

FCC § 2.1053; § 22.917 (a); § 24.238 (a); §27.53 SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917(a) and § 24.238(a) and § 27.53

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 receiving 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.

Test Data

Environmental Conditions

Temperature:	23~24 °C
Relative Humidity:	54~56 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Holland Yang and Charlie Cha from 2020-05-19 to 2020-11-10.

EUT operation mode: Transmitting

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, Low Channel										
964.2	38.12	124	2.4	H	-62.5	1.37	0.0	-63.87	-13	50.87
964.2	27.69	106	1.9	V	-71.7	1.37	0.0	-73.07	-13	60.07
1648.4	58.63	57	2.0	H	-49.7	1.40	8.90	-42.20	-13	29.20
1648.4	59.42	75	2.0	V	-48.7	1.40	8.90	-41.20	-13	28.20
2472.6	61.25	251	1.6	H	-42.9	2.60	9.30	-36.20	-13	23.20
2472.6	62.32	240	1.4	V	-41.3	2.60	9.30	-34.60	-13	21.60
3296.8	46.36	300	1.6	H	-54.0	1.50	9.60	-45.90	-13	32.90
3296.8	48.62	208	2.1	V	-51.8	1.50	9.60	-43.70	-13	30.70
WCDMA Mode, Low Channel										
955.4	37.68	97	1.9	H	-62.9	1.37	0.0	-64.27	-13	51.27
955.4	39.12	199	1.9	V	-60.2	1.37	0.0	-61.57	-13	48.57
1652.80	48.21	74	1.9	H	-58.1	1.30	8.90	-50.50	-13	37.50
1652.80	47.11	13	1.9	V	-58.6	1.30	8.90	-51.00	-13	38.00

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
959.6	37.57	99	1.1	H	-63.0	1.37	0.0	-64.37	-13	51.37
959.6	38.23	251	2.0	V	-61.1	1.37	0.0	-62.47	-13	49.47
1673.20	50.41	62	2.2	H	-55.9	1.30	8.90	-48.30	-13	35.30
1673.20	50.56	160	1.4	V	-55.2	1.30	8.90	-47.60	-13	34.60
2509.80	50.27	133	1.7	H	-53.1	2.60	10.20	-45.50	-13	32.50
2509.80	52.51	336	2.3	V	-50.2	2.60	10.20	-42.60	-13	29.60
3346.40	43.59	303	2.1	H	-57.3	1.50	11.70	-47.10	-13	34.10
3346.40	43.45	246	1.3	V	-57.5	1.50	11.70	-47.30	-13	34.30
WCDMA Mode, Middle channel										
958.7	37.42	96	1.6	H	-63.2	1.37	0.0	-64.57	-13	51.57
958.7	38.51	142	1.1	V	-60.8	1.37	0.0	-62.17	-13	49.17
1673.20	48.21	74	1.9	H	-58.1	1.30	8.90	-50.50	-13	37.50
1673.20	47.11	13	1.9	V	-58.6	1.30	8.90	-51.00	-13	38.00
2509.80	46.66	258	1.0	H	-56.7	2.60	10.20	-49.10	-13	36.10
2509.80	47.33	310	1.9	V	-55.4	2.60	10.20	-47.80	-13	34.80
3346.40	43.23	344	1.0	H	-57.7	1.50	11.70	-47.50	-13	34.50
3346.40	43.39	129	1.9	V	-57.5	1.50	11.70	-47.30	-13	34.30

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, High Channel										
957.8	38.12	83	1.8	H	-62.5	1.37	0.0	-63.87	-13	50.87
957.8	28.46	13	1.9	V	-70.9	1.37	0.0	-72.27	-13	59.27
1697.6	53.63	293	1.1	H	-53.8	1.30	9.10	-46.00	-13	33.00
1697.6	54.76	255	2.4	V	-52.1	1.30	9.10	-44.30	-13	31.30
2546.4	52.12	280	1.6	H	-52.1	2.60	9.30	-45.40	-13	32.40
2546.4	48.32	19	1.9	V	-55.3	2.60	9.30	-48.60	-13	35.60
3395.2	47.41	116	1.6	H	-53.5	1.40	9.70	-45.20	-13	32.20
3395.2	47.63	238	2.3	V	-53.1	1.40	9.70	-44.80	-13	31.80
WCDMA Mode, High Channel										
957.3	37.86	194	2.4	H	-62.7	1.37	0.0	-64.07	-13	51.07
957.3	38.15	44	1.1	V	-61.2	1.37	0.0	-62.57	-13	49.57
1693.20	48.21	74	1.9	H	-58.1	1.30	8.90	-50.50	-13	37.50
1693.20	47.11	13	1.9	V	-58.6	1.30	8.90	-51.00	-13	38.00

30 MHz ~ 20 GHz:

PCS Band (Part 24E)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, Low Channel										
955.6	37.86	207	1.0	H	-62.7	1.37	0.0	-64.07	-13	51.07
955.6	38.45	106	1.8	V	-60.9	1.37	0.0	-62.27	-13	49.27
3700.4	48.53	158	2.5	H	-53.5	1.60	9.80	-45.30	-13	32.30
3700.4	50.12	129	2.1	V	-51.3	1.60	9.80	-43.10	-13	30.10
WCDMA Mode Band II, Low Channel										
958.3	38.12	293	2.1	H	-62.5	1.37	0.0	-63.87	-13	50.87
958.3	38.76	358	1.6	V	-60.6	1.37	0.0	-61.97	-13	48.97
3704.80	43.94	89	2.3	H	-58.1	1.50	11.80	-47.80	-13	34.80
3704.80	44.71	254	1.8	V	-56.9	1.50	11.80	-46.60	-13	33.60

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
961.2	37.91	202	1.3	H	-62.7	1.37	0.0	-64.07	-13	51.07
961.2	38.49	322	2.2	V	-60.9	1.37	0.0	-62.27	-13	49.27
3760.00	45.24	242	1.7	H	-56.8	1.50	11.80	-46.50	-13	33.50
3760.00	44.94	176	2.1	V	-56.6	1.50	11.80	-46.30	-13	33.30
5640.00	44.13	123	2.5	H	-55.6	1.70	12.40	-44.90	-13	31.90
5640.00	43.85	21	1.6	V	-55.5	1.70	12.40	-44.80	-13	31.80
7520.00	43.23	199	2.1	H	-50.7	1.90	11.50	-41.10	-13	28.10
7520.00	44.21	44	2.2	V	-49.3	1.90	11.50	-39.70	-13	26.70
WCDMA Mode Band II, Middle channel										
960.6	37.28	139	2.3	H	-63.3	1.37	0.0	-64.67	-13	51.67
960.6	38.84	162	1.8	V	-60.5	1.37	0.0	-61.87	-13	48.87
3760.00	43.94	89	2.3	H	-58.1	1.50	11.80	-47.80	-13	34.80
3760.00	44.71	254	1.8	V	-56.9	1.50	11.80	-46.60	-13	33.60

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, High Channel										
960.4	38.12	32	2.4	H	-62.5	1.37	0.0	-63.87	-13	50.87
960.4	38.69	174	1.1	V	-60.7	1.37	0.0	-62.07	-13	49.07
3819.6	47.58	124	1.8	H	-54.7	1.50	9.70	-46.50	-13	33.50
3819.6	49.86	181	1.8	V	-52.0	1.50	9.70	-43.80	-13	30.80
WCDMA Mode Band II, High Channel										
956.9	37.56	273	1.7	H	-63.0	1.37	0.0	-64.37	-13	51.37
956.9	38.64	91	1.2	V	-60.7	1.37	0.0	-62.07	-13	49.07
3815.20	43.94	89	2.3	H	-58.1	1.50	11.80	-47.80	-13	34.80
3815.20	44.71	254	1.8	V	-56.9	1.50	11.80	-46.60	-13	33.60

30 MHz ~ 20 GHz:

AWS Band (Part 27)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
WCDMA Mode Band IV, Low Channel										
958.4	38.12	198	1.7	H	-62.5	1.37	0.0	-63.87	-13	50.87
958.4	37.93	245	2.3	V	-61.4	1.37	0.0	-62.77	-13	49.77
3424.8	43.63	14	1.4	H	-57.2	1.40	9.70	-48.90	-13	35.90
3424.8	45.63	52	1.3	V	-55.1	1.40	9.70	-46.80	-13	33.80

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
WCDMA Mode Band IV, Middle channel										
958.4	37.08	337	1.7	H	-63.5	1.37	0.0	-64.87	-13	51.87
958.4	38.42	42	1.5	V	-60.9	1.37	0.0	-62.27	-13	49.27
3465.20	44.21	87	1.1	H	-56.5	1.50	12.00	-46.00	-13	33.00
3465.20	46.20	142	2.0	V	-55.3	1.50	12.00	-44.80	-13	31.80

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
WCDMA Mode Band IV, High Channel										
958.4	37.12	287	2.4	H	-63.5	1.37	0.0	-64.87	-13	51.87
958.4	38.56	159	2.5	V	-60.8	1.37	0.0	-62.17	-13	49.17
3505.2	45.36	91	1.9	H	-55.8	1.50	9.70	-47.60	-13	34.60
3505.2	47.12	17	1.1	V	-54.8	1.50	9.70	-46.60	-13	33.60

LTE Band: (Pre-scan with all the bandwidth, and worst case as below)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 2 (1.4 MHz, Low Channel)										
Test frequency range:30 MHz ~ 20 GHz										
961.3	37.12	10	2.5	H	-63.5	1.37	0.0	-64.87	-13	51.87
961.3	38.24	353	2.2	V	-61.1	1.37	0.0	-62.47	-13	49.47
3701.4	43.95	230	2.5	H	-58.1	1.60	9.80	-49.90	-13	36.90
3701.4	44.78	343	2.4	V	-56.7	1.60	9.80	-48.50	-13	35.50
Band 4 (1.4 MHz, Low Channel)										
Test frequency range:30 MHz ~ 20 GHz										
945.6	37.25	287	1.8	H	-63.3	1.37	0.0	-64.67	-13	51.67
945.6	38.69	119	1.5	V	-60.7	1.37	0.0	-62.07	-13	49.07
3421.4	46.23	250	2.5	H	-54.6	1.40	9.70	-46.30	-13	33.30
3421.4	45.21	312	1.8	V	-55.5	1.40	9.70	-47.20	-13	34.20
Band 5 (1.4 MHz, Low Channel)										
Test frequency range:30 MHz ~ 10 GHz										
956.3	38.01	123	1.4	H	-62.6	1.37	0.0	-63.97	-13	50.97
956.3	38.53	59	1.9	V	-60.8	1.37	0.0	-62.17	-13	49.17
1649.4	49.65	188	2.3	H	-58.7	1.40	8.90	-51.20	-13	38.20
1649.4	48.67	262	1.8	V	-59.4	1.40	8.90	-51.90	-13	38.90
Band 7 (5 MHz, Low Channel)										
Test frequency range: 30 MHz ~ 26.5GHz										
963.4	37.85	75	2.2	H	-62.7	1.37	0.0	-64.07	-25	39.07
963.4	38.63	186	1.5	V	-60.7	1.37	0.0	-62.07	-25	37.07
5005	42.12	212	1.4	H	-57.0	1.70	11.20	-47.50	-25	22.50
5005	44.31	181	1.3	V	-54.3	1.70	11.20	-44.80	-25	19.80
Band 12 (1.4 MHz, Low Channel)										
Test frequency range: 30 MHz ~ 10GHz										
963.1	38.12	168	2.3	H	-62.5	1.37	0.0	-63.87	-13	50.87
963.1	38.75	151	1.9	V	-60.6	1.37	0.0	-61.97	-13	48.97
1399.4	48.12	83	2.5	H	-59.8	1.60	8.30	-53.10	-13	40.10
1399.4	47.68	79	2.0	V	-60.5	1.60	8.30	-53.80	-13	40.80
Band 17 (5 MHz, Low Channel)										
Test frequency range: 30 MHz ~ 10GHz										
962.3	37.25	235	1.8	H	-63.3	1.37	0.0	-64.67	-13	51.67
962.3	38.74	114	2.4	V	-60.6	1.37	0.0	-61.97	-13	48.97
1413	48.69	329	2.0	H	-59.3	1.60	8.30	-52.60	-13	39.60
1413	45.77	205	1.7	V	-62.4	1.60	8.30	-55.70	-13	42.70
Band 19 (5 MHz, Low Channel)										
Test frequency range: 30 MHz ~ 10GHz										
964.5	37.11	88	1.4	H	-63.5	1.37	0.0	-64.87	-13	51.87
964.5	38.69	259	1.7	V	-60.7	1.37	0.0	-62.07	-13	49.07
1665	46.68	8	1.9	H	-60.8	1.30	9.10	-53.00	-13	40.00
1665	43.56	239	1.7	V	-63.3	1.30	9.10	-55.50	-13	42.50

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 2 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 20 GHz										
958.7	37.54	243	1.3	H	-63.1	1.37	0.0	-64.47	-13	51.47
958.7	38.26	120	1.8	V	-61.1	1.37	0.0	-62.47	-13	49.47
3760.00	43.95	125	1.1	H	-58.1	1.50	11.80	-47.80	-13	34.80
3760.00	44.78	141	1.1	V	-56.8	1.50	11.80	-46.50	-13	33.50
Band 4 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 20 GHz										
961.3	37.48	201	2.0	H	-63.1	1.37	0.0	-64.47	-13	51.47
961.3	38.15	223	1.5	V	-61.2	1.37	0.0	-62.57	-13	49.57
3465.00	46.28	26	1.7	H	-54.5	1.50	12.00	-44.00	-13	31.00
3465.00	45.51	235	1.4	V	-56.0	1.50	12.00	-45.50	-13	32.50
Band 5 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 10 GHz										
959.4	37.63	284	2.0	H	-63.0	1.37	0.0	-64.37	-13	51.37
959.4	38.52	38	2.3	V	-60.8	1.37	0.0	-62.17	-13	49.17
1673.00	50.13	310	1.6	H	-56.2	1.30	8.90	-48.60	-13	35.60
1673.00	47.54	38	2.0	V	-58.2	1.30	8.90	-50.60	-13	37.60
Band 7 (5 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 26.5GHz										
962.5	37.34	154	1.2	H	-63.3	1.37	0.0	-64.67	-25	51.67
962.5	38.78	159	2.3	V	-60.6	1.37	0.0	-61.97	-25	48.97
5070.00	42.97	78	2.3	H	-54.7	1.60	12.10	-44.20	-25	31.20
5070.00	43.23	143	1.1	V	-54.4	1.60	12.10	-43.90	-25	30.90
Band 12 (1.4 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 10GHz										
962.4	37.41	327	1.5	H	-63.2	1.37	0.0	-64.57	-13	51.57
962.4	38.22	231	2.1	V	-61.1	1.37	0.0	-62.47	-13	49.47
1415.00	47.89	13	1.5	H	-60.3	1.60	7.90	-54.00	-13	41.00
1415.00	46.44	47	1.2	V	-62.0	1.60	7.90	-55.70	-13	42.70
Band 17 (5 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 10GHz										
961.7	37.39	173	1.8	H	-63.2	1.37	0.0	-64.57	-13	51.57
961.7	38.46	5	1.8	V	-60.9	1.37	0.0	-62.27	-13	49.27
1420.00	48.45	180	2.4	H	-59.7	1.60	7.90	-53.40	-13	40.40
1420.00	46.59	80	1.6	V	-61.8	1.60	7.90	-55.50	-13	42.50
Band 19 (5 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 10GHz										
963.6	37.35	92	1.3	H	-63.2	1.37	0.0	-64.57	-13	51.57
963.6	38.68	342	1.7	V	-60.7	1.37	0.0	-62.07	-13	49.07
1675.00	46.62	31	2.1	H	-59.7	1.30	8.90	-52.10	-13	39.10
1675.00	44.86	13	2.1	V	-60.9	1.30	8.90	-53.30	-13	40.30

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 2 (1.4 MHz, High Channel)										
Test frequency range:30 MHz ~ 20 GHz										
957.6	39.23	60	1.6	H	-61.4	1.37	0.0	-62.77	-13	49.77
957.6	38.75	345	1.4	V	-60.6	1.37	0.0	-61.97	-13	48.97
3818.6	42.56	142	2.4	H	-59.7	1.50	9.70	-51.50	-13	38.50
3818.6	44.69	279	1.2	V	-57.1	1.50	9.70	-48.90	-13	35.90
Band 4 (1.4 MHz, High Channel)										
Test frequency range:30 MHz ~ 20 GHz										
962.7	37.11	94	1.7	H	-63.5	1.37	0.0	-64.87	-13	51.87
962.7	39.58	316	1.4	V	-59.8	1.37	0.0	-61.17	-13	48.17
3508.6	45.12	97	1.7	H	-56.0	1.50	9.70	-47.80	-13	34.80
3508.6	46.32	344	2.5	V	-55.6	1.50	9.70	-47.40	-13	34.40
Band 5 (1.4 MHz, High Channel)										
Test frequency range:30 MHz ~ 10 GHz										
958.6	38.32	156	1.4	H	-62.3	1.37	0.0	-63.67	-13	50.67
958.6	38.99	236	2.4	V	-60.4	1.37	0.0	-61.77	-13	48.77
1696.6	49.36	218	2.3	H	-58.1	1.30	9.10	-50.30	-13	37.30
1696.6	46.36	61	1.8	V	-60.5	1.30	9.10	-52.70	-13	39.70
Band 7 (5 MHz, High Channel)										
Test frequency range: 30 MHz ~ 26.5GHz										
964.7	37.35	319	1.7	H	-63.2	1.37	0.0	-64.57	-25	39.57
964.7	38.96	228	1.8	V	-60.4	1.37	0.0	-61.77	-25	36.77
5135	42.12	254	2.4	H	-56.6	1.60	11.20	-47.00	-25	22.00
5135	44.03	279	2.3	V	-54.7	1.60	11.20	-45.10	-25	20.10
Band 12 (1.4 MHz, High Channel)										
Test frequency range: 30 MHz ~ 10GHz										
965.3	38.47	212	2.3	H	-62.1	1.37	0.0	-63.47	-13	50.47
965.3	39.24	284	2.5	V	-60.1	1.37	0.0	-61.47	-13	48.47
1430.6	46.69	87	1.4	H	-61.3	1.60	8.30	-54.60	-13	41.60
1430.6	47.12	357	1.2	V	-61.1	1.60	8.30	-54.40	-13	41.40
Band 17 (5 MHz, High Channel)										
Test frequency range: 30 MHz ~ 10GHz										
964.2	37.59	279	2.3	H	-63.0	1.37	0.0	-64.37	-13	51.37
964.2	38.36	265	1.7	V	-61.0	1.37	0.0	-62.37	-13	49.37
1427	48.65	274	2.3	H	-59.3	1.60	8.30	-52.60	-13	39.60
1427	47.12	42	1.6	V	-61.1	1.60	8.30	-54.40	-13	41.40
Band 19 (5 MHz, High Channel)										
Test frequency range: 30 MHz ~ 10GHz										
966.2	37.14	115	1.2	H	-63.5	1.37	0.0	-64.87	-13	51.87
966.2	38.74	308	1.7	V	-60.6	1.37	0.0	-61.97	-13	48.97
1685	46.53	227	2.5	H	-60.9	1.30	9.10	-53.10	-13	40.10
1685	43.69	147	2.2	V	-63.2	1.30	9.10	-55.40	-13	42.40

Note: Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

dBd is for the ERP, dBi is for EIRP.

FCC § 22.917 (a);§ 24.238 (a); §27.53 (h)(m) - BAND EDGES

Applicable Standard

According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

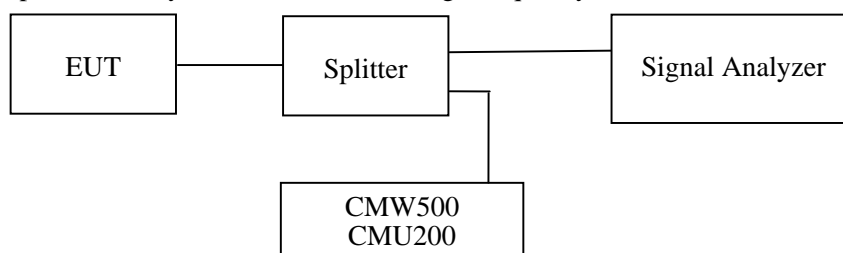
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to FCC §27.53 (h)(m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Test Procedure

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

The center of the spectrum analyzer was set to block edge frequency



Test Data

Environmental Conditions

Temperature:	23 °C
Relative Humidity:	53 %
ATM Pressure:	101.0 kPa

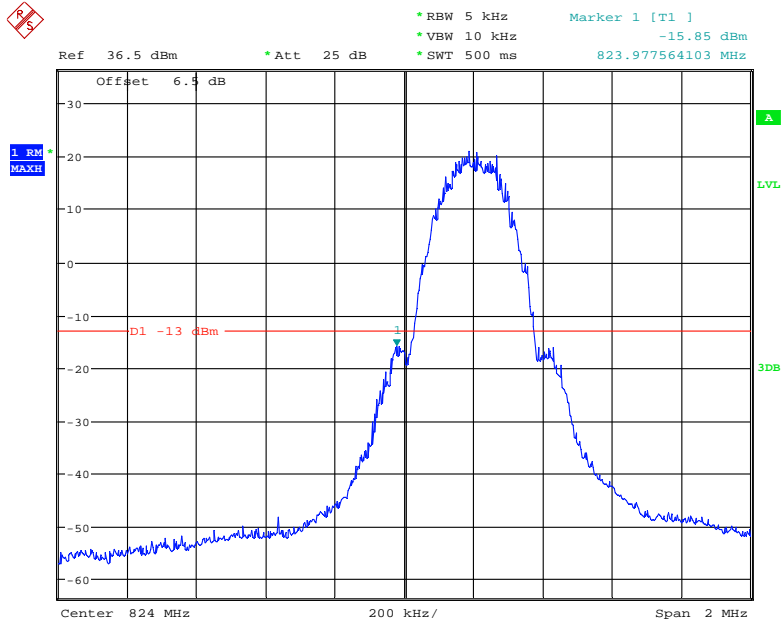
The testing was performed by Gavin Guo from 2020-05-21 to 2020-05-27.

EUT operation mode: Transmitting

Test Result: Compliance

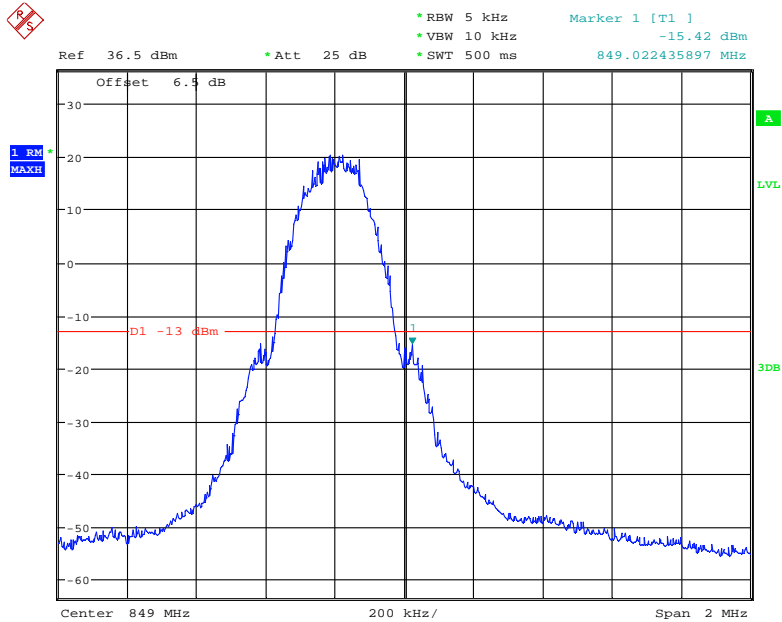
Please refer to the following plots.

