RF Test Report

For

Applicant name:	**Kinematic GNSS Inc**
Address:	Room 206, Building 2, Lane 666, Zhangheng Road, Pudong District, Shanghai, China
EUT name:	GNSS Receiver
Brand name:	Kinematic
Model number:	K1
Series model number:	N/A
FCC ID:	2BQJ7-K1

Issued By

Company name:	**BTF Testing Lab (Shenzhen) Co., Ltd.**
Address:	101/201/301, Building 1, Block 2, Tantou Industrial Park,Tantou Community, Songgang Subdistrict, Bao'an District, Shenzhen, China
Report number:	BTF250626R00905
Test standards:	47 CFR Part 2, Part 90
Test conclusion:	Pass
Date of sample receipt:	2025-01-03
Test date:	2025-01-03 to 2025-07.11
Date of issue:	2025-07-14
Prepared by:	Chris Liu Chris Liu/ Project engineer
Approved by:	Ryan.CJ /EMC manager

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Revision History		
Version	Issue date	Revisions content
R_V0	2025-07-14	Original
Note: *Once the revision has been made, then previous versions reports are invalid.*		

1. Introduction

1.1. Laboratory Location

Test location:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	101/201/301, Building 1, Block 2, Tantou Industrial Park,Tantou Community, Songgang Subdistrict, Bao'an District, Shenzhen, China
Phone number:	+86-0755-23146130
Fax number:	+86-0755-23146130

1.2. Laboratory Facility

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

- **FCC - Designation No.: CN1409**

  BTF Testing Lab (Shenzhen) Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The test firm Registration No. is 695374.

- **CNAS - Registration No.: CNAS L17568**

  BTF Testing Lab (Shenzhen) Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L17568.

- **A2LA - Registration No.: 6660.01**

  BTF Testing Lab (Shenzhen) Co., Ltd. is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories.

1.3. Announcement

(1) The test report reference to the report template version v0.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.

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(6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

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2. GENERAL DESCRIPTION

2.1. Applicant

Name	:	Kinematic GNSS Inc
Address	:	Room 206, Building 2, Lane 666, Zhangheng Road, Pudong District, Shanghai, China

2.2. Manufacturer

Name	:	Kinematic GNSS Inc
Address	:	Room 206, Building 2, Lane 666, Zhangheng Road, Pudong District, Shanghai, China

2.3. Factory

Name	:	Kinematic GNSS Inc
Address	:	Room 206, Building 2, Lane 666, Zhangheng Road, Pudong District, Shanghai, China

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2.4. General Information of EUT

Product Name:	GNSS Receiver
Model Name:	K1
Series Model:	N/A
Frequency Range:	410MHz~470MHz
Type of Modulation:	12.5KHz/25KHz
Rated Output Power: (Conducted)	High Power Level: 1W Low Power Level: 0.5W
Channel Spacing:	12.5KHz/25KHz
Antenna Type:	Rod Antenna
Antenna gain:	1.25 dBi
Power Supply:	DC 5V
Adapter:	N/A
Battery parameter:	N/A
Hardware Version:	V1.23
Software Version:	2.0.99

Remark:

The above information of EUT was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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2.5. Environmental conditions

Temperature	Normal Temperature(NT):	20°C
	High Temperature(HT):	50°C
	Low Temperature(LT):	-30°C
Voltage	Normal Voltage(NV):	5.0V
	High Voltage(HV):	5.5V
	Low Voltage(LV):	4.75V
Other	Relative Humidity	55 %
	Air Pressure	101 kPa

2.6. Modification of EUT

No modifications are made to the EUT during all test items.

2.7. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

47 CFR Part 2, 90

ANSI C63.26-2015

ANSI/TIA -102-2016

Remark:

All test items were verified and recorded according to the standards and without any deviation during the test.

3. TEST CONFIGURATION OF EQUIPMENT UNDER TEST

3.1. Test Mode

Per C63.26-2015, section 5.1, the lowest frequency, middle frequency, and highest frequency was performed the test as below:

Modulation/ Channel Bandwidth	Test Channel	TX Frequency (MHz)	RX Frequency (MHz)	Rule Part
4FSK/12.5KHz/25KHz	Lowest	410.05	410.05	For Part90
	Middle 1	429.95	429.95	For Part90
	Middle 2	440.05	440.05	For Part90
	Highest	469.95	469.95	For Part90

3.2. Summary of Test Results

Conducted Test:

Item	Test Description	FCC Rules	Result
1	Transmitter Frequency Stability	§2.1055;§90.213	Compliant
2	Transmitter Output Power	§2.1046;§90.205	Compliant
5	Occupied Bandwidth & Emission Mask	§2.1049;§90.209;§90.210;	Compliant
6	Transmitter Unwanted Emissions at Antenna Terminal	§2.1051;§90.210	Compliant
7	Transmitter Unwanted Emissions-Radiated	§2.1053;§90.210	Compliant
8	Transient Frequency Behavior	§90.214	Not applicable
9	Modulation Characteristic	§2.1047	Compliant

3.3. Support Unit used in test configuration and system

NO.	Unit	Brand	Model	Description
1	/	/	/	/
2	/	/	/	/

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3.4. Equipment List

Radiated test method					
Test Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EMI Receiver	Rohde &Schwarz	ESCI7	101032	2024/10/25	2025/10/24
Signal Analyzer	Rohde & Schwarz	FSQ40	100010	2024/10/25	2025/10/24
Log periodic antenna	Schwarzbeck	VULB 9168	01328	2024/10/28	2025/10/27
Wideband Radio Communication Tester	Rohde&Schwarz	CMW500	61997	2024/10/25	2025/10/24
Preamplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9744	00246	2024/09/24	2025/09/23
Horn Antenna (1GHz ~18GHz)	Schwarzbeck	BBHA9120D	2597	2024/10/30	2025/10/29
Horn Antenna (15GHz ~ 40GHz)	SCHWARZBECK	BBHA9170	1157	2024/10/24	2025/10/23
Preamplifier (1GHz ~ 40GHz)	TST Pass	LNA10180G45	246	2024/09/24	2025/09/23
Test Software	Frad	EZ_EMC	Version: FA-03A2 RE+		

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Conducted test method					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	Keysight	N9020A	MY50410020	2024/10/25	2025/10/24
ESG Vector Signal Generator	Agilent	E4438C	MY45094854	2024/10/25	2025/10/24
MXG Vector Signal Generator	Agilent	N5182A	MY46240163	2024/10/25	2025/10/24
Wideband Radio Communication Tester	Rohde&Schwarz	CMW500	61997	2024/10/25	2025/10/24
Temperature Humidity Chamber	ZZCKONG	ZZ-K02A	20210928007	2024/10/25	2025/10/24
DC Power Supply	Tongmen	etm-6050c	20211026123	2024/10/25	2025/10/24
RF Control Unit	Techy	TR1029-1	/	2024/10/25	2025/10/24
RF Sensor Unit	Techy	TR1029-2	/	2024/10/25	2025/10/24
Test Software	TST Pass	/	Version: 2.0		

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3.5. Measurement Uncertainty

Measurement	Value
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3.0 dB
Unwanted Emissions, conducted	±3.0 dB
Supply voltages	±3 %
Time	±5 %
Conducted Emission for LISN (9kHz ~ 150kHz)	±2.97 dB
Conducted Emission for LISN (150kHz ~ 30MHz)	±2.45 dB
Radiated Emission (30MHz ~ 1000MHz)	±4.80 dB
Radiated Emission (1GHz ~ 18GHz)	±4.82 dB
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

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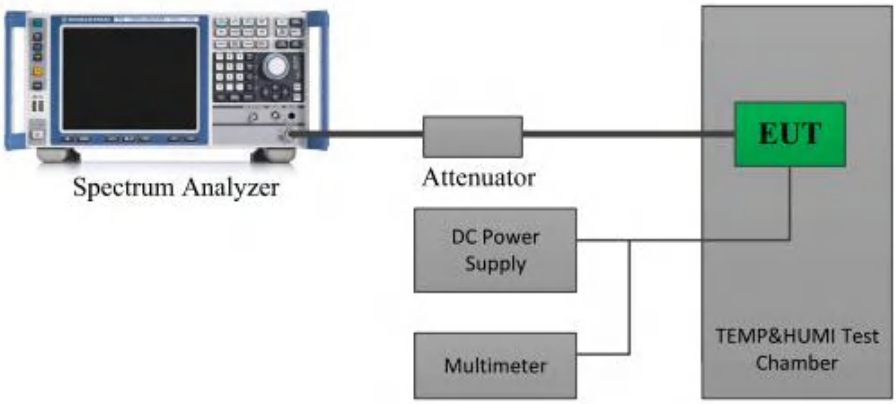
4. TEST RESULT

4.1. Transmitter Frequency Stability

4.1.1. Test Setup



4.1.2. Applicable Standard

FCC§ 90.213:

In the 150-174 MHz band, fixed and base stations with a 12.5 kHz channel bandwidth must have a frequency stability of 2.5 ppm. Fixed and base stations with a 6.25 kHz channel bandwidth must have a frequency stability of 1.0 ppm.

In the 150-174 MHz band, mobile stations designed to operate with a 12.5 kHz channel bandwidth or designed to operate on a frequency specifically designated for itinerant use or designed for low-power operation of two watts or less, must have a frequeney stability of 5.0 ppm. Mobile stations designed tol operate with a 6.25 kHz channel bandwidth must have a frequency stability of 2.0 ppm.

In the 421-512 MHz band, mobile stations designed to operate with a 12.5 kHz channel bandwidth must have a frequency stability of 2.5 ppm. Mobile stations designed to operate with a 6.25 kHz channel bandwidth must have a frequency stability of 1.0 ppm.

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4.1.3. Test Procedures

According to ANSI C63.26-2015 Section 5.6:

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations,with reference to the frequency measured at +20 °C and rated supply voltage.

The operating carrier frequency shall be set up in accordance with the manufacturer's published operationand instruction manual prior to the commencement of these tests. No adjustment of any frequency determining circuit element shall be made subsequent to this initial set-up. Frequency stability is tested:

a)At 10℃ intervals of temperatures between -30℃ and +50°C at the manufacturer's rated supply voltage, and

b) At +20 °C temperature and ±15% supply voltage variations. If a product is specified to operate over a range of input voltage then the-15% variation is applied to the lowermost voltage and the +15% is applied to the uppermost voltage.

During the test all necessary settings, adjustments and control of the EUT have to be performed without disturbing the test environment, i.e., without opening the environmental chamber. The frequency stabilities can be maintained to a lesser temperature range provided that the transmitter is automatically inhibited from operating outside the lesser temperature range. For handheld equipment that is only capable of operating from internal batteries and the supply voltage cannot be varied, the frequency stability tests shall be performed at the nominal battery voltage and the battery end point voltage specified by the manufacturer. An external supply voltage can be used and set at the internal battery nominal voltage, and again at the battery operating end point voltage which shall be specified by the equipment manufacturer.

If an unmodulated carrier is not available, the mean frequency of a modulated carrier can be obtained by using a frequency counter with gating time set to an appropriately large multiple of bit periods (gating time depending on the required accuracy). Full details on the choice of values shall be included in the test report.

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4.1.4. Test Result

Un-modulation, fc=410.05MHz					
Temp (℃)	Voltage (V)	Measured (MHz)	Frequency error (ppm)	Limit (ppm)	Result
-30	DC 12V	410.0503	0.732	2.5	Pass
-20		410.0504	0.975		Pass
-10		410.0502	0.488		Pass
0		410.0501	0.244		Pass
10		410.0502	0.488		Pass
20		410.0504	0.975		Pass
30		410.0503	0.732		Pass
40		410.0503	0.732		Pass
50		410.0502	0.488		Pass
20	DC 13.2V	410.0503	0.732		Pass
20	DC 10.8V	410.0502	0.488		Pass

Un-modulation, fc=429.95MHz					
Temp (℃)	Voltage (V)	Measured (MHz)	Frequency error (ppm)	Limit (ppm)	Result
-30	DC 12V	429.9503	0.698	2.5	Pass
-20		429.9502	0.465		Pass
-10		429.9503	0.698		Pass
0		429.9501	0.233		Pass
10		429.9502	0.465		Pass
20		429.9504	0.930		Pass
30		429.9503	0.698		Pass
40		429.9501	0.233		Pass
50		429.9502	0.465		Pass
20	DC 13.2V	429.9505	1.163		Pass
20	DC 10.8V	429.9502	0.465		Pass

Note: the Operation Voltage range was provided by manufacturer.

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Un-modulation, fc=440.05MHz					
Temp (℃)	Voltage (V)	Measured (MHz)	Frequency error (ppm)	Limit (ppm)	Result
-30	DC 12V	440.0501	0.227	2.5	Pass
-20		440.0503	0.682		Pass
-10		440.0501	0.227		Pass
0		440.0502	0.454		Pass
10		440.0505	1.136		Pass
20		440.0502	0.454		Pass
30		440.0503	0.682		Pass
40		440.0501	0.227		Pass
50		440.0503	0.682		Pass
20	DC 13.2V	440.0502	0.454		Pass
20	DC 10.8V	440.0503	0.682		Pass

Un-modulation, fc=469.95MHz					
Temp (℃)	Voltage (V)	Measured (MHz)	Frequency error (ppm)	Limit (ppm)	Result
-30	DC 12V	469.9502	0.426	2.5	Pass
-20		469.9504	0.851		Pass
-10		469.9502	0.426		Pass
0		469.9503	0.638		Pass
10		469.9503	0.638		Pass
20		469.9504	0.851		Pass
30		469.9501	0.213		Pass
40		469.9503	0.638		Pass
50		469.9501	0.213		Pass
20	DC 13.2V	469.9502	0.426		Pass
20	DC 10.8V	469.9503	0.638		Pass

Note: the Operation Voltage range was provided by manufacturer.

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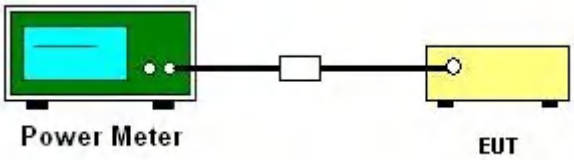
4.2. Transmitter Output Power

4.2.1. Test Setup



4.2.2. Applicable Standard

(d) 150-174 MHz. (1) The maximum allowable station ERP is dependent upon the station's antenna HAAT and required service area and will be authorized in accordance with table 1. Applicants requesting an ERP in excess of that listed in table 1 must submit an engineering analysis based upon generally accepted engineering practices and standards that includes coverage contours to demonstrate that the requested station parameters will not produce coverage in excess of that which the applicant requires.

(h) 450-470 MHz.
(1) The maximum allowable station effective radiated power (ERP) is dependent upon the station's antenna HAAT and required service area and will be authorized in accordance with table 2. Applicants requesting an ERP in excess of that listed in table 2 must submit an engineering analysis based upon generally accepted engineering practices and standards that includes coverage contours to demonstrate that the requested station parameters will not produce coverage in excess of that which the applicant requires.

(2) Applications for stations where special circumstances exist that make it necessary to deviate from the ERP and antenna heights in Table 2 will be submitted to the frequency coordinator accompanied by a technical analysis, based upon generally accepted engineering practices and standards, that demonstrates that the requested station parameters will not produce a signal strength in excess of 39 dBu at any point along the edge of the requested service area. The coordinator may then recommend any ERP appropriate to meet this condition.

(3) An applicant for a station with a service area radius greater than 32 km (20 mi) must justify the requested service area radius, which may be authorized only in accordance with table 2, note 4. For base stations with service areas greater than 80 km, all operations 80 km or less from the base station will be on a primary basis and all operations outside of 80 km from the base station will be on a secondary basis and will be entitled to no protection from primary operations.

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4.2.3. Test Procedures

C63.26-2015, Clause 5.2.3.2:

measurements may be performed using a wide band gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at itsl maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

4.2.4. Test Result

Channel Separation	Test Modulation	Test Channel	Frequency (MHz)	Conducted Output Power (dBm)		Limit (dBm)	
				High Power Level	Low Power Level	High Power Level	Low Power Level
12.5KHz	4FSK	Low	410.05	28.898	25.85	30	27
		Middle 1	429.95	29.445	26.289	30	27
		Middle 2	440.05	29.504	26.486	30	27
		High	469.95	29.426	26.843	30	27
25KHz	4FSK	Low	410.05	29.502	26.587	30	27
		Middle 1	429.95	29.503	26.385	30	27
		Middle 2	440.05	29.501	26.606	30	27
		High	469.95	29.432	26.675	30	27

Note:

The high rated power level is 1W(30dBm), and low rated power level is 0.5W(27dBm).

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4.3. Occupied Bandwidth & Emission Mask

4.3.1. Applicable Standard

FCC§ 90.209:

(a)Each authorization issued to a station licensed under this part will show an emission designator representing the class of emission authorized. The designator will be prefixed by a specified necessary bandwidth. This number does not necessarily indicate the bandwidth occupied by the emission at any instant. In those cases where §2.202 of this chapter does not provide a formula for the computation of necessary bandwidth, the occupied bandwidth, as defined in part 2 of this chapter, may be used in lieu of the necessary bandwidth.

(b) (5)Unless specified elsewhere, channel spacings and bandwidths that will be authorized in thefollowing frequency bands are given in the following table: STANDARD CHANNELSPACING/BANDWIDTH.

FCC§ 90.210:

Emission Mask D-12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1).On any frequency from the center of the authorized bandwidth fo to 5.625 kHz removed from fO: Zero dB.

(2).On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(fd-2.88 kHz) dB.

(3).On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 12.5 kHz: At least 50+10 log (P) dB or 70 dB, whichever is the lesser attenuation.

(4).The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrumentresolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may

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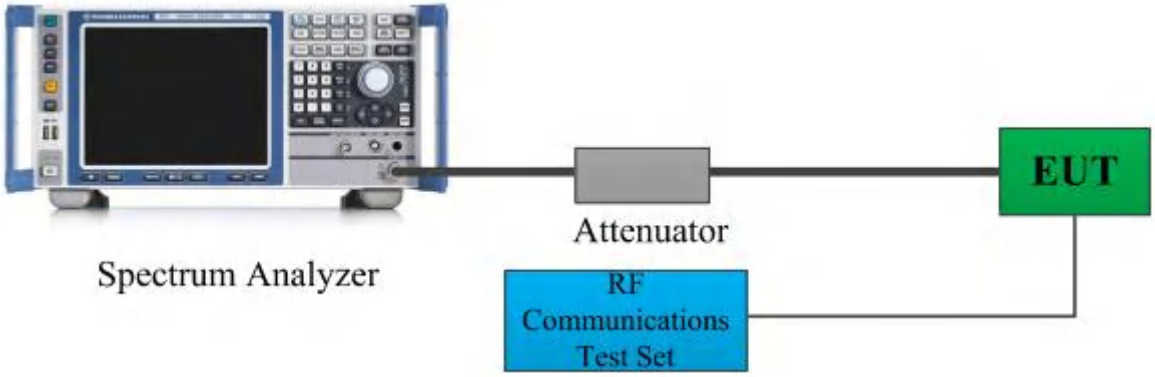
be used provided prior Commission approval is obtained.

4.3.2. Test Setup



4.3.3. Test Procedures

According to ANSI C63.26-2015 Section 5.4.4:

The OBW is the frequency bandwidth such that, below its lower and above its upper frequency limits, themean powers are each equal to 0.5% of the total mean power of the given emission.

The following procedure shall be used for measuring (99%) power bandwidth:

(a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of 1.5 x OBW is sufficient).

(b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set 3× RBW.

(c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding thel NOTE-Step a), step b), and step c) may require iteration to adjust within the specified tolerances.maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.

(d) Set the detection mode to peak, and the trace mode to max-hold.

(e) If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.

