HCT CO.,LTD
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
TEL: +82-31-645-6300 FAX: +82-31-645-6401

FCC REPORT

FCC / IC Certification

Applicant Name:
JVC KENWOOD Corporation

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

Date of Issue:
October 05 , 2015

Test Site/Location:
HCT CO., LTD.,
74, Seoicheon-ro 578beon-gil, Majang-myeon,
Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-R-1510-F003-1

HCT FRN: 0005866421

IC Recognition No.: 5944A-5

FCC ID:	**K44475400**
IC:	**282F-475400**
APPLICANT:	**JVC KENWOOD Corporation**

FCC Model(s):	TK-D240-K, TK-D240-M, TK-D240V-K
IC Model(s):	TK-D240-K
EUT Type:	VHF DIGITAL TRANSCEIVER
FCC Rule Part(s):	Part 90 and Part 2
IC Rule:	RSS-Gen (Issue 4), RSS-119 Issue 12

The measurements shown in this report were made in accordance with the procedures specified in CFR47 section §2.947. 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	Approved by
: Jong Seok Lee	: Kyoung Houn Seo
Test engineer of RF Team	Manager of RF Team

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1510-F003	October 02, 2015	- First Approval Report
HCT-R-1510-F003-1	October 05, 2015	- Revised the Type of Emission

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	JVC KENWOOD Corporation
Address:	1-16-2, Hakusan, Midori-ku, Yokohama-shi, Kanagawa, 226-8525 Japan
FCC ID:	K44475400
IC:	282F-475400
EUT Type:	VHF DIGITAL TRANSCEIVER
FCC Model(s):	TK-D240-K, TK-D240-M, TK-D240V-K
IC Model(s):	TK-D240-K
Date(s) of Tests:	September 01, 2015 ~ September 30, 2015
Place of Tests:	HCT Co., Ltd. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA (IC Recognition No. : 5944A-5)

2. EUT DESCRIPTION

EUT Type	VHF DIGITAL TRANSCEIVER
FCC Model Name	TK-D240-K, TK-D240-M, TK-D240V-K
IC Model Name	TK-D240-K
Power Supply	DC 7.5 V
Output Power	5 W (Power output continuously variable to 1 W)
Battery type	Li-ion Battery (KNB-45L, KNB-69L, KNB-29N, KNB-53N)
Antenna type	KRA-41M VHF Stubby Antenna (146 MHz – 162 MHz)
	KRA-41M2 VHF Stubby Antenna (162 MHz -174 MHz)
	KRA-41M3 VHF Stubby Antenna (136 MHz – 150 MHz)
	KRA-22M VHF Low Profile Helical Antenna (146 MHz – 162 MHz)
	KRA-22M2 VHF Low Profile Helical Antenna (162 MHz -174 MHz)
	KRA-22M3 VHF Low Profile Helical Antenna (136 MHz – 150 MHz)
	KRA-26M VHF Helical Antenna(146 MHz – 162 MHz)
	KRA-26M2 VHF Helical Antenna (162 MHz -174 MHz)
	KRA-26M3 VHF Helical Antenna (136 MHz – 150 MHz)
Channel Bandwidth	FCC : 12.5 kHz IC : 25kHz / 12.5 kHz
Operating Temperature	-30 ℃~ +60 ℃
Frequency Range	FCC : 150 MHz - 174 MHz IC : 138 MHz – 144 MHz and 148 MHz – 174 MHz
Test Frequency	138.05 MHz (IC) 150.05 MHz (FCC) 162.05 MHz (FCC / IC) 173.95 MHz (FCC / IC)

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)
7K60FXD/7K60FXE	(Digital)

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. TEST FACILITY

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, 17383, Rep. of 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)	IC Part Section(s)	Test Limit	Test Condition	Test Result
Carrier RF Output Power	§90.205(i) §2.1046(a)	RSS119-i11(5.4)	Varies	CONDUCTED	PASS
Unwanted Emissions	§2.1051	RSS119-i11(5.8)			PASS
99% Bandwidth(IC)	NA	NA	NA		PASS
Carrier Frequency Stability	§90.213(a), §2.1055	RSS119-i11(5.3)	Channel Spacing : 12.5 kHz = 2.5 ppm Channel Spacing : 25 kHz = 5 ppm		PASS
Audio Frequency Response	§2.1047(a)	RSS119-i11(5.8.1)	Varies		PASS
Audio Low Pass Filter	§2.1047(a)	RSS119-i11(5.8.1)			PASS
Modulation Limiting	§2.1047(b)	RSS119-i11(5.8.1)			PASS
Transient Frequency Behavior	§90.214	RSS119-i11(5.9)	Varies		PASS
Emission Mask	§90.210, §2.1049(c)(1)	RSS119-i11(5.5)	Varies		PASS
Field Strength of Spurious Radiation	§2.1053	RSS119-i11(5.8)	Varies	RADIATED	PASS
Receiver Spurious Emissions	§15.109(a)	RSS119-i11(5.11) RSS-Gen	cf. Section 7.1		PASS
Necessary Bandwidth	§2.202(g)		-	-	-

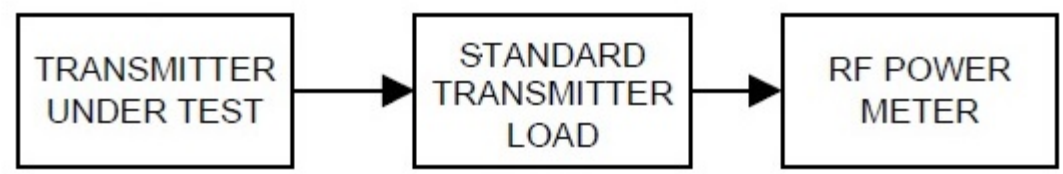
7. TEST RESULT

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

For FCC

Mode	Type of Emission	Channel Spacing	Freq.(MHz)	Carrier Output Power			
				Low		High	
				dBm	W	dBm	W
Analog	11K0F3E	12.5 kHz	150.05	29.817	0.959	36.984	4.993
			162.05	29.444	0.880	36.734	4.714
			173.95	29.800	0.955	36.626	4.598
Digital	7K60FXD/7K60FXE	12.5 kHz	150.05	30.630	1.156	37.050	5.070
			162.05	29.673	0.927	36.593	4.564
			173.95	29.585	0.909	36.194	4.163

For IC

Mode	Type of Emission	Channel Spacing	Freq.(MHz)	Carrier Output Power			
				Low		High	
				dBm	W	dBm	W
Analog	11K0F3E	12.5 kHz	138.05	30.074	1.017	37.044	5.063
			162.05	29.237	0.839	36.732	4.712
			173.95	29.627	0.918	36.560	4.529
	16K0F3E	25.0 kHz	138.05	30.002	1.001	37.051	5.071
			162.05	29.216	0.835	36.724	4.703
			173.95	29.438	0.879	36.563	4.533
Digital	7K60FXD/7K60FXE	12.5 kHz	138.05	30.208	1.049	36.784	4.769
			162.05	29.574	0.907	36.454	4.420
			173.95	29.366	0.864	36.118	4.091

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 - 7K60FXD/7K60FXE For ONLY FCC

(1) Frequency Stability (Temperature Variation)

150.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	150.049919748	-0.534835
-20	150.049919644	-0.535528
-10	150.049919576	-0.535981
0	150.049918549	-0.542826
10	150.049928516	-0.476401
20	150.050002853	0.019013
30	150.049863896	-0.907058
40	150.049860247	-0.931376

150.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	150.049918015	-0.546385
-20	150.049918226	-0.544978
-10	150.049917649	-0.548824
0	150.049918546	-0.542846
10	150.049965121	-0.232449
20	150.050006126	0.040824
30	150.049864552	-0.902686
40	150.049860498	-0.929703
50	150.049858214	-0.944925

(2)Frequency Stability (Voltage Variation)

150.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	150.050002906	0.019366
25	100	7.40	150.050002153	0.014351
25	115	8.51	150.050003442	0.022939

150.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	150.050006468	0.043109
25	100	7.40	150.050006618	0.044106
25	115	8.51	150.050006217	0.041431

▣TEST RESULTS - 11K0F3E For ONLY FCC

(1) Frequency Stability (Temperature Variation)

150.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	150.049992014	-0.053222
-20	150.049993846	-0.041013
-10	150.049993974	-0.040160
0	150.049996788	-0.021406
10	150.049989598	-0.069324
20	150.049993228	-0.045129
30	150.049991267	-0.058201
40	150.049987594	-0.082679
50	150.049973763	-0.174855

150.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	150.050015221	0.101440
-20	150.049989156	-0.072269
-10	150.049992978	-0.046798
0	150.049992924	-0.047158
10	150.049989186	-0.072069
20	150.049972098	-0.185951
30	150.049971498	-0.189950
40	150.049971411	-0.190530
50	150.049971438	-0.190350

(2)Frequency Stability (Voltage Variation)

150.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	150.049992954	-0.046957
25	100	7.40	150.049992855	-0.047620
25	115	8.51	150.049993332	-0.044439

150.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	150.049971858	-0.187553
25	100	7.40	150.049971418	-0.190481
25	115	8.51	150.049971825	-0.187770

▣TEST RESULTS - 7K60FXD/7K60FXE For FCC AND IC

(1) Frequency Stability (Temperature Variation)

162.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	162.049914995	-0.524560
-20	162.049914954	-0.524813
-10	162.049911649	-0.545208
0	162.049895462	-0.645097
10	162.049870025	-0.802067
20	162.049871861	-0.790738
30	162.049870581	-0.798636
40	162.049868412	-0.812021
50	162.049845890	-0.951003

173.95 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	173.949909684	-0.519207
-20	173.949908666	-0.525059
-10	173.949907516	-0.531670
0	173.949855678	-0.829675
10	173.949854338	-0.837379
20	173.949854364	-0.837227
30	173.949854319	-0.837488
40	173.949852687	-0.846870
50	173.949835533	-0.945484

162.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	162.049914653	-0.526671
-20	162.049914305	-0.528818
-10	162.049900984	-0.611021
0	162.049868459	-0.811731
10	162.049862783	-0.846757
20	162.049863803	-0.840464
30	162.049851914	-0.913829
40	162.049848975	-0.931965
50	162.049846752	-0.945683

173.95 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	173.949907041	-0.534401
-20	173.949907961	-0.529112
-10	173.949900657	-0.571101
0	173.949855816	-0.828882
10	173.949854981	-0.833682
20	173.949854834	-0.834526
30	173.949839319	-0.923719
40	173.949835341	-0.946588
50	173.949835614	-0.945019

(2)Frequency Stability (Voltage Variation)

162.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	162.049871760	-0.791361
25	100	7.40	162.049871500	-0.792963
25	115	8.51	162.049871666	-0.791941

173.95 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	173.949853998	-0.839331
25	100	7.40	173.949854310	-0.837539
25	115	8.51	173.949854150	-0.838460

162.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	162.049863805	-0.840448
25	100	7.40	162.049863805	-0.840452
25	115	8.51	162.049863800	-0.840481

173.95 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	173.949854879	-0.834267
25	100	7.40	173.949854881	-0.834260
25	115	8.51	173.949854898	-0.834158

▣TEST RESULTS - 11K0F3E For FCC AND IC

(1) Frequency Stability (Temperature Variation)

162.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	162.049986463	-0.083536
-20	162.049992895	-0.043844
-10	162.049992855	-0.044091
0	162.049990786	-0.056859
10	162.049990059	-0.061345
20	162.049968373	-0.195168
30	162.049969456	-0.188485
40	162.049970216	-0.183795
50	162.049973922	-0.160926

173.95 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	173.949982445	-0.100920
-20	173.949984656	-0.088209
-10	173.949983541	-0.094619
0	173.949982648	-0.099753
10	173.949982778	-0.099005
20	173.949964302	-0.205220
30	173.949965815	-0.196522
40	173.949968214	-0.182731
50	173.949972503	-0.158074

162.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	162.049990555	-0.058284
-20	162.049990785	-0.056865
-10	162.049990851	-0.056458
0	162.049980653	-0.119389
10	162.049970216	-0.183795
20	162.049967034	-0.203431
30	162.049969059	-0.190935
40	162.049969408	-0.188781
50	162.049969403	-0.188812

173.95 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	173.949972966	-0.155412
-20	173.949973771	-0.150785
-10	173.949973810	-0.150561
0	173.949973994	-0.149503
10	173.949970657	-0.168686
20	173.949964919	-0.201673
30	173.949965029	-0.201041
40	173.949966496	-0.192607
50	173.949967368	-0.187594

(2)Frequency Stability (Voltage Variation)

162.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	162.049968095	-0.196882
25	100	7.40	162.049967955	-0.197749
25	115	8.51	162.049968025	-0.197318

173.95 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	173.949964255	-0.205489
25	100	7.40	173.949964421	-0.204535
25	115	8.51	173.949964188	-0.205877

162.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	162.049967504	-0.200529
25	100	7.40	162.049967457	-0.200818
25	115	8.51	162.049967322	-0.201653

173.95 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	173.949964843	-0.202112
25	100	7.40	173.949965050	-0.200922
25	115	8.51	173.949965153	-0.200325

▣TEST RESULTS - 7K60FXD/7K60FXE For ONLY IC

(1) Frequency Stability (Temperature Variation)

138.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	138.049926928	-0.529315
-20	138.049925780	-0.537631
-10	138.049911598	-0.640362
0	138.049892615	-0.777870
10	138.049894657	-0.763079
20	138.049893644	-0.770415
30	138.049892289	-0.780232
40	138.049889052	-0.803680
50	138.049870757	-0.936204

138.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	138.049926922	-0.529359
-20	138.049928161	-0.520384
-10	138.049919548	-0.582774
0	138.049881846	-0.855878
10	138.049881259	-0.860130
20	138.049883199	-0.846075
30	138.049874651	-0.907997
40	138.049873598	-0.915625
50	138.049871135	-0.933466

138.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	138.049893454	-0.771790
25	100	7.40	138.049892962	-0.775358
25	115	8.51	138.049893160	-0.773925

138.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	138.049883432	-0.844387
25	100	7.40	138.049883217	-0.845944
25	115	8.51	138.049883432	-0.844389

▣TEST RESULTS - 11K0F3E For ONLY IC

(1) Frequency Stability (Temperature Variation)

138.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	138.049992844	-0.051836
-20	138.049992841	-0.051858
-10	138.049993417	-0.047686
0	138.049992541	-0.054031
10	138.049987165	-0.092974
20	138.049972835	-0.196780
30	138.049972948	-0.195958
40	138.049973549	-0.191604
50	138.049974587	-0.184085

138.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	138.049994052	-0.043086
-20	138.049994893	-0.036994
-10	138.049994751	-0.038022
0	138.049996571	-0.024839
10	138.049996789	-0.023260
20	138.049972271	-0.200860
30	138.049973259	-0.193705
40	138.049975492	-0.177530
50	138.049972447	-0.199587

138.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	138.049972836	-0.196768
25	100	7.40	138.049972554	-0.198813
25	115	8.51	138.049972500	-0.199203

138.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	138.049972532	-0.198974
25	100	7.40	138.049972162	-0.201650
25	115	8.51	138.049972366	-0.200172

▣TEST RESULTS - 16K0F3E For ONLY IC

(1) Frequency Stability (Temperature Variation)

138.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	138.049960901	-0.283223
-20	138.049959393	-0.294147
-10	138.049961267	-0.280572
0	138.050011130	0.080623
10	138.050012926	0.093633
20	138.049978510	-0.155670
30	138.049987990	-0.086997
40	138.049978918	-0.152713
50	138.049977285	-0.164542

162.05 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	162.049952793	-0.291311
-20	162.049957938	-0.259562
-10	162.049959995	-0.246868
0	162.049957905	-0.259766
10	162.049958465	-0.256310
20	162.049971724	-0.174490
30	162.049968459	-0.194637
40	162.049968994	-0.191336
50	162.049969480	-0.188337

173.95 MHz (High Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	173.949955042	-0.258454
-20	173.949954081	-0.263978
-10	173.949952519	-0.272958
0	173.949965489	-0.198396
10	173.949966159	-0.194544
20	173.949967813	-0.185034
30	173.949965194	-0.200092
40	173.949965002	-0.201196
50	173.949965085	-0.200719

138.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	138.049975292	-0.178979
-20	138.049978674	-0.154480
-10	138.049978672	-0.154495
0	138.049978549	-0.155386
10	138.049977948	-0.159739
20	138.049975894	-0.174615
30	138.049974915	-0.181710
40	138.049973218	-0.194002
50	138.049971276	-0.208070

162.05 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	162.049957609	-0.261592
-20	162.049957512	-0.262191
-10	162.049957119	-0.264616
0	162.049956457	-0.268701
10	162.049960787	-0.241981
20	162.049970270	-0.183463
30	162.049970994	-0.178994
40	162.049968125	-0.196699
50	162.049966917	-0.204153

173.95 MHz (Low Power)

Temperature (Degree C)	Frequency (MHz)	Frequency stability (ppm)
-30	173.949957372	-0.245059
-20	173.949957645	-0.243490
-10	173.949956892	-0.247818
0	173.949956127	-0.252216
10	173.949960249	-0.228520
20	173.949966972	-0.189871
30	173.949969516	-0.175246
40	173.949967341	-0.187749
50	173.949965234	-0.199862

(2)Frequency Stability (Voltage Variation)

138.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	138.049978177	-0.158081
25	100	7.40	138.049977814	-0.160713
25	115	8.51	138.049978022	-0.159202

162.05 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	162.049971450	-0.176182
25	100	7.40	162.049971202	-0.177710
25	115	8.51	162.049971267	-0.177312

173.95 MHz (High Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	173.949968127	-0.183232
25	100	7.40	173.949968174	-0.182960
25	115	8.51	173.949968049	-0.183682

138.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	138.049975626	-0.176558
25	100	7.40	138.049975486	-0.177571
25	115	8.51	138.049975570	-0.176962

162.05 MHz (Low Power)

Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	162.049970247	-0.183603
25	100	7.40	162.049970300	-0.183275
25	115	8.51	162.049970353	-0.182948

173.95 MHz (Low Power)

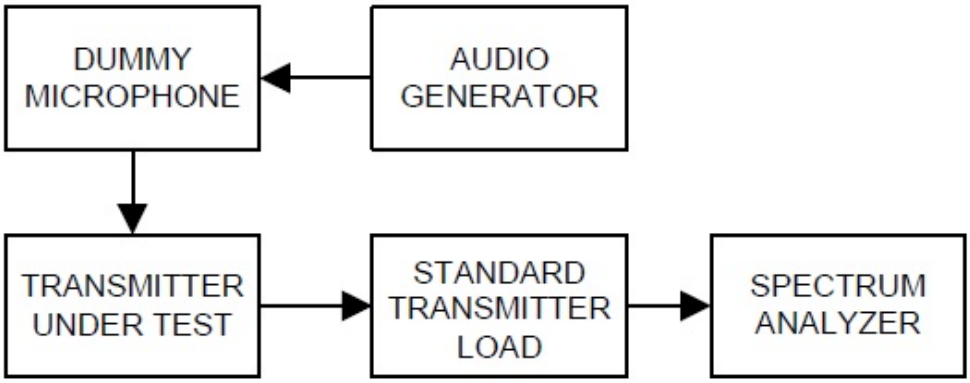
Temperature (Degree C)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)
25	85	6.29	173.949966931	-0.190108
25	100	7.40	173.949967179	-0.188683
25	115	8.51	173.949967114	-0.189054

7.3 Occupied Bandwidth

▣Definition

The transmitter sideband spectrum denotes the sideband power produced at a discrete frequency separation from the carrier up to the test bandwidth (see TIA-603-D Section 1.3.4.4) due to all sources of unwanted noise within the transmitter in a modulated condition.

▣ TEST CONFIGURATION



▣TEST PROCEDURE

According to TIA-603-D Section 2.2.11.2 / RSS-119 Section 5.5

a) For EUT supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for +/- 2.5 kHz deviation (or 50 % modulation). (FM modulation).

b) With level constant, the signal level was increased 16 dB..

c) For EUT supporting digital modulation, the digital modulation mode was operated to its maximum extent.

d) Adjust the spectrum analyzer for the following setting:

1) RBW : 100Hz (Non modulation and Authorized Band 6 kHz),
100Hz (Non modulation and Authorized Band 11.25 kHz),
300Hz (Non modulation and Authorized Band 20 kHz).

2) VBW : Video Bandwidth at least 10 times the resolution bandwidth.

4) Sweep Speed : Sweep Speed slow enough to maintain measurement calibration.

5) Sampling Time : 10 times

6) Detector Mode = Positive Peak.

e) The occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

▣LIMIT

Frequency Band (MHz)	Channel Spacing (kHz)	Authorized Bandwidth (kHz)
138- 174	25	20
	12.5	11.25

▣TEST RESULTS

Conducted 99% Bandwidth Measurements for 7K60FXD/7K60FXE

7K60FXD/7K60FXE Mode		Measured Bandwidth [kHz]	Setting
Frequency [MHz]	Channel bandwidth		
138.05	12.5 kHz	7.433	High Power
150.05		7.572	
162.05		7.512	
173.95		7.361	
138.05	12.5 kHz	7.409	Low Power
150.05		7.578	
162.05		7.508	
173.95		7.358	

Conducted 99% Bandwidth Measurements for 11K0F3E

11K0F3E Mode		Measured Bandwidth [kHz]	Setting
Frequency [MHz]	Channel bandwidth		
138.05	12.5 kHz	5.677	High Power
150.05		7.831	
162.05		5.745	
173.95		5.244	
138.05	12.5 kHz	5.696	Low Power
150.05		7.556	
162.05		6.313	
173.95		5.255	

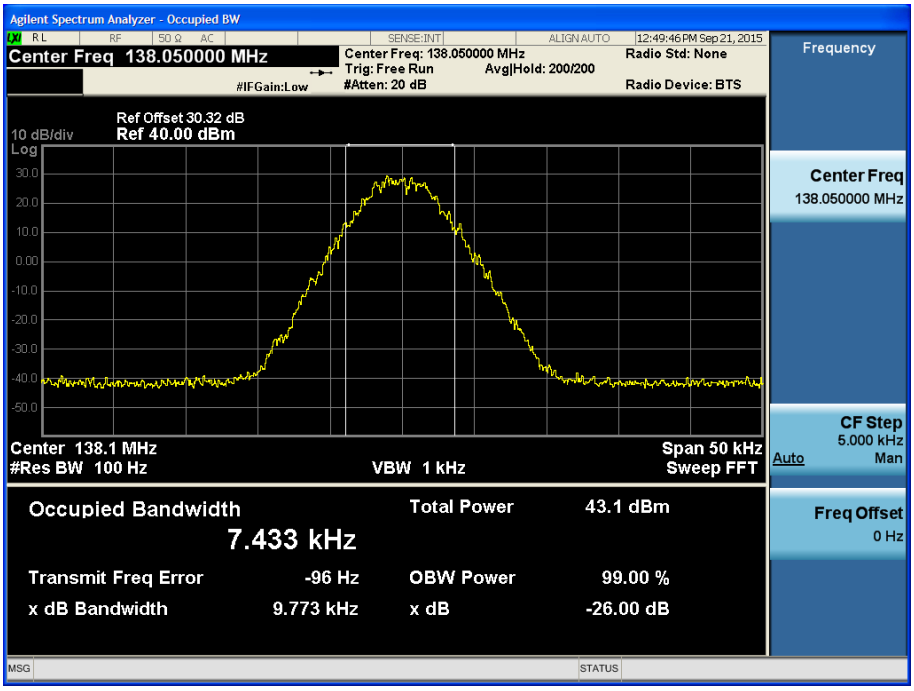
Conducted 99% Bandwidth Measurements for 16K0F3E

16K0F3E Mode		Measured Bandwidth [kHz]	Setting
Frequency [MHz]	Channel bandwidth		
138.05	25 kHz	10.678	High Power
162.05		10.764	
173.95		10.654	
138.05	25 kHz	10.674	Low Power
162.05		10.769	
173.95		10.665	

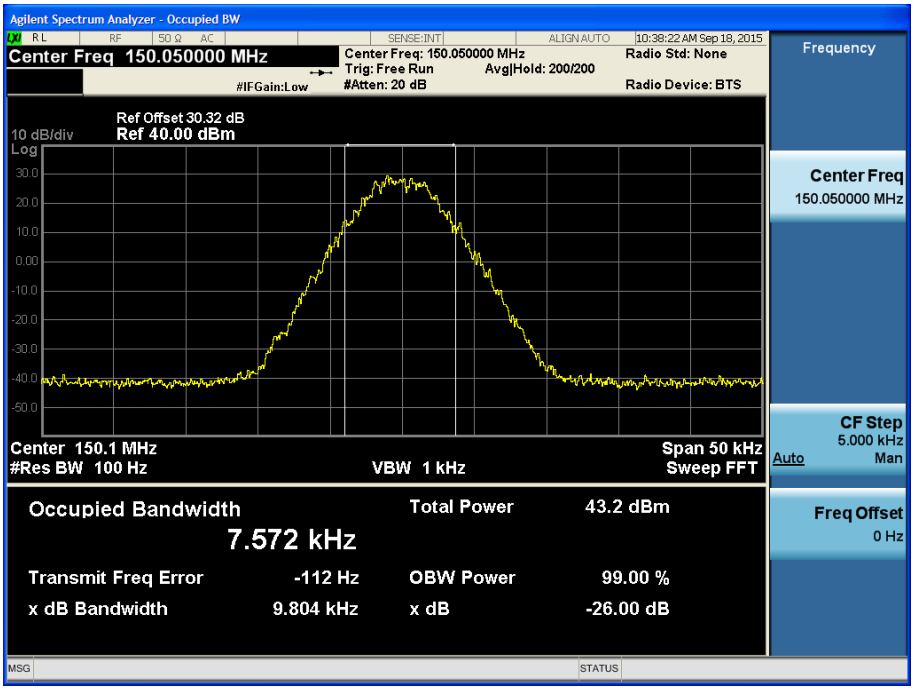
▣TEST PLOT

7K60FXD/7K60FXE:

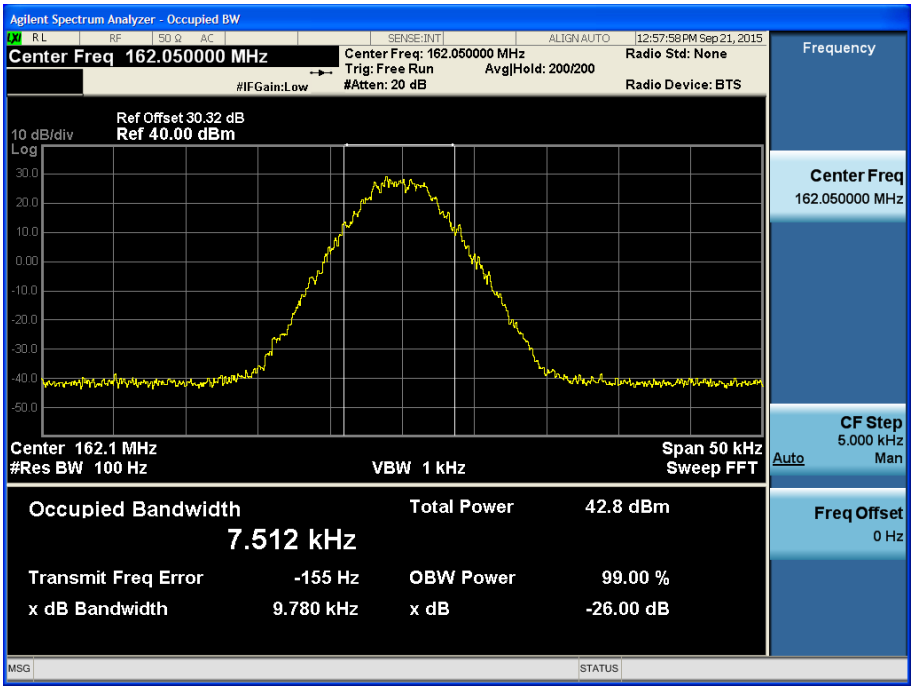
99% Bandwidth plot_HIGH POWER_7K60FXD/7K60FXE _138.05 MHz



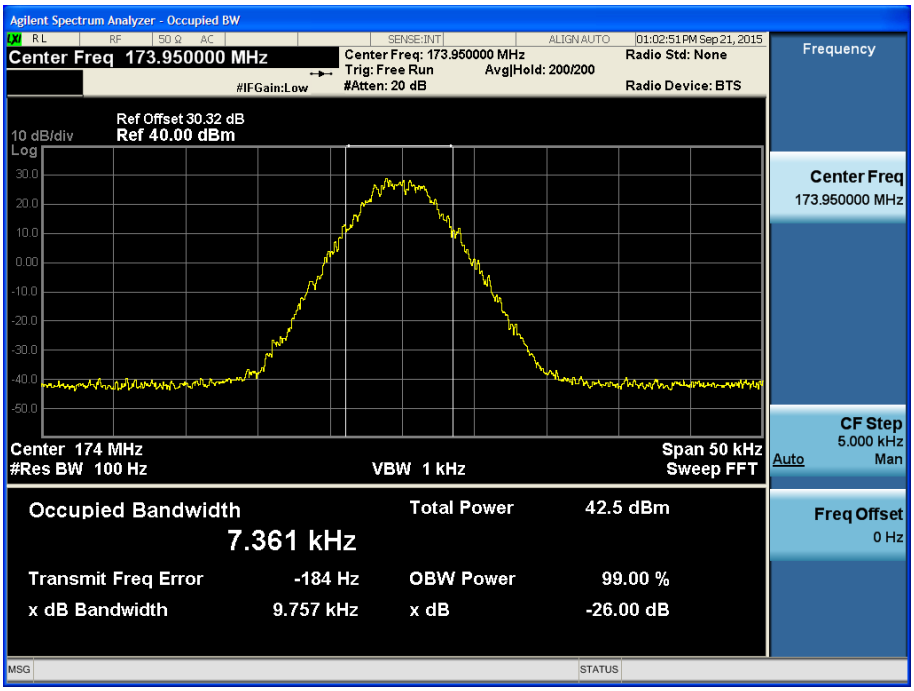
99% Bandwidth plot_HIGH POWER_7K60FXD/7K60FXE _150.05 MHz



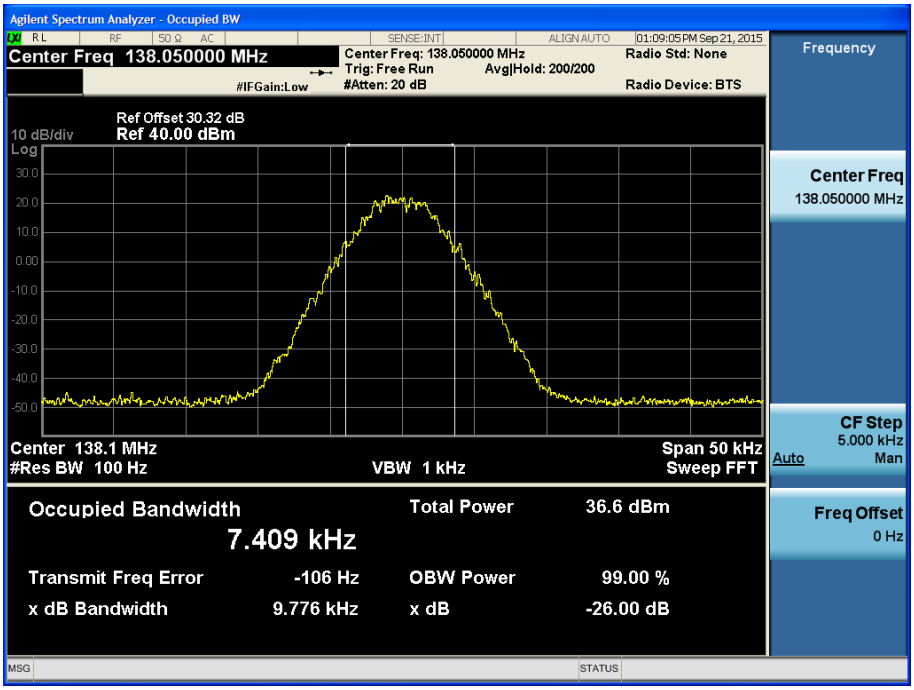
99% Bandwidth plot_HIGH POWER_7K60FXD/7K60FXE _162.05 MHz



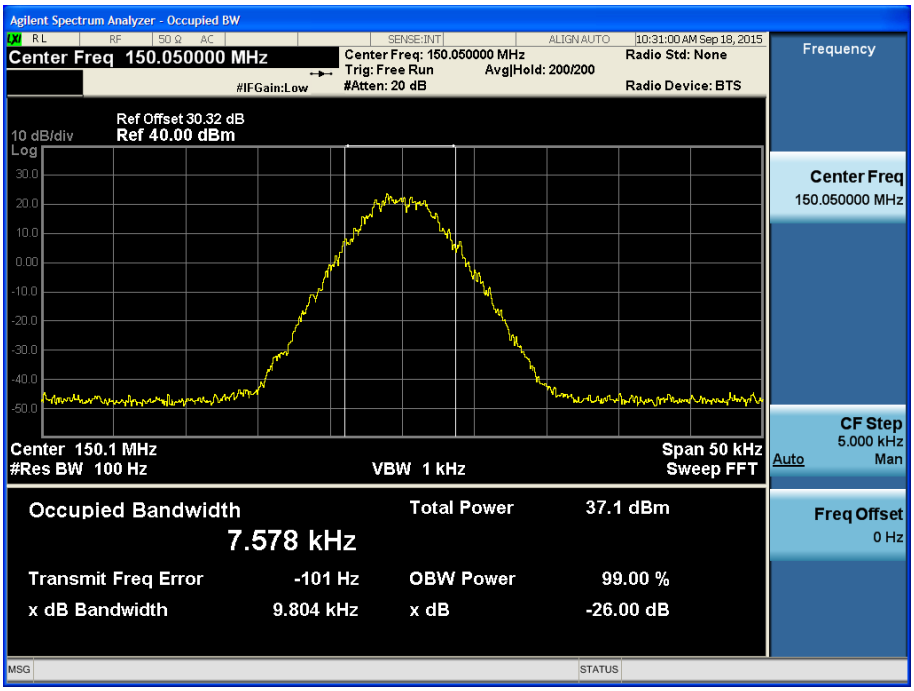
99% Bandwidth plot_ HIGH POWER_7K60FXD/7K60FXE _173.95 MHz



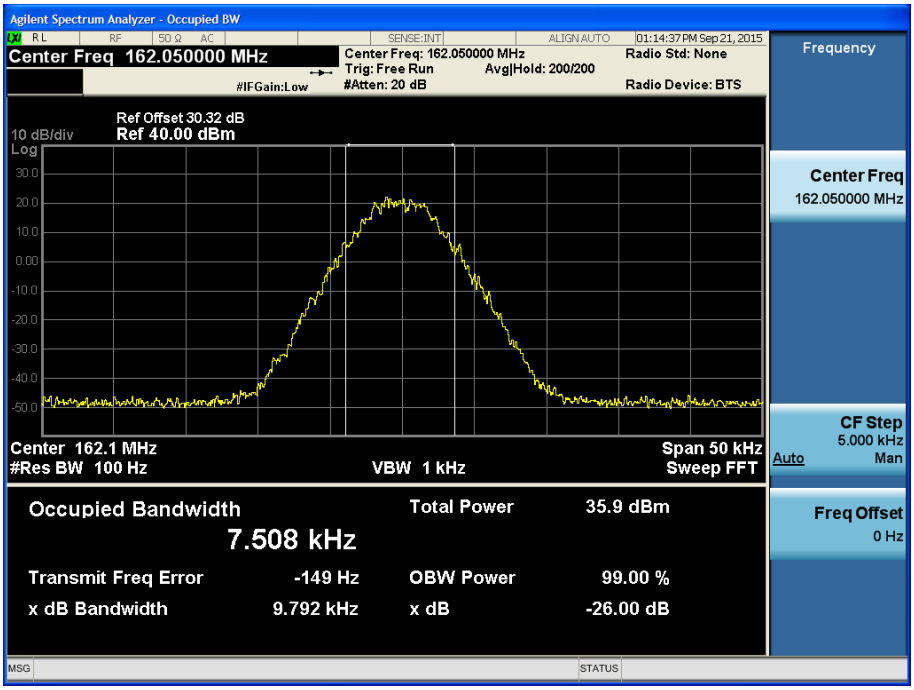
99% Bandwidth plot_LOW POWER_7K60FXD/7K60FXE _138.05 MHz



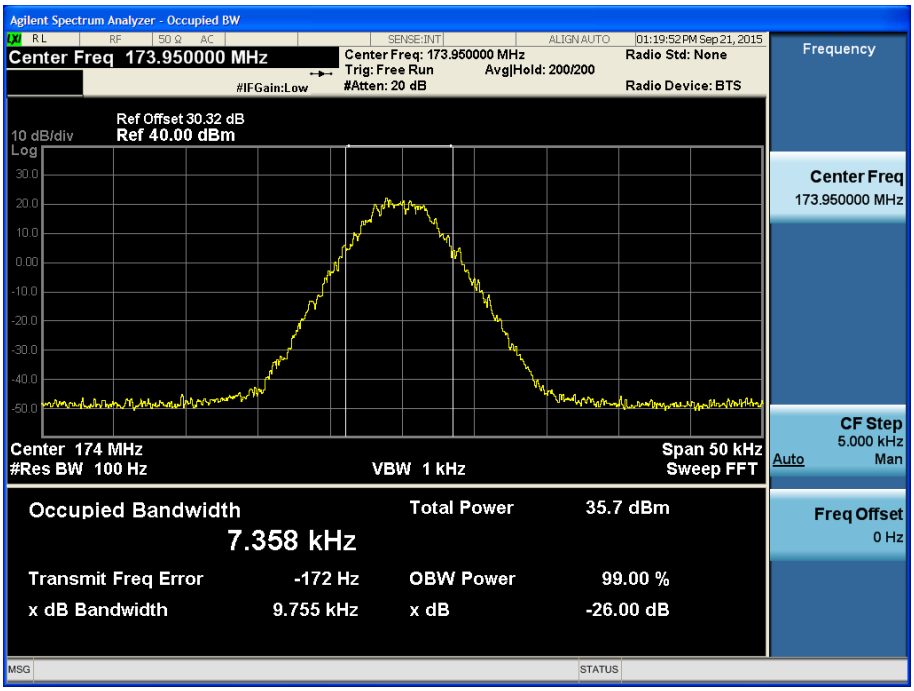
99% Bandwidth plot_ LOW POWER_7K60FXD/7K60FXE _150.05 MHz



99% Bandwidth plot_ LOW POWER_7K60FXD/7K60FXE _162.05 MHz

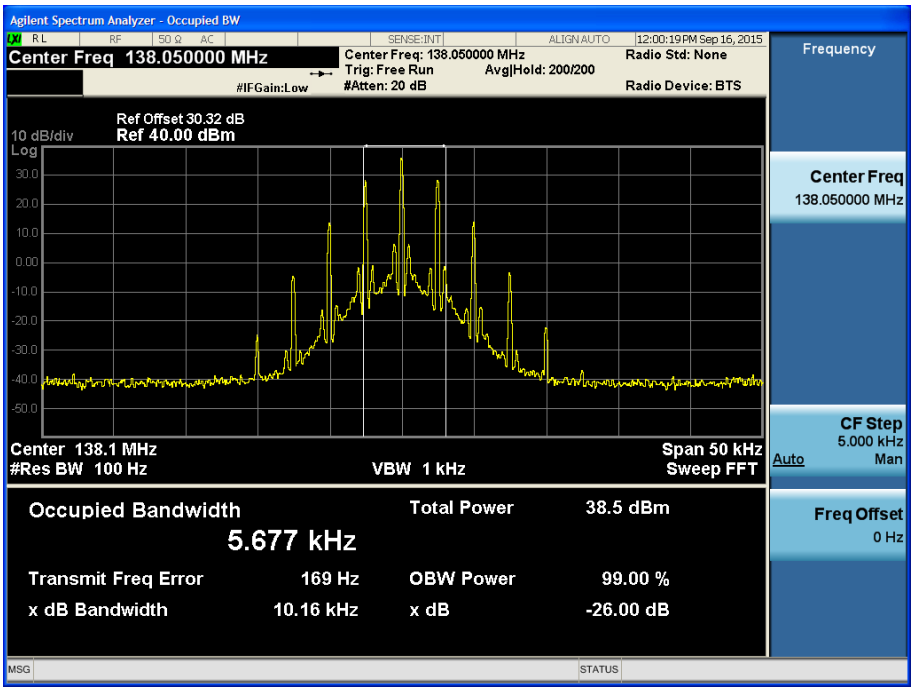


99% Bandwidth plot_LOW POWER_7K60FXD/7K60FXE _173.95 MHz

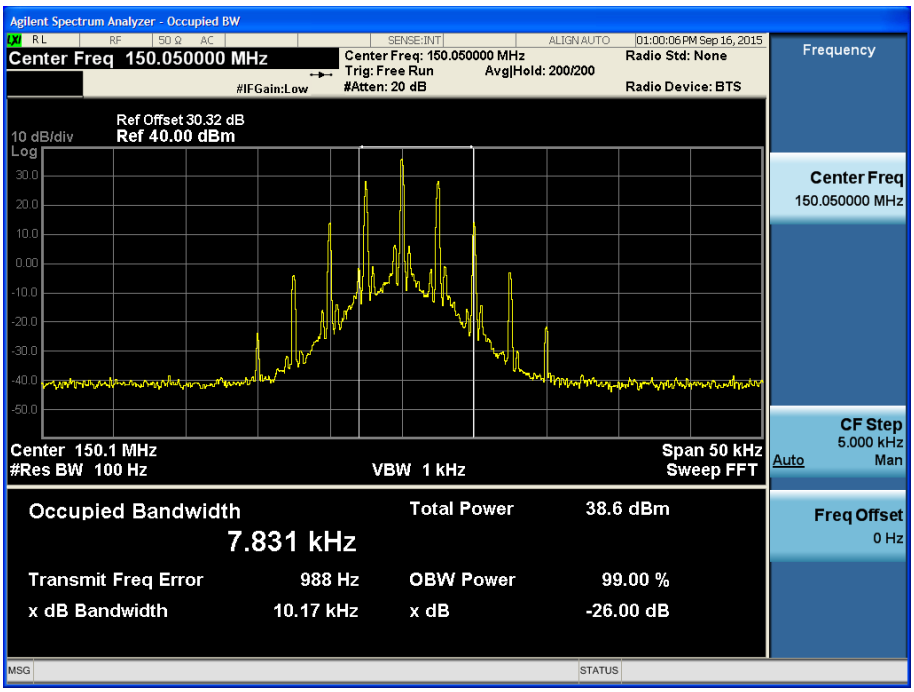


11K0F3E:

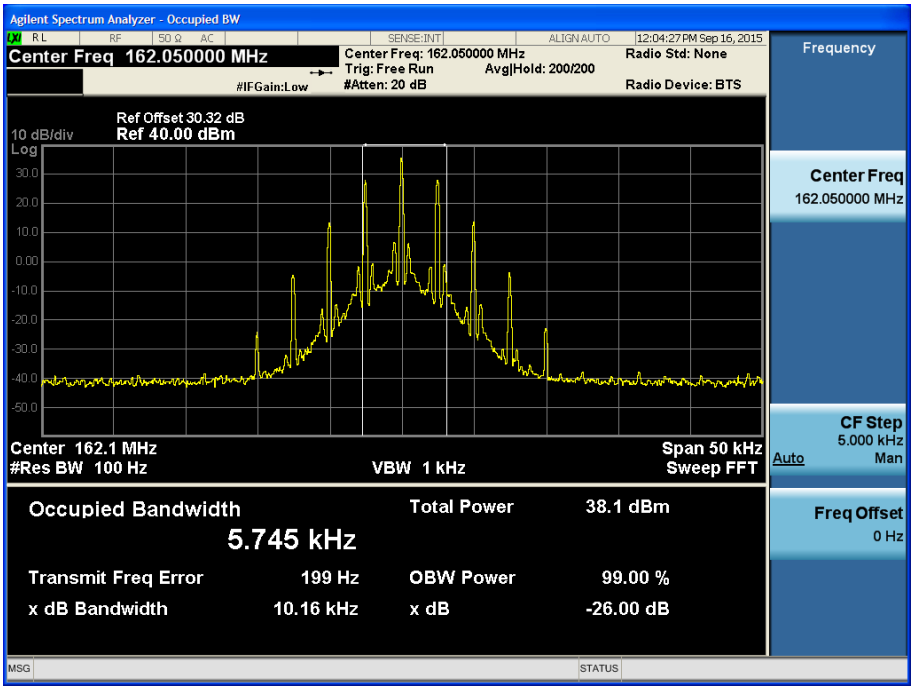
99% Bandwidth plot_HIGH POWER_11K0F3E_138.05 MHz



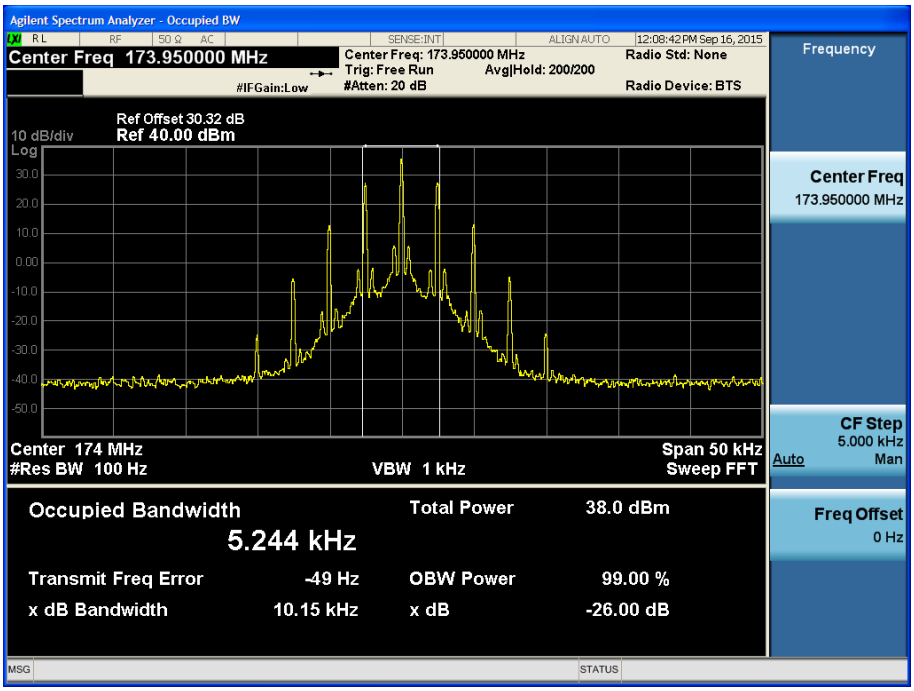
99% Bandwidth plot_HIGH POWER_11K0F3E_150.05 MHz



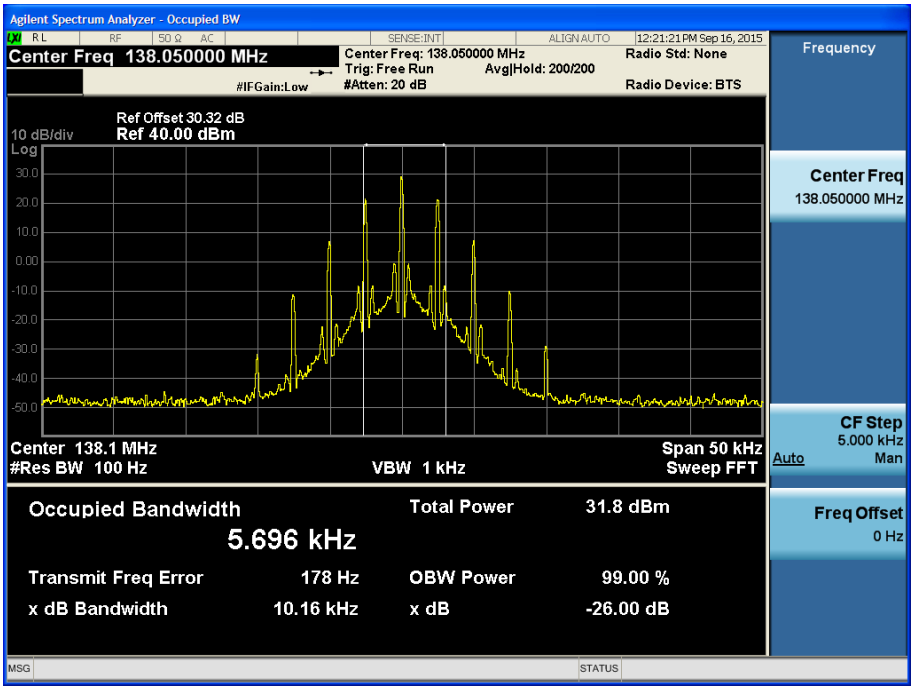
99% Bandwidth plot_HIGH POWER_11K0F3E_162.05 MHz



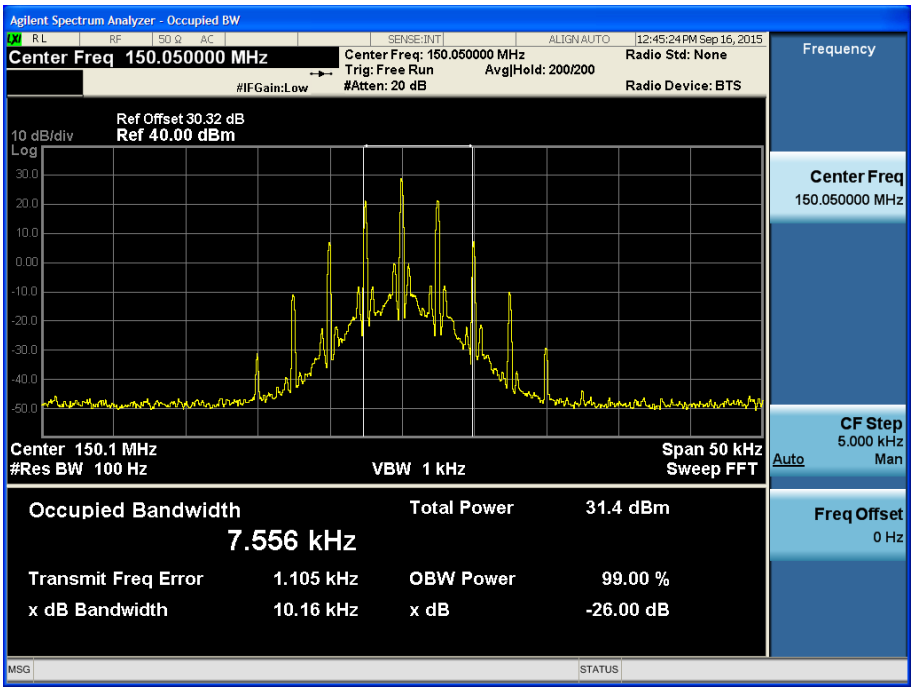
99% Bandwidth plot_ HIGH POWER_11K0F3E _173.95 MHz



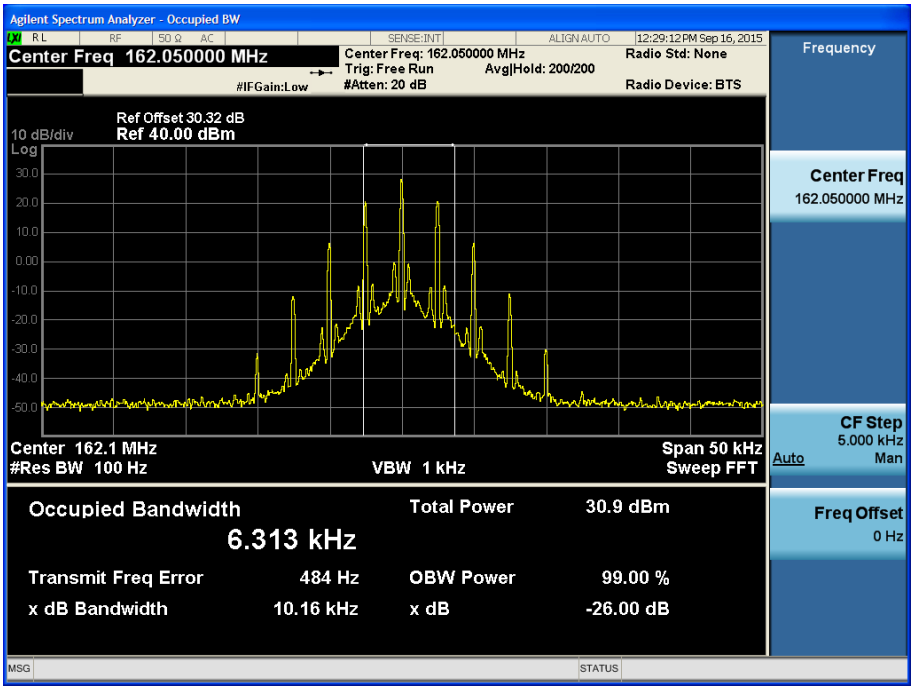
99% Bandwidth plot_LOW POWER_11K0F3E_138.05 MHz



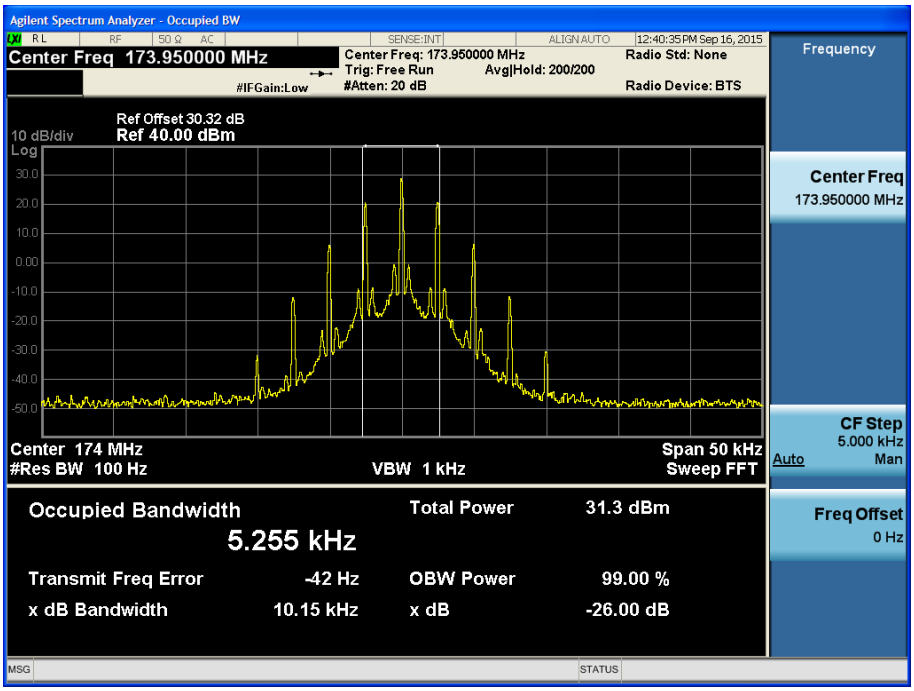
99% Bandwidth plot_ LOW POWER_11K0F3E_150.05 MHz



99% Bandwidth plot_ LOW POWER_11K0F3E_162.05 MHz

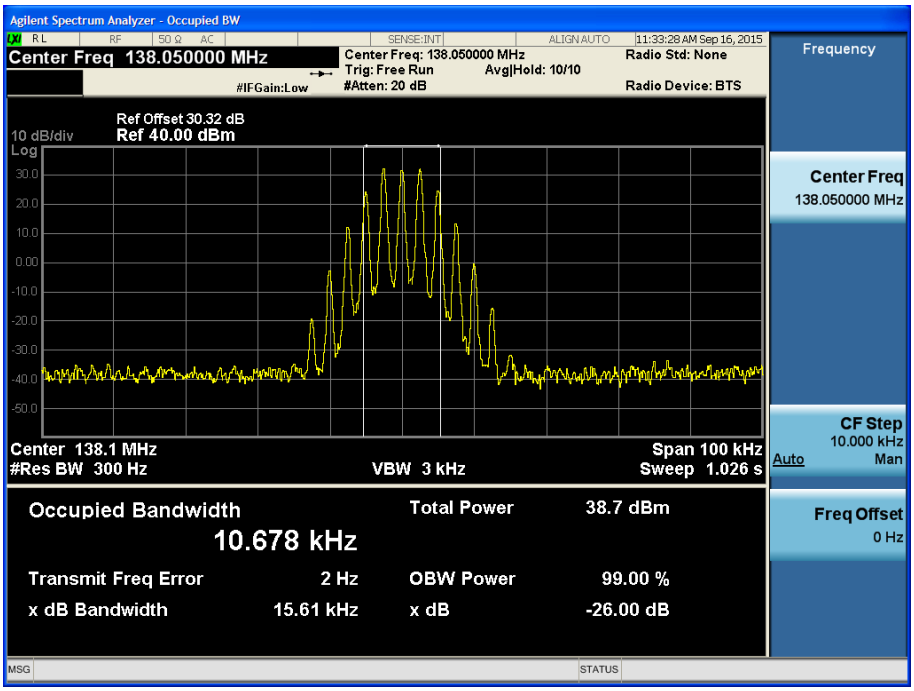


99% Bandwidth plot_LOW POWER_11K0F3E _173.95 MHz

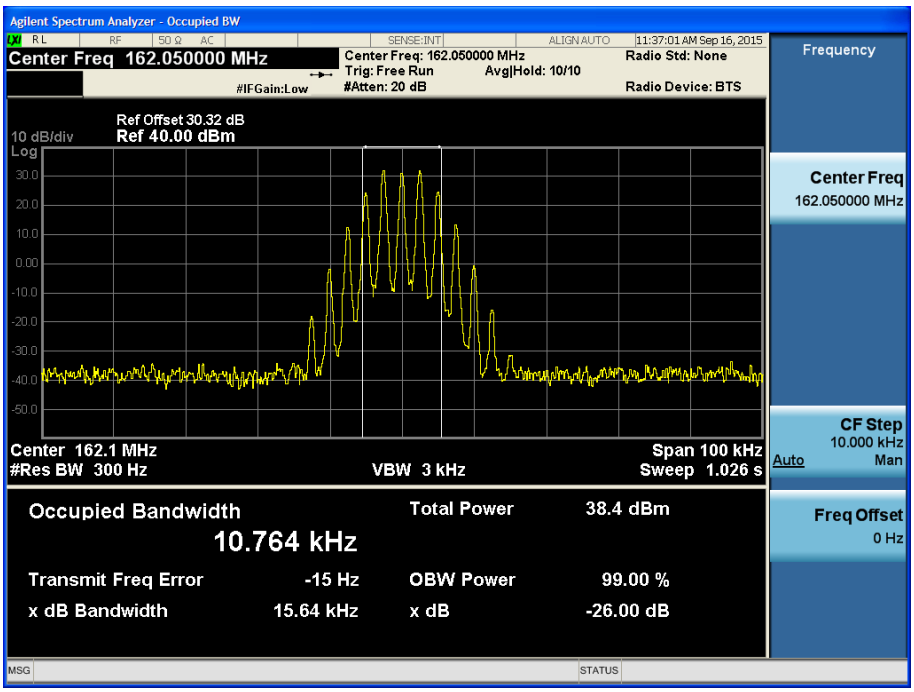


16K0F3E:

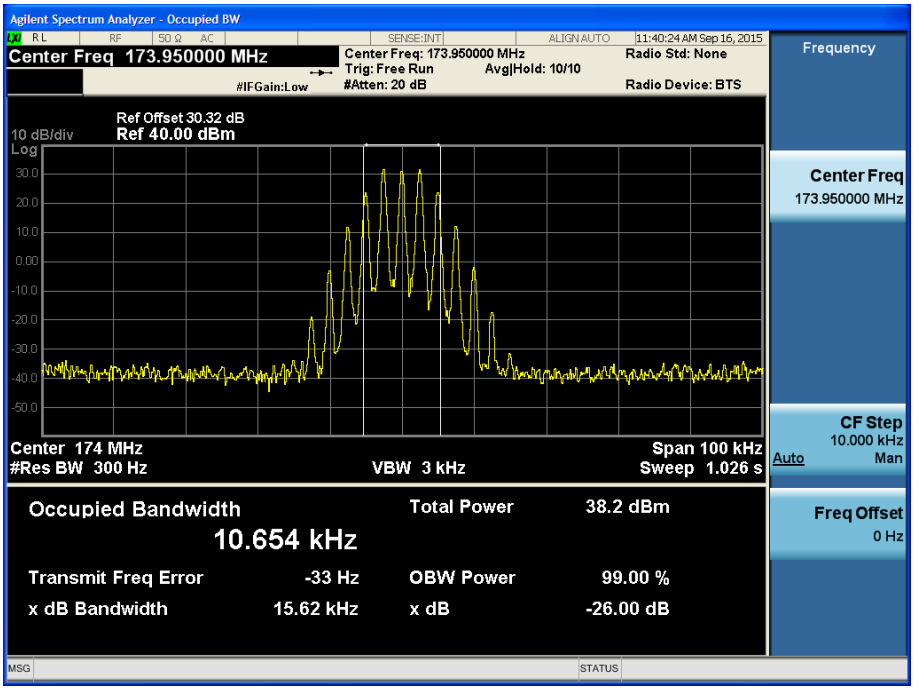
99% Bandwidth plot_HIGH POWER_16K0F3E_138.05 MHz



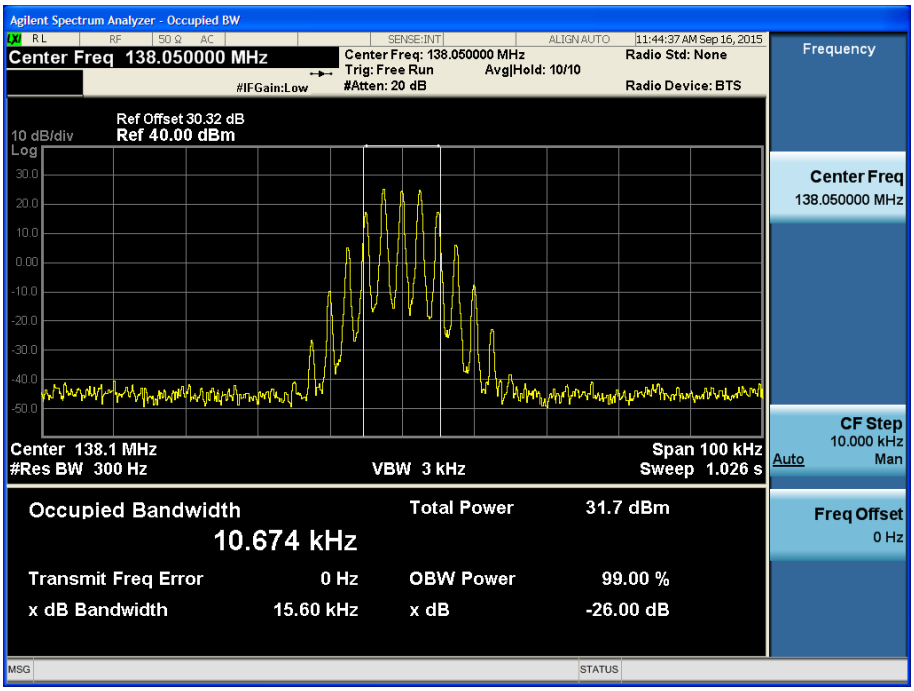
99% Bandwidth plot_HIGH POWER_16K0F3E_162.05 MHz



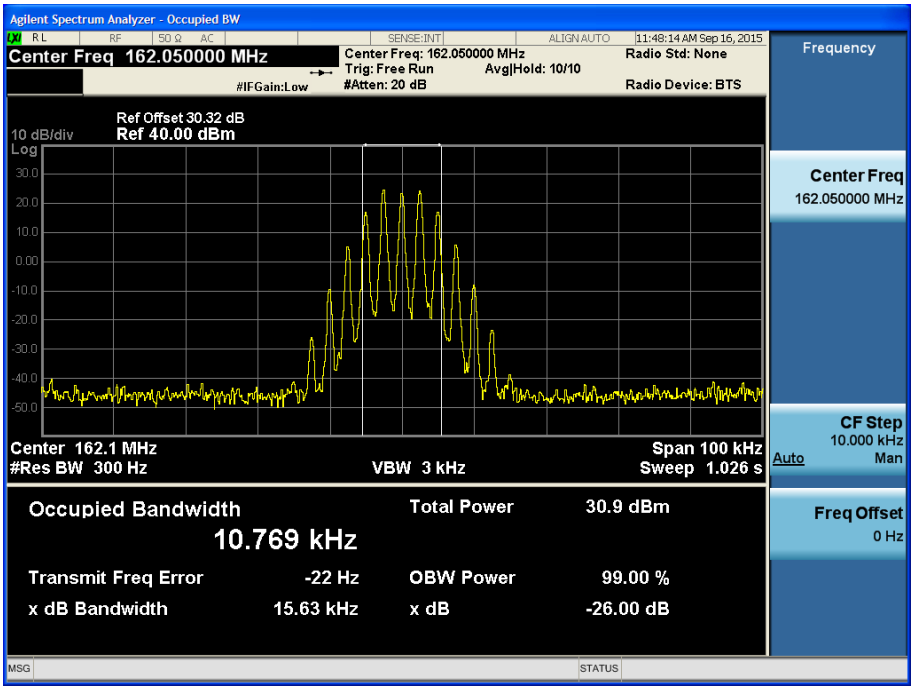
99% Bandwidth plot_HIGH POWER_16K0F3E_173.95 MHz



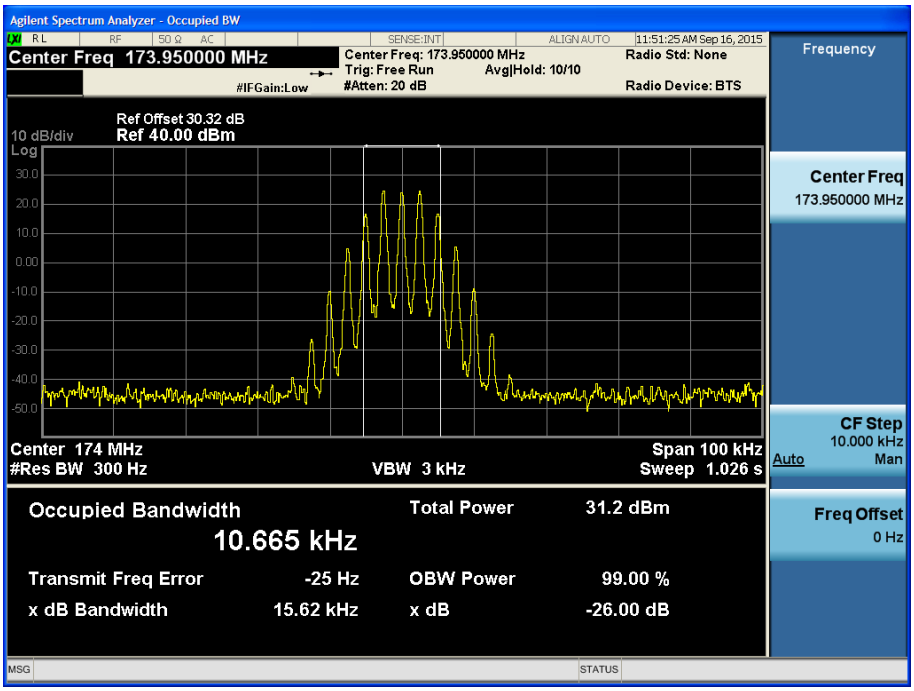
99% Bandwidth plot_LOW POWER_16K0F3E _138.05 MHz



99% Bandwidth plot_LOW POWER_16K0F3E _162.05 MHz



99% Bandwidth plot_LOW POWER_16K0F3E _173.95 MHz

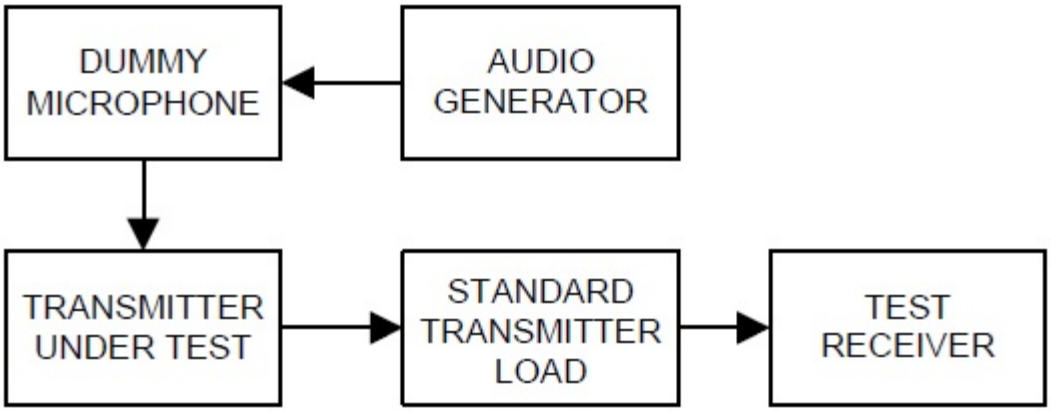


7.4 Modulation Limiting

▣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).

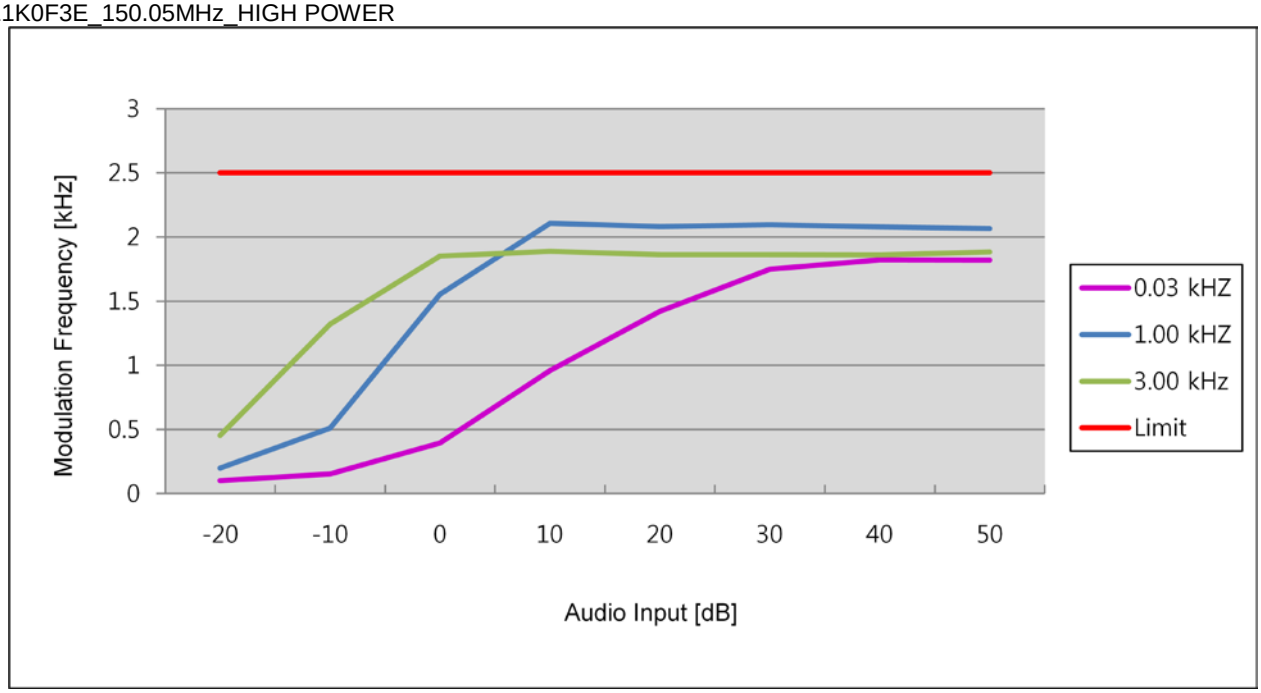
i) The values recorded in steps g) and h) are the modulation limiting.

