

# **TEST REPORT**

FCC/ISED Test for NX-3210R-K3 Certification

APPLICANT JVCKENWOOD Corporation

REPORT NO. HCT-RF-2402-FI004

DATE OF ISSUE February 22, 2024

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F-TP22-03(Rev.05)

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T E S T R E P O R T	REPORT NO. HCT-RF-2402-F1004 DATE OF ISSUE February 22, 2024
Applicant	<b>JVCKENWOOD Corporation</b> 1-16-2, Hakusan, Midori-ku, Yokohama-shi, Kanagawa, 226-8525 JAPAN
Product Name Model Name	VHF DIGITAL TRANSCEIVER NX-3210R-K3
FCC ID	K44523700
IC	282F-523700
Date(s) of Tests	January 08, 2024 ~ February 16, 2024
Test Standard Used	Part 2, 22, 74, 90 / RSS- Gen Issue 5, RSS-119 Issue 12
Frequency Range	FCC: 150 MHz - 174 MHz ISED: 138 MHz - 144 MHz, 148 MHz - 174 MHz MHz
Location of Test	■ Permanent Testing Lab □ On Site Testing Lab (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi- do, Republic of Korea)





## **REVISION HISTORY**

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	February 22, 2024	Initial Release

## Notice

The measurements shown in this report were made in accordance with the procedures specified in § 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)

The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated.

The test results have only been applied with the test methods required by the standard(s).

When confirmation of authenticity of this test report is required, please contact www.hct.co.kr

The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).



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## **1. GENERAL INFORMATION**

Manufacturer:	JVCKENWOOD Corporation
Address:	1-16-2 Hakusan Midori-ku Yokohama-shi Kanagawa 226-8525 Japan
FCC ID:	K44523700
IC:	282F-523700
EUT Type:	VHF DIGITAL TRANSCEIVER
Model(s):	NX-3210R-K3
Date(s) of Tests:	January 08, 2024 ~ February 16, 2024



# **2. EUT DESCRIPTION**

Power Supply Voltage	DC 7.5V $\pm$ 20%		
Output Power	5 W (Power output continuously variable to 1 W) (Max : 5.5 W)		
Battery type	KNB-L1: 2000mAh Li-ion Battery KNB-L2: 2600mAh Li-ion Battery KNB-L3: 3400mAh Li-ion Battery KNB-L11: 3900mAh Li-ion Battery		
Antenna	KRA-22M VHF Low Profile Helical Antenna (146-162 MHz) KRA-22M2 VHF Low Profile Helical Antenna (162-174 MHz) KRA-22M3 VHF Low Profile Helical Antenna (135-150 MHz) KRA-26M VHF Helical Antenna (146-162 MHz) KRA-26M2 VHF Helical Antenna (162-174 MHz) KRA-26M3 VHF Helical Antenna (135-150MHz) KRA-41M VHF Stubby antenna (146-162 MHz) KRA-41M2 VHF Stubby antenna (162-174 MHz) KRA-41M3 VHF Stubby antenna (136-150 MHz) KRA-25 High gain VHF helically loaded whip antenna (148-162 MHz) KRA-28 Broad-band VHF helically loaded whip antenna (140-170 MHz)		
Peak Antenna gain	0 dBd		
Type of Emission	16K0F3E : Analogue 11K0F3E : Analogue 8K30F1E, 8K30F1D, 8K30F7W : NXDN 4K00F1E, 4K00F1D, 4K00F7W : NXDN 4K00F2D : CWID		
Channel Bandwidth	6.25 kHz: 4K00F1E, 4K00F1D, 4K00F7W/ 4K00F2D 12.5 kHz: 11K0F3E/ 8K30F1E, 8K30F1D, 8K30F7W 25 kHz: 16K0F3E		
Operating Temperature	-30 °C ~ +60 °C		
Frequency Range	150 MHz - 174 MHz (FCC) 138 MHz - 144 MHz, 148 MHz - 174 MHz MHz (ISED)		
Test Frequency	138.05 MHz / 150.05 MHz / 162.05 MHz / 173.95 MHz		
Maximum deviation	16K0F3E : ± 5 kHz 11K0F3E : ± 2.5 kHz		
Frequency Stability	± 2.0 ppm		
PMN (Product Marketing Number)	NX-3210R-K3		
HVIN (Hardware Version Identification Number)	NX-3210R-K3		
FVIN (Firmware Version Identification Number)	N/A		
HMN (Host Marketing Name)	N/A		
Serial number	A1A11001		



# **3. TEST METHODOLOGY**

TIA-603-E dated March 2016 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, 22, 74 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-E-2016. 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;

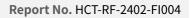
 $P_{d(dBm)} = Pg_{(dBm)} - cable loss_{(dB)} + antenna gain_{(dB)}$ 

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.





## **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. For ISED, test facility was accepted dated January 26, 2021 (CAB identifier: KR0032).

## **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. WORST CASE CONFIGURATION AND MODE

#### Radiated test

- 1. All modes of operation were investigated and the worst case configuration results are reported.
  - Mode : Stand alone + Microphone (High Power/ Low Power)
    - Stand alone + Accessories (High Power/ Low Power)
    - Stand alone + Microphone + Accessories (High Power/ Low Power)
  - Worstcase : Stand alone + Microphone (High Power)
- 2. All type of battery were investigated and the worst case configuration results are reported.
  - Type : KNB-L1, KNB-L2, KNB-L3, KNB-L11
  - Worstcase : KNB-L11
- 3. All Antenna were investigated and the worst case configuration results are reported.
  - Type : KRA-22M, KRA-22M2, KRA-22M3, KRA-26M, KRA-26M2, KRA-26M3,

KRA-41M, KRA-41M2, KRA-41M3, KRA-25, KRA-28

- Worstcase : KRA-26M, KRA-26M2, KRA-26M3
- 4. All type of microphones were investigated and the worst case configuration results are reported.
  - Type : KEP-1, KHS-11BL, KHS-12BL, KHS-14, KHS-15-BH, KHS-15-OH, KMC-70, KMC-72
  - Worstcase : KMC-72
- 5. All type of emission were investigated and the worst case configuration results are reported.
  - Type : 16K0F3E/ 11K0F3E/ 8K30F1E, 8K30F1D, 8K30F7W/ 4K00F1E, 4K00F1D, 4K00F7W/ 4K00F2D
  - Worstcase : 16K0F3E/ 8K30F1E, 8K30F1D, 8K30F7W/ 4K00F1E, 4K00F1D, 4K00F7W
- 6. Measurements value show only up to 8 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

#### Conducted test

- 1. Conducted Spurious Emission & Frequency Stability :
  - All Power of operation were investigated and the worst case configuration results are reported.
    - Power : High Power/ Low Power
    - Worstcase : High Power
- 2. Transient Frequency Behavior :
  - All type of emission were investigated and the worst case configuration results are reported.
    - Type : 16K0F3E/ 11K0F3E/ 8K30F1E, 8K30F1D, 8K30F7W/ 4K00F1E, 4K00F1D, 4K00F7W/ 4K00F2D
    - Worstcase : 16K0F3E/ 8K30F1E, 8K30F1D, 8K30F7W/ 4K00F1E, 4K00F1D, 4K00F7W



# 7. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	ISED Part Section(s)	Test Condition	Test Result
Carrier RF Output Power	§ 2.1046, § 22.565, § 74.461, § 90.205	RSS119 (5.4)	CONDUCTED	PASS
Unwanted Emissions	§ 2.1051 § 22.359, § 74.462, § 74.535, § 90.210	RSS119 (5.8)	CONDUCTED	PASS
99% Bandwidth(ISED)	NA	RSS119 (5.5)		PASS
Carrier Frequency Stability	§ 2.1055, § 22.355, § 74.464, § 90.213(a)	RSS119 (5.3)		PASS
Audio Frequency Response	§ 2.1047(a)	-		PASS
Audio Low Pass Filter	§ 2.1047(a)	-		PASS
Modulation Limiting	§ 2.1047(b)	-		PASS
Transient Frequency Behavior	§ 74.462, § 90.214	RSS119 (5.9)		PASS
Emission Mask	§ 2.1049, § 22.359, § 74.462, § 74.535, § 90.210	RSS119 (5.8)		PASS
Field Strength of Spurious Radiation	\$ 2.1053 \$ 22.359, \$ 74.462, \$ 74.535, \$ 90.210	RSS119 (5.8)	RADIATED	PASS
Receiver Spurious Emissions	NA	RSS-Gen(7)		PASS
Necessary Bandwidth	§ 2.202(g)	-	-	-



Test Description	Test Limit(FCC)	Test Limit(ISED)	
Carrier RF Output Power	Varies	60W	
	6.25 kHz: 55+ 10 log (P)dB	6.25 kHz: 55+ 10 log (P)dB	
Unwanted Emissions	12.5 kHz: 50 + 10 log (P)dB	12.5 kHz: 50 + 10 log (P)dB	
	25 kHz: 43 + 10 log (P)dB	25 kHz: 43 + 10 log (P)dB	
		6.25 kHz: 6 kHz	
99% Bandwidth(ISED)	N/A	12.5 kHz: 11.25kHz	
		25 kHz: 20 kHz	
	6.25 kHz = 2 ppm	6.25 kHz = 2 ppm	
Carrier Frequency Stability	12.5 kHz = 5 ppm	12.5 kHz = 5 ppm	
	25 kHz = 5 ppm	25 kHz = 5 ppm	
Audio Frequency Response	No. etc	N1/A	
Audio Low Pass Filter	Varies	N/A	
Modulation Limiting	25 kHz = 5 kHz 12.5 kHz = 2.5 kHz	N/A	
Transient Frequency Behavior	See Note3	See Note3	
Emission Mask	See Note2	See Note2	
Field Character of Caracia	6.25 kHz: 55+ 10 log (P)dB	6.25 kHz: 55+ 10 log (P)dB	
Field Strength of Spurious	12.5 kHz: 50 + 10 log (P)dB	12.5 kHz: 50 + 10 log (P)dB	
Radiation	25 kHz: 43 + 10 log (P)dB	25 kHz: 43 + 10 log (P)dB	
Receiver Spurious Emissions	N/A	See Note1	



## Note:

1. Receiver Spurious Emissions Limit :

Frequency	Field Strength
(MHz)	(μv/m at 3 meters)
30 – 88	100
88 - 216	150
216 - 960	200
Above 960	500

### 2. Emission Mask Limit :

#### Channel Bandwidth: 25kHz

Displacement Frequency	Minimum Attenuation
(% of Authorized Bandwidth)	(dB)
50 to 100	25 dB
100 to 250	35 dB
>250	43 + 10 log <sub>10</sub> (COP)

## Channel Bandwidth: 12.5kHz

Channel Spacing (kHz)	Displacement Frequency Range	Minimum Attenuation (dB)
12.5 & 15	>5.625 kHz to 12.5 kHz	7.27(f <sub>d</sub> - 2.88)
	>12.5 kHz	Whichever is less attenuation; 70
		or $50 + 10 \log_{10}(COP)$

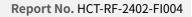
#### Channel Bandwidth: 6.25kHz

Channel Spacing (kHz)	Displacement Frequency Range	Minimum Attenuation (dB)
6.25 & 7.5	>3.0 kHz to 4.6 kHz	Whichever is less attenuation; 65 or $30 + 16.67(f_d - 3)$ or $55 + 10 \log_{10}(COP)$
	Greater than 4.6 kHz	Whichever is less attenuation; 65 or 55 + 10 log10(COP)



Channel Bandwidth (kHz)	Time Intervals	Maximum Frequency Difference	Transient Duration Limit (ms)		
	(Notes 1, 2)	(kHz)	138-174 MHz	406.1-512 MHz	
25	t1	±25	5	10	
	t <sub>2</sub>	±12.5	20	25	
	t3	±25	5	10	
	ti	±12.5	5	10	
12.5	t <sub>2</sub>	±6.25	20	25	
	t3	±12.5	5	10	
	ti	±6.25	5	10	
6.25	t <sub>2</sub>	±3.125	20	25	
	t3	±6.25	5	10	

3. Transien	t Frequenc	v Behavior	l imit :
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## 8. TEST RESULT

## 8.1 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-E Standard.

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



	Type of	Channel	Test	Carrier Output Power (AVG RMS measurement)			
Certification	Emission	Bandwidth	Frequency –	High I	Power	Low Power	
		(kHz)	(MHz)	dBm	W	dBm	W
ISED			138.05	36.841	4.831	30.633	1.157
FCC/ ISED	1640525	25	150.05	36.802	4.789	30.068	1.016
FCC/ ISED	16K0F3E	25	162.05	36.916	4.916	30.128	1.030
FCC/ ISED			173.95	36.748	4.730	30.274	1.065
ISED			138.05	36.719	4.698	30.609	1.150
FCC/ ISED	11//0525	12 5	150.05	36.711	4.690	30.029	1.007
FCC/ ISED	11K0F3E	12.5	162.05	36.815	4.802	30.125	1.029
FCC/ ISED			173.95	36.724	4.704	30.262	1.062
ISED	0//20515		138.05	36.811	4.798	30.658	1.163
FCC/ ISED	8K30F1E,	30F1D, 12.5	150.05	36.799	4.785	30.093	1.022
FCC/ ISED	8K30F1D, 8K30F7W		162.05	36.928	4.930	30.139	1.033
FCC/ ISED	8K3UF7W		173.95	36.726	4.706	30.269	1.064
ISED			138.05	36.721	4.700	30.608	1.150
FCC/ ISED	4K00F1E,	6.25	150.05	36.697	4.674	30.041	1.009
FCC/ ISED	4K00F1D, 4K00F7W	0.25	162.05	36.835	4.825	30.117	1.027
FCC/ ISED	4007700		173.95	36.762	4.745	30.259	1.062
ISED			138.05	36.761	4.743	30.626	1.155
FCC/ ISED		6 25	150.05	36.725	4.705	30.054	1.013
FCC/ ISED	4K00F2D	6.25	162.05	36.846	4.837	30.116	1.027
FCC/ ISED			173.95	36.760	4.742	30.268	1.064

## TEST RESULTS(Carrier Output Power)



## TEST RESULTS(ERP)

	Type of	Channel	Test	Carrier Output Power (AVG RMS measurement)			
Certification	Emission	Bandwidth (kHz)	Frequency – (MHz) –	High Power		Low Power	
		(KΠΖ)	(MHZ)	dBm	W	dBm	W
ISED			138.05	36.841	4.831	30.633	1.157
FCC/ ISED	1000000	25	150.05	36.802	4.789	30.068	1.016
FCC/ ISED	16K0F3E	25	162.05	36.916	4.916	30.128	1.030
FCC/ ISED	-		173.95	36.748	4.730	30.274	1.065
ISED			138.05	36.719	4.698	30.609	1.150
FCC/ ISED	11//0525		150.05	36.711	4.690	30.029	1.007
FCC/ ISED	11K0F3E	12.5	162.05	36.815	4.802	30.125	1.029
FCC/ ISED			173.95	36.724	4.704	30.262	1.062
ISED	01/00515		138.05	36.811	4.798	30.658	1.163
FCC/ ISED	8K30F1E,		150.05	36.799	4.785	30.093	1.022
FCC/ ISED	8K30F1D,	12.5	162.05	36.928	4.930	30.139	1.033
FCC/ ISED	8K30F7W		173.95	36.726	4.706	30.269	1.064
ISED			138.05	36.721	4.700	30.608	1.150
FCC/ ISED	4K00F1E,	6.05	150.05	36.697	4.674	30.041	1.009
FCC/ ISED	4K00F1D,	6.25	162.05	36.835	4.825	30.117	1.027
FCC/ ISED	4K00F7W		173.95	36.762	4.745	30.259	1.062
ISED			138.05	36.761	4.743	30.626	1.155
FCC/ ISED	4//00505	6.05	150.05	36.725	4.705	30.054	1.013
FCC/ ISED	4KUUF2D	4K00F2D 6.25	162.05	36.846	4.837	30.116	1.027
FCC/ ISED			173.95	36.760	4.742	30.268	1.064

Note:

1. ERP = Carrier Output Power + Peak Antenna gain(0 dBd)



## 8.2 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-E 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<sup>6</sup>

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.



## TEST RESULTS

# (1) Frequency Stability (Temperature Variation)

Type of Emission	Test Frequency (MHz)	Temperature (Degree C)	Frequency (MHz)	Result_FCC (ppm)	Result_ISED (ppm)	Limit (ppm)
		-30	138.050055327	0.401	0.020	
		-20	138.050055201	0.400	0.019	
		-10	138.050027121	0.196	-0.184	
		0	138.050066751	0.484	0.103	
	138.05	+10	138.050049012	0.355	-0.025	5.0
		+20 (Ref)	138.050052510	0.380	0.000	
		+30	138.050042683	0.309	-0.071	
		+40	138.050045288	0.328	-0.052	
		+50	138.050050597	0.367	-0.014	
		-30	150.050084791	0.565	0.143	
		-20	150.050076553	0.510	0.088	
		-10	150.050091924	0.613	0.191	
	150.05	0	150.050061095	0.407	-0.015	5.0
		+10	150.050077315	0.515	0.094	
		+20 (Ref)	150.050063277	0.422	0.000	
		+30	150.050090927	0.606	0.184	
		+40	150.050076961	0.513	0.091	
		+50	150.050069346	0.462	0.040	
16K0F3E		-30	162.050058012	0.358	-0.090	
		-20	162.050081805	0.505	0.057	
		-10	162.050046669	0.288	-0.160	
		0	162.050057201	0.353	-0.095	
	162.05	+10	162.050043917	0.271	-0.177	5.0
		+20 (Ref)	162.050072588	0.448	0.000	
		+30	162.050101223	0.625	0.177	
		+40	162.050071399	0.441	-0.007	
		+50	162.050097549	0.602	0.154	
		-30	173.950099102	0.570	0.081	
		-20	173.950086119	0.495	0.006	
		-10	173.950101755	0.585	0.096	
		0	173.950081197	0.467	-0.022	
	173.95	+10	173.950077494	0.445	-0.044	5.0
		+20 (Ref)	173.950085072	0.489	0.000	
		+30	173.950062397	0.359	-0.130	
		+40	173.950063214	0.363	-0.126	
		+50	173.950057134	0.328	-0.161	



Type of Emission	Test Frequency (MHz)	Temperature (Degree C)	Frequency (MHz)	Result_FCC (ppm)	Result_ISED (ppm)	Limit (ppm)
		-30	138.050037656	0.273	-0.213	
		-20	138.050059560	0.431	-0.054	
		-10	138.050038199	0.277	-0.209	
		0	138.050070073	0.508	0.022	
	138.05	+10	138.050095284	0.690	0.205	5.0
		+20 (Ref)	138.050067044	0.486	0.000	
		+30	138.050083353	0.604	0.118	
		+40	138.050094921	0.688	0.202	
		+50	138.050064208	0.465	-0.021	
		-30	150.050093915	0.626	0.127	
		-20	150.050080821	0.539	0.040	
		-10	150.050098969	0.660	0.161	
	150.05	0	150.050059975	0.400	-0.099	5.0
		+10	150.050055236	0.368	-0.131	
		+20 (Ref)	150.050074819	0.499	0.000	
		+30	150.050063331	0.422	-0.077	
		+40	150.050095459	0.636	0.138	
11//0525		+50	150.050103487	0.690	0.191	
11K0F3E		-30	162.050078175	0.482	-0.033	
		-20	162.050112278	0.693	0.178	
		-10	162.050076544	0.472	-0.043	
		0	162.050093433	0.577	0.061	
	162.05	+10	162.050088581	0.547	0.031	5.0
		+20 (Ref)	162.050083490	0.515	0.000	
		+30	162.050056358	0.348	-0.167	
		+40	162.050062389	0.385	-0.130	
		+50	162.050106595	0.658	0.143	
		-30	173.950116864	0.672	0.171	
		-20	173.950083745	0.481	-0.019	
		-10	173.950116976	0.672	0.172	
		0	173.950086380	0.497	-0.004	
	173.95	+10	173.950094333	0.542	0.042	5.0
		+20 (Ref)	173.950087072	0.501	0.000	
		+30	173.950087998	0.506	0.005	
		+40	173.950108223	0.622	0.122	
		+50	173.950065960	0.379	-0.121	



Type of Emission	Test Frequency (MHz)	Temperature (Degree C)	Frequency (MHz)	Result_FCC (ppm)	Result_ISED (ppm)	Limit (ppm)
	(	-30	138.050057756	0.418	-0.007	
		-20	138.050048009	0.348	-0.078	
		-10	138.050045959	0.333	-0.092	
		0	138.050083993	0.608	0.183	
	138.05	+10	138.050077617	0.562	0.137	5.0
		+20 (Ref)	138.050058712	0.425	0.000	
		+30	138.050077043	0.558	0.133	
		+40	138.050046813	0.339	-0.086	
		+50	138.050071385	0.517	0.092	
		-30	150.050055159	0.368	-0.068	
		-20	150.050090635	0.604	0.169	
		-10	150.050050011	0.333	-0.102	
	150.05	0	150.050036914	0.246	-0.189	5.0
		+10	150.050083194	0.554	0.119	
		+20 (Ref)	150.050065297	0.435	0.000	
		+30	150.050048507	0.323	-0.112	
		+40	150.050070926	0.473	0.038	
8K30F1E,		+50	150.050055054	0.367	-0.068	
8K30F1D,		-30	162.050096397	0.595	0.147	
8K30F7W		-20	162.050062576	0.386	-0.061	
		-10	162.050075289	0.465	0.017	
		0	162.050064489	0.398	-0.050	
	162.05	+10	162.050097315	0.601	0.153	5.0
		+20 (Ref)	162.050072514	0.447	0.000	
		+30	162.050077451	0.478	0.030	
		+40	162.050092895	0.573	0.126	
		+50	162.050062727	0.387	-0.060	
		-30	173.950095824	0.551	0.043	
		-20	173.950060762	0.349	-0.158	
		-10	173.950086112	0.495	-0.012	
		0	173.950077330	0.445	-0.063	
	173.95	+10	173.950116973	0.672	0.165	5.0
		+20 (Ref)	173.950088284	0.508	0.000	
		+30	173.950110324	0.634	0.127	
		+40	173.950080382	0.462	-0.045	
		+50	173.950066026	0.380	-0.128	



