

TEST REPORT

Report Number : 15107858-E4V2

Applicant : Google LLC
1600 Amphitheatre Parkway
Mountain View, CA 94043 U.S.A.

Model : GGX8B

FCC ID : A4RGGX8B

EUT Description : PHONE

Test Standard(s) : FCC 47 CFR Part 2 and 25

Date Of Issue:

2024-04-29

Prepared by:

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Revision History


<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2024-04-18	Initial Review	
V2	2024-04-29	Updated Section 3, 5.4, 6.2, 9.3, 10.1,10.2 and 10.3	Kiya Kedida

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1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	GOOGLE LLC 1600 AMPHITHEATRE PARKWAY MOUNTAIN VIEW, CA 94043 U.S.A.	
Model	GGX8B	
FCC ID	A4RGGX8B	
EUT Description	PHONE	
Serial Number	Conducted: 41121FDAS000DD and 3B041FDAS000AH Radiated: 41031FDAS0006T and 41101FDAS00H0	
Sample Receipt Date	2024-01-08	
Date Tested	2024-02-26 to 2024-04-04	
Applicable Standards	FCC 47 CFR PART 2 AND 25	
Test Results	COMPLIES	
<p>UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> <p>The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.</p> <p>This document may not be altered or revised in any way unless done so by UL Verification Services Inc and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc will constitute fraud and shall nullify the document.</p>		
Approved & Released By:	Prepared By:	
		
Dan Corona Operations Leader UL Verification Services Inc.	Kiya Kedida Senior Project Engineer UL Verification Services Inc	

2. SUMMARY OF TEST RESULTS

This report contains data provided by the customer, which can impact the validity of results. UL Verification Services Inc. is only responsible for correctly integrating customer-provided data with measurements performed by UL Verification Services Inc.

Requirement Description	Requirement Clause Number (FCC)	Result	Remarks
RF Output Power	§2.1046	Report only	N/A
RF Output Power Verification	§25.204 (a)	Complies	N/A
Occupied Bandwidth	§2.1049	Reporting purposes only	N/A
Emissions Mask - within 250% of Authorized Bandwidth	§2.1049 §25.202 (f)(1)&(2)	Complies	N/A
Out of Band Emissions	§2.1051 §25.202 (f)(3)	Complies	N/A
Additional Unwanted Emission (1559-1610MHz)	§25.216 (c)(e)(h) & (i) FCC 03-283	Complies	N/A
Carrier-Off State Emissions (1559-1610MHz)	§25.216 (i) FCC 03-283	Complies	N/A
Frequency Stability	§25.202 (d)	Complies	N/A

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following:

- ANSI C63.26:2015
- FCC 47 CFR Part 2 and Part 25
- [FCC KDB 971168 D01 v03r01](#): Power Meas License Digital Systems
- [FCC KDB 971168 D02 v02r02](#): Misc Rev Approv License Devices
- [FCC KDB 412172 D01 v01r01](#): Determining ERP and EIRP

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input type="checkbox"/>	Building 1: 47173 Benicia Street, Fremont, CA 94538 USA	US0104	2324A	550739
<input type="checkbox"/>	Building 2: 47266 Benicia Street, Fremont, CA 94538 USA			
<input type="checkbox"/>	Building 3: 843 Auburn Court, Fremont, CA 94538 USA			
<input checked="" type="checkbox"/>	Building 4: 47658 Kato Rd, Fremont, CA 94538 USA			
<input type="checkbox"/>	Building 5: 47670 Kato Rd, Fremont, CA 94538 USA			

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U _{Lab}
Conducted Antenna Port Emission Measurement	1.940 db
Power Spectral Density	2.466 db
Time Domain Measurements Using SA	3.39 %
RF Power Measurement Direct Method Using Power Meter	0.450 db Peak 1.300 db Ave.
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 db
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 db
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.87 db
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 db
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 db
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 db
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 db

Uncertainty figures are valid to a confidence level of 95%.

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is a Phone.

6.2. MAXIMUM OUTPUT POWER

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015
 KDB 971168 D01 Section 5.6

$$\text{EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

where: EIRP = effective isotropic radiated power, respectively (expressed in the same units as P_{Meas}, typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

The transmitter has a maximum average conducted and EIRP output powers as follows:

FCC Part 25 (2000.1 – 2019.9MHz)

Frequency (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
2000.1	BPSK	22.37	-3.3	10000	19.07	0.081	65.87	65K9G1D
	QPSK	22.60		10000	19.30	0.085	183.68	184KG1D
2010.0	BPSK	22.63		10000	19.33	0.086	62.07	62K1G1D
	QPSK	22.63		10000	19.33	0.086	184.25	184KG1D
2019.9	BPSK	22.32		10000	19.02	0.080	68.85	68K9G1D
	QPSK	23.31		10000	20.01	0.100	183.98	184KG1D

FCC Part 25 (1626.6 – 1660.4MHz)

Frequency (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
1626.6	BPSK	22.81	-5.3	10000	17.51	0.056	62.40	62K4G1D
	QPSK	22.83		10000	17.53	0.057	183.84	184KG1D
1643.5	BPSK	22.63		10000	17.33	0.054	62.69	62K7G1D
	QPSK	22.81		10000	17.51	0.056	181.75	182KG1D
1660.4	BPSK	22.46		10000	17.16	0.052	63.88	63K9G1D
	QPSK	22.69		10000	17.39	0.055	181.49	181KG1D

NOTE: All modulations have been tested, and only the worst test results are shown in the report

6.3. MAXIMUM ANTENNA GAIN

The antenna(s) gain as provided by the manufacturer are as follow:

Frequency Range (MHz)	ANT 1 Antenna Gain (dBi)	ANT 5 Antenna Gain (dBi)
2000.1 - 2019.9	-3.3	N/A
1626.5 - 1660.4	N/A	-5.3

6.4. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in three orthogonal orientations X/Y/Z on both ANT 1 and ANT 5 antennas. It was determined that X (Flatbed) orientation was the worst-case orientation.

The emissions mask tests were performed based on declared authorized bandwidths of 230kHz.

Conducted spurious emissions tests were performed on the worst-case antenna port because it has the highest conducted power.

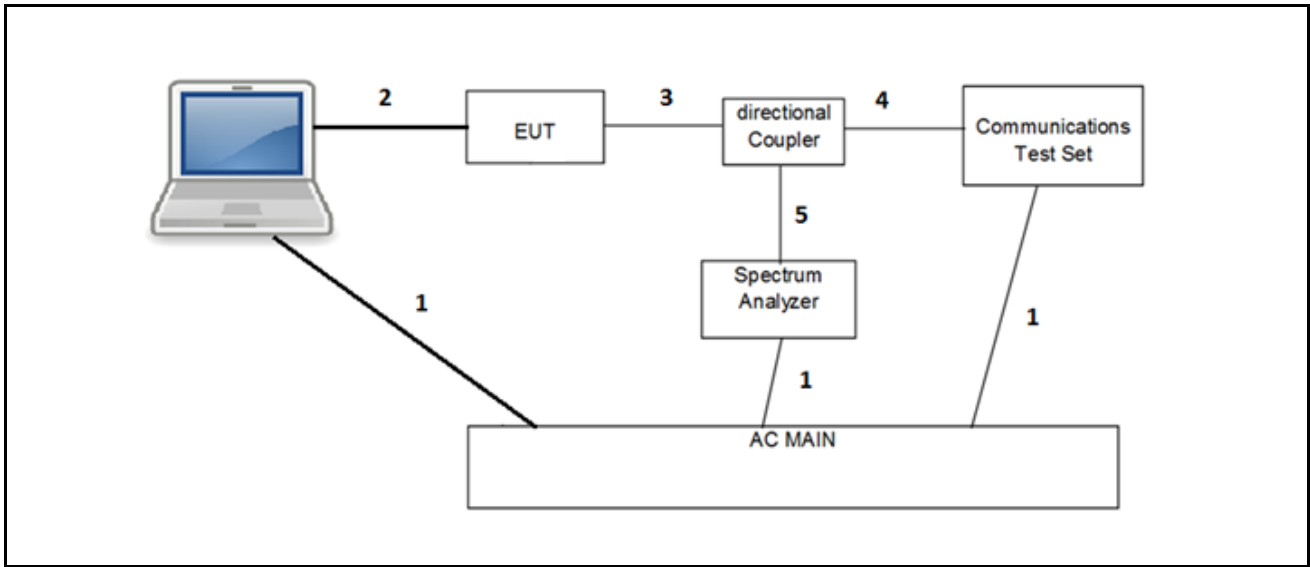
Radiated spurious emissions below 1GHz were performed with the highest output power on both ANT 1 and ANT 5 as worst-case scenario.

Radiated spurious emissions below 30MHz were investigated and there were no emissions found with less than 20dB of margin below the specified emissions limits.

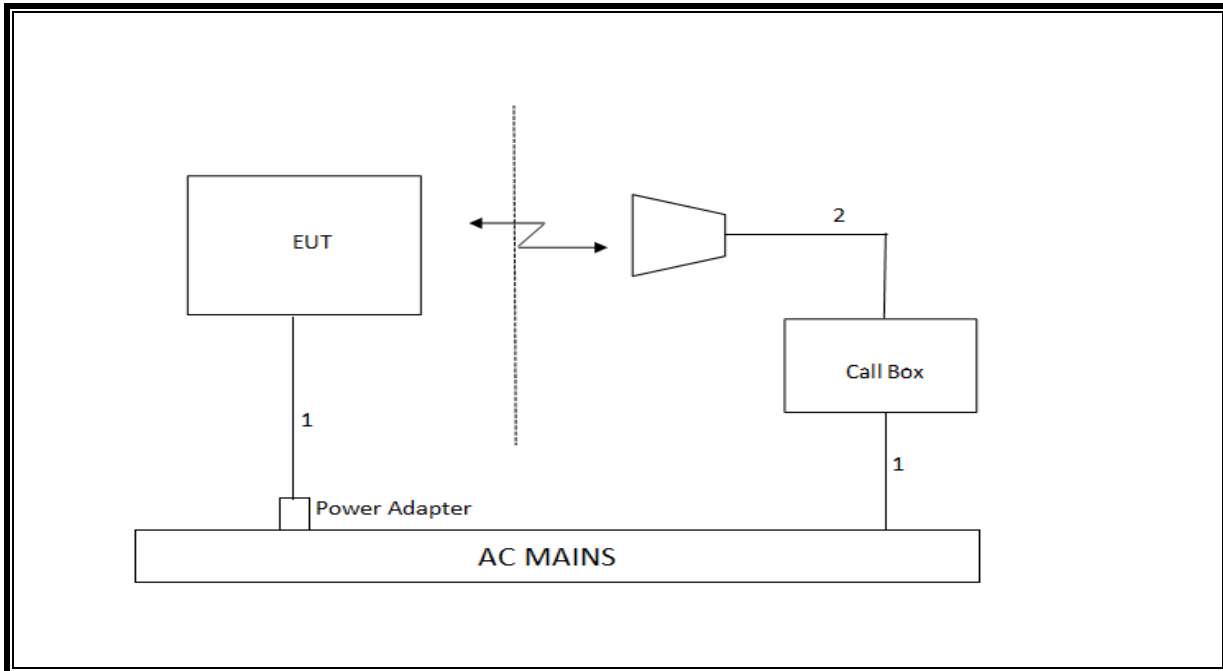
6.5. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description	Manufacturer	Model	Serial Number	FCC ID/ DoC		
Laptop	Dell	Latitude 7300	876819127	DoC		
AC/DC adapter	Dell	DA130PE1-00	CN-0M55GJ-DES00-066-5THK-A02	DoC		
Power Adapter	Google	GW8L7	1HV003B901000B9DE	DoC		
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	3	US 115V	Un-shielded	2.0	N/A
2	USB	1	USB-C	Un-shielded	1.0	N/A
3	RF In/Out	1	EUT	Un-shielded	0.6	N/A
4	RF In/Out	1	Communication Test Set	Un-shielded	1.2	N/A
5	RF In/Out	1	Barrel	N/A	N/A	N/A
I/O CABLES (RF RADIATED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	US 115V	Un-shielded	2.0	N/A
1	USB	1	USB-C	Un-shielded	1	N/A
2	RF In/Out	1	Antenna	Un-shielded	5.0	N/A