▣TEST RESULTS

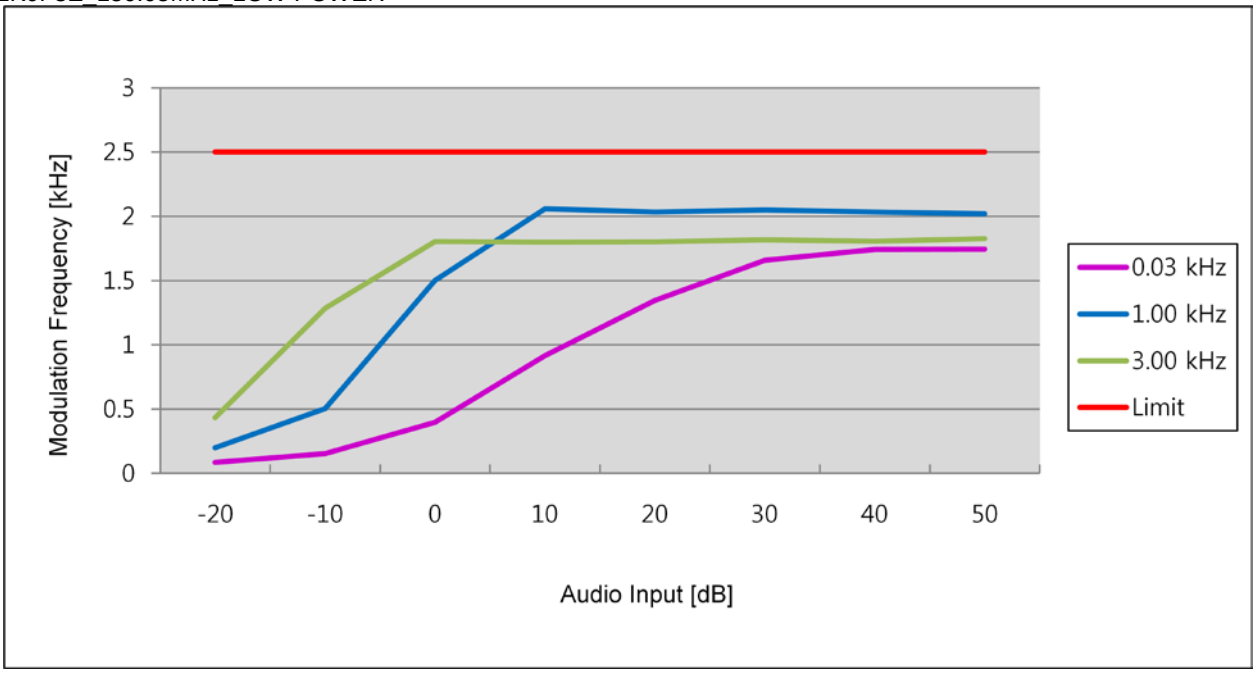
11K0F3E For ONLY FCC

Positive Peaks

11K0F3E_150.05MHz_HIGH POWER

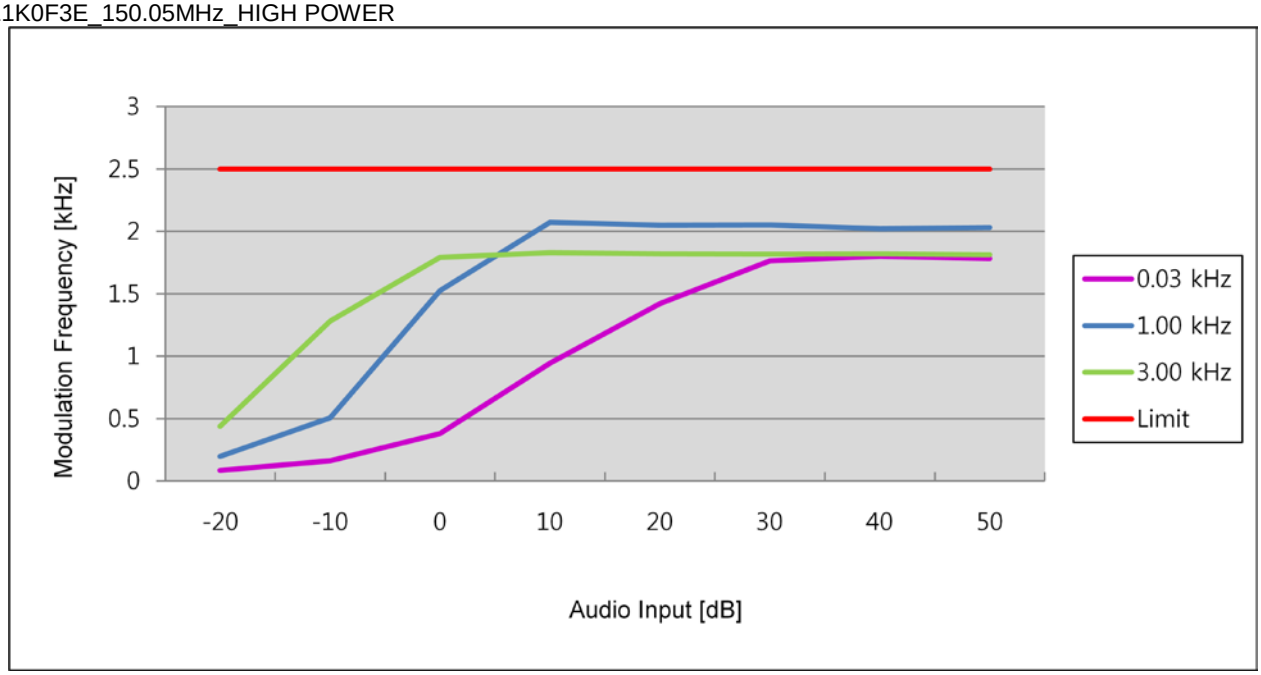


11K0F3E_150.05MHz_LOW POWER

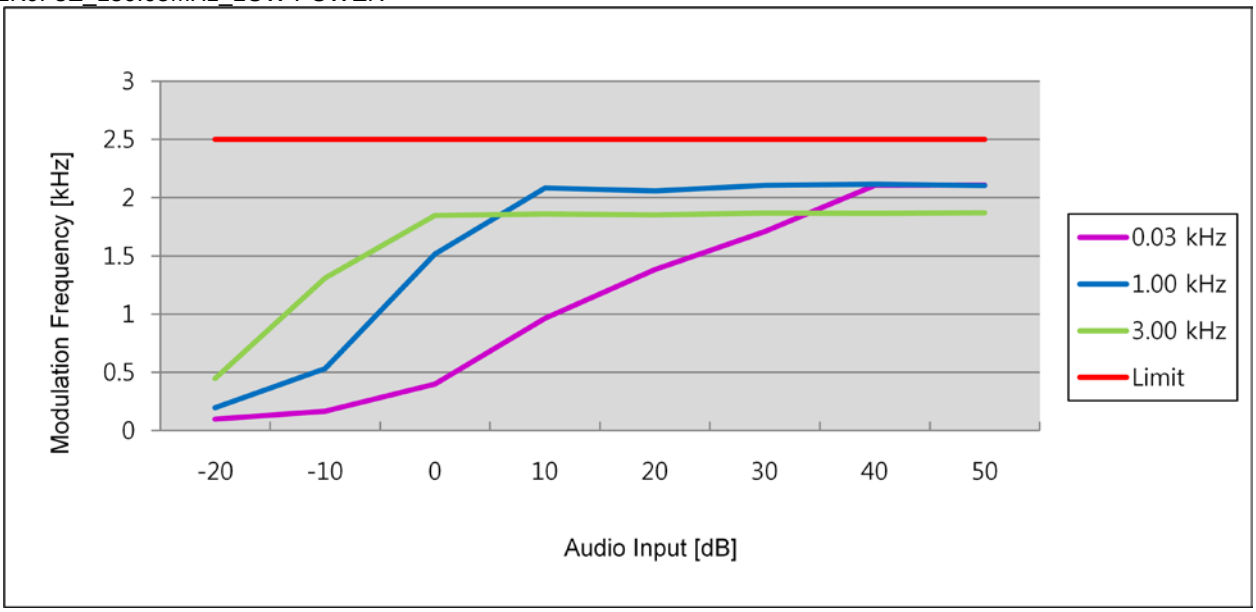


Negative Peaks

11K0F3E_150.05MHz_HIGH POWER



11K0F3E_150.05MHz_LOW POWER

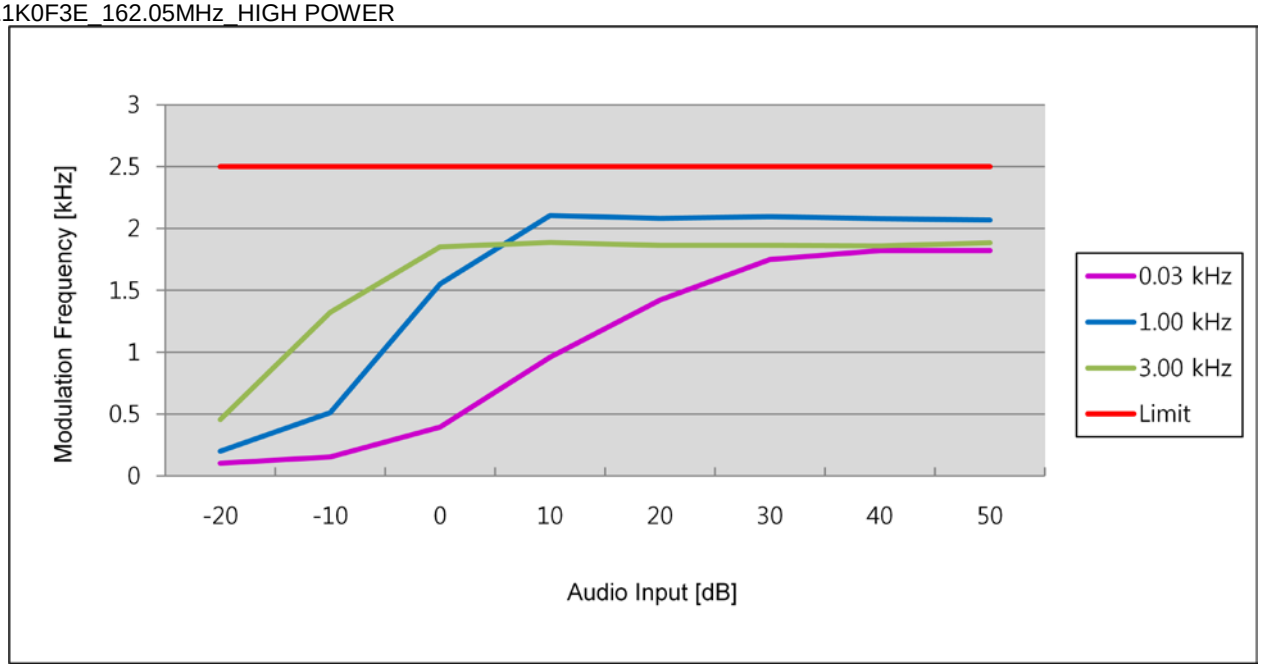


▣TEST RESULTS

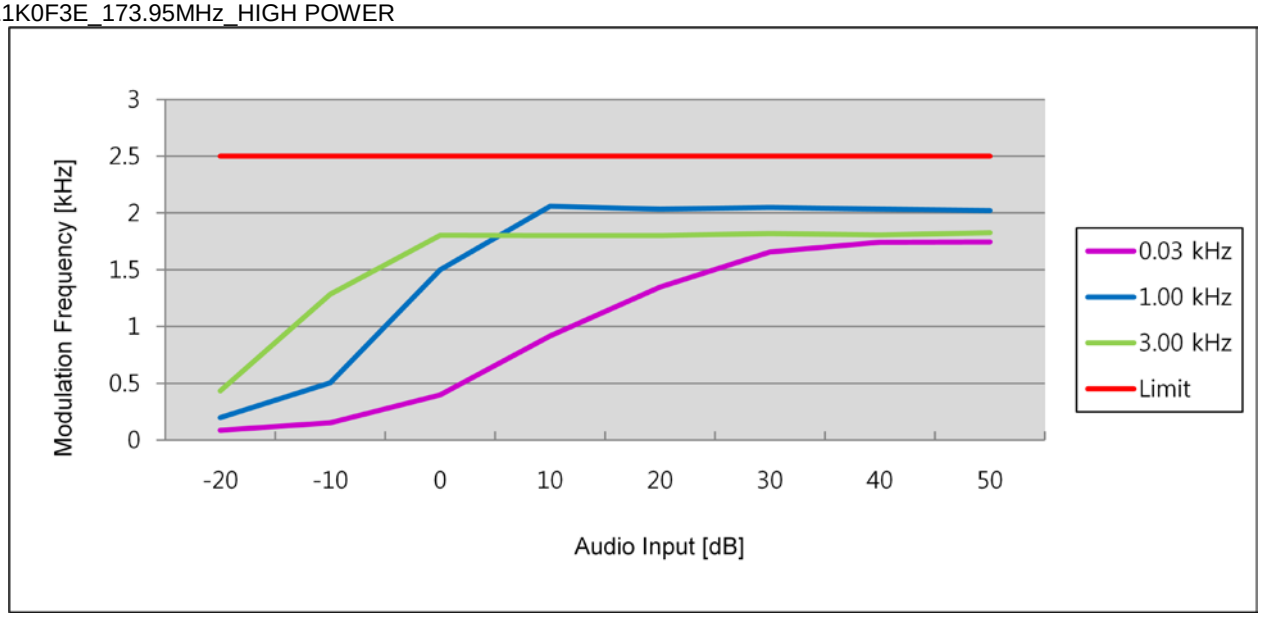
11K0F3E For FCC AND IC

Positive Peaks

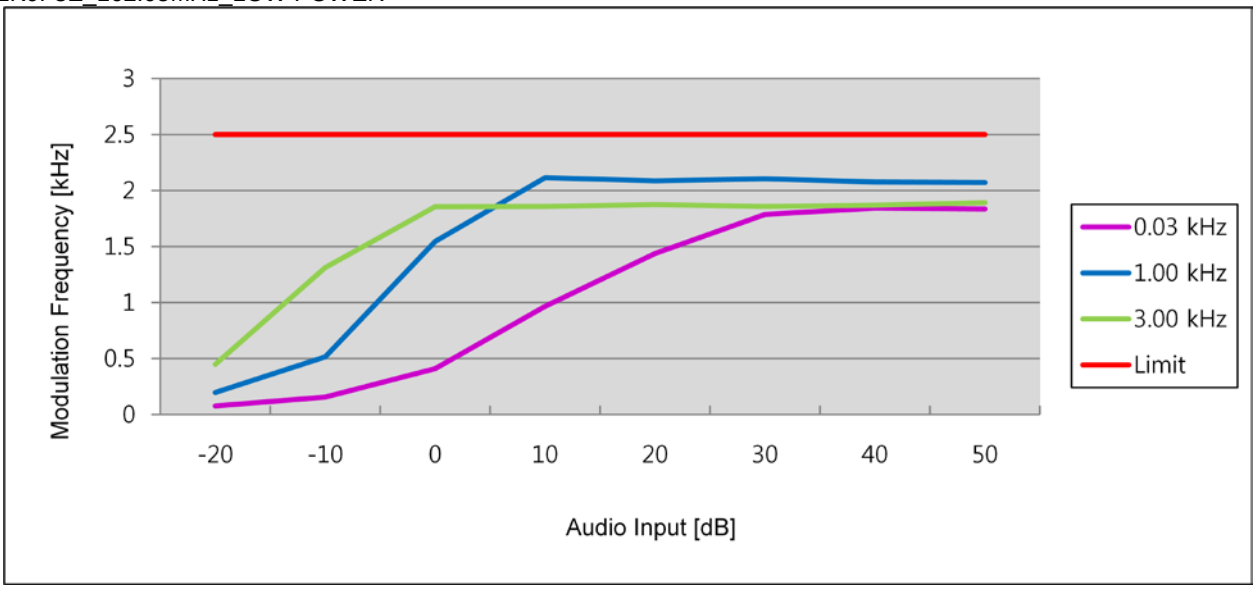
11K0F3E_162.05MHz_HIGH POWER



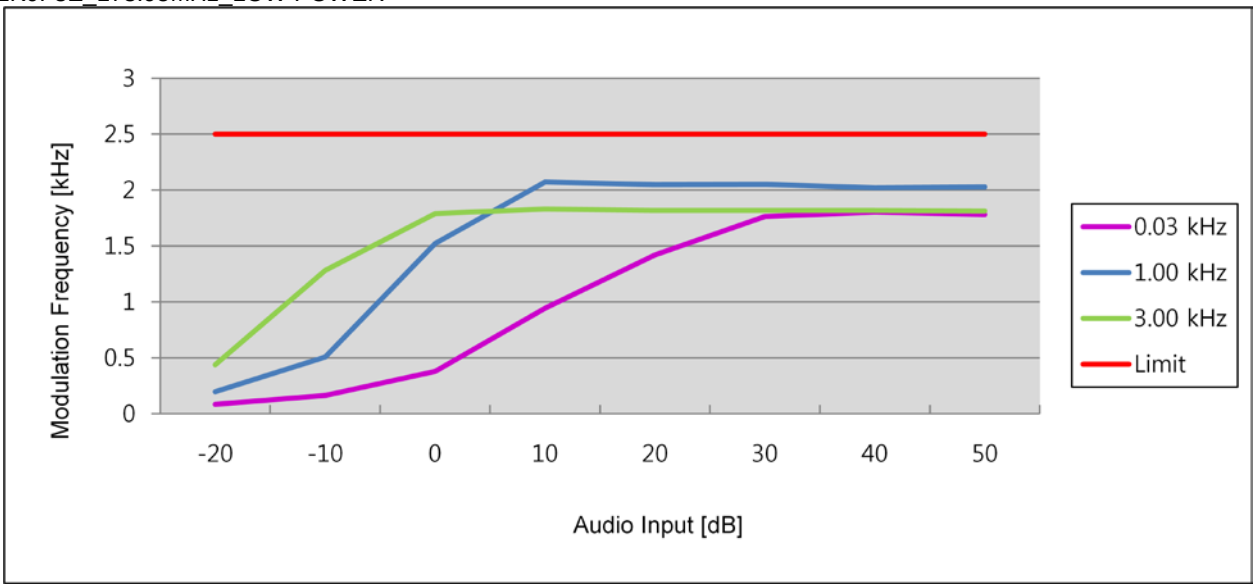
11K0F3E_173.95MHz_HIGH POWER



11K0F3E_162.05MHz_LOW POWER

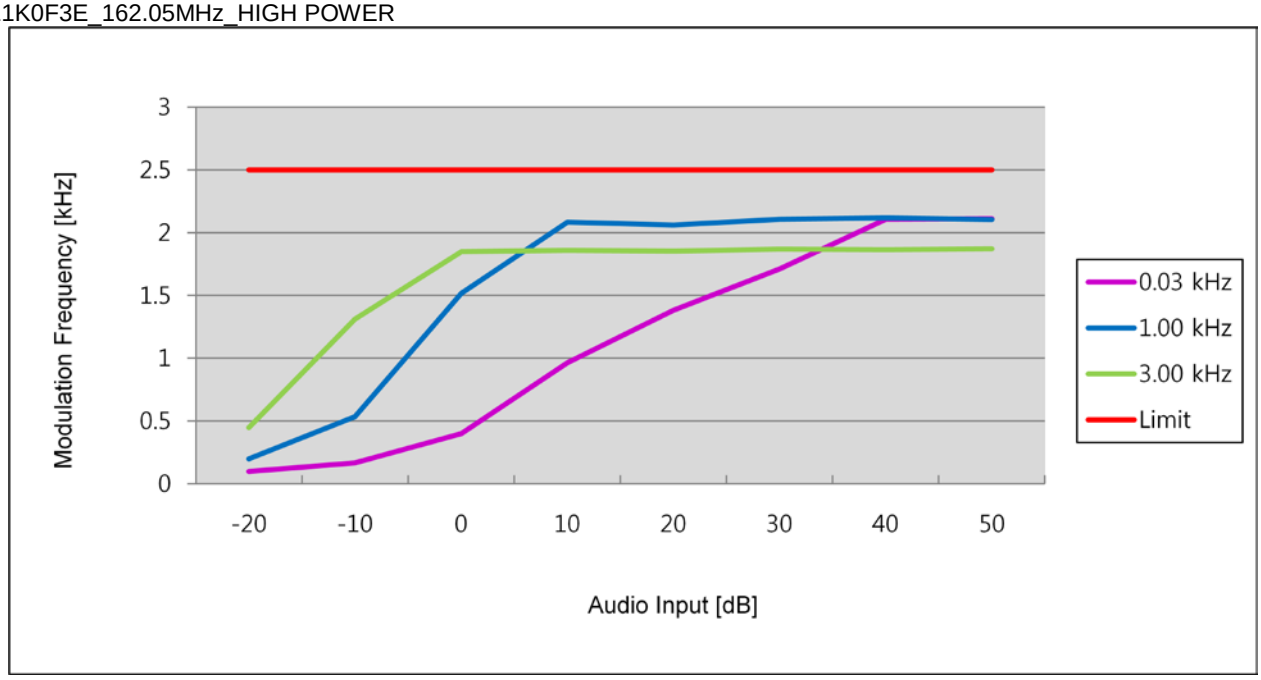


11K0F3E_173.95MHz_LOW POWER

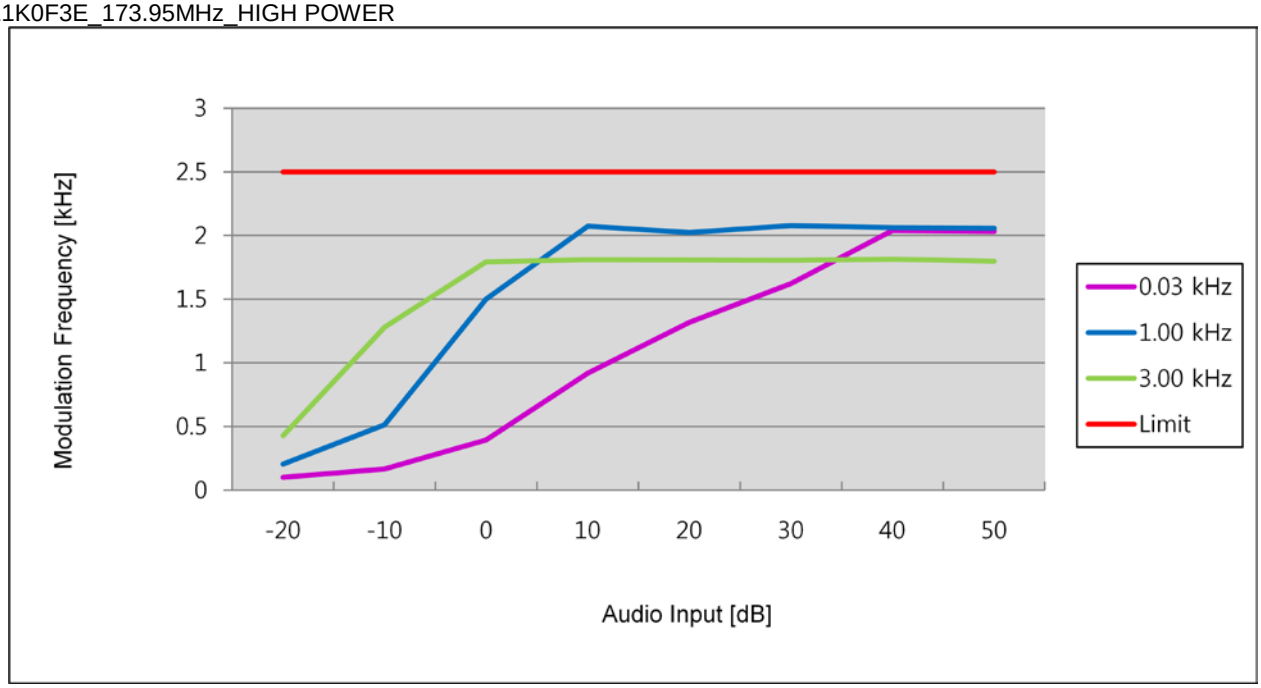


Negative Peaks

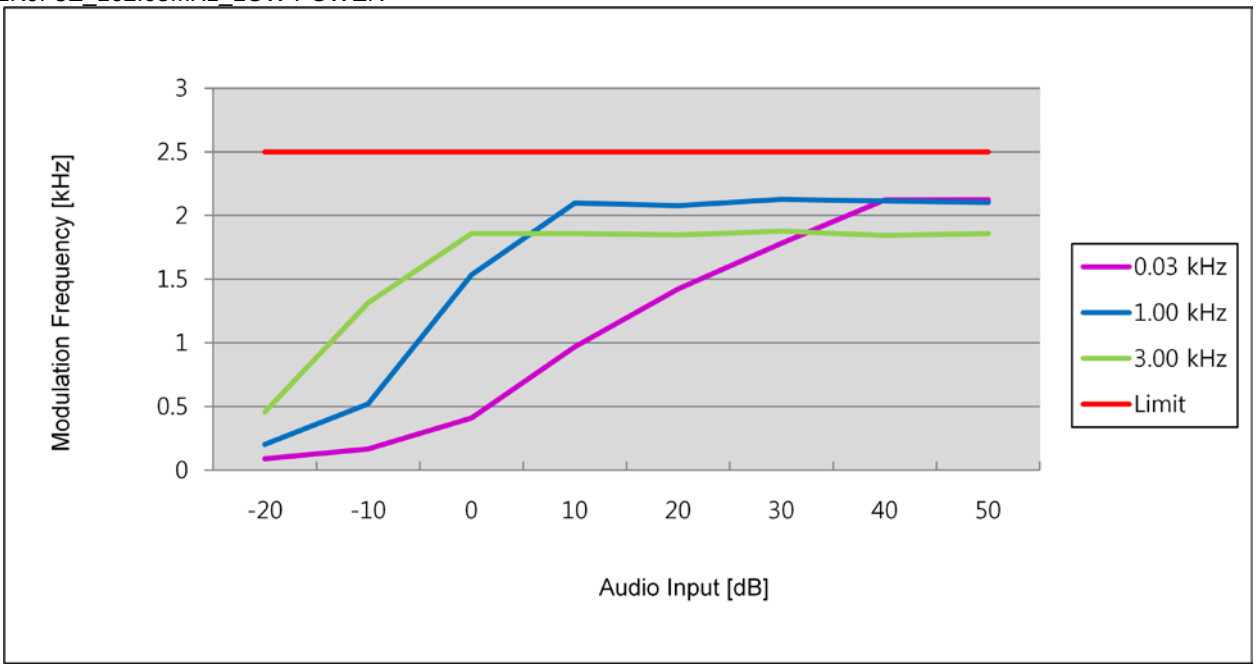
11K0F3E_162.05MHz_HIGH POWER



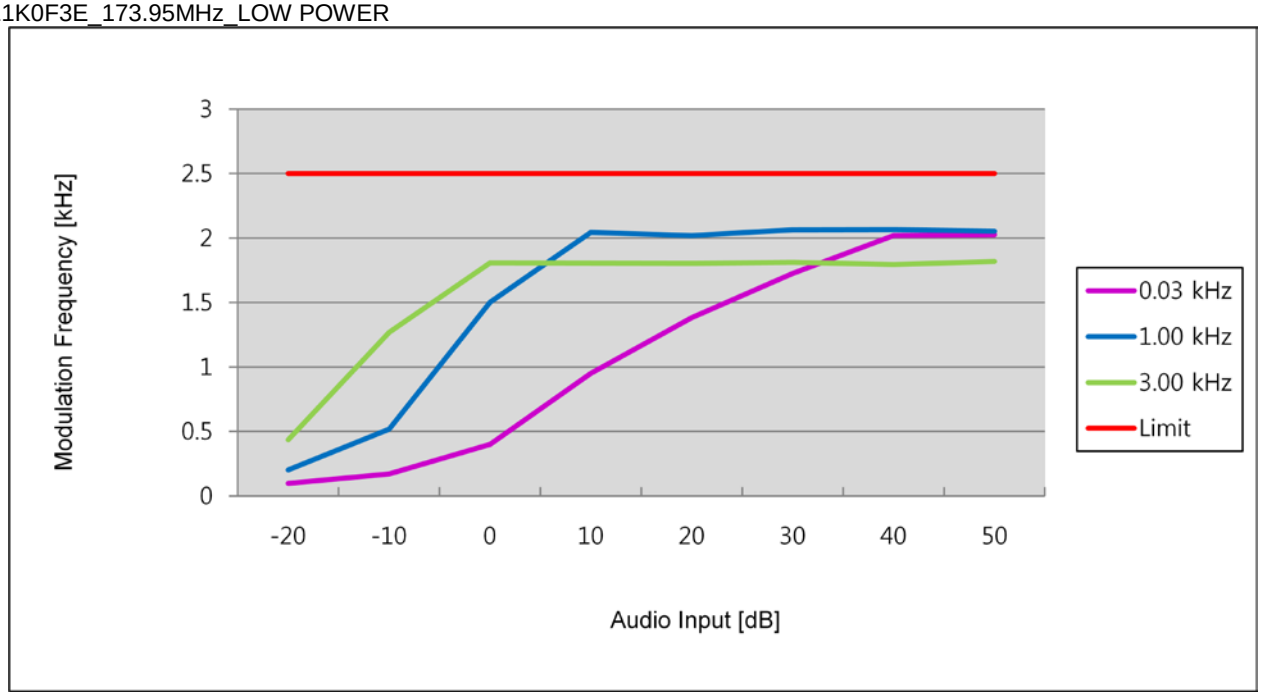
11K0F3E_173.95MHz_HIGH POWER



11K0F3E_162.05MHz_LOW POWER



11K0F3E_173.95MHz_LOW POWER

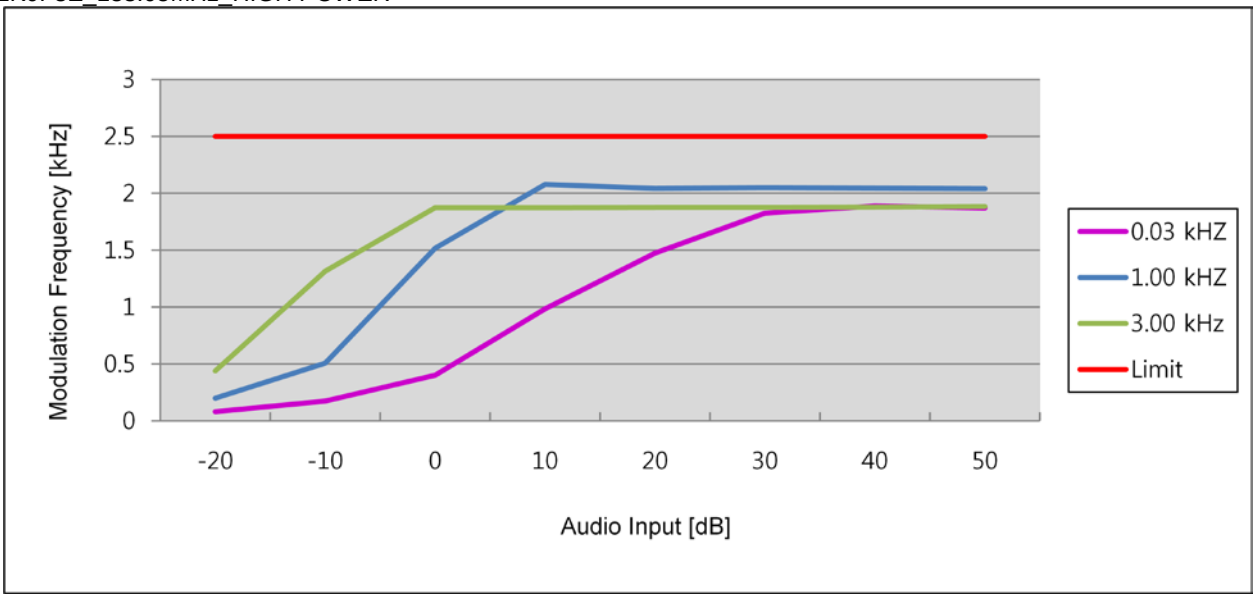


▣TEST RESULTS

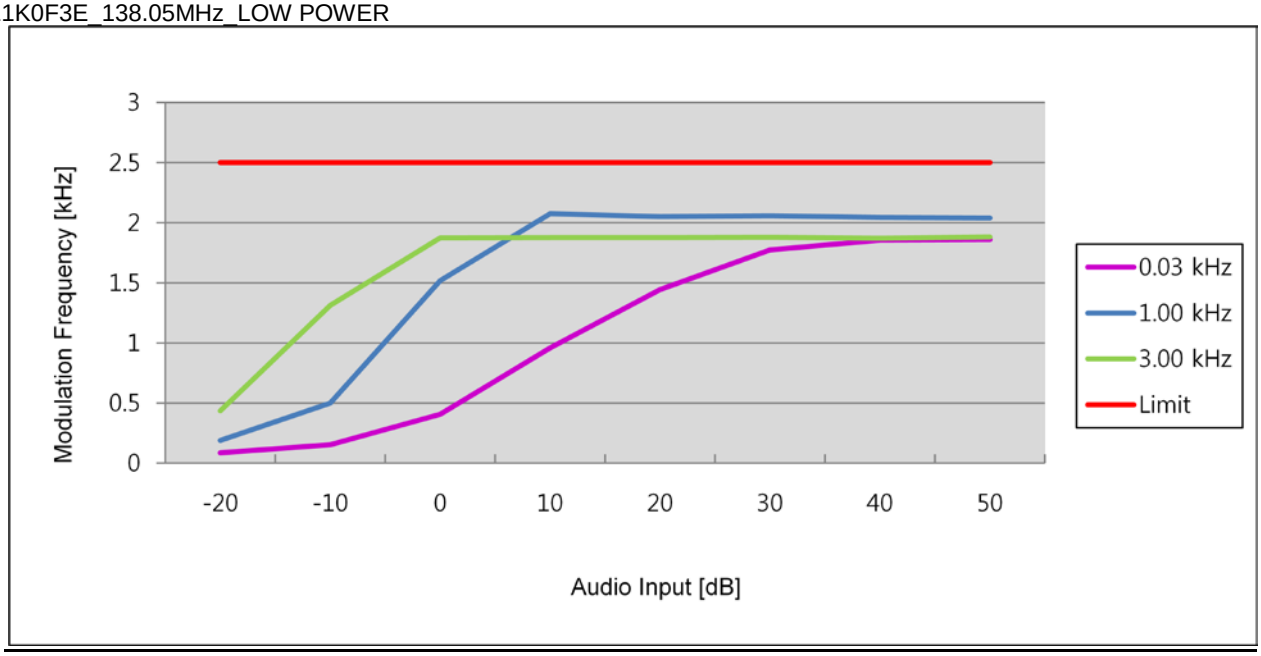
11K0F3E For ONLY IC

Positive Peaks

11K0F3E_138.05MHz_HIGH POWER

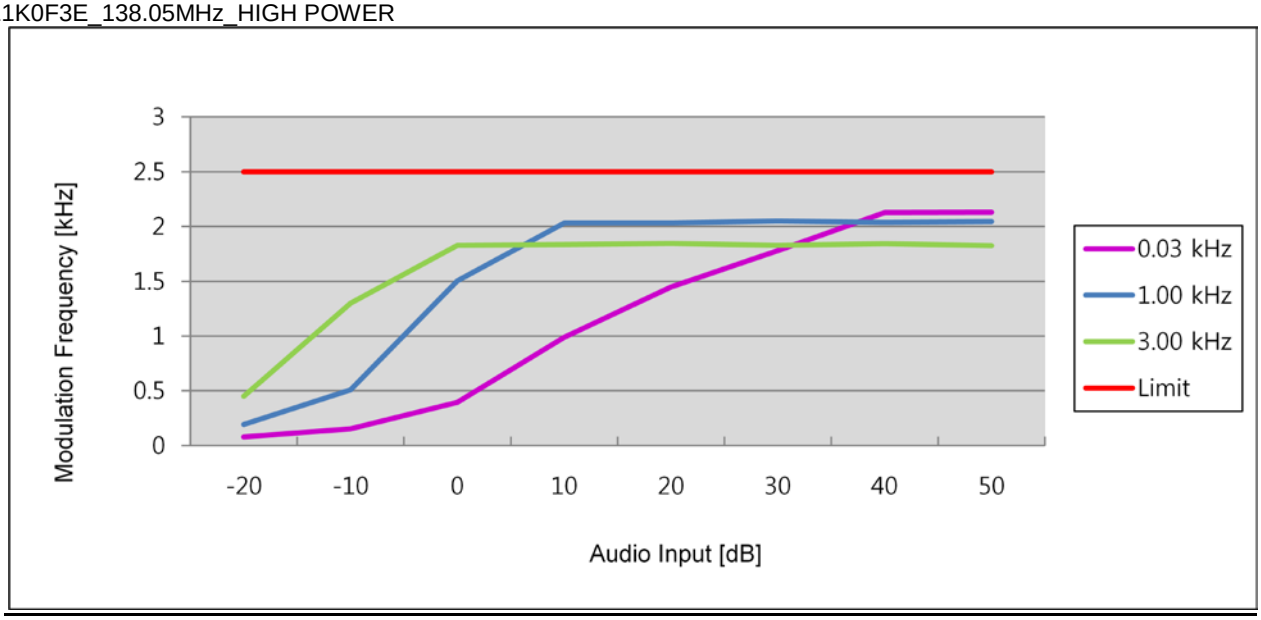


11K0F3E_138.05MHz_LOW POWER

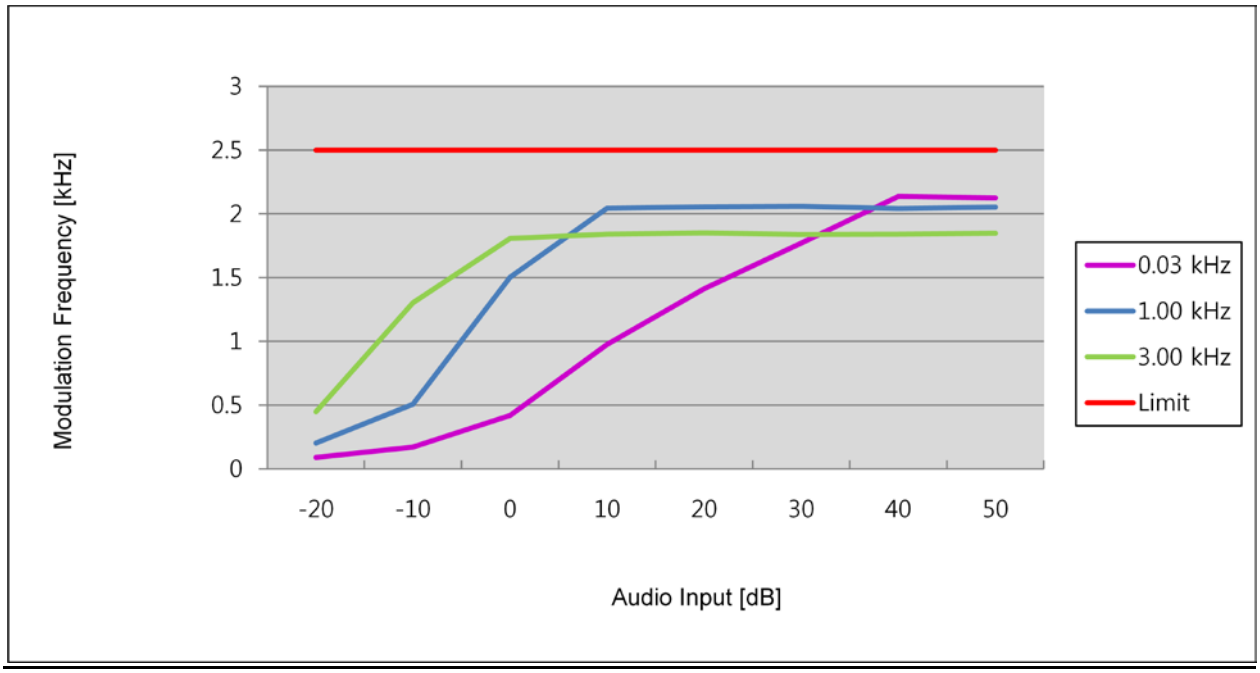


Negative Peaks

11K0F3E_138.05MHz_HIGH POWER



11K0F3E_138.05MHz_LOW POWER

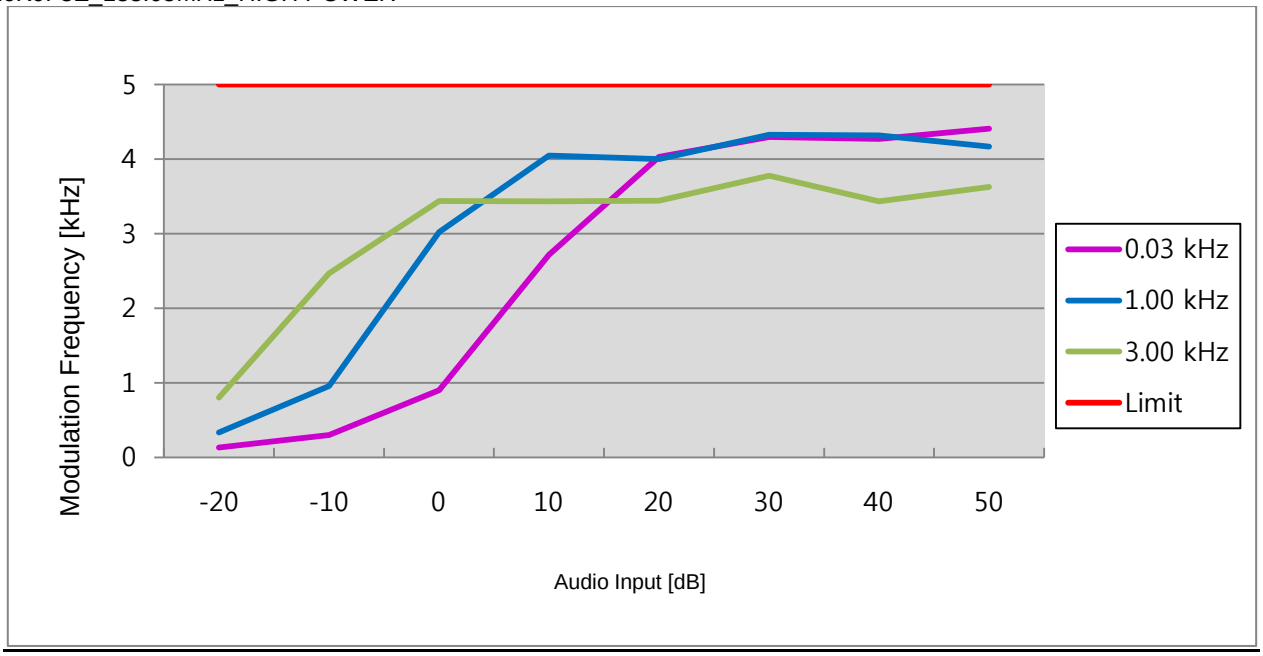


▣TEST RESULTS

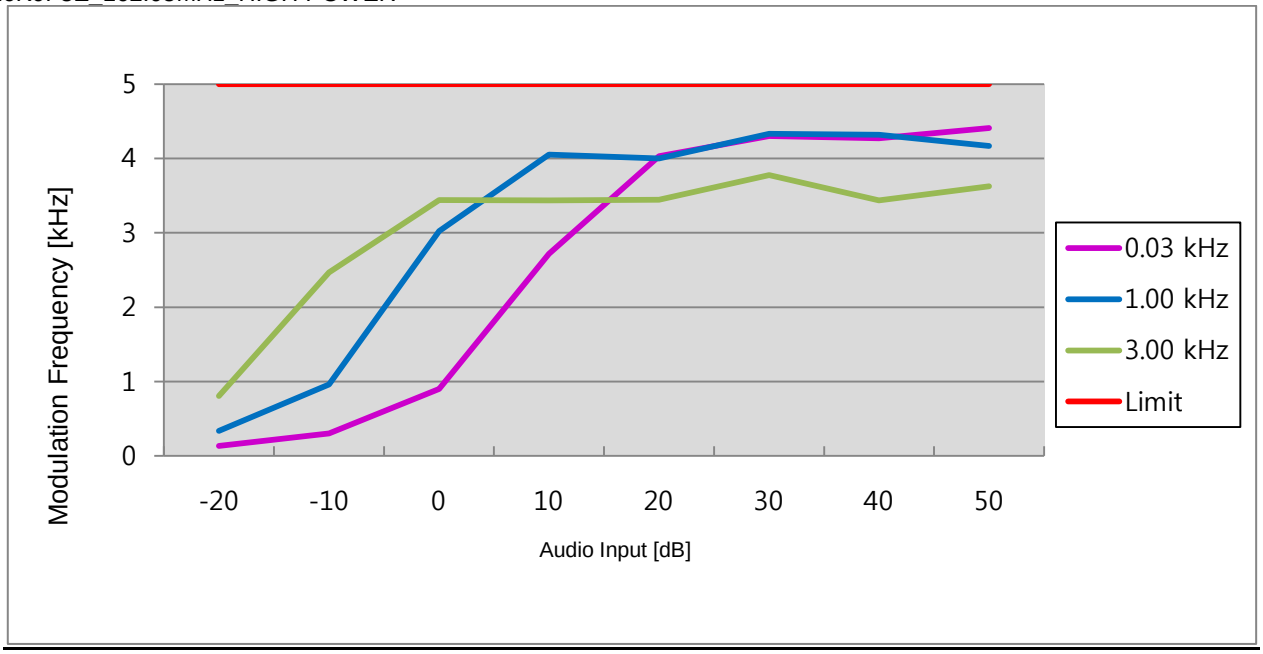
16K0F3E For ONLY IC

Positive Peaks

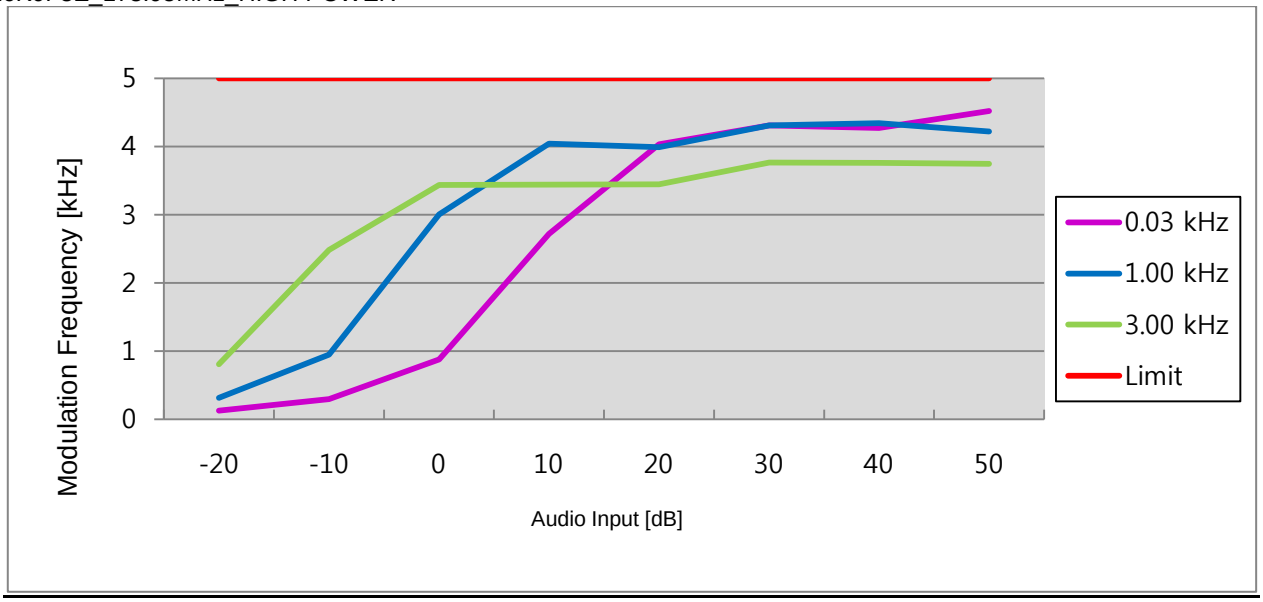
16K0F3E_138.05MHz_HIGH POWER



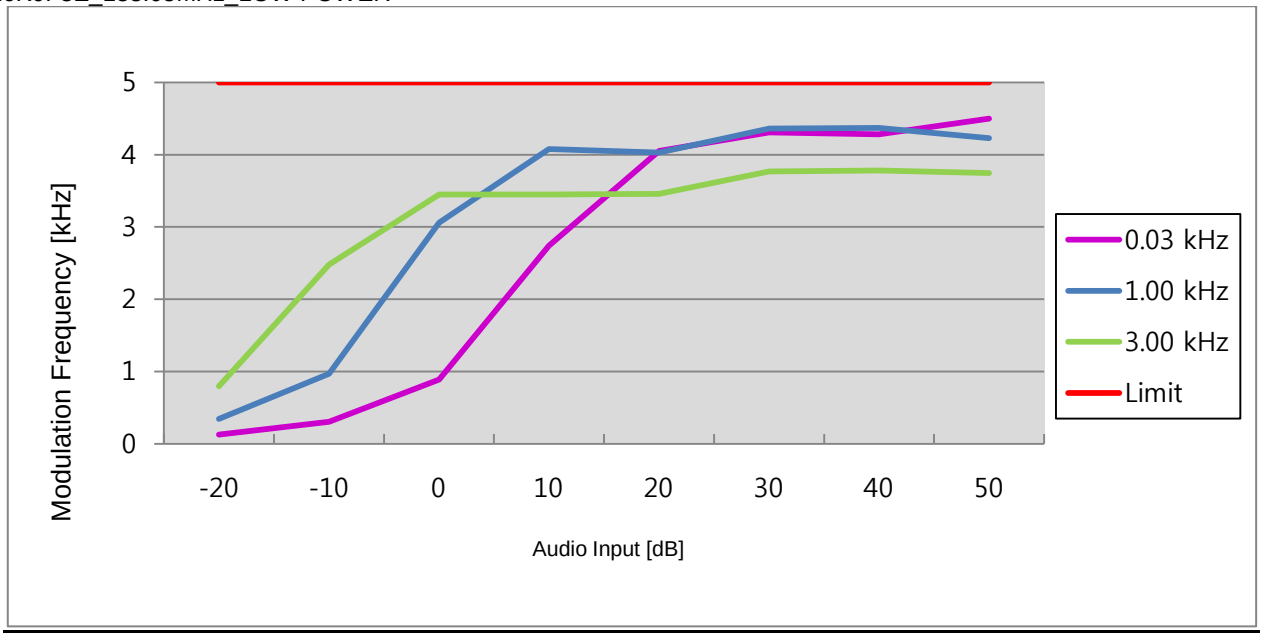
16K0F3E_162.05MHz_HIGH POWER



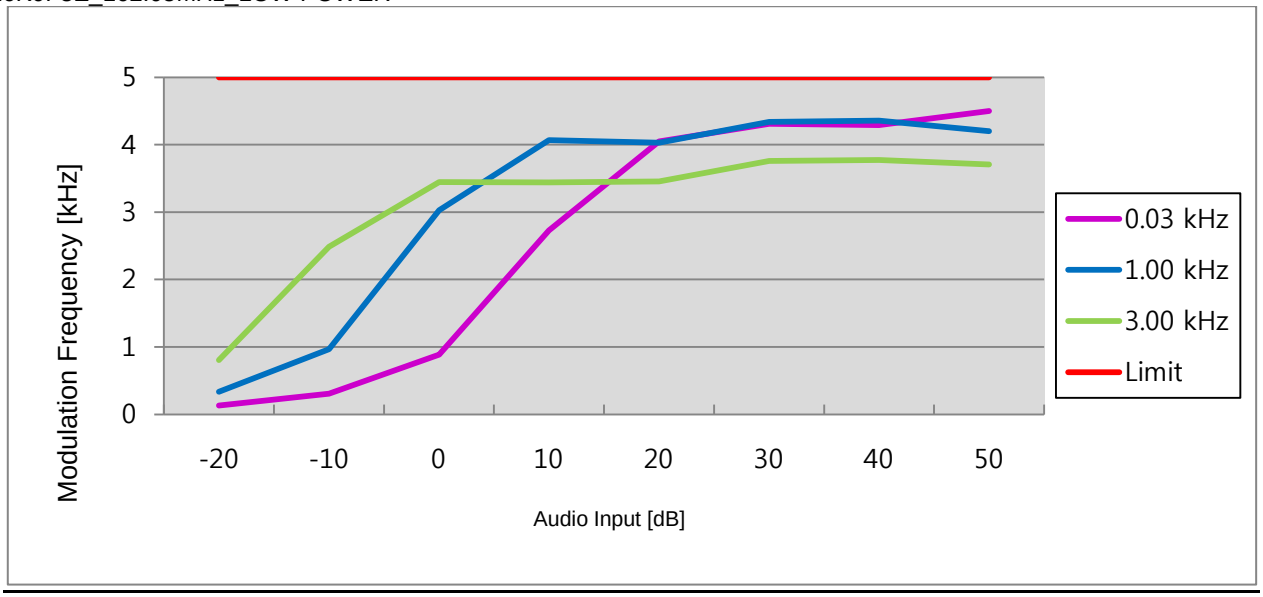
16K0F3E_173.95MHz_HIGH POWER



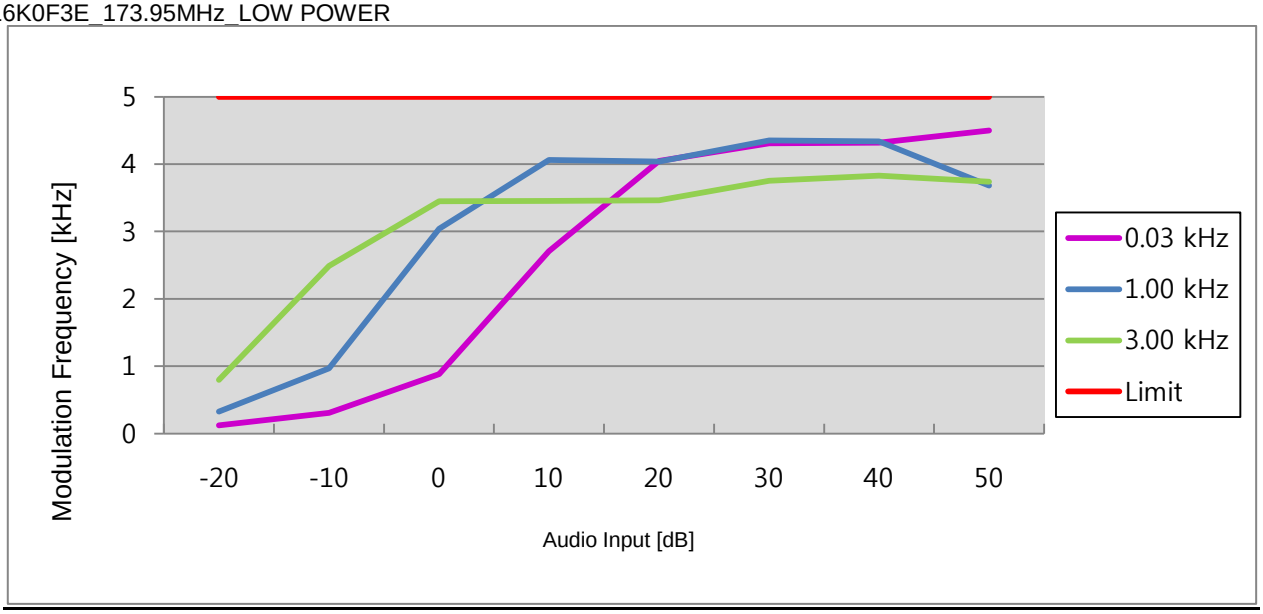
16K0F3E_138.05MHz_LOW POWER



16K0F3E_162.05MHz_LOW POWER

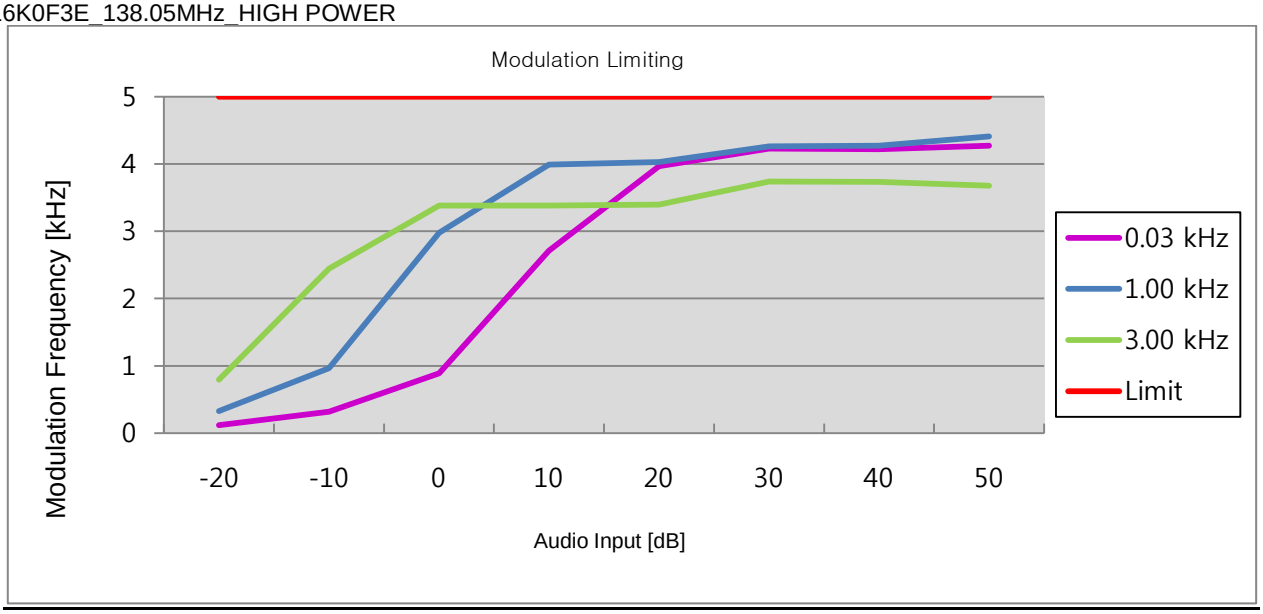


16K0F3E_173.95MHz_LOW POWER

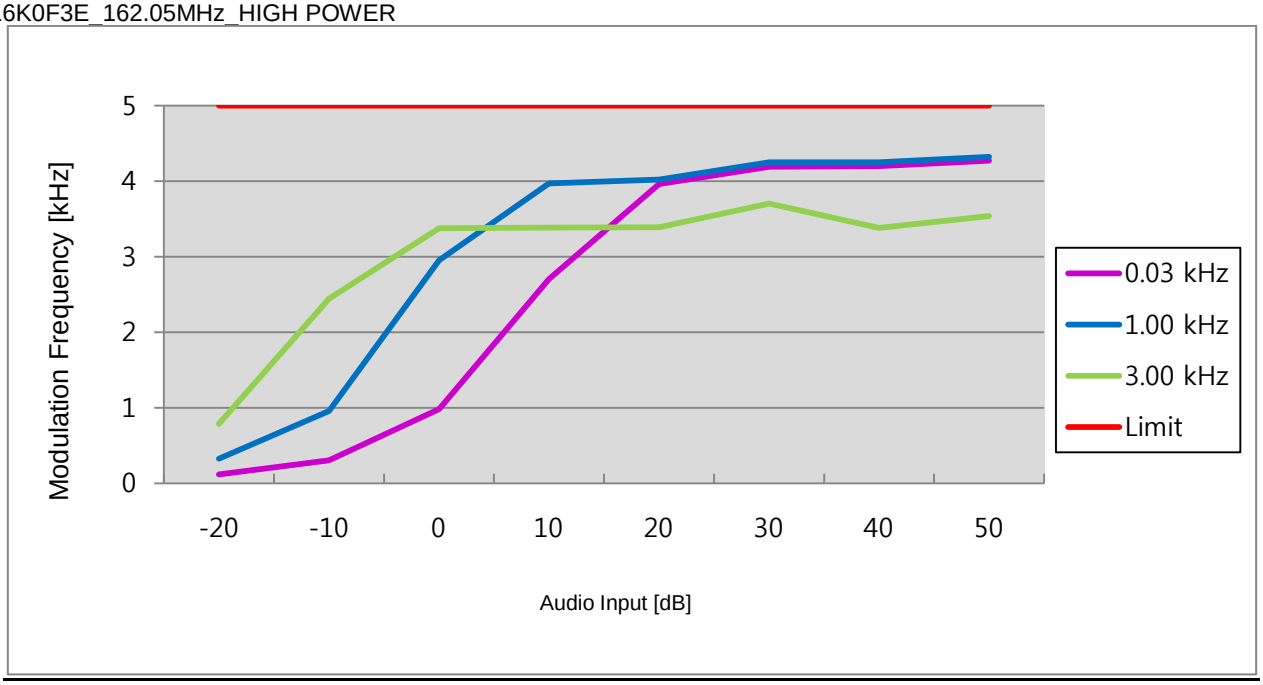


Negative Peaks

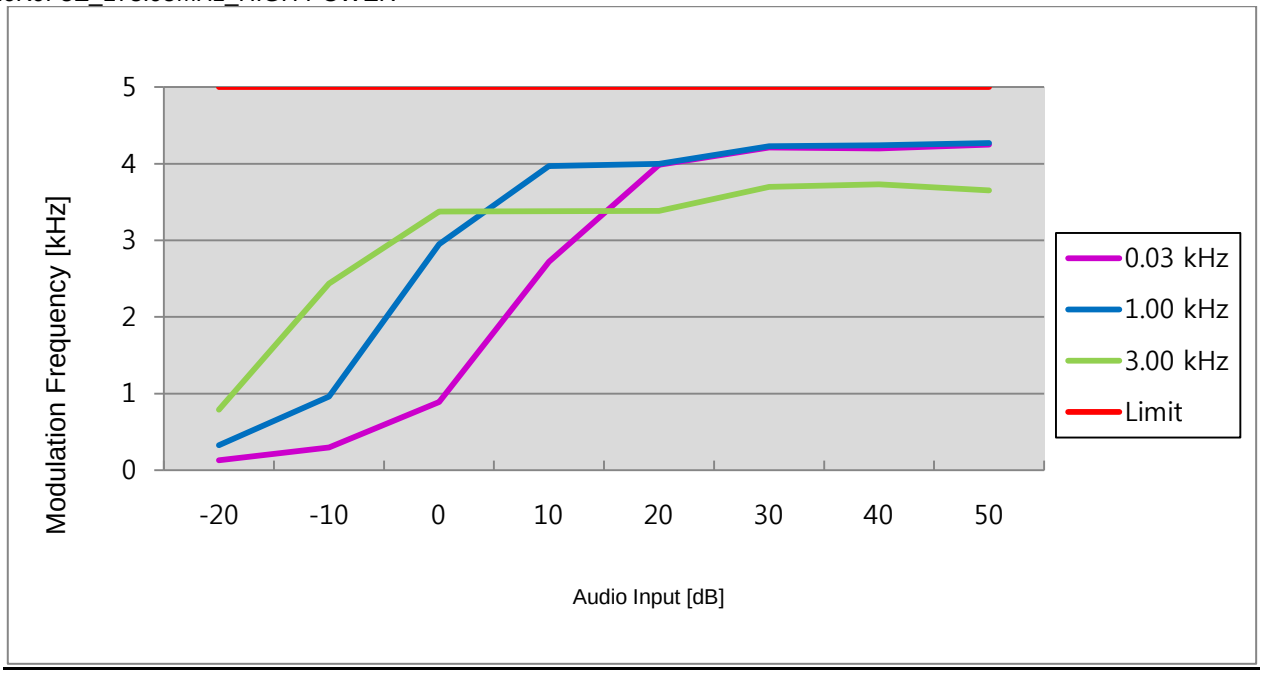
16K0F3E_138.05MHz_HIGH POWER



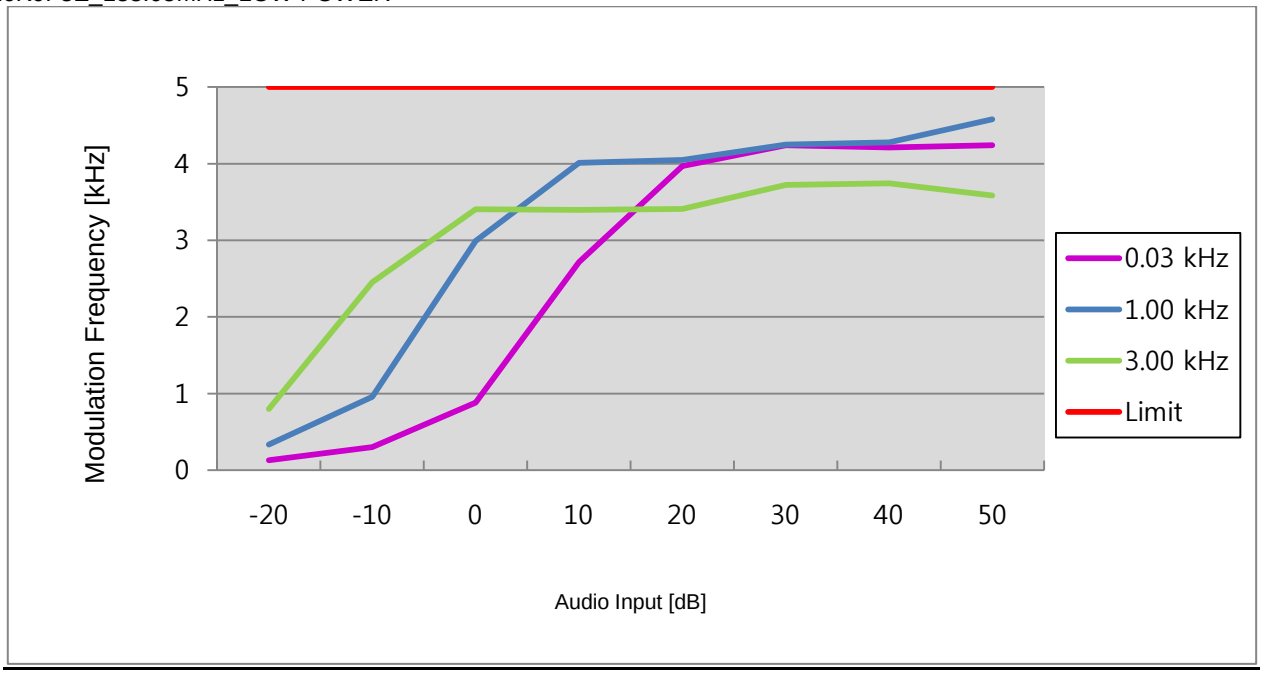
16K0F3E_162.05MHz_HIGH POWER



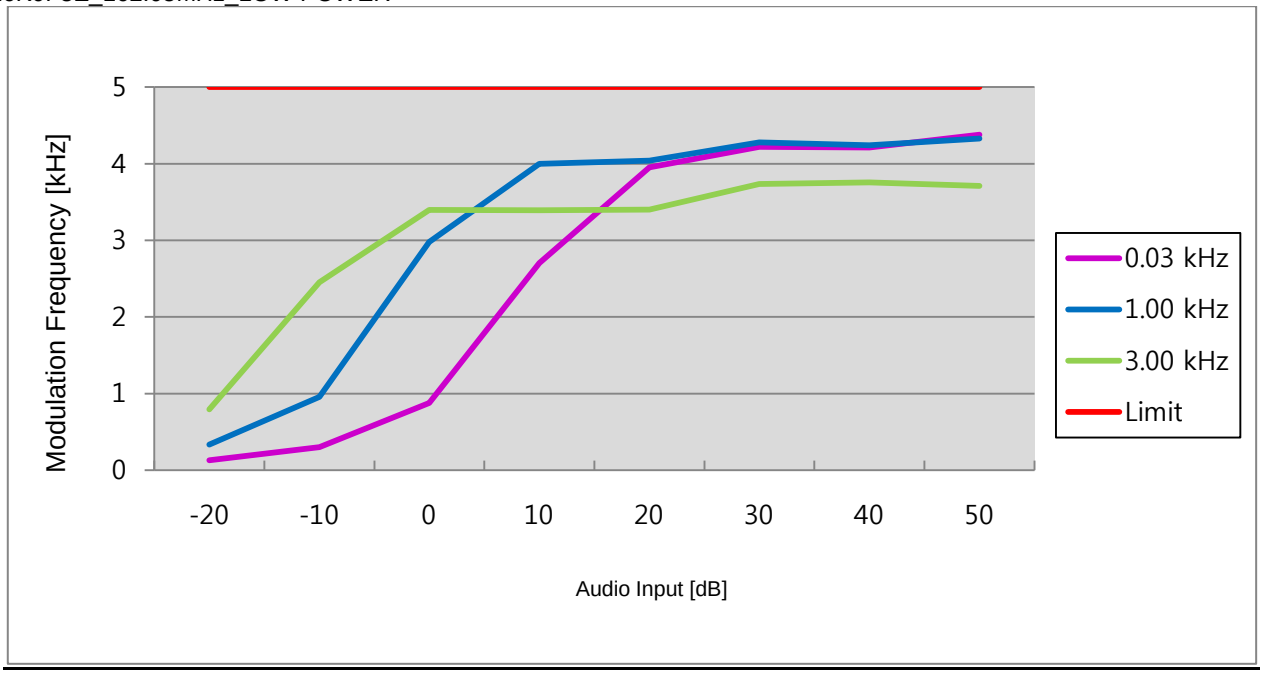
16K0F3E_173.95MHz_HIGH POWER



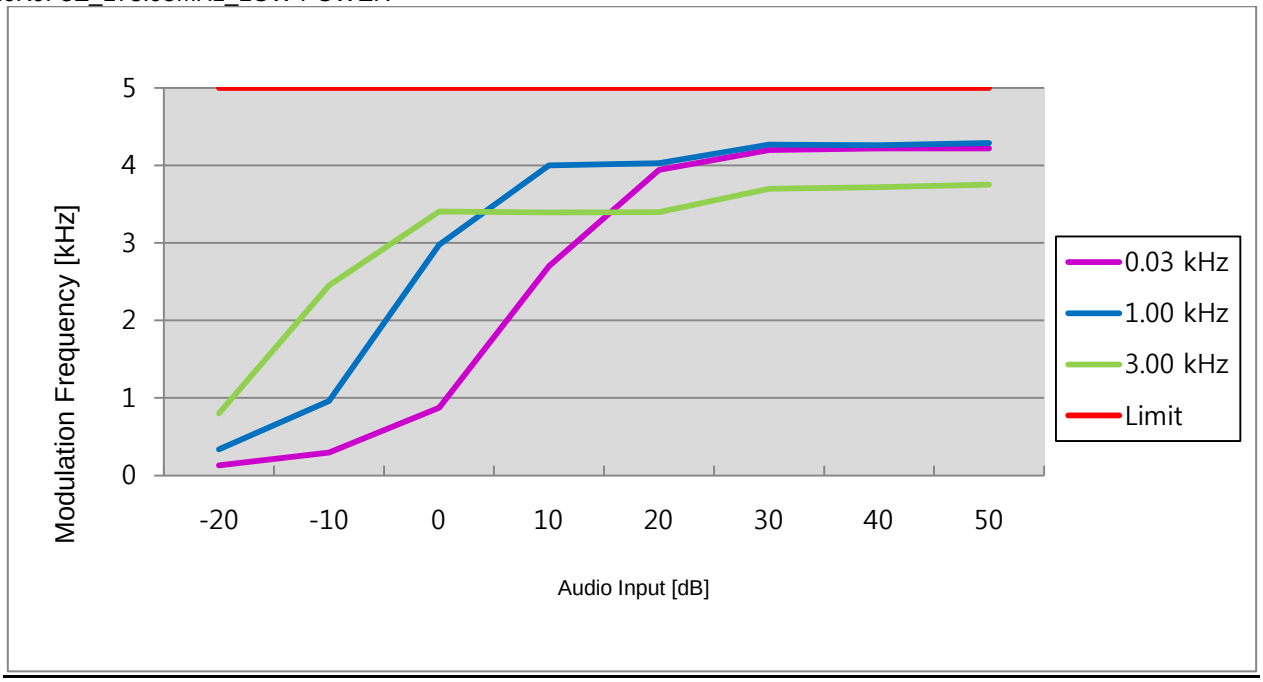
16K0F3E_138.05MHz_LOW POWER



16K0F3E_162.05MHz_LOW POWER



16K0F3E_173.95MHz_LOW POWER

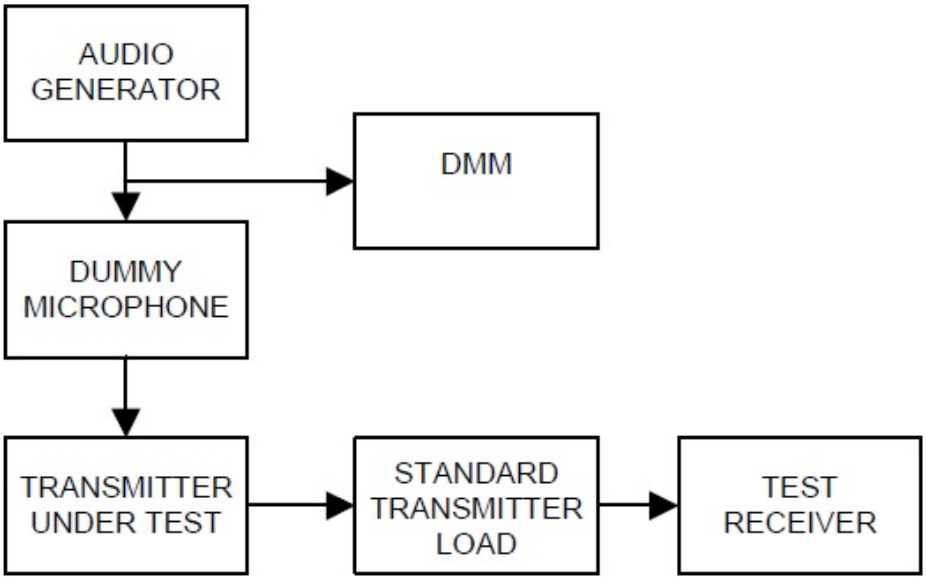


7.5 Audio Frequency Response / Audio Low Pass Filter Response

▣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.

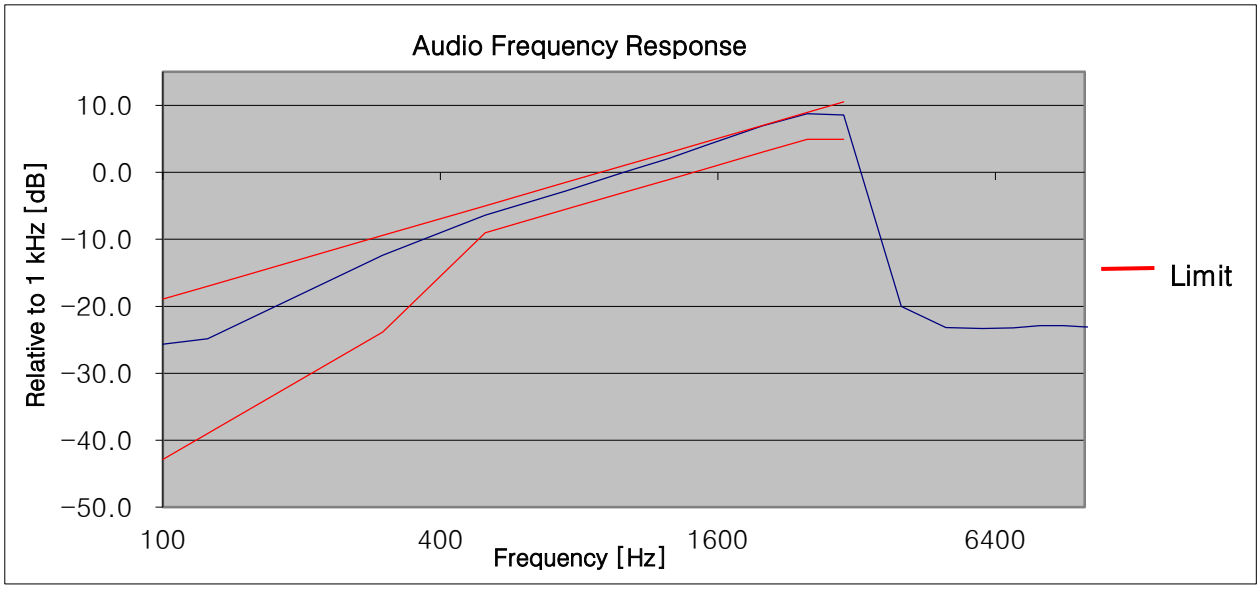
On the transmission condition above 3kHz, Transceiver shows Audio Low Pass Filter.

▣TEST RESULTS

11K0F3E For ONLY FCC

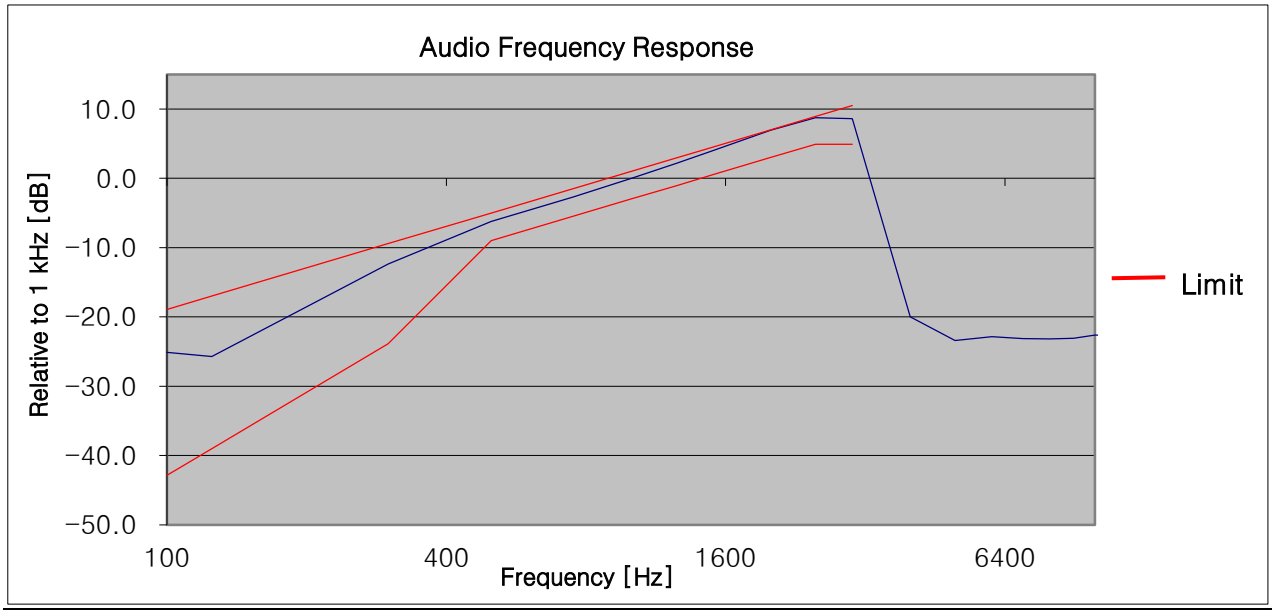
Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-25.66	-18.93	-42.86
125	-24.85	-17.00	-39.00
300	-12.36	-9.42	-23.84
500	-6.37	-5.00	-9.00
750	-2.78	-1.49	-5.49
1000	0.03	1.00	-3.00
1250	2.09	2.93	-1.07
1500	3.96	4.51	0.51
2000	6.93	7.00	3.00
2500	8.74	8.93	4.93