Type of Emission	Test Frequency (MHz)	Temperature (Degree C)	Frequency (MHz)	Result_FCC (ppm)	Result_ISED (ppm)	Limit (ppm)
	(11112)	-30	138.050071882	0.521	0.050	
		-20	138.050042898	0.311	-0.160	
		-10	138.050051023	0.311	-0.101	
		0	138.050049107	0.356	-0.115	
	138.05	+10	138.050036293	0.263	-0.208	2.0
		+20 (Ref)	138.050065020	0.471	0.000	2.0
		+30	138.050079696	0.577	0.106	
		+40	138.050056113	0.406	-0.065	
		+50	138.050074517	0.540	0.069	
		-30	150.050091040	0.607	0.115	
		-20	150.050095281	0.635	0.143	
		-10	150.050045140	0.301	-0.191	
	150.05	0	150.050095370	0.636	0.144	2.0
		+10	150.050079909	0.533	0.041	
		+20 (Ref)	150.050073768	0.492	0.000	
		+30	150.050050317	0.335	-0.156	
		+40	150.050081526	0.543	0.052	
4K00F1E,		+50	150.050055866	0.372	-0.119	
4K00F1D,		-30	162.050068311	0.422	-0.084	
4K00F7W		-20	162.050106287	0.656	0.150	
		-10	162.050063997	0.395	-0.111	
		0	162.050081534	0.503	-0.003	
	162.05	+10	162.050096108	0.593	0.087	2.0
		+20 (Ref)	162.050081945	0.506	0.000	
		+30	162.050111435	0.688	0.182	
		+40	162.050102697	0.634	0.128	
		+50	162.050087737	0.541	0.036	
		-30	173.950080782	0.464	0.093	
		-20	173.950054410	0.313	-0.058	
		-10	173.950048913	0.281	-0.090	
		0	173.950092125	0.530	0.158	
	173.95	+10	173.950057896	0.333	-0.038	2.0
		+20 (Ref)	173.950064560	0.371	0.000	
		+30	173.950038933	0.224	-0.147	
		+40	173.950047684	0.274	-0.097	
		+50	173.950042983	0.247	-0.124	



Type of Emission	Test Frequency (MHz)	Temperature (Degree C)	Frequency (MHz)	Result_FCC (ppm)	Result_ISED (ppm)	Limit (ppm)
	(1112)	-30	138.050028545	0.207	-0.179	
		-20	138.050043497	0.315	-0.071	
		-10	138.050030923	0.224	-0.162	
		0	138.050055070	0.399	0.013	
	138.05	+10	138.050079311	0.575	0.188	2.0
		+20 (Ref)	138.050053303	0.386	0.000	
		+30	138.050078381	0.568	0.182	
		+40	138.050041139	0.298	-0.088	
		+50	138.050037840	0.274	-0.112	
		-30	150.050063533	0.423	0.009	
		-20	150.050042242	0.282	-0.133	
		-10	150.050070904	0.473	0.058	
		0	150.050072576	0.484	0.069	2.0
	150.05	+10	150.050066885	0.446	0.031	
		+20 (Ref)	150.050062170	0.414	0.000	
		+30	150.050039940	0.266	-0.148	
		+40	150.050040200	0.268	-0.146	
41/00520		+50	150.050081850	0.545	0.131	
4K00F2D		-30	162.050097530	0.602	0.162	
		-20	162.050045708	0.282	-0.157	
		-10	162.050066677	0.411	-0.028	
		0	162.050087148	0.538	0.098	
	162.05	+10	162.050093677	0.578	0.139	2.0
		+20 (Ref)	162.050071208	0.439	0.000	
		+30	162.050087439	0.540	0.100	
		+40	162.050052683	0.325	-0.114	
		+50	162.050097740	0.603	0.164	
		-30	173.950078272	0.450	-0.037	
		-20	173.950107492	0.618	0.131	
		-10	173.950061641	0.354	-0.133	
		0	173.950072777	0.418	-0.069	
	173.95	+10	173.950094168	0.541	0.054	2.0
		+20 (Ref)	173.950084788	0.487	0.000	
		+30	173.950100814	0.580	0.092	
		+40	173.950095155	0.547	0.060	
		+50	173.950104979	0.604	0.116	



Type of Emission	Test Frequency (MHz)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
		80	6.00	138.050053541	0.388	
	138.05	100	7.50	138.050054027	0.391	5.0
		120	9.00	138.050053465	0.387	
		80	6.00	150.050063657	0.424	5.0
	150.05	100	7.50	150.050063671	0.424	
10/0525		120	9.00	150.050063241	0.421	
16K0F3E		80	6.00	162.050072723	0.449	
	162.05	100	7.50	162.050072792	0.449	5.0
		120	9.00	162.050072196	0.446	
	173.95	80	6.00	173.950085165	0.490	5.0
		100	7.50	173.950085422	0.491	
		120	9.00	173.950084706	0.487	
Type of	Test	Diviation	Voltage	Frequency	Frequency	Limit
Emission	Frequency	(%)	(V)	(MHz)	stability	(ppm)
LIIII33IOII	(MHz)	(70)	(•)	(MITZ)	(ppm)	
		80	6.00	138.050067119	0.486	-
	138.05	100	7.50	138.050066995	0.485	5.0
		120	9.00	138.050066712	0.483	
		80	6.00	150.050074982	0.500	
	150.05	100	7.50	150.050074812	0.499	5.0
11//0525		120	9.00	150.050074414	0.496	
11K0F3E		80	6.00	162.050083476	0.515	
	162.05	100	7.50	162.050083067	0.513	5.0
						1
		120	9.00	162.050082793	0.511	
		120 80	9.00 6.00	162.050082793 173.950087107	0.511 0.501	
	173.95					5.0

# (2) Frequency Stability (Voltage Variation)



Type of Emission	Test Frequency (MHz)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
		80	6.00	138.050058880	0.427	
	138.05	100	7.50	138.050058727	0.425	5.0
		120	9.00	138.050058487	0.424	
		80	6.00	150.050065458	0.436	5.0
01/20515	150.05	100	7.50	150.050065176	0.434	
8K30F1E,		120	9.00	150.050064857	0.432	
8K30F1D,		80	6.00	162.050072675	0.448	5.0
8K30F7W	162.05	100	7.50	162.050072490	0.447	
		120	9.00	162.050072055	0.445	
		80	6.00	173.950087683	0.504	5.0
	173.95	100	7.50	173.950087374	0.502	
		120	9.00	173.950086817	0.499	

Type of Emission	Test Frequency (MHz)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
		80	6.00	138.050064857	0.470	
	138.05	100	7.50	138.050064861	0.470	2.0
		120	9.00	138.050064439	0.467	
		80	6.00	150.050073819	0.492	2.0
	150.05	100	7.50	150.050073746	0.491	
4K00F1E,		120	9.00	150.050073224	0.488	
4K00F1D, 4K00F7W		80	6.00	162.050081774	0.505	
4KUUF7W	162.05	100	7.50	162.050081363	0.502	
		120	9.00	162.050080973	0.500	
		80	6.00	173.950065212	0.375	2.0
	173.95	100	7.50	173.950066105	0.380	
		120	9.00	173.950065038	0.374	



Type of Emission	Test Frequency (MHz)	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
		80	6.00	138.050054118	0.392	
	138.05	100	7.50	138.050054242	0.393	2.0
		120	9.00	138.050053865	0.390	
		80	6.00	150.050062397	0.416	
	150.05	100	7.50	150.050062462	0.416	2.0
4K00F2D		120	9.00	150.050061919	0.413	
4KUUF2D		80	6.00	162.050071260	0.440	
	162.05	100	7.50	162.050071157	7 0.439 2	2.0
		120	9.00	162.050070574	0.436	
		80	6.00	173.950084663	0.487	
	173.95	100	7.50	173.950084635	0.487	2.0
		120	9.00	173.950084065	0.483	

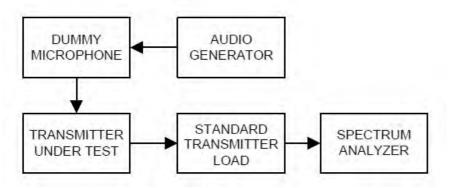


## 8.3 Occupied Bandwidth

#### 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-E Section 1.3.4.4) due to all sources of unwanted noise within the transmitter in a modulated condition.

#### TEST CONFIGURATION



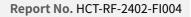
#### TEST PROCEDURE

According to TIA-603-E 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 (Authorized Band 6 kHz),

100Hz (Authorized Band 11.25 kHz),

- 300Hz (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.





#### TEST RESULTS

Certification	Type of Emission	Channel Bandwidth (kHz)	Test Frequency (MHz)	Maximi	99% OBW at um Freq. on(kHz) Low Power	Limit (kHz)
ISED			138.05	14.544	14.528	
FCC/ ISED	16K0F3E	25	150.05	10.704	10.672	20.00
FCC/ ISED	TOVOLSE	25	162.05	10.691	10.674	20.00
FCC/ ISED			173.95	14.583	14.549	
ISED			138.05	9.896	9.897	
FCC/ ISED	11K0F3E	12.5	150.05	9.886	9.871	11.25
FCC/ ISED	IINUFSE	12.5	162.05	7.558	7.554	11.25
FCC/ ISED			173.95	9.899	9.895	
ISED	0//20515		138.05	7.689	7.665	
FCC/ ISED	8K30F1E, 8K30F1D,	12.5	150.05	7.635	7.619	11.25
FCC/ ISED	8K30F1D,	12.5	162.05	7.615	7.611	11.25
FCC/ ISED	01307711		173.95	7.662	7.651	
ISED			138.05	3.618	3.613	
FCC/ ISED	4K00F1E, 4K00F1D,	6.25	150.05	3.564	3.603	6.00
FCC/ ISED	4K00F1D, 4K00F7W	0.25	162.05	3.600	3.614	0.00
FCC/ ISED			173.95	3.615	3.599	
ISED			138.05	3.311	3.315	
FCC/ ISED	4K00F2D	6.25	150.05	3.315	3.311	6.00
FCC/ ISED		0.25	162.05	3.312	3.315	0.00
FCC/ ISED			173.95	3.308	3.305	



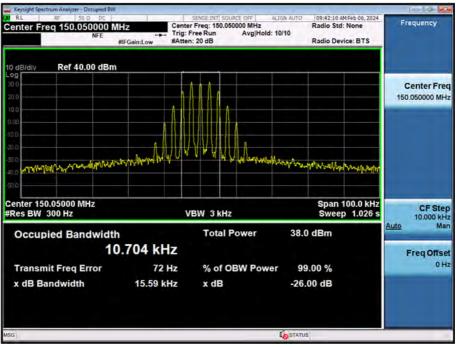
#### Plots of 99% Bandwidth

#### 16K0F3E



#### (138.05 MHz)\_High

## (150.05 MHz)\_High

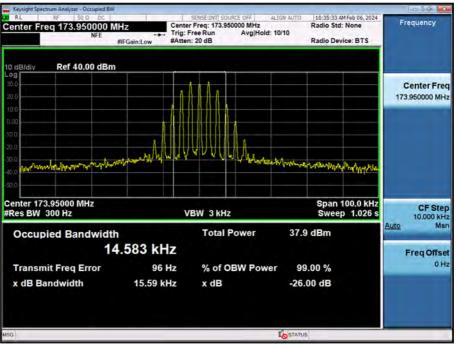




Keysight Spectrum Analyzer - Occupied BW			N AUTO 09:45:23 AM Feb 06, 2024	0 0 0
Center Freq 162.050000 M	Tri	SENSE:INT  SOURCE OFF   ALIG Inter Freq: 162.050000 MHz g: Free Run Avg Hold: 10/ Itten: 20 dB	Radio Std: None	Frequency
10 dB/div Ref 40.00 dBm		· · · · · · · · · · · · · · · · · · ·		
200	A			Center Fre 162.050000 MH
	and the way was a way of the way			
<sup>300</sup> 4000 <mark>(ประกับใหญ่งสุนการประกับใหญ่งสามาร</mark> 500 Center 162,05000 MHz			<sup>ຣະທ</sup> າຍພູ <sup>ໂ</sup> ພນະກາ <sub>ໃນ</sub> ກູໃຫ້ <sub>ນັດ</sub> ບູລູຢູ່ໜ Span 100.0 kHz	CF Ste
Res BW 300 Hz		VBW 3 kHz	Sweep 1.026 s	10,000 ki Auto Ma
Occupied Bandwidth 10	.691 kHz	Total Power	38.1 dBm	Freq Offs
Transmit Freq Error x dB Bandwidth	85 Hz 15.58 kHz	% of OBW Power x dB	99.00 % -26.00 dB	OH
8G		ú	STATUS	

#### (162.05 MHz)\_High

## (173.95 MHz)\_High

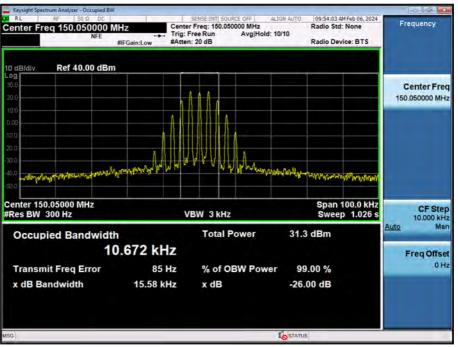




Keysight Spectrum Analyzer - Occupied BW				0.0 2
Center Freq 138.050000 MH NFE	Trig: F	SENSE:INT SOURCE OFF ALIC r Freq: 138,050000 MHz Free Run Avg Hold: 10 h: 20 dB	GN AUTO 09:50:08 AM Feb 06, 2024 Radio Std: None 1/10 Radio Device: BTS	Frequency
10 dB/div Ref 40.00 dBm				
20 0 20 0 10 0 10 0 10 0 20 0				Center Fre 138.050000 MH
200 	aborena La VV	BW 3 kHz	Span 100.0 kHz Sweep 1.026 s	CF Ste 10.000 kH
Occupied Bandwidth	500 kill-	Total Power	31.8 dBm	<u>Auto</u> Ma
14. Transmit Freq Error x dB Bandwidth	528 kHz 81 Hz 15.61 kHz	% of OBW Power x dB	99.00 % -26.00 dB	Freq Offse 0 H
SG			STATUS	

(138.05 MHz)\_Low

#### (150.05 MHz)\_ Low

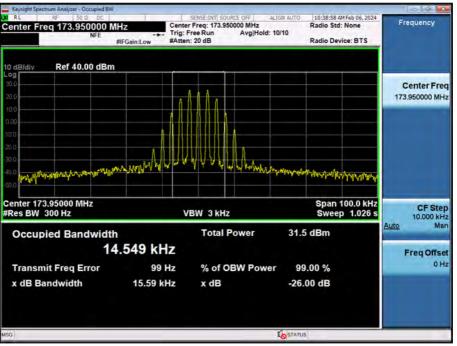




Keysight Spectrum Analyzer - Occupied BW				0.5 🕺
RL RF 50.0 DC Center Freq 162.050000 MHz NFE #IFG	Center Trig: F	SENSE:INT  SOURCE OFF ALI Freq: 162.050000 MHz ree Run Avg Hold: 10 : 20 dB	IGN AUTO 09:58:55 AM Feb ( Radio Std: Non 0/10 Radio Device: E	e Frequency
10 dB/div Ref 40.00 dBm				
300		A A A A A A A A A A A A A A A A A A A		Center Fre 162.050000 MH
<sup>40.0</sup> المراجعة المراجعة Center 162.05000 MHz #Res BW 300 Hz		BW 3 kHz	Span 100. Sweep 1.	kHz CESter
Occupied Bandwidth 10.6	74 kHz	Total Power	31.3 dBm	Auto Ma Freg Offse
	90 Hz 15.57 kHz	% of OBW Power x dB	99.00 % -26.00 dB	он

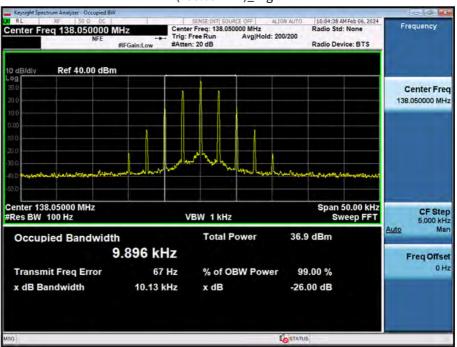
(162.05 MHz)\_ Low

## (173.95 MHz)\_ Low



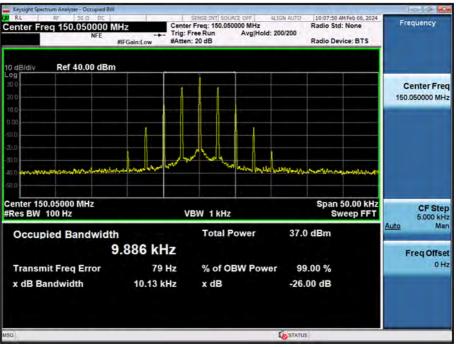


#### 11K0F3E



#### (138.05 MHz)\_High

#### (150.05 MHz)\_High

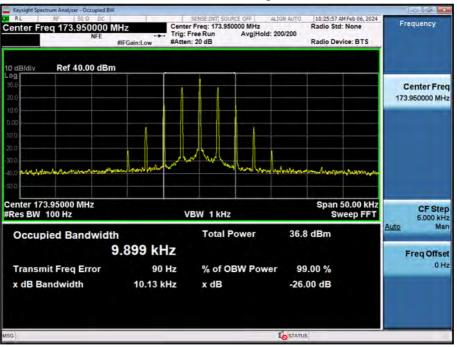




Keysight Spectrum Analyzer - Occupied BW					0.0
RL RF 50.0 DC Center Freq 162.050000 MH NFE	Tri	SENSE:INT SOURCE OF nter Freq: 162.050000 M g: Free Run Av tten: 20 dB		10:12:19 AM Feb 06, 2024 Radio Std: None Radio Device: BTS	Frequency
0 dB/div Ref 40.00 dBm					
200					Center Fre 162.050000 M
200 0 00000000000000000000000000000000		VBW 1 kHz	n landon	Span 50.00 kHz Sweep FFT	CF Ste 5,000 ki
Occupied Bandwidth	.558 kHz	Total Powe	er 37.	0 dBm	Auto M
Transmit Freq Error x dB Bandwidth	1.205 kHz 10.12 kHz	% of OBW x dB		9.00 % .00 dB	Freq Offs 01

(162.05 MHz)\_High

## (173.95 MHz)\_High

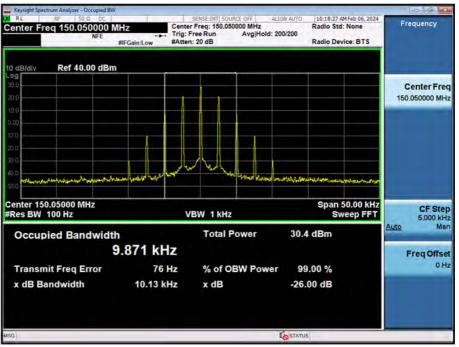




Keysight Spectrum Analyzer - Occupied BW			NSE:INT SOU	ore need a	LIGN AUTO	10:15:02 AM Feb 06, 2024	0.9 2
Center Freq 138.050000 MH			req: 138.050 e Run			Radio Std: None Radio Device: BTS	Frequency
10 dB/div Ref 40.00 dBm							
000 2000 1000 2000 2000 2000 2000 2000 2000							Center Fre 138.050000 MH
200 400 500 500 Center 138.05000 MHz #Res BW 100 Hz	and any a	VBI	N 1 kHz	hard	nunun	www.hww.huben.autor.autor. Span 50.00 kHz Sweep FFT	CF Ste
Occupied Bandwidth			Total P	ower	30.8	dBm	5,000 kH <u>Auto</u> Ma
	897 KH: 68 H 10.13 KH	z	% of O x dB	BW Powe		00 % 00 dB	Freq Offse 0 H
SG					STATUS		

#### (138.05 MHz)\_Low

## (150.05 MHz)\_ Low

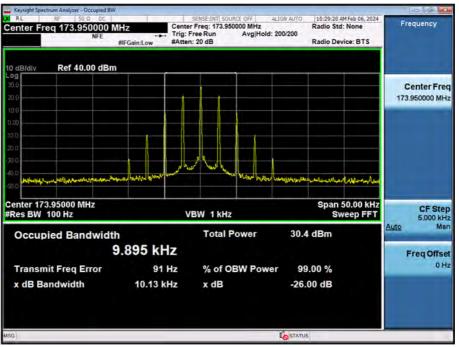




Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC			ALIGN AUTO 10:21:12 AM Feb 06, 202	4 Frequency
Center Freq 162.050000 MI	Trig	ter Freq: 162.050000 MHz I: Free Run Avg Hold: ten: 20 dB	200/200 Radio Device: BTS	Frequency
10 dB/div Ref 40.00 dBm				
20.0				Center Fre 162.050000 MH
10 D 20 D 30 0 40 0 40 0 40 0	alunne angre war		Mar Mar welger and a subject	
200 Center 162.05000 MHz Res BW 100 Hz		VBW 1 kHz	Span 50.00 kH Sweep FF	
Occupied Bandwidth	.554 kHz	Total Power	30.3 dBm	Auto Ma
r Transmit Freq Error x dB Bandwidth	1.205 kHz 10.12 kHz	% of OBW Powe x dB	er 99.00 % -26.00 dB	Freq Offse 0 H
			<b>A</b> 10	
ISG			STATUS	

