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FCC PART 27, PART 90
RSS-130 ISSUE 1, OCTOBER 2013
RSS-132 ISSUE 3, JANUARY 2013
RSS-133 ISSUE 6, JANUARY 2013
RSS-139 ISSUE 3, JULY 2015
RSS-199 ISSUE 3, DECEMBER 2016
RSS-GEN ISSUE 4, NOVEMBER 2014
MEASUREMENT AND TEST REPORT

For

Fujian LANDI Commercial Equipment Co., Ltd.

Building 17, Section A, Software Park, No. 89 Software Road, Gulou District, Fuzhou Municipality, Fujian Province, P.R. China.

FCC ID: 2AG6NAC01116
IC: 23725-AC01116

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	AC01116
EUT Model:	AC01116
EUT Type:	RF Module
FCC ID:	2AG6NAC01116
IC:	23725-AC01116
Rated Input Voltage:	DC 3.9V
External Dimension:	Length (41mm)*Width (41mm)*High (2.8mm)
Serial Number:	171225063
EUT Received Date:	2017.12.25

Objective

This report is prepared on behalf of *Fujian LANDI Commercial Equipment Co., Ltd.* in accordance with: Part 2-Subpart J, Part 22-Subpart H, and Part 24-Subpart E Part 27 and part 90 of the Federal Communication Commissions rules and RSS-130 Issue 1, October 2013, RSS-132, Issue 3, January 2013, RSS-133, Issue 6, January 2013, RSS-139, Issue 3, RSS-199 Issue 3, December 2016 of the Innovation, Science and Economic Development Canada.

The objective is to determine compliance with FCC Rules for output power, modulation characteristic, occupied bandwidth, spurious emissions at antenna terminal, spurious radiated emission, frequency stability and band edge.

Related Submittal(s)/Grant(s)

FCC Part 15C DSS submissions with FCC ID: 2AG6NAC01116.

FCC Part 15C DTS submissions with FCC ID: 2AG6NAC01116.

RSS-247 DTSSs, RSS-247 DSSs submissions with IC: 23725-AC01116

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 22 Subpart H - Public Mobile Services
 Part 24 Subpart E - Personal Communication Services
 Part 27 – Miscellaneous wireless communications services
 Part 90 –PRIVATE LAND MOBILE RADIO SERVICES

And:

RSS-130 Issue 1, October 2013, Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz;

RSS-132, Issue 3, January 2013, Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz;

RSS-133, Issue 6, January 2013, 2 GHz Personal Communication Services

RSS-139, Issue 3, JULY 2015, Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz.

RSS-199, Issue 3, December 2016, Broadband Radio Service (BRS) Equipment Operating in the Band 2500–2690 MHz.

TIA/EIA 603-D-2010.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp.(Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Unwanted Emissions, radiated	30MHz ~ 1GHz: 5.85 dB 1G~26.5GHz: 5.23 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1 °C
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603-D 2010.

The test items were performed with the EUT operating at testing mode. The device operates on GSM Band 850/1900MHz(only supports GPRS/EDGE), WCDMA Band 2/4/5, and LTE band 2/4/5/7/13/17/25/26/41, test was performed with channels as below table:

Frequency Bands	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
GPRS/EDGE850	0.25	824.2	836.6	848.8
GPRS/EDGE1900	0.25	1850.2	1880	1909.8
WCDMA Band 2	4.2	1852.4	1880	1907.6
WCDMA Band 4	4.2	1712.4	1732.6	1752.6
WCDMA Band 5	4.2	826.4	836.6	846.6
LTE Band 2	1.4	1850.7	1880	1909.3
	3	1851.5	1880	1908.5
	5	1852.5	1880	1907.5
	10	1855	1880	1905
	15	1857.5	1880	1902.5
	20	1860	1880	1900
LTE Band 4	1.4	1710.7	1732.5	1754.3
	3	1711.5	1732.5	1753.5
	5	1712.5	1732.5	1752.5
	10	1715	1732.5	1750
	15	1717.5	1732.5	1747.5
	20	1720	1732.5	1745
LTE Band 5	1.4	824.7	836.5	848.3
	3	825.5	836.5	847.5
	5	826.5	836.5	846.5
	10	829	836.5	844
LTE Band 7	5	2502.5	2535	2567.5
	10	2505	2535	2565
	15	2507.5	2535	2562.5
	20	2510	2535	2560
LTE Band 12	1.4	699.7	707.5	715.3
	3	700.5	707.5	714.5
	5	701.5	707.5	713.5
	10	704	707.5	711
LTE Band 13	5	779.5	782	784.5
	10	/	782	/
LTE Band 17	5	706.5	710	713.5
	10	709	710	711
LTE Band 25	1.4	1850.7	1882.5	1914.3
	3	1851.5	1882.5	1913.5
	5	1852.5	1882.5	1912.5
	10	1855	1882.5	1910
	15	1857.5	1882.5	1907.5
	20	1860	1882.5	1905

Frequency Bands	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
LTE Band 26 ^{Note 1}	1.4	814.7	831.5	848.3
	3	815.5	831.5	847.5
	5	816.5	831.5	846.5
	10	819	831.5	844
	15	821.5	831.5	841.5
LTE Band 41 ^{Note 2}	5	2498.5/2572.5	2593	2687.5/2617.5
	10	2501/2575	2593	2685/2615
	15	2503.5/2577.5	2593	2682.5/2612.5
	20	2506/2580	2593	2680/2610

Note 1: Band 26 for FCC only.

Note 2: Since different frequency range required by FCC and ISED, different low/high channels were tested.

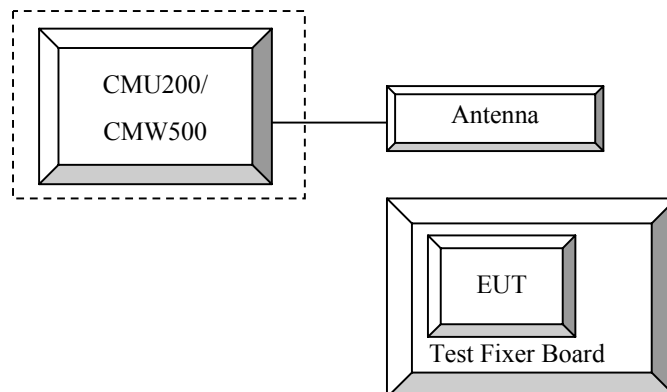
Equipment Modifications

No modification was made to the EUT.

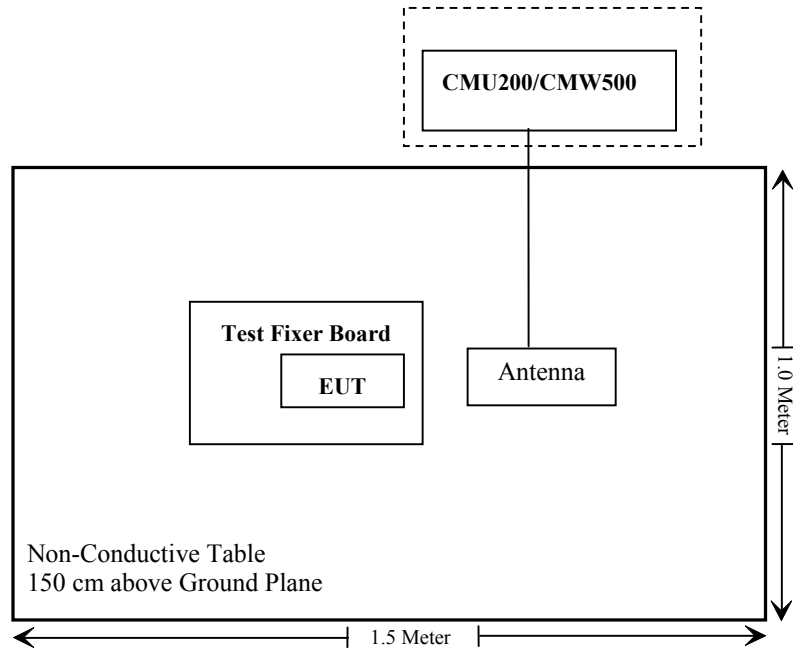
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Universal Radio Communication Tester	CMU200	109038
R&S	Wideband Radio Communication Tester	CMW500	147473
Huachang	Dipole antenna	071824	N/A
Fujian Landi Commercial Equipment Co., Ltd.	Test Fixer Board	N/A	N/A

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310, §2.1091 RSS-102§4	Maximum Permissible Exposure	Compliance
FCC§2.1046; § 22.913 (a); § 24.232 (c); §27.50;§90.635 RSS-130 §4.4;RSS-132 §5.4 RSS-133 §6.4;RSS-139 §6.5 RSS-199 § 4.4	RF Output Power	Compliance
FCC§ 2.1047	Modulation Characteristics	Not Applicable
RSS-130 §4.1;RSS-132 §5.2 RSS-133 §6.2;RSS-139 §6.2 RSS-199 § 4.1	Types of Modulation	Compliance
RSS-130 §4.2;RSS-132 §4.1 RSS-133 §6.1;RSS-139 §6.1 RSS-199 § 4.2	Frequency Sub-bands Frequency Plan	Compliance
FCC§ 2.1049; § 22.905 § 22.917; § 24.238; §27.53 §90.209 RSS-Gen §6.6	Occupied Bandwidth	Compliance
FCC§ 2.1051, § 22.917 (a); § 24.238 (a); §27.53;§90.691 RSS-130 §4.6;RSS-132 §5.5 RSS-133 §6.5;RSS-139 §6.6 RSS-199 § 4.5	Spurious Emissions at Antenna Terminal	Compliance
FCC§ 2.1053 § 22.917 (a); § 24.238 (a); §27.53 ;§90.691 RSS-130 §4.6;RSS-132 §5.5 RSS-133 §6.5;RSS-139 §6.6 RSS-199 § 4.5	Field Strength of Spurious Radiation	Compliance
FCC§ 22.917 (a); § 24.238 (a); §27.53;§90.691 RSS-130 §4.6;RSS-132 §5.5 RSS-133 §6.5;RSS-139 §6.6 RSS-199 § 4.5	Out of band emission, Band Edge	Compliance
FCC§ 2.1055 § 22.355; § 24.235; §27.54 §90.213 RSS-130 §4.3;RSS-132 §5.3 RSS-133 §6.3;RSS-139 §6.4 RSS-199 §4.3	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

FCC §1.1310, §2.1091& RSS-102 § 4 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission’s guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

According to RSS-102 § 4Table 4, RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ f ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ f ^{0.25}	0.1540/ f ^{0.25}	8.944/ f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619f ^{-0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/ f ^{1.2}

Note: f is frequency in MHz.
 *Based on nerve stimulation (NS).
 ** Based on specific absorption rate (SAR).

Calculation Formula:

Prediction of power density at the distance of the applicable MPE limit:

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

$$\Rightarrow G = 4\pi R^2 S / P$$

For simultaneously system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

For WLAN part:

Mode	Frequency Band	Antenna Gain		Max. Target Power including Tolerance		Evaluation Distance (cm)	FCC Power Density (mW/cm ²)	ISED Power Density (mW/cm ²)	FCC MPE Limit (mW/cm ²)	ISED MPE Limit (W/m ²)
		(dBi)	(numeric)	(dBm)	(mW)					
BDR/EDR	2402-2480	2	1.58	13.5	22.39	20.00	0.007	0.07	1.0	5.35
BLE	2402-2480	2	1.58	2	1.58	20.00	0.0005	0.005	1.0	5.35
WIFI	2412-2462	2	1.58	24	251.19	20.00	0.07924	0.7924	1.0	5.37

Note: Bluetooth and WIFI can't transmit simultaneously.

Bluetooth or WIFI can transmit simultaneously with WWAN. The maximum MPE to limit ratio for WLAN is WIFI: $0.7924/5.37=0.148$ (ISED limit was the used for calculation)

Calculated Maximum antenna gain allowed base on ERP/EIRP:

Mode	Frequency Range (MHz)	Conducted Power including Tolerance (dBm)	ERP/EIRP Limit (dBm)	Maximum Antenna Gain Allowed (dBi)
GSM850	824-849	32	38.45	6.45
GSM1900	1850-1910	30	33	3
WCDMA Band 2	1850-1910	24	33	9
WCDMA Band 4	1710-1755	24	30	6
WCDMA Band 5	824-849	24	38.45	14.45
LTE Band 2	1850-1910	24	33	9
LTE Band 4	1710-1755	24	30	6
LTE Band 5	824-849	24	38.45	14.45
LTE band 7	2500-2570	24	33	9
LTE band 12	699-716	24	34.77	10.77
LTE band 13	777-787	24	34.77	10.77
LTE band 17	704-716	24	34.77	10.77
LTE band 25	1850-1915	24	33	9
LTE band 26	814-849	24	38.45	14.45
LTE band 41	2496-2690	24	33	9

Calculated Maximum antenna gain allowed base on MPE:

Mode	Frequency Range (MHz)	Conducted Power including Tolerance (dBm)	power density Limits (W/m ²)	Maximum Power Density (S _{WWAN}) (W/m ²)	Evaluation Distance (cm)	Maximum Antenna Gain Allowed base on MPE	
						(numeric)	(dBi)
GSM850	824-849	29	2.58	2.198	20	1.39	1.43
GSM1900	1850-1910	27	4.48	3.817	20	3.83	5.83
WCDMA Band 2	1850-1910	24	4.48	3.817	20	7.63	8.83
WCDMA Band 4	1710-1755	24	4.24	3.612	20	7.22	8.59
WCDMA Band 5	824-849	24	2.58	2.198	20	4.40	6.43
LTE Band 2	1850-1910	24	4.48	3.817	20	7.63	8.83
LTE Band 4	1710-1755	24	4.24	3.612	20	7.22	8.59
LTE Band 5	824-849	24	2.58	2.198	20	4.40	6.43
LTE band 7	2500-2570	24	5.50	4.686	20	9.37	9.72
LTE band 12	699-716	24	2.30	1.960	20	3.92	5.93
LTE band 13	777-787	24	2.47	2.104	20	4.21	6.24
LTE band 17	704-716	24	2.31	1.968	20	3.94	5.95
LTE band 25	1850-1915	24	4.48	3.817	20	7.63	8.83
LTE band 26	814-849	24	2.55	2.173	20	4.35	6.38
LTE band 41	2496-2690	24	5.49	4.677	20	9.35	9.71

Note 1: for GSM850 and 1900, maximum time-average was reduced by 3dBc for worst 4 up time slots

Note 2: the strict limit is ISEDC, which was used for MPE evaluation.

Note 3:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

$$= S_{WLAN} / S_{limit-WLAN} + S_{WWAN} / S_{limit-WWAN}$$

$$\Rightarrow \text{Maximum } S_{WWAN} = (1 - S_{WLAN} / S_{limit-WLAN}) * S_{limit-WWAN} = (1 - 0.148) * S_{limit-WWAN} = 0.852 * S_{limit-WWAN}$$

Result: The device meets MPE requirement for Devices Used by the General Public at 20cm distance with the maximum antenna gain for each band as below table:

Frequency Range (MHz)	Maximum Antenna Gain Allowed (dBi)
814-849	1.43
1850-1915	3.0
1710-1755	6.0
699-716	5.93
777-787	6.24
2496-2690	9.0

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E, Part 27 , Part 90 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

RSS-130 §4.2 & RSS-132 §5.1 & RSS-133 §6.1 & RSS-139 §6.1 & RSS-199 §4.2- CHANNELLING ARRANGEMENTS & FREQUENCY PLAN

Applicable Standard

According to RSS-130 §4.2, the frequency bands 698-756 MHz and 777-787 MHz are divided into small frequency blocks as per SRSP- 518. Equipment shall operate according to the frequency plan given in the SRSP.

According to RSS-132 §5.1, the frequency bands 824-849 MHz and 869-894 MHz are divided into sub-bands as described in SRSP-503. These sub-bands are:

824-835 MHz, 835-845 MHz, 845-846.5 MHz, and 846.5-849 MHz for mobile transmit; and 869-880 MHz, 880-890 MHz, 890-891.5 MHz, and 891.5-894 MHz for base transmit.

According to RSS-133 §6.1, the frequency plan is described in SRSP-510.

According to RSS-139 §6.1, the frequency plan is described in SRSP-513.

According to RSS-199 §4.2, the channel bandwidth shall be equal to or greater than 1 MHz and shall be reported by the certification applicant.

Test Result

According to the test data, channeling arrangement meets all relevant conditions specified in SRSP-503, SRSP-510, SRSP-513, SRSP-517, SRSP-518.

RSS-130 §4.1 & RSS-132 §5.2 & RSS-133 §6.2 & RSS-139 §6.2 & RSS-199 §4.1- TYPES OF MODULATION

Applicable Standard

According to RSS-130 §4.1, equipment certified under this standard shall employ digital modulation.

According to RSS-132 §5.2, equipment certified under this standard shall use digital modulation.

According to RSS-133 §6.2, the devices shall employ digital modulation techniques.

According to RSS-139 §6.2, the devices may employ any type of modulation techniques. The type of modulation used must be reported.

According to RSS-199 §4.1, equipment certified under this standard shall employ digital modulation.

Test Result

The EUT uses GMSK, 8PSK, QPSK, 16QAM, 64QAM modulation.

FCC § 2.1046, § 22.913 (a) & § 24.232 (c) & § 27.50 & § 90.635 AND RSS-130 § 4.4 & RSS-132 § 5.4 & RSS-133 § 6.4 & RSS-139 § 6.5 RSS-199 § 4.4 - RF OUTPUT POWER

Applicable Standard

According to FCC § 2.1046 and § 22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC § 2.1046 and § 24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to § 24.232 (d) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of § 24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

According to FCC § 2.1046 and § 27.50 (d), (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

According to § 27.50

(b)(10) Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

(c) (10) Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

(d), (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

(h),(2) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

According to § 90.635

(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

According to RSS-130 § 4.4

The transmitter output power shall be measured in terms of average power.

For base and fixed equipment, refer to SRSP-518 for power limits.

The e.i.r.p. shall not exceed 50 watts for mobile equipment or for outdoor fixed subscriber equipment, nor shall it exceed 5 watts for portable equipment or for indoor fixed subscriber equipment.

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

According to RSS-132 §5.4

The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts. Refer to SRSP-503 for base station e.i.r.p. limits.

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

According to RSS-133 §6.4

The equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Moreover, base station transmitters operating in the band 1930-1995 MHz shall not have output power exceeding 100 watts.

In addition, the transmitter's peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

According to RSS-139 §6.5

The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed one watt.

Consult SRSP-513 for e.i.r.p. limits on fixed and base stations operating in the band 2110-2180 MHz.

According to RSS-199 §4.4

The transmitter output power shall be measured in terms of average value.

For base station equipment, refer to SRSP-517 for the maximum permissible e.i.r.p.

For mobile subscriber equipment, the e.i.r.p. shall not exceed 2 W. For fixed subscriber equipment, the transmitter output power shall not exceed 2 W and the e.i.r.p. shall be limited to 40 W.

In addition, the peak to average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1% of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission.

Test Procedure

GSM/GPRS/EGPRS

Function: Menu select > GSM Mobile Station > GSM 850/1900
 Press Connection control to choose the different menus
 Press RESET > choose all the reset all settings
 Connection Press Signal Off to turn off the signal and change settings
 Network Support > GSM + GPRS or GSM + EGSM
 Main Service > Packet Data
 Service selection > Test Mode A – Auto Slot Config. off
 MS Signal Press Slot Config Bottom on the right twice to select and change the number of time slots and power setting
 > Slot configuration > Uplink/Gamma
 > 33 dBm for GPRS 850
 > 30 dBm for GPRS 1900
 > 27 dBm for EGPRS 850
 > 26 dBm for EGPRS 1900
 BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel
 Frequency Offset > + 0 Hz
 Mode > BCCH and TCH
 BCCH Level > -85 dBm (May need to adjust if link is not stable)
 BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]

 Channel Type > Off
 P0 > 4 dB
 Slot Config > Unchanged (if already set under MS signal)
 TCH > choose desired test channel
 Hopping > Off
 Main Timeslot > 3
 Network Coding Scheme > CS4 (GPRS) and MCS5 (EGPRS)

 Bit Stream > 2E9-1 PSR Bit Stream
 AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
 Connection Press Signal on to turn on the signal and change settings

WCDMA-Release 99

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification. The EUT has a nominal maximum output power of 24dBm (+1.7/-3.7).

WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc / βd	8/15

WCDMA HSDPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subset	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c / β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
MPR(dB)	0	0	0.5	0.5	
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	$A_{hs} = \beta_{hs} / \beta_c$	30/15			

WCDMA HSUPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

	Mode	HSUPA	HSUPA	HSUPA	HSUPA	HSUPA
	Subset	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	-
	β_{hs}	22/15	12/15	30/15	4/15	5/15
	CM(dB)	1.0	3.0	2.0	3.0	1.0
MPR(dB)	0	2	1	2	0	
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback	4ms				
	CQI Repetition Factor	2				
	$A_{hs}=\beta_{hs}/\beta_c$	30/15				
HSUPA Specific Settings	DE-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_FCI	E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27	E-TFCI 11 E-TFCI PO4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27	

HSPA+

The following tests were conducted according to the test requirements in Table C.11.1.4 of 3GPP TS 34.121-1

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed1} : 30/15 β_{ed2} : 30/15	β_{ed3} : 24/15 β_{ed4} : 24/15	3.5	2.5	14	105	105

- Note 1: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.
- Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
- Note 3: DPDCH is not configured, therefore the β_c is set to 1 and $\beta_d = 0$ by default.
- Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
- Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

DC-HSDPA

The following tests were conducted according to the test requirements in Table C.8.1.12 of 3GPP TS 34.121-1

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
<p>Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.</p> <p>Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.</p>		

LTE (FDD):

The following tests were conducted according to the test requirements in 3GPP TS36.101

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of "NS_01".

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 ¹	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

LTE(TDD):

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$			$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-		-
9	$13168 \cdot T_s$			-		-

Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Calculated Duty Cycle

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-point Periodicity	Subframe Number										Calculated Duty Cycle (%)
		0	1	2	3	4	5	6	7	8	9	
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.33
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33

Calculated Duty Cycle = Extended cyclic prefix in uplink x (T_s) x # of S + # of U

Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:
 Calculated Duty Cycle = $5120 \times [1/(15000 \times 2048)] \times 2 + 6 \text{ ms} = 63.33\%$
 where
 T_s = 1/(15000 x 2048) seconds

Radiated method:

ANSI/TIA-603-D section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each Time	/
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-18	2018-07-18
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31

* **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:	25.9~26.5 °C
Relative Humidity:	49~54 %
ATM Pressure:	100.6~101.1 kPa

The testing was performed by Vern Shen, Steven Zuo and Swim Lv on 2018-03-05 & 2018-03-07.

Conducted Output Power

Cellular Band & PCS Band

Channel No.	Conducted Output Power (dBm)								
	GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot
128	31.50	31.44	31.26	30.42	28.67	26.18	26.09	25.02	22.96
190	31.50	31.48	31.28	30.53	28.22	26.03	25.93	24.83	22.85
251	31.50	31.47	31.25	30.49	28.16	25.99	25.88	24.75	22.77
512	29.90	29.98	29.83	29.73	29.61	26.09	25.91	25.84	25.62
661	29.70	29.75	29.64	29.47	29.27	25.94	25.78	25.56	25.33
810	29.60	29.68	29.56	29.43	29.31	26.03	25.84	25.61	25.43

WCDMA Band 2

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	23.37	2.52	23.08	2.32	23.41	2.28
HSDPA	1	22.27	3.12	22.02	3.64	22.40	3.72
	2	22.22	3.19	22.18	3.88	22.49	3.53
	3	22.25	3.05	22.23	3.56	22.39	3.92
	4	22.07	3.10	22.03	3.77	22.46	3.62
HSUPA	1	21.75	3.80	21.53	3.48	21.79	3.52
	2	22.15	3.98	21.98	3.86	22.57	3.67
	3	22.26	4.03	22.18	3.69	22.26	3.68
	4	22.07	3.66	21.96	3.50	22.63	3.80
	5	22.16	3.92	22.06	3.79	22.53	3.74
DC-HSDPA	1	22.25	3.97	21.86	3.83	22.28	3.74
	2	22.33	3.61	22.02	3.58	22.64	3.97
	3	22.39	3.90	22.09	3.49	22.56	3.73
	4	22.33	3.73	22.16	3.74	22.47	3.76
HSPA+	1	22.5	3.61	22.18	3.8	22.23	3.68

WCDMA Band 4

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	23.26	2.84	23.24	2.52	22.74	2.48
HSDPA	1	21.83	3.36	21.71	3.80	21.64	3.40
	2	22.05	3.16	21.75	3.95	21.45	3.53
	3	22.01	3.61	21.82	3.76	21.70	3.27
	4	22.06	3.16	21.55	3.97	21.61	3.46
HSUPA	1	21.33	3.32	21.09	3.52	21.04	3.92
	2	21.86	3.51	21.67	3.69	21.75	3.20
	3	21.79	3.27	21.67	3.64	21.47	3.43
	4	22.07	3.45	21.79	3.74	21.79	3.47
	5	22.00	3.22	21.78	3.97	21.72	3.58
DC-HSDPA	1	21.67	3.22	21.52	3.81	21.60	3.23
	2	21.86	3.16	21.96	3.93	21.79	3.46
	3	21.81	3.50	21.53	3.98	21.52	3.23
	4	21.99	3.37	21.94	3.98	21.69	3.38
HSPA+	1	21.81	3.32	21.71	4.02	21.54	3.65

WCDMA Band 5

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	23.25	2.28	23.31	3.20	23.22	3.12
HSDPA	1	21.11	2.88	21.07	4.59	21.03	4.24
	2	22.38	3.26	22.17	3.68	22.53	3.97
	3	22.05	3.34	22.21	3.84	22.60	3.73
	4	22.09	3.11	22.14	3.54	22.41	3.77
HSUPA	1	20.50	3.40	20.66	4.28	20.53	3.60
	2	20.40	3.18	20.42	3.54	20.53	3.54
	3	20.41	3.33	20.56	3.49	20.26	3.70
	4	20.28	3.00	20.46	3.62	20.30	3.76
	5	20.35	3.01	20.61	3.75	20.25	3.65
DC-HSDPA	1	20.36	3.13	20.41	3.60	20.36	3.83
	2	20.28	3.36	20.48	3.57	20.32	3.85
	3	20.49	3.21	20.55	3.58	20.23	3.53
	4	20.32	2.94	20.57	3.49	20.27	3.90
HSPA+	1	20.29	3	20.5	3.79	20.22	3.64

LTE Band 2

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	22.93	22.55	22.81
		1#3	22.87	22.48	23.16
		1#5	22.82	22.51	23.06
		3#0	22.87	22.59	23.18
		3#3	22.86	22.60	23.09
		6#0	21.78	21.62	21.97
	16QAM	1#0	22.54	21.59	21.37
		1#3	22.55	21.66	21.44
		1#5	22.42	21.75	21.39
		3#0	21.68	21.75	21.67
3#3		21.72	21.81	21.65	
3MHz	QPSK	1#0	22.98	22.37	22.96
		1#8	23.04	22.56	22.87
		1#14	23.10	22.62	22.84
		6#0	21.85	21.55	21.86
		6#9	21.90	21.69	21.84
		15#0	21.80	21.48	21.92
	16QAM	1#0	22.12	21.55	22.32
		1#8	22.41	21.32	21.59
		1#14	22.55	21.36	21.52
		6#0	21.12	20.36	21.34
6#9		21.04	20.71	21.32	
5MHz	QPSK	1#0	22.93	22.42	23.05
		1#13	22.77	22.52	22.92
		1#24	22.75	22.67	22.89
		15#0	21.81	21.58	22.05
		15#10	21.82	21.72	22.06
		25#0	21.88	21.52	21.90
	16QAM	1#0	22.75	21.69	22.63
		1#13	22.33	21.28	21.87
		1#24	22.44	21.52	21.78
		15#0	21.89	21.62	21.92
15#10		21.81	21.55	21.83	
		25#0	20.80	20.68	20.85

10MHz	QPSK	1#0	22.65	22.47	22.68
		1#24	23.04	22.60	23.27
		1#49	22.86	22.87	23.07
		25#0	21.87	21.66	21.96
		25#25	21.85	21.82	22.06
	50#0	21.77	21.65	21.82	
	16QAM	1#0	21.93	21.17	22.64
		1#24	22.31	21.62	21.65
		1#49	21.99	21.91	22.24
		25#0	21.52	21.76	21.62
25#25		21.68	21.58	21.71	
50#0	20.83	20.71	20.77		
15MHz	QPSK	1#0	22.88	22.46	23.04
		1#38	22.92	22.57	22.79
		1#74	22.73	23.03	22.95
		36#0	21.98	21.74	21.91
		36#39	21.87	21.96	22.12
		75#0	21.69	21.70	21.86
	16QAM	1#0	22.11	22.16	22.31
		1#38	22.37	22.38	22.98
		1#74	21.78	22.42	23.06
		36#0	20.95	20.64	20.83
		36#39	20.88	20.83	21.25
		75#0	20.67	20.54	20.81
20MHz	QPSK	1#0	22.76	22.66	23.18
		1#49	23.14	22.86	22.86
		1#99	22.66	23.31	23.50
		50#0	22.01	21.67	22.07
		50#50	21.76	22.00	21.97
		100#0	21.76	21.63	21.88
	16QAM	1#0	22.19	21.26	22.62
		1#49	22.12	21.50	22.35
		1#99	21.25	21.71	22.11
		50#0	20.97	20.67	21.04
		50#50	20.73	21.01	21.10
		100#0	20.79	20.66	20.82

LTE Band 4

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	23.29	23.24	23.32
		1#3	23.47	23.57	23.45
		1#5	23.44	23.52	23.37
		3#0	23.43	23.30	23.23
		3#3	23.40	23.25	23.30
		6#0	22.03	22.04	22.16
	16QAM	1#0	22.41	22.04	21.47
		1#3	23.07	23.17	22.79
		1#5	22.82	23.15	22.75
		3#0	22.11	22.53	21.98
3#3		22.56	22.55	21.95	
3MHz	QPSK	1#0	22.95	23.10	23.12
		1#8	23.30	22.98	23.07
		1#14	23.36	23.13	22.98
		6#0	22.39	22.08	22.24
		6#7	22.45	22.14	22.22
		15#0	22.15	21.93	22.05
	16QAM	1#0	22.40	22.12	22.07
		1#8	22.99	22.43	21.81
		1#14	22.55	22.30	21.96
		6#0	21.44	21.46	20.94
6#7		21.46	21.29	20.96	
5MHz	QPSK	1#0	22.98	23.14	23.07
		1#13	23.14	23.01	23.10
		1#24	23.26	23.17	23.36
		15#0	22.27	22.12	22.36
		15#10	22.30	22.29	22.29
		25#0	22.17	22.03	22.13
	16QAM	1#0	21.68	21.90	21.94
		1#13	22.09	22.77	22.27
		1#24	21.95	22.76	22.18
		15#0	21.32	21.20	21.11
15#10		21.24	21.35	21.24	
25#0	21.19	20.99	21.00		

10MHz	QPSK	1#0	23.33	23.14	23.13
		1#24	23.27	23.30	23.29
		1#49	23.22	23.18	23.33
		25#0	22.21	22.17	22.38
		25#25	22.20	22.25	22.28
	50#0	22.14	22.11	22.10	
	16QAM	1#0	22.65	22.63	21.76
		1#24	22.84	21.99	22.53
		1#49	22.80	22.01	22.78
		25#0	21.11	21.06	21.16
25#25		21.19	21.17	21.00	
50#0	21.13	21.22	20.88		
15MHz	QPSK	1#0	23.37	23.11	23.28
		1#38	23.30	23.46	23.06
		1#74	23.25	23.31	23.17
		36#0	22.27	22.23	22.35
		36#39	22.30	22.26	22.25
		75#0	22.21	22.19	22.13
	16QAM	1#0	22.69	22.34	22.65
		1#38	22.64	23.13	22.78
		1#74	22.58	22.77	22.98
		36#0	21.15	21.20	21.27
		36#39	21.21	21.26	21.15
		75#0	21.05	20.98	21.11
20MHz	QPSK	1#0	23.64	23.23	23.26
		1#49	23.48	23.28	23.32
		1#99	23.41	23.36	23.21
		50#0	22.27	22.30	22.30
		50#50	22.31	22.40	22.26
		100#0	22.18	22.20	22.27
	16QAM	1#0	22.57	21.95	22.66
		1#49	22.19	22.66	22.73
		1#99	22.15	21.79	22.53
		50#0	21.33	21.21	21.41
		50#50	21.17	21.25	21.26
		100#0	21.11	21.05	21.14

LTE Band 5

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	22.69	22.71	22.75
		1#3	23.00	22.98	23.30
		1#5	22.90	23.03	23.17
		3#0	22.90	22.95	23.16
		3#3	22.87	22.91	23.01
	16QAM	6#0	21.78	21.90	22.13
		1#0	21.95	21.68	22.23
		1#3	22.21	21.92	22.65
		1#5	22.20	22.78	22.57
		3#0	21.85	22.36	21.66
3MHz	QPSK	3#3	21.77	22.28	21.81
		6#0	20.88	20.70	21.04
		1#0	22.72	22.89	22.90
		1#8	22.66	22.78	22.80
		1#14	22.64	22.78	22.76
	16QAM	6#0	21.88	22.06	22.19
		6#9	21.85	21.94	22.10
		15#0	21.81	21.95	22.13
		1#0	21.39	22.06	22.20
		1#8	21.56	21.79	22.21
5MHz	QPSK	1#14	21.48	21.58	22.30
		6#0	20.75	20.90	21.23
		6#9	20.72	20.88	21.12
		15#0	20.72	20.75	20.97
		1#0	22.85	22.86	23.09
	16QAM	1#13	22.68	22.90	23.10
		1#24	22.82	22.91	23.05
		15#0	21.78	21.96	22.16
		15#10	21.74	21.88	22.03
		25#0	21.85	21.99	22.10
10MHz	QPSK	1#0	22.08	22.31	21.50
		1#13	21.36	22.47	22.09
		1#24	21.43	21.93	22.22
		15#0	21.06	21.00	21.06
		15#10	20.93	20.86	21.03
	16QAM	25#0	20.79	20.90	20.89
		1#0	22.83	23.02	22.90
		1#25	22.92	23.39	22.54
		1#49	23.04	23.10	23.20
		25#0	21.99	22.07	22.00
16QAM	25#25	22.12	22.01	22.12	
	50#0	21.86	21.97	22.03	
	1#0	22.28	21.91	22.34	
	1#25	22.37	22.78	22.74	
	1#49	22.52	22.32	22.73	
16QAM	25#0	20.81	20.83	20.92	
	25#25	20.95	20.91	21.13	
	50#0	21.01	20.76	20.93	

LTE Band 7

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	1#0	23.13	23.44	23.28
		1#13	22.04	22.44	21.68
		1#24	22.10	22.58	21.52
		15#0	22.08	22.23	21.85
		15#10	21.94	22.22	21.61
	16QAM	25#0	21.83	22.24	21.48
		1#0	21.54	21.67	21.19
		1#13	21.30	21.95	20.84
		1#24	21.38	22.09	20.69
		15#0	21.07	21.03	20.97
10MHz	QPSK	15#10	21.05	21.16	20.76
		25#0	21.00	21.18	20.63
		1#0	21.63	22.09	21.03
		1#24	21.74	22.23	21.68
		1#49	21.11	21.57	20.95
	16QAM	25#0	21.90	22.38	21.47
		25#25	21.57	22.10	21.49
		50#0	21.69	22.25	21.49
		1#0	20.76	21.71	20.24
		1#24	21.33	21.69	21.10
15MHz	QPSK	1#49	20.74	21.03	20.42
		25#0	20.97	21.07	20.58
		25#25	20.76	20.98	20.64
		50#0	20.76	21.23	20.50
		1#0	22.10	22.48	20.89
	16QAM	1#37	21.55	22.27	21.41
		1#74	21.57	21.92	21.18
		36#0	21.85	22.44	21.22
		36#39	21.54	22.11	21.48
		75#0	21.87	22.29	21.52
20MHz	QPSK	1#0	21.51	21.64	20.71
		1#37	20.91	21.56	20.79
		1#74	20.97	21.24	20.64
		36#0	21.00	21.41	20.40
		36#39	20.66	21.22	20.70
	16QAM	75#0	20.78	21.18	20.53
		1#0	22.14	22.37	21.02
		1#49	21.43	22.15	21.14
		1#99	21.31	21.20	20.92
		50#0	21.65	22.21	20.85
16QAM	50#50	21.38	21.75	21.30	
	100#0	21.74	22.28	21.35	
	1#0	21.53	21.48	20.30	
	1#49	20.78	21.45	20.56	
	1#99	20.69	20.51	20.40	
16QAM	50#0	20.81	21.34	20.57	
	50#50	20.55	20.87	20.45	
	100#0	20.90	21.35	20.45	

LTE Band 12

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	22.98	22.93	22.87
		1#3	22.87	23.35	22.97
		1#5	23.20	23.30	23.00
		3#0	23.02	23.03	23.14
		3#3	23.03	23.26	23.06
	16QAM	6#0	23.11	22.14	22.08
		1#0	21.85	21.94	21.55
		1#3	22.17	23.14	22.89
		1#5	22.19	23.07	22.88
		3#0	21.76	22.34	22.47
3MHz	QPSK	3#3	21.92	22.48	22.38
		6#0	21.05	21.12	21.07
		1#0	22.89	23.03	22.74
		1#7	22.95	23.08	22.80
		1#14	22.77	23.06	22.81
	16QAM	6#9	21.88	22.19	21.93
		15#0	21.93	22.13	22.03
		1#0	22.04	22.01	22.23
		1#7	21.89	21.68	21.65
		1#14	21.70	21.57	21.70
5MHz	QPSK	6#0	21.04	21.08	20.81
		6#9	20.96	21.00	20.73
		15#0	20.84	21.03	21.06
		1#0	22.89	22.99	23.13
		1#12	23.09	22.87	22.77
	16QAM	1#24	22.88	23.03	22.75
		15#0	22.12	22.01	22.05
		15#10	21.97	21.99	21.97
		25#0	22.01	21.98	22.11
		1#0	22.38	22.22	22.18
10MHz	QPSK	1#12	21.97	22.65	21.19
		1#24	21.86	22.42	21.21
		15#0	21.06	20.88	21.13
		15#10	21.00	20.70	20.77
		25#0	20.95	20.83	21.29
	16QAM	1#0	23.05	22.98	23.09
		1#24	23.15	23.10	23.31
		1#49	23.18	23.06	23.00
		25#0	22.01	22.01	22.02
		25#25	22.03	22.00	22.11
16QAM	50#0	22.13	22.02	22.19	
	1#0	22.53	22.29	22.15	
	1#24	22.70	22.66	22.47	
	1#49	22.63	22.78	22.21	
	25#0	20.93	21.81	21.15	
16QAM	25#25	21.06	20.76	20.97	
	50#0	20.92	21.09	21.04	

LTE Band 13

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)	
5MHz	QPSK	1#0	23.07	22.84	23.26	
		1#12	22.95	22.85	23.38	
		1#24	23.02	22.81	23.10	
		15#0	21.97	22.12	22.03	
		15#10	22.10	22.10	21.96	
		25#0	21.96	22.05	22.08	
	16QAM	1#0	22.41	22.29	22.00	
		1#12	21.98	22.11	22.15	
		1#24	22.13	21.41	22.02	
		15#0	20.81	21.10	20.85	
		15#10	20.93	20.65	21.01	
		25#0	20.94	20.94	21.01	
	10MHz	QPSK	1#0	/	23.00	/
			1#24	/	23.08	/
1#49			/	23.13	/	
25#0			/	22.01	/	
25#25			/	22.03	/	
50#0			/	22.12	/	
16QAM		1#0	/	21.83	/	
		1#24	/	22.06	/	
		1#49	/	21.70	/	
		25#0	/	20.89	/	
		25#25	/	20.81	/	
		50#0	/	21.13	/	

LTE Band 17

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	1#0	23.15	23.04	23.23
		1#12	23.35	23.00	23.06
		1#24	23.01	23.07	23.04
		15#0	22.14	22.14	22.16
		15#10	22.08	22.14	22.16
		25#0	22.15	22.24	22.15
	16QAM	1#0	22.29	22.03	22.28
		1#12	22.23	22.02	21.95
		1#24	22.12	22.21	22.00
		15#0	21.11	20.87	21.35
15#10		21.12	21.15	21.21	
25#0	21.09	21.17	21.28		
10MHz	QPSK	1#0	23.22	23.05	23.31
		1#24	23.27	23.10	23.12
		1#49	23.15	23.11	23.16
		25#0	22.17	22.22	22.25
		25#25	22.23	22.26	22.18
		50#0	22.21	22.12	22.24
	16QAM	1#0	22.31	22.28	21.91
		1#24	22.87	22.06	22.30
		1#49	22.39	22.07	22.02
		25#0	21.07	20.88	21.15
		25#25	21.09	20.91	21.06
50#0	21.08	21.03	21.01		

LTE Band 25

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	22.68	22.70	23.04
		1#3	22.74	22.93	23.08
		1#5	22.73	22.89	23.11
		3#0	22.93	22.84	23.08
		3#3	22.96	22.86	22.98
		6#0	21.67	21.81	21.96
	16QAM	1#0	21.58	21.82	21.92
		1#3	21.97	21.95	21.99
		1#5	21.96	21.96	22.03
		3#0	21.86	21.99	22.04
		3#3	21.89	22.02	22.06
		6#0	20.76	20.75	21.10
3MHz	QPSK	1#0	22.70	22.68	23.13
		1#8	22.71	22.73	22.15
		1#14	22.61	22.65	22.91
		6#0	21.83	21.80	21.98
		6#9	21.81	21.76	21.95
		15#0	21.80	21.77	22.10
	16QAM	1#0	22.06	21.82	22.24
		1#8	21.98	21.76	2.09
		1#14	21.95	21.81	22.01
		6#0	21.86	21.77	21.98
		6#9	21.85	21.76	21.94
		15#0	20.83	20.78	20.94
5MHz	QPSK	1#0	22.90	22.57	23.09
		1#13	22.95	22.65	23.10
		1#24	22.97	22.86	23.02
		15#0	21.89	21.75	22.01
		15#10	21.86	21.74	21.98
		25#0	21.88	21.81	22.06
	16QAM	1#0	22.15	21.95	22.28
		1#13	22.16	21.92	22.19
		1#24	22.14	21.94	22.21
		15#0	21.01	20.89	20.96
		15#10	20.99	20.79	21.01
		25#0	20.79	20.75	21.00
10MHz	QPSK	1#0	22.75	22.88	22.81
		1#25	22.89	22.93	22.94
		1#49	22.86	22.91	23.02
		25#0	21.69	21.73	22.02
		25#25	21.67	21.77	22.01
		50#0	21.85	21.90	22.03
	16QAM	1#0	21.85	21.88	22.96
		1#25	21.86	21.82	22.99
		1#49	21.81	21.89	22.92
		25#0	20.80	20.79	21.03
		25#25	20.79	20.81	21.01
		50#0	20.81	20.81	21.09

15MHz	QPSK	1#0	22.83	22.68	23.11
		1#38	22.89	22.72	23.12
		1#74	22.91	22.74	23.16
		36#0	21.82	21.75	22.01
		36#39	21.83	21.69	22.04
	75#0	21.88	21.76	22.03	
	16QAM	1#0	21.93	21.75	21.89
		1#38	21.96	21.81	21.90
		1#74	21.94	21.85	21.92
		36#0	20.89	20.86	20.86
36#39		20.86	20.89	20.89	
75#0	20.90	20.96	20.96		
20MHz	QPSK	1#0	22.90	22.81	23.34
		1#50	22.89	22.78	23.19
		1#99	22.86	22.72	23.11
		50#0	21.99	21.82	22.01
		50#50	22.03	21.83	22.06
	100#0	22.07	21.99	22.05	
	16QAM	1#0	22.29	21.87	22.51
		1#50	22.10	21.86	22.41
		1#99	22.16	21.84	22.24
		50#0	20.89	20.79	20.99
50#50		20.87	20.84	21.03	
100#0	20.93	20.88	20.95		

LTE Band 26

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	22.98	22.85	23.13
		1#3	23.07	23.17	23.23
		1#5	23.15	23.09	23.10
		3#0	23.17	23.20	23.10
		3#3	23.13	23.14	23.25
		6#0	22.01	22.08	22.03
	16QAM	1#0	21.91	21.76	22.31
		1#3	23.05	22.73	22.13
		1#5	23.15	22.40	22.14
		3#0	22.98	23.07	21.82
		3#3	21.95	23.16	21.66
		6#0	21.03	20.80	21.09

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
3MHz	QPSK	1#0	23.05	22.87	23.00
		1#8	22.89	23.19	23.28
		1#14	22.95	23.18	23.07
		6#0	22.11	22.07	22.17
		6#9	22.13	21.97	22.10
	16QAM	15#0	22.09	22.06	22.11
		1#0	22.23	21.92	22.34
		1#8	22.27	22.03	22.75
		1#14	22.44	21.82	22.41
		6#0	21.05	20.75	21.23
5MHz	QPSK	6#9	21.10	20.80	21.12
		15#0	21.08	21.12	21.09
		1#0	23.16	22.88	22.95
		1#13	22.98	22.94	23.15
		1#24	23.05	23.02	23.00
	16QAM	15#10	22.09	22.01	22.16
		25#0	21.01	20.94	21.05
		1#0	23.26	23.16	23.18
		1#13	21.81	22.10	22.12
		1#24	21.88	22.09	22.16
10MHz	QPSK	15#0	21.28	21.06	21.11
		15#10	21.27	21.04	21.06
		25#0	21.01	20.94	21.05
		1#0	23.26	23.16	23.18
		1#25	23.20	23.16	23.18
	16QAM	1#49	23.07	23.26	23.20
		25#0	22.19	22.08	22.20
		25#25	22.08	22.24	22.33
		50#0	22.17	22.04	22.28
		1#0	22.28	21.66	22.07
15MHz	QPSK	1#25	22.12	22.00	21.73
		1#49	22.15	21.86	21.88
		25#0	21.02	20.92	20.93
		25#25	20.90	21.11	21.03
		50#0	20.93	20.92	21.05
	16QAM	1#0	23.24	23.05	23.30
		1#38	23.08	23.13	22.90
		1#74	22.97	23.12	23.20
		36#0	22.25	22.07	22.19
		36#39	21.98	22.22	22.18
16QAM	75#0	22.08	22.01	22.15	
	1#0	22.51	22.18	22.38	
	1#38	22.22	21.73	22.24	
	1#74	22.07	21.82	22.75	
	36#0	22.13	22.18	22.20	
16QAM	36#39	22.00	22.13	22.19	
	75#0	21.09	20.88	21.05	

LTE Band 41

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)		Middle Channel (dBm)	High Channel (dBm)	
			FCC	ISED		FCC	ISED
5MHz	QPSK	1#0	22.86	22.91	23.10	22.23	22.11
		1#12	23.04	22.78	23.39	21.80	21.54
		1#24	22.83	22.86	23.02	21.83	21.55
		15#0	21.92	21.76	22.12	21.50	21.74
		15#10	22.12	21.80	22.03	21.33	21.64
	25#0	22.07	21.84	22.07	21.42	21.64	
	16QAM	1#0	21.70	21.32	21.88	21.36	21.45
		1#12	21.81	21.30	21.82	20.96	21.02
		1#24	21.66	21.29	21.87	20.99	21.33
		15#0	22.08	20.75	22.14	21.41	21.74
15#10		21.90	20.76	22.06	21.43	21.58	
25#0	22.07	20.89	22.09	20.53	21.00		
10MHz	QPSK	1#0	22.93	22.82	23.17	21.99	21.97
		1#24	23.10	22.77	23.10	22.01	22.07
		1#49	23.18	22.76	23.12	21.28	21.54
		25#0	21.85	21.94	22.16	21.53	21.47
		25#25	21.93	21.85	22.00	21.46	21.56
	50#0	21.95	20.90	21.99	21.55	21.47	
	16QAM	1#0	22.00	21.68	23.01	21.23	21.36
		1#24	22.15	21.78	22.93	21.28	21.55
		1#49	22.02	21.78	23.03	20.53	20.57
		25#0	20.88	20.77	22.09	21.72	21.64
25#25		20.71	20.76	22.00	21.47	21.74	
50#0	20.98	20.90	21.99	21.55	21.26		
15MHz	QPSK	1#0	22.87	22.85	22.99	22.67	22.28
		1#37	22.81	22.66	22.90	22.13	22.15
		1#74	22.93	22.73	22.98	21.75	21.97
		36#0	21.95	21.96	22.10	21.52	21.65
		36#17	21.88	21.82	22.09	21.39	21.64
	75#0	21.88	21.83	22.06	21.45	21.77	
	16QAM	1#0	21.93	22.01	22.14	21.77	21.89
		1#37	21.83	21.76	22.06	21.33	21.68
		1#74	21.93	21.91	22.10	20.98	20.99
		36#0	21.96	20.94	21.13	20.50	20.74
36#35		21.94	20.84	21.15	20.41	20.65	
75#0	21.08	20.84	21.07	20.46	20.74		
20MHz	QPSK	1#0	23.04	22.71	23.15	22.46	22.42
		1#49	23.45	22.71	23.38	22.24	22.14
		1#99	23.13	22.99	23.20	21.35	21.66
		50#0	21.98	21.88	22.12	21.85	21.87
		50#49	21.99	21.84	22.05	21.59	21.67
	100#0	21.92	21.85	22.12	21.62	21.78	
	16QAM	1#0	21.95	21.99	22.14	21.57	21.77
		1#49	22.00	22.03	22.31	21.35	21.98
		1#99	21.99	22.03	22.05	20.44	20.99
		50#0	21.22	20.90	21.25	20.62	21.45
50#49		21.27	20.87	21.20	20.53	21.05	
100#0	20.97	20.99	21.15	20.65	21.36		

PAR, Band 2

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	4.08	3.48	3.88	13
	100 RB		6.48	6.32	6.48	13
16QAM	1 RB	20 MHz	4.96	4.24	4.64	13
	100 RB		7.16	7.00	7.04	13

PAR, Band 4

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	4.08	3.96	3.76	13
	100 RB		6.52	6.52	6.44	13
16QAM	1 RB	20 MHz	4.96	5.12	4.60	13
	100 RB		7.12	7.28	7.12	13

PAR, Band 5

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	4.36	4.08	3.96	13
	50 RB		5.32	5.20	5.28	13
16QAM	1 RB	10 MHz	5.32	4.92	5.04	13
	50 RB		6.16	6.08	6.24	13

PAR, Band 7

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	4.32	4.12	4.28	13
	100 RB		6.48	6.44	6.48	13
16QAM	1 RB	20 MHz	5.08	5.00	5.08	13
	100 RB		7.12	7.08	7.12	13

PAR, Band 12

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	3.32	4.08	4.88	13
	50 RB		4.92	5.68	5.12	13
16QAM	1 RB	10 MHz	4.00	5.16	5.64	13
	50 RB		5.80	6.44	6.20	13

PAR, Band 13

Test Modulation		Channel Bandwidth	Middle Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	3.72	13
	50 RB		5.04	13
16QAM	1 RB	10 MHz	4.52	13
	50 RB		6.00	13

PAR, Band 17

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	4.60	3.32	3.68	13
	50 RB		5.60	5.44	5.20	13
16QAM	1 RB	10 MHz	5.48	4.48	4.60	13
	50 RB		6.60	6.48	6.28	13

PAR, LTE Band 25

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	3.59	3.88	3.08	13
	100 RB		6.41	6.38	6.31	13
16QAM	1 RB	20 MHz	4.29	5.00	4.26	13
	100RB		6.99	7.08	6.92	13

PAR, Band 26

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	3.68	4.16	4.08	13
	50 RB		5.72	5.92	5.92	13
16QAM	1 RB	10 MHz	4.52	5.32	4.76	13
	50 RB		6.60	6.76	6.76	13

PAR, Band 41

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)		Middle Channel PAR (dB)	High Channel PAR (dB)		Limit (dB)
			FCC	ISED		FCC	ISED	
QPSK	1 RB	20 MHz	4.26	3.92	4.61	4.50	4.65	13
	100 RB		5.59	5.19	5.91	5.62	5.36	13
16QAM	1 RB	20 MHz	4.99	4.58	5.26	5.16	5.44	13
	100 RB		6.28	6.08	6.89	6.46	6.79	13

Note: peak-to-average ratio (PAR) <13 dB.

FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53&§90.209 AND RSS-GEN §6.6 - OCCUPIED BANDWIDTH

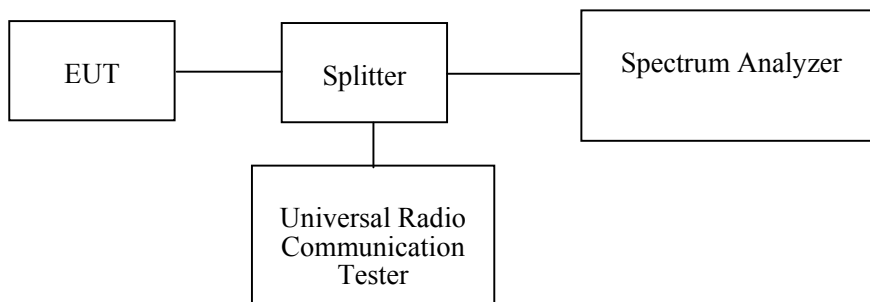
Applicable Standard

FCC §2.1049, §22.917, §22.905, §24.238, §27.53, §90.209, and RSS-GEN §6.6

Test Procedure

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

The 26 dB & 99% bandwidth was recorded.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2017-12-08	2018-12-08
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-18	2018-07-18
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each Time	/
E-Microwave	RF Attenuator	3dB	3dB-2	Each Time	/
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each Time	/

* **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:	25.6~25.9 °C
Relative Humidity:	49~58 %
ATM Pressure:	101~101.1 kPa

The testing was performed by Swim Lv from 2018-03-07 to 2018-07-10.

Test Mode: Transmitting

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

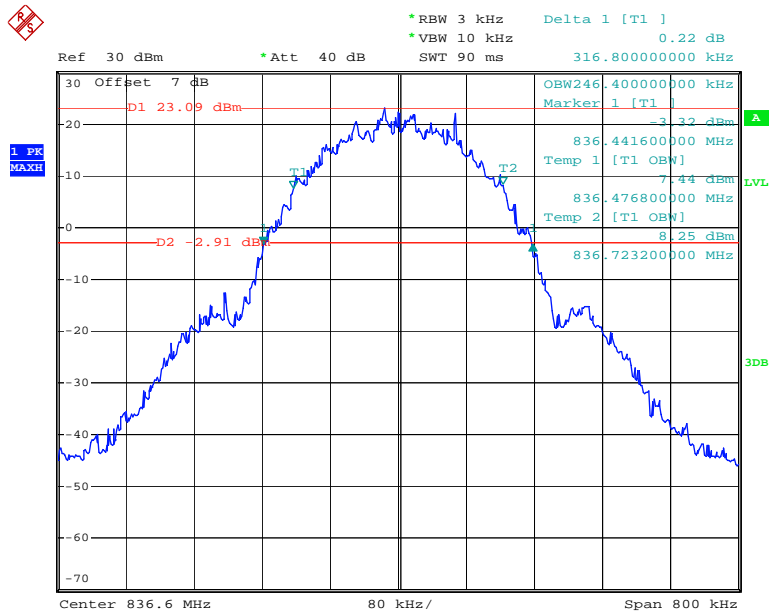
Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
Cellular	M	GSM	0.2464	0.3168
		EDGE	0.2248	0.3024
PCS		GSM	0.2464	0.3152
		EDGE	0.2248	0.3104
WCDMA Band 2		Rel 99	4.20	4.82
		HSDPA	4.20	4.82
		HSUPA	4.18	4.78
WCDMA Band 4		Rel 99	4.18	4.80
		HSDPA	4.18	4.78
		HSUPA	4.16	4.78
WCDMA Band 5		Rel 99	4.14	4.74
		HSDPA	4.16	4.78
	HSUPA	4.16	4.74	

Band	Test Modulation	Test Bandwidth (MHz)	Test Channel	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
LTE Band 2	QPSK	1.4	M	1.104	1.368
		3		2.748	3.096
		5		4.560	5.080
		10		9.000	9.920
		15		13.560	15.120
		20		17.920	19.600
	16QAM	M	1.4	1.110	1.326
			3	2.772	3.108
			5	4.540	5.060
			10	8.960	9.800
			15	13.560	15.060
			20	18.000	19.600

Band	Test Modulation	Test Bandwidth (MHz)	Test Channel	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
LTE Band 4	QPSK	1.4	M	1.098	1.326
		3		3.084	2.748
		5		4.540	5.040
		10		8.960	9.840
		15		13.560	15.060
		20		18.000	19.600
	16QAM	1.4	M	1.110	1.320
		3		2.772	3.108
		5		4.520	5.080
		10		8.960	9.760
		15		13.560	15.000
		20		18.000	19.600
LTE Band 5	QPSK	1.4	M	1.104	1.308
		3		2.748	3.096
		5		4.540	5.048
		10		8.960	9.840
	16QAM	1.4	M	1.104	1.314
		3		2.748	3.096
		5		4.540	5.068
		10		8.960	9.680
LTE Band 7	QPSK	5	M	4.540	5.040
		10		8.960	9.880
		15		13.560	15.100
		20		18.000	19.580
	16QAM	5	M	4.540	5.120
		10		8.960	9.840
		15		13.560	15.000
		20		18.000	19.520
LTE Band 12	QPSK	1.4	M	1.104	1.320
		3		2.760	3.096
		5		4.540	5.048
		10		9.000	9.848
	16QAM	1.4	M	1.104	1.326
		3		2.760	3.084
		5		4.540	5.088
		10		8.960	9.760
LTE Band 13	QPSK	5	M	4.540	5.020
		10		8.960	9.800
	16QAM	5	M	4.540	5.060
		10		8.960	9.720
LTE Band 17	QPSK	5	M	4.540	5.020
		10		8.920	9.800
	16QAM	5	M	4.520	5.060
		10		8.960	9.720

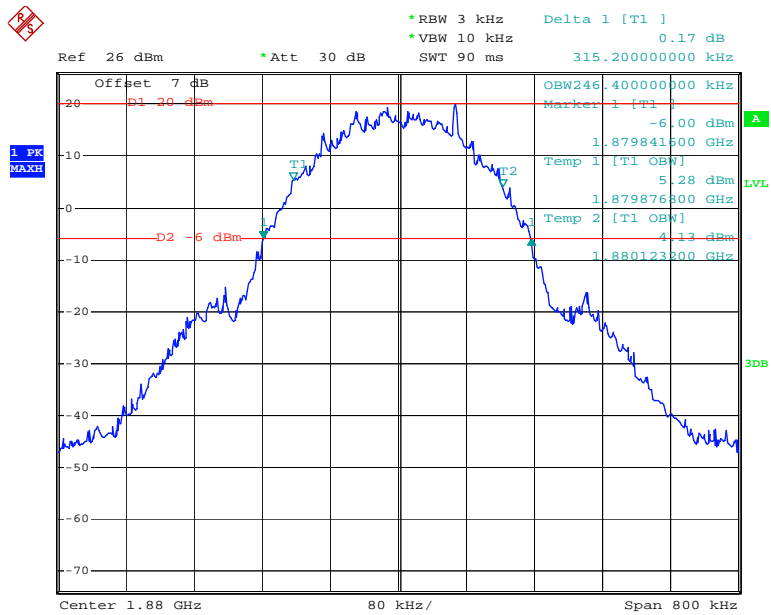
Band	Test Modulation	Test Bandwidth (MHz)	Test Channel	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
LTE Band 25	QPSK	1.4	M	1.114	1.299
		3		2.743	3.077
		5		4.529	5.049
		10		8.971	9.857
		15		13.543	15.029
		20		17.886	19.429
	16QAM	1.4	M	1.101	1.329
		3		2.769	3.094
		5		4.529	5.077
		10		8.943	9.629
		15		13.500	14.900
		20		17.943	19.543
LTE Band 26	QPSK	1.4	M	1.104	1.320
		3		2.748	3.102
		5		4.520	5.074
		10		9.000	9.934
		15		13.680	15.134
	16QAM	1.4	M	1.110	1.320
		3		2.772	3.078
		5		4.520	5.080
		10		8.960	9.774
		15		13.620	15.194
LTE Band 41	QPSK	5	M	4.540	5.380
		10		8.960	9.880
		15		13.620	16.280
		20		18.000	19.480
	16QAM	5	M	4.520	5.080
		10		8.960	9.640
		15		13.560	16.500
		20		18.000	20.040

GSM 850 Cellular Band



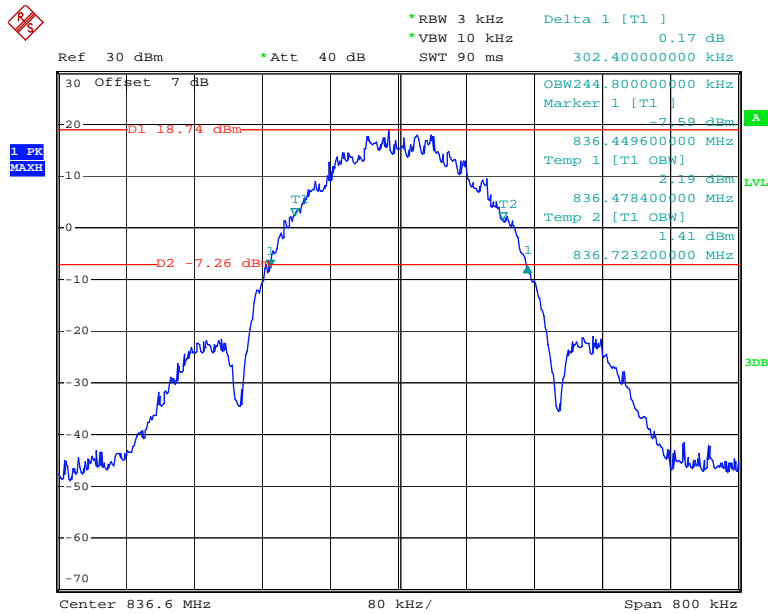
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GSM PCS1900 Cellular Band



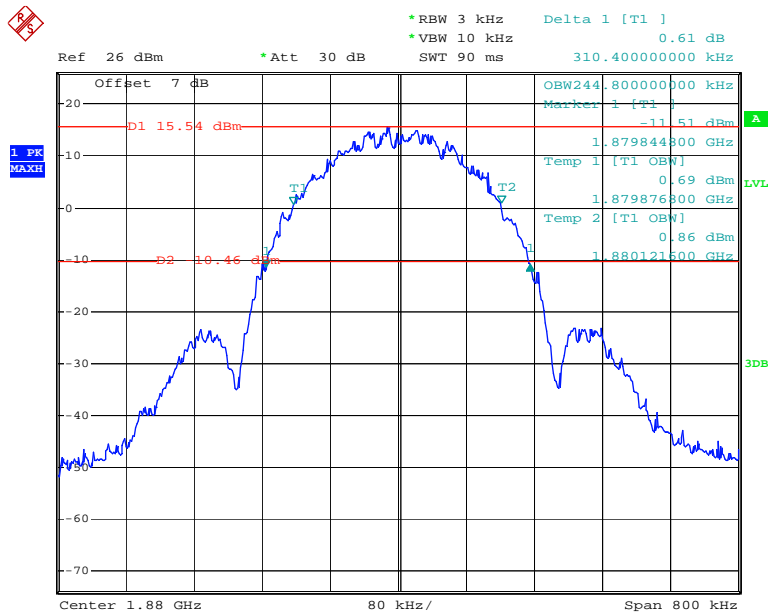
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EDGE 850 Cellular Band



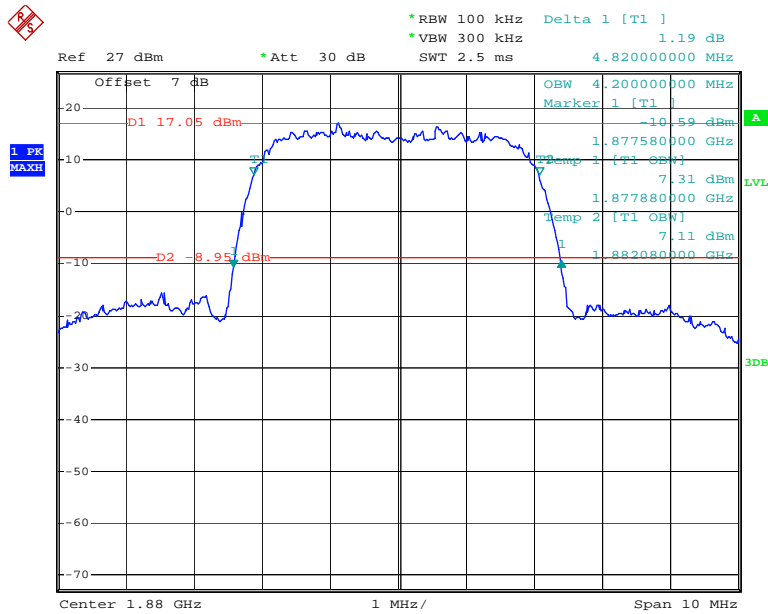
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EDGE PCS1900 Cellular Band



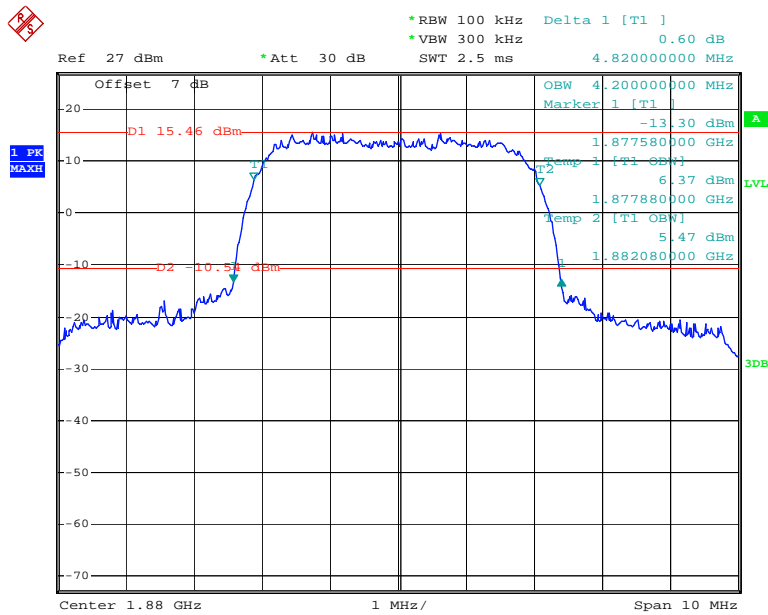
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REL99 Band 2



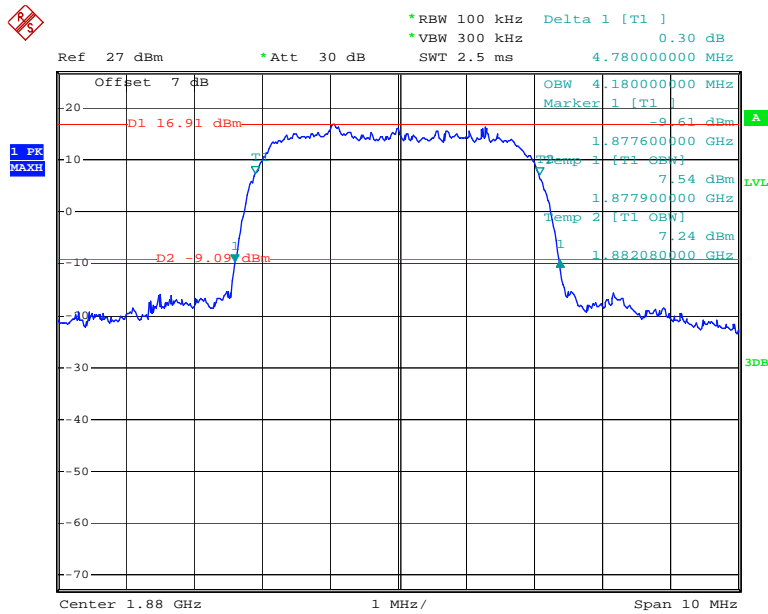
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HSDPA Band 2



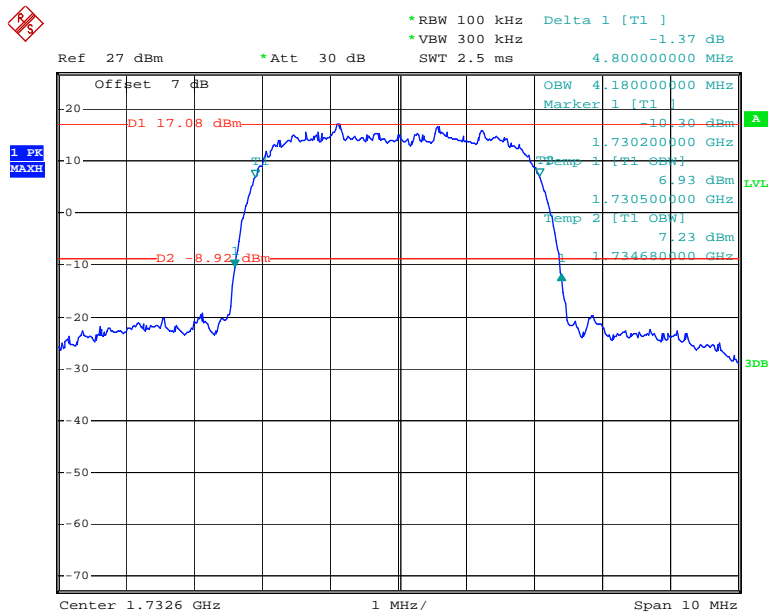
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HSUPA Band 2



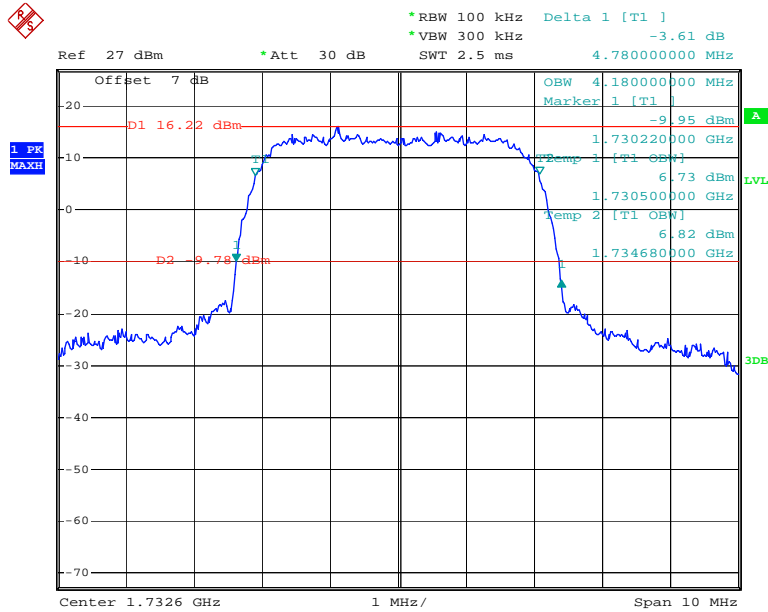
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REL99 Band 4



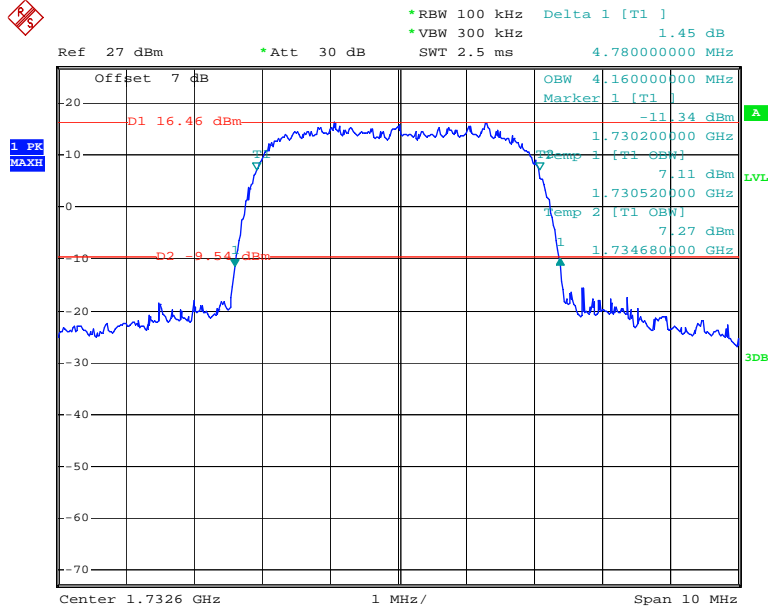
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HSDPA Band 4



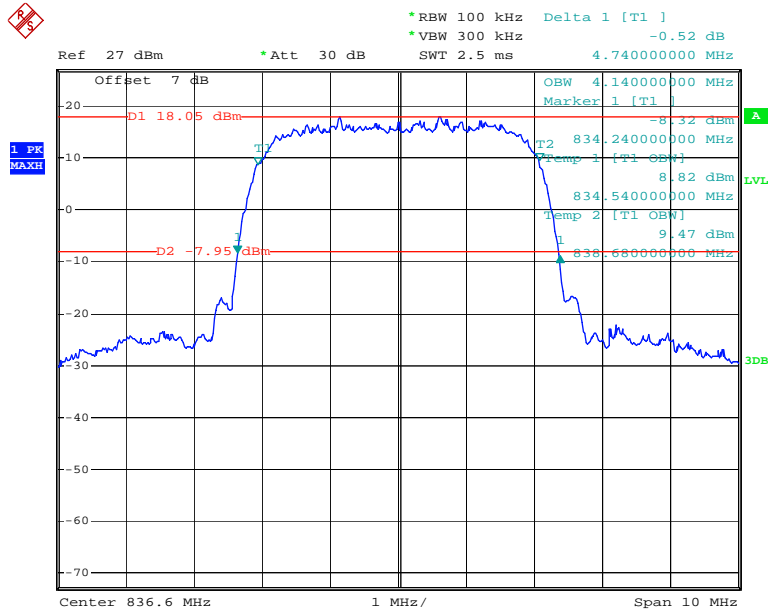
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HSUPA Band 4



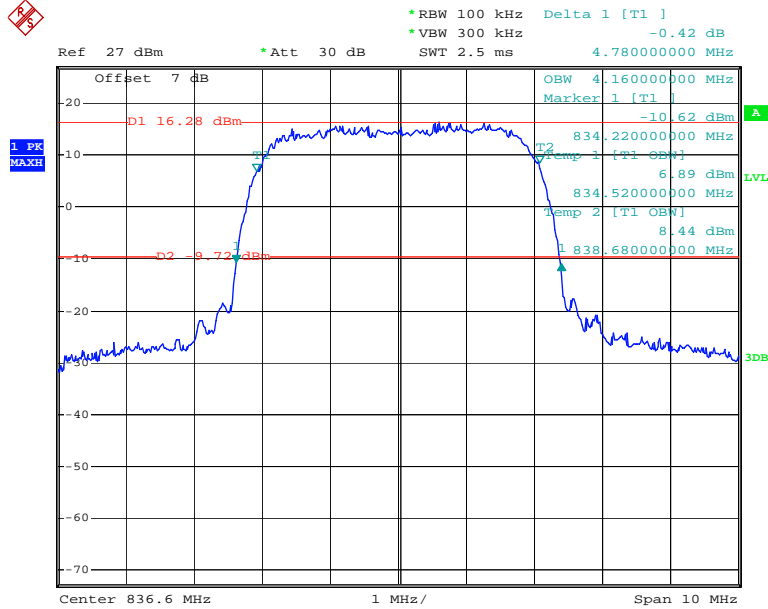
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REL99 Band 5



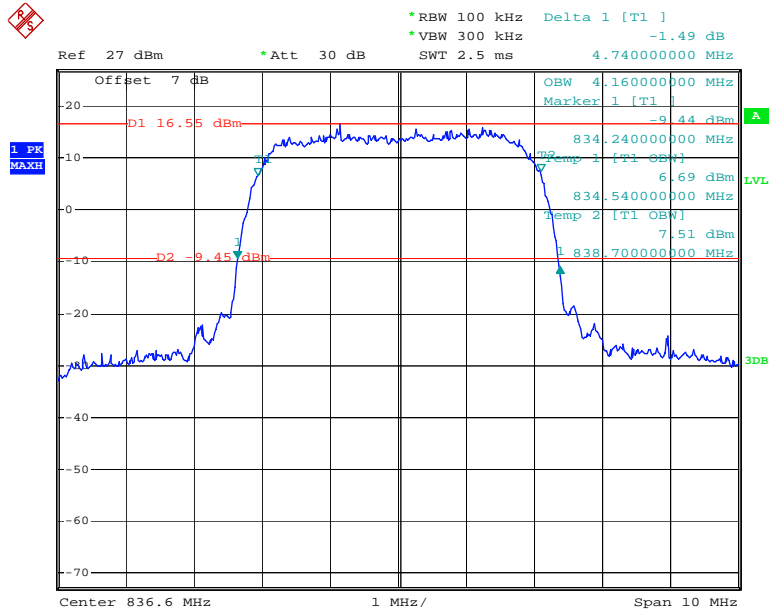
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HSDPA Band 5



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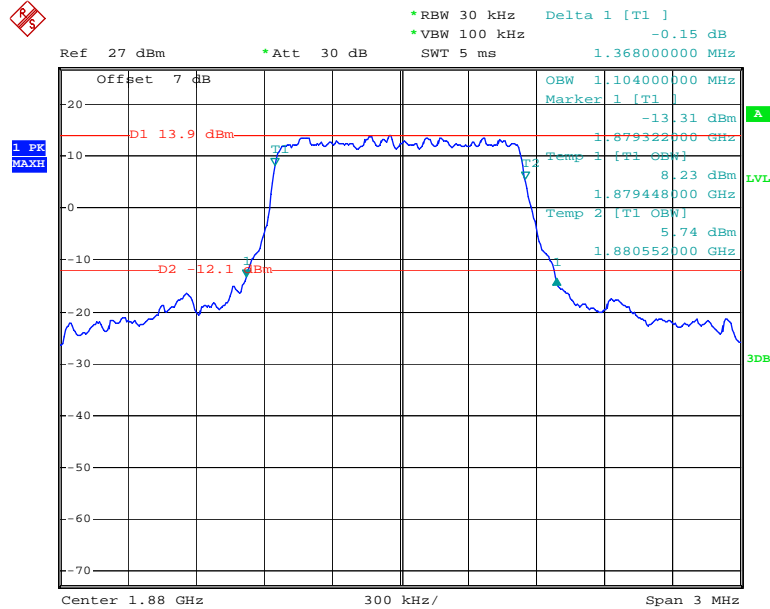
HSUPA Band 5



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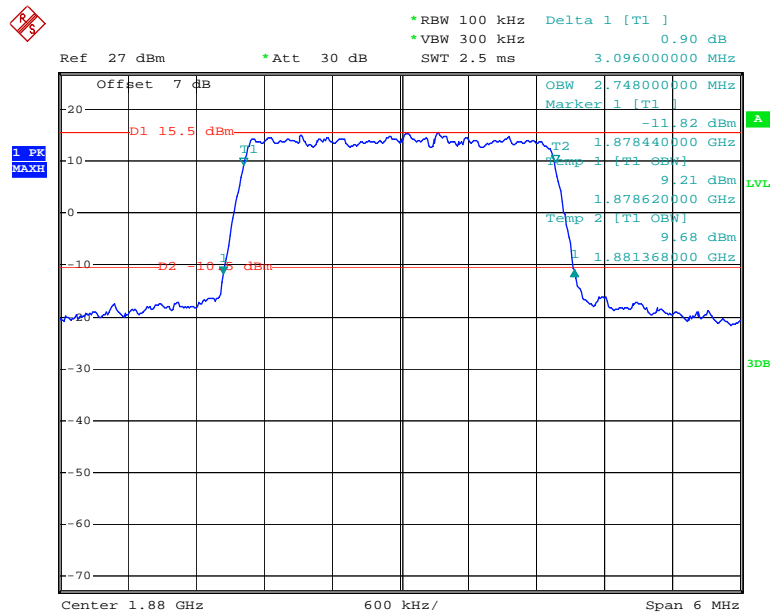
LTE Band 2

QPSK_1.4 MHz



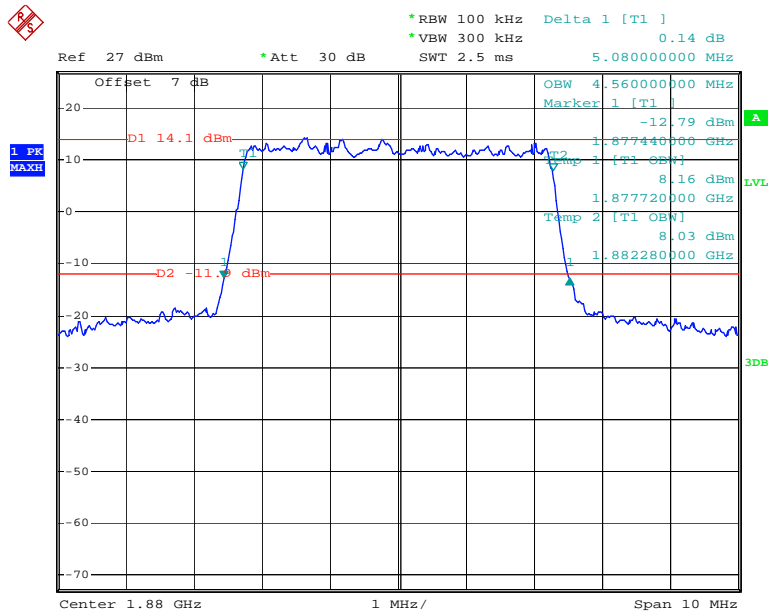
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QPSK_3 MHz



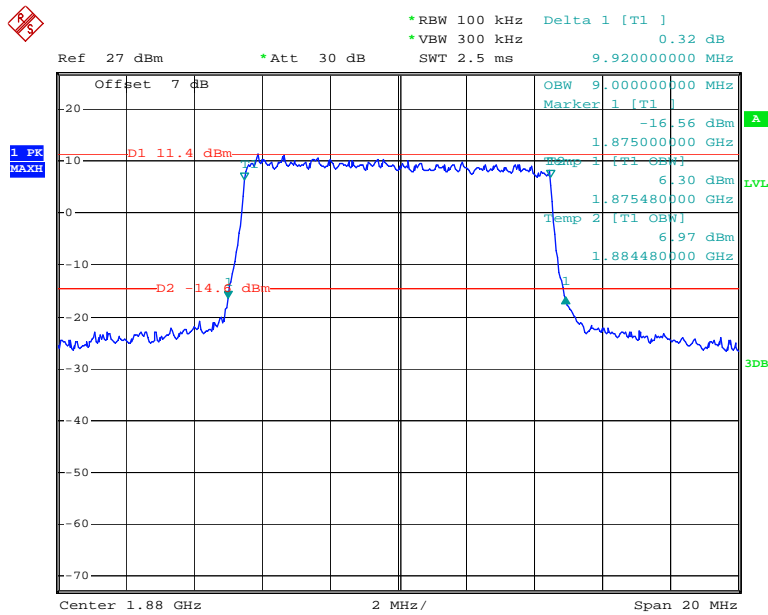
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QPSK_5 MHz



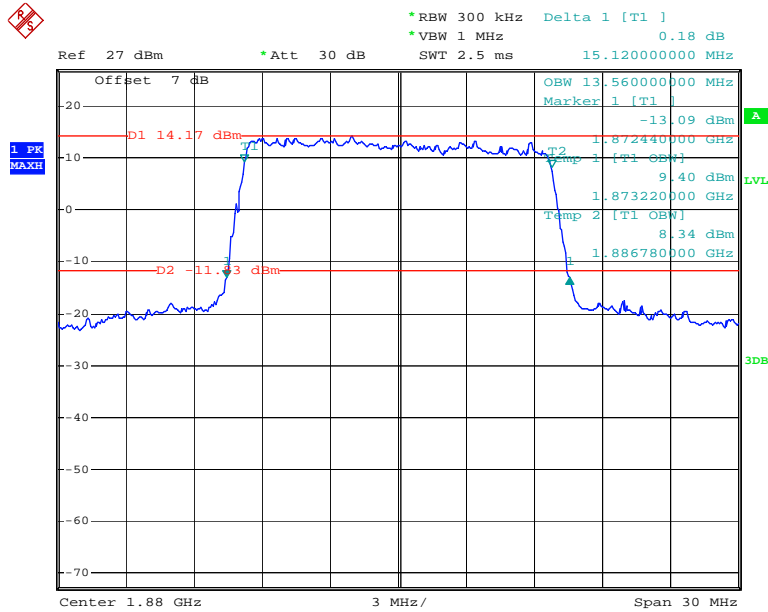
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QPSK_10 MHz



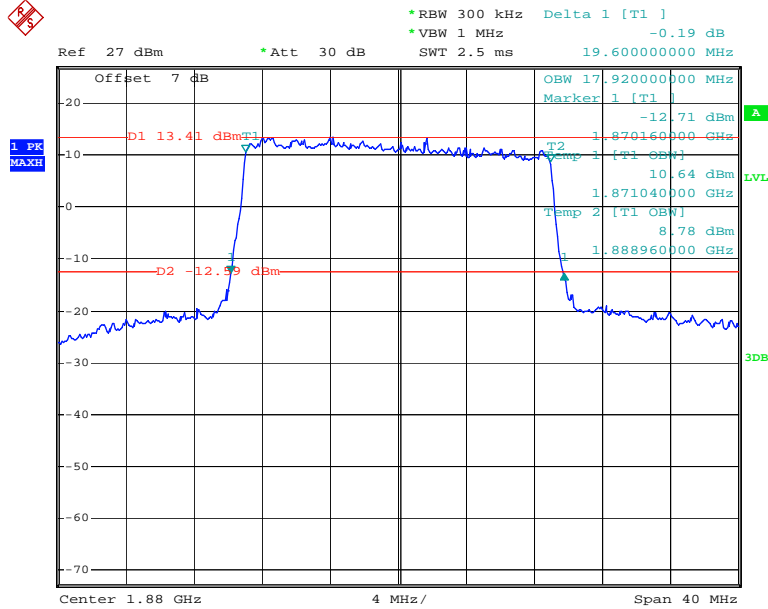
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QPSK_15 MHz



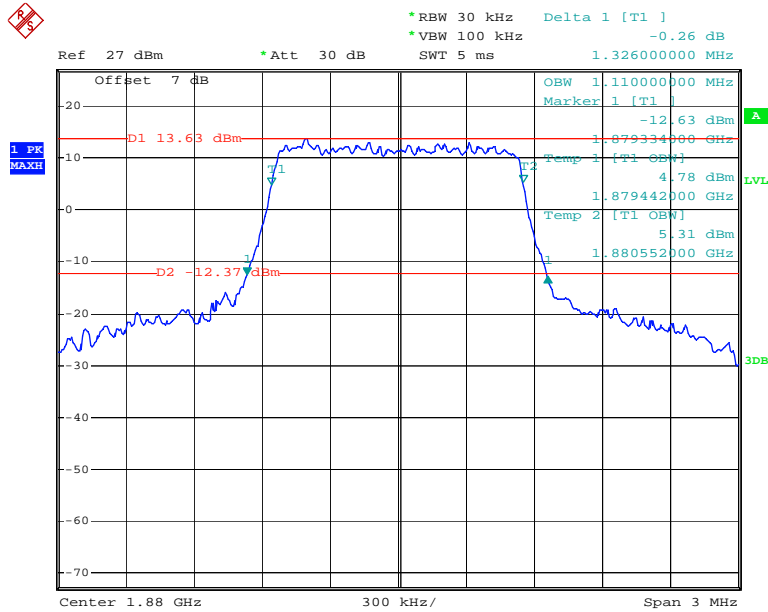
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QPSK_20 MHz



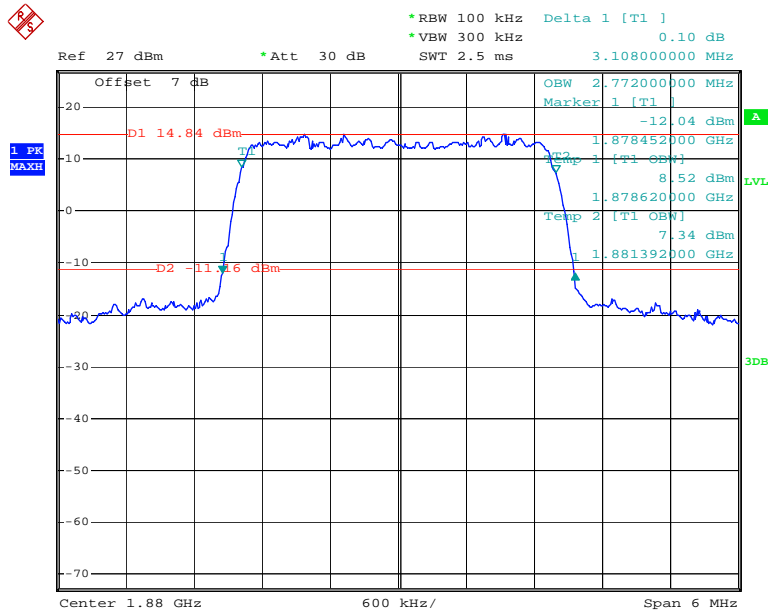
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16QAM_1.4 MHz



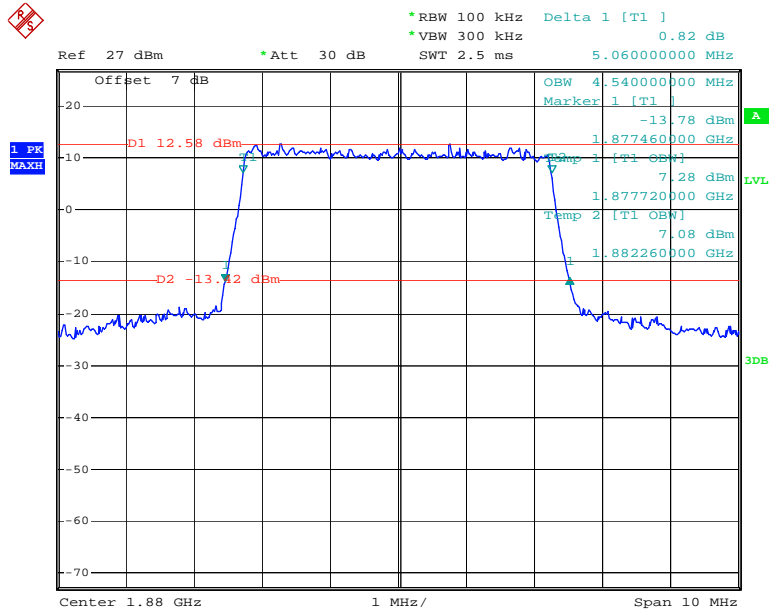
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16QAM_3 MHz



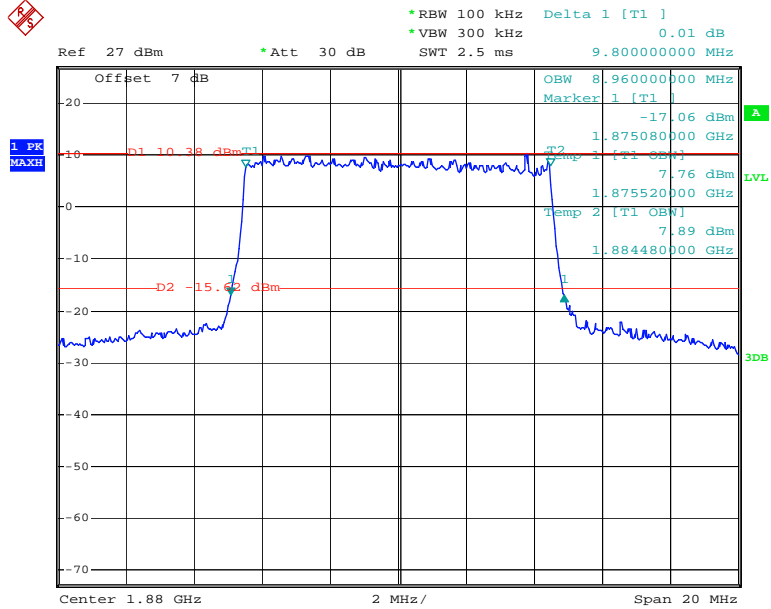
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16QAM_5 MHz



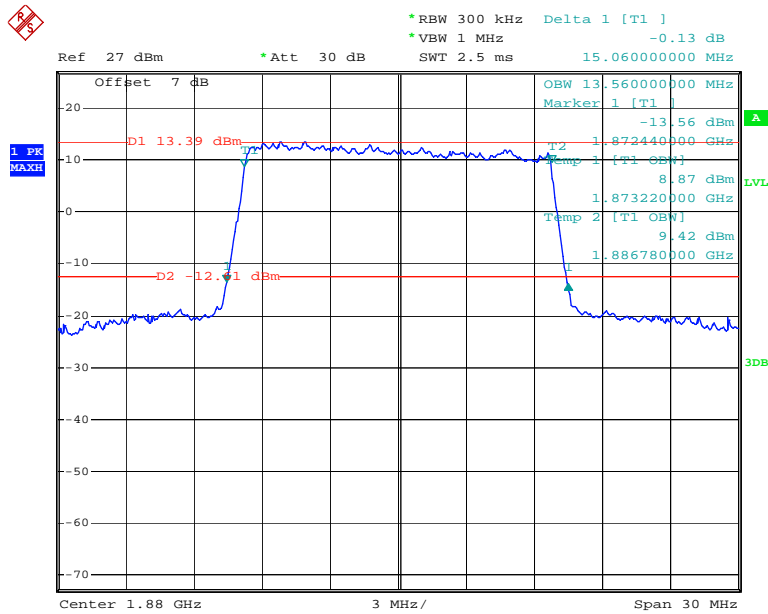
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16QAM_10 MHz



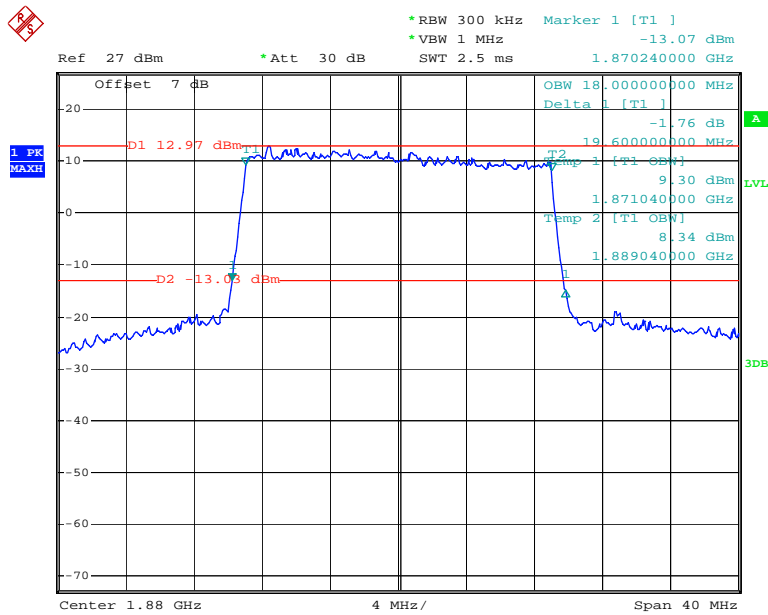
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16QAM_15 MHz