CONDUCTED SETUP



RADIATED SETUP



7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	80430	2024-08-31
Antenna, Horn 1-18GHz	ETS Lindgren	3117	79834	2024-06-30
Antenna, Broadband Hybrid, 30MHz to 3000MHz	SUNAR	JB3	85151	2024-4-30
RF Filter Box, 1-18GHz	UL-FR1	NA	217255	2024-10-31
RF Filter Box, 1-18GHz	UL-FR1	RATS 2	226781	2024-09-30
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	430250	2024-09-30
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	169936	2025-02-28
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	169935	2025-02-28
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	85943	2025-02-28
Directional Coupler	KRYTAR	152610	198816	2024-10-31
Directional Coupler	KRYTAR	152610	231664	2025-01-22
Power Meter, P-series single channel	Keysight	N1912A	90719	2025-01-31
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	81319	2025-01-31
Filter, HPF 1.2GHz	Wainwright Instruments GmbH	WHKX6-948-1.2/15G-40ST	99	2024-10-31
Spectrum Analyzer, PXA, 2Hz to 44GHz	Keysight	N9030B	231739	2025-01-31
Spectrum Analyzer, PXA, 2Hz to 44GHz	Keysight	N9030B	245120	2025-02-28
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	222793	2025-02-28
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	222797	2025-02-28
Chamber, Environmental	Thermotron Corp.	SM-16C Mini-Max	179936	2024-06-30
Transmitting Antenna, Horn Antenna	TEKBOX Digital Solutions	TBMA4	226709	C.N.R.
Antenna, Horn 18 to 26.5GHz	A.R.A.	MWH-1826/B	199659	2024-12-31
Amplifier 18-26.5GHz, +5Vdc, -54dBm P1dB	AMPLICAL	AMP18G26.5-60	234683	2024-03-29
DC Power Supply	GWINSTEK	GPS18500	N/A	C.N.R.
UL AUTOMATION SOFTWARE				
CLT Software	UL	UL RF	V2023.11.21.0	
Power Measurement Software	UL	UL RF	V2023.08.14.0	
Radiated test software	UL	UL RF	Ver 9.5 2023-05-01	

8. RF OUTPUT POWER VERIFICATION

LIMITS

FCC: §25.204

(a) In bands shared coequally with terrestrial radio communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station, other than an ESV, operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits except as provided for in paragraph (c) of this section:

+ 40 dBW in any 4 kHz band for $\theta \leq 0^\circ$

+ 40 + 3 θ dBW in any 4 kHz band for $0^\circ < \theta \leq 5^\circ$

where θ is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

TEST PROCEDURE

The transmitter output is connected to a wideband power meter/sensor which is greater than the occupied bandwidth as worst-case scenario, also the total power readings still comply with the required limit.

The cable assembly insertion loss was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

8.1.1. Band 23 ANT 1

Test Engineer ID:	CK	Test Date:	2024-02-29
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Band 23 SCS 3.75kHz

Test Frequency (MHz)	SC Size	Conducted Average Power (dBm)		Antenna Gain (dBi)	EIRP Average Power (dBm)	
		BPSK	QPSK		BPSK	QPSK
2000.1	1SC0	22.01	22.18	-3.3	18.71	18.88
	1SC47	22.37	22.6		19.07	19.3
2010	1SC0	22.26	22.25		18.96	18.95
	1SC47	22.42	22.4		19.12	19.1
2019.9	1SC0	22.27	22.26		18.97	18.96
	1SC47	22.32	22.31		19.02	19.01

Band 23 SCS 15kHz

Test Frequency (MHz)	SC Size	Conducted Average Power (dBm)		Antenna Gain (dBi)	EIRP Average Power (dBm)	
		BPSK	QPSK		BPSK	QPSK
2000.1	1SC0	22.06	22.17	-3.3	18.76	18.87
	1SC11	22.06	22.05		18.76	18.75
	3SC0	N/A	22.23		N/A	18.93
	3SC9	N/A	22.45		N/A	19.15
	6SC0	N/A	22.5		N/A	19.2
	6SC6	N/A	22.6		N/A	19.3
	12SC0	N/A	21.64		N/A	18.34
2010	1SC0	22.63	22.63		19.33	19.33
	1SC11	22.55	22.53		19.25	19.23
	3SC0	N/A	22.13		N/A	18.83
	3SC9	N/A	22.5		N/A	19.2
	6SC0	N/A	22.43		N/A	19.13
	6SC6	N/A	22.15		N/A	18.85
	12SC0	N/A	23.13		N/A	19.83
2019.9	1SC0	22.21	22.23	18.91	18.93	
	1SC11	22.05	22.05	18.75	18.75	
	3SC0	N/A	23.12	N/A	19.82	
	3SC9	N/A	23.1	N/A	19.8	
	6SC0	N/A	23.31	N/A	20.01	
	6SC6	N/A	23.4	N/A	20.1	
	12SC0	N/A	22.95	N/A	19.65	

8.1.2. Band 255 ANT 5

Test Engineer ID:	CK	Test Date:	2024-02-29
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Band 255 SCS 3.75kHz

Test Frequency (MHz)	SC Size	Conducted Average Power (dBm)		Antenna Gain (dBi)	EIRP Average Power (dBm)	
		BPSK	QPSK		BPSK	QPSK
1626.6	1SC0	22.77	22.77	-5.3	17.47	17.47
	1SC47	22.81	22.8		17.51	17.5
1643.5	1SC0	22.49	22.54		17.19	17.24
	1SC47	22.63	22.81		17.33	17.51
1660.5	1SC0	22.43	22.41		17.13	17.11
	1SC47	22.38	22.39		17.08	17.09

Band 255 SCS 15kHz

Test Frequency (MHz)	SC Size	Conducted Average Power (dBm)		Antenna Gain (dBi)	EIRP Average Power (dBm)	
		BPSK	QPSK		BPSK	QPSK
1626.6	1SC0	22.46	22.47	-5.3	17.16	17.17
	1SC11	22.43	22.42		17.13	17.12
	3SC0	N/A	22.61		N/A	17.31
	3SC9	N/A	22.65		N/A	17.35
	6SC0	N/A	22.83		N/A	17.53
	6SC6	N/A	22.79		N/A	17.49
	12SC0	N/A	21.91		N/A	16.61
1643.5	1SC0	22.47	22.37		17.17	17.07
	1SC11	22.6	22.3		17.3	17
	3SC0	N/A	22.15		N/A	16.85
	3SC9	N/A	22.31		N/A	17.01
	6SC0	N/A	22.45		N/A	17.15
	6SC6	N/A	22.46		N/A	17.16
	12SC0	N/A	21.81		N/A	16.51
1660.4	1SC0	22.44	22.42	17.14	17.12	
	1SC11	22.46	22.45	17.16	17.15	
	3SC0	N/A	22.25	N/A	16.95	
	3SC9	N/A	22.01	N/A	16.71	
	6SC0	N/A	22.42	N/A	17.12	
	6SC6	N/A	22.61	N/A	17.31	
	12SC0	N/A	22.69	N/A	17.39	

9. CONDUCTED TEST RESULTS

9.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only.

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the middle channel in each band. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times$ RBW. The 99% bandwidths were measured and recorded.

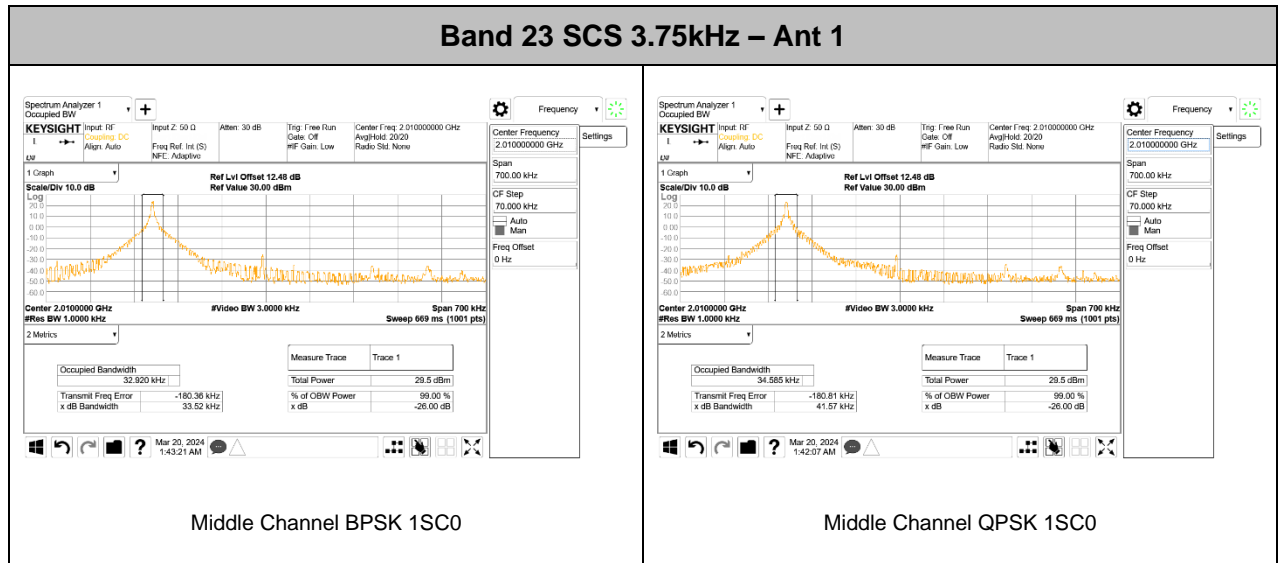
RESULTS

Plots are provided for the mid channel. Tabular data for all channels is presented.