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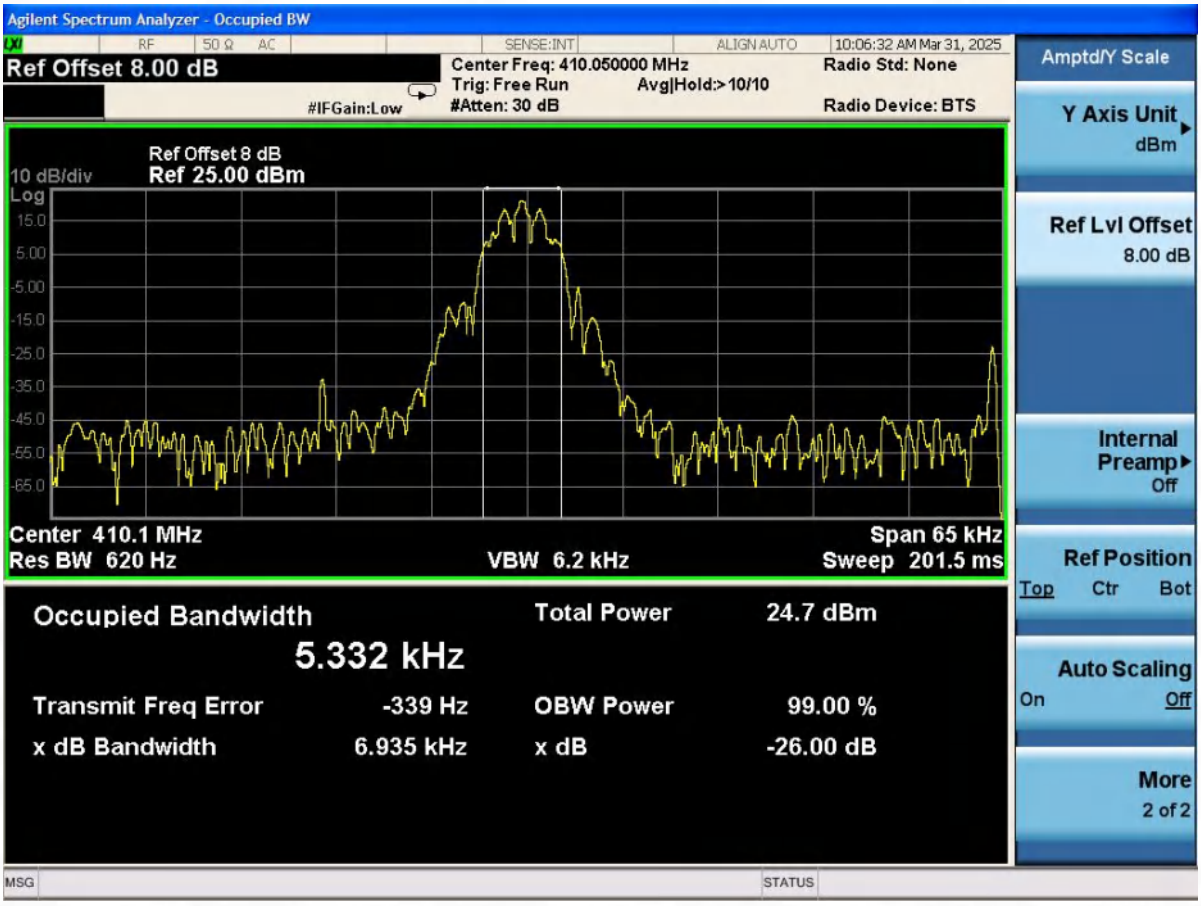
4.3.4. Test Result

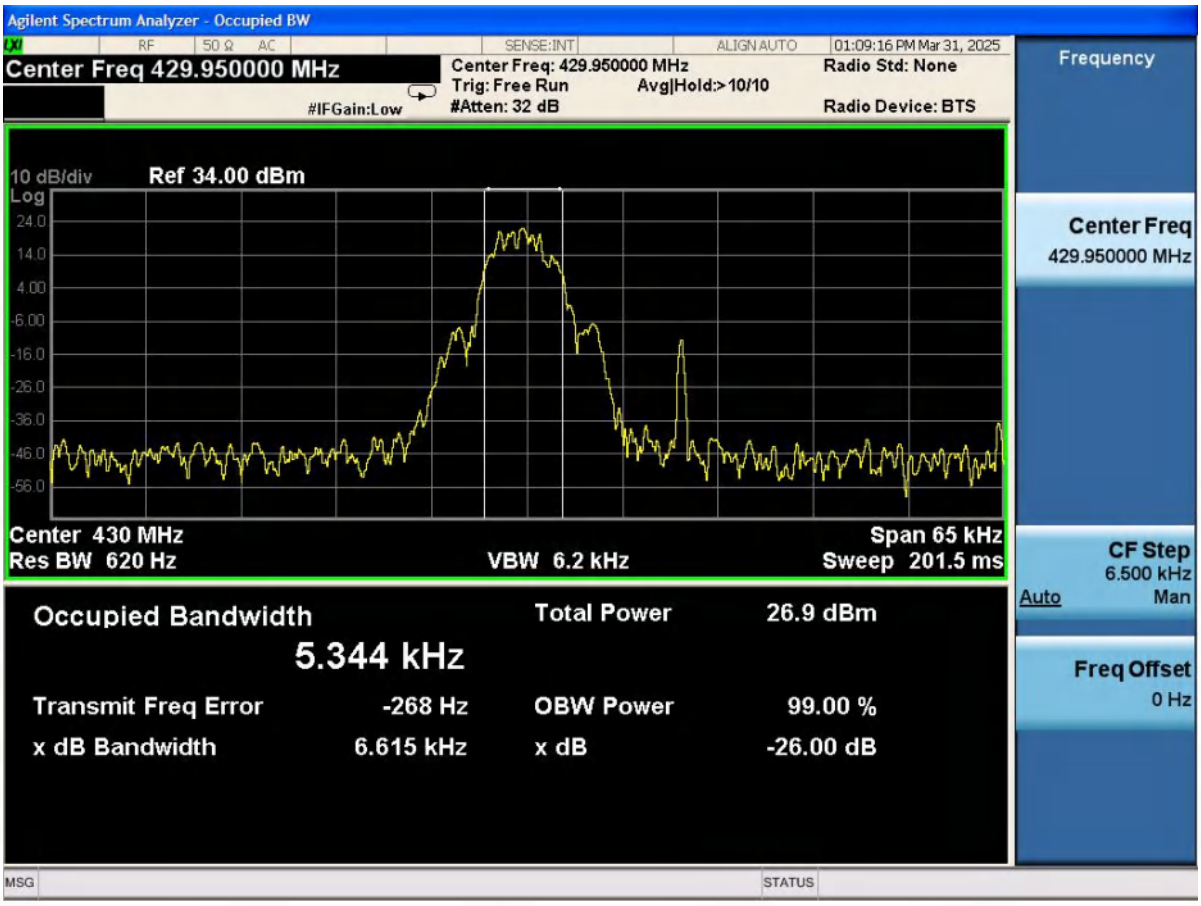
Emission Bandwidth Measurement Result _0.5W				
Operating Frequency (MHz)	12.5kHz Channel Separation			
	99% Occupied Bandwidth (KHz)	26dB Emission Bandwidth (KHz)	Limits (KHz)	Result
410.05	5.332	6.935	12.5	Pass
429.95	5.344	6.615	12.5	Pass
440.05	5.142	6.316	12.5	Pass
469.95	4.617	5.611	12.5	Pass

The test plots as follows:

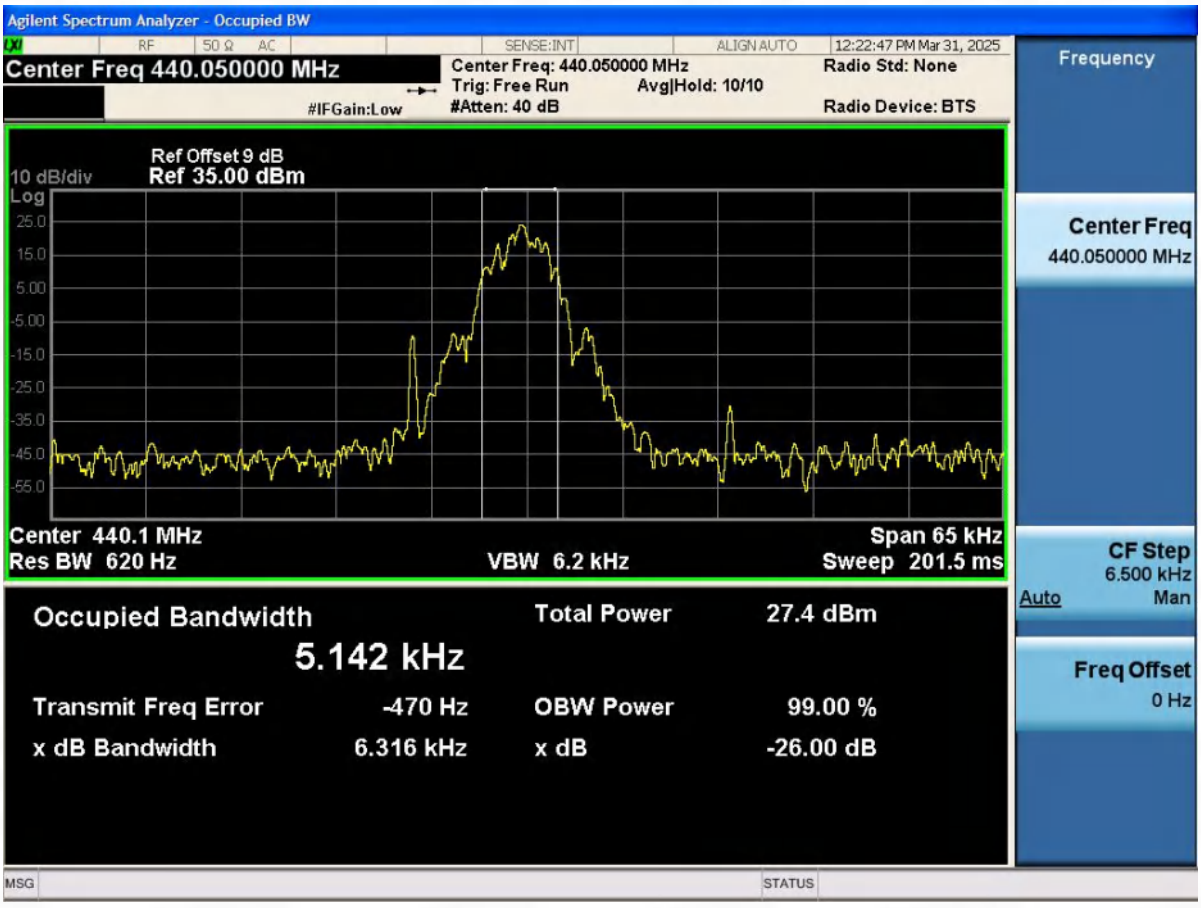
12.5kHz Channel Separation
410.05MHz



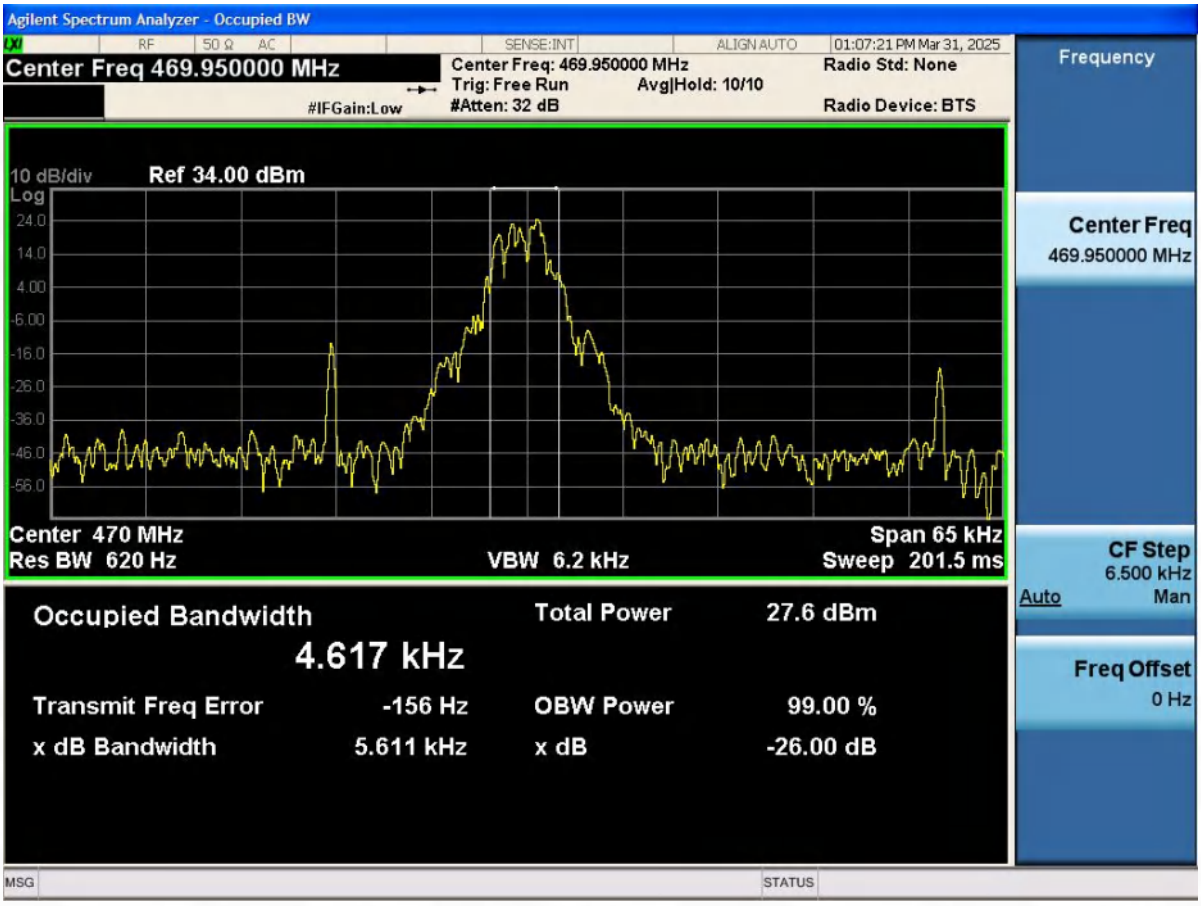
429.95MHz


Agilent Spectrum Analyzer - Occupied BW
Center Freq 429.950000 MHz
Center Freq: 429.950000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 32 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
01:09:16 PM Mar 31, 2025
Frequency
Ref 34.00 dBm
10 dB/div
Log
Center 430 MHz
Res BW 620 Hz
VBW 6.2 kHz
Span 65 kHz
Sweep 201.5 ms
Center Freq
429.950000 MHz
CF Step
6.500 kHz
Auto
Man
Freq Offset
0 Hz
Occupied Bandwidth
5.344 kHz
Total Power
26.9 dBm
Transmit Freq Error
-268 Hz
OBW Power
99.00 %
x dB Bandwidth
6.615 kHz
x dB
-26.00 dB
MSG
STATUS

440.05MHz


Agilent Spectrum Analyzer - Occupied BW
Center Freq 440.050000 MHz
Center Freq: 440.050000 MHz
Trig: Free Run
Avg|Hold: 10/10
#Atten: 40 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
12:22:47 PM Mar 31, 2025
Frequency
Ref Offset 9 dB
Ref 35.00 dBm
10 dB/div
Log
Center 440.1 MHz
Res BW 620 Hz
VBW 6.2 kHz
Span 65 kHz
Sweep 201.5 ms
Center Freq
440.050000 MHz
CF Step
6.500 kHz
Auto
Man
Freq Offset
0 Hz
Occupied Bandwidth
5.142 kHz
Total Power
27.4 dBm
Transmit Freq Error
-470 Hz
OBW Power
99.00 %
x dB Bandwidth
6.316 kHz
x dB
-26.00 dB
MSG
STATUS

469.95MHz


Agilent Spectrum Analyzer - Occupied BW
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
01:07:21 PM Mar 31, 2025
Center Freq 469.950000 MHz
Center Freq: 469.950000 MHz
Trig: Free Run
Avg|Hold: 10/10
#Atten: 32 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 34.00 dBm
Log
24.0
14.0
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
Center Freq
469.950000 MHz
Center 470 MHz
Res BW 620 Hz
VBW 6.2 kHz
Span 65 kHz
Sweep 201.5 ms
CF Step
6.500 kHz
Auto
Man
Occupied Bandwidth
4.617 kHz
Total Power
27.6 dBm
Transmit Freq Error
-156 Hz
OBW Power
99.00 %
x dB Bandwidth
5.611 kHz
x dB
-26.00 dB
Freq Offset
0 Hz
MSG
STATUS

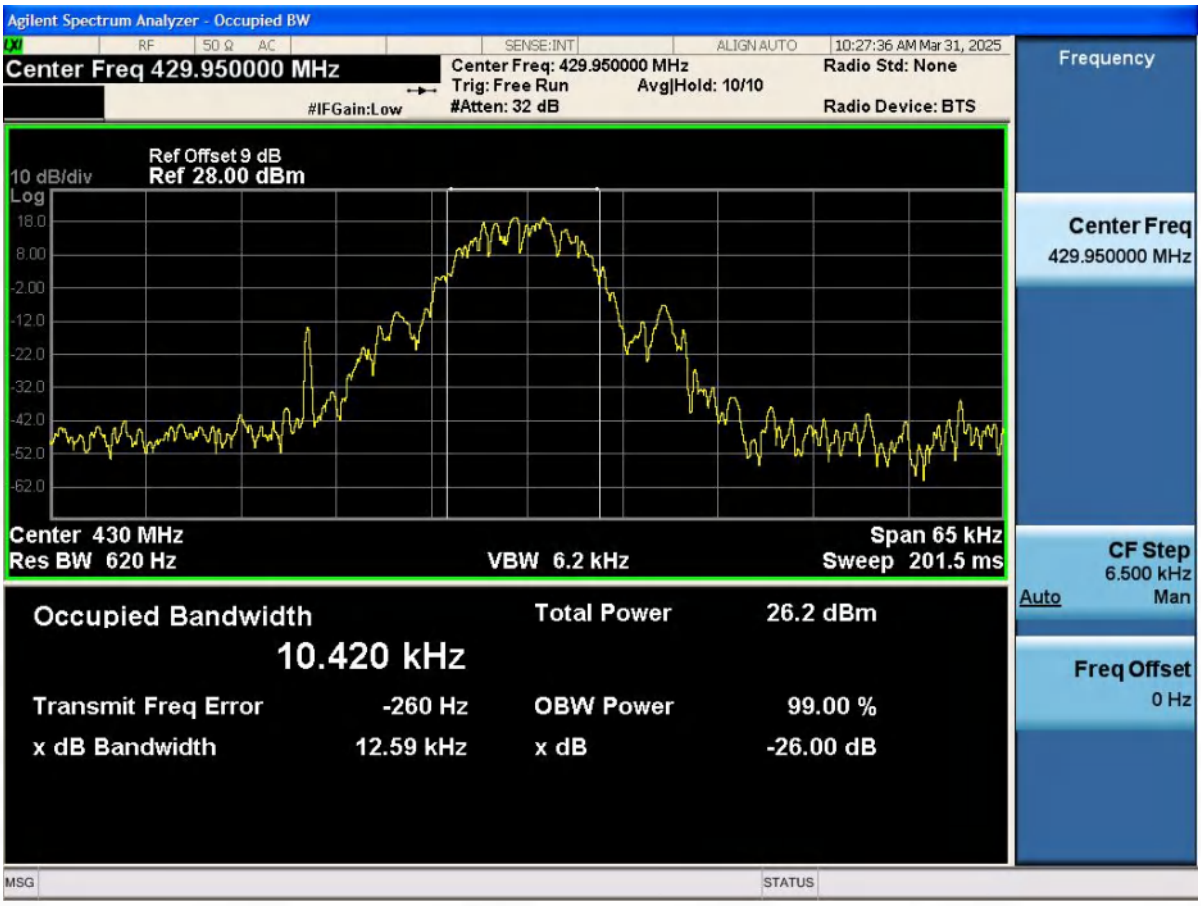
Emission Bandwidth Measurement Result _0.5W				
Operating Frequency	25kHz Channel Separation			
	99% Occupied Bandwidth (KHz)	26dB Emission Bandwidth (KHz)	Limits (KHz)	Result
410.05	9.942	12.44	20	Pass
429.95	10.42	12.59	20	Pass
440.05	10.52	12.61	20	Pass
469.95	10.06	12.16	20	Pass

The test plots as follows:

25kHz Channel Separation

410.05MHz

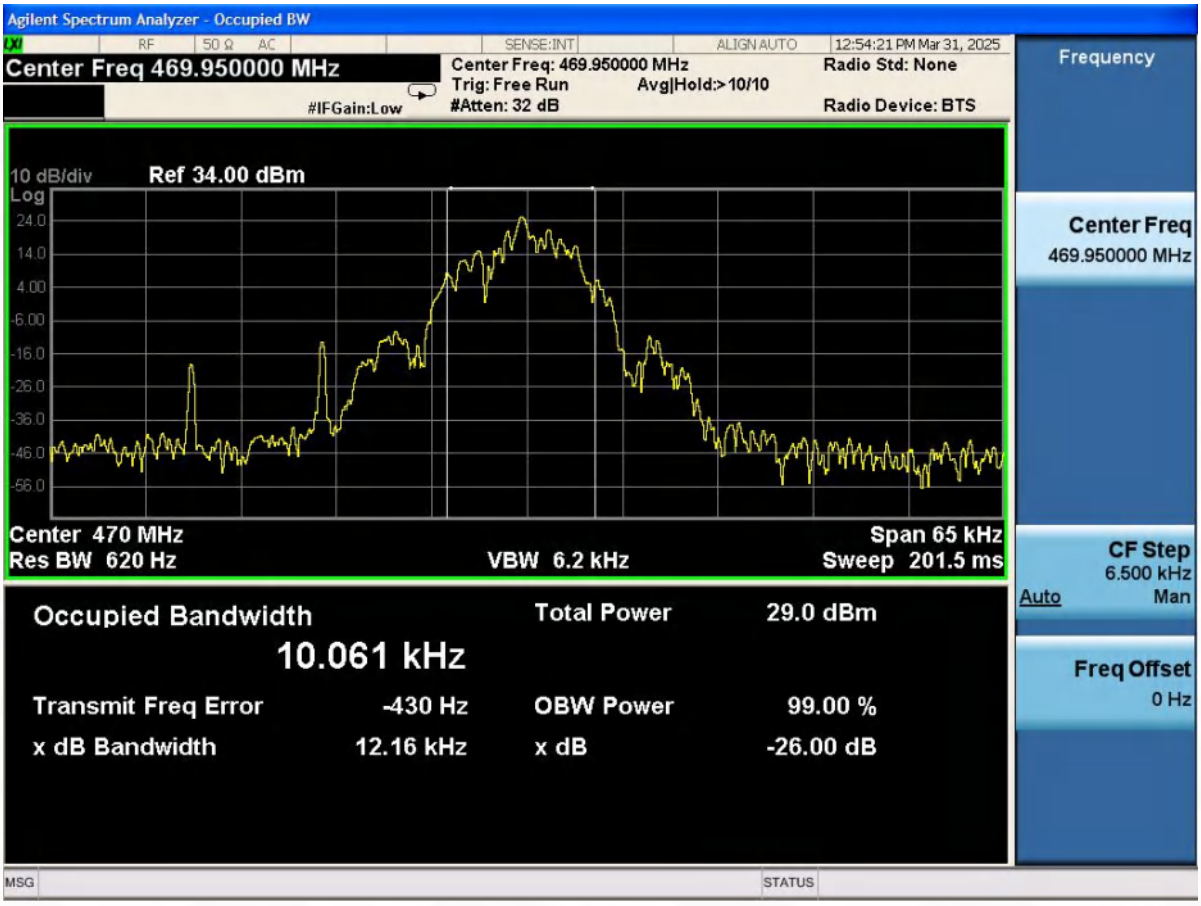
429.95MHz


Agilent Spectrum Analyzer - Occupied BW
Center Freq 429.950000 MHz
Center Freq: 429.950000 MHz
Trig: Free Run
Avg|Hold: 10/10
#Atten: 32 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10:27:36 AM Mar 31, 2025
Ref Offset 9 dB
10 dB/div
Ref 28.00 dBm
Log
Center 430 MHz
Res BW 620 Hz
VBW 6.2 kHz
Span 65 kHz
Sweep 201.5 ms
Occupied Bandwidth
10.420 kHz
Total Power 26.2 dBm
Transmit Freq Error -260 Hz
OBW Power 99.00 %
x dB Bandwidth 12.59 kHz
x dB -26.00 dB
Frequency
Center Freq
429.950000 MHz
CF Step
6.500 kHz
Auto Man
Freq Offset
0 Hz

440.05MHz

Agilent Spectrum Analyzer - Occupied BW
Center Freq 440.050000 MHz
Center Freq: 440.050000 MHz
Trig: Free Run
Avg|Hold: 10/10
#Atten: 32 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
01:37:48 PM Mar 31, 2025
10 dB/div
Ref 34.00 dBm
Log
Center 440.1 MHz
Res BW 620 Hz
VBW 6.2 kHz
Span 65 kHz
Sweep 201.5 ms
Occupied Bandwidth
10.521 kHz
Total Power 26.8 dBm
Transmit Freq Error -448 Hz
OBW Power 99.00 %
x dB Bandwidth 12.61 kHz
x dB -26.00 dB
Frequency
Center Freq
440.050000 MHz
CF Step
6.500 kHz
Auto Man
Freq Offset
0 Hz

