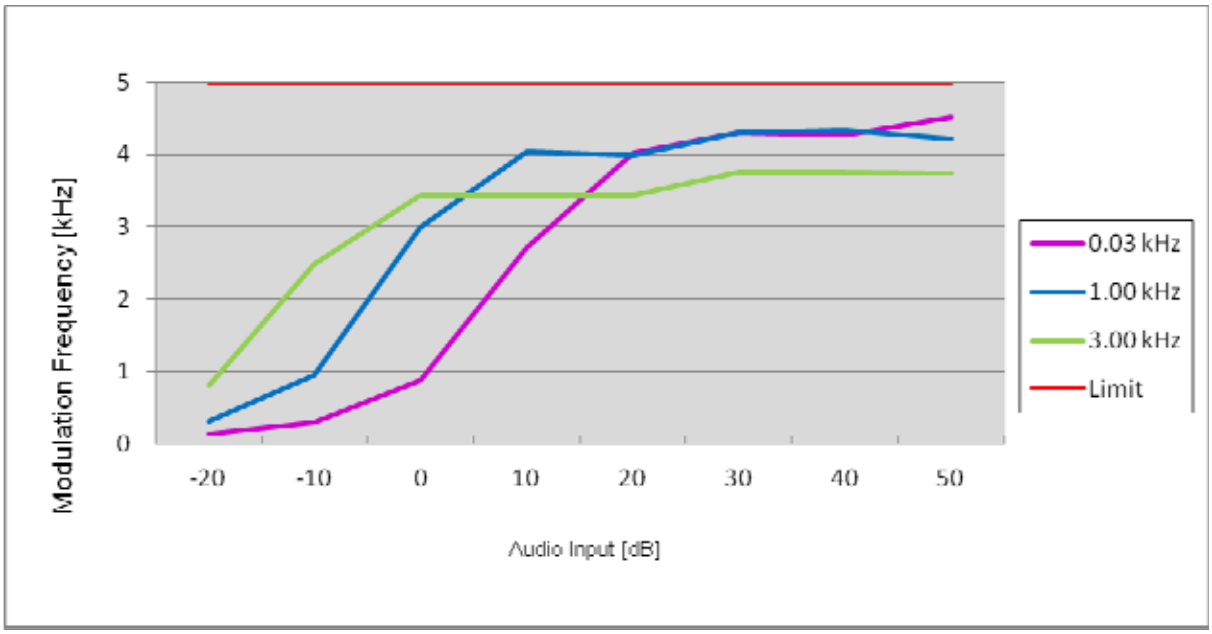
16K0F3E_470.05 MHz_HIGH POWER



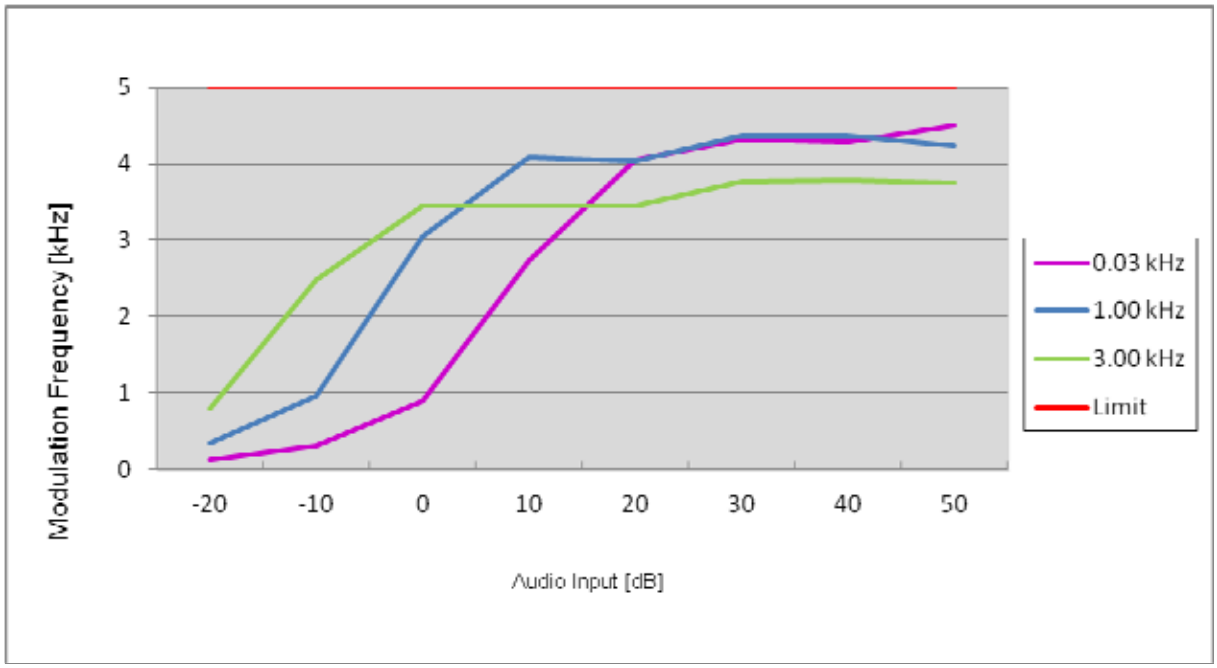
16K0F3E_491.05 MHz_HIGH POWER



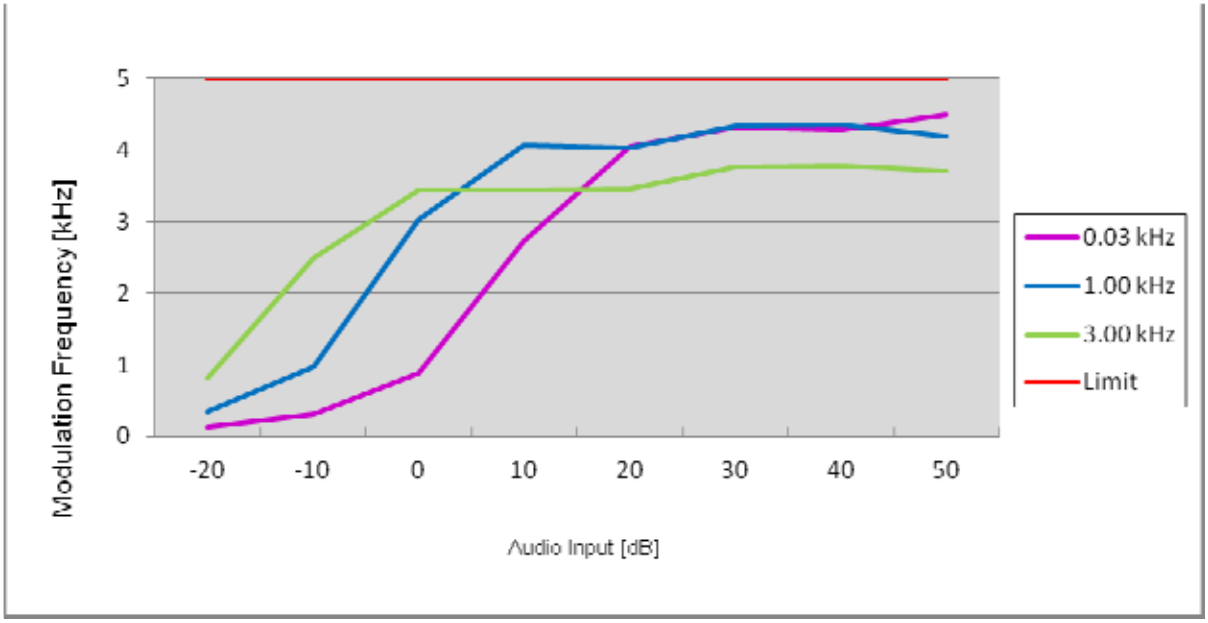
16K0F3E_511.95 MHz_HIGH POWER



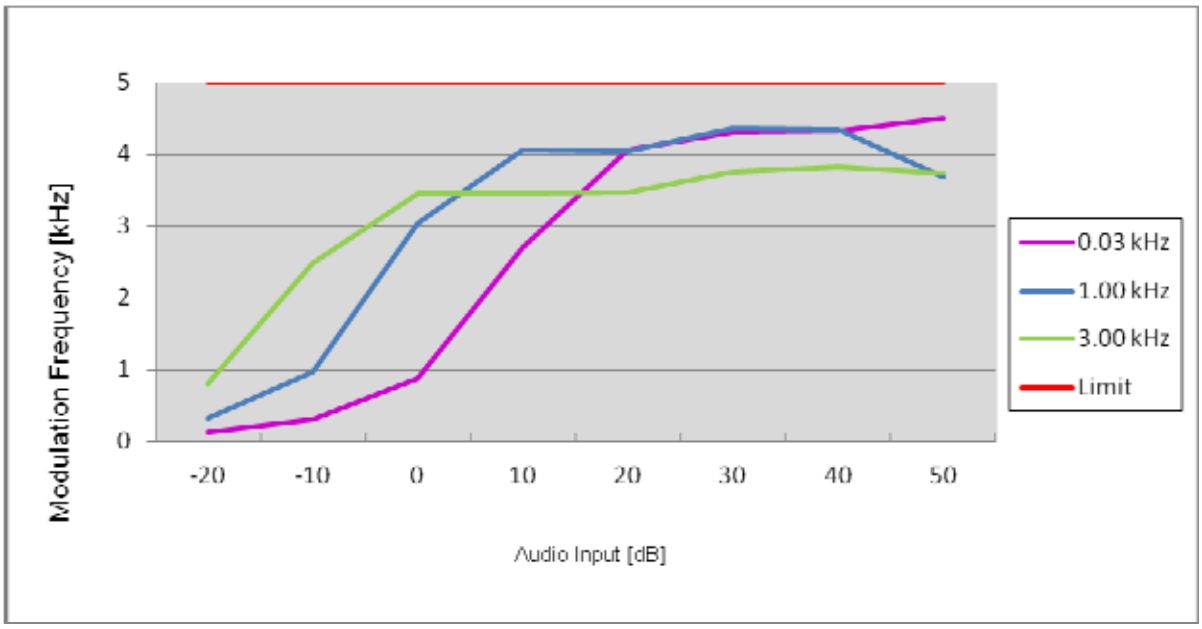
16K0F3E_470.05 MHz_LOW POWER



16K0F3E_491.05 MHz_LOW POWER

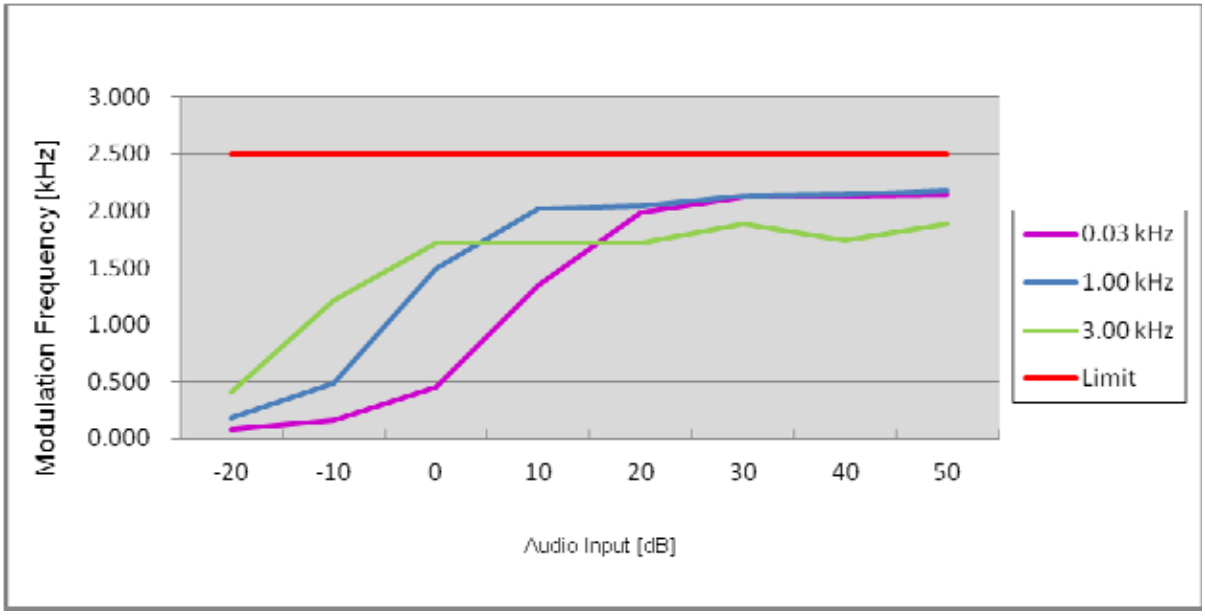


16K0F3E_511.95 MHz_LOW POWER

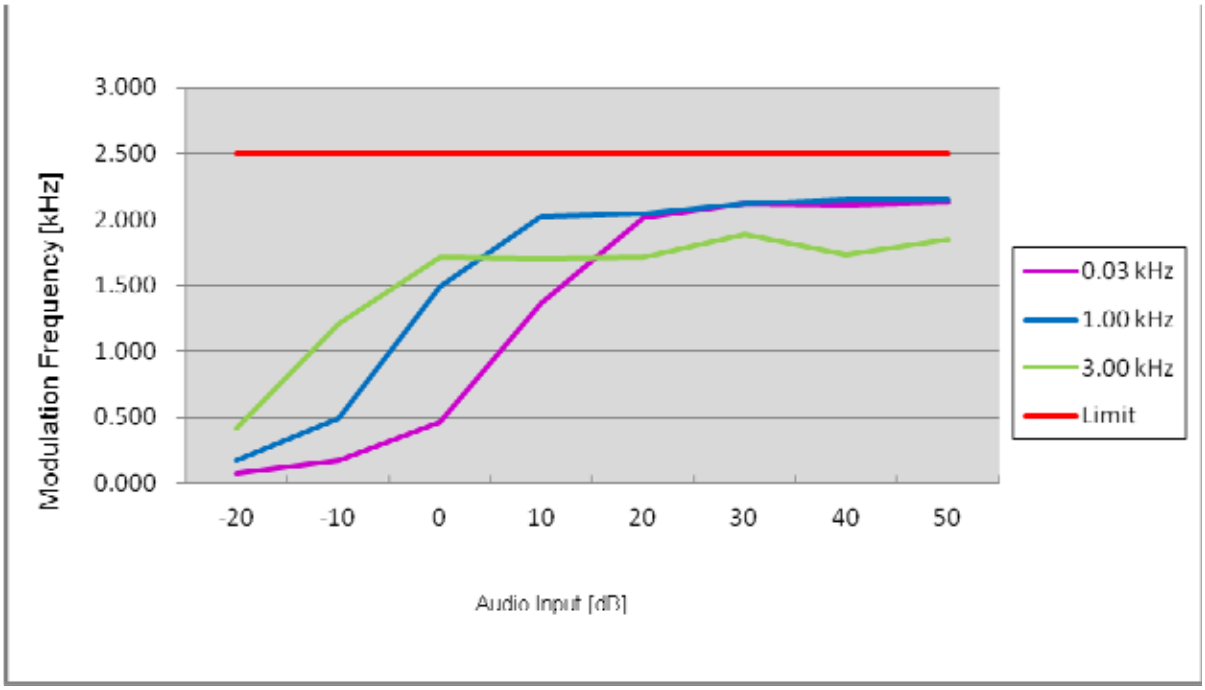


Negative Peaks

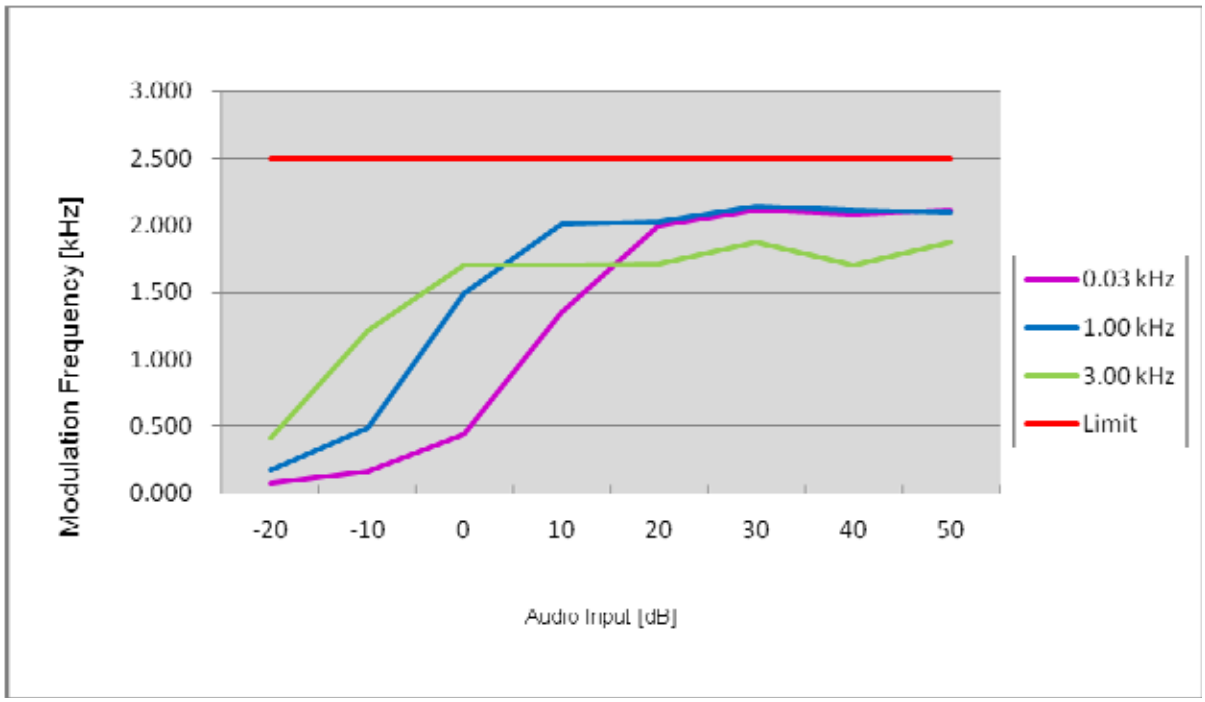
11K0F3E_450.05 MHz_HIGH POWER



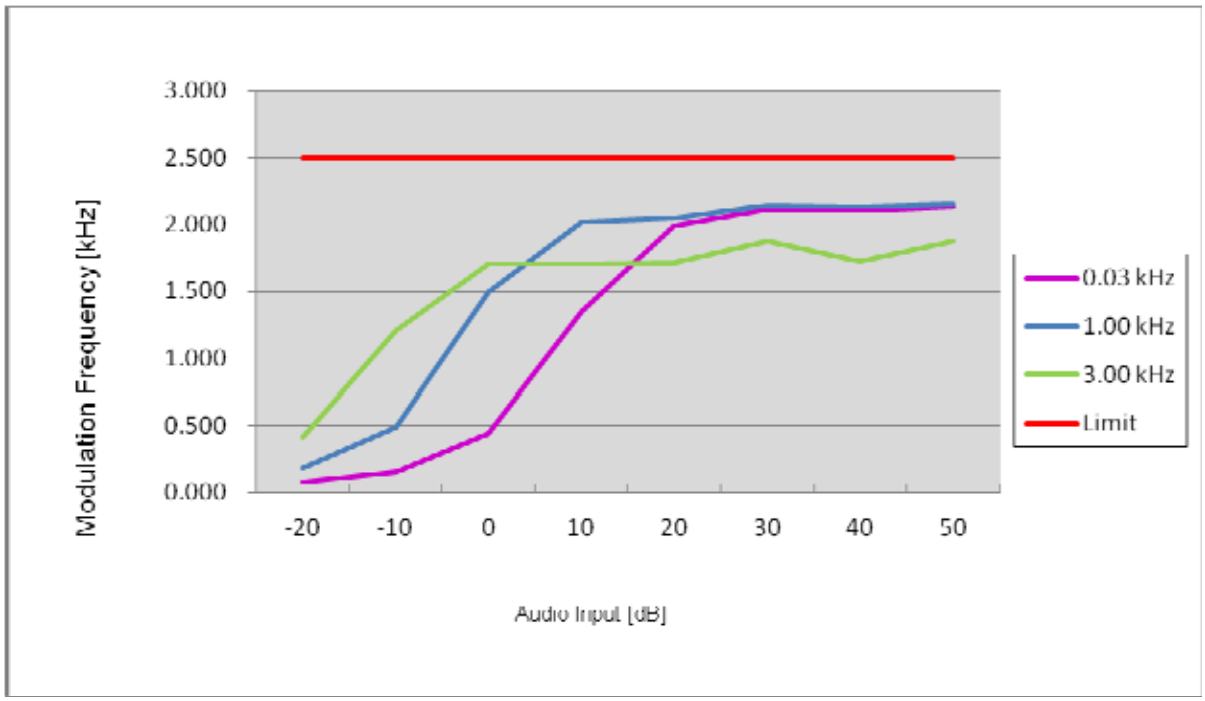
