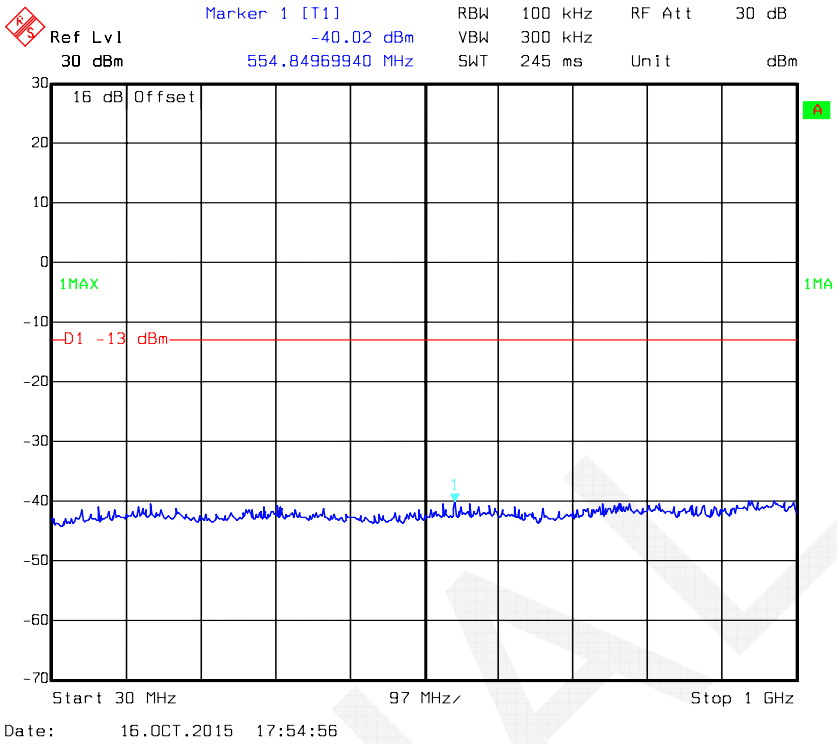
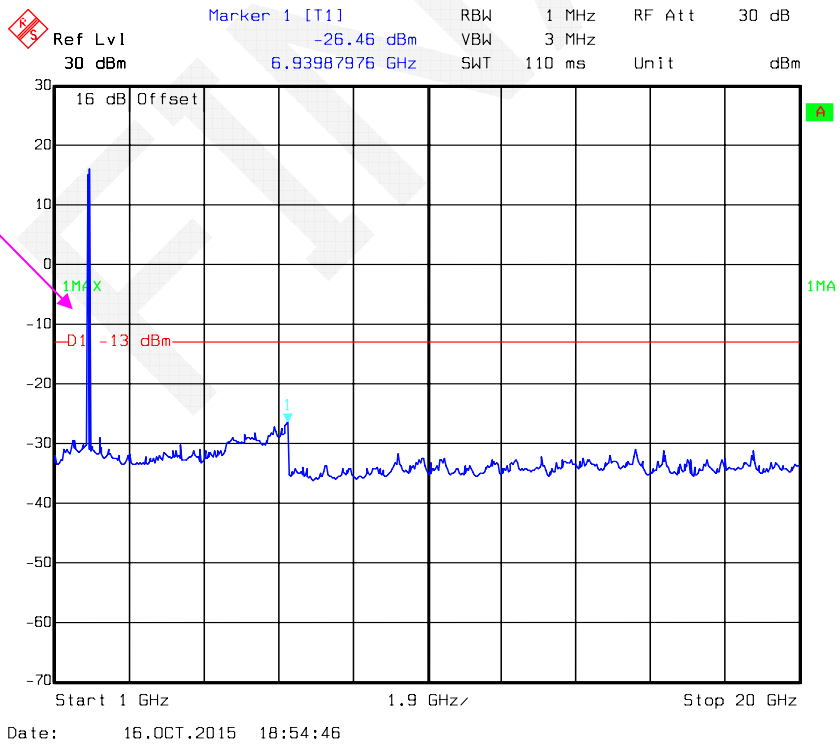
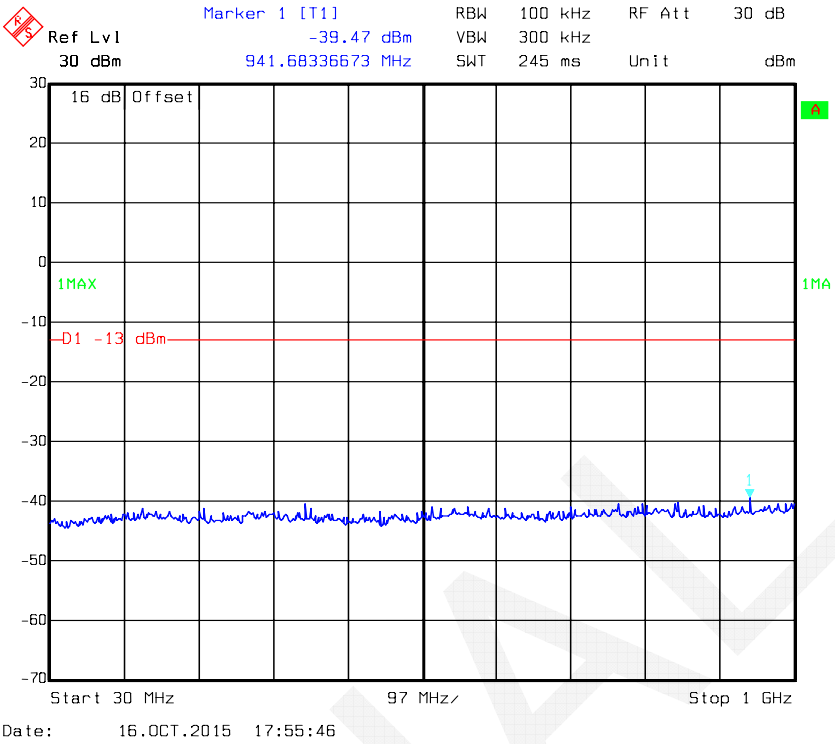
16-QAM, Band 2-10M _ Middle Channel

