



FCC RF Test Report

Product Name: LTE Multi-mode USB Rotator

Model Number: E397u-53

Report No: SYBH(Z-RF)008112011-2001

FCC ID: QISE397U-53

Reliability Laboratory of Huawei Technologies Co., Ltd.

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Notice

1. The laboratory has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L0310.
2. The laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 97456.
3. The laboratory has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 6369A-2.
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1 General Information

1.1 Applied Standard

Applied Rules: 47 CFR FCC Part 2, Subpart J
47 CFR FCC Part 24, Subpart E

1.2 Test Location

Test Location 1: Reliability Laboratory of Huawei Technologies Co., Ltd.
Address: Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R.
China

1.3 Test Environment Condition

Ambient Temperature: 20 – 25 °C
Ambient Relative Humidity: 45 – 55 %
Atmospheric Pressure: 101 kPa

2 Summary

Table 1 Summary of results

PCS Band			
Test Case	FCC Part No.	Requirements	Result
Transmitter Output Power	2.1046 & 24.232	Peak EIRP not exceed 2 W	Pass
Modulation Characteristics	2.1047	Digital modulation	Pass
Occupied Bandwidth	2.1049	(Not specified)	Pass
Band Edges Compliance	2.1051 & 24.238	Below -13 dBm/1%*EBW, in 1 MHz range	Pass
Spurious Emission at Antenna Terminals	2.1051 & 24.238	Below -13 dBm/1 kHz, 9 kHz to 150 kHz Below -13 dBm/10 kHz, 150 kHz to 30 MHz Below -13 dBm/1 MHz, 30 MHz to 10 th harmonics	Pass
Field Strength of Spurious Radiation	2.1053 & 24.238	Below -13 dBm/1 MHz	Pass
Frequency Stability	2.1055 & 24.235	Stay within the authorized frequency block	Pass

3 Product Description

3.1 Production Information

3.1.1 General Description

E397u-53 LTE/CDMA dual mode USB Rotator is subscriber equipment in the LTE/CDMA system. E397u-53 implement such functions as RF signal receiving/transmitting, LTE, CDMA2000 1x and the CDMA2000 1x EV-DO Rev.A/Rev.0 protocol processing, data service etc. Externally it provides USB interface (to connect to the notebook etc.), USIM card interface and Micro SD card interface. E397u-53 has three internal antennas as default.

3.1.2 Board

Table 1 Board Information

LTE Multi-mode USB Rotator		
E397u-53		
Main board		
Software Version	Hardware Version	Serial Number
11.337.03.01.644	CD1E397UM	B7PIEC11A2600091

4 Test Description

4.1 Supported Frequency Range

Characteristics	Description
Downlink	1930 to 1990 MHz
Uplink	1850 to 1910MHz

4.2 Transmitter / Receiver Characteristics

Characteristics	Description
System Type	LTE
TX Output Power (per Antenna Port)	2 W (= 33 dBm)
Channel Spacing(s) / Bandwidth(s)	LTE system: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz
Designation of Emissions	LTE system: 1M10G7D (1.4 MHz ,QPSK modulation),
	1M10W7D (1.4 MHz ,16QAM modulation),
	2M70G7D (3.0 MHz QPSK modulation),
	2M70W7D (3.0 MHz 16QAM modulation),
	4M50G7D (5.0MHz QPSK modulation),
4M50W7D (5.0MHz 16QAM modulation),	
9M00G7D (10 MHz QPSK modulation),	
9M00W7D (10 MHz 16QAM modulation),	

4.3 Antenna Gain

Antenna Gain(dBi) of LTE	1.76
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4.4 Power Supply

	Description
Power Supply Type	Directly Connected to DC /AC Power Supply
Input to EUT (DC power)	DC Voltage Nominal: \equiv +5V DC Voltage Range: \equiv +4.75 V to +5.25V
Input to EUT (AC power)	AC Voltage Nominal: ~ 220V (50/60 Hz) AC Voltage Range: ~ 100V-240V

5 General Test Conditions / Configurations

5.1 RF Channels under Test

Test Mode	TX / RX	RF Channel		
		Bottom (B)	Middle (M)	Top (T)
LTE	TX (1.4M)	Channel 18607	Channel 18900	Channel 19193
		1850.7 MHz	1880.0MHz	1909.3 MHz
	TX (3M)	Channel 18615	Channel 18900	Channel 19185
		1851.5 MHz	1880.0MHz	1908.5 MHz
	TX (5M)	Channel 18625	Channel 18900	Channel 19175
		1852.5 MHz	1880.0MHz	1907.5 MHz
	TX (10M)	Channel 18650	Channel 18900	Channel 19150
		1855.0 MHz	1880.0MHz	1905.0 MHz
	RX (1.4M)	Channel 607	Channel 900	Channel 1193
		1930.7 MHz	1960.0MHz	1989.3 MHz
	RX (3M)	Channel 615	Channel 900	Channel 1185
		1931.5 MHz	1960.0MHz	1988.5MHz
	RX (5M)	Channel 625	Channel 900	Channel 1175
		1932.5 MHz	1960.0MHz	1987.5 MHz
	RX (10M)	Channel 650	Channel 900	Channel 1150
		1935.0 MHz	1960.0MHz	1985.0 MHz



5.2 Test Modes

Test Mode	Test Modes Description
TM1	LTE

5.3 Test Environments

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	4.75V
	VN	5V
	VH	5.25V

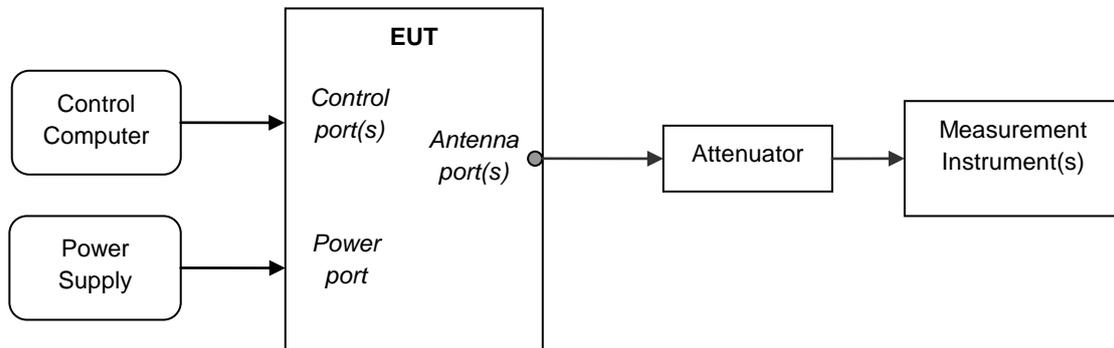
NOTE: VL= lower extreme test voltages
VN= nominal voltage
VH= upper extreme test voltage
TN= normal temperature

5.4 Test Setups

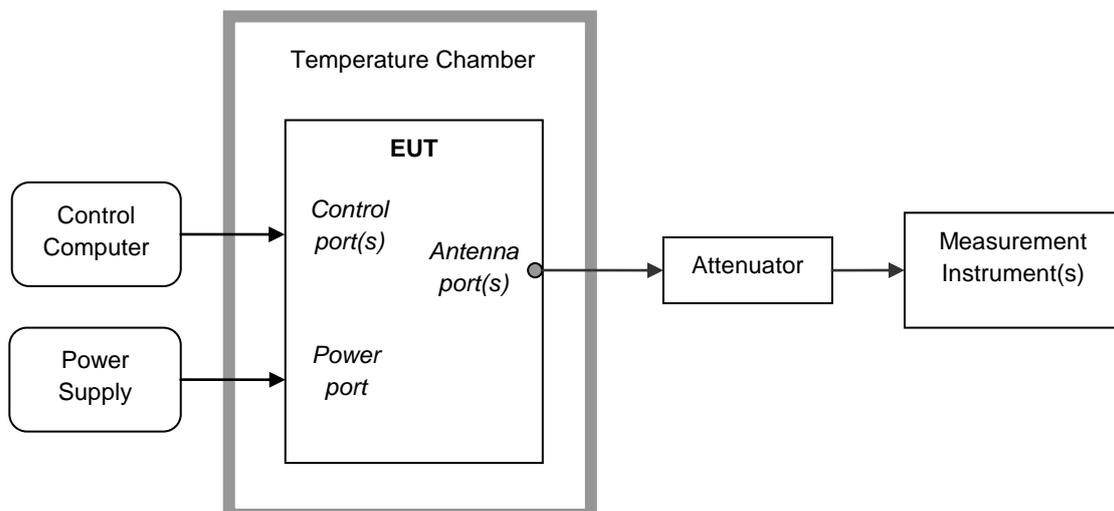
5.4.1 General Test Setup Configurations

Configuration	Description
Test Antenna Ports	Until otherwise declared, all TX tests are ONLY performed at the main Transmitter antenna port (e.g. TRXA, TXA and so on) of the EUT, and all RX tests are ONLY performed at the main Receiver antenna port (e.g. TRXA, RXA and so on) of the EUT.
Multiple RF Sources	Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.

5.4.2 Test Setup 1



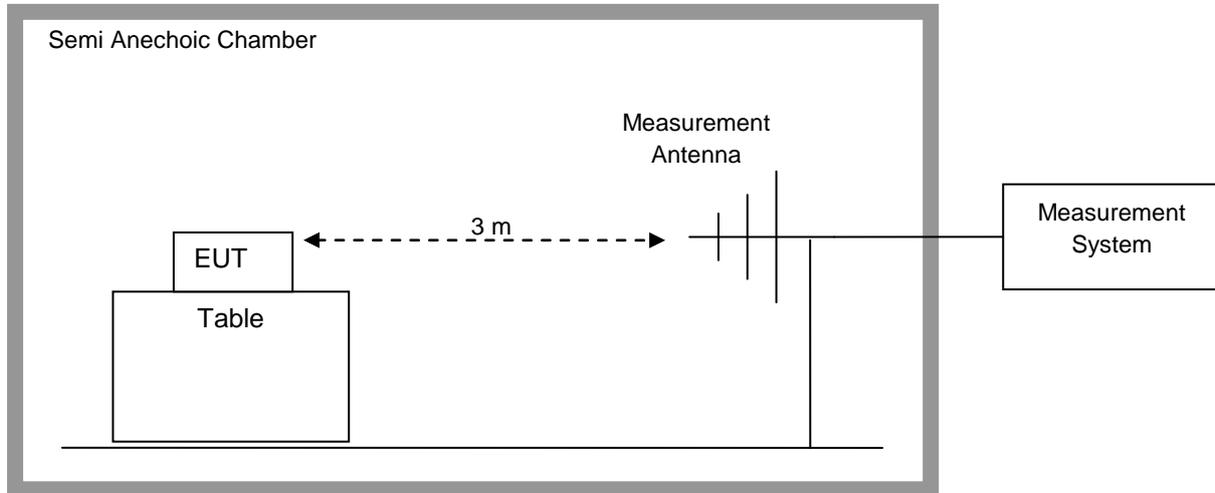
5.4.3 Test Setup 2



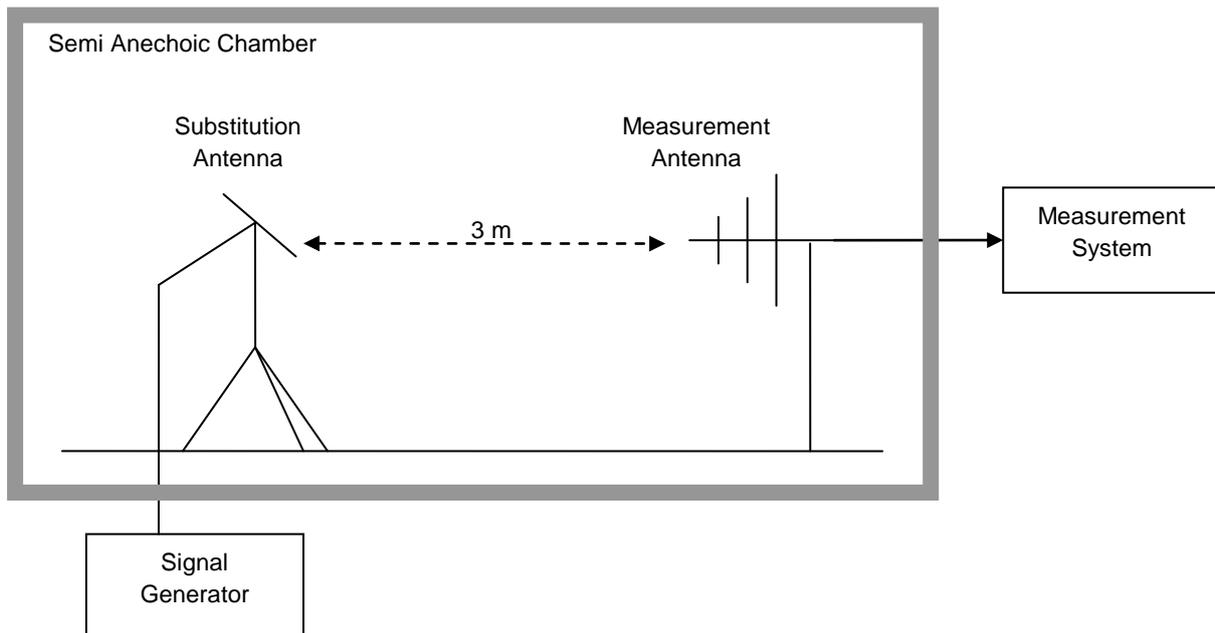
5.4.4 Test Setup 3

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

Step 1: Pre-test



Step 2: Substitution method to verify the maximum ERP



5.5 Test Conditions

Test Case	Test Conditions	
Transmitter Output Power	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Seup 1
	Detector	RMS
	RF Channels (TX)	B, M, T
	Test Mode	TM1
Modulation Characteristics	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Seup 1
	RF Channels (TX)	M
	Test Mode	TM1
Occupied Bandwidth	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Seup 1
	Detector	PK
	RF Channels (TX)	B, M, T
	Test Mode	TM1
Band Edges Compliance	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Seup 1
	Detector	RMS
	RF Channels (TX)	B, T
	Test Mode	TM1
Spurious Emission at Antenna Terminals	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Seup 1
	Detector	PK
	RF Channels (TX)	B, M, T
	Test Mode	TM1
Field Strength of Spurious Radiation	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Seup 3
	Detector	PK
	RF Channels (TX)	M
	Test Mode	TM1
Frequency Stability	Test Configuration	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) 85%, 100% and 115% of Rated Voltage at Ambient Temperature.



Test Case	Test Conditions	
	Test Setup	Test Seup 2
	RF Channels (TX)	M
	Test Mode	TM1

6 Main Test Instruments

Table 2 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Power supply	KEITHLEY	2303	1288003	Sep.27,2012
Universal Radio Communication Tester	R&S	CMU200	117341	Jan.13.2012
Universal Radio Communication Tester	Agilent	E5515C	MY50260239	Aug.31,2012
Spectrum Analyzer	Agilent	E4440A	MY49420179	Apr.20,2012
Signal Analyzer	R&S	FSQ31	200021	Sep.27,2012
Temperature Chamber	WEISS	WKL64	24600294	Jan.03,2012
Signal generator	Agilent	E8257D	MY49281095	Jul.9.2012
Test receiver	R&S	ESU26	100150	May.29.2012
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	919/1009	Jan.29.2012
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	979/917	Jan.29.2012
Horn Antenna	R & S	HF906	100683	May.15, 2012
Horn Antenna	R & S	HF906	100684	Jul.01, 2012
Broadband Antenna	Schwarzbeck	VULB 9163	9163-357	May.15, 2012
Broadband Antenna	Schwarzbeck	VULB 9163	9163-356	May.15, 2012
Universal Radio Communication Tester	R & S	CMW500	20347676	Sep.07,2012
Universal Radio Communication Tester	Anritsu	MT8820C	6200971028	May.04, 2012

7 Test Results

No.	Test Item	Test Result
1	Transmitter Output Power	Appendix A
2	Modulation Characteristics	Appendix B
3	Occupied Bandwidth	Appendix C
4	Band Edges Compliance	Appendix D
5	Spurious Emission at Antenna Terminals	Appendix E
6	Radiated spurious emission	Appendix F
7	Frequency Stability	Appendix G
8	Photos of Radiated Spurious Emissions	Appendix H

NOTE: The Appendix H only photos of Radiated Spurious Emissions, no test data.

8 Measurement Uncertainty

For a 95% confidence level ($k=2$), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Test Item		Extended Uncertainty
Transmitter Output Power	Power (dBm)	U =0.39 dB
Occupied Bandwidth	Magnitude (%)	U=0.2%
Band Edge Compliance	Disturbance Power (dBm)	U=2.0 dB
Conducted Spurious Emissions	Disturbance Power (dBm)	U=2.0 dB
Field Strength of Spurious Radiation	ERP (dBm)	U=4.6 dB (30 MHz – 1GHz) U=3.0 dB (above 1 GHz)
Frequency Stability	Frequency Accuracy (ppm)	U=0.21 ppm



Appendix A

Transmitter Output Power According to FCC Part 2.1046 & Part24.232



Conducted Power of Transmitter

Table 1 Measurement Results(LTE)

TM4 RF Output Power(Conducted)				
Test Mode	TN/VN			
	Modulation	RB	Measured (dBm)	Limit (dBm)
Channel (B) 1.4MHz(BW)	QPSK	1 RB/#0	21.78	31.24
		1 RB/#max	21.72	31.24
		3 RB/#2	21.82	31.24
		Full	20.88	31.24
	16QAM	1 RB/#0	21.35	31.24
		1 RB/#max	21.35	31.24
		3 RB/#2	20.8	31.24
		Full	20.04	31.24
Channel (B) 3MHz(BW)	QPSK	1 RB/#0	21.86	31.24
		1 RB/#max	21.58	31.24
		8 RB/#4	20.66	31.24
		Full	20.85	31.24
	16QAM	1 RB/#0	20.52	31.24
		1 RB/#max	20.46	31.24
		8 RB/#4	20.07	31.24
		Full	19.91	31.24
Channel (B) 5MHz(BW)	QPSK	1 RB/#0	21.86	31.24
		1 RB/#max	21.86	31.24
		12 RB/#6	20.85	31.24
		Full	20.98	31.24



	16QAM	1 RB/#0	21.19	31.24
		1 RB/#max	20.87	31.24
		12 RB/#6	19.72	31.24
		Full	20.26	31.24
Channel (B) 10MHz(BW)	QPSK	1 RB/#0	21.9	31.24
		1 RB/#max	21.6	31.24
		25 RB/#13	20.82	31.24
		Full	20.77	31.24
	16QAM	1 RB/#0	20.52	31.24
		1 RB/#max	20.32	31.24
		25 RB/#13	20.03	31.24
		Full	20.06	31.24
Channel (M) 1.4MHz(BW)	QPSK	1 RB/#0	21.74	31.24
		1 RB/#max	21.81	31.24
		3 RB/#2	21.6	31.24
		Full	20.73	31.24
	16QAM	1 RB/#0	20.83	31.24
		1 RB/#max	20.9	31.24
		3 RB/#2	20.47	31.24
		Full	19.85	31.24
Channel (M) 3MHz(BW)	QPSK	1 RB/#0	21.64	31.24
		1 RB/#max	21.73	31.24
		8 RB/#4	20.65	31.24
		Full	20.6	31.24
	16QAM	1 RB/#0	20.28	31.24



		1 RB/#max	20.35	31.24
		8 RB/#4	20.1	31.24
		Full	19.75	31.24
Channel (M) 5MHz(BW)	QPSK	1 RB/#0	21.89	31.24
		1 RB/#max	21.8	31.24
		12 RB/#6	20.72	31.24
		Full	20.78	31.24
	16QAM	1 RB/#0	21	31.24
		1 RB/#max	20.96	31.24
		12 RB/#6	19.73	31.24
		Full	20.03	31.24
Channel (M) 10MHz(BW)	QPSK	1 RB/#0	21.62	31.24
		1 RB/#max	21.7	31.24
		25 RB/#13	20.77	31.24
		Full	20.6	31.24
	16QAM	1 RB/#0	20.41	31.24
		1 RB/#max	20.6	31.24
		25 RB/#13	19.94	31.24
		Full	19.95	31.24
Channel (T) 1.4MHz(BW)	QPSK	1 RB/#0	21.65	31.24
		1 RB/#max	21.6	31.24
		3 RB/#2	21.48	31.24
		Full	20.5	31.24
	16QAM	1 RB/#0	20.54	31.24
		1 RB/#max	20.41	31.24



		3 RB/#2	20.49	31.24
		Full	19.76	31.24
Channel (T) 3MHz(BW)	QPSK	1 RB/#0	21.66	31.24
		1 RB/#max	21.34	31.24
		8 RB/#4	20.67	31.24
		Full	20.55	31.24
	16QAM	1 RB/#0	20.43	31.24
		1 RB/#max	20.27	31.24
		8 RB/#4	19.98	31.24
		Full	19.8	31.24
Channel (T) 5MHz(BW)	QPSK	1 RB/#0	21.7	31.24
		1 RB/#max	21.64	31.24
		12 RB/#6	20.64	31.24
		Full	20.5	31.24
	16QAM	1 RB/#0	20.7	31.24
		1 RB/#max	20.8	31.24
		12 RB/#6	19.64	31.24
		Full	20.1	31.24
Channel (T) 10MHz(BW)	QPSK	1 RB/#0	21.6	31.24
		1 RB/#max	21.5	31.24
		25 RB/#13	20.74	31.24
		Full	20.65	31.24
	16QAM	1 RB/#0	20.23	31.24
		1 RB/#max	20.26	31.24
		25 RB/#13	19.87	31.24



		Full	19.95	31.24
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Effective Isotropic Radiated Power of Transmitter (EIRP)

Table 2 Substitution Results (LTE)

Test Mode			Meas. Level [dBm]	Substitution Antenna Type	SGP[dBm]	Substitution Gain [dBi]	Cable Loss [dB]	Substitution Level (EIRP) [dBm]	FCC limit [dBm]	Result
Channel	Modulation	RB								
Channel (B) 1.4MHz(BW)	QPSK	1 RB/#0	23.54	Horn Ant.	20.02	4.5	1	23.52	33	Pass
		1 RB/#max	23.48	Horn Ant.	19.95	4.5	1	23.45	33	Pass
		3 RB/#2	23.58	Horn Ant.	20.06	4.5	1	23.56	33	Pass
		Full	22.64	Horn Ant.	19.1	4.5	1	22.6	33	Pass
	16QAM	1 RB/#0	23.11	Horn Ant.	19.6	4.5	1	23.1	33	Pass
		1 RB/#max	23.11	Horn Ant.	19.62	4.5	1	23.12	33	Pass
		3 RB/#2	22.56	Horn Ant.	19.04	4.5	1	22.54	33	Pass
		Full	21.8	Horn Ant.	18.32	4.5	1	21.82	33	Pass
Channel (B) 3MHz(BW)	QPSK	1 RB/#0	23.62	Horn Ant.	20.1	4.5	1	23.6	33	Pass
		1 RB/#max	23.34	Horn Ant.	19.81	4.5	1	23.31	33	Pass
		8 RB/#4	22.42	Horn Ant.	18.9	4.5	1	22.4	33	Pass
		Full	22.61	Horn Ant.	19.13	4.5	1	22.63	33	Pass
	16QAM	1 RB/#0	22.28	Horn Ant.	18.8	4.5	1	22.3	33	Pass
		1 RB/#max	22.22	Horn Ant.	18.73	4.5	1	22.23	33	Pass
		8 RB/#4	21.83	Horn Ant.	18.3	4.5	1	21.8	33	Pass
		Full	21.67	Horn Ant.	18.2	4.5	1	21.7	33	Pass
Channel (B)	QPSK	1 RB/#0	23.62	Horn Ant.	20.15	4.5	1	23.65	33	Pass



5MHz(BW)		1 RB/#max	23.62	Horn Ant.	20.13	4.5	1	23.63	33	Pass
		12 RB/#6	22.61	Horn Ant.	19.14	4.5	1	22.64	33	Pass
		Full	22.74	Horn Ant.	19.21	4.5	1	22.71	33	Pass
	16QAM	1 RB/#0	22.95	Horn Ant.	19.42	4.5	1	22.92	33	Pass
		1 RB/#max	22.63	Horn Ant.	19.1	4.5	1	22.6	33	Pass
		12 RB/#6	21.48	Horn Ant.	17.95	4.5	1	21.45	33	Pass
		Full	22.02	Horn Ant.	18.55	4.5	1	22.05	33	Pass
Channel (B) 10MHz(BW)	QPSK	1 RB/#0	23.66	Horn Ant.	20.13	4.5	1	23.63	33	Pass
		1 RB/#max	23.36	Horn Ant.	19.84	4.5	1	23.34	33	Pass
		25 RB/#13	22.58	Horn Ant.	19.1	4.5	1	22.6	33	Pass
		Full	22.53	Horn Ant.	19.01	4.5	1	22.51	33	Pass
	16QAM	1 RB/#0	22.28	Horn Ant.	18.81	4.5	1	22.31	33	Pass
		1 RB/#max	22.08	Horn Ant.	18.6	4.5	1	22.1	33	Pass
		25 RB/#13	21.79	Horn Ant.	18.33	4.5	1	21.83	33	Pass
		Full	21.82	Horn Ant.	18.35	4.5	1	21.85	33	Pass
Channel (M) 1.4MHz(BW)	QPSK	1 RB/#0	23.5	Horn Ant.	20.02	4.5	1	23.52	33	Pass
		1 RB/#max	23.57	Horn Ant.	20.04	4.5	1	23.54	33	Pass
		3 RB/#2	23.36	Horn Ant.	19.83	4.5	1	23.33	33	Pass
		Full	22.49	Horn Ant.	18.97	4.5	1	22.47	33	Pass
	16QAM	1 RB/#0	22.59	Horn Ant.	19.07	4.5	1	22.57	33	Pass
		1 RB/#max	22.66	Horn Ant.	19.2	4.5	1	22.7	33	Pass



		3 RB/#2	22.23	Horn Ant.	18.76	4.5	1	22.26	33	Pass
		Full	21.61	Horn Ant.	18.14	4.5	1	21.64	33	Pass
Channel (M) 3MHz(BW)	QPSK	1 RB/#0	23.4	Horn Ant.	19.93	4.5	1	23.43	33	Pass
		1 RB/#max	23.49	Horn Ant.	20.01	4.5	1	23.51	33	Pass
		8 RB/#4	22.41	Horn Ant.	18.93	4.5	1	22.43	33	Pass
		Full	22.36	Horn Ant.	18.88	4.5	1	22.38	33	Pass
	16QAM	1 RB/#0	22.04	Horn Ant.	18.58	4.5	1	22.08	33	Pass
		1 RB/#max	22.11	Horn Ant.	18.63	4.5	1	22.13	33	Pass
		8 RB/#4	21.86	Horn Ant.	18.39	4.5	1	21.89	33	Pass
		Full	21.51	Horn Ant.	18.03	4.5	1	21.53	33	Pass
Channel (M) 5MHz(BW)	QPSK	1 RB/#0	23.65	Horn Ant.	20.12	4.5	1	23.62	33	Pass
		1 RB/#max	23.56	Horn Ant.	20.03	4.5	1	23.53	33	Pass
		12 RB/#6	22.48	Horn Ant.	18.95	4.5	1	22.45	33	Pass
		Full	22.54	Horn Ant.	19	4.5	1	22.5	33	Pass
	16QAM	1 RB/#0	22.76	Horn Ant.	19.23	4.5	1	22.73	33	Pass
		1 RB/#max	22.72	Horn Ant.	19.2	4.5	1	22.7	33	Pass
		12 RB/#6	21.49	Horn Ant.	18.03	4.5	1	21.53	33	Pass
		Full	21.79	Horn Ant.	18.31	4.5	1	21.81	33	Pass
Channel (M) 10MHz(BW)	QPSK	1 RB/#0	23.38	Horn Ant.	19.91	4.5	1	23.41	33	Pass
		1 RB/#max	23.46	Horn Ant.	19.92	4.5	1	23.42	33	Pass
		25 RB/#13	22.53	Horn Ant.	19.01	4.5	1	22.51	33	Pass



	16QAM	Full	22.36	Horn Ant.	18.84	4.5	1	22.34	33	Pass
		1 RB/#0	22.17	Horn Ant.	18.69	4.5	1	22.19	33	Pass
		1 RB/#max	22.36	Horn Ant.	18.88	4.5	1	22.38	33	Pass
		25 RB/#13	21.7	Horn Ant.	17.9	4.5	1	21.4	33	Pass
		Full	21.71	Horn Ant.	18.19	4.5	1	21.69	33	Pass
Channel (T) 1.4MHz(BW)	QPSK	1 RB/#0	23.41	Horn Ant.	19.60	4.8	1	23.4	33	Pass
		1 RB/#max	23.36	Horn Ant.	19.58	4.8	1	23.38	33	Pass
		3 RB/#2	23.24	Horn Ant.	19.47	4.8	1	23.27	33	Pass
		Full	22.26	Horn Ant.	18.45	4.8	1	22.25	33	Pass
	16QAM	1 RB/#0	22.3	Horn Ant.	18.52	4.8	1	22.32	33	Pass
		1 RB/#max	22.17	Horn Ant.	18.50	4.8	1	22.3	33	Pass
		3 RB/#2	22.25	Horn Ant.	18.49	4.8	1	22.29	33	Pass
		Full	21.52	Horn Ant.	17.70	4.8	1	21.5	33	Pass
Channel (T) 3MHz(BW)	QPSK	1 RB/#0	23.42	Horn Ant.	19.60	4.8	1	23.4	33	Pass
		1 RB/#max	23.1	Horn Ant.	19.60	4.8	1	23.4	33	Pass
		8 RB/#4	22.43	Horn Ant.	18.65	4.8	1	22.45	33	Pass
		Full	22.31	Horn Ant.	18.55	4.8	1	22.35	33	Pass
	16QAM	1 RB/#0	22.19	Horn Ant.	18.43	4.8	1	22.23	33	Pass
		1 RB/#max	22.03	Horn Ant.	18.25	4.8	1	22.05	33	Pass
		8 RB/#4	21.74	Horn Ant.	17.98	4.8	1	21.78	33	Pass
		Full	21.56	Horn Ant.	17.74	4.8	1	21.54	33	Pass



Channel (T) 5MHz(BW)	QPSK	1 RB/#0	23.46	Horn Ant.	19.68	4.8	1	23.48	33	Pass
		1 RB/#max	23.4	Horn Ant.	19.62	4.8	1	23.42	33	Pass
		12 RB/#6	22.4	Horn Ant.	18.63	4.8	1	22.43	33	Pass
		Full	22.26	Horn Ant.	18.49	4.8	1	22.29	33	Pass
	16QAM	1 RB/#0	22.46	Horn Ant.	18.70	4.8	1	22.5	33	Pass
		1 RB/#max	22.56	Horn Ant.	18.8	4.8	1	22.6	33	Pass
		12 RB/#6	21.4	Horn Ant.	17.65	4.8	1	21.45	33	Pass
		Full	21.86	Horn Ant.	18.10	4.8	1	21.9	33	Pass
Channel (T) 10MHz(BW)	QPSK	1 RB/#0	23.36	Horn Ant.	19.60	4.8	1	23.4	33	Pass
		1 RB/#max	23.26	Horn Ant.	19.50	4.8	1	23.3	33	Pass
		25 RB/#13	22.5	Horn Ant.	18.76	4.8	1	22.56	33	Pass
		Full	22.41	Horn Ant.	18.65	4.8	1	22.45	33	Pass
	16QAM	1 RB/#0	21.99	Horn Ant.	18.16	4.8	1	21.96	33	Pass
		1 RB/#max	22.02	Horn Ant.	18.25	4.8	1	22.05	33	Pass
		25 RB/#13	21.63	Horn Ant.	17.8	4.8	1	21.6	33	Pass
		Full	21.71	Horn Ant.	19.95	4.8	1	21.75	33	Pass

Note: a, For getting the EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should take to calculate it,

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b, SGP=Signal Generator Level



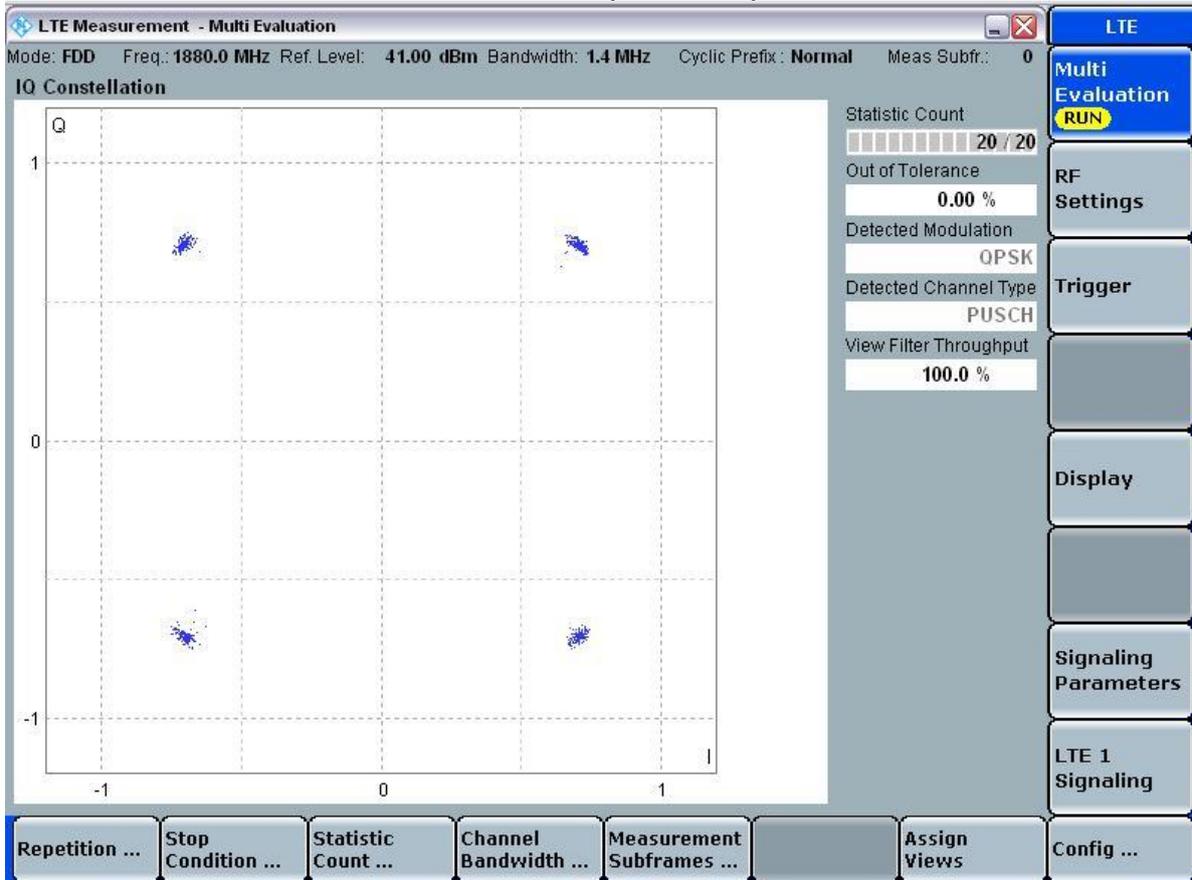
Appendix B

Modulation Characteristics

According to FCC Part 2.1046 & Part24.232

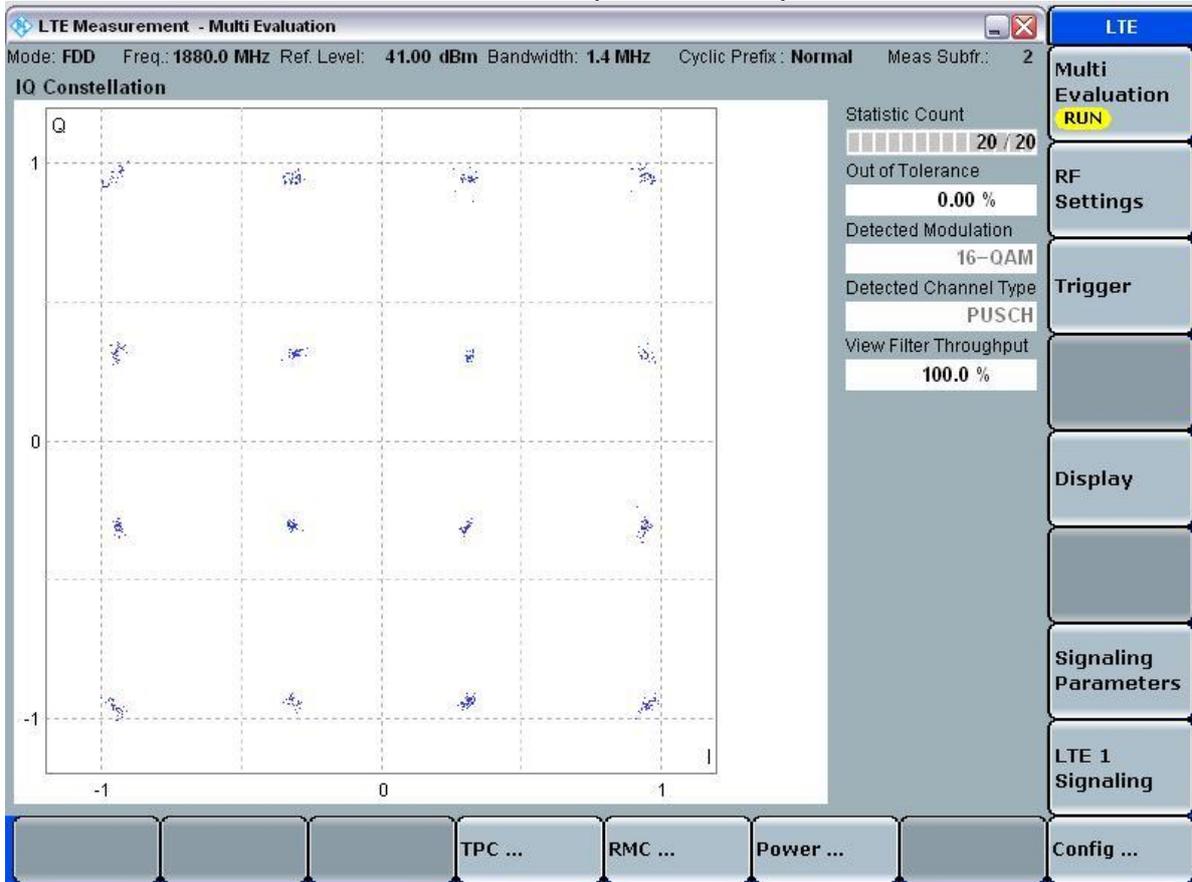


Channel 18900(TM1) 1.4MHz(QPSK)



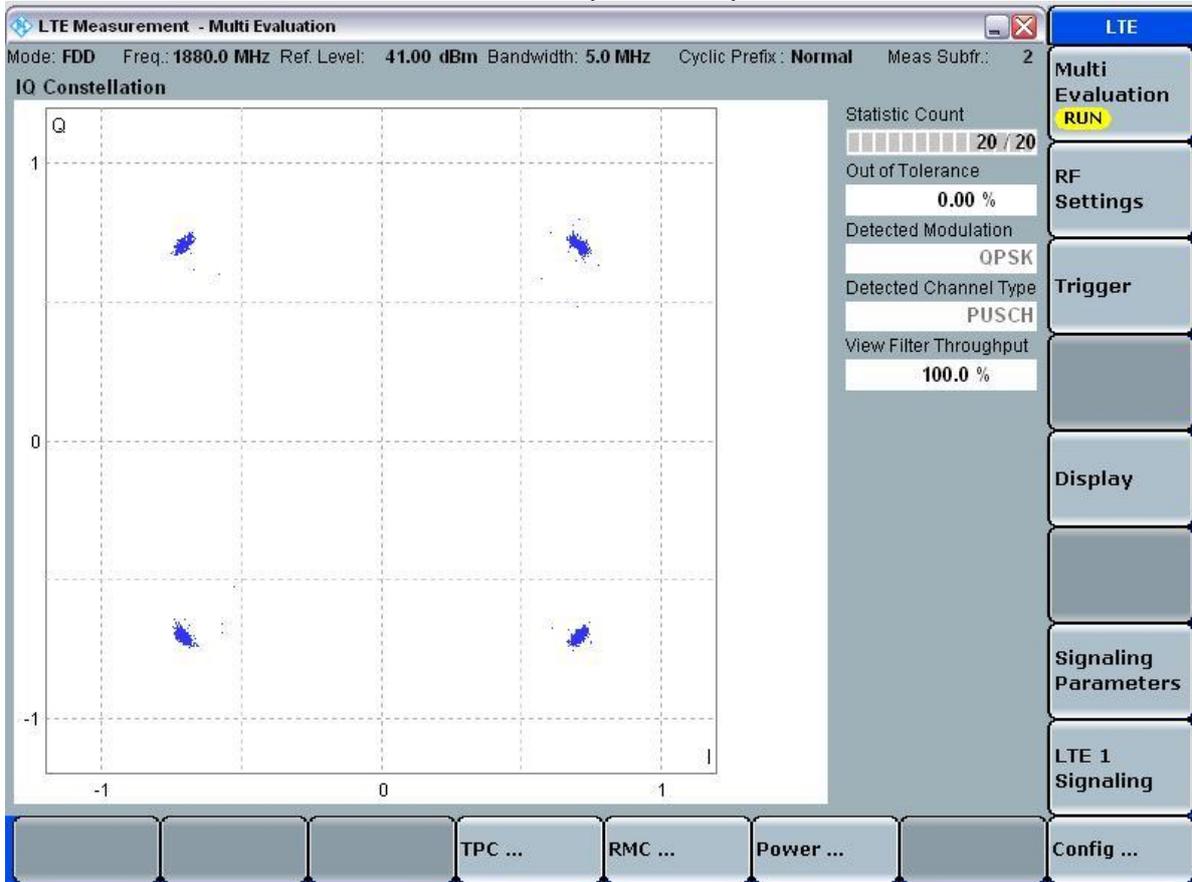


Channel 18900(TM1) 1.4MHz(16-QAM)



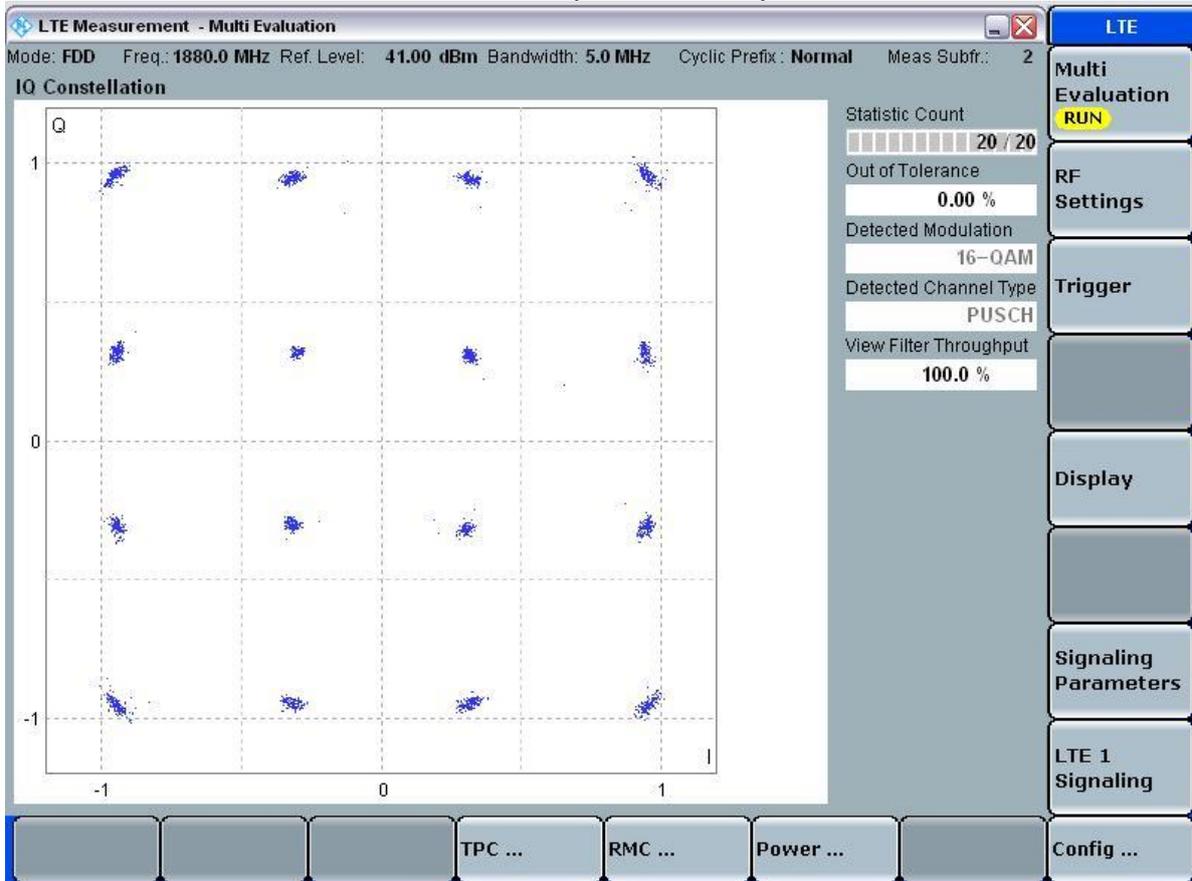


Channel 18900(TM1) 5MHz(QPSK)



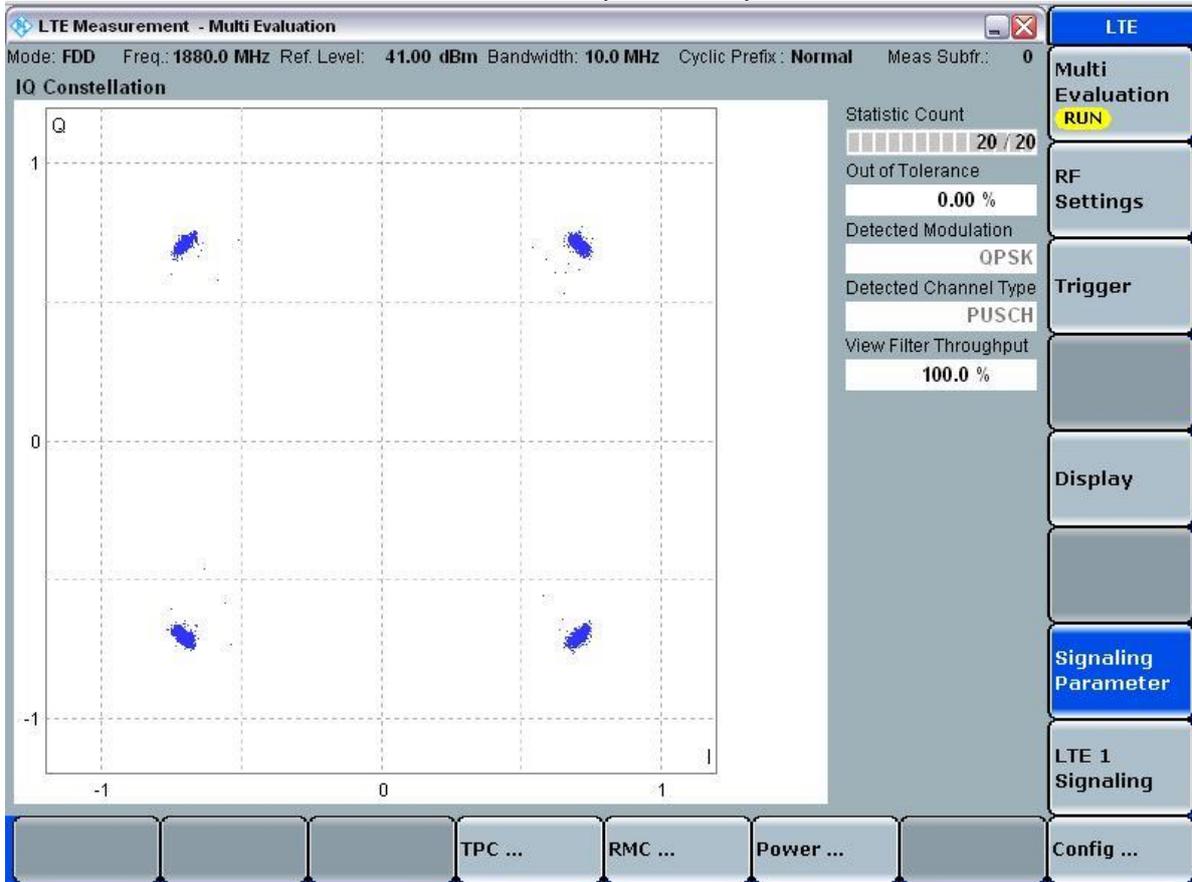


Channel 18900(TM1) 5MHz(16-QAM)



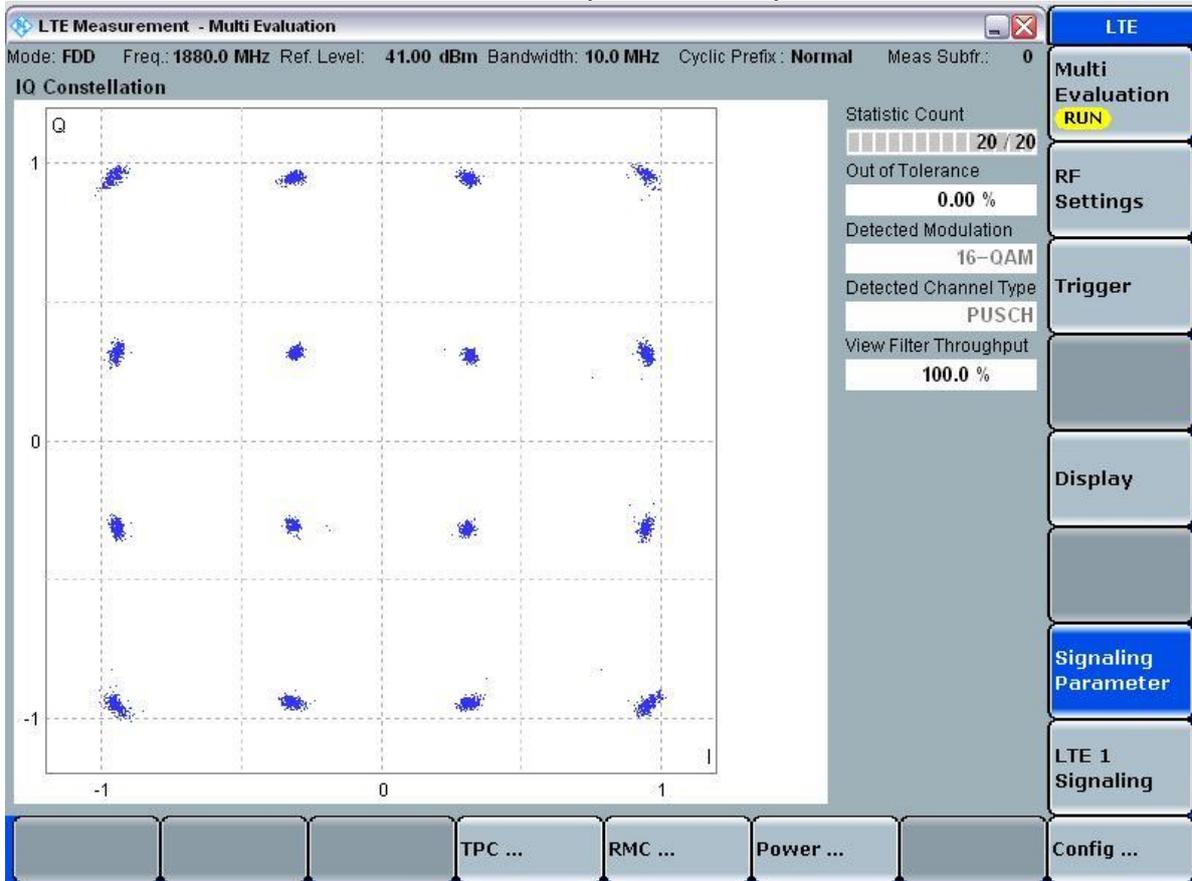


Channel 18900(TM1) 10MHz(QPSK)





Channel 18900(TM1) 10MHz(16-QAM)





Appendix C

Occupied Bandwidth

According to FCC part 2.1049 & Part 24 Subpart E



NOTE: All relevant operation modes have been tested, and the full RB data is included in.