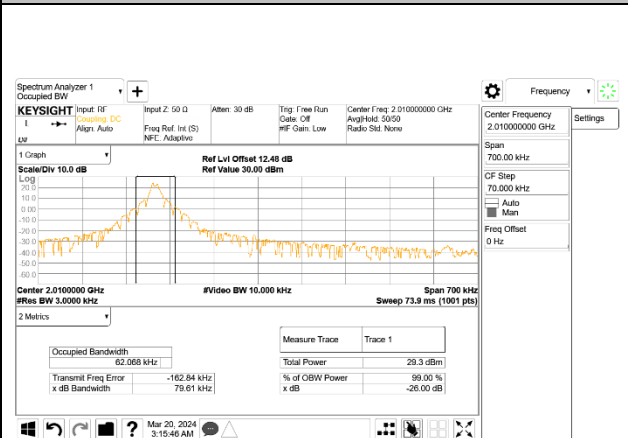
9.1.1. Band 23 ANT 1

Band 23 SCS 3.75kHz – Ant1			
Test Frequency (MHz)	Modulation	SC Size	99% BW (kHz)
2000.1	BPSK	1SC0	35.244
	QPSK	1SC0	34.582
2010.0	BPSK	1SC0	32.920
	QPSK	1SC0	34.585
2019.9	BPSK	1SC0	32.773
	QPSK	1SC0	33.477

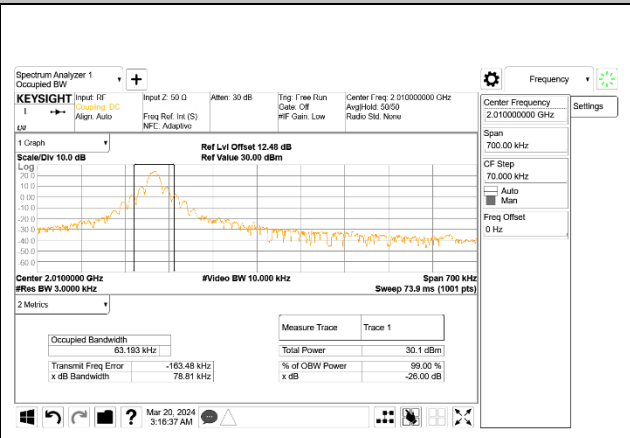
Band 23 SCS 15kHz – Ant1			
Test Frequency (MHz)	Modulation	SC Size	99% BW (kHz)
2000.1	BPSK	1SC0	65.873
	QPSK	1SC0	59.244
	QPSK	3SC0	72.692
	QPSK	6SC0	112.75
	QPSK	12SC0	183.68
2010.0	BPSK	1SC0	62.068
	QPSK	1SC0	63.193
	QPSK	3SC0	72.249
	QPSK	6SC0	116.31
	QPSK	12SC0	184.25
2019.9	BPSK	1SC0	68.854
	QPSK	1SC0	66.011
	QPSK	3SC0	81.666
	QPSK	6SC0	127.00
	QPSK	12SC0	183.98



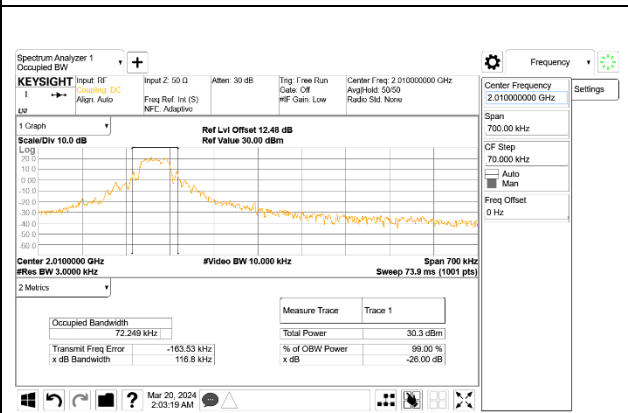
Band 23 SCS 15kHz – Ant 1



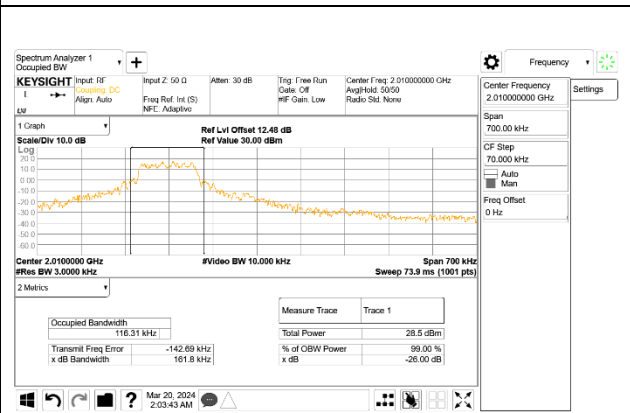
Middle Channel BPSK 1SC0



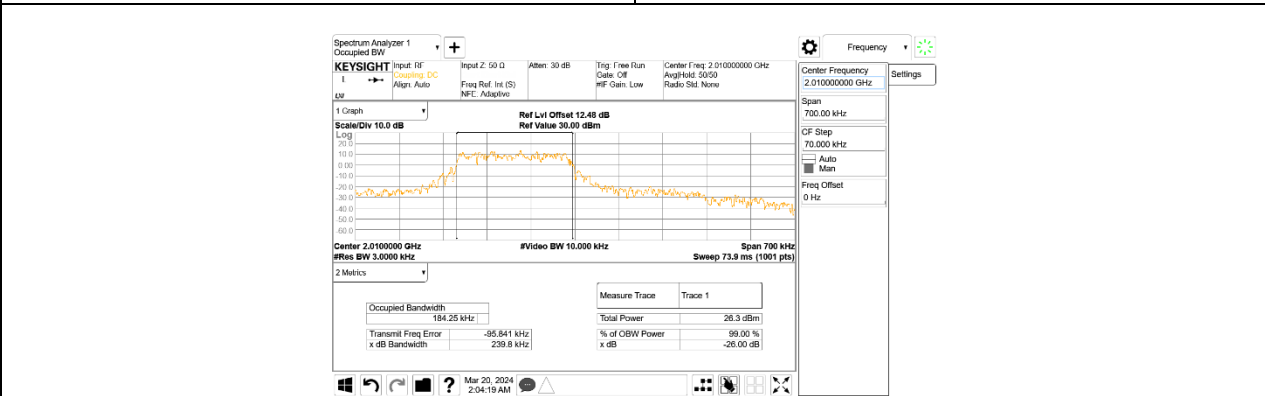
Middle Channel QPSK 1SC0



Middle Channel QPSK 3SC0



Middle Channel QPSK 6SC0



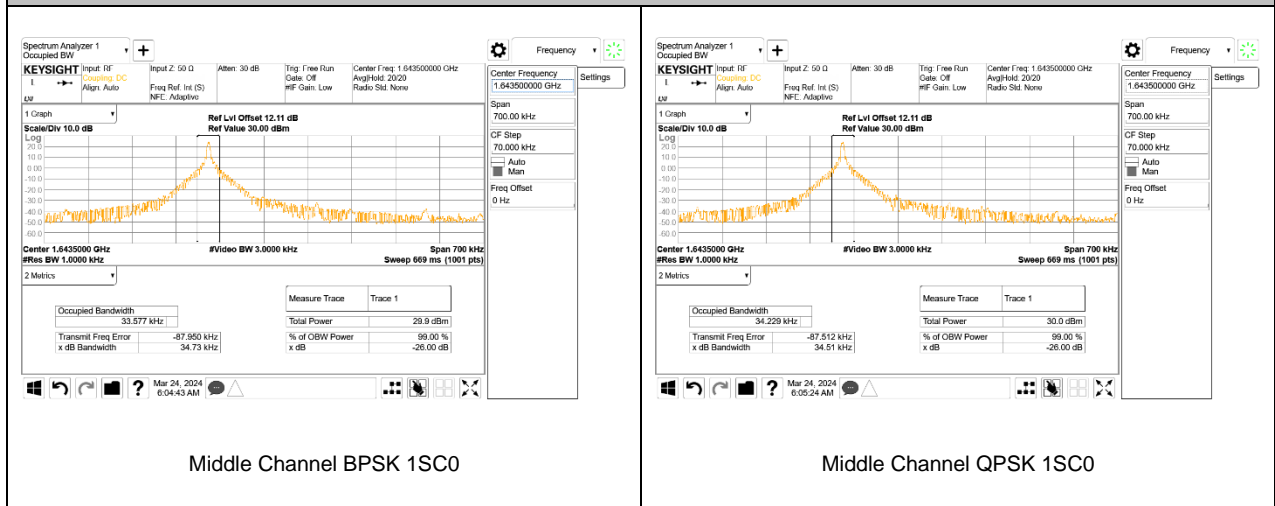
Middle Channel QPSK 12SC0

9.1.2. Band 255 ANT 5

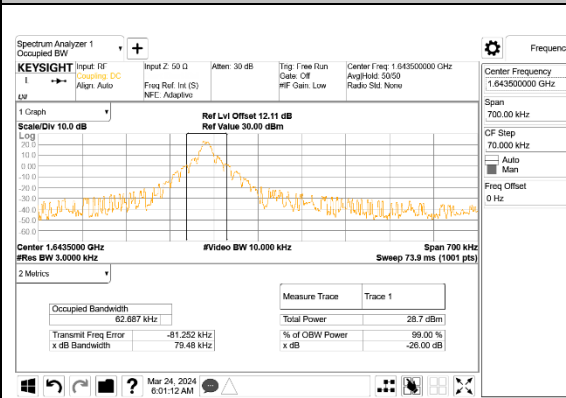
Band 255 SCS 3.75kHz – Ant 5			
Test Frequency (MHz)	Modulation	SC Size	99% BW (kHz)
1626.6	BPSK	1SC0	33.164
	QPSK	1SC0	35.634
1643.5	BPSK	1SC0	33.577
	QPSK	1SC0	34.229
1660.4	BPSK	1SC0	33.589
	QPSK	1SC0	34.465

Band 255 SCS 15kHz – Ant 5			
Test Frequency (MHz)	Modulation	SC Size	99% BW (kHz)
1626.6	BPSK	1SC0	62.397
	QPSK	1SC0	63.213
	QPSK	3SC0	72.735
	QPSK	6SC0	107.93
	QPSK	12SC0	183.84
1643.5	BPSK	1SC0	62.687
	QPSK	1SC0	61.989
	QPSK	3SC0	71.222
	QPSK	6SC0	104.24
	QPSK	12SC0	181.75
1660.4	BPSK	1SC0	63.878
	QPSK	1SC0	65.335
	QPSK	3SC0	72.255
	QPSK	6SC0	109.22
	QPSK	12SC0	181.49

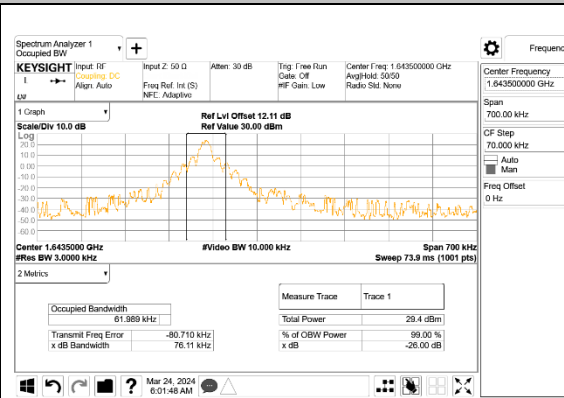
Band 255 SCS 3.75kHz – Ant 5



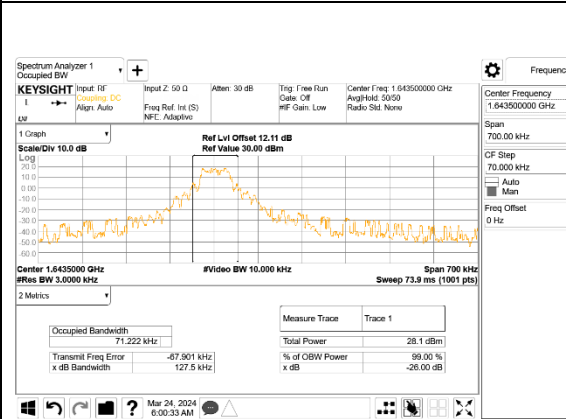
Band 255 SCS 15kHz – Ant 5



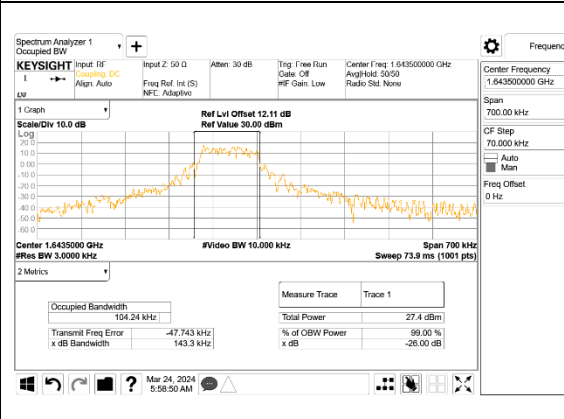
Middle Channel BPSK 1SC0



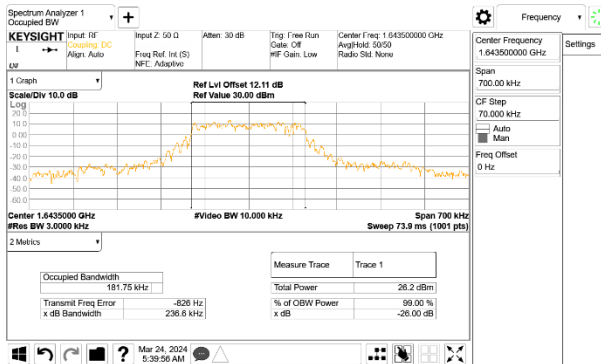
Middle Channel QPSK 1SC0



Middle Channel QPSK 3SC0



Middle Channel QPSK 6SC0



Middle Channel QPSK 12SC0

9.2. EMISSIONS MASK WITHIN 250% OF AUTHORIZED BANDWIDTH

LIMITS

FCC §25.202

(f) Emission limitations. Except for SDARS terrestrial repeaters and as provided for in paragraph (i), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