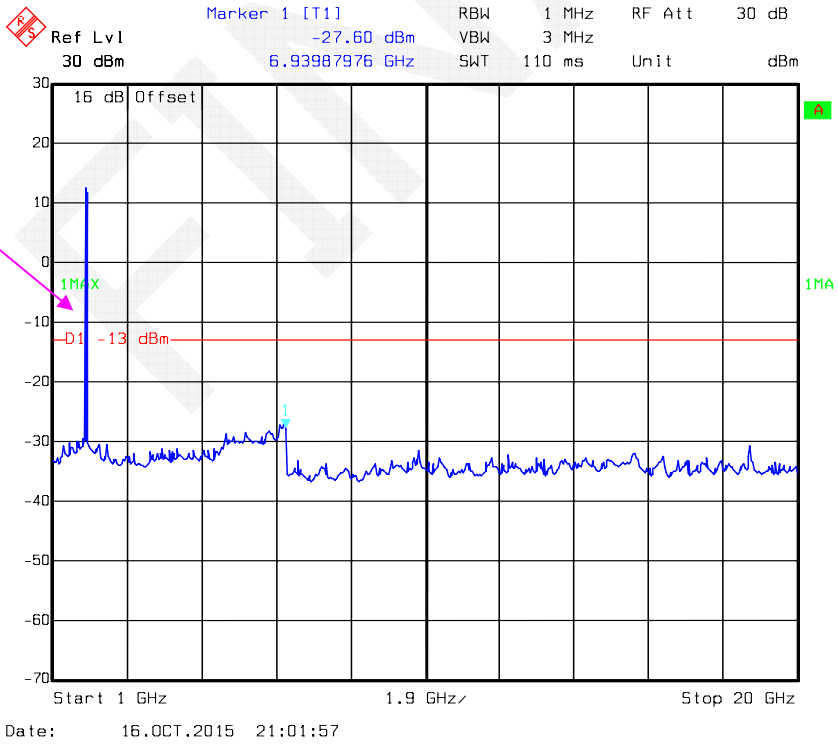




Fundamental

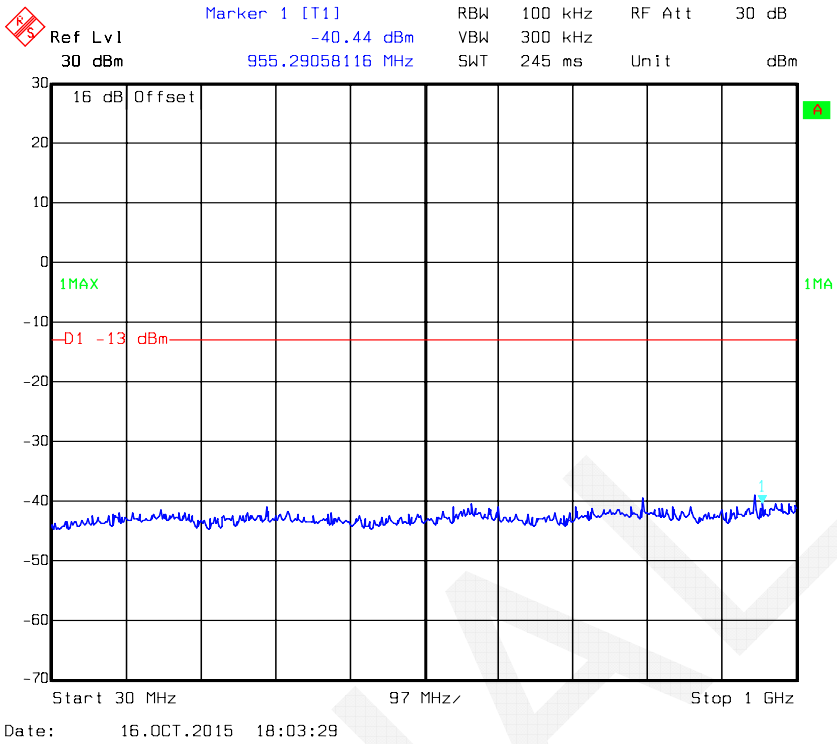
16-QAM, Band 2-15M _ Middle Channel

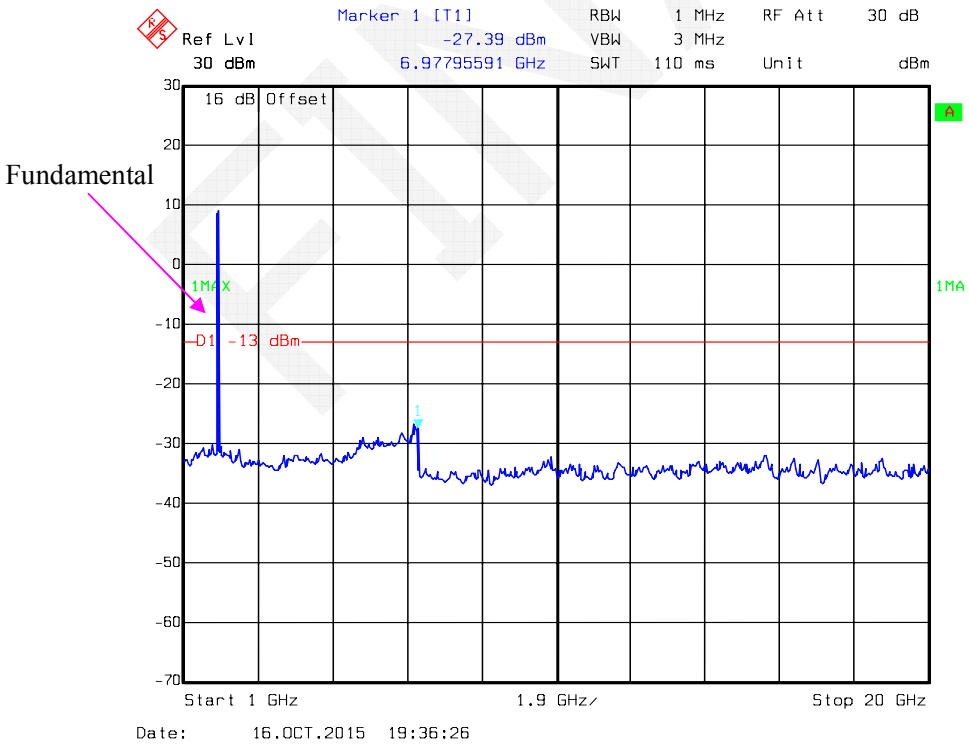




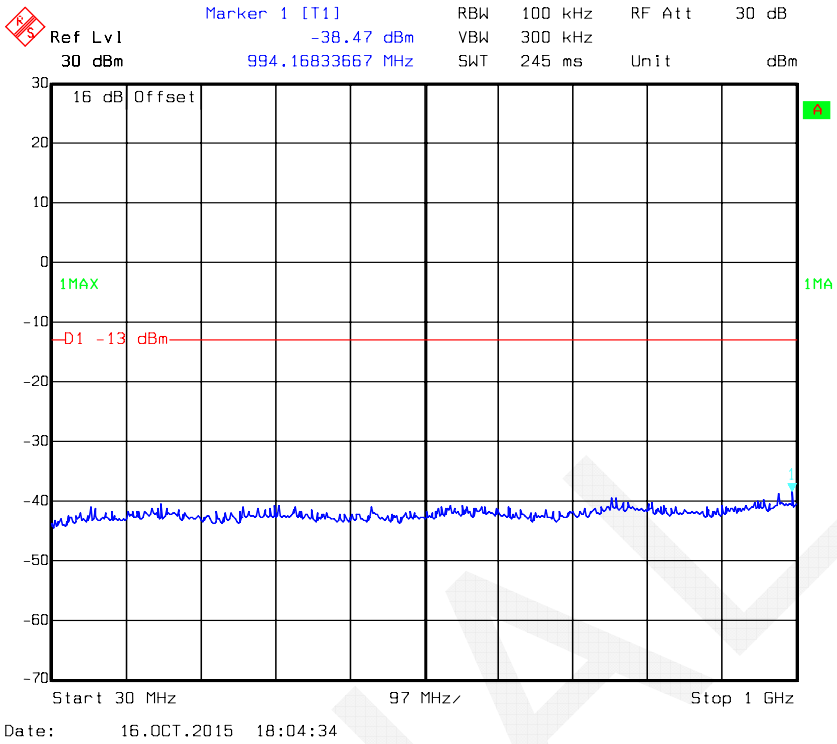
Fundamental

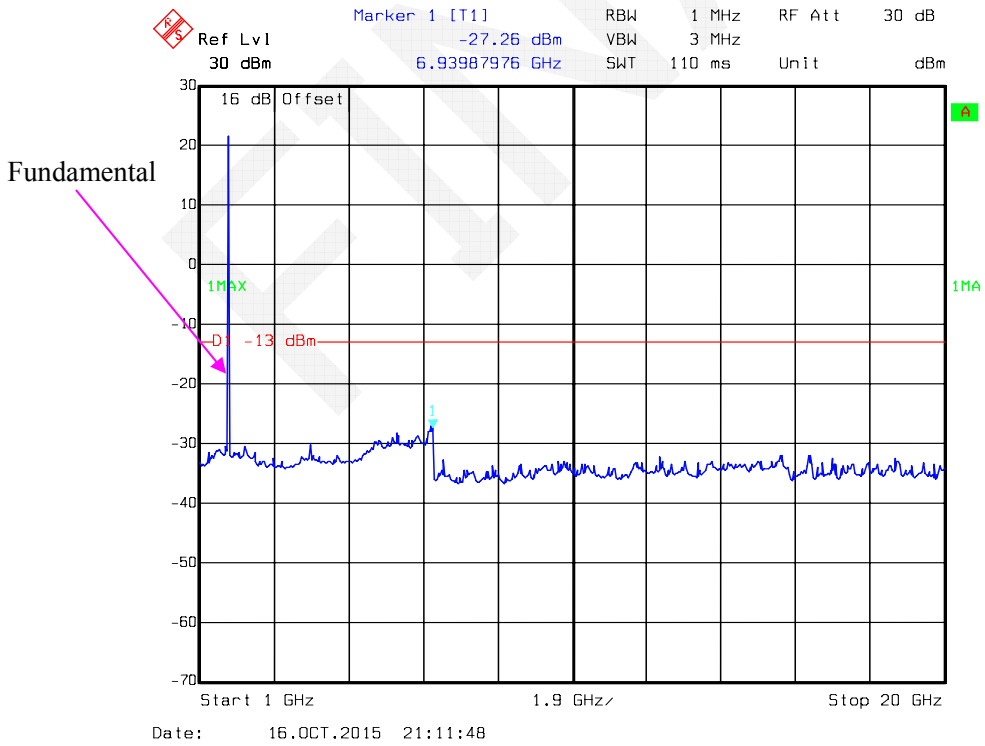
16-QAM, Band 2-20M _ Middle Channel



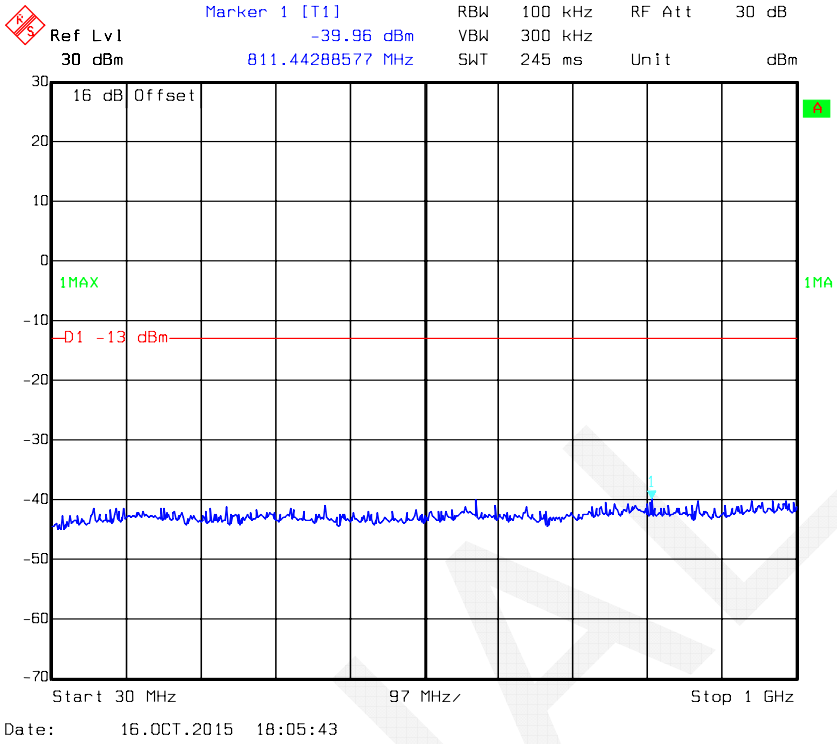


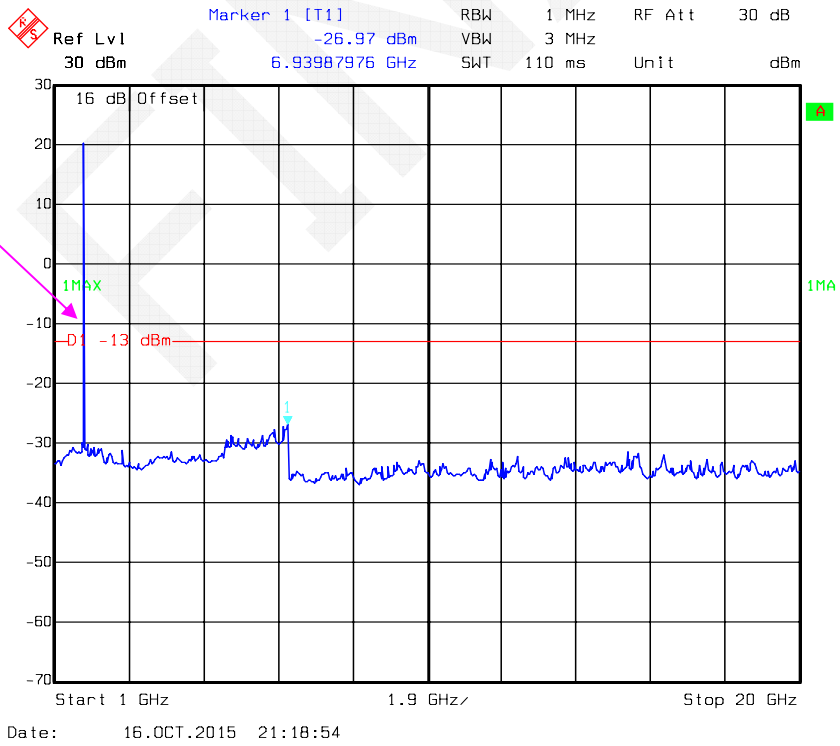
QPSK, Band 4-1.4M _ Middle Channel





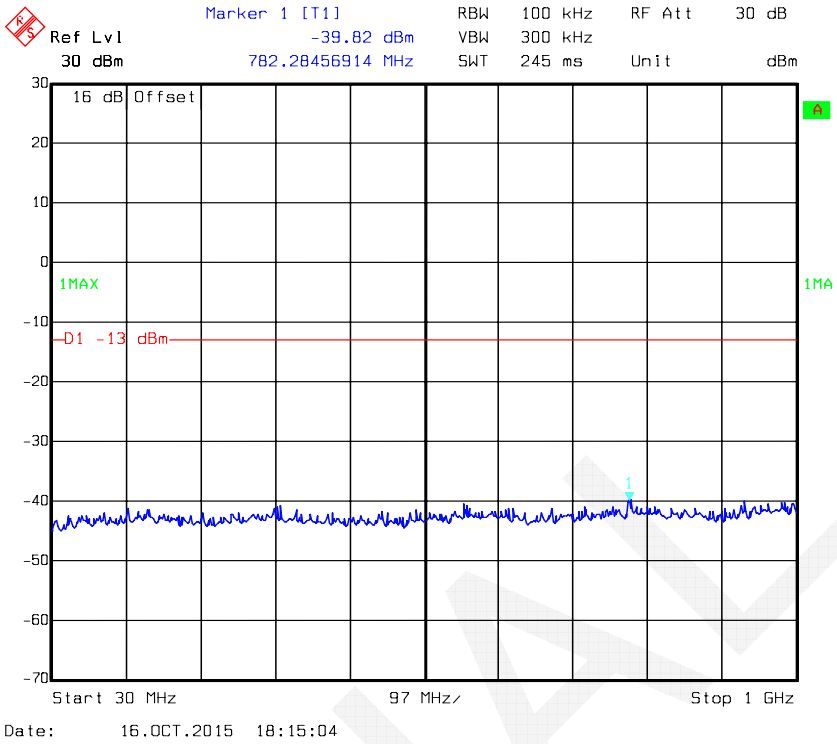
QPSK, Band 4-3M _ Middle Channel

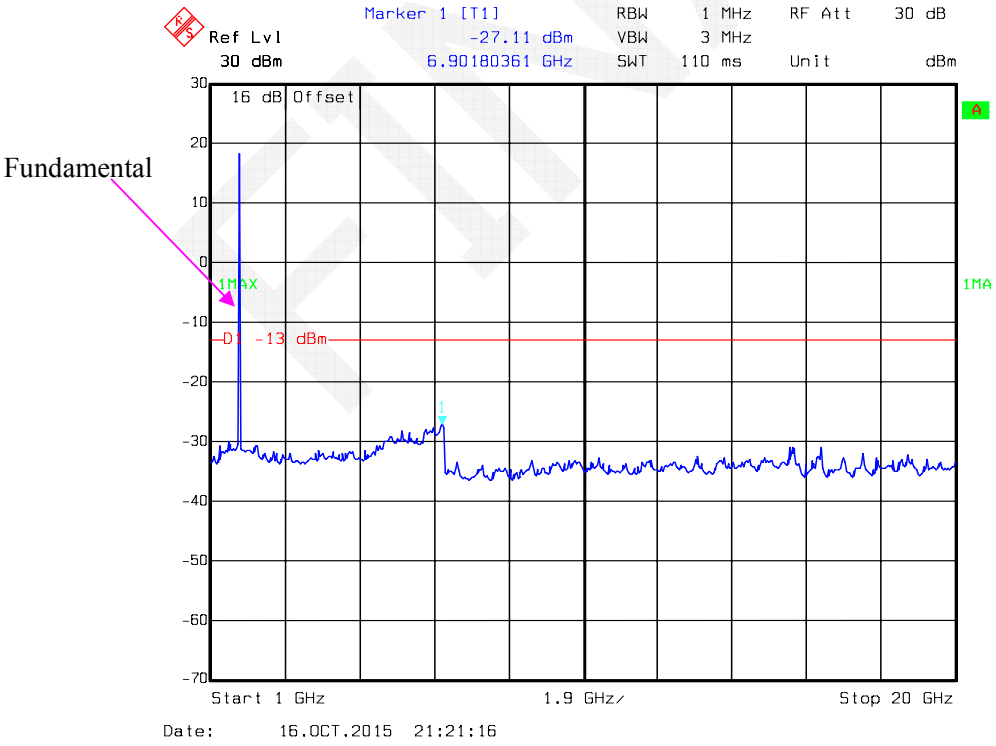




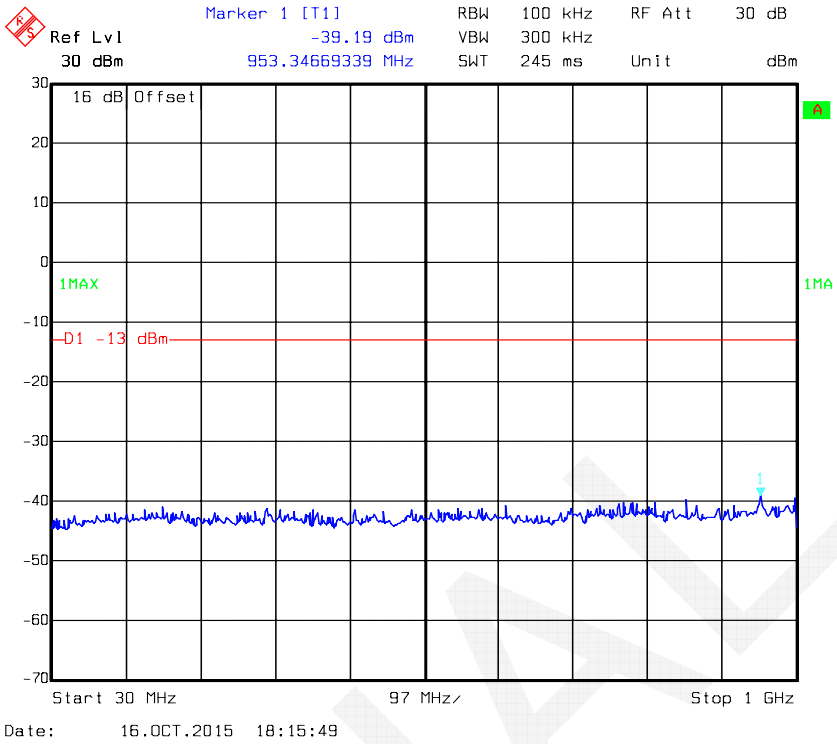
Fundamental

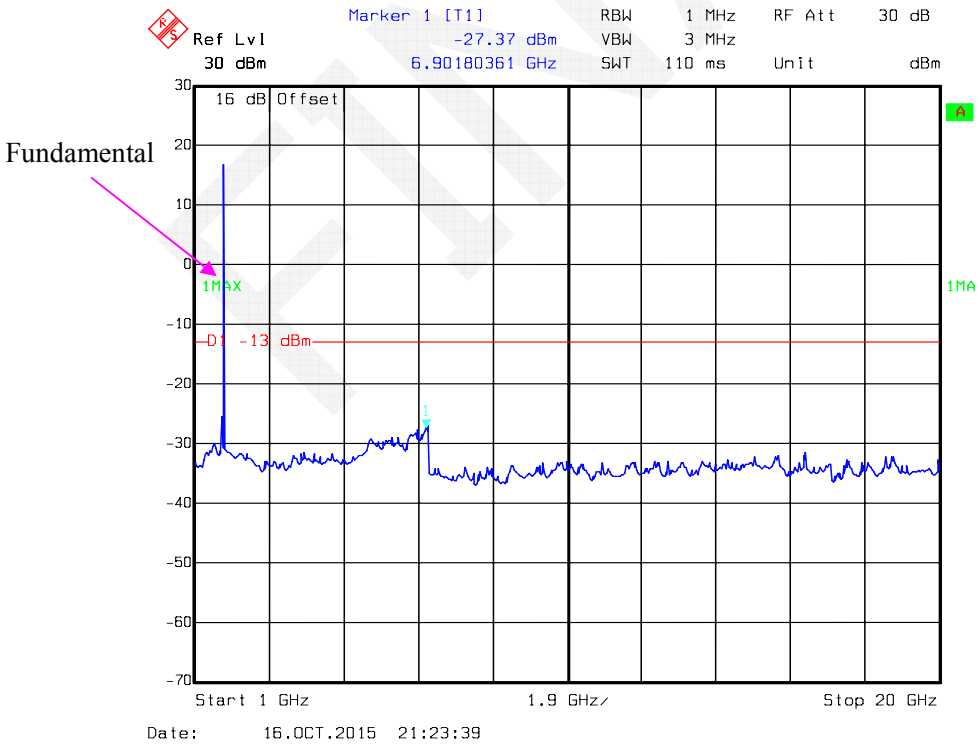
QPSK, Band 4-5M _ Middle Channel



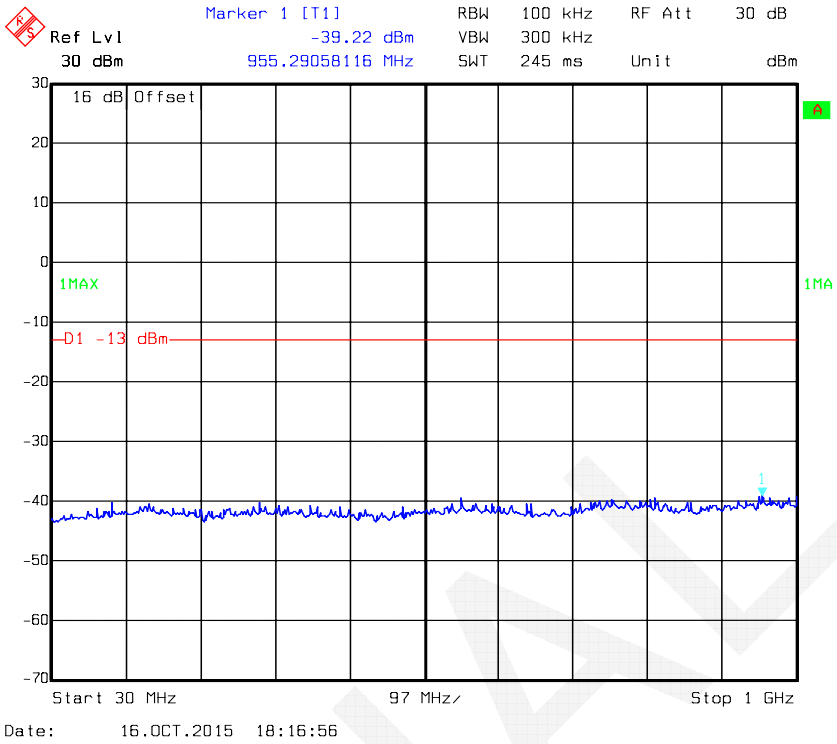


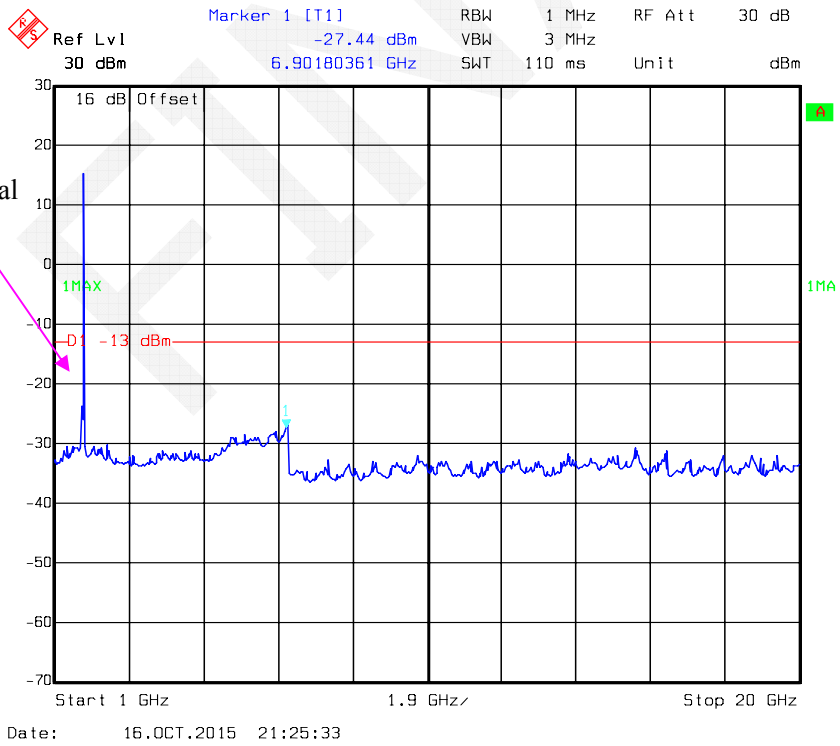
QPSK, Band 4-10M _ Middle Channel





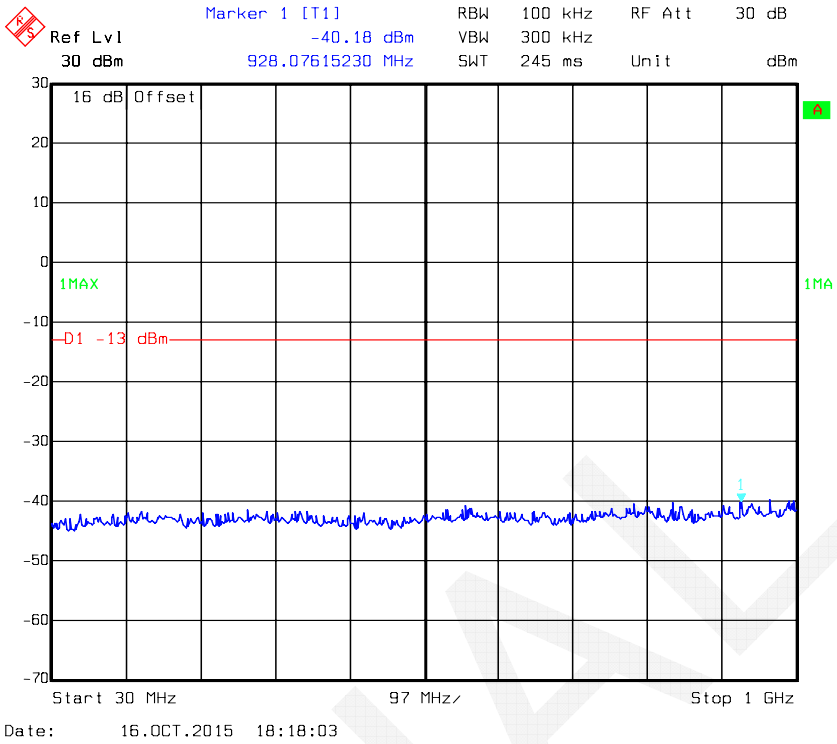
QPSK, Band 4-15M _ Middle Channel

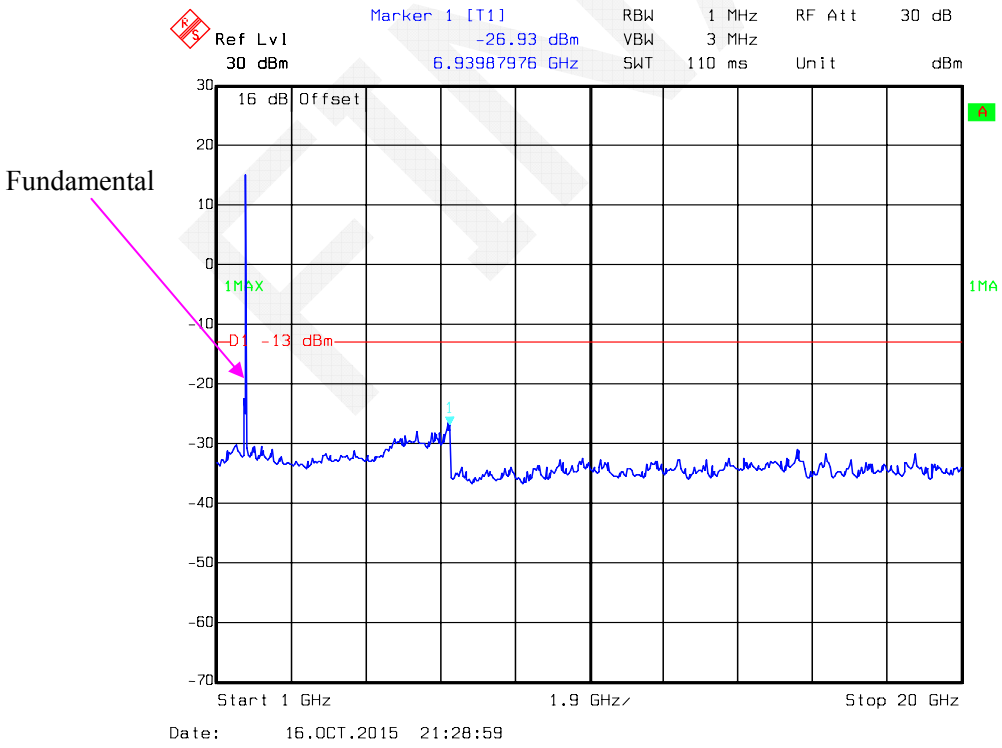




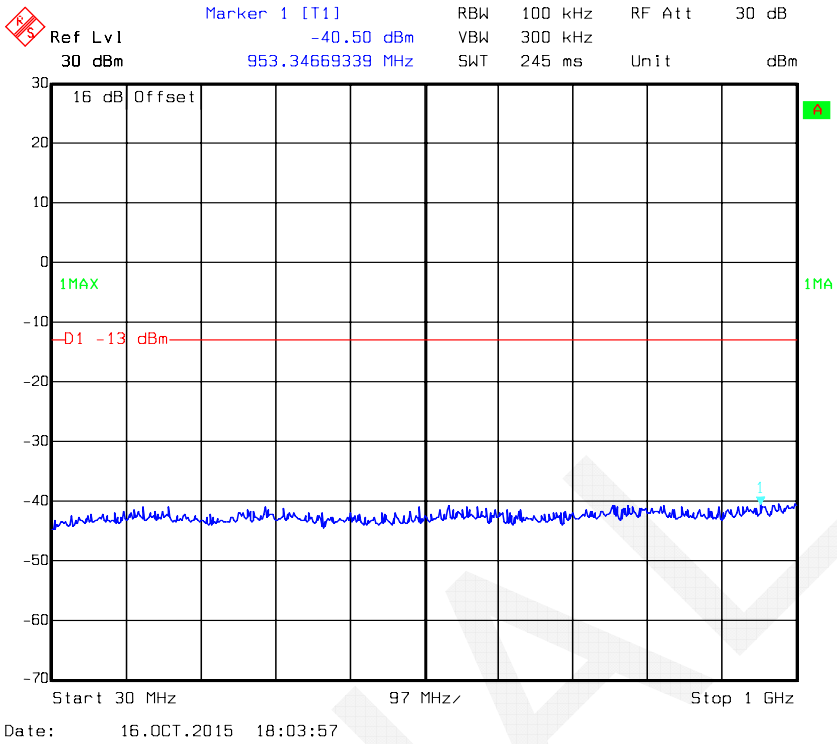
Fundamental

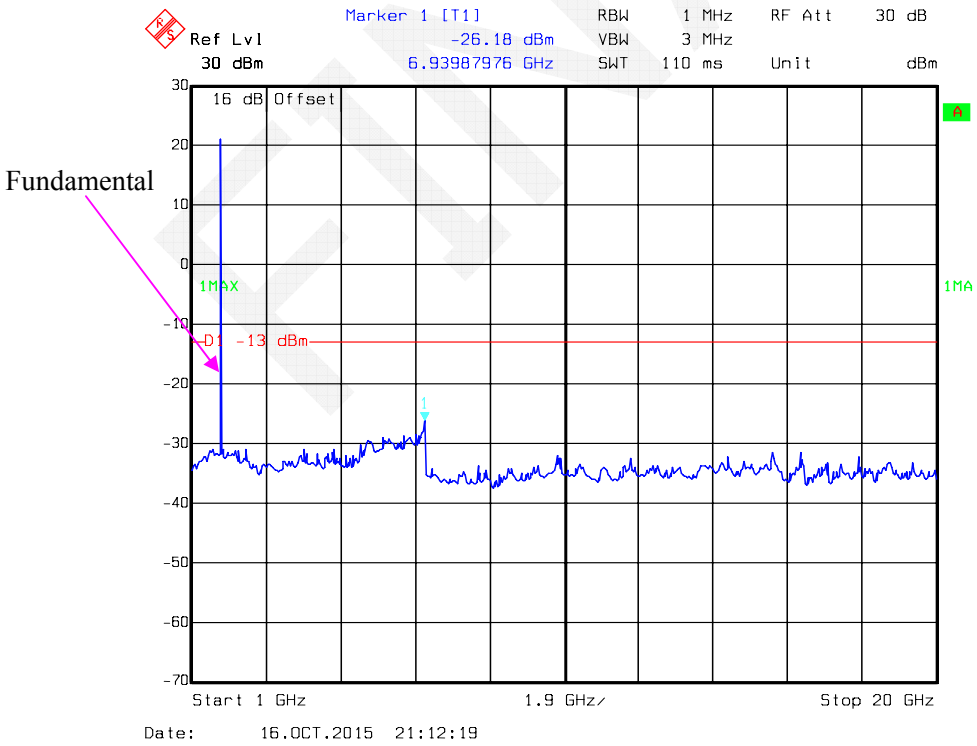
QPSK, Band 4-20M _ Middle Channel



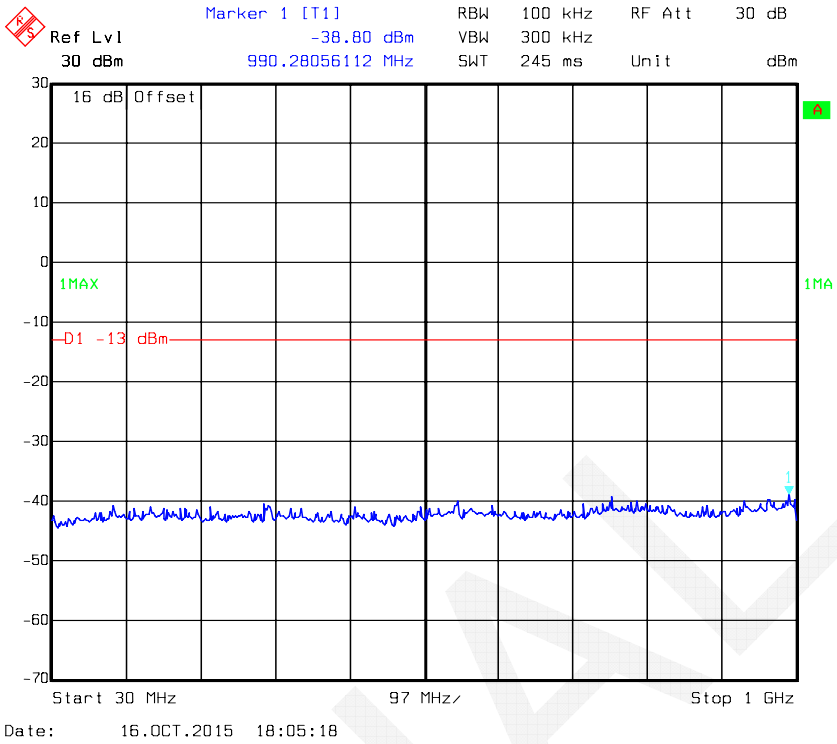


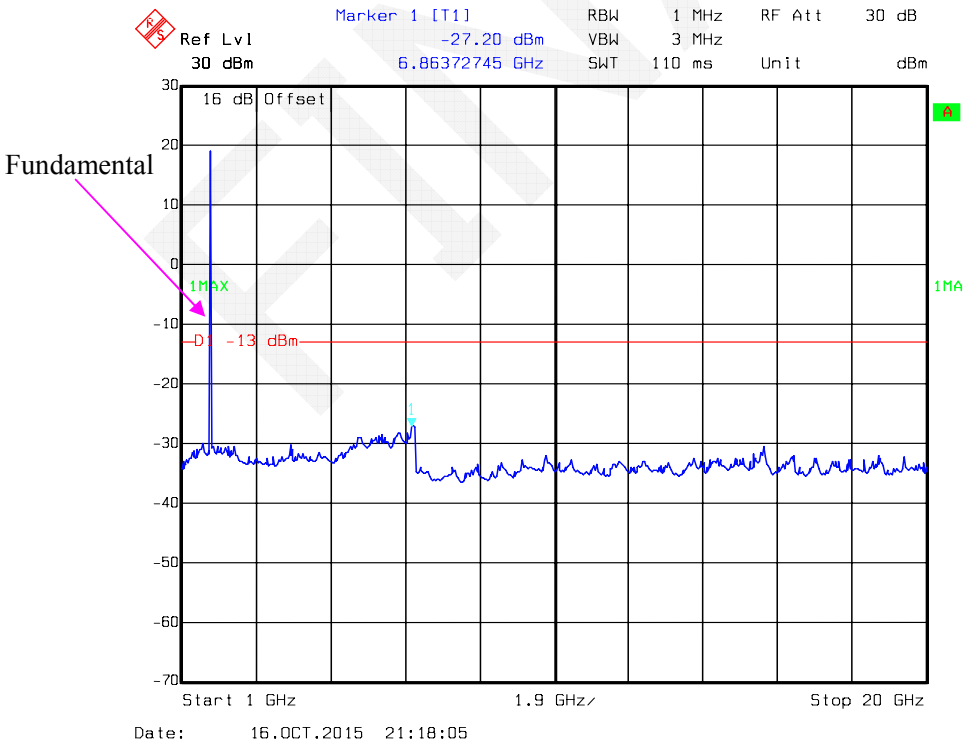
16-QAM, Band 4-1.4M _ Middle Channel



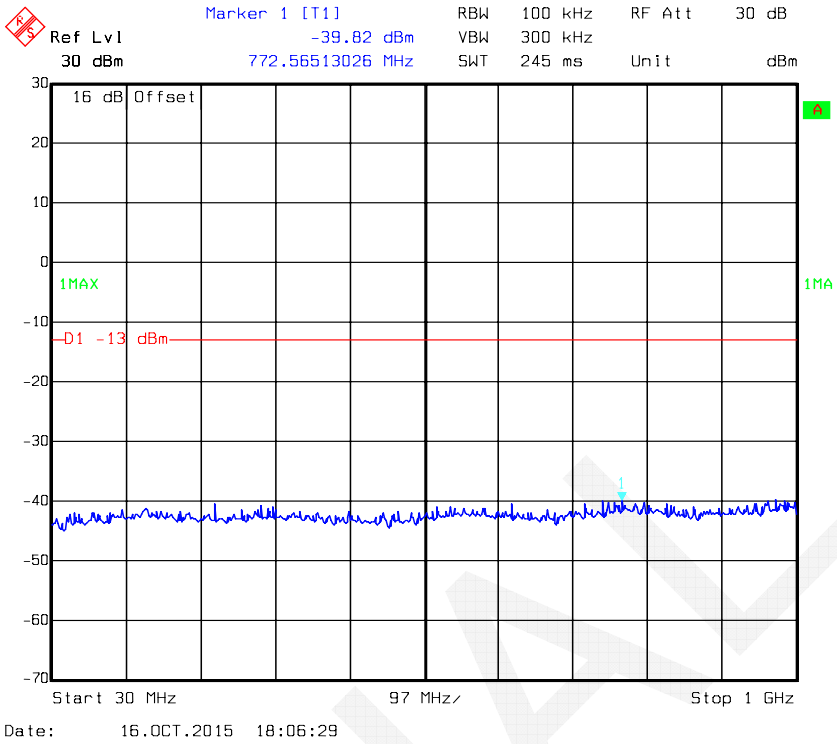


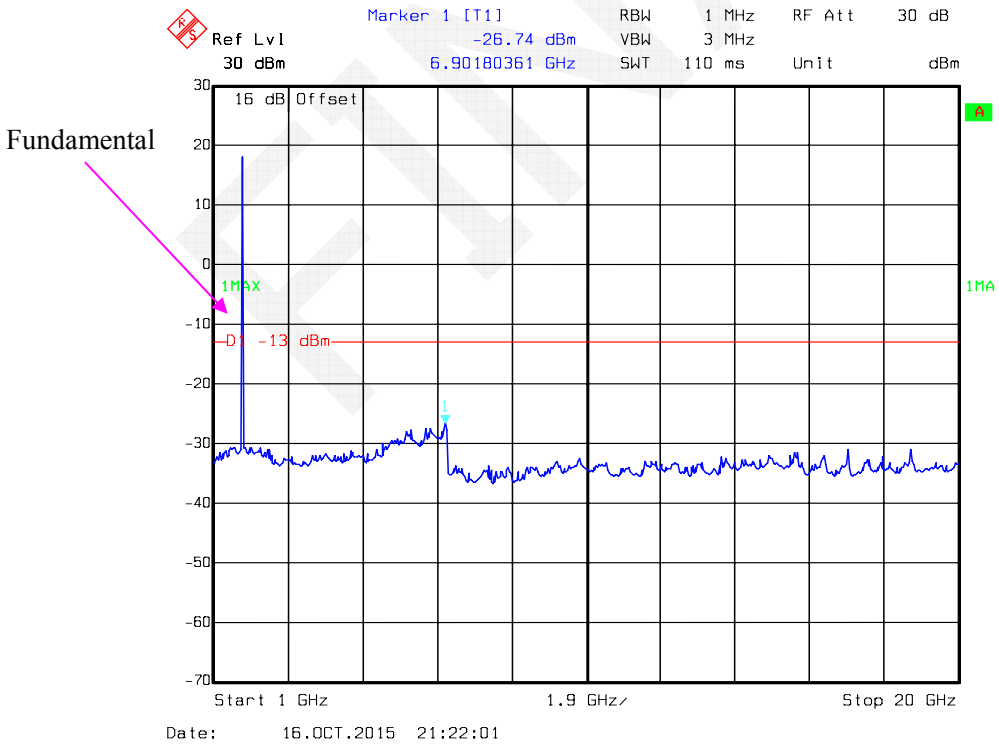
16-QAM, Band 4-3M _ Middle Channel



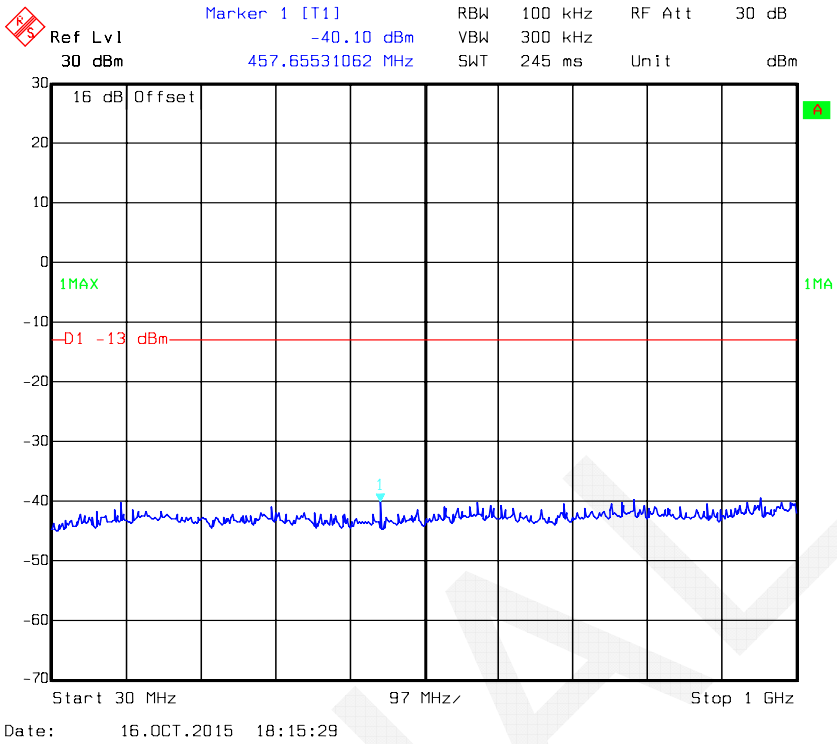


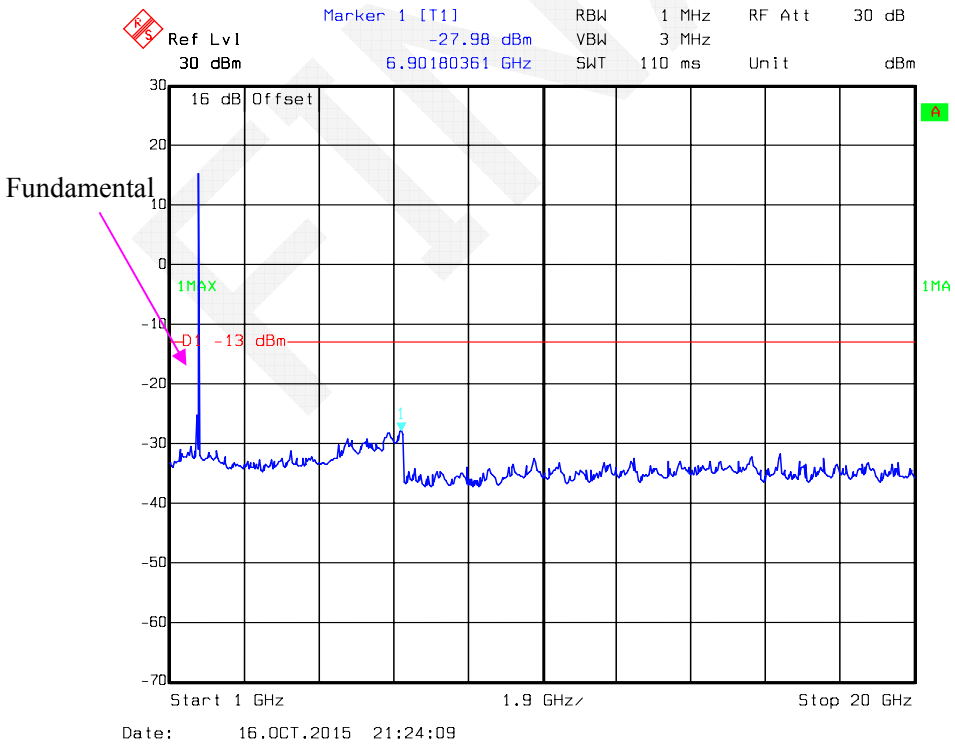
16-QAM, Band 4-5M _ Middle Channel



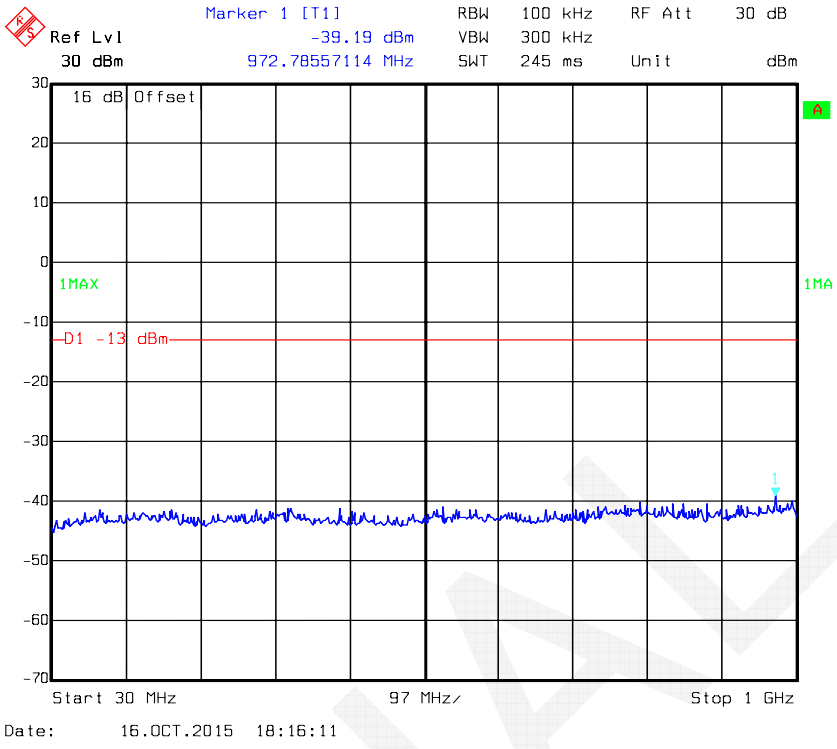


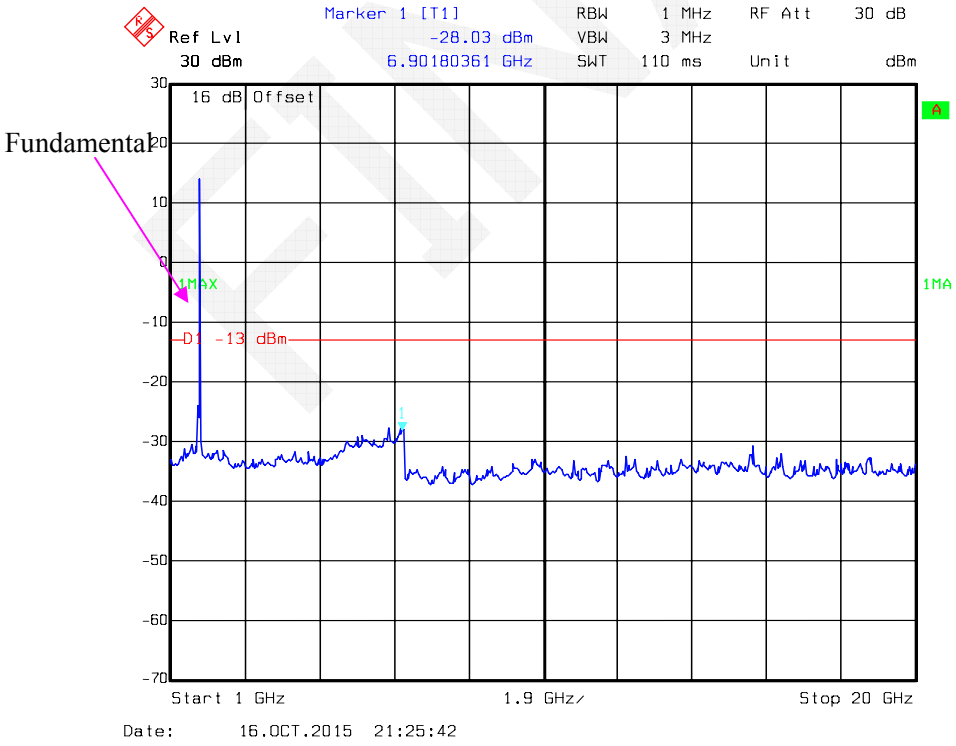
16-QAM, Band 4-10M _ Middle Channel



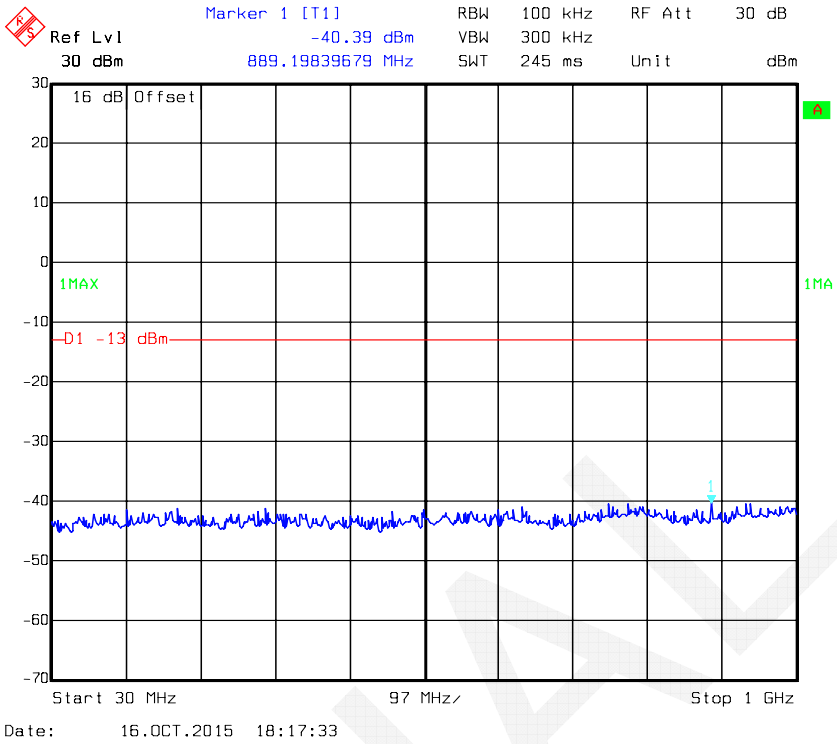


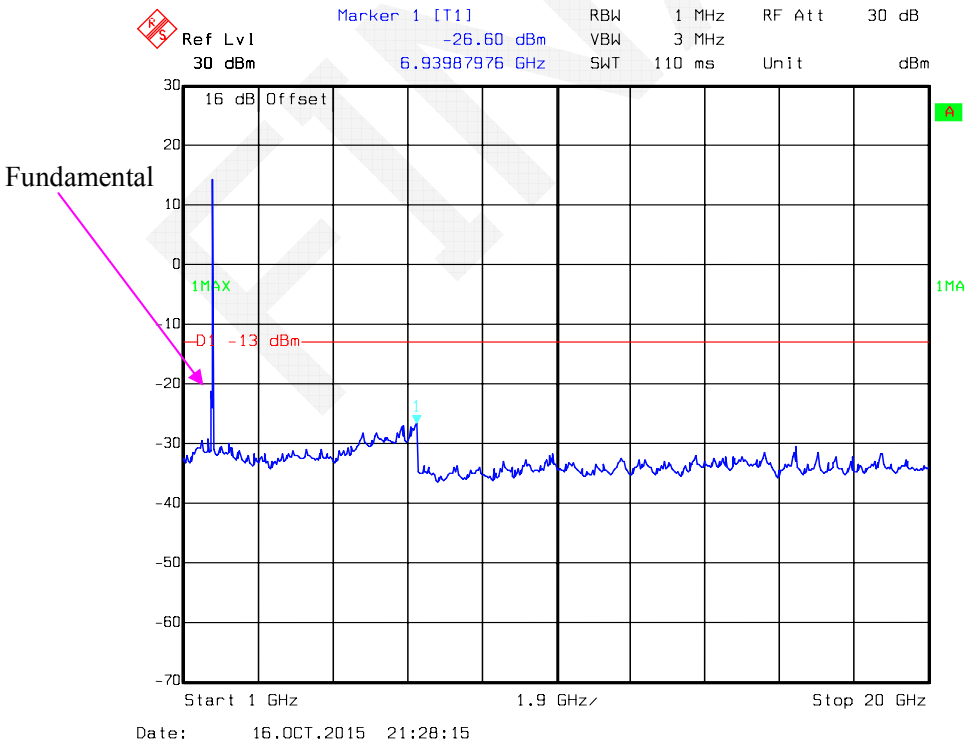
16-QAM, Band 4-15M _ Middle Channel





16-QAM, Band 4-20M _ Middle Channel





FCC §2.1053, §22.917 & §24.238 & §27.53- SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917, § 24.238 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 antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

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

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

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

Spurious attenuation limit in dB = 55 + 10 Log_{10} (power out in Watts) for band 7

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2015-08-03	2016-08-02
Sunol Sciences	Antenna	JB3	A060611-3	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2015-09-01	2016-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2015-09-06	2018-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2015-02-19	2016-02-19
Giga	Signal Generator	1026	320408	2015-05-09	2016-05-09
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2015-09-06	2018-09-06

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.1~27.4 °C
Relative Humidity:	49~53 %
ATM Pressure:	100.2~100.8 kPa

The testing was performed by Dean Liu from 2015-10-16 to 2015-10-28.

EUT Operation Mode: Transmitting

Cellular Band (PART 22H)

30 MHz-10 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
Frequency:836.6 MHz								
1673.200	H	41.11	-60	8.0	1.5	-53.5	-13.0	40.5
1673.200	V	39.96	-61.4	8.0	1.5	-54.9	-13.0	41.9
2509.800	H	50.00	-48	9.5	2.8	-41.3	-13.0	28.3
2509.800	V	44.59	-52.5	9.5	2.8	-45.8	-13.0	32.8

For below 1GHz, all spurious emissions are 20dB below the limit or are on the system noise floor level.

WCDMA Band V

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
Frequency:836.6 MHz								
1673.200	H	34.26	-66.8	8.0	1.5	-60.3	-13.0	47.3
1673.200	V	35.93	-65.4	8.0	1.5	-58.9	-13.0	45.9

For below 1GHz, all spurious emissions are 20dB below the limit or are on the system noise floor level.

PCS Band (PART 24E)

30 MHz-20 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
Frequency:1880 MHz								
3760.000	H	34.39	-59.9	9.3	2.9	-53.5	-13.0	40.5
3760.000	V	35.18	-57.9	9.3	2.9	-51.5	-13.0	38.5

For below 1GHz, all spurious emissions are 20dB below the limit or are on the system noise floor level.

WCDMA Band II

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
Frequency:1880 MHz								
3760.000	H	33.80	-60.5	9.3	2.9	-54.1	-13.0	41.1
3760.000	V	34.62	-58.4	9.3	2.9	-52.0	-13.0	39.0

For below 1GHz, all spurious emissions are 20dB below the limit or are on the system noise floor level.

WCDMA Band IV

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
Frequency:1732.6 MHz								
3465.200	H	34.17	-62.8	13.9	1.9	-50.8	-13.0	37.8
3465.200	V	34.85	-61.3	13.9	1.9	-49.3	-13.0	36.3

For below 1GHz, all spurious emissions are 20dB below the limit or are on the system noise floor level.

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

LTE Band 2

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency:1880 MHz								
3760.000	H	40.02	-54.3	9.3	2.9	-47.9	-13.0	34.9
3760.000	V	38.54	-54.5	9.3	2.9	-48.1	-13.0	35.1
5640.000	H	35.69	-56	10.4	2.1	-47.7	-13.0	34.7
5640.000	V	34.47	-57.2	10.4	2.1	-48.9	-13.0	35.9
16- QAM, Frequency:1880 MHz								
3760.000	H	39.36	-54.9	9.3	2.9	-48.5	-13.0	35.5
3760.000	V	37.41	-55.7	9.3	2.9	-49.3	-13.0	36.3
5640.000	H	34.52	-57.2	10.4	2.1	-48.9	-13.0	35.9
5640.000	V	33.39	-58.3	10.4	2.1	-50.0	-13.0	37.0

For below 1GHz, all spurious emissions are 20dB below the limit or are on the system noise floor level.

LTE Band 4

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency:1732.5 MHz								
3465.000	H	36.39	-60.5	8.4	1.9	-54.0	-13.0	41.0
3465.000	V	35.51	-60.7	8.4	1.9	-54.2	-13.0	41.2
5197.500	H	39.42	-51.6	10.4	2.3	-43.5	-13.0	30.5
5197.500	V	38.53	-54	10.4	2.3	-45.9	-13.0	32.9
16- QAM, Frequency: 1732.5 MHz								
3465.000	H	35.69	-61.2	8.4	1.9	-54.7	-13.0	41.7
3465.000	V	34.65	-61.5	8.4	1.9	-55.0	-13.0	42.0
5197.500	H	40.38	-50.6	10.4	2.3	-42.5	-13.0	29.5
5197.500	V	39.21	-53.3	10.4	2.3	-45.2	-13.0	32.2

For below 1GHz, all spurious emissions are 20dB below the limit or are on the system noise floor level.

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

FCC §22.917(a) & §24.238(a) & §27.53(g)§27.53(h) §27.53(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 §27.53 (g), For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

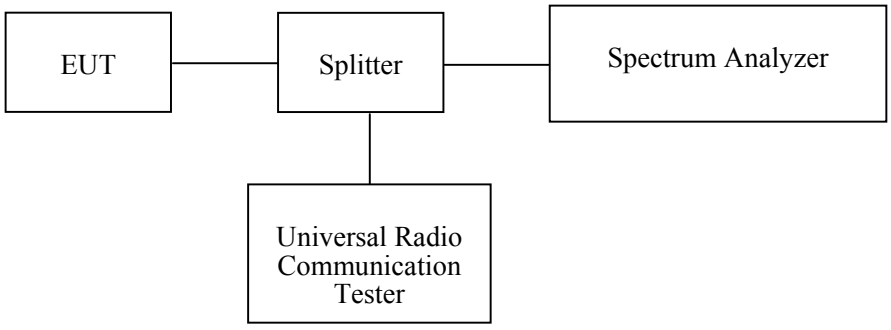
According to §27.53 (h), AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

According to §27.53 (m), (4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-05-09	2016-05-09
R&S	Universal Radio Communication Tester	CMU200	109038	2015-05-09	2016-05-09
R&S	Wideband Radio Communication Tester	CMW500	106891	2014-12-19	2015-12-19

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

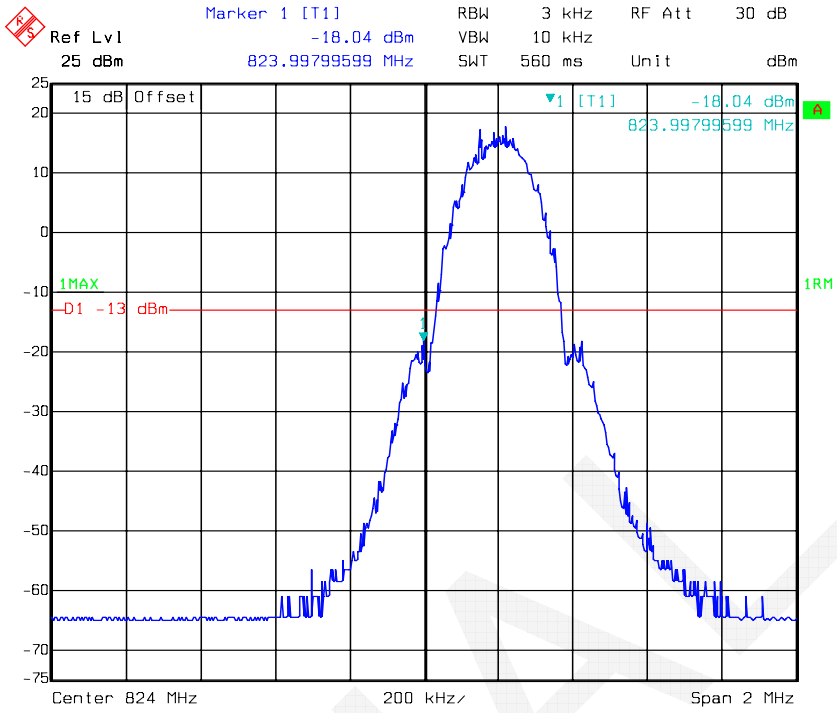
Temperature:	27.1~27.8 °C
Relative Humidity:	56~60 %
ATM Pressure:	100.8~101.1 kPa

The testing was performed by Dean Liu from 2015-10-14 to 2015-10-28.