## (162.05 MHz)\_ Low

## (173.95 MHz)\_ Low



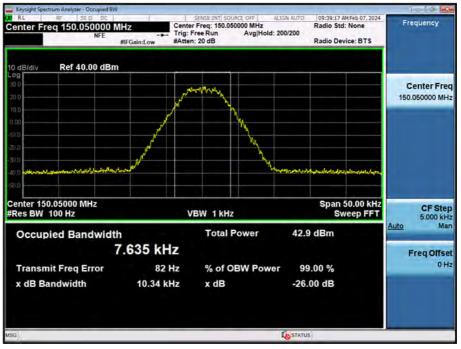


#### 8K30F1E



#### (138.05 MHz)\_High

#### (150.05 MHz)\_High

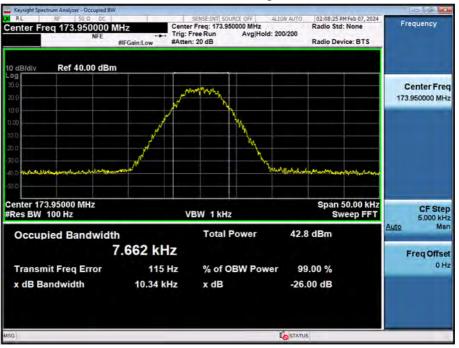




Keysight Spectrum Analyzer - Occupied BW				Real Property in Street open	0.0
Center Freq 162.050000 M NFE	Trig:	SENSE:INT SOURCE OFF ALLON AUTO Center Freq: 162.050000 MHz Trig: Free Run Avg Hold: 200/200 #Atten: 20 dB		41:55 AM Feb 07, 2024 to Std: None to Device: BTS	Frequency
10 dB/div Ref 40.00 dBm					
20.0		Manna			Center Fre 162.050000 MH
000	- A	- City			
20 D 20 D	d l	M			
0.0 <b></b>	rayati		"Warning warden and	Antonenaniste	
enter 162.05000 MHz Res BW 100 Hz		/BW 1 kHz	S	pan 50.00 kHz Sweep FFT	CF Ste 5.000 kH
Occupied Bandwidth		Total Power 43		m	Auto Ma
Transmit Freq Error	.615 kHz 89 Hz	% of OBW Po	wer 99.00	%	Freq Offs 0 H
x dB Bandwidth	10.33 kHz	x dB	-26.00 d		
			1 Januaria		
3G			STATUS		

(162.05 MHz)\_High

### (173.95 MHz)\_High

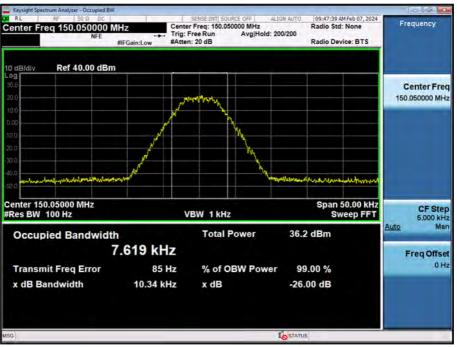




Keysight Spectrum Analyzer - Occupied BW		cover puri covers are l			0 5 2
enter Freq 138.050000 MHz	Center	SENSE:INT SOURCE OFF Freq: 138.050000 MHz ree Run Avg Hold : 20 dB	Radio	Std: None Device: BTS	Frequency
0 dB/div Ref 40.00 dBm					
og 300	ىلىپى	many			Center Fre 138.050000 MH
0.00 10 0 20 0		- M			
10.0 10.0 10.0 Hallandingelentralingener (10.74	www.	- A	malinguisen	AN MARKAN	
Center 138.05000 MHz Res BW 100 Hz	v	VBW 1 kHz		an 50.00 kHz Sweep FFT	5,000 ki
Occupied Bandwidth	665 kHz				
Transmit Freq Error x dB Bandwidth	81 Hz 10.36 kHz	% of OBW Pow x dB	er 99.00 % -26.00 dB		Freq Offs 0 F

(138.05 MHz)\_Low

### (150.05 MHz)\_ Low

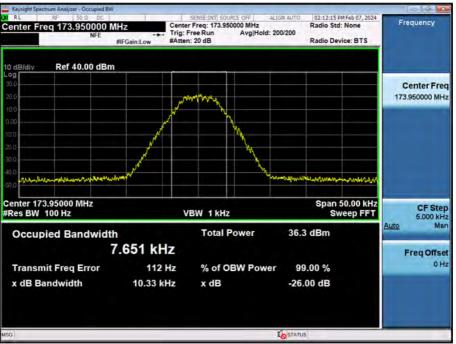




Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC		SENSE:INT SOURCE OFF	GN AUTO 09:52:14 AM Feb 07,	2024
Center Freq 162.050000 N NFE	Trig: F	r Freq: 162.050000 MHz Free Run Avg Hold: 20 a: 20 dB	Radio Std: None 0/200 Radio Device: BT	Frequency S
10 dB/div Ref 40.00 dBm				
Log 300 200 100	J. Market	m		Center Free 162.050000 MH
0.00		- Maria		
-37.0 -40.0 -50.0	www.com	han han	mallennedseedseedseedseedseed	<b>1.112</b>
Center 162.05000 MHz #Res BW 100 Hz	v	VBW 1 kHz		KHZ FT 5,000 kH
Occupied Bandwidth		Total Power	36.2 dBm	Auto Ma
Transmit Freg Error	2.611 kHz 95 Hz	% of OBW Power	99.00 %	Freq Offse
x dB Bandwidth	95 HZ 10.33 kHz	x dB	-26.00 dB	
ISG			STATUS	

(162.05 MHz)\_ Low

### (173.95 MHz)\_ Low

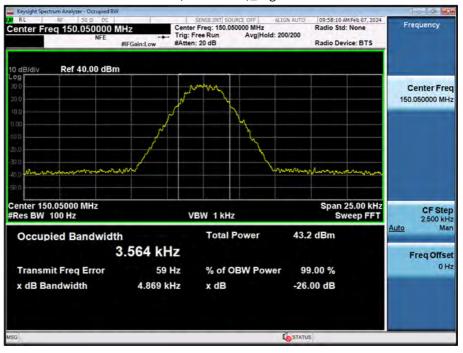




### 4K00F1E



## (150.05 MHz)\_High



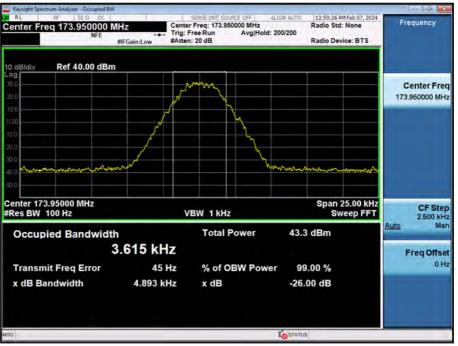
F-TP22-03 (Rev. 05)



Keysight Spectrum Analyzer - Occupied BW					0.0 2
RL RF 50.0 DC Center Freq 162.050000 MH NFE	Z Center Trig: F	SENSE:INT SOURCE OFF Freq: 162.050000 MHz Free Run Avg Hold : 20 dB	Radio St : 200/200	5 AM Feb 07, 2024 td: None evice: BTS	Frequency
10 dB/div Ref 40.00 dBm					
30.0 20.0 10.0	مسمهر	mm			Center Free 162.050000 MH
0.00 100 200	- Ar	- M			
30,0 40,0 <b></b>			minghappe	hord angest	
Center 162.05000 MHz Res BW 100 Hz	v	VBW 1 kHz		25.00 kHz weep FFT	CF St 2,500 k
Occupied Bandwidth 3.	600 kHz	Total Power	43.3 dBm		Auto Ma Freg Offse
	34 Hz 4.857 kHz	% of OBW Powe x dB	er 99.00 % -26.00 dB		OF
SG			STATUS		

(162.05 MHz)\_High

### (173.95 MHz)\_High

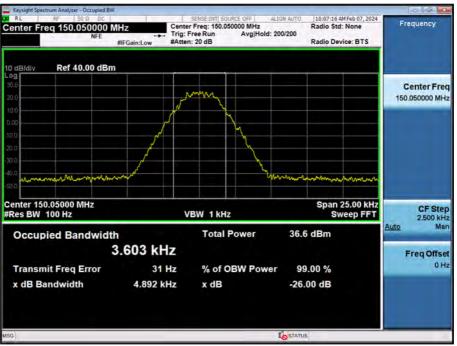




Keysight Spectrum Analyzer - Occupied BW					
Center Freq 138.050000 MHz	Trig: F	SENSE:INT SOURCE OF Freq: 138.050000 M Free Run Av a: 20 dB		Radio Device: BTS	Frequency
10 dB/div Ref 40.00 dBm					
-og 300	J.	m			Center Fre 138.050000 MH
100		- M			
810			h		
0.0 martin m 10.0			- water water	mmunum	
Center 138.05000 MHz Res BW 100 Hz	v	VBW 1 kHz		Span 25.00 kHz Sweep FFT	2,500 kH
Occupied Bandwidth	13 kHz	Total Powe	er 37	.1 dBm	Auto Ma
Transmit Freq Error x dB Bandwidth	30 Hz 4.888 kHz	% of OBW x dB		99.00 % 6.00 dB	Freq Offs 0 H
			2		
iG			Lo STA	rus	

### (138.05 MHz)\_Low

### (150.05 MHz)\_ Low

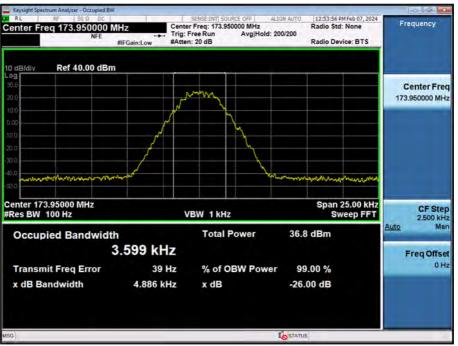




Keysight Spectrum Analyzer - Occupied BW	,				0 0 🕺
RL         RF         50 Ω         DC           Center Freq 162.050000 M         NFE         NFE	Hz Center Trig: F	SENSE:INT SOURCE OFF 4 Freq: 162.050000 MHz Free Run Avg Hold: : 20 dB	Radio Std:		Frequency
10 dB/div Ref 40.00 dBm					
Log 30.0 20.0	J. J	m			Center Fre 162.050000 MH
10 D	المر ا	- M			
20.0 40.0 50.0 50.0	mm		mmun	en ganna	
Center 162.05000 MHz #Res BW 100 Hz	v	BW 1 kHz		5.00 kHz eep FFT	CF St 2,500 k
Occupied Bandwidth		Total Power		A	Auto Ma
	.614 kHz				Freq Offse
Transmit Freq Error x dB Bandwidth	45 Hz 4.897 kHz	% of OBW Powe x dB	r 99.00 % -26.00 dB		U.
8G			STATUS		_

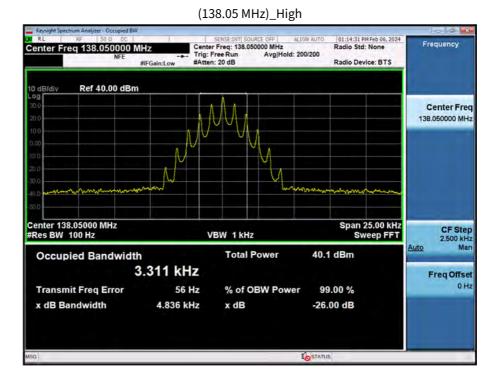
### (162.05 MHz)\_ Low

### (173.95 MHz)\_ Low

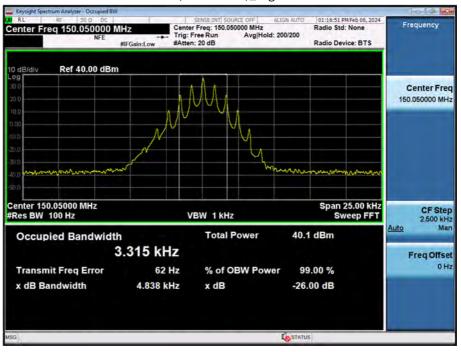




### 4K00F2D



## (150.05 MHz)\_High





Keysight Spectrum Analyzer - Occupied BW			0 2 2
Center Freq 162.050000 MHz NFE	SENSE:INT  SOURCE OFF 4LIGN / Center Freq: 162.050000 MHz Trig: Free Run Avg Hold: 200/2 #Atten: 20 dB	Radio Std: None	Frequency
10 dB/div Ref 40.00 dBm			
200 200	, MM,		Center Fre 162.050000 MH
	V M		
10.0		mmmm	
Center 162.05000 MHz Res BW 100 Hz	VBW 1 kHz	Span 25.00 kHz Sweep FFT	CF Ste 2,500 kH
Occupied Bandwidth 3.312		40.2 dBm	Auto Ma Freq Offse
	72 Hz % of OBW Power 4 kHz x dB	99.00 % -26.00 dB	OH
SG	r -	STATUS	

(162.05 MHz)\_High

### (173.95 MHz)\_High

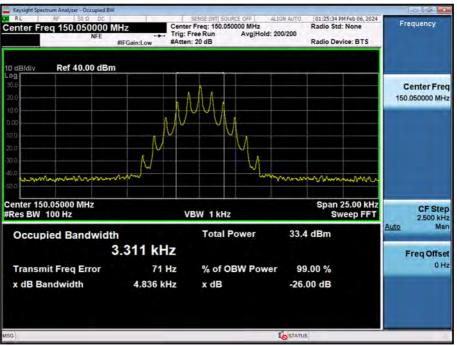




Keysight Spectrum Analyzer - Occupied BW		SENSE:INT SOURCE OFF	ALIGN AUTO 01:22:37	PM Feb 06, 2024	0 2 2
Center Freq 138.050000 M NFE	Hz Center Trig: F	Freq: 138.050000 MHz ree Run Avg Hold : 20 dB	Radio Sta 200/200		Frequency
10 dB/div Ref 40.00 dBm					
200	A A	M			Center Free 138.050000 MH
0.00 10.0	M	M			
80.0 40.0 50.0	~~~~	- M	mmmmmm	mann	
Center 138.05000 MHz Res BW 100 Hz	v	VBW 1 kHz			CF Ste 2,500 kH
Occupied Bandwidt	<sup>h</sup> 3.315 kHz	Total Power	34.0 dBm	A	uto Ma Freg Offs
Transmit Freq Error x dB Bandwidth	60 Hz 4.834 kHz	% of OBW Pow x dB	er 99.00 % -26.00 dB		OF
SG			STATUS		

(138.05 MHz)\_Low

### (150.05 MHz)\_ Low

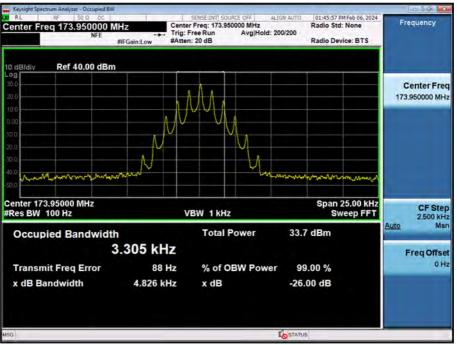




Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC		SENSE:INT SOURCE OFF	IN AUTO 01:28:28 PM Feb 06, 20	24
Center Freq 162.050000 M	Hz Center Trig: F	Freq: 162.050000 MHz Free Run Avg Hold: 20 : 20 dB	Radio Std: None	Frequency
10 dB/div Ref 40.00 dBm				
30.0 20.0 10.0		M		Center Free 162.050000 MH
0.00 		M		
40.0		- Andrew	manna	•••
Center 162.05000 MHz #Res BW 100 Hz	v	BW 1 kHz	Span 25.00 kl Sweep FF	T 2,500 kH
Occupied Bandwidth		Total Power	33.4 dBm	Auto Mar
	.315 kHz			Freq Offse
Transmit Freq Error x dB Bandwidth	75 Hz 4.827 kHz	% of OBW Power x dB	99.00 % -26.00 dB	0 H
ISG		C.	STATUS	

(162.05 MHz)\_ Low

### (173.95 MHz)\_ Low



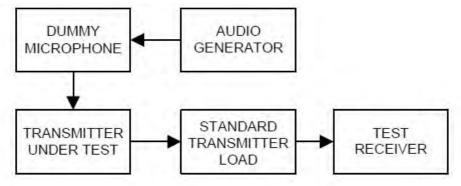


# 8.4 Modulation Limiting

### 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-E 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  $\leq$ 0.25 Hz to  $\geq$ 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.



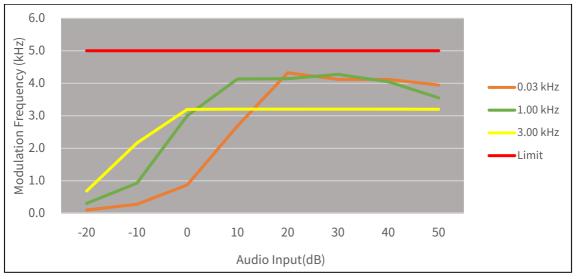
# TEST RESULTS (16K0F3E)

# Positive Peaks

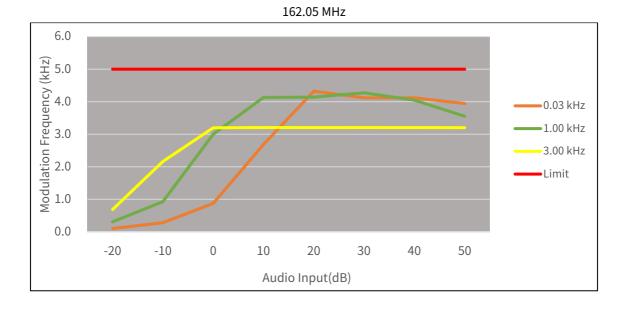
**HIGH POWER** 



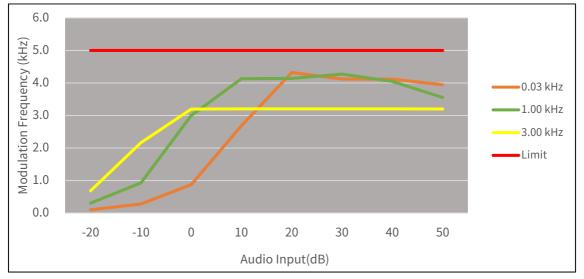
### 150.05 MHz







173.95 MHz



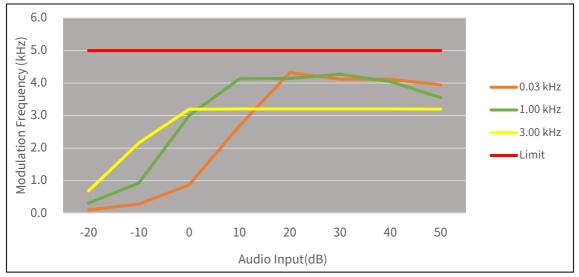




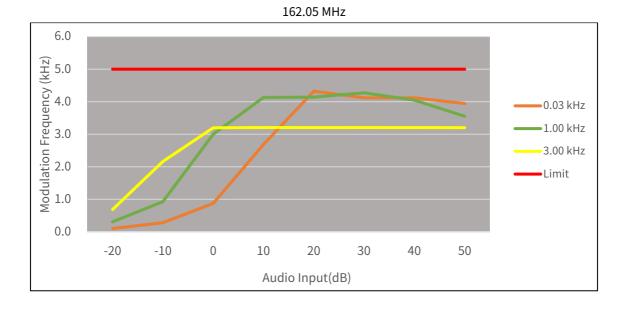
LOW POWER



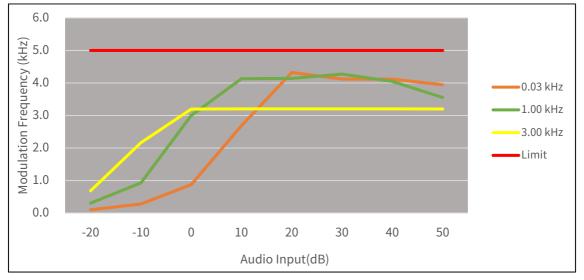
150.05 MHz





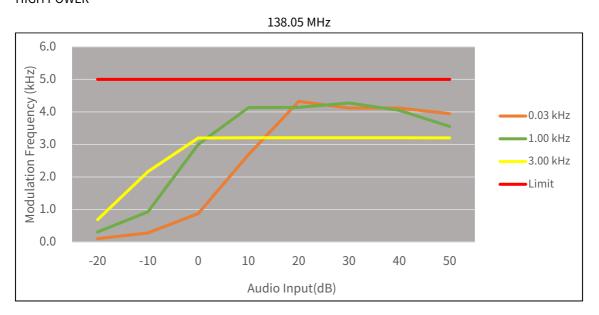


173.95 MHz

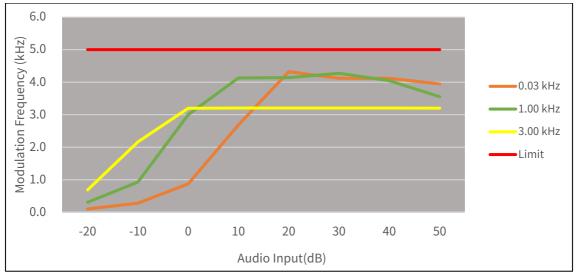




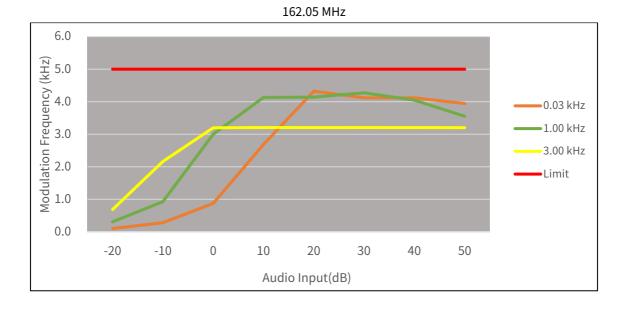
Negative Peaks HIGH POWER



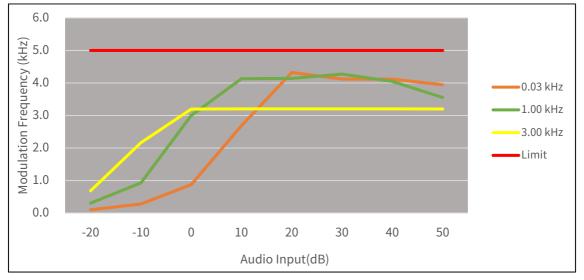
```
150.05 MHz
```







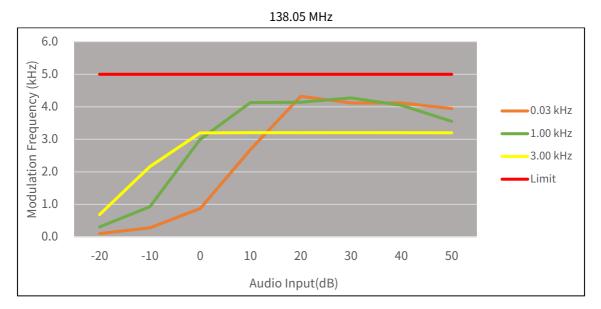
173.95 MHz



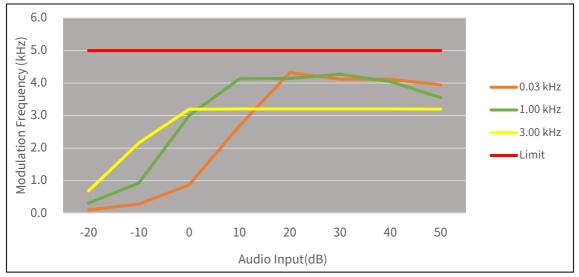




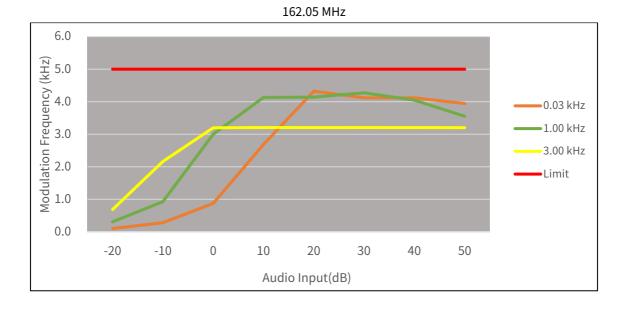
LOW POWER



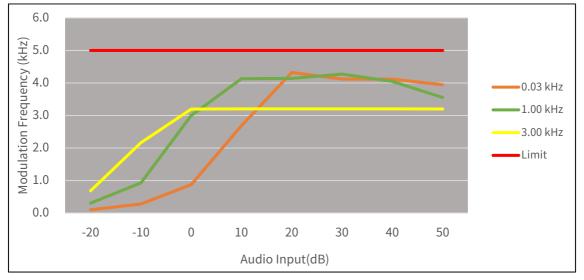
150.05 MHz







173.95 MHz

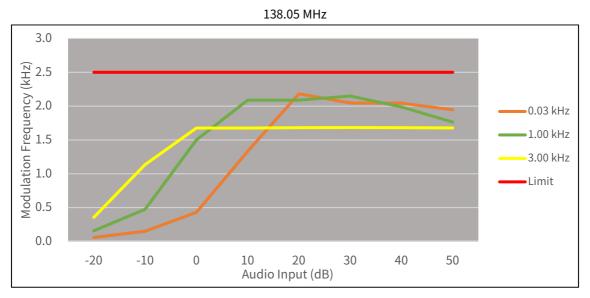




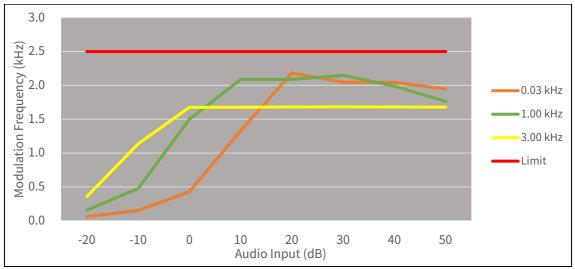
# TEST RESULTS(11K0F3E)

