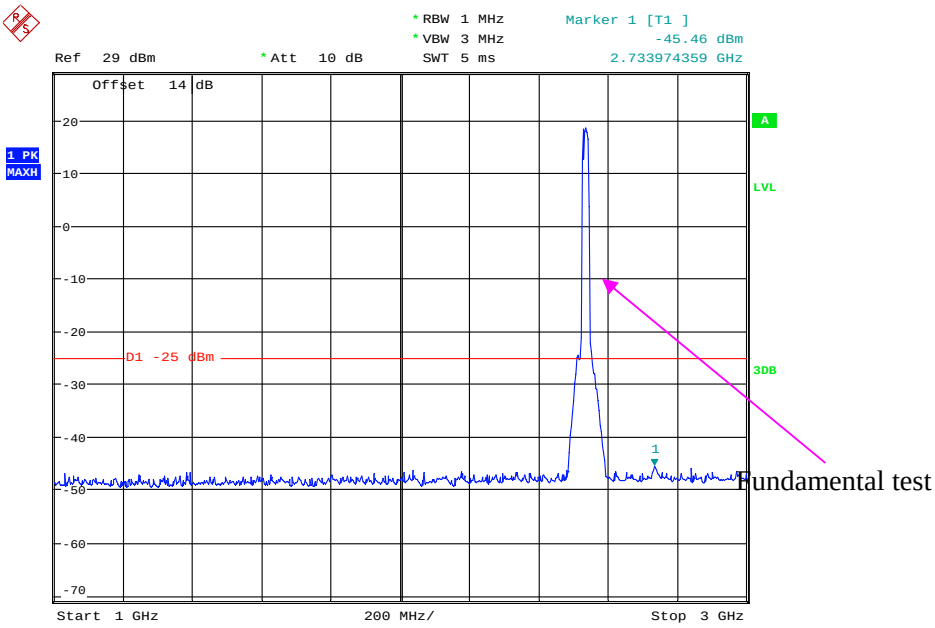
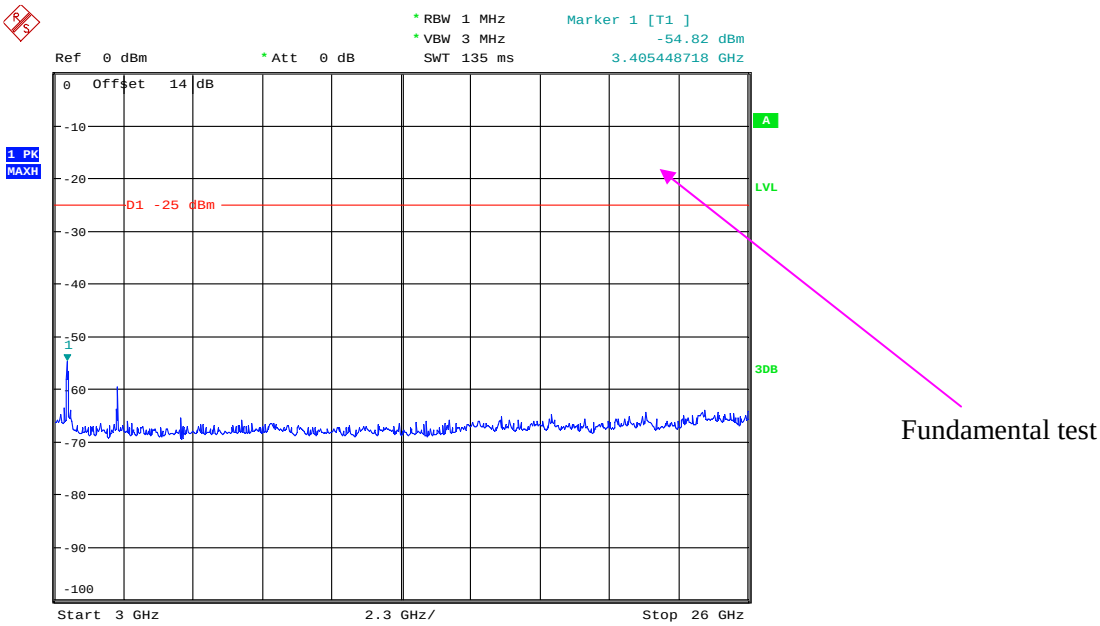
1 GHz – 3 GHz (20.0 MHz, Middle Channel)



Date: 18.OCT.2017 22:44:43

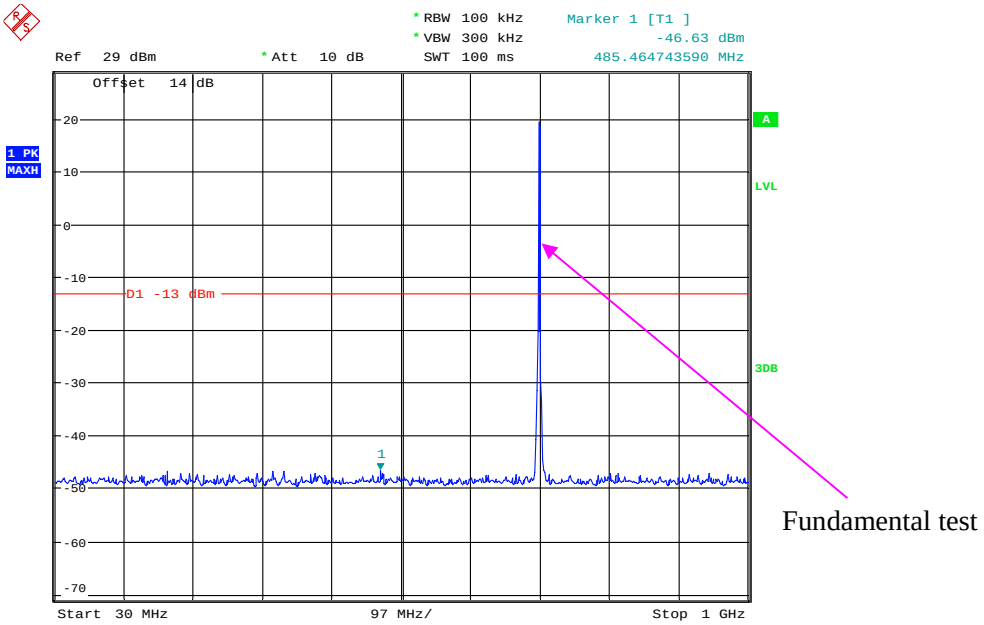
3 GHz – 26 GHz (20.0 MHz, Middle Channel)



Date: 18.OCT.2017 22:41:28

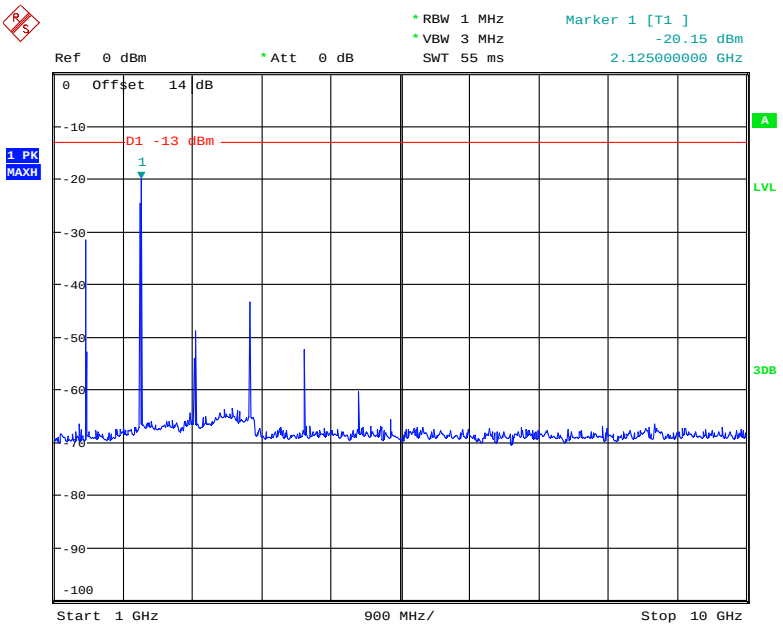
LTE Band 12:

30 MHz - 1 GHz (1.4 MHz, Middle Channel)



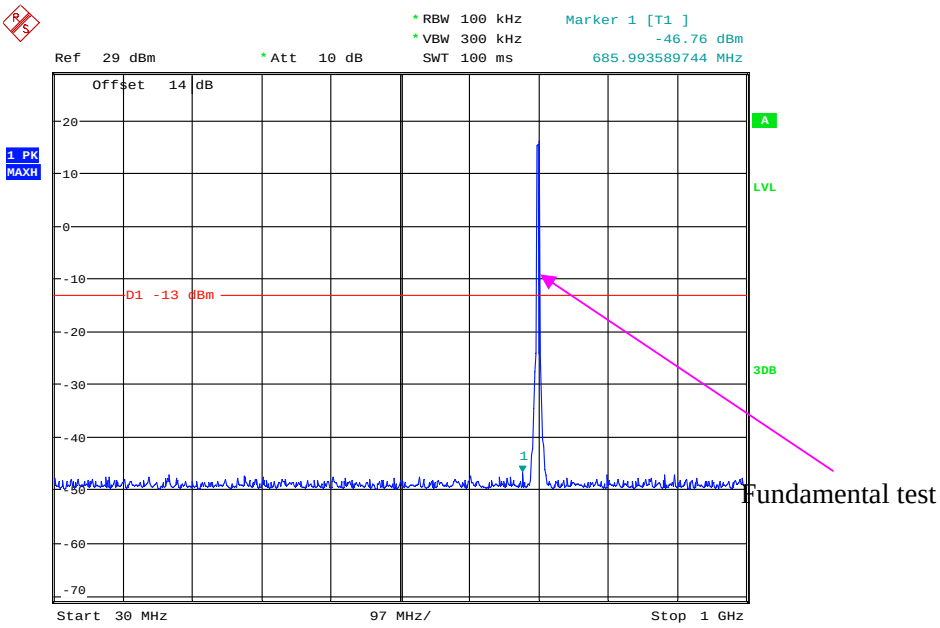
Date: 18.OCT.2017 22:54:37

1 GHz – 10 GHz (1.4 MHz, Middle Channel)



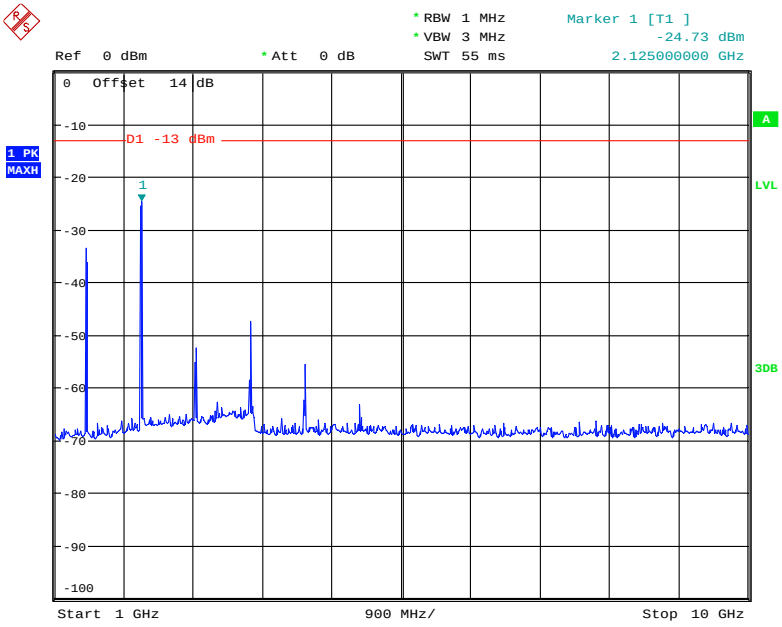
Date: 18.OCT.2017 22:49:10

30 MHz - 1 GHz (3.0 MHz, Middle Channel)



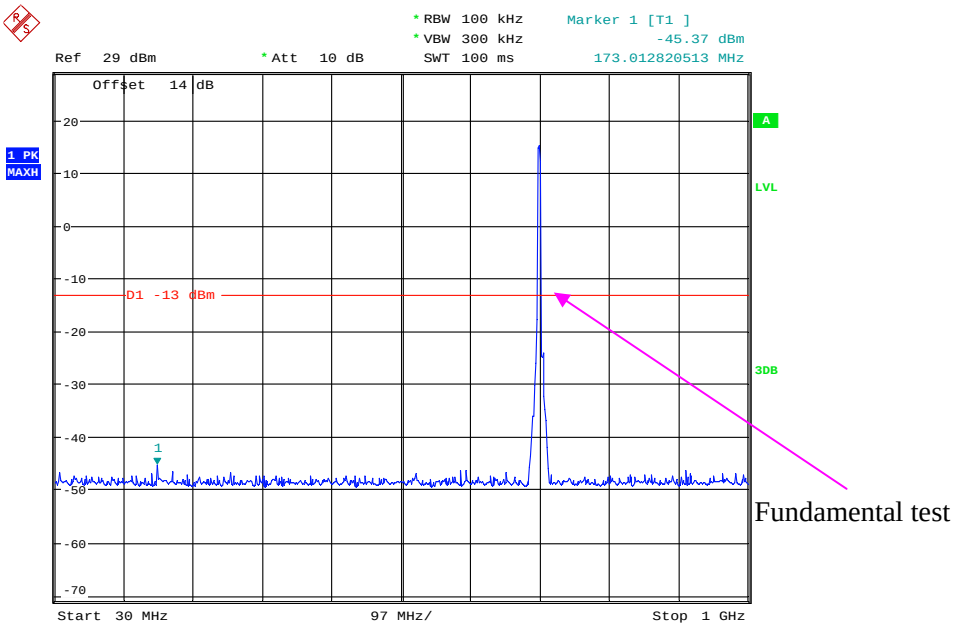
Date: 18.OCT.2017 22:53:23

1 GHz – 10 GHz (3.0 MHz, Middle Channel)



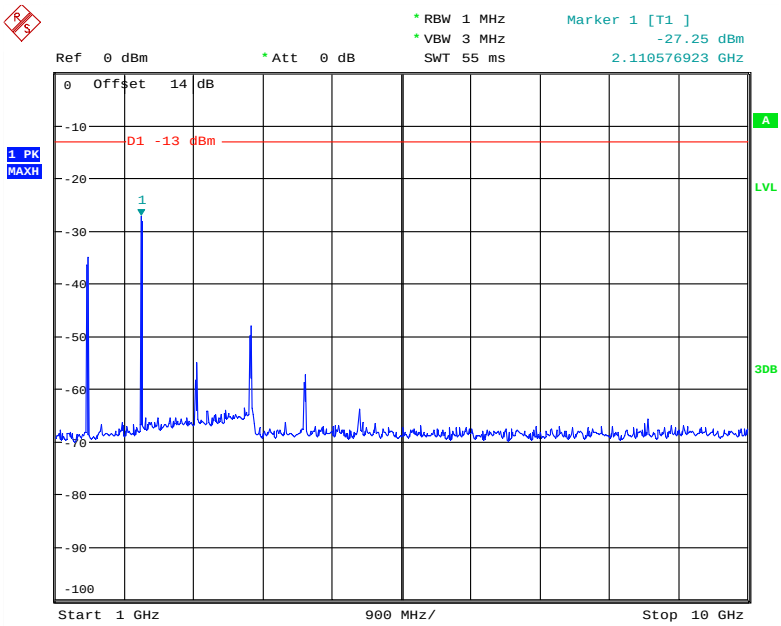
Date: 18.OCT.2017 22:49:34

30 MHz - 1 GHz (5.0 MHz, Middle Channel)



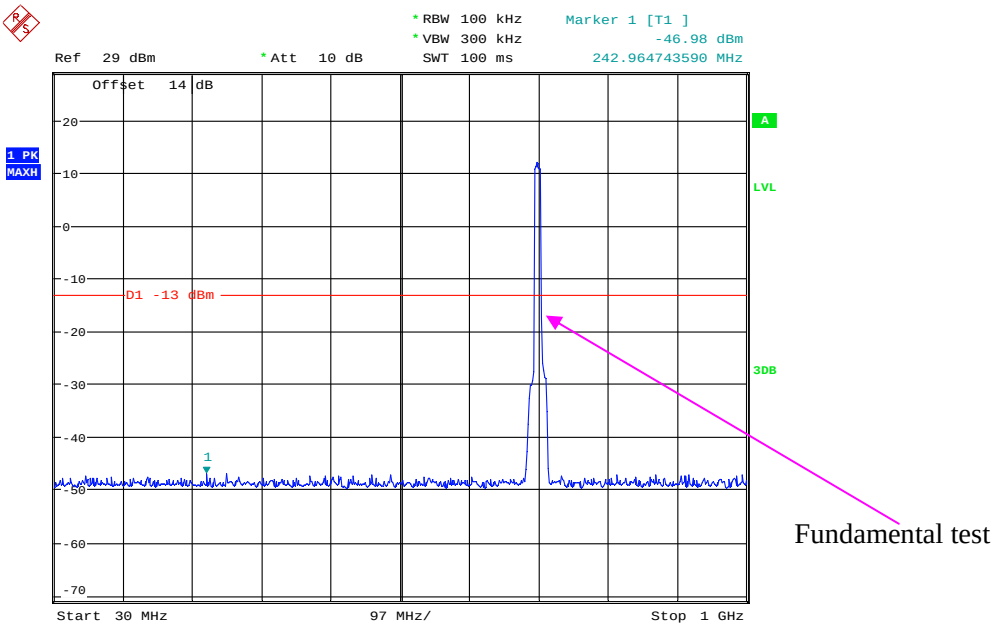
Date: 18.OCT.2017 22:52:51

1 GHz – 10 GHz (5.0 MHz, Middle Channel)



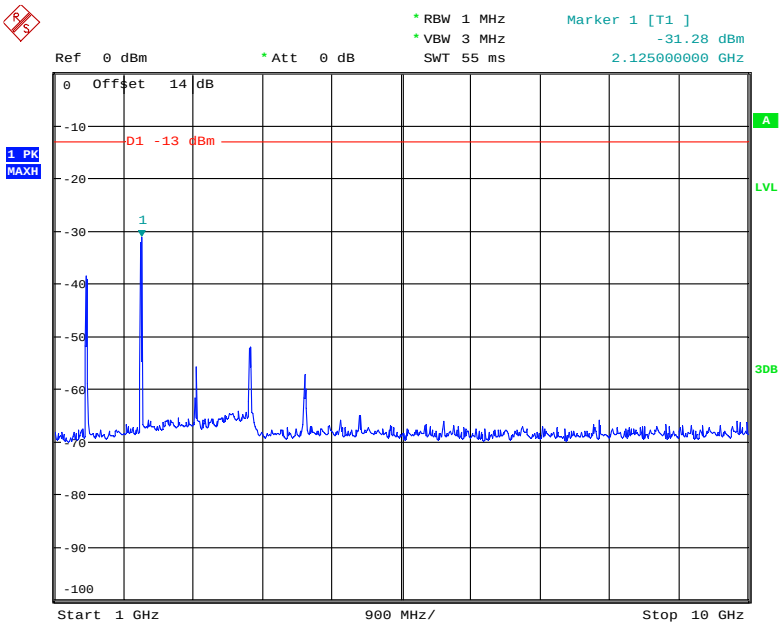
Date: 18.OCT.2017 22:49:53

30 MHz - 1 GHz (10.0 MHz, Middle Channel)



Date: 18.OCT.2017 22:51:35

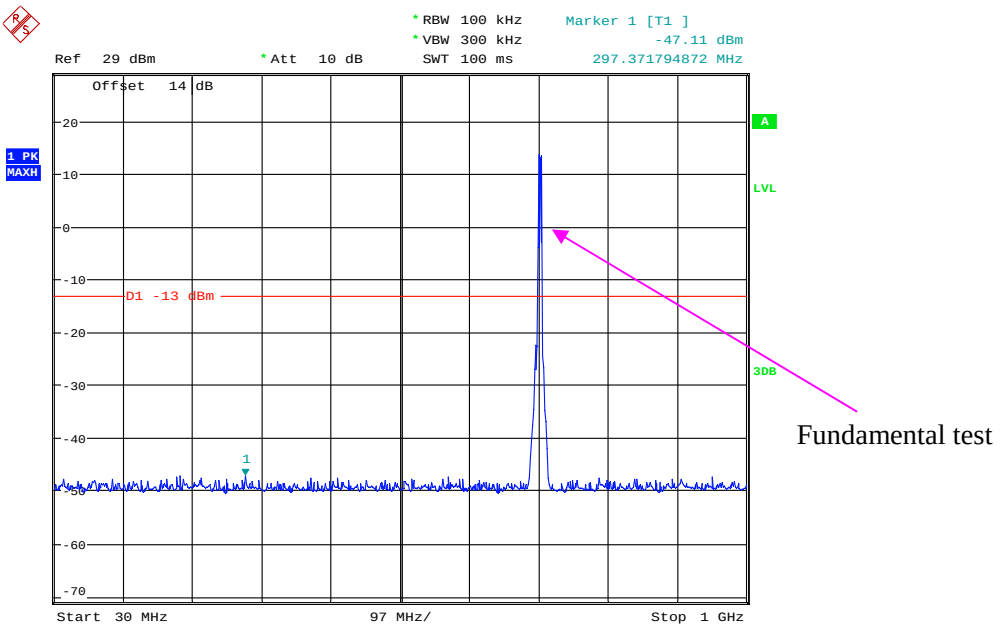
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 18.OCT.2017 22:50:06

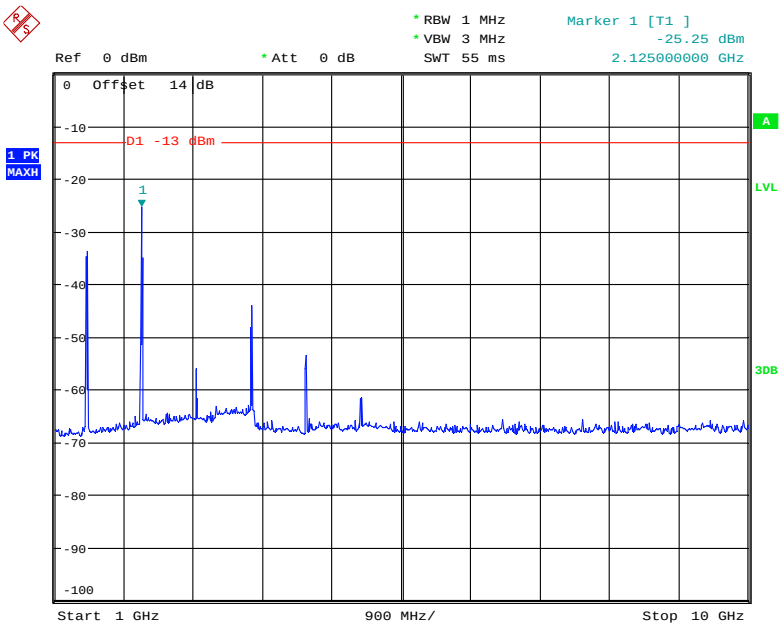
LTE Band 17:

30 MHz - 1 GHz (5.0 MHz, Middle Channel)



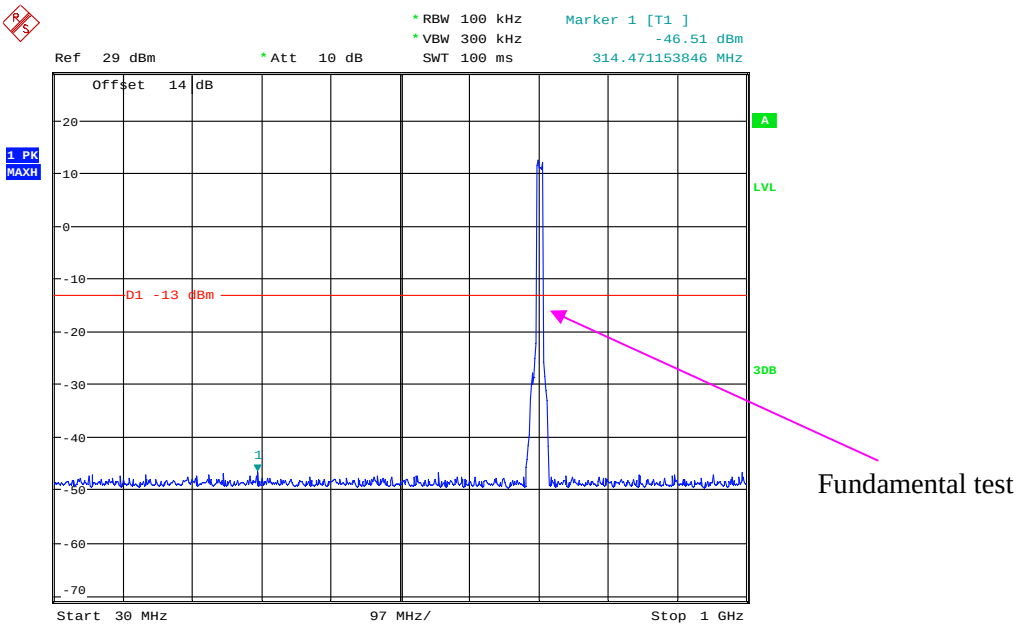
Date: 18.OCT.2017 22:59:45

1 GHz – 10 GHz (5.0 MHz, Middle Channel)



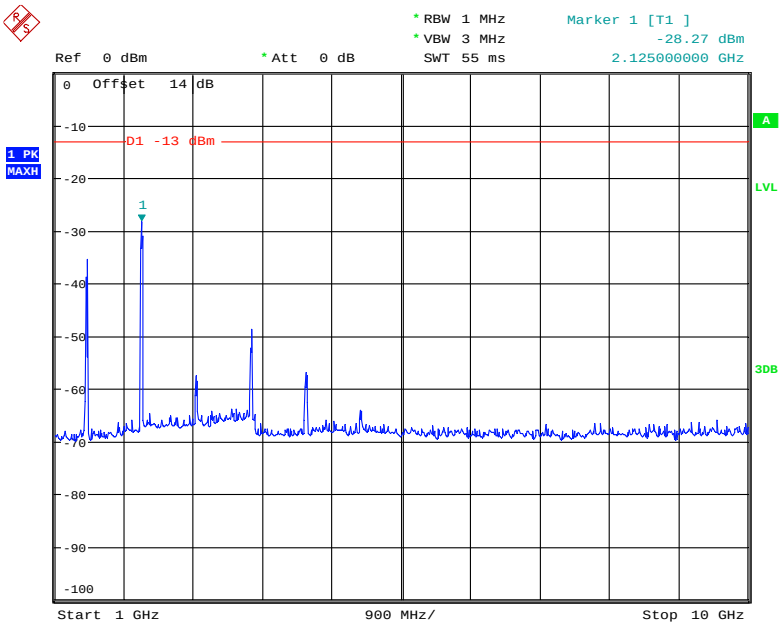
Date: 18.OCT.2017 22:57:21

30 MHz - 1 GHz (10.0 MHz, Middle Channel)



Date: 18.OCT.2017 22:59:11

1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 18.OCT.2017 22:57:46

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

Applicable Standard

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

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:	22 ℃
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Kobe Li on 2017-10-27.

EUT operation mode: Transmitting

Pre-scan with Low, Middle and High channel, the worst case as below:

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 (dB)		Limit (dBm)	Margin (dB)
GSM Mode, Middle channel										
399.88	30.28	350	2.0	H	-37	0.67	0	-37.67	-13	24.67
399.88	31.25	291	1.9	V	-36	0.67	0	-36.67	-13	23.67
1673.20	46.16	134	1.8	H	-60.9	1.30	9.10	-53.10	-13	40.10
1673.20	46.18	342	2.4	V	-60.3	1.30	9.10	-52.50	-13	39.50
2509.80	47.8	142	1.3	H	-55.7	2.60	9.30	-49.00	-13	36.00
2509.80	44.55	359	1.1	V	-58.4	2.60	9.30	-51.70	-13	38.70
WCDMA Mode, Middle channel										
400.27	34.25	154	1.6	H	-33.0	0.67	0	-33.67	-13	20.67
400.27	33.45	219	1.0	V	-33.8	0.67	0	-34.47	-13	21.47
1673.20	44.26	153	2.1	H	-62.8	1.30	9.10	-55.00	-13	42.00
1673.20	42.86	225	1.9	V	-63.6	1.30	9.10	-55.80	-13	42.80
2509.80	46.76	126	1.7	H	-56.8	2.60	9.30	-50.10	-13	37.10
2509.80	43.49	85	2.5	V	-59.4	2.60	9.30	-52.70	-13	39.70

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/27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
GSM Mode, Middle channel										
399.88	31.29	299	1.7	H	-35.9	0.67	0	-36.57	-13	23.57
399.88	32.54	146	2.2	V	-34.7	0.67	0	-35.37	-13	22.37
3760.00	46.15	93	1.7	H	-55.1	1.50	9.70	-46.90	-13	33.90
3760.00	46.18	126	2.4	V	-54.6	1.50	9.70	-46.40	-13	33.40
WCDMA Mode Band II, Middle channel										
400.27	33.29	111	1.5	H	-33.9	0.67	0	-34.57	-13	21.57
400.27	32.14	333	2.2	V	-35.1	0.67	0	-35.77	-13	22.77
3760.00	50.23	338	1.5	H	-51.0	1.50	9.70	-42.80	-13	29.80
3760.00	49.7	180	1.6	V	-51.1	1.50	9.70	-42.90	-13	29.90

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

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
Band 2										
Test frequency range:30 MHz ~ 20 GHz										
399.88	32.14	53	1.6	H	-35.1	0.67	0	-35.77	-13	22.77
399.88	33.12	295	2.0	V	-34.1	0.67	0	-34.77	-13	21.77
3760.00	52.68	88	2.3	H	-48.5	1.50	9.70	-40.30	-13	27.30
3760.00	47.19	166	2.2	V	-53.6	1.50	9.70	-45.40	-13	32.40
Band 4										
Test frequency range:30 MHz ~ 18 GHz										
399.88	31.04	137	1.2	H	-36.2	0.67	0	-36.87	-13	23.87
399.88	32.46	157	2.1	V	-34.8	0.67	0	-35.47	-13	22.47
3465.00	44.76	10	1.2	H	-55.6	1.50	9.70	-47.40	-13	34.40
3465.00	43.51	286	2.4	V	-57.6	1.50	9.70	-49.40	-13	36.40
Band 5										
Test frequency range:30 MHz ~ 10 GHz										
399.88	33.14	111	1.3	H	-34.1	0.67	0	-34.77	-13	21.77
399.88	34.57	240	1.3	V	-32.7	0.67	0	-33.37	-13	20.37
1673.00	45.09	270	1.2	H	-62.0	1.30	9.10	-54.20	-13	41.20
1673.00	42.22	228	2.2	V	-64.3	1.30	9.10	-56.50	-13	43.50
Band 7										
Test frequency range:30 MHz ~ 26 GHz										
399.88	32.84	78	2.3	H	-34.4	0.67	0	-35.07	-13	22.07
399.88	34.51	262	1.9	V	-32.7	0.67	0	-33.37	-13	20.37
5070.00	43.54	103	1.7	H	-54.3	1.60	11.20	-44.70	-25	19.70
5070.00	43.2	190	1.0	V	-54.7	1.60	11.20	-45.10	-25	20.10
Band 12										
Test frequency range: 30 MHz ~ 10 GHz										
399.88	32.24	261	2.0	H	-35	0.67	0	-35.67	-13	22.67
399.88	33.64	221	2.1	V	-33.6	0.67	0	-34.27	-13	21.27
1415.00	55.3	151	1.8	H	-52.5	1.60	8.30	-45.80	-13	32.80
1415.00	52.96	278	1.4	V	-55.1	1.60	8.30	-48.40	-13	35.40
2122.50	45.55	55	1.5	H	-56.5	1.30	8.80	-49.00	-13	36.00
2122.50	44.38	139	1.8	V	-58.5	1.30	8.80	-51.00	-13	38.00
Band 17										
Test frequency range: 30 MHz ~ 10GHz										
399.88	32.45	192	1.7	H	-34.8	0.67	0	-35.47	-13	22.47
399.88	33.78	274	1.3	V	-33.5	0.67	0	-34.17	-13	21.17
1420.00	55.41	153	2.4	H	-52.4	1.60	8.30	-45.70	-13	32.70
1420.00	53.08	129	1.9	V	-55.0	1.60	8.30	-48.30	-13	35.30
2130.00	44.54	43	2.0	H	-57.5	1.30	8.80	-50.00	-13	37.00
2130.00	43.85	299	1.8	V	-59.1	1.30	8.80	-51.60	-13	38.60

Note:
1) Absolute Level = Substituted Level - Cable loss + Antenna Gain
2) Margin = Limit- Absolute Level

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.

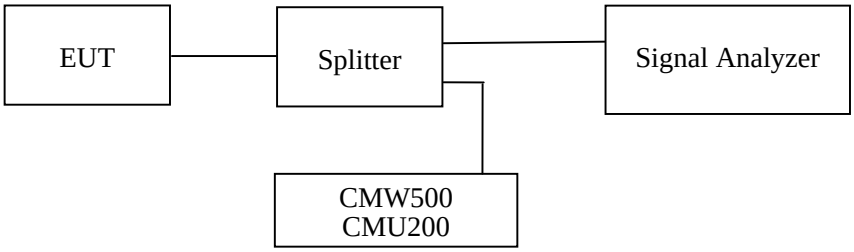
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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

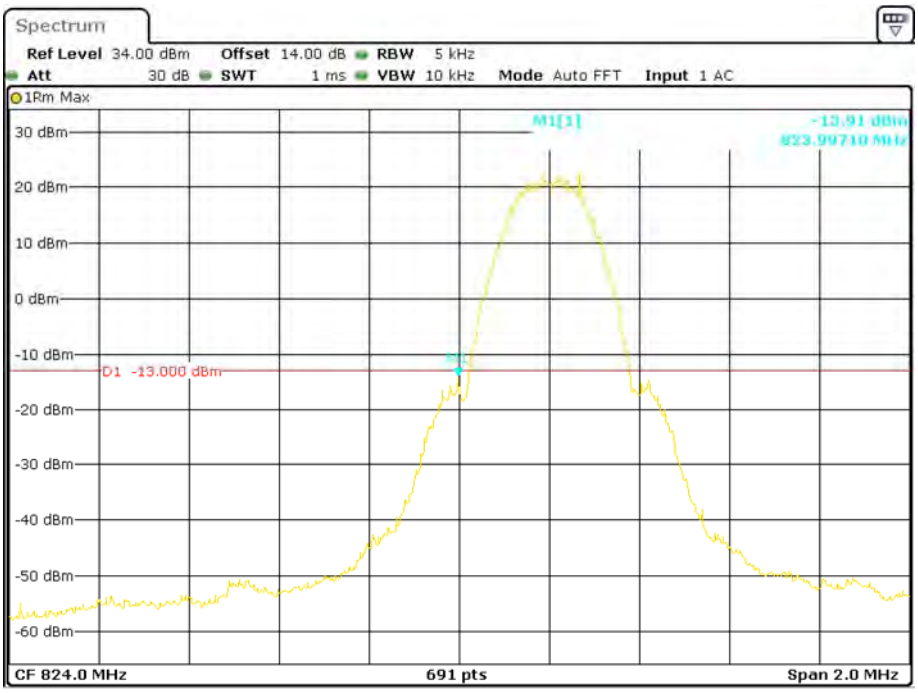
Temperature:	24~25℃
Relative Humidity:	47~50 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Kobe Li from 2017-10-18 to 2017-10-26.

EUT operation mode: Transmitting

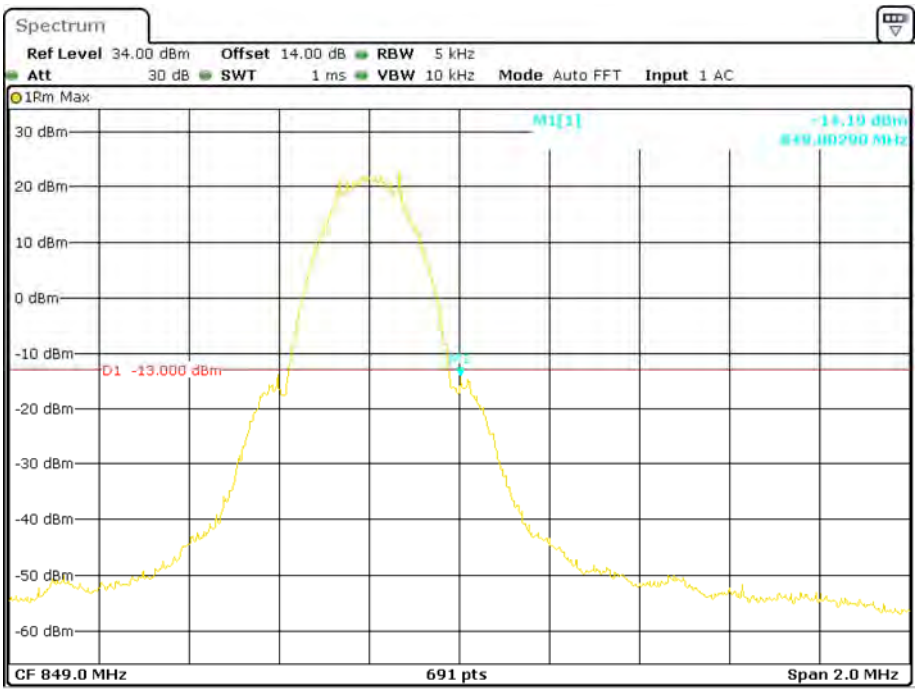
Test Result: Compliance. Please refer to the following plots.

