FCC Test Report

Report No.: AGC05559241201FR01

FCC ID	:	2AN62-CB606P
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	CB Radio
BRAND NAME	:	Radioddity
MODEL NAME	:	CB-606PRO, CB-606
APPLICANT	:	SAIN3 LLC
DATE OF ISSUE	:	Jan. 10, 2025
STANDARD(S)	:	FCC Part 95 Subpart D
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jan. 10, 2025	Valid	Initial Release

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1. General Information

Applicant	SAIN3 LLC
Address	36 Berkley Drive Newark, DE 19702 United States
Manufacturer	SAIN3 LLC
Address	36 Berkley Drive Newark, DE 19702 United States
Factory	SAIN3 LLC
Address	36 Berkley Drive Newark, DE 19702 United States
Product Designation	CB Radio
Brand Name	Radioddity
Test Model	CB-606PRO
Series Model(s)	CB-606
Difference Description	Only the model name, key style and printing pattern are different.
Date of receipt of test item	Dec. 18, 2024
Date of Test	Dec. 18, 2024~Jan. 10, 2025
Deviation from Standard	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Test Report Form No	AGCER-FCC-CBRS-V1

Note: The test results of this report relate only to the tested sample identified in this report.

Prepared By	Bibo Zhang (Project Engineer)	Jan. 10, 2025
Reviewed By	Calvin Liu (Reviewer)	Jan. 10, 2025
Approved By	Angela Li (Authorized Officer)	Jan. 10, 2025

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2. Product Information

2.1 Product Technical Description

Equipment Type	Citizens' Band (CB) Radio	
Communication Type	Voice / Tone only	
Operation Frequency Range	26.965MHz-27.405MHz	
Hardware Version	PQ824ZA C108484	
Software Version	V1.0	
Modulation Type	AM/FM	
Channel Separation	10kHz	
Emission Designator	8K00A3E/8K00F3E	
Number of Channels:	40 Channels	
Rated Output Power	4W (It was fixed by the manufacturer, any individual can't arbitrarily change it)	
Maximum Transmitter Power	AM:36.008dBm	FM:35.755dBm
Antenna Designation	External Antenna	
Antenna Gain	0dBi (Typical), 3dBi (Max)	
Frequency Tolerance	1.097ppm	
Power Supply	DC 12/24V	

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2.2 Test Frequency List

According to ANSI C63.26 section 5.1.2.1:
Measurements of transmitters shall be performed and, if required, reported for each frequency band in which the EUT can be operated with the device transmitting at the number of frequencies in each band specified in Table 2.

Frequency range Over which EUT operates	Number of Frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

Operation Frequency Each of Channel			
CBRS		CBRS	
Channel	Frequency	Channel	Frequency
1	**26.965 MHz**	21	27.215 MHz
2	26.975 MHz	22	27.225 MHz
3	26.985 MHz	23	27.255 MHz
4	27.005 MHz	24	27.235 MHz
5	27.015 MHz	25	27.245 MHz
6	27.025 MHz	26	27.265 MHz
7	27.035 MHz	27	27.275 MHz
8	27.055 MHz	28	27.285 MHz
9	27.065 MHz	29	27.295 MHz
10	27.075 MHz	30	27.305 MHz
11	27.085 MHz	31	27.315 MHz
12	27.105 MHz	32	27.325 MHz
13	27.115 MHz	33	27.335 MHz
14	27.125 MHz	34	27.345 MHz
15	27.135 MHz	35	27.355 MHz
16	27.155 MHz	36	27.365 MHz
17	27.165 MHz	37	27.375 MHz
18	27.175 MHz	38	27.385 MHz
19	27.185 MHz	39	27.395 MHz
20	**27.205 MHz**	40	**27.405 MHz**

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2.3 Related Submittal(S) / Grant (S)

This submittal(s) (test report) is intended for FCC ID: **2AN62-CB606P,** filing to comply with Part 2, Part 95 of the Federal Communication Commission rules.

2.4 Test Methodology

The tests were performed according to following standards:

No.	Identity	Document Title
1	FCC 47 CFR Part 95	Personal Radio Services
2	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
3	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
4	ANSI EIA/TIA 382-A-1989	Minimum standards – Citizens band radio service amplitude modulated (AM) transceivers operating in the 27MHz band.

2.5 Calculation of Emission Indicators

FCC Rules and Regulations Part 2.202: Necessary Bandwidth and Emission Bandwidth

For AM Mode (Channel Spacing: 10kHz)
Emission Designator 8K00A3E
Bn = 2M, M may vary between 4000 and 10000 depending on the quality desired.
Speech and music, M = 4000, Bandwidth: 8000 Hz= 8 kHz
A3E portion of the designator represents an AM voice transmission.
Therefore, the entire designator for 10 kHz channel spacing AM mode is 8K00A3E.

For FM Mode (Channel Spacing: 10kHz)
Emission Designator 8K00F3E
Bn = 2M, M may vary between 4000 and 10000 depending on the quality desired.
Speech and music, M = 4000, Bandwidth: 8000 Hz= 8 kHz
F3E portion of the designator represents an FM voice transmission.
Therefore, the entire designator for 10 kHz channel spacing FM mode is 8K00F3E.

2.6 Statement-Compliance To §95.977

§95.977 CBRS tone transmissions.
In addition to the tones permitted under §95.377, CBRS transmitter types may be designed to transmit brief tones to indicate the beginning or end of a transmission.

This device is capable of transmitting a brief (less than one second) audio tone, “Roger Beep”, when the PTT button is released on the microphone indicating end of transmission. This function is user selectable and complies with the requirements of §95.377. See User’s Manual .

2.7 Special Accessories

Not available for this EUT intended for grant.

2.8 Equipment Modifications

Not available for this EUT intended for grant.

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3. Test Environment

3.1 Address of The Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to follow CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories.)

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842(CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

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3.3 Environmental Conditions

	Normal Conditions	Extreme Conditions
Temperature range (℃)	15 - 35	-30 - 50
Relative humidty range	20 % - 75 %	20 % - 75 %
Pressure range (kPa)	86 - 106	86 - 106
Power supply	DC 13.2V	LV DC 10.8V/HV DC 15.6V
	DC 26.4V	LV DC 21.6V/HV DC 31.2V
Note: The Extreme Temperature and Extreme Voltages declared by the manufacturer.		

3.4 Measurement Uncertainty

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Test Items	Measurement Uncertainty
Frequency stability	±0.5%
Transmitter power conducted	±0.8dB
Transmitter power Radiated	±1.3dB
Conducted spurious emission 9kHz-40 GHz	±2.7dB
Conducted Emission	±3.2 dB
Radiated Emission below 1GHz	±3.9 dB
Radiated Emission above 1GHz	±4.8 dB
Occupied Channel Bandwidth	±2 %
FM deviation	±2 %
Audio level	±0.98dB
Low Pass Filter Response	±0.65dB
Modulation Limiting	0.42 %
Transient Frequency Behavior	6.8 %

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3.5 List of Equipment Used

● RF Conducted Test System							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-ER-E086	Spectrum Analyzer	KEYSIGHT	N9020A	MY53300860	2024-05-24	2025-05-23
☒	AGC-EM-E002	Wireless Connectivity Tester	HP	8920B	US35010161	2024-05-24	2025-05-23
☐	AGC-ER-E002	Modulation Domain analyzer	HP	53310A	3121A02467	2023-06-06	2025-06-02
☒	AGC-ER-E075	Small Environmental Tester	SH-242	ESPEC	93008290	2024-07-24	2026-07-23
☒	AGC-EM-A007	30dB Attenuator	Weinachel	58-30-33	ML030	2024-05-24	2025-05-23
☒	AGC-EM-E040	Directional coupler	Werlatone	C5571-10	99463	2024-05-24	2025-05-23
☒	--	RF Connection Cable	N/A	1#	N/A	Each time	N/A
☒	--	RF Connection Cable	N/A	2#	N/A	Each time	N/A

● Radiated Spurious Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E046	EMI Test Receiver	R&S	ESCI	10096	2024-02-01	2025-01-31
☒	AGC-EM-E086	Loop Antenna	ZHINAN	ZN30900C	18051	2024-03-05	2026-03-04
☒	AGC-EM-E005	Wideband Antenna	SCHWARZBECK	VULB9168	VULB9168-494	2023-01-05	2025-01-04
☒	AGC-EM-A139	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-01-05	2025-01-04
☒	AGC-EM-A136	Band Pass Filter	SHWHPH	50S	N/A	2023-01-05	2025-01-04

● Test Software					
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Version Information
☒	AGC-EM-S011	RSE Test System	Tonscend	TS^+ Ver2.1(JS36-RSE)	4.0.0.0

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4. System Test Configuration

4.1 EUT Configuration

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

4.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

Table 2-1 Equipment Used in Tested System

4.4 Equipment Used in Tested System

The following peripheral devices and interface cables were connected during the measurement:

☒ Test Accessories Come From The Laboratory

No.	Equipment	Model No.	Manufacturer	Specification Information	Cable
1	Load Antenna	DC-3G	Terminator	DC-3G(50W Max.)	N/A

☒ Test Accessories Come From The Manufacturer

No.	Equipment	Model No.	Manufacturer	Specification Information	Cable
1	Hand microphone	N/A	N/A	N/A	0.8m Unshielded
2	DC Power Line	N/A	N/A	N/A	1.0m Unshielded

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4.5 Summary of Test Results

Item	FCC Rules	Description of Test	Result
1	§ 95.967& 2.1046(a)	Maximum Transmitter Power	Pass
2	§95.975& 2.1047(a) (b)	Modulation Limit	Pass
3	§95.975& 2.1047(a)	Audio Frequency Response	Pass
4	§95.973& 2.1049	Emission Bandwidth	Pass
5	§95.979& 2.1049	Emission Mask	Pass
6	§95.965& 2.1055(a) (1)	Frequency Stability	Pass
7	§95.979& 2.1051	Spurious Emission on Antenna Port	Pass
8	§95.979& 2.1053	Radiated Spurious Emission	Pass

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5. Description of Test Modes

The EUT (**CB Radio**) has been tested under normal operating condition. (CBRS TX) are chosen for testing at each channel separation.

No.	Test Mode Description	Channel Separation
1	CBRS AM TX Channel 00	10.0 kHz
2	CBRS AM TX Channel 20	10.0 kHz
3	CBRS AM TX Channel 40	10.0 kHz
4	CBRS FM TX Channel 00	10.0 kHz
5	CBRS FM TX Channel 20	10.0 kHz
6	CBRS FM TX Channel 40	10.0 kHz

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. Manufacturers use computer PC programming software to switch and operate frequency points, refer to the instructions for details

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6. Frequency Stability

6.1 Provisions Applicable

Standard Applicable [Part 95.963] The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

- The carrier frequency of each CBRS transmitter type must be designed such that the transmit carrier frequency (or in the case of SSB transmissions, the reference frequency) remains within 50 ppm

6.2 Measurement Procedure

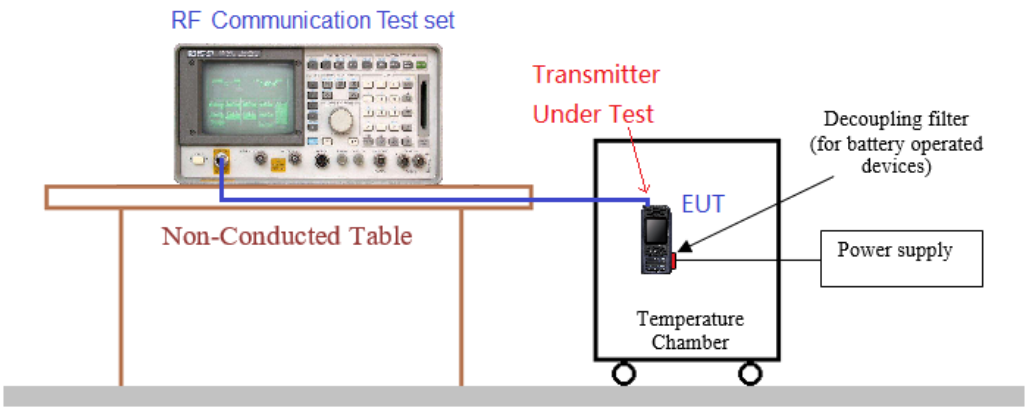
6.2.1 Frequency stability versus environmental temperature

1. Setup the configuration per figure 1 for frequencies measurement inside an environment chamber, Install new battery in the EUT.
2. Turn on EUT and set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1kHz and Video Resolution Bandwidth to 1kHz and Frequency Span to 50kHz.Record this frequency as reference frequency.
3. Set the temperature of chamber to 50℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.
4. Repeat step 2 with a 10℃ decreased per stage until the lowest temperature -30℃ is measured, record all measured frequencies on each temperature step.

6.2.2 Frequency stability versus input voltage

1. Setup the configuration per figure 1 for frequencies measured at temperature if it is within 15℃ to 25℃. Otherwise, an environment chamber set for a temperature of 20℃ shall be used. The EUT should be powered by the normal operating voltage.
2. Set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1 kHz and Video Resolution Bandwidth to 1kHz. Record this frequency as reference frequency.
3. Supply the EUT primary voltage at the operating end point which is specified by manufacturer and record the frequency.

6.3 Measurement Setup



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6.4 Measurement Result

10 kHz Channel Separation, AM modulation, Assigned Frequency For CBRS						
Test conditions		Frequency error (ppm)			Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)				
		26.965MHz	27.205MHz	27.405MHz		
13.2	-30	0.992	0.862	0.621	50	Pass
	-20	0.829	0.731	0.728		
	-10	0.993	0.636	0.899		
	0	0.929	1.018	0.530		
	10	0.546	0.786	0.878		
	20	0.521	0.808	0.903		
	30	0.883	1.038	0.509		
	40	1.017	0.911	0.986		
	50	0.606	0.779	0.745		
10.8	20	0.828	0.811	0.829		
15.6	20	0.921	0.978	0.943		

10 kHz Channel Separation, FM modulation, Assigned Frequency For CBRS						
Test conditions		Frequency error (ppm)			Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)				
		26.965MHz	27.205MHz	27.405MHz		
13.2	-30	0.731	0.811	1.055	50	Pass
	-20	1.039	0.829	0.545		
	-10	0.887	0.567	0.653		
	0	0.738	0.919	0.745		
	10	0.932	0.720	0.785		
	20	0.906	0.525	1.043		
	30	0.899	0.769	0.779		
	40	**1.091**	0.749	0.945		
	50	0.765	0.502	0.775		
10.8	20	0.858	0.929	0.564		
15.6	20	1.055	0.613	0.540		

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10 kHz Channel Separation, AM modulation, Assigned Frequency For CBRS						
Test conditions		Frequency error (ppm)			Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)				
		26.965MHz	27.205MHz	27.405MHz		
26.4	-30	1.066	0.665	0.888	50	Pass
	-20	0.792	0.651	0.996		
	-10	0.506	0.653	0.682		
	0	0.689	0.524	0.710		
	10	0.977	0.714	1.097		
	20	0.960	0.684	0.884		
	30	0.997	0.825	0.928		
	40	1.087	0.698	0.604		
	50	1.064	0.834	1.059		
21.6	20	0.978	0.915	0.834		
31.2	20	1.077	0.806	1.046		

10 kHz Channel Separation, FM modulation, Assigned Frequency For CBRS						
Test conditions		Frequency error (ppm)			Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)				
		26.965MHz	27.205MHz	27.405MHz		
26.4	-30	0.543	0.857	0.540	50	Pass
	-20	0.551	0.767	0.598		
	-10	0.716	0.689	0.638		
	0	0.964	0.960	1.083		
	10	1.030	0.753	0.572		
	20	0.947	0.940	1.013		
	30	0.675	0.997	0.566		
	40	0.632	0.675	0.813		
	50	0.895	1.085	0.785		
21.6	20	0.647	0.653	0.592		
31.2	20	0.853	0.962	1.021		

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7. 26dB Emission Bandwidth and 99% Occupied Bandwidth

7.1 Provisions Applicable

According to standard FCC Part 95.973, FCC Part 2.1049 reference is as follows: Each CBRS transmitter type must be designed such that the occupied bandwidth does not exceed the authorized bandwidth for the emission type under test.