3000	8.59	10.51	4.93
4000	-20	-	-
5000	-23.16	-	-
6000	-23.31	-	-
7000	-23.2	-	-
8000	-22.87	-	-
9000	-22.87	-	-
10000	-23.05	-	-
20000	-23.43	-	-
30000	-22.9	-	-
40000	-22.83	-	-
50000	-23.24	-	-

11K0F3E_150.05MHz_HIGH POWER



Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-25.1	-18.93	-42.86
125	-25.73	-17.00	-39.00
300	-12.38	-9.42	-23.84
500	-6.24	-5.00	-9.00
750	-2.72	-1.49	-5.49
1000	-0.03	1.00	-3.00
1250	2.16	2.93	-1.07
1500	4.01	4.51	0.51
2000	6.94	7.00	3.00
2500	8.77	8.93	4.93
3000	8.63	10.51	4.93
4000	-19.97	-	-
5000	-23.4	-	-
6000	-22.84	-	-
7000	-23.14	-	-
8000	-23.17	-	-
9000	-23.06	-	-
10000	-22.63	-	-
20000	-22.92	-	-
30000	-23.33	-	-
40000	-23.03	-	-
50000	-23.1	-	-

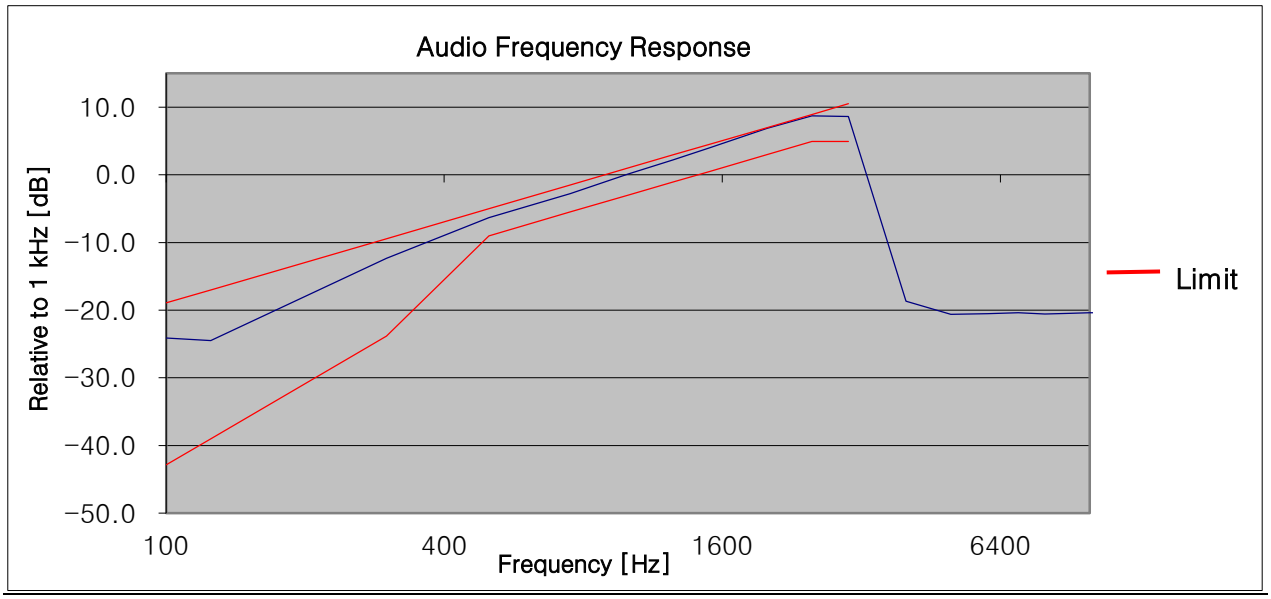
11K0F3E_150.05MHz_LOW POWER



11K0F3E For FCC AND IC

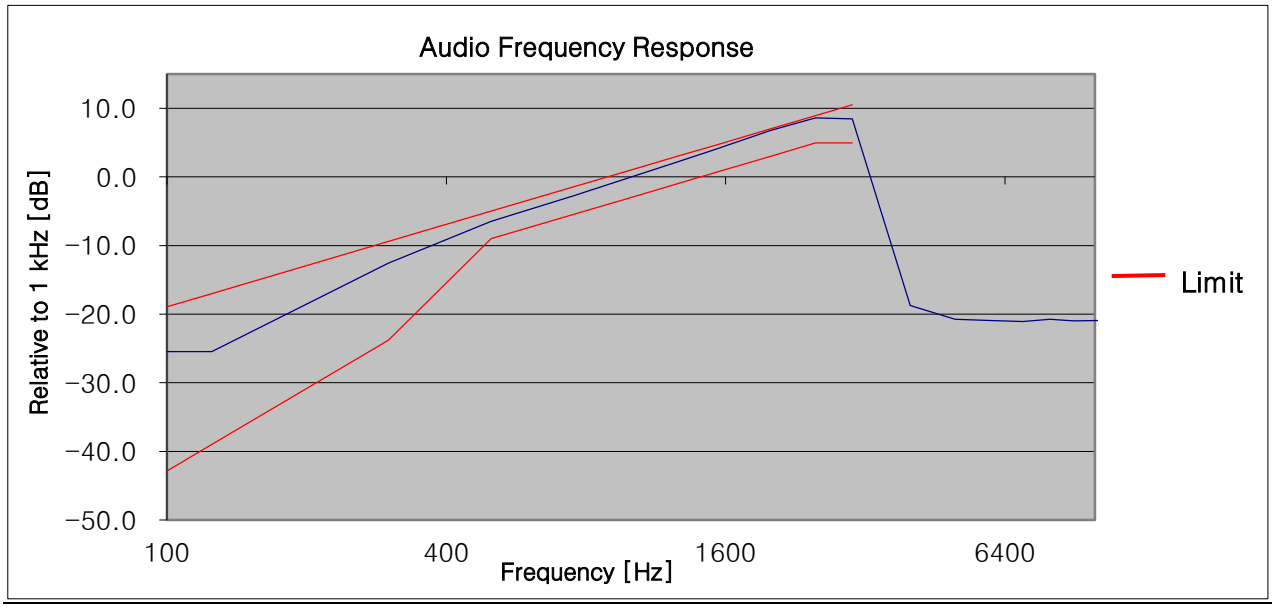
Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-24.11	-18.93	-42.86
125	-24.5	-17.00	-39.00
300	-12.32	-9.42	-23.84
500	-6.31	-5.00	-9.00
750	-2.78	-1.49	-5.49
1000	0.13	1.00	-3.00
1250	2.19	2.93	-1.07
1500	3.98	4.51	0.51
2000	6.89	7.00	3.00
2500	8.74	8.93	4.93
3000	8.63	10.51	4.93
4000	-18.66	-	-
5000	-20.63	-	-
6000	-20.52	-	-
7000	-20.36	-	-
8000	-20.55	-	-
9000	-20.46	-	-
10000	-20.38	-	-
20000	-20.55	-	-
30000	-20.69	-	-
40000	-20.86	-	-
50000	-20.72	-	-

11K0F3E_162.05MHz_HIGH POWER



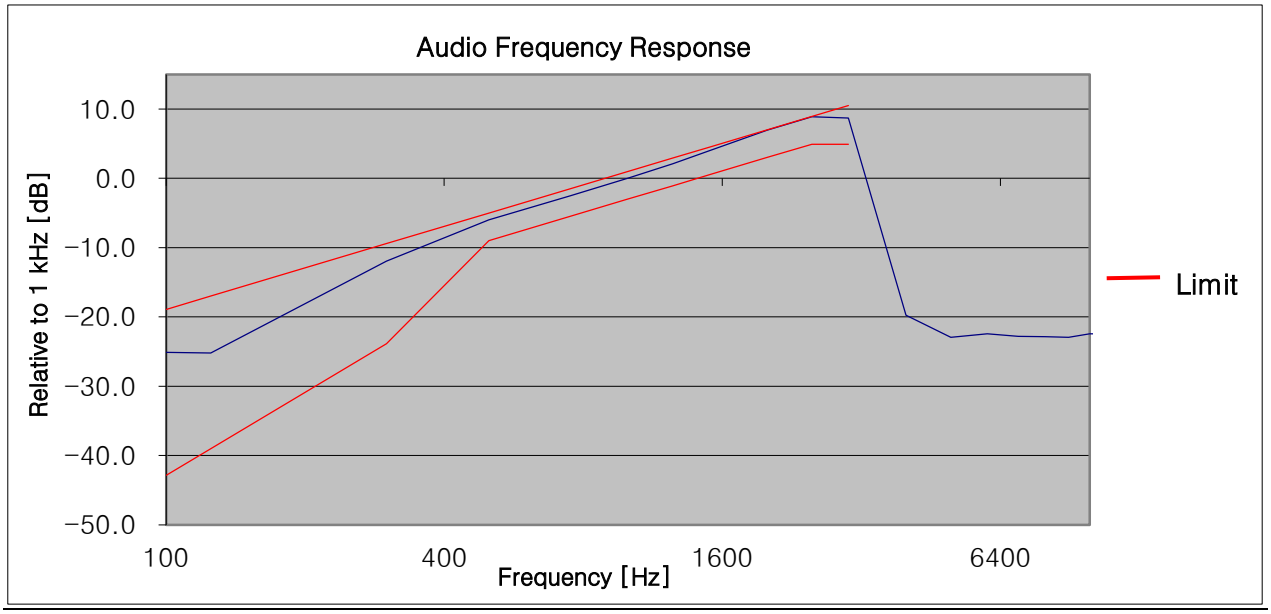
Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-25.45	-18.93	-42.86
125	-25.45	-17.00	-39.00
300	-12.58	-9.42	-23.84
500	-6.45	-5.00	-9.00
750	-2.78	-1.49	-5.49
1000	-0.03	1.00	-3.00
1250	2.09	2.93	-1.07
1500	3.86	4.51	0.51
2000	6.78	7.00	3.00
2500	8.6	8.93	4.93
3000	8.47	10.51	4.93
4000	-18.73	-	-
5000	-20.73	-	-
6000	-20.94	-	-
7000	-21.05	-	-
8000	-20.76	-	-
9000	-20.97	-	-
10000	-20.91	-	-
20000	-20.88	-	-
30000	-21.02	-	-
40000	-20.94	-	-
50000	-20.67	-	-

11K0F3E_173.95MHz_HIGH POWER



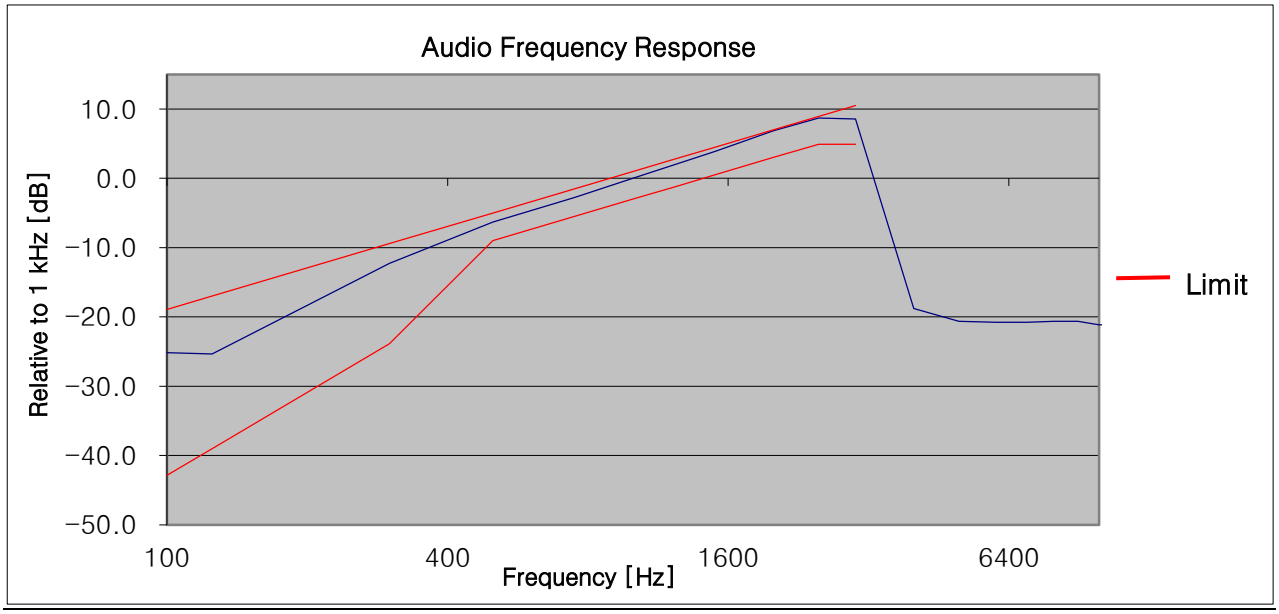
Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-25.11	-18.93	-42.86
125	-25.21	-17.00	-39.00
300	-11.95	-9.42	-23.84
500	-5.99	-5.00	-9.00
750	-2.53	-1.49	-5.49
1000	0.02	1.00	-3.00
1250	2.1	2.93	-1.07
1500	3.99	4.51	0.51
2000	6.93	7.00	3.00
2500	8.88	8.93	4.93
3000	8.71	10.51	4.93
4000	-19.73	-	-
5000	-22.93	-	-
6000	-22.45	-	-
7000	-22.81	-	-
8000	-22.84	-	-
9000	-22.92	-	-
10000	-22.43	-	-
20000	-22.71	-	-
30000	-22.98	-	-
40000	-23.65	-	-
50000	-22.42	-	-

11K0F3E_162.05MHz_LOW POWER



Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-25.18	-18.93	-42.86
125	-25.32	-17.00	-39.00
300	-12.29	-9.42	-23.84
500	-6.3	-5.00	-9.00
750	-2.76	-1.49	-5.49
1000	0	1.00	-3.00
1250	2.14	2.93	-1.07
1500	3.92	4.51	0.51
2000	6.87	7.00	3.00
2500	8.68	8.93	4.93
3000	8.55	10.51	4.93
4000	-18.76	-	-
5000	-20.62	-	-
6000	-20.76	-	-
7000	-20.76	-	-
8000	-20.62	-	-
9000	-20.62	-	-
10000	-21.16	-	-
20000	-20.85	-	-
30000	-20.47	-	-
40000	-20.56	-	-
50000	-20.73	-	-