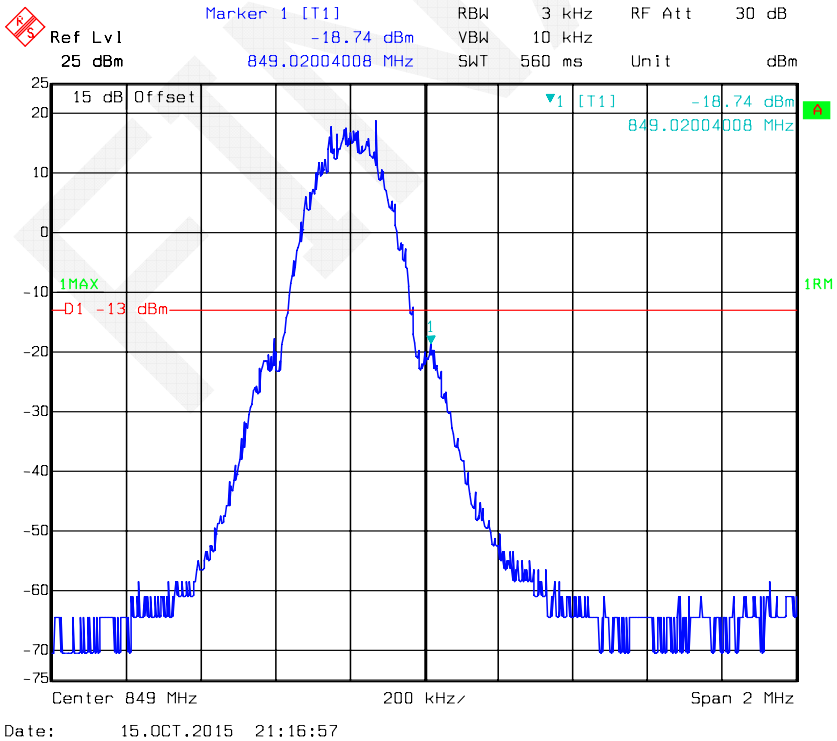
Test Mode: Transmitting

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

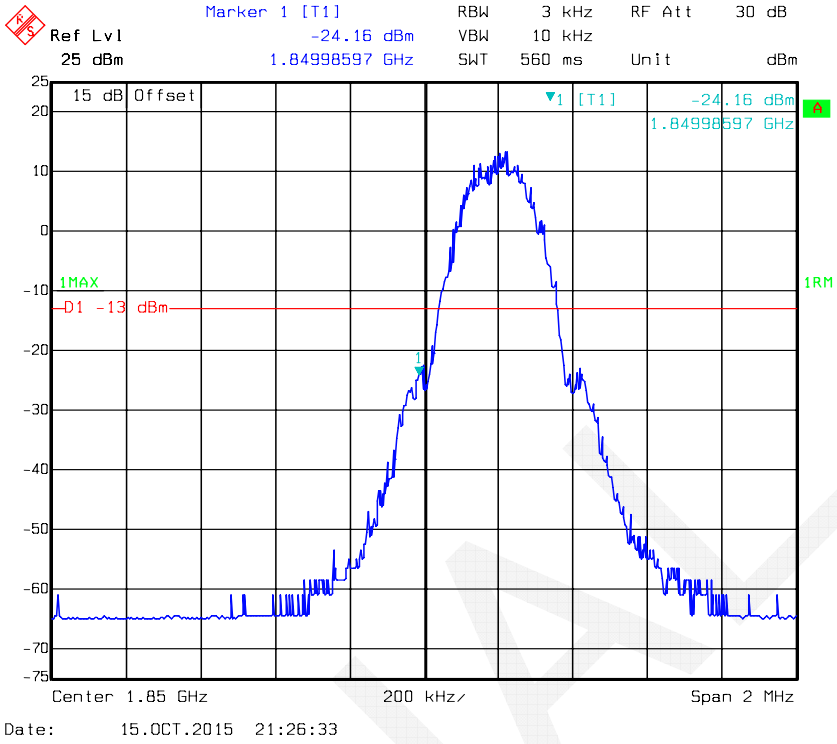
GSM 850, Left Band Edge



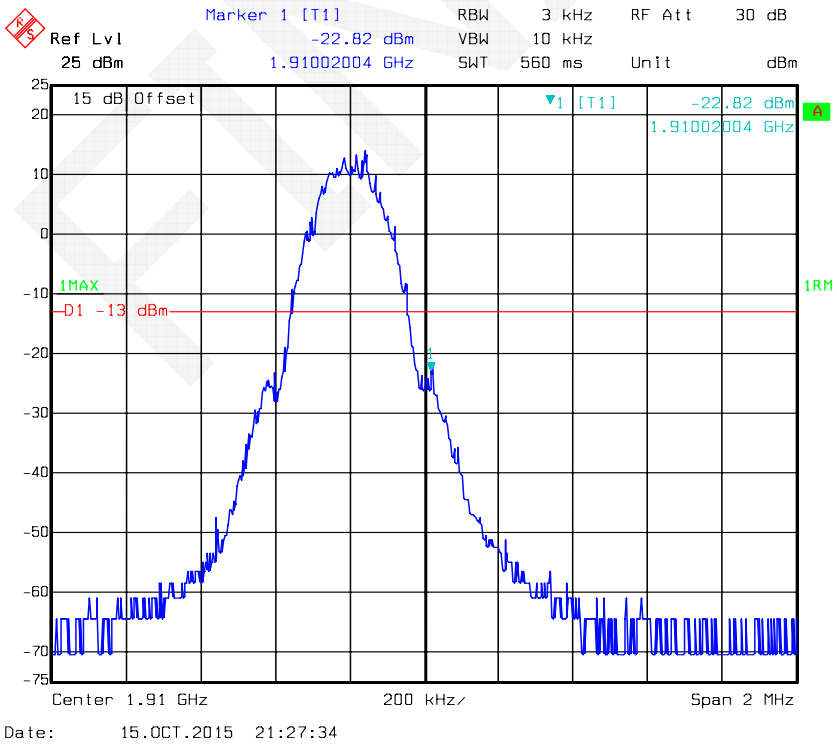
GSM 850, Right Band Edge



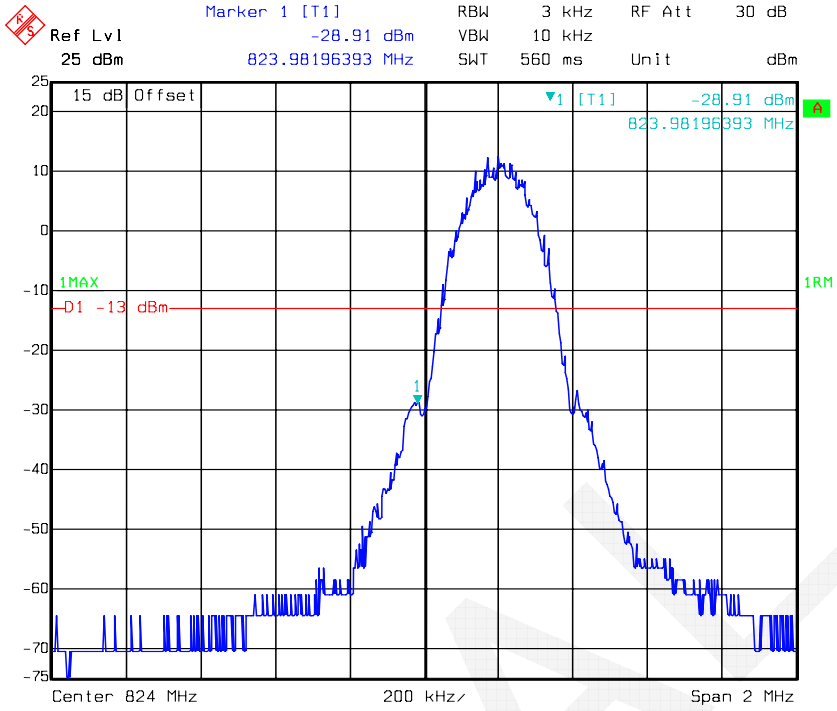
GSM 1900, Left Band Edge



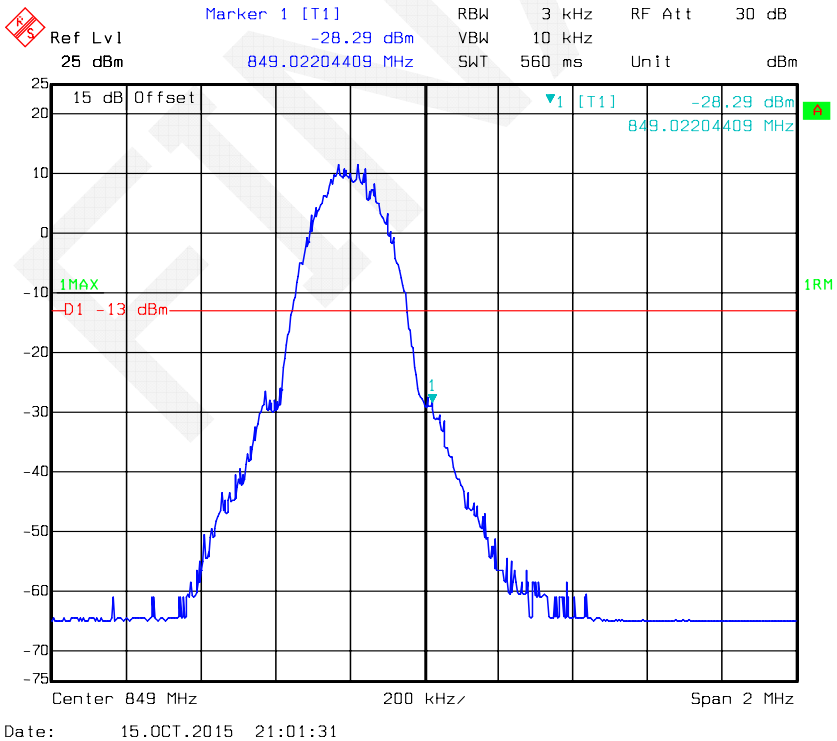
GSM 1900, Right Band Edge



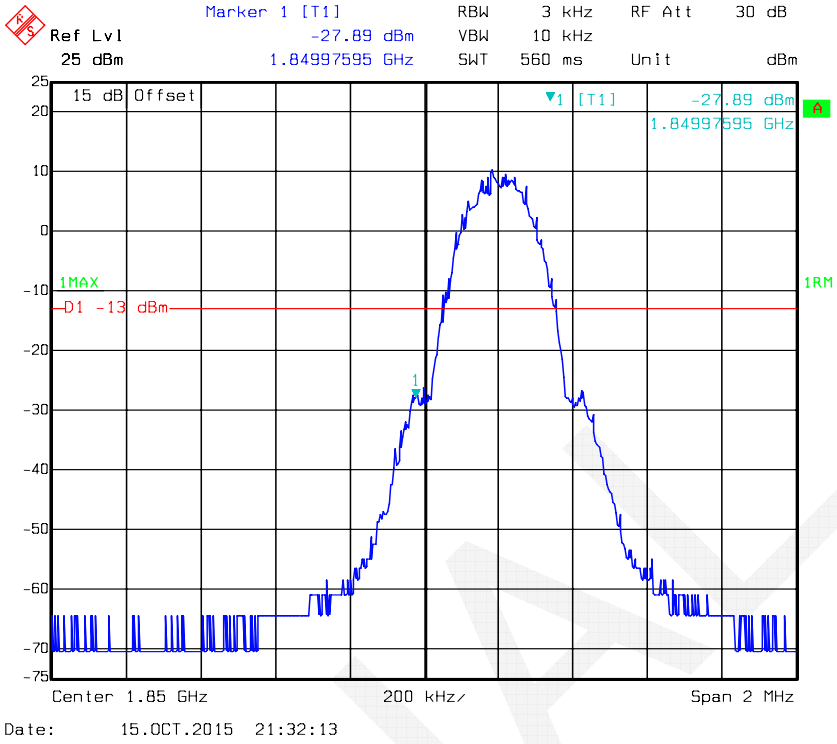
EDGE 850, Left Band Edge



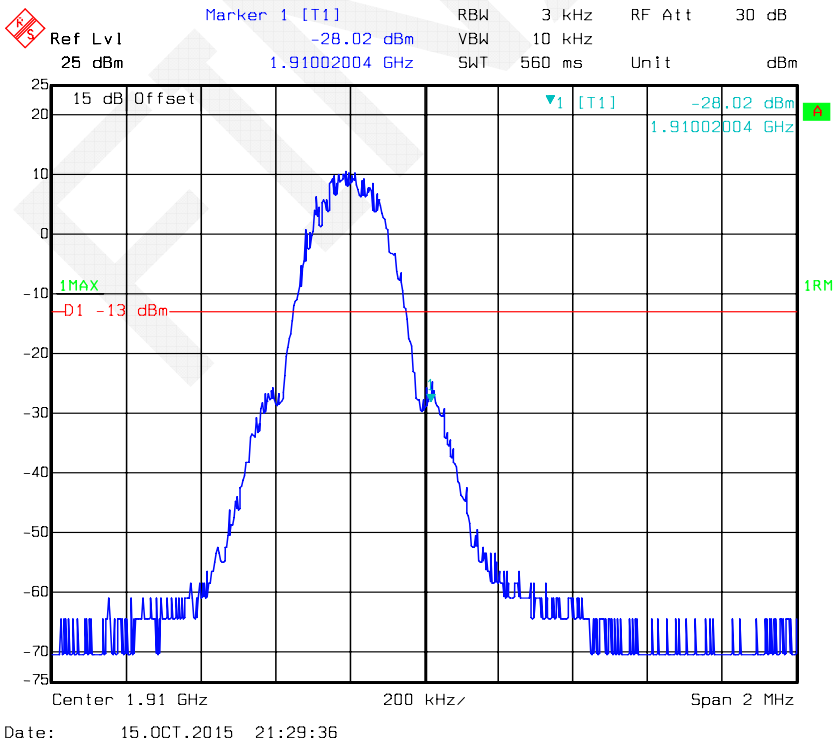
EDGE 850, Right Band Edge



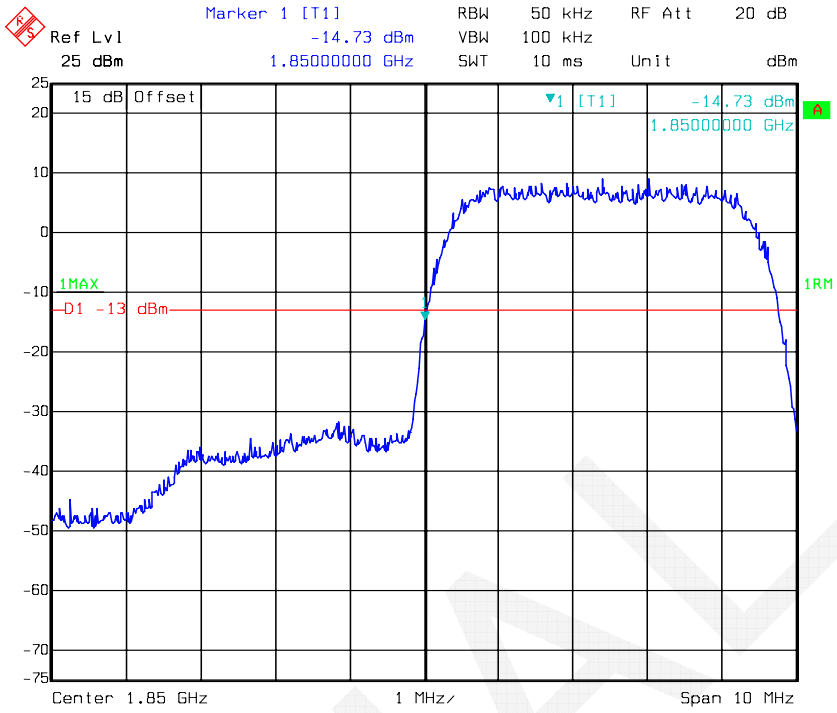
EDGE 1900, Left Band Edge



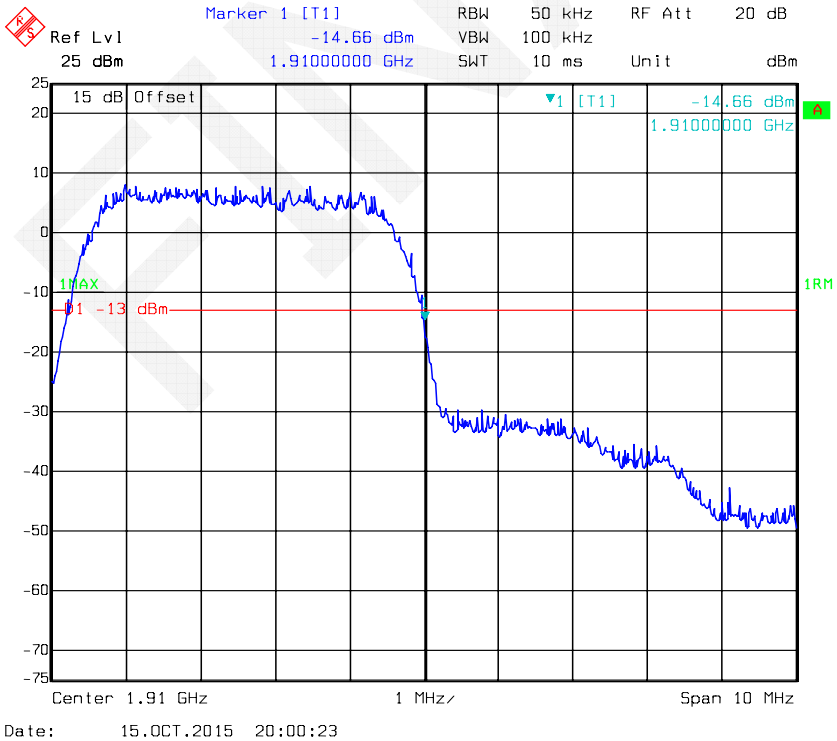
EDGE 1900, Right Band Edge



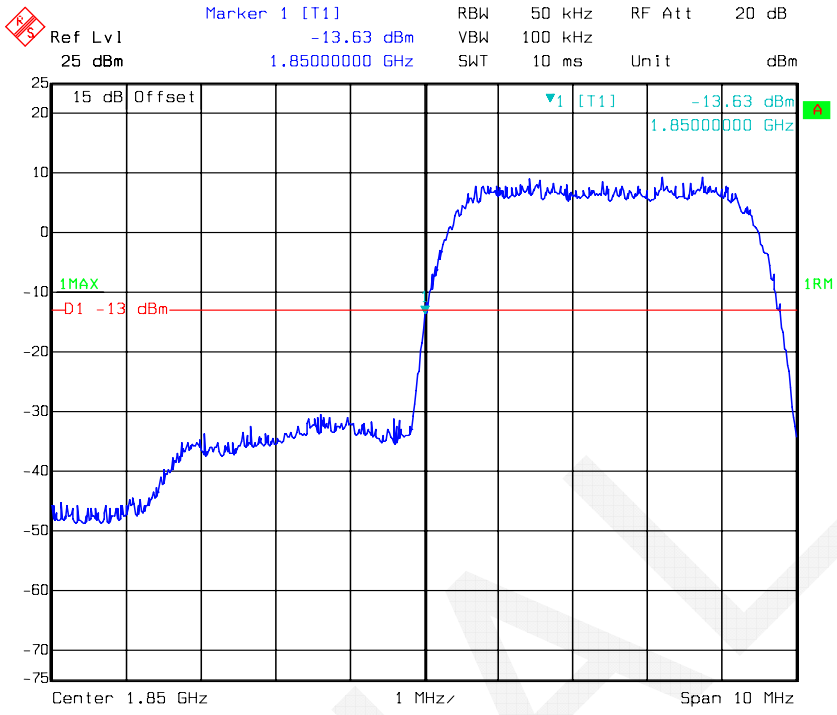
REL99 Band II, Left Band Edge



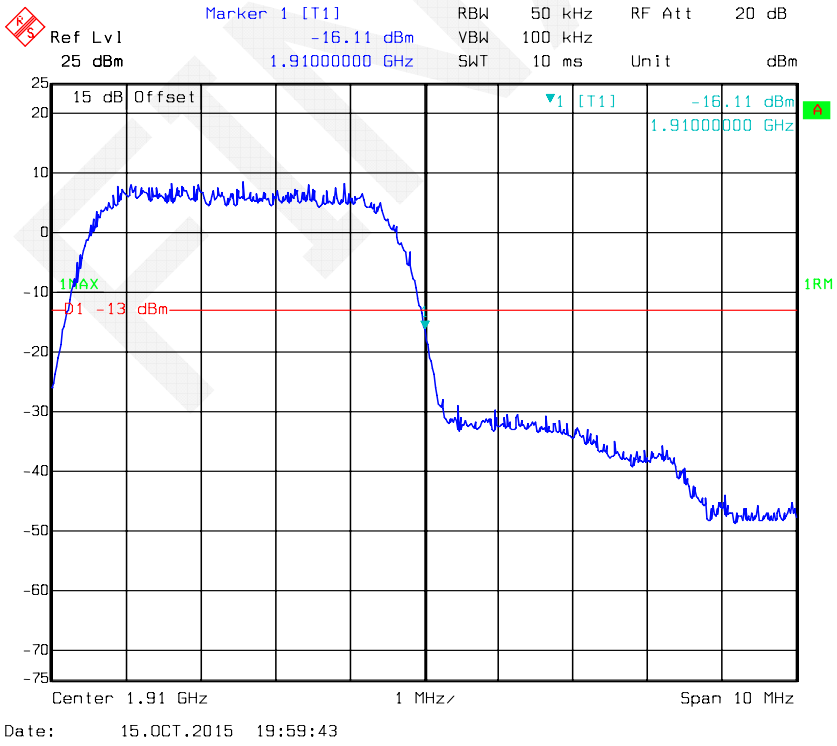
REL99 Band II, Right Band Edge



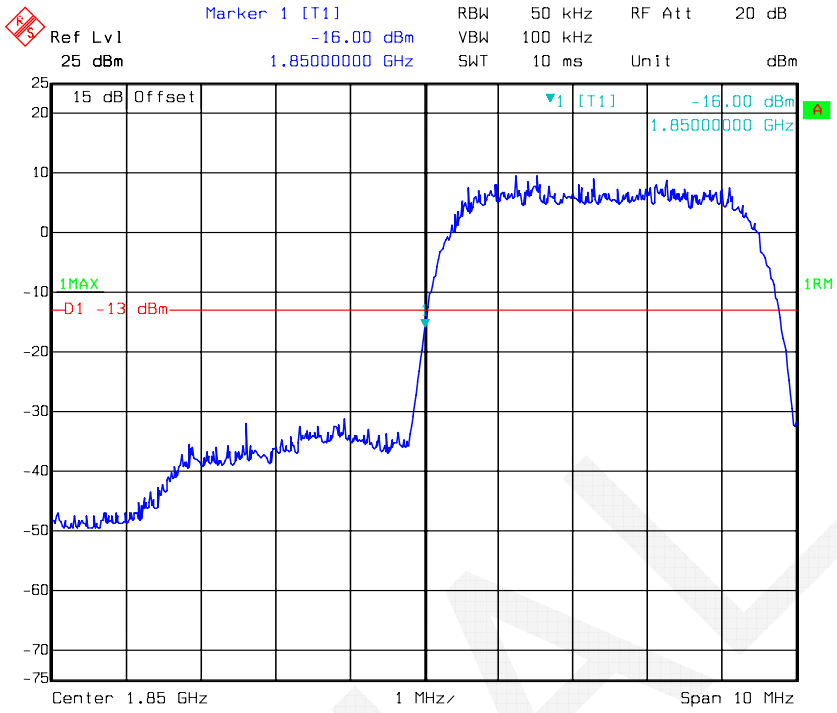
HSDPA Band II, Left Band Edge



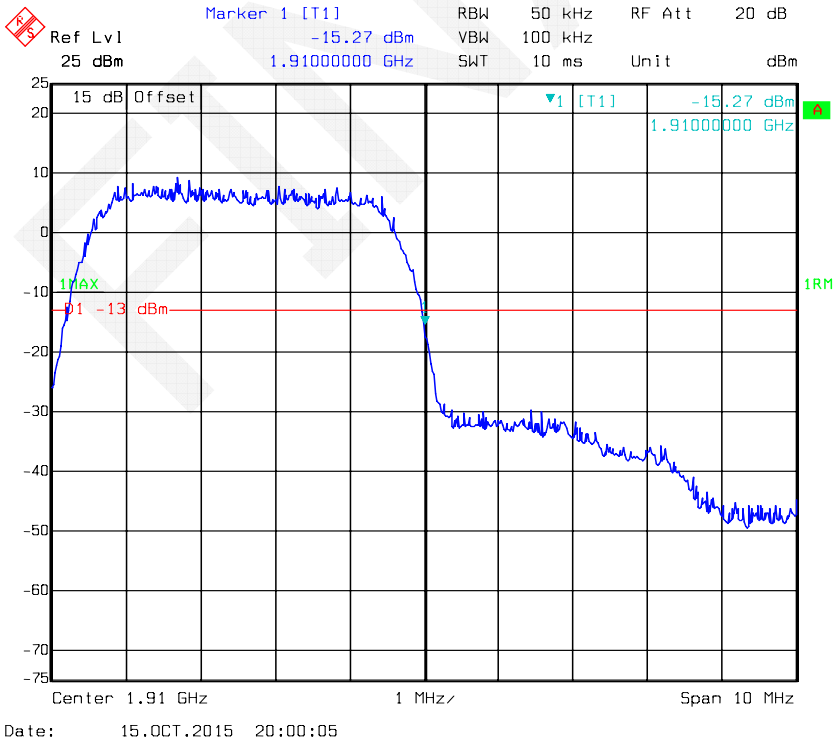
HSDPA Band II, Right Band Edge



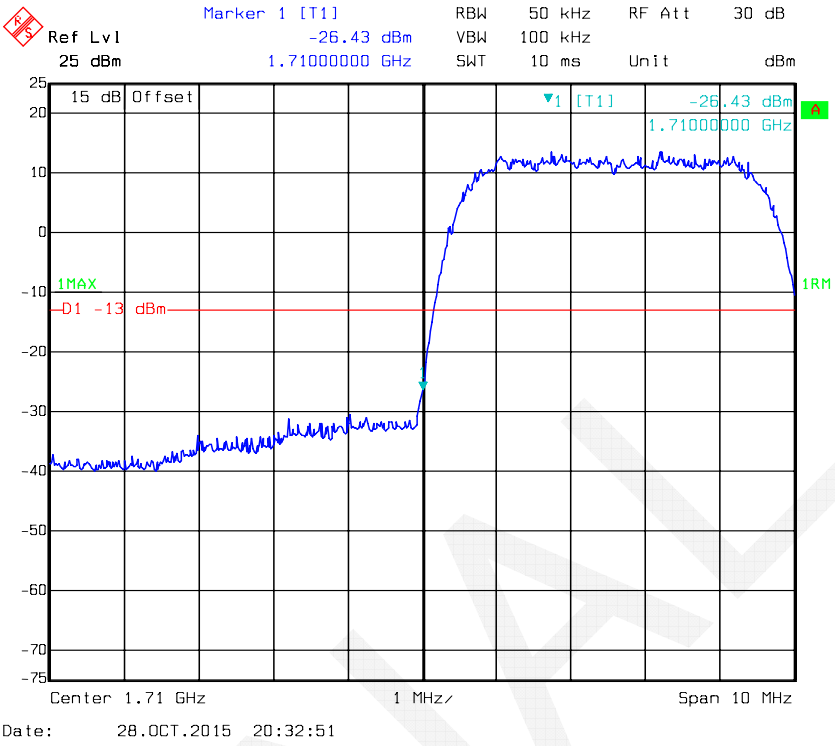
HSUPA Band II, Left Band Edge



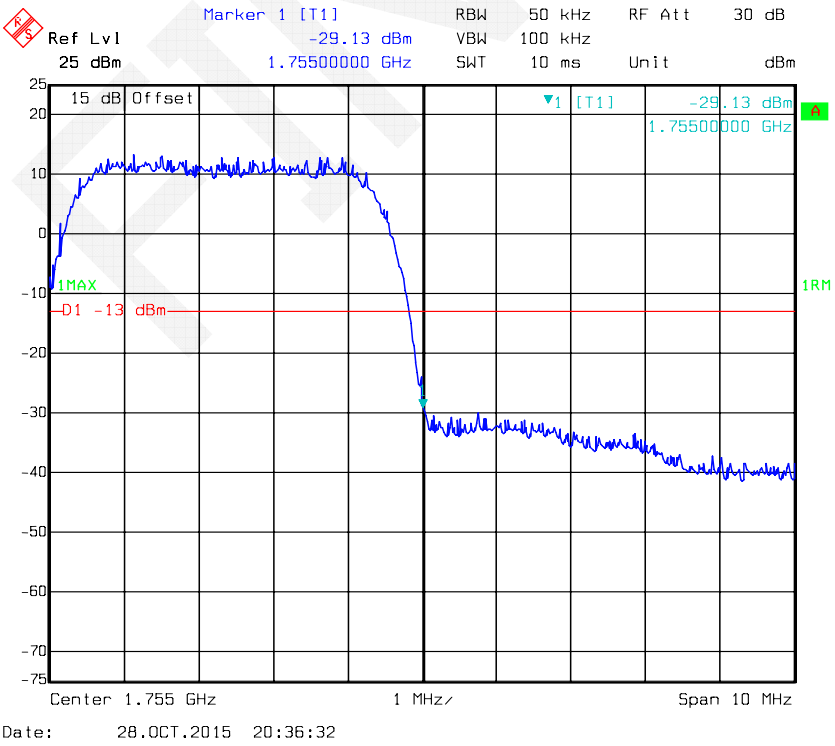
HSUPA Band II, Right Band Edge



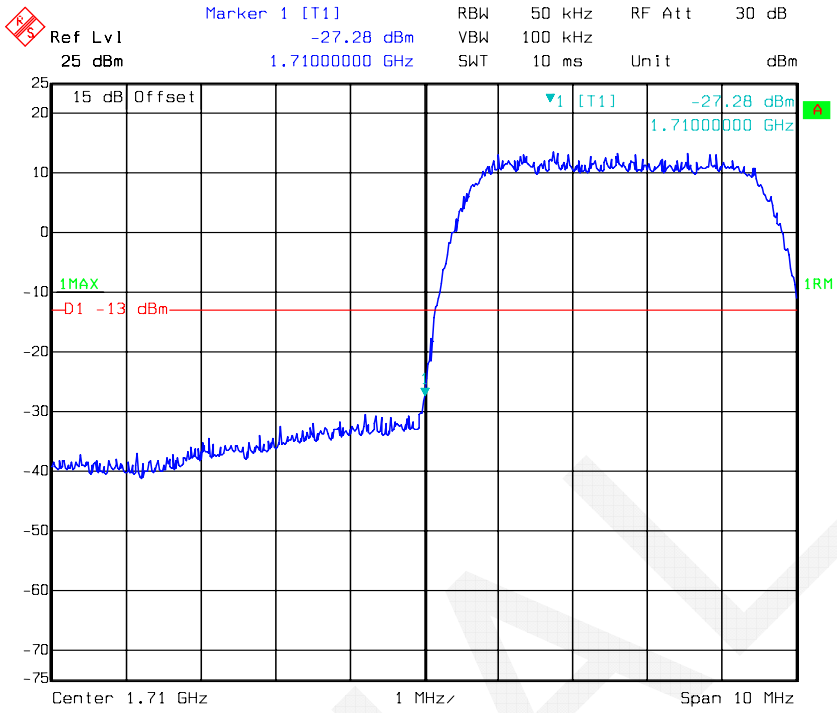
REL99 Band IV, Left Band Edge



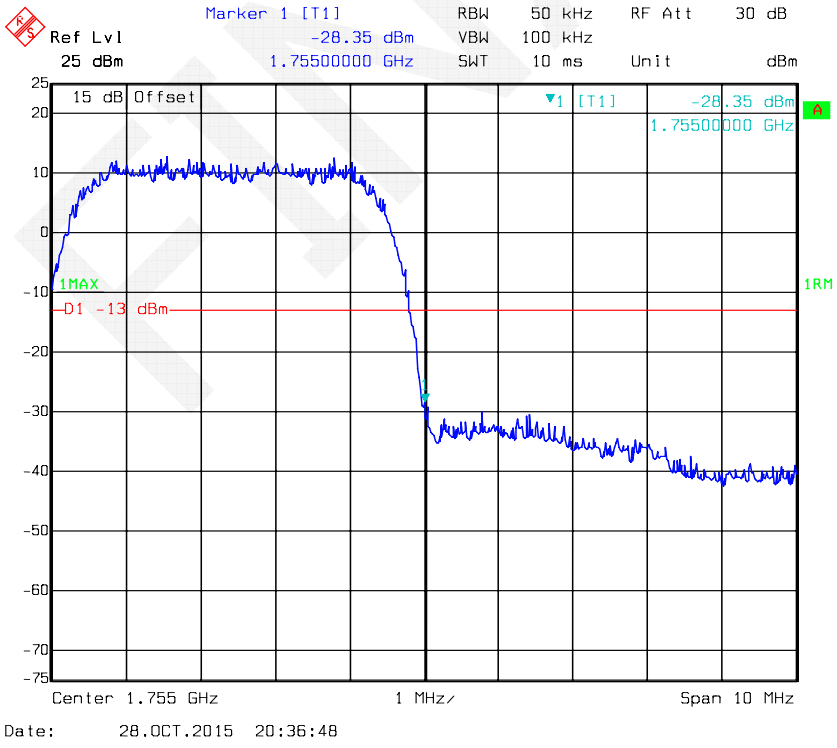
REL99 Band IV, Right Band Edge



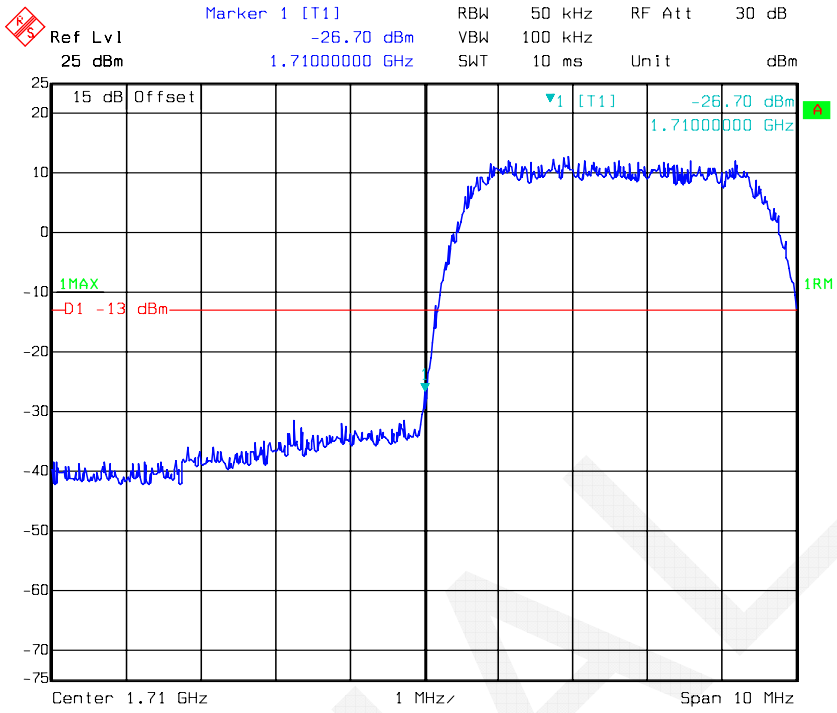
HSDPA Band IV, Left Band Edge



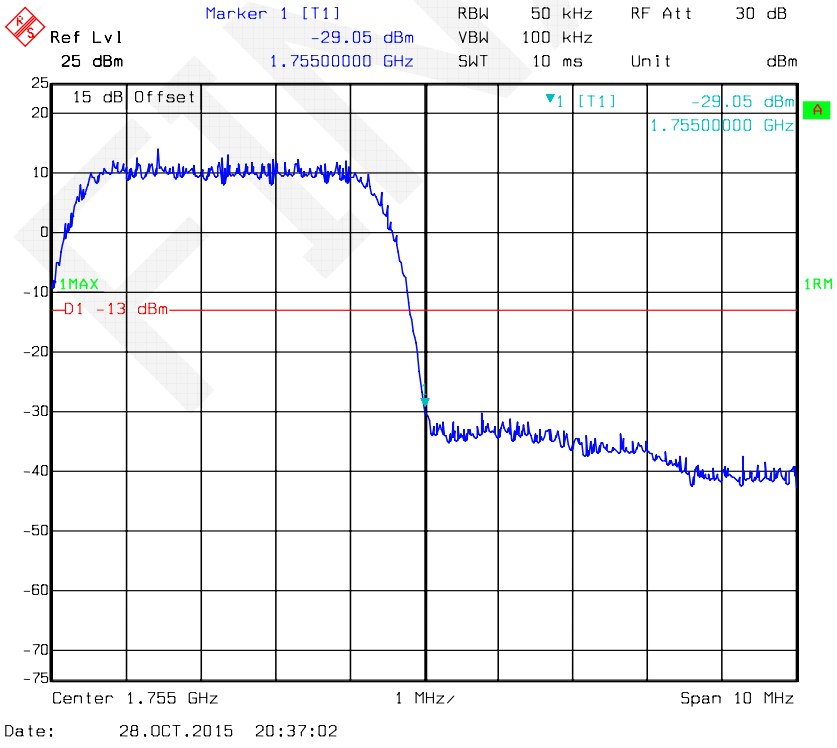
HSDPA Band IV, Right Band Edge



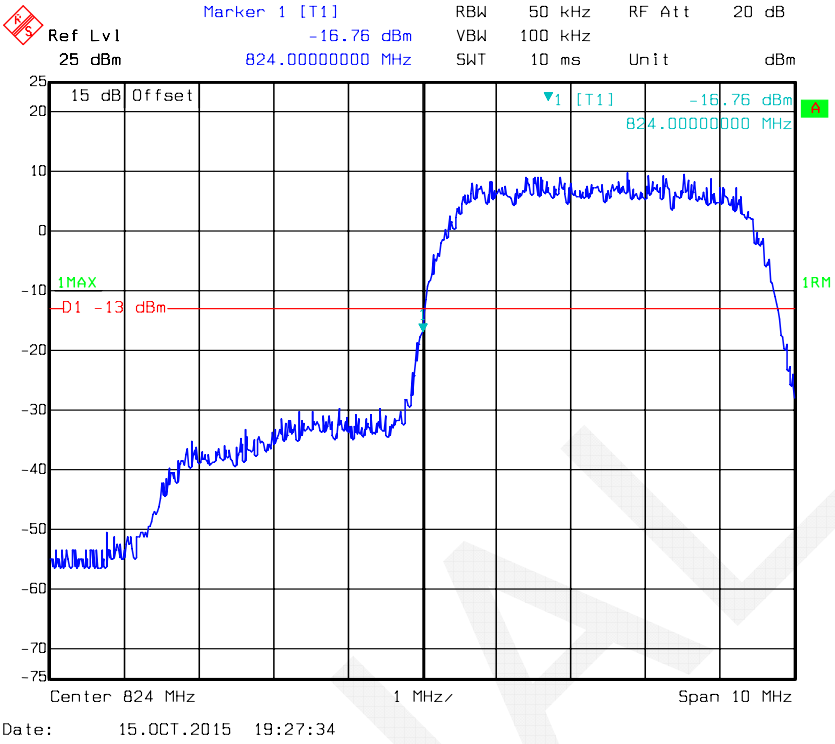
HSUPA Band IV, Left Band Edge



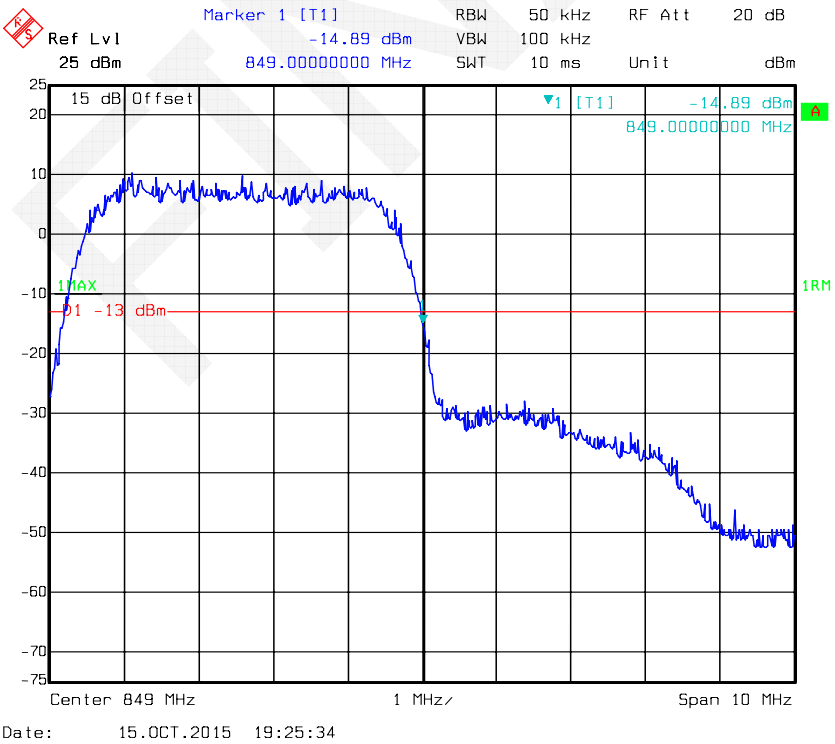
HSUPA Band IV, Right Band Edge



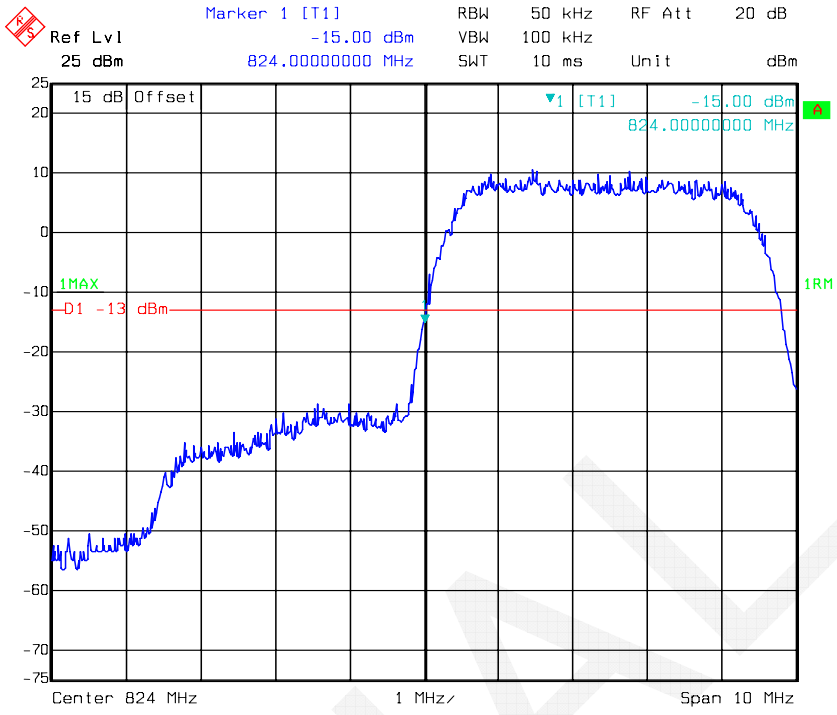
REL99 Band V, Left Band Edge



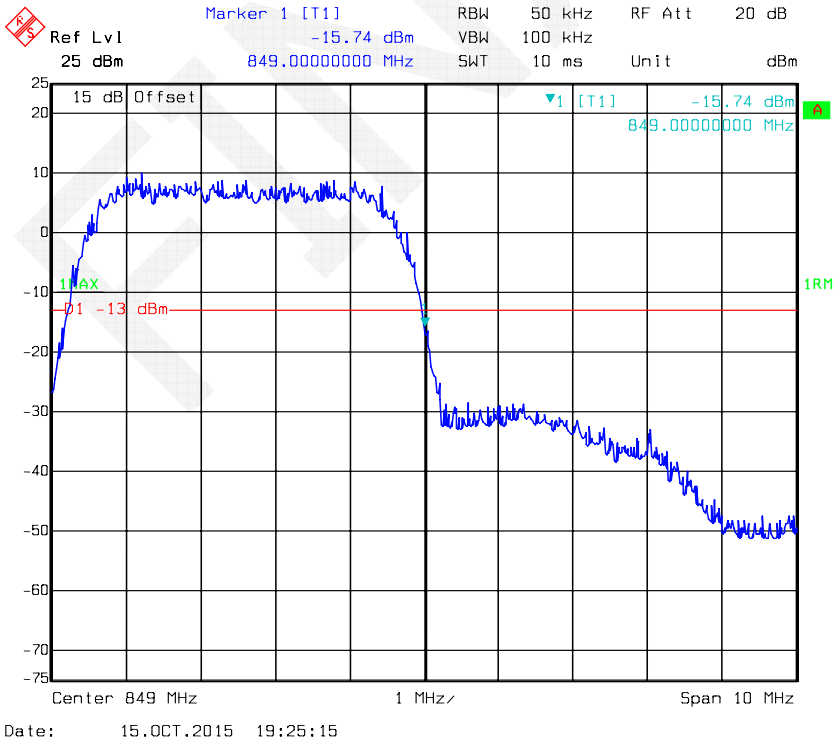
REL99 Band V Right Band Edge



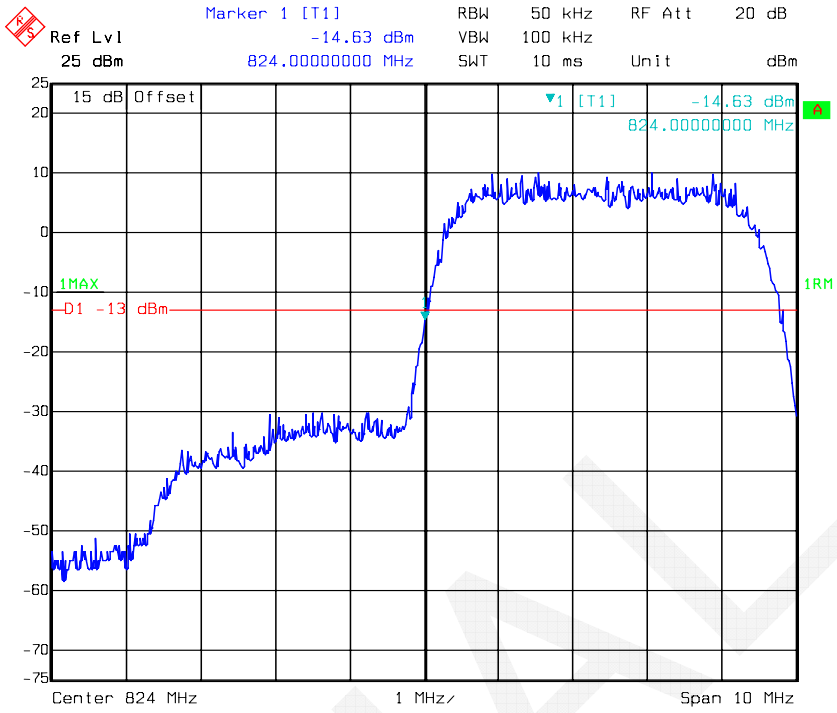
HSDPA Band V, Left Band Edge



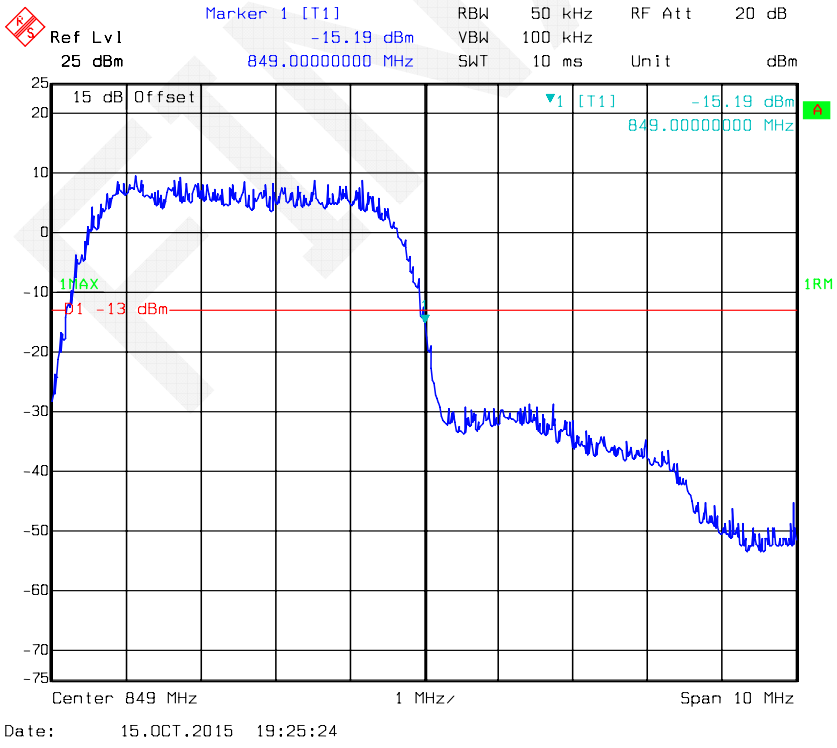
HSDPA Band V, Right Band Edge



HSUPA Band V, Left Band Edge

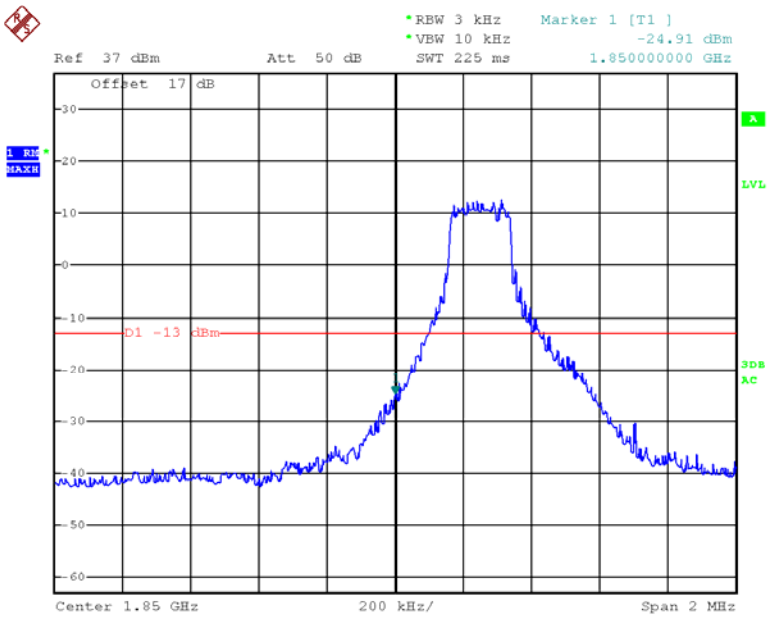


HSUPA Band V, Right Band Edge



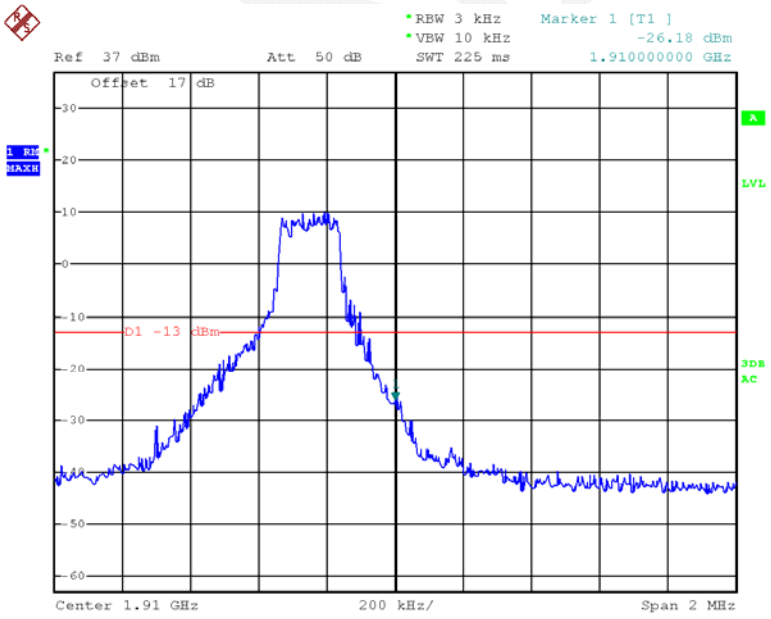
LTE Band 2

QPSK-1.4M 1RB, Left Band Edge



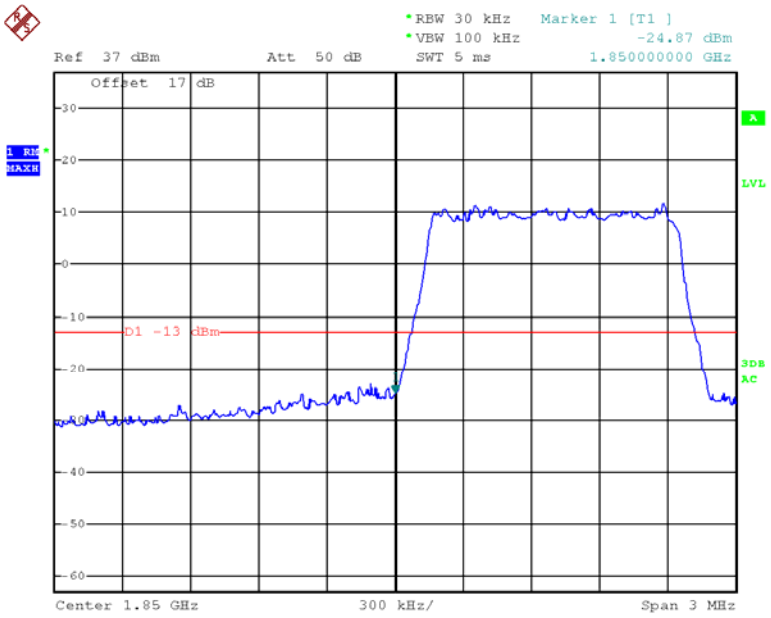
Date: 14.OCT.2015 20:30:45

QPSK-1.4M 1RB, Right Band Edge



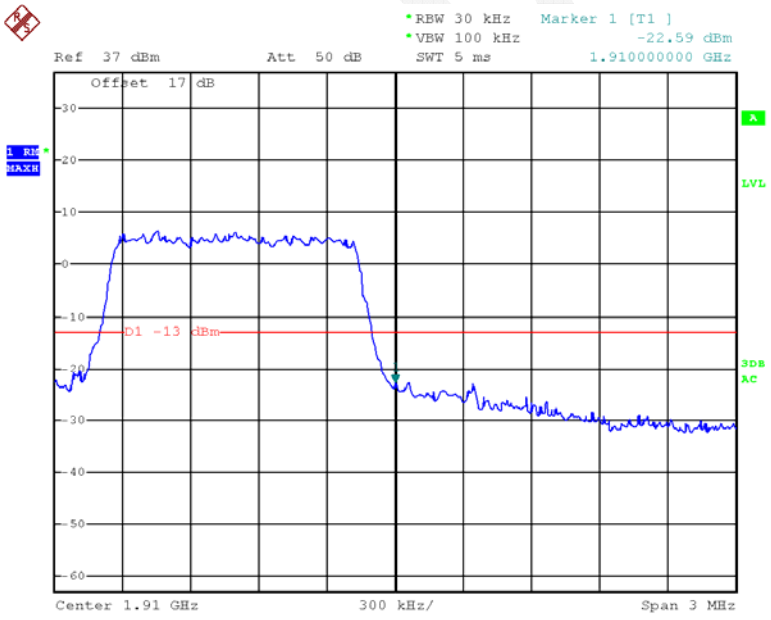
Date: 14.OCT.2015 20:32:24

QPSK-1.4M Full RB, Left Band Edge



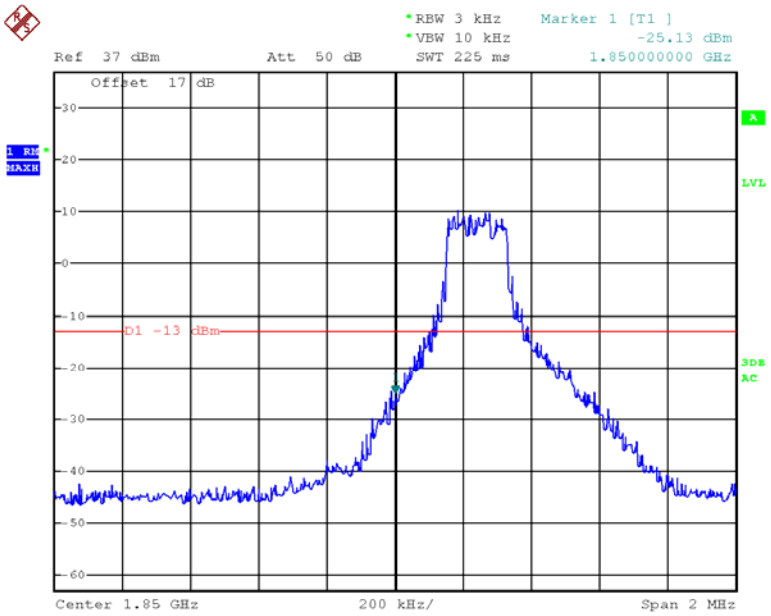
Date: 14.OCT.2015 20:40:53

QPSK-1.4M Full RB, Right Band Edge



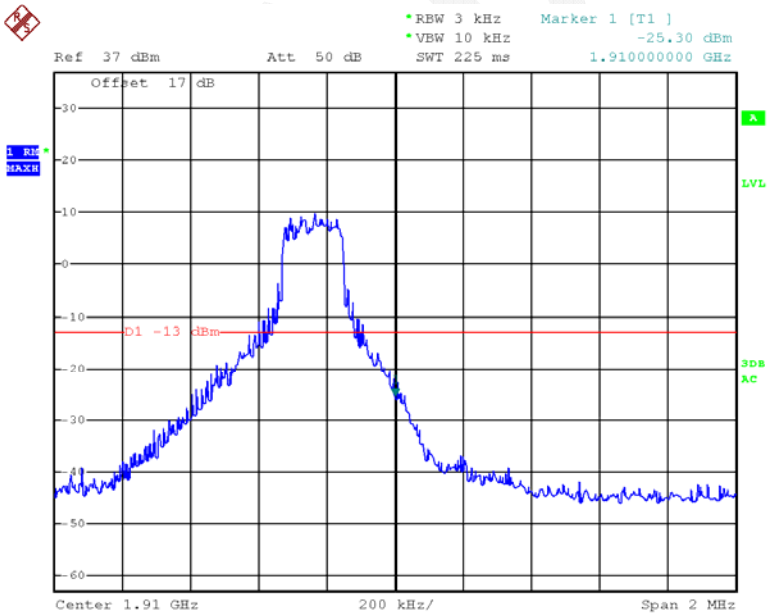
Date: 14.OCT.2015 20:37:51

QPSK-3M 1RB, Left Band Edge



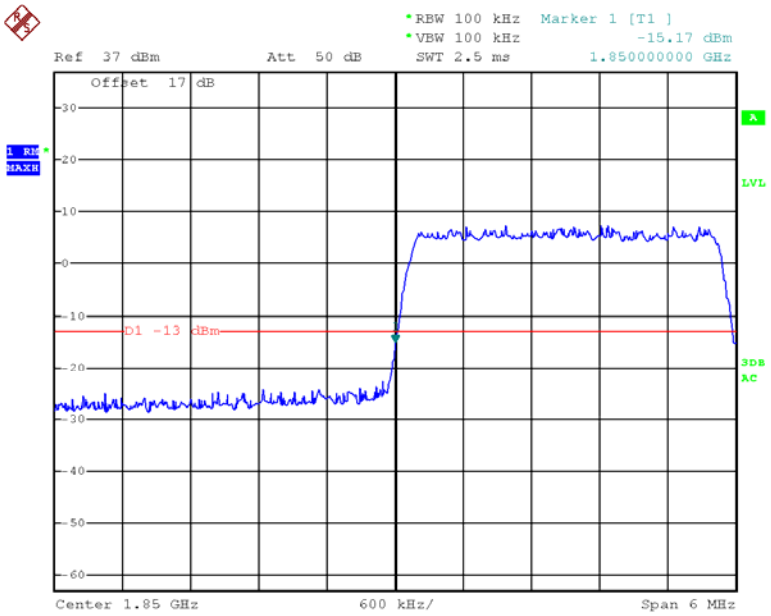
Date: 14.OCT.2015 21:09:47

QPSK-3M 1RB, Right Band Edge



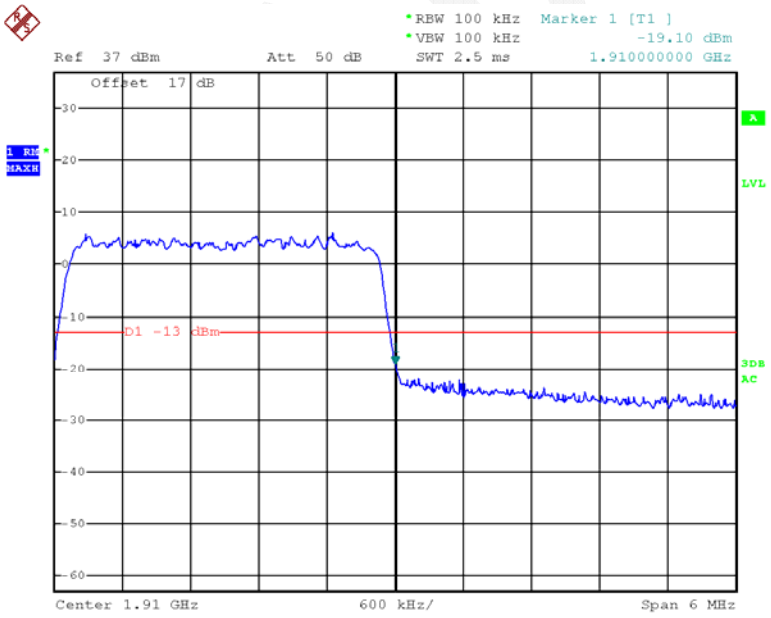
Date: 14.OCT.2015 21:07:43

QPSK-3M Full RB, Left Band Edge



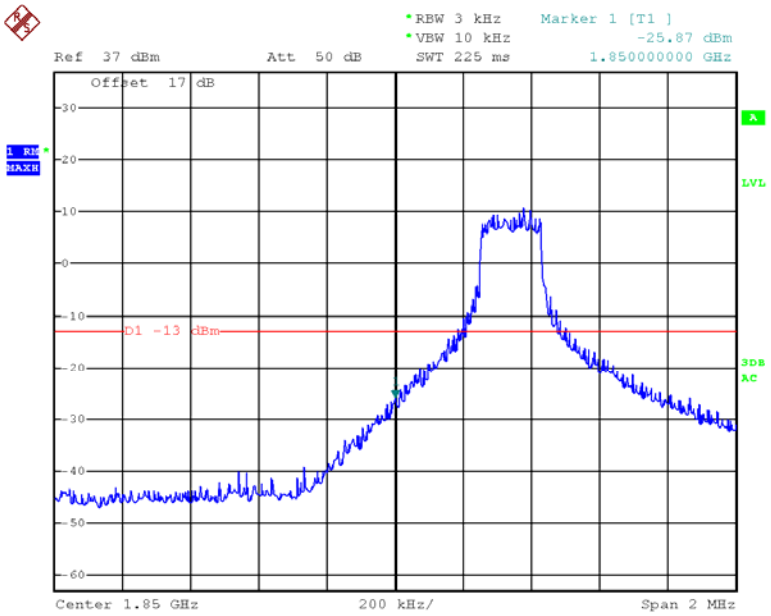
Date: 14.OCT.2015 20:57:39

QPSK-3M Full RB, Right Band Edge



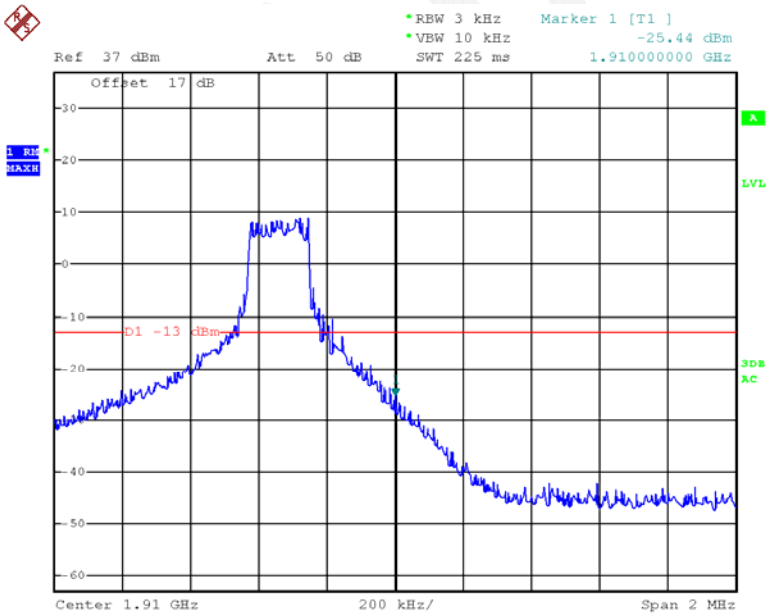
Date: 14.OCT.2015 20:59:59

QPSK-5M 1RB, Left Band Edge



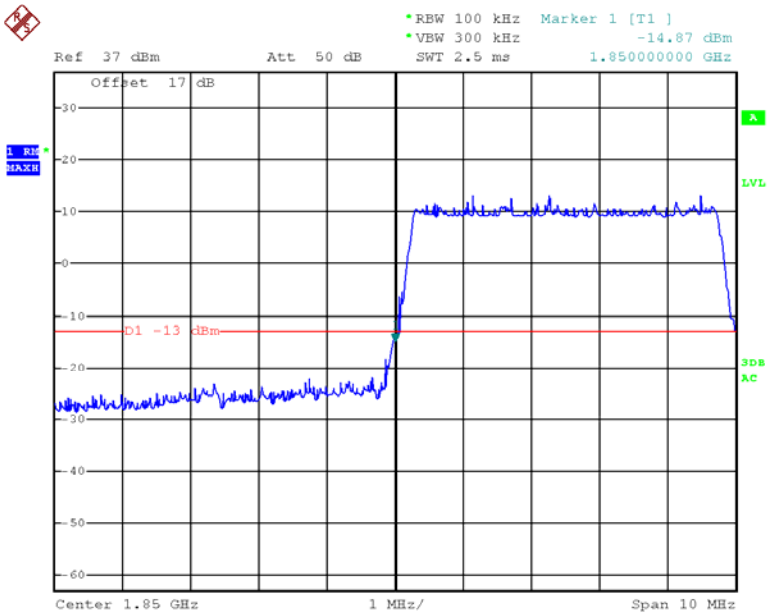
Date: 14.OCT.2015 21:15:07

QPSK-5M 1RB, Right Band Edge



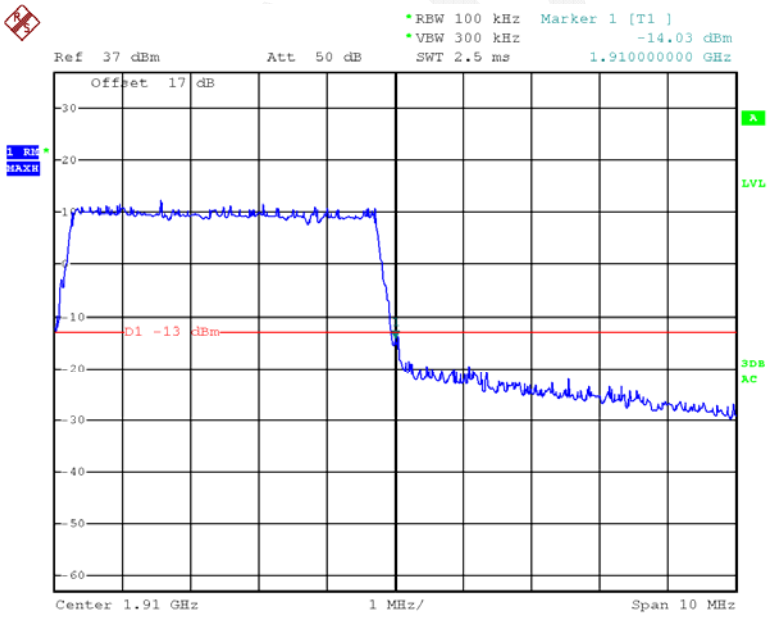
Date: 14.OCT.2015 21:21:47

QPSK-5M Full RB, Left Band Edge



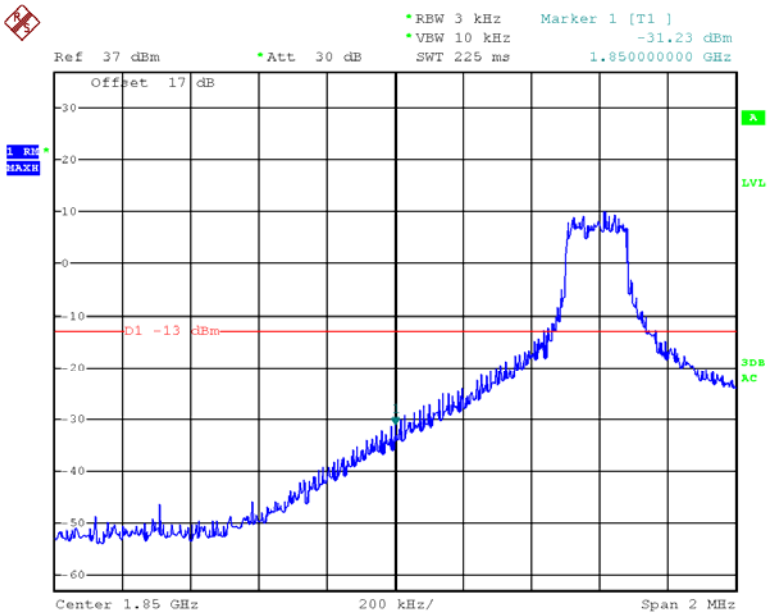
Date: 14.OCT.2015 21:17:58

QPSK-5M Full RB, Right Band Edge



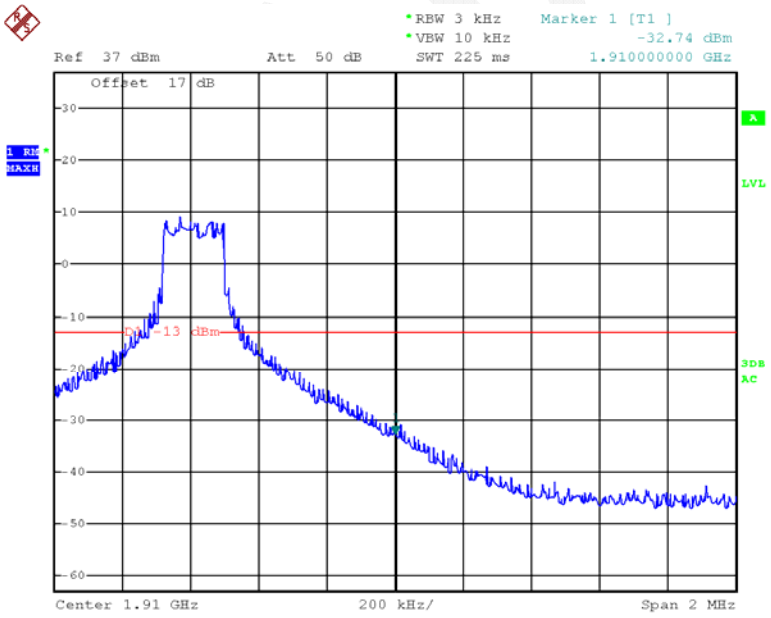
Date: 14.OCT.2015 21:19:51

QPSK-10M 1RB, Left Band Edge