# Positive Peaks

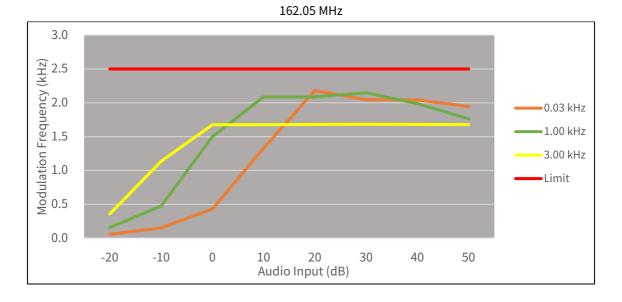
HIGH POWER



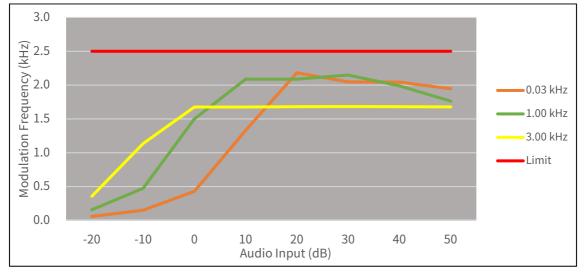
### 150.05 MHz







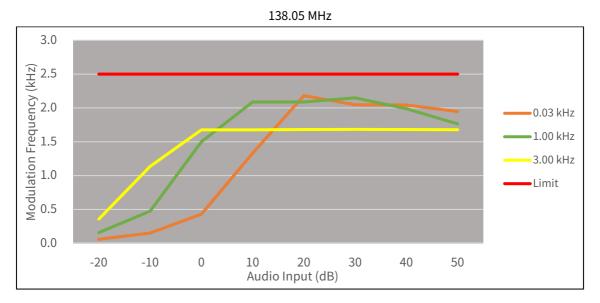
173.95 MHz



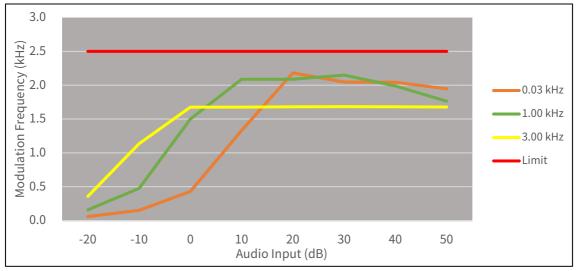




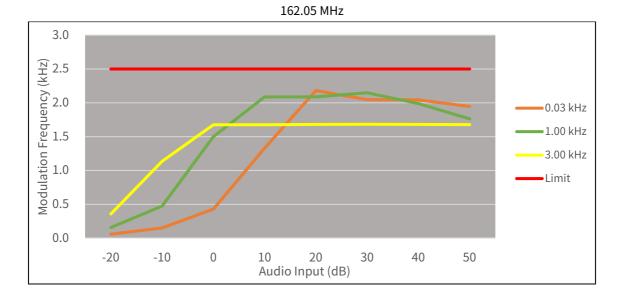
LOW POWER



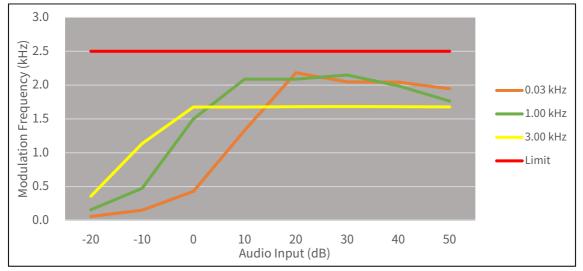
150.05 MHz





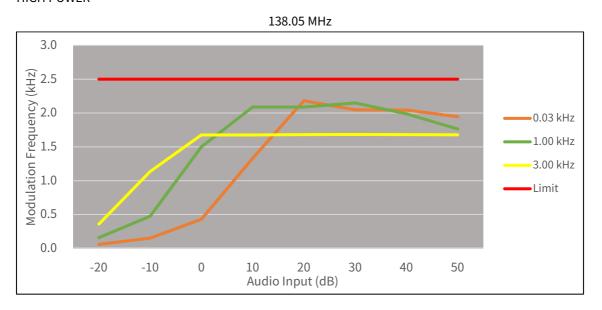


173.95 MHz





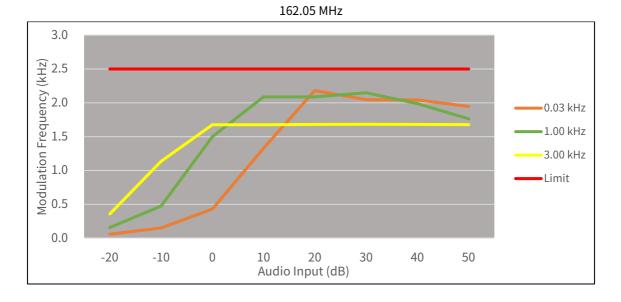
# Negative Peaks HIGH POWER



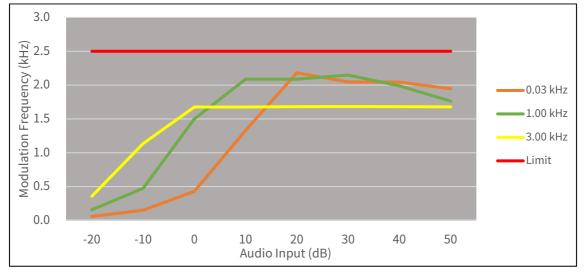
### 3.0 0.03 kHz 1.00 kHz 3.00 kHz Limit 0.0 -20 -10 0 20 30 40 50 10 Audio Input (dB)

150.05 MHz





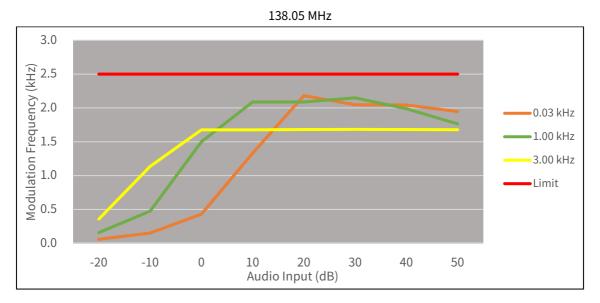
173.95 MHz



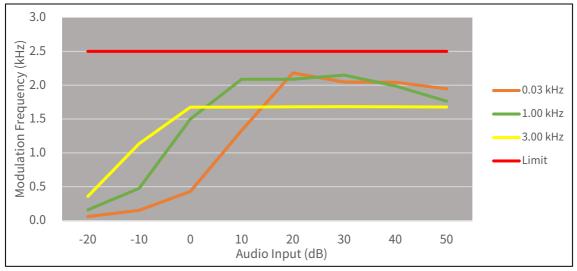




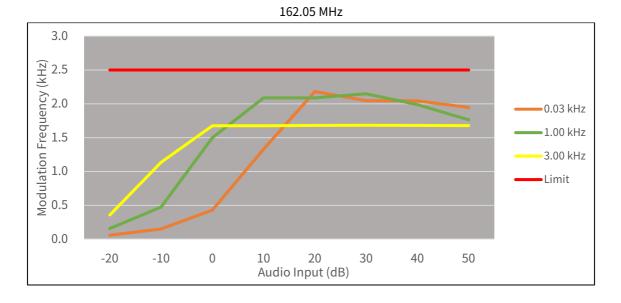
LOW POWER



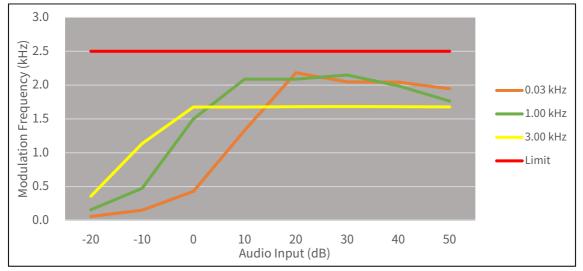
150.05 MHz







173.95 MHz



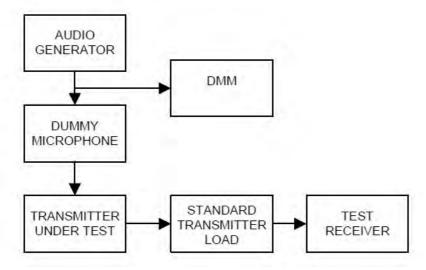


## 8.5 Audio Frequency Response / Audio Low Pass Filter Response

### 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-E Standard.

- a) Connect the equipment as illustrated.
- b) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for  $\leq$  50 Hz to  $\geq$  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  $V_{\text{REF.}}$
- 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.

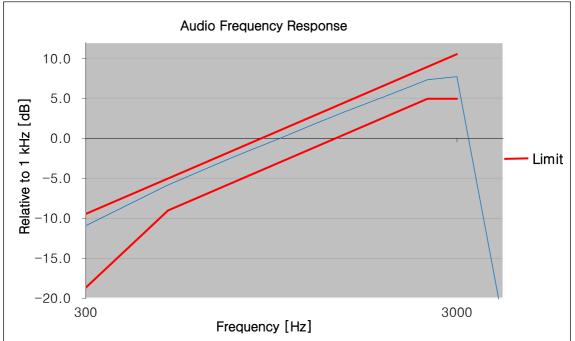
On the transmission condition above 3kHz, Transceiver shows Audio Low Pass Filter.



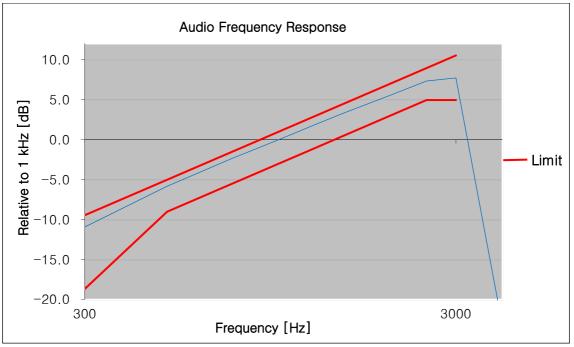
# TEST RESULTS (16K0F3E)

# HIGH POWER

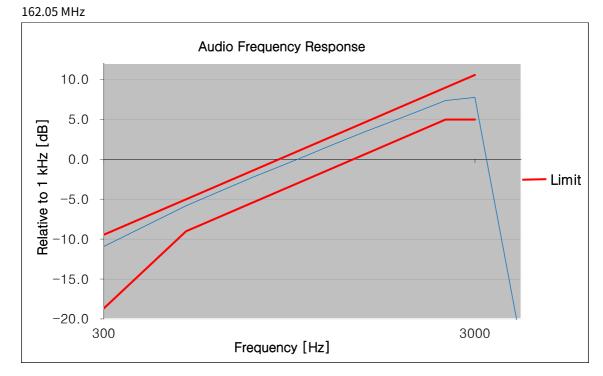
138.05 MHz



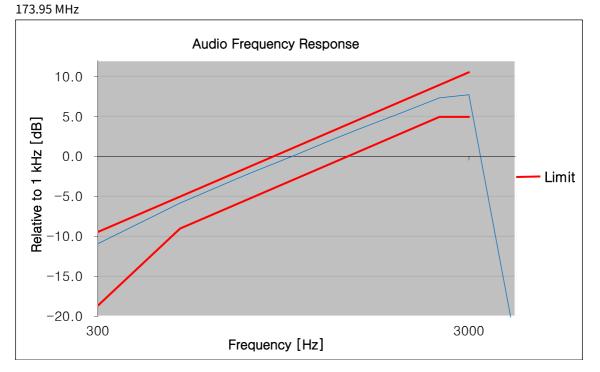








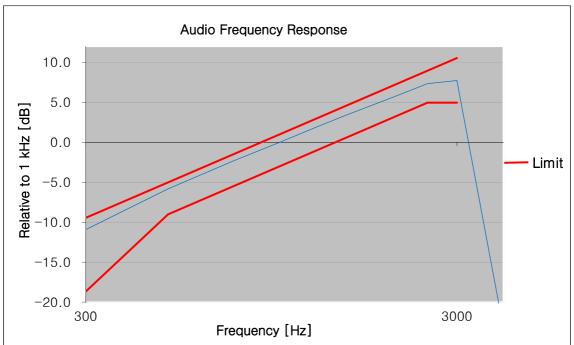




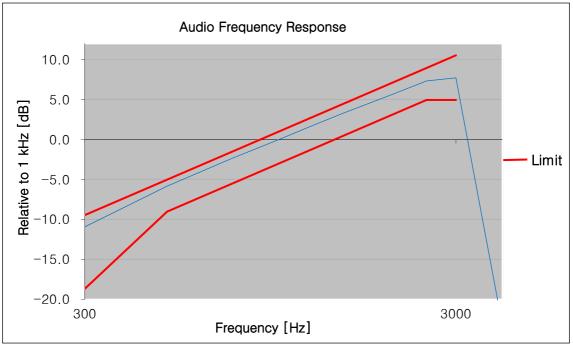


LOW POWER

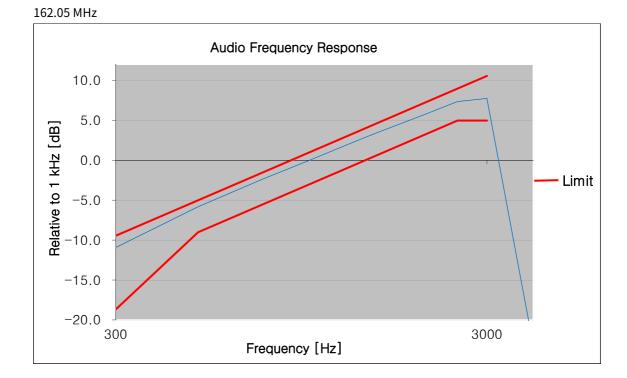
138.05 MHz



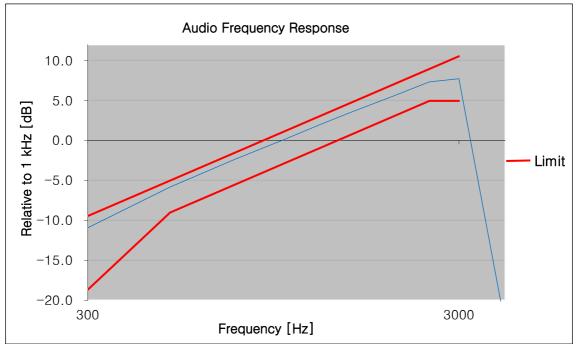
150.05 MHz







### 173.95 MHz

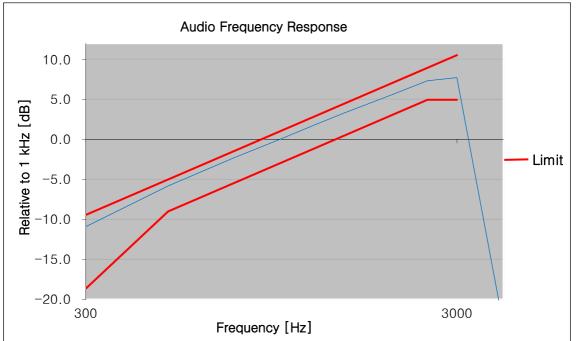




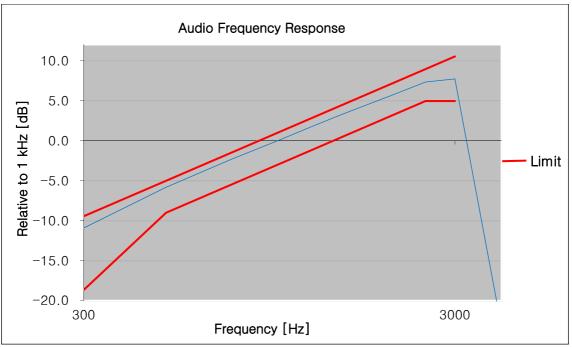
# TEST RESULTS (11K0F3E)

# HIGH POWER

138.05 MHz

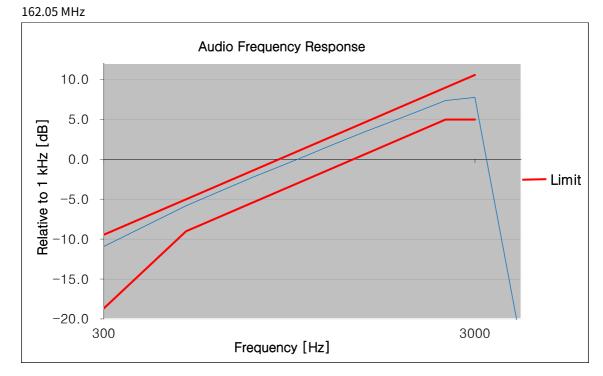




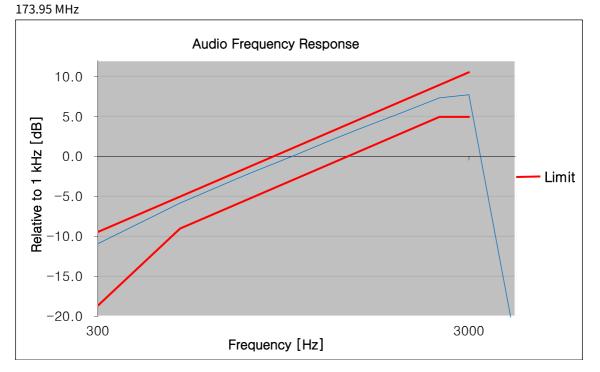


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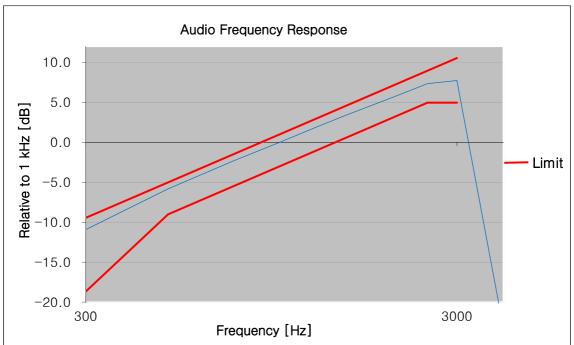




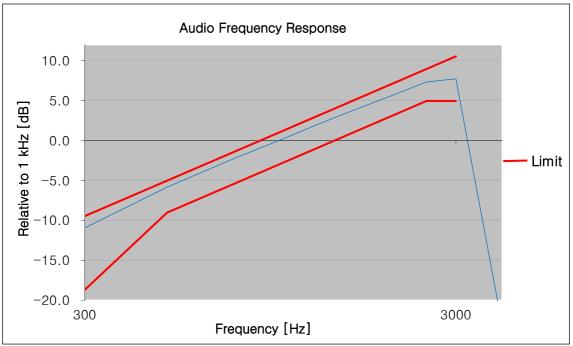


LOW POWER

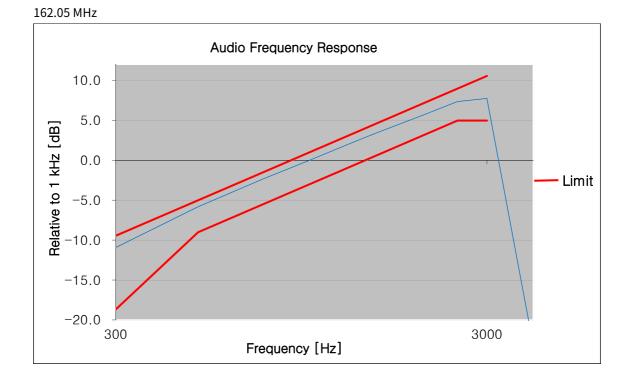
138.05 MHz



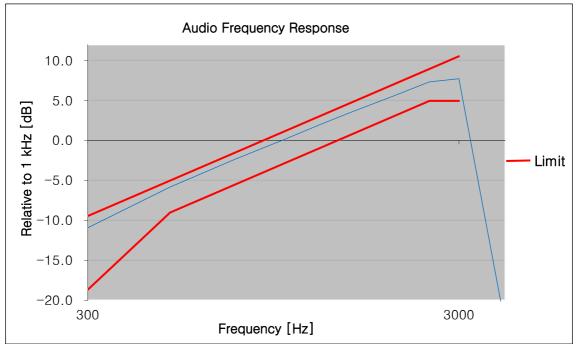
150.05 MHz







### 173.95 MHz



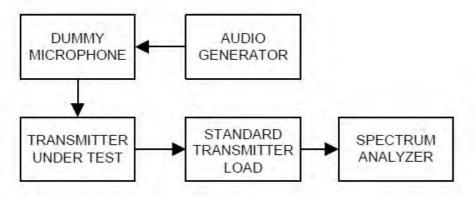


# 8.6 Emission Mask

### 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-E Standard.

a) Connect the equipment as illustrated. Use the table to determine the 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	В	с	300	
72-76	В	С	300	
138-174	NTIA	NTIA	300	
150-174	В	с	300	
150-174	D or E	D or E	100	
406-420	NTIA	NTIA	300	
421-512	В	С	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	В	Н	300	
896-901/935-940	I	J	300	

b) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth per the above table

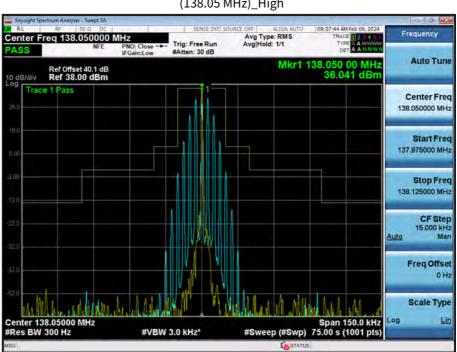


- 2) Video Bandwidth at least 10 times the resolution bandwidth.
- 3) Sweep Speed slow enough to maintain measurement calibration.
- 4) Detector Mode = Positive Peak.
- 5) Span that will allow proper viewing of the test bandwidth (see 1.3.4.4).
- c) Set the center frequency of the spectrum analyzer to 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.