469.95MHz

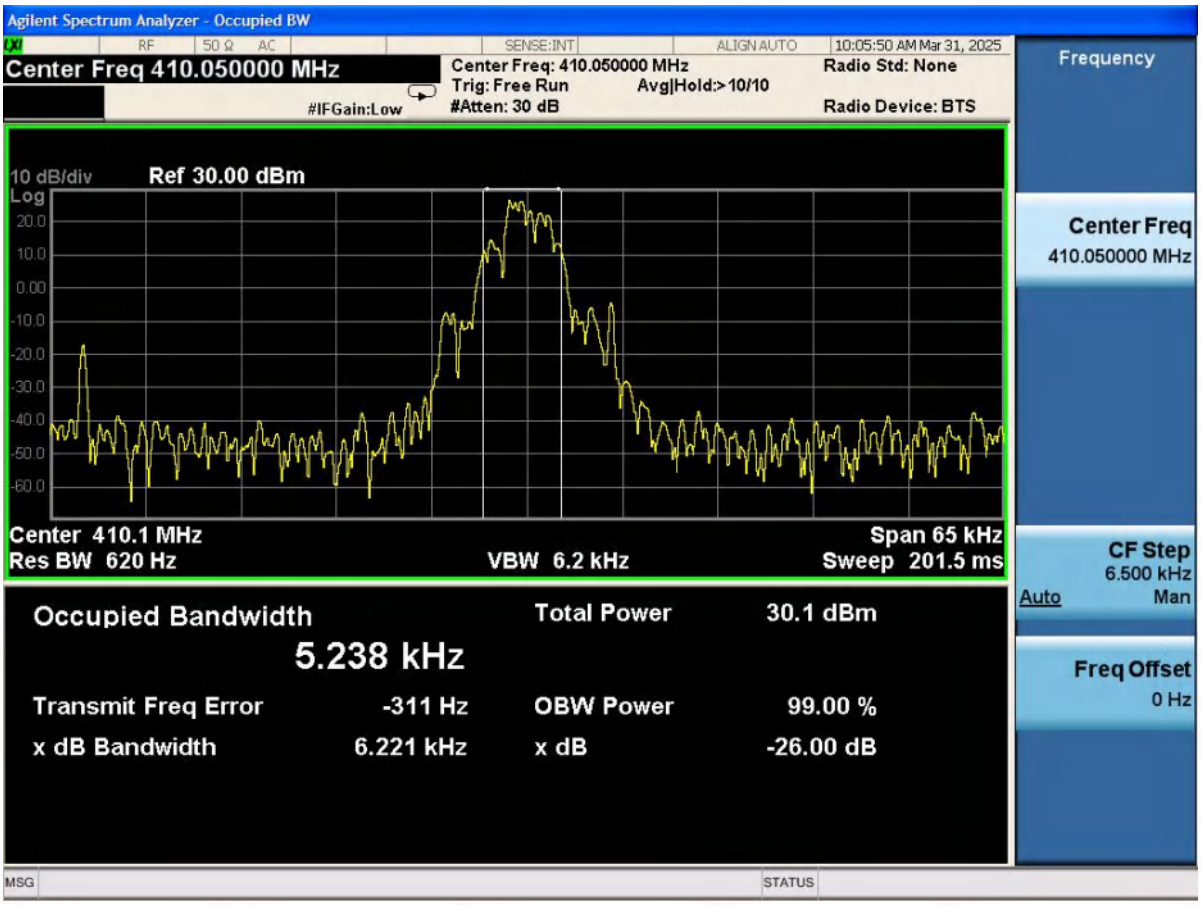

Agilent Spectrum Analyzer - Occupied BW
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
12:54:21 PM Mar 31, 2025
Center Freq 469.950000 MHz
Center Freq: 469.950000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 32 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 34.00 dBm
Log
24.0
14.0
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
Center Freq
469.950000 MHz
Center 470 MHz
Res BW 620 Hz
VBW 6.2 kHz
Span 65 kHz
Sweep 201.5 ms
CF Step
6.500 kHz
Auto
Man
Occupied Bandwidth
10.061 kHz
Total Power 29.0 dBm
Transmit Freq Error -430 Hz
OBW Power 99.00 %
x dB Bandwidth 12.16 kHz
x dB -26.00 dB
Freq Offset
0 Hz
MSG
STATUS

Emission Bandwidth Measurement Result _1W				
Operating Frequency	12.5kHz Channel Separation			
	99% Occupied Bandwidth (KHz)	26dB Emission Bandwidth (KHz)	Limits (KHz)	Result
410.05	5.238	6.221	12.5	Pass
429.95	5.091	6.26	12.5	Pass
440.05	5.089	6.125	12.5	Pass
469.95	4.876	6.473	12.5	Pass

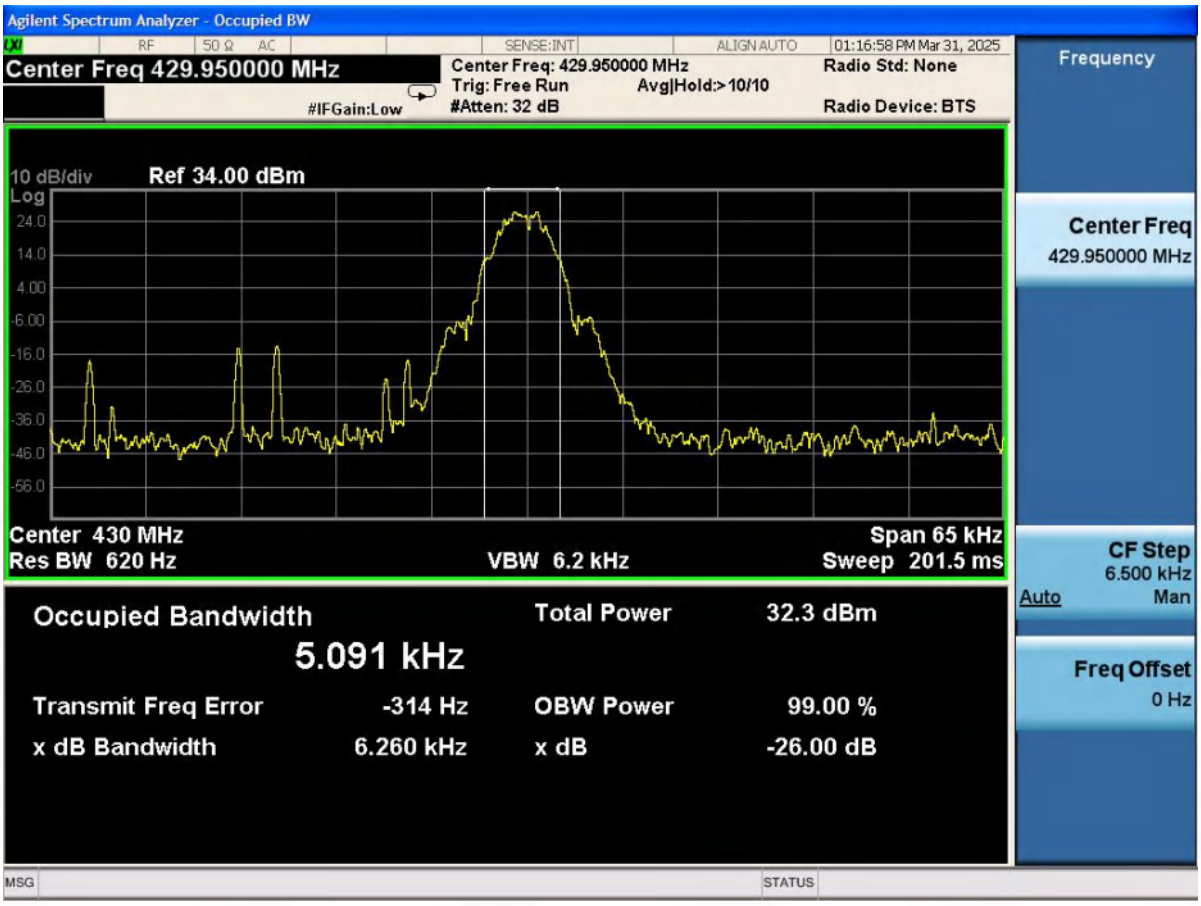
The test plots as follows:

12.5kHz Channel Separation

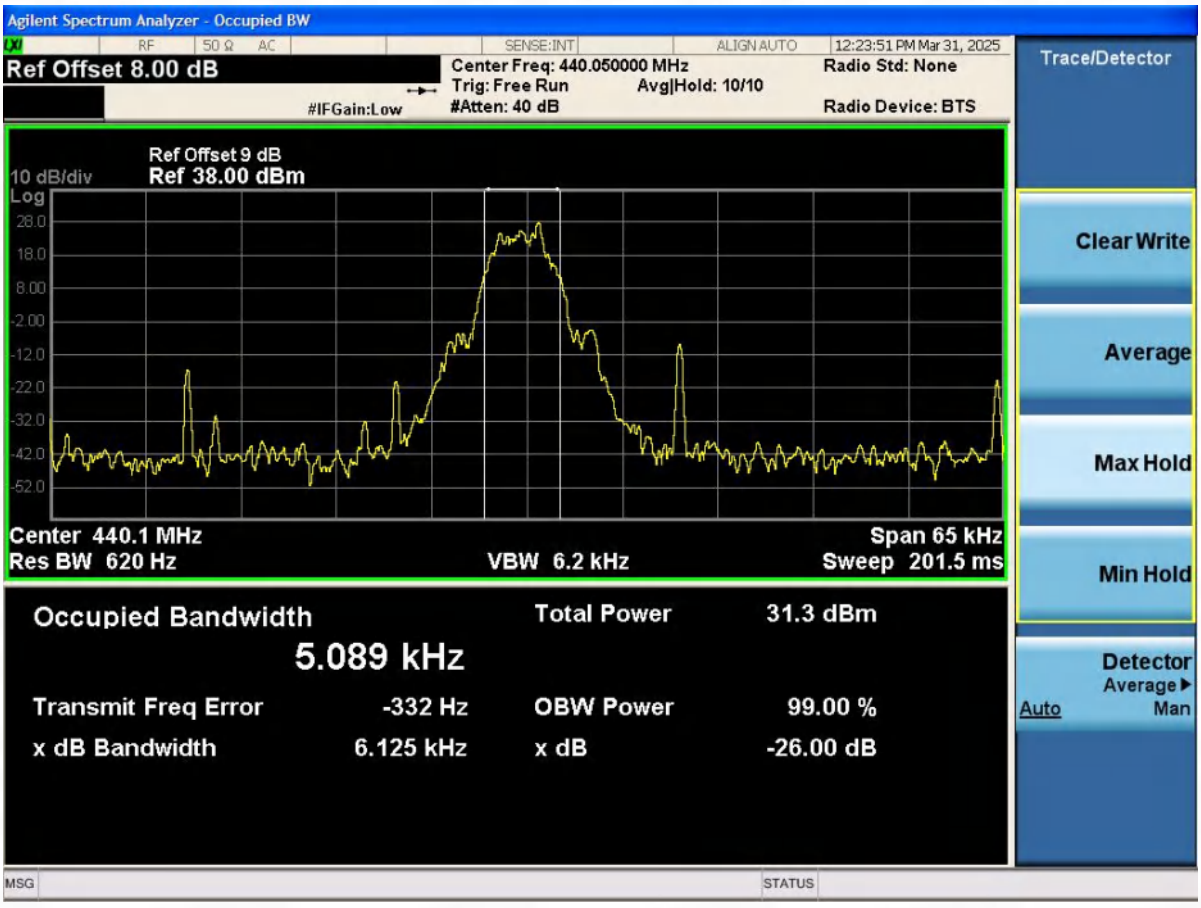
410.05MHz



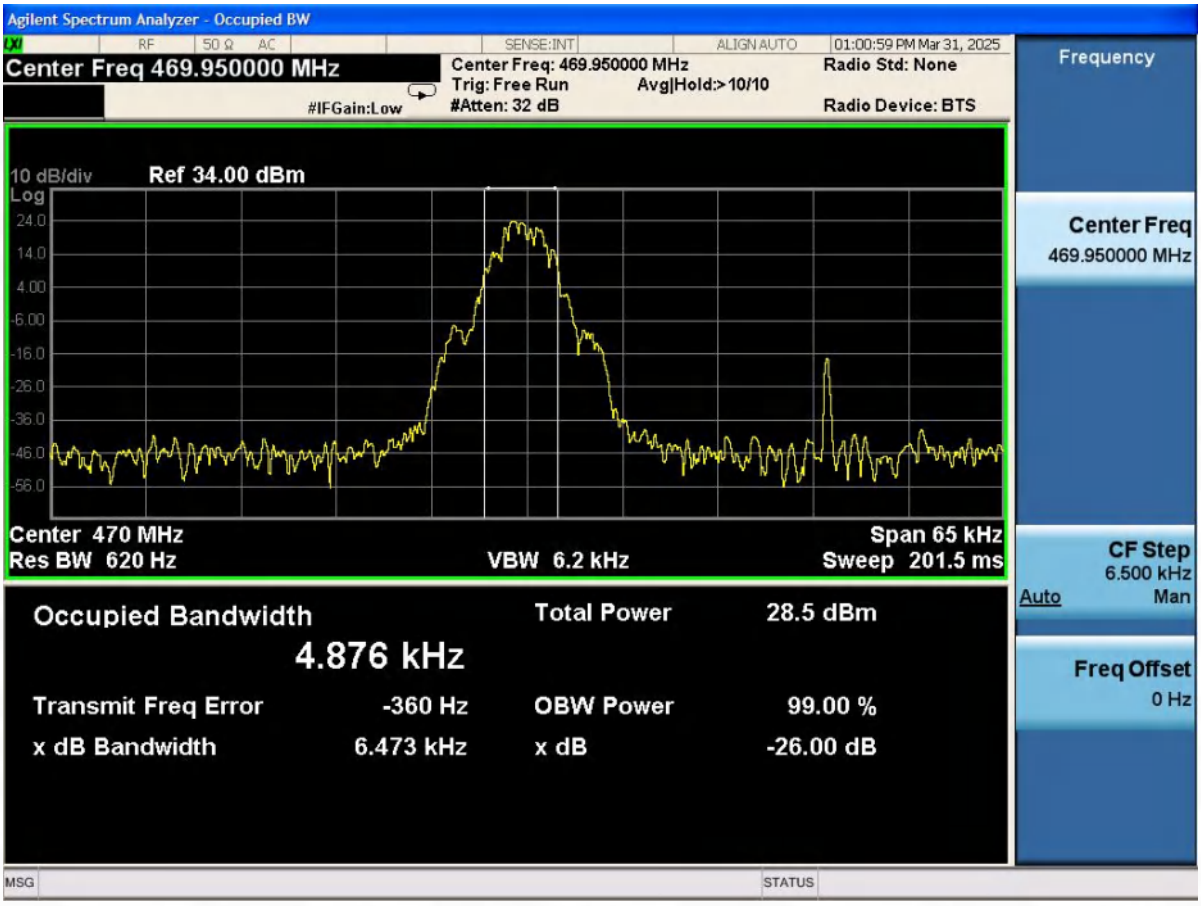
429.95MHz


Agilent Spectrum Analyzer - Occupied BW
Center Freq 429.950000 MHz
Center Freq: 429.950000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 32 dB
#IFGain:Low
01:16:58 PM Mar 31, 2025
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 34.00 dBm
Center 430 MHz
Res BW 620 Hz
VBW 6.2 kHz
Span 65 kHz
Sweep 201.5 ms
Occupied Bandwidth
5.091 kHz
Total Power 32.3 dBm
Transmit Freq Error -314 Hz
OBW Power 99.00 %
x dB Bandwidth 6.260 kHz
x dB -26.00 dB
Center Freq
429.950000 MHz
CF Step
6.500 kHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

440.05MHz


Agilent Spectrum Analyzer - Occupied BW
Ref Offset 8.00 dB
Center Freq: 440.050000 MHz
Trig: Free Run
Avg|Hold: 10/10
#Atten: 40 dB
#IFGain:Low
12:23:51 PM Mar 31, 2025
Radio Std: None
Radio Device: BTS
Trace/Detector
Ref Offset 9 dB
10 dB/div
Ref 38.00 dBm
Center 440.1 MHz
Res BW 620 Hz
VBW 6.2 kHz
Span 65 kHz
Sweep 201.5 ms
Occupied Bandwidth
5.089 kHz
Total Power 31.3 dBm
Transmit Freq Error -332 Hz
OBW Power 99.00 %
x dB Bandwidth 6.125 kHz
x dB -26.00 dB
Clear Write
Average
Max Hold
Min Hold
Detector
Average
Auto Man
MSG
STATUS

469.95MHz

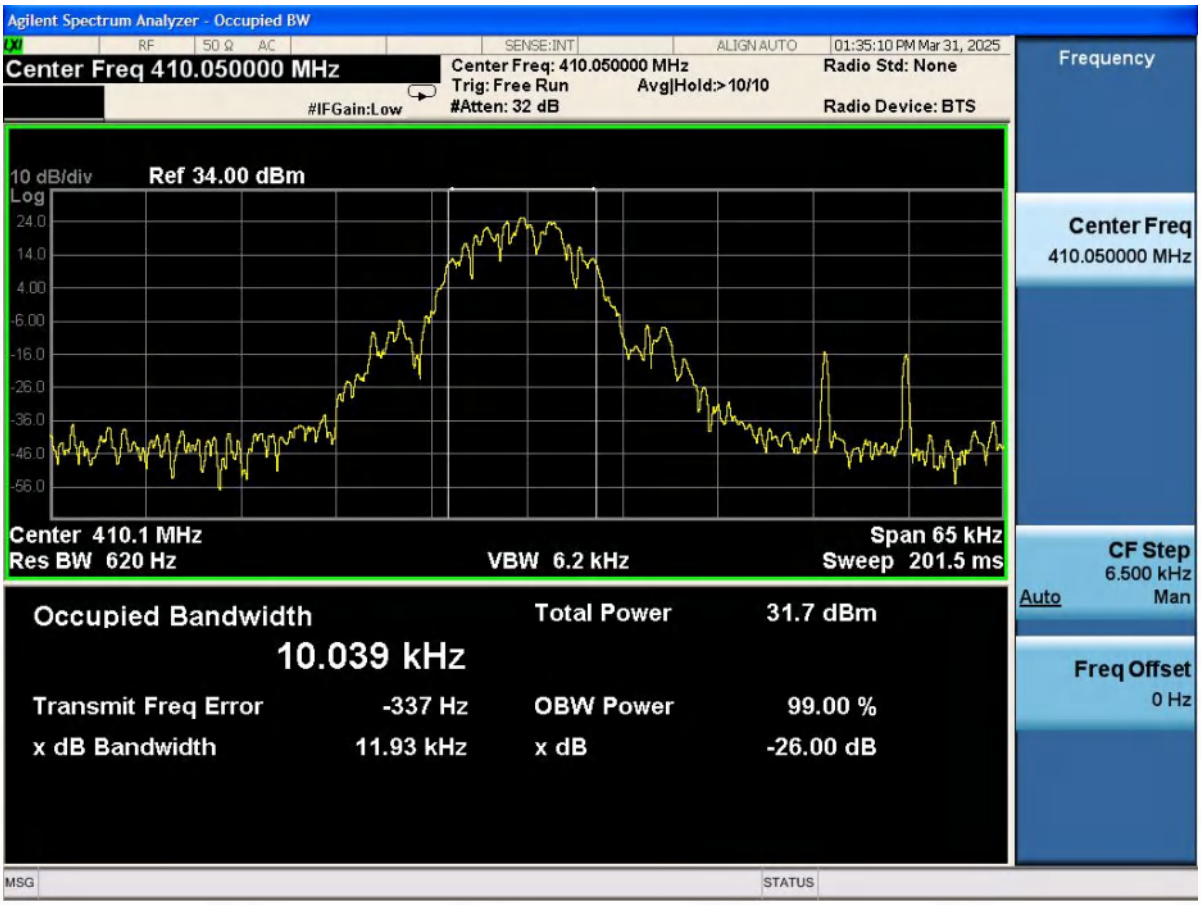

Agilent Spectrum Analyzer - Occupied BW
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
01:00:59 PM Mar 31, 2025
Center Freq 469.950000 MHz
Center Freq: 469.950000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 32 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 34.00 dBm
Log
24.0
14.0
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
Center Freq
469.950000 MHz
Center 470 MHz
Res BW 620 Hz
VBW 6.2 kHz
Span 65 kHz
Sweep 201.5 ms
CF Step
6.500 kHz
Auto
Man
Occupied Bandwidth
4.876 kHz
Total Power
28.5 dBm
Transmit Freq Error
-360 Hz
OBW Power
99.00 %
x dB Bandwidth
6.473 kHz
x dB
-26.00 dB
Freq Offset
0 Hz
MSG
STATUS

Emission Bandwidth Measurement Result _1W				
Operating Frequency	25kHz Channel Separation			
	99% Occupied Bandwidth (KHz)	26dB Emission Bandwidth (KHz)	Limits (KHz)	Result
410.05	10.039	11.93	20	Pass
429.95	10.19	12.23	20	Pass
440.05	9.568	11.35	20	Pass
469.95	10.104	12.07	20	Pass

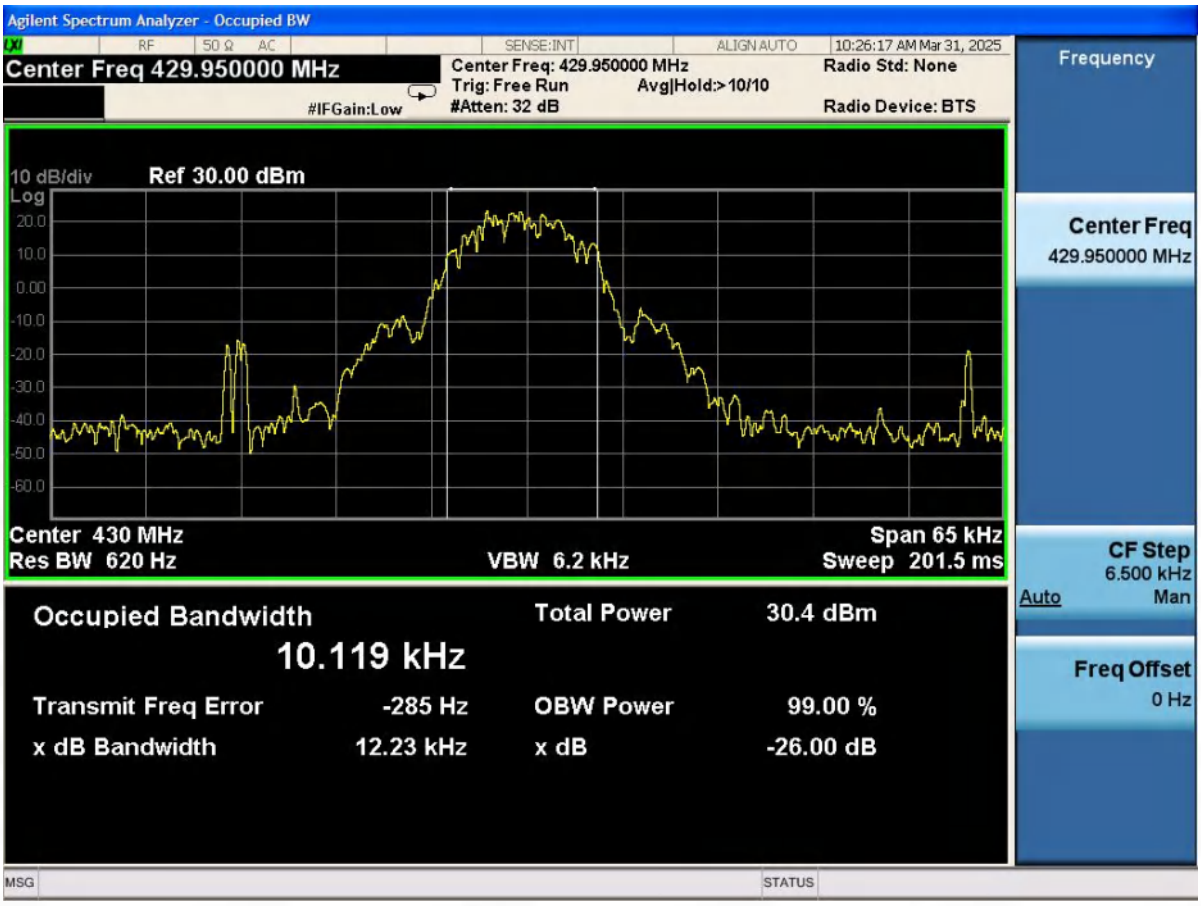
The test plots as follows:

25kHz Channel Separation

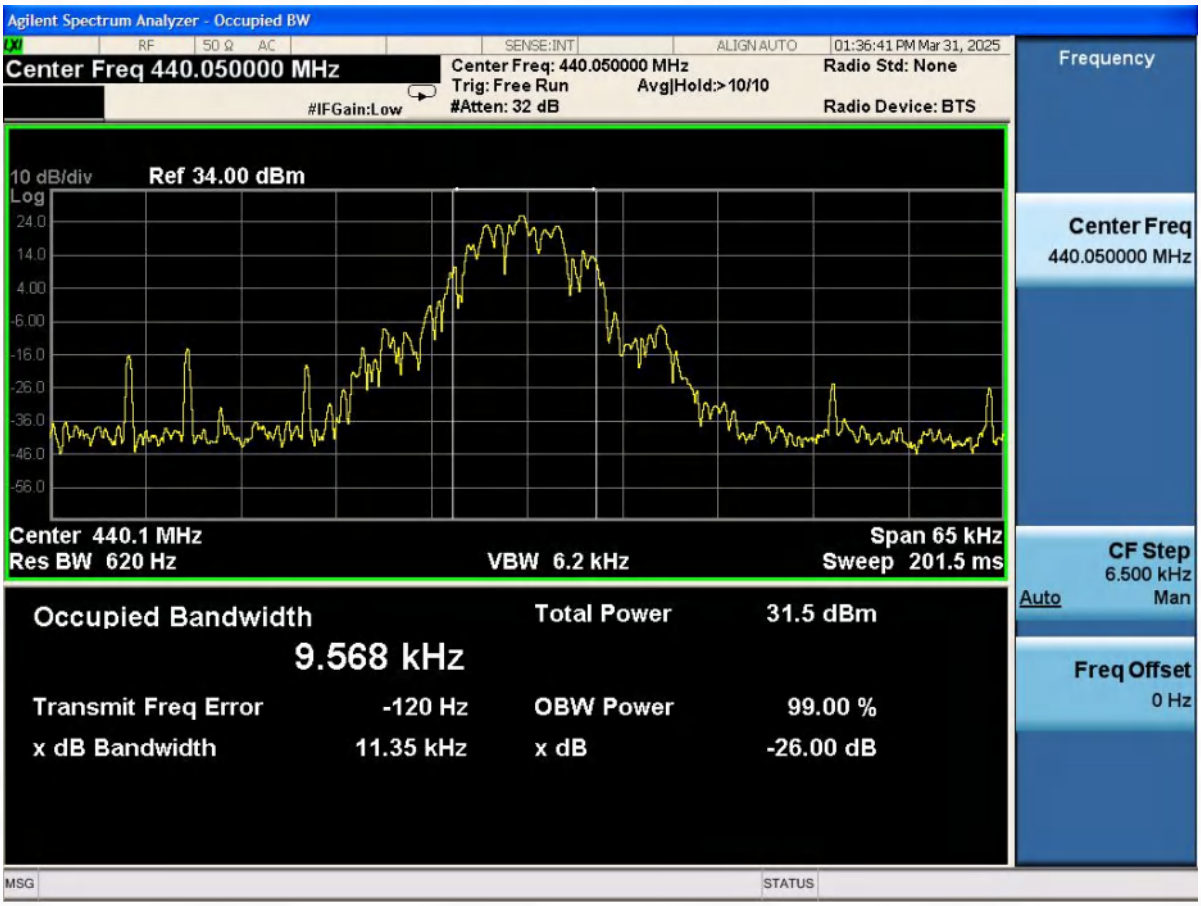
410.05MHz



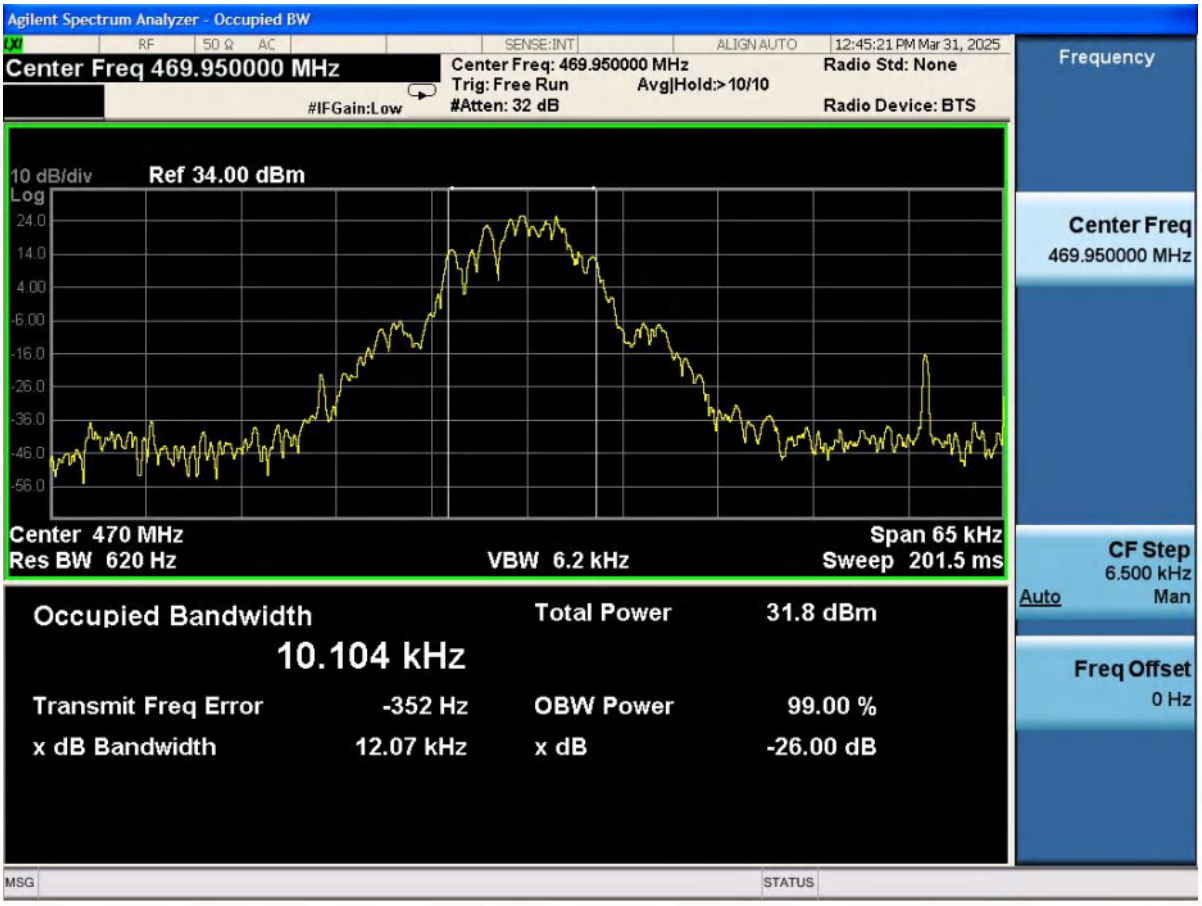
429.95MHz


Agilent Spectrum Analyzer - Occupied BW
Center Freq 429.950000 MHz
Center Freq: 429.950000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 32 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10:26:17 AM Mar 31, 2025
Frequency
10 dB/div
Ref 30.00 dBm
Center 430 MHz
Res BW 620 Hz
VBW 6.2 kHz
Span 65 kHz
Sweep 201.5 ms
Center Freq
429.950000 MHz
CF Step
6.500 kHz
Auto
Man
Freq Offset
0 Hz
Occupied Bandwidth
10.119 kHz
Total Power
30.4 dBm
Transmit Freq Error
-285 Hz
OBW Power
99.00 %
x dB Bandwidth
12.23 kHz
x dB
-26.00 dB
MSG
STATUS

440.05MHz


Agilent Spectrum Analyzer - Occupied BW
Center Freq 440.050000 MHz
Center Freq: 440.050000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 32 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
01:36:41 PM Mar 31, 2025
Frequency
10 dB/div
Ref 34.00 dBm
Center 440.1 MHz
Res BW 620 Hz
VBW 6.2 kHz
Span 65 kHz
Sweep 201.5 ms
Center Freq
440.050000 MHz
CF Step
6.500 kHz
Auto
Man
Freq Offset
0 Hz
Occupied Bandwidth
9.568 kHz
Total Power
31.5 dBm
Transmit Freq Error
-120 Hz
OBW Power
99.00 %
x dB Bandwidth
11.35 kHz
x dB
-26.00 dB
MSG
STATUS

469.95MHz



Emission Mask please refer to the plots:

NoteEmission bandwidth was based on calculation method instead of measurement.Emission Designator: Per CFR 47 §2.201& $2.202, BW= 2M + 2D

The detailed procedure employed for Emission Mask measurements are specified as following:-Connect the equipment as illustrated.-Spectrum set as follow:

1. Channel spacing,Centre frequency fundamental frequency, Span 50KHz for 12.5kHz and 25kHz RBW=100Hz, VBW=300Hz 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 theOdB reference for the measurement.
3. Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary toproduce 50% of rated system deviation(Rated system deviation is 2.5 kHz for 12.5kHz channel spacing).
4. Transmitters employing digital modulation techniques that bypass the limiter andthe audio low-pass filtershall be modulated as specified by the manufacturer.

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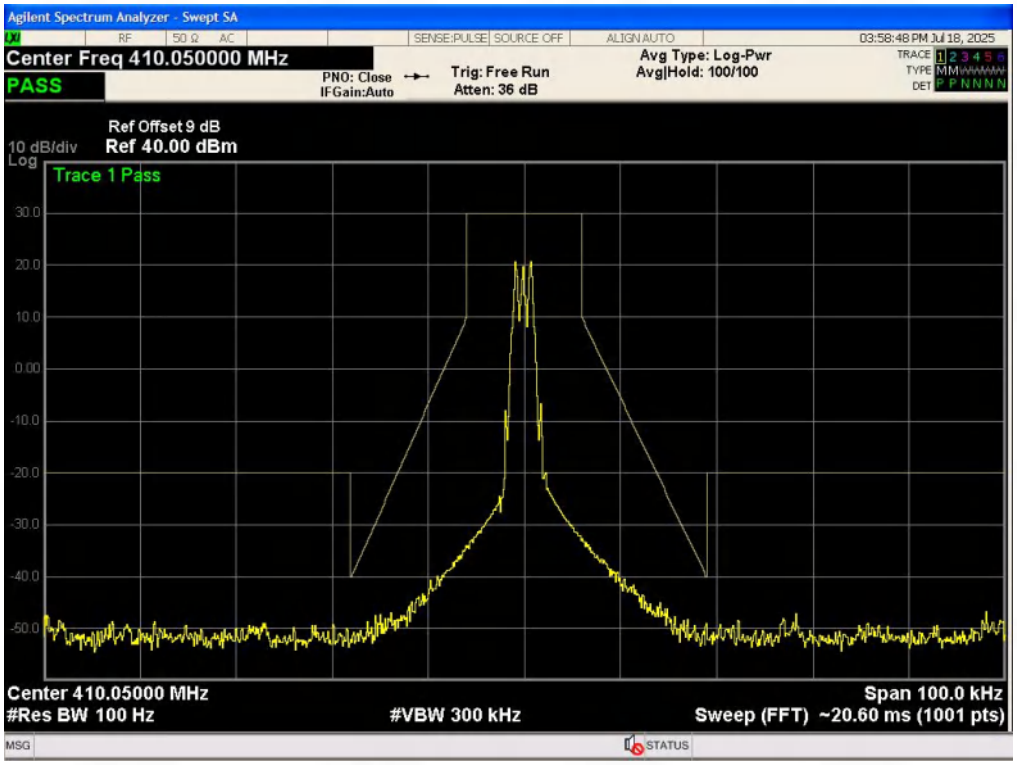
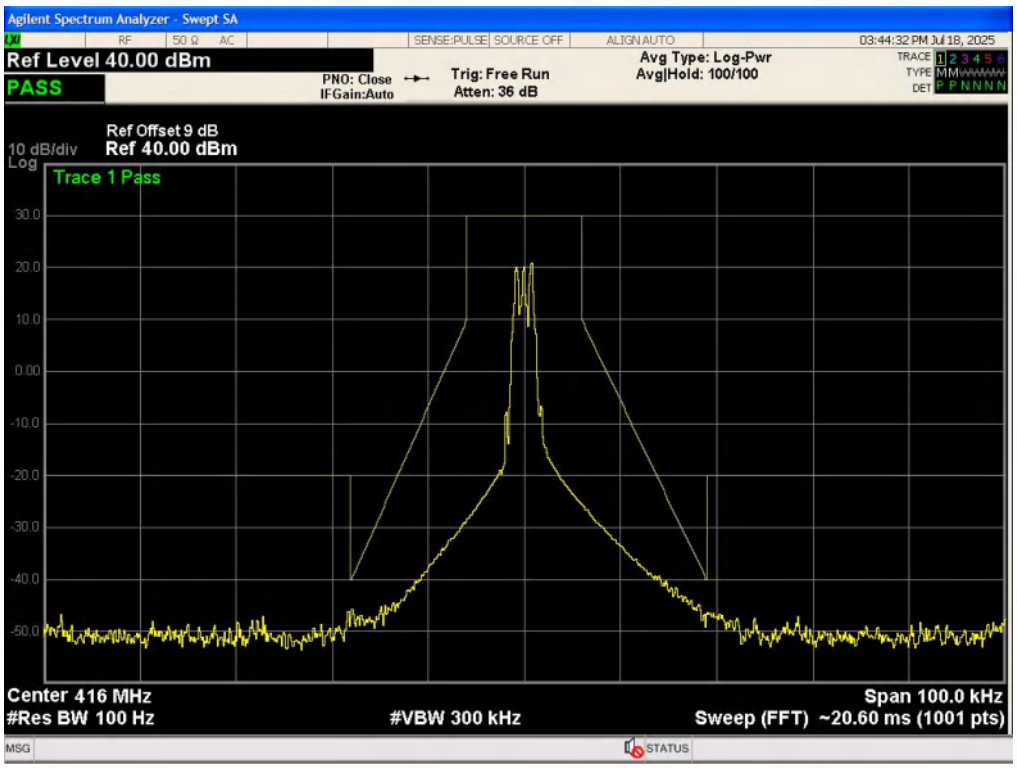
4FSK, 12.5kHz, High Power:

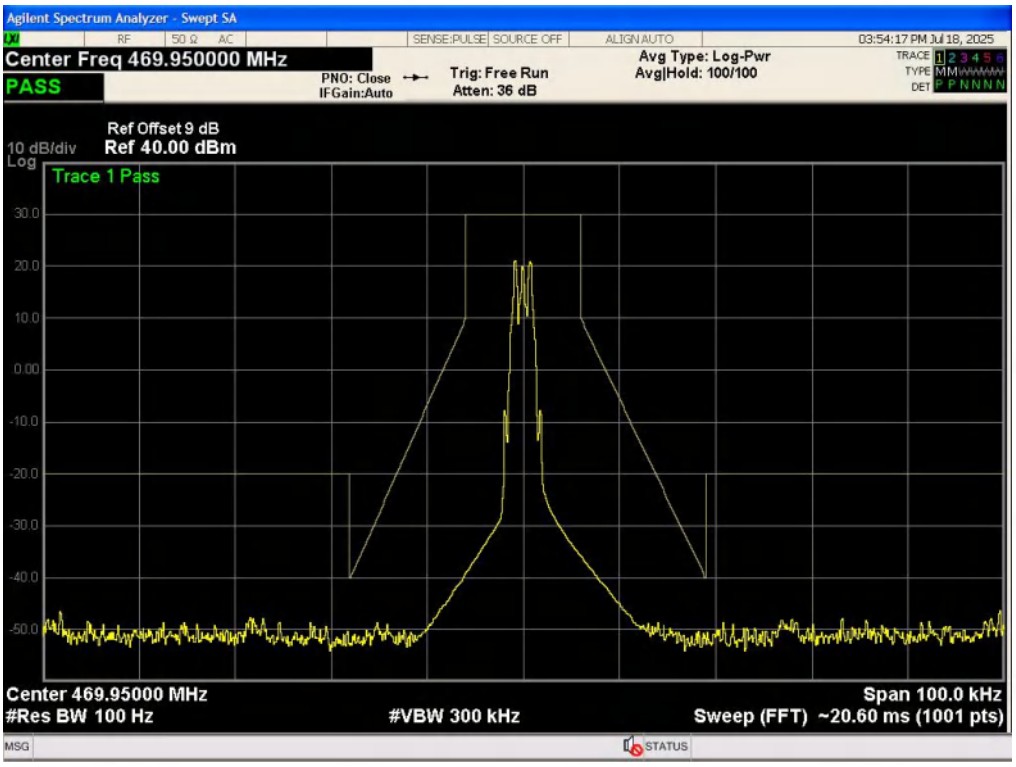
The Worst Emission Mask for (410.05MHz) of 12.5 KHz channel Separation (1W)



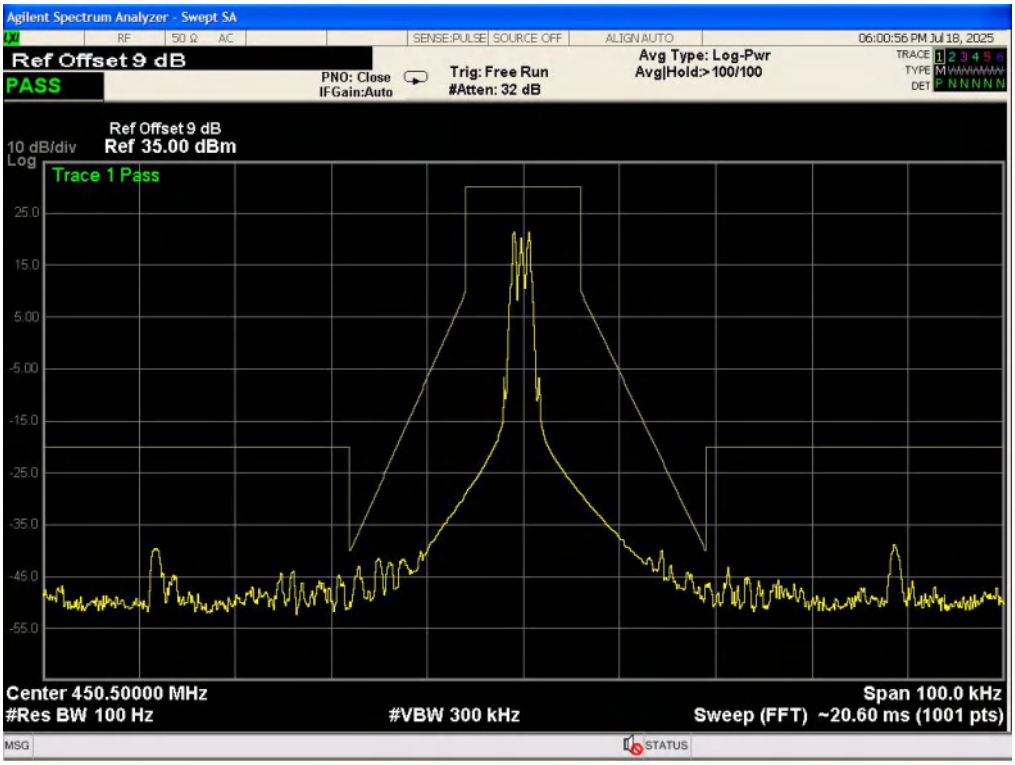
The Worst Emission Mask for (415.95MHz) of 12.5 KHz channel Separation (1W)



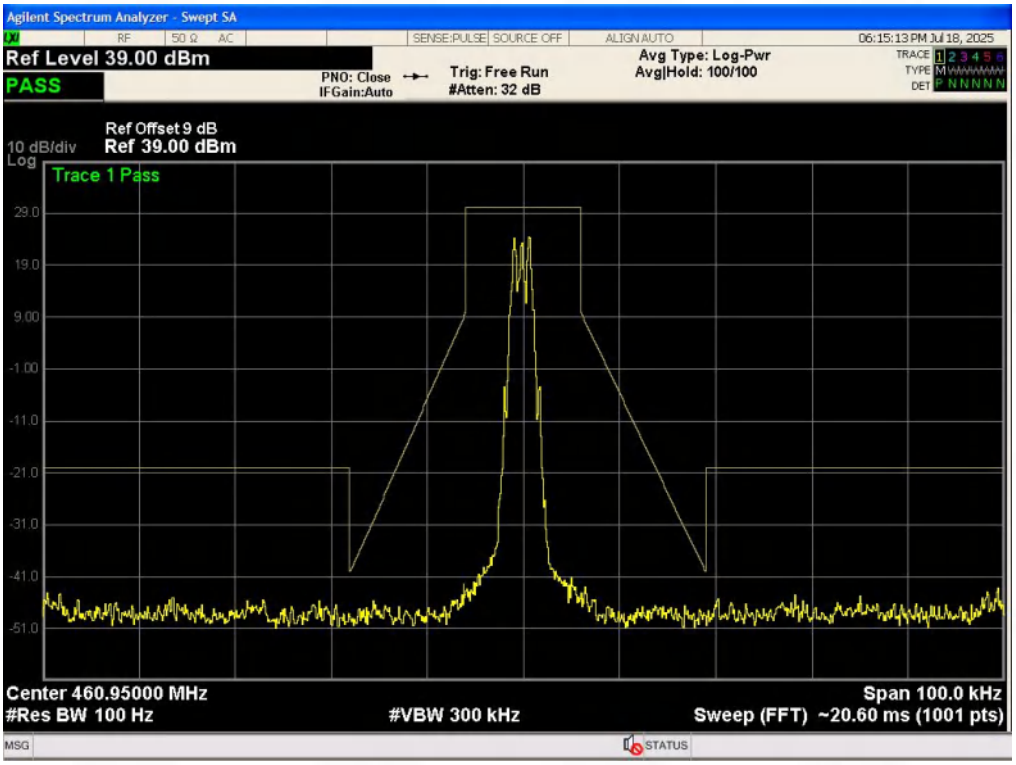
The Worst Emission Mask for (429.95MHz) of 12.5 KHz channel Separation (1W)



