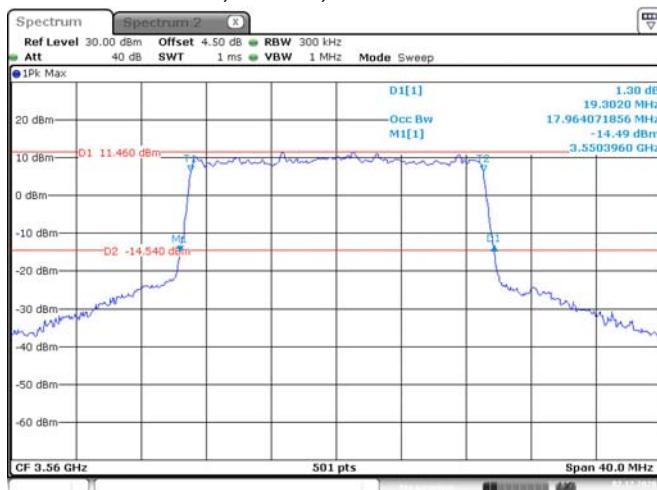
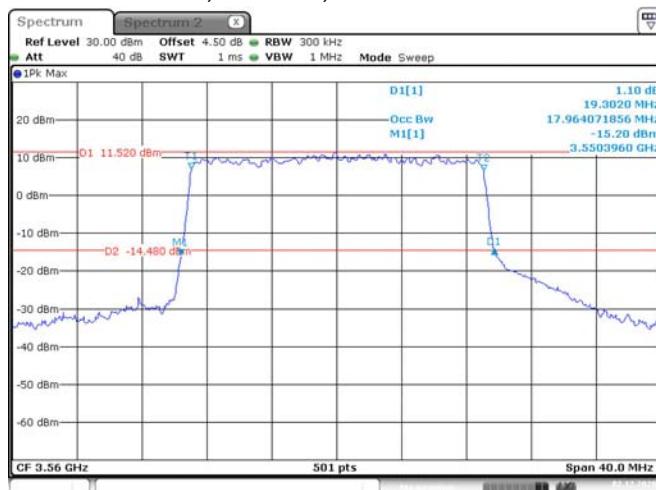


20M, QPSK, Low Channel



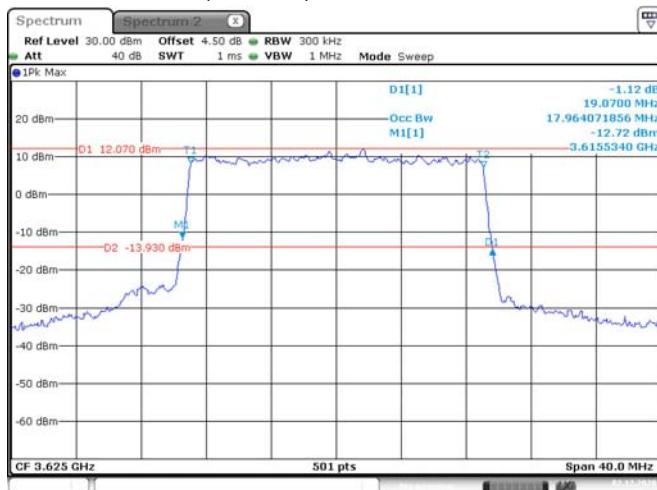
Date: 2.DEC.2020 19:47:43

20M, 16QAM, Low Channel



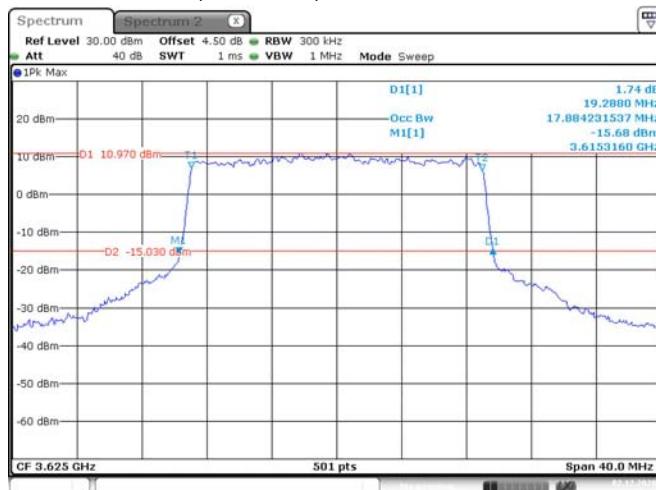
Date: 2.DEC.2020 19:49:01

20M, QPSK, Middle Channel



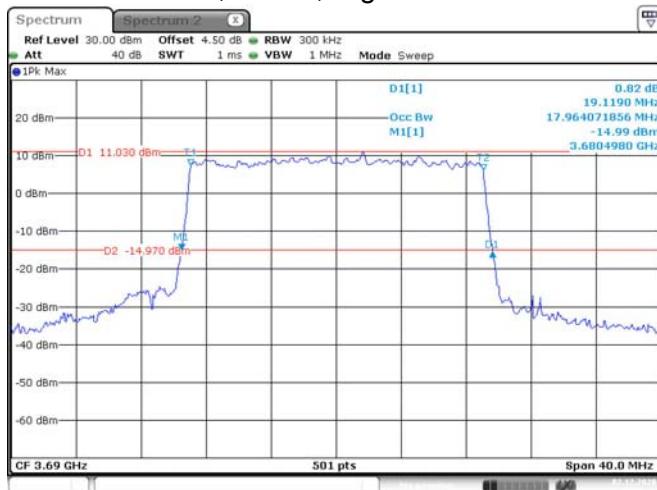
Date: 2.DEC.2020 18:57:45

20M, 16QAM, Middle Channel



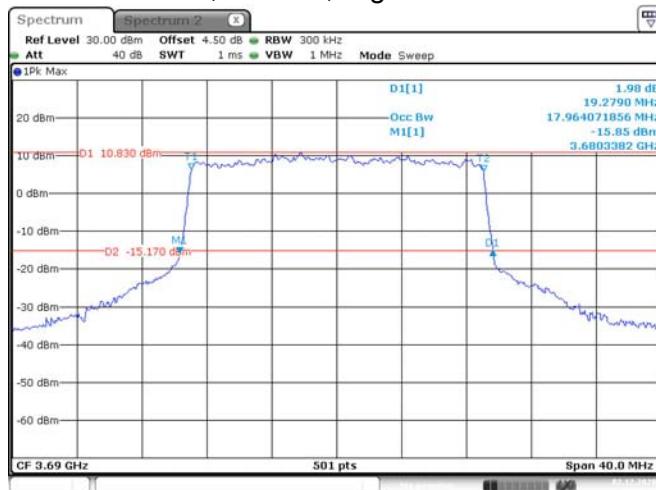
Date: 2.DEC.2020 18:58:49

20M, QPSK, High Channel



Date: 2.DEC.2020 19:37:49

20M, 16QAM, High Channel



Date: 2.DEC.2020 19:36:46

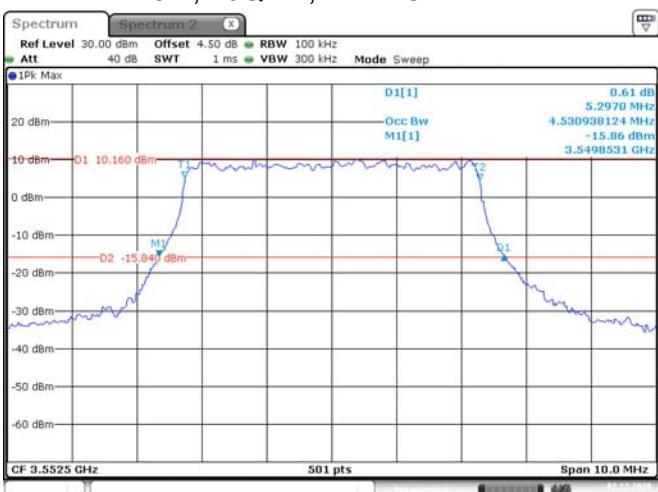
Chain 1:

5M, QPSK, Low Channel



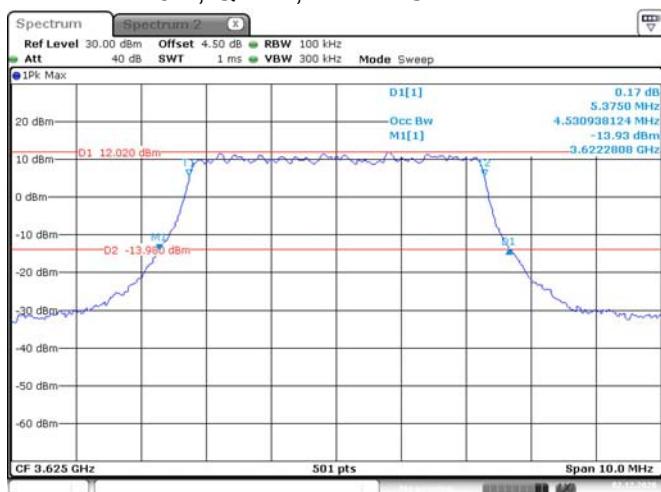
Date: 2.DEC.2020 19:59:02

5M, 16QAM, Low Channel



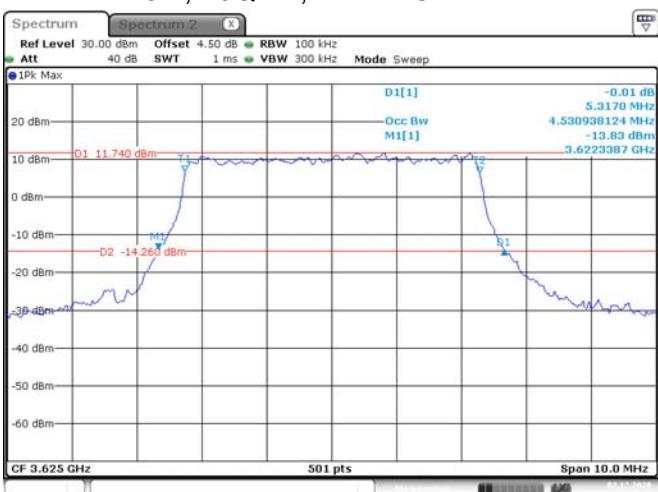
Date: 2.DEC.2020 19:57:34

5M, QPSK, Middle Channel



Date: 2.DEC.2020 17:59:29

5M, 16QAM, Middle Channel



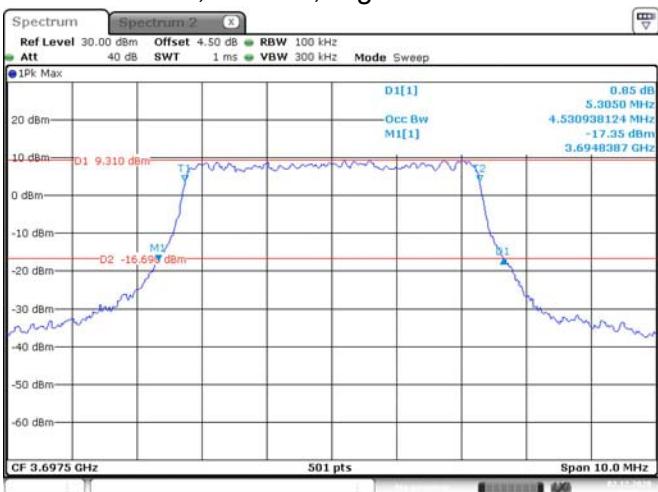
Date: 2.DEC.2020 18:00:30

5M, QPSK, High Channel



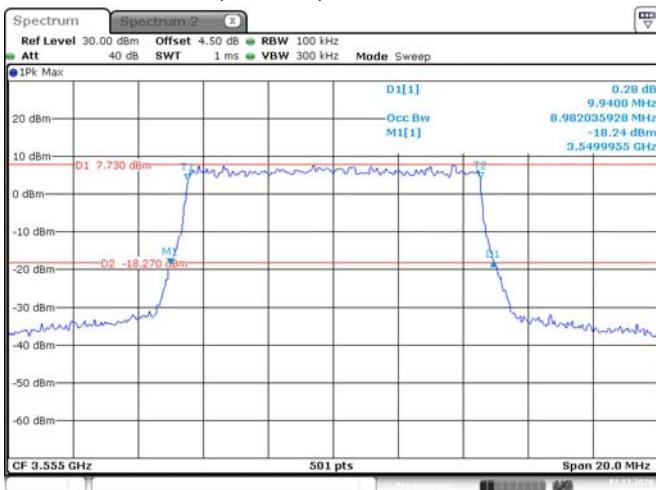
Date: 2.DEC.2020 20:02:12

5M, 16QAM, High Channel



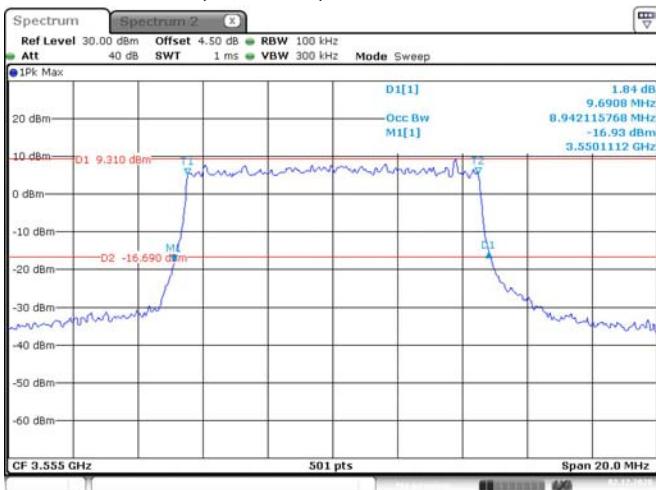
Date: 2.DEC.2020 20:03:18

10M, QPSK, Low Channel



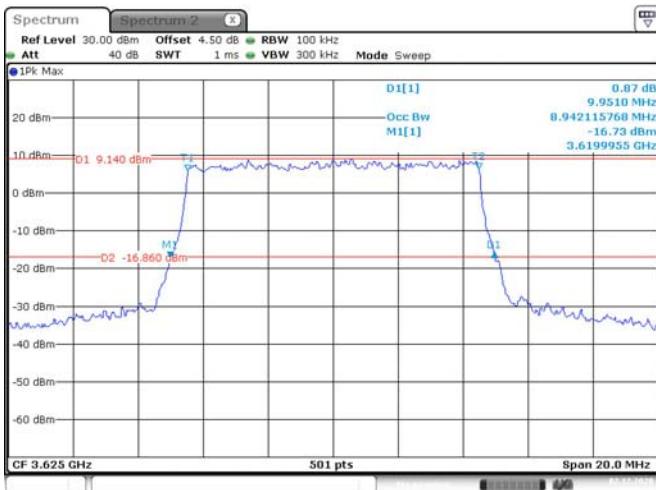
Date: 2.DEC.2020 17:42:56

10M, 16QAM, Low Channel



Date: 2.DEC.2020 17:44:18

10M, QPSK, Middle Channel



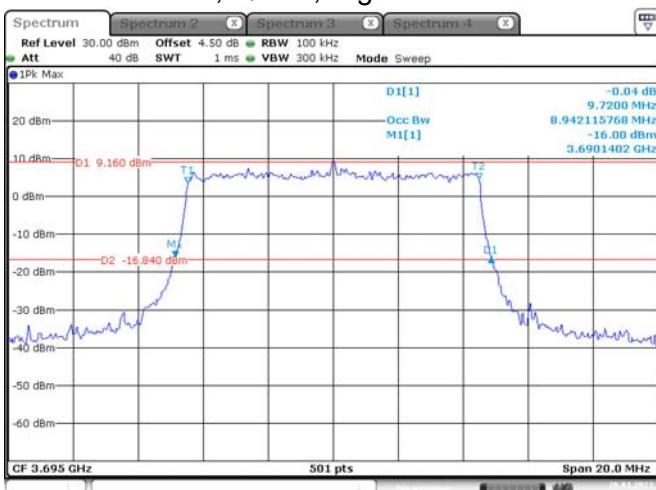
Date: 2.DEC.2020 17:58:14

10M, 16QAM, Middle Channel



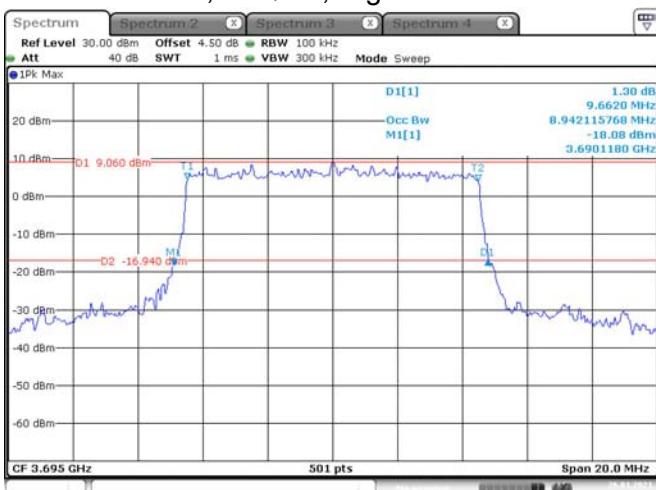
Date: 2.DEC.2020 17:57:18

10M, QPSK, High Channel



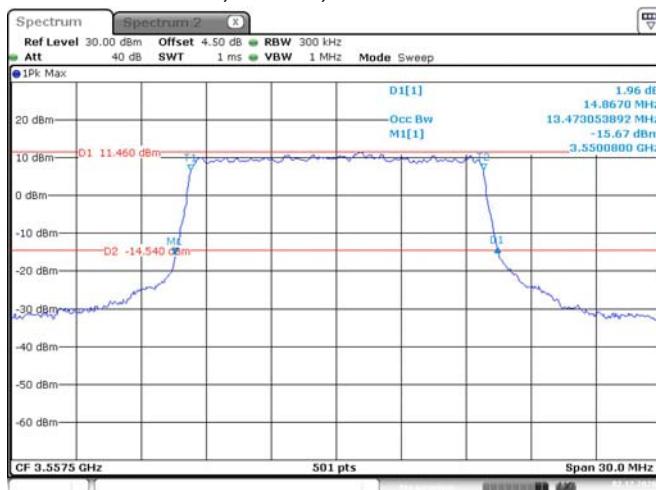
Date: 26.JAN.2021 21:43:39

10M, 16QAM, High Channel

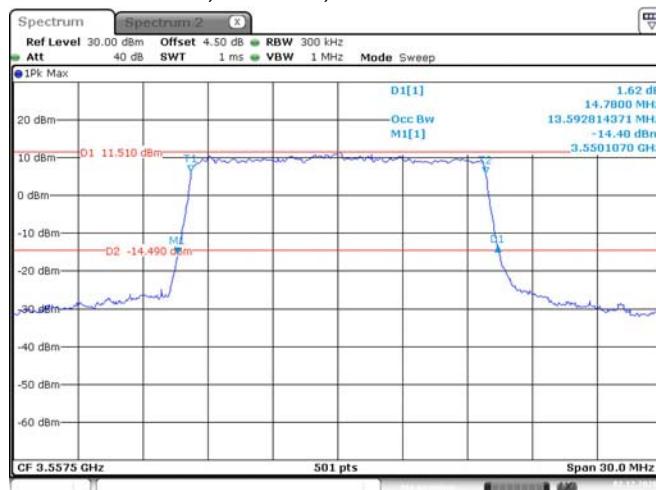


Date: 26.JAN.2021 21:44:44

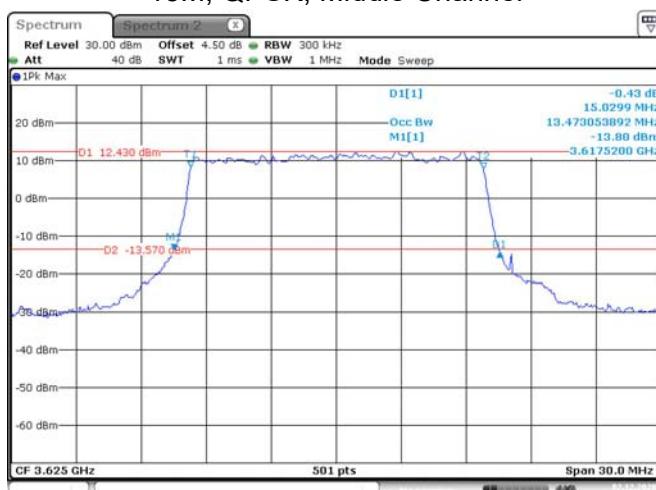
15M, QPSK, Low Channel



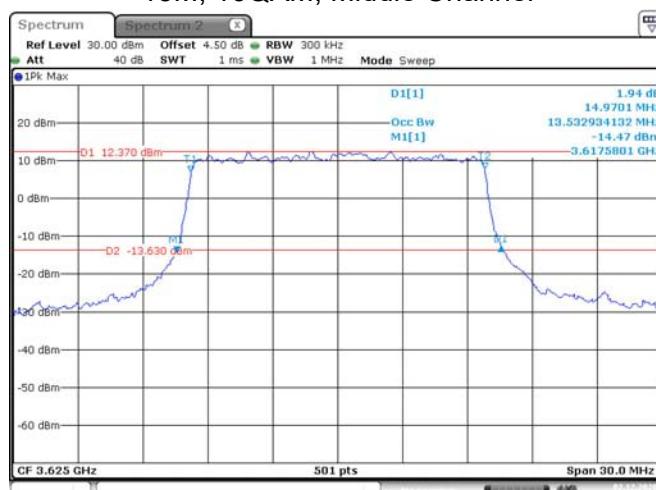
15M, 16QAM, Low Channel



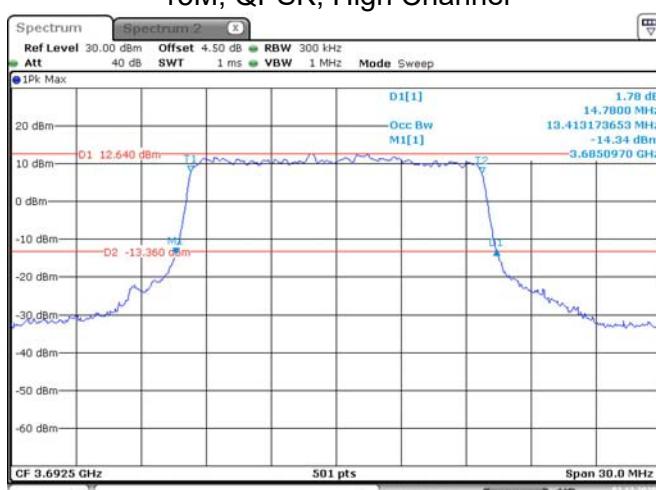
15M, QPSK, Middle Channel



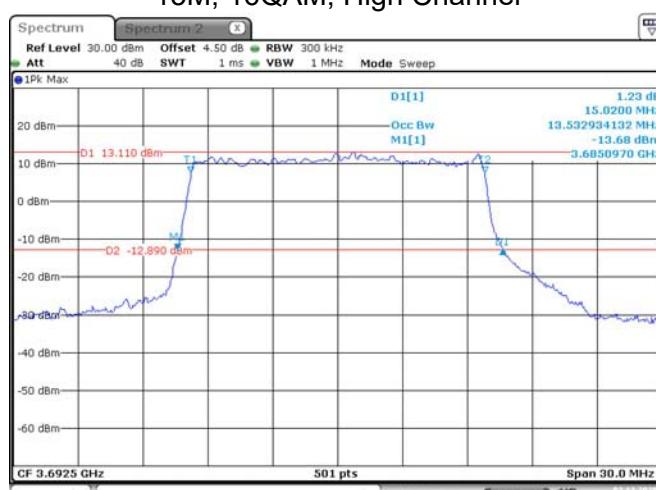
15M, 16QAM, Middle Channel



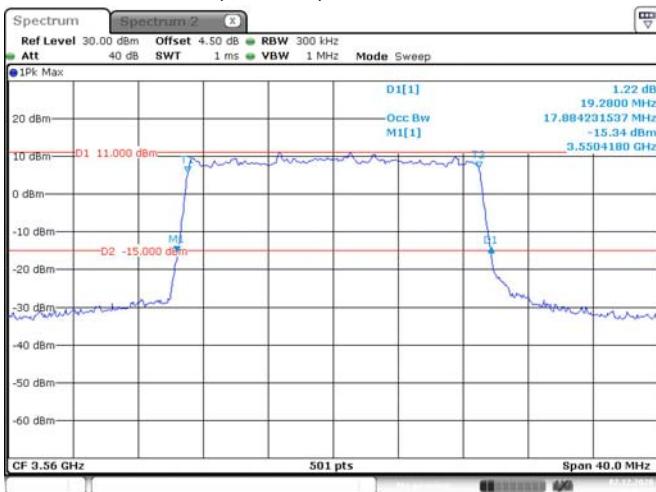
15M, QPSK, High Channel



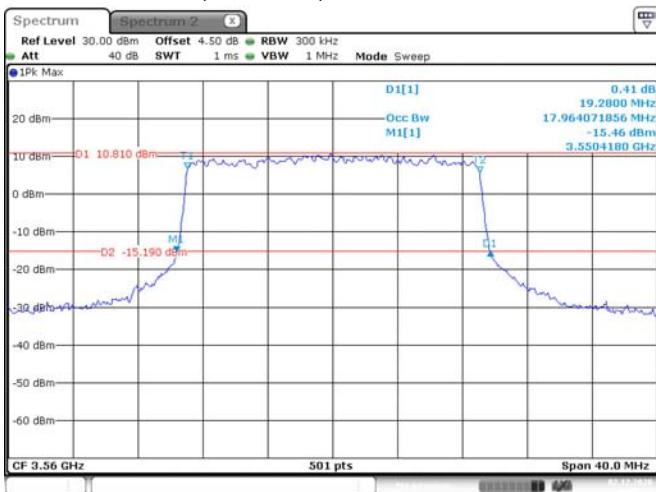
15M, 16QAM, High Channel



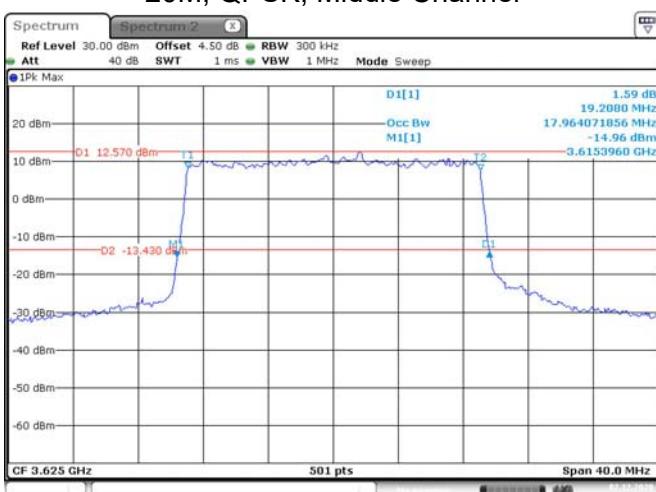
20M, QPSK, Low Channel



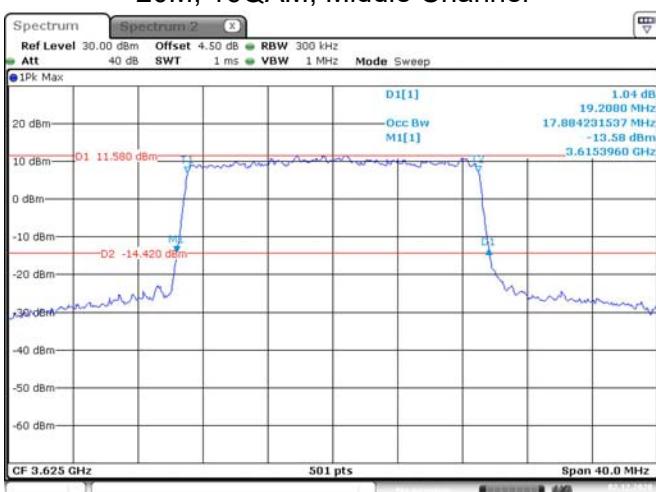
20M, 16QAM, Low Channel



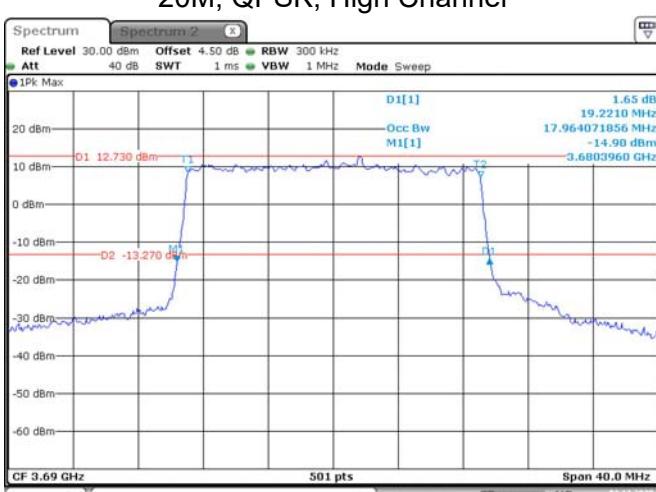
20M, QPSK, Middle Channel



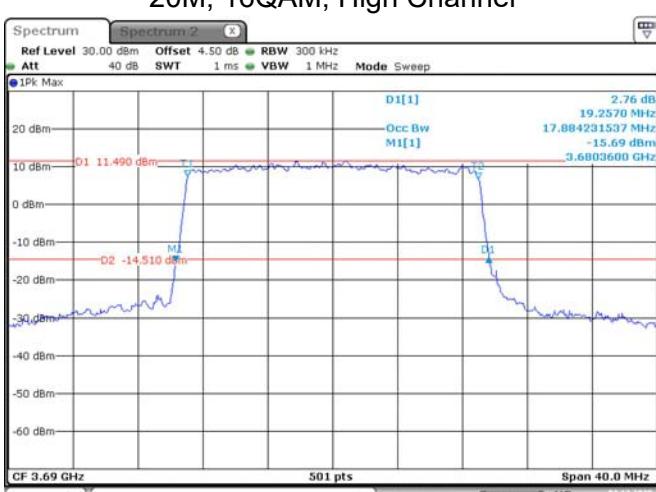
20M, 16QAM, Middle Channel



20M, QPSK, High Channel



20M, 16QAM, High Channel



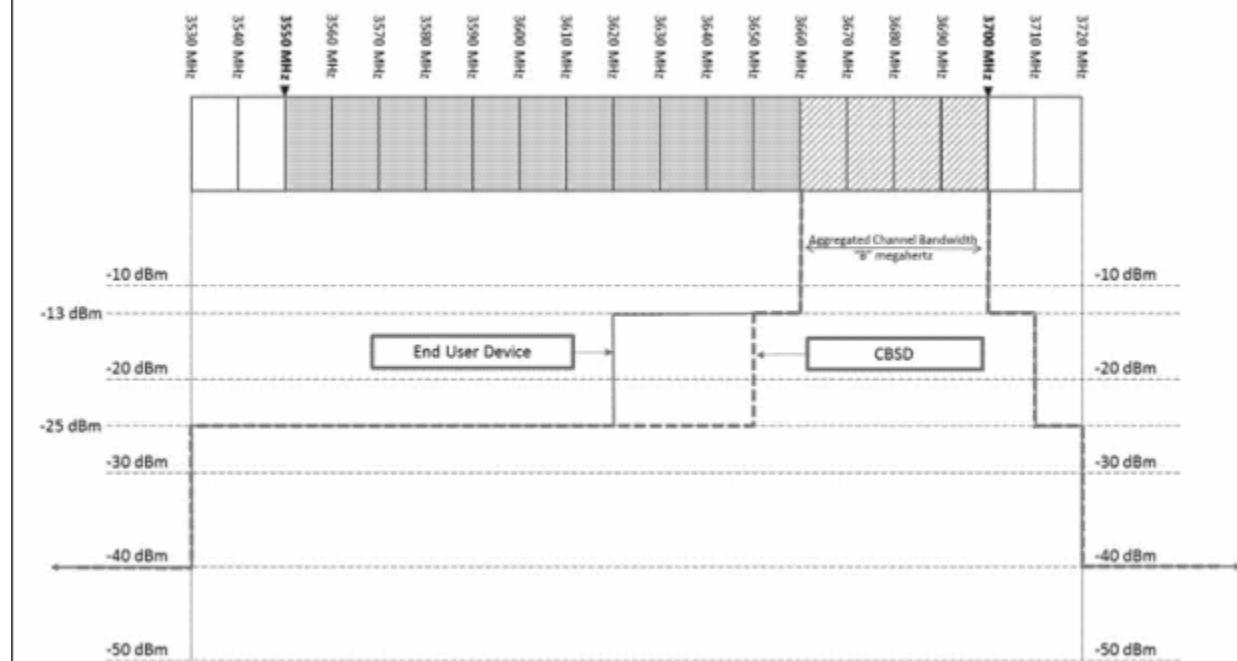
FCC §2.1049,§96.41(e)(2)(3) –Out-Of-Band Emissions

Applicable Standard

According to §96.41(e)

3.5 GHz Emissions and Interference Limits—(1) General protection levels.

Figure 1 to paragraph (e) – Protection levels



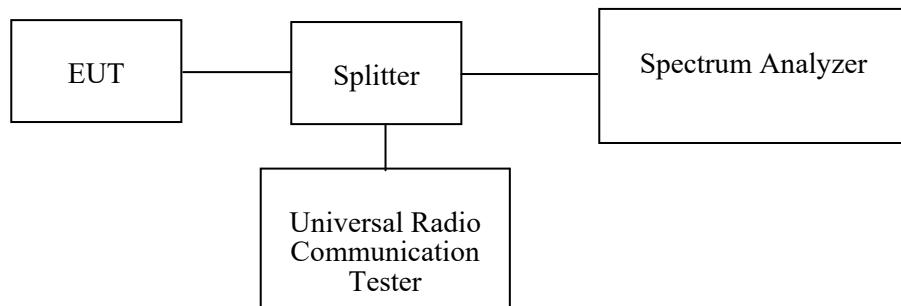
(i) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed -25 dBm/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.

(3) Measurement procedure. (i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full reference bandwidth (i.e., 1 MHz or 1 percent of emission bandwidth, as specified). The fundamental emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.



Test Data

Environmental Conditions

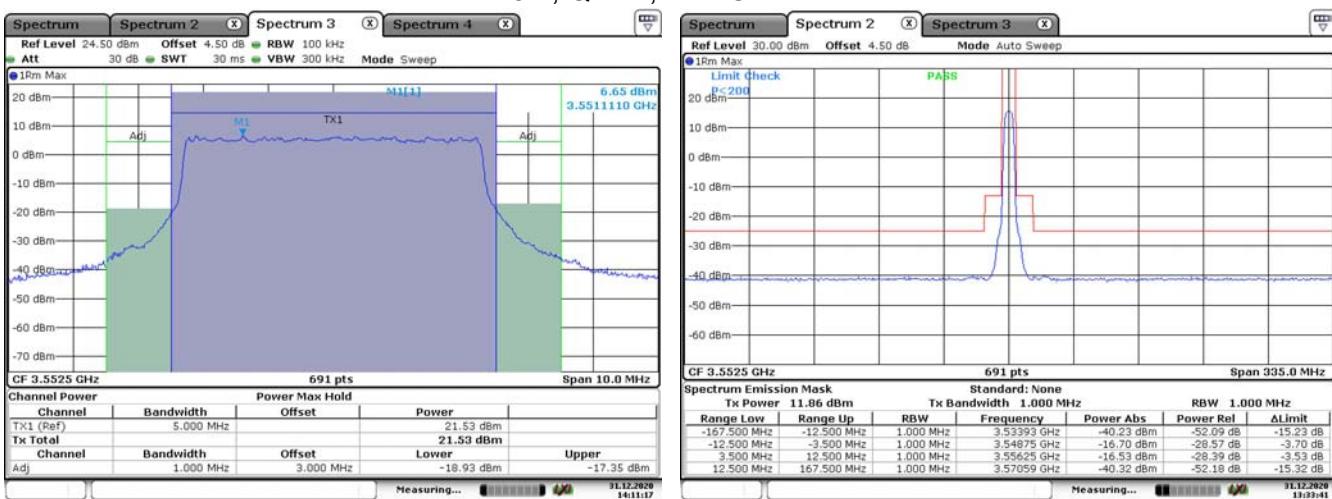
Temperature:	23.9~25.4 °C
Relative Humidity:	35~42%
ATM Pressure:	102.4~102.5kPa

The testing was performed by Winfred Wang on 2020-12-31.