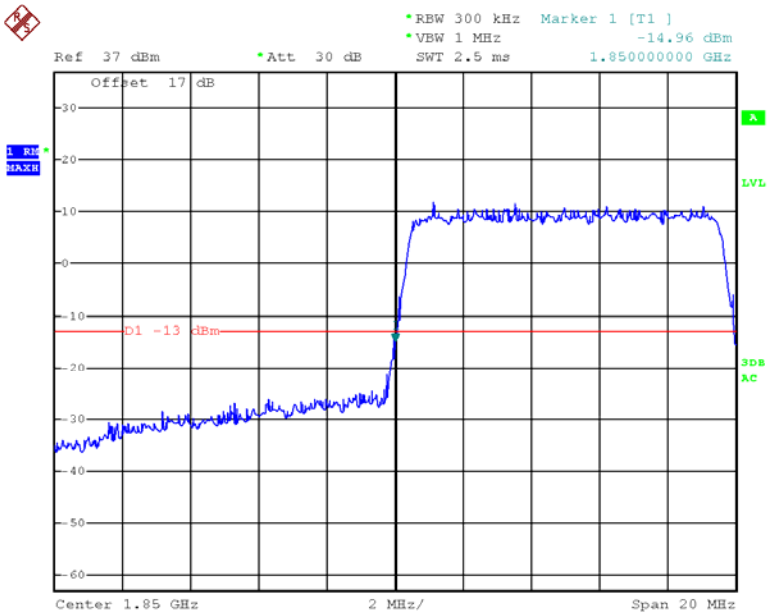
Date: 14.OCT.2015 21:30:30

QPSK-10M 1RB, Right Band Edge



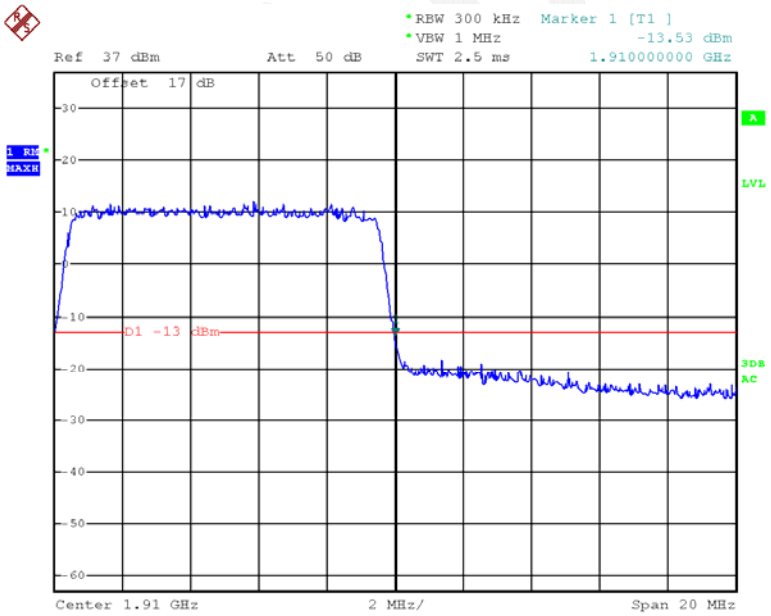
Date: 14.OCT.2015 21:24:48

QPSK-10M Full RB, Left Band Edge



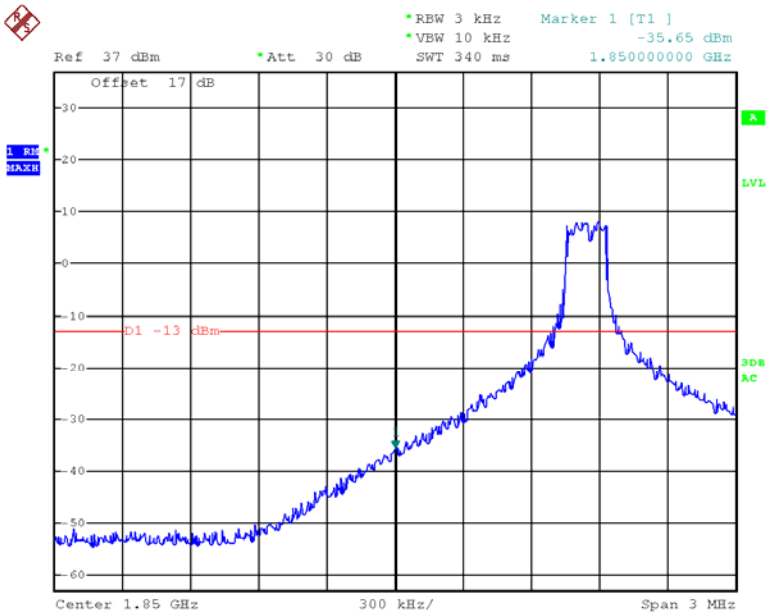
Date: 14.OCT.2015 21:28:39

QPSK-10M Full RB, Right Band Edge



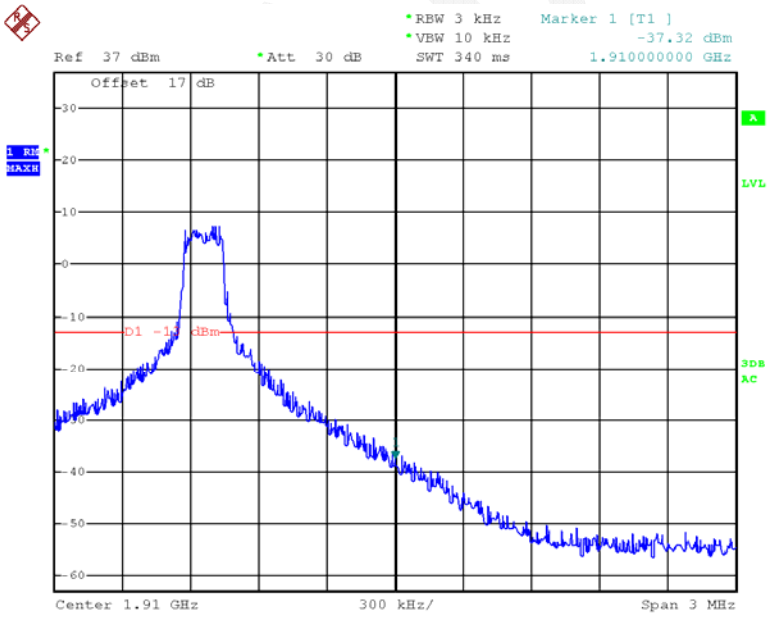
Date: 14.OCT.2015 21:26:24

QPSK-15M 1RB, Left Band Edge



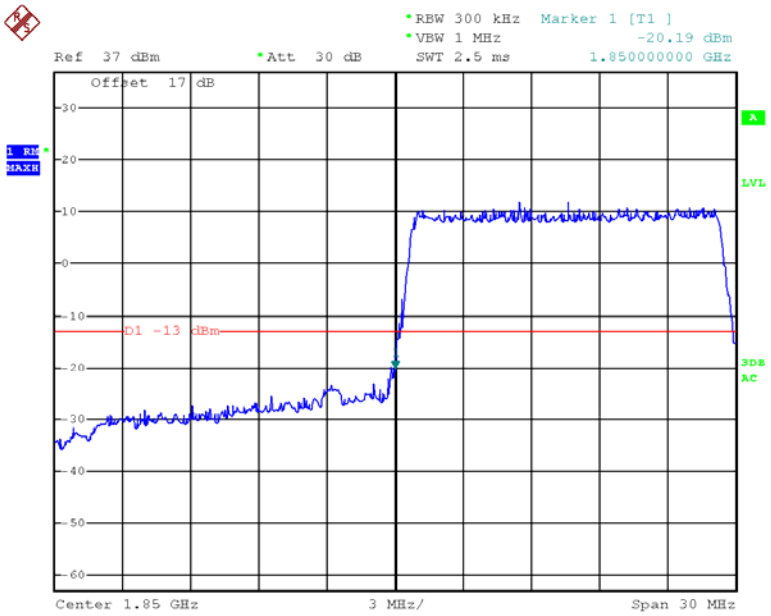
Date: 14.OCT.2015 21:38:29

QPSK-15M 1RB, Right Band Edge



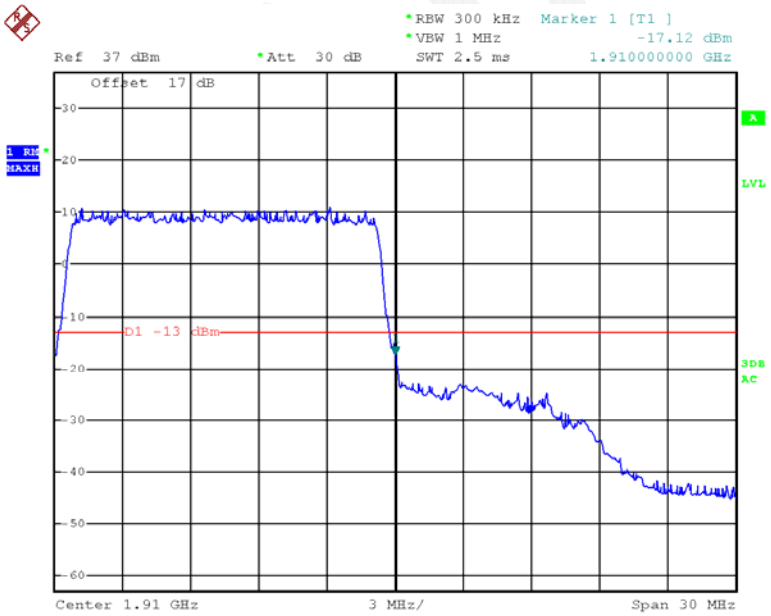
Date: 14.OCT.2015 21:44:07

QPSK-15M Full RB, Left Band Edge



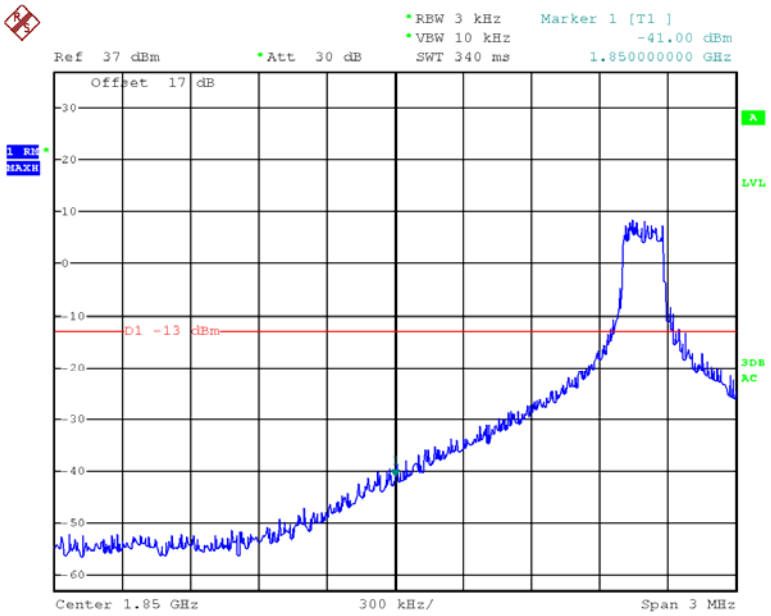
Date: 14.OCT.2015 21:40:23

QPSK-15M Full RB, Right Band Edge



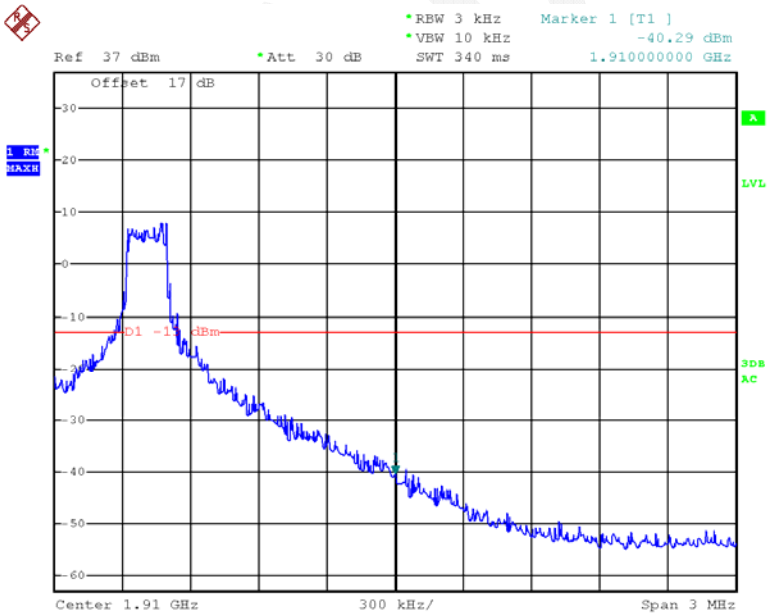
Date: 14.OCT.2015 21:41:35

QPSK-20M 1RB, Left Band Edge



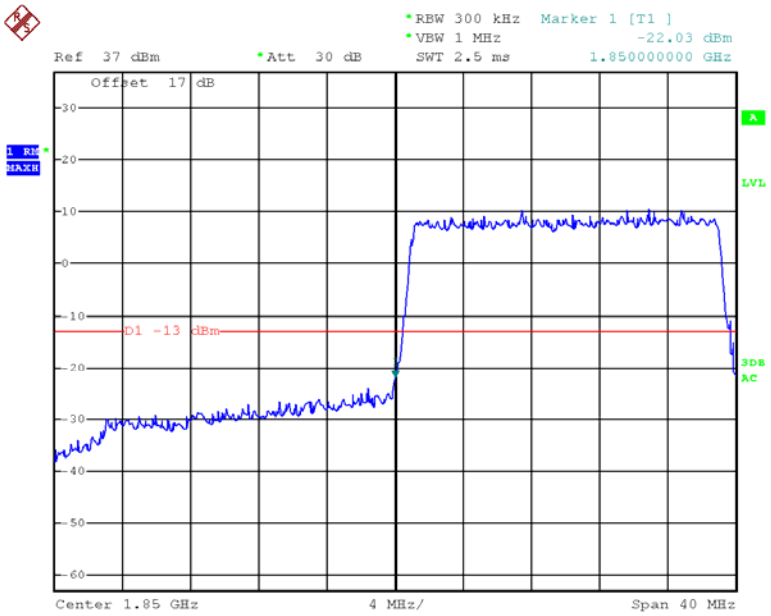
Date: 14.OCT.2015 21:53:31

QPSK-20M 1RB, Right Band Edge



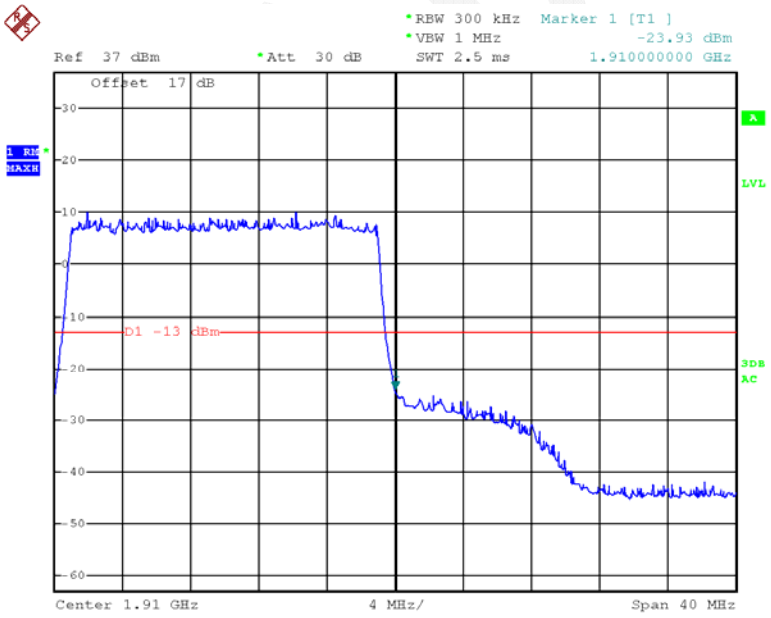
Date: 14.OCT.2015 21:47:42

QPSK-20M Full RB, Left Band Edge



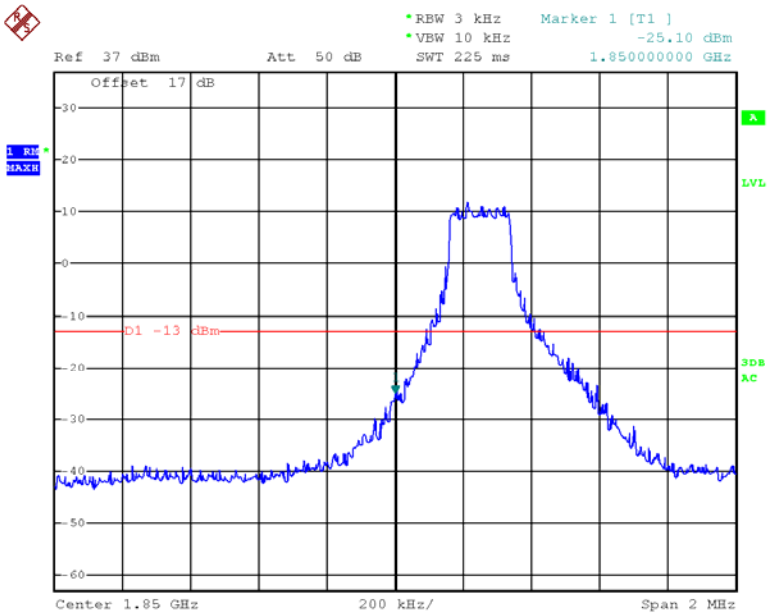
Date: 14.OCT.2015 21:52:14

QPSK-20M Full RB, Right Band Edge



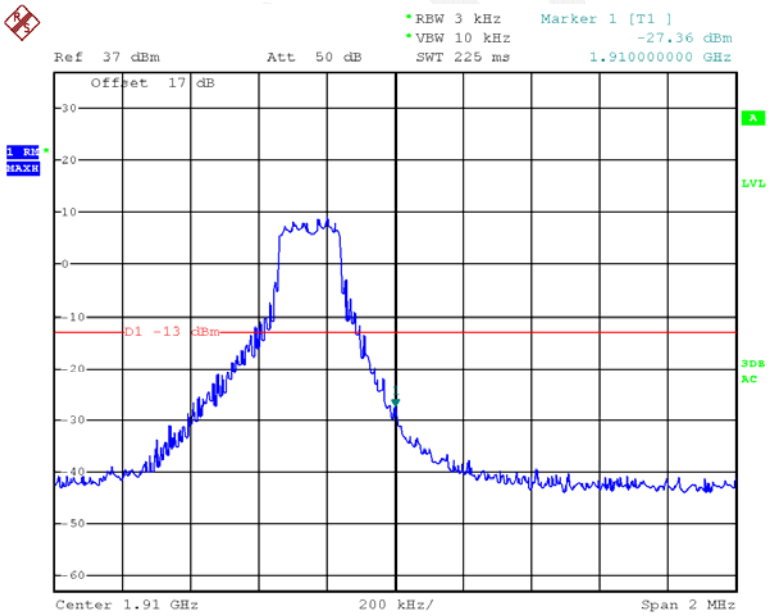
Date: 14.OCT.2015 21:48:41

16QAM -1.4M 1RB, Left Band Edge



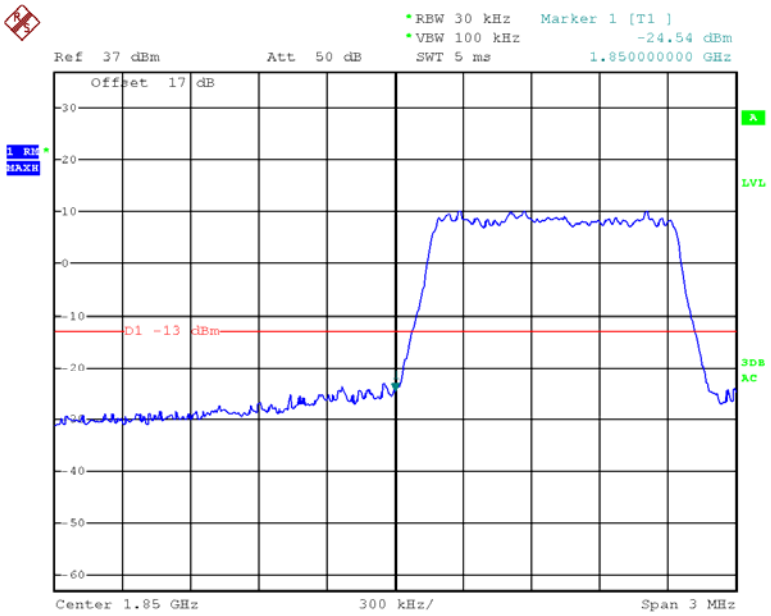
Date: 14.OCT.2015 20:29:28

16QAM -1.4M 1RB, Right Band Edge



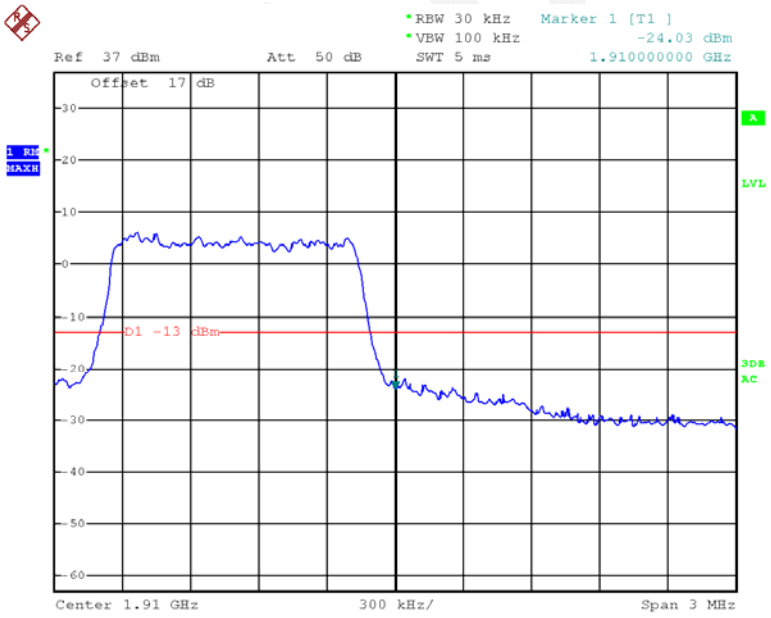
Date: 14.OCT.2015 20:32:51

16QAM -1.4M Full RB, Left Band Edge



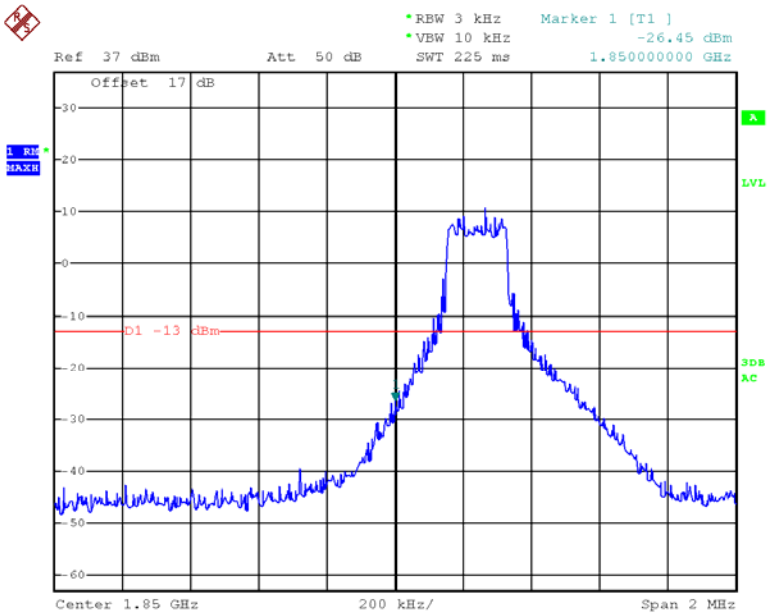
Date: 14.OCT.2015 20:41:48

16QAM -1.4M Full RB, Right Band Edge



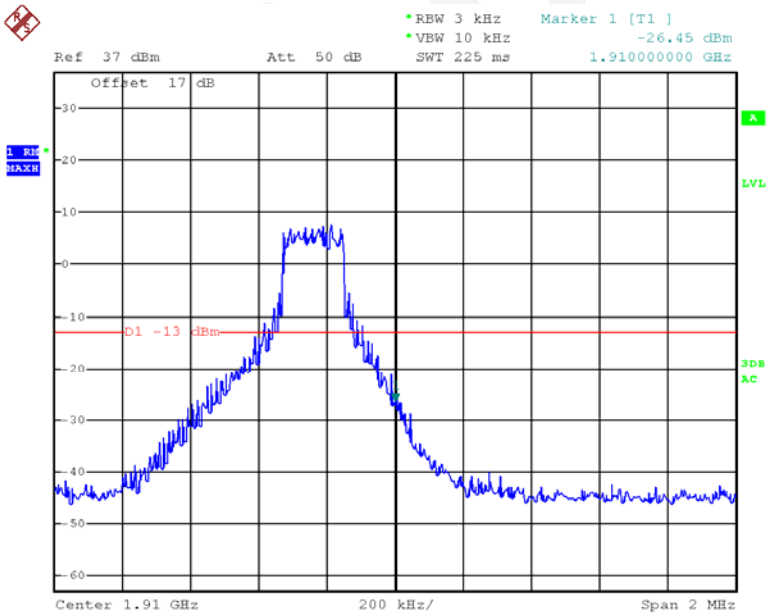
Date: 14.OCT.2015 20:37:04

16QAM -3M 1RB, Left Band Edge



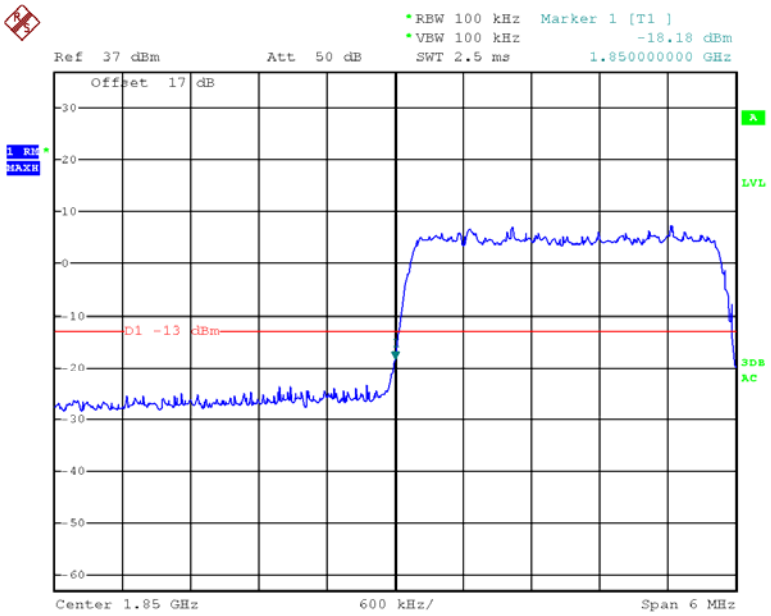
Date: 14.OCT.2015 21:10:09

16QAM -3M 1RB, Right Band Edge



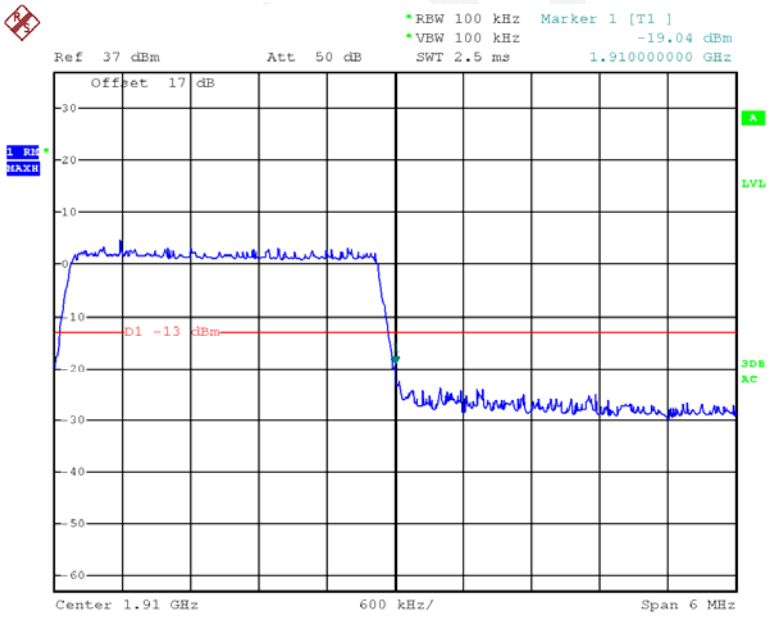
Date: 14.OCT.2015 21:03:53

16QAM -3M Full RB, Left Band Edge



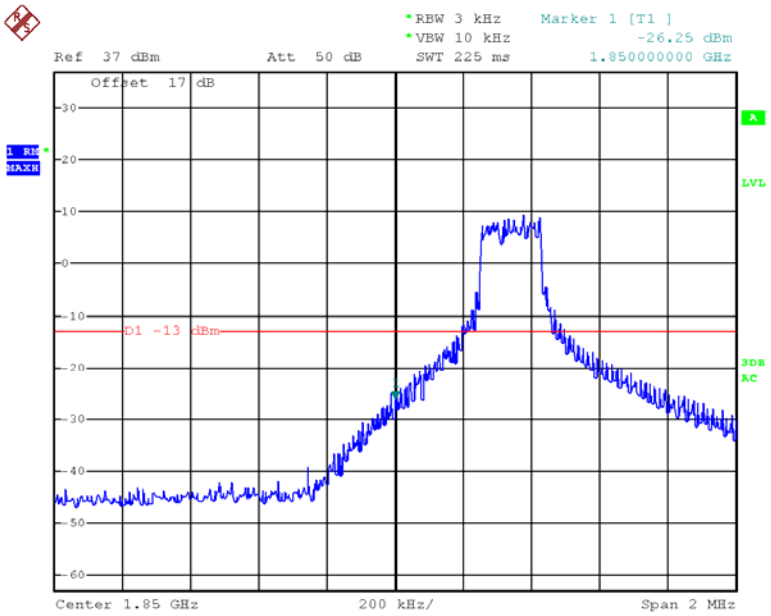
Date: 14.OCT.2015 20:57:14

16QAM -3M Full RB, Right Band Edge



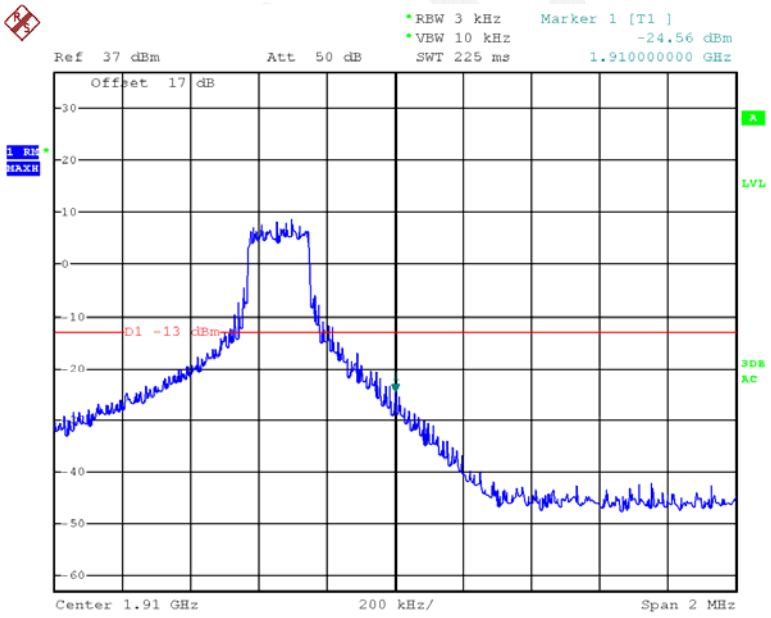
Date: 14.OCT.2015 21:00:14

16QAM -5M 1RB, Left Band Edge



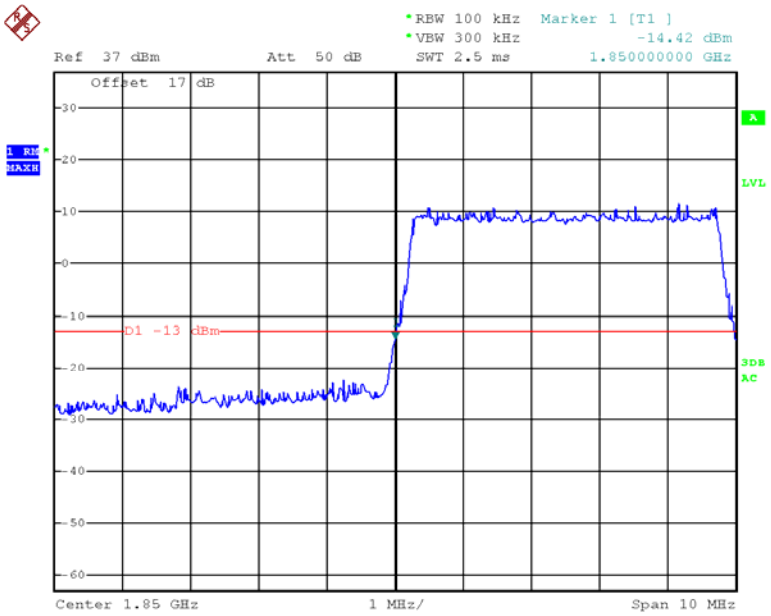
Date: 14.OCT.2015 21:16:14

16QAM -5M 1RB, Right Band Edge



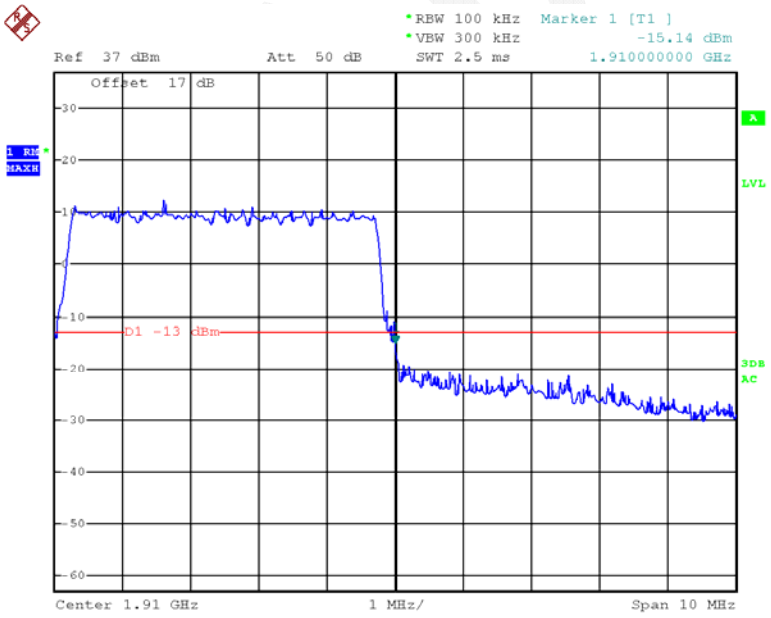
Date: 14.OCT.2015 21:22:05

16QAM -5M Full RB, Left Band Edge



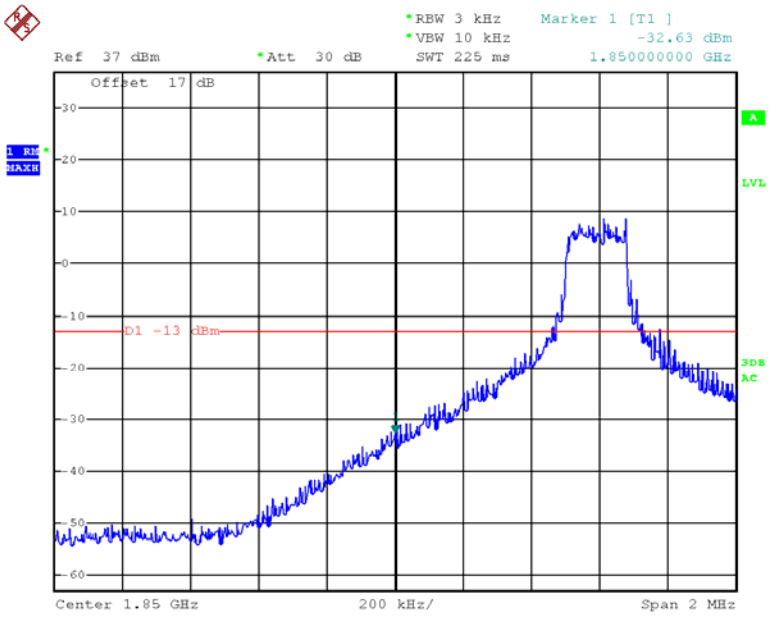
Date: 14.OCT.2015 21:17:16

16QAM -5M Full RB, Right Band Edge



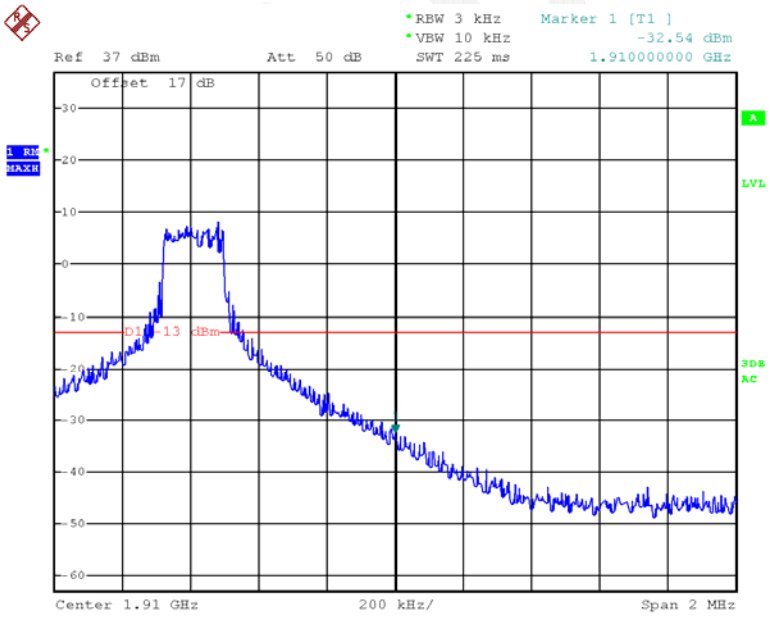
Date: 14.OCT.2015 21:19:29

16QAM -10M 1RB, Left Band Edge



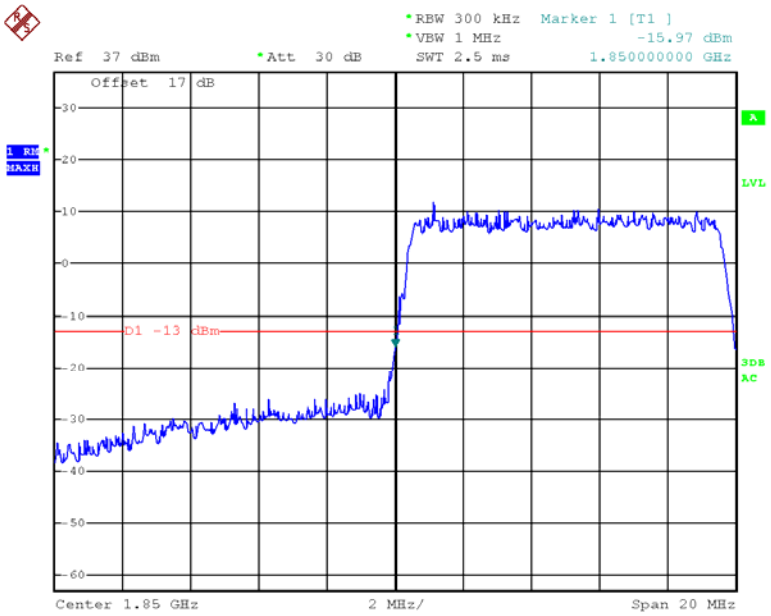
Date: 14.OCT.2015 21:30:04

16QAM -10M 1RB, Right Band Edge



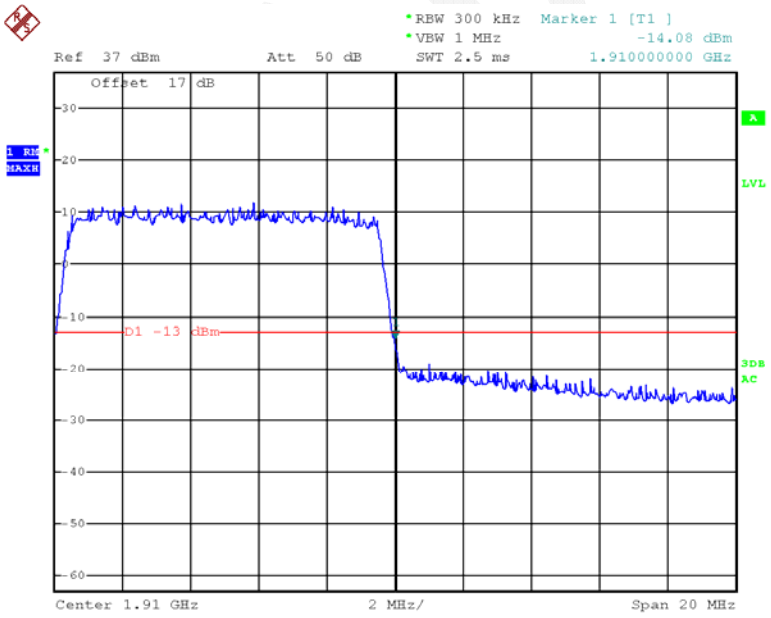
Date: 14.OCT.2015 21:25:04

16QAM -10M Full RB, Left Band Edge



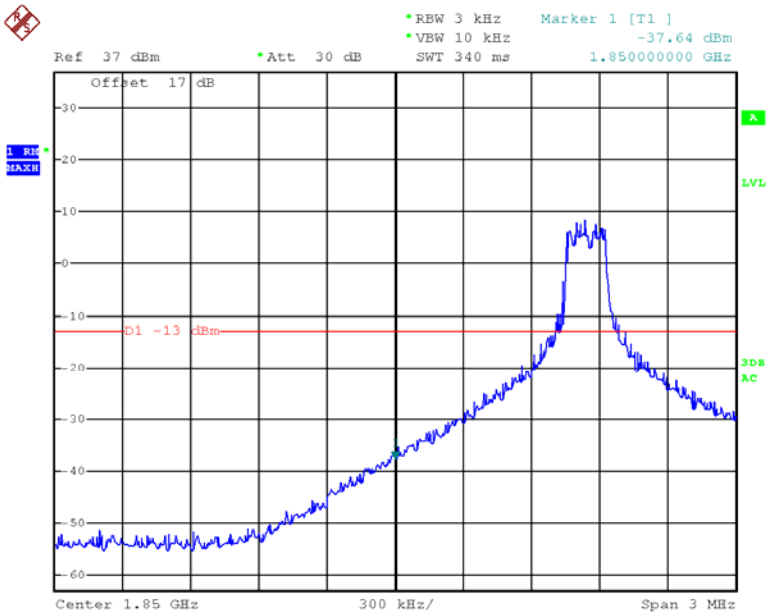
Date: 14.OCT.2015 21:28:36

16QAM -10M Full RB, Right Band Edge



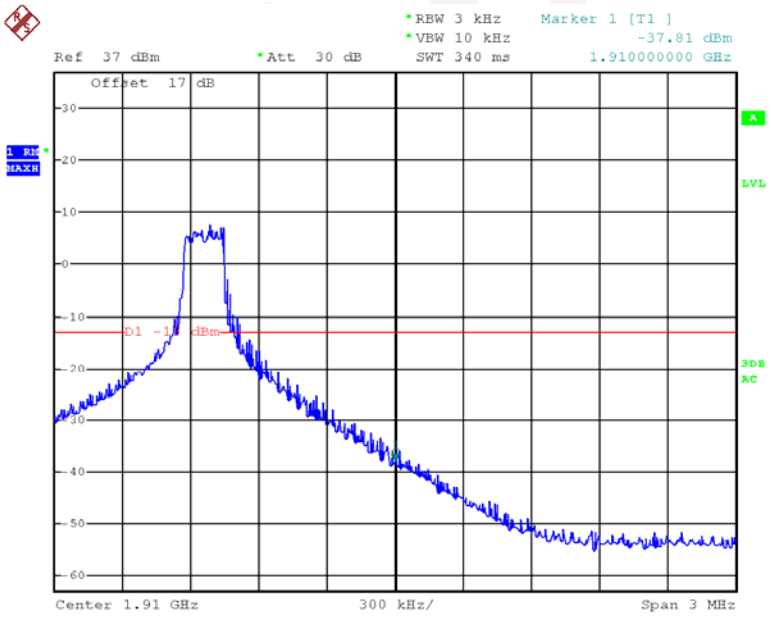
Date: 14.OCT.2015 21:26:32

16QAM -15M 1RB, Left Band Edge



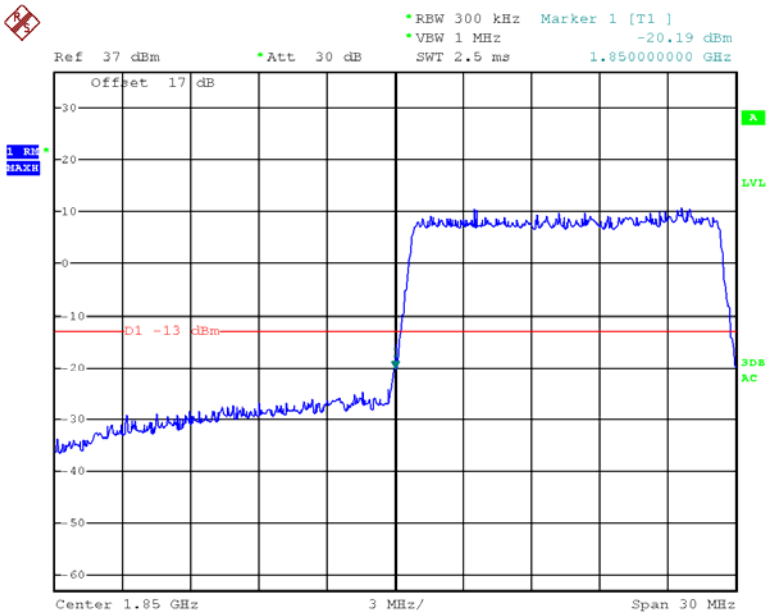
Date: 14.OCT.2015 21:38:53

16QAM -15M 1RB, Right Band Edge



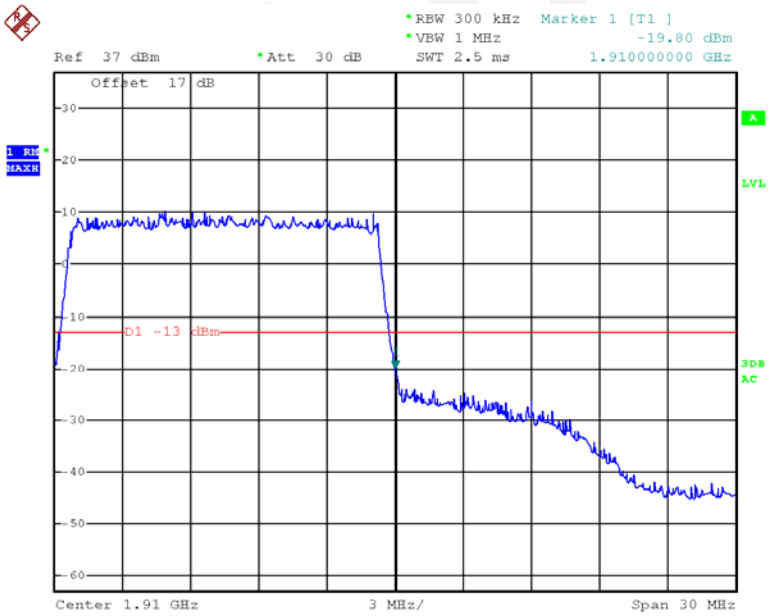
Date: 14.OCT.2015 21:43:48

16QAM -15M Full RB, Left Band Edge



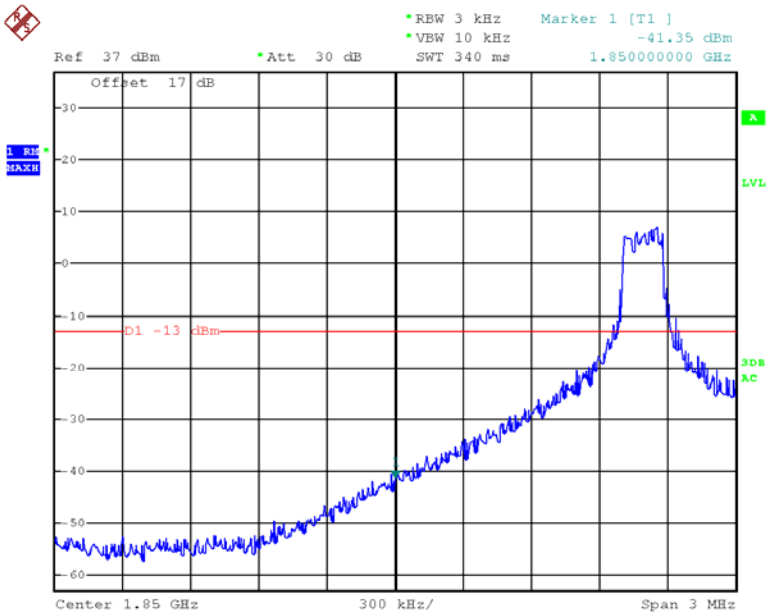
Date: 14.OCT.2015 21:40:04

16QAM -15M Full RB, Right Band Edge



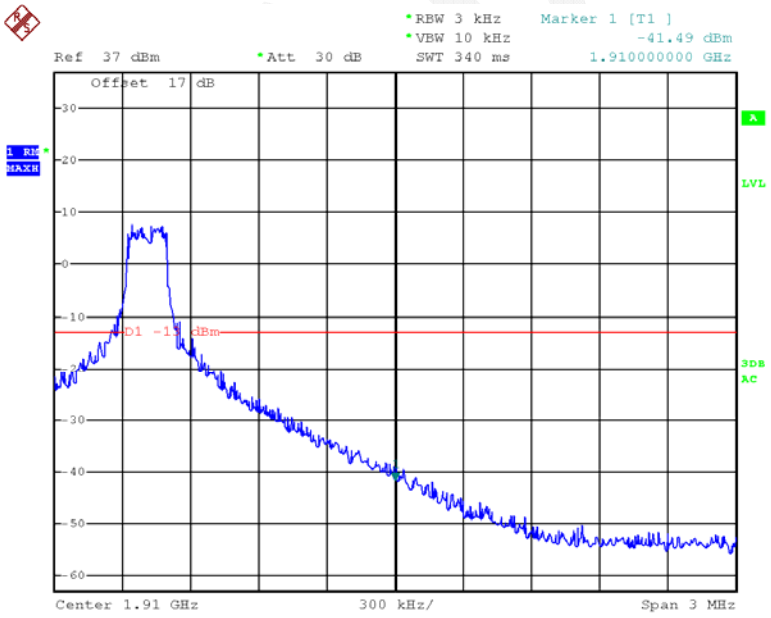
Date: 14.OCT.2015 21:41:58