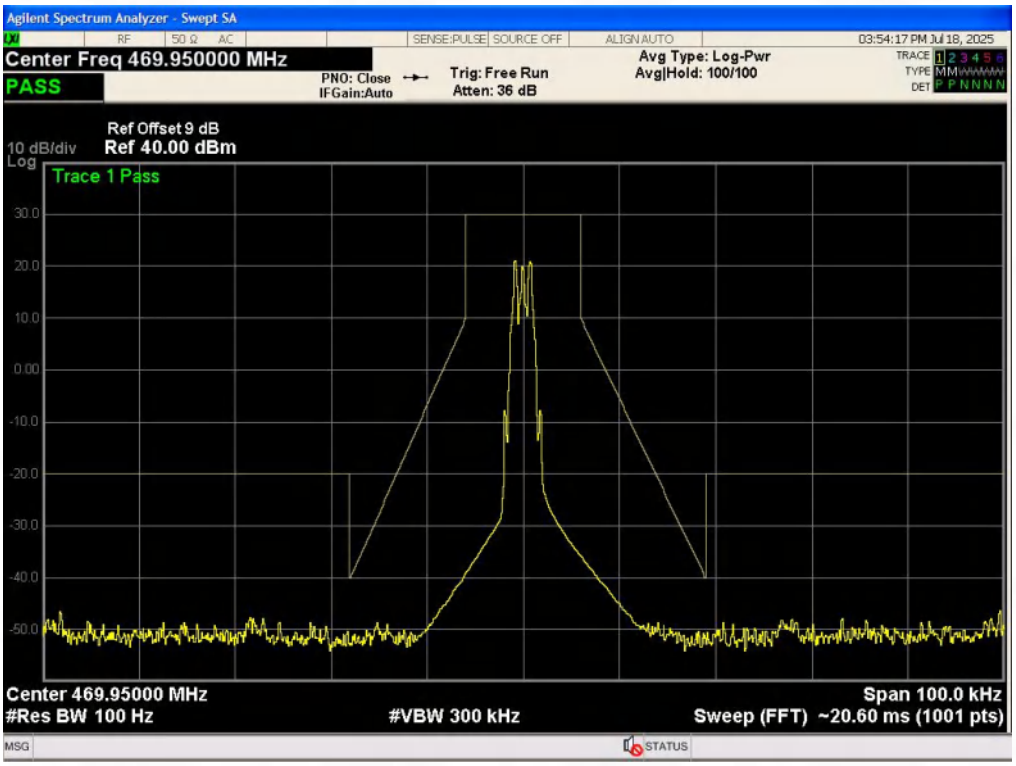
The Worst Emission Mask for (450.5MHz) of 12.5 KHz channel Separation (1W)



The Worst Emission Mask for (460.95MHz) of 12.5 KHz channel Separation (1W)



The Worst Emission Mask for (469.95MHz) of 12.5 KHz channel Separation (1W)



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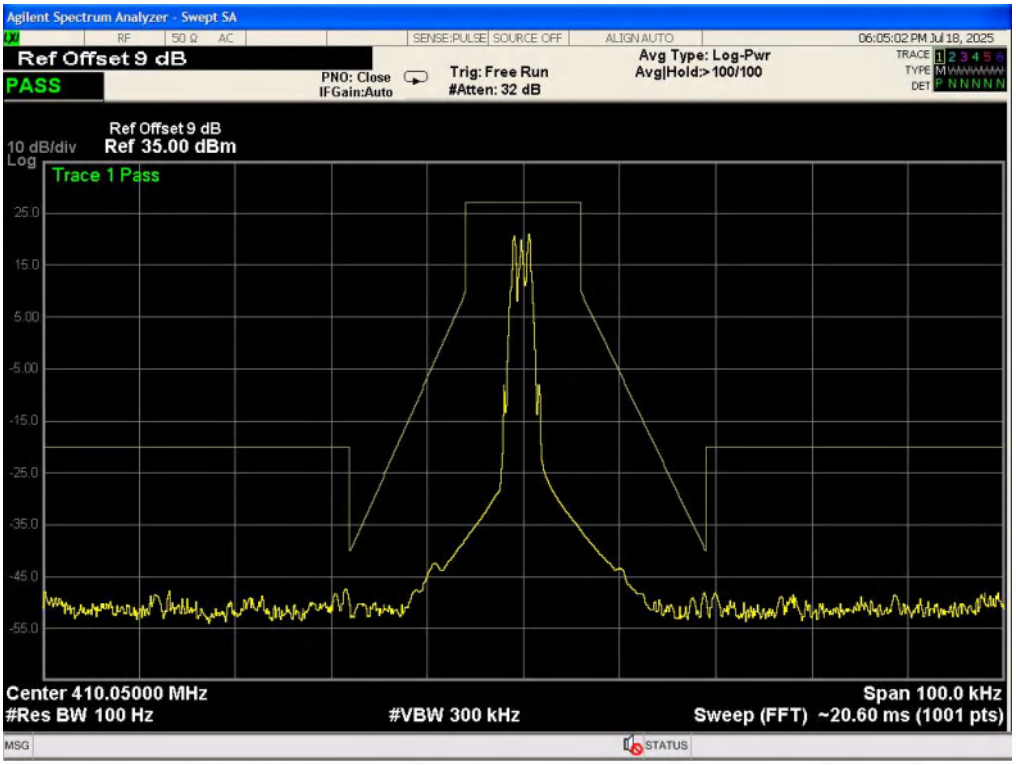
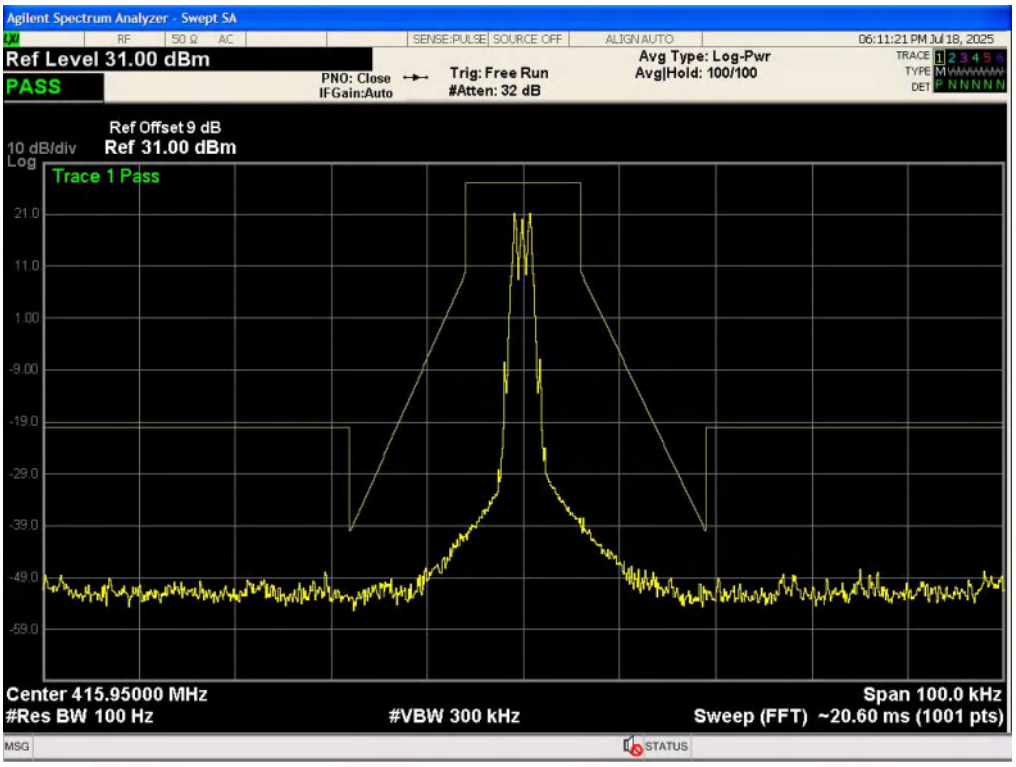
Email: info@btf-lab.com Tel: +86-755-23146130 http://www.btf-lab.com

4FSK, 12.5kHz, Low Power:

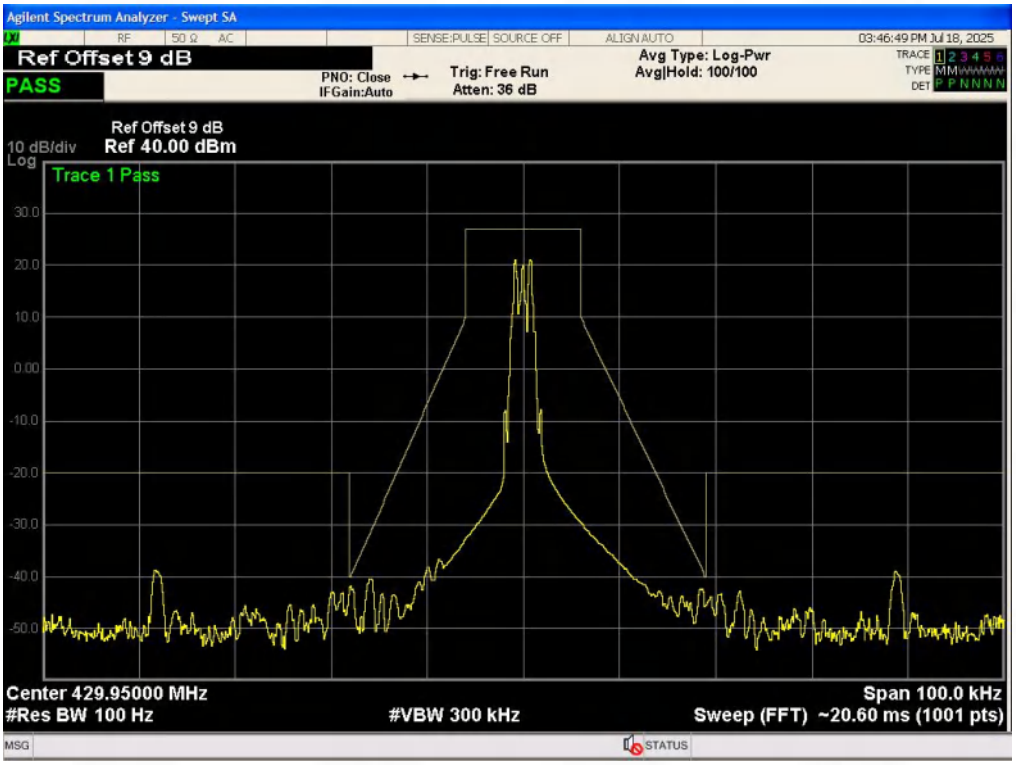
The Worst Emission Mask for (410.05MHz) of 12.5 KHz channel Separation (0.5W)



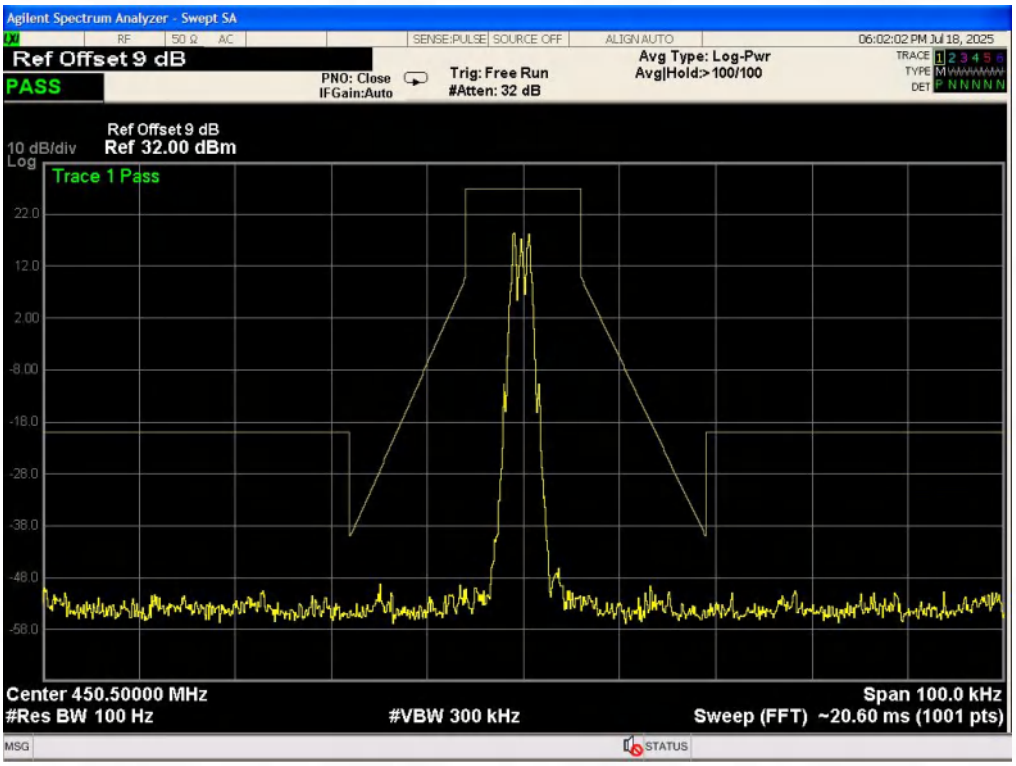
The Worst Emission Mask for (415.95MHz) of 12.5 KHz channel Separation (0.5W)



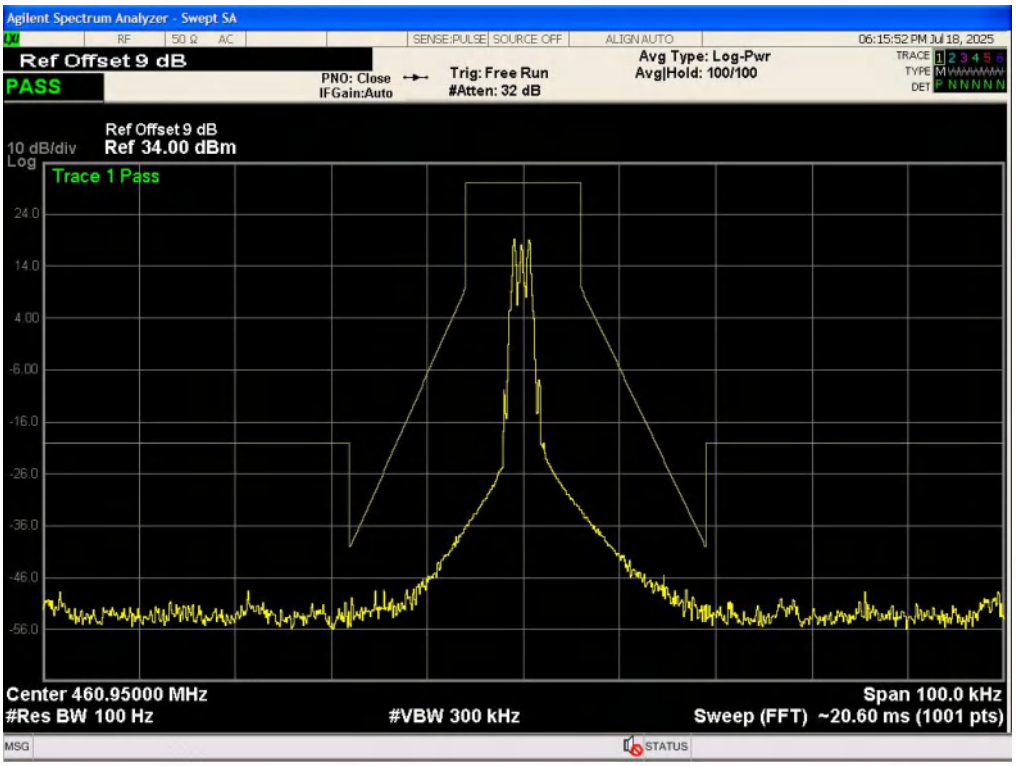
The Worst Emission Mask for (429.95MHz) of 12.5 KHz channel Separation (0.5W)



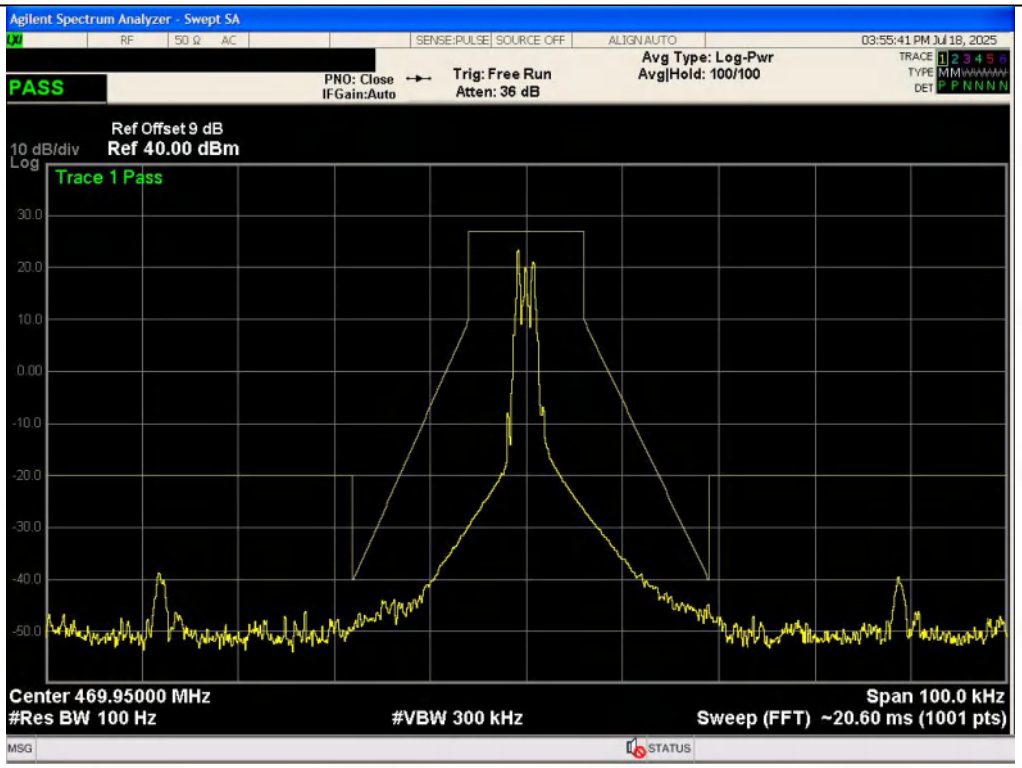
The Worst Emission Mask for (450.5MHz) of 12.5 KHz channel Separation (0.5W)



The Worst Emission Mask for (460.95MHz) of 12.5 KHz channel Separation (0.5W)

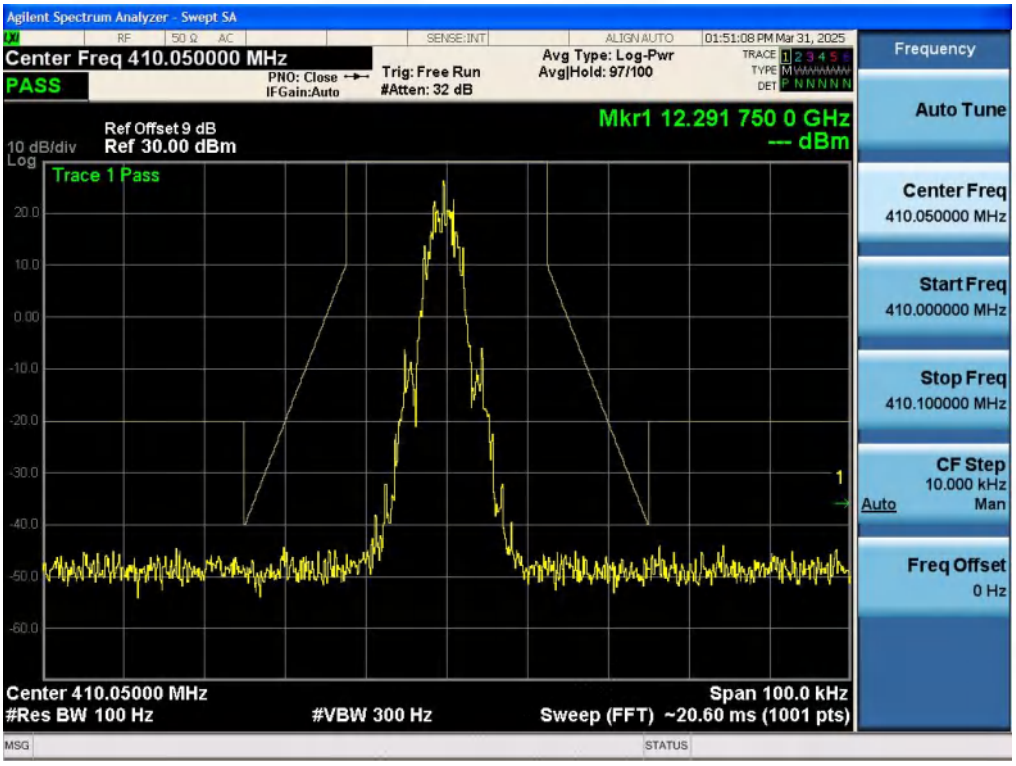


The Worst Emission Mask for (469.95MHz) of 12.5 KHz channel Separation (0.5W)