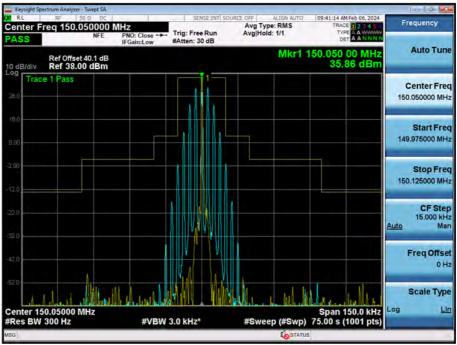
# Plots of Emission Mask

# 16K0F3E



# (138.05 MHz)\_High

# (150.05 MHz)\_High



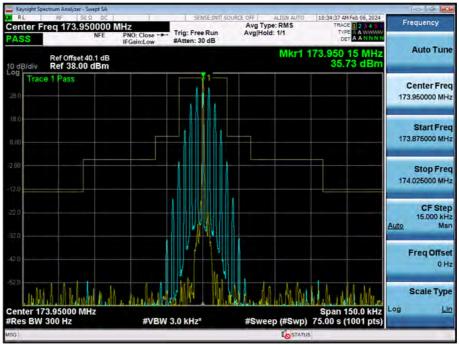
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0.0						ctrum Analyzer		
Frequency	09:44:27 AM Feb 06, 2024 TRACE 1 2 3 4 5 0 TYPE A A WWWW DET A A NN N N	Avg Type: RMS Avg Hold: 1/1	SENSE:INT S Trig: Free Run #Atten: 30 dB	PNO: Close	50 Ω DC 2.050000 N NFE		ter Fr	Cent PAS
Auto Tur	162.050 00 MHz 35.87 dBm	Mkr1	#Atten: 30 dB	IFGain:Low	set 40.1 dB 8.00 dBm	Ref Offset Ref 38.0		10 dB
Center Fre 162.050000 MH			-,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			a 1 Pass	Trace	28.0
Start Fre 161.975000 MF								(8.0 8.00
Stop Fre 162.125000 MH								260 · 12.0 :
CF Ste 15,000 kF Auto Ma								22,0 52,0
Freq Offs 0 H								4210
Scale Typ	Span 150.0 kHz 75.00 s (1001 pts)	#Sweep (#Swp)	3.0 kHz*	ut I I WAA	MHz	2.05000 N 300 Hz		
		Lo STATU						ASG

(162.05 MHz)\_High

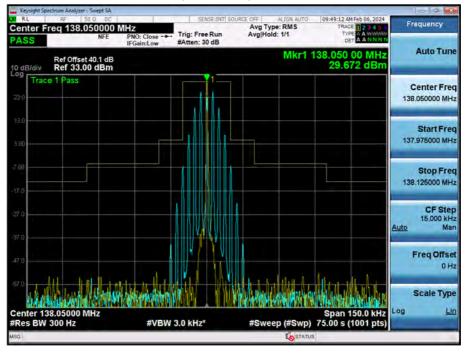
# (173.95 MHz)\_High



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(138.05 MHz) \_ Low

# (150.05 MHz)\_ Low



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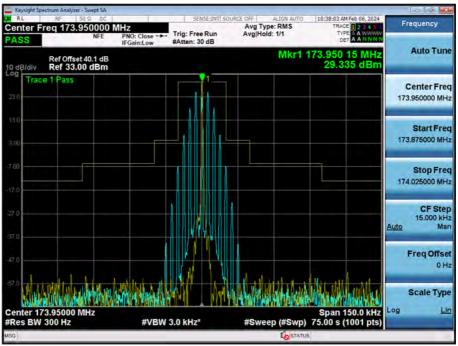
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MHz	Avg Type: RMS	09:58:00 AM Feb 06, 2024 TRACE 1 2 3 4 5	Frequency
PNO: Close - Trig: Free Run IFGain:Low #Atten: 30 dB		DET A ANNINN 162.050 15 MHz	Auto Tun
		29.034 dBm	Center Fre 162.050000 MH
			Start Fre 161.975000 MF
			Stop Fre 162.125000 MH
			CF Ste 15.000 kH Auto Ma
	Le stadio d		Freq Offse 0 F
#VBW 3.0 kHz*	#Sweep (#Swp)	Span 150.0 kHz 75.00 s (1001 pts)	Scale Typ Log L
	MHz PNO: Close +++ IFGain:Low #Atten: 30 dB	MHz PNO: Close ++++ IFGain:Low #Atten: 30 dB Mkr1 1 Mkr1 1	MHz PNO: Close

(162.05 MHz)\_ Low

# (173.95 MHz)\_Low

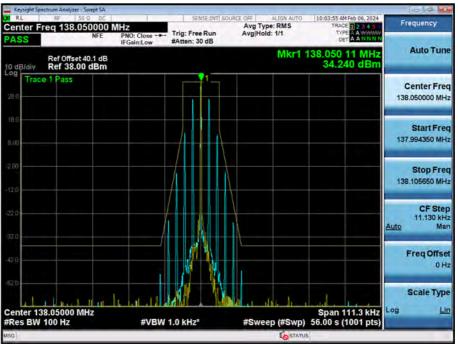


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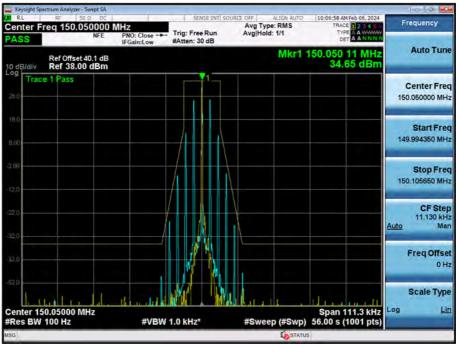


### 11K0F3E



# (138.05 MHz)\_High

# (150.05 MHz)\_High





Gain:Low #Atten: 30 dB	Avg Hold: 1/1	TYPE A A WWWW DET A A NNNNN	
	Mkr1 1	62.050 11 MHz 35.11 dBm	Auto Tune
			Center Fre 162.050000 MH
			Start Fre 161.994350 MF
			Stop Fre 162.105650 M
			CF Ste 11.130 kł Auto Ma
			Freq Offs 0 F
#VBW 1.0 kHz*	#Sweep (#Swp)	Span 111.3 kHz 56.00 s (1001 pts)	Scale Typ
	#VBW 1.0 KHz*		35.11 dBm

(162.05 MHz)\_High

# (173.95 MHz)\_High





0.9			SENSE:INT SOU		rum Analyzer - Swept SA	RL Keysight Sper
Frequency	10:14:28 AM Feb 06, 2024 TRACE 1 2 3 4 5 5 TYPE A A WWWW DET A A NN N N	Avg Type: RMS Avg[Hold: 1/1	Trig: Free Run #Atten: 30 dB	PNO: Close	re 50 0 DC q 138.050000 N NFE	
Auto Tun	138.050 11 MHz 28.36 dBm	Mkr1	#Atten: 30 dB	IFGain:Low	Ref Offset 40.1 dB Ref 33.00 dBm	dB/div
Center Fre 138.050000 MH					1 Pass	30 Trace
Start Fre 137.994350 MF						3.0.
Stop Fre 138.105650 MH						7.0
CF Ste 11.130 kł Auto Ma						7.0
Freq Offse 0 H						7 0
Scale Typ	Span 111.3 kHz 56.00 s (1001 pts)	#Sweep (#Swp)	1.0 kHz*	#VBW 1	05000 MHz	enter 13
	5	To STATUS				G

(138.05 MHz) \_ Low

#### (150.05 MHz)\_ Low

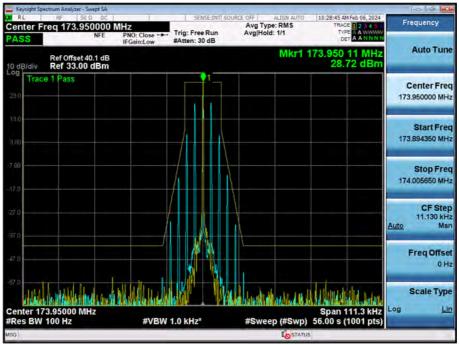




0.00			SENSE:INT SO		m Analyzer - Swept SA RF S0 Q DC		Key
Frequency	10:20:38 AM Feb 06, 2024 TRACE 1 2 3 4 5 5 TYPE A A WWWW DET A A N N N N	Avg Type: RMS Avg Hold: 1/1	ig: Free Run	PNO: Close Trig	162.050000 N NFE	ter Fre	
Auto Tun	162.050 11 MHz 28.31 dBm	Mkr1	itten: 50 dB	IFGain:Low #A	ef Offset 40.1 dB ef 33.00 dBm		10 dB
Center Fre 162.050000 MH					Pass	Trace	23.0 -
Start Fre 161.994350 MH							(3.0) 3,00
Stop Fre 162.105650 MH							7.60
CF Ste 11.130 kH Auto Ma							27 D -
Freq Offse 0 H		<u> </u>					47 ()
Scale Typ	Span 111.3 kHz 56.00 s (1001 pts)	#Sweep (#Swp)	kHz*	#VBW 1.0	05000 MHz 0 Hz	ter 162 s BW 1	
		To STATU					ASG

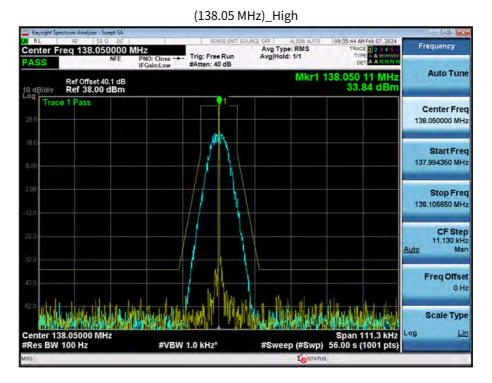
(162.05 MHz)\_ Low

# (173.95 MHz)\_Low

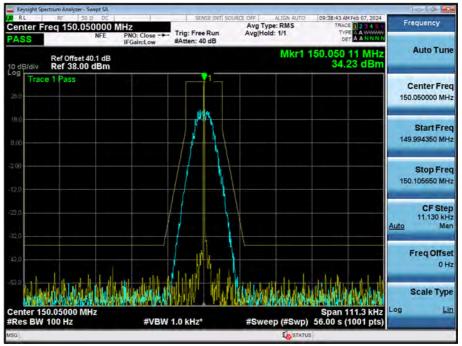




### 8K30F1E, 8K30F1D, 8K30F7W



# (150.05 MHz)\_High



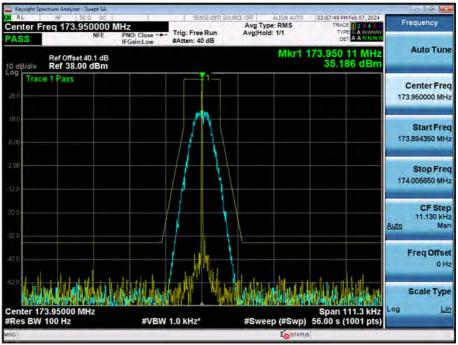
F-TP22-03 (Rev. 05)



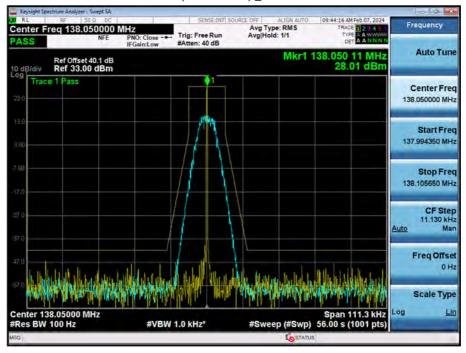
			Frequency
E PNO: Close Trig: Free Run IFGain:Low #Atten: 40 dB	Avg Hold: 1/1	DET A A NNN N	
iB m	Mkr1 1	62.050 11 MHz 34.77 dBm	Auto Tun
			Center Fre 162.050000 MH
			Start Fre 161.994350 MF
			Stop Fre 162.105650 MH
			CF Ste 11.130 ki Auto Ma
			Freq Offs 0 F
uddiadahan M	<b>Wandaha</b> k	Juli 111.5 KHZ	Scale Typ
	DO MHz E PNO: Close ↔ Trig: Free Run #Atten: 40 dB IB m 1 1 1 1 1 1 1 1 1 1 1 1 1	DO MHz PNO: Close +++ IFGain:Low #Atten: 40 dB Mkr1 1 Mkr1 1 	PNC: Close          Trig: Free Run #Atten: 40 dB         Avg/Hold: 1/1         Type A Annue N           JB         Mkr1 162.050 11 MHz 34.77 dBm         34.77 dBm

(162.05 MHz)\_High

# (173.95 MHz)\_High

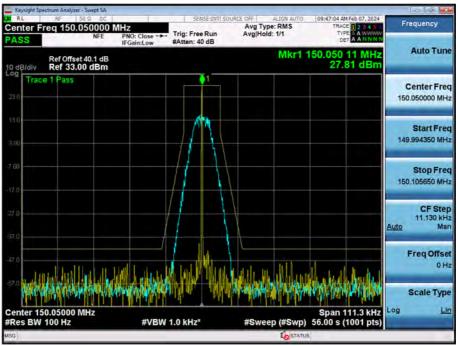




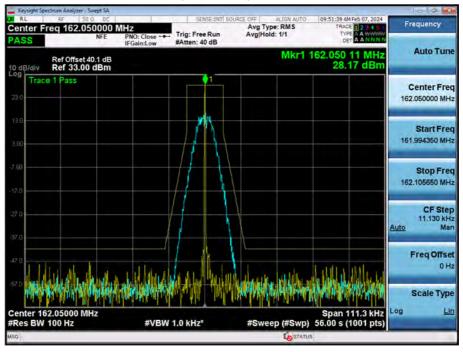


(138.05 MHz) \_ Low

# (150.05 MHz)\_ Low

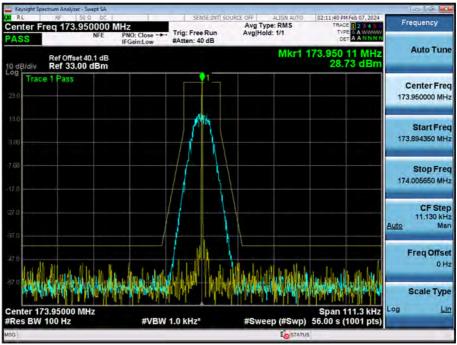






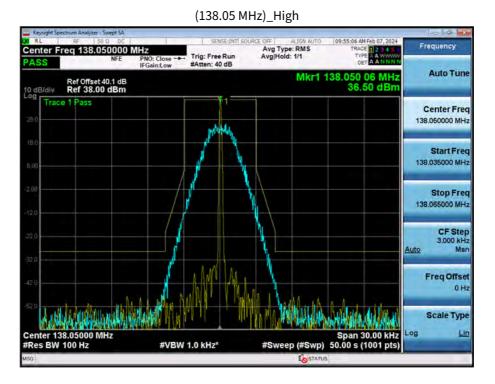
(162.05 MHz)\_ Low

# (173.95 MHz)\_Low

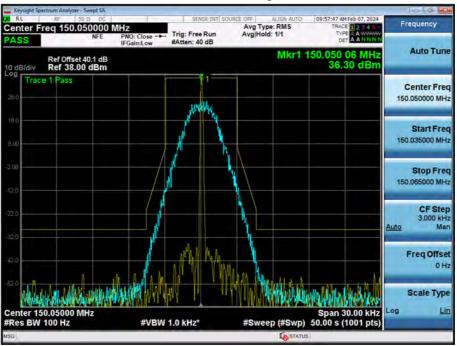




### 4K00F1E, 4K00F1D, 4K00F7W



### (150.05 MHz)\_High

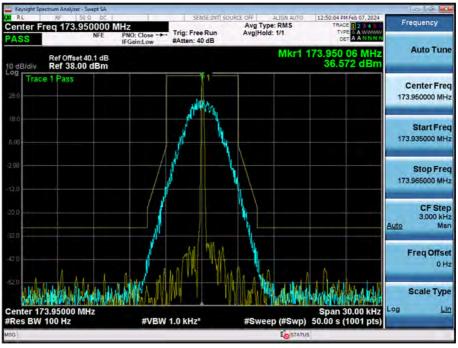




RF S0 Q DC	SENSE:INT SO	URCE OFF ALIGN AUTO	10:00:42 AM Feb 07, 2024	0 9 2
req 162.050000 MHz		Avg Type: RMS Avg Hold: 1/1	TRACE 1 2 3 4 5 1 TYPE A A WWWW DET A A NNNN	Frequency
Ref Offset 40.1 dB Ref 38.00 dBm	ann.cow written to as	Mkr1 1	62.050 09 MHz 36.53 dBm	Auto Tune
e 1 Pass	MAN			Center Free 162.050000 MH
				Start Fre 162.035000 MH
				Stop Fre 162.065000 MH
				CF Ste 3,000 kH Auto Ma
	A AM AM	Mar Mar a		Freq Offse 0 H
52.05000 MHz 100 Hz	#VBW 1.0 kHz*	#Sweep (#Swp)	Span 30.00 kHz 50.00 s (1001 pts)	Scale Typ Log <u>Li</u>
100 112		STATUS		

(162.05 MHz)\_High

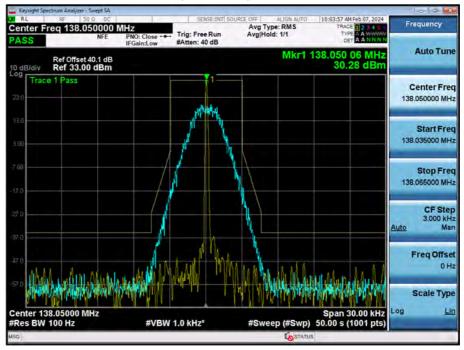
# (173.95 MHz)\_High



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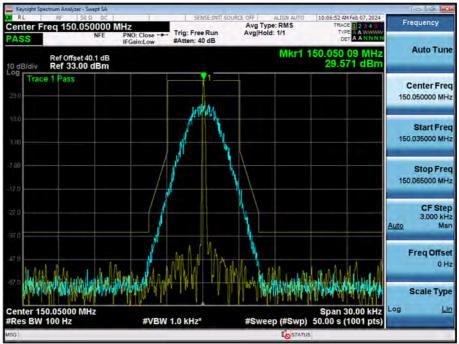
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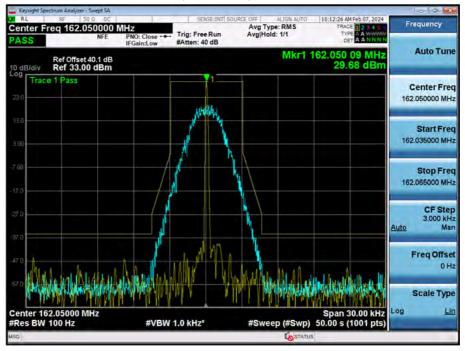