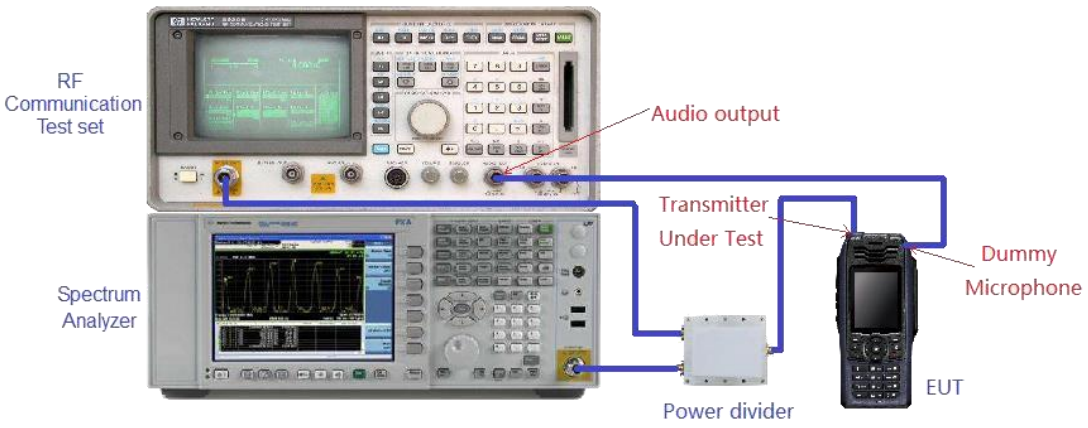
a) AM or FM modulation: the authorized bandwidth for emission type A3E and F3E is 8 kHz.

b) SSB modulation: the authorized bandwidth for emission types J3E, R3E, and H3E is 4 kHz.

7.2 Measurement Procedure

1. Connect the equipment as illustrated
2. The EUT was modulated by 2.5kHz sine wave audio signal; the level of the audio signal employed is 16dB
3. greater than that necessary to produce 50% of rated system deviation.
4. Rated system deviation is 2.5 kHz for 12.5kHz channel spacing).
5. Spectrum set as follow:
6. Centre frequency = the nominal EUT channel center frequency,
7. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products
8. including the emission skirts (typically a span of 1.5 × OBW is sufficient)
9. RBW = 1% to 5% of the anticipated OBW, VBW ≥ 3 × RBW, Sweep = auto, Detector function = peak,
10. Trace = max hold
11. Set 99% Occupied Bandwidth and 26dB Bandwidth
12. Measure and record the results in the test report.

7.3 Measurement Setup



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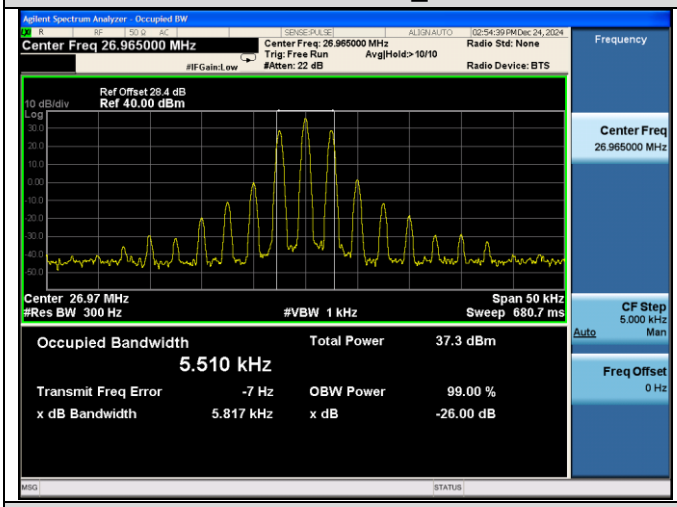
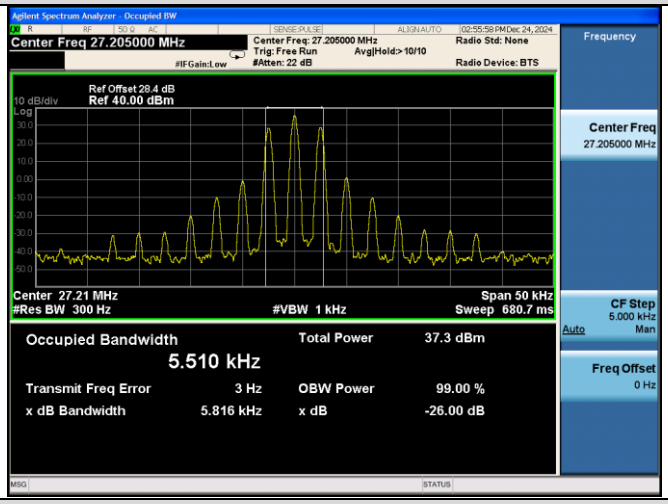
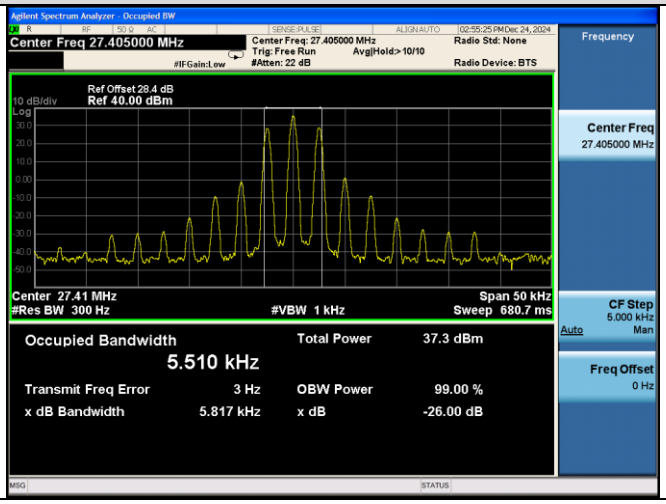
7.4 Measurement Result

- For DC 12V System:

Emission Bandwidth Measurement Result-CBRS				
Operating Frequency (MHz)	10 kHz Channel Separation			
	Occupied Bandwidth (kHz)	Emission Bandwidth (kHz)	Limits (kHz)	Result
26.965	5.510	5.817	8.0	Pass
27.205	5.510	5.816	8.0	Pass
27.405	5.510	5.817	8.0	Pass

Test plot as follows:

10kHz, AM Modulation_26.965MHz	10kHz, AM Modulation_27.205MHz
	
10kHz, AM Modulation_27.405MHz	**/**
	/

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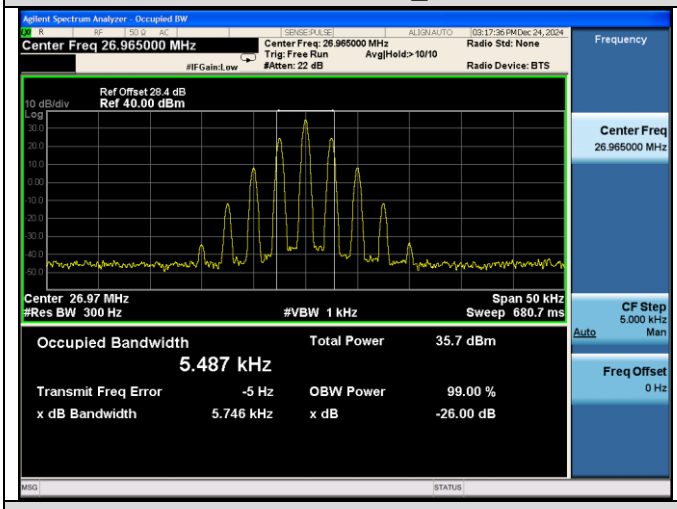
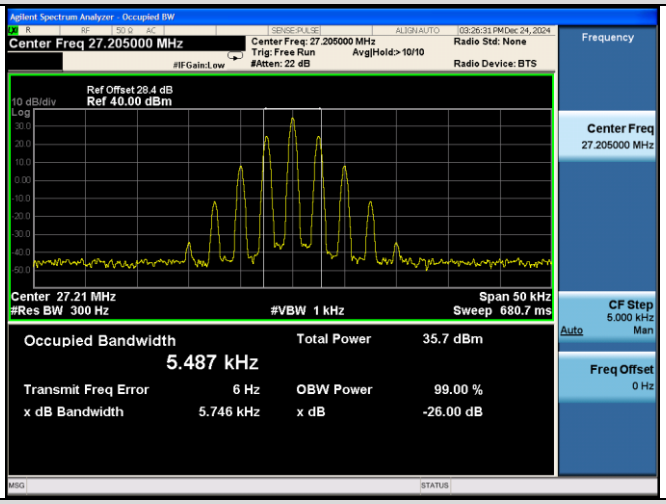
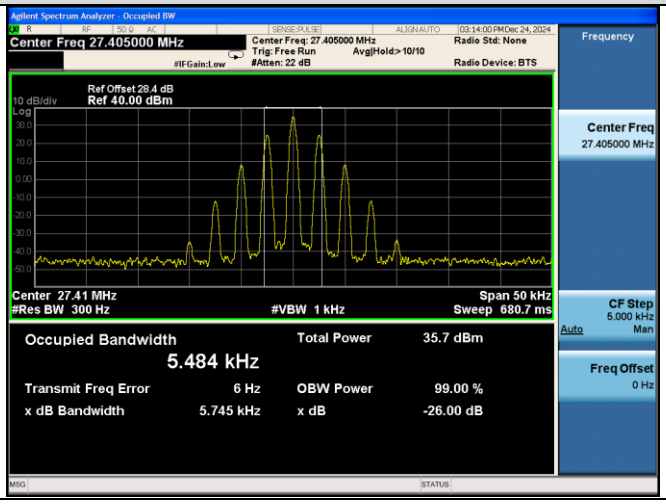
Emission Bandwidth Measurement Result-CBRS				
Operating Frequency (MHz)	10 kHz Channel Separation			
	Occupied Bandwidth (kHz)	Emission Bandwidth (kHz)	Limits (kHz)	Result
26.965	5.487	5.746	8.0	Pass
27.205	5.487	5.746	8.0	Pass
27.405	5.484	5.745	8.0	Pass

Test plot as follows:

10kHz, FM Modulation_26.965MHz	10kHz, FM Modulation_27.205MHz
	
10kHz, FM Modulation_27.405MHz	/
	/

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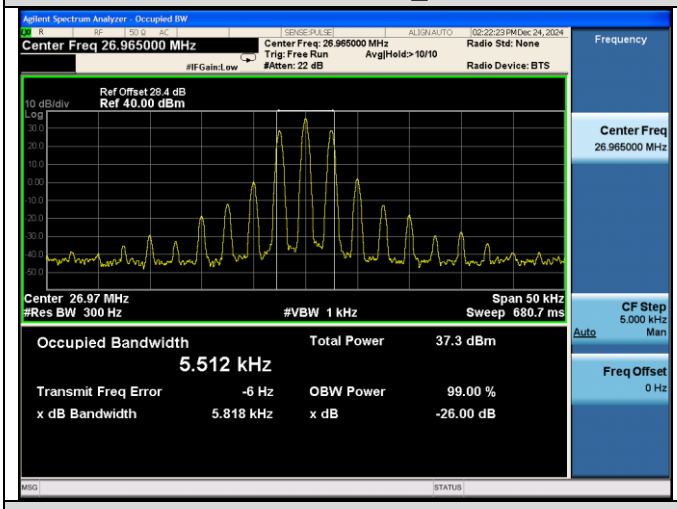
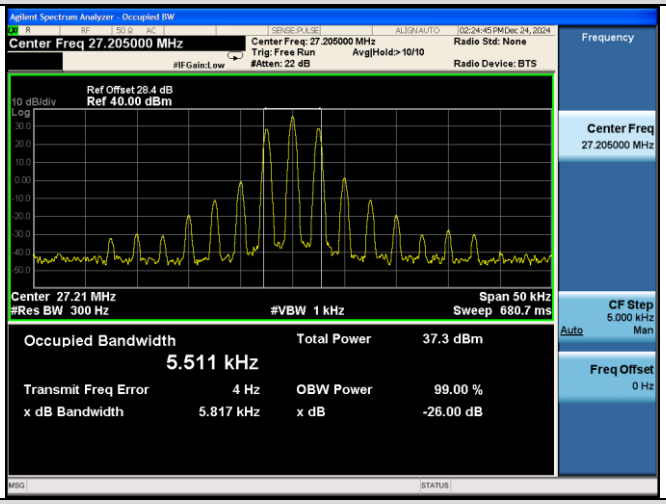
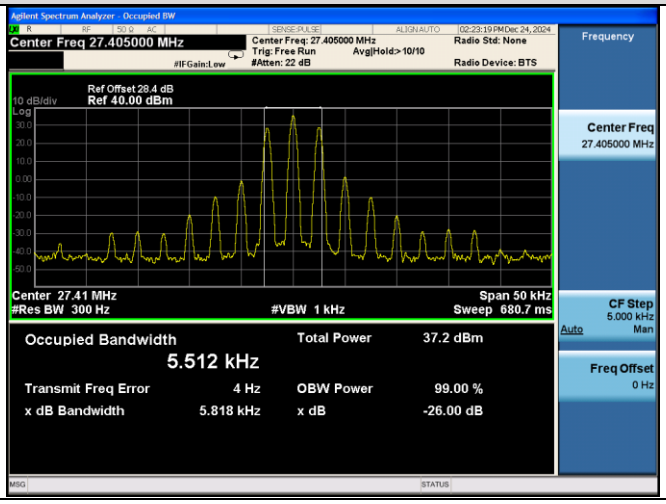
- For DC 24V System:

Emission Bandwidth Measurement Result-CBRS				
Operating Frequency (MHz)	10 kHz Channel Separation			
	Occupied Bandwidth (kHz)	Emission Bandwidth (kHz)	Limits (kHz)	Result
26.965	5.512	5.818	8.0	Pass
27.205	5.511	5.817	8.0	Pass
27.405	5.512	5.818	8.0	Pass

Test plot as follows:

10kHz, AM Modulation_26.965MHz	10kHz, AM Modulation_27.205MHz
	
10kHz, AM Modulation_27.405MHz	/
	/

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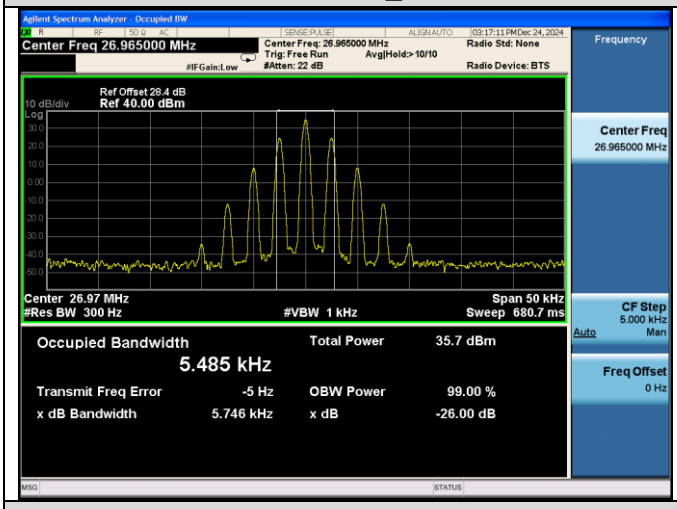
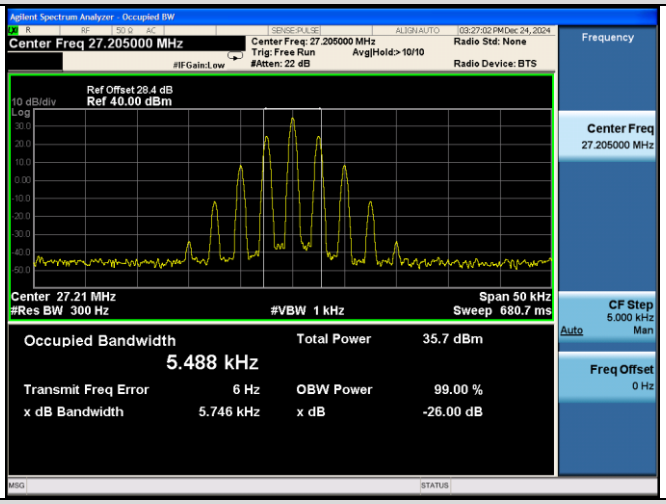
Emission Bandwidth Measurement Result-CBRS				
Operating Frequency (MHz)	10 kHz Channel Separation			
	Occupied Bandwidth (kHz)	Emission Bandwidth (kHz)	Limits (kHz)	Result
26.965 MHz	5.485	5.746	8.0	Pass
27.205 MHz	5.488	5.746	8.0	Pass
27.405 MHz	5.484	5.745	8.0	Pass

Test plot as follows:

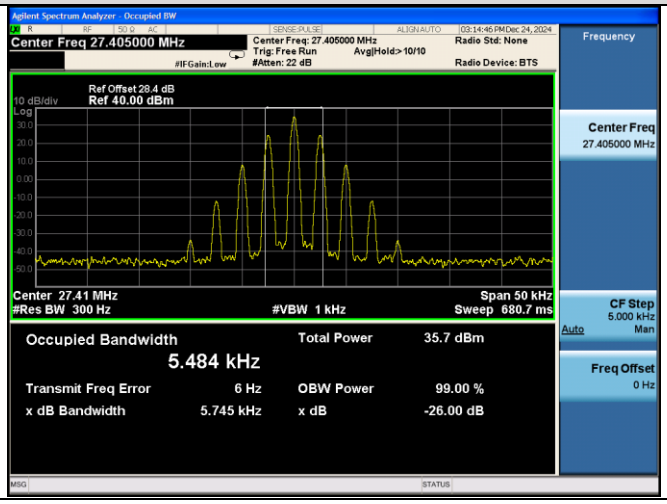
10kHz, FM Modulation_26.965MHz-4W



10kHz, FM Modulation_27.205MHz-4W



10kHz, FM Modulation_27.405MHz-4W



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8. Radiated Spurious Emission and Emission Mask

8.1 Provisions Applicable

According to the standard FCC Part 95.979(a), the requirements of FCC Part 2.1053 are as follows:
Each GMRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section.