Cellular Band, Left Band Edge for GSM (GMSK) Mode



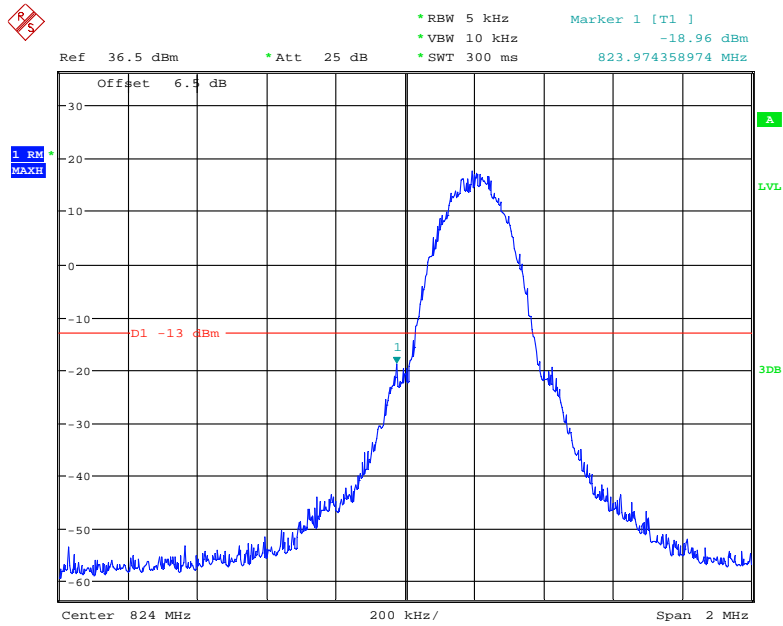
Date: 22.MAY.2020 18:22:33

Cellular Band, Right Band Edge for GSM (GMSK) Mode



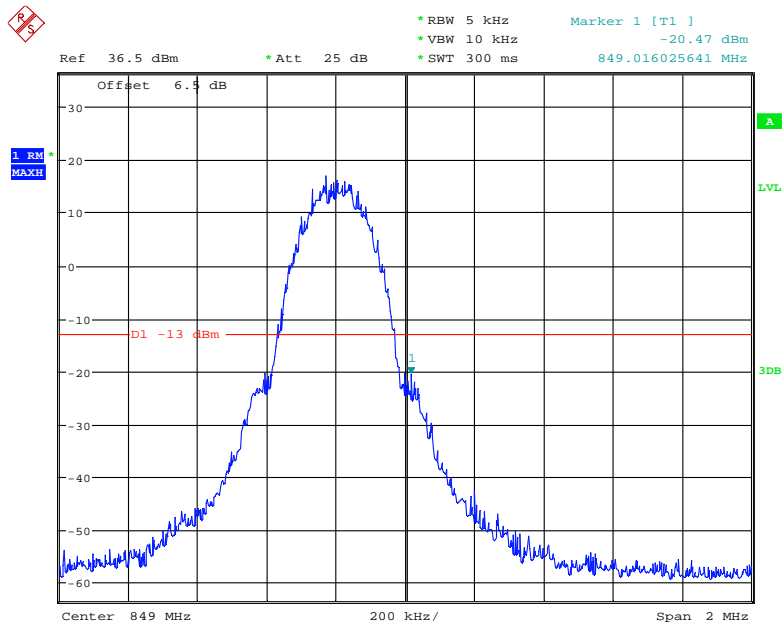
Date: 22.MAY.2020 18:23:43

Cellular Band, Left Band Edge for EDGE Mode



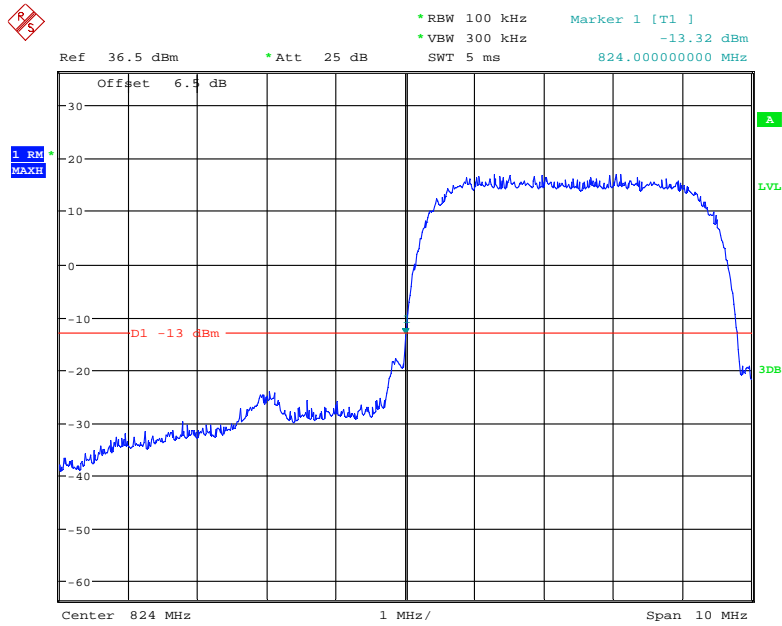
Date: 22.MAY.2020 18:28:56

Cellular Band, Right Band Edge for EDGE Mode



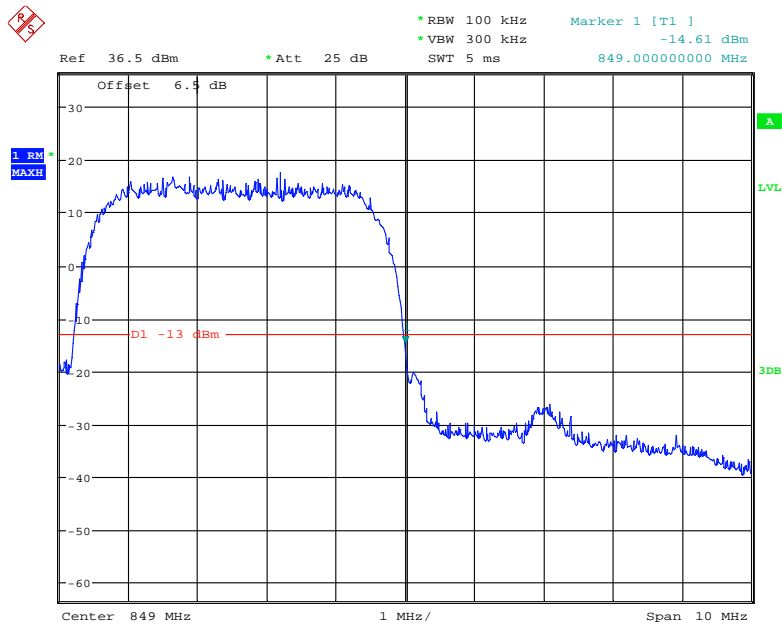
Date: 22.MAY.2020 18:26:33

Cellular Band, Left Band Edge for WCDMA (BPSK) Mode



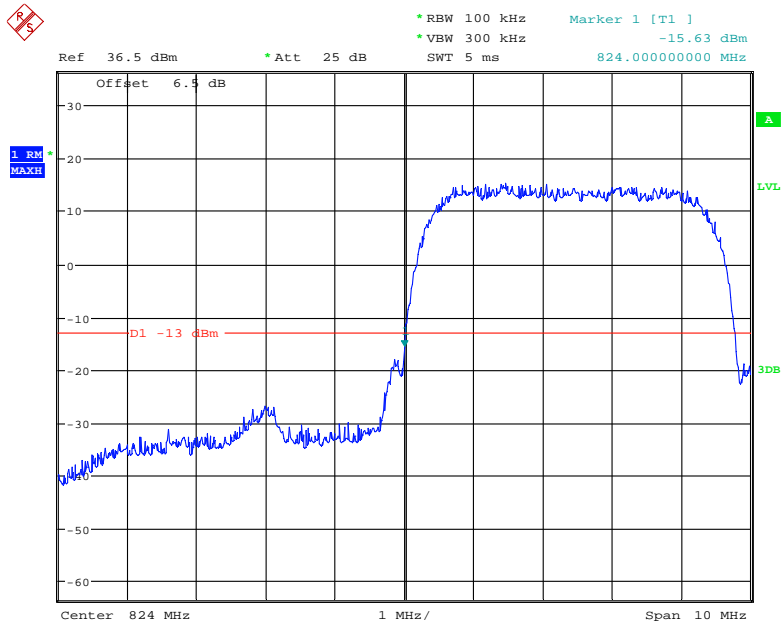
Date: 22.MAY.2020 19:27:52

Cellular Band, Right Band Edge for WCDMA (BPSK) Mode



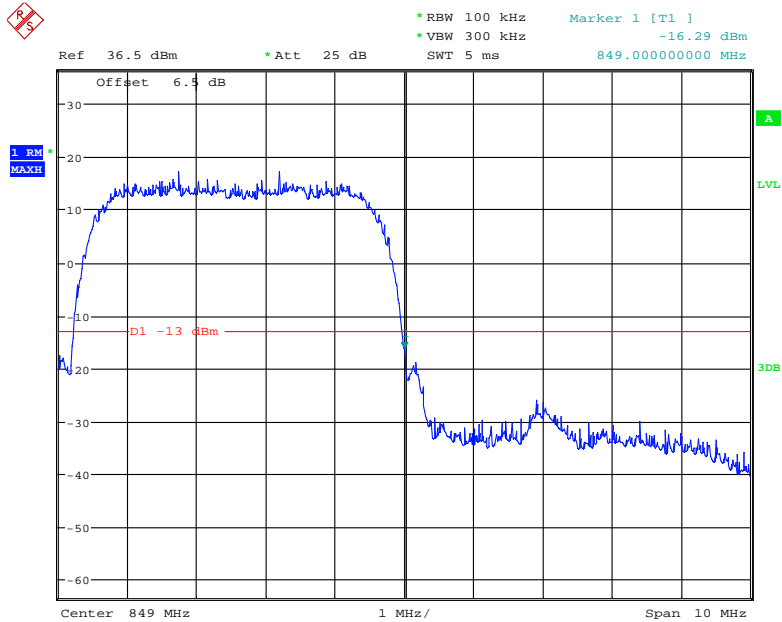
Date: 22.MAY.2020 19:28:17

Cellular Band, Left Band Edge for HSDPA (16QAM) Mode



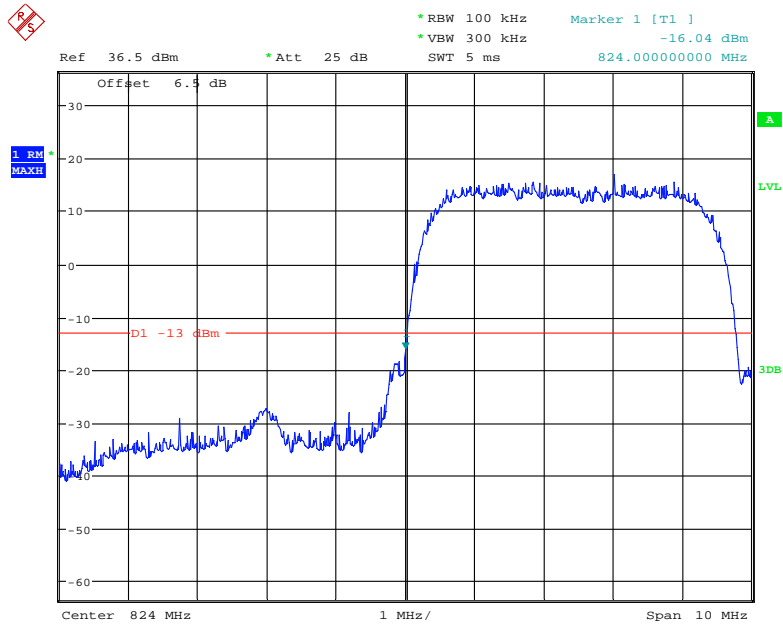
Date: 22.MAY.2020 19:38:11

Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



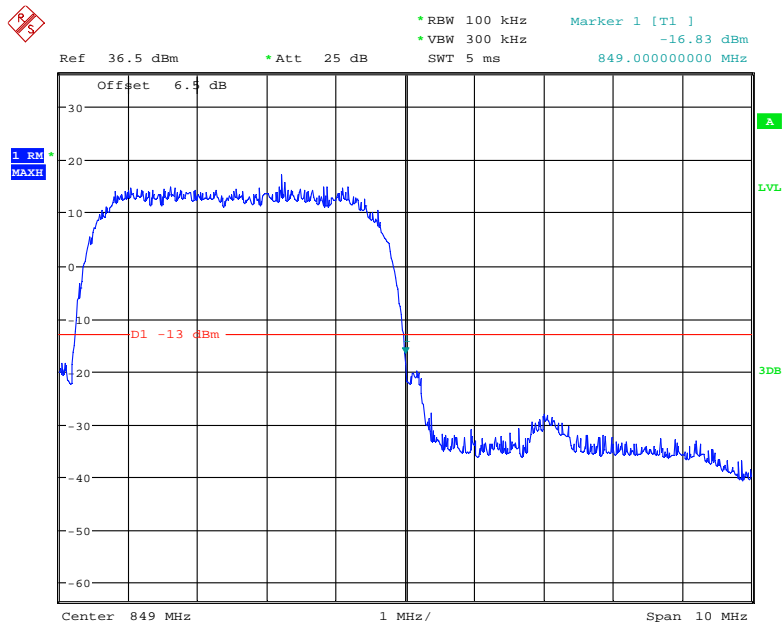
Date: 22.MAY.2020 19:39:03

Cellular Band, Left Band Edge for HSUPA (BPSK) Mode



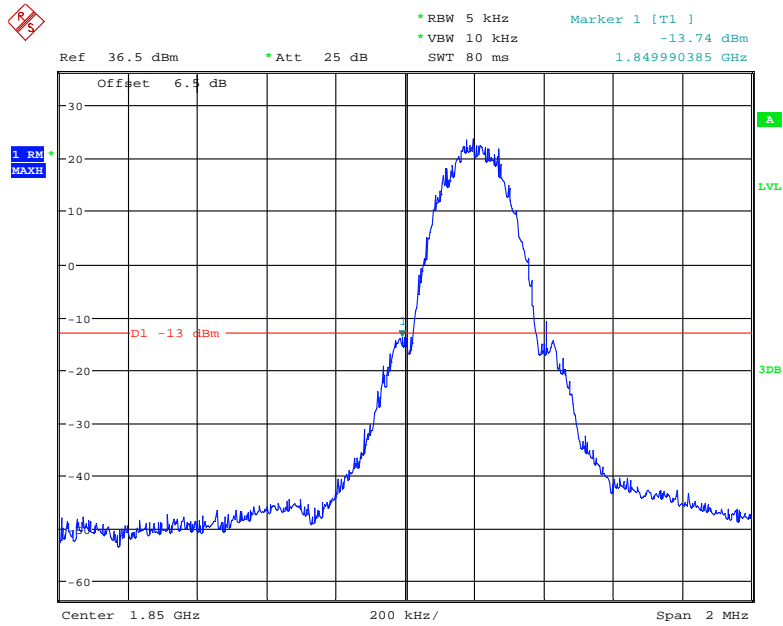
Date: 22.MAY.2020 19:40:45

Cellular Band, Right Band Edge for HSUPA (BPSK) Mode



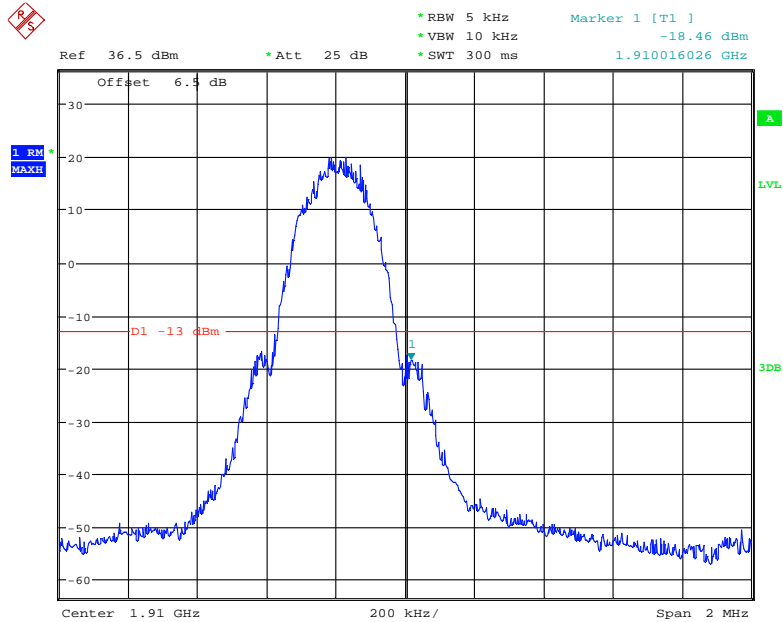
Date: 22.MAY.2020 19:40:19

PCS Band, Left Band Edge for GSM (GMSK) Mode



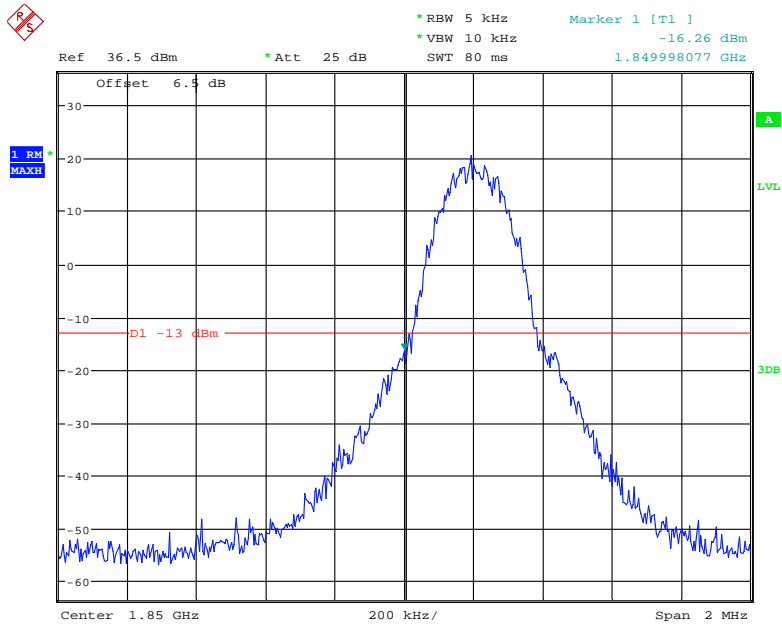
Date: 22.MAY.2020 18:47:38

PCS Band, Right Band Edge for GSM (GMSK) Mode



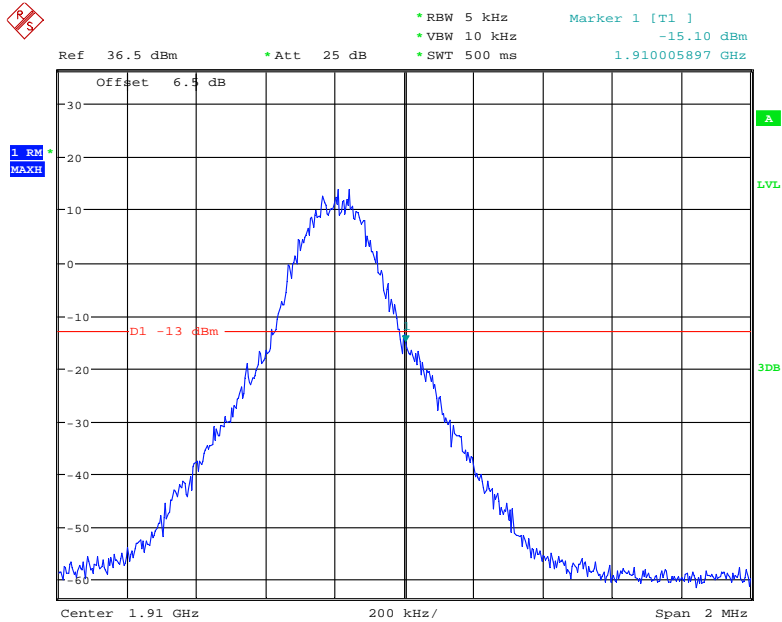
Date: 22.MAY.2020 18:50:56

PCS Band, Left Band Edge for EDGE Mode



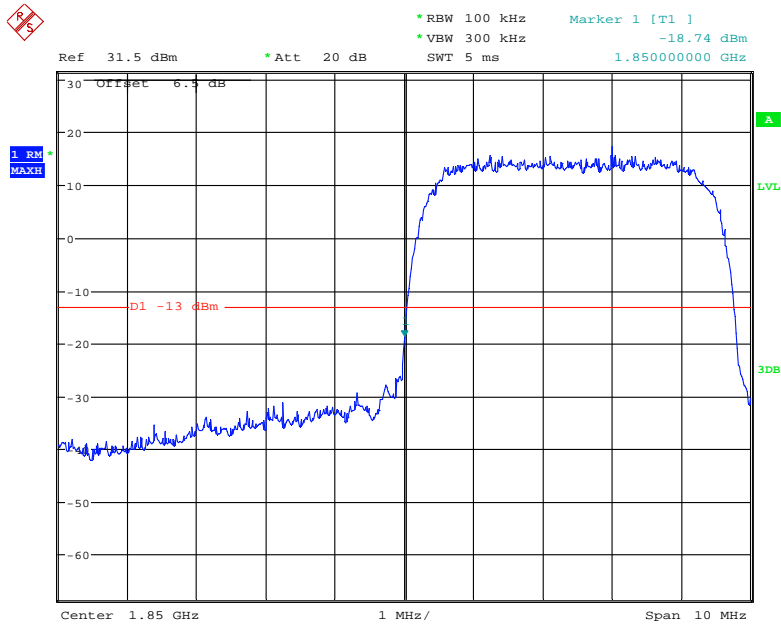
Date: 21.MAY.2020 22:34:31

PCS Band, Right Band Edge for EDGE Mode



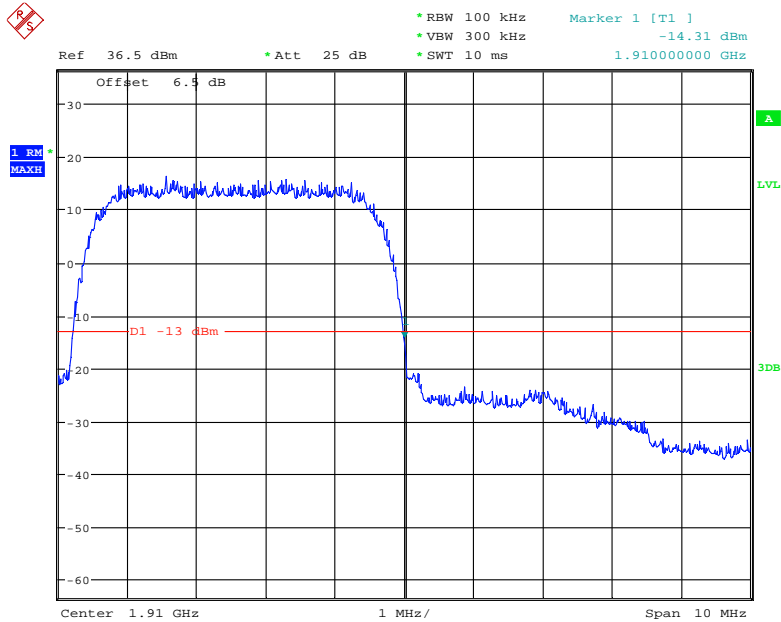
Date: 21.MAY.2020 22:36:10

PCS Band, Left Band Edge for WCDMA (BPSK) Mode



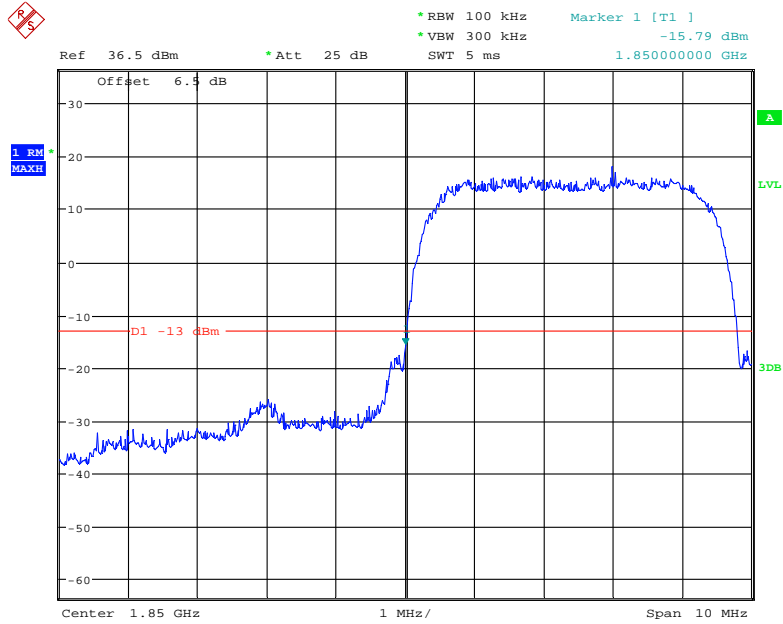
Date: 26.MAY.2020 16:14:20

PCS Band, Right Band Edge for WCDMA (BPSK) Mode



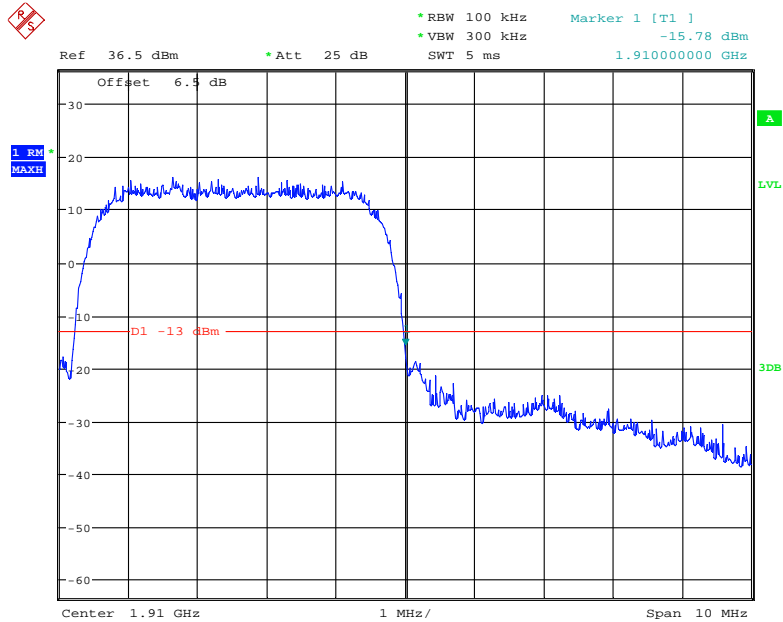
Date: 22.MAY.2020 18:56:27

PCS Band, Left Band Edge for HSDPA (16QAM) Mode



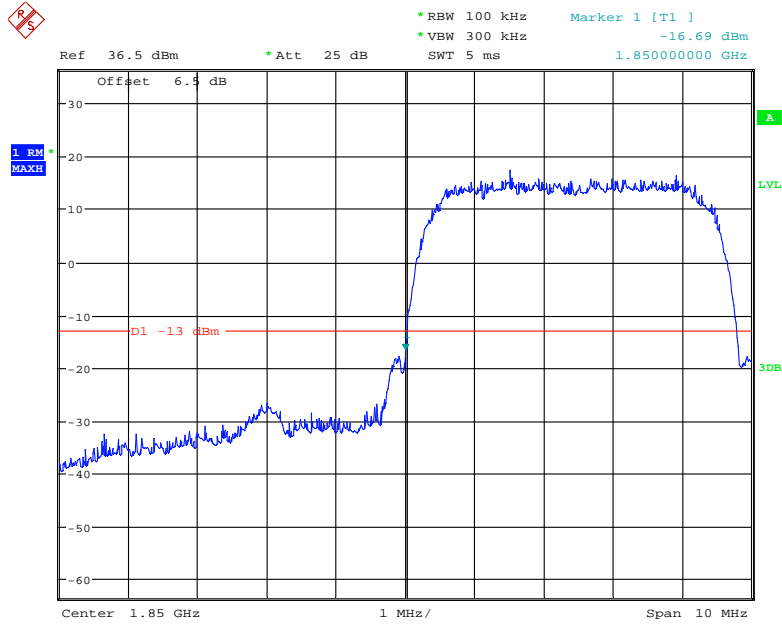
Date: 22.MAY.2020 19:10:30

PCS Band, Right Band Edge for HSDPA (16QAM) Mode



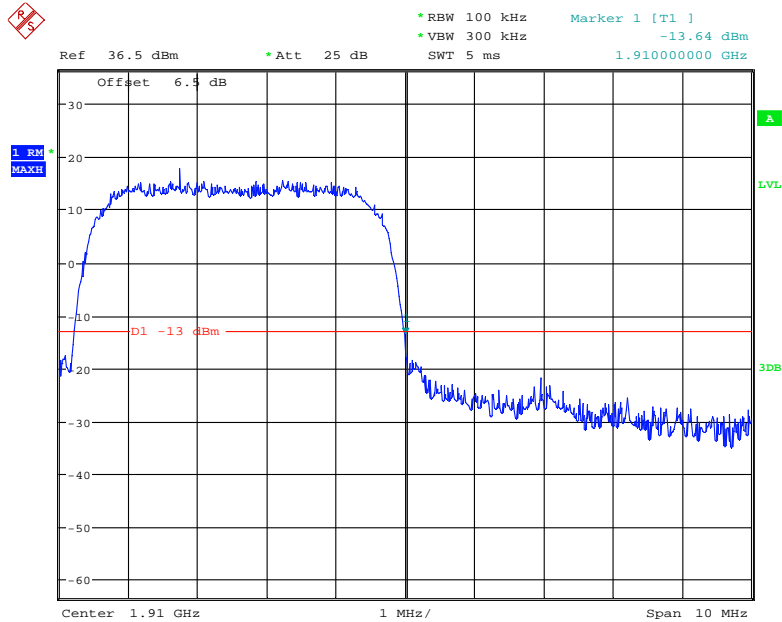
Date: 22.MAY.2020 19:10:56

PCS Band, Left Band Edge for HSUPA (BPSK) Mode



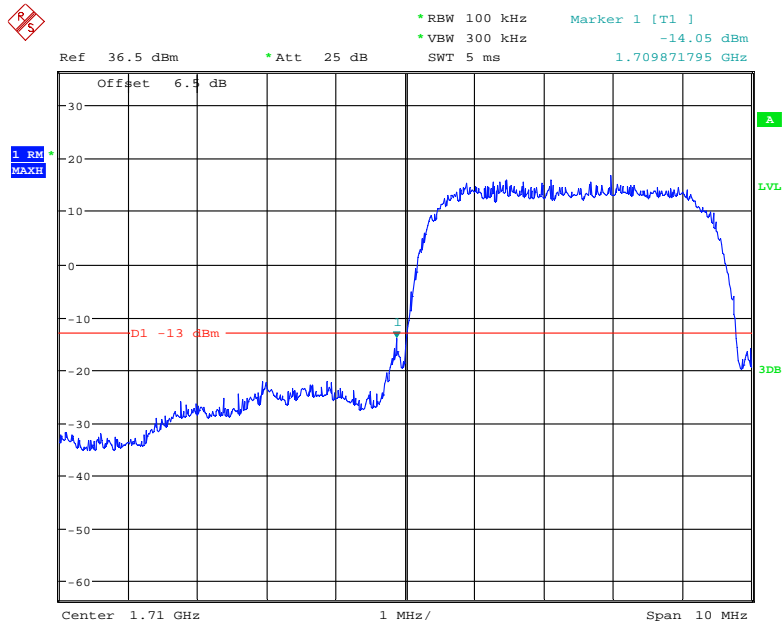
Date: 22.MAY.2020 19:12:45

PCS Band, Right Band Edge for HSUPA (BPSK) Mode



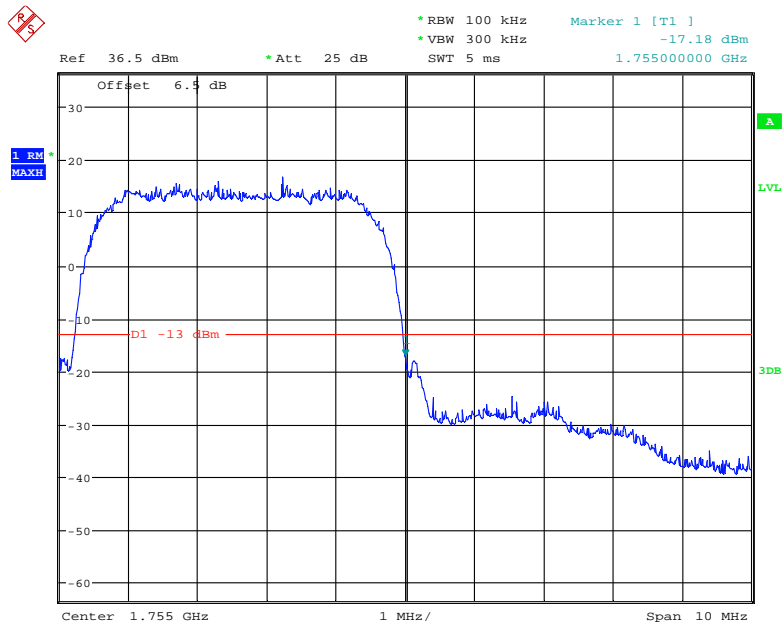
Date: 22.MAY.2020 19:12:07

AWS Band, Left Band Edge for WCDMA (BPSK) Mode



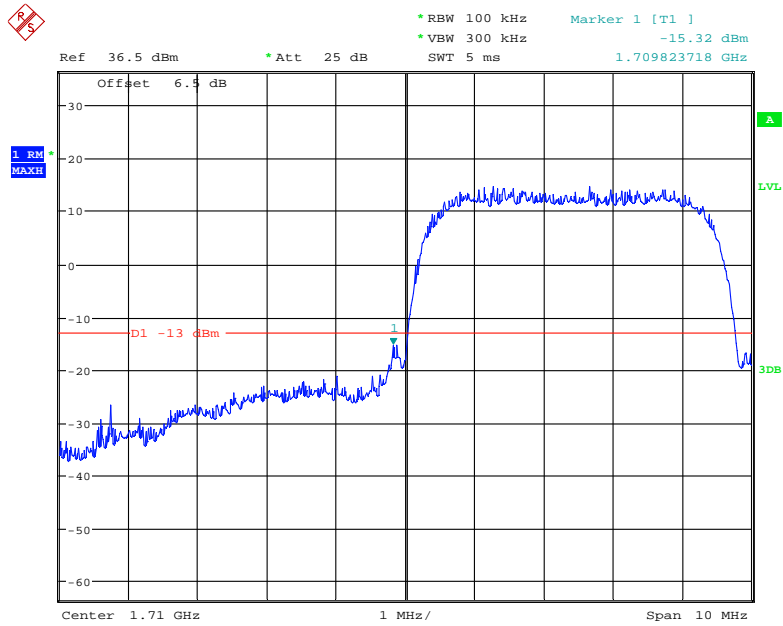
Date: 22.MAY.2020 19:25:45

AWS Band, Right Band Edge for WCDMA (BPSK) Mode



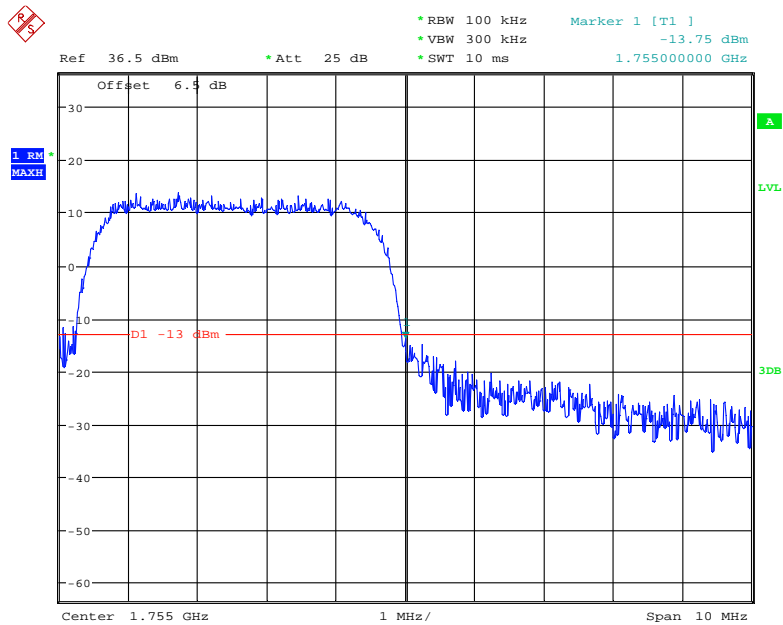
Date: 22.MAY.2020 19:26:40

AWS Band, Left Band Edge for HSDPA (16QAM) Mode



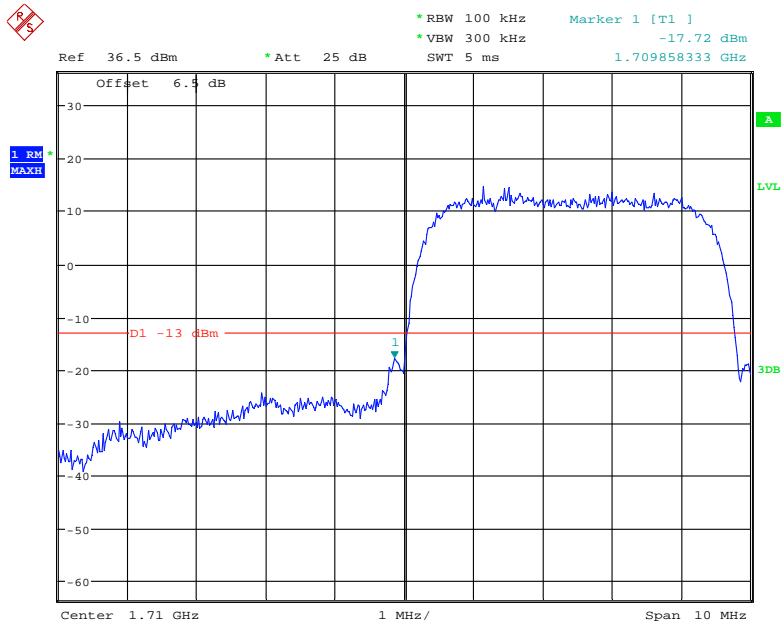
Date: 22.MAY.2020 19:18:48

AWS Band, Right Band Edge for HSDPA (16QAM) Mode



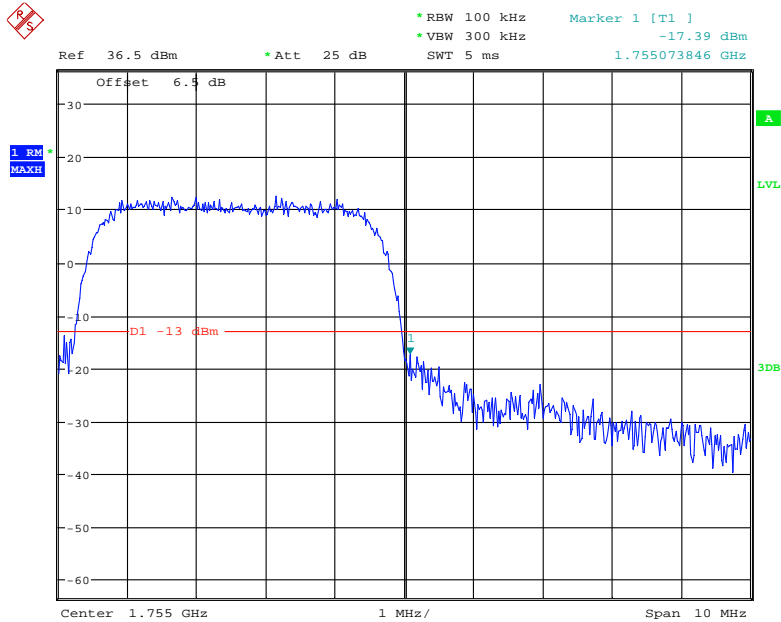
Date: 22.MAY.2020 19:20:35

AWS Band, Left Band Edge for HSUPA (BPSK) Mode



Date: 22.MAY.2020 00:53:28

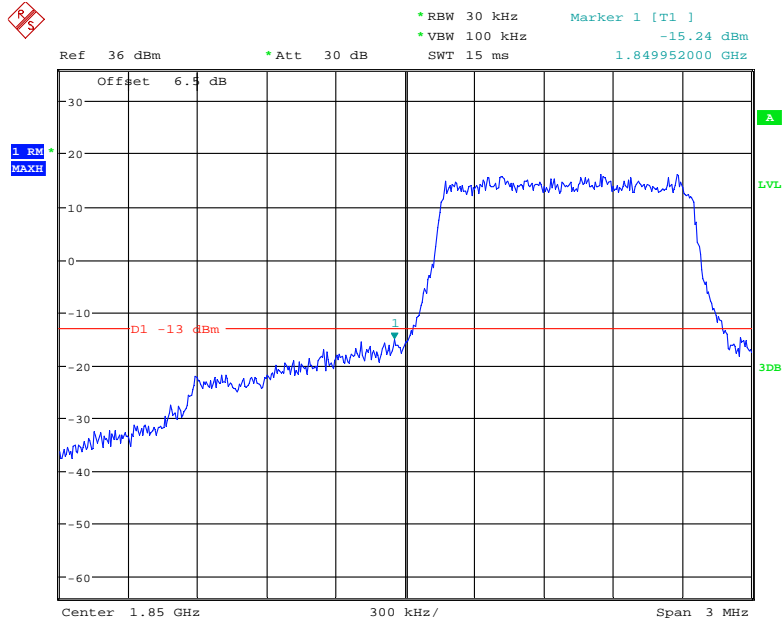
AWS Band, Right Band Edge for HSUPA (BPSK) Mode



Date: 22.MAY.2020 00:53:56

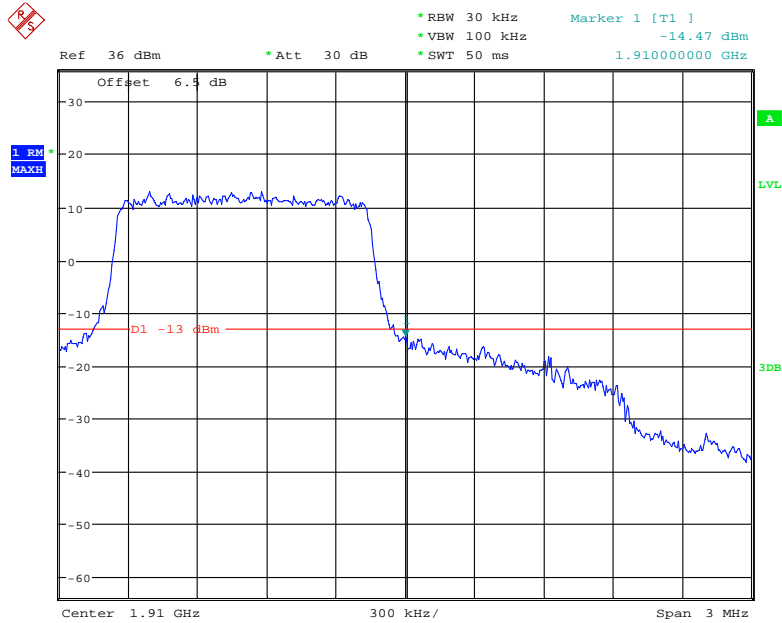
Band 2:

QPSK (1.4 MHz, FULL RB) - Left Band Edge



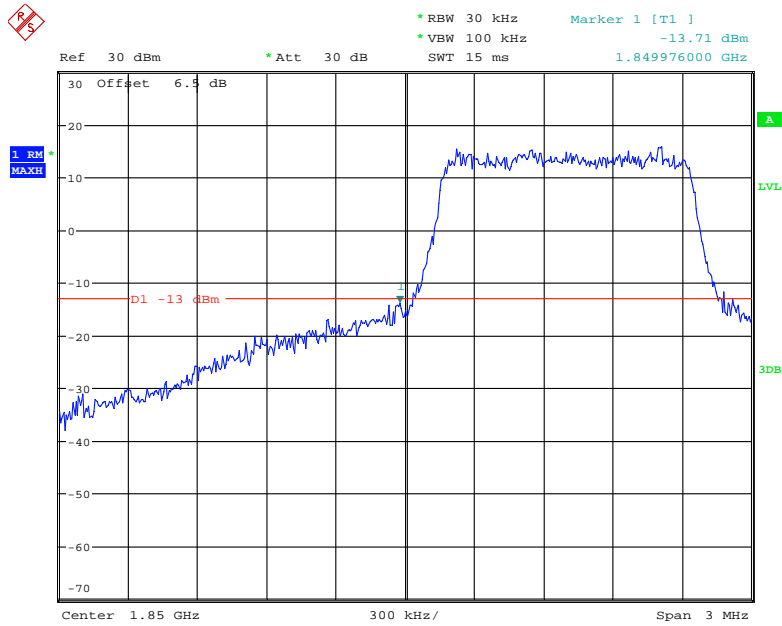
Date: 22.MAY.2020 13:15:00

QPSK (1.4 MHz, FULL RB) - Right Band Edge



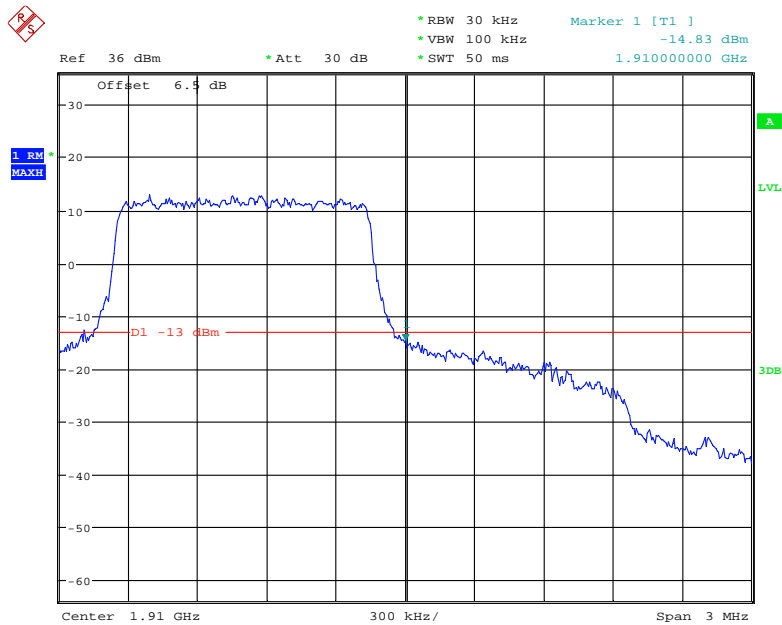
Date: 22.MAY.2020 13:13:10

16-QAM (1.4 MHz, FULL RB) - Left Band Edge



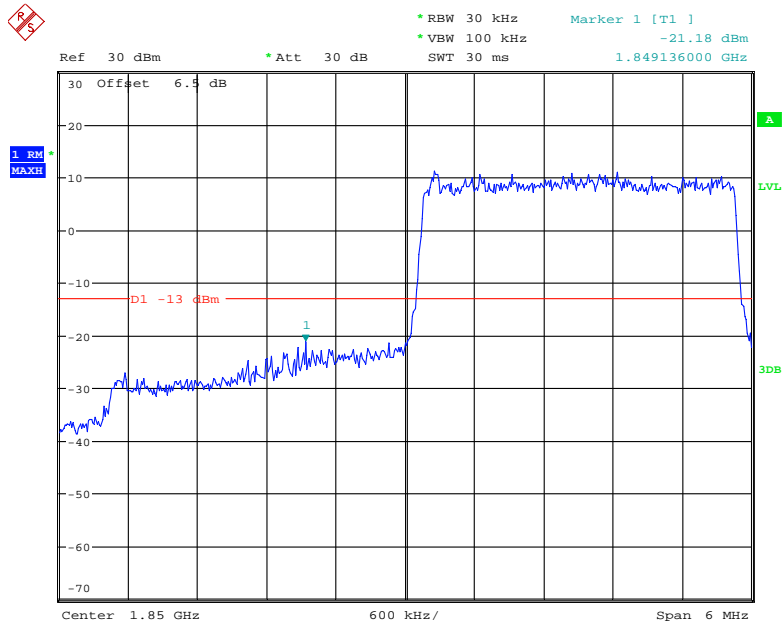
Date: 21.MAY.2020 15:45:21

16-QAM (1.4 MHz, FULL RB) - Right Band Edge



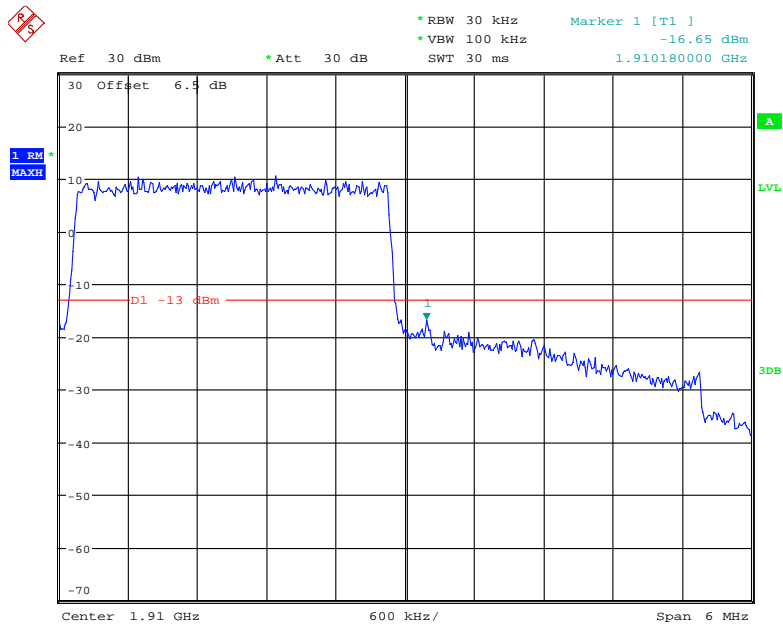
Date: 22.MAY.2020 13:13:57

QPSK (3.0 MHz, FULL RB) - Left Band Edge



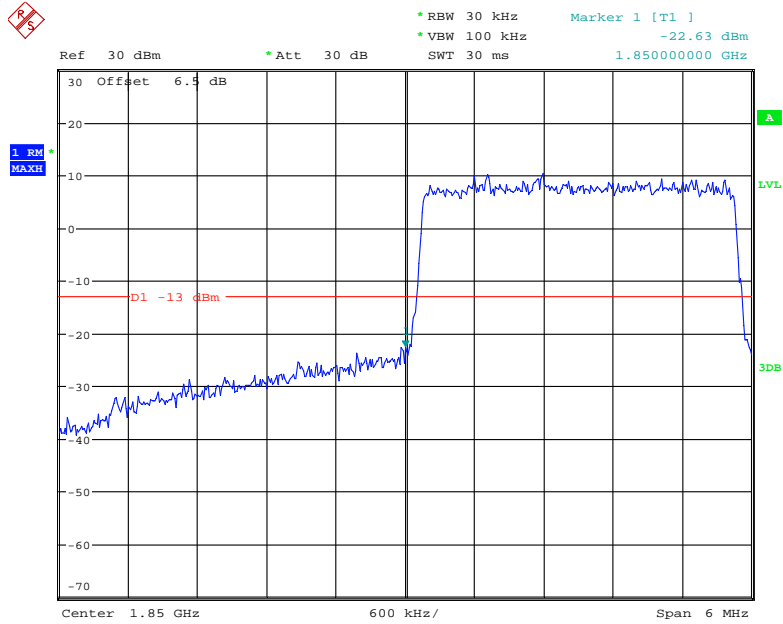
Date: 21.MAY.2020 15:46:23

QPSK (3.0 MHz, FULL RB) - Right Band Edge



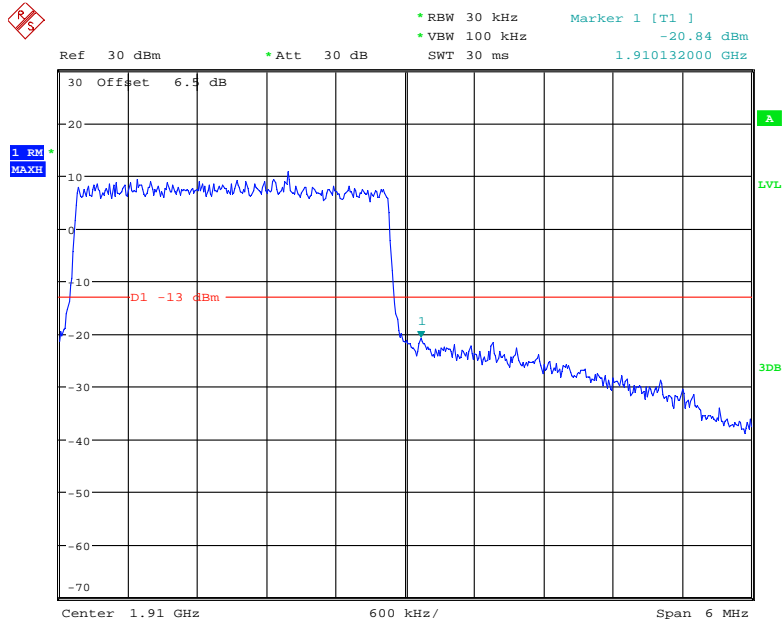
Date: 21.MAY.2020 15:47:00

16-QAM (3.0 MHz, FULL RB) - Left Band Edge



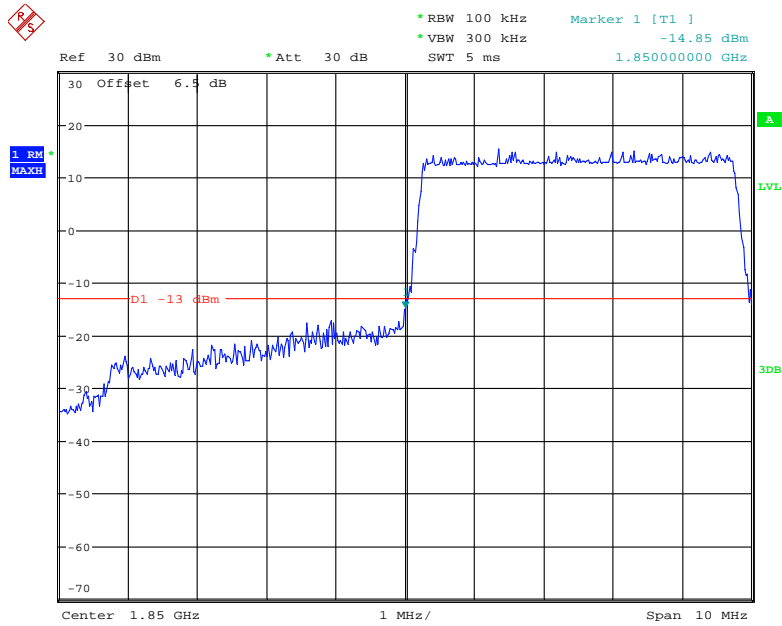
Date: 21.MAY.2020 15:46:42

16-QAM (3.0 MHz, FULL RB) - Right Band Edge



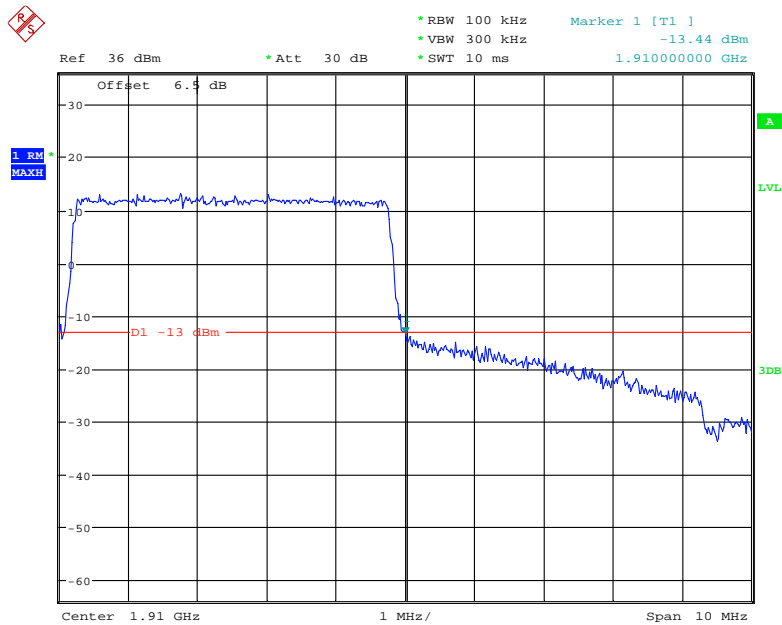
Date: 21.MAY.2020 15:47:19

QPSK (5.0 MHz, FULL RB) - Left Band Edge



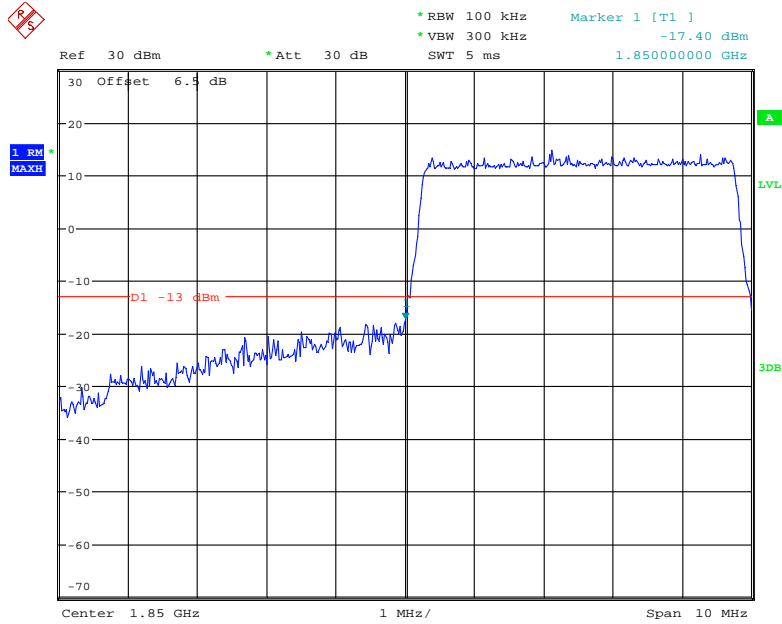
Date: 21.MAY.2020 15:47:38

QPSK (5.0 MHz, FULL RB) - Right Band Edge



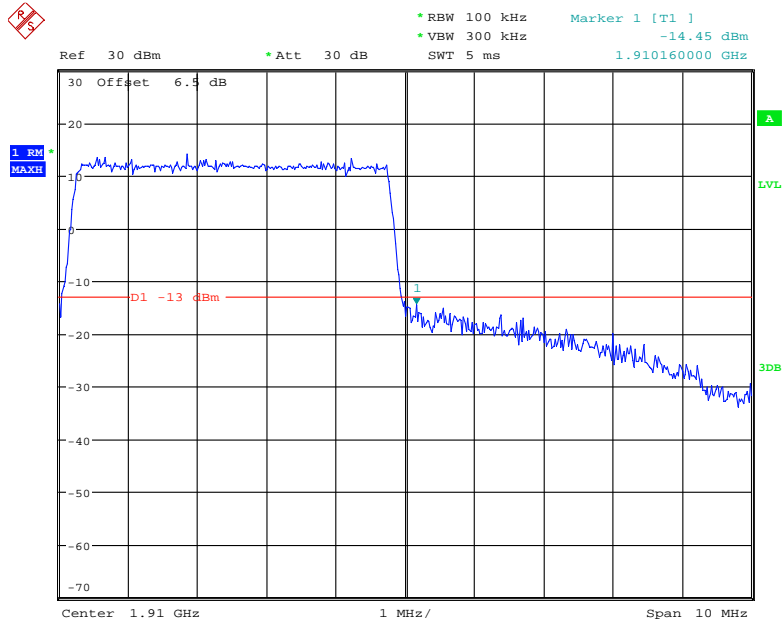
Date: 22.MAY.2020 13:11:22

16-QAM (5.0 MHz, FULL RB) - Left Band Edge



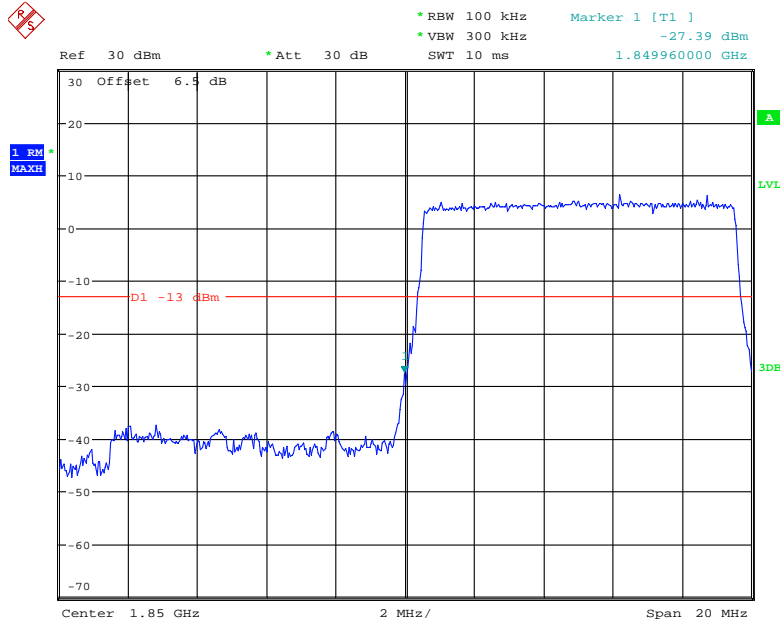
Date: 21.MAY.2020 15:47:58

16-QAM (5.0 MHz, FULL RB) - Right Band Edge



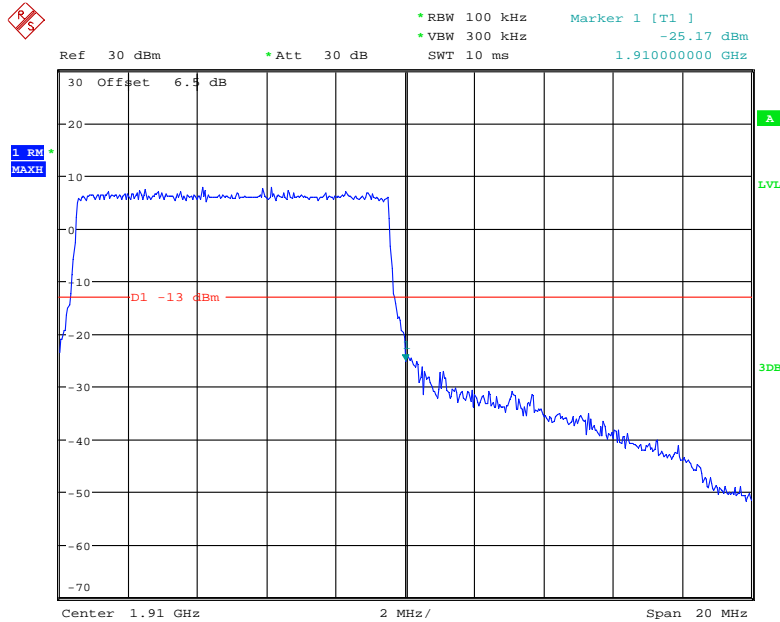
Date: 21.MAY.2020 15:48:35

QPSK (10.0 MHz, FULL RB) - Left Band Edge



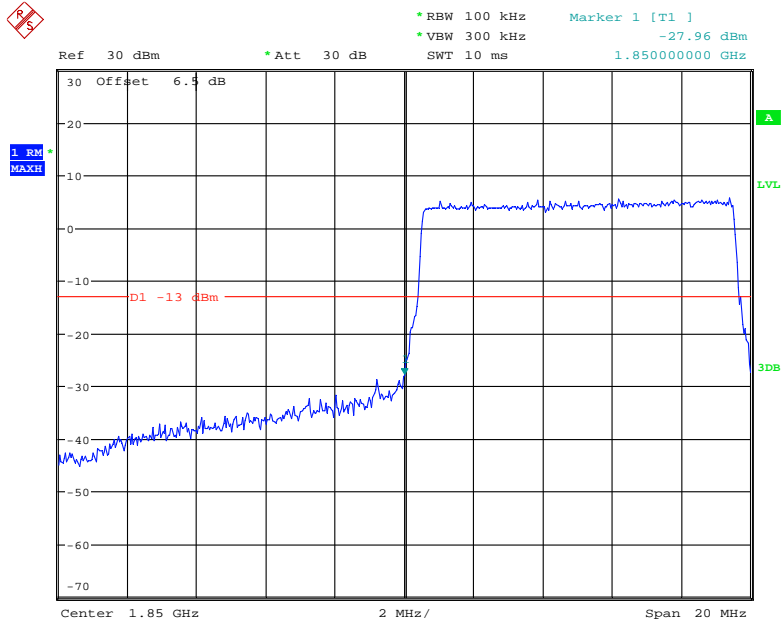
Date: 9.AUG.2020 14:32:26

QPSK (10.0 MHz, FULL RB) - Right Band Edge



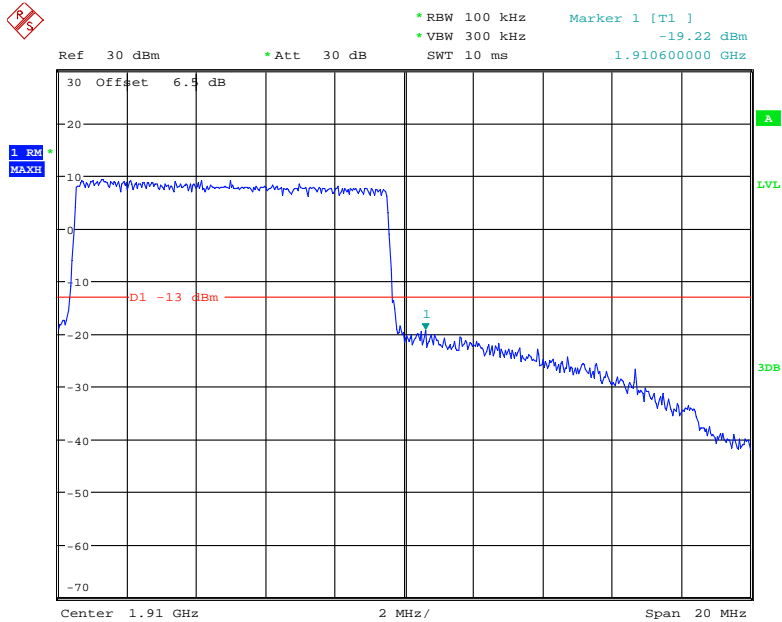
Date: 27.MAY.2020 11:16:01

16-QAM (10.0 MHz, FULL RB) - Left Band Edge



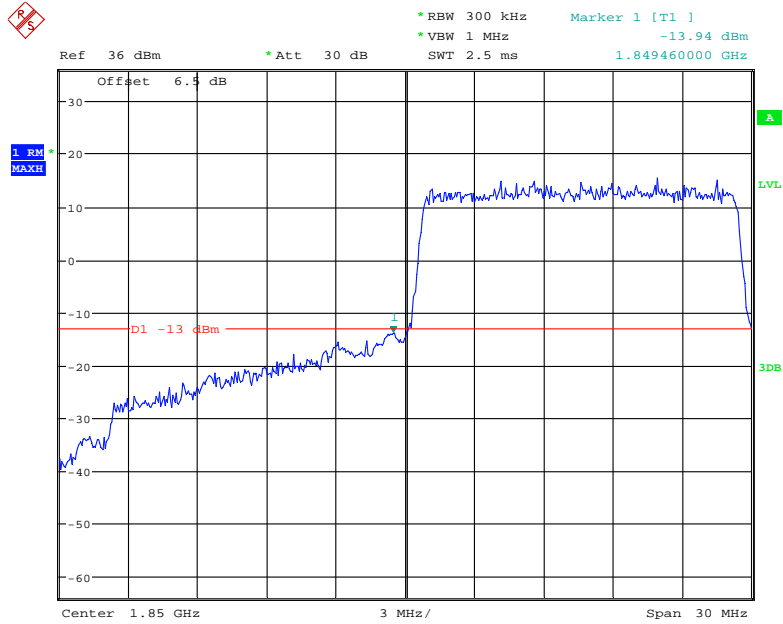
Date: 27.MAY.2020 11:14:55

16-QAM (10.0 MHz, FULL RB) - Right Band Edge



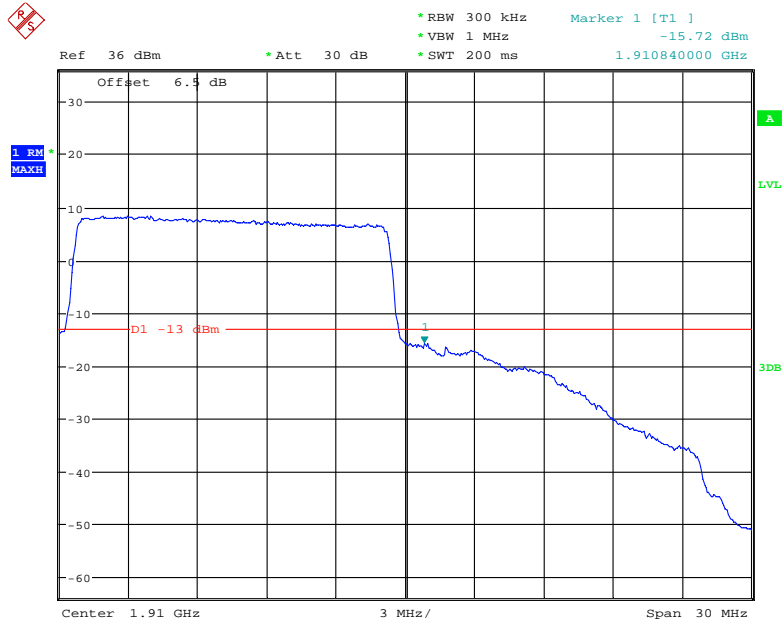
Date: 21.MAY.2020 15:49:49

QPSK (15.0 MHz, FULL RB) - Left Band Edge



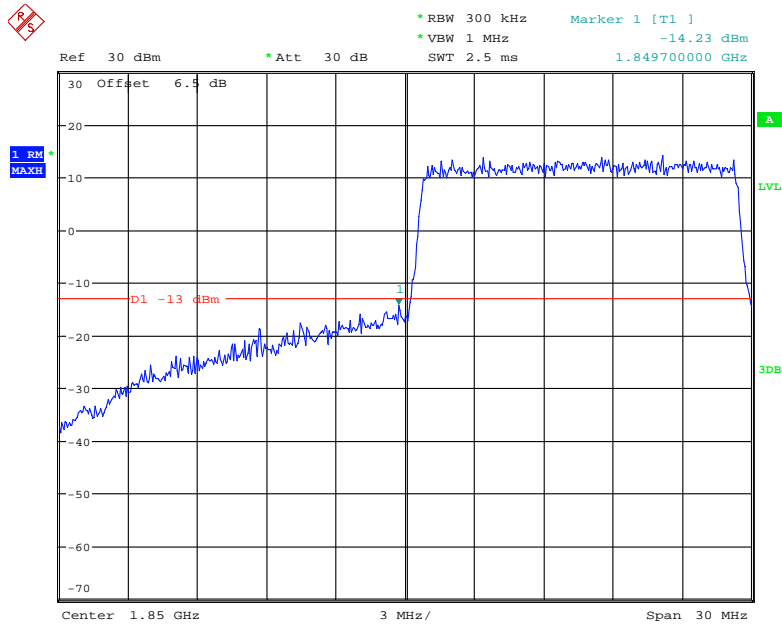
Date: 22.MAY.2020 13:09:33

QPSK (15.0 MHz, FULL RB) - Right Band Edge



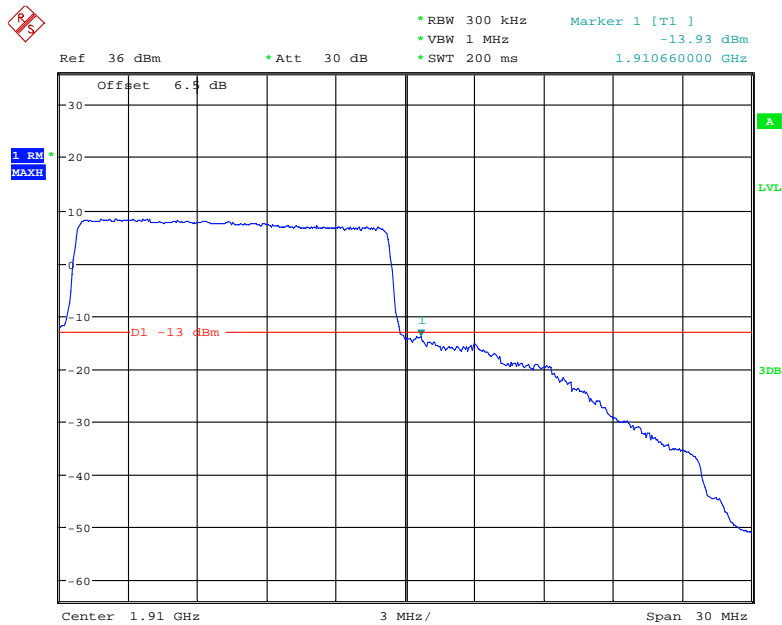
Date: 22.MAY.2020 13:08:01

16-QAM (15.0 MHz, FULL RB) - Left Band Edge



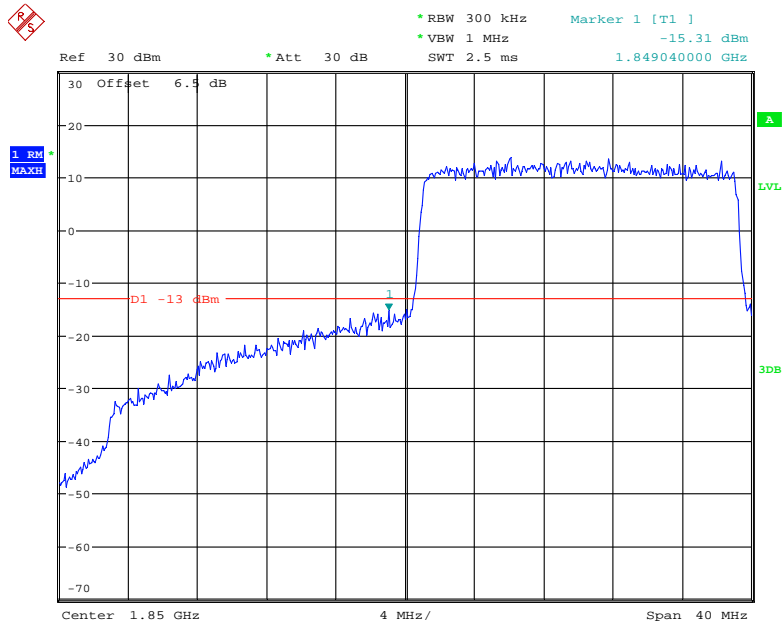
Date: 21.MAY.2020 15:50:36

16-QAM (15.0 MHz, FULL RB) - Right Band Edge



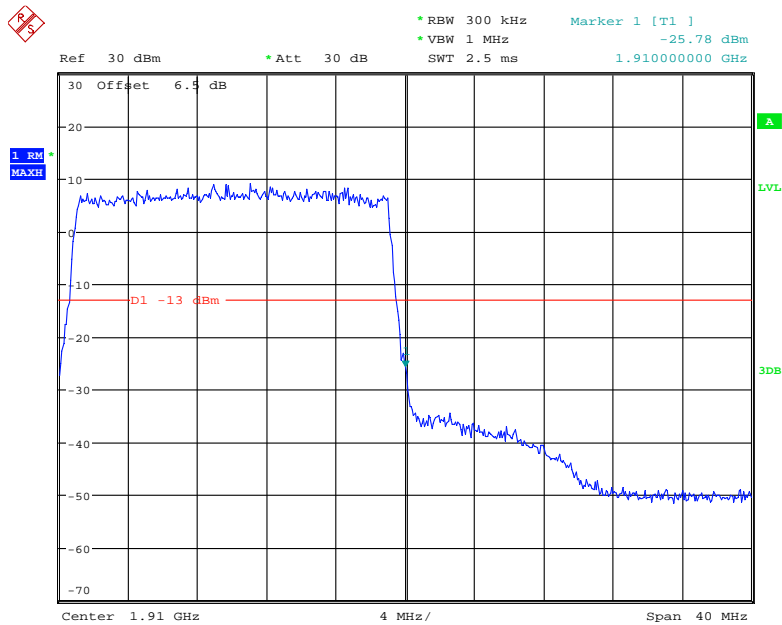
Date: 22.MAY.2020 13:07:32

QPSK (20.0 MHz, FULL RB) - Left Band Edge



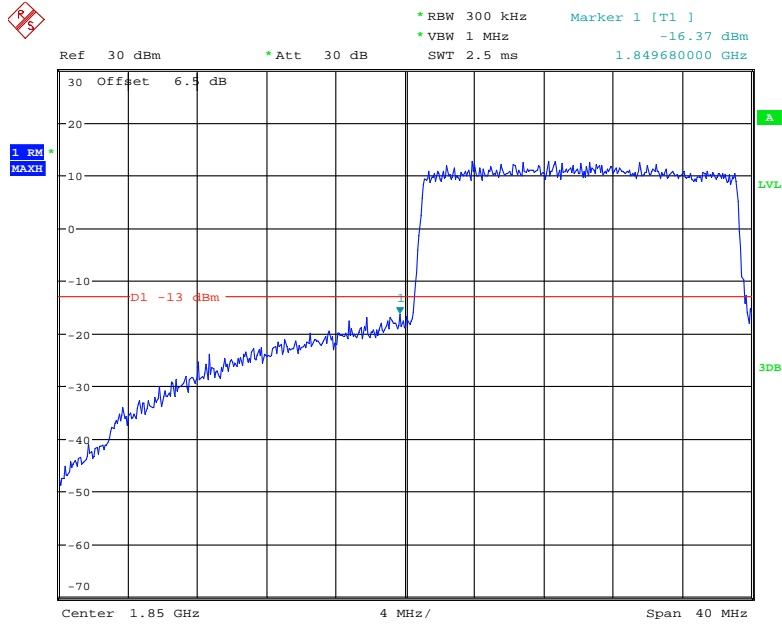
Date: 21.MAY.2020 15:51:42

QPSK (20.0 MHz, FULL RB) - Right Band Edge



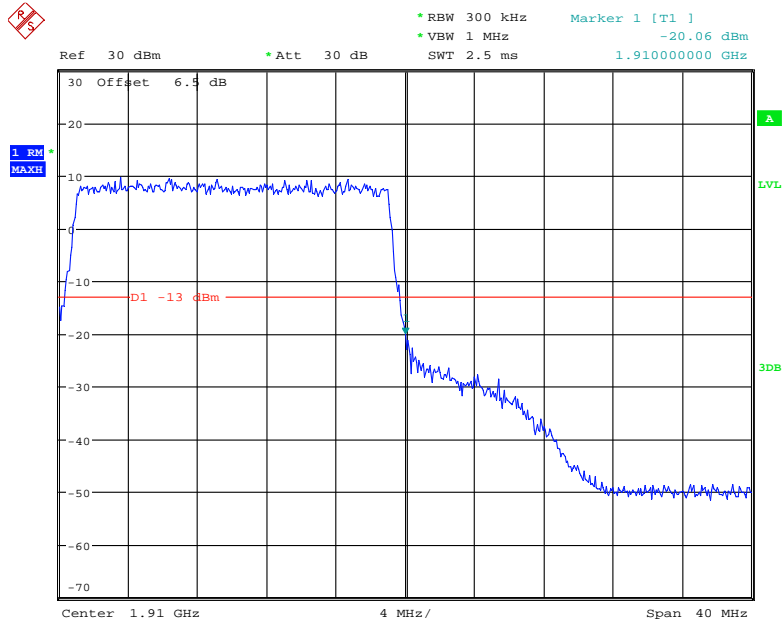
Date: 9.AUG.2020 14:35:42

16-QAM (20.0 MHz, FULL RB) - Left Band Edge



Date: 21.MAY.2020 15:52:05

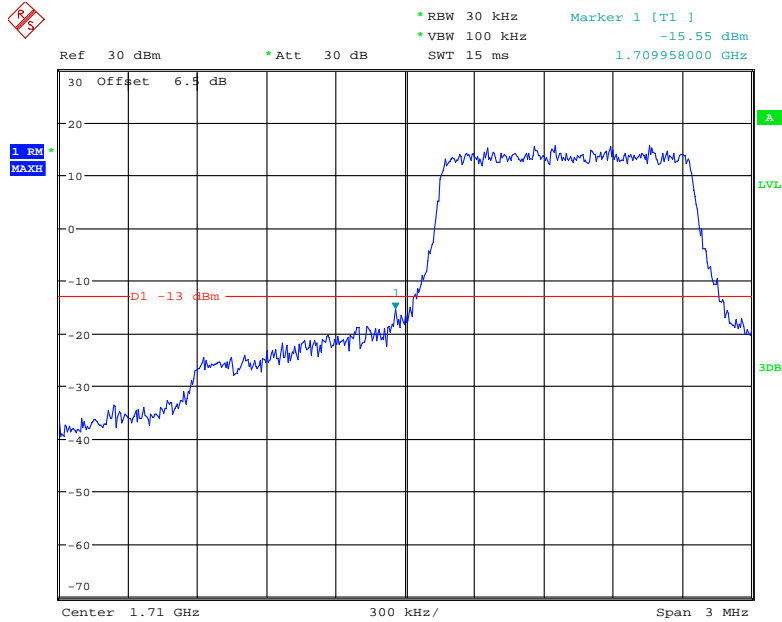
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 27.MAY.2020 10:04:18

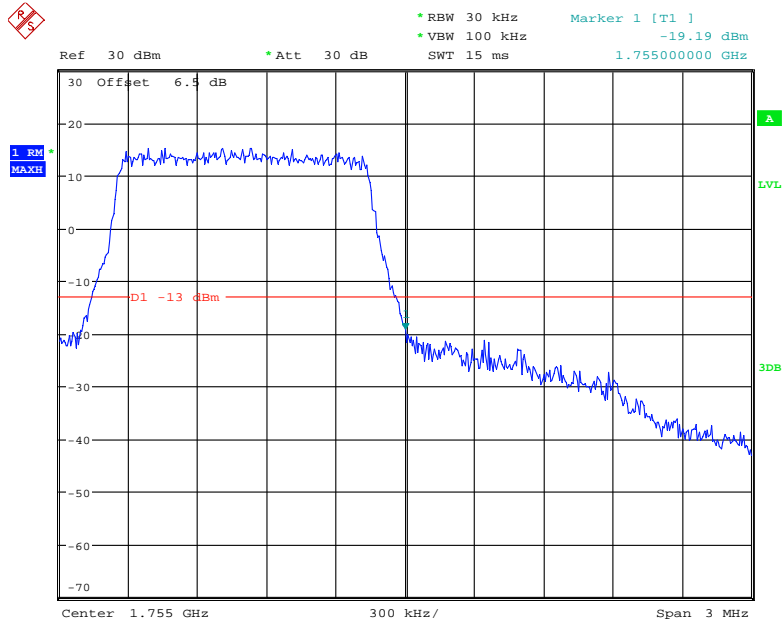
Band 4:

QPSK (1.4 MHz, FULL RB) - Left Band Edge



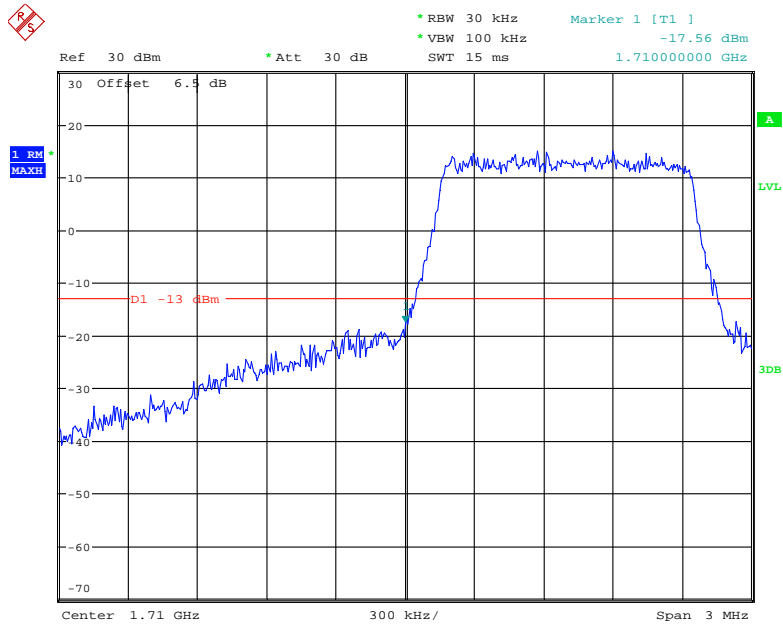
Date: 21.MAY.2020 15:53:11

QPSK (1.4 MHz, FULL RB) - Right Band Edge



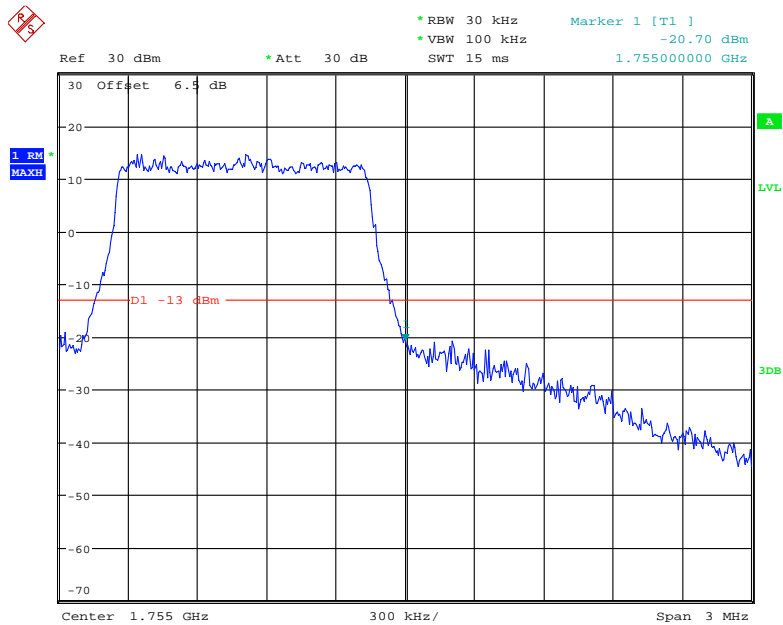
Date: 21.MAY.2020 15:53:51

16-QAM (1.4 MHz, FULL RB) - Left Band Edge



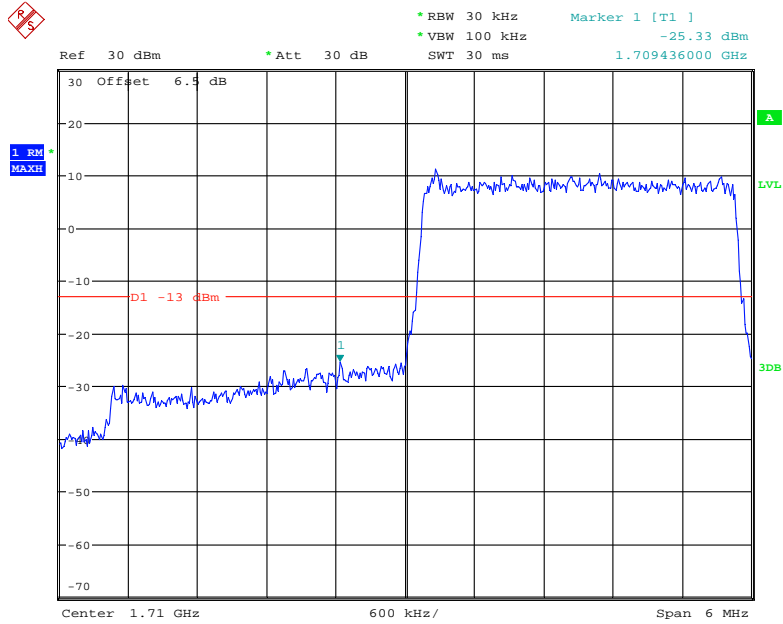
Date: 21.MAY.2020 15:53:31

16-QAM (1.4 MHz, FULL RB) - Right Band Edge



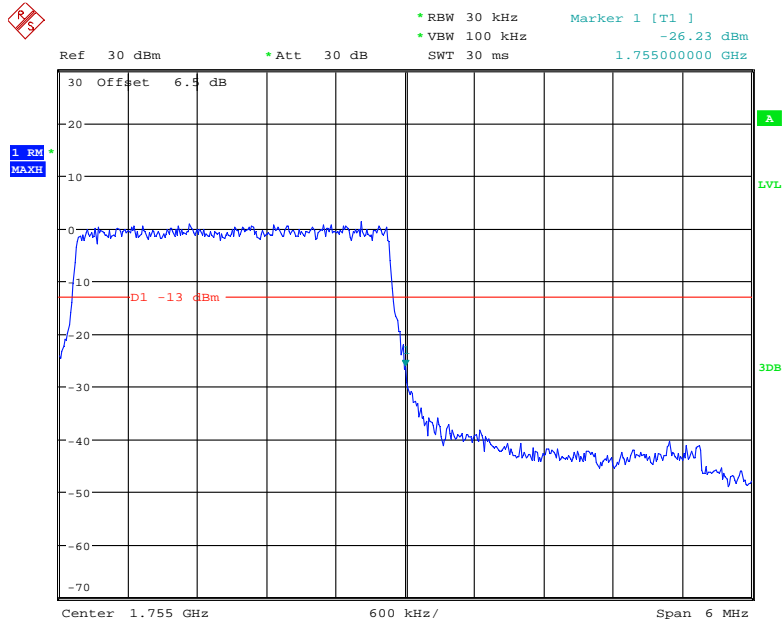
Date: 21.MAY.2020 15:54:11

QPSK (3.0 MHz, FULL RB) - Left Band Edge



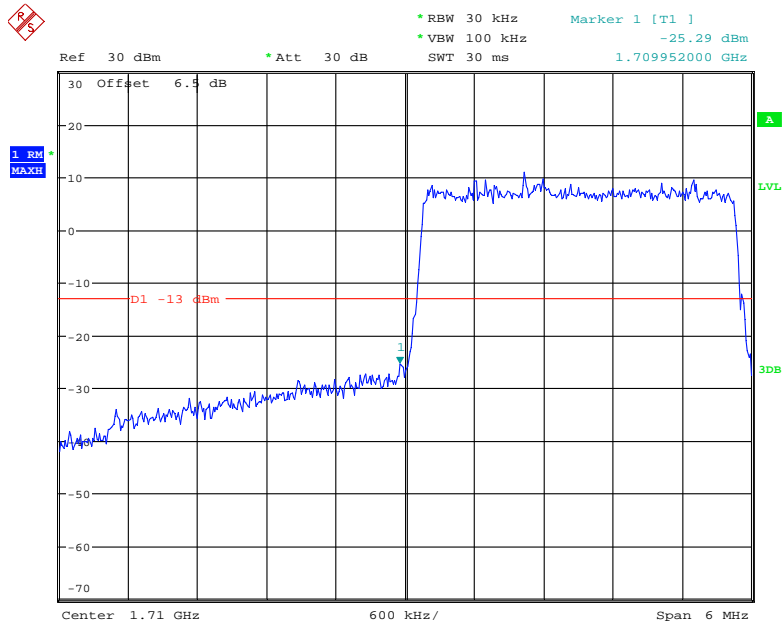
Date: 21.MAY.2020 15:54:30

QPSK (3.0 MHz, FULL RB) - Right Band Edge



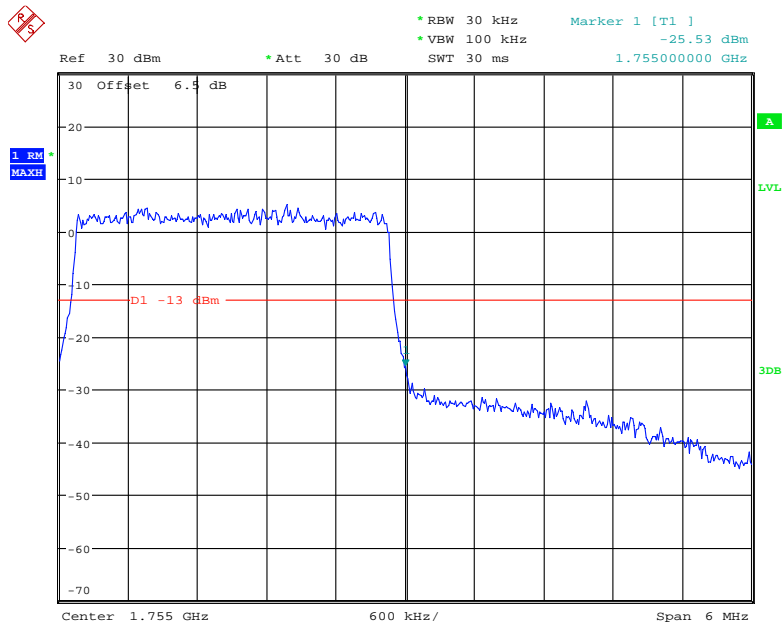
Date: 27.MAY.2020 10:06:27

16-QAM (3.0 MHz, FULL RB) - Left Band Edge



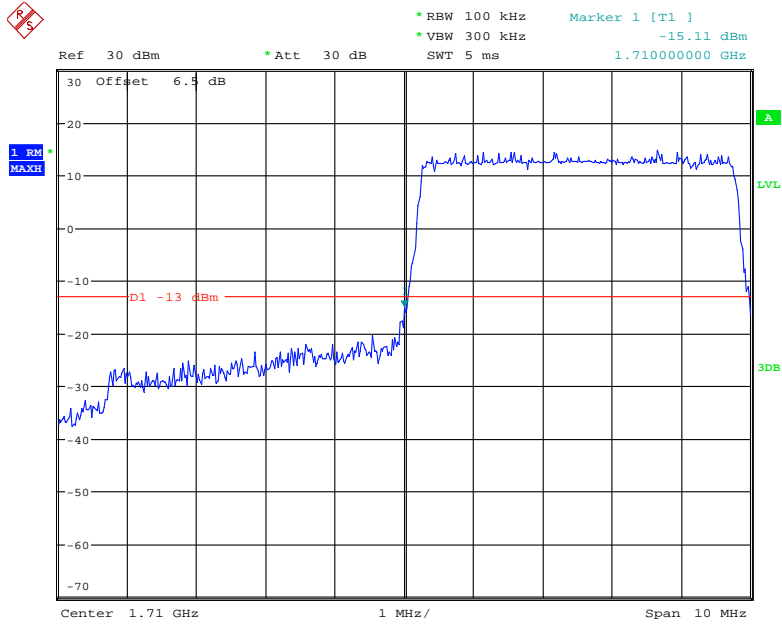
Date: 21.MAY.2020 15:54:47

16-QAM (3.0 MHz, FULL RB) - Right Band Edge



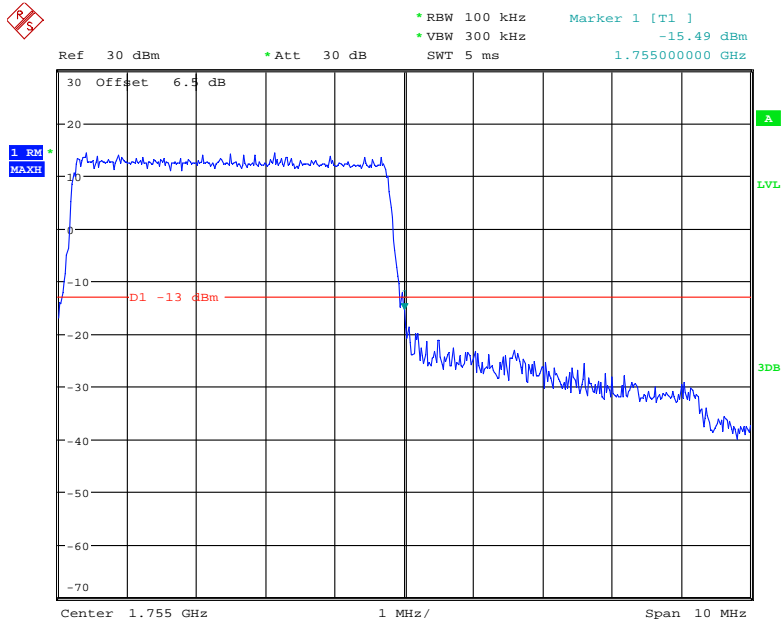
Date: 9.AUG.2020 14:38:26

QPSK (5.0 MHz, FULL RB) - Left Band Edge



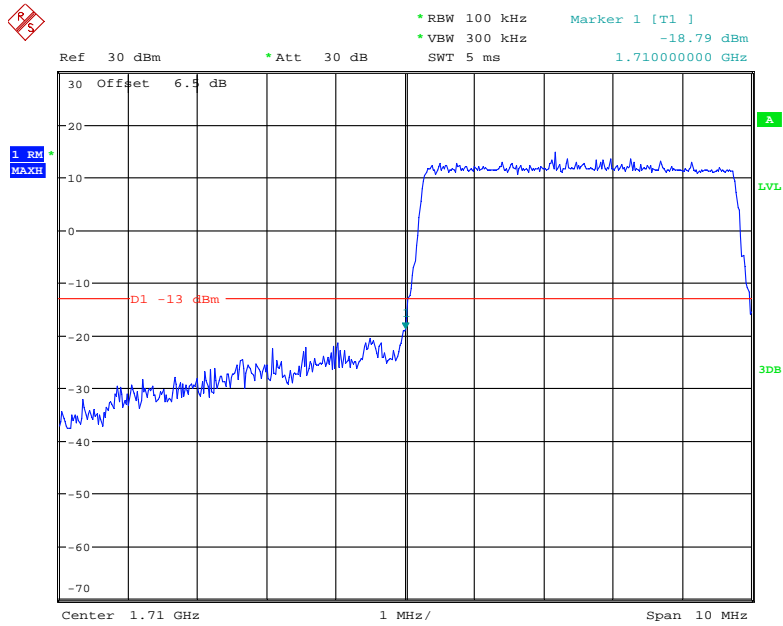
Date: 21.MAY.2020 15:55:43

QPSK (5.0 MHz, FULL RB) - Right Band Edge



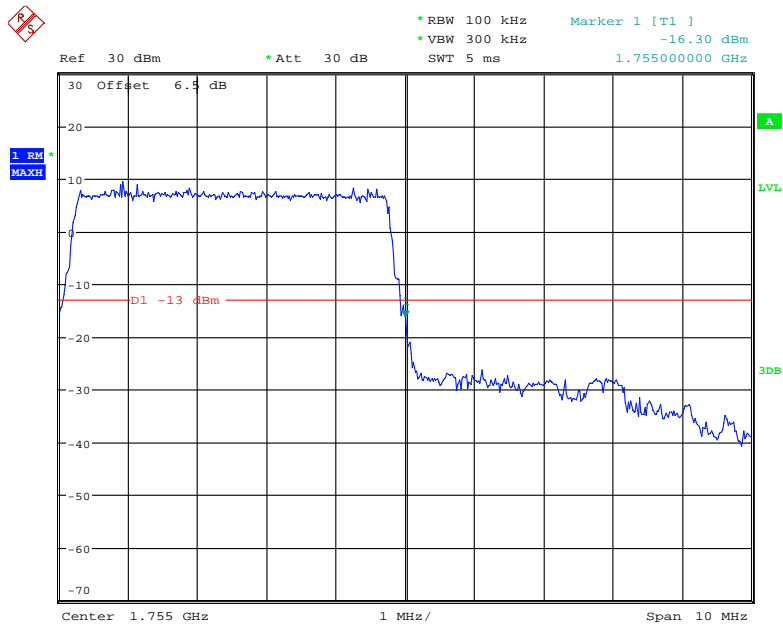
Date: 21.MAY.2020 15:56:20

16-QAM (5.0 MHz, FULL RB) - Left Band Edge



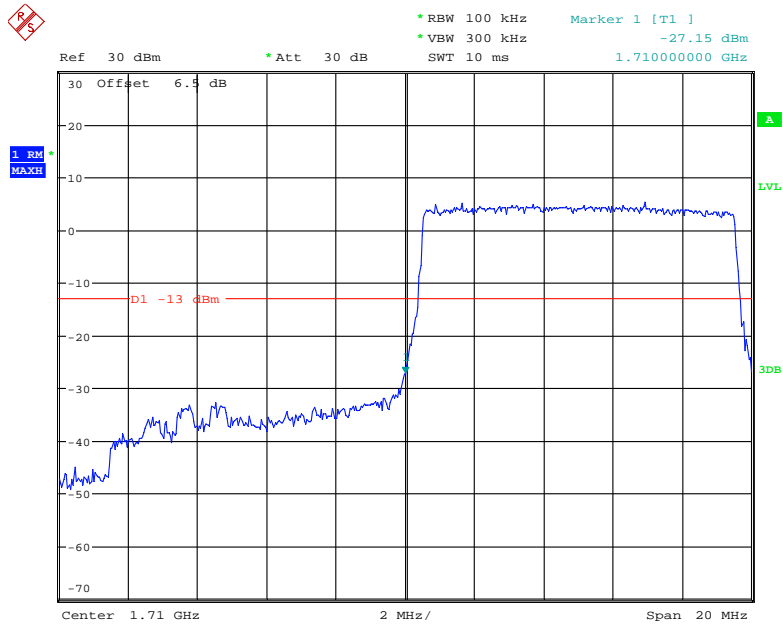
Date: 21.MAY.2020 15:56:03

16-QAM (5.0 MHz, FULL RB) - Right Band Edge



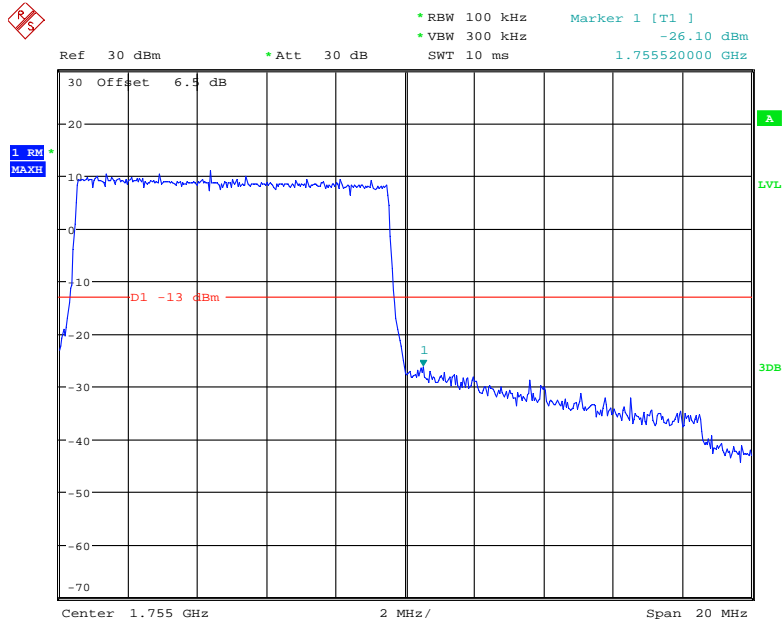
Date: 9.AUG.2020 14:39:33

QPSK (10.0 MHz, FULL RB) - Left Band Edge



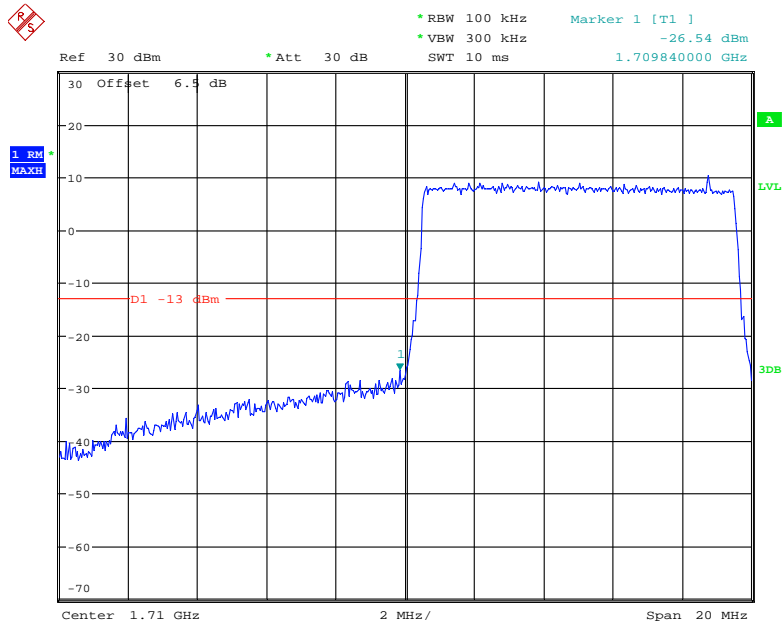
Date: 9.AUG.2020 14:39:54

QPSK (10.0 MHz, FULL RB) - Right Band Edge



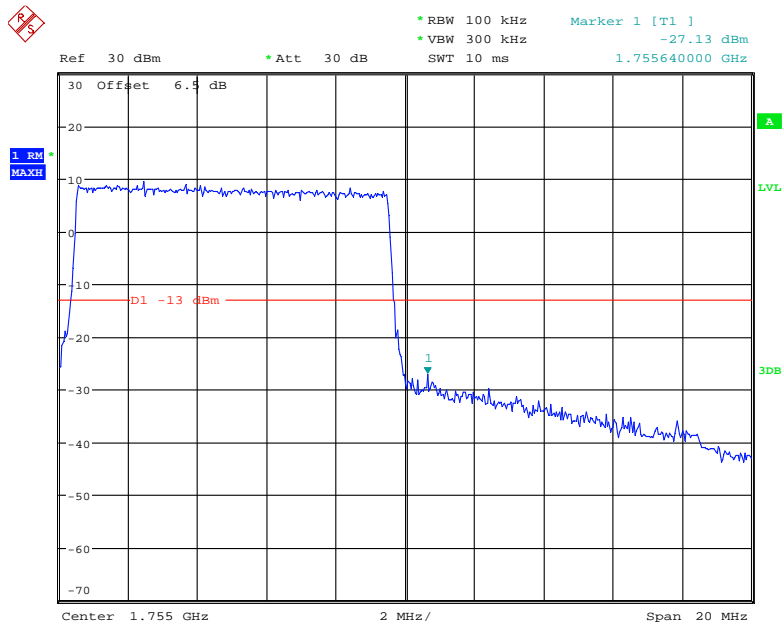
Date: 21.MAY.2020 15:57:39

16-QAM (10.0 MHz, FULL RB) - Left Band Edge



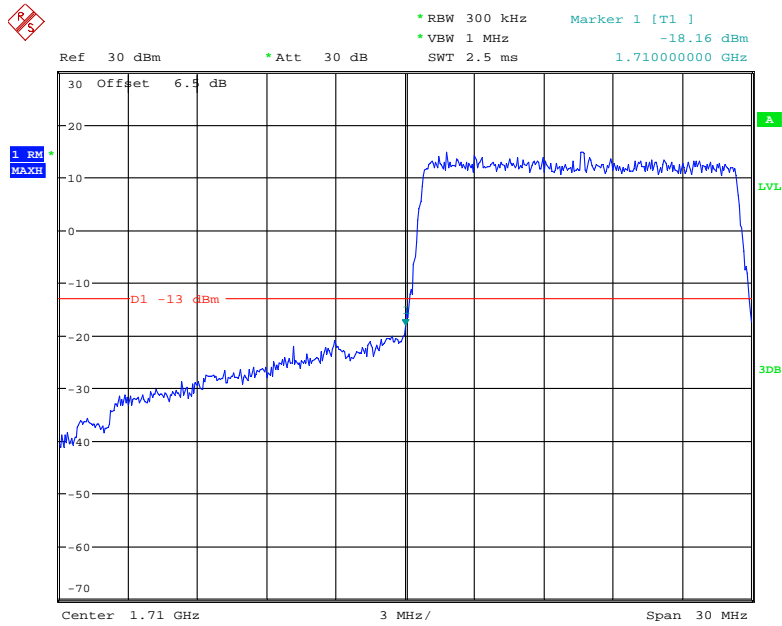
Date: 21.MAY.2020 15:57:20

16-QAM (10.0 MHz, FULL RB) - Right Band Edge



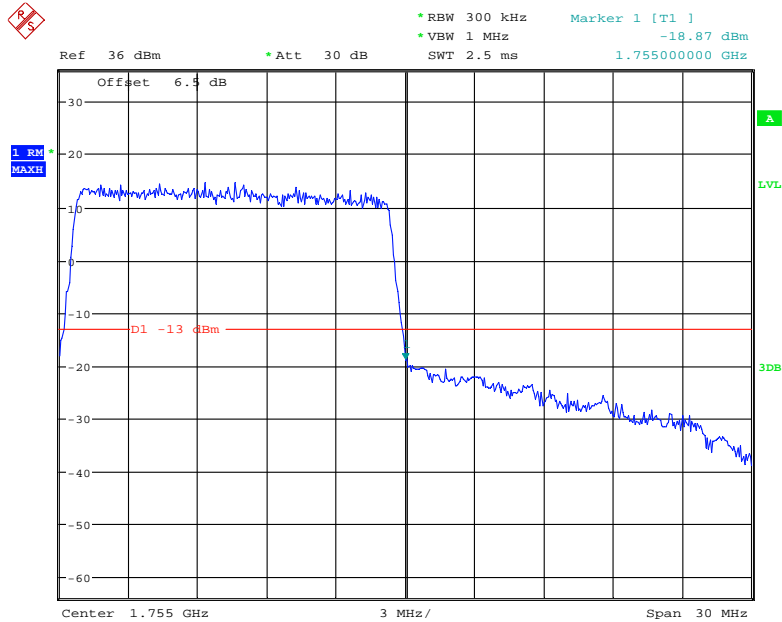
Date: 21.MAY.2020 15:57:56

QPSK (15.0 MHz, FULL RB) - Left Band Edge



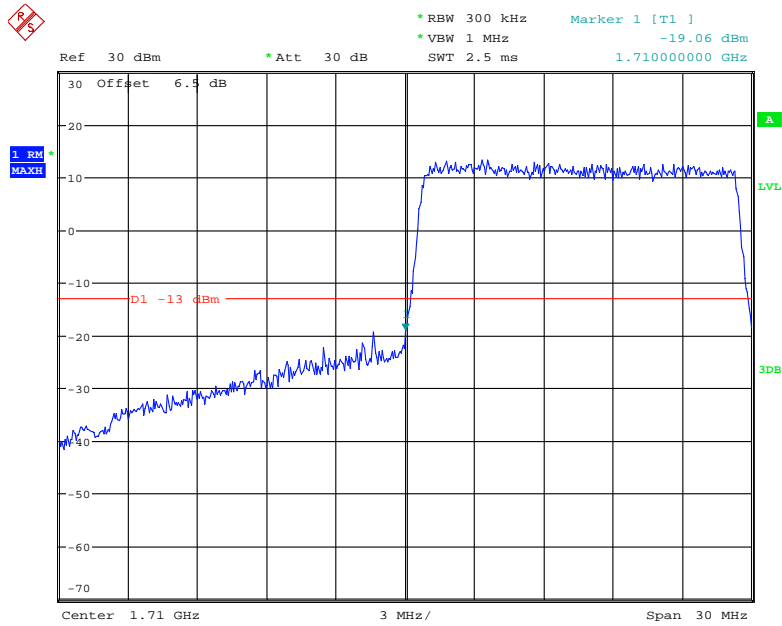
Date: 21.MAY.2020 15:58:19

QPSK (15.0 MHz, FULL RB) - Right Band Edge



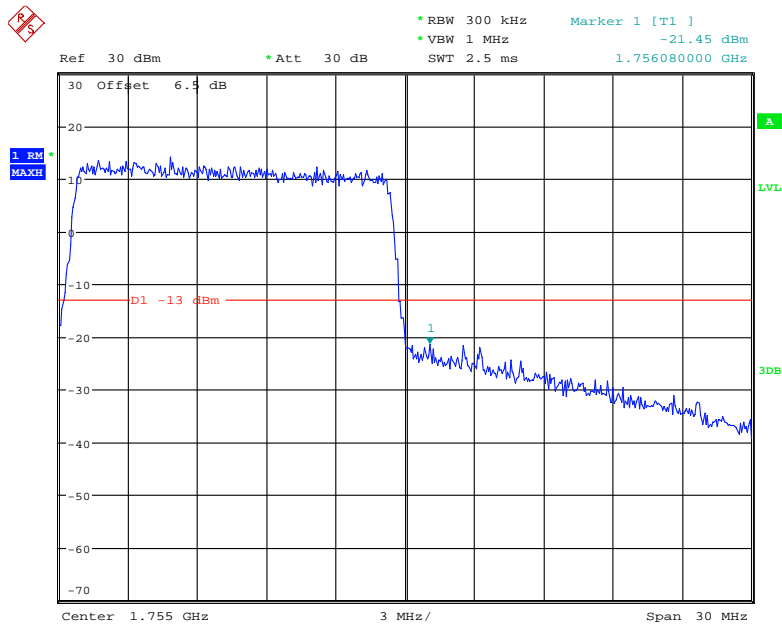
Date: 22.MAY.2020 11:55:48

16-QAM (15.0 MHz, FULL RB) - Left Band Edge



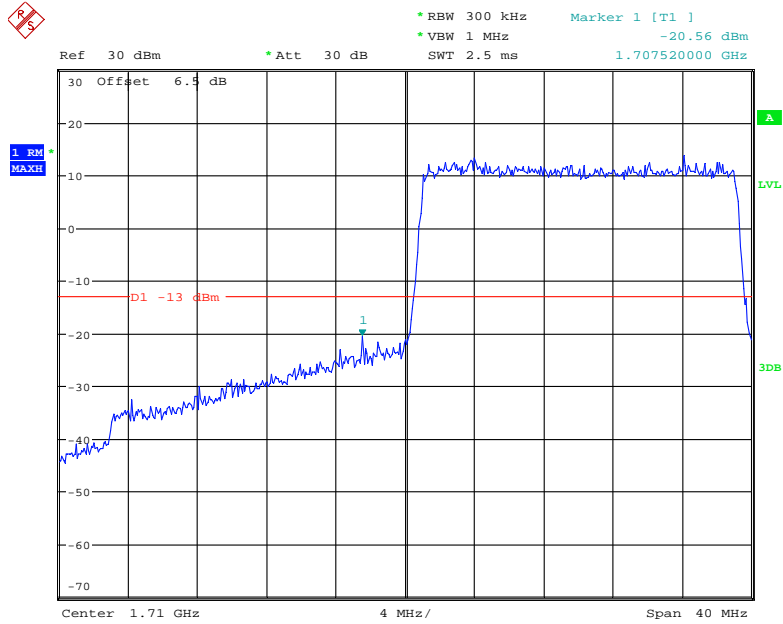
Date: 21.MAY.2020 15:58:42

16-QAM (15.0 MHz, FULL RB) - Right Band Edge



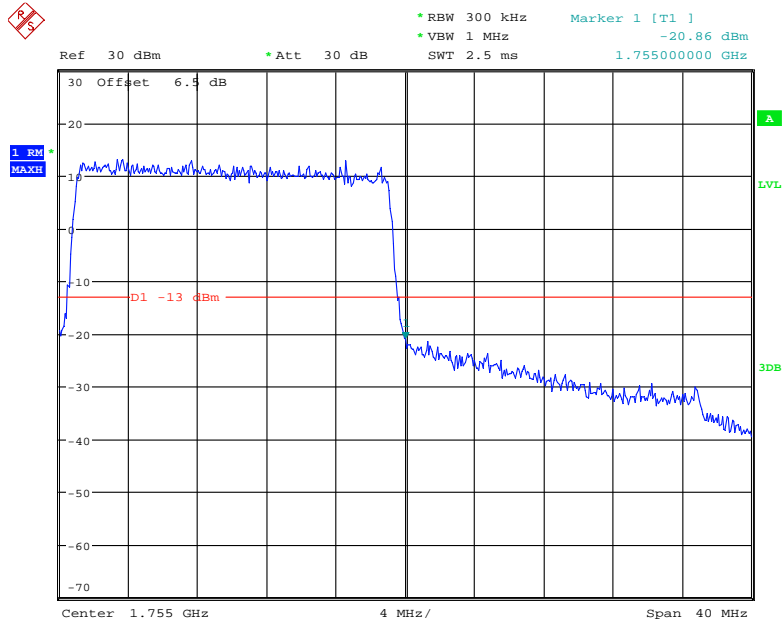
Date: 21.MAY.2020 15:59:23

QPSK (20.0 MHz, FULL RB) - Left Band Edge



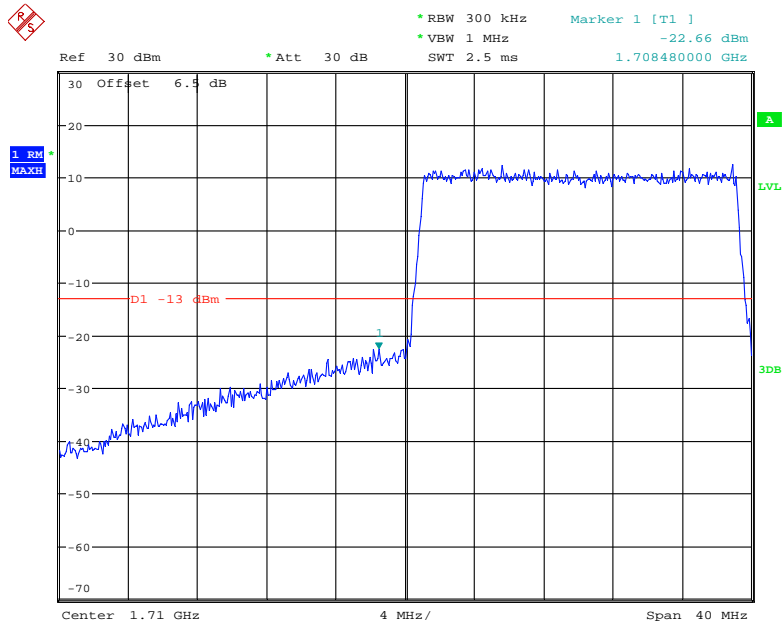
Date: 21.MAY.2020 15:59:45

QPSK (20.0 MHz, FULL RB) - Right Band Edge



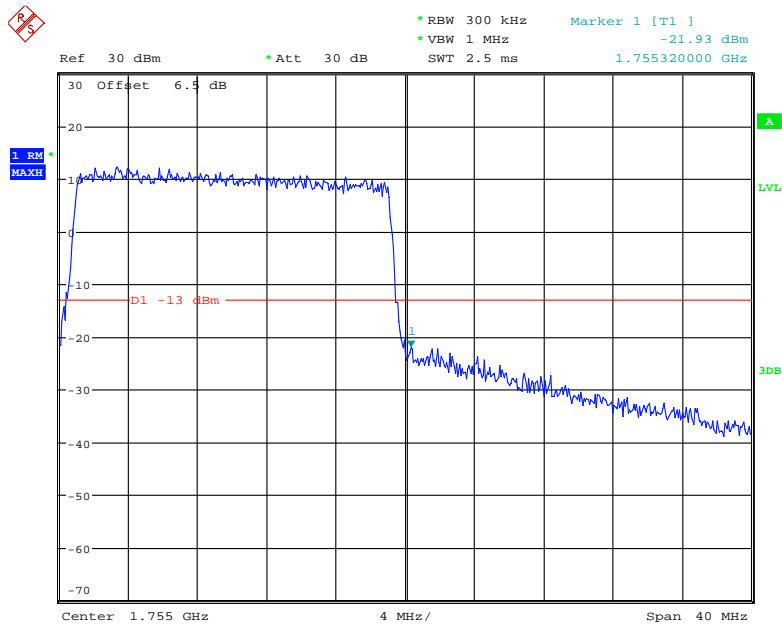
Date: 21.MAY.2020 16:00:29

16-QAM (20.0 MHz, FULL RB) - Left Band Edge



Date: 21.MAY.2020 16:00:08

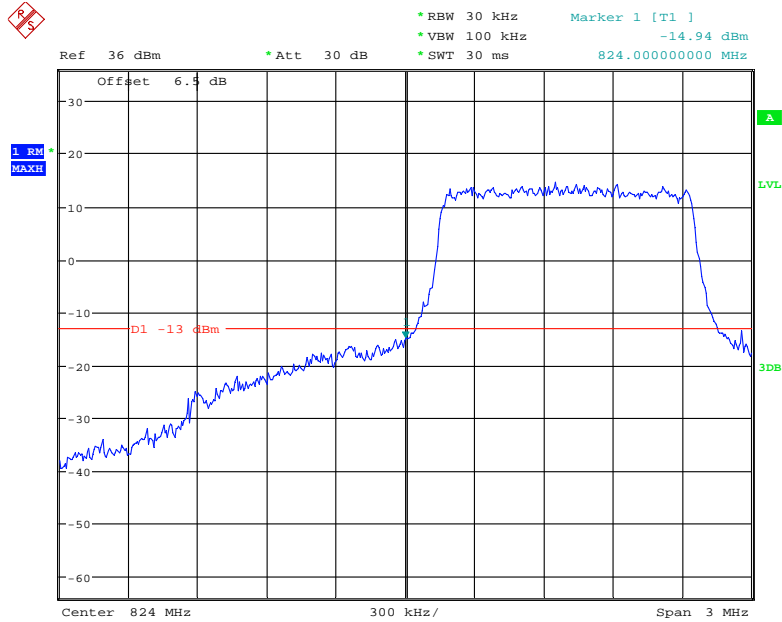
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 21.MAY.2020 16:00:48

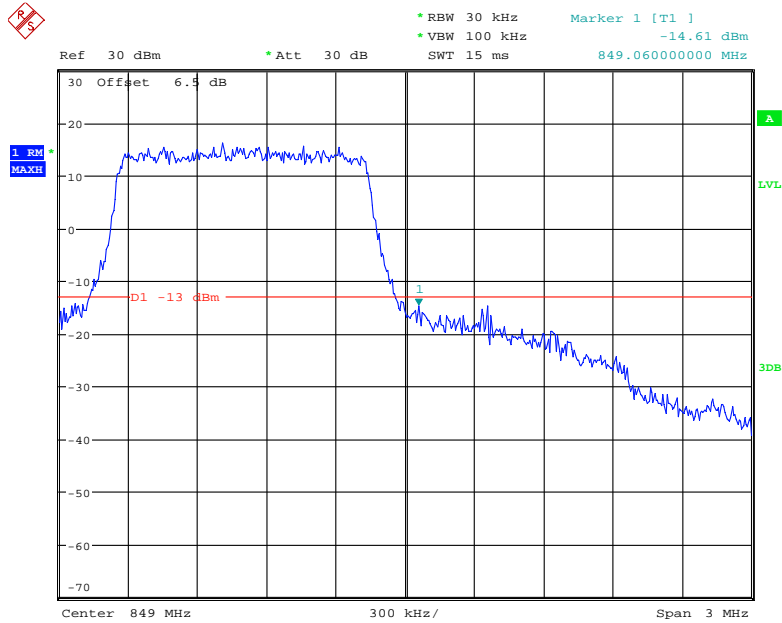
Band 5:

QPSK (1.4 MHz, FULL RB) - Left Band Edge



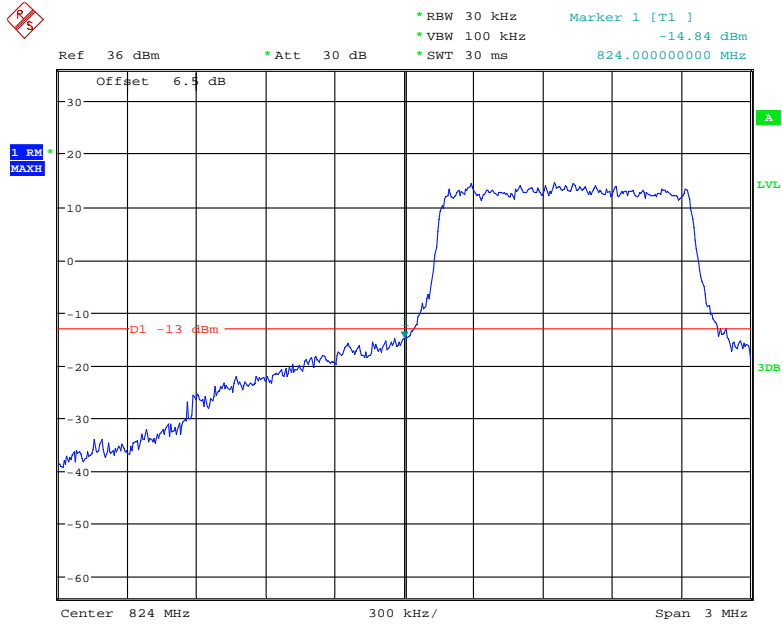
Date: 22.MAY.2020 11:53:23

QPSK (1.4 MHz, FULL RB) - Right Band Edge



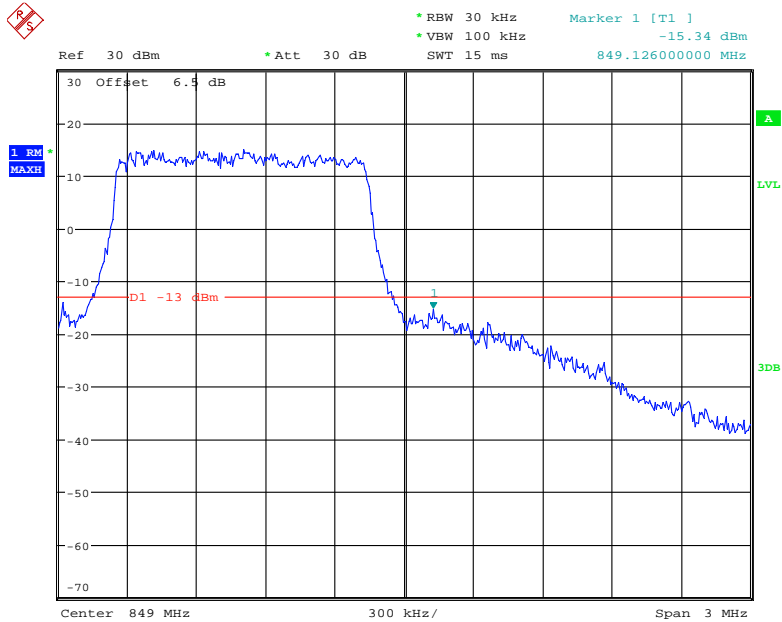
Date: 21.MAY.2020 16:01:42

16-QAM 1.4 MHz, FULL RB) - Left Band Edge



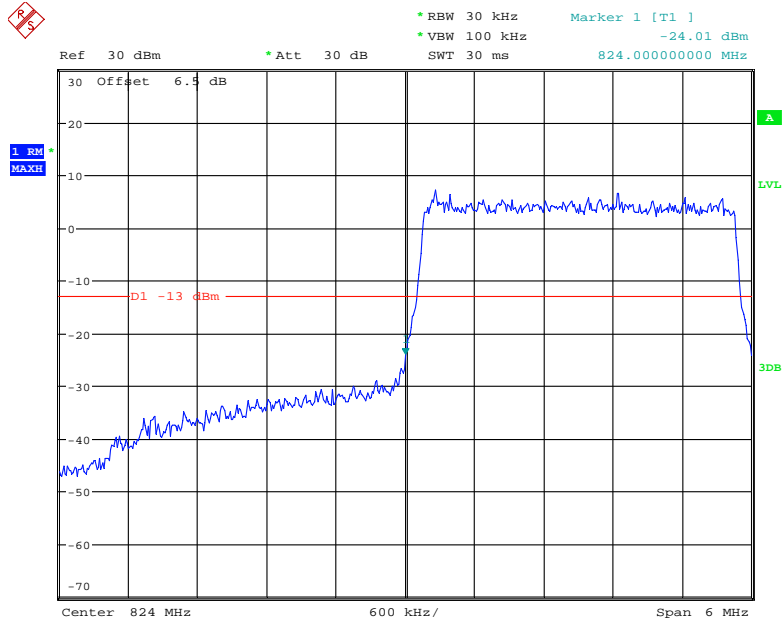
Date: 22.MAY.2020 11:52:46

16-QAM (1.4MHz, FULL RB) - Right Band Edge



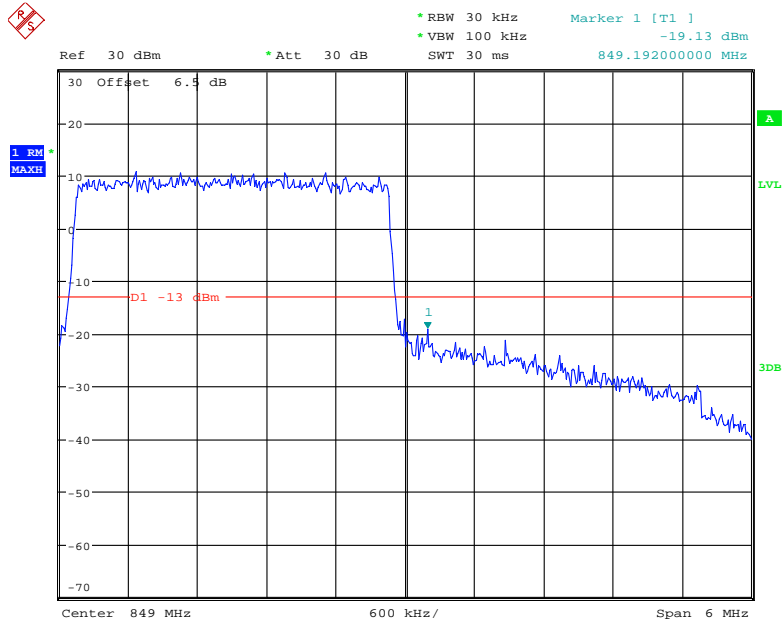
Date: 21.MAY.2020 16:02:04

QPSK (3.0 MHz, FULL RB) - Left Band Edge



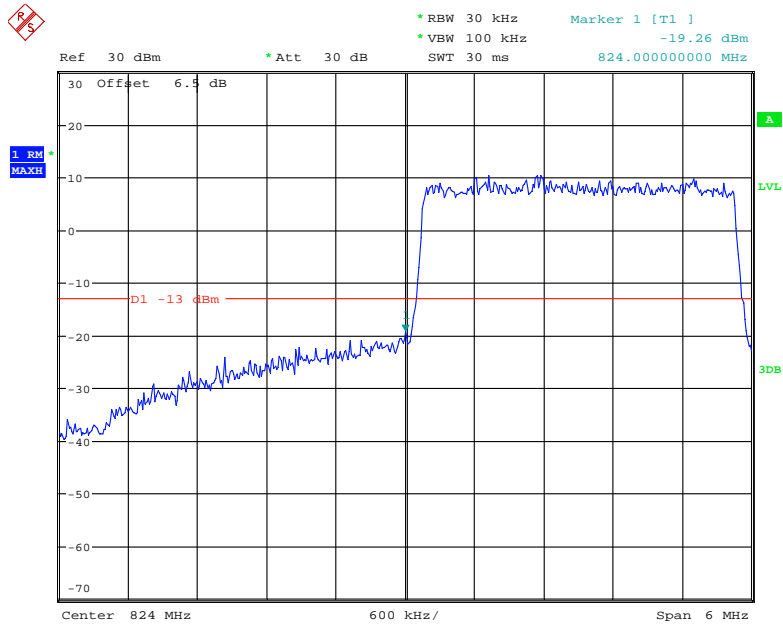
Date: 9.AUG.2020 15:41:39

QPSK (3.0 MHz, FULL RB) - Right Band Edge



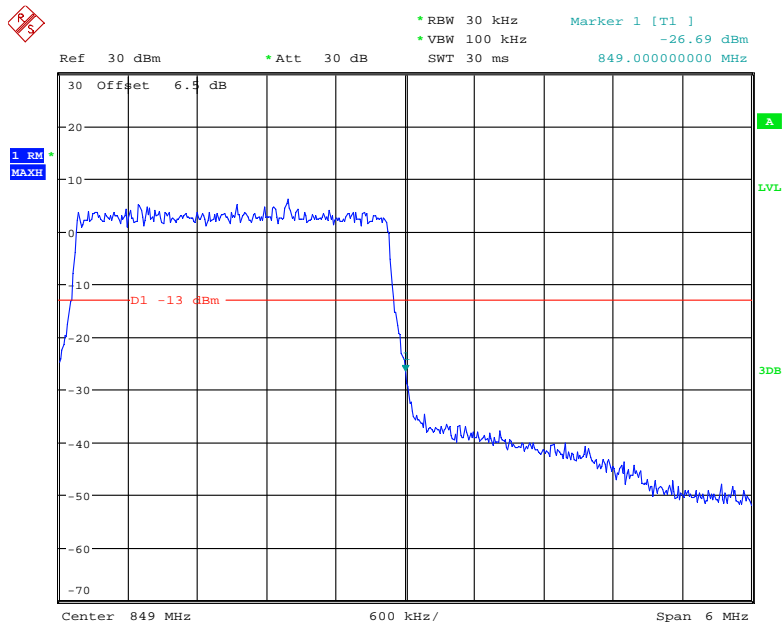
Date: 21.MAY.2020 16:03:00

16-QAM (3.0 MHz, FULL RB) - Left Band Edge



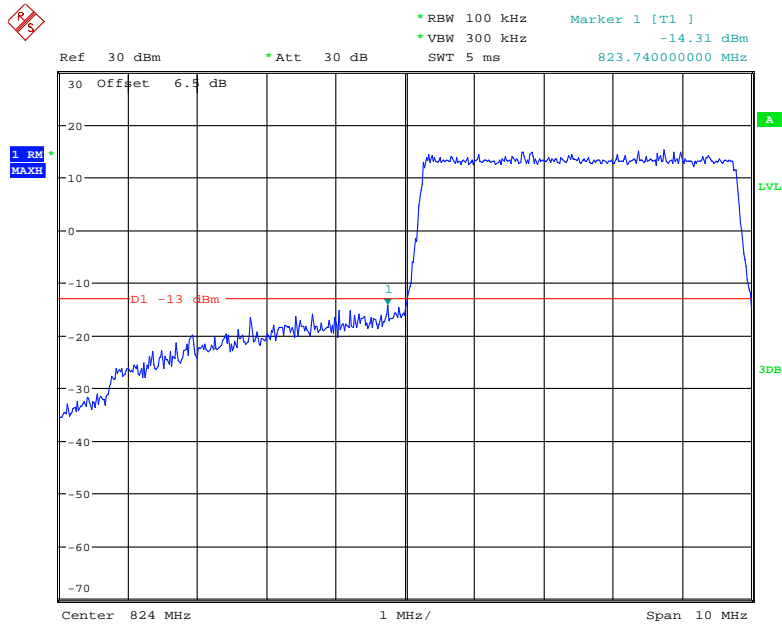
Date: 21.MAY.2020 16:02:43

16-QAM (3.0 MHz, FULL RB) - Right Band Edge



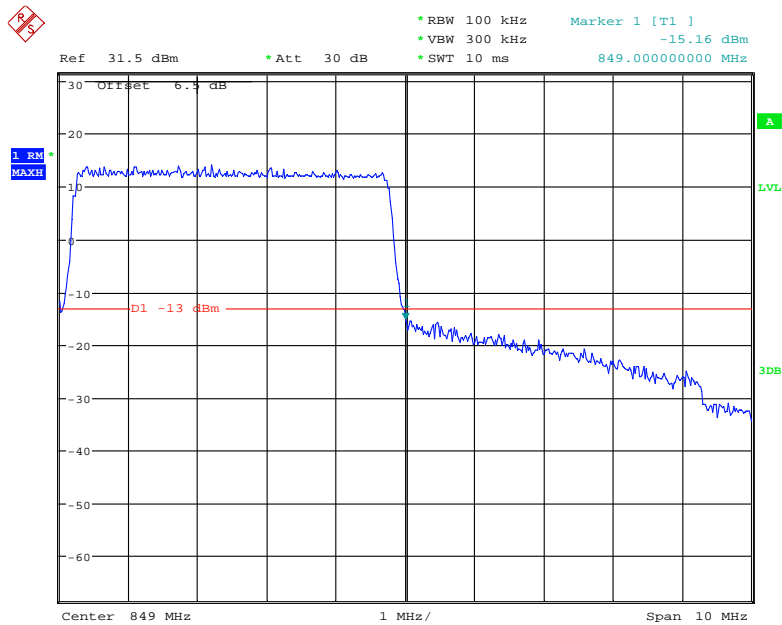
Date: 9.AUG.2020 15:42:30

QPSK (5.0 MHz, FULL RB) - Left Band Edge



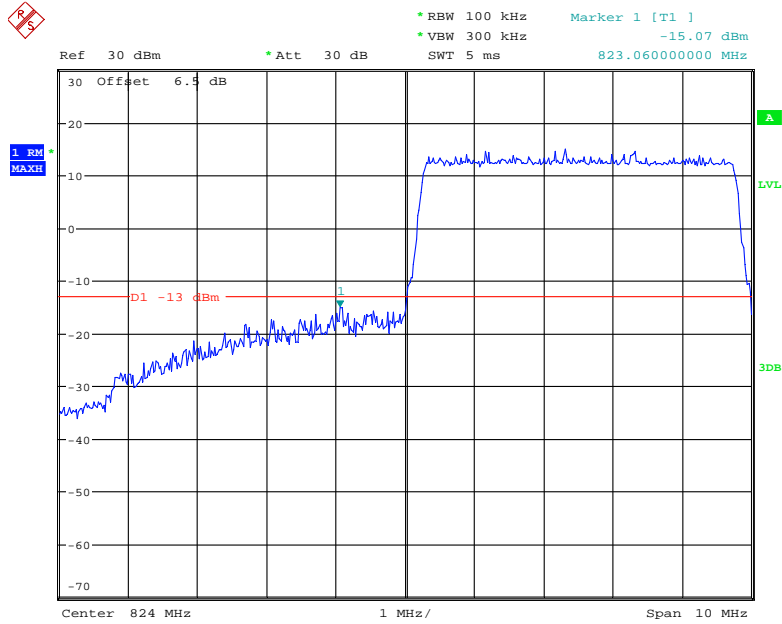
Date: 21.MAY.2020 16:03:36

QPSK (5.0 MHz, FULL RB) - Right Band Edge



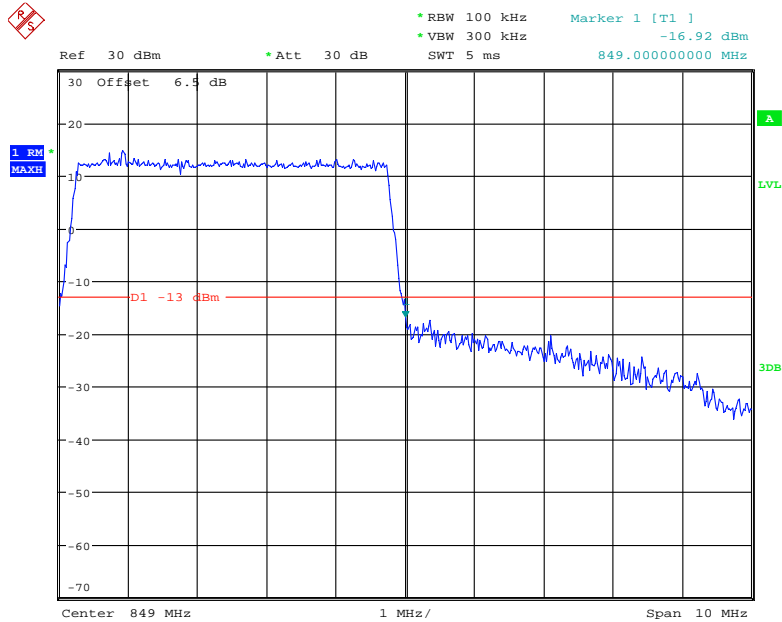
Date: 22.MAY.2020 11:50:19

16-QAM (5.0 MHz, FULL RB) - Left Band Edge



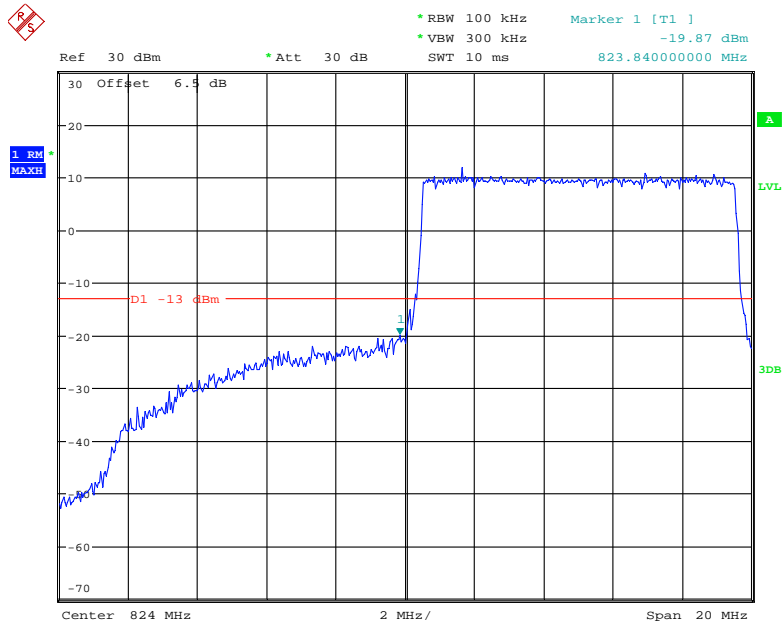
Date: 21.MAY.2020 16:04:03

16-QAM (5.0 MHz, FULL RB) - Right Band Edge



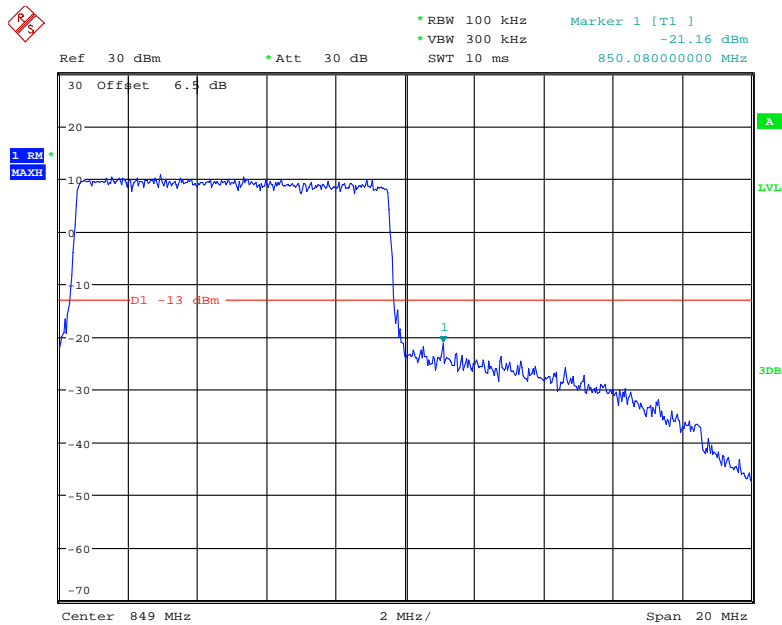
Date: 21.MAY.2020 16:04:36

QPSK (10.0 MHz, FULL RB) - Left Band Edge



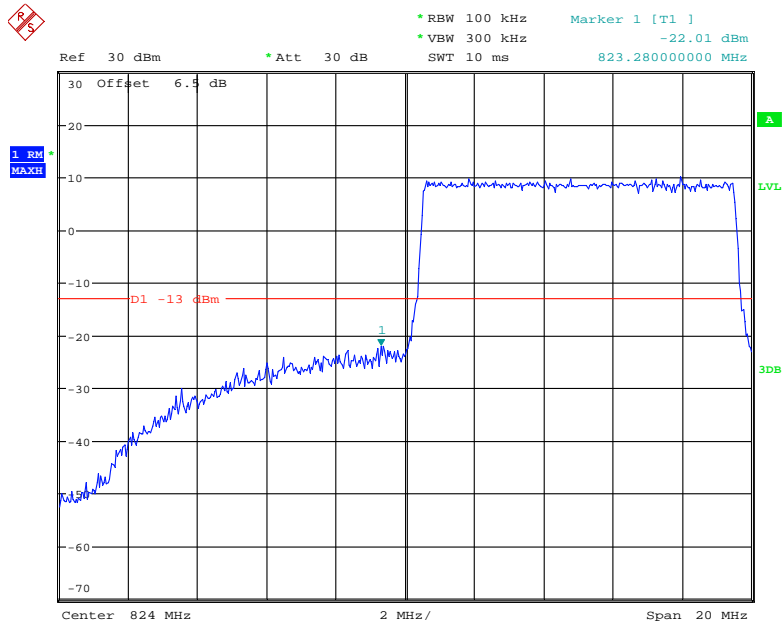
Date: 21.MAY.2020 16:04:57

QPSK (10.0 MHz, FULL RB) - Right Band Edge



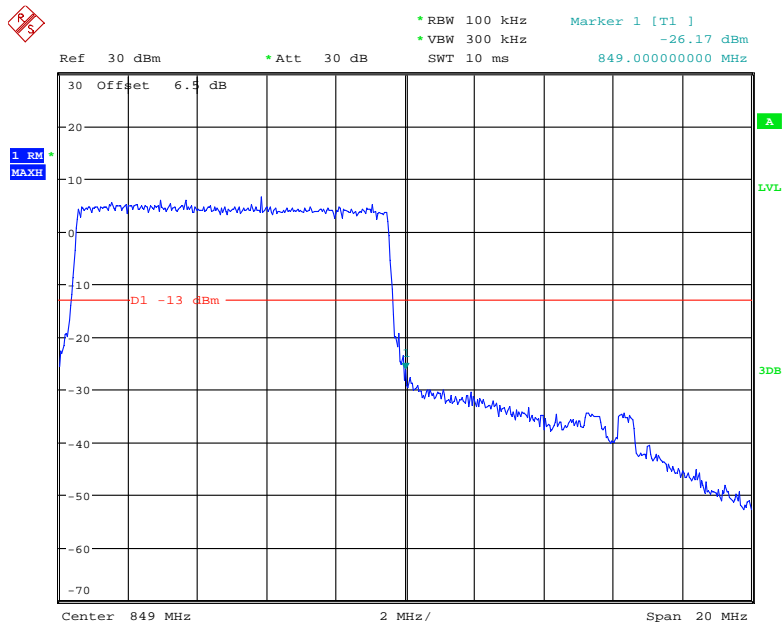
Date: 21.MAY.2020 16:05:36

16-QAM (10.0 MHz, FULL RB) - Left Band Edge



Date: 21.MAY.2020 16:05:18

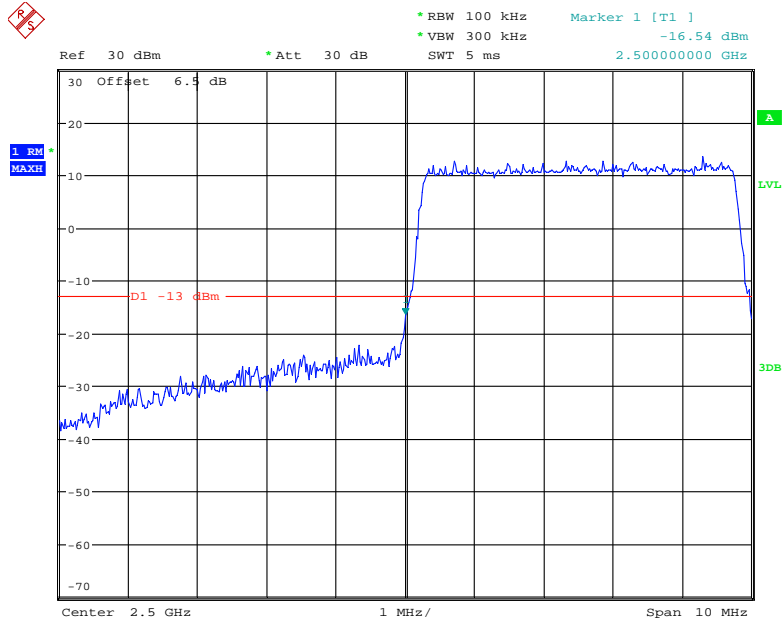
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 9.AUG.2020 15:44:31

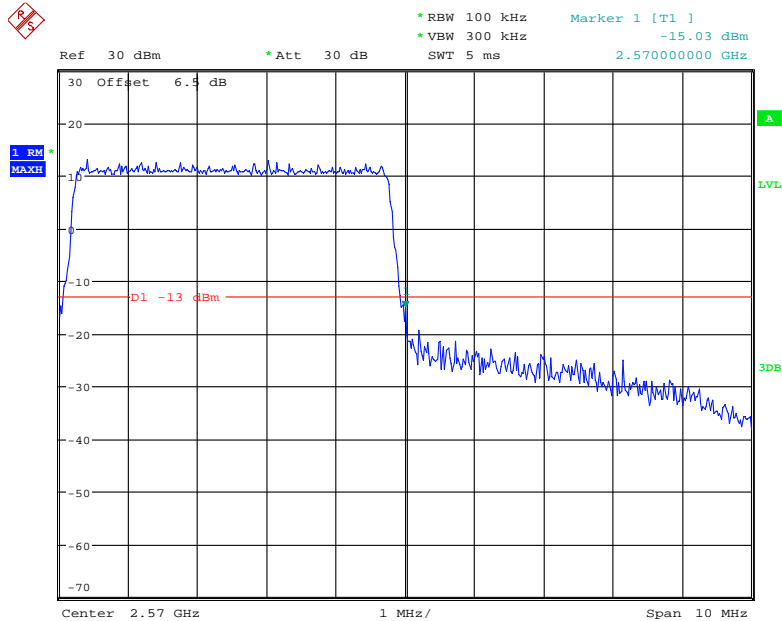