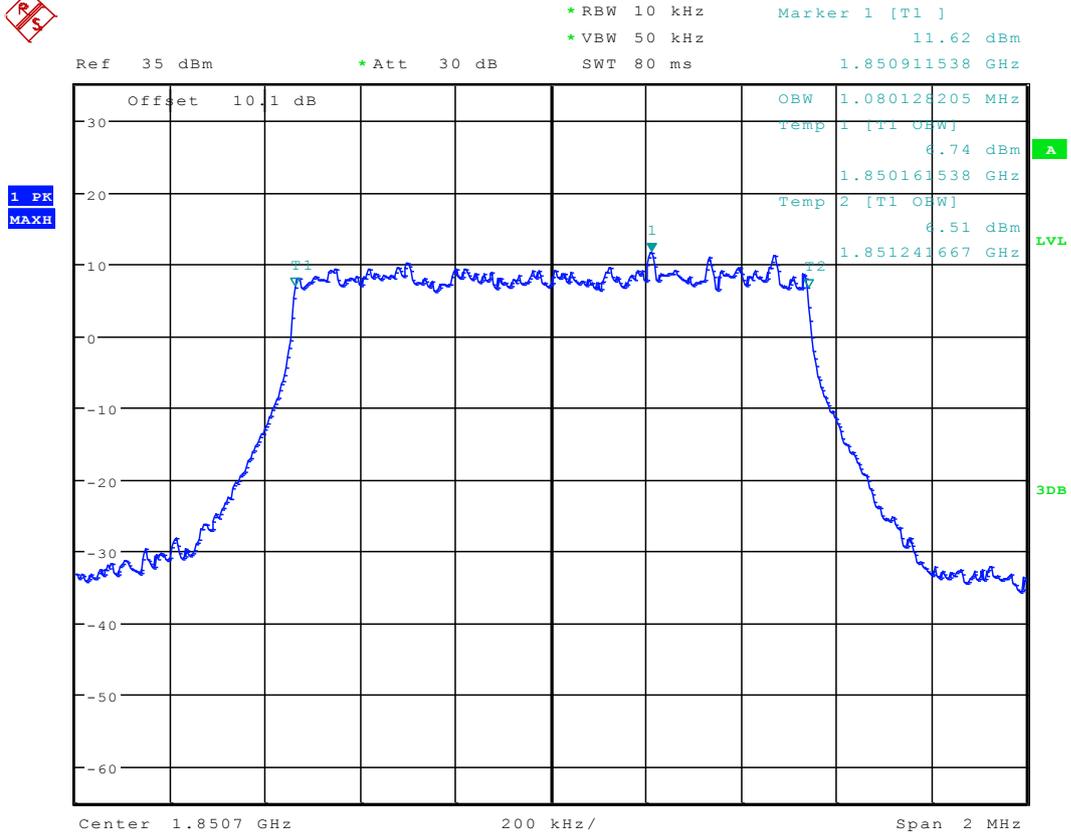
1 Result Table

Test Mode	Carrier Conf.	RF Ch.	Occupied Bandwidth [MHz]	Verdict
TM1 QPSK	1.4MHz	B	1.08	Pass
		M	1.08	Pass
		T	1.08	Pass
	3 MHz	B	2.68	Pass
		M	2.68	Pass
		T	2.68	Pass
	5 MHz	B	4.49	Pass
		M	4.49	Pass
		T	4.47	Pass
10 MHz	B	8.94	Pass	
	M	8.97	Pass	
	T	8.94	Pass	
TM1 16QAM	1.4MHz	B	1.07	Pass
		M	1.08	Pass
		T	1.08	Pass
	3 MHz	B	2.68	Pass
		M	2.68	Pass
		T	2.68	Pass
	5 MHz	B	4.47	Pass
		M	4.49	Pass
		T	4.47	Pass
	10 MHz	B	8.92	Pass
		M	8.94	Pass
		T	8.92	Pass



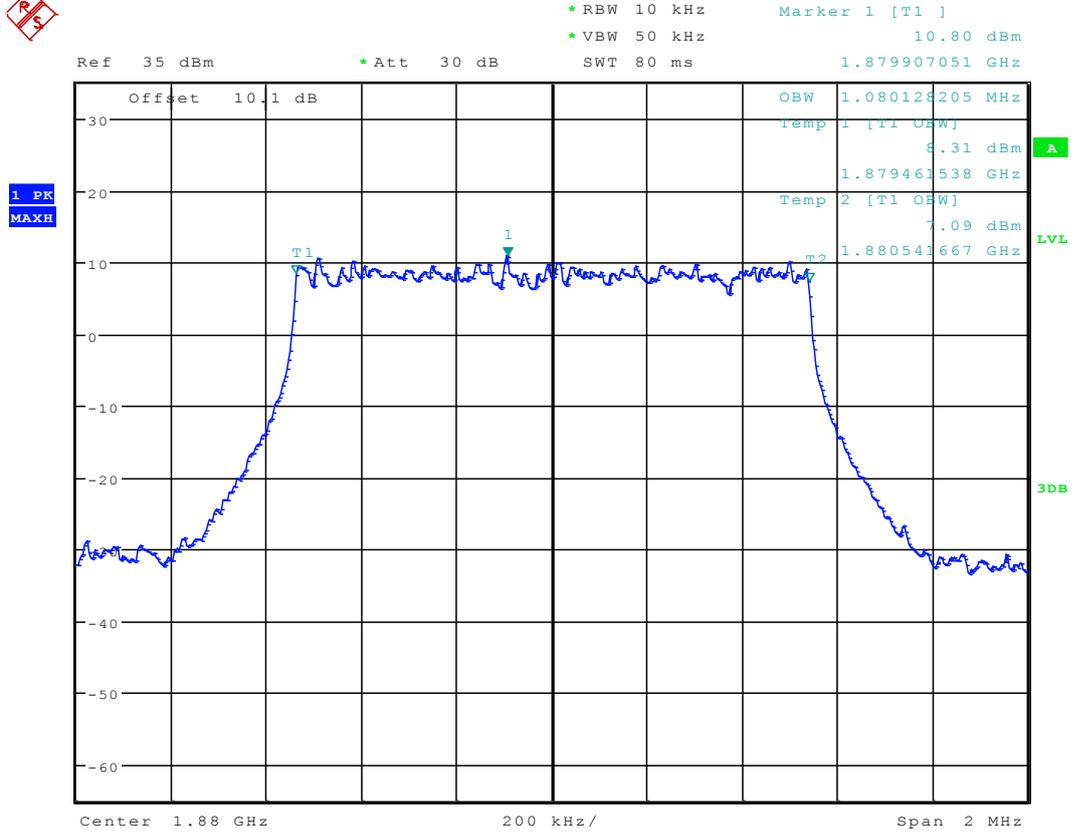
2 Test Plot

QPSK 1.4MHz(BW) Channel 18607





Channel 18900



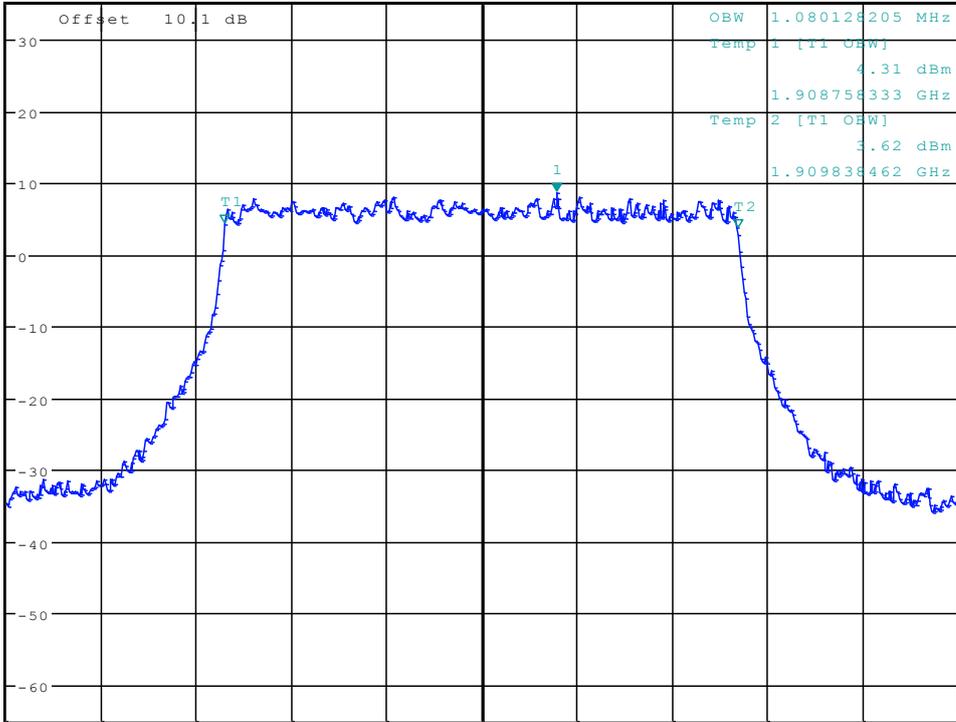


Channel 19193



Ref 35 dBm * Att 30 dB * RBW 10 kHz * VBW 50 kHz * SWT 80 ms

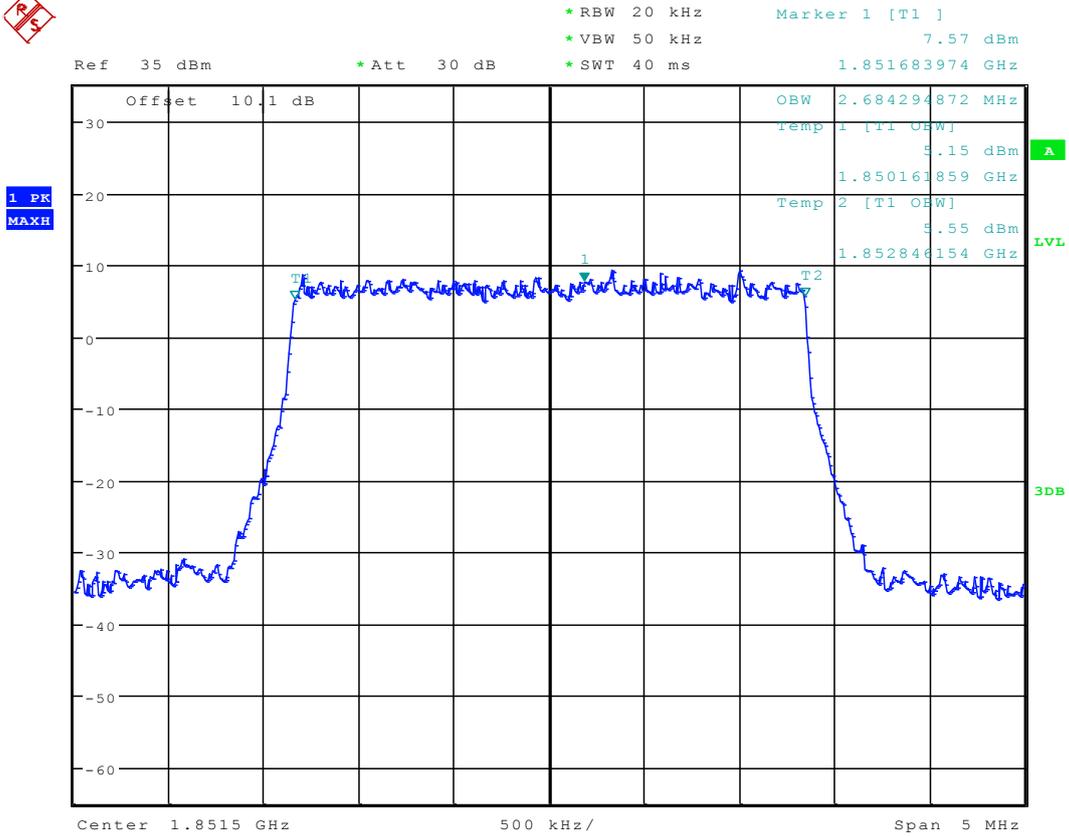
Marker 1 [T1] 8.60 dBm 1.909457051 GHz



Center 1.9093 GHz 200 kHz/ Span 2 MHz



QPSK 3MHz(BW) Channel 18615





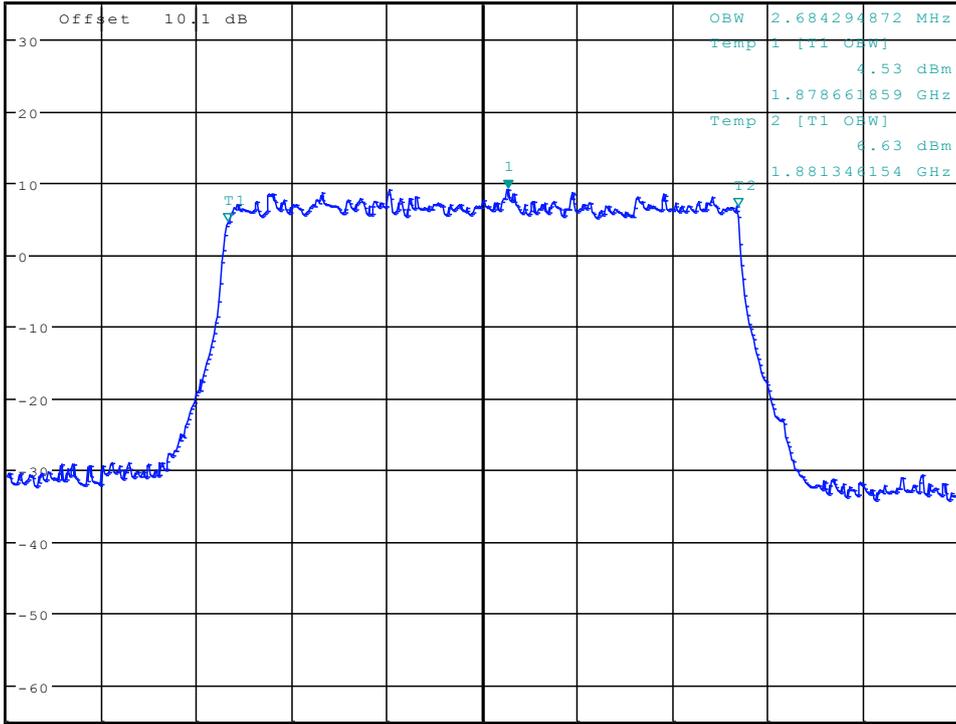
Channel 18900



*RBW 20 kHz Marker 1 [T1]
 *VBW 50 kHz 9.07 dBm
 SWT 40 ms 1.880136218 GHz

Ref 35 dBm *Att 30 dB

1 PK
 MAXH



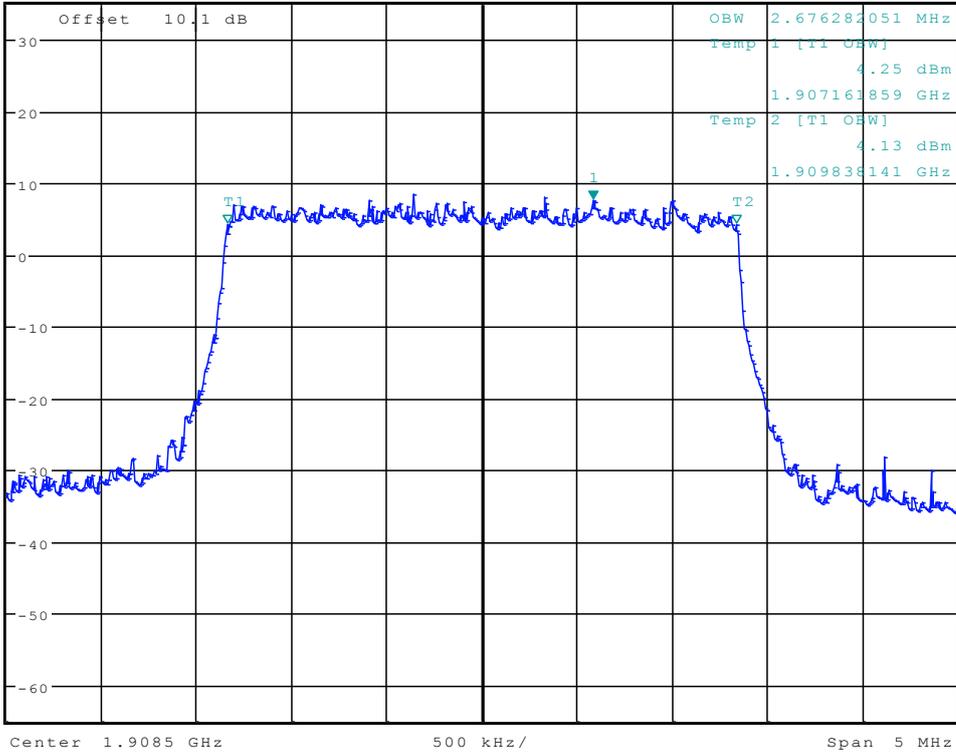


Channel 19185



Ref 35 dBm * Att 30 dB * RBW 20 kHz * VBW 50 kHz * SWT 40 ms

Marker 1 [T1] 7.60 dBm 1.909088462 GHz



1 PK
MAXH

A

LVL

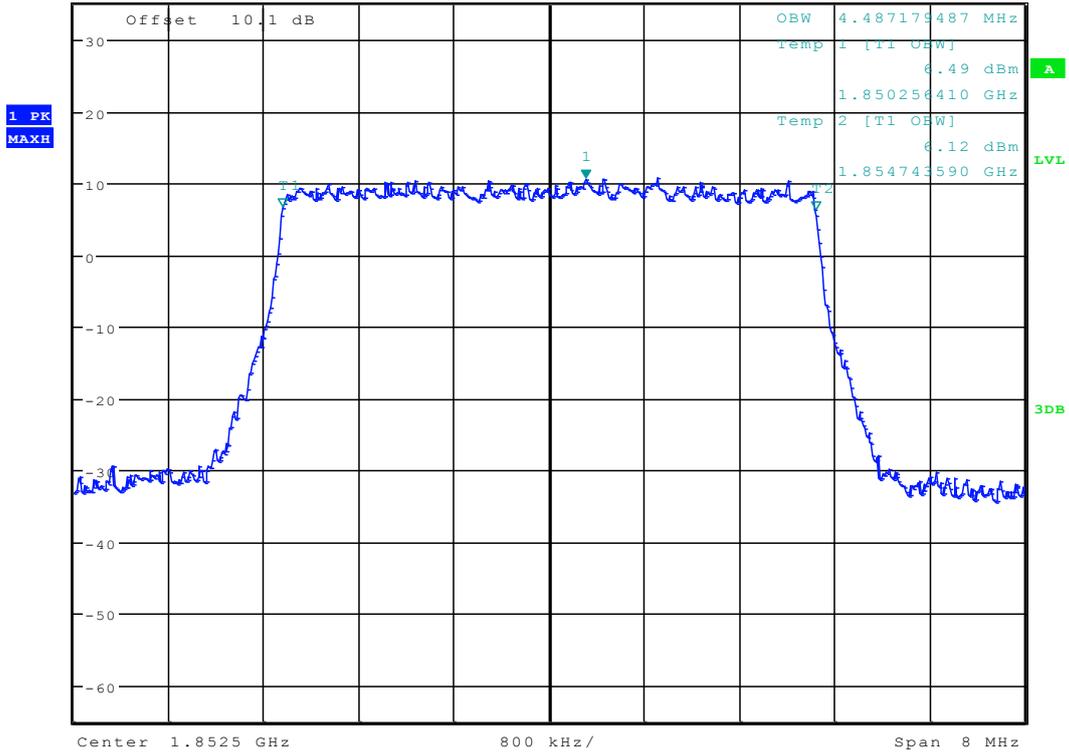
3DB



QPSK 5MHz(BW) Channel 18625

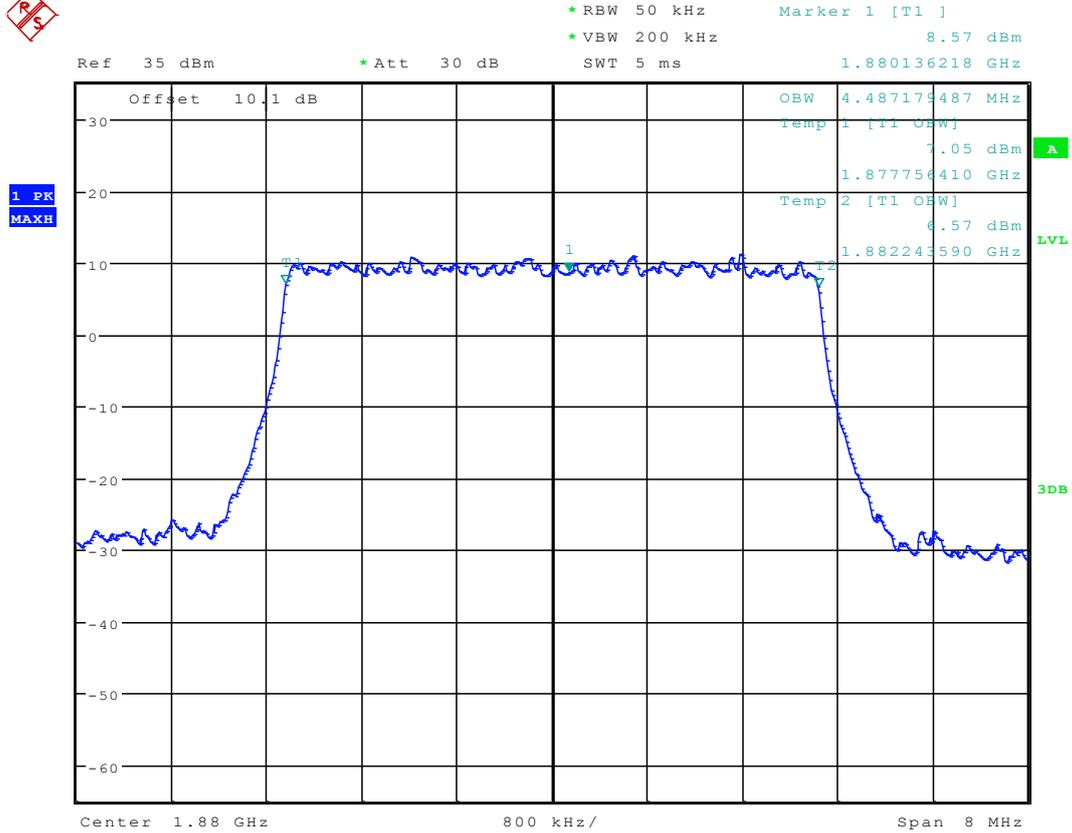


Ref 35 dBm *Att 30 dB *RBW 50 kHz *VBW 200 kHz *SWT 5 ms Marker 1 [T1] 10.52 dBm 1.852813782 GHz





Channel 18900



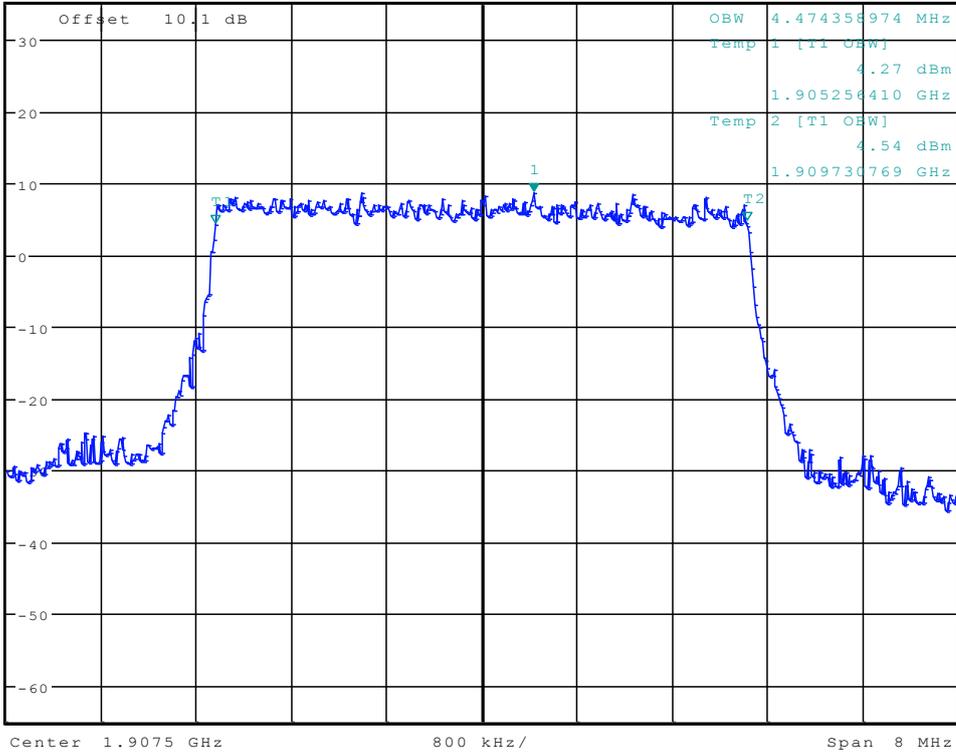


Channel 19175



Ref 35 dBm * Att 30 dB * RBW 50 kHz * VBW 200 kHz * SWT 5 ms

Marker 1 [T1] 8.56 dBm 1.907929808 GHz



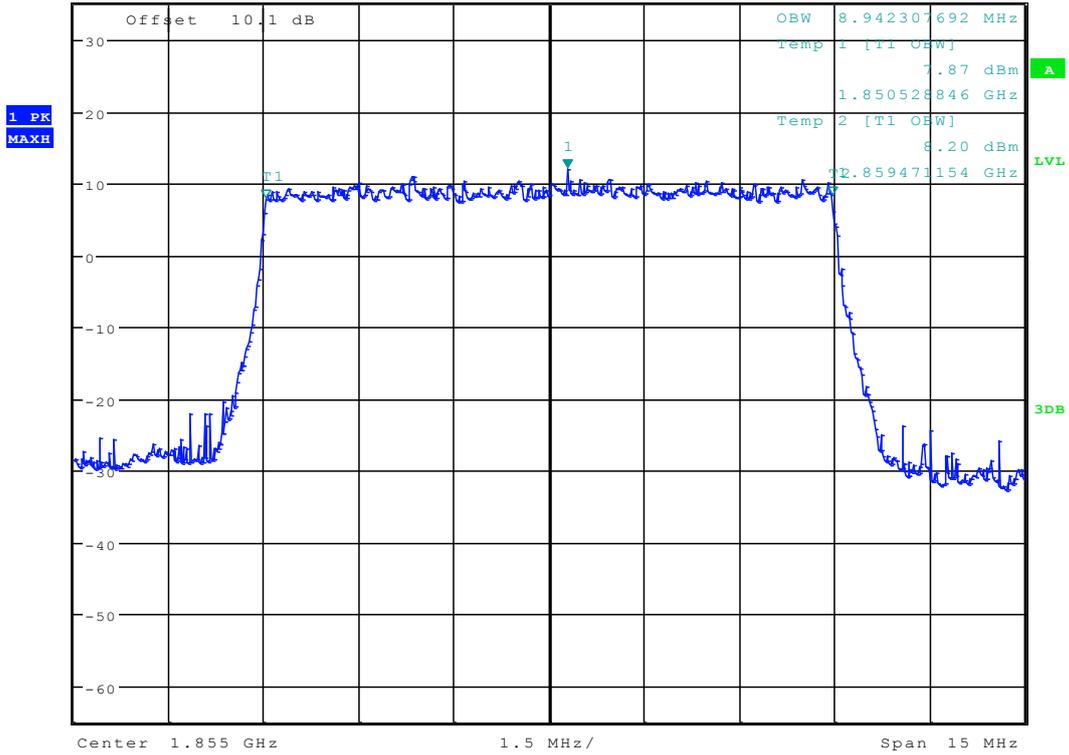


QPSK 10MHz(BW) Channel 18650



Ref 35 dBm * Att 30 dB * RBW 100 kHz * VBW 300 kHz * SWT 10 ms

Marker 1 [T1] 11.98 dBm 1.855278526 GHz

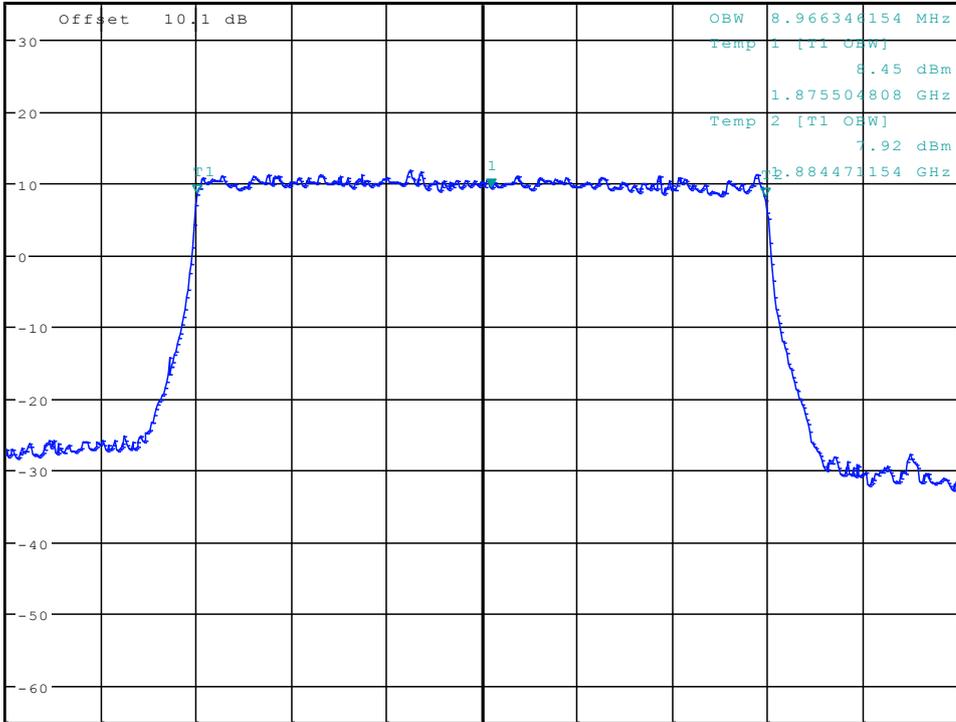




Channel 18900



Ref 35 dBm * Att 30 dB SWT 10 ms Marker 1 [T1] 9.24 dBm
 * RBW 100 kHz * VBW 300 kHz 1.880136218 GHz



Center 1.88 GHz 1.5 MHz/ Span 15 MHz

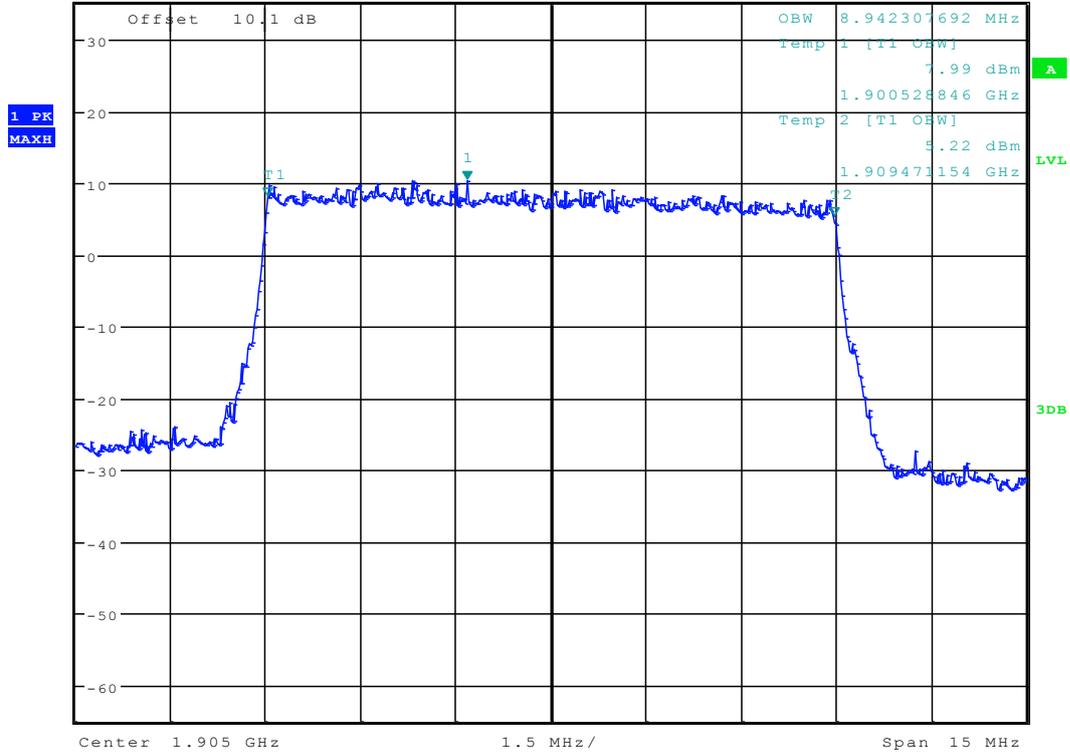


Channel 19150



Ref 35 dBm * Att 30 dB * RBW 100 kHz * VBW 300 kHz * SWT 10 ms

Marker 1 [T1] 10.29 dBm 1.903675000 GHz





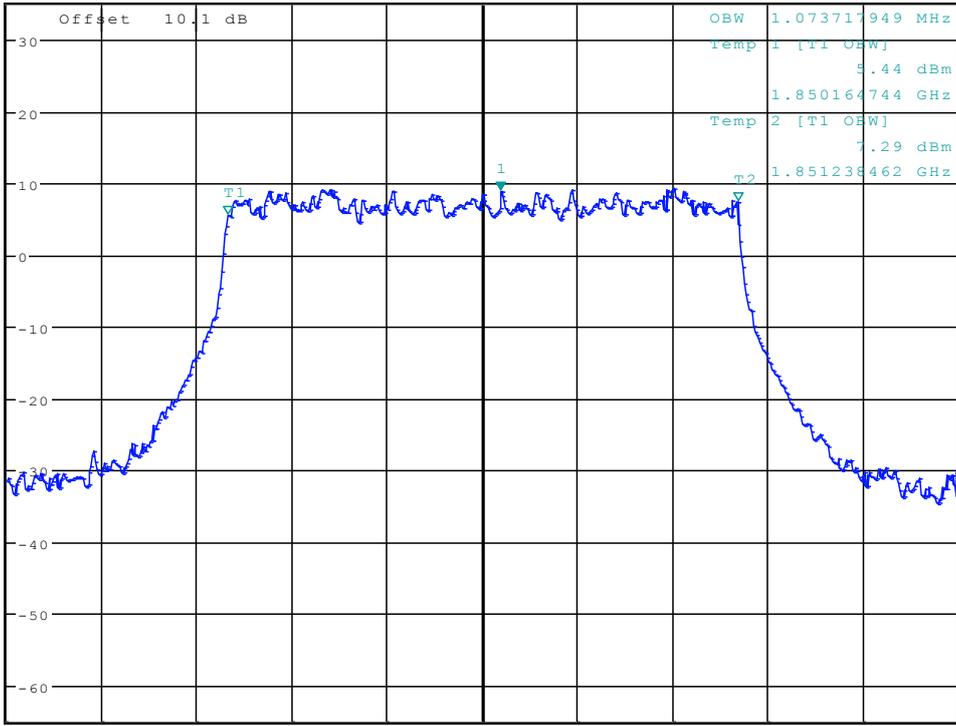
16QAM 1.4MHz(BW)



*RBW 10 kHz Marker 1 [T1]
 *VBW 50 kHz 8.80 dBm
 SWT 80 ms 1.850738462 GHz

Ref 35 dBm *Att 30 dB Offset 10.1 dB

1 PK
 MAXH



Center 1.8507 GHz 200 kHz/ Span 2 MHz

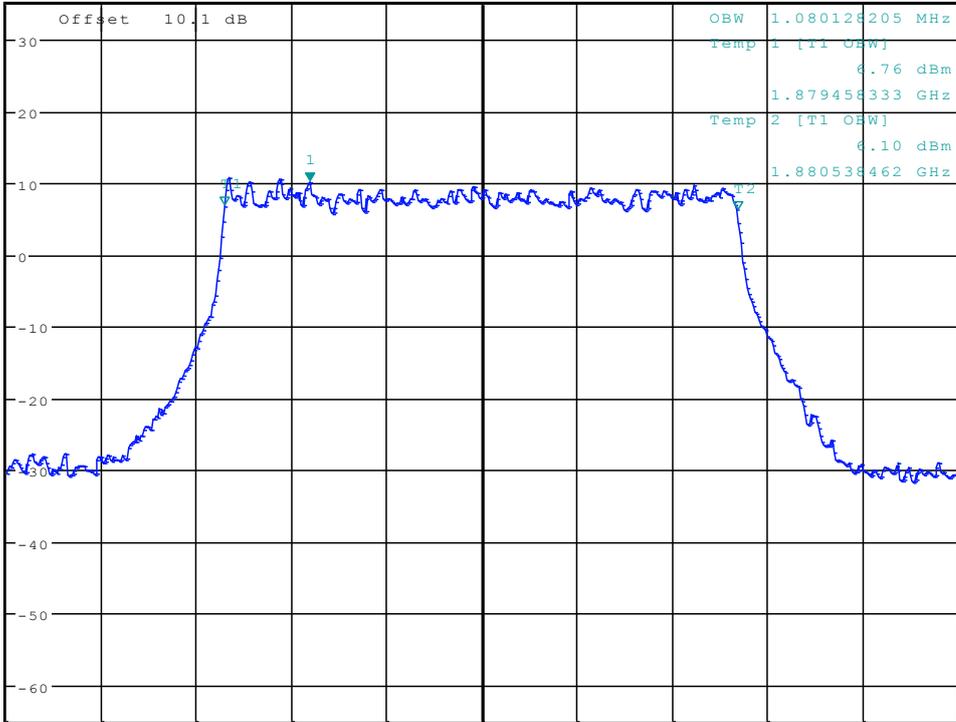


Channel 18900



Ref 35 dBm * Att 30 dB SWT 80 ms Marker 1 [T1] 1.879637821 GHz

* RBW 10 kHz * VBW 10 MHz



Center 1.88 GHz 200 kHz/ Span 2 MHz

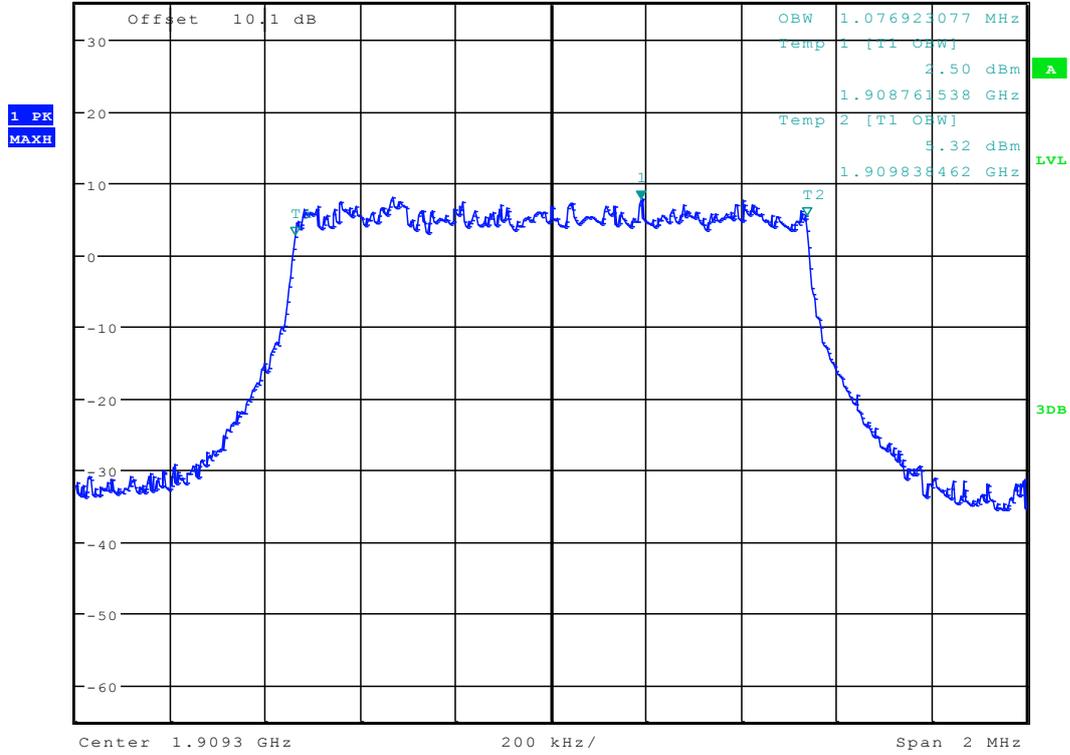


Channel 19193



Ref 35 dBm * Att 30 dB * RBW 10 kHz * VBW 50 kHz * SWT 80 ms

Marker 1 [T1] 7.49 dBm 1.909489103 GHz

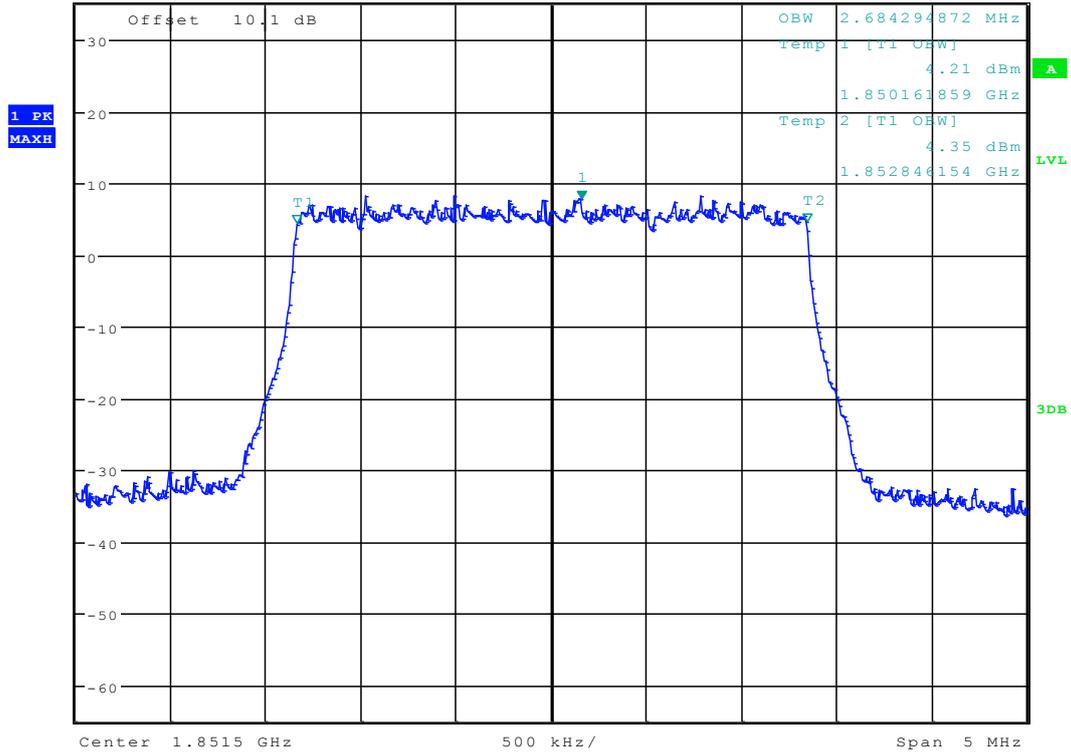




16QAM 3MHz(BW) Channel 18615

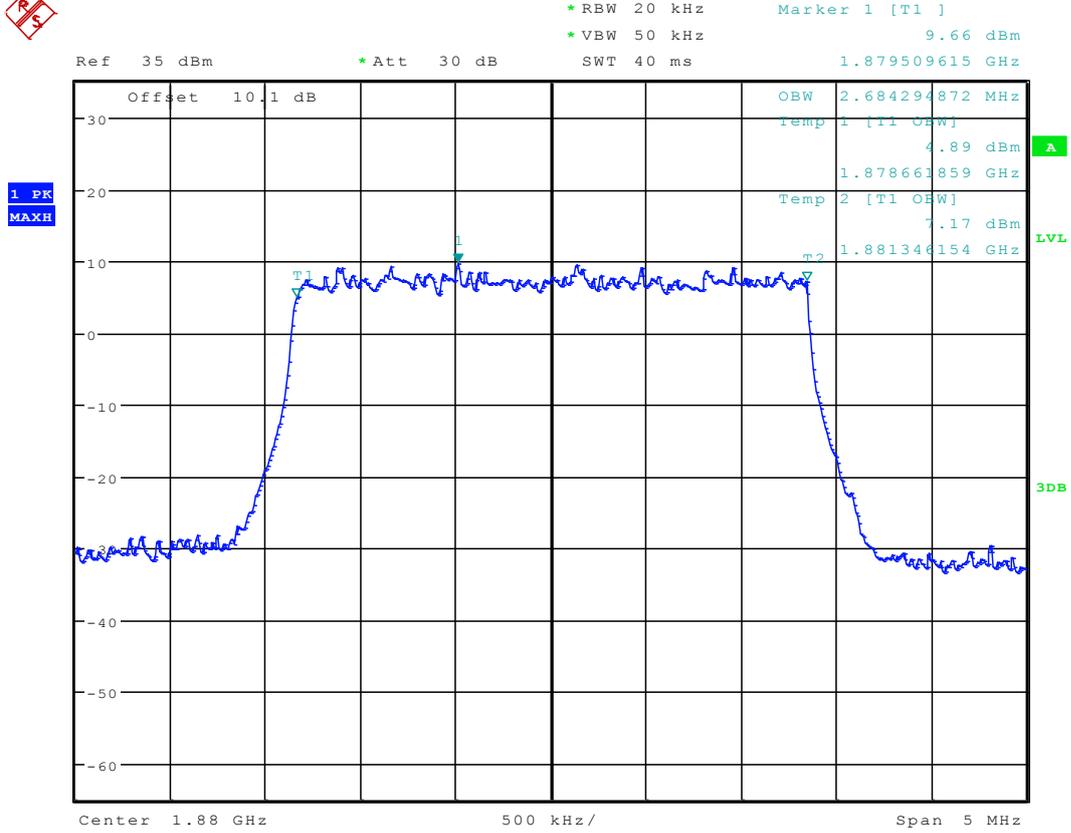


Ref 35 dBm *Att 30 dB *RBW 20 kHz *VBW 50 kHz *SWT 40 ms Marker 1 [T1] 7.55 dBm 1.851659936 GHz





Channel 18900

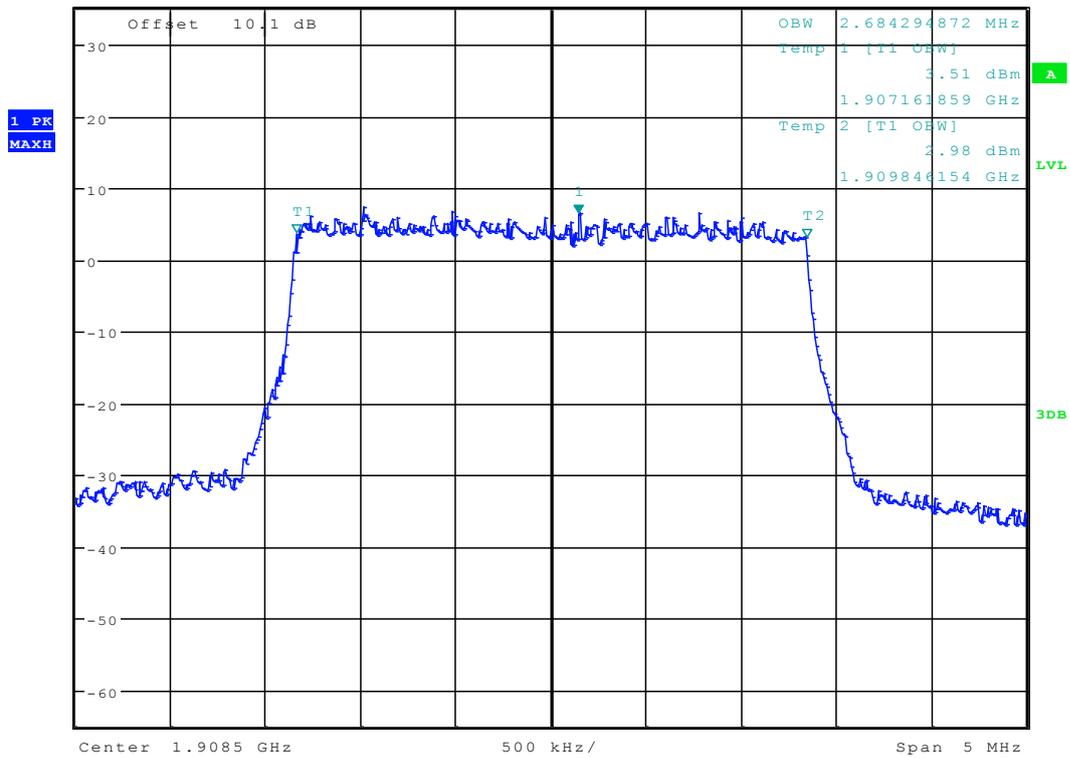




Channel 19185

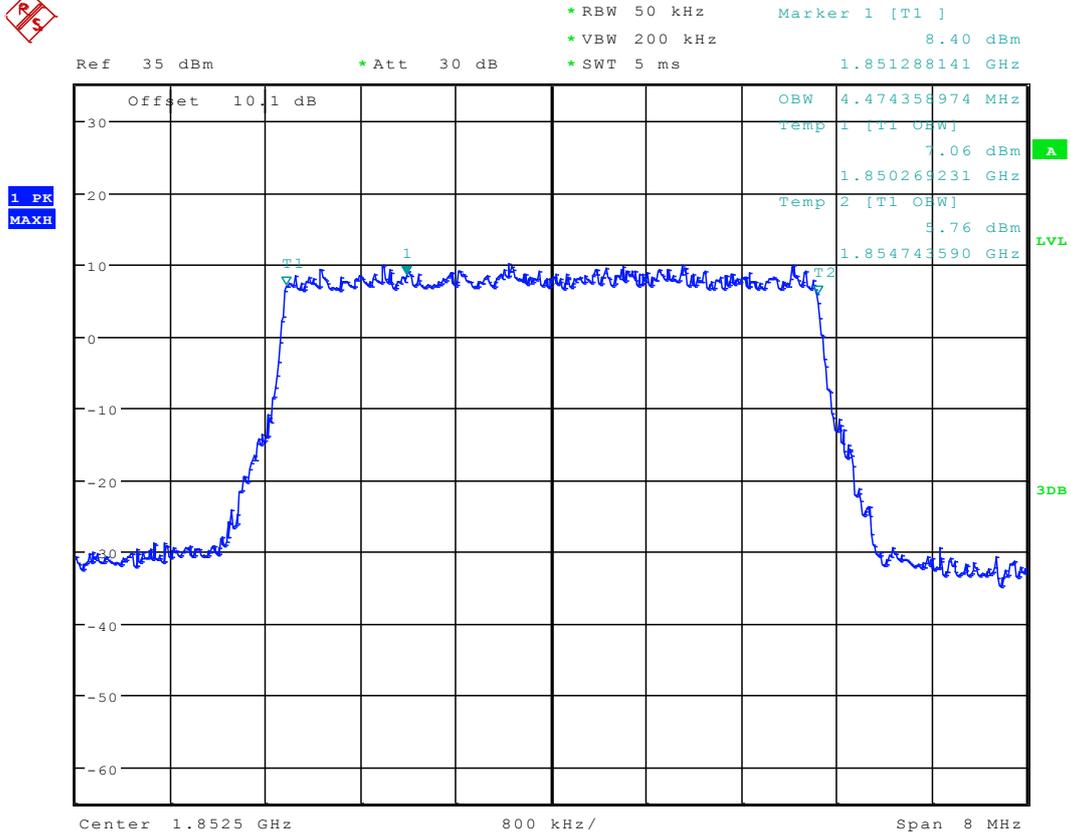


Ref 35 dBm * Att 30 dB * RBW 20 kHz * VBW 50 kHz * SWT 40 ms Marker 1 [T1] 6.36 dBm
 1.908647756 GHz



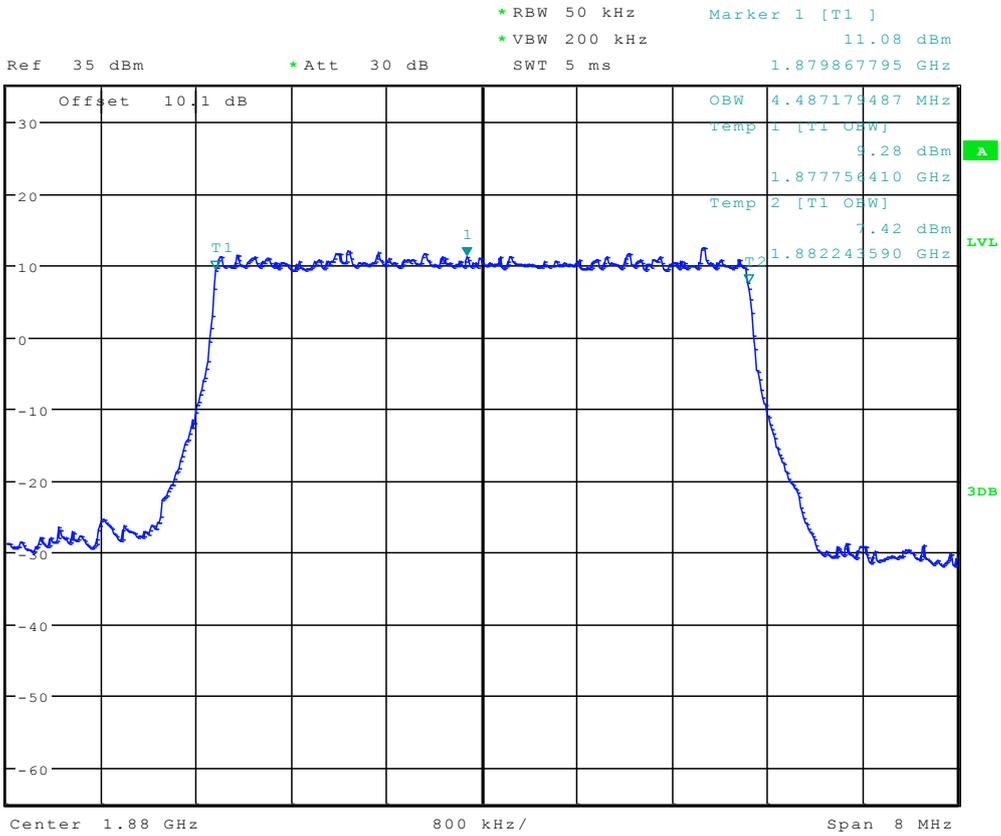


16QAM 5MHz(BW) Channel 18625





Channel 18900



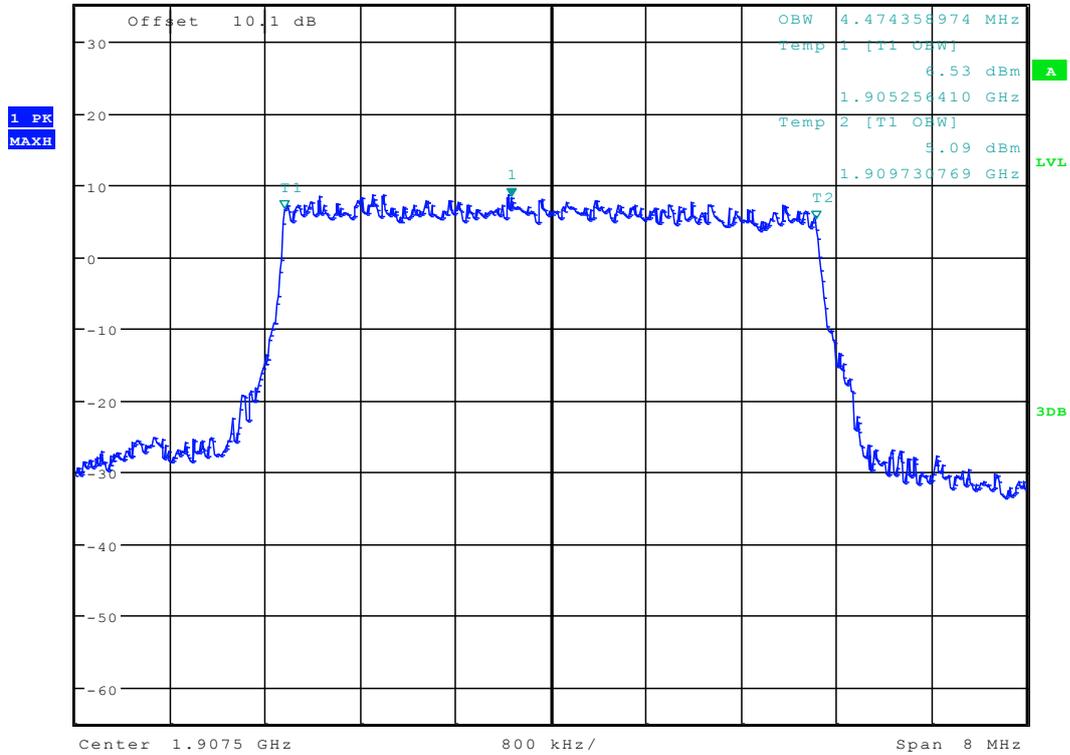


Channel 19175



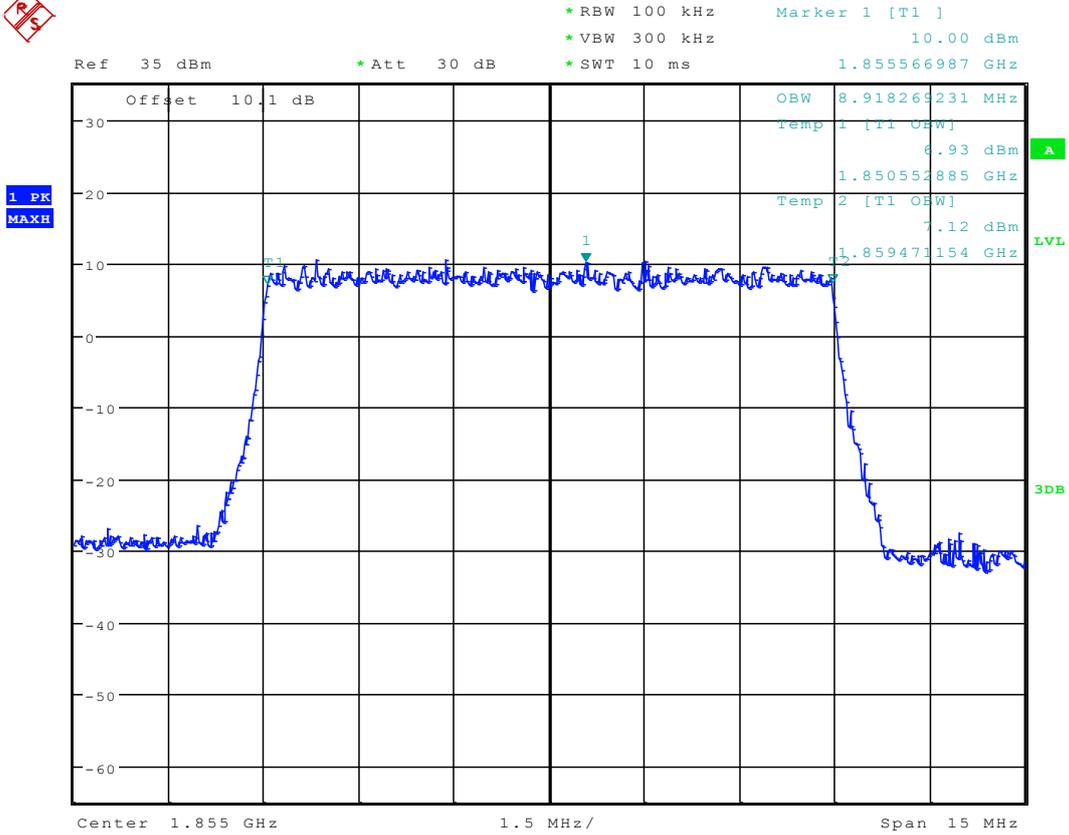
Ref 35 dBm * Att 30 dB * RBW 50 kHz * VBW 200 kHz * SWT 5 ms

Marker 1 [T1] 8.14 dBm 1.907160577 GHz



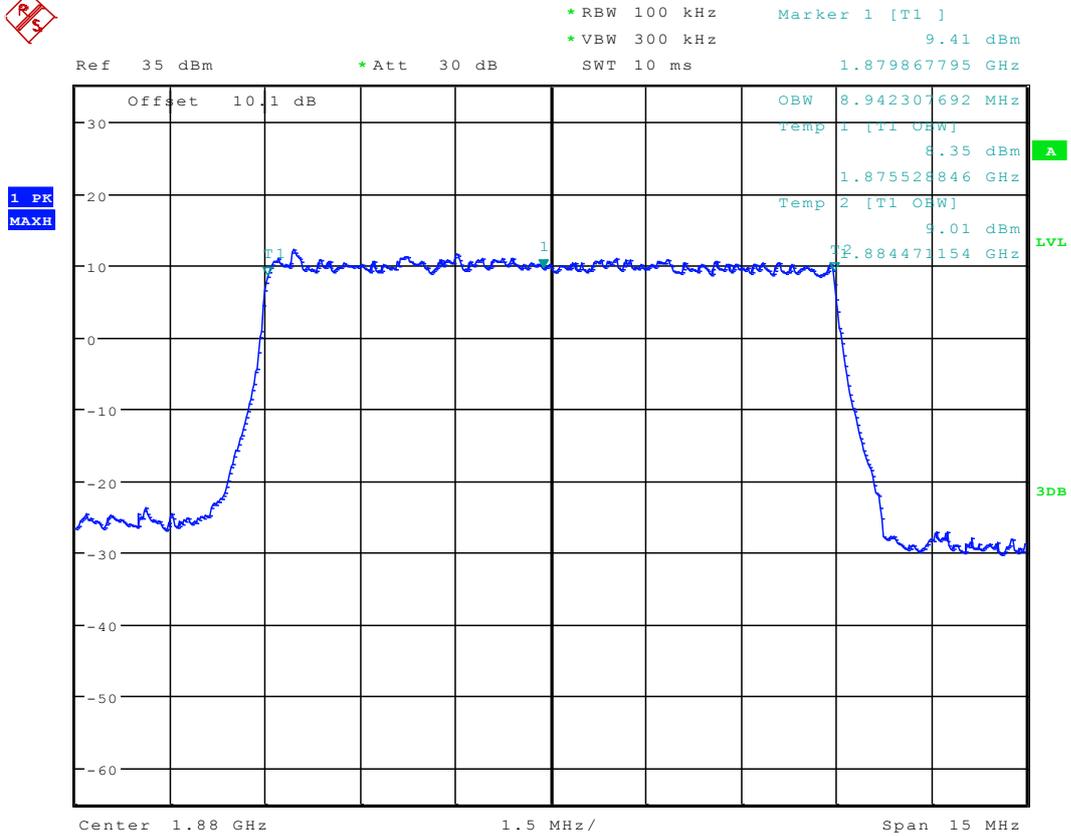


16QAM 10MHz(BW) Channel 18650





Channel 18900



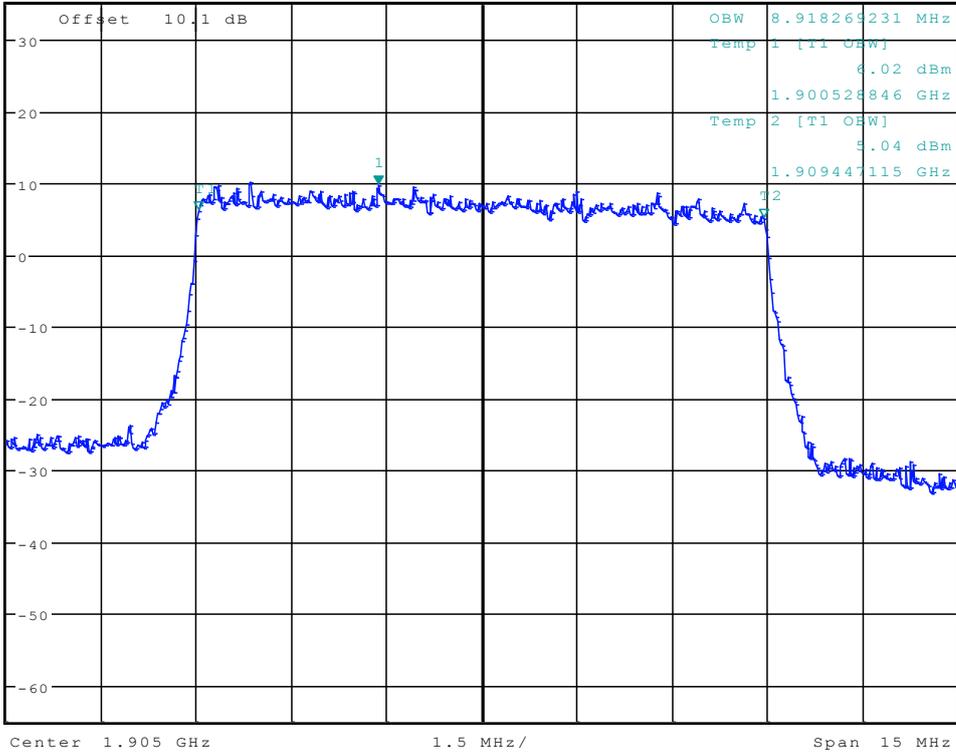


Channel 19150



Ref 35 dBm * Att 30 dB * RBW 100 kHz * VBW 300 kHz * SWT 10 ms

Marker 1 [T1] 9.76 dBm 1.903362500 GHz





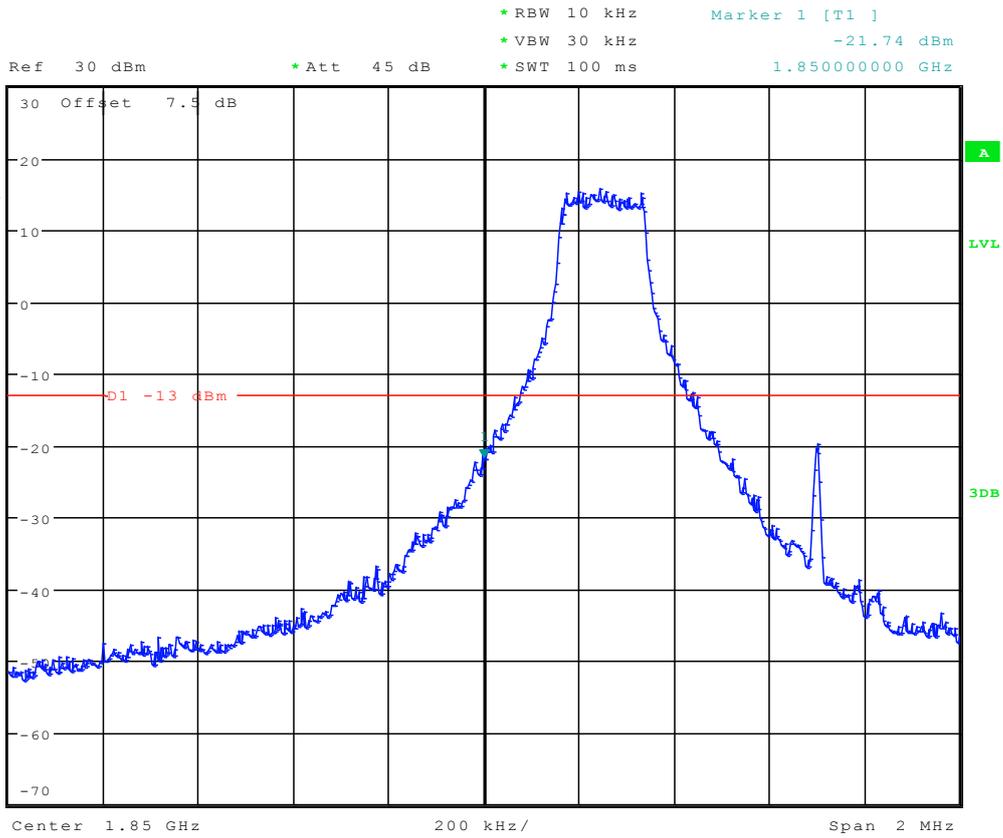
Appendix D

Band Edges Compliance According to FCC Part 2.1051 & 24.238



Left Edge 1.4MHz(BW) Channel 18607

QPSK/1RB #0





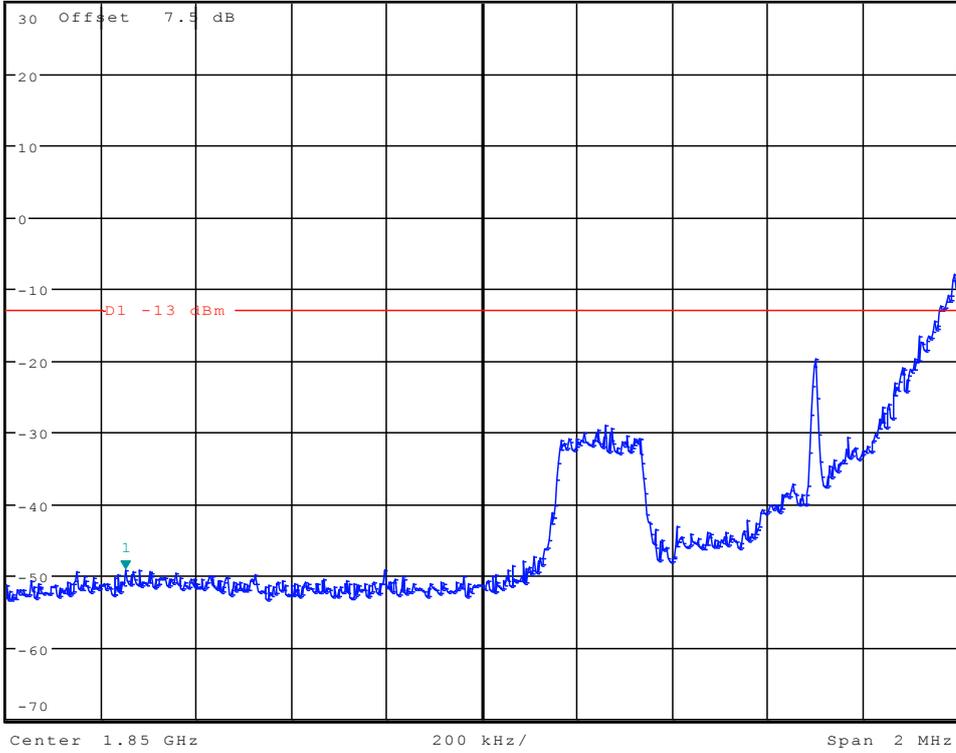
QPSK/1RB #max



*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -49.18 dBm
*SWT 100 ms 1.849250000 GHz