- Emission masks. Emission masks applicable to transmitting equipment in the GMRS are defined by the requirements in the following table. The numbers in the attenuation requirements column refer to rule paragraph numbers under paragraph (b) of this section.

Emission Types	Attenuation Requirements
A3E,F3E	(1), (3), (5), (6)
H3E, J3E, R3E	(2), (4), (5), (6)

1) 25 dB (decibels) in the frequency band 4 kHz to 8 kHz removed from the channel center frequency;
2) 25 dB in the frequency band 2 kHz to 6 kHz removed from the channel center frequency;
3) 35 dB in the frequency band 8 kHz to 20 kHz removed from the channel center frequency;
4) 35 dB in the frequency band 6 kHz to 10 kHz removed from the channel center frequency;
5) 53 + 10 log (P) dB in any frequency band removed from the channel center frequency by more than 250% of the authorized bandwidth.
6) 60 dB in any frequency band centered on a harmonic (i.e., an integer multiple of two or more times) of the carrier frequency.

8.2 Measurement Procedure

1) EUT was placed on a 0.8 or 1.5meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made. The radiated emission measurements of all transmit frequencies in all channels were measured with peak detector.
2) A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3) The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz for above 1GHz and RBW=100kHz, VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (Pr).
4) The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the

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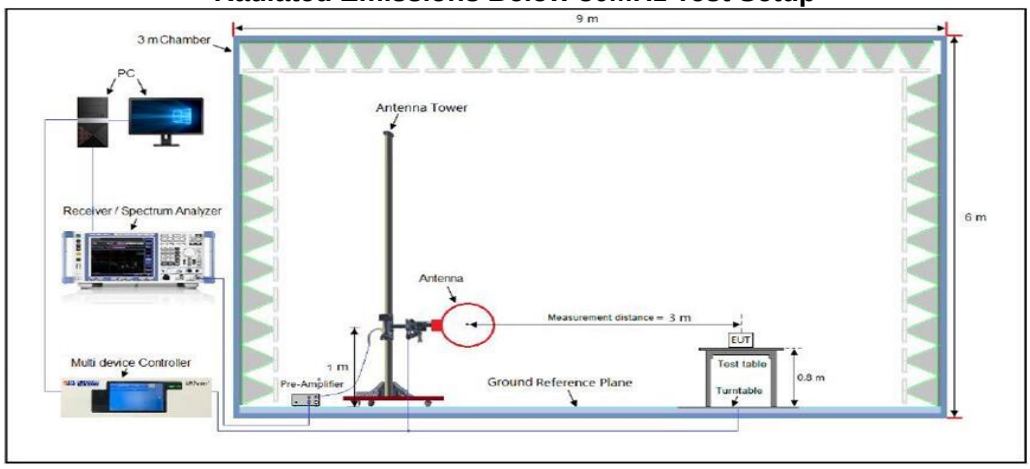
frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

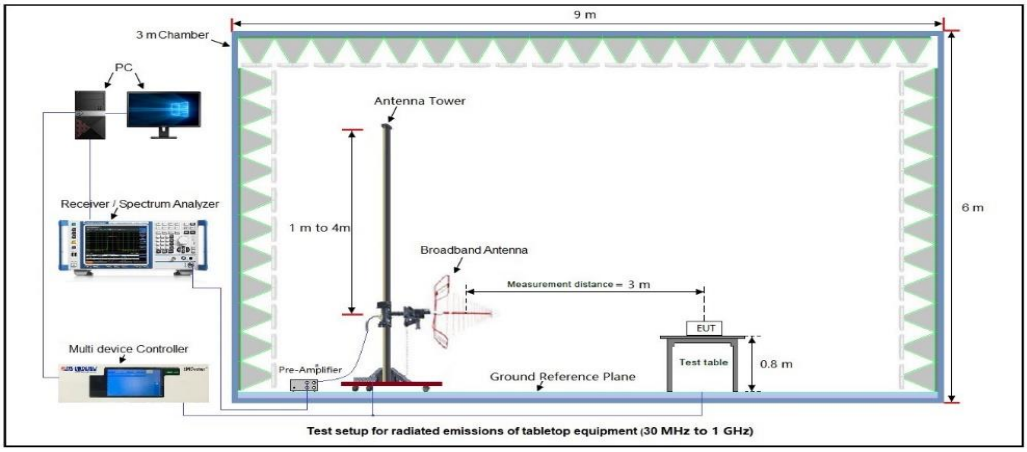
5) A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test
6) The measurement results are obtained as described below: Power(EIRP)=PMea- PAg - Pcl - Ga The measurement results are amend as described below:Power(EIRP)=PMea- Pcl - Ga
7) This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
8) ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.
9) Test the EUT in the lowest channel, the middle channel the Highest channel

8.3 Measurement Setup

Radiated Emissions Below 30MHz Test Setup



Radiated Emissions 30MHz-1000MHz Test Setup



Test setup for radiated emissions of tabletop equipment (30 MHz to 1 GHz)

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8.4 Measurement Result

- The Unwanted spurious emissions limits are as follows:

Attenuation Requirement Results	Reference limit
At least 53+10*log (P) =53+10log*(4W) =59.02 (dB)	Limit=P(dBm)- Preliminary calculation=-23dBm

- The Harmonic emissions spurious limits are as follows:

The maximum power of the measured fundamental frequency drops by at least 60Db

- For DC 12V System:

Test Mode	Measuring Center frequency (MHz)	Maximum Power (dBm)	Reference limit (dBm)
AM	26.965	35.930	-24.07
	27.205	36.008	-23.99
	27.405	35.967	-24.03
FM	26.965	35.664	-24.34
	27.205	35.694	-24.31
	27.405	35.691	-24.31

- For DC 24V System:

Test Mode	Measuring Center frequency (MHz)	Maximum Power (dBm)	Reference limit (dBm)
AM	26.965	35.924	-24.08
	27.205	35.990	-24.01
	27.405	35.970	-24.03
FM	26.965	35.722	-24.28
	27.205	35.755	-24.25
	27.405	35.744	-24.26

There will be accuracy errors when the radiation spurious software reads the harmonic frequency points, which are in correspondence with the harmonic frequency points given by the reference limit. Please ignore them.

- The Radiated Spurious Measurement Parameters are as Follows:

Note 1: Factor=Antenna Factor + Cable loss. (Below 1GHz)
Note 2: Factor=Antenna Factor+ Cable loss -Pre-amplifier. (Above 1 GHz)
Note 3: Margin=Limit- Level
Note 4: Unwanted spurious signals in the 9kHz-30MHz band are below the limit by 20dB and are not recorded.

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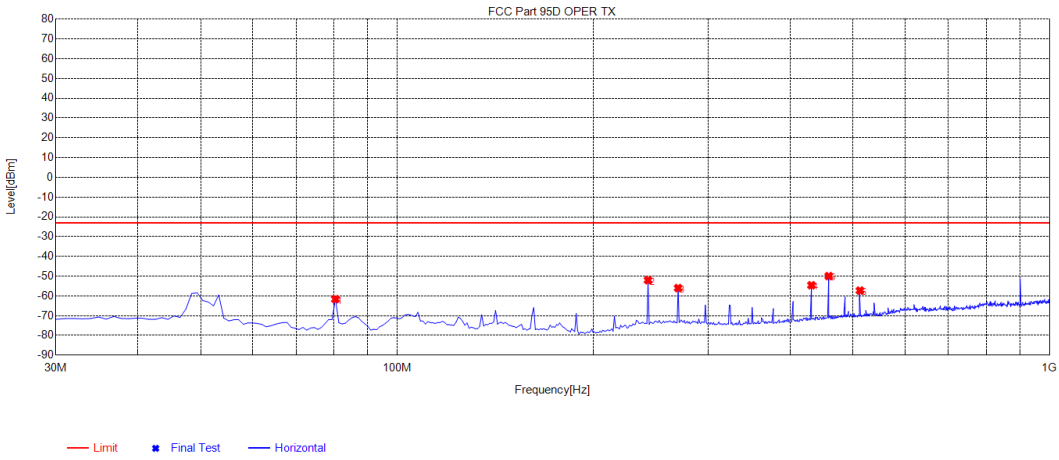
Test Mode	Mode 1	Supply Voltage	DC 12V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	80.44	-85.86	-61.65	-23.00	38.65	24.21	Peak	Horizontal
2	242.43	-79.91	-52.03	-23.00	29.03	27.88	Peak	Horizontal
3	269.59	-84.45	-56.05	-23.00	33.05	28.40	Peak	Horizontal
4	431.58	-85.12	-54.62	-23.00	31.62	30.50	Peak	Horizontal
5	458.74	-81.13	-49.98	-23.00	26.98	31.15	Peak	Horizontal
6	512.09	-89.40	-57.31	-23.00	34.31	32.09	Peak	Horizontal
Test data for Harmonic emissions spurious								
1	80.44	-85.86	-61.65	-24.07	37.58	24.21	Peak	Horizontal
2	242.43	-79.91	-52.03	-24.07	27.96	24.59	Peak	Horizontal
3	269.59	-84.45	-56.05	-24.07	31.98	27.88	Peak	Horizontal
4	431.58	-85.12	-54.62	-24.07	30.55	28.40	Peak	Horizontal
5	458.74	-81.13	-49.98	-24.07	25.91	30.50	Peak	Horizontal
6	512.09	-89.40	-57.31	-24.07	33.24	31.15	Peak	Horizontal

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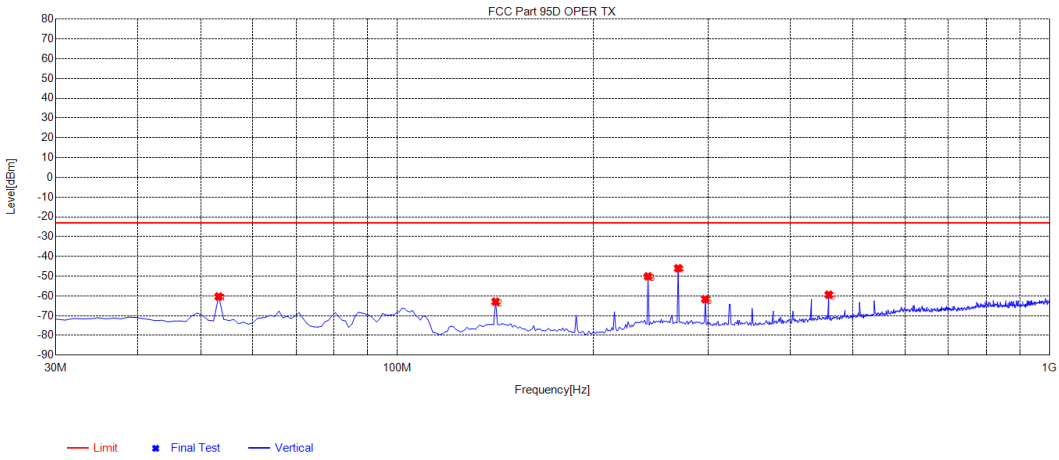
Test Mode	Mode 1	Supply Voltage	DC 12V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	53.28	-88.22	-60.30	-23.00	37.30	27.92	Peak	Vertical
2	141.55	-90.11	-62.93	-23.00	39.93	27.18	Peak	Vertical
3	242.43	-78.00	-50.12	-23.00	27.12	27.88	Peak	Vertical
4	269.59	-74.42	-46.02	-23.00	23.02	28.40	Peak	Vertical
5	296.75	-89.70	-61.66	-23.00	38.66	28.04	Peak	Vertical
6	458.74	-90.55	-59.40	-23.00	36.40	31.15	Peak	Vertical
Test data for Harmonic emissions spurious								
1	53.28	-88.22	-60.30	-24.07	36.23	27.92	Peak	Vertical
2	141.55	-90.11	-62.93	-24.07	38.86	27.18	Peak	Vertical
3	242.43	-78.00	-50.12	-24.07	26.05	27.88	Peak	Vertical
4	269.59	-74.42	-46.02	-24.07	21.95	28.40	Peak	Vertical
5	296.75	-89.70	-61.66	-24.07	37.59	28.04	Peak	Vertical
6	458.74	-90.55	-59.40	-24.07	35.33	31.15	Peak	Vertical

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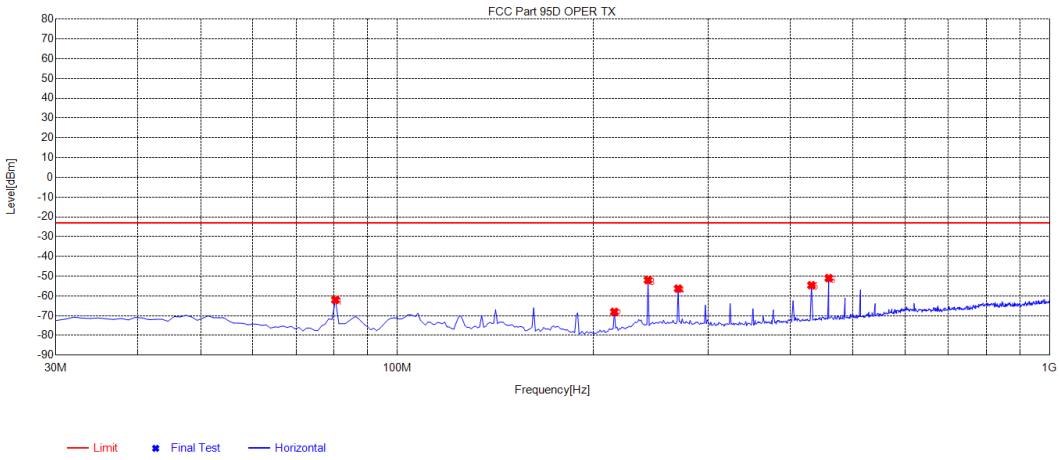
Test Mode	Mode 2	Supply Voltage	DC 12V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	80.44	-86.24	-62.03	-23.00	39.03	24.21	Peak	Horizontal
2	215.27	-93.04	-68.08	-23.00	45.08	24.96	Peak	Horizontal
3	242.43	-79.90	-52.02	-23.00	29.02	27.88	Peak	Horizontal
4	269.59	-84.72	-56.32	-23.00	33.32	28.40	Peak	Horizontal
5	431.58	-85.12	-54.62	-23.00	31.62	30.50	Peak	Horizontal
6	458.74	-82.17	-51.02	-23.00	28.02	31.15	Peak	Horizontal
Test data for Harmonic emissions spurious								
1	80.44	-86.24	-62.03	-23.99	38.04	24.21	Peak	Horizontal
2	215.27	-93.04	-68.08	-23.99	44.09	24.96	Peak	Horizontal
3	242.43	-79.90	-52.02	-23.99	28.03	27.88	Peak	Horizontal
4	269.59	-84.72	-56.32	-23.99	32.33	28.40	Peak	Horizontal
5	431.58	-85.12	-54.62	-23.99	30.63	30.50	Peak	Horizontal
6	458.74	-82.17	-51.02	-23.99	27.03	31.15	Peak	Horizontal