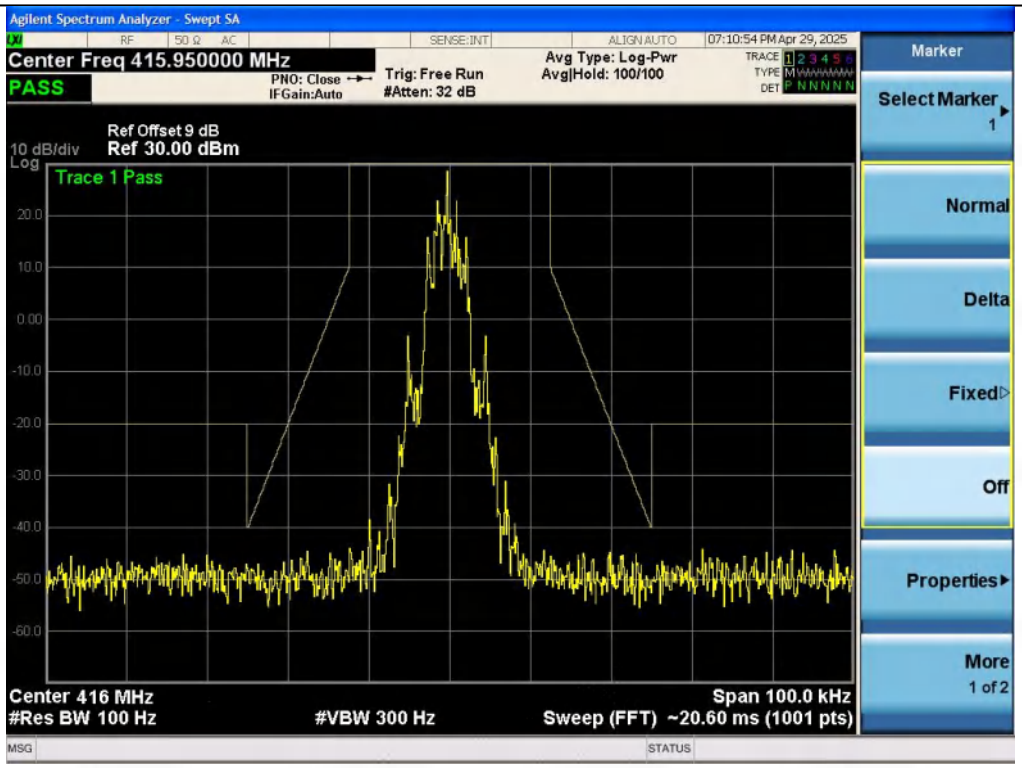


4FSK, 25kHz, High Power:

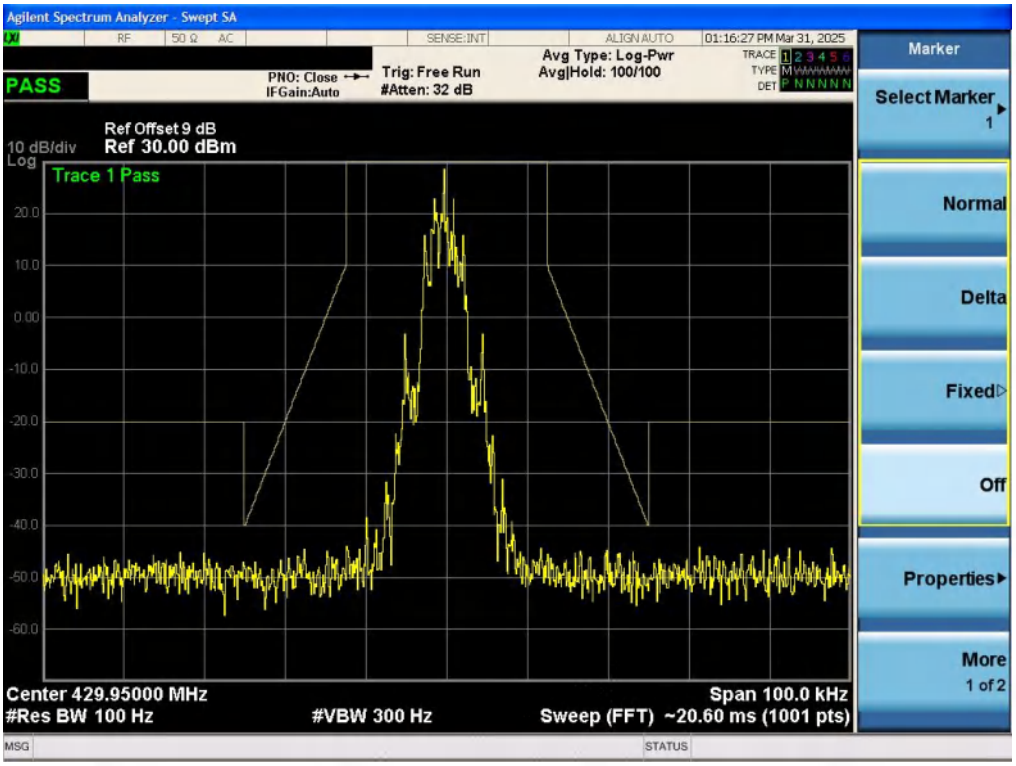
The Worst Emission Mask for (410.05MHz) of 25 KHz channel Separation (1W)



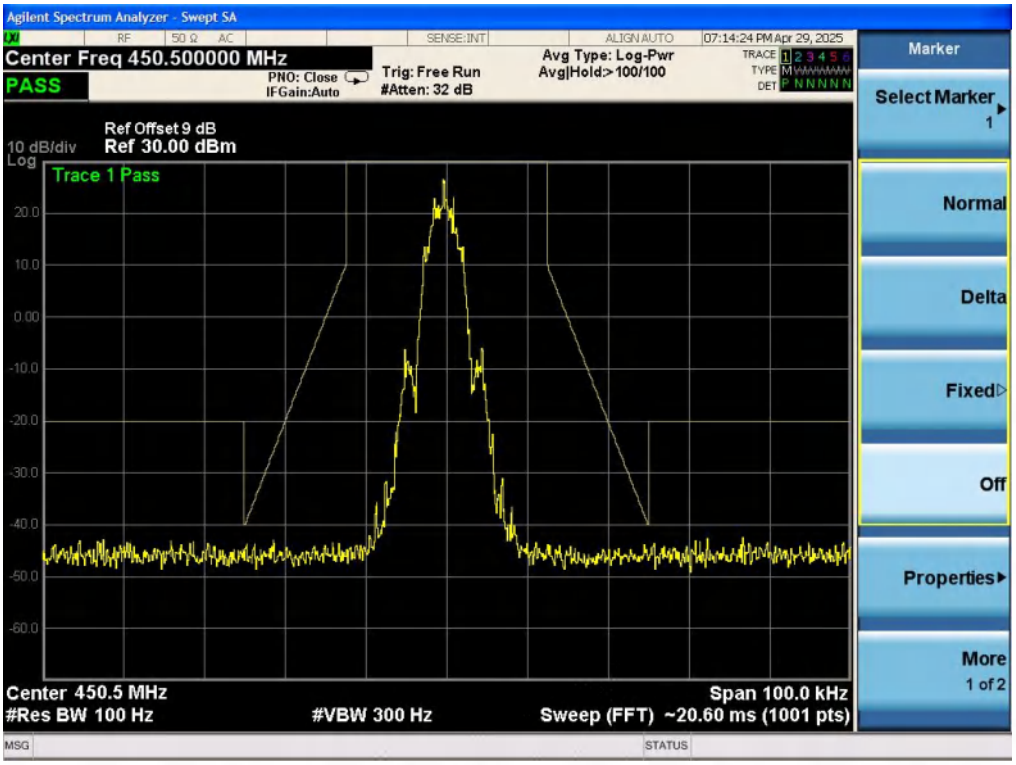
The Worst Emission Mask for (415.95MHz) of 25 KHz channel Separation (1W)



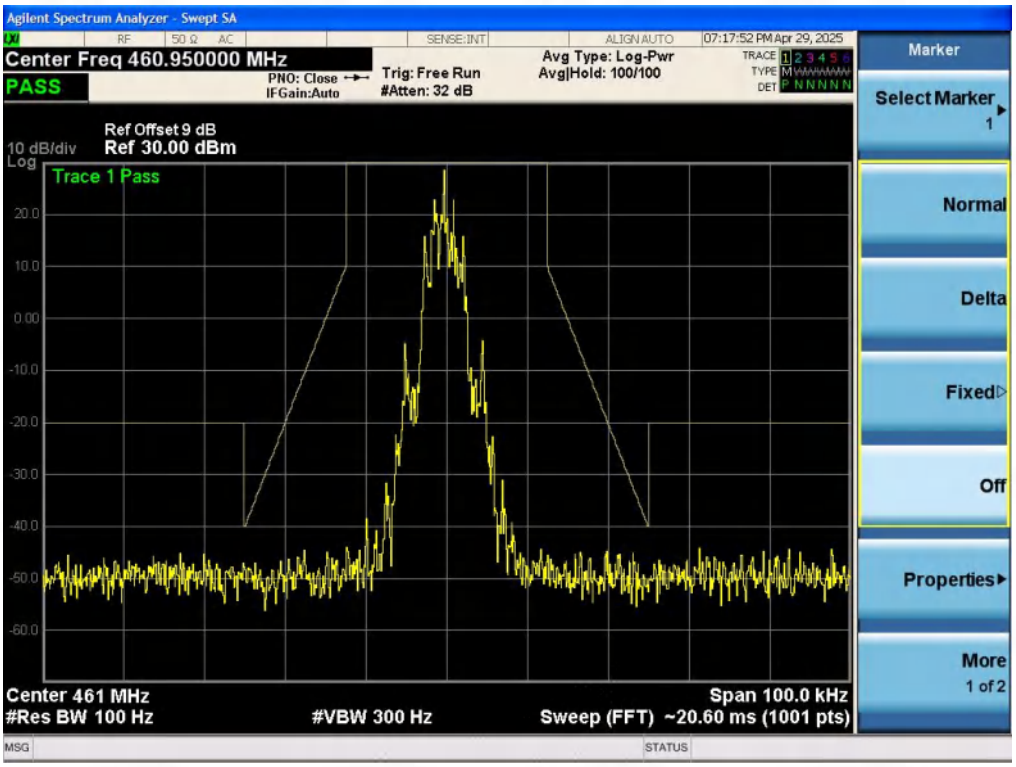
The Worst Emission Mask for (429.95MHz) of 25 KHz channel Separation (1W)



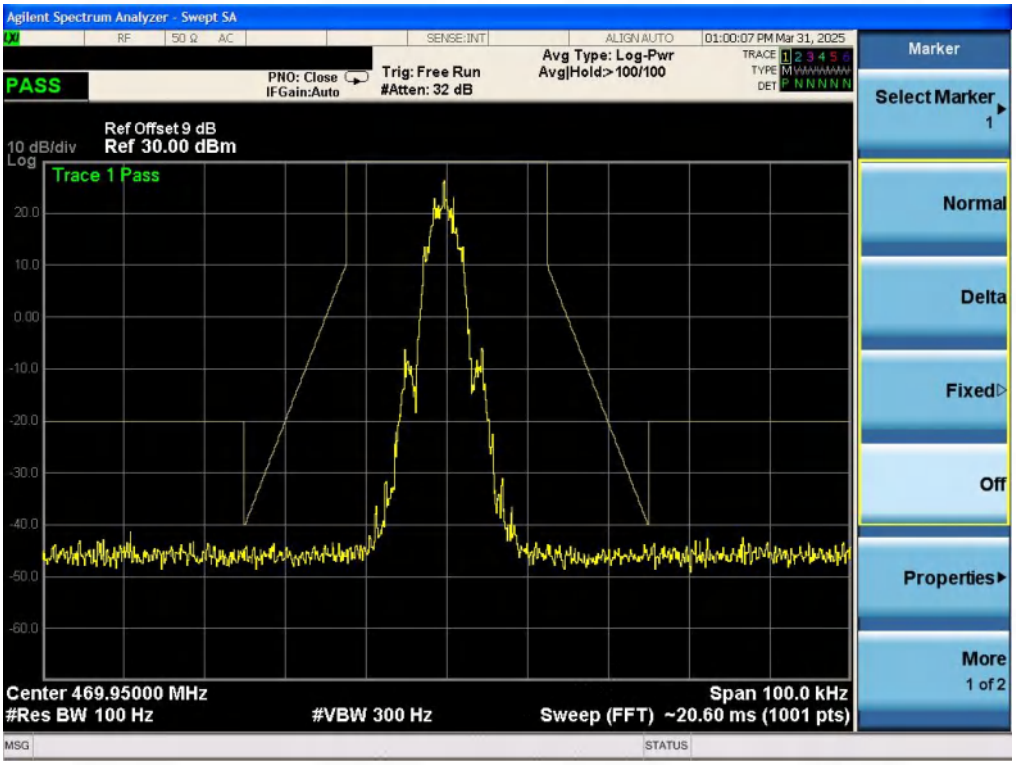
The Worst Emission Mask for (450.5MHz) of 25 KHz channel Separation (1W)



The Worst Emission Mask for (460.95MHz) of 25 KHz channel Separation (1W)

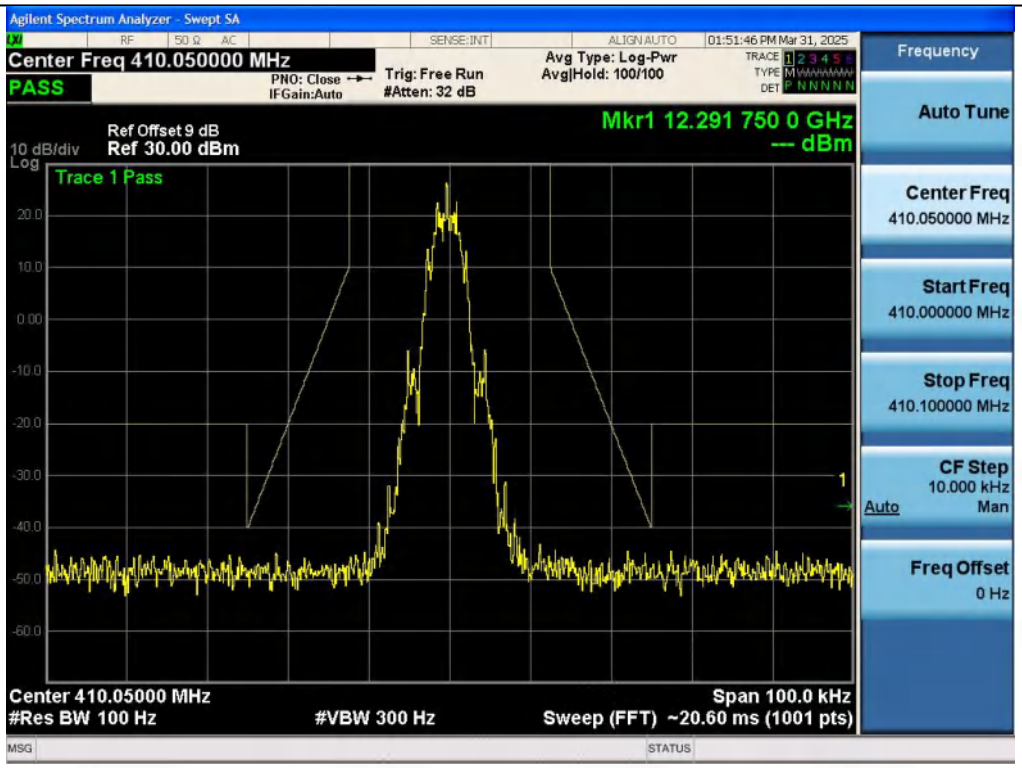


The Worst Emission Mask for (469.95MHz) of 25 KHz channel Separation (1W)

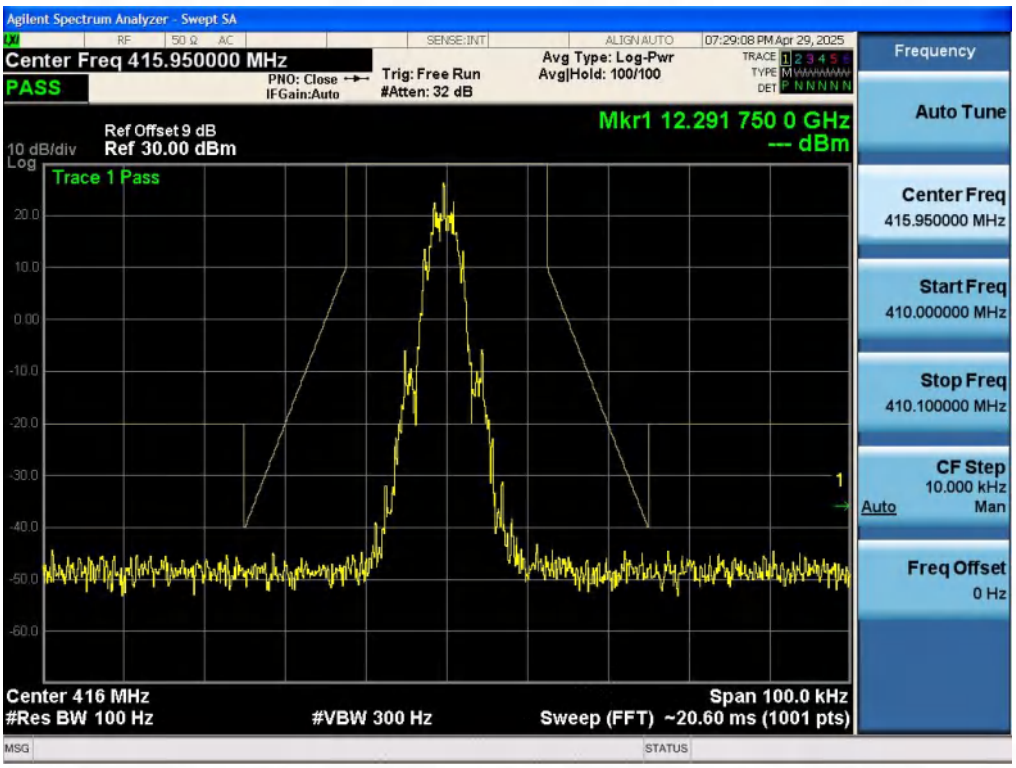


4FSK, 25kHz, Low Power:

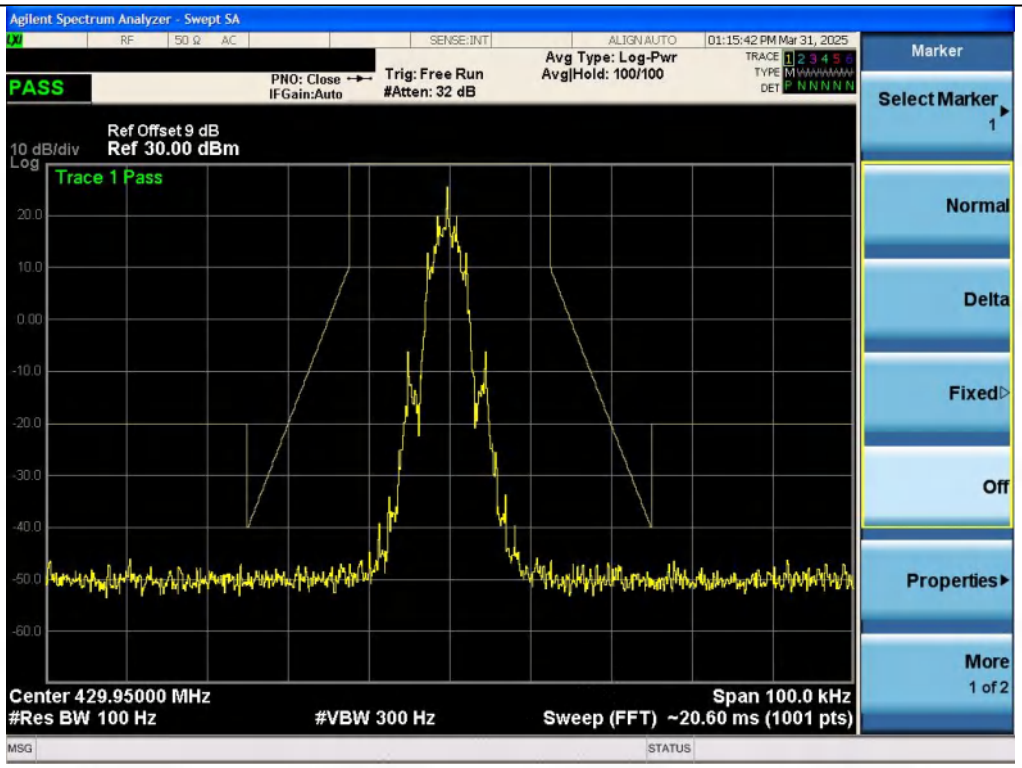
The Worst Emission Mask for (410.05MHz) of 25 KHz channel Separation (0.5W)



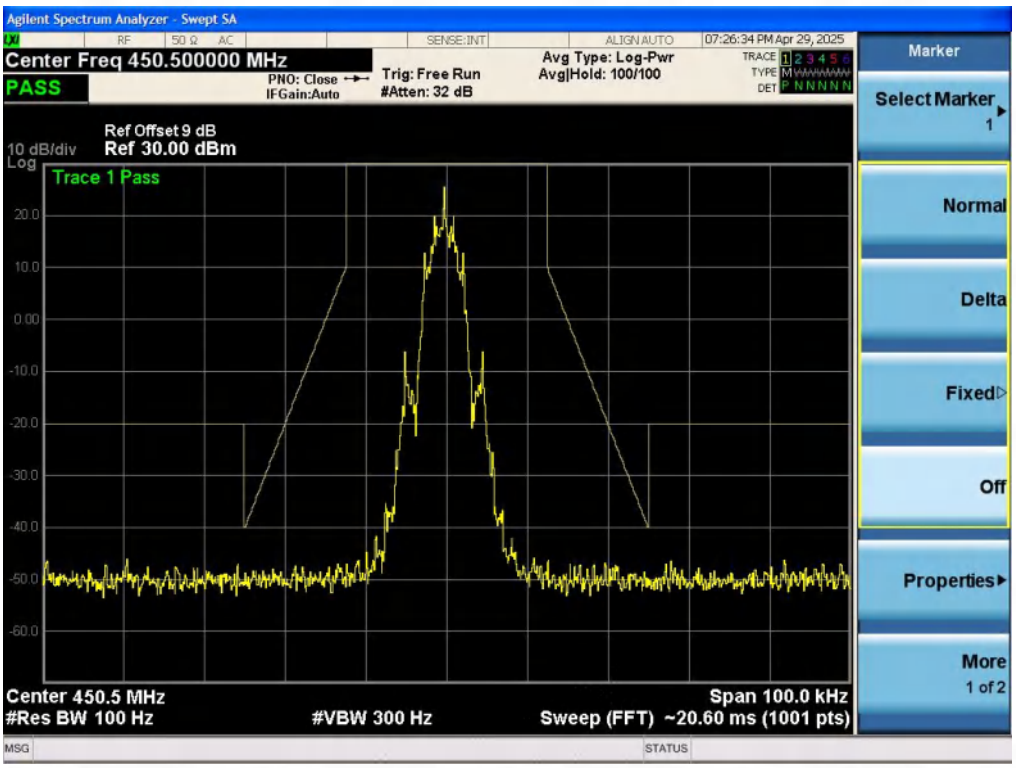
The Worst Emission Mask for (415.95MHz) of 25 KHz channel Separation (0.5W)



