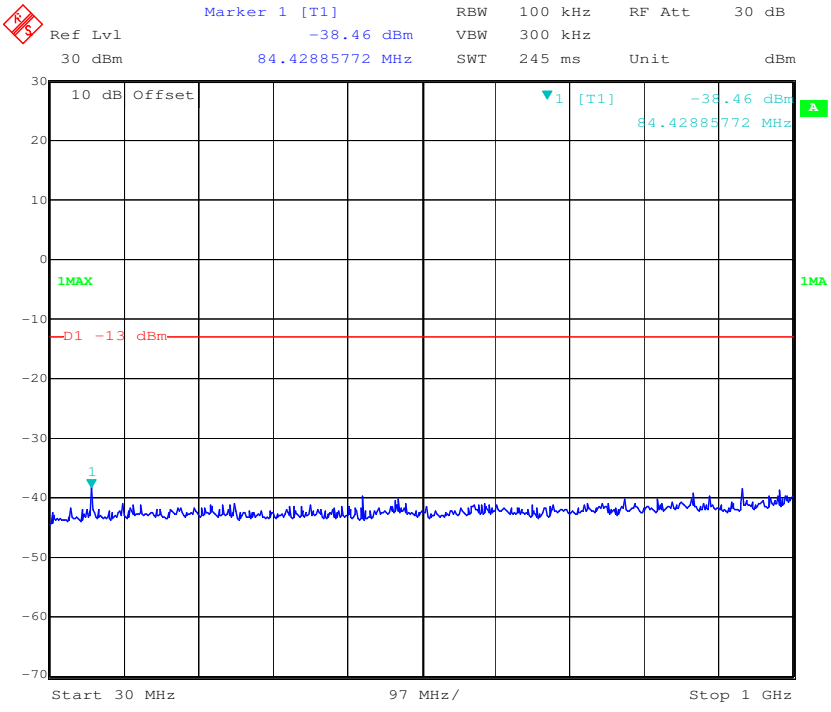
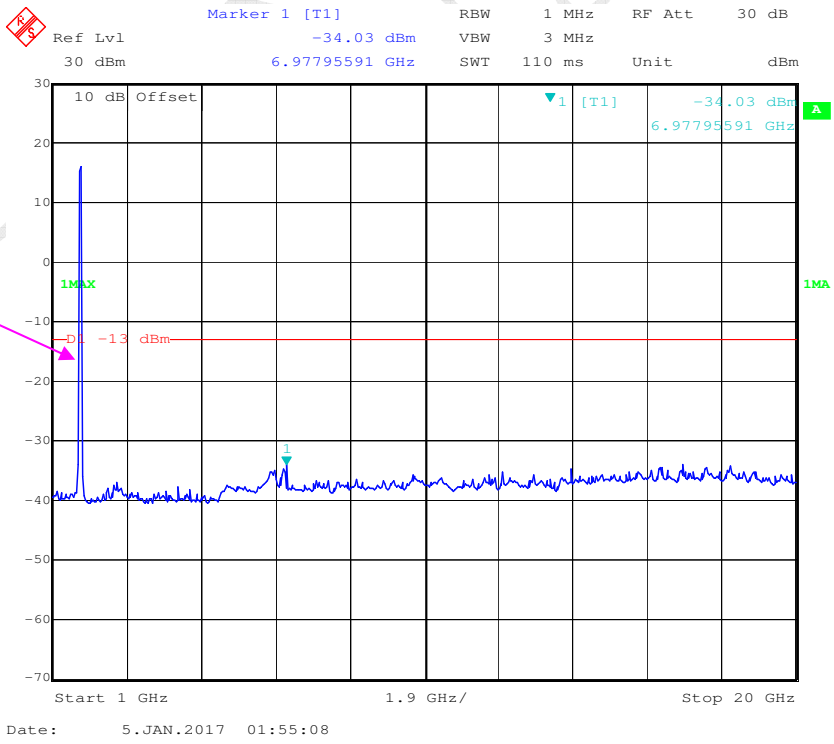
QPSK_20 MHz

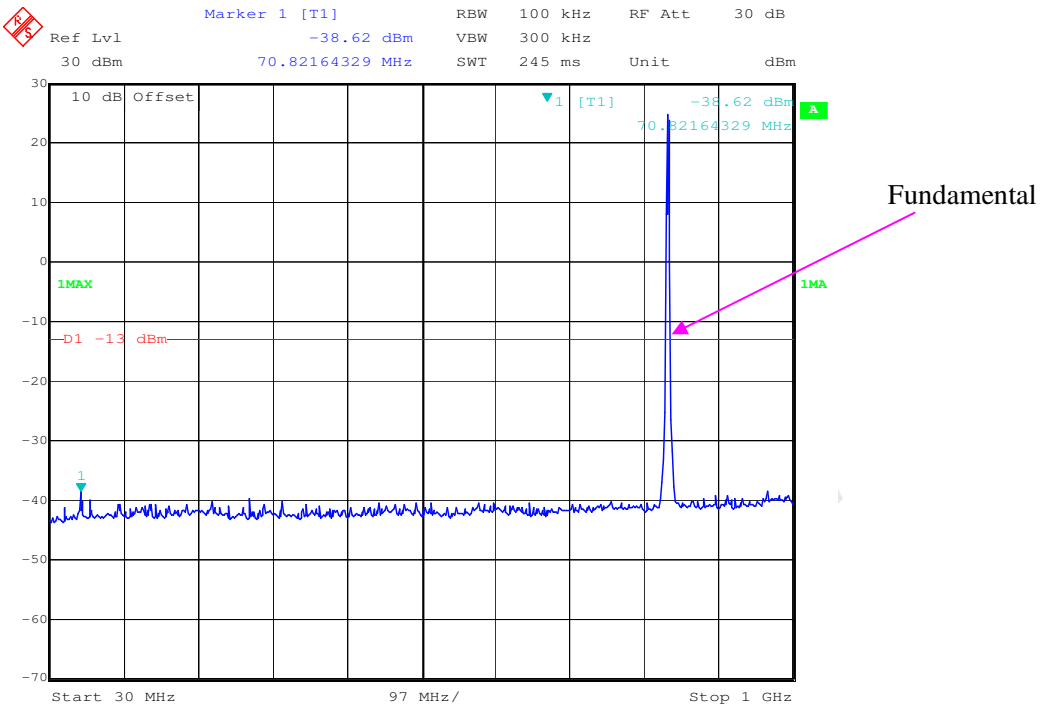


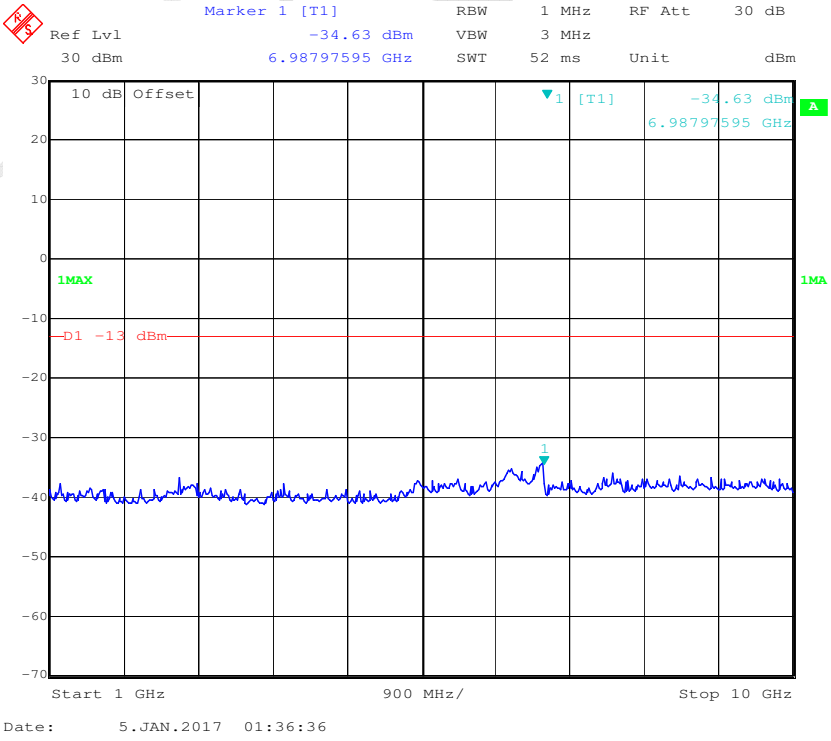


Fundamental

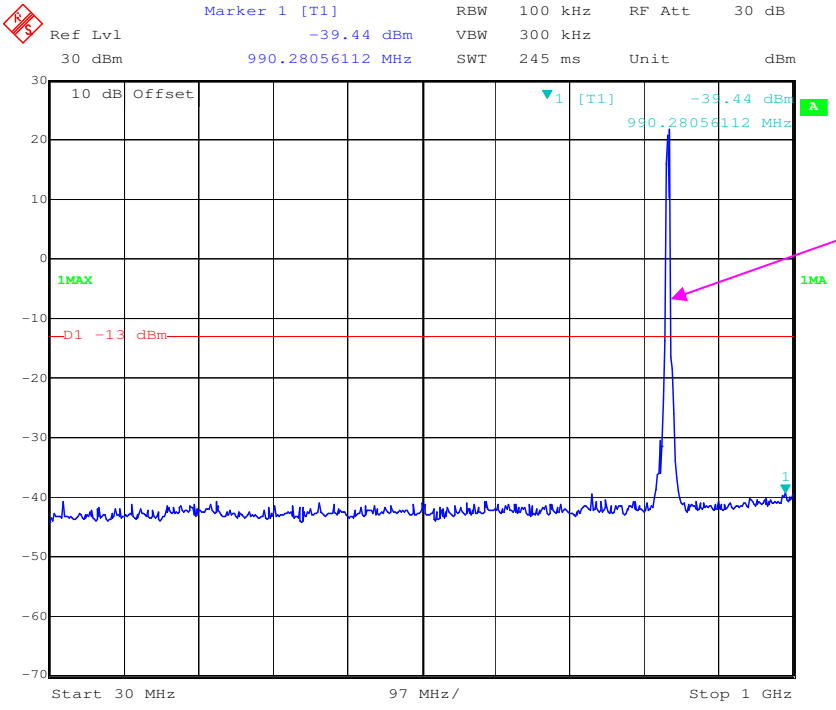
LTE Band V (Middle Channel)

QPSK_1.4 MHz

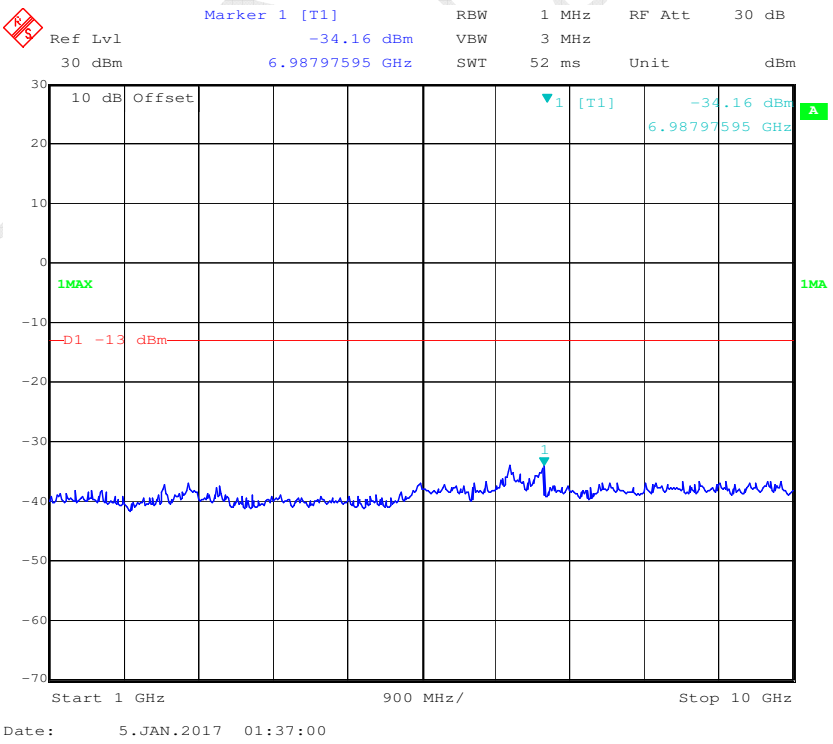




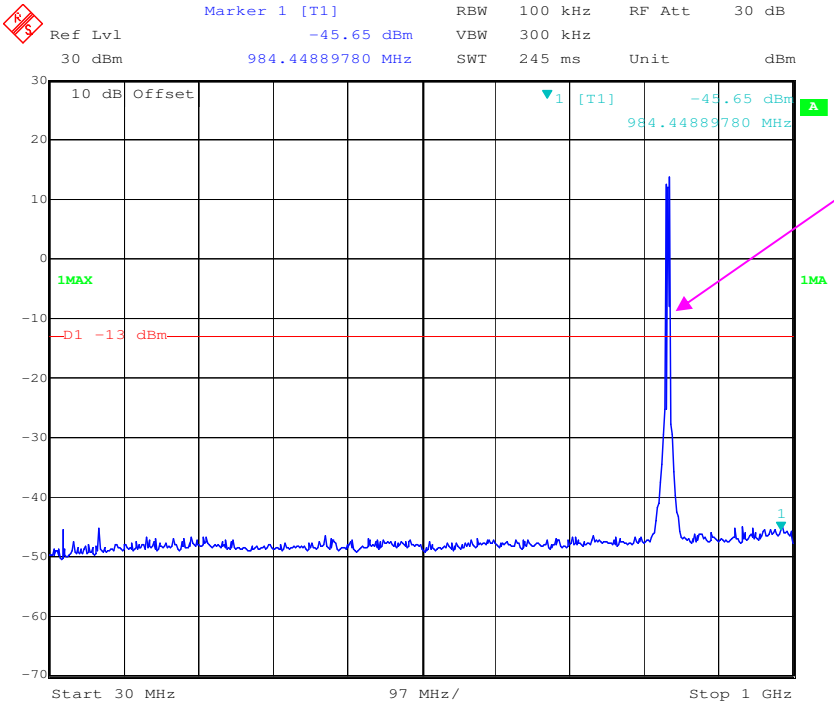
QPSK_3 MHz



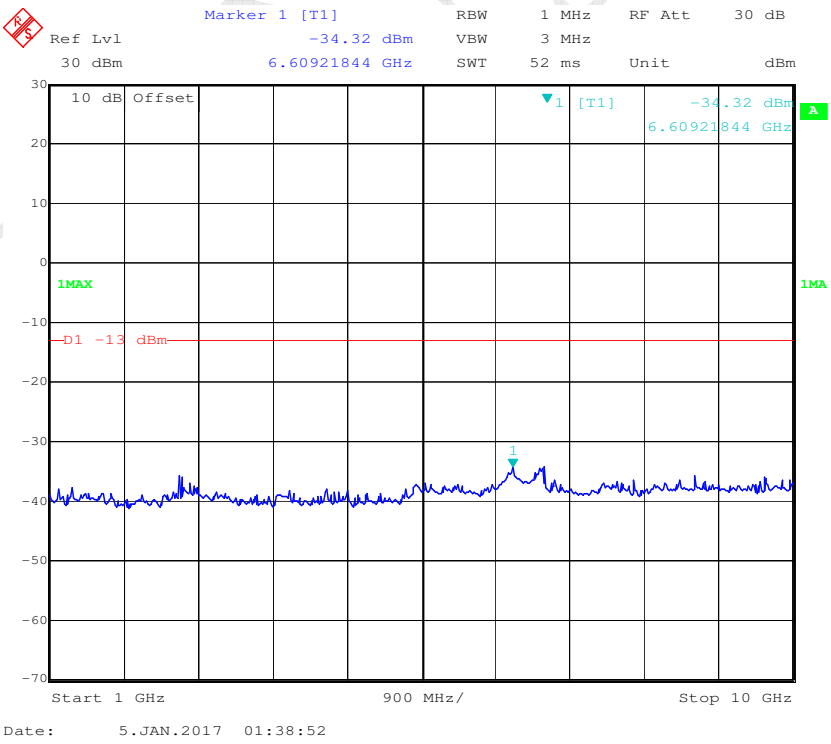
Fundamental



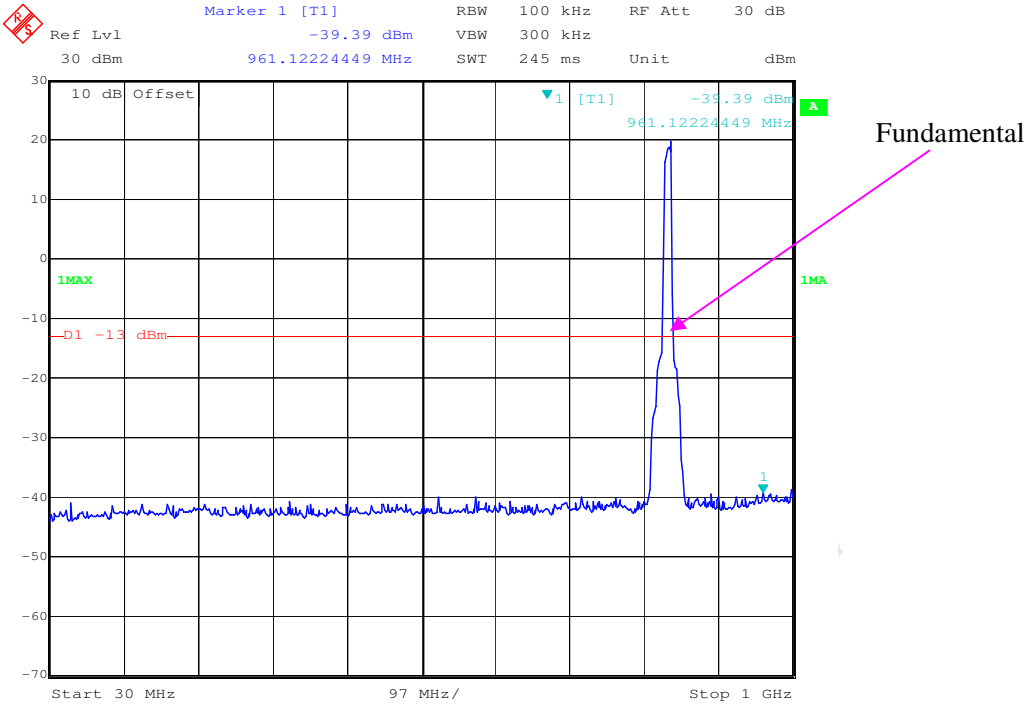
QPSK_5 MHz



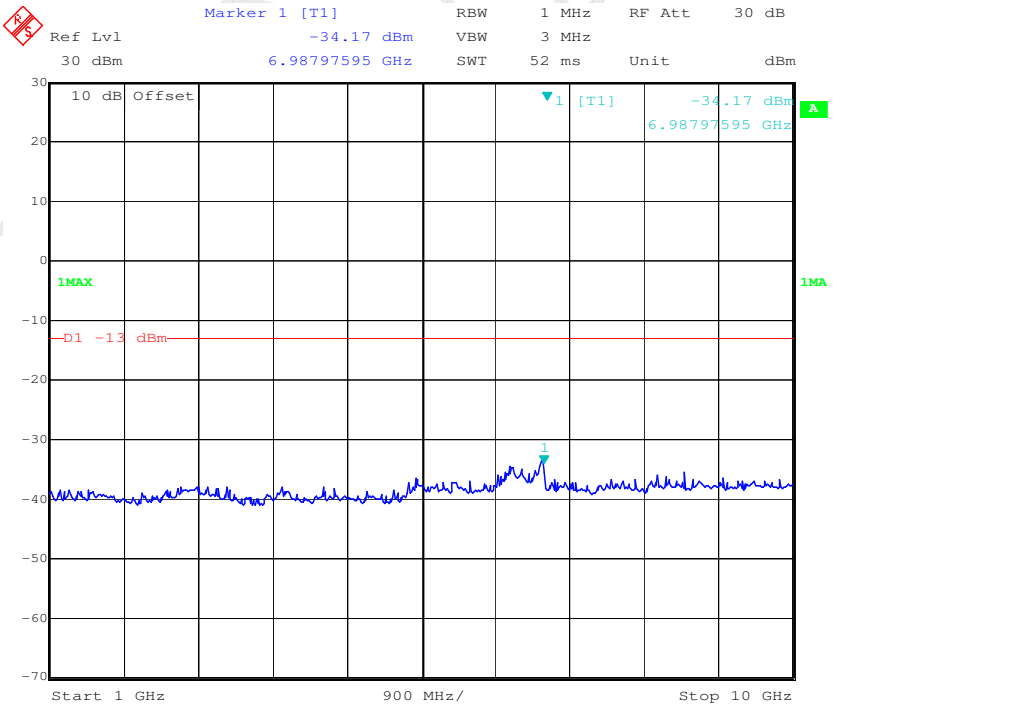
Fundamental



QPSK_10 MHz



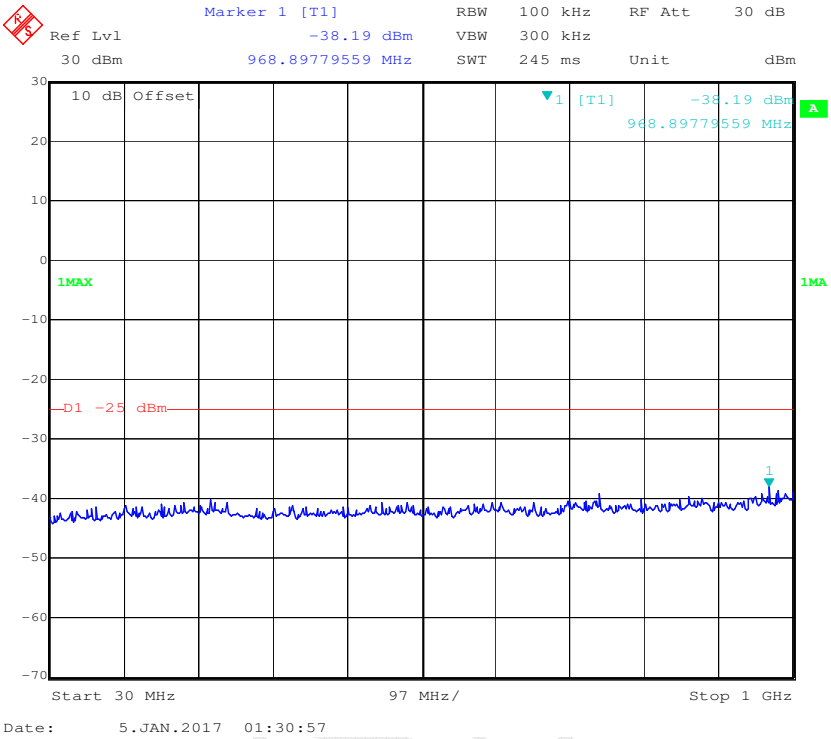
Date: 5.JAN.2017 01:40:15

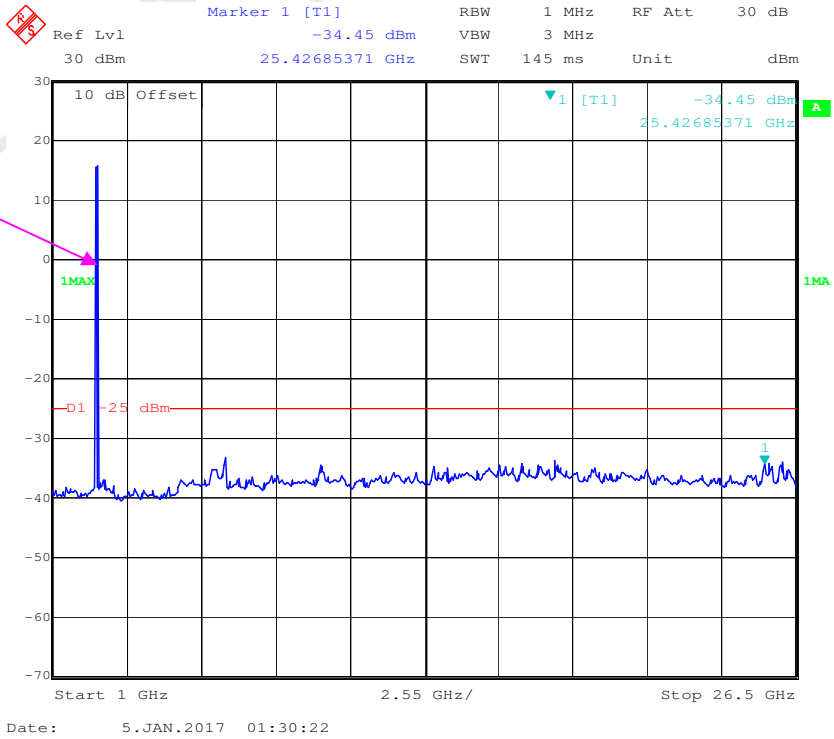


Date: 5.JAN.2017 01:39:24

LTE Band VII

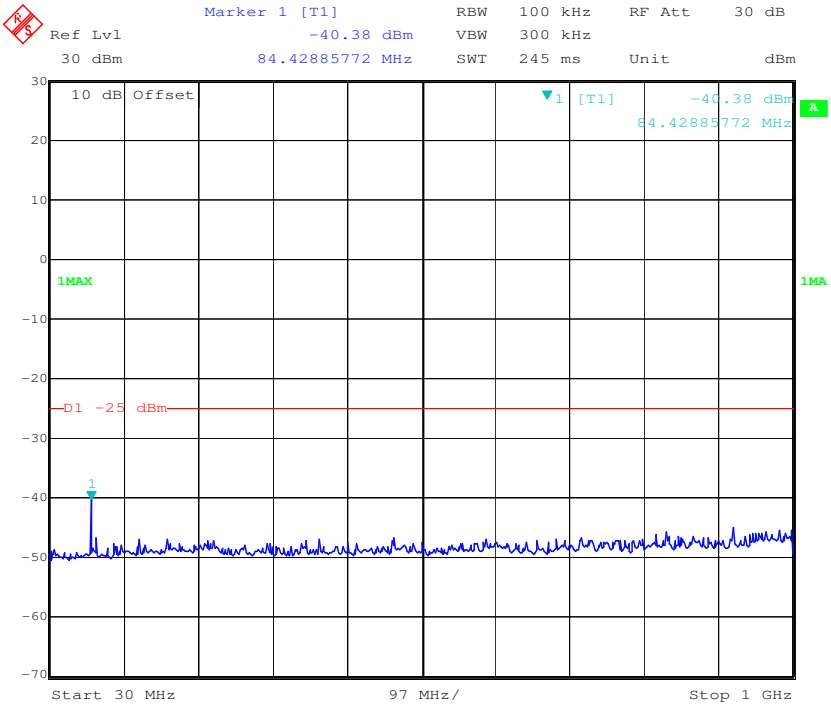
QPSK_5 MHz

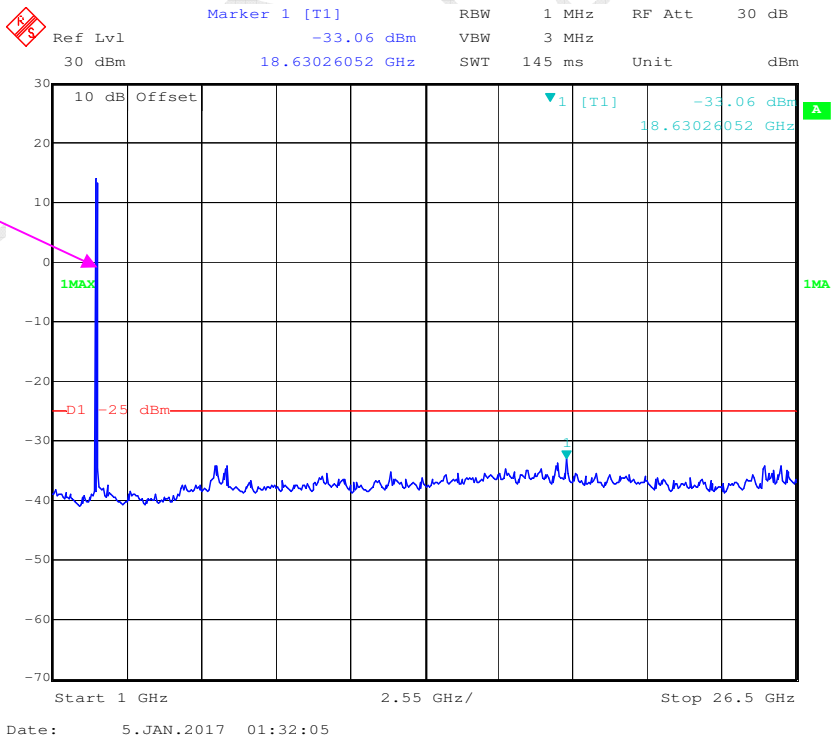




Fundamental

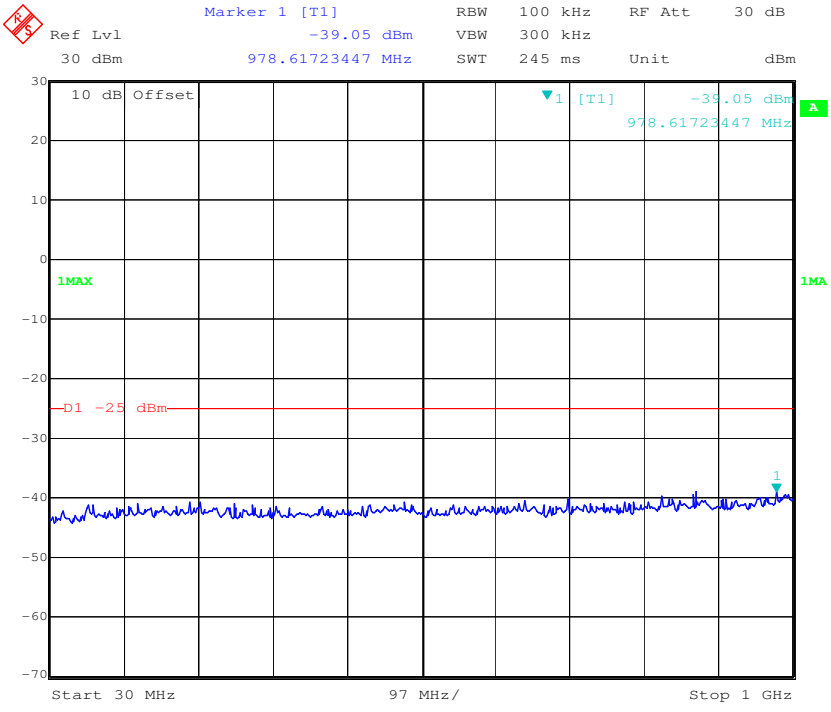
QPSK_10 MHz

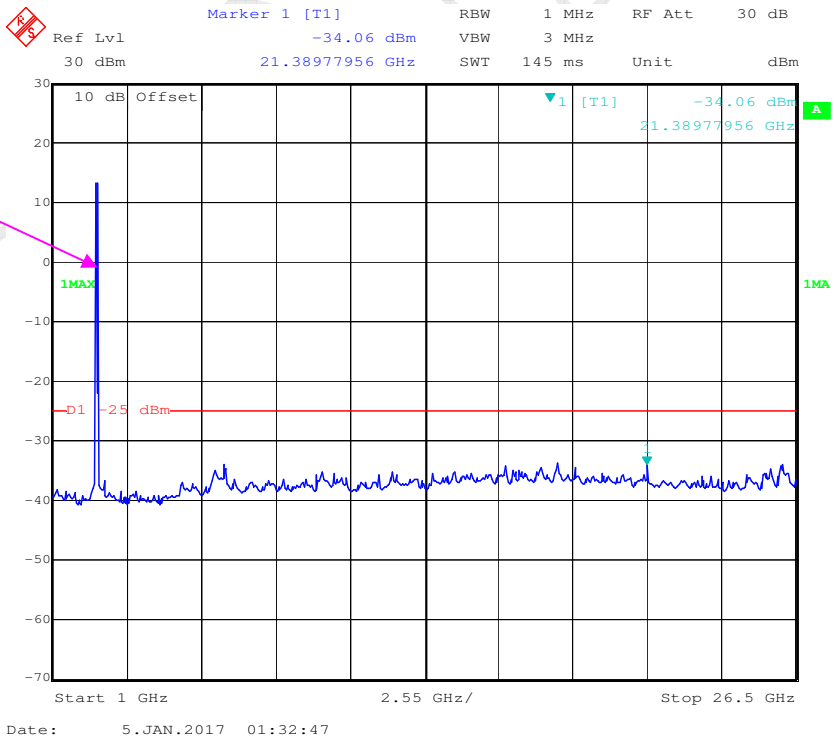




Fundamental

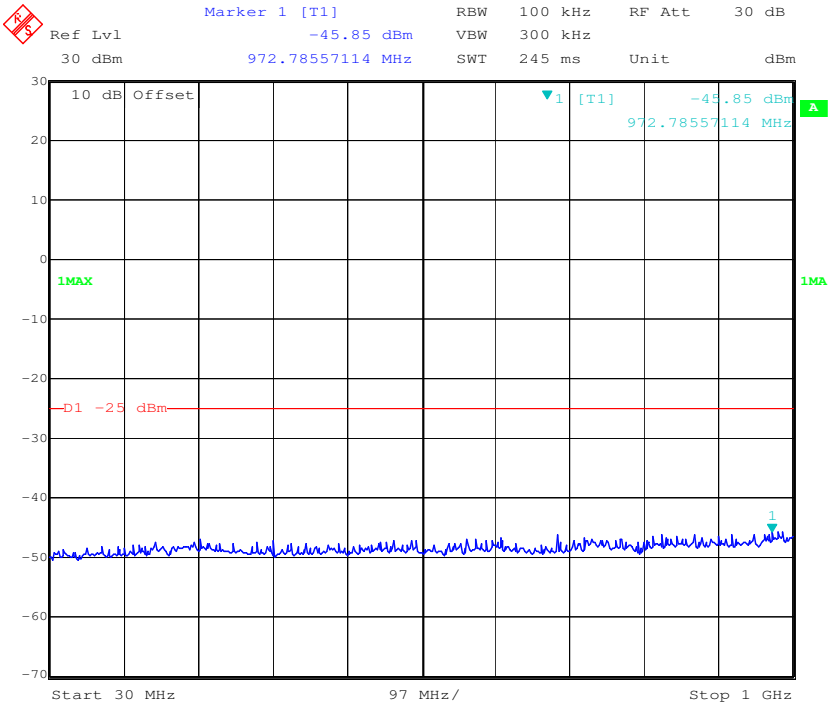
QPSK_15 MHz

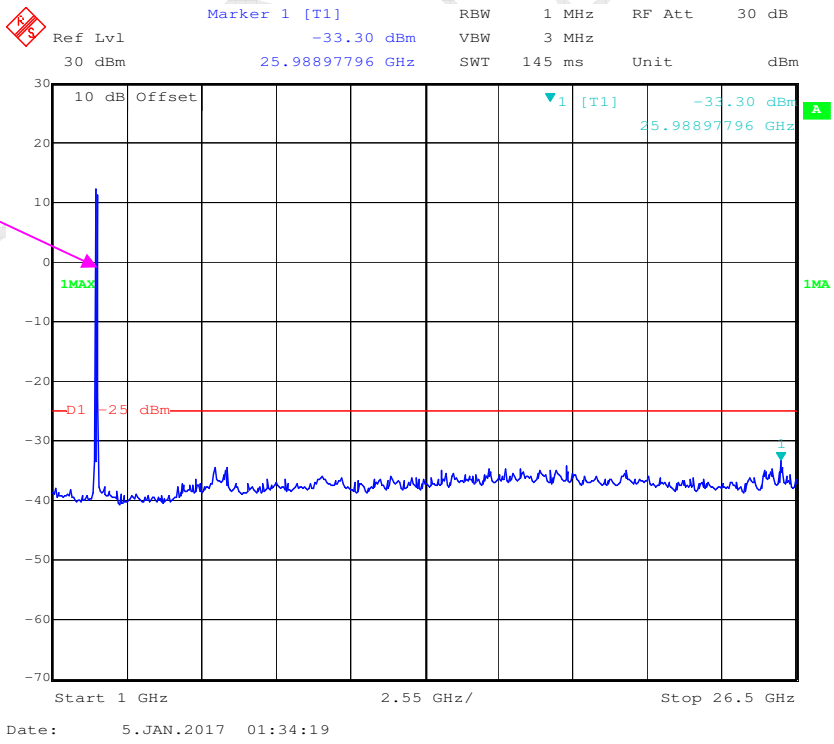




Fundamental

QPSK_20 MHz

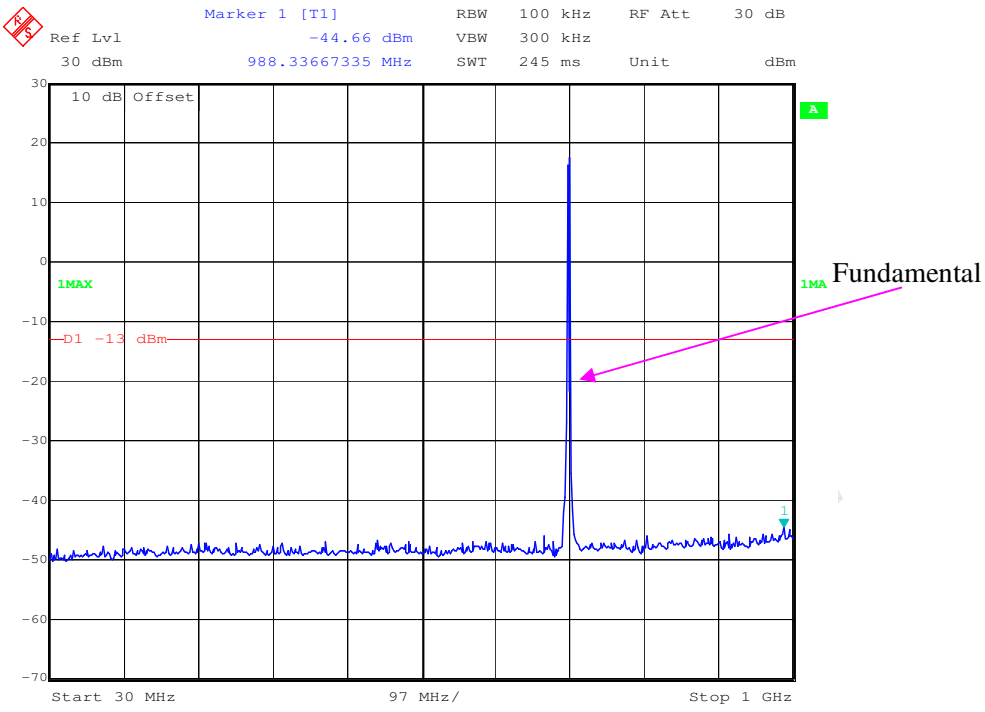


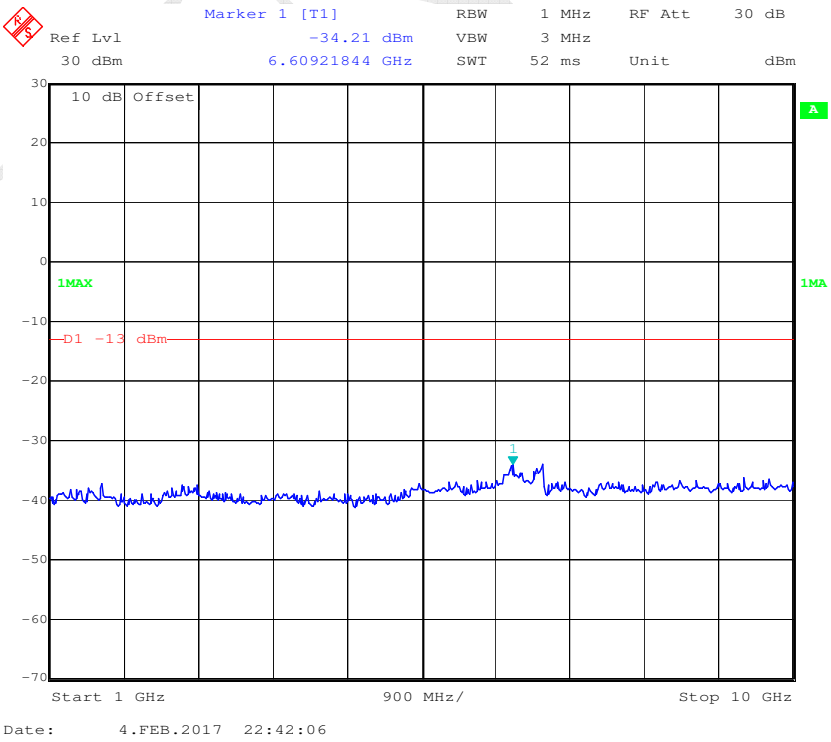


Fundamental

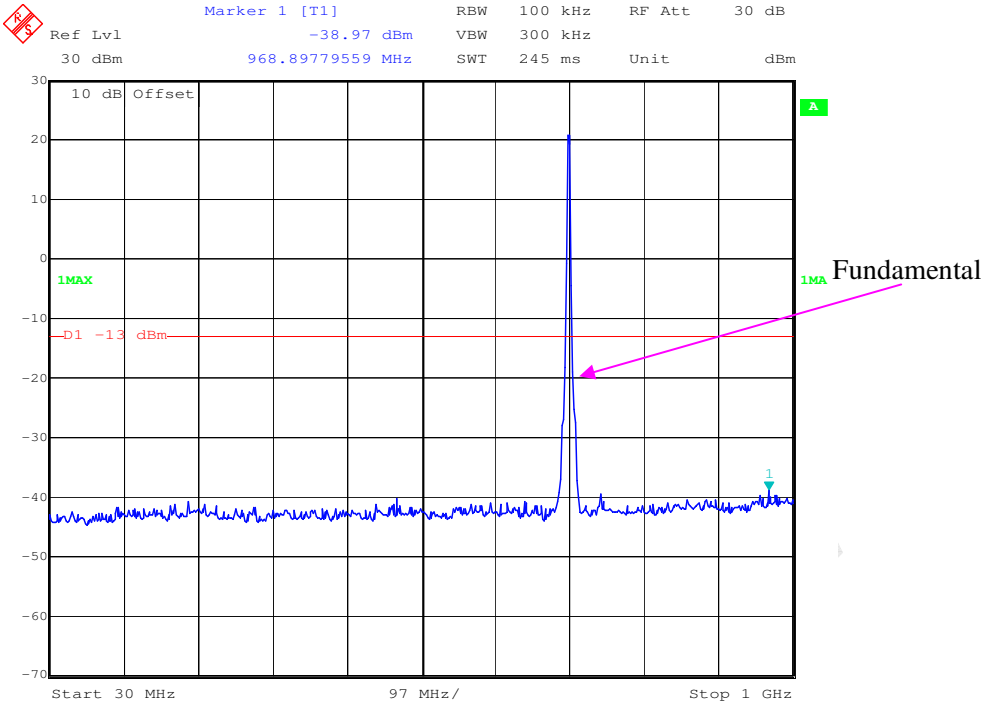
LTE Band 12 (Middle Channel)