Test Mode: Transmitting

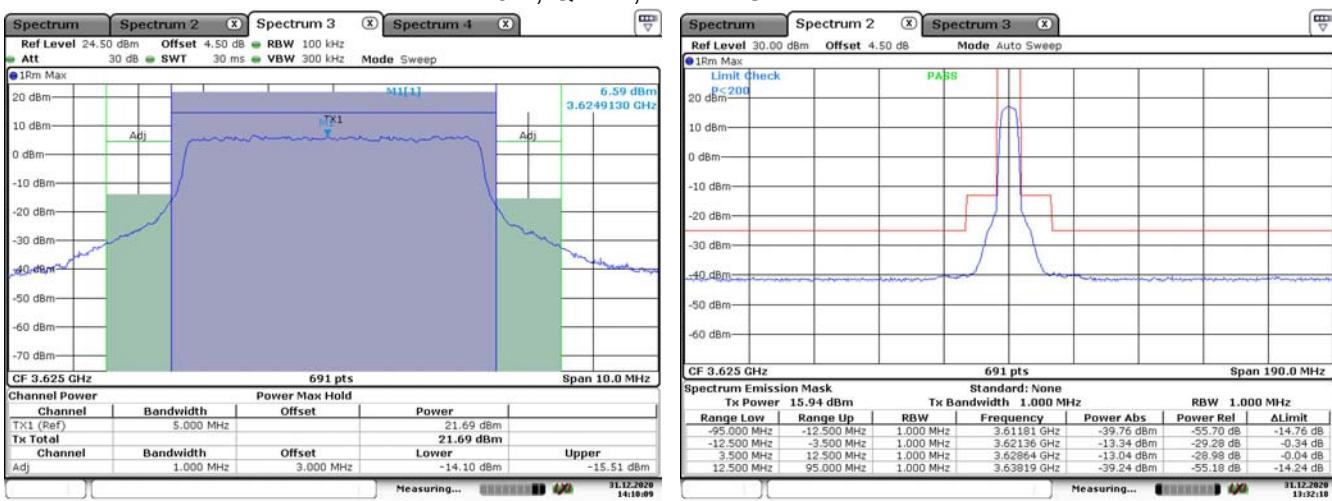
Chain 0:

5M, QPSK, Low Channel



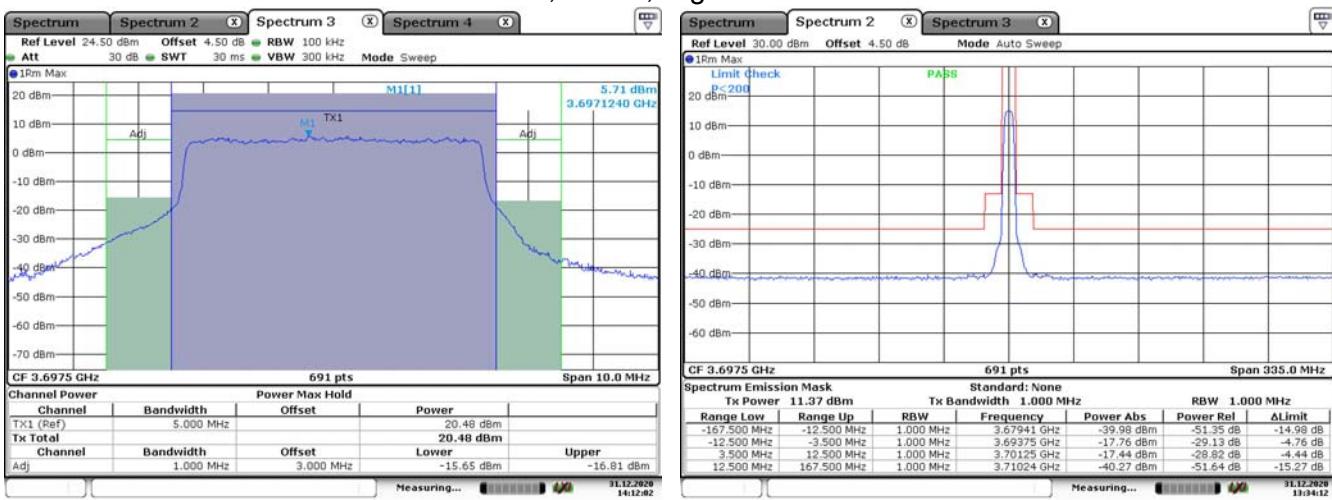
Date: 31.DEC.2020 14:11:17

5M, QPSK, Middle Channel



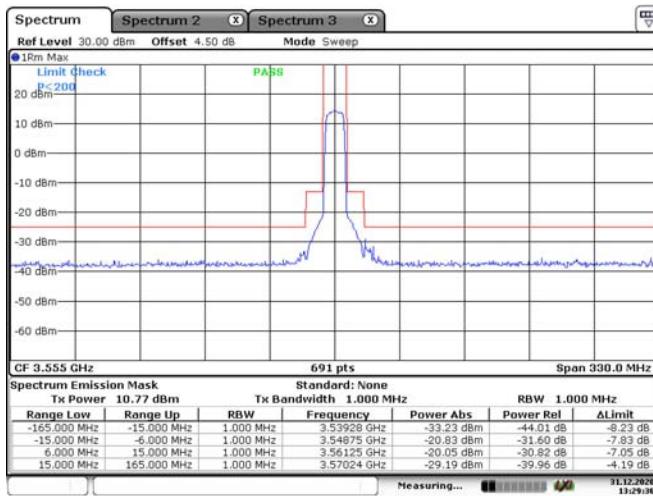
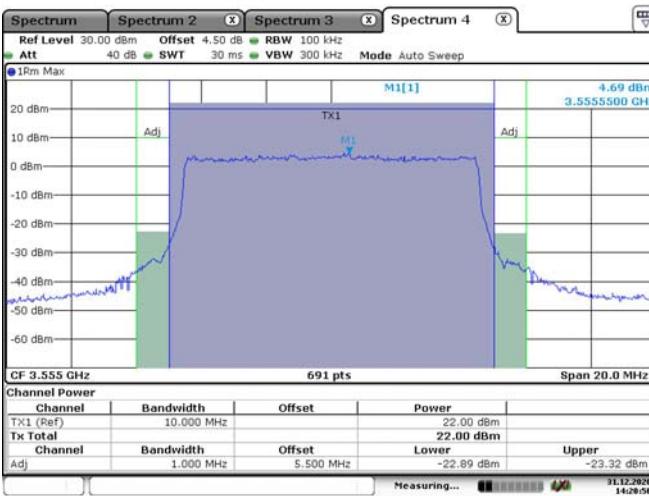
Date: 31.DEC.2020 14:10:09

5M, QPSK, High Channel



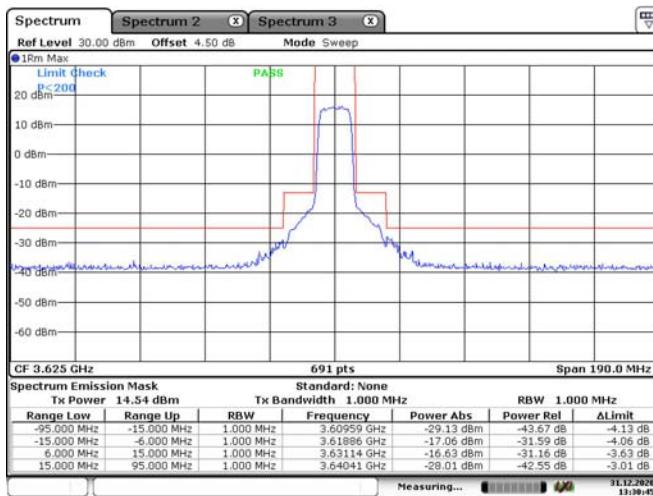
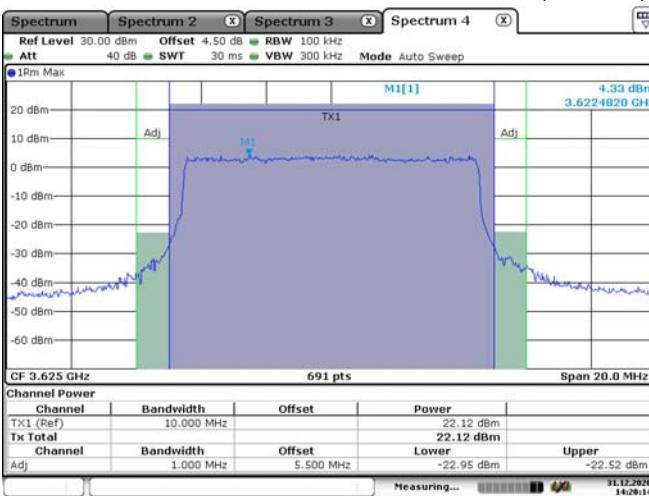
Date: 31.DEC.2020 14:12:02

10M, QPSK, Low Channel



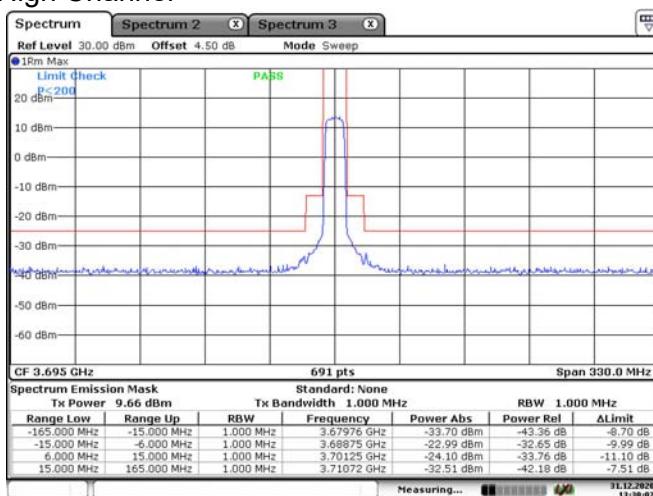
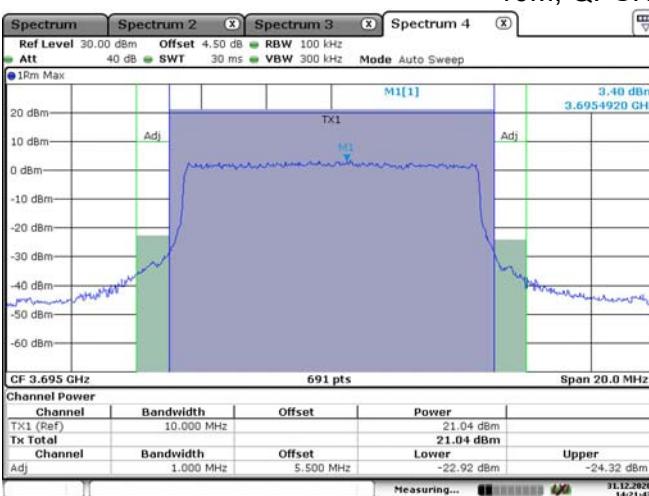
Date: 31.DEC.2020 14:20:57