16QAM -20M 1RB, Left Band Edge



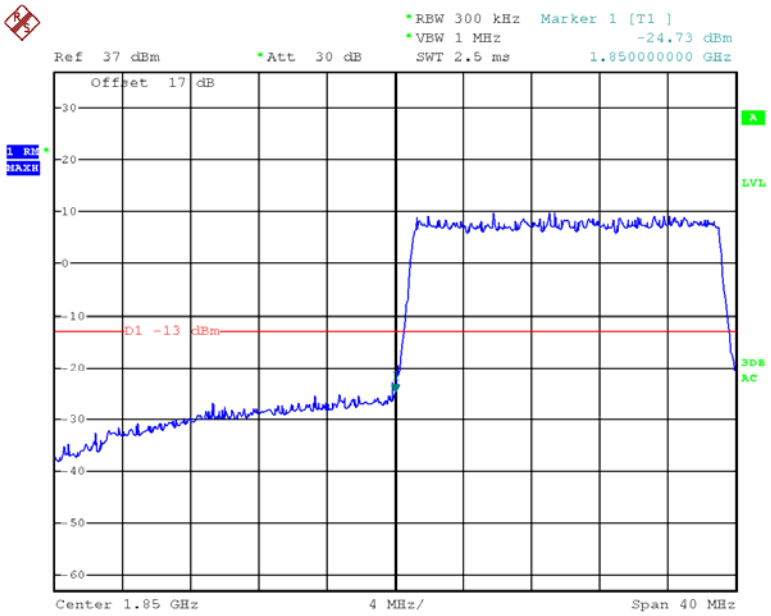
Date: 14.OCT.2015 21:53:43

16QAM -20M 1RB, Right Band Edge



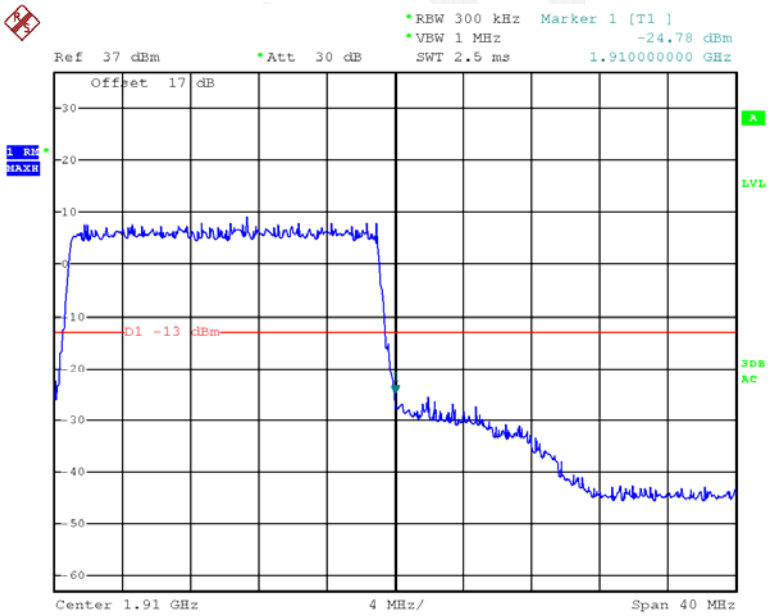
Date: 14.OCT.2015 21:47:08

16QAM -20M Full RB, Left Band Edge



Date: 14.OCT.2015 21:51:56

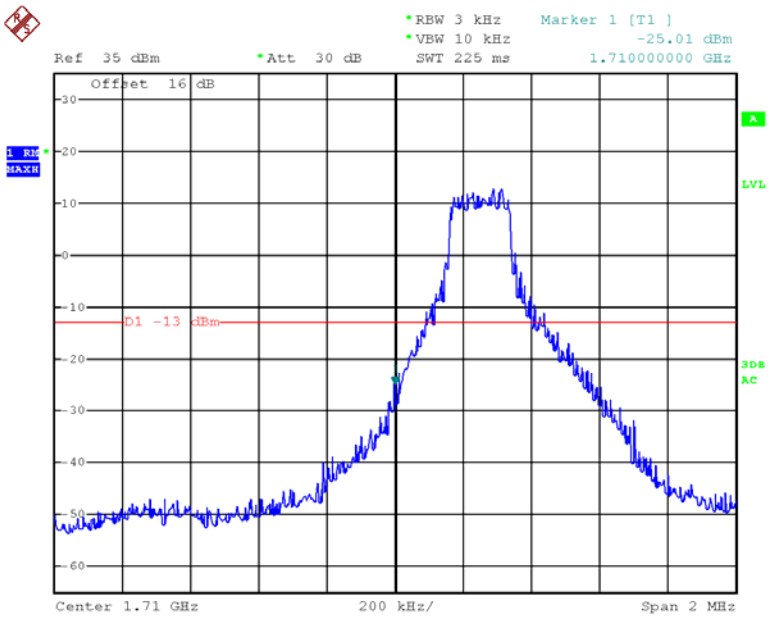
16QAM-20M Full RB, Right Band Edge



Date: 14.OCT.2015 21:48:58

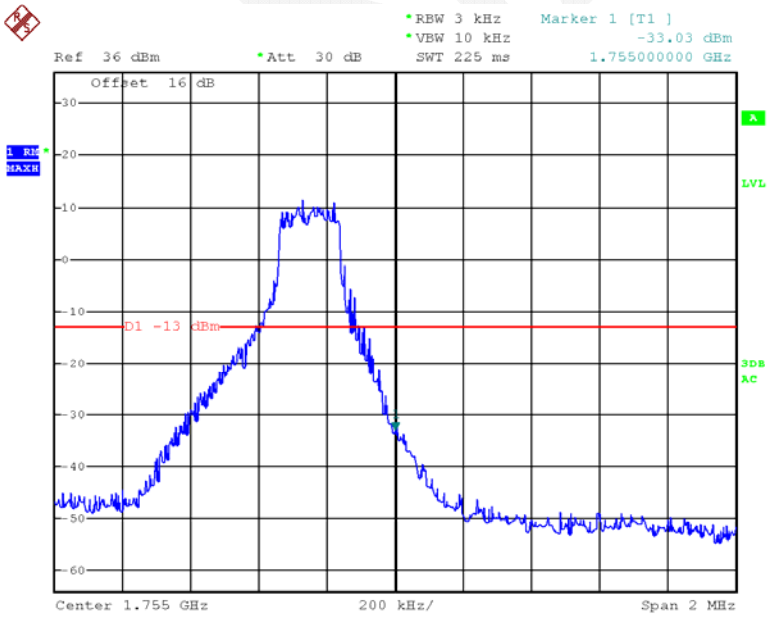
LTE Band 4

QPSK-1.4M 1RB, Left Band Edge



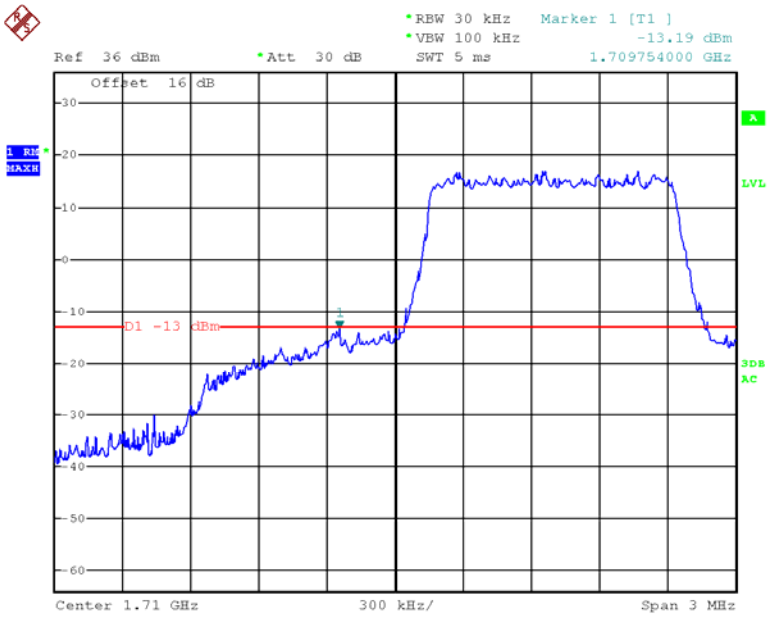
Date: 14.OCT.2015 23:55:35

QPSK-1.4M 1RB, Right Band Edge



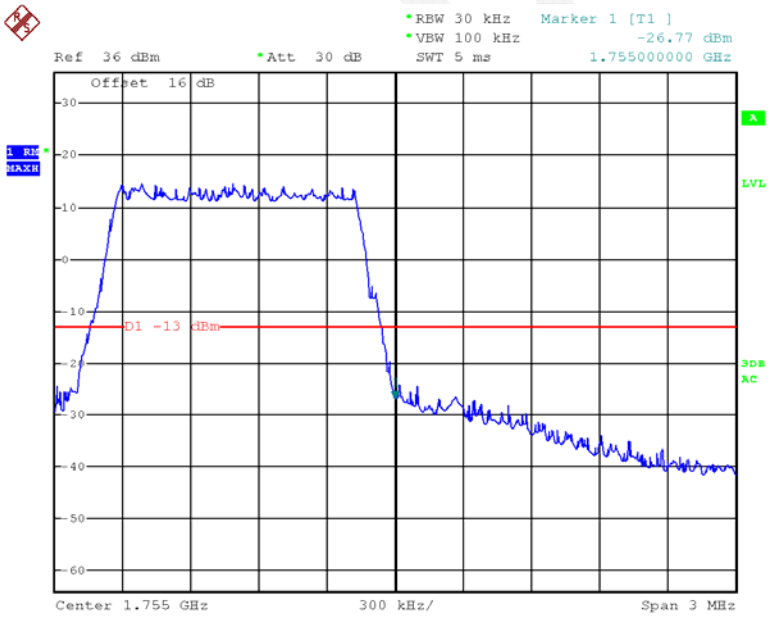
Date: 15.OCT.2015 00:09:16

QPSK-1.4M Full RB, Left Band Edge



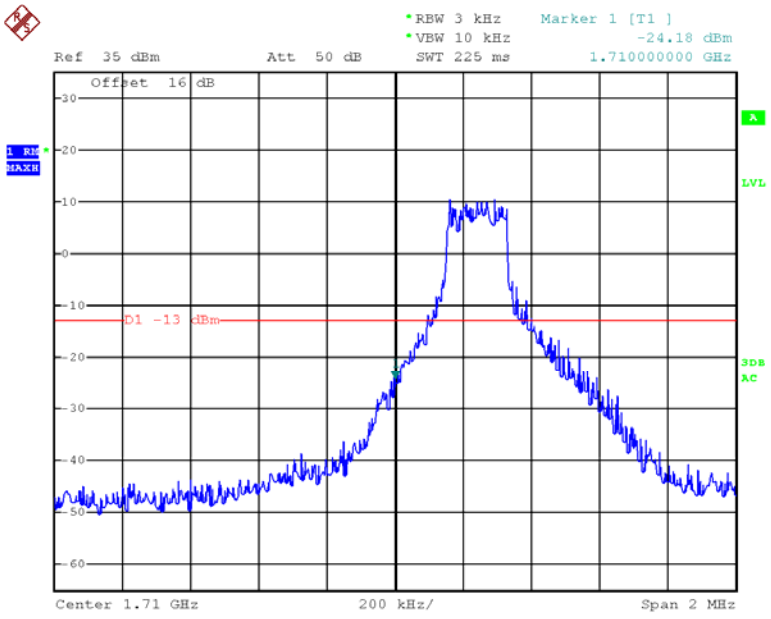
Date: 15.OCT.2015 00:04:39

QPSK-1.4M Full RB, Right Band Edge



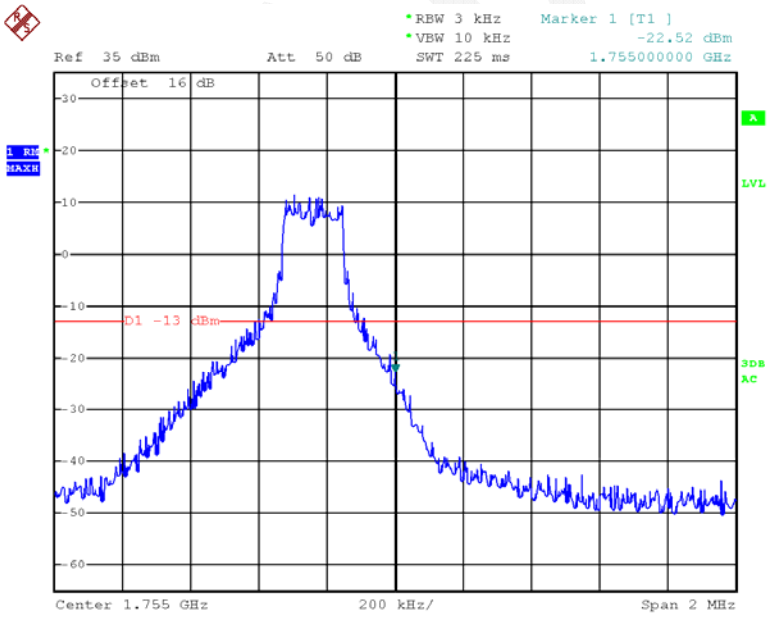
Date: 15.OCT.2015 00:07:10

QPSK-3M 1RB, Left Band Edge



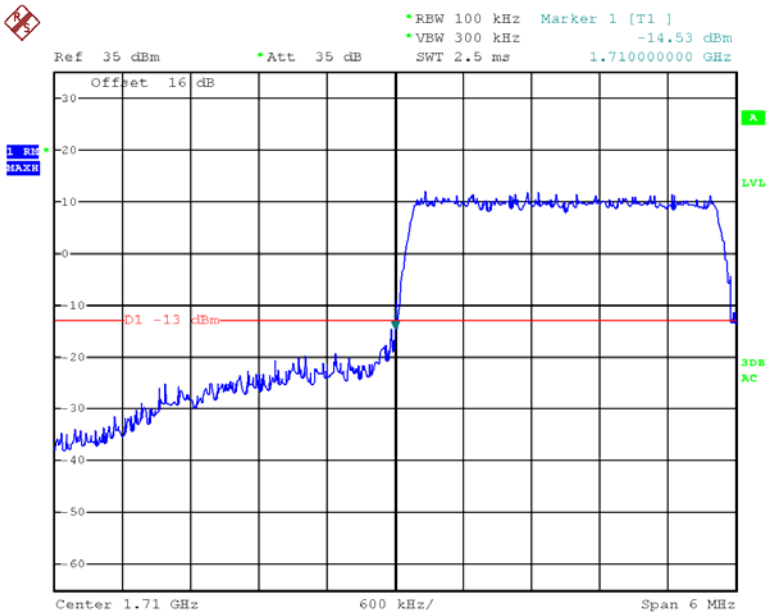
Date: 15.OCT.2015 21:47:19

QPSK-3M 1RB, Right Band Edge



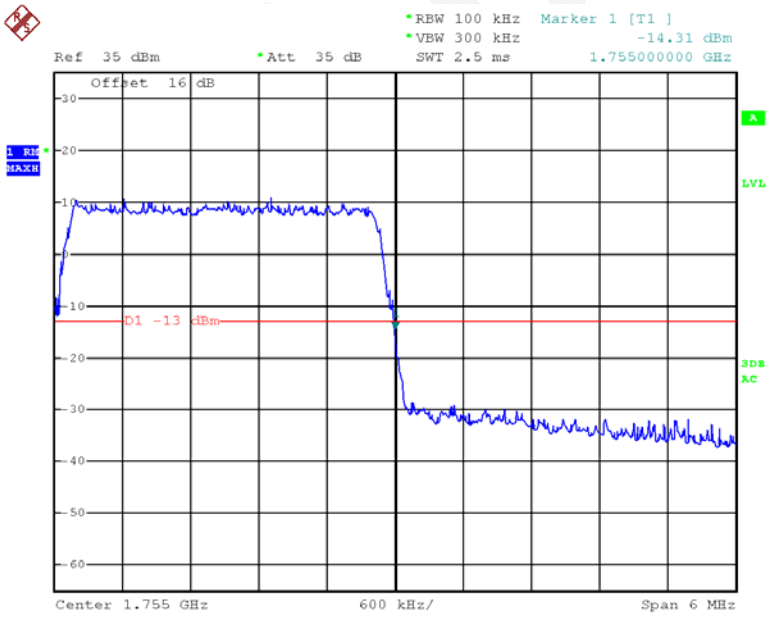
Date: 15.OCT.2015 21:54:35

QPSK-3M Full RB, Left Band Edge



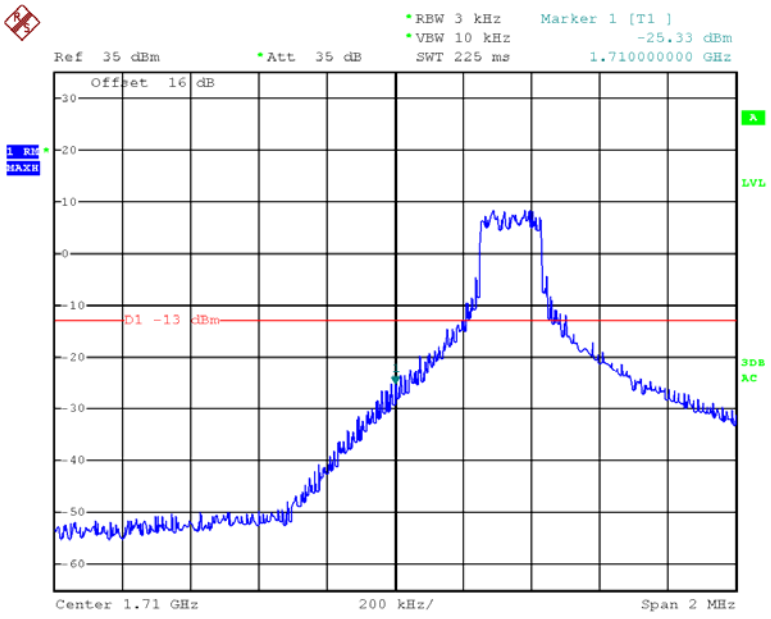
Date: 15.OCT.2015 22:07:37

QPSK-3M Full RB, Right Band Edge



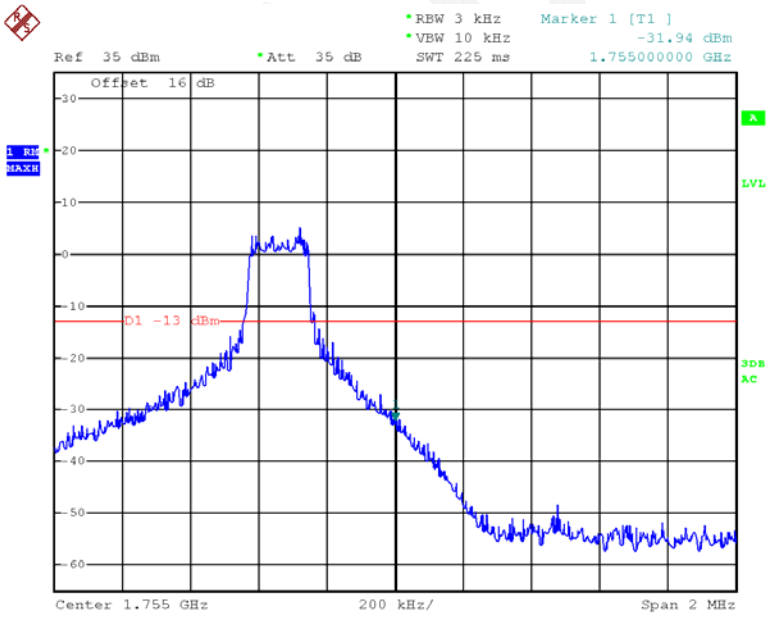
Date: 15.OCT.2015 22:04:50

QPSK-5M 1RB, Left Band Edge



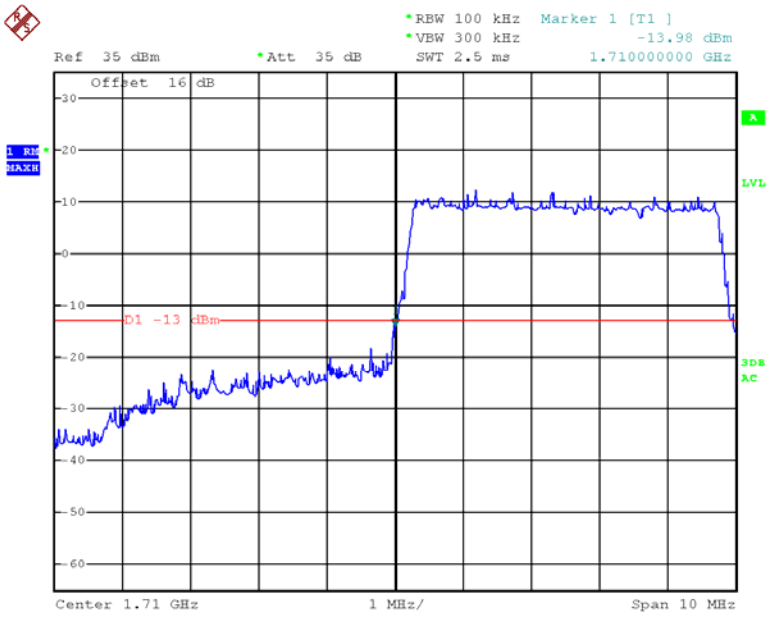
Date: 15.OCT.2015 22:21:01

QPSK-5M 1RB, Right Band Edge



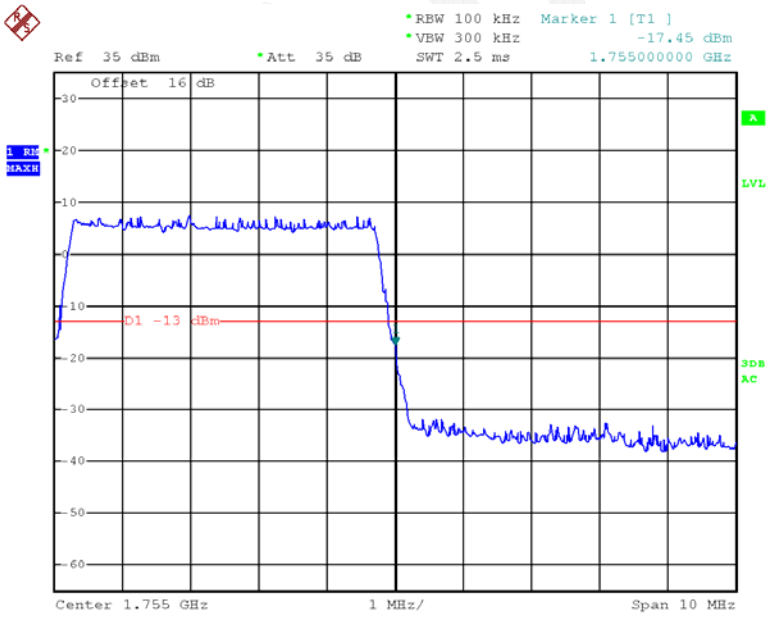
Date: 15.OCT.2015 22:18:35

QPSK-5M Full RB, Left Band Edge



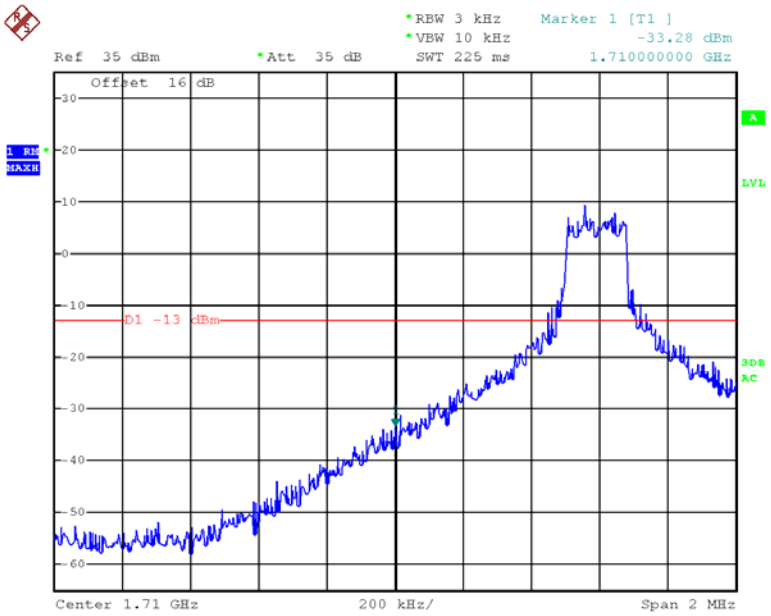
Date: 15.OCT.2015 22:11:25

QPSK-5M Full RB, Right Band Edge



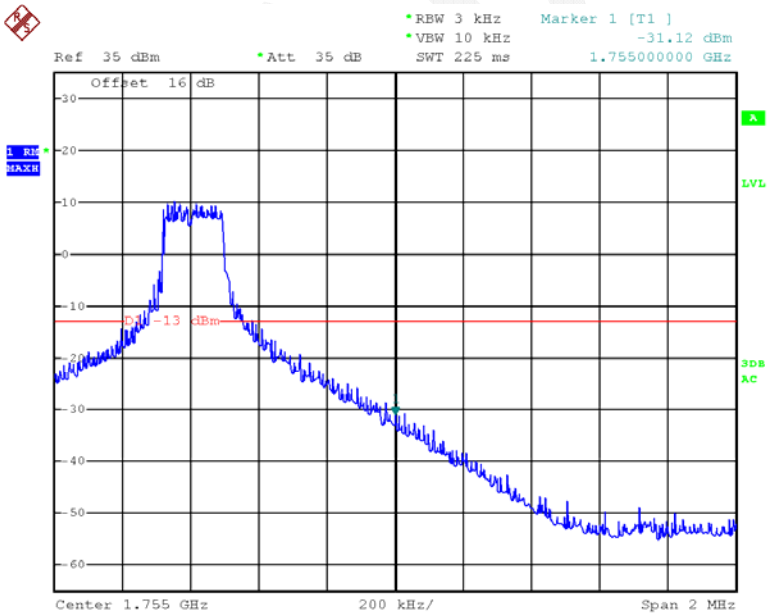
Date: 15.OCT.2015 22:16:50

QPSK-10M 1RB, Left Band Edge



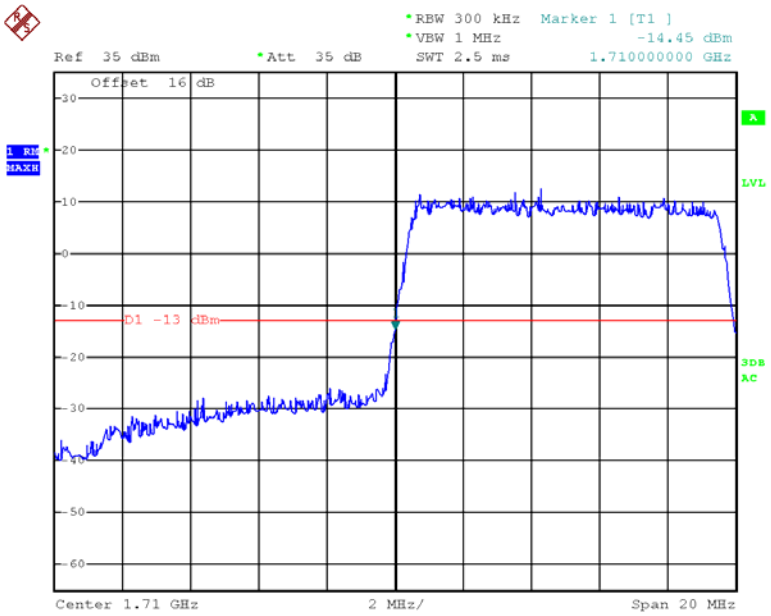
Date: 15.OCT.2015 22:27:19

QPSK-10M 1RB, Right Band Edge



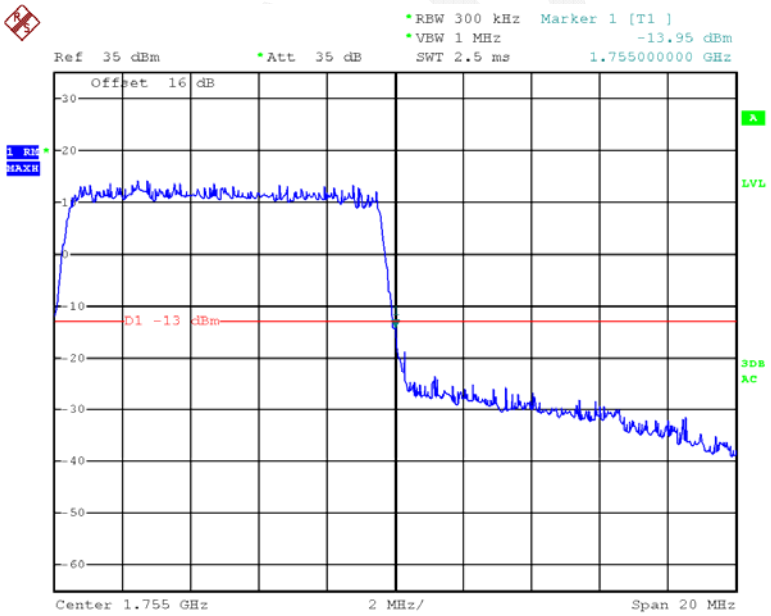
Date: 15.OCT.2015 22:31:45

QPSK-10M Full RB, Left Band Edge



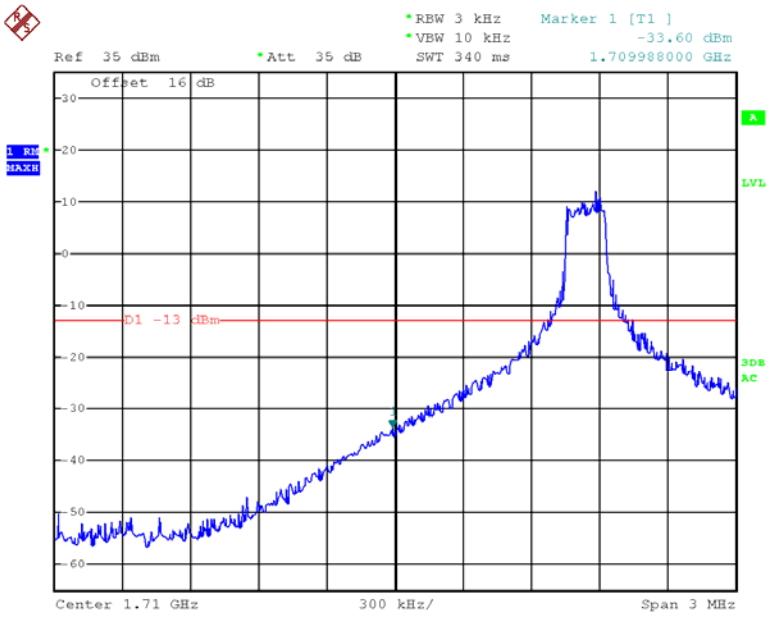
Date: 15.OCT.2015 22:42:25

QPSK-10M Full RB, Right Band Edge



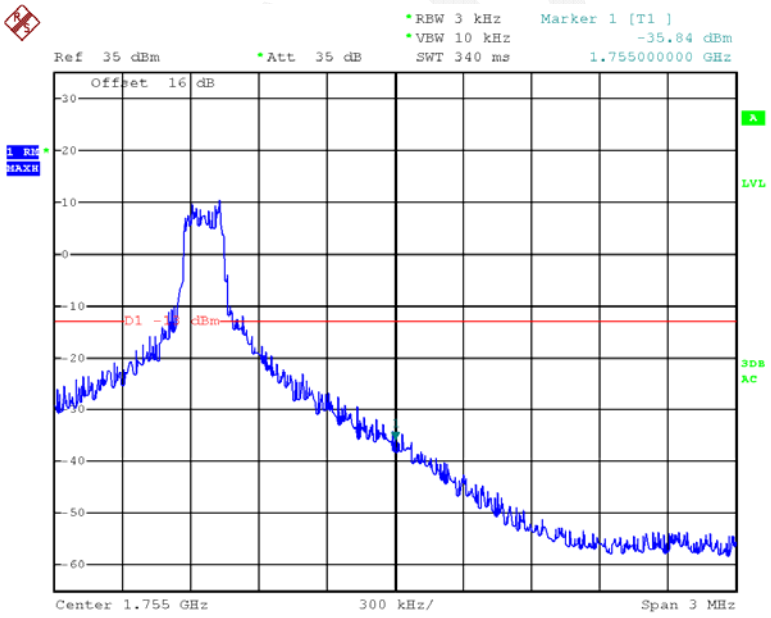
Date: 15.OCT.2015 22:37:30

QPSK-15M 1RB, Left Band Edge



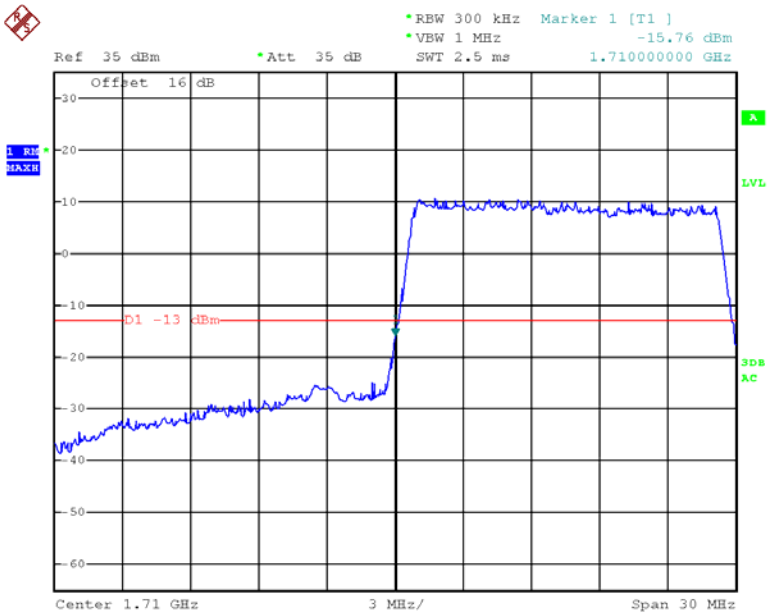
Date: 15.OCT.2015 22:59:00

QPSK-15M 1RB, Right Band Edge



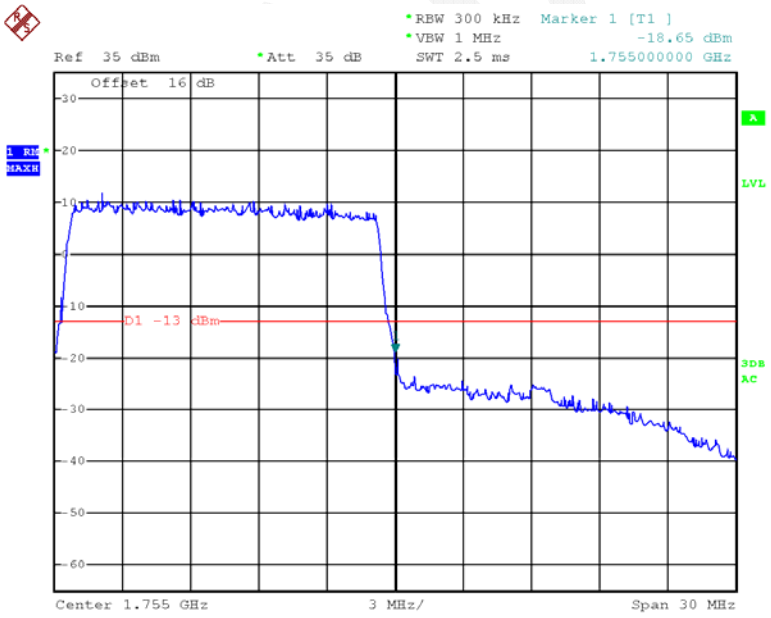
Date: 15.OCT.2015 22:56:26

QPSK-15M Full RB, Left Band Edge



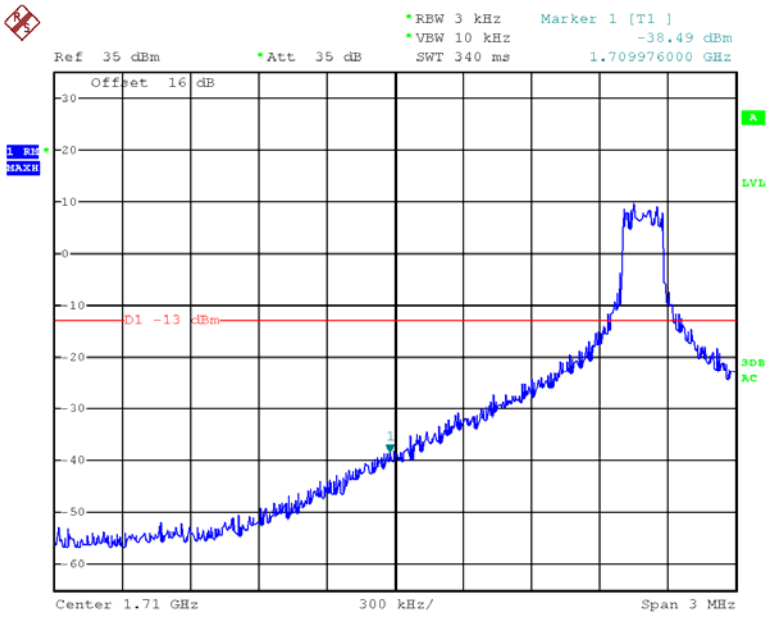
Date: 15.OCT.2015 22:49:01

QPSK-15M Full RB, Right Band Edge



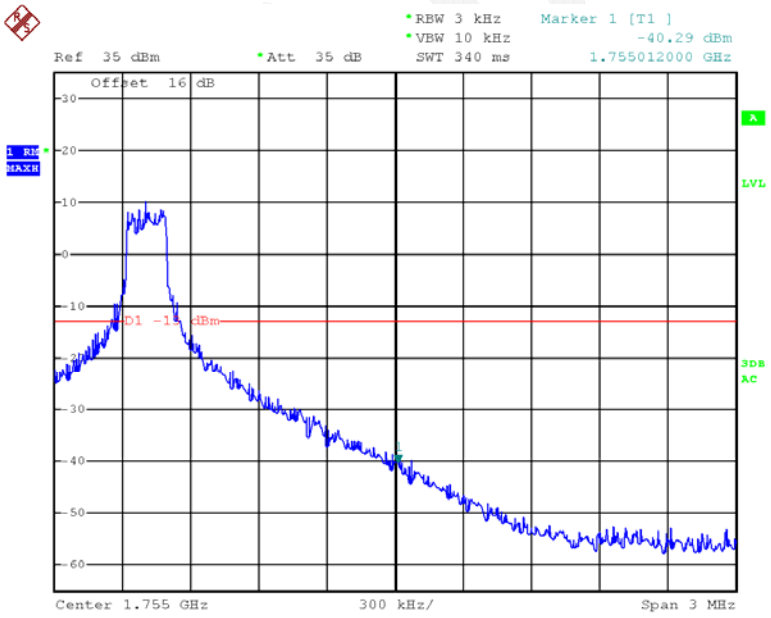
Date: 15.OCT.2015 22:52:48

QPSK-20M 1RB, Left Band Edge



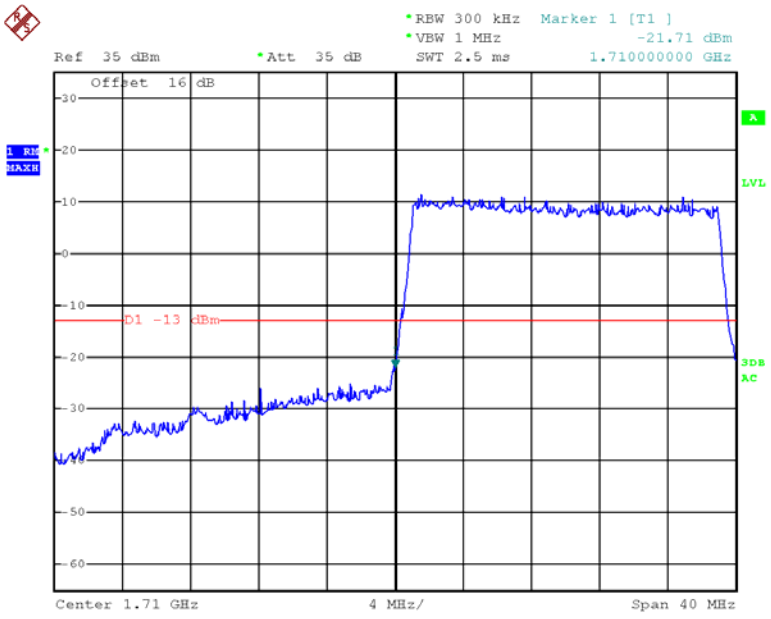
Date: 15.OCT.2015 23:04:00

QPSK-20M 1RB, Right Band Edge



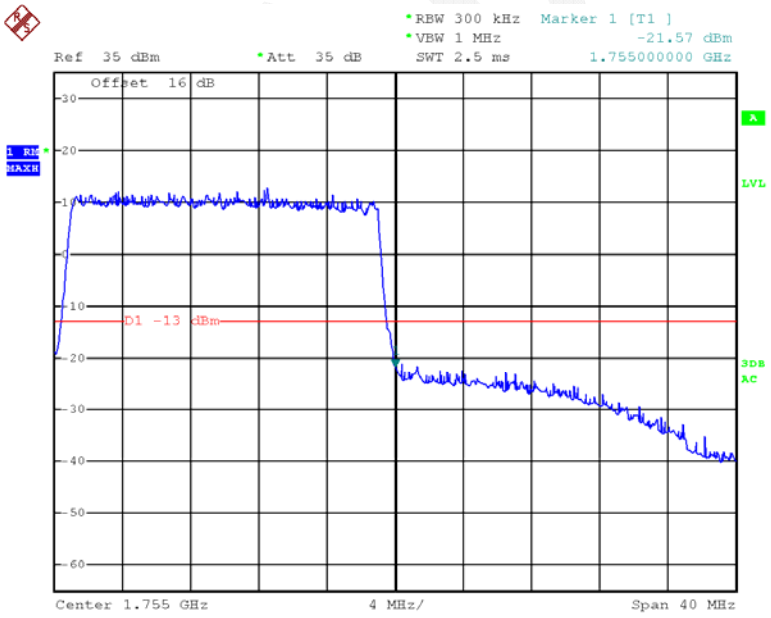
Date: 15.OCT.2015 23:06:30

QPSK-20M Full RB, Left Band Edge



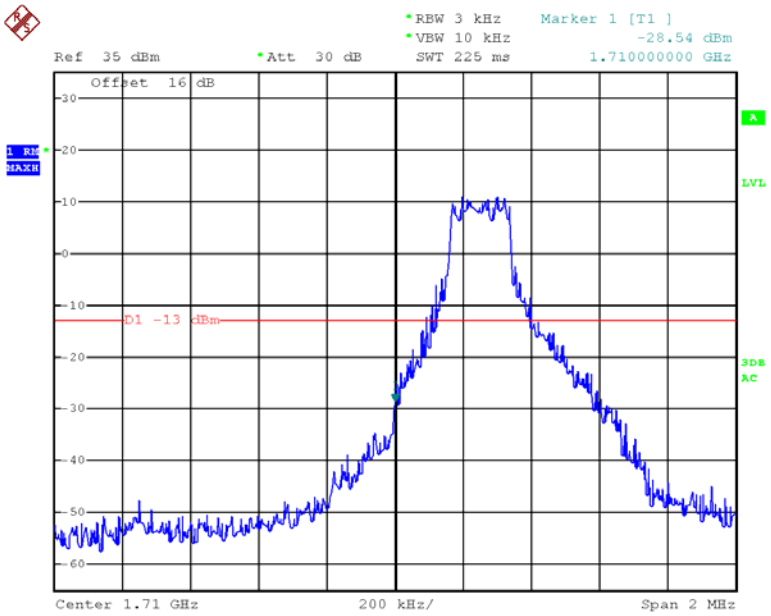
Date: 15.OCT.2015 23:11:56

QPSK-20M Full RB, Right Band Edge



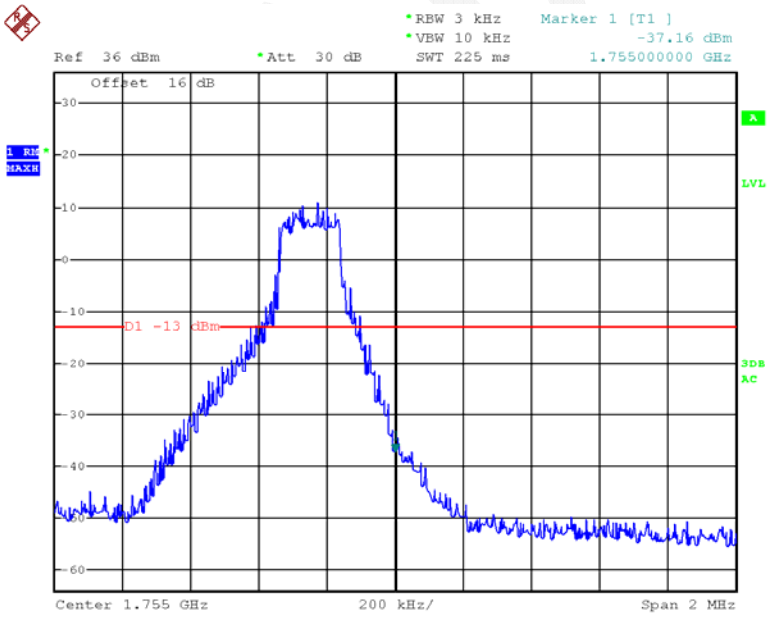
Date: 15.OCT.2015 23:08:35

16QAM -1.4M 1RB, Left Band Edge



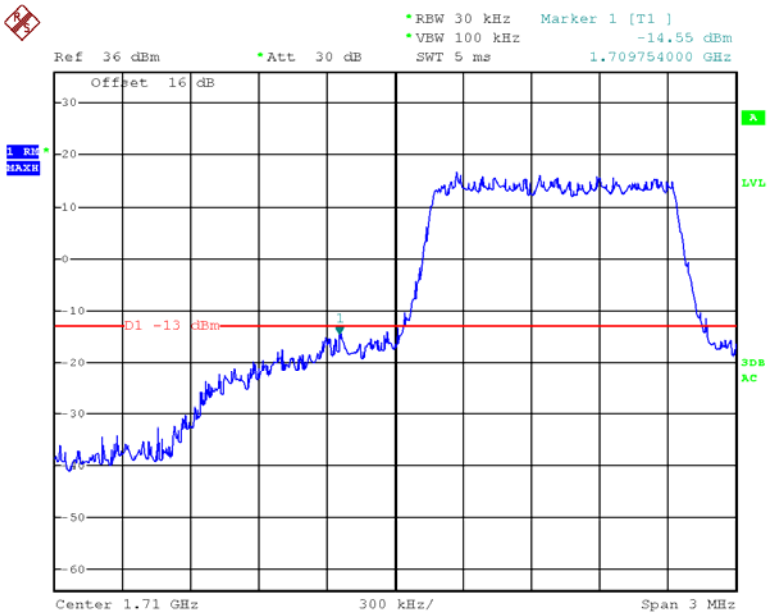
Date: 14.OCT.2015 23:54:51

16QAM -1.4M 1RB, Right Band Edge



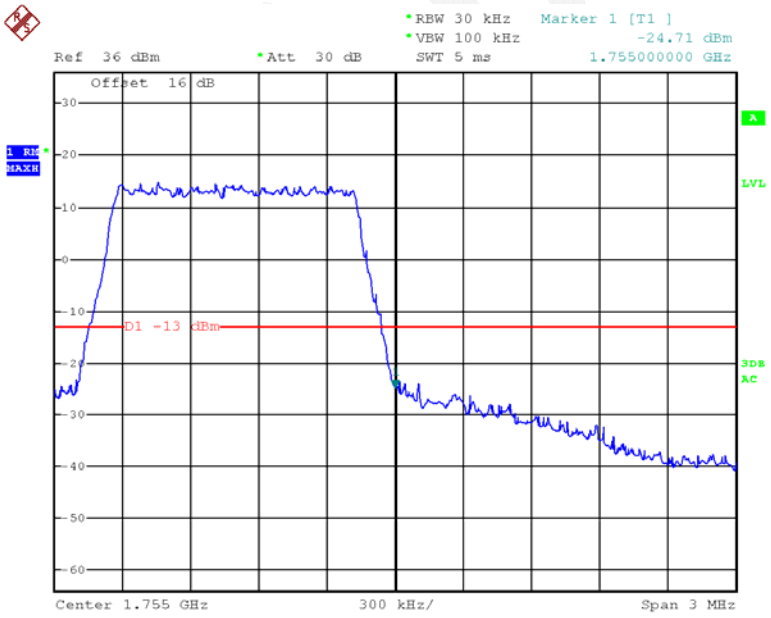
Date: 15.OCT.2015 00:09:30

16QAM -1.4M Full RB, Left Band Edge



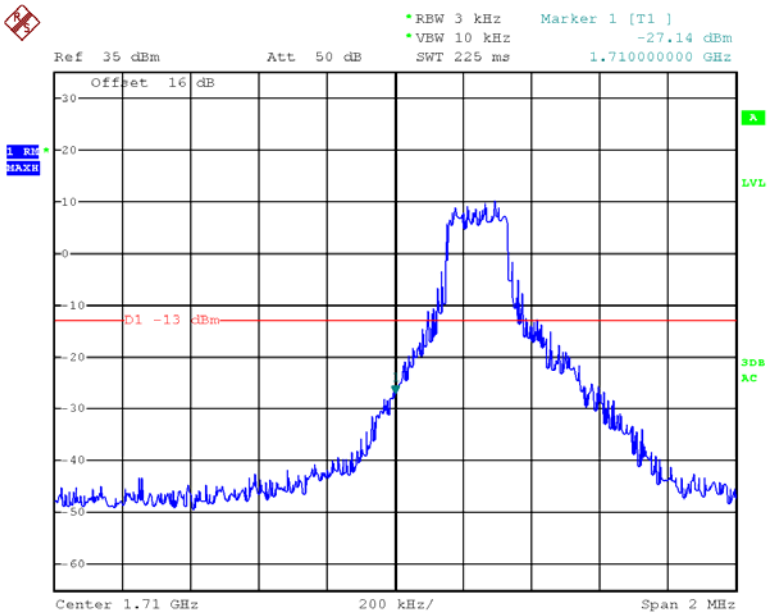
Date: 15.OCT.2015 00:03:34

16QAM -1.4M Full RB, Right Band Edge



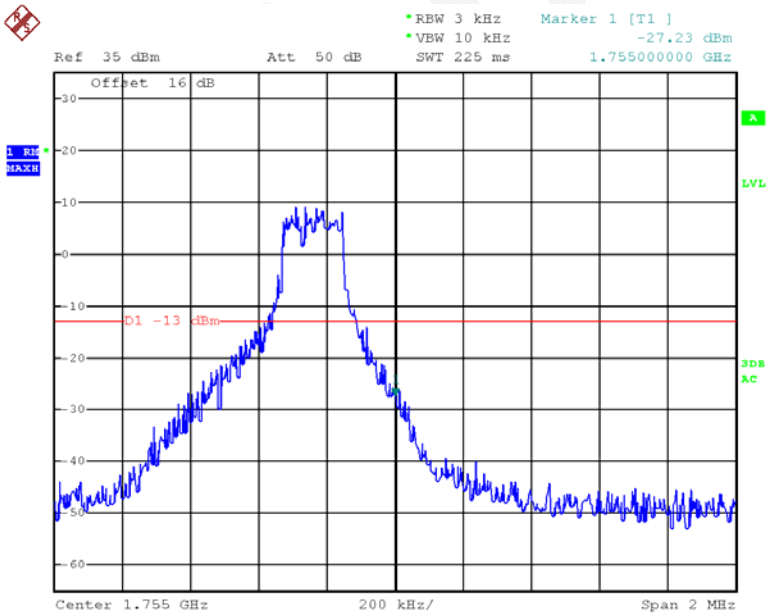