(138.05 MHz) \_ Low

# (150.05 MHz)\_ Low

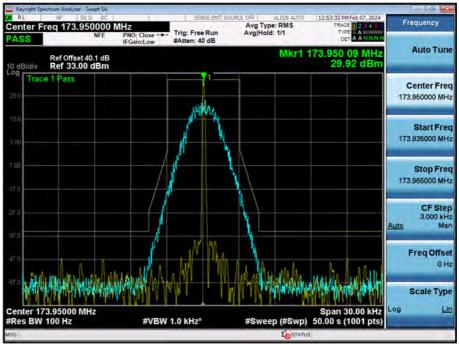






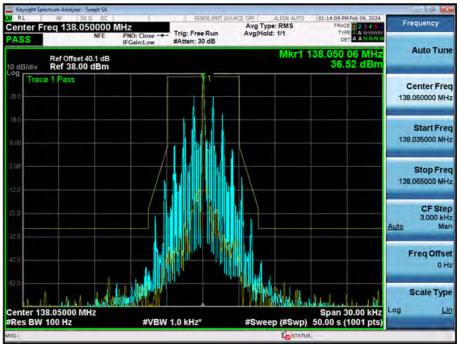
(162.05 MHz)\_ Low

# (173.95 MHz)\_Low



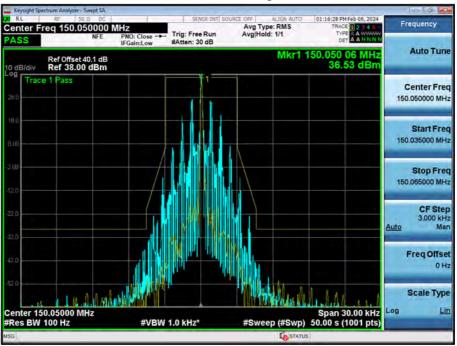


#### 4K00F2D



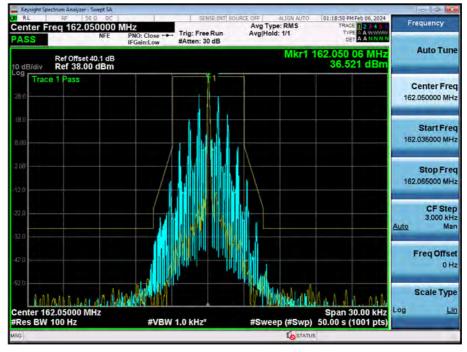
# (138.05 MHz)\_High

# (150.05 MHz)\_High



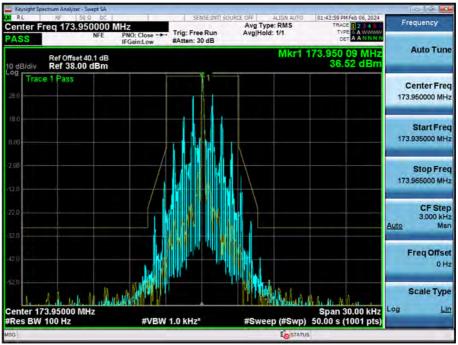
F-TP22-03 (Rev. 05)



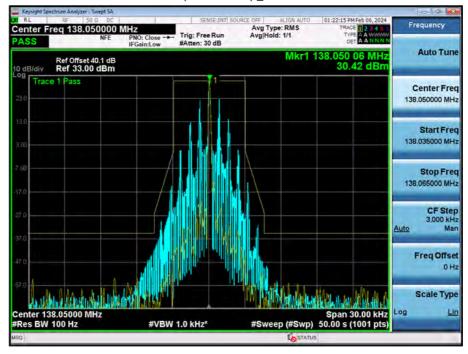


(162.05 MHz)\_High

# (173.95 MHz)\_High

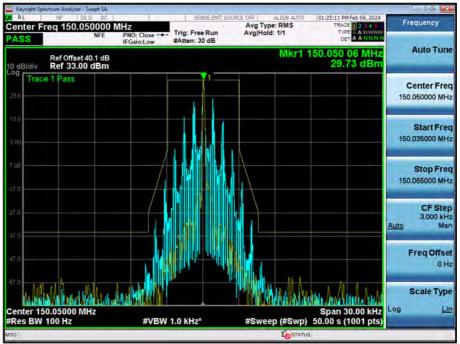




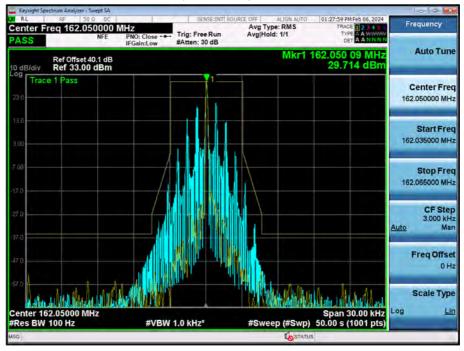


(138.05 MHz) \_ Low

(150.05 MHz)\_ Low

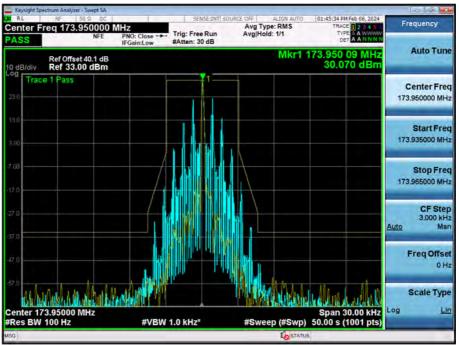






(162.05 MHz)\_ Low

# (173.95 MHz)\_Low





# 8.7 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-E 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 time base 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<sub>1</sub> and t<sub>2</sub>, and shall also remain within limits following t<sub>2</sub>.
- 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.

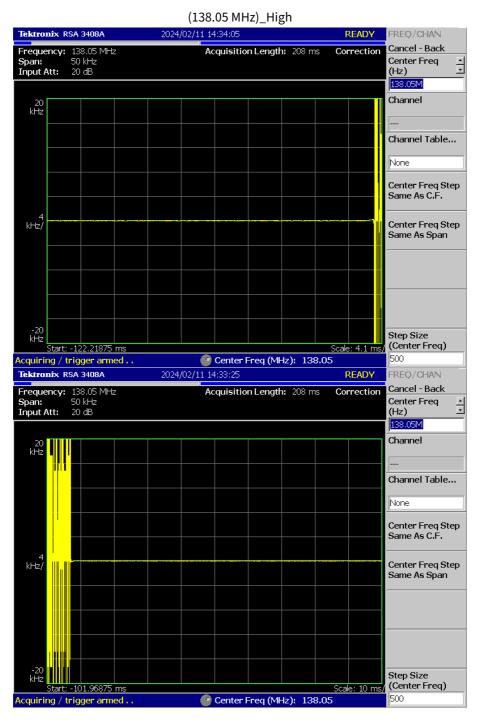


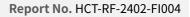
- Adjust the display of the modulation domain analyzer for proper viewing of the transmitter transient behavior. Set the time base reference to the right for observing the transmitter turn-off transient.
- l) Unkey the transmitter.
- m) Observe the stored display of the modulation domain analyzer. The signal trace shall be maintained within the allowable limits during the period t<sub>3</sub>.



# Plots of Transient Frequency Behavior

# 16K0F3E

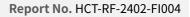






Tektronix F	RSA 3408A		2024,	/02/11 14	1:35:43				Ready	FREQ/CHAN
Frequency:		Z		Ac	quisitio	n Length	<b>1:</b> 208 m	is Co	rrection	Cancel - Back
Span:	50 kHz									Center Freq (Hz)
Input Att:	20 dB									<u></u>
										150.05M
20 kHz										Channel
kHz										
										Channel Table
										None
										INONE
										Center Freq Step
									<u> </u>	Same As C.F.
4 kHz/			·····		~_~~					Center Freq Step
										Same As Span
									<b>.</b>	
-20 kHz										Step Size
	-129.046875	5 mc							e: 4.1 ms/	/- · - ·
Acquiring / 1					Center I	Frea (MH	Hz): 150		5, <del>4</del> ,1 ms/	500
Tektronix F			2024	/02/11 14					READY	FREQ/CHAN
		_	2021,							Cancel - Back
Frequency: Span:	150.05 MHz 50 kHz	<u> </u>		AC	quisitio	ri Lengu	<b>1:</b> 208 m	is Co	rrection	Center Freq
Input Att:	20 dB									(Hz) 🖸
										150.05M
20										Channel
20 kHz										
										Channel Table
										None
										Center Freq Step
										Same As C.F.
4										Center Freq Step
										Same As Span
-20 kHz										Chan Cinc
kHz 🚺	-98.203125								0212	Step Size (Center Freq)
Acquiring / t					Center	Fred (ML			20313 ms/	500
nequining /	angger anni	curr		$\neg$	Senter I	red (ivil	12)- 100	5.05		

(150.05 MHz)\_High





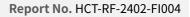
Tektronix RSA 3408A	2024/02/11 14:37:13	READY FREQ/CHAN
Frequency: 162.05 MHz	Acquisition Length: 208 ms	Correction Cancel - Back
Span: 50 kHz Input Att: 20 dB		Center Freq (Hz)
		162.05M
20 kHz		Channel
кпz		
		Channel Table
		None
		Center Freq Step Same As C.F.
4 kHz/		Center Freq Step Same As Span
-20 kHz		Step Size
KHz       Start: -123.515625 ms		Scale: 4.1 ms/ (Center Freq)
Acquiring / trigger armed	Center Freq (MHz): 162.0	500
Tektronix RSA 3408A	2024/02/11 14:36:23	READY FREQ/CHAN
Frequency: 162.05 MHz Span: 50 kHz	Acquisition Length: 208 ms	Correction Cancel - Back Center Freq
Input Att: 20 dB		(Hz) <u>162.05M</u>
		Channel
20 kHz		Ghanner
		Channel Table
		None
		Center Freq Step
		Same As C.F.
4		
kHz/		Center Freq Step Same As Span
-20 kHz Start: -99.046875 ms		Step Size 9.904688 ms/ (Center Freq)
Acquiring / trigger armed	Scale Center Freq (MHz): 162.0	

(162.05 MHz)\_High



Tektroniy 5	RSA 3408A		2024	/02/11 14	143-25				READY	FREQ/CHAN
			2024)				2020			Cancel - Back
Frequency: Span:	50 kHz	2		AC	quisitio	n Length	: 208 ms	Col	rection	Center Freq 🔄
Input Att:	20 dB									(Hz) <u>⊥</u> 173.95M
										Channel
20 kHz										Channer
										Channel Table
									]	None
										Center Freq Step Same As C.F.
4 ~~~. kHz/	~				~~~~~			·		Center Freq Step Same As Span
-20 kHz										Step Size (Center Freq)
Start: Acquiring / t	-133.28125				Contor	Trog (MI	lz): 173		:: 4.1 ms	500
Tektronix F		eu	2024	/02/11 14		TEQ (MI	2): 173		READY	FREQ/CHAN
			2024)				000			
Frequency: Span: Input Att:	173.95 MH; 50 kHz 20 dB	2		AC	quisitio	n Length	: 208 ms	Col	rection	Center Freq (Hz)
										173.95M
20										Channel
20 kHz										
										]
										Channel Table
										Channel Table
4 kHz/										None Center Freq Step
4 kHz/										None Center Freq Step Same As C.F. Center Freq Step
4 kHz/										None Center Freq Step Same As C.F. Center Freq Step
										None Center Freq Step Same As C.F. Center Freq Step
-20 kHz										None Center Freq Step Same As C.F. Center Freq Step Same As Span
-20 kH2	-92.3125 m				Center	-reg. (ME	S. Iz); 173		3125 ms	None Center Freq Step Same As C.F. Center Freq Step Same As Span

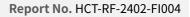
(173.95 MHz)\_High





Tektronix F	RSA 3408A		2024/	/02/11 14	H:38:33			ł	READY	FREQ/CHAN
Frequency:	138.05 MHz	2		Ac	quisitio	n Length	<b>1:</b> 208 m	s Coi	rection	Cancel - Back
Span: Input Att:	50 kHz 20 dB									Center Freq I (Hz)
Input Atti	20 00									138.05M
20										, Channel
20 kHz										
										Channel Table
										None
										<u> </u> ]
										Center Freq Step Same As C.F.
4 kHz/										Center Freq Step
										Same As Span
-20 kHz										Step Size
	<u>-131.5625 n</u>					- 44	1		e: 4.1 ms,	(Center Freq) 500
Acquiring / 1		ed	2024	<u>/</u> 02/11 14		-req (M	Hz): 138		READY	1
			2024)							FREQ/CHAN Cancel - Back
Frequency: Span:	138.05 MHz 50 kHz	-		Ac	quisitio	n Lengtr	<b>1:</b> 208 m	s Coi	rection	Center Freq
Input Att:	20 dB									()
										138.05M
20 kHz										Channel
										Channel Table
										None
										None
										Center Freq Step
										Same As C.F.
4 kHz/										Center Freq Step
- KI 12}										Same As Span
-20 kHz										Step Size
	: -93.78125 n	ns					Sc	ale: 9.37	'8125 ms,	(Center Freq)
Acquiring / t	trigger arm	ed		•	Center I	Freq (M	Hz): 138			500
				9	Center F	Freq (M			8125 MS,	

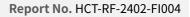
(138.05 MHz)\_Low





Tektronix RSA 3408A	2024/02/11 14:39:58	READY	FREQ/CHAN
Frequency: 150.05 MHz	Acquisition Length: 208 ms	Correction	Cancel - Back
Span: 50 kHz Input Att: 20 dB			Center Freq I (Hz)
			150.05M
20			Channel
20 kHz			
			Channel Table
			None
			Conton Frag Ston
			Center Freq Step Same As C.F.
4 kHz/	<u> </u>		Center Freq Step
			Same As Span
-20			
-20 kHz Start: -120.140625 ms		Scale: 4.1 ms,	Step Size (Center Freq)
Acquiring / trigger armed	Center Freq (MHz): 150.0		500
Tektronix RSA 3408A	2024/02/11 14:39:04	READY	FREQ/CHAN
Frequency: 150.05 MHz	Acquisition Length: 208 ms	Correction	Cancel - Back
Span: 50 kHz Input Att: 20 dB			Center Freq I (Hz)
			150.05M
20 kHz			Channel
kHz III			
			Channel Table
			Channel Table
			None
			Center Freq Step
			Same As C.F.
4			
kHz/			Center Freq Step
			Same As Span
КП27 -20 kHz Start: -100.03125 ms	Center Freq (MHz): 150.0	Scale: 10 ms.	Step Size

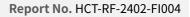
(150.05 MHz)\_ Low





Tektronix RSA 3408A	2024/02/11 14:41:48	READY	FREQ/CHAN
Frequency: 162.05 MHz	Acquisition Length: 208 ms	Correction	Cancel - Back
Span: 50 kHz Input Att: 20 dB			Center Freq 🔥
			162.05M
20			Channel
20 kHz			
			Channel Table
			None
			Center Freq Step
			Same As C.F.
4 kHz/			Center Freq Step Same As Span
-20 kHz			Step Size (Center Freq)
Start: -132.765625 ms Acquiring / trigger armed	Center Freq (MHz): 162.0	Scale: 4.1 ms/	500
Tektronix RSA 3408A	2024/02/11 14:40:39	READY	FREQ/CHAN
			Cancel - Back
Frequency:         162.05 MHz           Span:         50 kHz           Input Att:         20 dB	Acquisition Length: 208 ms	Correction	Center Freq (Hz)
			162.05M
20 kHz			Channel
			Channel Table
			None
			Center Freq Step Same As C.F.
4			Center Freq Step Same As Span
-20			Step Size
-20 kHz Start: -96.203125 ms	Scale	: 9.620313 ms/	Step Size (Center Freq) 500

(162.05 MHz)\_ Low





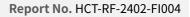
Tektronix RSA 3408A	2024/02/11 14:44:54	READY FREQ/CHAN
Frequency: 173.95 MHz	Acquisition Length: 208 ms	Correction Cancel - Back
Span: 50 kHz		Center Freq (Hz)
Input Att: 20 dB		()
		173.95M
20 kHz		Channel
kHz		
		Channel Table
		blame
		None
		Center Freq Step
		Same As C.F.
4 kHz/	have been and the second se	Center Freq Step
		Same As Span
-20		
-20 kHz		Step Size
Start: -122.4375 ms	Center Freq (MHz): 173.9	
Acquiring / trigger armed		
Tektronix RSA 3408A	2024/02/11 14:43:55	READY FREQ/CHAN
Frequency: 173.95 MHz Span: 50 kHz	Acquisition Length: 208 ms	Correction Cancel - Back Center Freq
Input Att: 20 dB		(Hz)
		173.95M
		Channel
20 kHz		Granner
		Channel Table
		None
		Center Freq Step
		Same As C.F.
4		
kHz/		Center Freq Step Same As Span
		Same As Span
-20		Step Size
-20 kHz Start: -98.1875 ms	Sa	ale: 9.81875 ms/ (Center Freq)
-20 kHz Start: -98.1875 ms Acquiring / trigger armed	Sca Center Freq (MHz): 173.	ale: 9.81875 ms/ (Center Freq)

(173.95 MHz)\_ Low



#### 8K30F1E, 8K30F1D, 8K30F7W

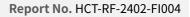
(138.05 MHz)\_High Tektronix RSA 3408A 2024/02/11 14:55:37 READY FREQ/CHAN Frequency:138.05 MHzSpan:50 kHzInput Att:20 dB Cancel - Back Acquisition Length: 208 ms Correction Center Freq -(Hz) 138.05M Channel 10 kHz Channel Table... L None Center Freq Step Same As C.F. 2 kHz/ Center Freq Step Same As Span -10 kHz Step Size (Center Freq) Start: -128.515625 ms 500 Acquiring / trigger armed . . . Center Freq (MHz): 138.05 Tektronix RSA 3408A 2024/02/11 14:55:12 FREQ/CHAN READY Cancel - Back Frequency: 138.05 MHz Span: 50 kHz Input Att: 20 dB Acquisition Length: 208 ms Correction Center Freq • (Hz) 138.05M Channel 10 kHz Channel Table... None Center Freq Step Same As C.F. 2 kHz/ Center Freq Step Same As Span -10 kHz Step Size Scale: 5 ms/ (Center Freq) Start: -90.828125 ms Center Freq (MHz): 138.05 500 Acquiring / trigger armed .





Tektronix R	ISA 3408A	2024/02/11 14:56:28		READY	FREQ/CHAN
Frequency:	150.05 MHz	Acquisition Ler	n <b>gth:</b> 208 ms	Correction	Cancel - Back
Span: Input Att:	50 kHz 20 dB				Center Freq 🔄 (Hz) 🔄
					150.05M
10 kHz					Channel
					Channel Table
					None
					Center Freq Step
					Same As C.F.
2 kHz/					Center Freq Step Same As Span
-10 kHz					Step Size (Center Freq)
	-130.765625 ms trigger armed	🕜 Center Freq	(MHz)+ 150.05	Scale: 5 ms/	500
Tektronix R		2024/02/11 14:56:05	(1112): 130:03	READY	FREQ/CHAN
	150.05 MHz	Acquisition Ler	ath: 208 ms	Correction	Cancel - Back
Span: Input Att:	50 kHz 20 dB	nequisition Est	gan 200 mb	Gorrection	Center Freq 🔺 (Hz) 🗠
					150.05M
10 kHz					Channel
					Channel Table
					None
					Center Freq Step
					Same As C.F.
2  / kHz/					Center Freq Step
					Same As Span
-10 kHz					Step Size
Start:	-88.65625 ms			Scale: 5 ms/	
Acquiring / 1	trigger armed	🕜 Center Freq	(MHz): 150.05		500

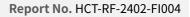
# (150.05 MHz)\_High





Tektronix R	ISA 3408A	2024/	/02/11 14:57:22	/_ 8		READY	FREQ/CHAN
Frequency:	162.05 MHz		Acquisit	ion Length	: 208 ms	Correction	Cancel - Back
Span: Input Att:	50 kHz 20 dB						Center Freq (Hz)
							162.05M
10 kHz							Channel
							Channel Table
							None
							, <u> </u>
							Center Freq Step Same As C.F.
2 . kHz/					·		Center Freq Step Same As Span
							Same As Span
					I		
10							
-10 kHz	-127.90625 ms					Scale: 5 ms	Step Size (Center Freq)
	trigger armed		🕜 Cente	r Freq (MH	lz): 162.0		500
Tektronix R	ISA 3408A	2024/	/02/11 14:56:58			READY	FREQ/CHAN
Frequency:	162.05 MHz		Acquisit	ion Length	<b>:</b> 208 ms	Correction	Cancel - Back Center Freg
Span: Input Att:	50 kHz 20 dB						(Hz) .
							162.05M
10 kHz							Channel
							Channel Table
							None
							Center Freq Step
							Same As C.F.
2 kHz/							Center Freq Step
, , ,							Same As Span
-10 kHz							Step Size
Start:	-88.640625 ms					Scale: 5 ms	(Center Freq)
Acquiring / t	trigger armed	11	Cente	r Freq (MH	iz): 162.0	5	1200

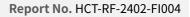
## (162.05 MHz)\_High





Tektronix RSA 3408A	2024/02/11 15:01:12	READY FREQ/CHAN
Frequency: 173.95 MHz	Acquisition Length: 208 ms	Correction Cancel - Back
Span: 50 kHz Input Att: 20 dB		Center Freq (Hz)
		173.95M
10 kHz		Channel
кпz		
		Channel Table
		Shanner rabient
		None
		Center Freq Step
		Same As C.F.
2		
2 kHz/		Center Freq Step Same As Span
		Same As Span
-10 kHz		Step Size
Start: -123.84375 ms Acquiring / trigger armed	Center Freq (MHz): 173.9	Scale: 5 ms/ (Center Freq) 5 500
Tektronix RSA 3408A	2024/02/11 15:00:51	READY FREQ/CHAN
Frequency: 173.95 MHz	Acquisition Length: 208 ms	Correction Cancel - Back
Span: 50 kHz	Acquisition Ecligation 200 mis	Center Freq
Input Att: 20 dB		(Hz) . 173.95M
		Channel
10 kHz		Ghanner
		Channel Table
		None
		Center Freq Step
		Same As C.F.
2 kHz/		Center Freq Step
		Same As Span
-10		
		Stop Sizo
-10 kHz Start: -87,640625 ms		Step Size
kHz Start: -87.640625 ms Acquiring / trigger armed	Center Freq (MHz): 173.9	Scale: 5 ms/ (Center Freq)

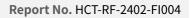
## (173.95 MHz)\_High





Tektronix RSA 3408A	2024/02/11 14:58:28	READY	FREQ/CHAN
Frequency: 138.05 MHz	Acquisition Length: 208 ms	Correction	Cancel - Back
Span: 50 kHz Input Att: 20 dB			Center Freq (Hz)
			138.05M
10 kHz			Channel
kHz			
			Channel Table
			Ghanner rabiem
			None
			Center Freq Step
			Same As C.F.
2 kHz/			
kHz/			Center Freq Step Same As Span
			·
-10			Step Size
kHz		Scale: 5 ms,	(Center Freq)
Acquiring / trigger arme			500
Tektronix RSA 3408A	2024/02/11 14:57:57	READY	FREQ/CHAN
Frequency: 138.05 MHz Span: 50 kHz	Acquisition Length: 208 ms	Correction	Cancel - Back Center Freq
Input Att: 20 dB			(Hz) .
			138.05M
10 kHz			Channel
			Channel Table
			None
			INONE
			Center Freq Step Same As C.F.
			Jame As GF
2 kHz/			Center Freq Step
			Same As Span
-10 kHz			Step Size
Start: -97.890625 r	-	Scale: 5 ms,	(Center Freq) 500
Acquiring / trigger arme			