10M, QPSK, Middle Channel



Date: 31.DEC.2020 14:20:15

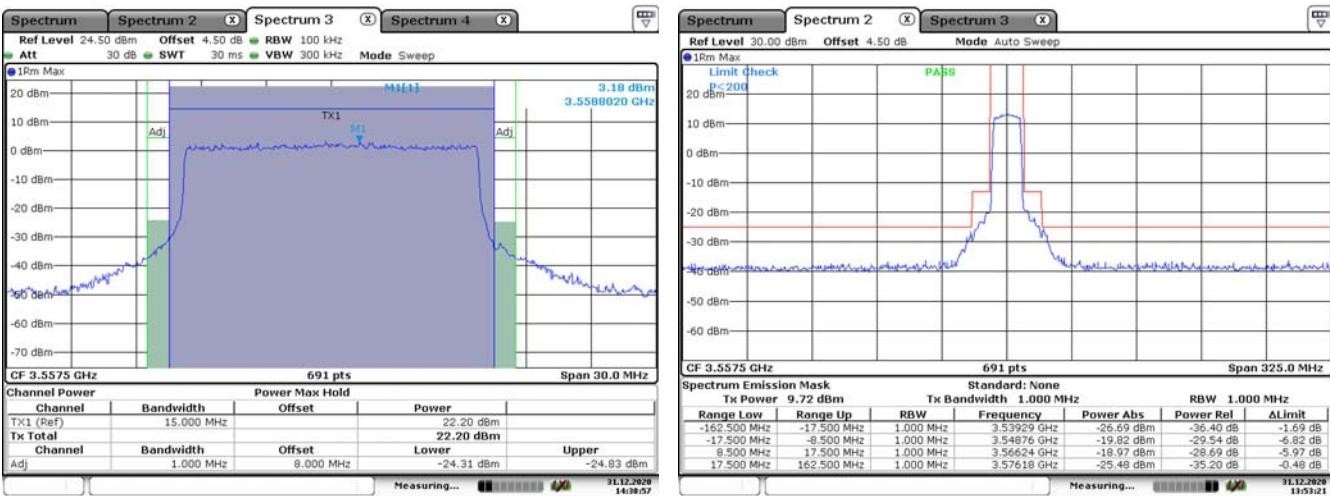
10M, QPSK, High Channel



Date: 31.DEC.2020 14:21:44

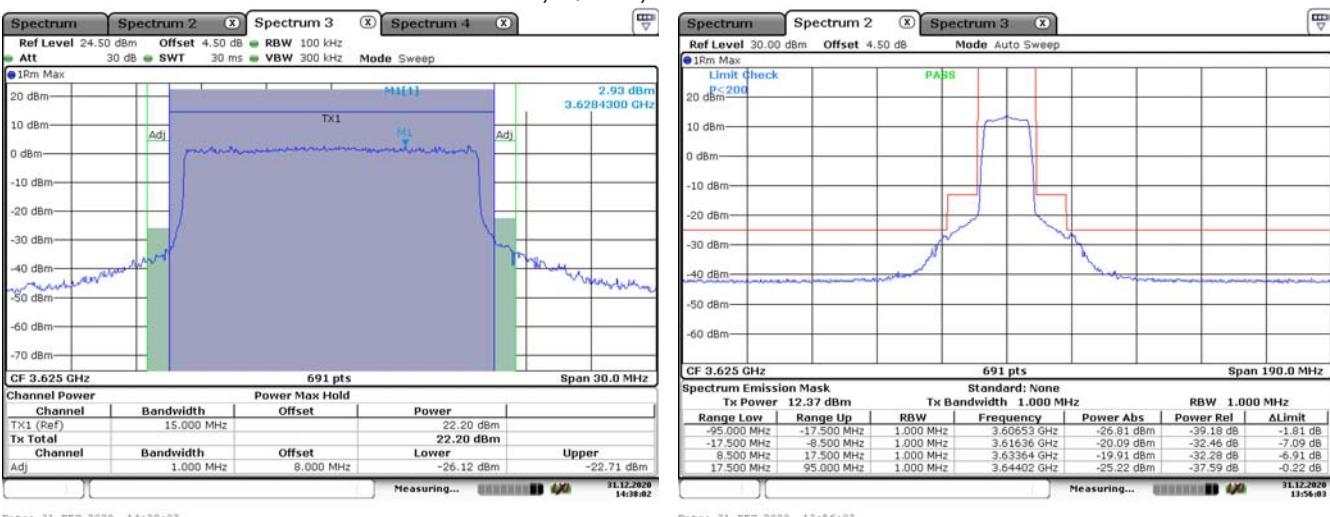
Date: 31.DEC.2020 13:30:06

15M, QPSK, Low Channel



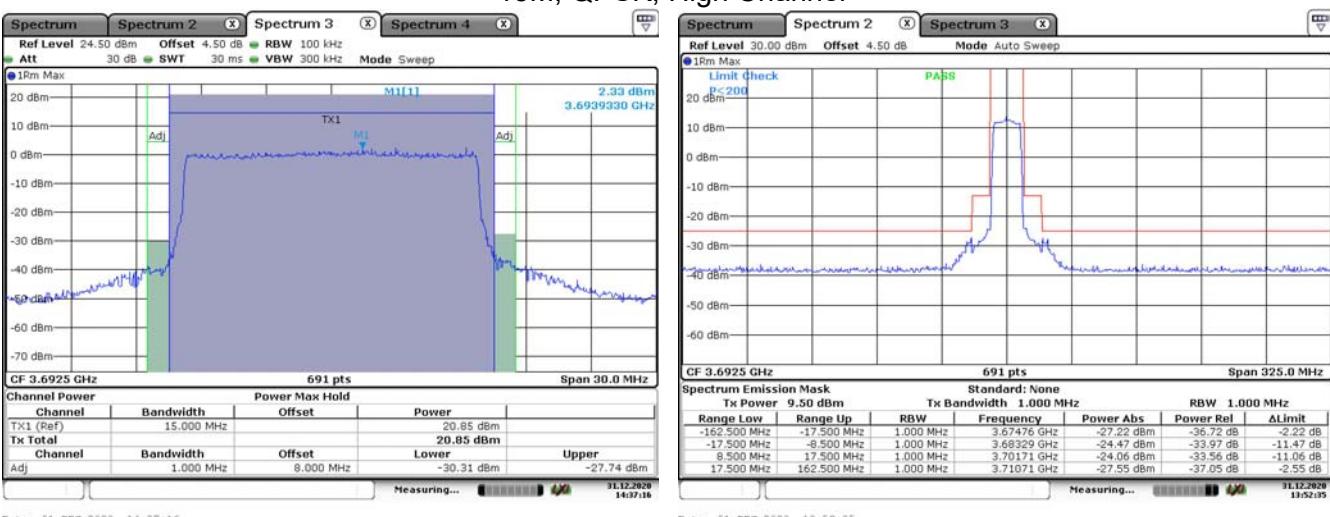
Date: 31.DEC.2020 14:38:57

15M, QPSK, Middle Channel



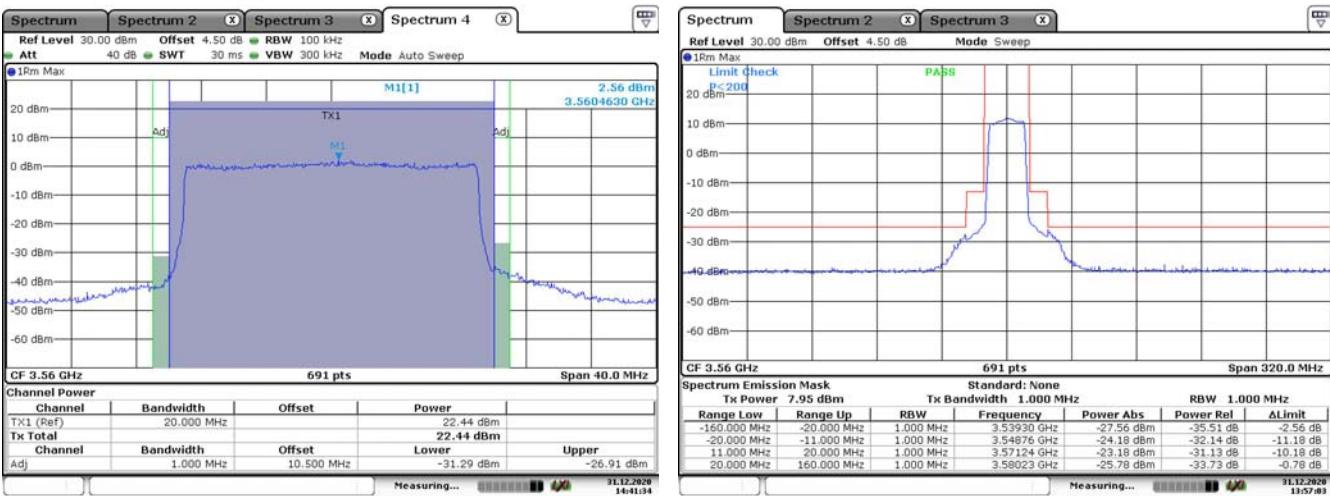
Date: 31.DEC.2020 14:38:03

15M, QPSK, High Channel

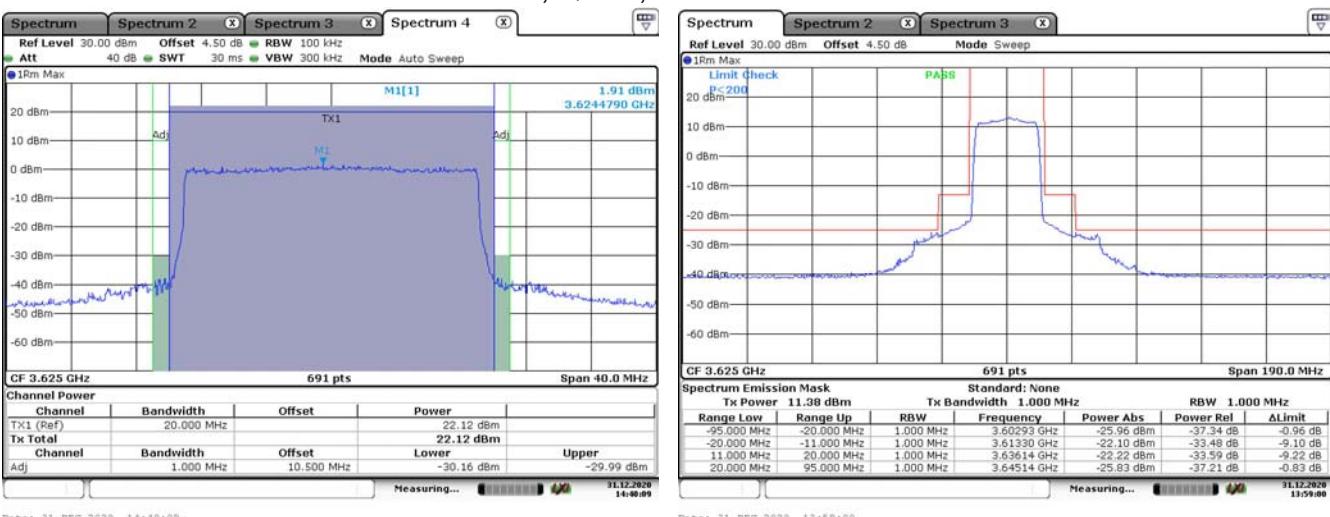


Date: 31.DEC.2020 14:37:16

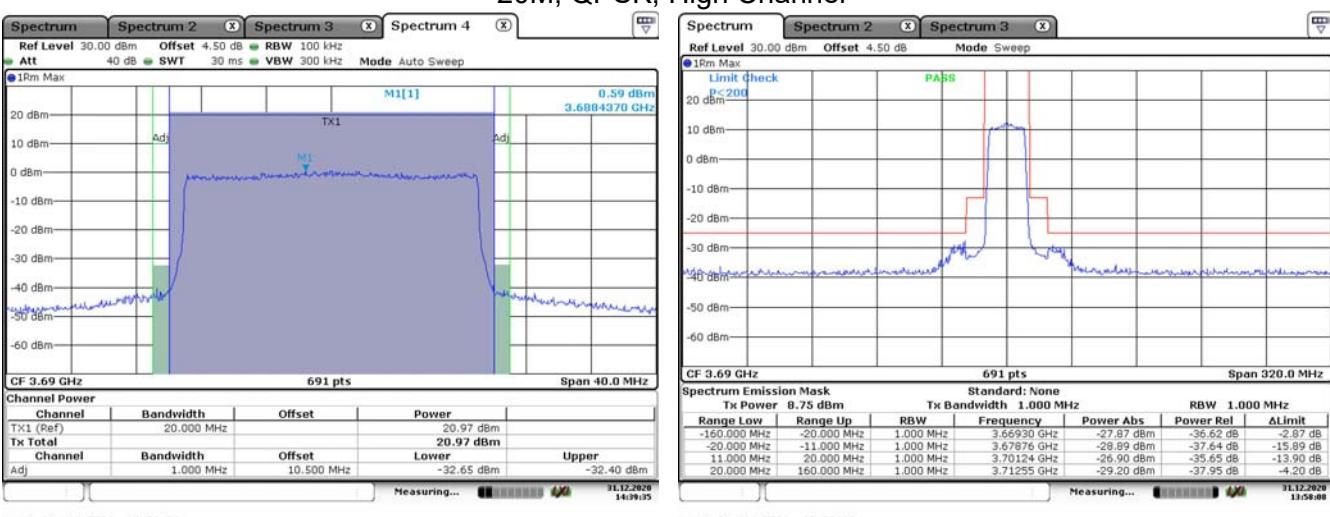
20M, QPSK, Low Channel



20M, QPSK, Middle Channel

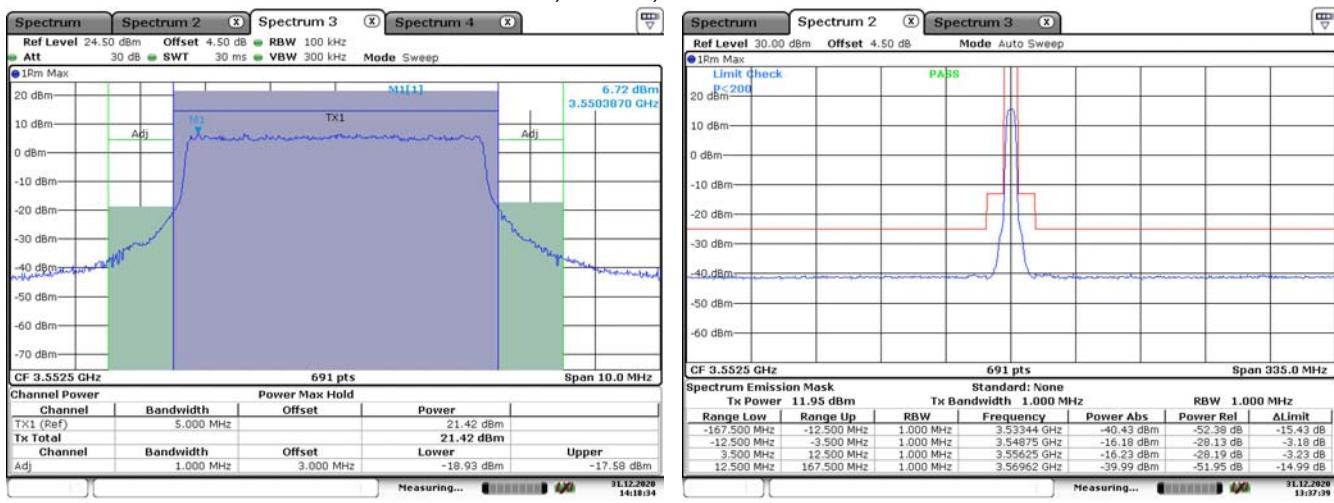


20M, QPSK, High Channel



Chain 1:

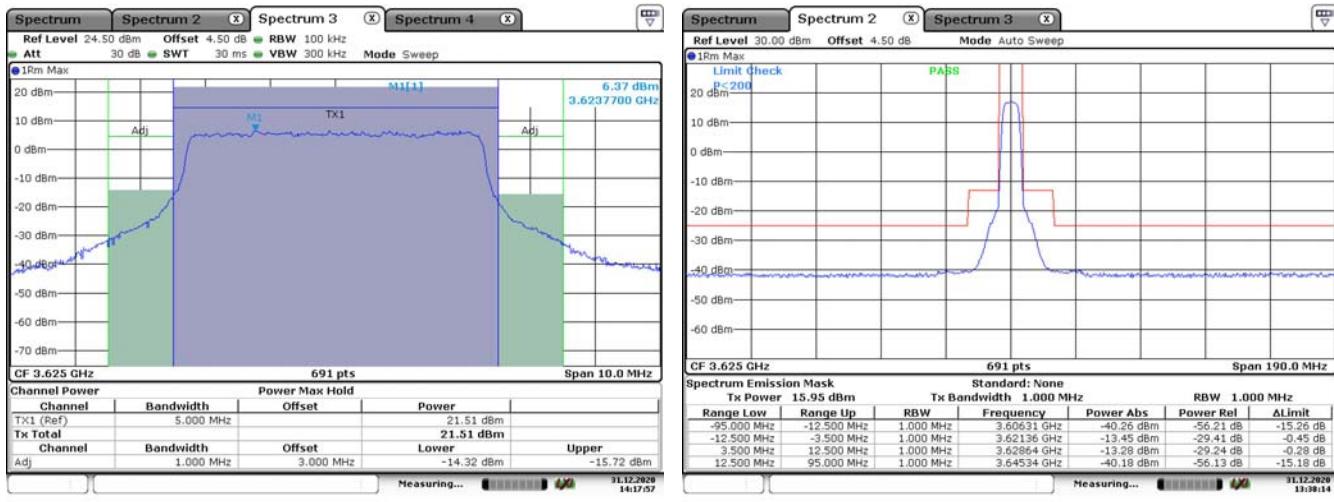
5M, QPSK, Low Channel



Date: 31.DEC.2020 14:18:34

Date: 31.DEC.2020 13:37:38

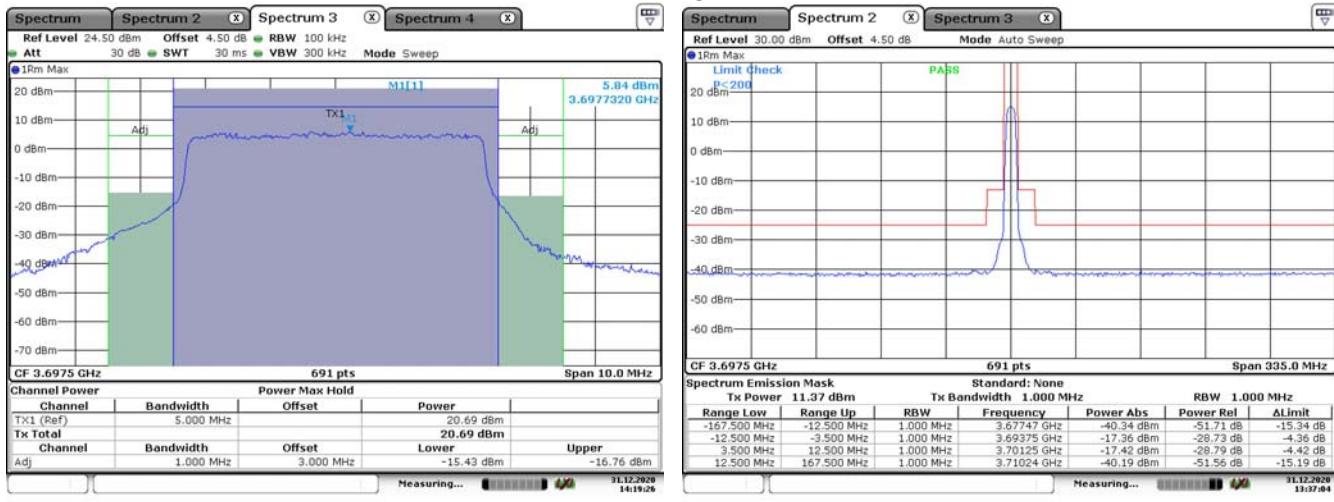
5M, QPSK, Middle Channel



Date: 31.DEC.2020 14:17:58

Date: 31.DEC.2020 13:38:13

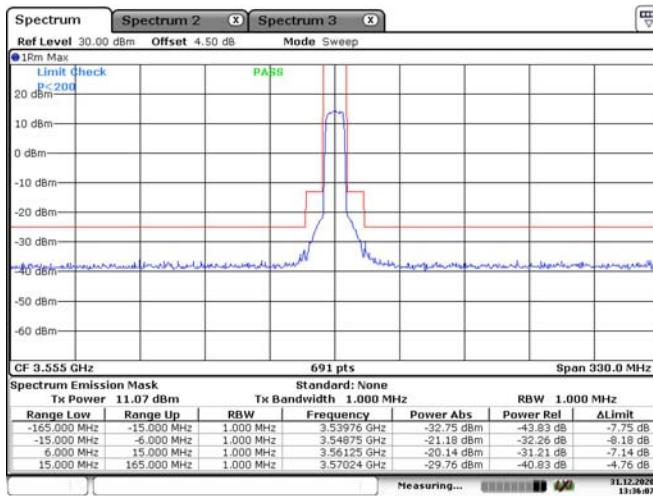
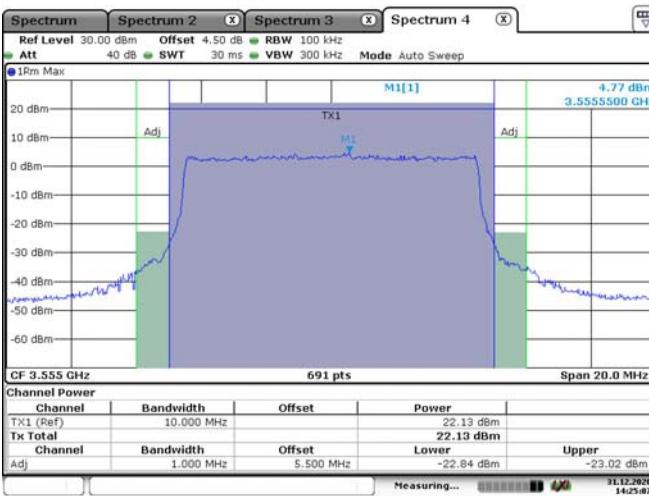
5M, QPSK, High Channel



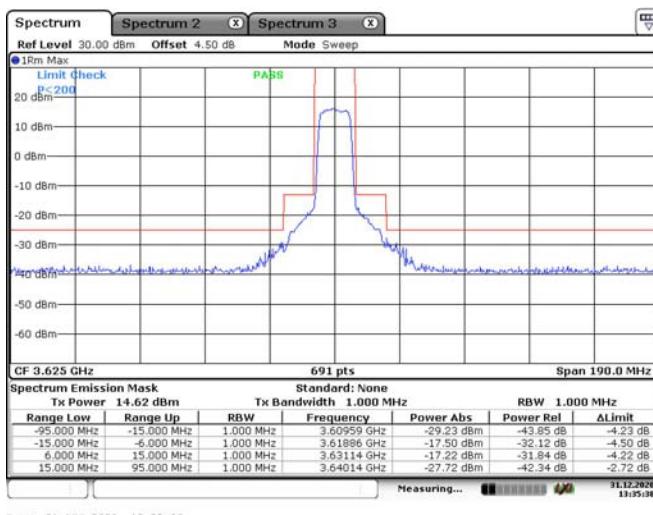
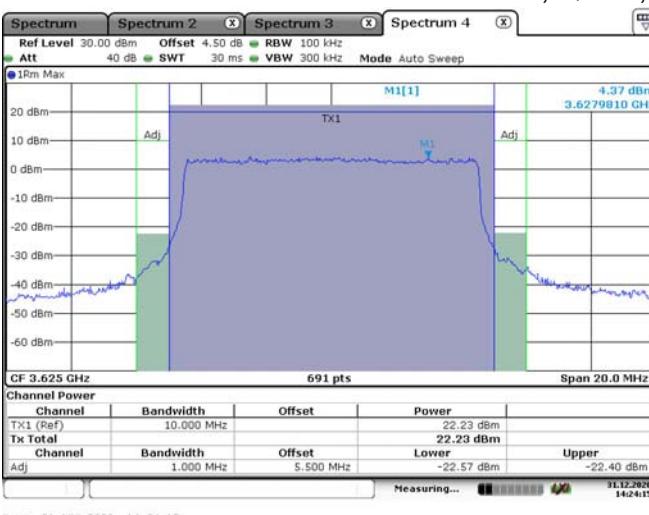
Date: 31.DEC.2020 14:19:26

Date: 31.DEC.2020 13:37:04

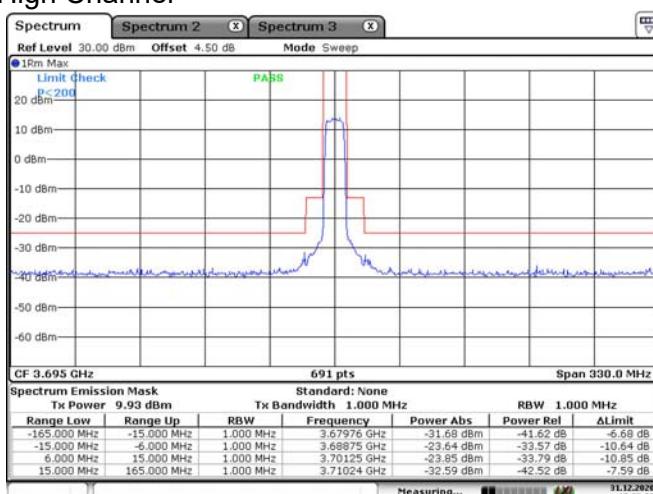
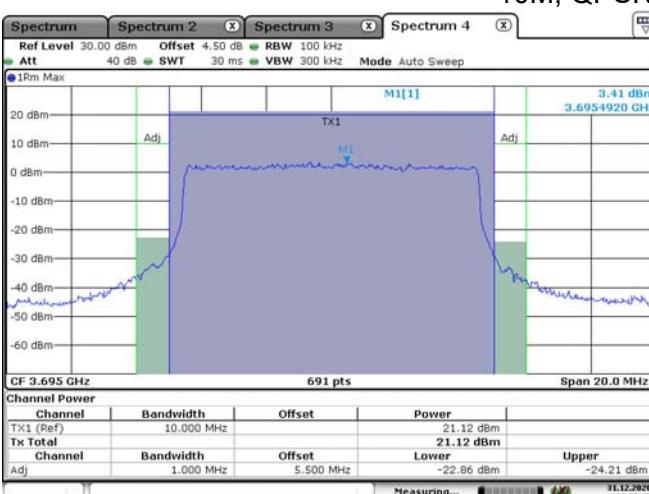
10M, QPSK, Low Channel