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



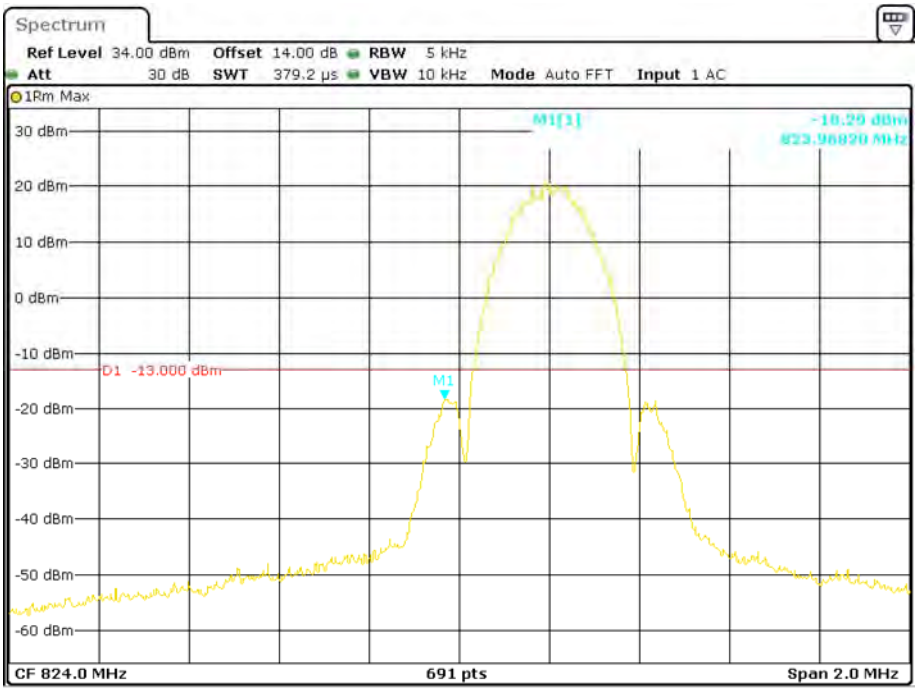
Date: 18.OCT.2017 20:00:37

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



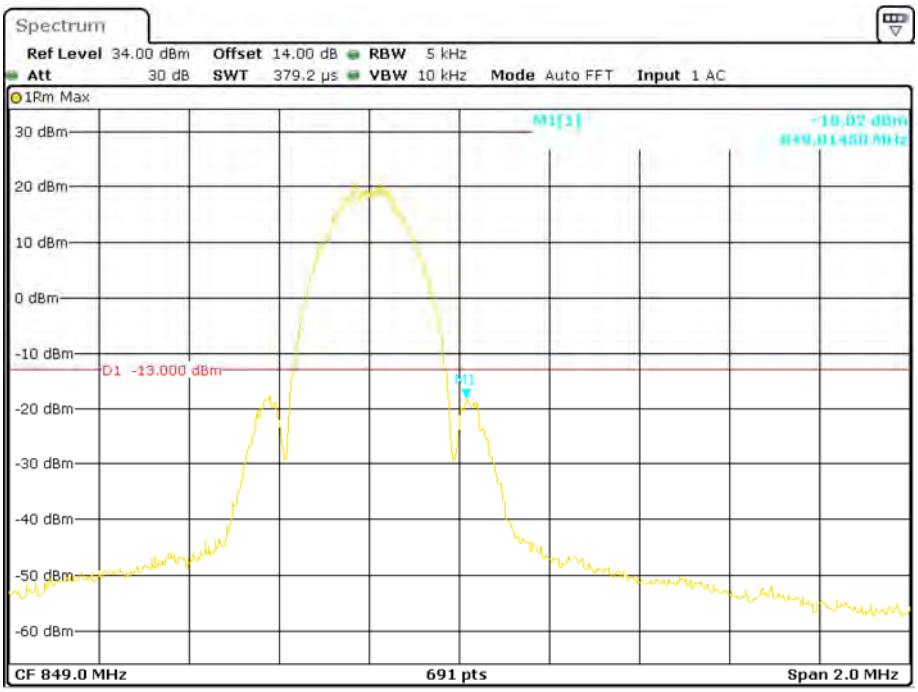
Date: 18.OCT.2017 19:59:23

Cellular Band, Left Band Edge for EDGE Mode



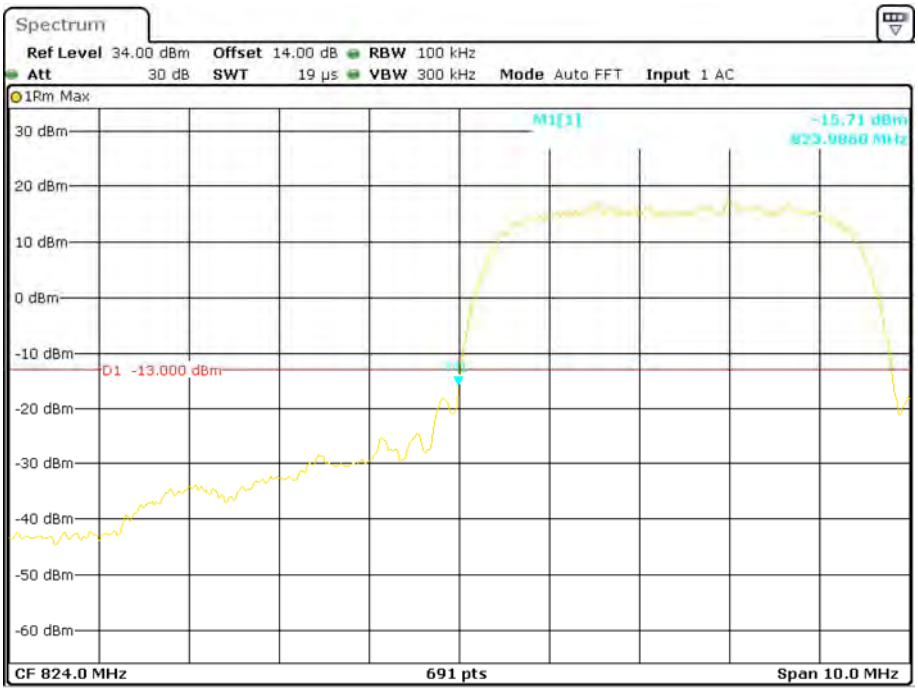
Date: 18.OCT.2017 19:55:29

Cellular Band, Right Band Edge for EDGE Mode



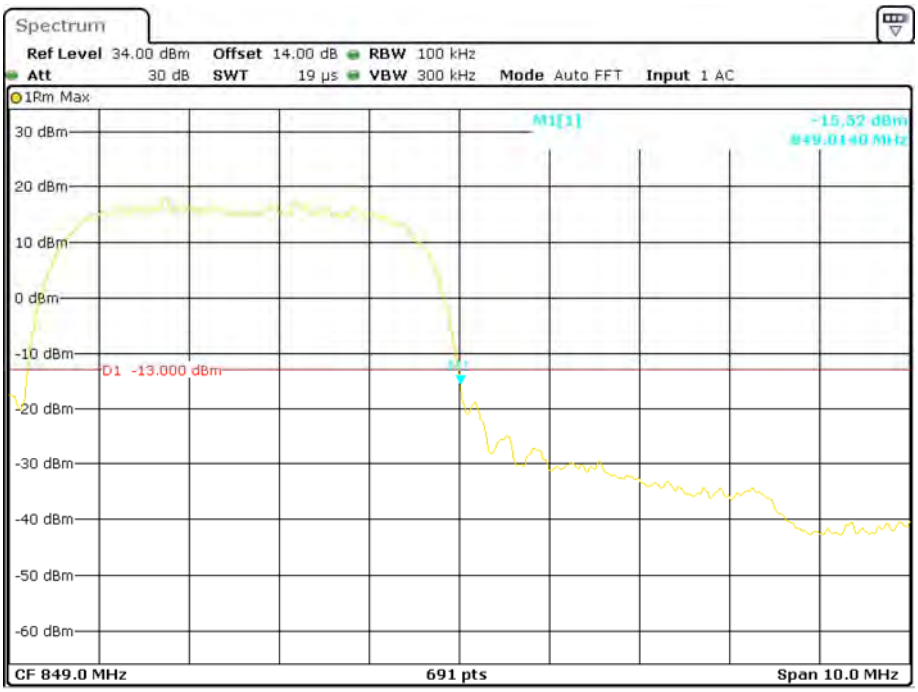
Date: 18.OCT.2017 19:56:28

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



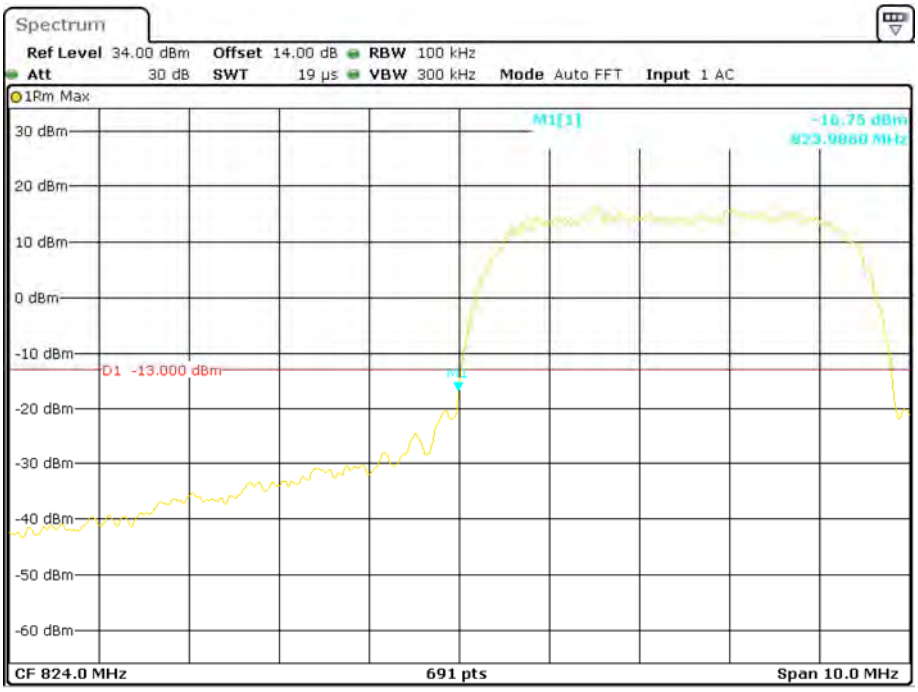
Date: 18.OCT.2017 20:50:35

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



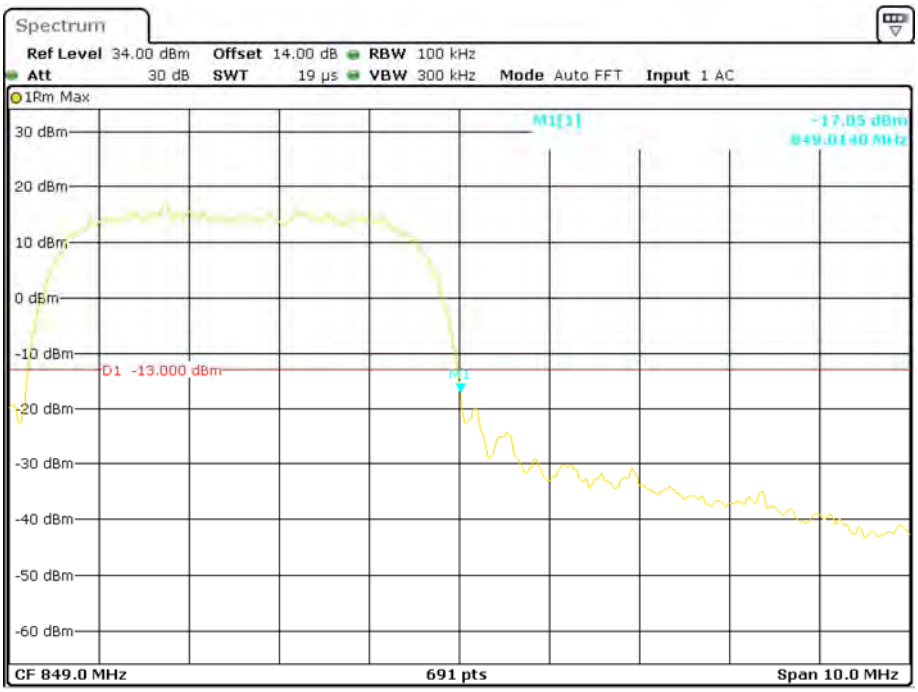
Date: 18.OCT.2017 20:48:40

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



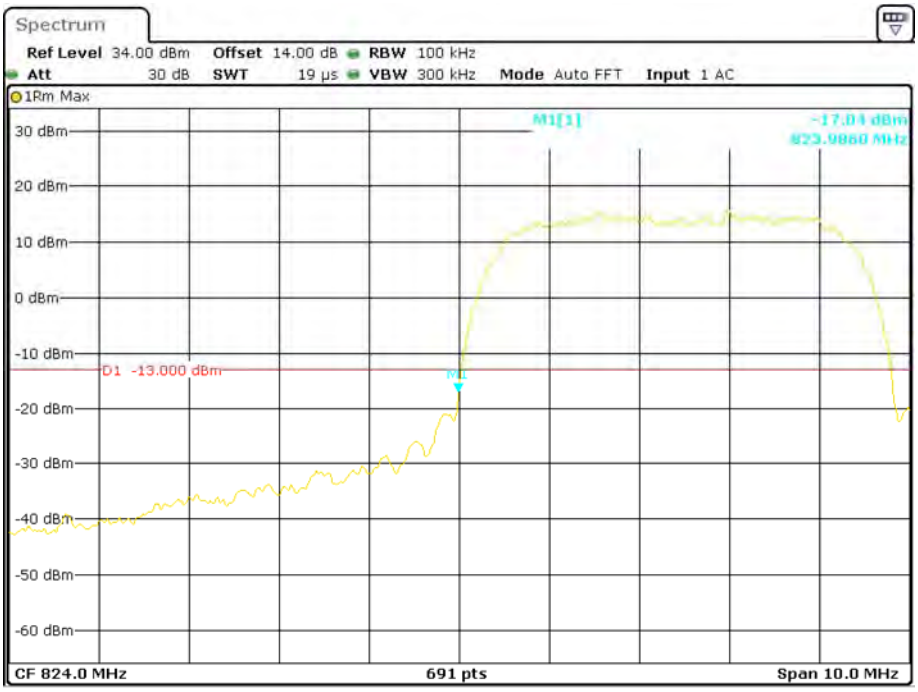
Date: 18.OCT.2017 20:42:36

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



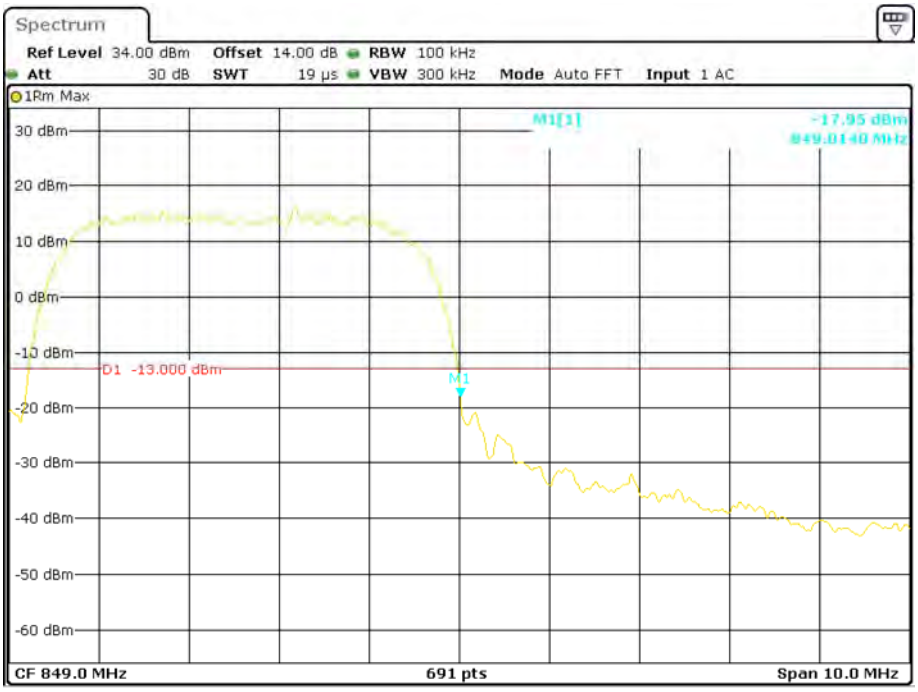
Date: 18.OCT.2017 20:41:39

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



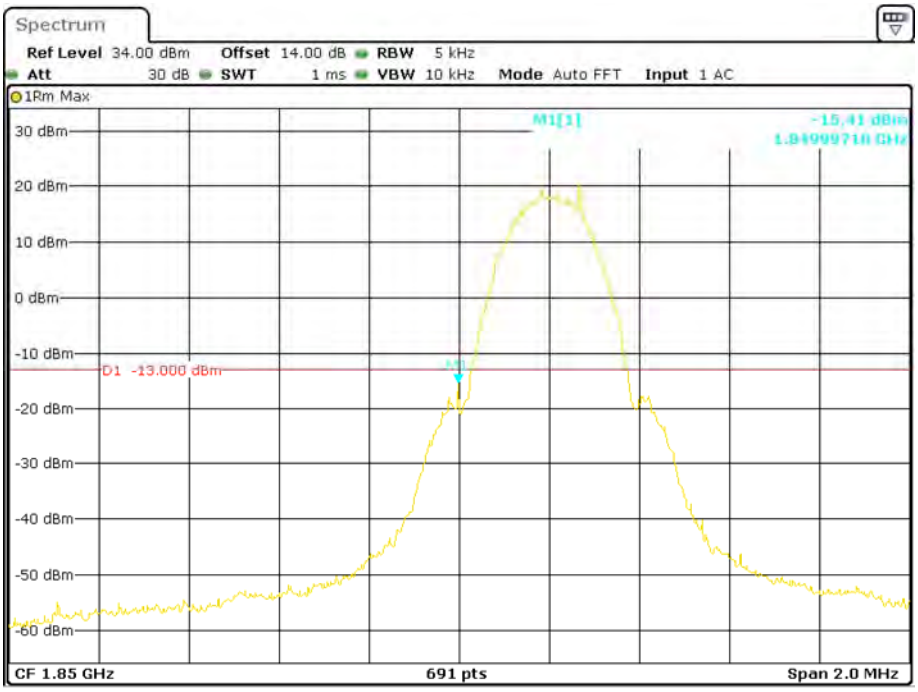
Date: 18.OCT.2017 20:35:00

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



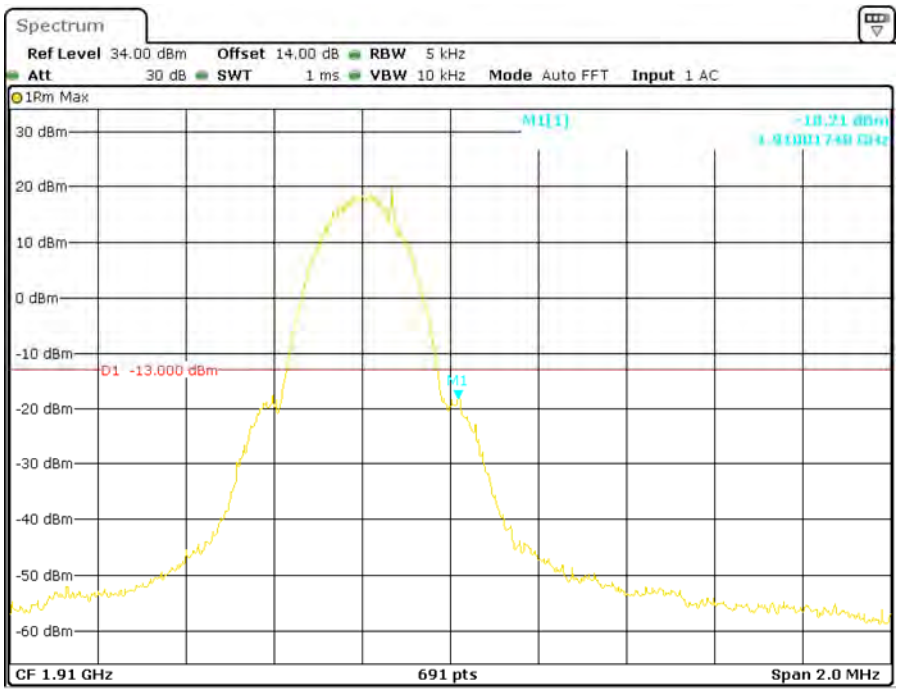
Date: 18.OCT.2017 20:36:45

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



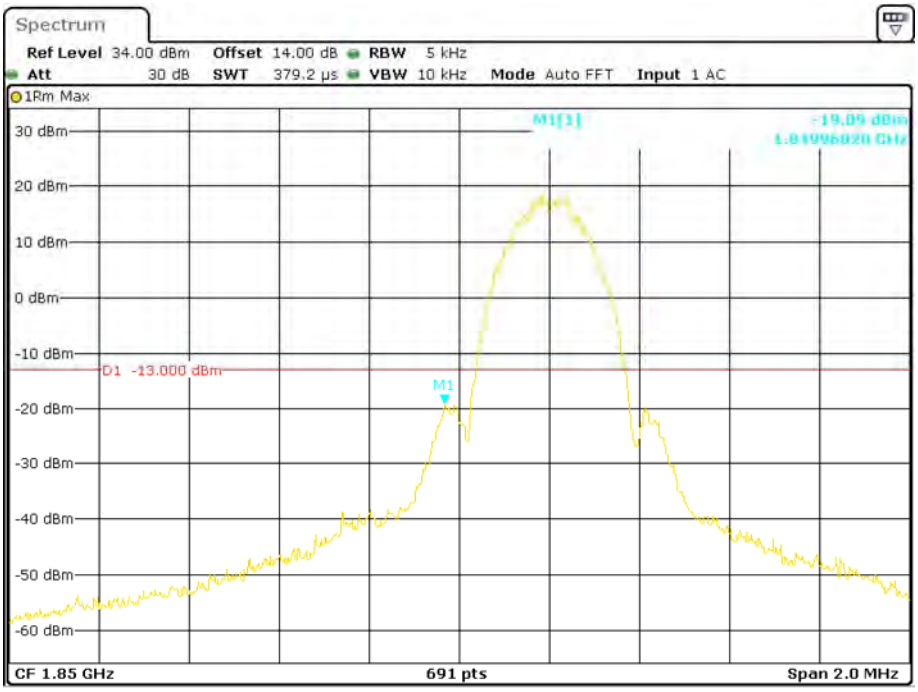
Date: 18.OCT.2017 20:02:31

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



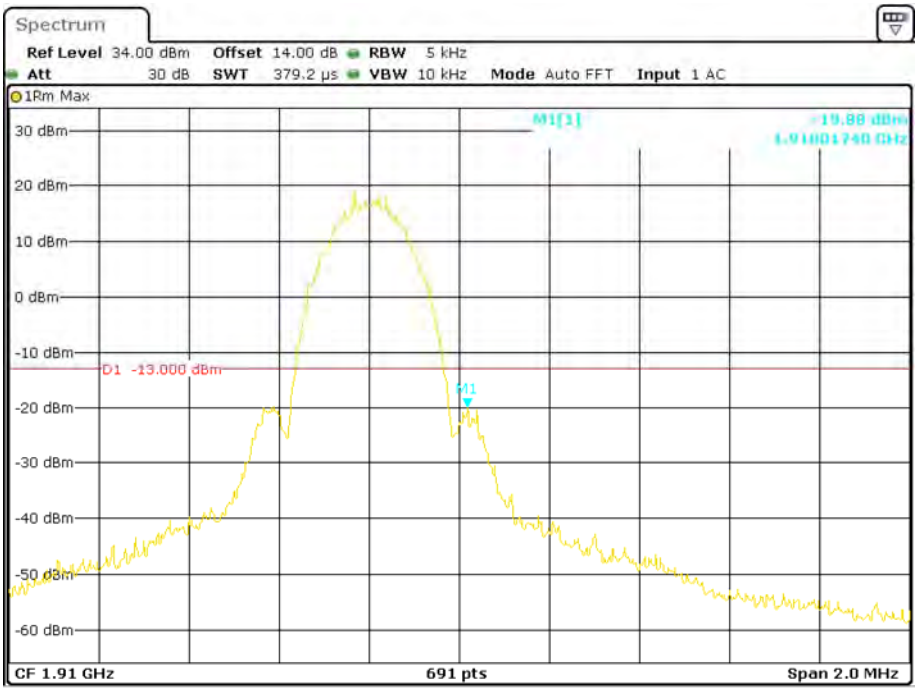
Date: 18.OCT.2017 20:03:20

PCS Band, Left Band Edge for EDGE Mode



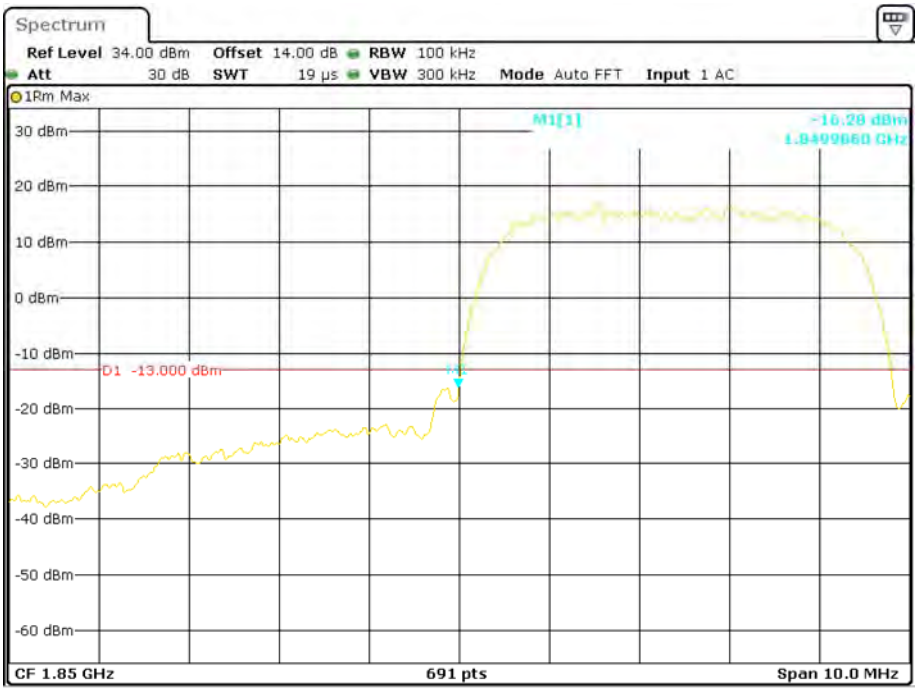
Date: 18.OCT.2017 19:51:00

PCS Band, Right Band Edge for EDGE Mode



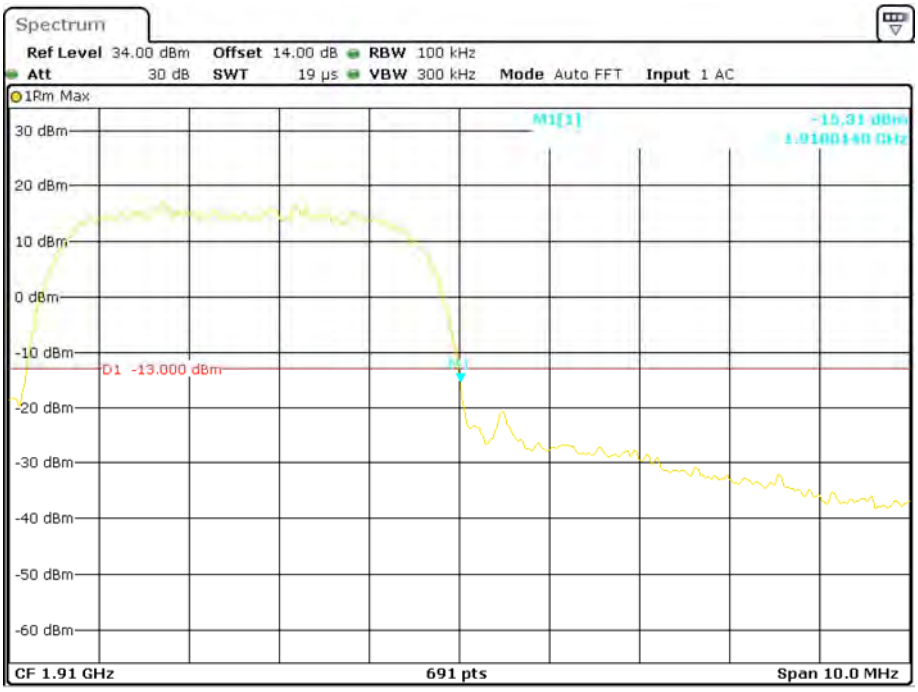
Date: 18.OCT.2017 19:53:28

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



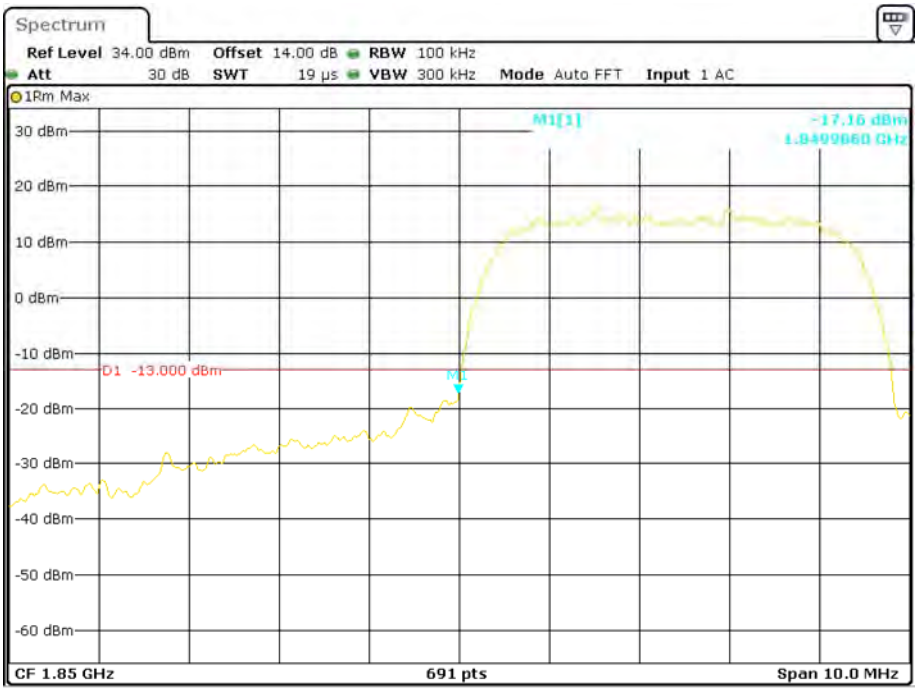
Date: 18.OCT.2017 20:46:12

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



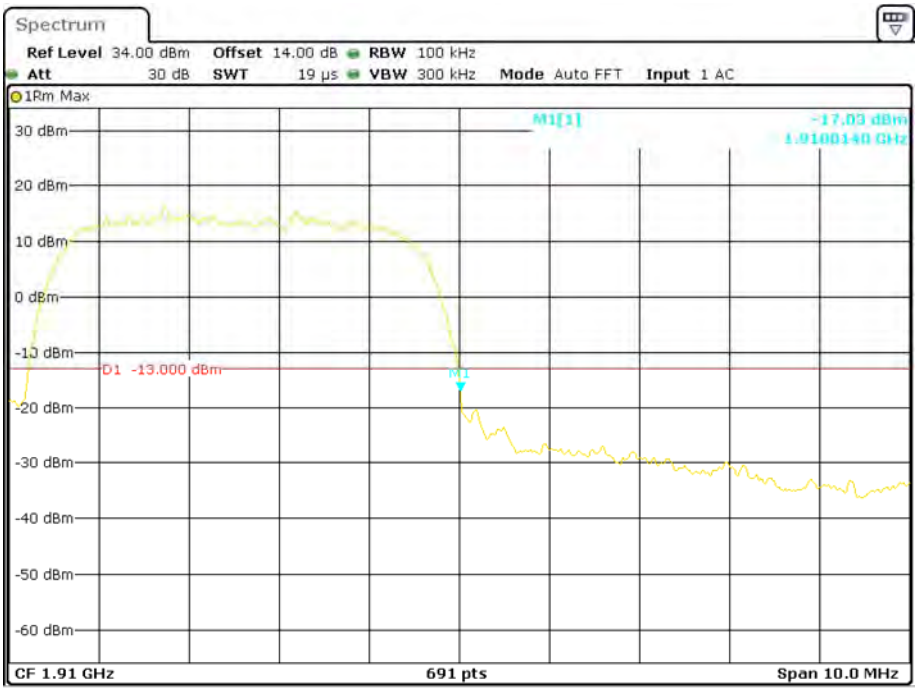
Date: 18.OCT.2017 20:45:16

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



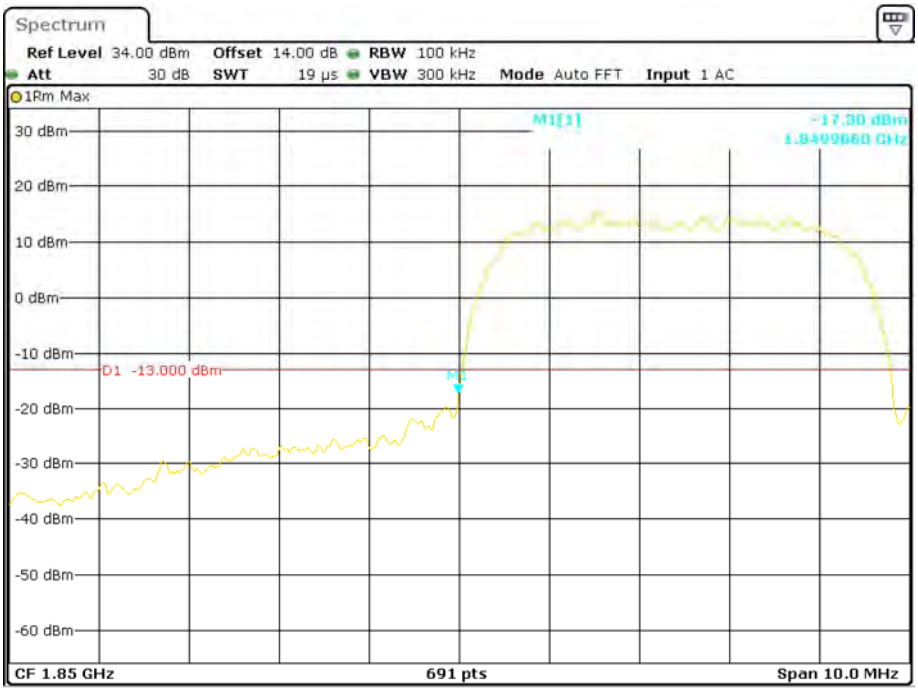
Date: 18.OCT.2017 20:39:51

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



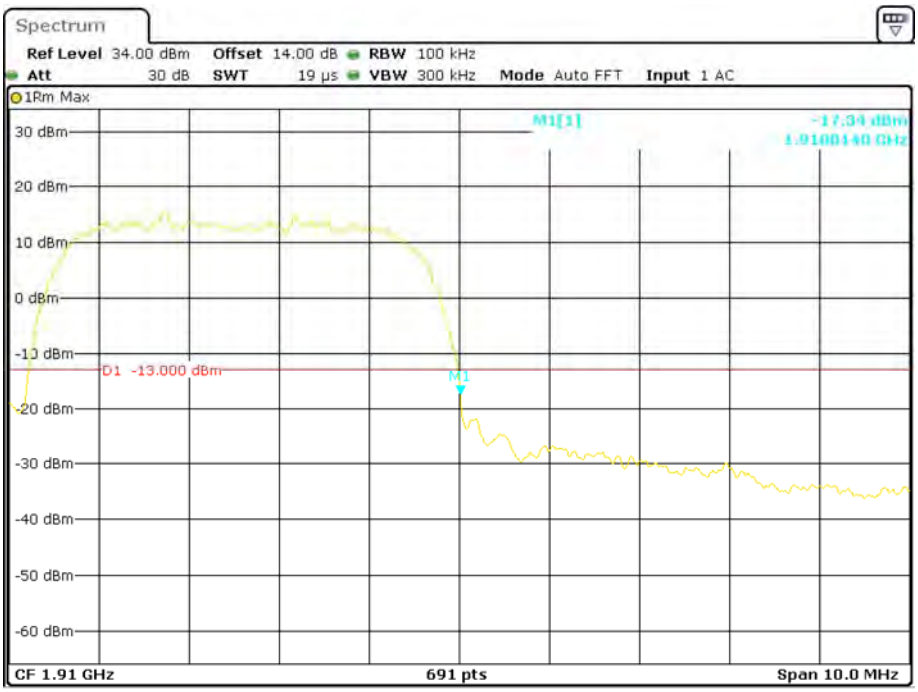
Date: 18.OCT.2017 20:40:45

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



Date: 18.OCT.2017 20:38:34

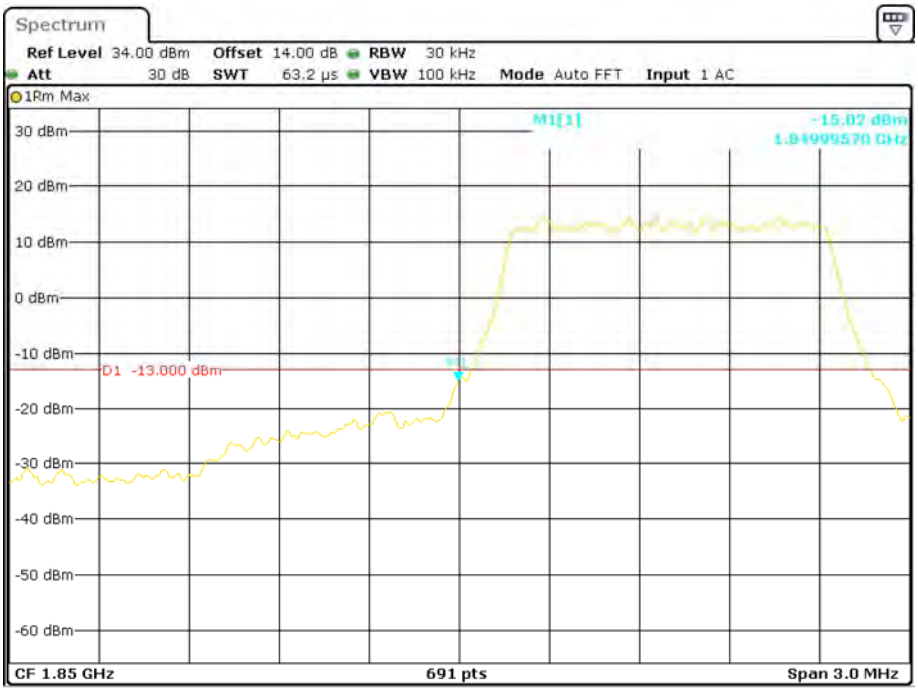
PCS Band, Right Band Edge for HSUPA (BPSK) Mode