(1) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;

(2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: 35 dB;

TEST PROCEDURE

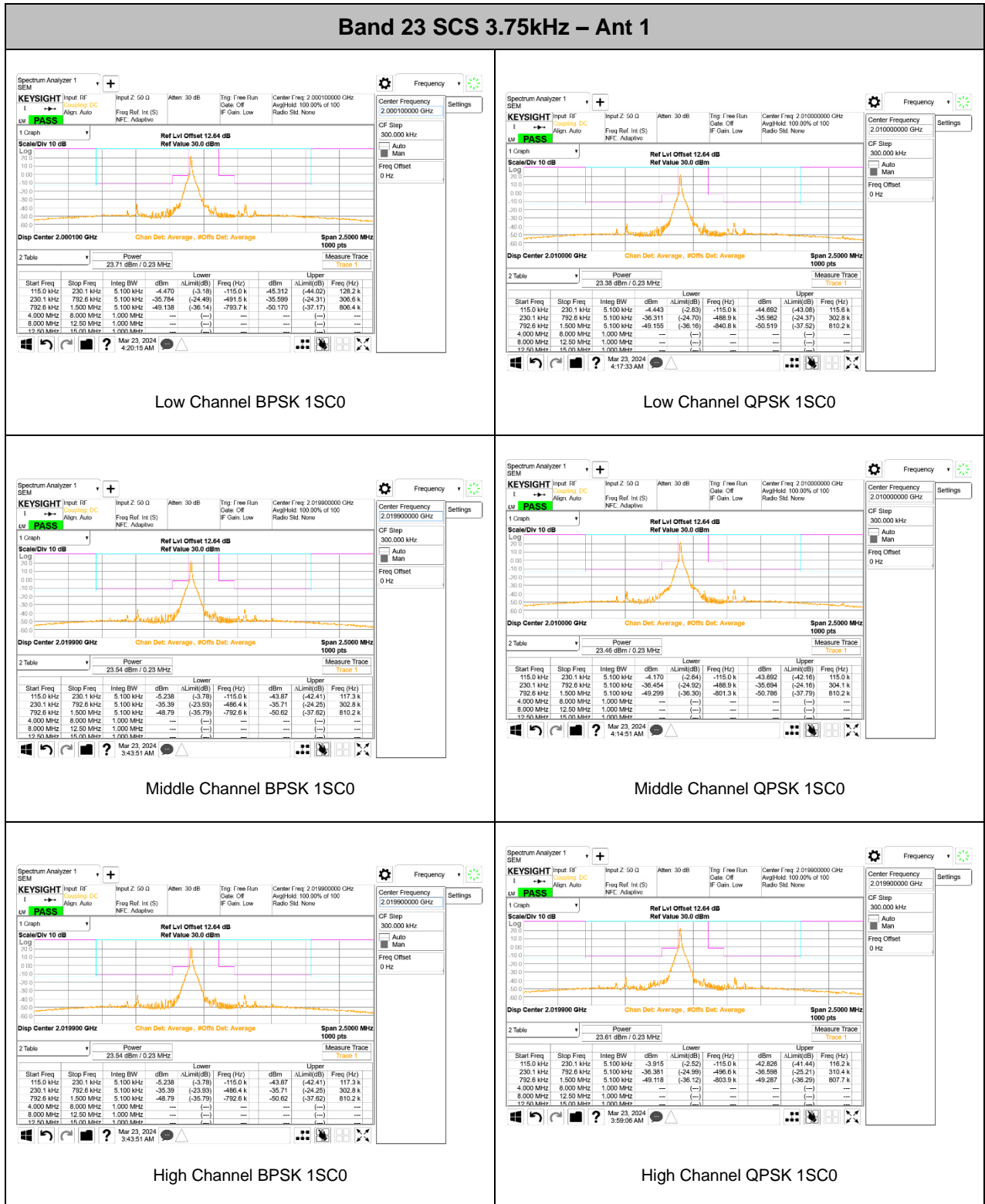
The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The channel edge emissions were measured on the low, mid and high channels. The limits within 250% of the authorized bandwidth are relative to the total in-band (channel) power. The measurement bandwidth (RBW) is set to ≥ 4 kHz and VBW set to at least 3 times the RBW. To measure the average value of the emissions the detector is set to rms while observing the minimum required number of points as detailed in ANSI C63.26 for average rms measurements. The sweep time is set to 2ms multiplied by the number of points to obtain the average over 2ms. Multiple sweeps with max hold enabled are made to capture the maximum average value.

RESULTS

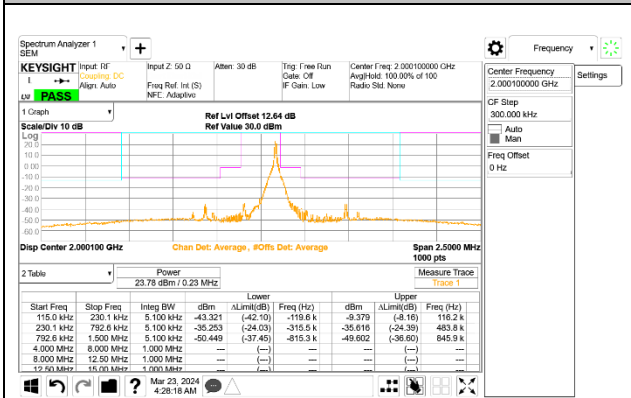
The tests were performed based on declared authorized bandwidths of 230kHz. Both ANT 1 and ANT 5 were performed on low, mid, high channels for SCS 3.75kHz on SC 1SC0 and 1SC47 and SCS 15kHz SC 1SC0 and 1SC11, 12SC0 as worst case.