11K0F3E_481.05 MHz_HIGH POWER



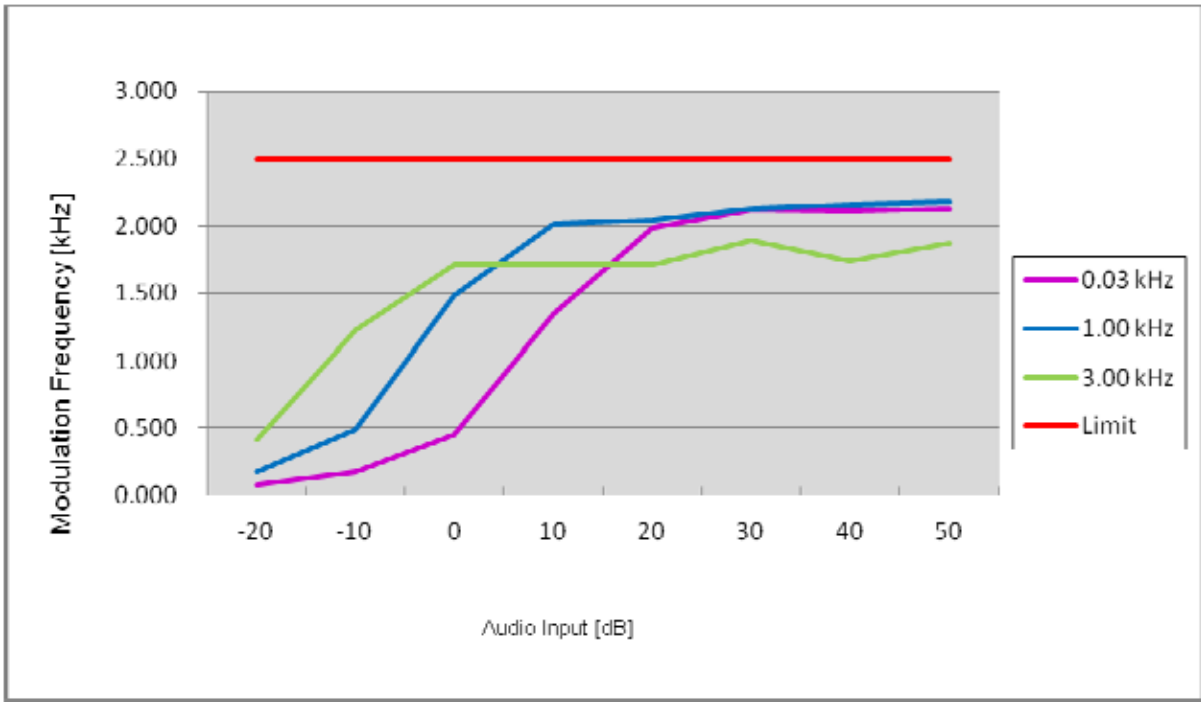
11K0F3E_511.95 MHz_HIGH POWER



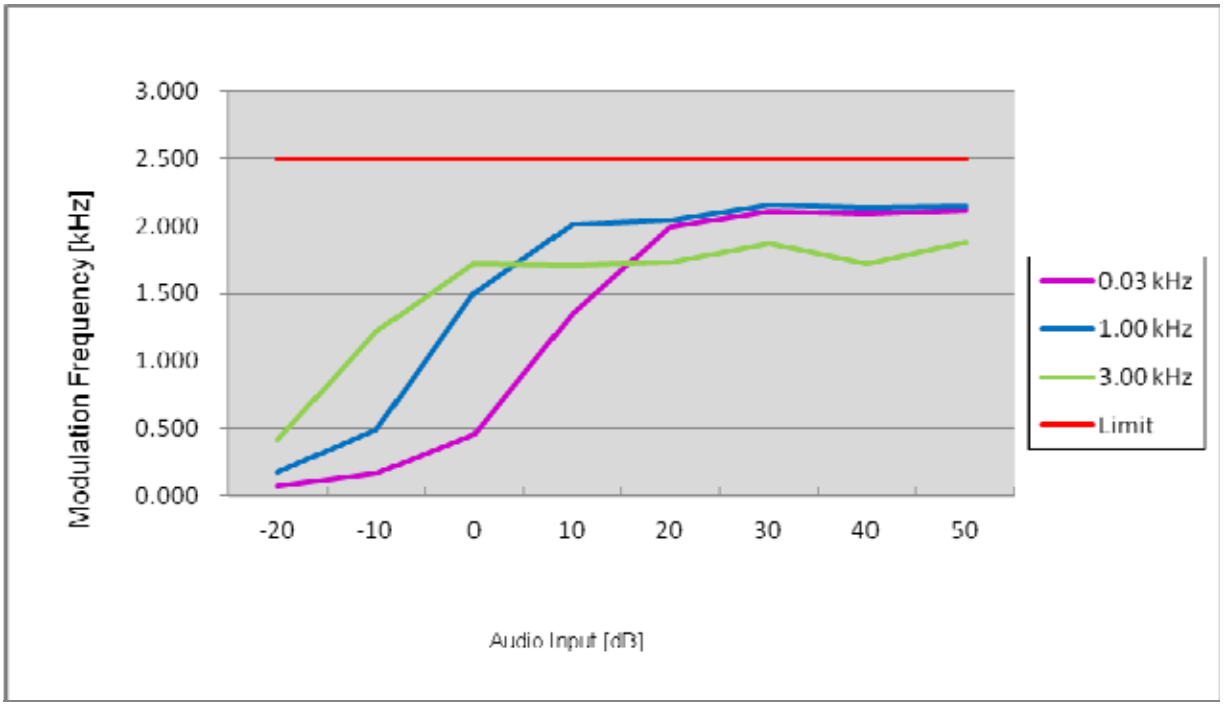
11K0F3E_450.05 MHz_LOW POWER



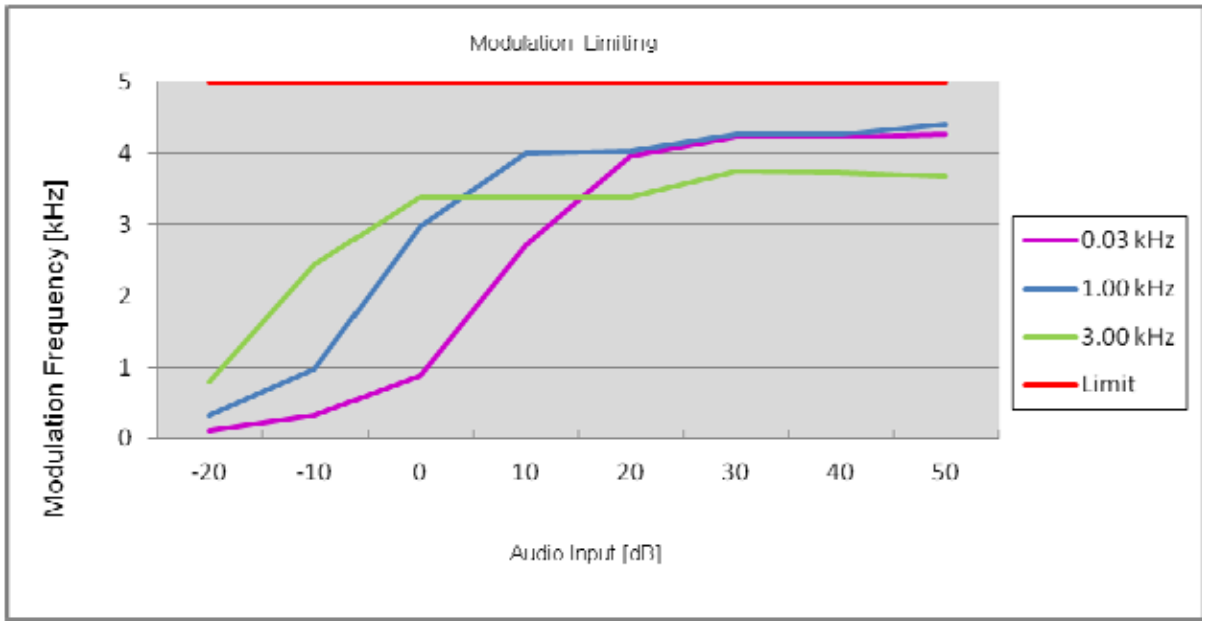
11K0F3E_481.05 MHz_LOW POWER



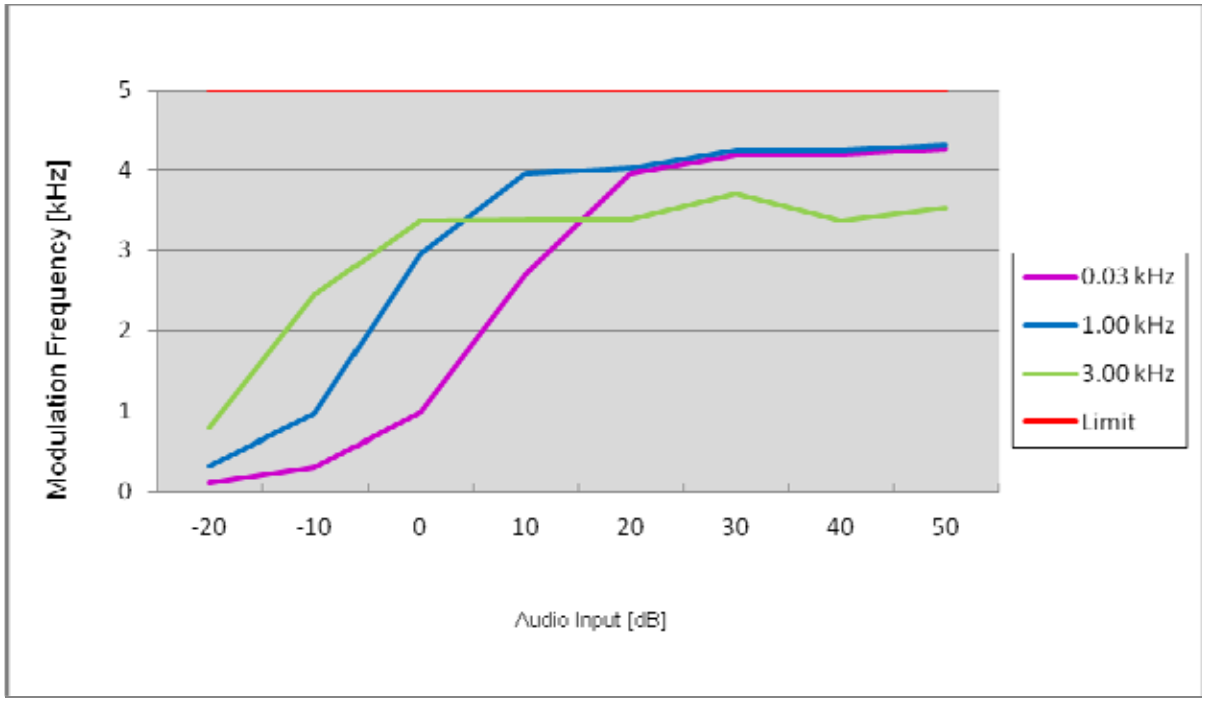
11K0F3E_511.95 MHz_LOW POWER



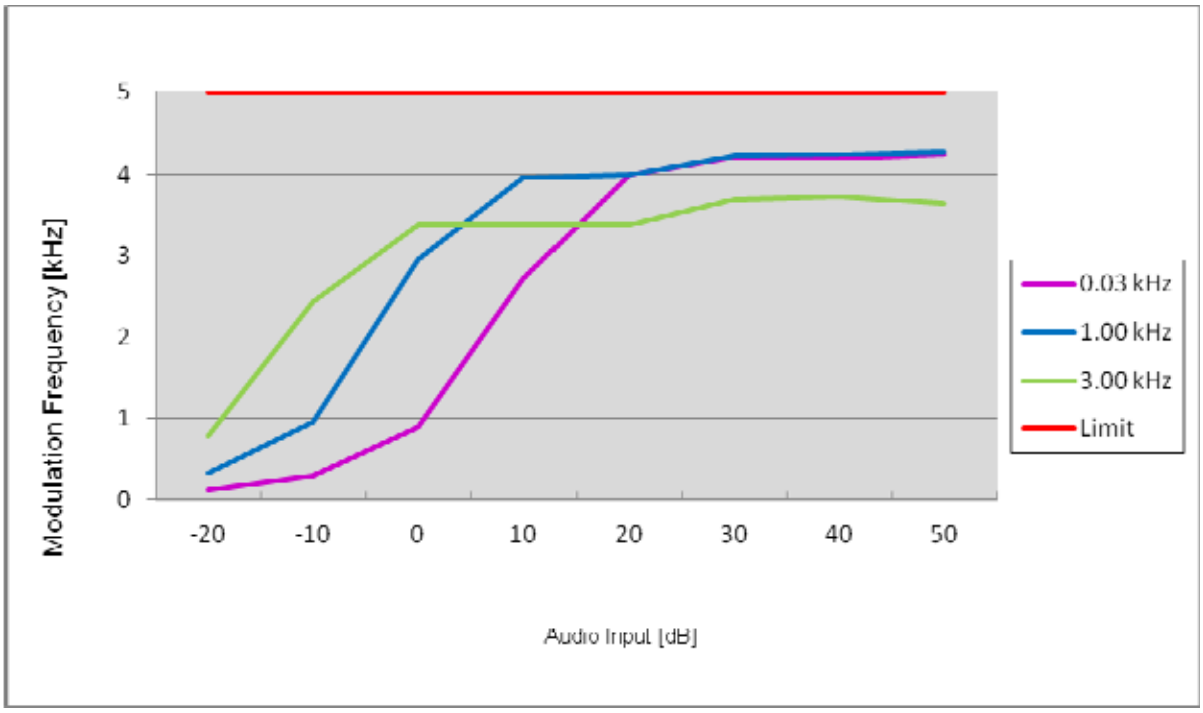
16K0F3E_470.05 MHz_HIGH POWER



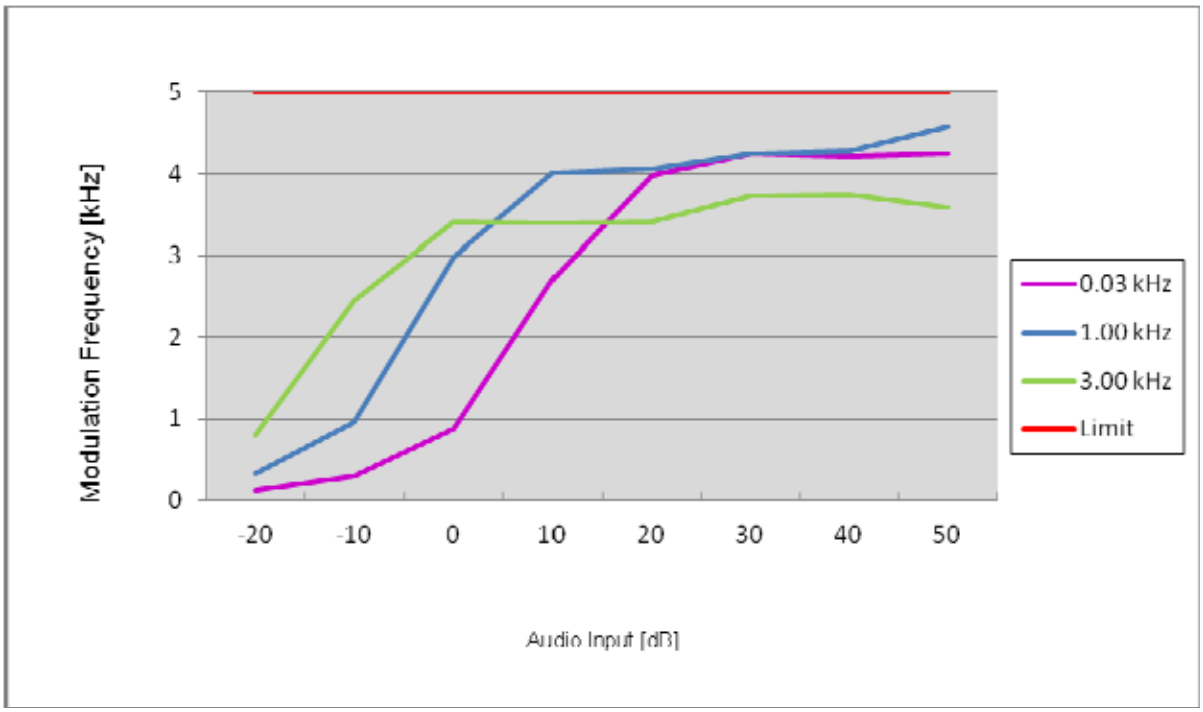
16K0F3E_491.05 MHz_HIGH POWER



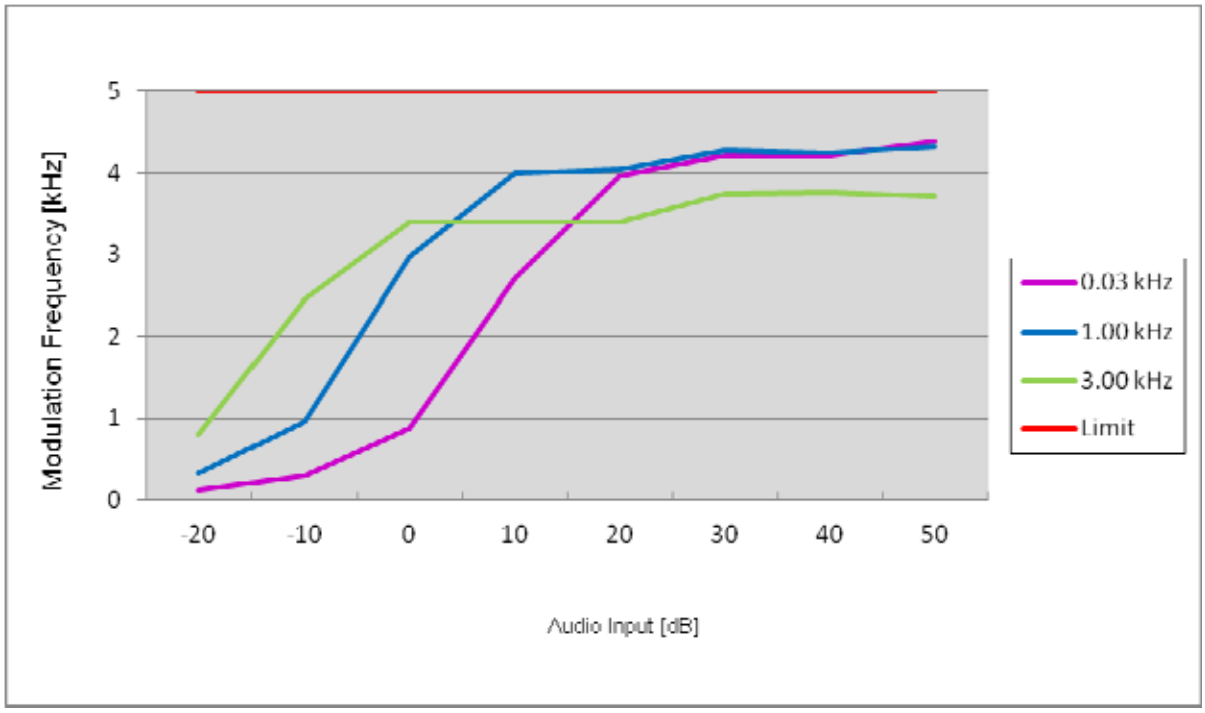
16K0F3E_511.95 MHz_HIGH POWER



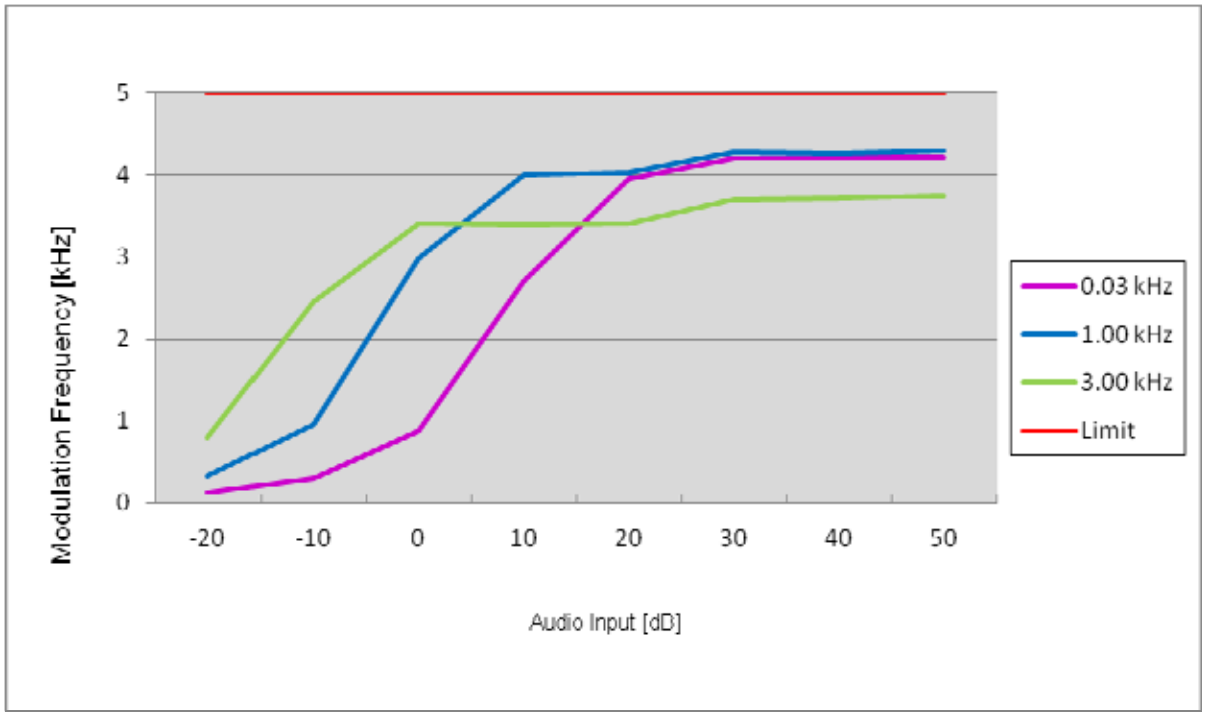