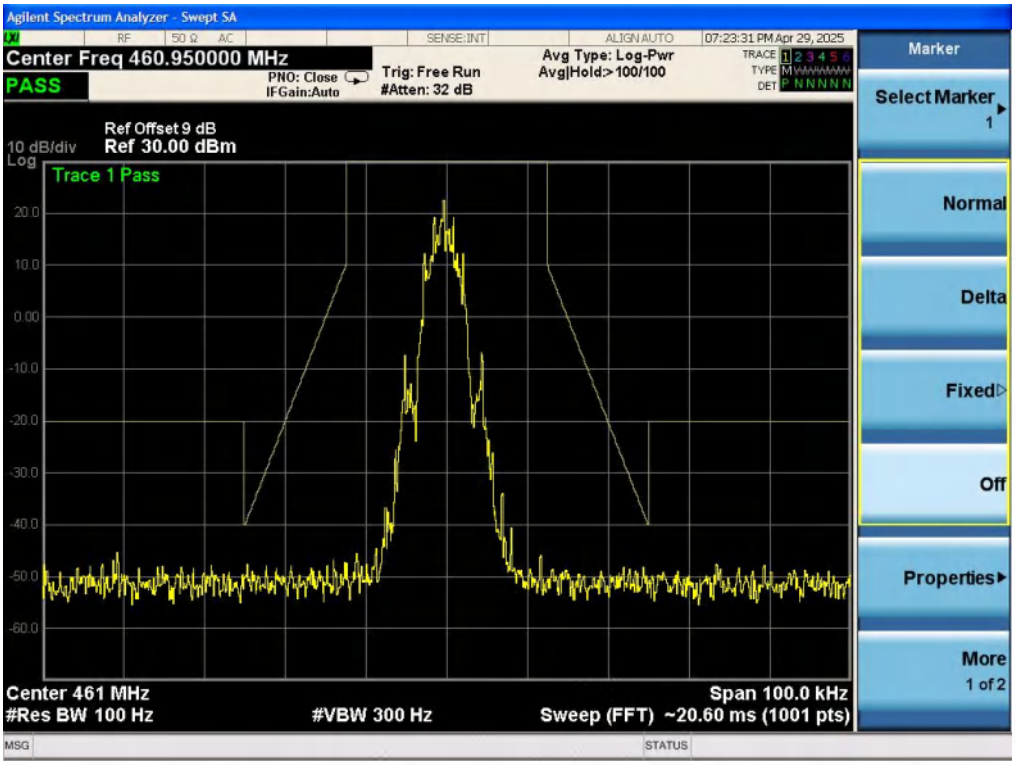
The Worst Emission Mask for (429.95MHz) of 25 KHz channel Separation (0.5W)



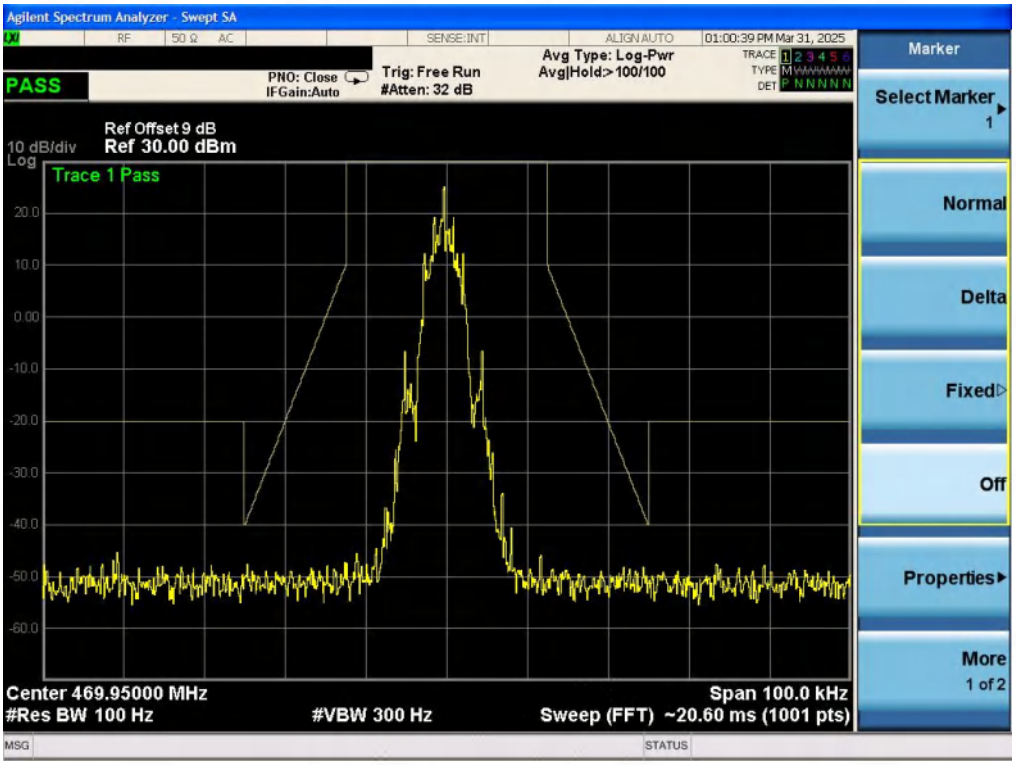
The Worst Emission Mask for (450.5MHz) of 25 KHz channel Separation (0.5W)



The Worst Emission Mask for (460.95MHz) of 25 KHz channel Separation (0.5W)



The Worst Emission Mask for (469.95MHz) of 25 KHz channel Separation (0.5W)



4.4. Transmitter Unwanted Emissions at Antenna Terminal

4.4.1. Applicable Standard

FCC§ 90.210:

Emission Mask D-12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 125 kHz channel hand width any emission must he attenuated he low the nower (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f0 to 5.625 kHz removed from f0: Zero dB.

(2)On any froquones romovod from tho contor of tho authorirod handuridth hu a dienlaeomont frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(fd-2.88 kHz)dB.

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 12.5 kHz: At least 50 +10 log (P) dB or 70 dB, whichever is the lesser attenuation.

(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

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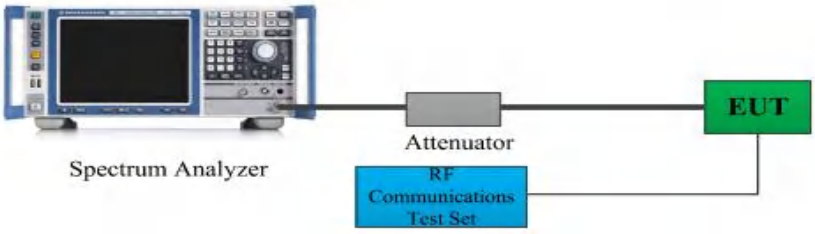
4.4.2. Test Setup



4.4.3. Test Procedures

According to ANSI C63.26-2015 Section 5.7.4:

(a) Set the spectrum analyzer start frequency to the lowest frequency generated by the EUT, without going below 9 kHz, and the stop frequency to the lower frequency covered by the measurements previously performed in 5.7.3. As an alternative, the stop frequency can be set to the value specified in 5.1.1,depending on the EUT operating range, if the resulting plot can clearly demonstrate compliance for all frequencies not addressed by the out-of-band emissions measurements performed as per 5.7.3.

(b) When using an average power (rms) detector, ensure that the number of points in the sweep⩾ 2 x (span /RBW). This may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the spectrum analyzer capabilities. This requirement does not apply to peak detected power measurements. When average power is specified by the applicable regulation, a peak detector can be utilized for preliminary measurements to accommodate wider frequency spans. Any emissions found in the preliminary measurement to exceed the applicable limit(s) shall be further examined using a power averaging (rms) detector with the minimum number of measurement points as defined above.

(c) The cueen time chould he cet to auto-couple for nerformino neak- detector measuremente For measurements that use a nower averagino (rms) detector the sween time shall he set as deserihed for out of-hand emissions measurements in item d) of 5. 7. 3.

(d) Identify and measure the highest spurious emission levels in each frequency range. It is not necessary to re-measure the out-of-band emissions as a part of this test, Record the frequencies and amplitudes corresponding to the measured emissions and capture the data plots.

e) Reneat sten b) throuch sten d) for the unner snurious emission frequency range if not already cantured by a wide snan measurement nerformed as ner the alternative provided in sten a). The unner freguency for this measurement is defined in 5.1.1 as a funetion of the EUT operating range.

(f) Compare the results with the corresponding limit in the applicable regulation.

(g) The test report shall include the data plots of the measuring instrument display and the measured data.

Limit: At least 50+10 log (P)=50+10log (0.5)=53.01 (dB) - 0.5W 27-53.01=-26.01dBm;
At least 50+10 log (P)=50+10log (1)=50.00 (dB) -1W 30.00-50.00=-20dBm

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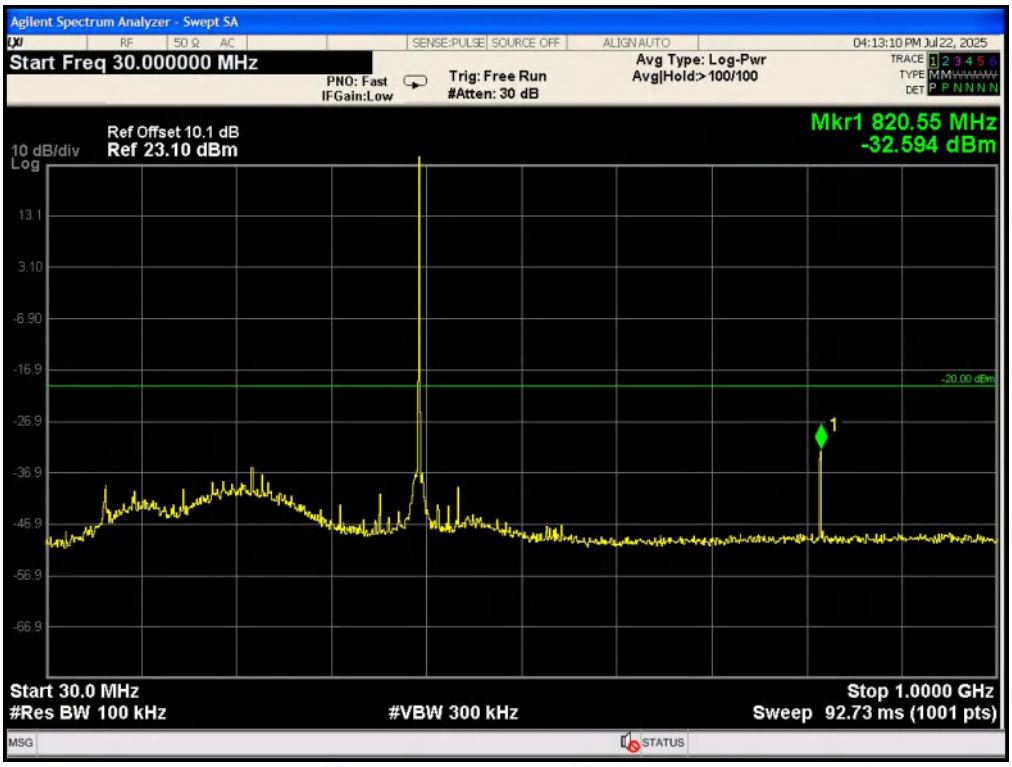
4.4.4. Test Result

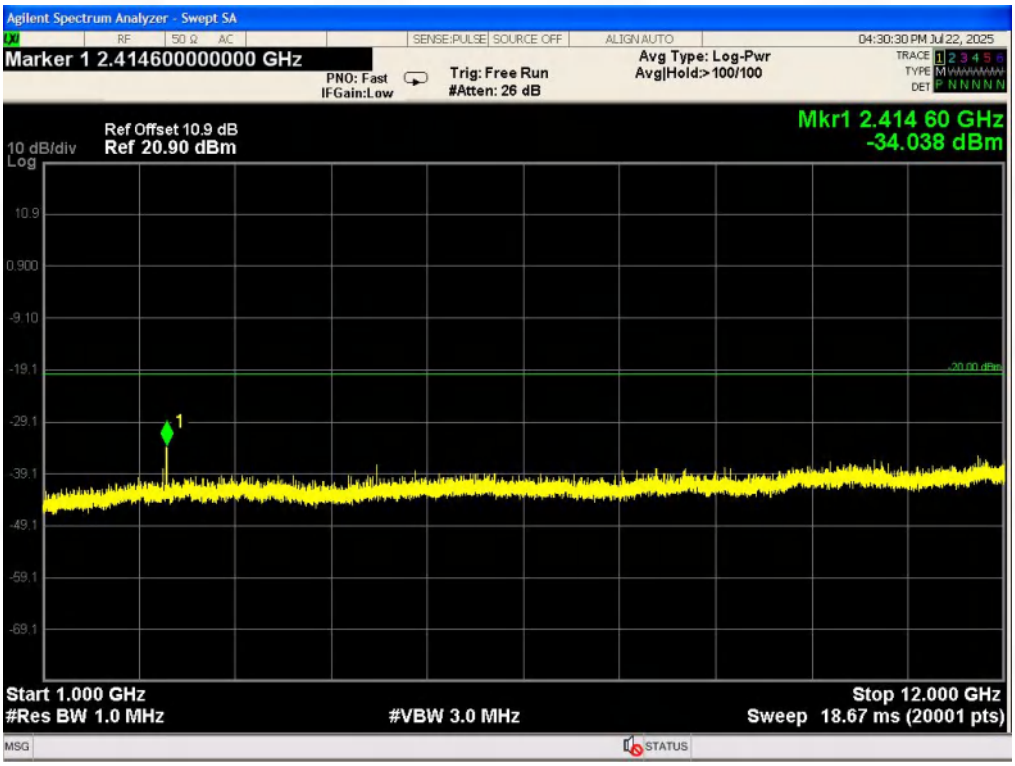
Note:Test only was performed at high power level (12.5KHz Channel Separation).

Conducted Spurious Emission (worst) @410.05MHz With 12.5 KHz Channel Separation -1W

30MHz~1000MHz

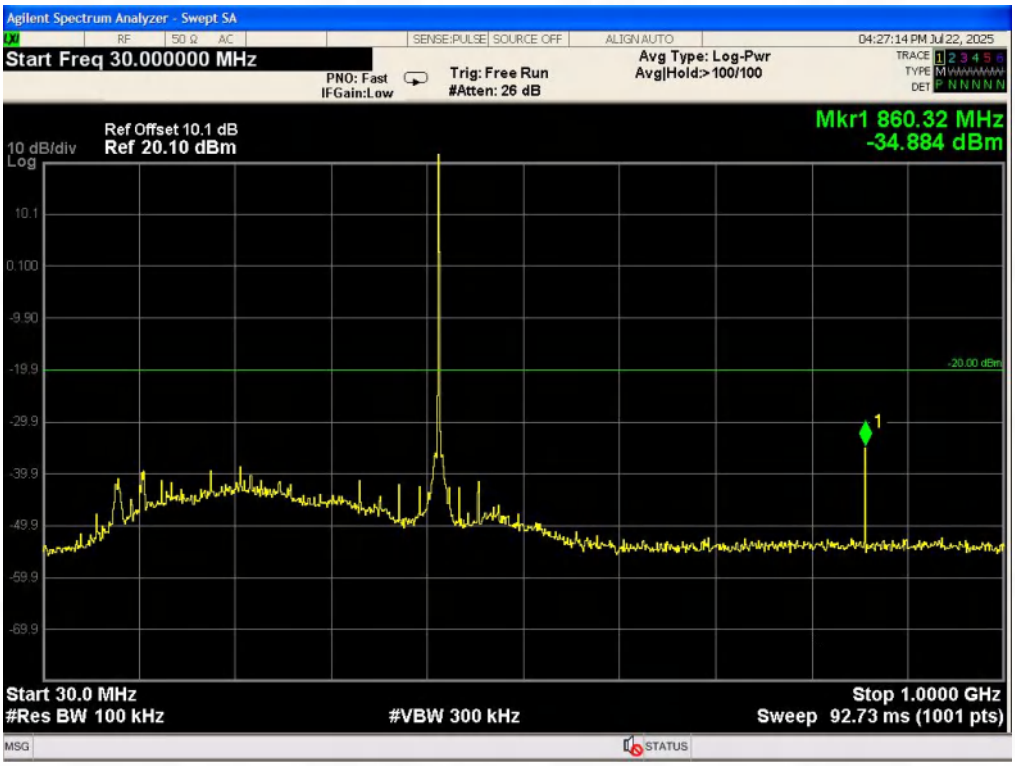


1000MHz-12750MHz

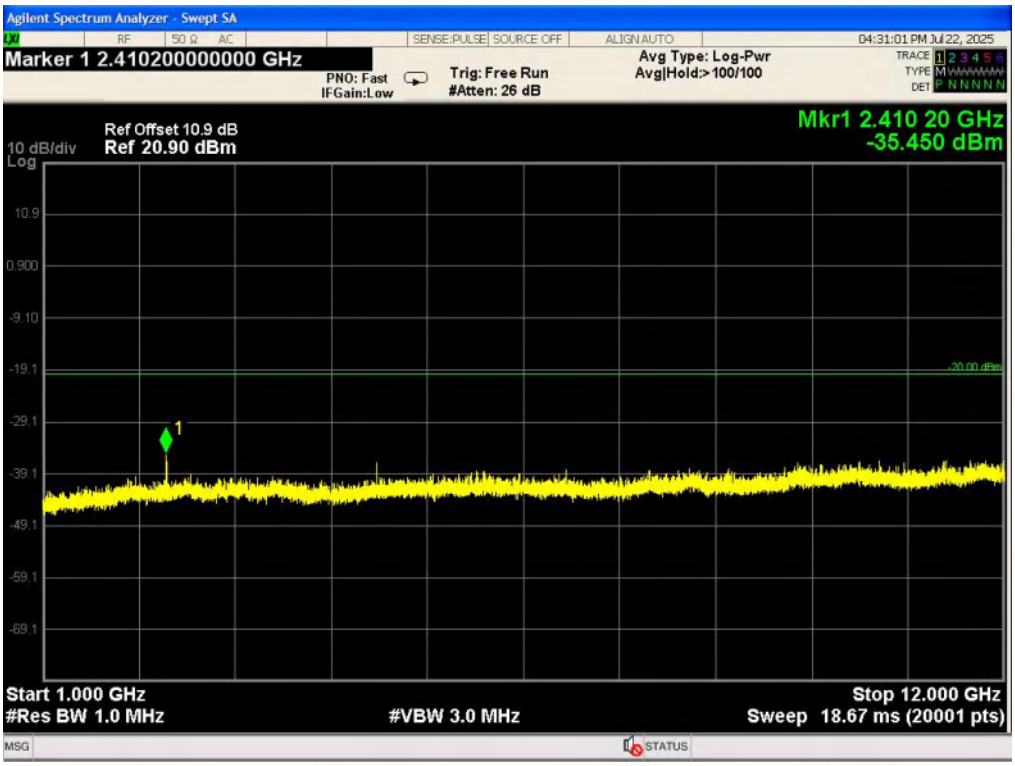


Conducted Spurious Emission (worst) @429.95MHz With 12.5 KHz Channel Separation -1W

30MHz~1000MHz

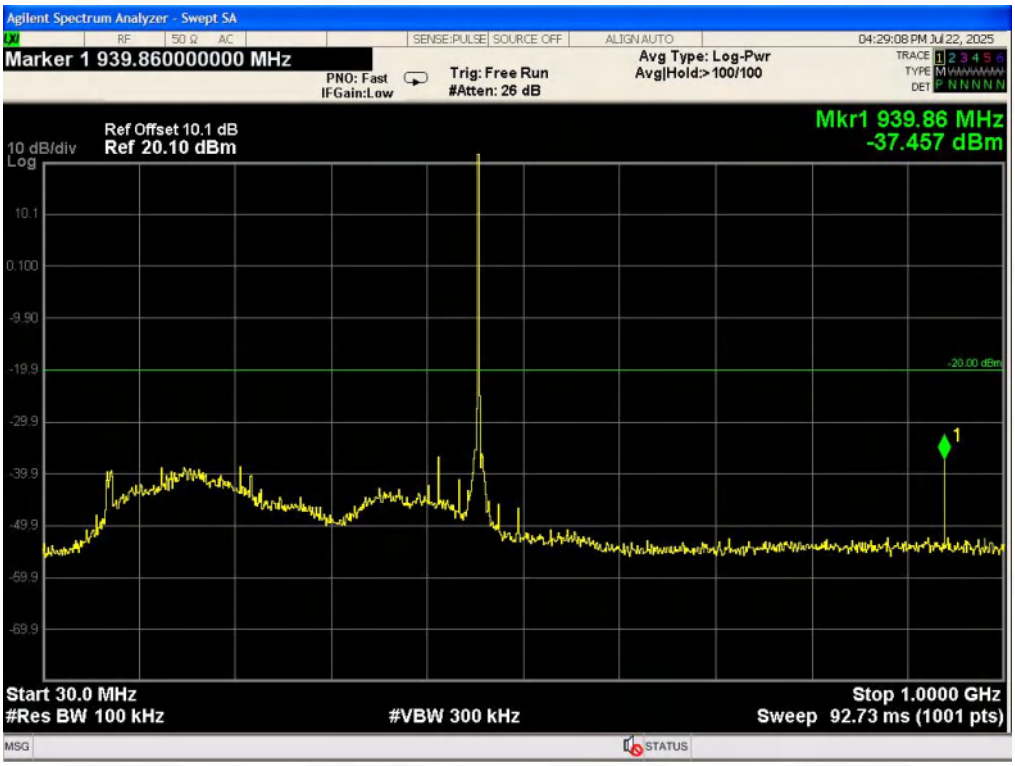


1000MHz-12750MHz

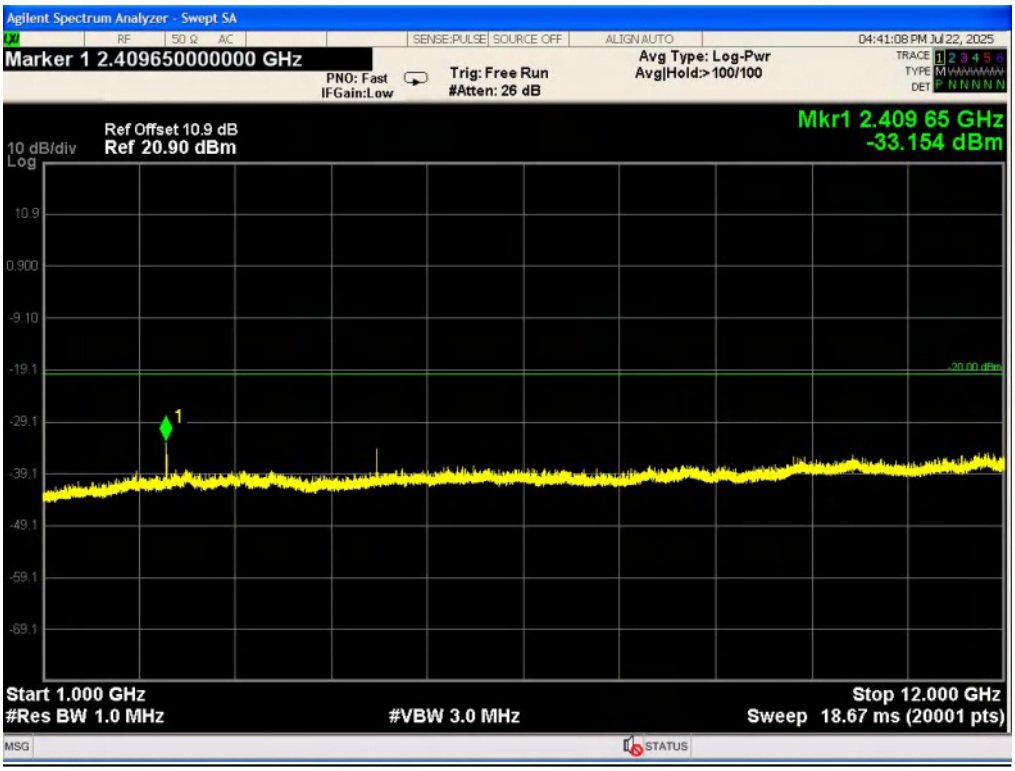


Conducted Spurious Emission (worst) @469.95MHz With 12.5 KHz Channel Separation -1W

30MHz~1000MHz



1000MHz-12750MHz



4.5. Transient Frequency Behavior

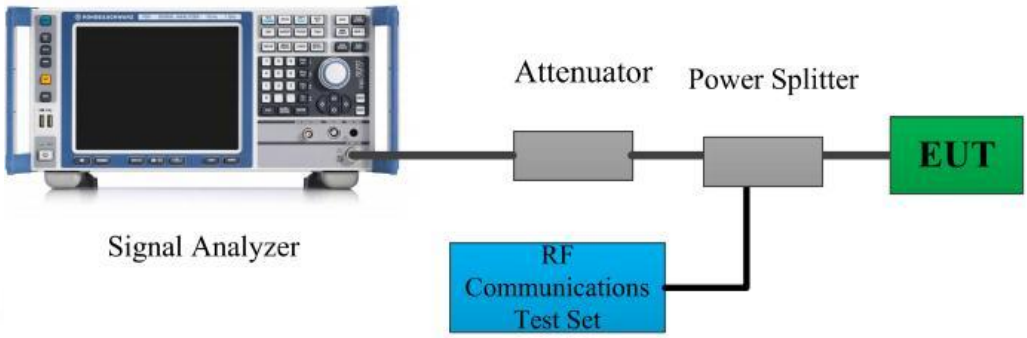
4.5.1. Applicable Standard

FCC§ 90.214:

Transmitters designed to operate in the 150-174 MHz and 421-512 MHz frequency bands must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated:

Time intervals[1 2]	Maximum frequency difference[3]	All equipment	
		150 to 174 MHz	421 to 512 MHz
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels			
t_1[4]	±12.5 kHz	5.0 ms	10.0 ms
t_2	±6.25 kHz	20.0 ms	25.0 ms
t_3[4]	±12.5 kHz	5.0 ms	10.0 ms

4.5.2. Test Setup



4.5.3. Test Procedures

According to ANSI C63.26-2015 Section 6.5.2.2:

(a) Connect the equipment as illustrated.