9.2.1. Band 23 ANT 1

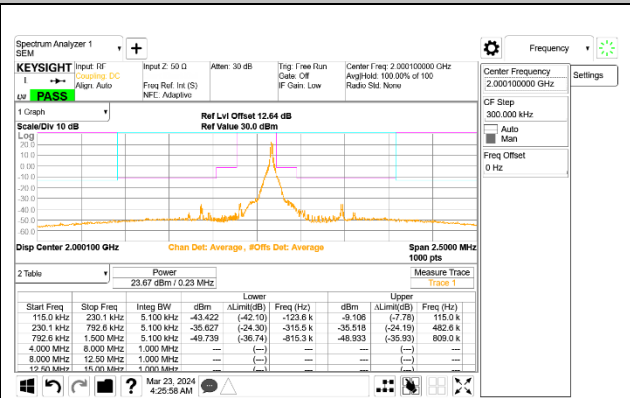
Band 23 SCS 3.75kHz – Ant 1



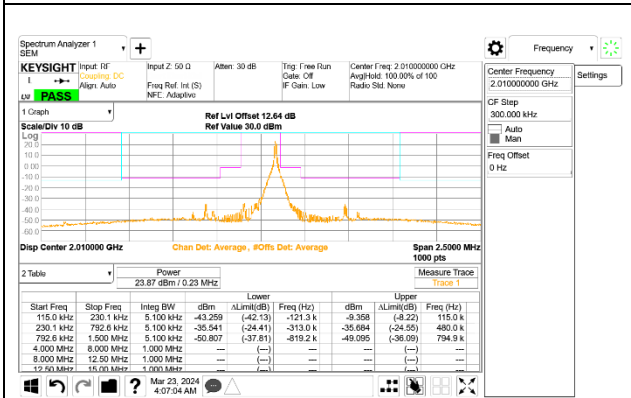
Band 23 SCS 3.75kHz – Ant 1



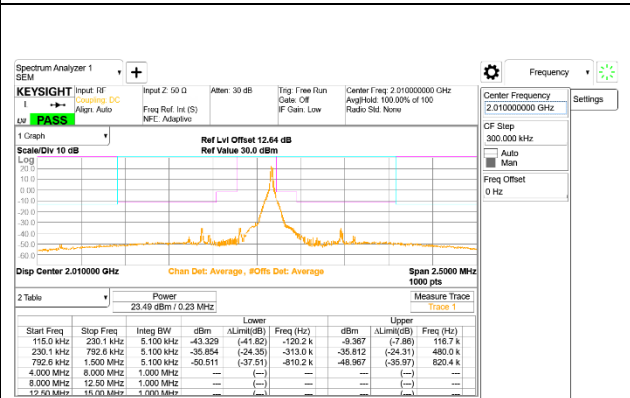
Low Channel BPSK 1SC47



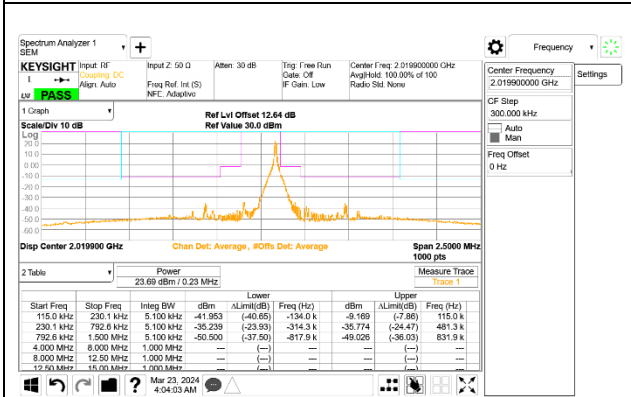
Low Channel QPSK 1SC47



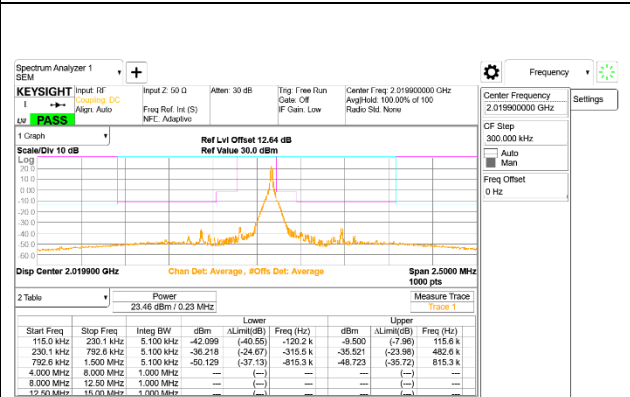
Middle Channel BPSK 1SC47



Middle Channel QPSK 1SC47

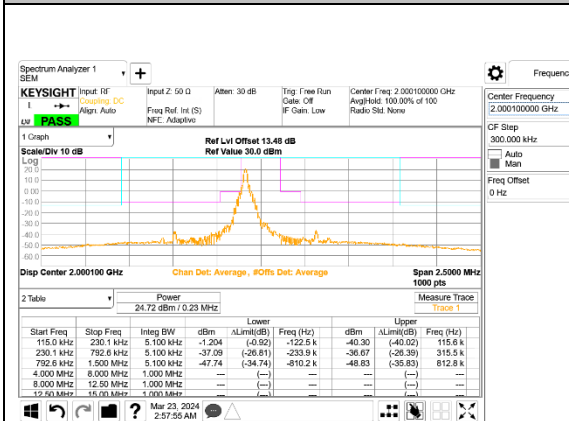


High Channel BPSK 1SC47

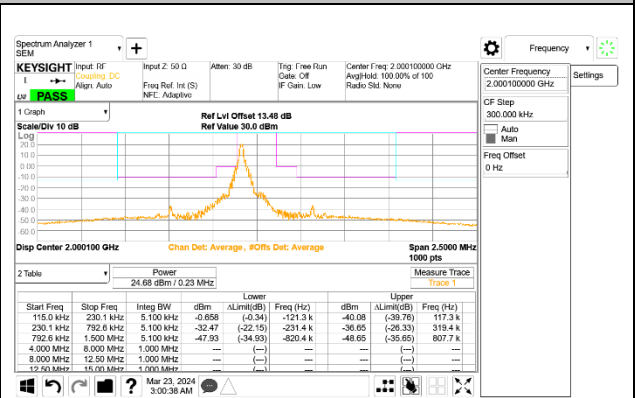


High Channel QPSK 1SC47

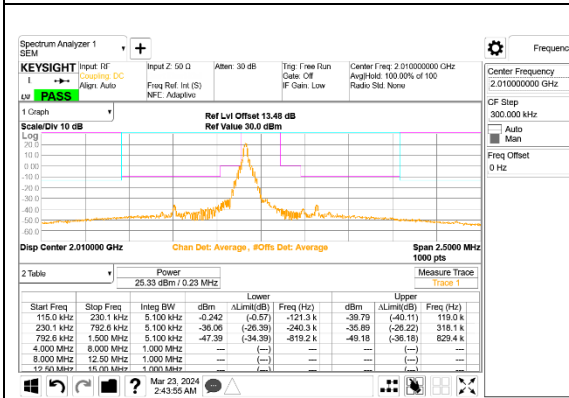
Band 23 SCS 15kHz – Ant 1



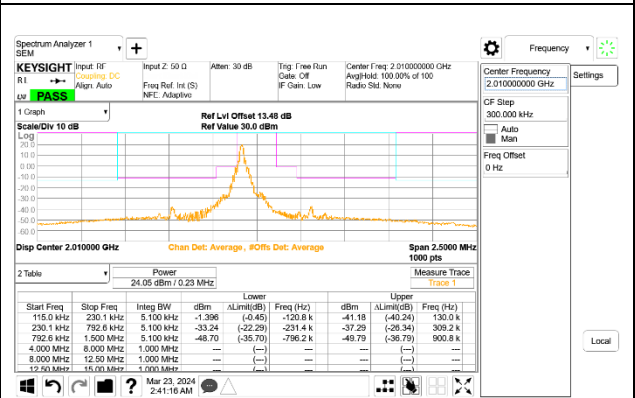
Low Channel BPSK 1SC0



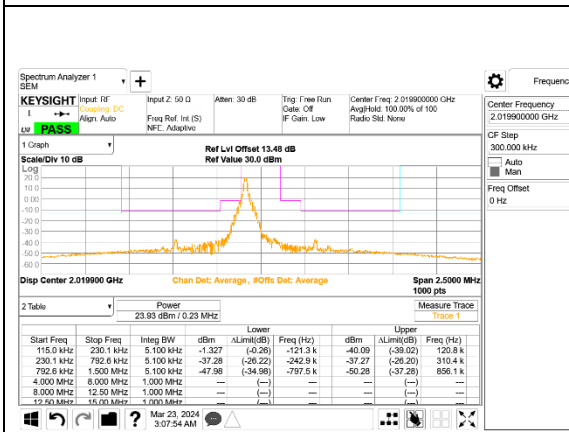