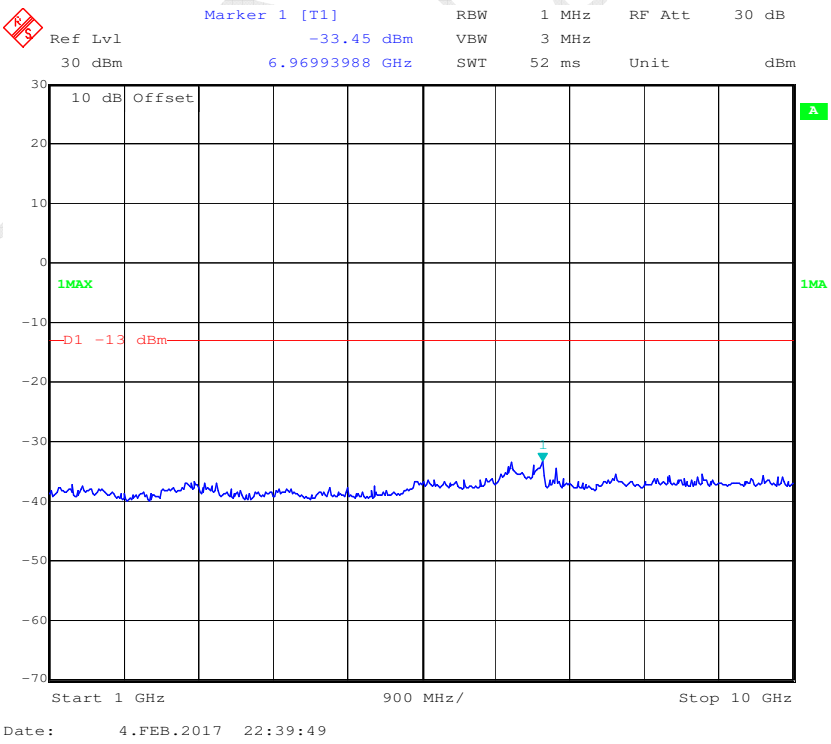
QPSK_1.4 MHz



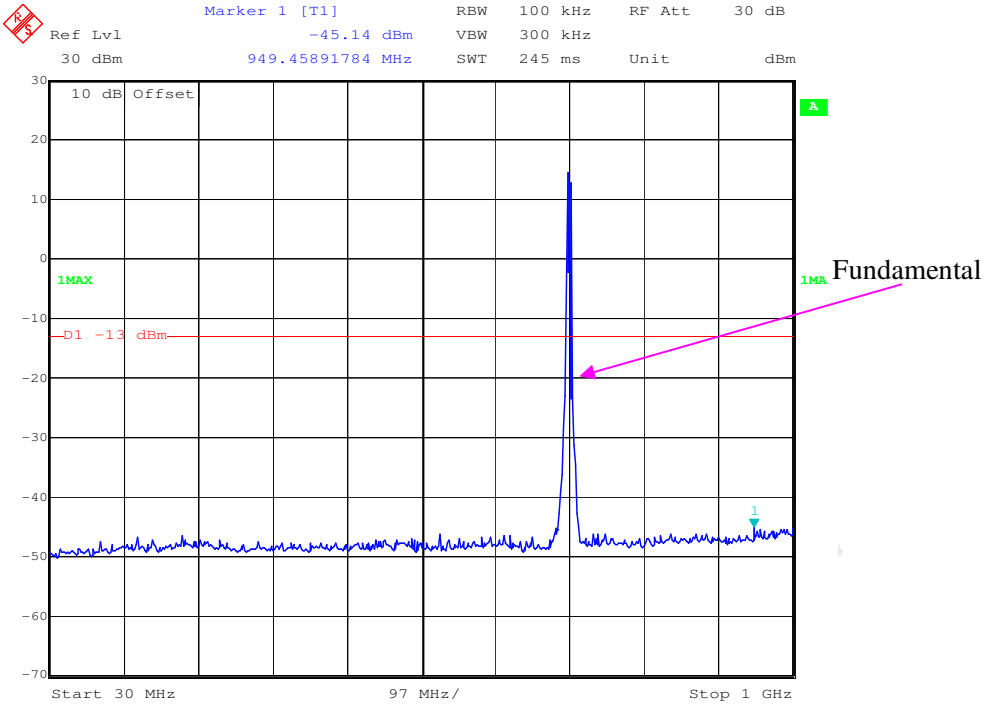


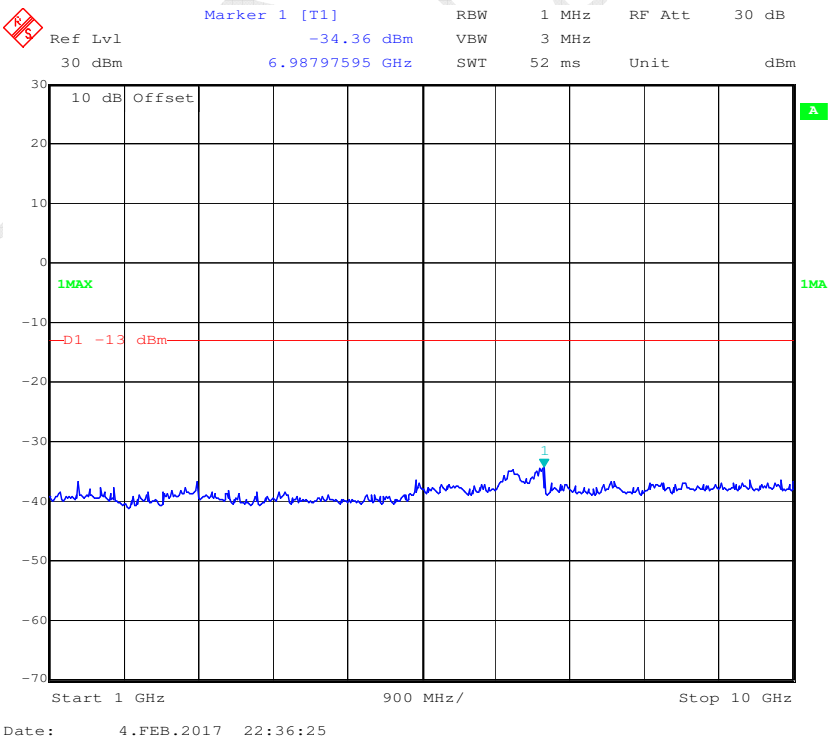
QPSK_3 MHz


Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-38.97 dBm
VBW 300 kHz
30 dBm
968.89779559 MHz
SWT 245 ms
Unit dBm
10 dB Offset
1MAX
D1 -13 dBm
Start 30 MHz
97 MHz/
Stop 1 GHz
Fundamental
Date: 4.FEB.2017 22:40:13

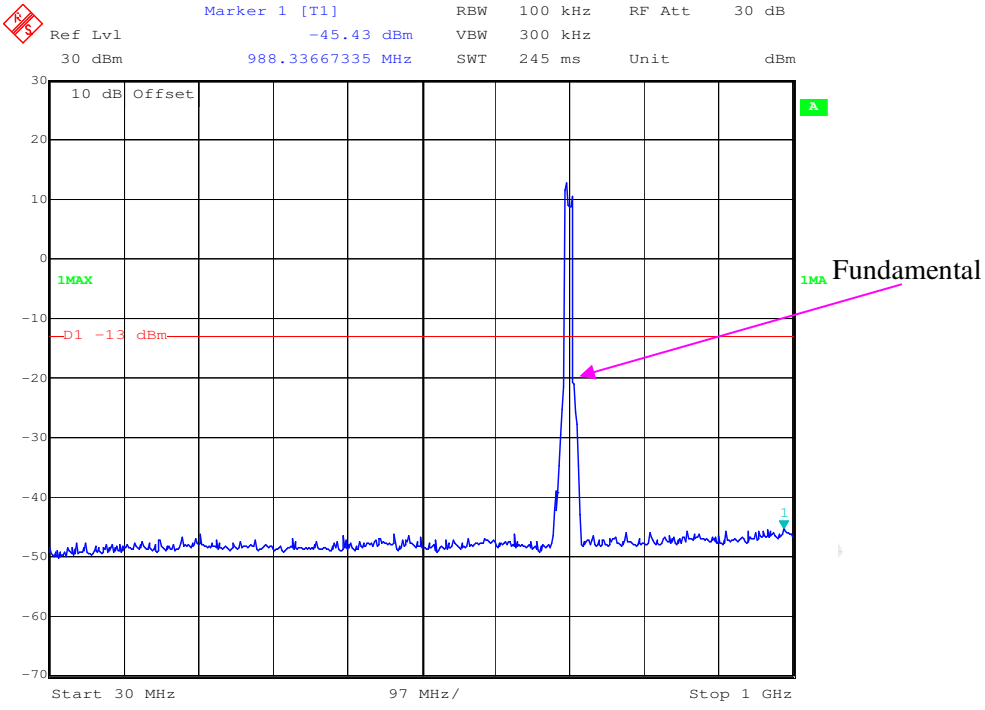

Marker 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-33.45 dBm
VBW 3 MHz
30 dBm
6.96993988 GHz
SWT 52 ms
Unit dBm
10 dB Offset
1MAX
D1 -13 dBm
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 4.FEB.2017 22:39:49

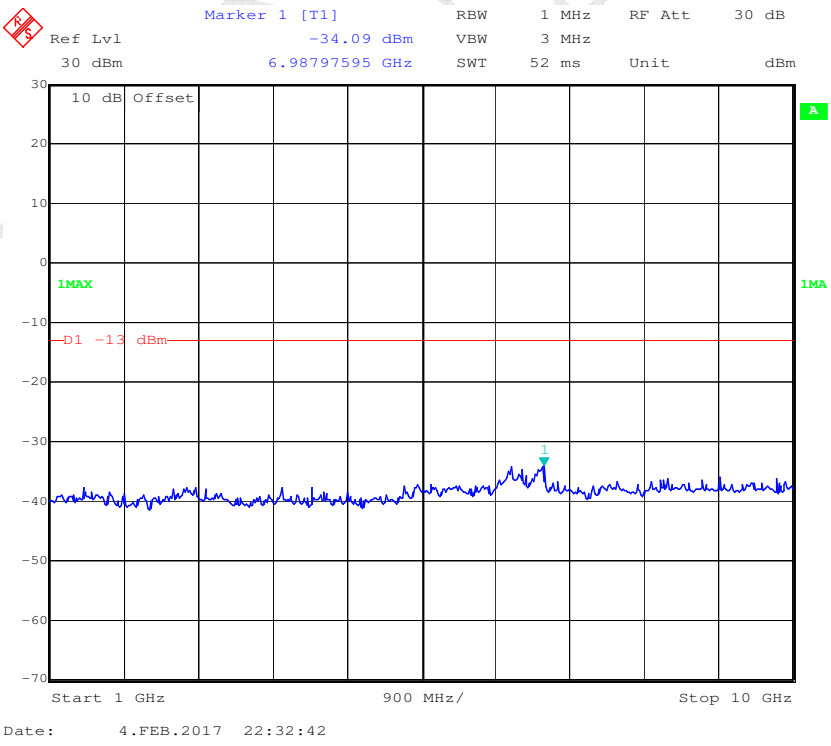
QPSK_5 MHz


Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-45.14 dBm
VBW 300 kHz
30 dBm
949.45891784 MHz
SWT 245 ms
Unit dBm
10 dB Offset
1MAX
D1 -13 dBm
1MA
Fundamental
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 4.FEB.2017 22:35:39


Marker 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-34.36 dBm
VBW 3 MHz
30 dBm
6.98797595 GHz
SWT 52 ms
Unit dBm
10 dB Offset
1MAX
D1 -13 dBm
1MA
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 4.FEB.2017 22:36:25

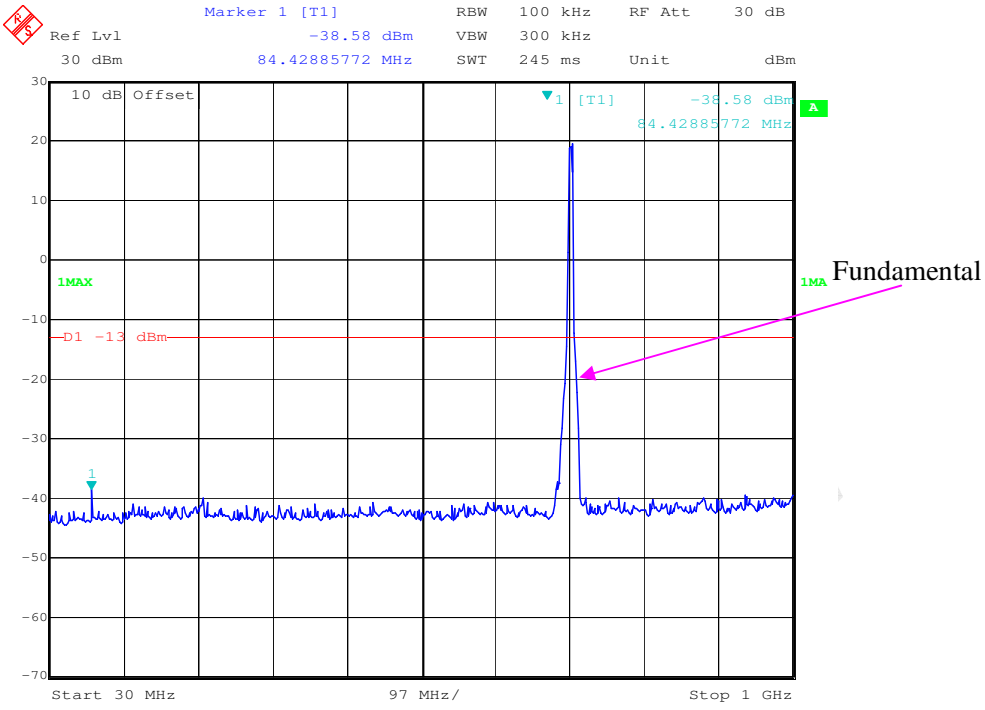
QPSK_10 MHz

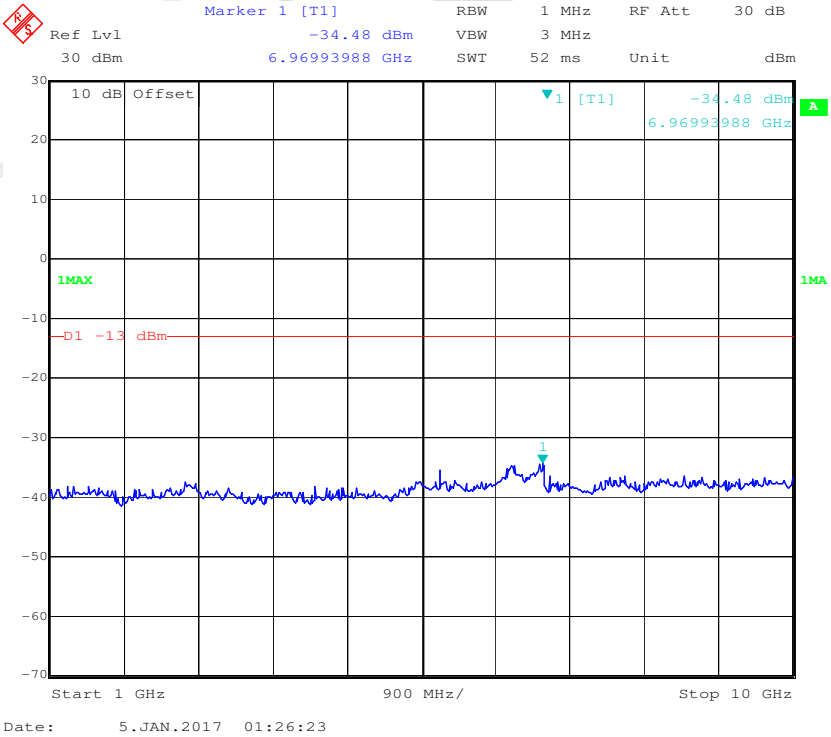

Marker 1 [T1]
-45.43 dBm
988.33667335 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
Ref Lvl
30 dBm
10 dB Offset
1MAX
D1 -13 dBm
1MA
Fundamental
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 4.FEB.2017 22:31:56


Marker 1 [T1]
-34.09 dBm
6.98797595 GHz
RBW 1 MHz
VBW 3 MHz
SWT 52 ms
RF Att 30 dB
Unit dBm
Ref Lvl
30 dBm
10 dB Offset
1MAX
D1 -13 dBm
1MA
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 4.FEB.2017 22:32:42

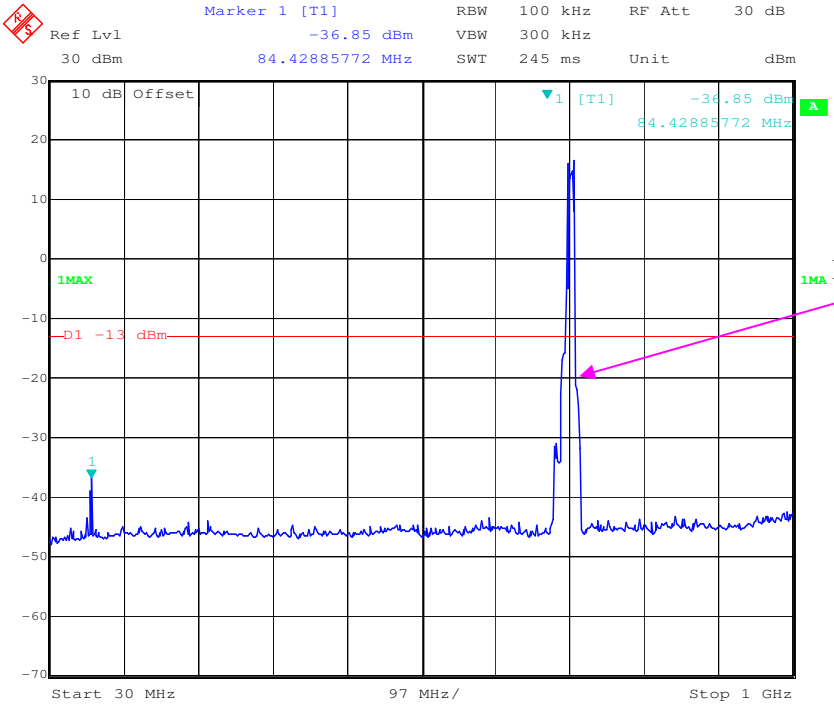
LTE Band 17 (Middle Channel)

QPSK_5 MHz

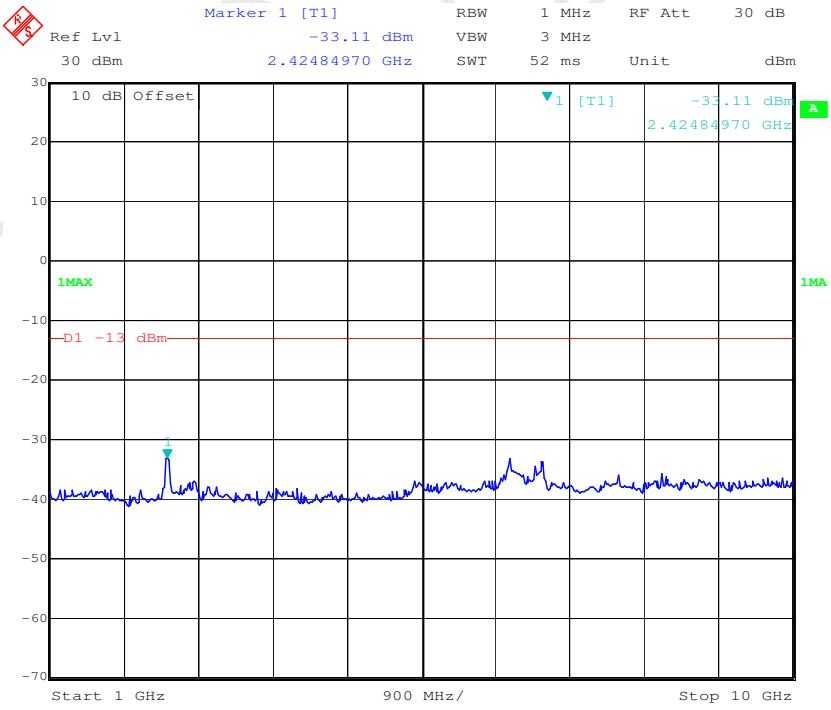




QPSK_10 MHz



Date: 5.JAN.2017 01:24:15



Date: 5.JAN.2017 01:25:50

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)

Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Agilent	Amplifier	8447D	2944A10442	2016-12-02	2017-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Sunol Sciences	Broadband Antenna	JB3	A101808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
ETS	Horn Antenna	3115	003-6076	2016-12-02	2017-12-01
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-0113024	2014-06-16	2017-06-15
EMCO	Adjustable Dipole Antenna	3121C	9109-258	N/A	N/A
HP	Signal Generator	8648C	3623A04150	2016-05-23	2017-05-22
WILTRON	SWEPT FREQUENCY SYNTHESIZER	6737	213001	2016-05-23	2017-05-22
Mini-circuits	Amplifier	ZVA-183-S+	771001215	2016-05-20	2017-05-19
HP	Amplifier	8449B	3008A00277	2016-12-02	2017-12-01
EMCT	Semi-Anechoic Chamber	966	N/A	2015-04-24	2018-04-23
N/A	RF Cable (below 1GHz)	NO.1	N/A	2016-11-10	2017-11-09
N/A	RF Cable (below 1GHz)	NO.4	N/A	2016-11-10	2017-11-09
N/A	RF Cable (above 1GHz)	NO.2	N/A	2016-11-10	2017-11-09
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1315	2016-08-18	2017-08-18
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1312	2016-08-18	2017-08-18

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.1 °C
Relative Humidity:	50 %
ATM Pressure:	101.1 kPa

The testing was performed by Tom Tang on 2017-01-05.

EUT Operation Mode: Transmitting

Cellular Band

30MHz-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)			
GSM850, Frequency:836.600 MHz								
112.450	H	43.350	-56.6	0.0	0.2	-56.8	-13.0	43.8
199.750	V	39.400	-57	0.0	0.2	-57.2	-13.0	44.2
1673.200	H	70.97	-42.4	10.5	4.5	-36.4	-13.0	23.4
1673.200	V	68.82	-44.8	10.5	4.5	-38.8	-13.0	25.8
2509.800	H	54.05	-57.2	12.2	5.4	-50.4	-13.0	37.4
2509.800	V	57.93	-53.3	12.2	5.4	-46.5	-13.0	33.5
1741.000	H	62.25	-50.9	10.7	4.6	-44.8	-13.0	31.8
1741.000	V	55.39	-58.1	10.7	4.6	-52.0	-13.0	39.0
WCDMA Band V R99,Frequency:836.600 MHz								
199.750	V	38.090	-58.4	0.0	0.2	-58.6	-13.0	45.6
199.750	H	37.070	-63.1	0.0	0.2	-63.3	-13.0	50.3
1673.200	H	47.37	-66	10.5	4.5	-60.0	-13.0	47.0
1673.200	V	46.28	-67.3	10.5	4.5	-61.3	-13.0	48.3
3277.000	H	45.64	-63.8	12.3	6.1	-57.6	-13.0	44.6
2852.000	V	46.76	-63.7	12.3	5.7	-57.1	-13.0	44.1

PCS Band

30MHz-20GHz:

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)			
GSM1900, Frequency:1880.000 MHz								
199.750	V	43.880	-52.6	0.0	0.2	-52.8	-13.0	39.8
199.750	H	41.210	-59	0.0	0.2	-59.2	-13.0	46.2
3760.000	H	48.73	-59.3	12.3	6.7	-53.7	-13.0	40.7
3760.000	V	55.22	-53.2	12.3	6.7	-47.6	-13.0	34.6
2843.000	H	42.16	-68.2	12.3	5.7	-61.6	-13.0	48.6
2843.000	V	41.86	-68.6	12.3	5.7	-62.0	-13.0	49.0
WCDMA Band II, R99, Frequency:1880.000 MHz								
199.750	H	35.030	-65.1	0.0	0.2	-65.3	-13.0	52.3
199.750	V	35.810	-60.6	0.0	0.2	-60.8	-13.0	47.8
3760.000	H	48.19	-59.8	12.3	6.7	-54.2	-13.0	41.2
3760.000	V	47.76	-60.7	12.3	6.7	-55.1	-13.0	42.1
2916.000	H	49.06	-61.1	12.4	5.8	-54.5	-13.0	41.5
3624.000	V	50.34	-58.5	12.2	6.5	-52.8	-13.0	39.8

AWS Band

30MHz-20GHz:

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)			
WCDMA Band IV, R99, Frequency:1732.6 MHz								
199.750	V	40.500	-55.9	0.0	0.2	-56.1	-13.0	43.1
199.750	H	34.570	-65.6	0.0	0.2	-65.8	-13.0	52.8
3465.200	H	52.95	-56.1	12.2	6.3	-50.2	-13.0	37.2
3465.200	V	51.51	-57.8	12.2	6.3	-51.9	-13.0	38.9
5197.800	H	56.74	-47.8	12.9	7.6	-42.5	-13.0	29.5
5197.800	V	52.61	-52.5	12.9	7.6	-47.2	-13.0	34.2

LTE Bands

LTE Band II (30MHz-20GHz):

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:1880.00 MHz								
3760.000	H	33.64	-60.7	13.8	2.9	-49.8	-13.0	36.8
3760.000	V	31.61	-61.5	13.8	2.9	-50.6	-13.0	37.6
5640.000	H	36.58	-55.1	14.0	2.1	-43.2	-13.0	30.2
5640.000	V	33.15	-58.5	14.0	2.1	-46.6	-13.0	33.6
231.700	H	35.560	-64	0.0	0.2	-64.2	-13.0	51.2
299.400	V	36.280	-61	0.0	0.3	-61.3	-13.0	48.3

LTE Band IV (30MHz-20GHz):

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:1732.500 MHz								
3465.000	H	35.26	-61.7	13.9	1.9	-49.7	-13.0	36.7
3465.000	V	32.68	-63.5	13.9	1.9	-51.5	-13.0	38.5
5197.500	H	46.95	-44.1	14.0	2.3	-32.4	-13.0	19.4
5197.500	V	38.26	-54.3	14.0	2.3	-42.6	-13.0	29.6
266.400	H	36.21	-62.9	0.0	0.3	-63.2	-13.0	50.2
302.700	V	37.32	-59.9	0.0	0.3	-60.2	-13.0	47.2

LTE Band V (30MHz-10GHz)

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:836.500 MHz								
1673.000	H	37.56	-63.5	10.6	1.5	-54.4	-13.0	41.4
1673.000	V	34.28	-67.1	10.6	1.5	-58.0	-13.0	45.0
2509.500	H	42.63	-55.4	13.1	2.8	-45.1	-13.0	32.1
2509.500	V	38.59	-58.5	13.1	2.8	-48.2	-13.0	35.2
285.300	H	36.780	-62.2	0.0	0.3	-62.5	-13.0	49.5
255.800	V	37.560	-60.3	0.0	0.3	-60.6	-13.0	47.6

LTE Band VII (30MHz-26GHz)

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:2535.000 MHz								
5070.000	H	36.54	-54.8	13.9	2.4	-43.3	-25.0	18.3
5070.000	V	34.28	-57.9	13.9	2.4	-46.4	-25.0	21.4
7605.000	H	41.82	-45.7	13.2	3.1	-35.6	-25.0	10.6
7605.000	V	38.67	-48.8	13.2	3.1	-38.7	-25.0	13.7
250.900	H	35.98	-63.2	0.0	0.3	-63.5	-25.0	38.5
291.700	V	36.05	-61.3	0.0	0.3	-61.6	-25.0	36.6

LTE Band 12 (30MHz-10GHz)

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:707.500 MHz								
1415.000	H	35.74	-65.1	9.0	1.3	-57.4	-13.0	44.4
1415.000	V	33.15	-67.4	9.0	1.3	-59.7	-13.0	46.7
2122.500	H	36.48	-59.5	11.2	1.4	-49.7	-13.0	36.7
2122.500	V	34.82	-59.9	11.2	1.4	-50.1	-13.0	37.1
429.640	H	34.30	-62.4	0.0	0.4	-62.8	-13.0	49.8
41.640	V	40.14	-38.3	-24.2	0.1	-62.6	-13.0	49.6

LTE Band 17 (30MHz-10GHz)

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:710.000 MHz								
1420.000	H	38.36	-62.5	9.1	1.3	-54.7	-13.0	41.7
1420.000	V	36.72	-63.9	9.1	1.3	-56.1	-13.0	43.1
2130.000	H	43.82	-52.1	11.2	1.4	-42.3	-13.0	29.3
2130.000	V	39.27	-55.5	11.2	1.4	-45.7	-13.0	32.7
303.100	H	35.740	-63.1	0.0	0.3	-63.4	-13.0	50.4
271.900	V	36.560	-61.1	0.0	0.3	-61.4	-13.0	48.4

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- 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.

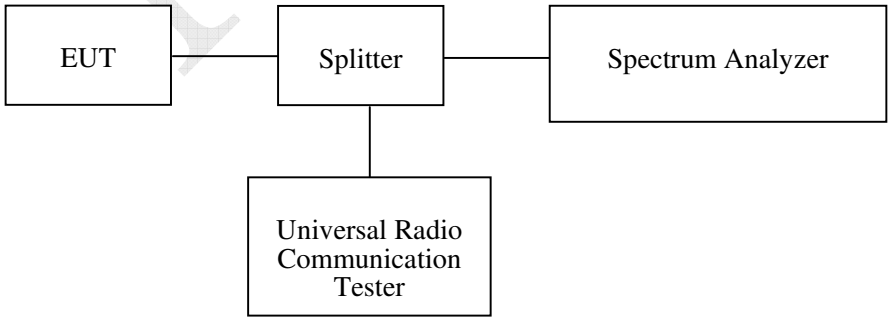
According to §27.53 (h), AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission 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
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
N/A	RF Cable	N/A	N/A	Each Time	/
N/A	Two-way Spliter	N/A	OE0120121	Each Time	/

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

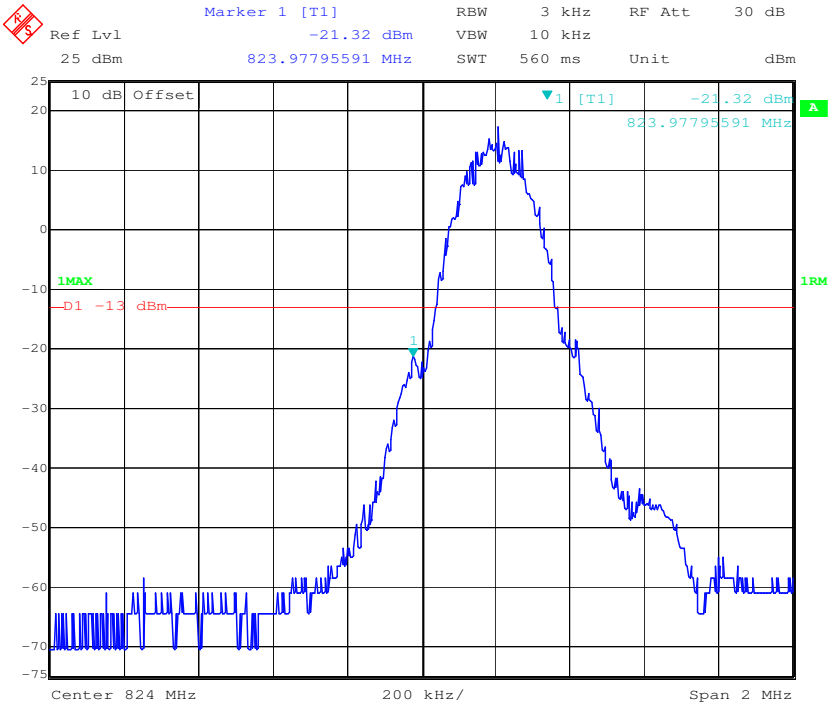
Temperature:	23.2 ~ 28.8 °C
Relative Humidity:	31~52 %
ATM Pressure:	100.7~102.3 kPa

The testing was performed by Tom Tang from 2016-12-16 to 2017-02-04.

Test Mode: Transmitting

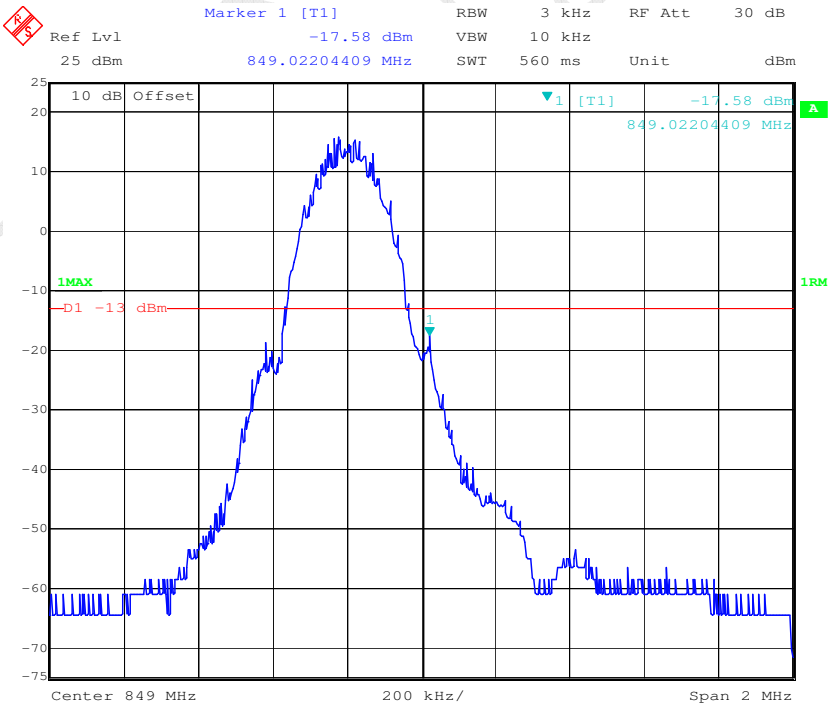
Test Result: Compliant. Please refer to the following plots.