16K0F3E_470.05 MHz_LOW POWER



16K0F3E_491.05 MHz_LOW POWER



16K0F3E_511.95 MHz_LOW POWER

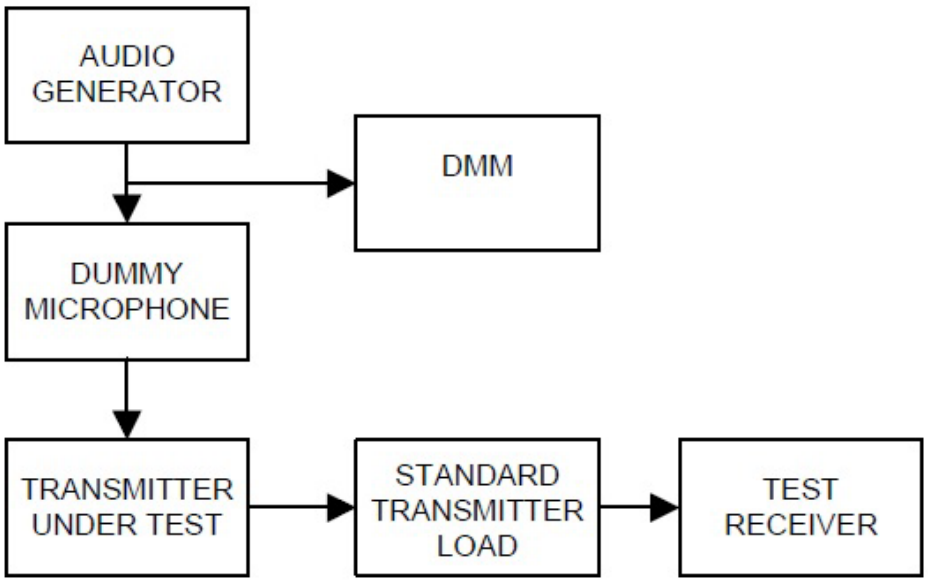


7.4 Audio Frequency Response / Audio Low Pass Filter Response

▣ Definition

The audio frequency response is the degree of closeness to which the frequency deviation of the transmitter follows a prescribed characteristic.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

According to 2.2.6 in TIA-603-D Standard.

a) Connect the equipment as illustrated.
b) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤ 50 Hz to ≥ 15,000 Hz. Turn the de-emphasis function off.