Ref 30 dBm

*Att 45 dB



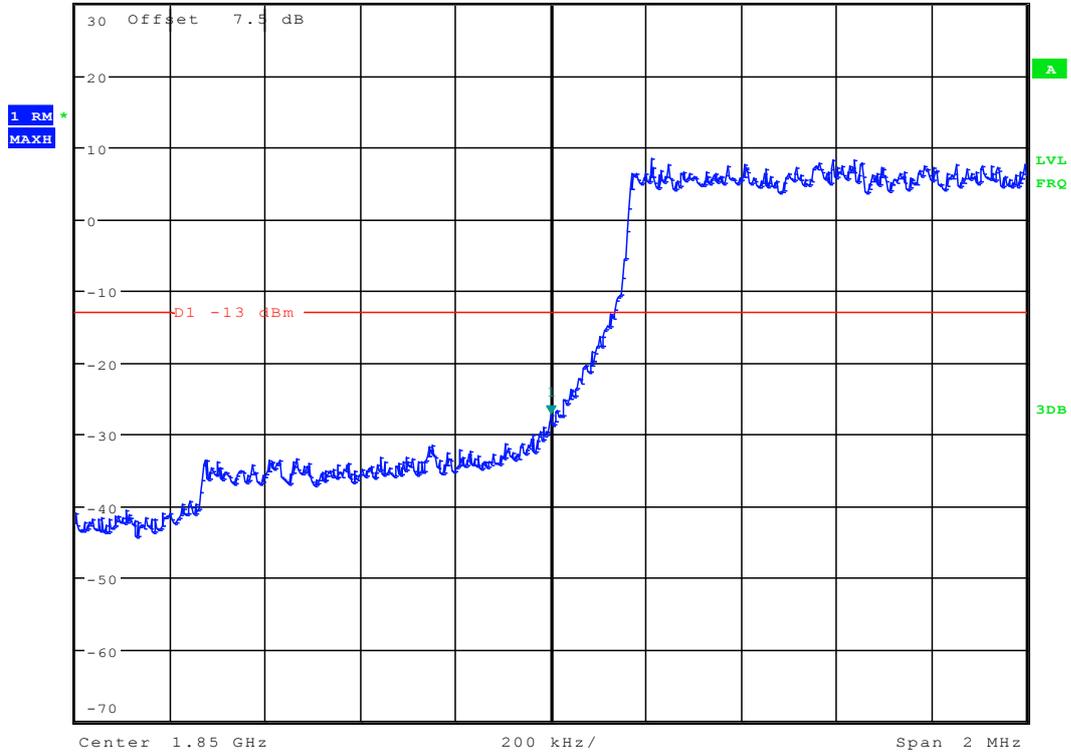


QPSK/partial RBs/RB #0



*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -27.34 dBm
*SWT 100 ms 1.850000000 GHz

Ref 30 dBm *Att 45 dB

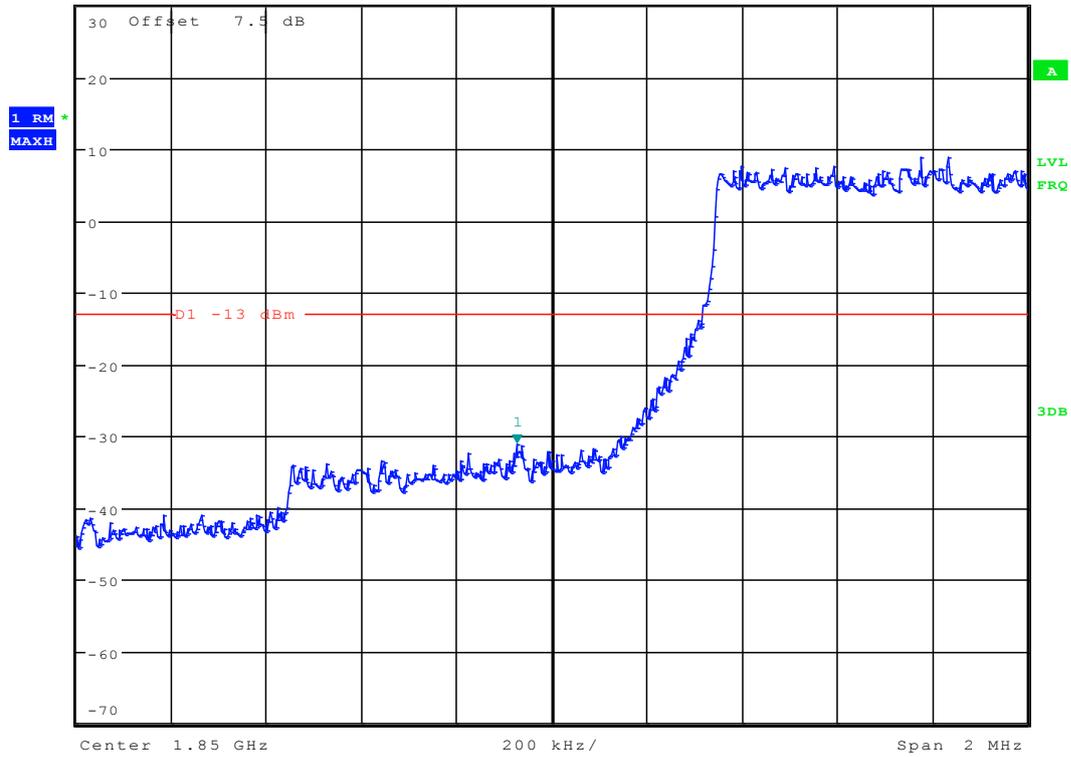




QPSK/partial RBs/RB #max



Ref 30 dBm * Att 45 dB * RBW 10 kHz Marker 1 [T1]
 * VBW 30 kHz -31.11 dBm
 * SWT 100 ms 1.849926282 GHz

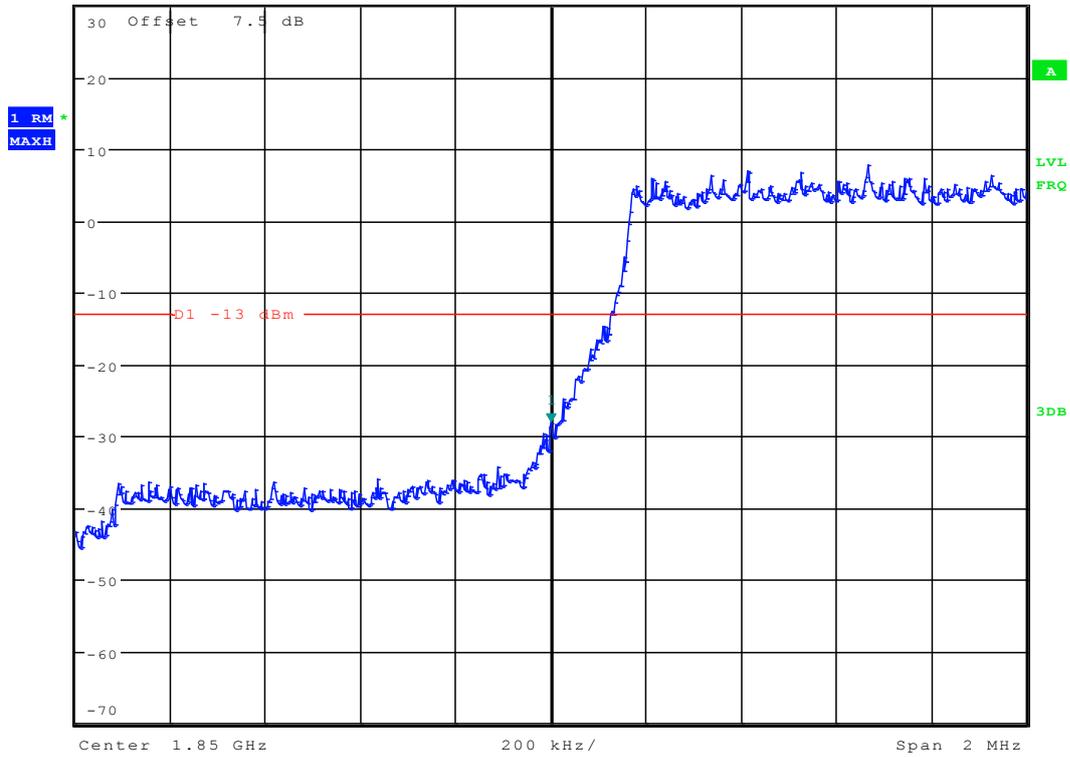




QPSK/ full RBs

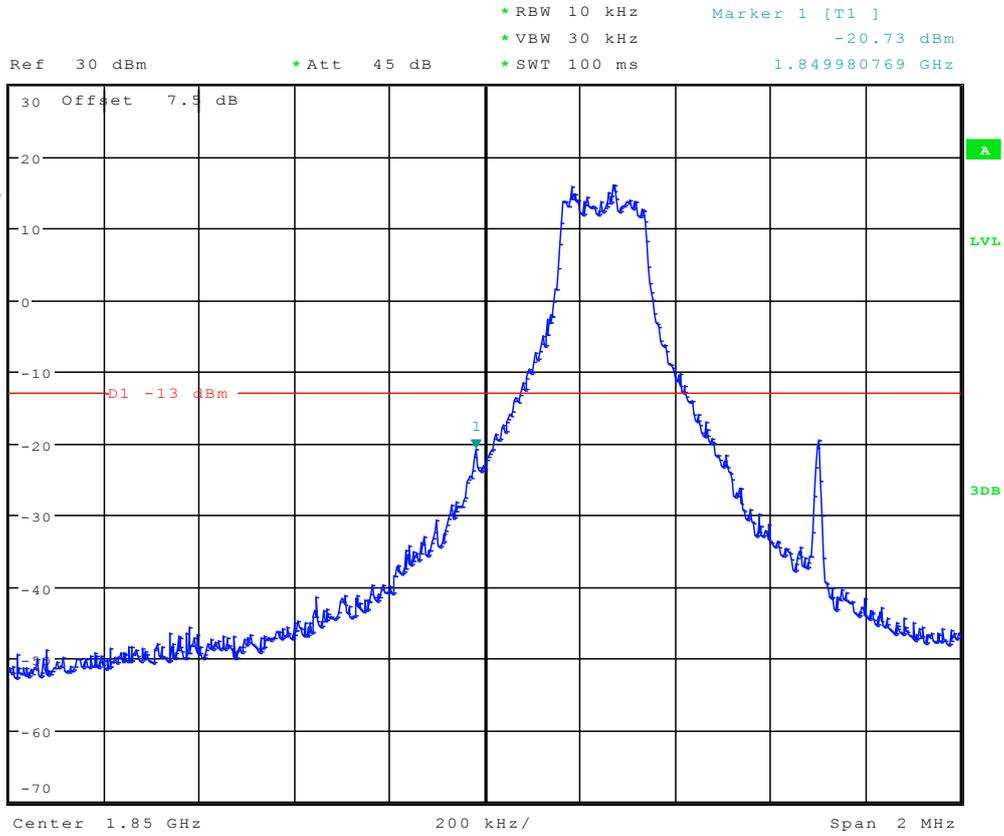


Ref 30 dBm * Att 45 dB * RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -28.18 dBm
* SWT 100 ms 1.850000000 GHz





16QAM /1RB #0





16QAM /1RB #max



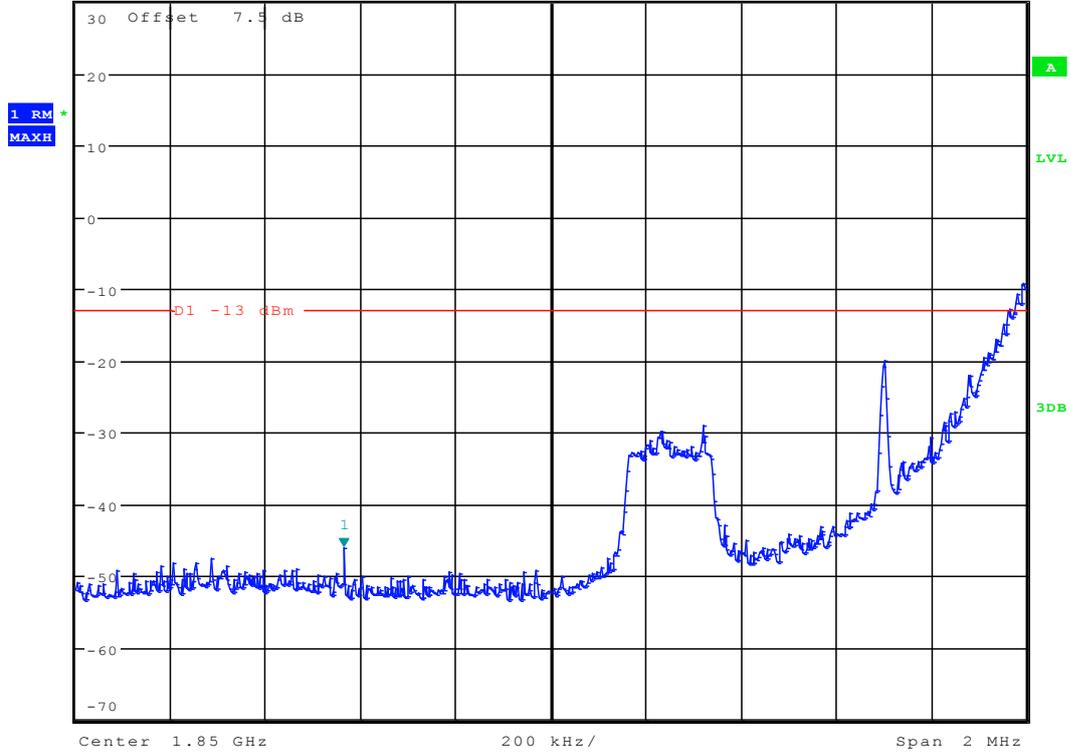
*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -45.87 dBm
*SWT 100 ms 1.849564103 GHz

Ref 30 dBm

*Att 45 dB

*SWT 100 ms

1.849564103 GHz





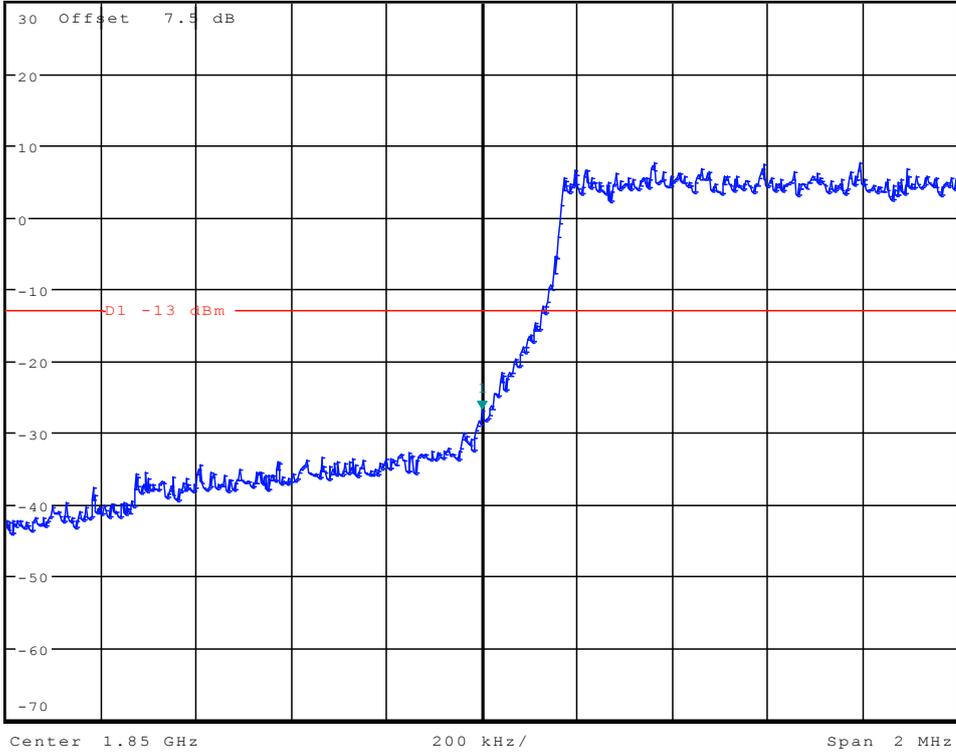
16QAM /partial RBs/RB #0



*RBW 10 kHz Marker 1 [T1]
 *VBW 30 kHz -26.77 dBm
 *SWT 100 ms 1.850000000 GHz

Ref 30 dBm

*Att 45 dB

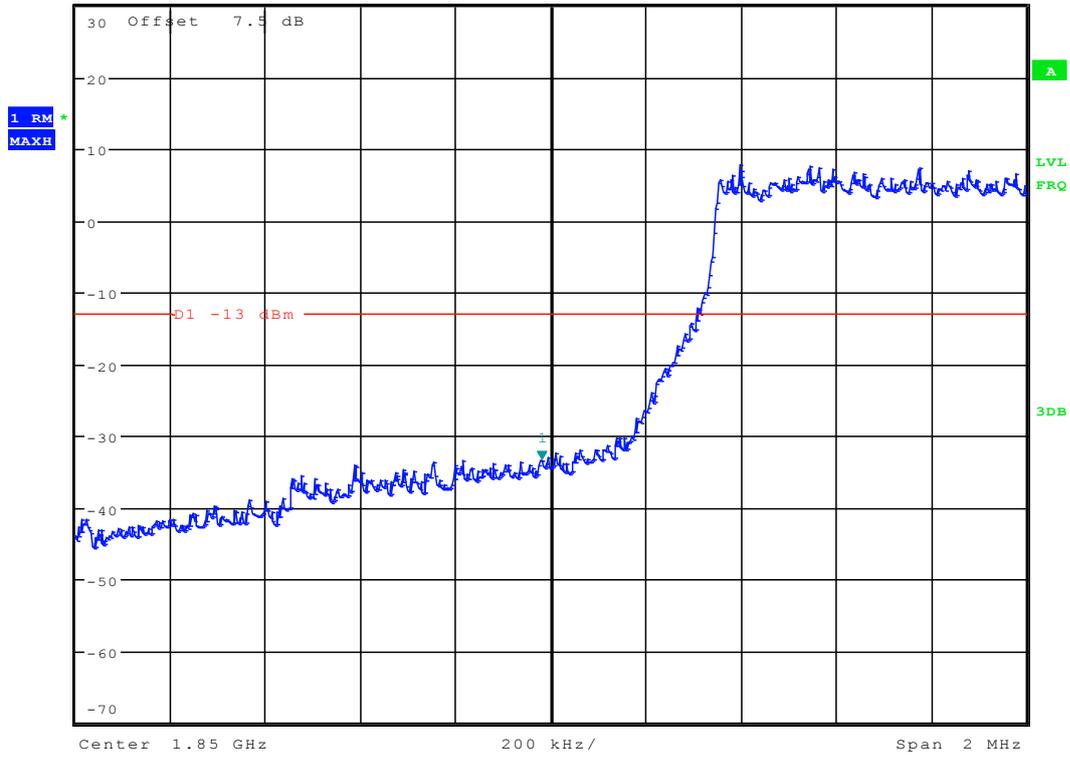




16QAM /partial RBs/RB #max

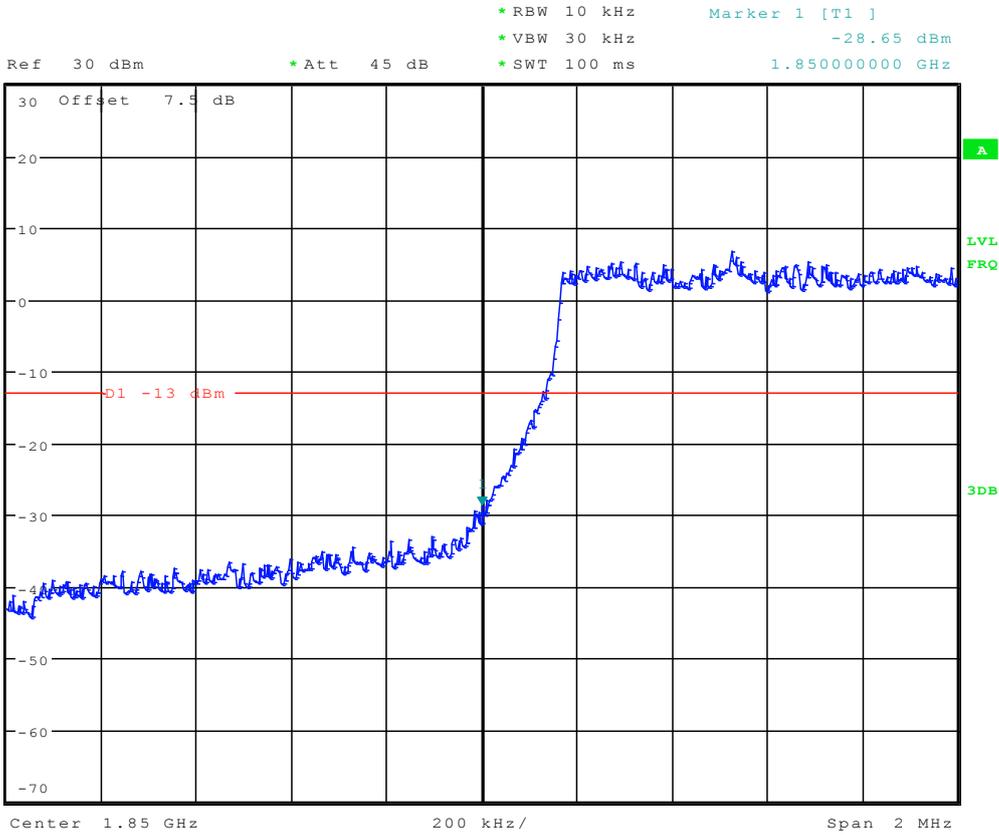


* RBW 10 kHz Marker 1 [T1]
 * VBW 30 kHz -33.42 dBm
 * SWT 100 ms 1.849980769 GHz
 Ref 30 dBm * Att 45 dB





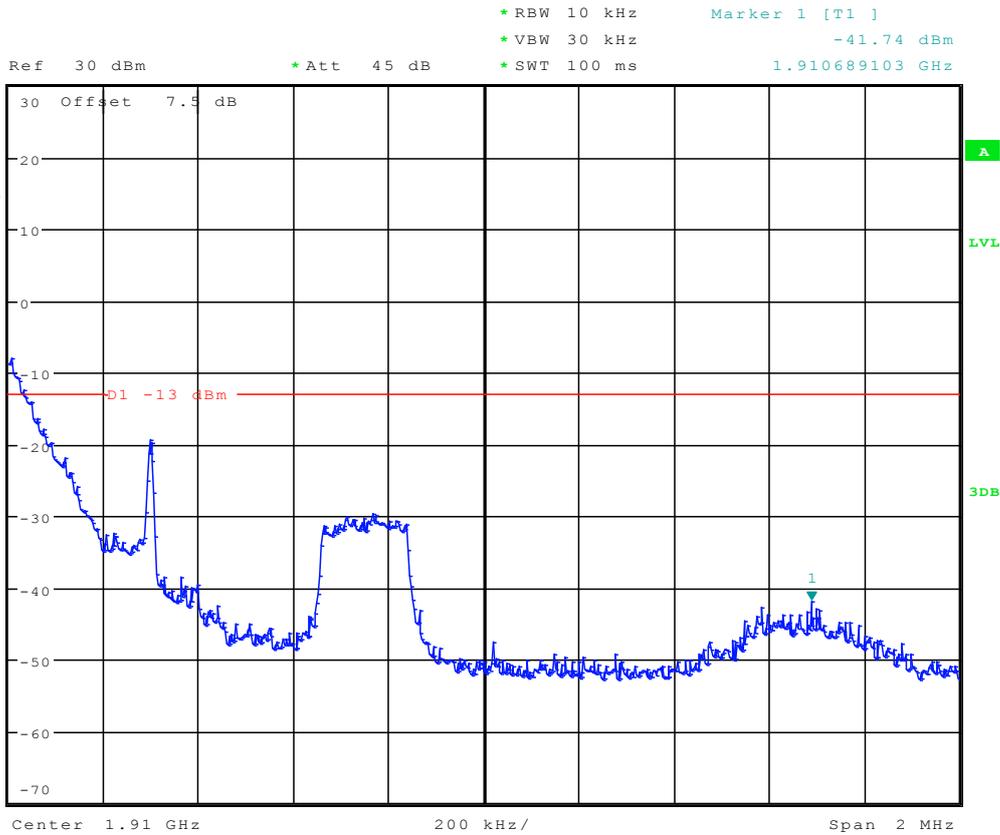
16QAM/full RBs





Right Edge 1.4MHz(BW) Channel 19193

QPSK/1RB #0

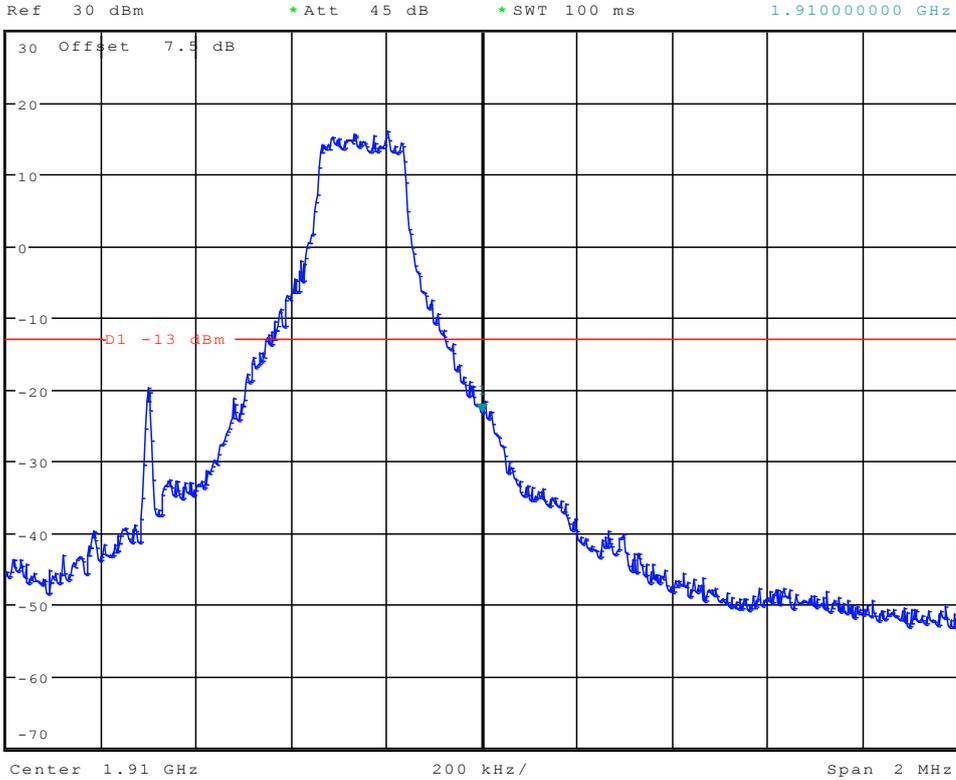




QPSK/1RB #max



*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -23.17 dBm
*SWT 100 ms 1.910000000 GHz





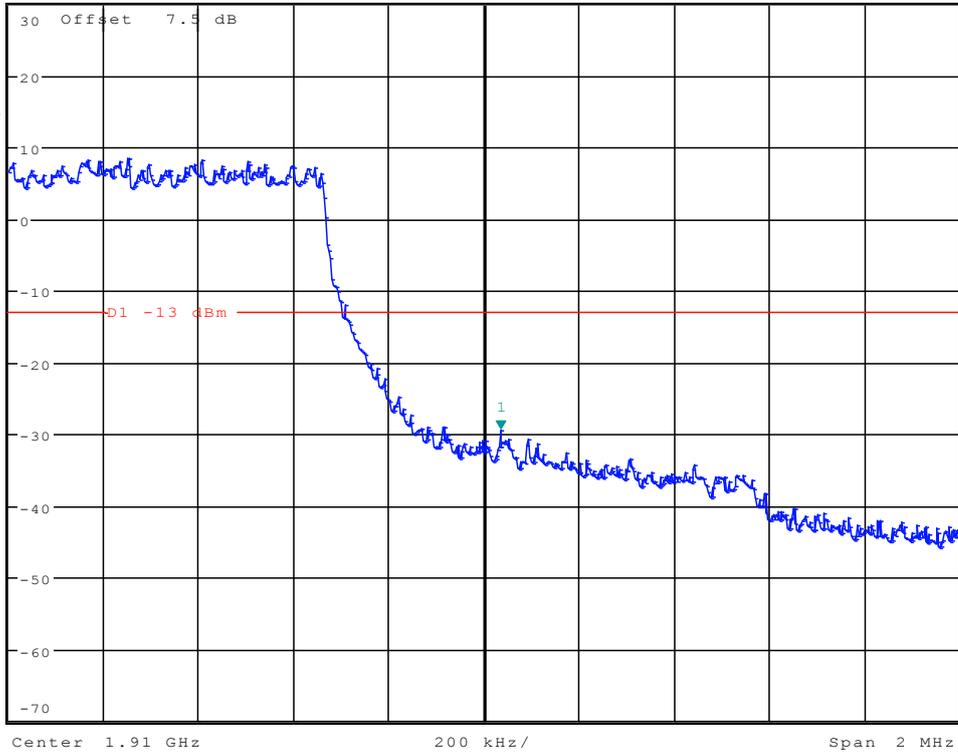
QPSK/partial RBs/RB #0



*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -29.40 dBm
*SWT 100 ms 1.910035256 GHz

Ref 30 dBm

*Att 45 dB

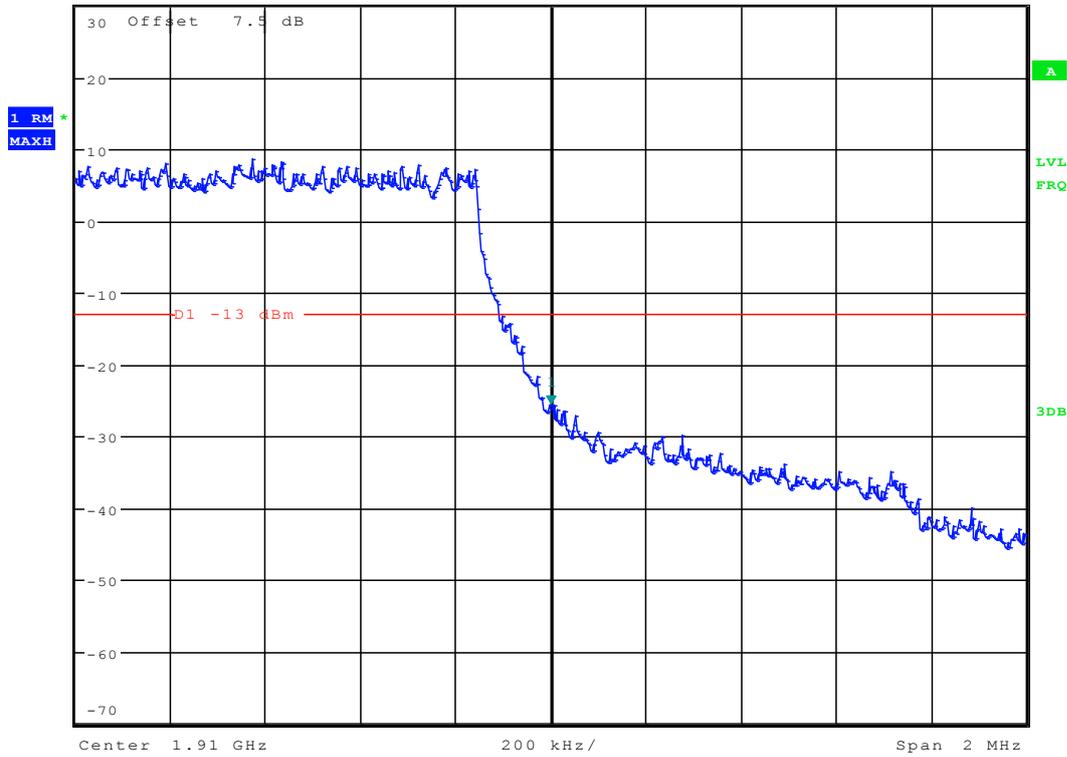




QPSK/partial RBs/RB #max



Ref 30 dBm * Att 45 dB * RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -25.67 dBm
* SWT 100 ms 1.910000000 GHz

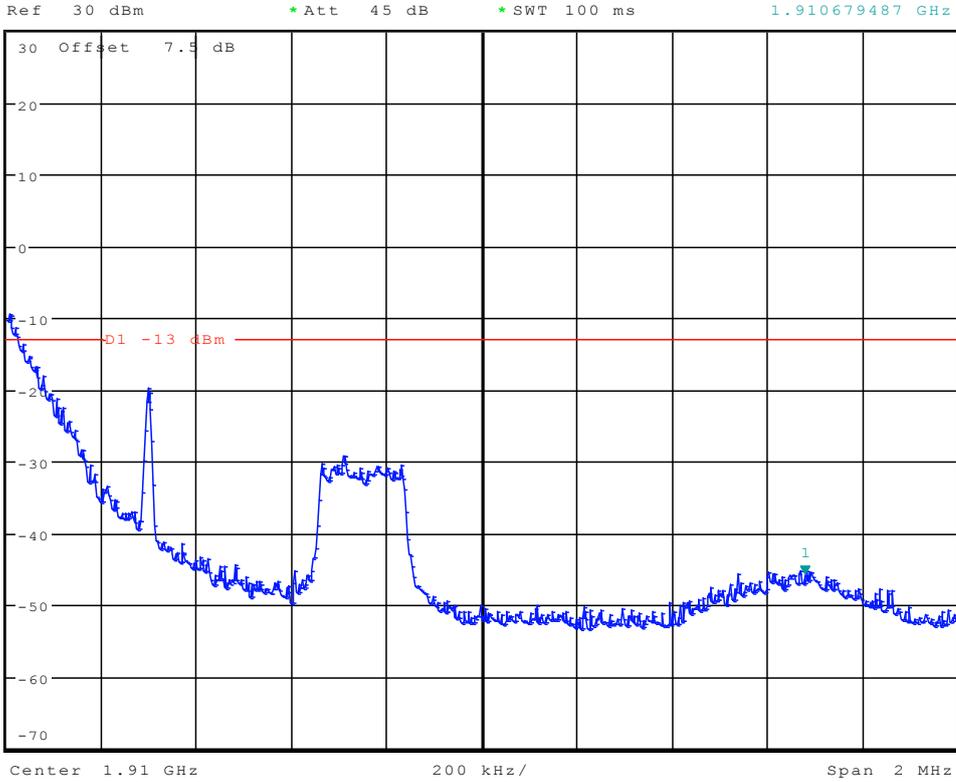




16QAM/1RB #0



*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -45.76 dBm
*SWT 100 ms 1.910679487 GHz





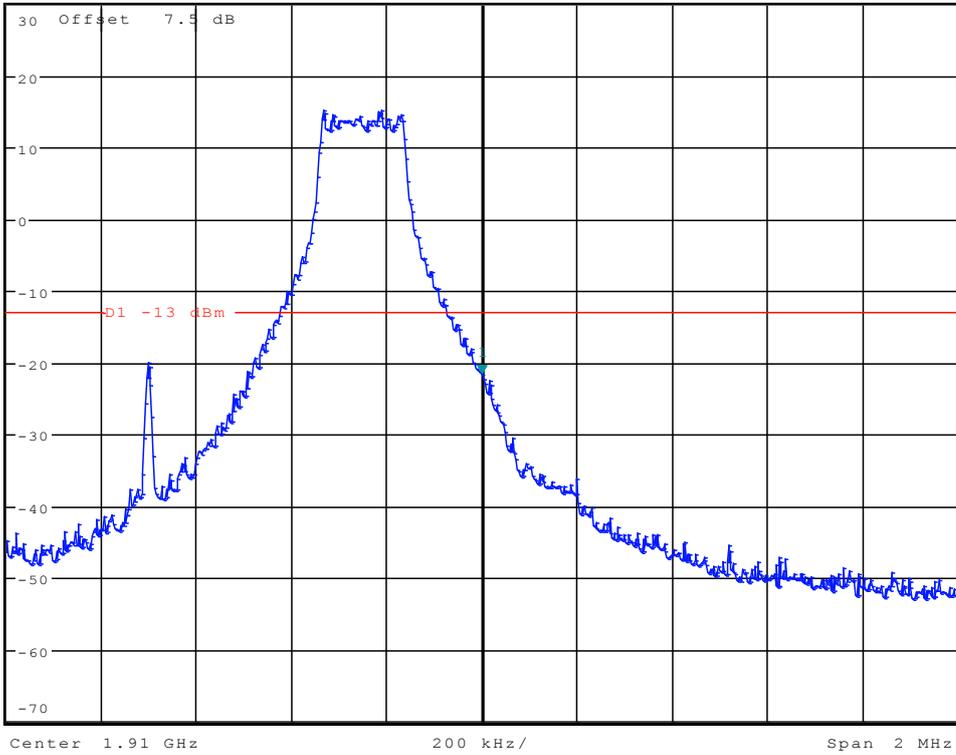
16QAM /1RB #max



*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -21.62 dBm
*SWT 100 ms 1.910000000 GHz

Ref 30 dBm

*Att 45 dB



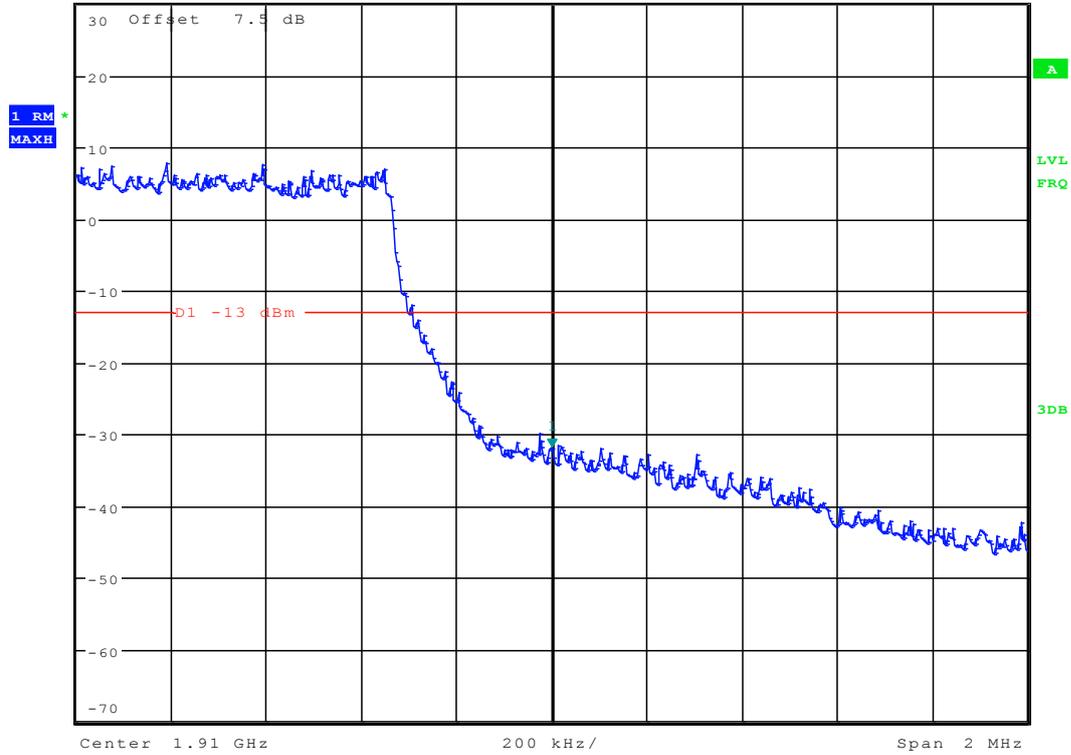


16QAM /partial RBs/RB #0



*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -31.94 dBm
*SWT 100 ms 1.910000000 GHz

Ref 30 dBm *Att 45 dB



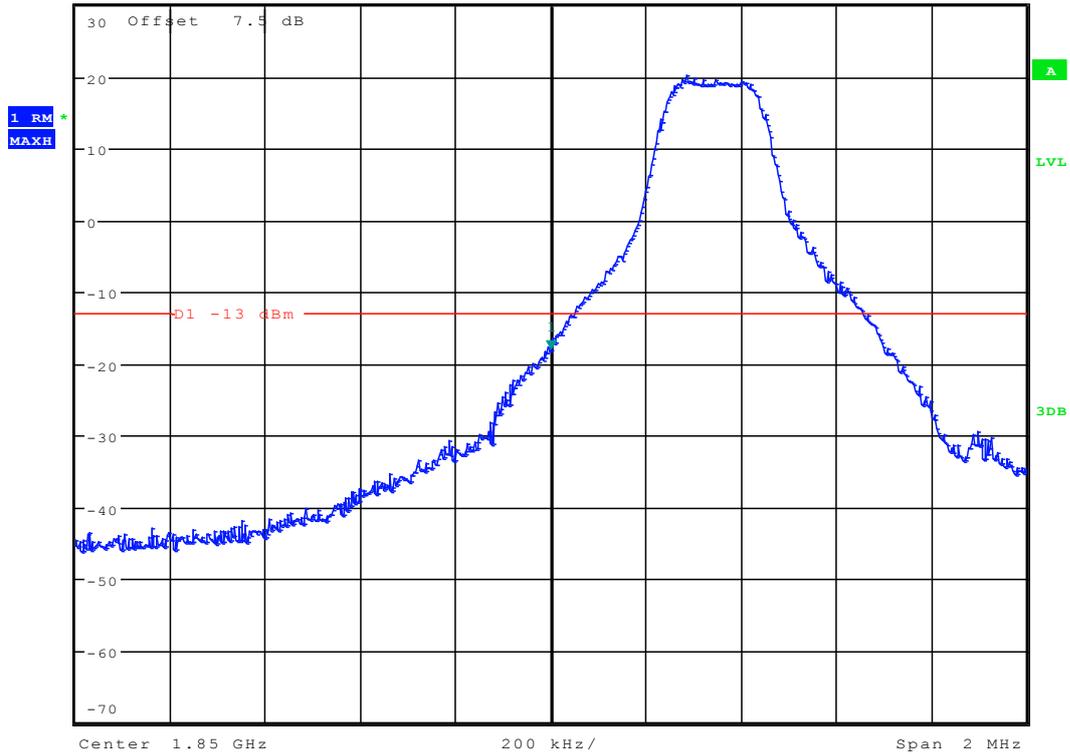


Left Edge 5MHz(BW) Channel 18625

QPSK/1RB #0



Ref 30 dBm * Att 45 dB * RBW 50 kHz Marker 1 [T1]
* VBW 30 kHz -17.90 dBm
* SWT 50 ms 1.850000000 GHz





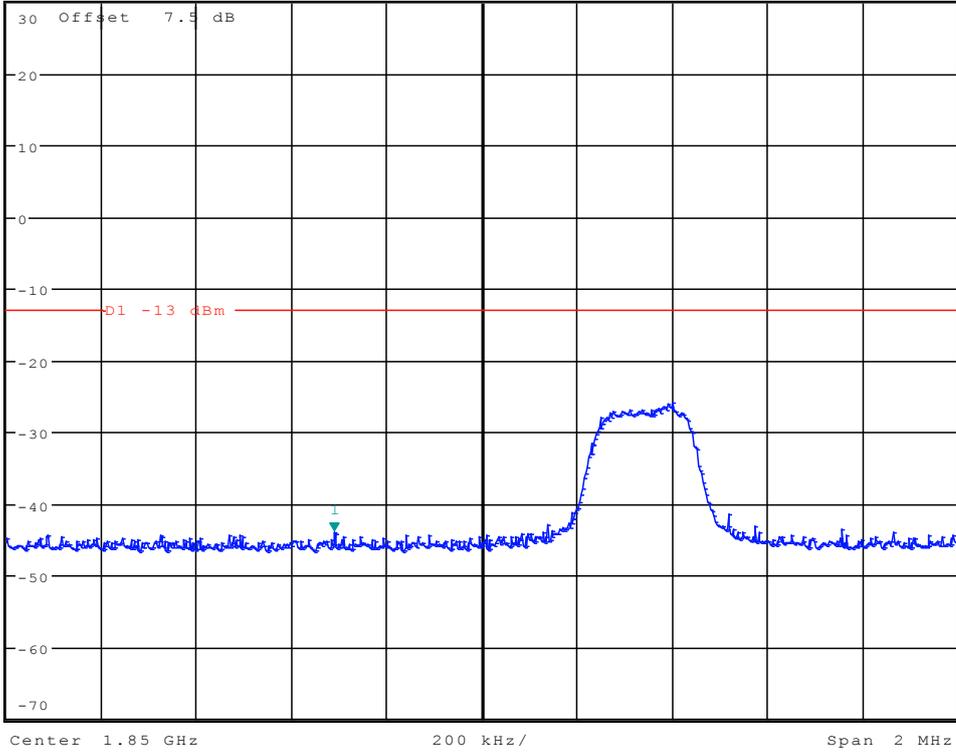
QPSK /1RB #max



*RBW 50 kHz Marker 1 [T1]
*VBW 30 kHz -43.87 dBm
*SWT 50 ms 1.849689103 GHz

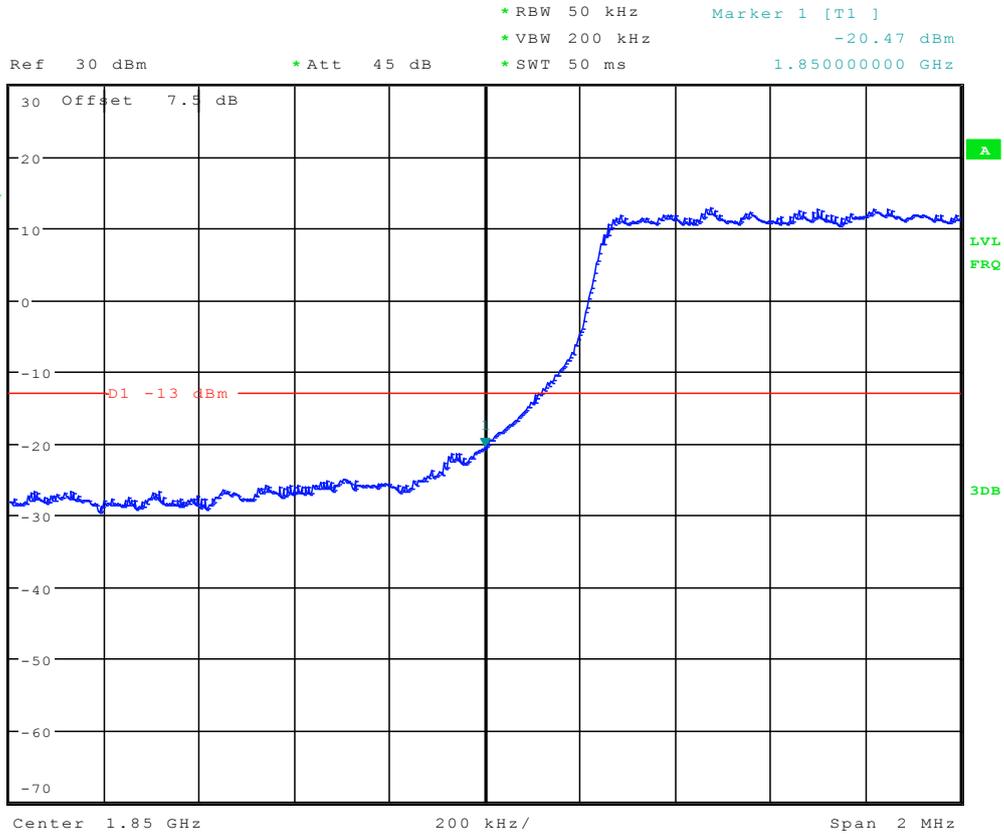
Ref 30 dBm

*Att 45 dB





QPSK/partial RBs/RB #0

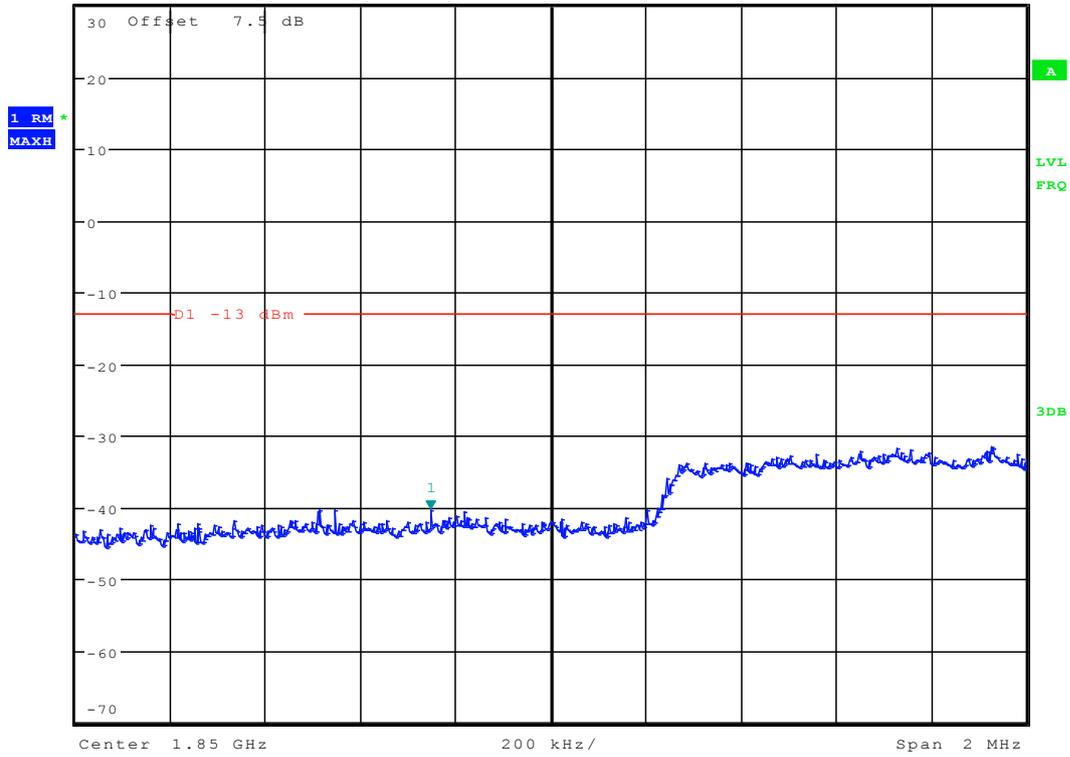




QPSK/partial RBs/RB #max

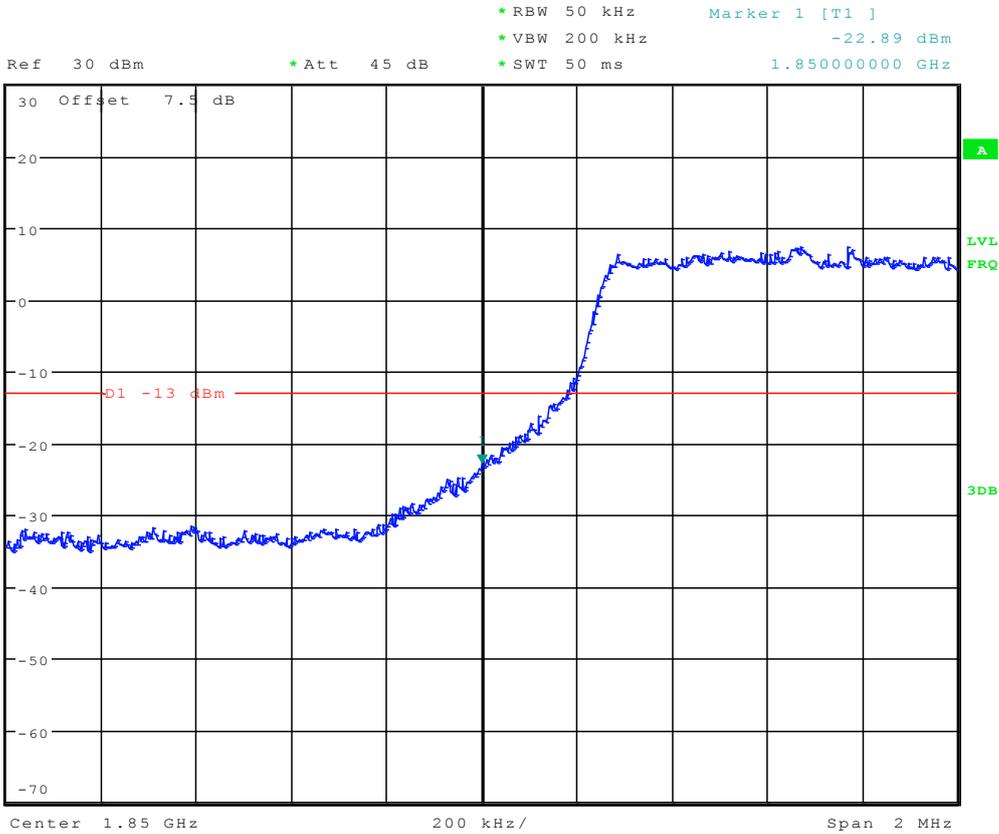


* RBW 50 kHz Marker 1 [T1]
 * VBW 200 kHz -40.28 dBm
 * SWT 50 ms 1.849746795 GHz
 Ref 30 dBm * Att 45 dB