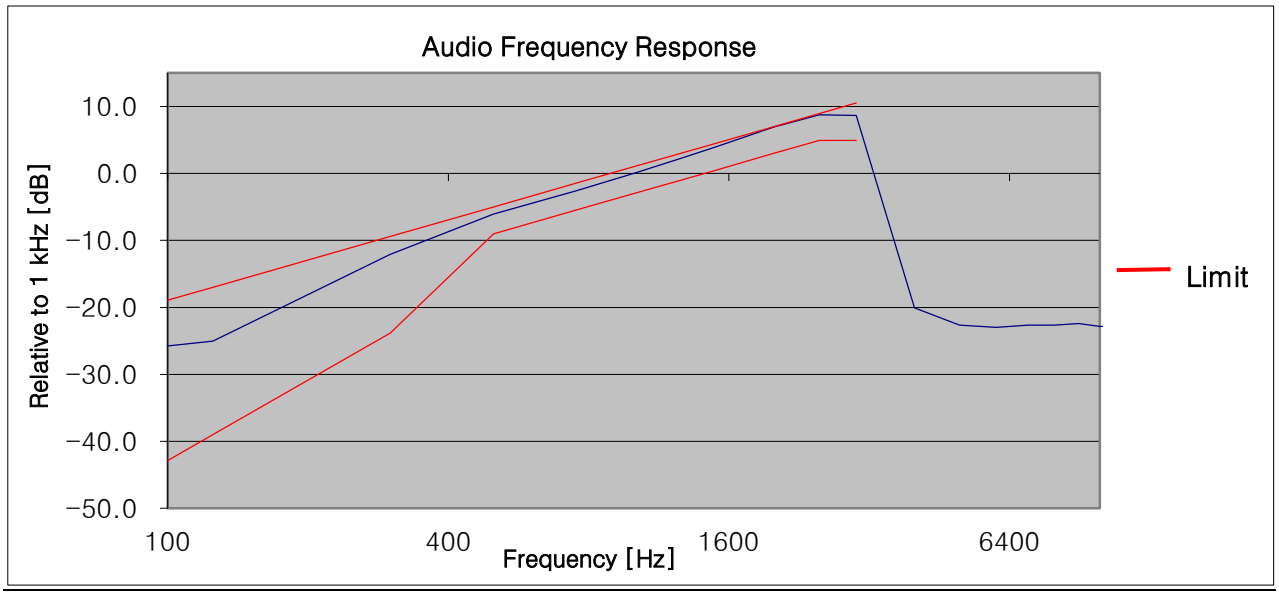
11K0F3E_173.95MHz_LOW POWER



11K0F3E For ONLY IC

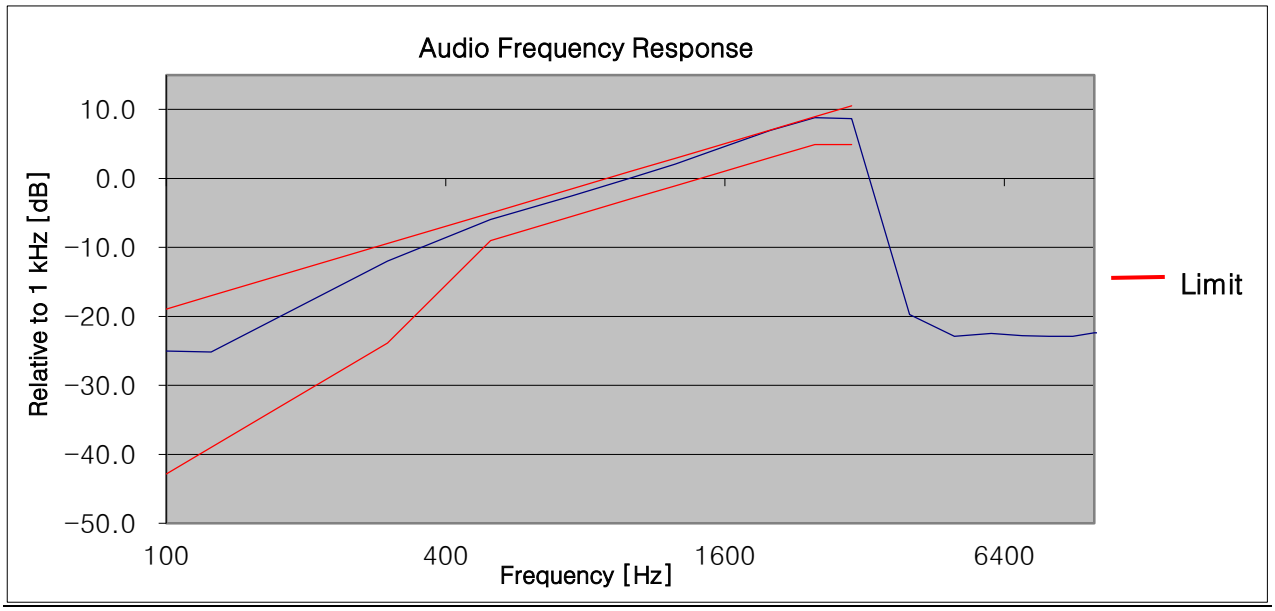
Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-25.76	-18.93	-42.86
125	-25.02	-17.00	-39.00
300	-12.07	-9.42	-23.84
500	-6.07	-5.00	-9.00
750	-2.62	-1.49	-5.49
1000	0	1.00	-3.00
1250	2.16	2.93	-1.07
1500	3.97	4.51	0.51
2000	6.96	7.00	3.00
2500	8.78	8.93	4.93
3000	8.66	10.51	4.93
4000	-20.08	-	-
5000	-22.63	-	-
6000	-22.99	-	-
7000	-22.66	-	-
8000	-22.63	-	-
9000	-22.41	-	-
10000	-22.81	-	-
20000	-22.95	-	-
30000	-23.03	-	-
40000	-22.77	-	-
50000	-22.7	-	-

11K0F3E_138.05MHz_HIGH POWER



Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-25.01	-18.93	-42.86
125	-25.16	-17.00	-39.00
300	-11.99	-9.42	-23.84
500	-5.96	-5.00	-9.00
750	-2.52	-1.49	-5.49
1000	0.05	1.00	-3.00
1250	2.07	2.93	-1.07
1500	3.96	4.51	0.51
2000	6.95	7.00	3.00
2500	8.82	8.93	4.93
3000	8.69	10.51	4.93
4000	-19.74	-	-
5000	-22.9	-	-
6000	-22.47	-	-
7000	-22.8	-	-
8000	-22.87	-	-
9000	-22.9	-	-
10000	-22.4	-	-
20000	-22.76	-	-
30000	-22.98	-	-
40000	-23.33	-	-
50000	-22.47	-	-

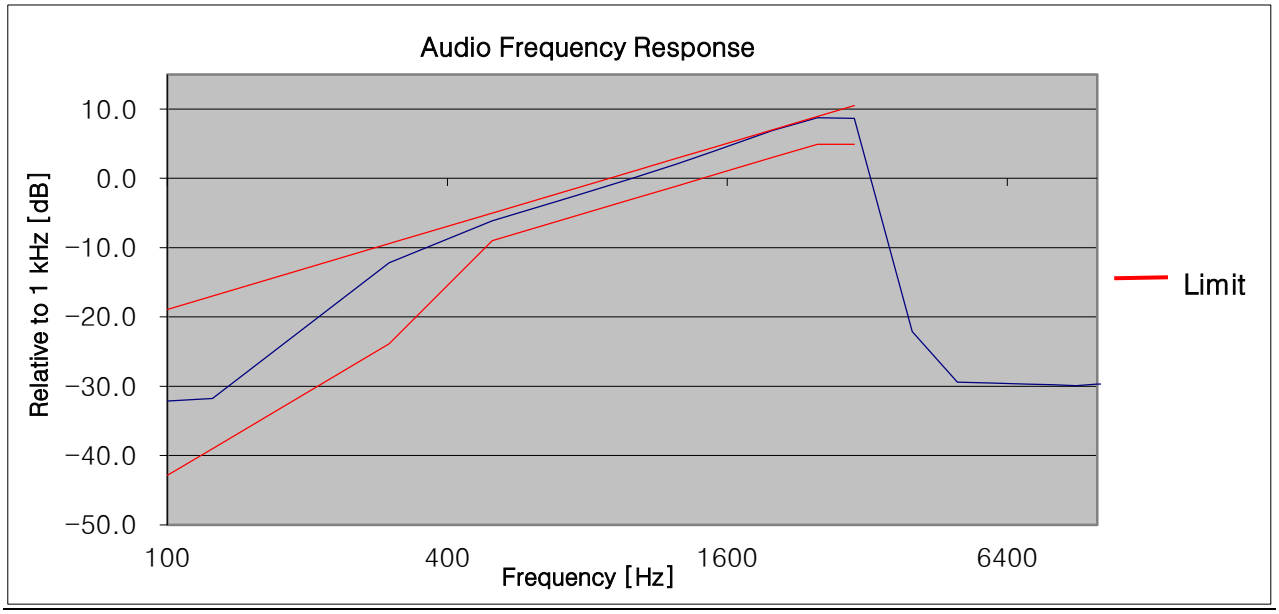
11K0F3E_138.05MHz_LOW POWER



16K0F3E For ONLY IC

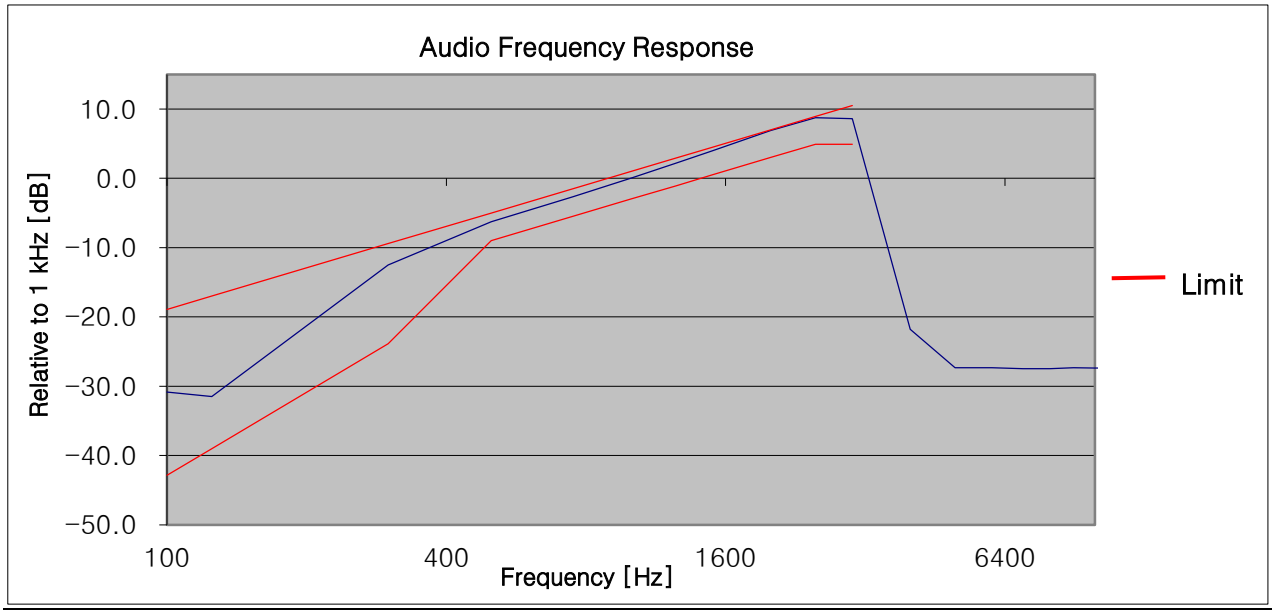
Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-32.15	-18.93	-42.86
125	-31.74	-17.00	-39.00
300	-12.17	-9.42	-23.84
500	-6.13	-5.00	-9.00
750	-2.57	-1.49	-5.49
1000	0	1.00	-3.00
1250	2.1	2.93	-1.07
1500	3.95	4.51	0.51
2000	6.91	7.00	3.00
2500	8.77	8.93	4.93
3000	8.67	10.51	4.93
4000	-22.11	-	-
5000	-29.42	-	-
6000	-29.55	-	-
7000	-29.69	-	-
8000	-29.76	-	-
9000	-29.9	-	-
10000	-29.69	-	-
20000	-29.58	-	-
30000	-29.29	-	-
40000	-29.66	-	-
50000	-29.69	-	-

16K0F3E_138.05MHz_HIGH POWER



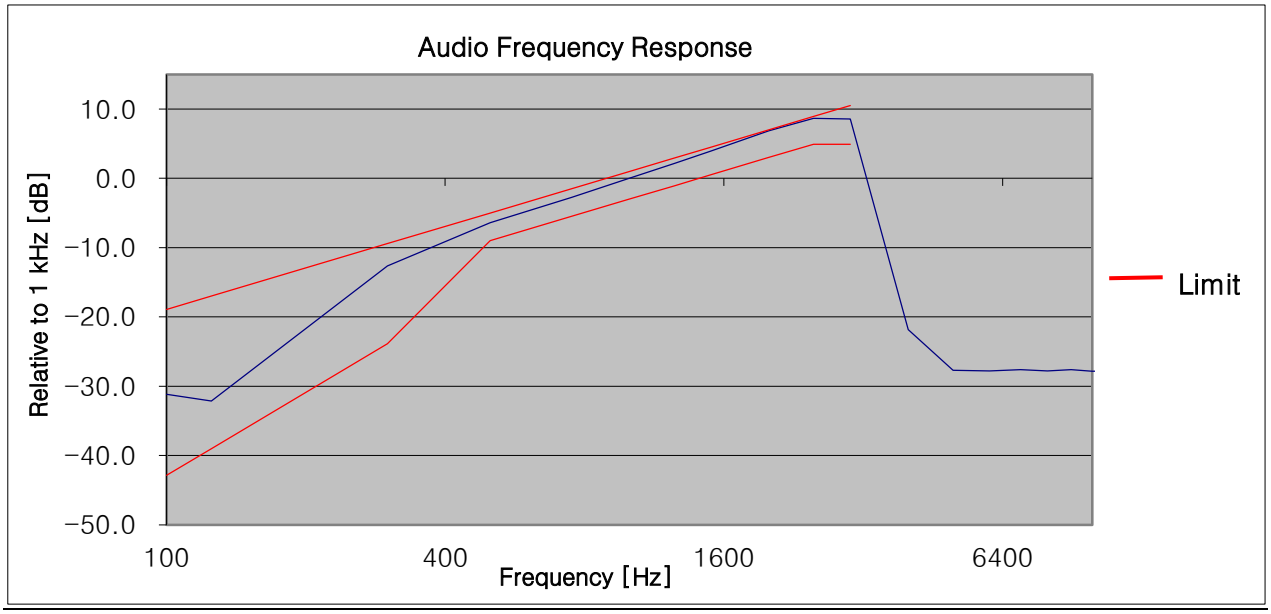
Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-30.84	-18.93	-42.86
125	-31.5	-17.00	-39.00
300	-12.49	-9.42	-23.84
500	-6.27	-5.00	-9.00
750	-2.65	-1.49	-5.49
1000	0.04	1.00	-3.00
1250	2.19	2.93	-1.07
1500	3.97	4.51	0.51
2000	6.92	7.00	3.00
2500	8.75	8.93	4.93
3000	8.63	10.51	4.93
4000	-21.79	-	-
5000	-27.33	-	-
6000	-27.33	-	-
7000	-27.45	-	-
8000	-27.48	-	-
9000	-27.31	-	-
10000	-27.39	-	-
20000	-27.35	-	-
30000	-27.68	-	-
40000	-27.33	-	-
50000	-27.35	-	-

16K0F3E_162.05MHz_HIGH POWER



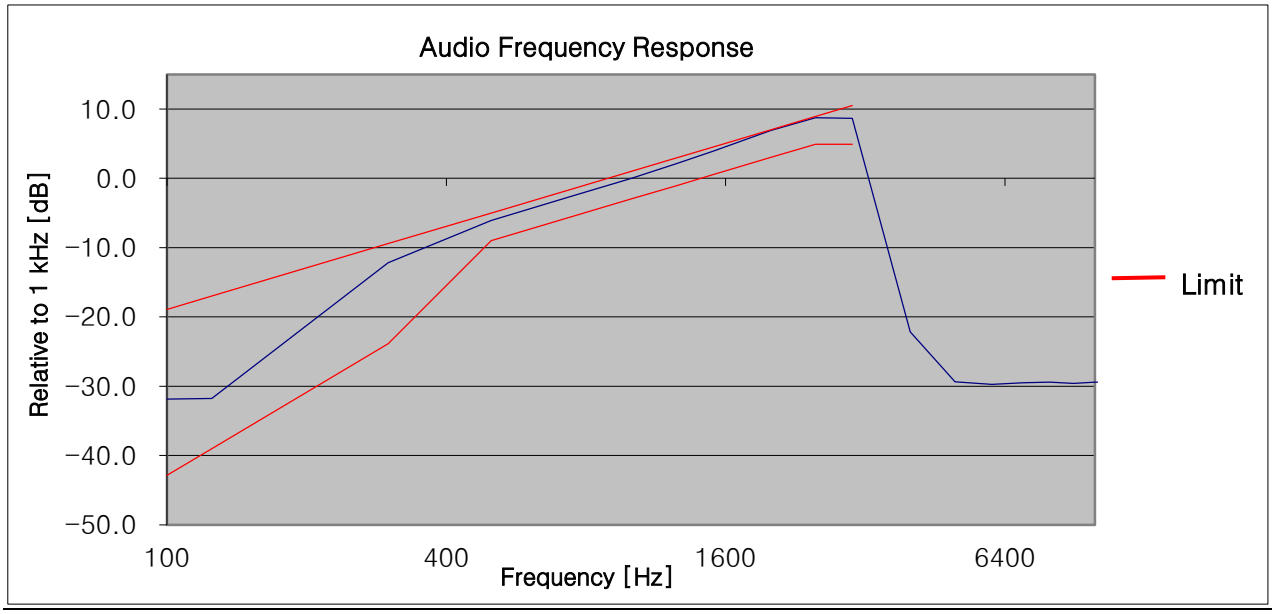
Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-31.15	-18.93	-42.86
125	-32.15	-17.00	-39.00
300	-12.65	-9.42	-23.84
500	-6.39	-5.00	-9.00
750	-2.75	-1.49	-5.49
1000	0.04	1.00	-3.00
1250	2.13	2.93	-1.07
1500	3.93	4.51	0.51
2000	6.85	7.00	3.00
2500	8.67	8.93	4.93
3000	8.56	10.51	4.93
4000	-21.84	-	-
5000	-27.72	-	-
6000	-27.81	-	-
7000	-27.6	-	-
8000	-27.79	-	-
9000	-27.6	-	-
10000	-27.85	-	-
20000	-27.35	-	-
30000	-27.77	-	-
40000	-27.81	-	-
50000	-27.87	-	-

16K0F3E_173.95MHz_HIGH POWER



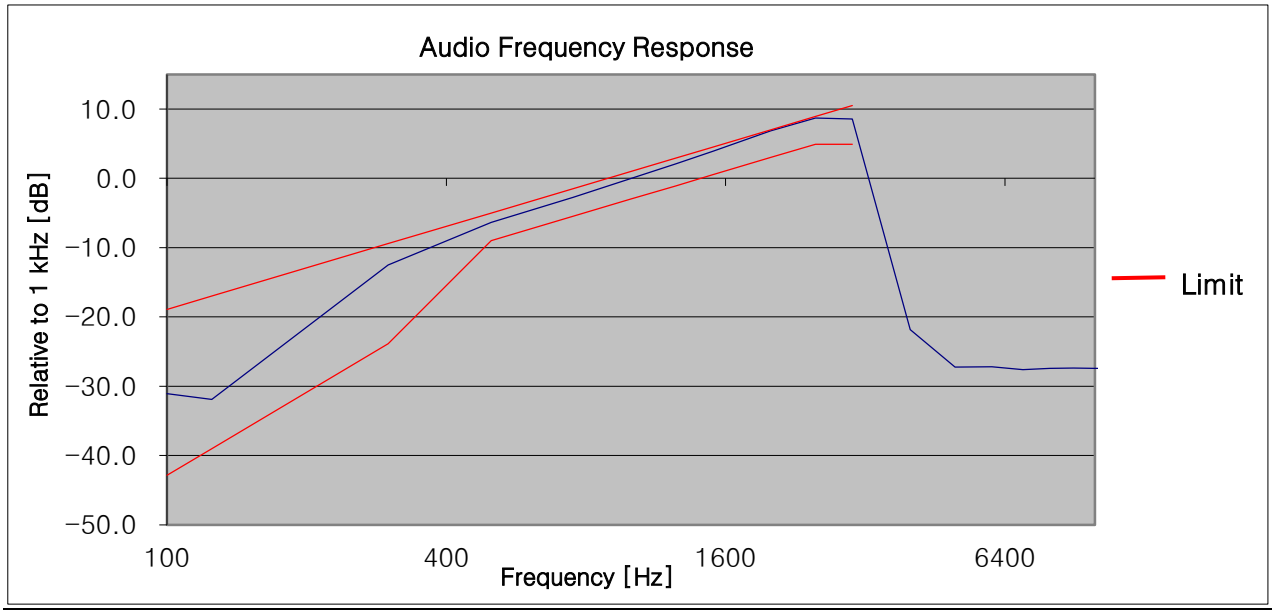
Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-31.87	-18.93	-42.86
125	-31.74	-17.00	-39.00
300	-12.18	-9.42	-23.84
500	-6.06	-5.00	-9.00
750	-2.53	-1.49	-5.49
1000	-0.01	1.00	-3.00
1250	2.09	2.93	-1.07
1500	3.91	4.51	0.51
2000	6.9	7.00	3.00
2500	8.76	8.93	4.93
3000	8.65	10.51	4.93
4000	-22.15	-	-
5000	-29.37	-	-
6000	-29.71	-	-
7000	-29.5	-	-
8000	-29.42	-	-
9000	-29.61	-	-
10000	-29.42	-	-
20000	-29.32	-	-
30000	-29.92	-	-
40000	-29.27	-	-
50000	-29.42	-	-

16K0F3E_138.05MHz_LOW POWER



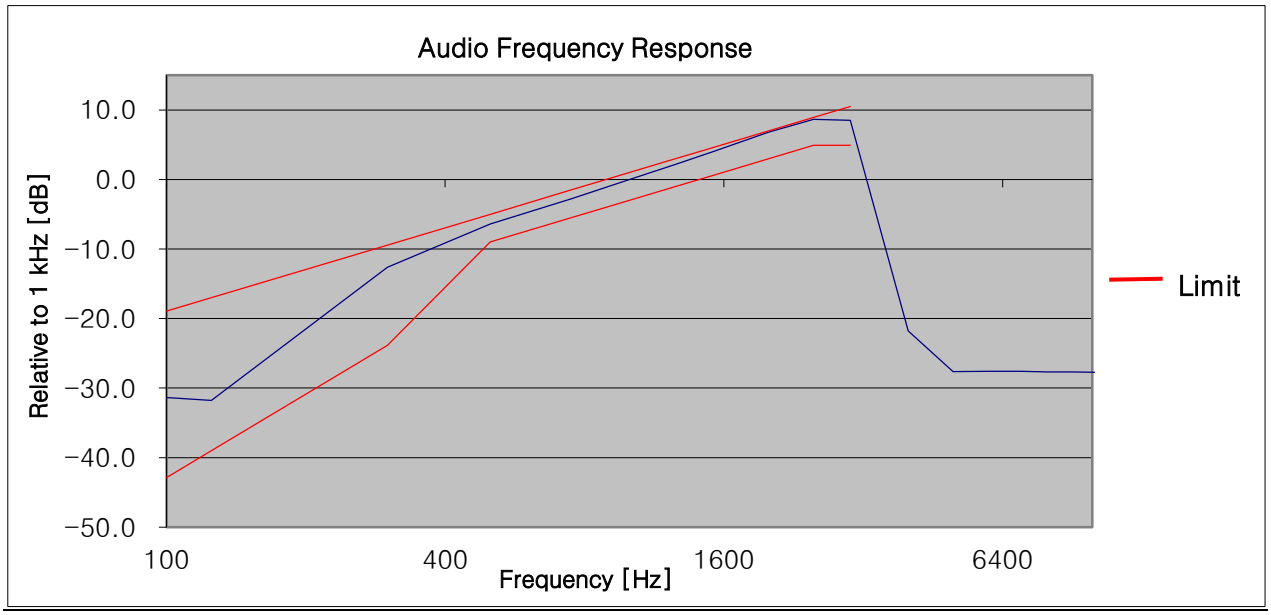
Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-31.09	-18.93	-42.86
125	-31.9	-17.00	-39.00
300	-12.51	-9.42	-23.84
500	-6.36	-5.00	-9.00
750	-2.75	-1.49	-5.49
1000	-0.04	1.00	-3.00
1250	2.1	2.93	-1.07
1500	3.89	4.51	0.51
2000	6.85	7.00	3.00
2500	8.69	8.93	4.93
3000	8.57	10.51	4.93
4000	-21.83	-	-
5000	-27.23	-	-
6000	-27.17	-	-
7000	-27.6	-	-
8000	-27.43	-	-
9000	-27.39	-	-
10000	-27.43	-	-
20000	-27.43	-	-
30000	-27.48	-	-
40000	-27.25	-	-
50000	-27.33	-	-

16K0F3E_162.05MHz_LOW POWER



Frequency (Hz)	Attenuation Rel. to 1kHz (dB)	Upper limit (dB)	Lower limit (dB)
100	-31.37	-18.93	-42.86
125	-31.77	-17.00	-39.00
300	-12.61	-9.42	-23.84
500	-6.39	-5.00	-9.00
750	-2.76	-1.49	-5.49
1000	-0.01	1.00	-3.00
1250	2.11	2.93	-1.07
1500	3.91	4.51	0.51
2000	6.81	7.00	3.00
2500	8.65	8.93	4.93
3000	8.52	10.51	4.93
4000	-21.78	-	-
5000	-27.64	-	-
6000	-27.58	-	-
7000	-27.58	-	-
8000	-27.66	-	-
9000	-27.66	-	-
10000	-27.72	-	-
20000	-27.98	-	-
30000	-27.85	-	-
40000	-27.72	-	-
50000	-27.6	-	-

16K0F3E_173.95MHz_LOW POWER

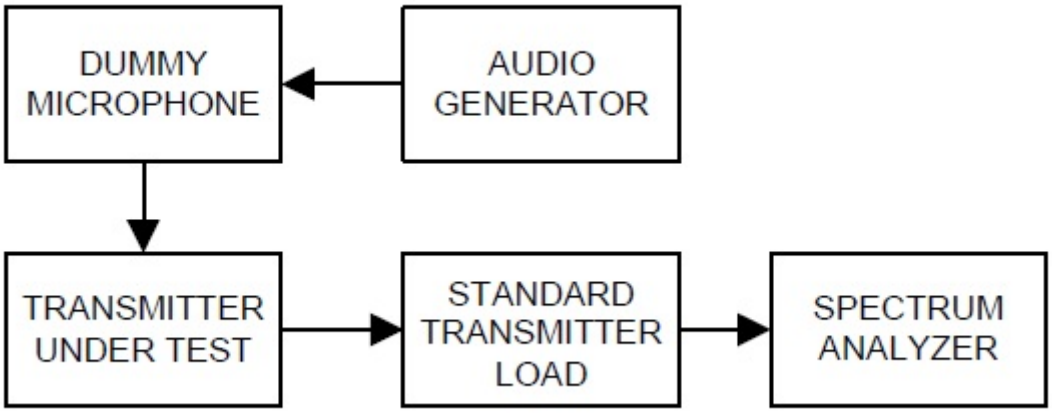


7.6 Emission Mask

▣Definition

The transmitter sideband spectrum 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.

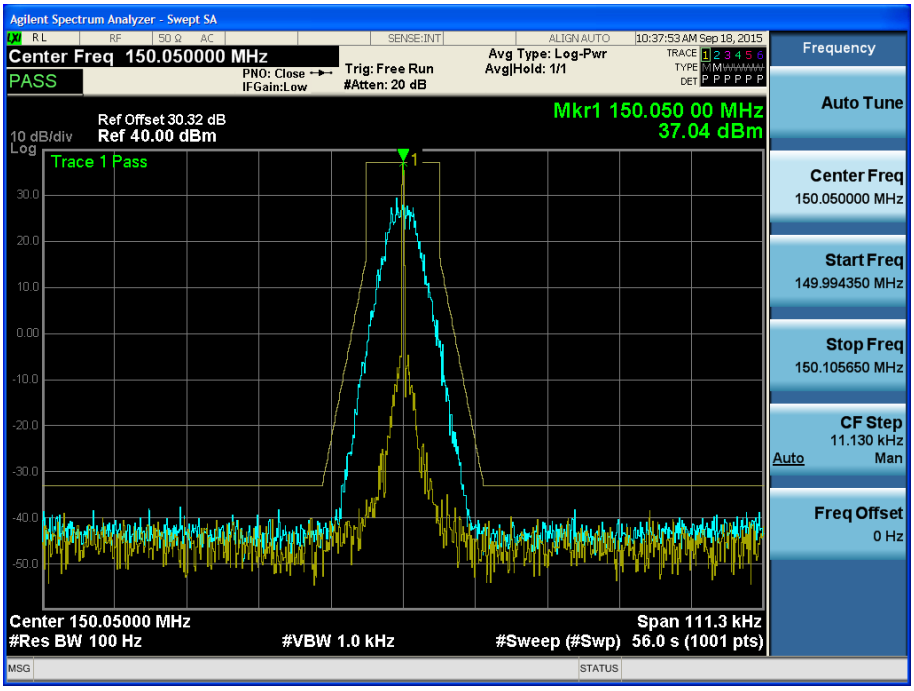
d) Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation. The input level shall be established at the frequency of maximum response of the audio modulating circuit. Transmitters employing digital modulation techniques 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.