GSM 850, Left Band Edge



Date: 16.DEC.2016 20:23:10

GSM 850, Right Band Edge



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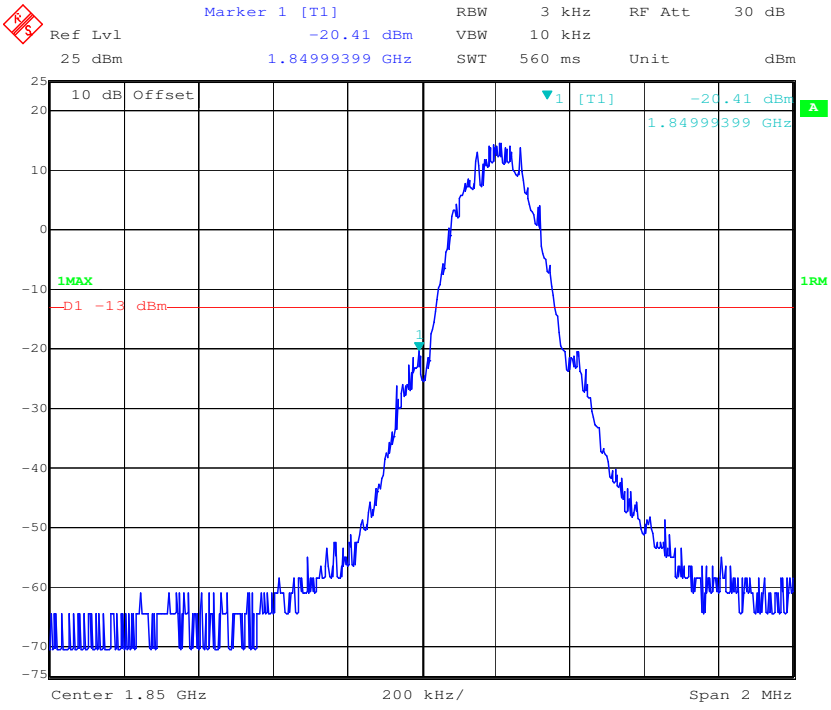
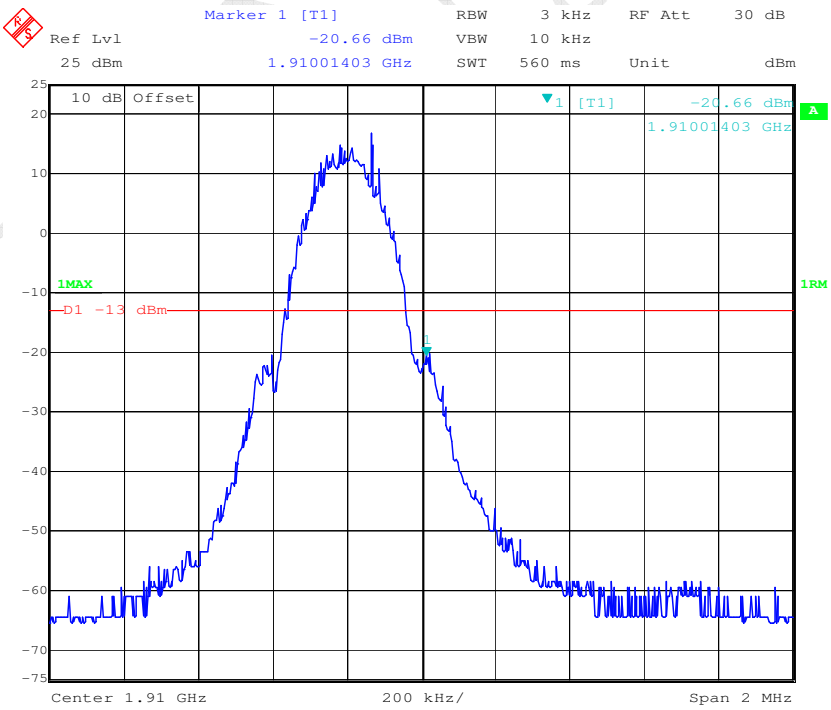
GSM 1900, Left Band Edge



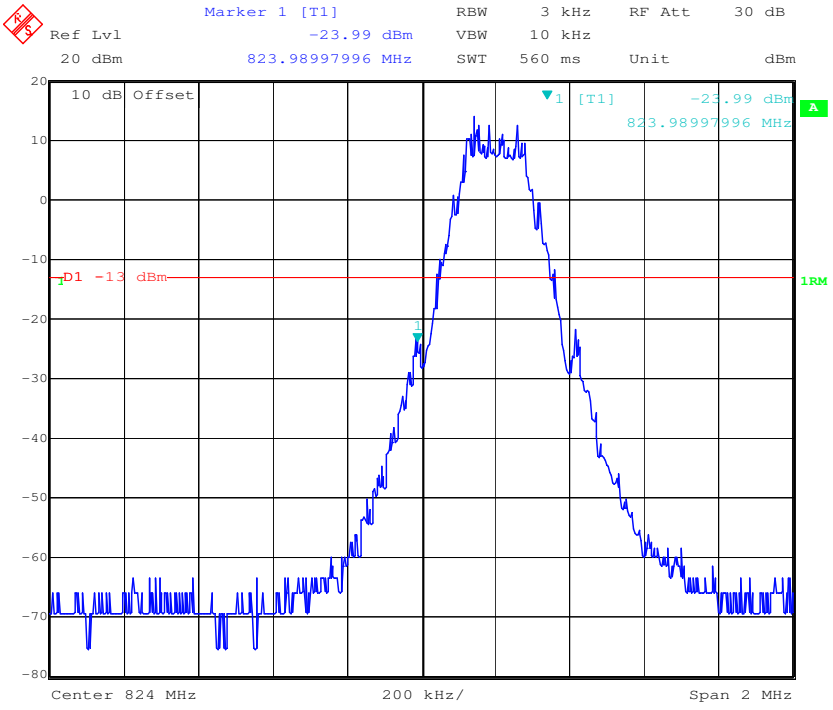
Date: 16.DEC.2016 20:21:00

GSM 1900, Right Band Edge



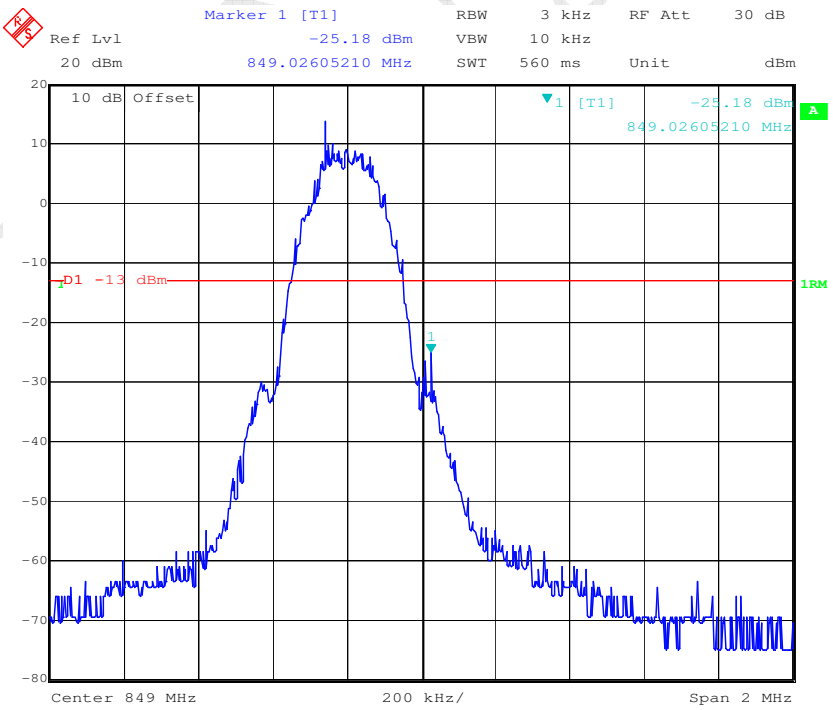
Date: 16.DEC.2016 20:20:12

EDGE 850, Left Band Edge



Date: 16.DEC.2016 20:30:21

EDGE 850, Right Band Edge



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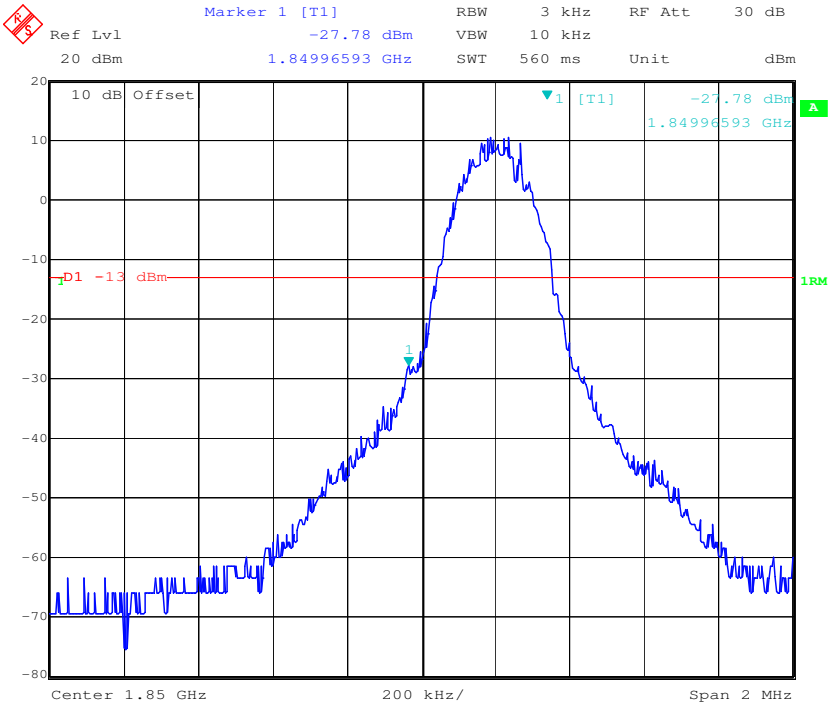
EDGE 1900, Left Band Edge



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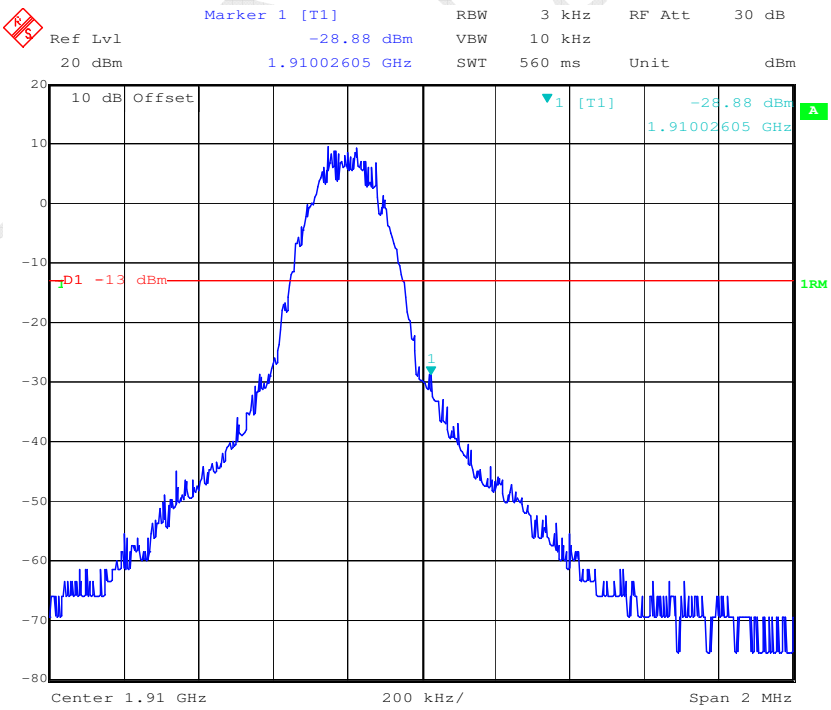
EDGE 1900, Right Band Edge



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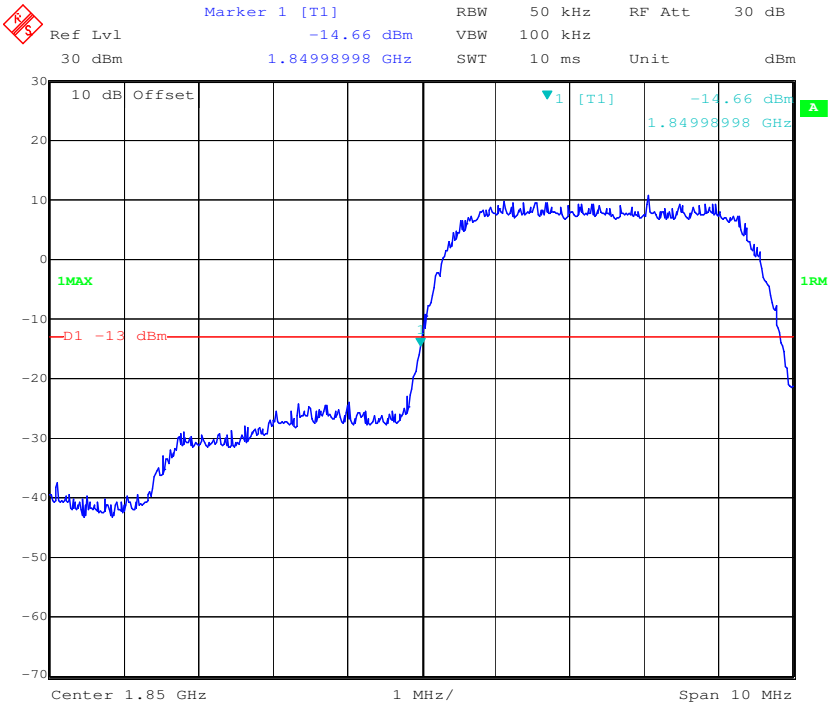
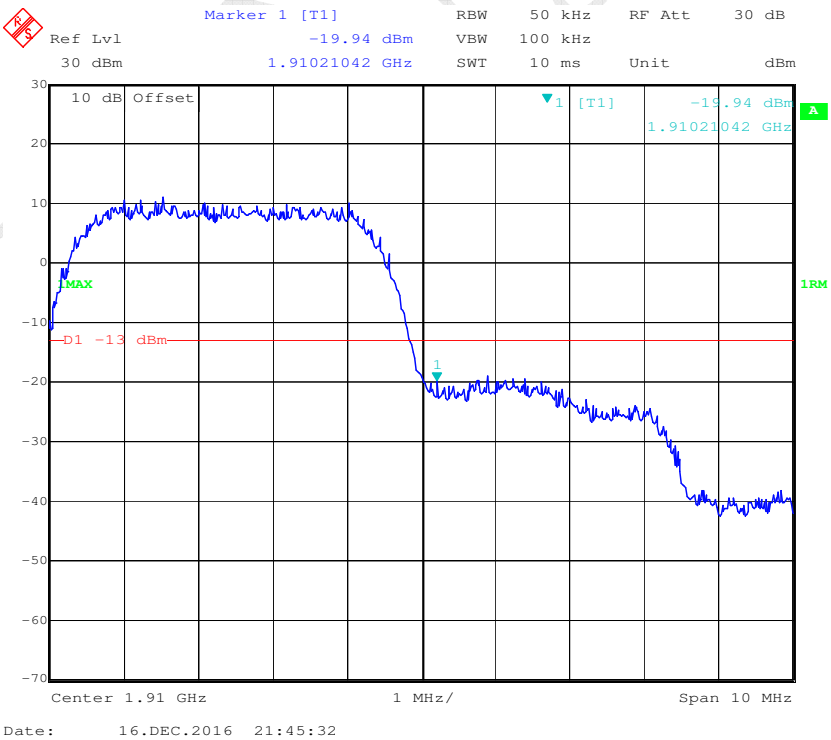
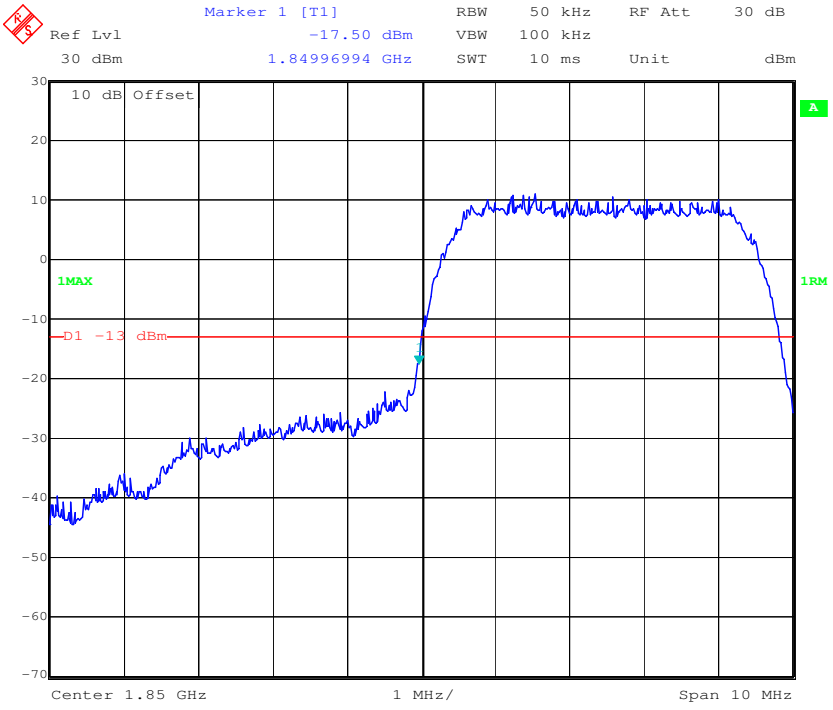
REL99 Band II, Left Band Edge



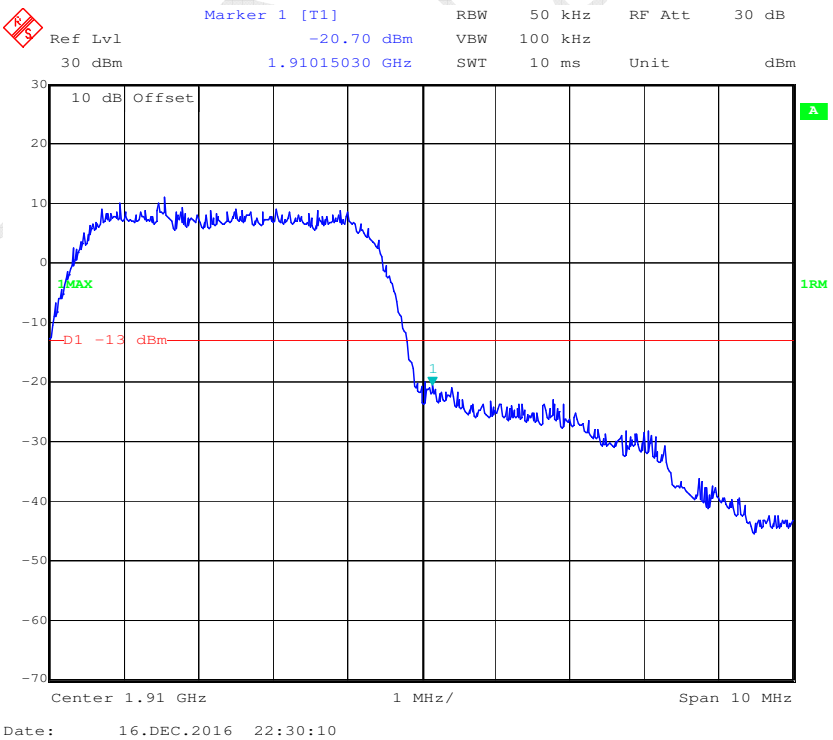
REL99 Band II, Right Band Edge



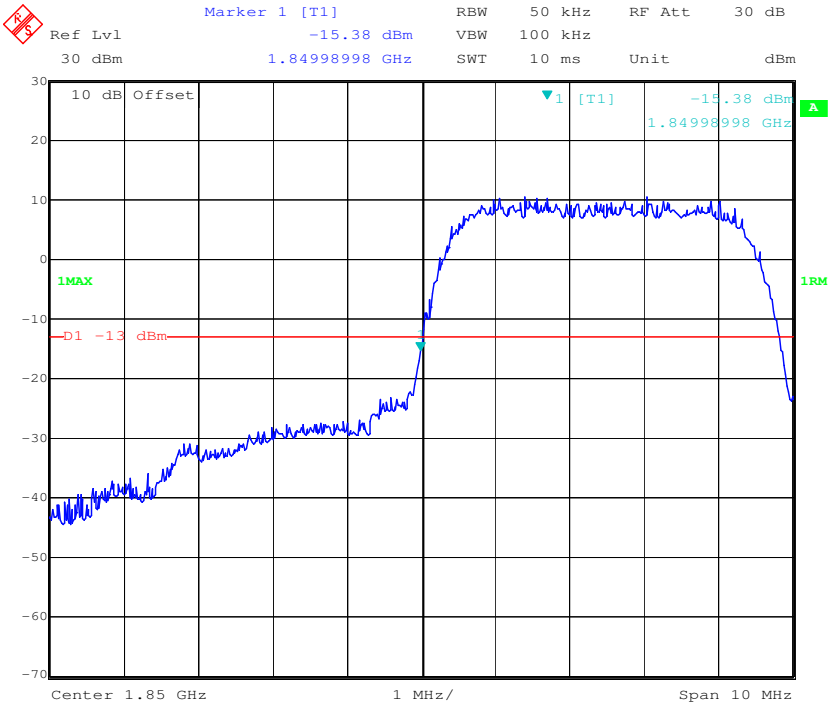
HSDPA Band II, Left Band Edge



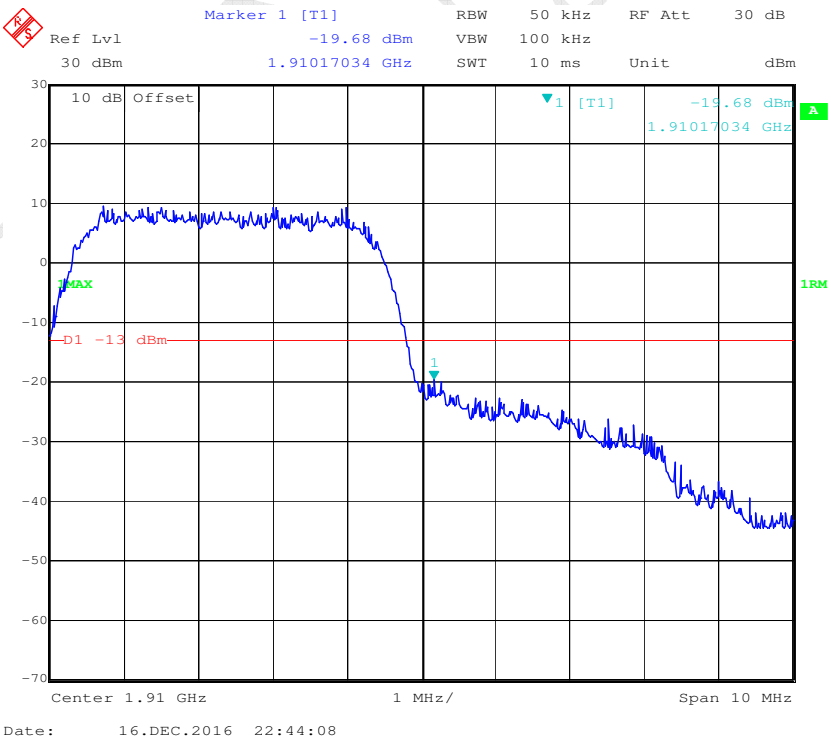
HSDPA Band II, Right Band Edge



HSUPA Band II, Left Band Edge

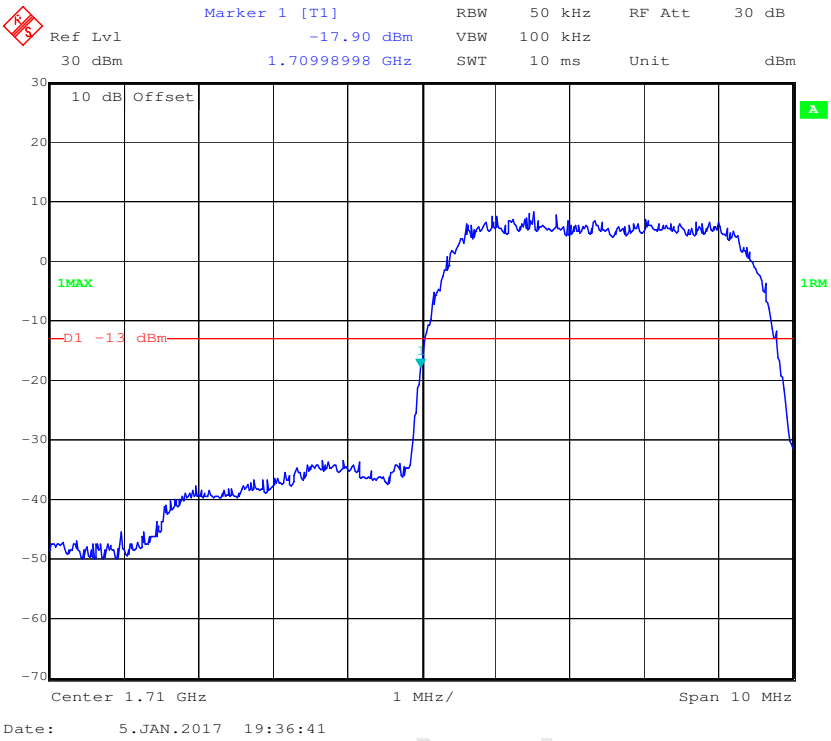


HSUPA Band II, Right Band Edge

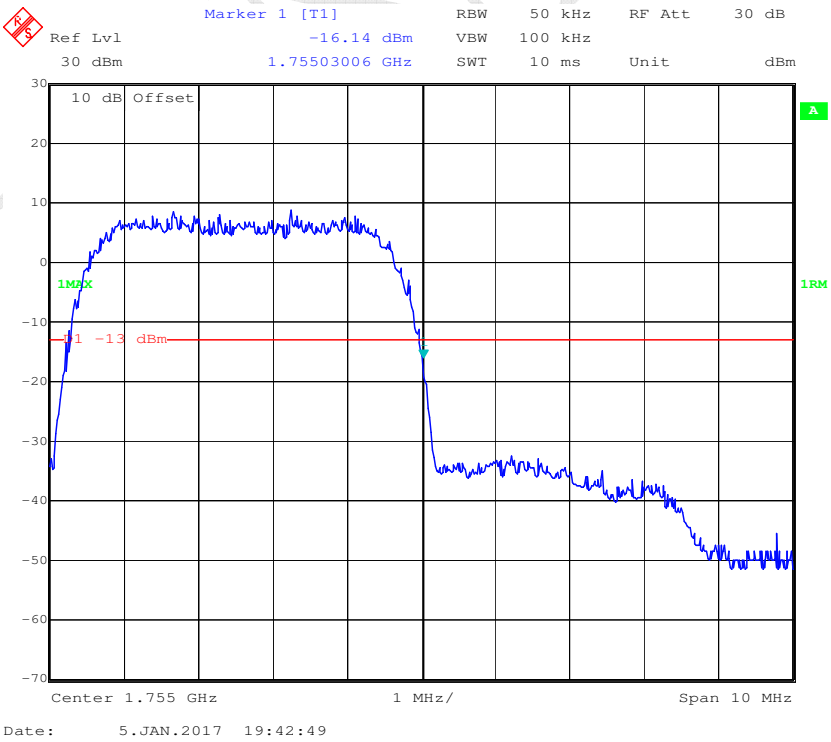


WCDMA Band IV

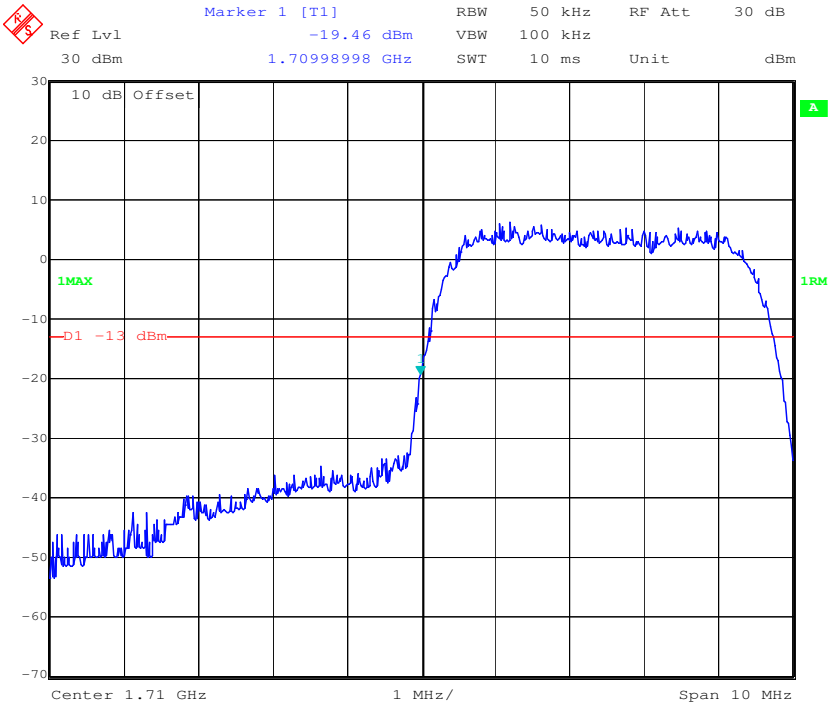
REL99 Band IV, Left Band Edge



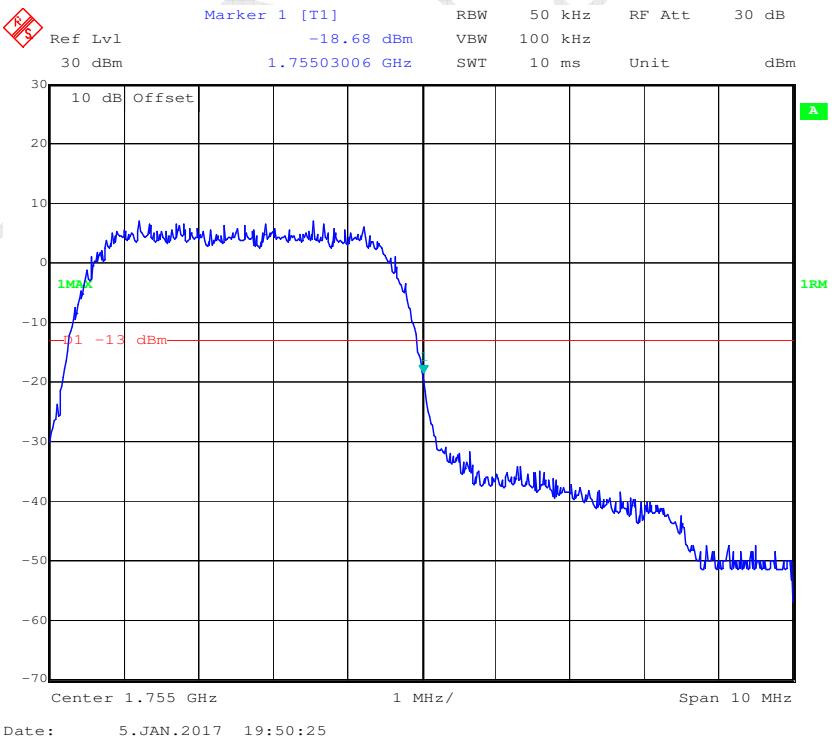
REL99 Band IV Right Band Edge



REL99 Band IV, Left Band Edge



REL99 Band IV, Right Band Edge



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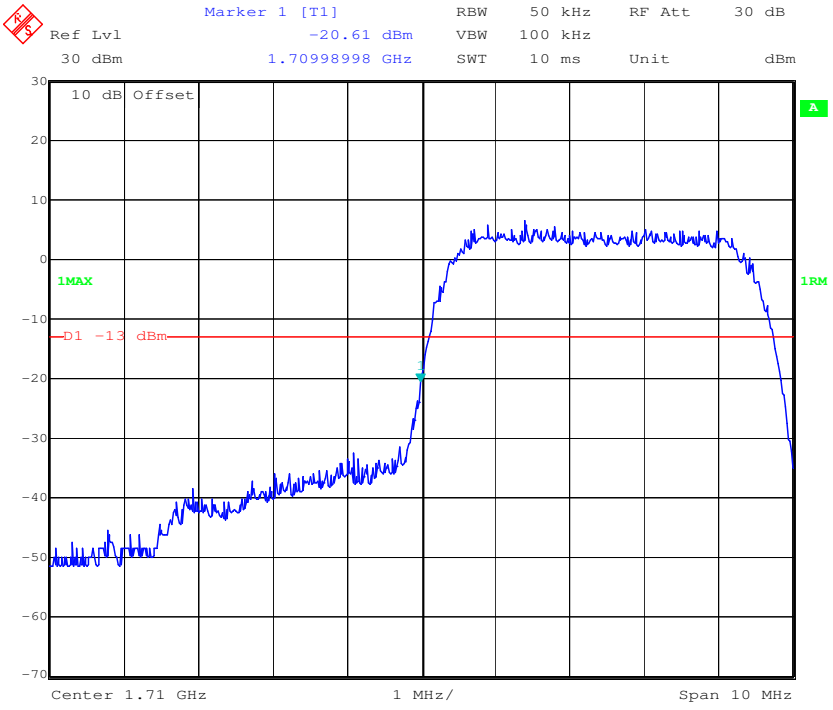
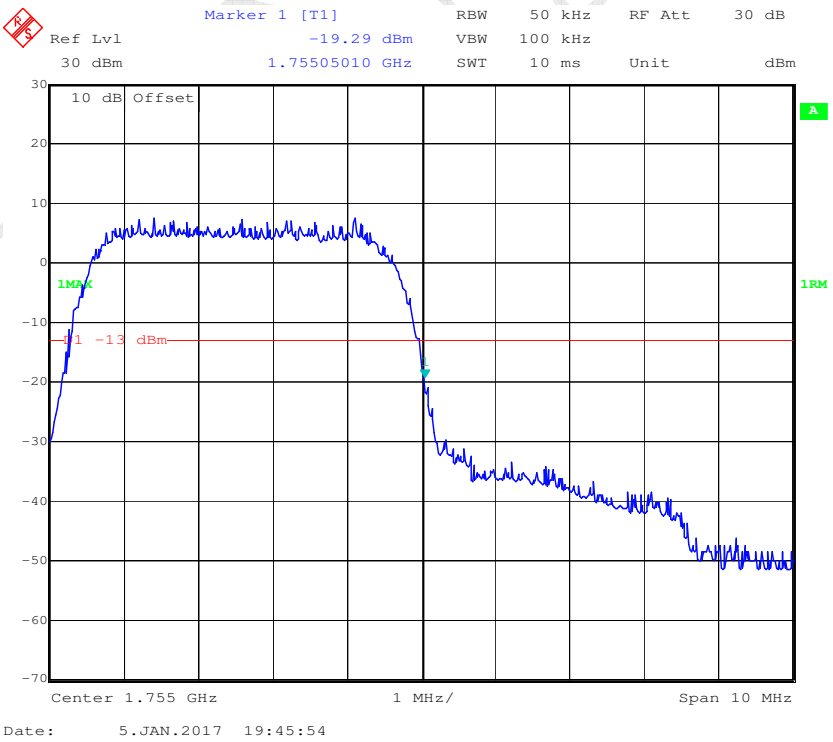
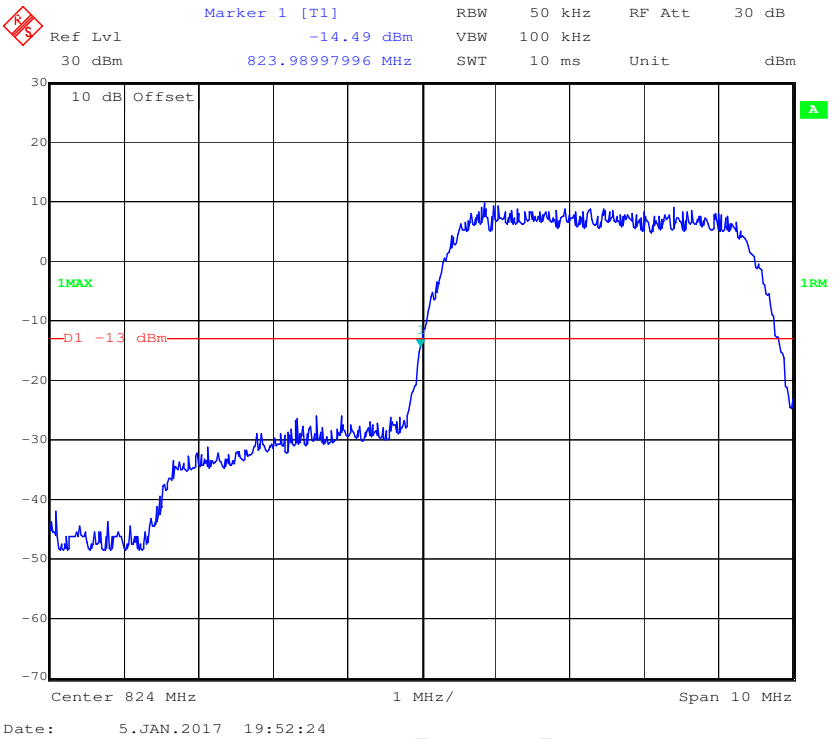