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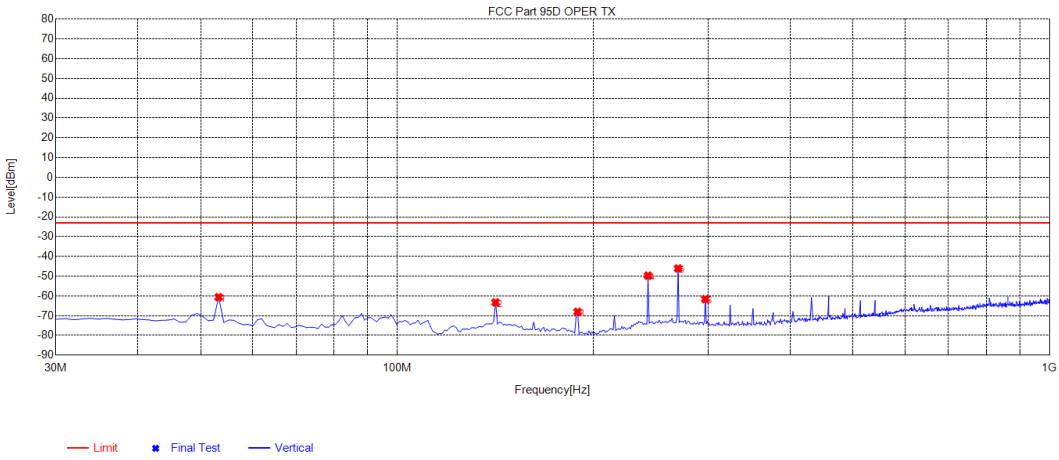
Test Mode	Mode 2	Supply Voltage	DC 12V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	53.28	-88.57	-60.65	-23.00	37.65	27.92	Peak	Vertical
2	141.55	-90.47	-63.29	-23.00	40.29	27.18	Peak	Vertical
3	189.08	-91.36	-68.08	-23.00	45.08	23.28	Peak	Vertical
4	242.43	-77.65	-49.77	-23.00	26.77	27.88	Peak	Vertical
5	269.59	-74.51	-46.11	-23.00	23.11	28.40	Peak	Vertical
6	296.75	-89.67	-61.63	-23.00	38.63	28.04	Peak	Vertical
Test data for Harmonic emissions spurious								
1	53.28	-88.57	-60.65	-23.99	36.66	27.92	Peak	Vertical
2	141.55	-90.47	-63.29	-23.99	39.30	27.18	Peak	Vertical
3	189.08	-91.36	-68.08	-23.99	44.09	23.28	Peak	Vertical
4	242.43	-77.65	-49.77	-23.99	25.78	27.88	Peak	Vertical
5	269.59	-74.51	-46.11	-23.99	22.12	28.40	Peak	Vertical
6	296.75	-89.67	-61.63	-23.99	37.64	28.04	Peak	Vertical

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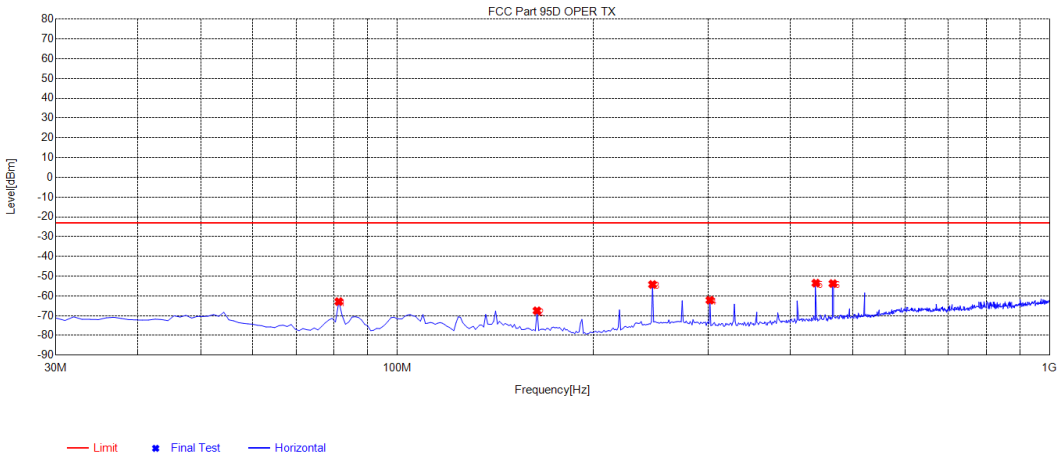
Test Mode	Mode 3	Supply Voltage	DC 12V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	81.41	-86.91	-62.89	-23.00	39.89	24.02	Peak	Horizontal
2	163.86	-92.13	-67.52	-23.00	44.52	24.61	Peak	Horizontal
3	246.31	-82.53	-54.25	-23.00	31.25	28.28	Peak	Horizontal
4	301.6	-90.18	-62.18	-23.00	39.18	28.00	Peak	Horizontal
5	438.37	-84.24	-53.55	-23.00	30.55	30.69	Peak	Horizontal
6	465.53	-85.03	-53.77	-23.00	30.77	31.26	Peak	Horizontal
Test data for Harmonic emissions spurious								
1	81.41	-86.91	-62.89	-24.03	38.86	24.02	Peak	Horizontal
2	163.86	-92.13	-67.52	-24.03	43.49	24.61	Peak	Horizontal
3	246.31	-82.53	-54.25	-24.03	30.22	28.28	Peak	Horizontal
4	301.6	-90.18	-62.18	-24.03	38.15	28.00	Peak	Horizontal
5	438.37	-84.24	-53.55	-24.03	29.52	30.69	Peak	Horizontal
6	465.53	-85.03	-53.77	-24.03	29.74	31.26	Peak	Horizontal

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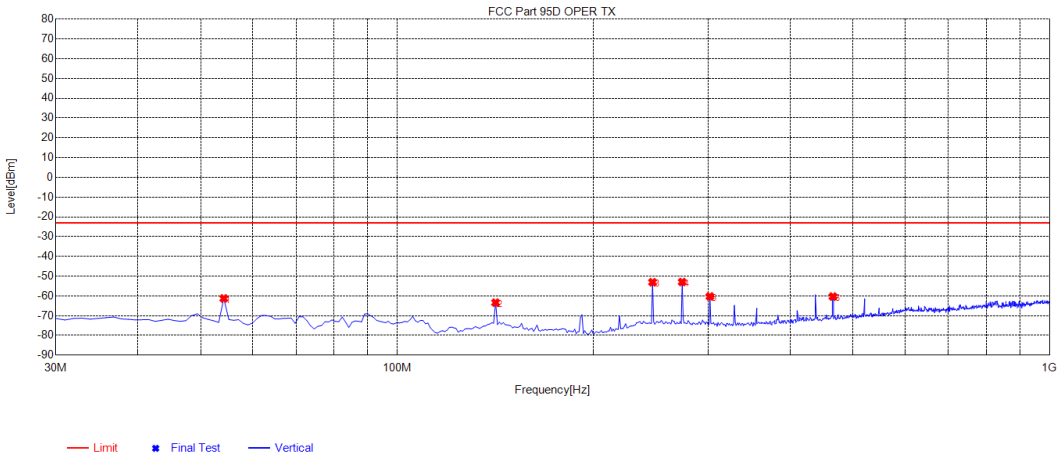
Test Mode	Mode 3	Supply Voltage	DC 12V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	54.25	-88.97	-61.27	-23.00	38.27	27.70	Peak	Vertical
2	141.55	-90.58	-63.40	-23.00	40.40	27.18	Peak	Vertical
3	246.31	-81.37	-53.09	-23.00	30.09	28.28	Peak	Vertical
4	273.47	-81.33	-52.97	-23.00	29.97	28.36	Peak	Vertical
5	301.6	-88.27	-60.27	-23.00	37.27	28.00	Peak	Vertical
6	465.53	-91.58	-60.32	-23.00	37.32	31.26	Peak	Vertical
Test data for Harmonic emissions spurious								
1	54.25	-88.97	-61.27	-24.03	37.24	27.70	Peak	Vertical
2	141.55	-90.58	-63.40	-24.03	39.37	27.18	Peak	Vertical
3	246.31	-81.37	-53.09	-24.03	29.06	28.28	Peak	Vertical
4	273.47	-81.33	-52.97	-24.03	28.94	28.36	Peak	Vertical
5	301.6	-88.27	-60.27	-24.03	36.24	28.00	Peak	Vertical
6	465.53	-91.58	-60.32	-24.03	36.29	31.26	Peak	Vertical

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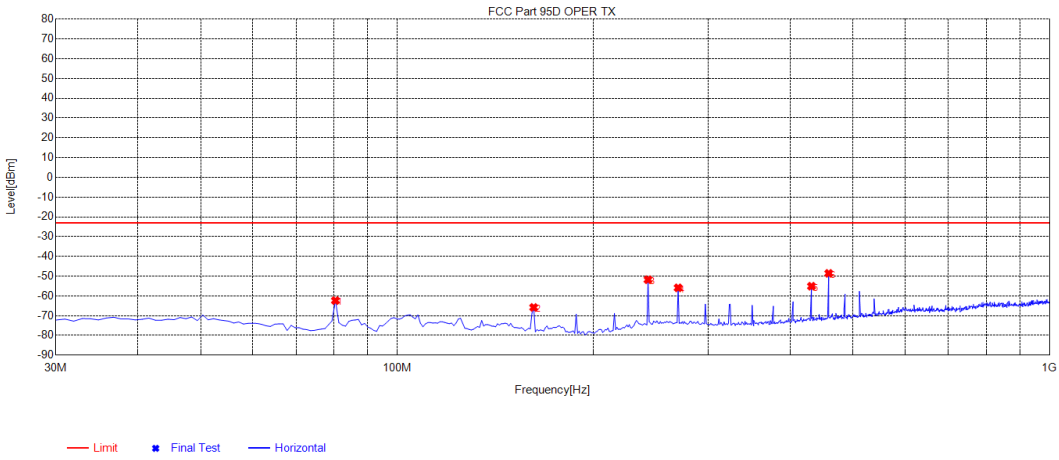
Test Mode	Mode 4	Supply Voltage	DC 12V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	80.44	-86.58	-62.37	-23.00	39.37	24.21	Peak	Horizontal
2	161.92	-90.43	-65.84	-23.00	42.84	24.59	Peak	Horizontal
3	242.43	-79.68	-51.80	-23.00	28.80	27.88	Peak	Horizontal
4	269.59	-84.32	-55.92	-23.00	32.92	28.40	Peak	Horizontal
5	431.58	-85.61	-55.11	-23.00	32.11	30.50	Peak	Horizontal
6	458.74	-79.74	-48.59	-23.00	25.59	31.15	Peak	Horizontal
Test data for Harmonic emissions spurious								
1	80.44	-86.58	-62.37	-24.34	38.03	24.21	Peak	Horizontal
2	161.92	-90.43	-65.84	-24.34	41.50	24.59	Peak	Horizontal
3	242.43	-79.68	-51.80	-24.34	27.46	27.88	Peak	Horizontal
4	269.59	-84.32	-55.92	-24.34	31.58	28.40	Peak	Horizontal
5	431.58	-85.61	-55.11	-24.34	30.77	30.50	Peak	Horizontal
6	458.74	-79.74	-48.59	-24.34	24.25	31.15	Peak	Horizontal

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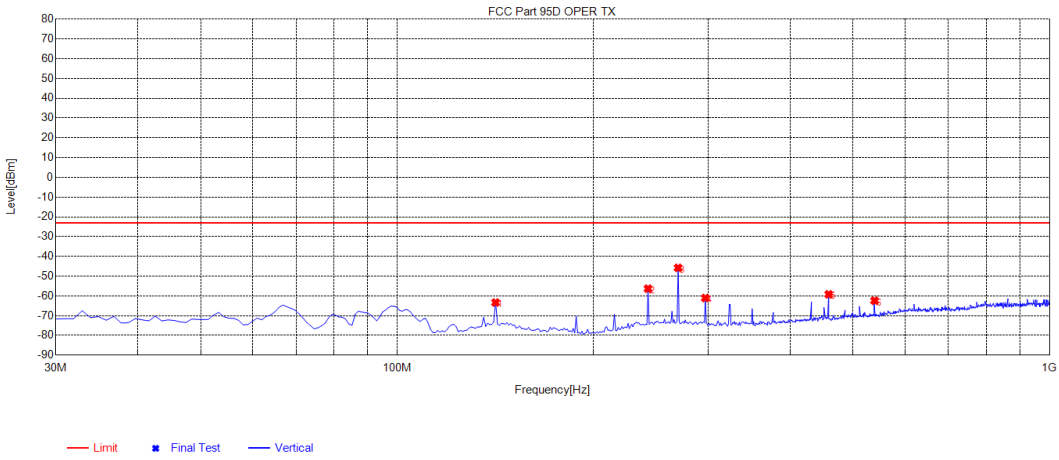
Test Mode	Mode 4	Supply Voltage	DC 12V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	141.55	-90.53	-63.35	-23.00	40.35	27.18	Peak	Vertical
2	242.43	-84.23	-56.35	-23.00	33.35	27.88	Peak	Vertical
3	269.59	-74.20	-45.80	-23.00	22.80	28.40	Peak	Vertical
4	296.75	-89.12	-61.08	-23.00	38.08	28.04	Peak	Vertical
5	458.74	-90.36	-59.21	-23.00	36.21	31.15	Peak	Vertical
6	539.25	-95.01	-62.41	-23.00	39.41	32.60	Peak	Vertical
Test data for Harmonic emissions spurious								
1	141.55	-90.53	-63.35	-24.34	39.01	27.18	Peak	Vertical
2	242.43	-84.23	-56.35	-24.34	32.01	27.88	Peak	Vertical
3	269.59	-74.20	-45.80	-24.34	21.46	28.40	Peak	Vertical
4	296.75	-89.12	-61.08	-24.34	36.74	28.04	Peak	Vertical
5	458.74	-90.36	-59.21	-24.34	34.87	31.15	Peak	Vertical
6	539.25	-95.01	-62.41	-24.34	38.07	32.60	Peak	Vertical

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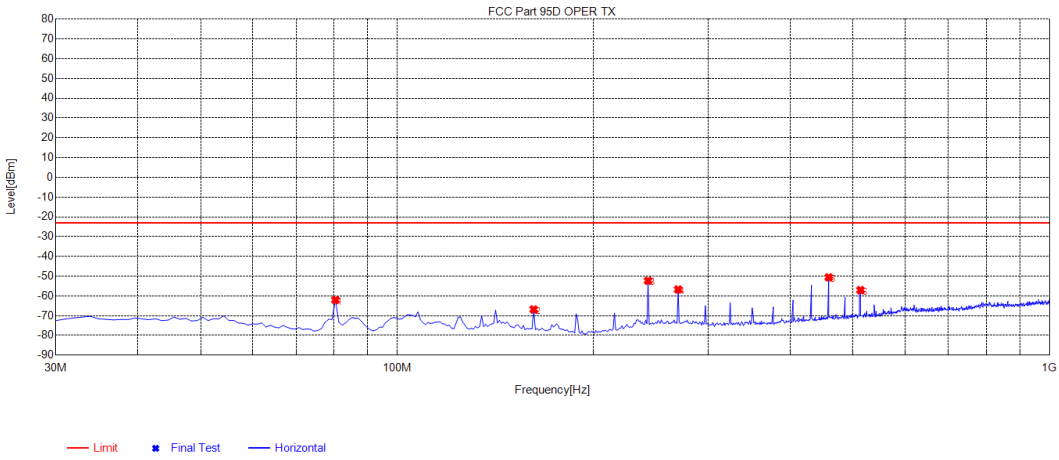
Test Mode	Mode 5	Supply Voltage	DC 12V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	80.44	-86.32	-62.11	-23.00	39.11	24.21	Peak	Horizontal
2	161.92	-91.44	-66.85	-23.00	43.85	24.59	Peak	Horizontal
3	242.43	-80.20	-52.32	-23.00	29.32	27.88	Peak	Horizontal
4	269.59	-85.15	-56.75	-23.00	33.75	28.40	Peak	Horizontal
5	458.74	-81.78	-50.63	-23.00	27.63	31.15	Peak	Horizontal
6	513.06	-89.17	-57.07	-23.00	34.07	32.10	Peak	Horizontal
Test data for Harmonic emissions spurious								
1	80.44	-86.32	-62.11	-24.31	37.80	24.21	Peak	Horizontal
2	161.92	-91.44	-66.85	-24.31	42.54	24.59	Peak	Horizontal
3	242.43	-80.20	-52.32	-24.31	28.01	27.88	Peak	Horizontal
4	269.59	-85.15	-56.75	-24.31	32.44	28.40	Peak	Horizontal
5	458.74	-81.78	-50.63	-24.31	26.32	31.15	Peak	Horizontal
6	513.06	-89.17	-57.07	-24.31	32.76	32.10	Peak	Horizontal