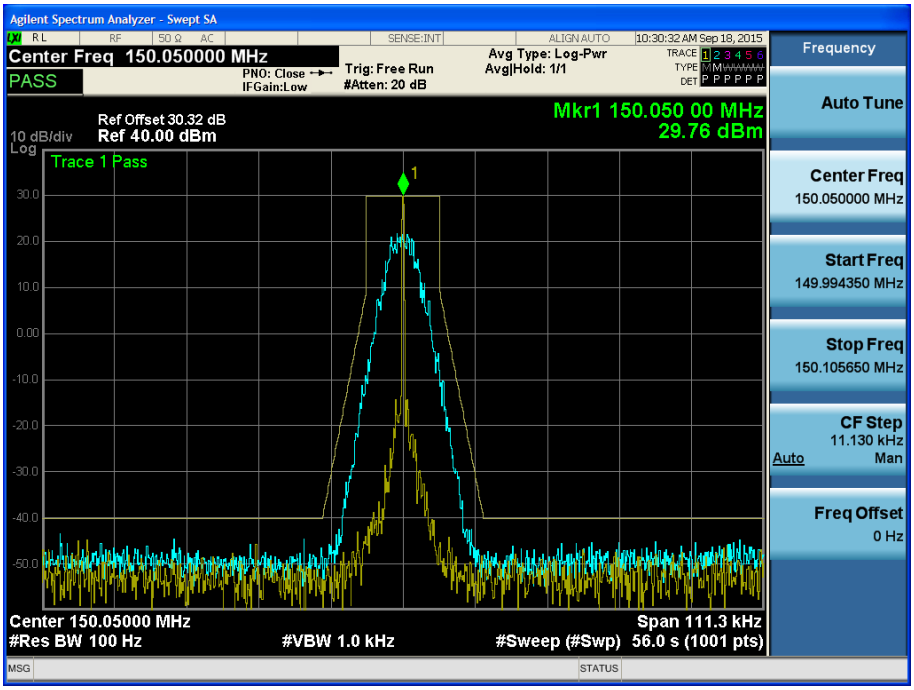
▣TEST RESULTS

7K60FXD/7K60FXE For ONLY FCC

HIGH POWER_7K60FXD/7K60FXE _150.05 MHz

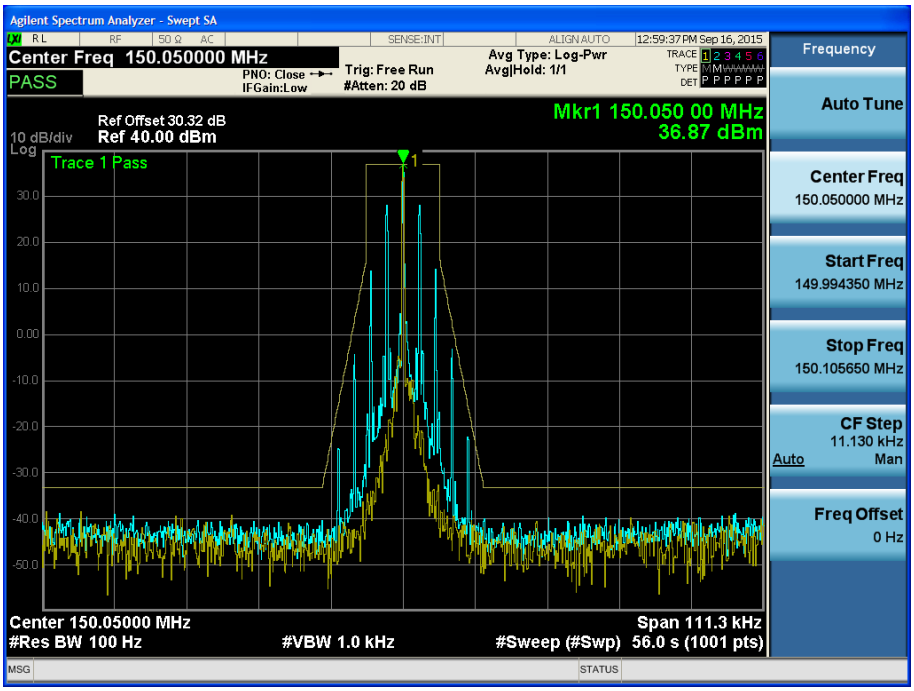


LOW POWER_7K60FXD/7K60FXE _150.05 MHz

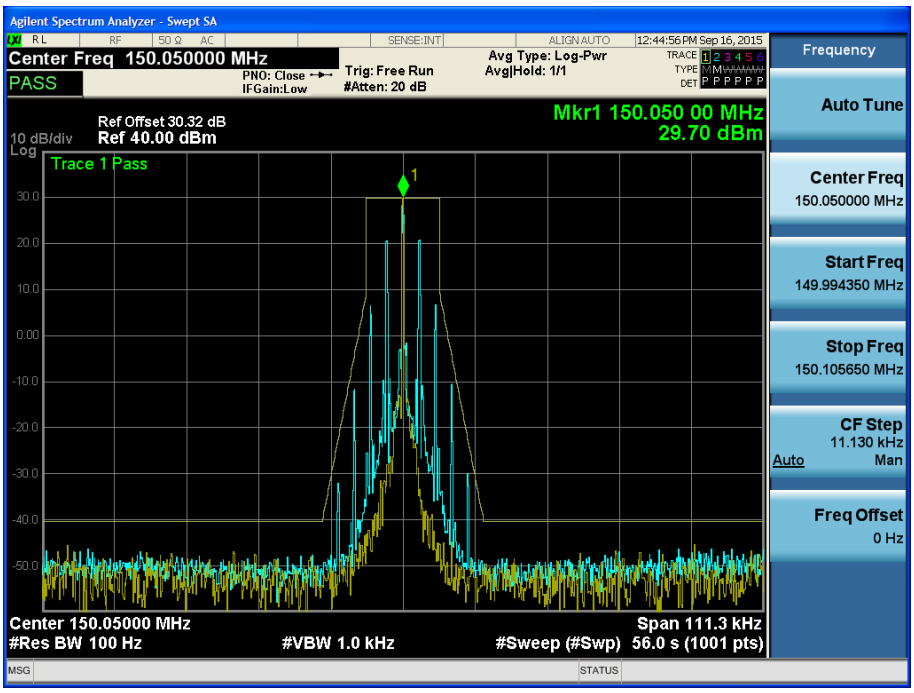


11K0F3E For ONLY FCC

HIGH POWER_11K0F3E_150.05 MHz

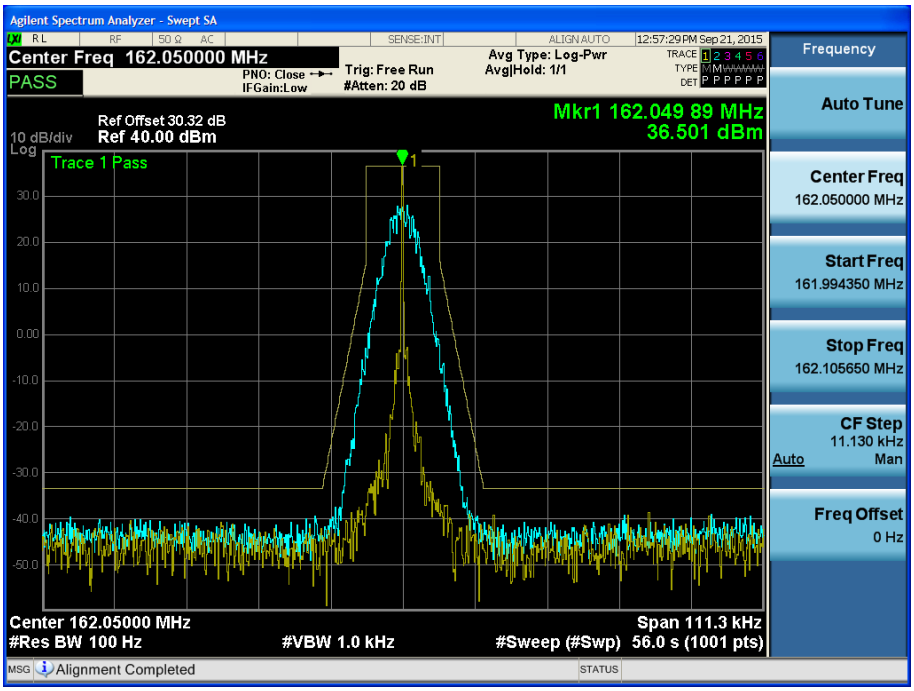


LOW POWER_11K0F3E_150.05 MHz

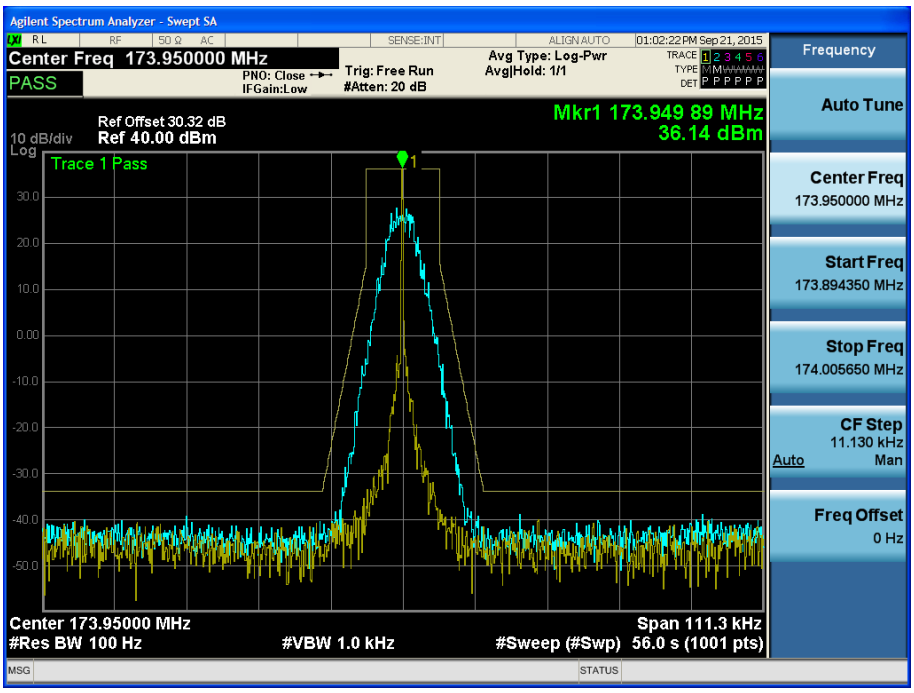


7K60FXD/7K60FXE For FCC AND IC

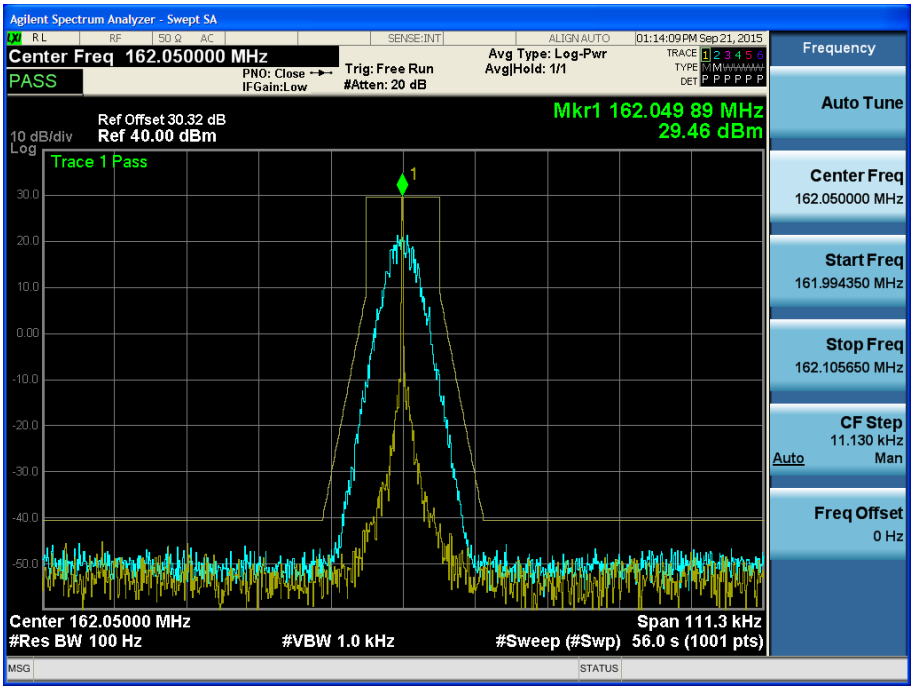
HIGH POWER_7K60FXD/7K60FXE _162.05 MHz



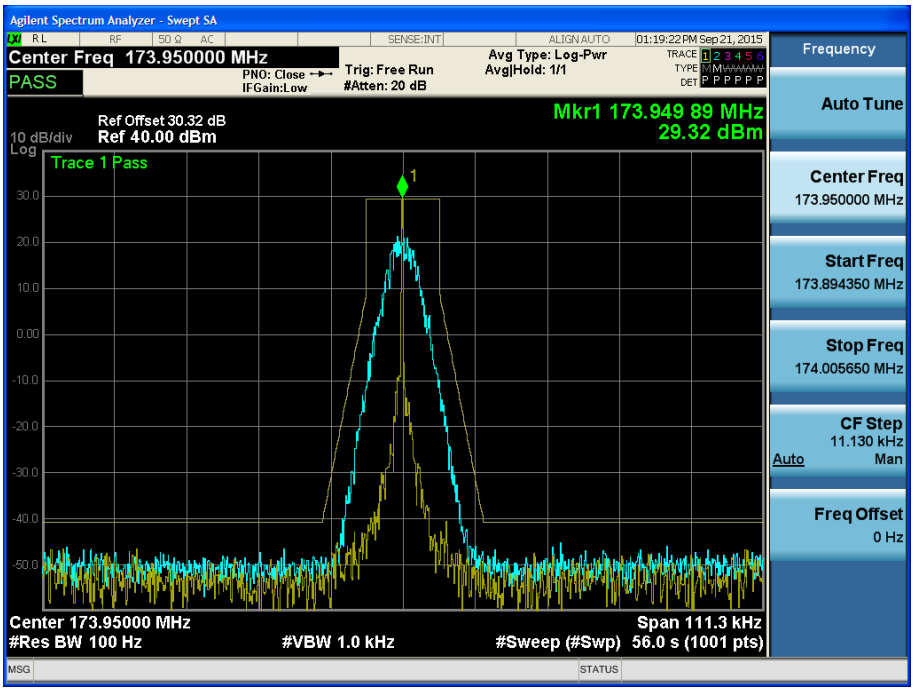
HIGH POWER_7K60FXD/7K60FXE _173.95 MHz



LOW POWER_7K60FXD/7K60FXE _162.05 MHz

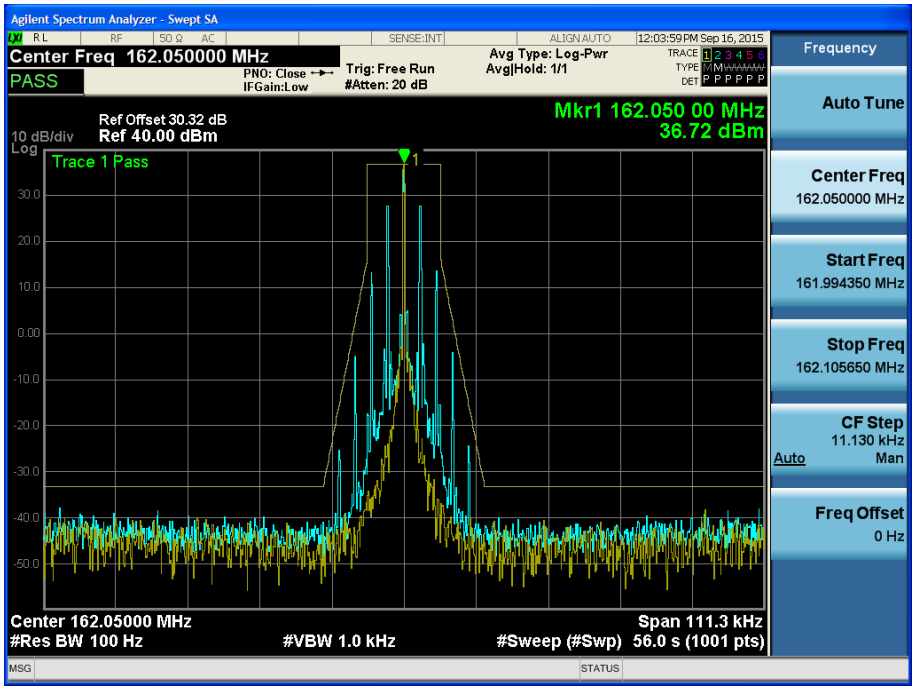


LOW POWER_7K60FXD/7K60FXE _173.95 MHz

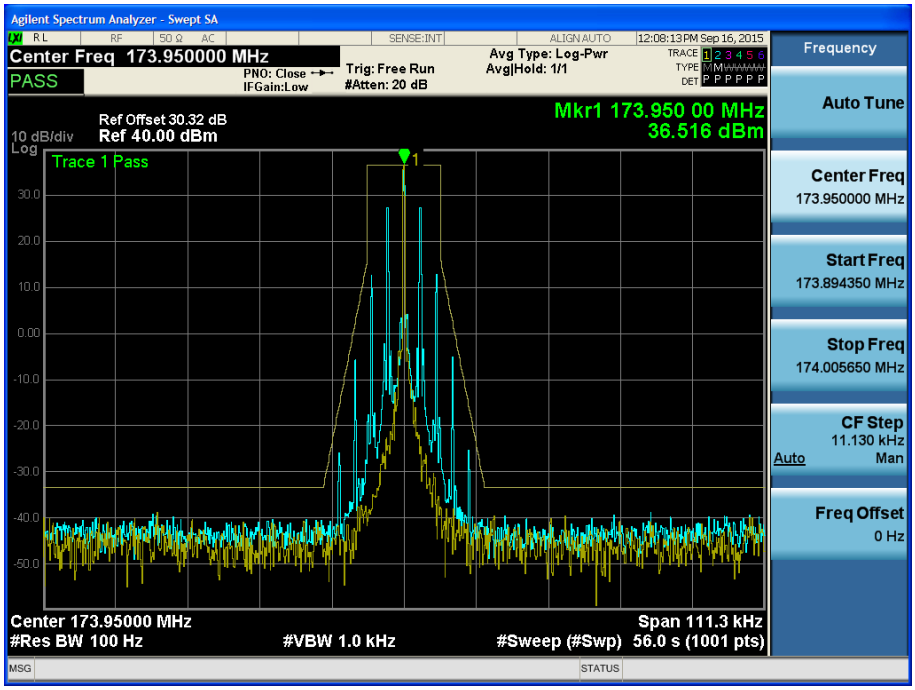


11K0F3E For FCC AND IC

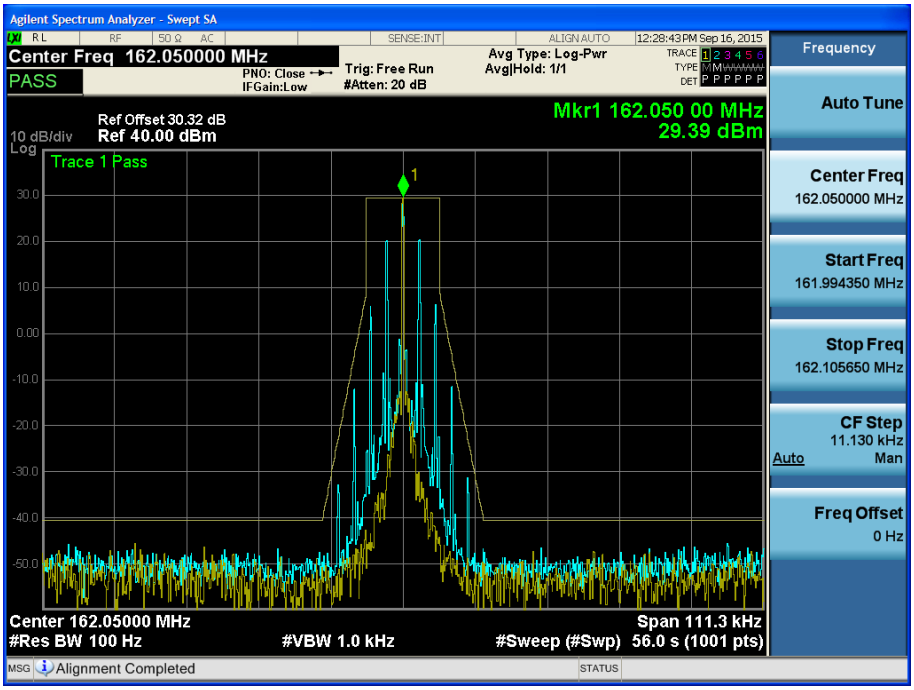
HIGH POWER_11K0F3E_162.05 MHz



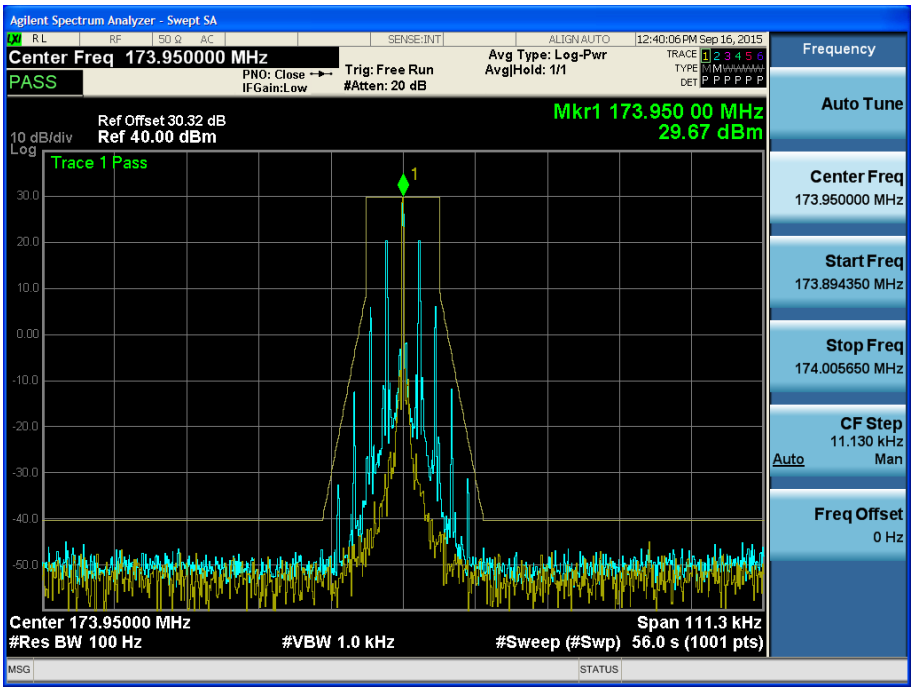
HIGH POWER_11K0F3E _173.95 MHz



LOW POWER_11K0F3E_162.05 MHz

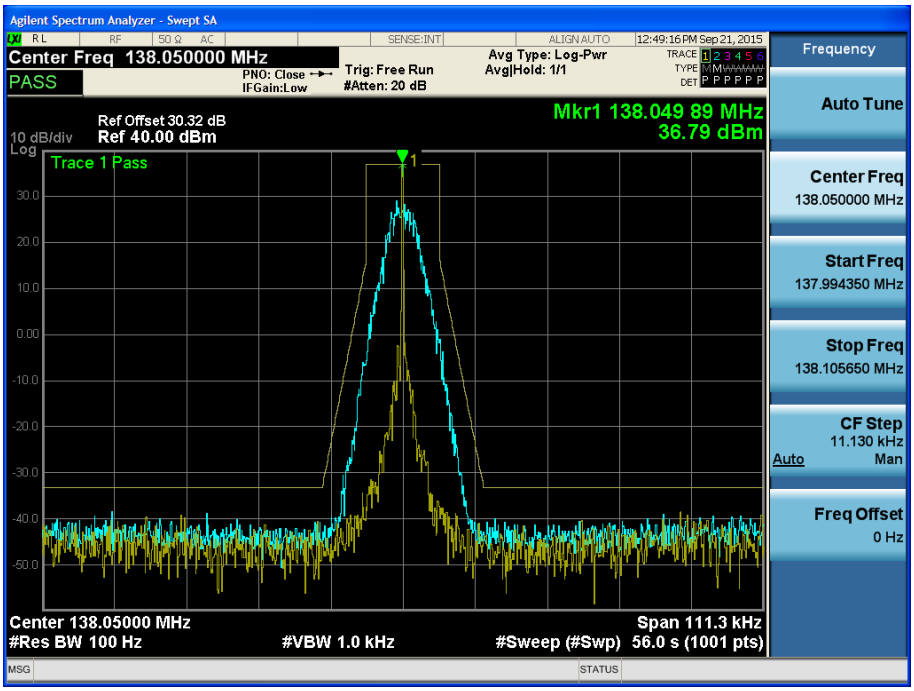


LOW POWER_11K0F3E _173.95 MHz

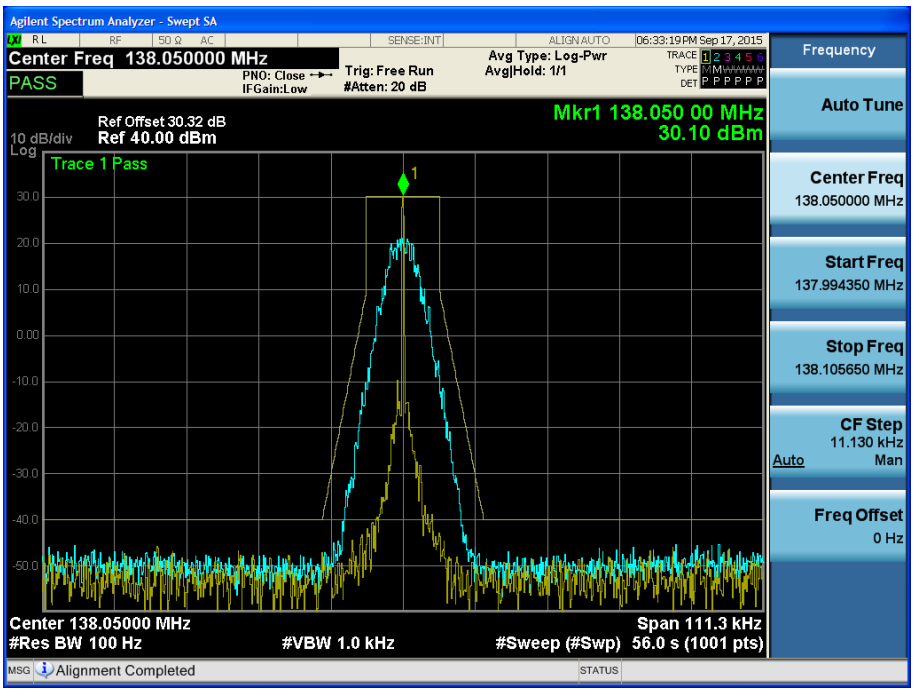


7K60FXD/7K60FXE For ONLY IC

HIGH POWER_7K60FXD/7K60FXE _138.05 MHz

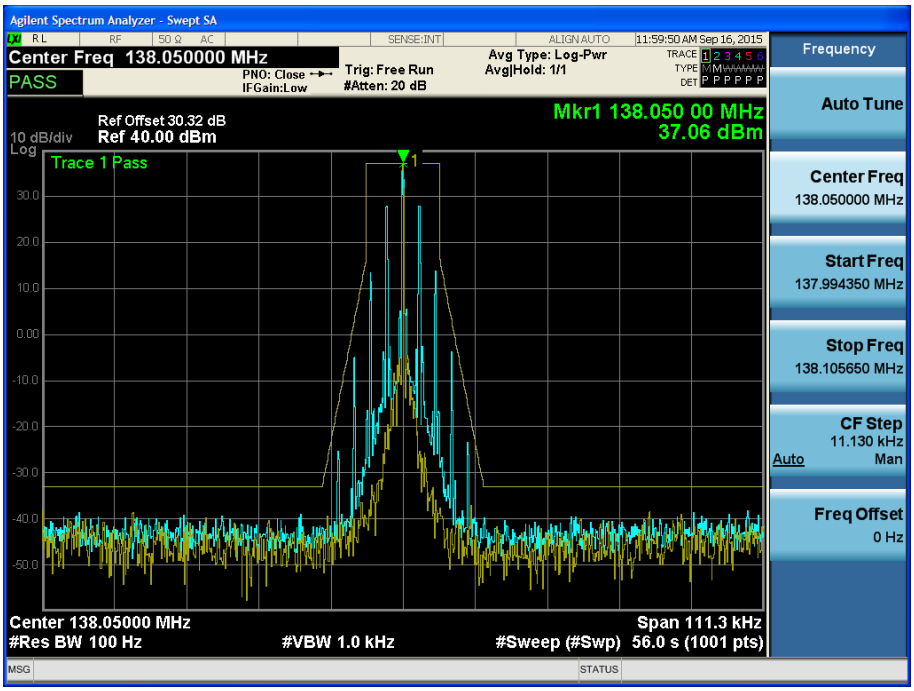


LOW POWER_7K60FXD/7K60FXE _138.05 MHz

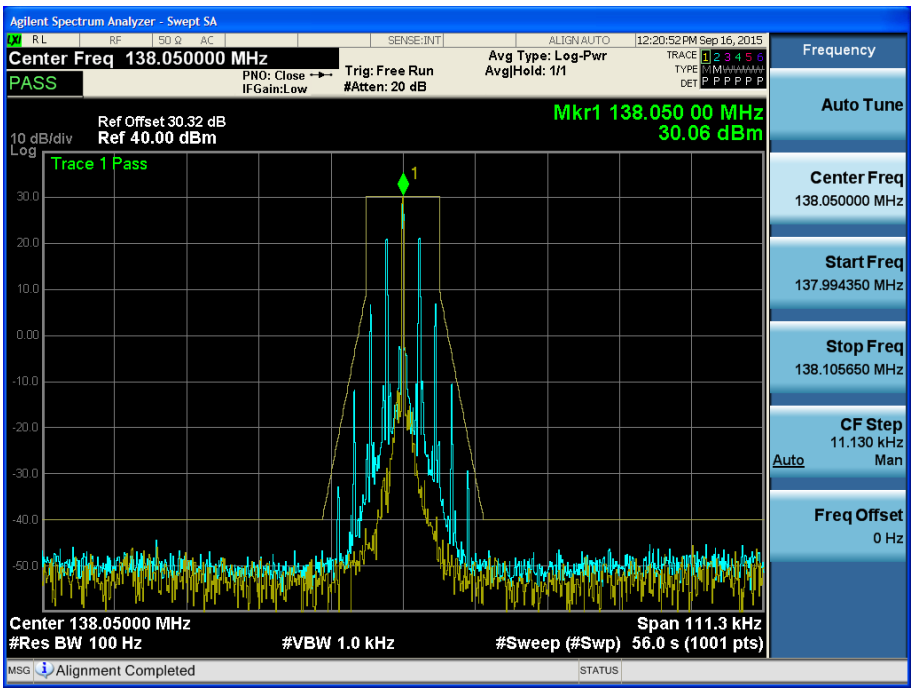


11K0F3E For ONLY IC

HIGH POWER_11K0F3E_138.05 MHz

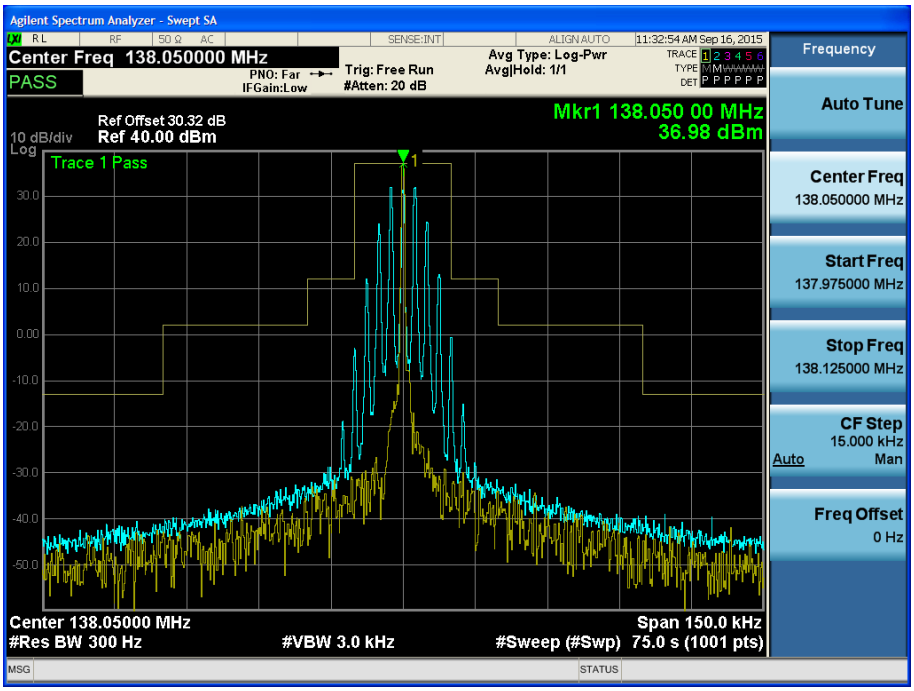


LOW POWER_11K0F3E_138.05 MHz

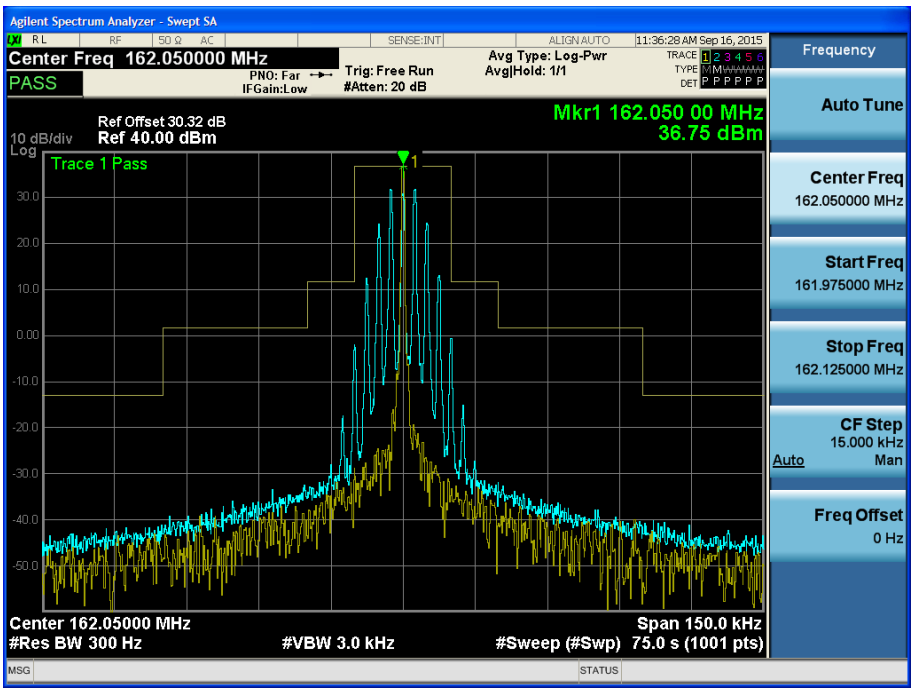


16K0F3E FOR ONLY IC

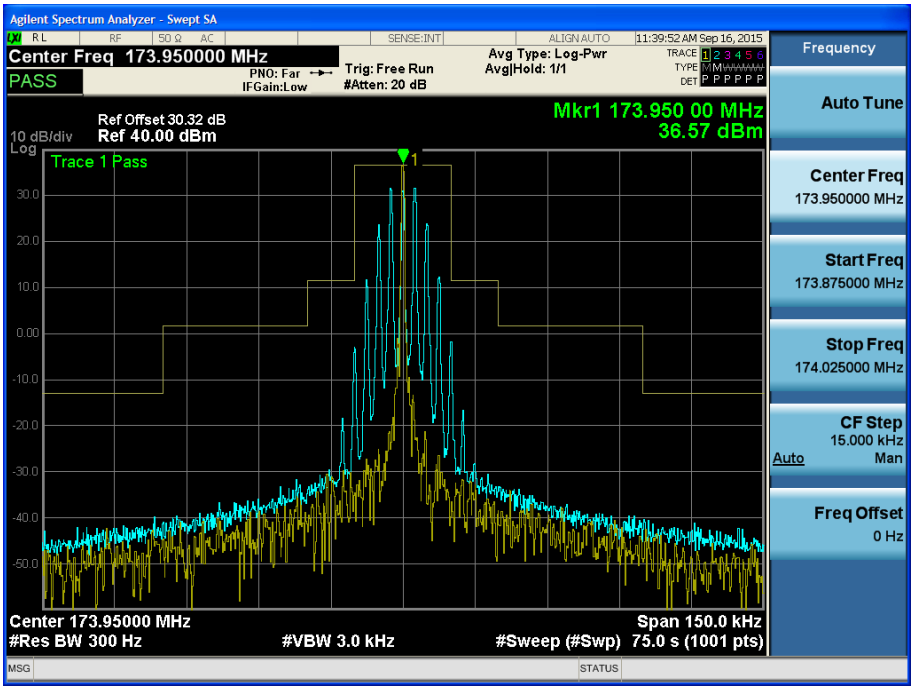
HIGH POWER_16K0F3E_138.05 MHz



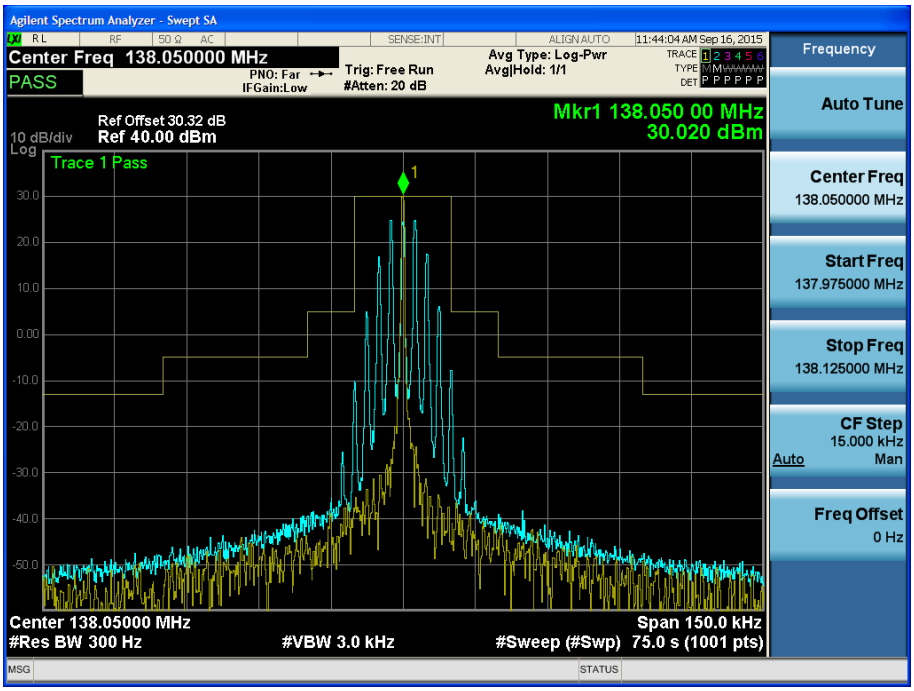
HIGH POWER_16K0F3E_162.05 MHz



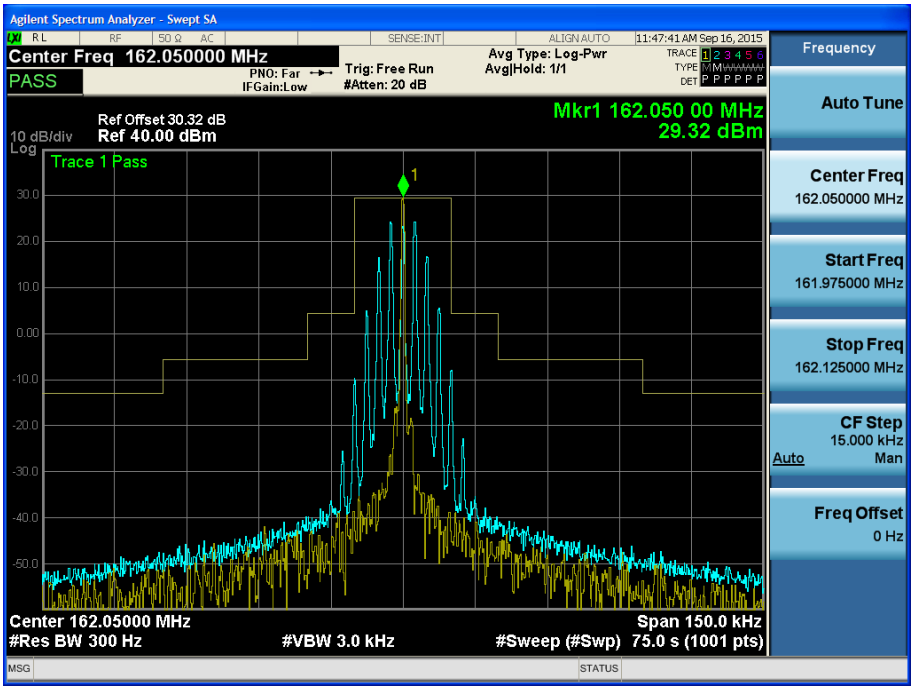
HIGH POWER_16K0F3E_173.95 MHz



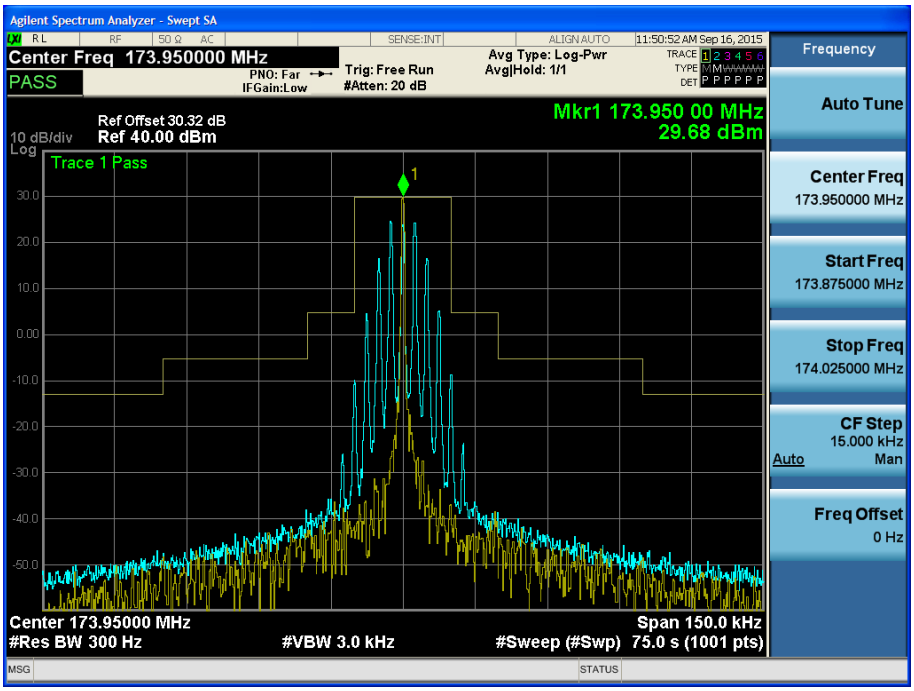
LOW POWER_16K0F3E _138.05 MHz



LOW POWER_16K0F3E _162.05 MHz



LOW POWER_16K0F3E _173.95 MHz

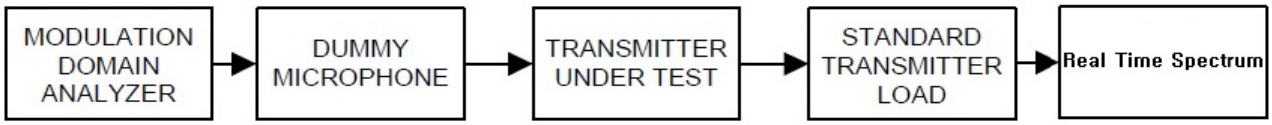


7.7 Transient Frequency Behavior

▣Definition

Transient frequency behavior is a measure of the difference, as a function in time, of the actual transmitter frequency to the assigned transmitter frequency when the transmitted RF output power is switched on or off.

▣ TEST CONFIGURATION



▣TEST PROCEDURE

According to 2.2.19 in TIA-603-D Standard.

a) Connect the equipment as illustrated.

b) Connect the output of the standard transmitter load to the RF power meter.
Supply sufficient attenuation via the RF attenuator to provide a level that is approximately 40 dB below the maximum allowable input to the modulation domain analyzer.

c) Unkey the transmitter.

d) Disconnect the RF power meter and connect the modulation domain analyzer in its place.
Set the envelope trigger of the modulation domain analyzer to the minimum level that will trigger when the transmitter is keyed.

e) Reduce the attenuation of the RF attenuator so that the input to the modulation domain analyzer is increased by 30 dB when the transmitter is keyed.

f) Set the modulation domain analyzer to trigger on the rising edge of the waveform in order to capture a single-shot turn-on of the transmitter signal.

g) Adjust the display of the modulation domain analyzer for proper viewing of the transmitter transient behavior. Set the timebase reference to the left for observing the transmitter turn-on transient.

h) Key the transmitter.

i) Observe the stored display of the modulation domain analyzer.
The signal trace shall be maintained within the allowable limits during the periods t_1 and t_2, and shall also remain within limits following t_2.

j) Adjust the modulation domain analyzer to trigger on the falling edge of the transmitter waveform in order to capture a single-shot turn-off transient of the transmitter signal.

k) Adjust the display of the modulation domain analyzer for proper viewing of the transmitter transient behavior. Set the timebase reference to the right for observing the transmitter turn-off transient.

l) Unkey the transmitter.

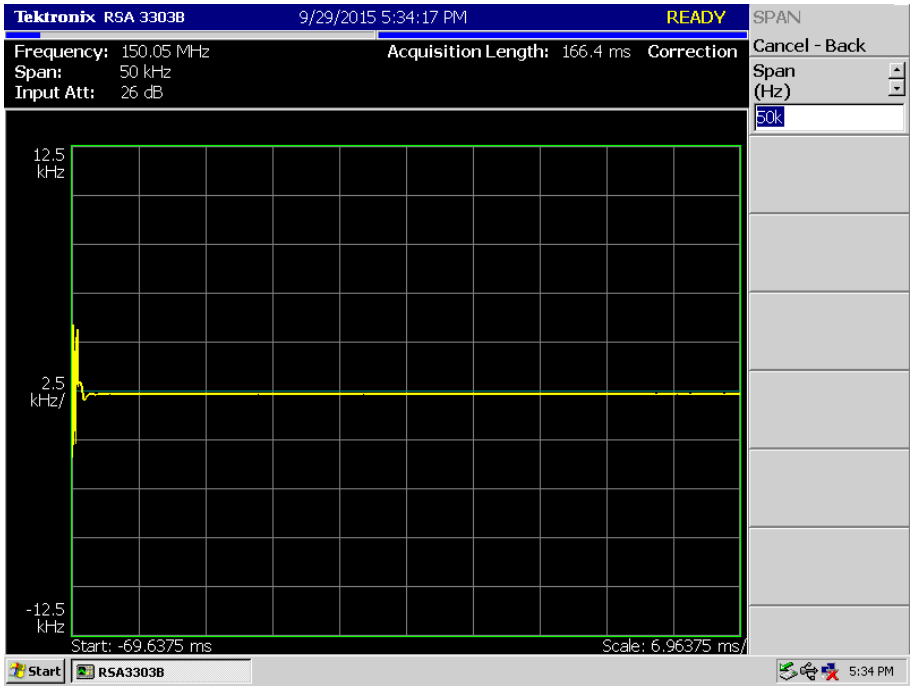
m) Observe the stored display of the modulation domain analyzer. The signal trace shall be maintained within the allowable limits during the period t_3.

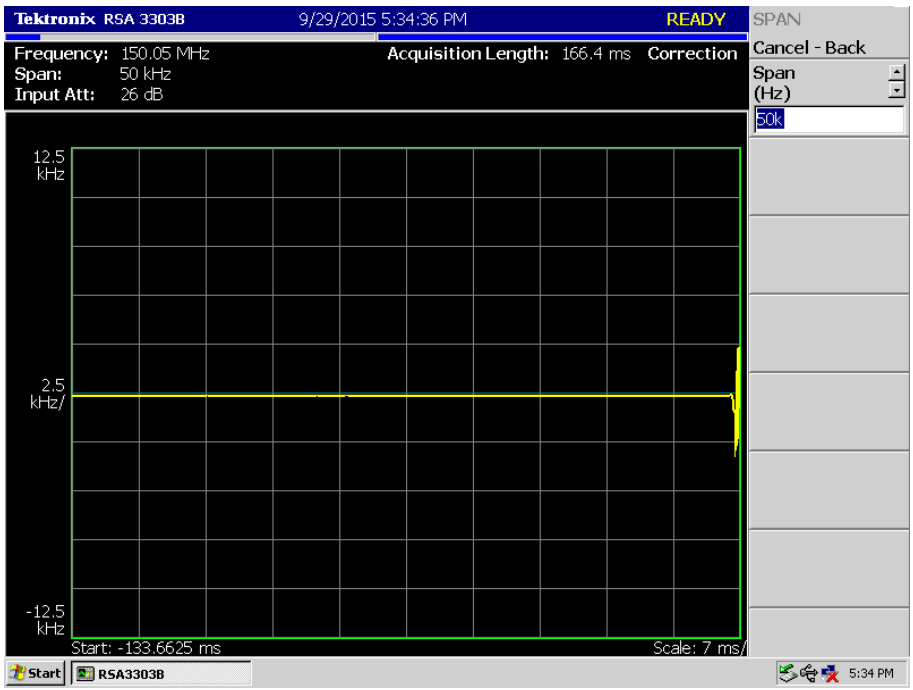
*Note :Digital test is no provision to configure the device with un-modulated carrier, hence test was performed with digital modulation on.