REL99 Band IV, Right Band Edge

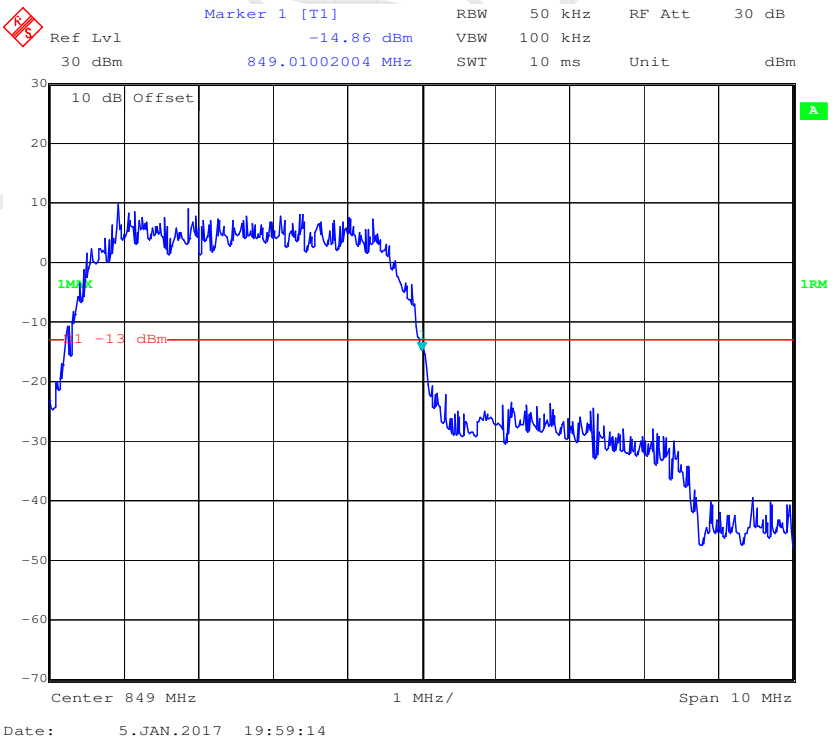


WCDMA Band V

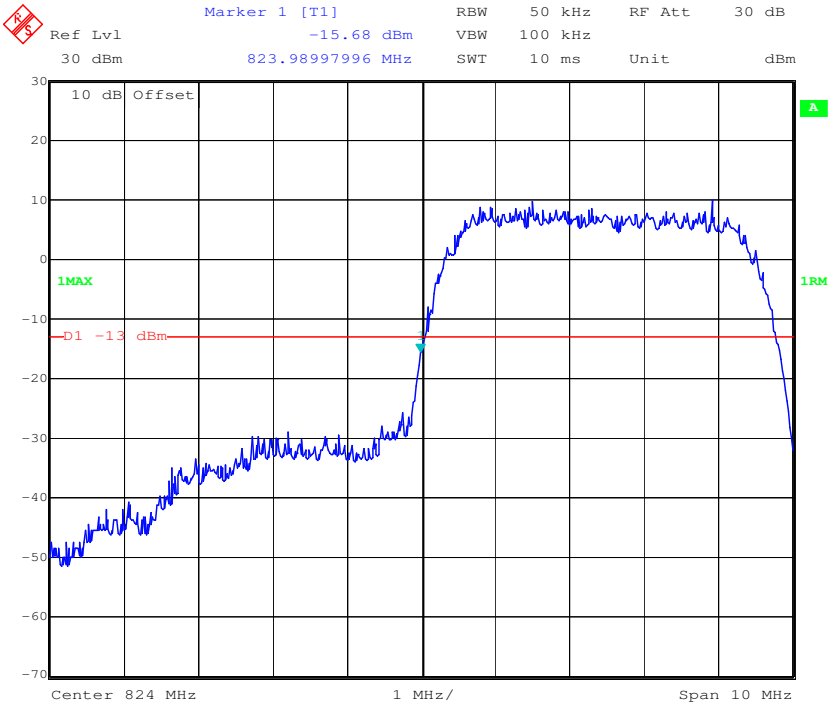
REL99 Band V, Left Band Edge



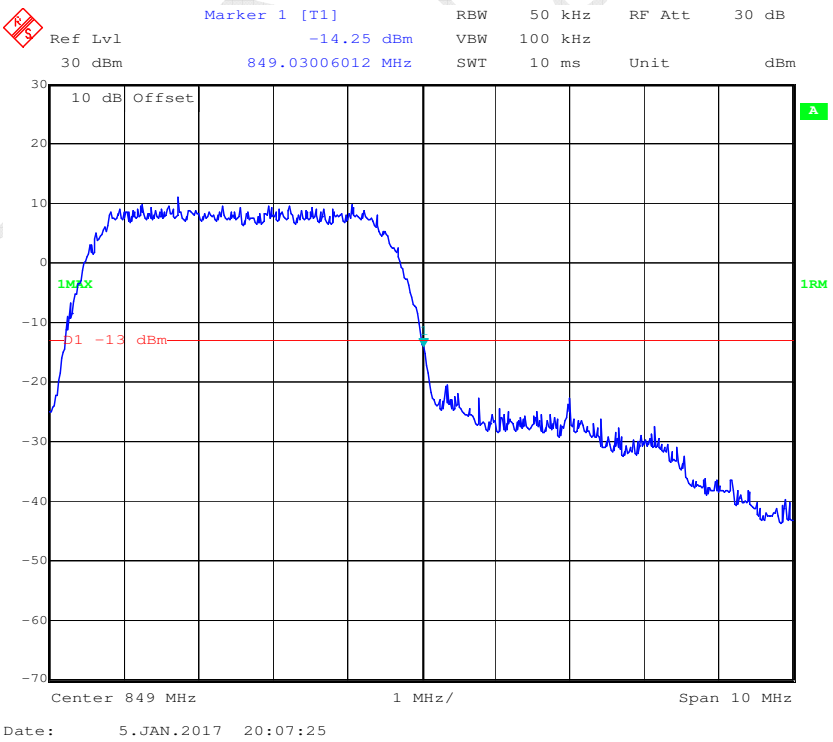
REL99 Band V Right Band Edge



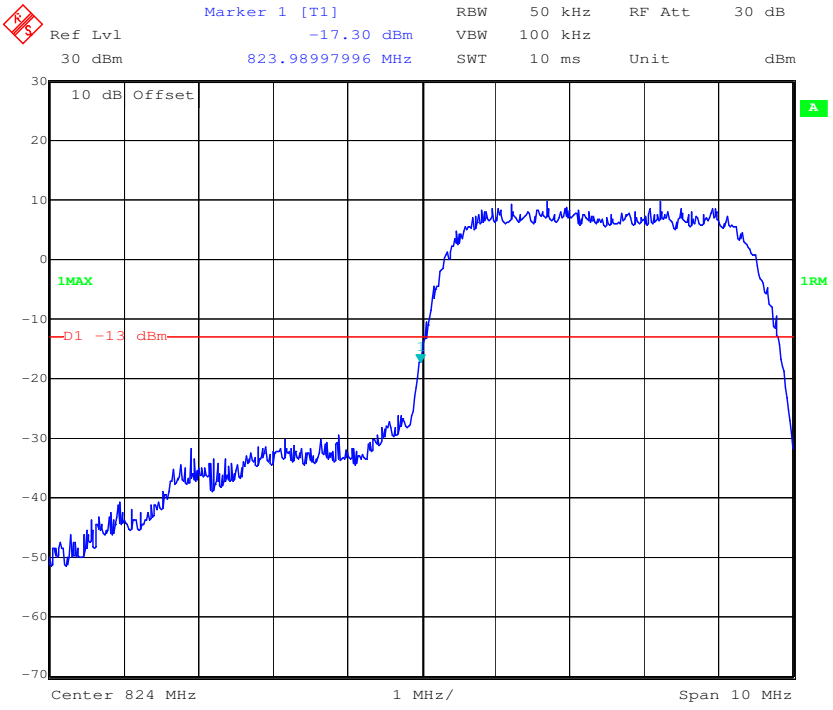
HSDPA Band V, Left Band Edge



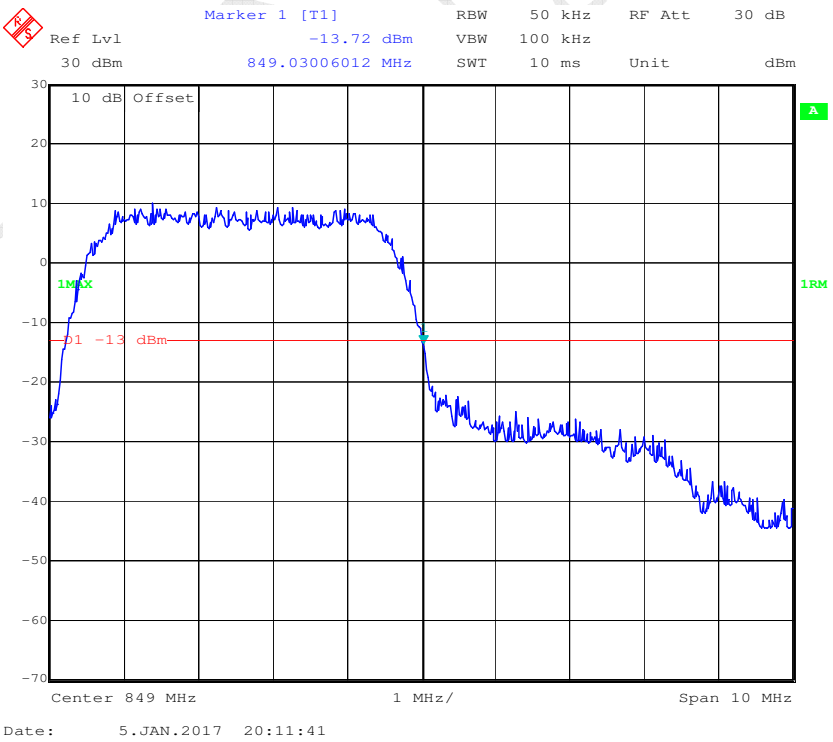
HSDPA Band V, Right Band Edge



HSUPA Band V, Left Band Edge

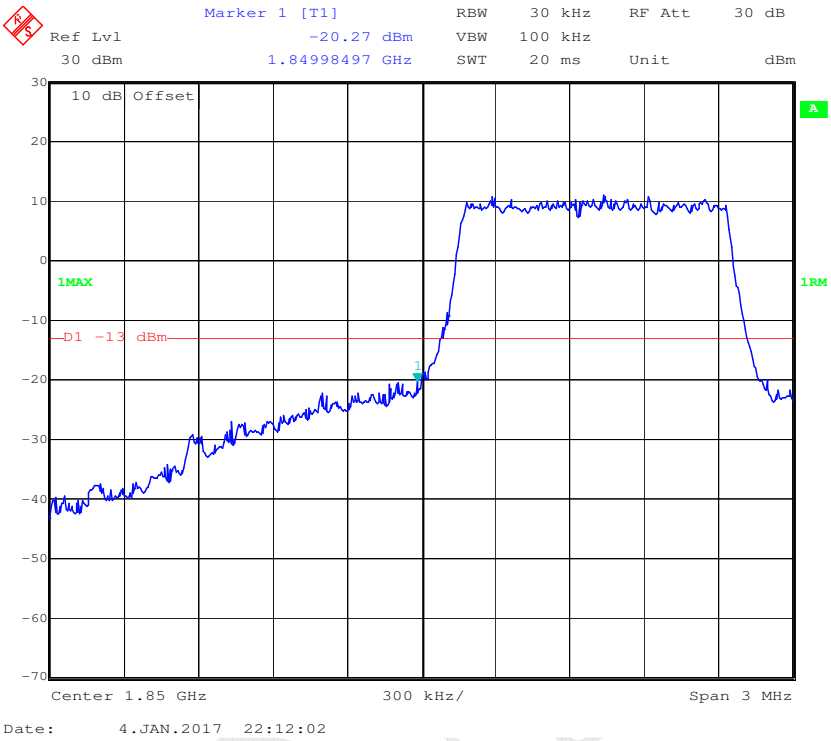


HSUPA Band V, Right Band Edge

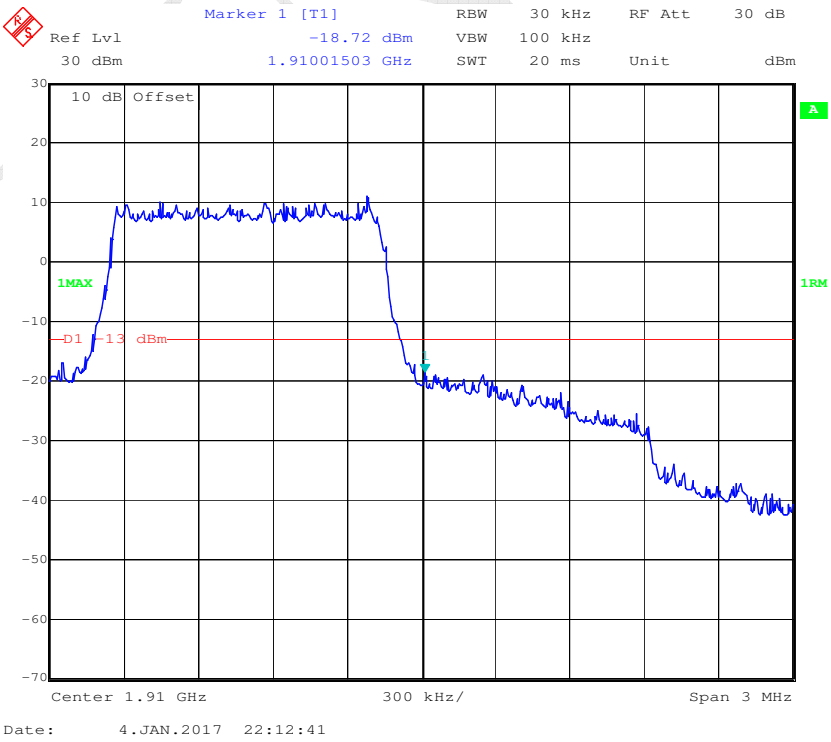


LTE Band II

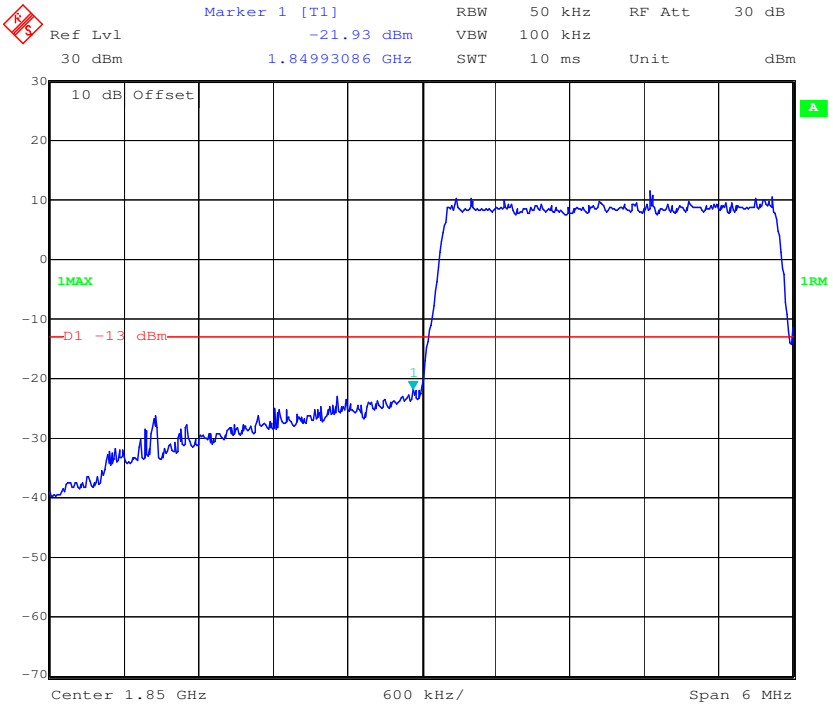
QPSK_1.4MHz_ FULL RB_ Left



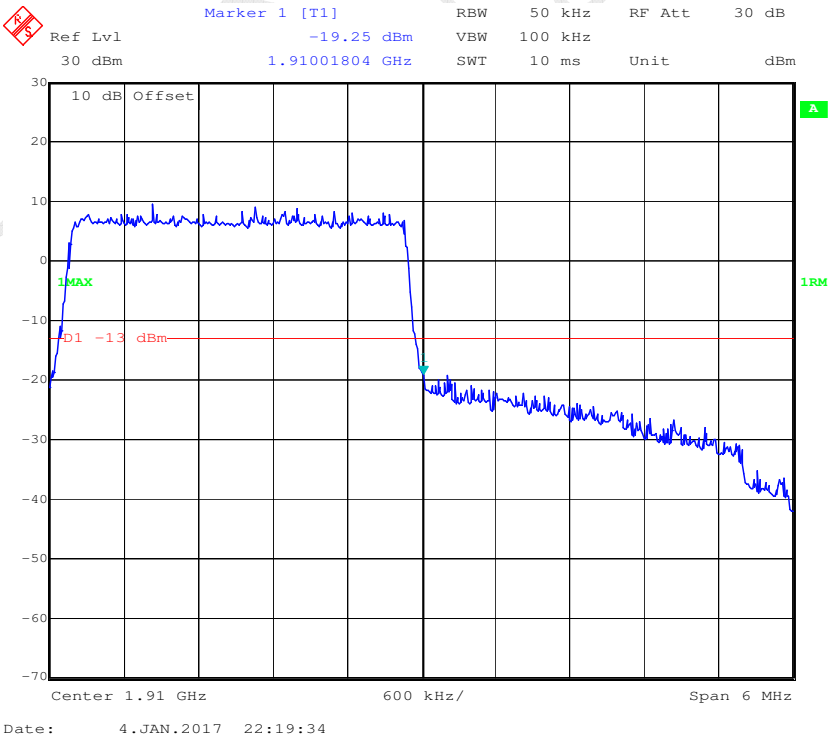
QPSK_1.4MHz_ FULL RB_ Right



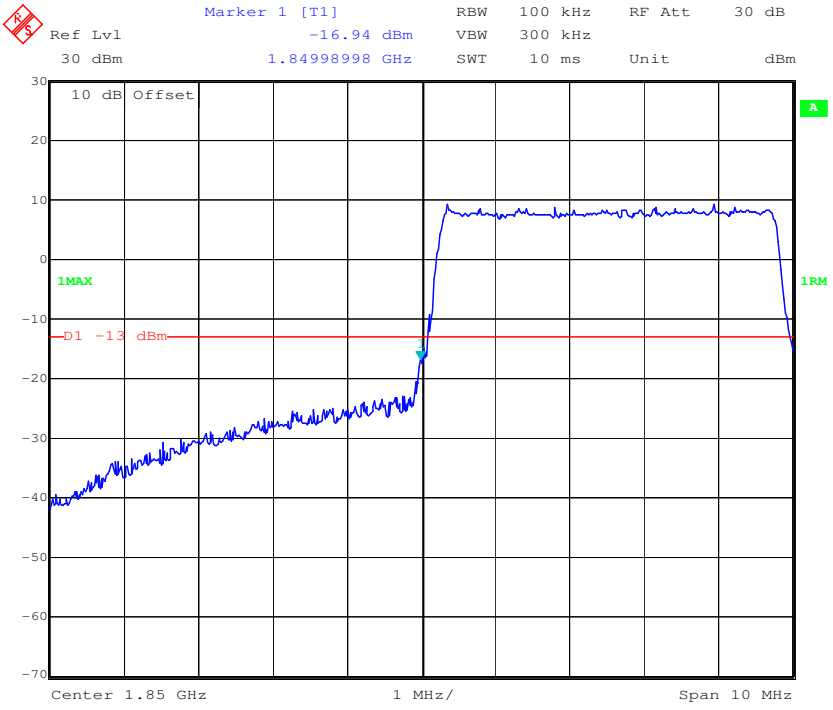
QPSK_3MHz_ FULL RB_ Left



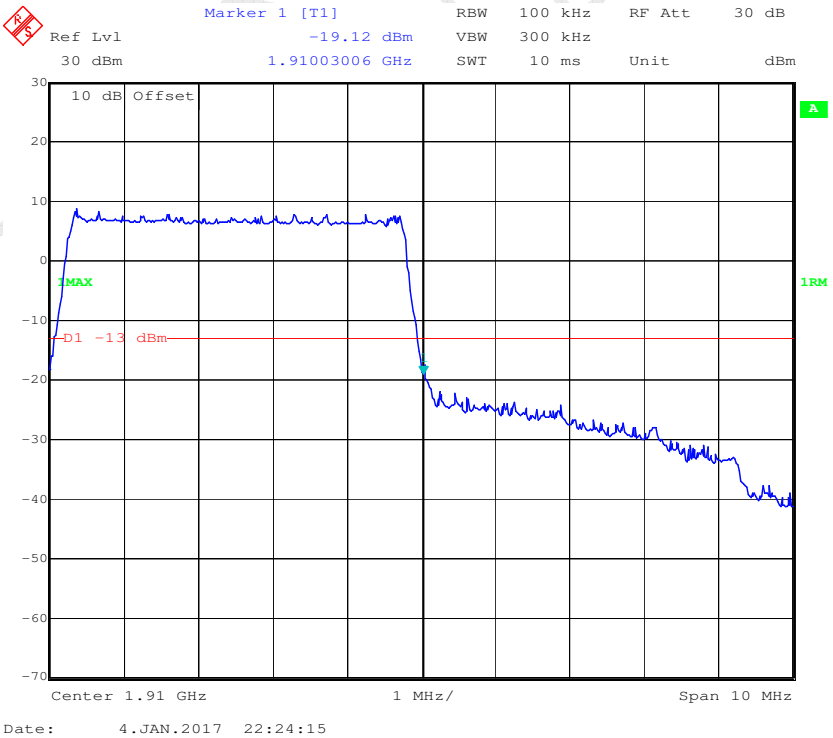
QPSK_3MHz_ FULL RB_ Right



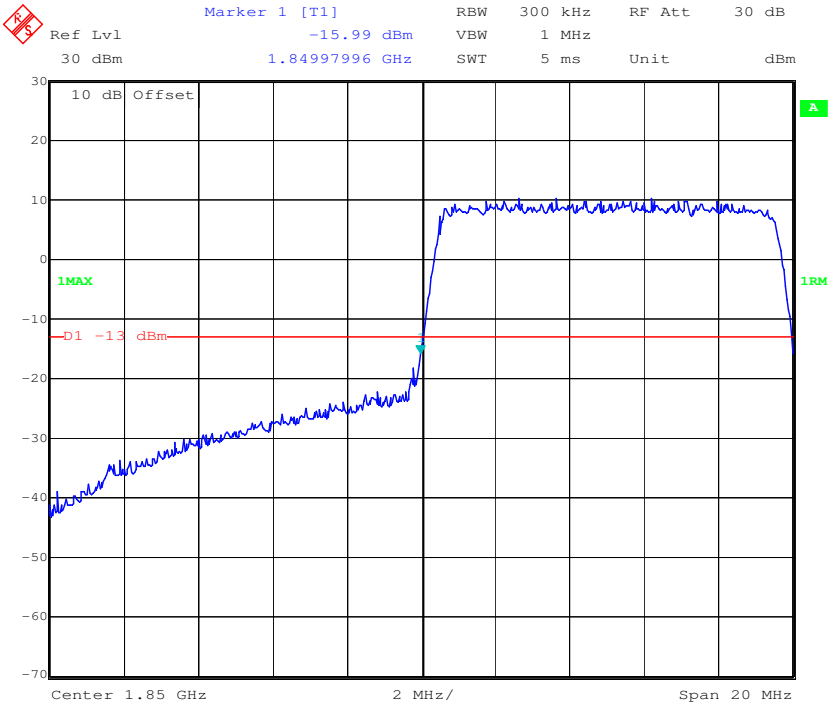
QPSK_5MHz_ FULL RB_ Left



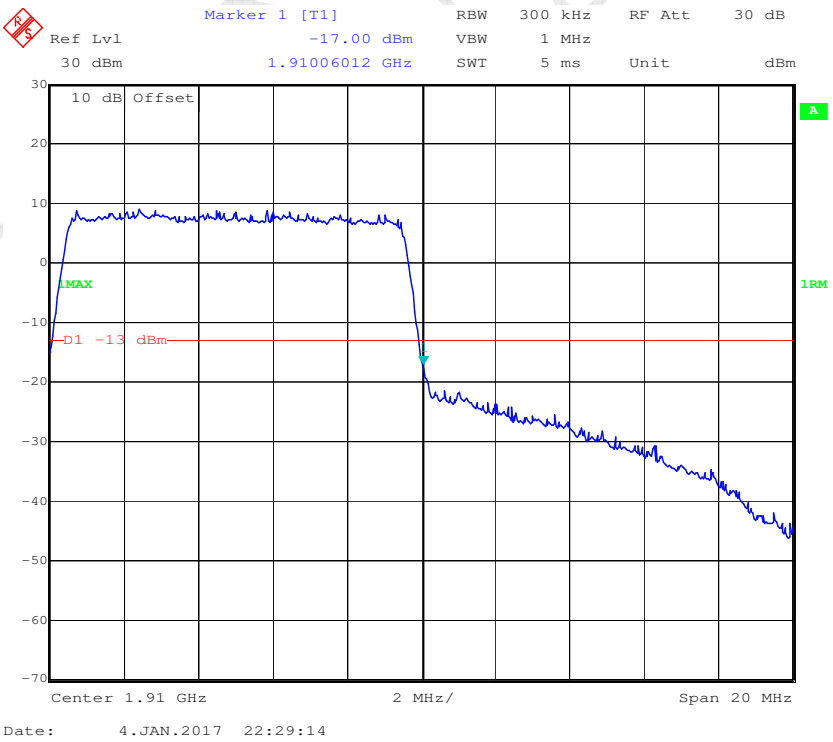
QPSK_5MHz_ FULL RB_ Right



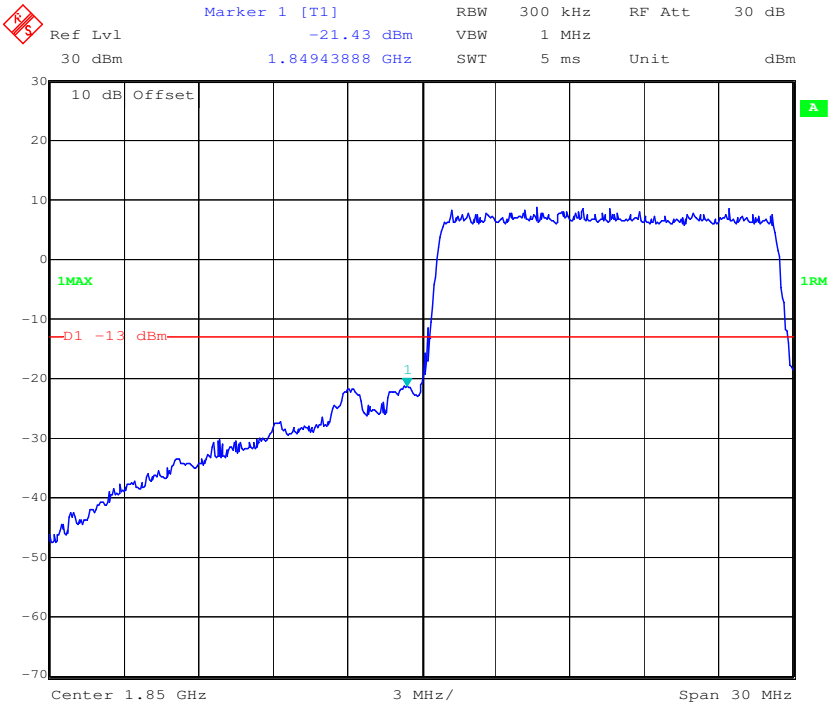
QPSK_10MHz_ FULL RB_ Left



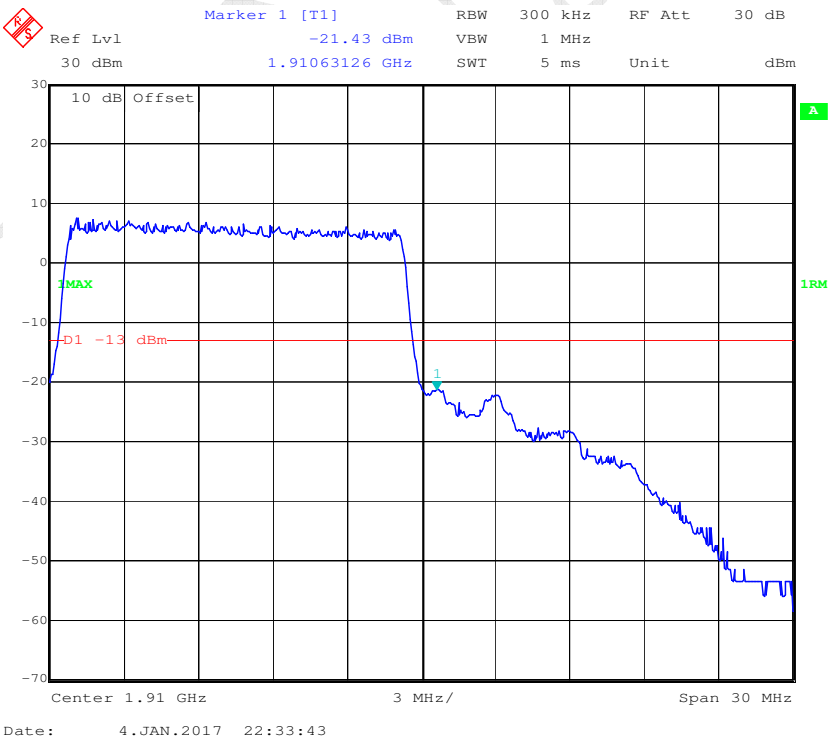
QPSK_10MHz_ FULL RB_ Right



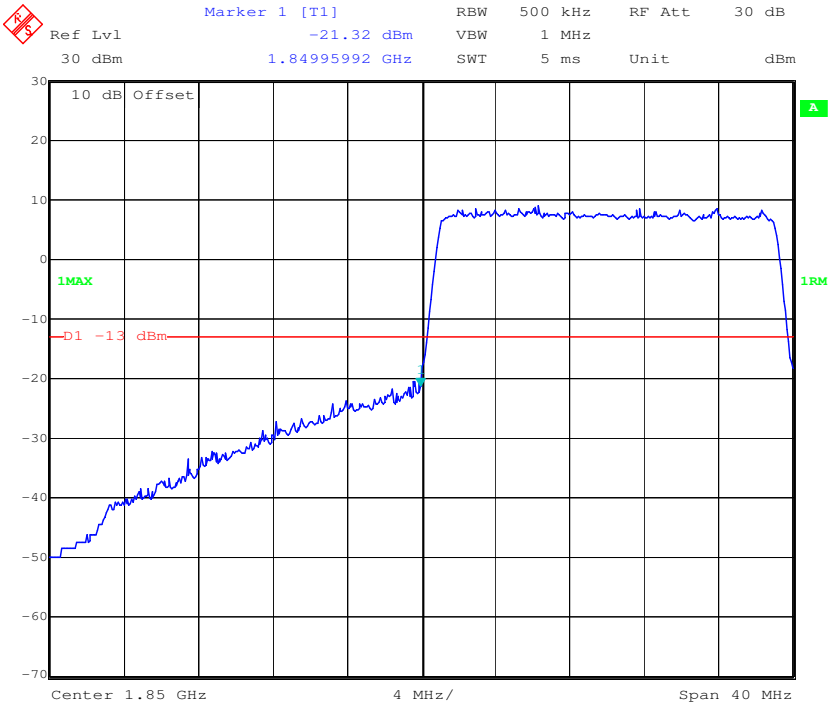
QPSK_15MHz_ FULL RB_ Left



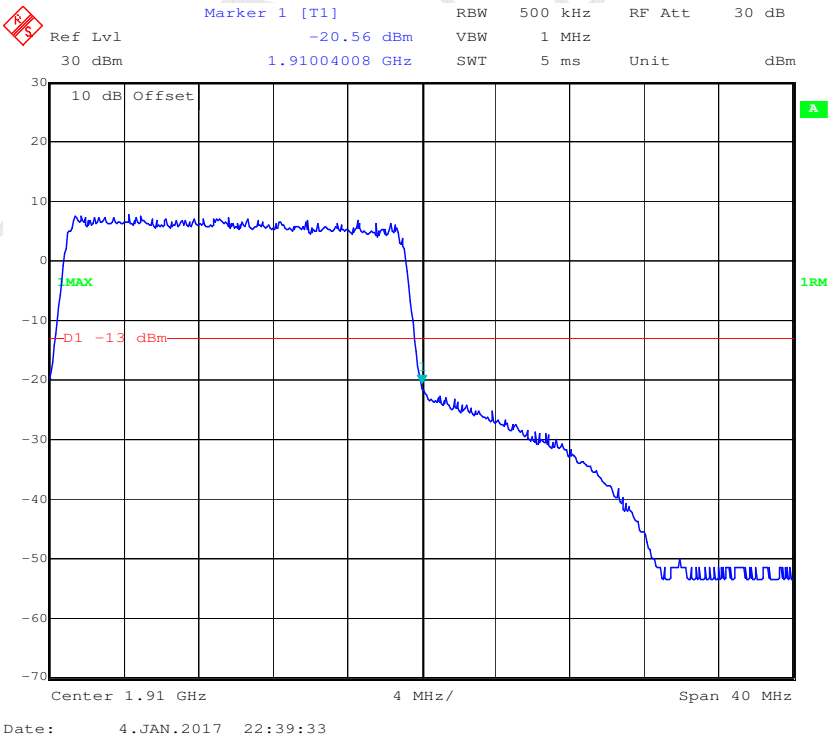
QPSK_15MHz_ FULL RB_ Right



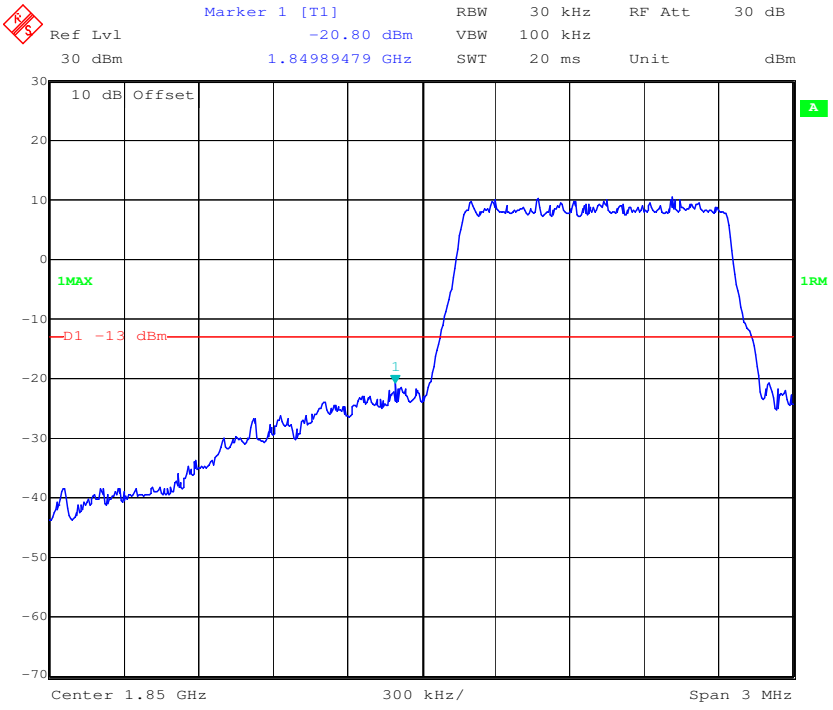
QPSK_20MHz_ FULL RB_ Left



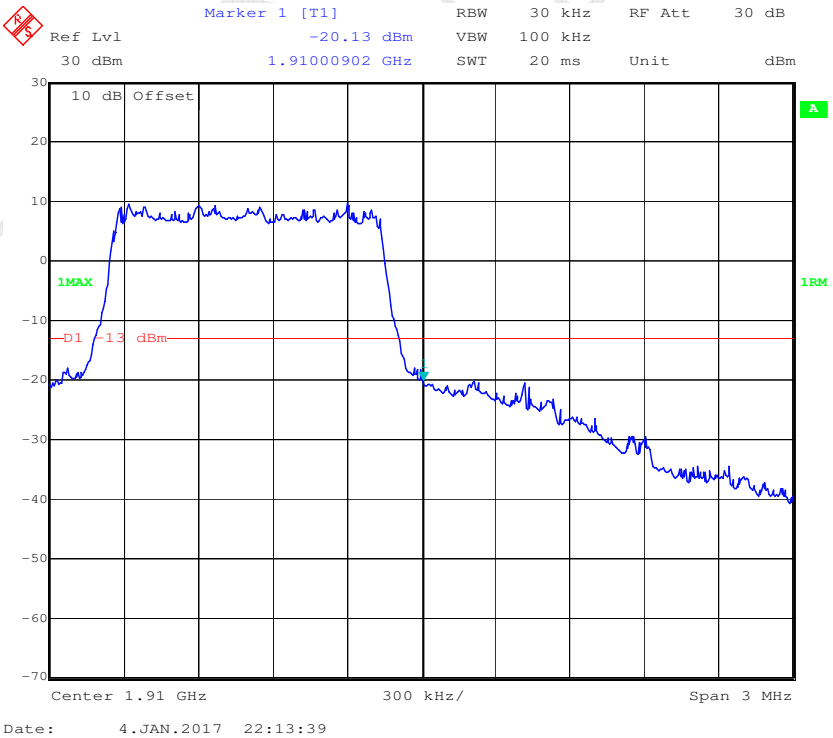
QPSK_20MHz_ FULL RB_ Right



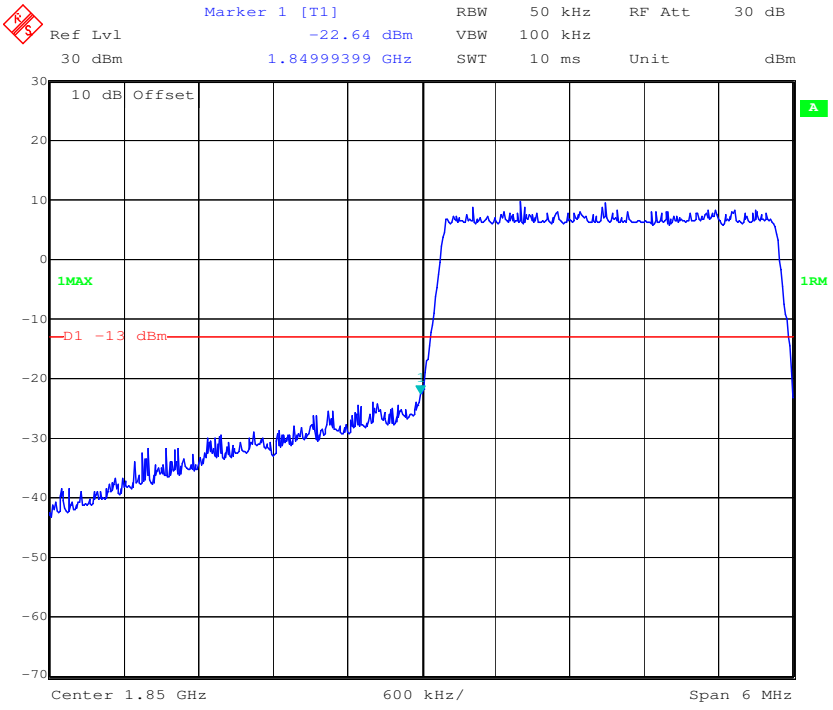
16QAM_1.4MHz_ FULL RB_ Left



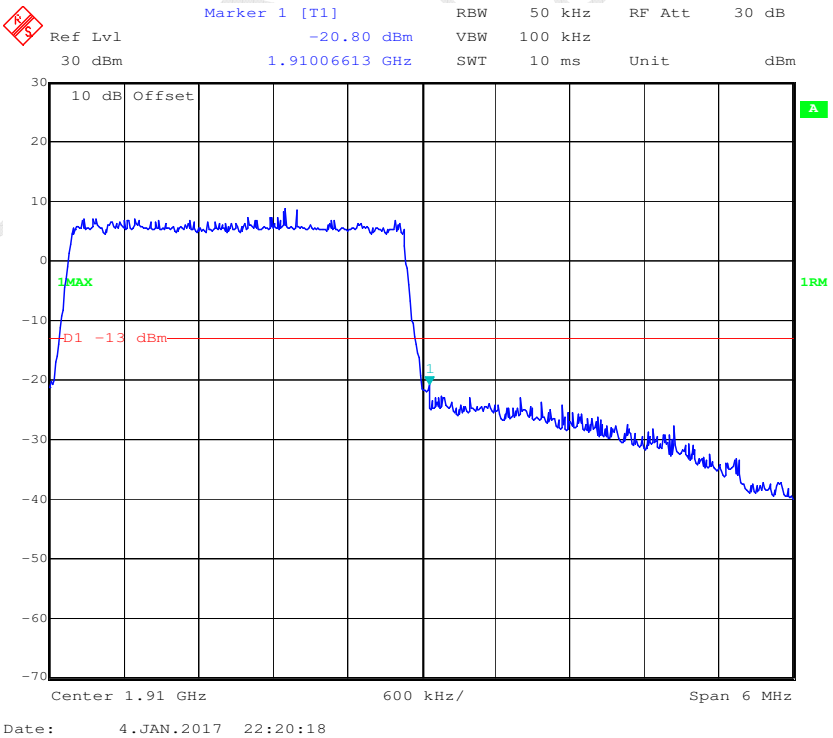
16QAM_1.4MHz_ FULL RB_ Right



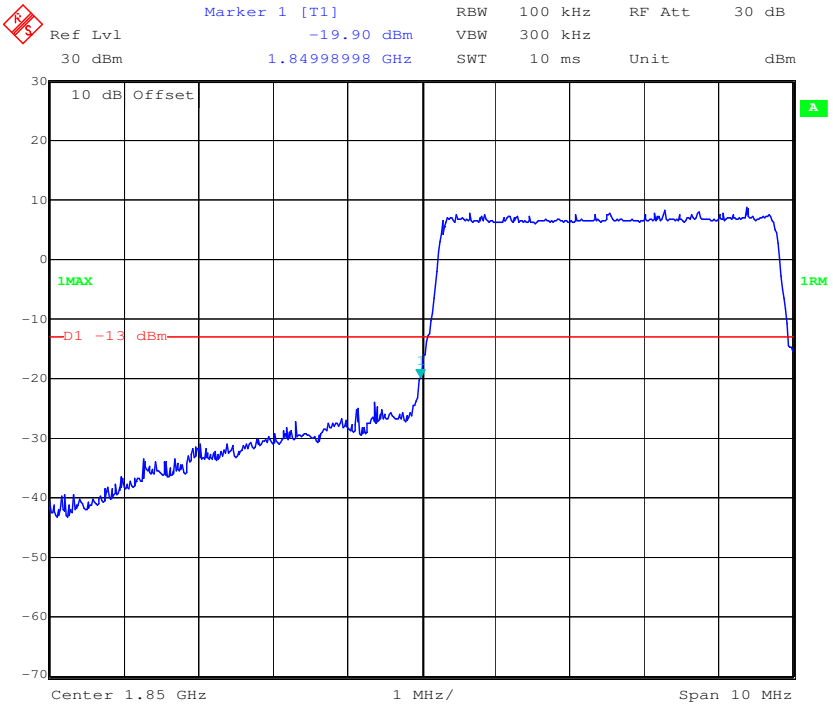
16QAM_3MHz_ FULL RB_ Left



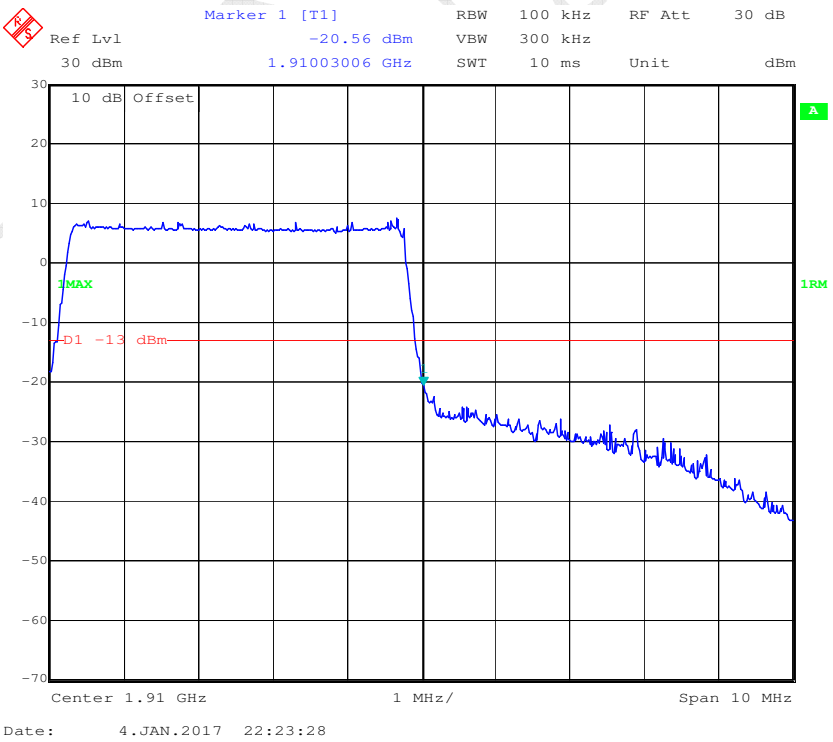
16QAM_3MHz_ FULL RB_ Right



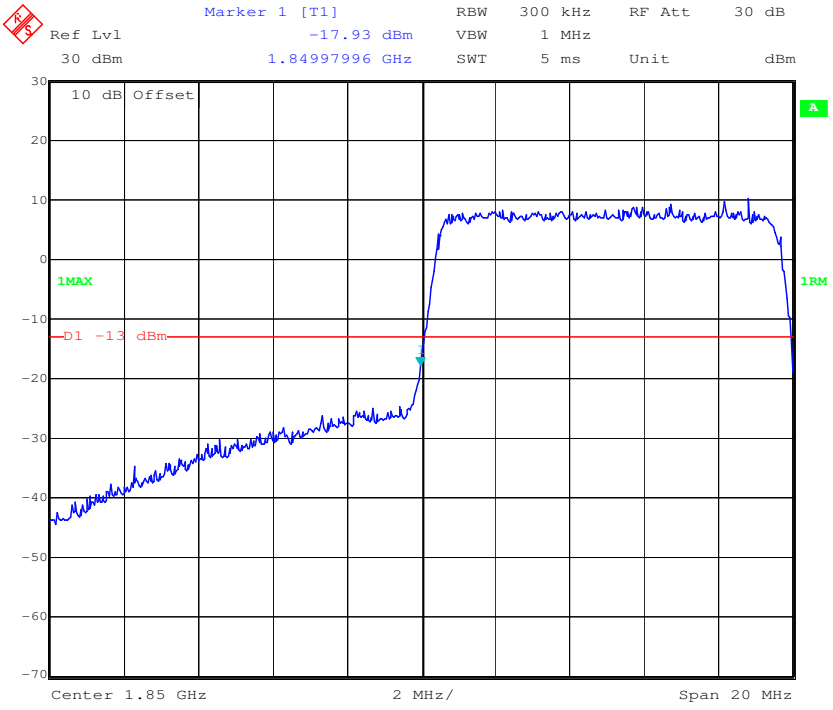
16QAM_5MHz_ FULL RB_ Left



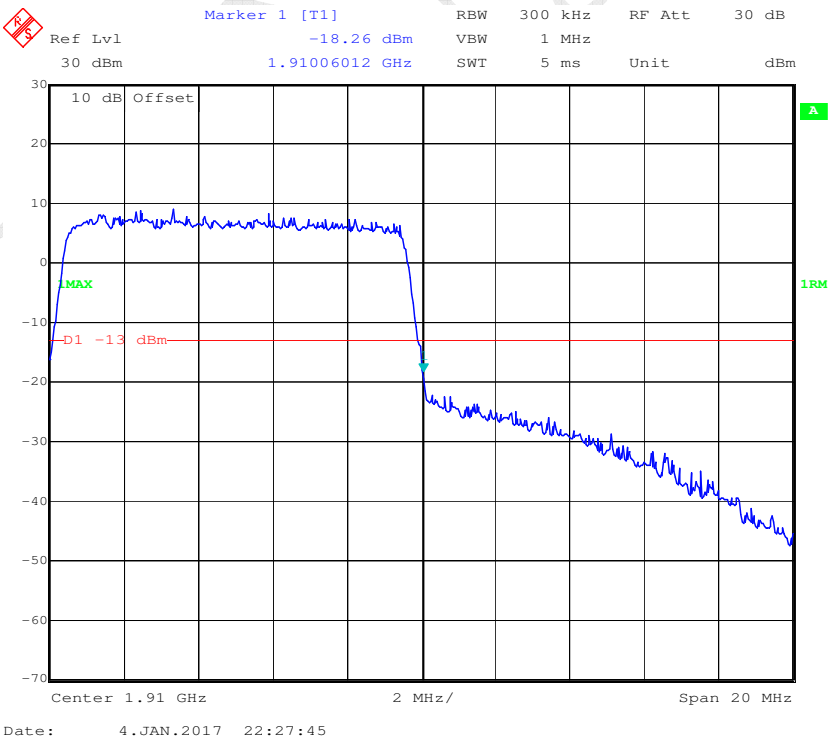
16QAM_5MHz_ FULL RB_ Right



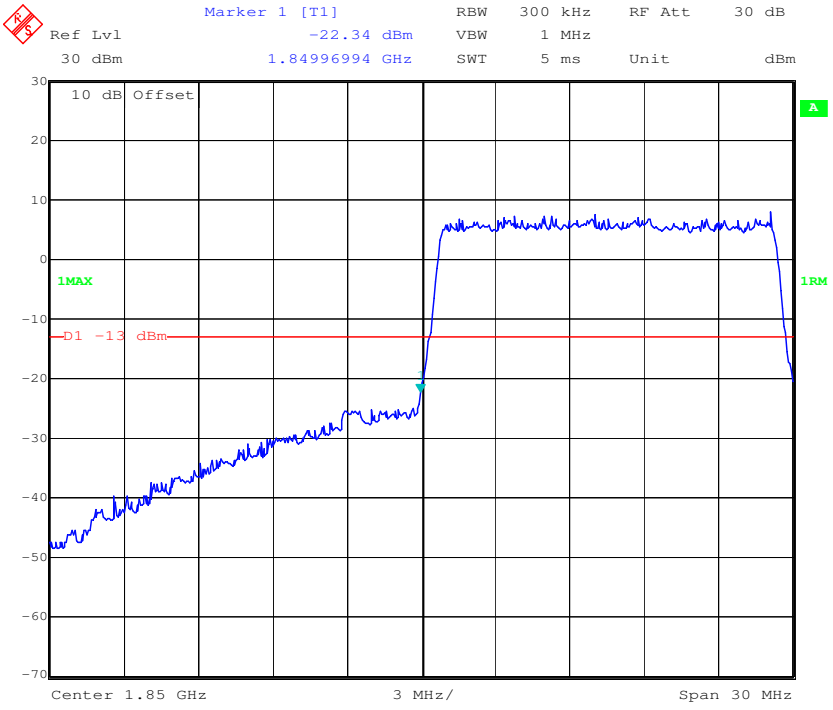
16QAM_10MHz_ FULL RB_ Left



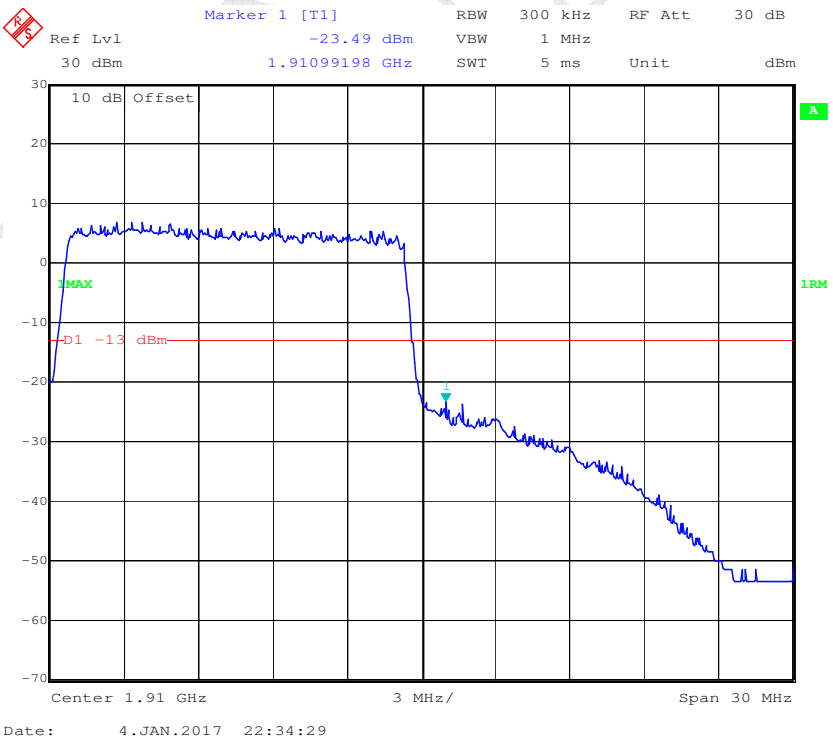
16QAM_10MHz_ FULL RB_ Right



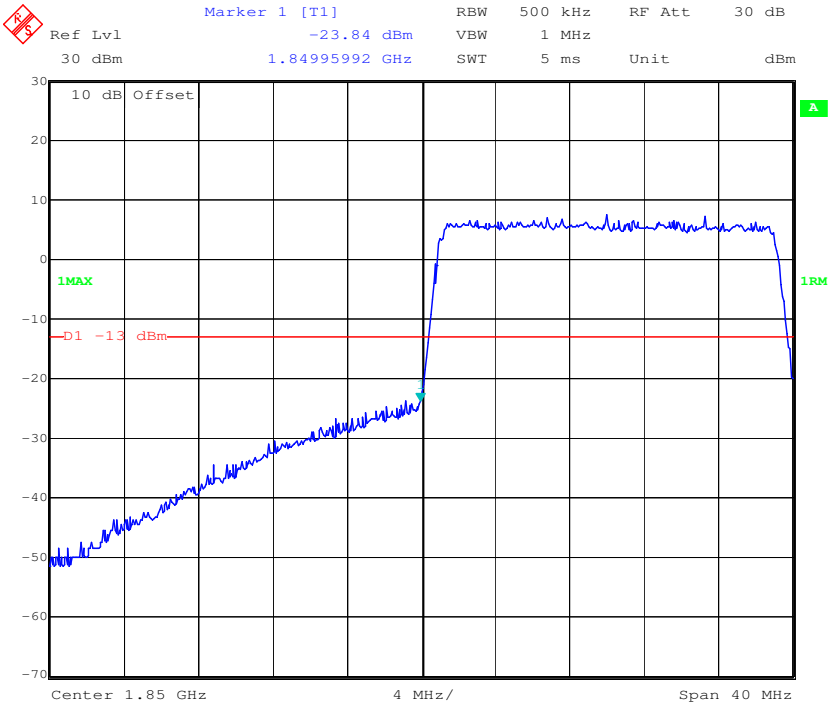
16QAM_15MHz_ FULL RB_ Left



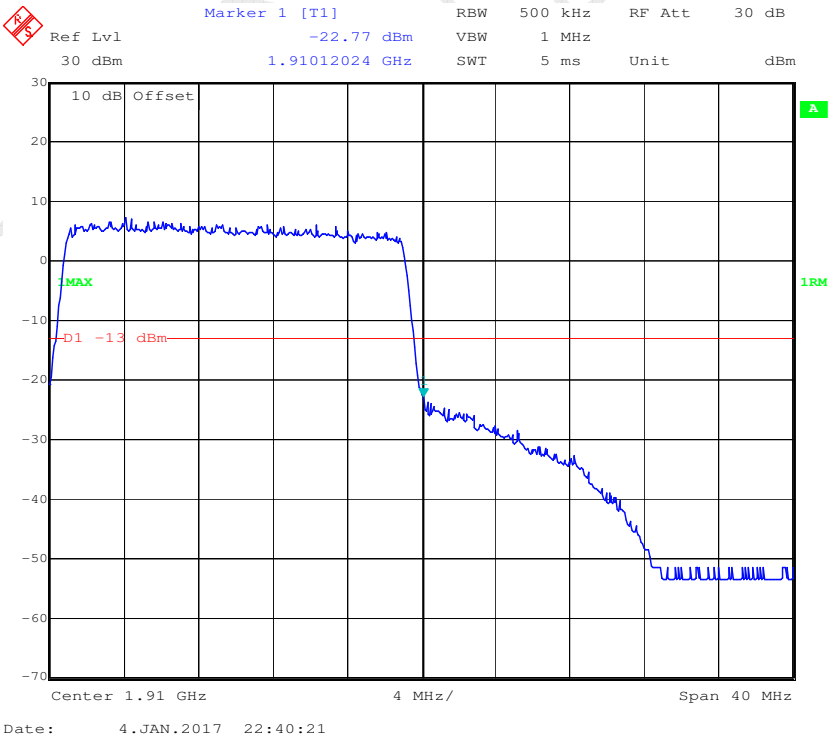
16QAM_15MHz_ FULL RB_ Right



16QAM_20MHz_ FULL RB_ Left

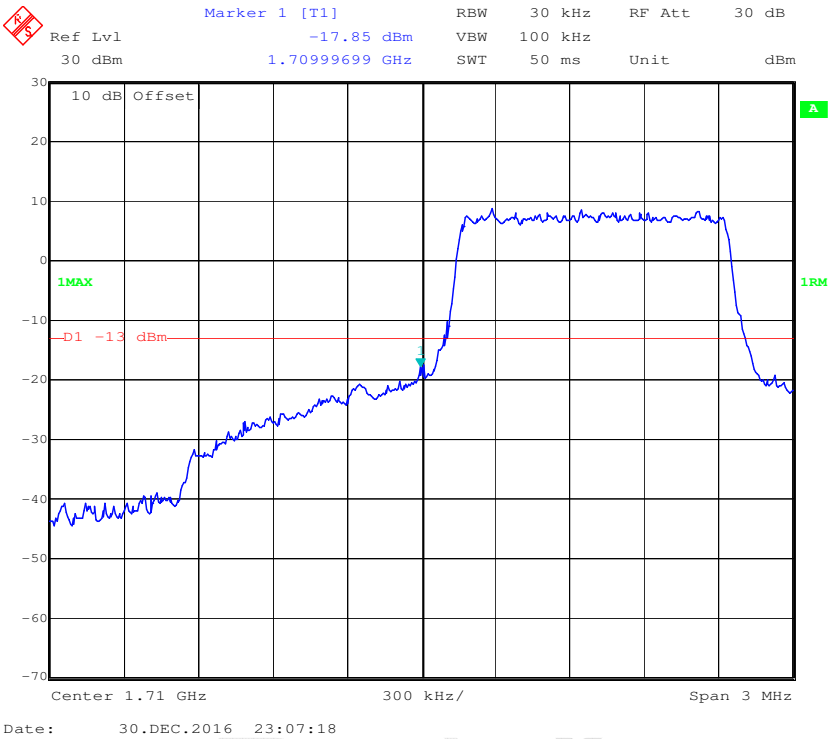


16QAM_20MHz_ FULL RB_ Right

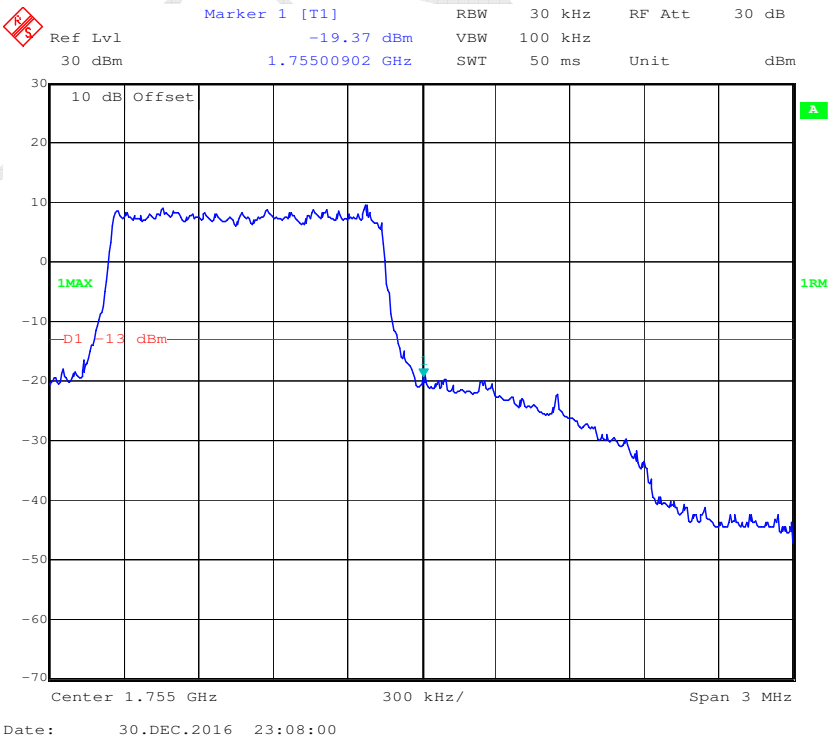


LTE Band IV

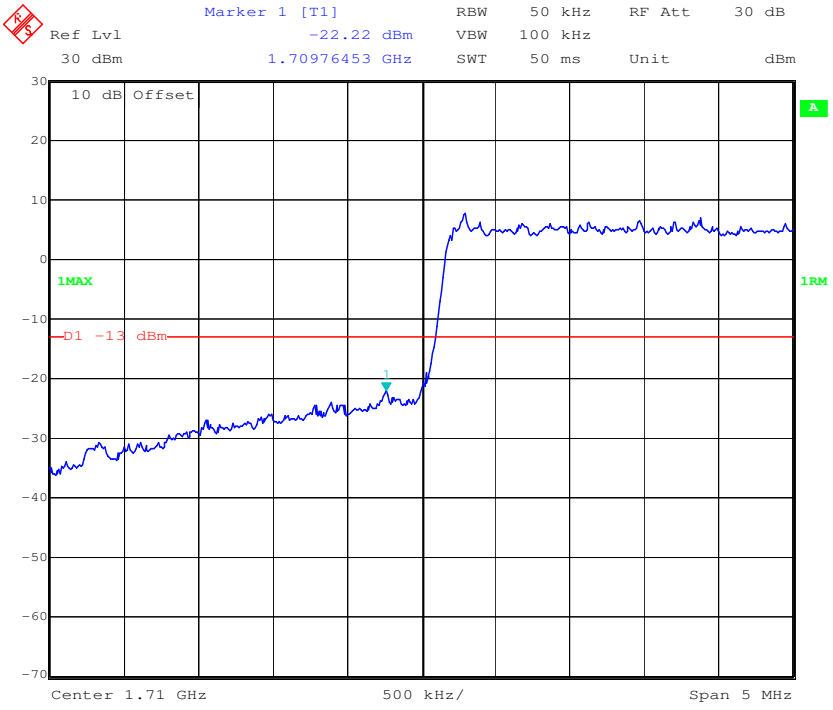
QPSK_1.4MHz_ FULL RB_ Left



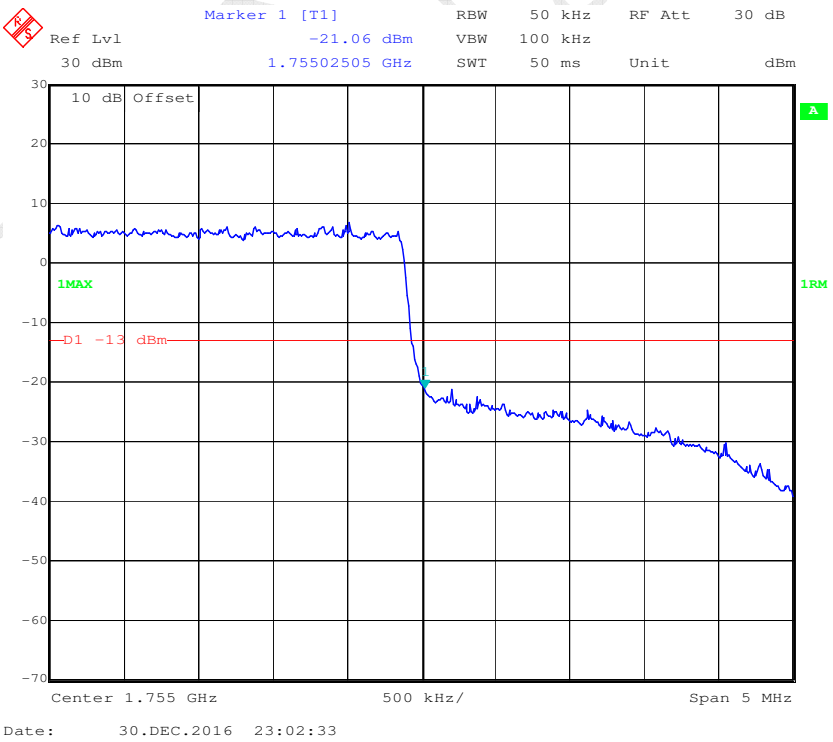
QPSK_1.4MHz_ FULL RB_ Right



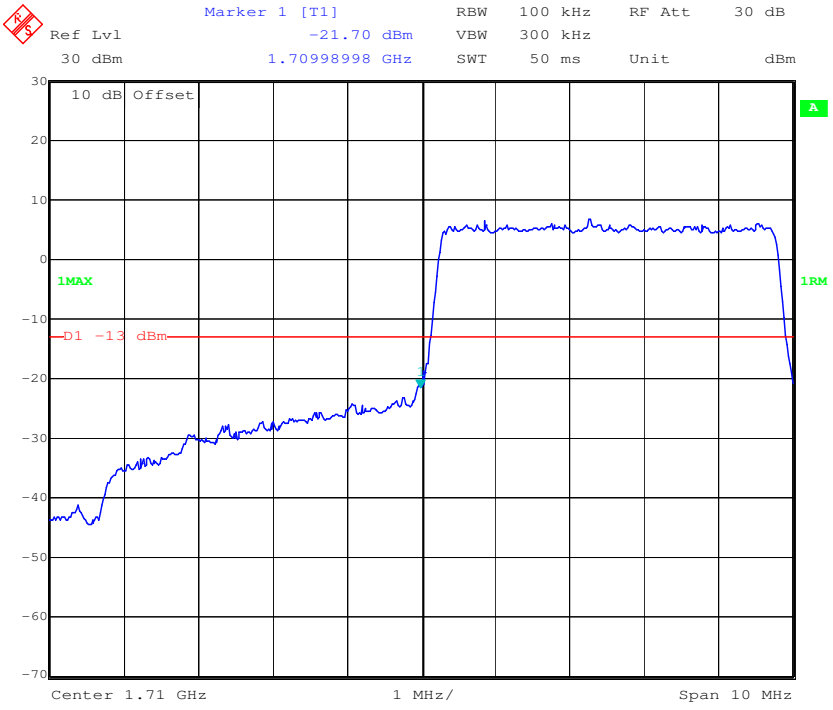
QPSK_3MHz_ FULL RB_ Left



QPSK_3MHz_ FULL RB_ Right

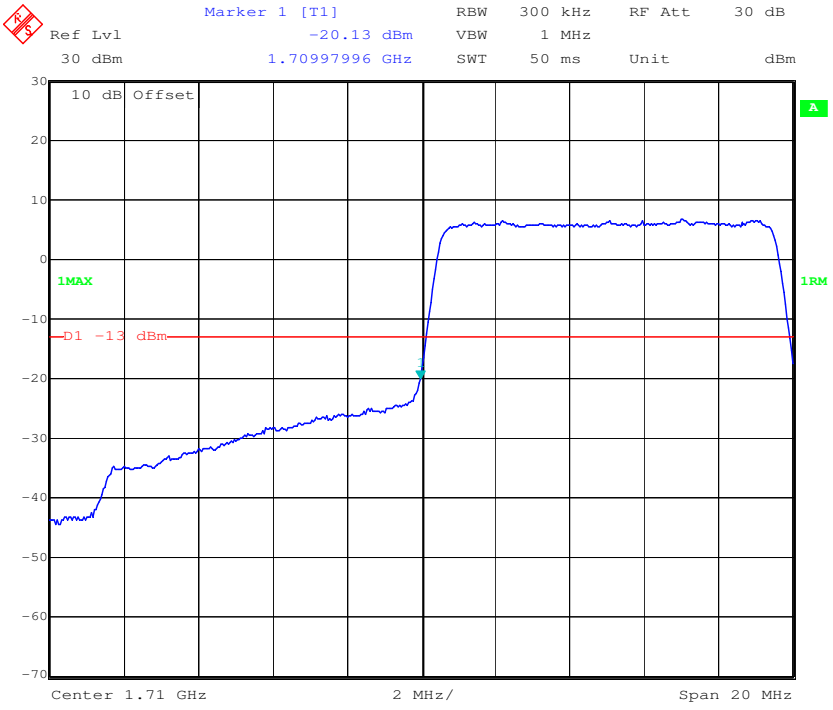


QPSK_5MHz_ FULL RB_ Left



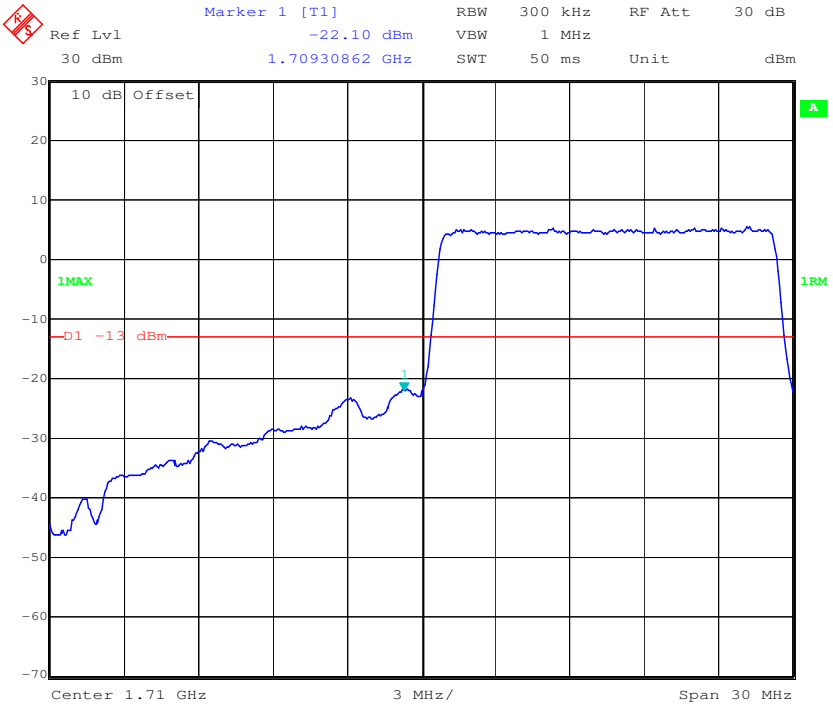
QPSK_5MHz_ FULL RB_ Right

QPSK_10MHz_ FULL RB_ Left

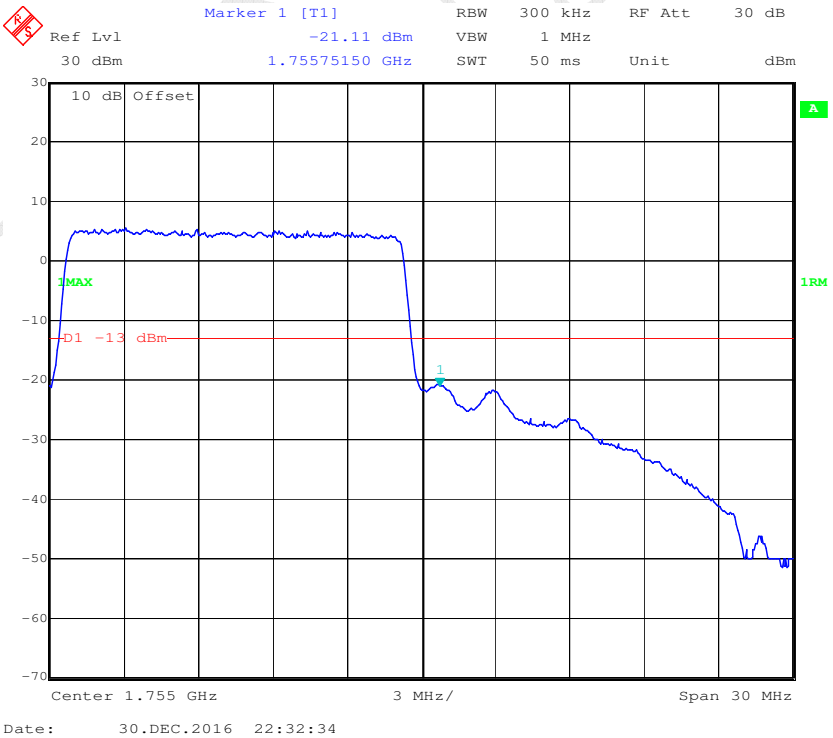


QPSK_10MHz_ FULL RB_ Right

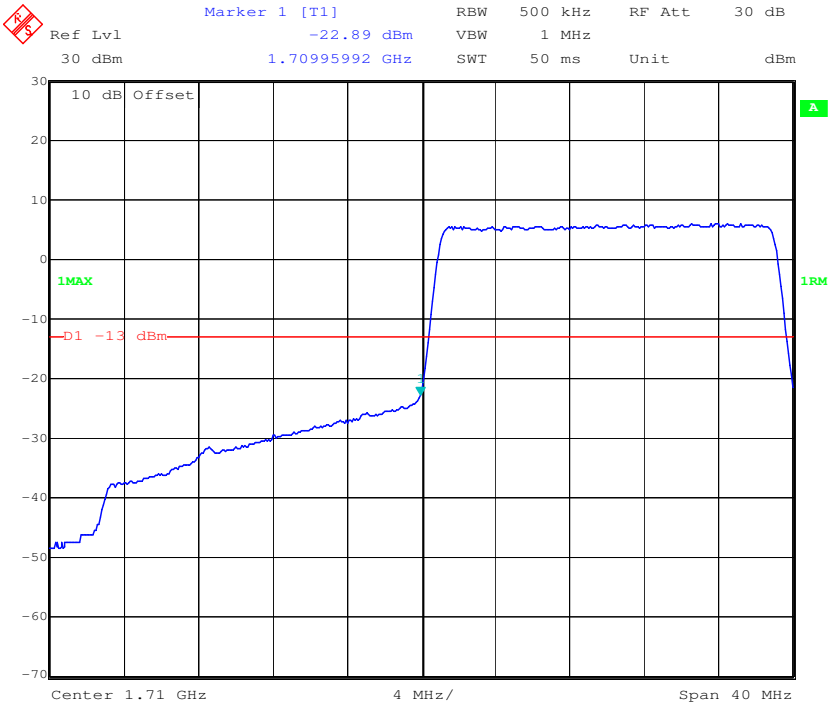
QPSK_15MHz_ FULL RB_ Left



QPSK_15MHz_ FULL RB_ Right

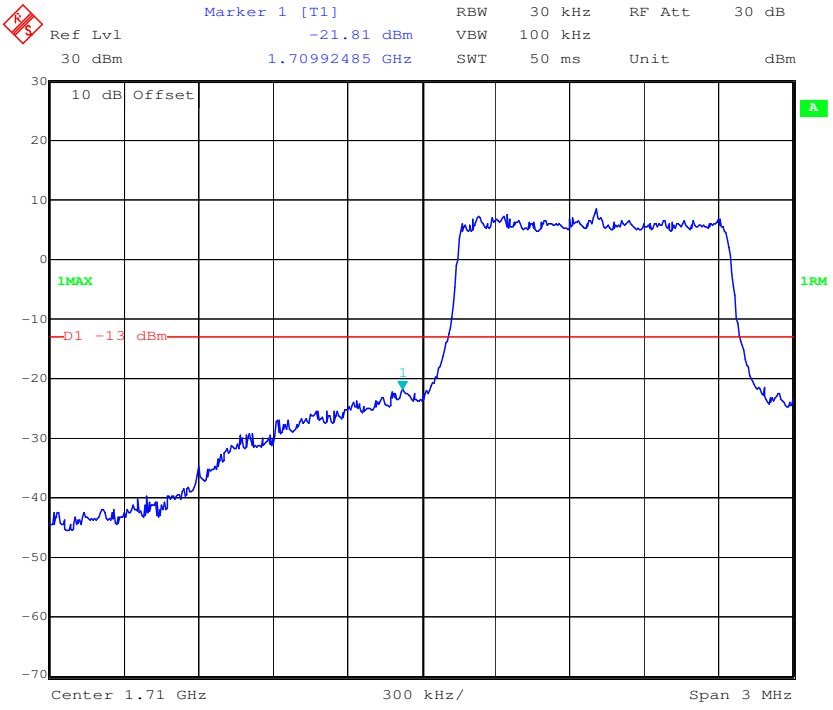


QPSK_20MHz_ FULL RB_ Left

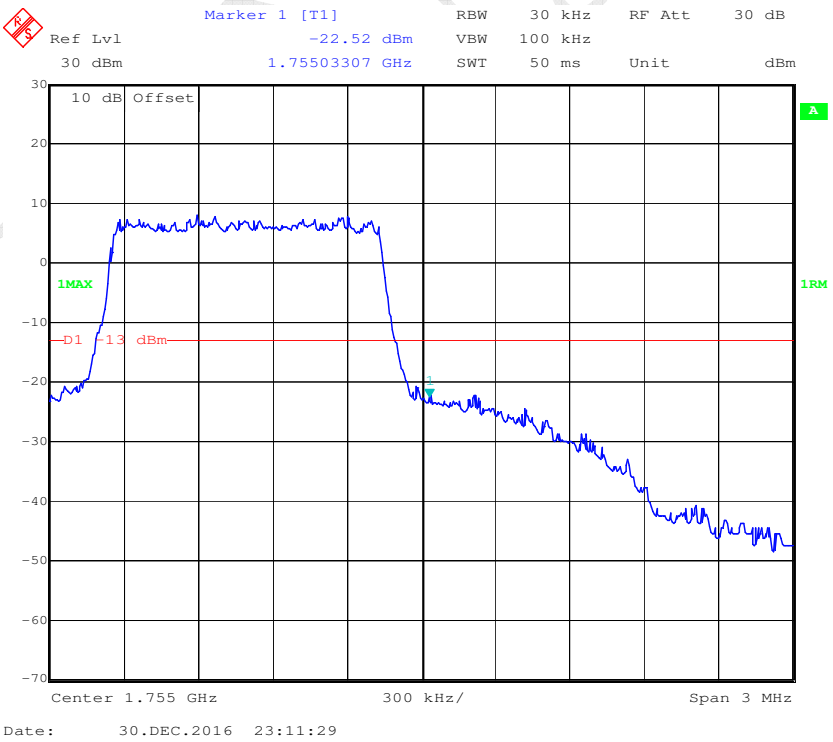


QPSK_20MHz_ FULL RB_ Right

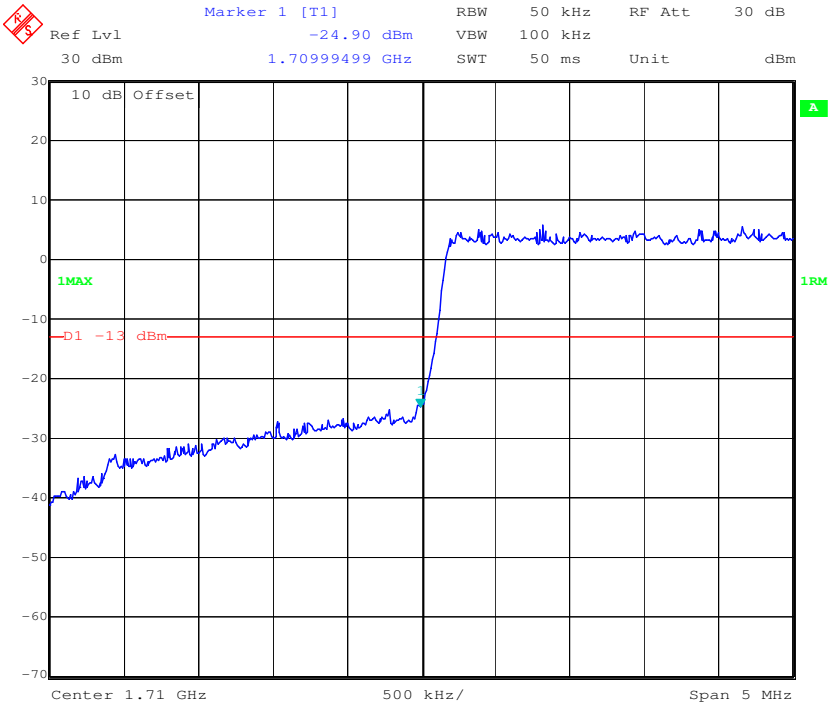
16QAM_1.4MHz_ FULL RB_ Left



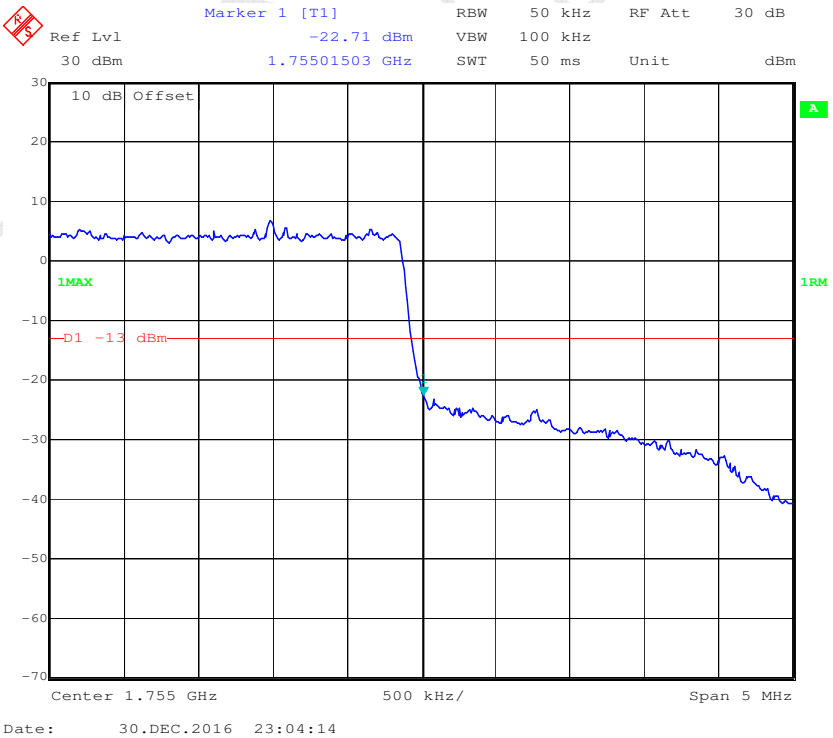
16QAM_1.4MHz_ FULL RB_ Right