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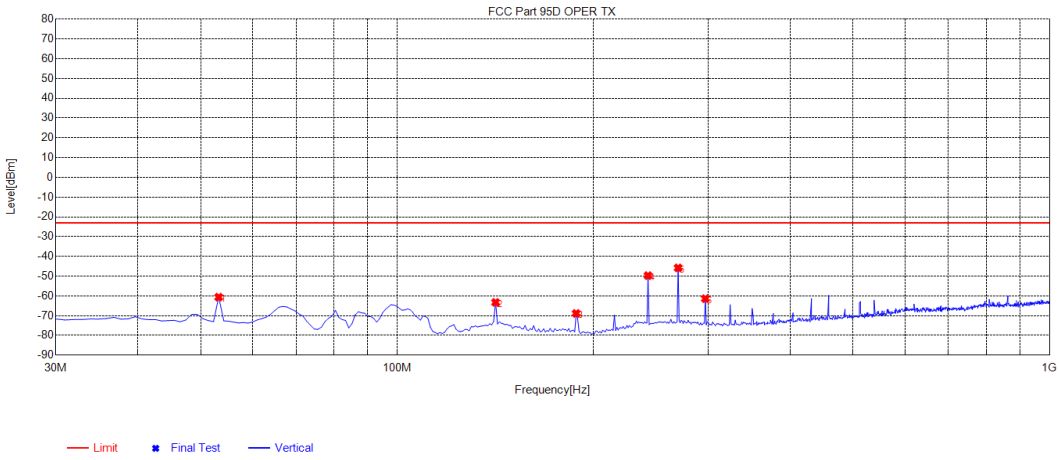
Test Mode	Mode 5	Supply Voltage	DC 12V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	53.28	-88.55	-60.63	-23.00	37.63	27.92	Peak	Vertical
2	141.55	-90.46	-63.28	-23.00	40.28	27.18	Peak	Vertical
3	188.11	-92.29	-68.88	-23.00	45.88	23.41	Peak	Vertical
4	242.43	-77.63	-49.75	-23.00	26.75	27.88	Peak	Vertical
5	269.59	-74.22	-45.82	-23.00	22.82	28.40	Peak	Vertical
6	296.75	-89.44	-61.40	-23.00	38.40	28.04	Peak	Vertical
Test data for Harmonic emissions spurious								
1	53.28	-88.55	-60.63	-24.31	36.32	27.92	Peak	Vertical
2	141.55	-90.46	-63.28	-24.31	38.97	27.18	Peak	Vertical
3	188.11	-92.29	-68.88	-24.31	44.57	23.41	Peak	Vertical
4	242.43	-77.63	-49.75	-24.31	25.44	27.88	Peak	Vertical
5	269.59	-74.22	-45.82	-24.31	21.51	28.40	Peak	Vertical
6	296.75	-89.44	-61.40	-24.31	37.09	28.04	Peak	Vertical

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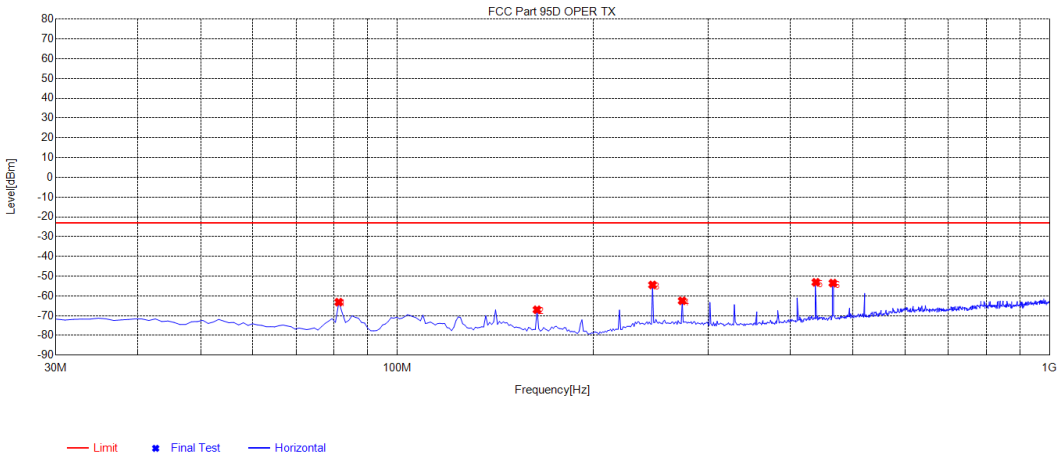
Test Mode	Mode 6	Supply Voltage	DC 12V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	81.41	-87.19	-63.17	-23.00	40.17	24.02	Peak	Horizontal
2	163.86	-91.62	-67.01	-23.00	44.01	24.61	Peak	Horizontal
3	246.31	-82.73	-54.45	-23.00	31.45	28.28	Peak	Horizontal
4	273.47	-90.85	-62.49	-23.00	39.49	28.36	Peak	Horizontal
5	438.37	-83.82	-53.13	-23.00	30.13	30.69	Peak	Horizontal
6	465.53	-84.78	-53.52	-23.00	30.52	31.26	Peak	Horizontal
Test data for Harmonic emissions spurious								
1	81.41	-87.19	-63.17	-24.31	38.86	24.02	Peak	Horizontal
2	163.86	-91.62	-67.01	-24.31	42.70	24.61	Peak	Horizontal
3	246.31	-82.73	-54.45	-24.31	30.14	28.28	Peak	Horizontal
4	273.47	-90.85	-62.49	-24.31	38.18	28.36	Peak	Horizontal
5	438.37	-83.82	-53.13	-24.31	28.82	30.69	Peak	Horizontal
6	465.53	-84.78	-53.52	-24.31	29.21	31.26	Peak	Horizontal

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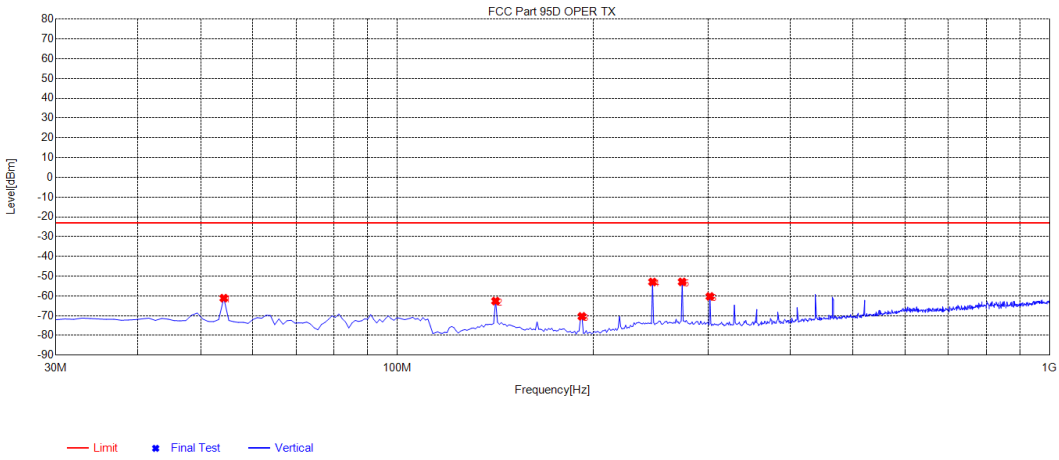
Test Mode	Mode 6	Supply Voltage	DC 12V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	54.25	-88.84	-61.14	-23.00	38.14	27.70	Peak	Vertical
2	141.55	-89.80	-62.62	-23.00	39.62	27.18	Peak	Vertical
3	191.99	-93.55	-70.36	-23.00	47.36	23.19	Peak	Vertical
4	246.31	-81.24	-52.96	-23.00	29.96	28.28	Peak	Vertical
5	273.47	-81.28	-52.92	-23.00	29.92	28.36	Peak	Vertical
6	301.6	-88.29	-60.29	-23.00	37.29	28.00	Peak	Vertical
Test data for Harmonic emissions spurious								
1	81.41	-87.19	-63.17	-24.31	38.86	27.70	Peak	Vertical
2	163.86	-91.62	-67.01	-24.31	42.70	27.18	Peak	Vertical
3	246.31	-82.73	-54.45	-24.31	30.14	23.19	Peak	Vertical
4	273.47	-90.85	-62.49	-24.31	38.18	28.28	Peak	Vertical
5	438.37	-83.82	-53.13	-24.31	28.82	28.36	Peak	Vertical
6	465.53	-84.78	-53.52	-24.31	29.21	28.00	Peak	Vertical

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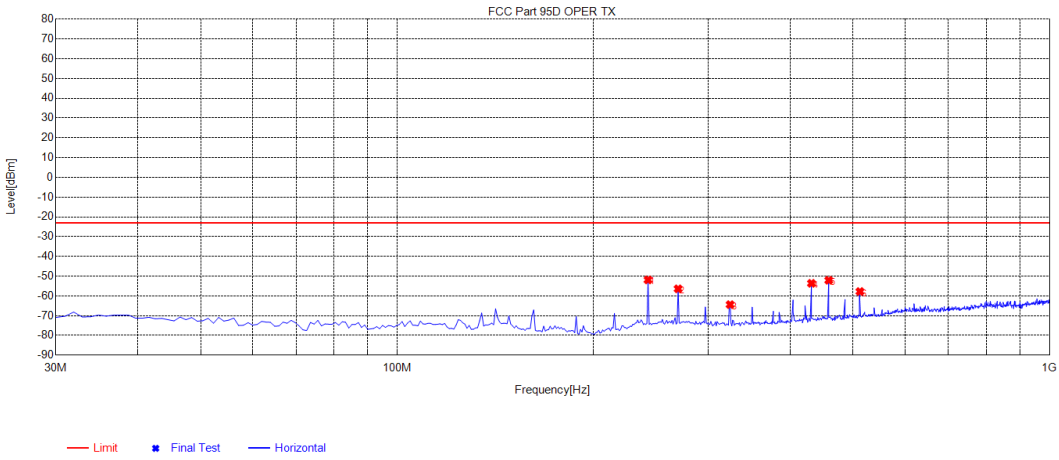
Test Mode	Mode 1	Supply Voltage	DC 24V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	242.43	-79.78	-51.90	-23.00	28.90	27.88	Peak	Horizontal
2	269.59	-84.83	-56.43	-23.00	33.43	28.40	Peak	Horizontal
3	323.91	-92.57	-64.42	-23.00	41.42	28.15	Peak	Horizontal
4	431.58	-84.14	-53.64	-23.00	30.64	30.50	Peak	Horizontal
5	458.74	-83.26	-52.11	-23.00	29.11	31.15	Peak	Horizontal
6	512.09	-89.88	-57.79	-23.00	34.79	32.09	Peak	Horizontal
Test data for Harmonic emissions spurious								
1	242.43	-79.78	-51.90	-24.08	27.82	24.21	Peak	Horizontal
2	269.59	-84.83	-56.43	-24.08	32.35	24.59	Peak	Horizontal
3	323.91	-92.57	-64.42	-24.08	40.34	27.88	Peak	Horizontal
4	431.58	-84.14	-53.64	-24.08	29.56	28.40	Peak	Horizontal
5	458.74	-83.26	-52.11	-24.08	28.03	30.50	Peak	Horizontal
6	512.09	-89.88	-57.79	-24.08	33.71	31.15	Peak	Horizontal

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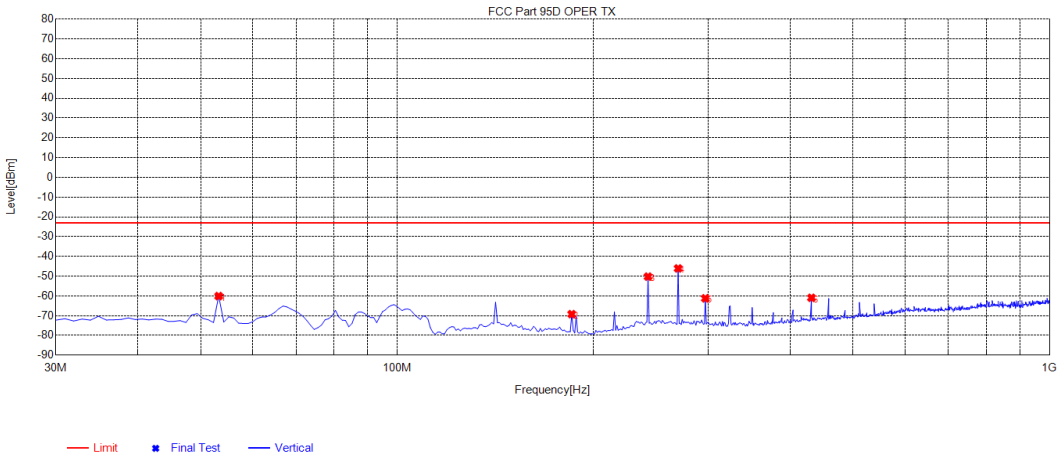
Test Mode	Mode 1	Supply Voltage	DC 24V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	53.28	-88.01	-60.09	-23.00	37.09	27.92	Peak	Vertical
2	185.2	-93.07	-69.25	-23.00	46.25	23.82	Peak	Vertical
3	242.43	-78.13	-50.25	-23.00	27.25	27.88	Peak	Vertical
4	269.59	-74.50	-46.10	-23.00	23.10	28.40	Peak	Vertical
5	296.75	-89.28	-61.24	-23.00	38.24	28.04	Peak	Vertical
6	431.58	-91.46	-60.96	-23.00	37.96	30.50	Peak	Vertical
Test data for Harmonic emissions spurious								
1	53.28	-88.01	-60.09	-24.08	36.01	27.92	Peak	Vertical
2	185.2	-93.07	-69.25	-24.08	45.17	23.82	Peak	Vertical
3	242.43	-78.13	-50.25	-24.08	26.17	27.88	Peak	Vertical
4	269.59	-74.50	-46.10	-24.08	22.02	28.40	Peak	Vertical
5	296.75	-89.28	-61.24	-24.08	37.16	28.04	Peak	Vertical
6	431.58	-91.46	-60.96	-24.08	36.88	30.50	Peak	Vertical

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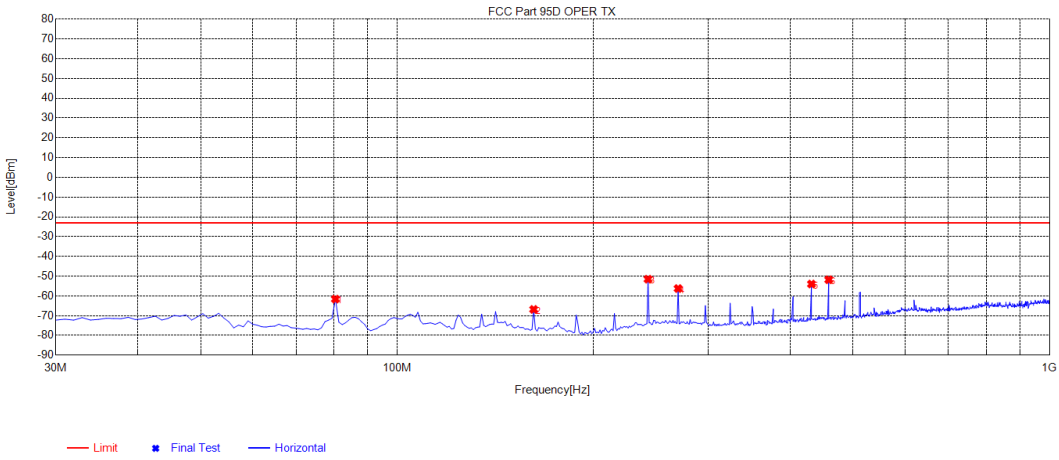
Test Mode	Mode 2	Supply Voltage	DC 24V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	80.44	-85.83	-61.62	-23.00	38.62	24.21	Peak	Horizontal
2	161.92	-91.43	-66.84	-23.00	43.84	24.59	Peak	Horizontal
3	242.43	-79.42	-51.54	-23.00	28.54	27.88	Peak	Horizontal
4	269.59	-84.68	-56.28	-23.00	33.28	28.40	Peak	Horizontal
5	431.58	-84.49	-53.99	-23.00	30.99	30.50	Peak	Horizontal
6	458.74	-82.98	-51.83	-23.00	28.83	31.15	Peak	Horizontal
Test data for Harmonic emissions spurious								
1	80.44	-85.83	-61.62	-24.01	37.61	24.21	Peak	Horizontal
2	161.92	-91.43	-66.84	-24.01	42.83	24.59	Peak	Horizontal
3	242.43	-79.42	-51.54	-24.01	27.53	27.88	Peak	Horizontal
4	269.59	-84.68	-56.28	-24.01	32.27	28.40	Peak	Horizontal
5	431.58	-84.49	-53.99	-24.01	29.98	30.50	Peak	Horizontal
6	458.74	-82.98	-51.83	-24.01	27.82	31.15	Peak	Horizontal