Date: 8.MAR.2018 20:51:47

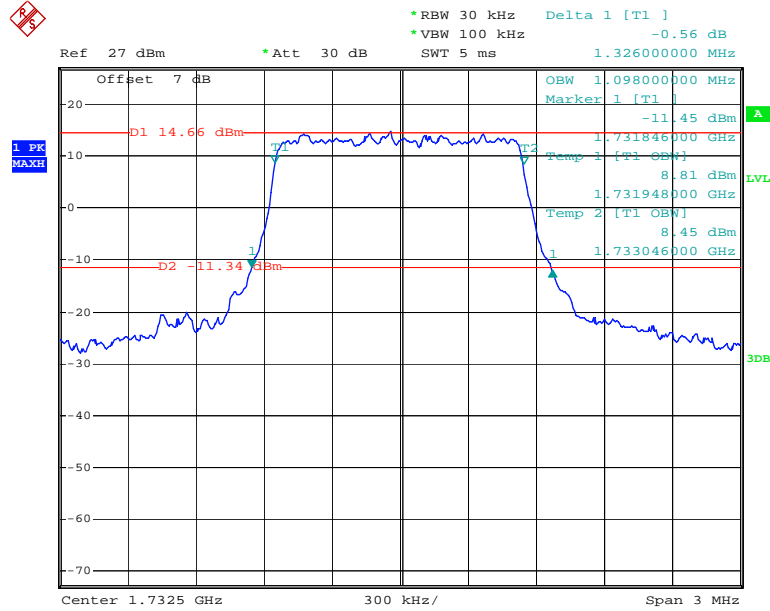
16QAM_20 MHz



Date: 8.MAR.2018 21:02:03

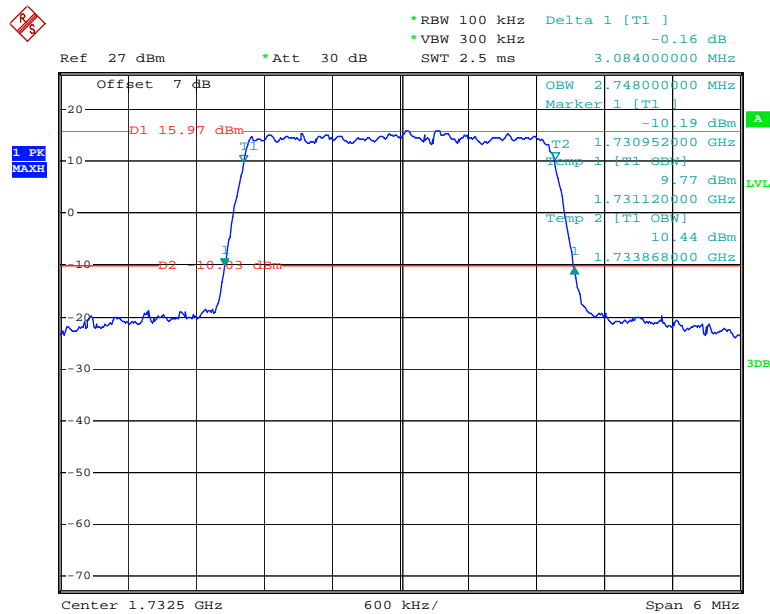
LTE Band 4:

QPSK_1.4 MHz



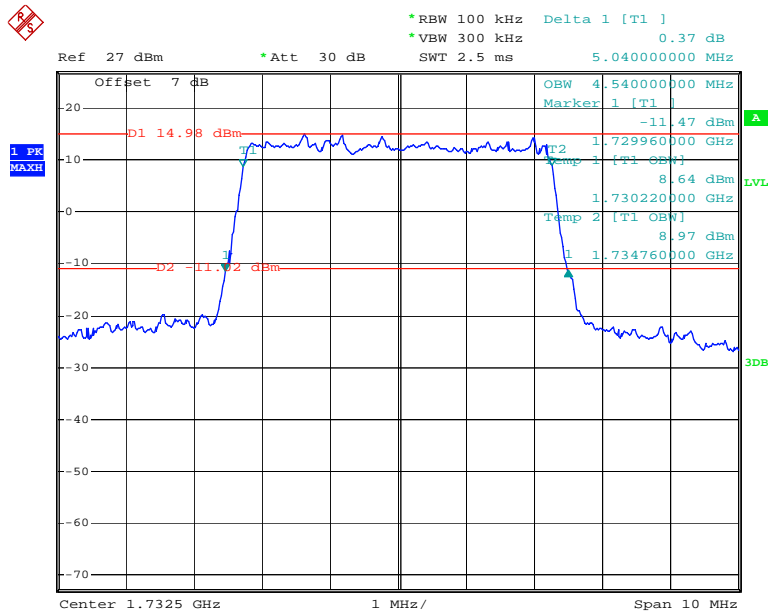
Date: 8.MAR.2018 21:09:00

QPSK_3 MHz



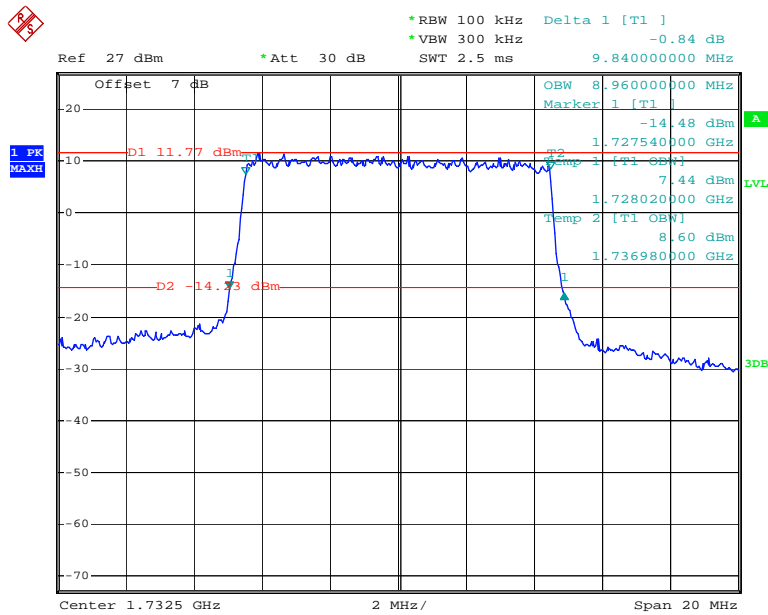
Date: 8.MAR.2018 21:10:48

QPSK_5 MHz



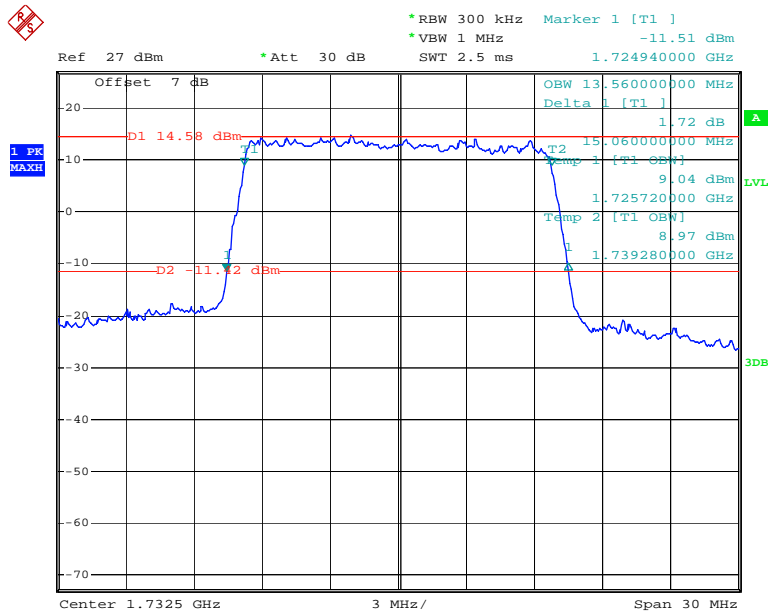
Date: 8.MAR.2018 21:14:55

QPSK_10 MHz



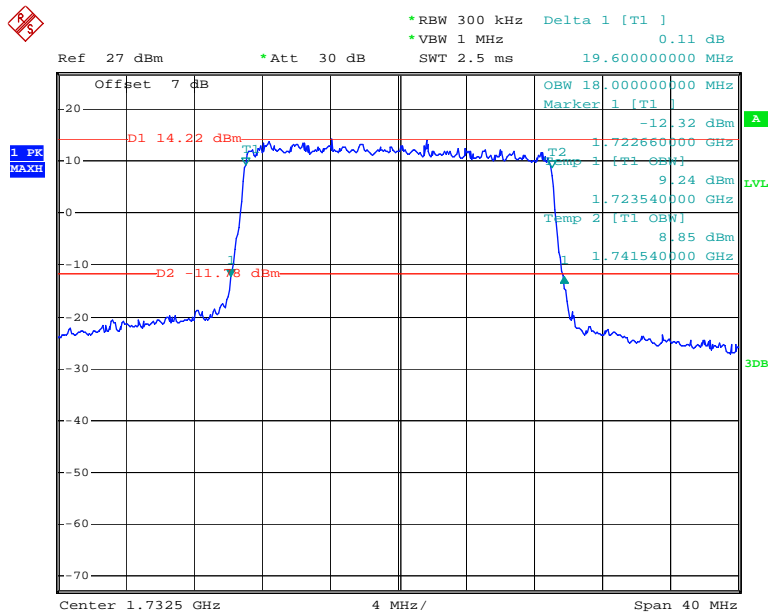
Date: 8.MAR.2018 21:18:52

QPSK_15 MHz



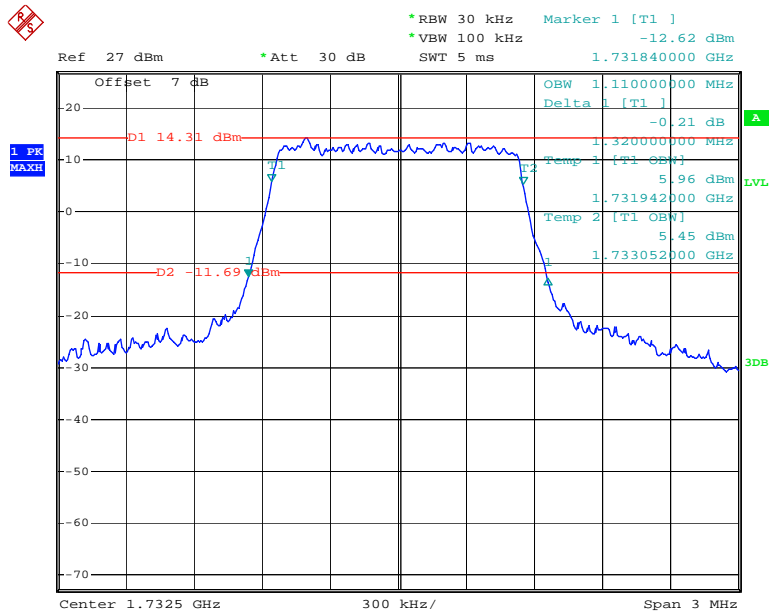
Date: 8.MAR.2018 21:23:53

QPSK_20 MHz



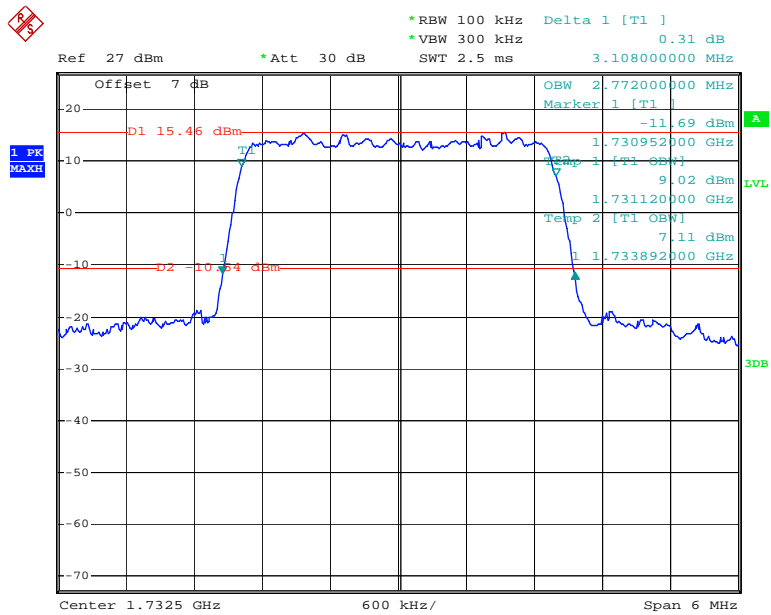
Date: 8.MAR.2018 21:28:10

16QAM_1.4 MHz



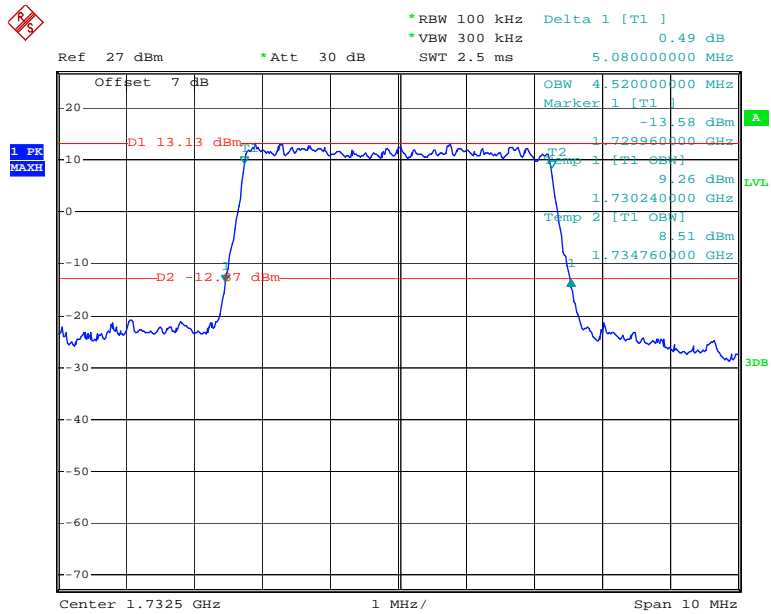
Date: 8.MAR.2018 21:07:08

16QAM_3 MHz



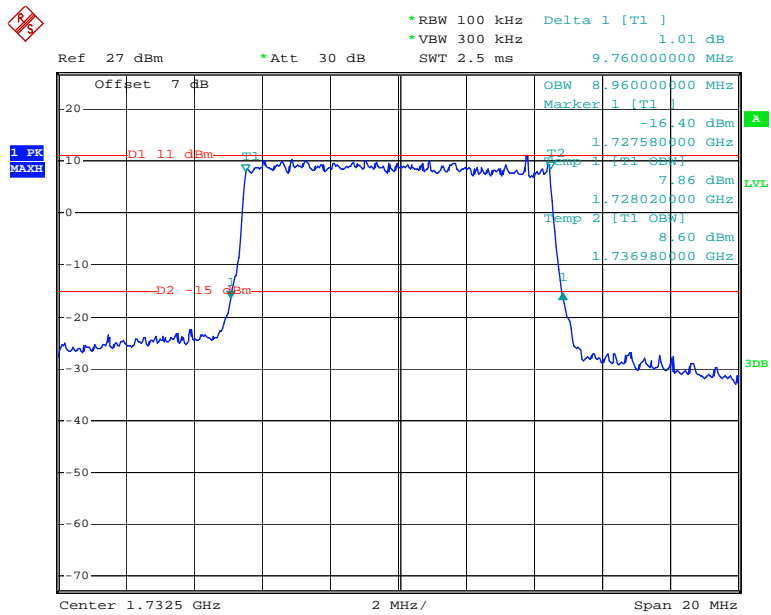
Date: 8.MAR.2018 21:12:38

16QAM_5 MHz



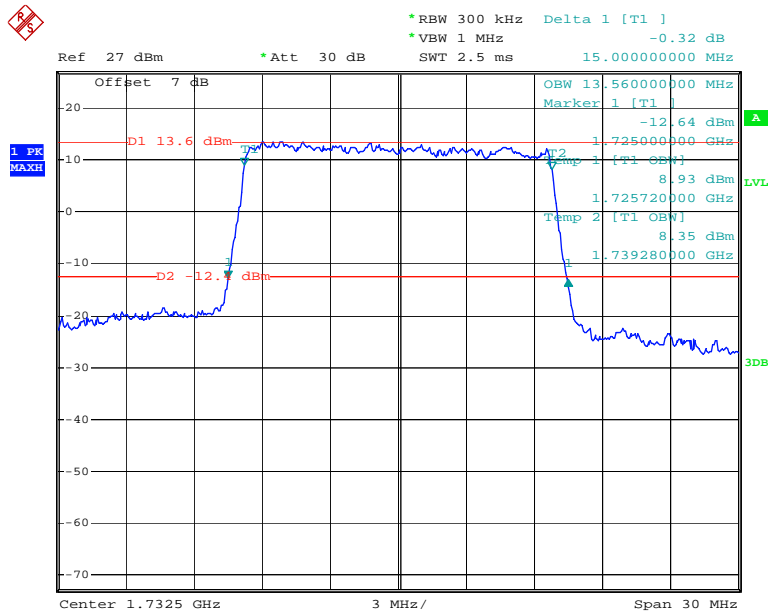
Date: 8.MAR.2018 21:16:39

16QAM_10 MHz



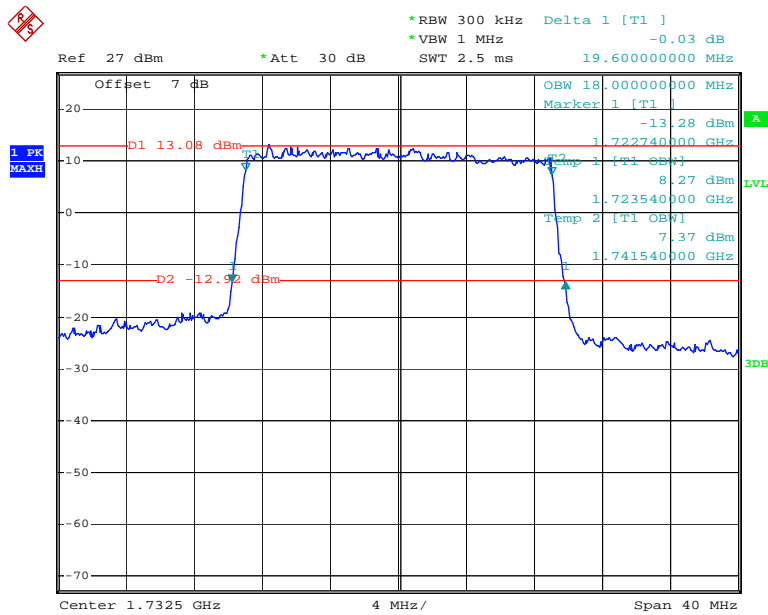
Date: 8.MAR.2018 21:21:44

16QAM_15 MHz



Date: 8.MAR.2018 21:25:08

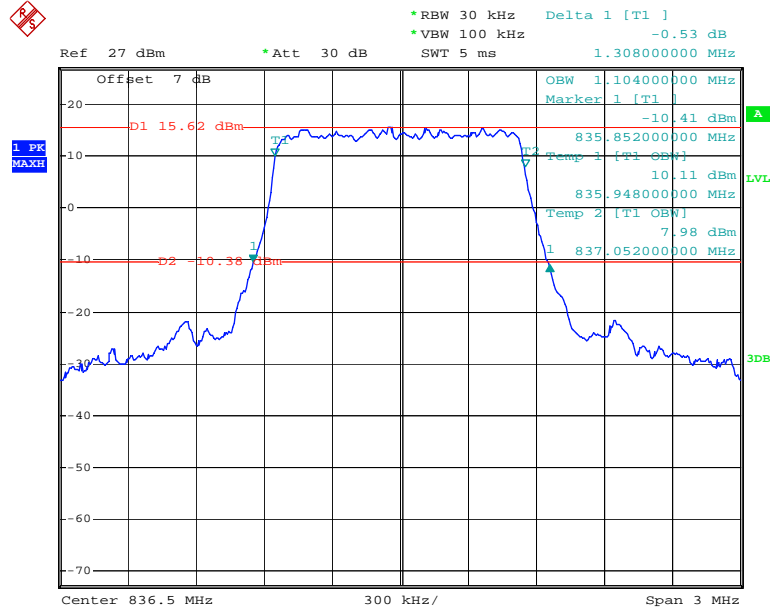
16QAM_20 MHz



Date: 8.MAR.2018 21:26:53

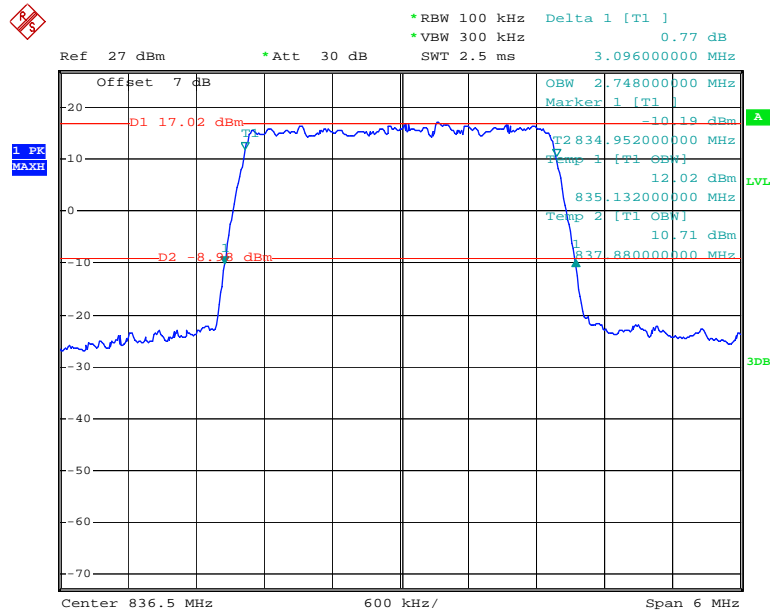
LTE Band 5:

QPSK_1.4 MHz



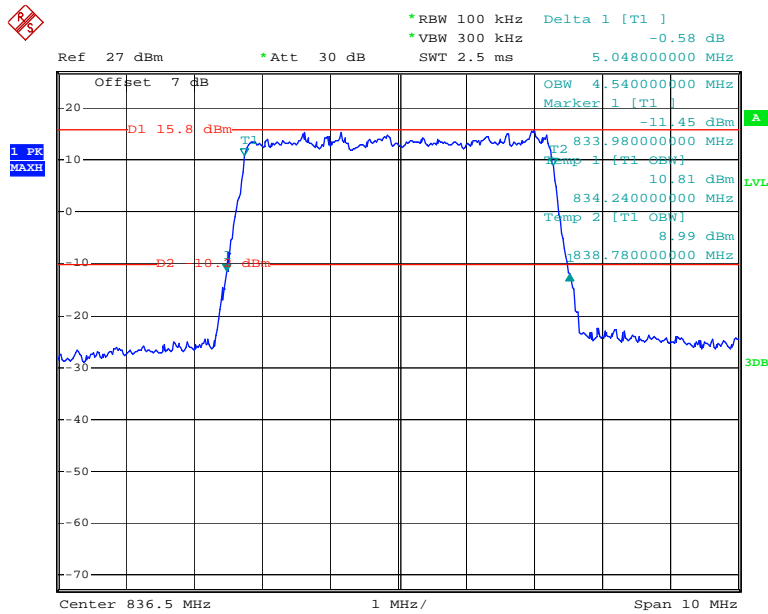
Date: 8.MAR.2018 21:30:59

QPSK_3 MHz



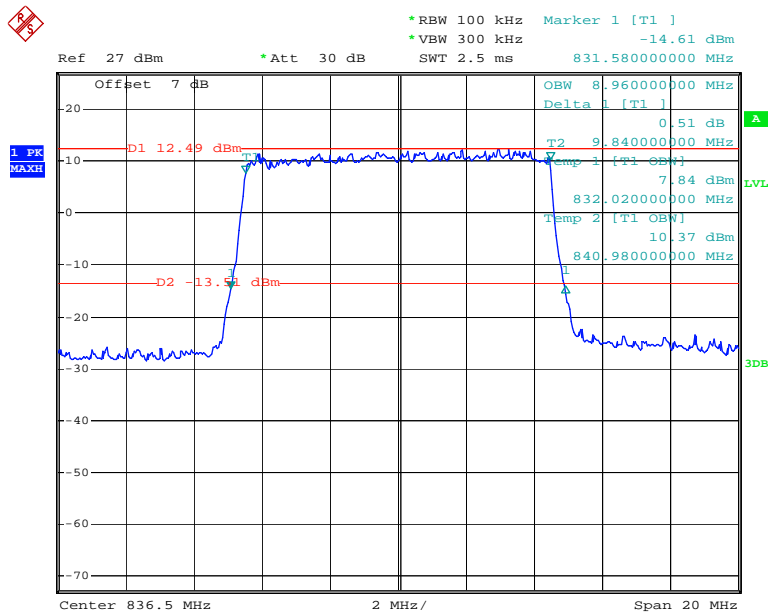
Date: 8.MAR.2018 21:35:48

QPSK_5 MHz



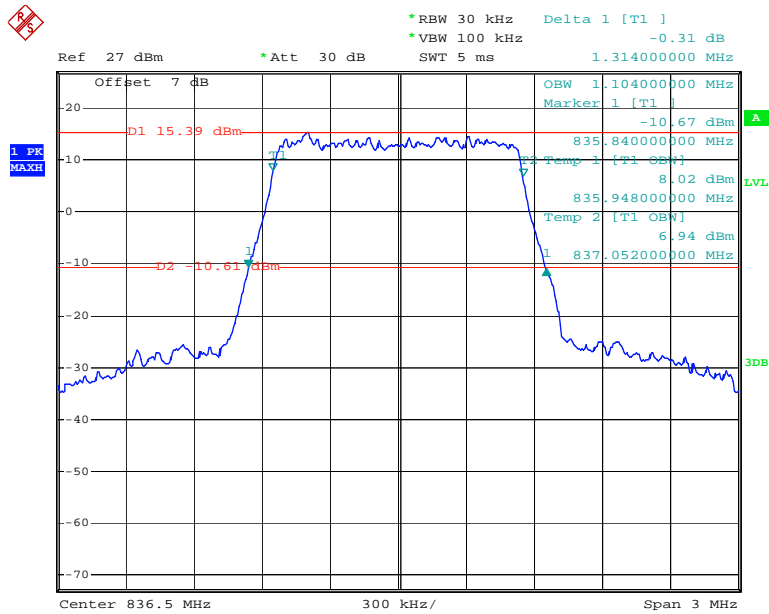
Date: 8.MAR.2018 21:38:37

QPSK_10 MHz



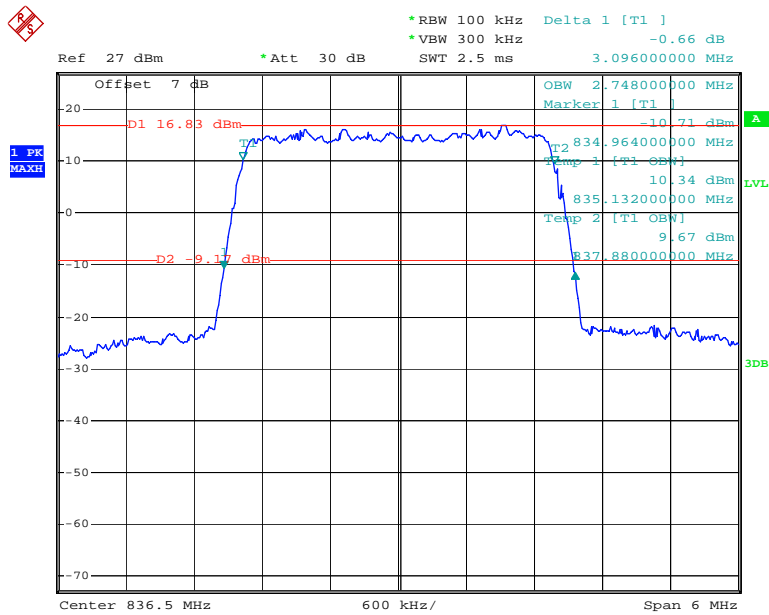
Date: 8.MAR.2018 21:43:12

16QAM_1.4 MHz



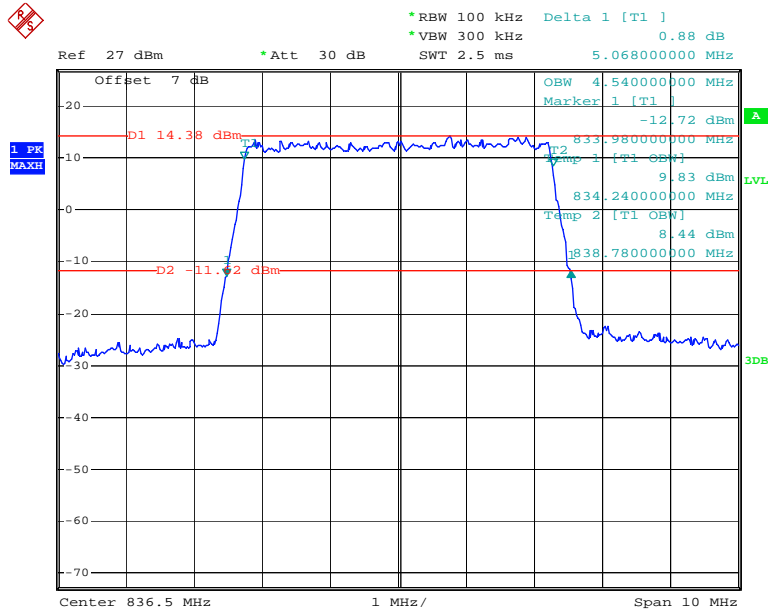
Date: 8.MAR.2018 21:32:16

16QAM_3 MHz



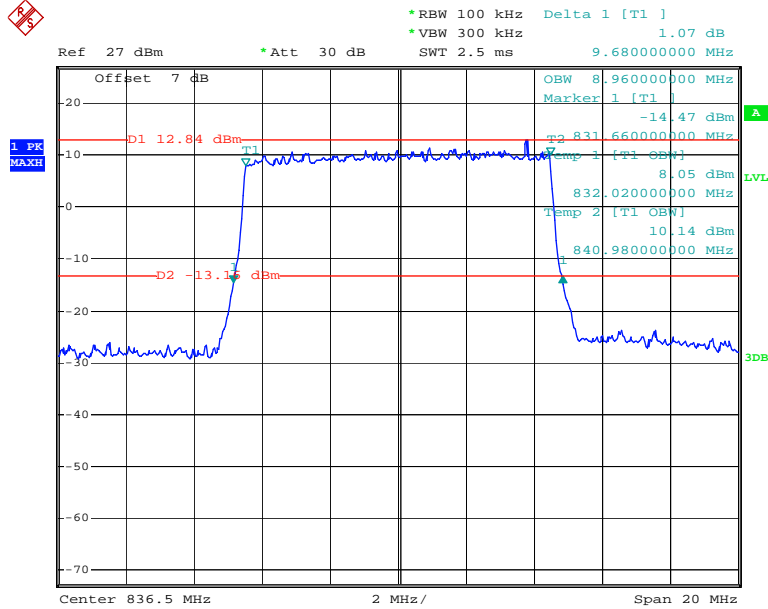
Date: 8.MAR.2018 21:34:07

16QAM_5 MHz



Date: 8.MAR.2018 21:37:23

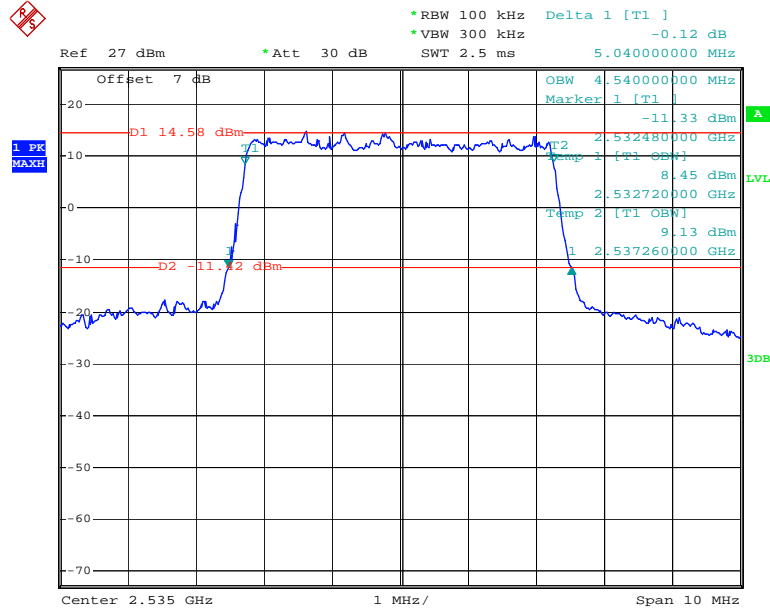
16QAM_10 MHz



Date: 8.MAR.2018 21:41:33

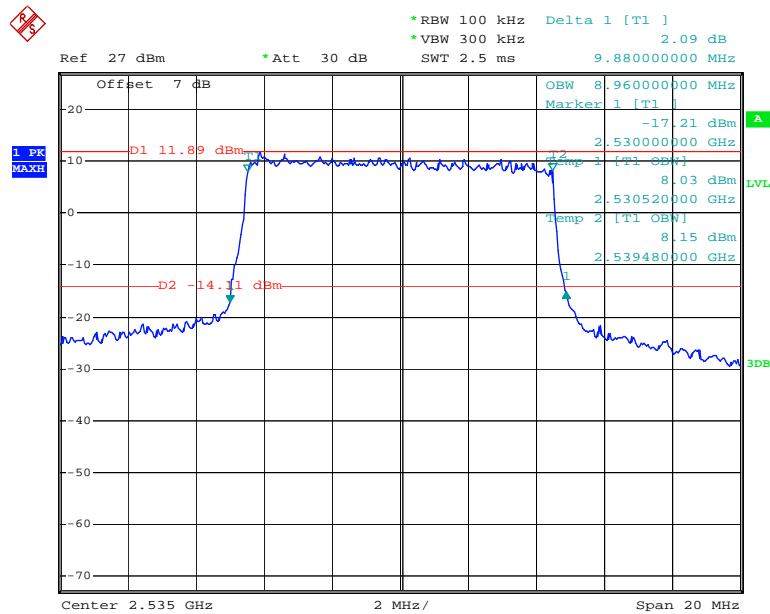
LTE Band 7:

QPSK_5 MHz



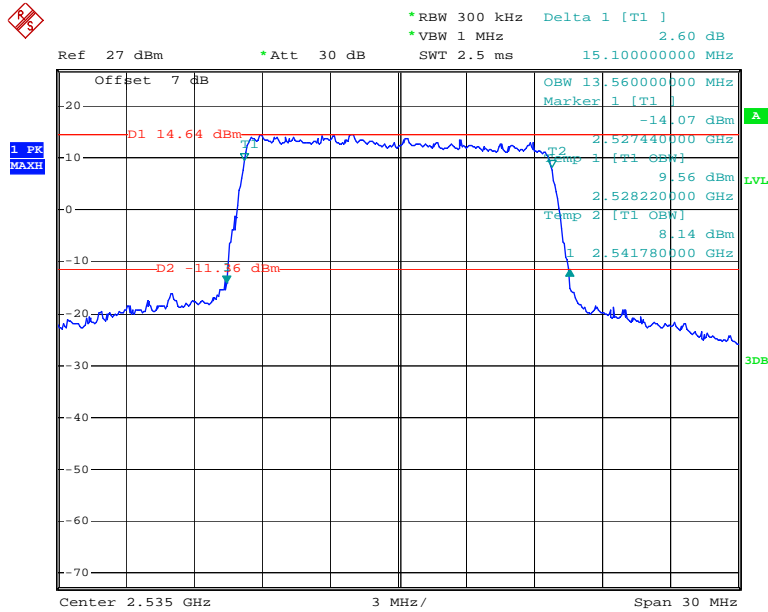
Date: 8.MAR.2018 21:48:20

QPSK_10 MHz



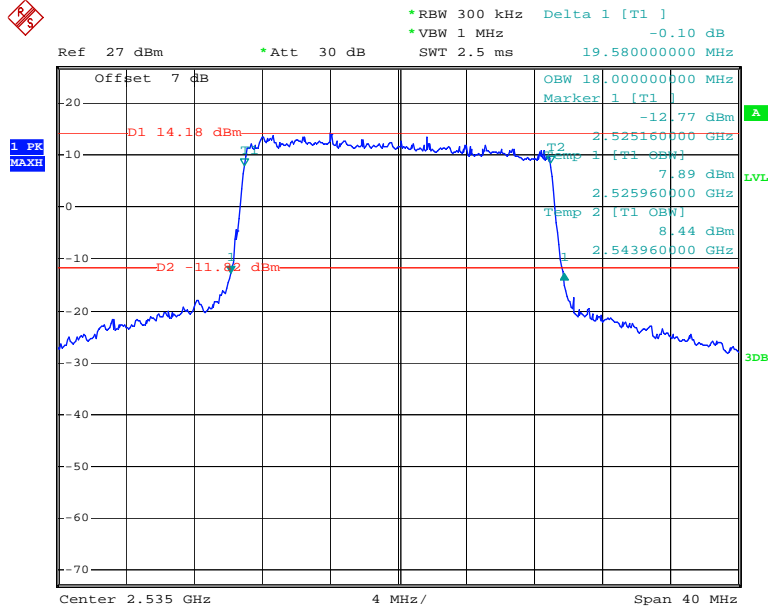
Date: 8.MAR.2018 21:53:40

QPSK_15 MHz



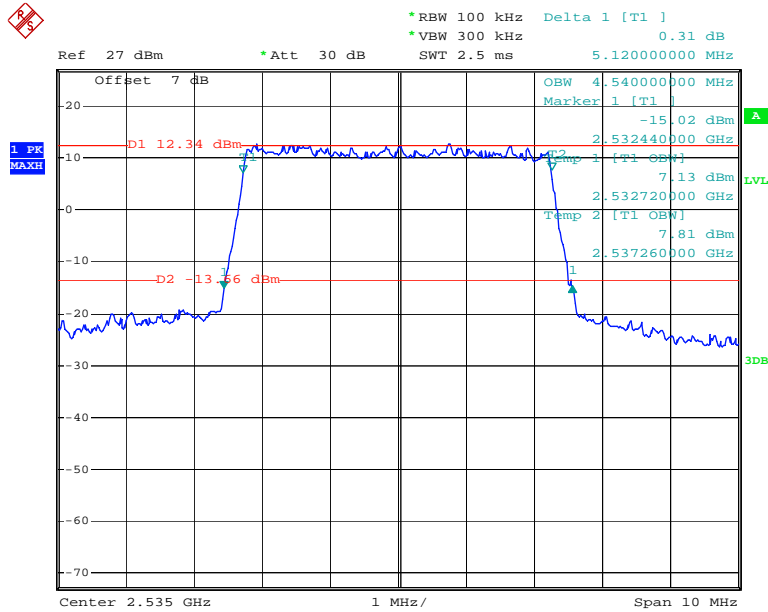
Date: 8.MAR.2018 22:00:21

QPSK_20 MHz



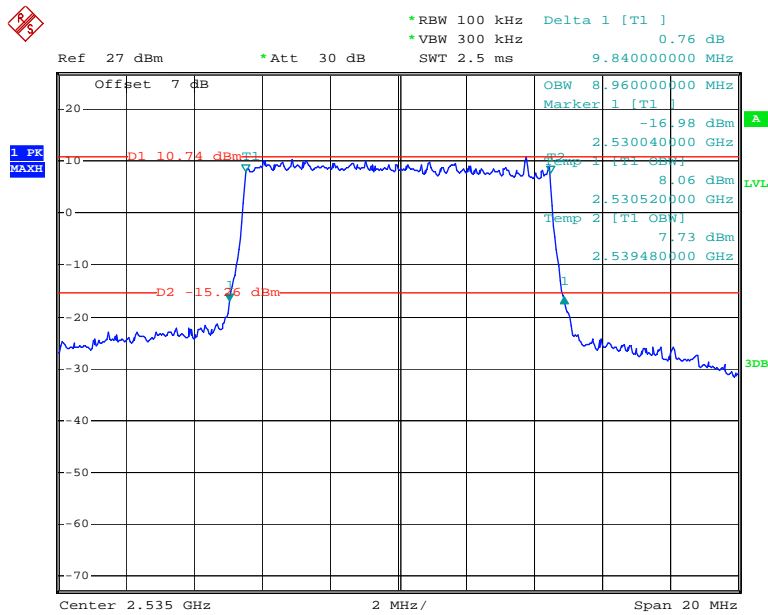
Date: 8.MAR.2018 21:57:05

16QAM_5 MHz



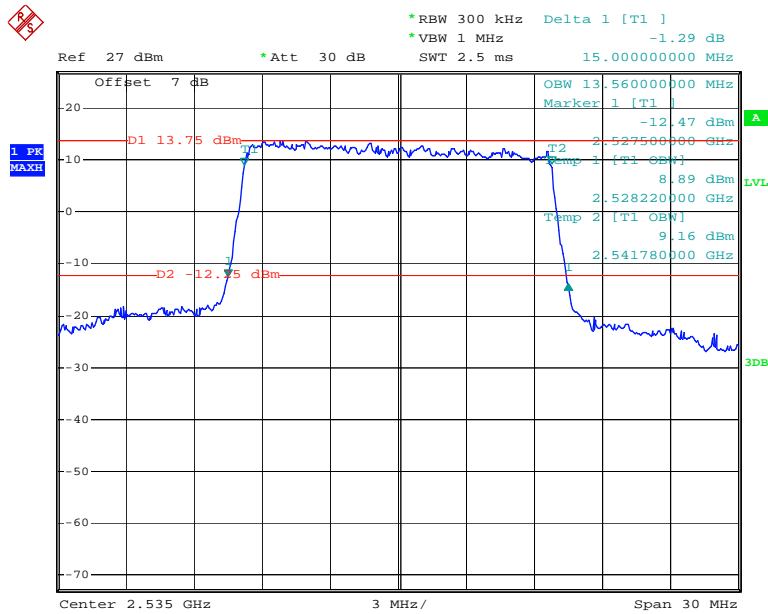
Date: 8.MAR.2018 21:49:30

16QAM_10 MHz



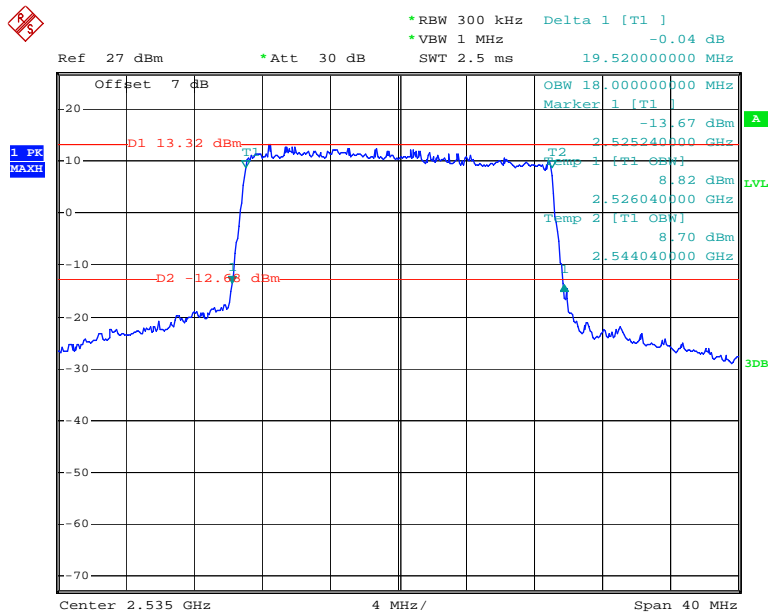
Date: 8.MAR.2018 21:52:06

16QAM_15 MHz



Date: 8.MAR.2018 21:55:44

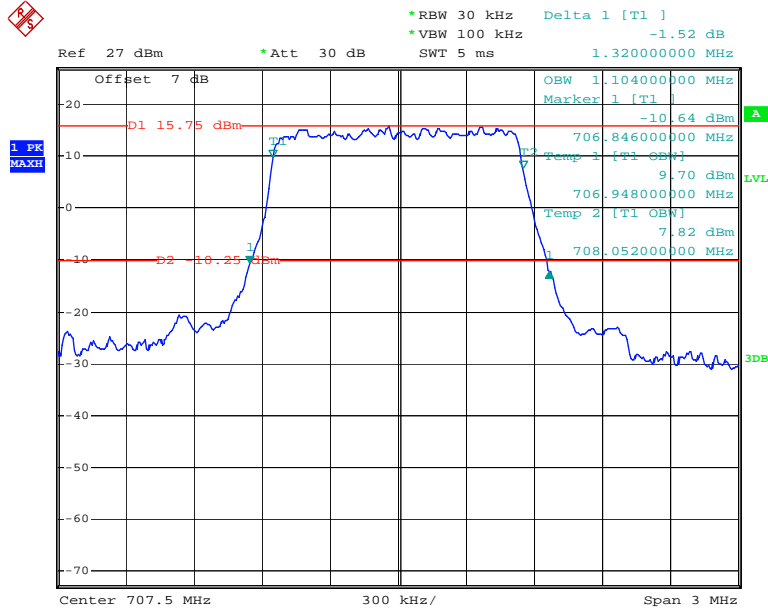
16QAM_20 MHz



Date: 8.MAR.2018 21:58:27

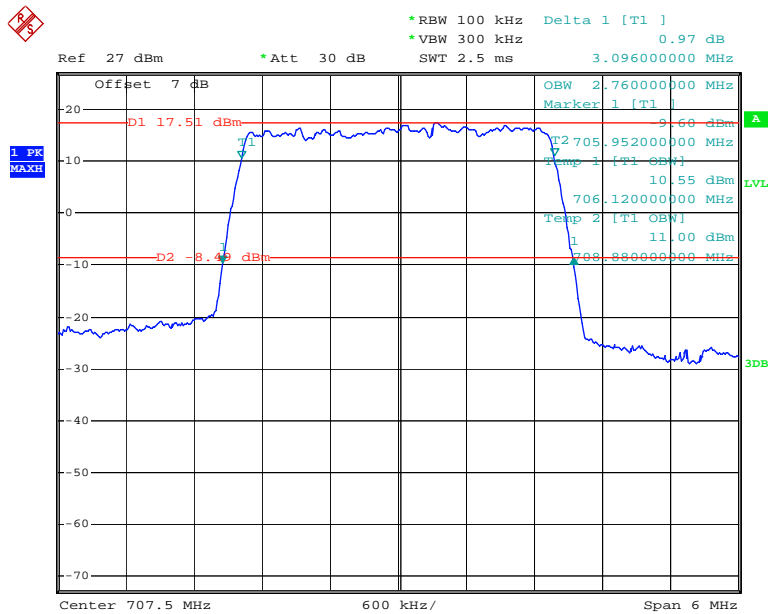
LTE Band 12:

QPSK_1.4 MHz



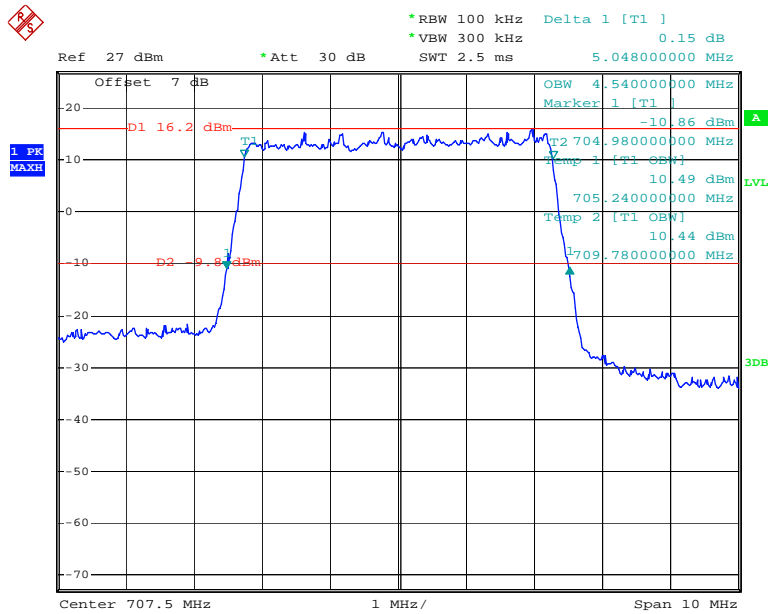
Date: 8.MAR.2018 22:04:00

QPSK_3 MHz



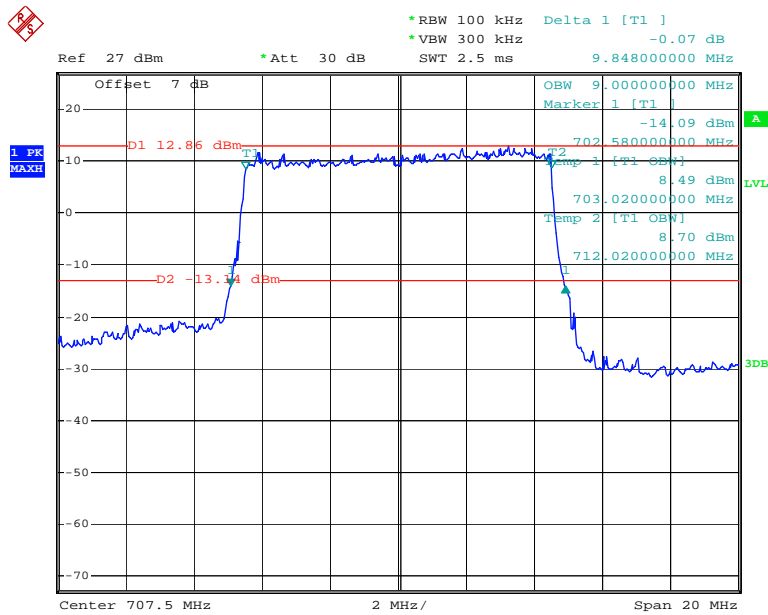
Date: 8.MAR.2018 22:10:02

QPSK_5 MHz



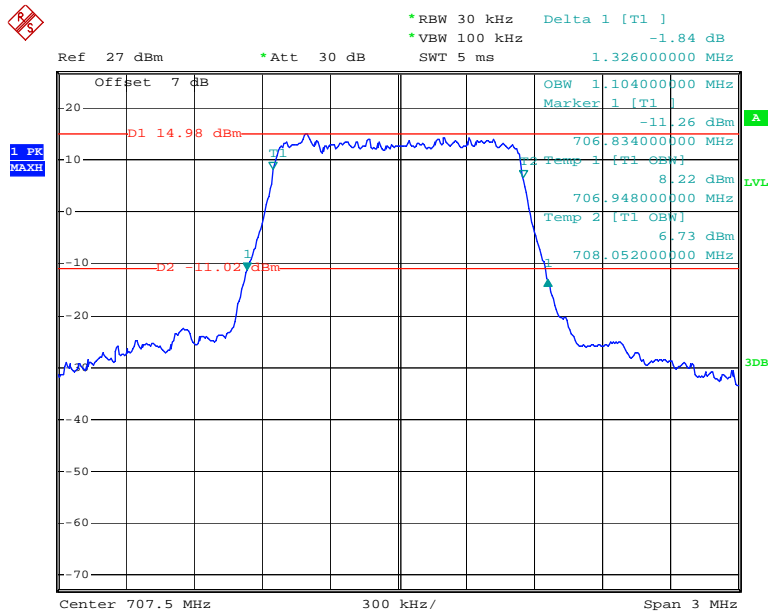
Date: 8.MAR.2018 22:14:01

QPSK_10 MHz



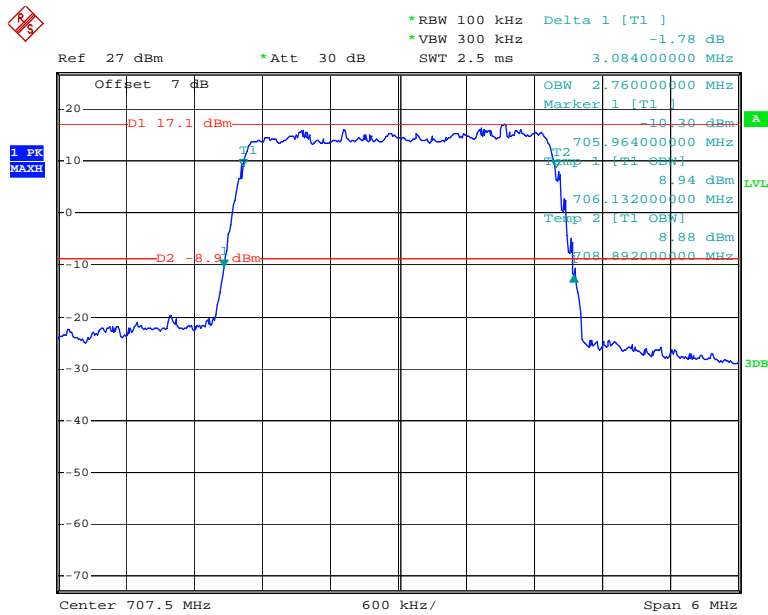
Date: 8.MAR.2018 22:15:43

16QAM_1.4 MHz



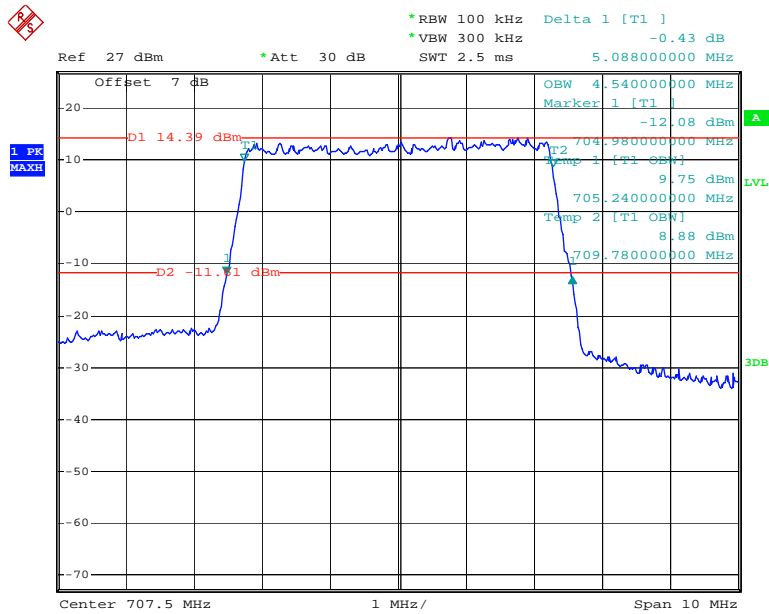
Date: 8.MAR.2018 22:02:40

16QAM_3 MHz



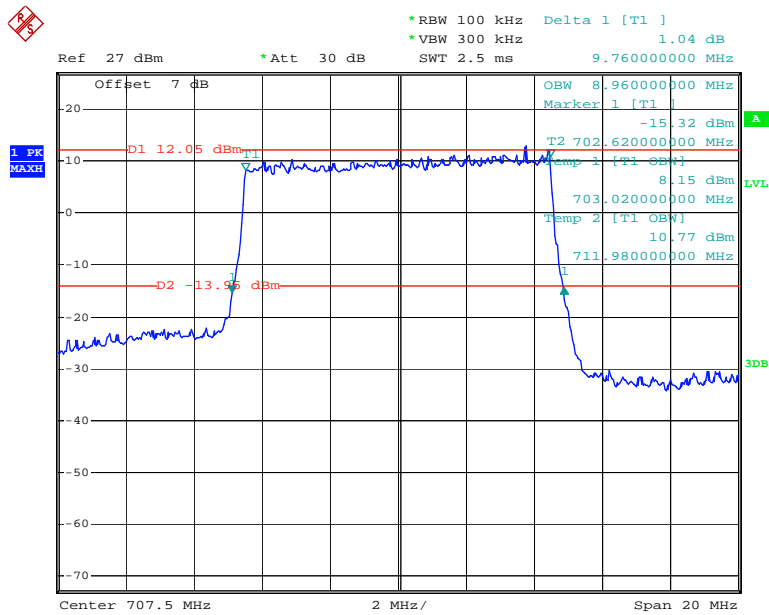
Date: 8.MAR.2018 22:11:08

16QAM_5 MHz



Date: 8.MAR.2018 22:12:43

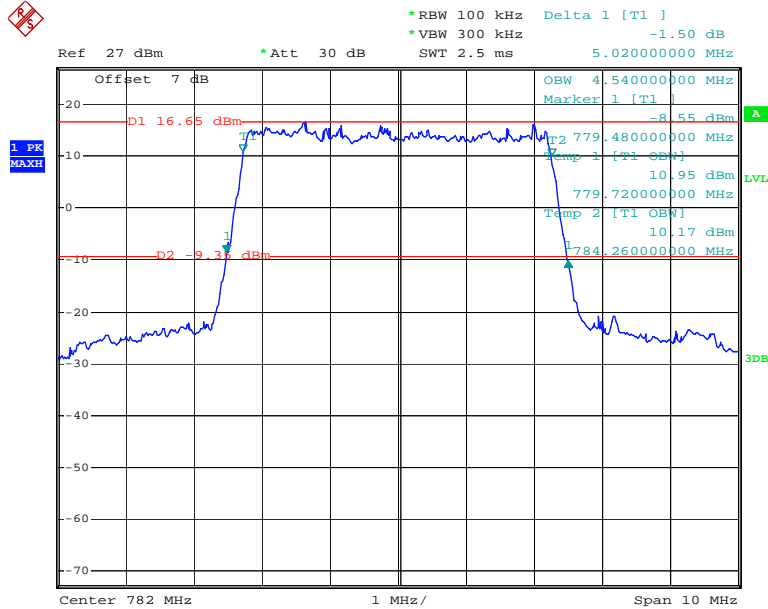
16QAM_10 MHz



Date: 8.MAR.2018 22:17:03

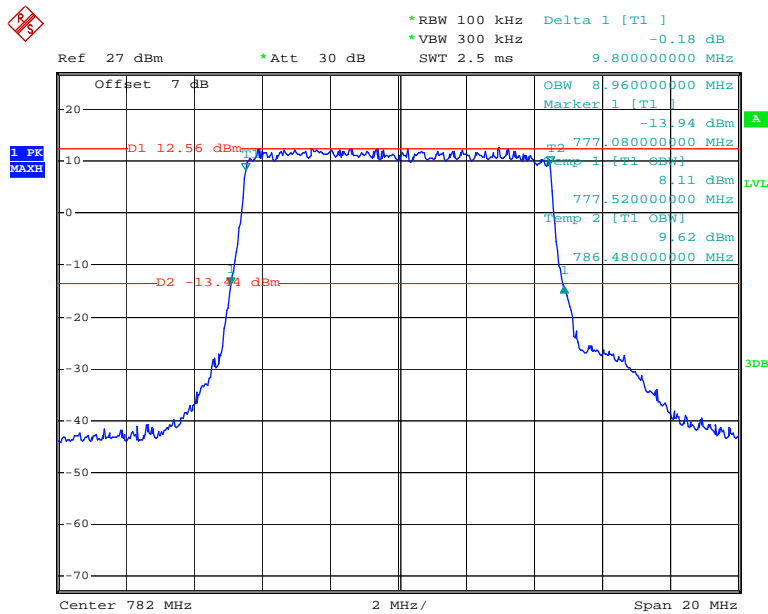
LTE Band 13:

QPSK_5 MHz



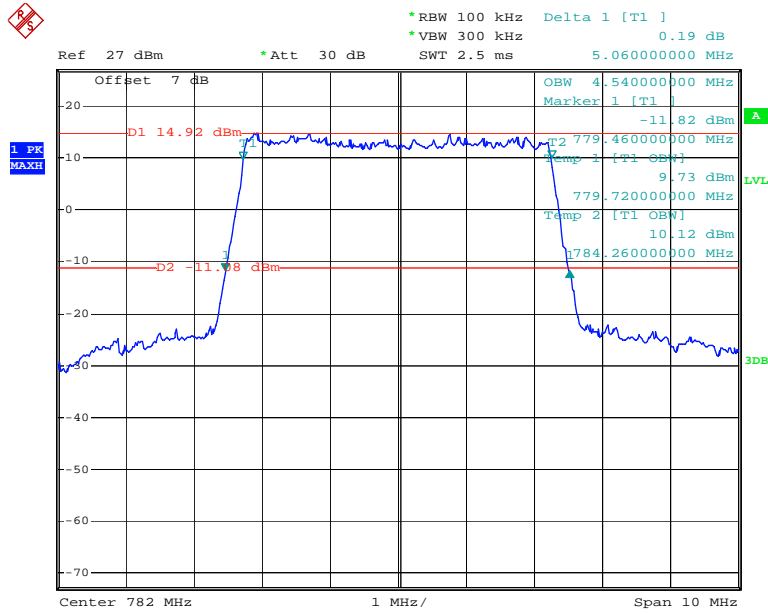
Date: 8.MAR.2018 22:18:55

QPSK_10 MHz



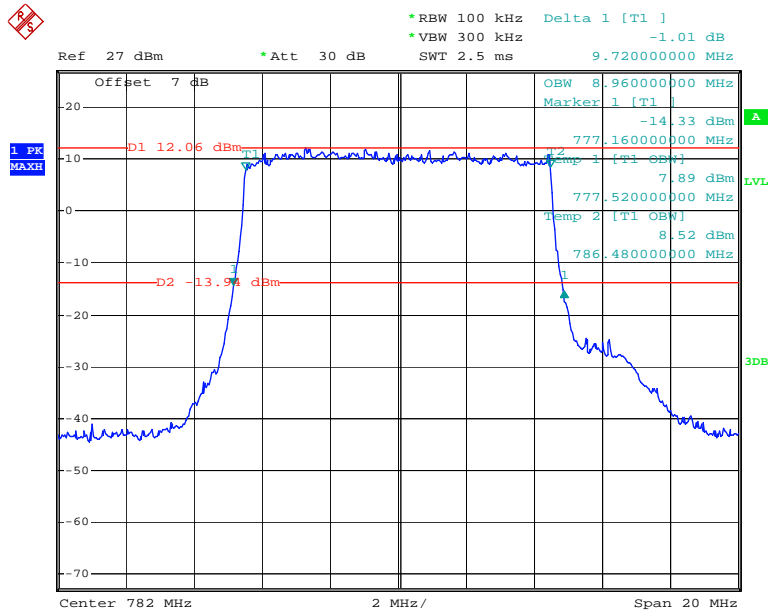
Date: 8.MAR.2018 22:23:23

16QAM_5 MHz



Date: 8.MAR.2018 22:20:02

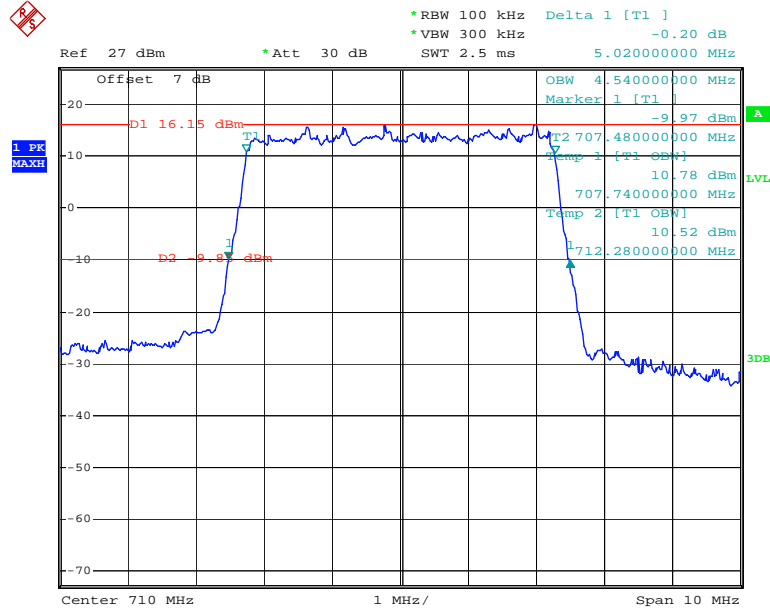
16QAM_10 MHz



Date: 8.MAR.2018 22:21:40

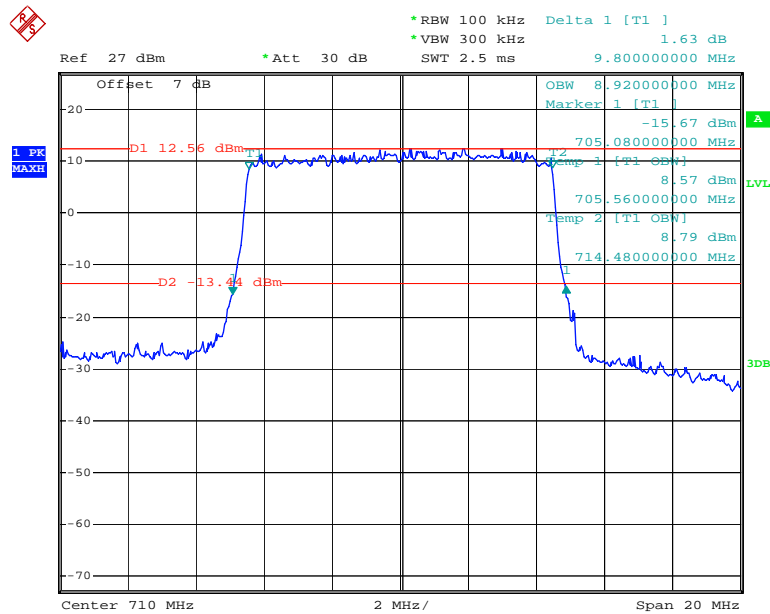
LTE Band 17:

QPSK_5 MHz



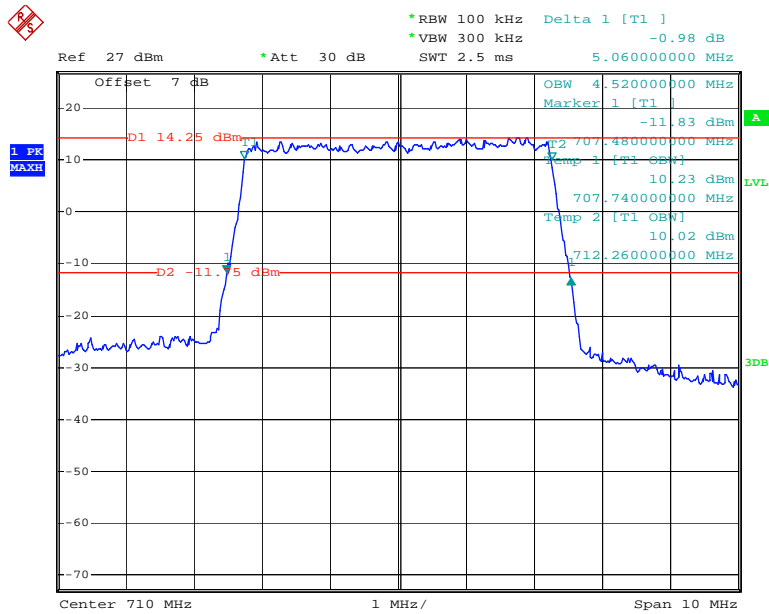
Date: 8.MAR.2018 22:38:00

QPSK_10 MHz



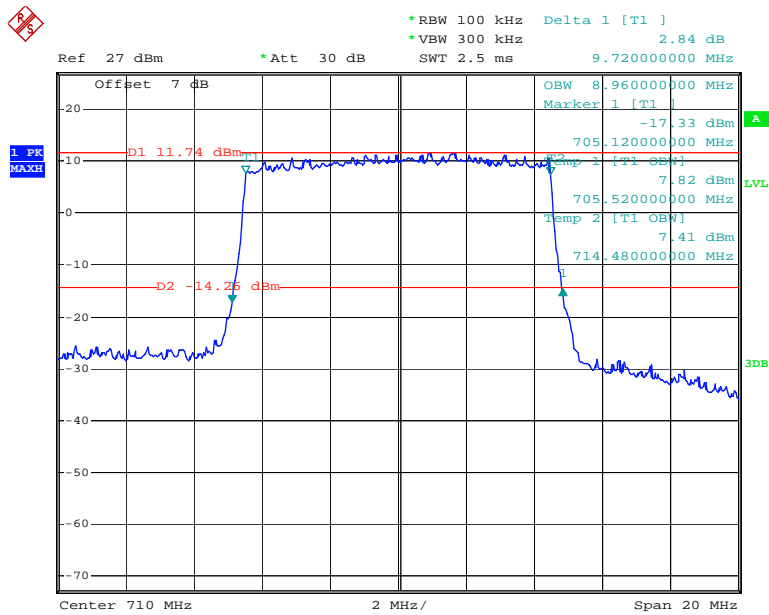
Date: 8.MAR.2018 22:39:11

16QAM_5 MHz



Date: 8.MAR.2018 22:36:47

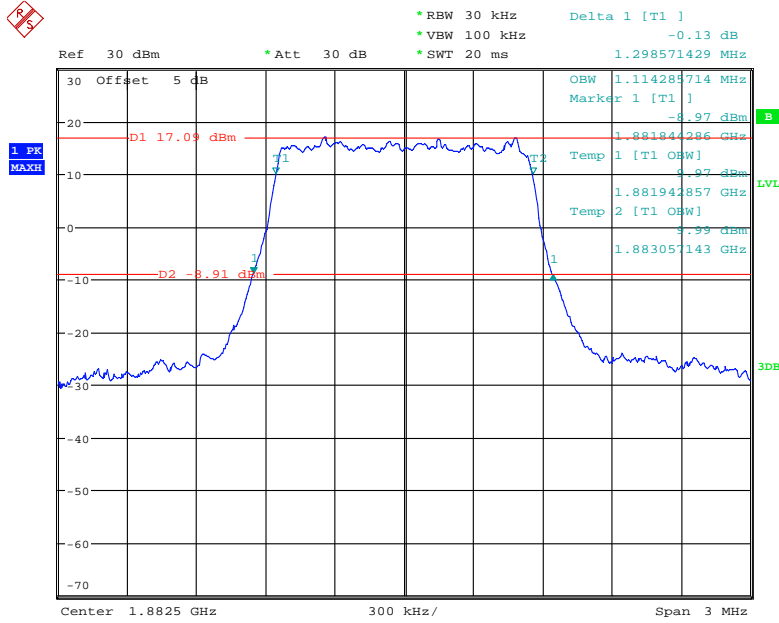
16QAM_10 MHz



Date: 8.MAR.2018 22:40:43

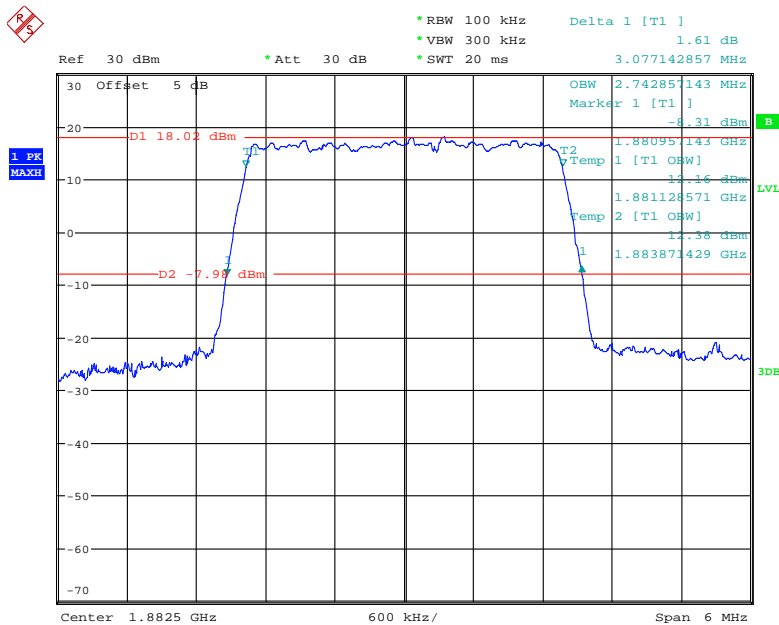
LTE Band 25:

QPSK_1.4 MHz



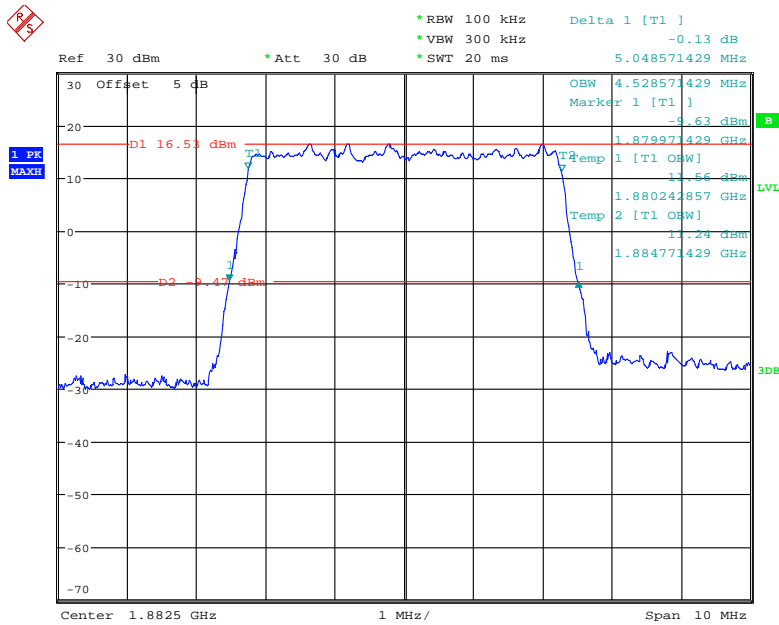
Date: 19.APR.2018 14:47:26

QPSK_3 MHz



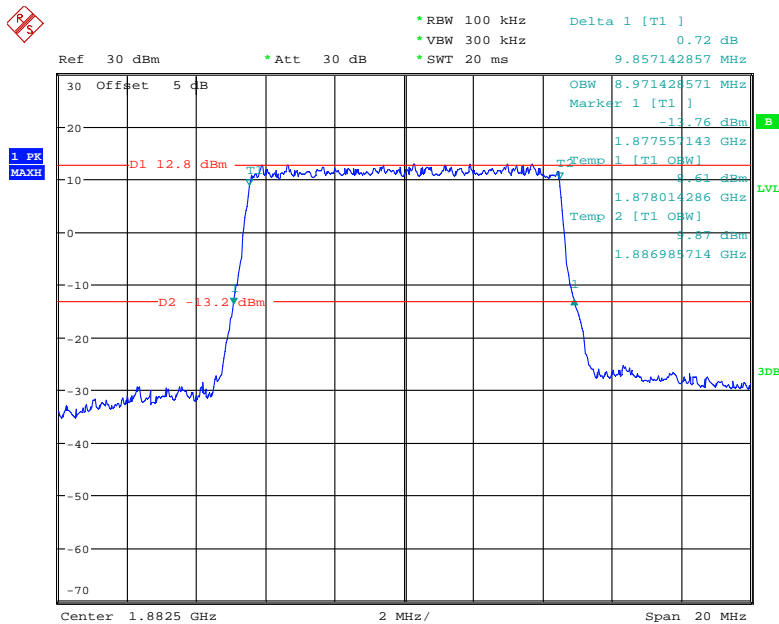
Date: 19.APR.2018 14:50:11

QPSK_5 MHz



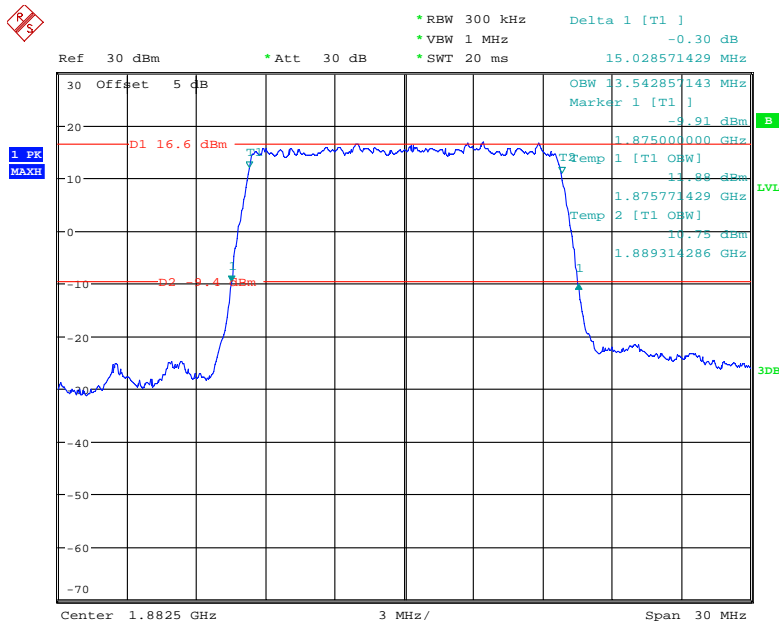
Date: 19.APR.2018 14:53:32

QPSK_10 MHz



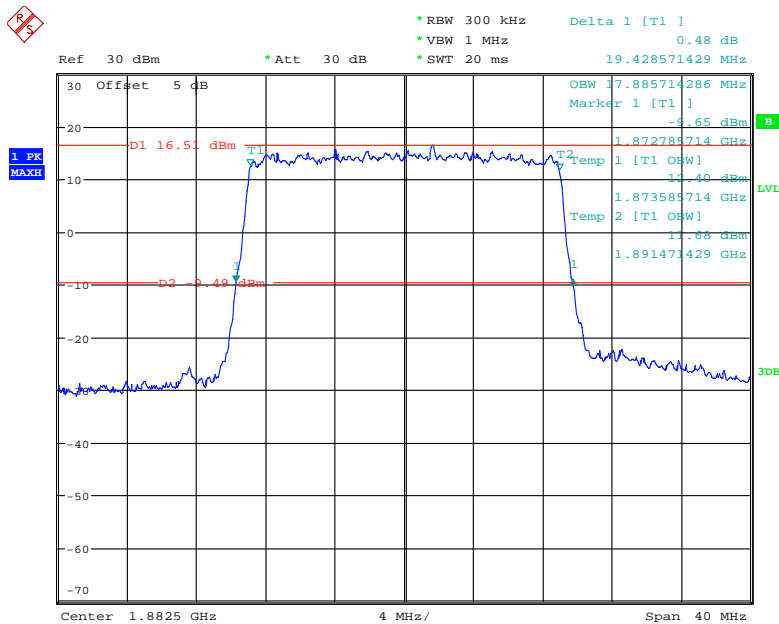
Date: 19.APR.2018 14:59:19

QPSK_15 MHz



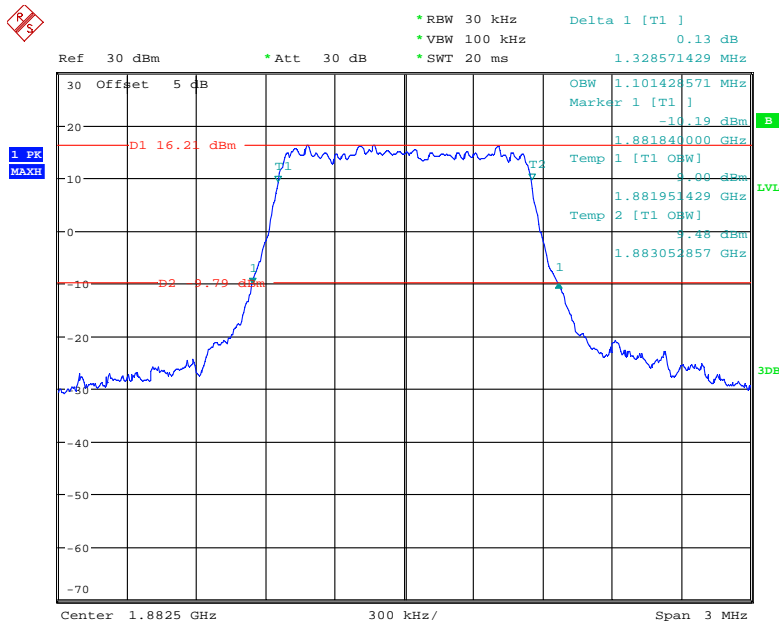
Date: 19.APR.2018 15:04:22

QPSK_20 MHz



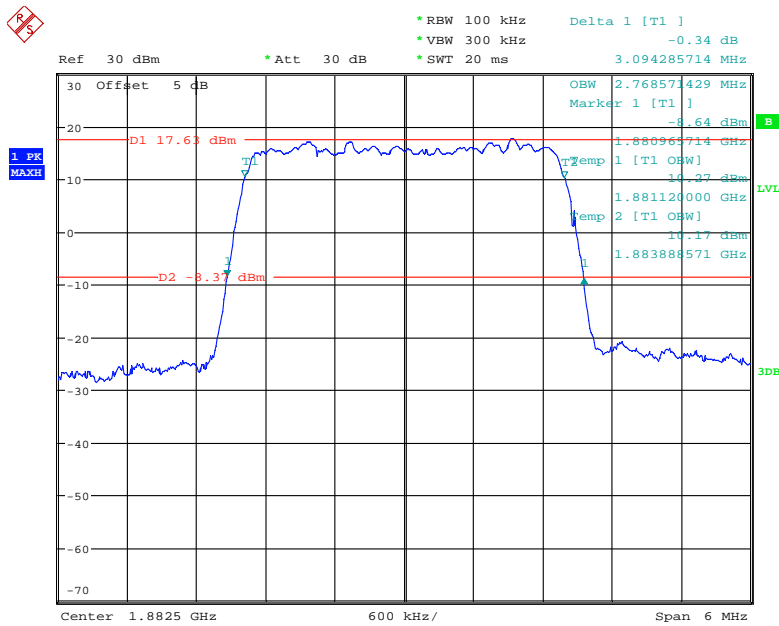
Date: 19.APR.2018 15:07:17

16QAM_1.4 MHz



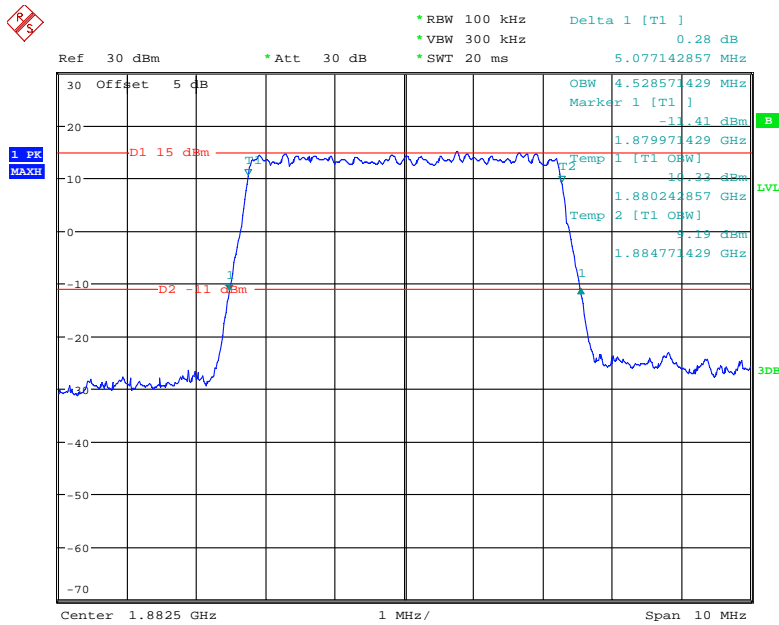
Date: 19.APR.2018 14:45:52

16QAM_3 MHz



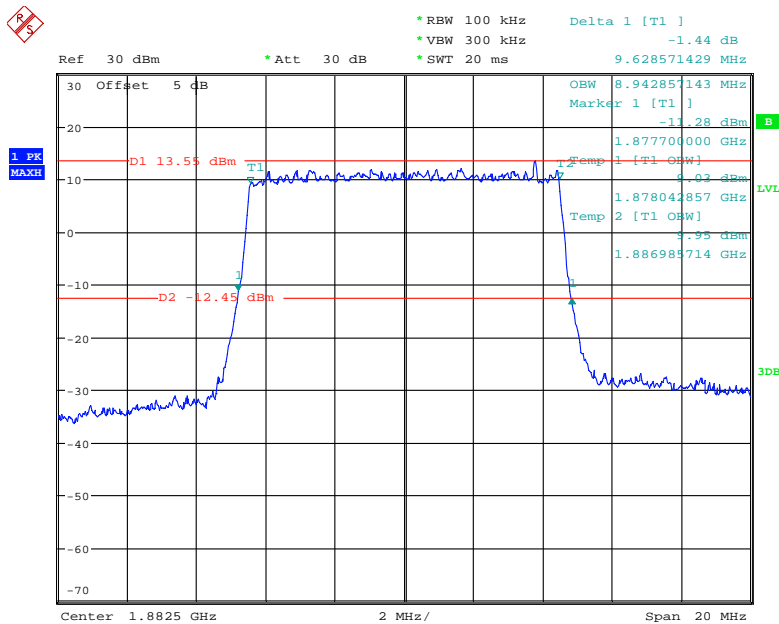
Date: 19.APR.2018 14:49:16

16QAM_5 MHz



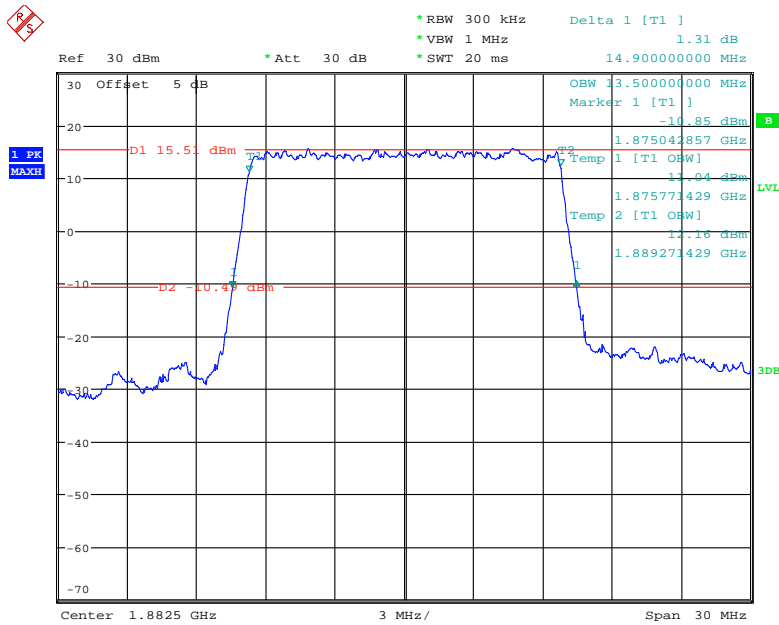
Date: 19.APR.2018 14:52:15

16QAM_10 MHz



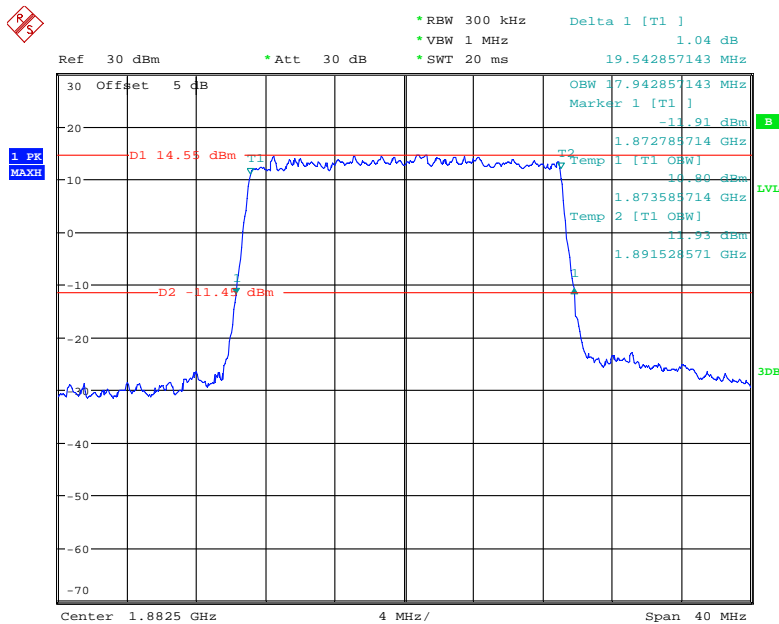
Date: 19.APR.2018 14:58:20

16QAM_15 MHz



Date: 19.APR.2018 15:03:35

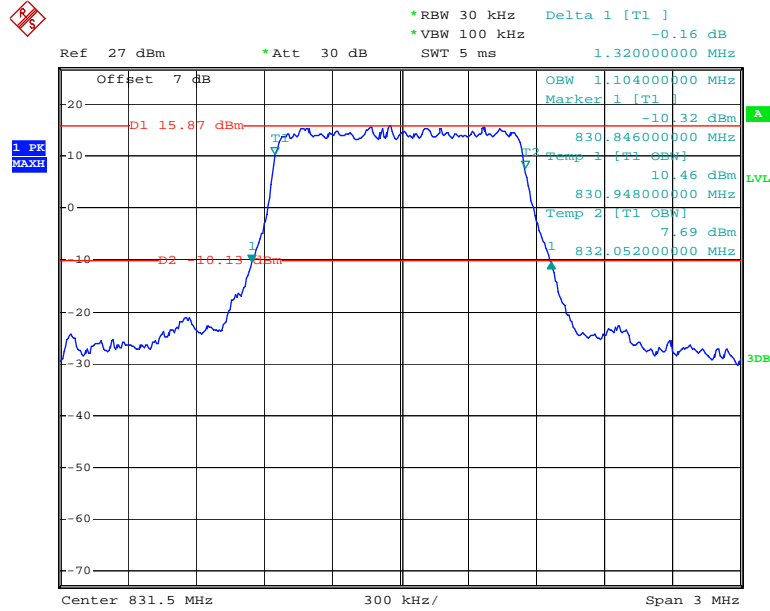
16QAM_20 MHz



Date: 19.APR.2018 15:06:11

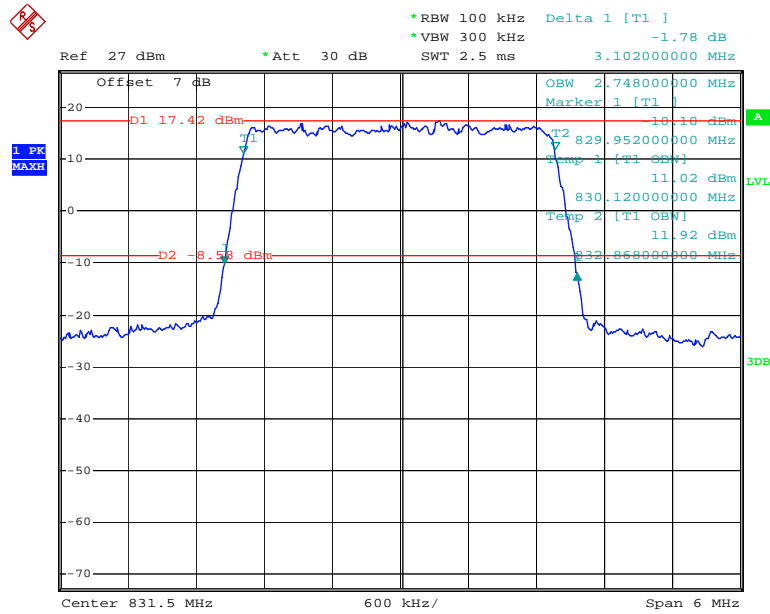
LTE Band 26:

QPSK_1.4 MHz



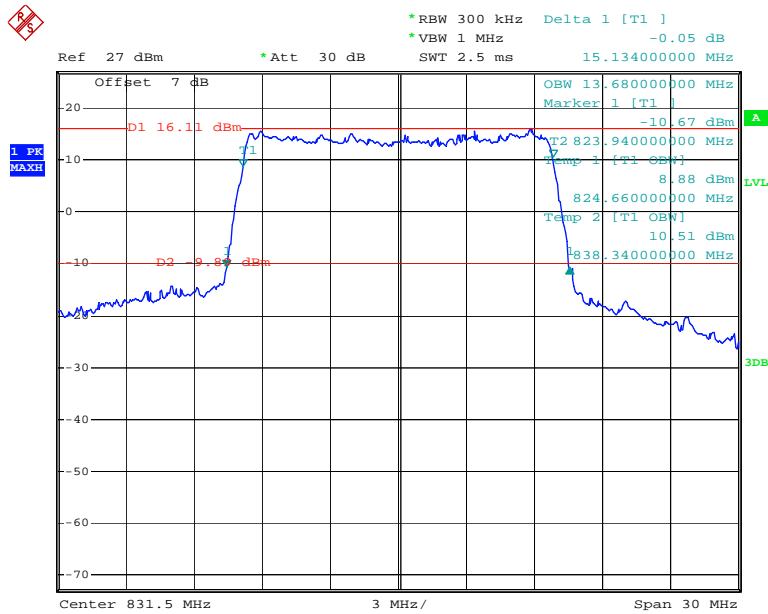
Date: 8.MAR.2018 22:43:09

QPSK_3 MHz



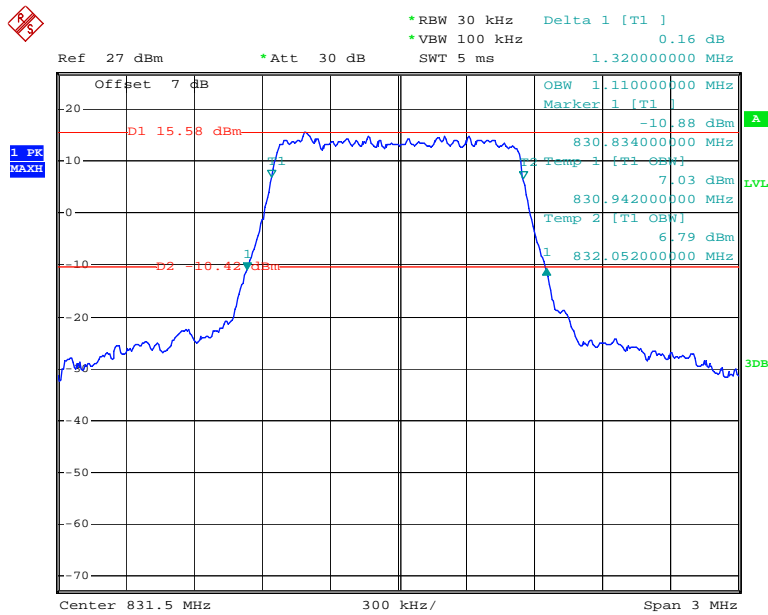
Date: 8.MAR.2018 22:48:02

QPSK_15 MHz



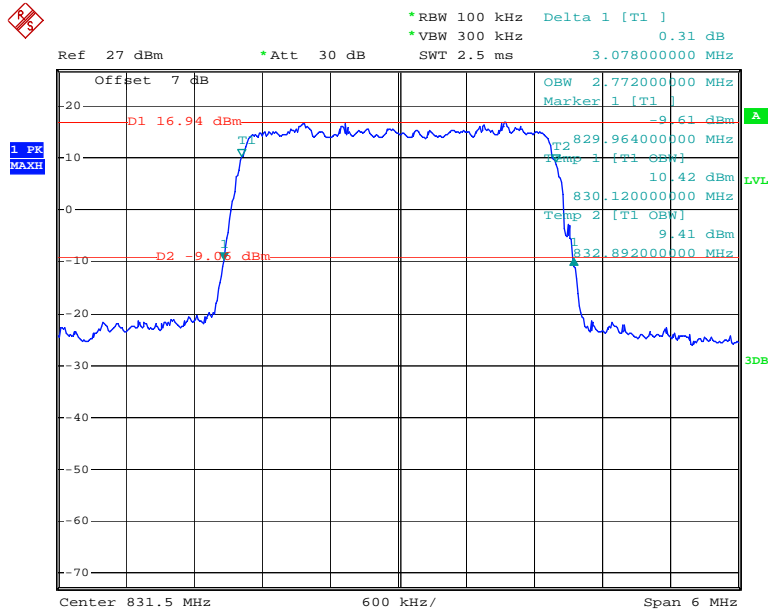
Date: 8.MAR.2018 22:57:53

16QAM_1.4 MHz



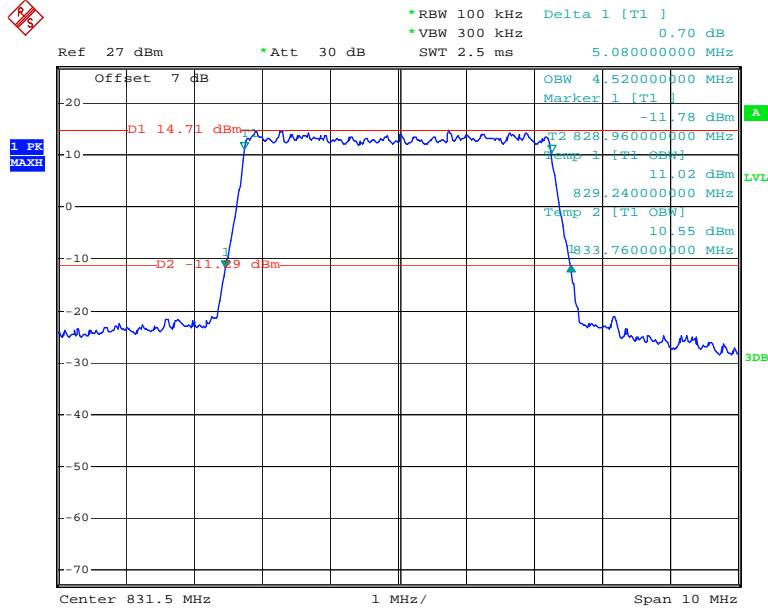
Date: 8.MAR.2018 22:45:08

16QAM_3 MHz



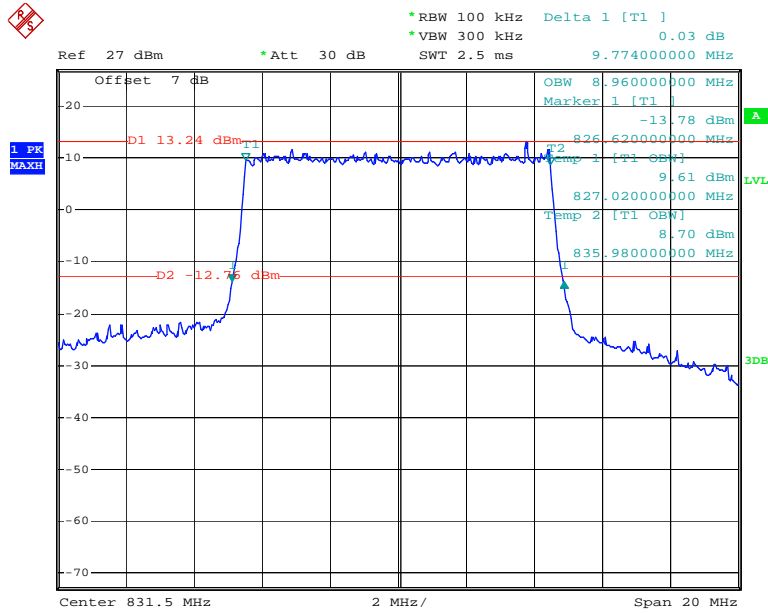
Date: 8.MAR.2018 22:46:45

16QAM_5 MHz



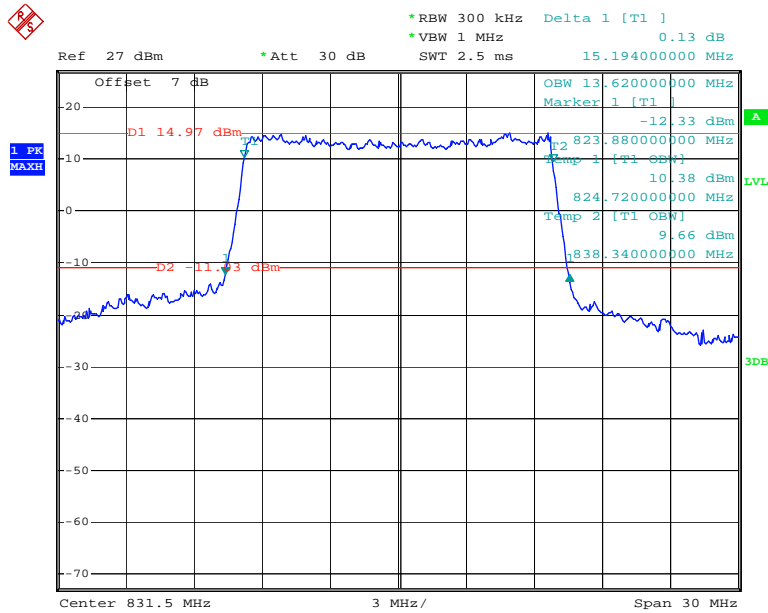
Date: 6.JUL.2018 20:25:30

16QAM_10 MHz



Date: 8.MAR.2018 22:54:48

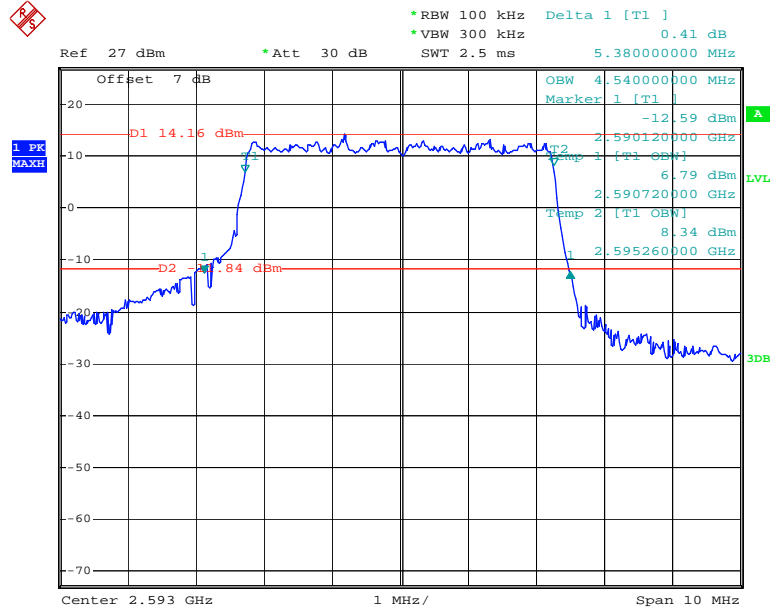
16QAM_15 MHz



Date: 8.MAR.2018 22:59:32

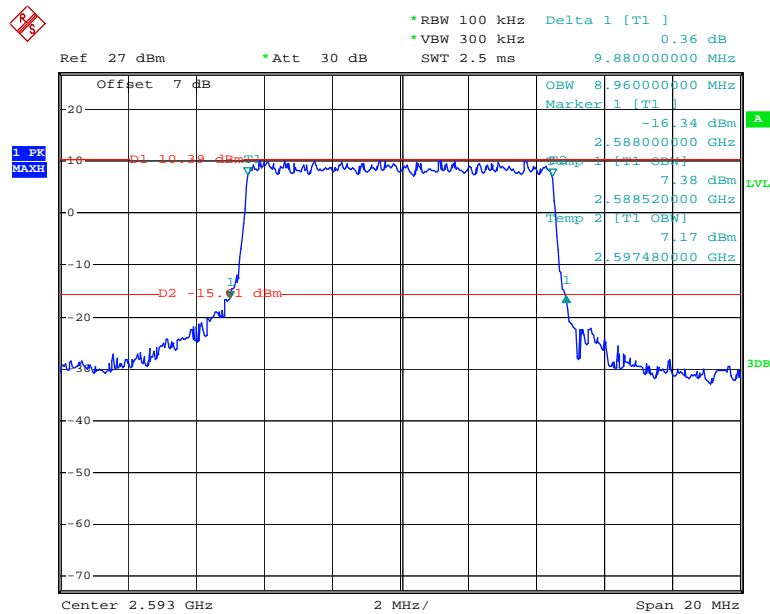
LTE Band 41:

QPSK_5 MHz



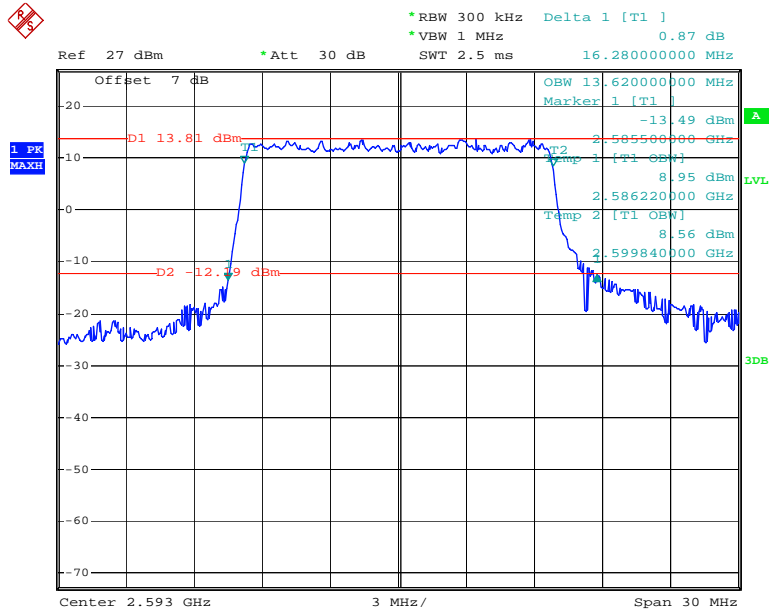
Date: 8.MAR.2018 23:34:23

QPSK_10 MHz



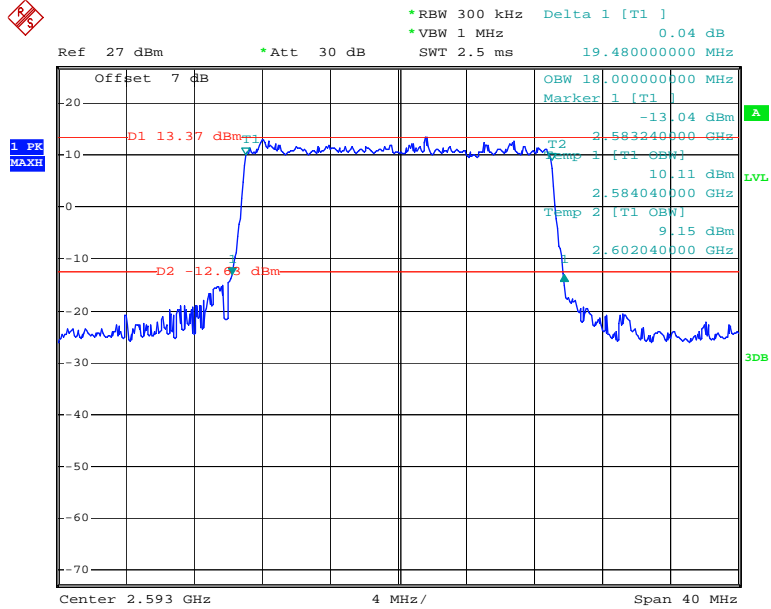
Date: 8.MAR.2018 23:40:04

QPSK_15 MHz



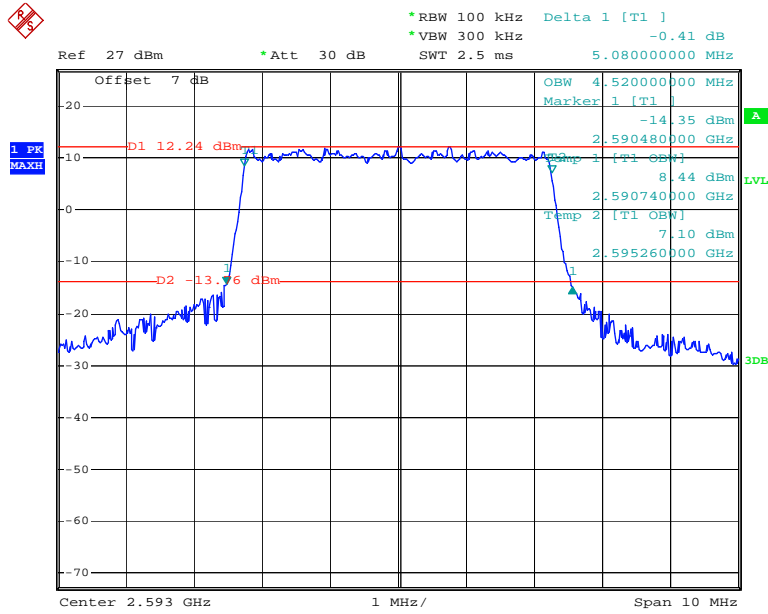
Date: 8.MAR.2018 23:45:13

QPSK_20 MHz



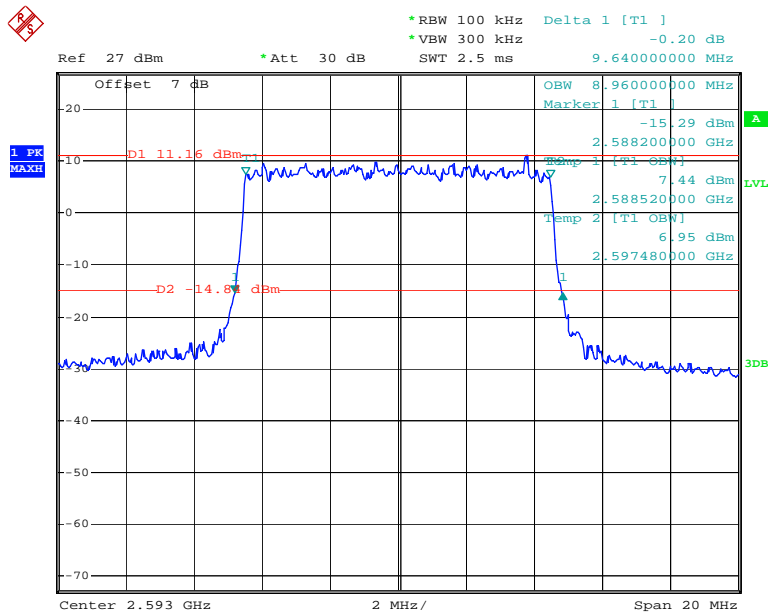
Date: 8.MAR.2018 23:52:50

16QAM_5 MHz



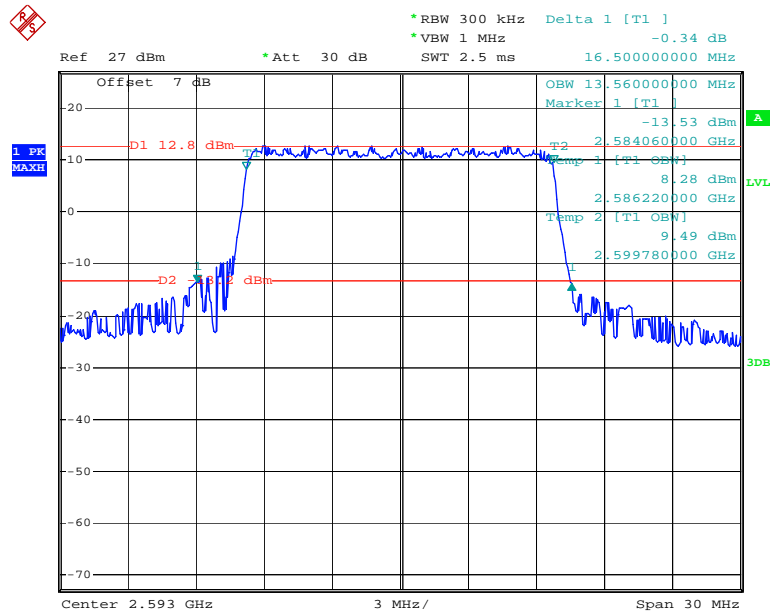
Date: 8.MAR.2018 23:35:41

16QAM_10 MHz



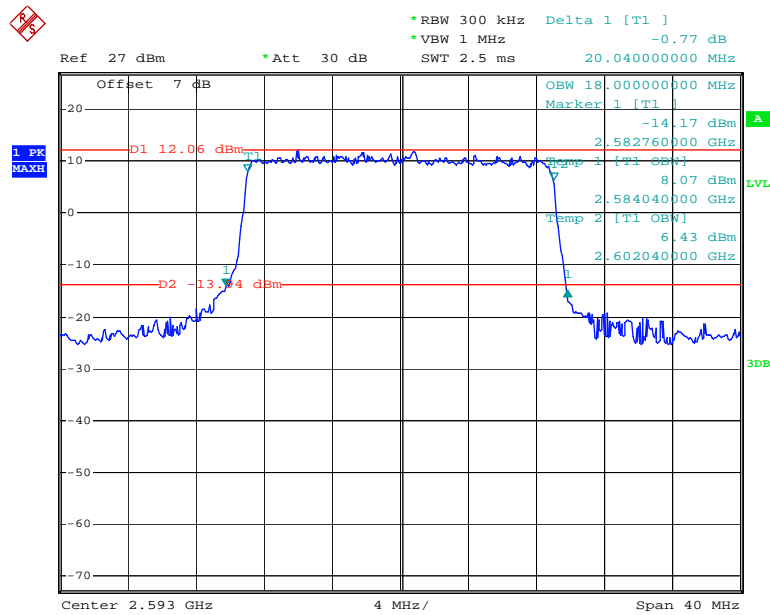
Date: 8.MAR.2018 23:38:42

16QAM_15 MHz



Date: 8.MAR.2018 23:48:46

16QAM_20 MHz



Date: 8.MAR.2018 23:51:01

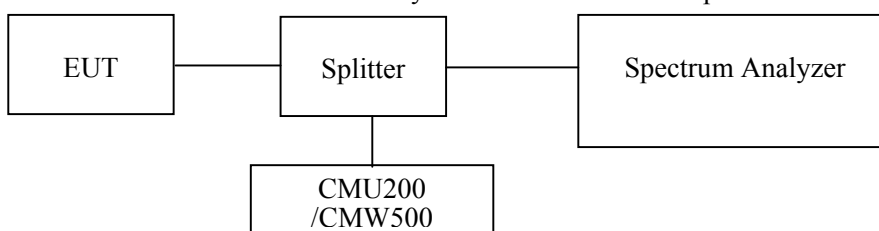
FCC §2.1051, §22.917(a) & §24.238(a) & §27.53& §90.691AND RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5& RSS-139 §6.6& RSS-199 § 4.5 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

FCC § 2.1053, §22.917, § 24.238 ,§ 27.53,§90.691 and RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5 & RSS-139 §6.6.& RSS-199 § 4.5

Test Procedure

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-18	2018-07-18
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each Time	/
E-Microwave	RF Attenuator	3dB	3dB-2	Each Time	/
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each Time	/
R&S	Spectrum Analyzer	FSU 26	200256	2017-12-08	2018-12-08

* **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

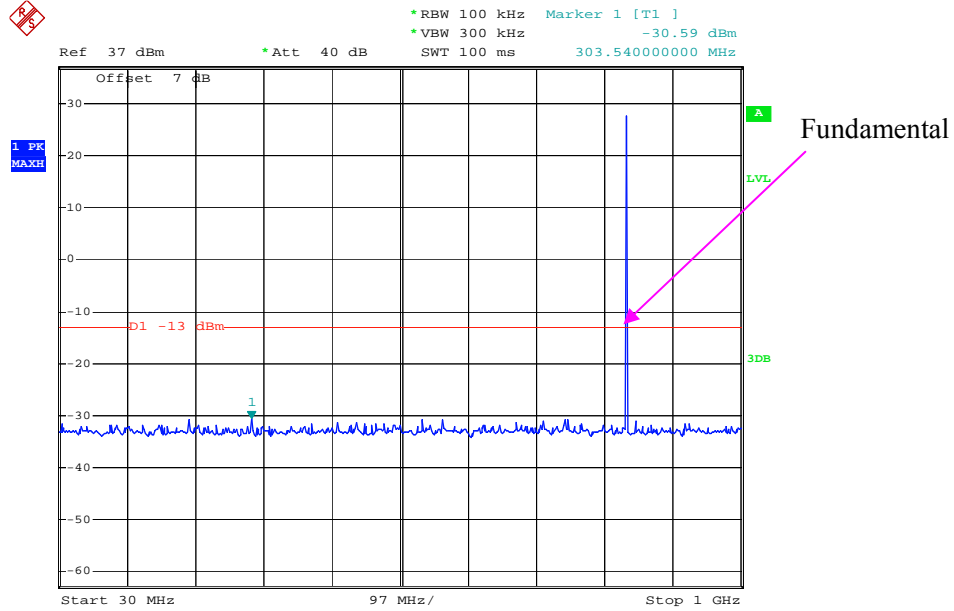
Environmental Conditions

Temperature:	25.6~25.9°C
Relative Humidity:	49~58 %
ATM Pressure:	101~101.1 kPa

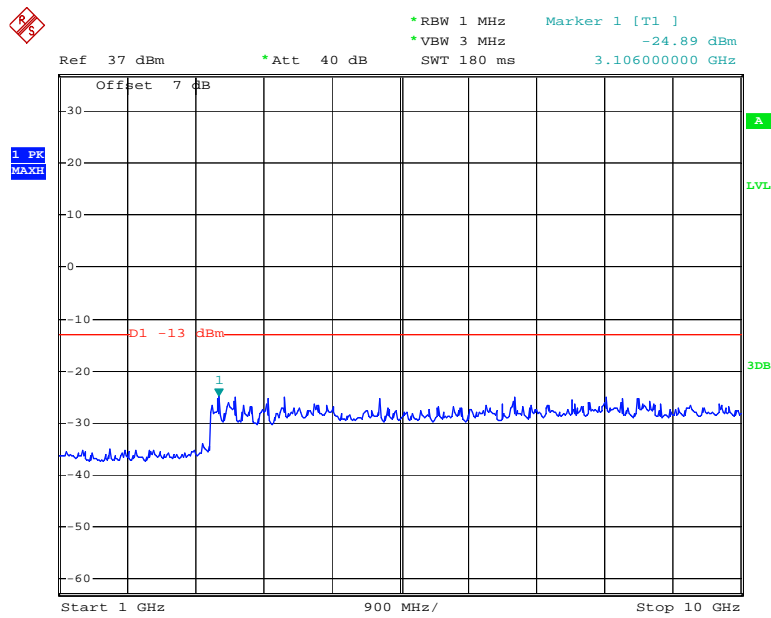
The testing was performed by Swim Lv from 2018-03-07to 2018-05-22.

Please refer to the following plots.

GSM850_Middle Channel

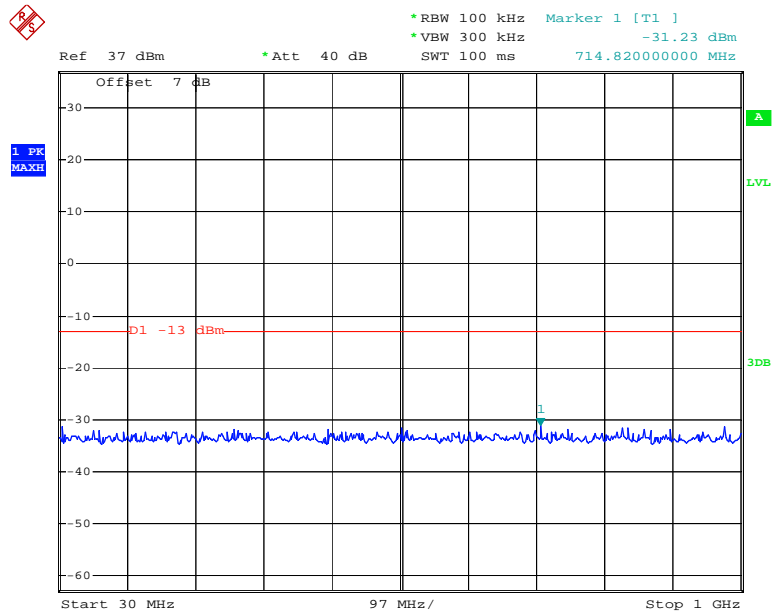


Date: 7.MAR.2018 16:14:07



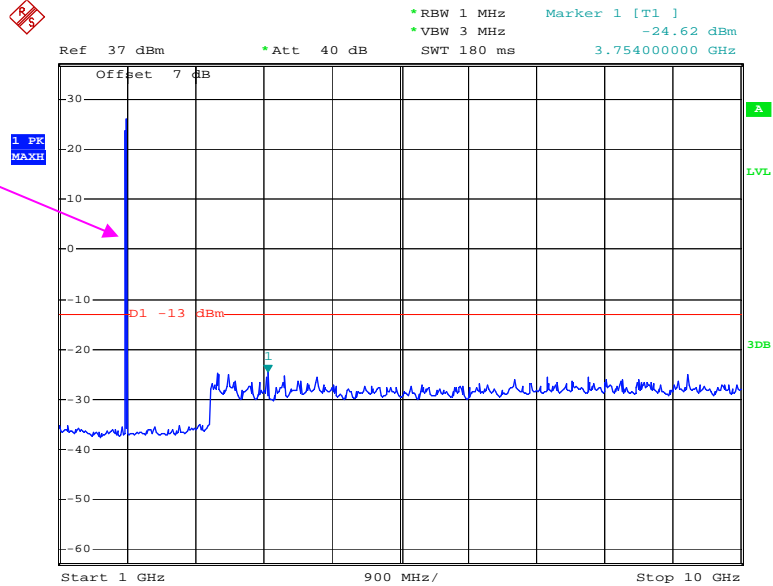
Date: 7.MAR.2018 16:15:00

PCS 1900_ Middle Channel

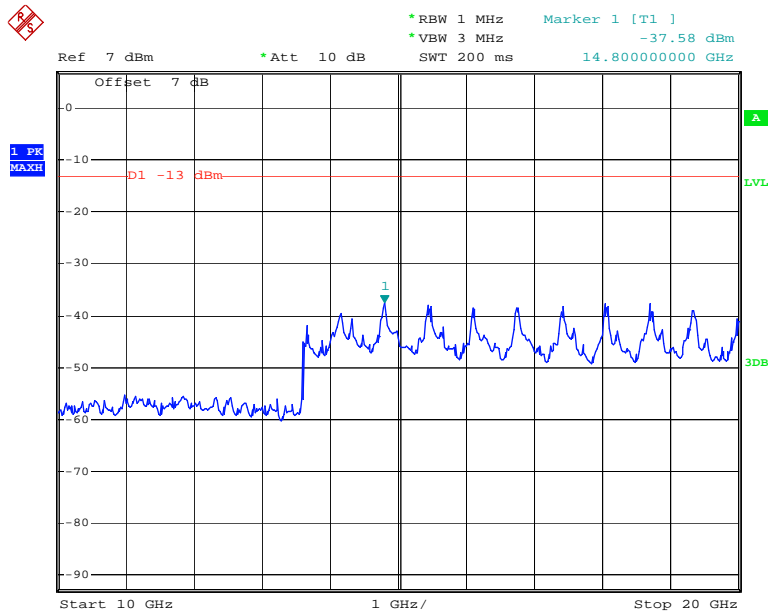


Date: 7.MAR.2018 16:29:26

Fundamental

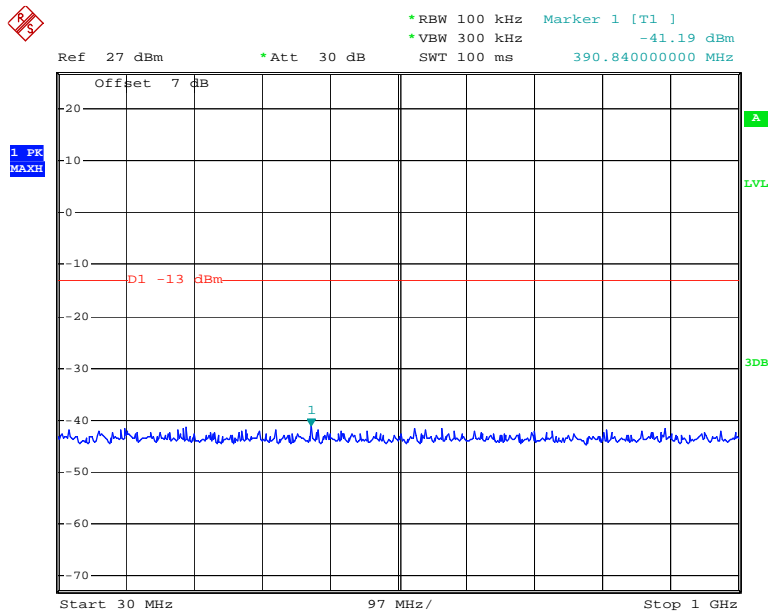


Date: 7.MAR.2018 16:30:21

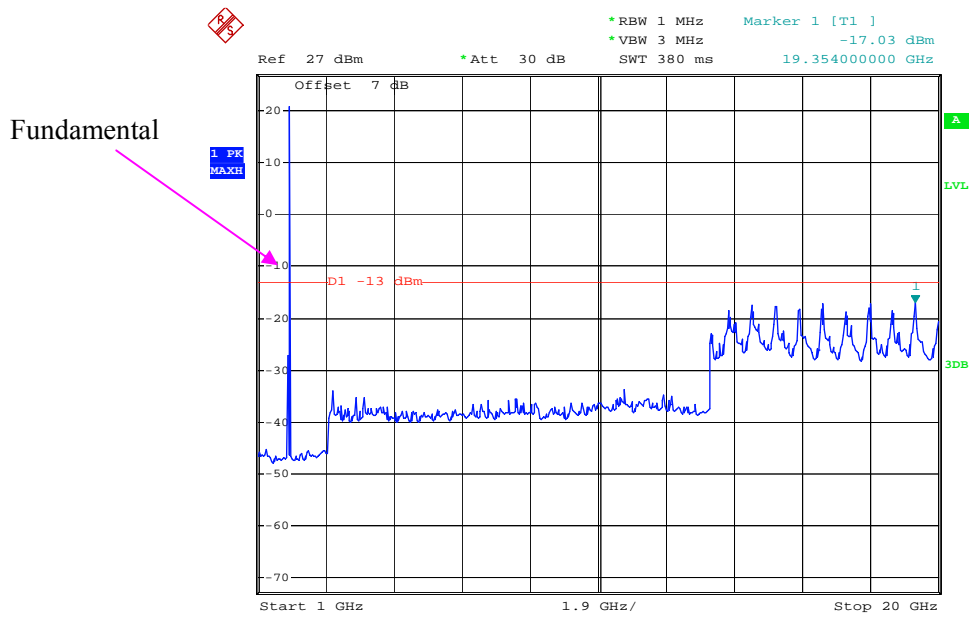


Date: 7.MAR.2018 16:31:15

REL99 Band 2_ Middle Channel

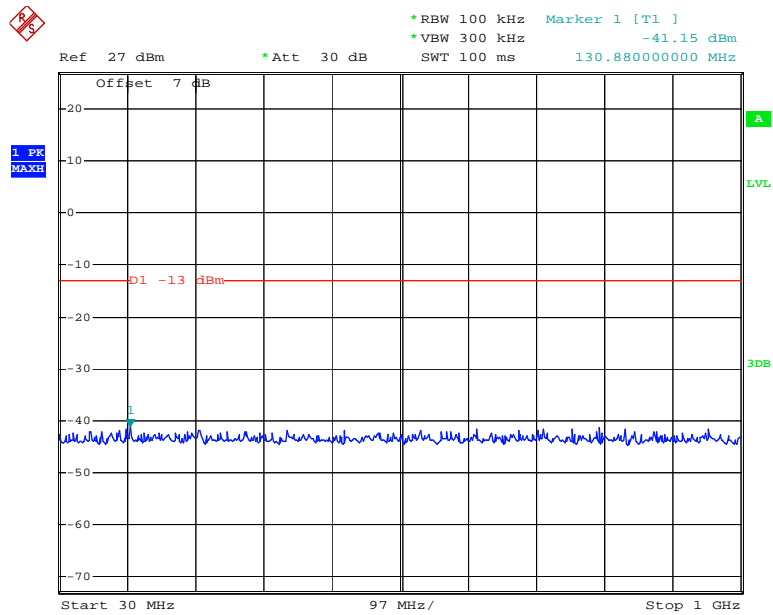


Date: 7.MAR.2018 21:00:21

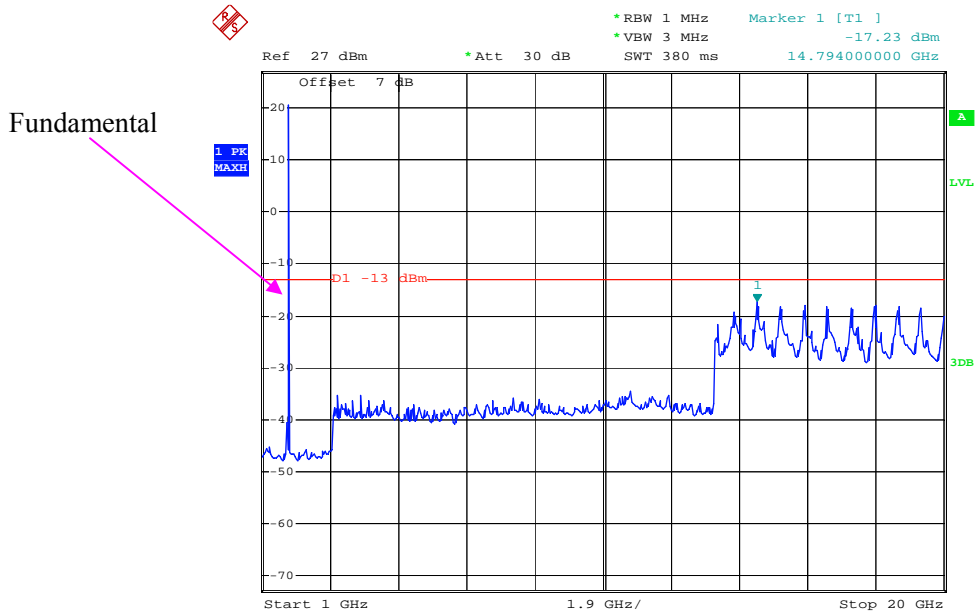


Date: 7.MAR.2018 21:03:12

Rel 99 Band 4_ Middle Channel

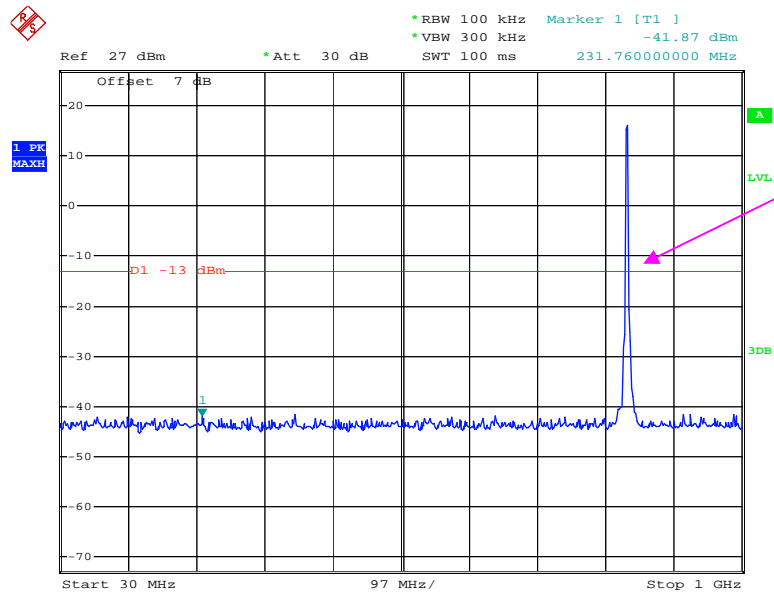


Date: 7.MAR.2018 20:57:30

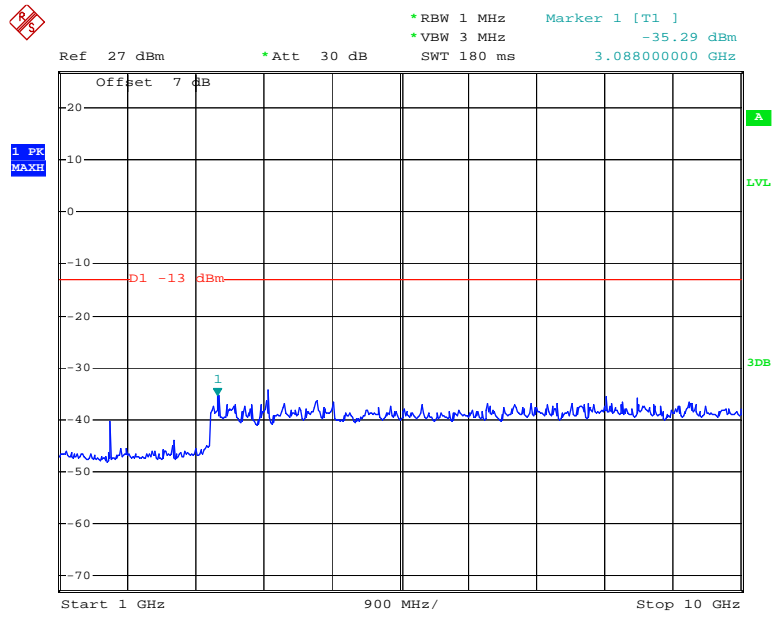


Date: 7.MAR.2018 21:01:48

Rel 99 Band 5_ Middle Channel



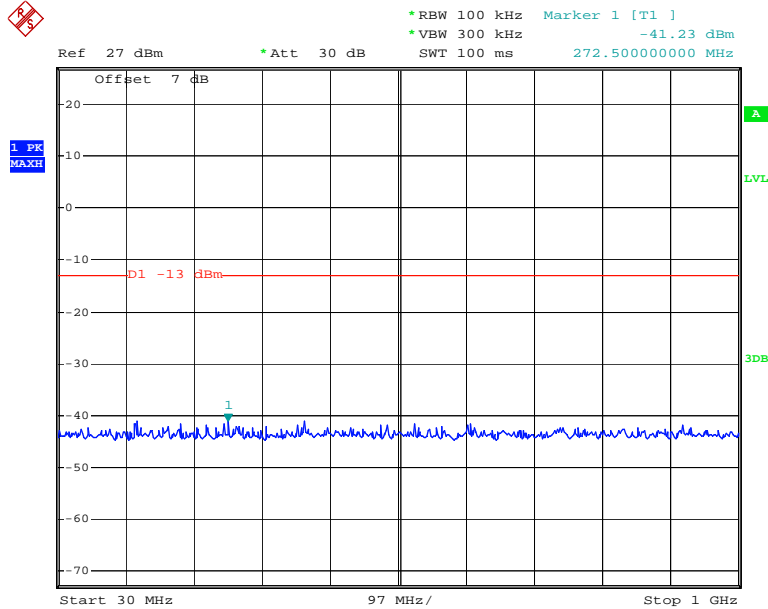
Date: 7.MAR.2018 20:56:33



Date: 7.MAR.2018 20:56:03

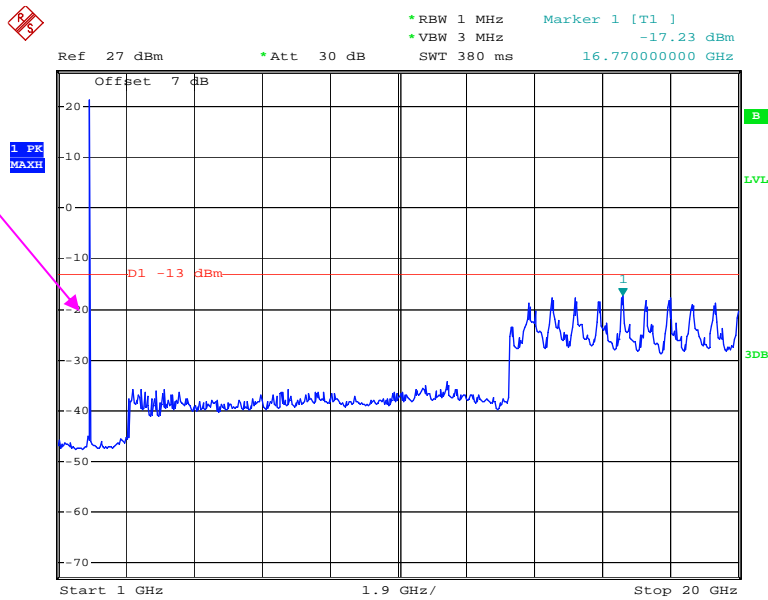
LTE Band 2 (Middle Channel)

QPSK_1.4 MHz



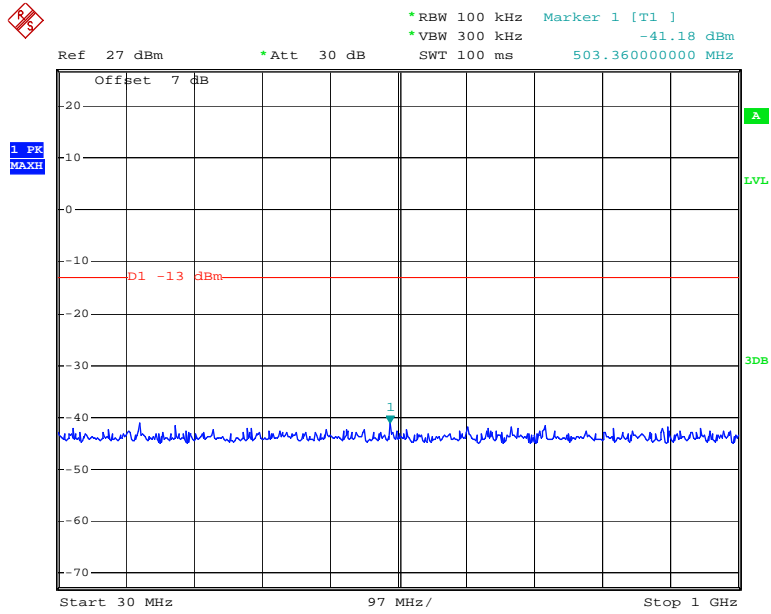
Date: 9.MAR.2018 00:17:12

Fundamental



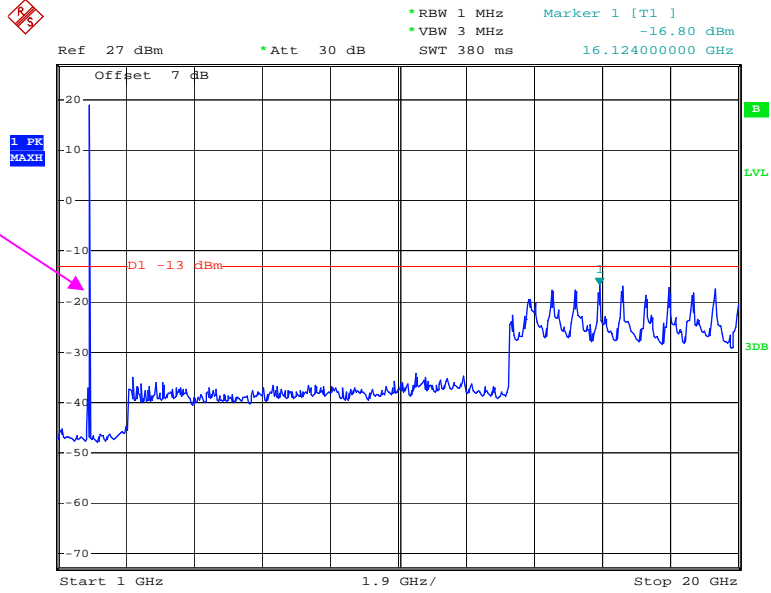
Date: 9.MAR.2018 00:17:36

QPSK_3 MHz



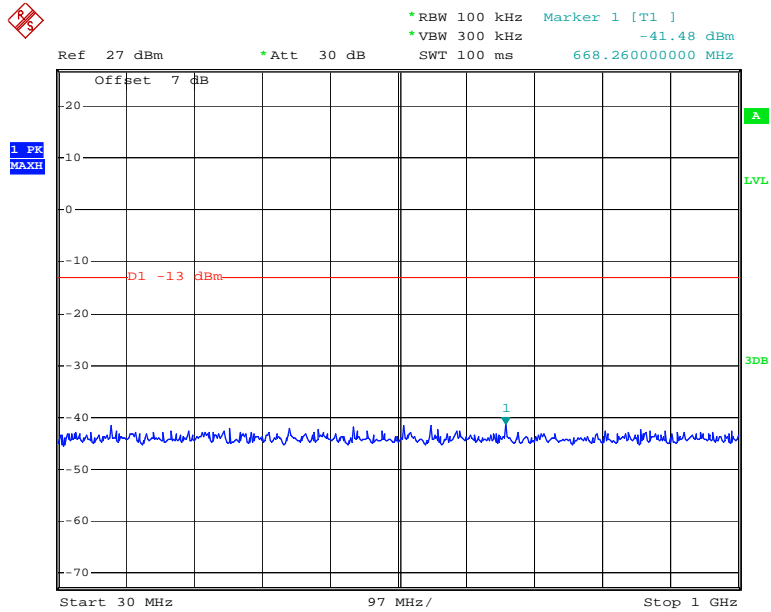
Date: 9.MAR.2018 00:18:11

Fundamental



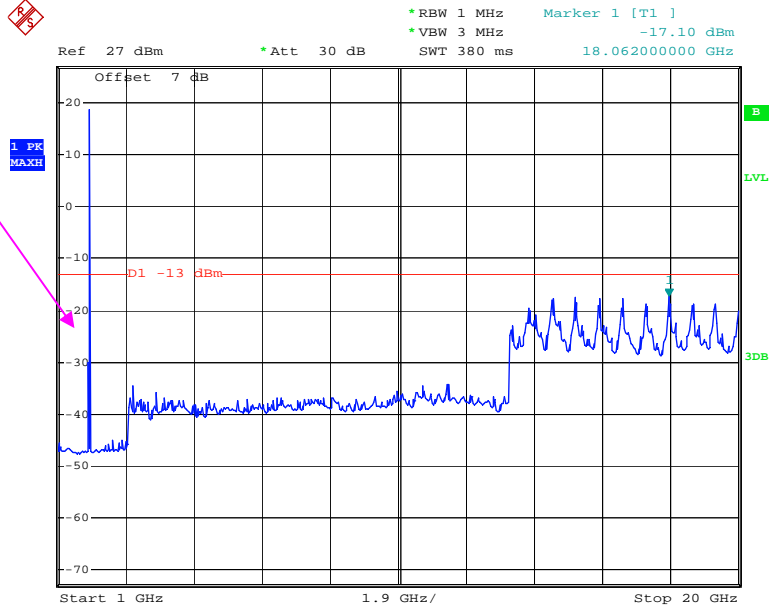
Date: 9.MAR.2018 00:18:32

QPSK_5 MHz



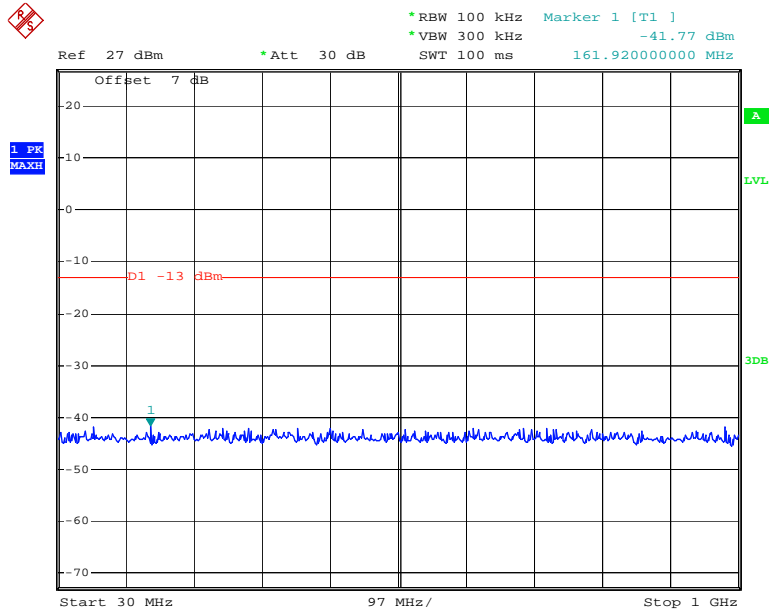
Date: 9.MAR.2018 00:20:32

Fundamental



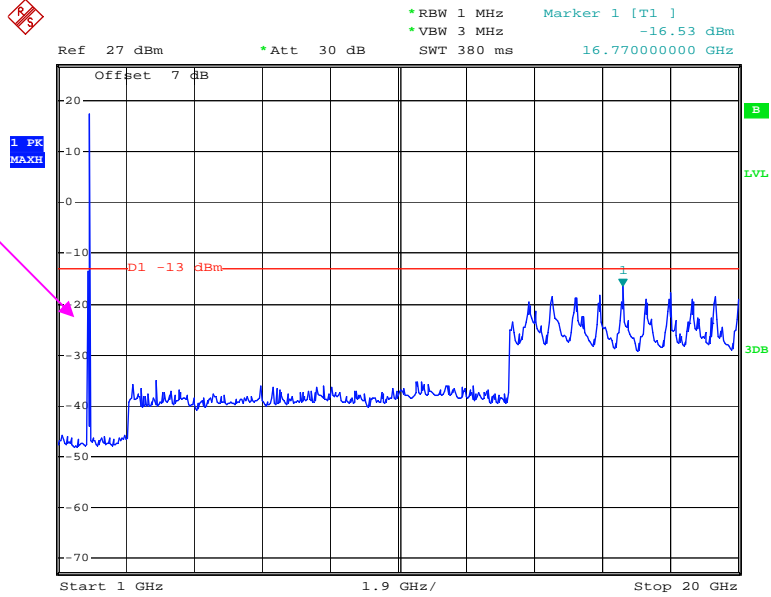
Date: 9.MAR.2018 00:20:50

QPSK_10 MHz



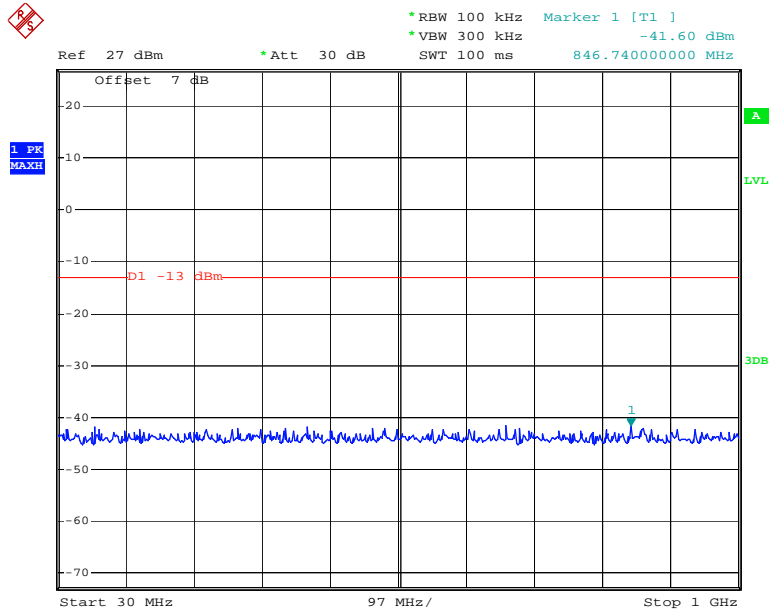
Date: 9.MAR.2018 00:21:33

Fundamental



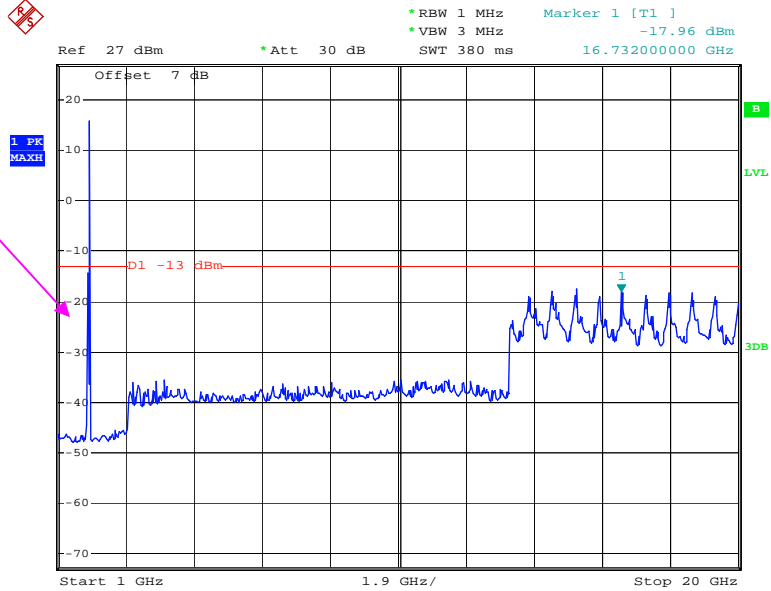
Date: 9.MAR.2018 00:21:47

QPSK_15 MHz



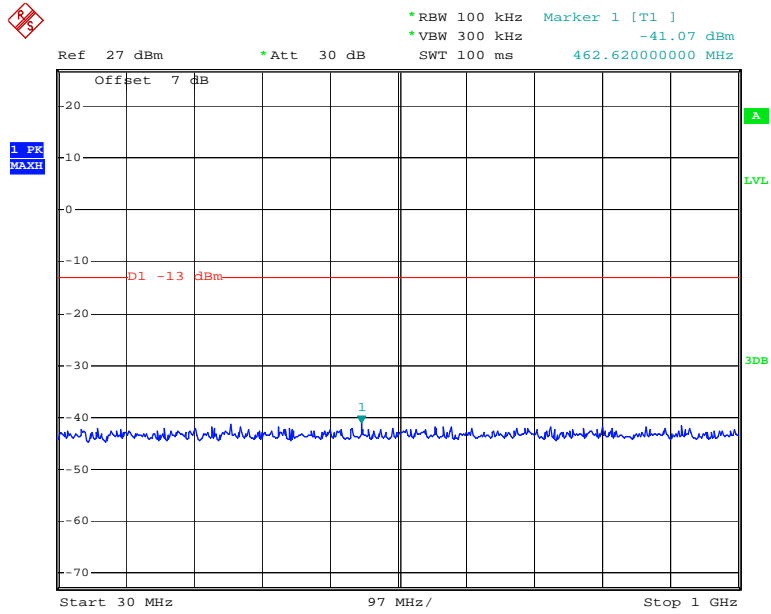
Date: 9.MAR.2018 00:22:26

Fundamental

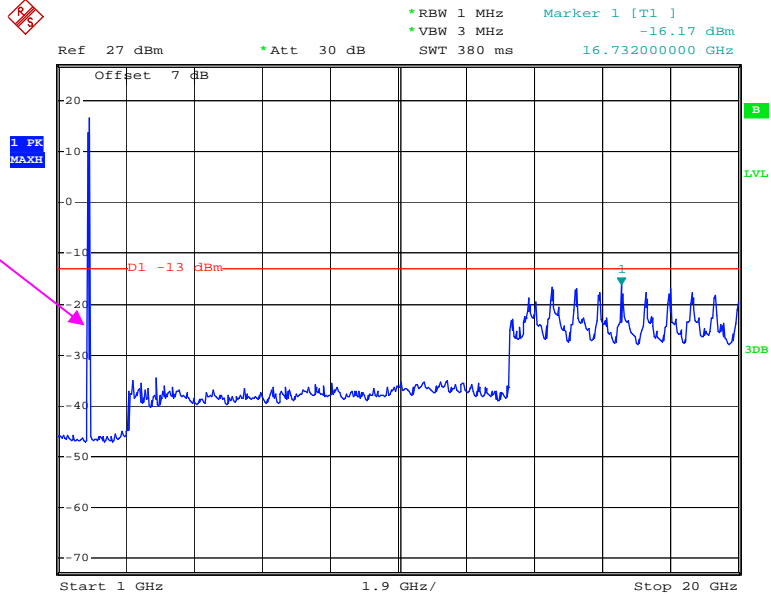


Date: 9.MAR.2018 00:22:44

QPSK_20 MHz



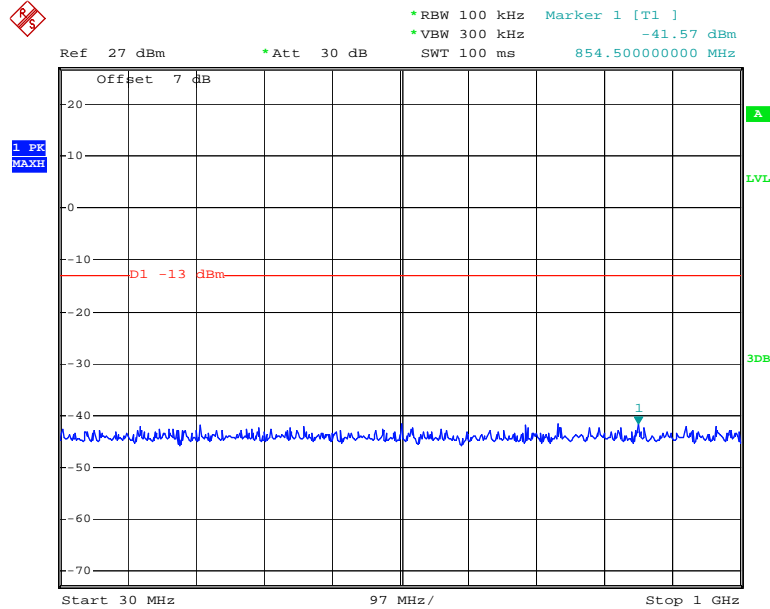
Date: 9.MAR.2018 00:23:26



Date: 9.MAR.2018 00:24:27

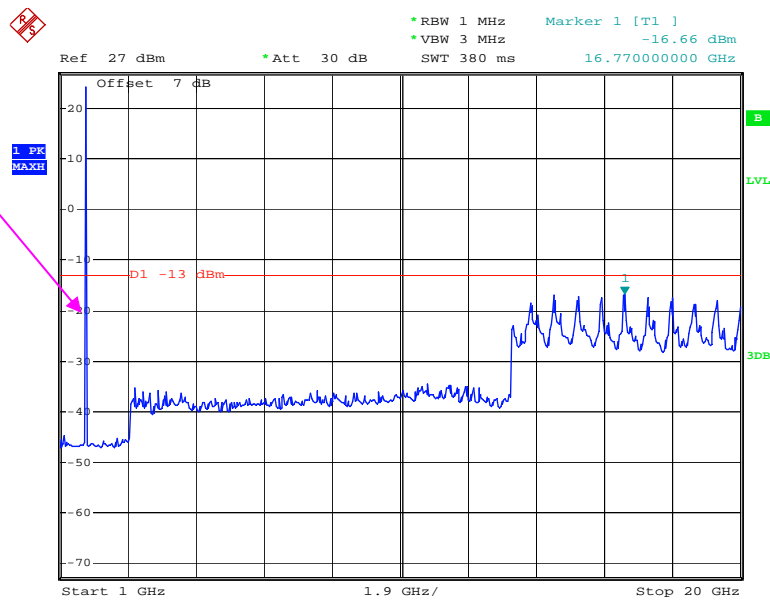
LTE Band 4 (Middle Channel)

QPSK_1.4 MHz



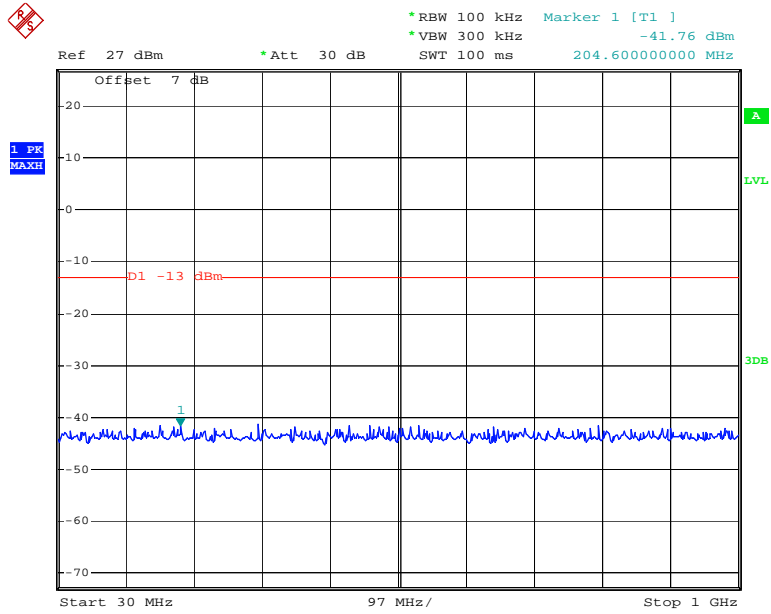
Date: 9.MAR.2018 17:17:27

Fundamental



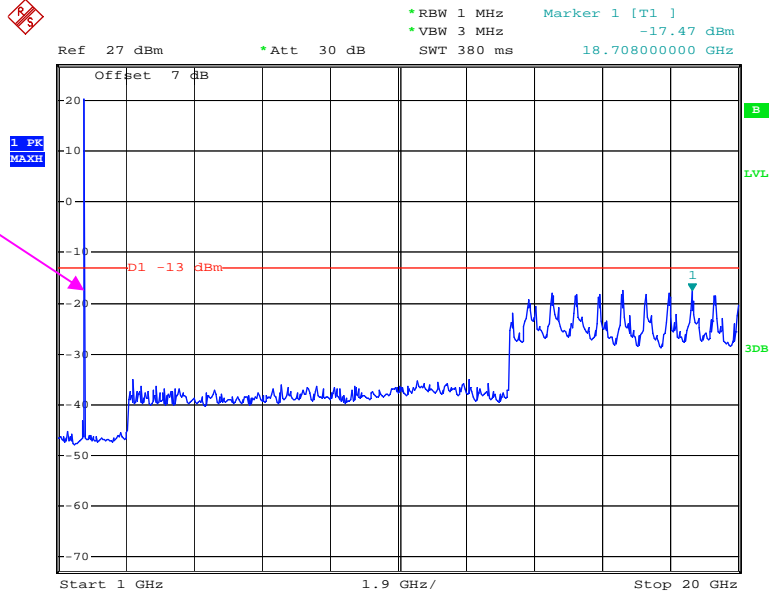
Date: 9.MAR.2018 17:17:00

QPSK_3 MHz



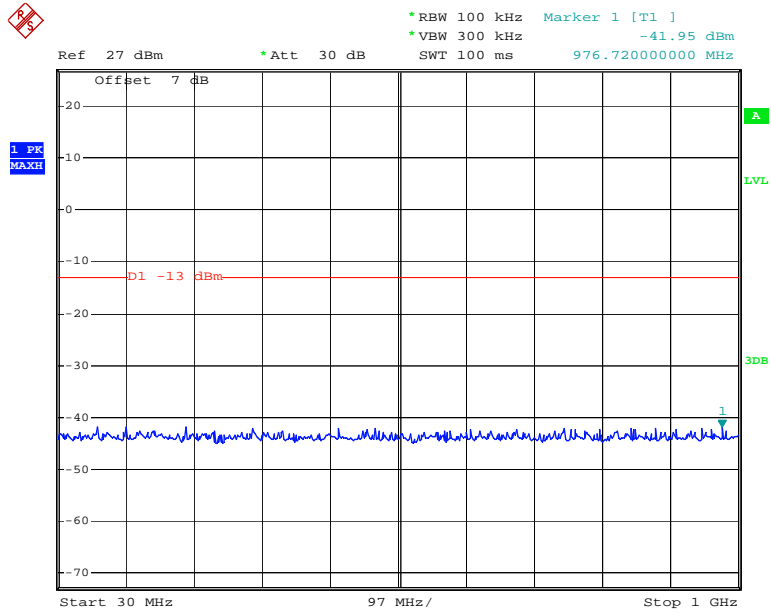
Date: 9.MAR.2018 17:19:16

Fundamental



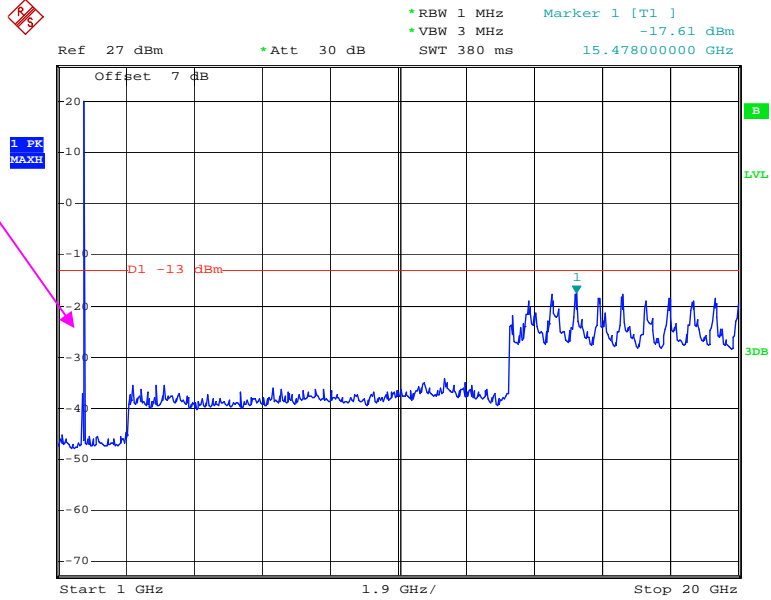
Date: 9.MAR.2018 17:21:55

QPSK_5 MHz



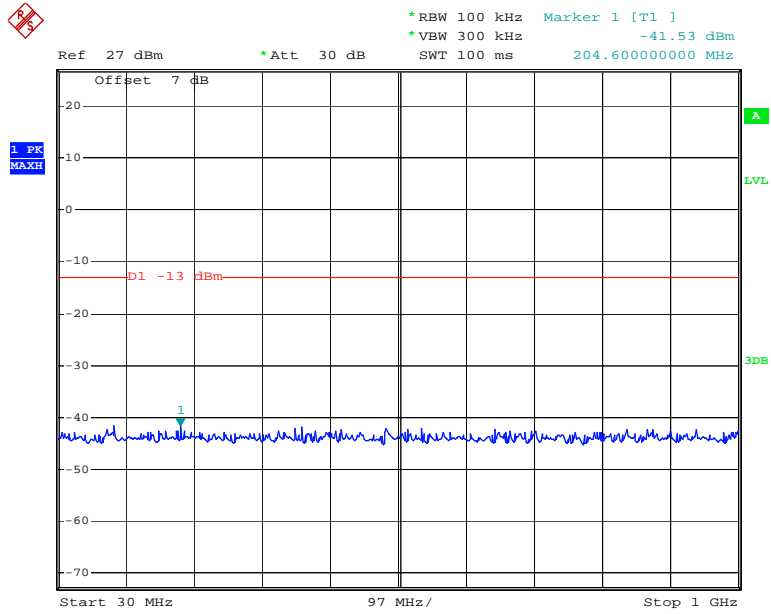
Date: 9.MAR.2018 17:24:27

Fundamental



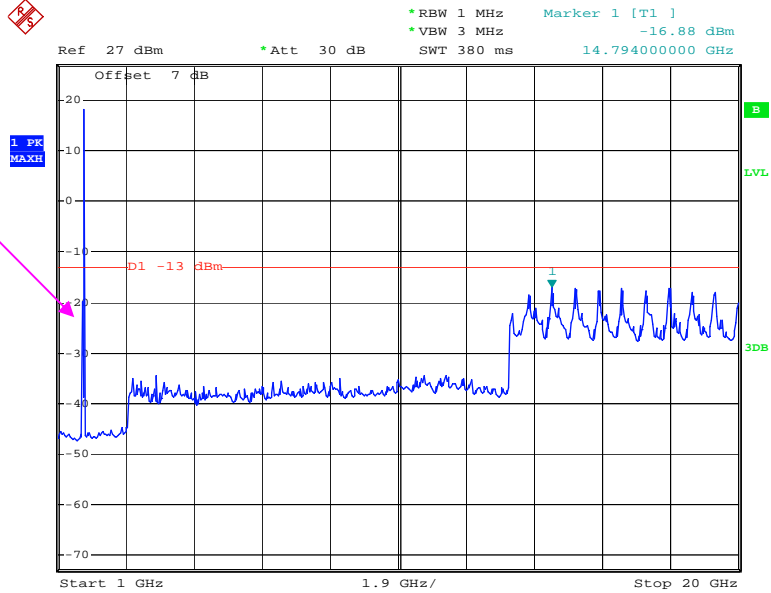
Date: 9.MAR.2018 17:24:43

QPSK_10 MHz



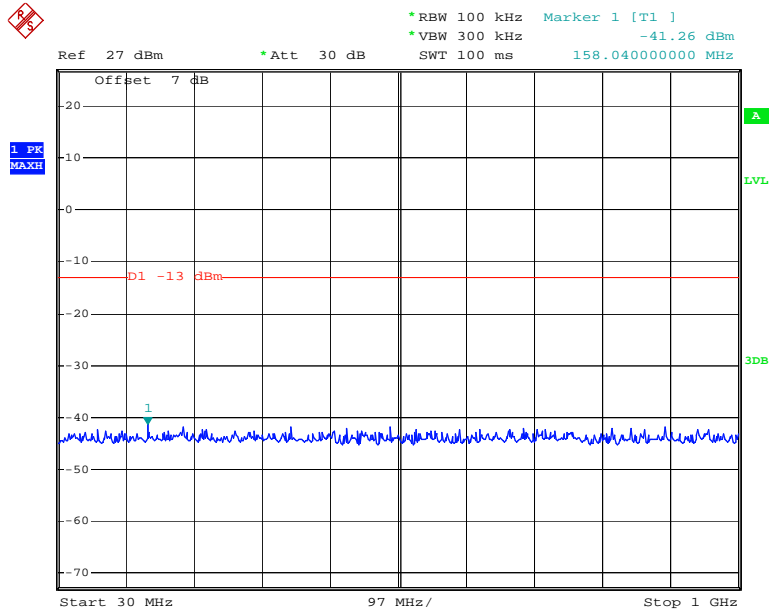
Date: 9.MAR.2018 17:26:18

Fundamental



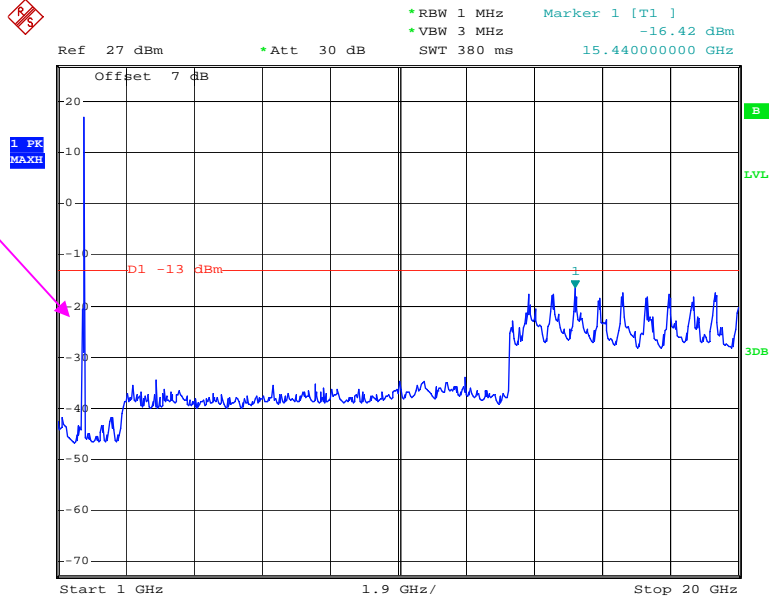
Date: 9.MAR.2018 17:25:58

QPSK_15 MHz



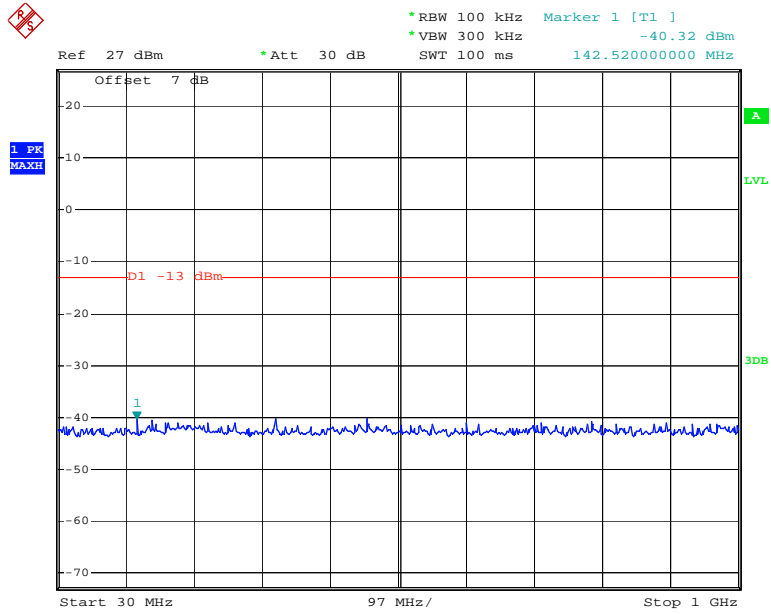
Date: 9.MAR.2018 17:27:39

Fundamental



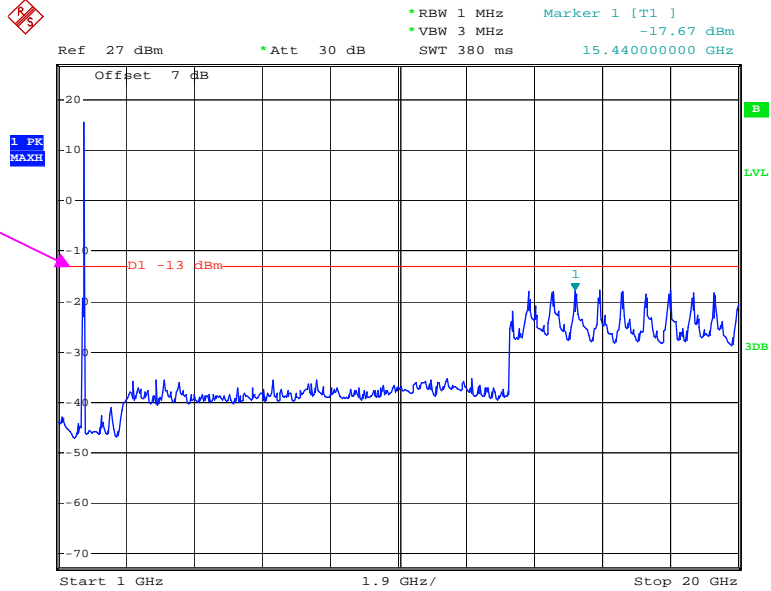
Date: 9.MAR.2018 17:28:03

QPSK_20 MHz



Date: 9.MAR.2018 17:29:44

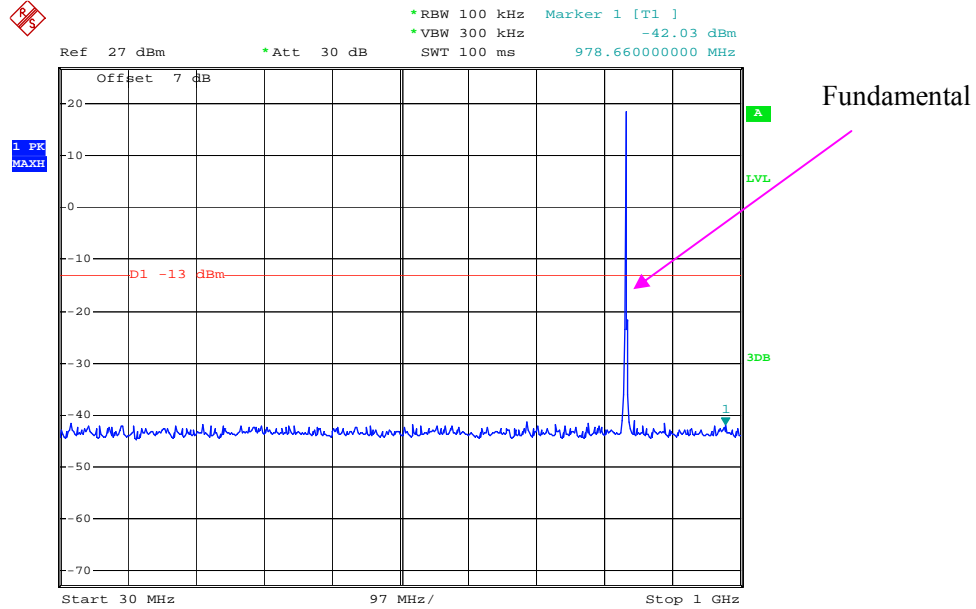
Fundamental



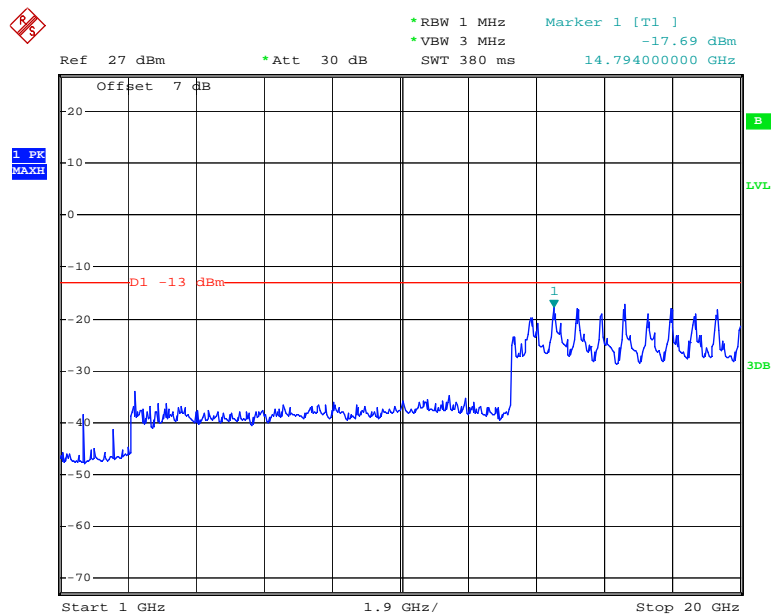
Date: 9.MAR.2018 17:30:08

LTE Band 5 (Middle Channel)

QPSK_1.4 MHz

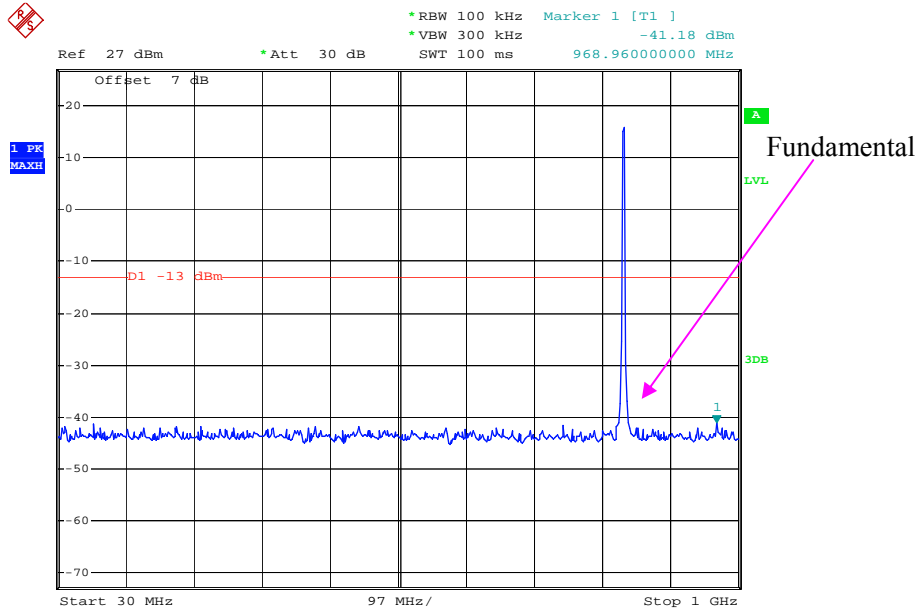


Date: 9.MAR.2018 17:34:48

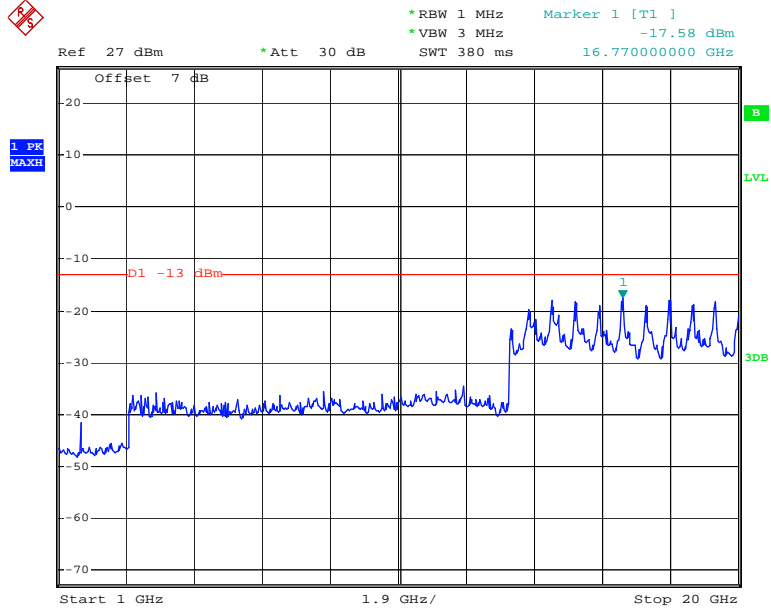


Date: 9.MAR.2018 17:35:18

QPSK_3 MHz

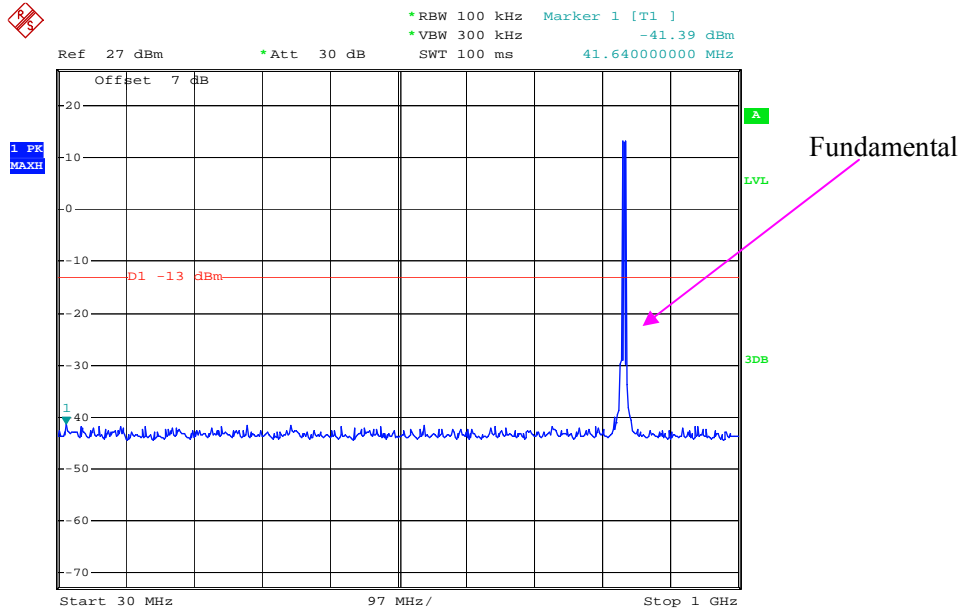


Date: 9.MAR.2018 17:36:09

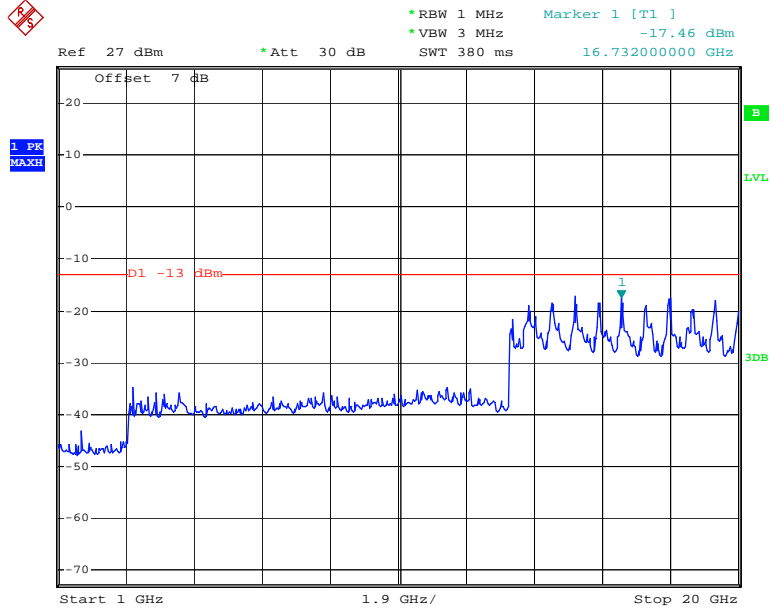


Date: 9.MAR.2018 17:36:27

QPSK_5 MHz

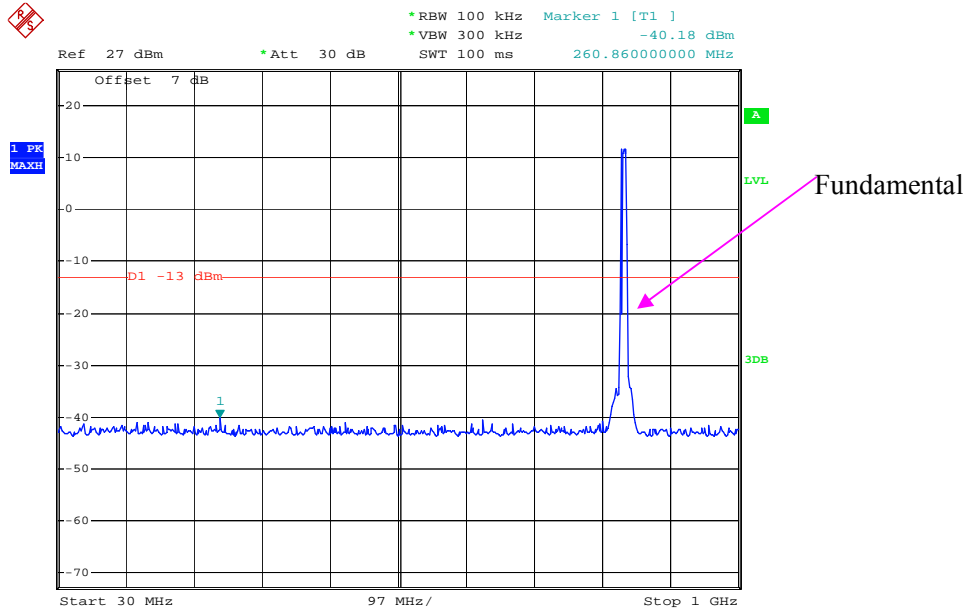


Date: 9.MAR.2018 17:37:54

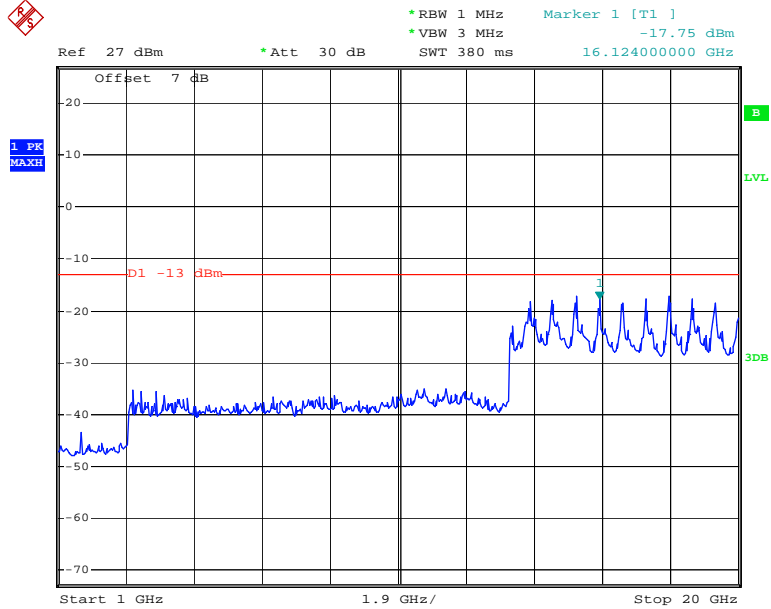


Date: 9.MAR.2018 17:38:11

QPSK_10 MHz



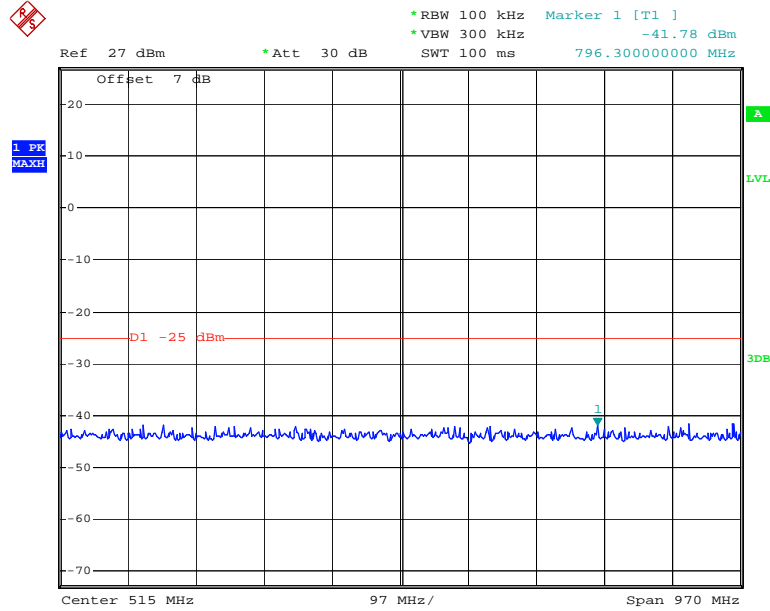
Date: 9.MAR.2018 17:40:10



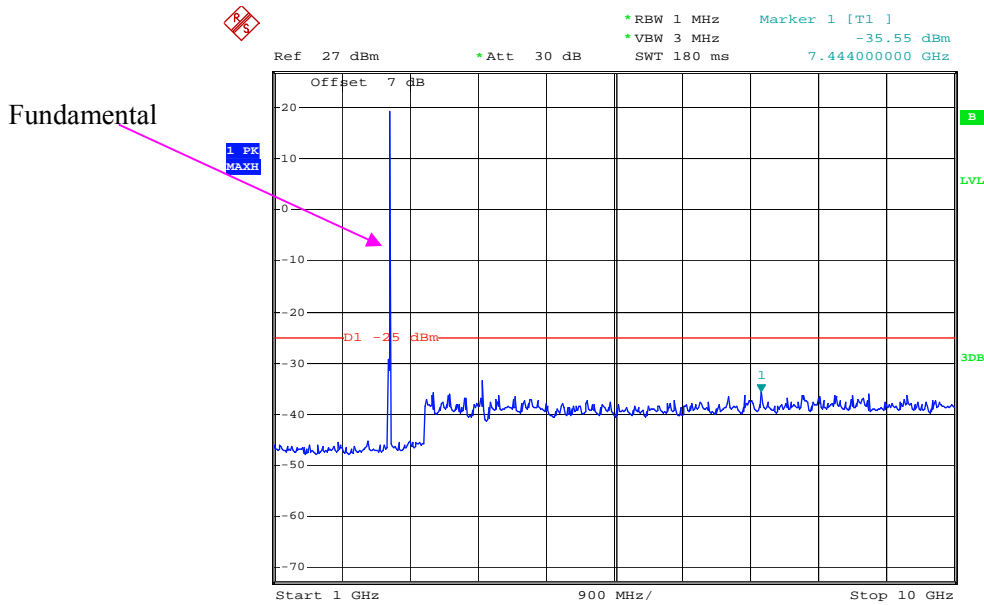
Date: 9.MAR.2018 17:40:26

LTE Band 7 (Middle Channel)