Date: 18.OCT.2017 20:37:49

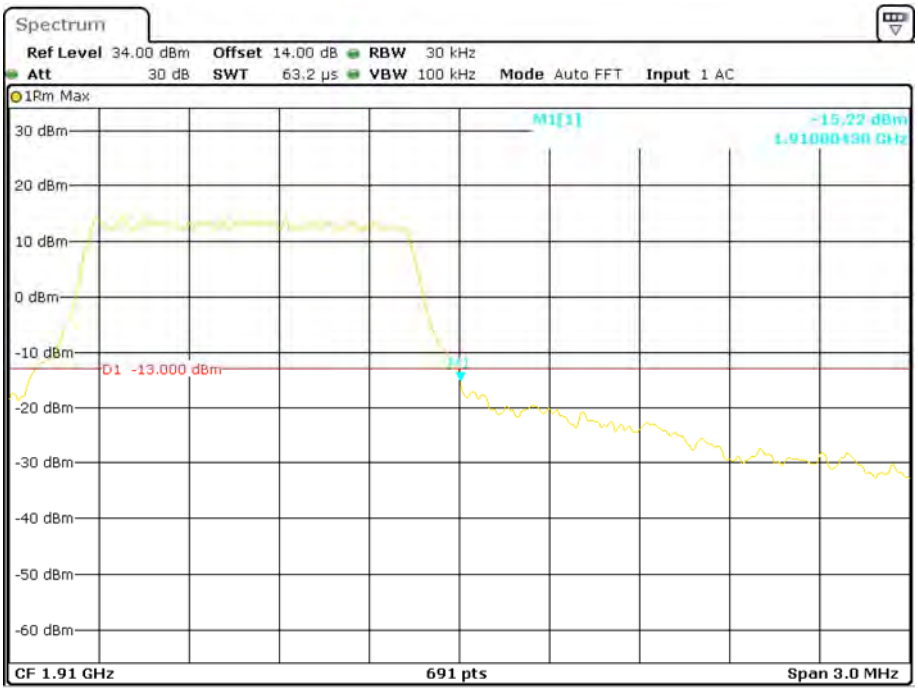
Band 2:

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



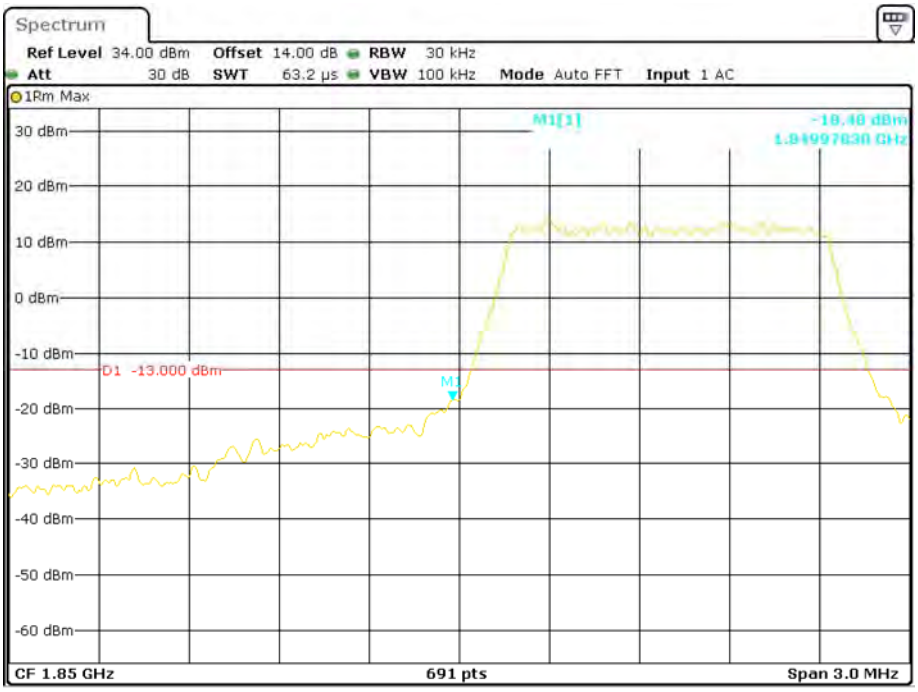
Date: 19.OCT.2017 22:33:18

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



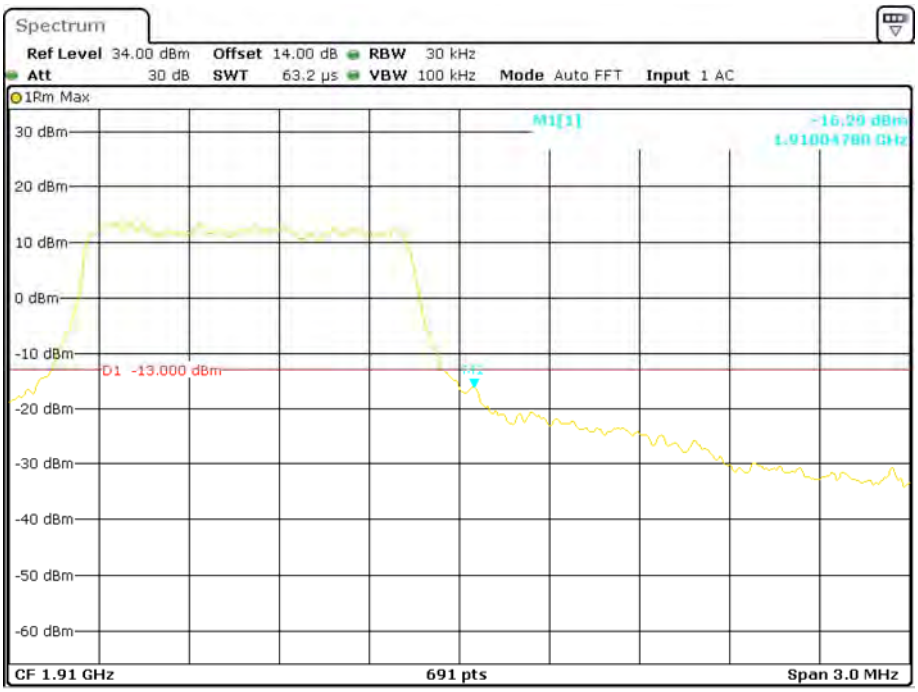
Date: 19.OCT.2017 22:36:30

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



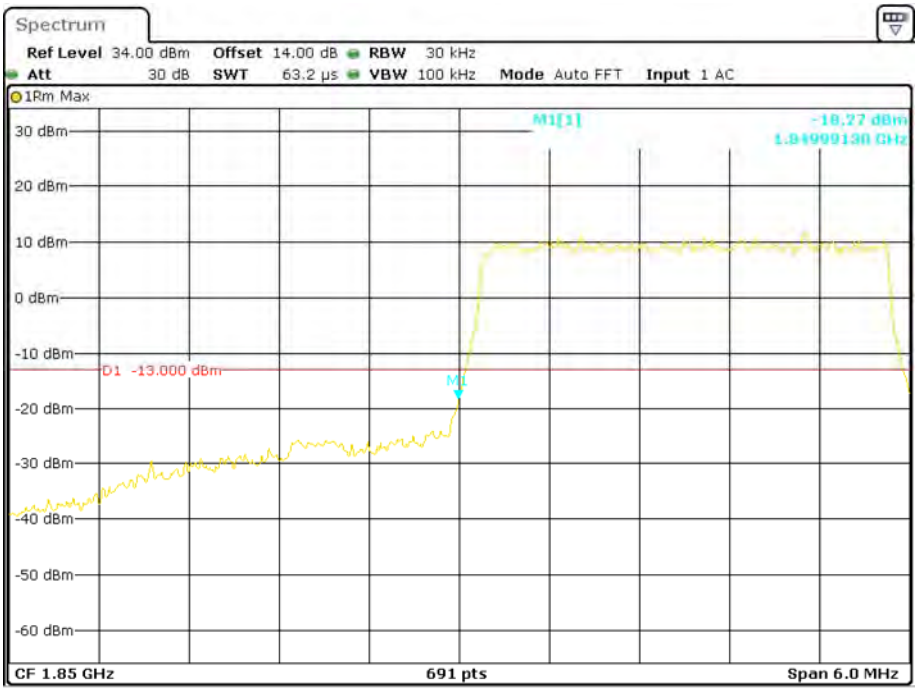
Date: 19.OCT.2017 22:34:23

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



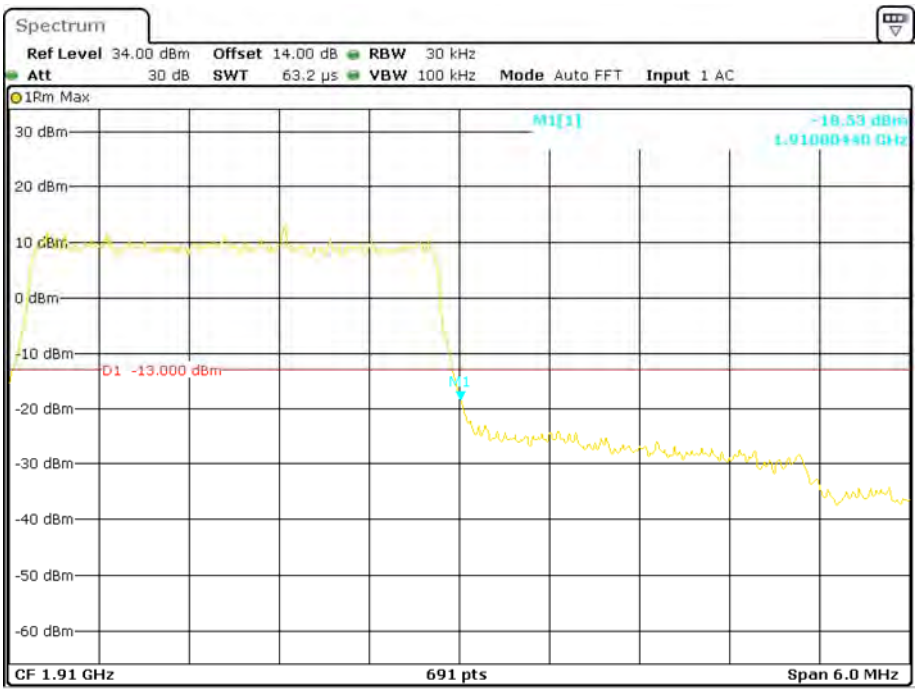
Date: 19.OCT.2017 22:35:49

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



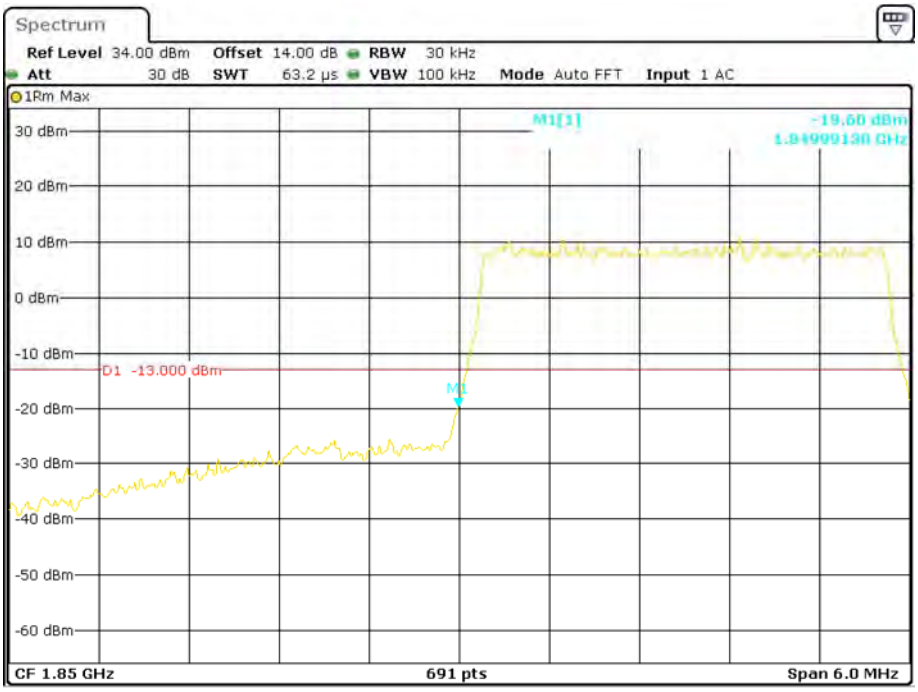
Date: 19.OCT.2017 22:40:36

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



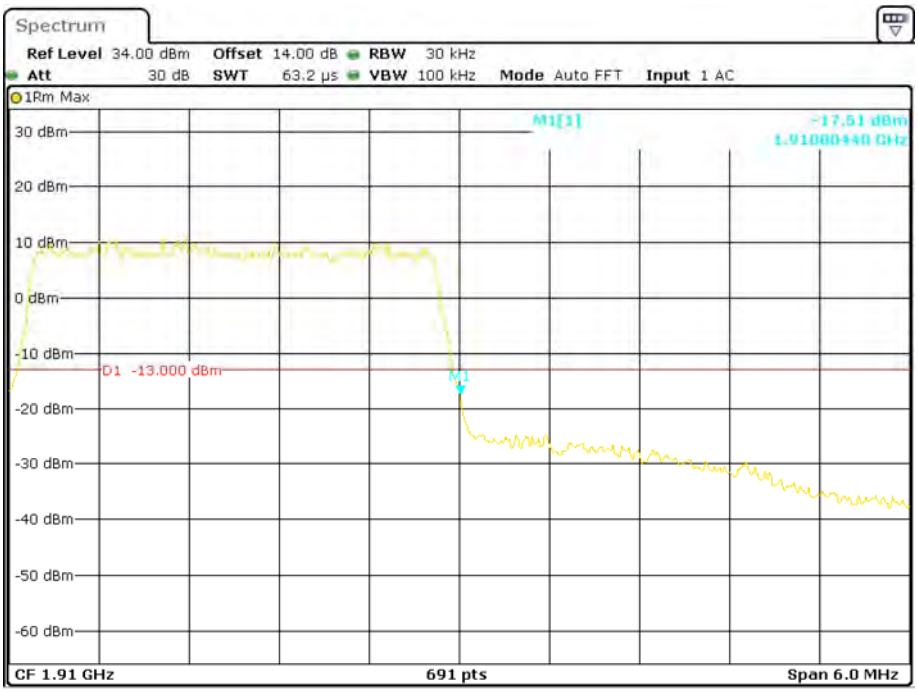
Date: 19.OCT.2017 22:38:40

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



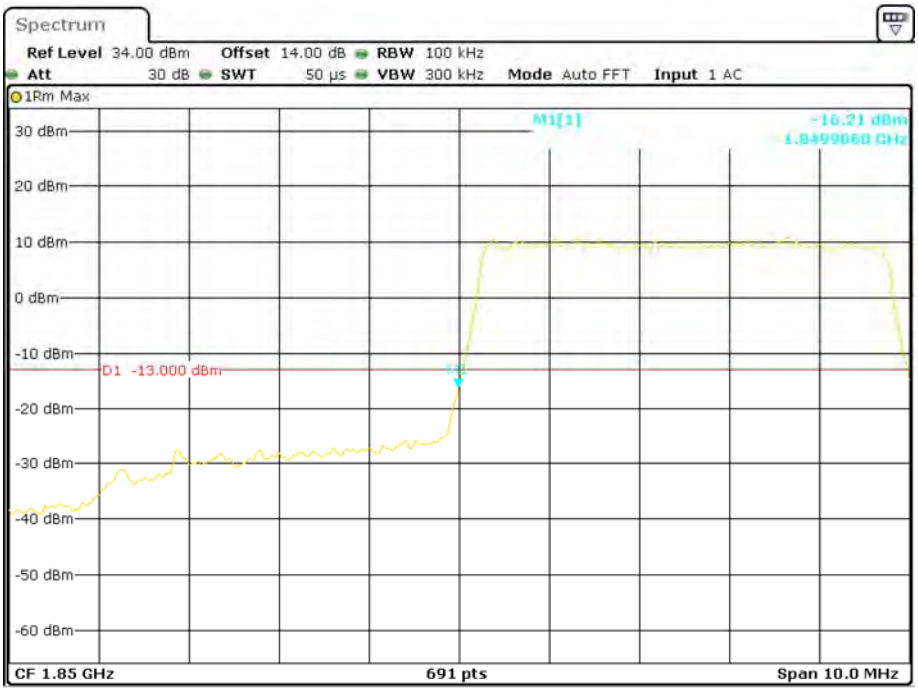
Date: 19.OCT.2017 22:40:09

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



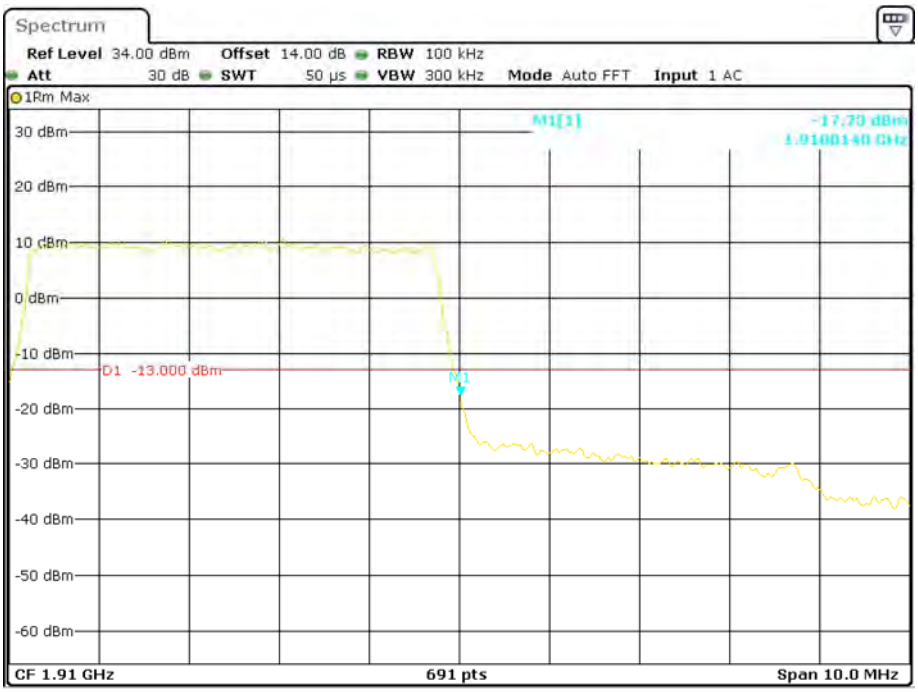
Date: 19.OCT.2017 22:39:16

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



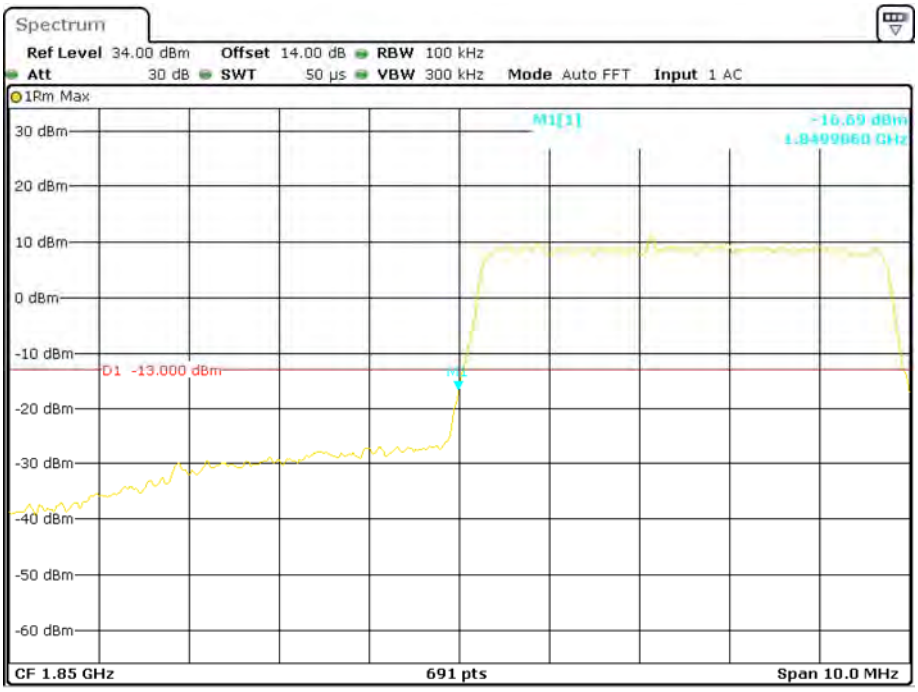
Date: 19.OCT.2017 22:45:24

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



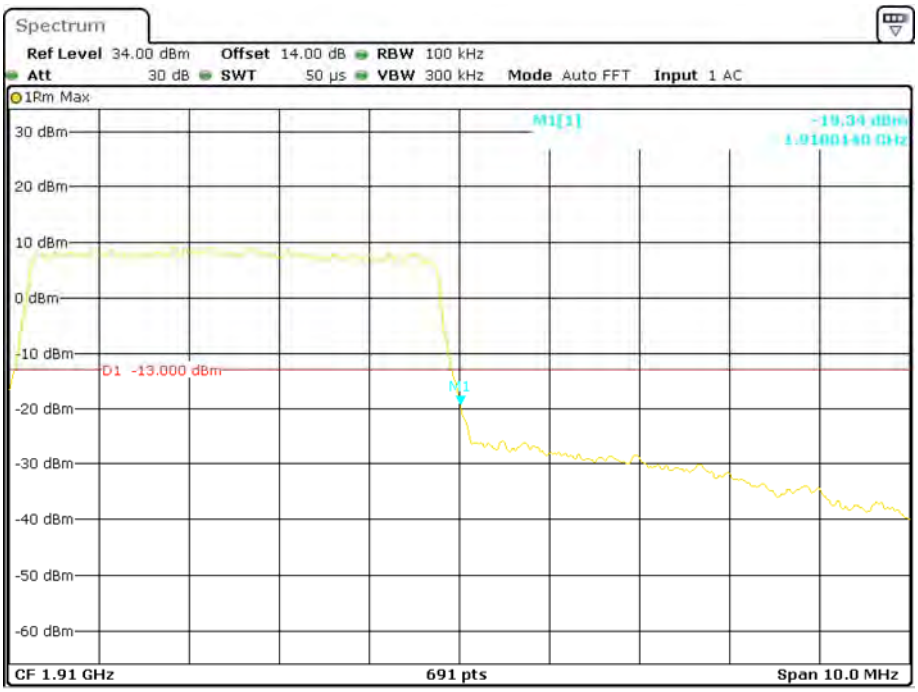
Date: 19.OCT.2017 22:50:36

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



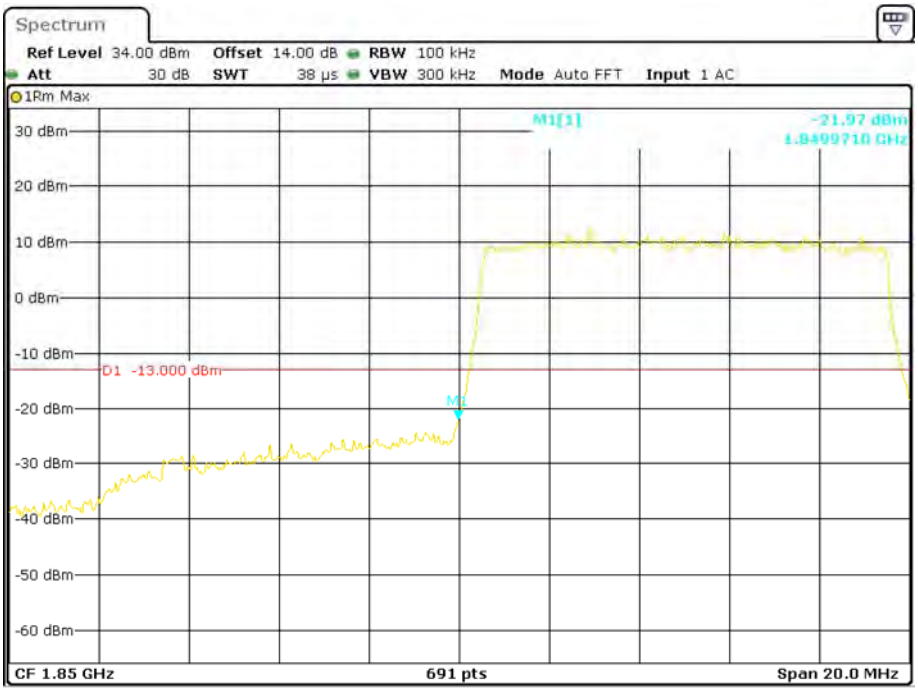
Date: 19.OCT.2017 22:46:01

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



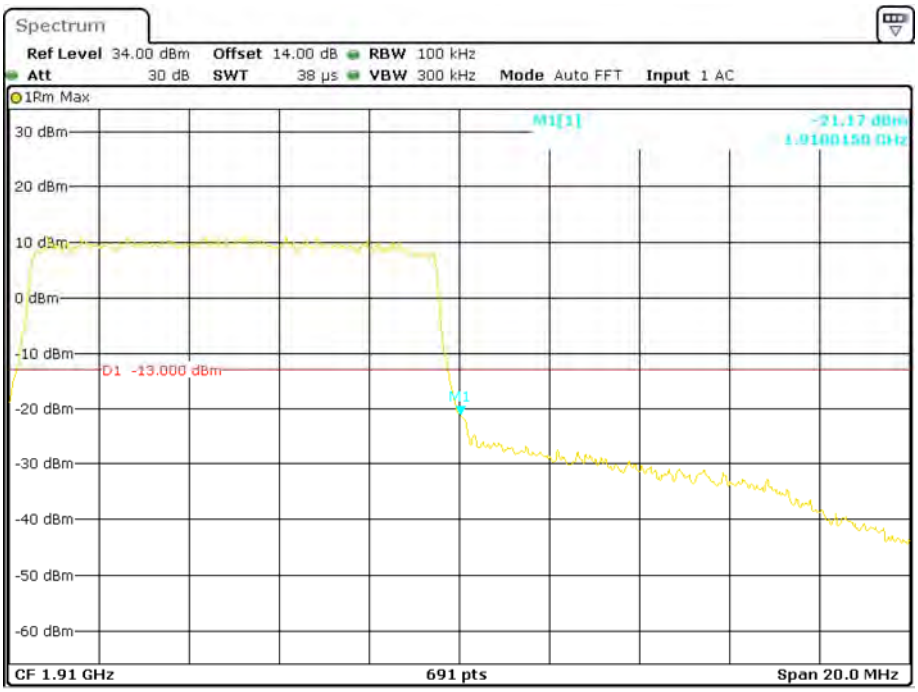
Date: 19.OCT.2017 22:50:13

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



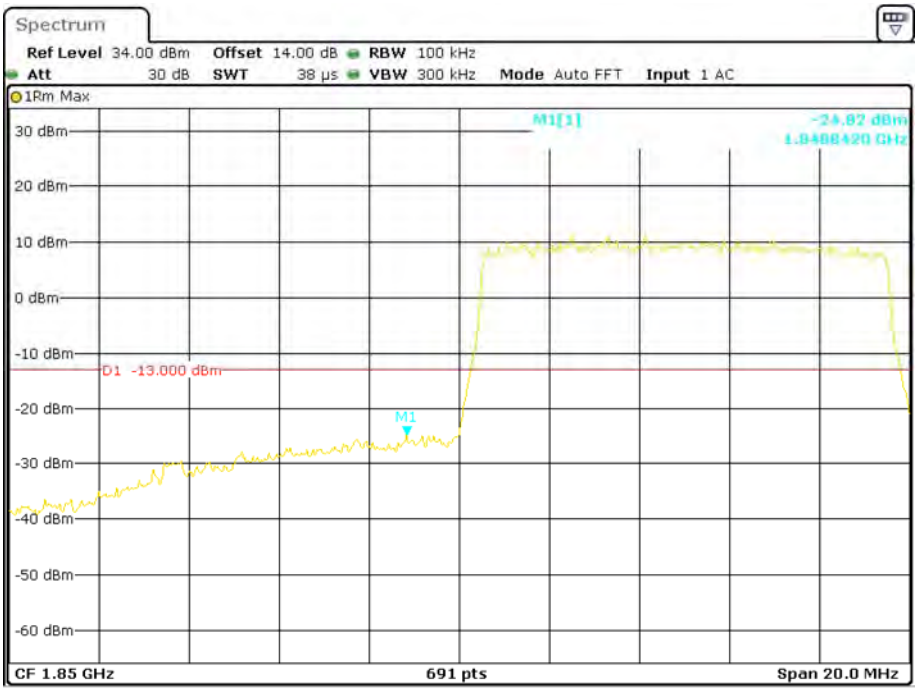
Date: 19.OCT.2017 22:54:45

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



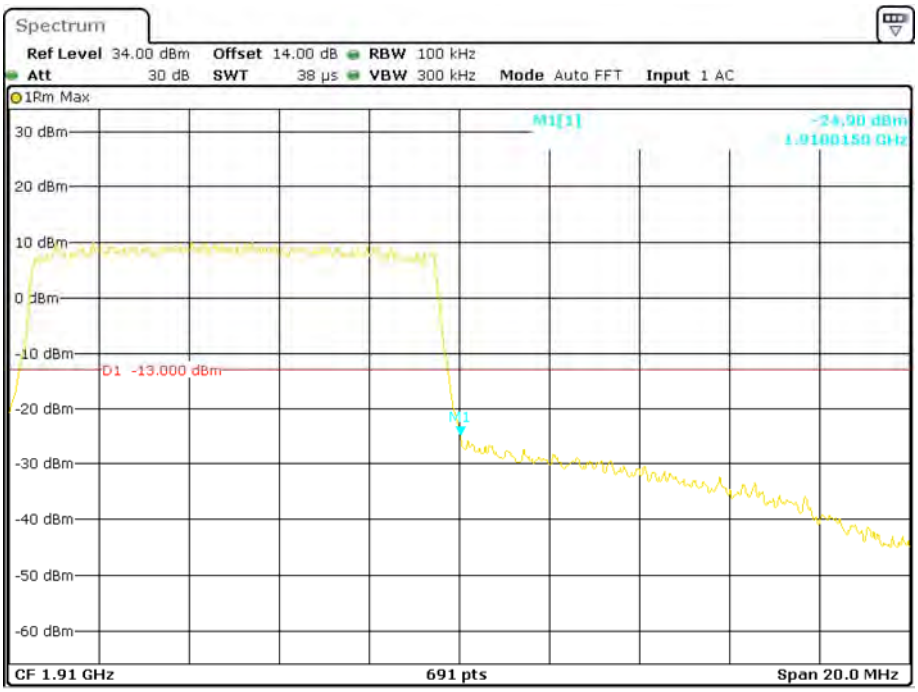
Date: 19.OCT.2017 22:51:49

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



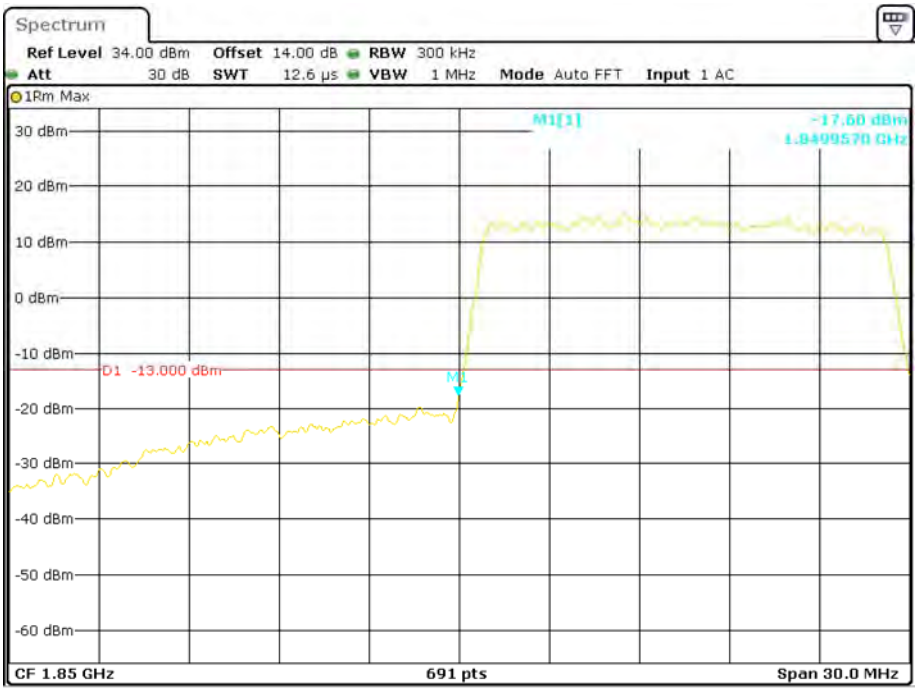
Date: 19.OCT.2017 22:54:05

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



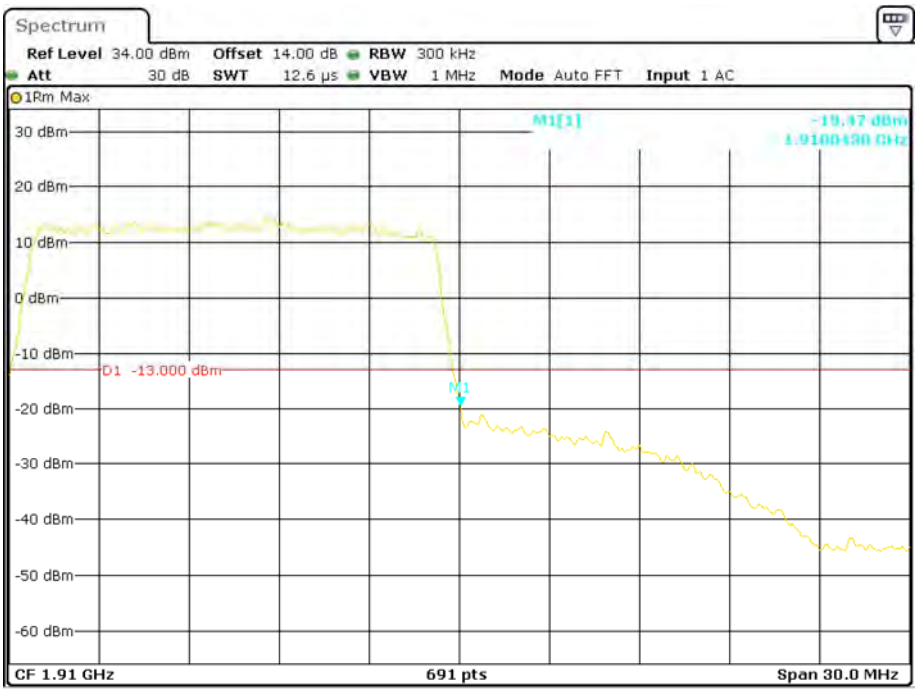
Date: 19.OCT.2017 22:52:35

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



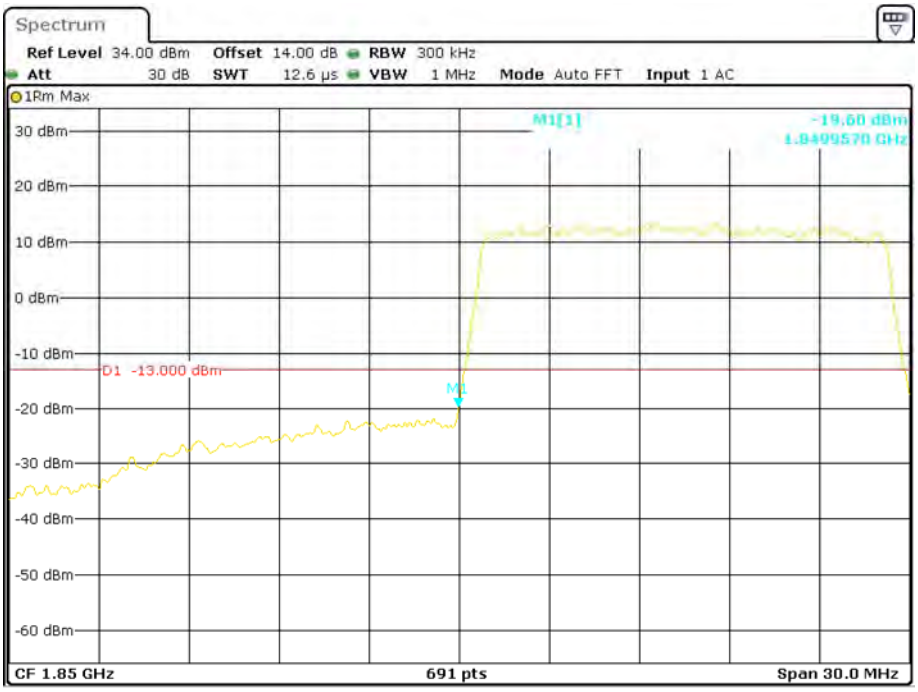
Date: 19.OCT.2017 22:56:45

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



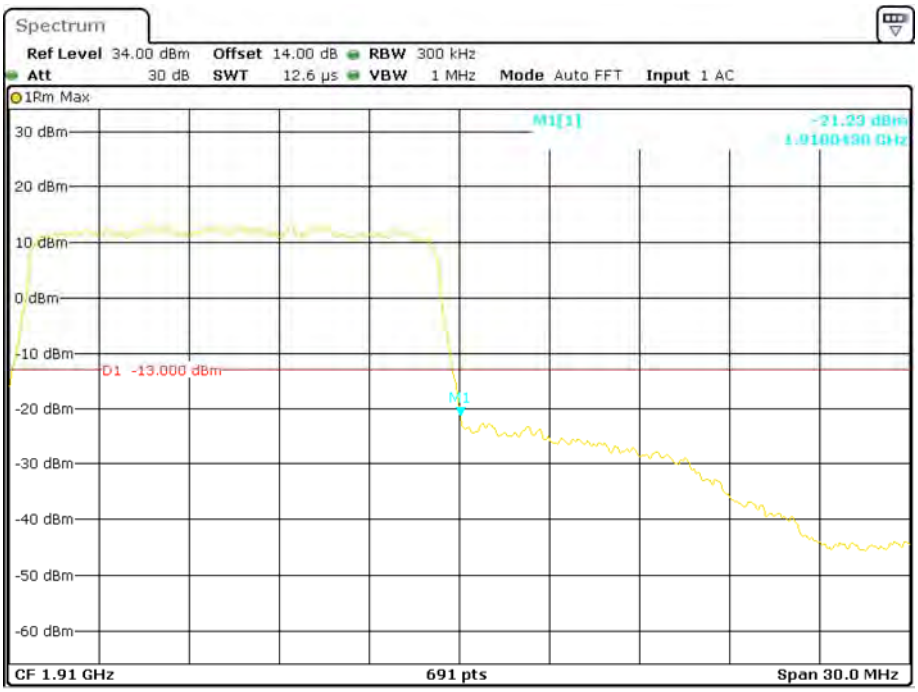
Date: 19.OCT.2017 22:59:20

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



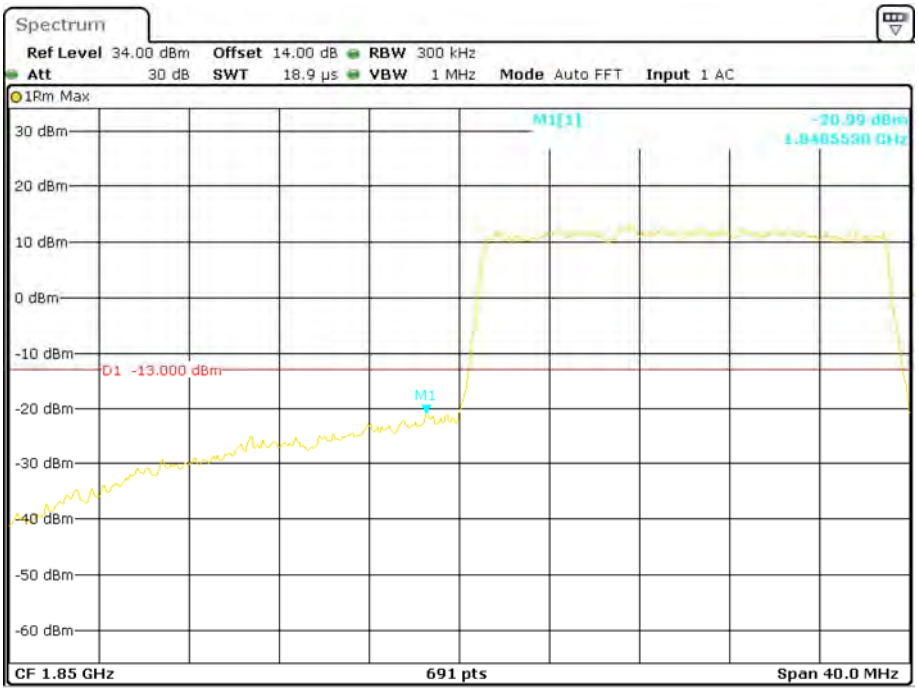
Date: 19.OCT.2017 22:57:34

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



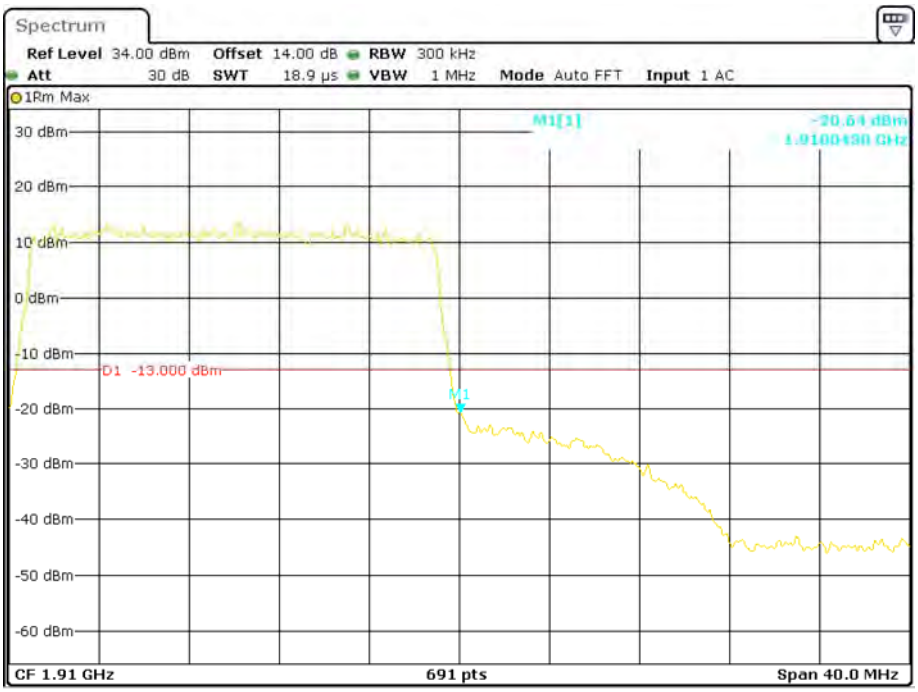
Date: 19.OCT.2017 22:58:47

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



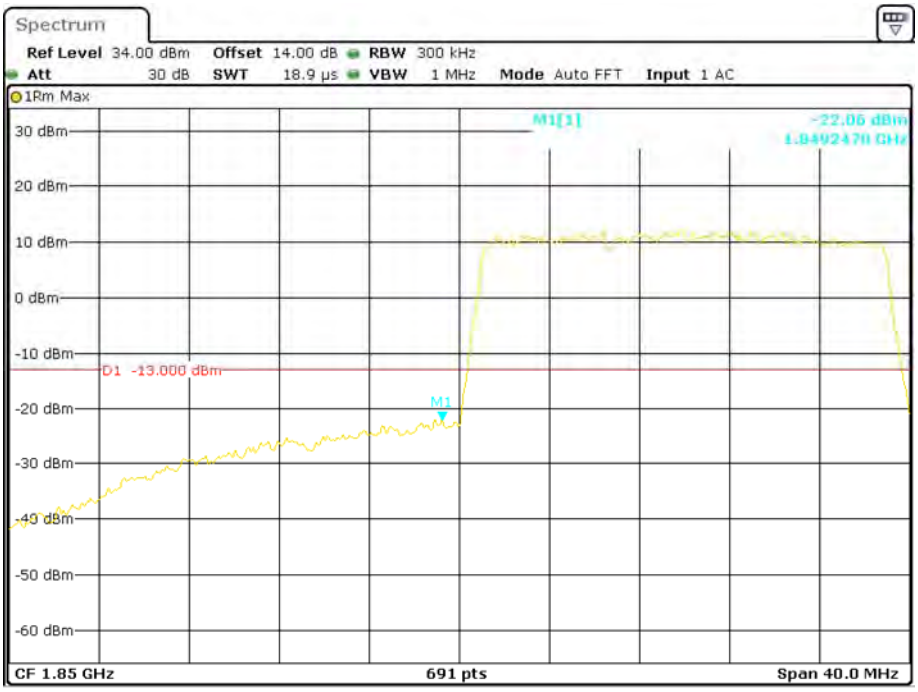
Date: 19.OCT.2017 23:03:32

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



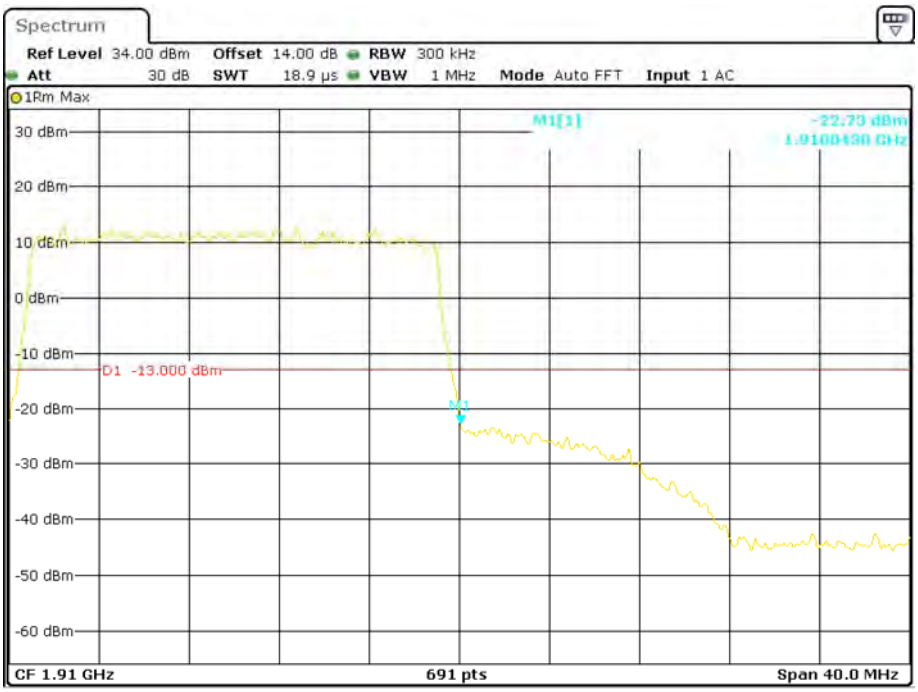
Date: 19.OCT.2017 23:00:41

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



Date: 19.OCT.2017 23:02:51

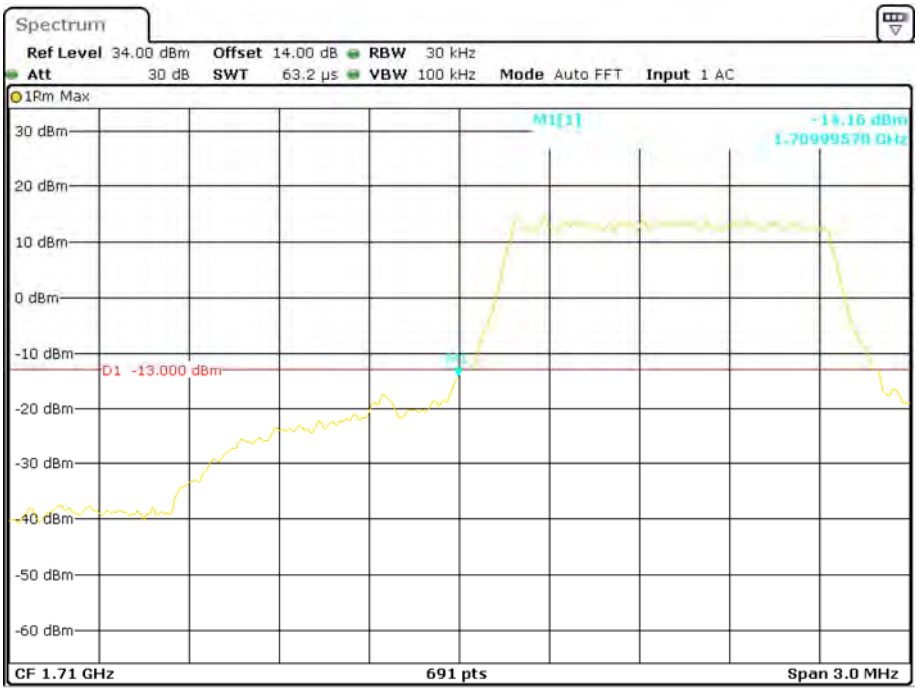
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 19.OCT.2017 23:01:47

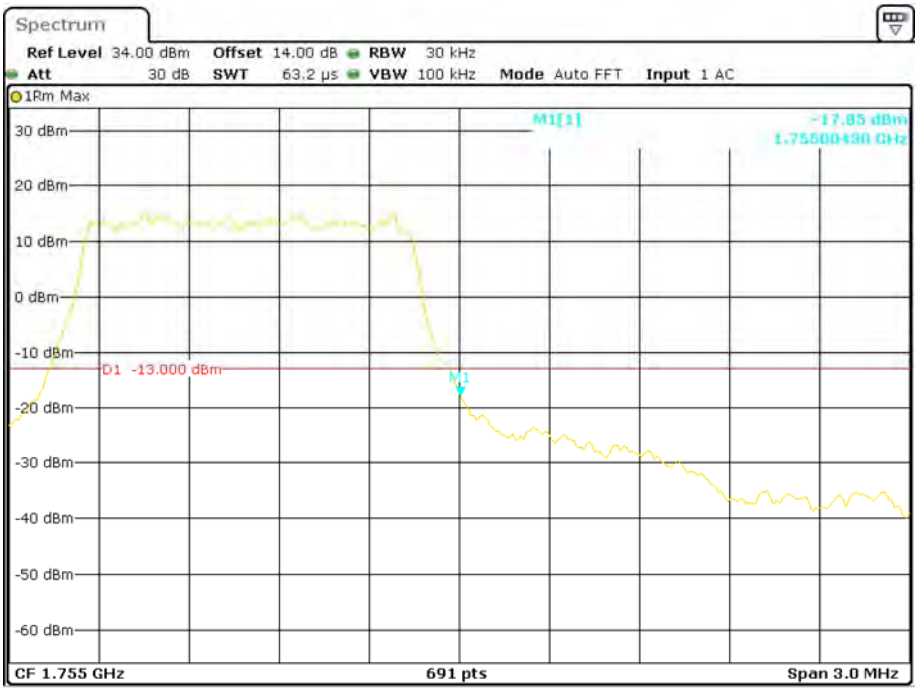
Band 4:

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



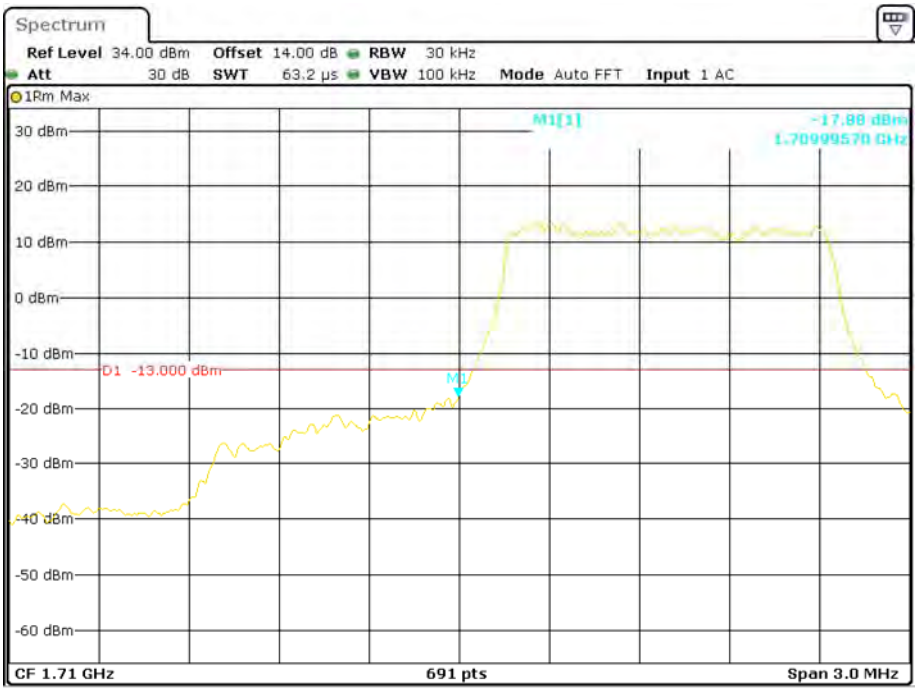
Date: 19.OCT.2017 23:06:53

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



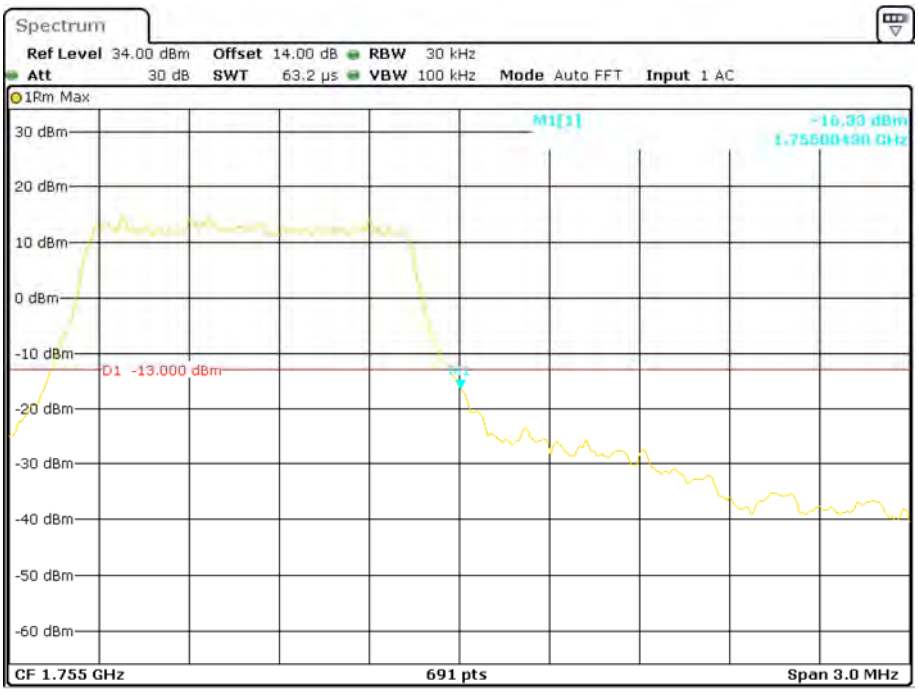
Date: 19.OCT.2017 23:10:34

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



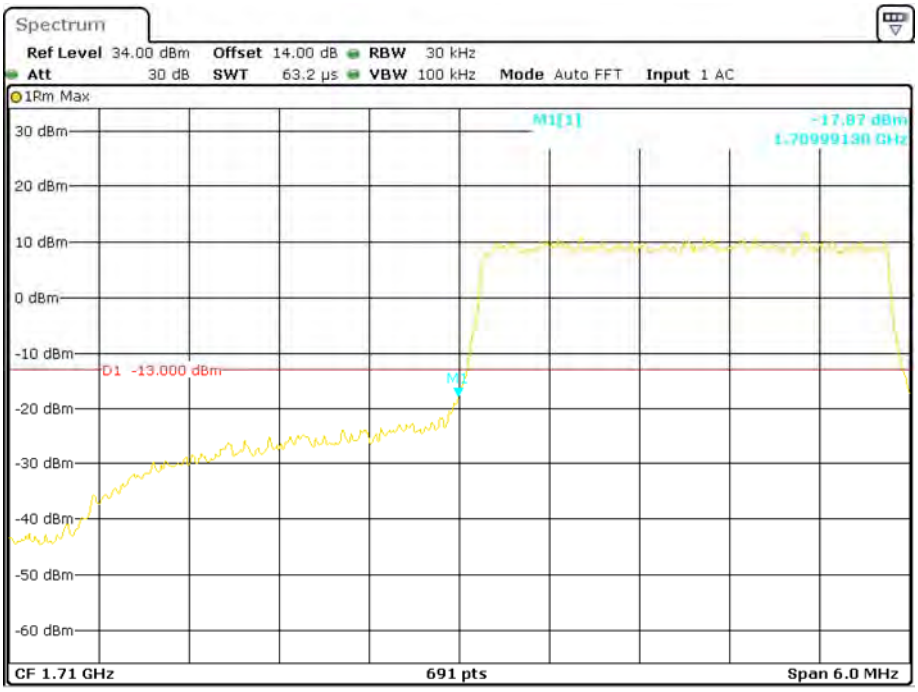
Date: 19.OCT.2017 23:07:53

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



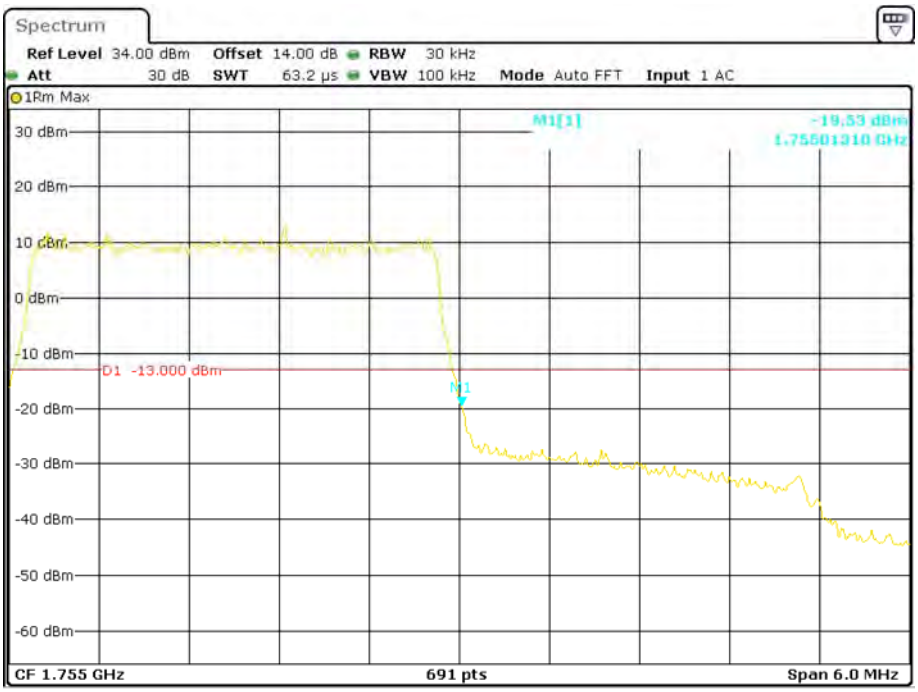
Date: 19.OCT.2017 23:09:38

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



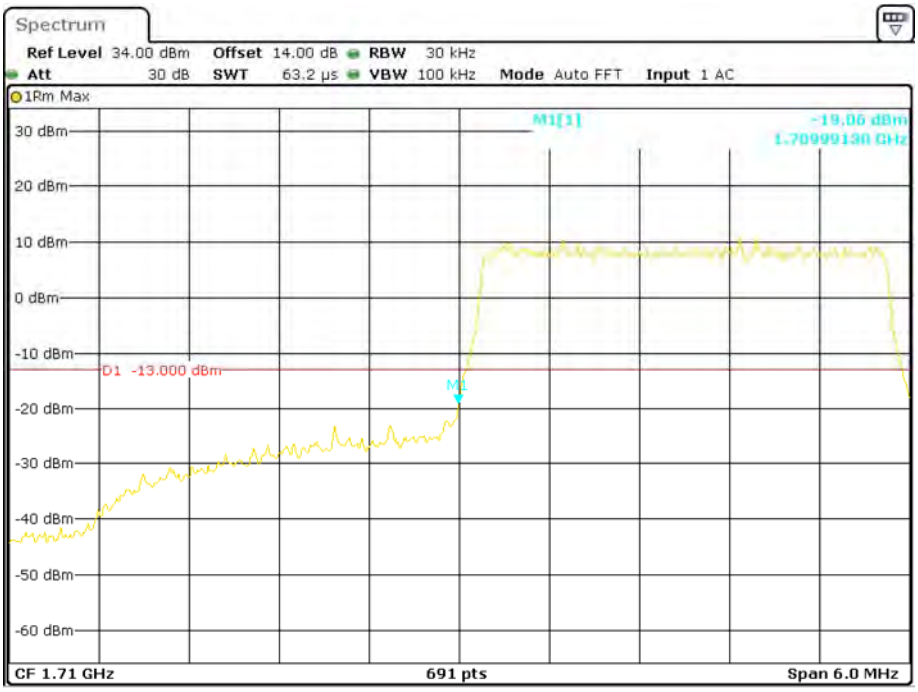
Date: 19.OCT.2017 23:18:53

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



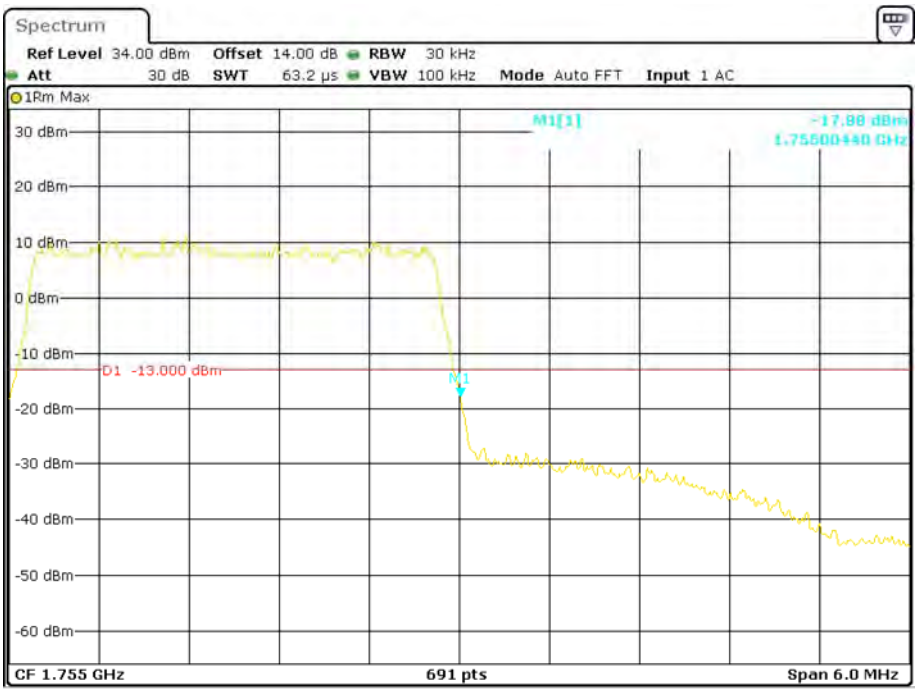
Date: 19.OCT.2017 23:14:58

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



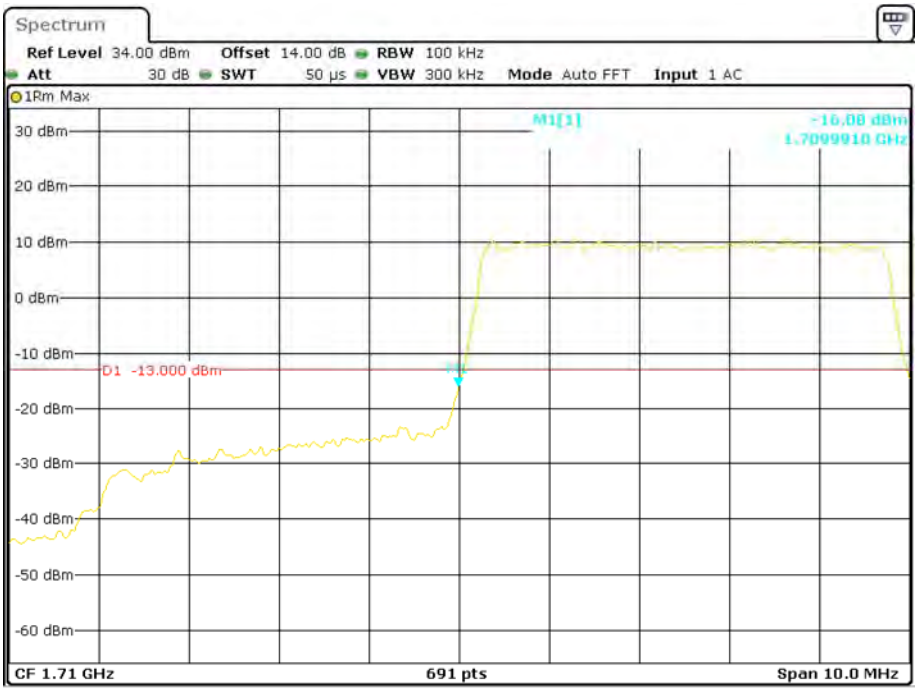
Date: 19.OCT.2017 23:18:14

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



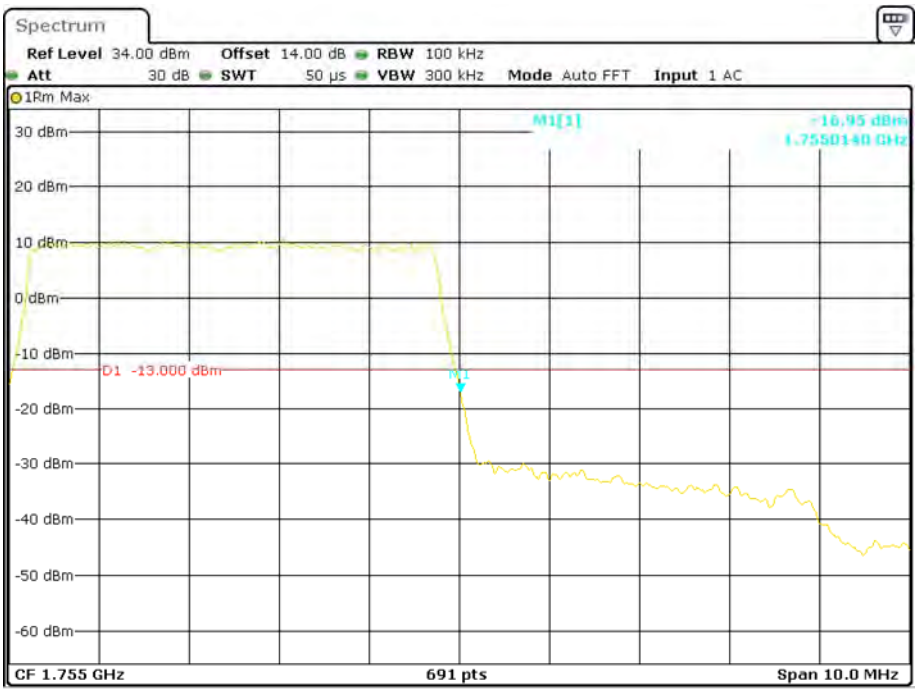
Date: 19.OCT.2017 23:16:17

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



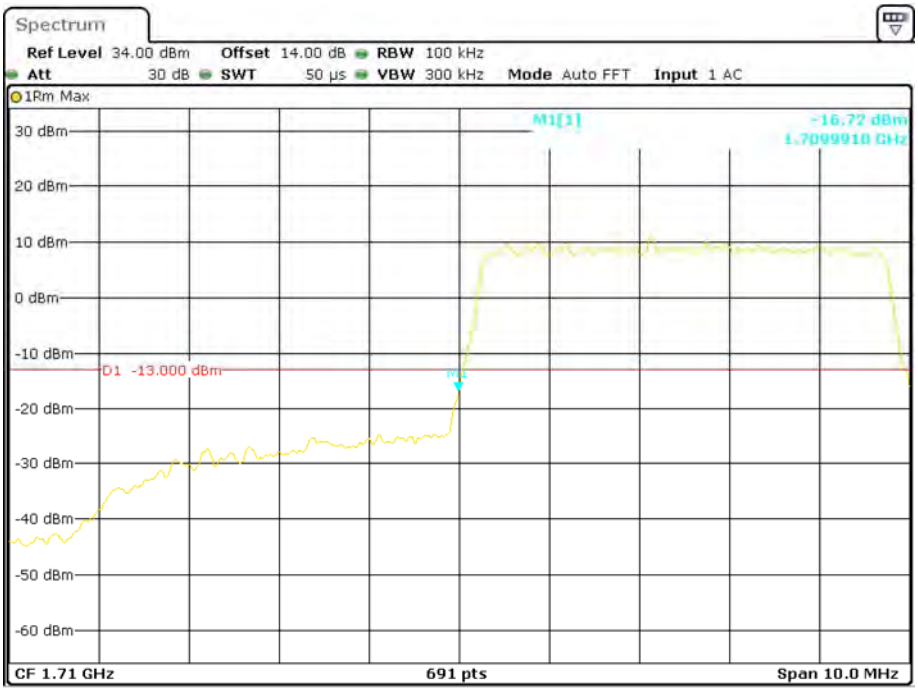
Date: 19.OCT.2017 23:21:07

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



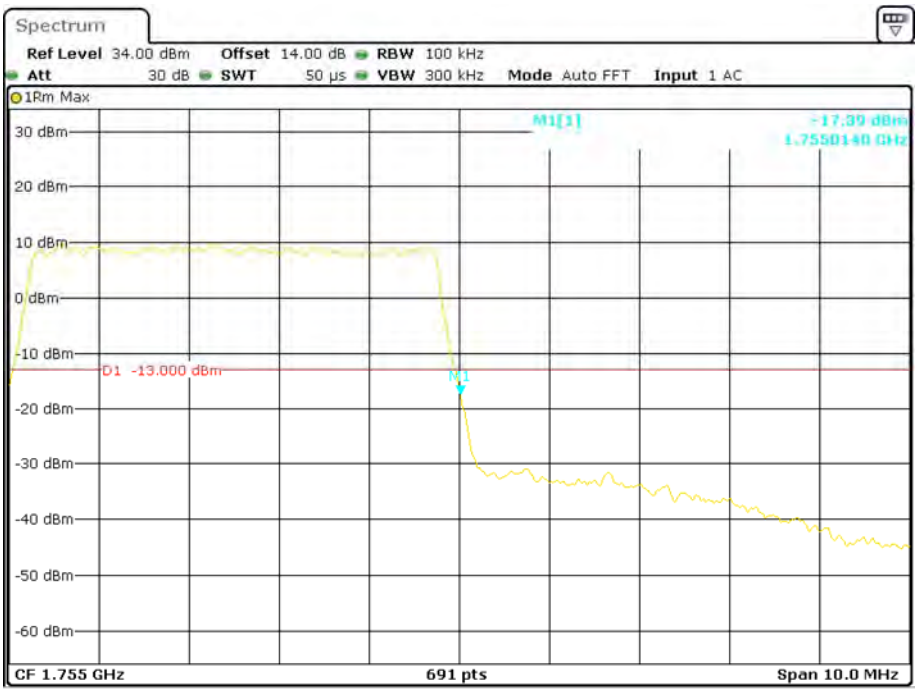
Date: 19.OCT.2017 23:23:24

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



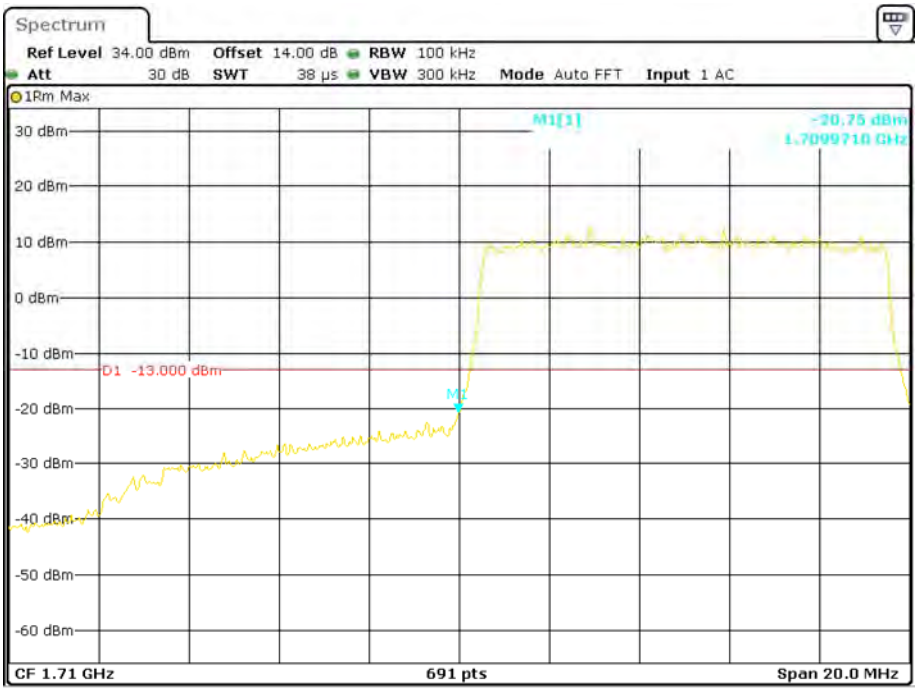
Date: 19.OCT.2017 23:22:09

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



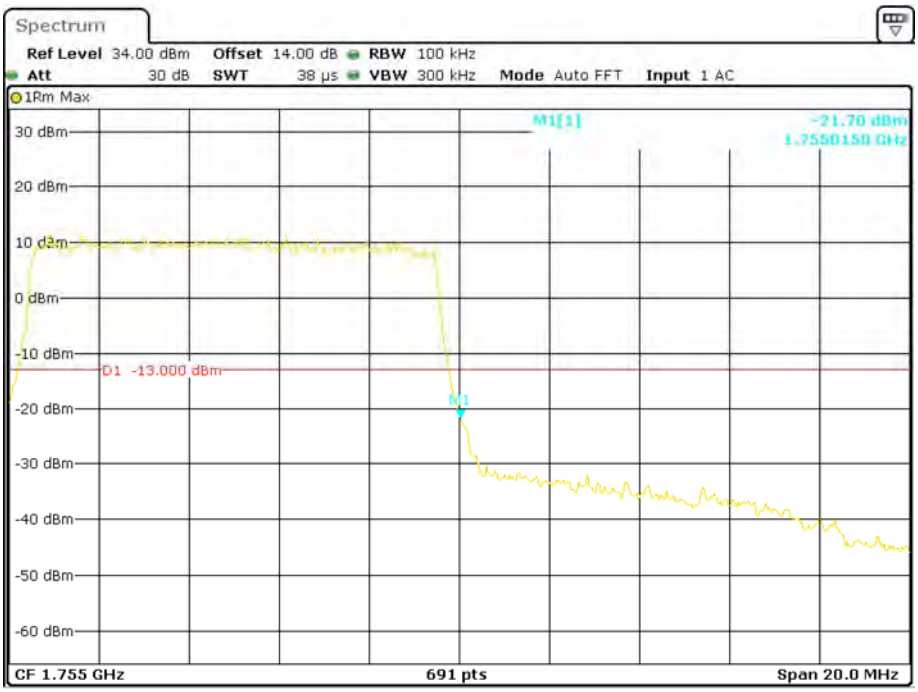
Date: 19.OCT.2017 23:22:54

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



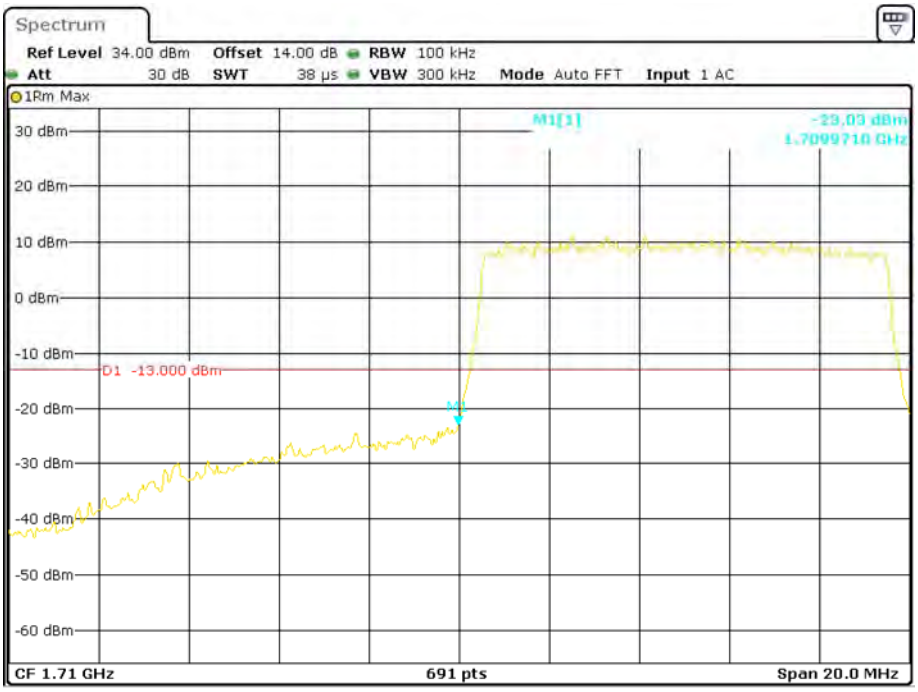
Date: 19.OCT.2017 23:26:55

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



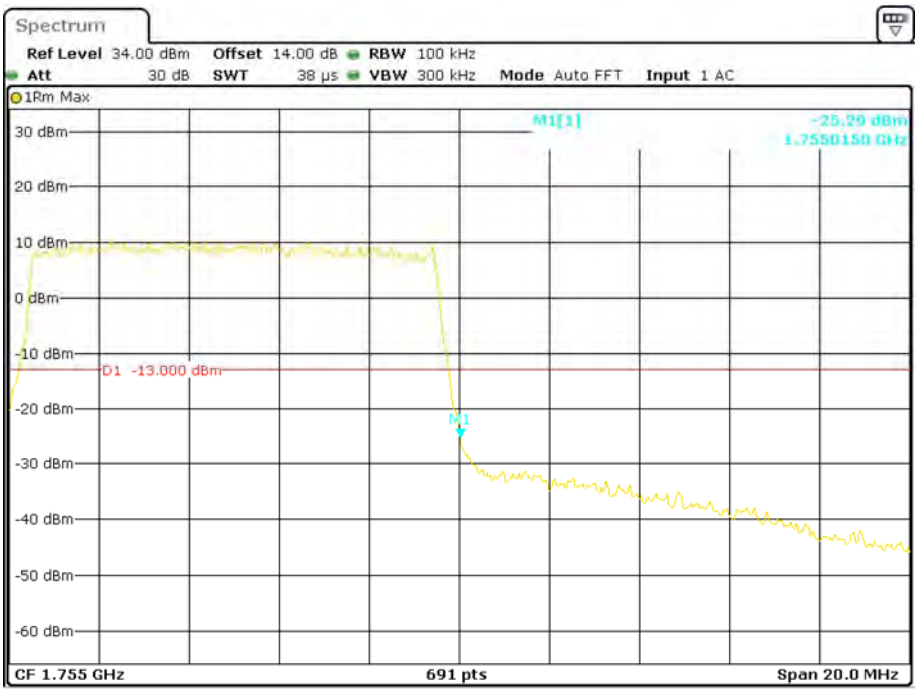
Date: 19.OCT.2017 23:24:28

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



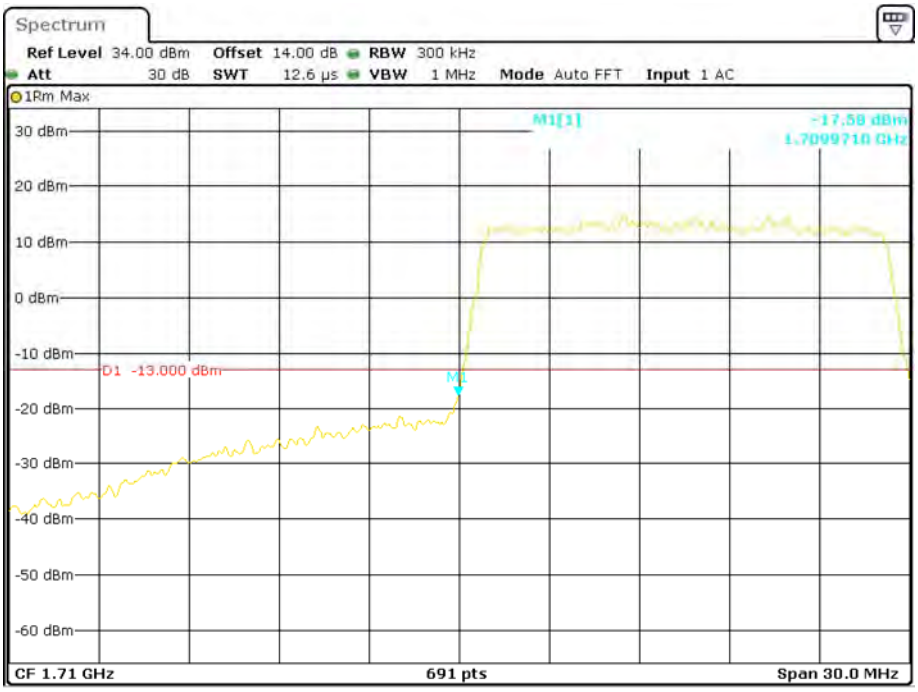
Date: 19.OCT.2017 23:26:12

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



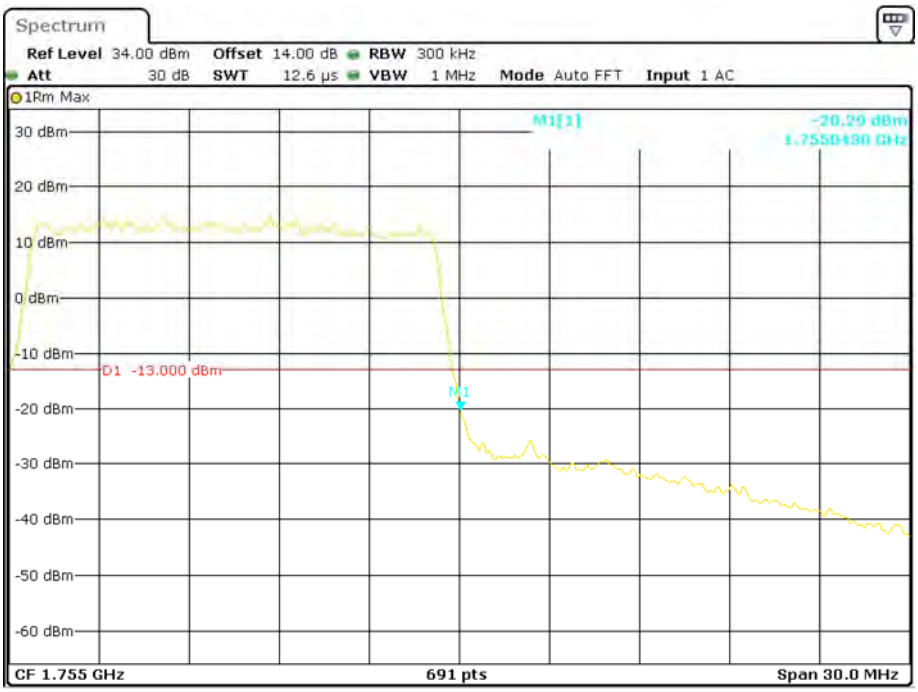
Date: 19.OCT.2017 23:25:12

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



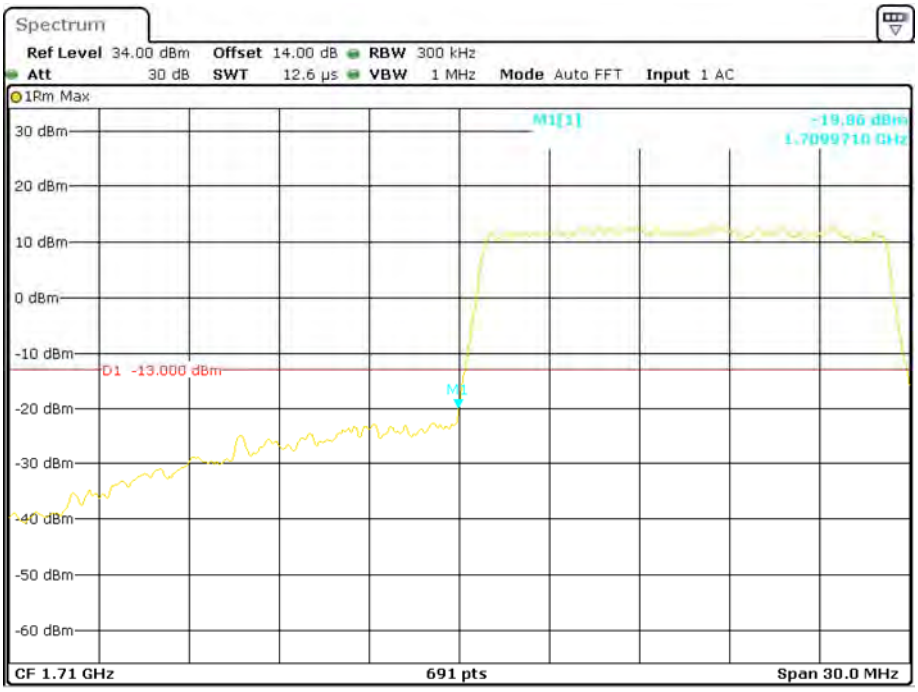
Date: 19.OCT.2017 23:32:10

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



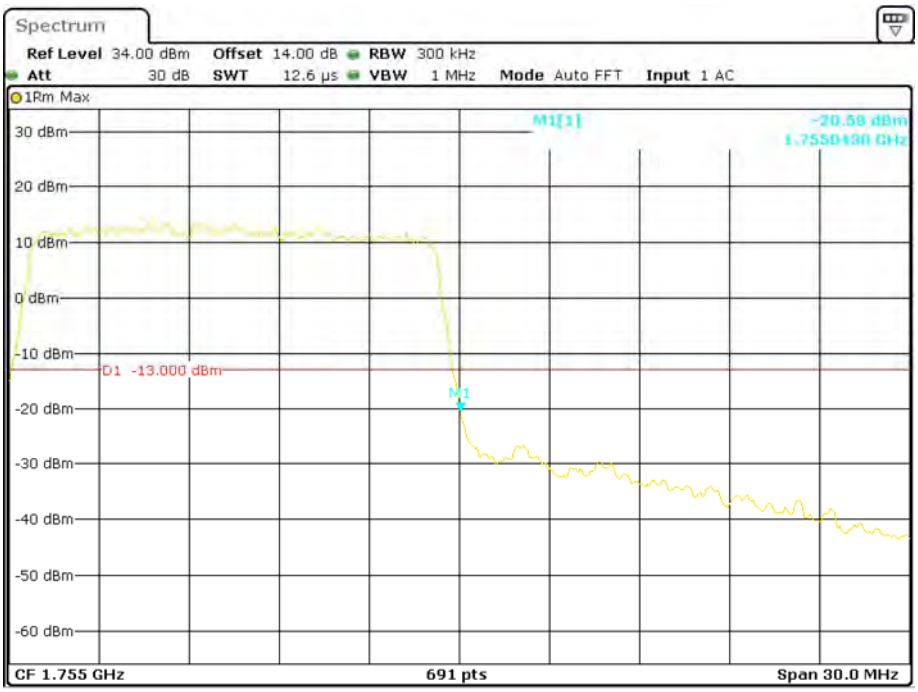
Date: 19.OCT.2017 23:34:53

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



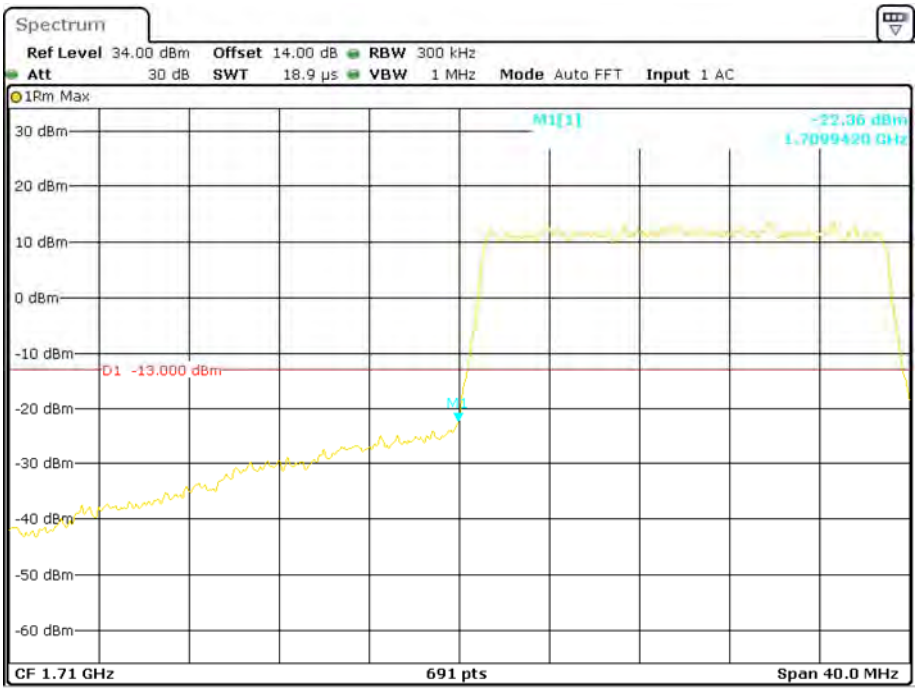
Date: 19.OCT.2017 23:32:56

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



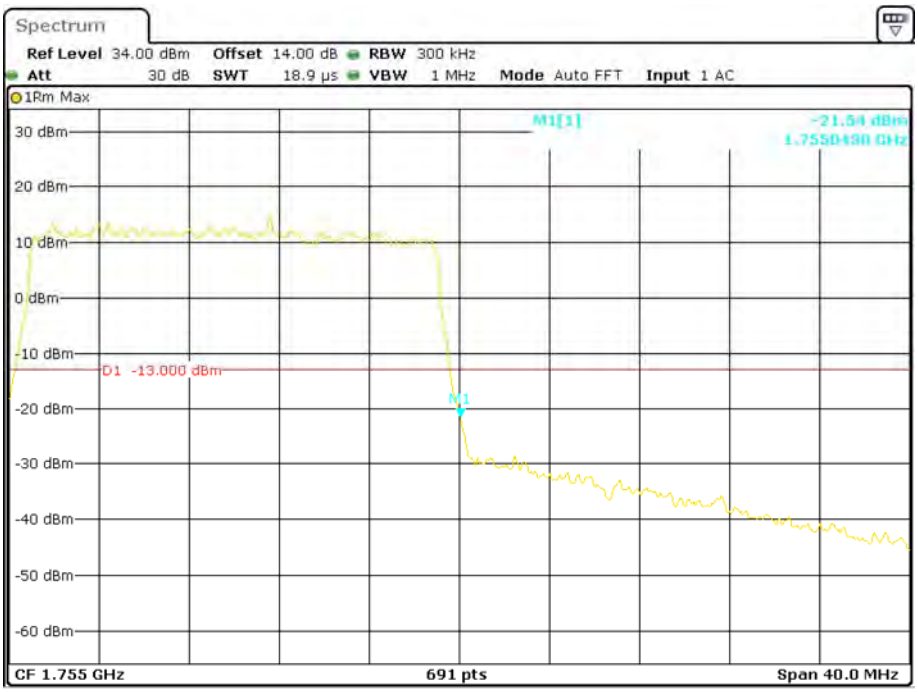
Date: 19.OCT.2017 23:34:13

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



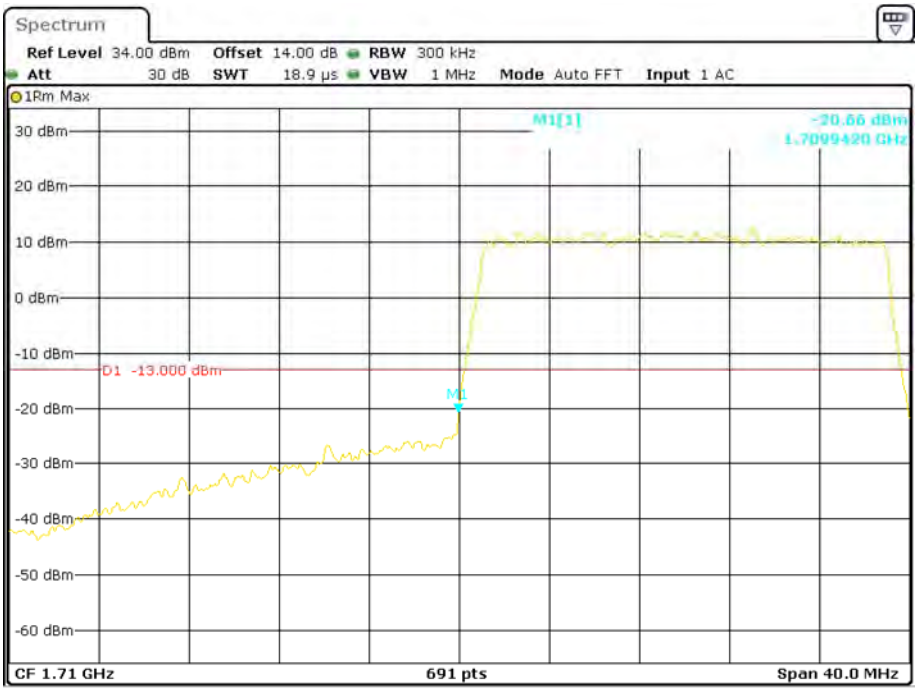
Date: 19.OCT.2017 23:38:30

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



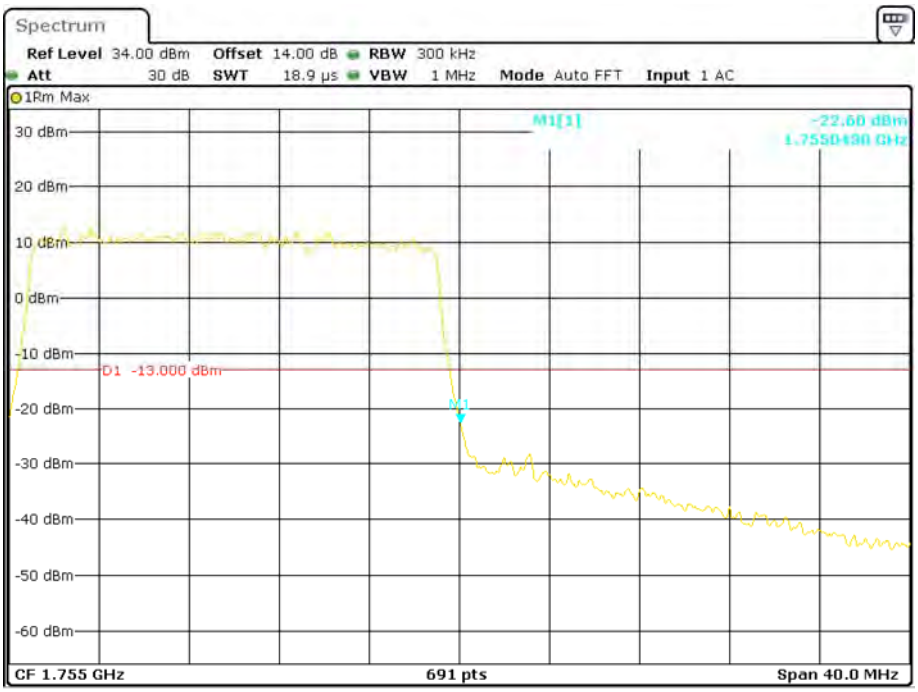
Date: 19.OCT.2017 23:36:00

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



Date: 19.OCT.2017 23:37:41

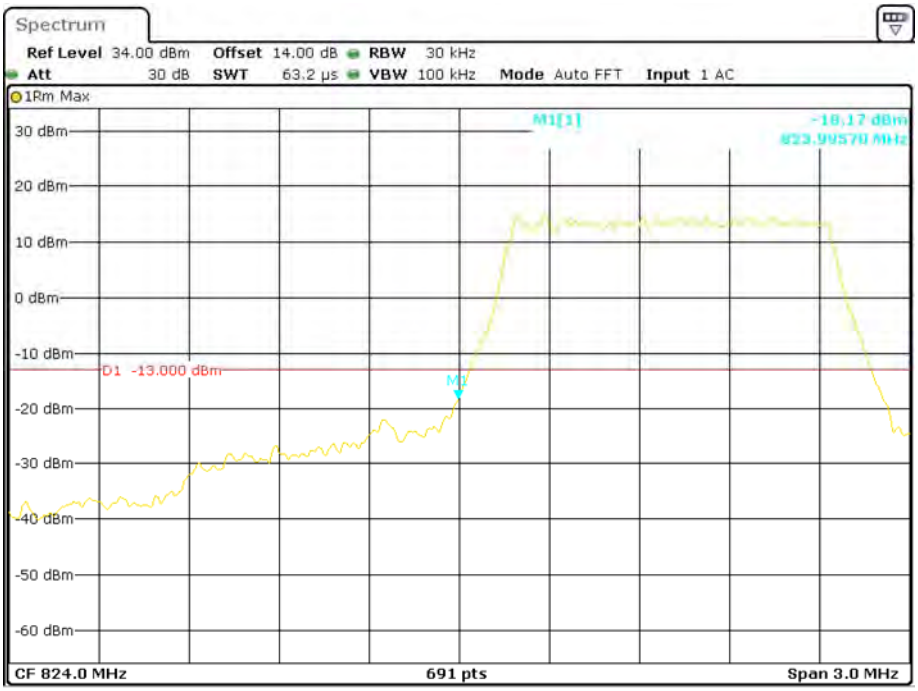
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 19.OCT.2017 23:36:45

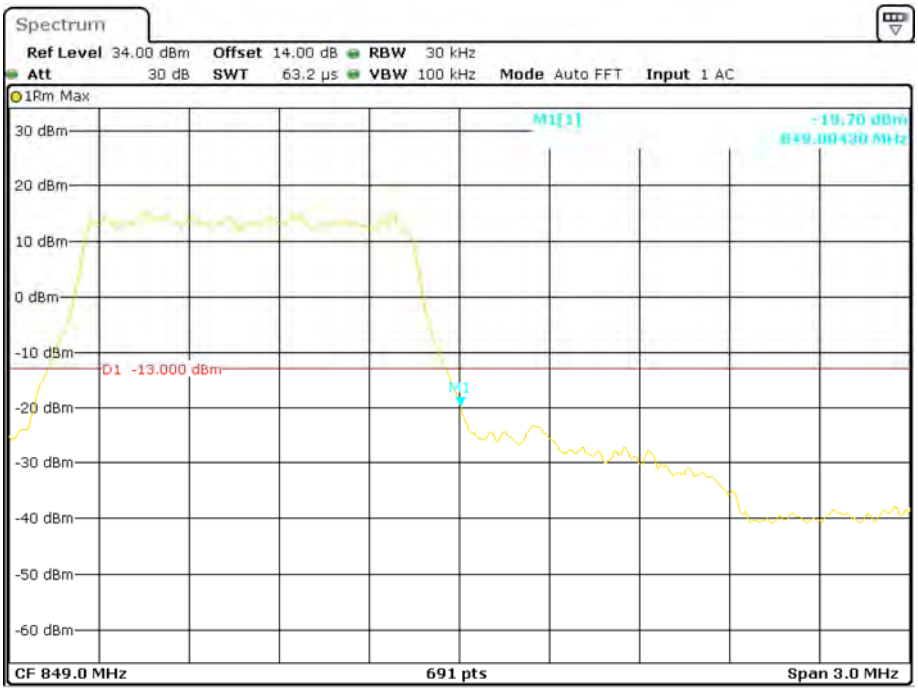
Band 5:

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



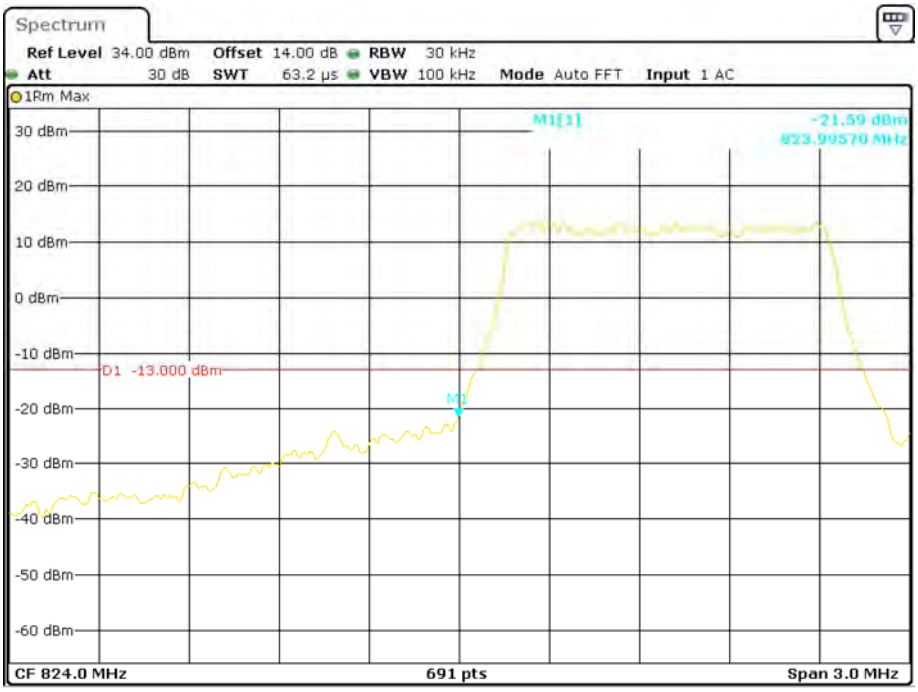
Date: 19.OCT.2017 23:42:12

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



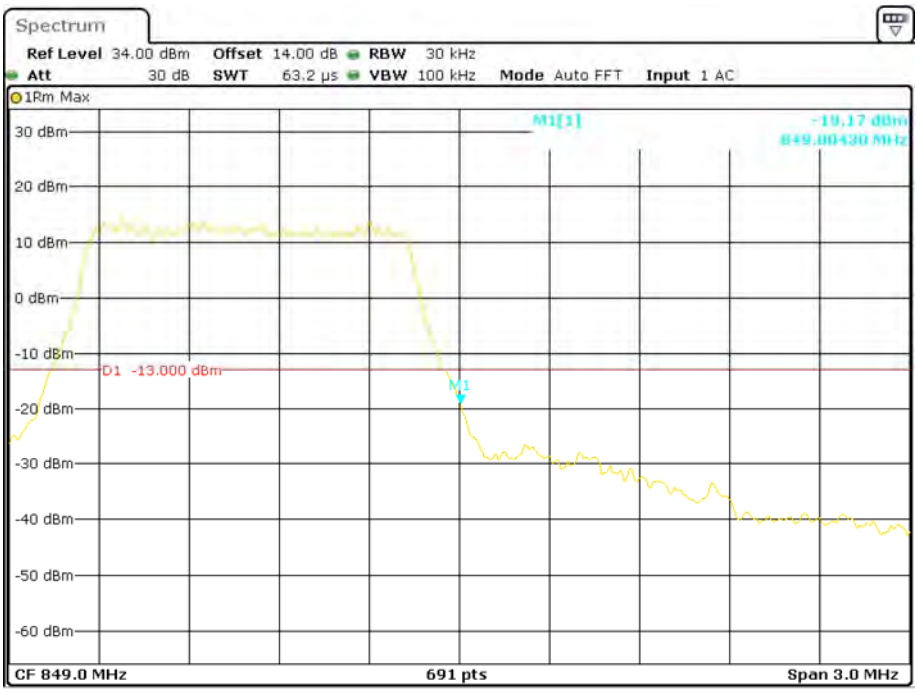
Date: 19.OCT.2017 23:44:55

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



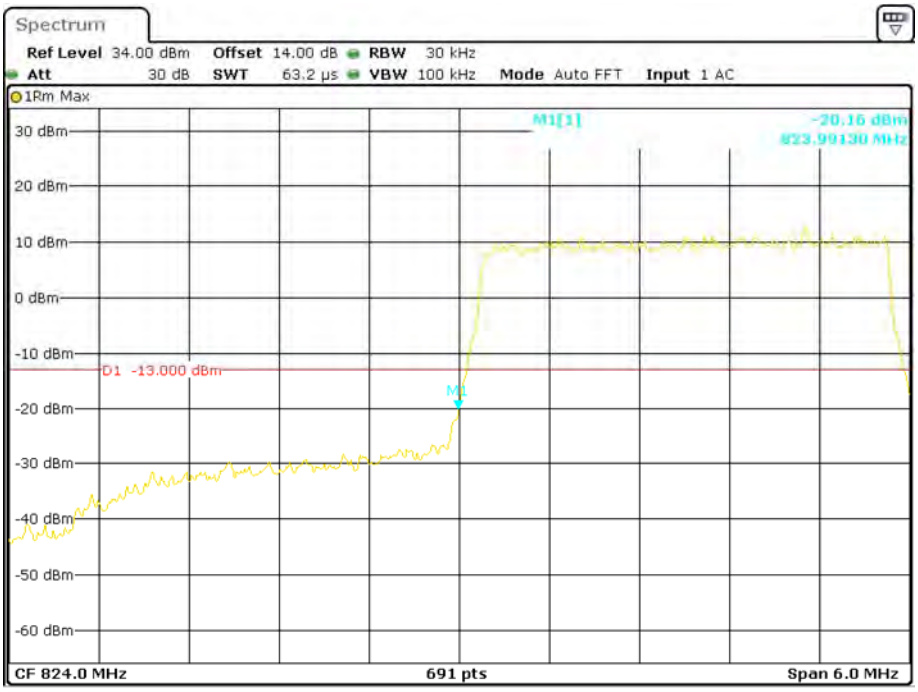
Date: 19.OCT.2017 23:43:17

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



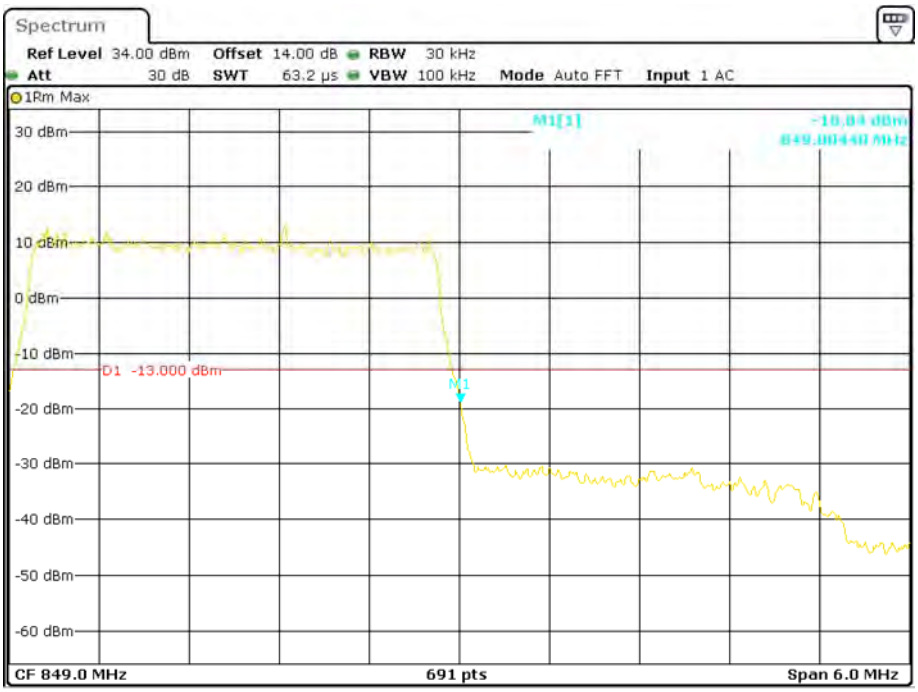
Date: 19.OCT.2017 23:44:13

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



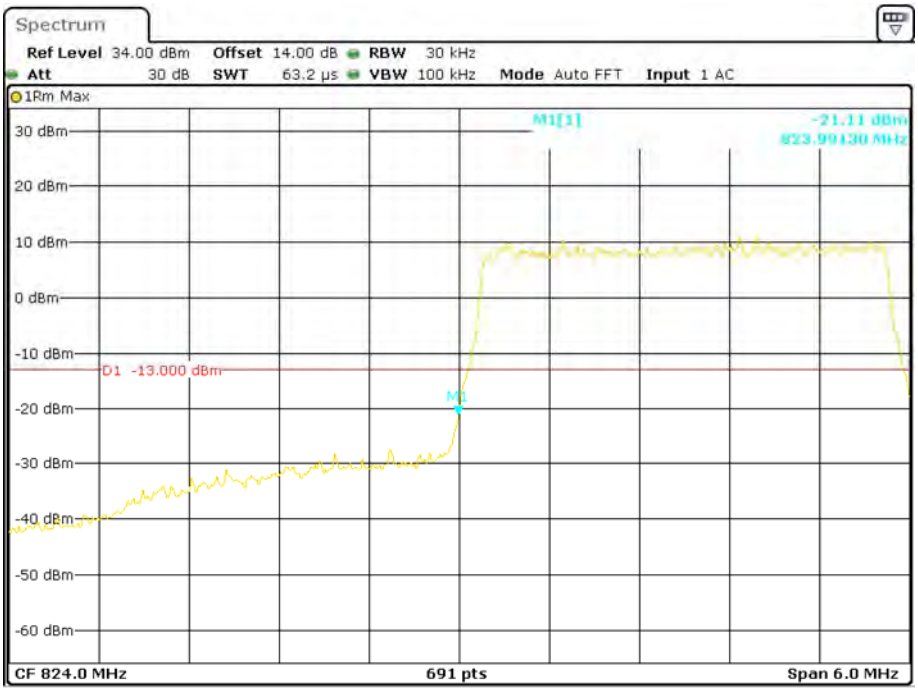
Date: 19.OCT.2017 23:48:11

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



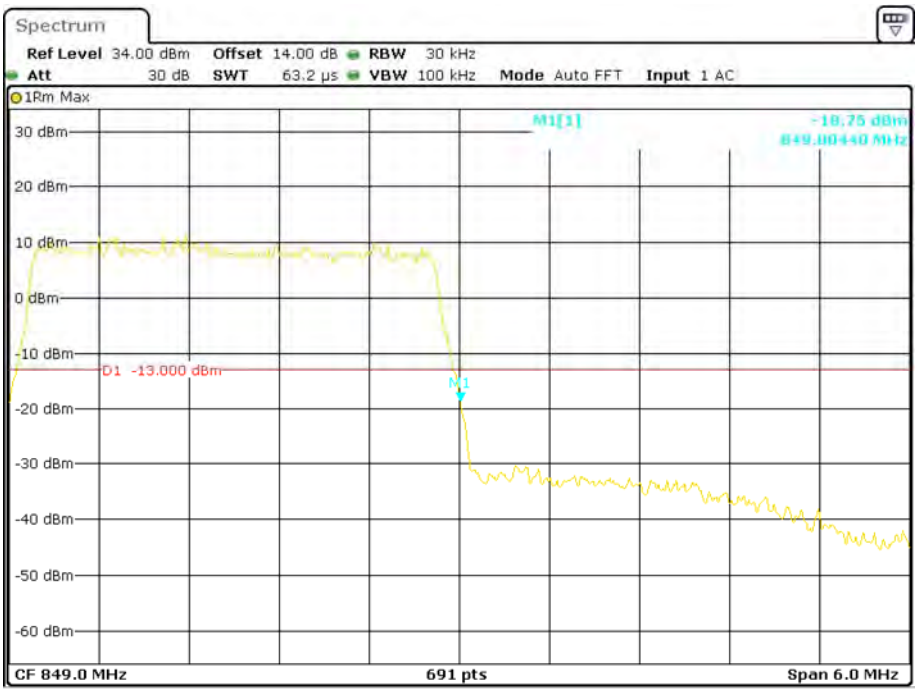
Date: 19.OCT.2017 23:46:06

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



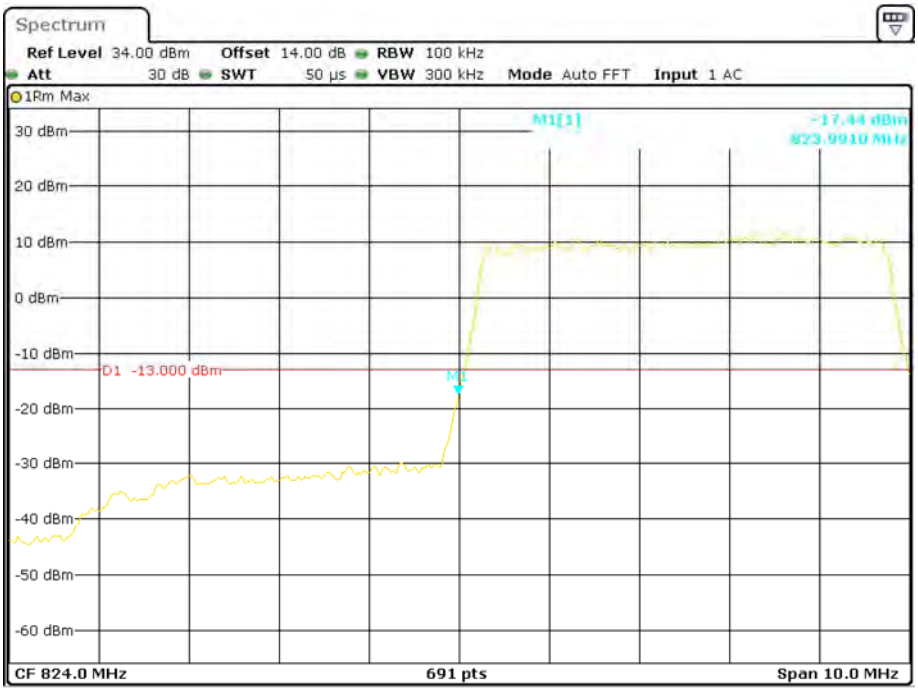
Date: 19.OCT.2017 23:47:34

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



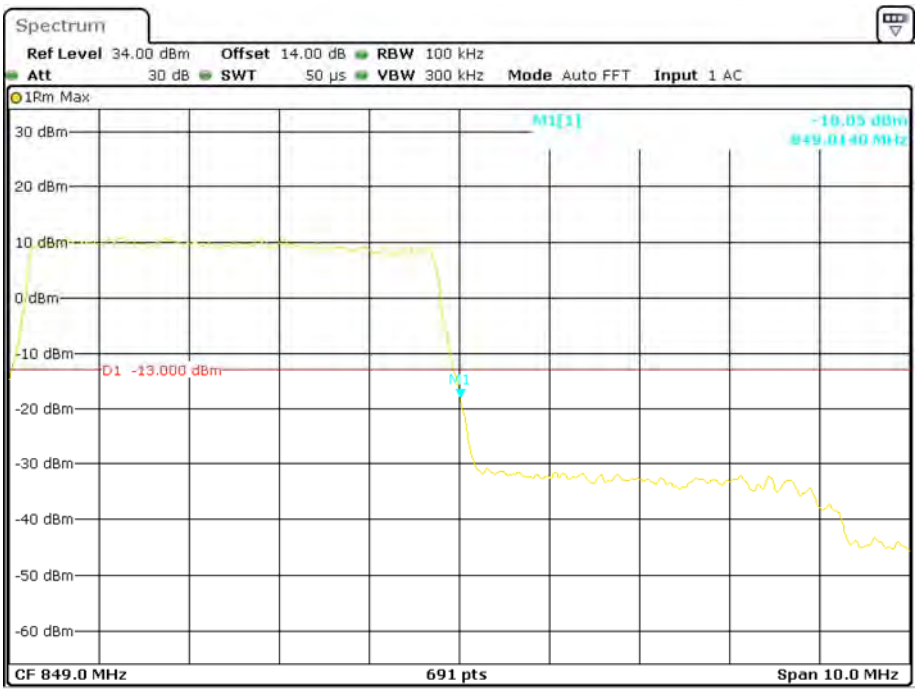
Date: 19.OCT.2017 23:46:44

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



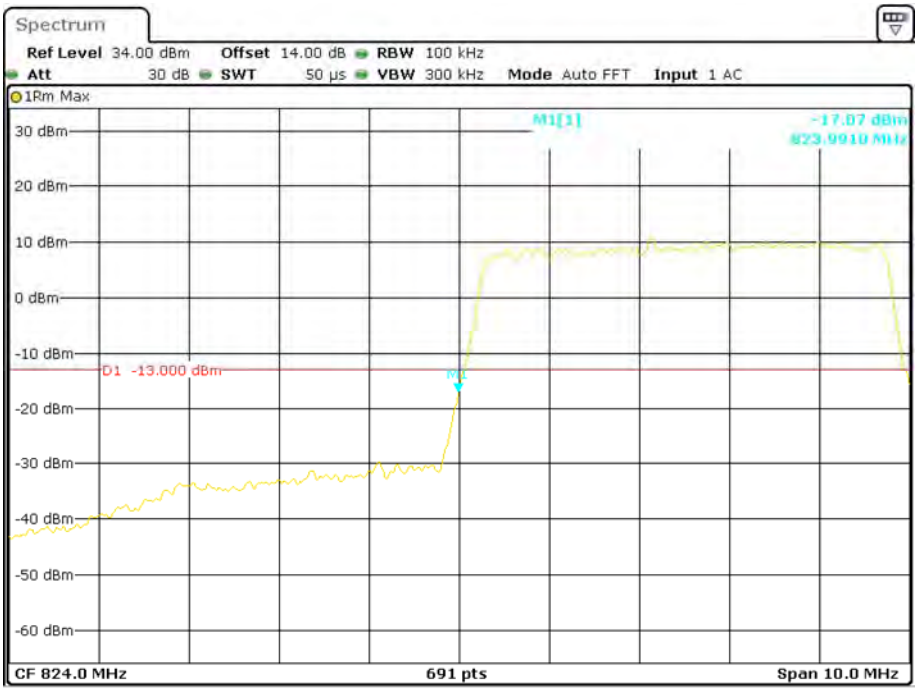
Date: 19.OCT.2017 23:49:53

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



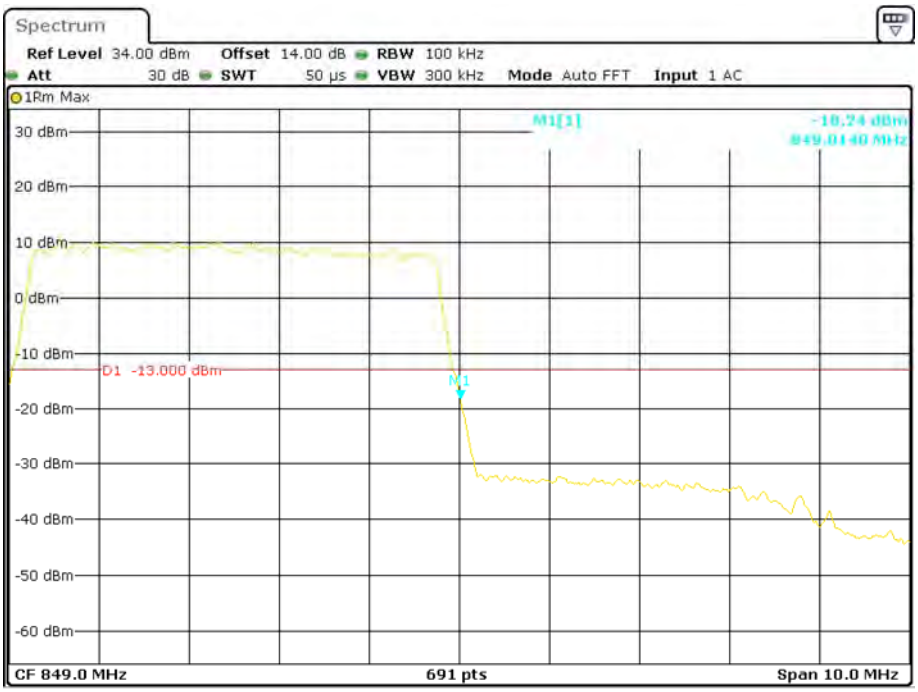
Date: 19.OCT.2017 23:51:45

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



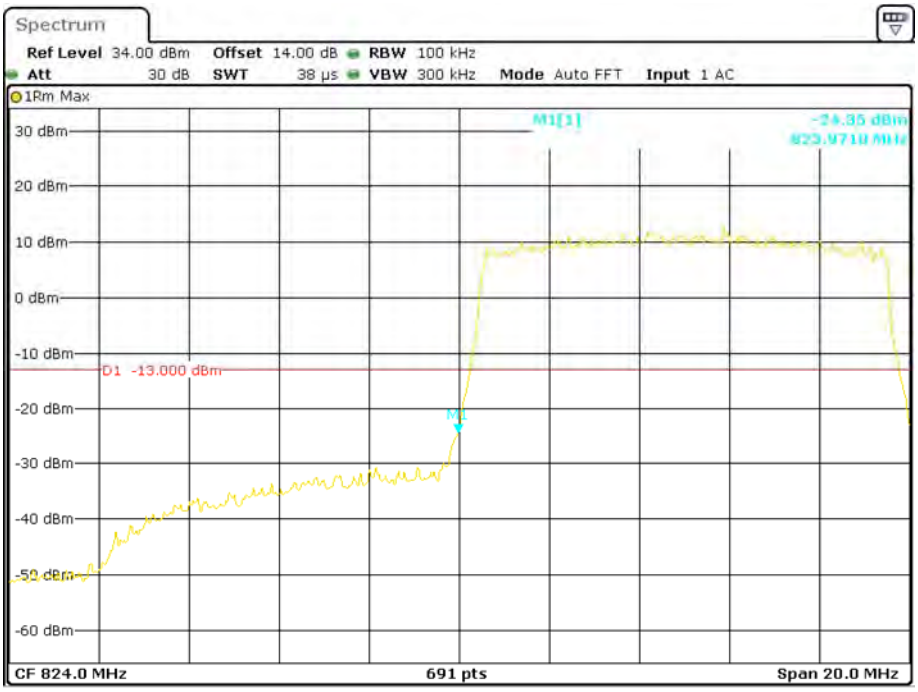
Date: 19.OCT.2017 23:50:21

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



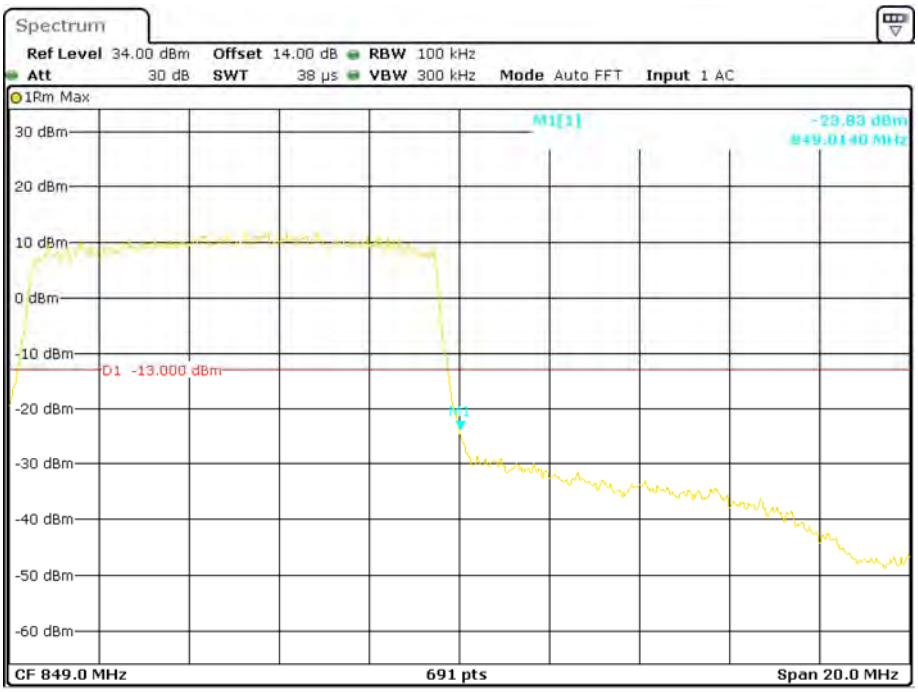
Date: 19.OCT.2017 23:51:14

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



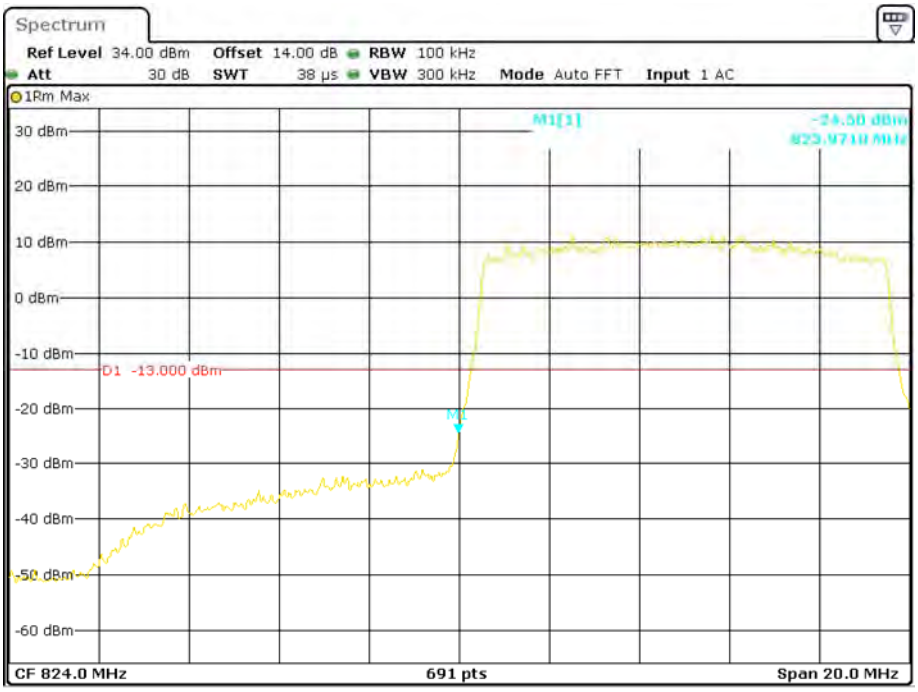
Date: 19.OCT.2017 23:55:42

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



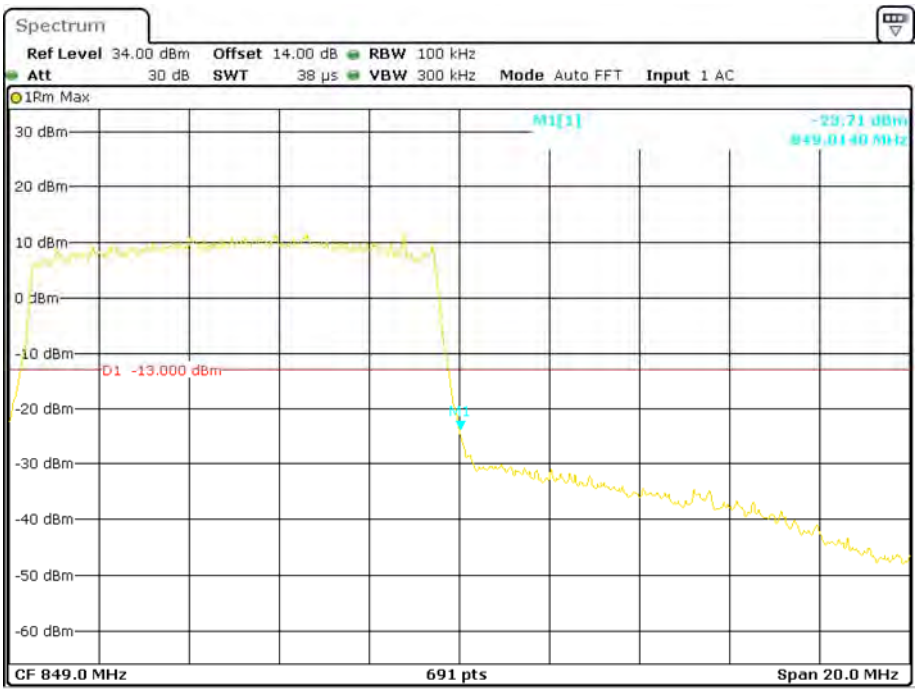
Date: 19.OCT.2017 23:52:54

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



Date: 19.OCT.2017 23:55:11

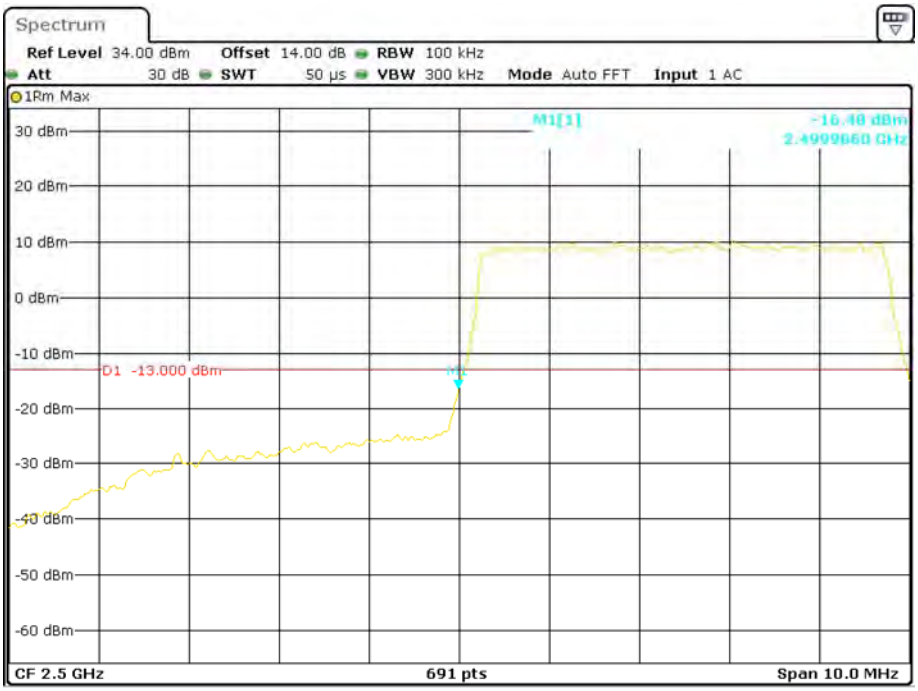
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 19.OCT.2017 23:54:16

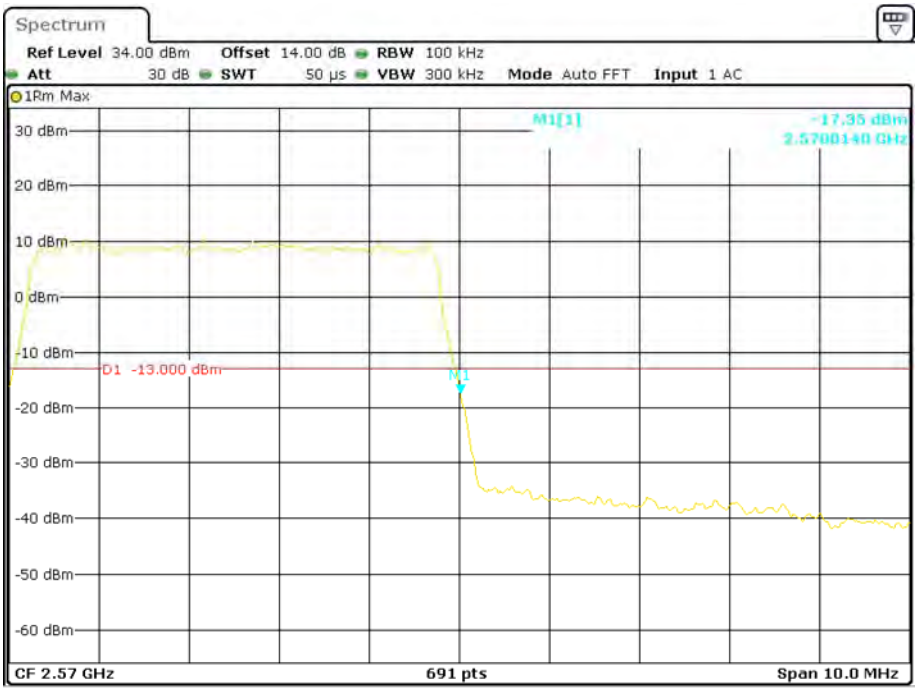
Band 7:

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



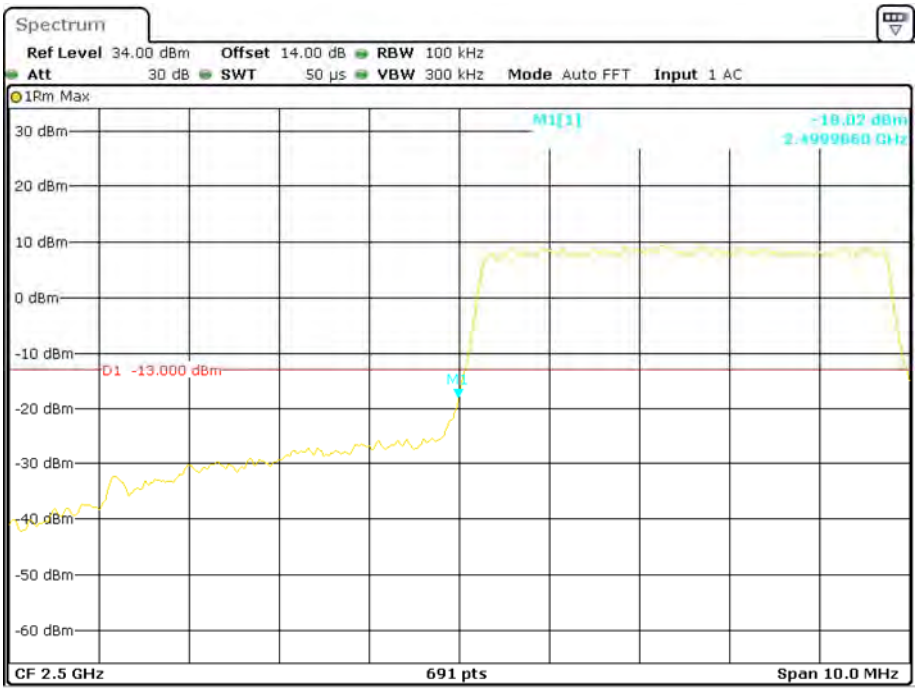
Date: 20.OCT.2017 18:59:59

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



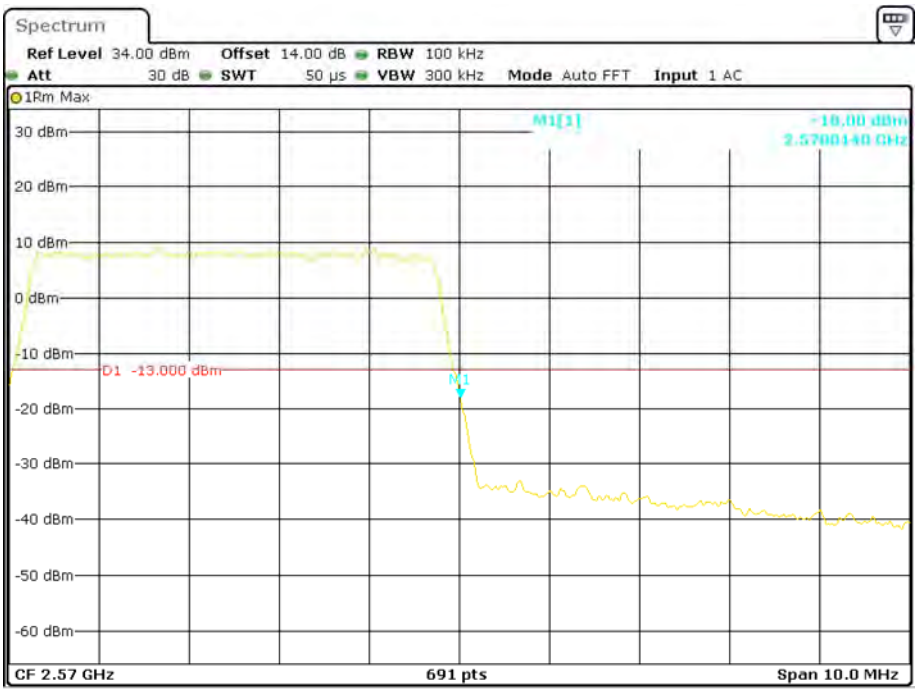
Date: 20.OCT.2017 19:02:11

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



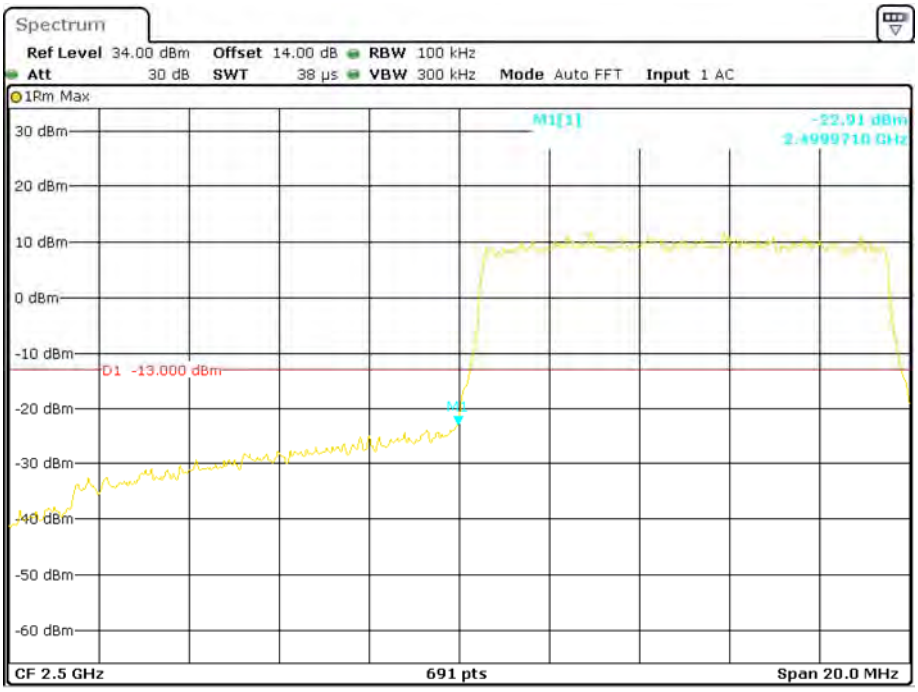
Date: 20.OCT.2017 19:00:33

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



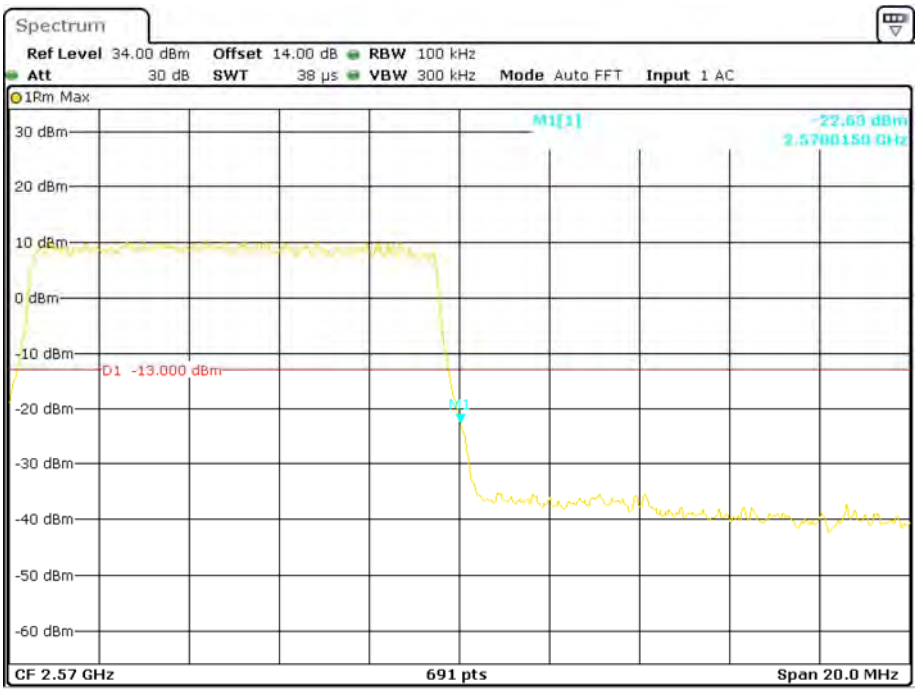
Date: 20.OCT.2017 19:01:38

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



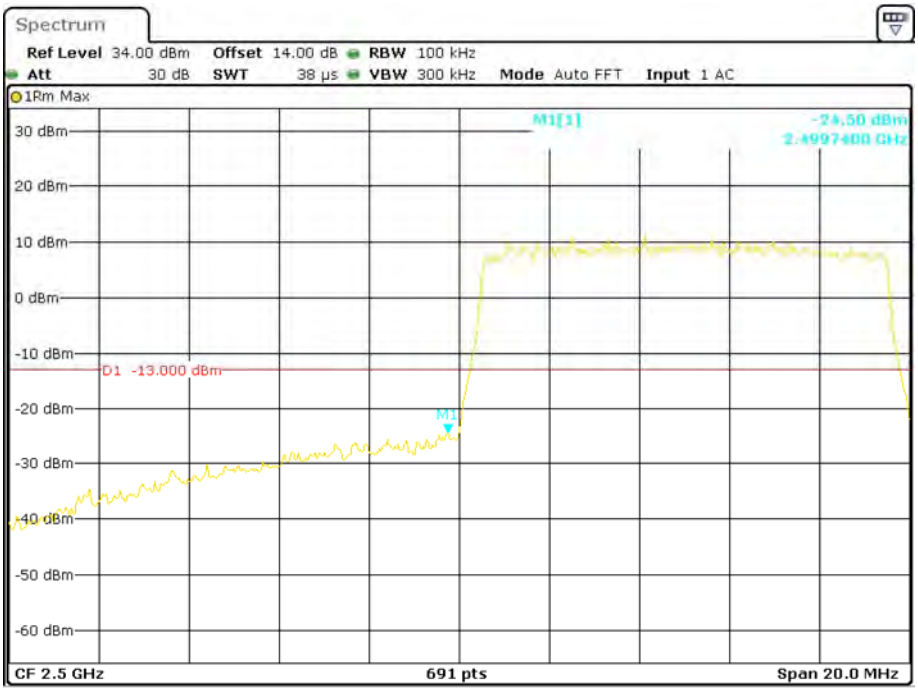
Date: 20.OCT.2017 19:07:41

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



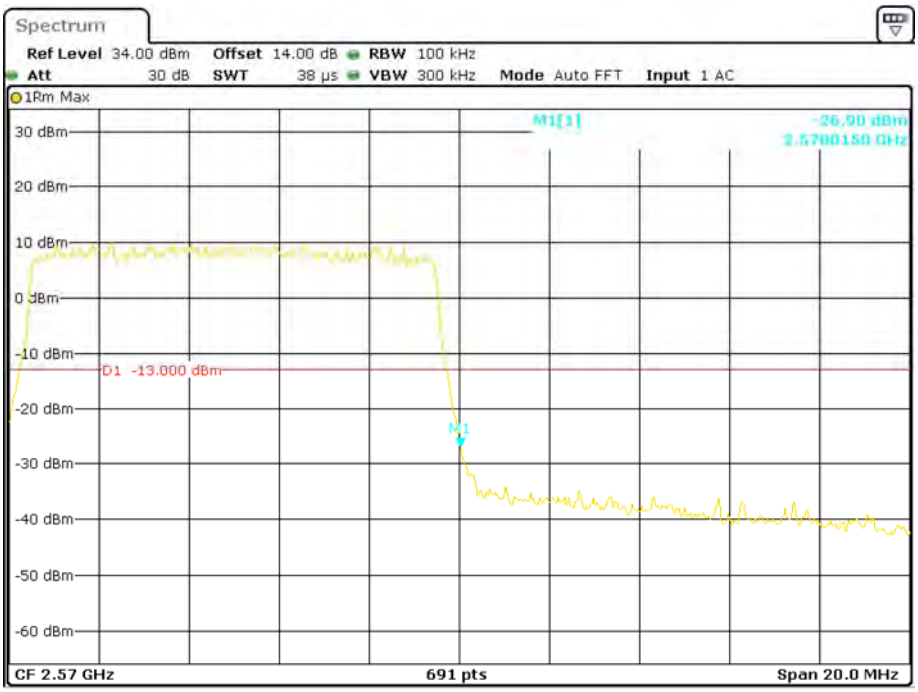
Date: 20.OCT.2017 19:03:43

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



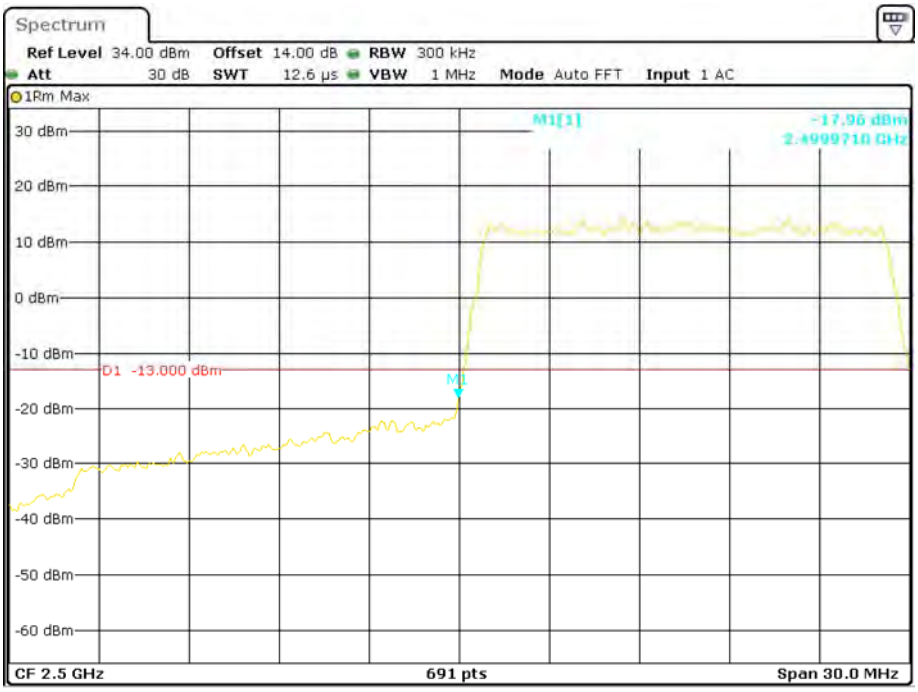
Date: 20.OCT.2017 19:06:02

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



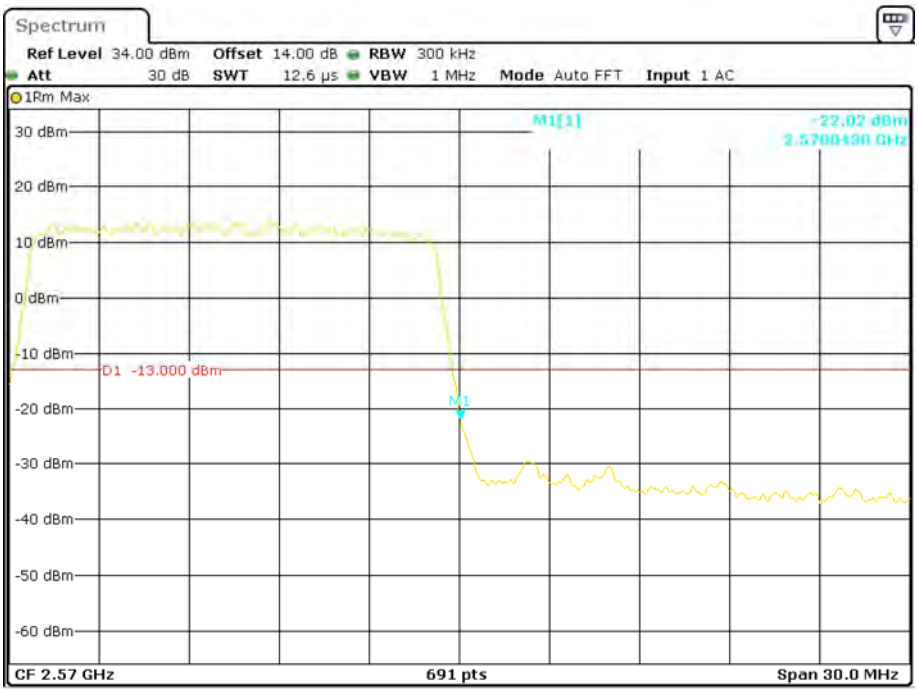
Date: 20.OCT.2017 19:04:56

QPSK (15 MHz, FULL RB) - Left Band Edge



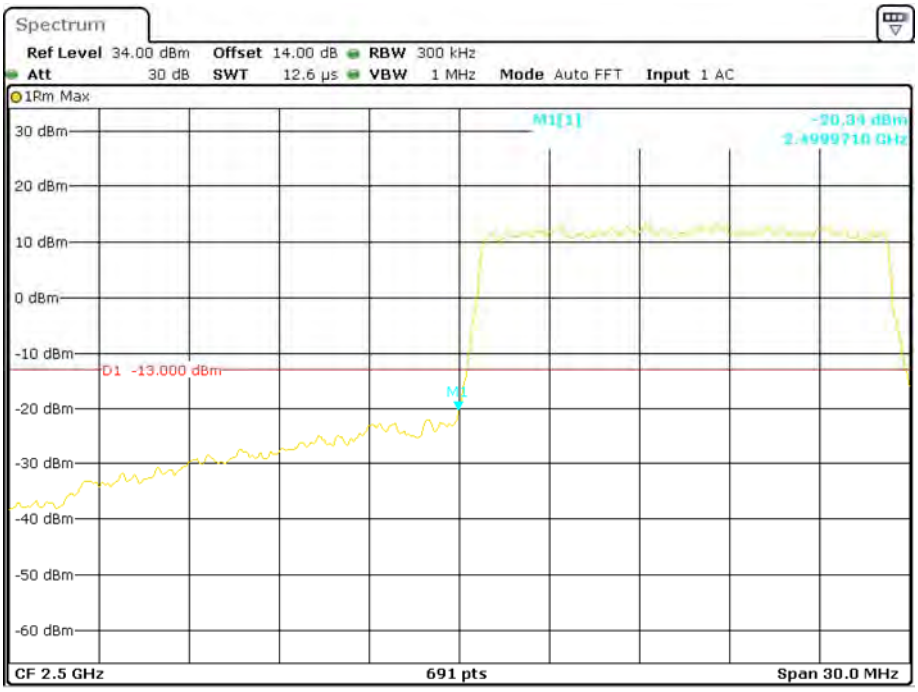
Date: 20.OCT.2017 19:09:21

QPSK (15 MHz, FULL RB) - Right Band Edge



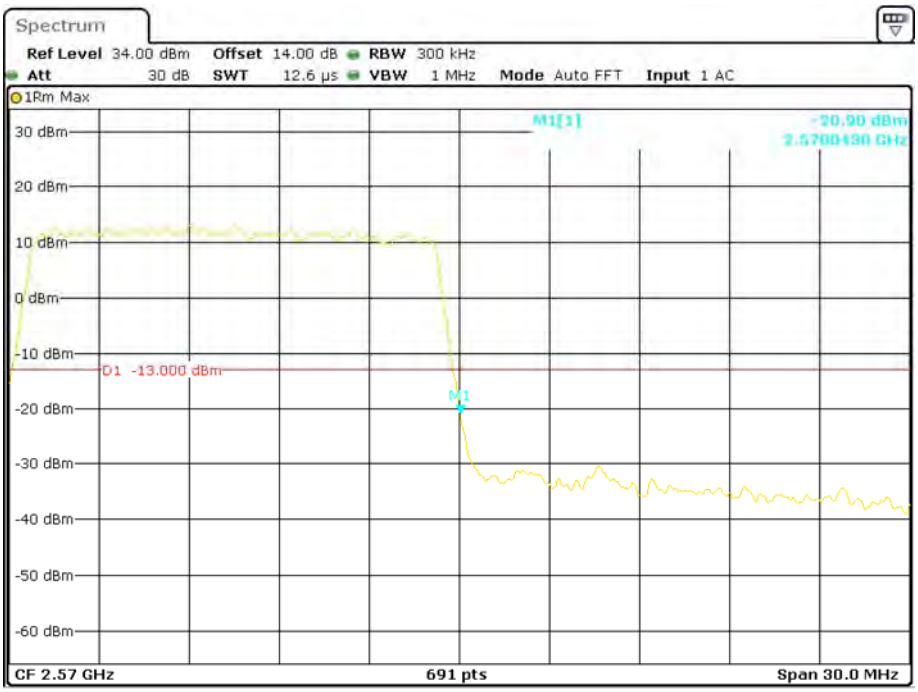
Date: 20.OCT.2017 19:11:49

16-QAM (15 MHz, FULL RB) - Left Band Edge



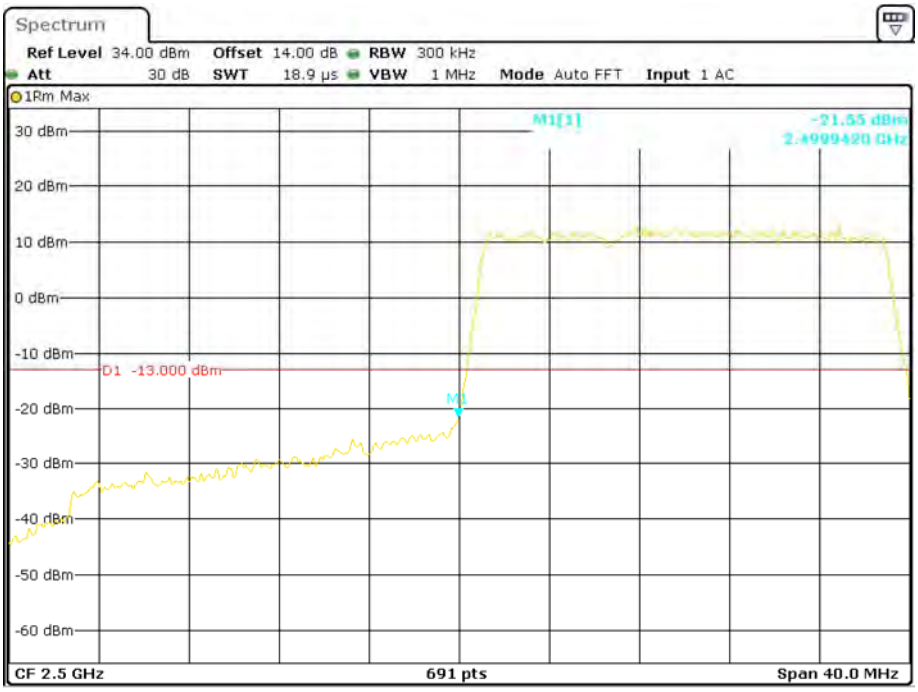
Date: 20.OCT.2017 19:10:00

16-QAM (15 MHz, FULL RB) - Right Band Edge



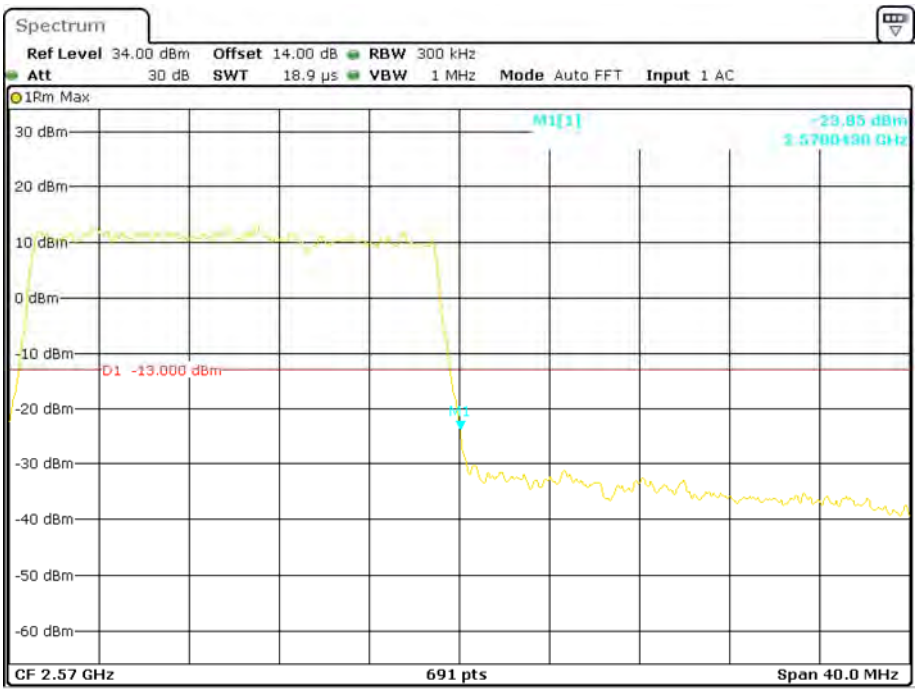
Date: 20.OCT.2017 19:11:07

QPSK (20 MHz, FULL RB) - Left Band Edge



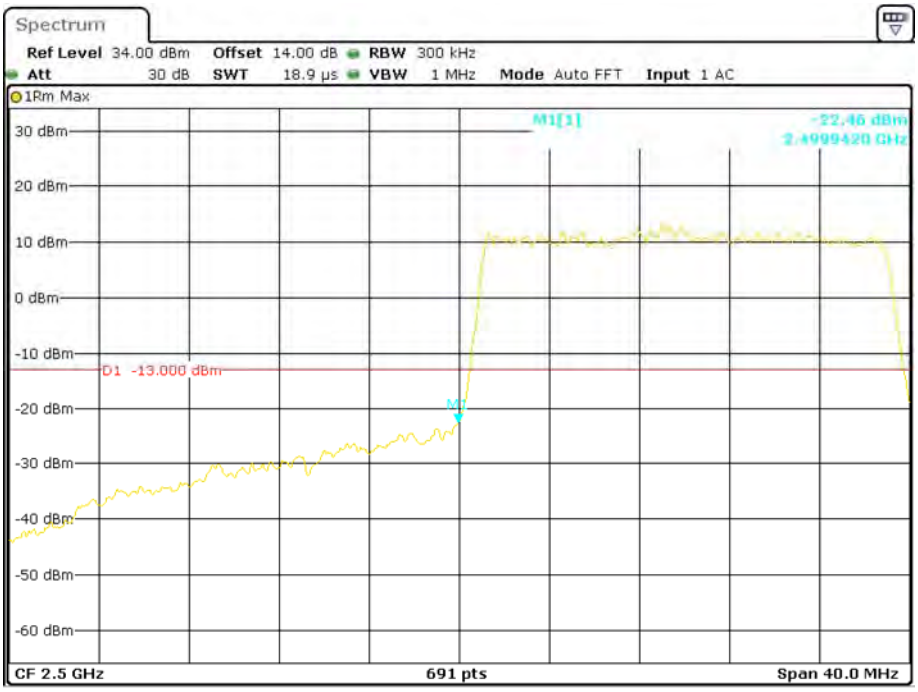
Date: 20.OCT.2017 19:16:49

QPSK (20 MHz, FULL RB) - Right Band Edge



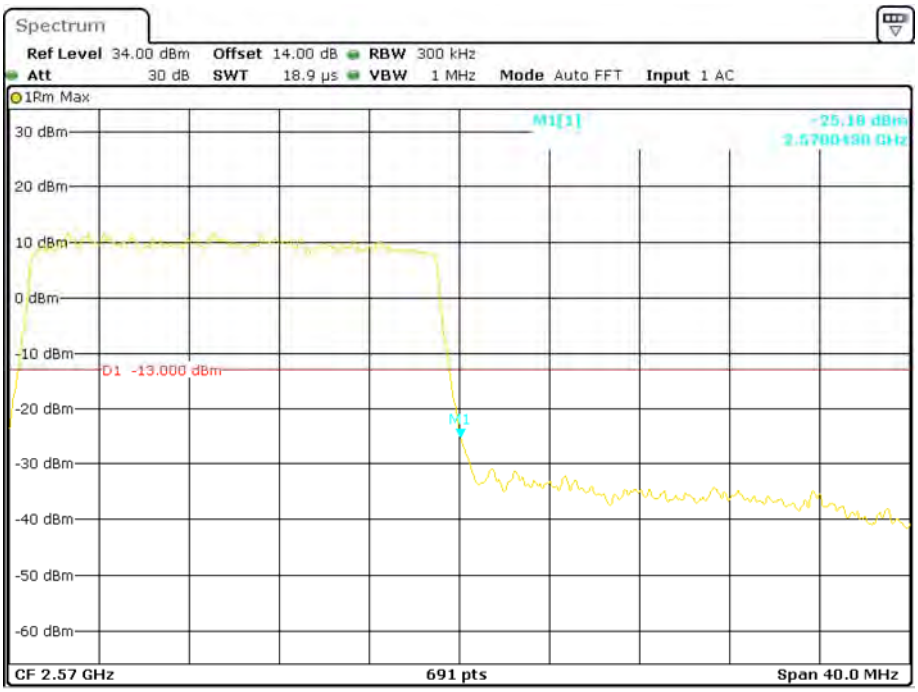
Date: 20.OCT.2017 19:14:24

16-QAM (20 MHz, FULL RB) - Left Band Edge



Date: 20.OCT.2017 19:16:15

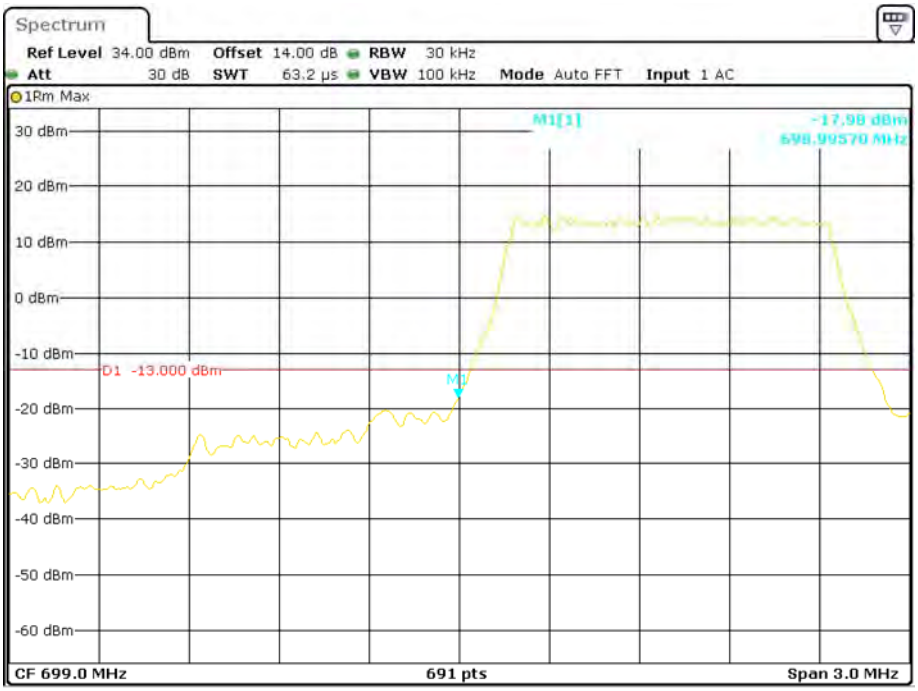
16-QAM (20 MHz, FULL RB) - Right Band Edge



Date: 20.OCT.2017 19:15:01

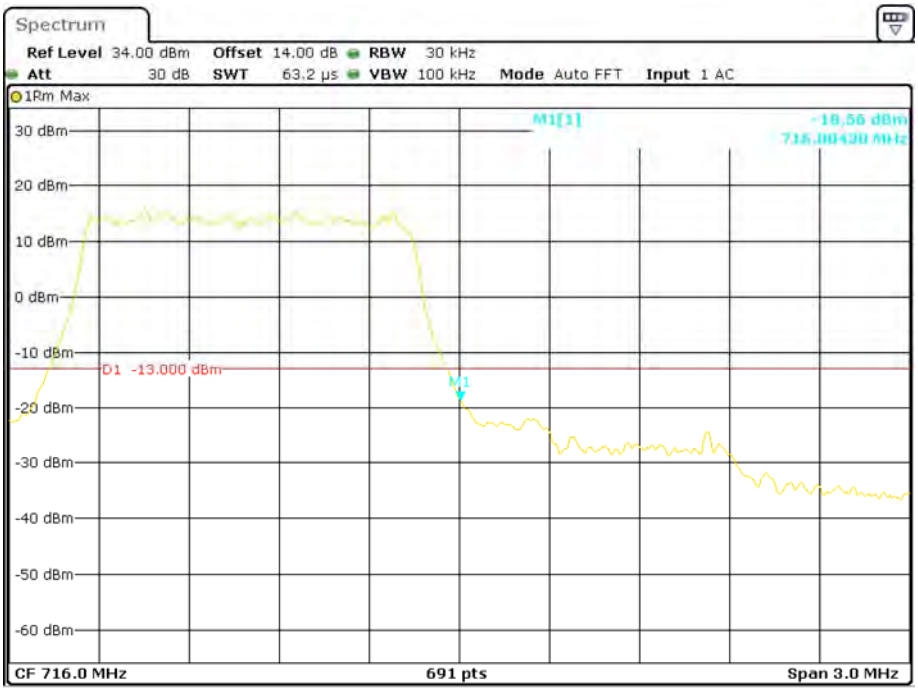
Band 12:

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



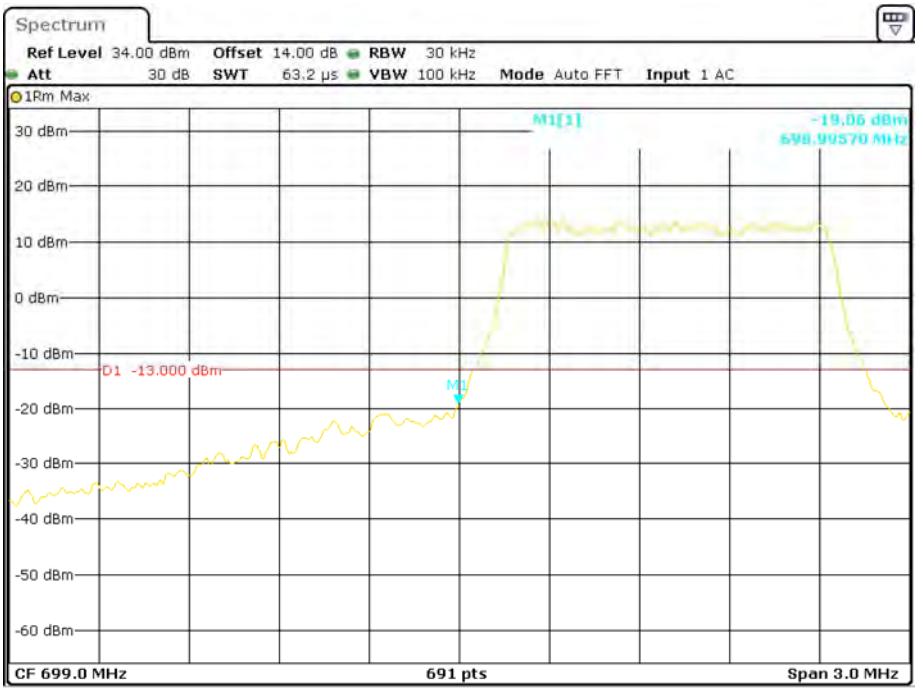
Date: 20.OCT.2017 19:21:27

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



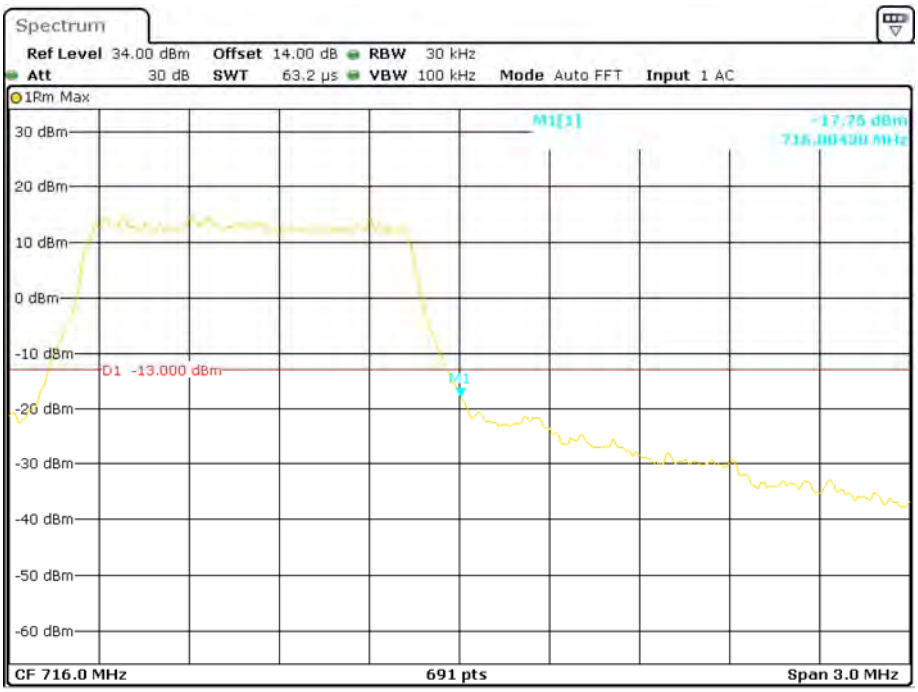
Date: 20.OCT.2017 19:23:27

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



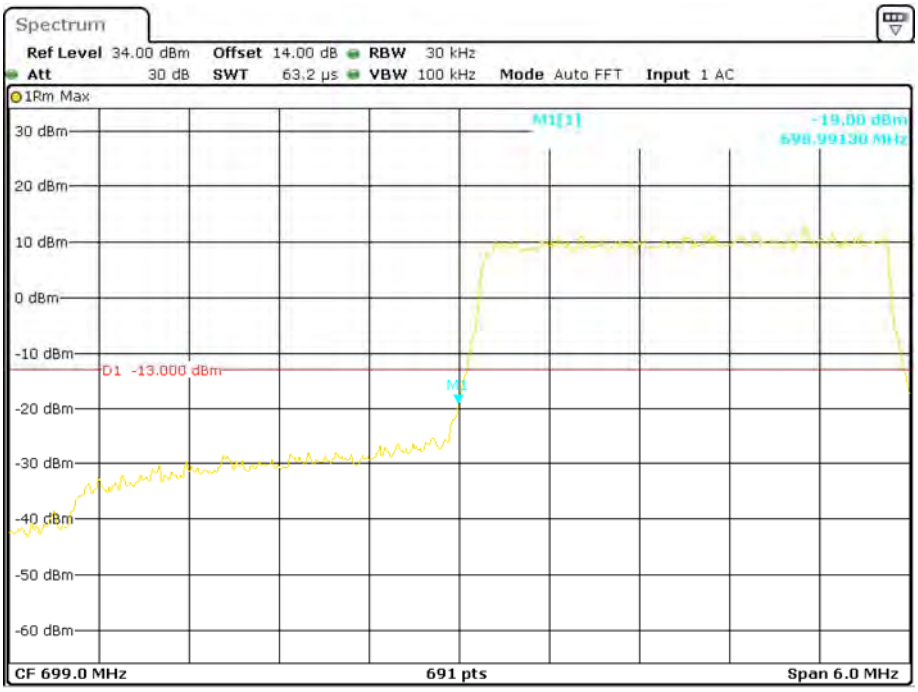
Date: 20.OCT.2017 19:22:07

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



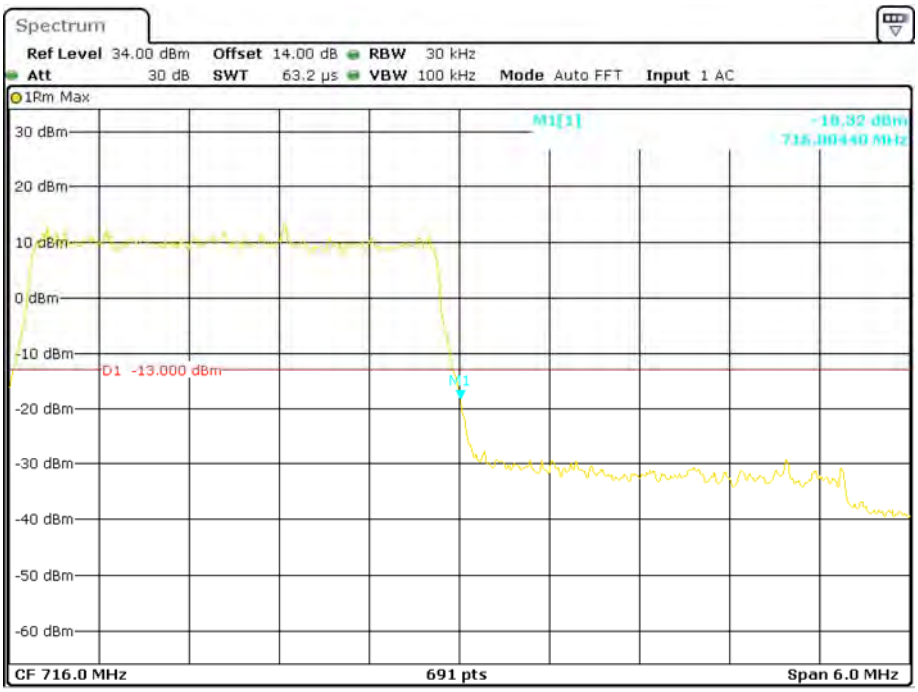
Date: 20.OCT.2017 19:22:57

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



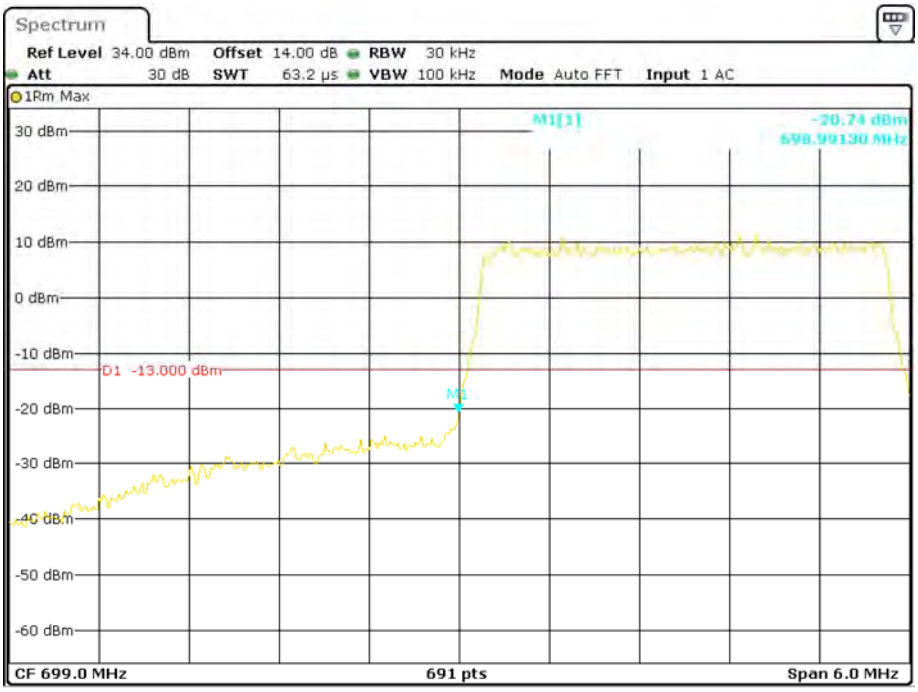
Date: 20.OCT.2017 19:26:50

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



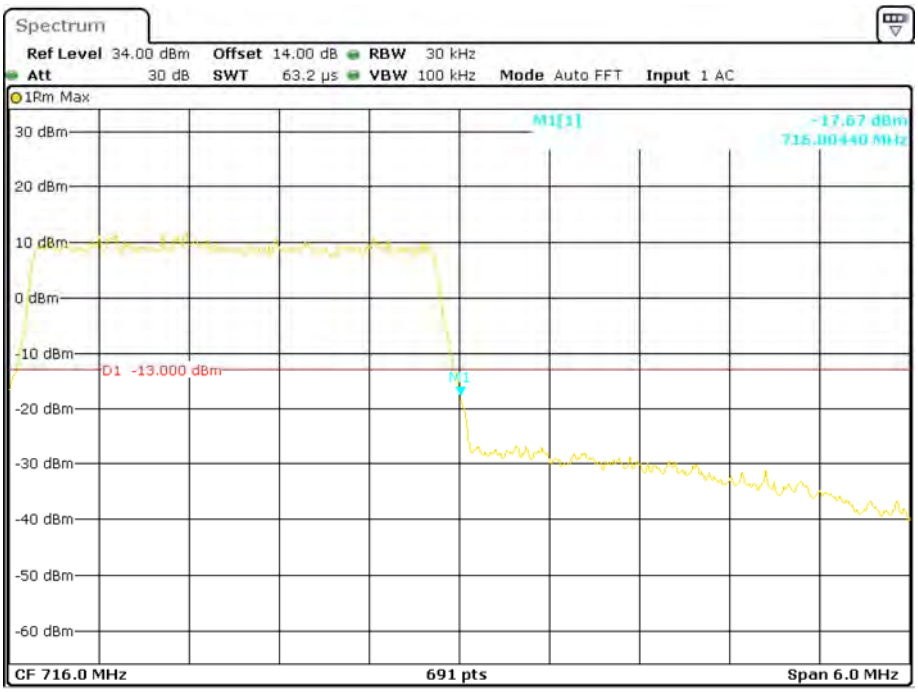
Date: 20.OCT.2017 19:25:01

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



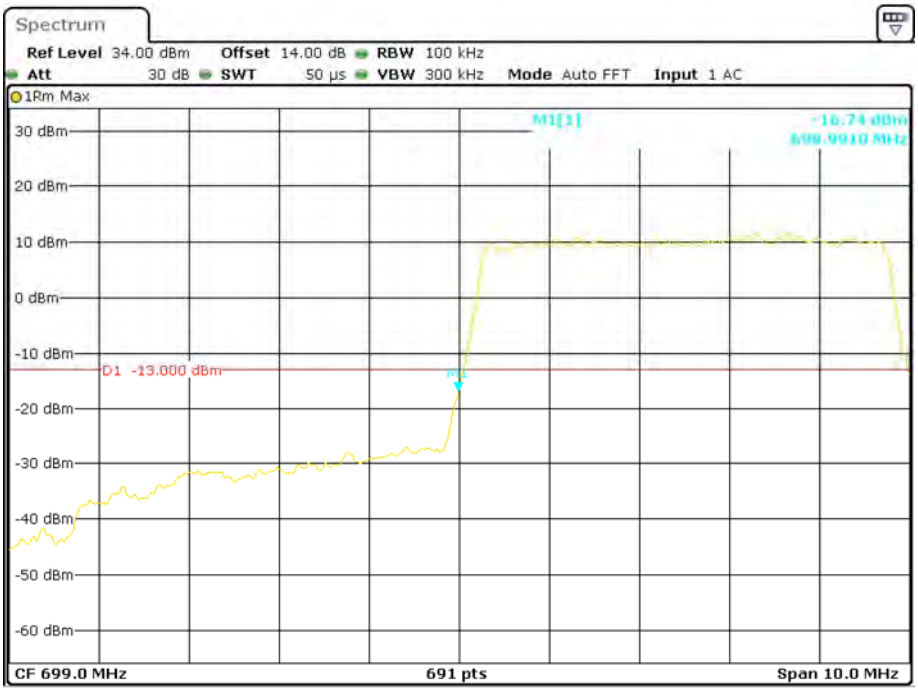
Date: 20.OCT.2017 19:26:18

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



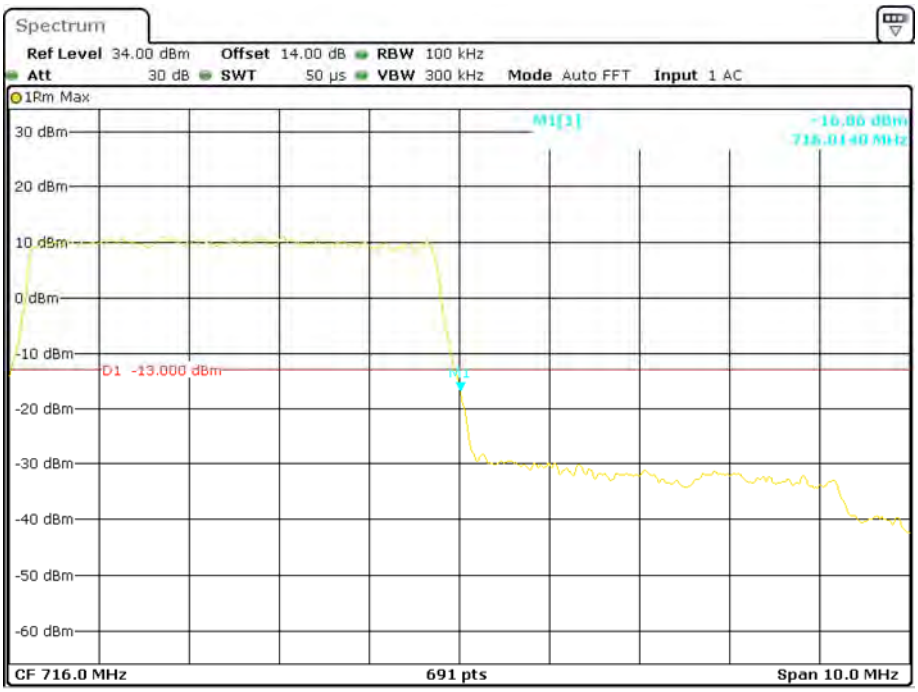
Date: 20.OCT.2017 19:25:29

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



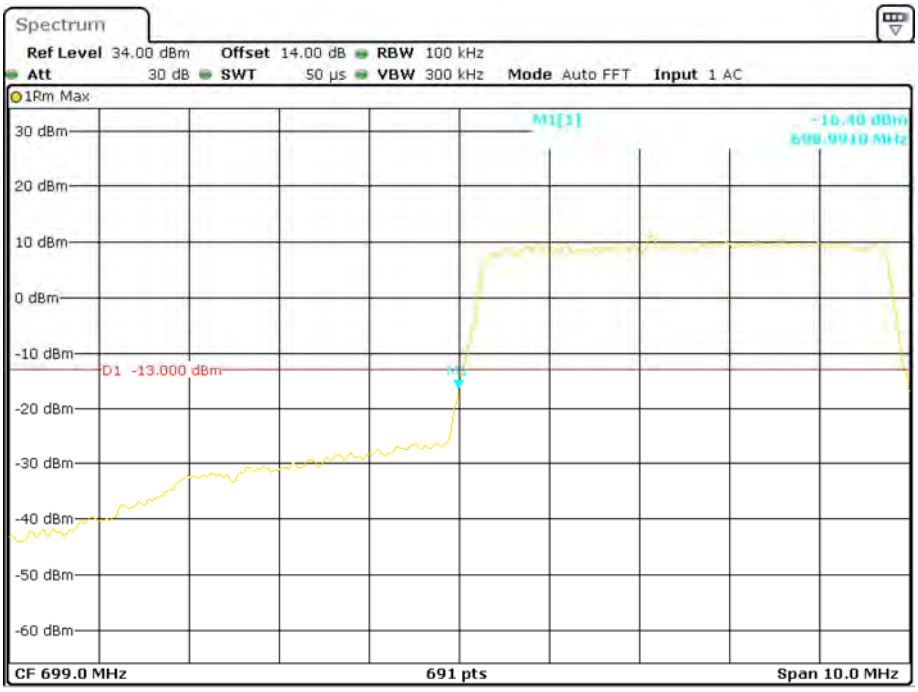
Date: 20.OCT.2017 19:29:40

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



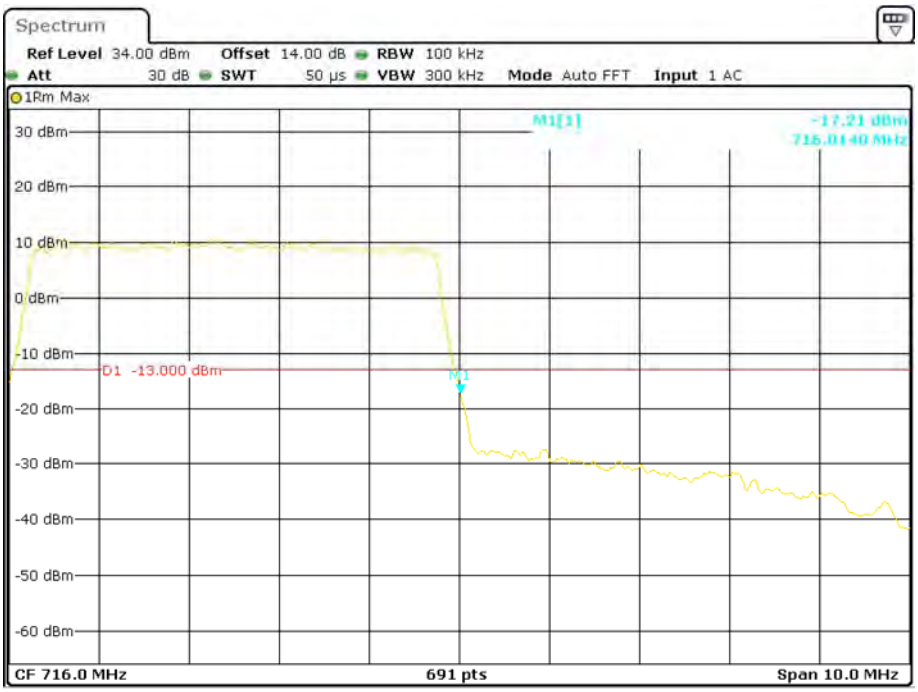
Date: 20.OCT.2017 19:31:39

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



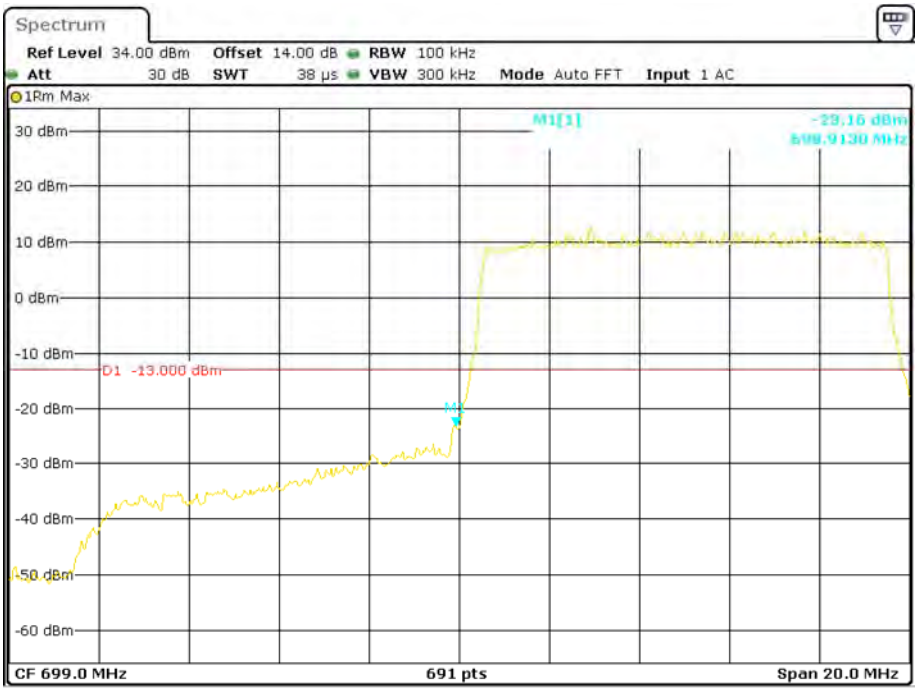
Date: 20.OCT.2017 19:30:09

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



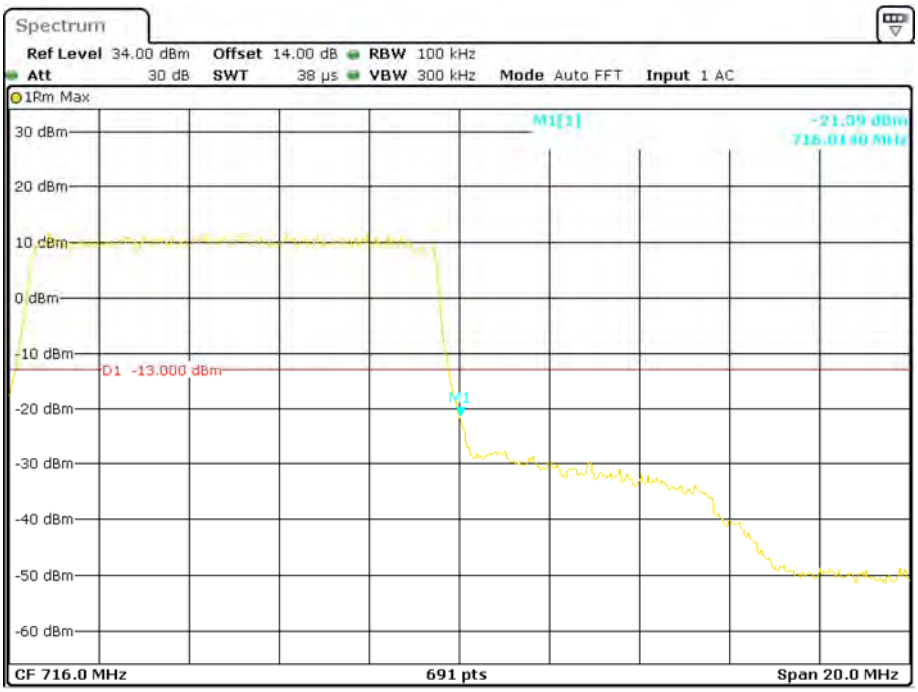
Date: 20.OCT.2017 19:31:11

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



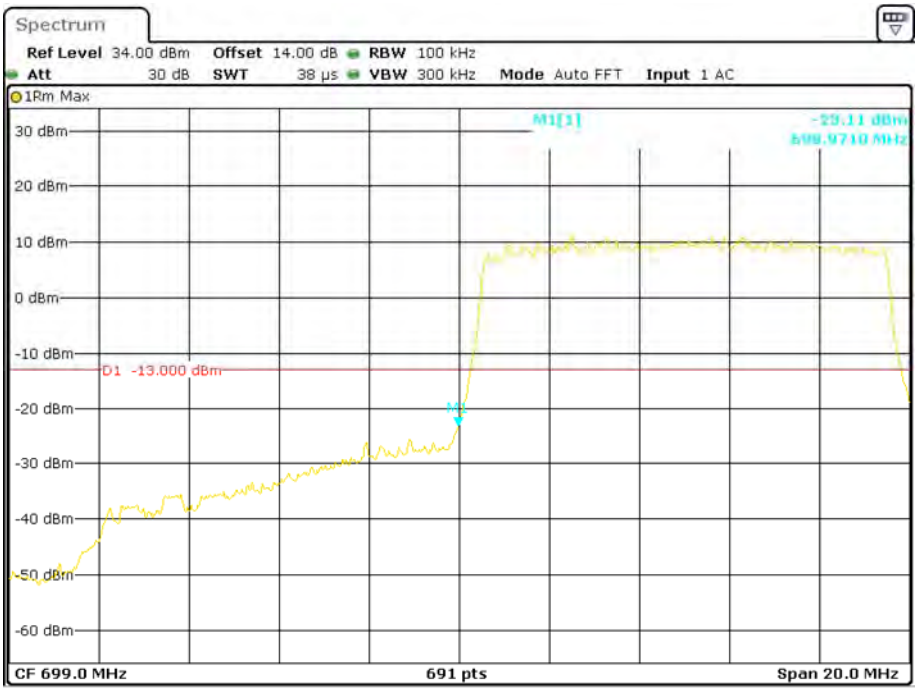
Date: 20.OCT.2017 19:37:10

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



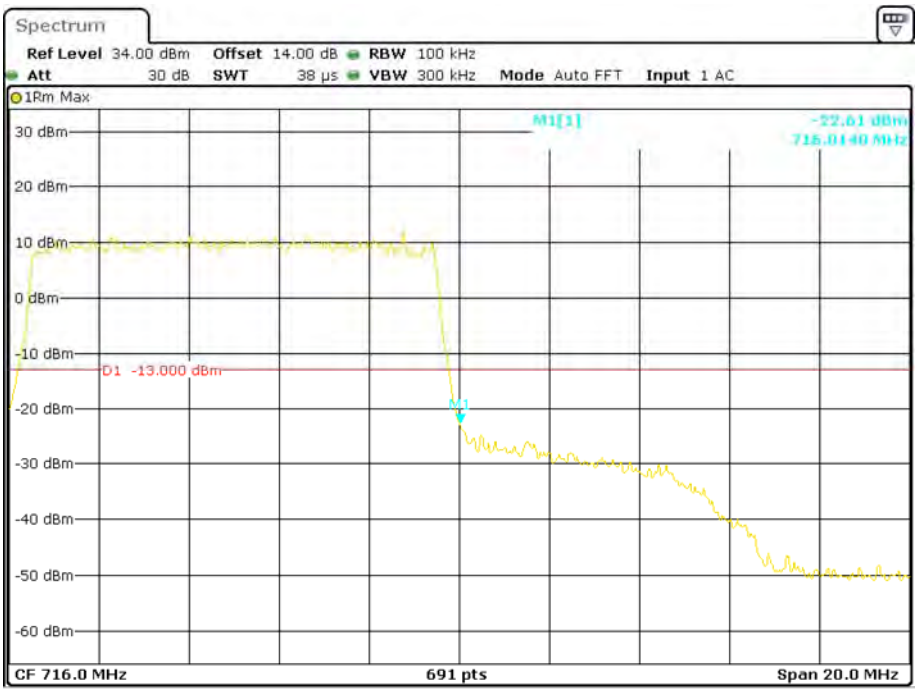
Date: 20.OCT.2017 19:33:57

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



Date: 20.OCT.2017 19:36:30

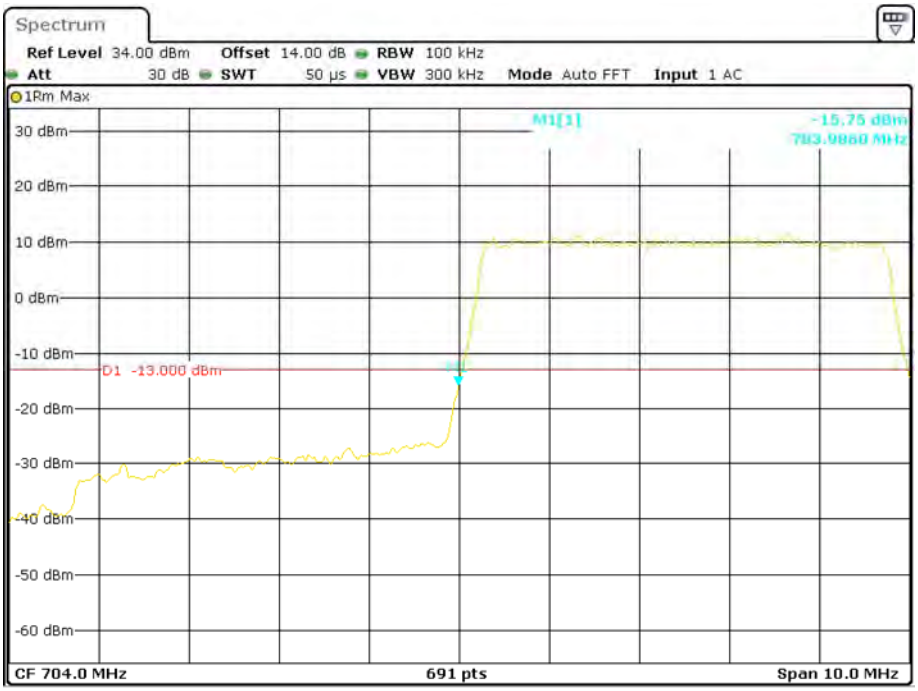
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 20.OCT.2017 19:35:19

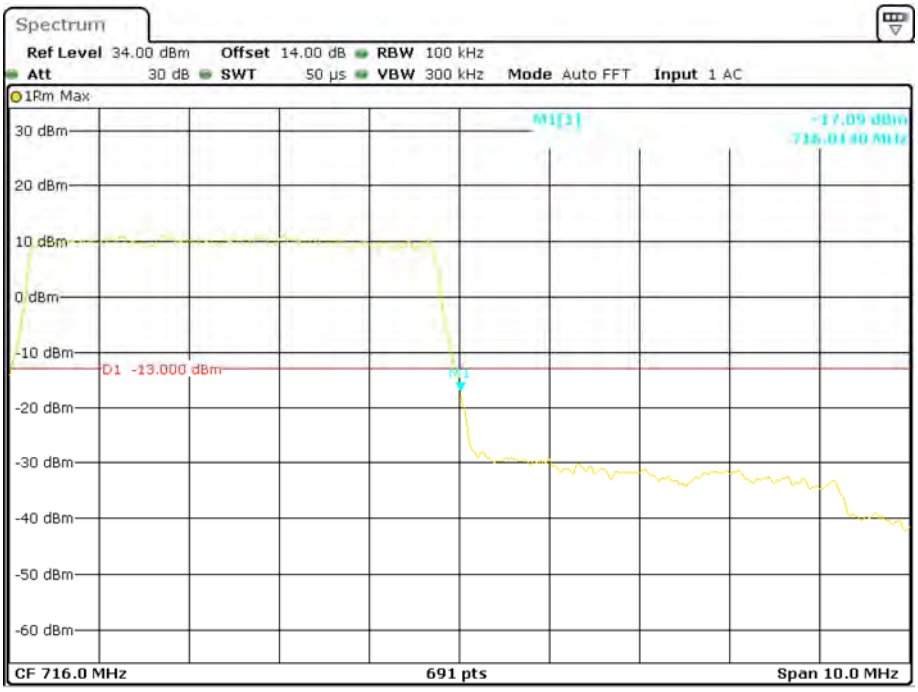
Band 17:

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



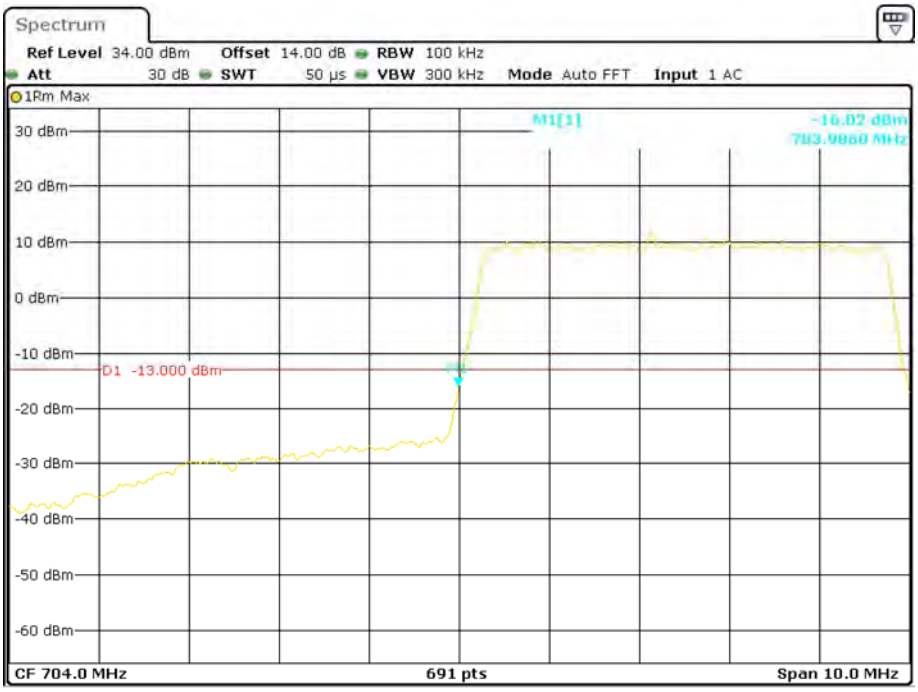
Date: 20.OCT.2017 19:50:27

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



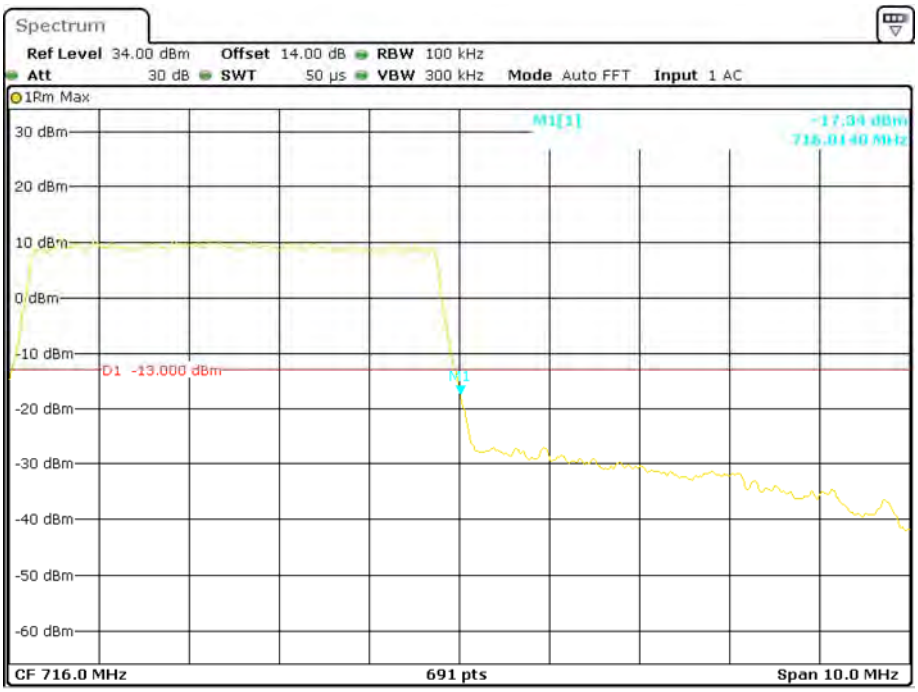
Date: 20.OCT.2017 19:54:47

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



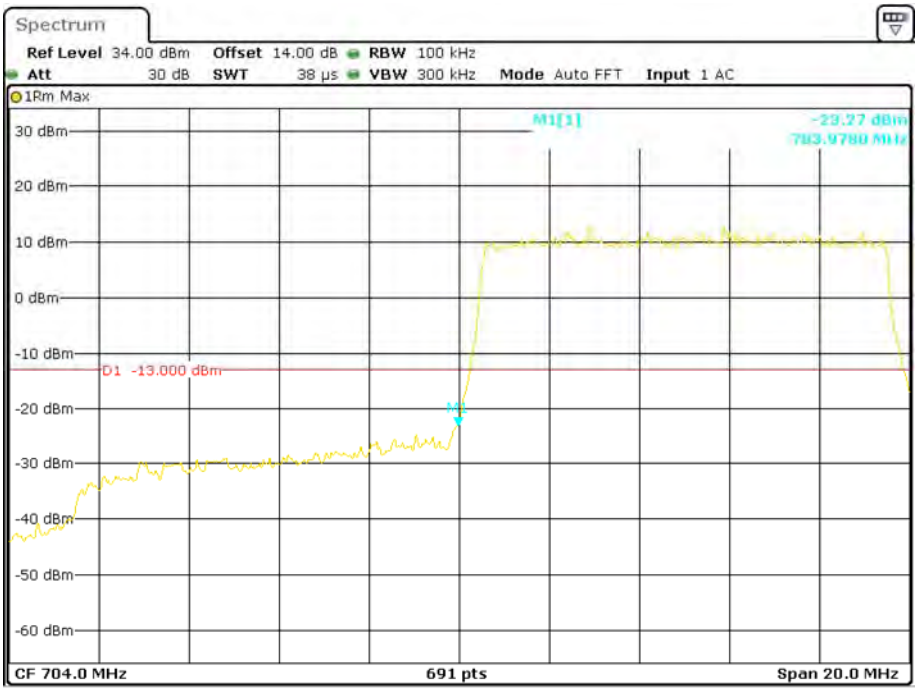
Date: 20.OCT.2017 19:51:43

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



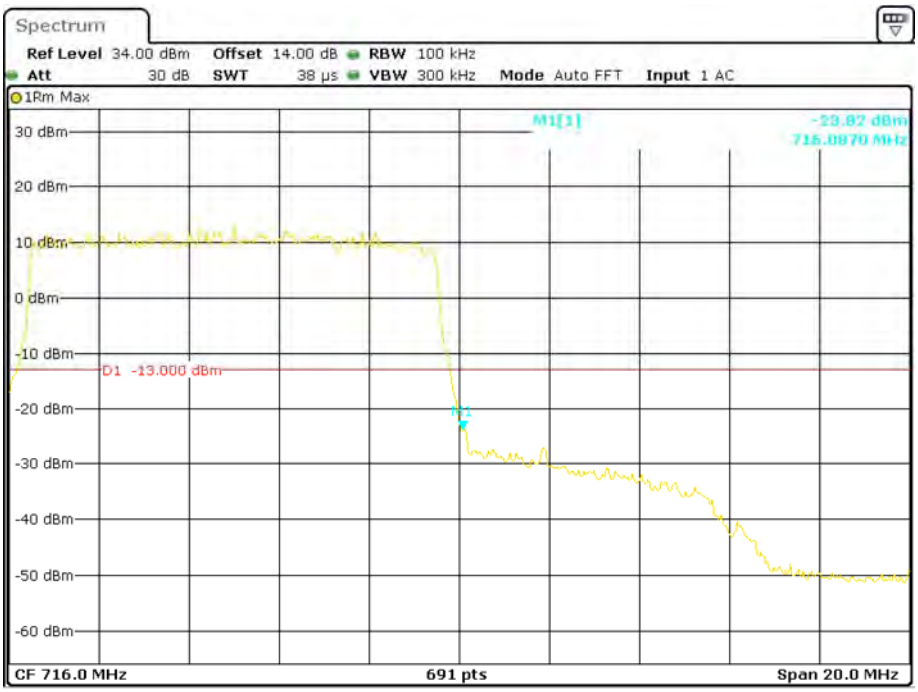
Date: 20.OCT.2017 19:53:17

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



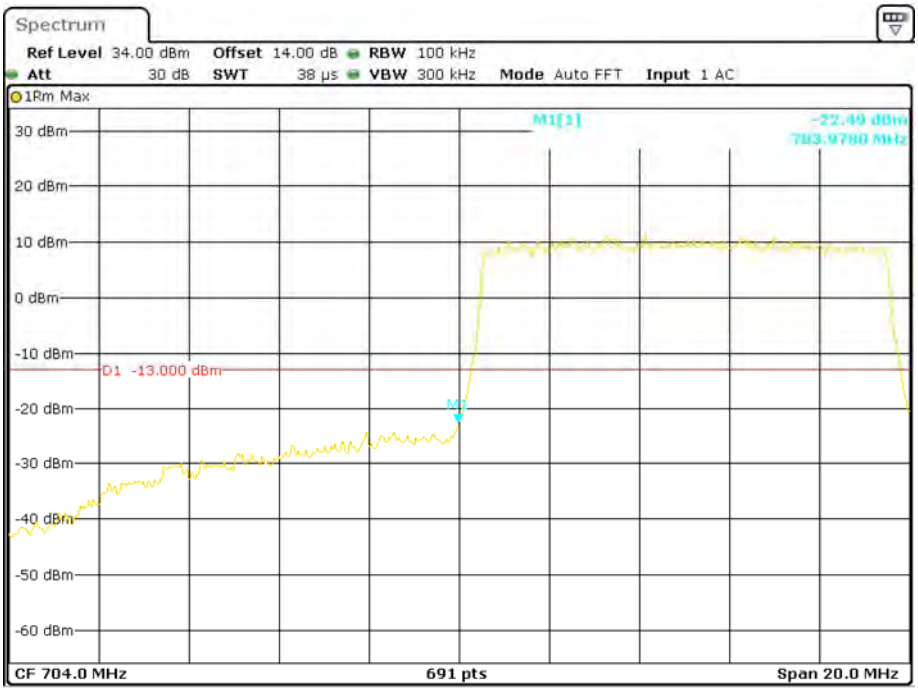
Date: 20.OCT.2017 19:42:00

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



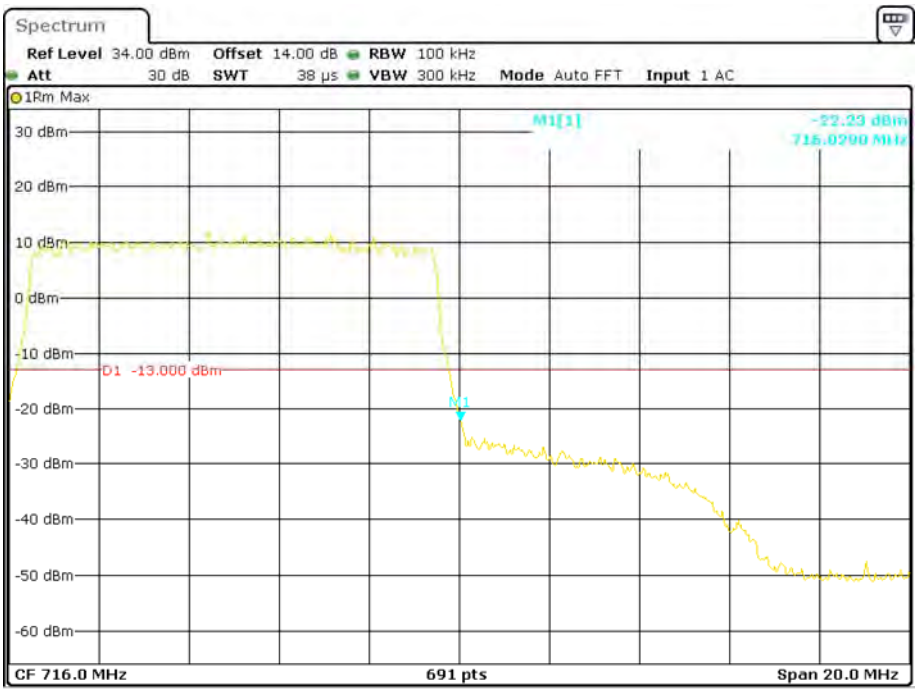
Date: 20.OCT.2017 19:44:17

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



Date: 20.OCT.2017 19:42:45

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



Date: 20.OCT.2017 19:43:43

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

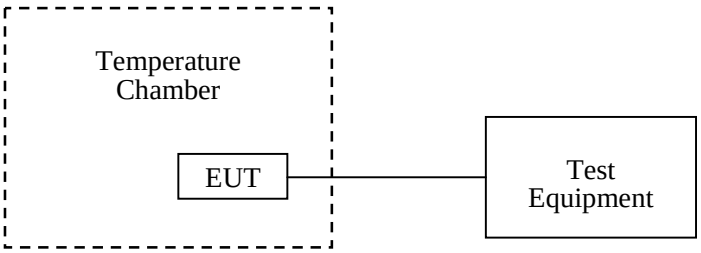
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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:	22 ℃
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Kobe Li on 2017-10-27.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

GSM Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.85	-4	-0.0048	2.5
-20		-5	-0.0060	2.5
-10		-3	-0.0036	2.5
0		-3	-0.0036	2.5
10		-8	-0.0096	2.5
20		10	0.0120	2.5
30		-3	-0.0036	2.5
40		-4	-0.0048	2.5
50		5	0.0060	2.5
25	V min.= 3.6	-5	-0.0060	2.5
	V max.= 4.4	-2	-0.0024	2.5

EDGE Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.85	6	0.0072	2.5
-20		7	0.0084	2.5
-10		-2	-0.0024	2.5
0		3	0.0036	2.5
10		-4	-0.0048	2.5
20		16	0.0191	2.5
30		-6	-0.0072	2.5
40		-4	-0.0048	2.5
50		2	0.0024	2.5
25	V min.= 3.6	-3	-0.0036	2.5
	V max.= 4.4	0	0.0000	2.5

WCDMA Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.85	25	0.0299	2.5
-20		25	0.0299	2.5
-10		24	0.0287	2.5
0		25	0.0299	2.5
10		23	0.0275	2.5
20		21	0.0251	2.5
30		22	0.0263	2.5
40		24	0.0287	2.5
50		22	0.0263	2.5
25	V min.= 3.6	24	0.0287	2.5
	V max.= 4.4	25	0.0299	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	15	0.0080	pass
-20		9	0.0048	pass
-10		16	0.0085	pass
0		10	0.0053	pass
10		8	0.0043	pass
20		12	0.0064	pass
30		7	0.0037	pass
40		8	0.0043	pass
50		5	0.0027	pass
25	V min.= 3.6	4	0.0021	pass
	V max.= 4.4	6	0.0032	pass

EDGE Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-20	3.85	-17	-0.0090	pass
-10		-9	-0.0048	pass
0		-12	-0.0064	pass
10		-11	-0.0059	pass
20		-8	-0.0043	pass
30		-4	-0.0021	pass
40		-8	-0.0043	pass
50		-4	-0.0021	pass
25	V min.= 3.6	-4	-0.0021	pass
	V max.= 4.4	-7	-0.0037	pass

WCDMA Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	28	0.0149	pass
-20		27	0.0144	pass
-10		24	0.0128	pass
0		25	0.0133	pass
10		24	0.0128	pass
20		19	0.0101	pass
30		23	0.0122	pass
40		23	0.0122	pass
50		26	0.0138	pass
25	V min.= 3.6	22	0.0117	pass
	V max.= 4.4	23	0.0122	pass

LTE:
QPSK:

Band 2:

10.0 MHz Middle Channel, f_o =1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	-4	-0.0021	pass
-20		-5	-0.0027	pass
-10		-2	-0.0011	pass
0		-1	-0.0005	pass
10		-2	-0.0011	pass
20		0	0.0000	pass
30		-3	-0.0016	pass
40		-2	-0.0011	pass
50		-3	-0.0016	pass
20	V min.= 3.6	-5	-0.0027	pass
	V max.= 4.4	-6	-0.0032	pass

Band 4:

10.0 MHz Middle Channel, f_o =1732.5 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	-5	-0.0029	pass
-20		-4	-0.0023	pass
-10		-2	-0.0012	pass
0		-3	-0.0017	pass
10		-2	-0.0012	pass
20		2	0.0012	pass
30		1	0.0006	pass
40		-4	-0.0023	pass
50		-4	-0.0023	pass
20	V min.= 3.6	-6	-0.0035	pass
	V max.= 4.4	-8	-0.0046	pass

Band 5:

10.0 MHz Middle Channel, f_o =836.5 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	5	0.0060	pass
-20		5	0.0060	pass
-10		3	0.0036	pass
0		3	0.0036	pass
10		3	0.0036	pass
20		1	0.0012	pass
30		-1	-0.0012	pass
40		3	0.0036	pass
50		3	0.0036	pass
20	V min.= 3.6	6	0.0072	pass
	V max.= 4.4	5	0.0060	pass

Band 7:

10.0 MHz Middle Channel, f_o =2535 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.85	5	0.0020	pass
-20		6	0.0024	pass
-10		5	0.0020	pass
0		5	0.0020	pass
10		4	0.0016	pass
20		4	0.0016	pass
30		-4	-0.0016	pass
40		6	0.0024	pass
50		7	0.0028	pass
20	V min.= 3.6	10	0.0039	pass
	V max.= 4.4	12	0.0047	pass

Band 12:

10.0 MHz Middle Channel, f_o =707.5 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	4	0.0057	pass
-20		3	0.0042	pass
-10		3	0.0042	pass
0		2	0.0028	pass
10		2	0.0028	pass
20		1	0.0014	pass
30		-1	-0.0014	pass
40		4	0.0057	pass
50		3	0.0042	pass
20	V min.= 3.6	4	0.0057	pass
	V max.= 4.4	4	0.0057	pass

Band 17:

10.0 MHz Middle Channel, f_o =710 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	5	0.0070	pass
-20		4	0.0056	pass
-10		5	0.0070	pass
0		3	0.0042	pass
10		3	0.0042	pass
20		1	0.0014	pass
30		-1	-0.0014	pass
40		4	0.0056	pass
50		4	0.0056	pass
25	V min.= 3.6	7	0.0099	pass
	V max.= 4.4	8	0.0113	pass

16QAM:

Band 2:

10.0 MHz Middle Channel, f_o =1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	1	0.0005	pass
-20		2	0.0011	pass
-10		-1	-0.0005	pass
0		1	0.0005	pass
10		-2	-0.0011	pass
20		-1	-0.0005	pass
30		2	0.0011	pass
40		-2	-0.0011	pass
50		-1	-0.0005	pass
20	V min.= 3.6	1	0.0005	pass
	V max.= 4.4	-1	-0.0005	pass

Band 4:

10.0 MHz Middle Channel, f_o =1732.5 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	1	0.0006	pass
-20		-1	-0.0006	pass
-10		-2	-0.0012	pass
0		-1	-0.0006	pass
10		2	0.0012	pass
20		1	0.0006	pass
30		-1	-0.0006	pass
40		2	0.0012	pass
50		-2	-0.0012	pass
20	V min.= 3.6	2	0.0012	pass
	V max.= 4.4	1	0.0006	pass

Band 5:

10.0 MHz Middle Channel, f_o =836.5 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	5	0.0060	pass
-20		6	0.0072	pass
-10		4	0.0048	pass
0		5	0.0060	pass
10		4	0.0048	pass
20		2	0.0024	pass
30		3	0.0036	pass
40		4	0.0048	pass
50		5	0.0060	pass
20	V min.= 3.6	4	0.0048	pass
	V max.= 4.4	5	0.0060	pass

Band 7:

10.0 MHz Middle Channel, f_o =2535 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.85	1	0.0004	pass
-20		3	0.0012	pass
-10		-1	-0.0004	pass
0		1	0.0004	pass
10		2	0.0008	pass
20		1	0.0004	pass
30		-2	-0.0008	pass
40		2	0.0008	pass
50		-1	-0.0004	pass
20	V min.= 3.6	1	0.0004	pass
	V max.= 4.4	2	0.0008	pass

Band 12:

10.0 MHz Middle Channel, f_o =707.5 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	2	0.0028	pass
-20		2	0.0028	pass
-10		3	0.0042	pass
0		-1	-0.0014	pass
10		5	0.0071	pass
20		1	0.0014	pass
30		-1	-0.0014	pass
40		4	0.0057	pass
50		3	0.0042	pass
20	V min.= 3.6	2	0.0028	pass
	V max.= 4.4	3	0.0042	pass

Band 17:

10.0 MHz Middle Channel, f_o =710 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	-1	-0.0014	pass
-20		1	0.0014	pass
-10		2	0.0028	pass
0		-1	-0.0014	pass
10		1	0.0014	pass
20		3	0.0042	pass
30		-2	-0.0028	pass
40		2	0.0028	pass
50		1	0.0014	pass
25	V min.= 3.6	1	0.0014	pass
25	V max.= 4.4	3	0.0042	pass

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