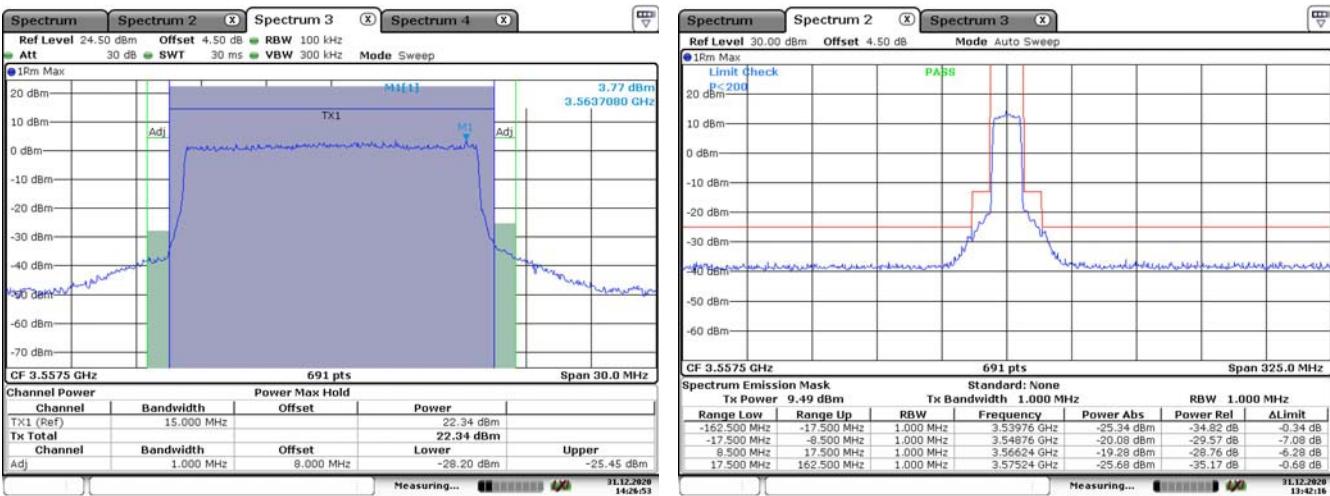
10M, QPSK, Middle Channel



10M, QPSK, High Channel

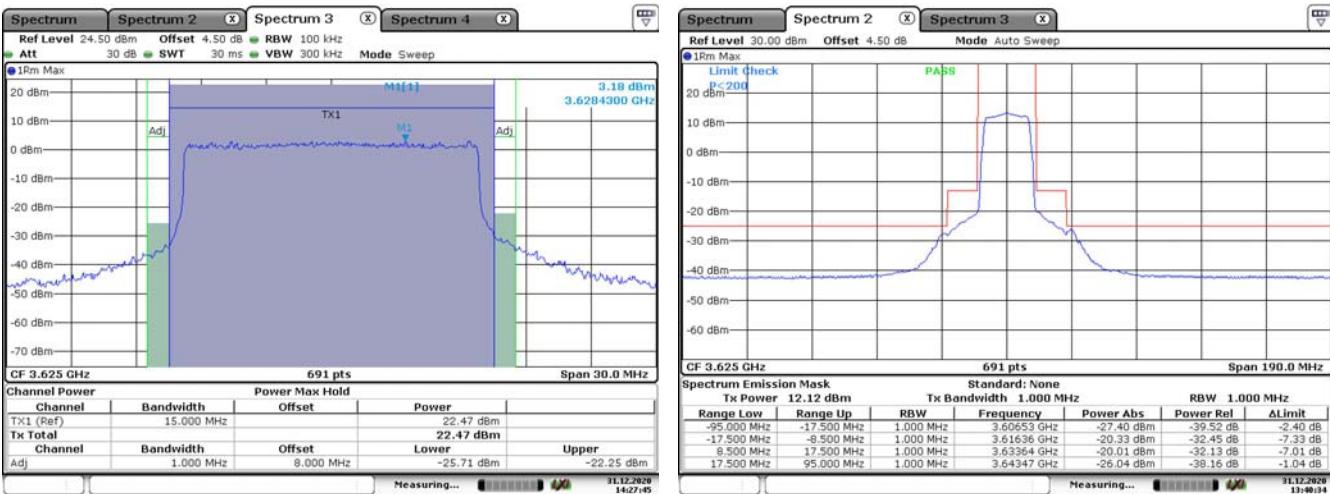


15M, QPSK, Low Channel



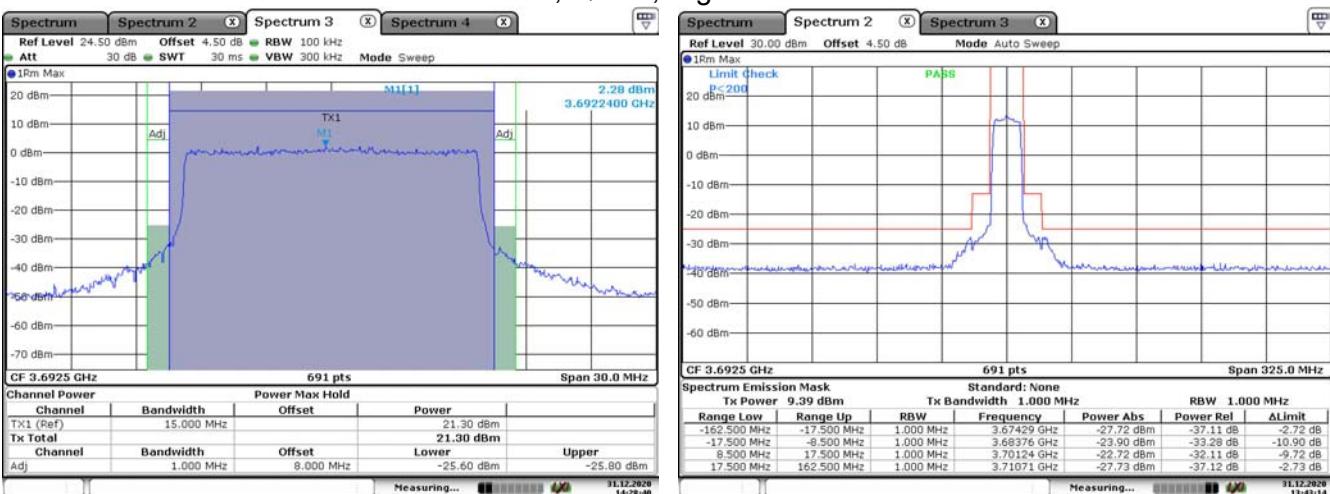
Date: 31.DEC.2020 14:26:53

15M, QPSK, Middle Channel



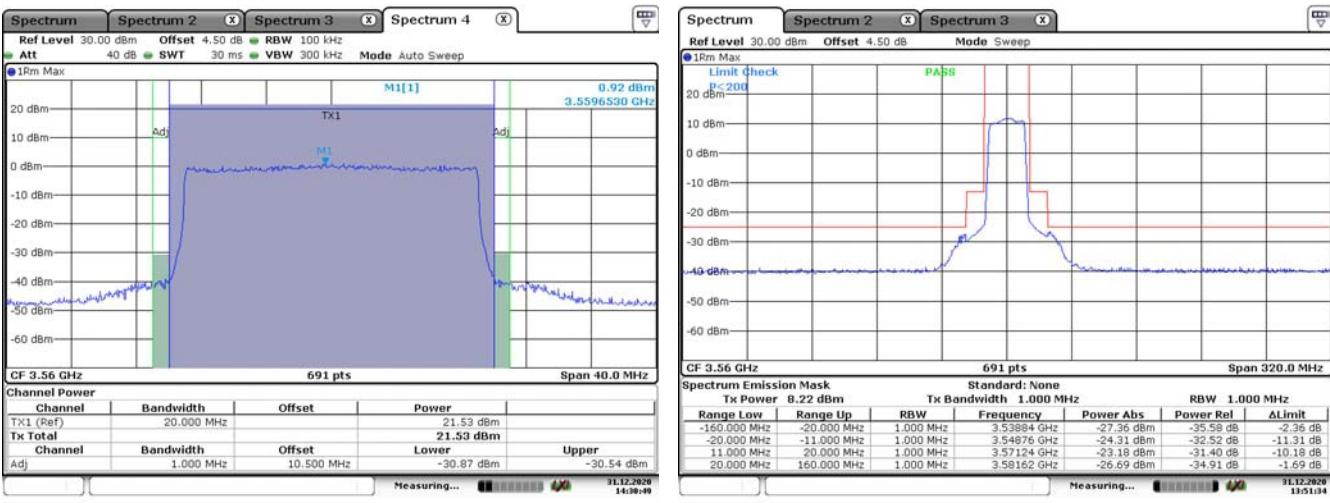
Date: 31.DEC.2020 13:40:34

15M, QPSK, High Channel

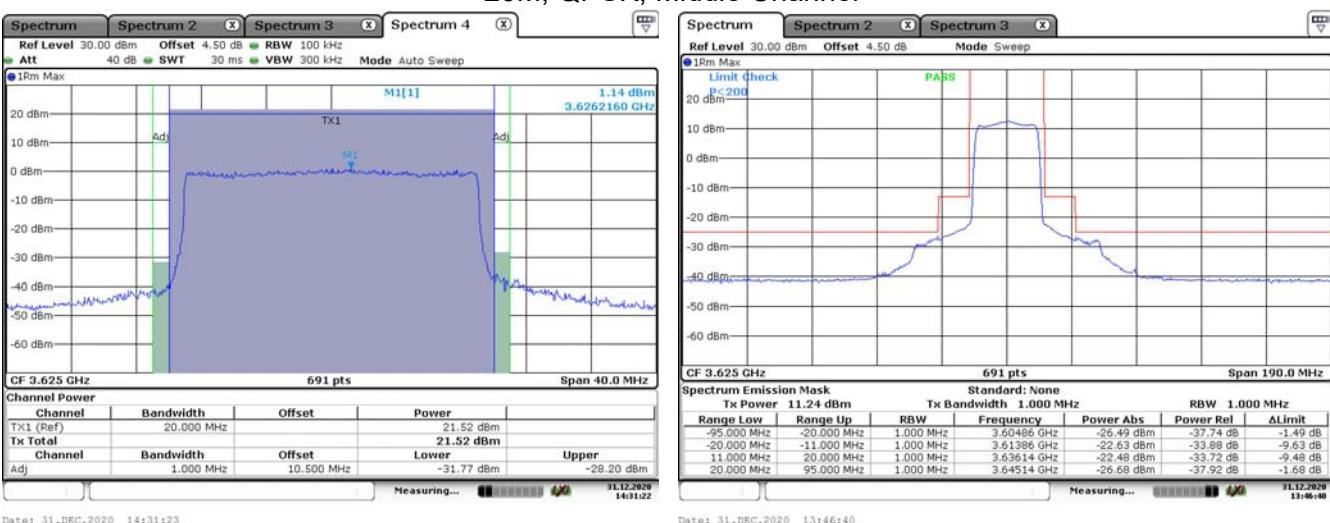


Date: 31.DEC.2020 13:43:14

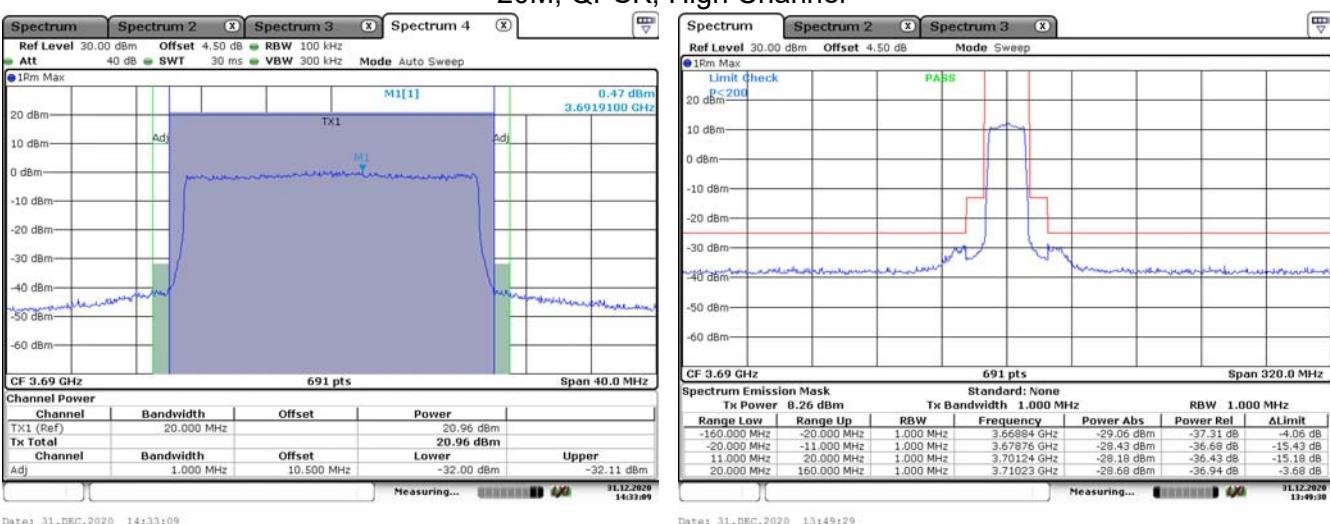
20M, QPSK, Low Channel



20M, QPSK, Middle Channel



20M, QPSK, High Channel



FCC §2.1051, §96.41- SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

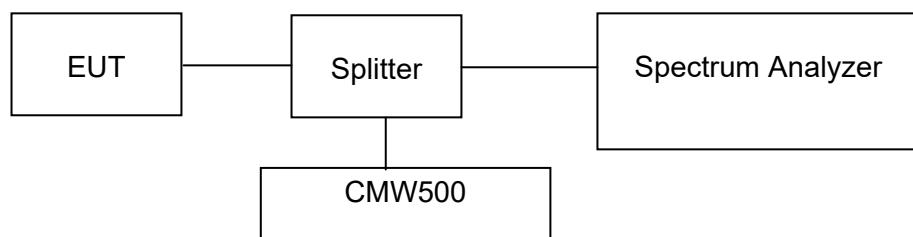
According to §96.41(e)(2)(3)

(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.

(3) Measurement procedure. (i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full reference bandwidth (i.e., 1 MHz or 1 percent of emission bandwidth, as specified). The fundamental emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Data

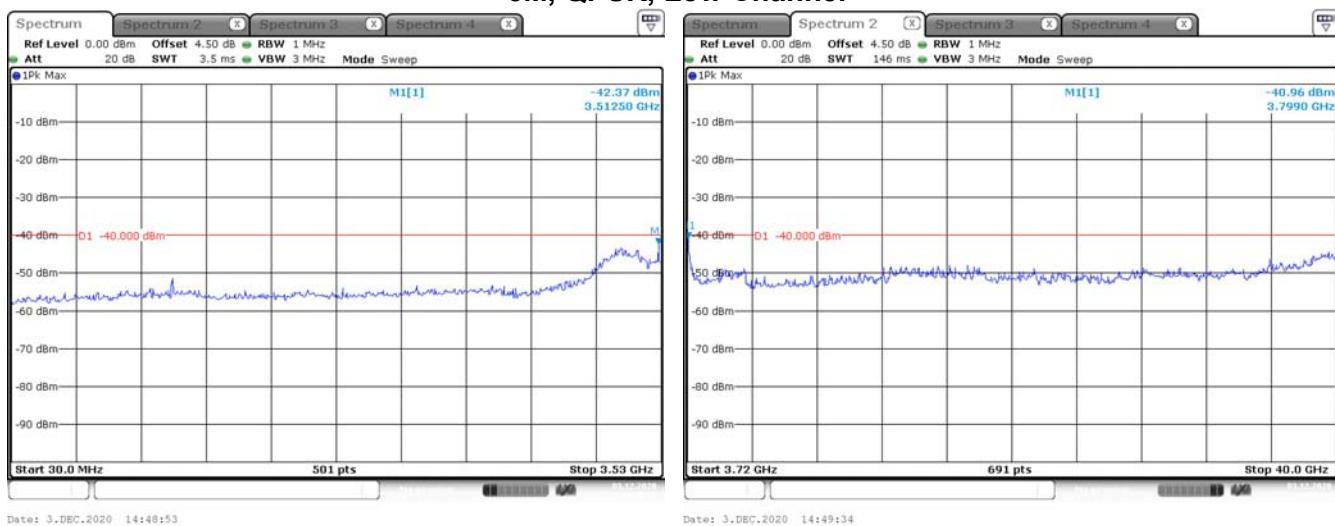
Environmental Conditions

Temperature:	23.9~25.4 °C
Relative Humidity:	35~42%
ATM Pressure:	102.4~102.5kPa
Tester:	Winfred Wang
Test Date:	2020-12-01~2020-12-04

Test Result: Compliance. Please refer to the following plots.