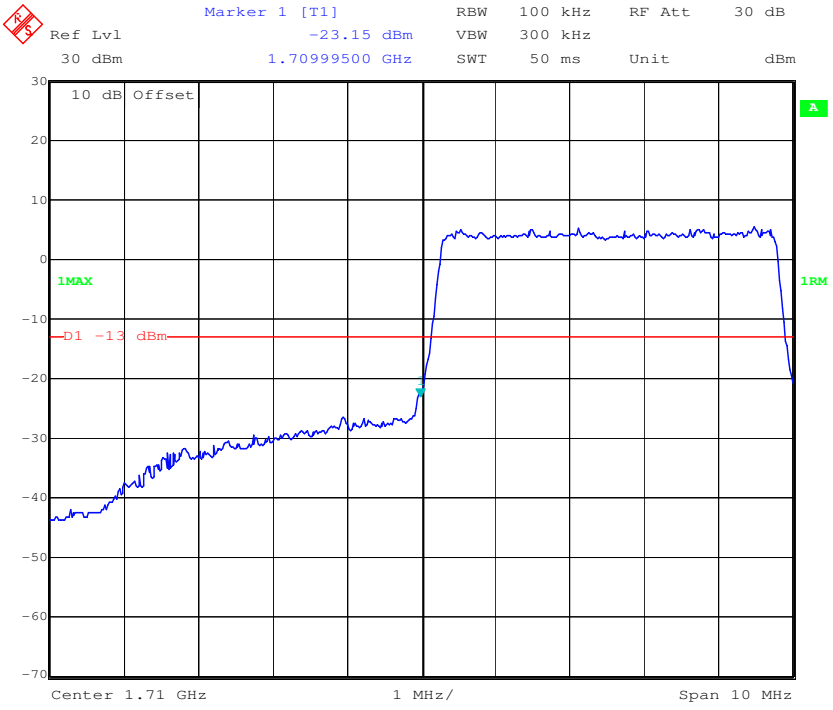
16QAM_3MHz_ FULL RB_ Left



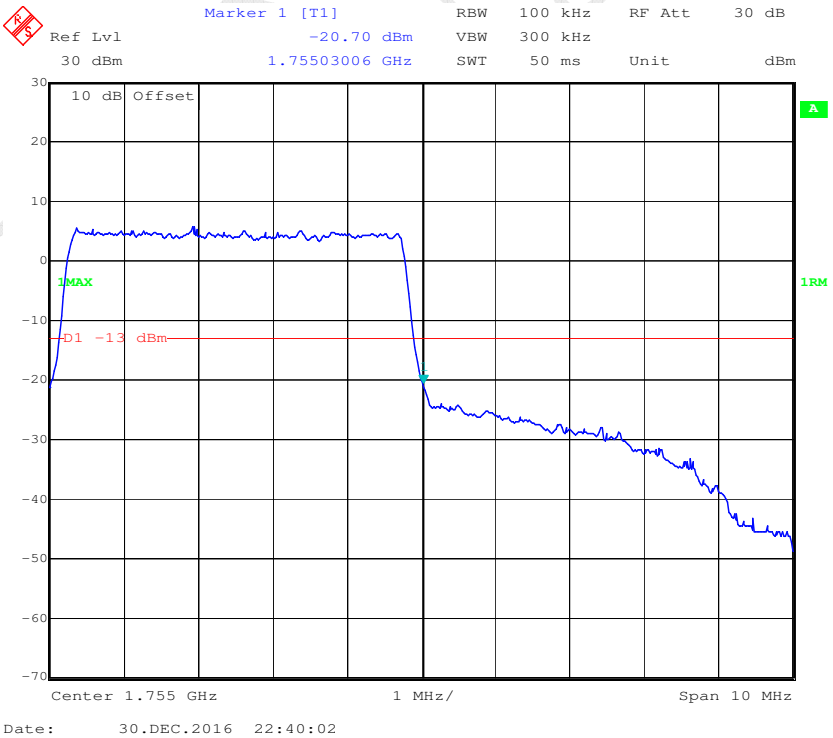
16QAM_3MHz_ FULL RB_ Right



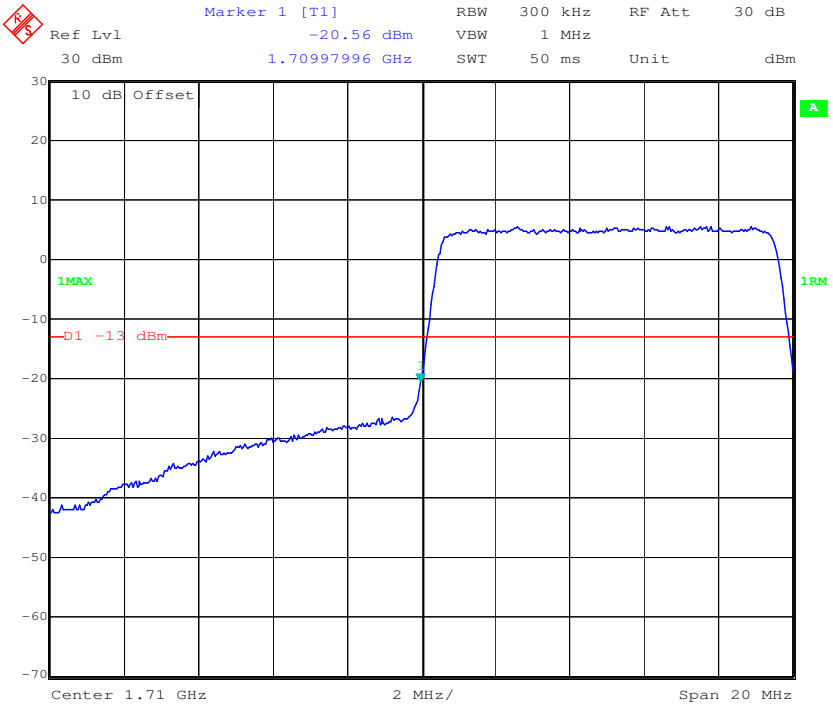
16QAM_5MHz_ FULL RB_ Left



16QAM_5MHz_ FULL RB_ Right

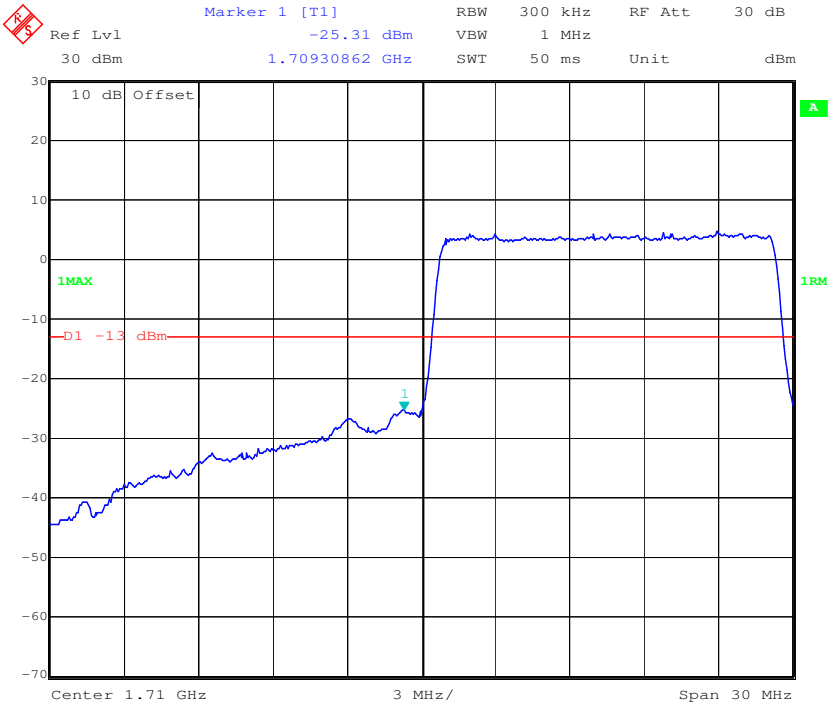


16QAM_10MHz_ FULL RB_ Left

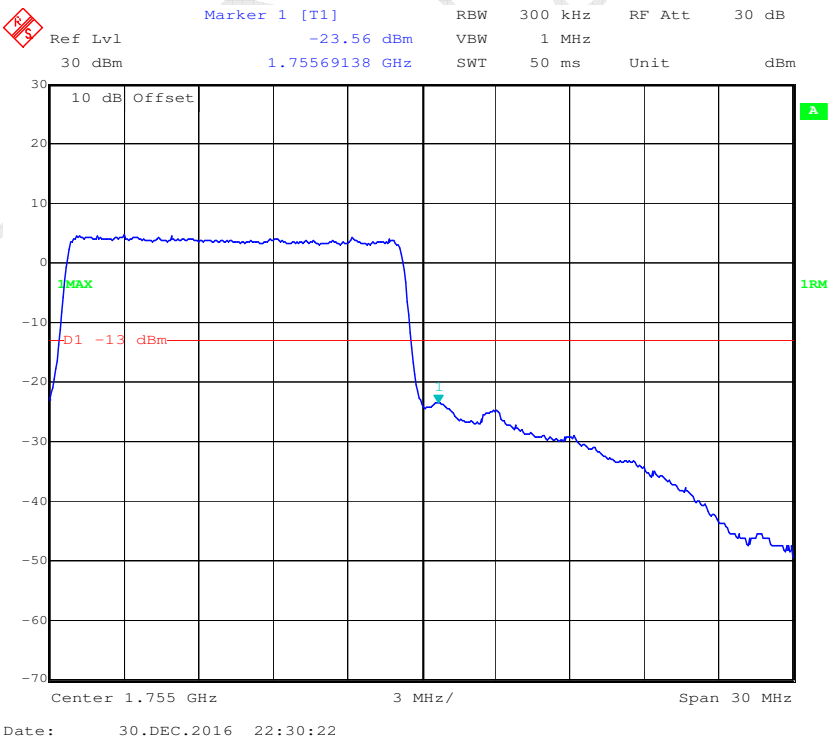


16QAM_10MHz_ FULL RB_ Right

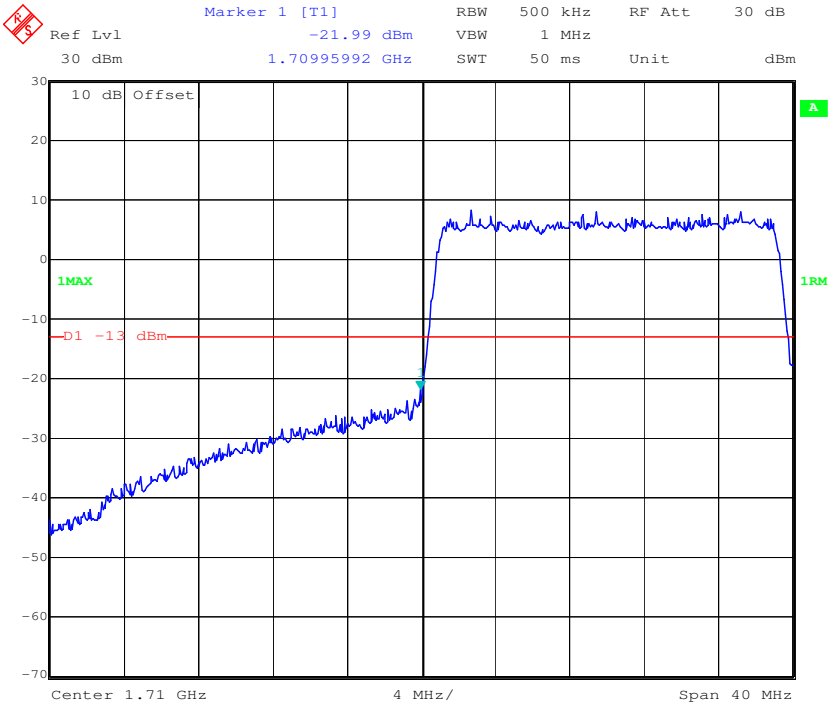
16QAM_15MHz_ FULL RB_ Left



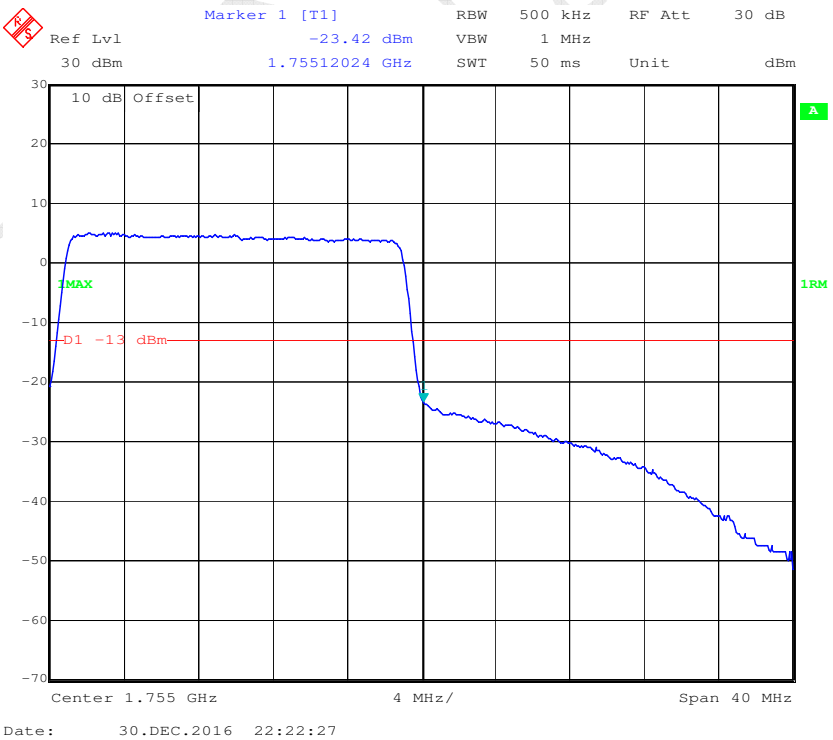
16QAM_15MHz_ FULL RB_ Right



16QAM_20MHz_ FULL RB_ Left

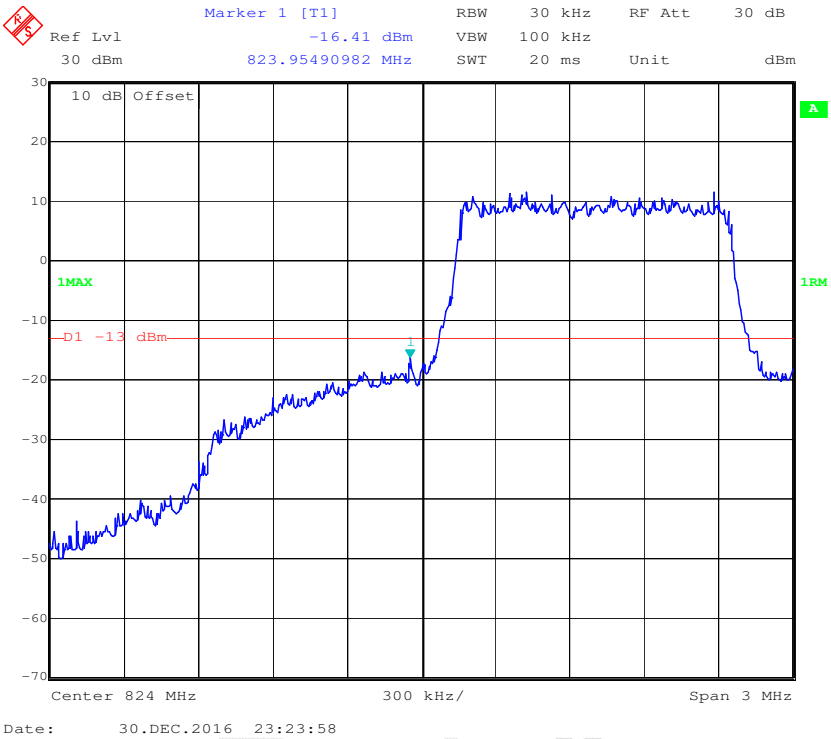


16QAM_20MHz_ FULL RB_ Right

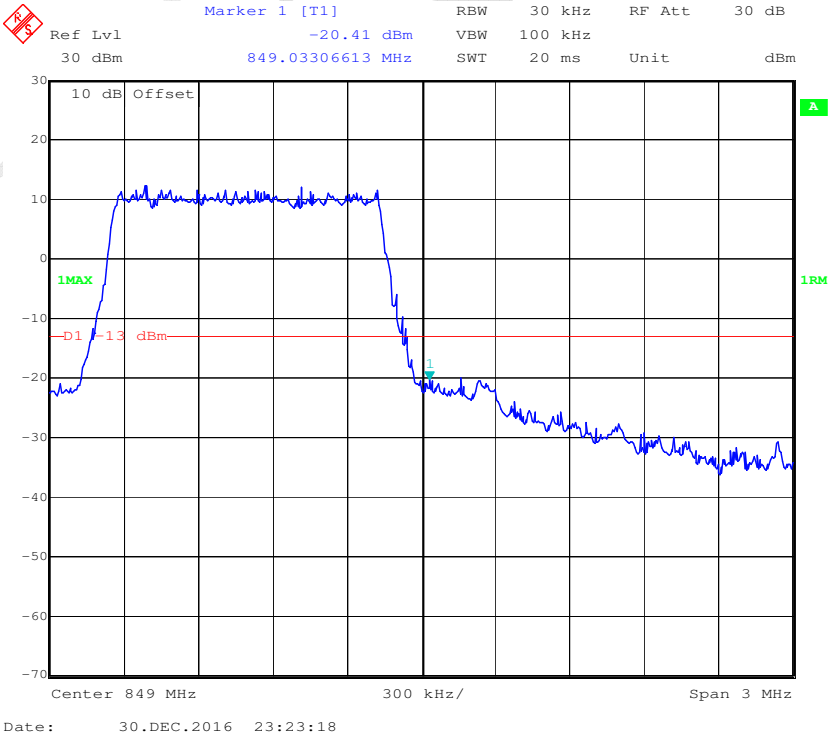


LTE Band V

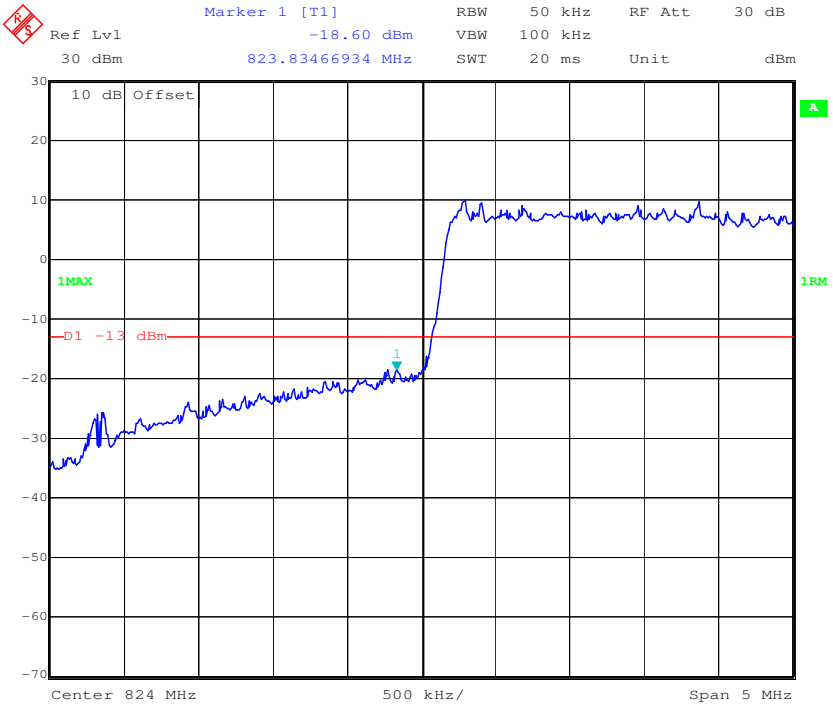
QPSK_1.4MHz_ FULL RB_ Left



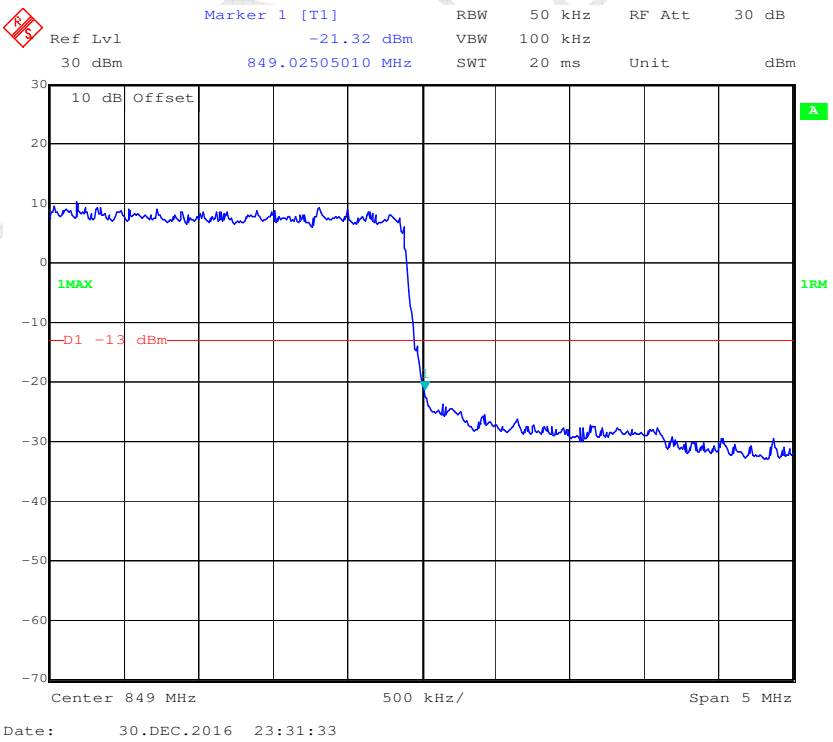
QPSK_1.4MHz_ FULL RB_ Right



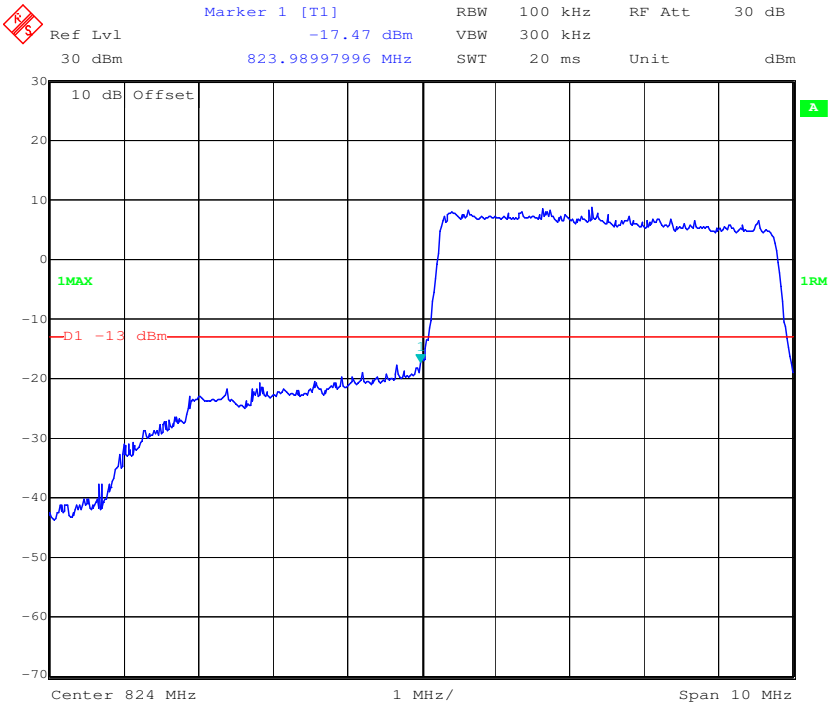
QPSK_3MHz_ FULL RB_ Left



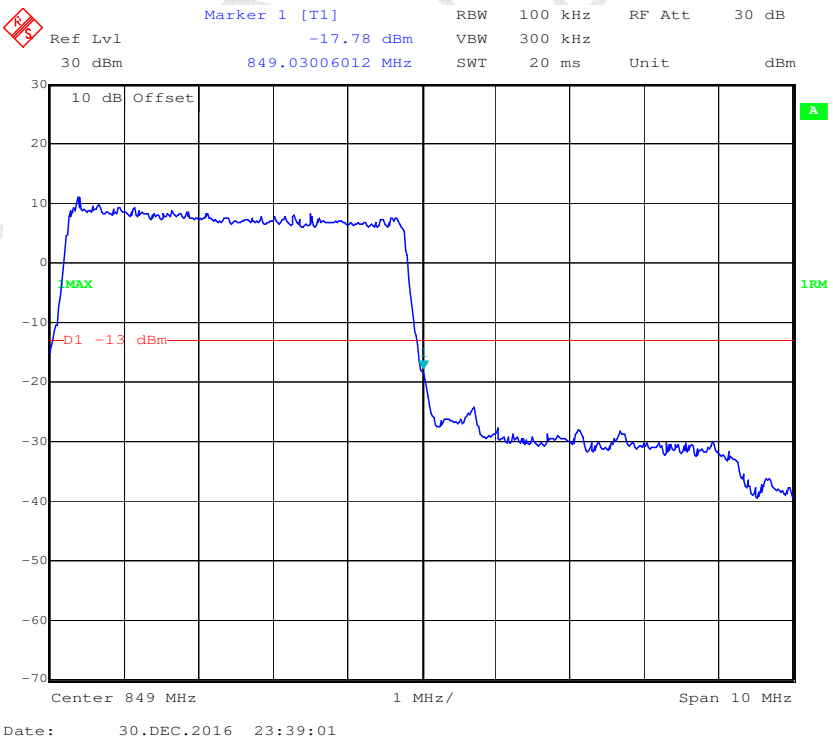
QPSK_3MHz_ FULL RB_ Right



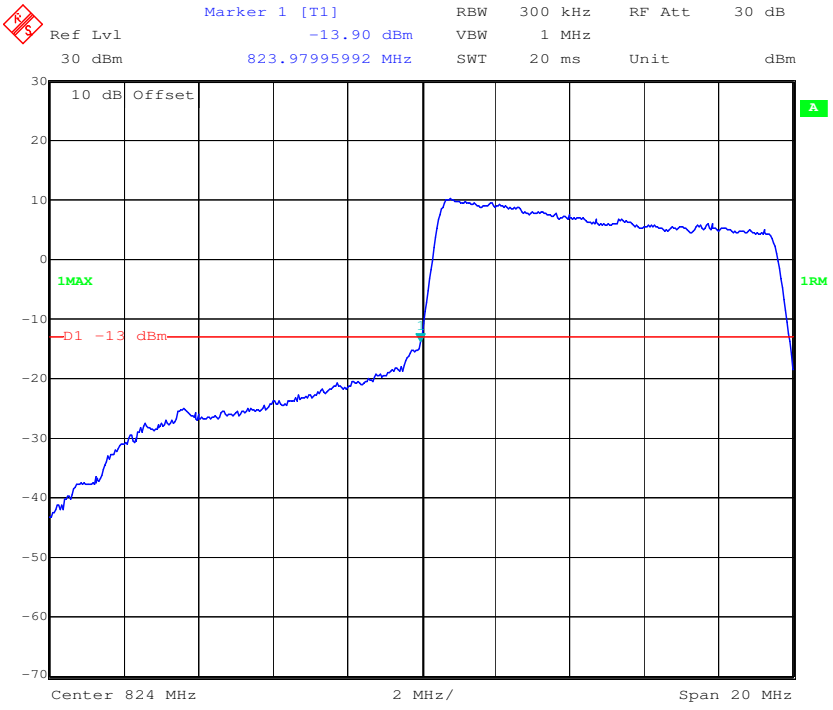
QPSK_5MHz_ FULL RB_ Left



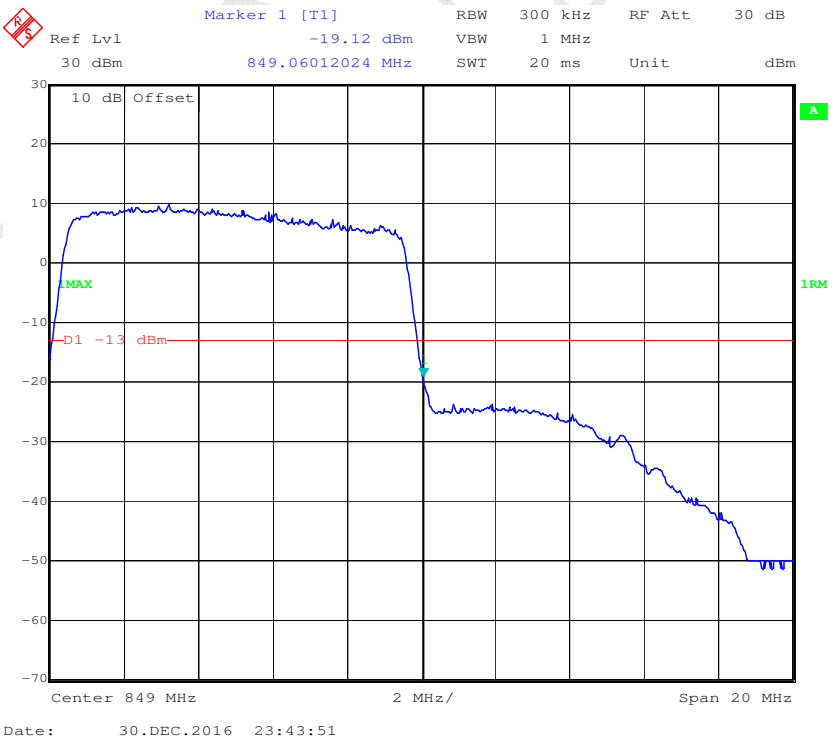
QPSK_5MHz_ FULL RB_ Right



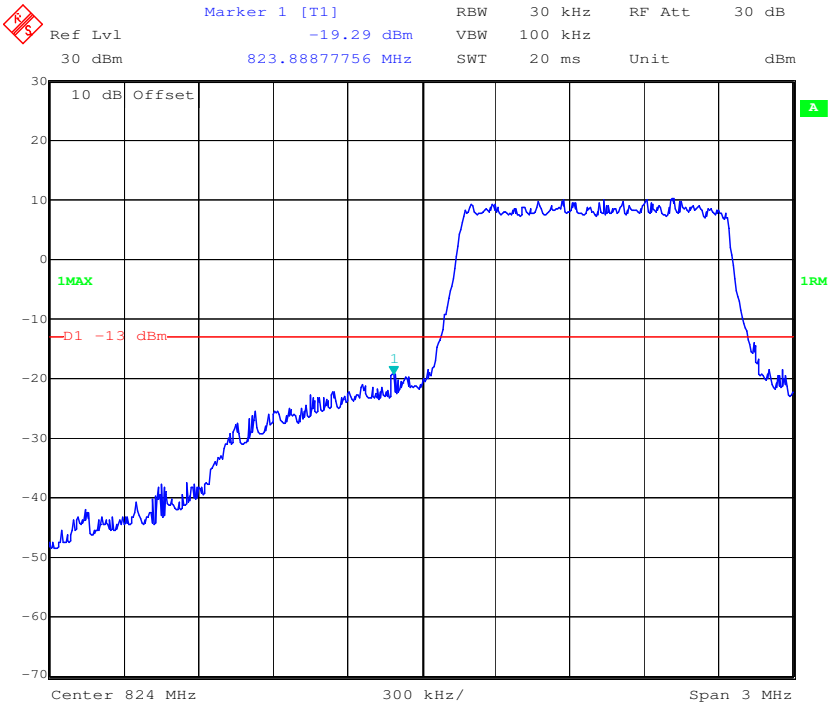
QPSK_10MHz_ FULL RB_ Left



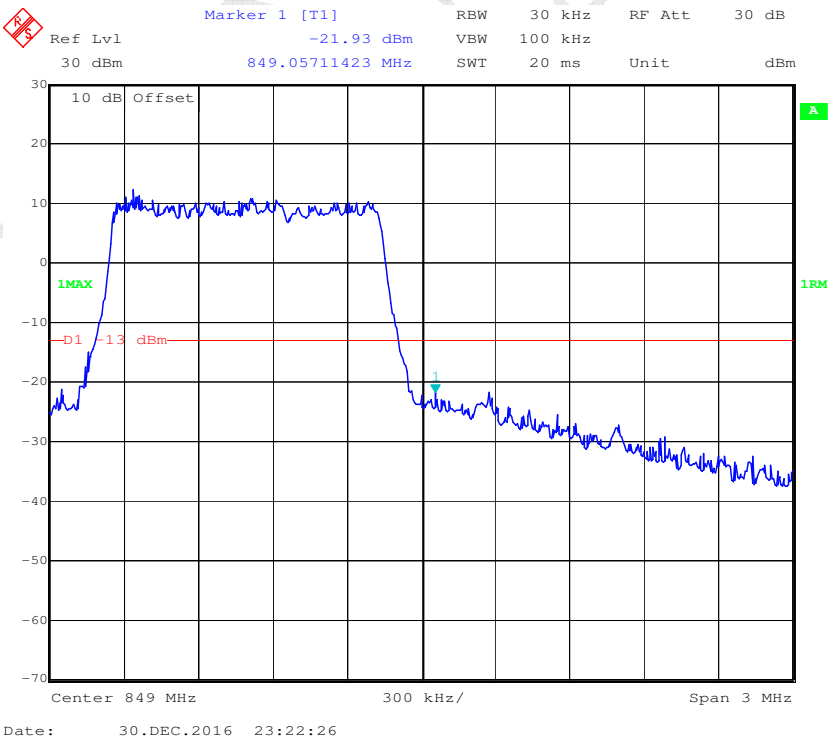
QPSK_10MHz_ FULL RB_ Right



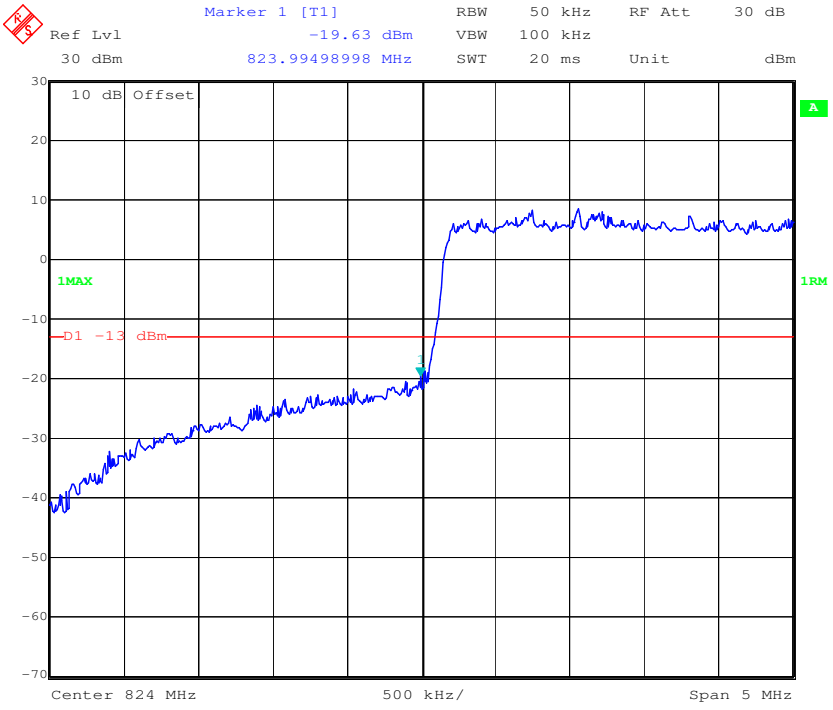
16QAM_1.4MHz_ FULL RB_ Left



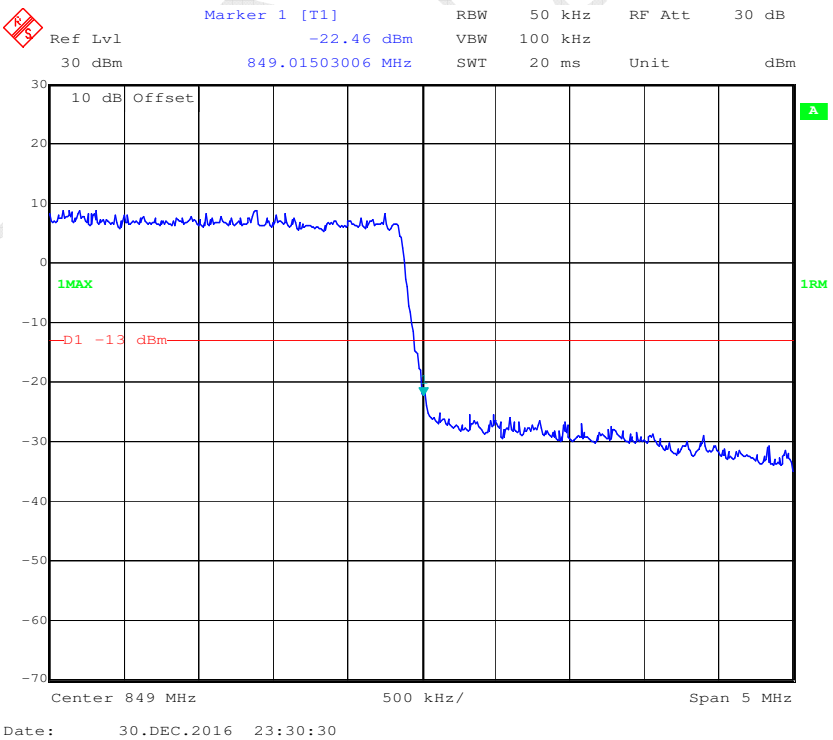
16QAM_1.4MHz_ FULL RB_ Right



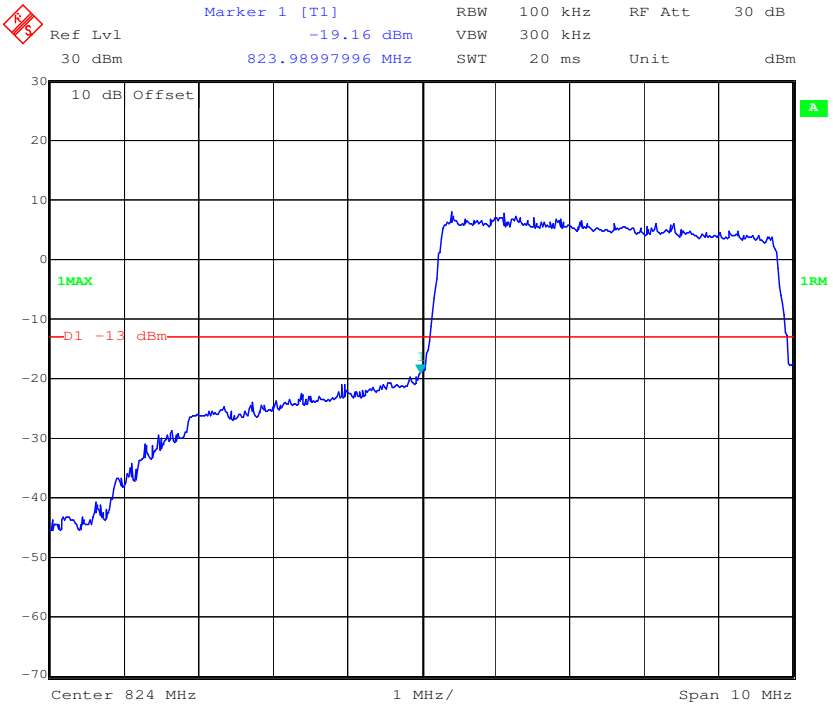
16QAM_3MHz_ FULL RB_ Left



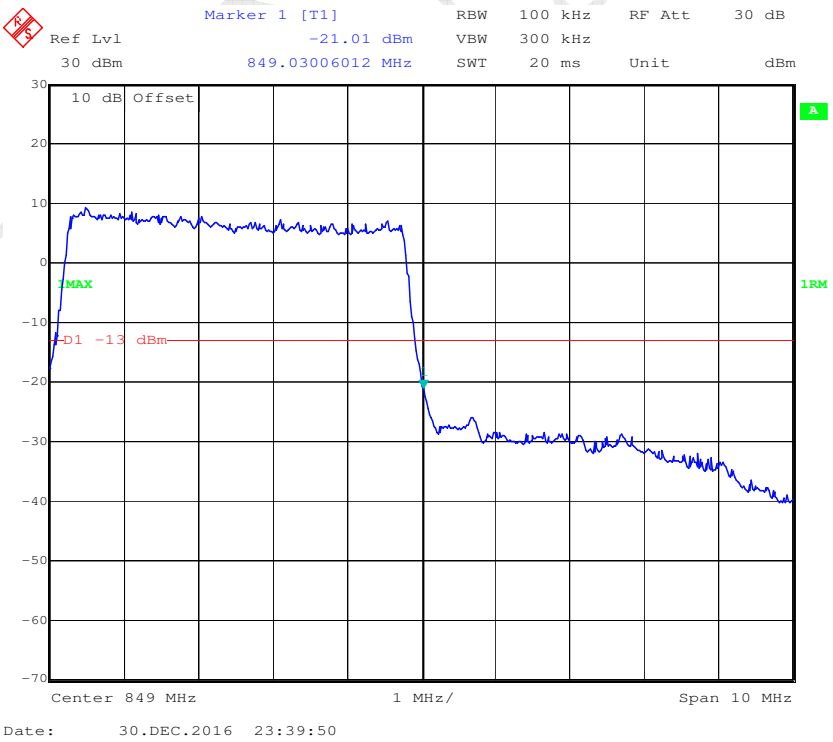
16QAM_3MHz_ FULL RB_ Right



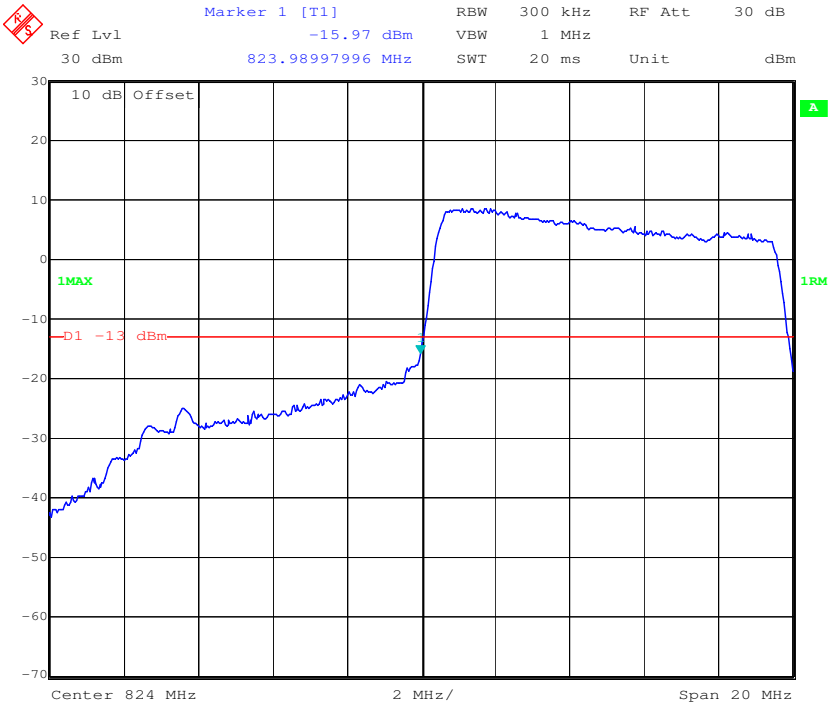
16QAM_5MHz_ FULL RB_ Left



16QAM_5MHz_ FULL RB_ Right



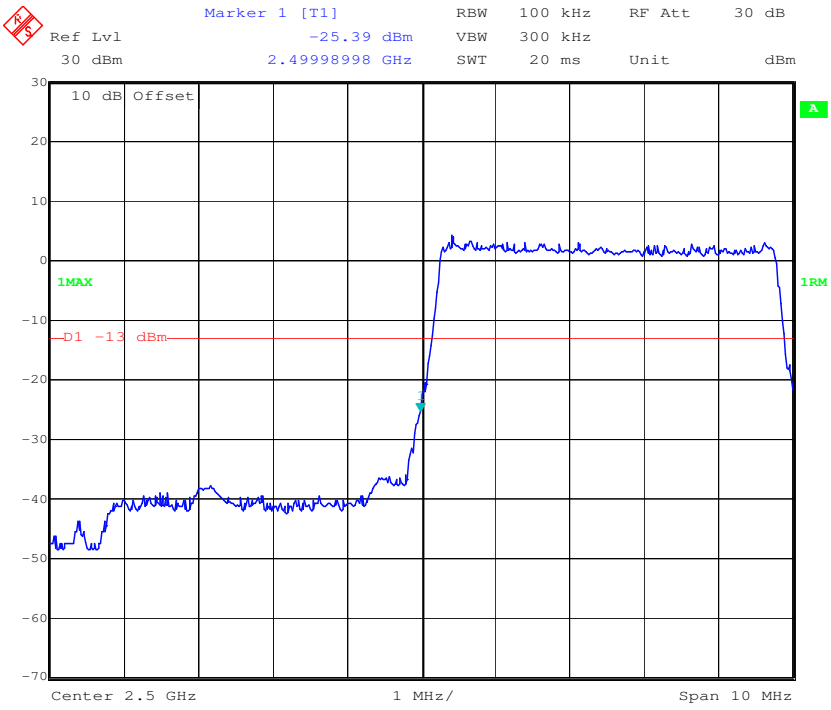
16QAM_10MHz_ FULL RB_ Left



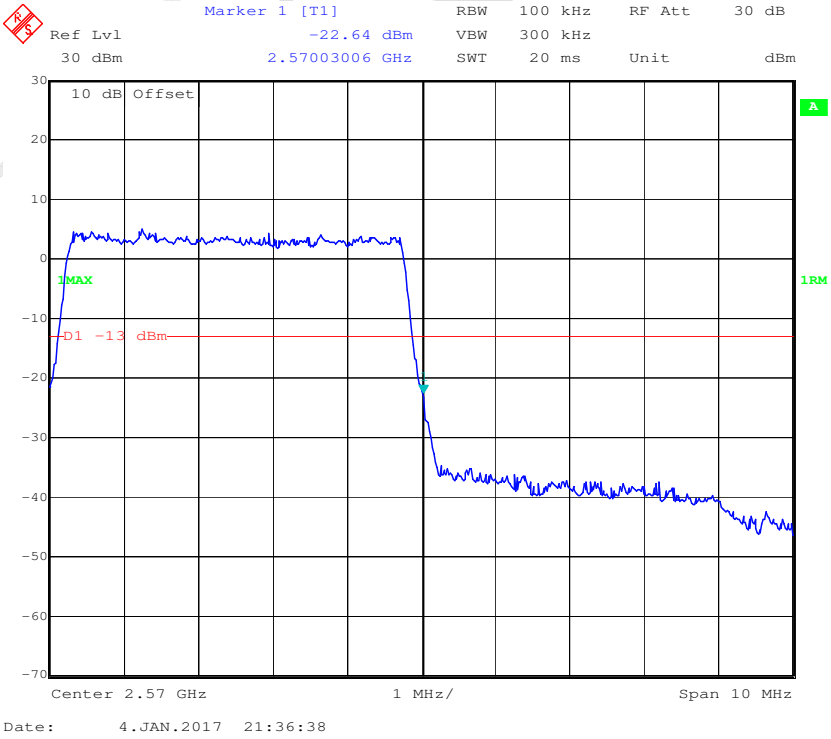
16QAM_10MHz_ FULL RB_ Right

LTE Band VII

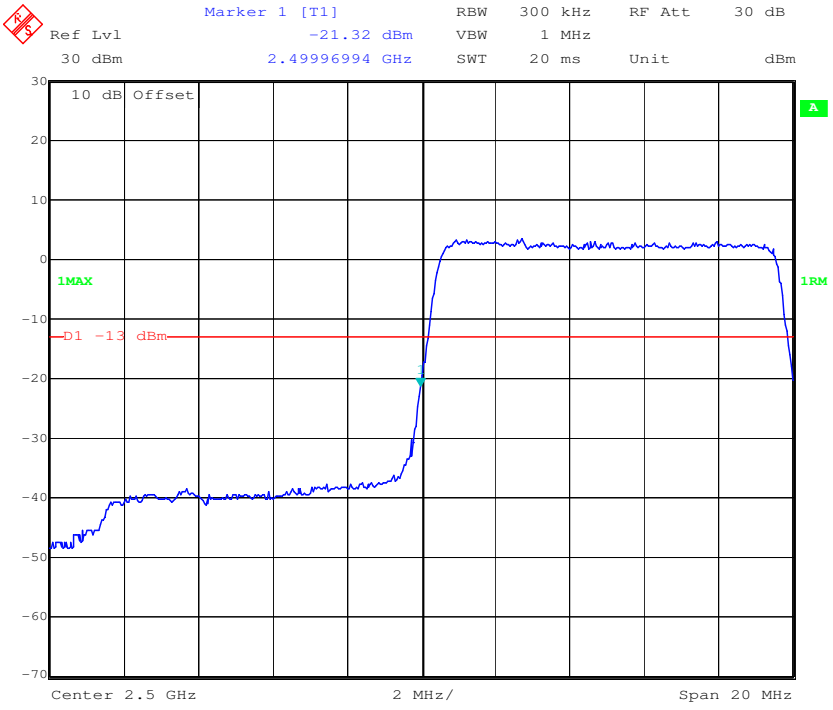
QPSK_5MHz_ FULL RB_ Left



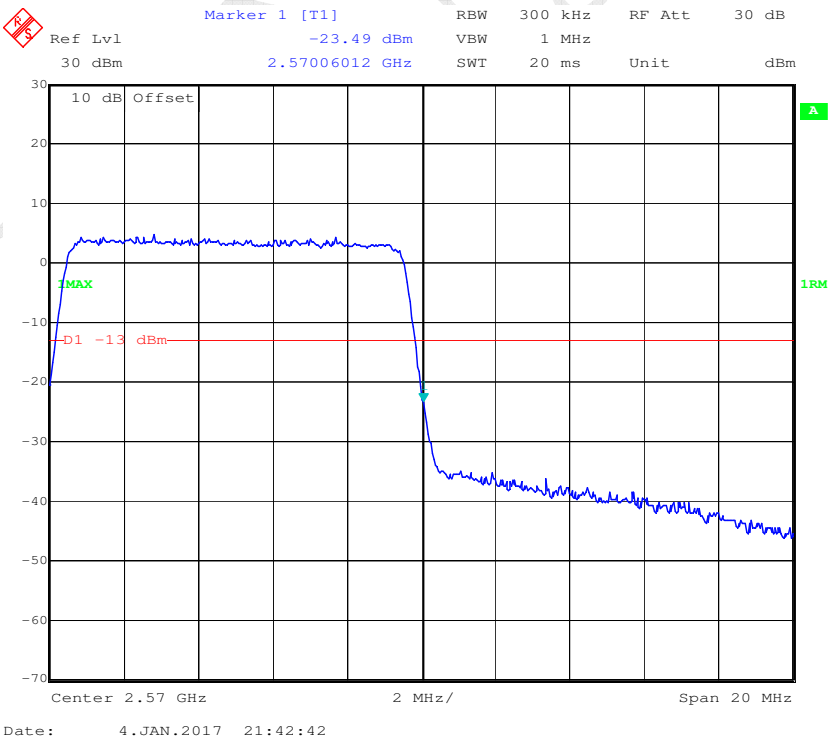
QPSK_5MHz_ FULL RB_ Right



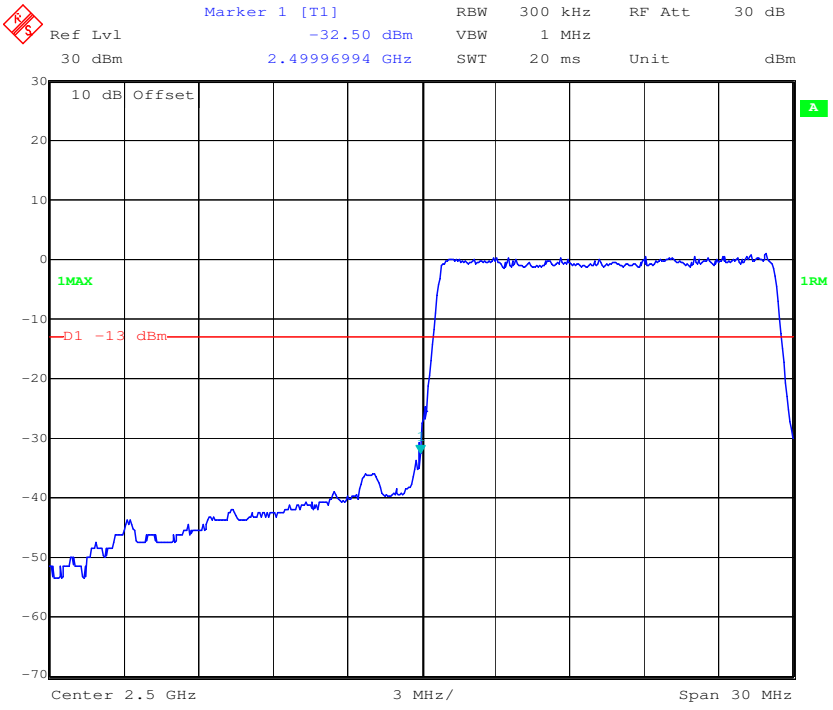
QPSK_10MHz_ FULL RB_ Left



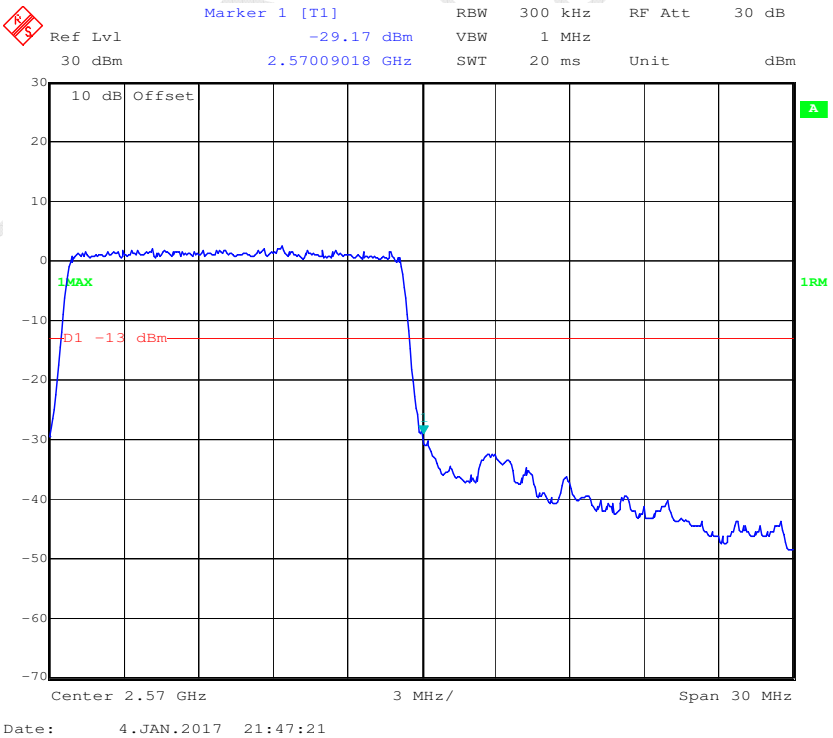
QPSK_10MHz_ FULL RB_ Right



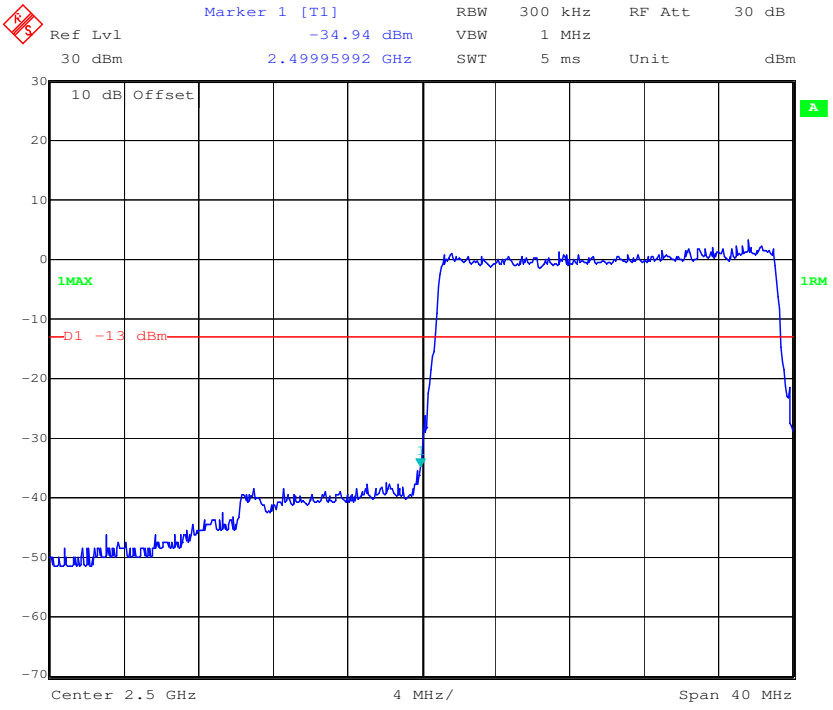
QPSK_15MHz_ FULL RB_ Left



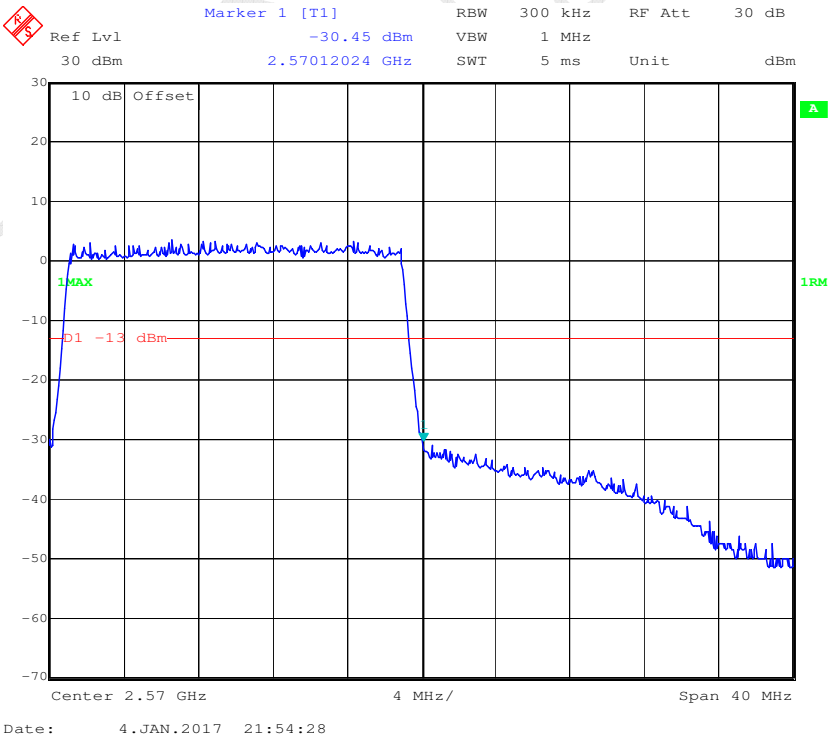
QPSK_15MHz_ FULL RB_ Right



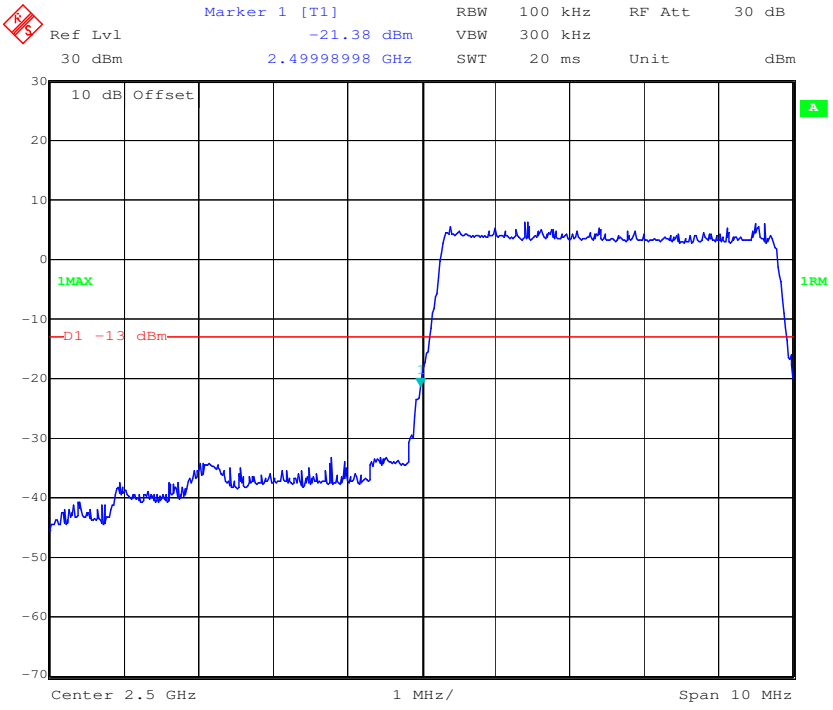
QPSK_20MHz_ FULL RB_ Left



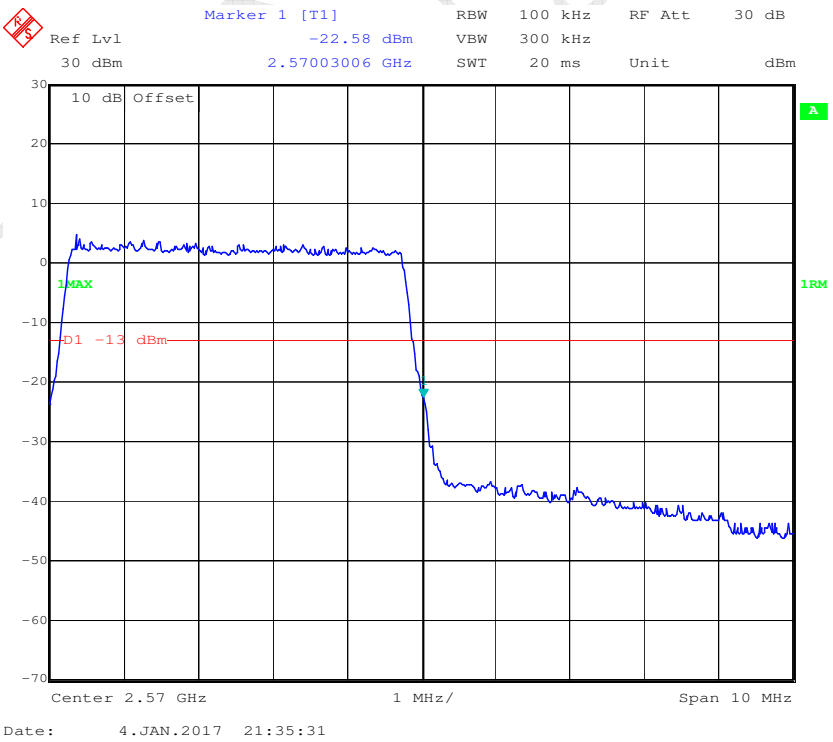
QPSK_20MHz_ FULL RB_ Right



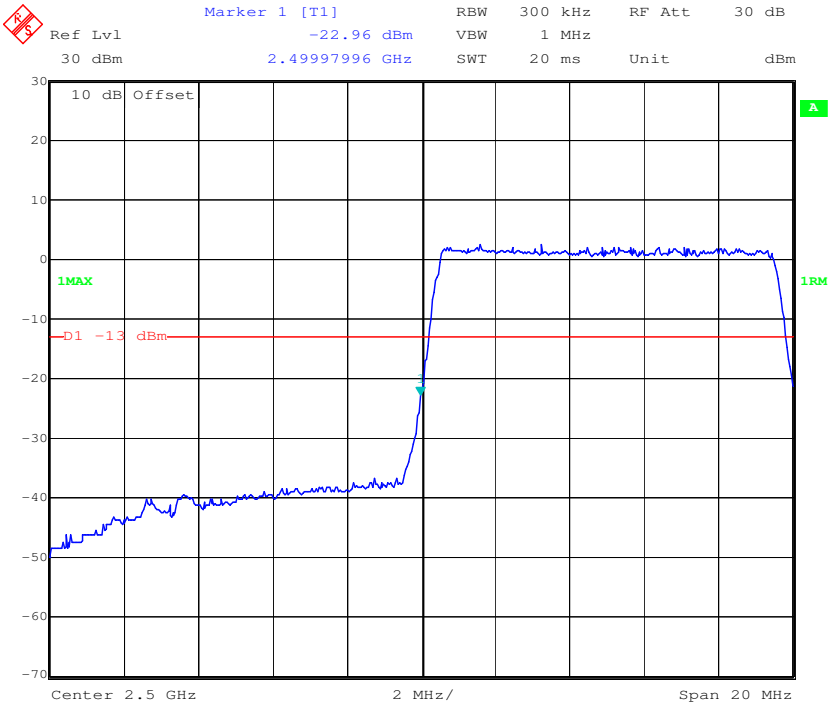
16QAM_5MHz_ FULL RB_ Left



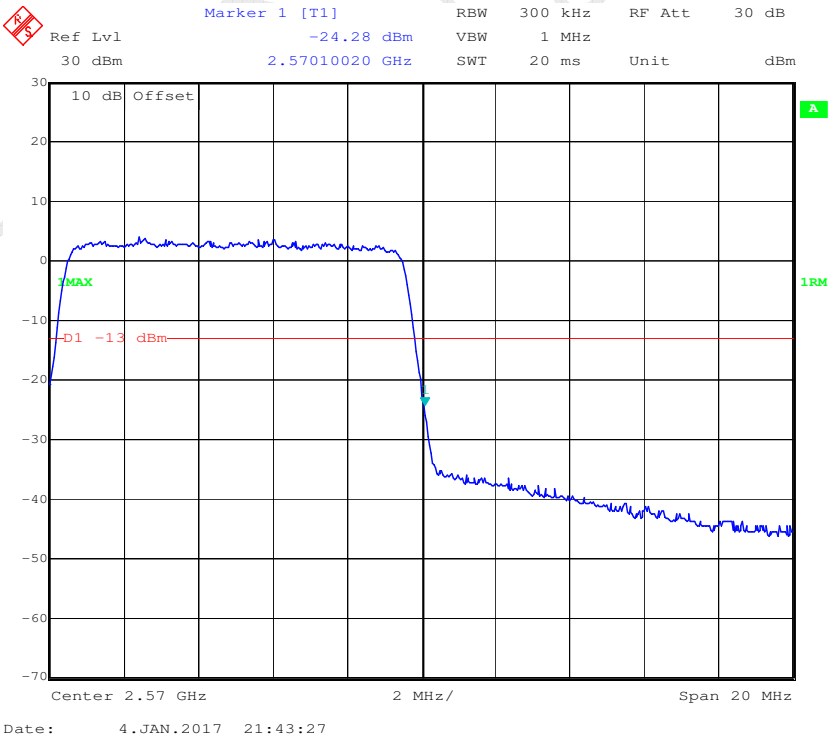
16QAM_5MHz_ FULL RB_ Right



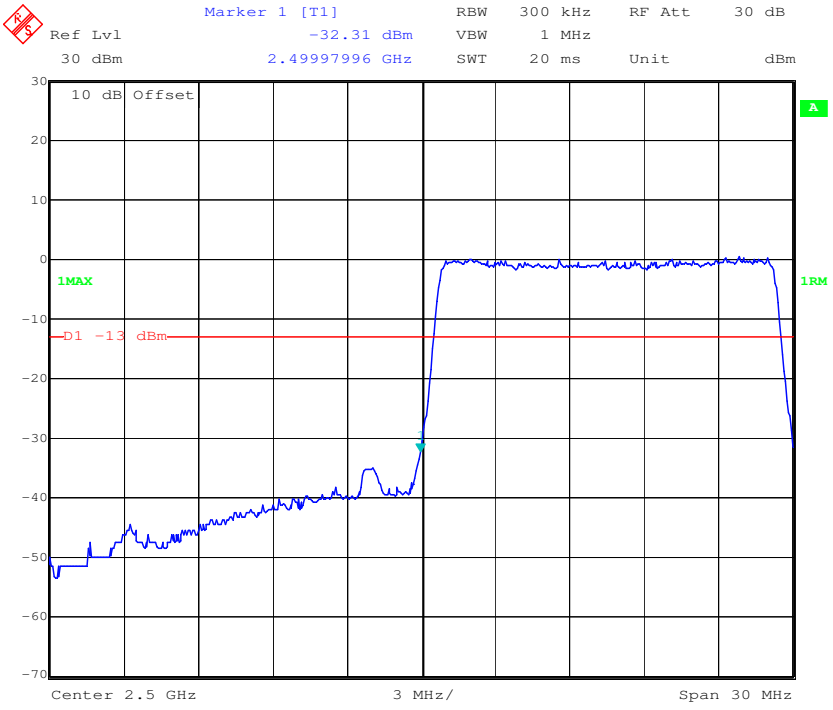
16QAM_10MHz_ FULL RB_ Left



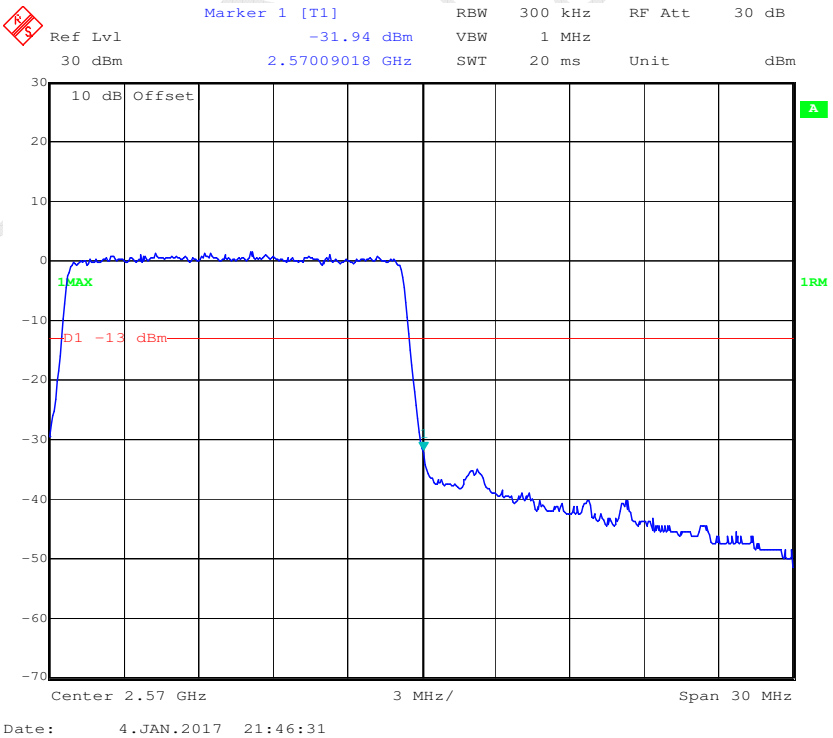
16QAM_10MHz_ FULL RB_ Right



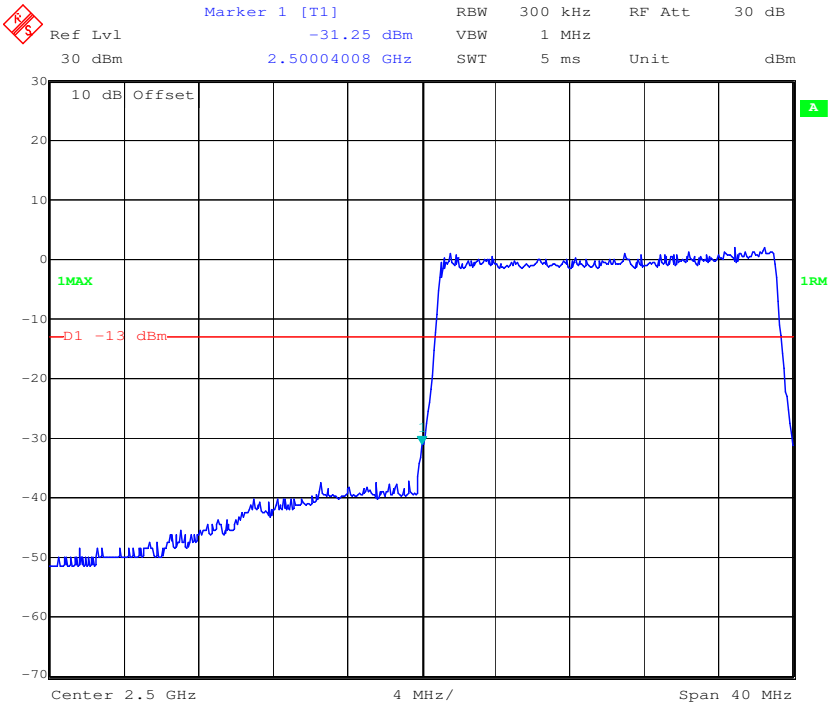
16QAM_15MHz_ FULL RB_ Left



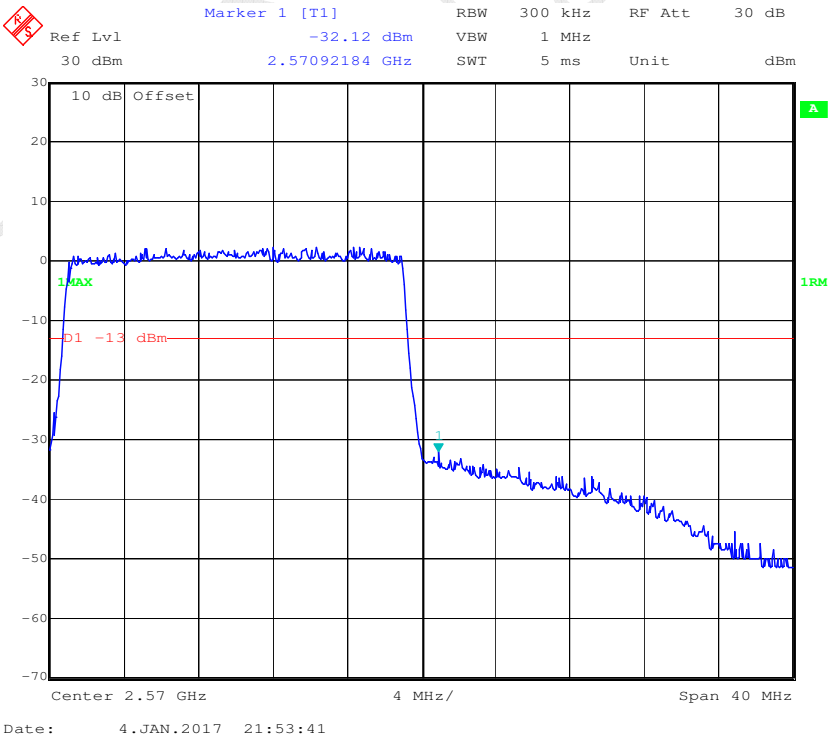
16QAM_15MHz_ FULL RB_ Right



16QAM_20MHz_ FULL RB_ Left

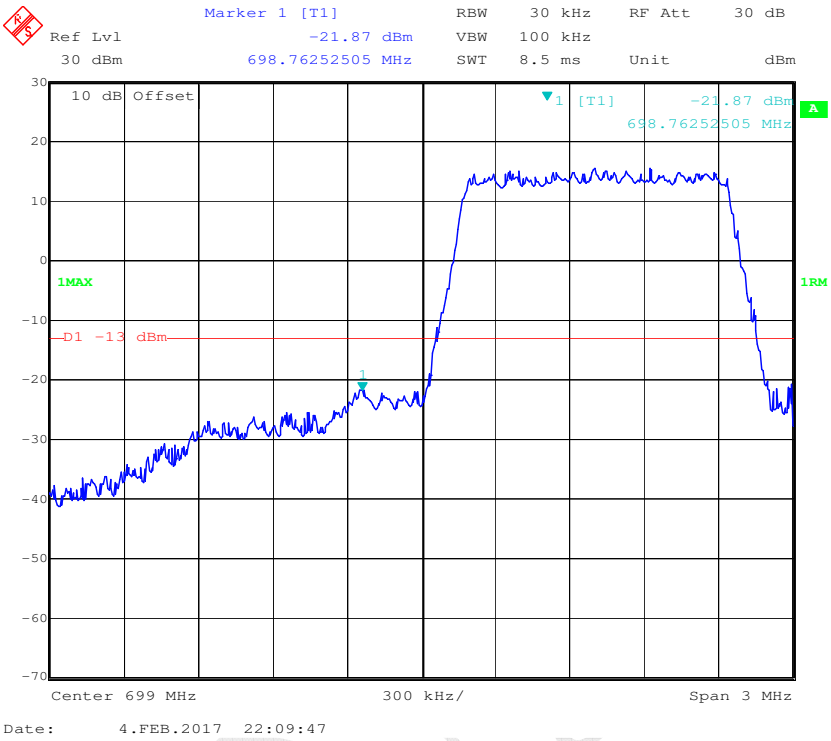


16QAM_20MHz_ FULL RB_ Right

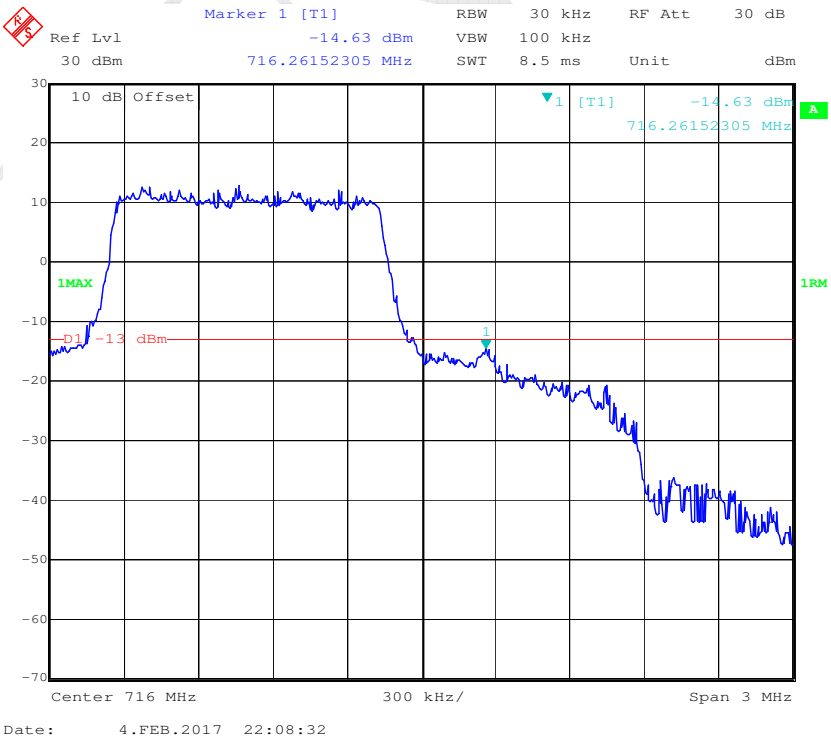


LTE Band 12

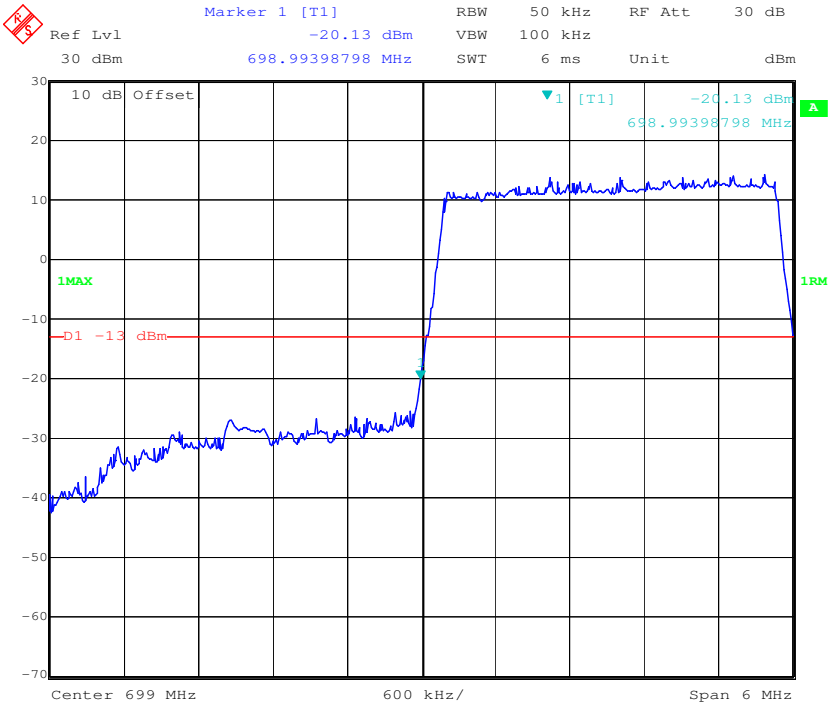
QPSK_1.4MHz_ FULL RB_ Left



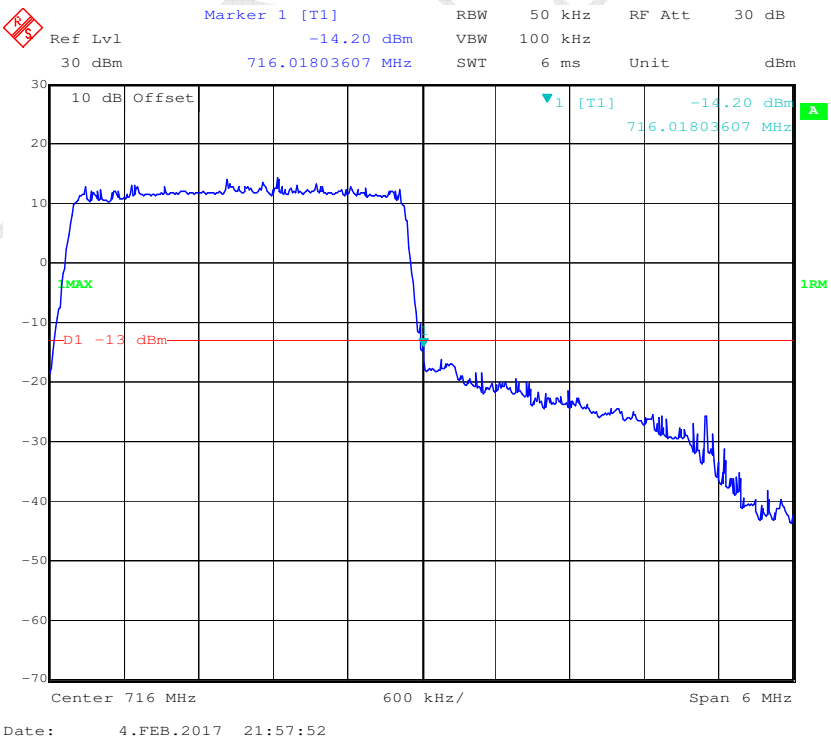
QPSK_1.4MHz_ FULL RB_ Right



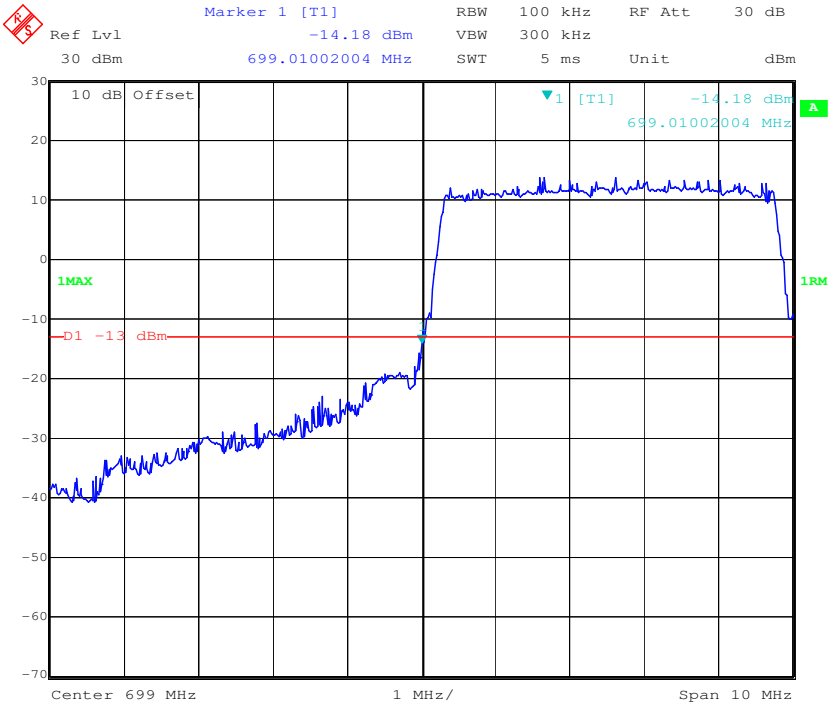