## (138.05 MHz)\_Low

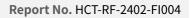




Tektronix R	RSA 3408A	2024/02/11 14:59:11	READY	FREQ/CHAN
Frequency:	150.05 MHz	Acquisition Length: 208 ms	Correction	Cancel - Back
Span: Input Att:	50 kHz 20 dB			Center Freq (Hz)
				150.05M
10 kHz				Channel
				Channel Table
				None
				Center Freq Step Same As C.F.
2 kHz/				Center Freq Step Same As Span
-10 kHz Start	: -134.328125 ms		Scale: 5 ms/	Step Size (Center Freq)
	trigger armed	🕑 Center Freq (MHz): 150.03		500
Tektronix R		2024/02/11 14:58:50	READY	FREQ/CHAN
Frequency: Span: Input Att:	150.05 MHz 50 kHz 20 dB	Acquisition Length: 208 ms	Correction	Cancel - Back Center Freq (Hz)
				150.05M
10 kHz				Channel
KHZ	<u> </u>			
				Channel Table
				None
				Center Freq Step Same As C.F.
2 kHz/				Center Freq Step Same As Span
-10 kHz				Step Size
Start:	-89.65625 ms	Center Freq (MHz): 150.0	Scale: 5 ms/	(Center Freq)
Acquiring / 1	heigen ownood			0000

## (150.05 MHz)\_ Low

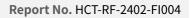
F-TP22-03 (Rev. 05)





Tektronix R	SA 3408A	2024/02/11 15:00:08	READY	FREQ/CHAN
Frequency:	162.05 MHz	Acquisition Length: 208 ms	Correction	Cancel - Back
Span: Input Att:	50 kHz 20 dB			Center Freq (Hz)
				162.05M
10 kHz				Channel
				Channel Table
				None
				Center Freq Step Same As C.F.
2 kHz/				Center Freq Step Same As Span
-10 kHz Start:	-135.84375 ms		Scale: 5 ms/	Step Size (Center Freq)
	trigger armed	Center Freq (MHz): 162.0		500
Tektronix R	SA 3408A	2024/02/11 14:59:41	READY	FREQ/CHAN
Frequency: Span: Input Att:	162.05 MHz 50 kHz 20 dB	Acquisition Length: 208 ms	Correction	Cancel - Back Center Freq 🛕 (Hz)
				162.05M
10 kHz				Channel
				Channel Table
				None
				Center Freq Step Same As C.F.
2 kHz/				Center Freq Step Same As Span
-10 kHz				Step Size
	-98.515625 ms trigger armed	🕑 Center Freq (MHz): 162.0	Scale: 5 ms/	(Center Freq) 500
Acquiring				

(162.05 MHz)\_ Low





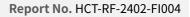
Tektronix RSA 3408A	2024/02/11 15:02:16	READY FREQ/CHAN
Frequency: 173.95 MHz	Acquisition Length: 208 ms	Correction Cancel - Back
Span: 50 kHz Input Att: 20 dB		Center Freq (Hz)
		173.95M
10 kHz		Channel
kHz		
		Channel Table
		None
		Center Freq Step Same As C.F.
2 kHz/		Center Freq Step Same As Span
		Same As Span
-10 kHz		Step Size
Start: -121.15625 ms Acquiring / trigger armed	Center Freq (MHz): 173.	Scale: 5 ms/ (Center Freq) 500
Tektronix RSA 3408A	2024/02/11 15:01:48	READY FREQ/CHAN
Frequency: 173.95 MHz	Acquisition Length: 208 ms	Correction Cancel - Back
Span: 50 kHz Input Att: 20 dB		Center Freq (Hz)
		173.95M
10 kHz		Channel
kHz		
		Channel Table
		None
		Center Freq Step
		Same As C.F.
2		Center Freq Step
		Same As Span
-10		
kHz		Step Size Scale: 5 ms/ (Center Freq)
Acquiring / trigger armed	Center Freq (MHz): 173.	

(173.95 MHz)\_ Low



## 4K00F1E, 4K00F1D, 4K00F7W

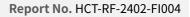
(138.05 MHz)\_High Tektronix RSA 3408A 2024/02/11 15:05:08 READY FREQ/CHAN Frequency:138.05 MHzSpan:20 kHzInput Att:20 dB Cancel - Back Acquisition Length: 520 ms Correction Center Freq -(Hz) 138.05M Channel 4 kHz Channel Table... None Center Freq Step Same As C.F. 800 Hz/ Center Freq Step Same As Span -4 kHz Step Size (Center Freq) Start: -312.265625 ms Scale: 10 ms/ 200 Center Freq (MHz): 138.05 Acquiring / trigger armed . 2024/02/11 15:04:22 Tektronix RSA 3408A FREQ/CHAN READY Frequency: 138.05 MHz Span: 20 kHz Input Att: 20 dB Acquisition Length: 520 ms Cancel - Back Correction Center Freq (Hz) • 138.05M Channel 4 kHz Channel Table... None Center Freq Step Same As C.F. 800 Hz/ Center Freq Step Same As Span Step Size Scale: 10 ms/ (Center Freq) kHz Start: -236.796875 ms Center Freq (MHz): 138.05 200 Acquiring / trigger armed . . .





Tektronix	RSA 3408A		2024,	/02/11 15	5:07:00				READY	FREQ/CHAN
Frequency	150.05 MHz	2		Ac	quisitio	n Length	<b>1:</b> 520 m	is Co	rrectio	n Cancel - Back
Span: Input Att:	20 kHz 20 dB									Center Freq (Hz)
										150.05M
4 kHz										Channel
kHz										
										Channel Table
										None
										Center Freq Step
										Same As C.F.
800 Hz/									╏╹	Center Freq Step
										Same As Span
-4 kHz										Step Size s/ (Center Freq)
	:: -311.171875 trigger armo				Center I	rea (M	Hz): 150		le: 10 n	200
Tektronix		carr	2024	/02/11 15		104(11	12,11 10		READY	FREO/CHAN
	150.05 MHz	2				n Longtk	<b>n:</b> 520 m		rrectio	
Span: Input Att:	20 kHz 20 dB				quisitio	n Lengu	<b>n</b> 320 m	6 00	rrectio	Center Freq (Hz)
										150.05M
4 kHz										Channel
										Channel Table
										None
										Conton Enge Otor
										Center Freq Step Same As C.F.
800 Hz/	<mark>   </mark> ,							<u> </u>		Center Freq Step
- 12)										Same As Span
-4 kHz										Step Size
	: -231.835938				Conterr		1-1-1-54		le: 10 n	15/ (Center Freq)
Acquiring /	trigger arm	ed		- V	Center	req (M	Hz): 150	0.05		200

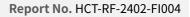
(150.05 MHz)\_High





Tektronix RSA 3408A	2024/02/11 15:07:56	READY	FREQ/CHAN
Frequency: 162.05 MHz	Acquisition Length: 520 ms	Correction	Cancel - Back
Span: 20 kHz Input Att: 20 dB			Center Freq (Hz)
			162.05M
4 kHz			Channel
			Channel Table
			None
			Center Freq Step
			Same As C.F.
800 Hz/		<mark>}//// / /</mark>	Center Freq Step
			Same As Span
-4 kHz Start: -308.164063 ms		Scale: 10 ms/	Step Size (Center Freq)
Acquiring / trigger armed	Center Freq (MHz): 162.0		200
Tektronix RSA 3408A	2024/02/11 15:07:32	READY	FREQ/CHAN
Frequency: 162.05 MHz	Acquisition Length: 520 ms	Correction	Cancel - Back
Span: 20 kHz Input Att: 20 dB			Center Freq • (Hz) •
			162.05M
4 kHz			Channel
			Channel Table
			None
			Center Freq Step
			Same As C.F.
800 <b> </b>			Center Freq Step
			Same As Span
-4 kHz Start: -208.242188 ms		Scale: 10 ms/	Step Size (Center Freq)
Acquiring / trigger armed	Center Freq (MHz): 162.0		200
			P

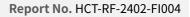
## (162.05 MHz)\_High





Tektronix RSA 3408A	2024/02/11 15:13:07	READY FREQ/CHAN
Frequency: 173.95 MHz	Acquisition Length: 520 ms	Correction Cancel - Back
Span: 20 kHz Input Att: 20 dB		Center Freq (Hz)
		173.95M
4		Channel
kHz .		
		Channel Table
		None
		Center Freq Step Same As C.F.
800		Center Freq Step Same As Span
-4		Step Size
Start: -214.375 ms		Scale: 10 ms/ (Center Freq) 200
Acquiring / trigger armed Tektronix RSA 3408A	Center Freq (MHz): 173. 2024/02/11 15:13:53	READY FREQ/CHAN
		Correction Cancel - Back
Frequency: 173.95 MHz Span: 20 kHz	Acquisition Length: 520 ms	Center Freq
Input Att: 20 dB		(Hz)
4		Channel
4 kHz		
		Channel Table
		Channel Table
		Channel Table
		None Center Freq Step
		None
800		None Center Freq Step Same As C.F.
800 Hz/		None Center Freq Step
800 Hz/		None       Center Freq Step       Same As C.F.       Center Freq Step       Center Freq Step
800 Hz/		None       Center Freq Step       Same As C.F.       Center Freq Step       Center Freq Step
800 Hz/		None       Center Freq Step       Same As C.F.       Center Freq Step       Center Freq Step
800		None       Center Freq Step       Same As C.F.       Center Freq Step       Center Freq Step
-4		None         None         Center Freq Step         Same As C.F.         Center Freq Step         Center Freq Step         Same As Span         Image: Same As Span
		None       Center Freq Step       Same As C.F.       Center Freq Step       Center Freq Step

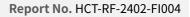
## (173.95 MHz)\_High





Tektronix RSA 3408A 2024/02/11 15:09:12	READY FREQ/CHAN
Frequency: 138.05 MHz Acquisition Le	ength: 520 ms Correction Cancel - Back
Span: 20 kHz Input Att: 20 dB	Center Freq (Hz)
	138.05M
4 kHz	Channel
	Channel Table
	None
	Center Freq Step Same As C.F.
800 Hz/	Center Freq Step
	Same As Span
-4 kHz	Step Size
KHz	Scale: 10 ms/ (Center Freq)
	200 (MHz): 138.05
Tektronix RSA 3408A 2024/02/11 15:08:37	READY FREQ/CHAN
	ength: 520 ms Correction Cancel - Back
Span: 20 kHz Input Att: 20 dB	Center Freq (Hz)
	138.05M
4	Channel
kHz kHz	
	Channel Table
	None
	Center Freq Step Same As C.F.
800 <b></b>	Center Freq Step
	Same As Span
4	Step Size
Start: -234.179688 ms	Scale: 10 ms/         (Center Freq)           (MHz): 138.05         200

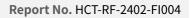
(138.05 MHz)\_Low





Tektronix RSA 3408A	2024/02/11 15:09:58	READY FREQ/CHAN
Frequency: 150.05 MHz	Acquisition Length: 520 ms	Correction Cancel - Back
Span: 20 kHz Input Att: 20 dB		Center Freq (Hz)
		150.05M
4 kHz		Channel
		Channel Table
		None
		Center Freq Step Same As C.F.
800 <b> </b>		Center Freq Step Same As Span
		Same As Span
-4 kHz		Ohar Olar
kHz kHz kHz		Step Size Scale: 10 ms/ (Center Freq)
Acquiring / trigger armed	. Center Freq (MHz): 150.0	
Tektronix RSA 3408A	2024/02/11 15:10:26	READY FREQ/CHAN
Frequency: 150.05 MHz	Acquisition Length: 520 ms	Correction Cancel - Back
Span: 20 kHz Input Att: 20 dB		Center Freq (Hz)
		150.05M
4 kHz		Channel
kHz		
		Channel Table
		None
		Center Freq Step
		Same As C.F.
800		Center Freq Step
		Same As Span
-4 kHz		Step Size
Start: -290.039063 ms		Scale: 10 ms/ (Center Freq)
Acquiring / trigger armed	Center Freq (MHz): 150.0	

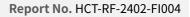
(150.05 MHz)\_ Low





Tektronix F	RSA 3408A	2024/02/11 1	5:12:04		READY	FREQ/CHAN		
Frequency:	162.05 MHz	A	Acquisition Length: 520 ms Correction					
Span: Input Att:	20 kHz 20 dB					Center Freq (Hz)		
						162.05M		
4 kHz						Channel		
КП2								
						Channel Table		
						None		
						J		
						Center Freq Step Same As C.F.		
800 Hz/						Center Freq Step Same As Span		
-4						Step Size		
kHz Start:	: -304.296875 ms				Scale: 10 ms	/- · · · ·		
	trigger armed	. 🕑	Center Freq (M	Hz): 162.0		200		
Tektronix F	RSA 3408A	2024/02/11 1	5:11:28		READY	FREQ/CHAN		
Frequency: Span:	162.05 MHz 20 kHz	A	cquisition Lengt	<b>h:</b> 520 ms	Correction	Cancel - Back Center Freg		
Input Att:	20 dB					Center Freq (Hz)		
4			1	1 1		Channel		
4 kHz								
						Channel Table		
						None		
						Center Freq Step Same As C.F.		
800 Hz/						Center Freq Step		
						Same As Span		
-4 kHz	: -216.484375 ms				Scale: 10 ms,	Step Size (Center Freq)		
	trigger armed	6	Center Freq (M	Hz): <u>162.0</u>		200		
inequiling /								

## (162.05 MHz)\_ Low





Tektronix F	RSA 3408A		2024/02/:	11 15:16:31			READY	FREQ/CHAN
Frequency	173.95 MHz	z		Acquisitio	n Length: 5	520 ms	Correction	Cancel - Back
Span: Input Att:	20 kHz 20 dB							Center Freq (Hz)
								173.95M
4 kHz								Channel
								Channel Table
								None
								Center Freq Step
								Same As C.F.
800 Hz/							1	Center Freq Step Same As Span
-4 kHz								Step Size
	: -315.507812			<b>A O and and</b>	/N 41 1	170.0	Scale: 10 ms	(Center Freq)
Acquiring /		ea	2024/02/		Freq (MHz):	173.9	READY	1
			2024/02/.	11 15:15:36				FREQ/CHAN Cancel - Back
Frequency		7		Acquisitio	n enath <sup>,</sup> 5	20 me		
Span:	173.95 MHz 20 kHz 20 dB				n Eongan o	20 ms	Correction	Center Freq 🔄
	20 kHz 20 dB	-					Correction	Center Freq
Span: Input Att:	20 kHz						Correction	Center Freq A (Hz)
Span:	20 kHz						Correction	Center Freq ▲ (Hz) ✓ 173.95M
Span: Input Att:	20 kHz						Correction	Center Freq ▲ (Hz) ✓ 173.95M
Span: Input Att:	20 kHz						Correction	Center Freq (Hz) 173.95M Channel
Span: Input Att:	20 kHz							Center Freq A (Hz) X 173.95M Channel  Channel Table
Span: Input Att:	20 kHz							Center Freq  (Hz) (T3:95M Channel Channel Table None Center Freq Step
Span: Input Att:	20 kHz							Center Freq (Hz) (Hz) (Hz) Channel Channel Table None Center Freq Step Same As C.F. Center Freq Step
Span: Input Att:	20 kHz							Center Freq (Hz) (Hz) (Hz) Channel Channel Table None Center Freq Step Same As C.F. Center Freq Step
Span: Input Att:	20 kHz							Center Freq (Hz) 173.95M Channel Channel Table None Center Freq Step Same As C.F. Center Freq Step
Span: Input Att:	20 kHz 20 dB							Center Freq (Hz)
Span: Input Att:	20 kHz 20 dB	s			Freq (MHz):		Scale: 10 ms	Center Freq (Hz)

(173.95 MHz)\_ Low

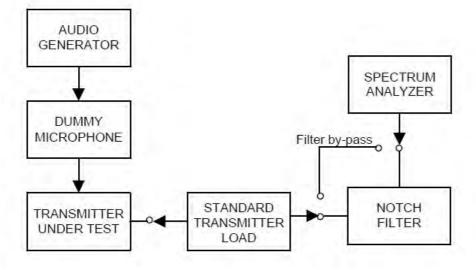


## 8.8 Unwanted Emissions : Conducted Spurious Emission

#### Definition

Conducted spurious emissions are emissions at the antenna terminals on a frequency or frequencies that are outside a band sufficient to ensure transmission of information of required quality for the class of communication desired.

TEST CONFIGURATION



#### TEST PROCEDURE

According to 2.2.13 in TIA-603-E Standard.

- a) Connect the equipment as illustrated, with the notch filter by-passed.
- b) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency, key the transmitter, and set the level of the carrier to the full scale reference line.
- c) 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 modulation circuit.
- d) Adjust the spectrum analyzer for the following settings:
- 1) Resolution Bandwidth = 10 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1 GHz.
- 2) Video Bandwidth  $\geq$ 3 times the resolution bandwidth.
- 3) Sweep Speed  $\leq$  2000 Hz per second.
- 4) Detector Mode = mean or average power.
- e) Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from:
- 1) The lowest radio frequency generated in the equipment to the carrier frequency minus the test bandwidth (see 1.3.4.4).

F-TP22-03 (Rev. 05)



- 2) The carrier frequency plus the test bandwidth to a frequency less than 2 times the carrier frequency.
- f) Record the frequencies and levels of spurious emissions from step e).
- g) Unkey the transmitter. Replace the transmitter under test with the signal generator and adjust the signal level to reproduce the frequencies and levels of every spurious emission recorded in step f). Record the signal generator levels in dBm.
- h) Insert the notch filter.
- i) Adjust the spectrum analyzer for the following settings:
- 1) Resolution Bandwidth = 10 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1 GHz.
- 2) Video Bandwidth  $\geq$  3 times the resolution bandwidth.
- 3) Sweep Speed  $\leq$  2000 Hz per second.
- 4) Detector Mode = mean or average power.
- j) Key the transmitter. Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from a frequency equal to 2 times the carrier frequency and to the tenth harmonic of the carrier frequency.



#### TEST RESULTS

Type of Emission	Test Frequency (MHz)	Measured Frequency (MHz)	Resilt (dBm)	Limit (dBm)	Margin (dB)
		0.01	-68.348	-13.000	55.348
	120.05	29.69	-65.434	-13.000	52.434
	138.05	276.11	-51.867	-13.000	38.867
		3755.94	-39.029	-13.000	26.029
		0.01	-70.365	-13.000	57.365
	150.05	26.10	-64.321	-13.000	51.321
	150.05	300.08	-50.139	-13.000	37.139
100000		3765.39	-37.588	-13.000	24.588
16K0F3E		0.01	-69.268	-13.000	56.268
	102.05	0.80	-65.412	-13.000	52.412
	162.05	730.41	-54.570	-13.000	41.570
		3788.79	-38.297	-13.000	25.297
		0.01	-69.207	-13.000	56.207
	172.05	0.17	-64.572	-13.000	51.572
	173.95	347.90	-53.677	-13.000	40.677
		3761.79	-38.088	-13.000	25.088

Type of Emission	Test Frequency (MHz)	Measured Frequency (MHz)	Resilt (dBm)	Limit (dBm)	Margin (dB)
		0.02	-68.921	-20.000	48.921
	120.05	1.44	-63.157	-20.000	43.157
	138.05	276.11	-50.858	-20.000	30.858
		4901.25	-39.023	-20.000	19.023
		0.01	-69.145	-20.000	49.145
	150.05	0.26	-63.627	-20.000	43.627
	150.05	300.08	-49.874	-20.000	29.874
11//0525		3797.34	-38.618	-20.000	18.618
11K0F3E		0.01	-69.873	-20.000	49.873
	102.05	0.32	-65.200	-20.000	45.200
	162.05	486.14	-52.092	-20.000	32.092
		4920.15	-38.954	-20.000	18.954
		0.01	-68.227	-20.000	48.227
	172.05	0.27	-64.463	-20.000	44.463
	173.95	347.90	-53.517	-20.000	33.517
		3791.94	-38.304	-20.000	18.304



Type of Emission	Test Frequency (MHz)	Measured Frequency (MHz)	Resilt (dBm)	Limit (dBm)	Margin (dB)
		0.01	-68.318	-20.000	48.318
	120.05	18.92	-64.739	-20.000	44.739
	138.05	276.11	-53.761	-20.000	33.761
		3815.79	-39.214	-20.000	19.214
		0.01	-68.291	-20.000	48.291
	150.05	24.13	-63.151	-20.000	43.151
	150.05	300.08	-50.800	-20.000	30.800
8K30F1E,		4920.15	-38.000	-20.000	18.000
8K30F1D,		0.01	-64.137	-20.000	44.137
8K30F7W	162.05	0.18	-63.876	-20.000	43.876
	162.05	486.14	-50.711	-20.000	30.711
		4930.05	-38.881	-20.000	18.881
		0.01	-66.424	-20.000	46.424
	172.05	20.36	-64.496	-20.000	44.496
	173.95	793.08	-52.830	-20.000	32.830
		4062.40	-38.233	-20.000	18.233

Type of Emission	Test Frequency (MHz)	Measured Frequency (MHz)	Resilt (dBm)	Limit (dBm)	Margin (dB)
		0.01	-66.616	-25.000	41.616
	120.05	20.36	-64.391	-25.000	39.391
	138.05	276.11	-52.719	-25.000	27.719
		3801.84	-37.831	-25.000	12.831
		0.01	-67.198	-25.000	42.198
	150.05	0.33	-63.906	-25.000	38.906
4//00515	150.05	300.08	-50.926	-25.000	25.926
4K00F1E,		4068.70	-38.428	-25.000	13.428
4K00F1D,		0.01	-66.712	-25.000	41.712
4K00F7W	162.05	3.05	-64.115	-25.000	39.115
	162.05	486.14	-51.786	-25.000	26.786
		3770.79	-38.420	-25.000	13.420
		0.01	-67.686	-25.000	42.686
	172.05	4.84	-64.785	-25.000	39.785
	173.95	347.90	-53.208	-25.000	28.208
		3800.04	-38.022	-25.000	13.022