Date: 15.OCT.2015 00:06:47

16QAM -3M 1RB, Left Band Edge



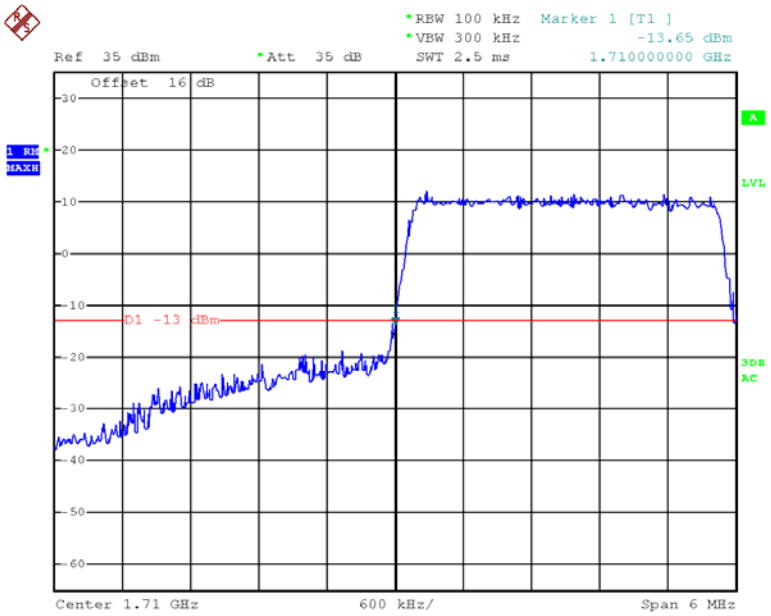
Date: 15.OCT.2015 21:48:15

16QAM -3M 1RB, Right Band Edge



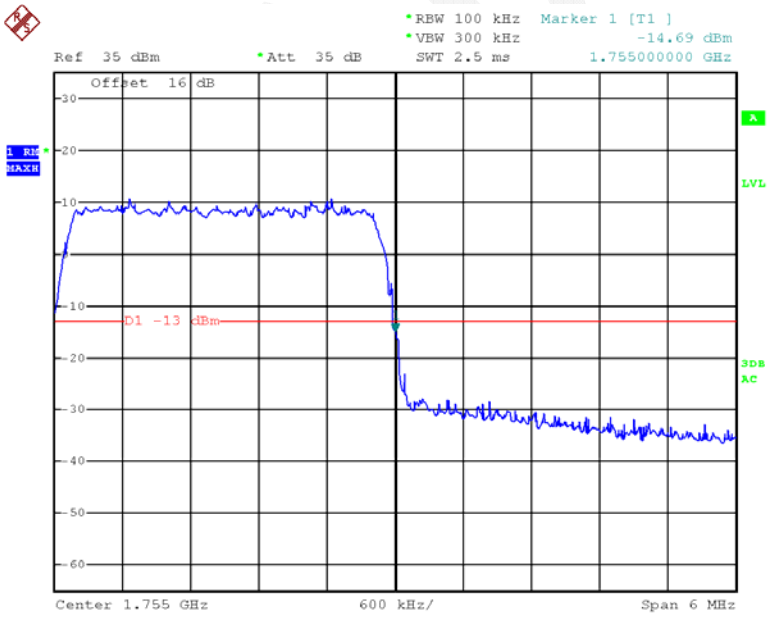
Date: 15.OCT.2015 21:54:17

16QAM -3M Full RB, Left Band Edge



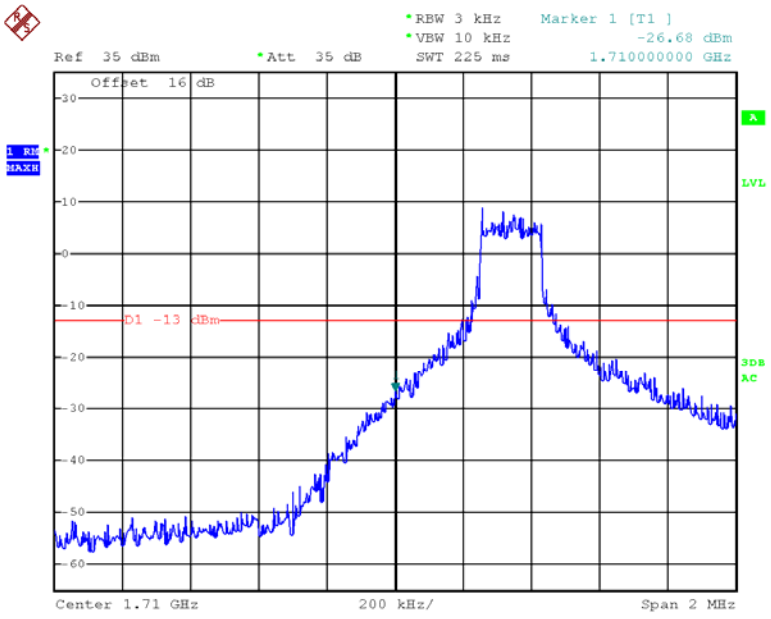
Date: 15.OCT.2015 22:07:23

16QAM -3M Full RB, Right Band Edge



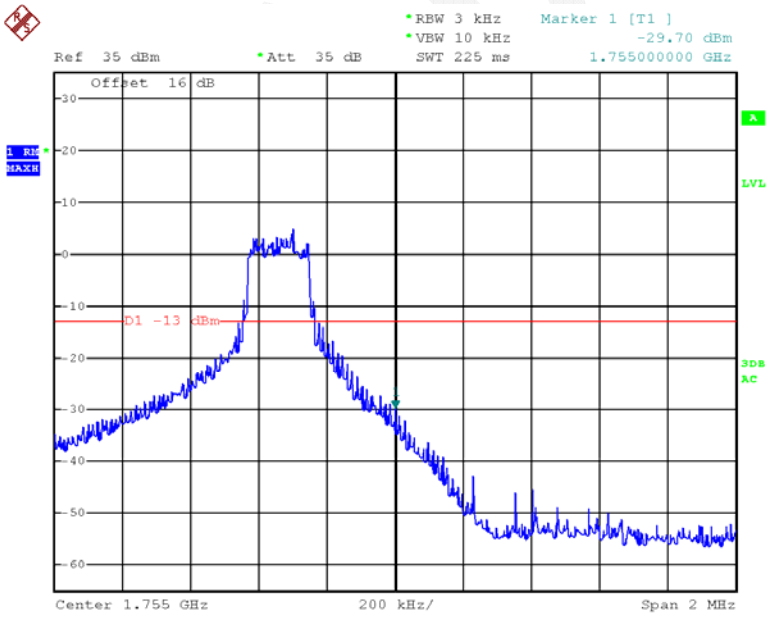
Date: 15.OCT.2015 22:05:34

16QAM -5M 1RB, Left Band Edge



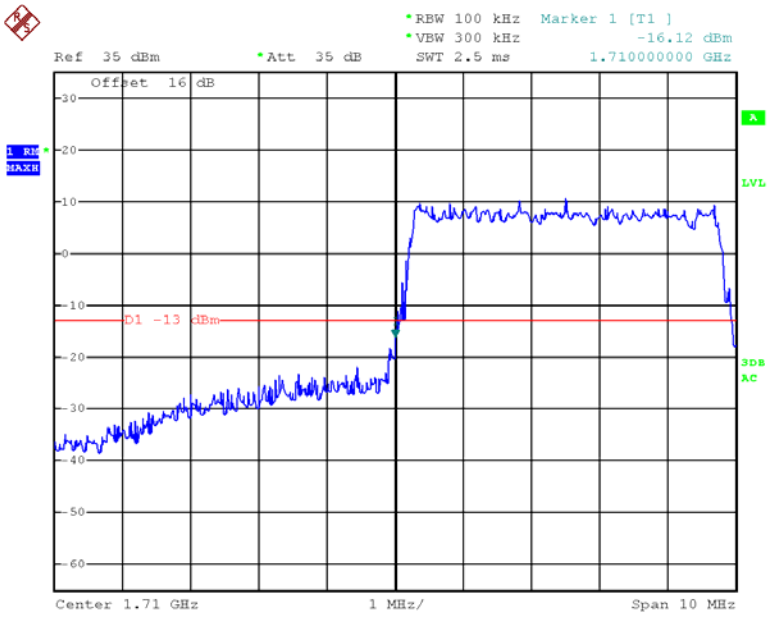
Date: 15.OCT.2015 22:20:42

16QAM -5M 1RB, Right Band Edge



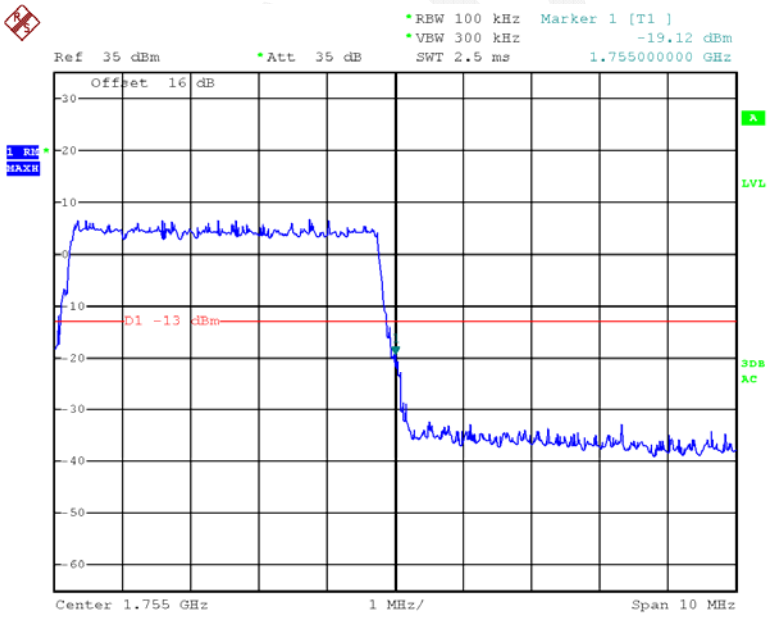
Date: 15.OCT.2015 22:18:54

16QAM -5M Full RB, Left Band Edge



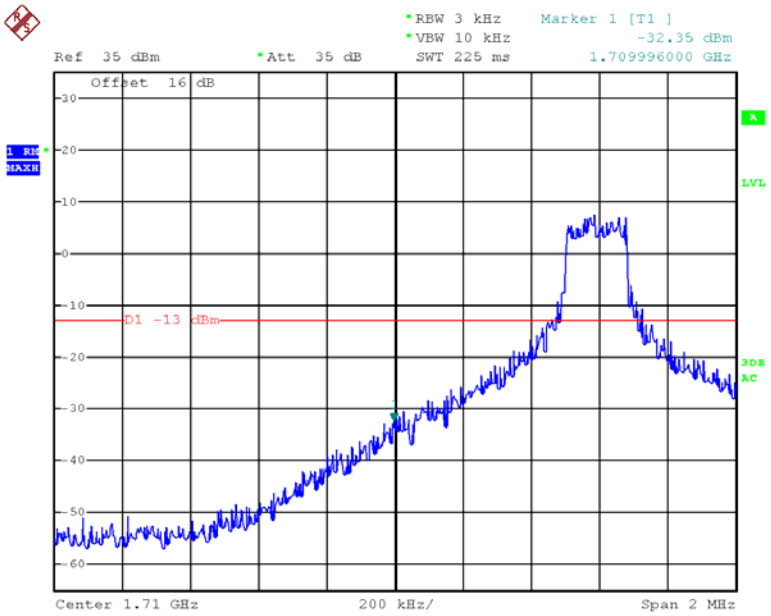
Date: 15.OCT.2015 22:13:30

16QAM -5M Full RB, Right Band Edge



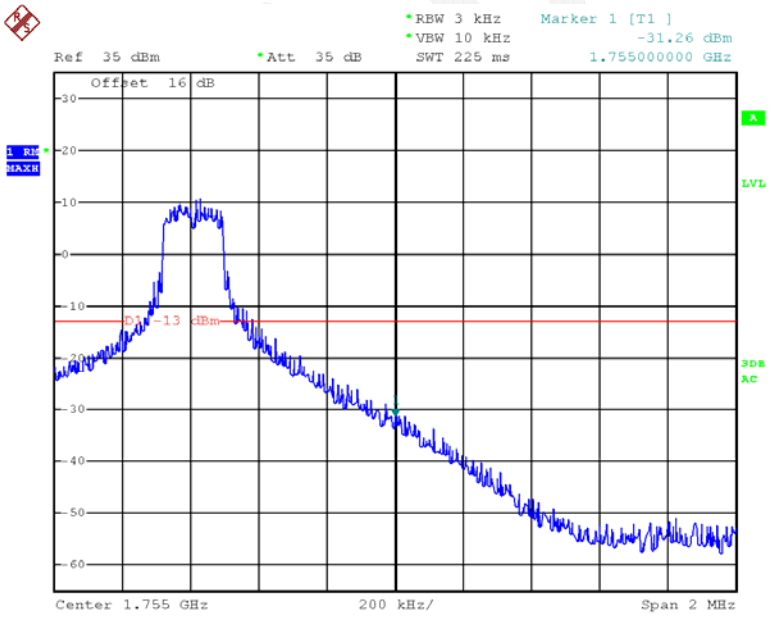
Date: 15.OCT.2015 22:16:18

16QAM -10M 1RB, Left Band Edge



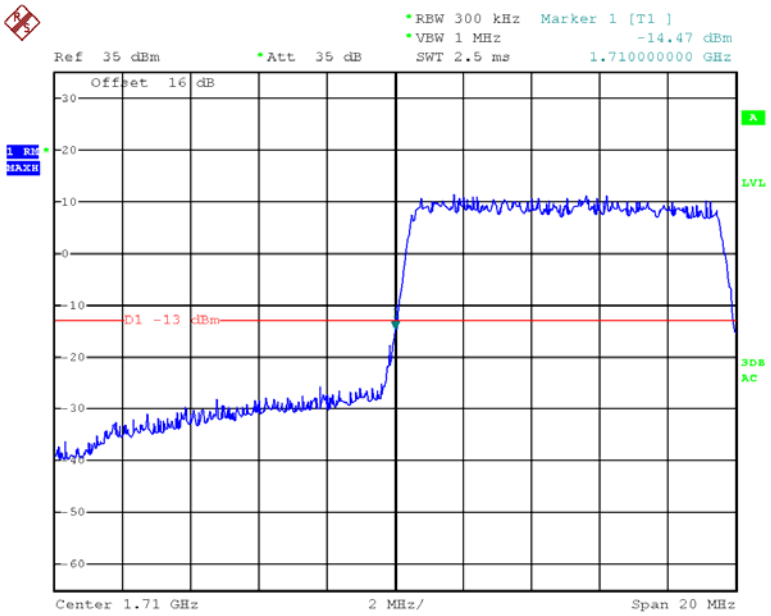
Date: 15.OCT.2015 22:27:56

16QAM -10M 1RB, Right Band Edge



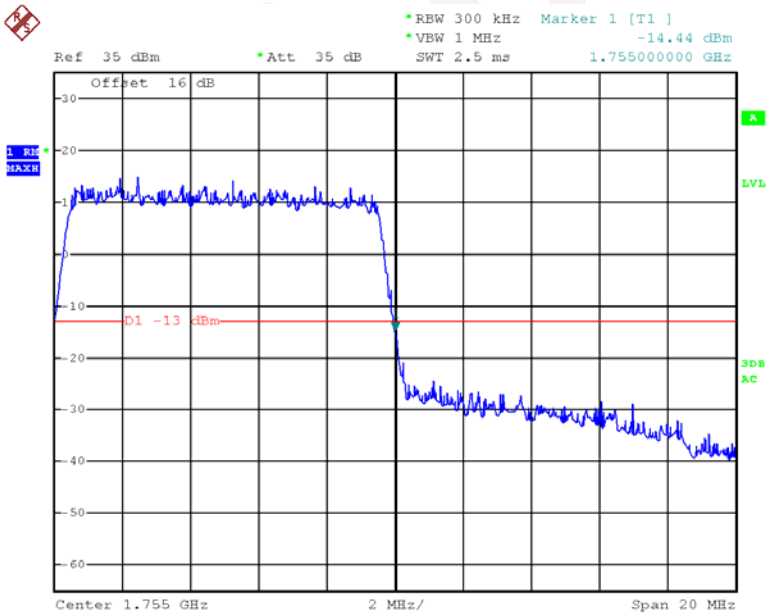
Date: 15.OCT.2015 22:32:02

16QAM -10M Full RB, Left Band Edge



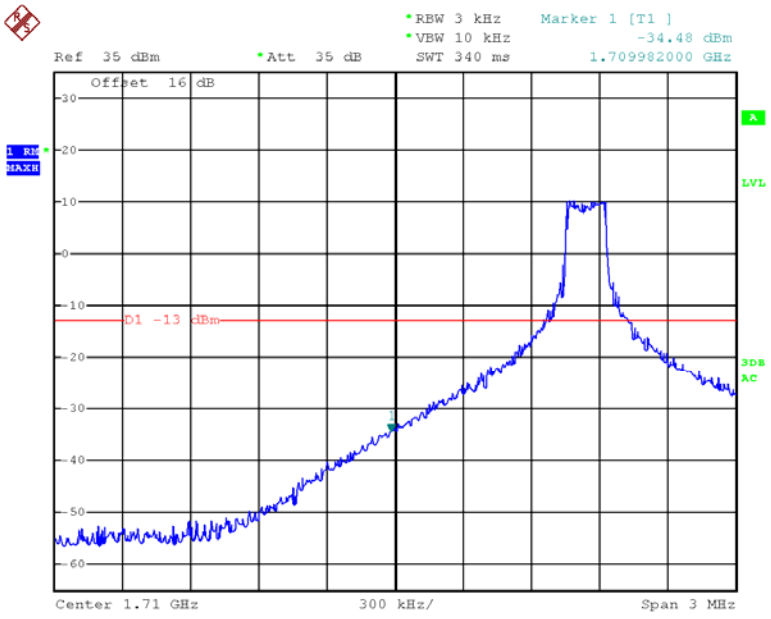
Date: 15.OCT.2015 22:42:12

16QAM -10M Full RB, Right Band Edge



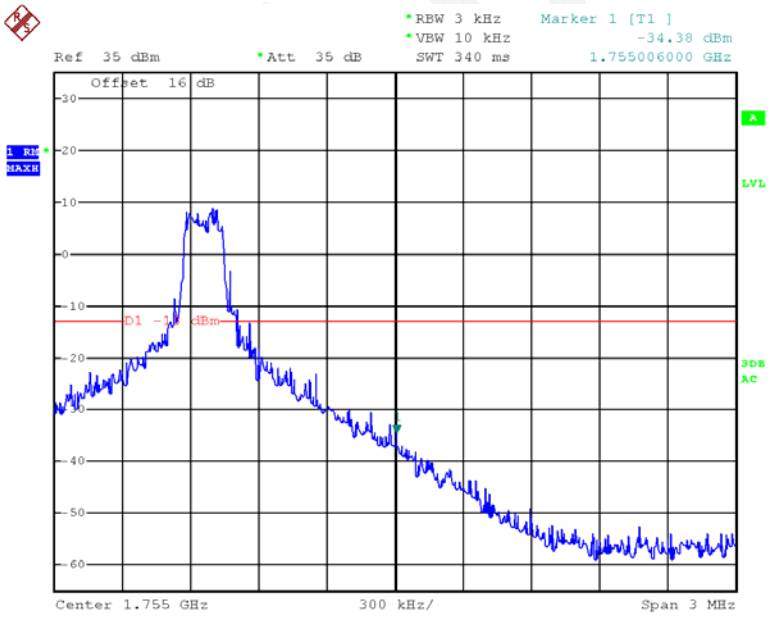
Date: 15.OCT.2015 22:35:14

16QAM -15M 1RB, Left Band Edge



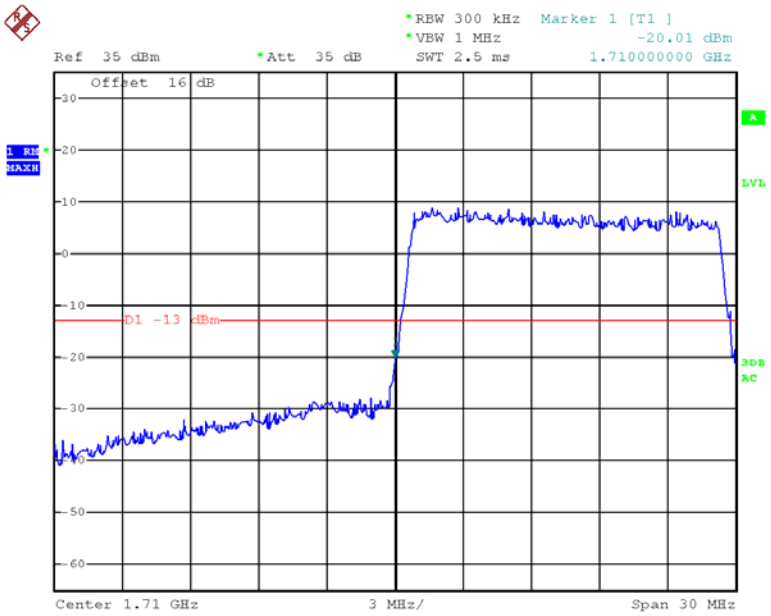
Date: 15.OCT.2015 22:59:33

16QAM -15M 1RB, Right Band Edge



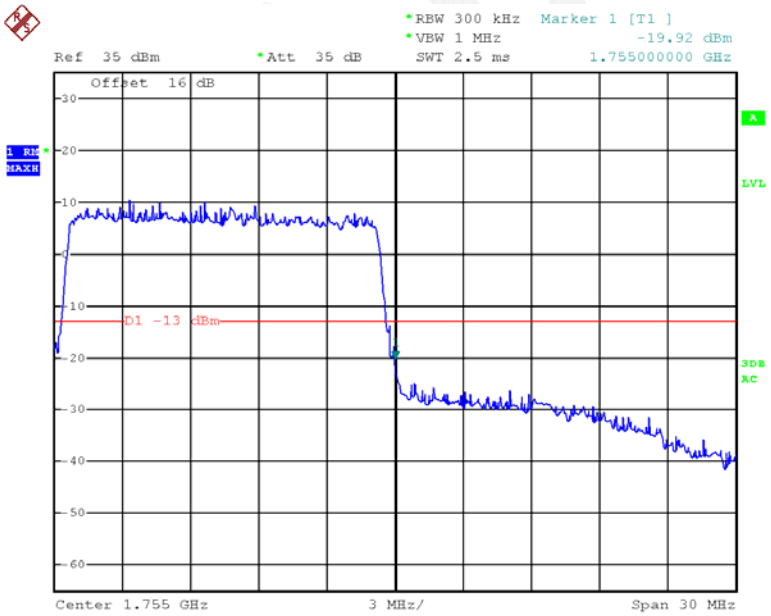
Date: 15.OCT.2015 22:56:50

16QAM -15M Full RB, Left Band Edge



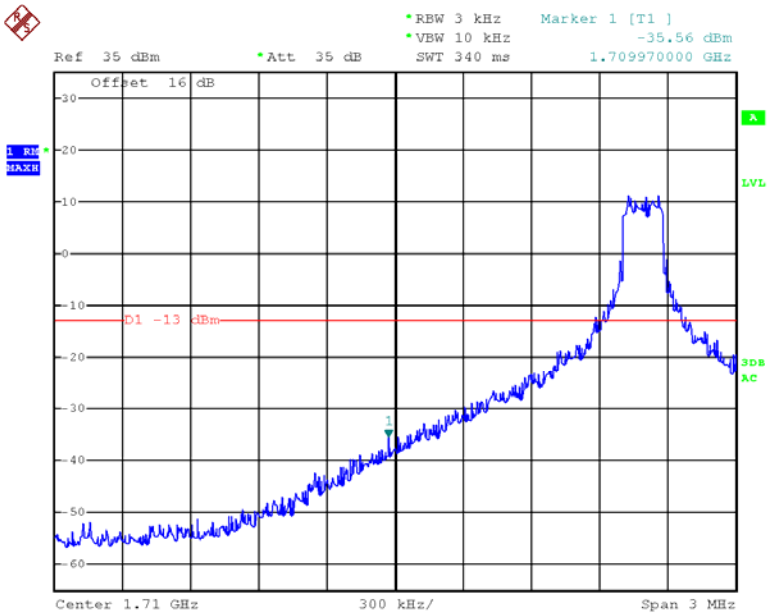
Date: 15.OCT.2015 22:49:34

16QAM -15M Full RB, Right Band Edge



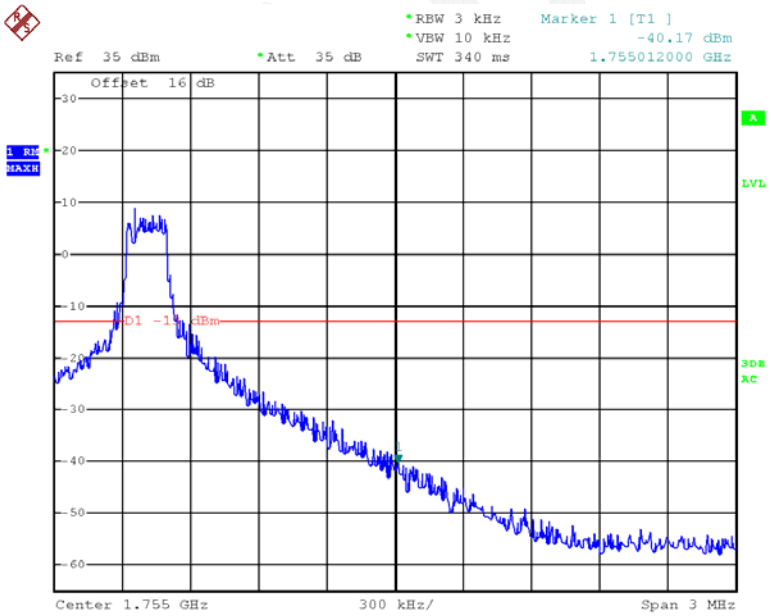
Date: 15.OCT.2015 22:52:23

16QAM -20M 1RB, Left Band Edge



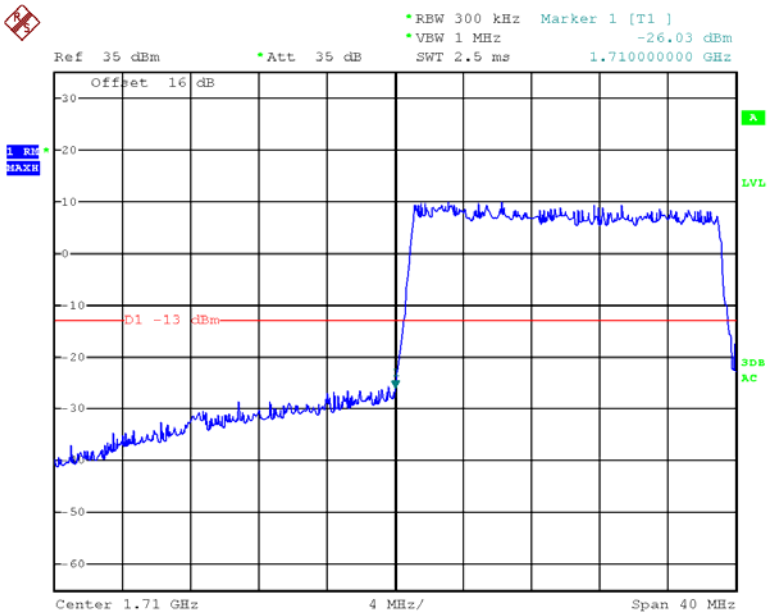
Date: 15.OCT.2015 23:03:22

16QAM -20M 1RB, Right Band Edge



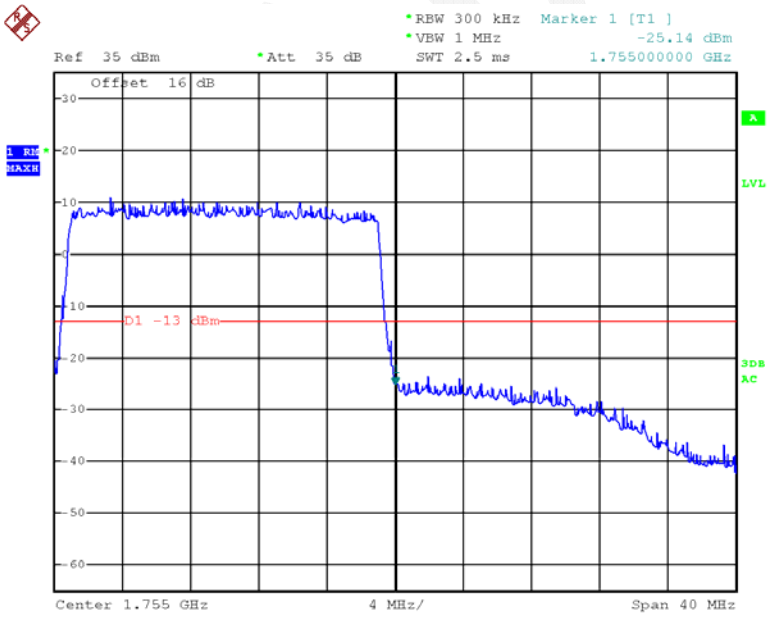
Date: 15.OCT.2015 23:05:52

16QAM -20M Full RB, Left Band Edge



Date: 15.OCT.2015 23:10:36

16QAM-20M Full RB, Right Band Edge



Date: 15.OCT.2015 23:09:01

FCC §2.1055, §22.355 & §24.235 & §27.54 - FREQUENCY STABILITY

Applicable Standard

FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235，§27.54

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

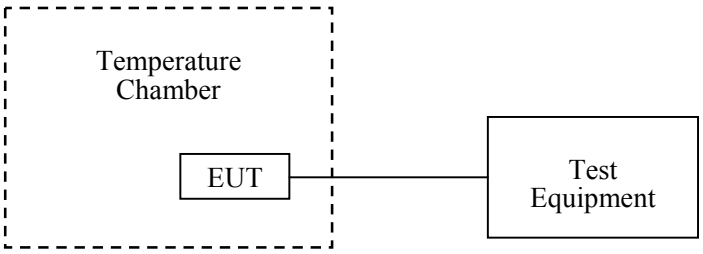
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set from 85% to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-3	2015-09-10	2016-09-09
R&S	Universal Radio Communication Tester	CMU200	109 038	2015-05-09	2016-05-09
R&S	Wideband Radio Communication Tester	CMW500	106891	2014-12-19	2015-12-19

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.6~27.1 °C
Relative Humidity:	51~54 %
ATM Pressure:	100.2~100.8 kPa

The testing was performed by Dean Liu from 2015-10-16 to 2015-10-28.

Cellular Band (Part 22H)

GMSK, Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{DC}**	**Hz**	**ppm**	**ppm**
-30	3.8	-13	-0.016	2.5
-20	3.8	-14	-0.017	2.5
-10	3.8	-12	-0.014	2.5
0	3.8	-18	-0.022	2.5
10	3.8	-16	-0.019	2.5
20	3.8	-11	-0.013	2.5
30	3.8	-15	-0.018	2.5
40	3.8	-18	-0.022	2.5
50	3.8	-10	-0.012	2.5
25	3.6	-11	-0.013	2.5
25	4.3	-18	-0.022	2.5

EDGE, Middle Channel, f_c = 836.6 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
℃	V_{DC}	Hz	ppm	ppm
-30	3.8	-15	-0.018	2.5
-20	3.8	-16	-0.019	2.5
-10	3.8	-12	-0.014	2.5