Chain 0:

5M, QPSK, Low Channel



Date: 3.DEC.2020 14:48:53

Date: 3.DEC.2020 14:49:34

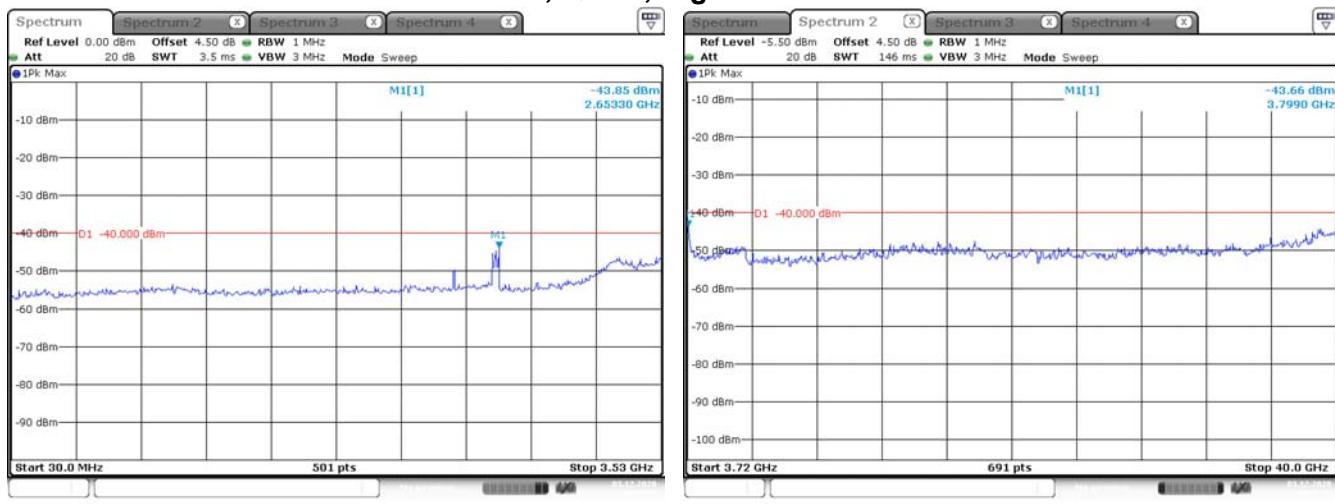
5M, QPSK, Middle Channel



Date: 3.DEC.2020 16:39:51

Date: 3.DEC.2020 20:52:49

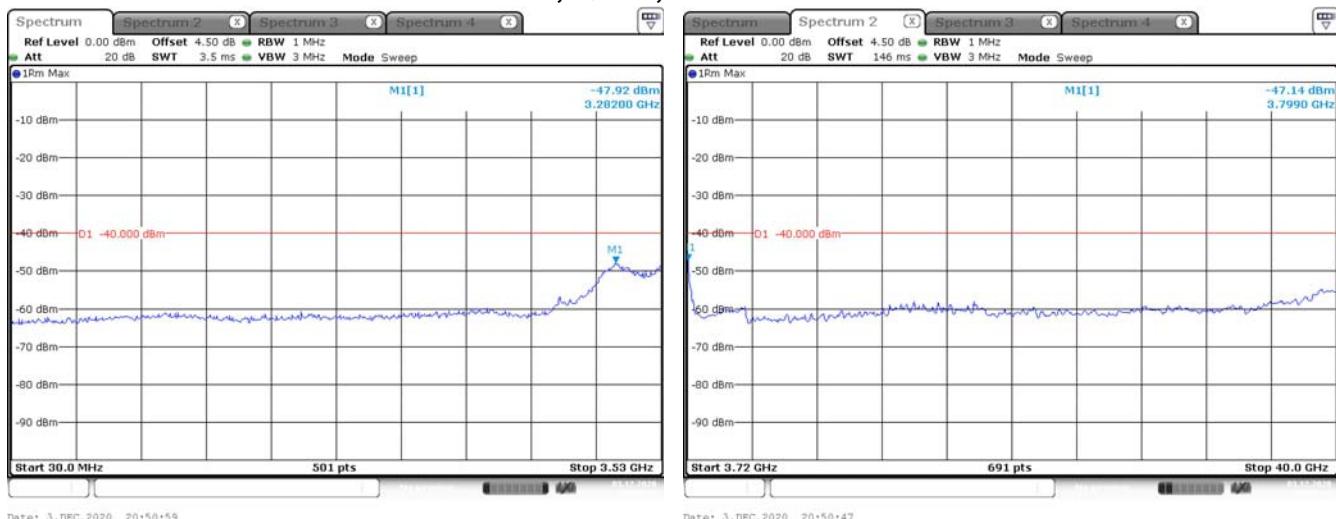
5M, QPSK, High Channel



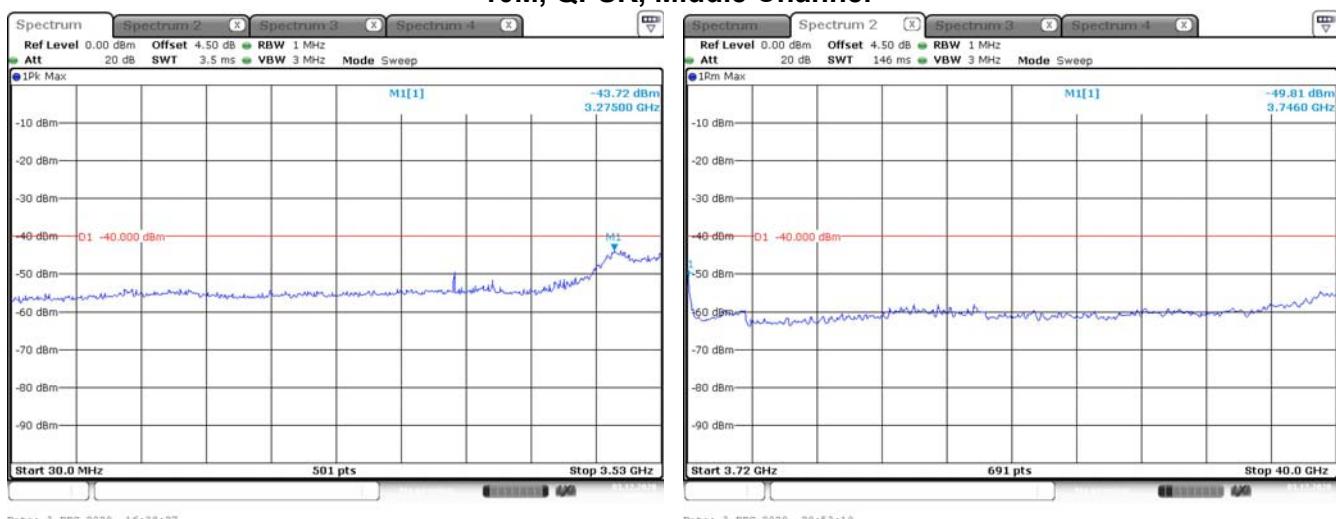
Date: 3.DEC.2020 16:41:26

Date: 3.DEC.2020 16:41:49

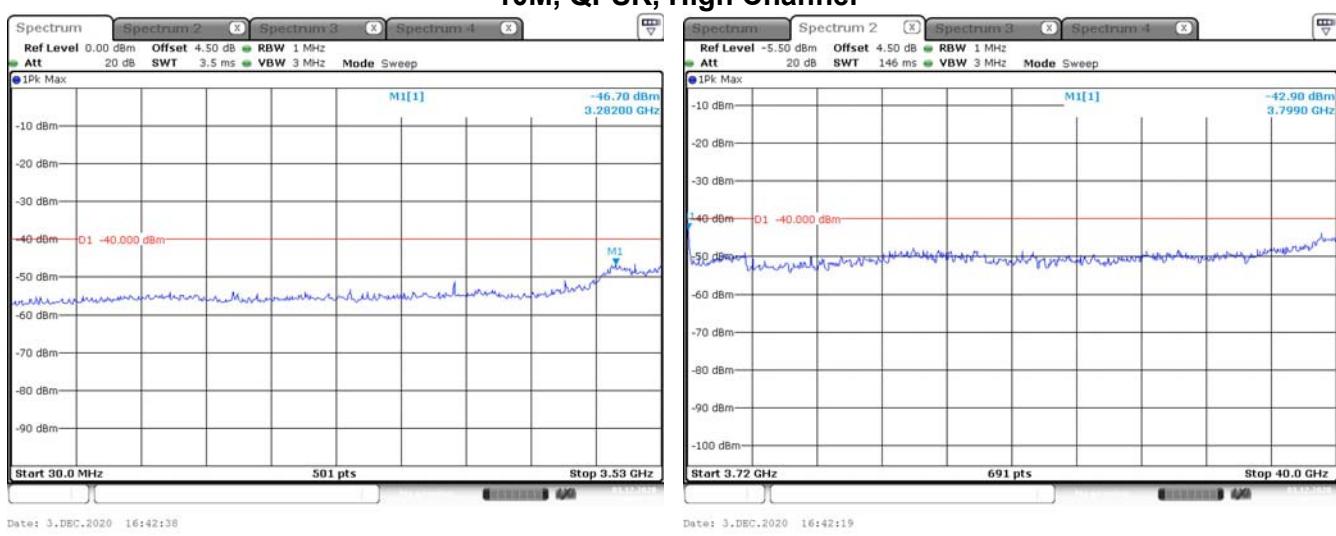
10M, QPSK, Low Channel



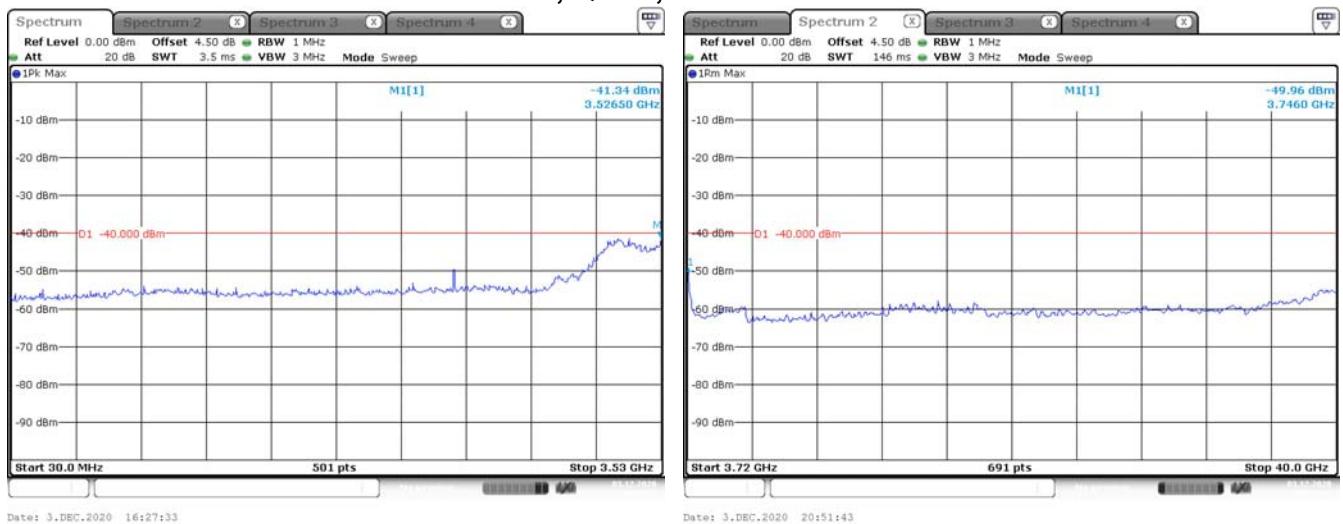
10M, QPSK, Middle Channel



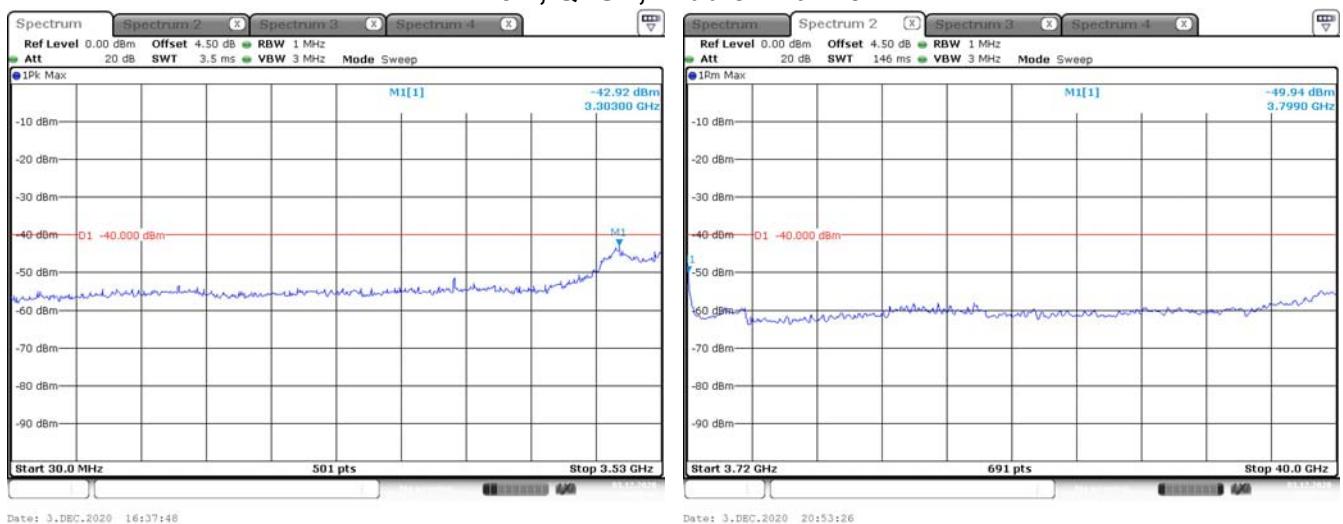
10M, QPSK, High Channel



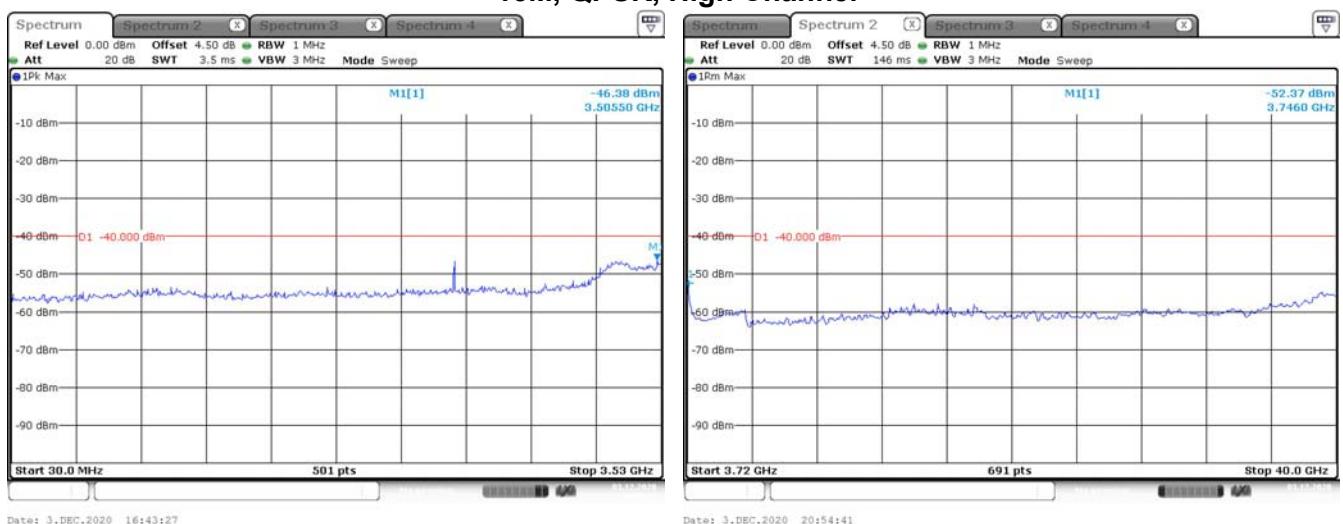
15M, QPSK, Low Channel



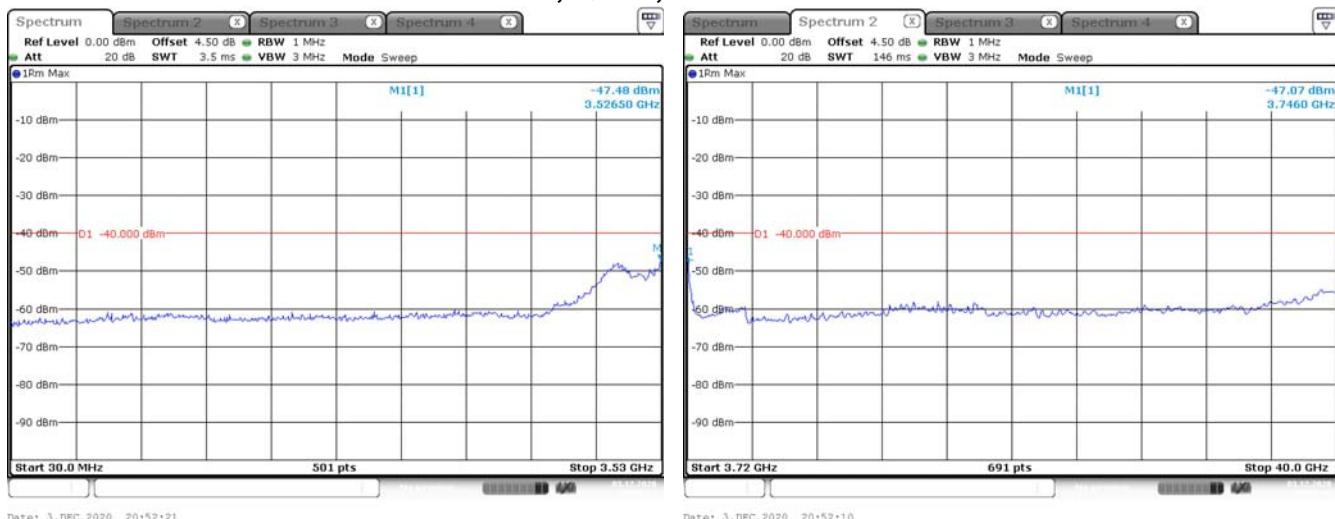
15M, QPSK, Middle Channel



15M, QPSK, High Channel

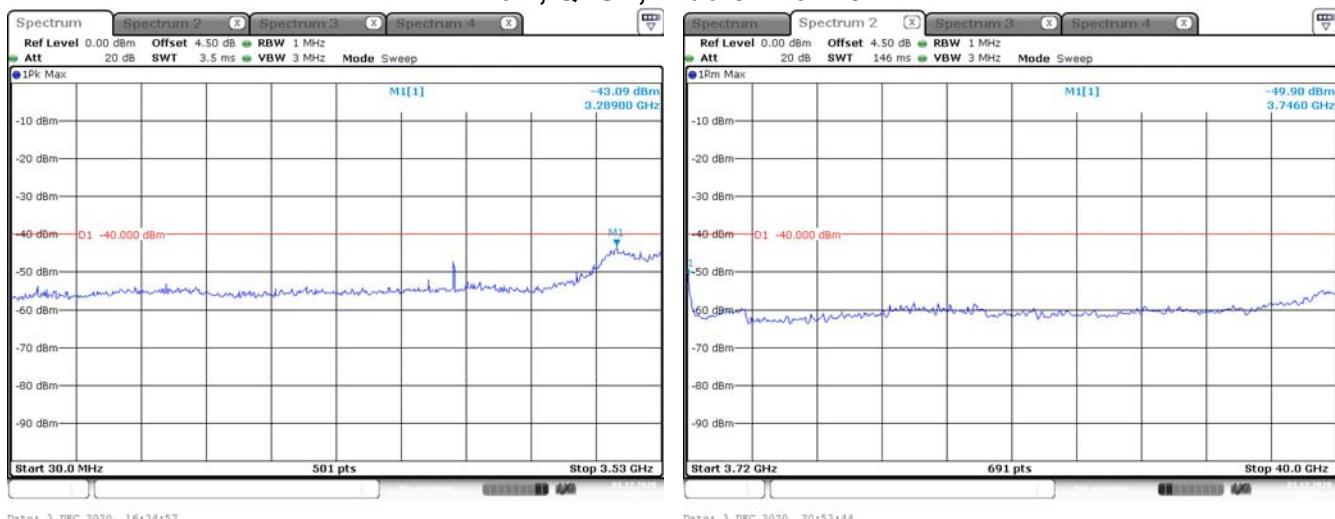


20M, QPSK, Low Channel



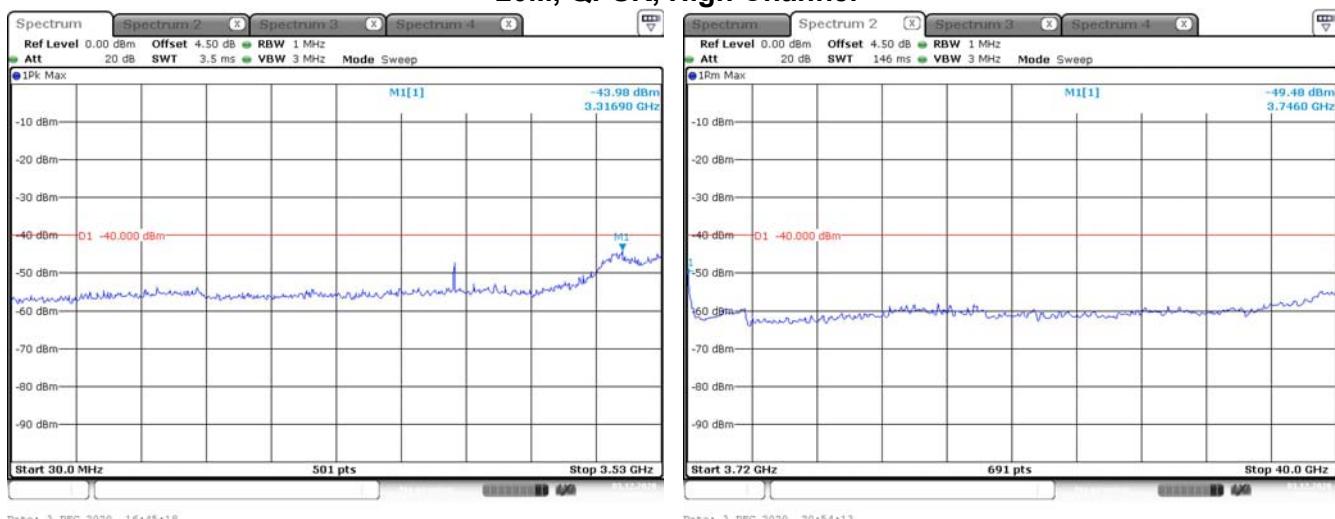
Date: 3.DEC.2020 20:52:21

20M, QPSK, Middle Channel



Date: 3.DEC.2020 16:34:57

20M, QPSK, High Channel

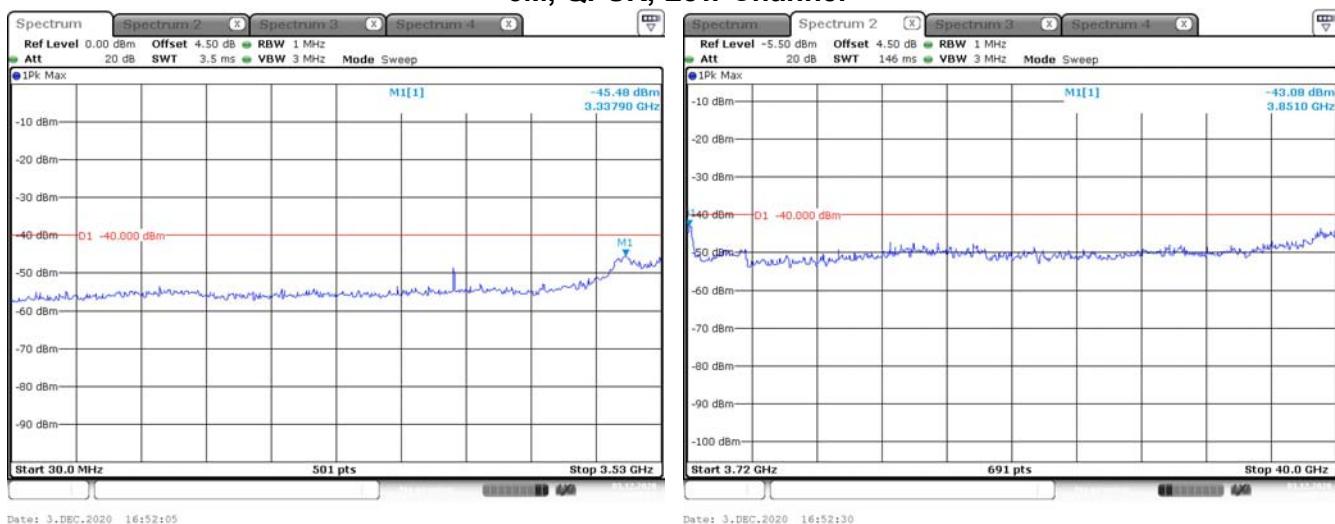


Date: 3.DEC.2020 16:45:18

Date: 3.DEC.2020 20:54:13

Chain 1:

5M, QPSK, Low Channel



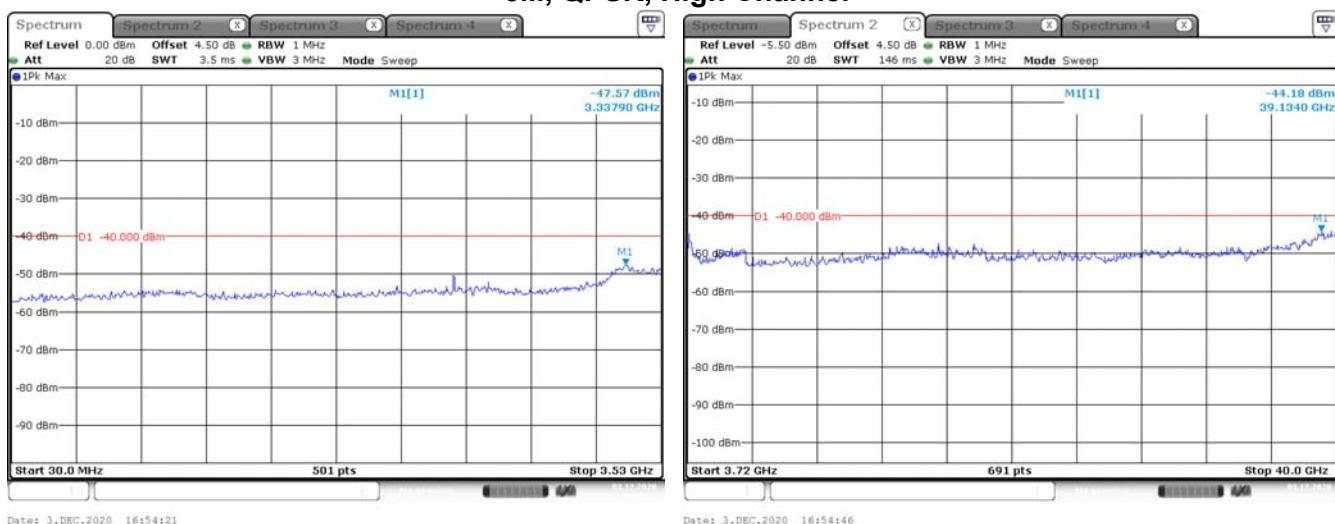
Date: 3.DEC.2020 16:52:05

5M, QPSK, Middle Channel



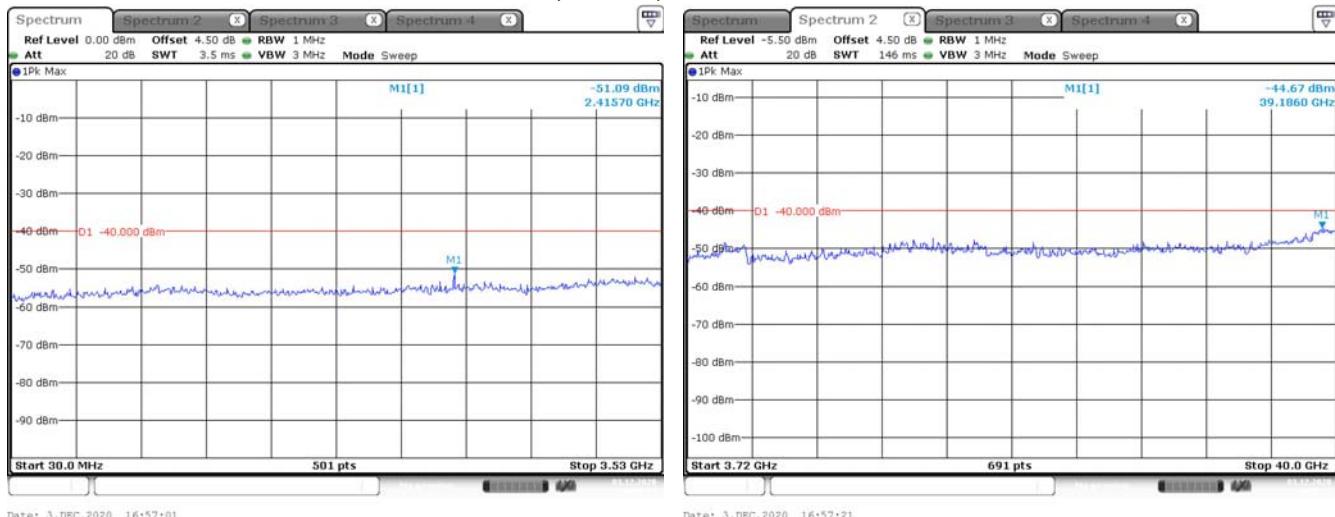
Date: 3.DEC.2020 16:53:43

5M, QPSK, High Channel



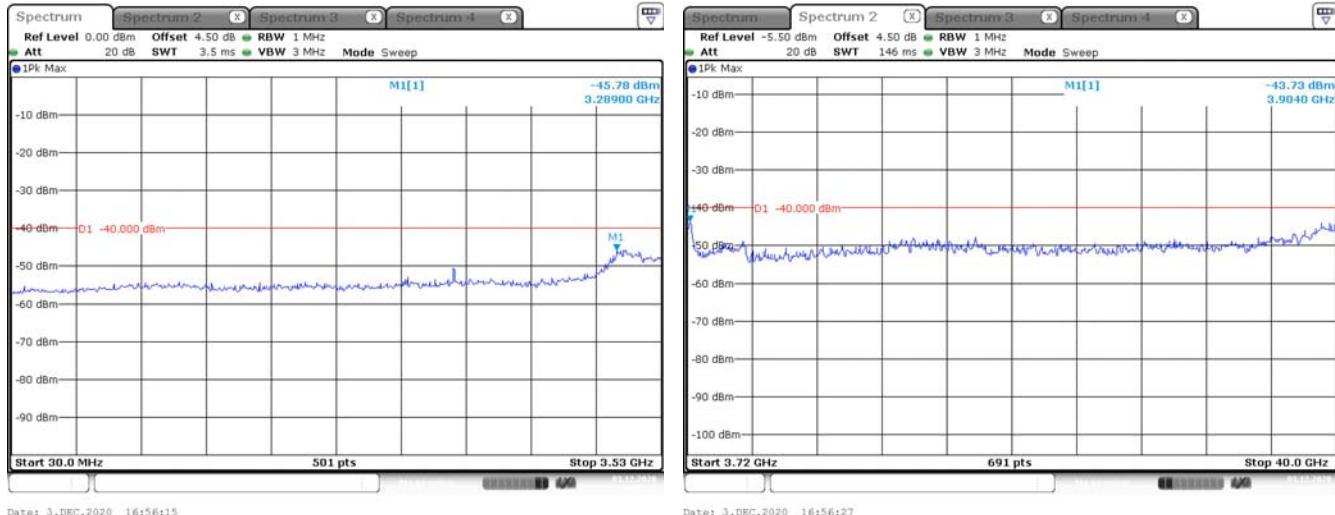
Date: 3.DEC.2020 16:54:21

10M, QPSK, Low Channel



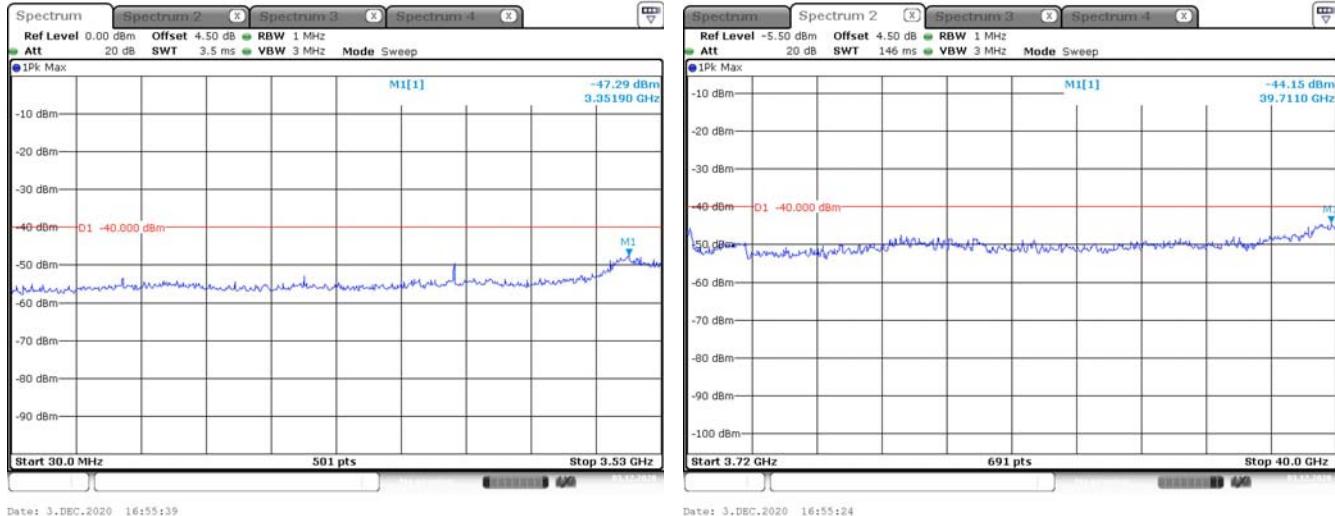
Date: 3.DEC.2020 16:57:01

10M, QPSK, Middle Channel



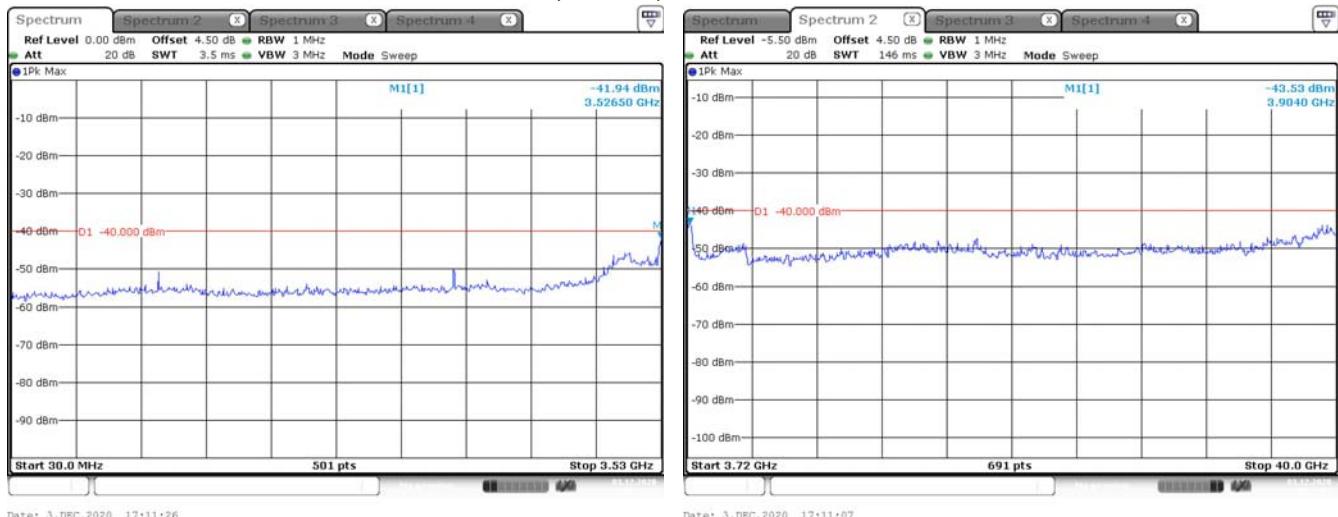
Date: 3.DEC.2020 16:56:15

10M, QPSK, High Channel

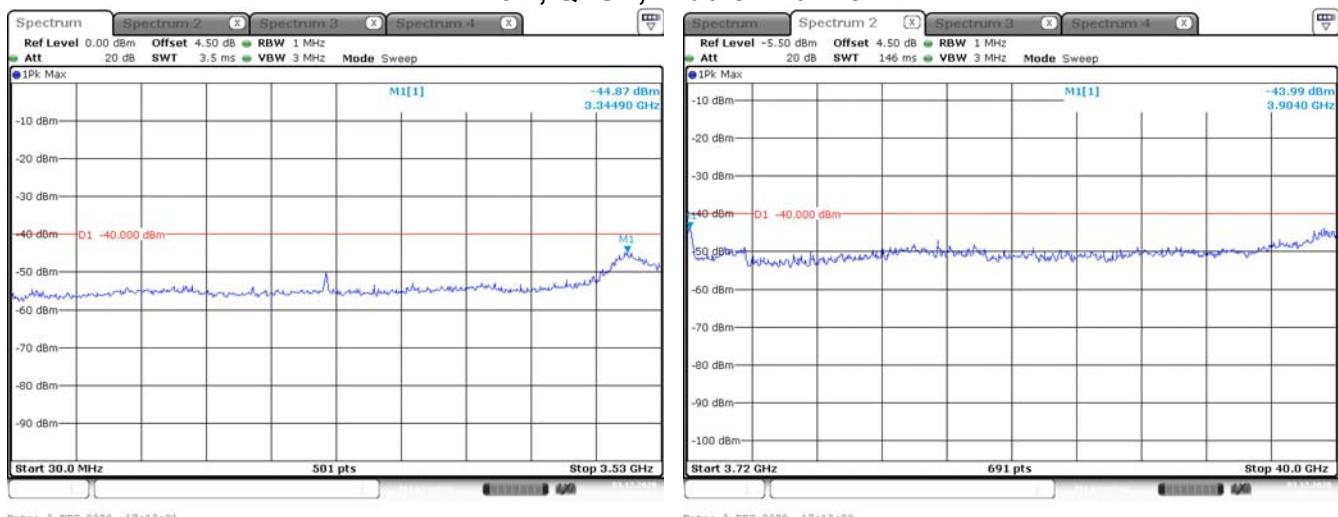


Date: 3.DEC.2020 16:55:39

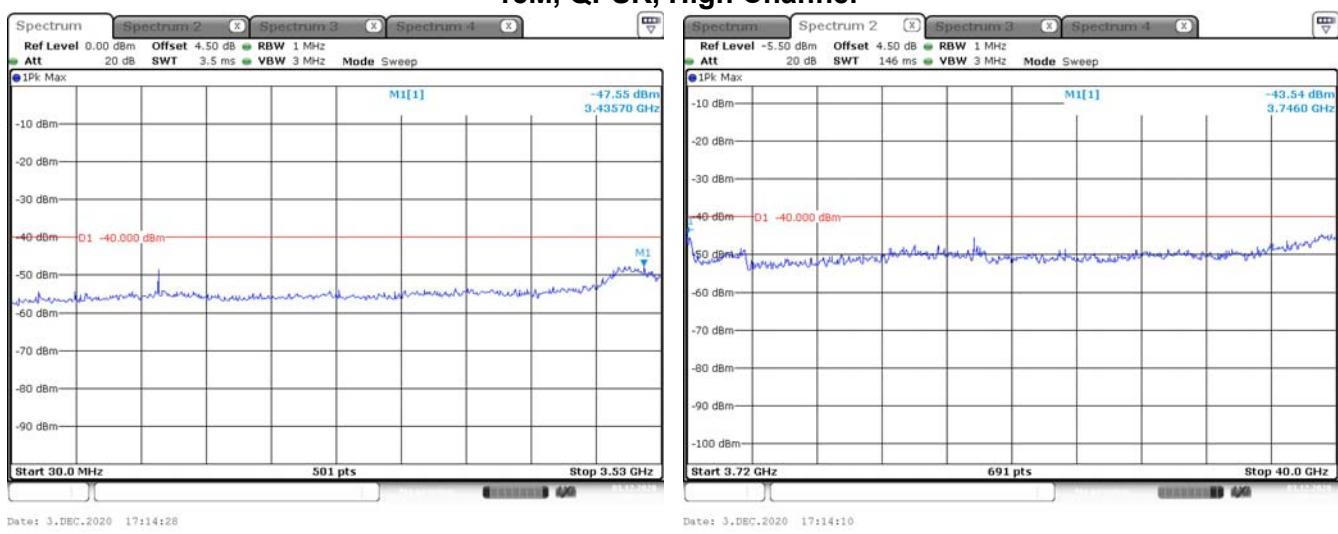
15M, QPSK, Low Channel



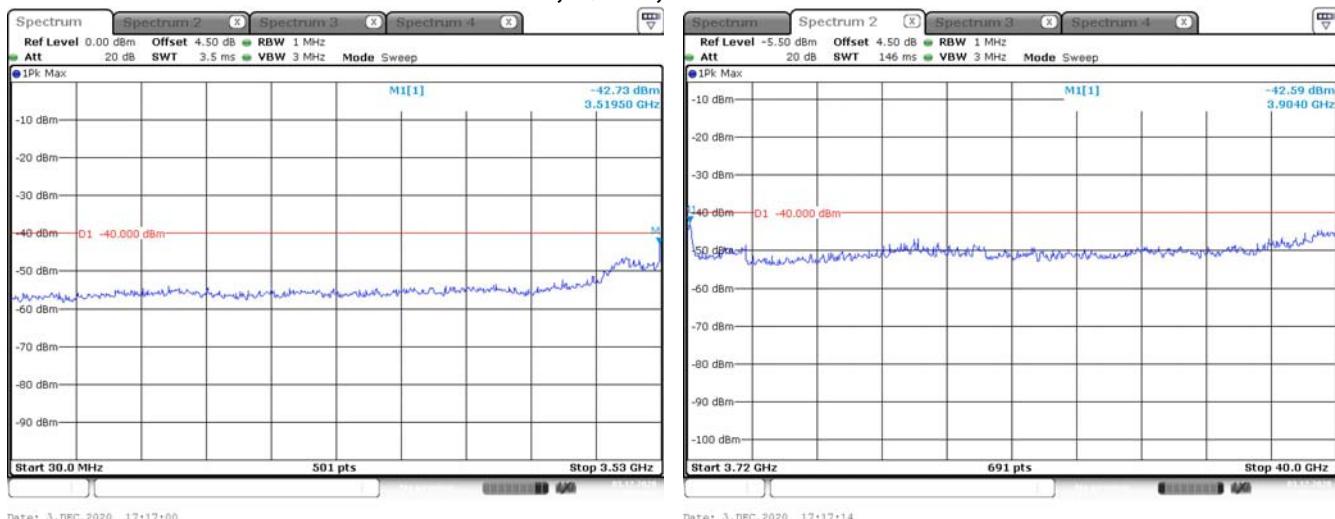
15M, QPSK, Middle Channel



15M, QPSK, High Channel

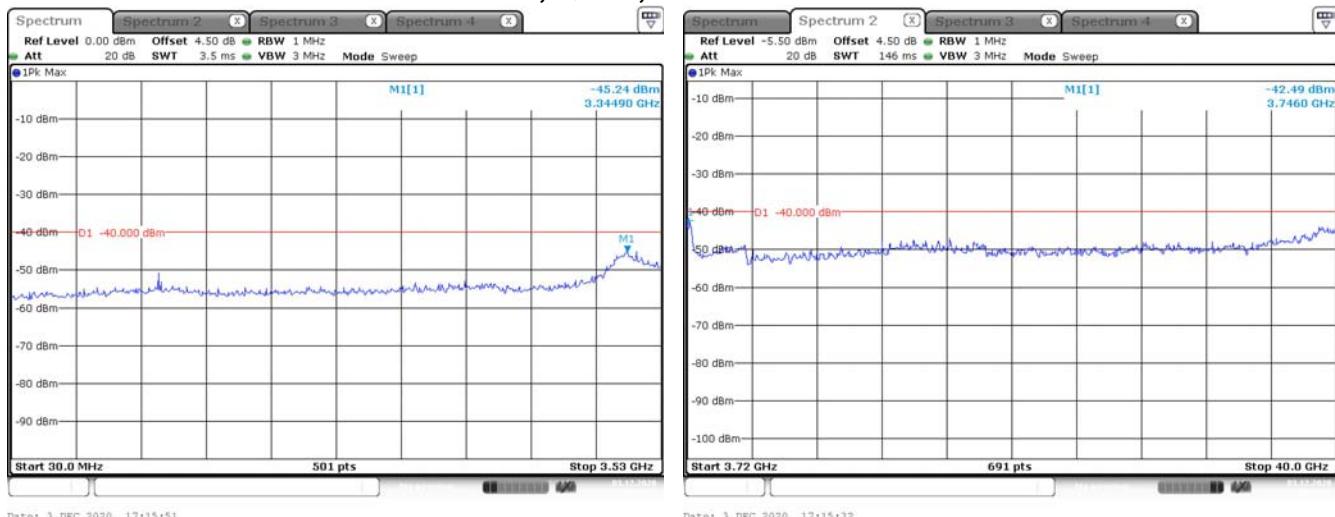


20M, QPSK, Low Channel



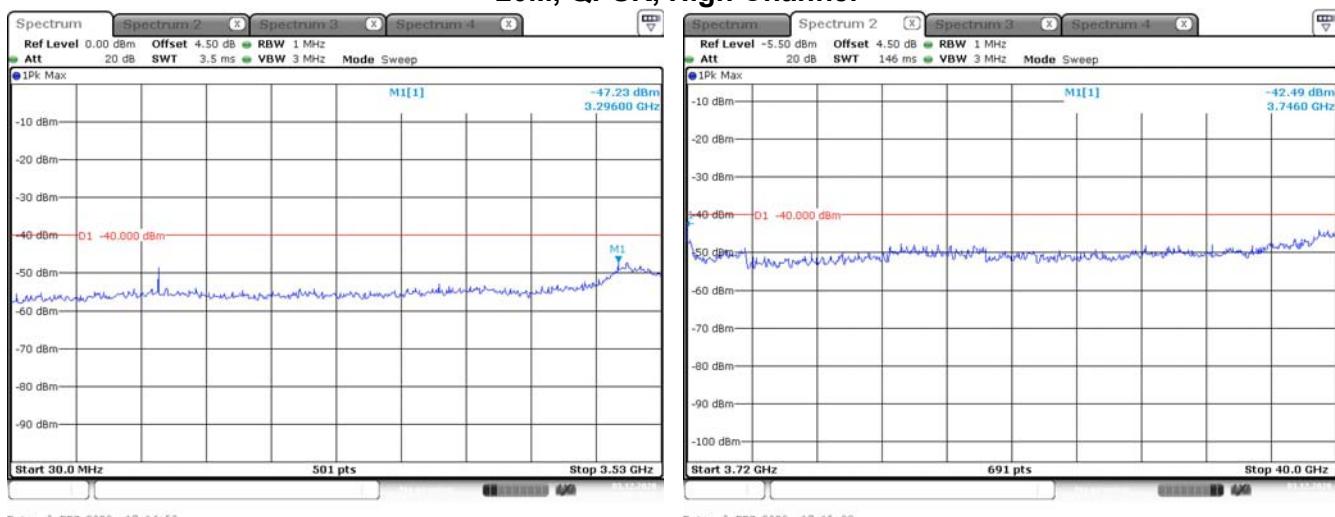
Date: 3.DEC.2020 17:17:00

20M, QPSK, Middle Channel



Date: 3.DEC.2020 17:15:51

20M, QPSK, High Channel



Date: 3.DEC.2020 17:14:53

Date: 3.DEC.2020 17:15:08

FCC §2.1053 & §96.41 - RADIATED SPURIOUS EMISSION

Applicable Standard

According to §96.41(e)(2)(3)

(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.

(3) Measurement procedure. (i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full reference bandwidth (i.e., 1 MHz or 1 percent of emission bandwidth, as specified). The fundamental emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Test Data

Environmental Conditions

Temperature:	21.1~27.4°C
Relative Humidity:	10~41 %
ATM Pressure:	101.1~101.2 kPa

The testing was performed by Winfred Wang on 2020-12-08~2020-12-10

Test Mode: Transmitting (worst)

30MHz-40GHz:
Chain 0:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 3555 MHz								
7110.00	H	33.27	-56.80	13.17	1.72	-45.35	-40.00	5.35
7110.00	V	32.98	-57.07	13.17	1.72	-45.62	-40.00	5.62
10665.00	H	22.35	-64.70	13.07	0.46	-52.09	-40.00	12.09
10665.00	V	22.26	-64.07	13.07	0.46	-51.46	-40.00	11.46
14220.00	H	22.68	-62.44	12.90	2.17	-51.71	-40.00	11.71
14220.00	V	22.74	-64.58	12.90	2.17	-53.85	-40.00	13.85
45.52	H	50.61	-41.35	-19.29	0.19	-60.83	-40.00	20.83
47.46	V	55.11	-38.60	-17.39	0.19	-56.18	-40.00	16.18
QPSK, Frequency: 3625 MHz								
7250.00	H	30.11	-59.44	13.05	1.58	-47.97	-40.00	7.97
7250.00	V	33.27	-56.44	13.05	1.58	-44.97	-40.00	4.97
10875.00	H	22.80	-64.27	13.25	0.69	-51.71	-40.00	11.71
10875.00	V	22.61	-63.80	13.25	0.69	-51.24	-40.00	11.24
14500.00	H	22.58	-61.65	13.50	1.95	-50.10	-40.00	10.10
14500.00	V	22.44	-64.52	13.50	1.95	-52.97	-40.00	12.97
111.48	H	55.79	-54.65	0.00	0.16	-54.81	-40.00	14.81
61.06	V	59.69	-45.76	-9.74	0.17	-55.67	-40.00	15.67
QPSK, Frequency: 3695 MHz								
7390.00	H	28.83	-60.20	13.29	1.43	-48.34	-40.00	8.34
7390.00	V	26.75	-62.62	13.29	1.43	-50.76	-40.00	10.76
11085.00	H	22.46	-64.76	12.85	0.98	-52.89	-40.00	12.89
11085.00	V	22.50	-63.93	12.85	0.98	-52.06	-40.00	12.06
167.74	H	50.11	-60.85	0.00	0.24	-61.09	-40.00	21.09
49.40	V	53.11	-41.70	-15.49	0.19	-57.38	-40.00	17.38

Chain 1:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 3555 MHz								
7110.00	H	31.73	-58.34	13.17	1.72	-46.89	-40.00	6.89
7110.00	V	32.78	-57.27	13.17	1.72	-45.82	-40.00	5.82
10665.00	H	22.25	-64.80	13.07	0.46	-52.19	-40.00	12.19
10665.00	V	22.33	-64.00	13.07	0.46	-51.39	-40.00	11.39
14220.00	H	22.79	-62.33	12.90	2.17	-51.60	-40.00	11.60