Low Channel QPSK 1SC0



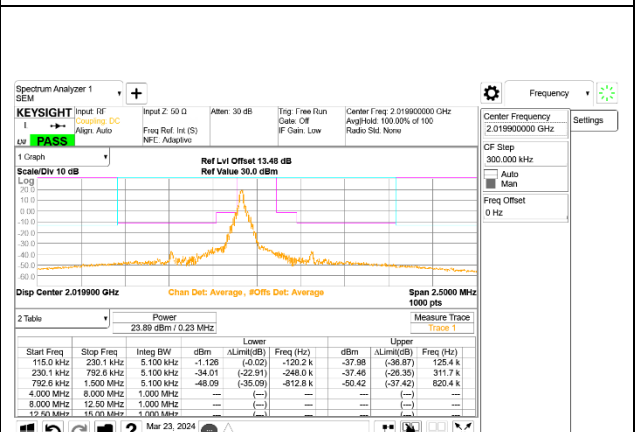
Middle Channel BPSK 1SC0



Middle Channel QPSK 1SC0

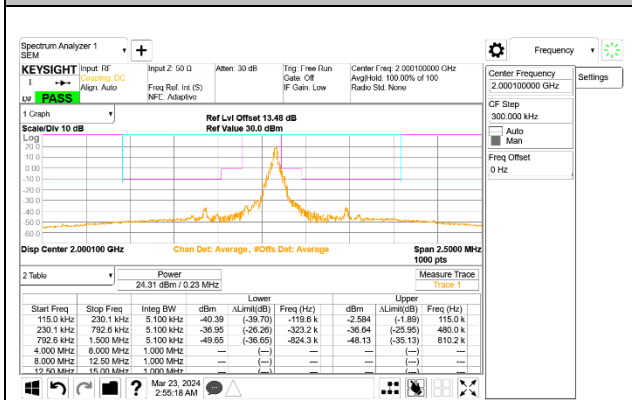


High Channel BPSK 1SC0

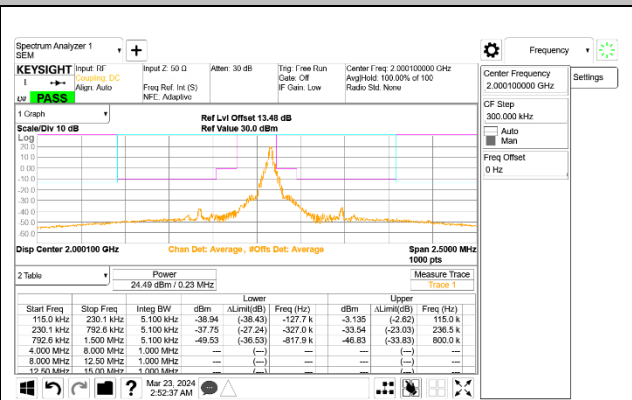


High Channel QPSK 1SC0

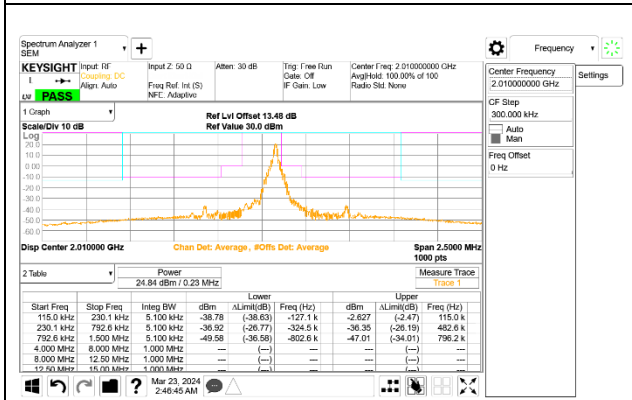
Band 23 SCS 15kHz – Ant 1



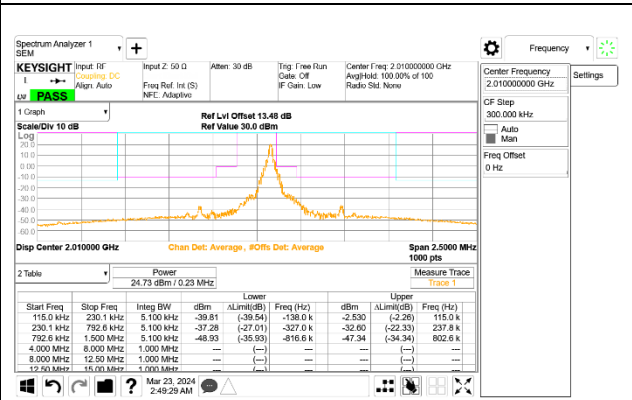
Low Channel BPSK 1SC11



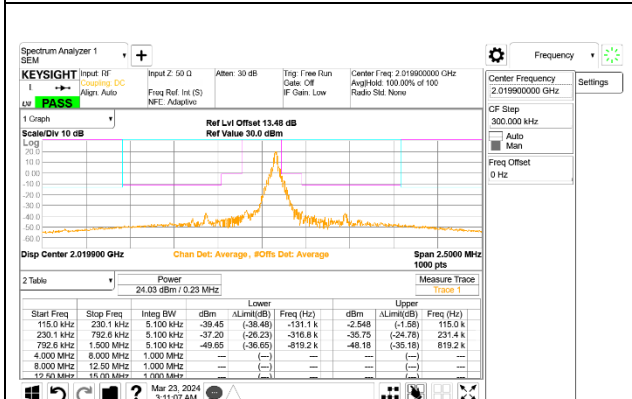
Low Channel QPSK 1SC11



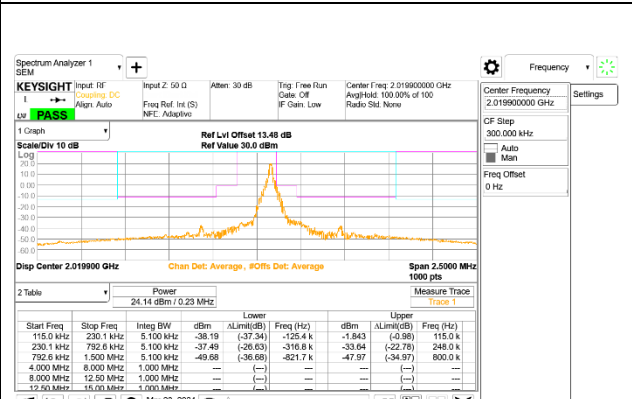
Middle Channel BPSK 1SC11



Middle Channel QPSK 1SC11

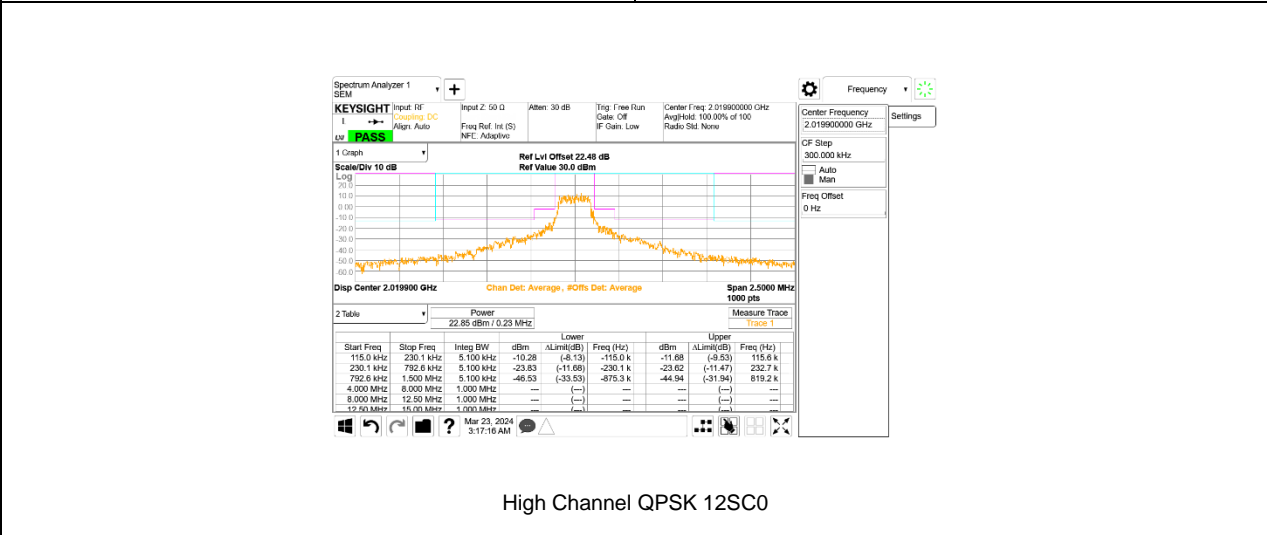
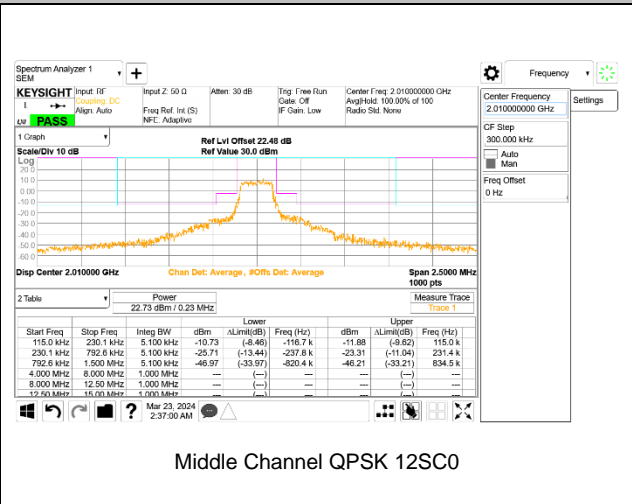
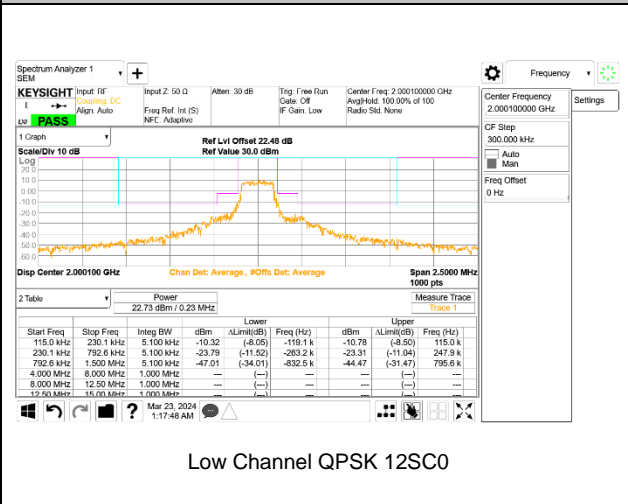