0	3.8	-11	-0.013	2.5
10	3.8	-13	-0.016	2.5
20	3.8	-14	-0.017	2.5
30	3.8	-17	-0.020	2.5
40	3.8	-18	-0.022	2.5
50	3.8	-22	-0.026	2.5
25	3.6	-11	-0.013	2.5
25	4.3	-16	-0.019	2.5

WCDMA Band V: Re199

Middle Channel, f_c = 836.6 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
℃	V_{DC}	Hz	ppm	ppm
-30	3.8	-17	-0.020	2.5
-20	3.8	-15	-0.018	2.5
-10	3.8	-13	-0.016	2.5
0	3.8	-18	-0.022	2.5
10	3.8	-22	-0.026	2.5
20	3.8	-19	-0.023	2.5
30	3.8	-15	-0.018	2.5
40	3.8	-11	-0.013	2.5
50	3.8	-19	-0.023	2.5
25	3.6	-15	-0.018	2.5
25	4.3	-18	-0.022	2.5

WCDMA Band V: HSDPA

Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{DC}**	**Hz**	**ppm**	**ppm**
-30	3.8	-13	-0.016	2.5
-20	3.8	-20	-0.024	2.5
-10	3.8	-10	-0.012	2.5
0	3.8	-17	-0.020	2.5
10	3.8	-11	-0.013	2.5
20	3.8	-14	-0.017	2.5
30	3.8	-18	-0.022	2.5
40	3.8	-15	-0.018	2.5
50	3.8	-12	-0.014	2.5
25	3.6	-20	-0.024	2.5
25	4.3	-16	-0.019	2.5

WCDMA Band V: HSUPA

Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{DC}**	**Hz**	**ppm**	**ppm**
-30	3.8	-22	-0.026	2.5
-20	3.8	-15	-0.018	2.5
-10	3.8	-20	-0.024	2.5
0	3.8	-12	-0.014	2.5
10	3.8	-14	-0.017	2.5
20	3.8	-16	-0.019	2.5
30	3.8	-21	-0.025	2.5
40	3.8	-15	-0.018	2.5
50	3.8	-19	-0.023	2.5
25	3.6	-14	-0.017	2.5
25	4.3	-17	-0.020	2.5

PCS Band (Part 24E)

GMSK, Middle Channel, f_c = 1880.0 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	-14	-0.007	Compliance
-20	3.8	-19	-0.010	Compliance
-10	3.8	-16	-0.009	Compliance
0	3.8	-22	-0.012	Compliance
10	3.8	-12	-0.006	Compliance
20	3.8	-20	-0.011	Compliance
30	3.8	-17	-0.009	Compliance
40	3.8	-16	-0.009	Compliance
50	3.8	-15	-0.008	Compliance
25	3.6	-22	-0.012	Compliance
25	4.3	-11	-0.006	Compliance

EDGE, Middle Channel, f_c = 1880.0 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	-16	-0.009	Compliance
-20	3.8	-17	-0.009	Compliance
-10	3.8	-16	-0.009	Compliance
0	3.8	-15	-0.008	Compliance
10	3.8	-17	-0.009	Compliance
20	3.8	-20	-0.011	Compliance
30	3.8	-24	-0.013	Compliance
40	3.8	-14	-0.007	Compliance
50	3.8	-11	-0.006	Compliance
25	3.6	-18	-0.010	Compliance
25	4.3	-21	-0.011	Compliance

WCDMA Band II: Re199

Middle Channel, f_c = 1880.0 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	-15	-0.008	Compliance
-20	3.8	-11	-0.006	Compliance
-10	3.8	-12	-0.006	Compliance
0	3.8	-15	-0.008	Compliance
10	3.8	-18	-0.010	Compliance
20	3.8	-20	-0.011	Compliance
30	3.8	-11	-0.006	Compliance
40	3.8	-16	-0.009	Compliance
50	3.8	-23	-0.012	Compliance
25	3.6	-12	-0.006	Compliance
25	4.3	-17	-0.009	Compliance

WCDMA Band II: HSDPA

Middle Channel, f_c = 1880.0 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	-12	-0.006	Compliance
-20	3.8	-16	-0.009	Compliance
-10	3.8	-19	-0.010	Compliance
0	3.8	-15	-0.008	Compliance
10	3.8	-10	-0.005	Compliance
20	3.8	-18	-0.010	Compliance
30	3.8	-13	-0.007	Compliance
40	3.8	-14	-0.007	Compliance
50	3.8	-16	-0.009	Compliance
25	3.6	-10	-0.005	Compliance
25	4.3	-15	-0.008	Compliance

WCDMA Band II: HSUPA

Middle Channel, f_c = 1880.0 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	-15	-0.008	Compliance
-20	3.8	-13	-0.007	Compliance
-10	3.8	-17	-0.009	Compliance
0	3.8	-15	-0.008	Compliance
10	3.8	-18	-0.010	Compliance
20	3.8	-12	-0.006	Compliance
30	3.8	-11	-0.006	Compliance
40	3.8	-18	-0.010	Compliance
50	3.8	-13	-0.007	Compliance
25	3.6	-16	-0.009	Compliance