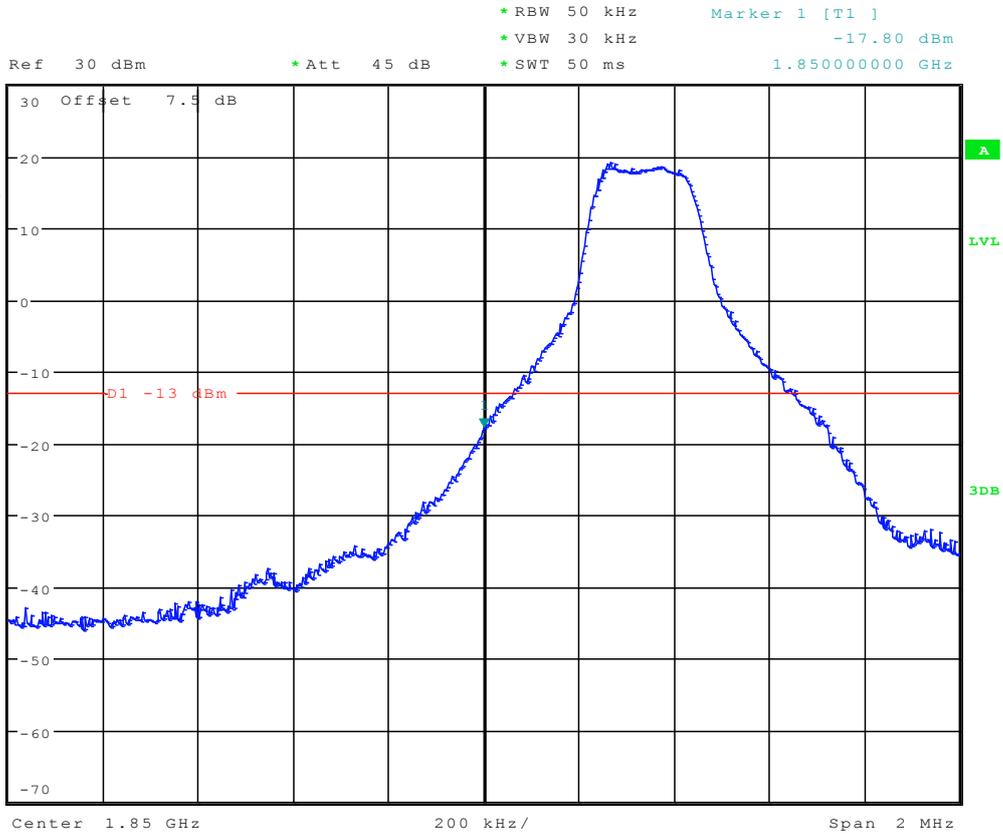


QPSK/ full RBs





16QAM/1RB #0

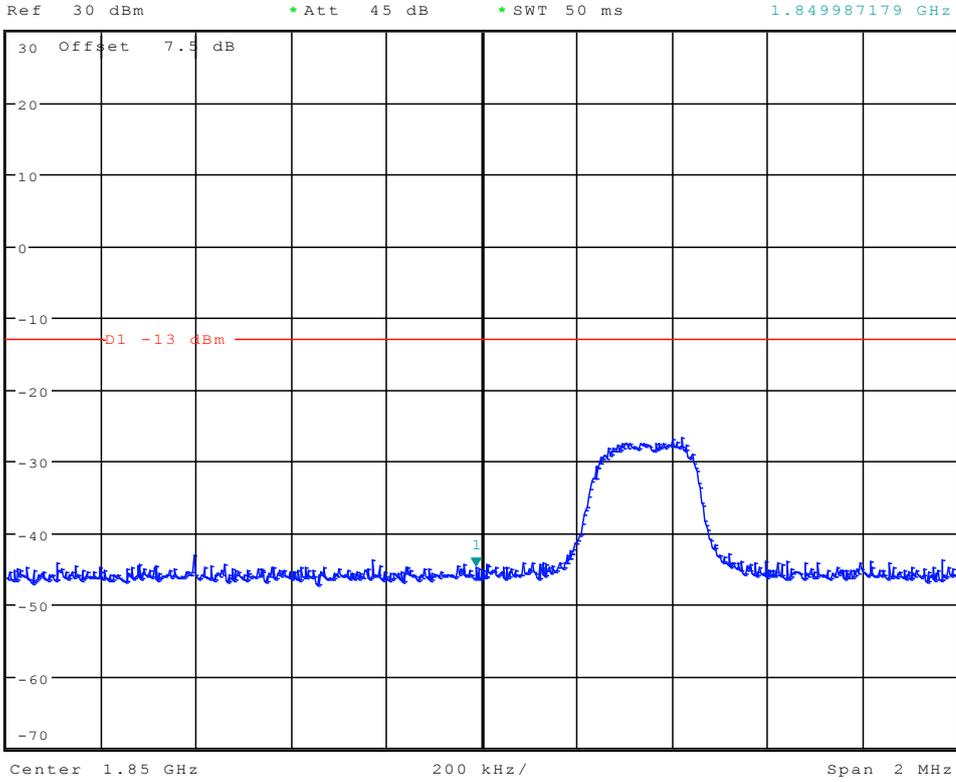




16QAM /1RB #max

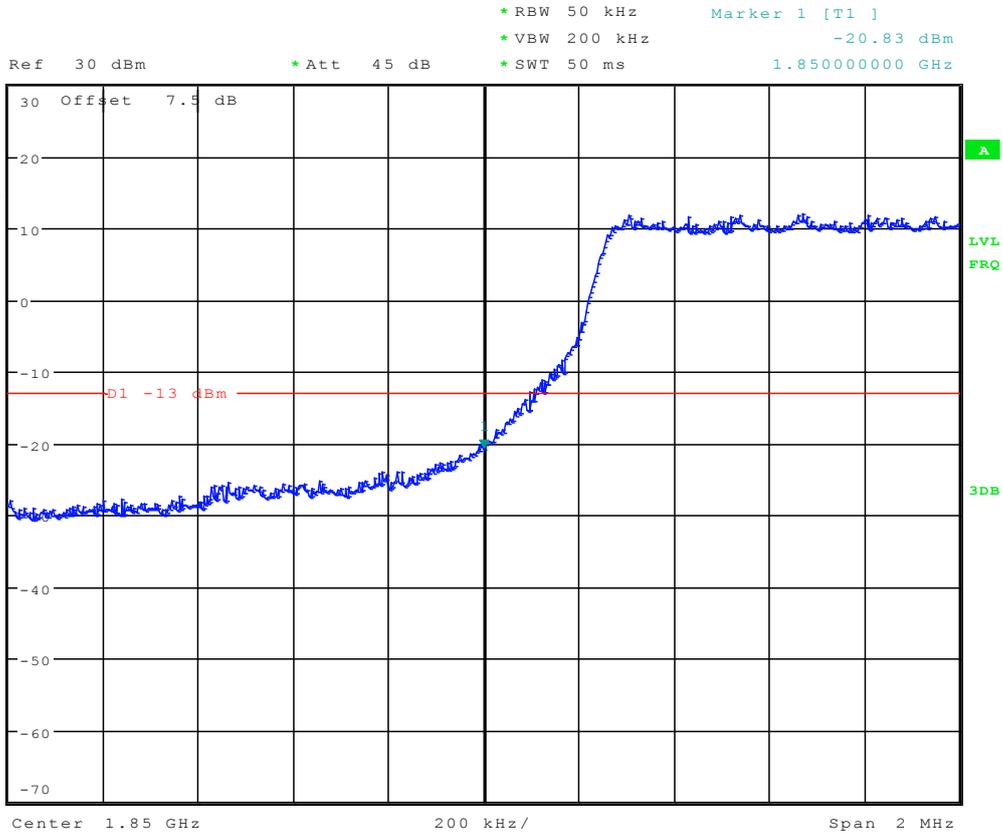


*RBW 50 kHz Marker 1 [T1]
 *VBW 30 kHz -44.66 dBm
 *SWT 50 ms 1.849987179 GHz





16QAM /partial RBs/RB #0

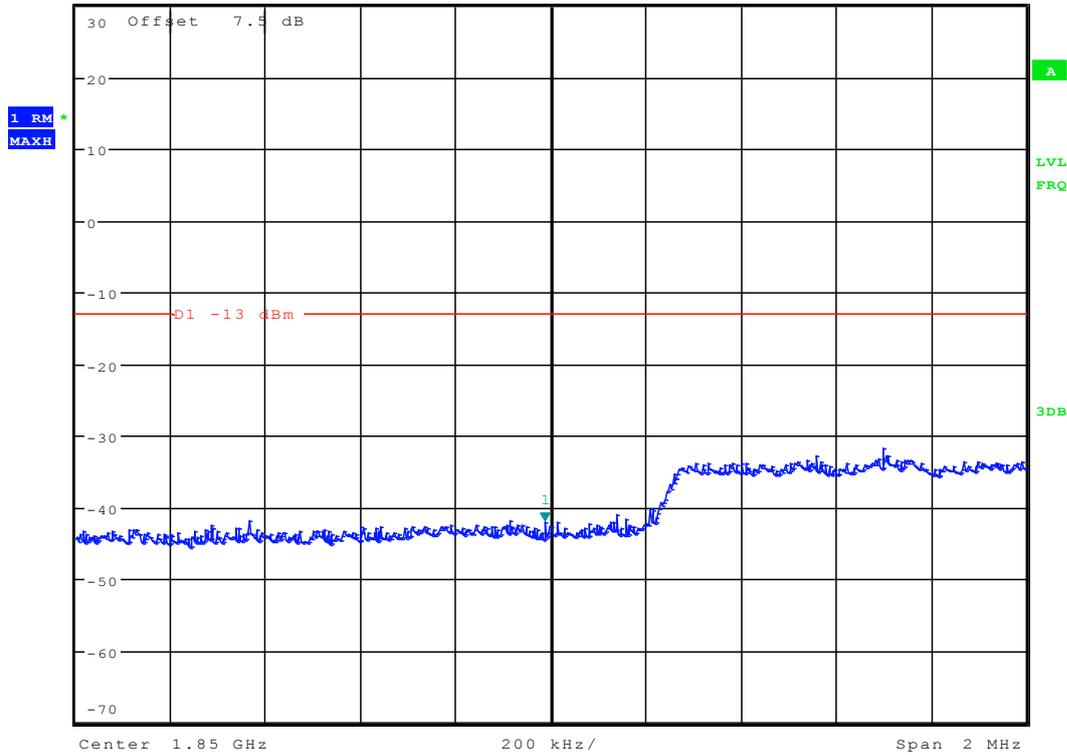




16QAM /partial RBs/RB #max

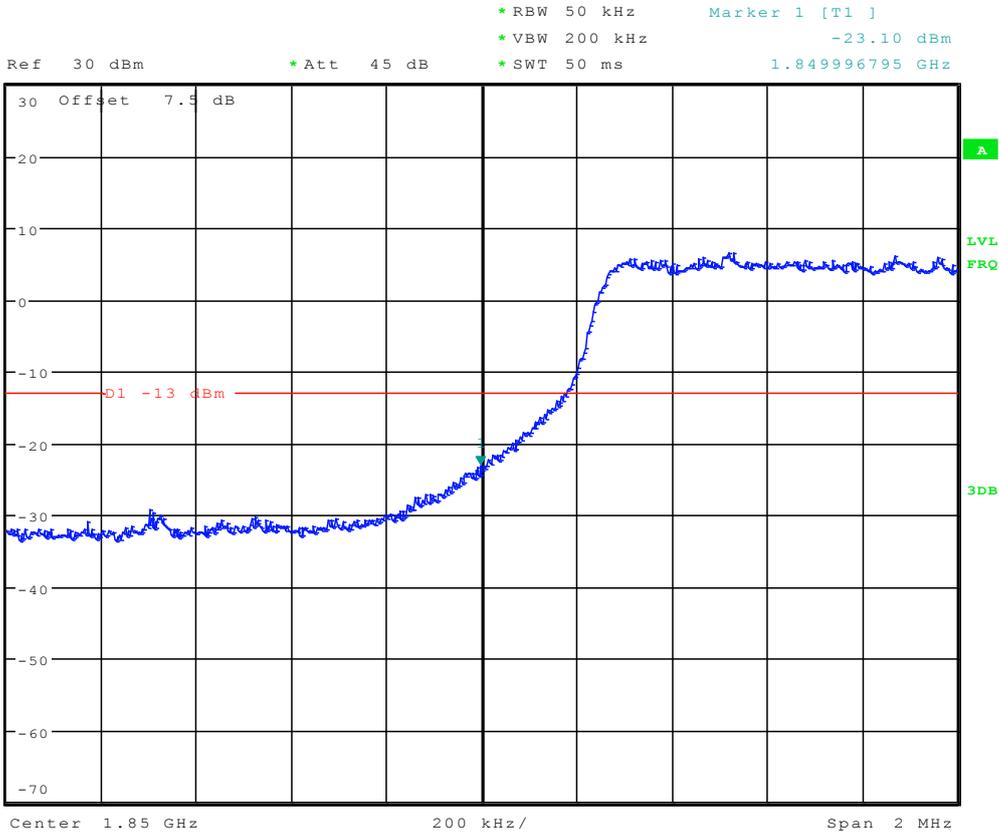


Ref 30 dBm * Att 45 dB * RBW 50 kHz Marker 1 [T1]
* VBW 200 kHz -42.06 dBm
* SWT 50 ms 1.849987179 GHz





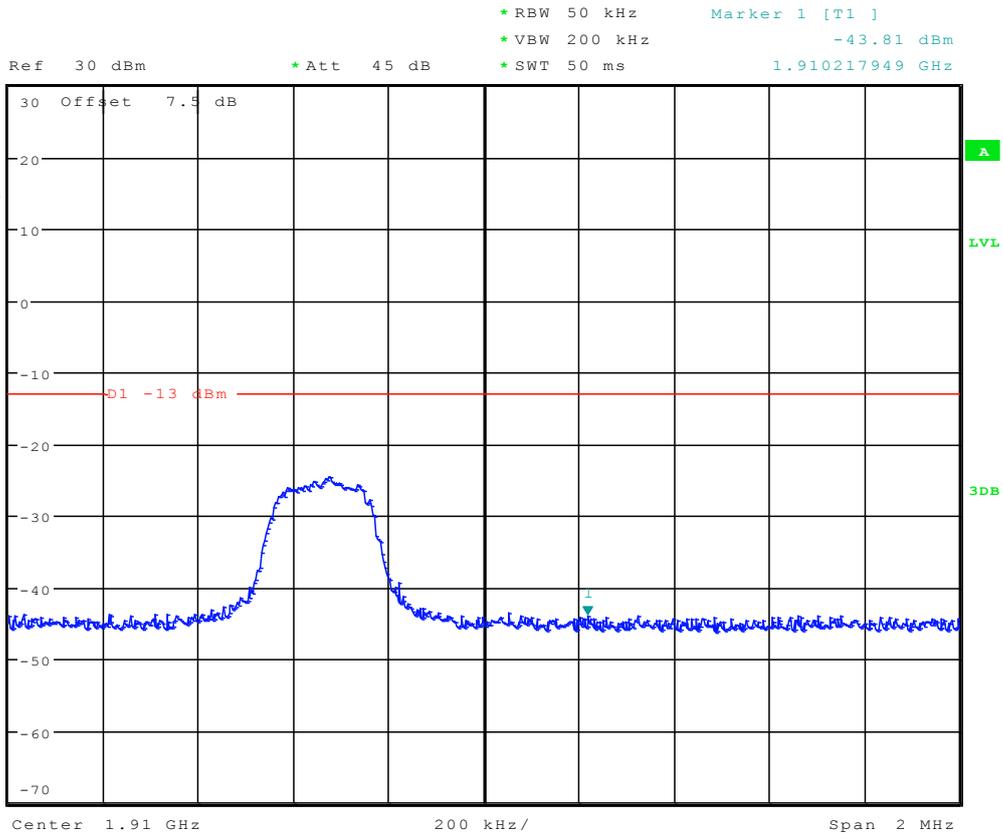
16QAM/full RBs





Right Edge 5MHz(BW) Channel 19175

QPSK/1RB #0





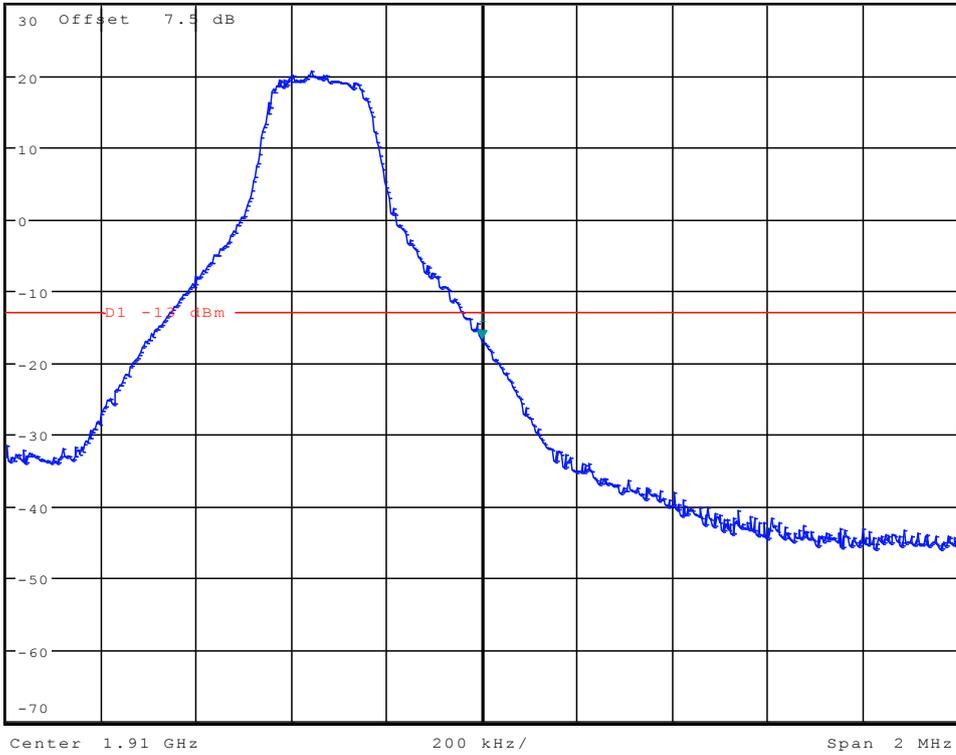
QPSK /1RB #max



*RBW 50 kHz Marker 1 [T1]
*VBW 200 kHz -16.83 dBm
*SWT 50 ms 1.910000000 GHz

Ref 30 dBm

*Att 45 dB





QPSK/partial RBs/RB #0

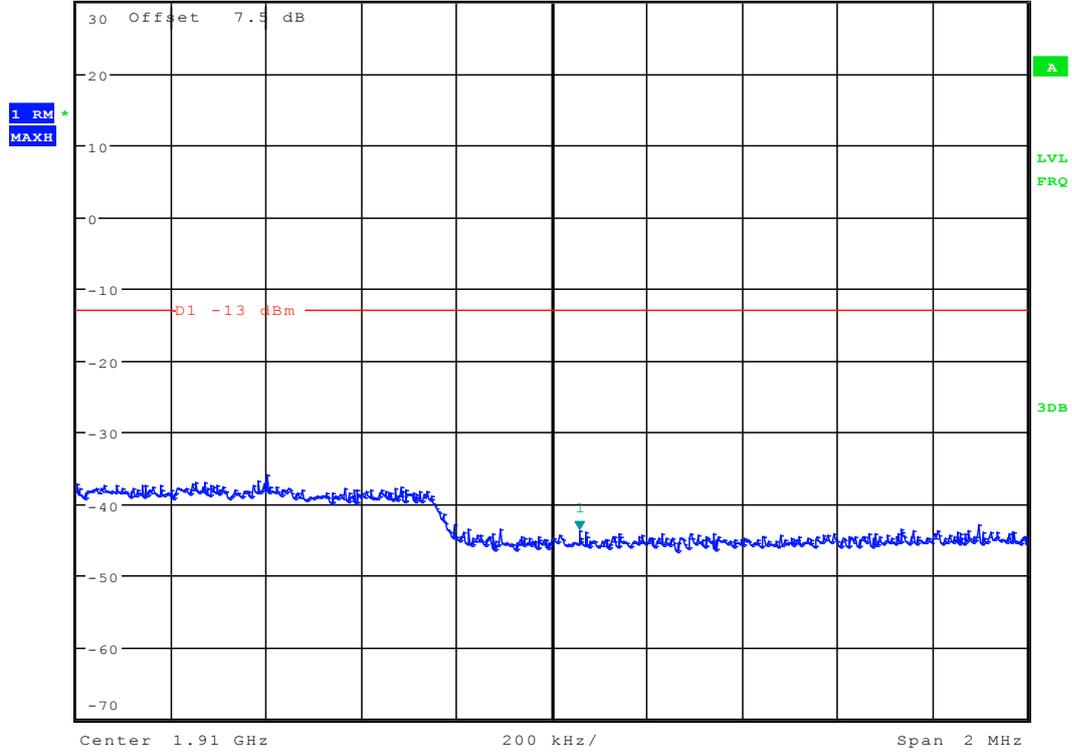


*RBW 50 kHz Marker 1 [T1]
*VBW 200 kHz -43.54 dBm
*SWT 50 ms 1.910057692 GHz

Ref 30 dBm

*Att 45 dB

1.910057692 GHz

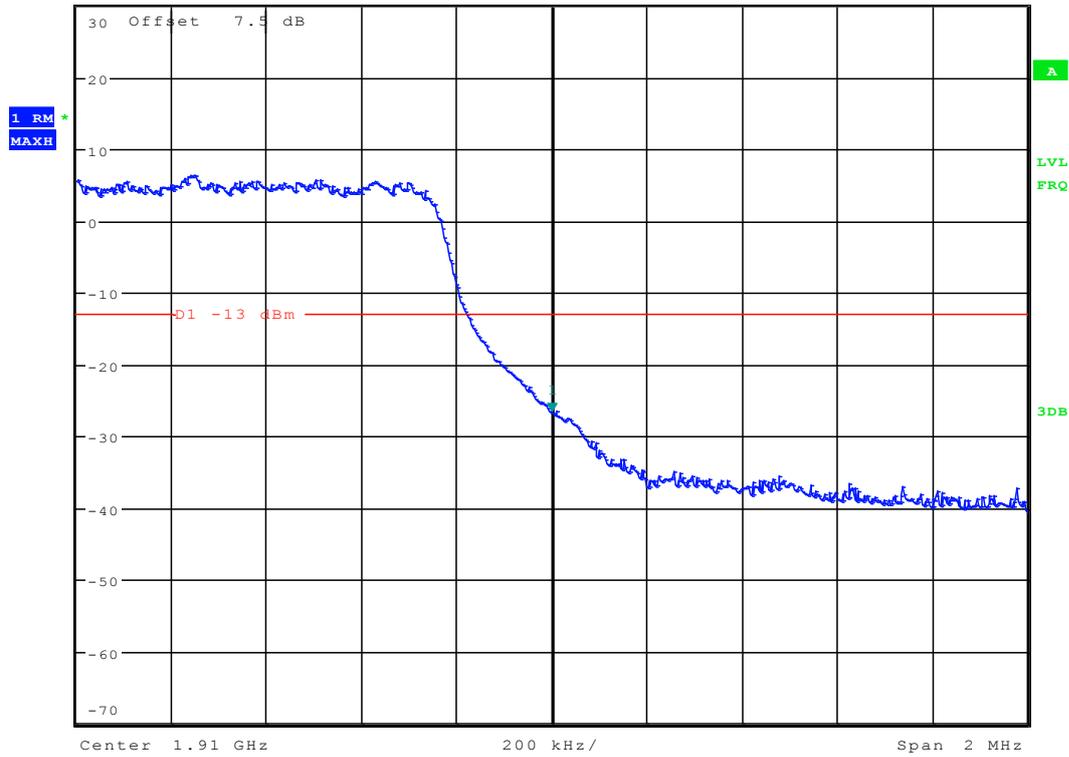




QPSK/partial RBs/RB #max



Ref 30 dBm * Att 45 dB * RBW 50 kHz Marker 1 [T1]
* VBW 200 kHz -26.55 dBm
* SWT 50 ms 1.910000000 GHz

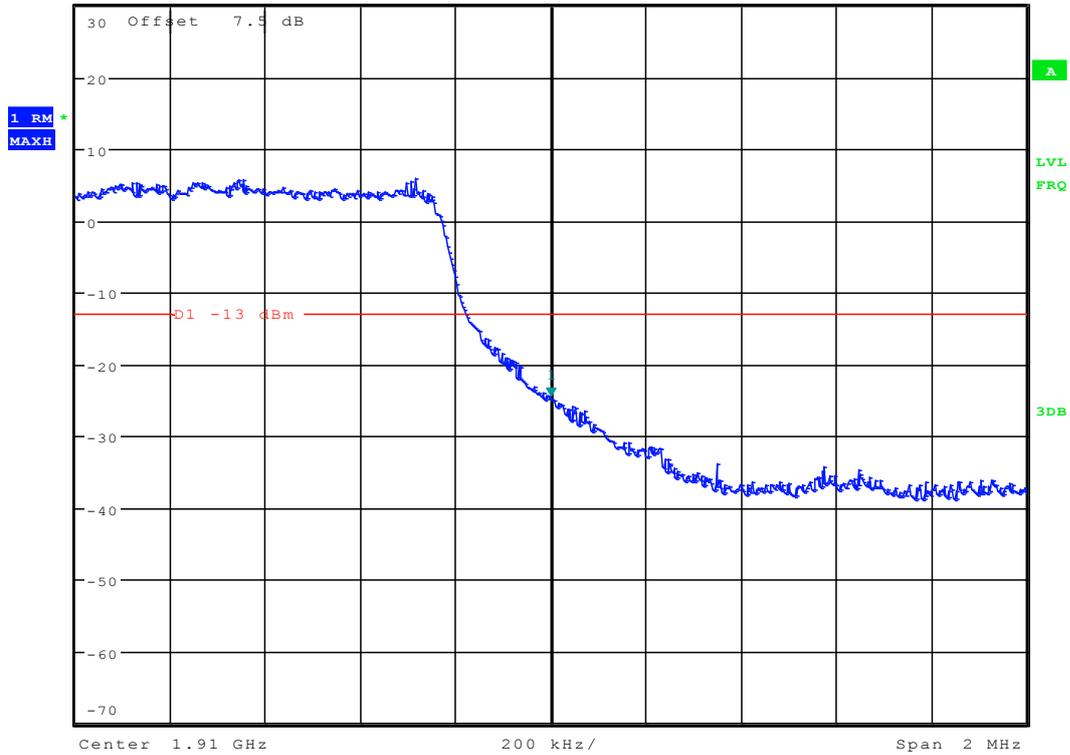




QPSK/ full RBs

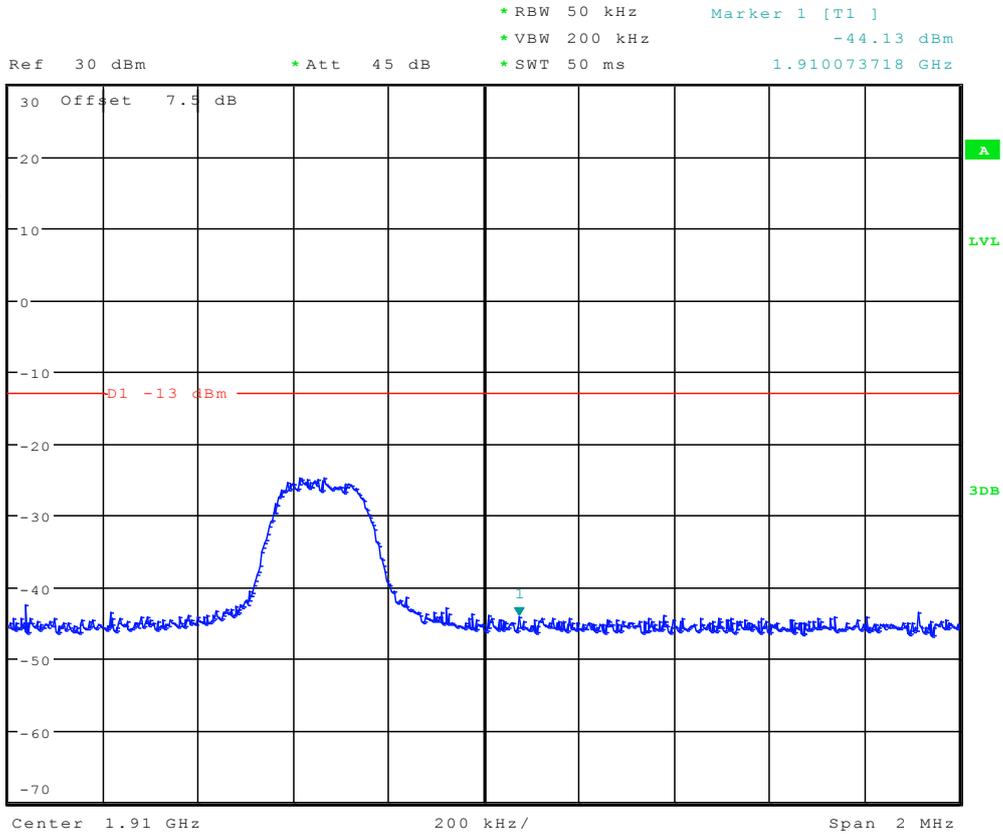


Ref 30 dBm * Att 45 dB * RBW 50 kHz Marker 1 [T1] -24.51 dBm
* VBW 200 kHz * SWT 50 ms 1.910000000 GHz





16QAM/1RB #0





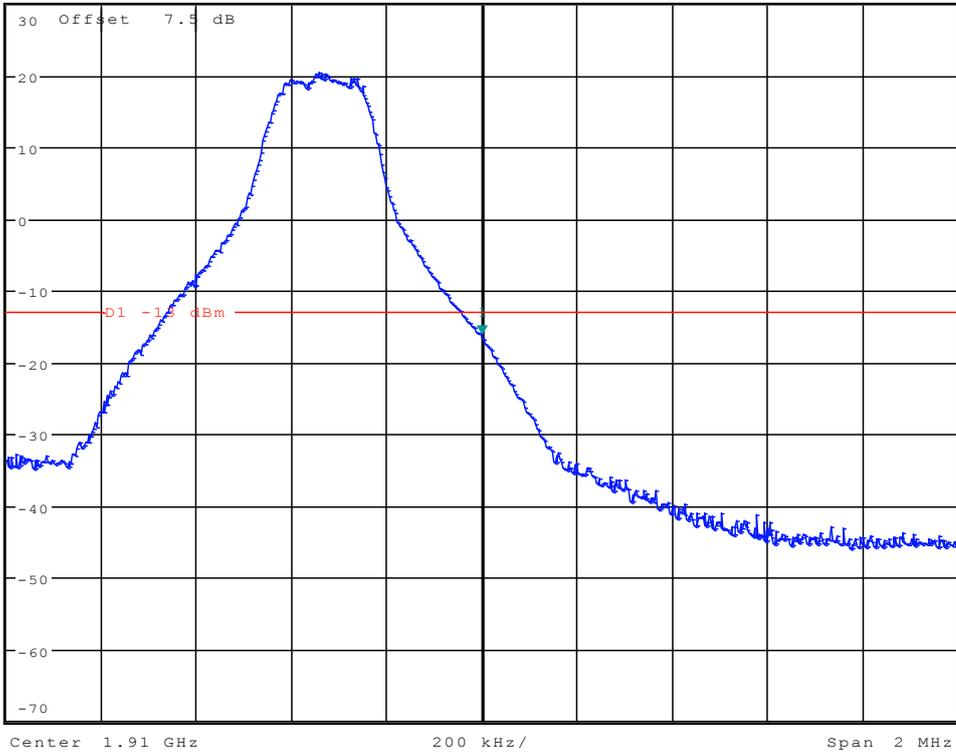
16QAM /1RB #max



*RBW 50 kHz Marker 1 [T1]
*VBW 200 kHz -16.05 dBm
*SWT 50 ms 1.910000000 GHz

Ref 30 dBm

*Att 45 dB





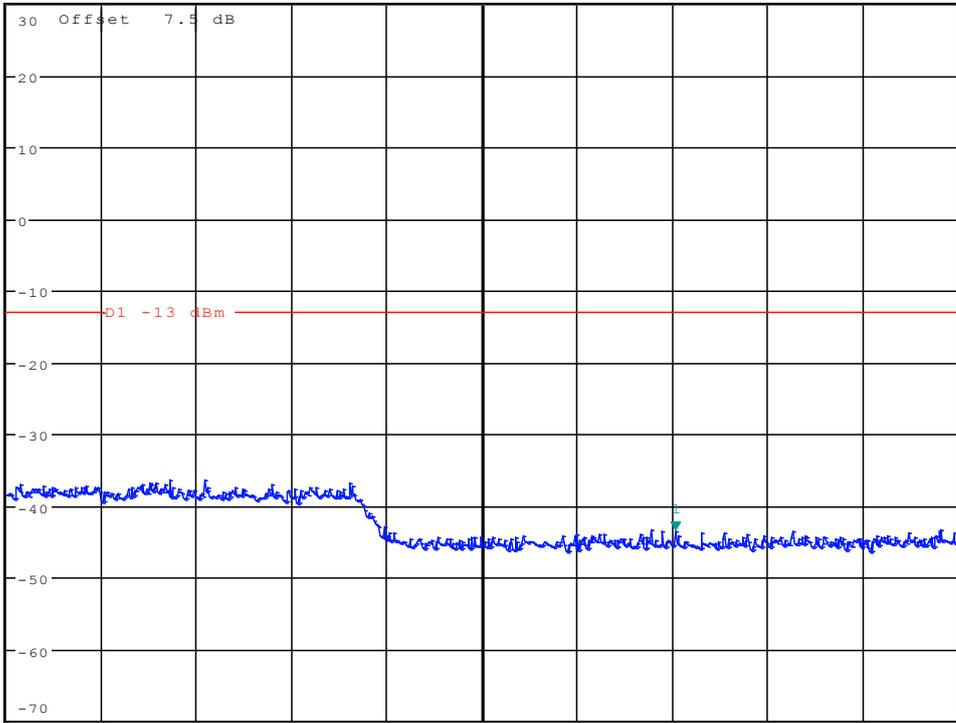
16QAM /partial RBs/RB #0



*RBW 50 kHz Marker 1 [T1]
*VBW 200 kHz -43.47 dBm
*SWT 50 ms 1.910407051 GHz

Ref 30 dBm

*Att 45 dB

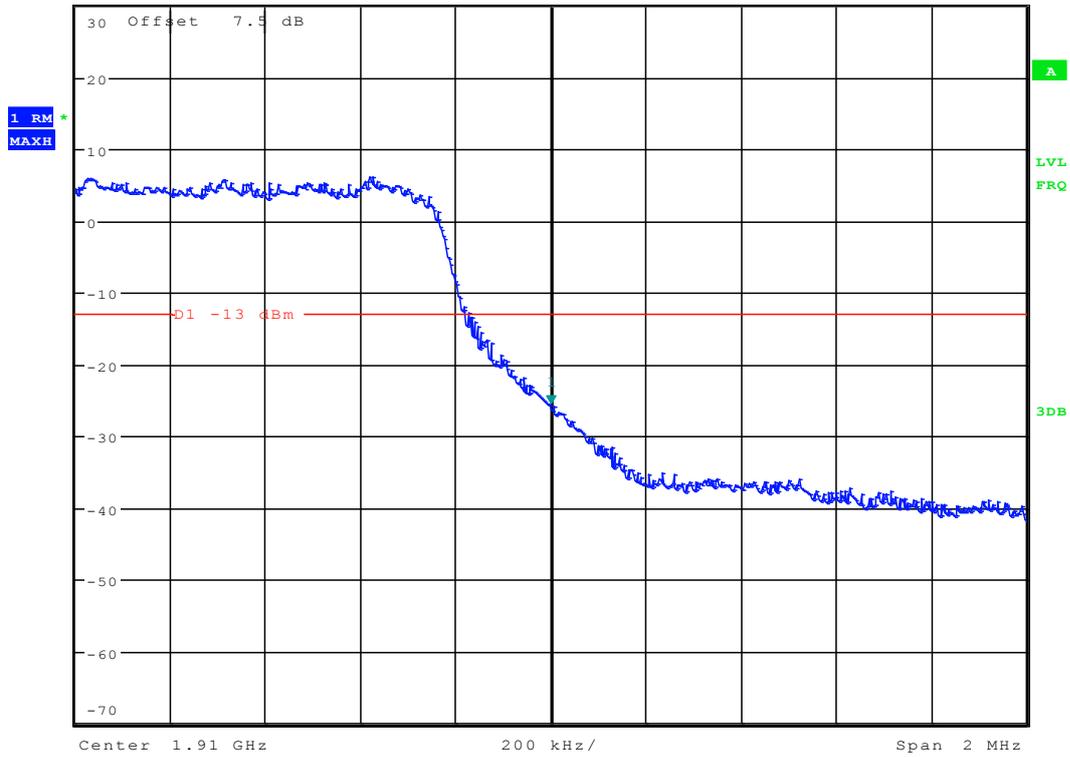




16QAM /partial RBs/RB #max



Ref 30 dBm * Att 45 dB * RBW 50 kHz Marker 1 [T1]
* VBW 200 kHz -25.64 dBm
* SWT 50 ms 1.910000000 GHz

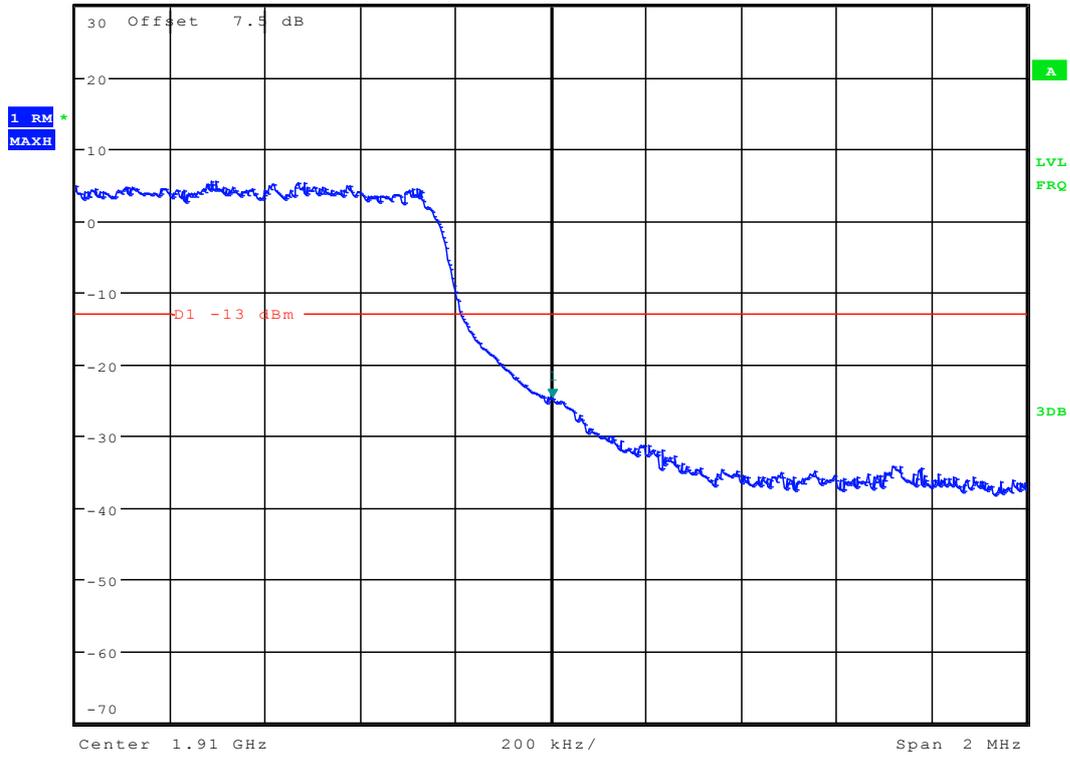




16QAM/full RBs



Ref 30 dBm * Att 45 dB * RBW 50 kHz Marker 1 [T1]
* VBW 200 kHz -24.78 dBm
* SWT 50 ms 1.910003205 GHz



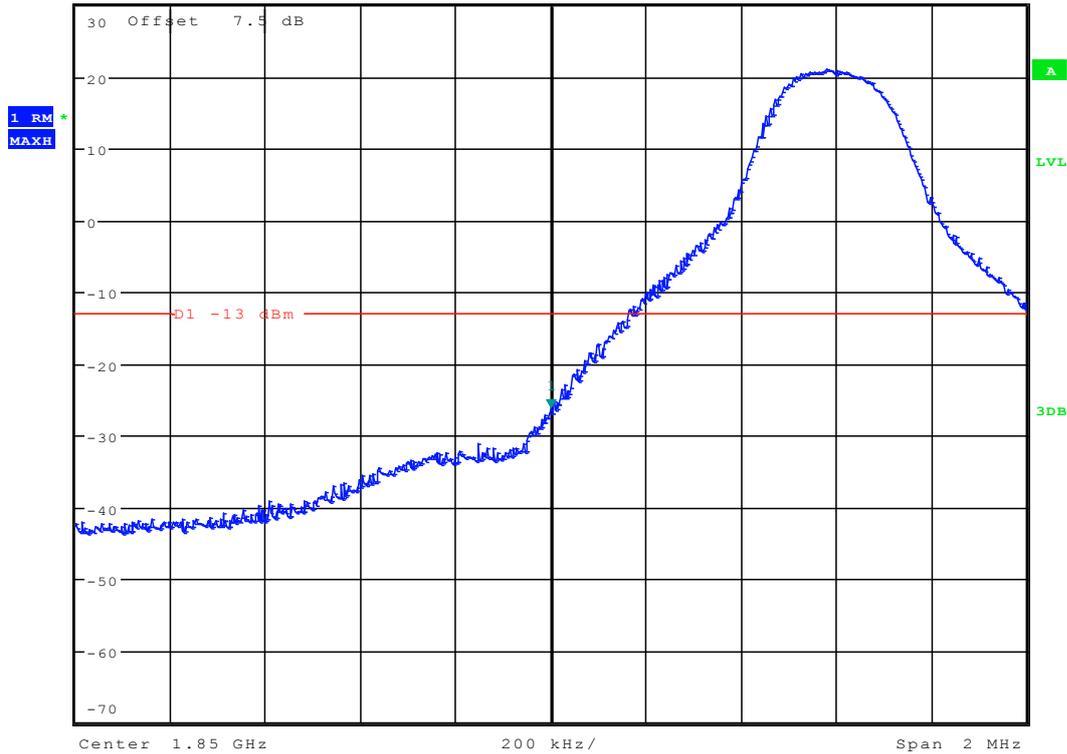


Left Edge 10MHz(BW) Channel 18650

QPSK/1RB #0



Ref 30 dBm * Att 45 dB * RBW 100 kHz Marker 1 [T1] -26.20 dBm
* VBW 300 kHz 1.850000000 GHz
* SWT 50 ms

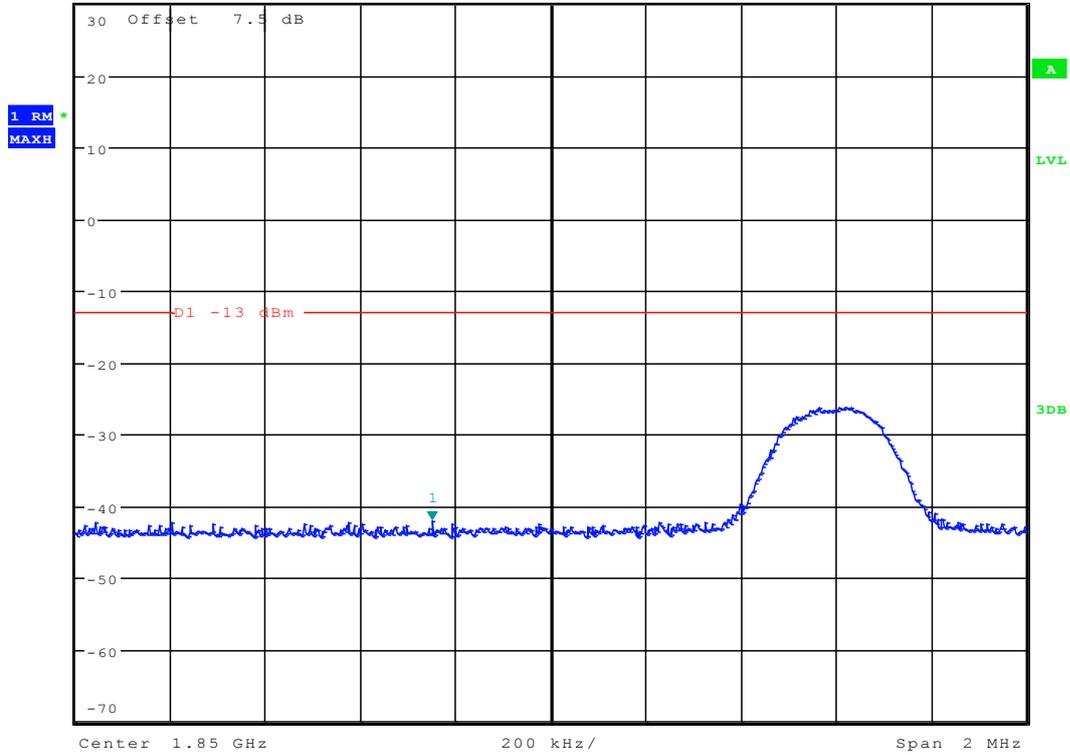




QPSK /1RB #max

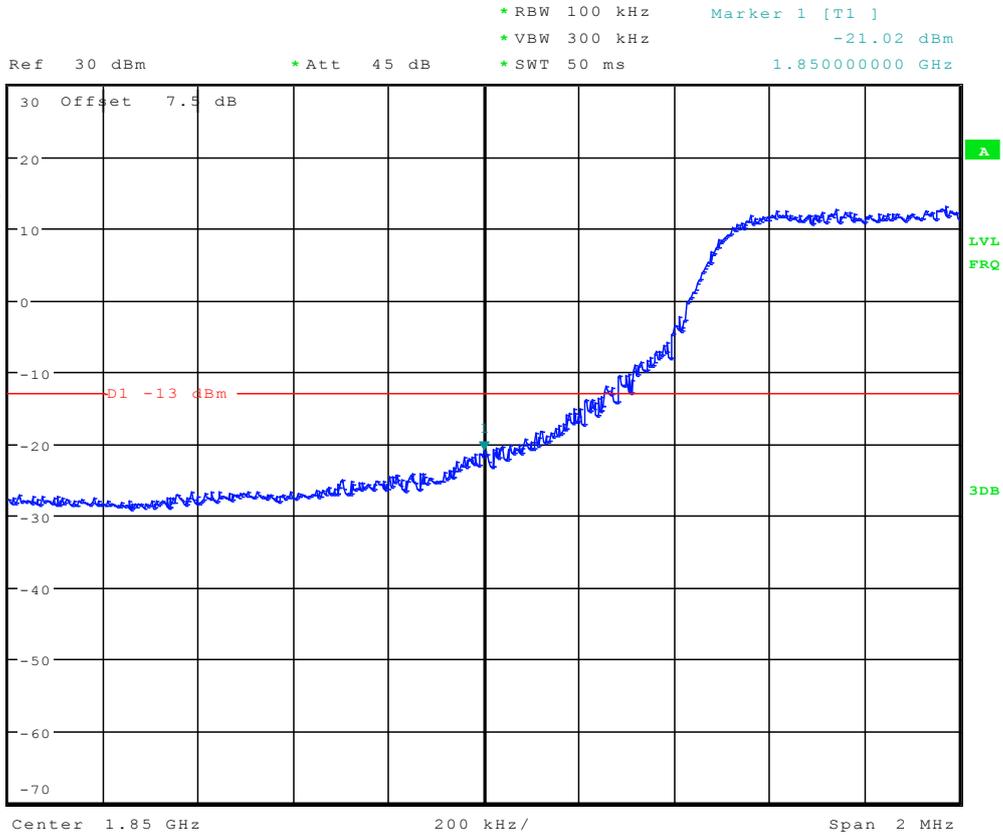


Ref 30 dBm * Att 45 dB * RBW 100 kHz Marker 1 [T1]
* VBW 300 kHz -42.03 dBm
* SWT 50 ms 1.849750000 GHz





QPSK/partial RBs/RB #0





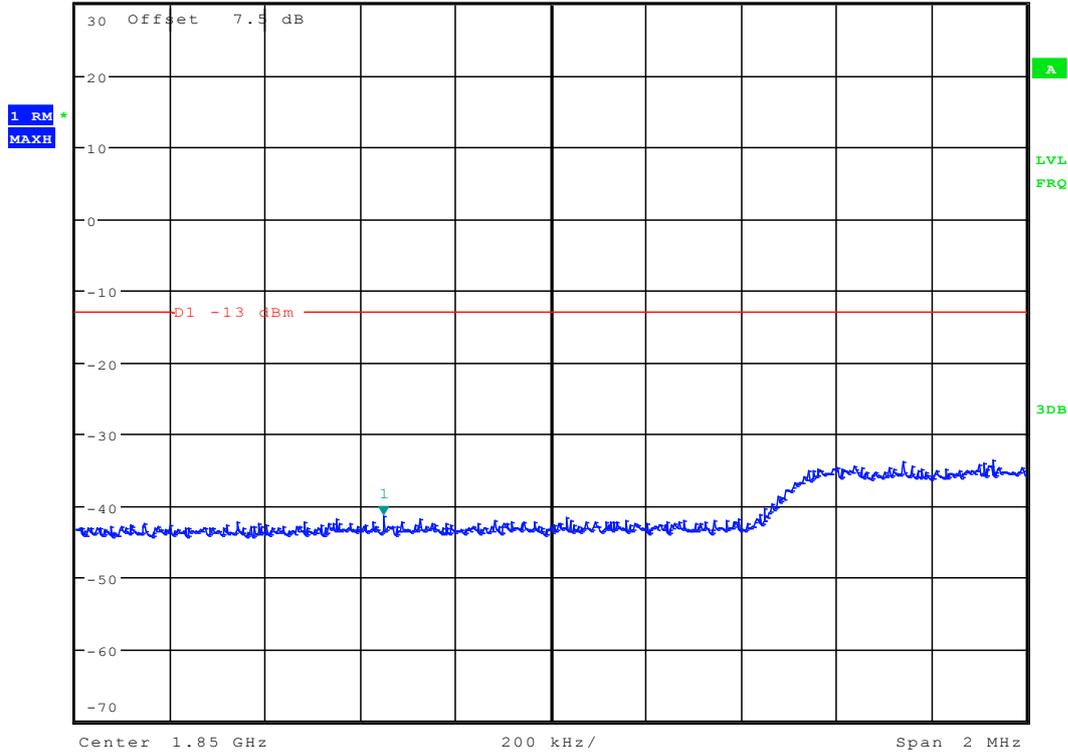
QPSK/partial RBs/RB #max



* RBW 100 kHz Marker 1 [T1]
* VBW 300 kHz -41.32 dBm
* SWT 50 ms 1.849647436 GHz

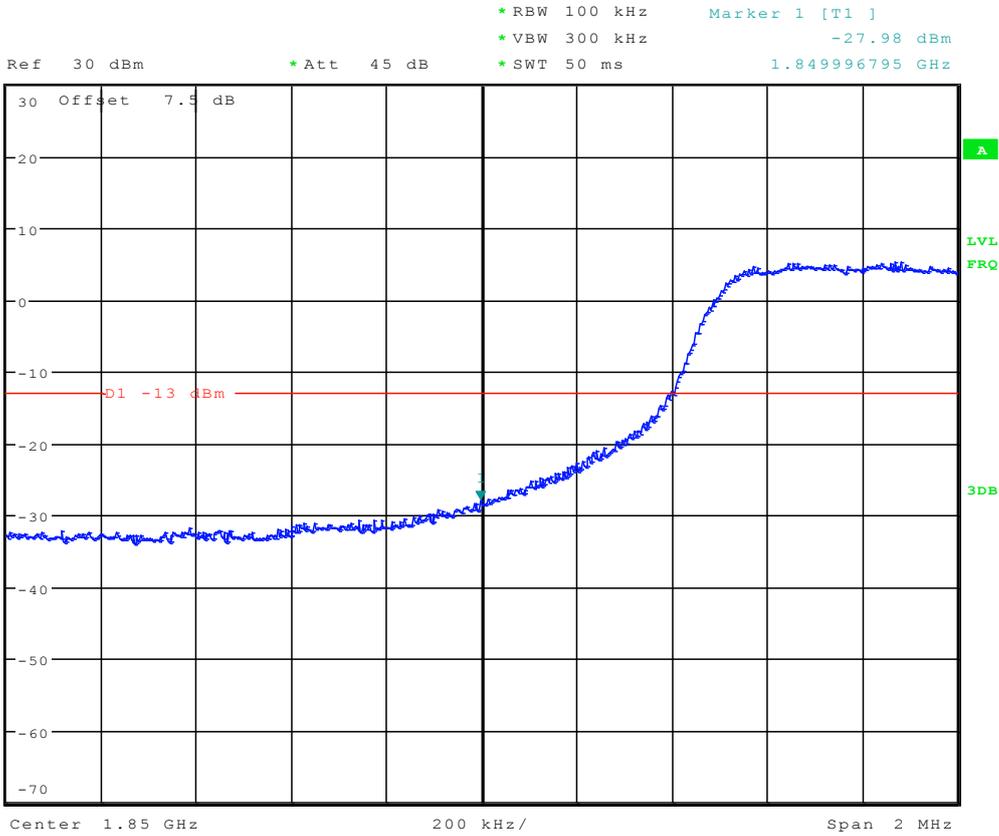
Ref 30 dBm

* Att 45 dB



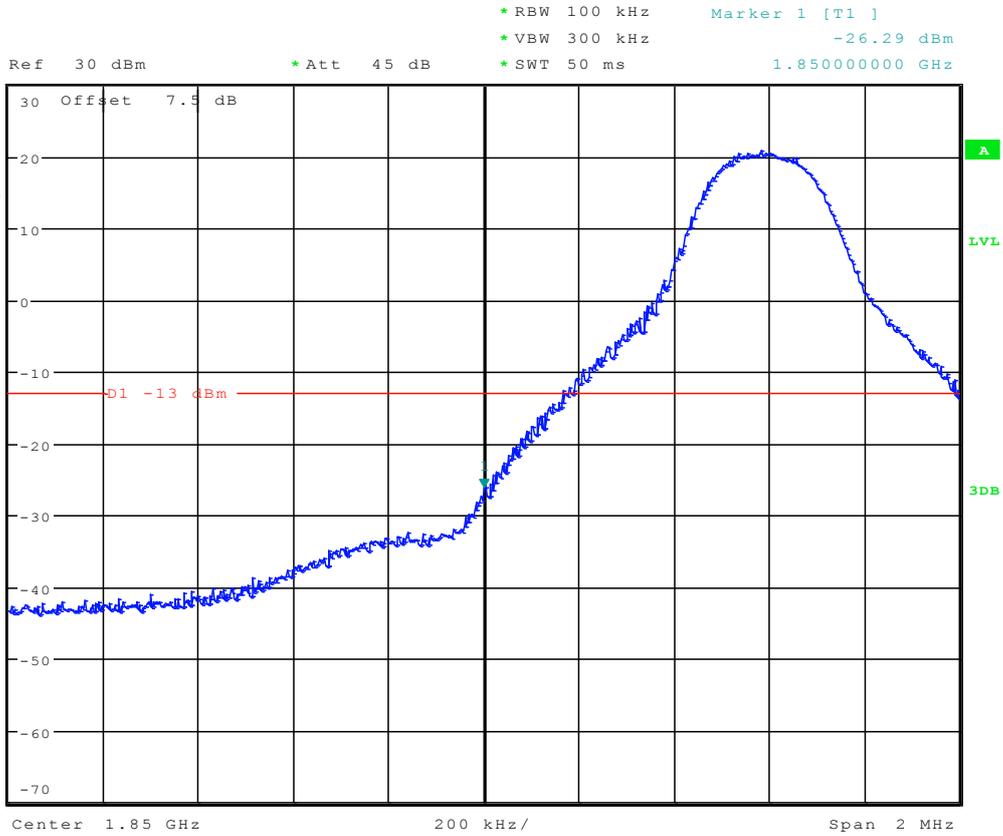


QPSK/ full RBs



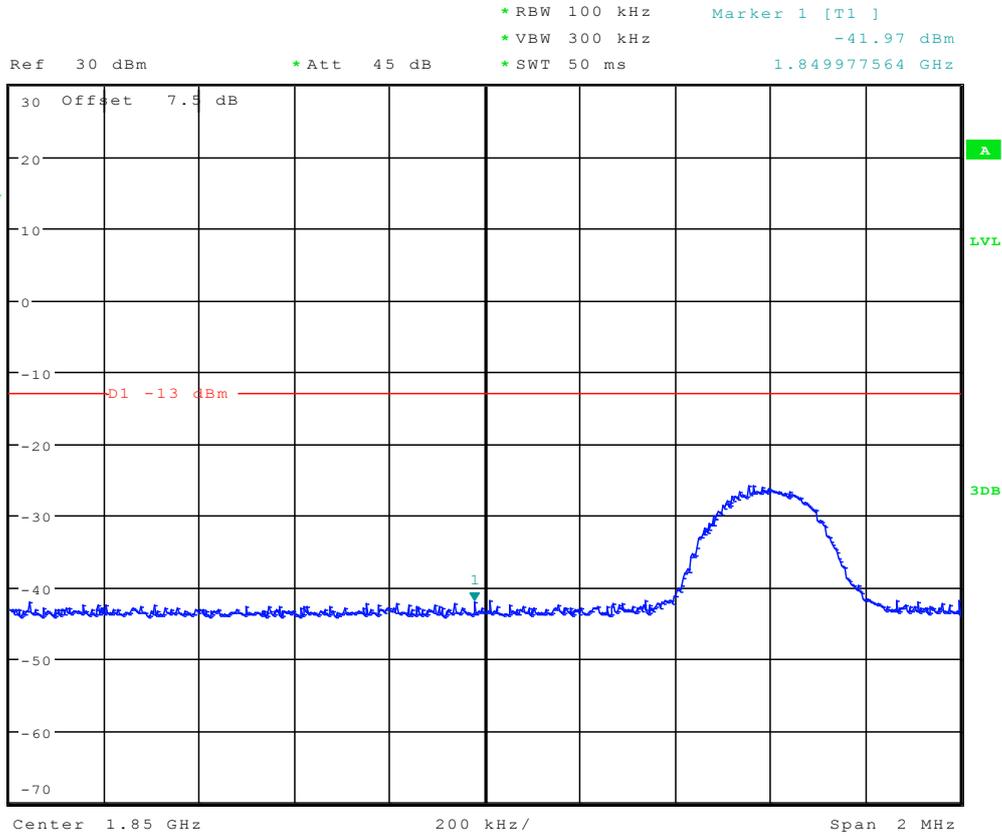


16QAM/1RB #0



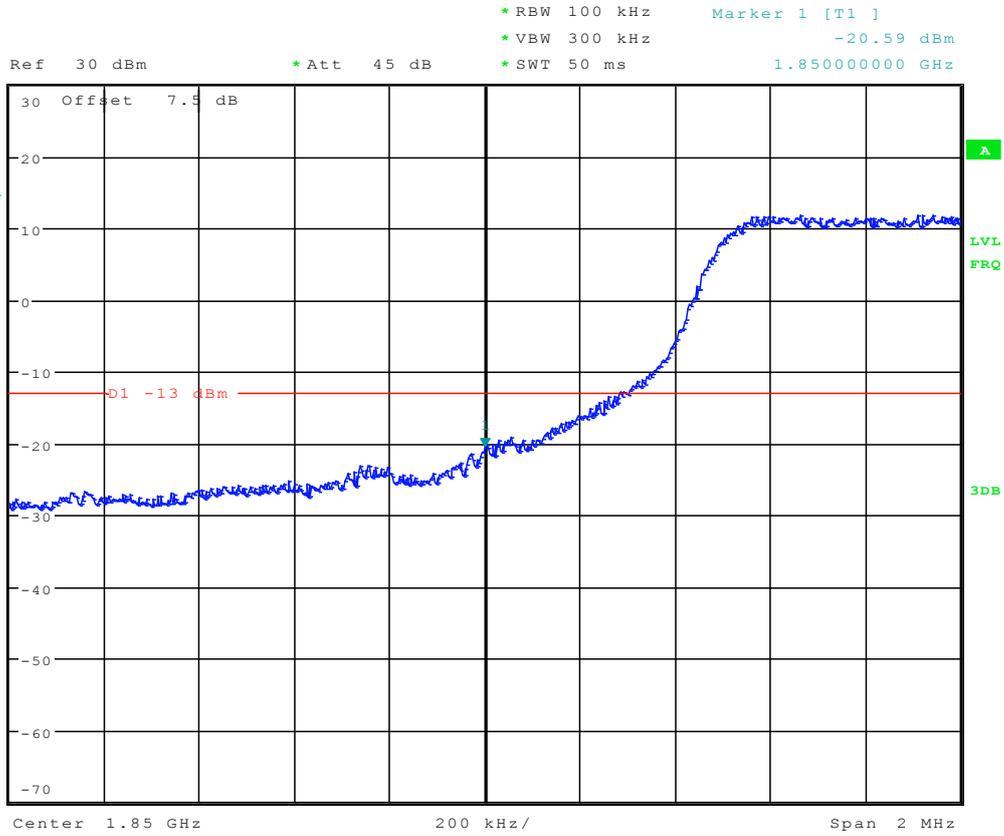


16QAM /1RB #max





16QAM /partial RBs/RB #0





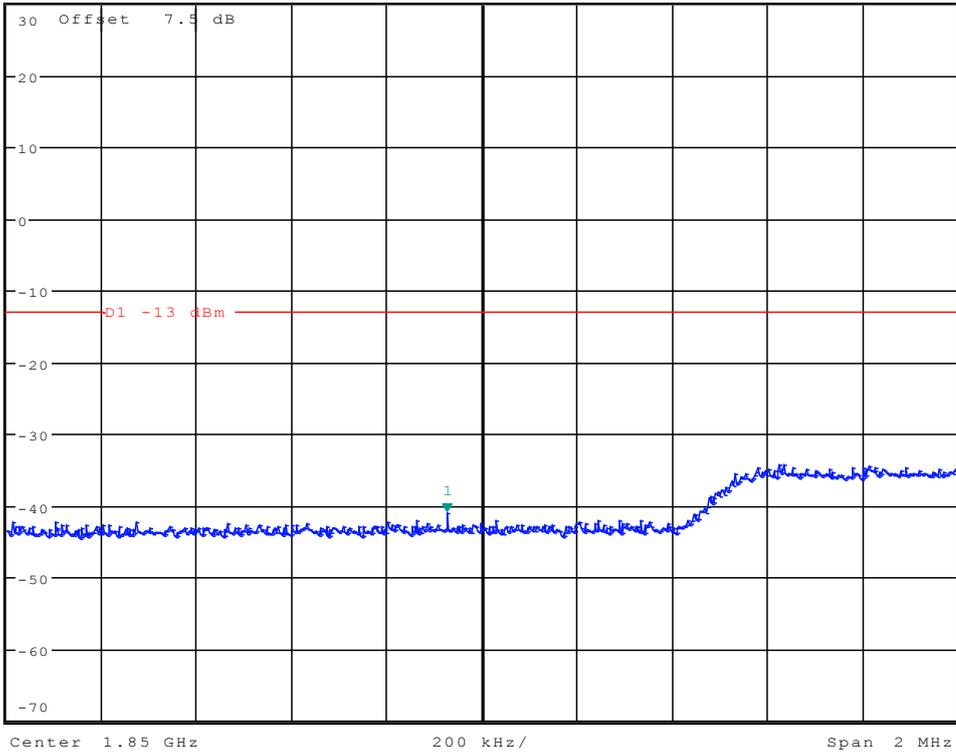
16QAM /partial RBs/RB #max



* RBW 100 kHz Marker 1 [T1]
* VBW 300 kHz -40.89 dBm
* SWT 50 ms 1.849926282 GHz

Ref 30 dBm

* Att 45 dB

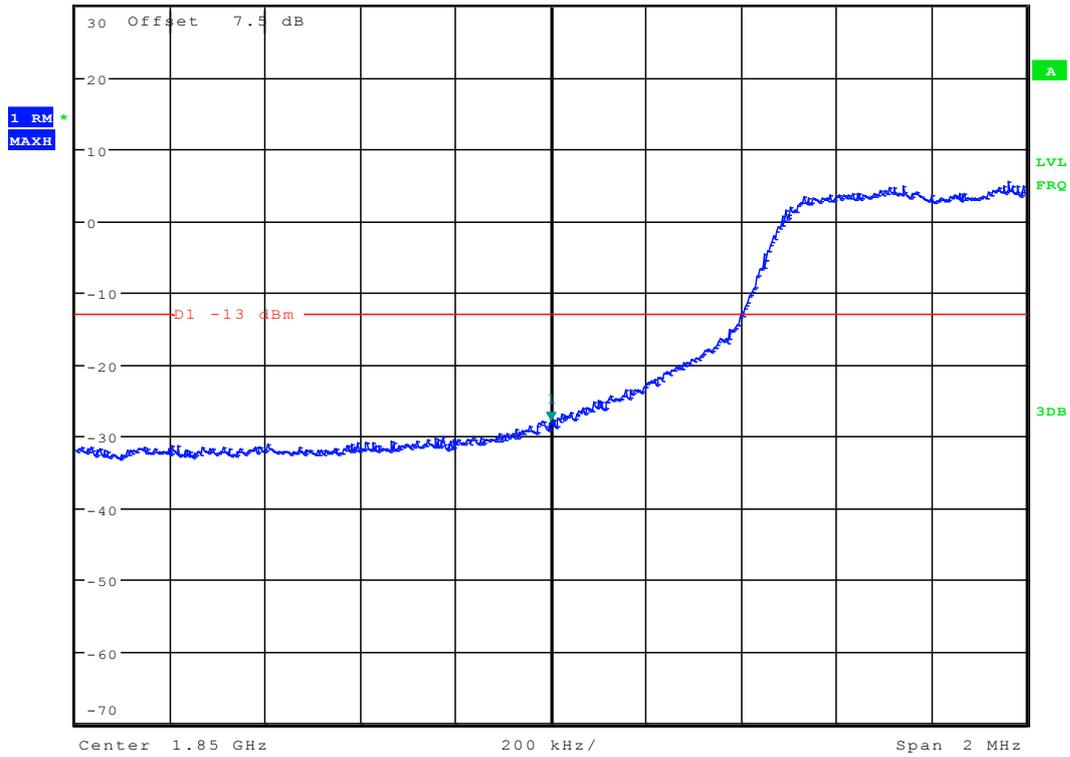




16QAM/full RBs



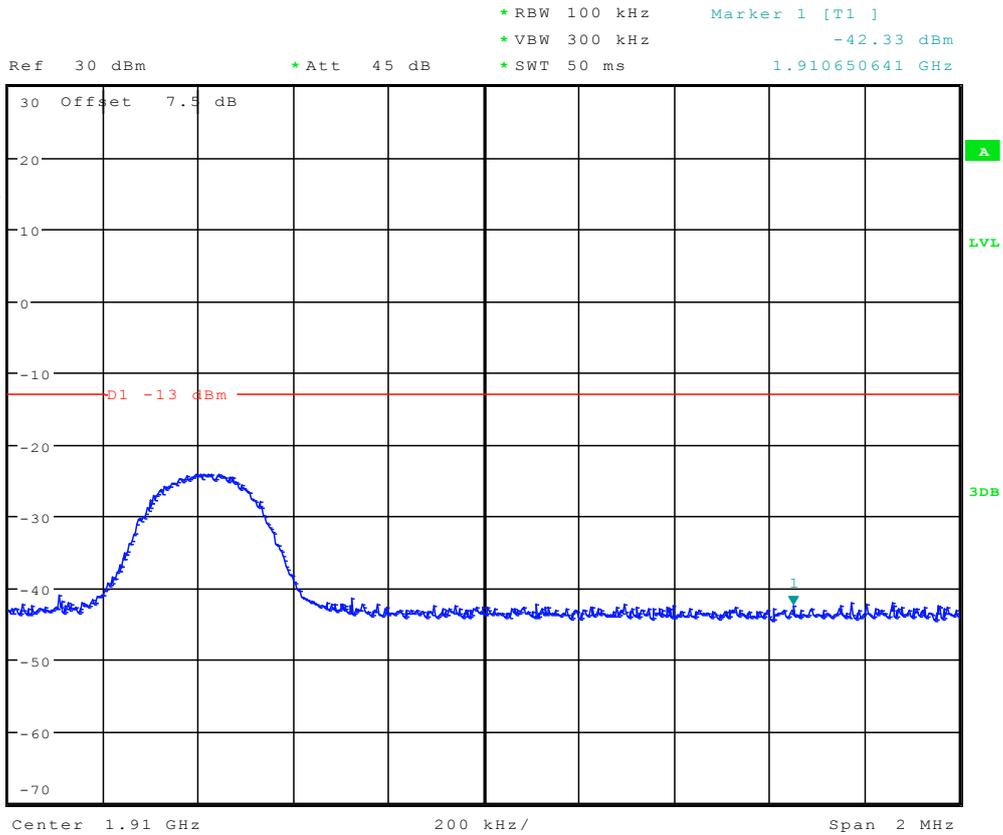
Ref 30 dBm * Att 45 dB * RBW 100 kHz Marker 1 [T1]
* VBW 300 kHz -27.85 dBm
* SWT 50 ms 1.850000000 GHz