High Channel BPSK 1SC11



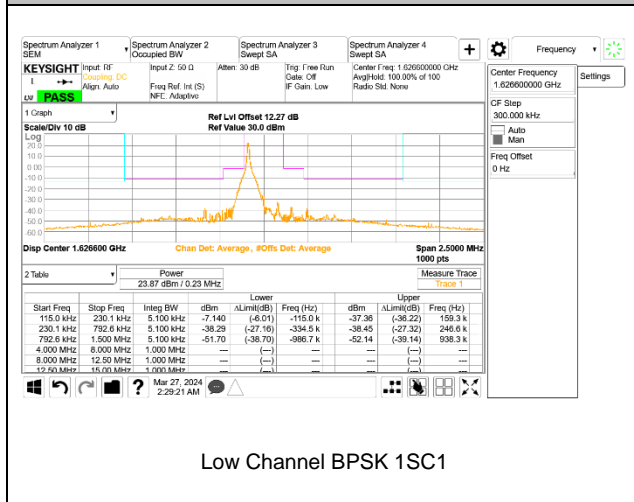
High Channel QPSK 1SC11

Band 23 SCS 15kHz – Ant 1

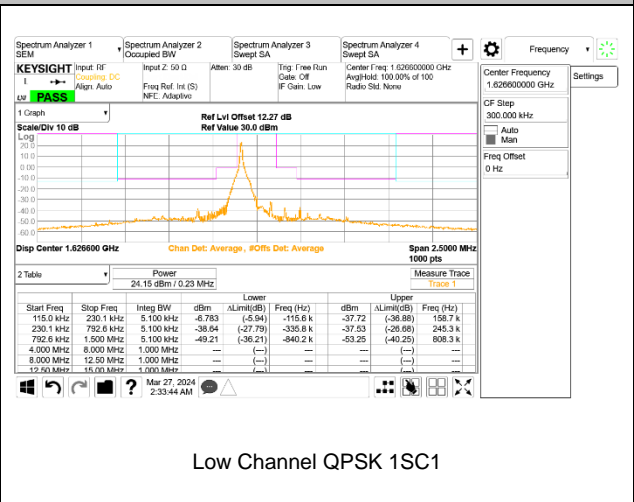


9.2.2. Band 255 ANT 5

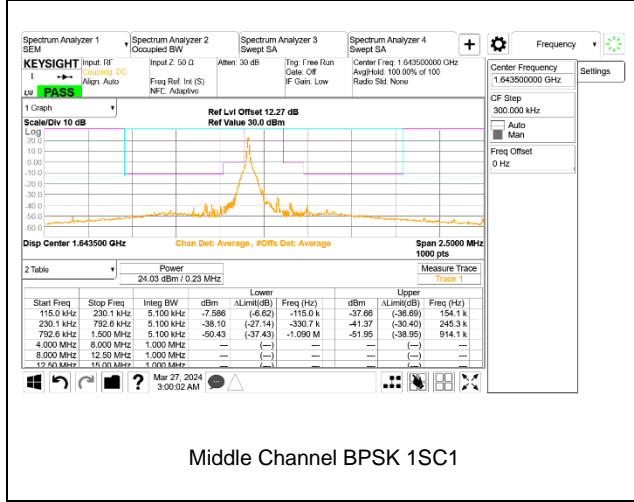
Band 255 SCS 3.75kHz – Ant 5



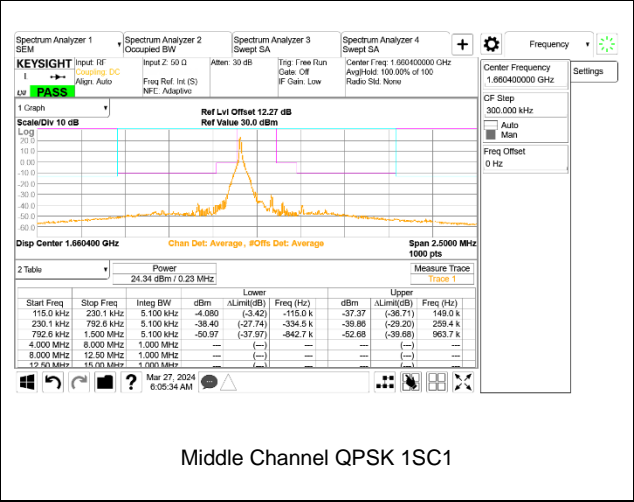
Low Channel BPSK 1SC1



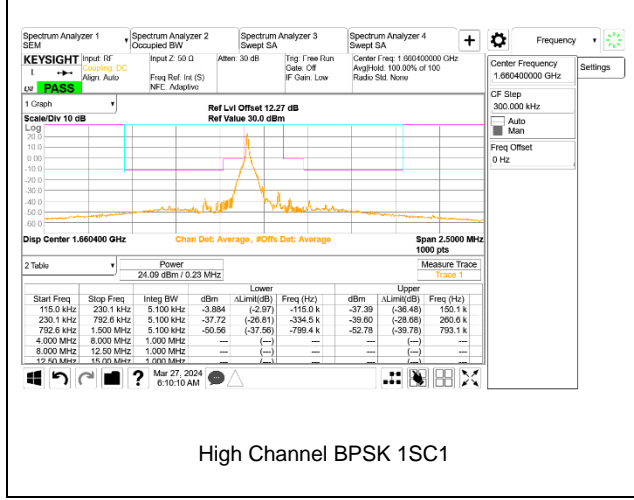
Low Channel QPSK 1SC1



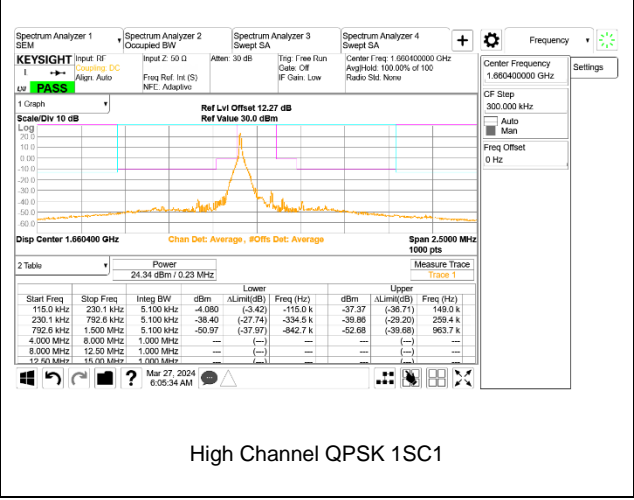
Middle Channel BPSK 1SC1



Middle Channel QPSK 1SC1

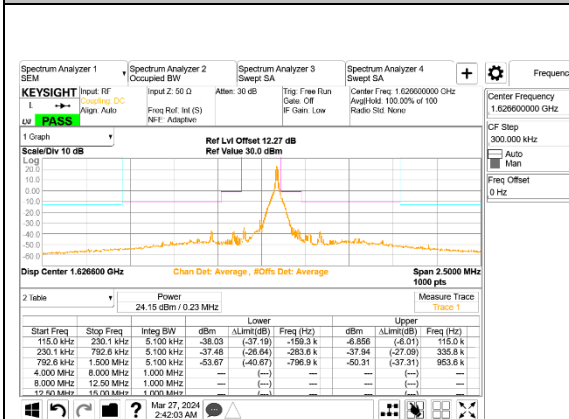


High Channel BPSK 1SC1

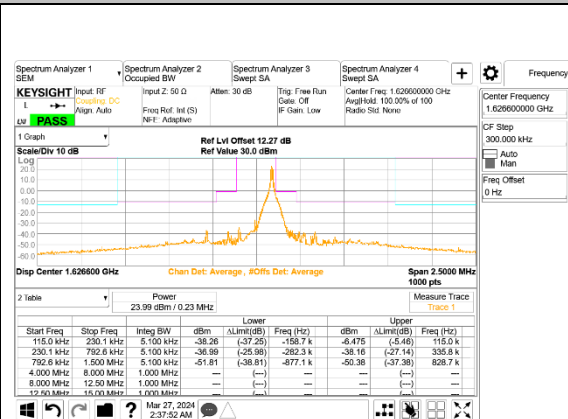


High Channel QPSK 1SC1

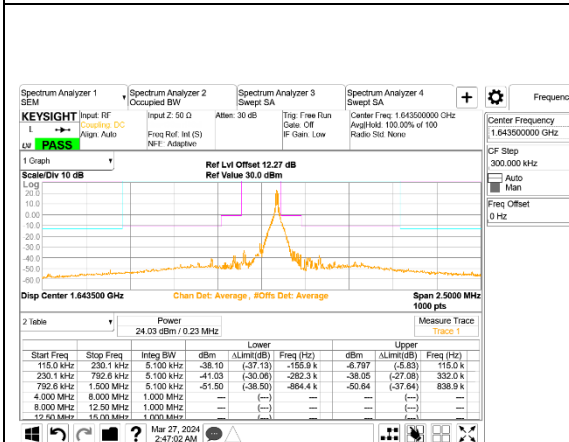
Band 255 SCS 3.75kHz – Ant 5



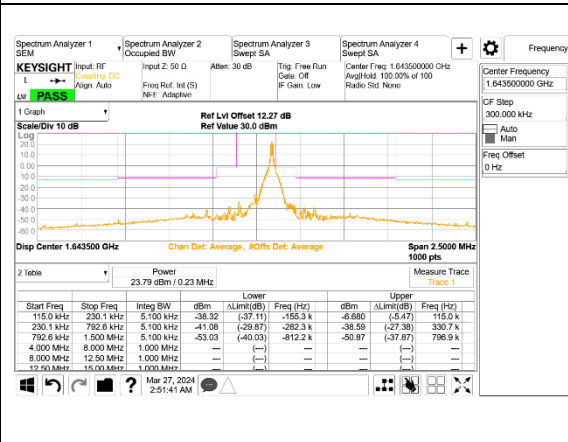
Low Channel BPSK 1SC47



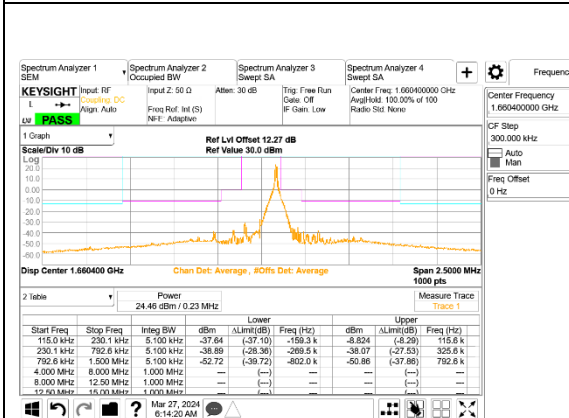
Low Channel QPSK 1SC47



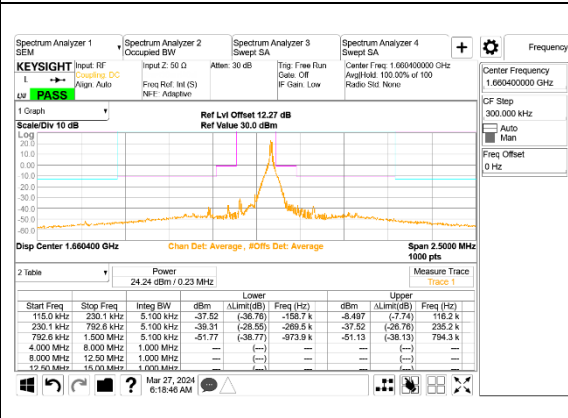
Middle Channel BPSK 1SC47



Middle Channel QPSK 1SC47

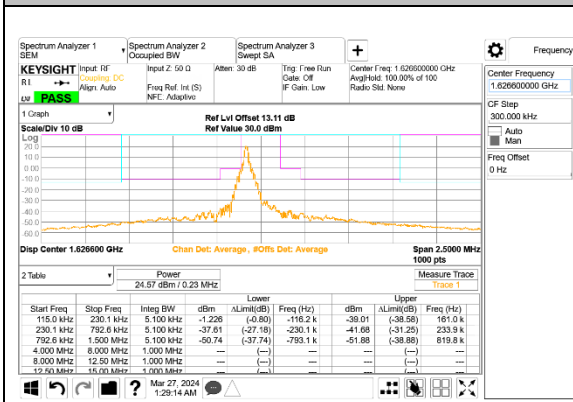


High Channel BPSK 1SC47

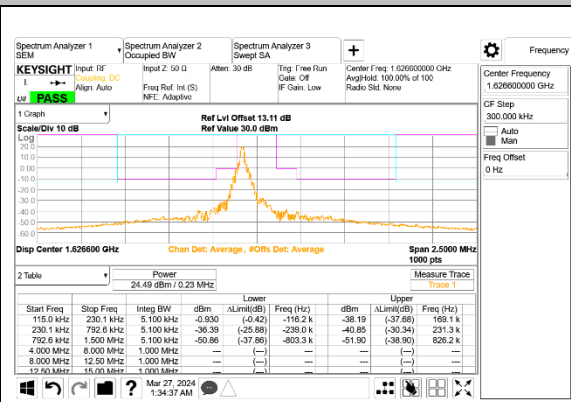


High Channel QPSK 1SC47

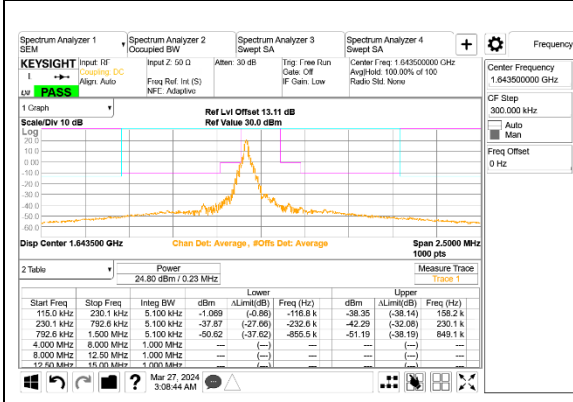
Band 255 SCS 15kHz – Ant 5



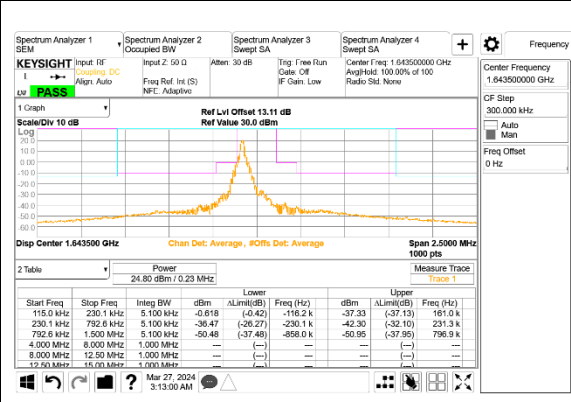
Low Channel BPSK 1SC1



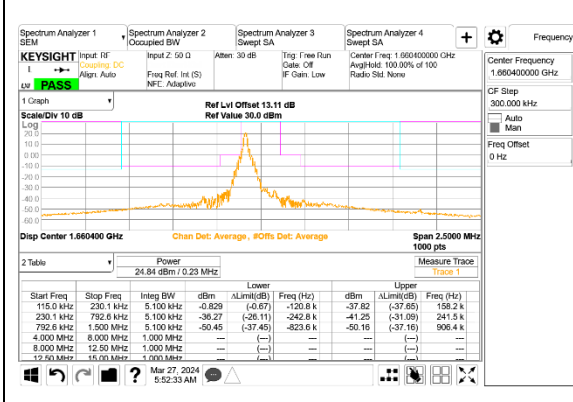
Low Channel QPSK 1SC1



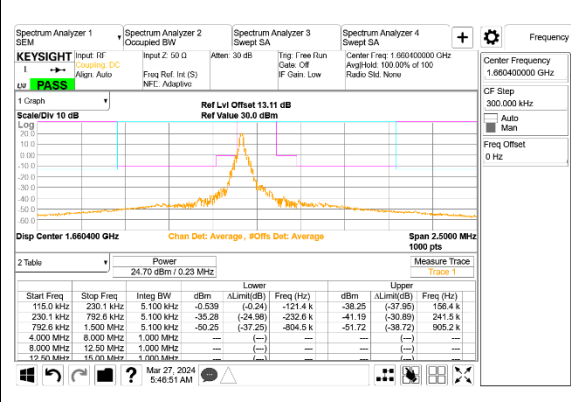
Middle Channel BPSK 1SC1



Middle Channel QPSK 1SC1

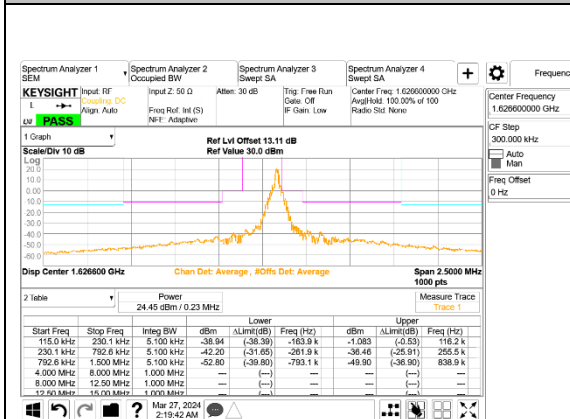


High Channel BPSK 1SC1

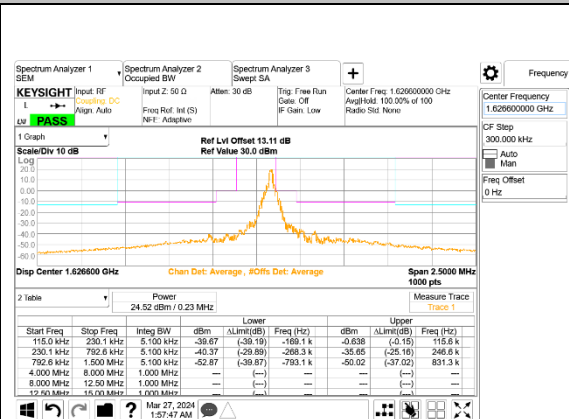