QPSK_3MHz_ FULL RB_ Left



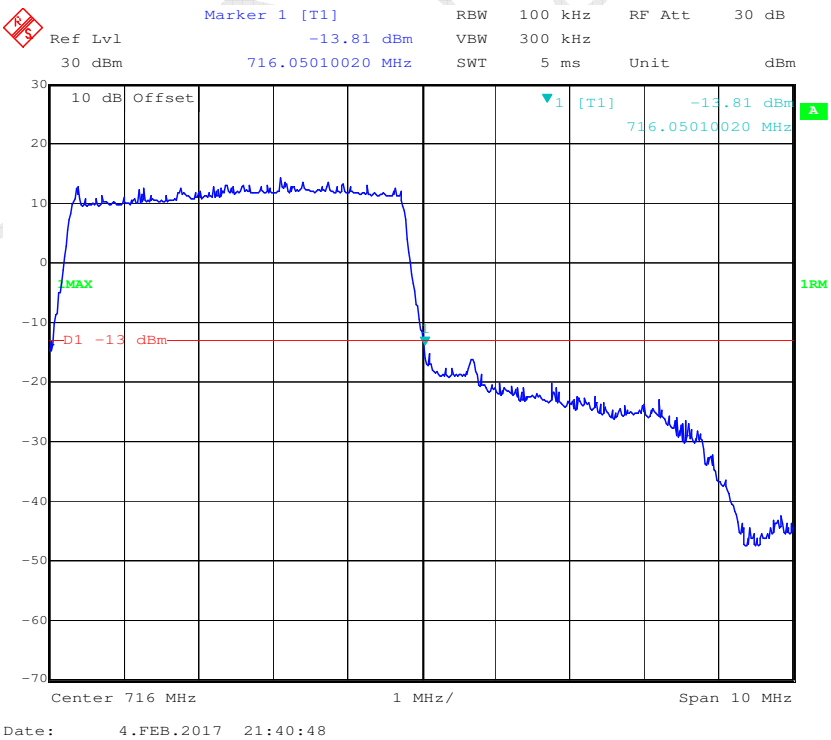
QPSK_3MHz_ FULL RB_ Right



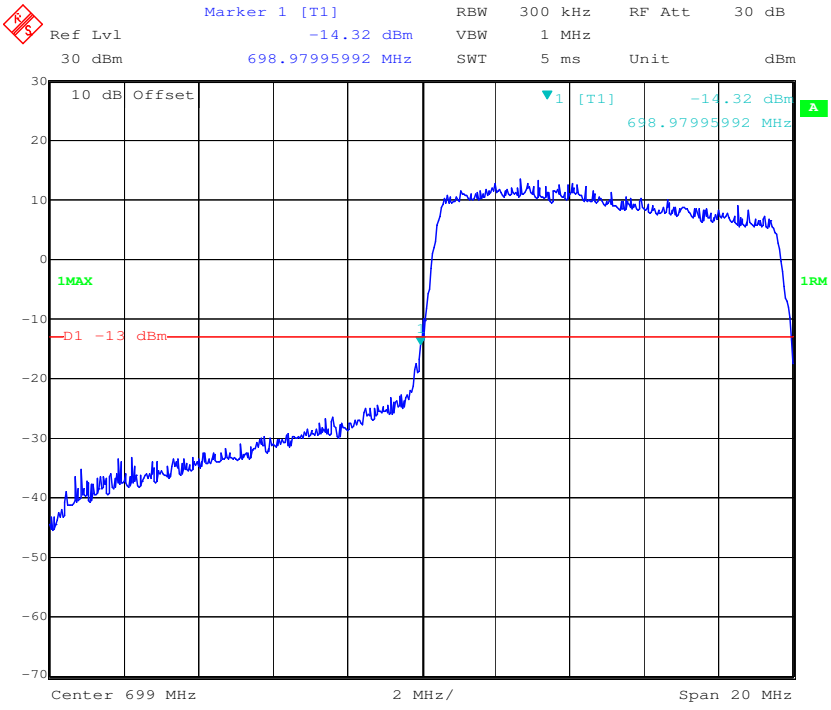
QPSK_5MHz_ FULL RB_ Left



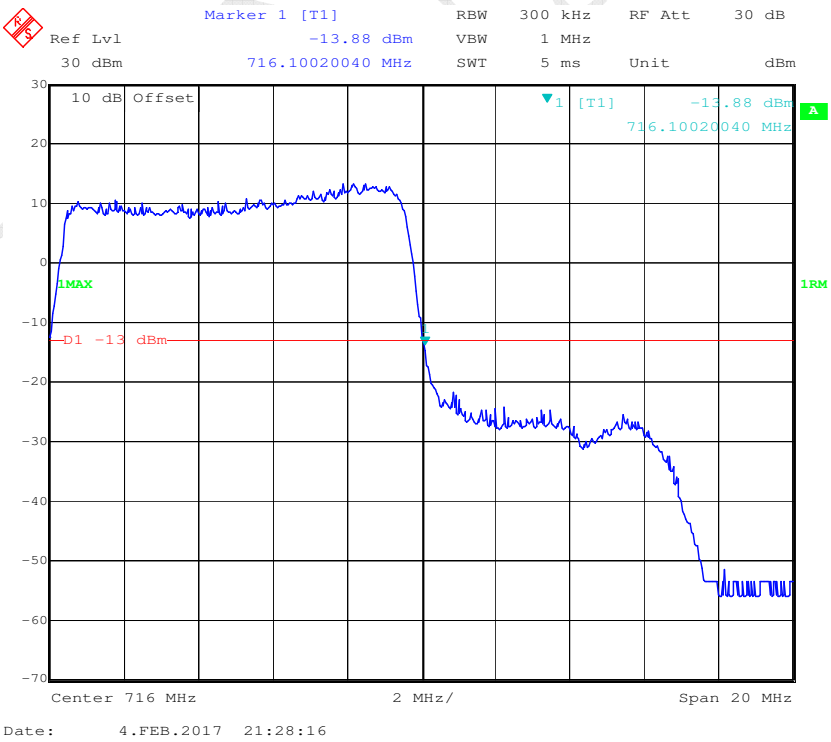
QPSK_5MHz_ FULL RB_ Right



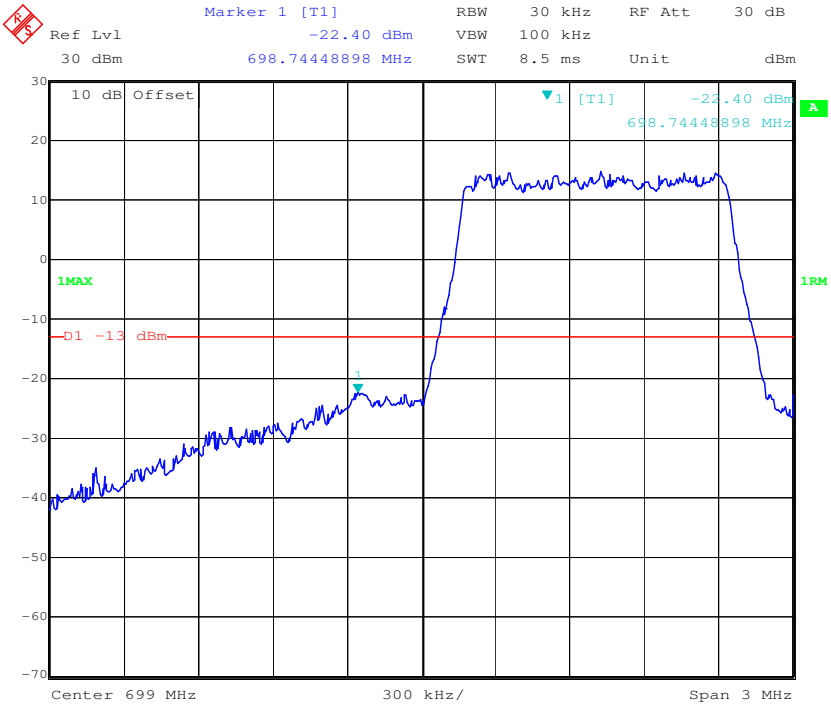
QPSK_10MHz_ FULL RB_ Left



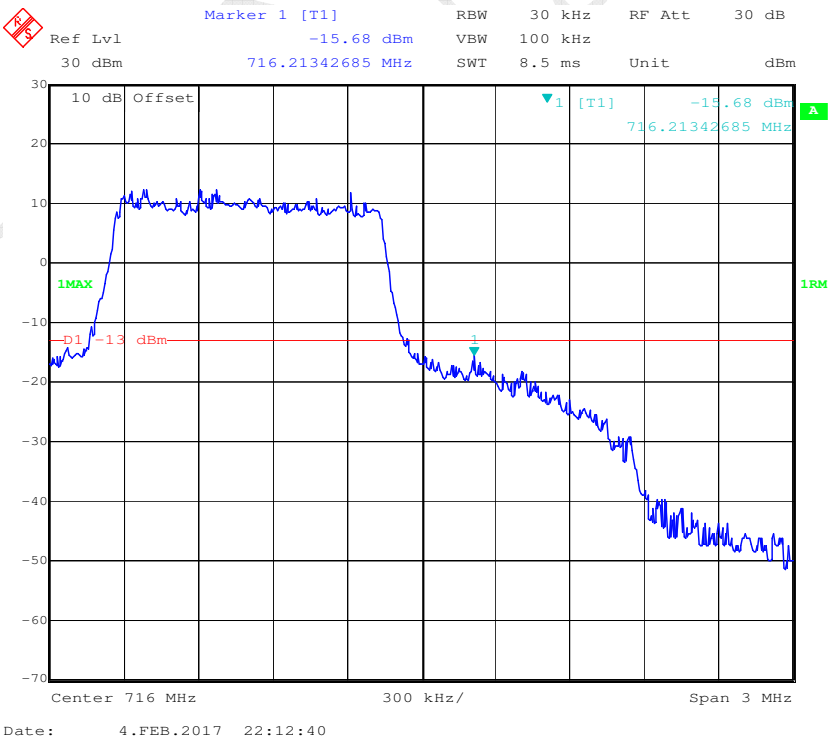
QPSK_10MHz_ FULL RB_ Right



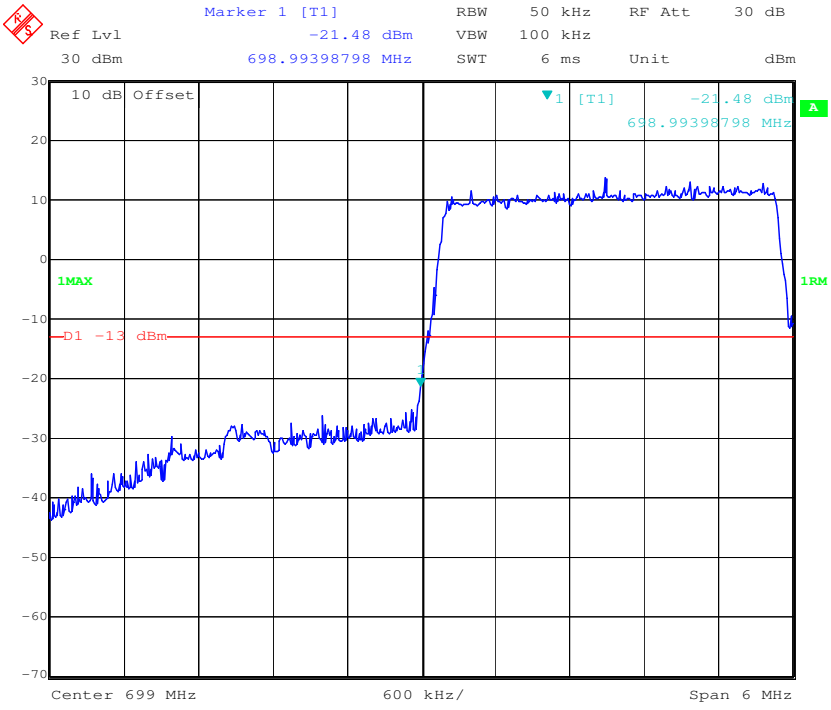
16QAM_1.4MHz_ FULL RB_ Left



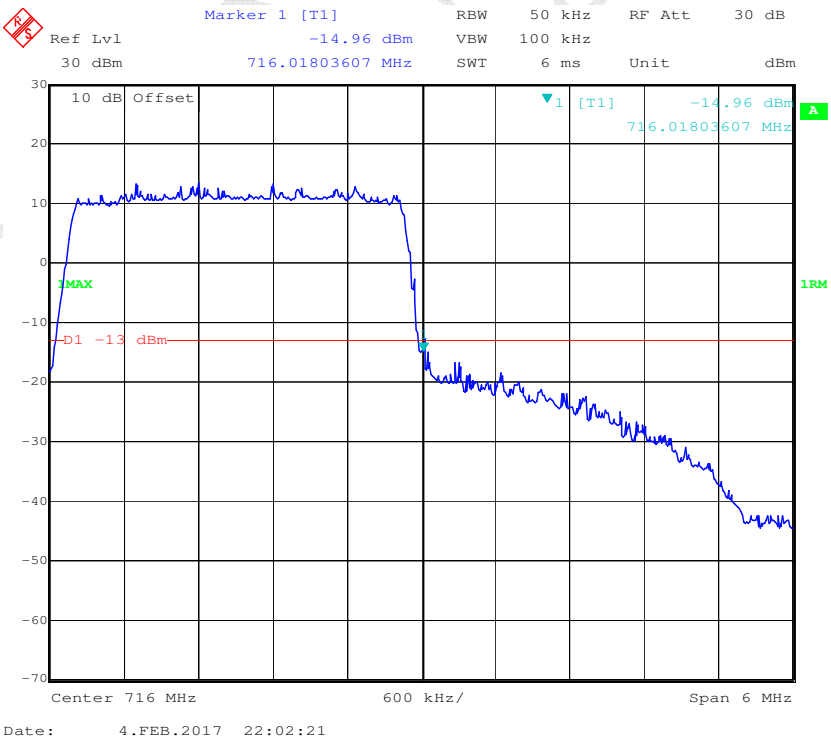
16QAM_1.4MHz_ FULL RB_ Right



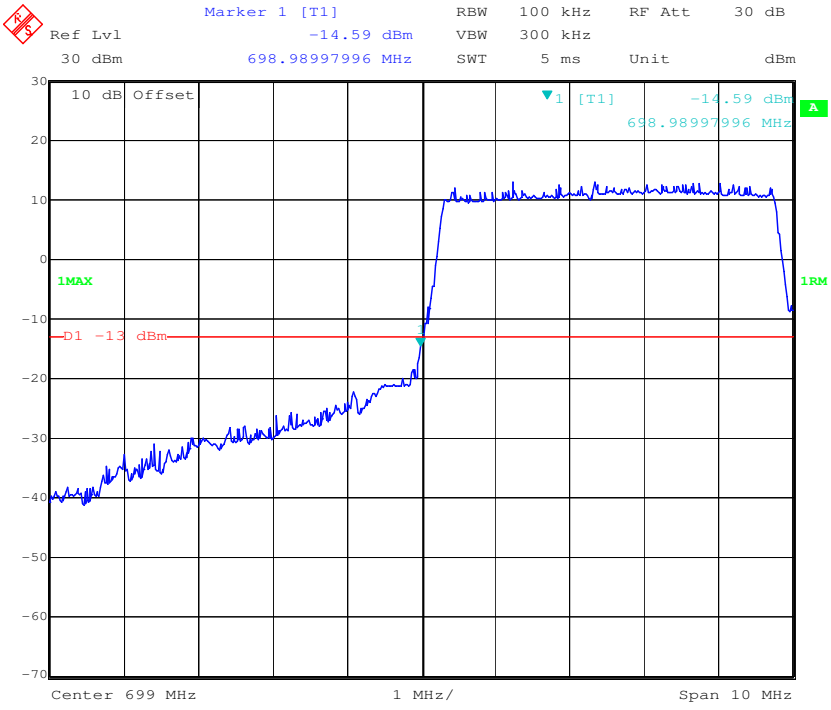
16QAM_3MHz_ FULL RB_ Left



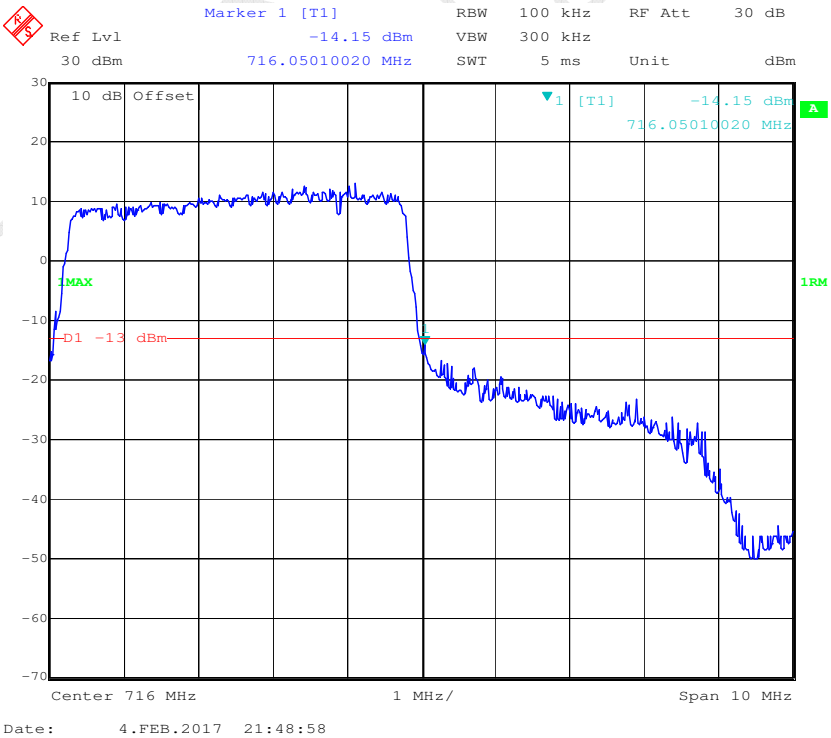
16QAM_3MHz_ FULL RB_ Right



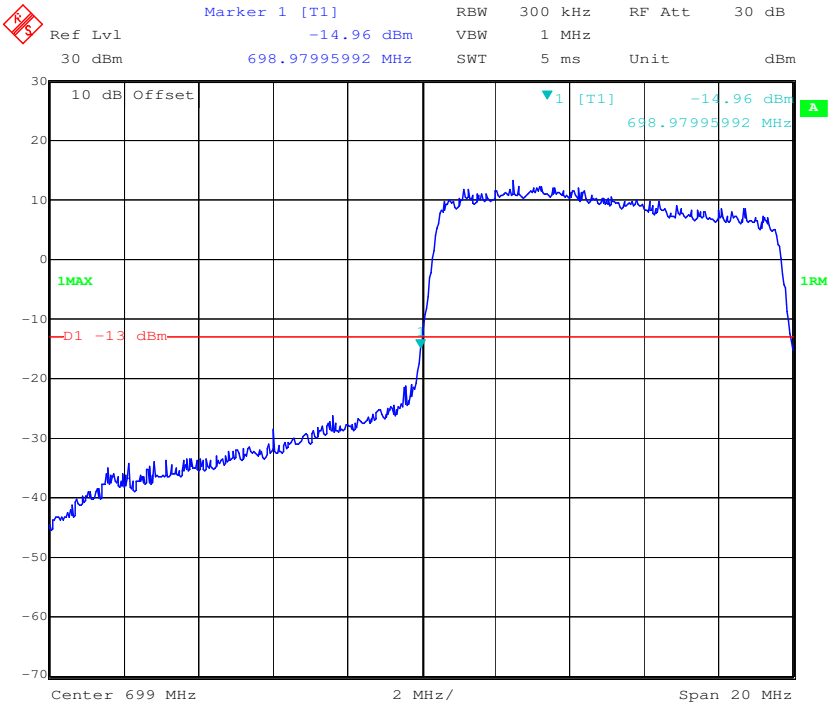
16QAM_5MHz_ FULL RB_ Left



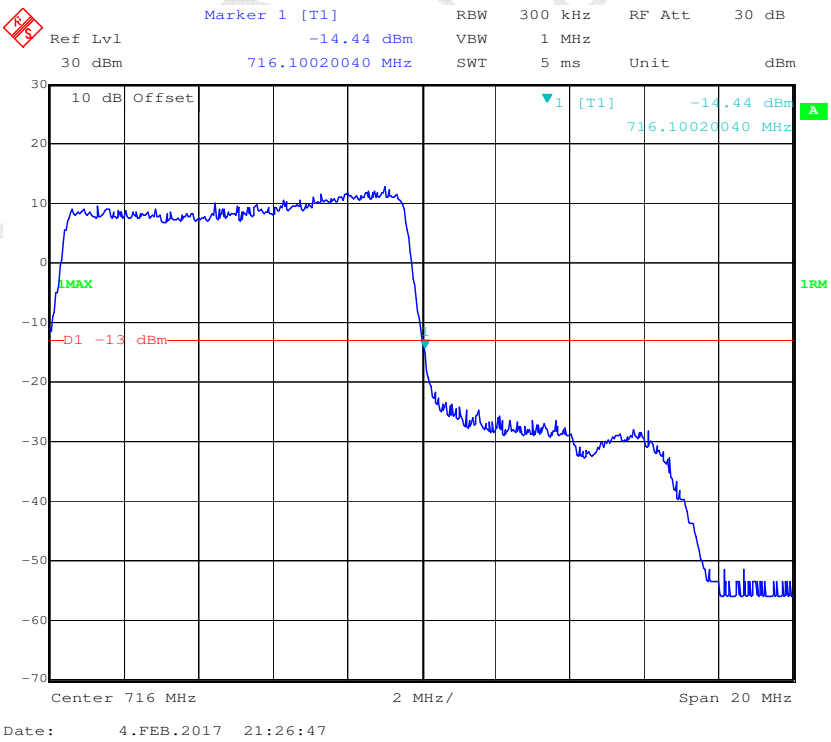
16QAM_5MHz_ FULL RB_ Right



16QAM_10MHz_ FULL RB_ Left

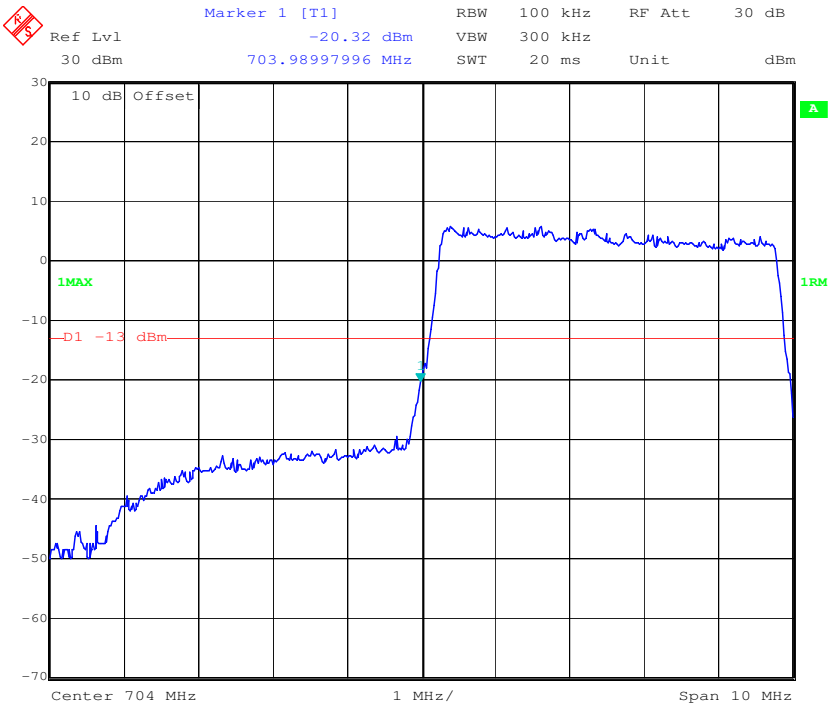


16QAM_10MHz_ FULL RB_ Right

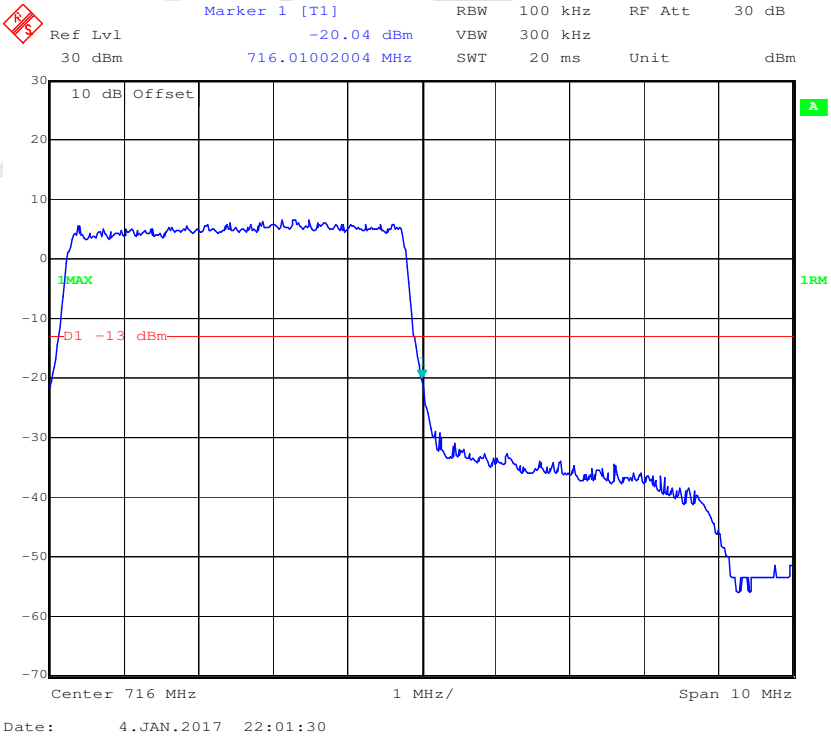


LTE Band 17:

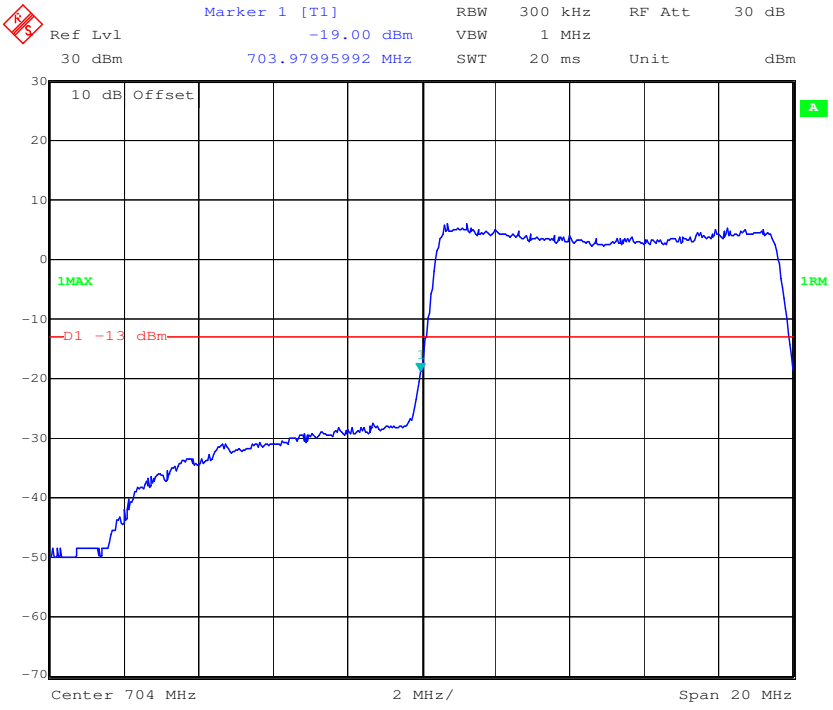
QPSK_5MHz_ FULL RB_ Left



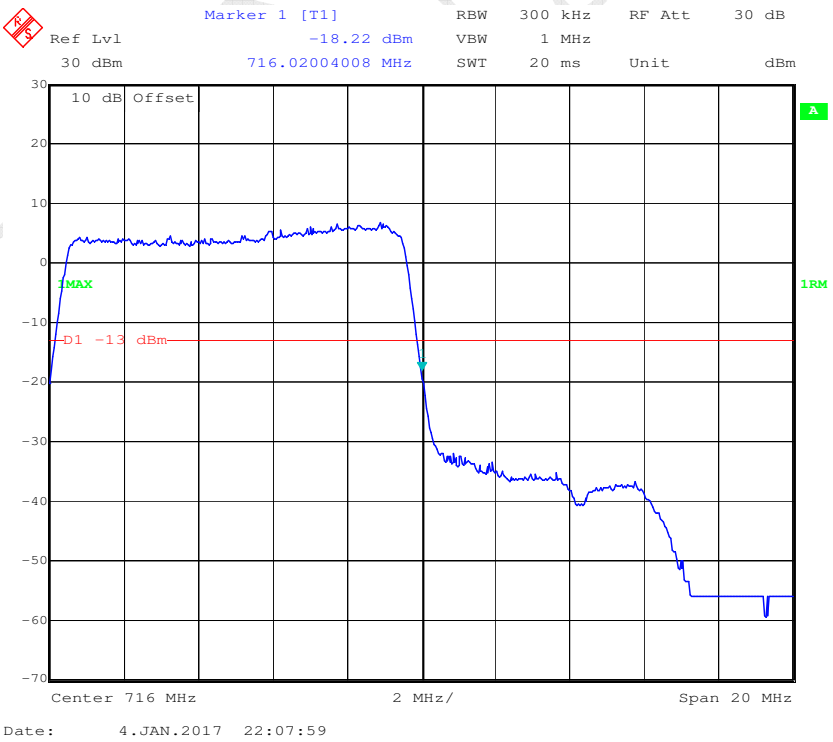
QPSK_5MHz_ FULL RB_ Right



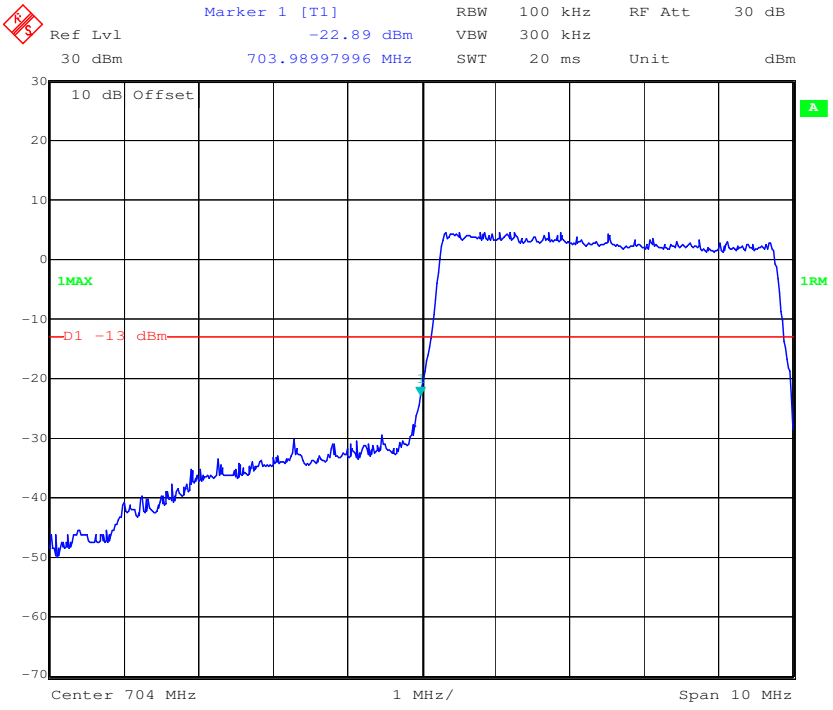
QPSK_10MHz_ FULL RB_ Left



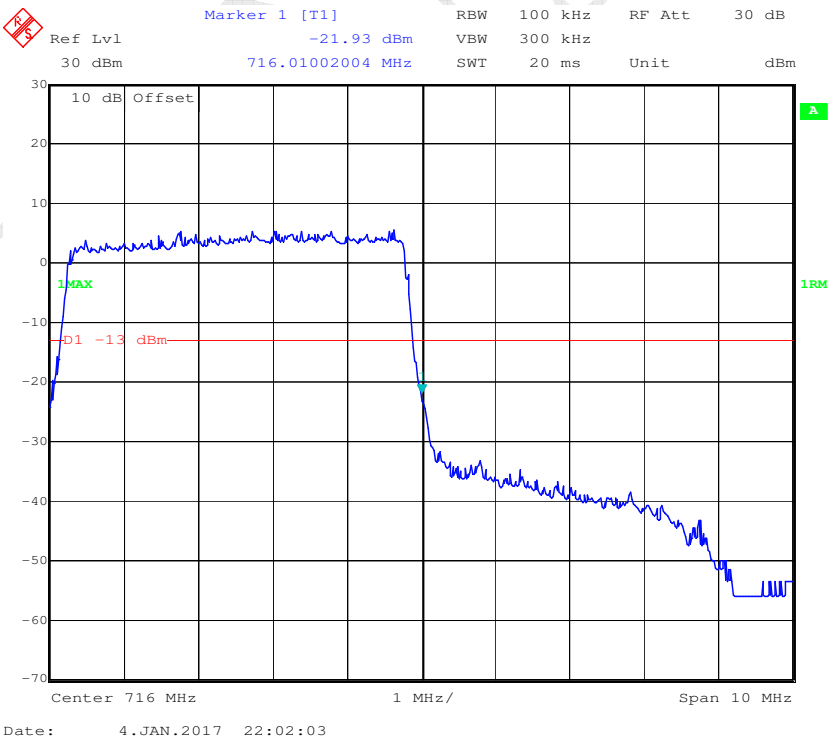
QPSK_10MHz_ FULL RB_ Right



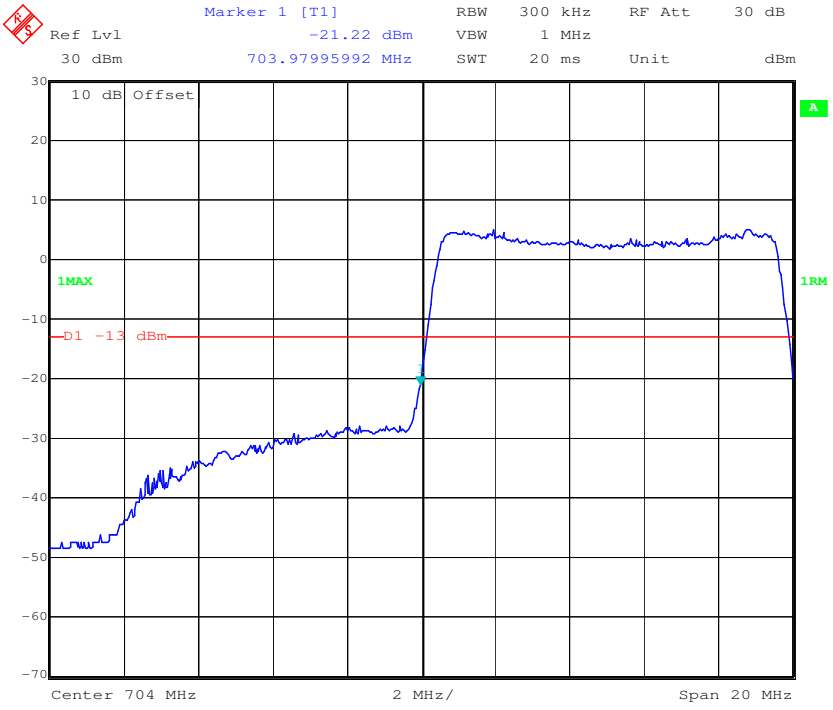
16QAM_5MHz_ FULL RB_ Left



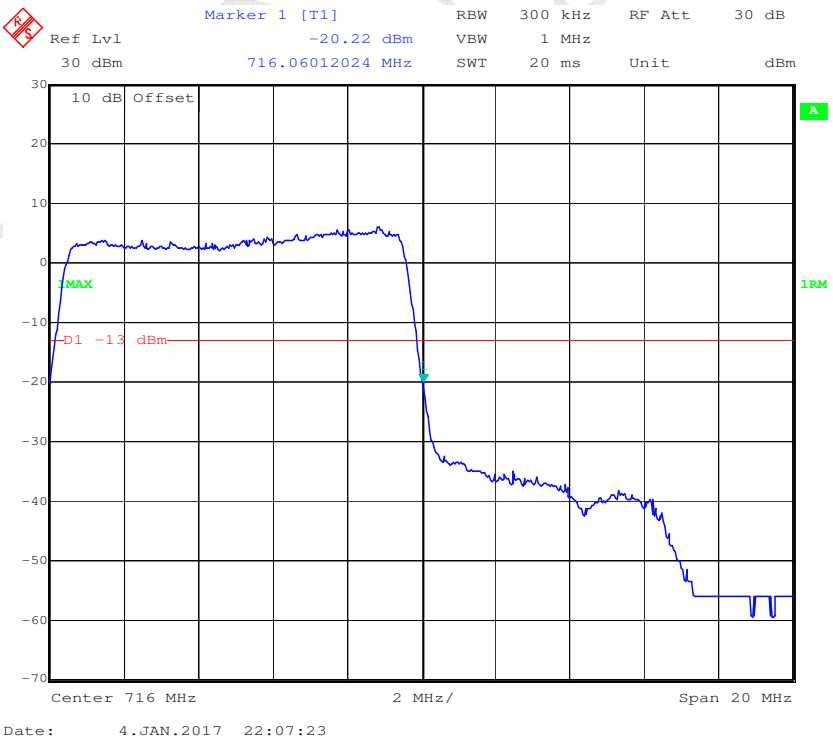
16QAM_5MHz_ FULL RB_ Right



16QAM_10MHz_ FULL RB_ Left



16QAM_10MHz_ FULL RB_ Right



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.

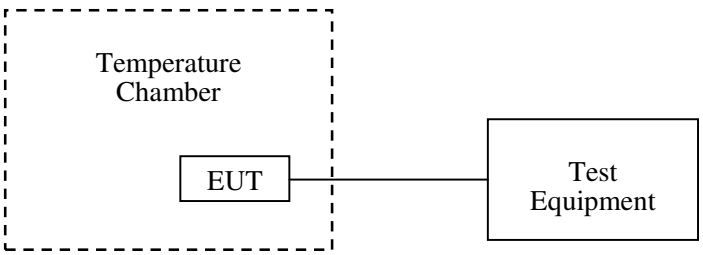
According to §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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
BACL	High Temperature Test Chamber	BTH-150	30024	2016-12-02	2017-12-01
FLUKE	Multimeter	1587	27870099	2016-12-30	2017-12-29
R&S	Universal Radio Communication Tester	CMU200	11-9435686-111	2016-07-28	2017-07-27
R&S	Wideband Radio Communication Tester	CMW500	106891	2016-11-23	2017-11-23
N/A	RF Cable	N/A	N/A	Each Time	/

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.1 °C
Relative Humidity:	50 %
ATM Pressure:	101.1 kPa

The testing was performed by Tom Tang on 2017-01-05.

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	15	0.018	2.5
-10	3.8	11	0.013	2.5
0	3.8	15	0.018	2.5
10	3.8	10	0.012	2.5
20	3.8	20	0.024	2.5
30	3.8	16	0.019	2.5
40	3.8	13	0.016	2.5
50	3.8	21	0.025	2.5
25	3.6	20	0.024	2.5
25	4.35	15	0.018	2.5

Cellular Band (Part 22H)

EDGE, Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	V_{DC}	Hz	ppm	ppm
-30	3.8	18	0.010	2.5
-20	3.8	22	0.012	2.5
-10	3.8	21	0.011	2.5
0	3.8	25	0.013	2.5
10	3.8	22	0.012	2.5
20	3.8	18	0.010	2.5
30	3.8	15	0.008	2.5
40	3.8	19	0.010	2.5
50	3.8	12	0.006	2.5
25	3.6	16	0.009	2.5
25	4.35	13	0.007	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	18	0.010	Pass
-20	3.8	22	0.012	Pass
-10	3.8	21	0.011	Pass
0	3.8	25	0.013	Pass
10	3.8	22	0.012	Pass
20	3.8	18	0.010	Pass
30	3.8	15	0.008	Pass
40	3.8	19	0.010	Pass
50	3.8	12	0.006	Pass
25	3.6	16	0.009	Pass
25	4.35	13	0.007	Pass

PCS Band (Part 24E)

EDGE, Middle Channel, f_c = 1880.0 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	5	-0.001	Pass