25	4.3	-14	-0.007	Compliance

WCDMA Band IV: Re199

Middle Channel, f_c = 1732.6 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	-18	-0.010	Compliance
-20	3.8	-13	-0.008	Compliance
-10	3.8	-16	-0.009	Compliance
0	3.8	-12	-0.007	Compliance
10	3.8	-15	-0.009	Compliance
20	3.8	-19	-0.011	Compliance
30	3.8	-23	-0.013	Compliance
40	3.8	-17	-0.010	Compliance
50	3.8	20	0.012	Compliance
25	3.6	-22	-0.013	Compliance
25	4.3	-14	-0.008	Compliance

WCDMA Band IV: HSDPA

Middle Channel, f_c = 1732.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-15	-0.009	Compliance
-20	3.8	-19	-0.011	Compliance
-10	3.8	-13	-0.008	Compliance
0	3.8	-18	-0.010	Compliance
10	3.8	-21	-0.012	Compliance
20	3.8	-12	-0.007	Compliance
30	3.8	-17	-0.010	Compliance
40	3.8	-14	-0.008	Compliance
50	3.8	-16	-0.009	Compliance
25	3.6	-11	-0.006	Compliance
25	4.3	-20	-0.012	Compliance

WCDMA Band IV: HSUPA

Middle Channel, f_c = 1732.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-13	-0.008	Compliance
-20	3.8	-17	-0.010	Compliance
-10	3.8	-21	-0.012	Compliance
0	3.8	-15	-0.009	Compliance
10	3.8	-23	-0.013	Compliance
20	3.8	-16	-0.009	Compliance
30	3.8	-11	-0.006	Compliance
40	3.8	-19	-0.011	Compliance
50	3.8	-20	-0.012	Compliance
25	3.6	-18	-0.010	Compliance
25	4.3	-12	-0.007	Compliance

LTE Band 2:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 1880 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	12.55	0.0067	Compliance
-20	3.8	1142	0.6074	Compliance
-10	3.8	9.8	0.0052	Compliance
0	3.8	8.86	0.0047	Compliance
10	3.8	11.06	0.0059	Compliance
20	3.8	11.08	0.0059	Compliance
30	3.8	8.02	0.0043	Compliance
40	3.8	10.32	0.0055	Compliance
50	3.8	10.22	0.0054	Compliance
25	3.6	6.69	0.0036	Compliance
25	4.3	8.25	0.0044	Compliance

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c = 1880 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	19.84	0.0106	Compliance
-20	3.8	19.04	0.0101	Compliance
-10	3.8	18.67	0.0099	Compliance
0	3.8	18.57	0.0099	Compliance
10	3.8	17.53	0.0093	Compliance
20	3.8	16.97	0.0090	Compliance
30	3.8	17.08	0.0091	Compliance
40	3.8	18.95	0.0101	Compliance
50	3.8	18.33	0.0098	Compliance
25	3.6	16.34	0.0087	Compliance
25	4.3	17.67	0.0094	Compliance

LTE Band 4:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 1732.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-22.46	-0.0130	Compliance
-20	3.8	-20.38	-0.0118	Compliance
-10	3.8	-22.43	-0.0129	Compliance
0	3.8	-21.07	-0.0122	Compliance
10	3.8	-18.88	-0.0109	Compliance
20	3.8	-16.99	-0.0098	Compliance
30	3.8	-16.91	-0.0098	Compliance
40	3.8	-18.29	-0.0106	Compliance
50	3.8	-20.32	-0.0117	Compliance
25	3.6	-18.67	-0.0108	Compliance
25	4.3	-15.77	-0.0091	Compliance

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c = 1732.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-17.58	-0.0101	Compliance
-20	3.8	-15.5	-0.0089	Compliance
-10	3.8	-15.56	-0.0090	Compliance
0	3.8	-14.31	-0.0083	Compliance
10	3.8	-14.17	-0.0082	Compliance
20	3.8	-12.18	-0.0070	Compliance
30	3.8	-12.06	-0.0070	Compliance
40	3.8	-13.45	-0.0078	Compliance
50	3.8	-15.6	-0.0090	Compliance
25	3.6	-13.77	-0.0079	Compliance
25	4.3	-11	-0.0063	Compliance

Note: The fundamental emissions stay within the authorized bands of operation based on the frequency deviation measured is small.

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