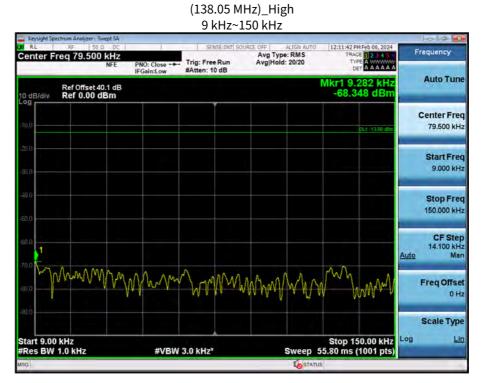


Type of Emission	Test Frequency (MHz)	Measured Frequency (MHz)	Resilt (dBm)	Limit (dBm)	Margin (dB)
		0.01	-68.418	-25.000	43.418
	138.05	0.33	-64.226	-25.000	39.226
		276.11	-52.072	-25.000	27.072
		3797.79	-38.025	-25.000	13.025
		0.01	-68.263	-25.000	43.263
	150.05	4.79	-64.447	-25.000	39.447
	150.05	300.08	-50.198	-25.000	25.198
41400520		3759.99	-39.148	-25.000	14.148
4K00F2D		0.13	-69.275	-25.000	44.275
	102.05	0.20	-64.526	-25.000	39.526
	162.05	324.13	-53.472	-25.000	28.472
		3798.69	-38.329	-25.000	13.329
		0.01	-69.245	-25.000	44.245
	172.05	7.95	-65.182	-25.000	40.182
	173.95	347.90	-52.978	-25.000	27.978
		3730.74	-38.668	-25.000	13.668



Plots of Unwanted Emissions : Conducted Spurious Emission

#### 16K0F3E



#### 150 kHz~30 MHz

Keysight Spectrum	Analyzer - Swept SA							0 9 8	
RL RF Center Freq	15.075000 MHz	NO: Wide Tri	SENSE INT SOU	Avg Type: Avg Hold:		TRAC	4 Feb 06, 2024 E 1 2 3 4 5 E A WWWWWW T A A A A A A	Frequency	
		FGain:Low #A	tten: 10 dB	Auto Tur					
0.0							041 - 13:00 dBm	Center Fre 15.075000 Mi	
0,0								Start Fre 150.000 ki	
0.0								Stop Fr 30.000000 M	
ao ao <mark>bend 1, na</mark>	ially or how all a subscript	ti i nalisti to gel is	hans la stabilitati	հետվենն	witha.	un chial air		CF Sto 2.985000 M <u>Auto</u> M	
0,0					<b>P</b> MMA			Freq Offs 01	
tart 150 kHz						Stop 3	0.00 MHz	Scale Typ	
Res BW 10 k	Hz	#VBW 301	kHz*	8	weep 1		5970 pts)	1	

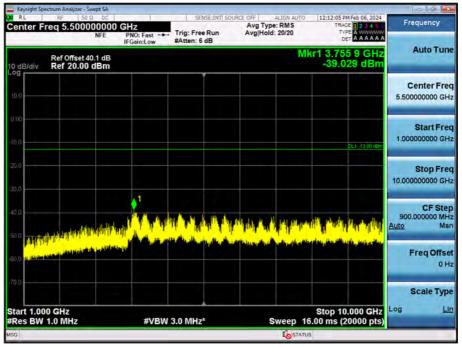
F-TP22-03 (Rev. 05)



00	12:11:58 PM Feb 06, 2024	ALIGN AUTO	T SOURCE OFF	CENCE-TH			RF 50 S	Spectr	leysight R L
Frequency Auto Tune	TRACE 1 2 3 4 5 1 TYPE A WAYNE	Type: RMS Hold: 20/20	Avg		Z PNO: Fast FGain:Low	NFE N		Fre	
	r1 276.11 MHz -51.867 dBm	Mk				0.1 dB	Ref Offset 4 Ref 38.00		dB/di
Center Fre 515.000000 MH							2		
Start Fr 30.000000 M	21.1.1.1.00 (Bm								0
Stop Fr 1.000000000 G		tran terdinti de				1.			0 0 0
CF St 97.000000 M Auto M	<u>alla a finindilatinal</u> Stop 1.0000 GHz 66 ms (10000 pts)	Sweep 46.	ndalaman Maraka	v 300 kHz*	#VB	lalkusi kalen h	GHz 0 KHz	N 1	es B
Freq Offs 0	FUNCTION VALUE	FUNCTION WDTH	FUNCTION	-51.867 dBm 35.133 dBm	11 MHz 07 MHz		f		
Scale Ty Log j									
	1.8	I STATUS		. m				-	_

#### 30 MHz~1 GHz

#### 1 GHz~10 GHz

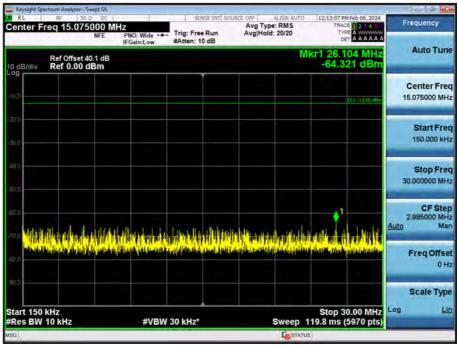




	(2001001)			
	9 kHz~.	150 kHz		
Keysight Spectrum Analyzer - Swept SA			State of the local state of the	0 2 4
X RL RF 50 DC Center Freq 79.500 kHz NFE	PNO: Close Trig: Free Run IFGain:Low #Atten: 10 dB	Avg Type: RMS Avg Hold: 20/20	12:13:01 PM Feb 06, 2024 TRACE 2 3 4 5 TYPE A WANNAW DET A A A A A A	Frequency
Ref Offset 40.1 dB			Mkr1 9.423 kHz -70.365 dBm	Auto Tune
10.0			24.1 - 13.00 dBm	Center Fred 79.500 kH:
200				Start Free 9.000 kH:
40.0				Stop Free 150.000 kH
60 0				CF Step 14.100 kH: Auto Mar
60.0	M Mun Mary	Manny	MM Mum	Freq Offset 0 Hz
90.0 Start 9.00 kHz			0100 100.00 Kinz	Scale Type
#Res BW 1.0 kHz	#VBW 3.0 kHz*	Sweep	55.80 ms (1001 pts)	

(150.05 MHz)\_High

#### 150 kHz~30 MHz

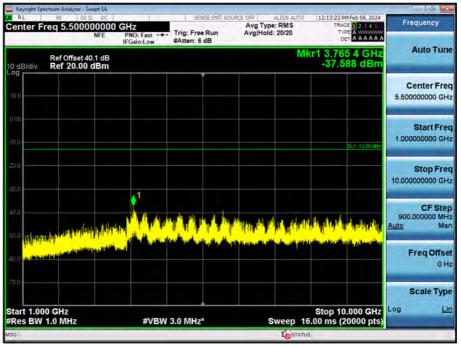




Keysight Spec	trum Analyzer - Sw RF 50 Ω			ri couper are l			0.0
	eq 515.000		1		ALIGN AUTO Type: RMS Hold: 20/20	12:13:15 PM Feb 06, 2024 TRACE 1 2 3 4 5 TYPE A WARA A A A A	Frequency
10 dB/div	Ref Offset 40 Ref 38.00				M	r1 300.08 MHz -50.139 dBm	
- <b>og</b> 25.0 16.0 8.01	¥2						Center Fre 515.000000 MH
200						D(1-1200 @m	Start Fr 30.000000 M
20 20 20		<b>1</b>					Stop Fr 1.000000000 G
tart 0.030 Res BW 1	100 kHz		1 <b>1</b> 1/16 1/16 1/16 1/16 1/16 1/16 1/16 1/	i dan si hadar	Sweep 46	Stop 1.0000 GHz 66 ms (10000 pts)	CF Sto 97.000000 M Auto M
KR MODE TRO		X 300.08 MHz	-50.139 dBm	FUNCTION	FUNCTION WOTH	FUNCTION VALUE	
2 N 1 3 4 5 5		150.00 MHz	33.979 dBm			E	Freq Offs 0
7 8 9							Scale Ty
10						-	Log <u>L</u>
G			in.		Lo STATUS		

#### 30 MHz~1 GHz

#### 1 GHz~10 GHz





	9 kHz~150 kHz								
Keysight Spectrum Analyzer - Swept S4 RL RF 50 Ω D7 Center Freq 79.500 kH NFE	SENSE: INT SO	URCE OFF ALIGN AUTO Avg Type: RMS Avg Hold: 20/20	12:14:14 PM Feb 06, 2024 TRACE 1 2 3 4 5 1 TYPE A	Frequency					
Ref Offset 40.1 dl	В		Mkr1 9.846 kHz -69.268 dBm	Auto Tune					
-19.0			DL1 -13.00 dBm	Center Fre 79.500 kH					
-30.0				Start Free 9.000 kH					
-40.0				Stop Fre 150.000 kH					
60.0				CF Step 14.100 kH Auto Ma					
-70.0 K	Jard Marthan Marthan	MMWWWWW	Martin	Freq Offse 0 H					
900 Start 9.00 kHz			0100 100.00 Kill2	Scale Type					
#Res BW 1.0 kHz	#VBW 3.0 kHz*	Sweep 5	5.80 ms (1001 pts)						

(162.05 MHz)\_High

#### 150 kHz~30 MHz

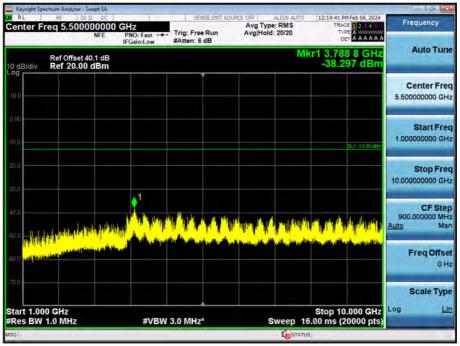
	Feb 06, 2024	12:14:20 PM	ALIGN AUTO	E OFF	NSE:INT SOUR	SE			Analyzer - Swe		RL
Frequency	<b>12345</b> A WWWWWW	TRAC	RMS	Avg Type Avg Hold:	e Run		IO: Wide		15.0750		Cent
Auto Tune	300 kHz 12 dBm	Mkr1 8			0 05	#Atten: 1	sain:Low	1 dB	f Offset 40. f 0.00 dB		0 dB
Center Fre 15.075000 MH	DL1 - 13.00 (84)										.og
Start Fre 150.000 kH											2010 30,0
Stop Fre 30.000000 MH											40.0 50.0
CF Ste 2.985000 MH Auto Ma	alderig	-mile Late	i contente	ende werden in een	i an air	ll a mi dalat	illet hasilit. U		ut natilitiest	1 Huninati Id	80,0 70.0
Freq Offse 0 H			dia anto	MY Philipping	air a frai	Loui Lor				1 APRIL	80.0
Scale Typ											90,0
.og <u>Lin</u>	0.00 MHz 5970 pts)	Stop 30 19.8 ms (	Sweep 1			30 kHz*	#VBW			150 kHz BW 10 I	
		5	STATUS								ISG



00	12:14:34 PM Feb 06, 2024	ALIGN AUTO	T SOURCE OFF	CENCE-TM		SO Q DC	ectrum Ani	Keysight S R L				
Frequency	TRACE 12345 TYPE A WARMAN	Type: RMS fold: 20/20	Avg			5.000000 NFE						
Auto Tu	Ref Offset 40.1 dB Mkr1 730.41 MHz dB/dlv Ref 38.00 dBm -54.570 dBm											
Center Fr 515.000000 M						*2		9 0 0				
Start Fr 30.000000 M	D(1-1200 (Bm							0				
Stop Fr 1.000000000 G								0 0 0				
CF St 97.000000 M Auto M	Stop 1.0000 GHz 66 ms (10000 pts)	Sweep 46.0	illita atdut	w 300 kHz*	fusadh sé itali #VB		300 GH 100 ki					
Auto N	FUNCTION VALUE	FUNCTION WOTH	FUNCTION	Y -54.570 dBm	730.41 MHz	X	RC SCL	MODE				
Freq Offs 0	E			35.551 dBm	162.03 MHz			Ň				
Scale Ty												
	1.1			m				-				
		I STATUS					_					

#### 30 MHz~1 GHz

## 1 GHz~10 GHz





		=/8		
	9 kH:	z~150 kHz		
Keysight Spectrum Analyzer - Swept SA				0 2 2
Center Freq 79.500 kHz	PNO: Close +++ Trig: Free Rur IFGain:Low #Atten: 10 dB	AVG Type: RMS AVg Hold: 20/20	10:45:07 AM Feb 06, 2024 TRACE 2 3 4 5 TYPE A WWWWW DET A A A A A A	Frequency
Ref Offset 40.1 dB			Mkr1 9.000 kHz -69.207 dBm	Auto Tun
19.0			04.1 - 13.00 dBm	Center Free 79.500 kH
200				Start Free 9.000 kH
40.0				Stop Fre 150.000 kH
60.0				CF Stej 14.100 kH Auto Ma
70.0 VWWWMM	april when when when when when when when when	MANNAM	MMMM	Freq Offse 0 H
90.0 Start 9.00 kHz			Stop 150.00 kHz	Scale Type
Res BW 1.0 kHz	#VBW 3.0 kHz*	Sweep	55.80 ms (1001 pts)	1 ······

(173.95 MHz)\_High

#### 150 kHz~30 MHz

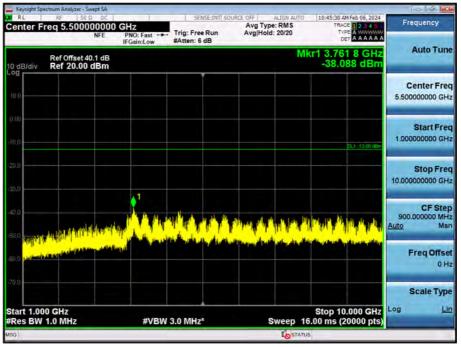
	n Analyzer - Swept SA		I conct of			landra and	4 Feb 06, 2024	0.9
	15.075000 MI	PNO: Wide	Trig: Free Run		ALIGN AUTO pe: RMS Id: 20/20	TRAC	E 2 3 4 5 E A MMMMM T A A A A A A	Frequency
10 dB/div Re	ef Offset 40.1 dB ef 0.00 dBm	IFGain:Low	#Atten: 10 dB			Mkr1	170 kHz 72 dBm	Auto Tun
-og -19.0							0L1 - 13.00 dBm	Center Fre 15.075000 MH
200								Start Fre 150.000 kH
40.0								Stop Fre 30.000000 MH
60.0 <b>1</b>	lindin on de	us set s to d Wideball	الالالية الم	e turio usolde dus	and the second	a Hili aita	dan .	CF Ste 2.985000 MH Auto Ma
0.08								Freq Offse 0 H
90,0								Scale Typ
Res BW 10		#VBW	30 kHz*		Sweep 1	Stop 3 19.8 ms (	0.00 MHz 5970 pts)	Log <u>Li</u>
SG					To STATUS			J



0.9	10:45:23 AM Feb 06, 2024	ALIGN AUTO	T SOURCE OFF	SENSEIIN		or - Swept SA	trum Analyz RF	ght Spec	Keysi RL
Frequency	TYPE A WWWW	Type: RMS Hold: 20/20	Avg		PNO: Fast - IFGain:Low	000000 N	eq 515	er Fr	ente
Auto Tur	r1 347.90 MHz -53.677 dBm	Mk				et 40.1 dB .00 dBm		div	) dB/
Center Fre 515.000000 Mi						2			og 15-0 18-0 18-0
Start Fr 30,000000 M	DL1-1200 (Bm								.00 20
Stop Fr 1.000000000 G					• <sup>1</sup>				20 20 20
CF St 97.000000 M Auto M	<mark>56194961818646566687</mark> Stop 1.0000 GHz 66 ms (10000 pts)		demonstation of	W 300 kHz*	#VB	hat desita ku i	00 GHz 100 kHz		
Auto	FUNCTION VALUE	FUNCTION WIDTH	FUNCTION	Y -53.677 dBm	47.90 MHz	X		DE TRO	
Freq Offs 0				35.301 dBm	73.96 MHz		ŕ		2 3 4 5 5
Scale Ty									7 8 9 9
Log				,m					1
	1.00	STATUS							3

#### 30 MHz~1 GHz

#### 1 GHz~10 GHz





#### (138.05 MHz)\_High 9 kHz~150 kHz Avg Type: RMS Avg Hold: 20/20 eb 06, 202 Frequency Center Freq 79.500 kHz Trig: Free Run #Atten: 10 dB PNO: Close +++ IFGain:Low Auto Tune Mkr1 15.063 kHz -68.921 dBm Ref Offset 40.1 dB Ref 0.00 dBm Center Freq 79.500 kHz Start Freq 9.000 kHz Stop Freq 150.000 kHz CF Step 14.100 kHz Man uto MAMAN mannanan Freq Offset 0 Hz Scale Type Start 9.00 kHz #Res BW 1.0 kHz Stop 150.00 kHz Sweep 55.80 ms (1001 pts) Log Lin #VBW 3.0 kHz\*

11K0F3E

#### 150 kHz~30 MHz

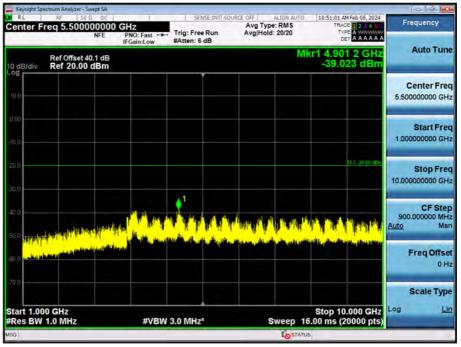
RL	RF 50 S	2 00		SE	NSE:INT SOUR		ALIGN AUTO		4 Feb 06, 2024		equency
Center Fi	req 15.075	NFE	PNO: Wide	Trig: Fre		Avg Type Avg Hold:		TRAC TYP DE			equency
10 dB/div	Ref Offset 40 Ref 0.00 d	0.1 dB					N	Akr1 1.4 -63.1	35 MHz 57 dBm		Auto Tune
.og											enter Fre
2010									064 -20 00 dBm		Start Free 150.000 kH
40.0 50.0										30	Stop Fre
50.0	initalianad.	ile Matin		Alder of Alder	ilas b div lik	An Cal. Ala	h <b>a soli s</b> a al	anai el ildi	Hall alt	Auto <sup>2</sup>	CF Ste 985000 MH Ma
eo.c		- Andrew							alangan da	,	Freq Offse 0 H
90,0											Scale Type
Start 150 Res BW			#VBW	30 kHz*			Sweep 1	Stop 3 19.8 ms (	0.00 MHz 5970 pts)	Log	Li
56						_	I STATUS	1			



0.0	10:50:54 AM Feb 06, 2024	ALIGN AUTO	T SOURCE OFF	CONST. ON			trum Analyzer - S RF 50		Ke
Frequency	TRACE 2 3 4 5 TVPE A WANNA DET A A A A A A	Type: RMS Hold: 20/20	Avg		PNO: Fast -	NFE F	eq 515.00		
Auto Tur	r1 276.11 MHz -50.858 dBm	Mk				0.1 dB	Ref Offset 4 Ref 38.00	iB/div	
Center Fre 515.000000 MH							*2	2 	.0g 26.0 16.0 8.00
Start Fre 30.000000 Mi	D(.1 -2000) (Bit)								
Stop Fr 1.000000000 G						• <sup>1</sup>		-	
CF St 97.000000 M Auto M	Stop 1.0000 GHz 66 ms (10000 pts)		ollabia	indialiliaideadala di W 300 kHz*	يەنتىلىم يىلىر VB'#	an la castribu	00 GHz 100 kHz	rt 0.03 es BW	
-	FUNCTION VALUE	FUNCTION WOTH	FUNCTION	Y -50.858 dBm 35.076 dBm	.11 MHz .07 MHz		f f	MODE TR	KR 1 2
Freq Offs 0									345
Scale Ty									6 7 8 9
Log	-								10
		To STATUS							SG

30 MHz~1 GHz

#### 1 GHz~10 GHz





	9 kHz~	150 kHz		
Keysight Spectrum Analyzer - Swept SA	SENSE: INT	SOURCE OFF ALIGN AUTO	10:52:12 AM Feb 06, 2024	0 9 4
Center Freq 79.500 kHz NFE	PNO: Close Trig: Free Run IFGain:Low #Atten: 10 dB	Avg Type: RMS Avg Hold: 20/20	TRACE 1 2 3 4 5 1 TYPE A WWWWW DET A A A A A A	Frequency
Ref Offset 40.1 dB			Mkr1 9.000 kHz -69.145 dBm	Auto Tun
10.0				Center Fre
200			0L1 -20 00 dBm	79.500 kH
30,0				Start Fre 9.000 kH
40.0				Stop Fre 150.000 kH
50.0 1 70.0 <b>x</b> =				CF Ste 14.100 kH Auto Ma
eoo marin and marine and	wwwwwww	MMMMM	MMM	Freq Offse 0 H
-90,0				Scale Typ
Start 9.00 kHz #Res BW 1.0 kHz	#VBW 3.0 kHz*	Sweep	Stop 150.00 kHz 55.80 ms (1001 pts)	.og <u>Li</u>
KSG		Lo STATU		_

# (150.05 MHz)\_High

#### 150 kHz~30 MHz

RL RL	RF 50 Q			SE	SE:INT SOUR	CE OFF	ALIGN AUTO	10:52:18 A	M Feb 06, 2024		0.9
Center Fi	reg 15.0750		IO: Wide	Trig: Free #Atten: 1	Run	Avg Type Avg Hold:	RMS	TRAC	E 1 2 3 4 5 1	F	requency
0 dB/div	Ref Offset 40.1 Ref 0.00 dB	dB	Juniton						260 kHz 27 dBm		Auto Tun
10.0											Center Fre 5.075000 MH
201) 10,0									0L1-20.09 dBm		Start Fre 150.000 kH
1010										3	Stop Fre
80.0 1	analisist daa	ta İtali. d	histori, data	- 14.4 (14)	Million	alltek (haik)		ah), tah	u halaadda	Auto	CF Ste 2.985000 MH Ma
0.08		a particular	luna (a. ju)				A Mariana		diplosite.		Freq Offse 0 H
90.0 Start 150	147							Stop 3	0.00 MHz	Log	Scale Typ
Res BW			#VBW	30 kHz*		:	Sweep 1	19.8 ms (	5970 pts)	1000	
SG							STATUS			_	

F-TP22-03 (Rev. 05)