-20	3.8	6	0.001	Pass
-10	3.8	5	-0.003	Pass
0	3.8	7	-0.001	Pass
10	3.8	8	-0.003	Pass
20	3.8	7	-0.001	Pass
30	3.8	6	-0.001	Pass
40	3.8	4	0.001	Pass
50	3.8	2	-0.002	Pass
20	3.5	-2	-0.003	Pass
20	4.2	5	-0.001	Pass

WCDMA Band V :

Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	V_{DC}	Hz	ppm	ppm
-30	3.8	-8	-0.010	2.5
-20	3.8	-2	-0.002	2.5
-10	3.8	1	0.001	2.5
0	3.8	3	0.004	2.5
10	3.8	-6	-0.007	2.5
20	3.8	5	0.006	2.5
30	3.8	-4	-0.005	2.5
40	3.8	2	0.002	2.5
50	3.8	0	0.000	2.5
25	3.6	2	0.002	2.5
25	4.35	-1	-0.001	2.5

WCDMA Band IV :

Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	V_{DC}	Hz	ppm	ppm
-30	3.8	-6	-0.003	2.5
-20	3.8	-4	-0.002	2.5
-10	3.8	-1	-0.001	2.5
0	3.8	3	0.002	2.5
10	3.8	-4	-0.002	2.5
20	3.8	-3	-0.002	2.5
30	3.8	1	0.001	2.5
40	3.8	-5	-0.003	2.5
50	3.8	-1	-0.001	2.5
25	3.6	1	0.001	2.5
25	4.35	0	0.000	2.5

WCDMA Band II :

Middle Channel, f_c = 1880.0 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	V_{DC}	**Hz**	**ppm**	
-30	3.8	-3	-0.002	Pass
-20	3.8	6	0.003	Pass
-10	3.8	4	0.002	Pass
0	3.8	-1	-0.001	Pass
10	3.8	5	0.003	Pass
20	3.8	0	0.000	Pass
30	3.8	2	0.001	Pass
40	3.8	3	0.002	Pass
50	3.8	4	0.002	Pass
25	3.6	0	0.000	Pass
25	4.35	3	0.002	Pass

LTE Band II:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 1880 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	16.27	0.0087	Pass
-20	3.8	15.64	0.0083	Pass
-10	3.8	15.11	0.0080	Pass
0	3.8	18.12	0.0096	Pass
10	3.8	16.87	0.0090	Pass
20	3.8	17.50	0.0093	Pass
30	3.8	15.19	0.0081	Pass
40	3.8	17.82	0.0095	Pass
50	3.8	17.71	0.0094	Pass
25	3.5	17.65	0.0094	Pass
25	4.2	16.32	0.0087	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =1880 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	17.70	0.0094	Pass
-20	3.8	17.98	0.0096	Pass
-10	3.8	17.53	0.0093	Pass
0	3.8	16.75	0.0089	Pass
10	3.8	17.15	0.0091	Pass
20	3.8	16.53	0.0088	Pass
30	3.8	18.19	0.0097	Pass
40	3.8	17.66	0.0094	Pass
50	3.8	16.66	0.0089	Pass
25	3.5	18.29	0.0097	Pass
25	4.2	16.98	0.0090	Pass

LTE Band IV:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 1732.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{DC}**	**Hz**	**ppm**	**ppm**
-30	3.8	-18.09	-0.0104	2.5
-20	3.8	-16.79	-0.0097	2.5
-10	3.8	-17.32	-0.0100	2.5
0	3.8	-17.98	-0.0104	2.5
10	3.8	-18.16	-0.0105	2.5
20	3.8	-17.62	-0.0102	2.5
30	3.8	-18.30	-0.0106	2.5
40	3.8	-18.39	-0.0106	2.5
50	3.8	-17.25	-0.0100	2.5
25	3.5	-16.77	-0.0097	2.5
25	4.2	-17.60	-0.0102	2.5

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c = 1732.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{DC}**	**Hz**	**ppm**	**ppm**
-30	3.8	15.87	0.0092	2.5
-20	3.8	16.71	0.0096	2.5
-10	3.8	16.45	0.0095	2.5
0	3.8	16.05	0.0093	2.5
10	3.8	15.86	0.0092	2.5
20	3.8	15.89	0.0092	2.5
30	3.8	16.97	0.0098	2.5
40	3.8	16.80	0.0097	2.5
50	3.8	15.37	0.0089	2.5
25	3.5	17.54	0.0101	2.5
25	4.2	16.55	0.0096	2.5

LTE Band V:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 836.5 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	20.66	0.0247	Pass
-20	3.8	20.53	0.0245	Pass
-10	3.8	20.29	0.0243	Pass
0	3.8	19.91	0.0238	Pass
10	3.8	20.50	0.0245	Pass
20	3.8	20.69	0.0247	Pass