▣TEST RESULTS

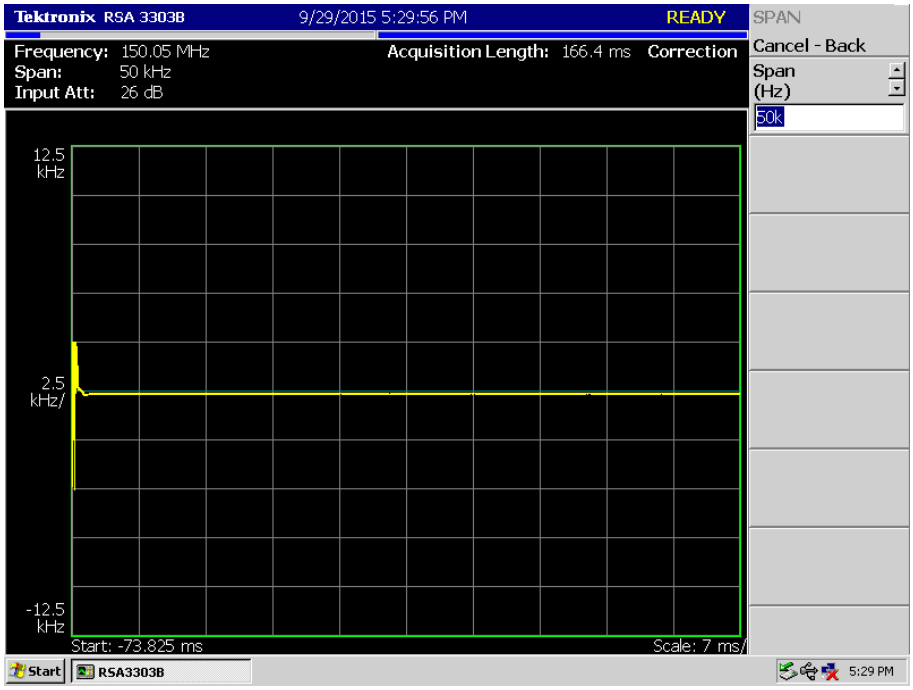
7K60FXD/7K60FXE For ONLY FCC

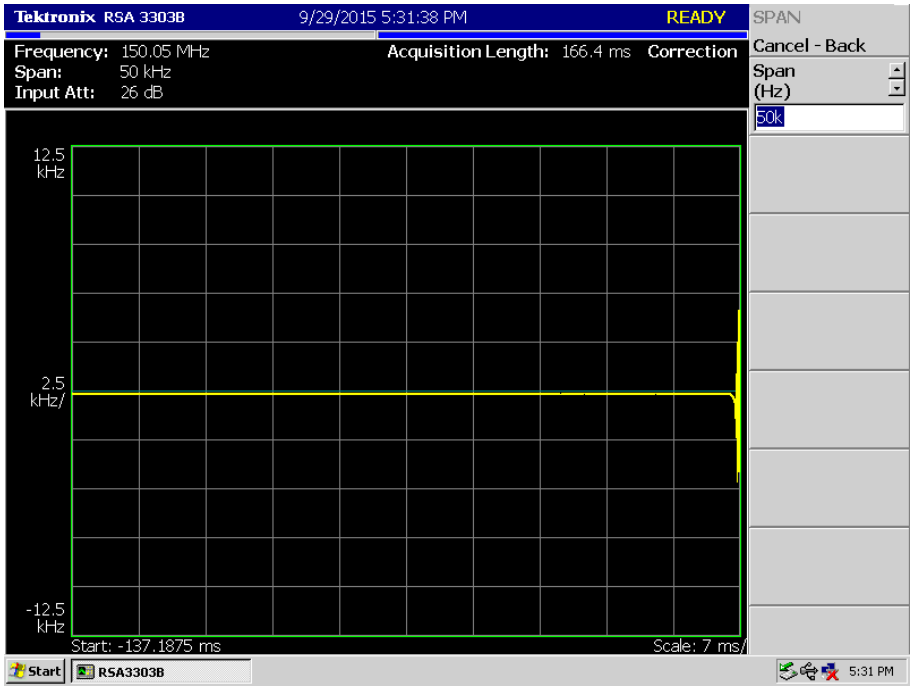
HIGH POWER_7K60FXD/7K60FXE _150.05 MHz





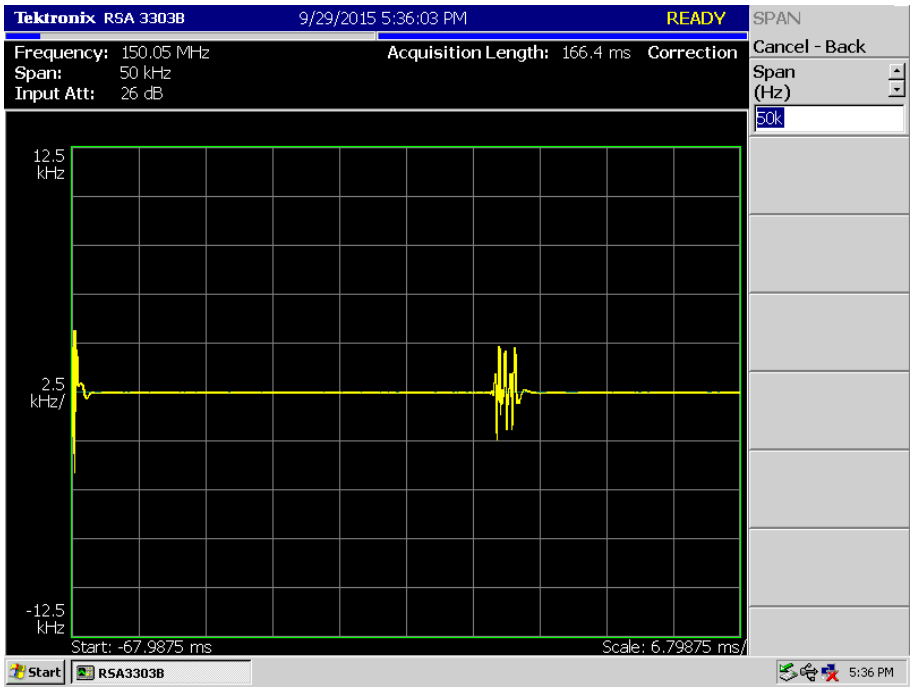
LOW POWER_7K60FXD/7K60FXE _150.05 MHz

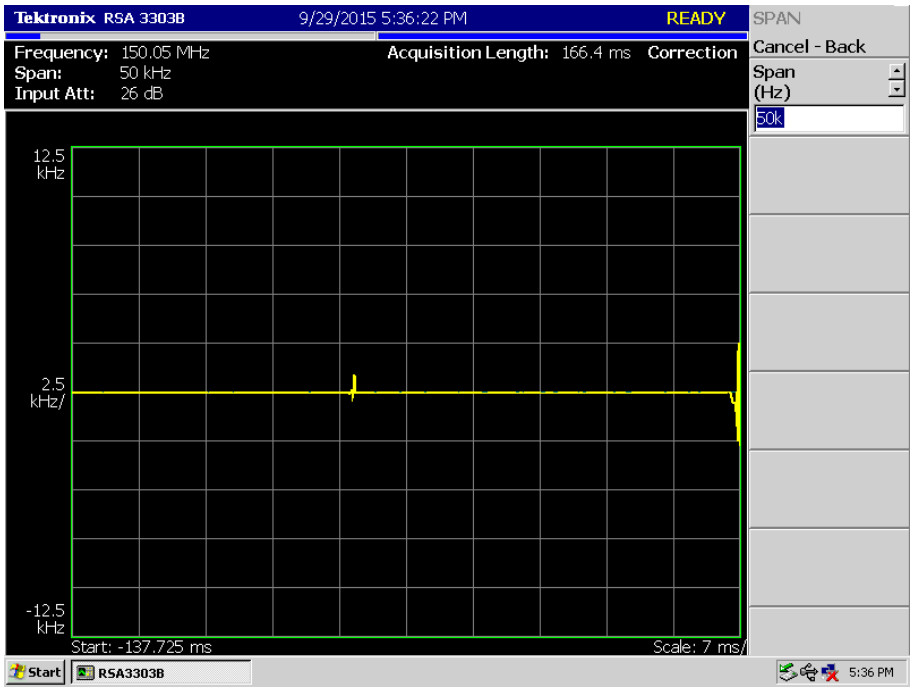




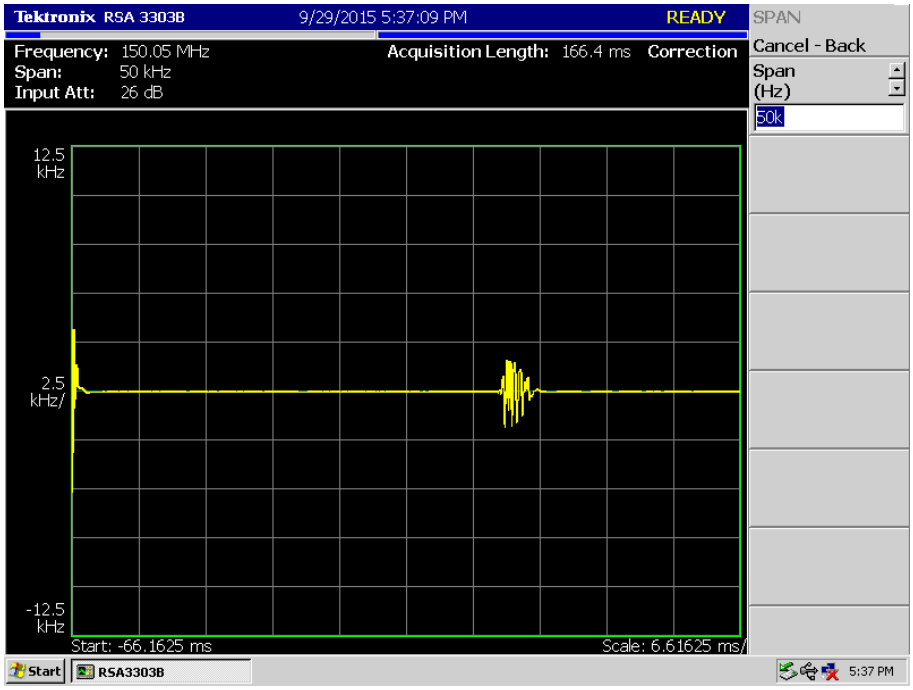
11K0F3E For ONLY FCC

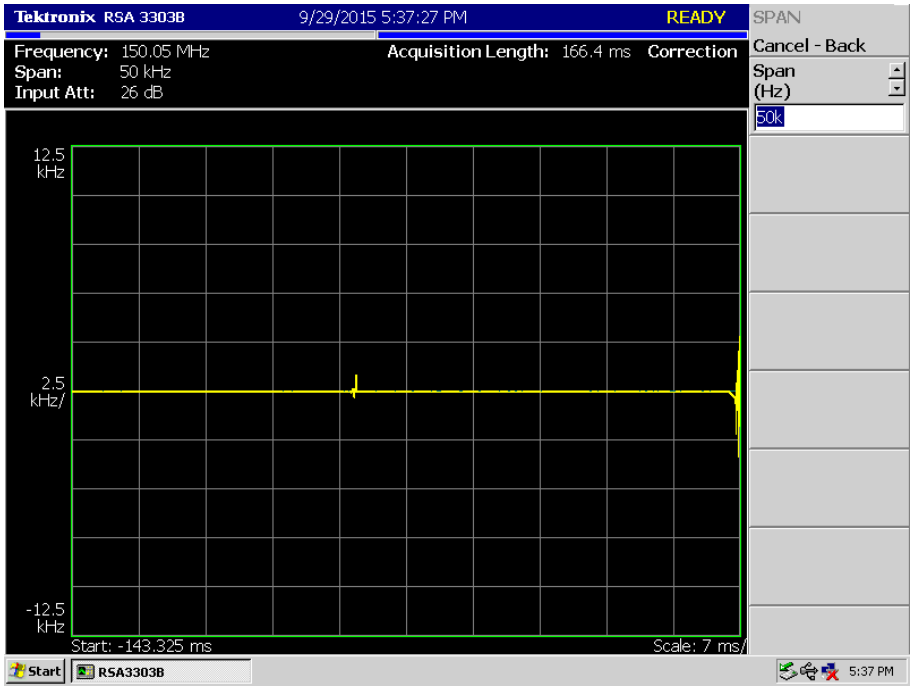
HIGH POWER_11K0F3E_150.05 MHz





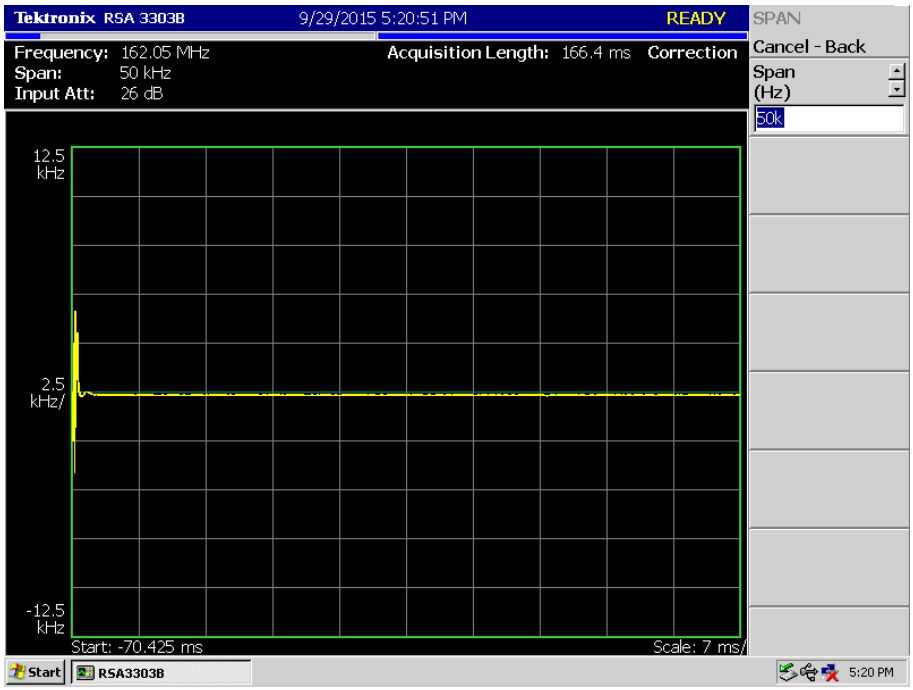
LOW POWER_11K0F3E_150.05 MHz

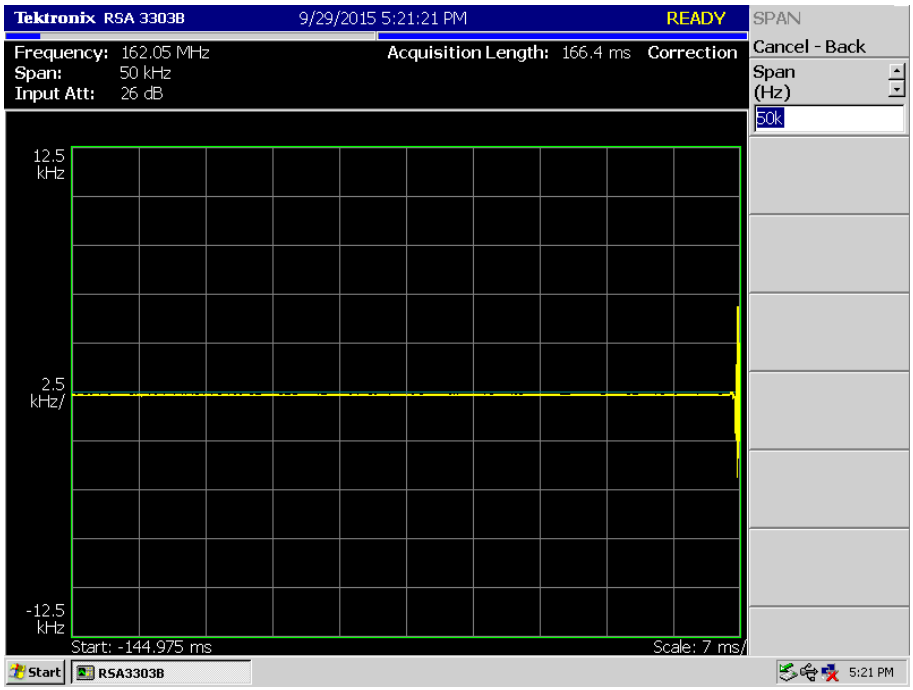




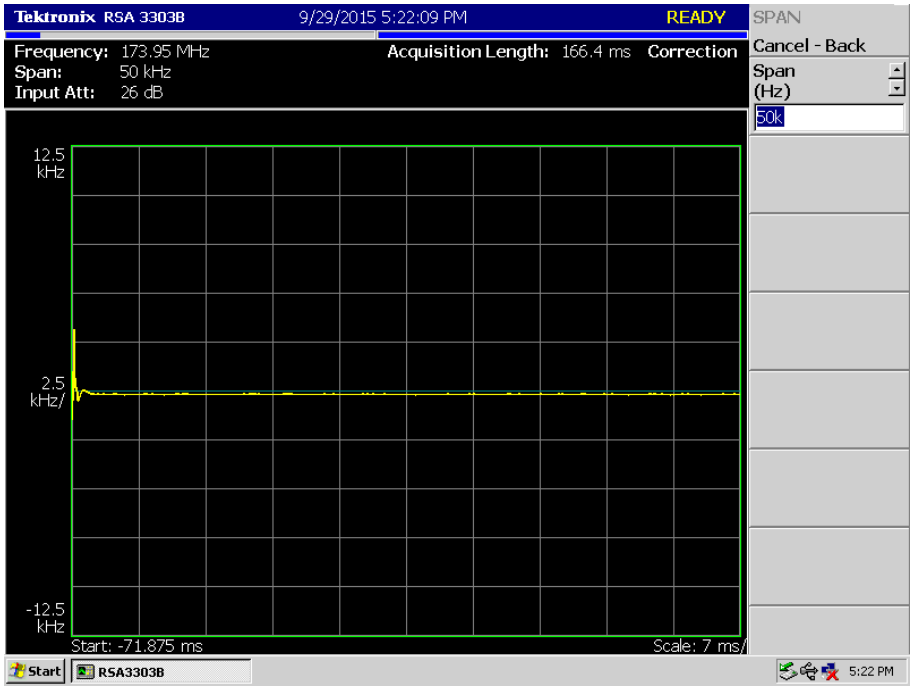
7K60FXD/7K60FXE For FCC AND IC

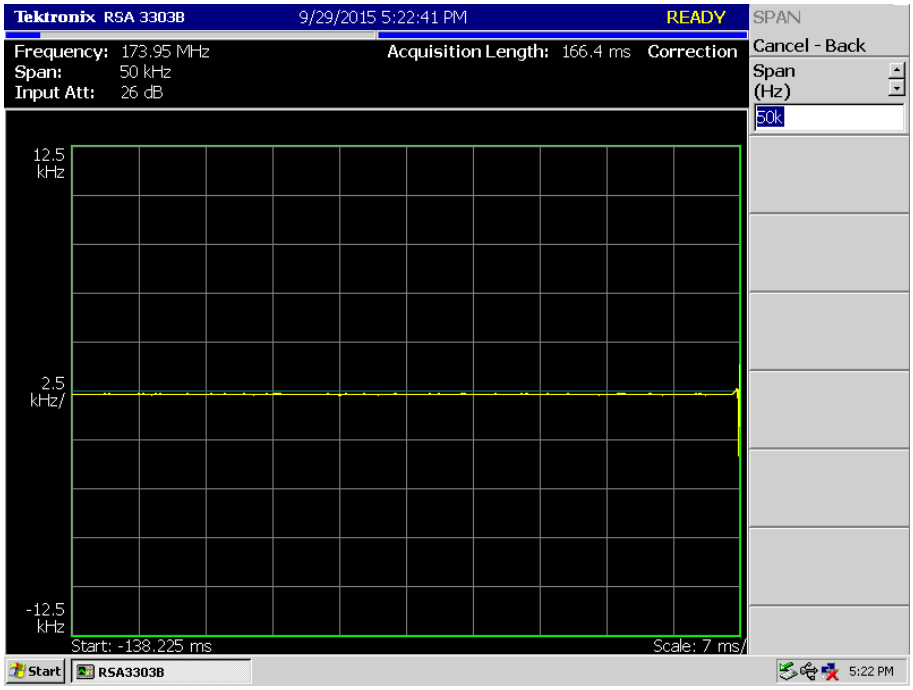
HIGH POWER_7K60FXD/7K60FXE _162.05 MHz



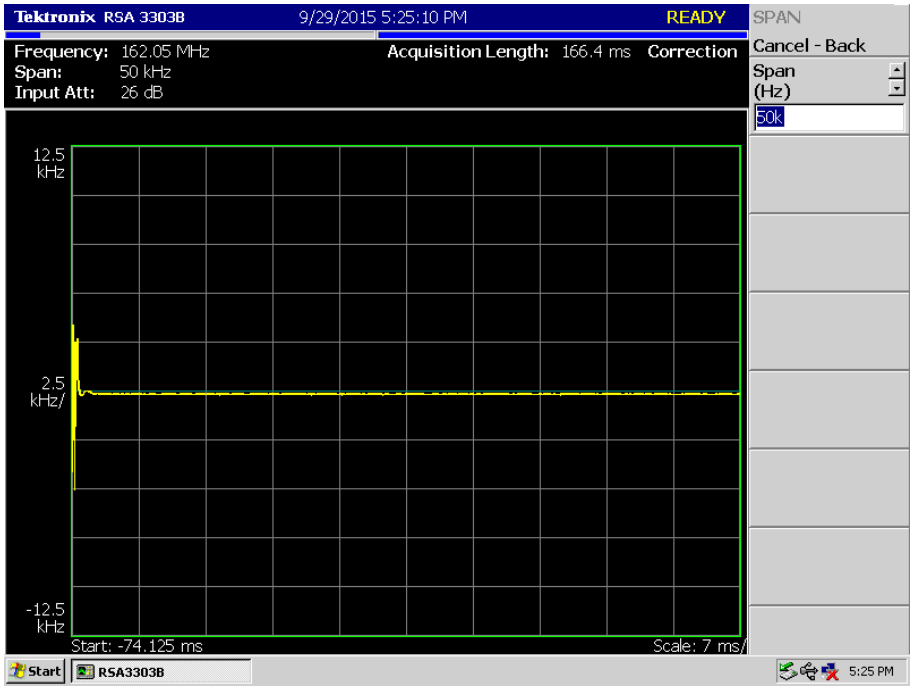


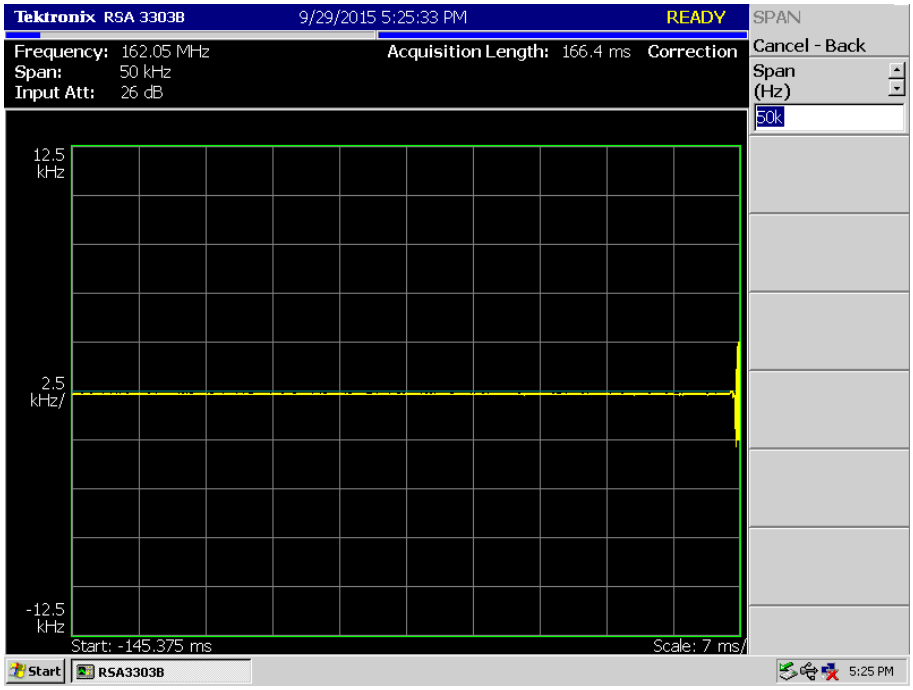
HIGH POWER_7K60FXD/7K60FXE _173.95 MHz



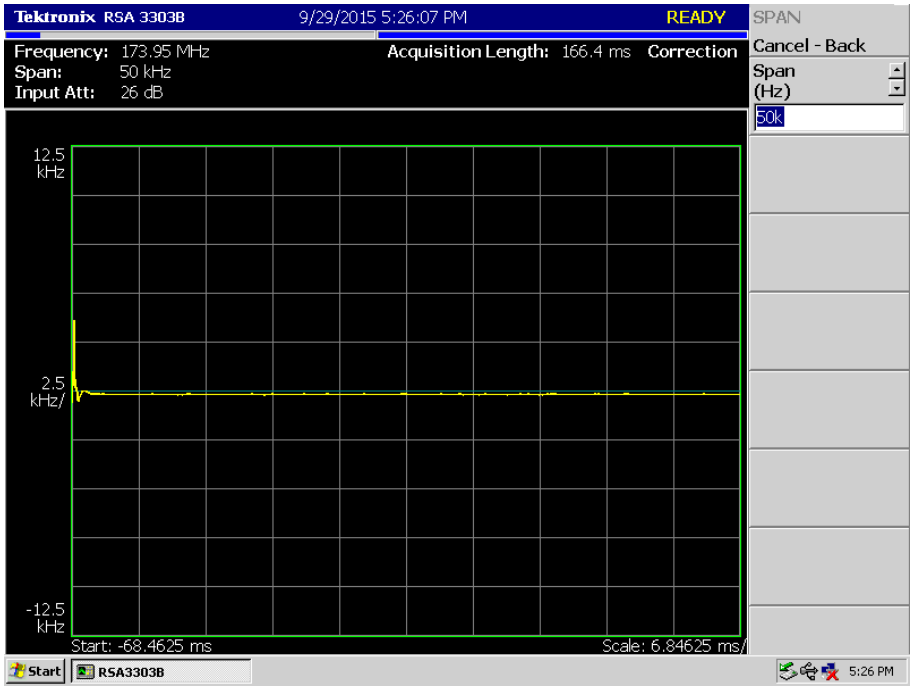


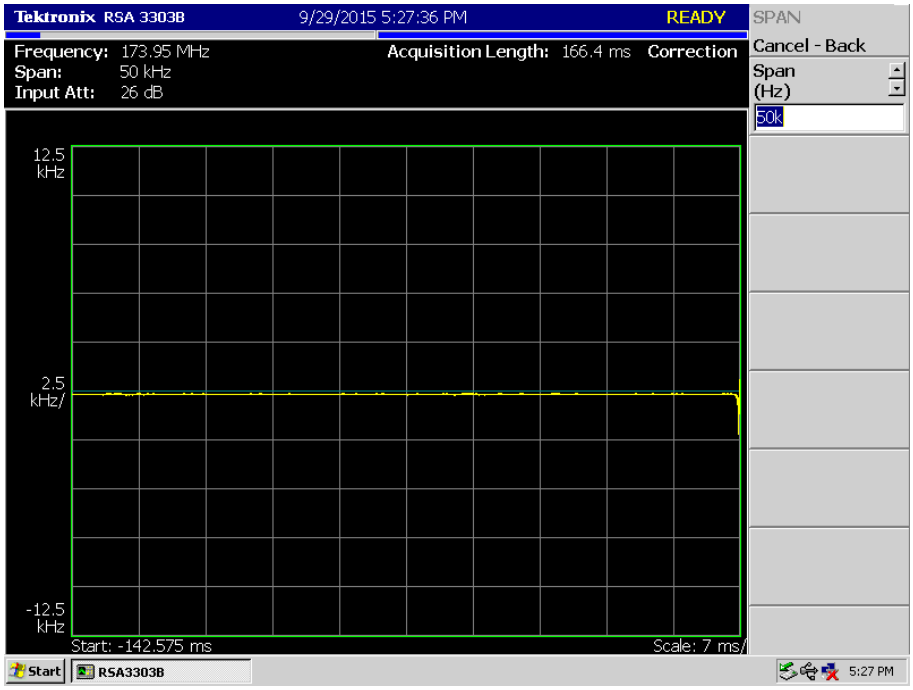
LOW POWER_7K60FXD/7K60FXE _162.05 MHz





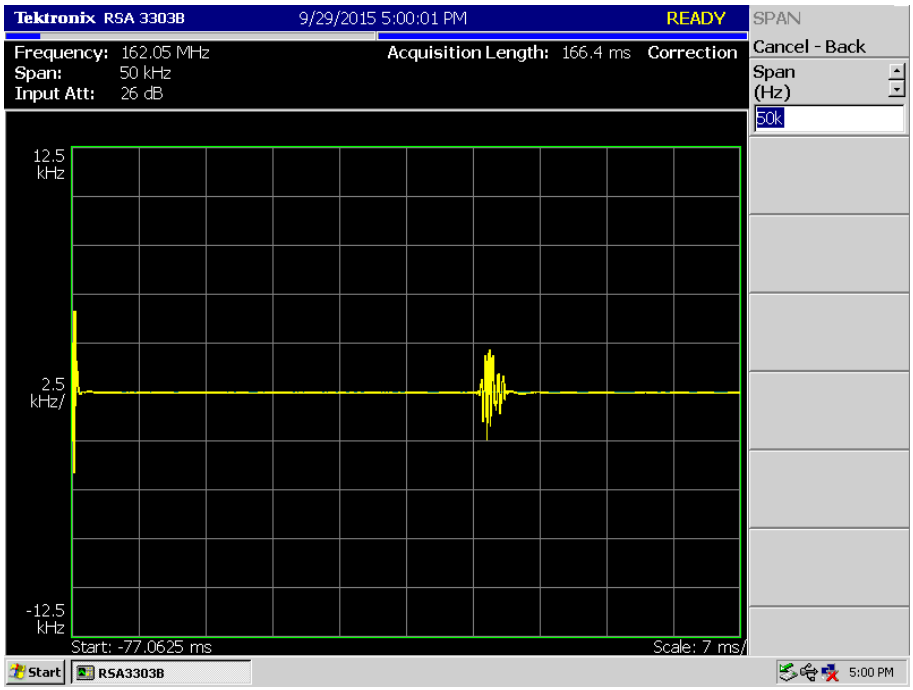
LOW POWER_7K60FXD/7K60FXE _173.95 MHz

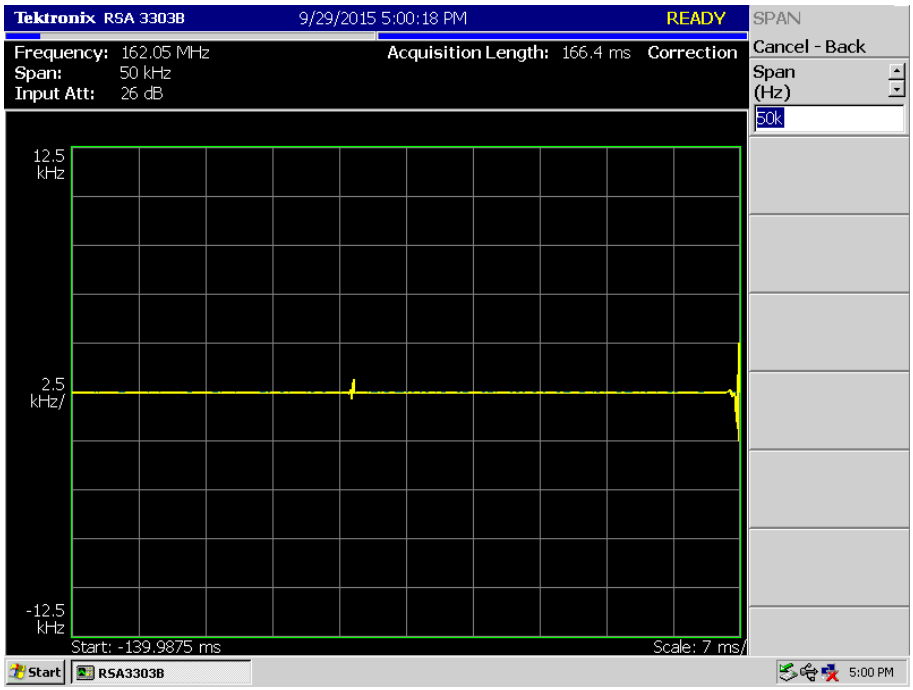




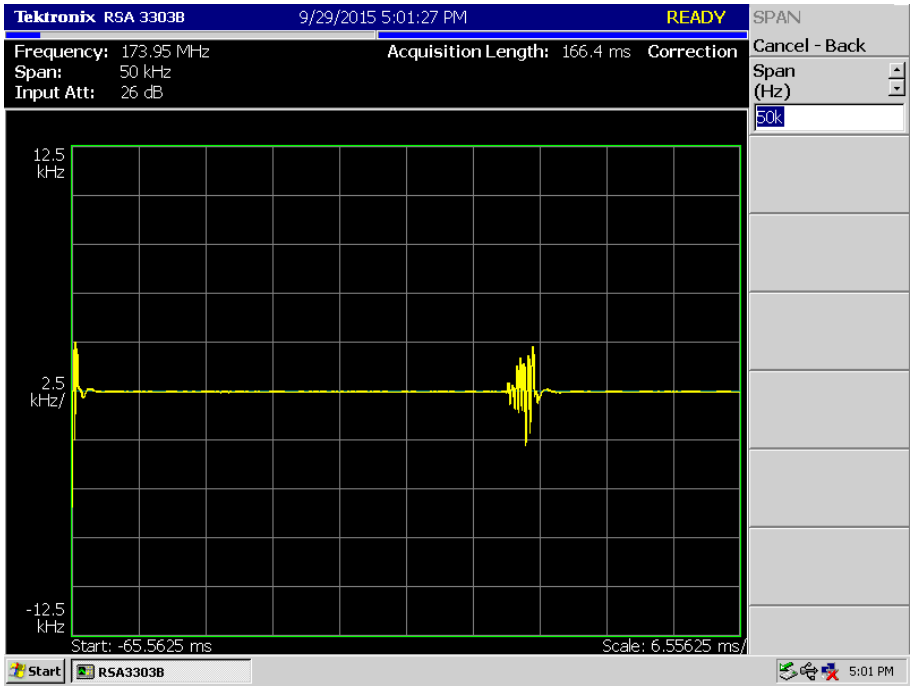
11K0F3E For FCC AND IC

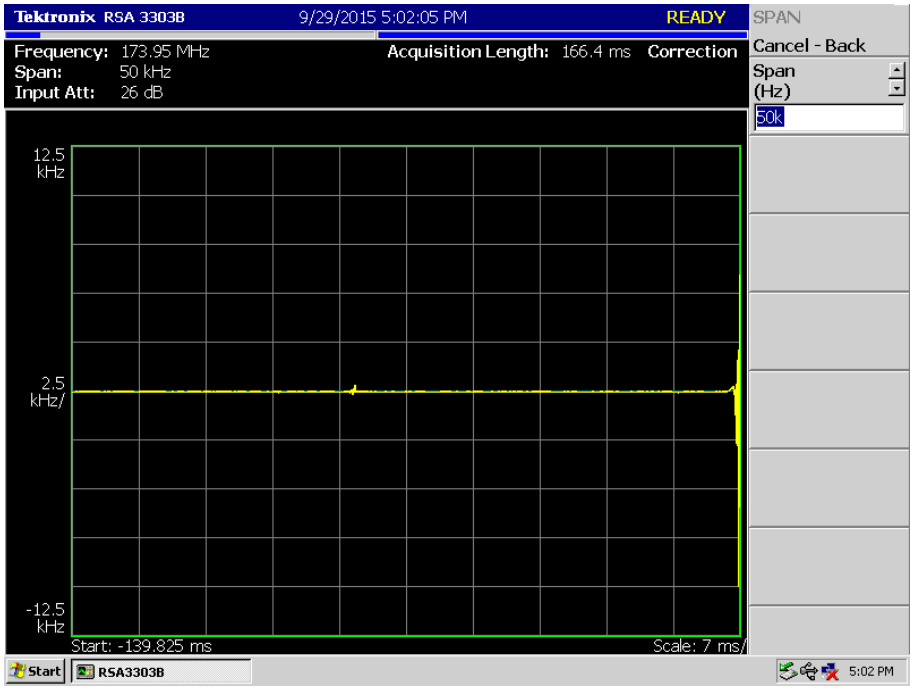
HIGH POWER_11K0F3E_162.05 MHz



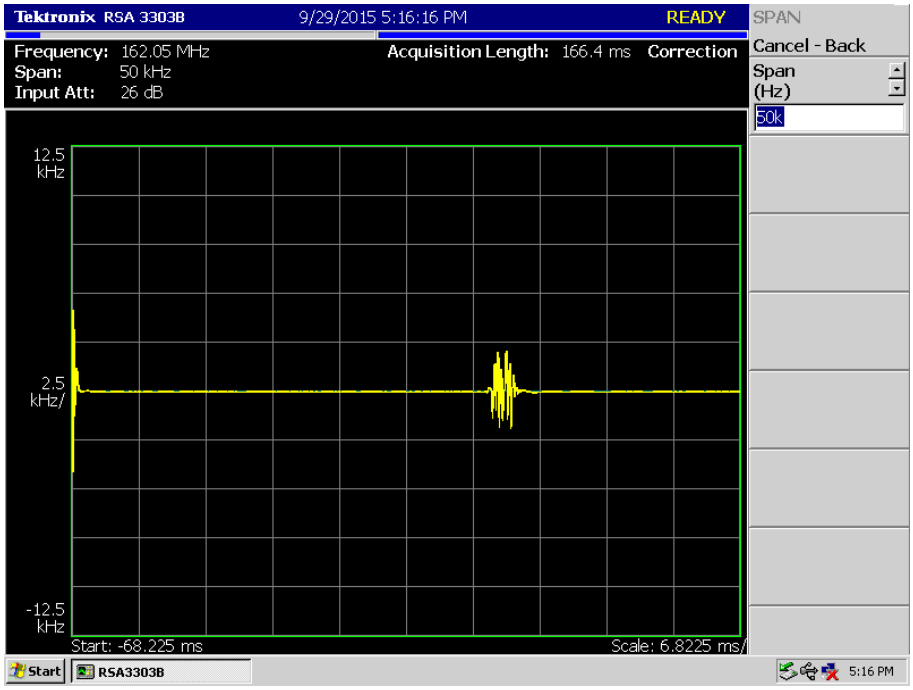


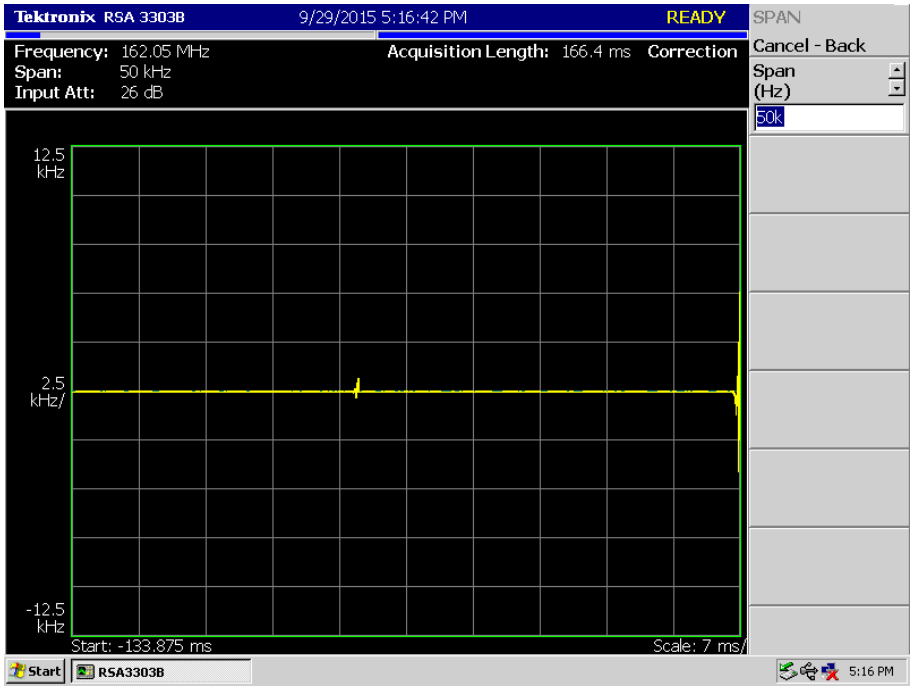
HIGH POWER_11K0F3E _173.95 MHz



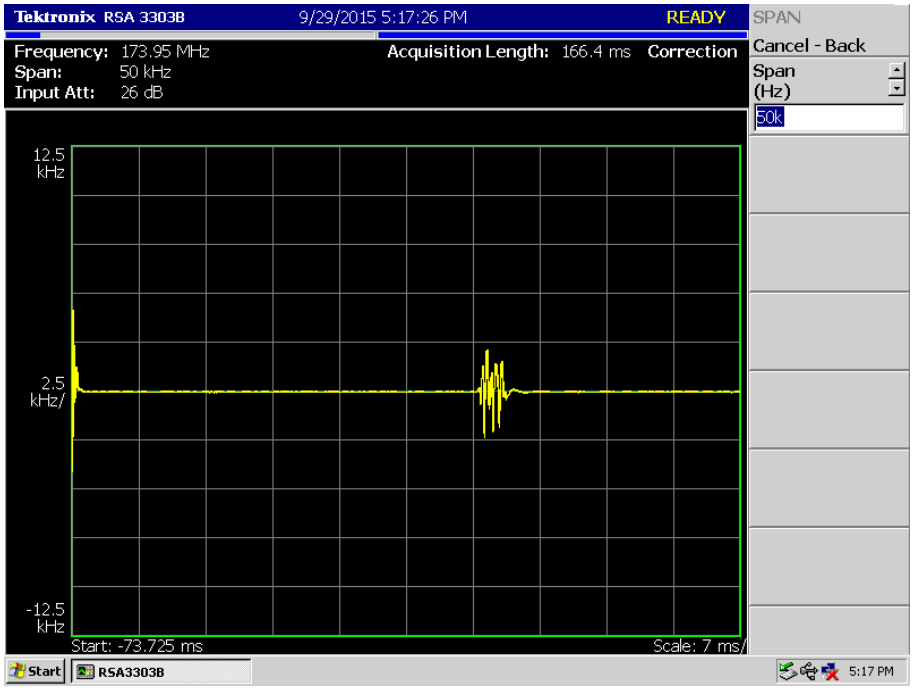