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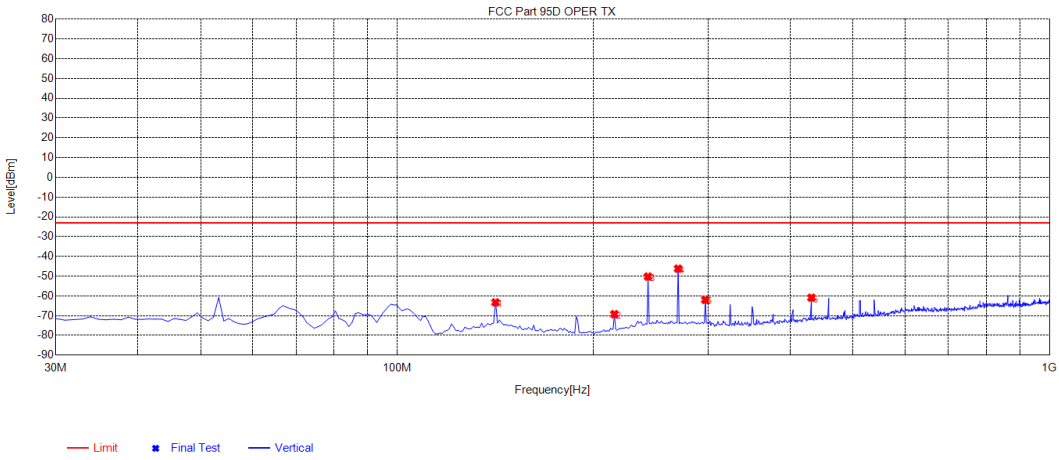
Test Mode	Mode 2	Supply Voltage	DC 24V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	141.55	-90.47	-63.29	-23.00	40.29	27.18	Peak	Vertical
2	215.27	-94.23	-69.27	-23.00	46.27	24.96	Peak	Vertical
3	242.43	-78.11	-50.23	-23.00	27.23	27.88	Peak	Vertical
4	269.59	-74.64	-46.24	-23.00	23.24	28.40	Peak	Vertical
5	296.75	-90.04	-62.00	-23.00	39.00	28.04	Peak	Vertical
6	431.58	-91.42	-60.92	-23.00	37.92	30.50	Peak	Vertical
Test data for Harmonic emissions spurious								
1	141.55	-90.47	-63.29	-24.01	39.28	27.18	Peak	Vertical
2	215.27	-94.23	-69.27	-24.01	45.26	24.96	Peak	Vertical
3	242.43	-78.11	-50.23	-24.01	26.22	27.88	Peak	Vertical
4	269.59	-74.64	-46.24	-24.01	22.23	28.40	Peak	Vertical
5	296.75	-90.04	-62.00	-24.01	37.99	28.04	Peak	Vertical
6	431.58	-91.42	-60.92	-24.01	36.91	30.50	Peak	Vertical

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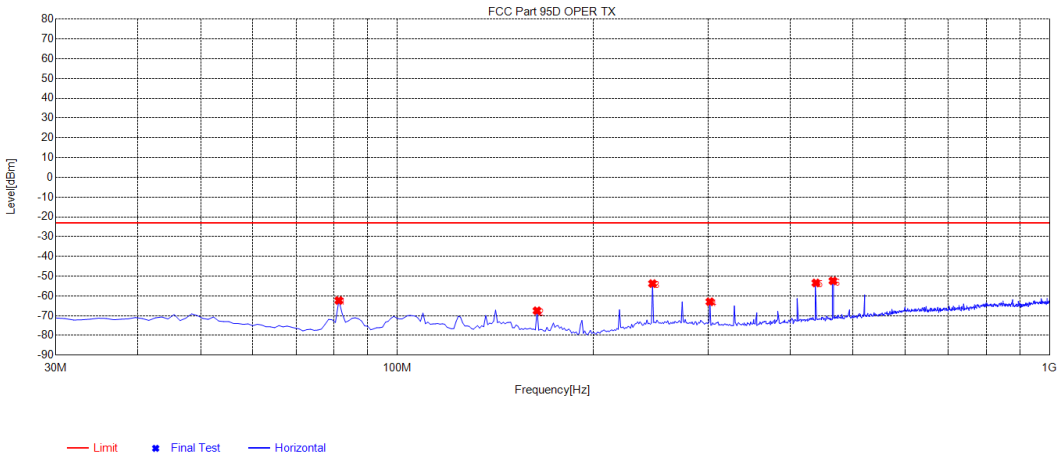
Test Mode	Mode 3	Supply Voltage	DC 24V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	81.41	-86.35	-62.33	-23.00	39.33	24.02	Peak	Horizontal
2	163.86	-92.12	-67.51	-23.00	44.51	24.61	Peak	Horizontal
3	246.31	-82.06	-53.78	-23.00	30.78	28.28	Peak	Horizontal
4	301.6	-90.99	-62.99	-23.00	39.99	28.00	Peak	Horizontal
5	438.37	-84.14	-53.45	-23.00	30.45	30.69	Peak	Horizontal
6	465.53	-83.66	-52.40	-23.00	29.40	31.26	Peak	Horizontal
Test data for Harmonic emissions spurious								
1	81.41	-86.35	-62.33	-24.03	38.30	24.02	Peak	Horizontal
2	163.86	-92.12	-67.51	-24.03	43.48	24.61	Peak	Horizontal
3	246.31	-82.06	-53.78	-24.03	29.75	28.28	Peak	Horizontal
4	301.6	-90.99	-62.99	-24.03	38.96	28.00	Peak	Horizontal
5	438.37	-84.14	-53.45	-24.03	29.42	30.69	Peak	Horizontal
6	465.53	-83.66	-52.40	-24.03	28.37	31.26	Peak	Horizontal

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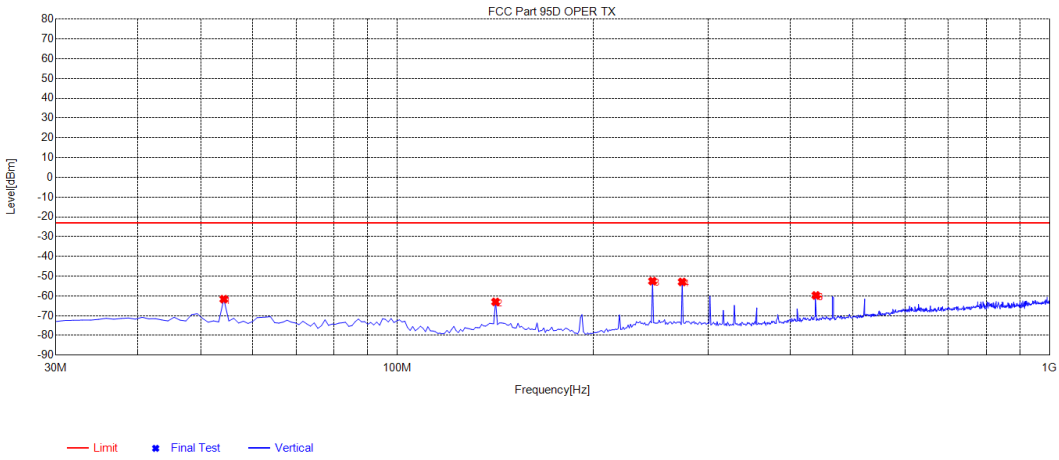
Test Mode	Mode 3	Supply Voltage	DC 24V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	54.25	-89.34	-61.64	-23.00	38.64	27.70	Peak	Vertical
2	141.55	-90.22	-63.04	-23.00	40.04	27.18	Peak	Vertical
3	246.31	-80.81	-52.53	-23.00	29.53	28.28	Peak	Vertical
4	273.47	-81.30	-52.94	-23.00	29.94	28.36	Peak	Vertical
5	438.37	-90.47	-59.78	-23.00	36.78	30.69	Peak	Vertical
6	438.37	-90.47	-59.78	-23.00	36.78	30.69	Peak	Vertical
Test data for Harmonic emissions spurious								
1	54.25	-89.34	-61.64	-24.03	37.61	27.70	Peak	Vertical
2	141.55	-90.22	-63.04	-24.03	39.01	27.18	Peak	Vertical
3	246.31	-80.81	-52.53	-24.03	28.50	28.28	Peak	Vertical
4	273.47	-81.30	-52.94	-24.03	28.91	28.36	Peak	Vertical
5	438.37	-90.47	-59.78	-24.03	35.75	30.69	Peak	Vertical
6	438.37	-90.47	-59.78	-24.03	35.75	30.69	Peak	Vertical

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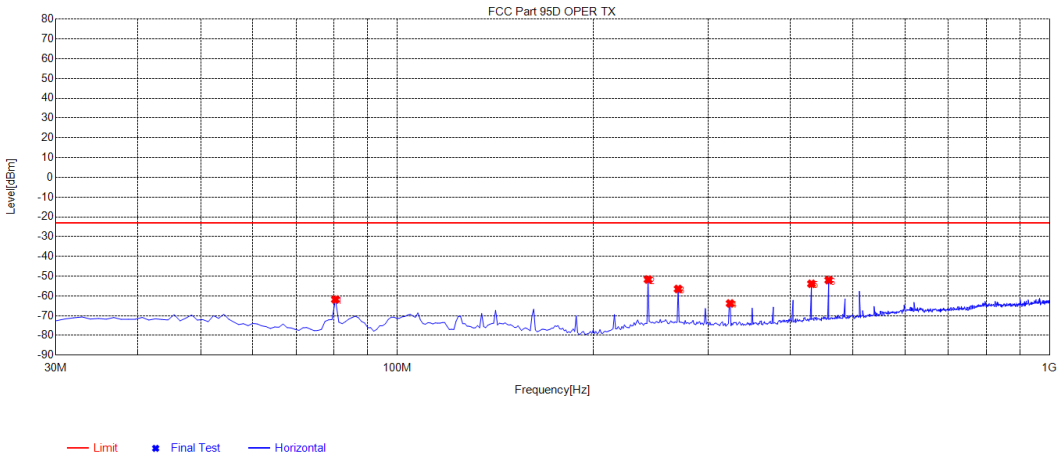
Test Mode	Mode 4	Supply Voltage	DC 24V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	80.44	-86.04	-61.83	-23.00	38.83	24.21	Peak	Horizontal
2	242.43	-79.58	-51.70	-23.00	28.70	27.88	Peak	Horizontal
3	269.59	-84.90	-56.50	-23.00	33.50	28.40	Peak	Horizontal
4	323.91	-91.97	-63.82	-23.00	40.82	28.15	Peak	Horizontal
5	431.58	-84.37	-53.87	-23.00	30.87	30.50	Peak	Horizontal
6	458.74	-83.17	-52.02	-23.00	29.02	31.15	Peak	Horizontal
Test data for Harmonic emissions spurious								
1	80.44	-86.04	-61.83	-24.28	37.55	24.21	Peak	Horizontal
2	242.43	-79.58	-51.70	-24.28	27.42	27.88	Peak	Horizontal
3	269.59	-84.90	-56.50	-24.28	32.22	28.40	Peak	Horizontal
4	323.91	-91.97	-63.82	-24.28	39.54	28.15	Peak	Horizontal
5	431.58	-84.37	-53.87	-24.28	29.59	30.50	Peak	Horizontal
6	458.74	-83.17	-52.02	-24.28	27.74	31.15	Peak	Horizontal

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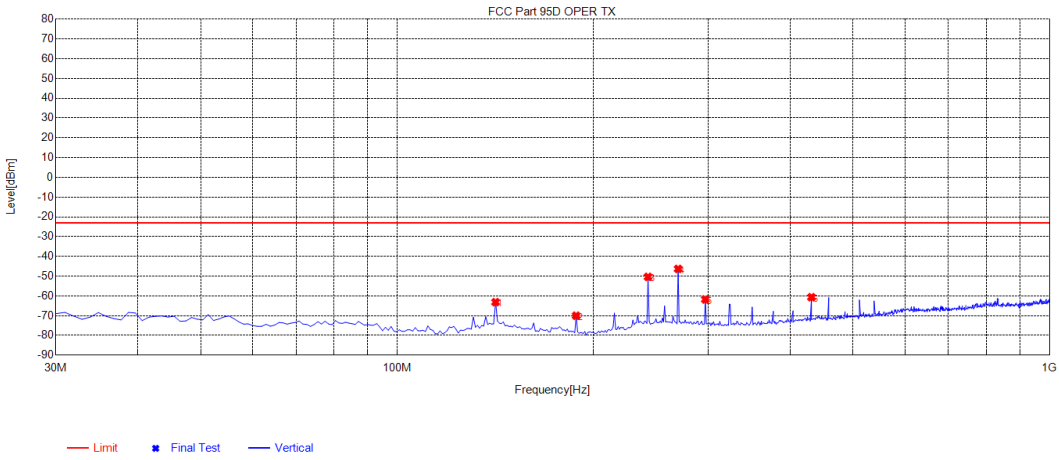
Test Mode	Mode 4	Supply Voltage	DC 24V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	141.55	-90.34	-63.16	-23.00	40.16	27.18	Peak	Vertical
2	188.11	-93.44	-70.03	-23.00	47.03	23.41	Peak	Vertical
3	242.43	-78.25	-50.37	-23.00	27.37	27.88	Peak	Vertical
4	269.59	-74.74	-46.34	-23.00	23.34	28.40	Peak	Vertical
5	296.75	-89.83	-61.79	-23.00	38.79	28.04	Peak	Vertical
6	431.58	-91.16	-60.66	-23.00	37.66	30.50	Peak	Vertical
Test data for Harmonic emissions spurious								
1	141.55	-90.34	-63.16	-24.28	38.88	27.18	Peak	Vertical
2	188.11	-93.44	-70.03	-24.28	45.75	23.41	Peak	Vertical
3	242.43	-78.25	-50.37	-24.28	26.09	27.88	Peak	Vertical
4	269.59	-74.74	-46.34	-24.28	22.06	28.40	Peak	Vertical
5	296.75	-89.83	-61.79	-24.28	37.51	28.04	Peak	Vertical
6	431.58	-91.16	-60.66	-24.28	36.38	30.50	Peak	Vertical

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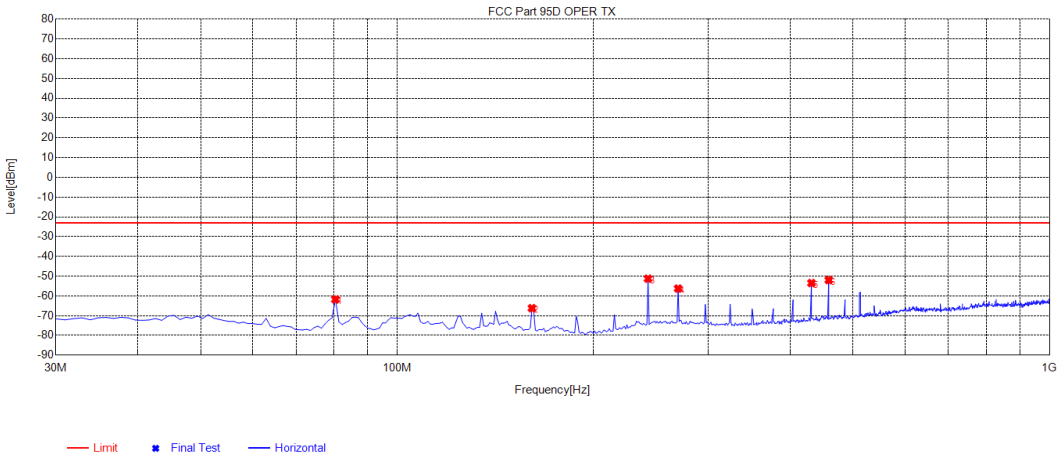
Test Mode	Mode 5	Supply Voltage	DC 24V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	80.44	-85.99	-61.78	-23.00	38.78	24.21	Peak	Horizontal
2	160.95	-90.81	-66.23	-23.00	43.23	24.58	Peak	Horizontal
3	242.43	-79.16	-51.28	-23.00	28.28	27.88	Peak	Horizontal
4	269.59	-84.69	-56.29	-23.00	33.29	28.40	Peak	Horizontal
5	431.58	-84.01	-53.51	-23.00	30.51	30.50	Peak	Horizontal
6	458.74	-83.14	-51.99	-23.00	28.99	31.15	Peak	Horizontal
Test data for Harmonic emissions spurious								
1	80.44	-85.99	-61.78	-24.25	37.53	24.21	Peak	Horizontal
2	160.95	-90.81	-66.23	-24.25	41.98	24.58	Peak	Horizontal
3	242.43	-79.16	-51.28	-24.25	27.03	27.88	Peak	Horizontal
4	269.59	-84.69	-56.29	-24.25	32.04	28.40	Peak	Horizontal
5	431.58	-84.01	-53.51	-24.25	29.26	30.50	Peak	Horizontal
6	458.74	-83.14	-51.99	-24.25	27.74	31.15	Peak	Horizontal