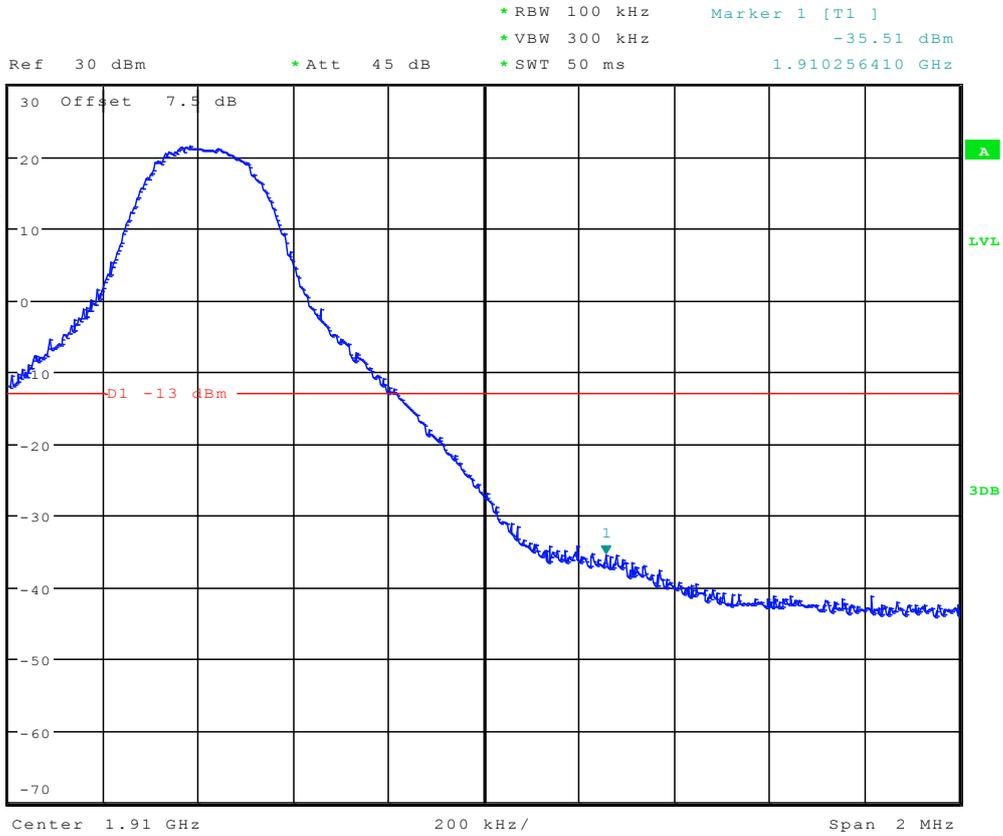
Right Edge 10MHz(BW) Channel 19150

QPSK/1RB #0





QPSK /1RB #max





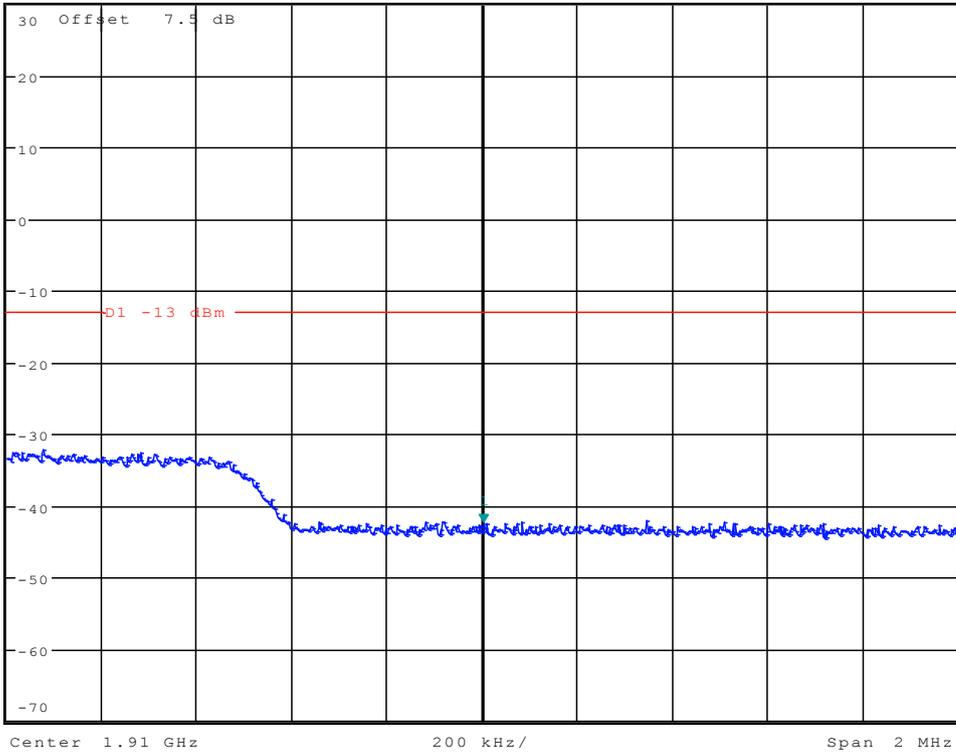
QPSK/partial RBs/RB #0



*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz -42.37 dBm
*SWT 50 ms 1.910003205 GHz

Ref 30 dBm

*Att 45 dB

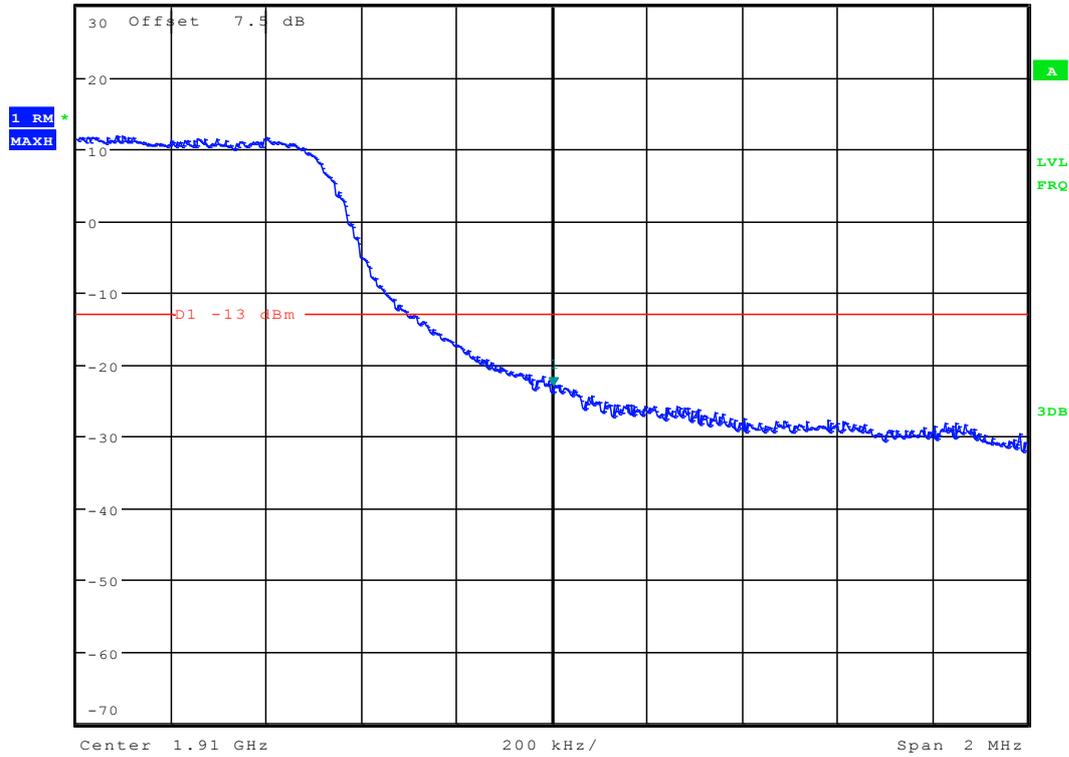




QPSK/partial RBs/RB #max



Ref 30 dBm * Att 45 dB * RBW 100 kHz Marker 1 [T1]
* VBW 300 kHz -23.05 dBm
* SWT 50 ms 1.910003205 GHz

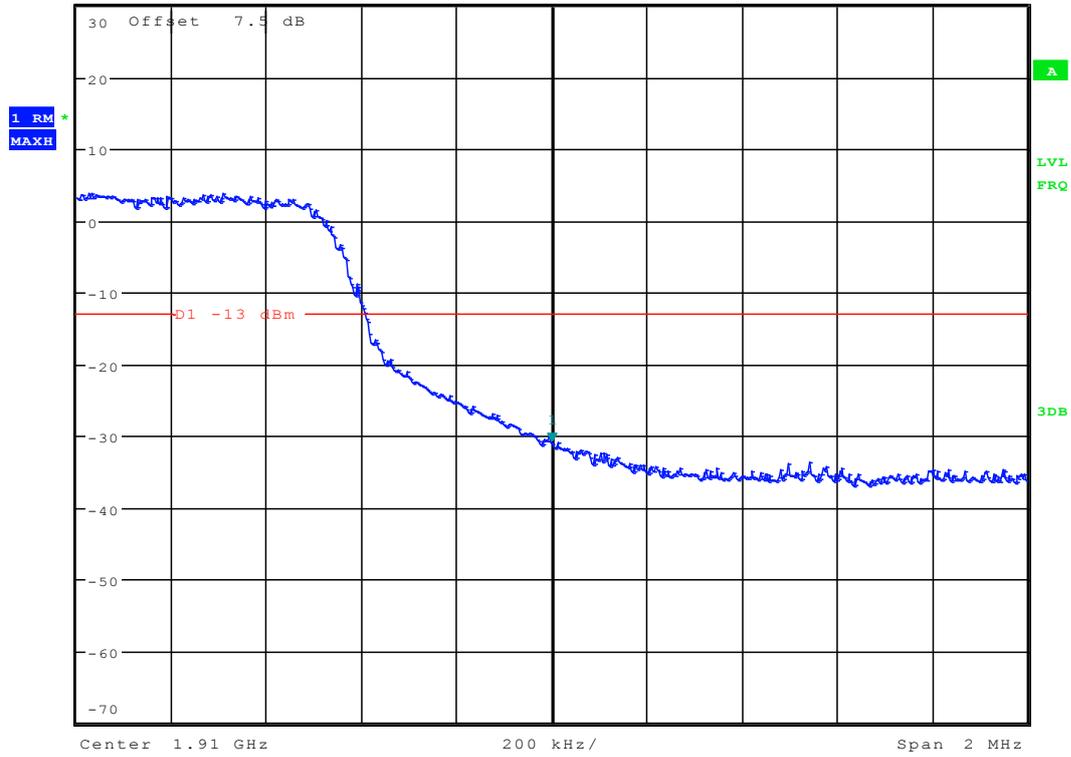




QPSK/ full RBs



Ref 30 dBm * Att 45 dB * RBW 100 kHz Marker 1 [T1]
* VBW 300 kHz -30.83 dBm
* SWT 50 ms 1.910000000 GHz



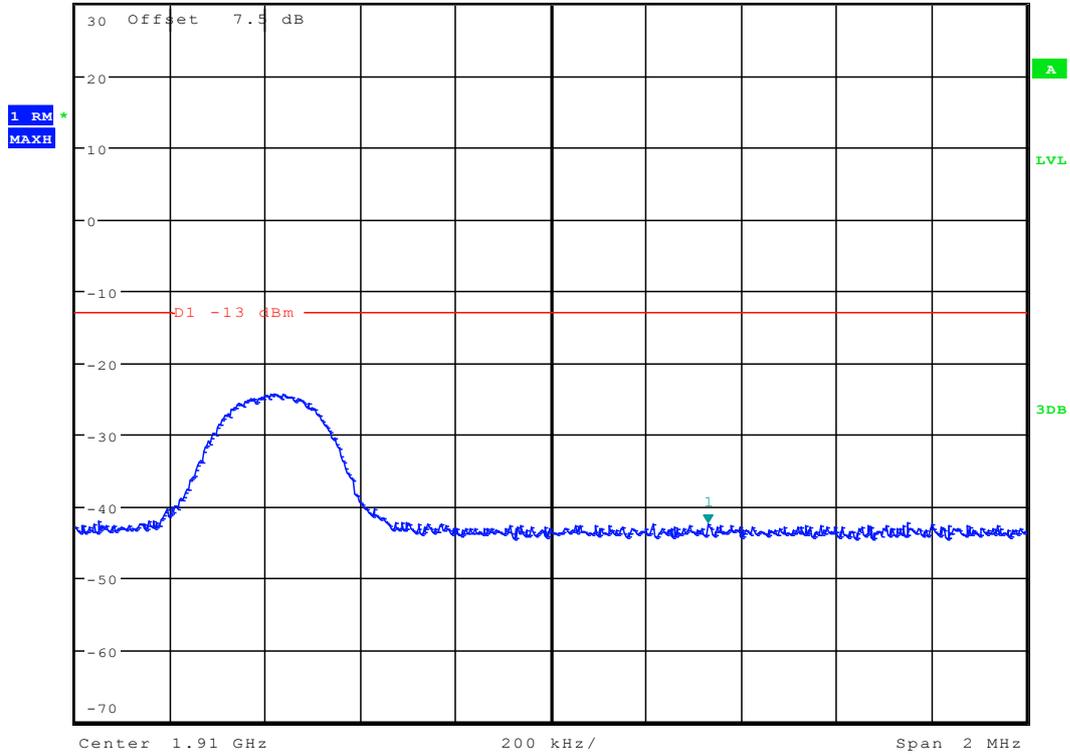


16QAM/1RB #0



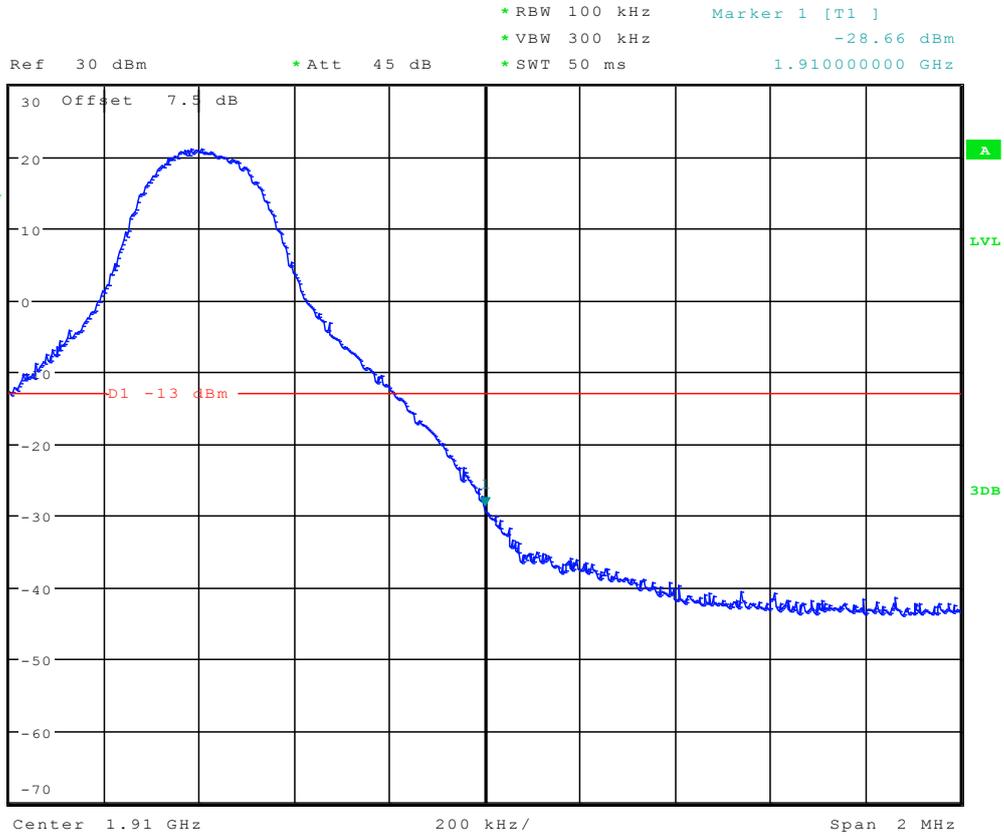
*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz -42.45 dBm
*SWT 50 ms 1.910330128 GHz

Ref 30 dBm *Att 45 dB





16QAM /1RB #max





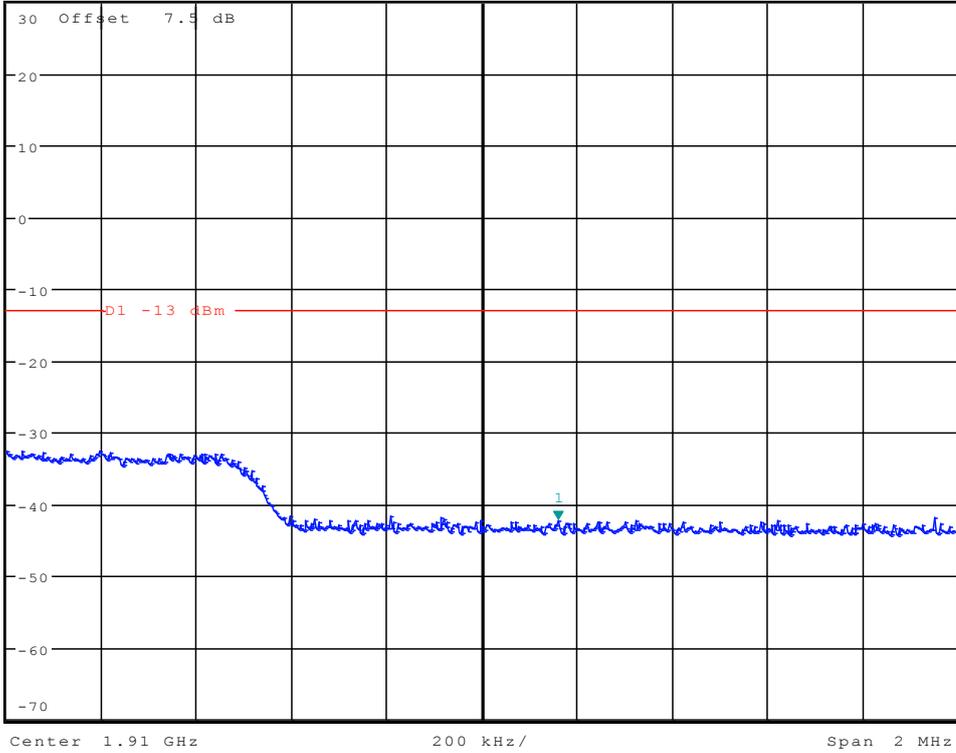
16QAM /partial RBs/RB #0



*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz -42.15 dBm
*SWT 50 ms 1.910160256 GHz

Ref 30 dBm

*Att 45 dB

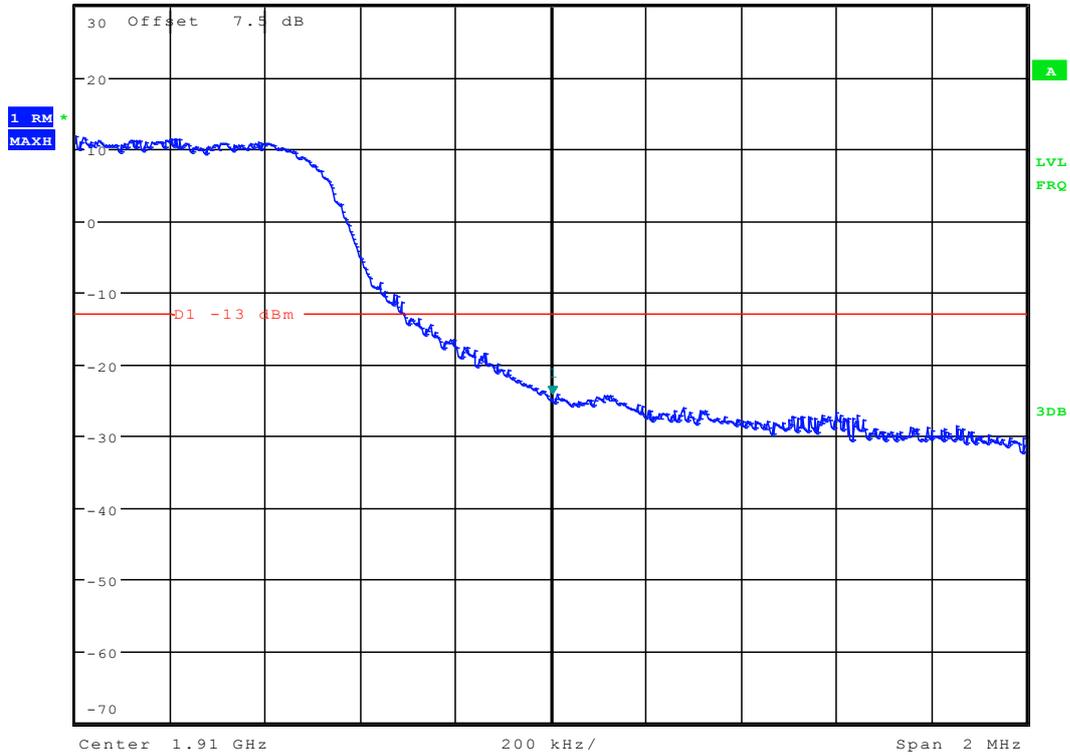




16QAM /partial RBs/RB #max



Ref 30 dBm * Att 45 dB * RBW 100 kHz Marker 1 [T1]
* VBW 300 kHz -24.27 dBm
* SWT 50 ms 1.910003205 GHz

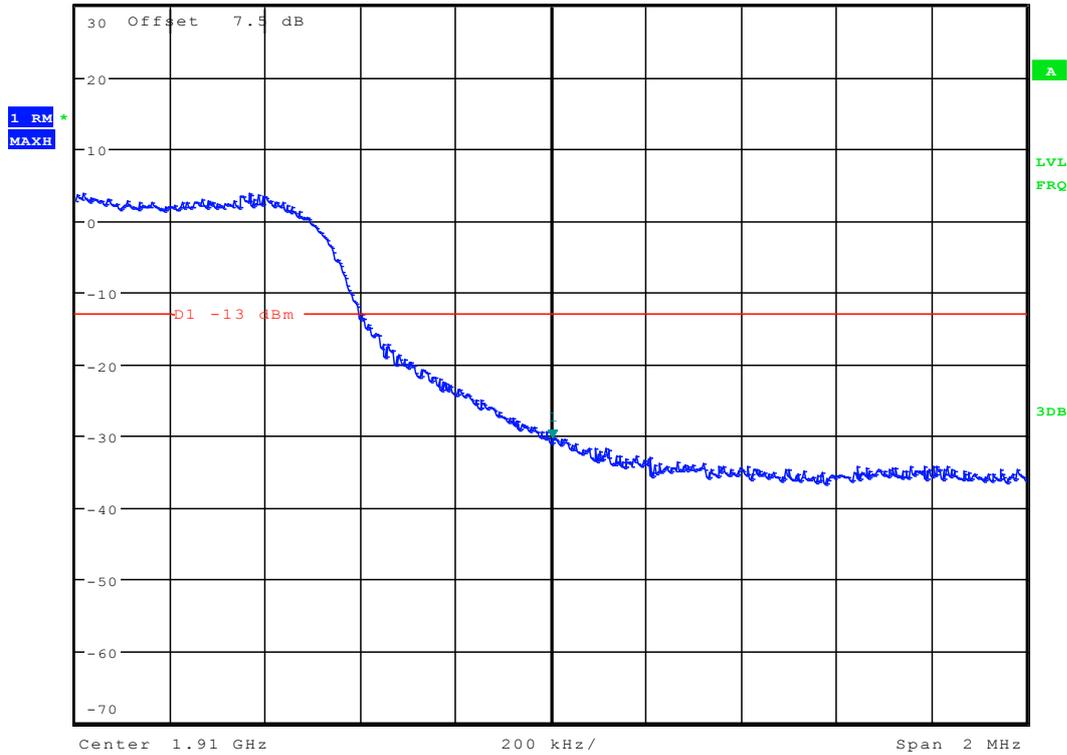




16QAM/full RBs



Ref 30 dBm * Att 45 dB * RBW 100 kHz Marker 1 [T1]
* VBW 300 kHz -30.42 dBm
* SWT 50 ms 1.910003205 GHz





Appendix E

Spurious Emission at Antenna Terminal

According to FCC Part 2.1051 & 24.238



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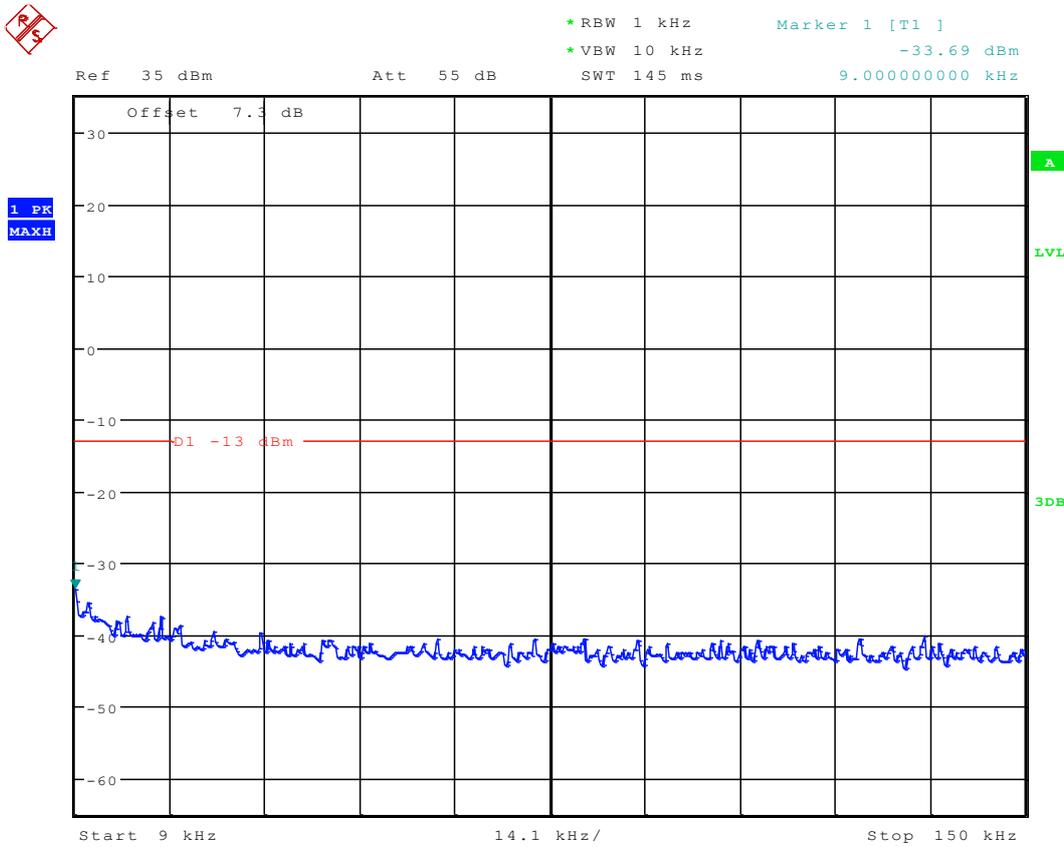
NOTE1: QPSK output power higher than 16QAM, so only test the QPSK mode.
NOTE2: All relevant operation modes have been tested, and the worst case data (1RB&full RB) is included in this report.

1 For Band 2 (TM1)

1.1 Channel Bandwidth = Lowest (1.4 MHz)

1.1.1 Channel = B

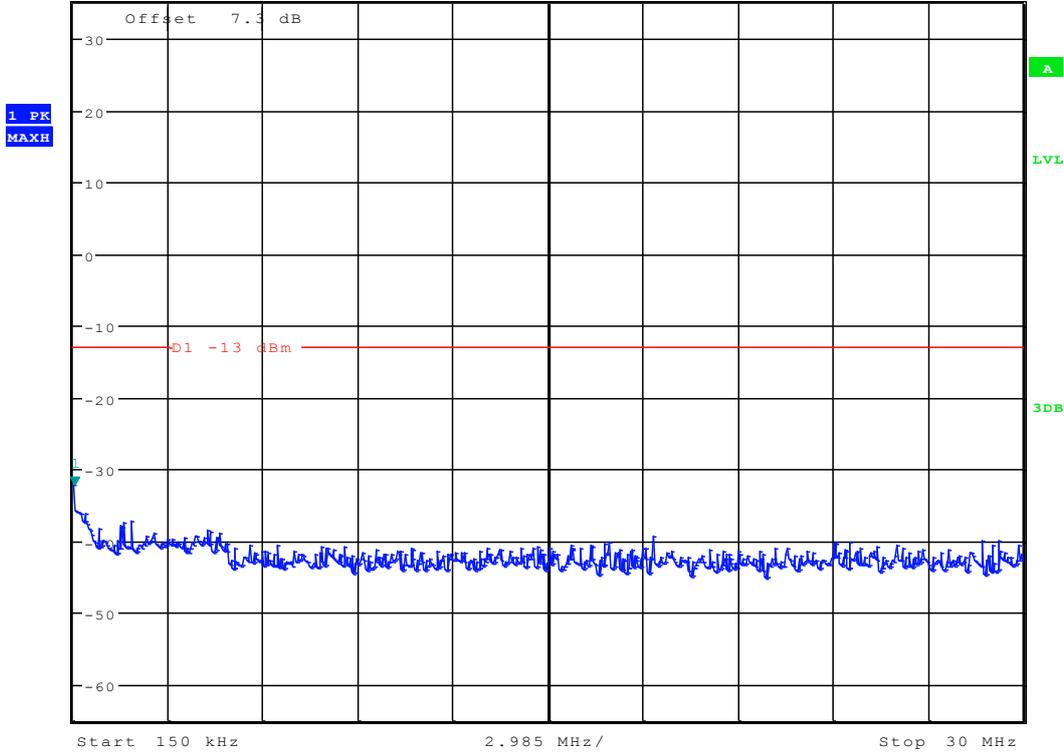
1.1.1.1 QPSK/1RBs /RB #0



Date: 18.NOV.2011 22:27:25



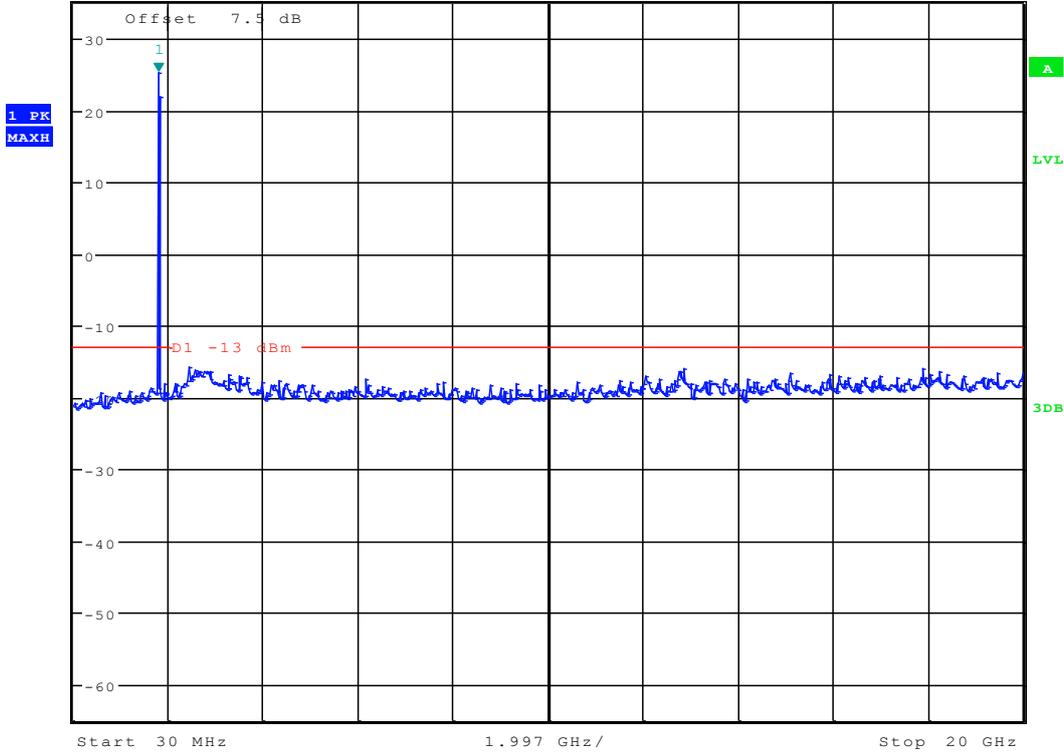
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -32.36 dBm
Ref 35 dBm Att 55 dB SWT 300 ms 197.836538462 kHz



Date: 18.NOV.2011 23:23:37



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 25.22 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.822179487 GHz



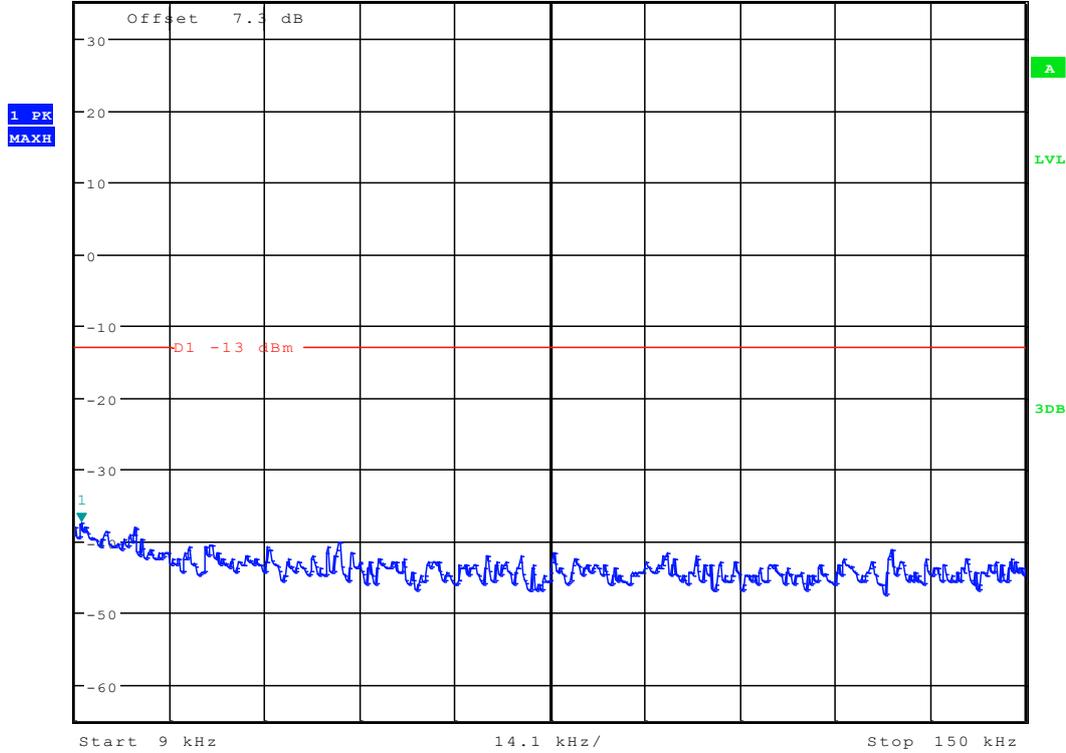
Date: 18.NOV.2011 23:24:56



1.1.1.2 QPSK/1RBs /RB #max



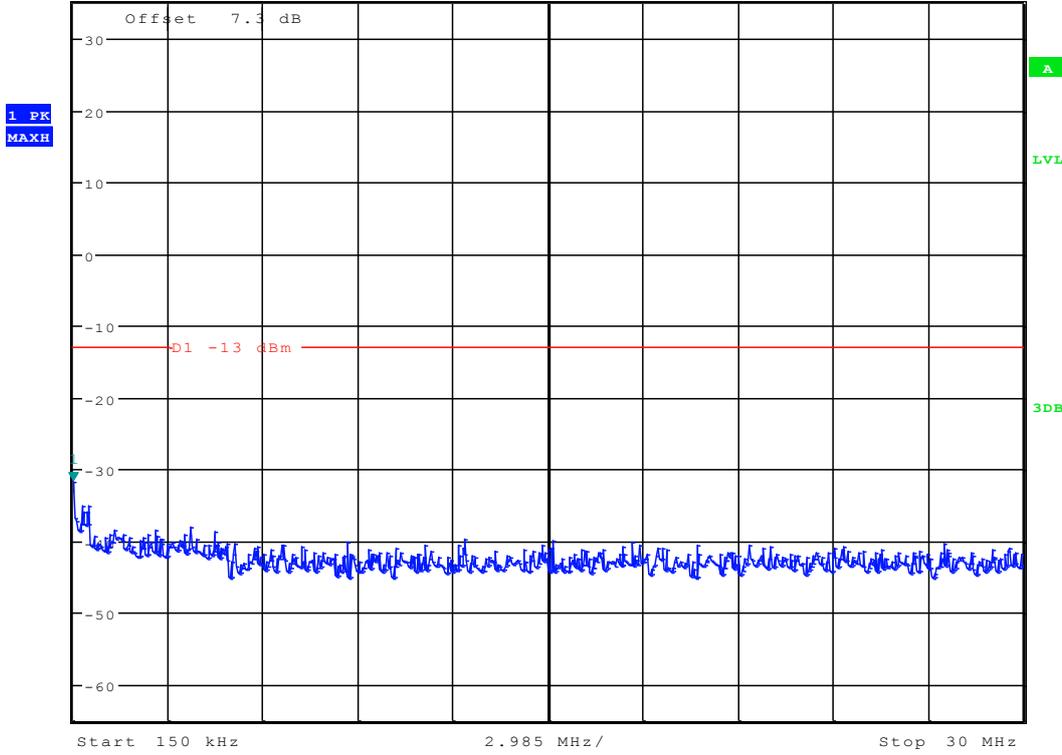
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -37.47 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 9.9038846154 kHz



Date: 18.NOV.2011 22:27:47



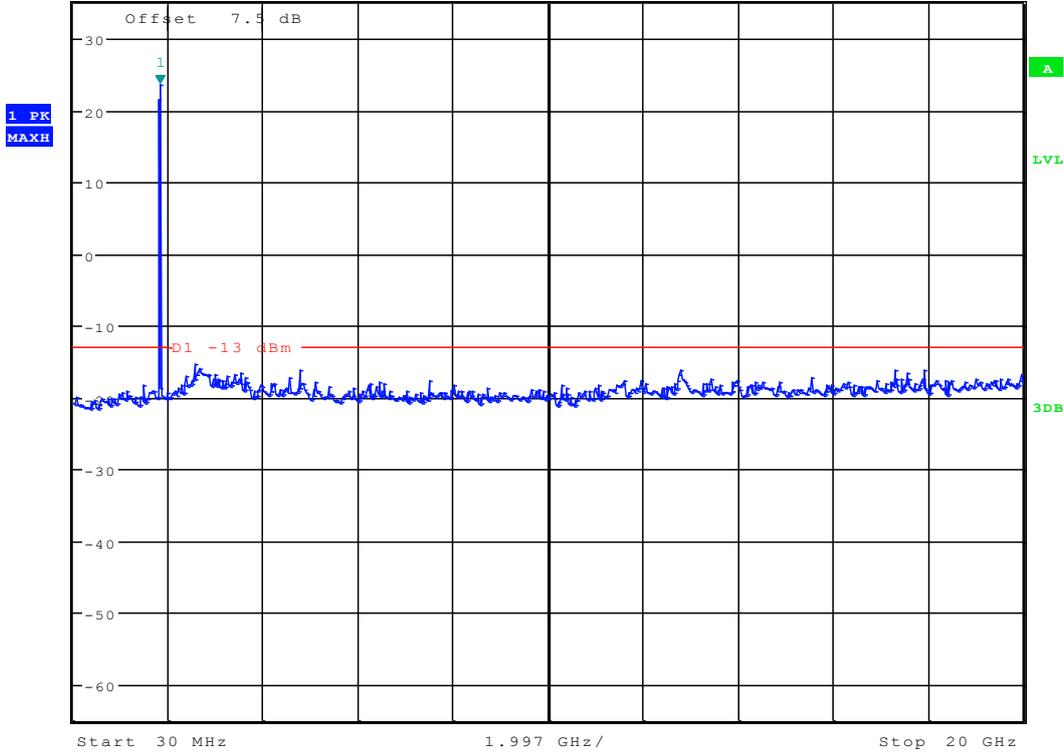
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -31.71 dBm
Ref 35 dBm Att 55 dB SWT 300 ms 150.00000000 kHz



Date: 18.NOV.2011 23:23:57



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 23.48 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.854182692 GHz



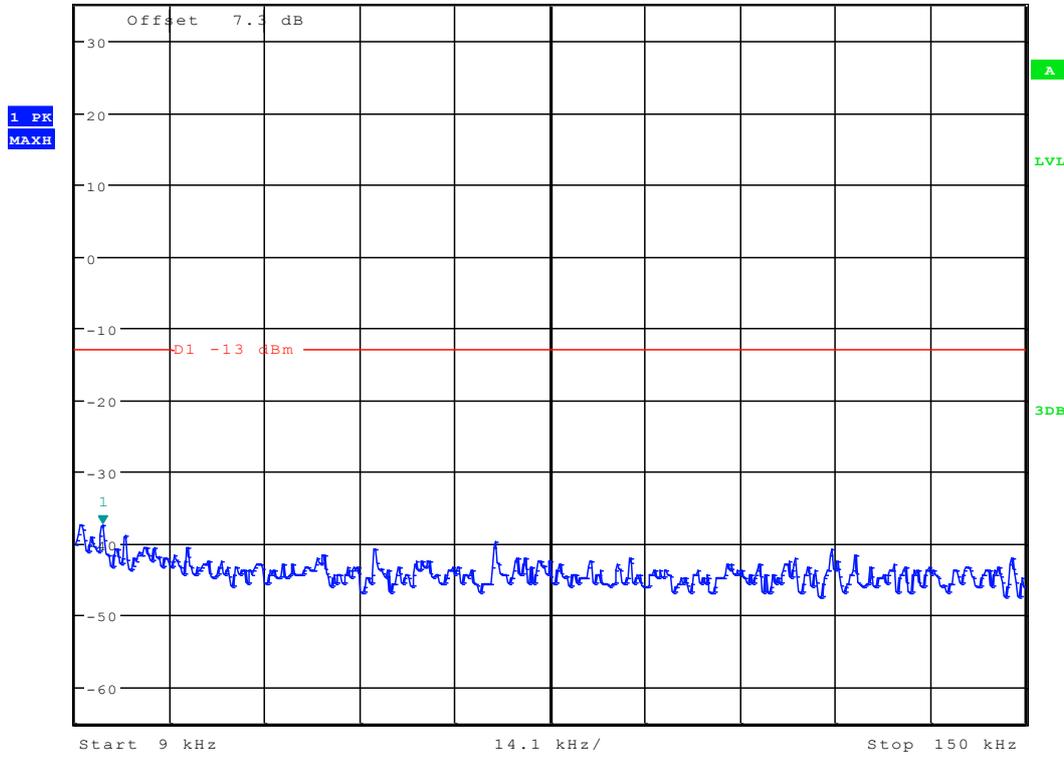
Date: 18.NOV.2011 23:25:22



1.1.1.3 QPSK/full RBs



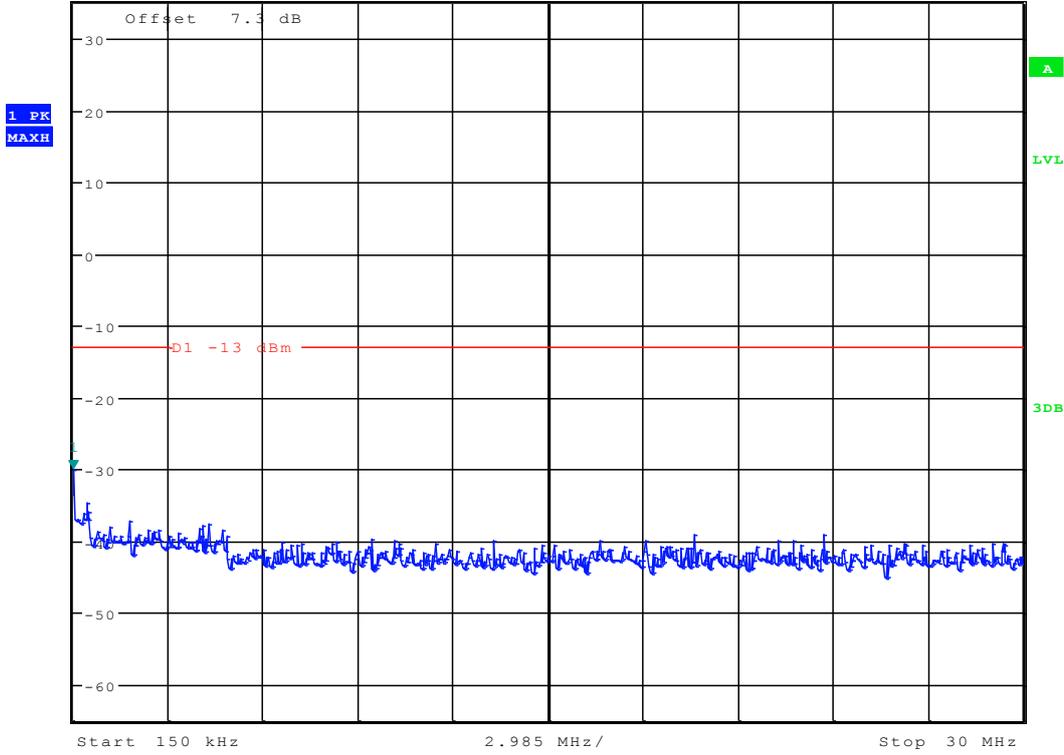
*RBW 1 kHz Marker 1 [T1]
 *VBW 10 kHz -37.27 dBm
 Ref 35 dBm Att 55 dB SWT 145 ms 13.067307692 kHz



Date: 18.NOV.2011 22:28:11



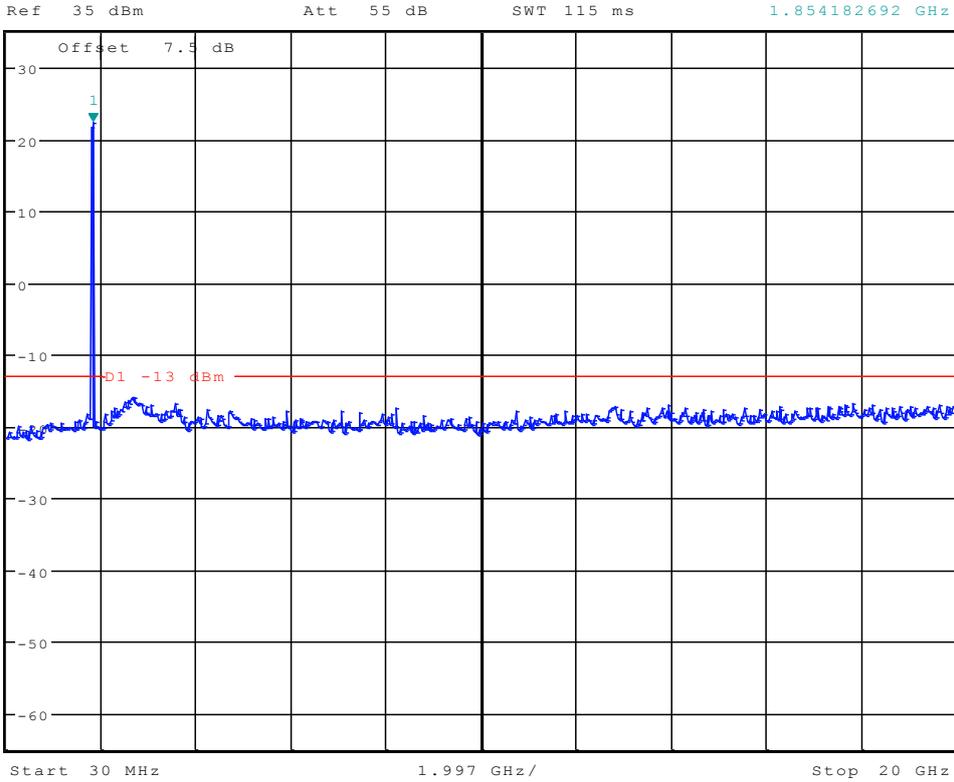
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -30.06 dBm
Ref 35 dBm Att 55 dB SWT 300 ms 150.00000000 kHz



Date: 18.NOV.2011 23:22:49



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 22.39 dBm
SWT 115 ms 1.854182692 GHz



Date: 18.NOV.2011 23:25:37

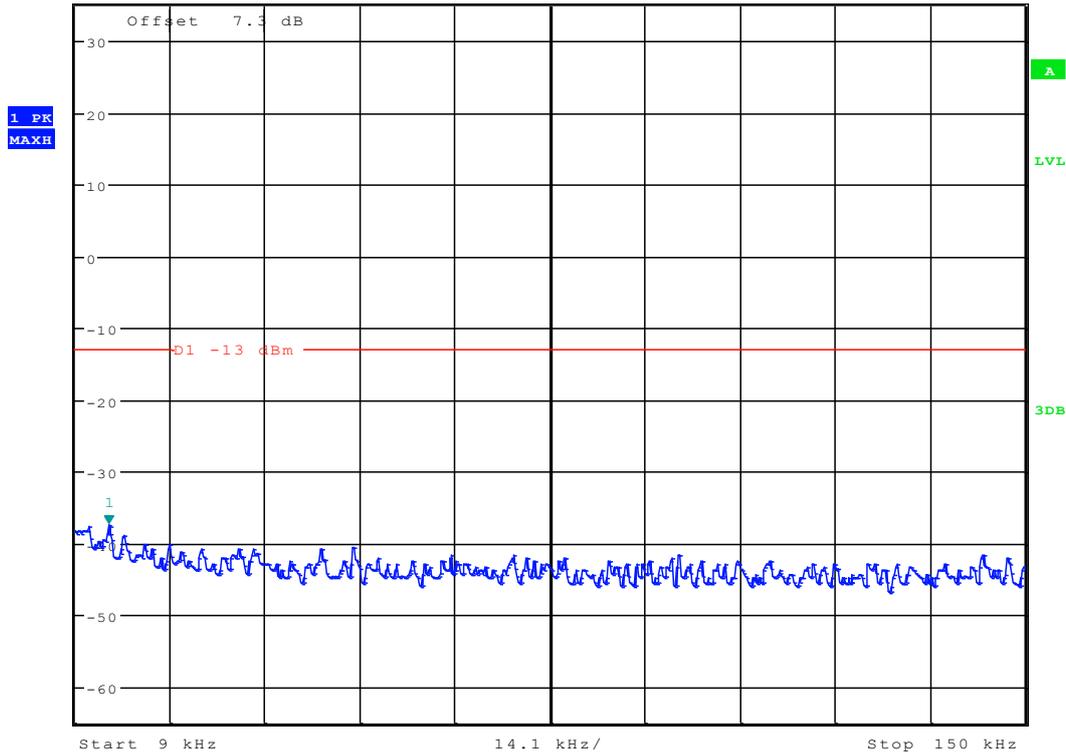


1.1.2 Frequency = M

1.1.2.1 QPSK/1RBs /RB #0



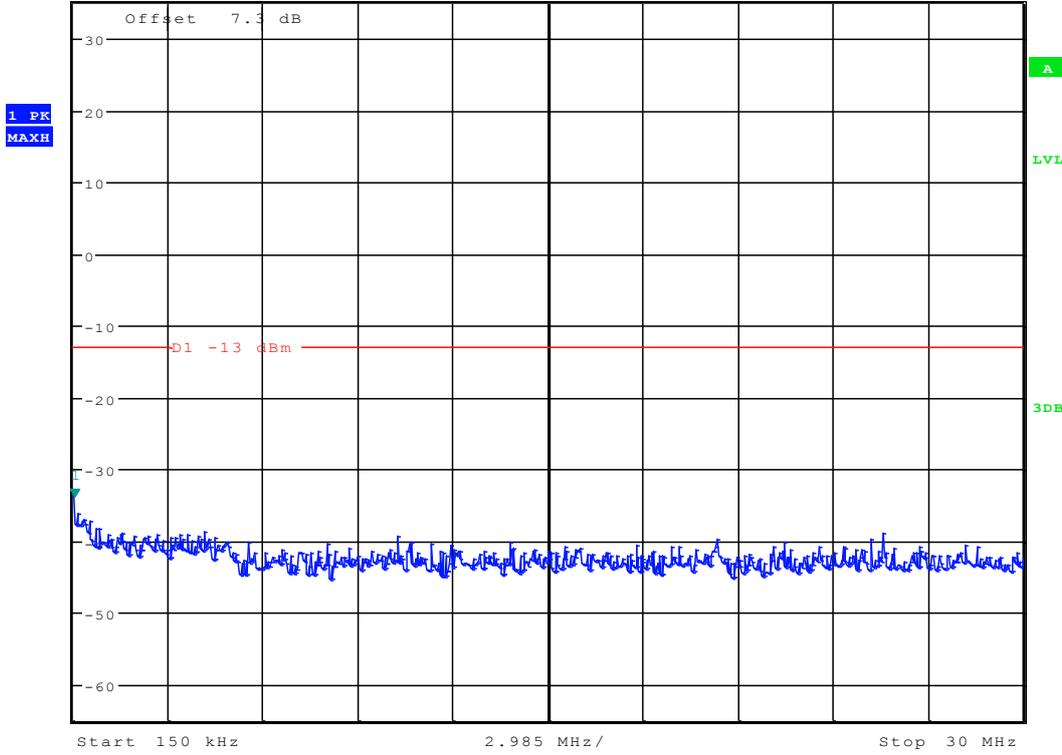
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -37.47 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 13.971153846 kHz