Band 7:

QPSK (5.0 MHz, FULL RB) - Left Band Edge



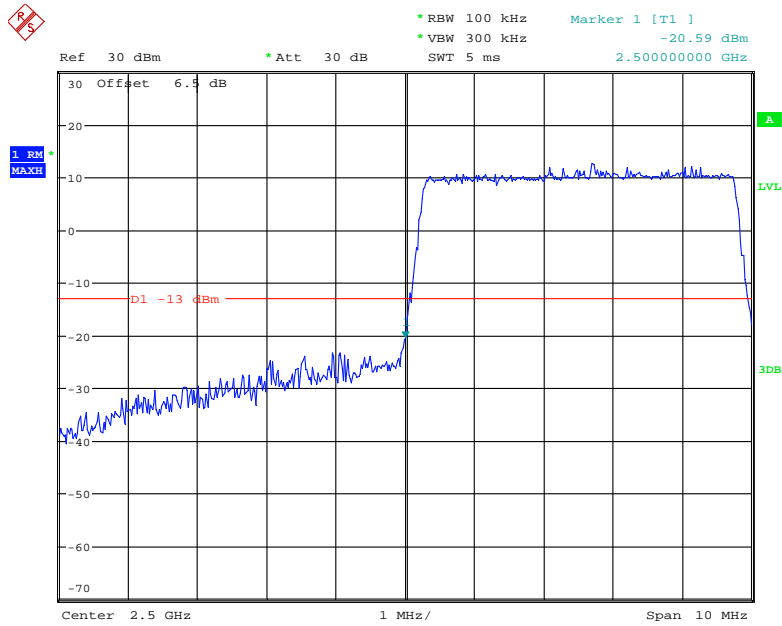
Date: 21.MAY.2020 16:06:19

QPSK (5.0 MHz, FULL RB) - Right Band Edge



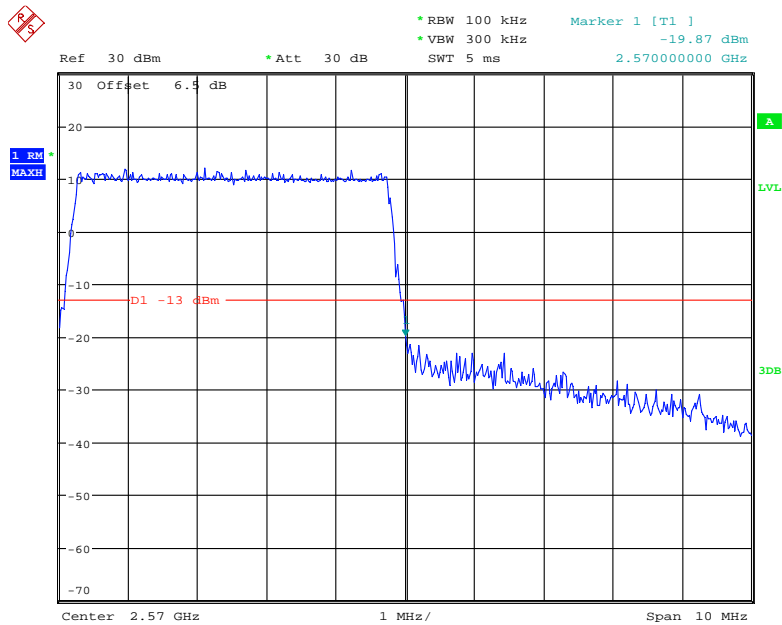
Date: 21.MAY.2020 16:06:59

16-QAM (5.0 MHz, FULL RB) - Left Band Edge



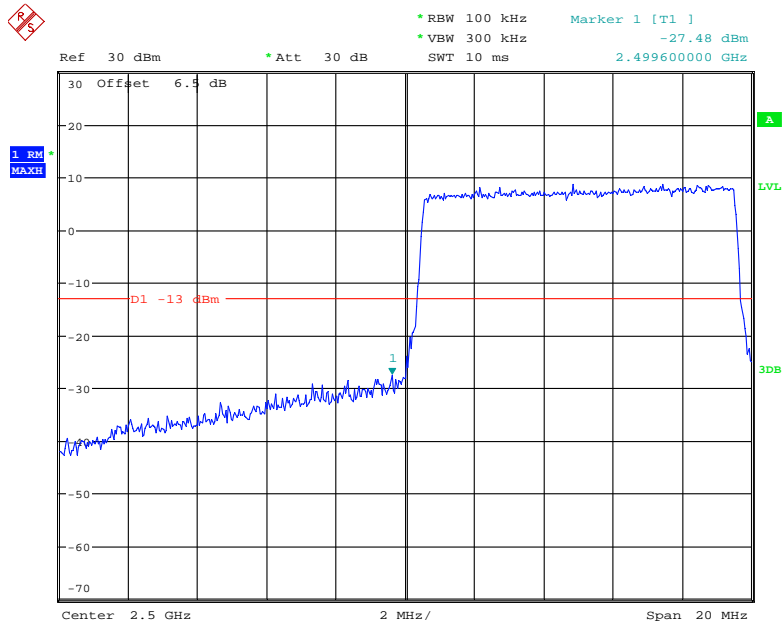
Date: 21.MAY.2020 16:06:38

16-QAM (5.0 MHz, FULL RB) - Right Band Edge



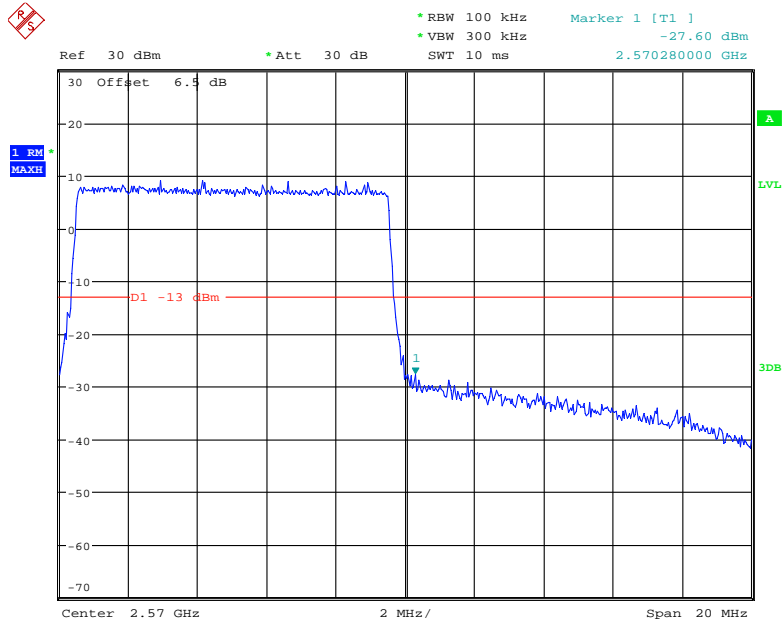
Date: 21.MAY.2020 16:07:18

QPSK (10.0 MHz, FULL RB) - Left Band Edge



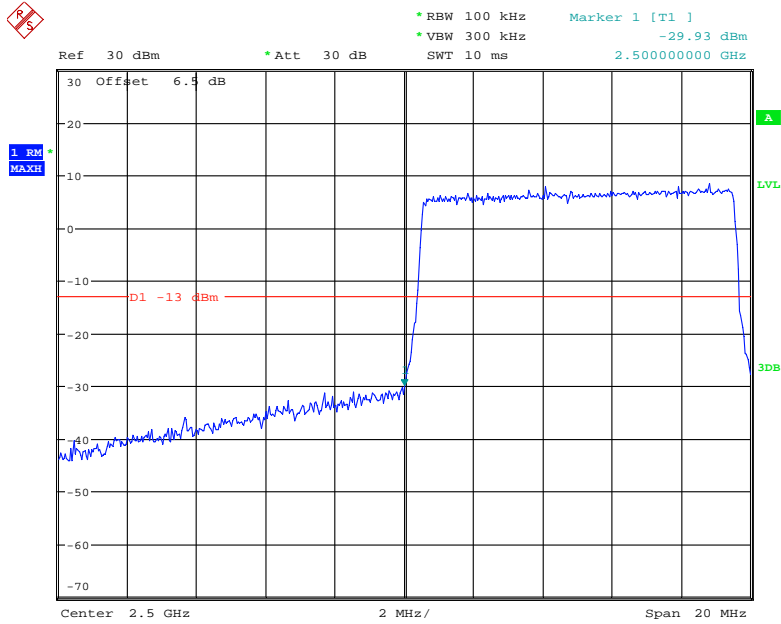
Date: 21.MAY.2020 16:07:39

QPSK (10.0 MHz, FULL RB) - Right Band Edge



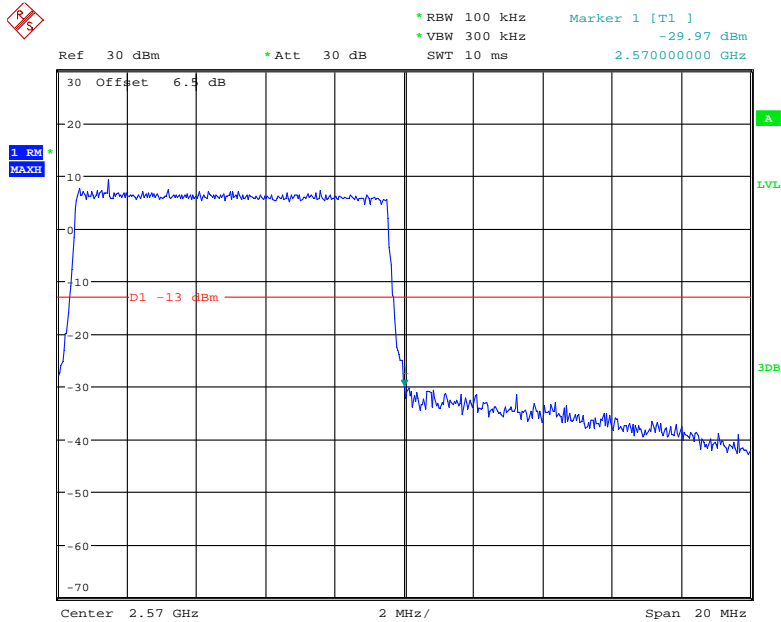
Date: 21.MAY.2020 16:08:18

16-QAM (10.0 MHz, FULL RB) - Left Band Edge



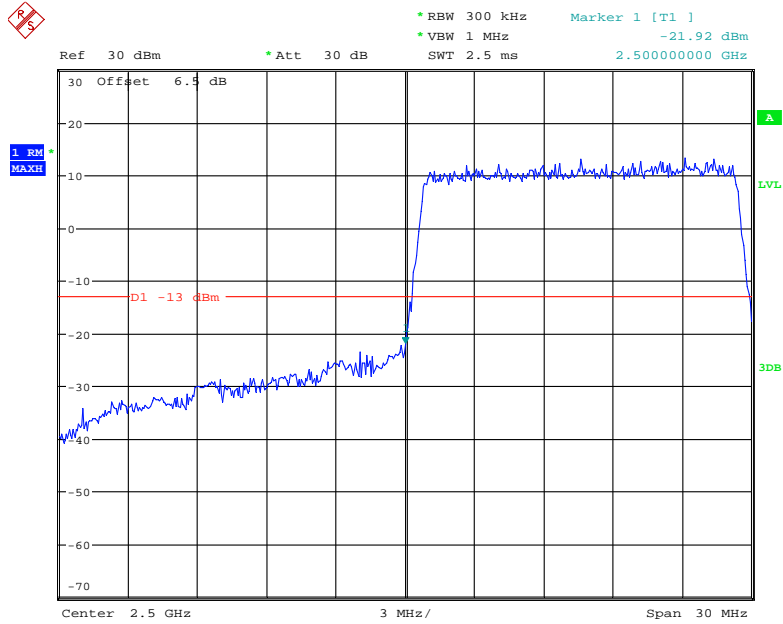
Date: 21.MAY.2020 16:07:56

16-QAM (10.0 MHz, FULL RB) - Right Band Edge



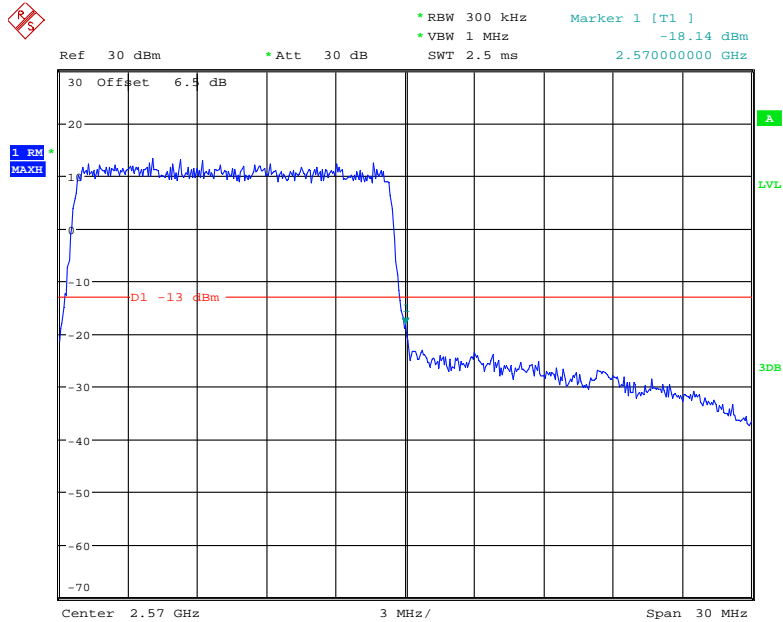
Date: 21.MAY.2020 16:08:35

QPSK (15.0 MHz, FULL RB) - Left Band Edge



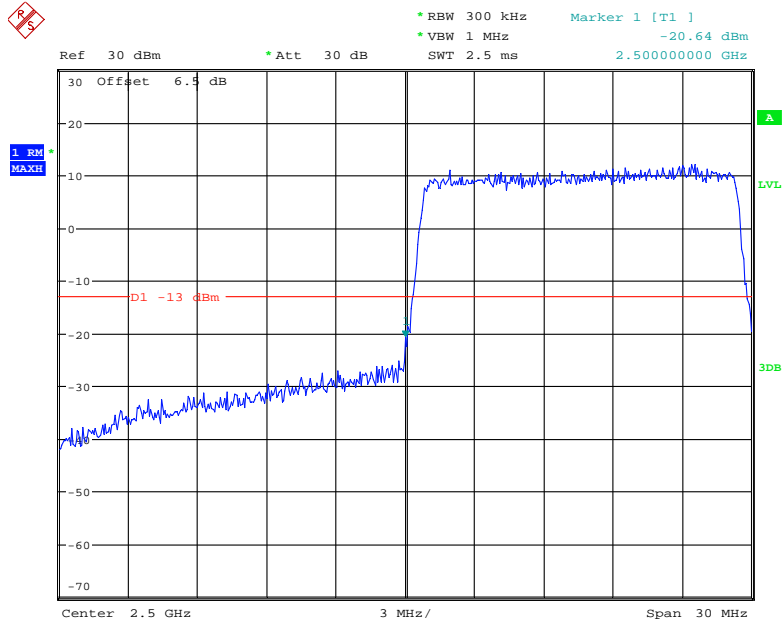
Date: 21.MAY.2020 16:08:58

QPSK (15.0 MHz, FULL RB) - Right Band Edge



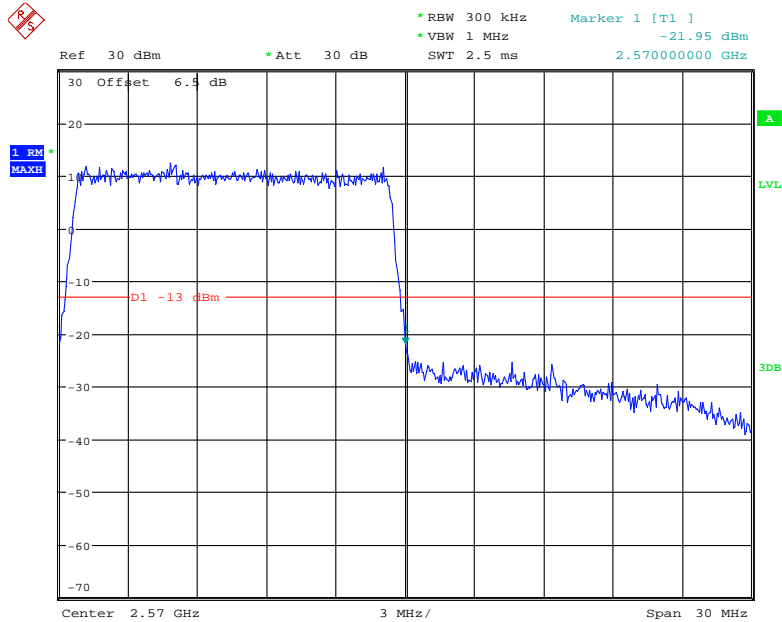
Date: 21.MAY.2020 16:09:38

16-QAM (15.0 MHz, FULL RB) - Left Band Edge



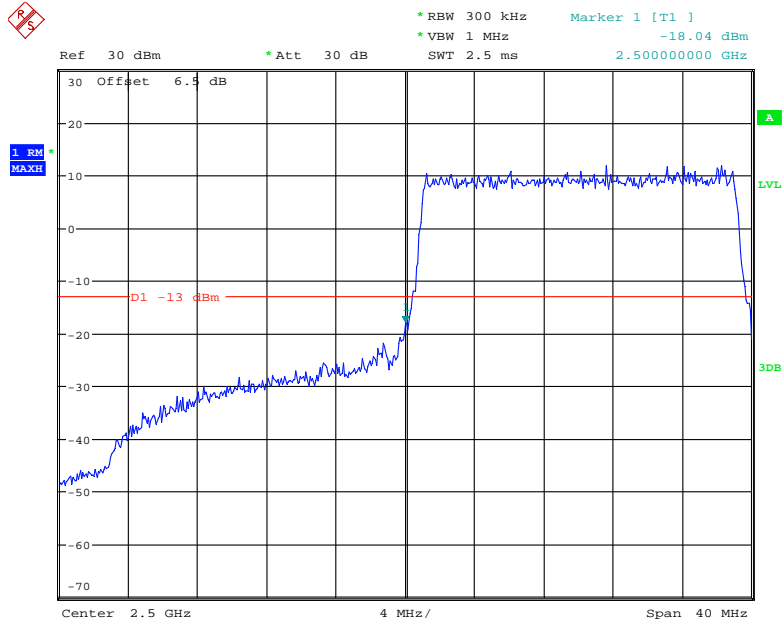
Date: 21.MAY.2020 16:09:18

16-QAM (15.0 MHz, FULL RB) - Right Band Edge



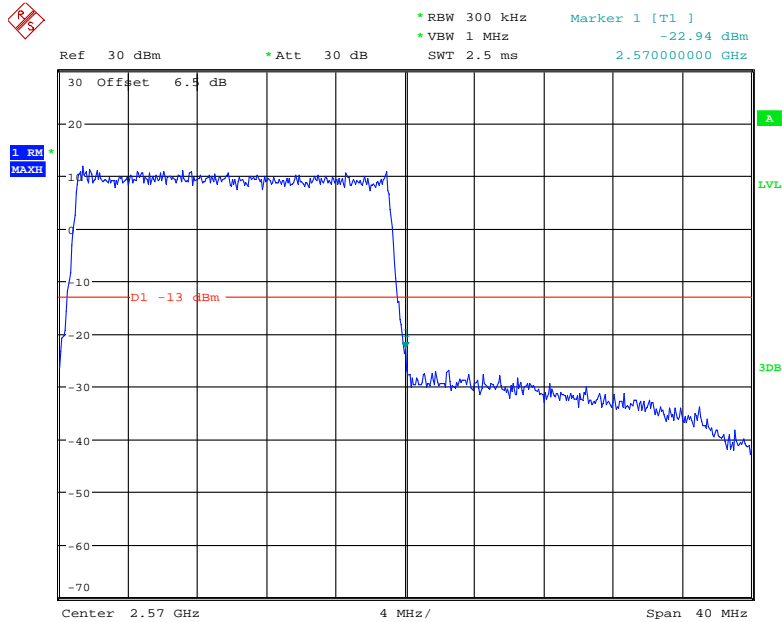
Date: 21.MAY.2020 16:10:01

QPSK (20.0 MHz, FULL RB) - Left Band Edge



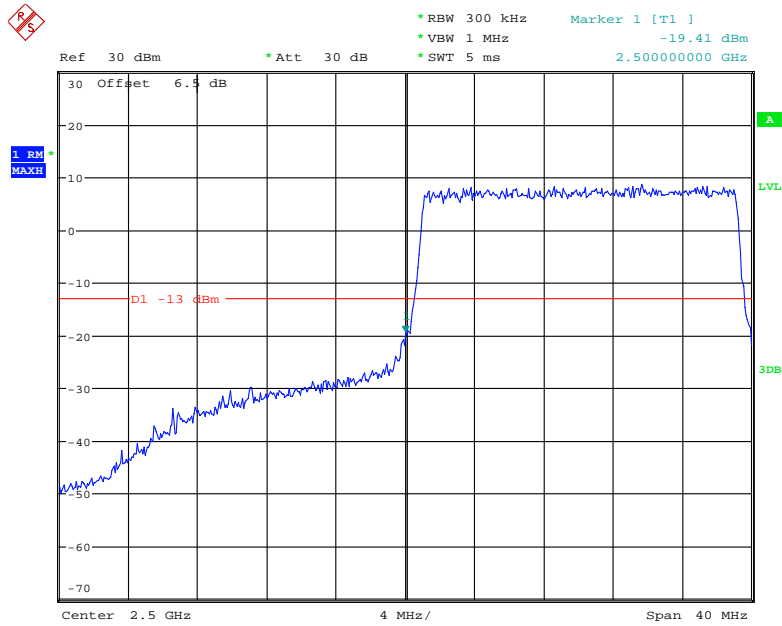
Date: 27.MAY.2020 10:17:04

QPSK (20.0 MHz, FULL RB) - Right Band Edge



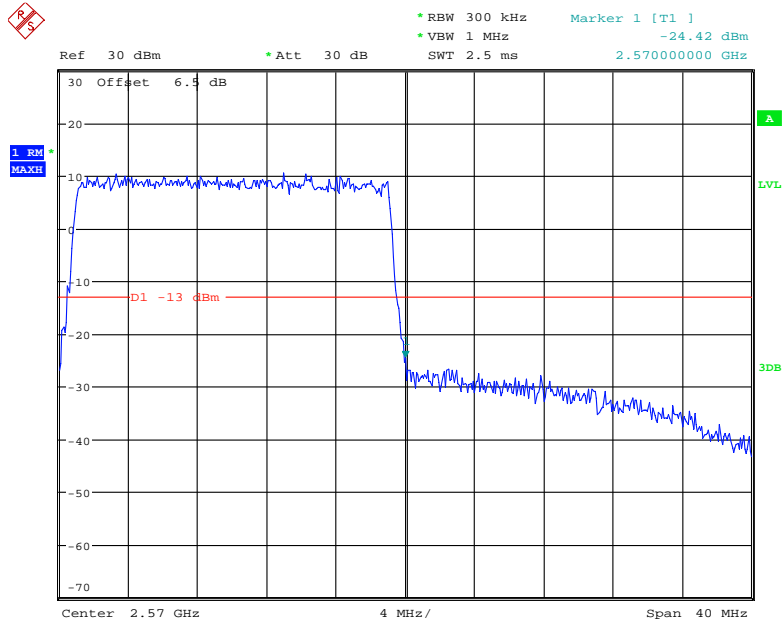
Date: 21.MAY.2020 16:11:11

16-QAM (20.0 MHz, FULL RB) - Left Band Edge



Date: 27.MAY.2020 12:03:52

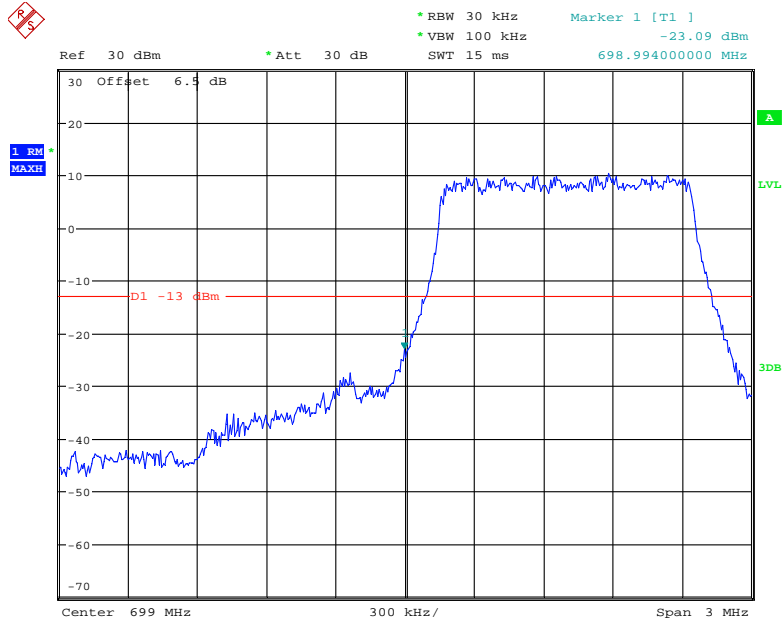
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 21.MAY.2020 16:11:34