c) Set the DMM to measure rms voltage.
d) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
e) Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation.
f) Set the test receiver to measure rms deviation and record the deviation reading.
g) Record the DMM reading as $V_{REF.}$
h) Set the audio frequency generator to the desired test frequency between 300 Hz and 3000 Hz.
i) Vary the audio frequency generator output level until the deviation reading that was recorded in step f) is obtained.
j) Record the DMM reading as $V_{FREQ.}$
k) Calculate the audio frequency response at the present frequency as:

audio frequency response = 20 * $\log_{10}(V_{FREQ}/V_{REF})$

l) Repeat steps h) through k) for all the desired test frequencies.

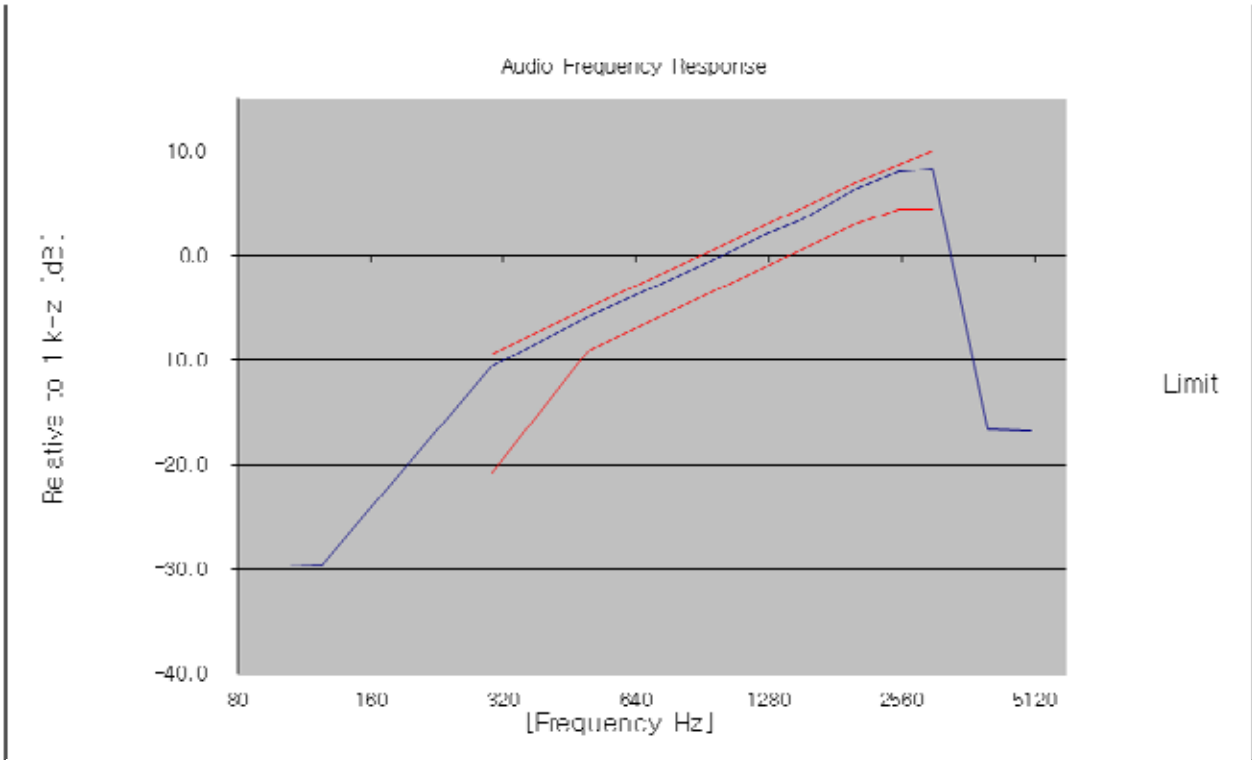
*Note : Audio Filter of the above result is substituted with the same structure as Audio Frequency Response.

On the transmission condition below 3kHz, Transceiver shows pre-emphasis condition of transmission function.

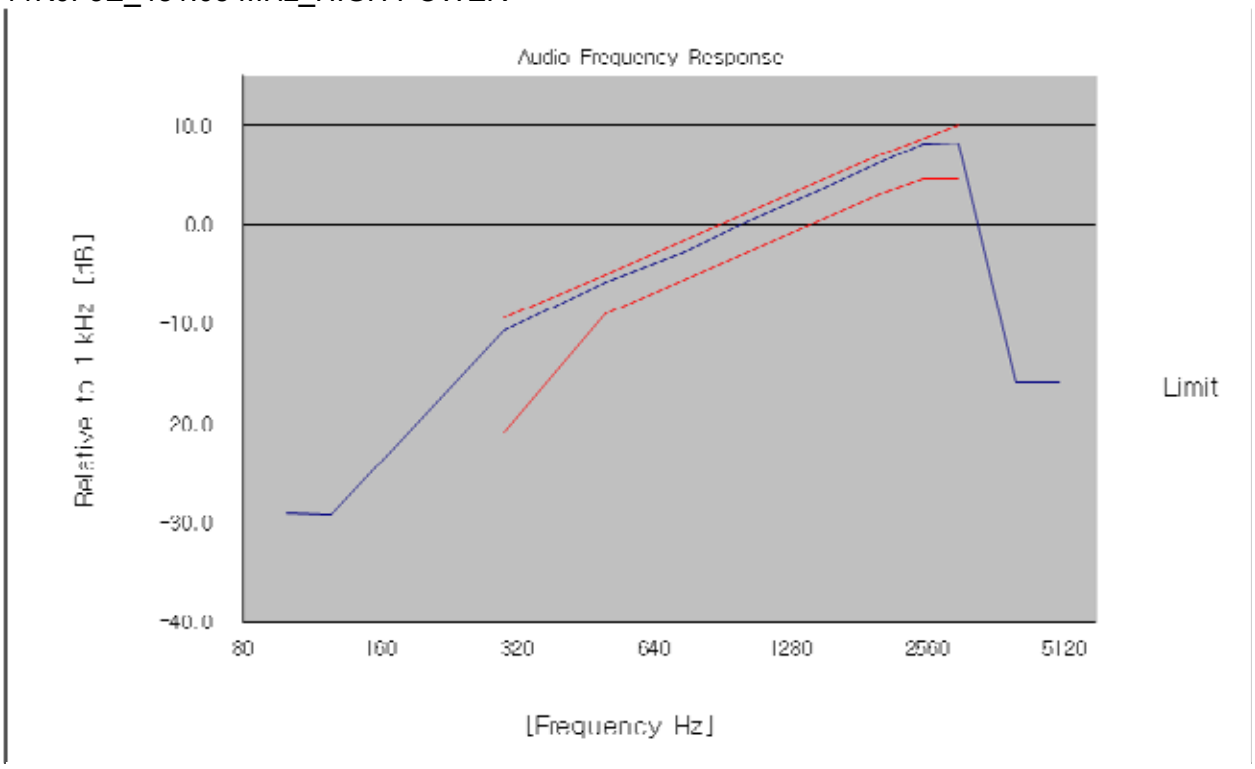
On the transmission condition above 3kHz, Transceiver shows Audio Low Pass Filter.