(b) Connect the output of the transmitter to the signal analyzer with modulation domain analyzer function.

(c) 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.

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

(e) Key the transmitter.

(f) Observe the stored display of the modulation domain analyzer. The signal trace shall be maintained within the allowable limits during the periods ti and t2, and shall also remain within

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limits following t2.

(g) 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.

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

(i) Unkey the transmitter.

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

4.5.4. Test Result

Note:

The product is a digital device and is not applicable to this test item.

4.6. Modulation Characteristic

4.6.1. Applicable Standard

FCC§ 2.1047:

(a) Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

(b) Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.

(c) Single sideband and independent sideband radiotelephone transmitters which employ a device or circuit to limit peak envelope power. A curve showing the peak envelope power output versus the modulation input voltage shall be supplied. The modulating signals shall be the same in frequency as specified in paragraph (c) of §2.1049 for the occupied bandwidth tests.

(d) Other types of equipment. A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

4.6.2. Test Procedures

According to ANSI C63.26-2015 Section 5.3.2:

Modulation limiting test methodology

Modulation limiting is the ability of a transmitter circuit to limit the transmitter from producing deviations in excess of a rated system deviation.a) Connect the equipment as illustrated in Figure 1.

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

c) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ⩽0.25 Hz to ⩾215000 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 to obtain 60% of full rated system deviation. This is the 0 dB reference level.

e) Increase the level from the audio generator by 20 dB in 5 dB increments recording the deviation as measured from the test receiver in each step. Verify that the audio level used to make the OBW measurement is included in the sweep.

f) Repeat for step e) at 300 Hz, 2500 Hz and 3000 Hz at a minimum using the 0 dB reference level obtained in step d).

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

h) The values recorded in step f) and step g) are the modulation limiting.

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i) Plot the data set as a percentage of deviation relative to the 0 dB reference point versus input voltage.

Audio Frequency Response

(1). Configure the EUT as shown in figure 1.

(2). Adjust the audio input for 20% of rated system deviation at 1 kHz using this level as a reference (0 dB).

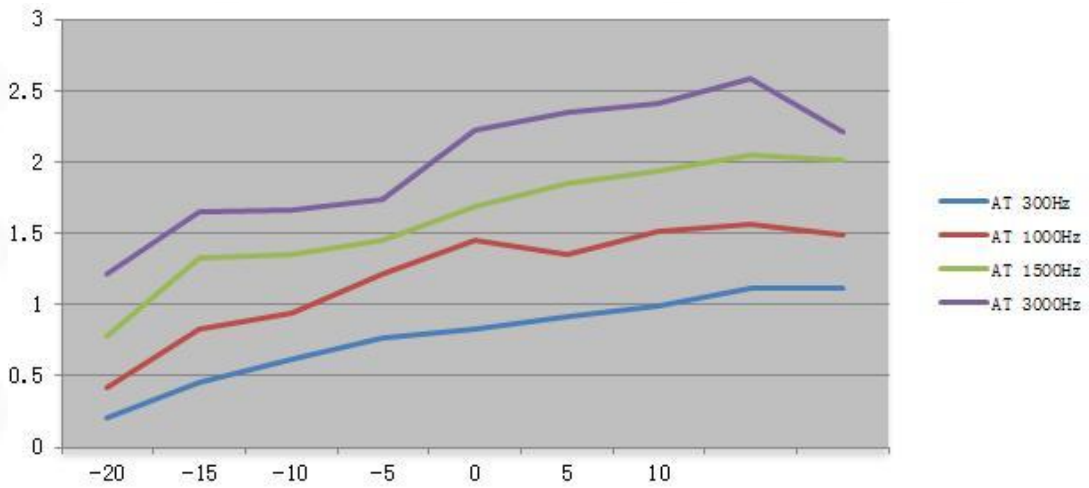
(3). Vary the Audio frequency from 100 Hz to 10 kHz and record the frequency deviation.

(4). Audio Frequency Response = 20log10 (Deviation of test frequency/Deviation of 1 kHz reference).

4.6.3. Test Result

Teat Data:

12.5kHz, 4FSK modulation, Frequency:469.95MHz _1W				
Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (kHz)	Peak Freq. Deviation At 1000 Hz (kHz)	Peak Freq. Deviation At 1500 Hz (kHz)	Peak Freq. Deviation At 3000 Hz (kHz)
-20	0.21	0.42	0.78	1.21
-15	0.45	0.83	1.32	1.65
-10	0.62	0.94	1.35	1.66
-5	0.77	1.21	1.45	1.74
0	0.83	1.45	1.69	2.22
+5	0.92	1.35	1.85	2.35
+10	0.99	1.51	1.94	2.41
+15	1.12	1.56	2.05	2.58
+20	1.11	1.49	2.01	2.21



Note: All the modes had been tested, but only the worst data recorded in the report

4.7. Transmitter Unwanted Emissions-Radiated

4.7.1. Applicable Standard

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1)On any frequency from the center of the authorized bandwidth f0 to 5.625 kHz removed from fo: Zero dB.

(2)On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(fd-2.88 kHz) dB.

(3)On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 12.5 kHz: At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.

(4)The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrumentresolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

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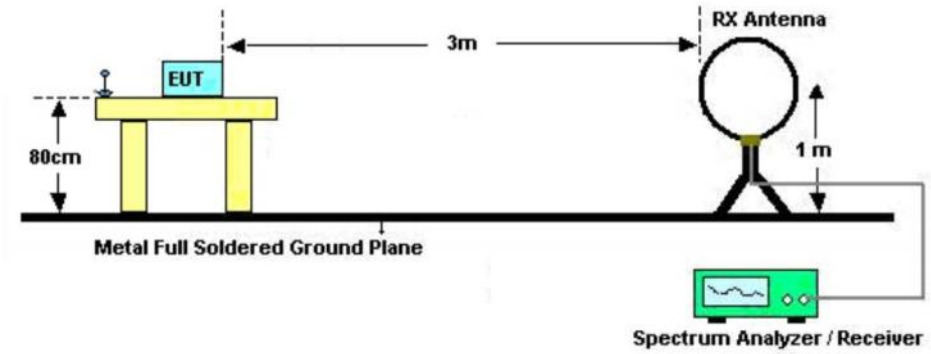
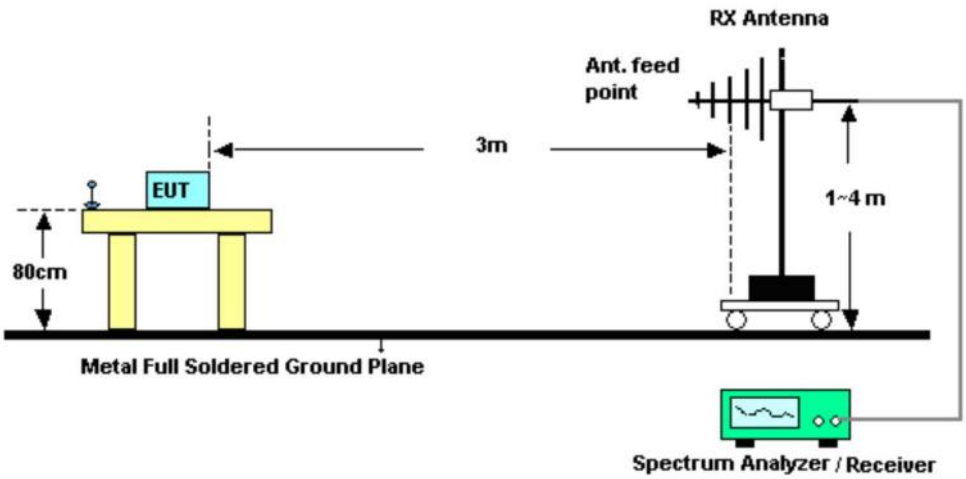
4.7.2. Test Setup

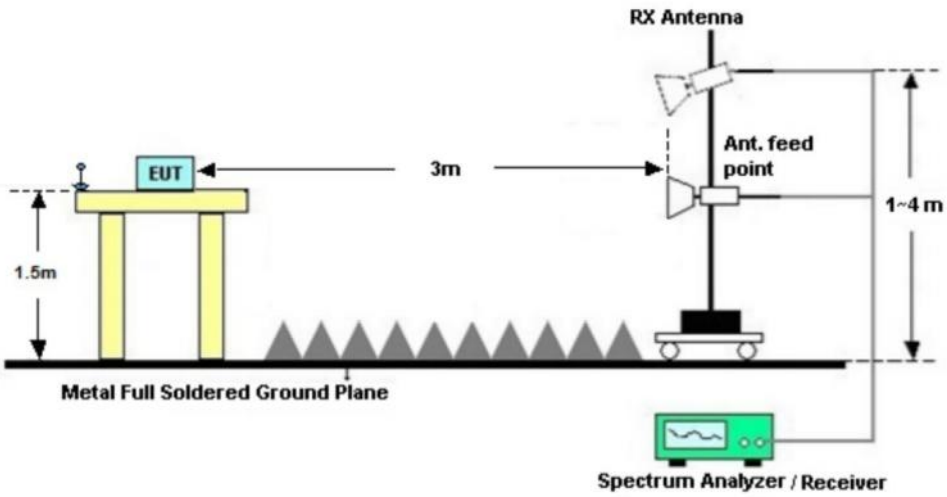
4.7.2.1. For radiated test below 30MHz



4.7.2.2. For radiated test from 30MHz to 1GHz



4.7.2.3. For radiated test above 1GHz



4.7.3. Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.7.4. Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from 50 + 10log(P)dB below the transmitter power P(Watts)

At least 50+10 log (P)=50+10log (0.5)=53.01 (dB) - 0.5W 27-53.01=-26.01dBm;

At least 50+10 log (P)=50+10log (1)=50.00 (dB) -1W 30.00-50.00=-20dBm

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4.7.5. Test Result of Radiated Spurious Emission

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Measurement Result for 12.5 KHz Channel Separation @ 410.025MHz-1W

Emission Frequency	Ant.Polarity (H/V)	Measurement Result (dBm)	Limit (dBm)	Result (P/F)
820.1	Horizontal	-73.66	-20.00	Pass
820.1	Vertical	-69.21	-20.00	Pass
1230.15	Horizontal	-68.60	-20.00	Pass
1230.15	Vertical	-62.73	-20.00	Pass
1640.2	Horizontal	-69.67	-20.00	Pass
1640.2	Vertical	-58.08	-20.00	Pass
2050.25	Horizontal	-57.54	-20.00	Pass
2050.25	Vertical	-53.99	-20.00	Pass
2466.3	Horizontal	-59.40	-20.00	Pass
2460.3	Vertical	-56.14	-20.00	Pass
2870.35	Horizontal	-60.16	-20.00	Pass
2870.35	Vertical	-57.41	-20.00	Pass
3280.4	Horizontal	-73.55	-20.00	Pass
3280.4	Vertical	-68.87	-20.00	Pass
3690.45	Horizontal	-67.85	-20.00	Pass
3690.45	Vertical	-62.85	-20.00	Pass
4100.5	Horizontal	-69.39	-20.00	Pass
4110.5	Vertical	-57.20	-20.00	Pass

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Measurement Result for 12.5 KHz Channel Separation @ 429.95MHz-1W

Emission Frequency	Ant.Polarity (H/V)	Measurement Result (dBm)	Limit (dBm)	Result (P/F)
859.9	Horizontal	-73.98	-20.00	Pass
859.9	Vertical	-68.72	-20.00	Pass
1289.85	Horizontal	-68.23	-20.00	Pass
1289.85	Vertical	-62.54	-20.00	Pass
1719.8	Horizontal	-69.45	-20.00	Pass
1719.8	Vertical	-58.00	-20.00	Pass
2149.75	Horizontal	-57.35	-20.00	Pass
2149.75	Vertical	-53.37	-20.00	Pass
2579.7	Horizontal	-59.26	-20.00	Pass
2579.7	Vertical	-56.46	-20.00	Pass
3009.65	Horizontal	-60.73	-20.00	Pass
3009.65	Vertical	-57.24	-20.00	Pass
3439.6	Horizontal	-72.69	-20.00	Pass
3439.6	Vertical	-68.30	-20.00	Pass
3869.55	Horizontal	-68.36	-20.00	Pass
3869.55	Vertical	-62.25	-20.00	Pass
4299.5	Horizontal	-70.27	-20.00	Pass
4299.5	Vertical	-56.90	-20.00	Pass

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Measurement Result for 12.5 KHz Channel Separation @ 440.05MHz-1W

Emission Frequency	Ant.Polarity (H/V)	Measurement Result (dBm)	Limit (dBm)	Result (P/F)
880.1	Horizontal	-74.23	-20.00	Pass
880.1	Vertical	-68.56	-20.00	Pass
1320.15	Horizontal	-68.49	-20.00	Pass
1320.15	Vertical	-62.93	-20.00	Pass
1760.2	Horizontal	-69.05	-20.00	Pass
1760.2	Vertical	-57.61	-20.00	Pass
2200.25	Horizontal	-57.74	-20.00	Pass
2200.25	Vertical	-53.78	-20.00	Pass
2640.3	Horizontal	-59.16	-20.00	Pass
2640.3	Vertical	-56.99	-20.00	Pass
3080.35	Horizontal	-59.98	-20.00	Pass
3080.35	Vertical	-56.99	-20.00	Pass
3520.4	Horizontal	-72.95	-20.00	Pass
3520.4	Vertical	-68.20	-20.00	Pass
3960.45	Horizontal	-68.60	-20.00	Pass
3960.45	Vertical	-62.43	-20.00	Pass
4400.5	Horizontal	-69.87	-20.00	Pass
4400.5	Vertical	-57.03	-20.00	Pass

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Measurement Result for 12.5 KHz Channel Separation @ 469.95MHz-1W

Emission Frequency	Ant.Polarity (H/V)	Measurement Result (dBm)	Limit (dBm)	Result (P/F)
939.9	Horizontal	-74.30	-20.00	Pass
939.9	Vertical	-68.62	-20.00	Pass
1409.85	Horizontal	-68.63	-20.00	Pass
1409.85	Vertical	-62.63	-20.00	Pass
1879.8	Horizontal	-68.96	-20.00	Pass
1879.8	Vertical	-58.32	-20.00	Pass
2349.75	Horizontal	-57.70	-20.00	Pass
2349.75	Vertical	-53.78	-20.00	Pass
2819.7	Horizontal	-59.77	-20.00	Pass
2819.7	Vertical	-56.46	-20.00	Pass
3289.65	Horizontal	-59.97	-20.00	Pass
3289.65	Vertical	-57.28	-20.00	Pass
3759.6	Horizontal	-73.64	-20.00	Pass
3759.6	Vertical	-67.98	-20.00	Pass
4229.55	Horizontal	-67.90	-20.00	Pass
4229.55	Vertical	-62.87	-20.00	Pass
4699.5	Horizontal	-69.72	-20.00	Pass
4699.5	Vertical	-56.96	-20.00	Pass

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Measurement Result for 25KHz Channel Separation @ 410.025MHz-1W

Emission Frequency	Ant.Polarity (H/V)	Measurement Result (dBm)	Limit (dBm)	Result (P/F)
820.1	Horizontal	-74.05	-20.00	Pass
820.1	Vertical	-69.55	-20.00	Pass
1230.15	Horizontal	-69.08	-20.00	Pass
1230.15	Vertical	-63.63	-20.00	Pass
1640.2	Horizontal	-70.45	-20.00	Pass
1640.2	Vertical	-58.98	-20.00	Pass
2050.25	Horizontal	-58.31	-20.00	Pass
2050.25	Vertical	-54.82	-20.00	Pass
2466.3	Horizontal	-59.42	-20.00	Pass
2460.3	Vertical	-56.99	-20.00	Pass
2870.35	Horizontal	-60.57	-20.00	Pass
2870.35	Vertical	-58.36	-20.00	Pass
3280.4	Horizontal	-74.08	-20.00	Pass
3280.4	Vertical	-68.98	-20.00	Pass
3690.45	Horizontal	-68.27	-20.00	Pass
3690.45	Vertical	-63.77	-20.00	Pass
4100.5	Horizontal	-69.79	-20.00	Pass
4110.5	Vertical	-57.68	-20.00	Pass

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Measurement Result for 25KHz Channel Separation @ 429.95MHz-1W

Emission Frequency	Ant.Polarity (H/V)	Measurement Result (dBm)	Limit (dBm)	Result (P/F)
859.9	Horizontal	-74.21	-20.00	Pass
859.9	Vertical	-69.51	-20.00	Pass
1289.85	Horizontal	-68.46	-20.00	Pass
1289.85	Vertical	-63.19	-20.00	Pass
1719.8	Horizontal	-69.56	-20.00	Pass
1719.8	Vertical	-58.60	-20.00	Pass
2149.75	Horizontal	-57.60	-20.00	Pass
2149.75	Vertical	-53.66	-20.00	Pass
2579.7	Horizontal	-59.97	-20.00	Pass
2579.7	Vertical	-57.41	-20.00	Pass
3009.65	Horizontal	-61.60	-20.00	Pass
3009.65	Vertical	-57.91	-20.00	Pass
3439.6	Horizontal	-73.18	-20.00	Pass
3439.6	Vertical	-68.58	-20.00	Pass
3869.55	Horizontal	-69.20	-20.00	Pass
3869.55	Vertical	-62.69	-20.00	Pass
4299.5	Horizontal	-71.04	-20.00	Pass
4299.5	Vertical	-57.20	-20.00	Pass

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Measurement Result for 25KHz Channel Separation @ 440.05MHz-1W

Emission Frequency	Ant.Polarity (H/V)	Measurement Result (dBm)	Limit (dBm)	Result (P/F)
880.1	Horizontal	-74.99	-20.00	Pass
880.1	Vertical	-68.87	-20.00	Pass
1320.15	Horizontal	-69.18	-20.00	Pass
1320.15	Vertical	-62.86	-20.00	Pass
1760.2	Horizontal	-69.64	-20.00	Pass
1760.2	Vertical	-59.16	-20.00	Pass
2200.25	Horizontal	-58.63	-20.00	Pass
2200.25	Vertical	-54.08	-20.00	Pass
2640.3	Horizontal	-60.26	-20.00	Pass
2640.3	Vertical	-57.29	-20.00	Pass
3080.35	Horizontal	-60.43	-20.00	Pass
3080.35	Vertical	-57.56	-20.00	Pass
3520.4	Horizontal	-74.29	-20.00	Pass
3520.4	Vertical	-68.60	-20.00	Pass
3960.45	Horizontal	-68.26	-20.00	Pass
3960.45	Vertical	-63.18	-20.00	Pass
4400.5	Horizontal	-70.70	-20.00	Pass
4400.5	Vertical	-57.89	-20.00	Pass

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Measurement Result for 25KHz Channel Separation @ 469.95MHz-1W

Emission Frequency	Ant.Polarity (H/V)	Measurement Result (dBm)	Limit (dBm)	Result (P/F)
939.9	Horizontal	-74.75	-20.00	Pass
939.9	Vertical	-69.20	-20.00	Pass
1409.85	Horizontal	-69.55	-20.00	Pass
1409.85	Vertical	-62.85	-20.00	Pass
1879.8	Horizontal	-69.67	-20.00	Pass
1879.8	Vertical	-58.80	-20.00	Pass
2349.75	Horizontal	-58.46	-20.00	Pass
2349.75	Vertical	-53.97	-20.00	Pass
2819.7	Horizontal	-60.62	-20.00	Pass
2819.7	Vertical	-56.76	-20.00	Pass
3289.65	Horizontal	-60.39	-20.00	Pass
3289.65	Vertical	-58.24	-20.00	Pass
3759.6	Horizontal	-73.92	-20.00	Pass
3759.6	Vertical	-68.06	-20.00	Pass
4229.55	Horizontal	-67.93	-20.00	Pass
4229.55	Vertical	-63.52	-20.00	Pass
4699.5	Horizontal	-70.50	-20.00	Pass
4699.5	Vertical	-57.42	-20.00	Pass

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5. Test Setup Photos

Please refer to the Appendix I Test Setup Photos

6. EUT Constructional Details (EUT Photos)

Please refer to the Appendix II External Photos &Appendix III External Photos

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