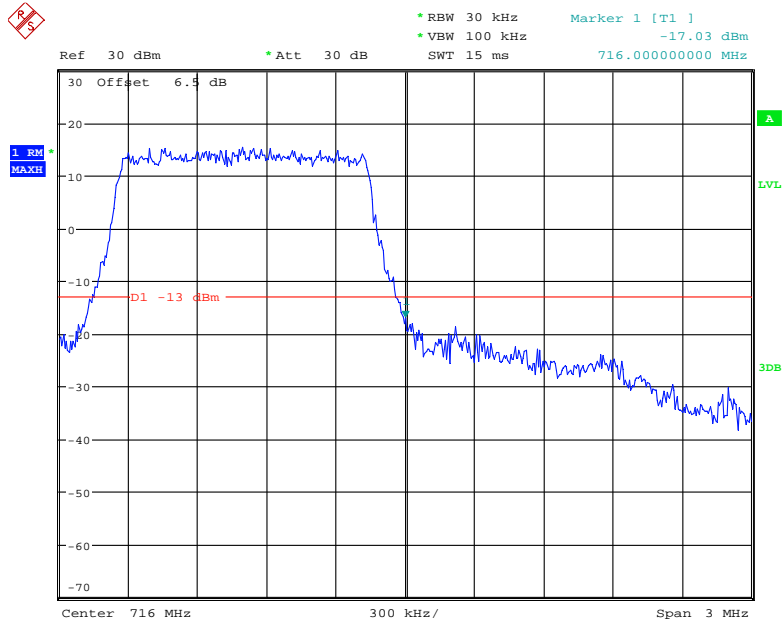
Band 12:

QPSK (1.4 MHz, FULL RB) - Left Band Edge



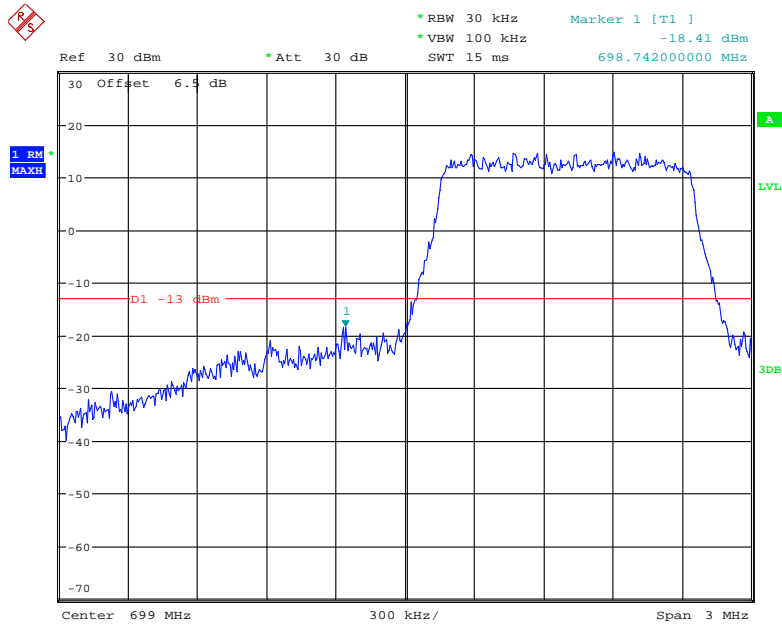
Date: 9.AUG.2020 15:45:13

QPSK (1.4 MHz, FULL RB) - Right Band Edge



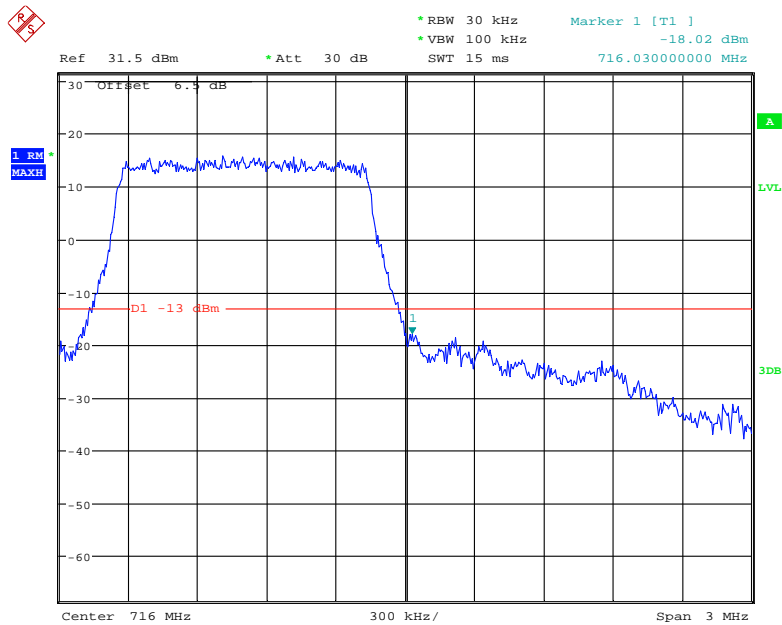
Date: 21.MAY.2020 16:12:36

16-QAM 1.4 MHz, FULL RB) - Left Band Edge



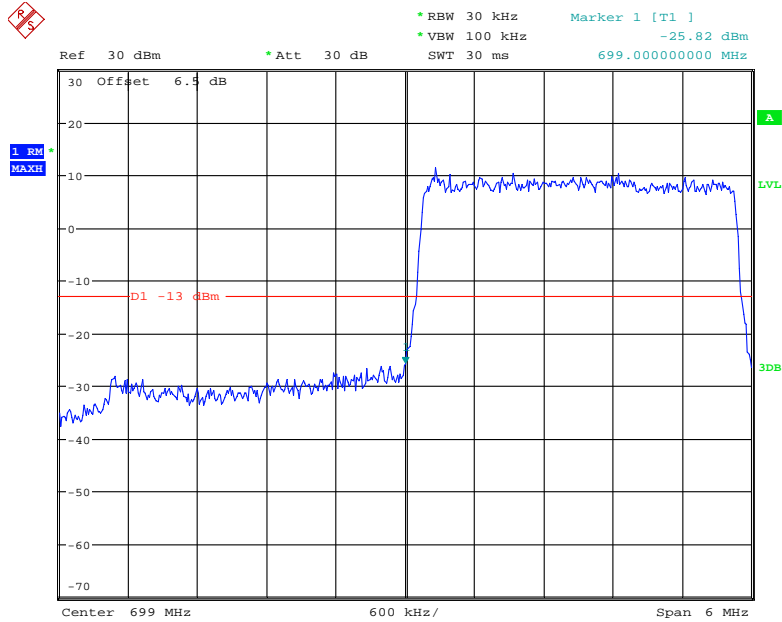
Date: 21.MAY.2020 16:12:16

16-QAM (1.4MHz, FULL RB) - Right Band Edge



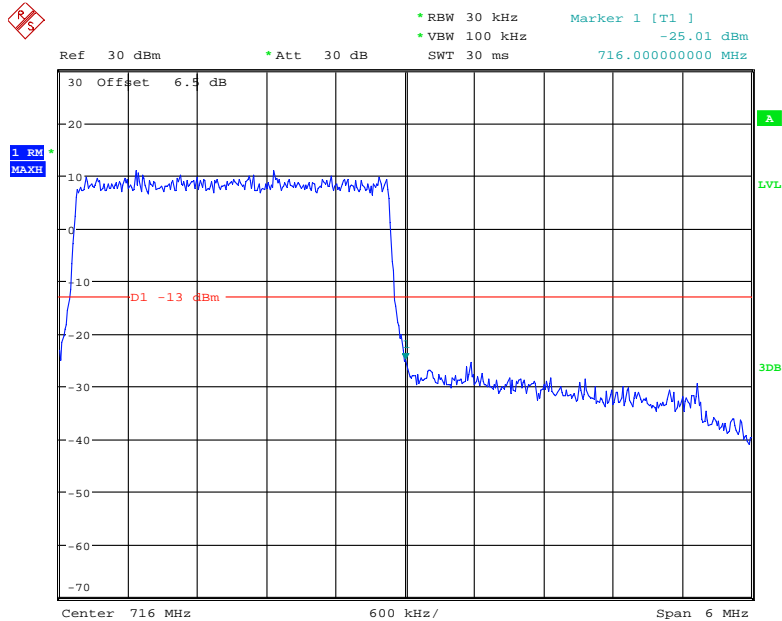
Date: 22.MAY.2020 11:47:55

QPSK (3.0 MHz, FULL RB) - Left Band Edge



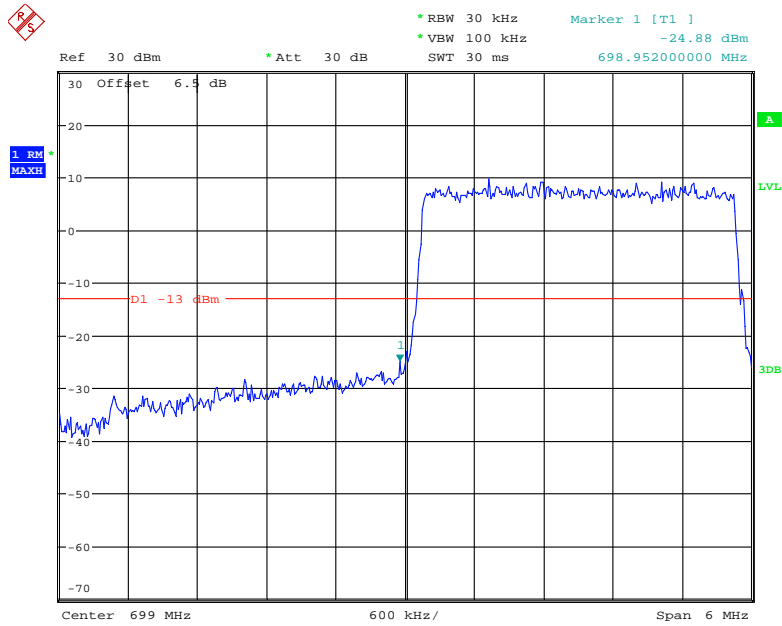
Date: 21.MAY.2020 16:13:18

QPSK (3.0 MHz, FULL RB) - Right Band Edge



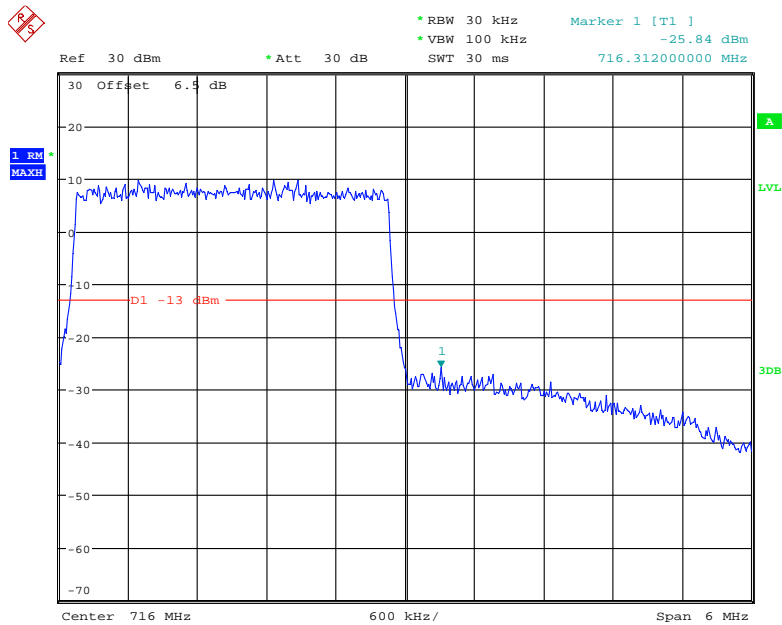
Date: 21.MAY.2020 16:13:55

16-QAM (3.0 MHz, FULL RB) - Left Band Edge



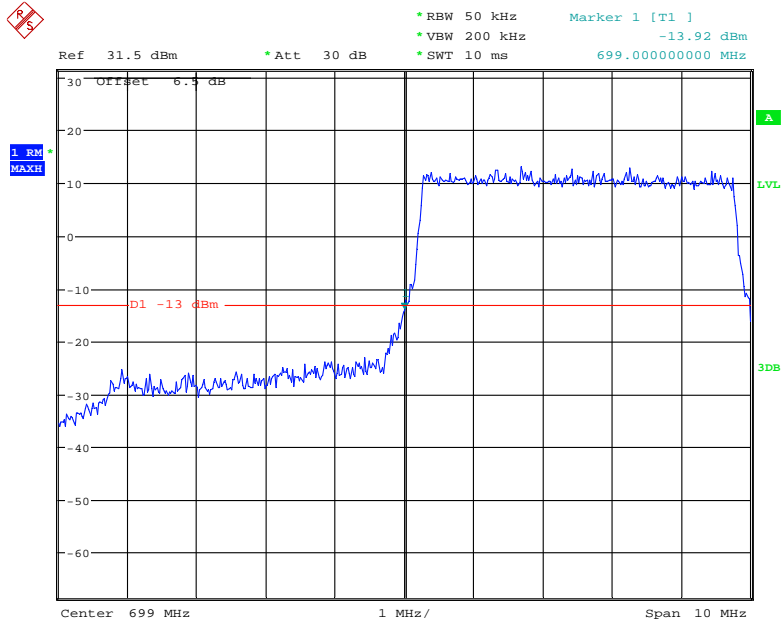
Date: 21.MAY.2020 16:13:38

16-QAM (3.0 MHz, FULL RB) - Right Band Edge



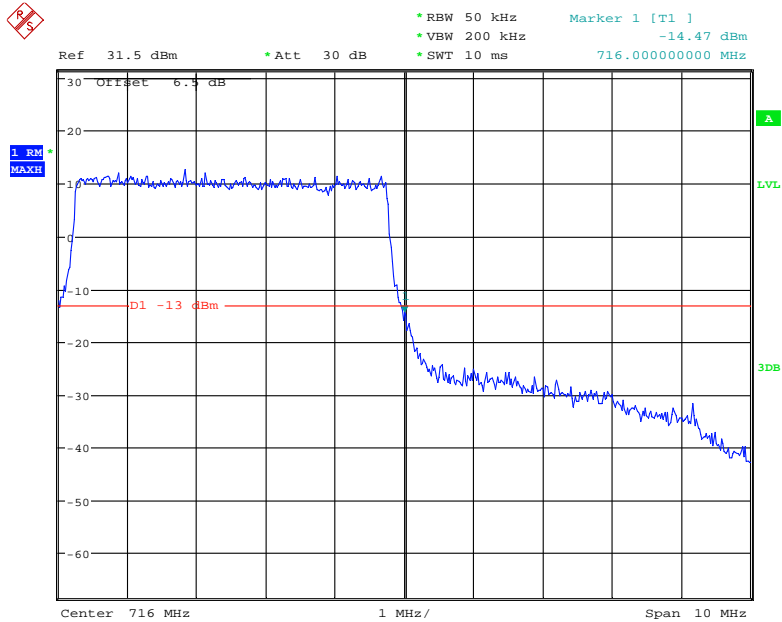
Date: 21.MAY.2020 16:14:11

QPSK (5.0 MHz, FULL RB) - Left Band Edge



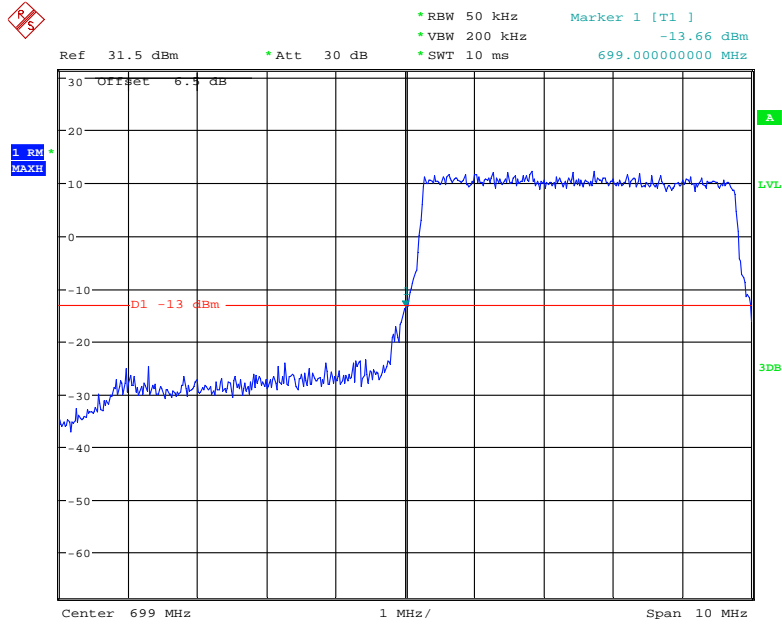
Date: 22.MAY.2020 11:43:29

QPSK (5.0 MHz, FULL RB) - Right Band Edge



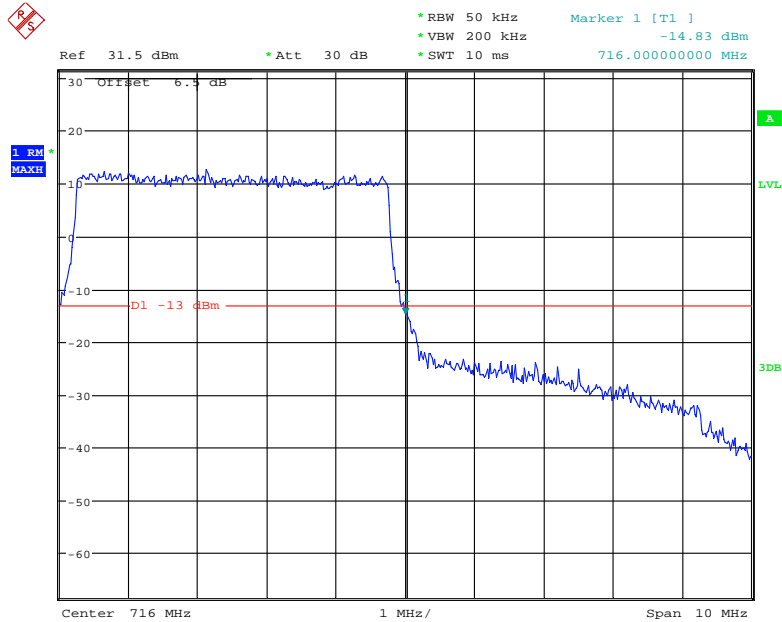
Date: 22.MAY.2020 11:46:26

16-QAM (5.0 MHz, FULL RB) - Left Band Edge



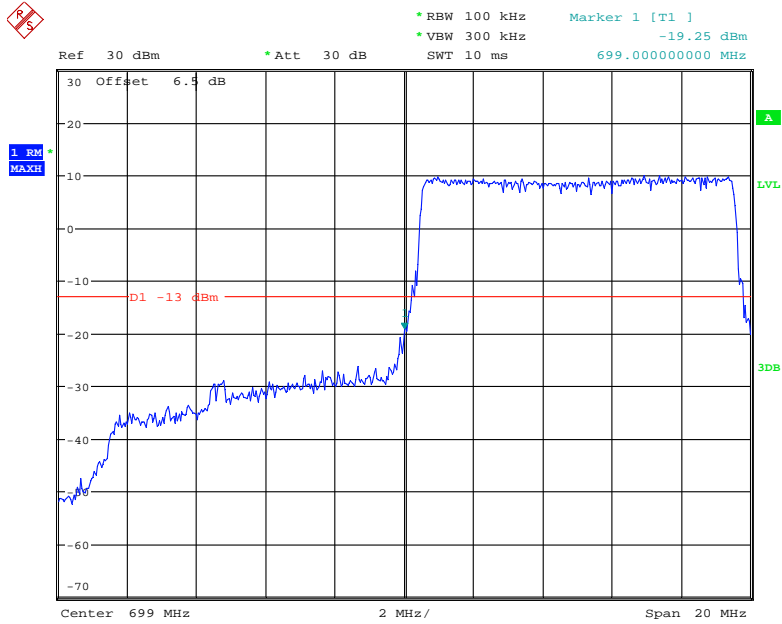
Date: 22.MAY.2020 11:44:17

16-QAM (5.0 MHz, FULL RB) - Right Band Edge



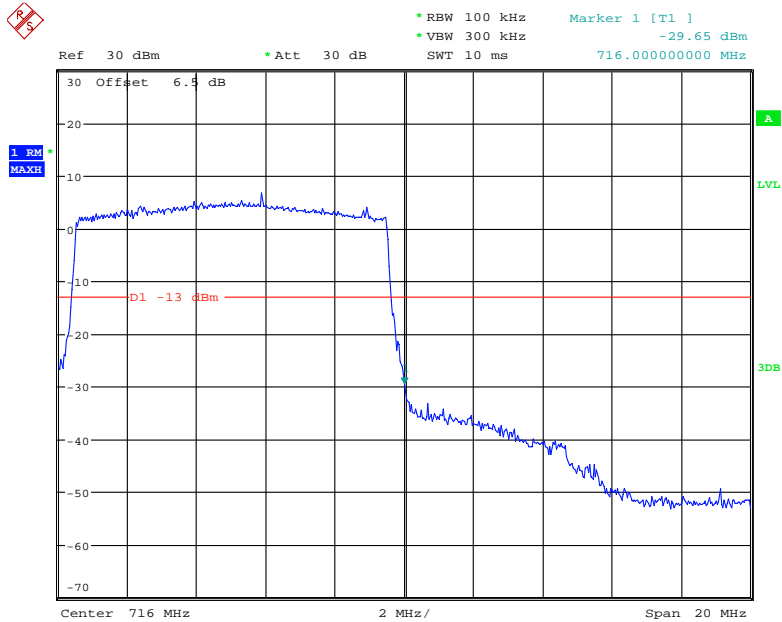
Date: 22.MAY.2020 11:45:50

QPSK (10.0 MHz, FULL RB) - Left Band Edge



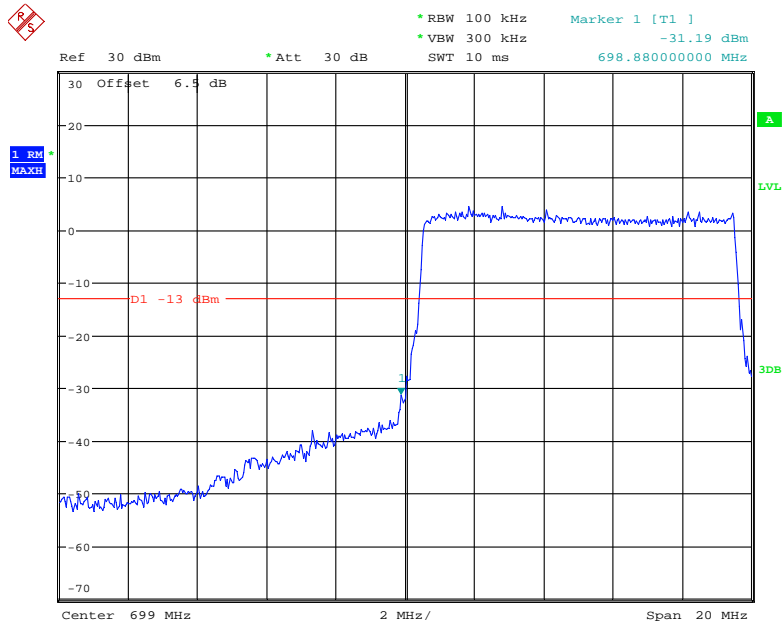
Date: 21.MAY.2020 16:15:51

QPSK (10.0 MHz, FULL RB) - Right Band Edge



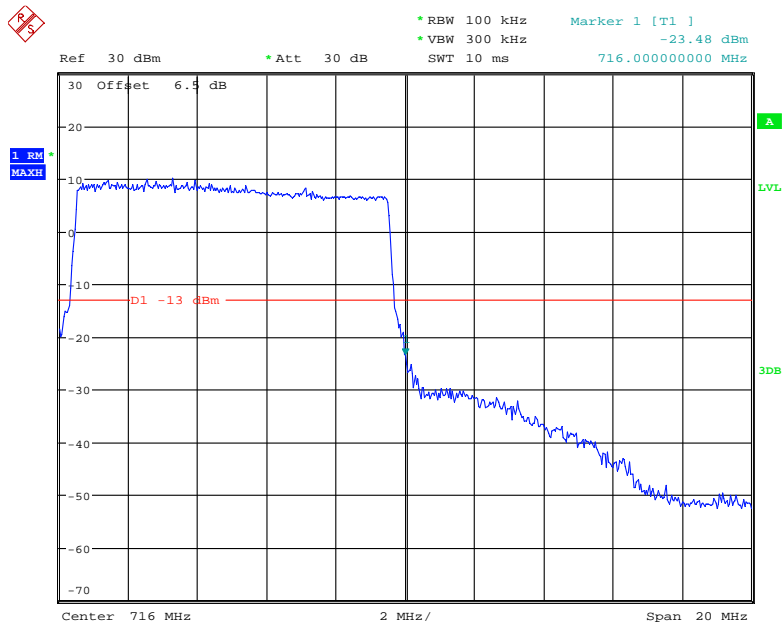
Date: 9.AUG.2020 15:49:24

16-QAM (10.0 MHz, FULL RB) - Left Band Edge



Date: 9.AUG.2020 15:49:07

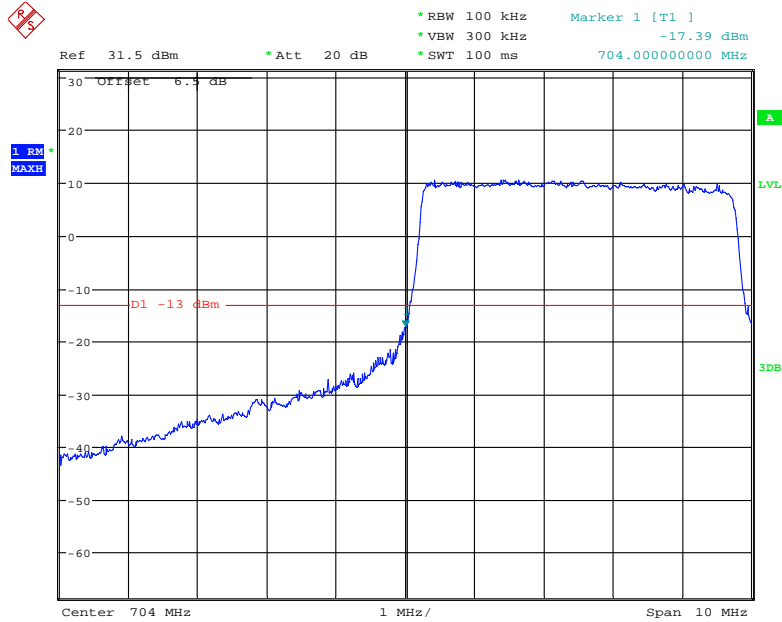
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 21.MAY.2020 16:16:47

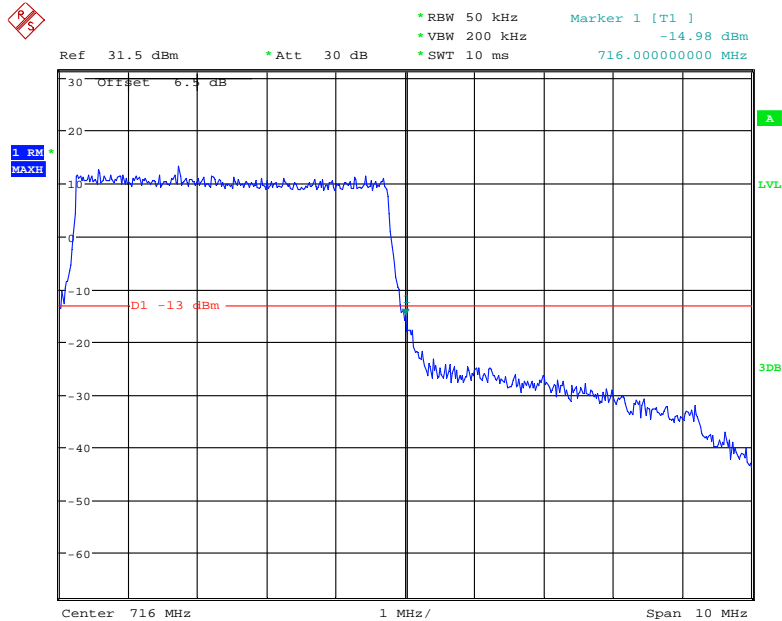
Band 17:

QPSK (5.0 MHz, FULL RB) - Left Band Edge



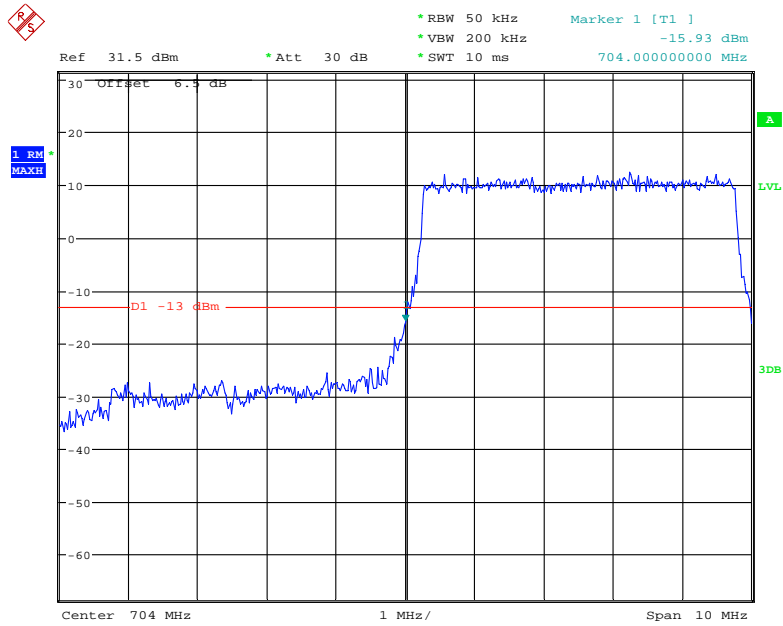
Date: 18.JUN.2020 15:44:31

QPSK (5.0 MHz, FULL RB) - Right Band Edge



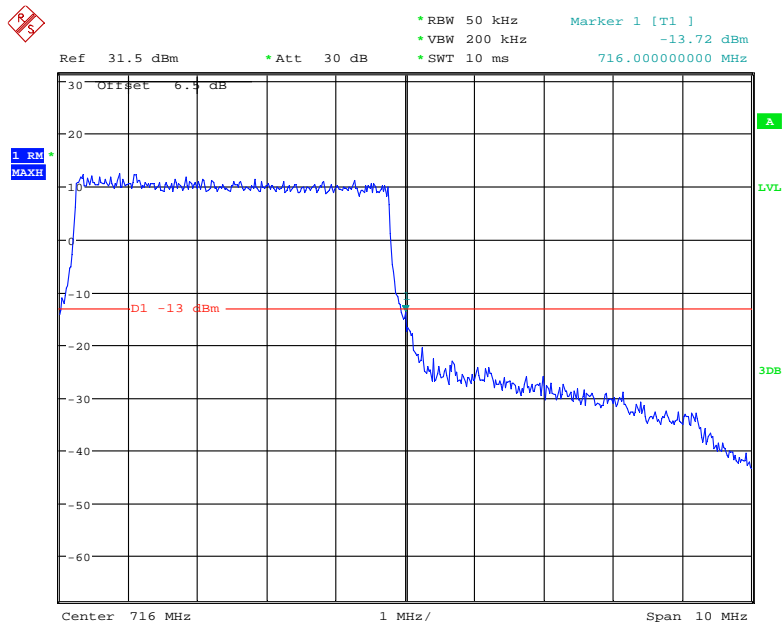
Date: 22.MAY.2020 11:41:09

16-QAM (5.0 MHz, FULL RB) - Left Band Edge



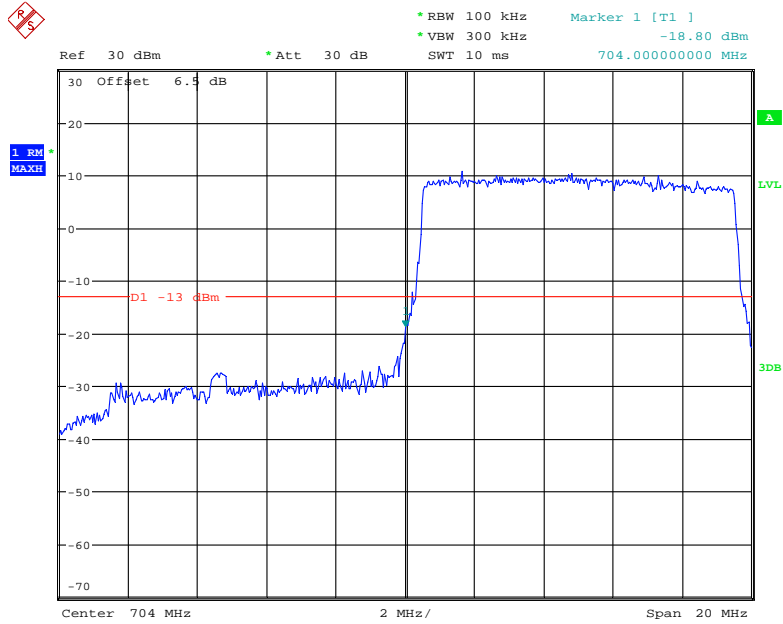
Date: 22.MAY.2020 11:38:47

16-QAM (5.0 MHz, FULL RB) - Right Band Edge



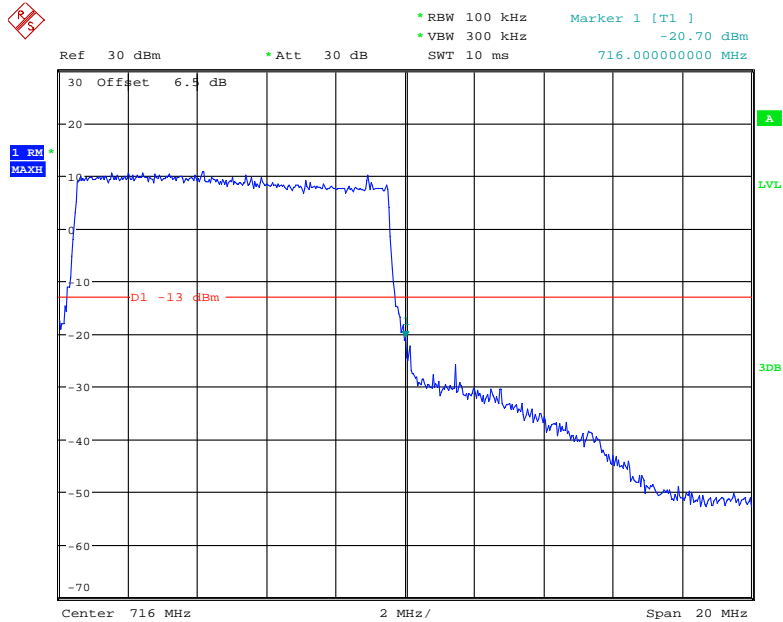
Date: 22.MAY.2020 11:41:40

QPSK (10.0 MHz, FULL RB) - Left Band Edge



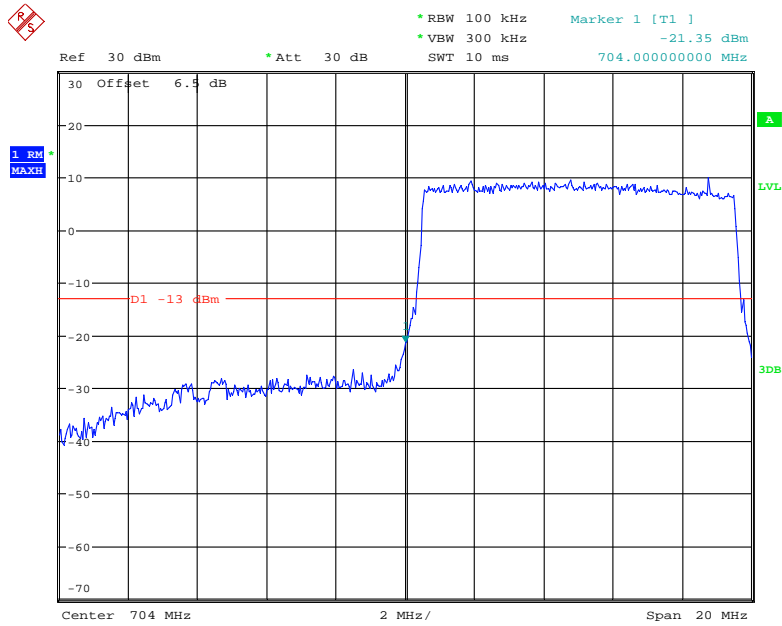
Date: 21.MAY.2020 16:18:26

QPSK (10.0 MHz, FULL RB) - Right Band Edge



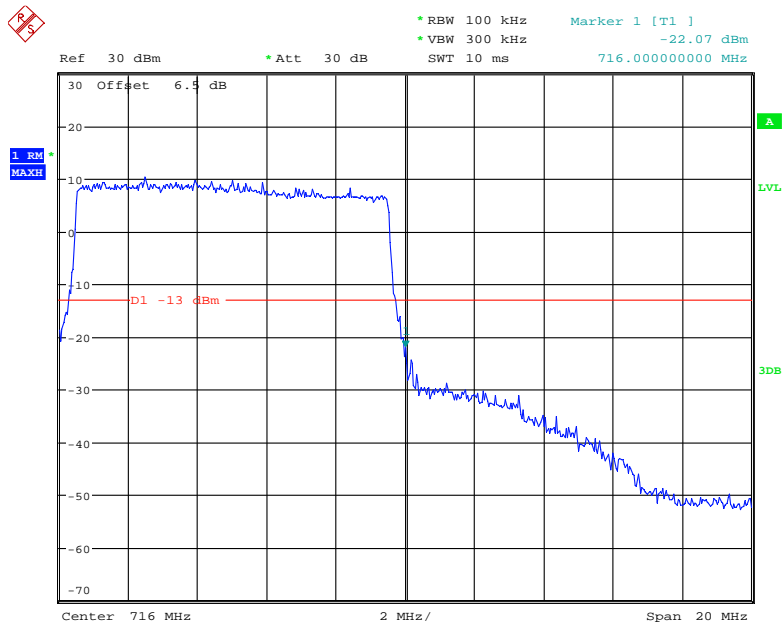
Date: 21.MAY.2020 16:19:05

16-QAM (10.0 MHz, FULL RB) - Left Band Edge



Date: 21.MAY.2020 16:18:47

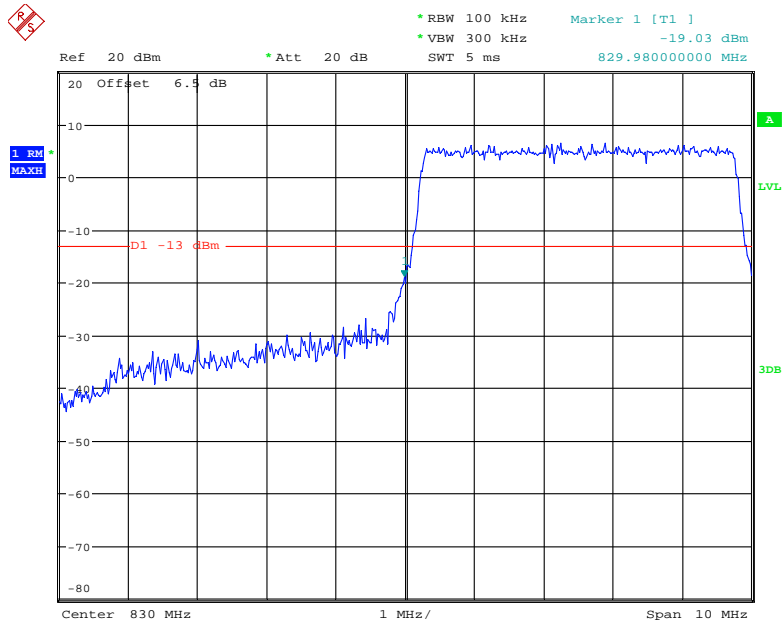
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 21.MAY.2020 16:19:22

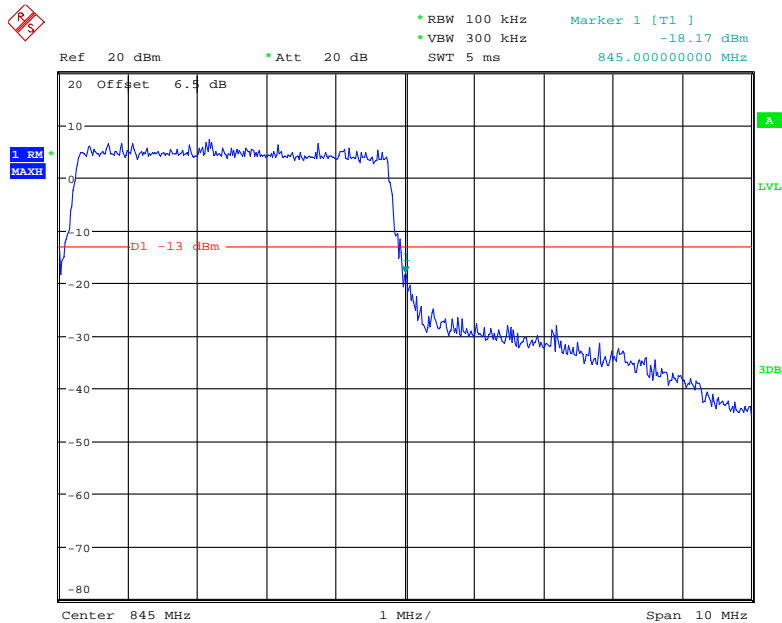
Band 19:

QPSK (5.0 MHz, FULL RB) - Left Band Edge



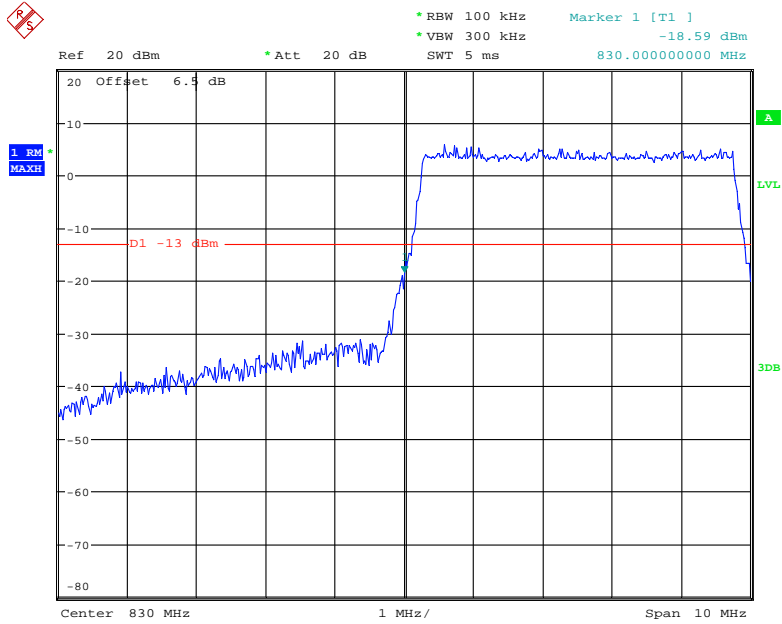
Date: 22.MAY.2020 10:05:47

QPSK (5.0 MHz, FULL RB) - Right Band Edge



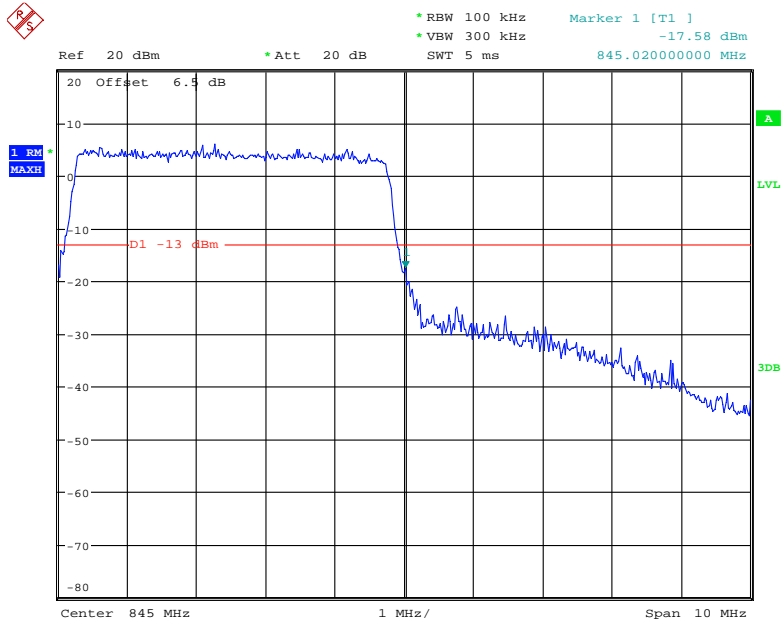
Date: 22.MAY.2020 10:06:23

16-QAM (5.0 MHz, FULL RB) - Left Band Edge



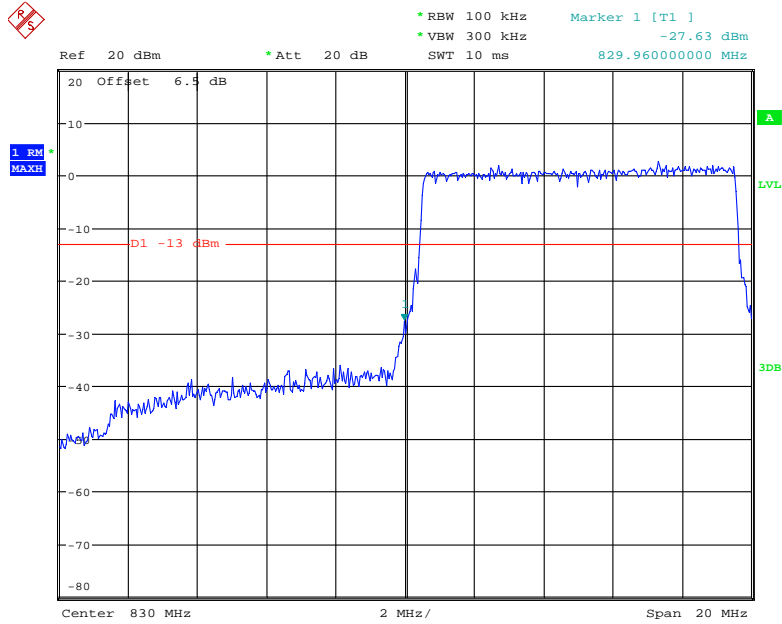
Date: 22.MAY.2020 10:06:06

16-QAM (5.0 MHz, FULL RB) - Right Band Edge



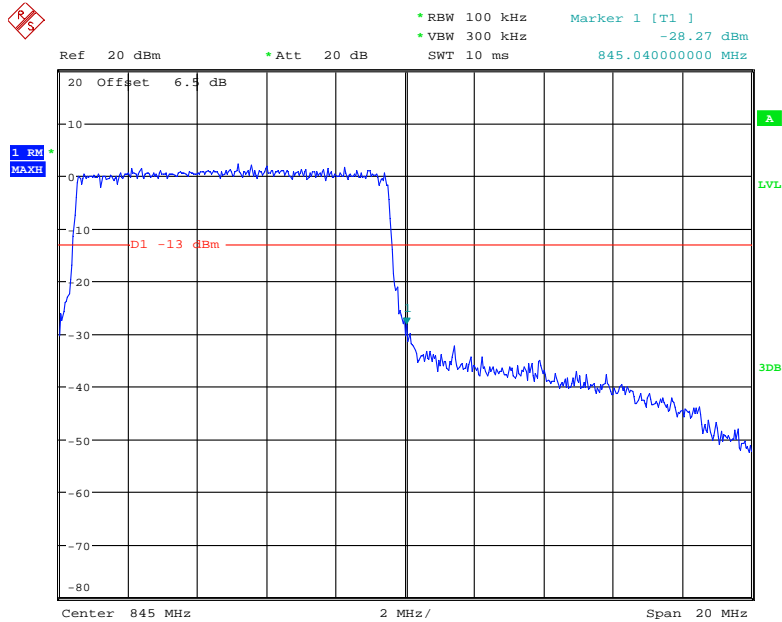
Date: 22.MAY.2020 10:06:46

QPSK (10.0 MHz, FULL RB) - Left Band Edge



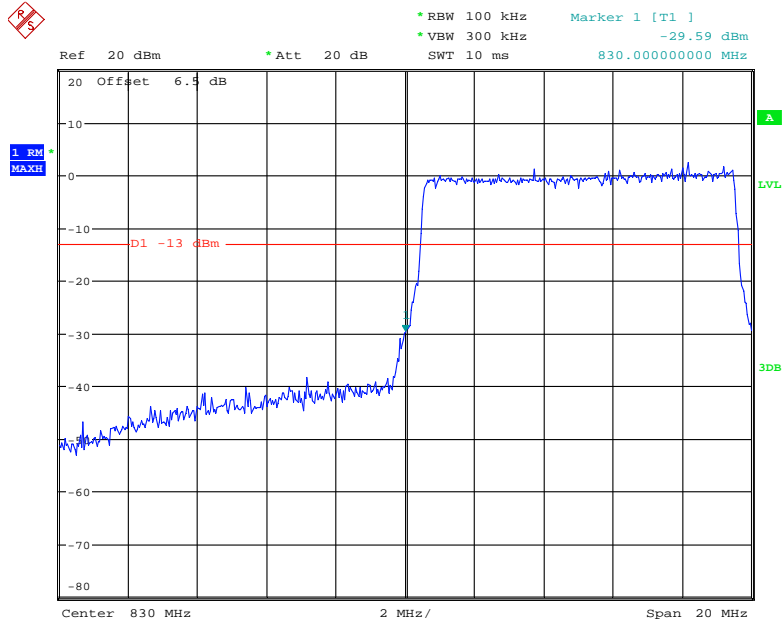
Date: 22.MAY.2020 10:07:06

QPSK (10.0 MHz, FULL RB) - Right Band Edge



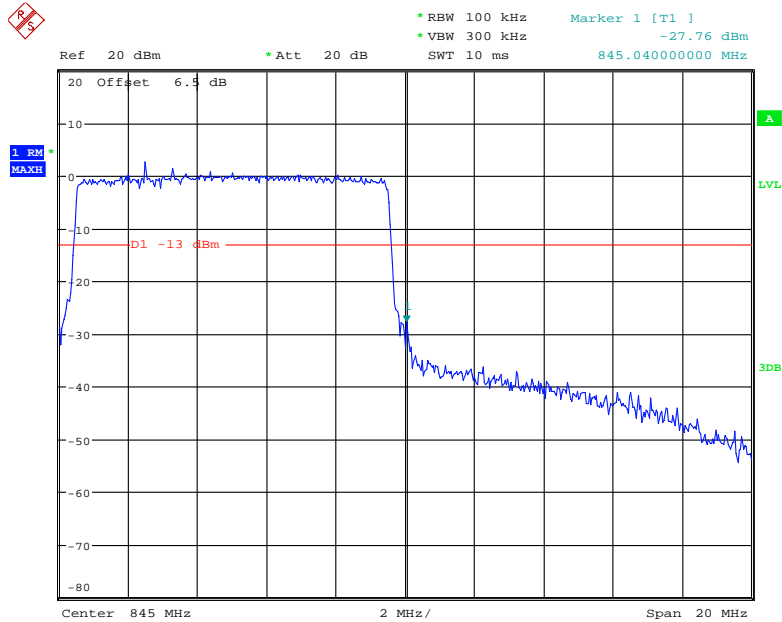
Date: 22.MAY.2020 10:07:45

16-QAM (10.0 MHz, FULL RB) - Left Band Edge



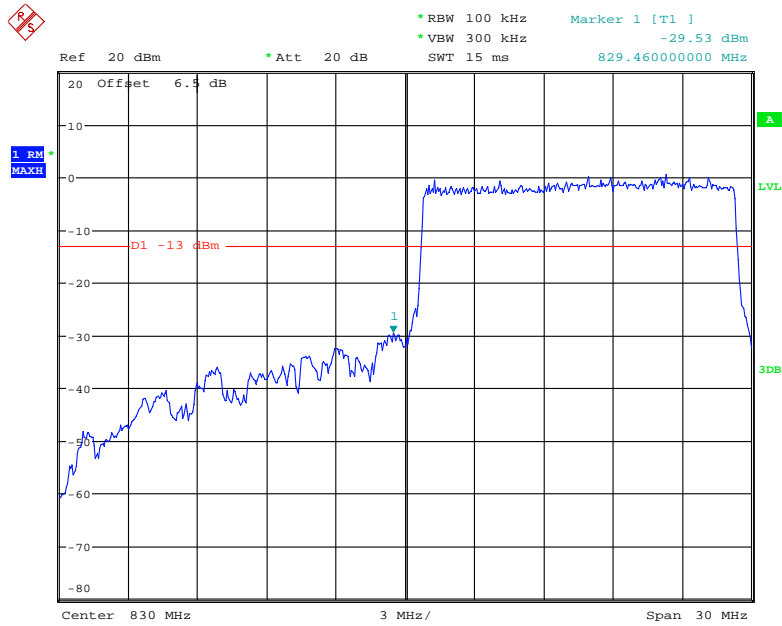
Date: 22.MAY.2020 10:07:24

16-QAM (10.0 MHz, FULL RB) - Right Band Edge



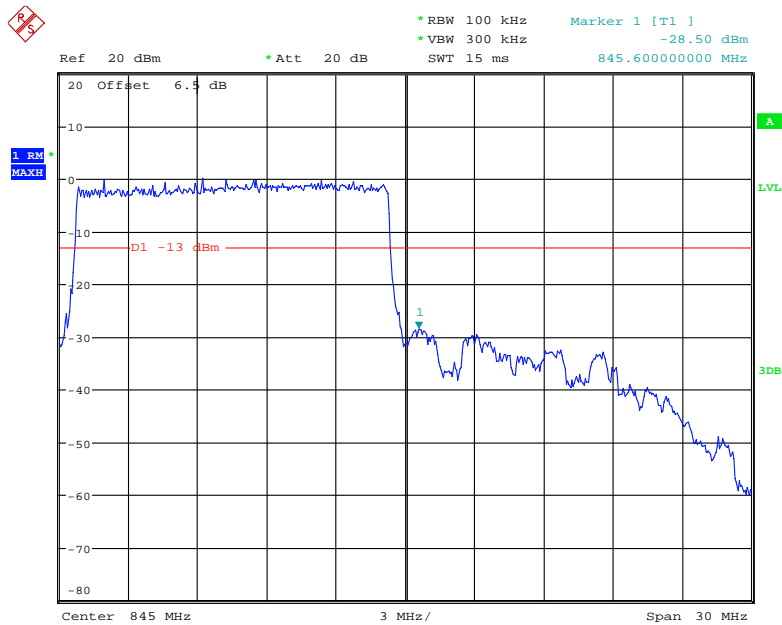
Date: 22.MAY.2020 10:08:06

QPSK (15.0 MHz, FULL RB) - Band Edge



Date: 22.MAY.2020 10:14:28

16-QAM (15.0 MHz, FULL RB) - Band Edge



Date: 22.MAY.2020 10:13:24

FCC § 2.1055; § 22.355; § 24.235; §27.54 - FREQUENCY STABILITY

Applicable Standard

FCC § 2.1055, §22.355, §24.235 and & §27.54.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile > 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

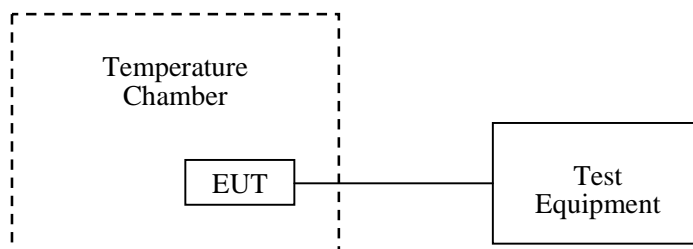
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC 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 communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



Test Data

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Gavin Guo from 2020-05-21 to 2020-05-22.

EUT operation mode: Transmitting

Test Result: Compliance

Please refer to the following tables.

Cellular Band (Part 22H)

GSM Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8V	13	0.015539	2.5
-20		15	0.017930	2.5
-10		14	0.016734	2.5
0		10	0.011953	2.5
10		-9	-0.010758	2.5
20		9	0.010758	2.5
30		14	0.016734	2.5
40		13	0.015539	2.5
50		-14	-0.016734	2.5
20		V min.= 3.6V	15	0.019125
20	V max.= 4.35V	18	0.021516	2.5

EDGE Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8V	14	0.016734	2.5
-20		15	0.017930	2.5
-10		14	0.016734	2.5
0		-9	-0.010758	2.5
10		-11	-0.013148	2.5
20		12	0.014344	2.5
30		11	0.013148	2.5
40		-12	-0.014344	2.5
50		-11	-0.013148	2.5
20		V min.= 3.6V	-9	-0.010758
20	V max.= 4.35V	9	0.010758	2.5

WCDMA Mode

Middle Channel, $f_0=836.6\text{MHz};$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8V	-10	-0.012	2.5
-20		9	0.011	2.5
-10		8	0.010	2.5
0		-5	-0.006	2.5
10		-3	-0.004	2.5
20		-7	-0.008	2.5
30		4	0.005	2.5
40		-5	-0.006	2.5
50		-8	-0.010	2.5
20		V min.= 3.6V	5	0.006
20	V max.= 4.35V	-6	-0.007	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8V	18	0.009574	pass
-20		16	0.008511	pass
-10		-17	-0.009043	pass
0		16	0.008511	pass
10		19	0.010106	pass
20		15	0.007979	pass
30		18	0.009574	pass
40		22	0.011702	pass
50		-16	-0.008511	pass
20		V min.= 3.6V	25	0.011702
20	V max.= 4.35V	17	0.009043	pass

EDGE Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8V	8	0.004255	pass
-20		7	0.003723	pass
-10		-8	-0.004255	pass
0		3	0.001596	pass
10		6	0.003191	pass
20		9	0.004787	pass
30		6	0.003191	pass
40		-8	-0.004255	pass
50		6	0.003191	pass
20		V min.= 3.6V	7	0.003723
20	V max.= 4.35V	-4	-0.002128	pass

WCDMA Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8V	-11	-0.0059	pass
-20		19	0.0101	pass
-10		18	0.0096	pass
0		-15	-0.0080	pass
10		-13	-0.0069	pass
20		-17	-0.0090	pass
30		14	0.0074	pass
40		-17	-0.0090	pass
50		-10	-0.0053	pass
20	V min.= 3.6V	15	0.0080	pass
20	V max.= 4.35V	-12	-0.0064	pass

AWS Band (Part 27)

Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8V	1710.1123	1754.9974	1710	1755
-20		1710.1134	1754.9945	1710	1755
-10		1710.1154	1754.9963	1710	1755
0		1710.1124	1754.9974	1710	1755
10		1710.1117	1754.9958	1710	1755
20		1710.1182	1754.9942	1710	1755
30		1710.1169	1754.9993	1710	1755
40		1710.1135	1754.9957	1710	1755
50		1710.1165	1754.9966	1710	1755
20		V min.= 3.6V	1710.1114	1754.9924	1710
	V max.= 4.35V	1710.1186	1754.9945	1710	1755

**LTE:
QPSK:**

Band 2:

10.0 MHz Middle Channel, $f_0 = 1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8V	-10.70	-0.0057	pass
-20		6.09	0.0032	pass
-10		-7.02	-0.0037	pass
0		7.35	0.0039	pass
10		8.23	0.0044	pass
20		-9.14	-0.0049	pass
30		9.52	0.0051	pass
40		-6.52	-0.0035	pass
50		-7.83	-0.0042	pass
20		V min.= 3.6V	7.38	0.0039
	V max.= 4.35V	7.02	0.0037	pass

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8V	1710.0065	1754.9974	1710	1755
-20		1710.0039	1754.9970	1710	1755
-10		1710.0055	1754.9963	1710	1755
0		1710.0023	1754.9954	1710	1755
10		1710.0017	1754.9977	1710	1755
20		1710.0055	1754.9990	1710	1755
30		1710.0055	1754.9959	1710	1755
40		1710.0035	1754.9966	1710	1755
50		1710.0069	1754.9986	1710	1755
20		V min.= 3.6V	1710.0038	1754.9964	1710
	V max.= 4.35V	1710.0006	1754.9976	1710	1755

Band 5:

10.0 MHz Middle Channel, $f_0 = 836.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8V	-7.45	-0.0089	2.5
-20		-7.37	-0.0088	2.5
-10		6.94	0.0083	2.5
0		7.29	0.0087	2.5
10		7.08	0.0085	2.5
20		-9.71	-0.0116	2.5
30		-7.47	-0.0089	2.5
40		-5.65	-0.0068	2.5
50		-8.68	-0.0104	2.5
20		V min.= 3.6V	-6.62	-0.0079
	V max.= 4.35V	6.05	0.0072	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8V	2500.4744	2569.6952	2500	2570
-20		2500.4760	2569.6983	2500	2570
-10		2500.4724	2569.6956	2500	2570
0		2500.4758	2569.6980	2500	2570
10		2500.4733	2569.6951	2500	2570
20		2500.4737	2569.6951	2500	2570
30		2500.4760	2569.6985	2500	2570
40		2500.4721	2569.6959	2500	2570
50		2500.4766	2569.6978	2500	2570
20		V min.= 3.6V	2500.4739	2569.6950	2500
	V max.= 4.35V	2500.4744	2569.6941	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8V	699.5233	715.5863	699	716
-20		699.5231	715.5873	699	716
-10		699.5241	715.5875	699	716
0		699.5227	715.5868	699	716
10		699.5234	715.5869	699	716
20		699.5231	715.5869	699	716
30		699.5225	715.5849	699	716
40		699.5237	715.5850	699	716
50		699.5227	715.5867	699	716
20		V min.= 3.6V	699.5250	715.5869	699
	V max.= 4.35V	699.5224	715.5865	699	716

Band 17:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8V	704.3886	715.7268	704	716
-20		704.3867	715.7259	704	716
-10		704.3885	715.7252	704	716
0		704.3874	715.7225	704	716
10		704.3880	715.7267	704	716
20		704.3866	715.7268	704	716
30		704.3885	715.7250	704	716
40		704.3874	715.7232	704	716
50		704.3875	715.7247	704	716
20		V min.= 3.6V	704.3880	715.7264	704
	V max.= 4.35V	704.3871	715.7265	704	716

Band 19:

10.0 MHz Middle Channel, $f_0 = 837.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8V	-7.55	-0.0090	2.5
-20		-7.24	-0.0086	2.5
-10		5.63	0.0067	2.5
0		6.96	0.0083	2.5
10		6.33	0.0076	2.5
20		-7.45	-0.0089	2.5
30		-7.47	-0.0089	2.5
40		-6.12	-0.0073	2.5
50		5.23	0.0062	2.5
20		V min.= 3.6V	-6.32	-0.0075
	V max.= 4.35V	5.24	0.0063	2.5

16QAM:

Band 2:

10.0 MHz Middle Channel, $f_0 = 1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8V	-7.37	-0.0039	pass
-20		-6.90	-0.0037	pass
-10		-8.41	-0.0045	pass
0		-8.47	-0.0045	pass
10		6.40	0.0034	pass
20		-6.95	-0.0037	pass
30		6.53	0.0035	pass
40		9.18	0.0049	pass
50		7.47	0.0040	pass
20		V min.= 3.6V	8.88	0.0047
	V max.= 4.35V	-7.46	-0.0040	pass

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8V	1710.0035	1754.9974	1710	1755
-20		1710.0061	1754.9972	1710	1755
-10		1710.0024	1754.9954	1710	1755
0		1710.0015	1754.9978	1710	1755
10		1710.0050	1754.9985	1710	1755
20		1710.0054	1754.9964	1710	1755
30		1710.0033	1754.9979	1710	1755
40		1710.0042	1754.9979	1710	1755
50		1710.0057	1754.9973	1710	1755
20		V min.= 3.6V	1710.0026	1754.9954	1710
	V max.= 4.35V	1710.0016	1754.9971	1710	1755

Band 5:

10.0 MHz Middle Channel, f _o =836.5MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8V	-5.46	-0.0065	2.5
-20		6.14	0.0073	2.5
-10		5.96	0.0071	2.5
0		8.01	0.0096	2.5
10		-7.10	-0.0085	2.5
20		-7.27	-0.0087	2.5
30		7.10	0.0085	2.5
40		-8.68	-0.0104	2.5
50		-5.49	-0.0066	2.5
20		V min.= 3.6V	-7.79	-0.0093
	V max.= 4.35V	6.16	0.0074	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8V	2500.4741	2569.6952	2500	2570
-20		2500.4737	2569.6955	2500	2570
-10		2500.4755	2569.6984	2500	2570
0		2500.4731	2569.6961	2500	2570
10		2500.4756	2569.6980	2500	2570
20		2500.4737	2569.6950	2500	2570
30		2500.4739	2569.6949	2500	2570
40		2500.4740	2569.6959	2500	2570
50		2500.4724	2569.6948	2500	2570
20	V min.= 3.6V	2500.4732	2569.6983	2500	2570
	V max.= 4.35V	2500.4735	2569.6944	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8V	699.5231	715.5867	699	716
-20		699.5233	715.5851	699	716
-10		699.5229	715.5873	699	716
0		699.5245	715.5869	699	716
10		699.5223	715.5866	699	716
20		699.5235	715.5860	699	716
30		699.5233	715.5873	699	716
40		699.5220	715.5849	699	716
50		699.5247	715.5891	699	716
20		V min.= 3.6V	699.5245	715.5862	699
	V max.= 4.35V	699.5243	715.5889	699	716

Band 17:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8V	704.3893	715.7246	704	716
-20		704.3890	715.7267	704	716
-10		704.3859	715.7249	704	716
0		704.3888	715.7260	704	716
10		704.3879	715.7245	704	716
20		704.3882	715.7266	704	716
30		704.3867	715.7278	704	716
40		704.3891	715.7245	704	716
50		704.3883	715.7270	704	716
20		V min.= 3.6V	704.3864	715.7248	704
	V max.= 4.35V	704.3888	715.7253	704	716

Band 19:

10.0 MHz Middle Channel, f ₀ =837MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8V	3.11	0.0037	2.5
-20		5.02	0.0060	2.5
-10		6.11	0.0073	2.5
0		7.24	0.0086	2.5
10		5.26	0.0063	2.5
20		-5.23	-0.0062	2.5
30		6.97	0.0083	2.5
40		-7.44	-0.0089	2.5
50		5.22	0.0062	2.5
20		V min.= 3.6V	3.66	0.0044
	V max.= 4.35V	7.10	0.0085	2.5

***** END OF REPORT *****