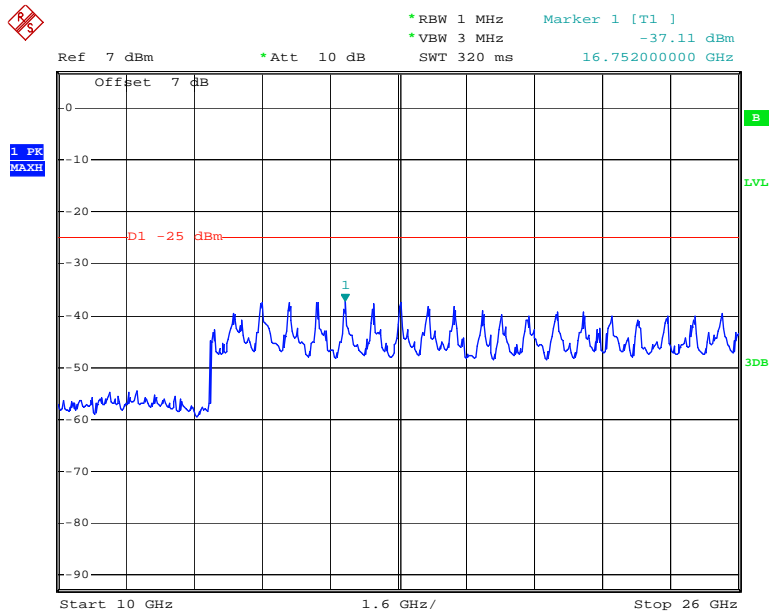
QPSK_5 MHz



Date: 9.MAR.2018 17:54:55

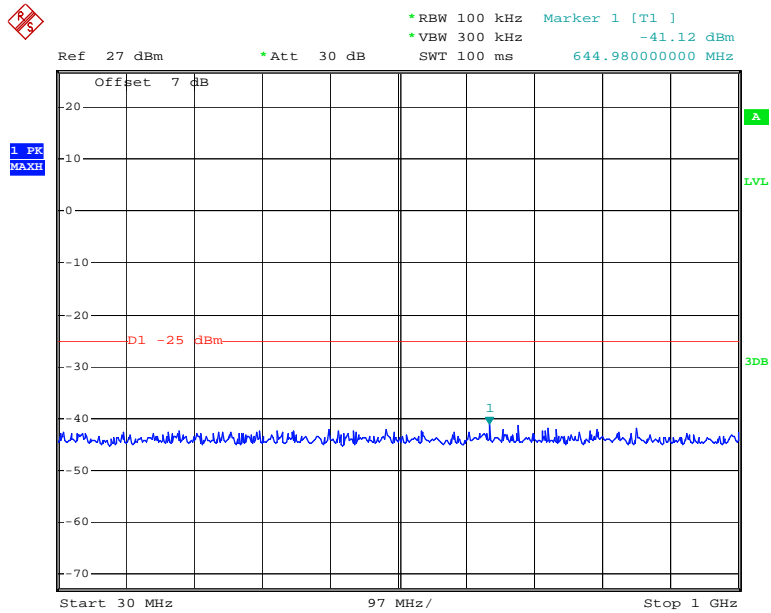


Date: 9.MAR.2018 17:55:27

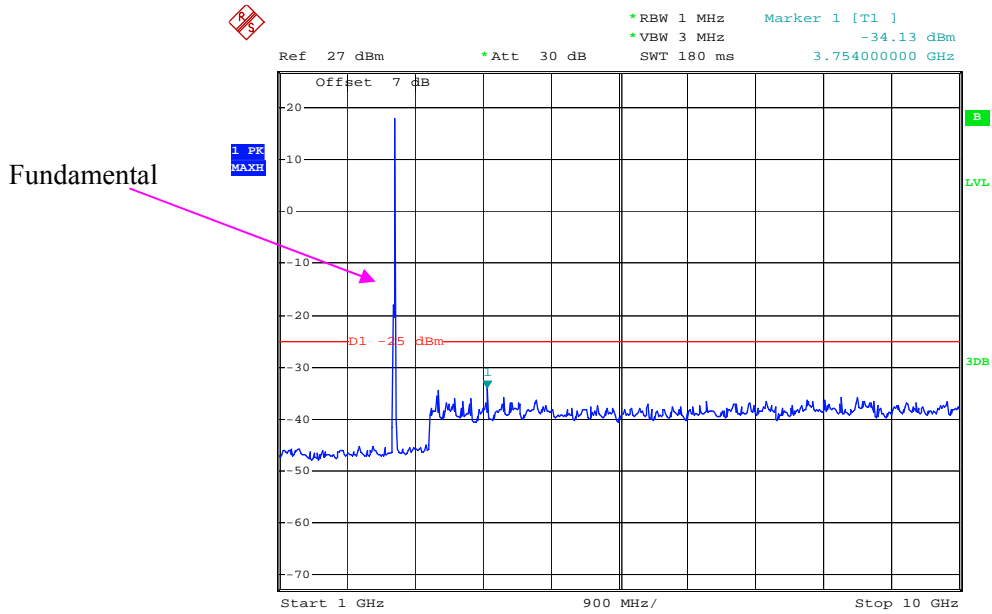


Date: 9.MAR.2018 17:56:12

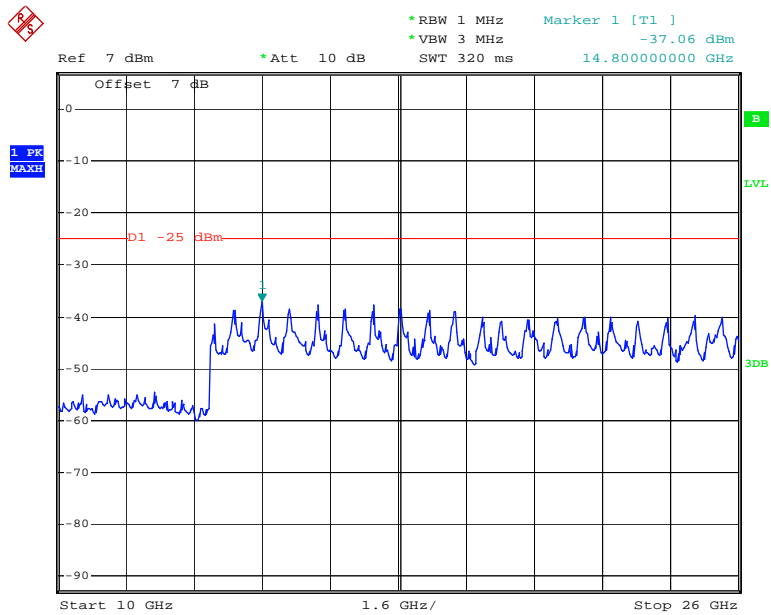
QPSK_10 MHz



Date: 9.MAR.2018 17:57:45

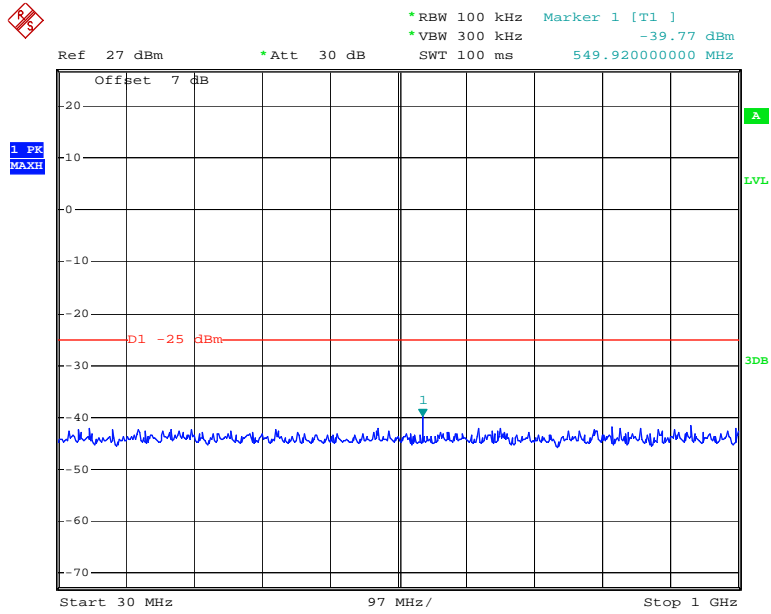


Date: 9.MAR.2018 17:57:31

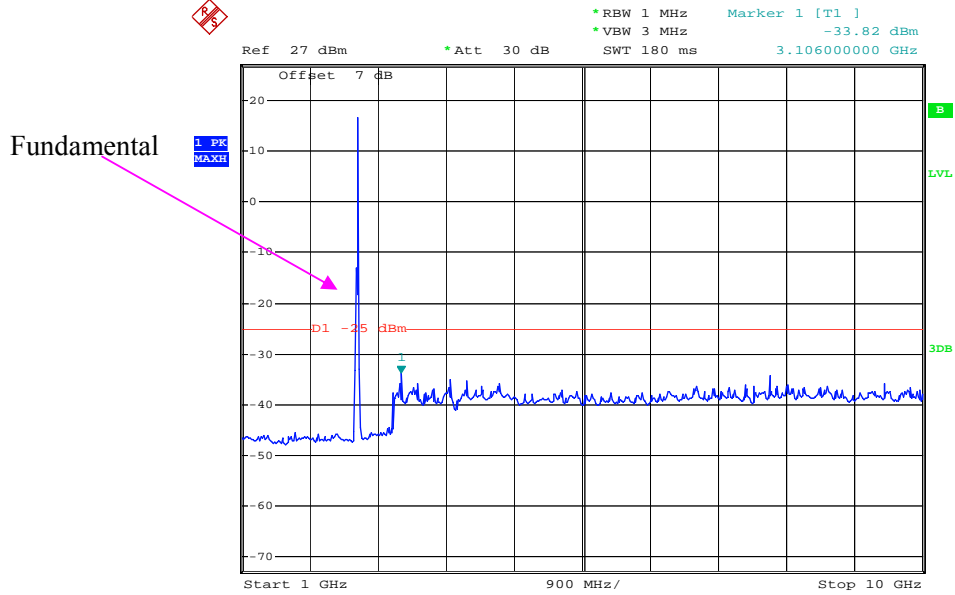


Date: 9.MAR.2018 17:56:50

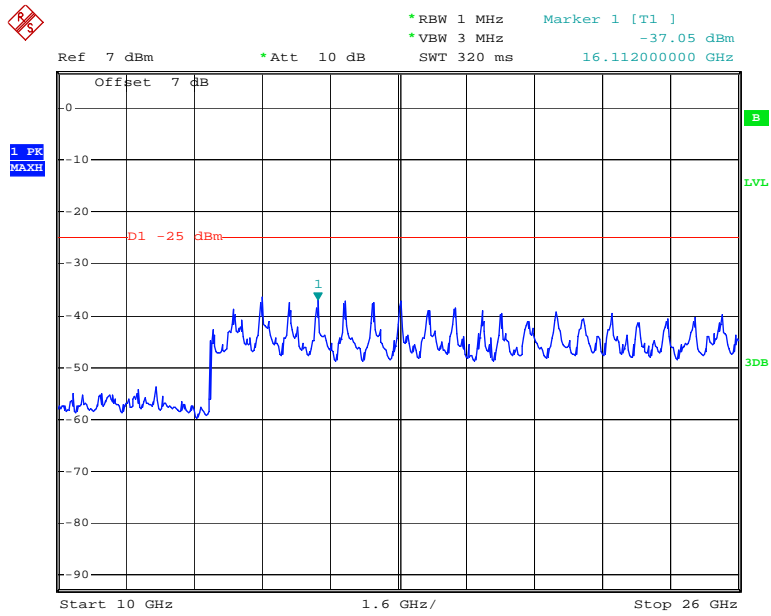
QPSK_15 MHz



Date: 9.MAR.2018 17:58:09

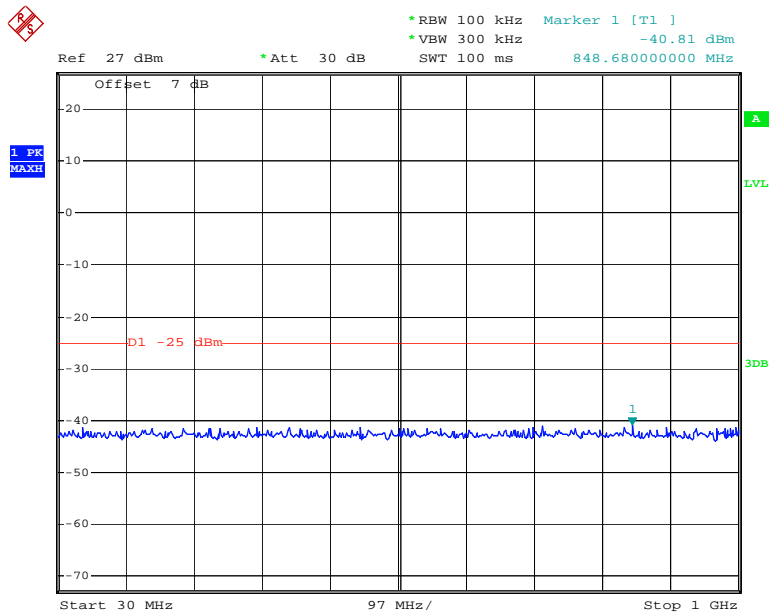


Date: 9.MAR.2018 18:02:57

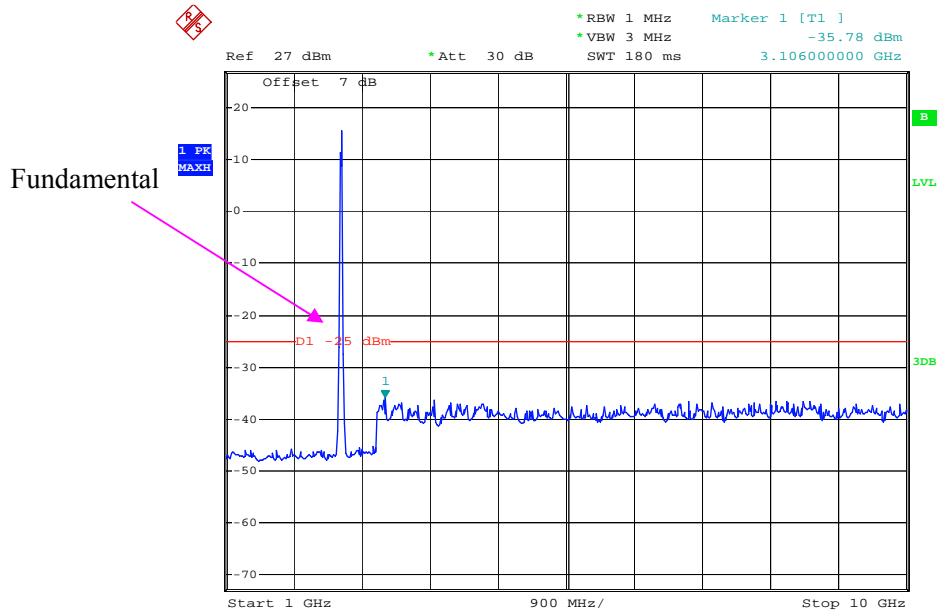


Date: 9.MAR.2018 17:58:54

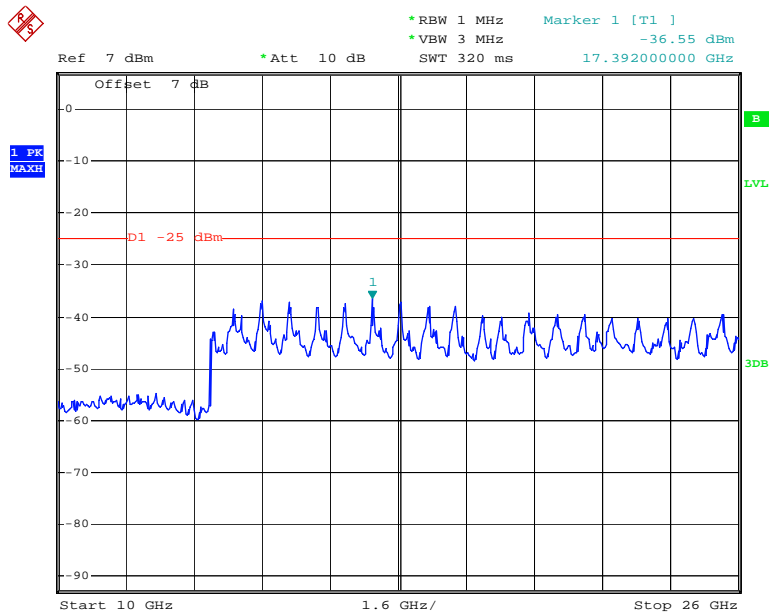
QPSK_20 MHz



Date: 9.MAR.2018 18:01:54



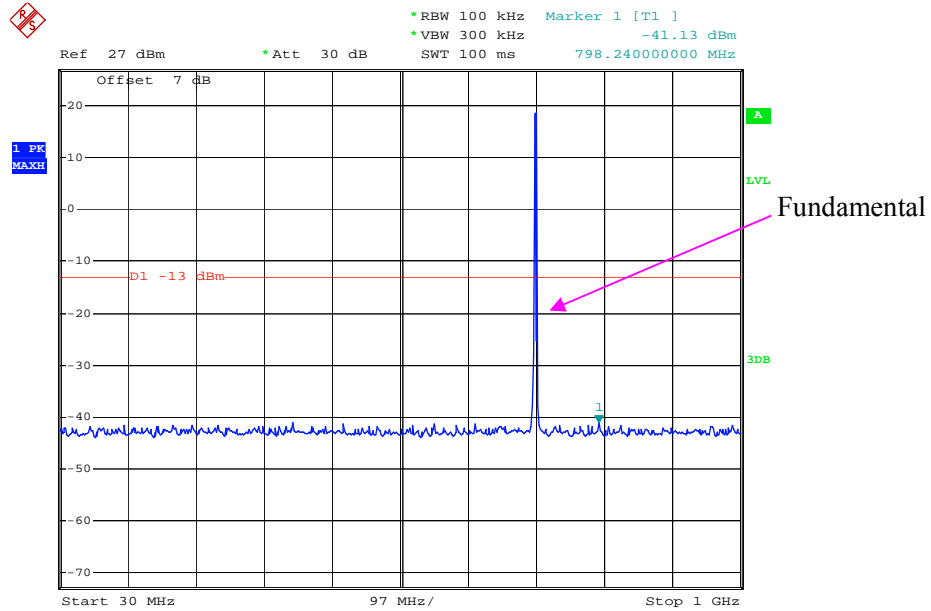
Date: 9.MAR.2018 18:00:21



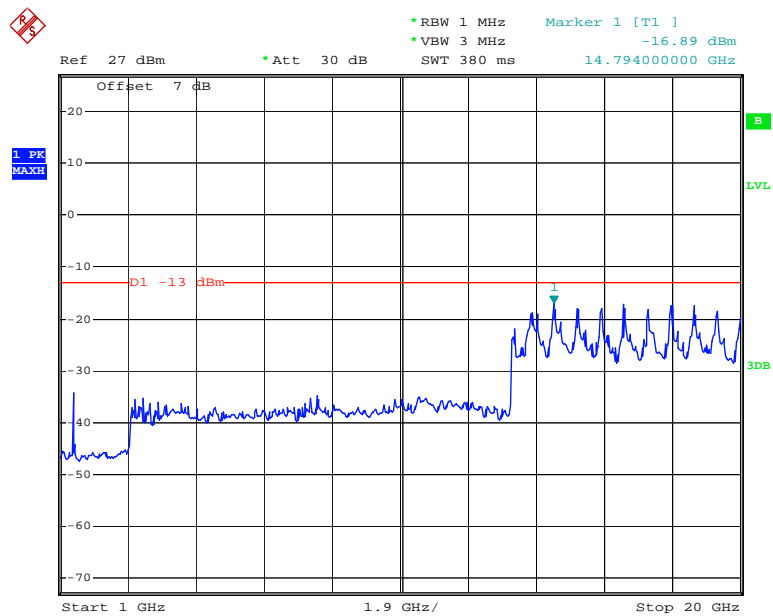
Date: 9.MAR.2018 17:59:47

LTE Band 12 (Middle Channel)

QPSK_1.4 MHz

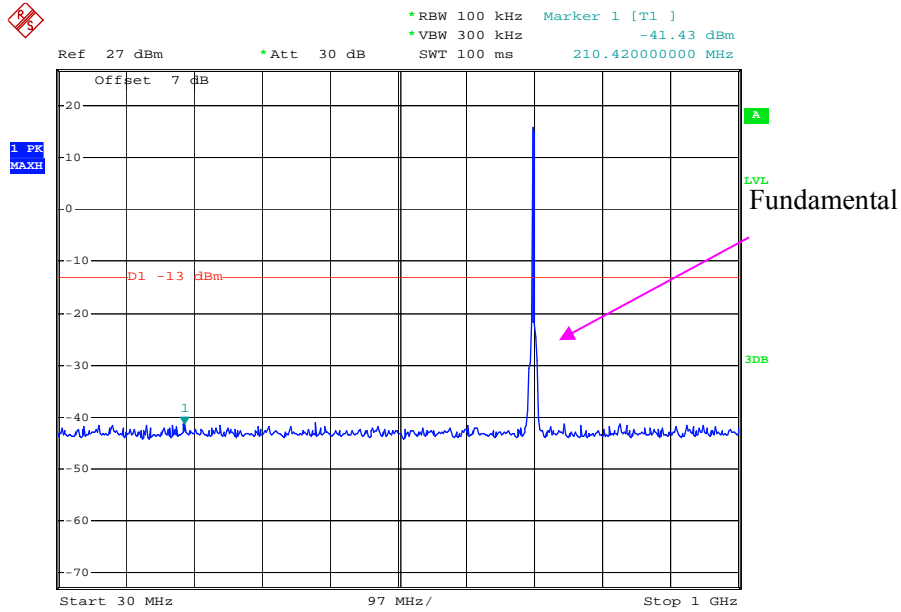


Date: 9.MAR.2018 18:08:25

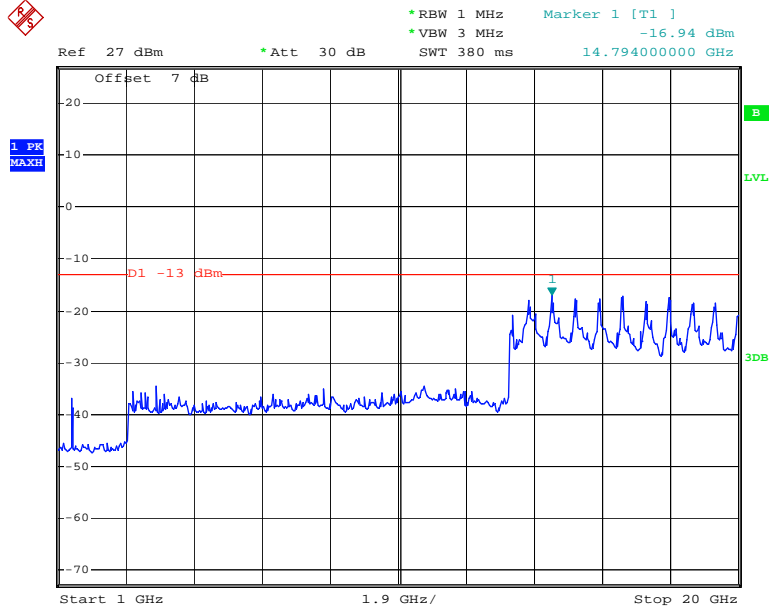


Date: 9.MAR.2018 18:09:01

QPSK_3 MHz

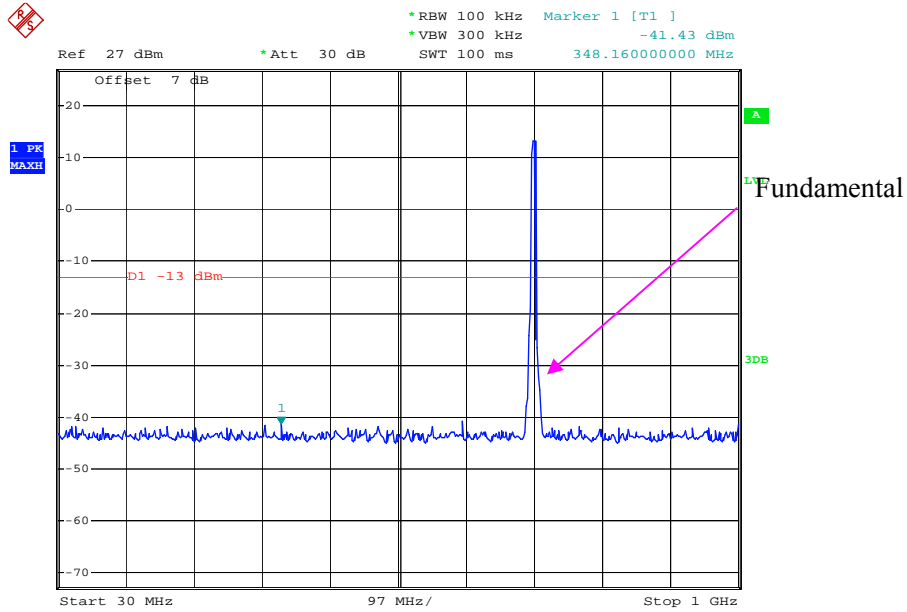


Date: 9.MAR.2018 18:10:27

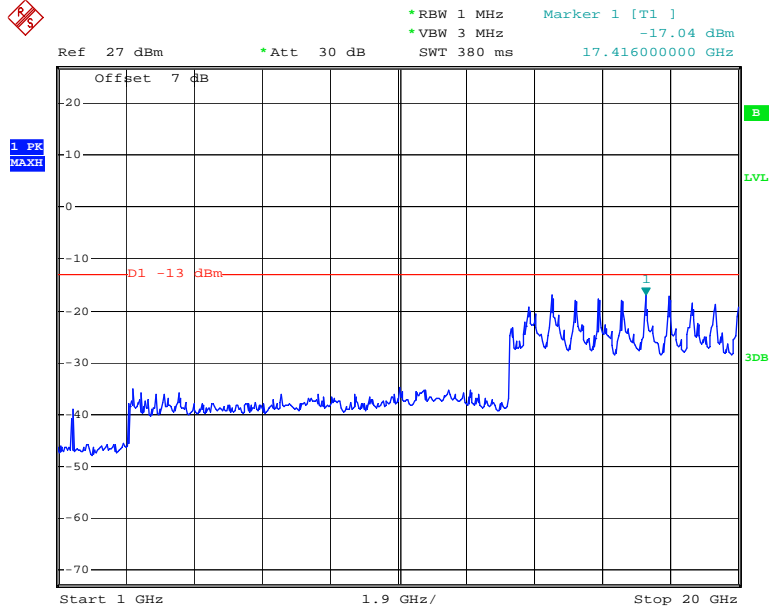


Date: 9.MAR.2018 18:10:57

QPSK_5 MHz

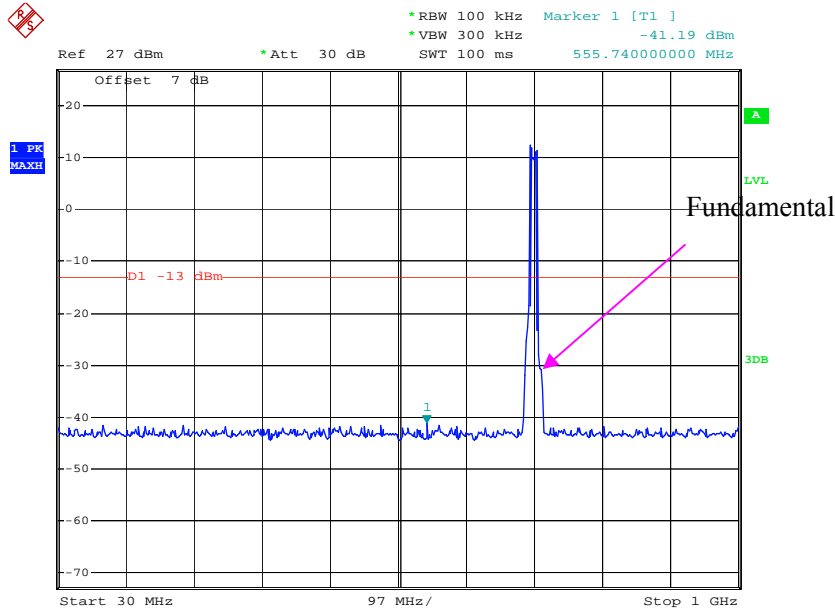


Date: 9.MAR.2018 18:12:17

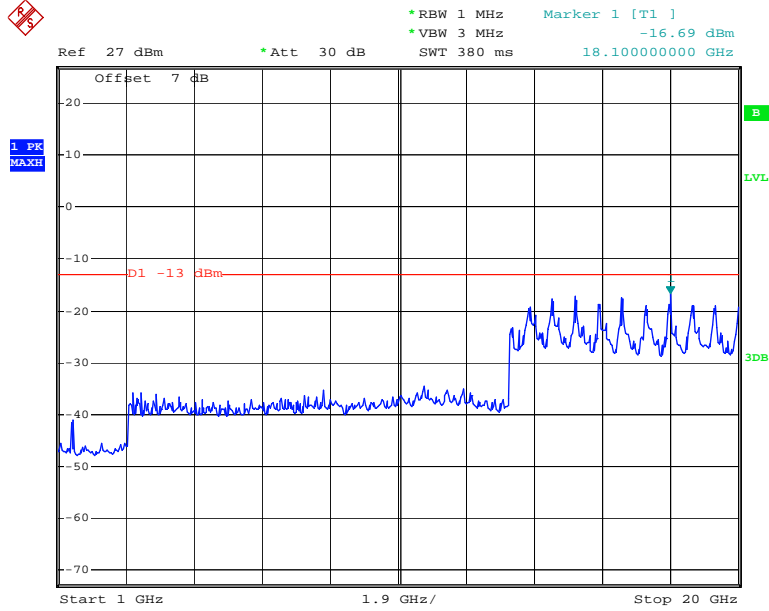


Date: 9.MAR.2018 18:11:51

QPSK_10 MHz



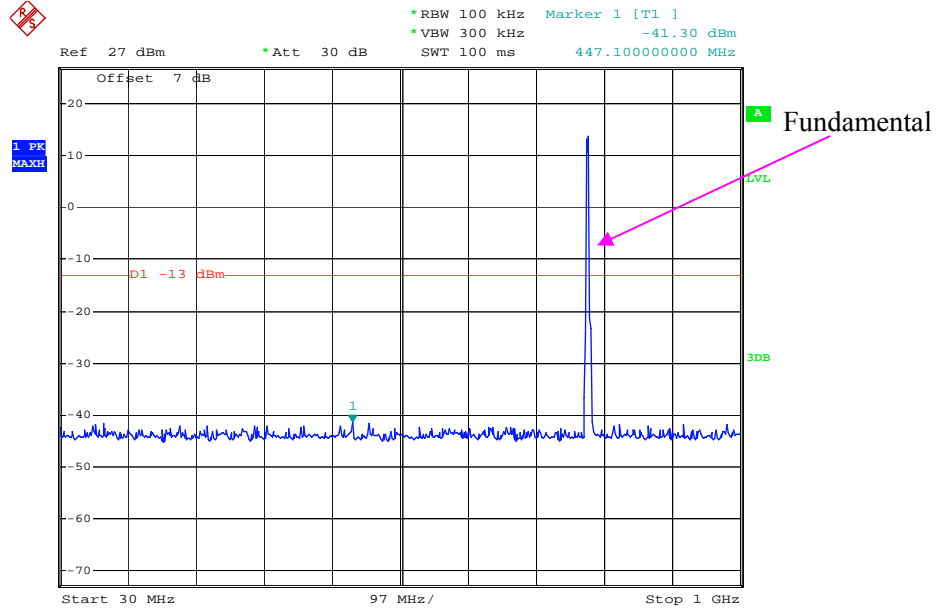
Date: 9.MAR.2018 18:13:41



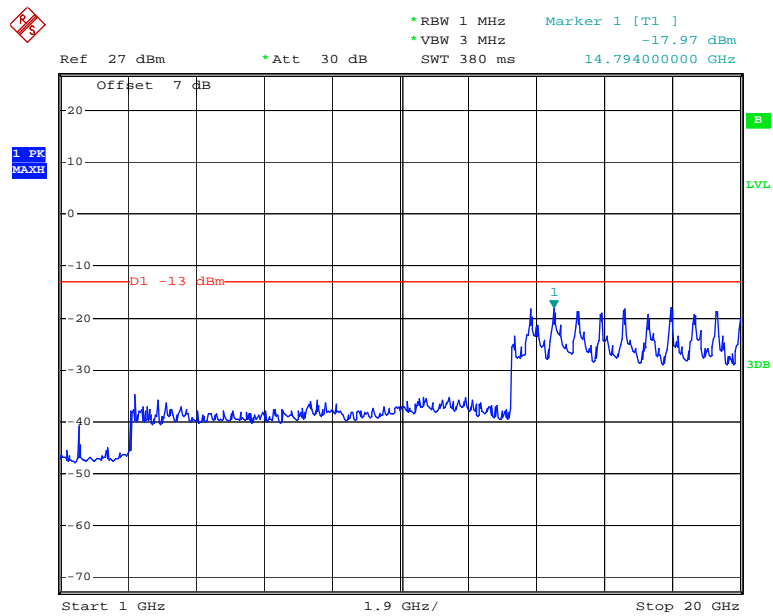
Date: 9.MAR.2018 18:14:02

LTE Band 13 (Middle Channel)

QPSK_5 MHz

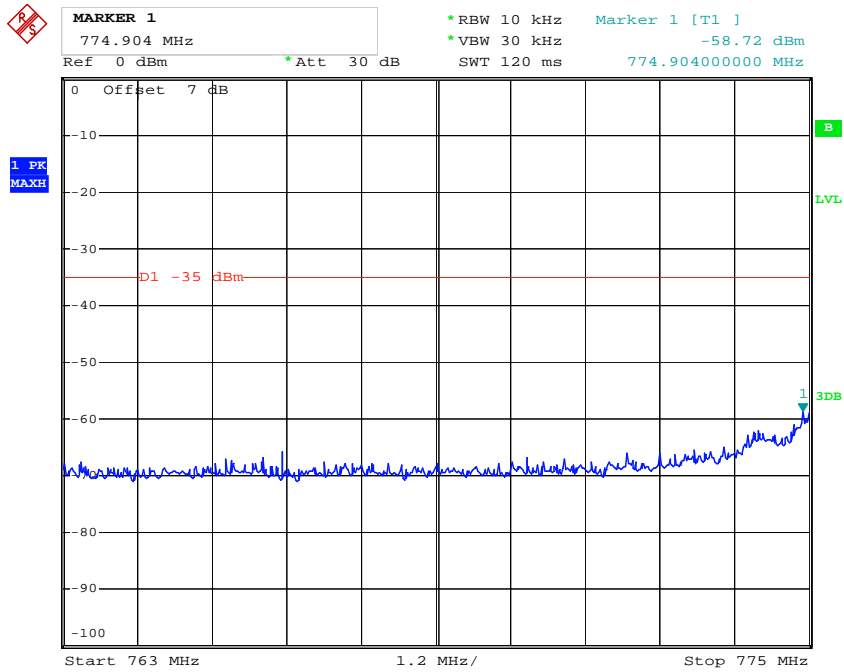


Date: 9.MAR.2018 18:15:36

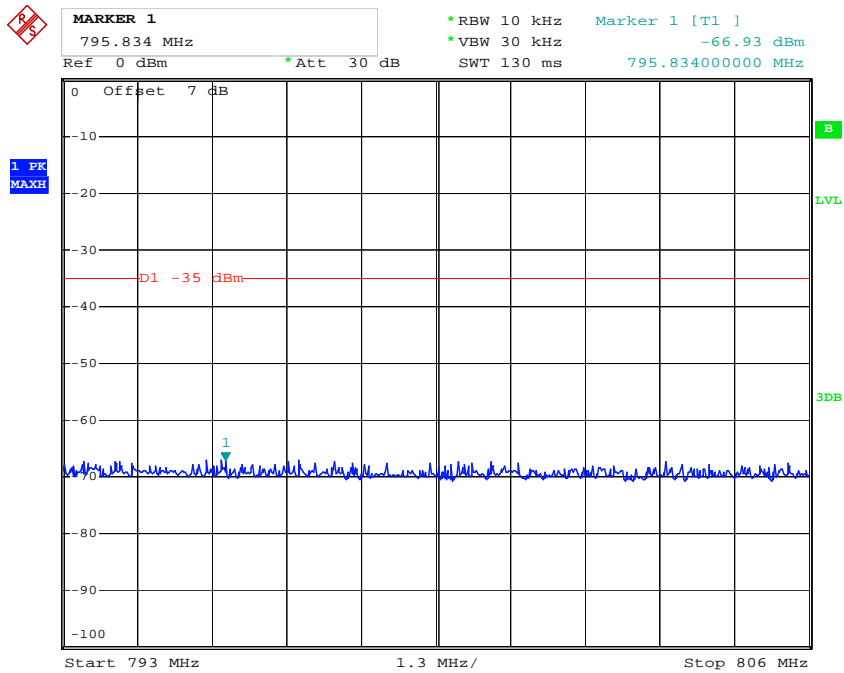


Date: 9.MAR.2018 18:15:52

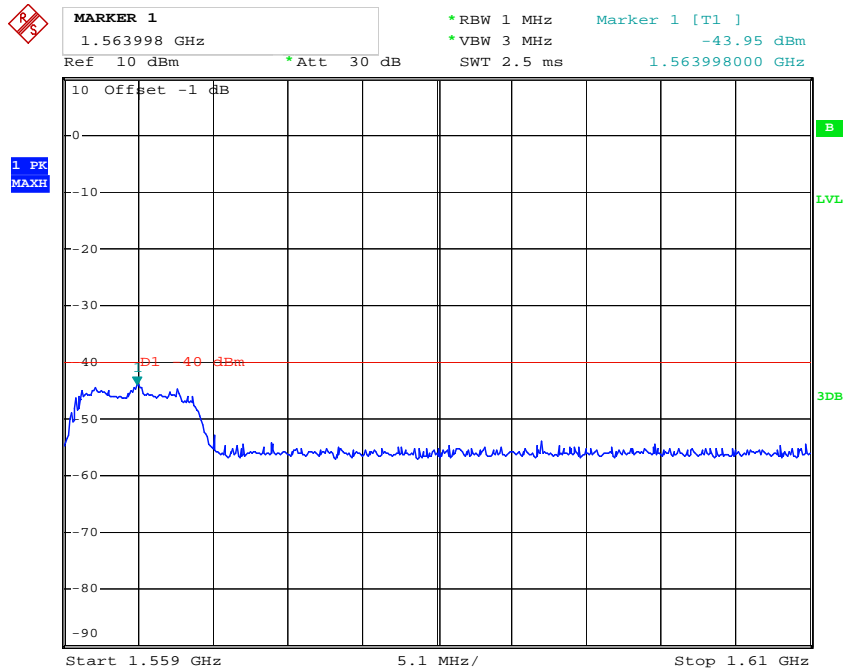
Additional frequency band



Date: 22.MAY.2018 21:13:33

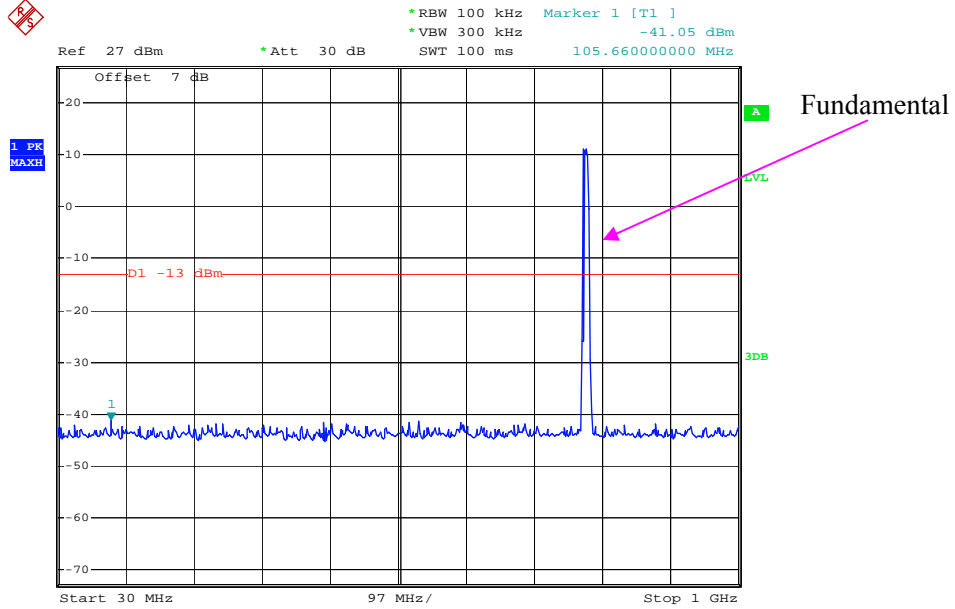


Date: 22.MAY.2018 21:12:29

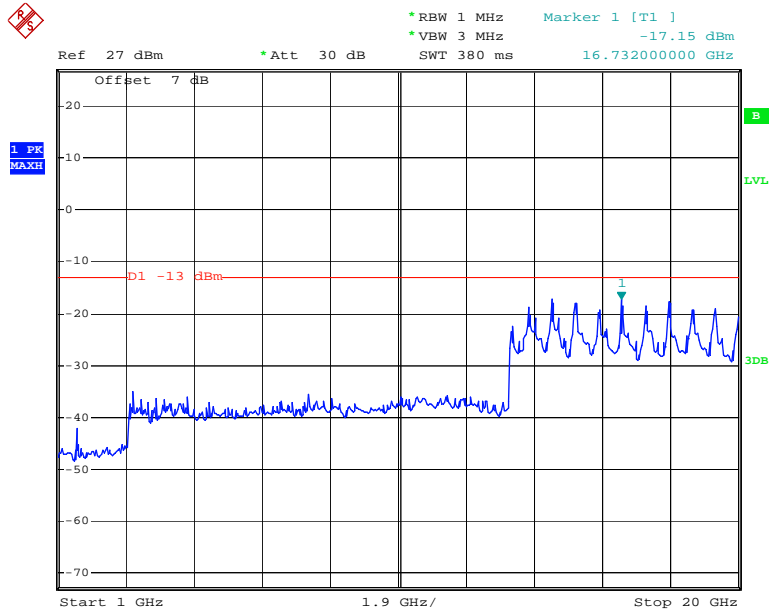


Date: 22.MAY.2018 21:09:37

QPSK_10 MHz

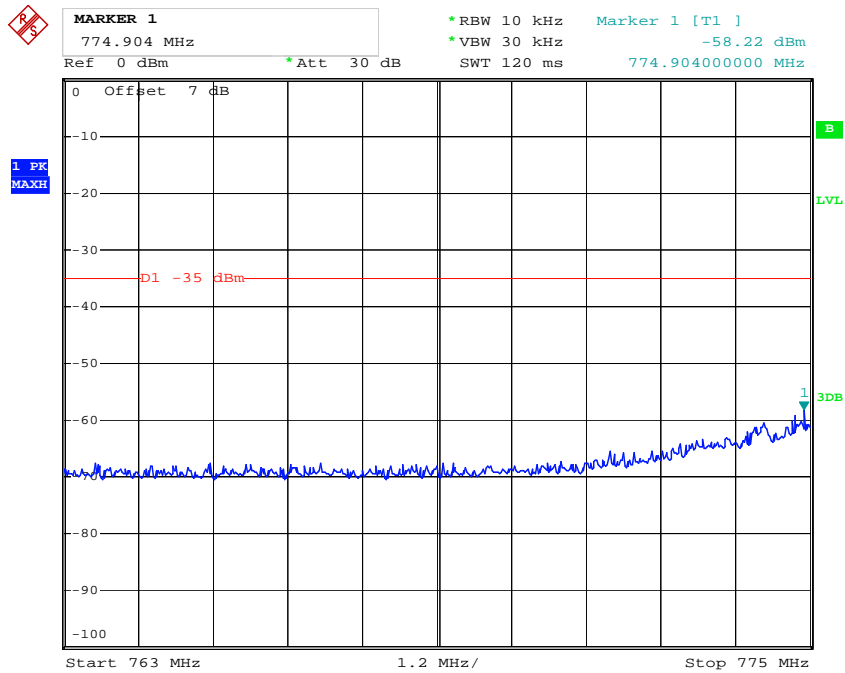


Date: 9.MAR.2018 18:16:44

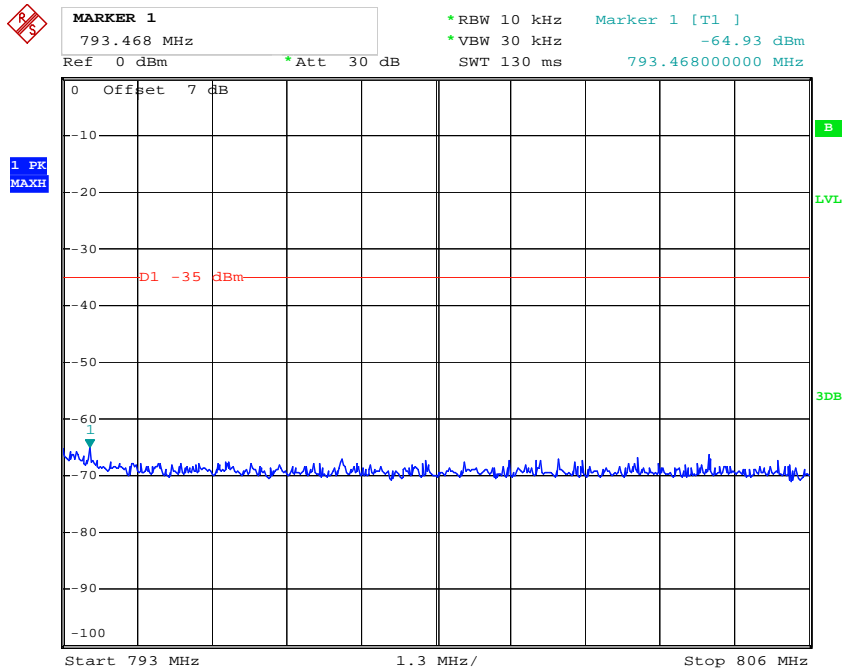


Date: 9.MAR.2018 18:16:59

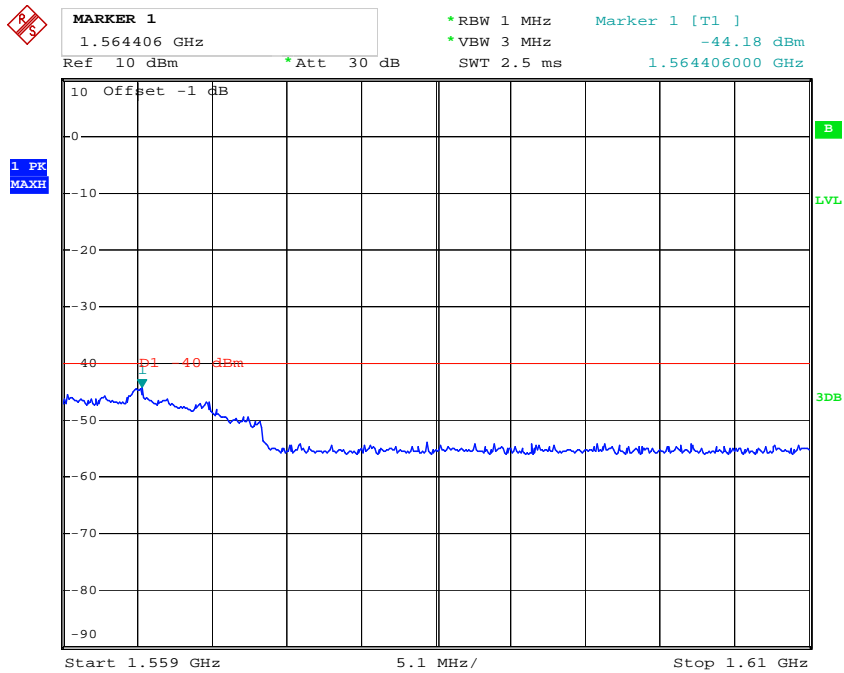
Additional frequency band



Date: 22.MAY.2018 21:14:48



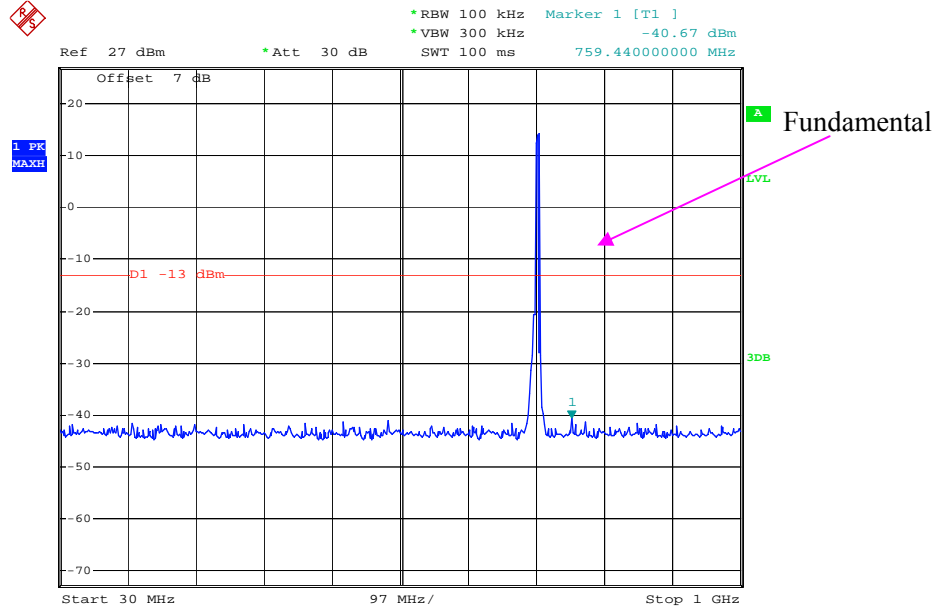
Date: 22.MAY.2018 21:16:04



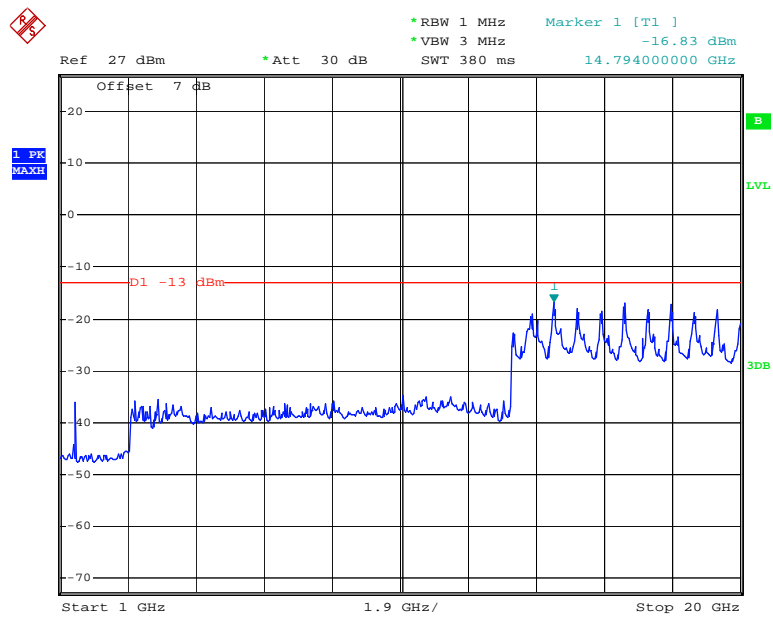
Date: 22.MAY.2018 21:09:07

LTE Band 17 (Middle Channel)

QPSK_5 MHz

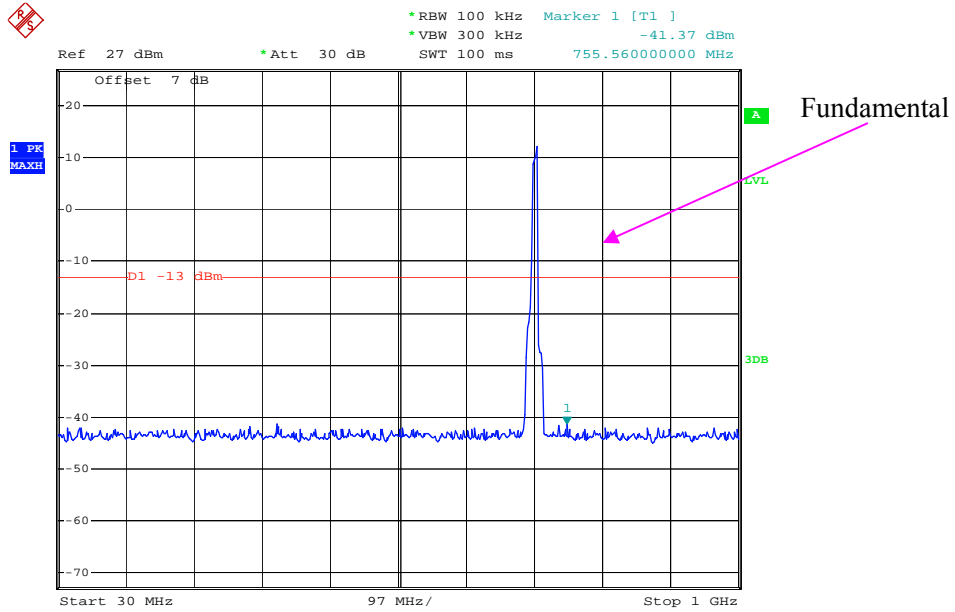


Date: 9.MAR.2018 18:23:36

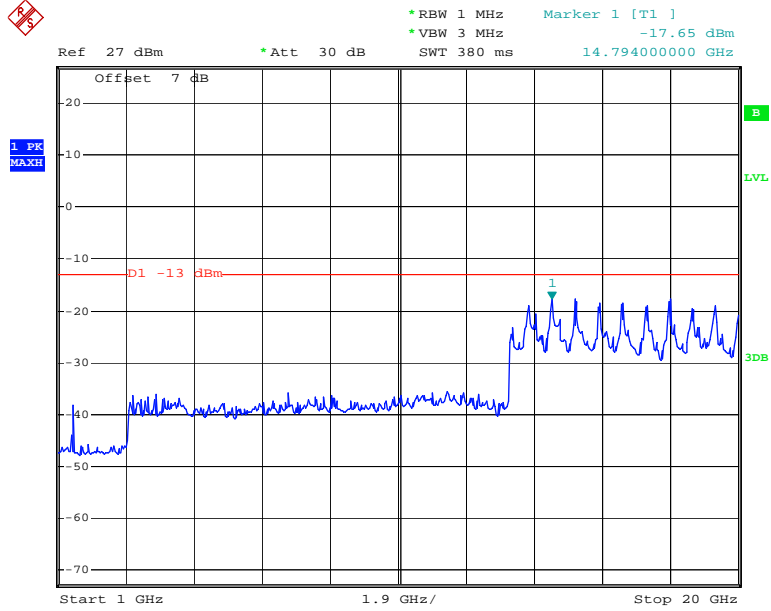


Date: 9.MAR.2018 18:24:28

QPSK_10 MHz



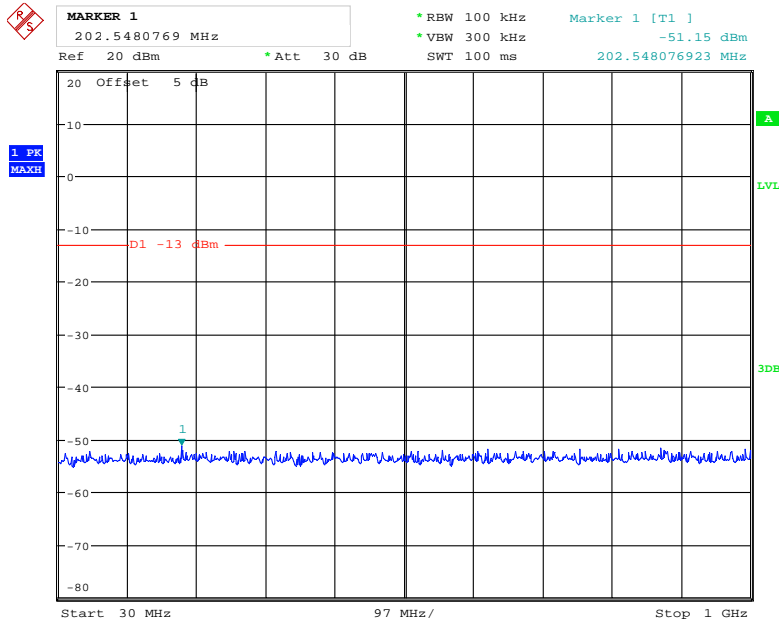
Date: 9.MAR.2018 18:26:35



Date: 9.MAR.2018 18:26:15

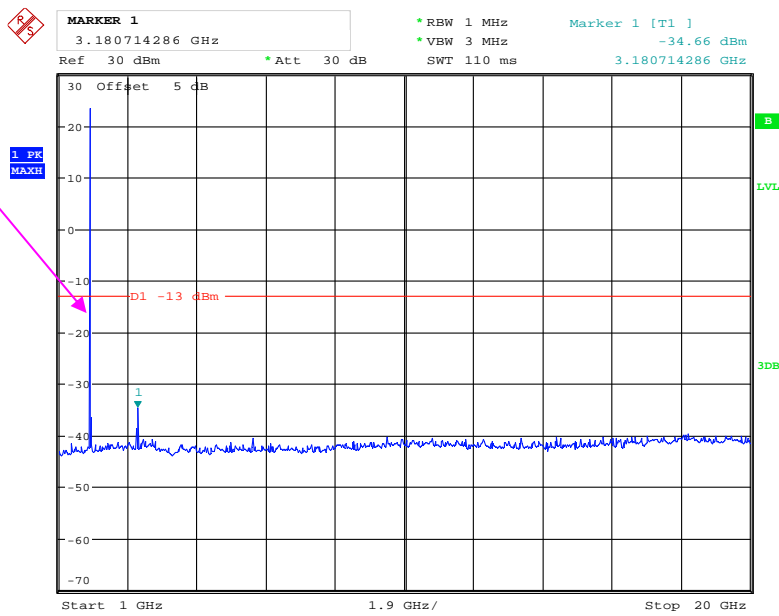
LTE Band 25 (Middle Channel)

QPSK_1.4 MHz



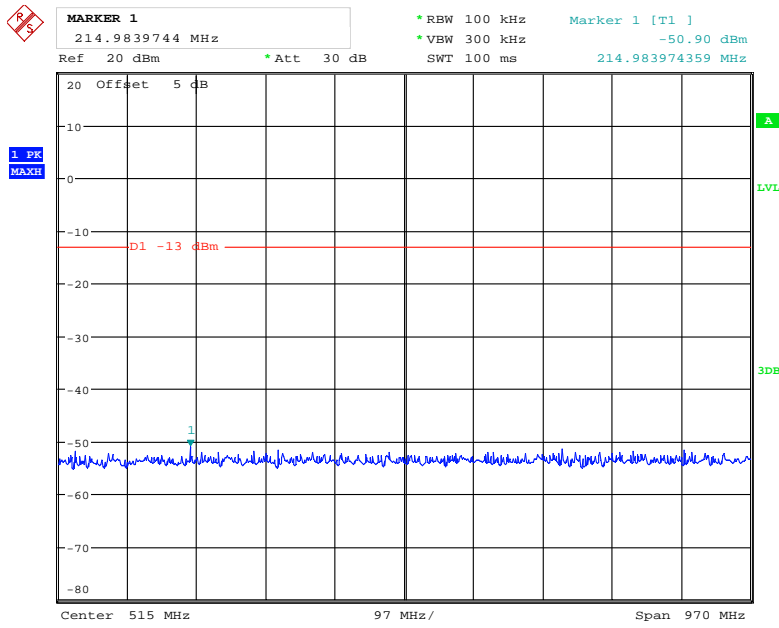
Date: 19.APR.2018 14:10:30

Fundamental



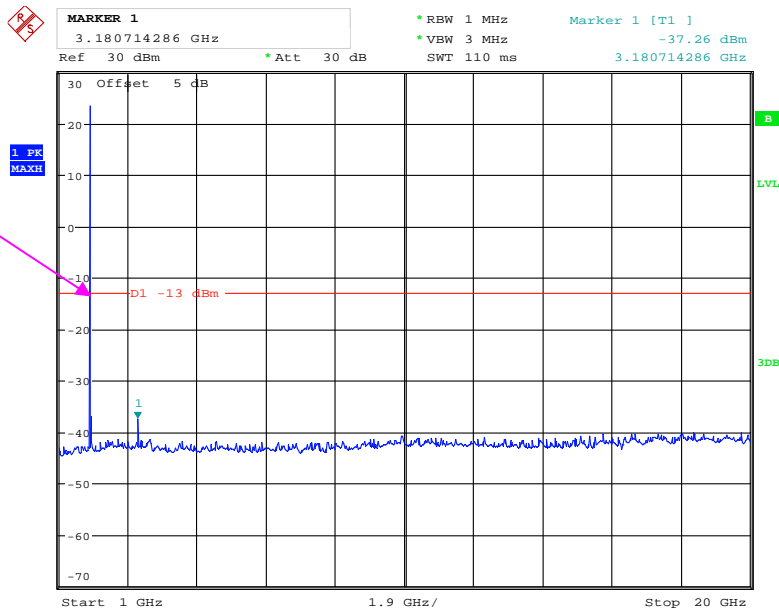
Date: 19.APR.2018 14:05:43

QPSK_3 MHz



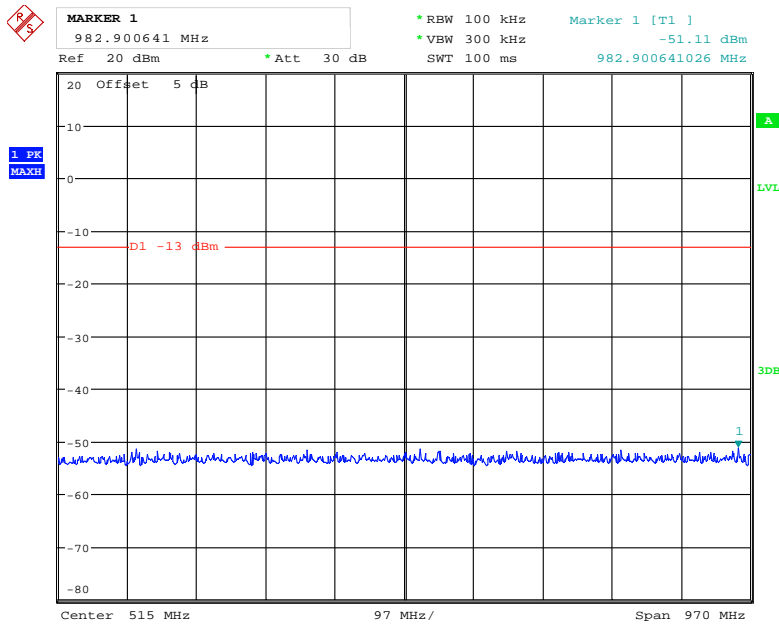
Date: 19.APR.2018 14:06:06

Fundamental



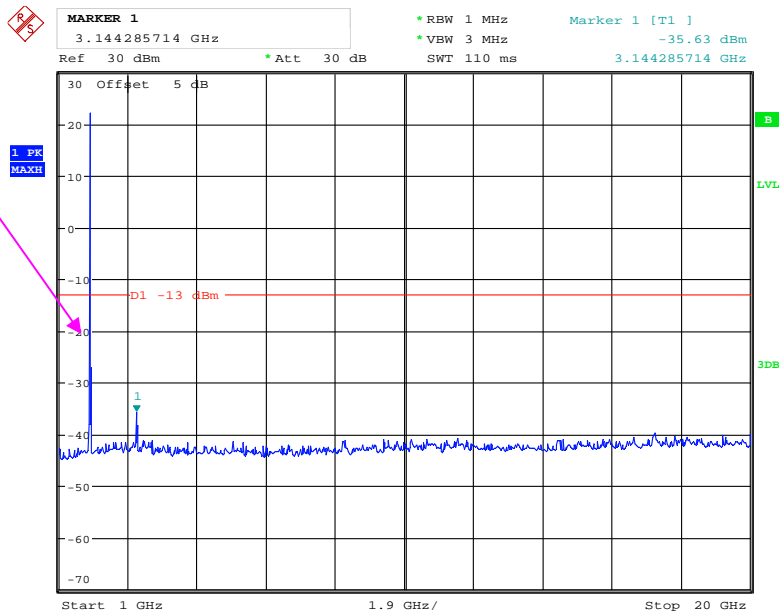
Date: 19.APR.2018 14:05:25

QPSK_5 MHz



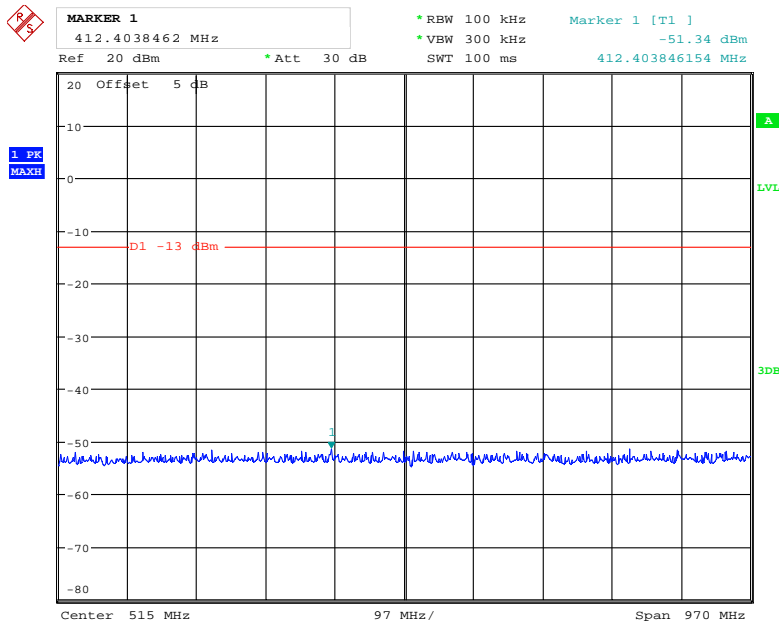
Date: 19.APR.2018 14:06:40

Fundamental



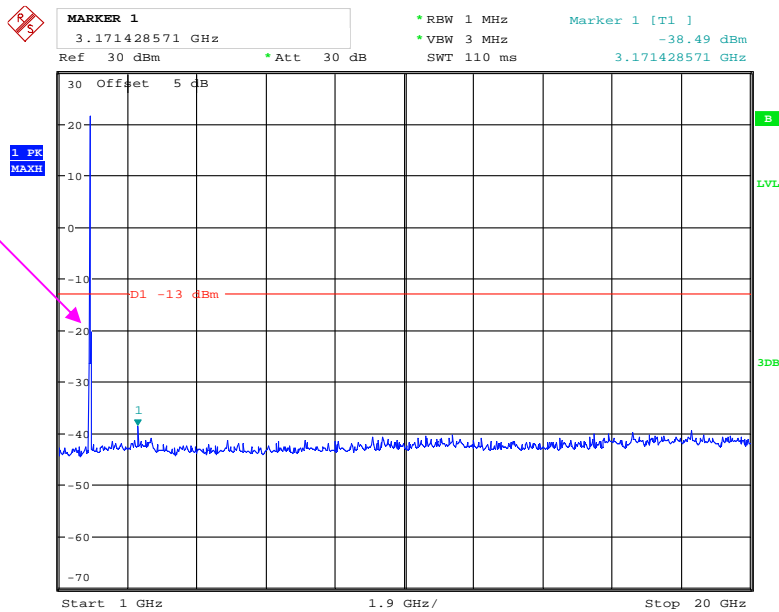
Date: 19.APR.2018 14:06:55

QPSK_10 MHz



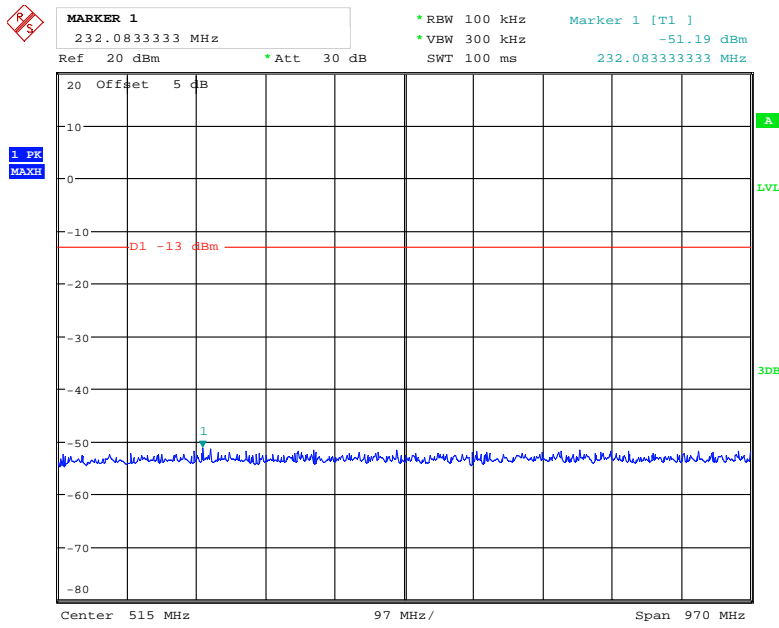
Date: 19.APR.2018 14:07:58

Fundamental



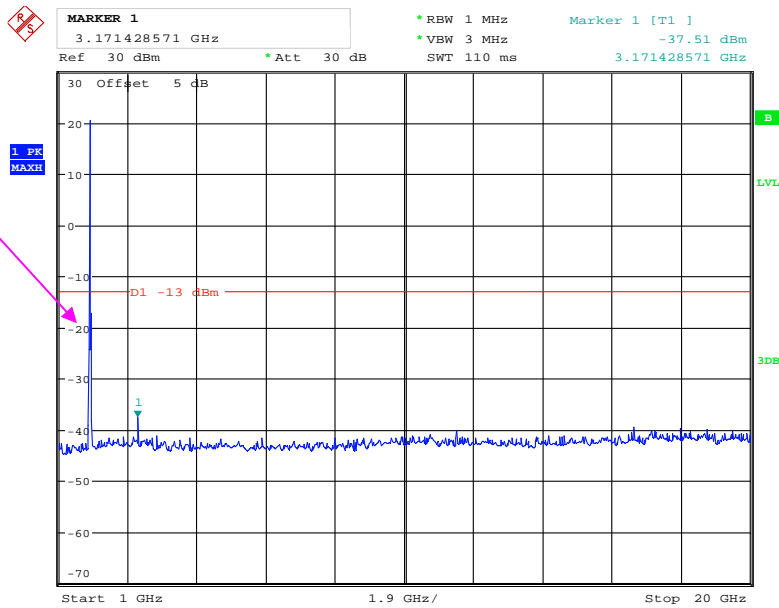
Date: 19.APR.2018 14:07:32

QPSK_15 MHz



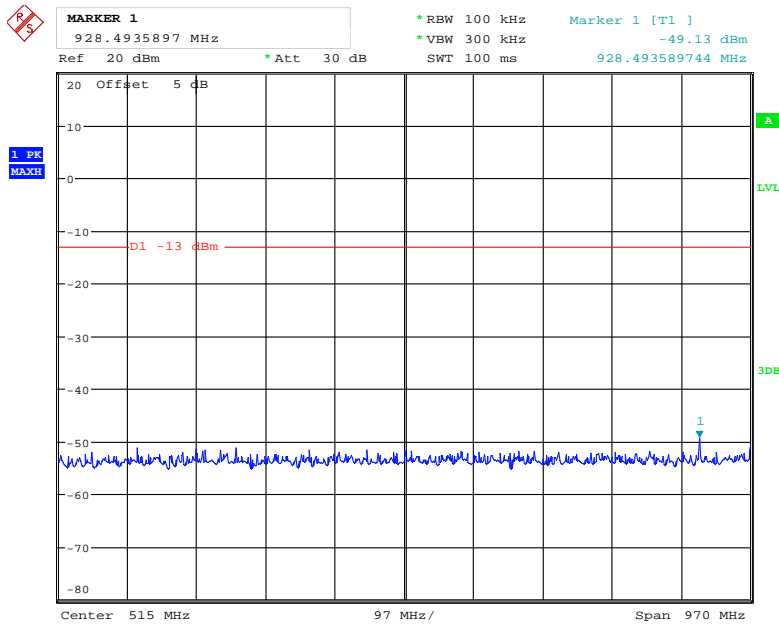
Date: 19.APR.2018 14:08:41

Fundamental



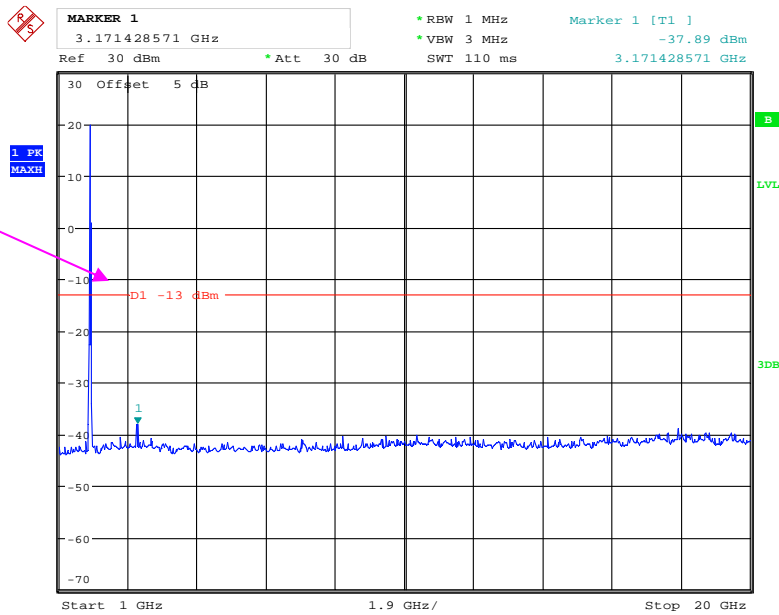
Date: 19.APR.2018 14:08:58

QPSK_20 MHz



Date: 19.APR.2018 14:09:55

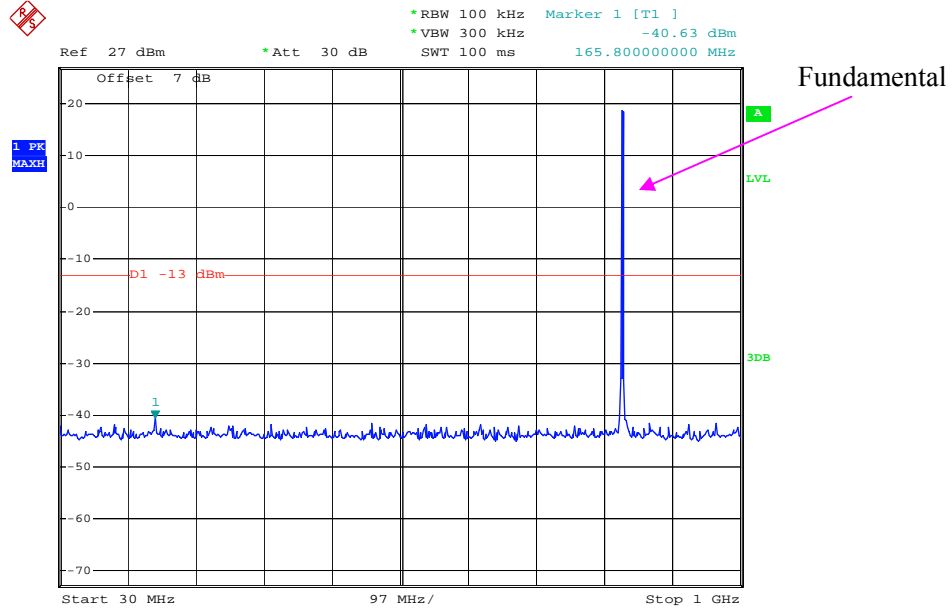
Fundamental



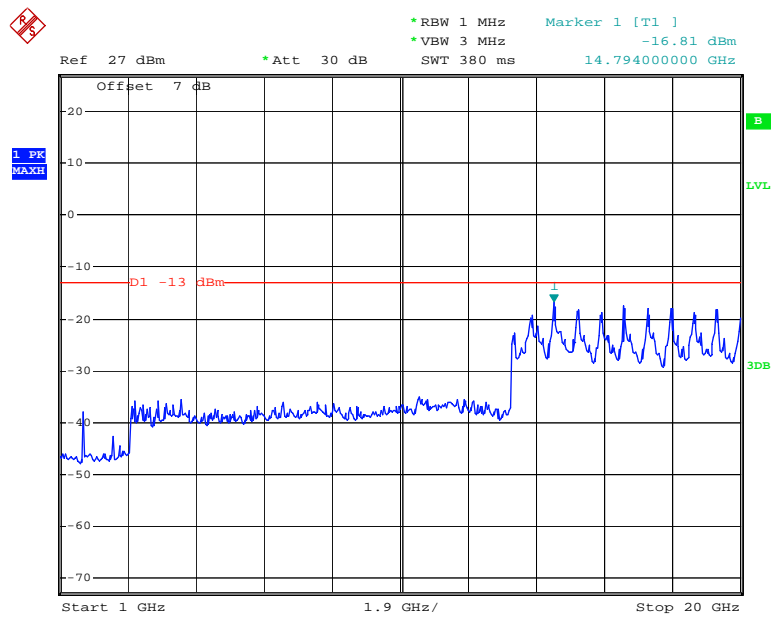
Date: 19.APR.2018 14:11:37

LTE Band 26 (Middle Channel)

QPSK_1.4 MHz

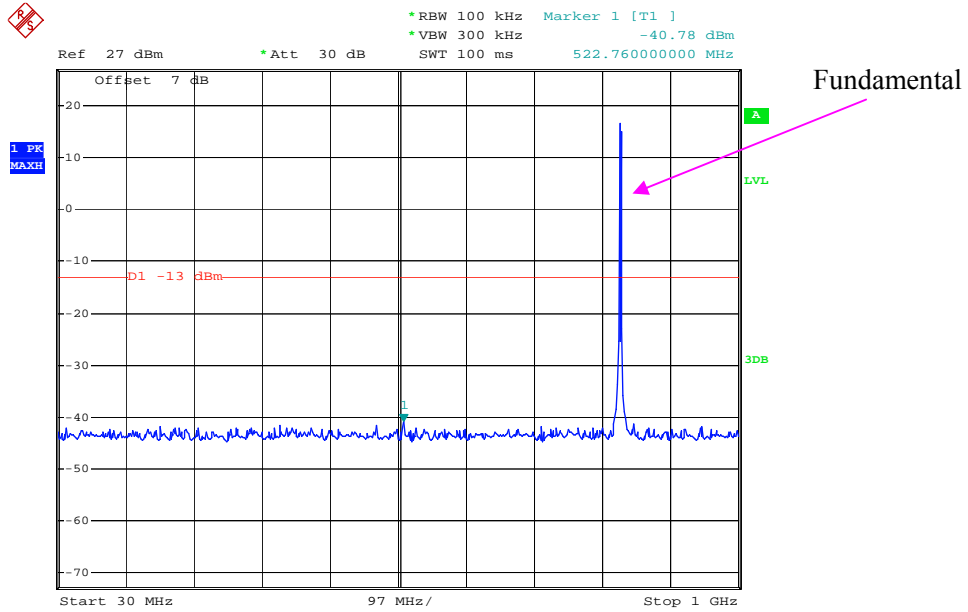


Date: 9.MAR.2018 18:30:00

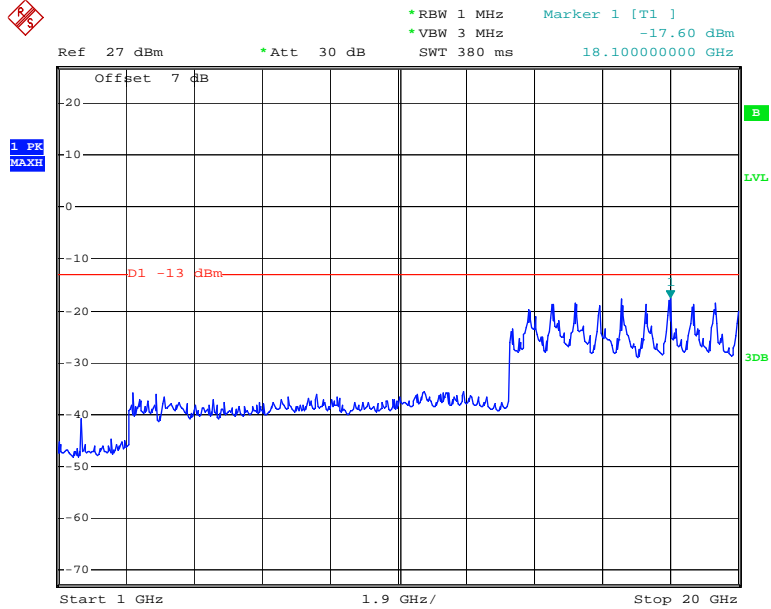


Date: 9.MAR.2018 18:30:25

QPSK_3 MHz

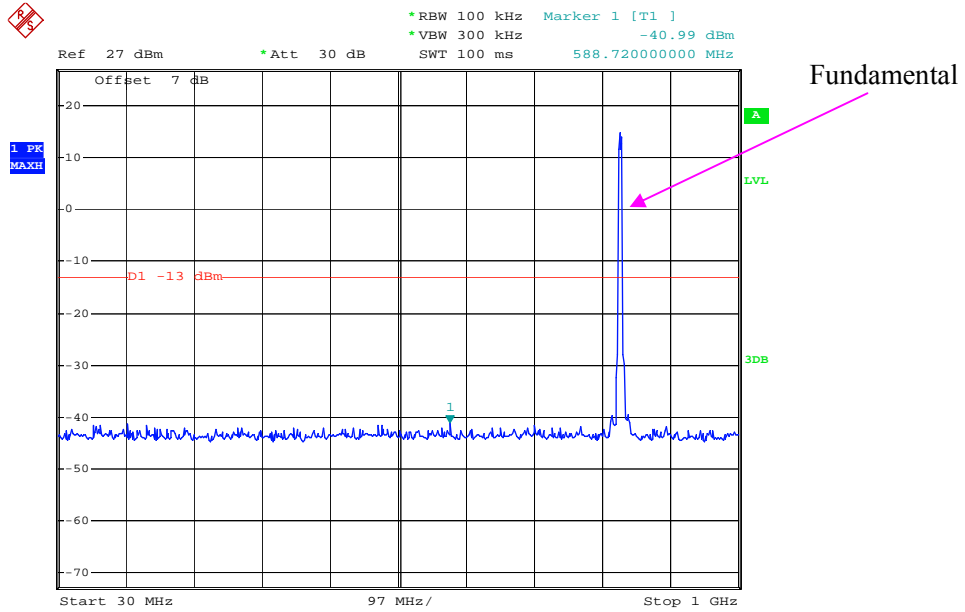


Date: 9.MAR.2018 18:31:07

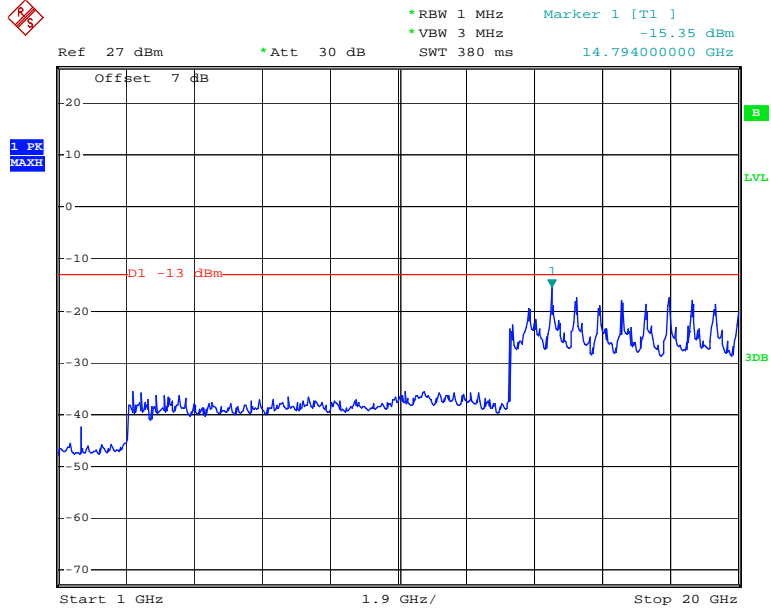


Date: 9.MAR.2018 18:31:24

QPSK_5 MHz

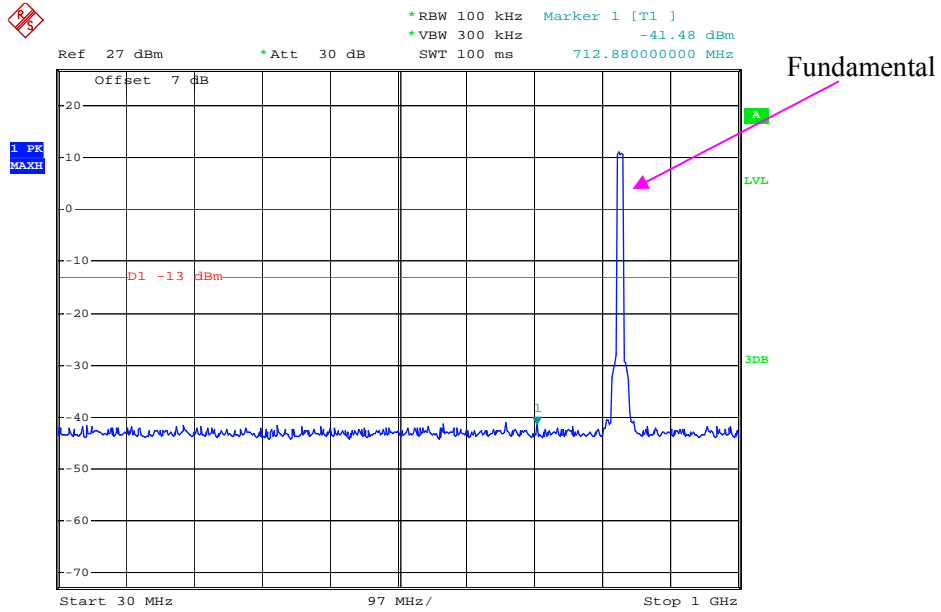


Date: 9.MAR.2018 18:28:08

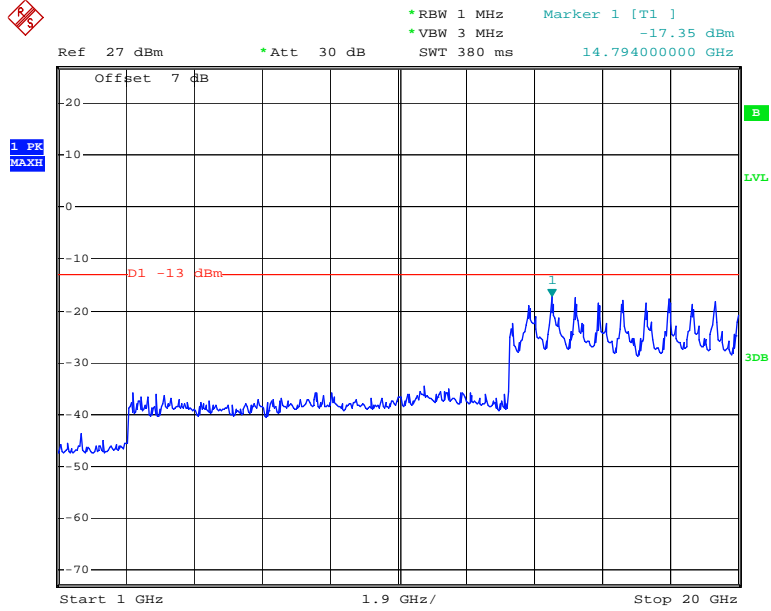


Date: 9.MAR.2018 18:28:24

QPSK_10 MHz

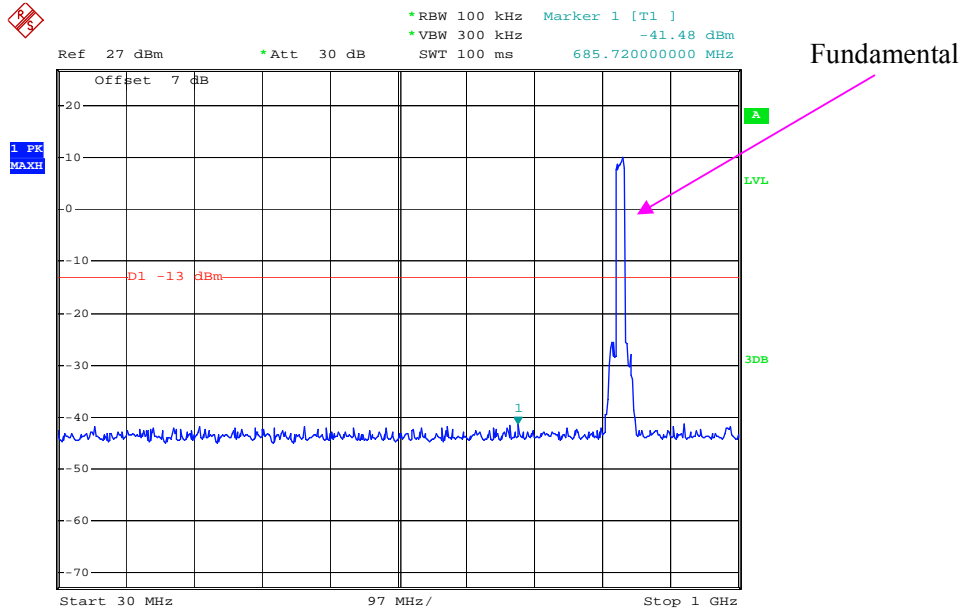


Date: 9.MAR.2018 18:32:32

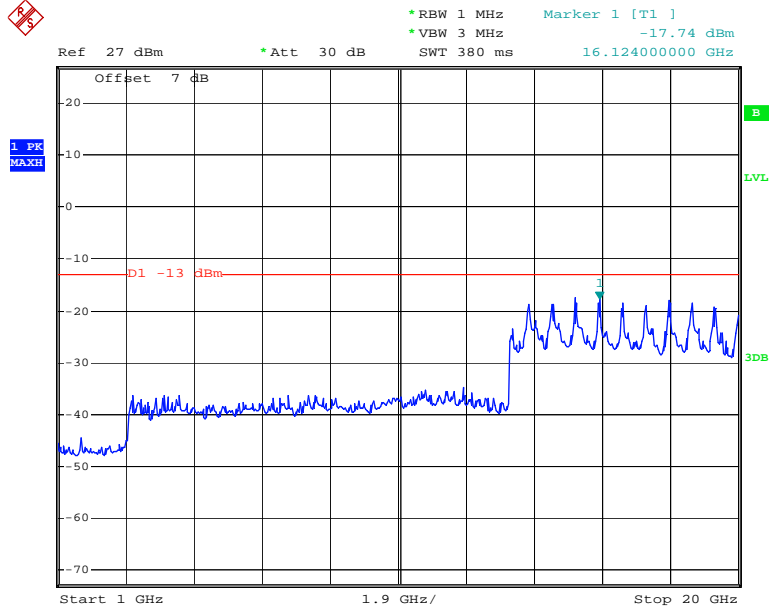


Date: 9.MAR.2018 18:32:57

QPSK_15 MHz



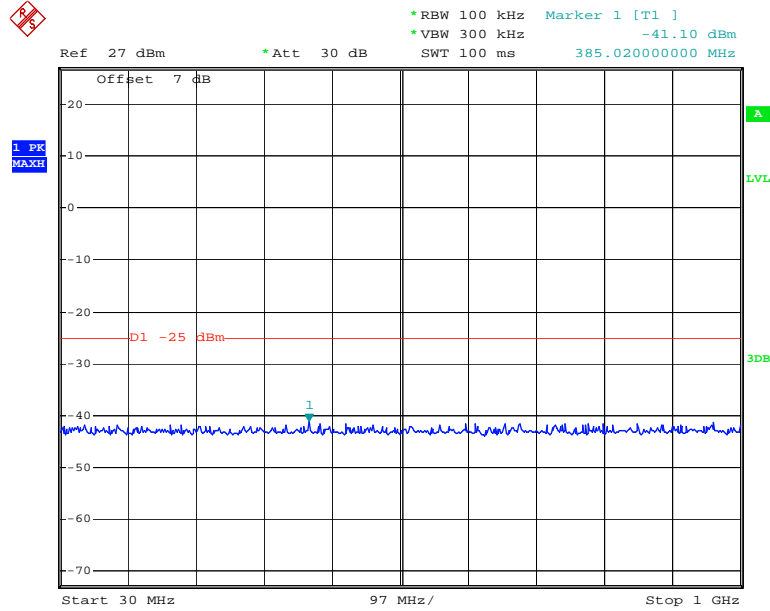
Date: 9.MAR.2018 18:33:35



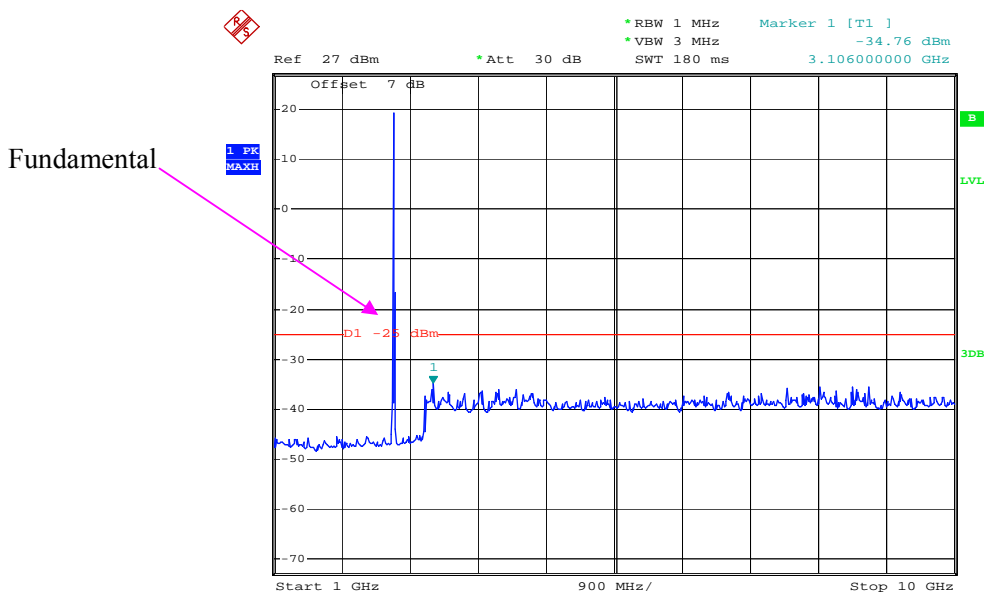
Date: 9.MAR.2018 18:33:52

LTE Band 41 (Middle Channel)

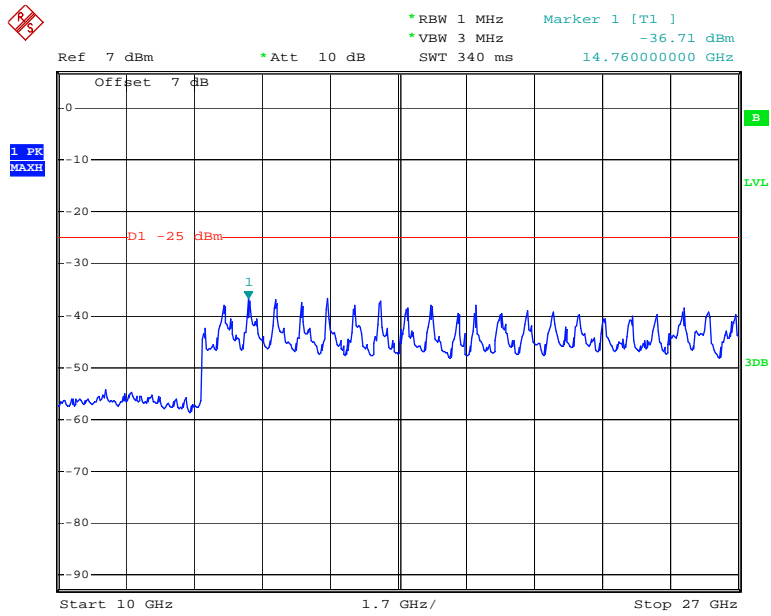
QPSK_5 MHz



Date: 9.MAR.2018 19:36:54

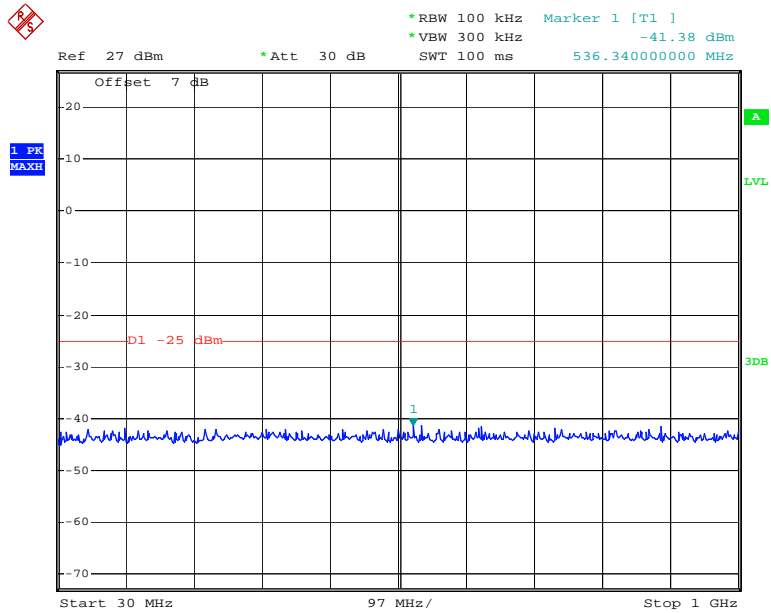


Date: 9.MAR.2018 19:37:20

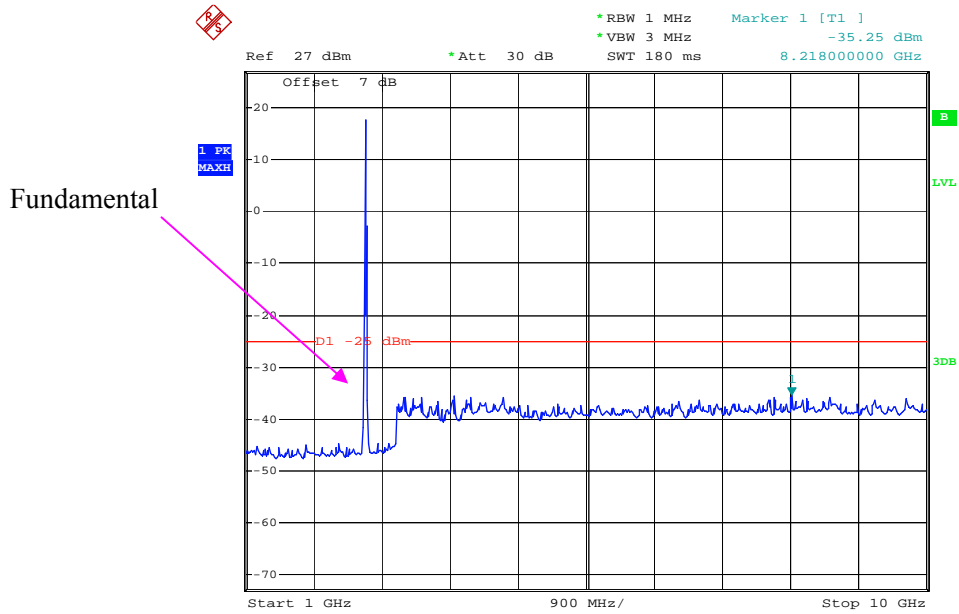


Date: 9.MAR.2018 19:38:16

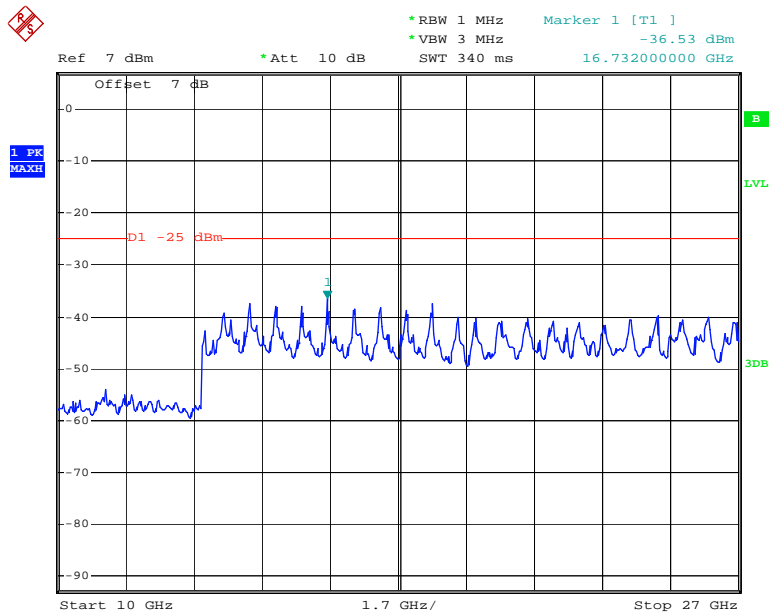
QPSK_10 MHz



Date: 9.MAR.2018 19:40:13

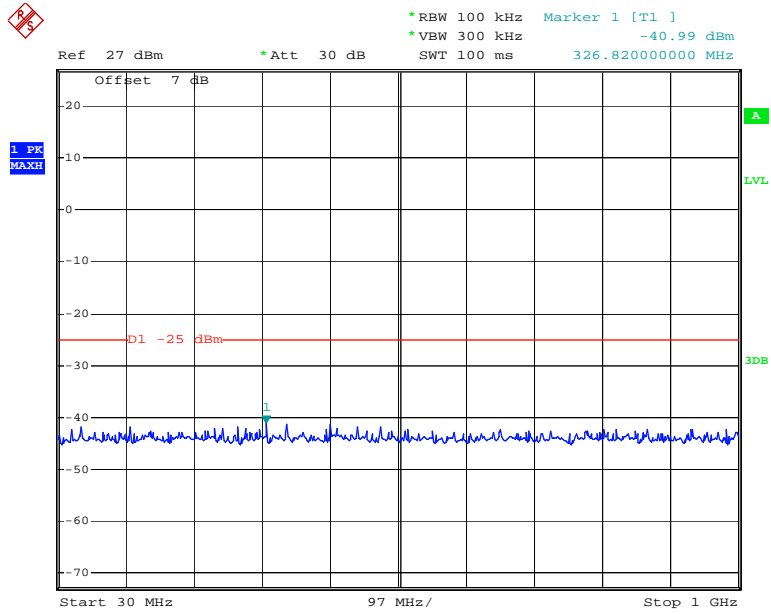


Date: 9.MAR.2018 19:39:49

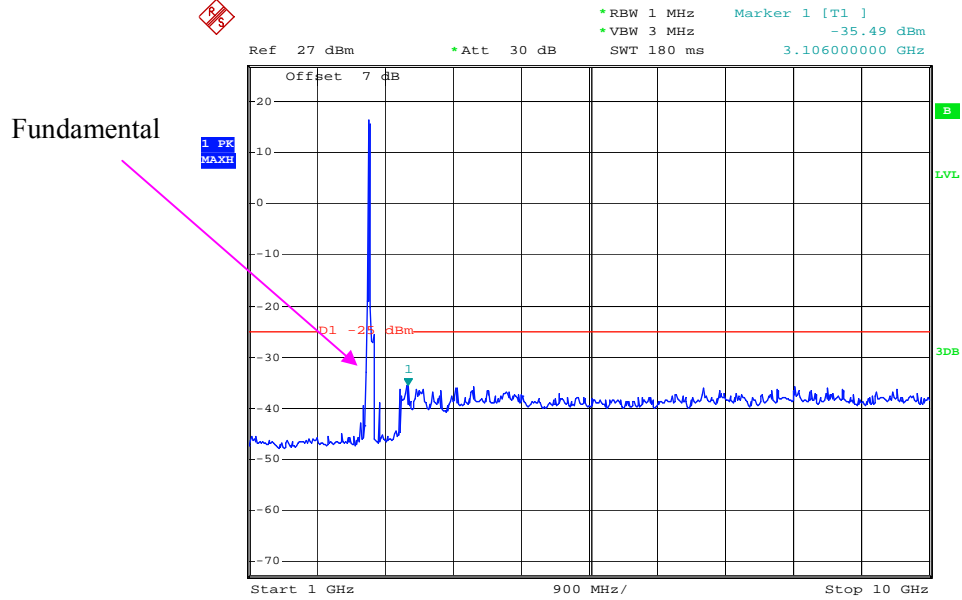


Date: 9.MAR.2018 19:39:04

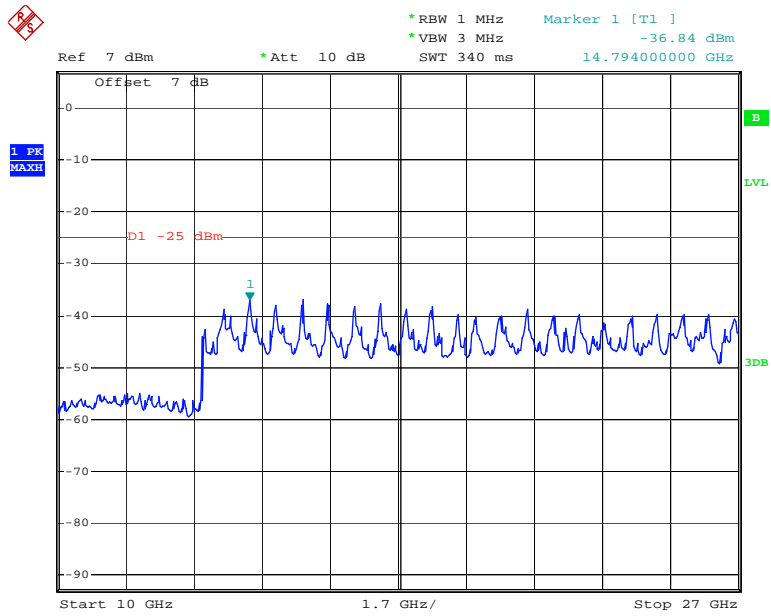
QPSK_15 MHz



Date: 9.MAR.2018 19:41:06

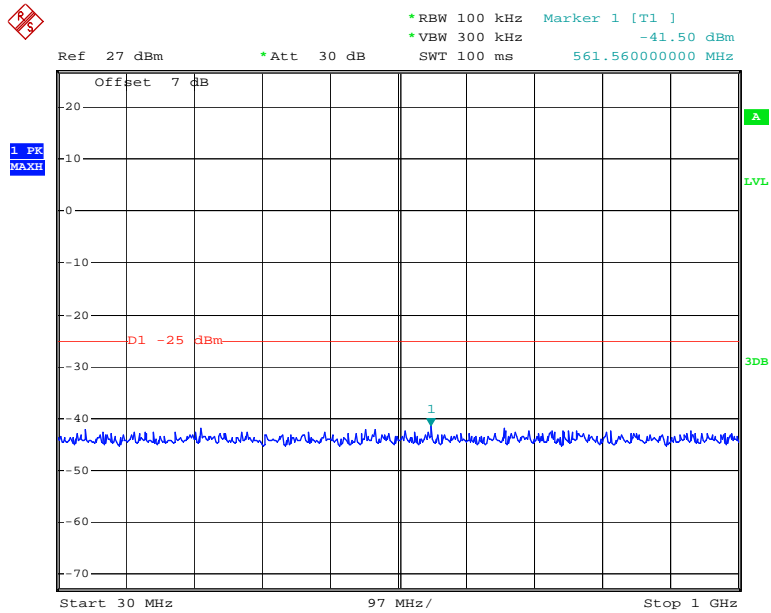


Date: 9.MAR.2018 19:41:28

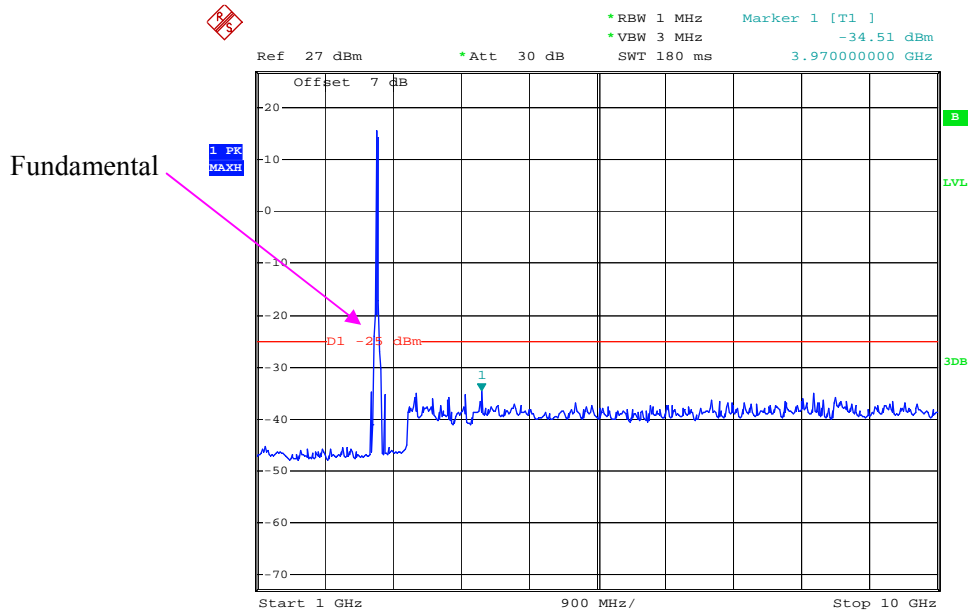


Date: 9.MAR.2018 19:42:12

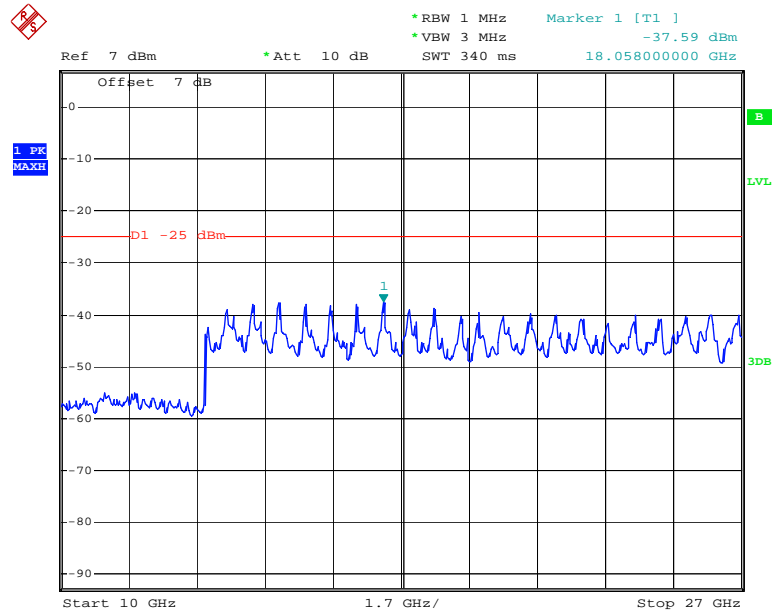
QPSK_20 MHz



Date: 9.MAR.2018 19:44:03



Date: 9.MAR.2018 19:43:43



Date: 9.MAR.2018 19:42:59

FCC §2.1053, §22.917 & §24.238 & §27.53& §90.691AND RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5 & RSS-139 §6.6& RSS-199 §4.5 - SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917, § 24.238 and § 27.53 & §90.691& RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5 & RSS-139 §6.6& RSS-199 §4.5.