▣ TEST RESULTS

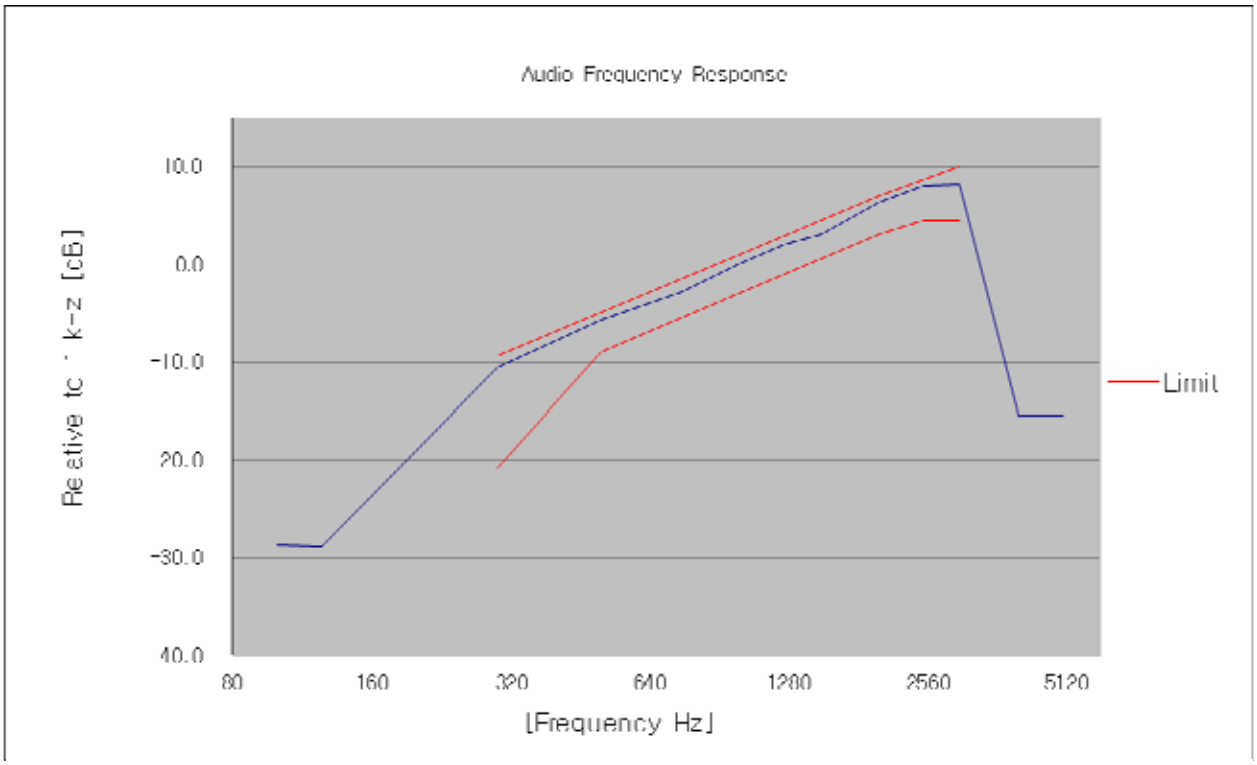
11K0F3E_450.05 MHz_HIGH POWER



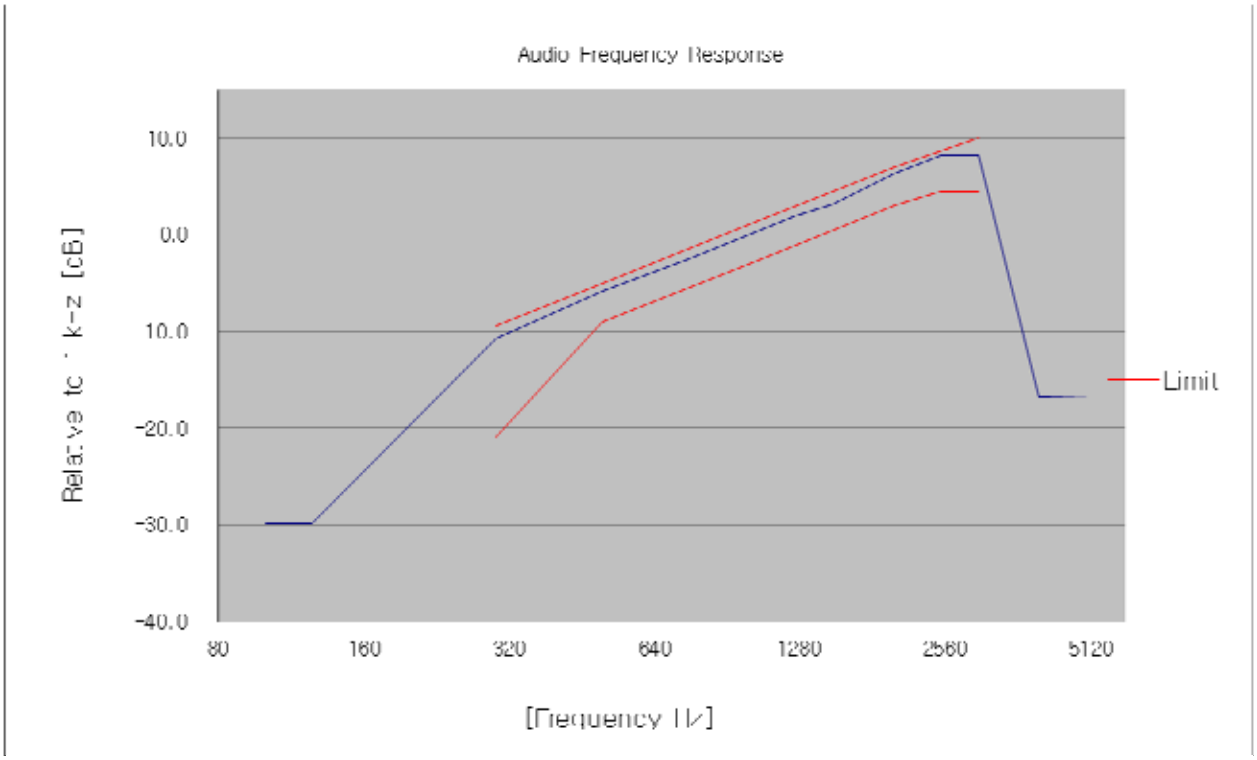
11K0F3E_481.05 MHz_HIGH POWER



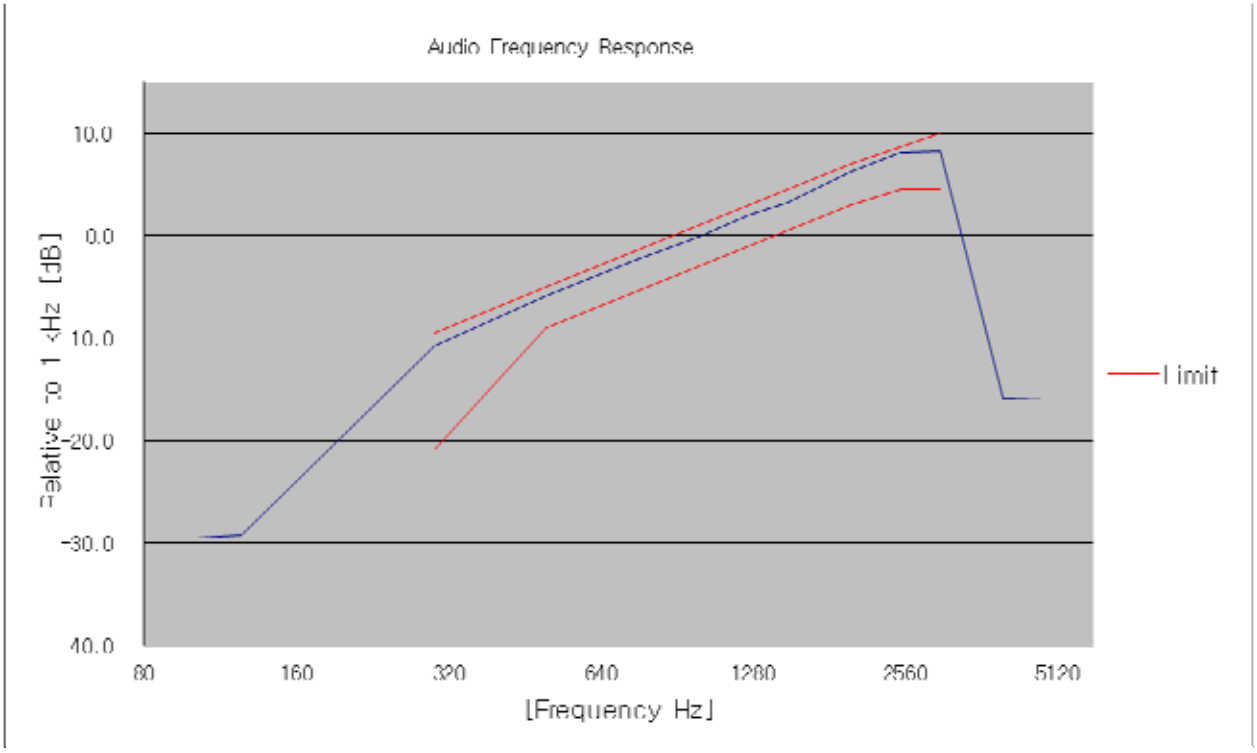
11K0F3E_511.95 MHz_HIGH POWER



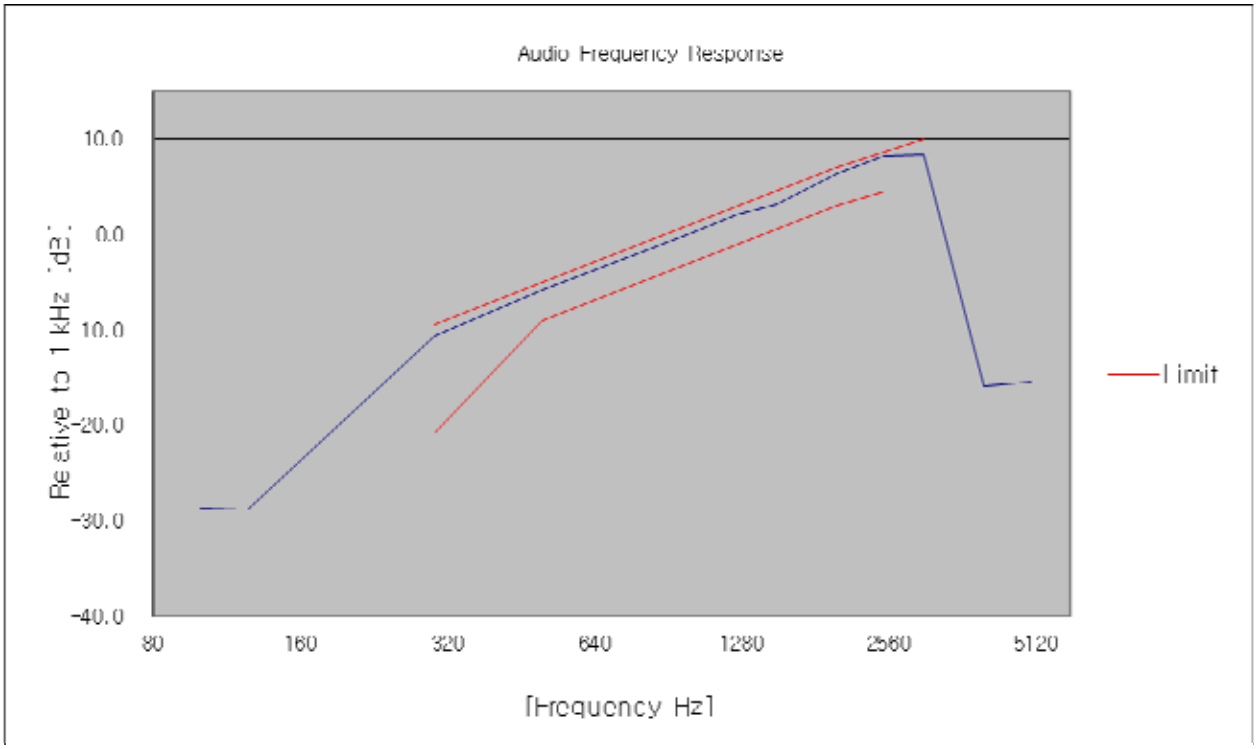
11K0F3E_511.95 MHz_LOW POWER



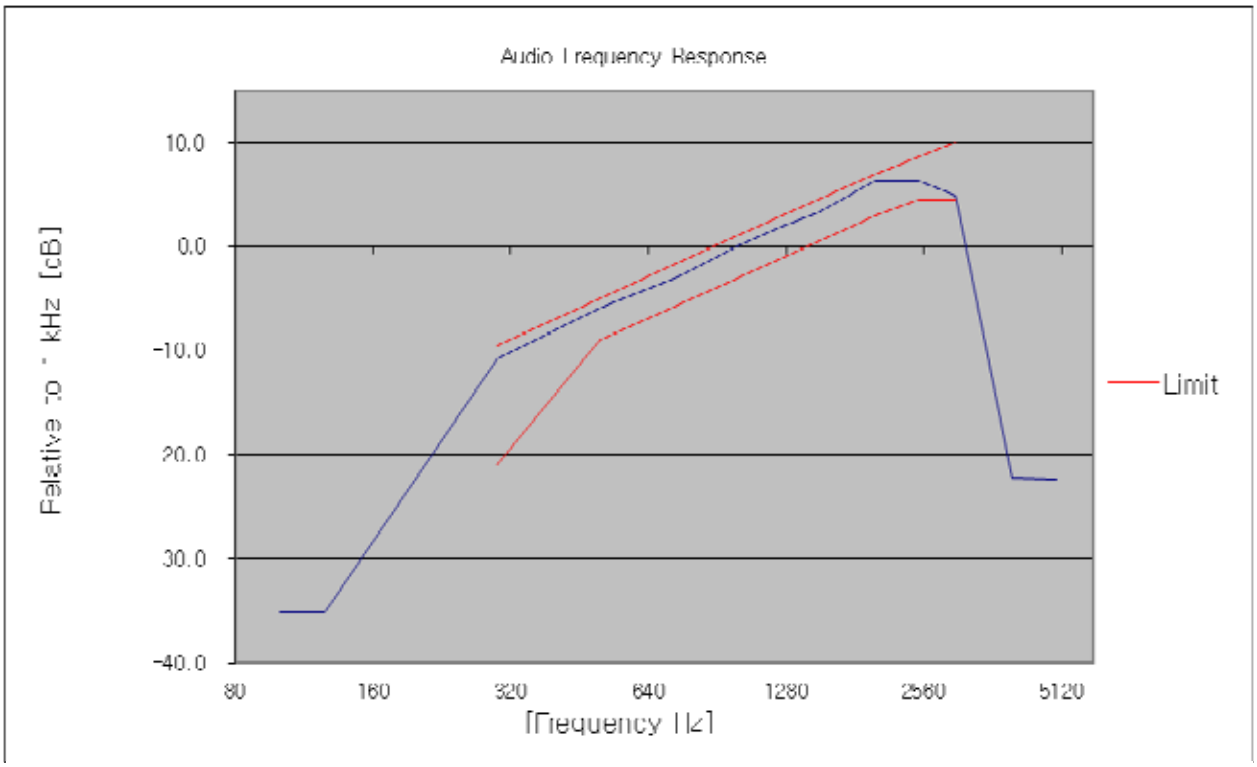
11K0F3E_481.05 MHz_LOW POWER



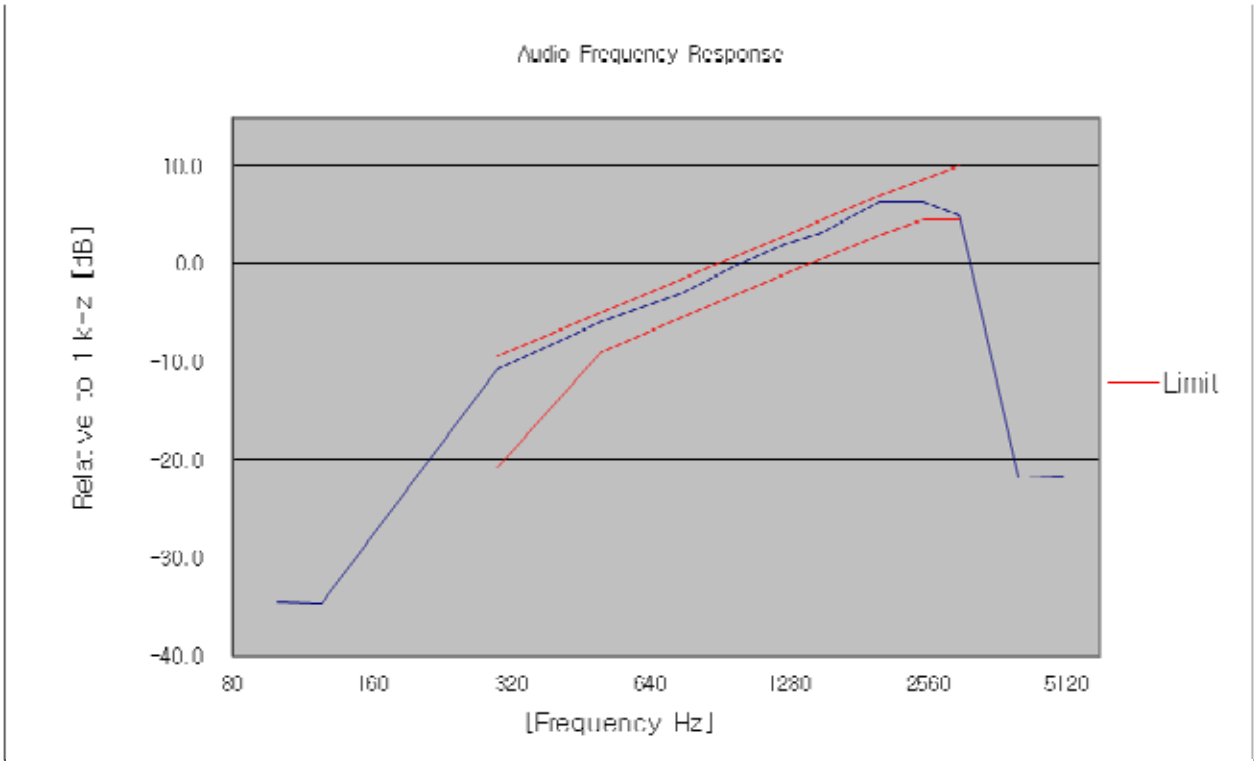
11K0F3E_450.05 MHz_LOW POWER



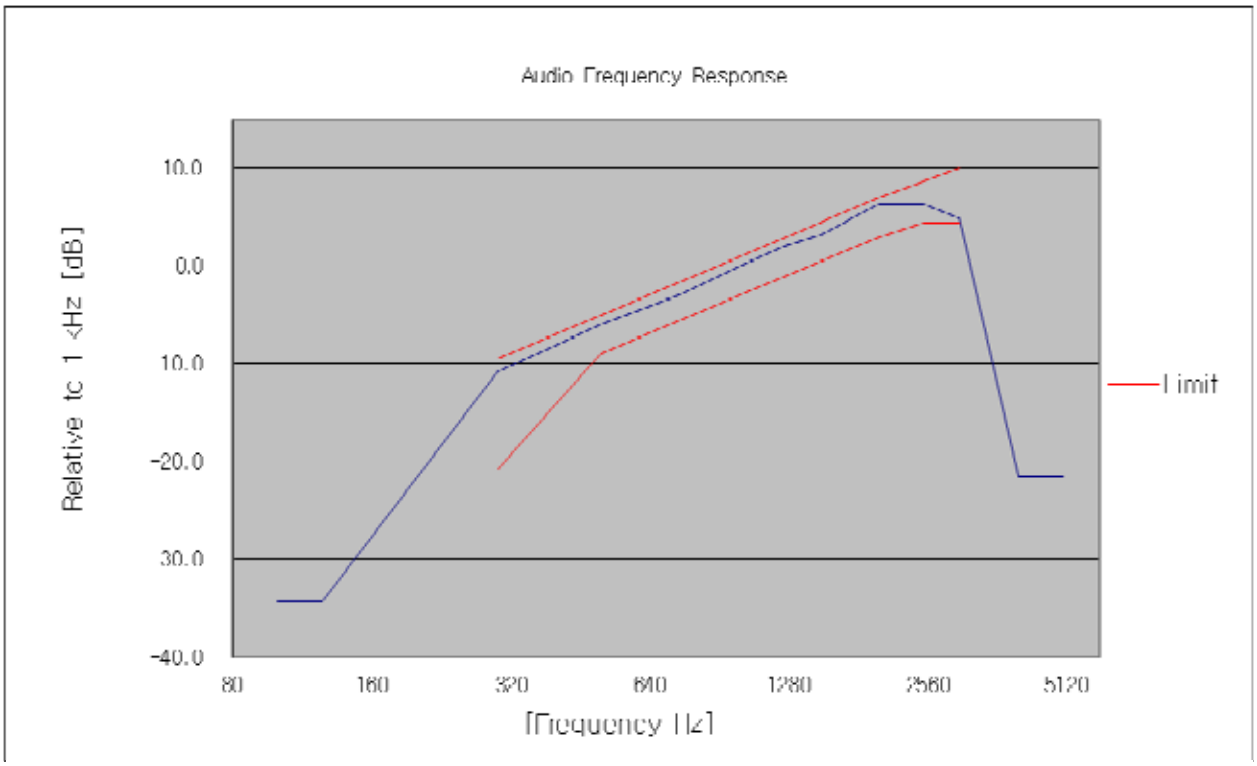
16K0F3E_470.05 MHz_HIGH POWER



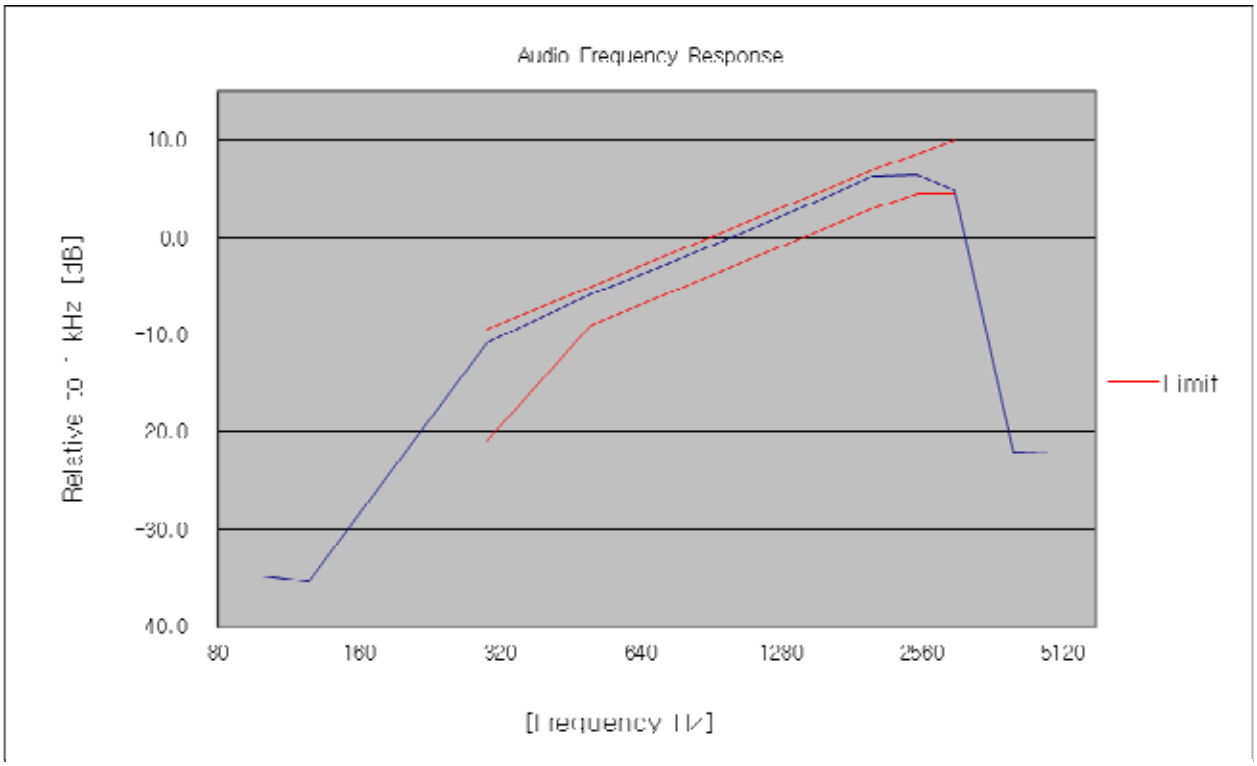
16K0F3E_491.05 MHz_HIGH POWER



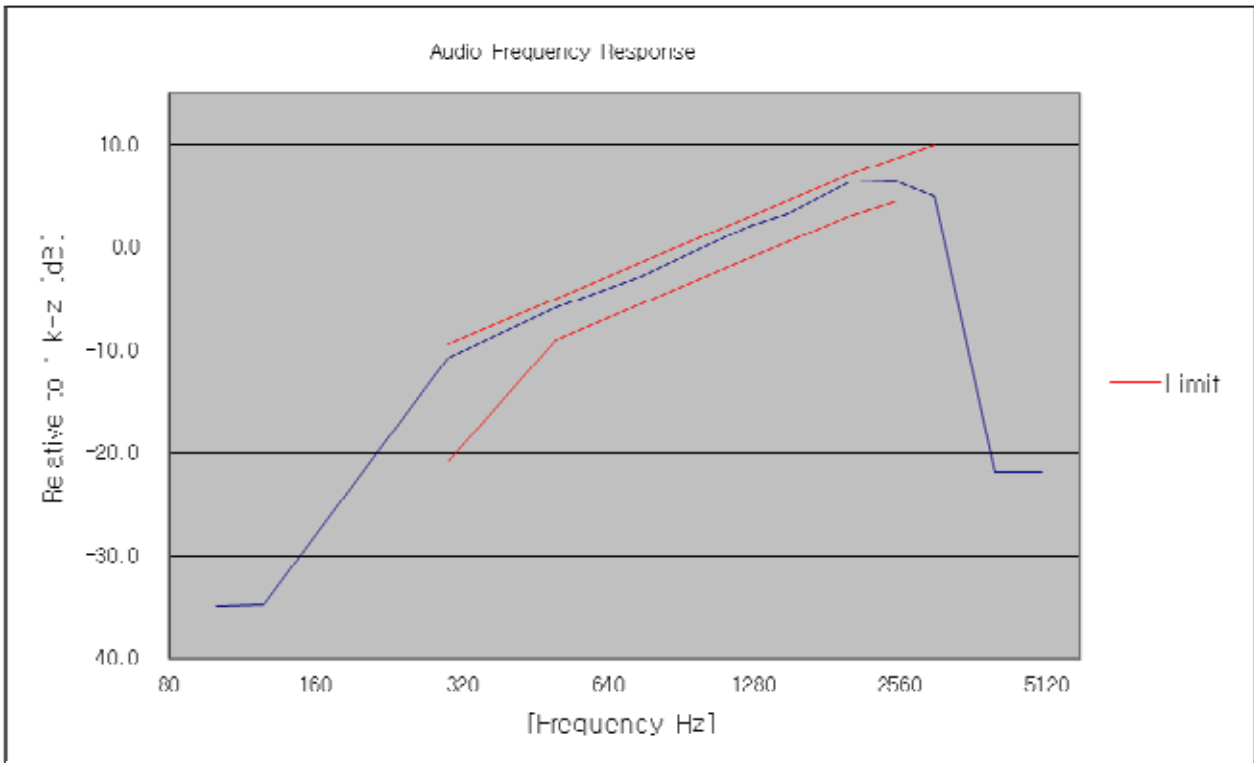
16K0F3E_511.95 MHz_HIGH POWER



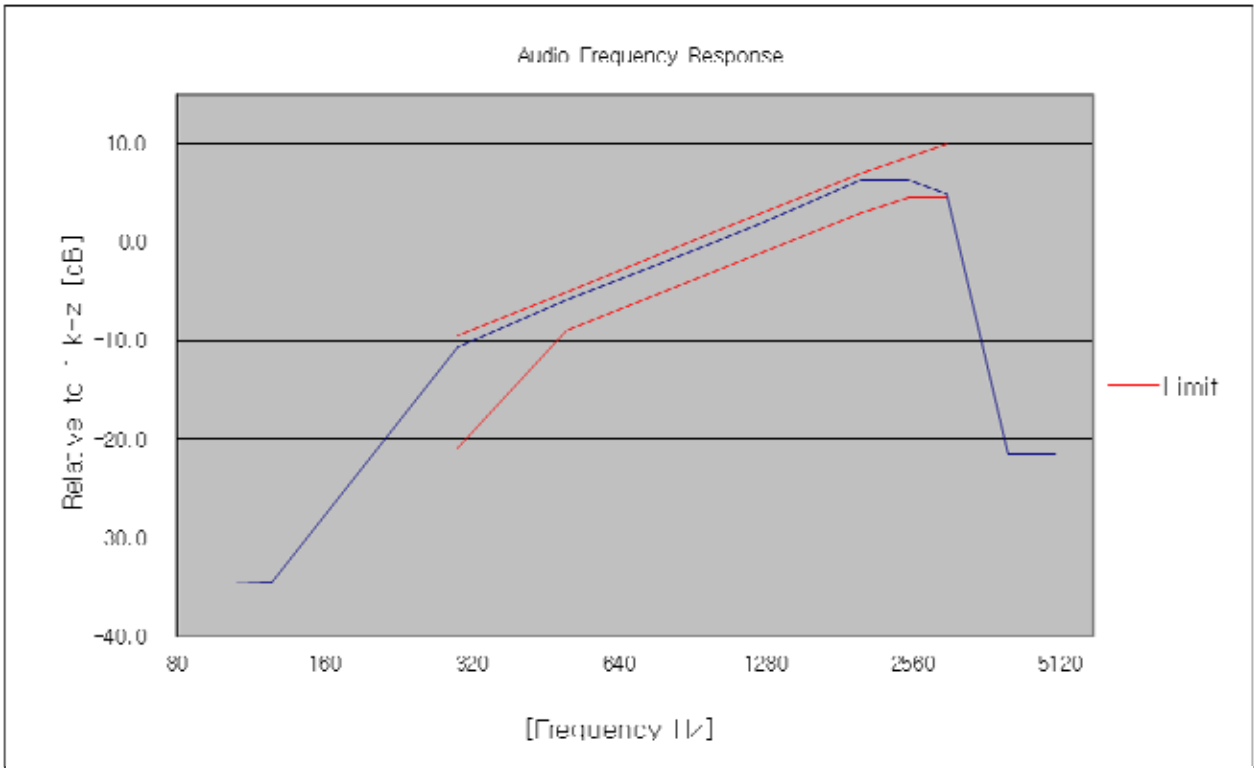
16K0F3E_470.05 MHz_LOW POWER



16K0F3E_491.05 MHz_LOW POWER



16K0F3E_511.95 MHz_LOW POWER

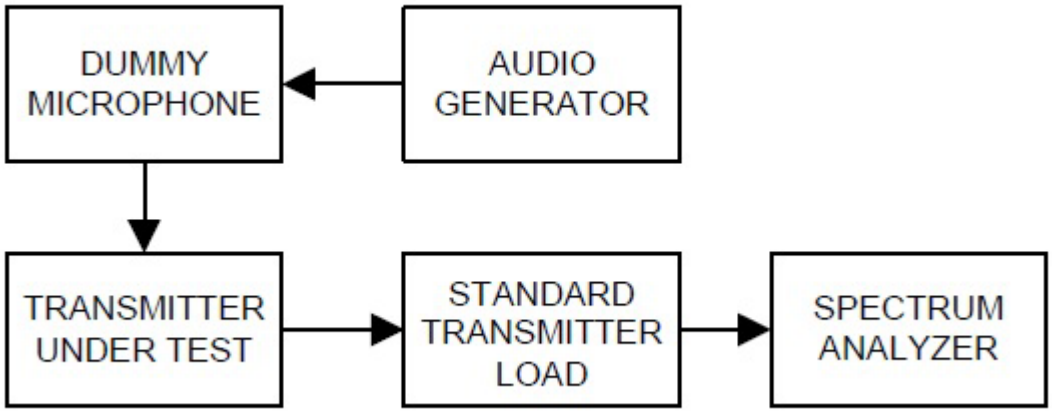


7.5 Emission Mask

▣ Definition