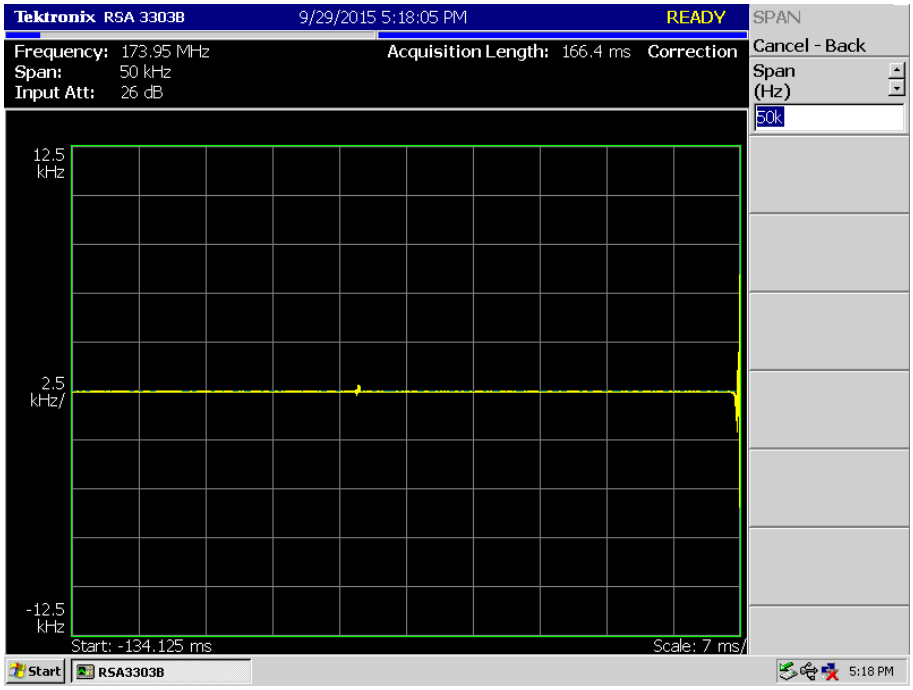
LOW POWER_11K0F3E_162.05 MHz





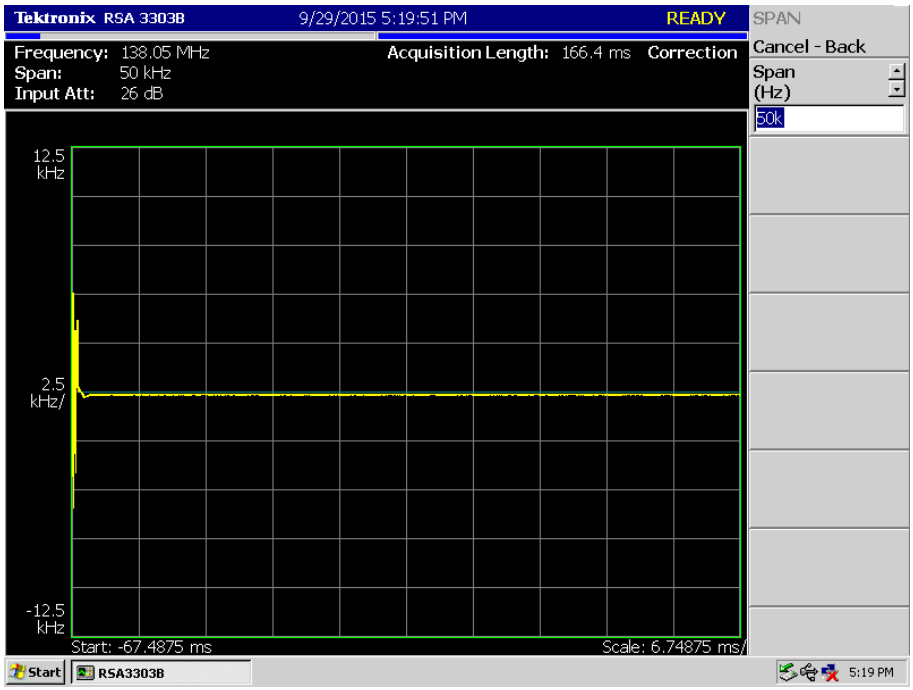
LOW POWER_11K0F3E _173.95 MHz

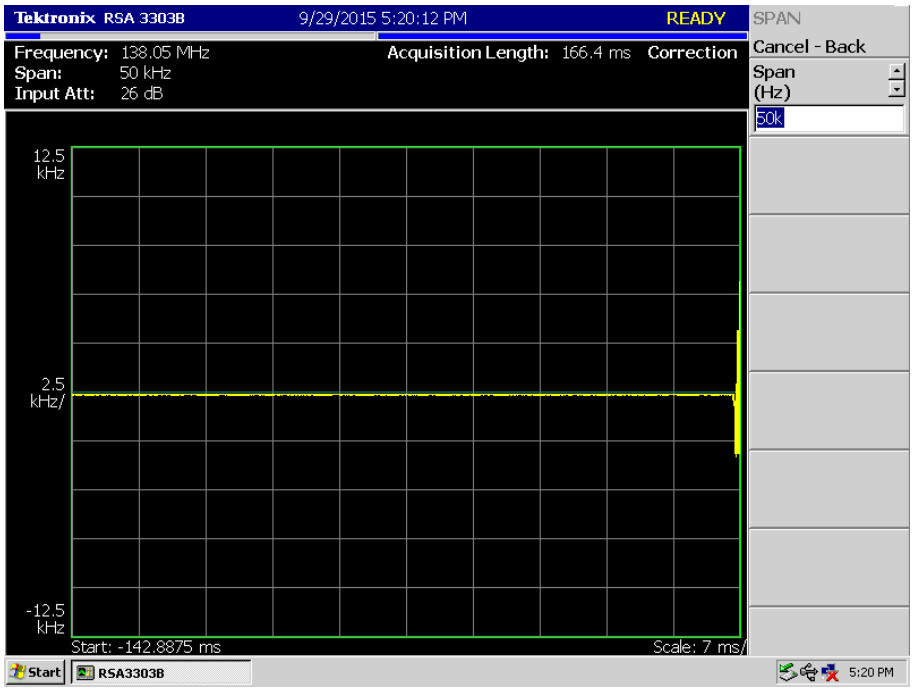




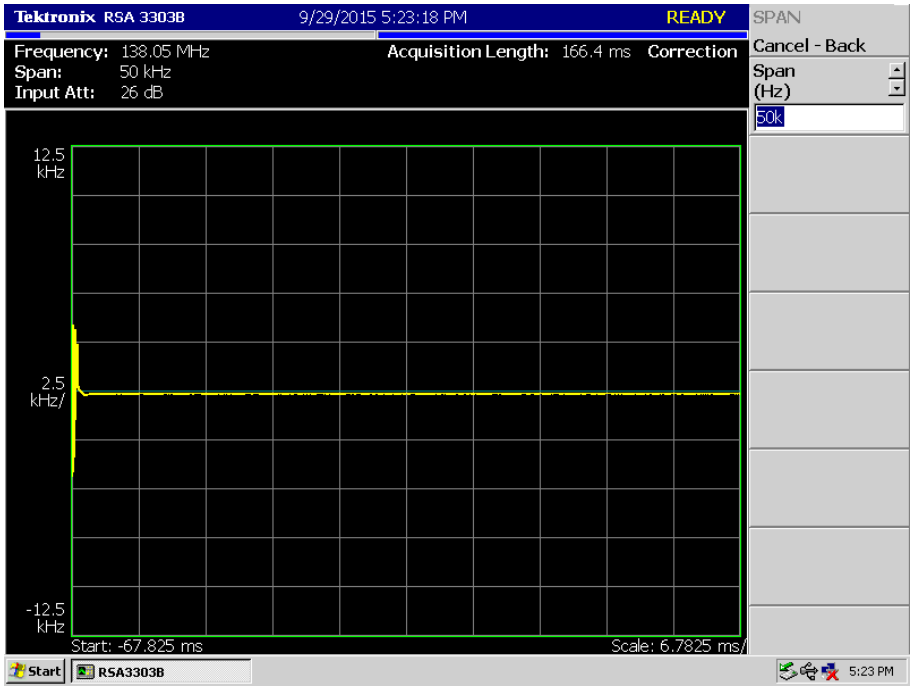
7K60FXD/7K60FXE For ONLY IC

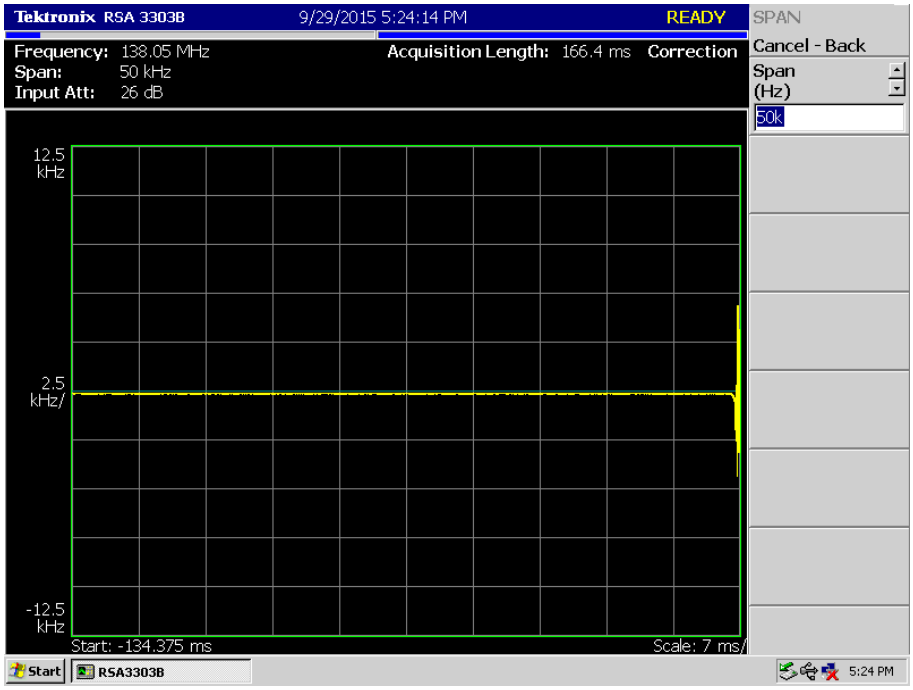
HIGH POWER_7K60FXD/7K60FXE _138.05 MHz





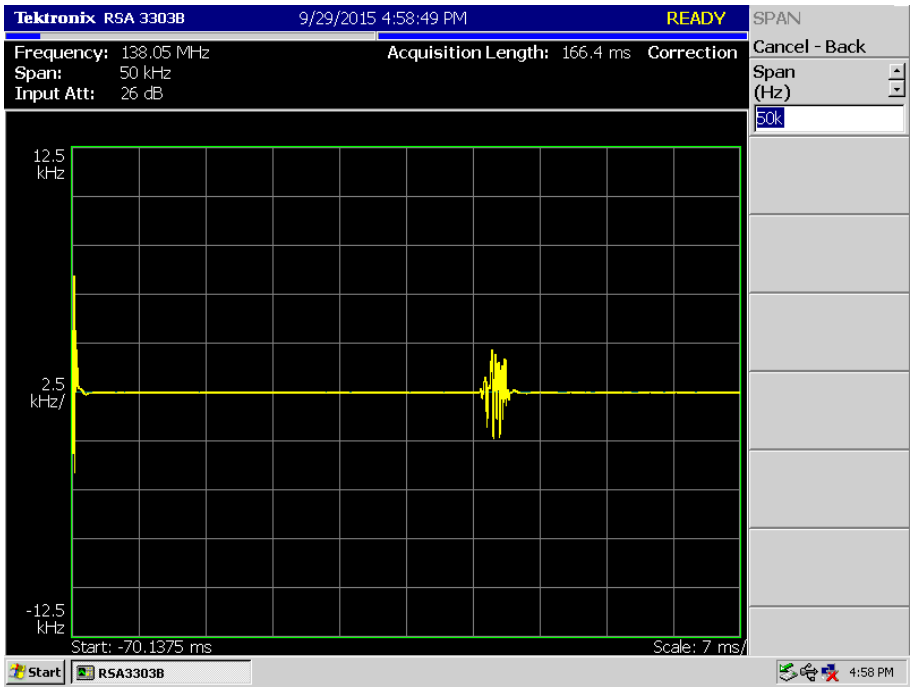
LOW POWER_7K60FXD/7K60FXE _138.05 MHz

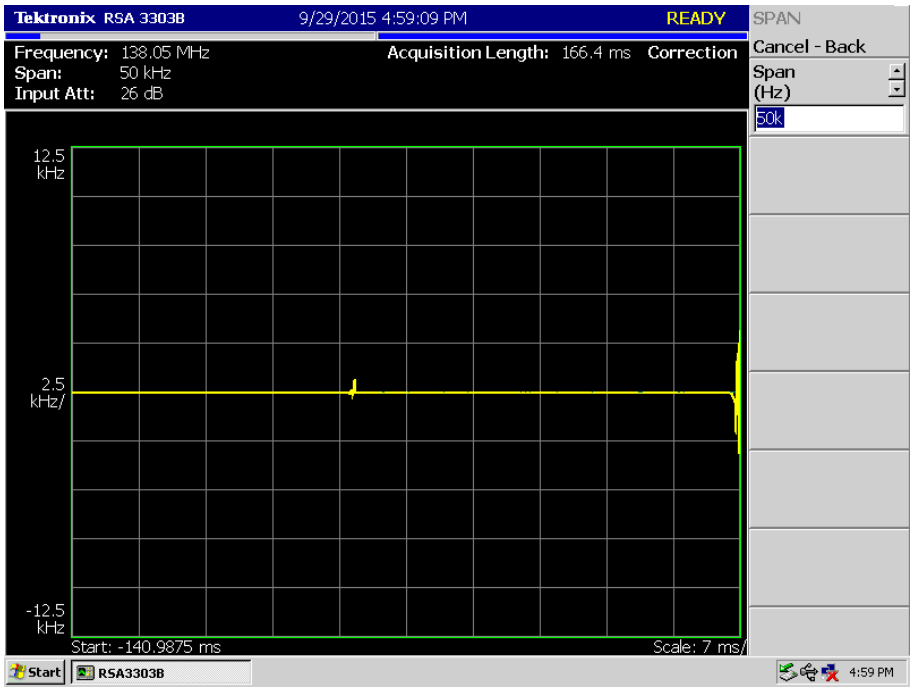




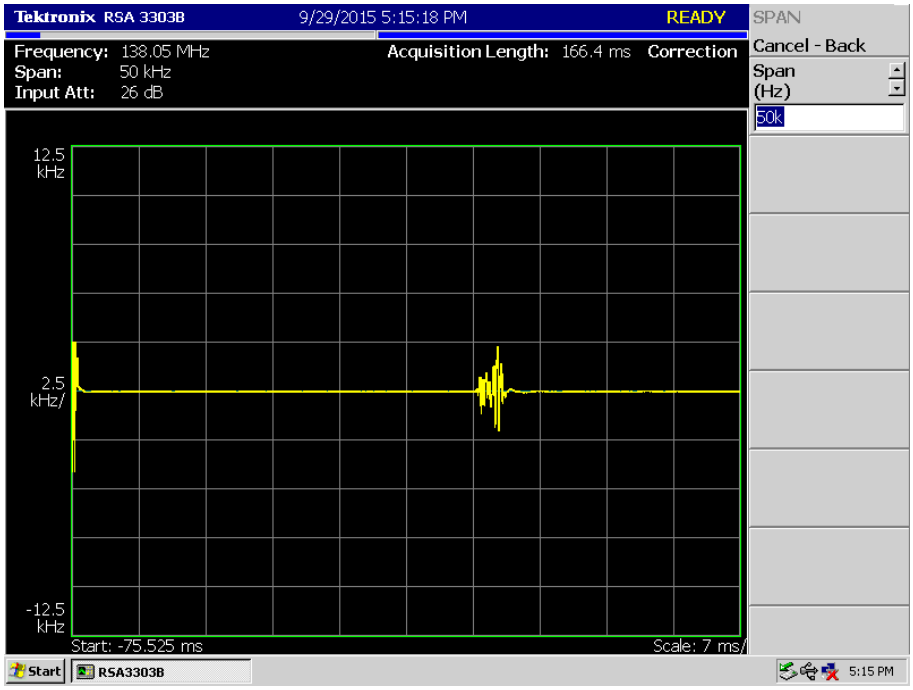
11K0F3E For ONLY IC

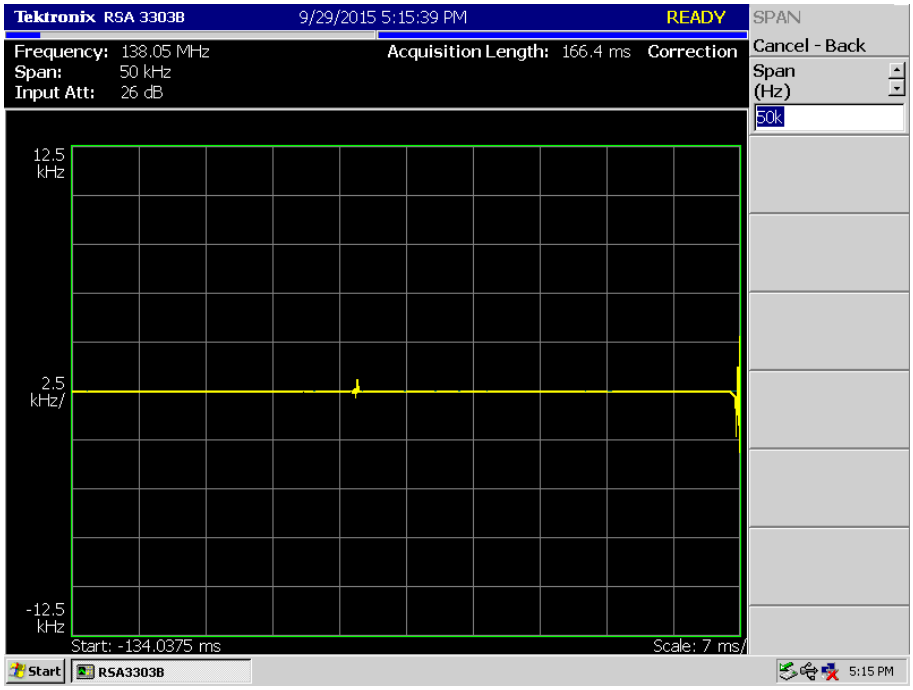
HIGH POWER_11K0F3E_138.05 MHz





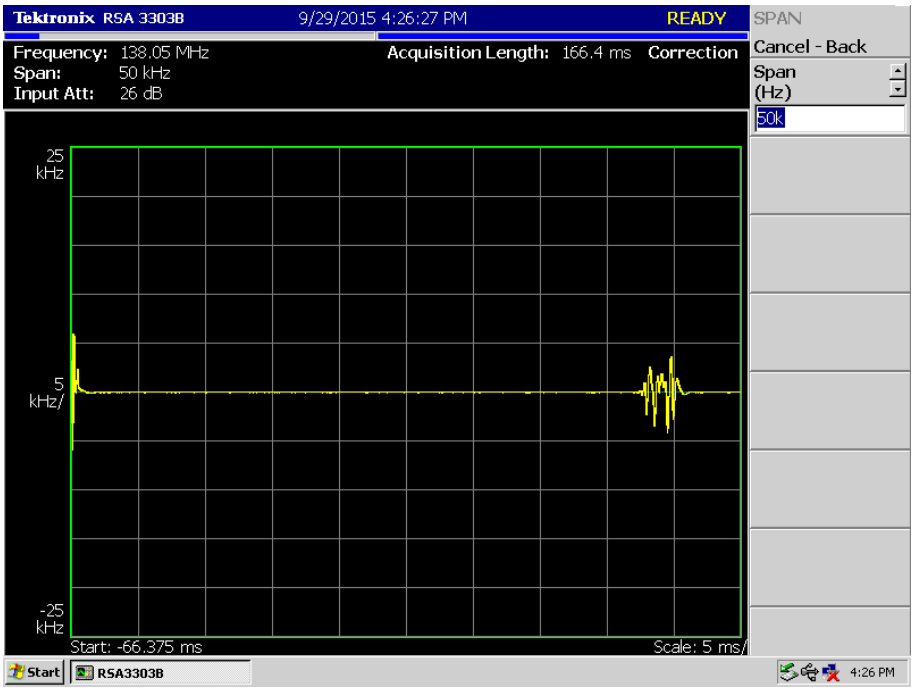
LOW POWER_11K0F3E_138.05 MHz

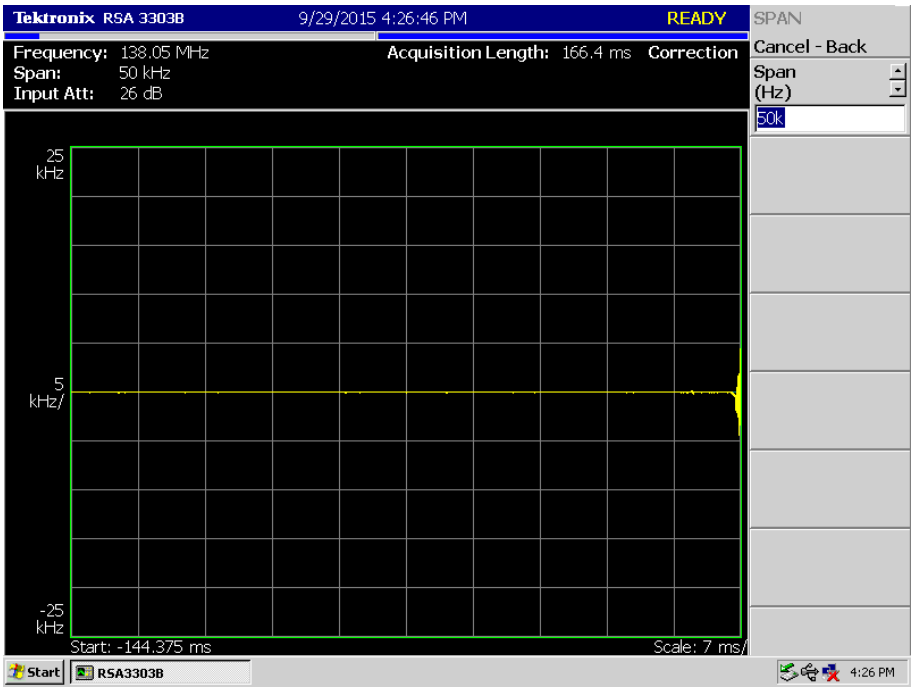




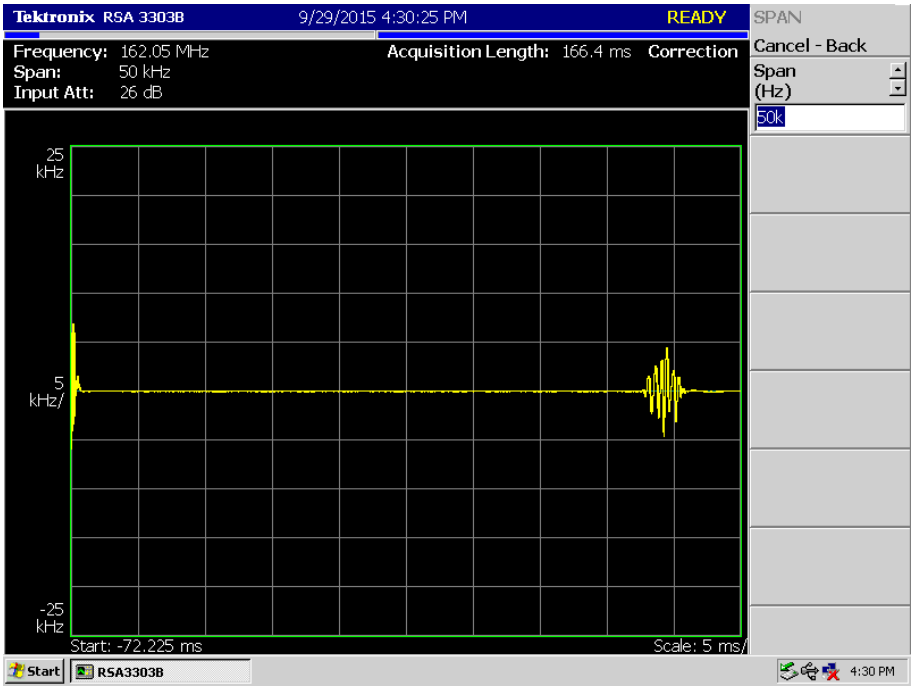
16K0F3E for ONLY ONLY IC

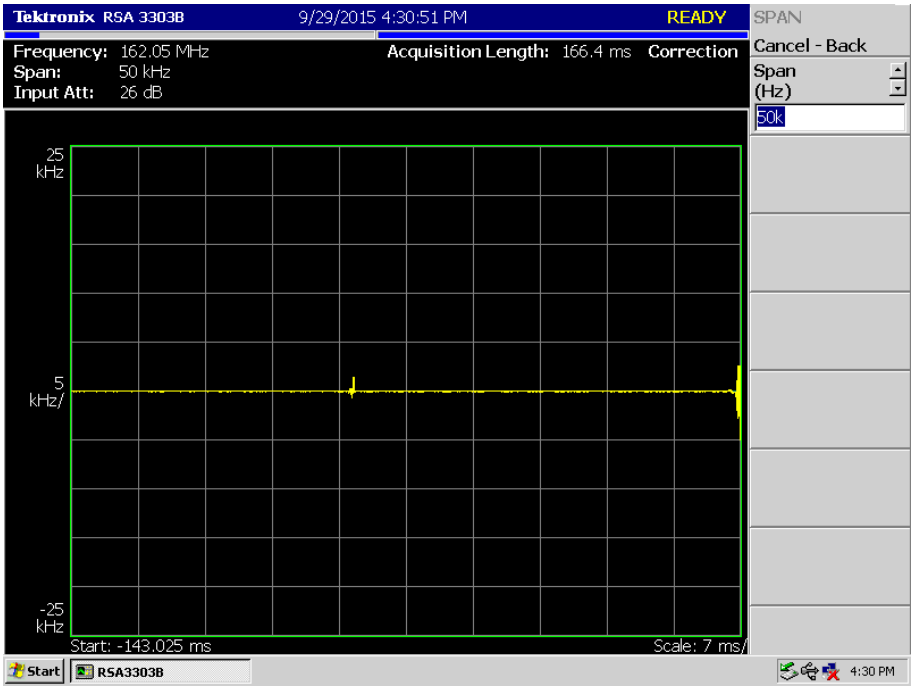
HIGH POWER_16K0F3E_138.05 MHz



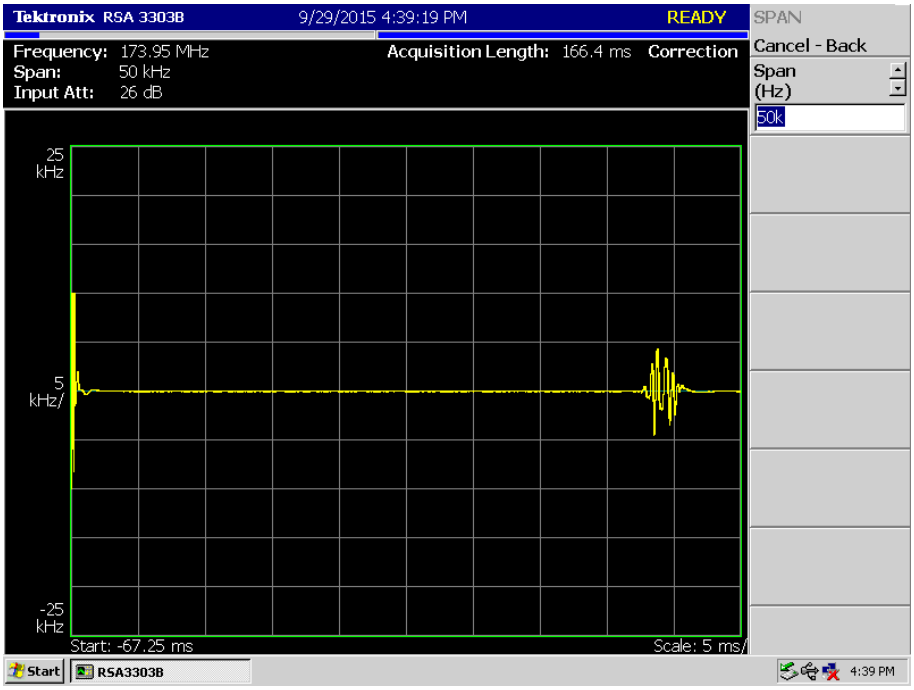


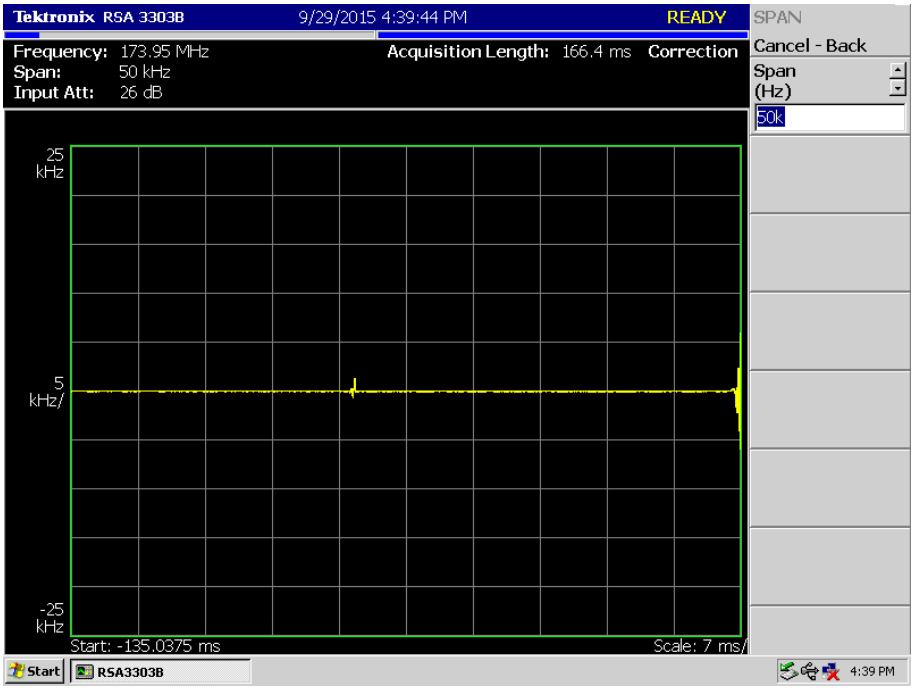
HIGH POWER_16K0F3E_162.05 MHz



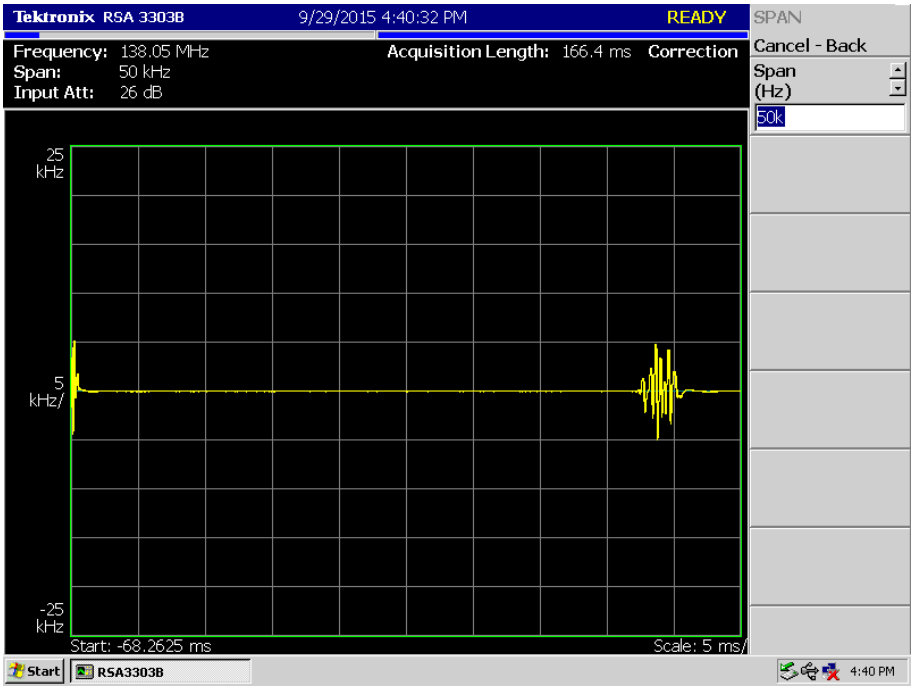


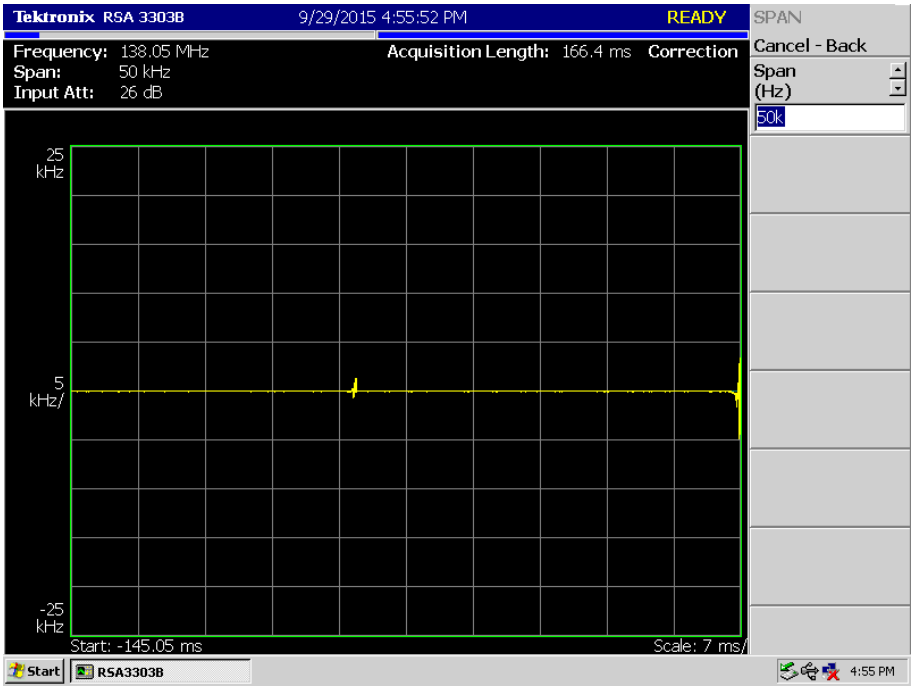
HIGH POWER_16K0F3E_173.95 MHz



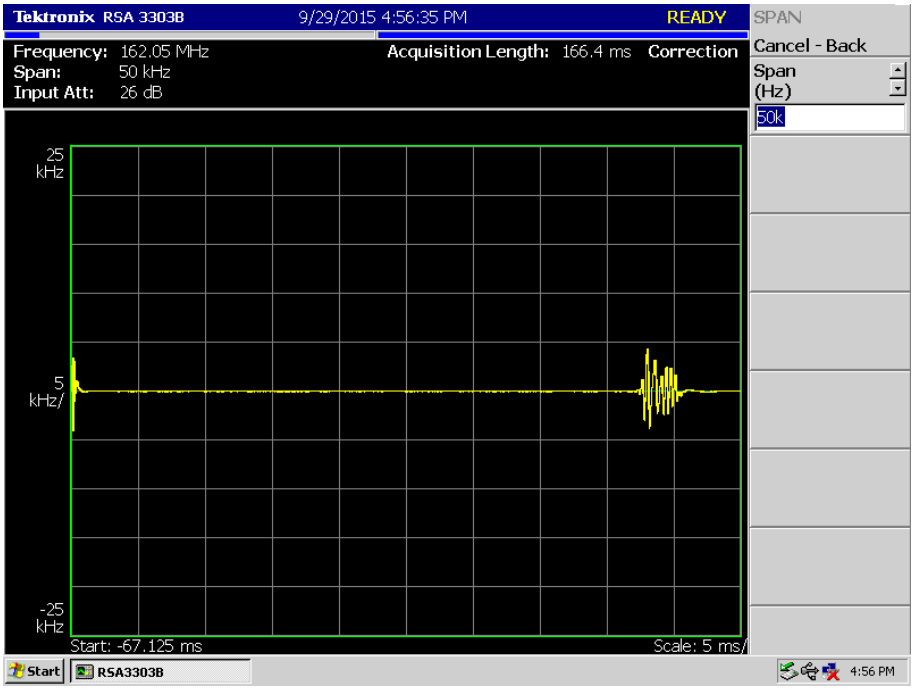


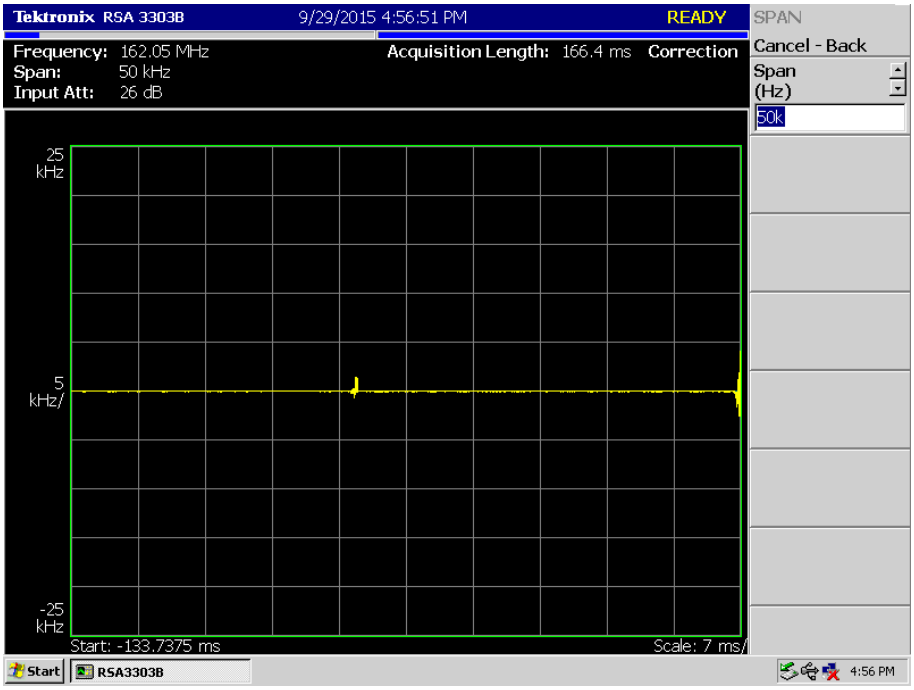
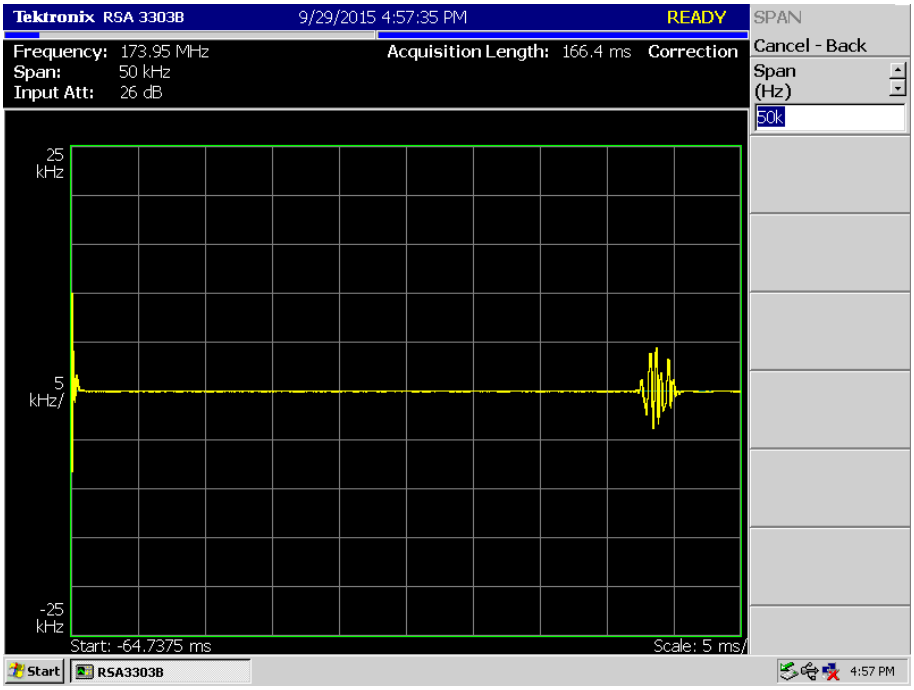
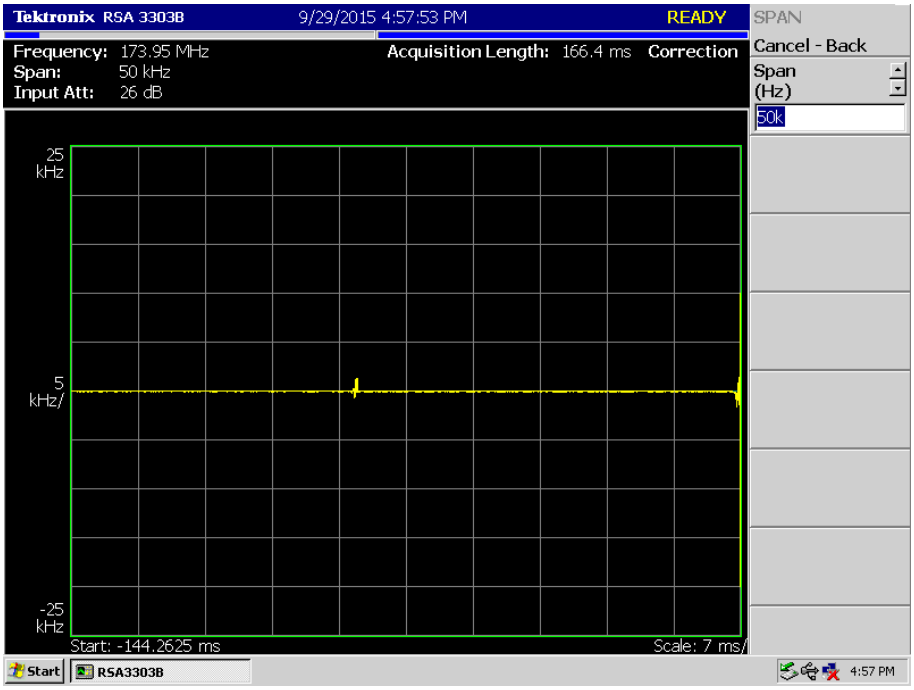
LOW POWER_16K0F3E _138.05 MHz





LOW POWER_16K0F3E _162.05 MHz





LOW POWER_16K0F3E _173.95 MHz