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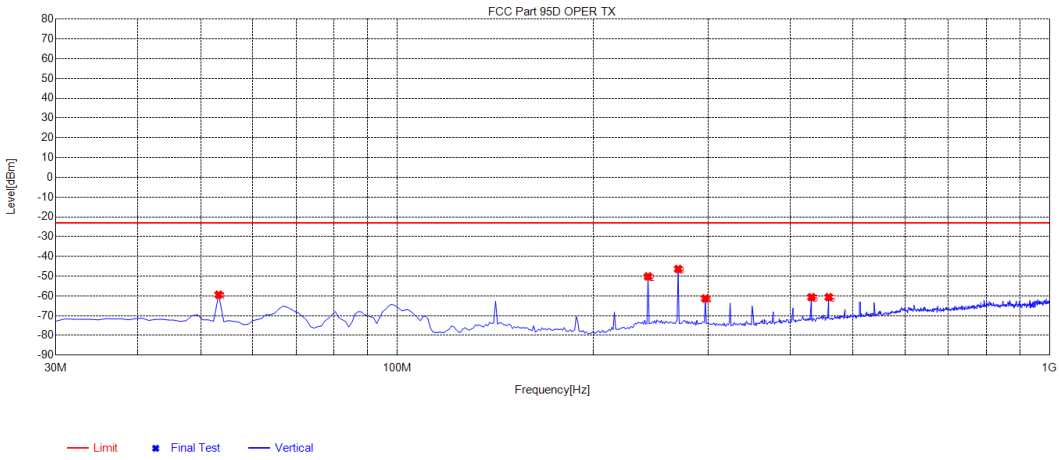
Test Mode	Mode 5	Supply Voltage	DC 24V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	53.28	-87.35	-59.43	-23.00	36.43	27.92	Peak	Vertical
2	242.43	-78.02	-50.14	-23.00	27.14	27.88	Peak	Vertical
3	269.59	-74.79	-46.39	-23.00	23.39	28.40	Peak	Vertical
4	296.75	-89.35	-61.31	-23.00	38.31	28.04	Peak	Vertical
5	431.58	-91.19	-60.69	-23.00	37.69	30.50	Peak	Vertical
6	458.74	-91.80	-60.65	-23.00	37.65	31.15	Peak	Vertical
Test data for Harmonic emissions spurious								
1	53.28	-87.35	-59.43	-24.25	35.18	27.92	Peak	Vertical
2	242.43	-78.02	-50.14	-24.25	25.89	27.88	Peak	Vertical
3	269.59	-74.79	-46.39	-24.25	22.14	28.40	Peak	Vertical
4	296.75	-89.35	-61.31	-24.25	37.06	28.04	Peak	Vertical
5	431.58	-91.19	-60.69	-24.25	36.44	30.50	Peak	Vertical
6	458.74	-91.80	-60.65	-24.25	36.40	31.15	Peak	Vertical

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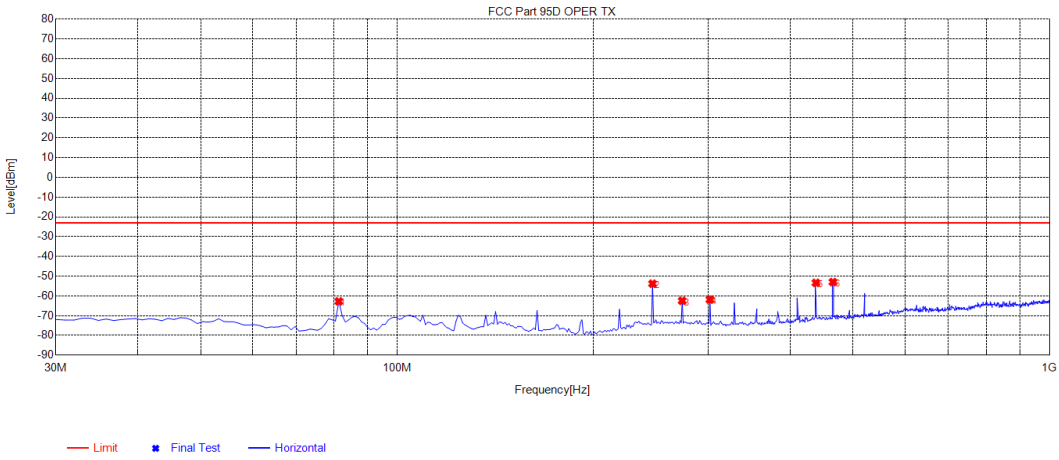
Test Mode	Mode 6	Supply Voltage	DC 24V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	81.41	-86.79	-62.77	-23.00	39.77	24.02	Peak	Horizontal
2	246.31	-82.11	-53.83	-23.00	30.83	28.28	Peak	Horizontal
3	273.47	-90.84	-62.48	-23.00	39.48	28.36	Peak	Horizontal
4	301.6	-89.90	-61.90	-23.00	38.90	28.00	Peak	Horizontal
5	438.37	-84.08	-53.39	-23.00	30.39	30.69	Peak	Horizontal
6	465.53	-84.25	-52.99	-23.00	29.99	31.26	Peak	Horizontal
Test data for Harmonic emissions spurious								
1	81.41	-86.79	-62.77	-24.26	38.51	24.02	Peak	Horizontal
2	246.31	-82.11	-53.83	-24.26	29.57	28.28	Peak	Horizontal
3	273.47	-90.84	-62.48	-24.26	38.22	28.36	Peak	Horizontal
4	301.6	-89.90	-61.90	-24.26	37.64	28.00	Peak	Horizontal
5	438.37	-84.08	-53.39	-24.26	29.13	30.69	Peak	Horizontal
6	465.53	-84.25	-52.99	-24.26	28.73	31.26	Peak	Horizontal

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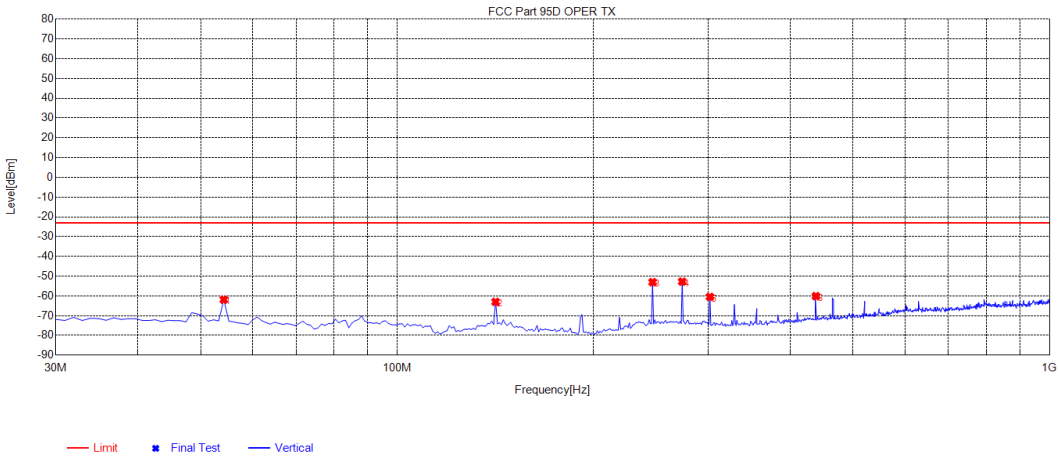
Test Mode	Mode 6	Supply Voltage	DC 24V

Test graph and data for Unwanted Spurious Emissions



No.	Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	54.25	-89.60	-61.90	-23.00	38.90	27.70	Peak	Vertical
2	141.55	-90.21	-63.03	-23.00	40.03	27.18	Peak	Vertical
3	246.31	-81.33	-53.05	-23.00	30.05	28.28	Peak	Vertical
4	273.47	-81.13	-52.77	-23.00	29.77	28.36	Peak	Vertical
5	301.6	-88.48	-60.48	-23.00	37.48	28.00	Peak	Vertical
6	438.37	-90.81	-60.12	-23.00	37.12	30.69	Peak	Vertical
Test data for Harmonic emissions spurious								
1	54.25	-89.60	-61.90	-24.26	37.64	27.70	Peak	Vertical
2	141.55	-90.21	-63.03	-24.26	38.77	27.18	Peak	Vertical
3	246.31	-81.33	-53.05	-24.26	28.79	28.28	Peak	Vertical
4	273.47	-81.13	-52.77	-24.26	28.51	28.36	Peak	Vertical
5	301.6	-88.48	-60.48	-24.26	36.22	28.00	Peak	Vertical
6	438.37	-90.81	-60.12	-24.26	35.86	30.69	Peak	Vertical

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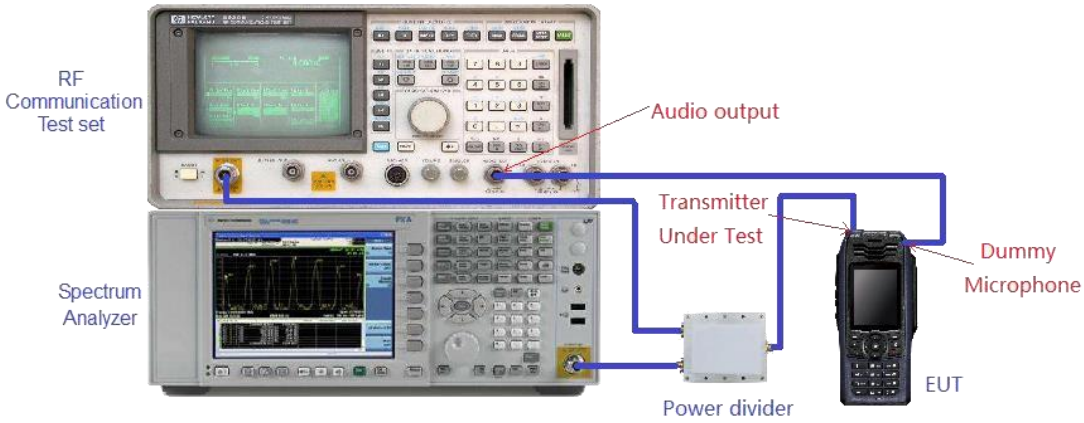
8.5 Emission Mask Measurement Part

The detailed procedure employed for Emission Mask measurements are specified as following:

-Connect the equipment as illustrated.

-Spectrum set as follow:

1. Centre frequency = fundamental frequency, Span=150kHz for 12.5kHz and 25kHz channel spacing, RBW=300Hz, VBW=1000Hz for 12.5kHz, RBW=300Hz, VBW=1000Hz for 25kHz, Sweep = auto, Detector function = peak, Trace = max hold
2. Key the transmitter, and set the level of the unmodulated carrier to a full scale reference line. This is the 0dB reference for the measurement.
3. 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 (Rated system deviation is 2.5 kHz for 12.5kHz channel spacing). The input level shall be established at the frequency of maximum response of the audio modulating circuit.
4. Transmitters employing digital modulation techniques that bypass the limiter and the audio low-pass filter shall be modulated as specified by the manufacturer.
5. Measure and record the results in the test report.



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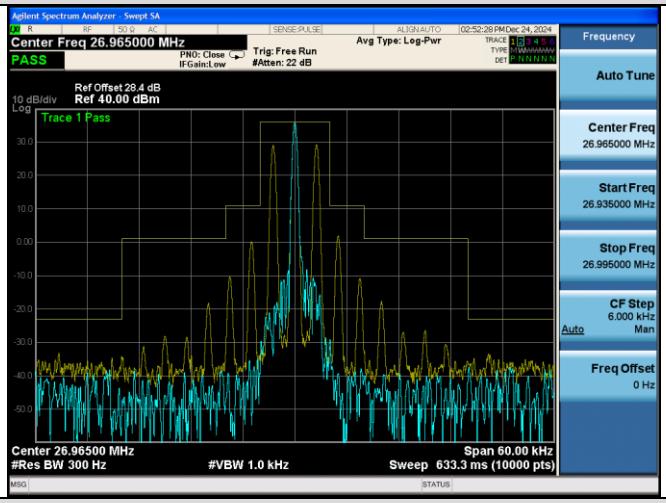
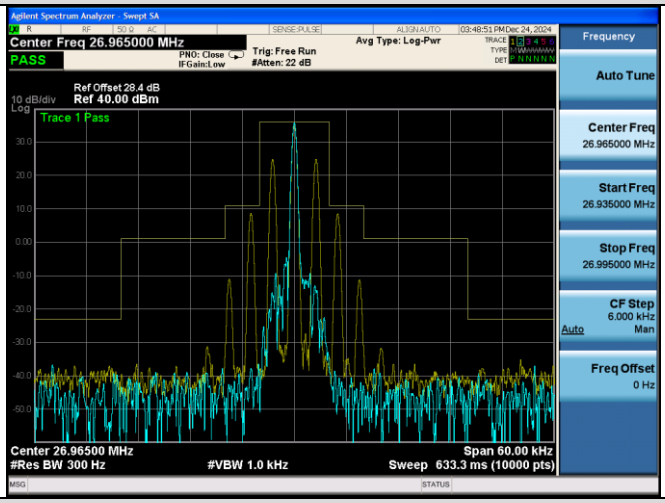
Test plot as follows:

- For DC 12V System:

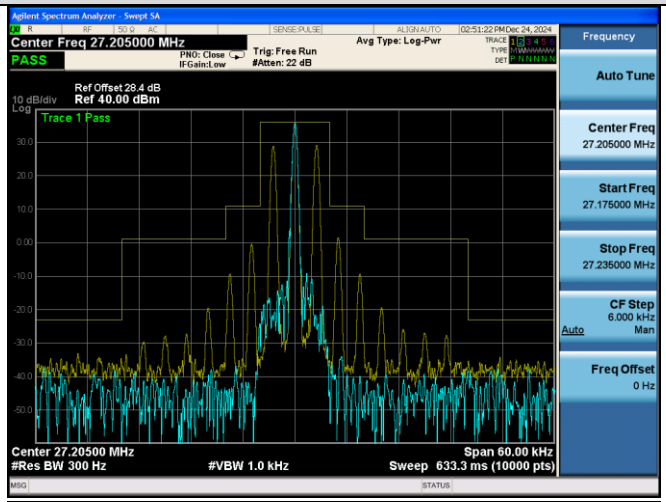
Emission Mask- AM Modulation @ 26.965MHz



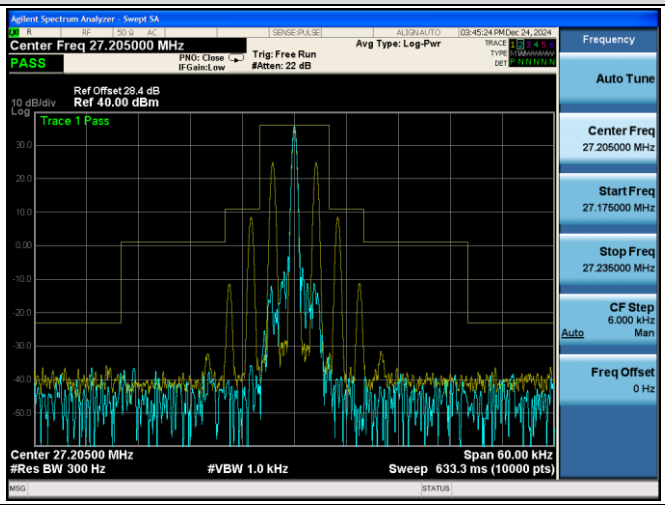
Emission Mask- FM Modulation @ 26.965MH



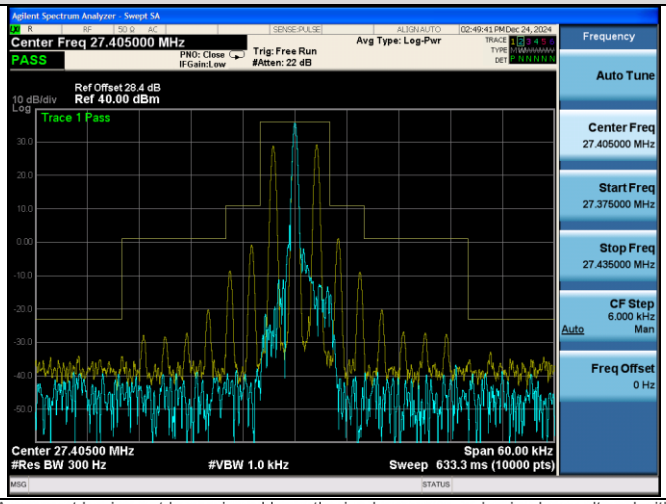
Emission Mask- AM Modulation @ 27.205MHz



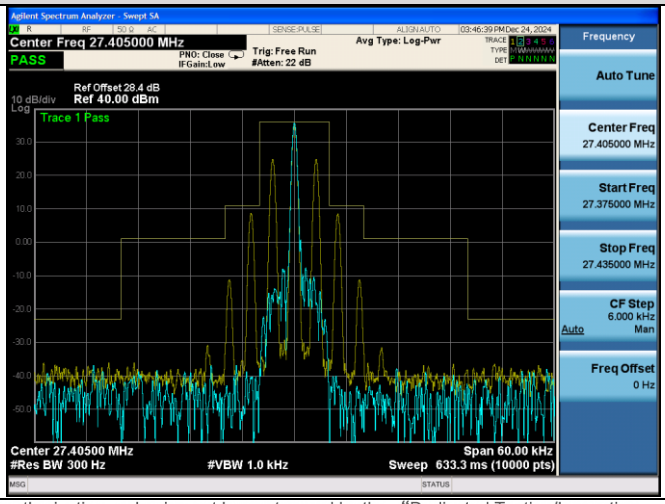
Emission Mask- FM Modulation @ 27.205MHz