The transmitter Emission Mask denotes the sideband power produced at a discrete frequency separation from the carrier up to the test bandwidth (see 1.3.4.4) due to all sources of unwanted noise within the transmitter in a modulated condition.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

According to 2.2.11 in TIA-603-D Standard.

a) Connect the equipment as illustrated. Use the table to determine the spectrum analyzer resolution bandwidth:

Spectrum Analyzer Resolution Bandwidth

Frequency Band (MHz)	Mask for Equipment with Audio Low Pass Filter	Mask for Equipment without Low Pass Filter	Spectrum Analyzer Resolution Bandwidth (Hz)
25-50	B	C	300
72-76	B	C	300
138-174	NTIA	NTIA	300
150-174	B	C	300
150-174	D or E	D or E	100
406-420	NTIA	NTIA	300
421-512	B	C	300
421-512	D or E	D or E	100
806-821/851-866	B or EA	G or EA	300
821-824/866-869	B	H	300
896-901/935-940	I	J	300

b) Adjust the spectrum analyzer for the following settings:
   1) Resolution Bandwidth per the above table
   2) Video Bandwidth at least 10 times the resolution bandwidth.
   3) Sweep Speed slow enough to maintain measurement calibration.
   4) Detector Mode = Positive Peak.
   5) Span that will allow proper viewing of the test bandwidth (see 1.3.4.4).

c) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency. Key the transmitter, and set the level of the unmodulated carrier to a full scale reference line. This is the 0 dB reference for the measurement.

d) Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation. The input level shall be established at the frequency of maximum response of the audio modulating circuit. Transmitters employing digital modulation techniques that bypass the limiter and the audio low-pass filter shall be modulated as specified by the manufacturer.

e) Record the resulting spectrum analyzer presentation of the emission level with an on-line recording device or in a photograph. It is recommended that the emission limit (as given in 3.2.11) be drawn on the plotted graph or photograph. The spectrum analyzer presentation is the sideband spectrum.