14220.00	V	22.77	-64.55	12.90	2.17	-53.82	-40.00	13.82
47.46	H	47.46	-46.72	-17.39	0.19	-64.30	-40.00	24.30
365.62	V	45.62	-59.49	0.00	0.36	-59.85	-40.00	19.85
QPSK, Frequency: 3625 MHz								
7250.00	H	31.41	-58.14	13.05	1.58	-46.67	-40.00	6.67
7250.00	V	31.93	-57.78	13.05	1.58	-46.31	-40.00	6.31
10875.00	H	22.58	-64.49	13.25	0.69	-51.93	-40.00	11.93
10875.00	V	22.42	-63.99	13.25	0.69	-51.43	-40.00	11.43
14500.00	H	22.65	-61.58	13.50	1.95	-50.03	-40.00	10.03
14500.00	V	22.76	-64.20	13.50	1.95	-52.65	-40.00	12.65
365.62	H	50.63	-56.80	0.00	0.36	-57.16	-40.00	17.16
49.40	V	56.35	-38.46	-15.49	0.19	-54.14	-40.00	14.14
QPSK, Frequency: 3695 MHz								
7390.00	H	35.57	-53.46	13.29	1.43	-41.60	-40.00	1.60
7390.00	V	34.72	-54.65	13.29	1.43	-42.79	-40.00	2.79
11085.00	H	22.19	-65.03	12.85	0.98	-53.16	-40.00	13.16
11085.00	V	22.43	-64.00	12.85	0.98	-52.13	-40.00	12.13
14780.00	H	22.53	-62.82	14.34	1.52	-50.00	-40.00	10.00
14780.00	V	22.63	-63.47	14.34	1.52	-50.65	-40.00	10.65
365.62	H	49.86	-57.57	0.00	0.36	-57.93	-40.00	17.93
47.46	V	55.11	-38.60	-17.39	0.19	-56.18	-40.00	16.18

Note:

- 1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
- 2) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 3) Margin = Limit-Absolute Level

FCC§2.1055 - FREQUENCY STABILITY

Applicable Standard

According to FCC §2.1055

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external power supply and the RF output was connected to a Frequency Counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The power leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Frequency Counter.

Frequency Stability vs. Voltage:

1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

The output frequency was recorded for each voltage.

Test Data

Environmental Conditions

Temperature:	23.9~25.4 °C
Relative Humidity:	35~42%
ATM Pressure:	102.4~102.5kPa

The testing was performed by Winfred Wang on 2020-12-01~2020-12-04.

Test Mode: Transmitting

Chain 0:

QPSK, Channel Bandwidth:20MHz Middle Channel, $f_c = 3625$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{AC}	Hz	ppm	
-30	120	-1.76	-0.0005	Pass
-20		1.17	0.0003	
-10		1.94	0.0005	
0		1.44	0.0004	
10		-6.27	-0.0017	
20		-2.51	-0.0007	
30		1.95	0.0005	
40		-0.63	-0.0002	
50		0.39	0.0001	
20	102	-8.75	-0.0024	
20	138	8.69	0.0024	

16QAM, Channel Bandwidth:20MHz Middle Channel, $f_c = 3625$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{AC}	Hz	ppm	
-30	120	8.05	0.0022	Pass
-20		8.04	0.0022	
-10		3.12	0.0009	
0		-0.85	-0.0002	
10		6.64	0.0018	
20		-2.81	-0.0008	
30		1.59	0.0004	
40		4.83	0.0013	
50		-1.63	-0.0004	
20	102	-2.73	-0.0008	
20	138	-4.46	-0.0012	

Chain 1:

QPSK, Channel Bandwidth:20MHz Middle Channel, $f_c = 3625$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{AC}	Hz	ppm	
-30	120	8.37	0.0023	Pass
-20		4.36	0.0012	
-10		6.96	0.0019	
0		-6.78	-0.0019	
10		8.74	0.0024	
20		-0.58	-0.0002	
30		-2.79	-0.0008	
40		-3.80	-0.0010	
50		7.67	0.0021	
20	102	6.41	0.0018	
20	138	5.00	0.0014	

16QAM, Channel Bandwidth:20MHz Middle Channel, $f_c = 3625$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{AC}	Hz	ppm	
-30	120	-2.23	-0.0006	Pass
-20		4.52	0.0012	
-10		2.32	0.0006	
0		-8.46	-0.0023	
10		-8.92	-0.0025	
20		-3.14	-0.0009	
30		6.32	0.0017	
40		0.10	0.0000	
50		7.26	0.0020	
20	102	-4.60	-0.0013	
20	138	1.18	0.0003	

END OF REPORT