Date: 18.NOV.2011 22:41:59



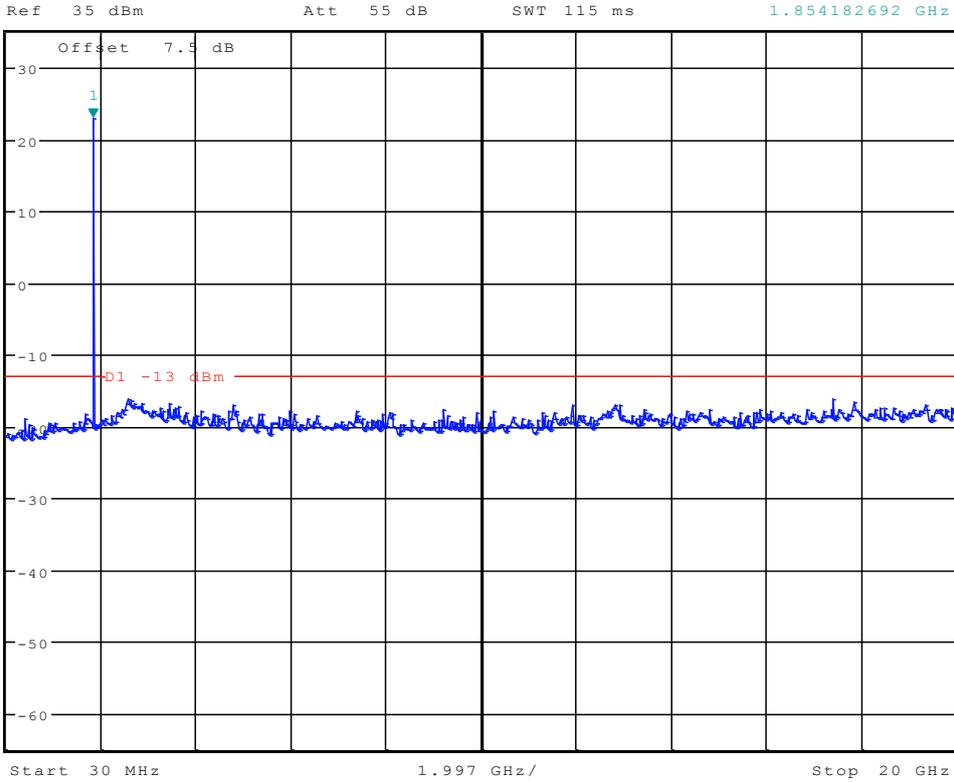
* RBW 10 kHz Marker 1 [T1]
 * VBW 30 kHz -33.95 dBm
 Ref 35 dBm Att 55 dB SWT 300 ms 197.836538462 kHz



Date: 18.NOV.2011 23:17:55



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 22.82 dBm
SWT 115 ms 1.854182692 GHz



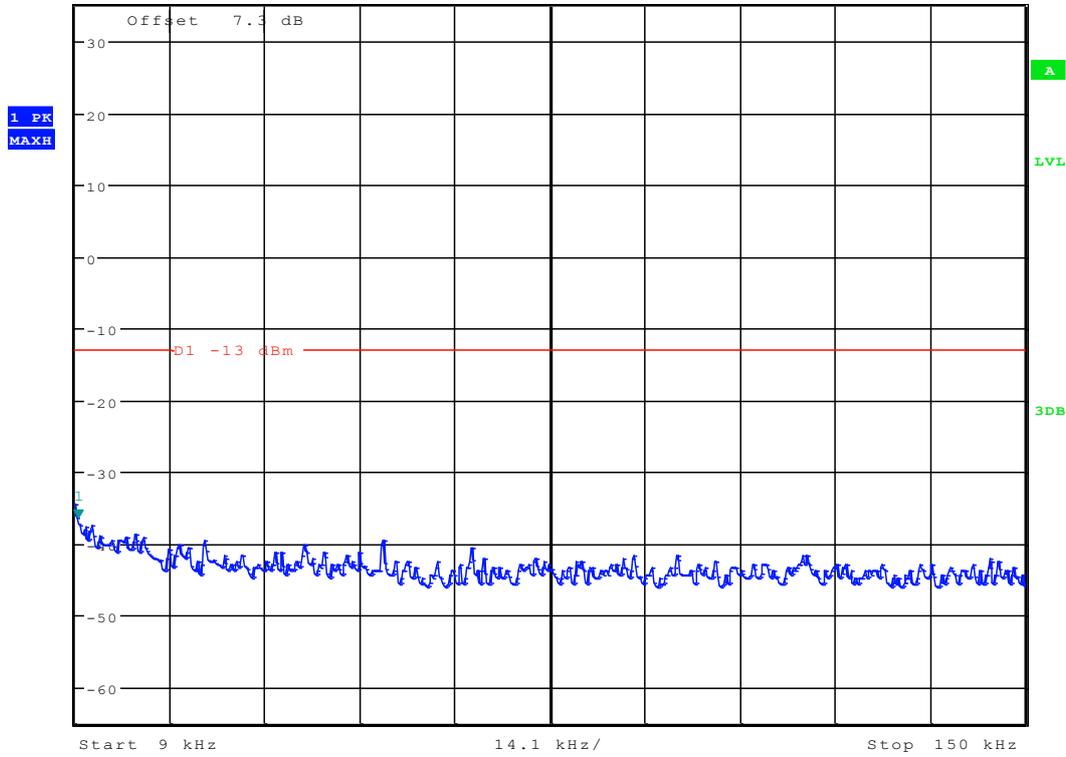
Date: 18.NOV.2011 23:30:34



1.1.2.2 QPSK/1RBs /RB #max



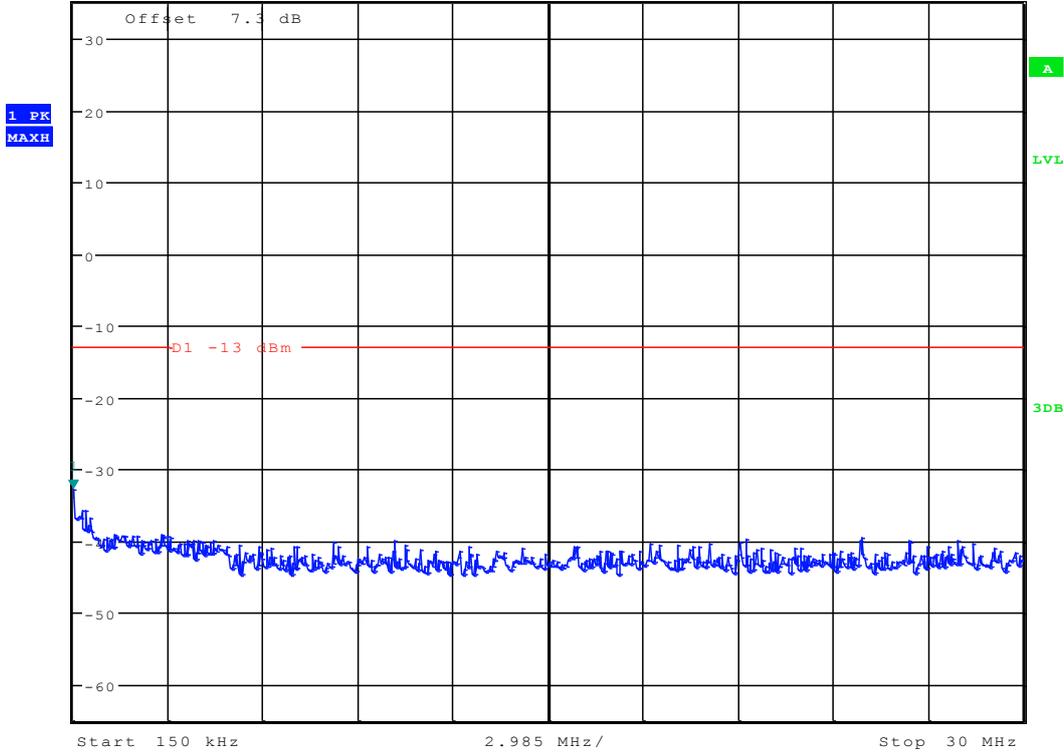
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -36.52 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 9.451923077 kHz



Date: 18.NOV.2011 22:42:57



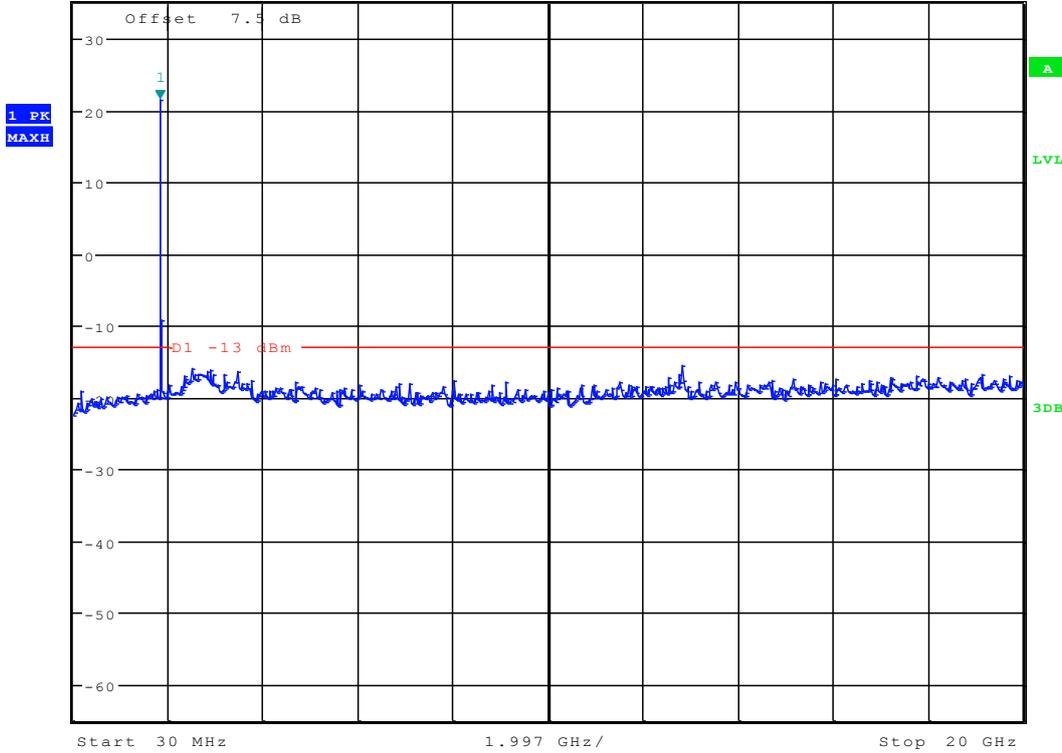
* RBW 10 kHz Marker 1 [T1]
 * VBW 30 kHz -32.82 dBm
 Ref 35 dBm Att 55 dB SWT 300 ms 150.00000000 kHz



Date: 18.NOV.2011 23:18:11



* RBW 1 MHz Marker 1 [T1]
 * VBW 3 MHz 21.40 dBm
 Ref 35 dBm Att 55 dB SWT 115 ms 1.854182692 GHz



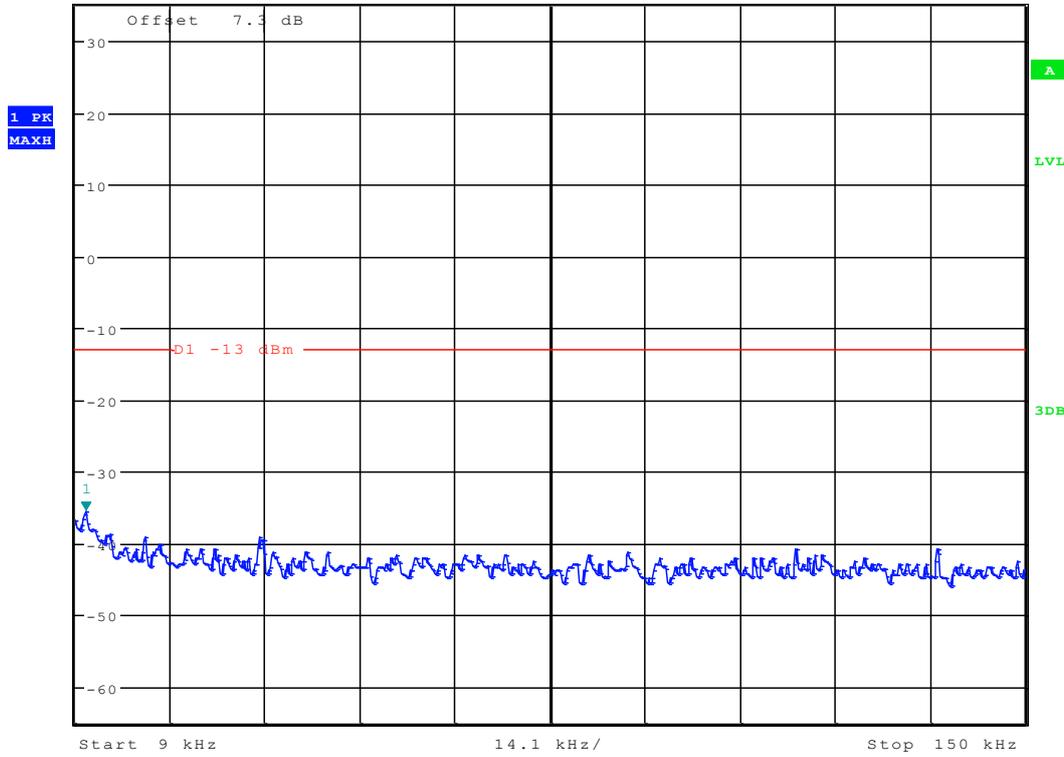
Date: 18.NOV.2011 23:30:49



1.1.2.3 QPSK/full RBs



*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -35.49 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 10.581730769 kHz



Date: 18.NOV.2011 22:43:37



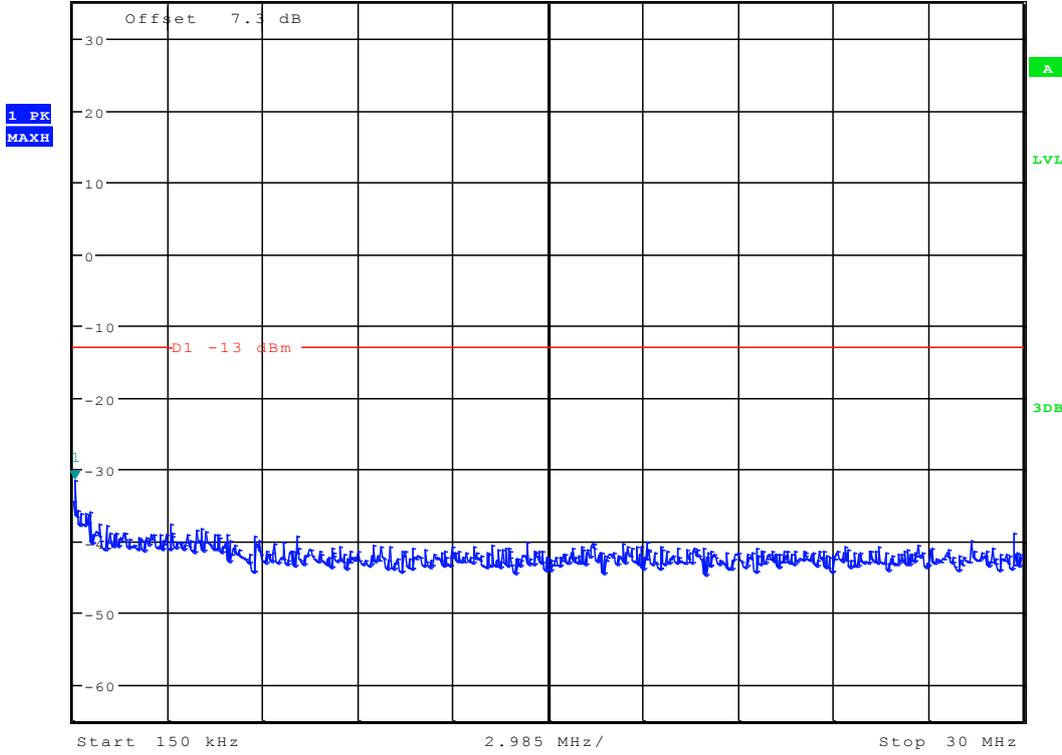
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -31.50 dBm
SWT 300 ms 197.836538462 kHz

Ref 35 dBm

Att 55 dB

SWT 300 ms

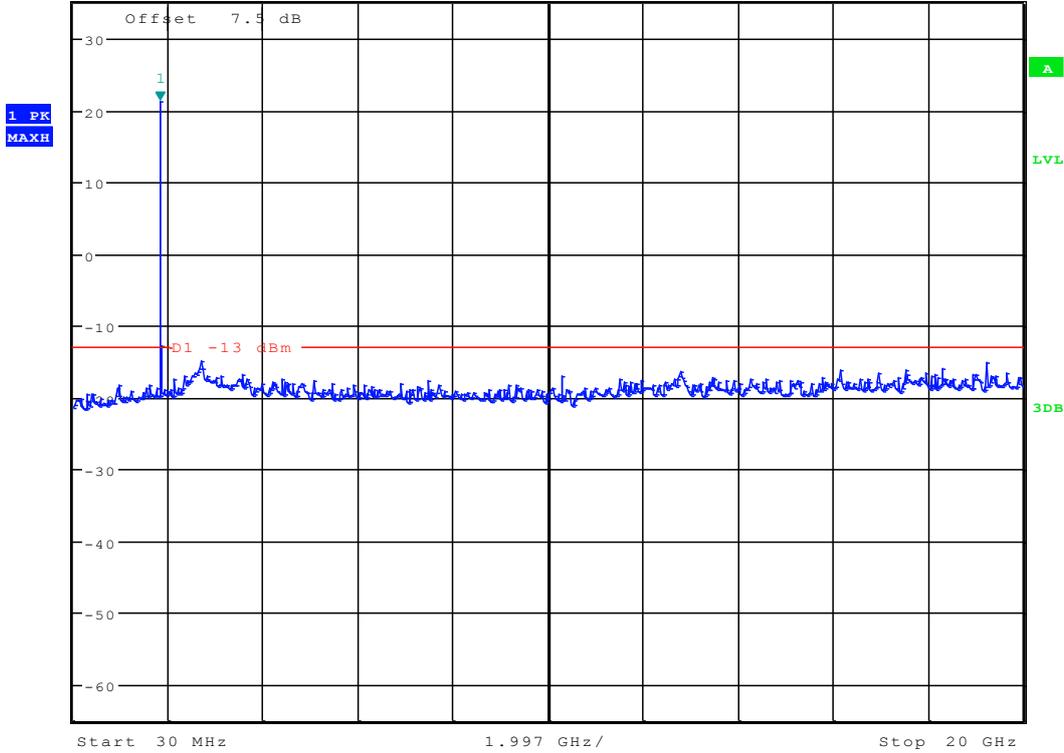
197.836538462 kHz



Date: 18.NOV.2011 23:17:38



* RBW 1 MHz Marker 1 [T1]
 * VBW 3 MHz 21.19 dBm
 Ref 35 dBm Att 55 dB SWT 115 ms 1.854182692 GHz



Date: 18.NOV.2011 23:31:07

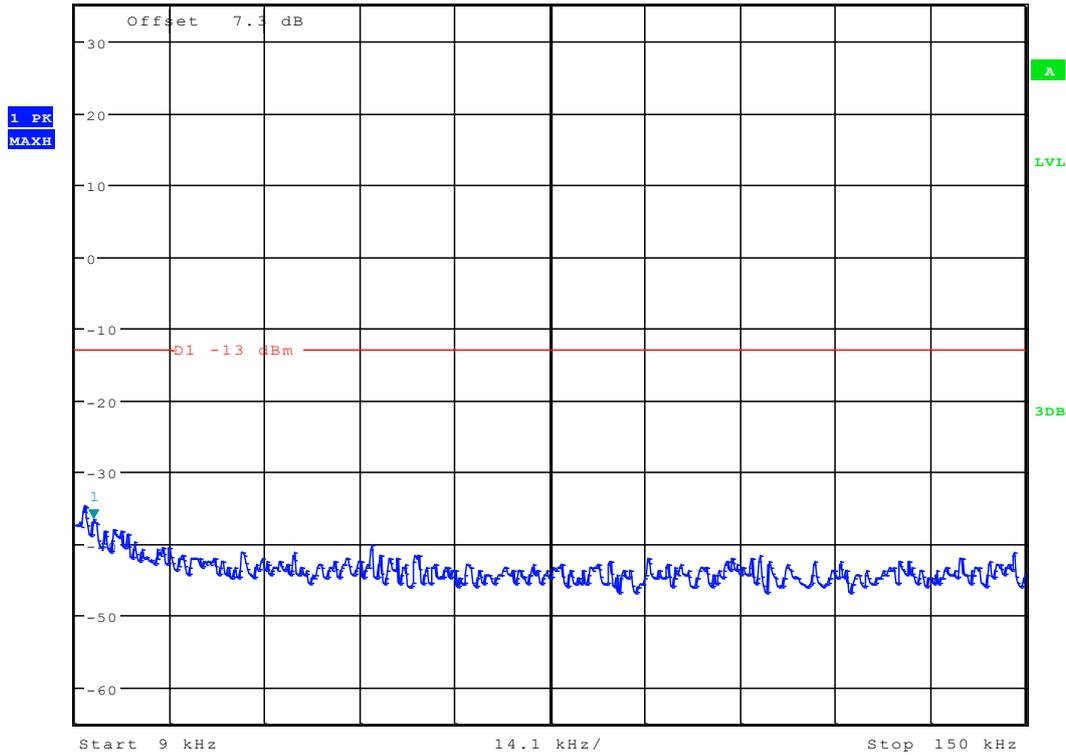


1.1.3 Channel = T

1.1.3.1 QPSK/1RBs /RB #0



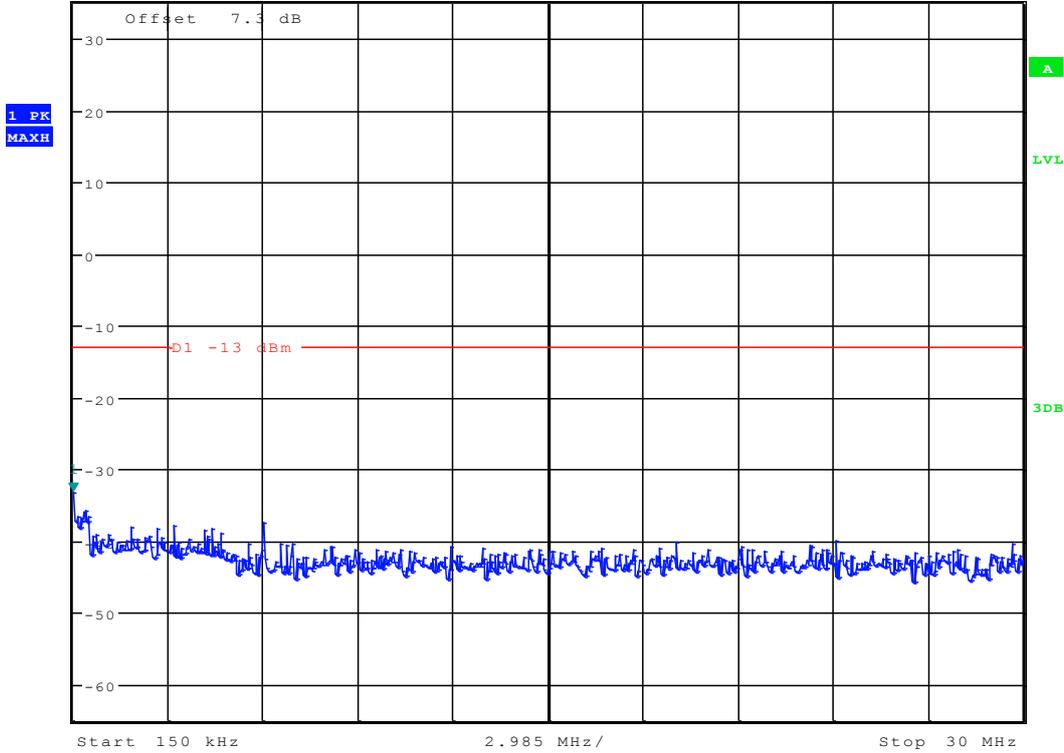
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -36.52 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 11.711538462 kHz



Date: 18.NOV.2011 22:50:48



* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -33.18 dBm
Ref 35 dBm Att 55 dB SWT 300 ms 150.00000000 kHz



Date: 18.NOV.2011 23:11:13



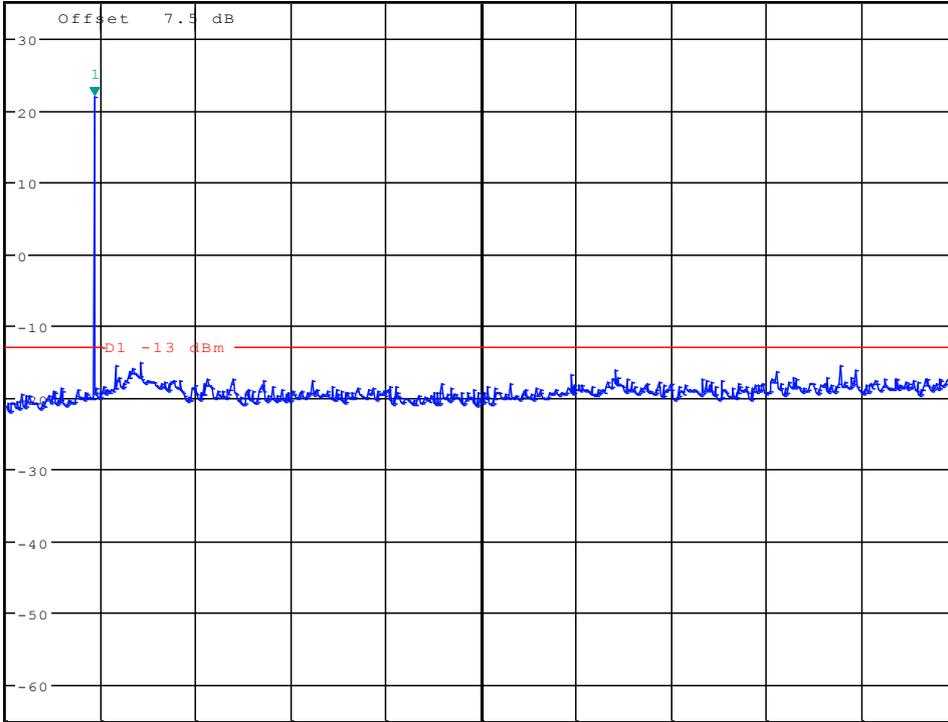
* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 21.81 dBm
SWT 115 ms 1.886185897 GHz

Ref 35 dBm

Att 55 dB

SWT 115 ms

1.886185897 GHz



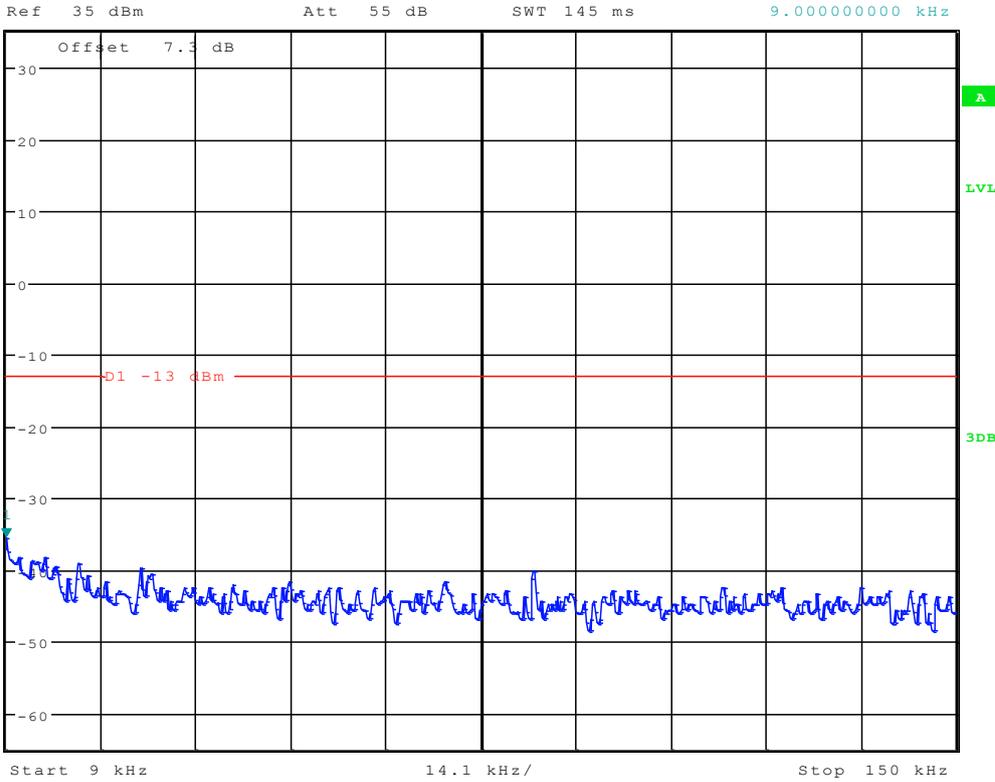
Date: 18.NOV.2011 23:35:33



1.1.3.2 QPSK/1RBs /RB #max



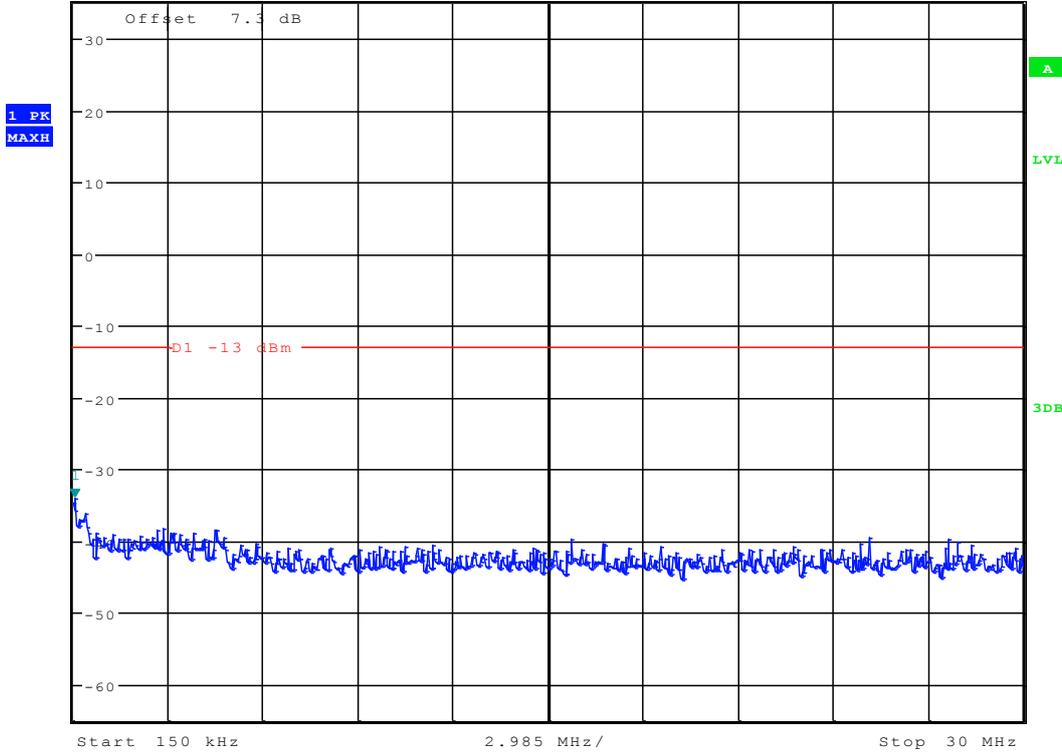
* RBW 1 kHz Marker 1 [T1]
* VBW 10 kHz -35.49 dBm
SWT 145 ms 9.000000000 kHz



Date: 18.NOV.2011 22:51:04



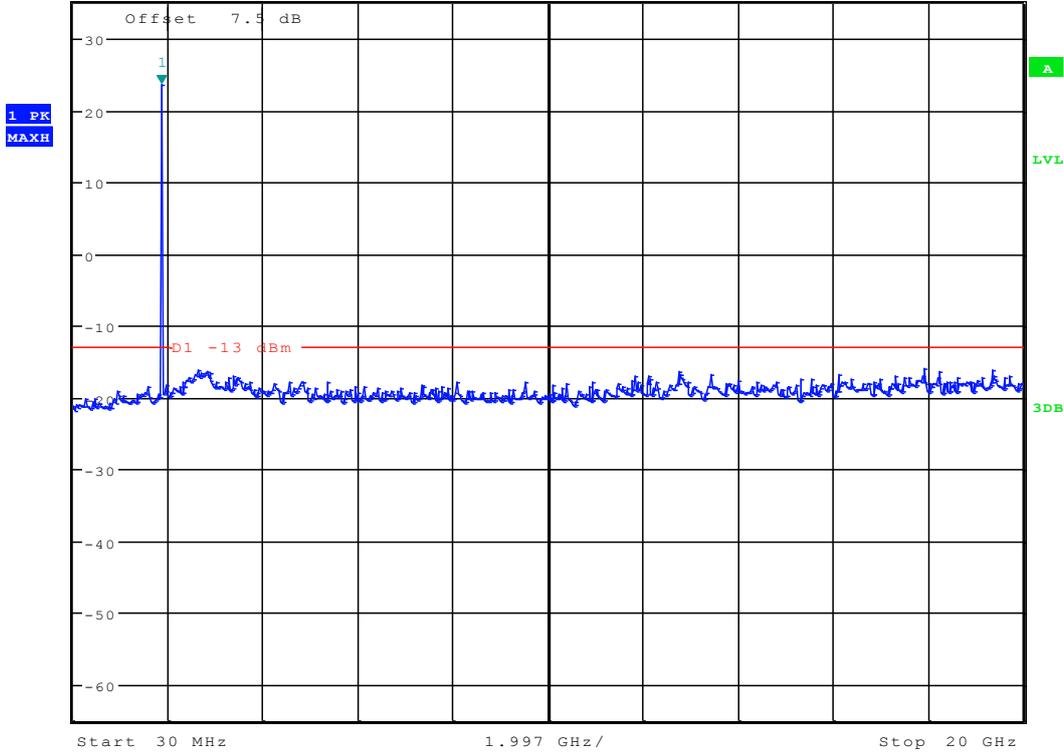
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -34.02 dBm
Ref 35 dBm Att 55 dB SWT 300 ms 197.836538462 kHz



Date: 18.NOV.2011 23:11:36



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 23.48 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.886185897 GHz



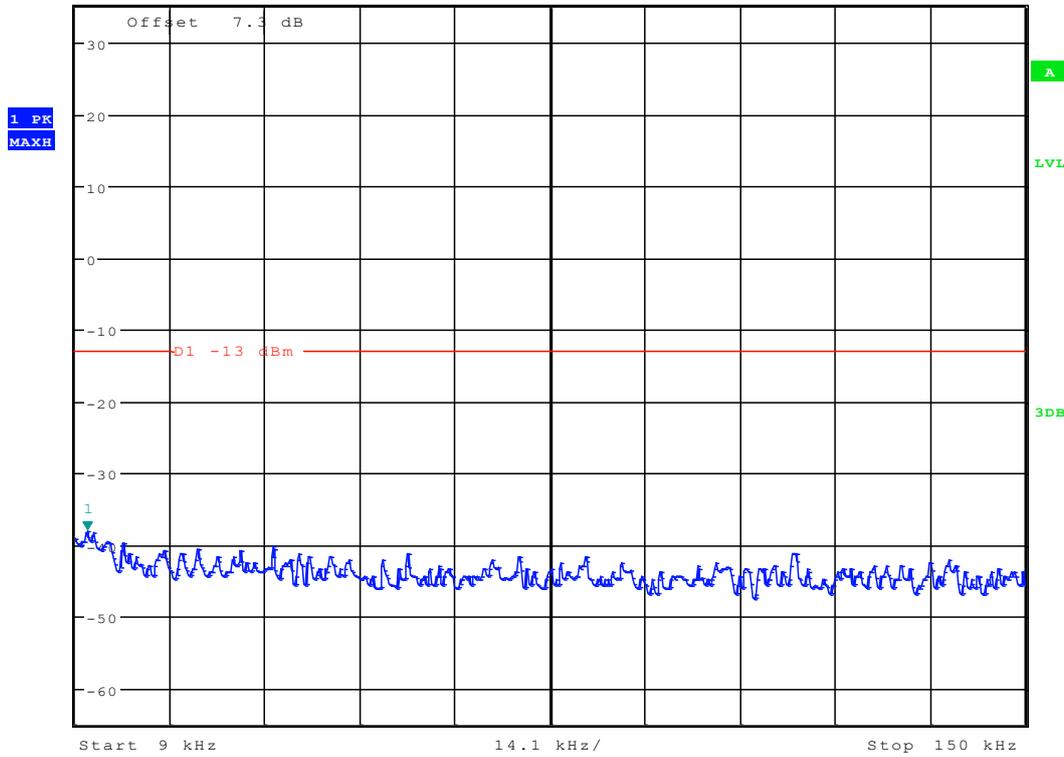
Date: 18.NOV.2011 23:35:53



1.1.3.3 QPSK/full RBs



* RBW 1 kHz Marker 1 [T1]
 * VBW 10 kHz -37.99 dBm
 Ref 35 dBm Att 55 dB SWT 145 ms 10.807692308 kHz



Date: 18.NOV.2011 22:51:20



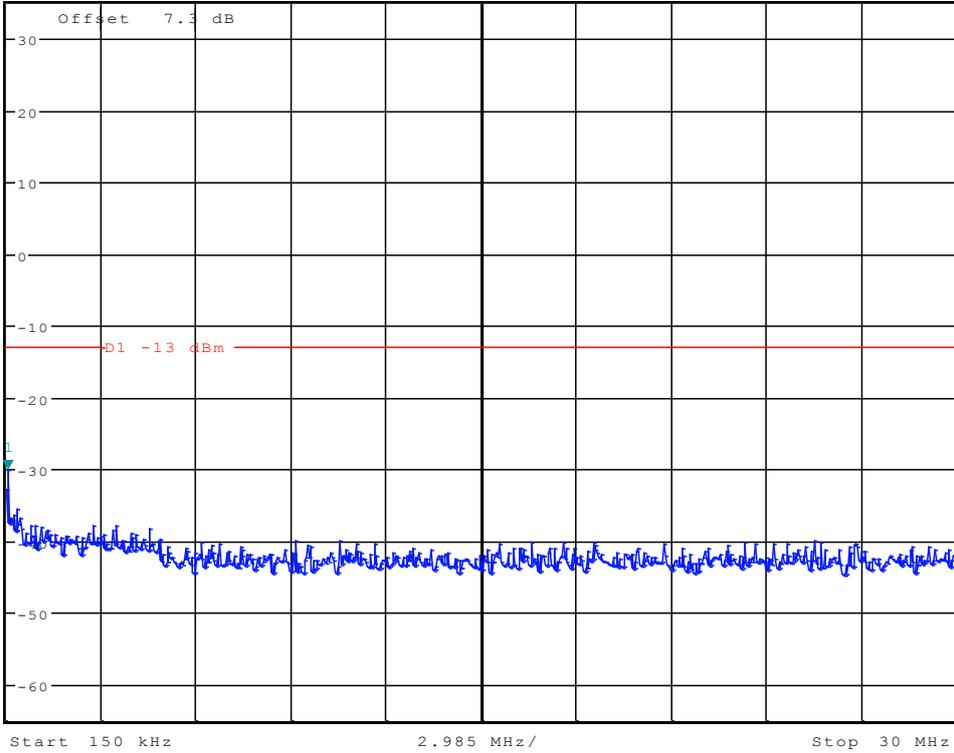
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -30.01 dBm
SWT 300 ms 197.836538462 kHz

Ref 35 dBm

Att 55 dB

SWT 300 ms

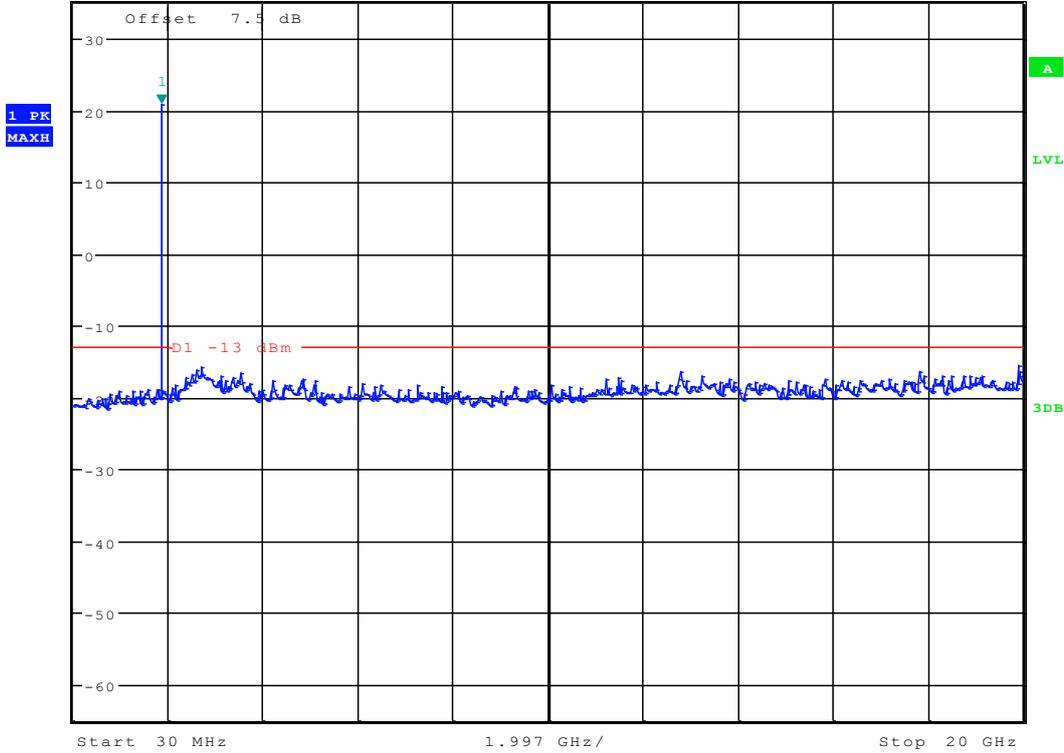
197.836538462 kHz



Date: 18.NOV.2011 23:11:00



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 20.89 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.886185897 GHz



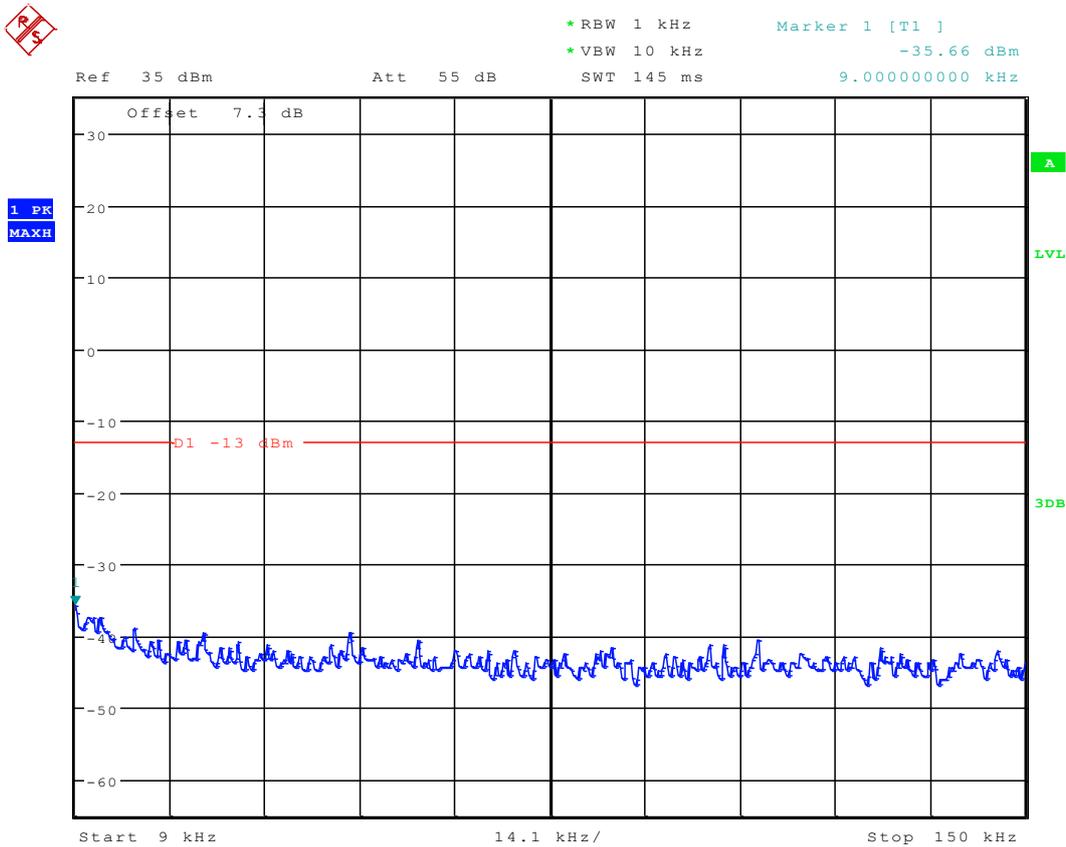
Date: 18.NOV.2011 23:36:12



1.2 Channel Bandwidth =5 MHz

1.2.1 Channel = B

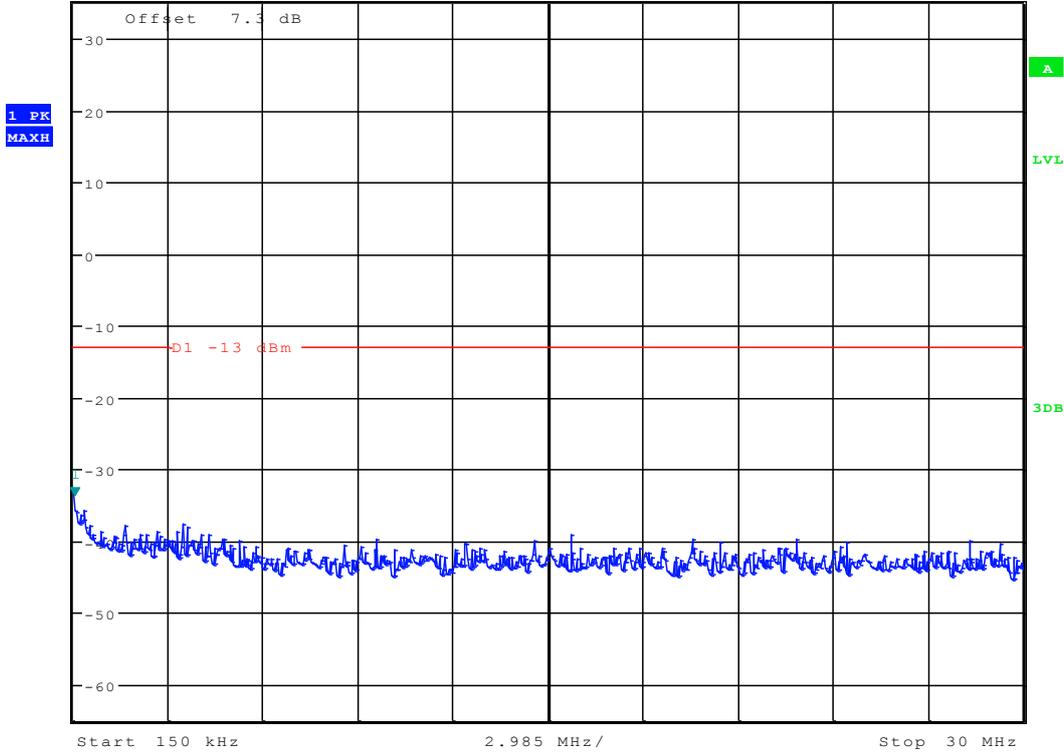
1.2.1.1 QPSK/1RBs /RB #0



Date: 18.NOV.2011 22:29:38



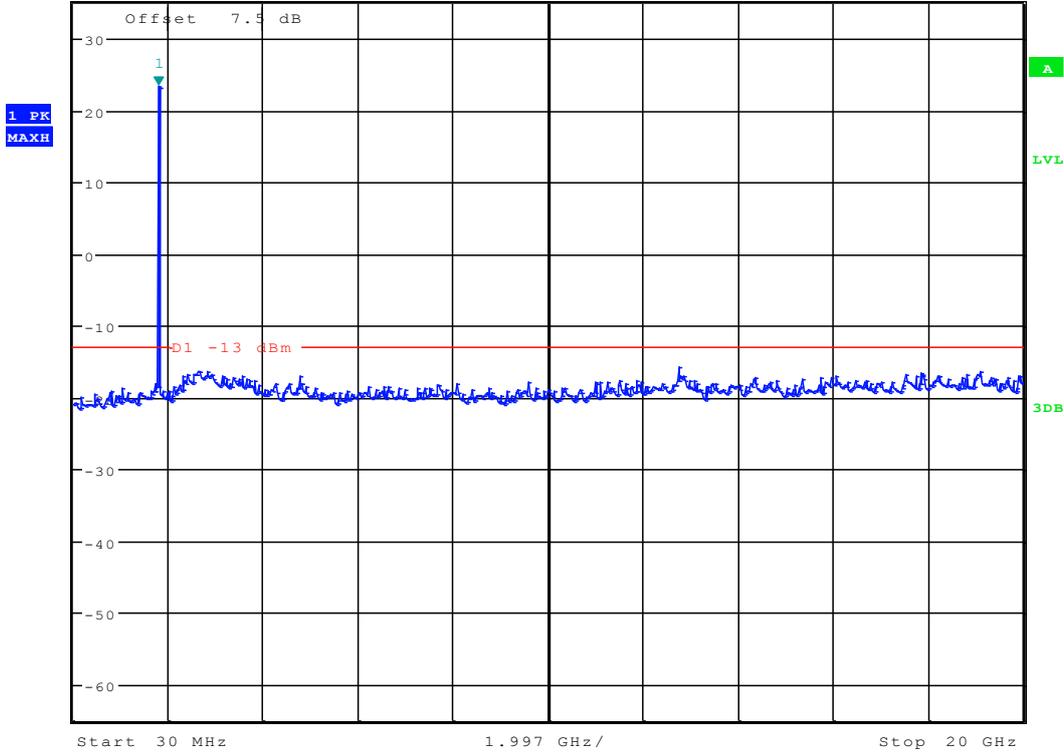
* RBW 10 kHz Marker 1 [T1]
 * VBW 30 kHz -33.75 dBm
 Ref 35 dBm Att 55 dB SWT 300 ms 197.836538462 kHz



Date: 18.NOV.2011 23:21:23



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 23.44 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.822179487 GHz



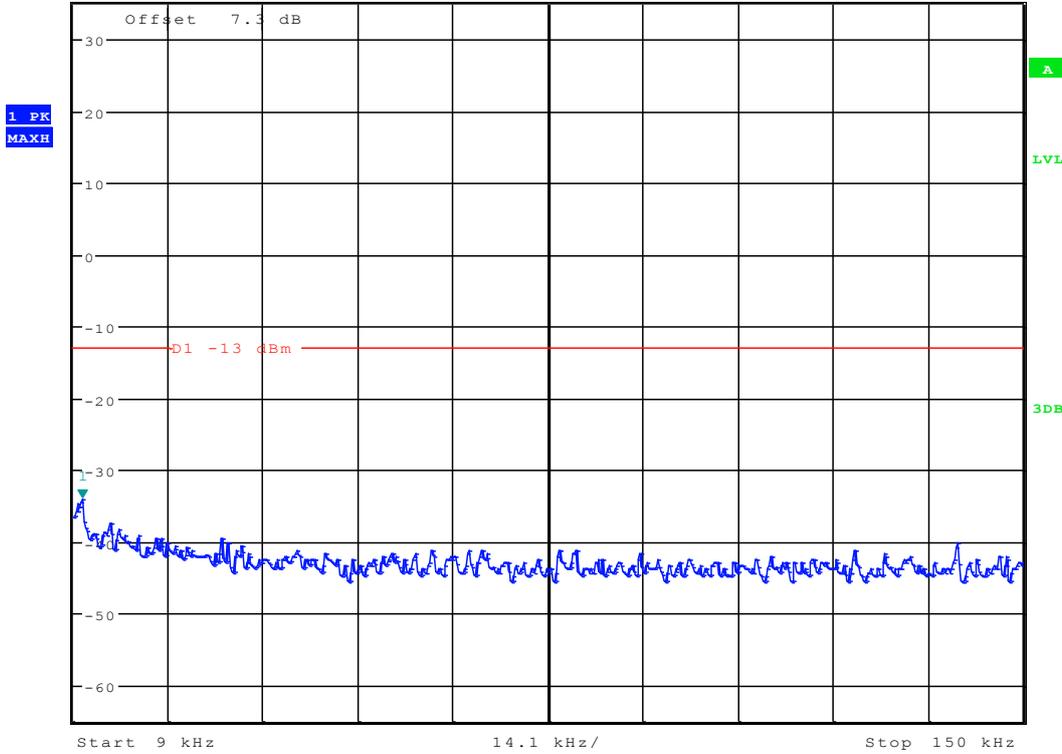
Date: 18.NOV.2011 23:27:12



1.2.1.2 QPSK/1RBs /RB #max



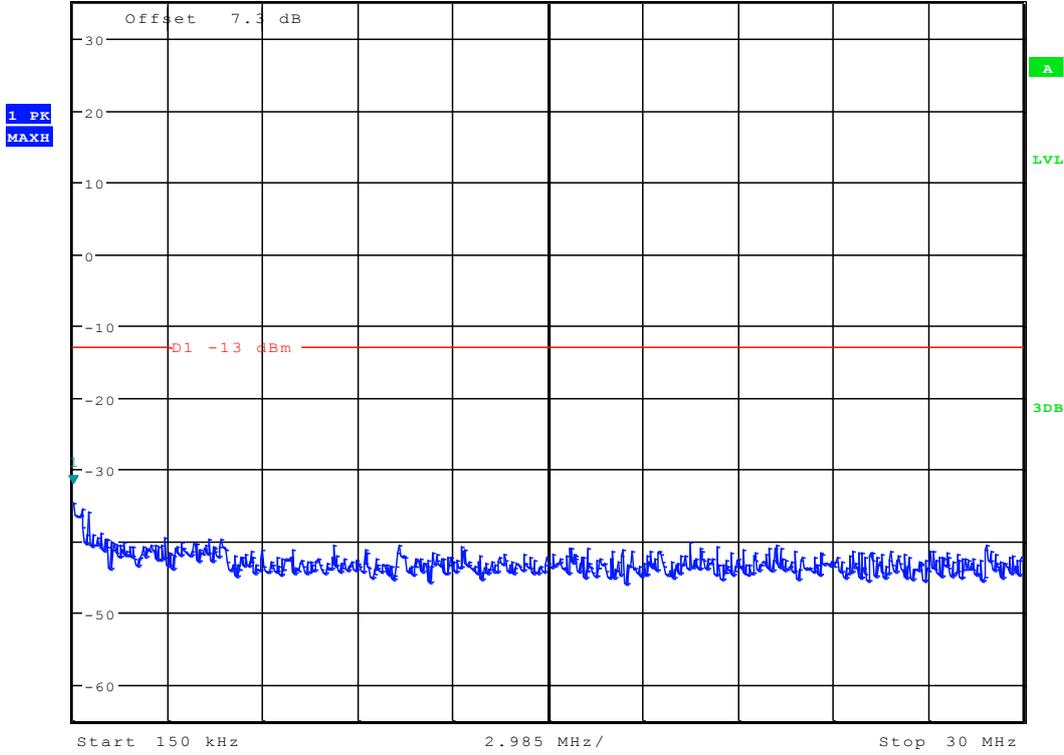
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -34.02 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 10.355769231 kHz



Date: 18.NOV.2011 22:30:06



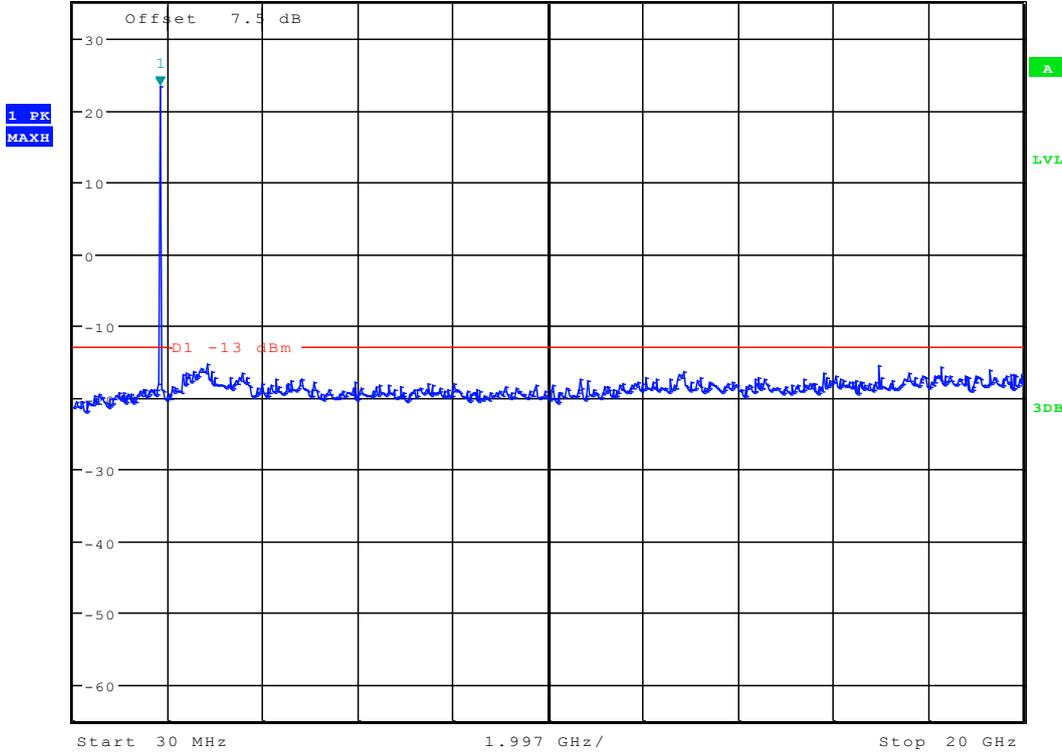
* RBW 10 kHz Marker 1 [T1]
 * VBW 30 kHz -32.13 dBm
 Ref 35 dBm Att 55 dB SWT 300 ms 150.00000000 kHz