High Channel QPSK 1SC1

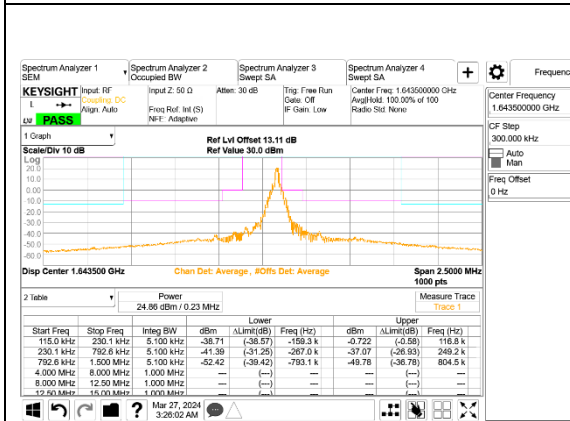
Band 255 SCS 3.75kHz – Ant 5



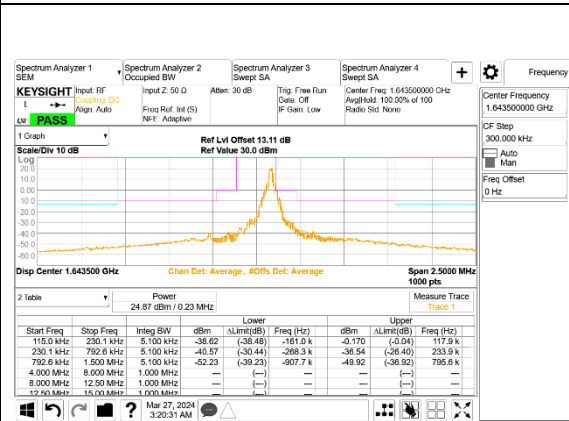
Low Channel BPSK 1SC11



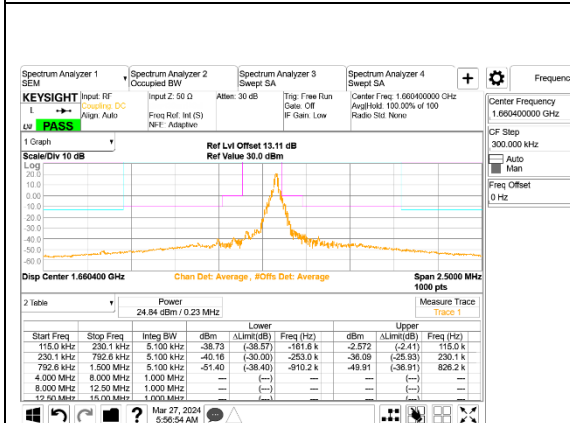
Low Channel QPSK 1SC11



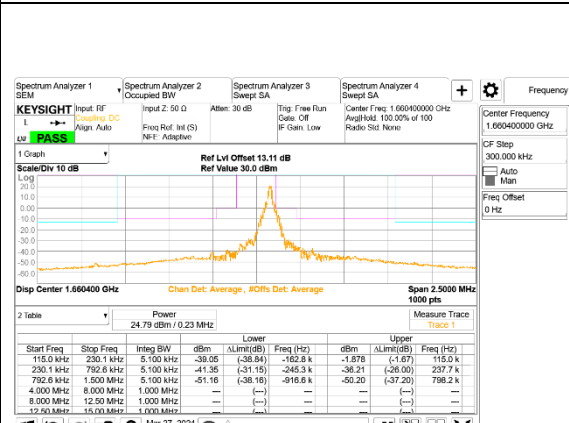
Middle Channel BPSK 1SC11



Middle Channel QPSK 1SC11

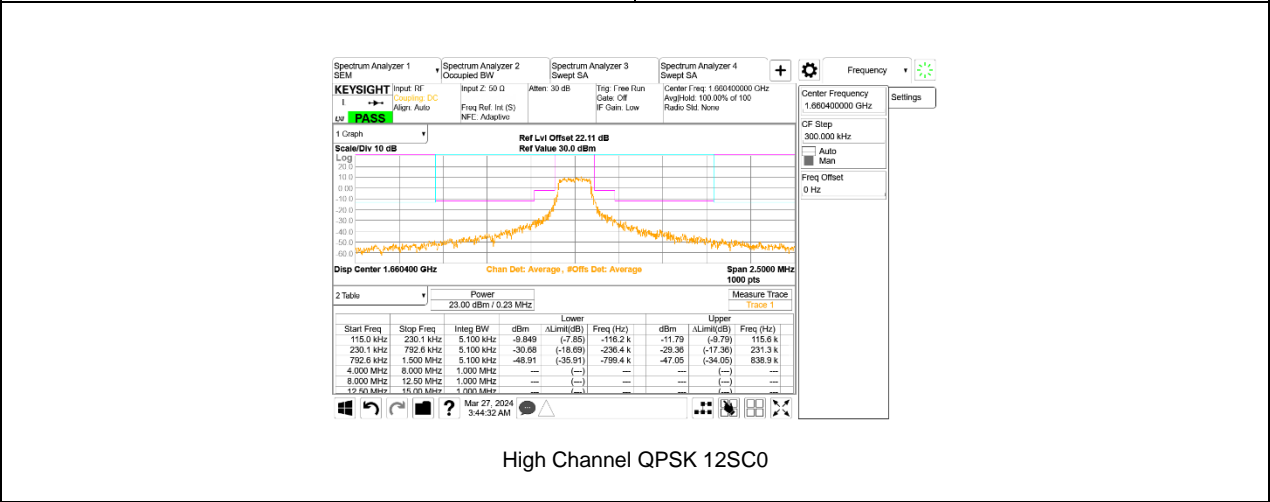
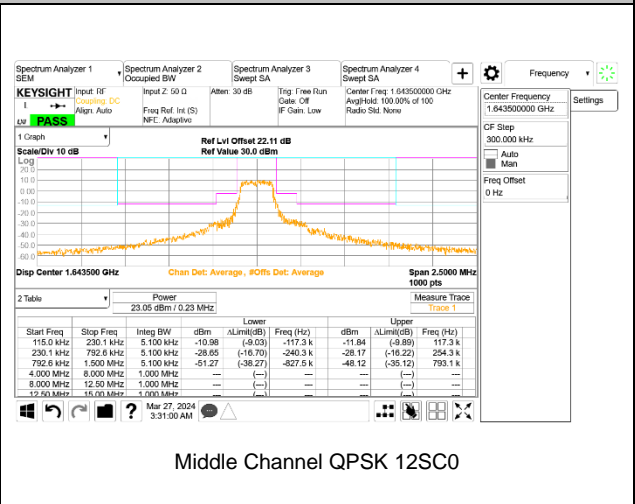
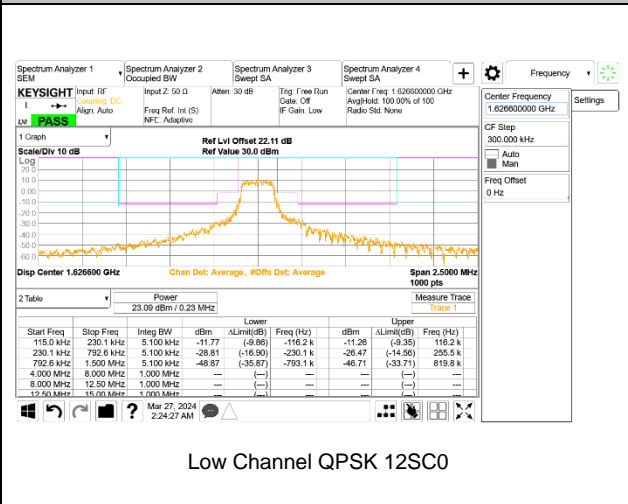


High Channel BPSK 1SC11



High Channel QPSK 1SC11

Band 23 SCS 15kHz – Ant 1



9.3. OUT OF BAND EMISSIONS

LIMITS

FCC §25.202

(f) Emission limitations. Except for SDARS terrestrial repeaters and as provided for in paragraph (i), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

(3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts.

TEST PROCEDURE

KDB 971168 D01 v03r01/D02 v02r02

For each out of band emissions measurement:

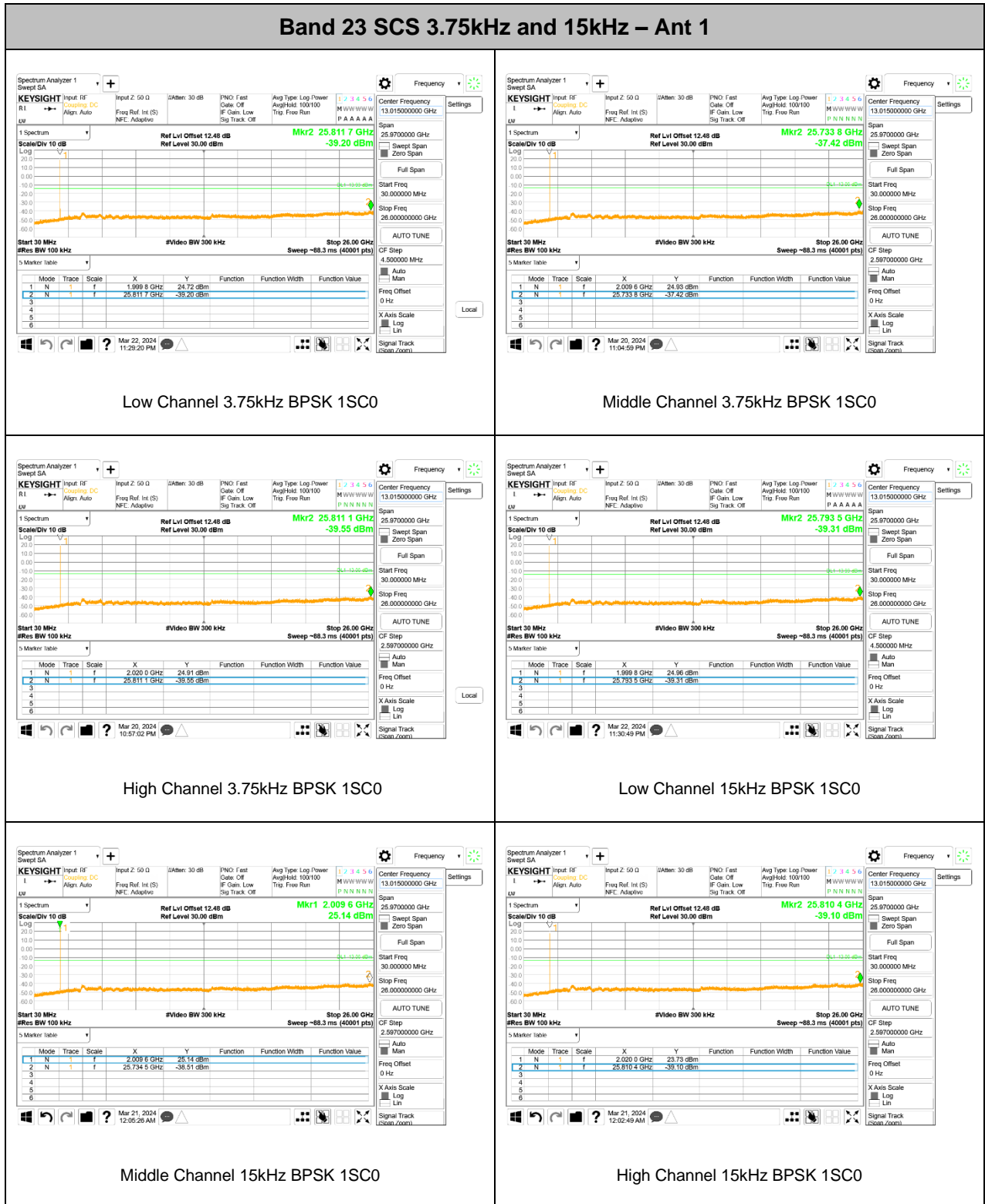
- Set display line at -13 dBm (the limit of $43 + 10\text{Log}(P)$)
- Set RWB $\geq 4\text{kHz}$ and VBW $\geq 3 \times \text{RBW}$ with peak detector for all measurements. The limit is an average limit so any emissions that exceed the limit using the peak detector are measured using rms detection with an averaging time of 2ms.

RESULTS

Both ANT 1 and ANT 5 were performed on low, mid, high channels.

9.3.1. Band 23 ANT 1

Band 23 SCS 3.75kHz and 15kHz – Ant 1



9.3.1. Band 255 ANT 5

Band 255 SCS 3.75kHz and 15kHz – Ant 5