30	3.8	19.89	0.0238	Pass
40	3.8	20.18	0.0241	Pass
50	3.8	19.45	0.0233	Pass
25	3.5	19.11	0.0228	Pass
25	4.2	20.33	0.0243	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =836.5 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	17.29	0.0207	Pass
-20	3.8	18.29	0.0219	Pass
-10	3.8	17.96	0.0215	Pass
0	3.8	18.86	0.0225	Pass
10	3.8	17.34	0.0207	Pass
20	3.8	17.63	0.0211	Pass
30	3.8	17.64	0.0211	Pass
40	3.8	17.99	0.0215	Pass
50	3.8	18.15	0.0217	Pass
25	3.5	17.28	0.0207	Pass
25	4.2	17.68	0.0211	Pass

LTE Band VII:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 2535 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	25.52	0.0101	Pass
-20	3.8	25.45	0.0100	Pass
-10	3.8	26.36	0.0104	Pass
0	3.8	25.49	0.0101	Pass
10	3.8	24.89	0.0098	Pass
20	3.8	26.76	0.0106	Pass
30	3.8	25.01	0.0099	Pass
40	3.8	26.17	0.0103	Pass
50	3.8	24.40	0.0096	Pass
25	3.5	25.92	0.0102	Pass
25	4.2	26.93	0.0106	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =2535 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	23.15	0.0091	Pass
-20	3.8	23.02	0.0091	Pass
-10	3.8	22.85	0.0090	Pass
0	3.8	22.79	0.0090	Pass
10	3.8	24.20	0.0095	Pass
20	3.8	24.87	0.0098	Pass
30	3.8	24.16	0.0095	Pass
40	3.8	23.80	0.0094	Pass
50	3.8	24.21	0.0096	Pass
25	3.5	22.98	0.0091	Pass
25	4.2	23.40	0.0092	Pass

LTE Band 12:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 707.5 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	3.45	0.0014	Pass
-20	3.8	3.52	0.0014	Pass
-10	3.8	3.62	0.0014	Pass
0	3.8	3.65	0.0014	Pass
10	3.8	3.59	0.0014	Pass
20	3.8	3.39	0.0013	Pass
30	3.8	3.56	0.0014	Pass
40	3.8	3.44	0.0014	Pass
50	3.8	3.66	0.0014	Pass
25	3.5	3.48	0.0014	Pass
25	4.2	3.61	0.0014	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =707.5 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	3.04	0.0012	Pass
-20	3.8	3.18	0.0013	Pass
-10	3.8	3.14	0.0012	Pass
0	3.8	3.07	0.0012	Pass
10	3.8	3.16	0.0012	Pass
20	3.8	3.25	0.0013	Pass
30	3.8	3.30	0.0013	Pass
40	3.8	3.21	0.0013	Pass
50	3.8	3.14	0.0012	Pass
25	3.5	3.12	0.0012	Pass
25	4.2	3.26	0.0013	Pass

LTE Band 17:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 710 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	-21.10	-0.0297	Pass
-20	3.8	-21.78	-0.0307	Pass
-10	3.8	-22.12	-0.0312	Pass
0	3.8	-21.92	-0.0309	Pass
10	3.8	-21.97	-0.0309	Pass
20	3.8	-21.40	-0.0301	Pass
30	3.8	-22.01	-0.0310	Pass
40	3.8	-21.70	-0.0306	Pass
50	3.8	-21.81	-0.0307	Pass
25	3.5	-21.91	-0.0309	Pass
25	4.2	-22.03	-0.0310	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =710 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
℃	V_{DC}	Hz	ppm	
-30	3.8	-19.98	-0.0281	Pass
-20	3.8	-19.59	-0.0276	Pass
-10	3.8	-18.70	-0.0263	Pass
0	3.8	-19.60	-0.0276	Pass
10	3.8	-19.80	-0.0279	Pass
20	3.8	-19.25	-0.0271	Pass
30	3.8	-19.19	-0.0270	Pass
40	3.8	-19.59	-0.0276	Pass
50	3.8	-19.28	-0.0272	Pass
25	3.5	-19.23	-0.0271	Pass
25	4.2	-19.98	-0.0281	Pass

Note: The fundamental emissions stay within the authorized bands of operation based on the frequency deviation measured is small, the extreme voltage was declared by applicant.

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