Date: 18.NOV.2011 23:21:36



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 23.29 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.854182692 GHz



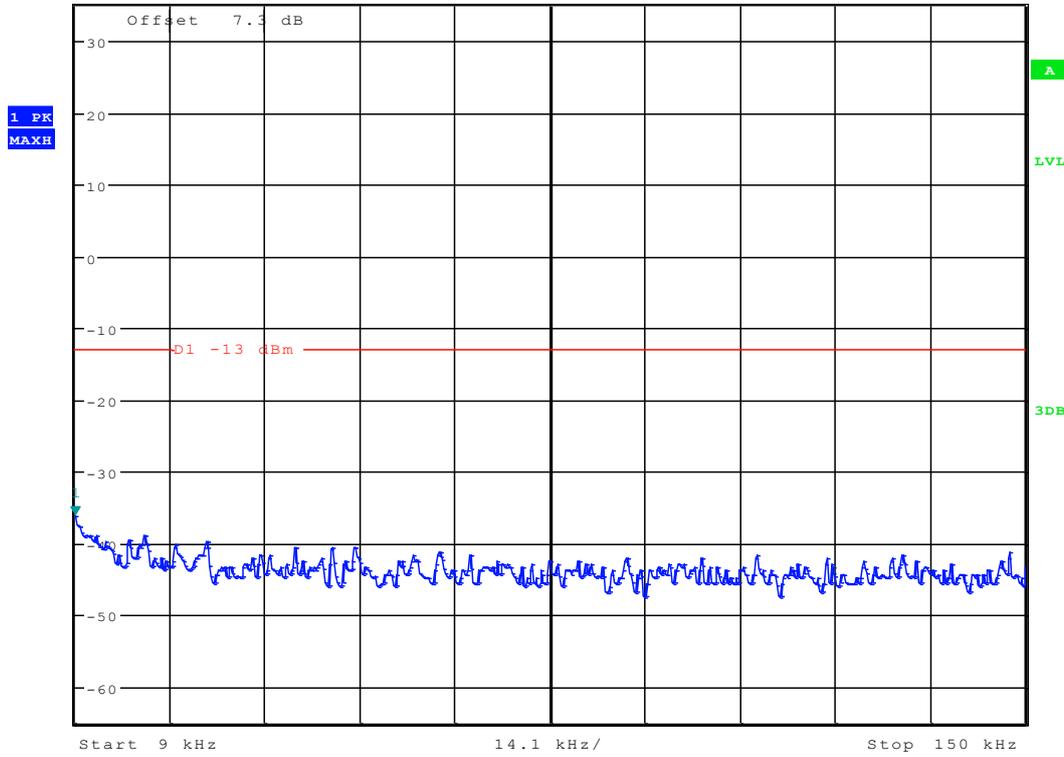
Date: 18.NOV.2011 23:27:30



1.2.1.3 QPSK/full RBs



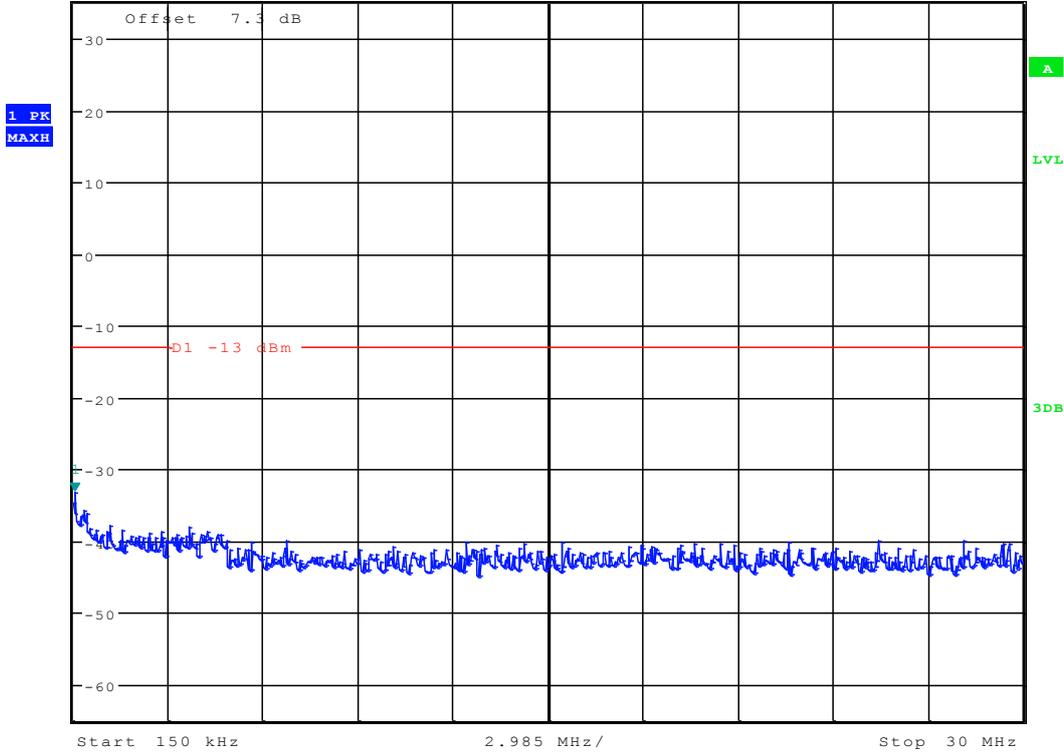
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -36.08 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 9.000000000 kHz



Date: 18.NOV.2011 22:30:24



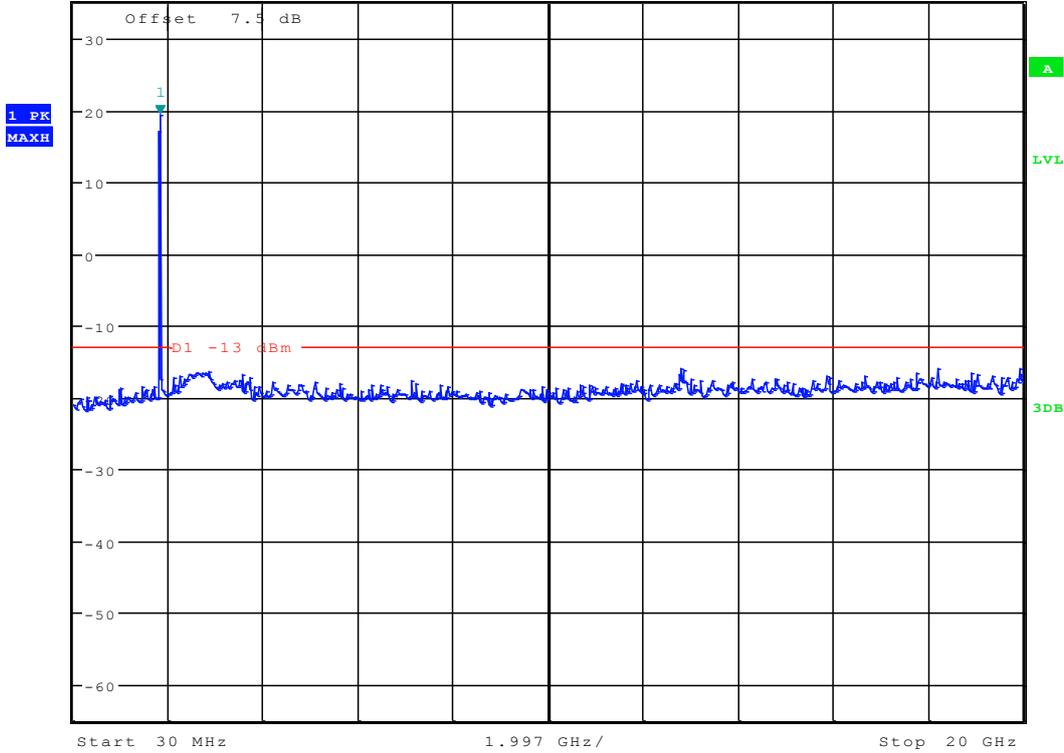
* RBW 10 kHz Marker 1 [T1]
 * VBW 30 kHz -33.18 dBm
 Ref 35 dBm Att 55 dB SWT 300 ms 197.836538462 kHz



Date: 18.NOV.2011 23:21:05



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 19.29 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.854182692 GHz



Date: 18.NOV.2011 23:27:50

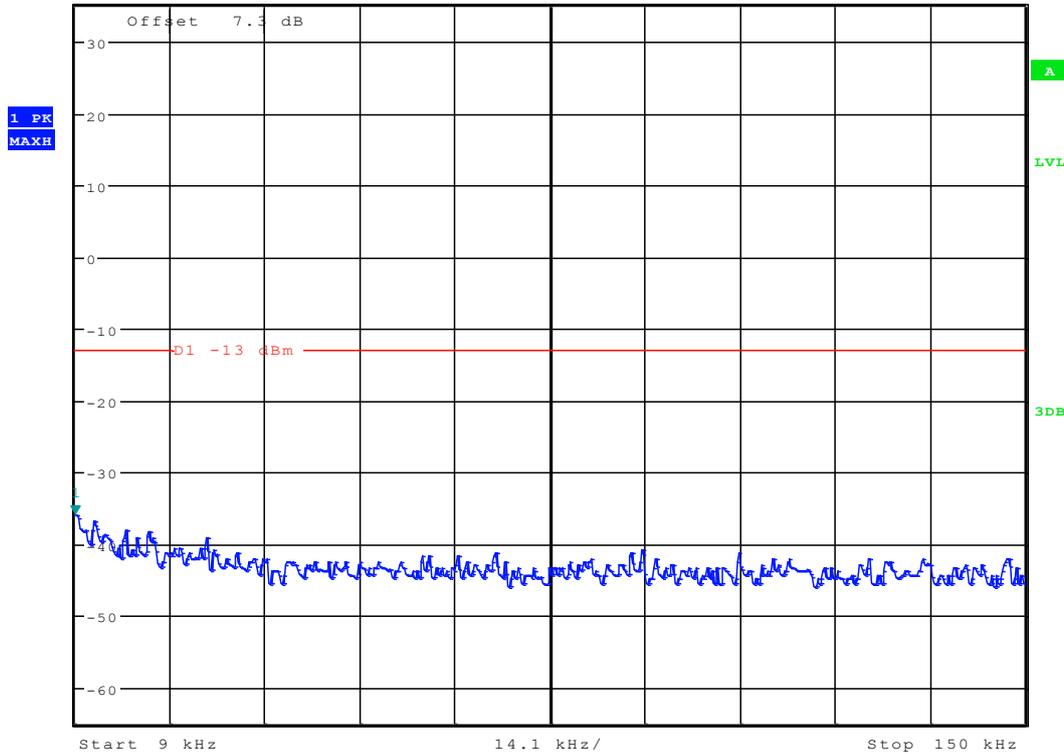


1.2.2 Frequency = M

1.2.2.1 QPSK/1RBs /RB #0



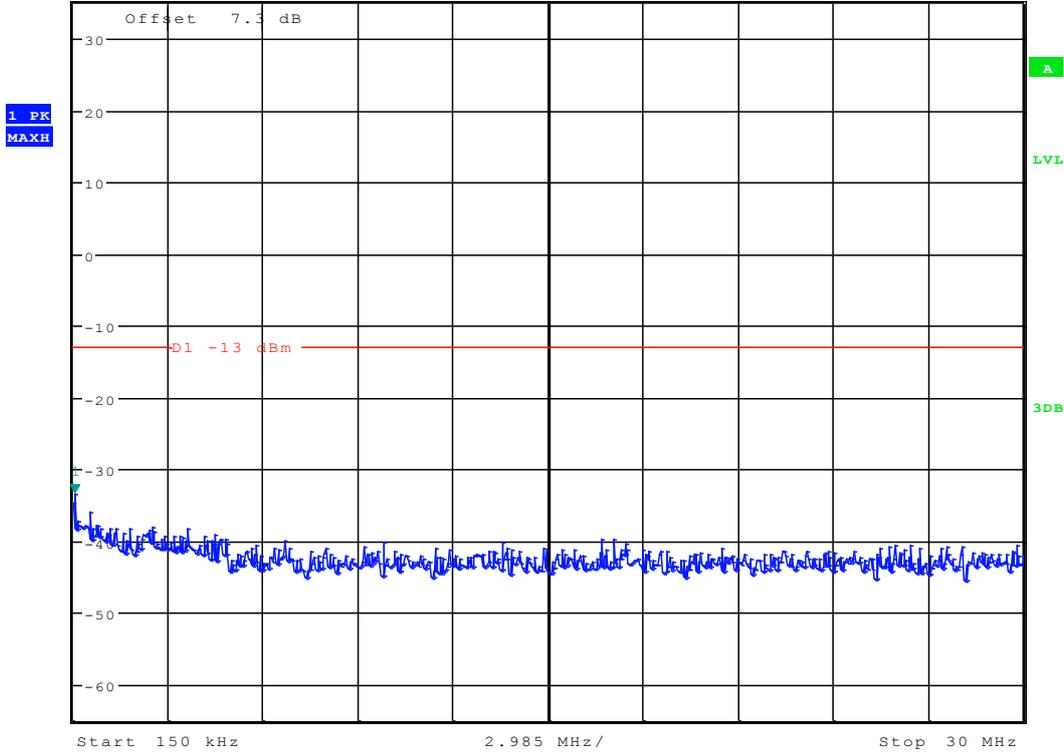
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -35.91 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 9.000000000 kHz



Date: 18.NOV.2011 22:45:56



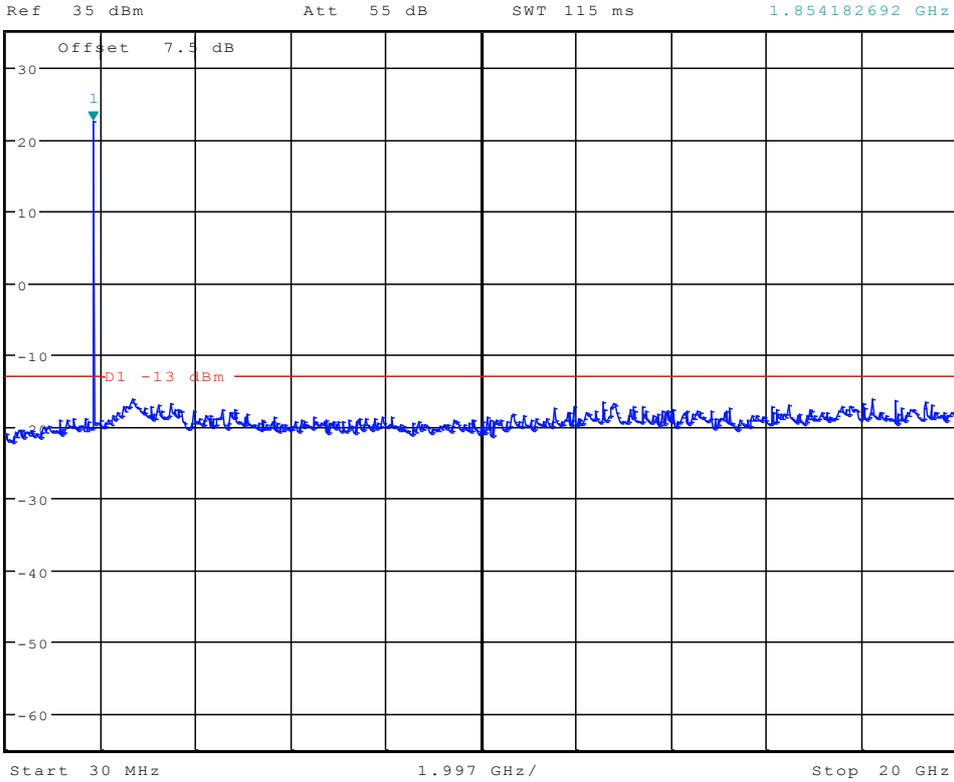
* RBW 10 kHz Marker 1 [T1]
 * VBW 30 kHz -33.30 dBm
 Ref 35 dBm Att 55 dB SWT 300 ms 197.836538462 kHz



Date: 18.NOV.2011 23:16:12



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 22.42 dBm
SWT 115 ms 1.854182692 GHz



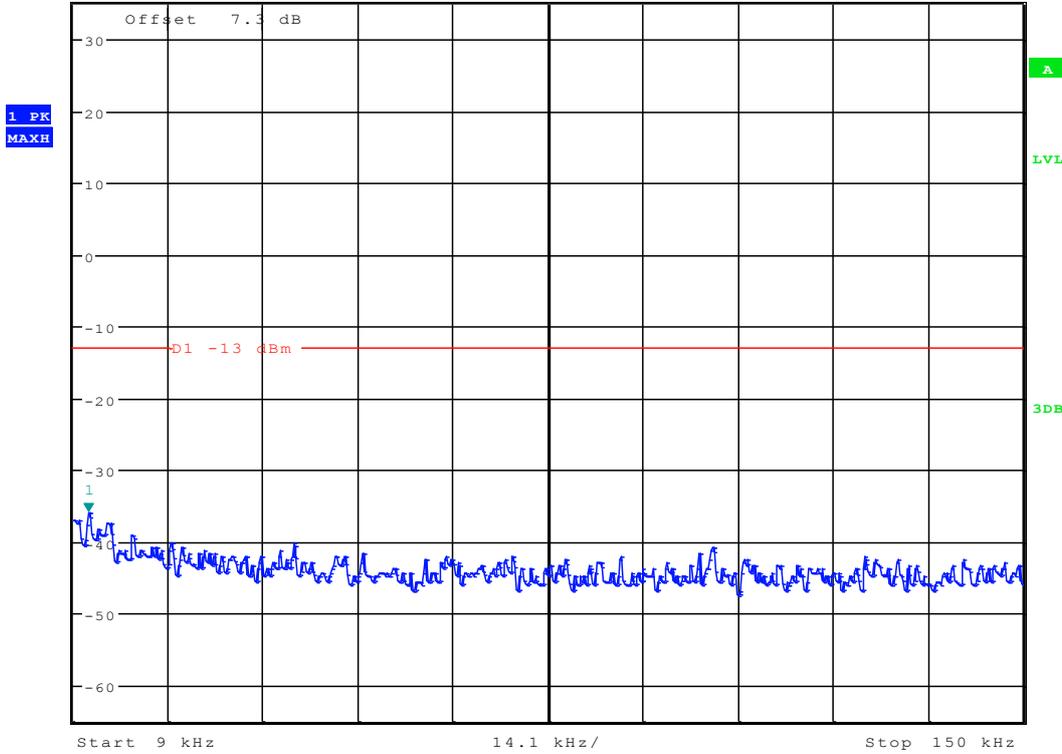
Date: 18.NOV.2011 23:32:06



1.2.2.2 QPSK/1RBs /RB #max



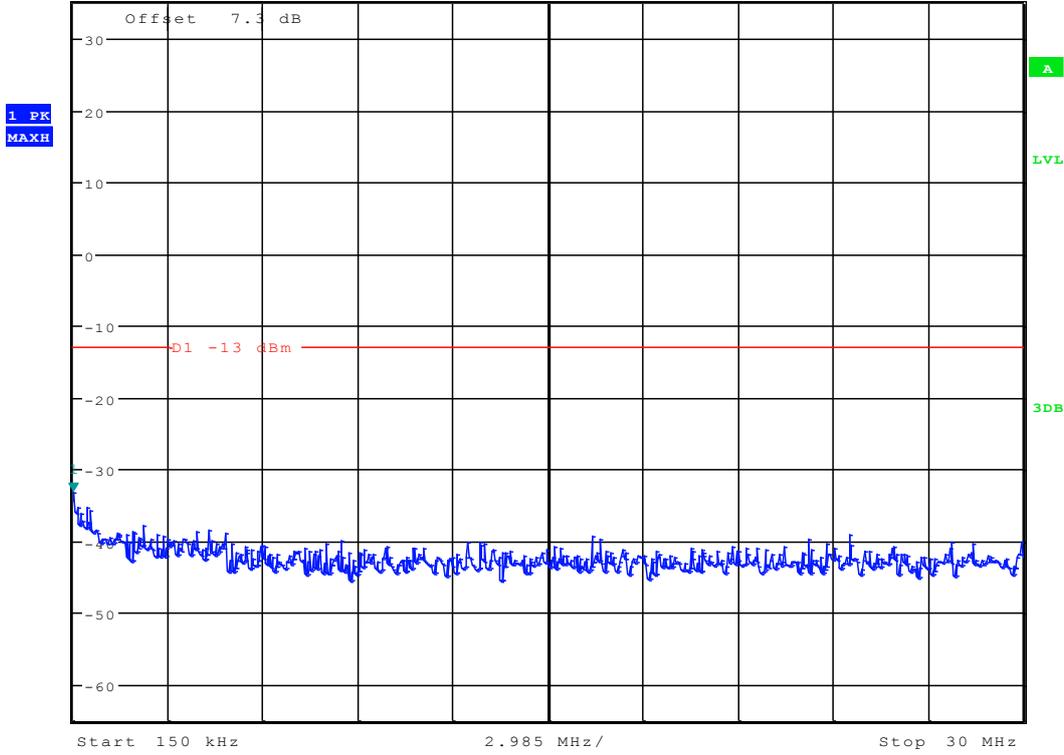
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -35.91 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 11.259615385 kHz



Date: 18.NOV.2011 22:46:15



* RBW 10 kHz Marker 1 [T1]
 * VBW 30 kHz -33.12 dBm
 Ref 35 dBm Att 55 dB SWT 300 ms 150.00000000 kHz



Date: 18.NOV.2011 23:16:36



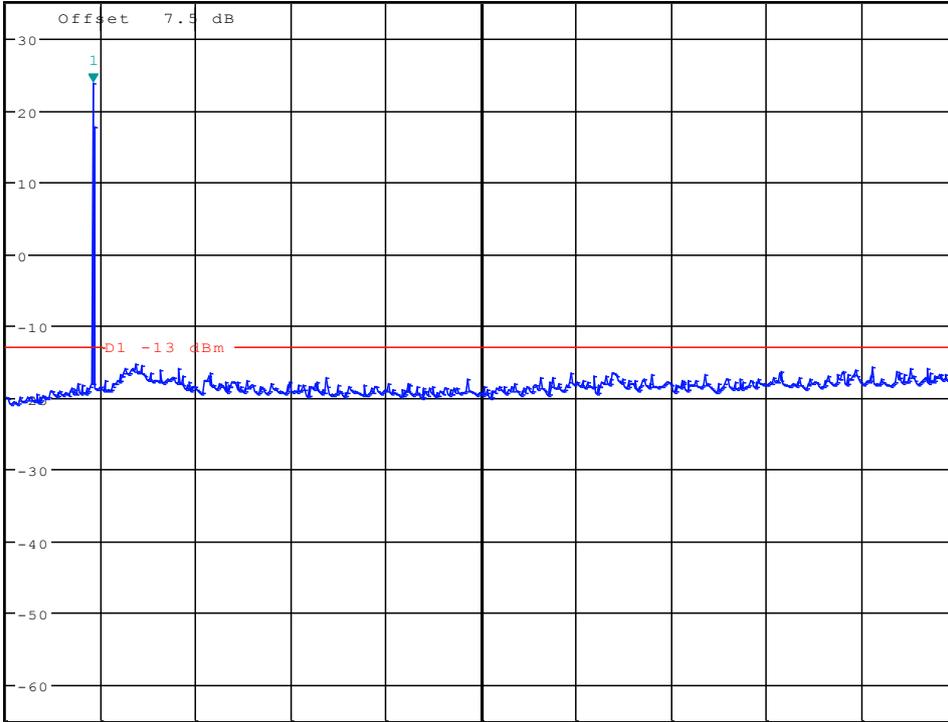
* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 23.75 dBm
SWT 115 ms 1.854182692 GHz

Ref 35 dBm

Att 55 dB

SWT 115 ms

1.854182692 GHz



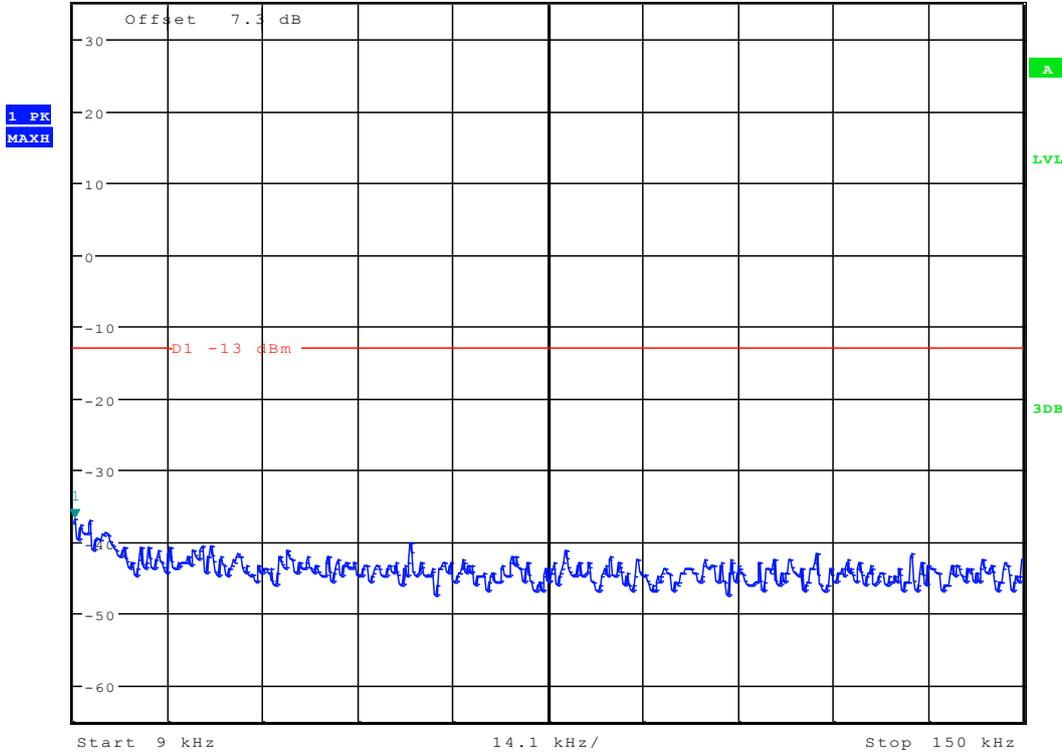
Date: 18.NOV.2011 23:32:58



1.2.2.3 QPSK/full RBs



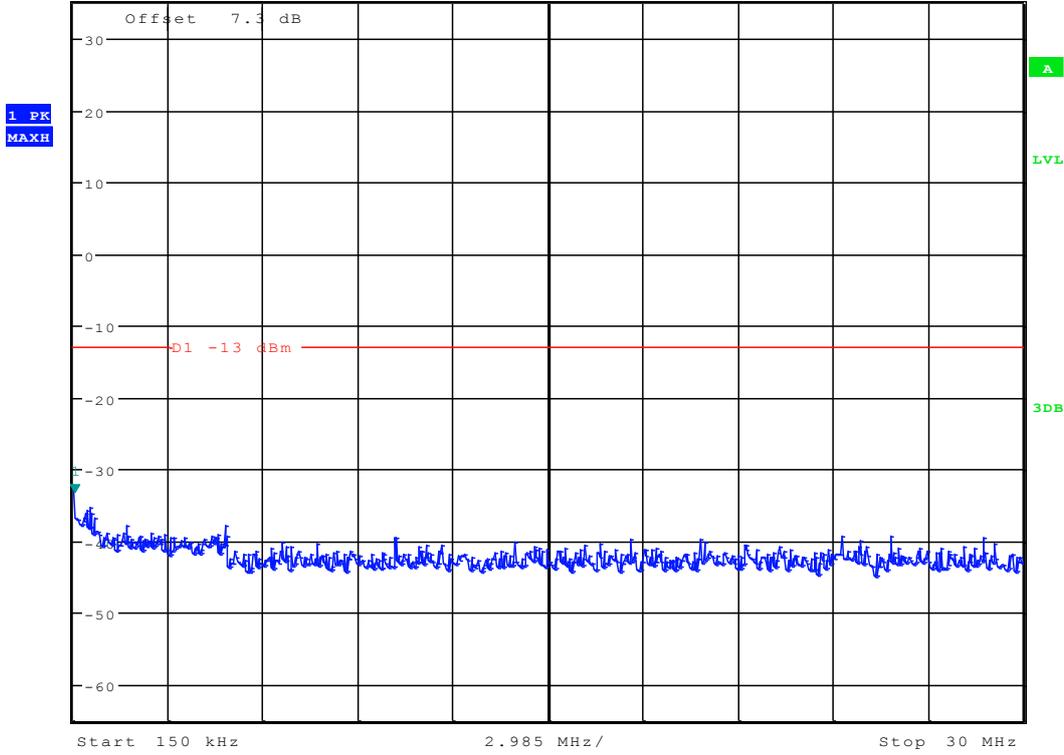
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -36.79 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 9.225961538 kHz



Date: 18.NOV.2011 22:46:32



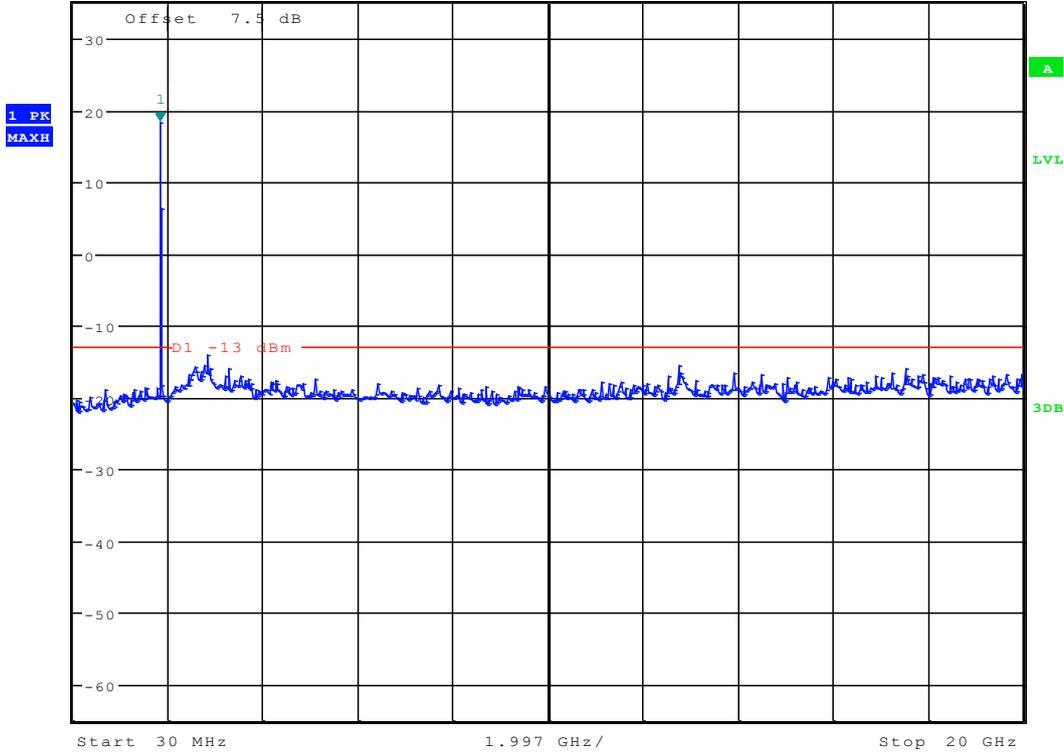
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -33.43 dBm
Ref 35 dBm Att 55 dB SWT 300 ms 197.836538462 kHz



Date: 18.NOV.2011 23:15:57



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 18.33 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.854182692 GHz



Date: 18.NOV.2011 23:33:12

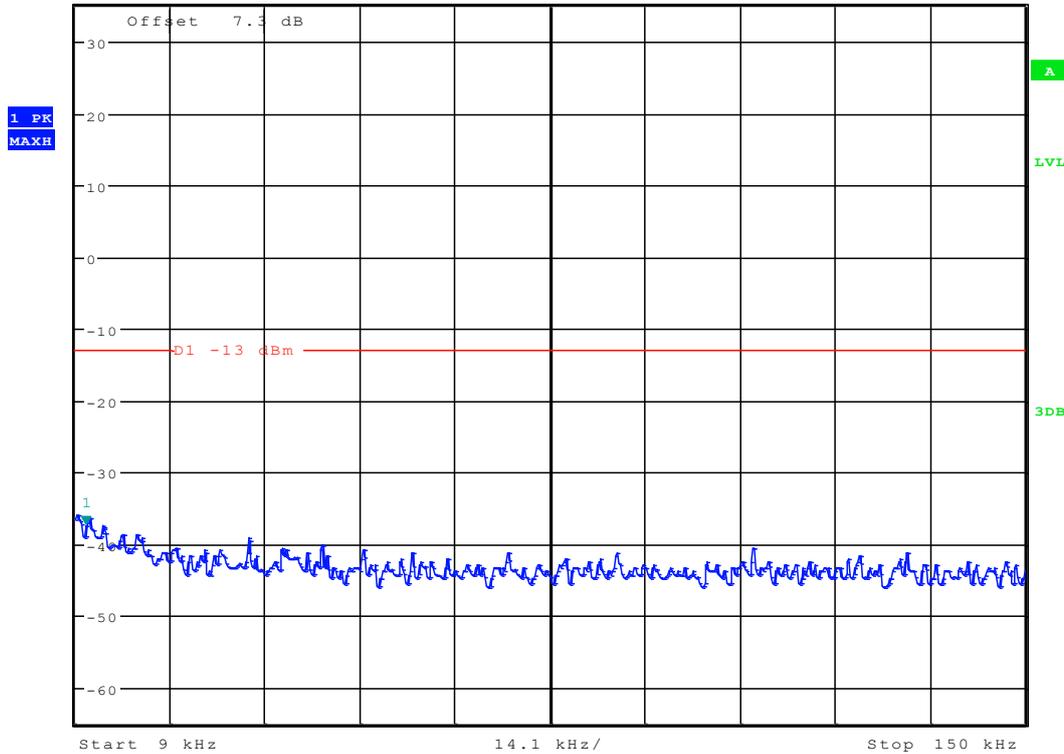


1.2.3 Channel = T

1.2.3.1 QPSK/1RBs /RB #0



*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -37.47 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 10.581730769 kHz



Date: 18.NOV.2011 22:56:10



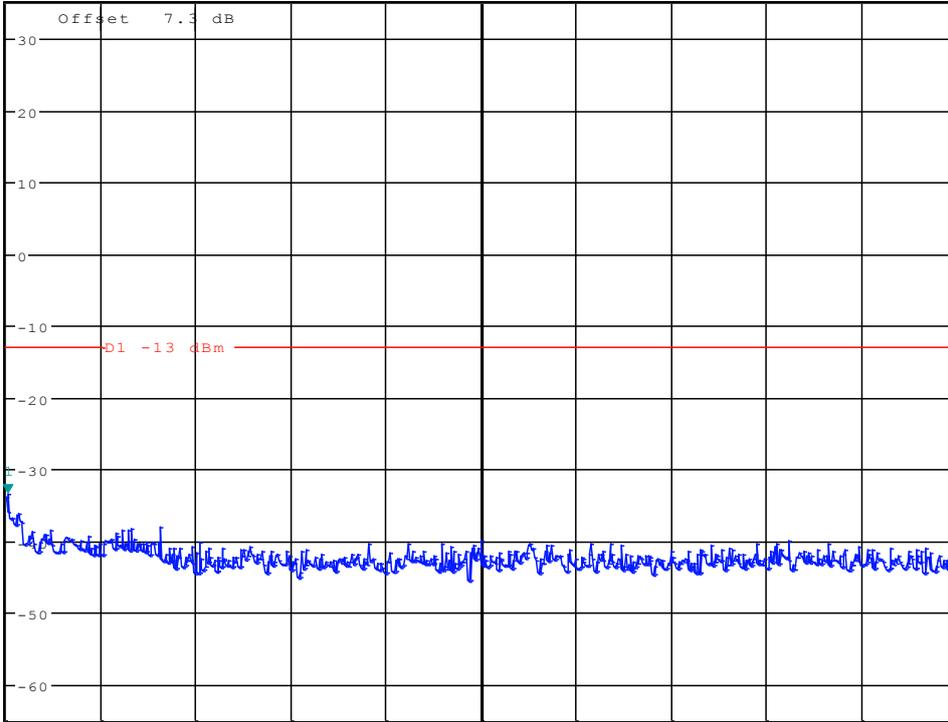
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -33.30 dBm
SWT 300 ms 197.836538462 kHz

Ref 35 dBm

Att 55 dB

SWT 300 ms

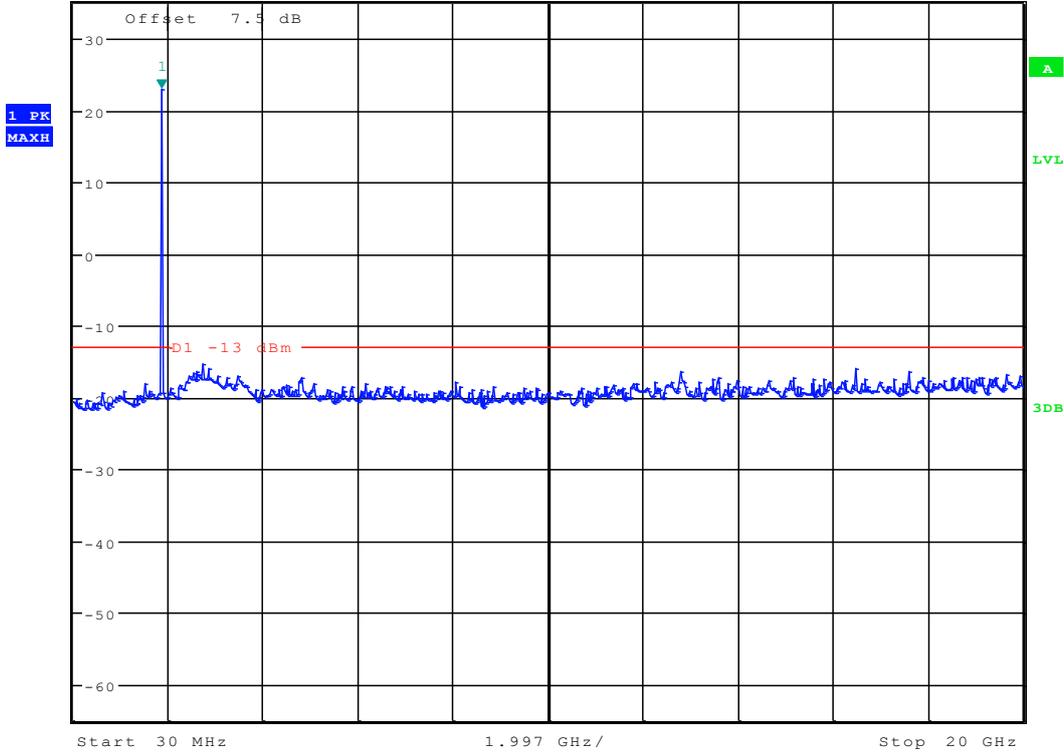
197.836538462 kHz



Date: 18.NOV.2011 23:09:49



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 22.95 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.886185897 GHz



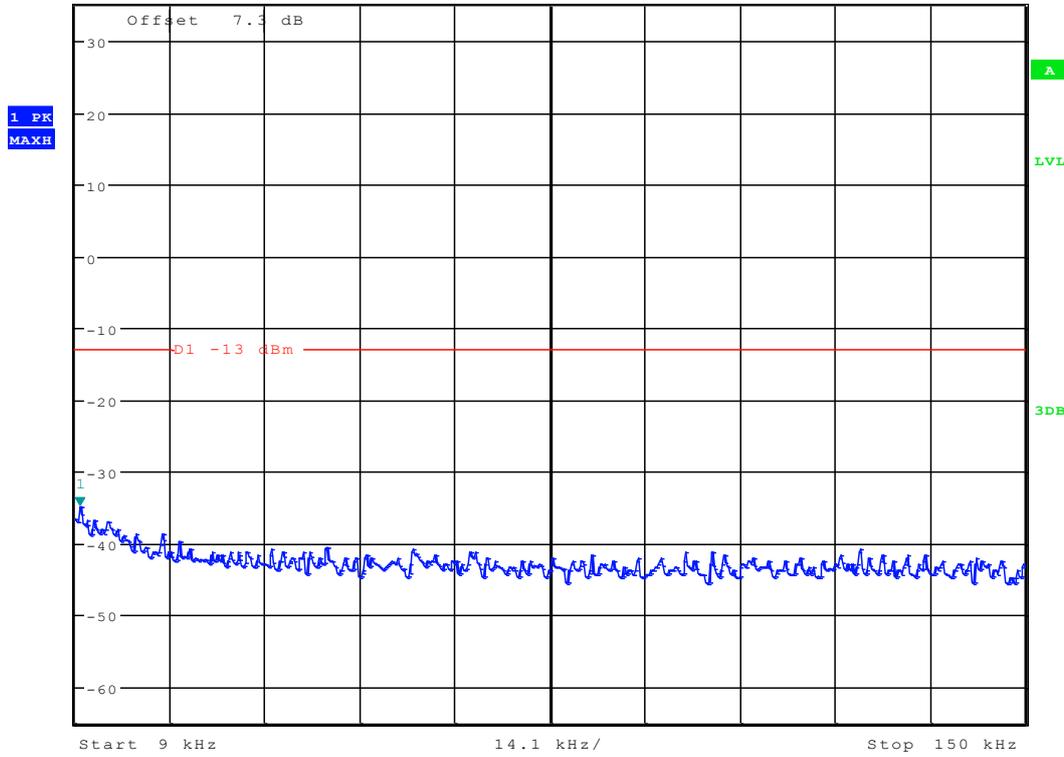
Date: 18.NOV.2011 23:37:12



1.2.3.2 QPSK/1RBs /RB #max



*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -34.87 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 9.677884615 kHz



Date: 18.NOV.2011 22:56:44



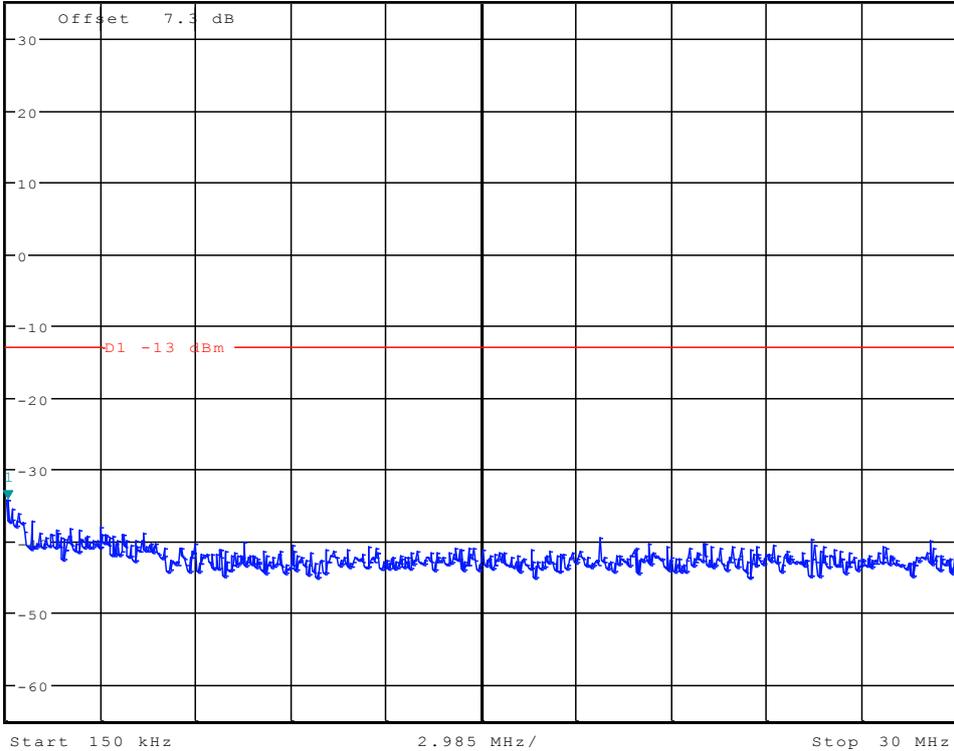
*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -34.16 dBm
SWT 300 ms 197.836538462 kHz

Ref 35 dBm

Att 55 dB

SWT 300 ms

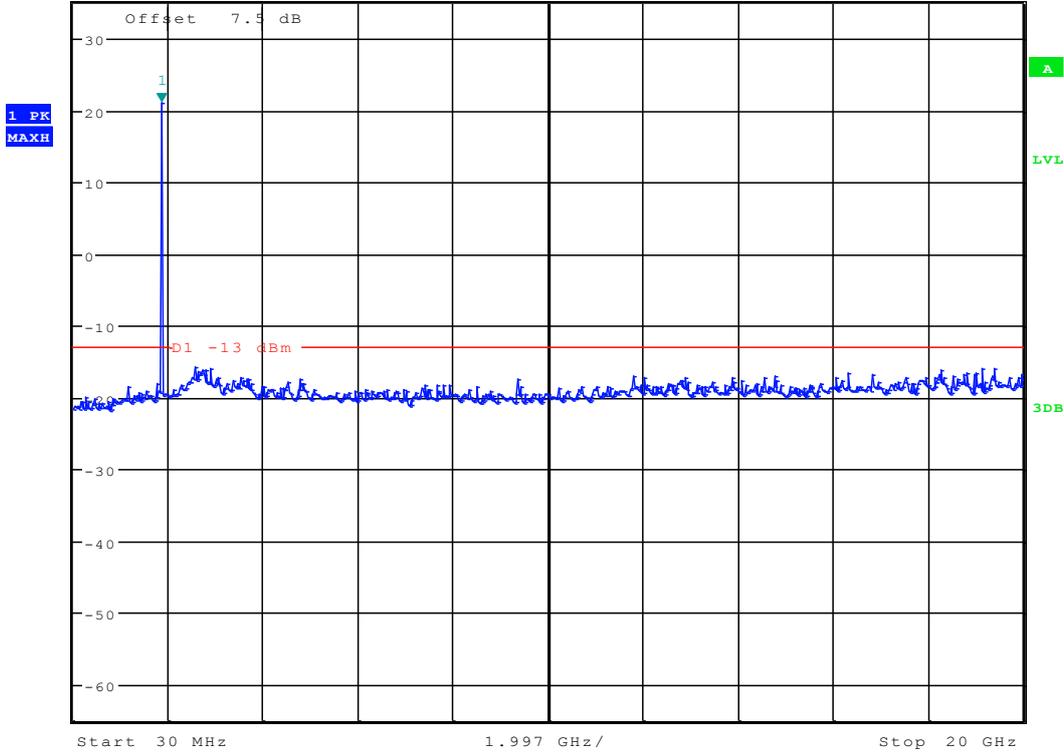
197.836538462 kHz



Date: 18.NOV.2011 23:10:05



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 21.08 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.886185897 GHz



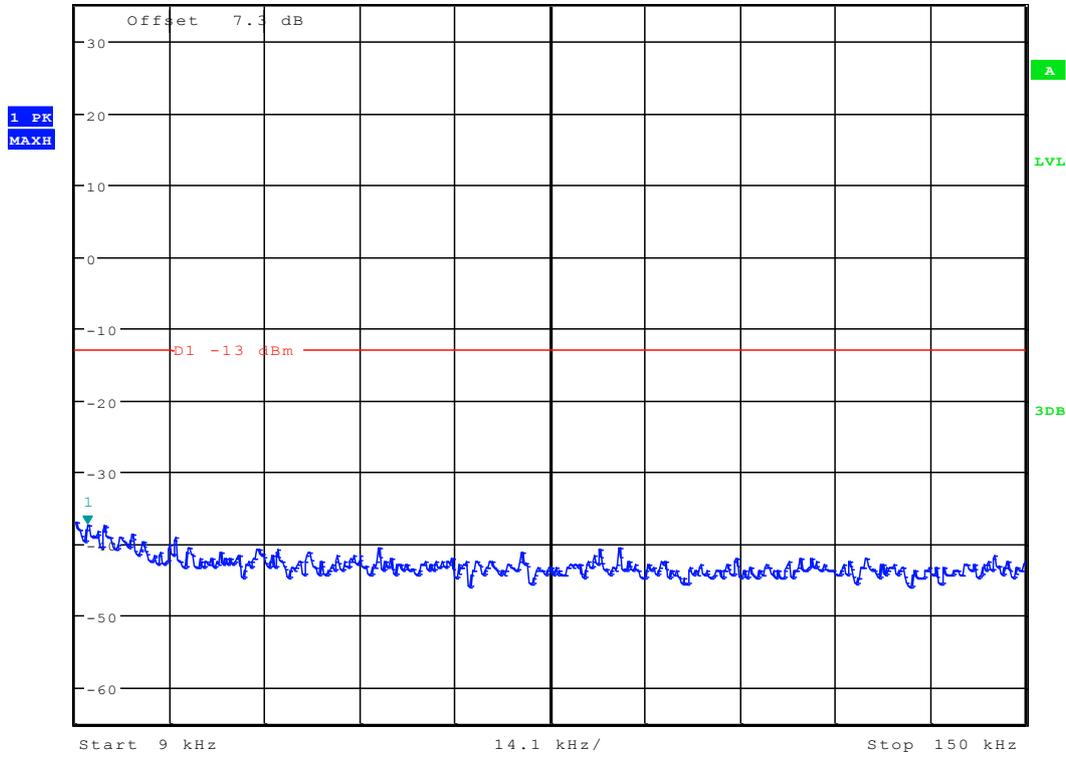
Date: 18.NOV.2011 23:37:32



1.2.3.3 QPSK/full RBs



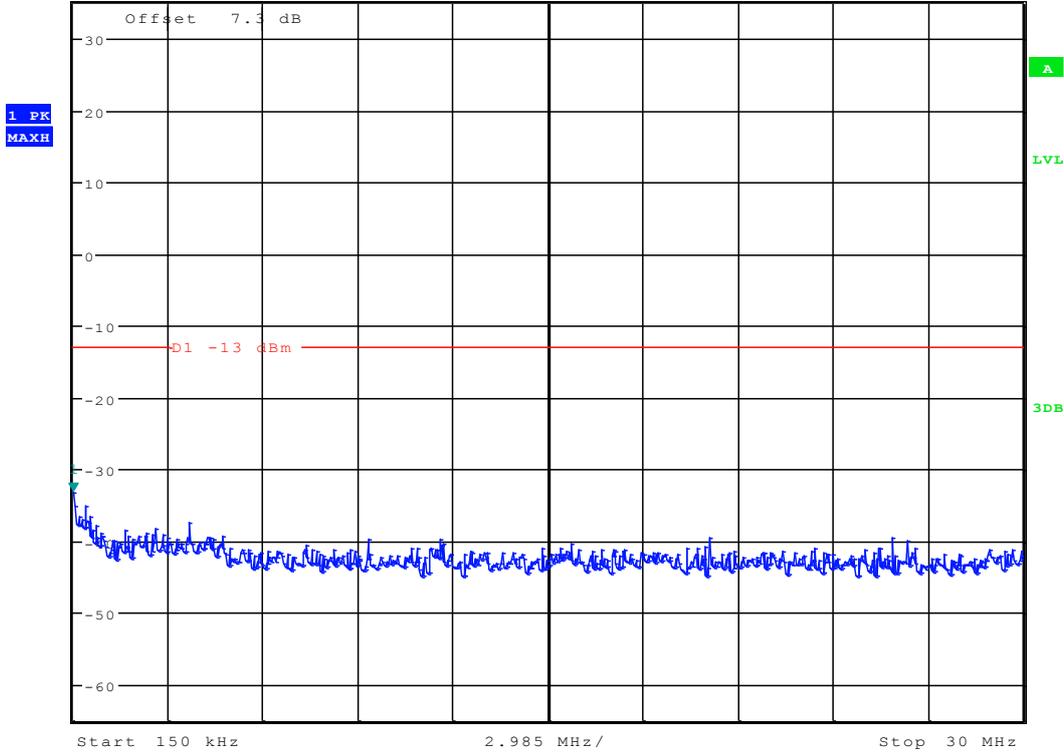
*RBW 1 kHz Marker 1 [T1]
 *VBW 10 kHz -37.47 dBm
 Ref 35 dBm Att 55 dB SWT 145 ms 10.807692308 kHz



Date: 18.NOV.2011 22:57:10



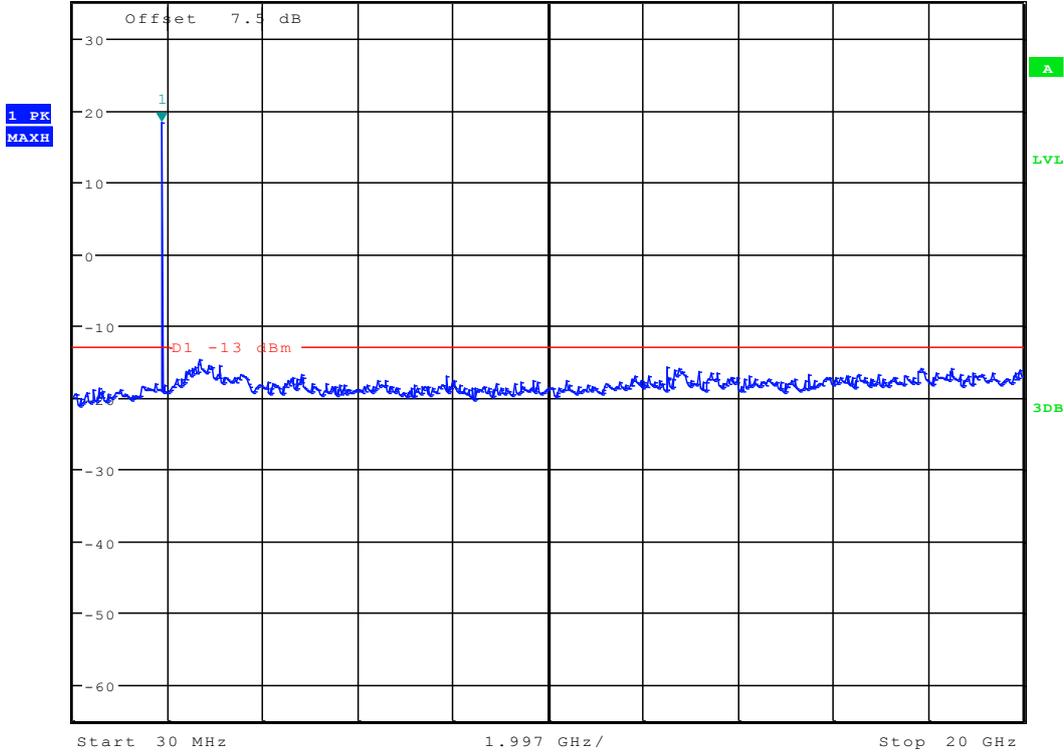
* RBW 10 kHz Marker 1 [T1]
 * VBW 30 kHz -33.12 dBm
 Ref 35 dBm Att 55 dB SWT 300 ms 150.00000000 kHz



Date: 18.NOV.2011 23:09:31



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 18.20 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.886185897 GHz



Date: 18.NOV.2011 23:38:09



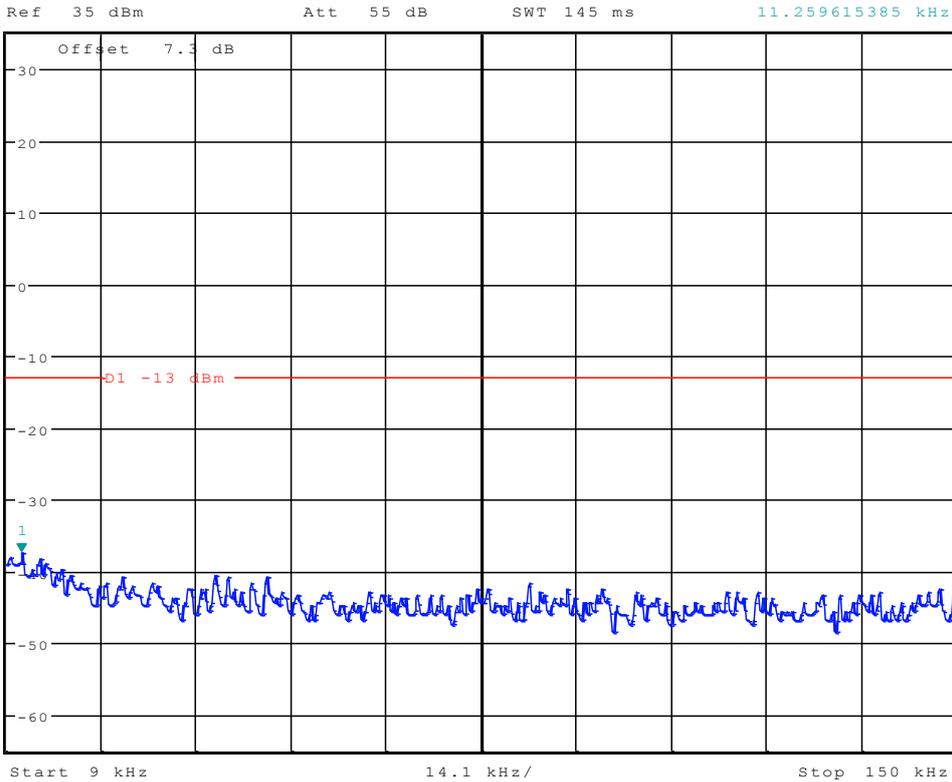
1.3 Channel Bandwidth = Highest (10 MHz)

1.3.1 Channel = B

1.3.1.1 QPSK/1RBs /RB #0



*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -37.27 dBm
SWT 145 ms 11.259615385 kHz