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 = $10 \lg(\text{TXpwr in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \text{Log}_{10}(\text{power out in Watts})$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
R&S	Spectrum Analyzer	FSU 26	200256	2017-12-08	2018-12-08
Agilent	Signal Generator	E8247C	MY43321350	2017-12-11	2018-12-11
ETS LINDGREN	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Mini-Circuit	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
HP	Signal Generator	1026	320408	2017-12-08	2018-12-08
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2016-01-05	2019-01-04
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2017-06-16	2020-06-15
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05

* **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:	22.3~22.8°C
Relative Humidity:	48~49 %
ATM Pressure:	100.6~100.9 kPa

* The testing was performed by Vern Shen, Steven Zuo and Blake Yang on 2018-03-05&2018-03-06.

EUT Operation Mode: Transmitting

30 MHz-10 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM850, Frequency:836.600 MHz								
1673.200	H	52.18	-62	10.6	0.7	-52.1	-13.0	39.1
1673.200	V	63.25	-51.6	10.6	0.7	-41.7	-13.0	28.7
2509.800	H	51.14	-61.9	13.1	1.2	-50.0	-13.0	37.0
2509.800	V	61.57	-51.5	13.1	1.2	-39.6	-13.0	26.6
3346.400	H	45.35	-65.3	13.8	1.6	-53.1	-13.0	40.1
3346.400	V	45.86	-64.8	13.8	1.6	-52.6	-13.0	39.6
237.580	H	62.43	-46.7	0.0	0.5	-47.2	-13.0	34.2
235.640	V	65.76	-46.3	0.0	0.5	-46.8	-13.0	33.8
WCDMA Band 5 R99, Frequency:836.600 MHz								
1673.200	H	47.58	-66.6	10.6	0.7	-56.7	-13.0	43.7
1673.200	V	48.35	-66.5	10.6	0.7	-56.6	-13.0	43.6
2509.800	H	53.68	-59.3	13.1	1.2	-47.4	-13.0	34.4
2509.800	V	62.04	-51	13.1	1.2	-39.1	-13.0	26.1
3346.400	H	45.79	-64.9	13.8	1.6	-52.7	-13.0	39.7
3346.400	V	46.54	-64.2	13.8	1.6	-52.0	-13.0	39.0
98.000	H	78.45	-28.7	0.0	0.3	-29.0	-13.0	16.0
91.120	V	73.89	-39	0.0	0.3	-39.3	-13.0	26.3

30 MHz-20 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM1900, Frequency:1880.000 MHz								
3760.000	H	44.63	-64.2	13.8	1.6	-52.0	-13.0	39.0
3760.000	V	45.84	-62.8	13.8	1.6	-50.6	-13.0	37.6
5640.000	H	44.26	-61.8	14.0	1.3	-49.1	-13.0	36.1
5640.000	V	45.75	-60.2	14.0	1.3	-47.5	-13.0	34.5
150.280	H	61.57	-44.9	0.0	0.4	-45.3	-13.0	32.3
90.140	V	70.21	-42.7	0.0	0.4	-43.1	-13.0	30.1
WCDMA Band 2, R99, Frequency:1880.000 MHz								
3760.000	H	45.86	-62.9	13.8	1.6	-50.7	-13.0	37.7
3760.000	V	46.35	-62.3	13.8	1.6	-50.1	-13.0	37.1
5640.000	H	44.57	-61.5	14.0	1.3	-48.8	-13.0	35.8
5640.000	V	45.29	-60.6	14.0	1.3	-47.9	-13.0	34.9
97.900	H	78.23	-29	0.0	0.3	-29.3	-13.0	16.3
92.080	V	77.37	-35.6	0.0	0.3	-35.9	-13.0	22.9

30 MHz-20 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
WCDMA Band 4, R99, Frequency: 1732.6 MHz								
3465.200	H	46.25	-64	13.9	1.6	-51.7	-13.0	38.7
3465.200	V	47.78	-62.5	13.9	1.6	-50.2	-13.0	37.2
5197.800	H	45.36	-61.1	14.0	1.5	-48.6	-13.0	35.6
5197.800	V	47.38	-59.1	14.0	1.5	-46.6	-13.0	33.6
97.920	H	78.37	-28.9	0.0	0.3	-29.2	-13.0	16.2
92.180	V	77.95	-35	0.0	0.3	-35.3	-13.0	22.3

LTE Band 2 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 1880.000 MHz								
3760.000	H	46.38	-62.4	13.8	1.6	-50.2	-13.0	37.2
3760.000	V	47.79	-60.9	13.8	1.6	-48.7	-13.0	35.7
5640.000	H	49.26	-56.8	14.0	1.3	-44.1	-13.0	31.1
5640.000	V	52.57	-53.3	14.0	1.3	-40.6	-13.0	27.6
273.000	H	50.25	-58.7	0.0	0.5	-59.2	-13.0	46.2
273.000	V	49.38	-62	0.0	0.5	-62.5	-13.0	49.5

LTE Band 4 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 1732.500 MHz								
3465.000	H	46.46	-63.8	13.9	1.6	-51.5	-13.0	38.5
3465.000	V	48.94	-61.3	13.9	1.6	-49.0	-13.0	36.0
5197.500	H	45.36	-61.1	14.0	1.5	-48.6	-13.0	35.6
5197.500	V	46.39	-60.1	14.0	1.5	-47.6	-13.0	34.6
98.600	H	55.93	-51	0.0	0.3	-51.3	-13.0	38.3
98.600	V	54.59	-58.4	0.0	0.3	-58.7	-13.0	45.7

LTE Band 5 (30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 836.500 MHz								
1673.000	H	46.37	-67.8	10.6	0.7	-57.9	-13.0	44.9
1673.000	V	46.95	-67.9	10.6	0.7	-58.0	-13.0	45.0
2509.500	H	47.18	-65.8	13.1	1.2	-53.9	-13.0	40.9
2509.500	V	47.84	-65.2	13.1	1.2	-53.3	-13.0	40.3
3346.000	H	45.67	-65	13.8	1.6	-52.8	-13.0	39.8
3346.000	V	46.23	-64.5	13.8	1.6	-52.3	-13.0	39.3
97.900	H	56.13	-51.1	0.0	0.3	-51.4	-13.0	38.4
97.900	V	55.42	-57.6	0.0	0.3	-57.9	-13.0	44.9

LTE Band 7 (30MHz-26GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 2535.000 MHz								
5070.000	H	46.27	-60.5	13.9	1.3	-47.9	-25.0	22.9
5070.000	V	50.79	-55.8	13.9	1.3	-43.2	-25.0	18.2
7605.000	H	45.13	-55.2	13.2	1.4	-43.4	-25.0	18.4
7605.000	V	47.67	-53.1	13.2	1.4	-41.3	-25.0	16.3
299.000	H	49.12	-59.5	0.0	0.5	-60.0	-25.0	35.0
299.000	V	48.73	-61.3	0.0	0.5	-61.8	-25.0	36.8

LTE Band 12 (30MHz-10GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 707.500 MHz								
1415.000	H	51.84	-61.7	9.1	1.2	-53.8	-13.0	40.8
1415.000	V	56.23	-57.8	9.1	1.2	-49.9	-13.0	36.9
2122.500	H	47.38	-65.4	11.3	1.1	-55.2	-13.0	42.2
2122.500	V	50.99	-61.8	11.3	1.1	-51.6	-13.0	38.6
2830.000	H	45.53	-66.6	13.3	1.4	-54.7	-13.0	41.7
2830.000	V	46.05	-66.3	13.3	1.4	-54.4	-13.0	41.4
98.600	H	56.37	-50.6	0.0	0.3	-50.9	-13.0	37.9
98.600	V	54.68	-58.3	0.0	0.3	-58.6	-13.0	45.6

LTE Band 13 (30MHz-10GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 782.000 MHz								
1564.000	H	46.33	-68.6	9.9	0.9	-59.6	-13.0	46.6
1564.000	V	47.02	-68.3	9.9	0.9	-59.3	-13.0	46.3
2346.000	H	47.12	-65.3	11.7	1.3	-54.9	-13.0	41.9
2346.000	V	47.75	-64.7	11.7	1.3	-54.3	-13.0	41.3
3128.000	H	45.81	-64.8	13.3	1.8	-53.3	-13.0	40.3
3128.000	V	46.13	-64.5	13.3	1.8	-53.0	-13.0	40.0
98.600	H	56.31	-50.6	0.0	0.3	-50.9	-13.0	37.9
98.600	V	54.60	-58.4	0.0	0.3	-58.7	-13.0	45.7

LTE Band 17 (30MHz-10GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 710.000 MHz								
1420.000	H	49.76	-63.8	9.1	1.2	-55.9	-13.0	42.9
1420.000	V	52.48	-61.6	9.1	1.2	-53.7	-13.0	40.7
2130.000	H	49.05	-63.7	11.2	1.1	-53.6	-13.0	40.6
2130.000	V	49.84	-62.9	11.2	1.1	-52.8	-13.0	39.8
2840.000	H	45.58	-66.5	13.4	1.4	-54.5	-13.0	41.5
2840.000	V	46.39	-65.9	13.4	1.4	-53.9	-13.0	40.9
97.900	H	55.21	-52	0.0	0.3	-52.3	-13.0	39.3
97.900	V	53.59	-59.4	0.0	0.3	-59.7	-13.0	46.7

LTE Band 25 (30MHz-20GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 1882.500 MHz								
3765.000	H	45.65	-63.1	13.7	1.6	-51.0	-13.0	38.0
3765.000	V	47.63	-61	13.7	1.6	-48.9	-13.0	35.9
5647.500	H	46.84	-59.2	14.0	1.3	-46.5	-13.0	33.5
5647.500	V	49.52	-56.4	14.0	1.3	-43.7	-13.0	30.7
485.260	H	46.35	-58	0.0	0.7	-58.7	-13.0	45.7
485.260	V	48.52	-58.9	0.0	0.7	-59.6	-13.0	46.6

LTE Band 26 (30MHz-10GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 831.500 MHz								
1663.000	H	47.25	-67	10.5	0.7	-57.2	-13.0	44.2
1663.000	V	47.63	-67.3	10.5	0.7	-57.5	-13.0	44.5
2494.500	H	47.89	-65.1	13.1	1.2	-53.2	-13.0	40.2
2494.500	V	48.28	-64.7	13.1	1.2	-52.8	-13.0	39.8
3326.000	H	45.76	-65	13.7	1.6	-52.9	-13.0	39.9
3326.000	V	46.35	-64.4	13.7	1.6	-52.3	-13.0	39.3
97.900	H	55.48	-51.8	0.0	0.3	-52.1	-13.0	39.1
97.900	V	53.72	-59.3	0.0	0.3	-59.6	-13.0	46.6

LTE Band 41 (30MHz-26GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 2593.000 MHz								
5186.000	H	50.34	-56.1	14.0	1.5	-43.6	-25.0	18.6
5186.000	V	50.52	-55.9	14.0	1.5	-43.4	-25.0	18.4
7779.000	H	47.28	-53.2	13.3	1.5	-41.4	-25.0	16.4
7779.000	V	49.37	-51.3	13.3	1.5	-39.5	-25.0	14.5
298.000	H	54.31	-54.4	0.0	0.5	-54.9	-25.0	29.9
298.000	V	52.66	-57.4	0.0	0.5	-57.9	-25.0	32.9

Note:

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

FCC §22.917(a) & §24.238(a) & §27.53 AND RSS-130 §4.6 & §90.691& RSS-132 §5.5 & RSS-133& RSS-139 §6.6& RSS-199§4.5- BAND EDGES

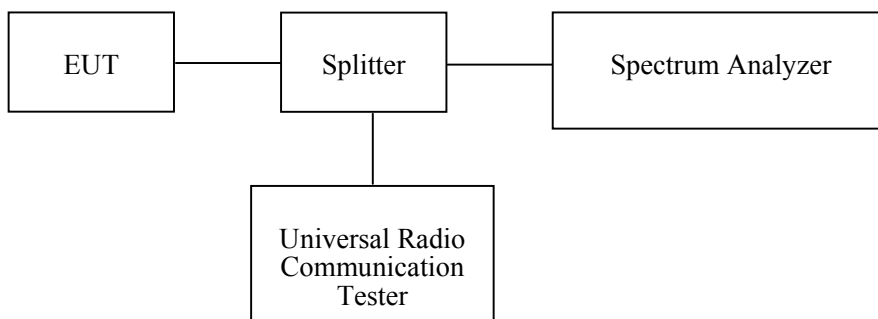
Applicable Standard

FCC § 2.1053, §22.917, § 24.238 and § 27.53 & §90.691 &RSS-130 §4.6 & RSS-132 §5.5 & RSS-133& RSS-139 §6.6.& RSS-199§4.5

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	Universal Radio Communication Tester	CMU200	109 038	2017-07-18	2018-07-18
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each Time	/
E-Microwave	RF Attenuator	3dB	3dB-2	Each Time	/
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each Time	/
R&S	Spectrum Analyzer	FSU 26	200256	2017-12-08	2018-12-08

* **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

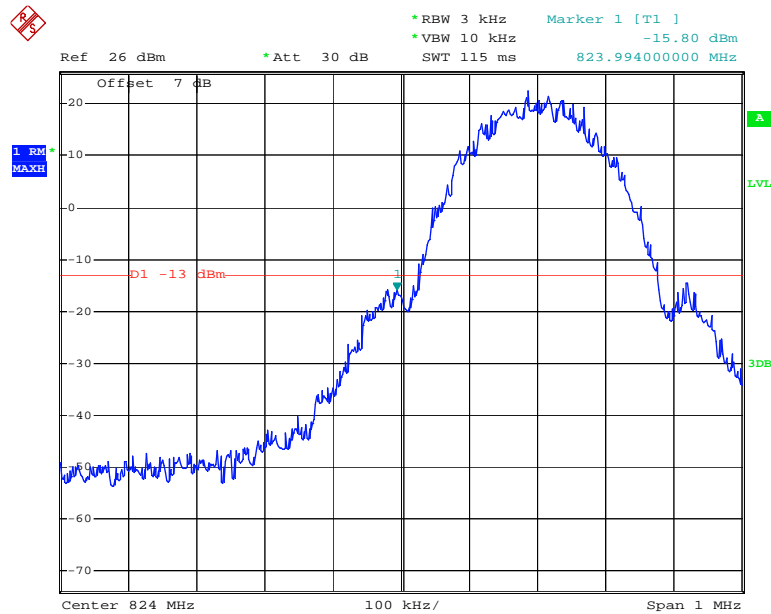
Temperature:	25.6~25.9°C
Relative Humidity:	49~58 %
ATM Pressure:	101~101.1 kPa

The testing was performed by Swim Lv from 2018-03-07 to 2018-04-19.

Test Mode: Transmitting

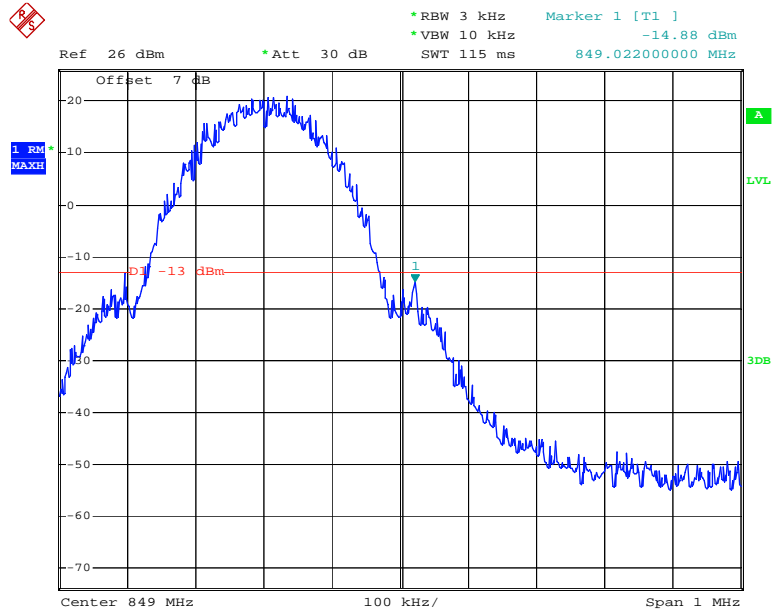
Test Result: Compliant. Please refer to the following plots.

GSM 850, Left Band Edge



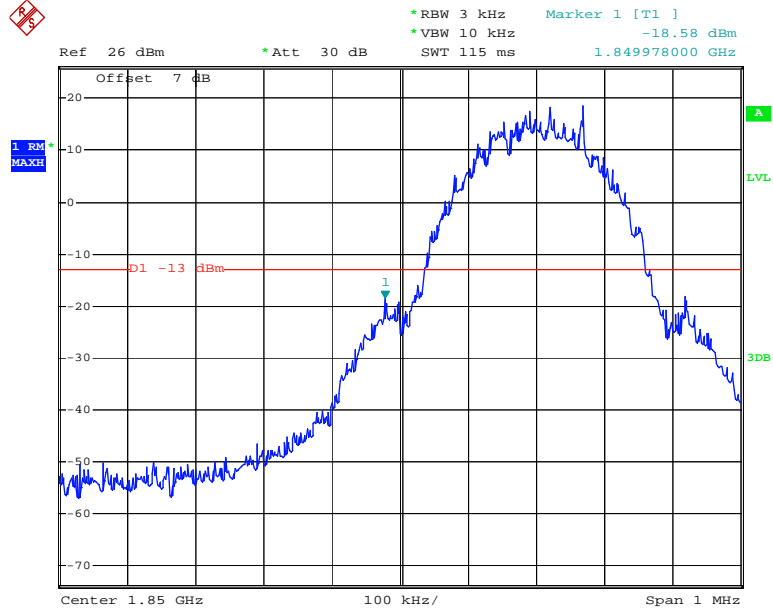
Date: 7.MAR.2018 15:47:51

GSM 850, Right Band Edge



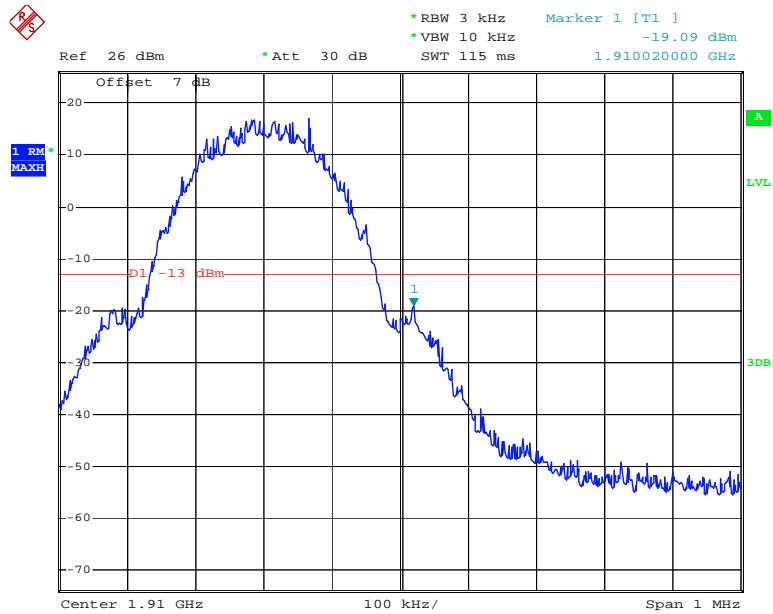
Date: 7.MAR.2018 15:45:41

GSM 1900, Left Band Edge



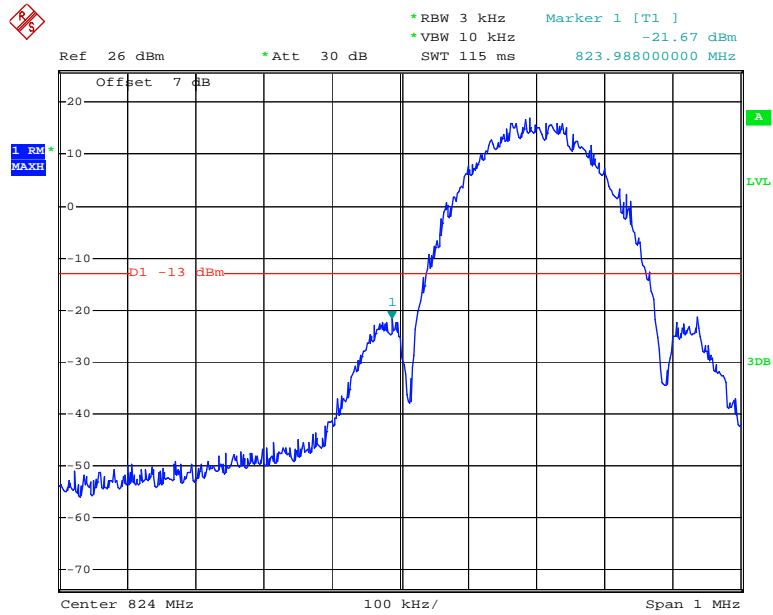
Date: 7.MAR.2018 15:51:50

GSM 1900, Right Band Edge



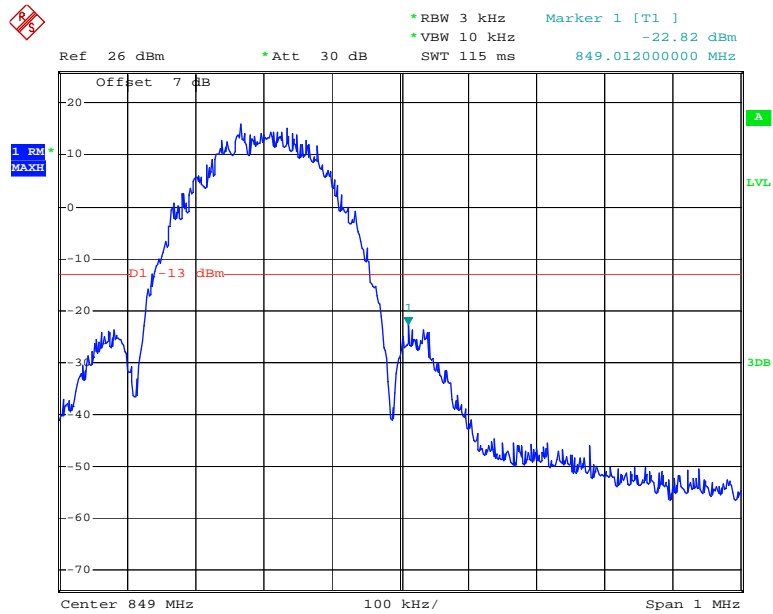
Date: 7.MAR.2018 15:53:01

EDGE 850, Left Band Edge



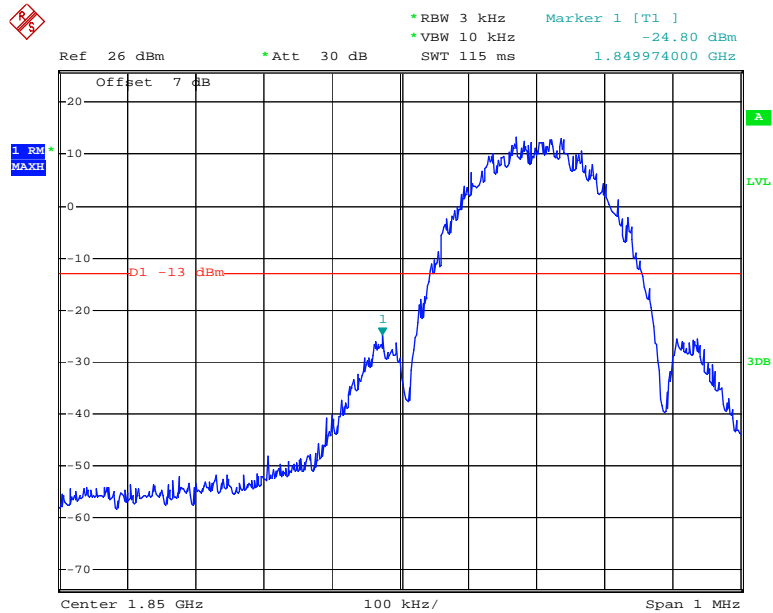
Date: 7.MAR.2018 15:43:00

EDGE 850, Right Band Edge



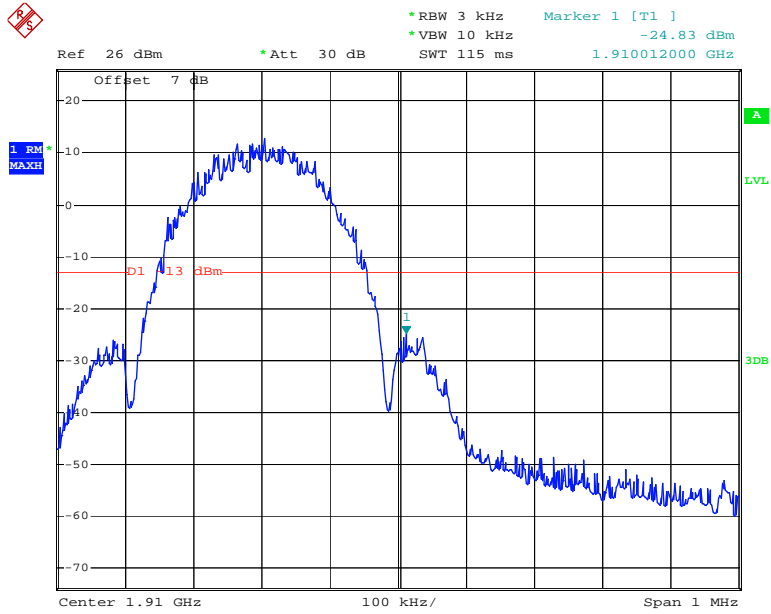
Date: 7.MAR.2018 15:44:03

EDGE 1900, Left Band Edge



Date: 7.MAR.2018 15:55:04

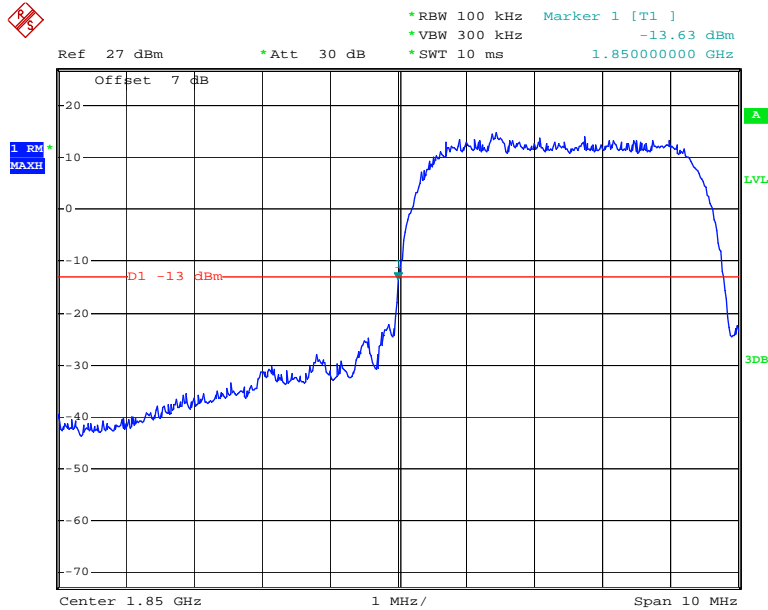
EDGE 1900, Right Band Edge



Date: 7.MAR.2018 15:55:42

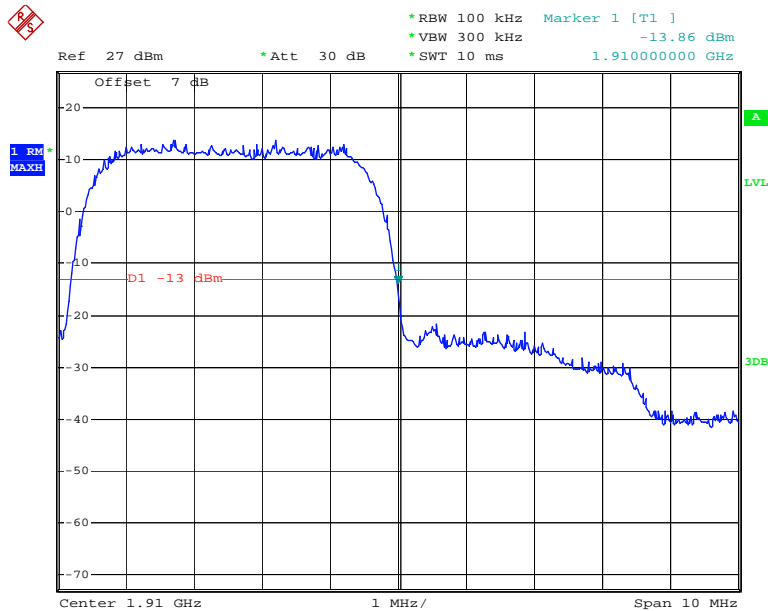
WCDMA Band 2:

REL99 Band 2, Left Band Edge



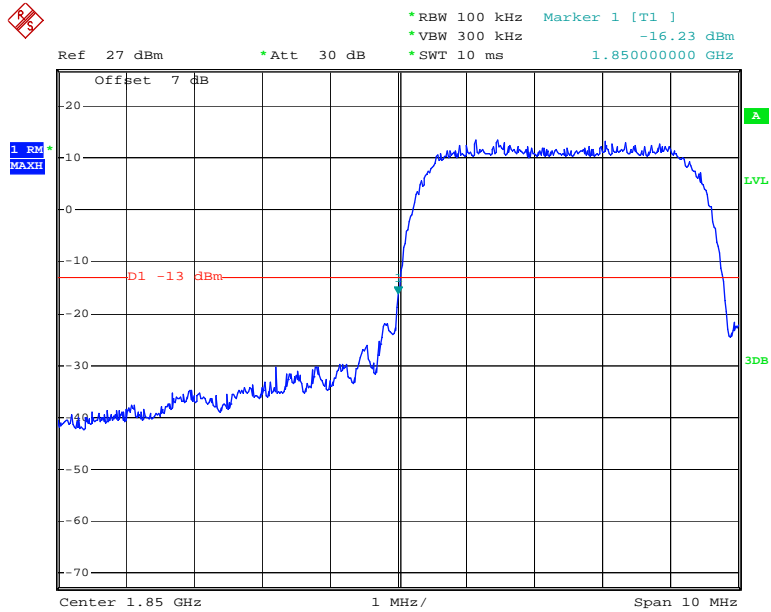
Date: 2.APR.2018 17:43:49

REL99 Band 2, Right Band Edge



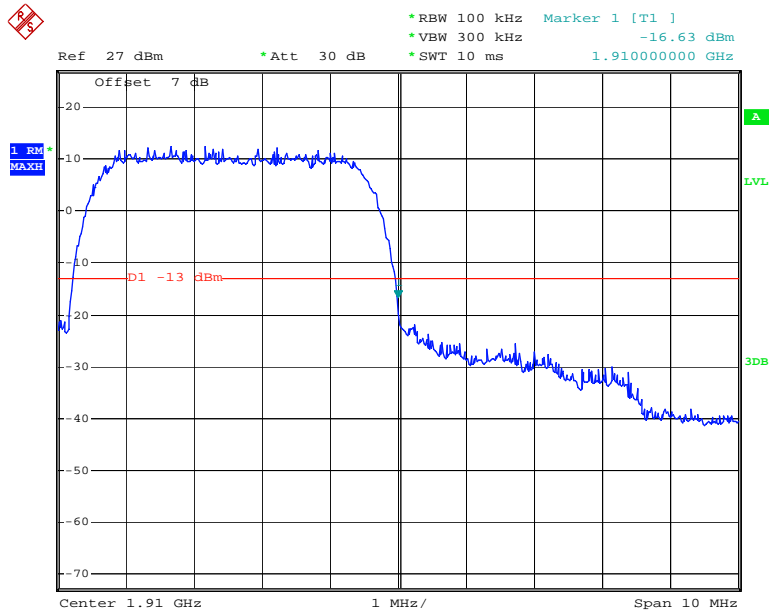
Date: 2.APR.2018 17:45:27

HSDPA Band 2, Left Band Edge



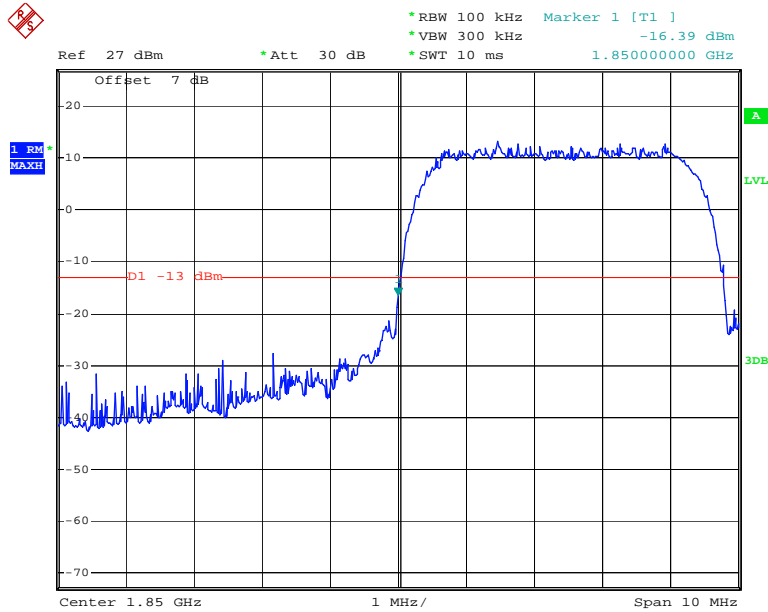
Date: 2.APR.2018 18:10:19

HSDPA Band 2, Right Band Edge



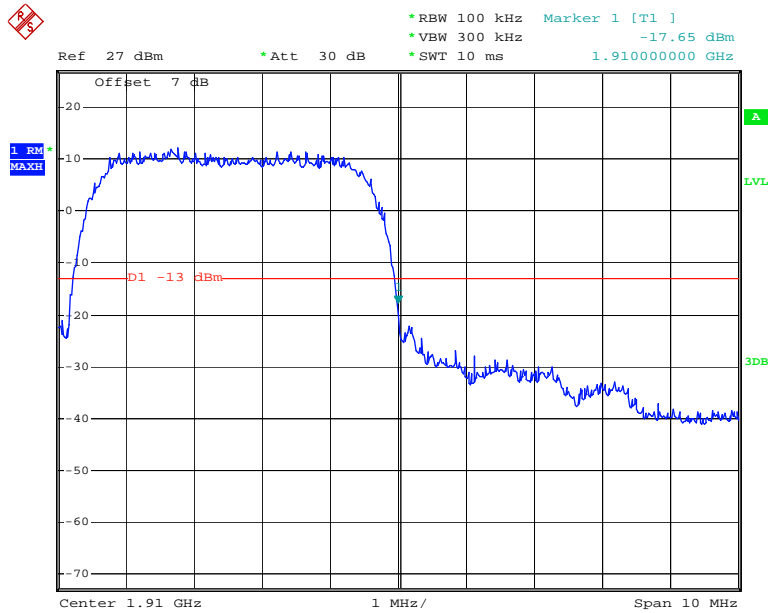
Date: 2.APR.2018 18:10:56

HSUPA Band 2, Left Band Edge



Date: 2.APR.2018 18:02:49

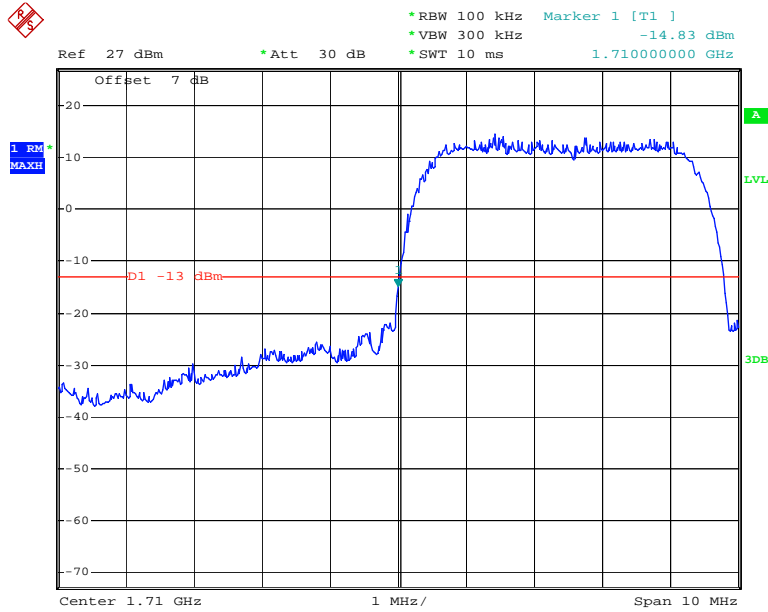
HSUPA Band 2, Right Band Edge



Date: 2.APR.2018 18:01:55

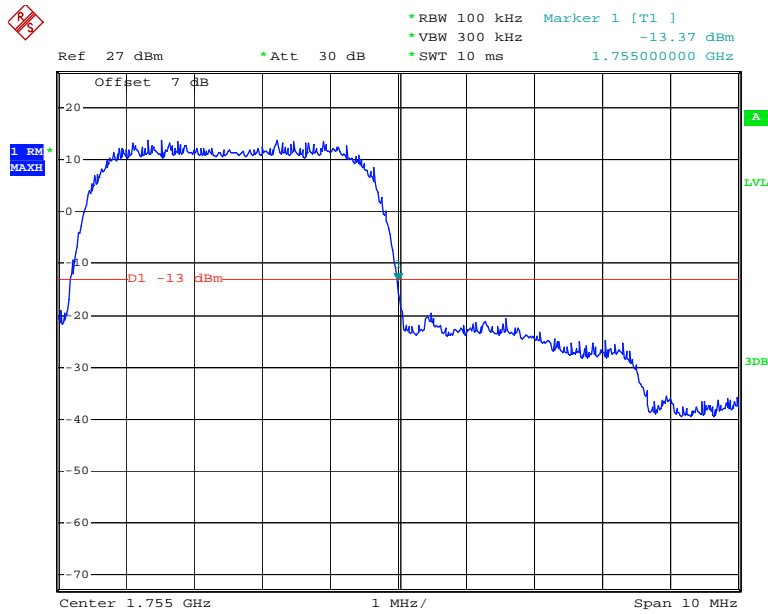
WCDMA Band 4:

REL99 Band 4, Left Band Edge



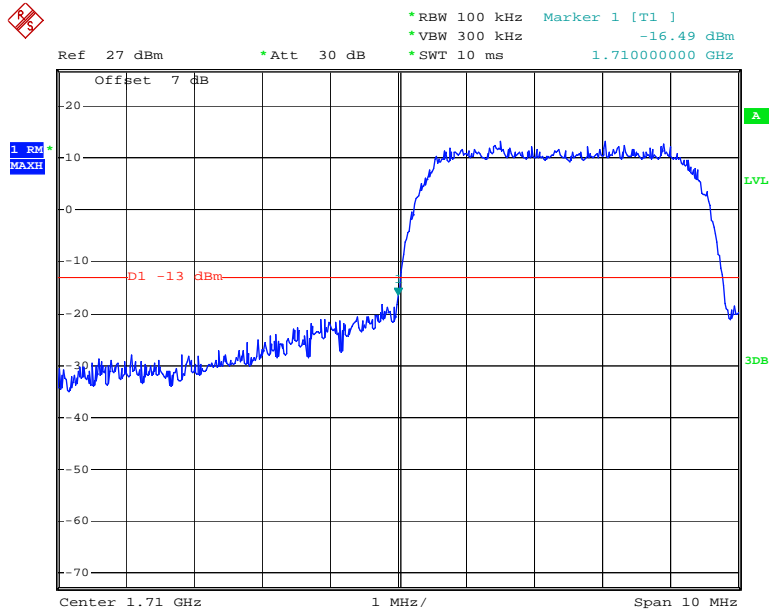
Date: 2.APR.2018 17:58:08

REL99 Band 4, Right Band Edge



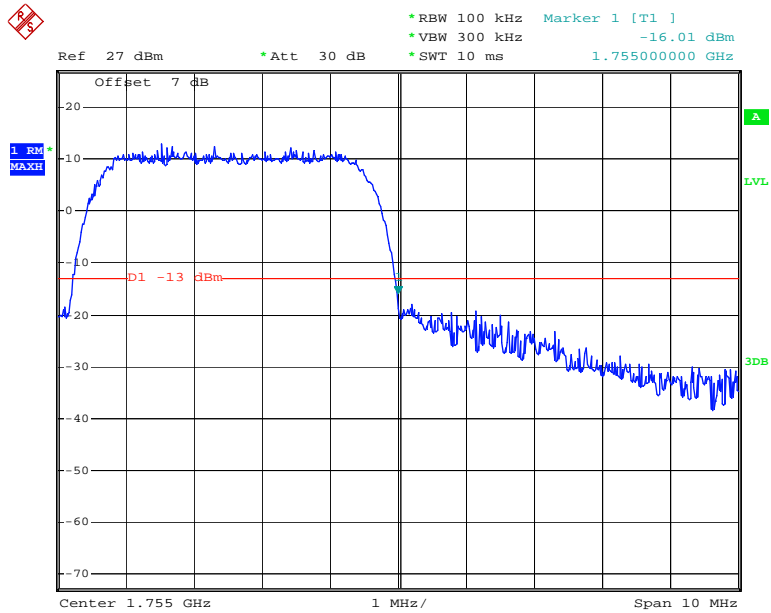
Date: 2.APR.2018 18:00:14

HSDPA Band 4, Left Band Edge



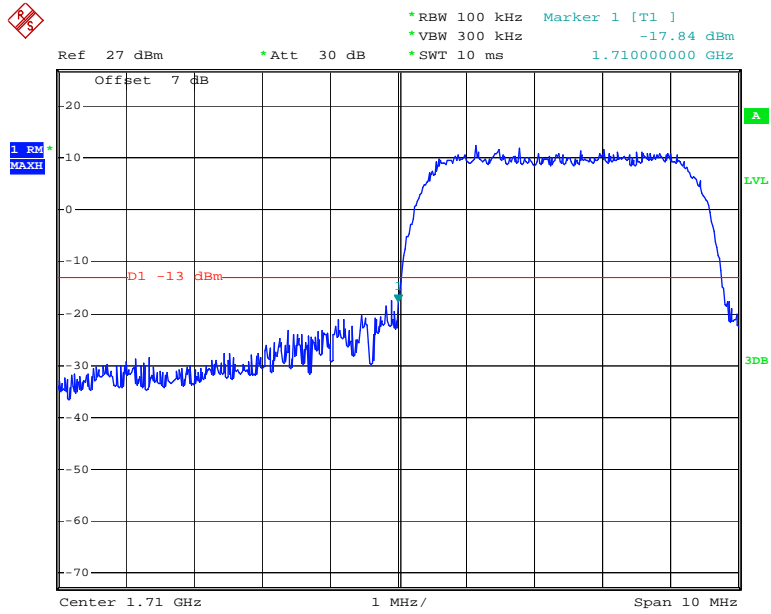
Date: 2.APR.2018 18:14:47

HSDPA Band 4, Right Band Edge



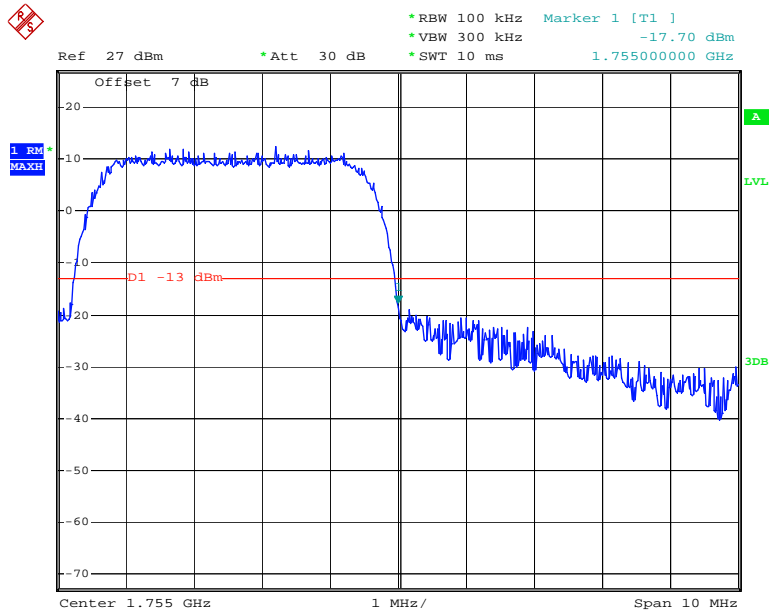
Date: 2.APR.2018 18:15:45

HSUPA Band 4, Left Band Edge



Date: 2.APR.2018 18:04:59

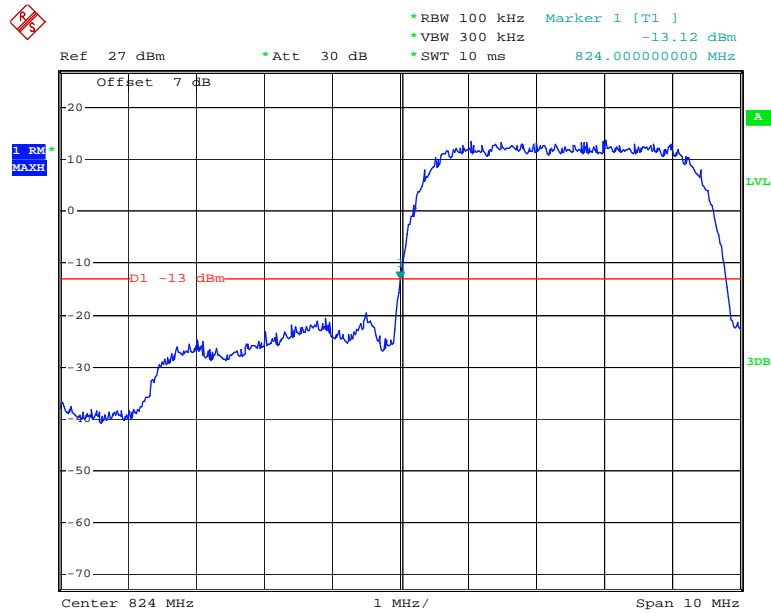
HSUPA Band 4, Right Band Edge



Date: 2.APR.2018 18:04:00

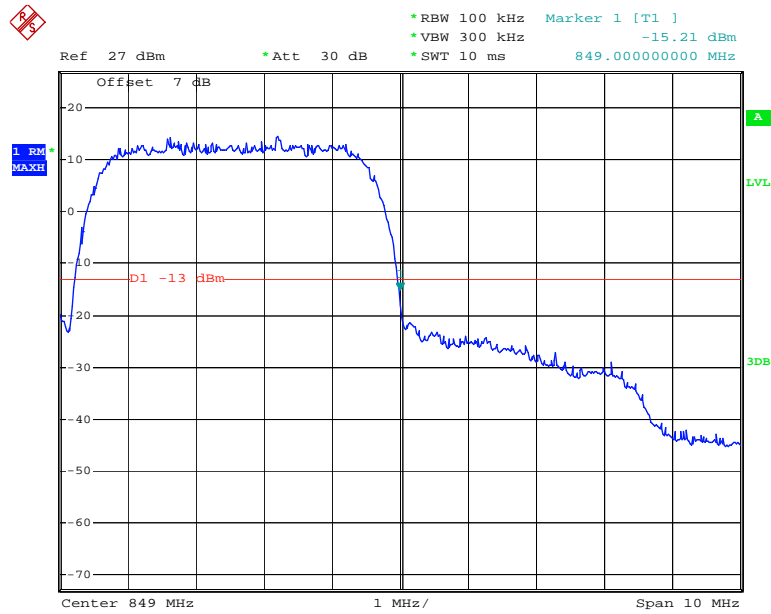
WCDMA Band 5

REL99 Band 5, Left Band Edge



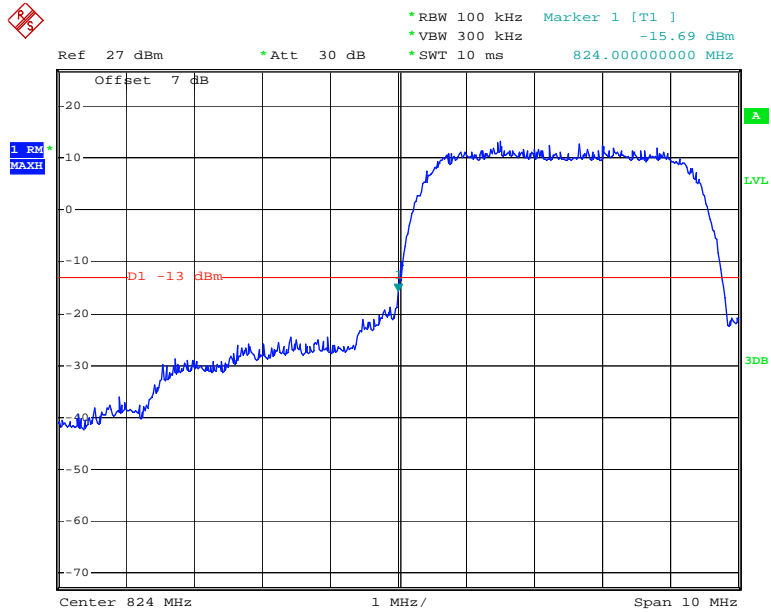
Date: 2.APR.2018 17:54:55

REL99 Band 5 Right Band Edge



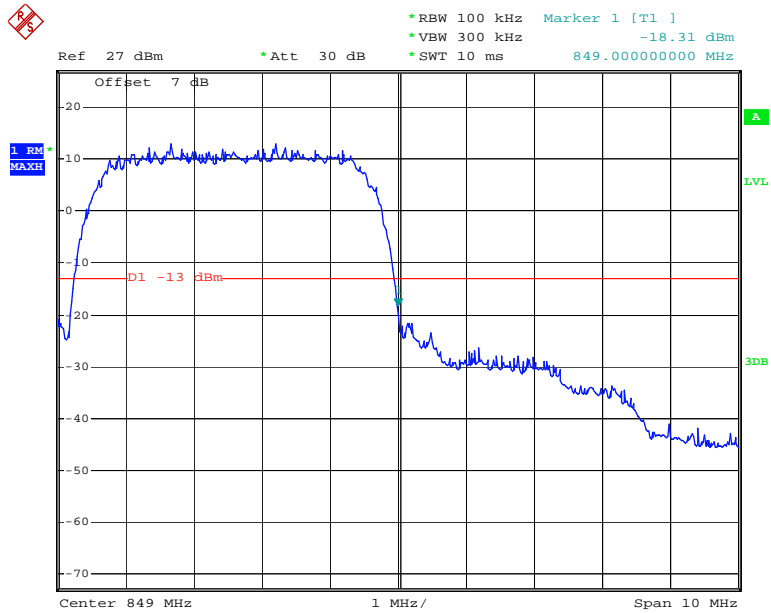
Date: 2.APR.2018 17:55:59

HSDPA Band 5, Left Band Edge



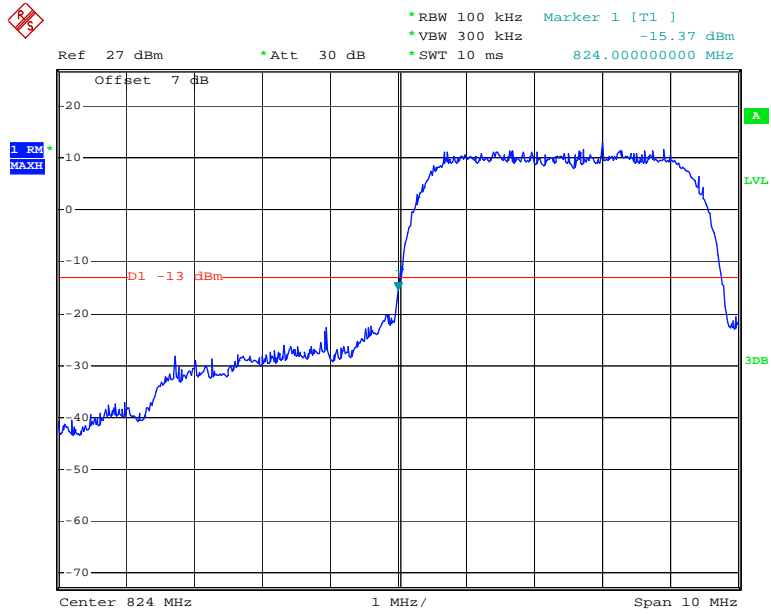
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HSDPA Band 5, Right Band Edge



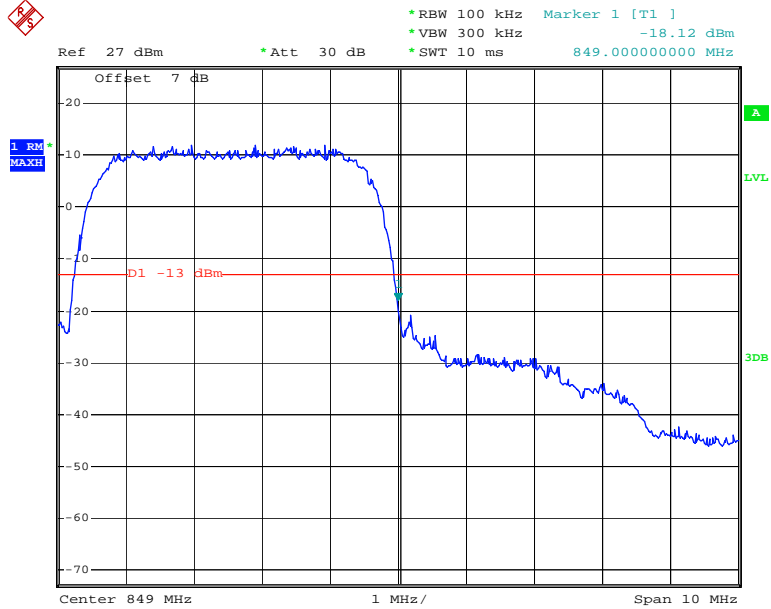
Date: 2.APR.2018 18:17:46

HSUPA Band 5, Left Band Edge



Date: 2.APR.2018 18:07:08

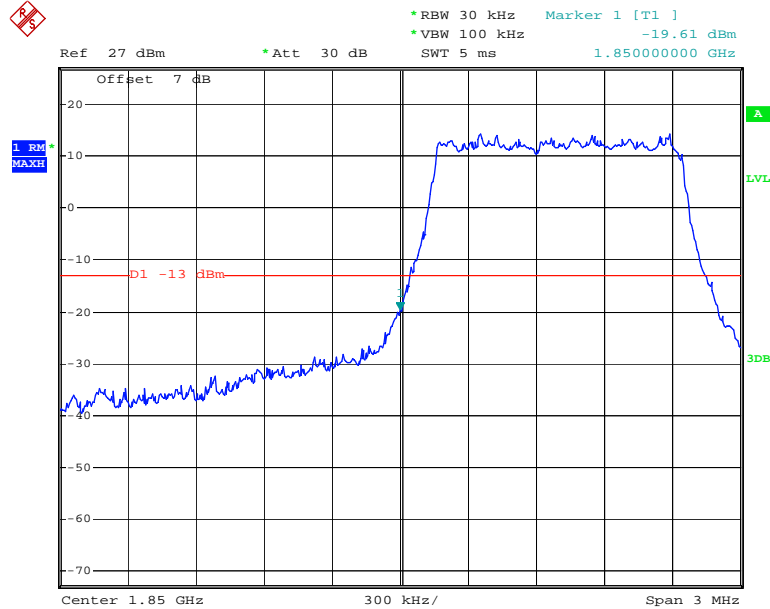
HSUPA Band 5, Right Band Edge



Date: 2.APR.2018 18:06:23

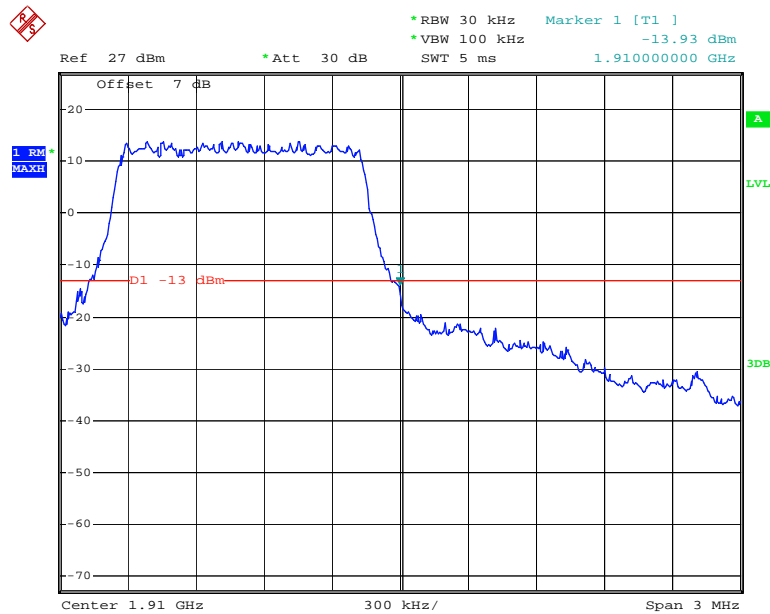
LTE Band 2

QPSK_1.4MHz_6 RB_Left



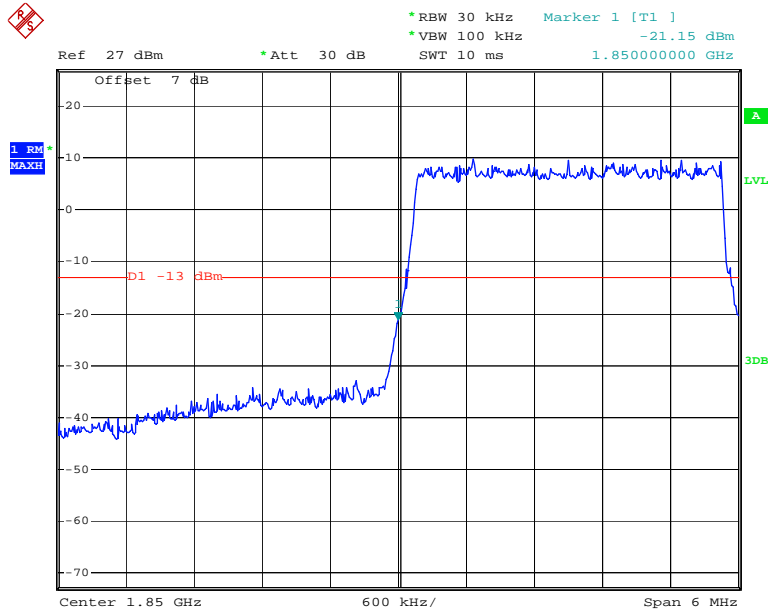
Date: 31.MAR.2018 10:51:48

QPSK_1.4MHz_6 RB_Right



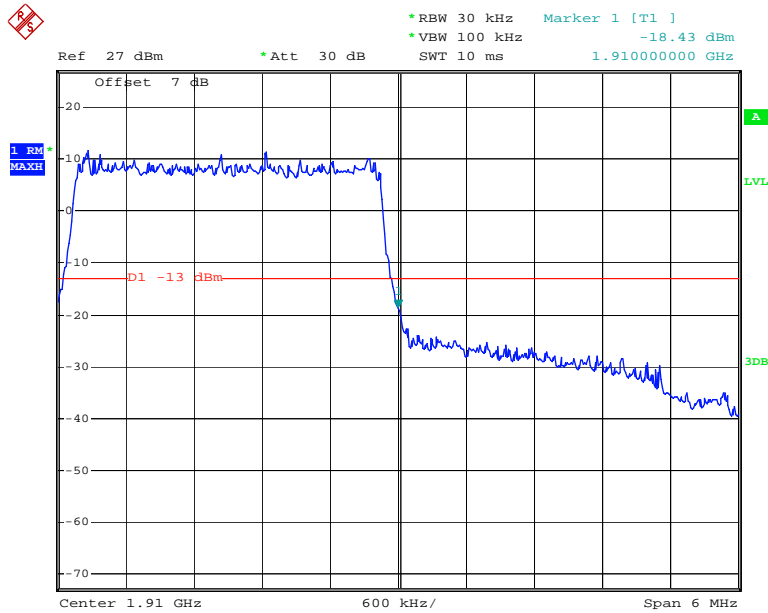
Date: 31.MAR.2018 10:55:09

QPSK_3MHz_15 RB_Left



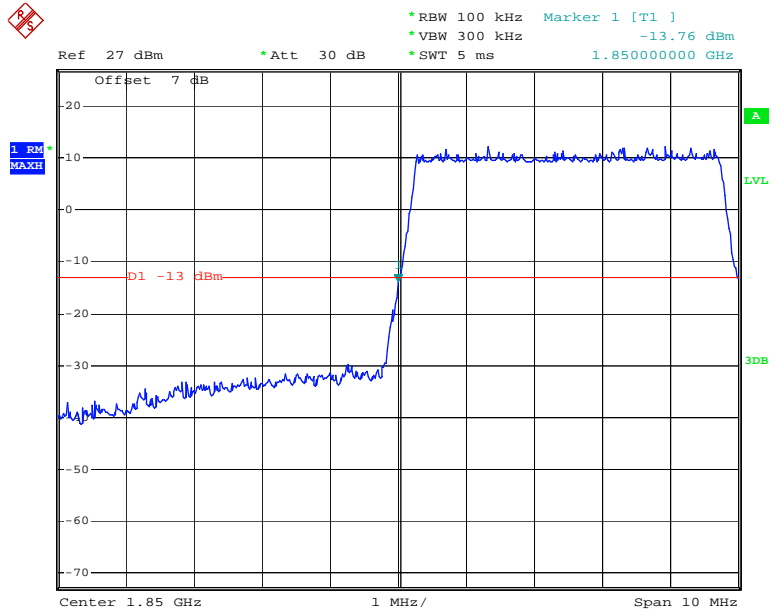
Date: 31.MAR.2018 10:58:15

QPSK_3MHz_15 RB_Right



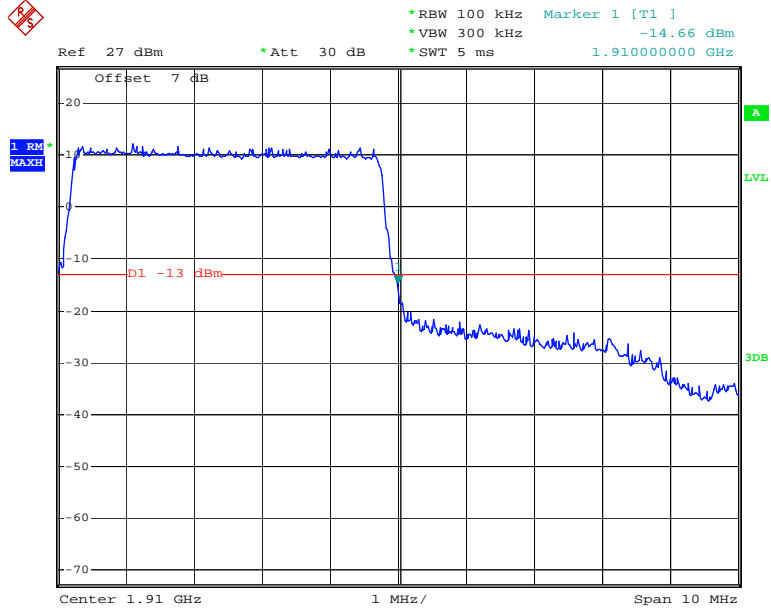
Date: 31.MAR.2018 10:56:28

QPSK_5MHz_25 RB_Left



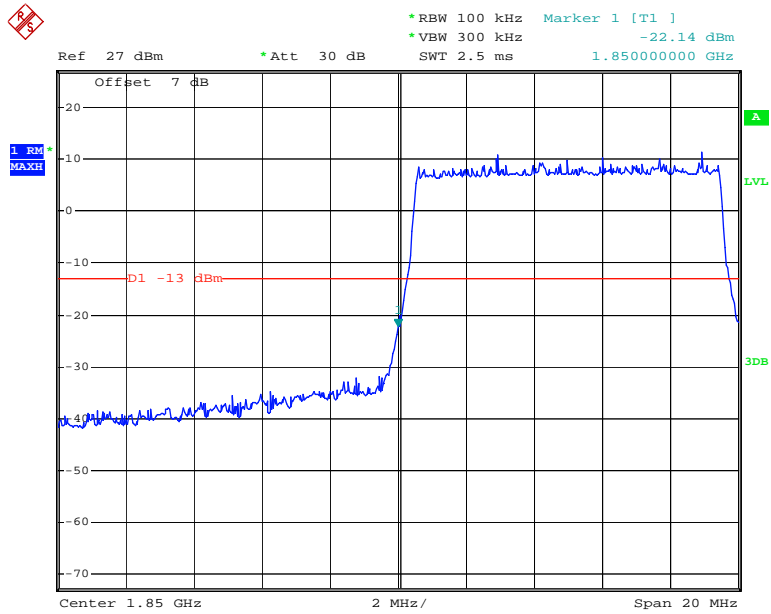
Date: 31.MAR.2018 11:00:18

QPSK_5MHz_25 RB_Right



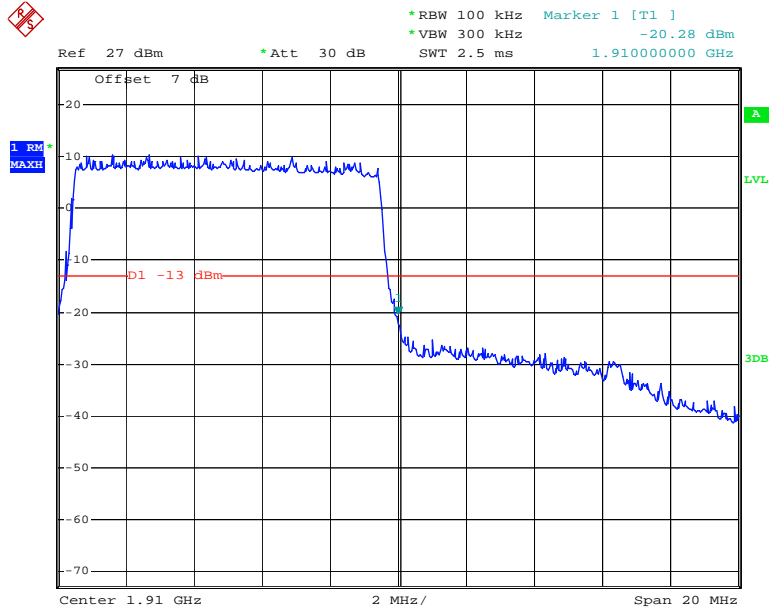
Date: 31.MAR.2018 11:02:32

QPSK_10MHz_50 RB_Left



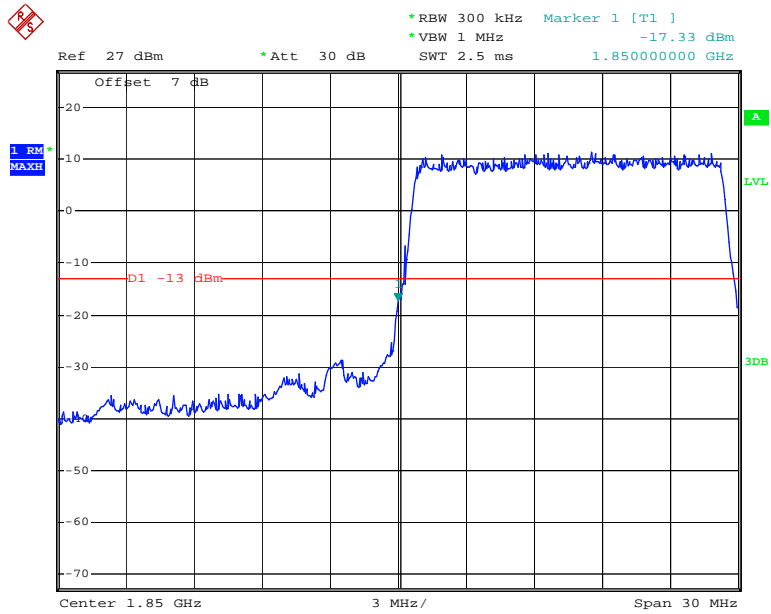
Date: 31.MAR.2018 11:06:26

QPSK_10MHz_50 RB_Right



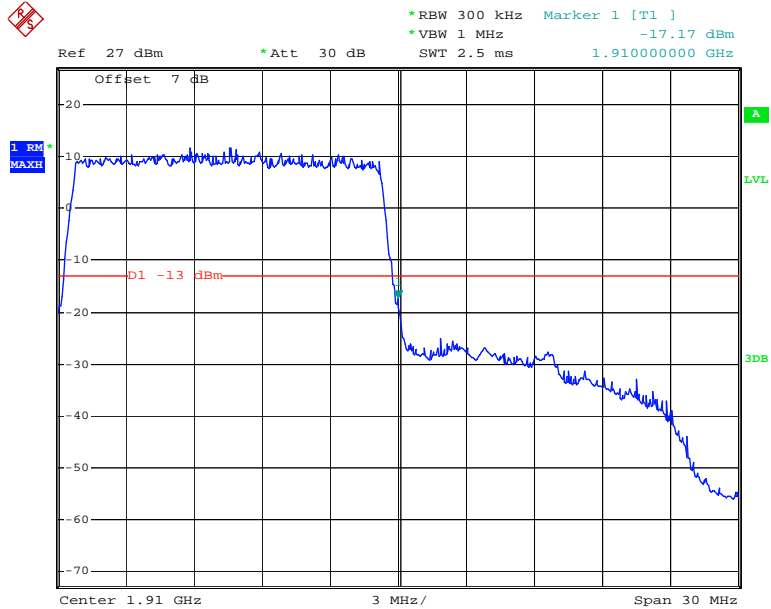
Date: 31.MAR.2018 11:05:18

QPSK_15MHz_75 RB_Left



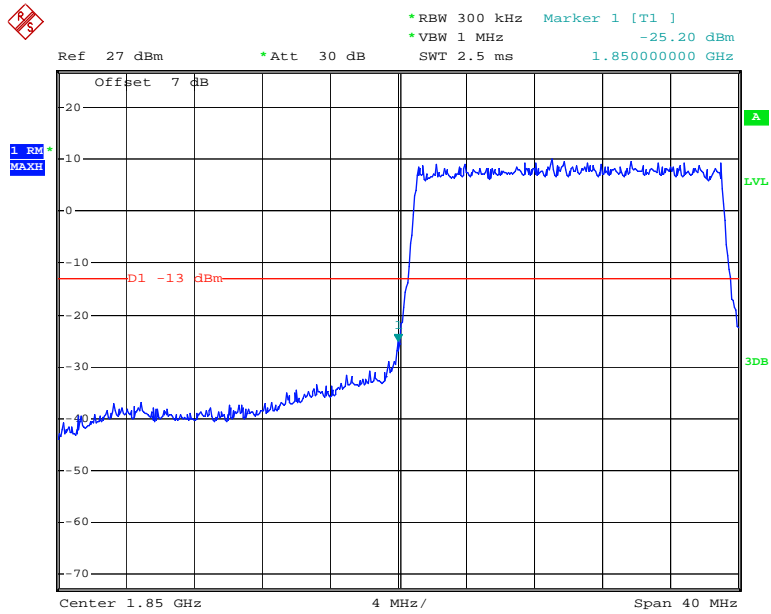
Date: 31.MAR.2018 11:10:50

QPSK_15MHz_75 RB_Right



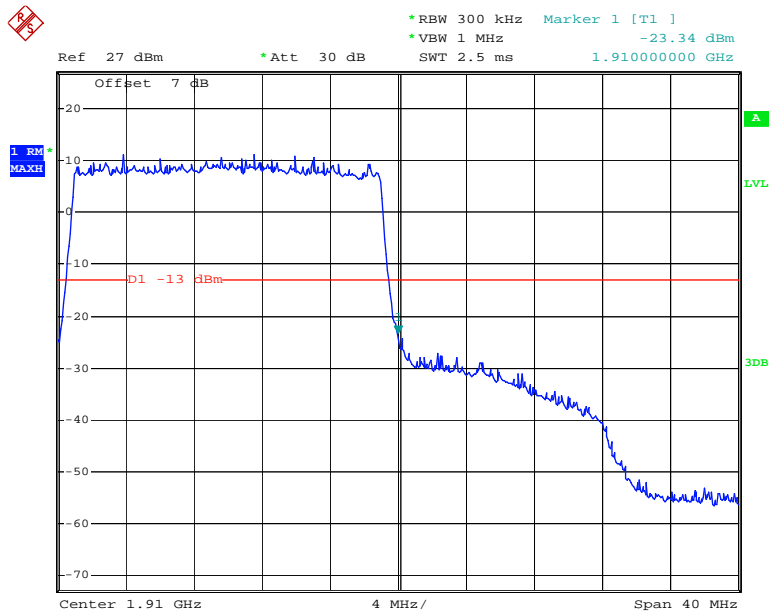
Date: 31.MAR.2018 11:12:31

QPSK_20MHz_FULL RB_Left



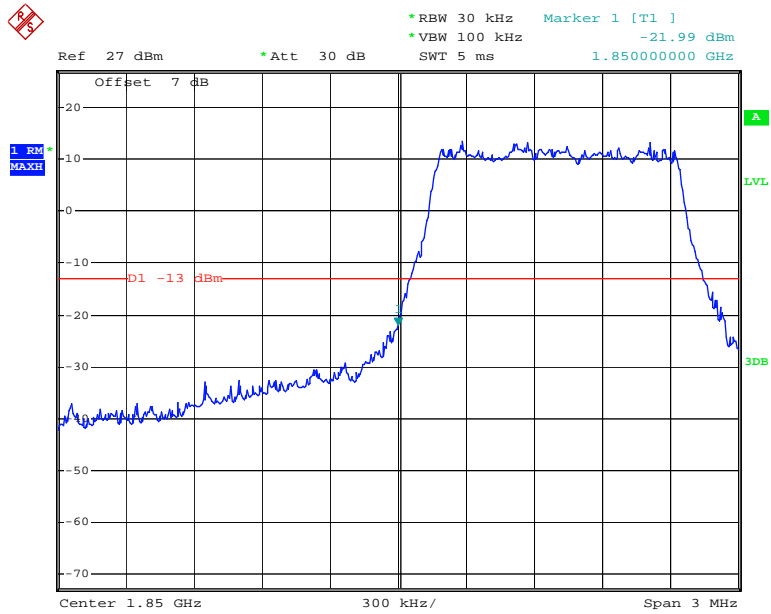
Date: 31.MAR.2018 11:16:09

QPSK_20MHz_FULL RB_Right



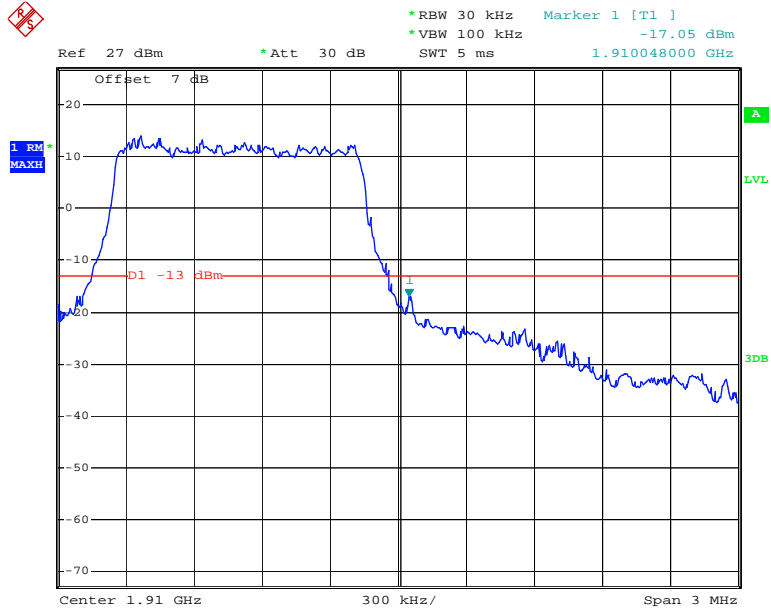
Date: 31.MAR.2018 11:14:04

16QAM_1.4MHz_6 RB_ Left



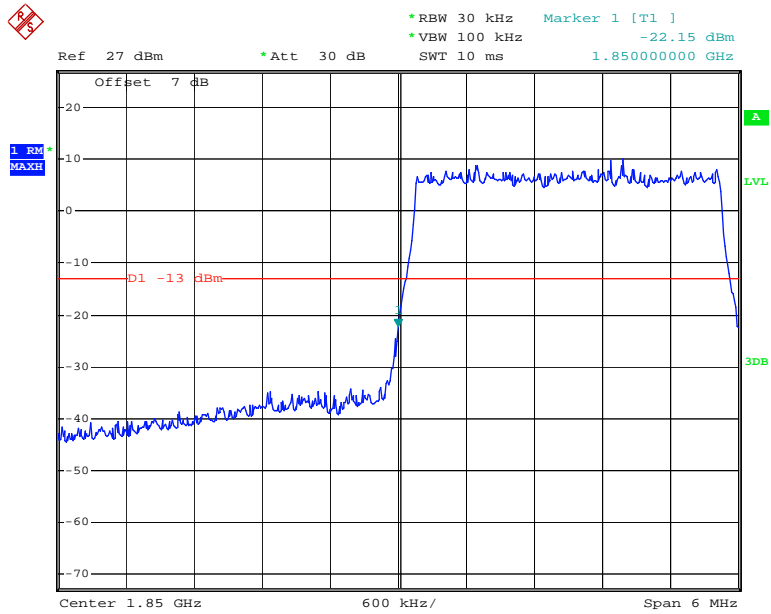
Date: 31.MAR.2018 10:53:18

16QAM_1.4MHz_6 RB_ Right



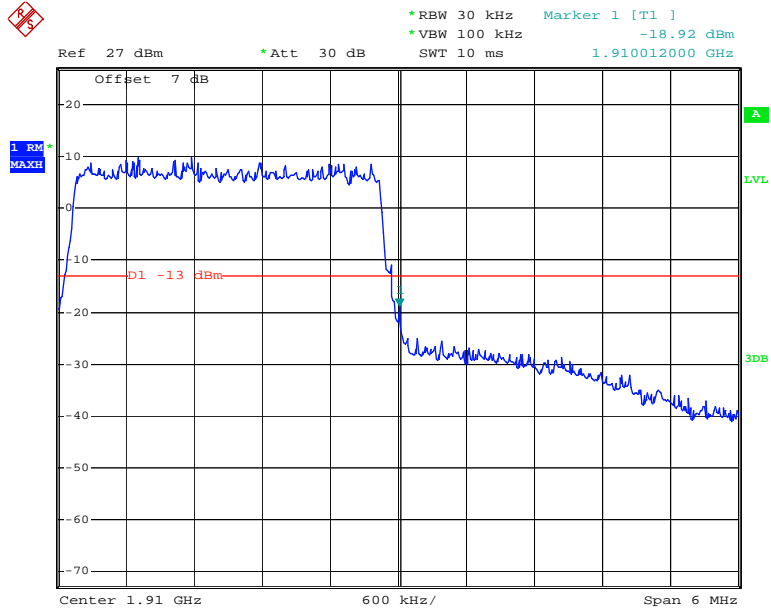
Date: 31.MAR.2018 10:54:28

16QAM_3MHz_15 RB_Left



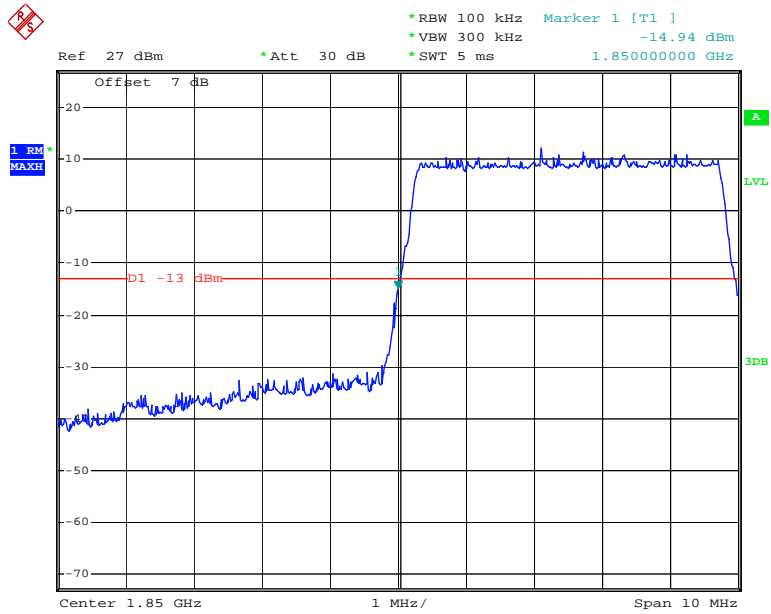
Date: 31.MAR.2018 10:57:50

16QAM_3MHz_15 RB_Right



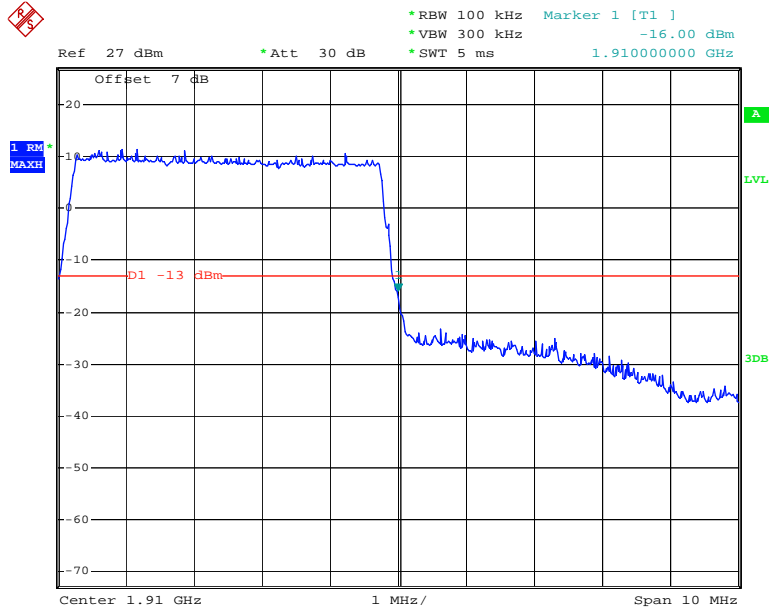
Date: 31.MAR.2018 10:57:10

16QAM_5MHz_25 RB_Left



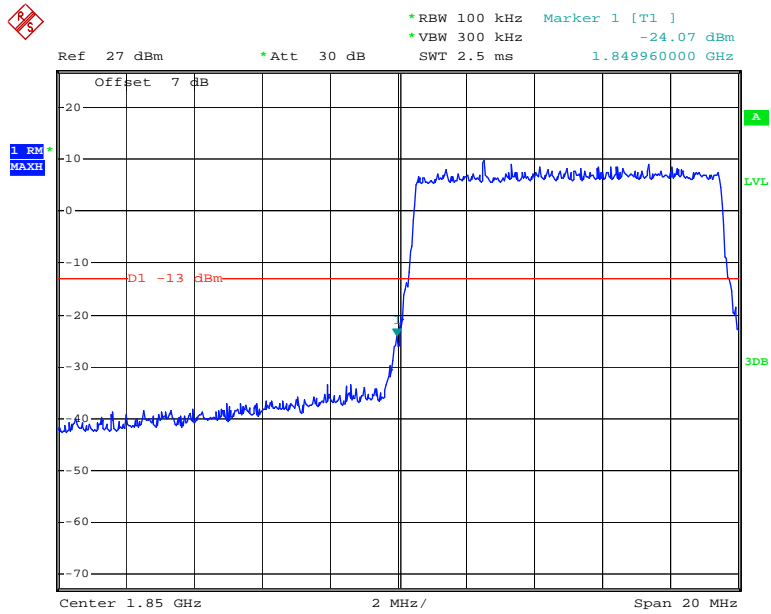
Date: 31.MAR.2018 11:00:57

16QAM_5MHz_25 RB_Right



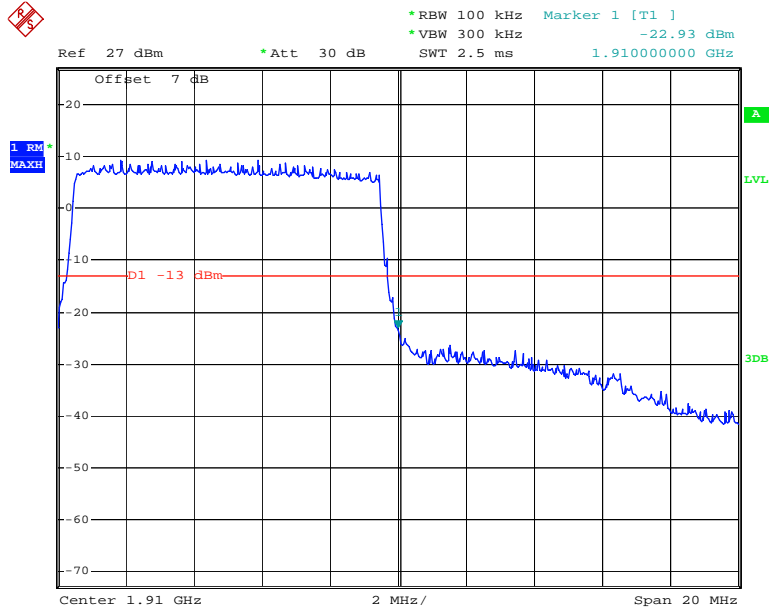
Date: 31.MAR.2018 11:01:56

16QAM_10MHz_50 RB_Left



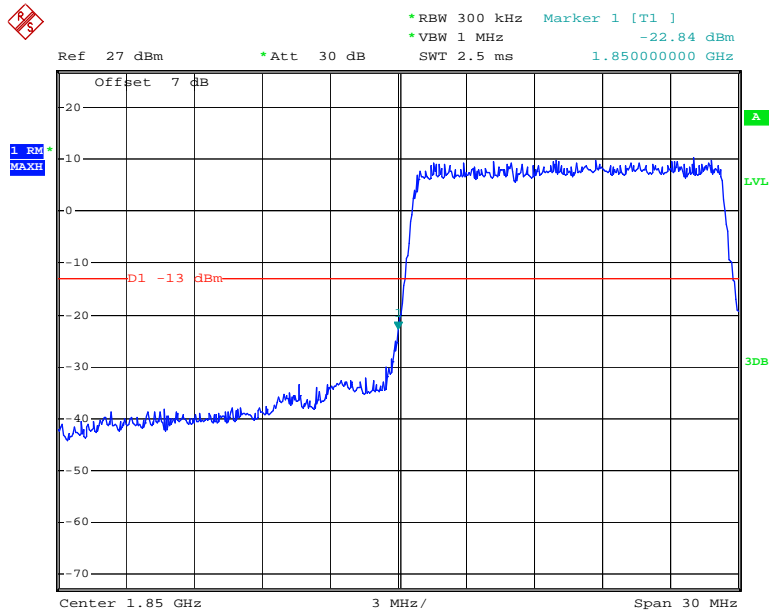
Date: 31.MAR.2018 11:07:12

16QAM_10MHz_50 RB_Right



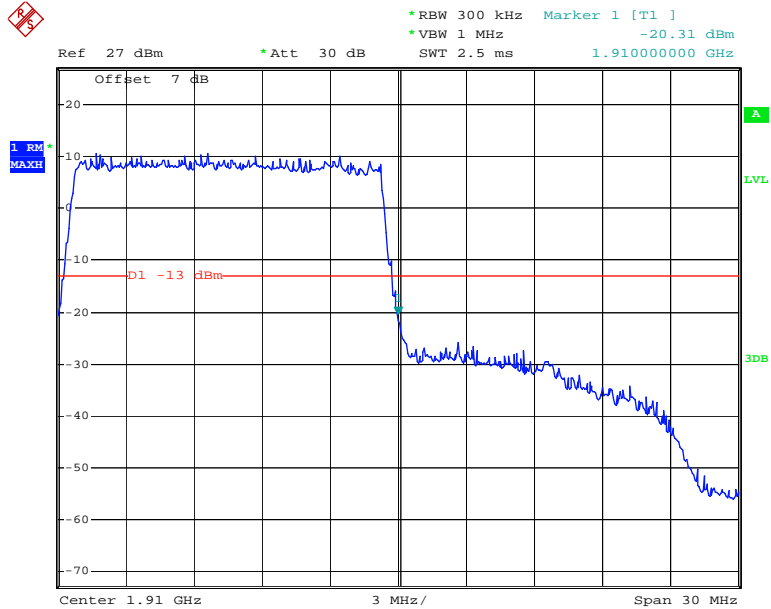
Date: 31.MAR.2018 11:04:44

16QAM_15MHz_75 RB_Left



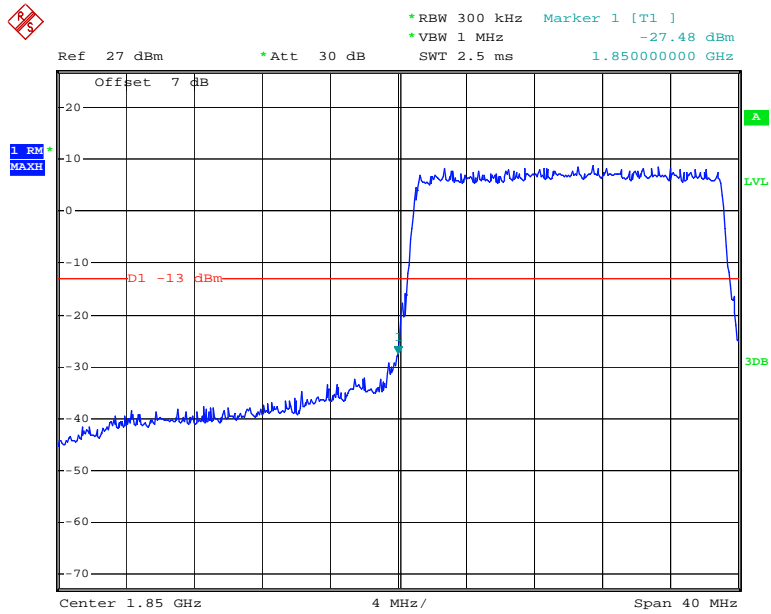
Date: 31.MAR.2018 11:11:20

16QAM_15MHz_75 RB_Right



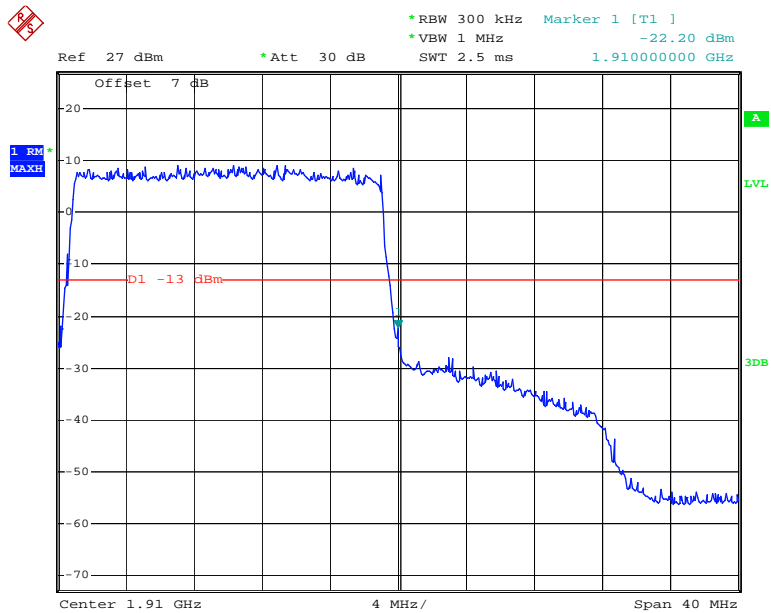
Date: 31.MAR.2018 11:11:59

16QAM_20MHz_FULL RB_Left



Date: 31.MAR.2018 11:15:31

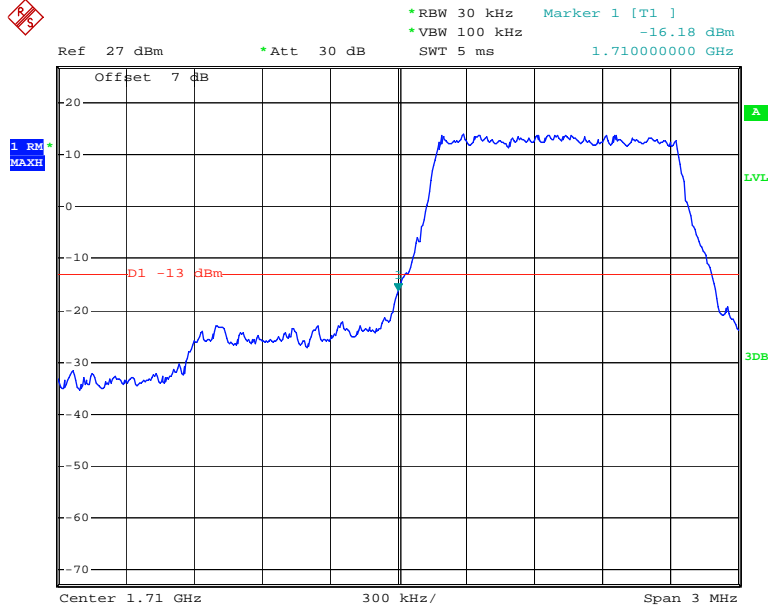
16QAM_20MHz_FULL RB_Right



Date: 31.MAR.2018 11:14:43

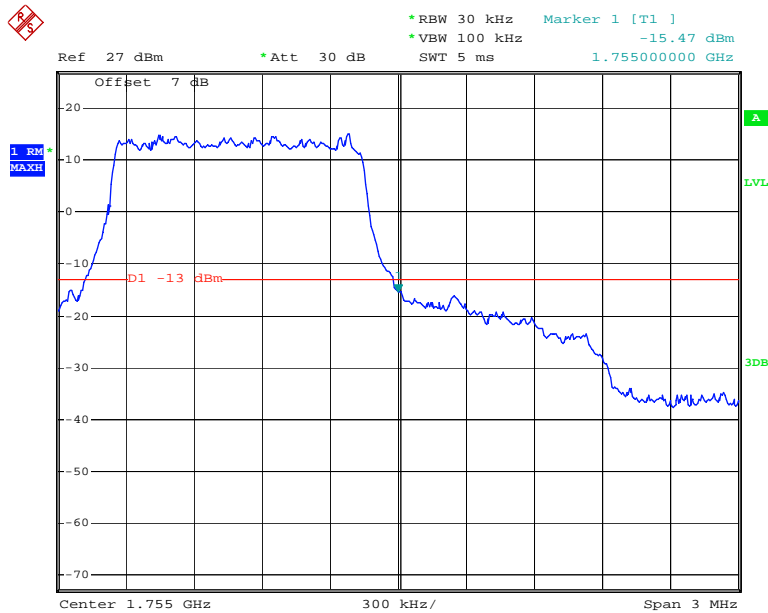
LTE Band 4:

QPSK_1.4MHz_6 RB_Left



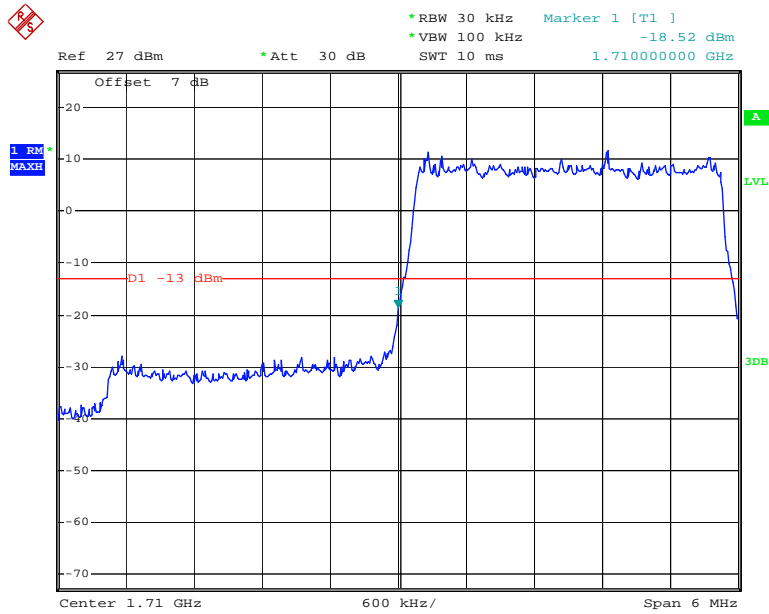
Date: 31.MAR.2018 11:18:54

QPSK_1.4MHz_6 RB_Right



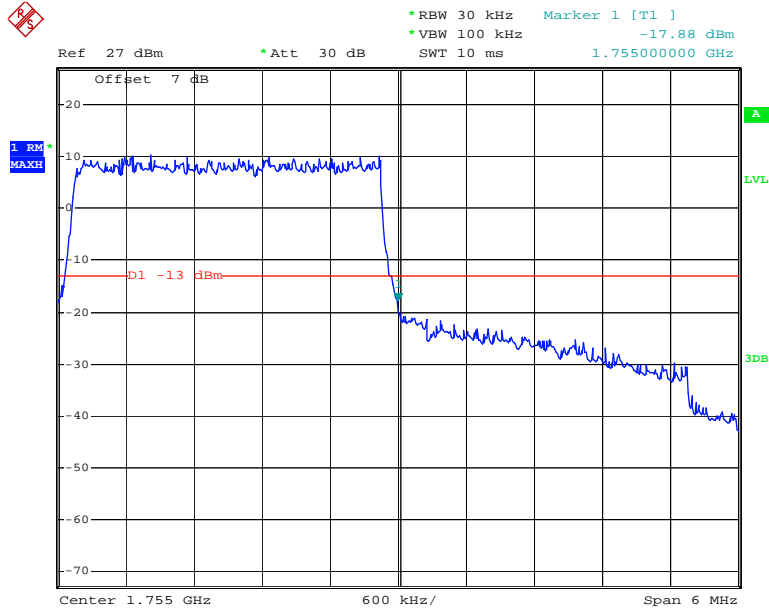
Date: 31.MAR.2018 11:28:30

QPSK_3MHz_15 RB_Left



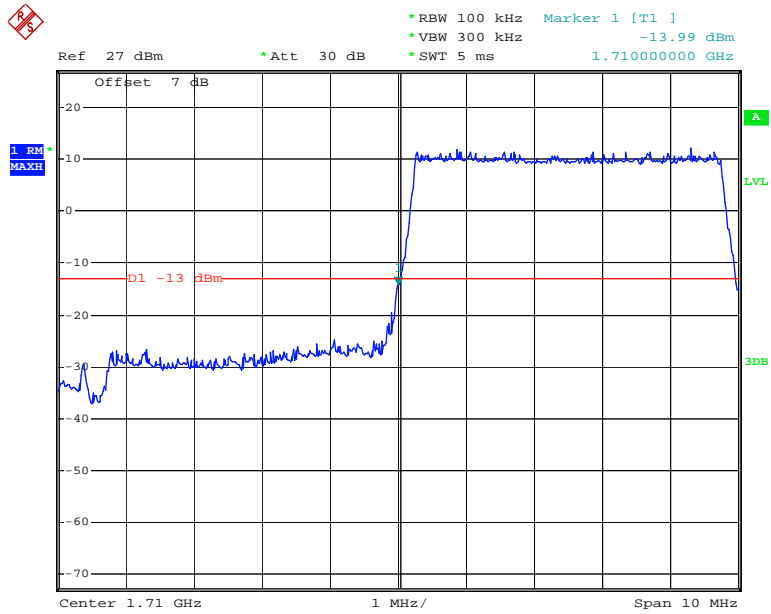
Date: 31.MAR.2018 15:00:12

QPSK_3MHz_15 RB_Right



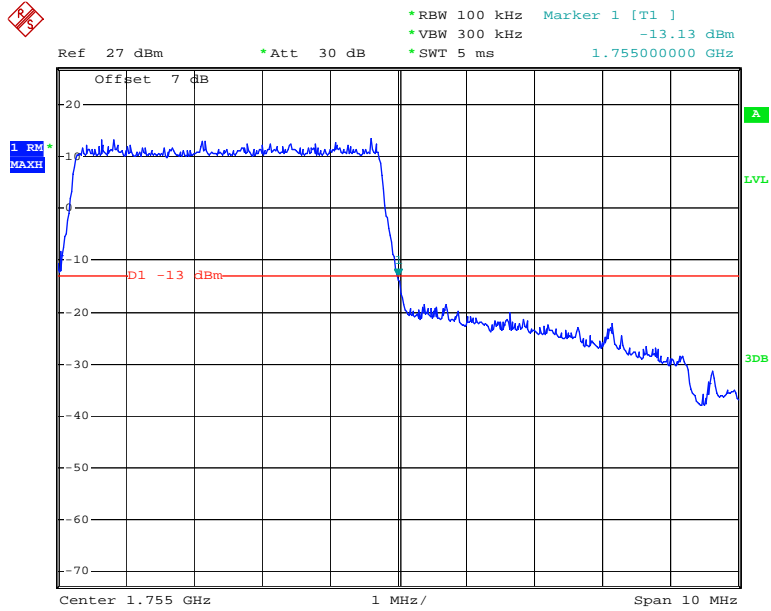
Date: 31.MAR.2018 15:01:52

QPSK_5MHz_25 RB_Left



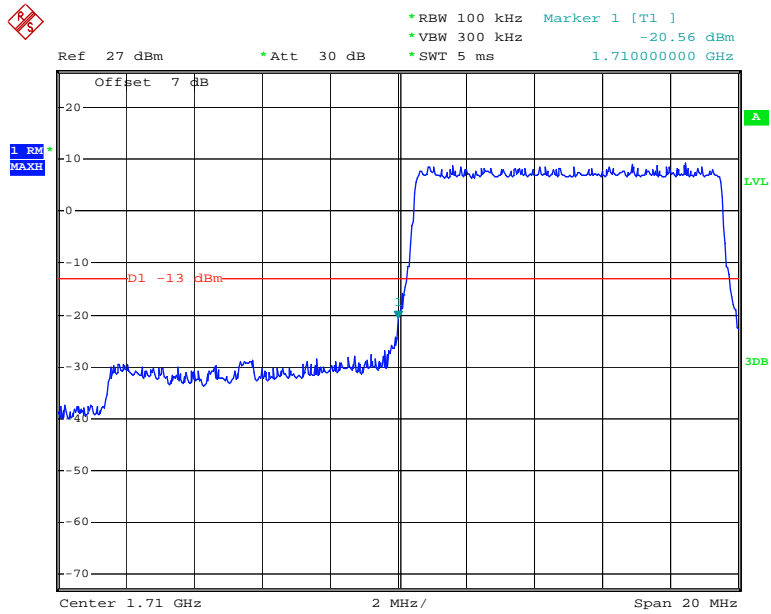
Date: 31.MAR.2018 15:07:55

QPSK_5MHz_25 RB_Right



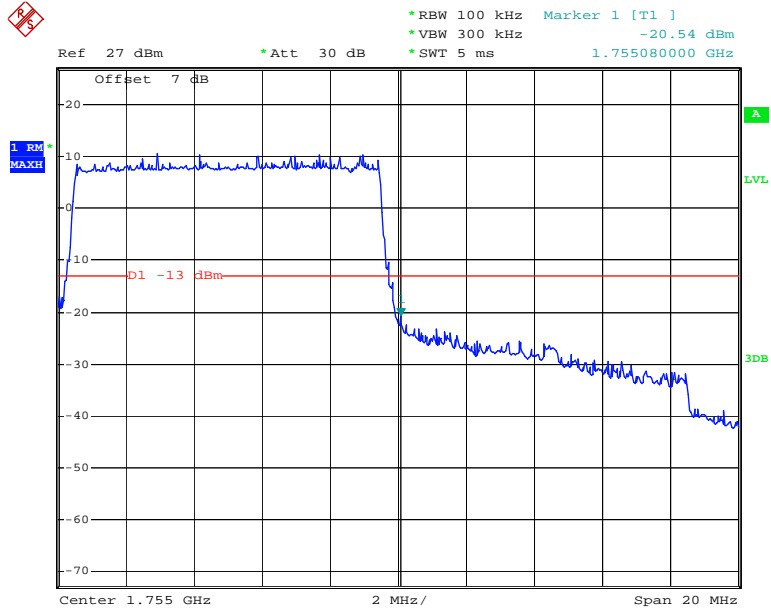
Date: 31.MAR.2018 15:05:38

QPSK_10MHz_50 RB_ Left



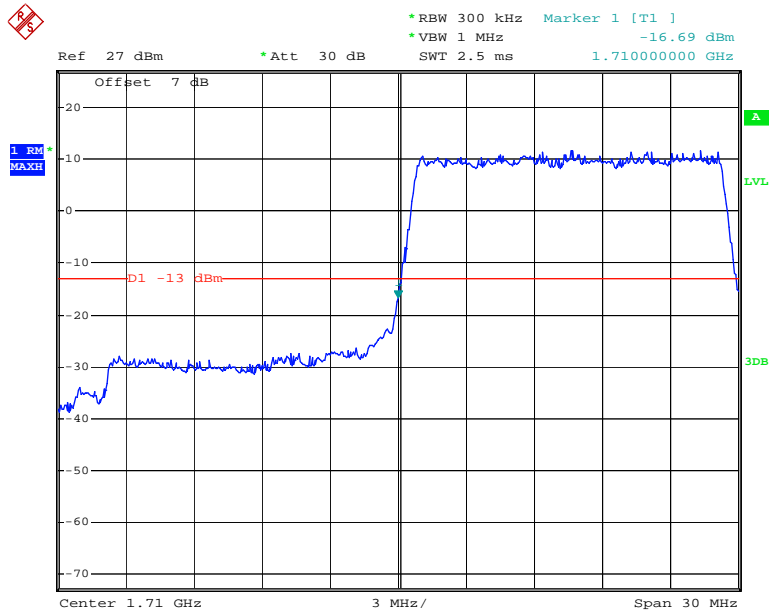
Date: 31.MAR.2018 15:10:54

QPSK_10MHz_50 RB_ Right



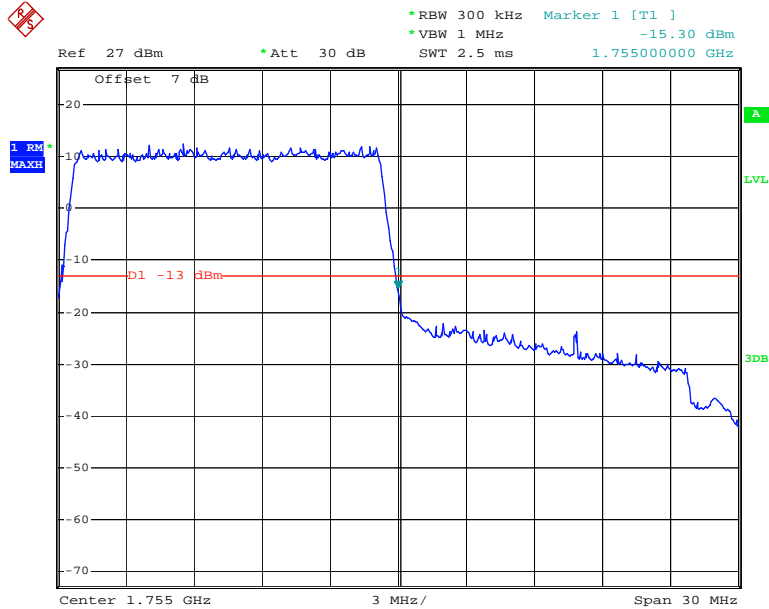
Date: 31.MAR.2018 15:12:59

QPSK_15MHz_75 RB_Left



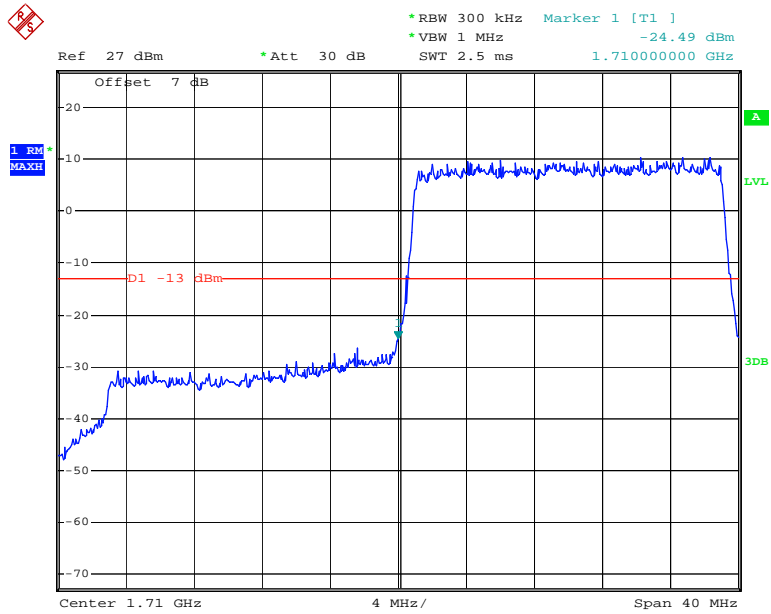
Date: 31.MAR.2018 15:19:46

QPSK_15MHz_75 RB_Right



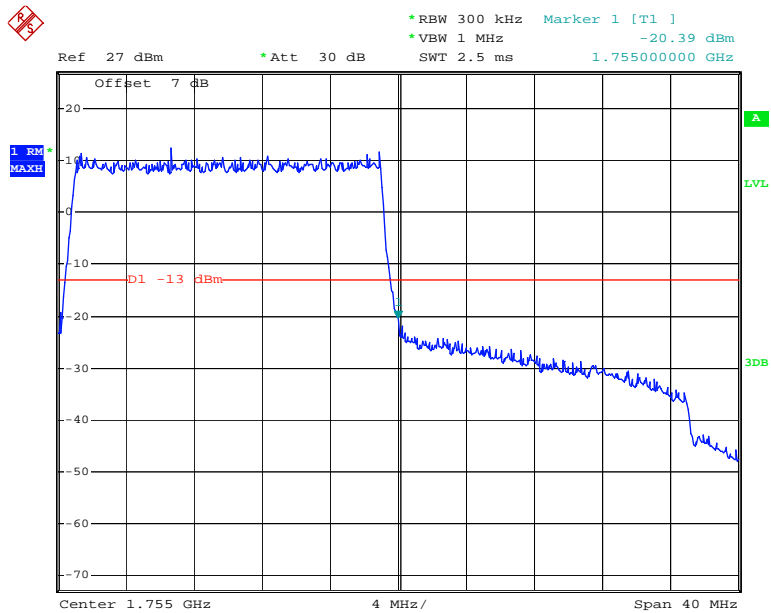
Date: 31.MAR.2018 15:15:09

QPSK_20MHz_FULL RB_Left



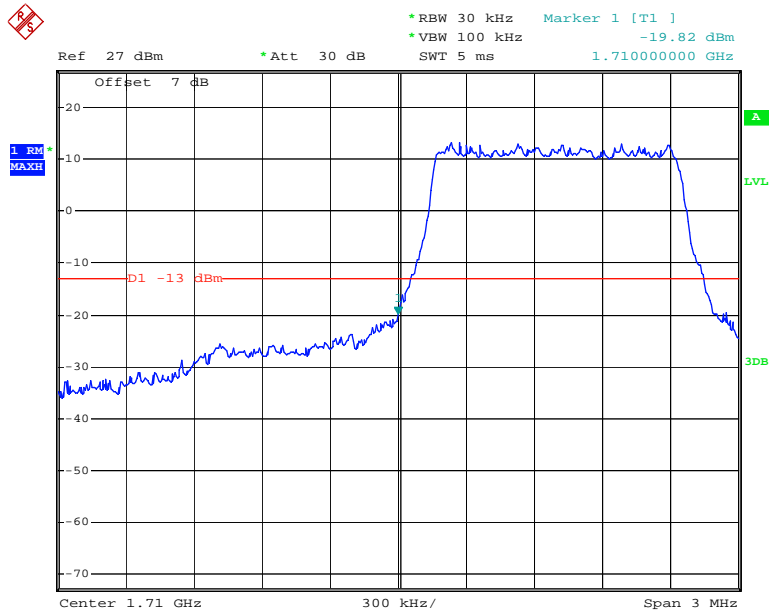
Date: 31.MAR.2018 15:20:51

QPSK_20MHz_FULL RB_Right



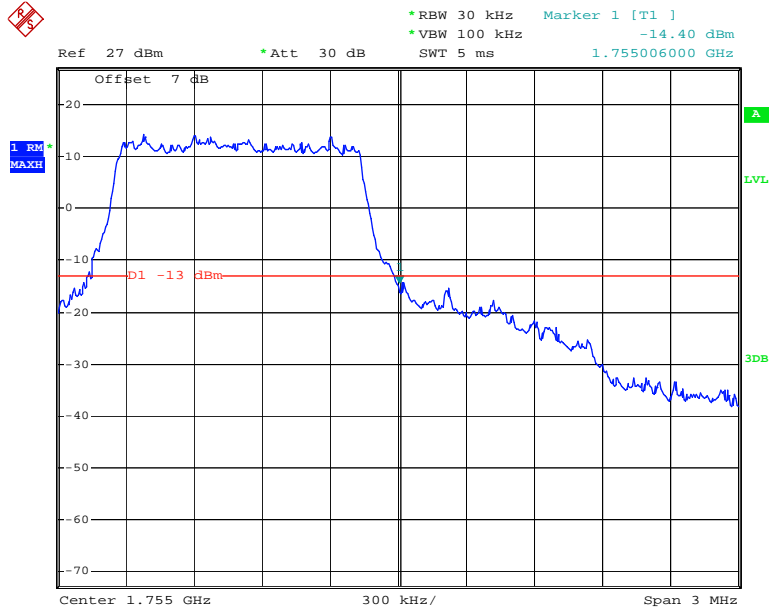
Date: 31.MAR.2018 15:24:37

16QAM_1.4MHz_6 RB_ Left



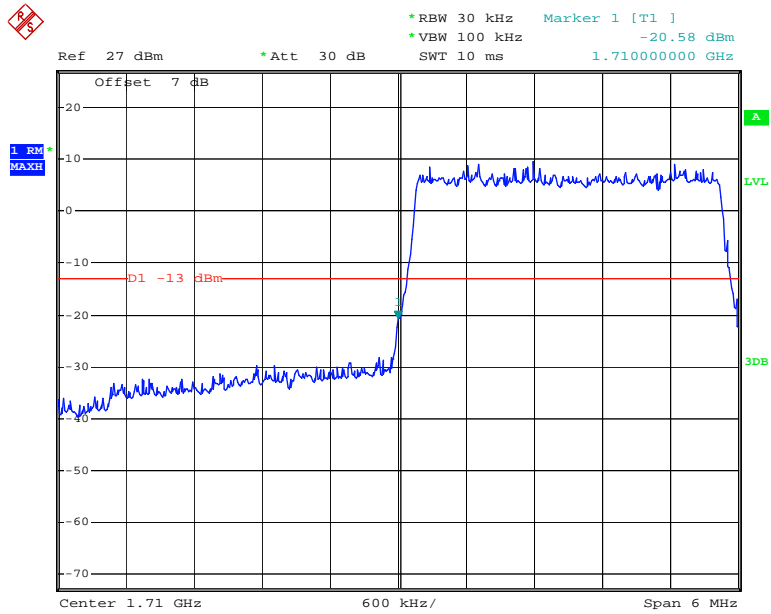
Date: 31.MAR.2018 11:19:35

16QAM_1.4MHz_6 RB_ Right



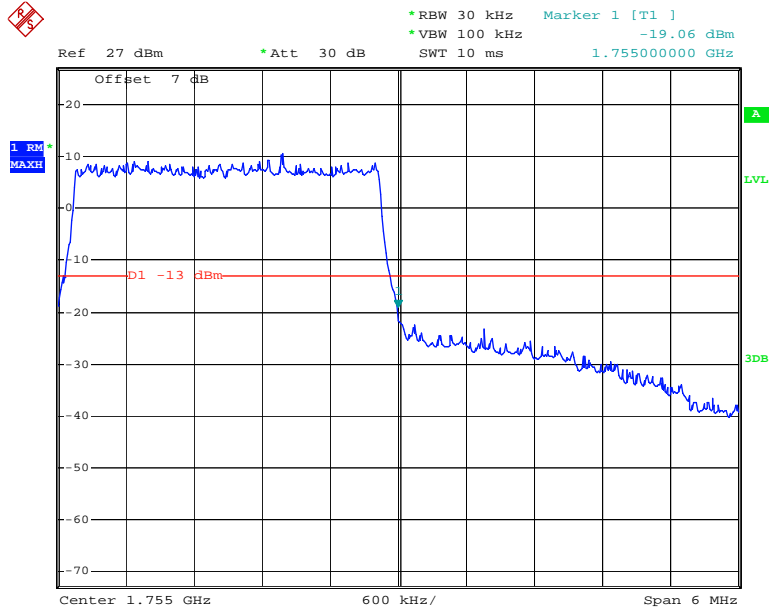
Date: 31.MAR.2018 11:20:34

16QAM_3MHz_15 RB_Left



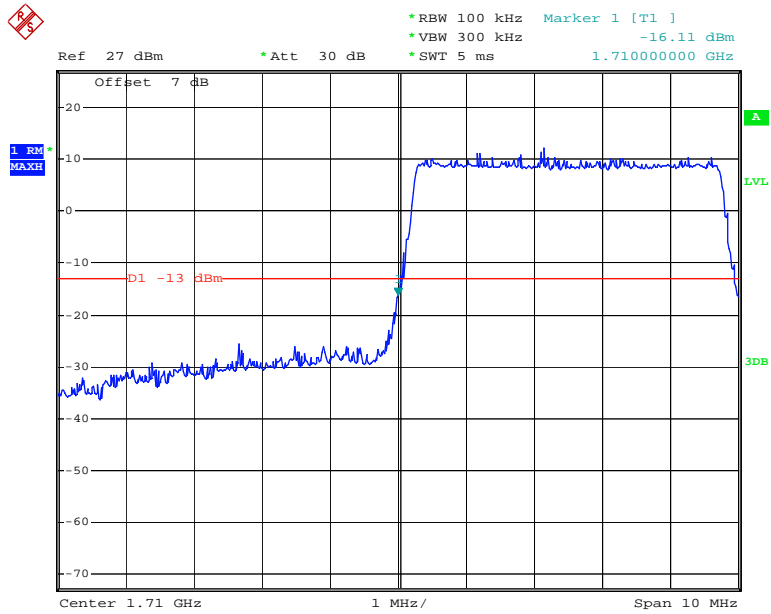
Date: 31.MAR.2018 15:00:41

16QAM_3MHz_15 RB_Right



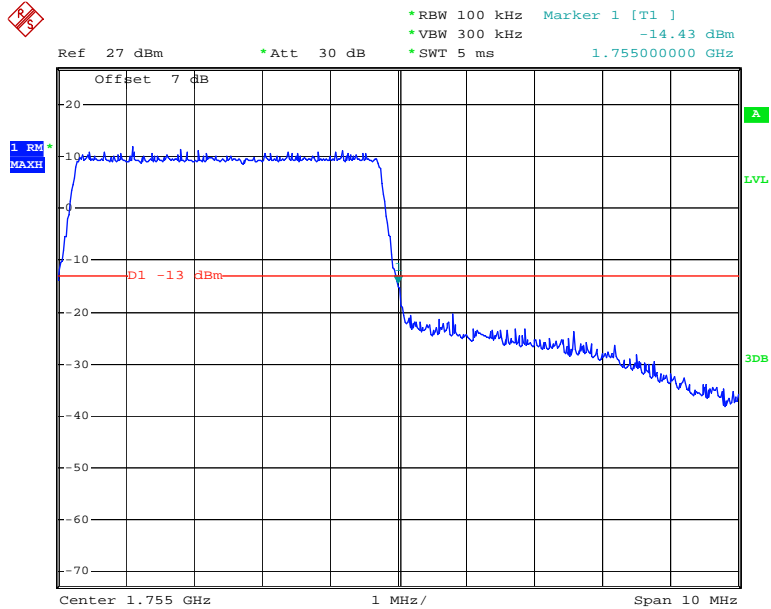
Date: 31.MAR.2018 15:01:24

16QAM_5MHz_25 RB_Left



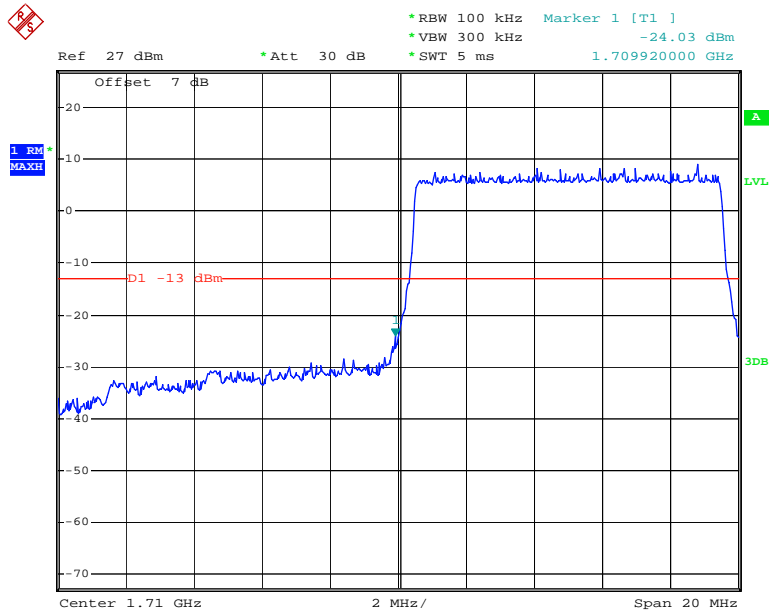
Date: 31.MAR.2018 15:07:04

16QAM_5MHz_25 RB_Right



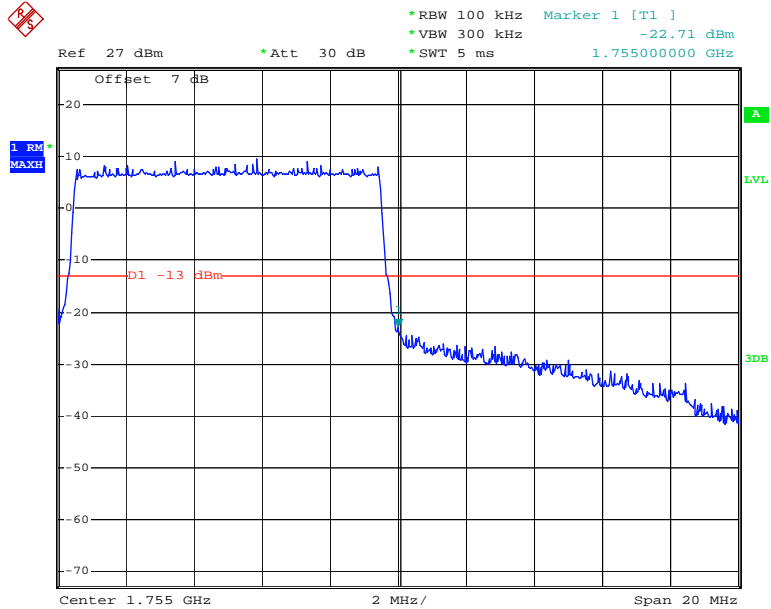
Date: 31.MAR.2018 15:06:17

16QAM_10MHz_50 RB_Left



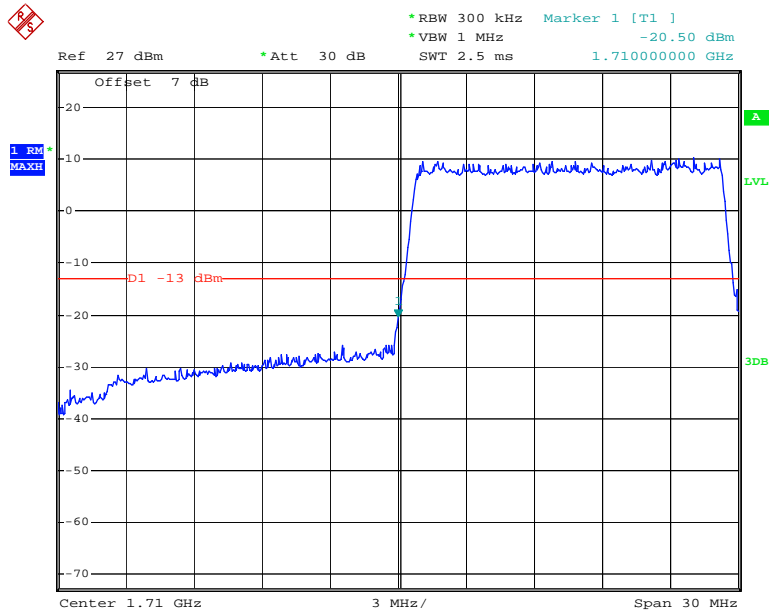
Date: 31.MAR.2018 15:11:34

16QAM_10MHz_50 RB_Right



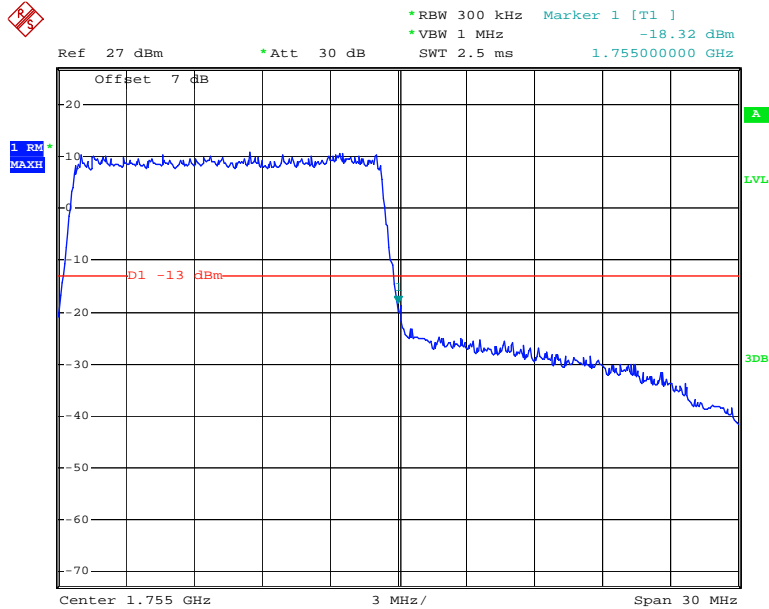
Date: 31.MAR.2018 15:12:15

16QAM_15MHz_75 RB_Left



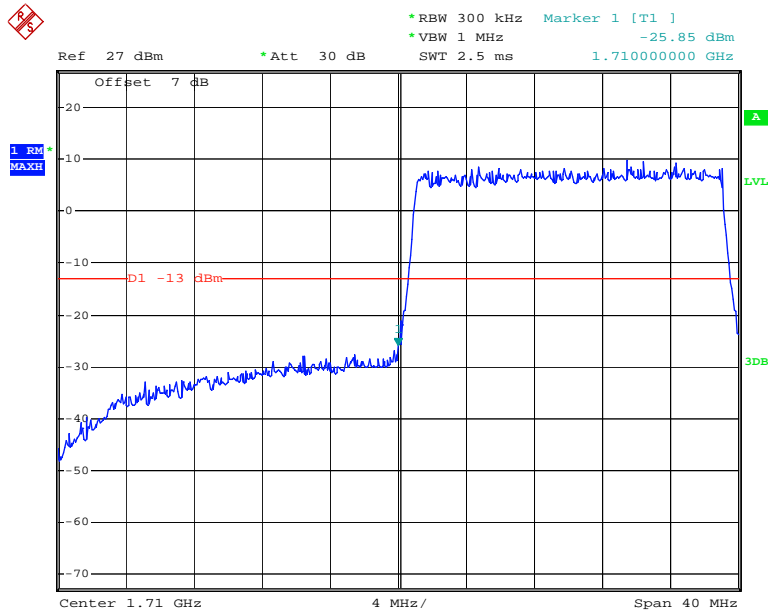
Date: 31.MAR.2018 15:18:29

16QAM_15MHz_75 RB_Right



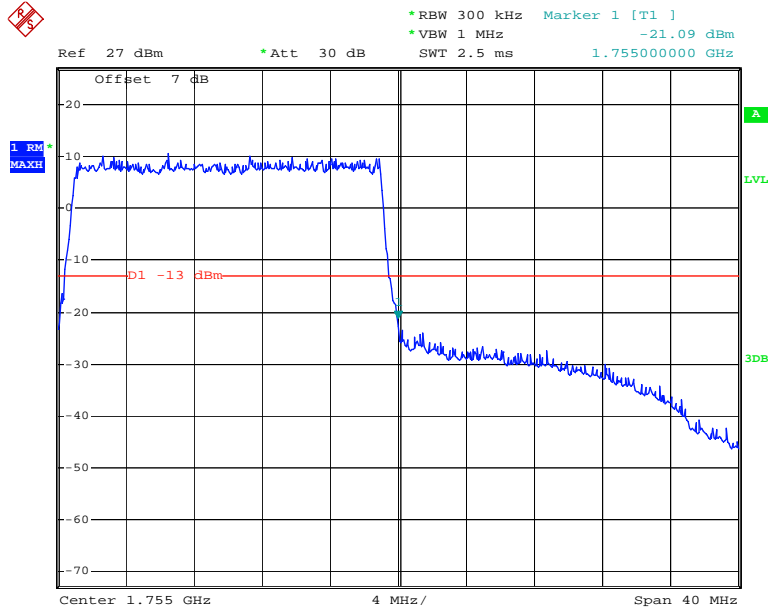
Date: 31.MAR.2018 15:16:06

16QAM_20MHz_FULL RB_Left



Date: 31.MAR.2018 15:21:25

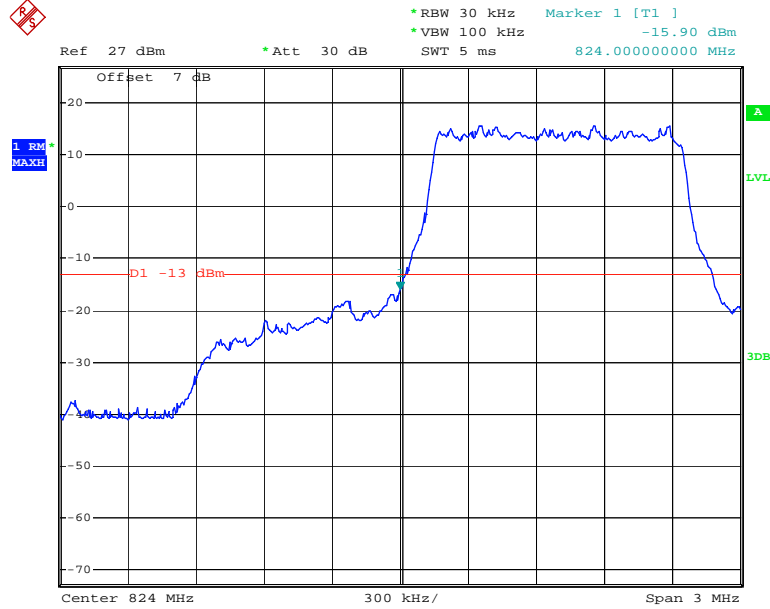
16QAM_20MHz_FULL RB_Right



Date: 31.MAR.2018 15:22:54

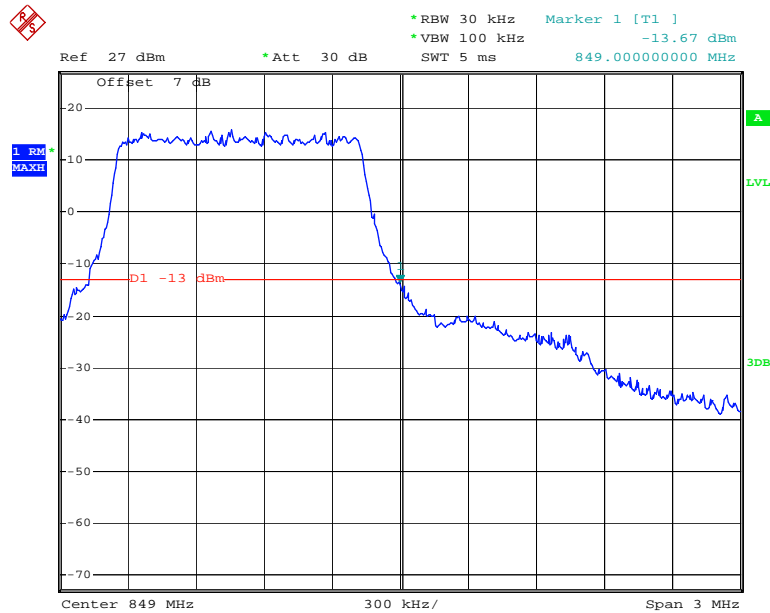
LTE Band 5:

QPSK_1.4MHz_6 RB_Left



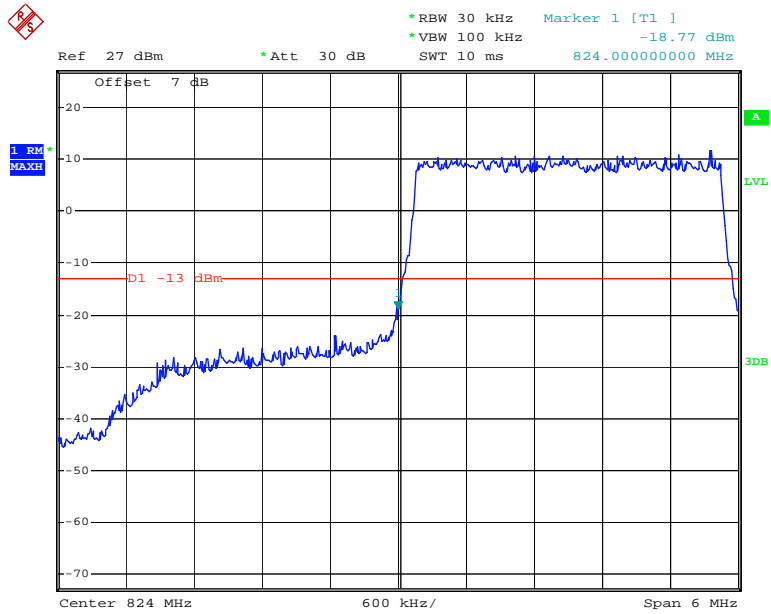
Date: 31.MAR.2018 15:27:05

QPSK_1.4MHz_6 RB_Right



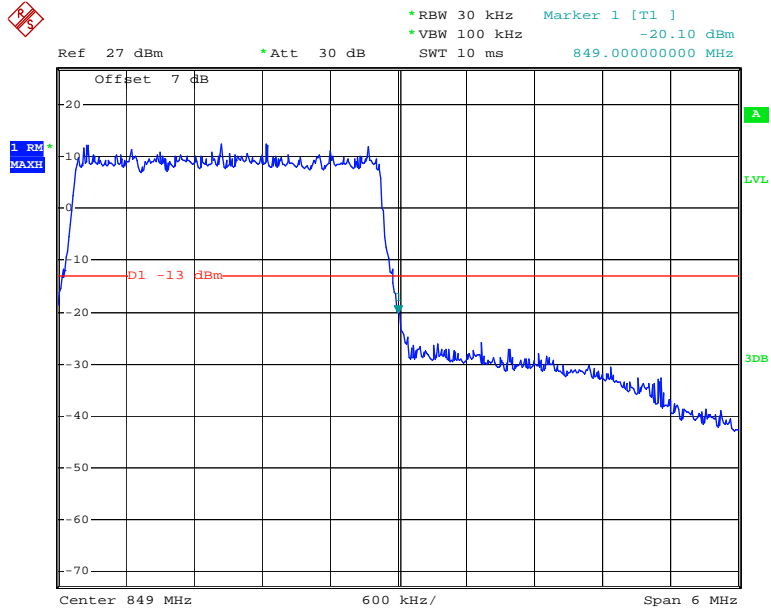
Date: 31.MAR.2018 15:30:00

QPSK_3MHz_15 RB_Left



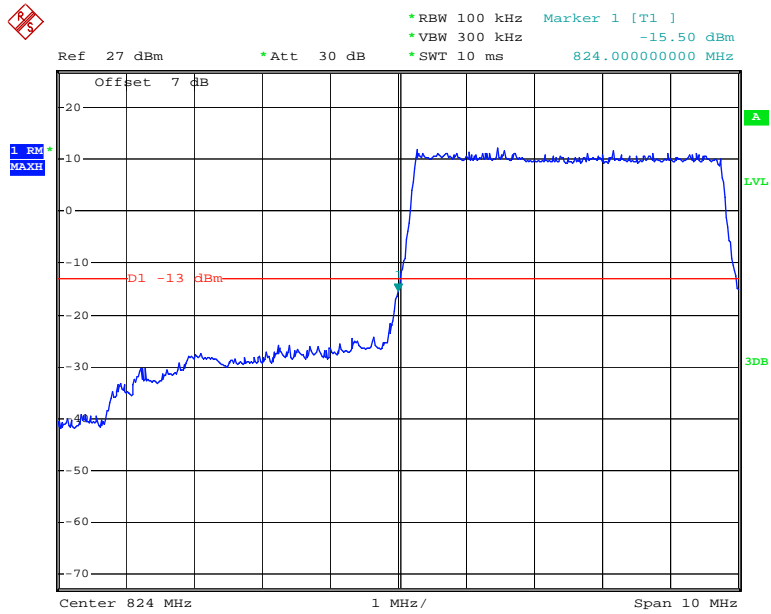
Date: 31.MAR.2018 15:34:57

QPSK_3MHz_15 RB_Right



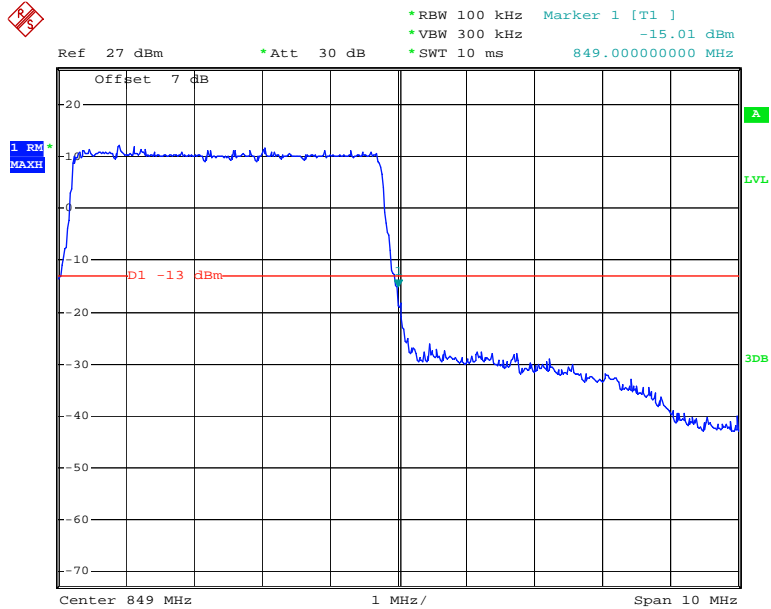
Date: 31.MAR.2018 15:31:34

QPSK_5MHz_25 RB_Left



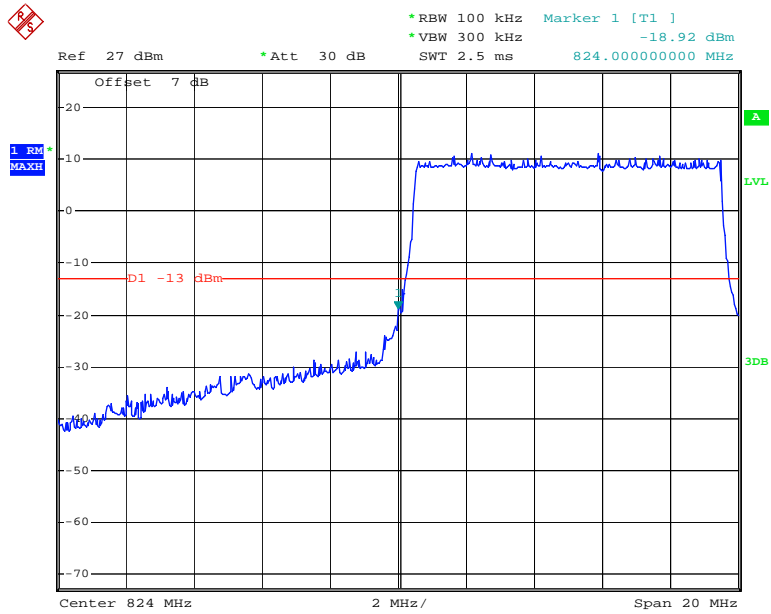
Date: 31.MAR.2018 15:37:36

QPSK_5MHz_25 RB_Right



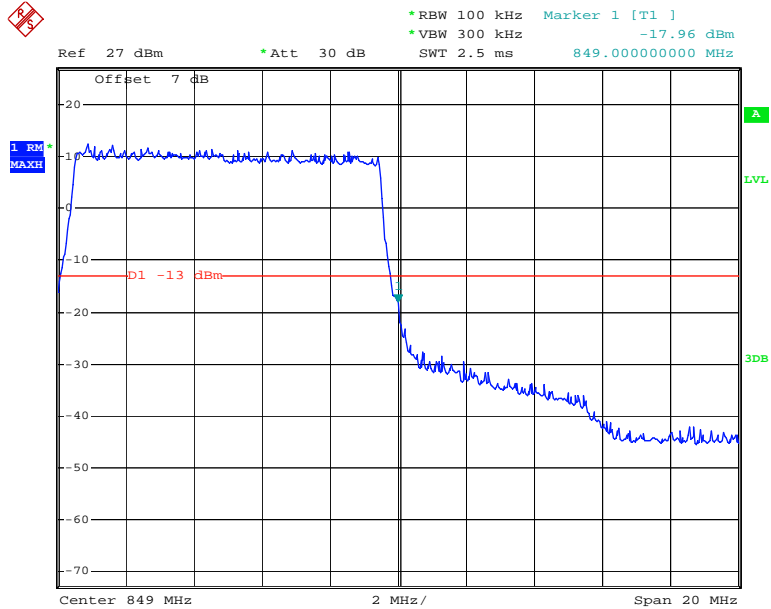
Date: 31.MAR.2018 15:38:57

QPSK_10MHz_50 RB_Left



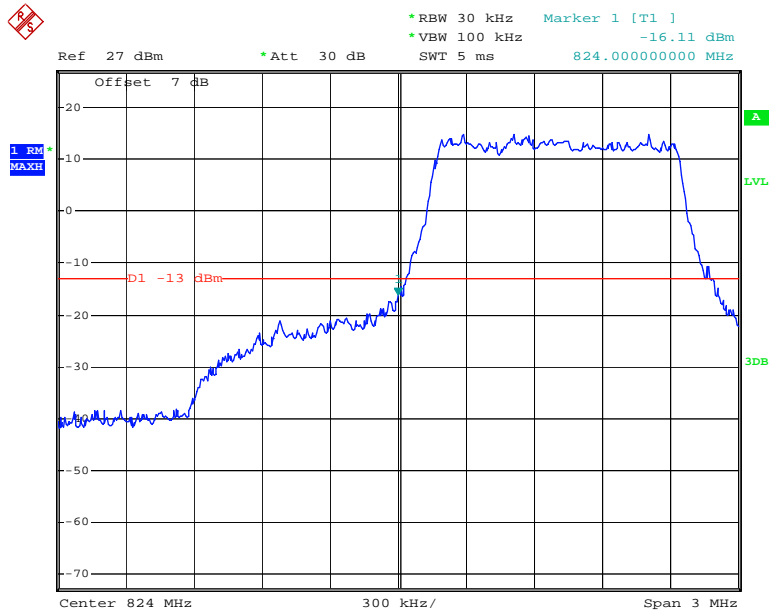
Date: 31.MAR.2018 15:43:19

QPSK_10MHz_50 RB_Right



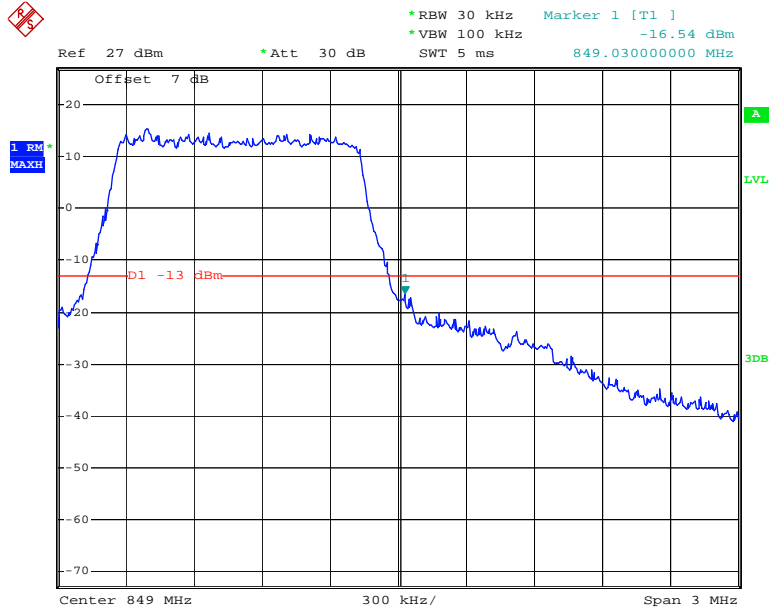
Date: 31.MAR.2018 15:41:26

16QAM_1.4MHz_6 RB_ Left



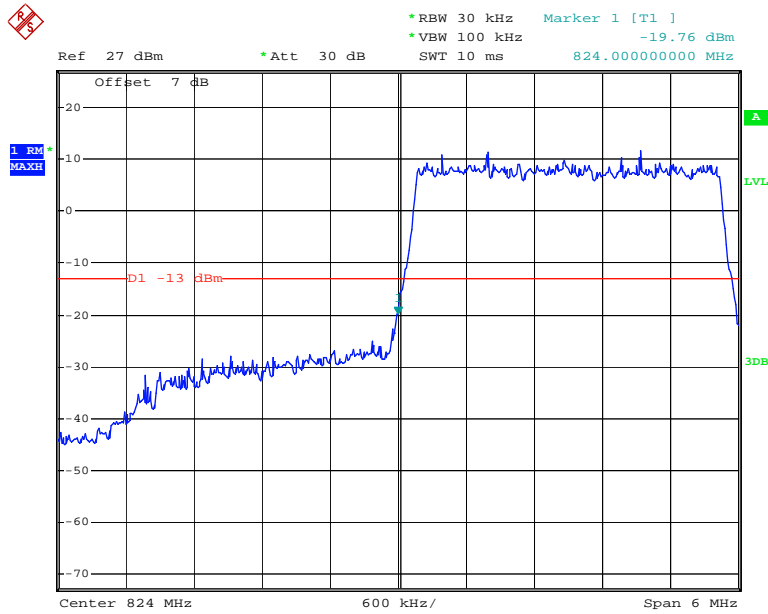
Date: 31.MAR.2018 15:27:51

16QAM_1.4MHz_6 RB_ Right



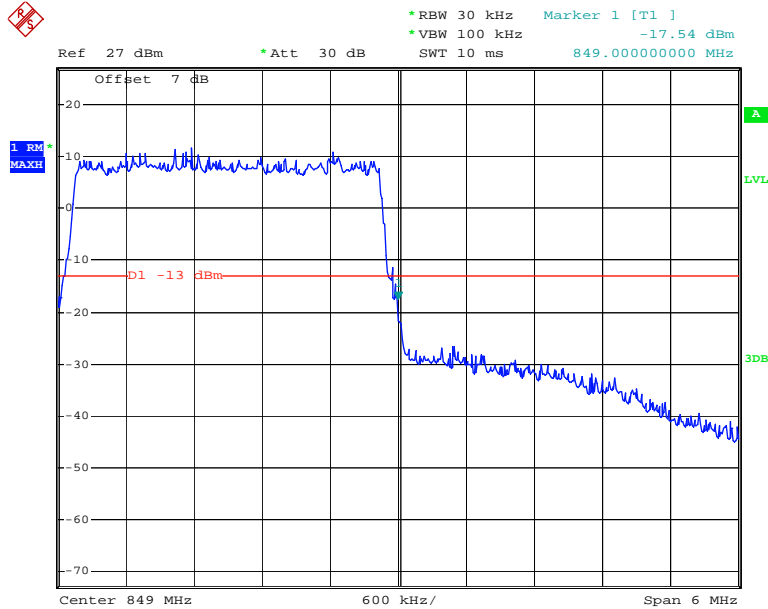
Date: 31.MAR.2018 15:29:07

16QAM_3MHz_15 RB_Left



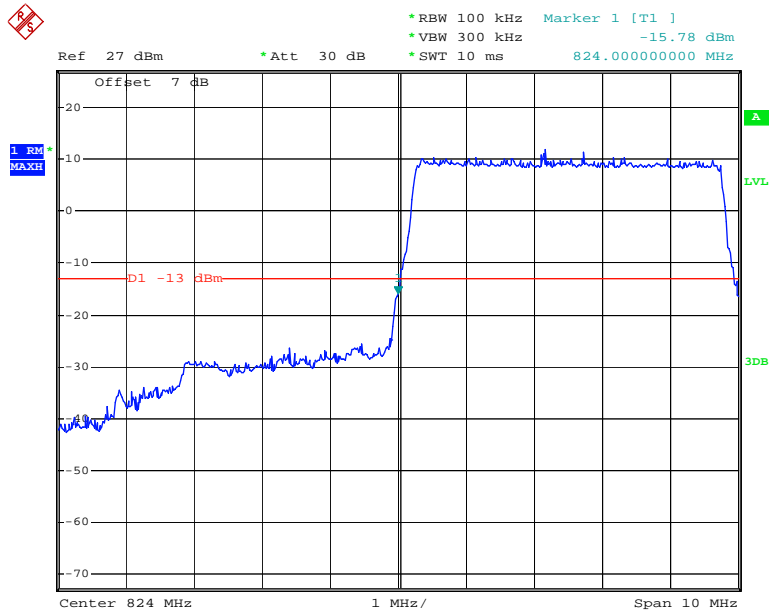
Date: 31.MAR.2018 15:34:24

16QAM_3MHz_15 RB_Right



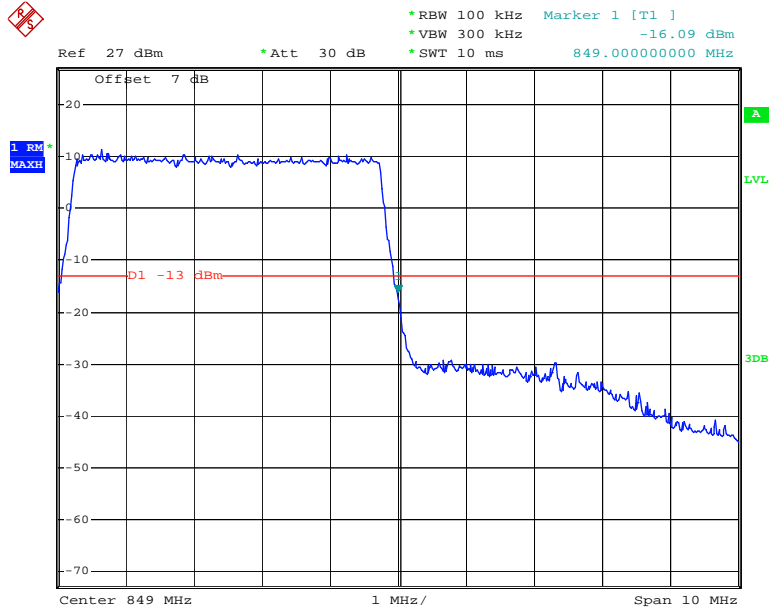
Date: 31.MAR.2018 15:32:38

16QAM_5MHz_25 RB_Left



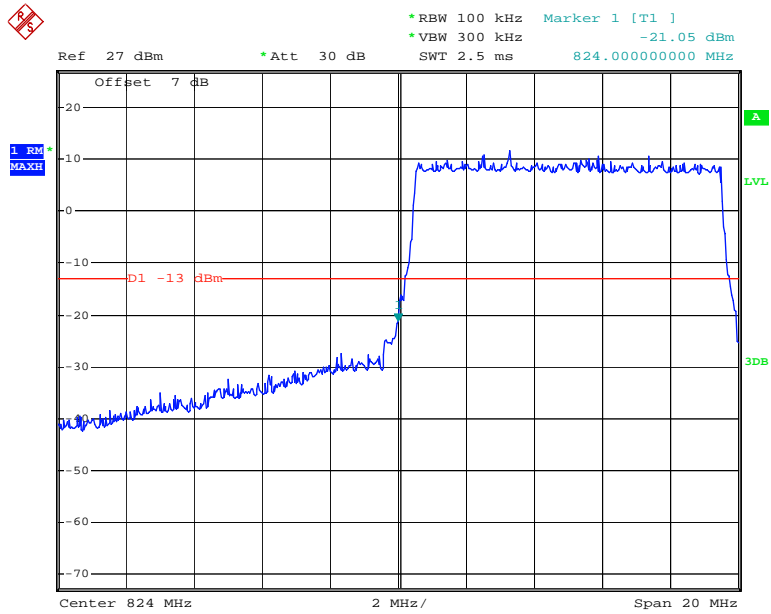
Date: 31.MAR.2018 15:36:36

16QAM_5MHz_25 RB_Right



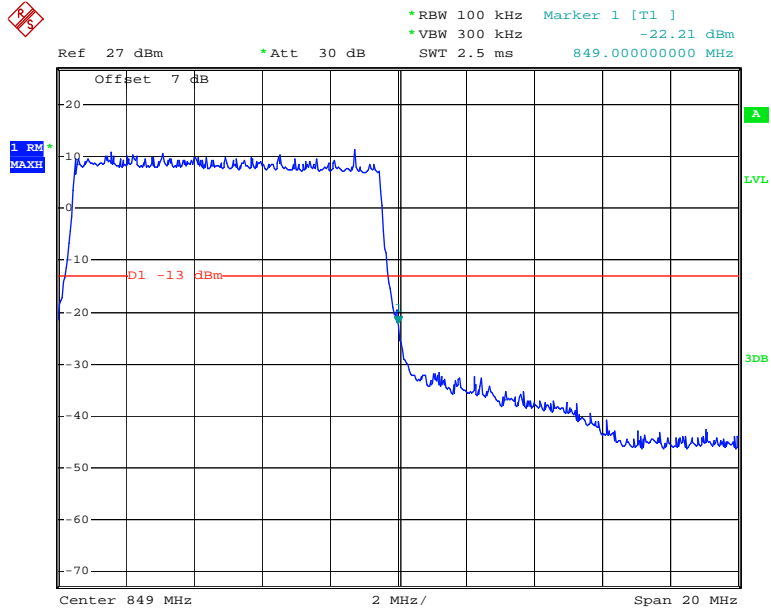
Date: 31.MAR.2018 15:39:32

16QAM_10MHz_50 RB_Left



Date: 31.MAR.2018 15:42:53

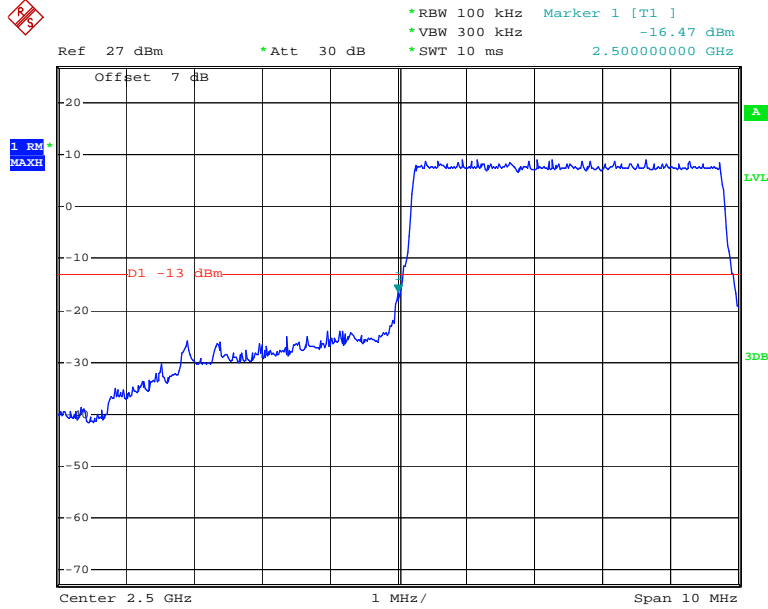
16QAM_10MHz_50 RB_Right



Date: 31.MAR.2018 15:41:53

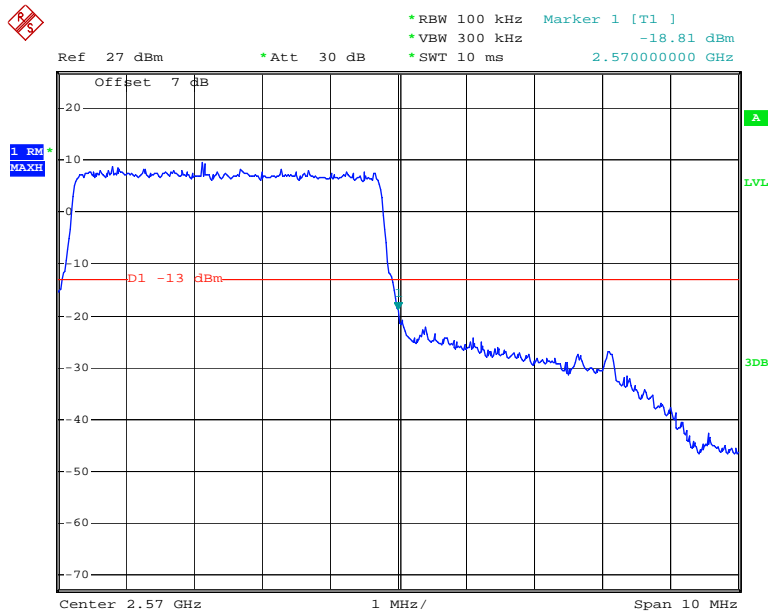
LTE Band 7:

QPSK_5MHz_25 RB_Left



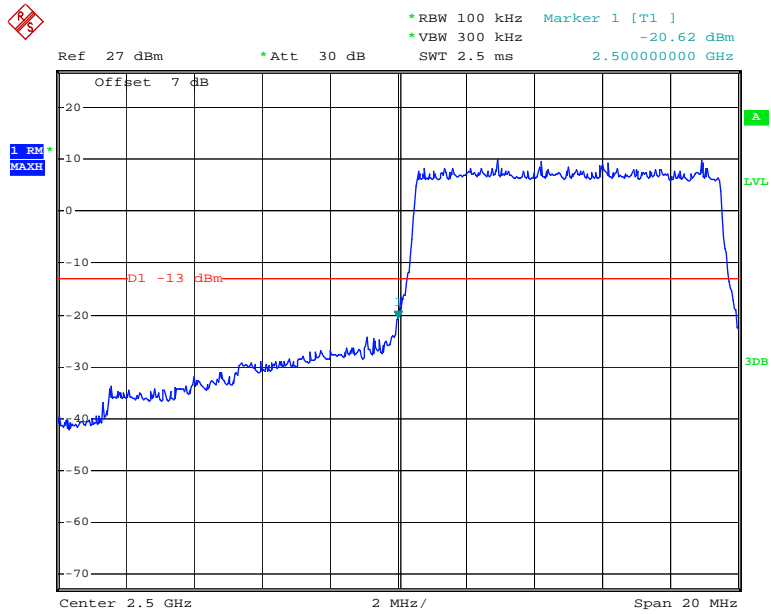
Date: 31.MAR.2018 15:52:27

QPSK_5MHz_25 RB_Right



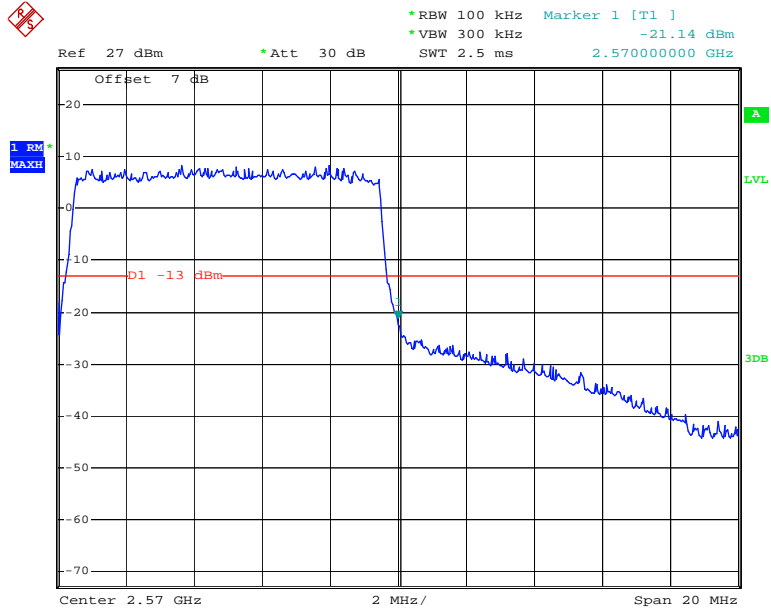
Date: 31.MAR.2018 15:55:39

QPSK_10MHz_50 RB_Left



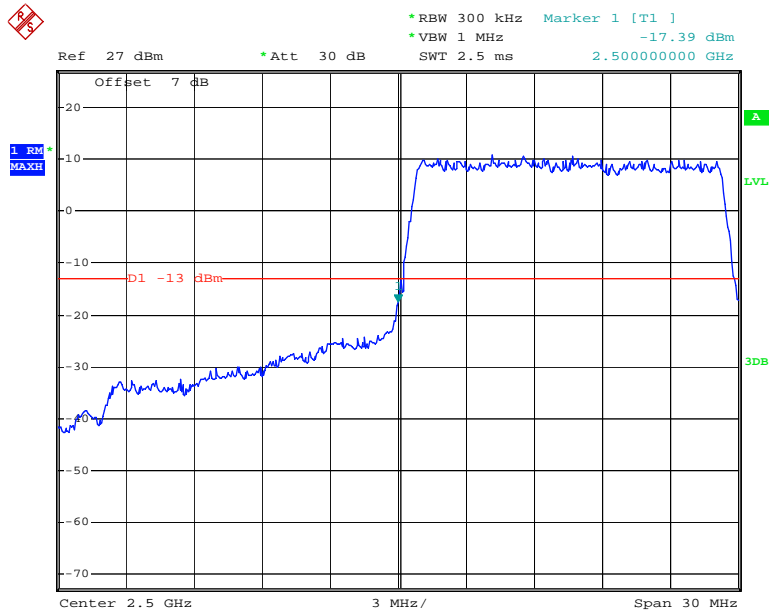
Date: 31.MAR.2018 16:00:06

QPSK_10MHz_50 RB_Right



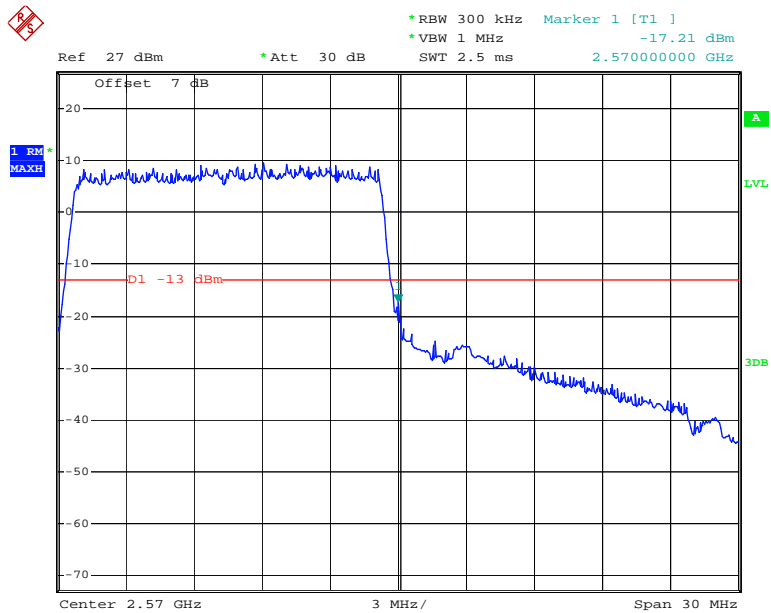
Date: 31.MAR.2018 15:57:41

QPSK_15MHz_75 RB_ Left



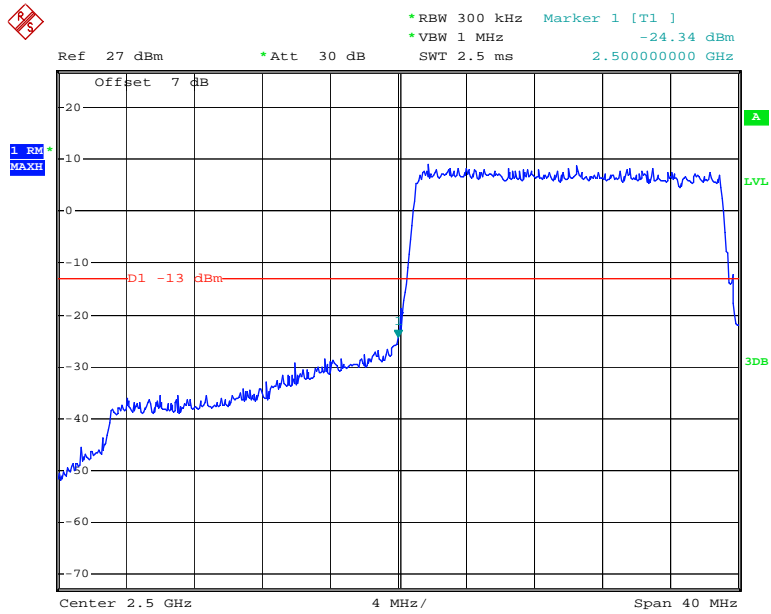
Date: 31.MAR.2018 16:01:51

QPSK_15MHz_75 RB_ Right



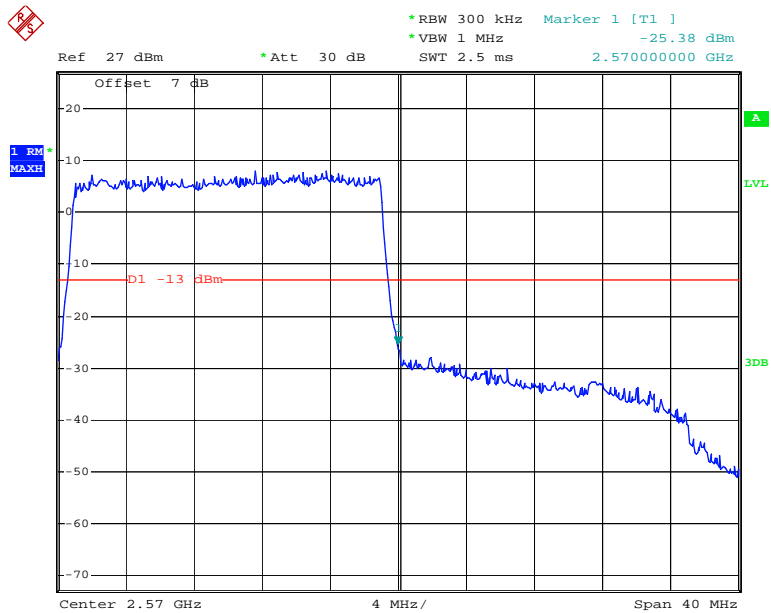
Date: 31.MAR.2018 16:03:27

QPSK_20MHz_FULL RB_Left



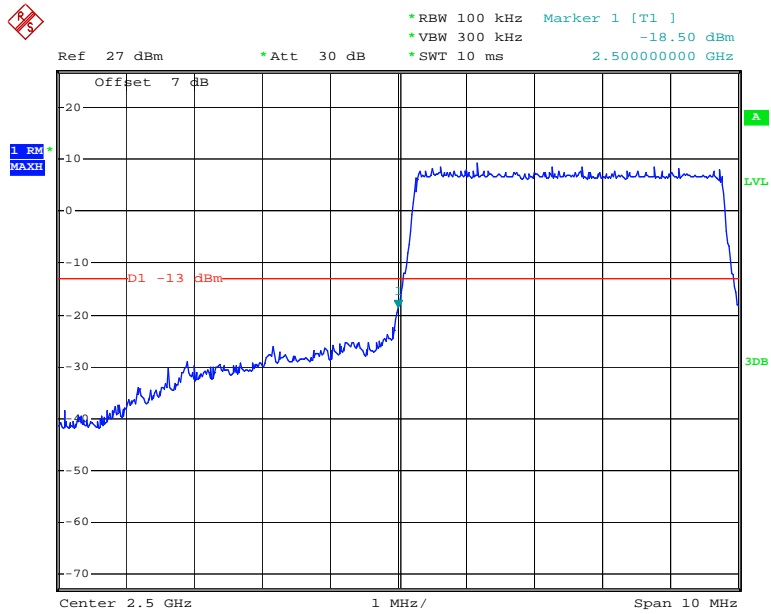
Date: 31.MAR.2018 16:07:18

QPSK_20MHz_FULL RB_Right



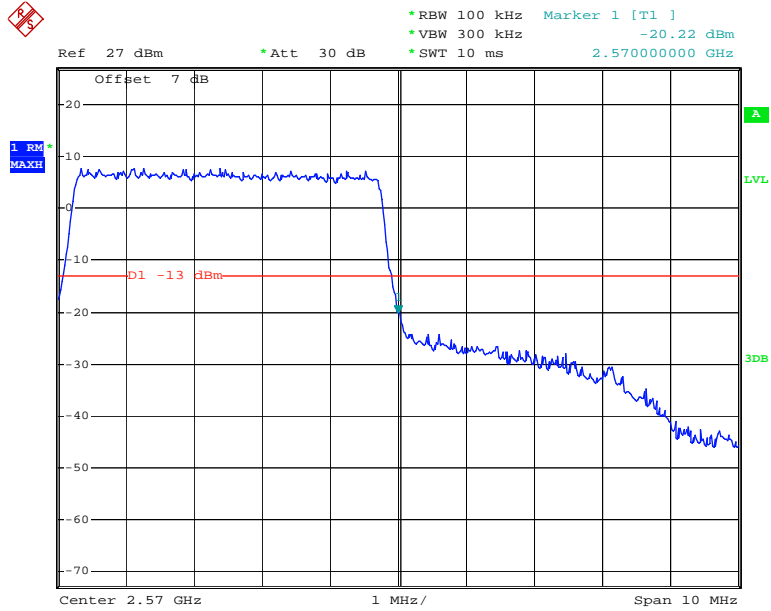
Date: 31.MAR.2018 16:05:13

16QAM_5MHz_25 RB_Left



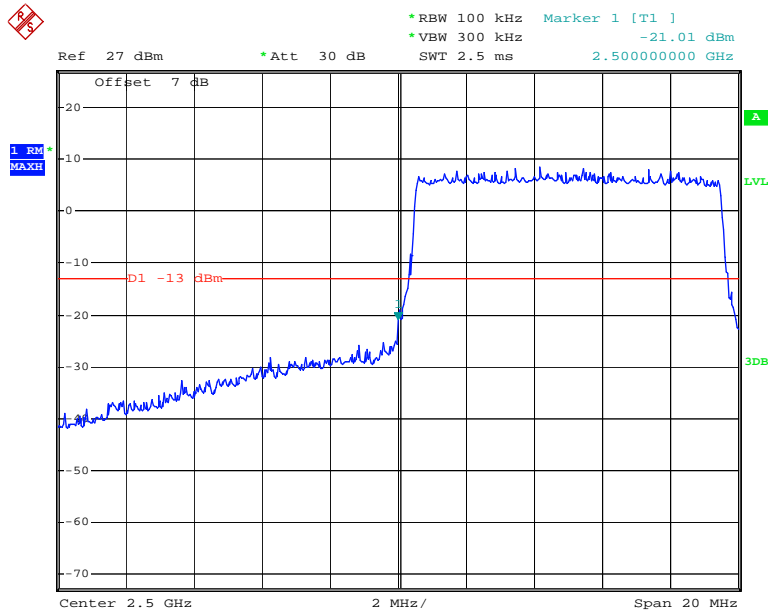
Date: 31.MAR.2018 15:54:03

16QAM_5MHz_25 RB_Right



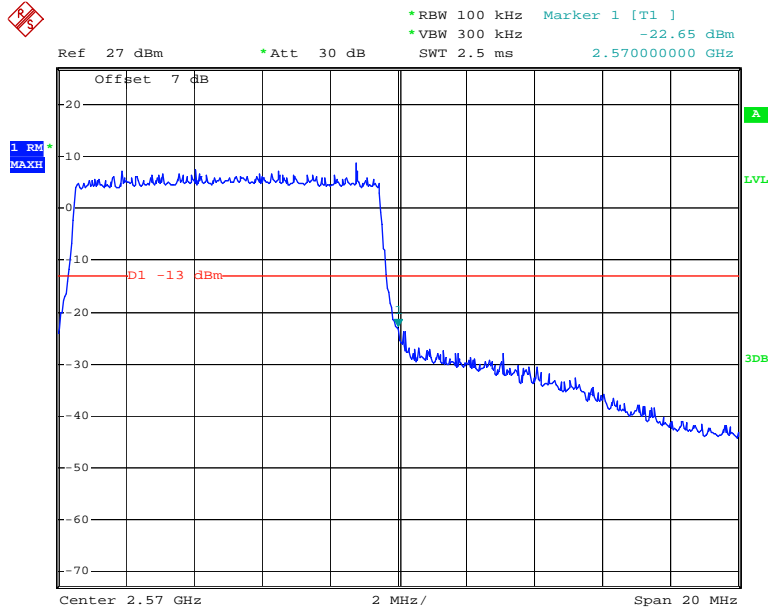
Date: 31.MAR.2018 15:54:43

16QAM_10MHz_50 RB_Left



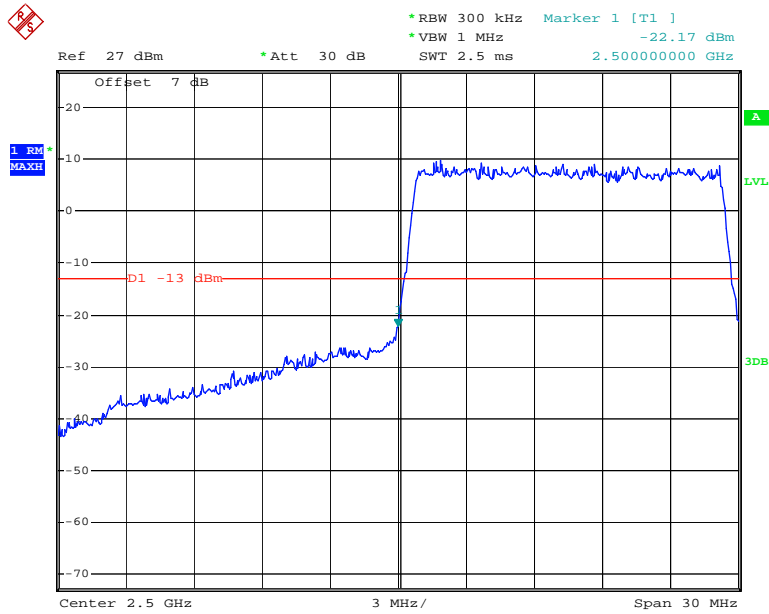
Date: 31.MAR.2018 15:59:26

16QAM_10MHz_50 RB_Right



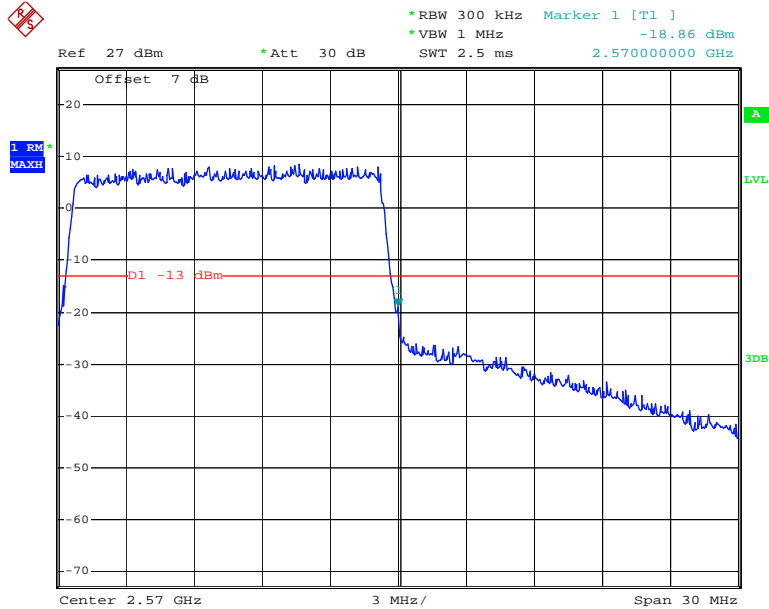
Date: 31.MAR.2018 15:58:24

16QAM_15MHz_75 RB_Left



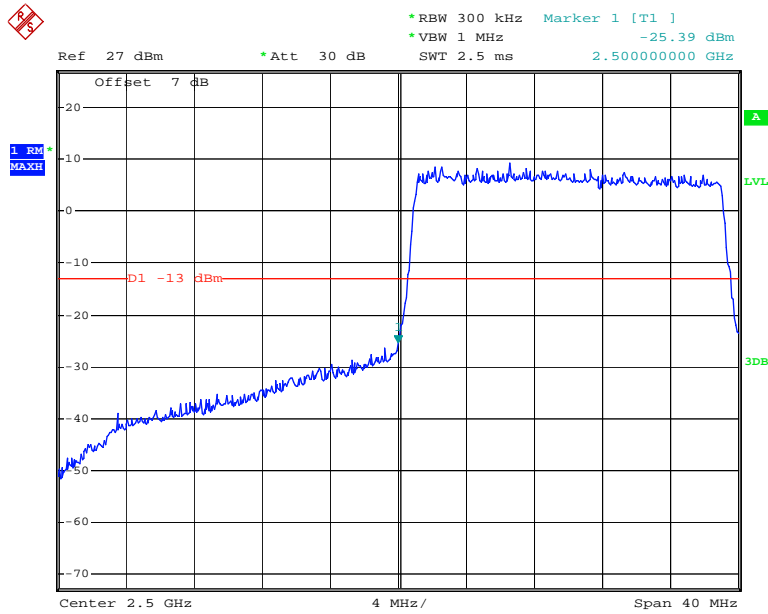
Date: 31.MAR.2018 16:02:18

16QAM_15MHz_75 RB_Right



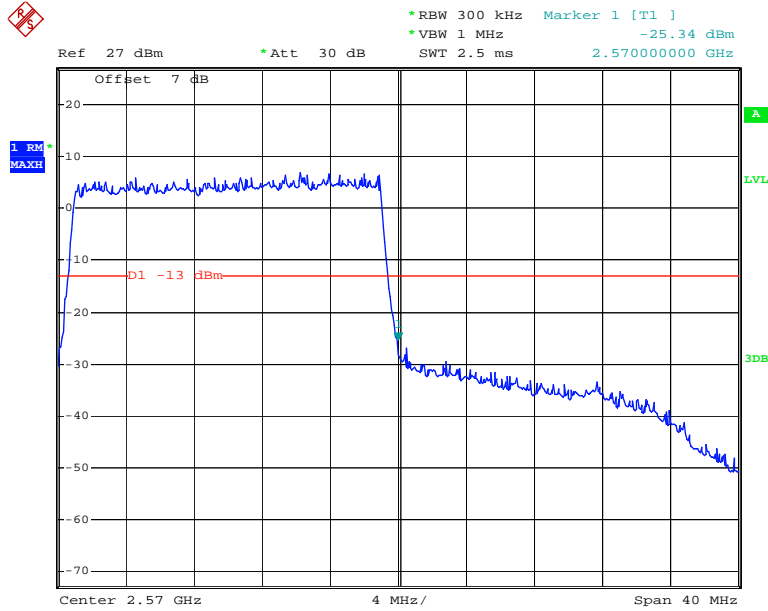
Date: 31.MAR.2018 16:02:56

16QAM_20MHz_FULL RB_Left



Date: 31.MAR.2018 16:06:54

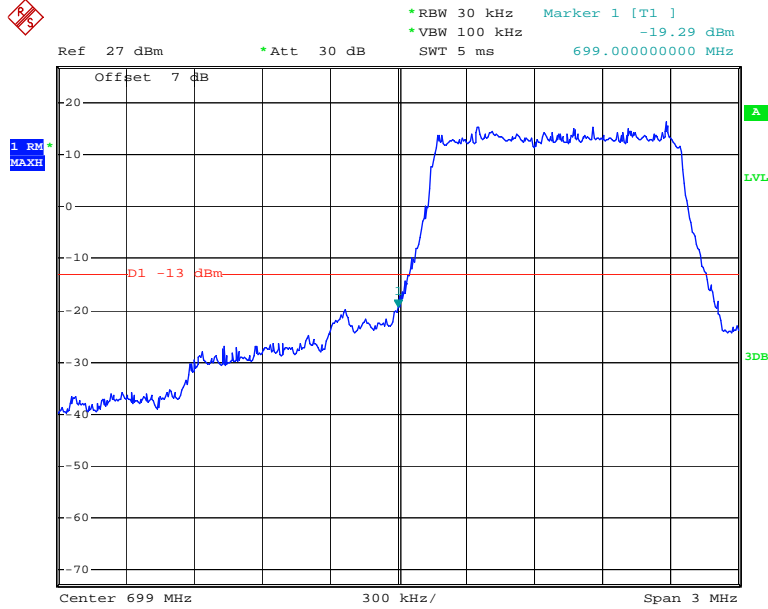
16QAM_20MHz_FULL RB_Right



Date: 31.MAR.2018 16:05:37

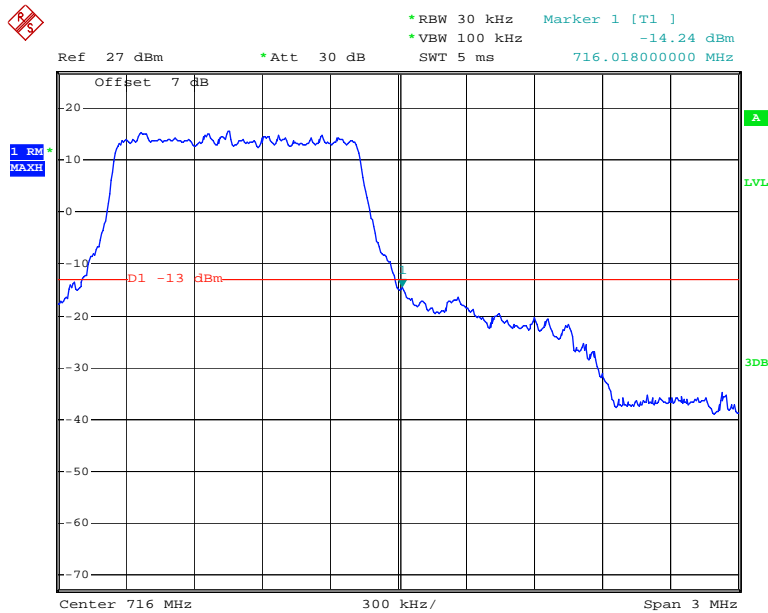
LTE Band 12:

QPSK_1.4MHz_6 RB_Left



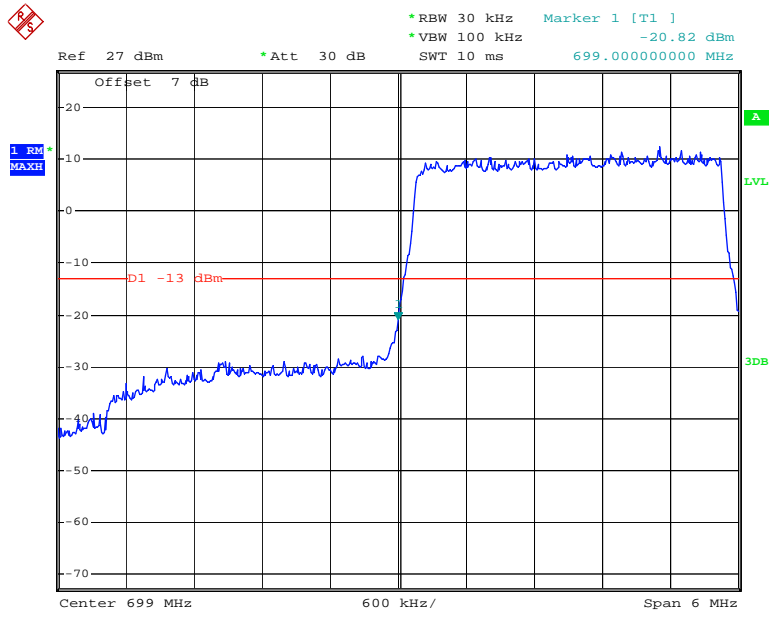
Date: 31.MAR.2018 16:09:38

QPSK_1.4MHz_6 RB_Right



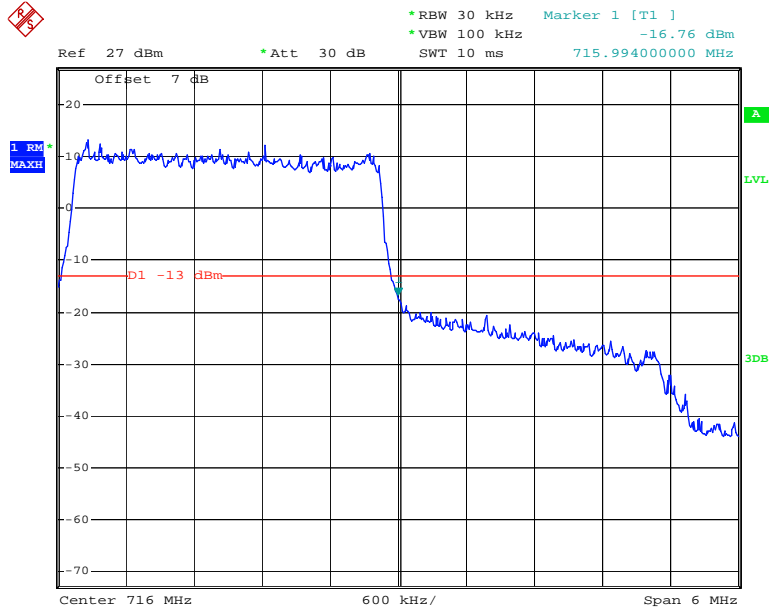
Date: 31.MAR.2018 16:14:02

QPSK_3MHz_15 RB_Left



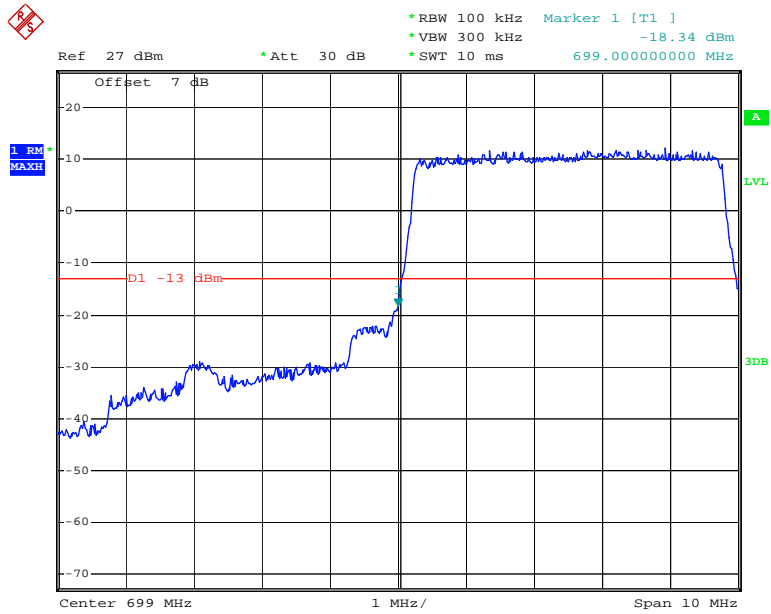
Date: 31.MAR.2018 16:19:17

QPSK_3MHz_15 RB_Right



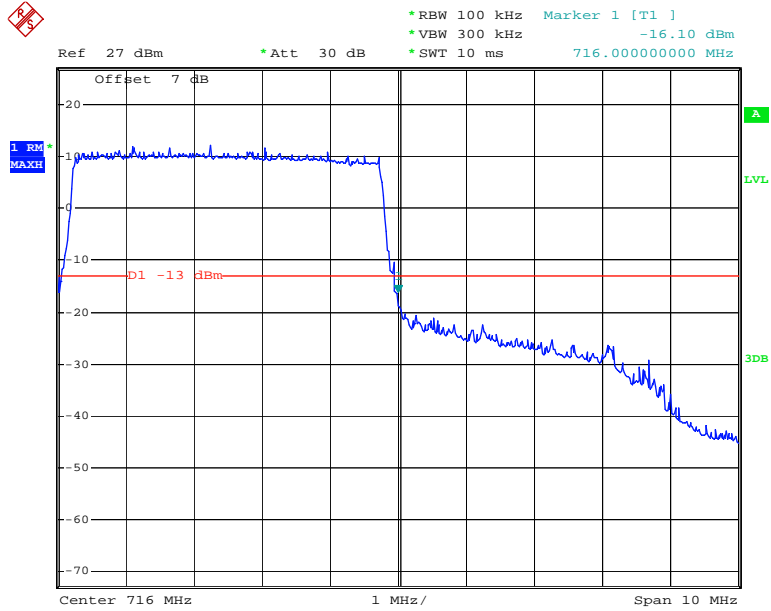
Date: 31.MAR.2018 16:16:46

QPSK_5MHz_25 RB_Left



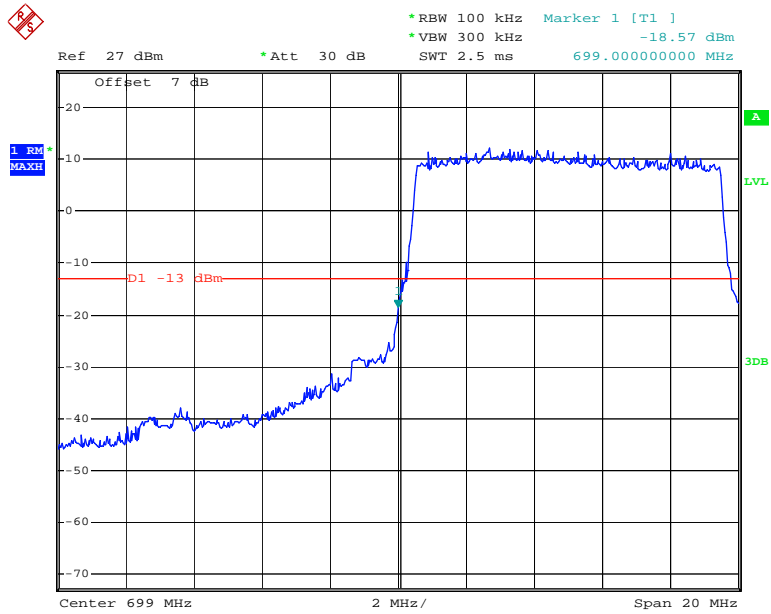
Date: 31.MAR.2018 16:21:21

QPSK_5MHz_25 RB_Right



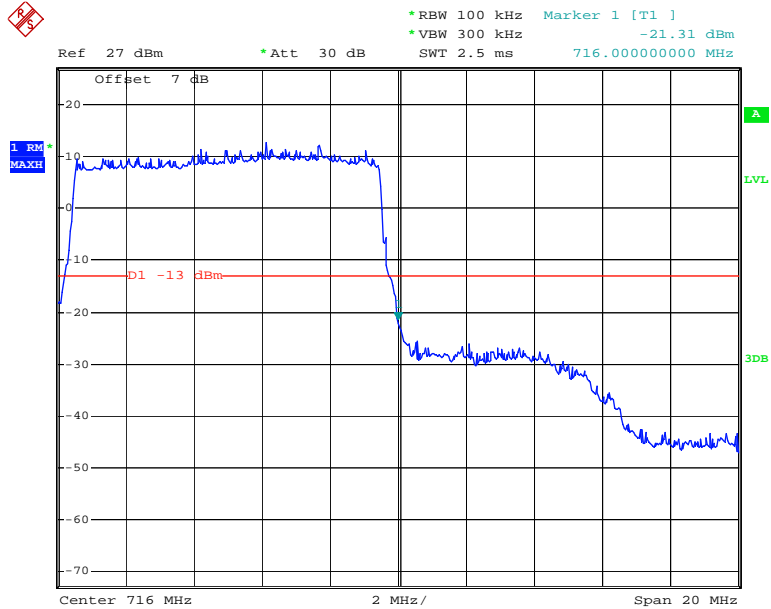
Date: 31.MAR.2018 16:25:23

QPSK_10MHz_50 RB_Left



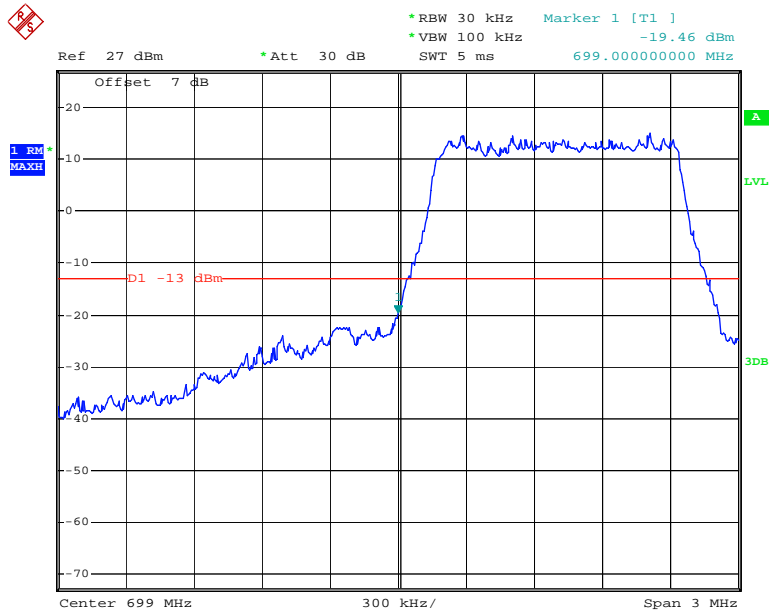
Date: 31.MAR.2018 16:28:17

QPSK_10MHz_50 RB_Right



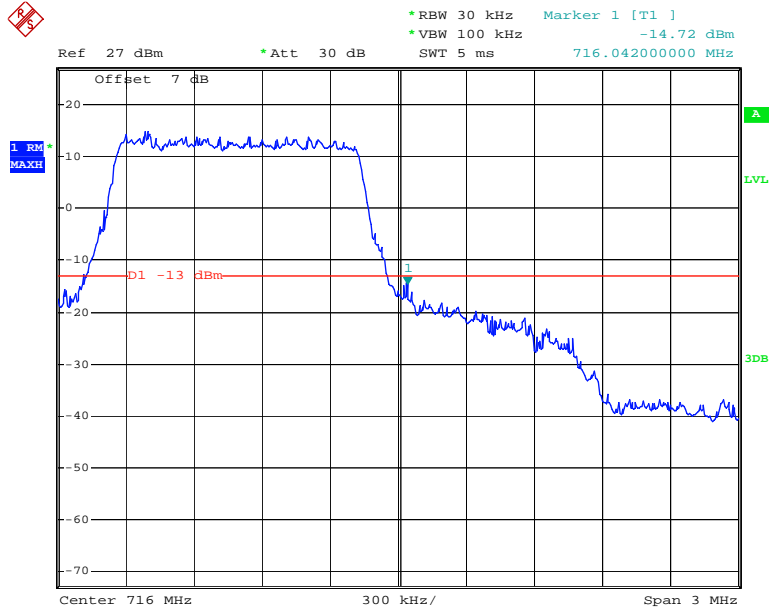
Date: 31.MAR.2018 16:30:18

16QAM_1.4MHz_6 RB_ Left



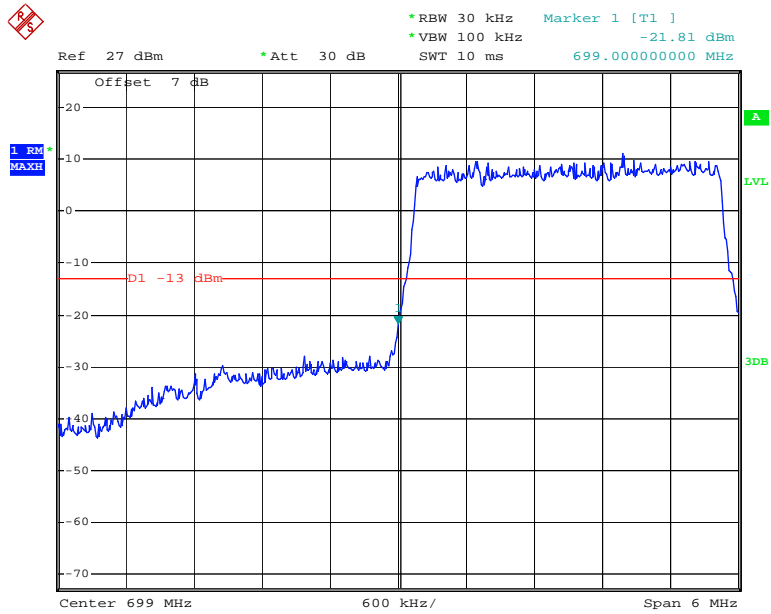
Date: 31.MAR.2018 16:10:23

16QAM_1.4MHz_6 RB_ Right



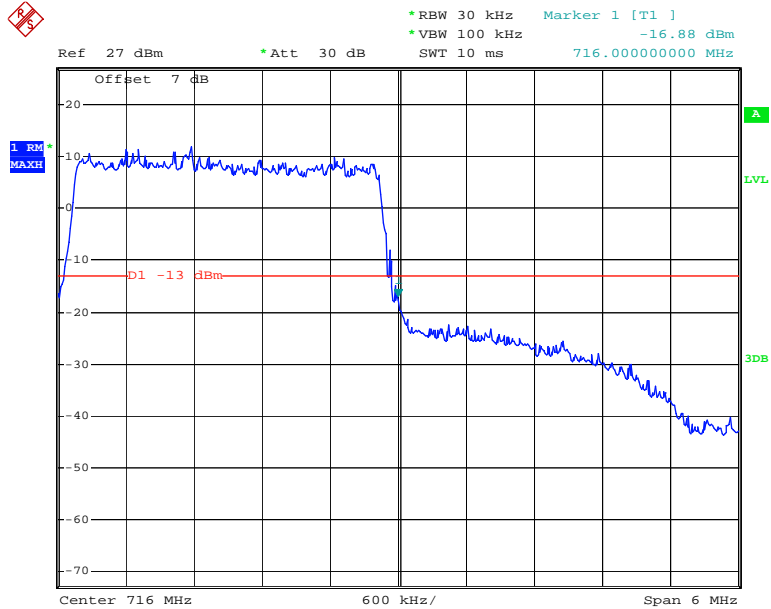
Date: 31.MAR.2018 16:11:10

16QAM_3MHz_15 RB_Left



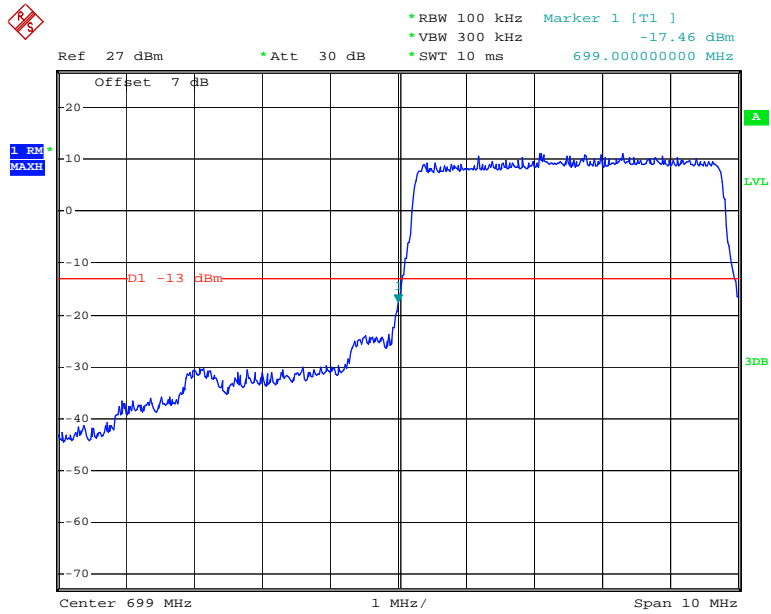
Date: 31.MAR.2018 16:18:16

16QAM_3MHz_15 RB_Right



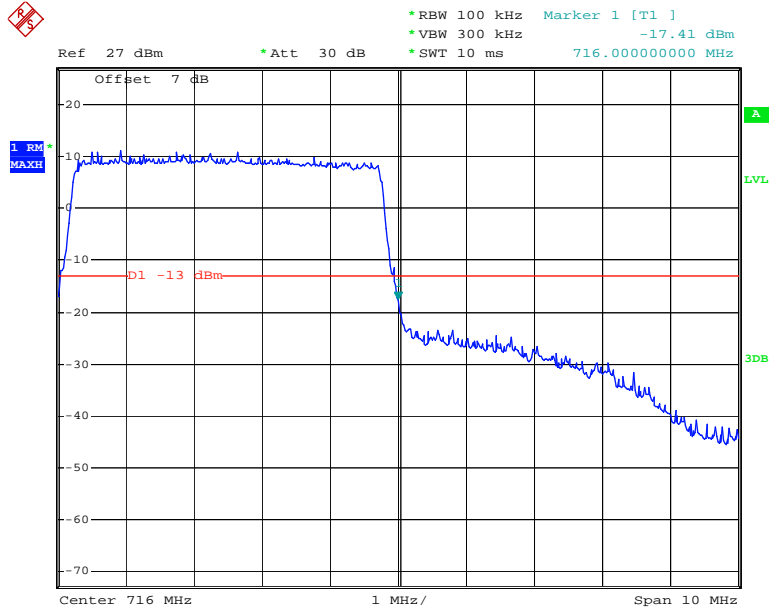
Date: 31.MAR.2018 16:17:28

16QAM_5MHz_25 RB_Left



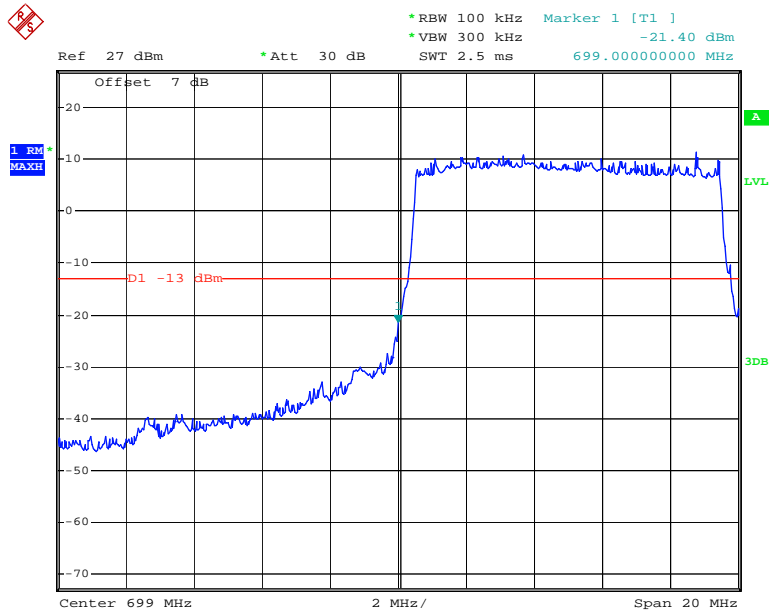
Date: 31.MAR.2018 16:21:57

16QAM_5MHz_25 RB_Right



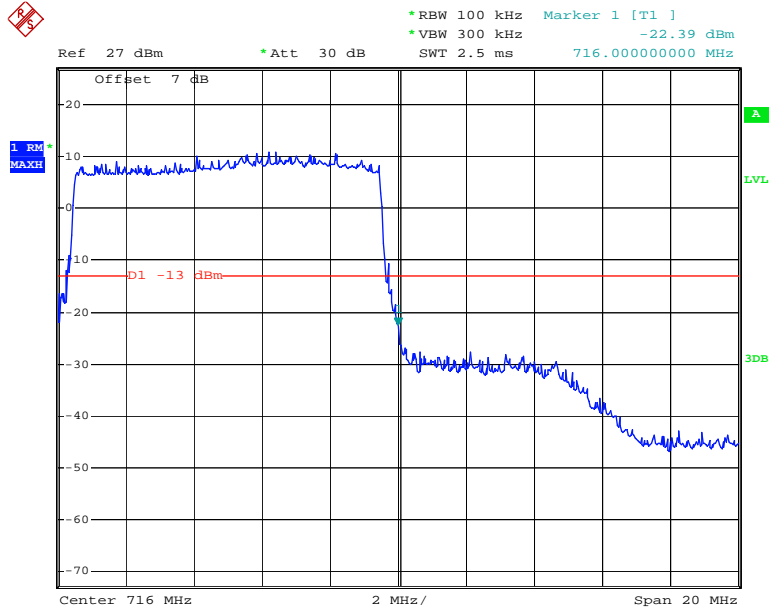
Date: 31.MAR.2018 16:24:24

16QAM_10MHz_50 RB_Left



Date: 31.MAR.2018 16:28:46

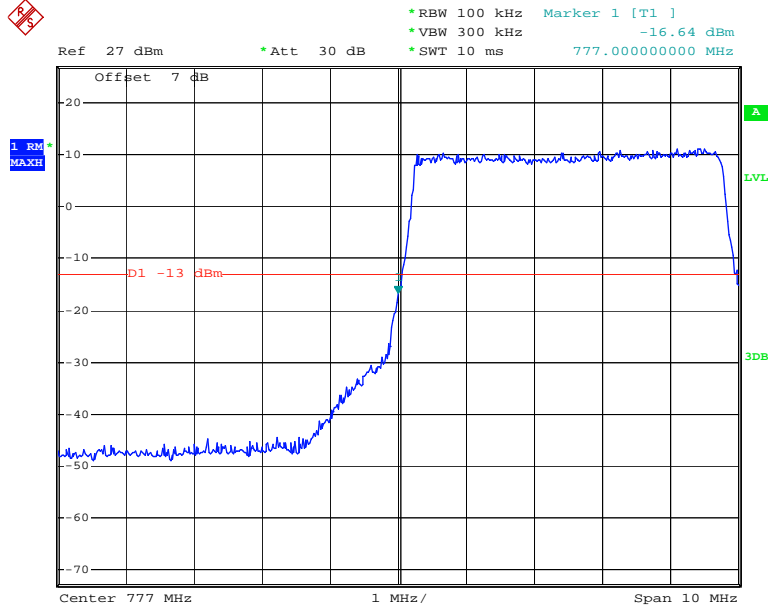
16QAM_10MHz_50 RB_Right



Date: 31.MAR.2018 16:29:34

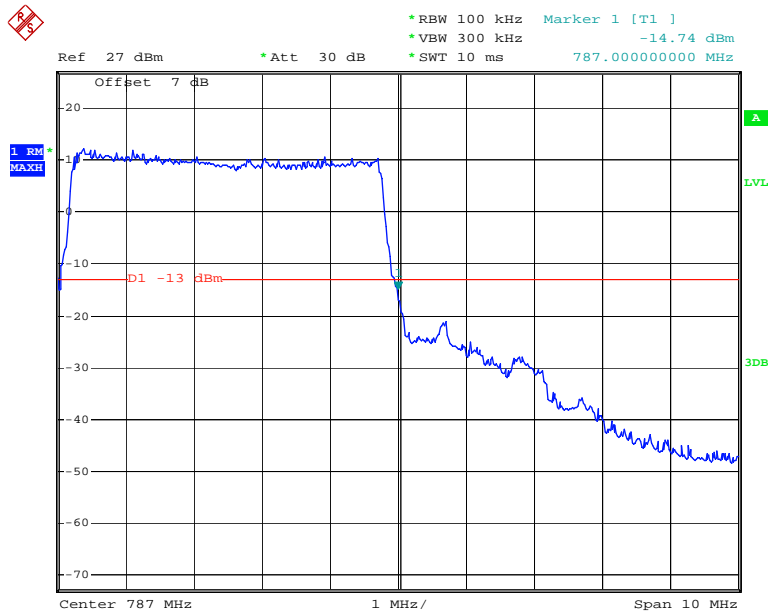
LTE Band 12:

QPSK_5MHz_25 RB_Left



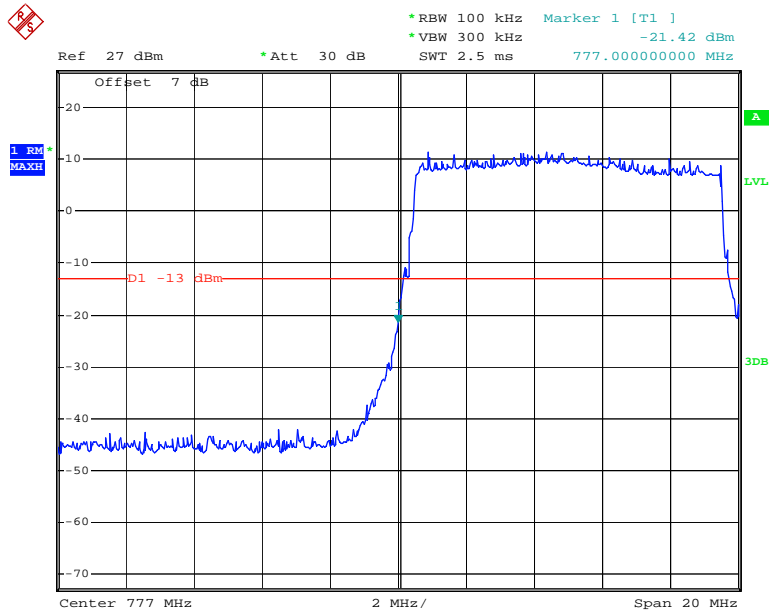
Date: 31.MAR.2018 17:09:01

QPSK_5MHz_25 RB_Right



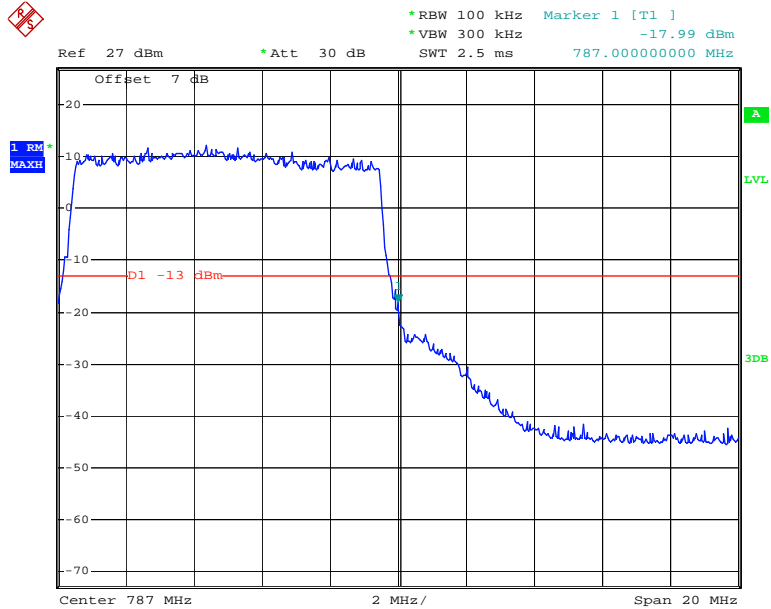
Date: 31.MAR.2018 17:10:51

QPSK_10MHz_50 RB_Left



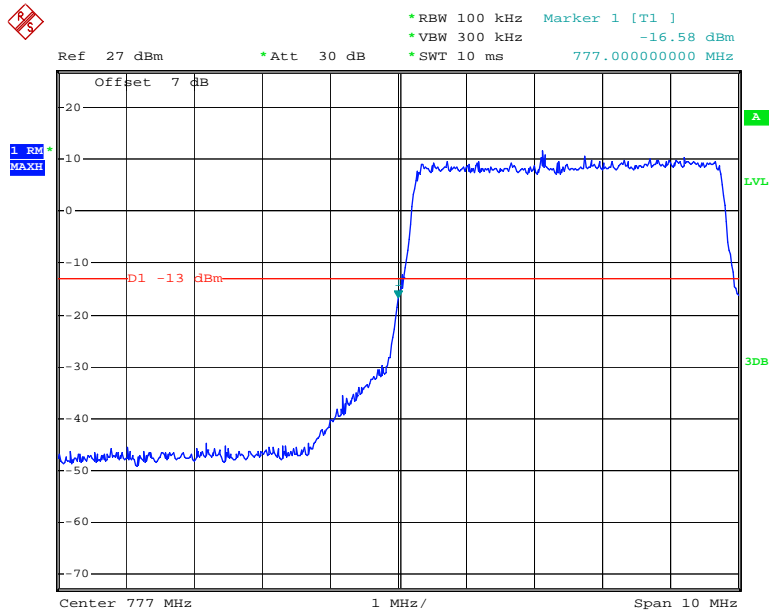
Date: 31.MAR.2018 17:15:21

QPSK_10MHz_50 RB_Right



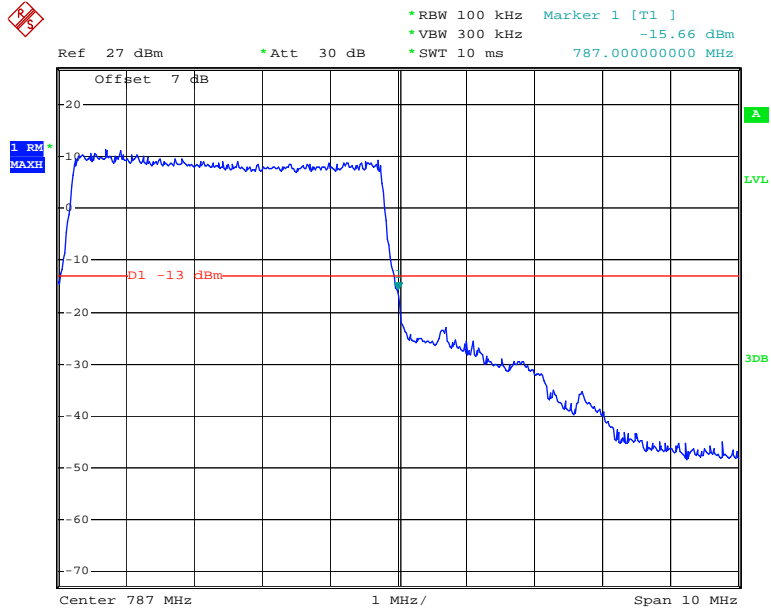
Date: 31.MAR.2018 17:16:35

16QAM_5MHz_25 RB_Left



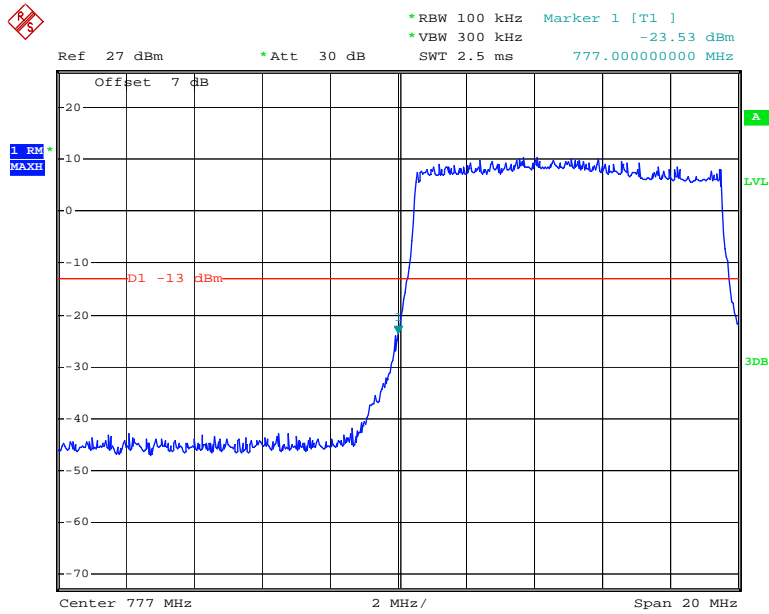
Date: 31.MAR.2018 17:09:34

16QAM_5MHz_25 RB_Right



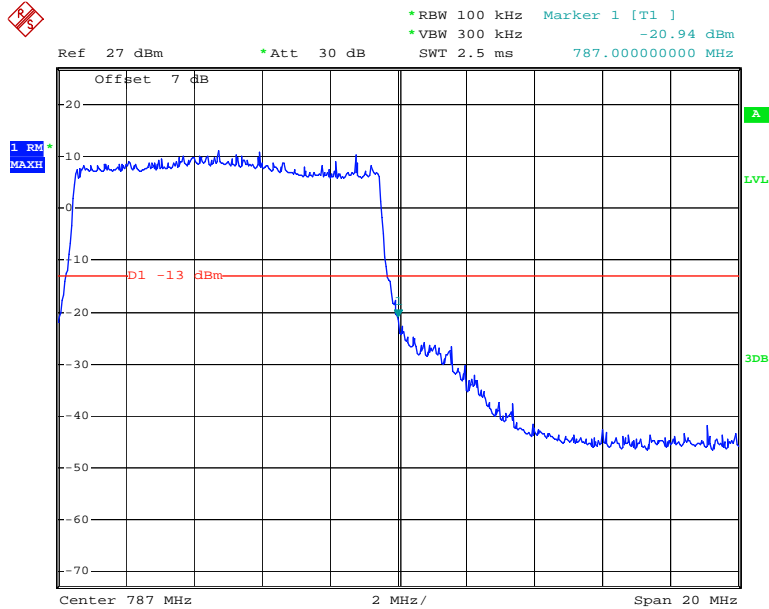
Date: 31.MAR.2018 17:10:18

16QAM_10MHz_50 RB_Left



Date: 31.MAR.2018 17:14:57

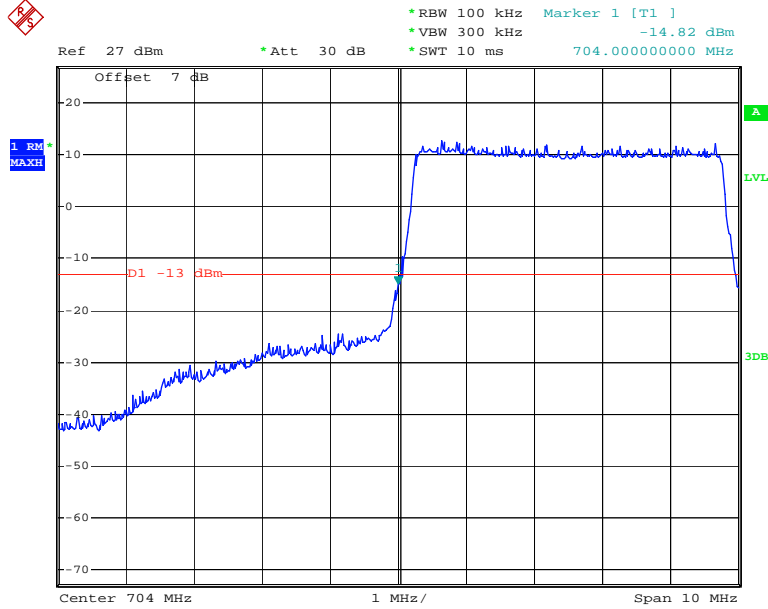
16QAM_10MHz_50 RB_Right



Date: 31.MAR.2018 17:17:22

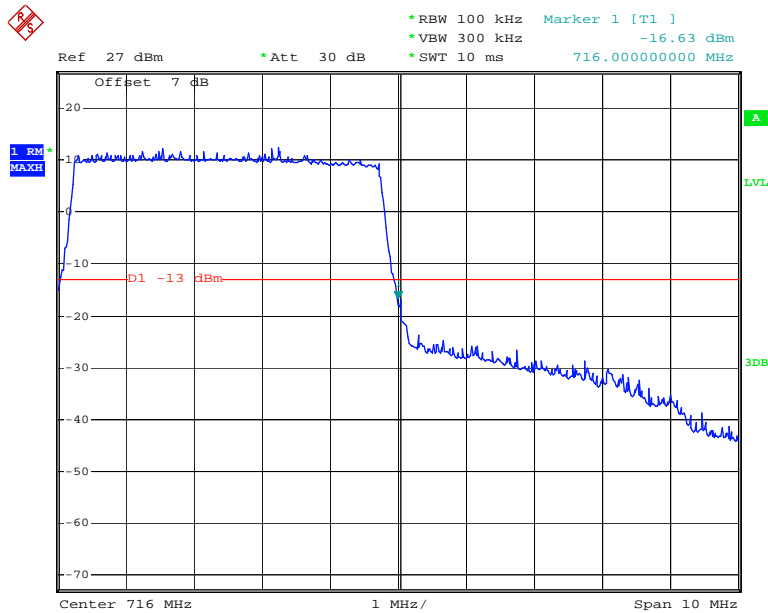
LTE Band 17:

QPSK_5MHz_25 RB_Left



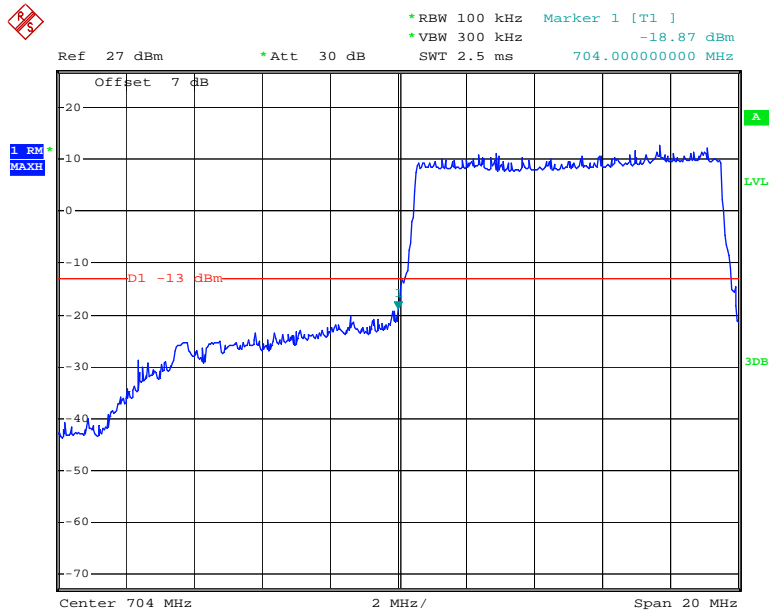
Date: 31.MAR.2018 17:19:09

QPSK_5MHz_25 RB_Right



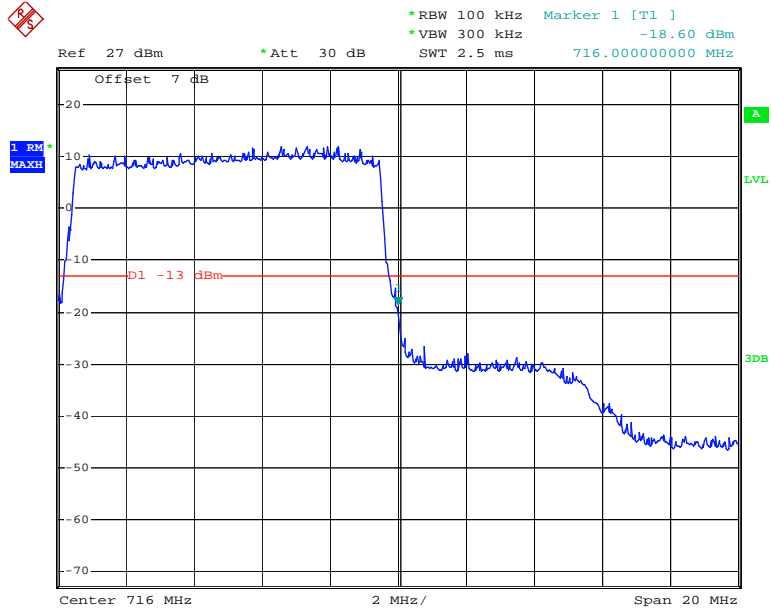
Date: 31.MAR.2018 17:21:03

QPSK_10MHz_50 RB_Left



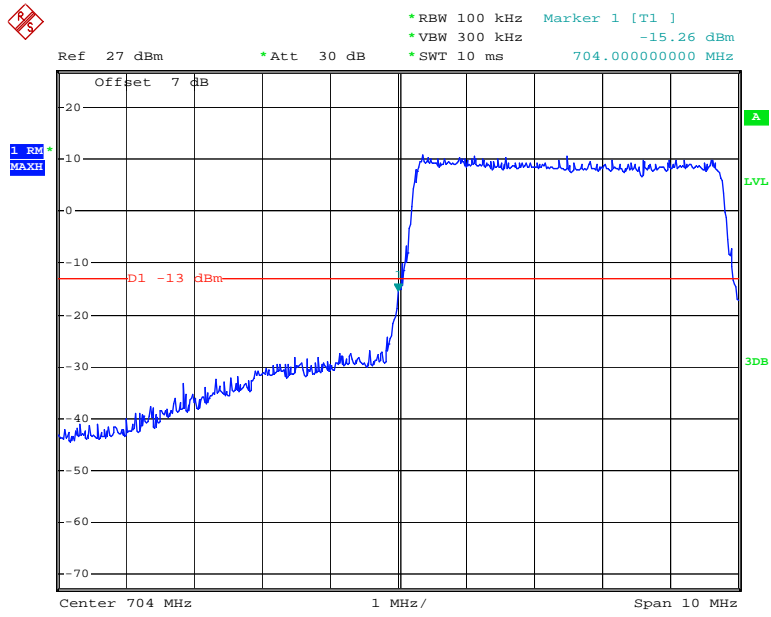
Date: 31.MAR.2018 17:23:51

QPSK_10MHz_50 RB_Right



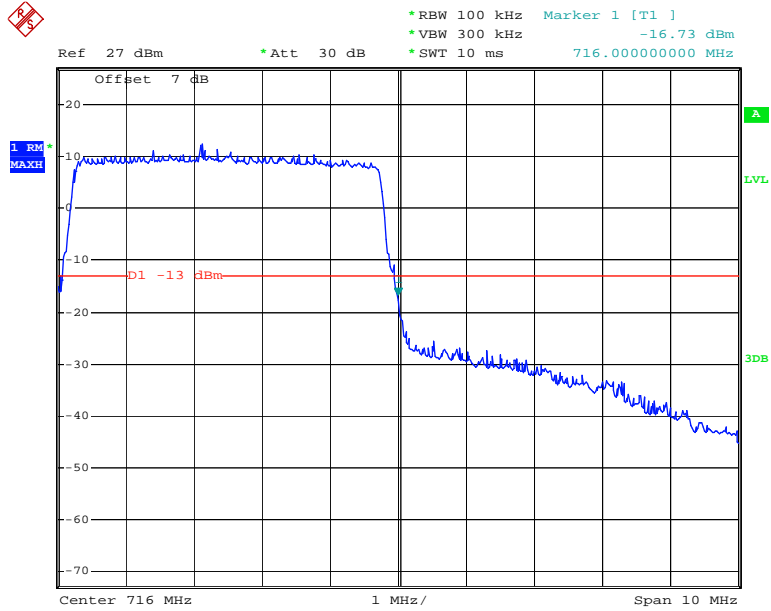
Date: 31.MAR.2018 17:23:18

16QAM_5MHz_25 RB_Left



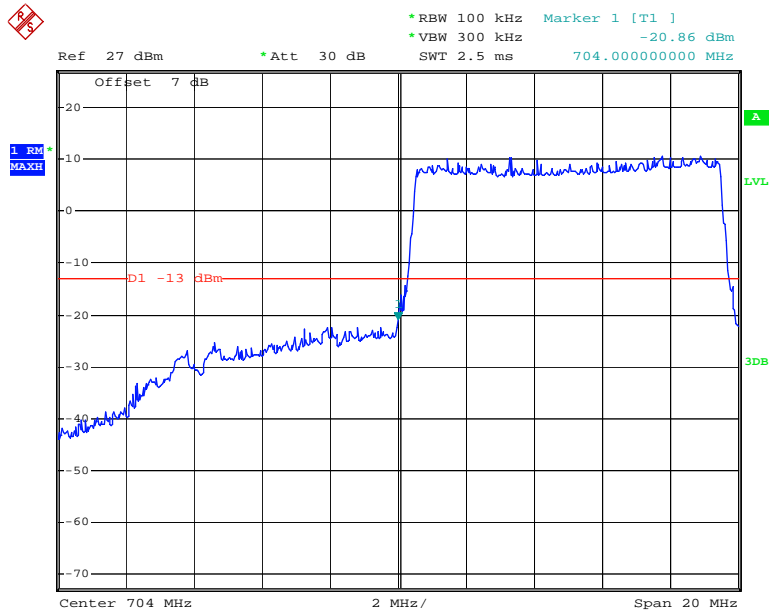
Date: 31.MAR.2018 17:19:33

16QAM_5MHz_25 RB_Right



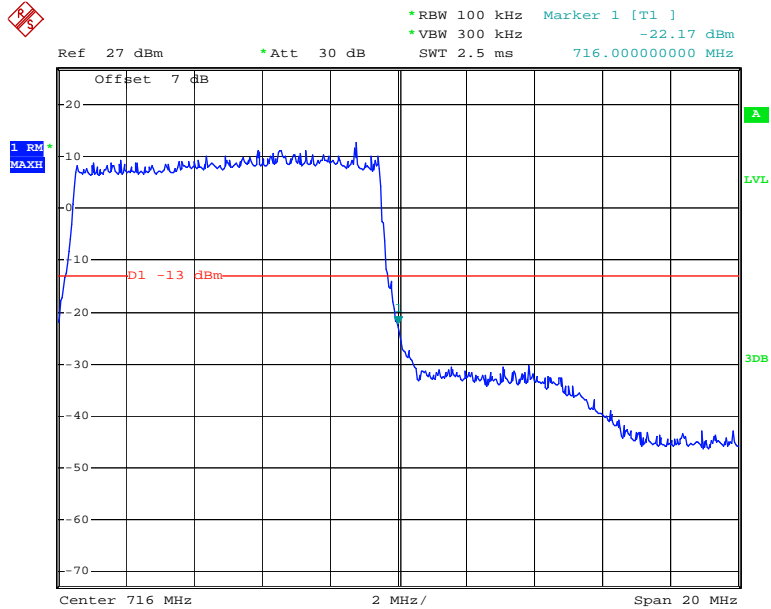
Date: 31.MAR.2018 17:20:33

16QAM_10MHz_50 RB_Left



Date: 31.MAR.2018 17:24:32

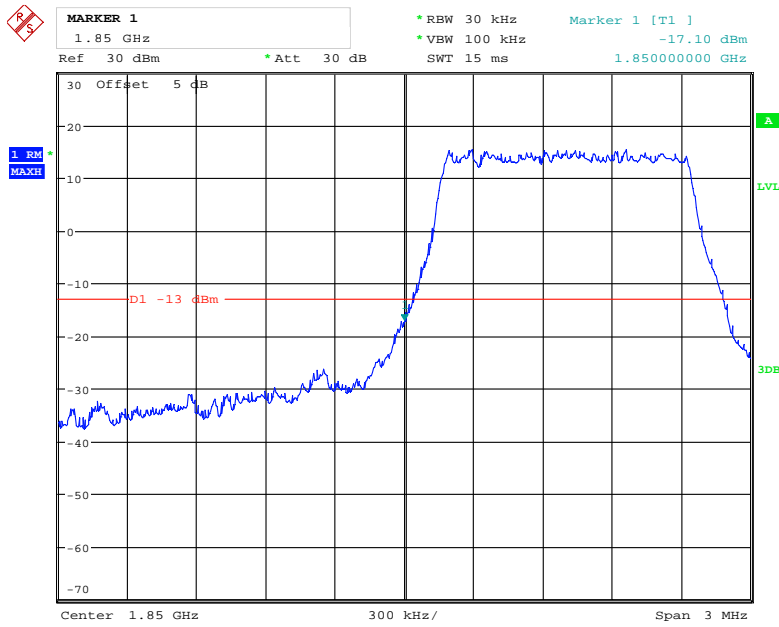
16QAM_10MHz_50 RB_Right



Date: 31.MAR.2018 17:22:06

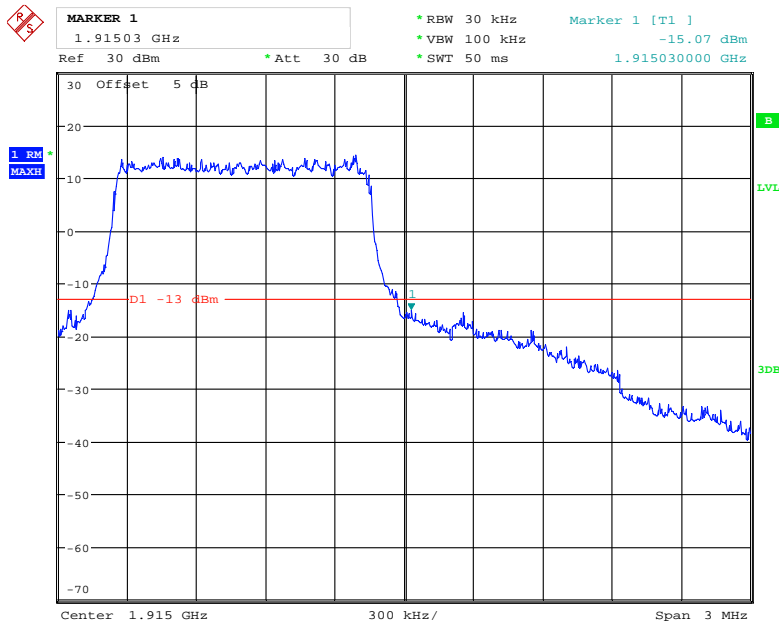
LTE Band 25:

QPSK_1.4MHz_6 RB_Left



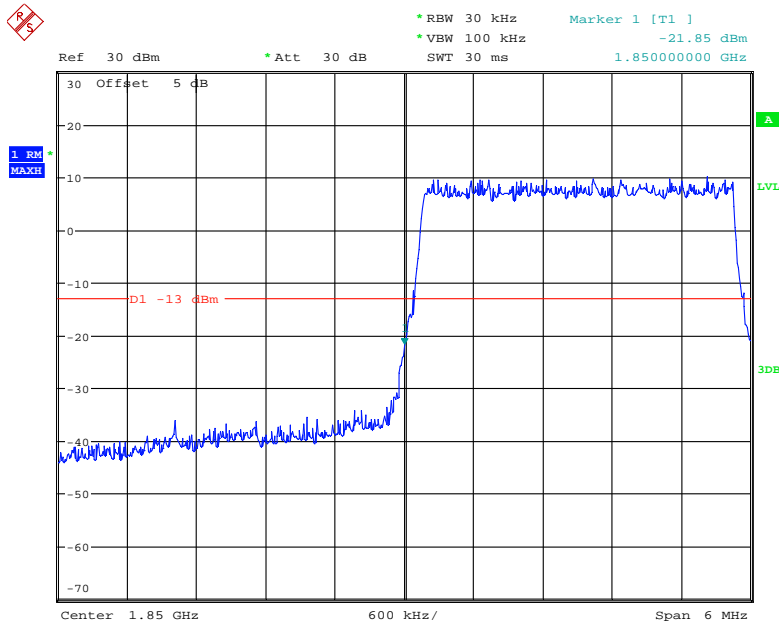
Date: 19.APR.2018 14:17:02

QPSK_1.4MHz_6 RB_Right



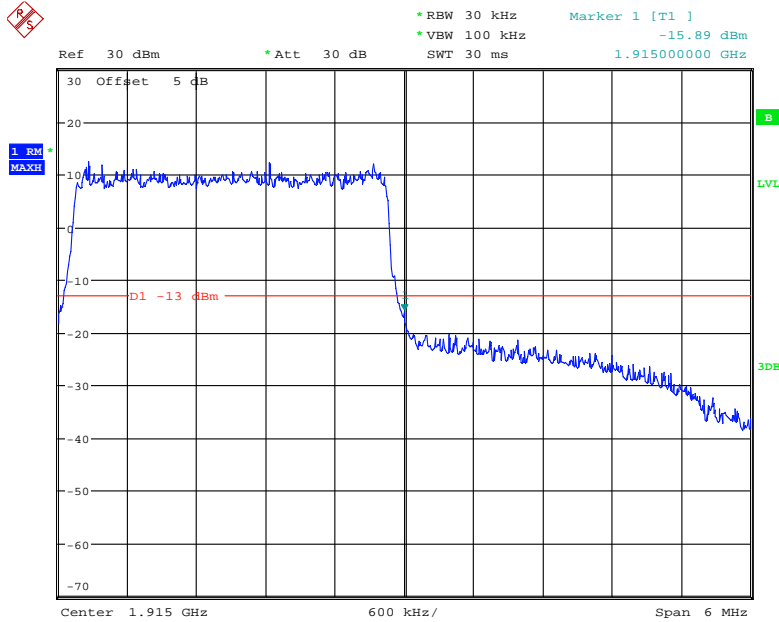
Date: 19.APR.2018 14:20:11

QPSK_3MHz_15 RB_Left



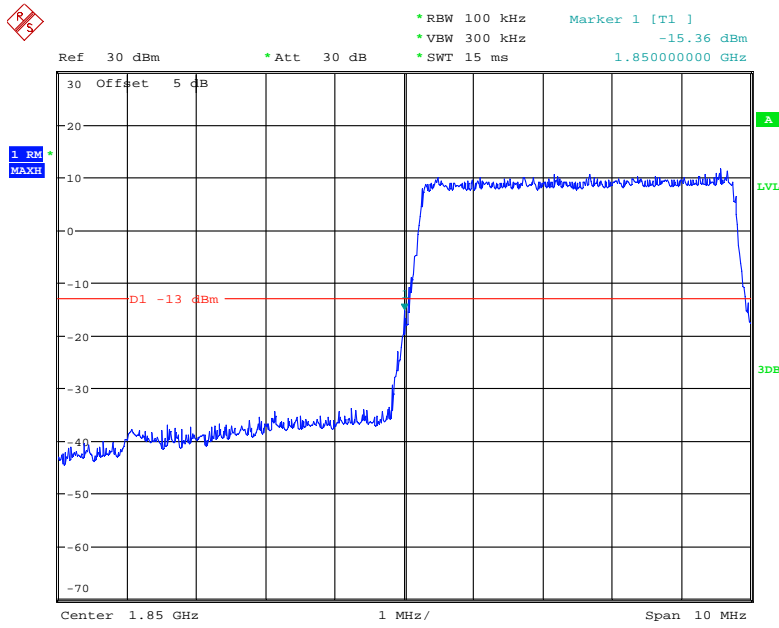
Date: 19.APR.2018 14:24:05

QPSK_3MHz_15 RB_Right



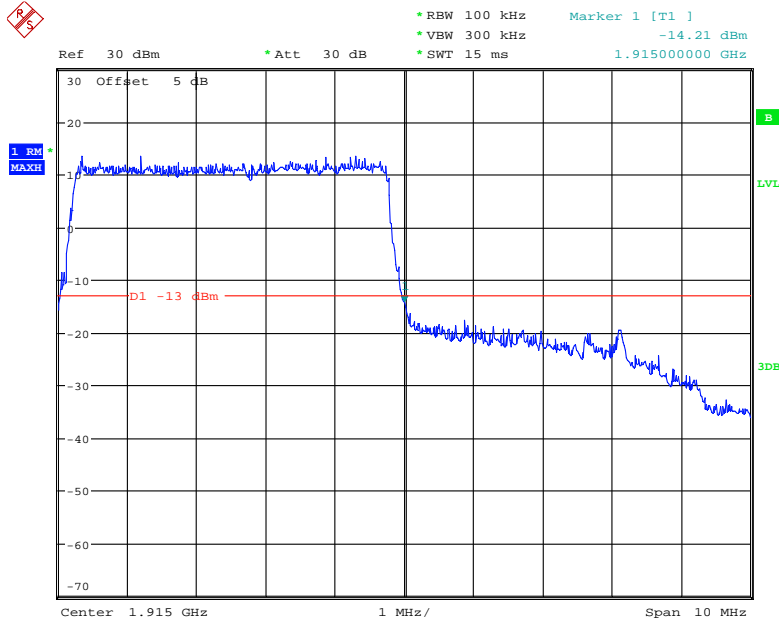
Date: 19.APR.2018 14:22:53

QPSK_5MHz_25 RB_Left



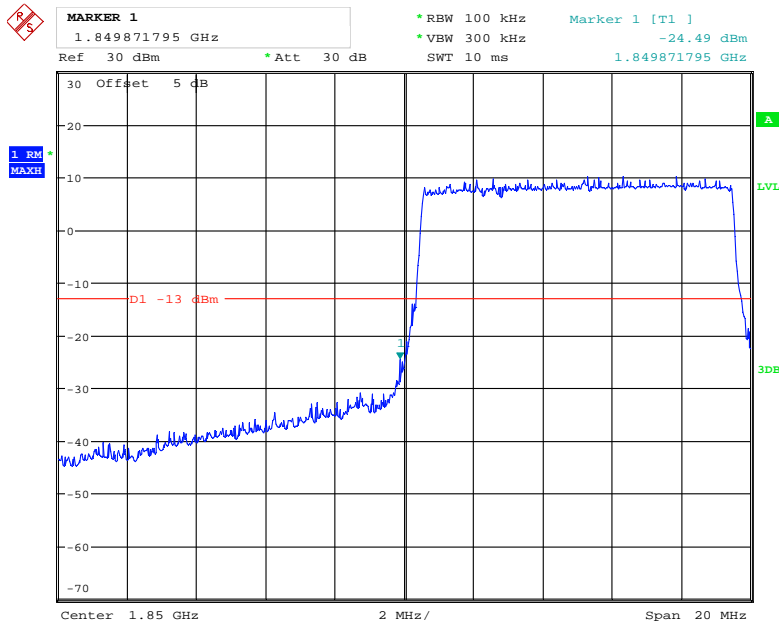
Date: 19.APR.2018 14:26:23

QPSK_5MHz_25 RB_Right



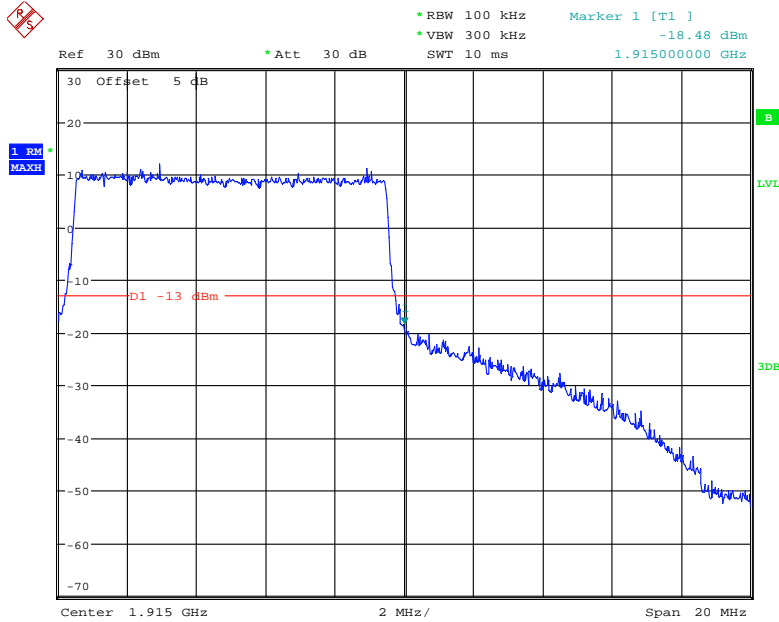
Date: 19.APR.2018 14:28:03

QPSK_10MHz_50 RB_Left



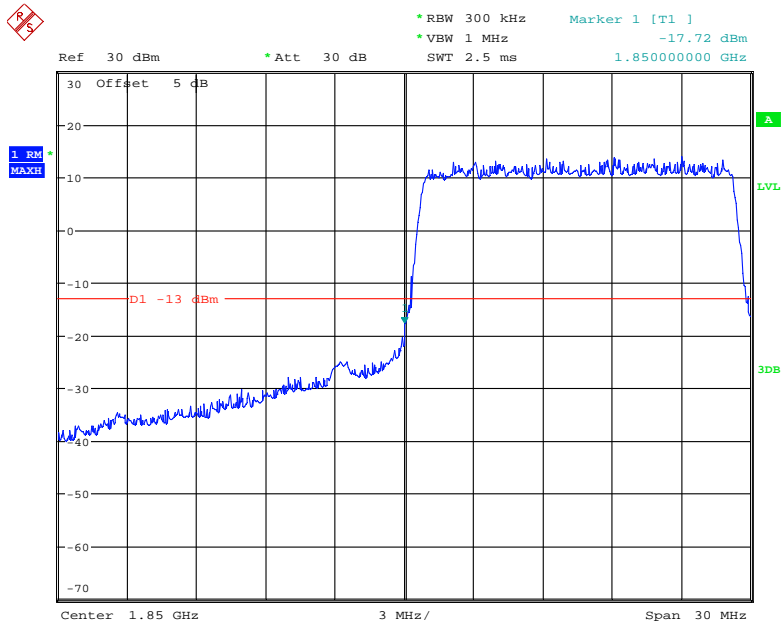
Date: 19.APR.2018 14:31:31

QPSK_10MHz_50 RB_Right



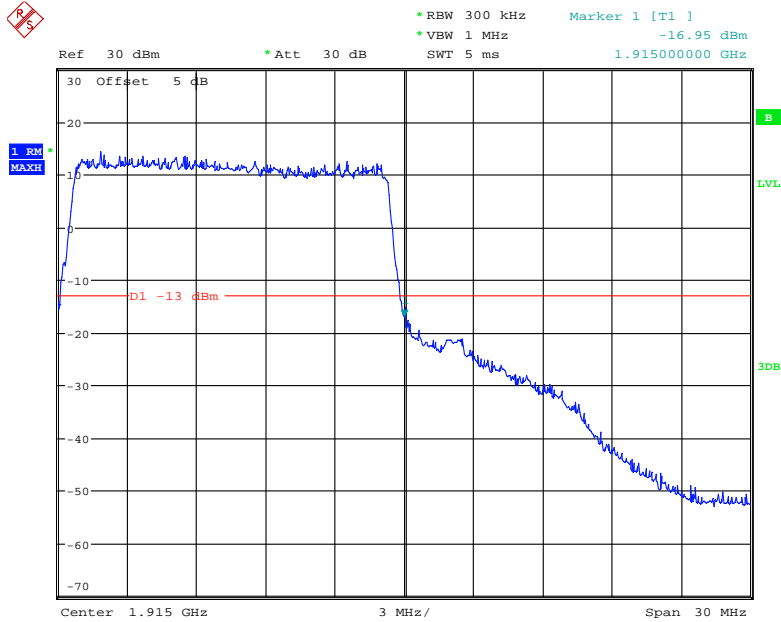
Date: 19.APR.2018 14:30:46

QPSK_15MHz_75 RB_Left



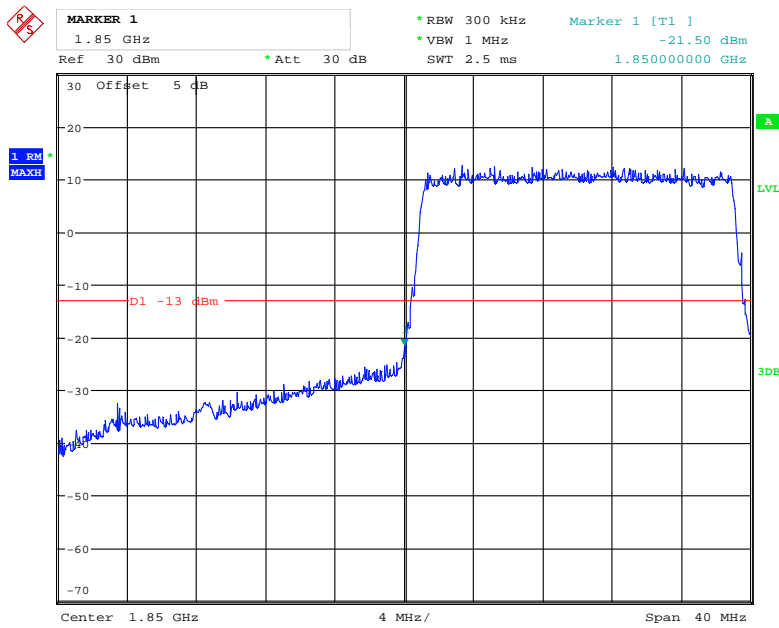
Date: 19.APR.2018 14:33:38

QPSK_15MHz_75 RB_Right



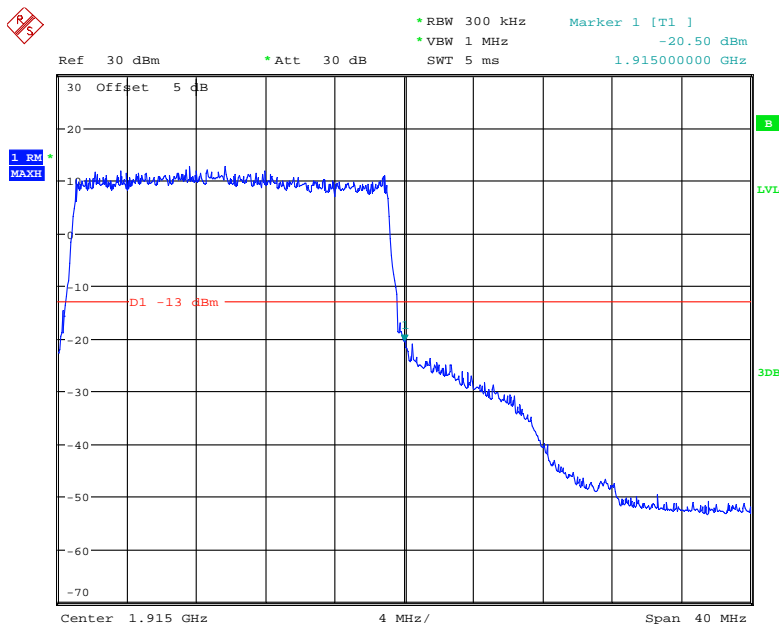
Date: 19.APR.2018 14:34:27

QPSK_20MHz_FULL RB_Left



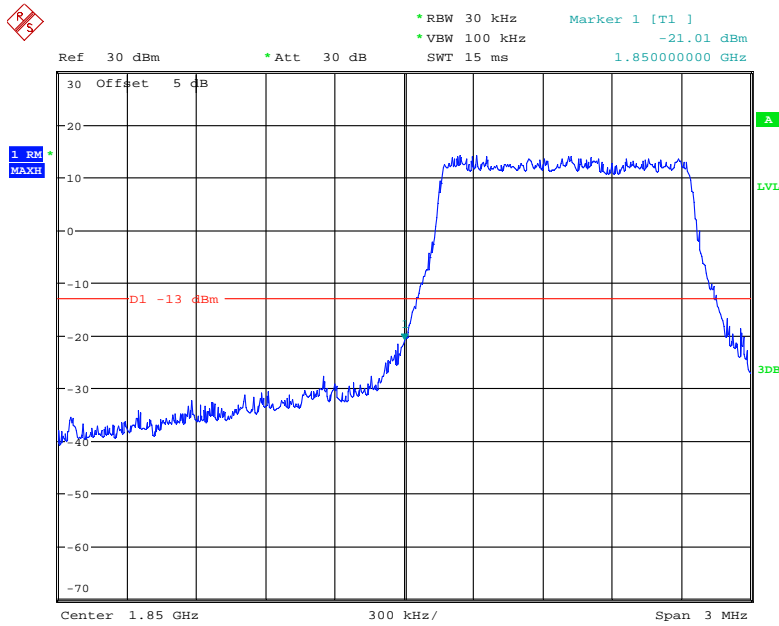
Date: 19.APR.2018 14:37:43

QPSK_20MHz_FULL RB_Right



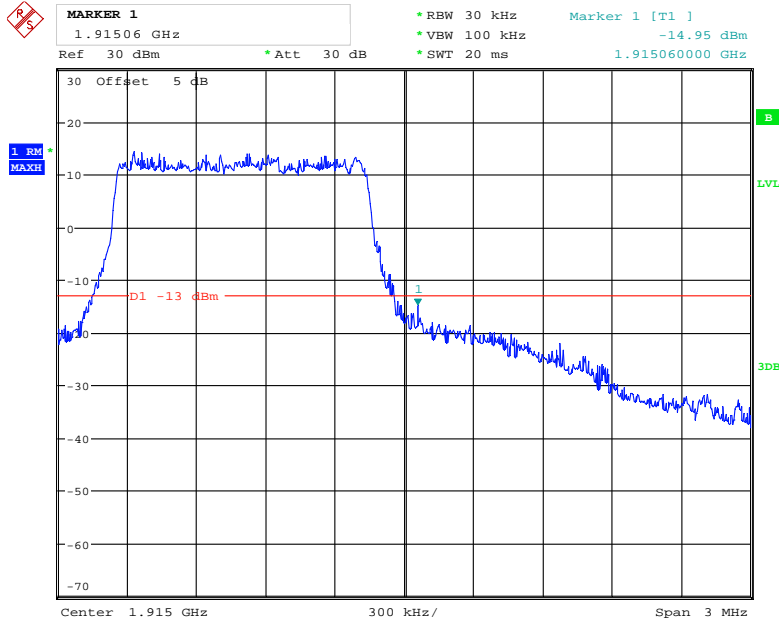
Date: 19.APR.2018 14:36:49

16QAM_1.4MHz_6 RB_Left



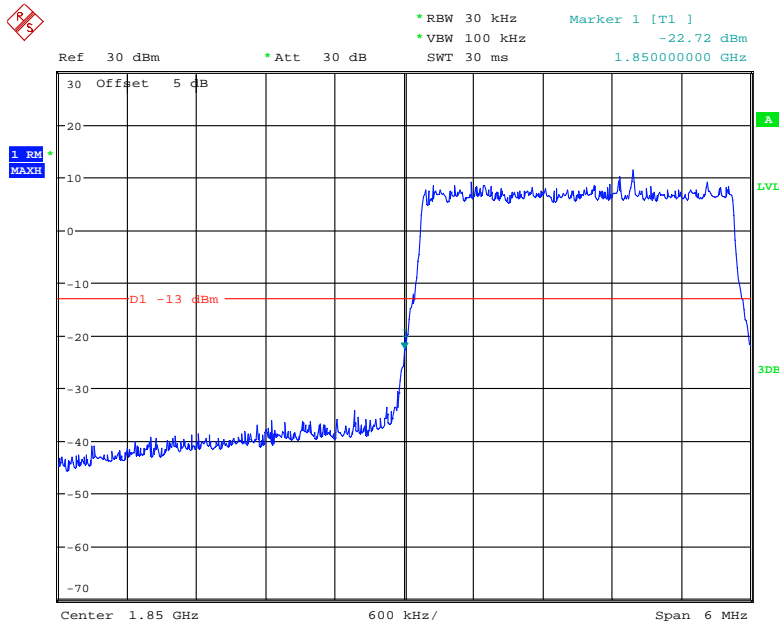
Date: 19.APR.2018 14:14:40

16QAM_1.4MHz_6 RB_Right



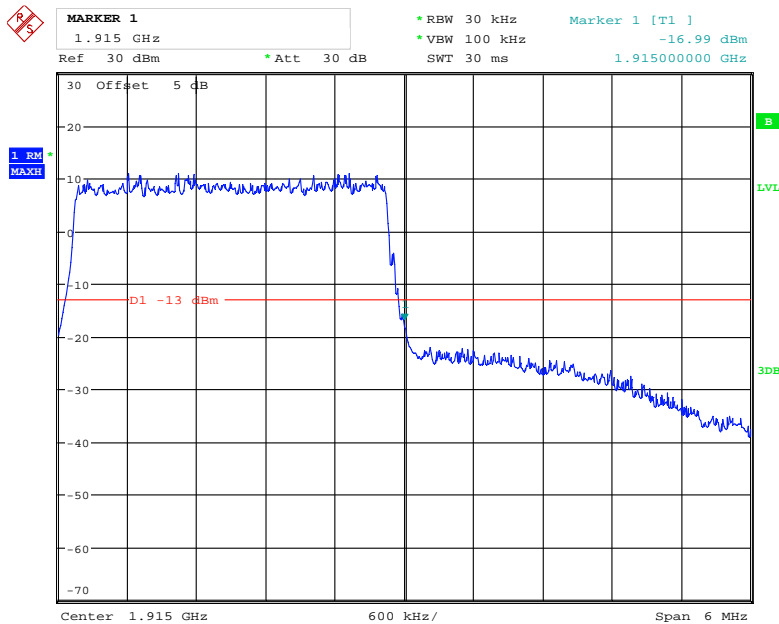
Date: 19.APR.2018 14:42:43

16QAM_3MHz_15 RB_Left



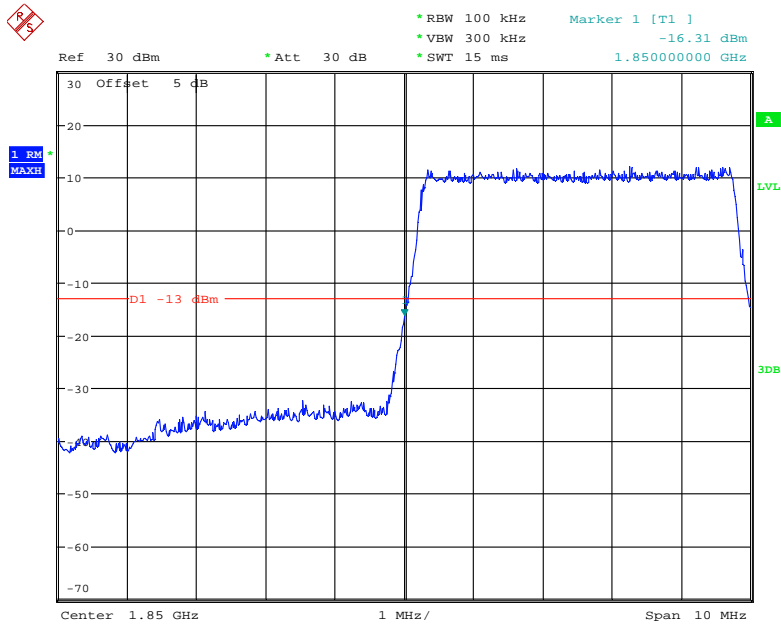
Date: 19.APR.2018 14:23:37

16QAM_3MHz_15 RB_Right



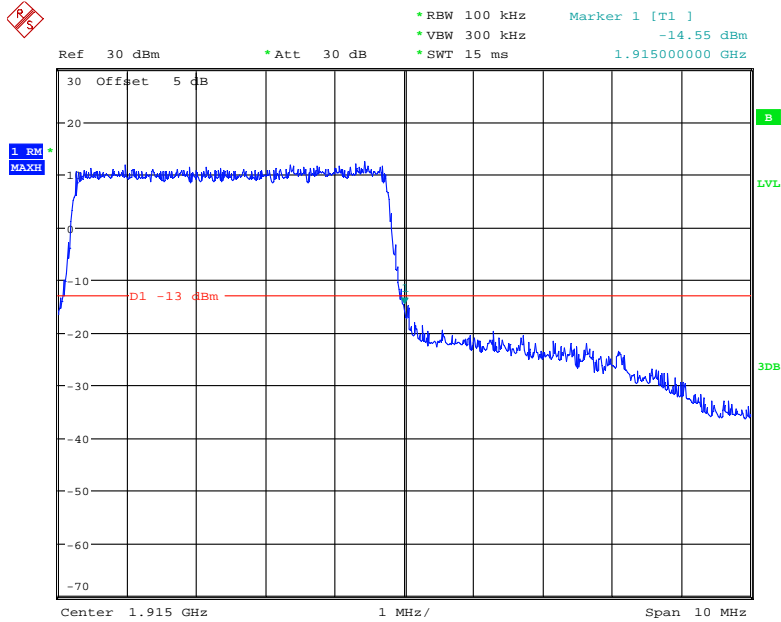
Date: 19.APR.2018 14:22:23

16QAM_5MHz_25 RB_Left



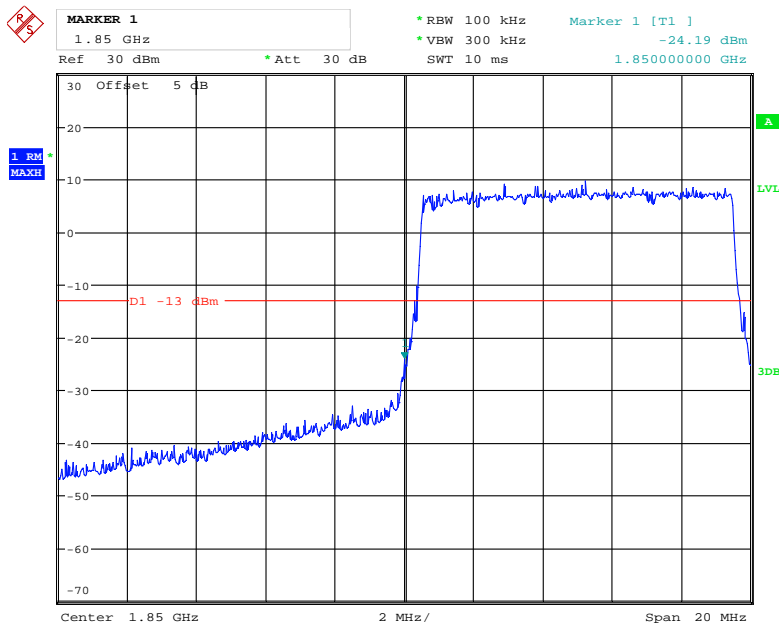
Date: 19.APR.2018 14:25:44

16QAM_5MHz_25 RB_Right



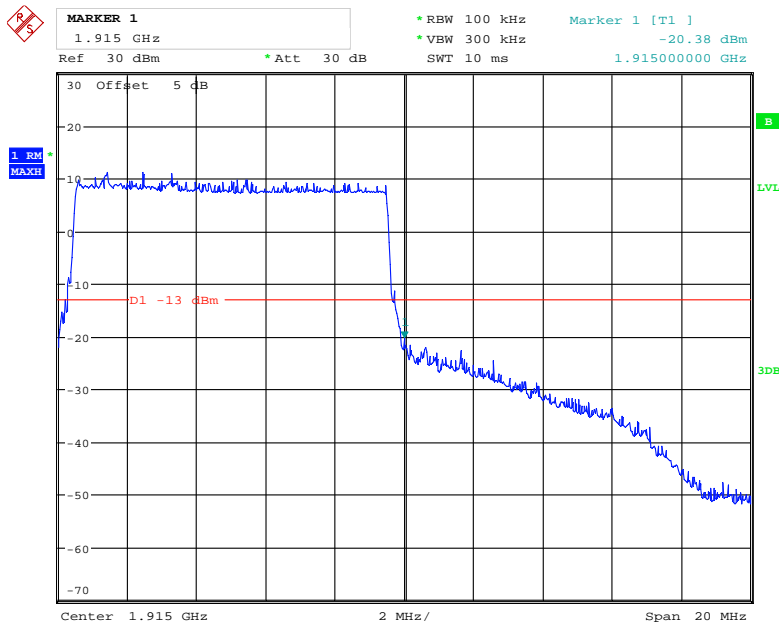
Date: 19.APR.2018 14:28:30

16QAM_10MHz_50 RB_Left



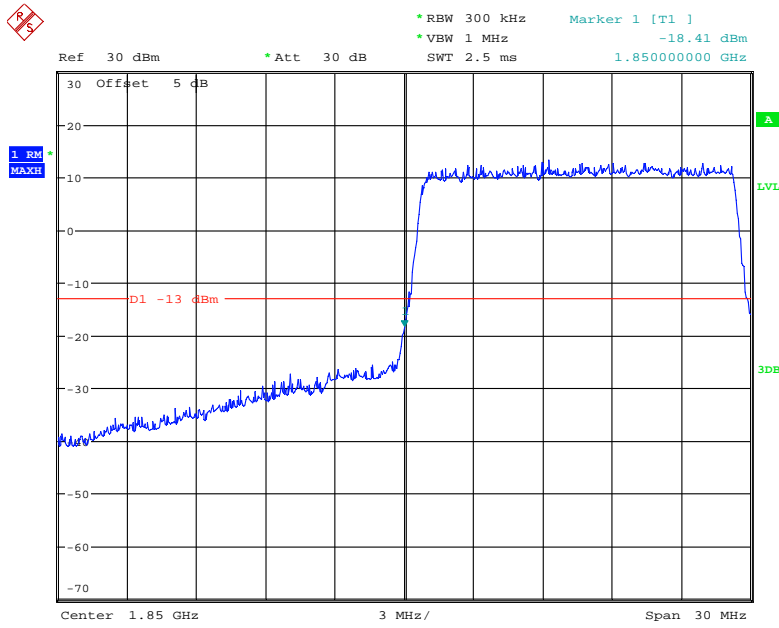
Date: 19.APR.2018 14:32:04

16QAM_10MHz_50 RB_Right



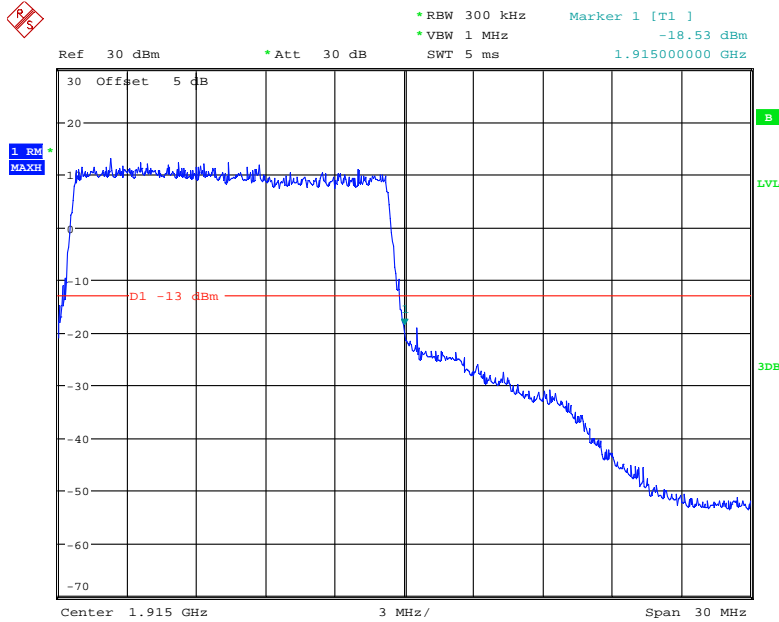
Date: 19.APR.2018 14:30:22

16QAM_15MHz_75 RB_Left



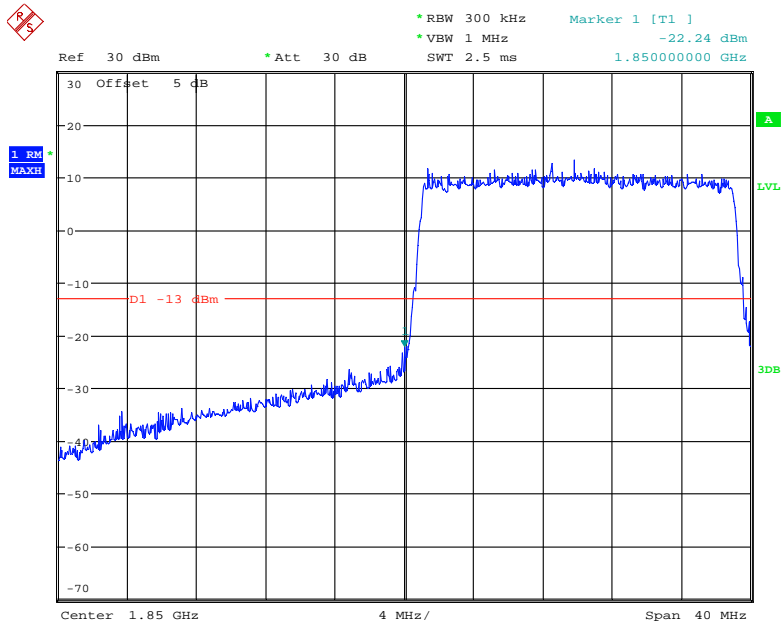
Date: 19.APR.2018 14:33:18

16QAM_15MHz_75 RB_Right



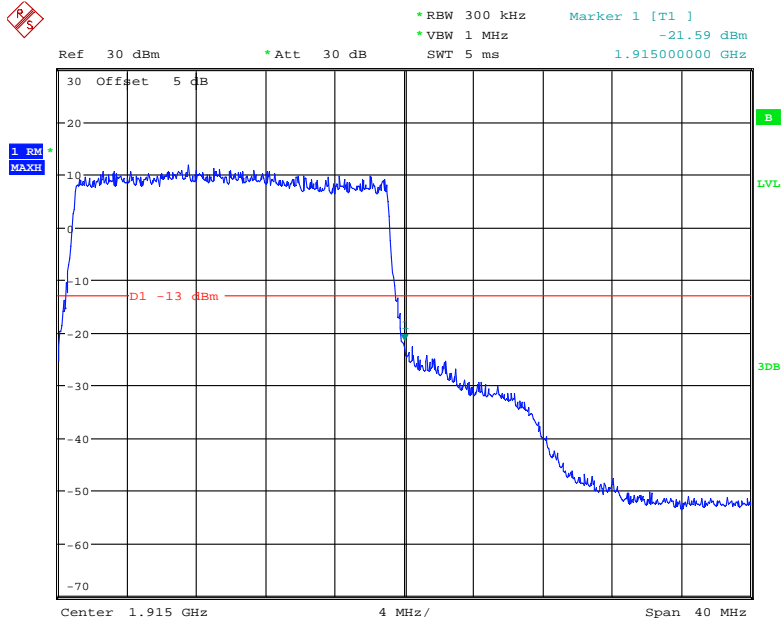
Date: 19.APR.2018 14:34:57

16QAM_20MHz_FULL RB_Left



Date: 19.APR.2018 14:38:22

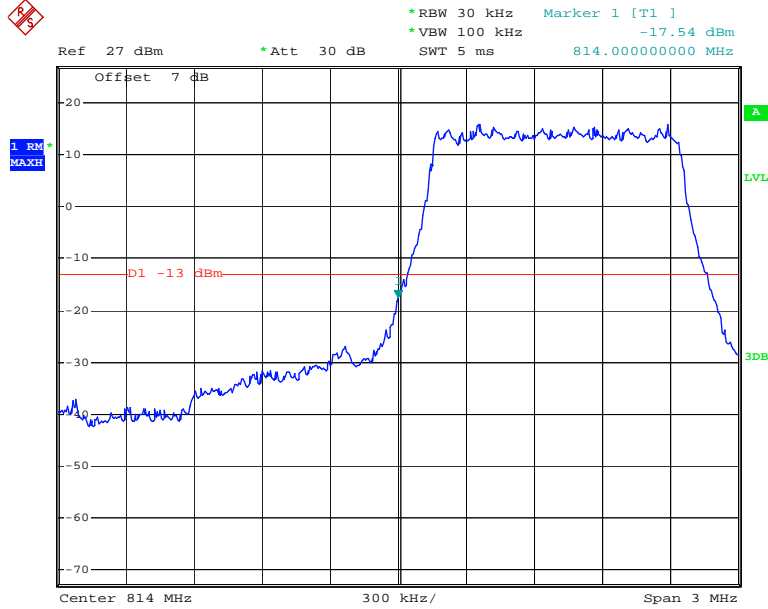
16QAM_20MHz_FULL RB_Right



Date: 19.APR.2018 14:36:16

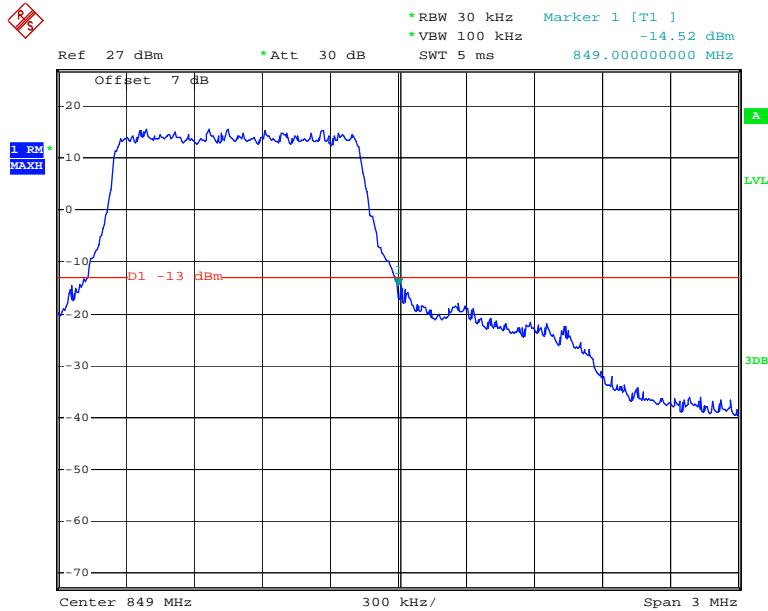
LTE Band 26:

QPSK_1.4MHz_6 RB_Left



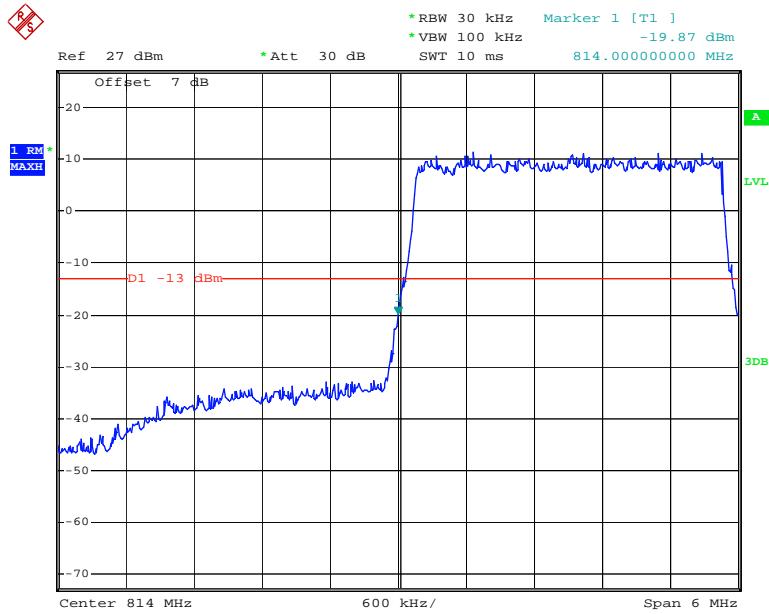
Date: 31.MAR.2018 17:26:21

QPSK_1.4MHz_6 RB_Right



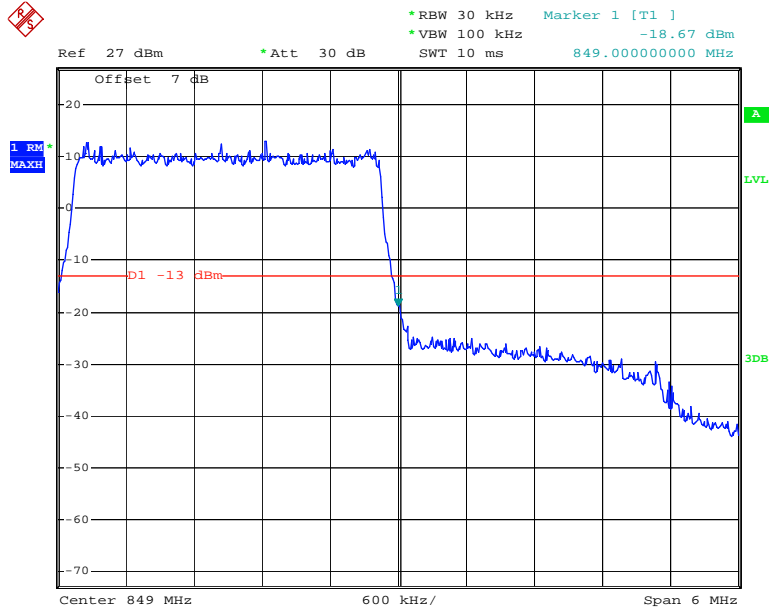
Date: 31.MAR.2018 17:28:39

QPSK_3MHz_15 RB_Left



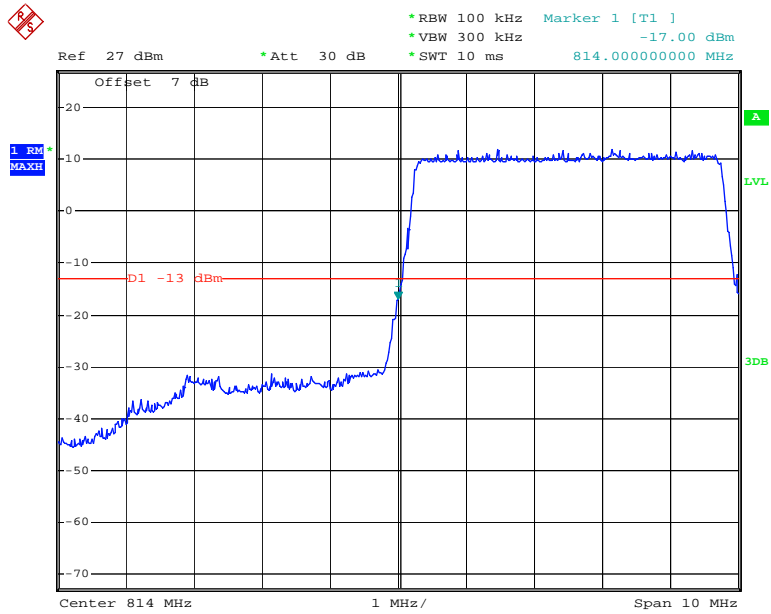
Date: 31.MAR.2018 17:33:33

QPSK_3MHz_15 RB_Right



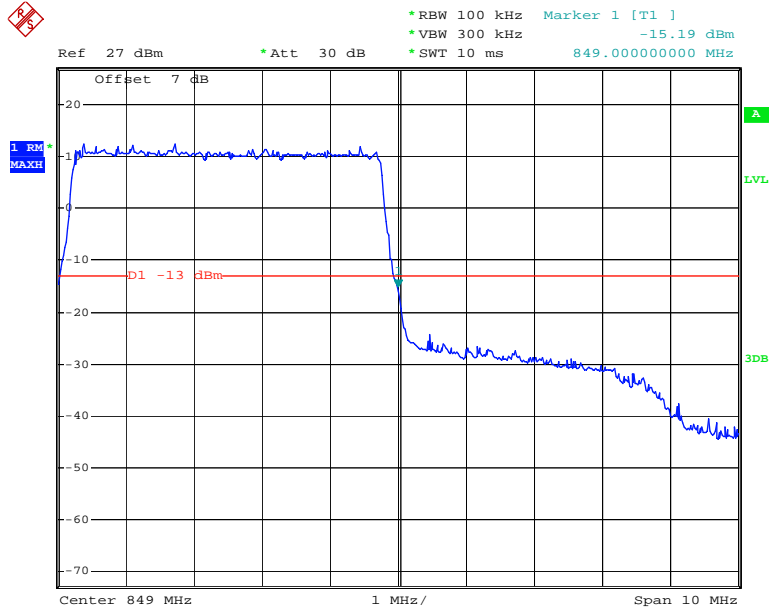
Date: 31.MAR.2018 17:30:54

QPSK_5MHz_25 RB_Left



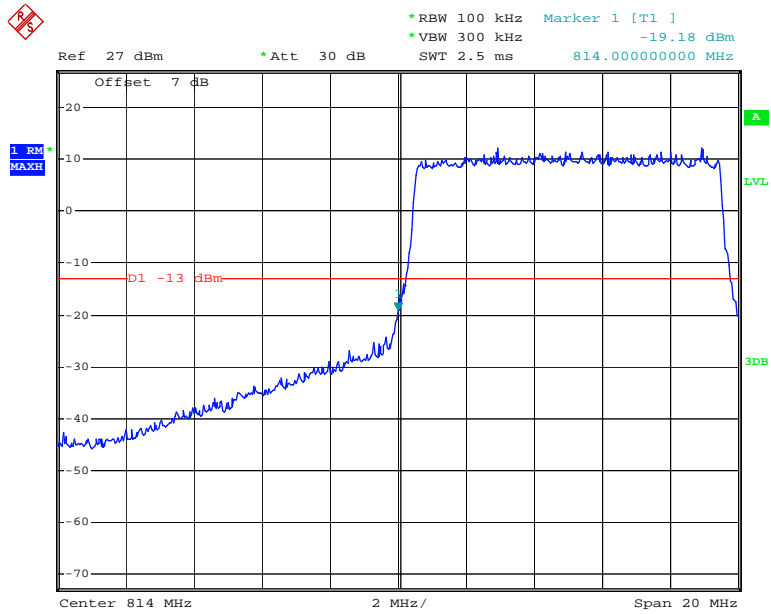
Date: 31.MAR.2018 17:37:12

QPSK_5MHz_25 RB_Right



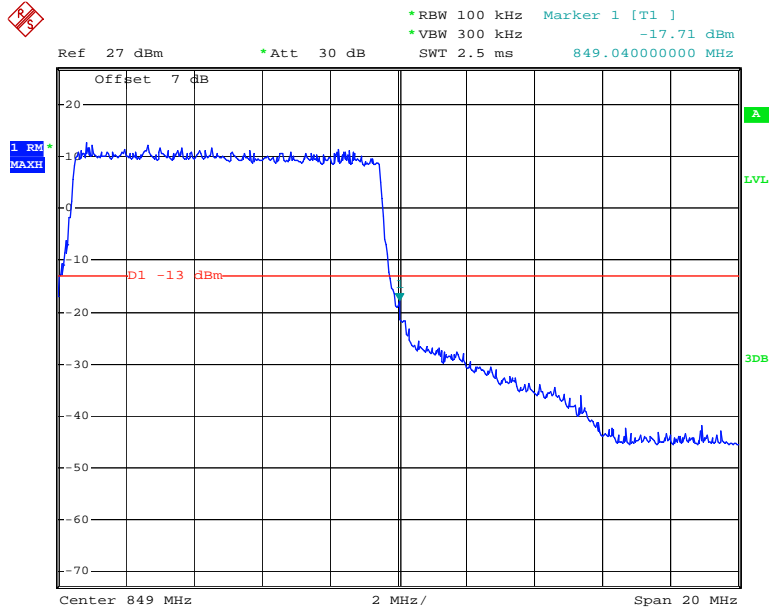
Date: 31.MAR.2018 17:38:05

QPSK_10MHz_50 RB_Left



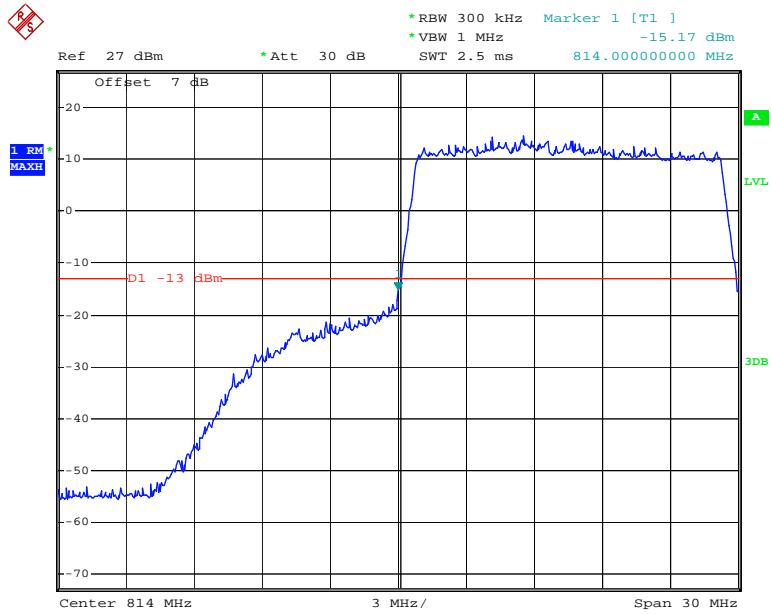
Date: 31.MAR.2018 17:42:45

QPSK_10MHz_50 RB_Right



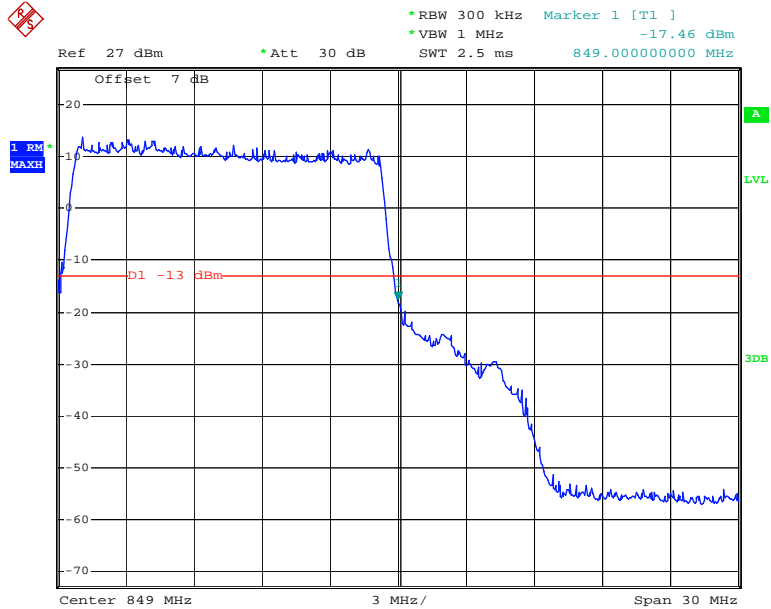
Date: 31.MAR.2018 17:41:43

QPSK_15MHz_75 RB_Left



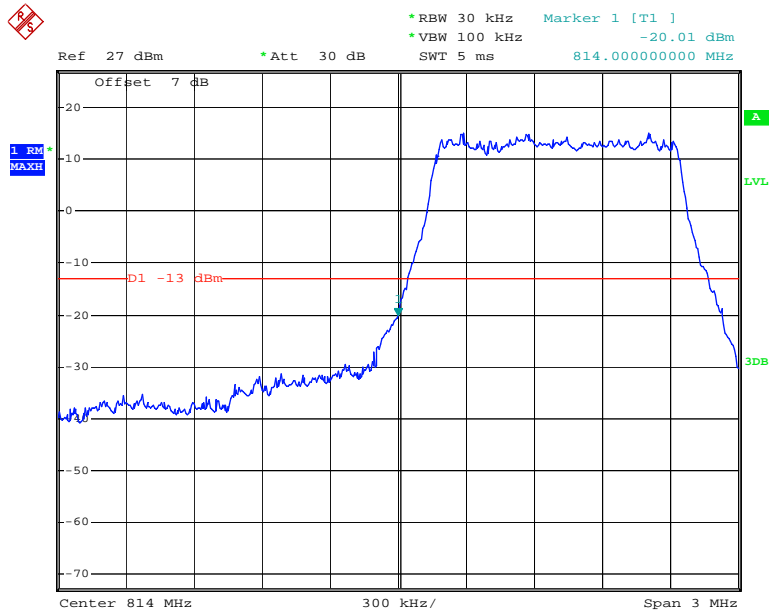
Date: 2.APR.2018 16:58:03

QPSK_15MHz_75 RB_Right



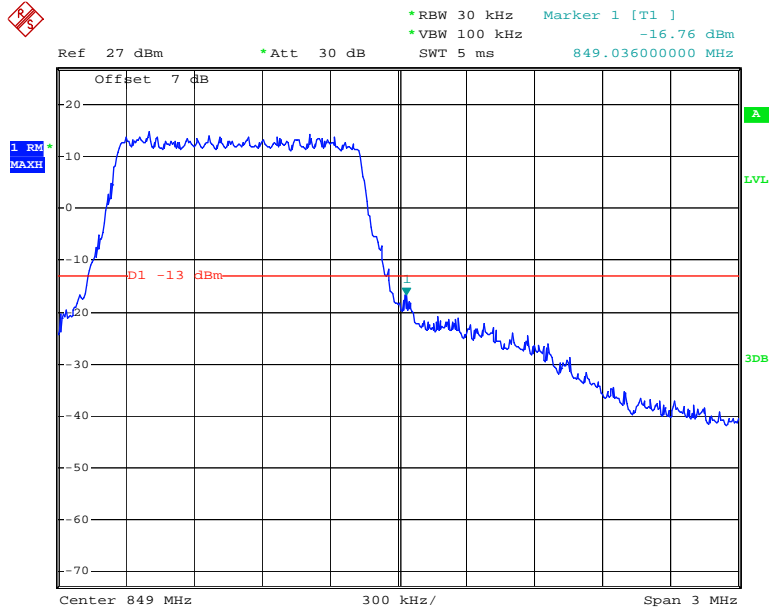
Date: 2.APR.2018 17:00:37

16QAM_1.4MHz_6 RB_ Left



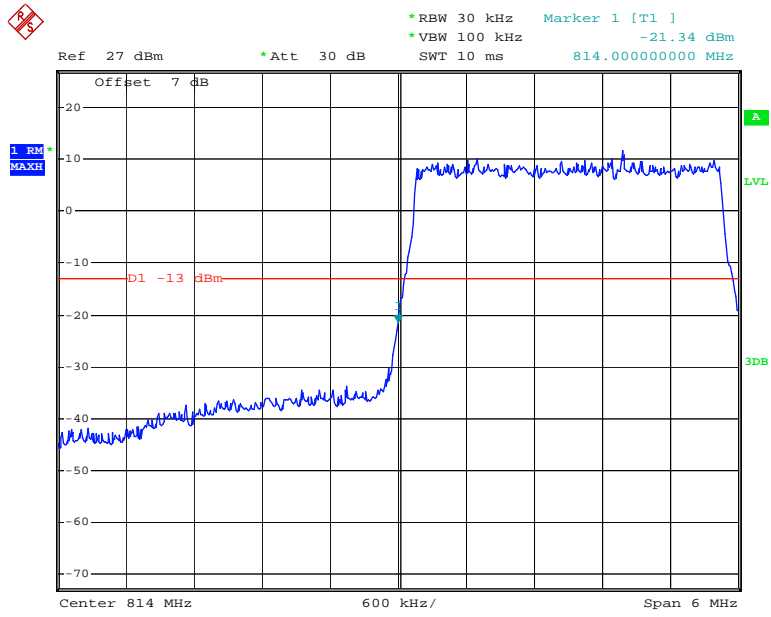
Date: 31.MAR.2018 17:27:04

16QAM_1.4MHz_6 RB_ Right



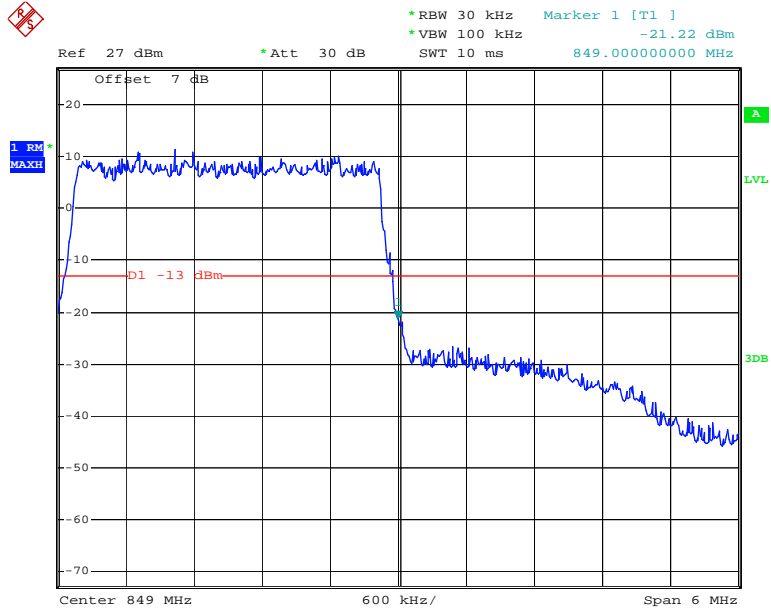
Date: 31.MAR.2018 17:28:06

16QAM_3MHz_15 RB_Left



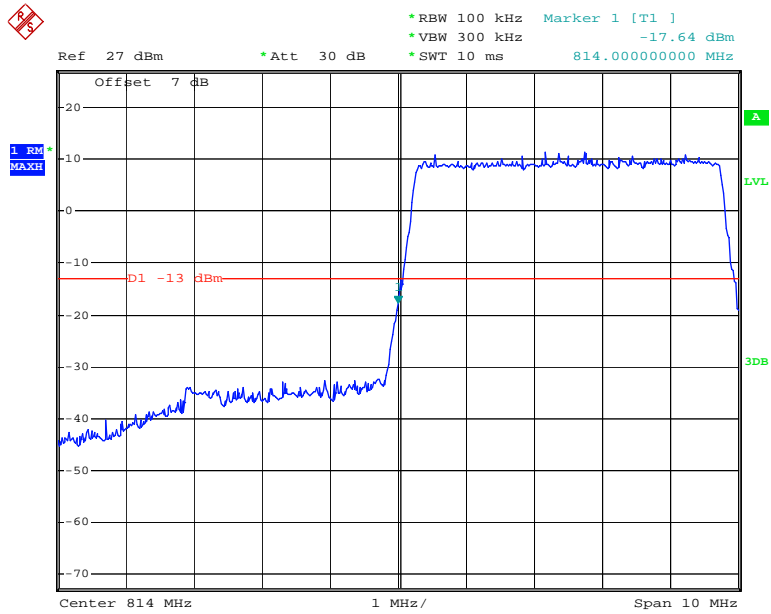
Date: 31.MAR.2018 17:32:18

16QAM_3MHz_15 RB_Right



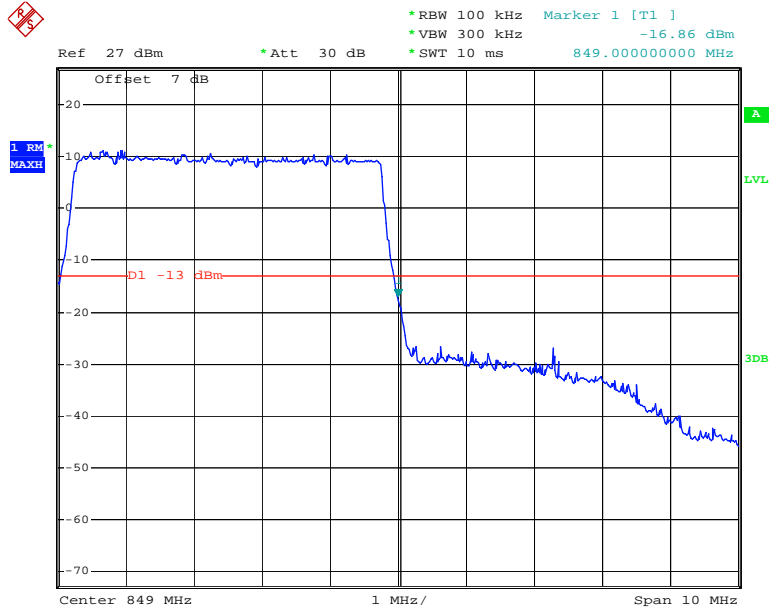
Date: 31.MAR.2018 17:31:16

16QAM_5MHz_25 RB_Left



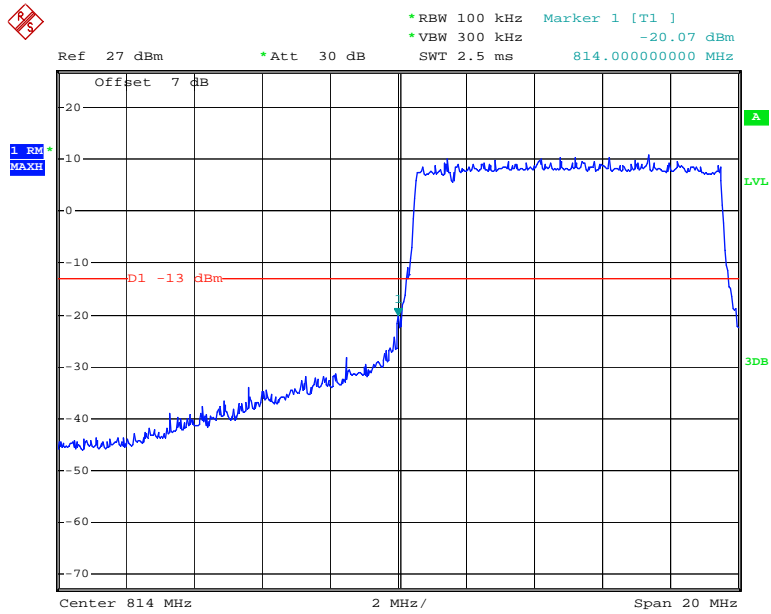
Date: 31.MAR.2018 17:36:35

16QAM_5MHz_25 RB_Right



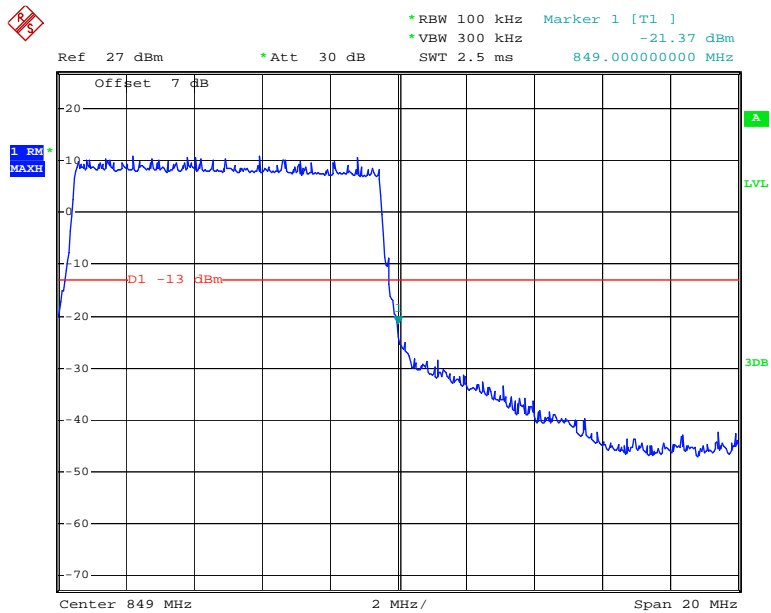
Date: 31.MAR.2018 17:38:38

16QAM_10MHz_50 RB_Left



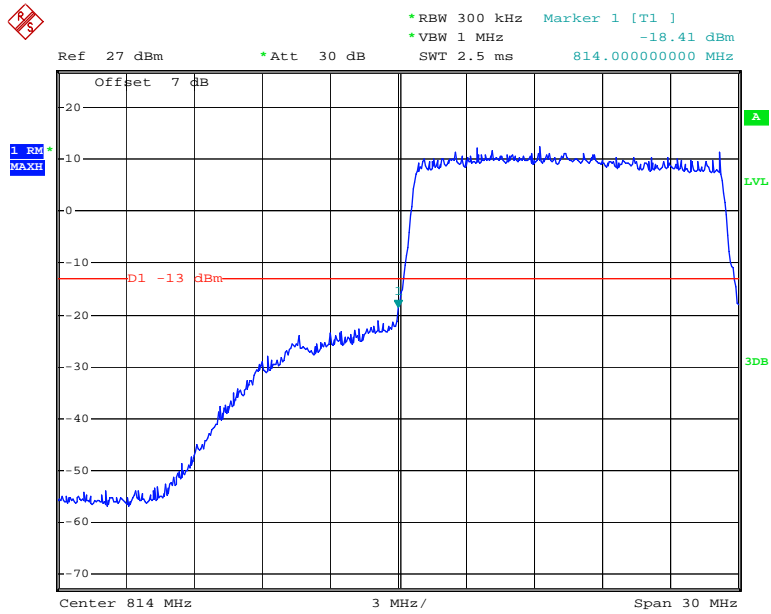
Date: 31.MAR.2018 17:43:42

16QAM_10MHz_50 RB_Right



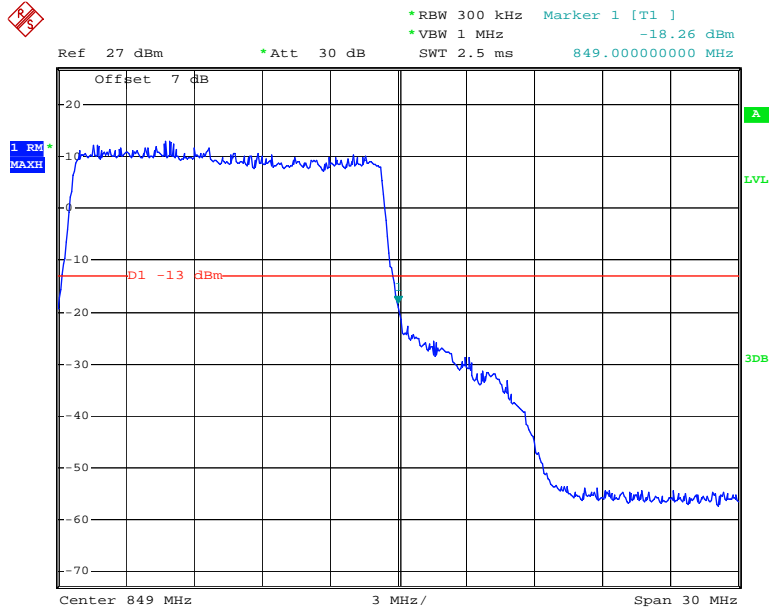
Date: 31.MAR.2018 17:40:33

16QAM_15MHz_75 RB_Left



Date: 2.APR.2018 16:59:25

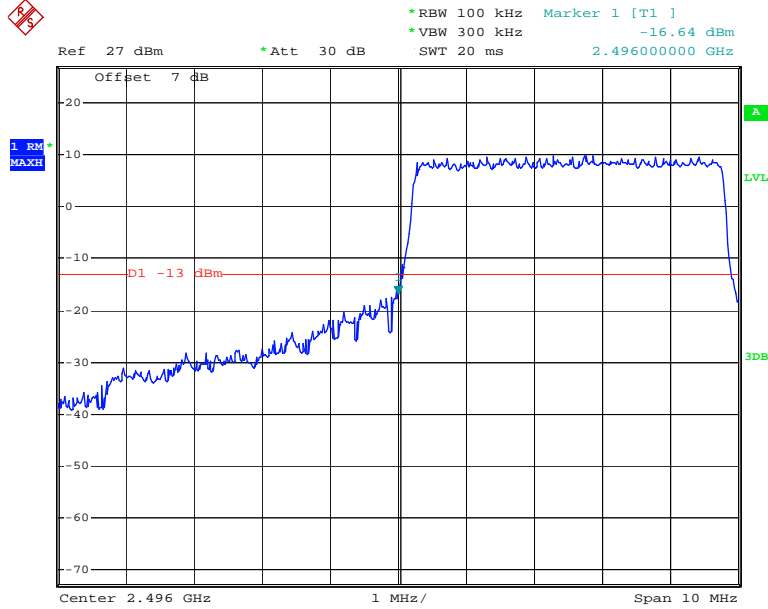
16QAM_15MHz_75 RB_Right



Date: 2.APR.2018 17:00:10

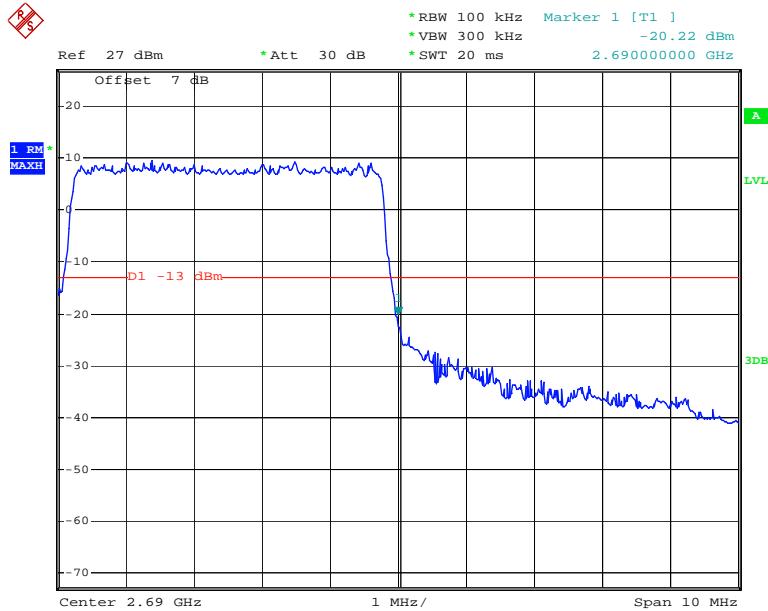
LTE Band 41(Left for FCC):

QPSK_5MHz_25 RB_Left



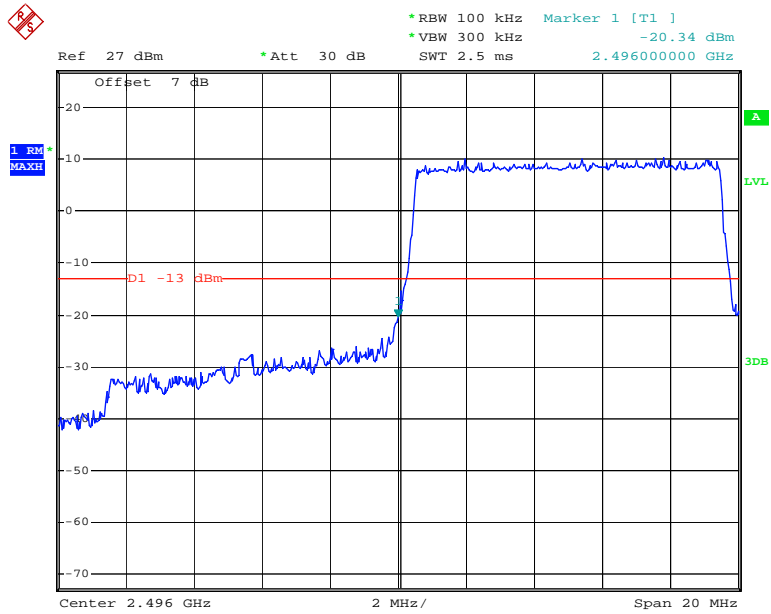
Date: 2.APR.2018 17:06:18

QPSK_5MHz_25 RB_Right



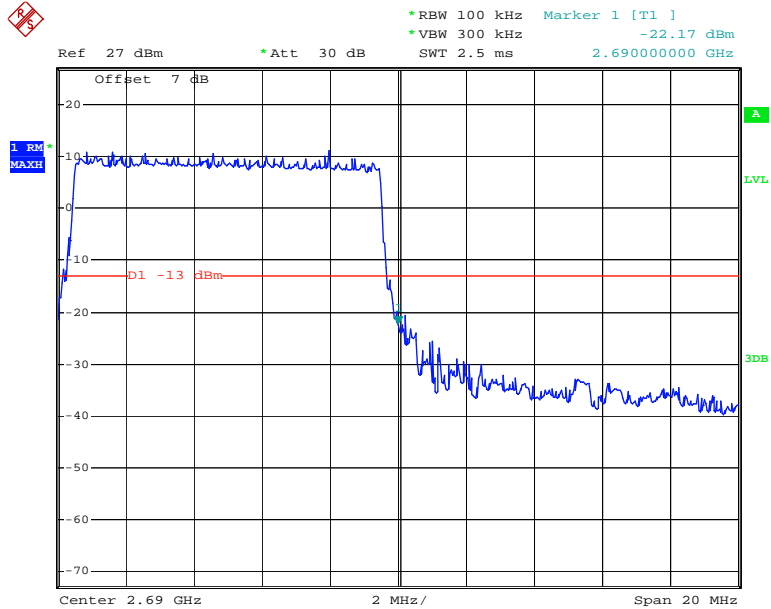
Date: 2.APR.2018 17:08:12

QPSK_10MHz_50 RB_Left



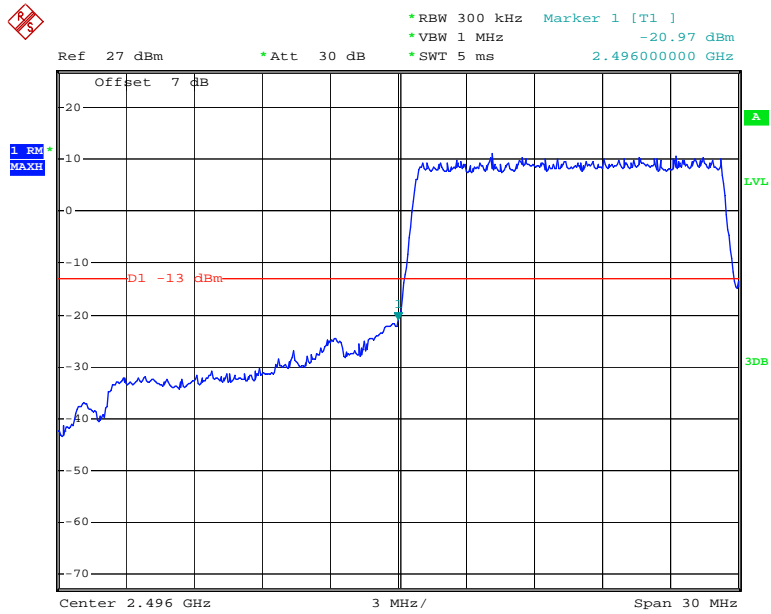
Date: 2.APR.2018 17:12:18

QPSK_10MHz_50 RB_Right



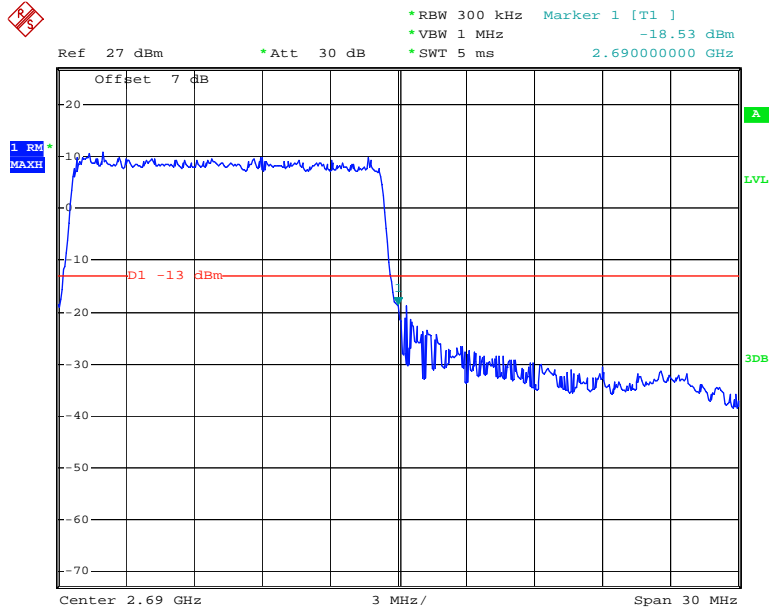
Date: 2.APR.2018 17:09:53

QPSK_15MHz_75 RB_Left



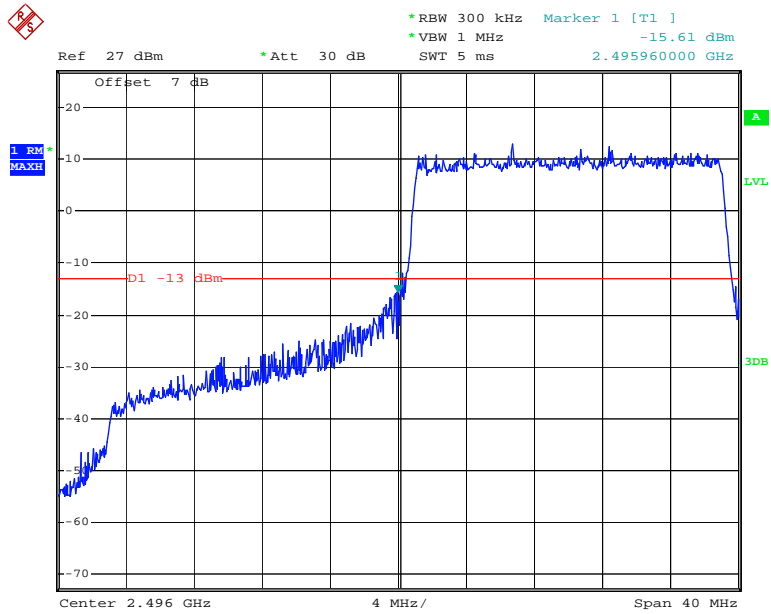
Date: 2.APR.2018 17:15:55

QPSK_15MHz_75 RB_Right



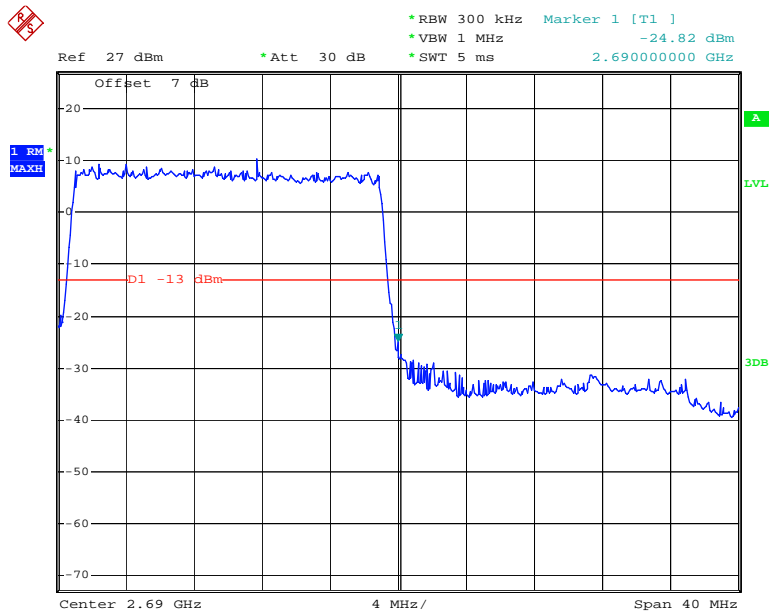
Date: 2.APR.2018 17:18:47

QPSK_20MHz_FULL RB_Left



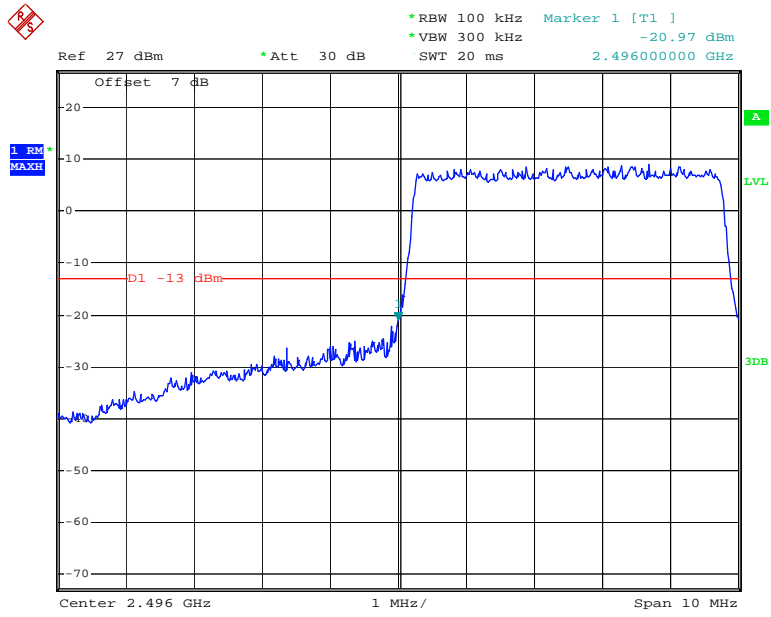
Date: 2.APR.2018 17:28:39

QPSK_20MHz_FULL RB_Right



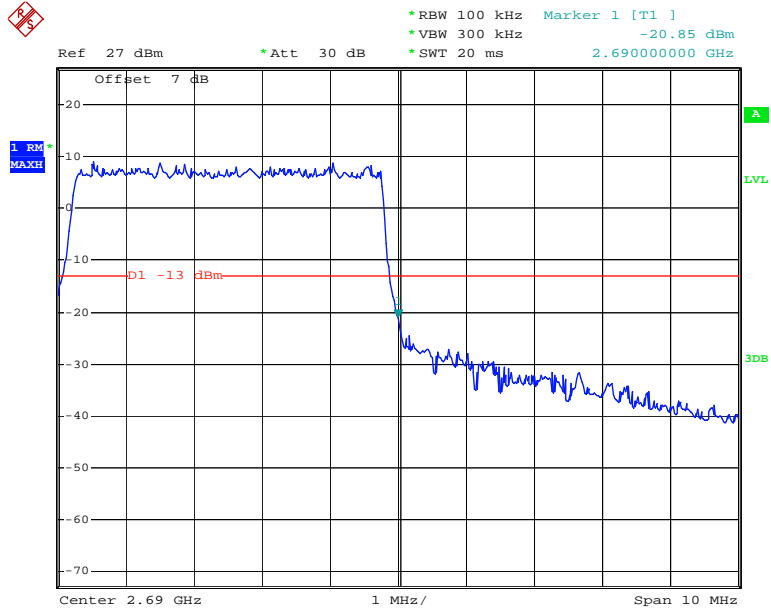
Date: 2.APR.2018 17:20:02

16QAM_5MHz_25 RB_Left



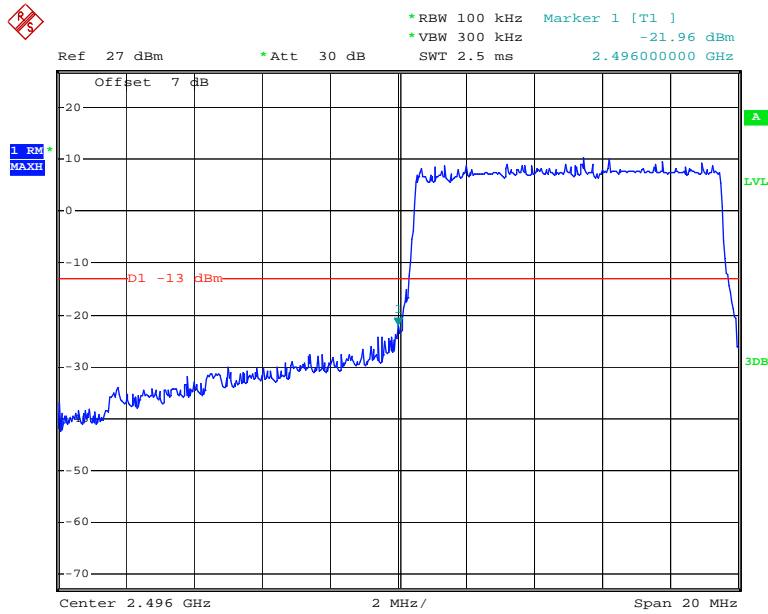
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16QAM_5MHz_25 RB_Right



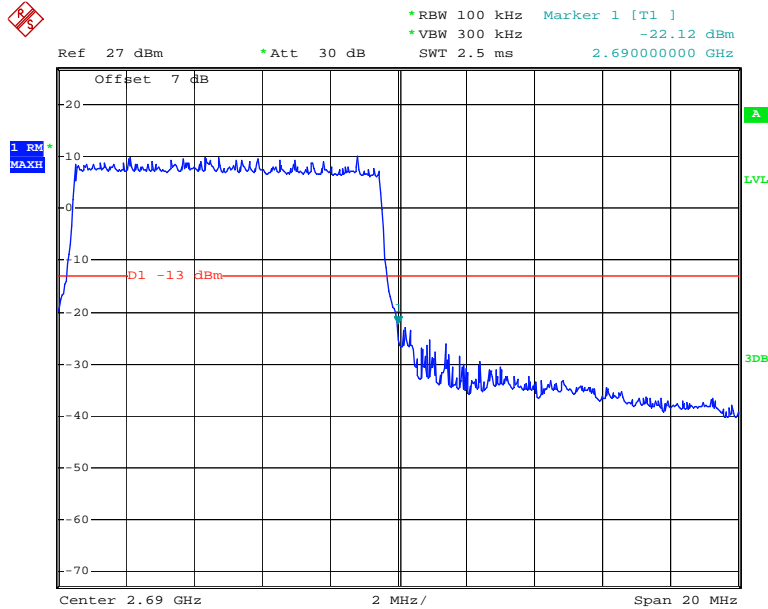
Date: 2.APR.2018 17:07:42

16QAM_10MHz_50 RB_Left



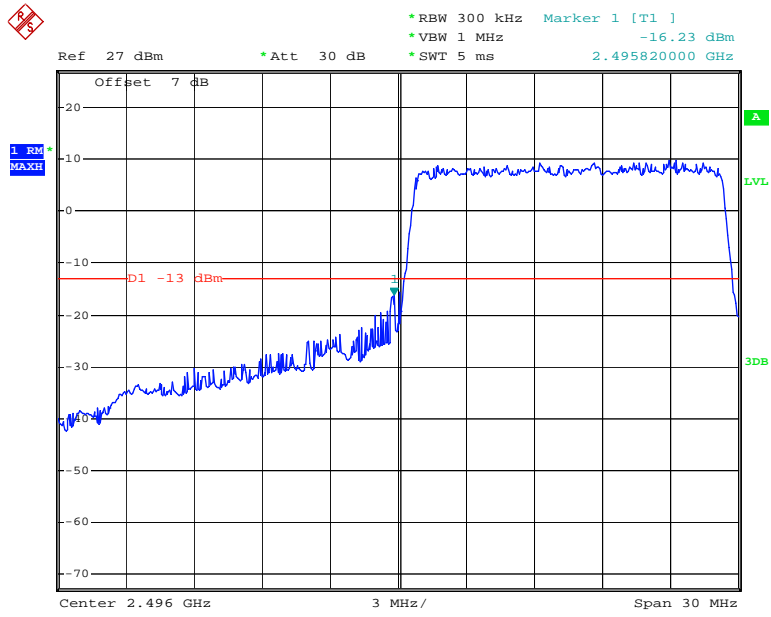
Date: 2.APR.2018 17:11:48

16QAM_10MHz_50 RB_Right



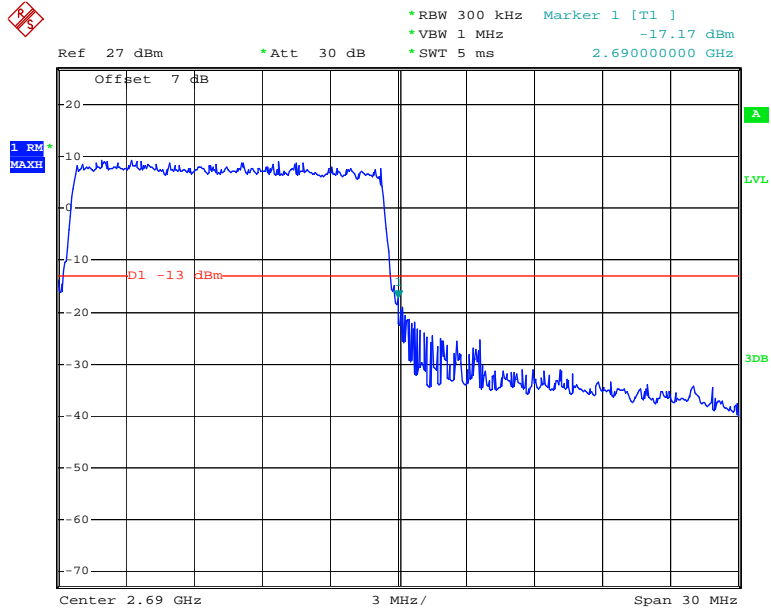
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16QAM_15MHz_75 RB_Left



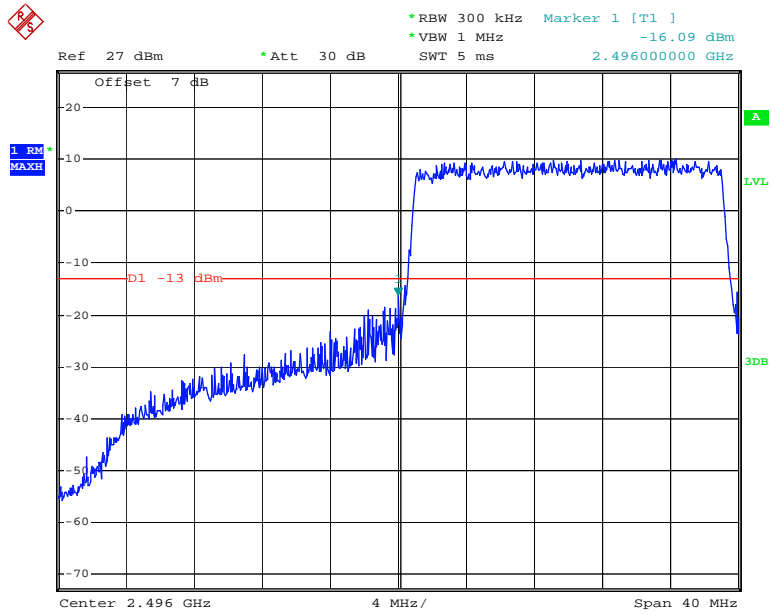
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16QAM_15MHz_75 RB_Right



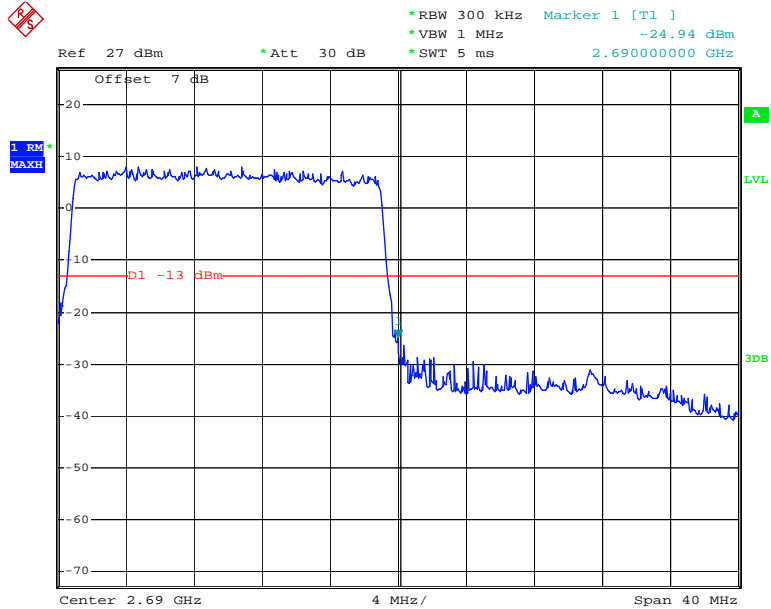
Date: 2.APR.2018 17:18:09

16QAM_20MHz_FULL RB_Left



Date: 2.APR.2018 17:27:19

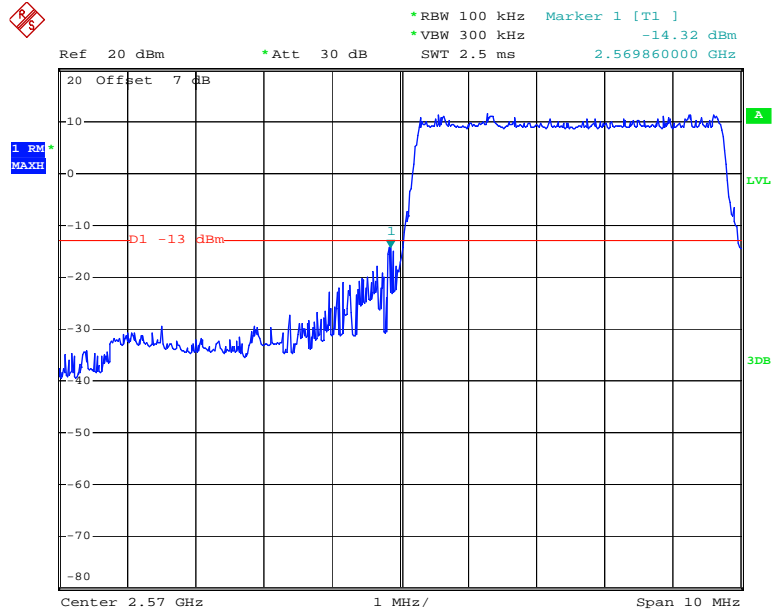
16QAM_20MHz_FULL RB_Right



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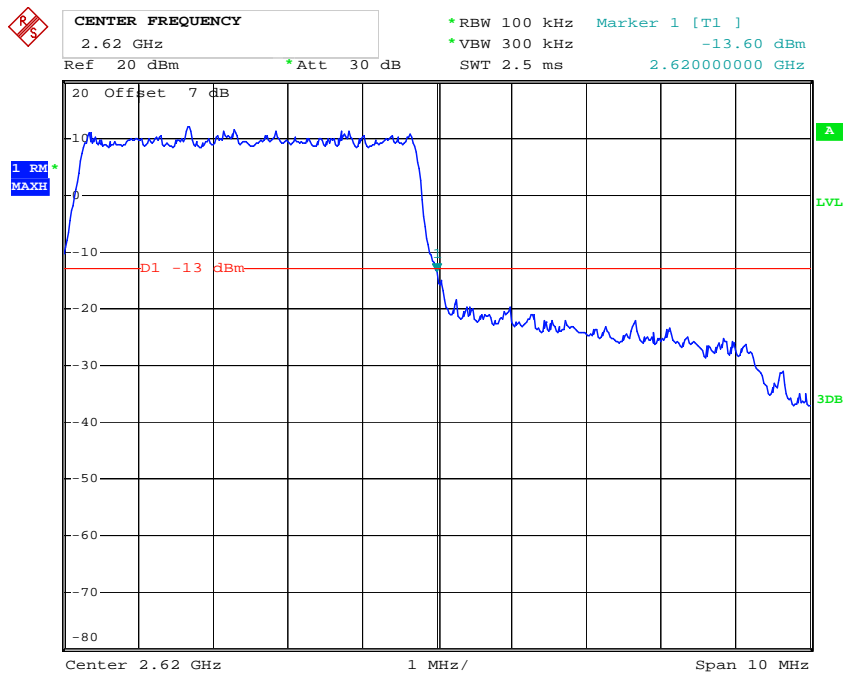
Additional Left for ISEDC:

QPSK_5MHz_25 RB_Left



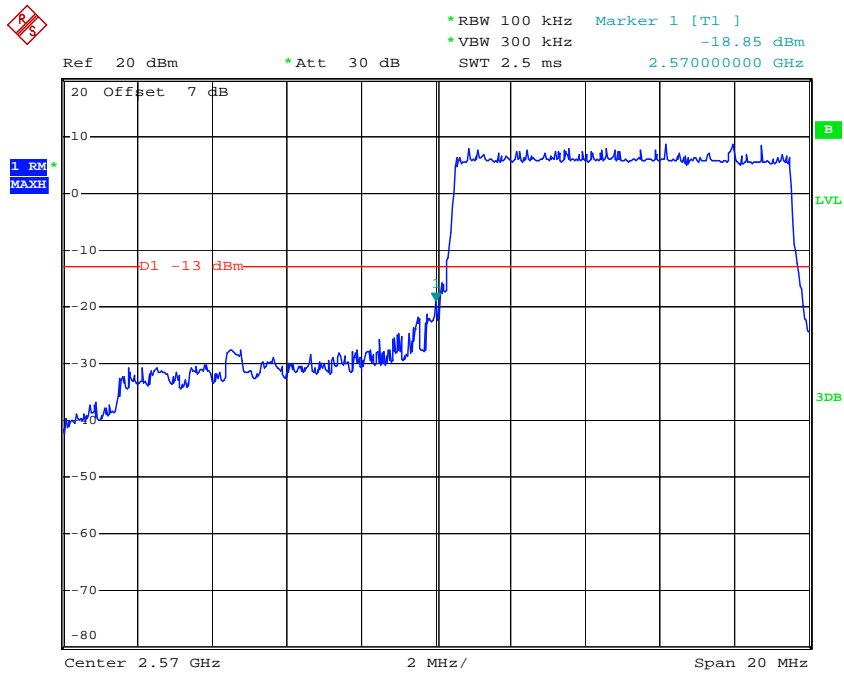
Date: 4.JUN.2018 18:46:01

QPSK_5MHz_25 RB_Right



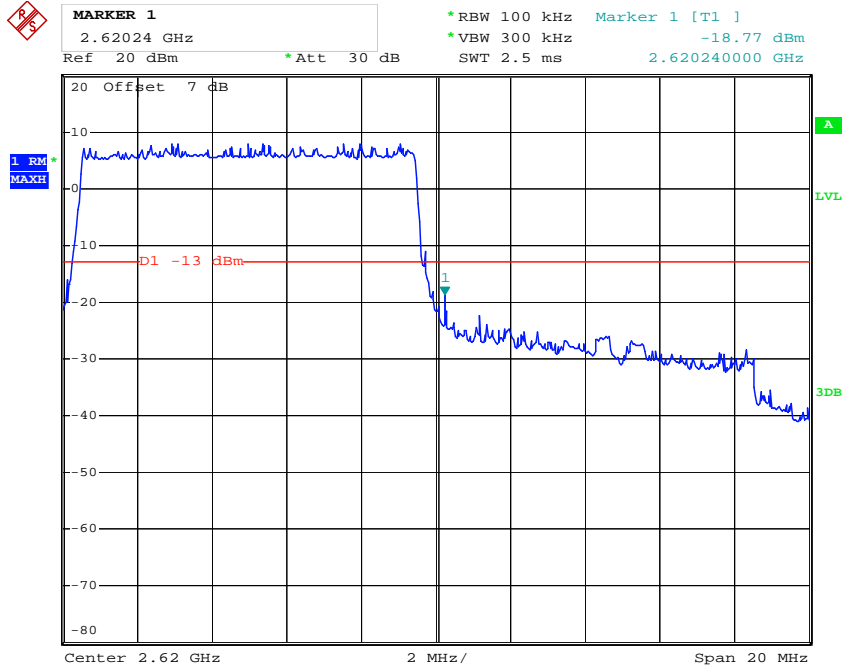
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QPSK_10MHz_50 RB_Left



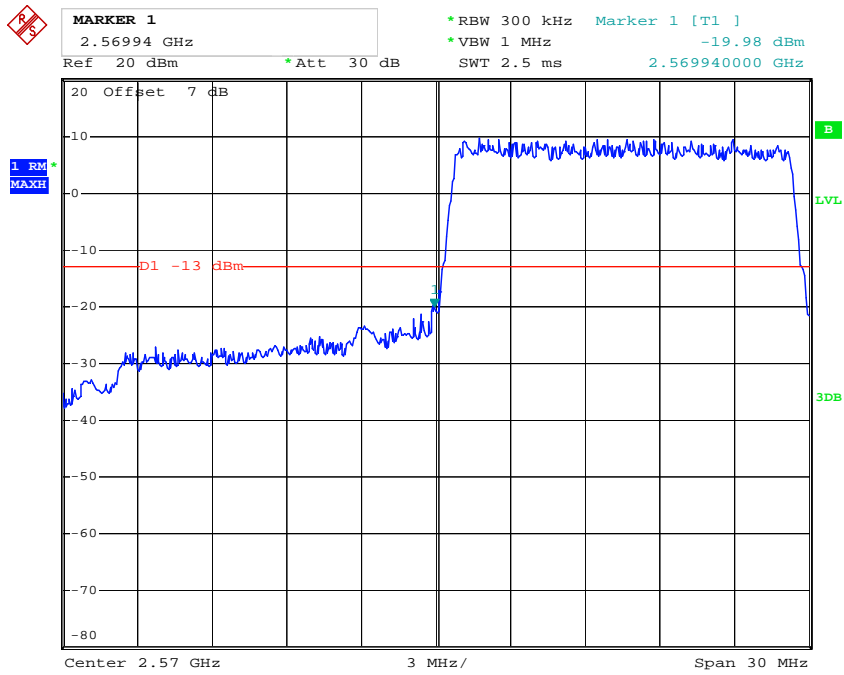
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QPSK_10MHz_50 RB_Right



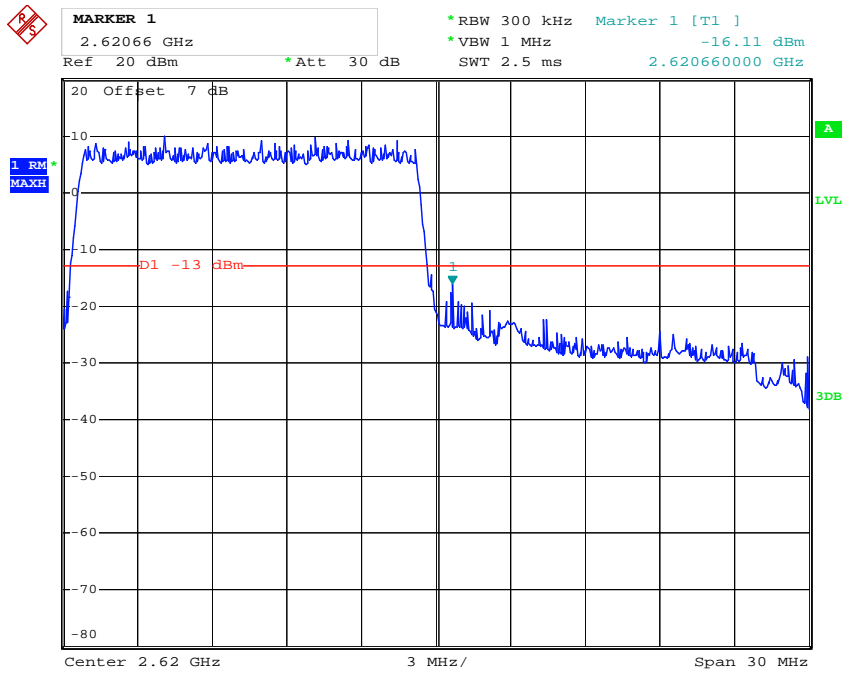
Date: 22.MAY.2018 20:28:02

QPSK_15MHz_75 RB_Left



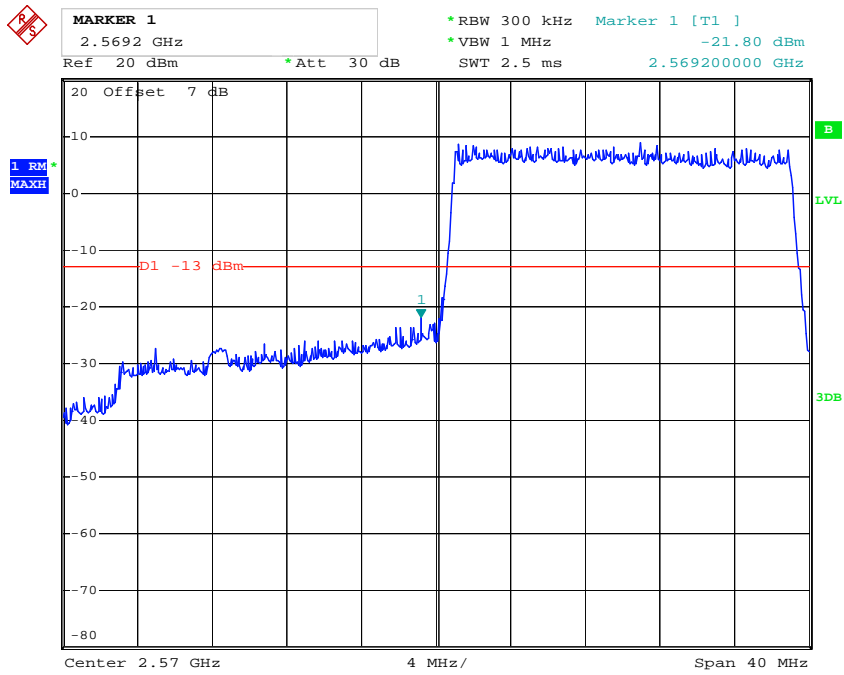
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QPSK_15MHz_75 RB_Right



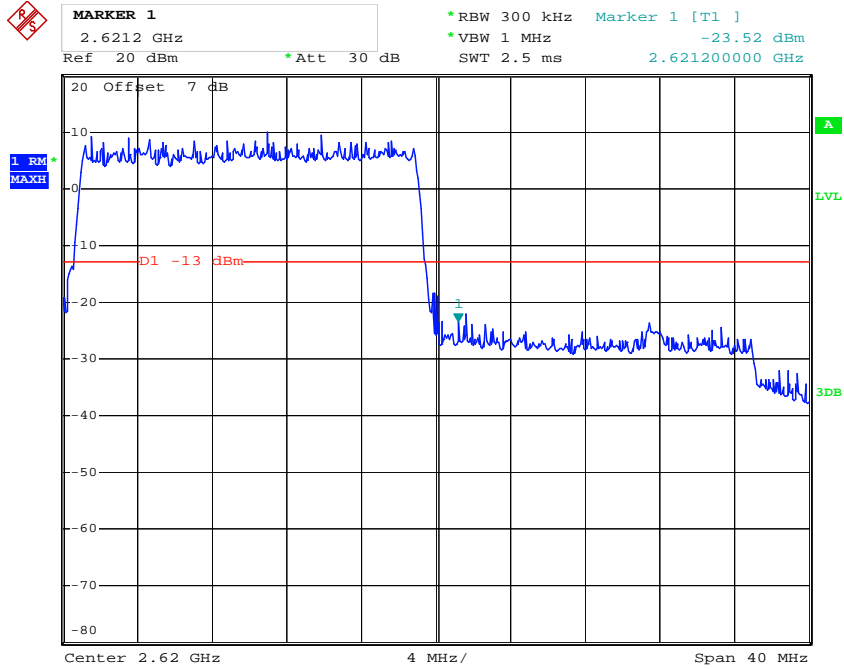
Date: 22.MAY.2018 20:30:29

QPSK_20MHz_FULL RB_Left



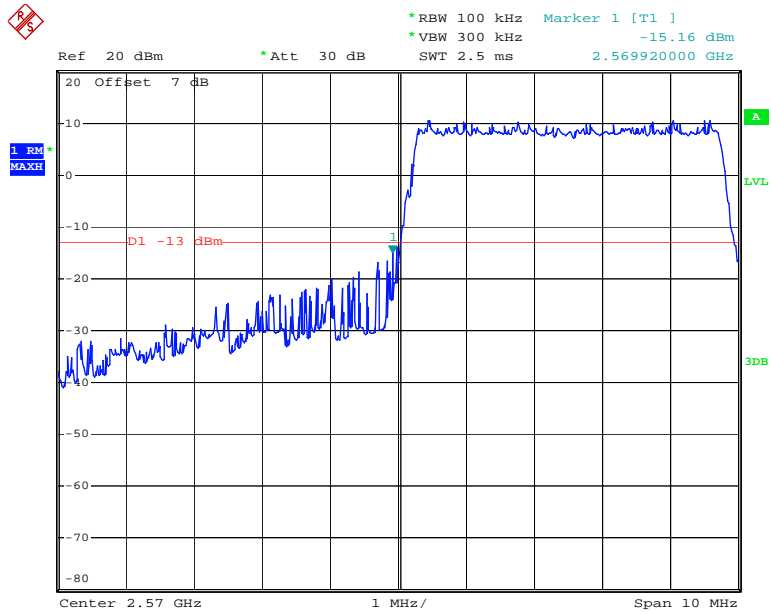
Date: 22.MAY.2018 20:35:24

QPSK_20MHz_FULL RB_Right



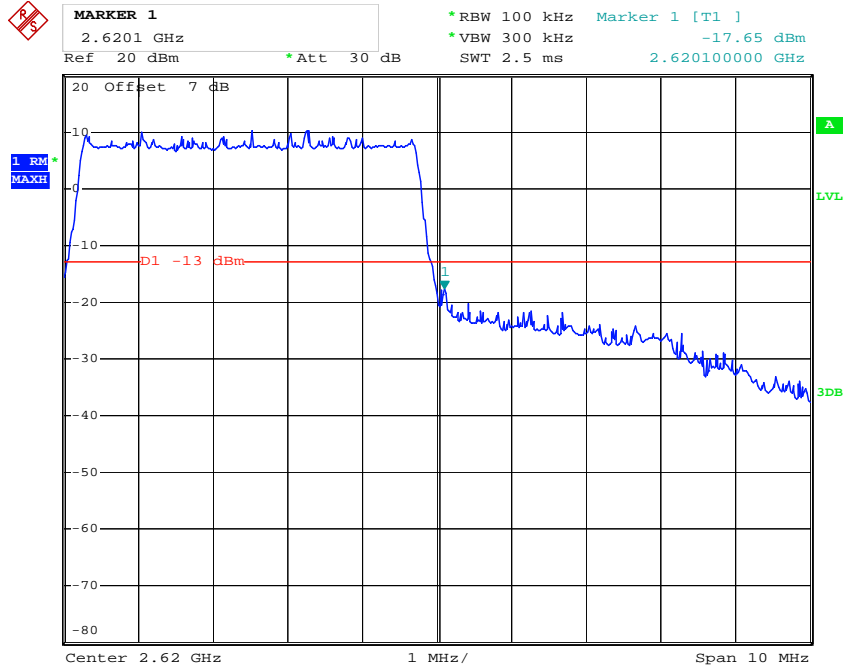
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16QAM_5MHz_25 RB_Left



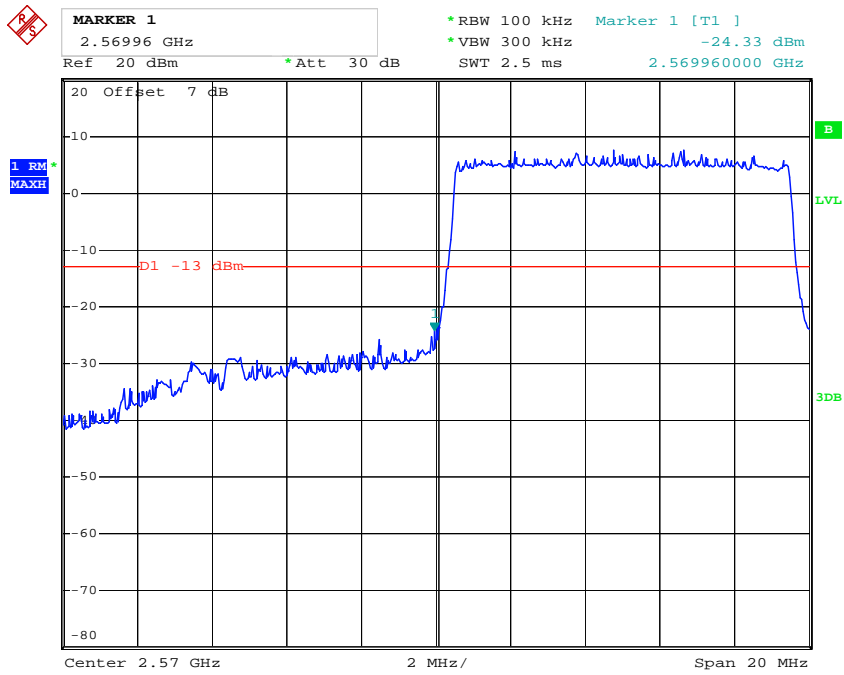
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16QAM_5MHz_25 RB_Right



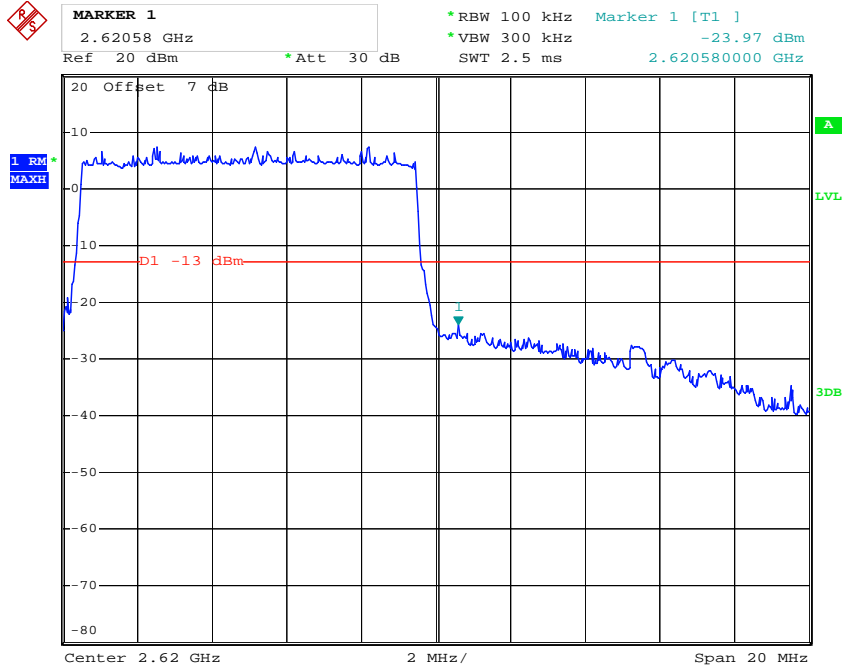
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16QAM_10MHz_50 RB_Left



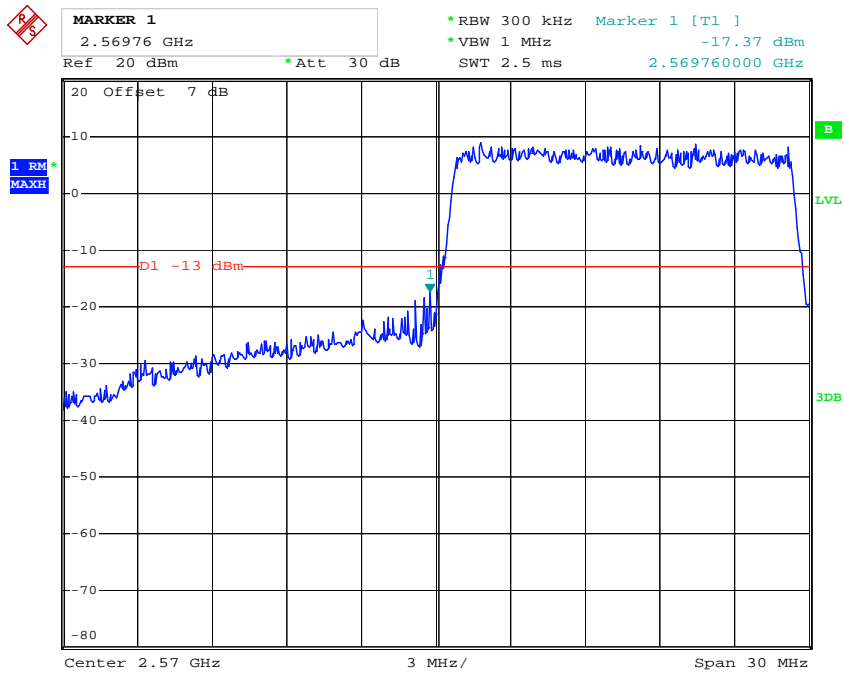
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16QAM_10MHz_50 RB_Right



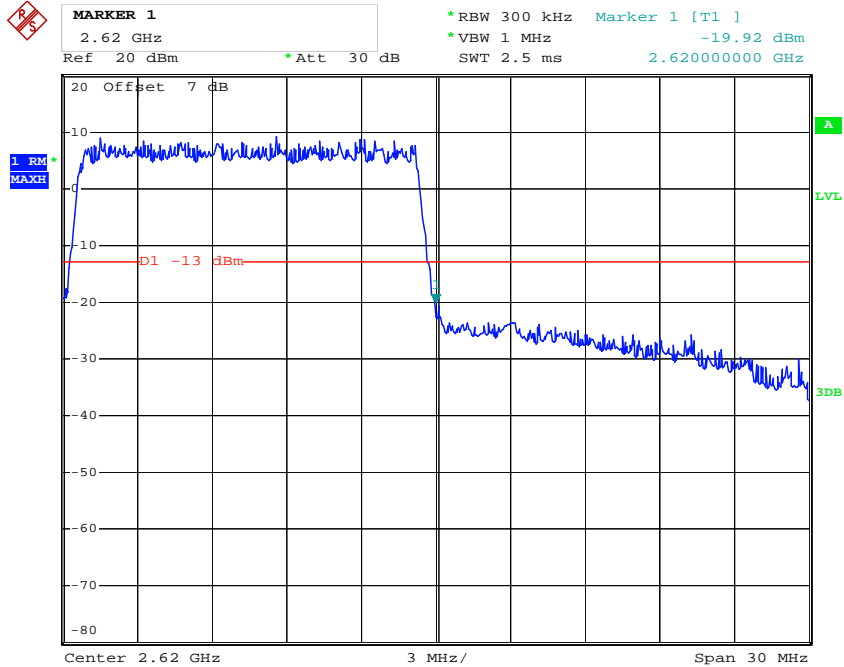
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16QAM_15MHz_75 RB_Left



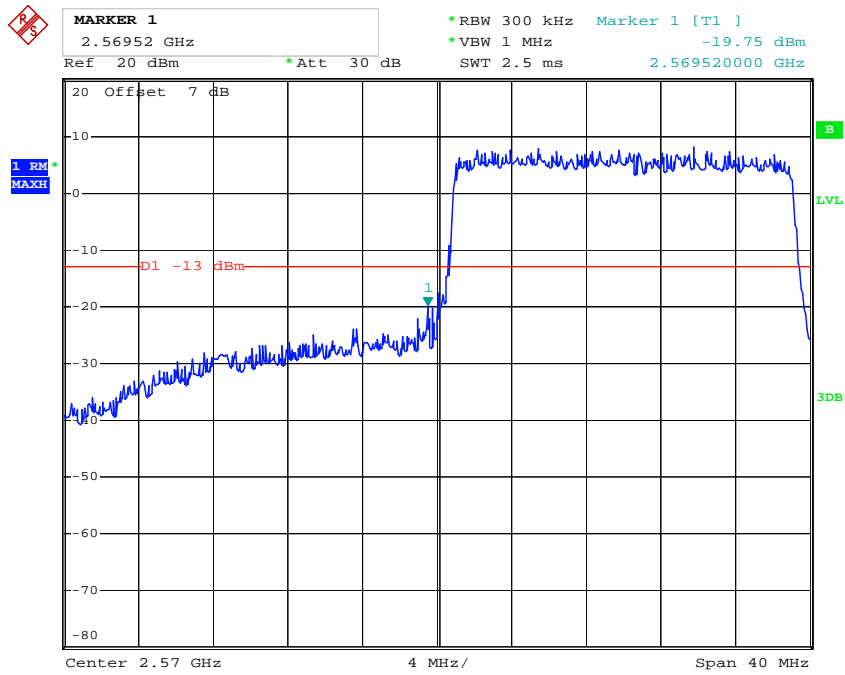
Date: 22.MAY.2018 20:34:23

16QAM_15MHz_75 RB_Right



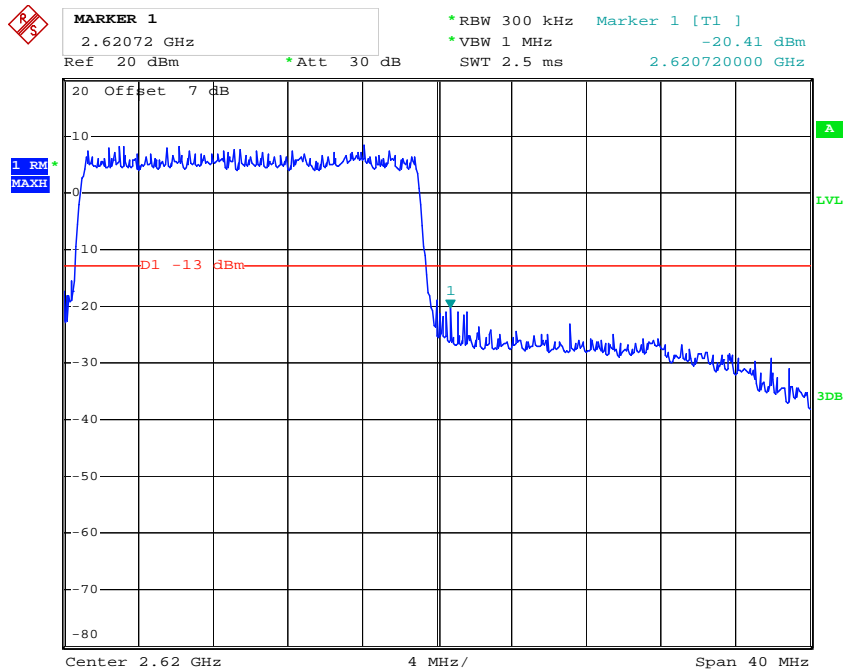
Date: 22.MAY.2018 20:31:09

16QAM_20MHz_FULL RB_Left



Date: 22.MAY.2018 20:36:01

16QAM_20MHz_FULL RB_Right



Date: 22.MAY.2018 20:36:46

FCC §2.1055, §22.355 & §24.235 & §27.54& §90.213 AND RSS-130 §4.3 & RSS-132 §5.3& RSS-133 §6.3 & RSS-139 §6.4& RSS-199 §4.3 - FREQUENCY STABILITY

Applicable Standard

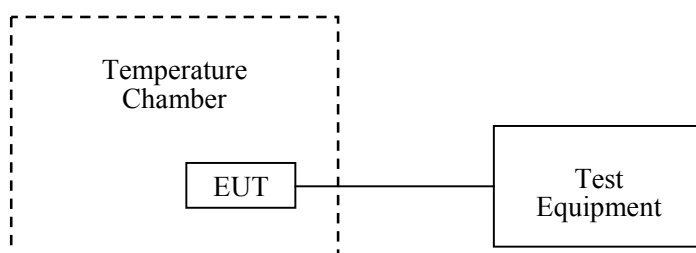
FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235, §27.54, §90.213and RSS-130 §4.3 & RSS-132 §5.3 & RSS-133 §6.3 & RSS-139 §6.4& RSS-199 §4.3

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	201105083-4	2016-09-10	2017-09-09
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-18	2018-07-18
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31
UNI-T	Multimeter	UT39A	M130199938	2017-04-02	2018-04-02
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each Time	/
Pro instrument	DC Power Supply	pps3300	N/A	N/A	N/A

* **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:	25.9 °C
Relative Humidity:	49 %
ATM Pressure:	101.1 kPa

The testing was performed by Swim Lv on 2018-03-07.

Cellular Band (Part 22H)

GSM, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	FCC&ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.9	-9	-0.011	2.5
-20		-10	-0.012	
-10		-2	-0.002	
0		19	0.023	
10		-7	-0.008	
20		5	0.006	
30		7	0.008	
40		-5	-0.006	
50		-3	-0.004	
25		3.5	8	
25	4.2	14	0.017	

PCS Band (Part 24E)

GSM, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISED Limit
°C	V _{DC}	Hz	ppm	
-30	3.9	-16	-0.009	2.5ppm
-20		-2	-0.001	
-10		-8	-0.004	
0		2	0.001	
10		-8	-0.004	
20		-9	-0.005	
30		11	0.006	
40		16	0.009	
50		-18	-0.010	
25		3.5	-3	
25	4.2	17	0.009	

Note: FCC no limit was specified.

EDGE (Part 22H)

EDGE, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	FCC&ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.9	14	0.017	2.5
-20		-4	-0.005	
-10		6	0.007	
0		19	0.023	
10		5	0.006	
20		18	0.022	
30		9	0.011	
40		17	0.020	
50		4	0.005	
25		3.5	23	
25	4.2	1	0.001	

EDGE (Part 24E)

EDGE, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISED Limit
°C	V _{DC}	Hz	ppm	
-30	3.9	14	0.007	2.5ppm
-20		20	0.011	
-10		-3	-0.002	
0		6	0.003	
10		13	0.007	
20		-10	-0.005	
30		8	0.004	
40		-11	-0.006	
50		15	0.008	
25		3.5	13	
25	4.2	15	0.008	

Note: FCC no limit was specified.

WCDMA Band 2: R99

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISEDC Limit
°C	V _{DC}	Hz	ppm	
-30	3.9	10	0.005	2.5ppm
-20		-18	-0.010	
-10		17	0.009	
0		-5	-0.003	
10		13	0.007	
20		8	0.004	
30		-5	-0.003	
40		-4	-0.002	
50		-15	-0.008	
25		3.5	3	
25	4.2	18	0.010	

Note: FCC no limit was specified.

WCDMA Band 4: R99

Temperature	Voltage	Test Result (MHz)		FCC/ISEDC Limit (MHz)	
		F _L	F _H	F _L	F _H
-30	3.9	1710.5400023	1754.5700013	1710	1755
-20		1710.4800015	1754.5499983	1710	1755
-10		1710.5500018	1754.5999983	1710	1755
0		1710.5400022	1754.5899982	1710	1755
10		1710.4600025	1754.4699982	1710	1755
20		1710.5200028	1754.5199991	1710	1755
30		1710.5000015	1754.5199995	1710	1755
40		1710.5100012	1754.5399994	1710	1755
50		1710.5400013	1754.5099994	1710	1755
25		3.5	1710.5299992	1754.4600005	1710
25	4.2	1710.5599993	1754.5400004	1710	1755

Note: the FL and FH was determined by OBW low point and high point in lowest and highest channels

WCDMA Band 5: R99

Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	FCC&ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.9	18	0.022	2.5
-20		-17	-0.020	
-10		-18	-0.022	
0		9	0.011	
10		20	0.024	
20		8	0.010	
30		-11	-0.013	
40		10	0.012	
50		17	0.020	
25		3.5	-2	
25	4.2	-4	-0.005	

LTE Band 2:

QPSK, Channel Bandwidth: 10MHz Middle Channel, $f_c = 1880$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISED Limit
°C	V _{DC}	Hz	ppm	
-30	3.9	-1.82	-0.0010	2.5ppm
-20		-2.80	-0.0015	
-10		-1.63	-0.0009	
0		-0.14	-0.0001	
10		-2.89	-0.0015	
20		-0.72	-0.0004	
30		-0.76	-0.0004	
40		0.86	0.0005	
50		1.06	0.0006	
25		3.5	-3.20	
25	4.2	-0.95	-0.0005	

Note: FCC no limit was specified.

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 1880$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISEDC Limit
°C	V _{DC}	Hz	ppm	
-30	3.9	-5.35	-0.0028	2.5ppm
-20		-1.95	-0.0010	
-10		-4.25	-0.0023	
0		-3.31	-0.0018	
10		-4.43	-0.0024	
20		-3.60	-0.0019	
30		-2.38	-0.0013	
40		-3.14	-0.0017	
50		-1.12	-0.0006	
25		3.5	-3.64	
25	4.2	-3.20	-0.0017	

Note: FCC no limit was specified.

LTE Band 4:

QPSK, Channel Bandwidth:20MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISEDC Limit (MHz)	
		F _L	F _H	F _L	F _H
°C	V _{DC}				
-30	3.9	1710.4400012	1754.6999988	1710	1755
-20		1710.6499984	1754.5800016	1710	1755
-10		1710.7800015	1754.6199985	1710	1755
0		1710.4799983	1754.5300018	1710	1755
10		1710.5099987	1754.6200013	1710	1755
20		1710.7699986	1754.6200014	1710	1755
30		1710.5600009	1754.4799991	1710	1755
40		1710.6600025	1754.4699975	1710	1755
50		1710.5800012	1754.6499989	1710	1755
25		3.5	1710.4500006	1754.3599994	1710
25	4.2	1710.6400020	1754.6499980	1710	1755

16QAM, Channel Bandwidth:20MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	1710.6499994	1754.6400006	1710	1755
-20		1710.4900022	1754.6099978	1710	1755
-10		1710.4700015	1754.4599985	1710	1755
0		1710.4900020	1754.6999980	1710	1755
10		1710.4699991	1754.7100009	1710	1755
20		1710.5500011	1754.6899989	1710	1755
30		1710.5200004	1754.4799996	1710	1755
40		1710.7100001	1754.6699999	1710	1755
50		1710.7299986	1754.3700014	1710	1755
25		3.5	1710.6900004	1754.3999996	1710
25	4.2	1710.7400003	1754.4799997	1710	1755

Note: the FL and FH was determined by OBW low point and high point in lowest and highest channels

LTE Band 5:

QPSK, Channel Bandwidth:10MHz Middle Channel, f _c = 836.5 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	FCC&ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.9	-0.50	-0.0006	2.5
-20		-1.62	-0.0019	
-10		-0.96	-0.0011	
0		-3.22	-0.0038	
10		-0.95	-0.0011	
20		0.86	0.0010	
30		-1.28	-0.0015	
40		-2.43	-0.0029	
50		0.83	0.0010	
25		3.5	-1.63	
25	4.2	-0.86	-0.0010	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 836.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	FCC&ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.9	1.51	0.0018	2.5
-20		1.92	0.0023	
-10		0.96	0.0011	
0		-2.02	-0.0024	
10		1.33	0.0016	
20		-1.02	-0.0012	
30		-0.75	-0.0009	
40		0.17	0.0002	
50		0.47	0.0006	
25		3.5	-0.97	
25	4.2	1.46	0.0017	

LTE Band 7:

QPSK, Channel Bandwidth:20MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	2500.2200079	2569.7299921	2500	2570
-20		2500.4300063	2569.6899937	2500	2570
-10		2500.3200043	2569.8699957	2500	2570
0		2500.3200082	2569.8699918	2500	2570
10		2500.3700068	2569.8399932	2500	2570
20		2500.1800045	2569.8699955	2500	2570
30		2500.2000049	2569.7599951	2500	2570
40		2500.1600083	2569.6599917	2500	2570
50		2500.1200058	2569.7699942	2500	2570
25		3.5	2500.3400065	2569.8399936	2500
25	4.2	2500.2500072	2569.8999928	2500	2570

16QAM, Channel Bandwidth:20MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	2500.2100061	2569.7799939	2500	2570
-20		2500.4500032	2569.6899968	2500	2570
-10		2500.2600066	2569.7599934	2500	2570
0		2500.2400033	2569.7599967	2500	2570
10		2500.3100050	2569.8399951	2500	2570
20		2500.2900029	2569.6399971	2500	2570
30		2500.2400038	2569.7600000	2500	2570
40		2500.2100070	2569.7099930	2500	2570
50		2500.4400044	2569.6599957	2500	2570
25		3.5	2500.2100053	2569.9399947	2500
25	4.2	2500.3100043	2569.7599958	2500	2570

Note: the FL and FH was determined by unwanted emission limit low point and high point in lowest and highest channels

LTE Band 12:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	699.2200016	715.8499984	699	716
-20		699.1400010	715.8699990	699	716
-10		699.0500033	715.8099967	699	716
0		699.2400017	715.8899984	699	716
10		699.2100021	715.8799979	699	716
20		699.3299994	715.9400007	699	716
30		699.1600028	715.8799972	699	716
40		699.0899990	715.8300010	699	716
50		699.0700027	715.8799973	699	716
25		3.5	699.1700013	715.7599987	699
25	4.2	699.3500010	715.9599990	699	716

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	699.2000004	715.8799996	699	716
-20		699.1799990	715.7300010	699	716
-10		699.0800011	715.8999989	699	716
0		699.1200033	715.7899967	699	716
10		699.2299999	715.8300001	699	716
20		699.2600028	715.7599972	699	716
30		699.2000002	715.8399998	699	716
40		699.1200003	715.8199997	699	716
50		699.1900016	715.8399984	699	716
25		3.5	699.1700014	715.8299986	699
25	4.2	699.1000006	715.7599994	699	716

Note: the FL and FH was determined by unwanted emission limit low point and high point in lowest and highest channels

LTE Band 13:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	777.2500009	786.9099991	777	787
-20		777.3200007	786.8999993	777	787
-10		777.1800028	786.9299972	777	787
0		777.3300007	786.9599993	777	787
10		777.4200022	786.9699978	777	787
20		777.3200009	786.7699991	777	787
30		777.1999996	786.8000004	777	787
40		777.2900028	786.8899972	777	787
50		777.1599998	786.8700002	777	787
25		3.5	777.3000011	786.7499989	777
25	4.2	777.4000006	786.7499989	777	787

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	777.1099998	786.9600002	777	787
-20		777.1000019	786.6999981	777	787
-10		777.2500018	786.7299982	777	787
0		777.4300029	786.9899971	777	787
10		777.4200028	786.9499973	777	787
20		777.1100009	786.6999991	777	787
30		777.1999991	786.8000009	777	787
40		777.2999998	786.8600002	777	787
50		777.2299992	786.9800008	777	787
25		3.5	777.1900011	786.7399989	777
25	4.2	777.4299998	786.9300003	777	787

Note: the FL and FH was determined by unwanted emission limit low point and high point in lowest and highest channels

LTE Band 17:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	704.0100021	715.9399979	704	716
-20		704.2400026	715.9499974	704	716
-10		704.2799995	715.6800005	704	716
0		704.2100015	715.9899985	704	716
10		704.2899990	715.9200010	704	716
20		704.3300022	715.9799978	704	716
30		704.1200000	715.8800000	704	716
40		704.1100029	715.9499971	704	716
50		704.0000018	715.9499983	704	716
25		3.5	704.2200013	715.8399987	704
25	4.2	704.3400011	715.9399989	704	716

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	704.2399997	715.8200003	704	716
-20		704.1500030	715.7799970	704	716
-10		704.0500006	715.7799970	704	716
0		704.1000011	715.6899990	704	716
10		704.3400007	715.9099993	704	716
20		704.3200028	715.8699972	704	716
30		704.1200011	715.7999989	704	716
40		704.1500029	715.7499971	704	716
50		704.0799994	715.8900006	704	716
25		3.5	704.3500016	715.8299984	704
25	4.2	704.0200017	715.7799983	704	716

Note: the FL and FH was determined by unwanted emission limit low point and high point in lowest and highest channels

LTE Band 25:

QPSK, Channel Bandwidth:10MHz Middle Channel, f _c = 1882.5 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	7.2	0.80	0.0004	2.5
-20		0.74	0.0004	
-10		0.70	0.0004	
0		0.91	0.0005	
10		0.75	0.0004	
20		1.16	0.0006	
30		0.82	0.0004	
40		1.56	0.0008	
50		1.20	0.0006	
25		6.6	1.29	
25	8.4	1.42	0.0008	

Note: FCC no limit was specified.

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 1882.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISEDC Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.9	0.65	0.0003	2.5
-20		0.38	0.0002	
-10		0.57	0.0003	
0		0.18	0.0001	
10		0.55	0.0003	
20		0.40	0.0002	
30		0.50	0.0003	
40		0.46	0.0002	
50		-0.03	0.0000	
25		3.5	0.47	
25	4.2	0.83	0.0004	

Note: FCC no limit was specified.

LTE Band 26:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 831.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	FCC/ISEDC Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.9	-0.55	-0.0007	2.5
-20		1.29	0.0016	
-10		0.53	0.0006	
0		-1.44	-0.0017	
10		-0.36	-0.0004	
20		0.78	0.0009	
30		0.28	0.0003	
40		1.59	0.0019	
50		2.39	0.0029	
25		3.5	-0.33	
25	4.2	0.57	0.0007	

16QAM, Channel Bandwidth:10MHz Middle Channel, f _c = 831.5 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	FCC/ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.9	-0.20	-0.0002	2.5
-20		1.98	0.0024	
-10		0.39	0.0005	
0		1.51	0.0018	
10		0.80	0.0010	
20		-1.63	-0.0020	
30		-1.86	-0.0022	
40		-2.46	-0.0030	
50		-1.95	-0.0023	
25		3.5	-0.26	
25	4.2	-1.50	-0.0018	

**LTE Band 41:
For FCC**

QPSK, Channel Bandwidth:20MHz					
Temperature	Voltage	Test Result (MHz)		FCC Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	2496.1200052	2689.8199933	2496	2690
-20		2496.1300043	2689.7899933	2496	2690
-10		2496.1200043	2689.7999924	2496	2690
0		2496.1400024	2689.7599948	2496	2690
10		2496.1200025	2689.7899955	2496	2690
20		2496.1100059	2689.8099942	2496	2690
30		2496.1000035	2689.7899943	2496	2690
40		2496.1200052	2689.7999924	2496	2690
50		2496.1400033	2689.8099943	2496	2690
25		3.5	2496.1100028	2689.8099952	2496
25	4.2	2496.1200053	2689.7899953	2496	2690

16QAM, Channel Bandwidth:20MHz					
Temperature	Voltage	Test Result (MHz)		FCC Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	2496.2200041	2689.6699943	2496	2690
-20		2496.2000024	2689.6799984	2496	2690
-10		2496.2199932	2689.6600003	2496	2690
0		2496.1800032	2689.6899984	2496	2690
10		2496.1900055	2689.6799995	2496	2690
20		2496.1900023	2689.6899952	2496	2690
30		2496.2100012	2689.6799991	2496	2690
40		2496.2099998	2689.6700002	2496	2690
50		2496.1900016	2689.6799994	2496	2690
25		3.5	2496.1800013	2689.6599990	2496
25	4.2	2496.2100013	2689.6799990	2496	2690

For ISEDC:

QPSK, Channel Bandwidth:20MHz					
Temperature	Voltage	Test Result (MHz)		ISEDC Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	2570.4500062	2619.7799938	2570	2620
-20		2570.4300054	2619.7299946	2570	2620
-10		2570.4700058	2619.6599942	2570	2620
0		2570.3000025	2619.7399975	2570	2620
10		2570.3900028	2619.8199972	2570	2620
20		2570.1900052	2619.7999948	2570	2620
30		2570.2800053	2619.7599947	2570	2620
40		2570.3200066	2619.9799934	2570	2620
50		2570.2300048	2619.9199952	2570	2620
25		3.5	2570.2400047	2619.9899953	2570
25	4.2	2570.2200040	2619.9299960	2570	2620

16QAM, Channel Bandwidth:20MHz					
Temperature	Voltage	Test Result (MHz)		ISEDC Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.9	2570.2600050	2619.7799938	2570	2620
-20		2570.2900050	2619.7299946	2570	2620
-10		2570.3600041	2619.6599942	2570	2620
0		2570.4100027	2619.7399975	2570	2620
10		2570.3500015	2619.8199972	2570	2620
20		2570.2900010	2619.7999948	2570	2620
30		2570.2800011	2619.7599947	2570	2620
40		2570.3200031	2619.9799934	2570	2620
50		2570.4600038	2619.9199952	2570	2620
25		3.5	2570.3000032	2619.9899953	2570
25	4.2	2570.4400025	2619.9299960	2570	2620

Note: the FL and FH was determined by unwanted emission limit low point and high point in lowest and highest channels

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