Emission Mask- AM Modulation @ 27.405MHz



Emission Mask- FM Modulation @ 27.405MHz



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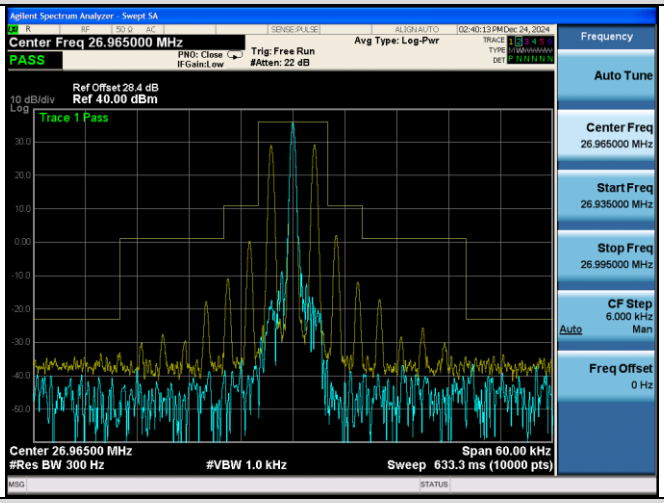
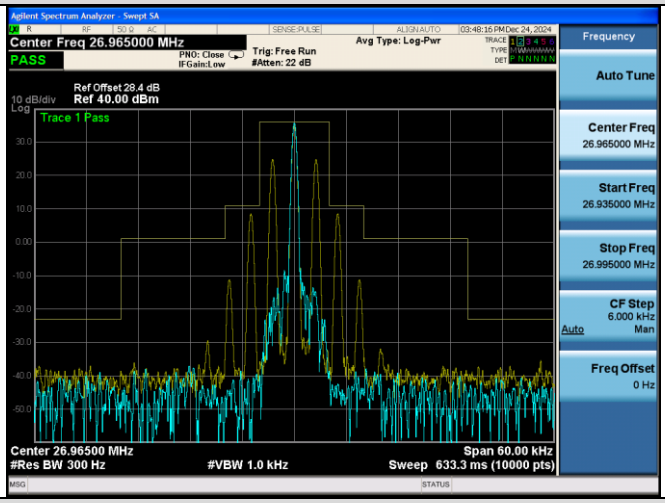
- For DC 24V System:

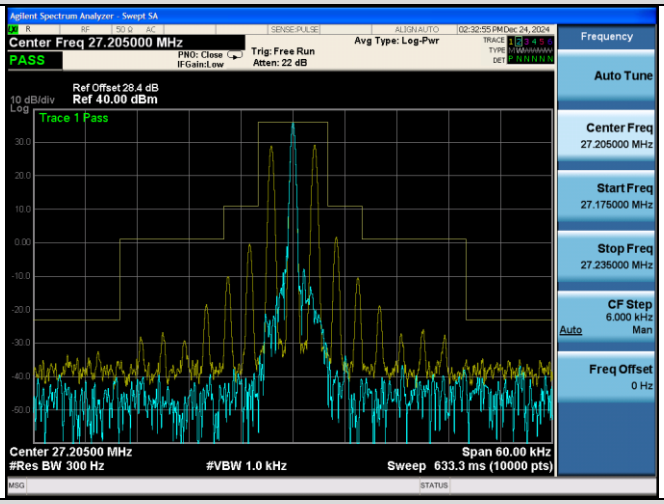
Emission Mask- AM Modulation @ 26.965MHz



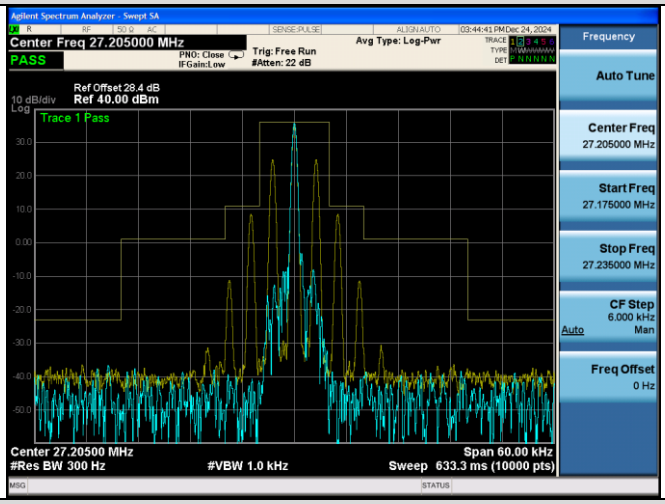
Emission Mask- FM Modulation @ 26.965MH



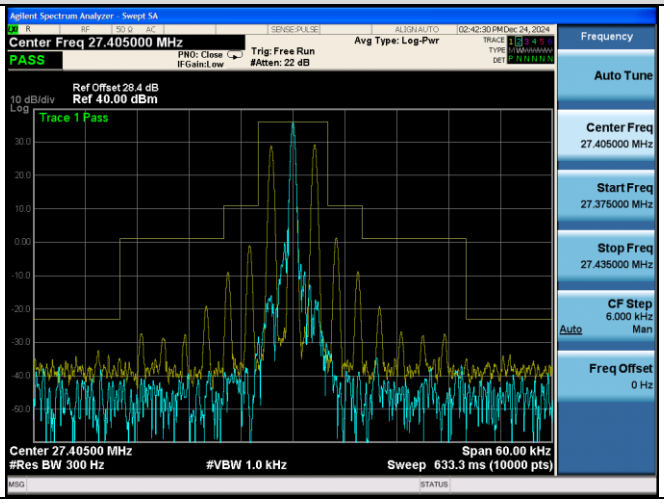
Emission Mask- AM Modulation @ 27.205MHz



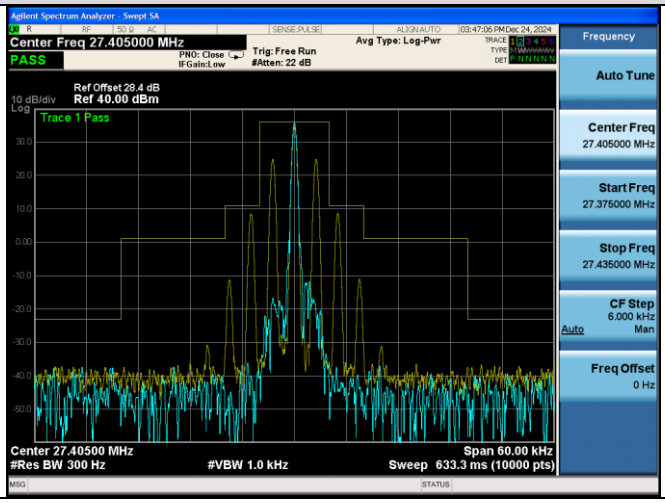
Emission Mask- FM Modulation @ 27.205MHz



Emission Mask- AM Modulation @ 27.405MHz



Emission Mask- FM Modulation @ 27.405MHz



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9. Maximum Transmitter Power

9.1 Provisions Applicable

According to FCC§2.1046(a) and §95.967 the following requirements are required:
The maximum transmit power limits for each CBRS transmitter type are as follows:
(a) When transmitting amplitude modulated (AM) voice signals or frequency modulated (FM) voice signals, the mean carrier power must not exceed 4 Watts
(b) When transmitting single sideband (SSB) voice signals, the peak envelope power must not exceed 12 Watts.

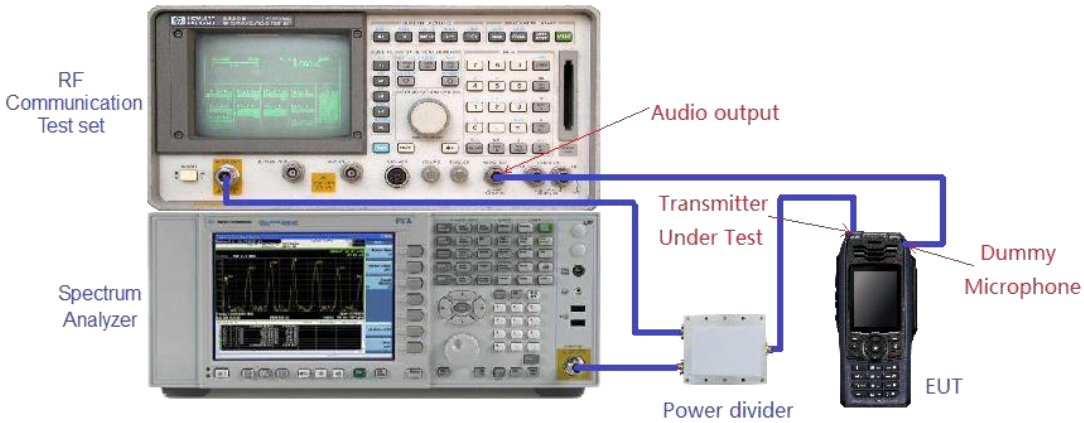
9.2 Measurement Procedure

- Conducted RF Output Power:

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2. The DUT was connected to a Spectrum Analyzer (SA) via a 30dB attenuator connected to the DUT's antenna port. The
3. SA was configured as above using the Automatic 6dB Cursor Bandwidth measurement. The output power of the DUT was set to the manufacturer's highest output power setting at the Low, Mid and High frequency channels as permitted by the device.
4. The DUT was set to transmit at its maximum Duty Cycle.
5. Spectrum set as follow:
6. Centre frequency = fundamental frequency, Span=150kHz , RBW=30kHz, VBW=30kHz ;
7. Sweep = auto, Detector function = peak, Trace = max hold
8. The final recorded maximum power is reported

- Calculation Formula: CP = R + A + L
  - CP: The final Conducted Power
  - R: The reading value from spectrum analyzer
  - A: The attenuation value of the used attenuator
  - L: The loss of all connection cables

9.3 Measurement Setup



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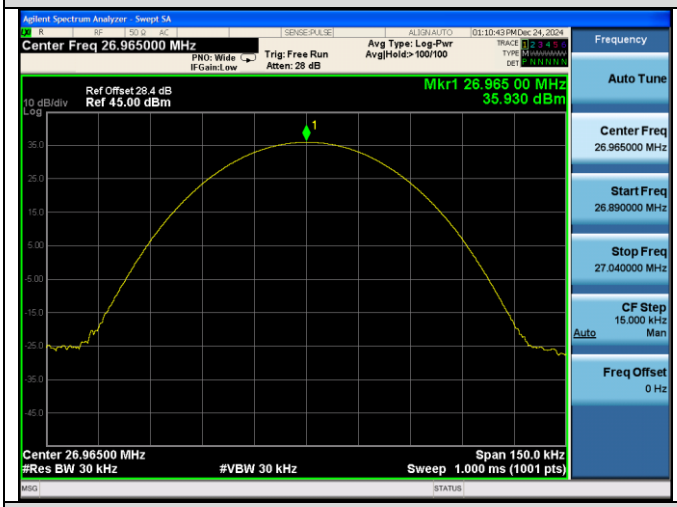
9.4 Measurement Result

- For DC 12V System:

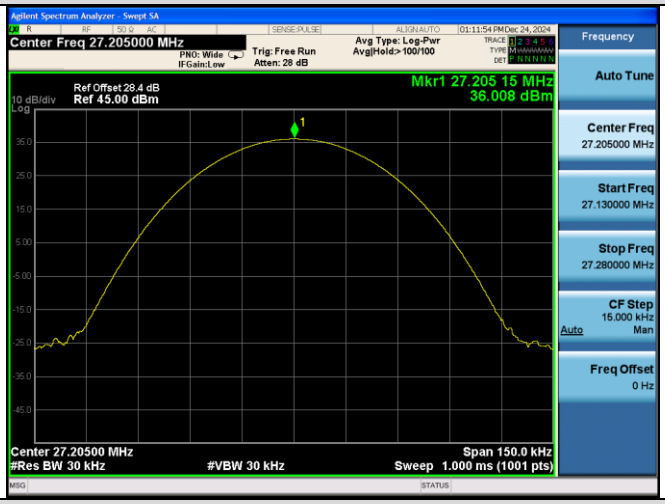
Conducted Power Measurement Results			
Test Mode	Channel Separation	Test Channel	Measurement Result (dBm)
CBRS TX_AM	10 kHz	26.965 MHz	35.930
		27.205 MHz	**36.008**
		27.405 MHz	35.967

Test plot as follows:

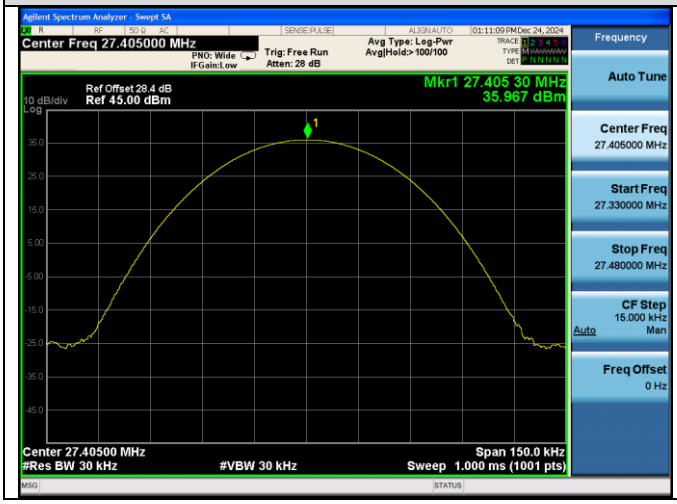
10kHz, AM Modulation:26.965MHz



10kHz, AM Modulation:27.205MHz



10kHz, AM Modulation:27.405MHz



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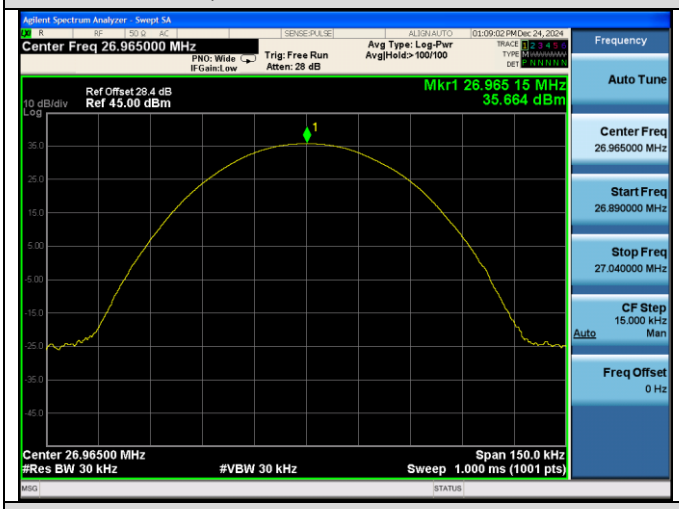
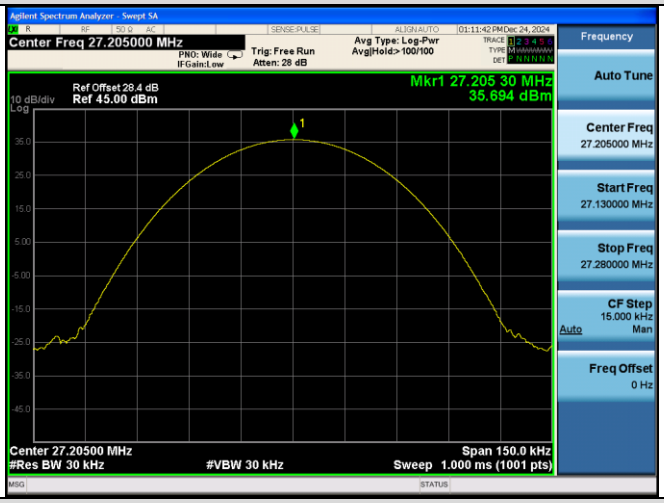
Conducted Power Measurement Results			
Test Mode	Channel Separation	Test Channel	Measurement Result (dBm)
CBRS TX_FM	10 kHz	26.965 MHz	35.664
		27.205 MHz	**35.694**
		27.405 MHz	35.691

Test plot as follows:

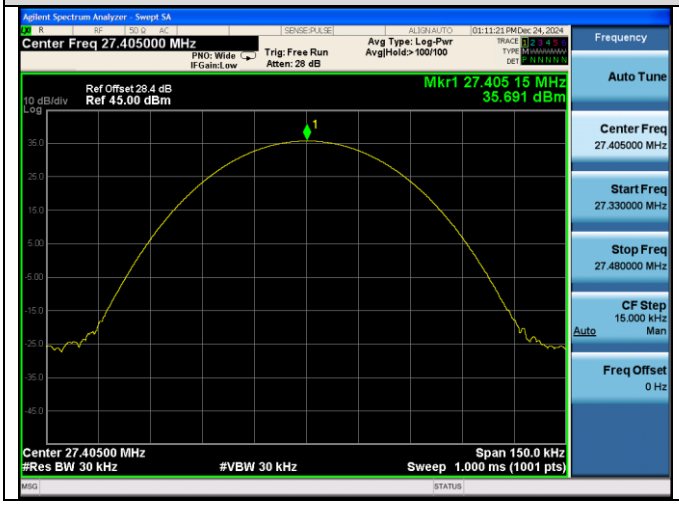
10kHz, FM Modulation:26.965MHz



10kHz,FM Modulation:27.205MHz



10kHz, FM Modulation:27.405MHz



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