Date: 18.NOV.2011 22:31:40



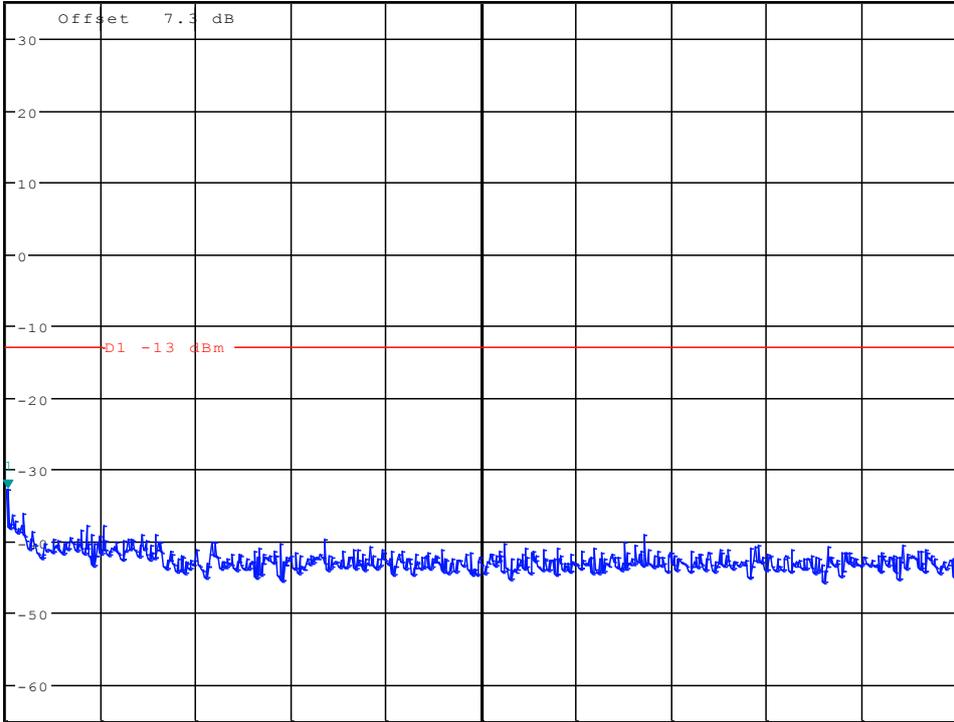
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -32.70 dBm
SWT 300 ms 197.836538462 kHz

Ref 35 dBm

Att 55 dB

SWT 300 ms

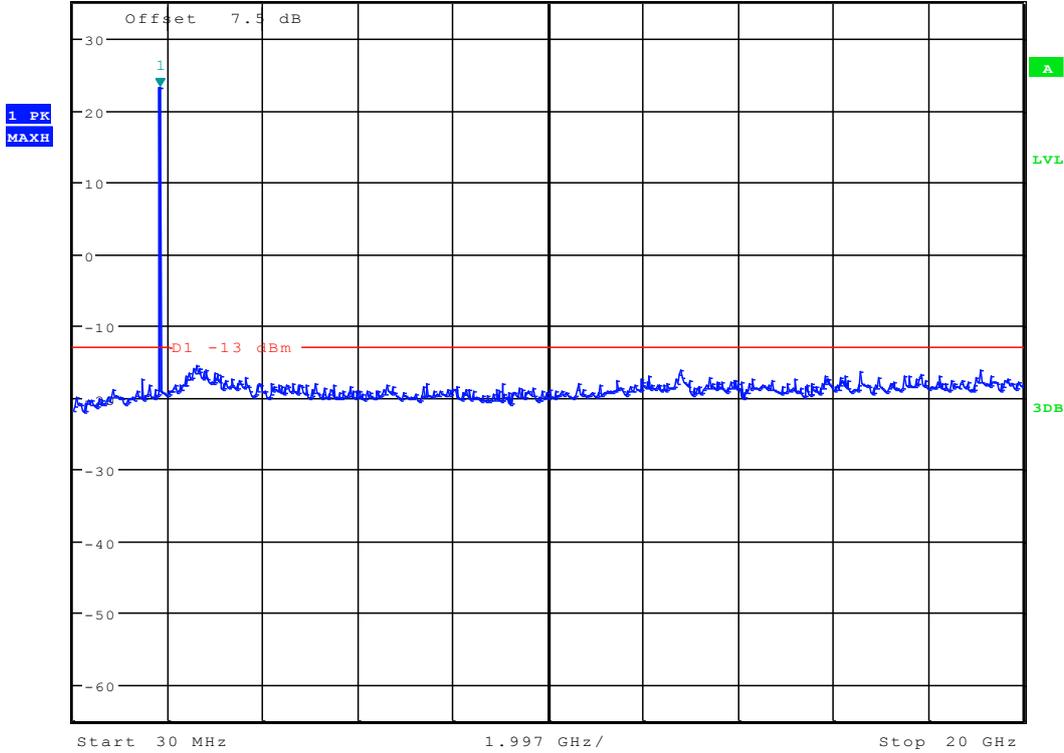
197.836538462 kHz



Date: 18.NOV.2011 23:19:50



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 23.15 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.854182692 GHz



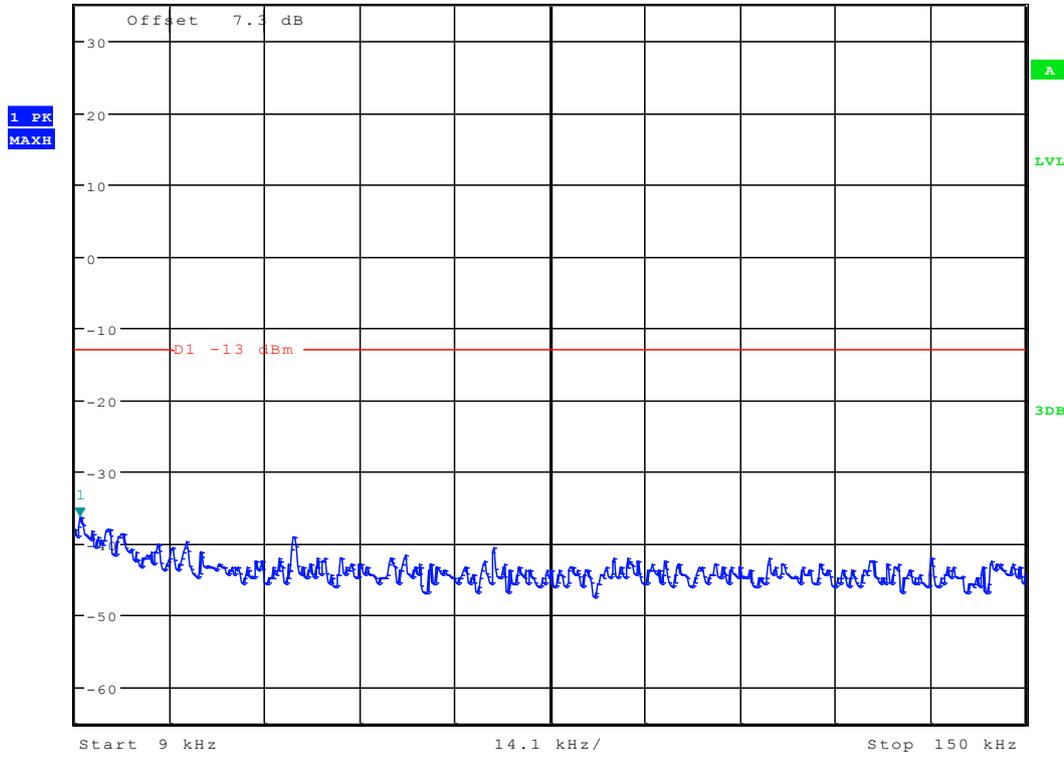
Date: 18.NOV.2011 23:29:07



1.3.1.2 QPSK/1RBs /RB #max



*RBW 1 kHz Marker 1 [T1]
 *VBW 10 kHz -36.34 dBm
 Ref 35 dBm Att 55 dB SWT 145 ms 9.677884615 kHz



Date: 18.NOV.2011 22:33:15

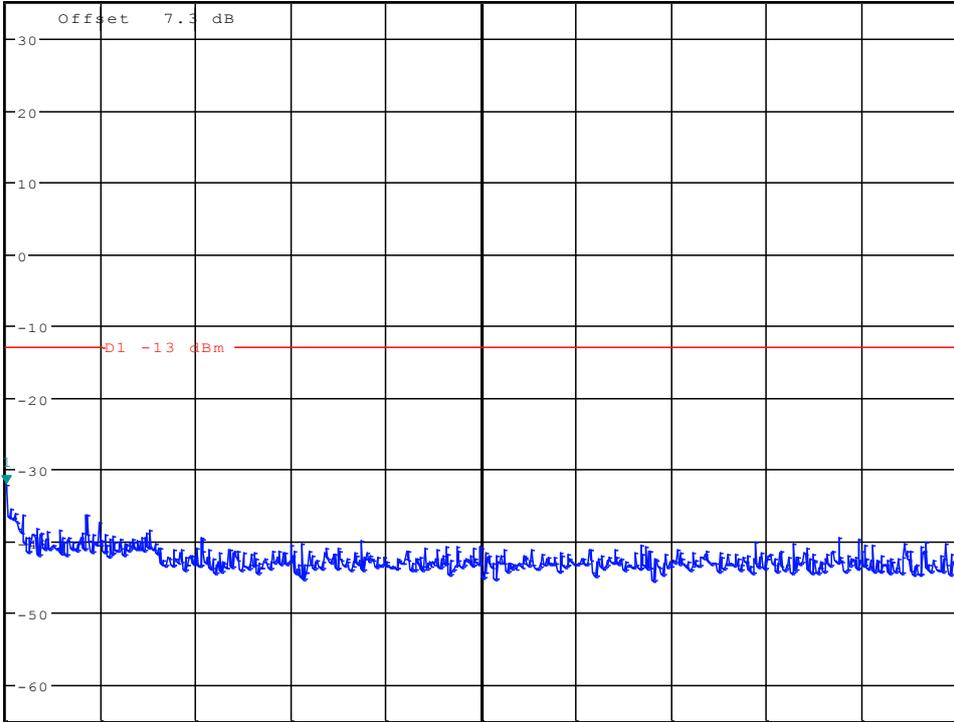


* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -32.19 dBm
SWT 300 ms 150.00000000 kHz

Ref 35 dBm

Att 55 dB

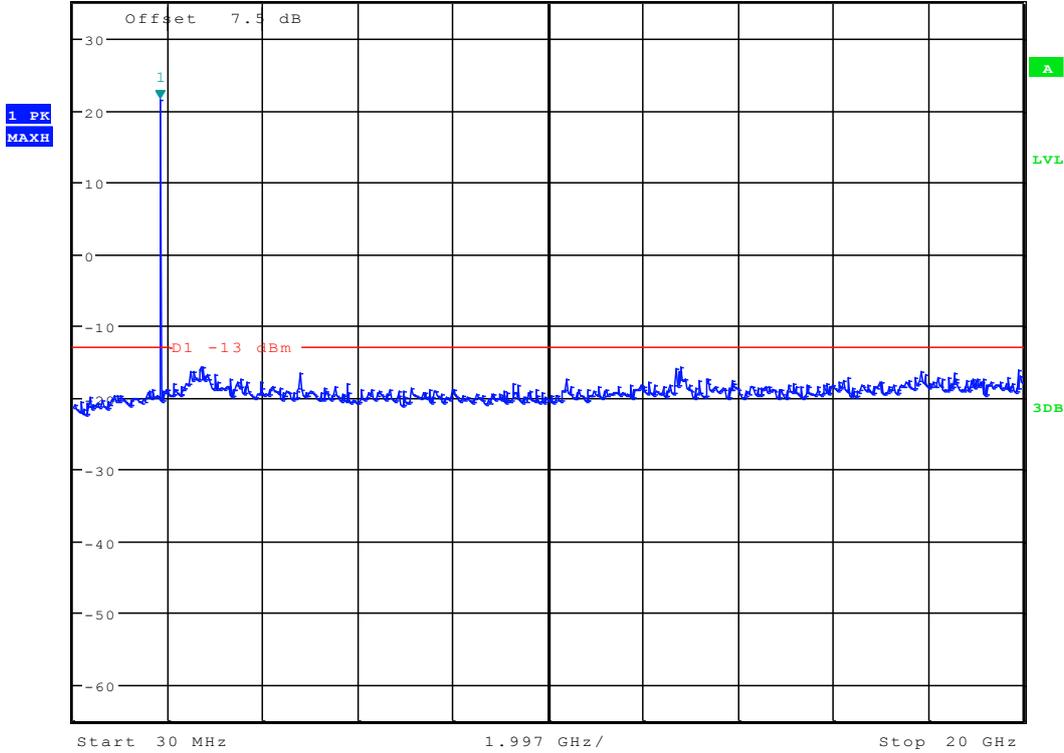
1 PK
MAXH



Date: 18.NOV.2011 23:20:08



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 21.42 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.854182692 GHz



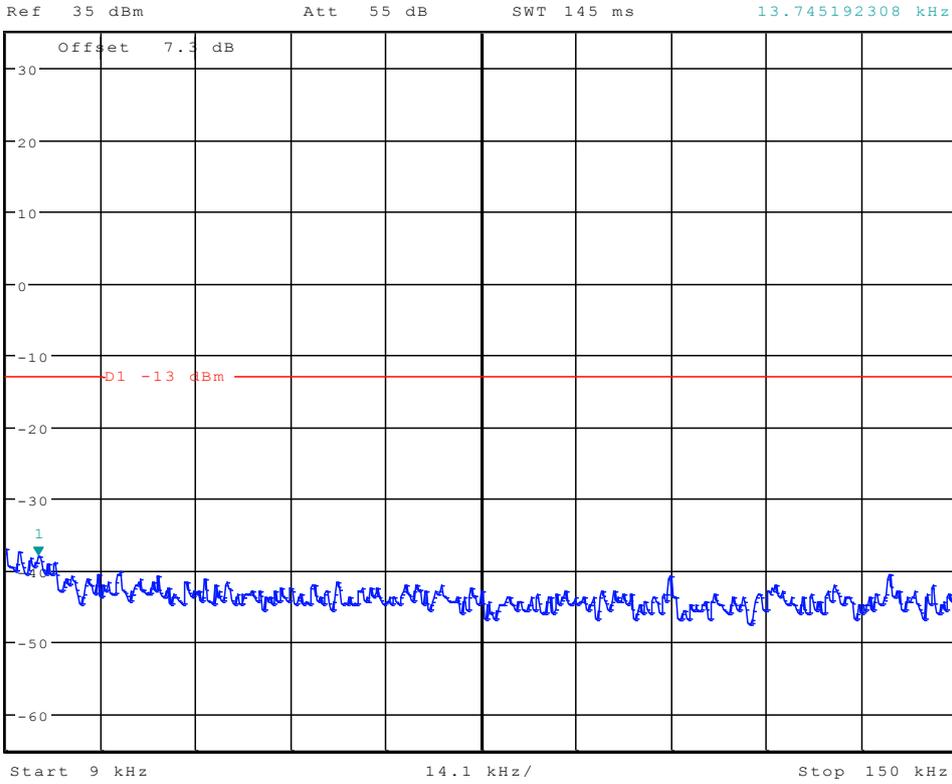
Date: 18.NOV.2011 23:29:22



1.3.1.3 QPSK/full RBs



*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -37.99 dBm
SWT 145 ms 13.745192308 kHz



Date: 18.NOV.2011 22:33:38



* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -33.69 dBm
SWT 300 ms 197.836538462 kHz

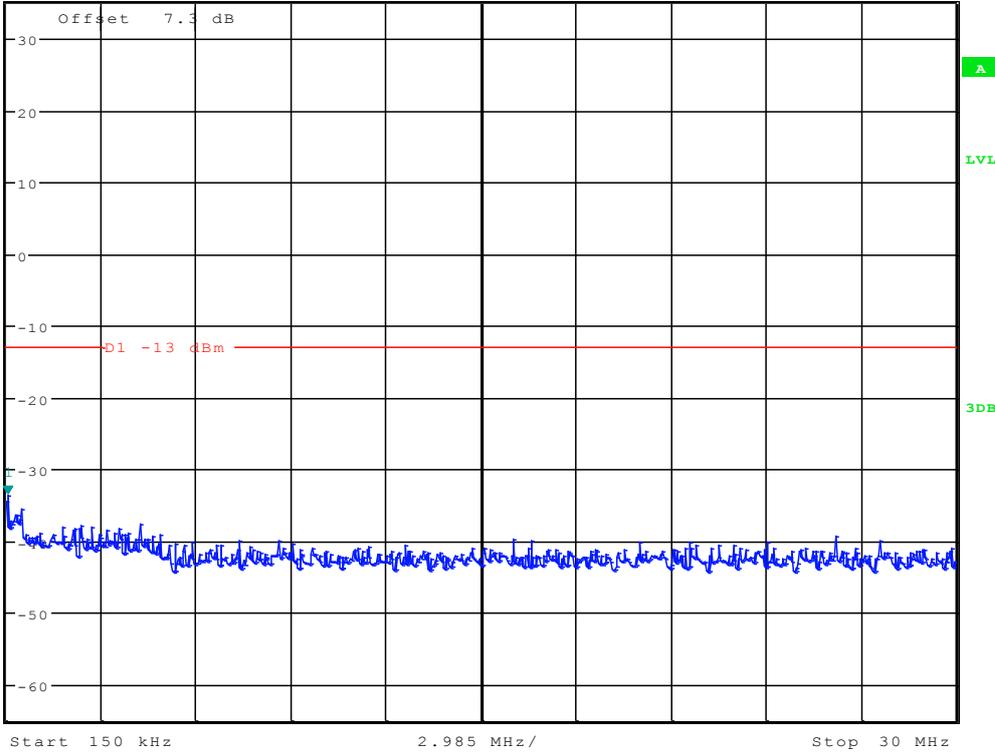
Ref 35 dBm

Att 55 dB

SWT 300 ms

197.836538462 kHz

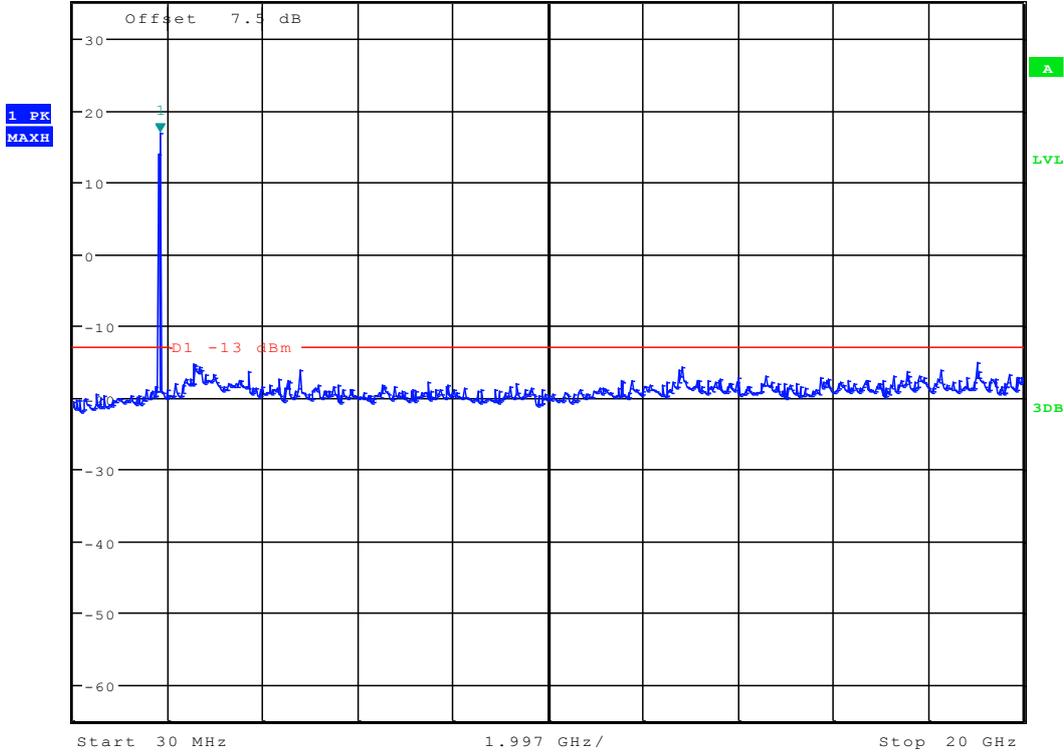
1 PK
MAXH



Date: 18.NOV.2011 23:19:28



* RBW 1 MHz Marker 1 [T1]
 * VBW 3 MHz 16.80 dBm
 Ref 35 dBm Att 55 dB SWT 115 ms 1.854182692 GHz

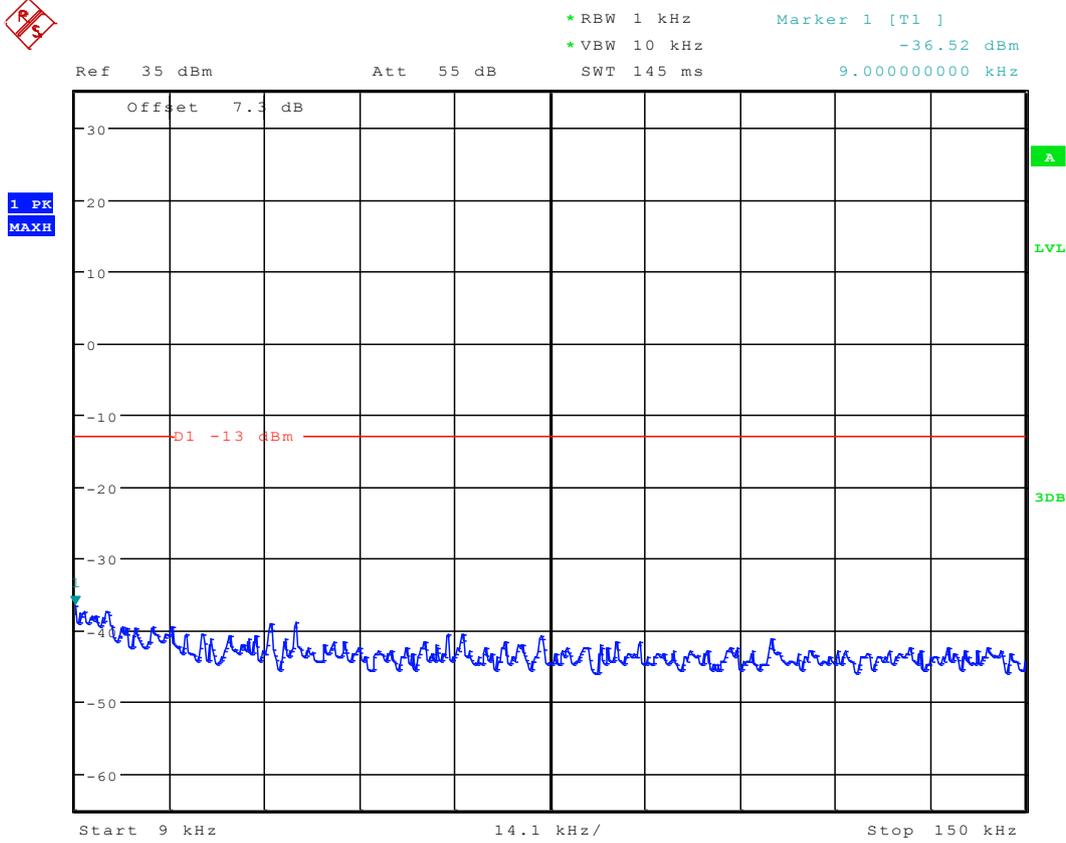


Date: 18.NOV.2011 23:29:36



1.3.2 Frequency = M

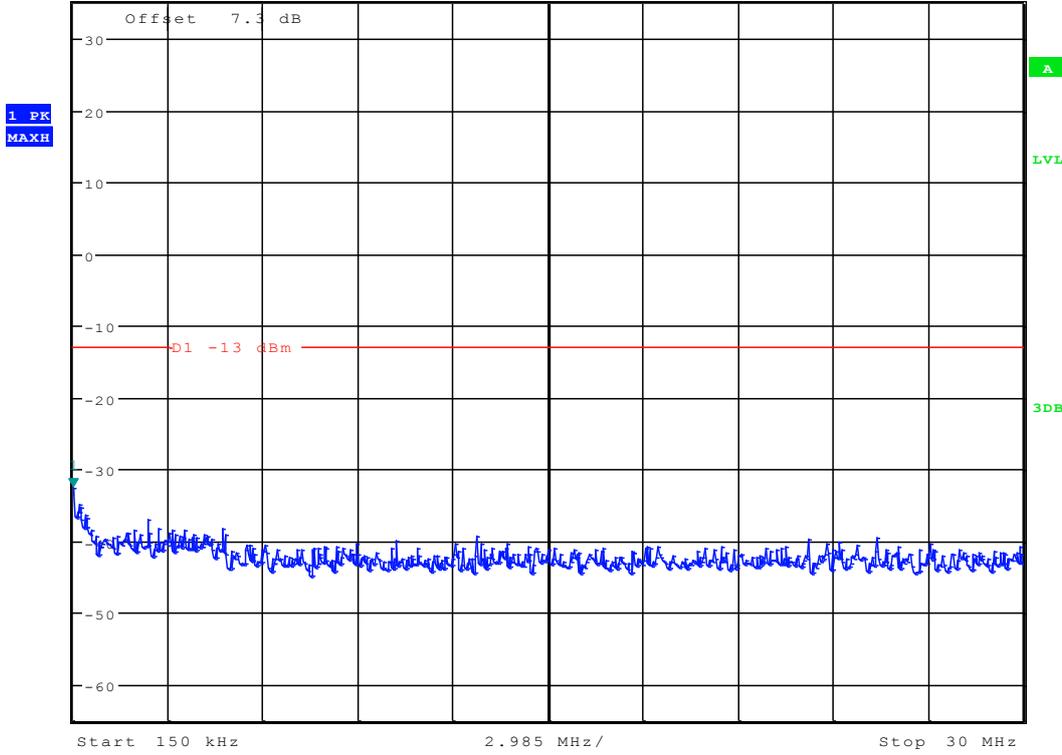
1.3.2.1 QPSK/1RBs /RB #0



Date: 18.NOV.2011 22:47:41



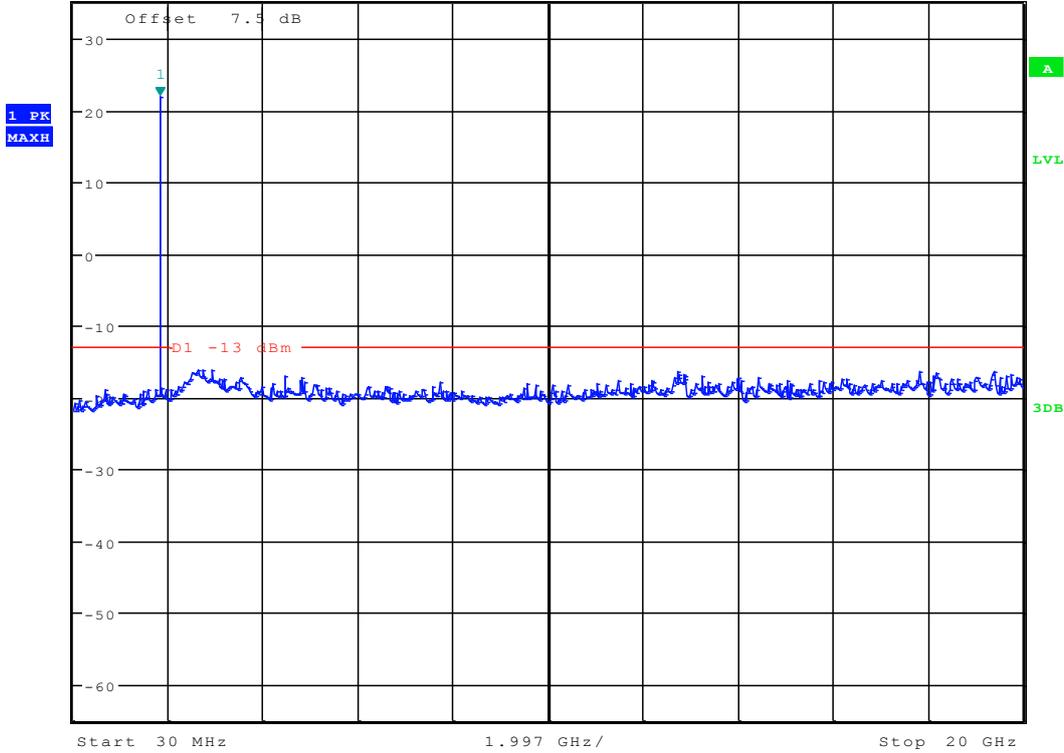
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -32.53 dBm
Ref 35 dBm Att 55 dB SWT 300 ms 150.00000000 kHz



Date: 18.NOV.2011 23:14:23



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 21.94 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.854182692 GHz



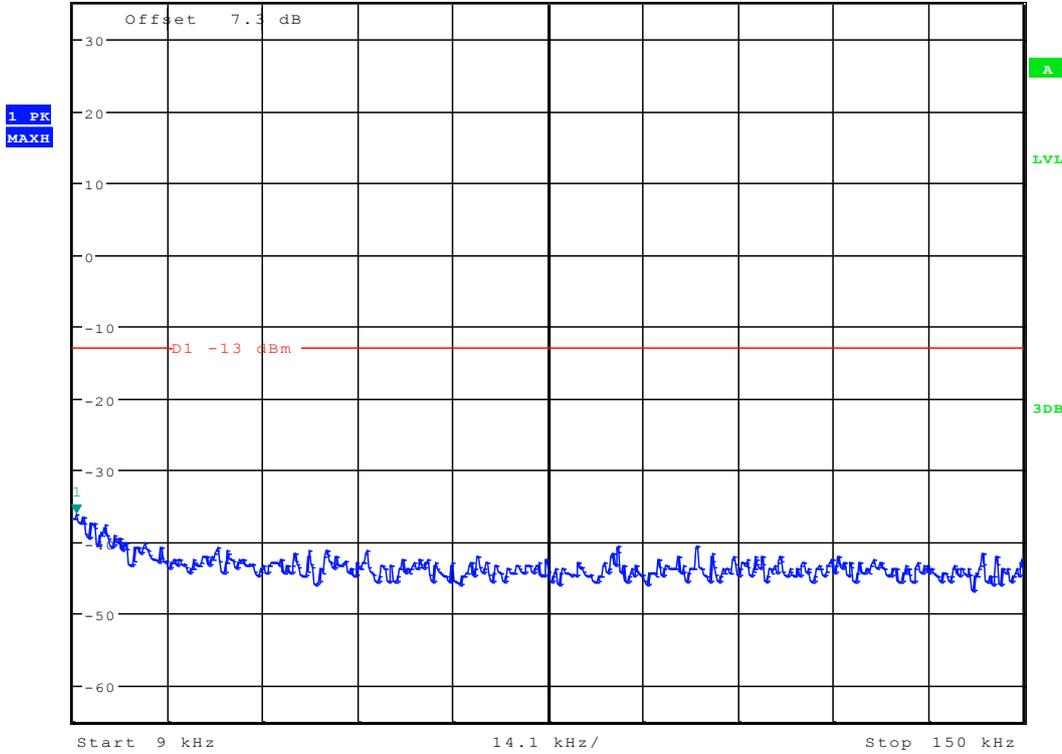
Date: 18.NOV.2011 23:34:00



1.3.2.2 QPSK/1RBs /RB #max



*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -36.08 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 9.451923077 kHz



Date: 18.NOV.2011 22:48:05



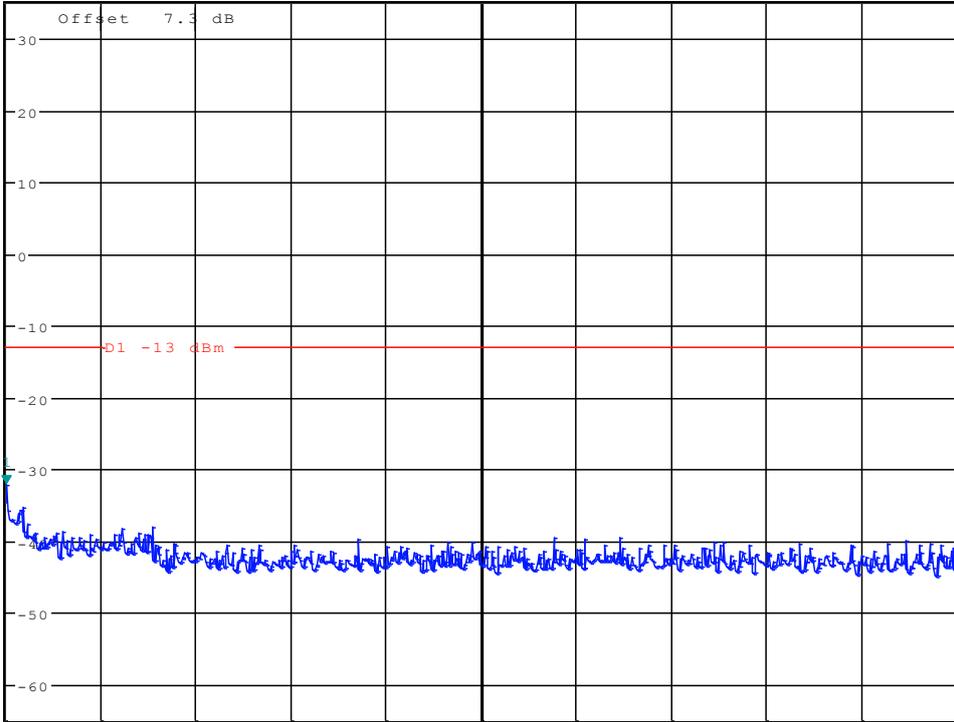
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -32.03 dBm
SWT 300 ms 150.00000000 kHz

Ref 35 dBm

Att 55 dB

SWT 300 ms

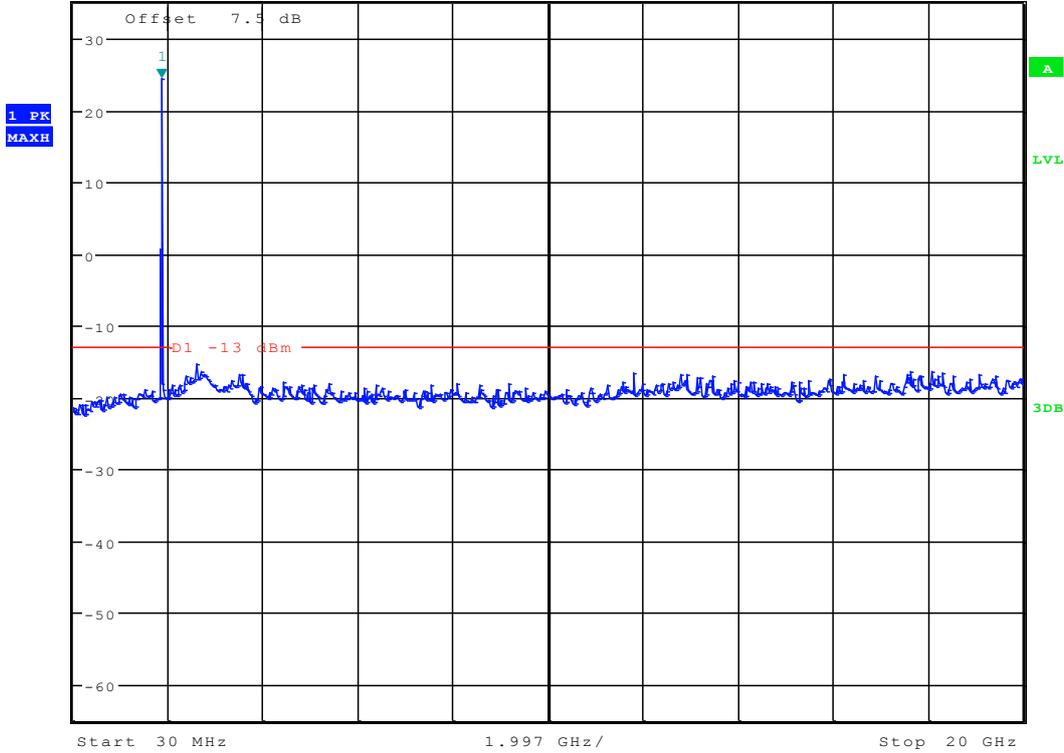
150.00000000 kHz



Date: 18.NOV.2011 23:14:43



* RBW 1 MHz Marker 1 [T1]
 * VBW 3 MHz 24.35 dBm
 Ref 35 dBm Att 55 dB SWT 115 ms 1.886185897 GHz



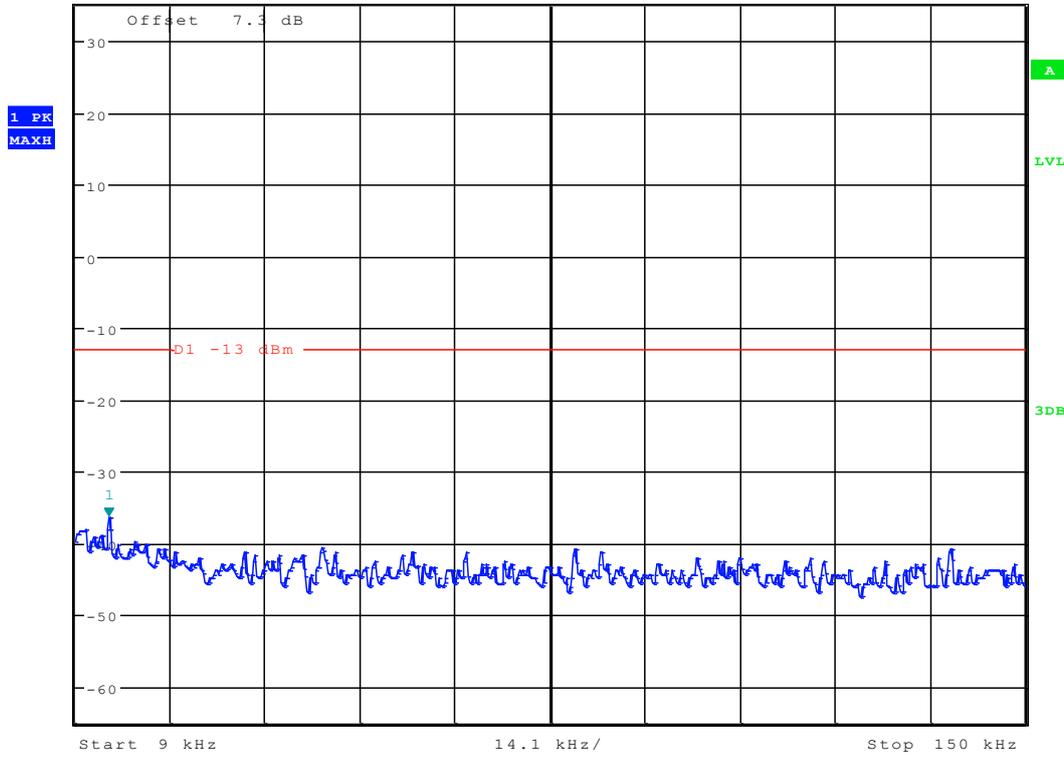
Date: 18.NOV.2011 23:34:13



1.3.2.3 QPSK/full RBs



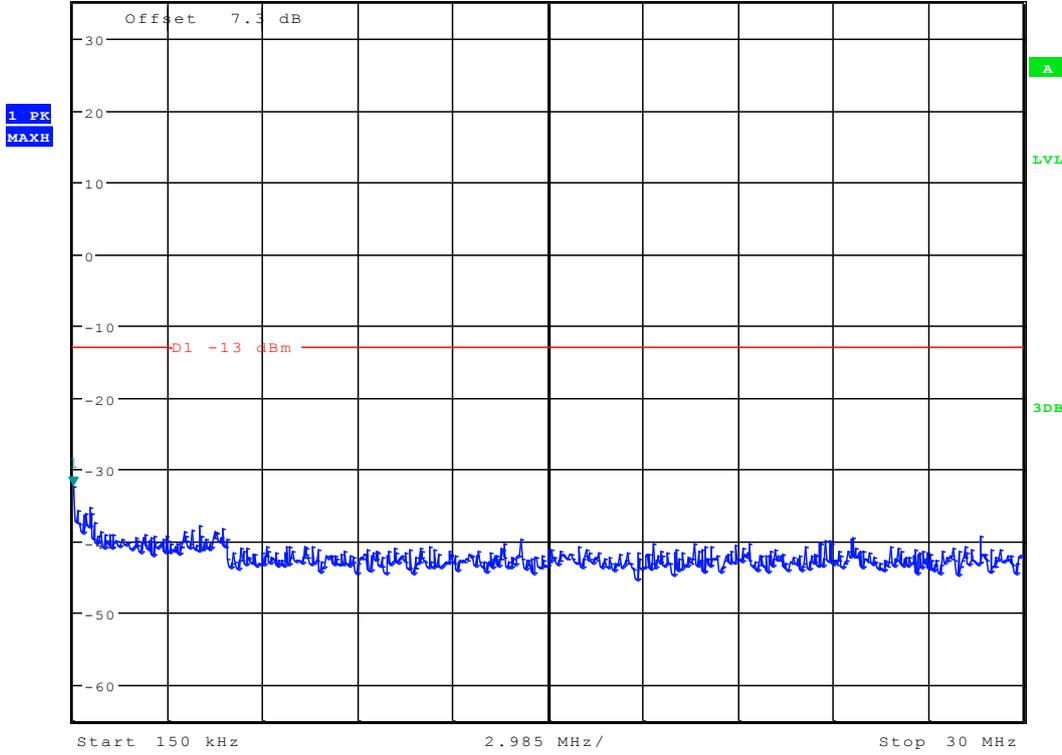
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -36.34 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 13.971153846 kHz



Date: 18.NOV.2011 22:48:24



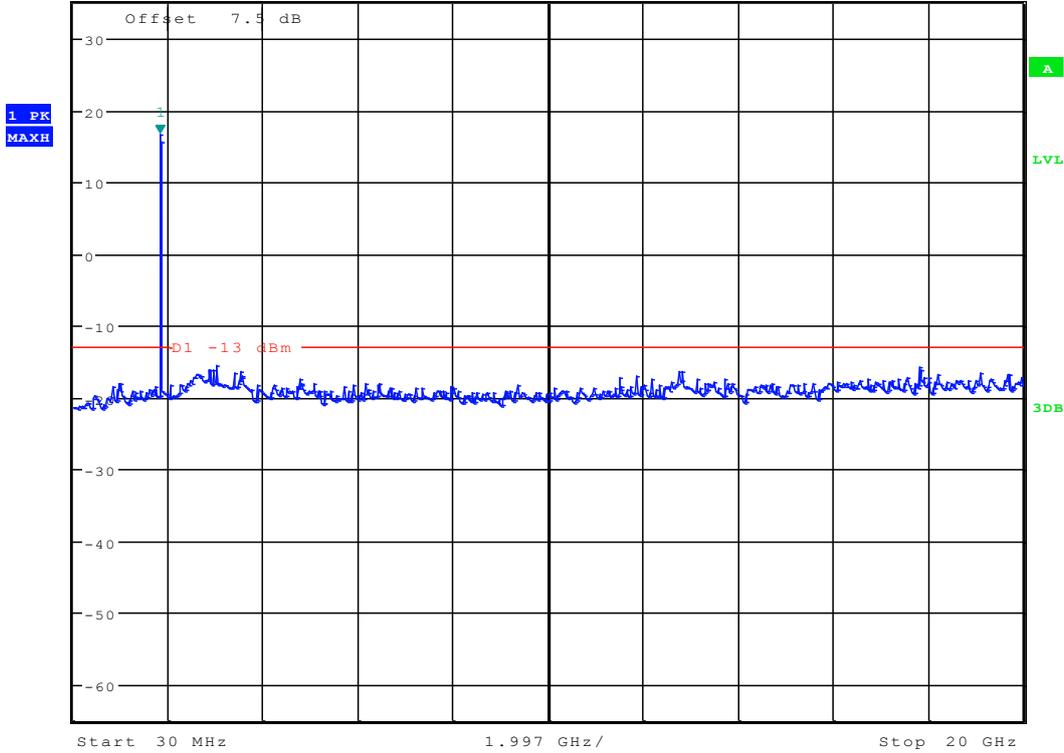
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -32.41 dBm
Ref 35 dBm Att 55 dB SWT 300 ms 150.00000000 kHz



Date: 18.NOV.2011 23:14:05



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 16.68 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.854182692 GHz



Date: 18.NOV.2011 23:34:30



1.3.3 Channel = T

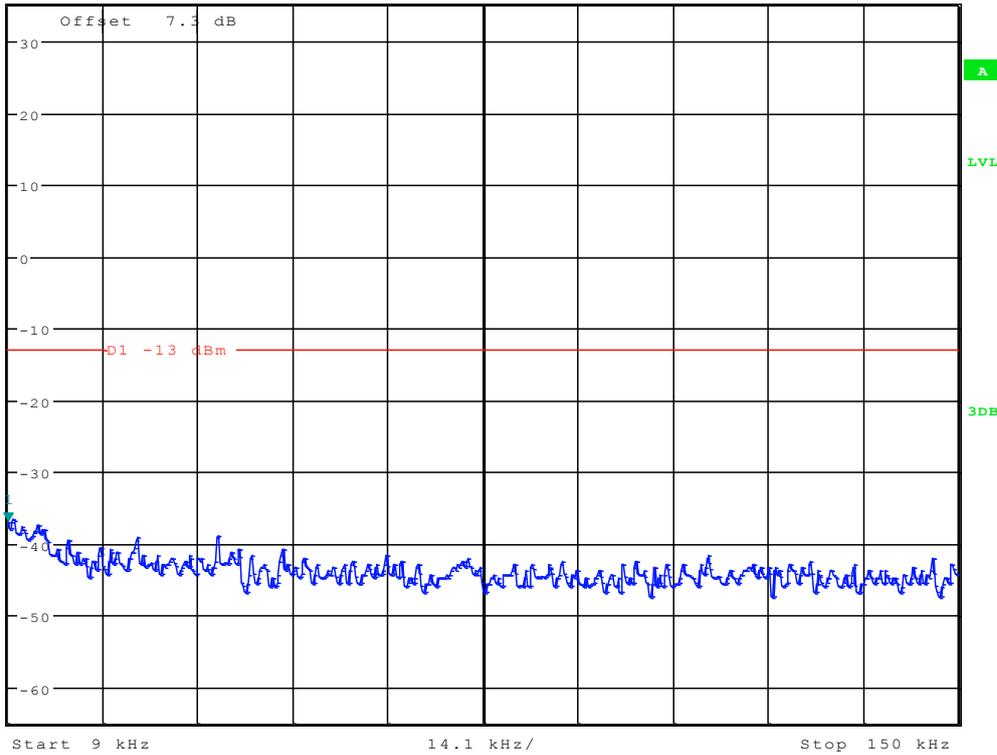
1.3.3.1 QPSK/1RBs /RB #0



*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -36.98 dBm

Ref 35 dBm Att 55 dB SWT 145 ms 9.000000000 kHz

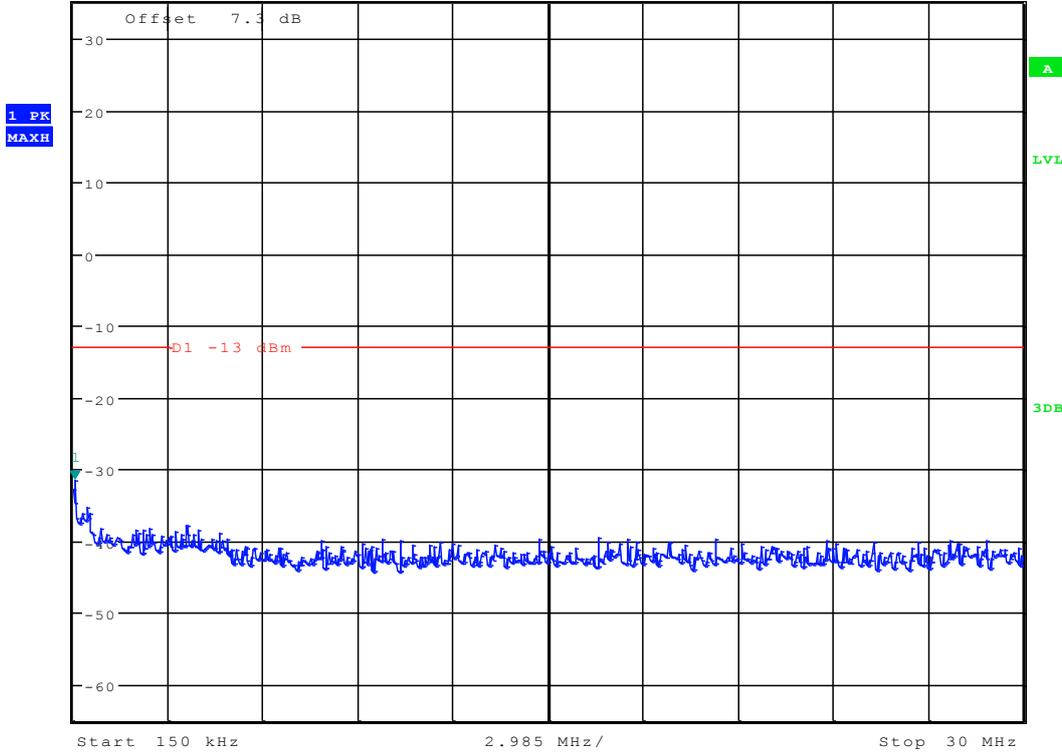
1 PK
MAXH



Date: 18.NOV.2011 23:05:42



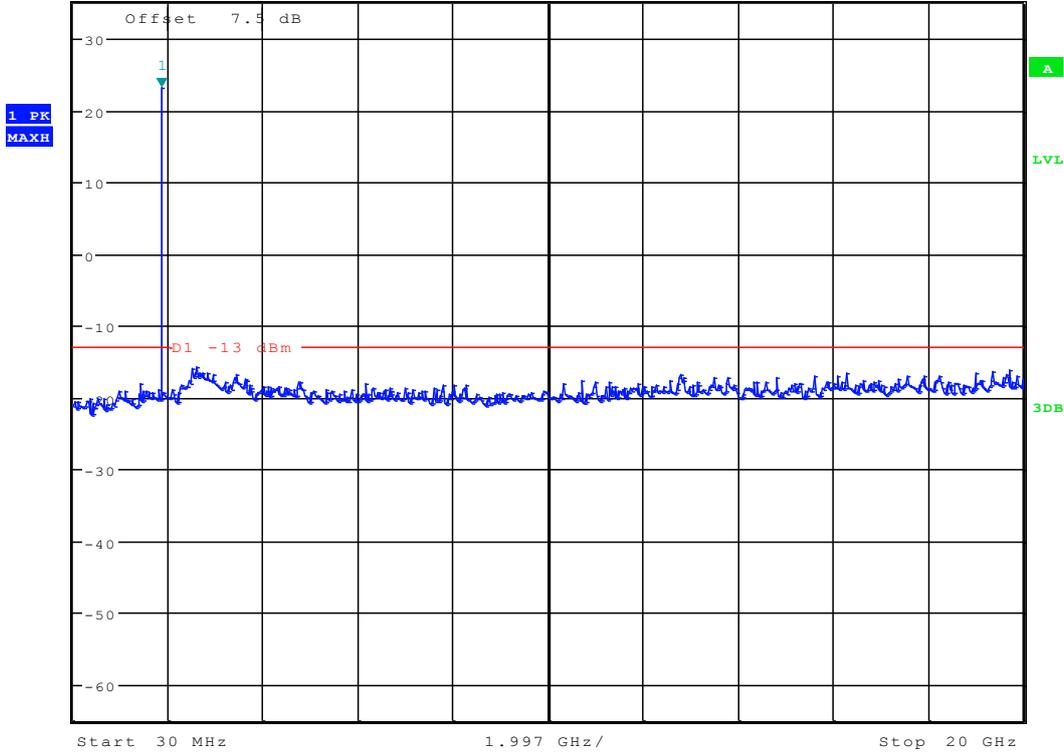
* RBW 10 kHz Marker 1 [T1]
 * VBW 30 kHz -31.50 dBm
 Ref 35 dBm Att 55 dB SWT 300 ms 197.836538462 kHz



Date: 18.NOV.2011 23:08:00



* RBW 1 MHz Marker 1 [T1]
 * VBW 3 MHz 23.20 dBm
 Ref 35 dBm Att 55 dB SWT 115 ms 1.886185897 GHz



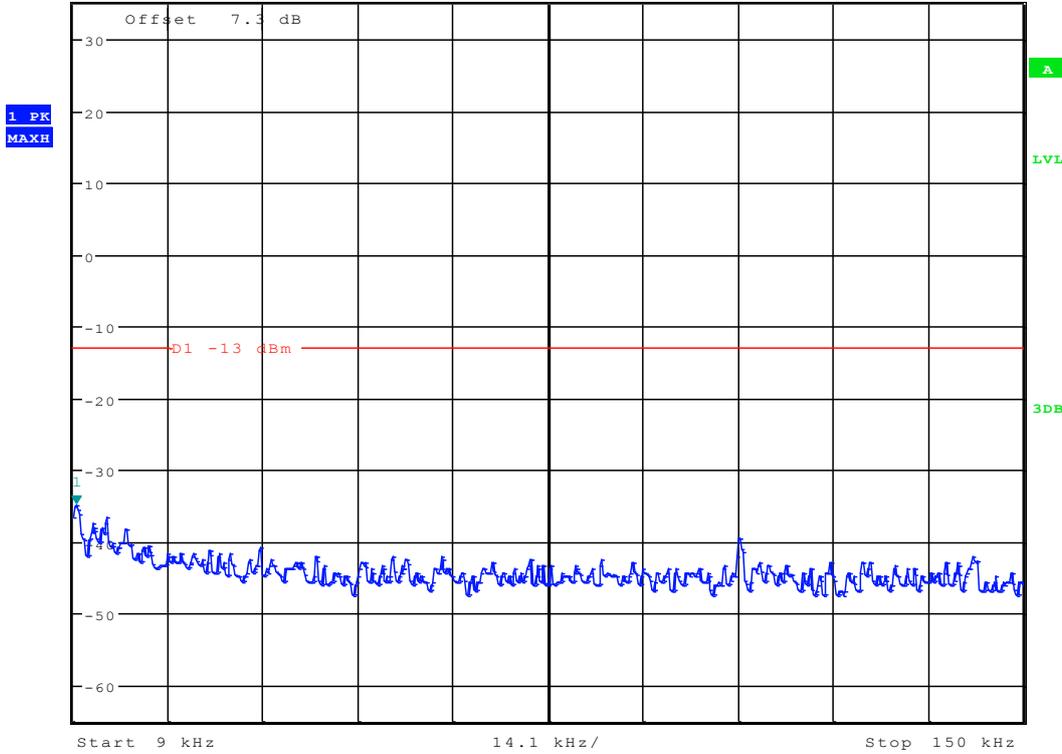
Date: 18.NOV.2011 23:43:38



1.3.3.2 QPSK/1RBs /RB #max



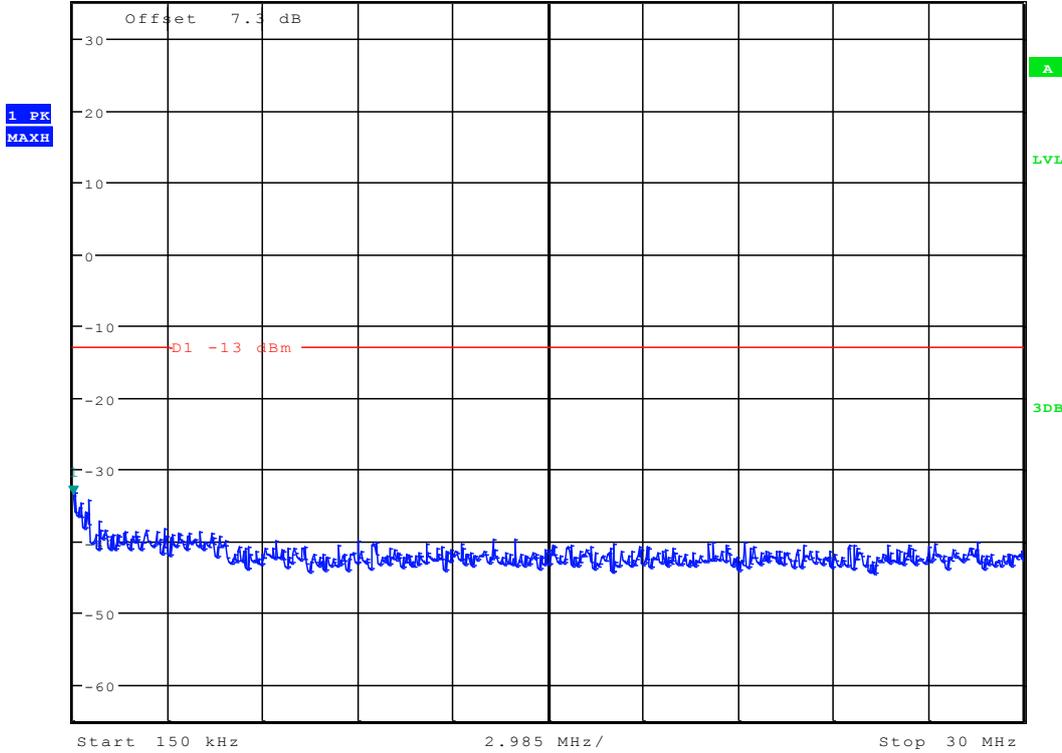
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -34.87 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 9.451923077 kHz



Date: 18.NOV.2011 23:06:00



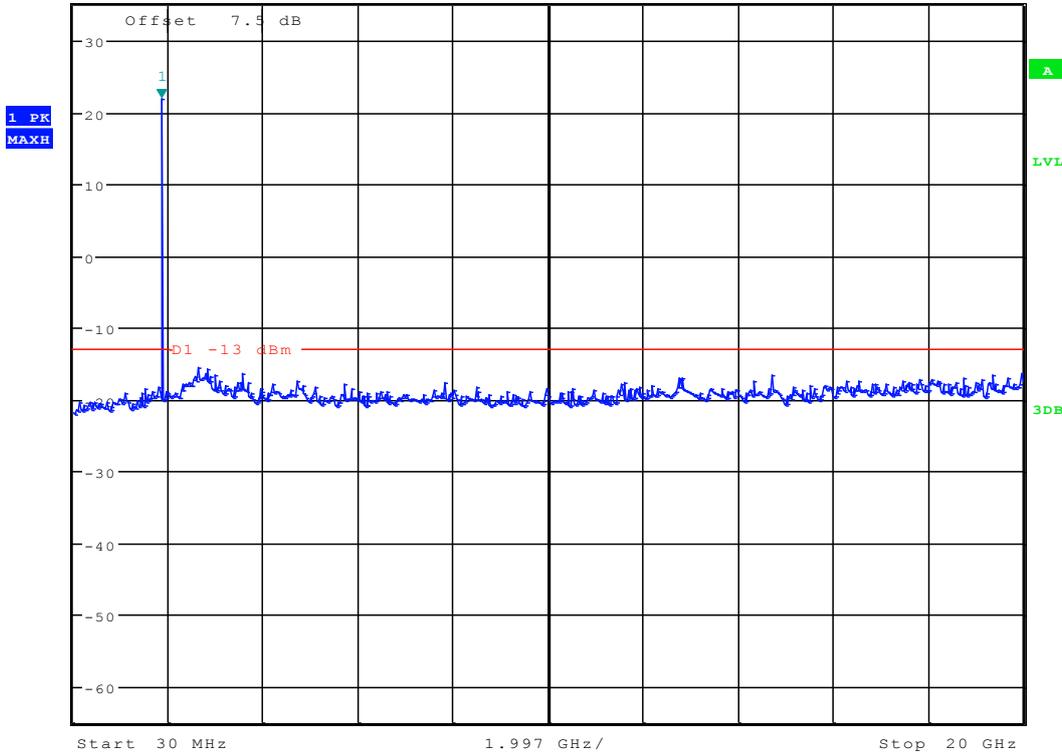
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -33.62 dBm
Ref 35 dBm Att 55 dB SWT 300 ms 150.00000000 kHz



Date: 18.NOV.2011 23:08:28



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 21.95 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.886185897 GHz



Date: 18.NOV.2011 23:43:56

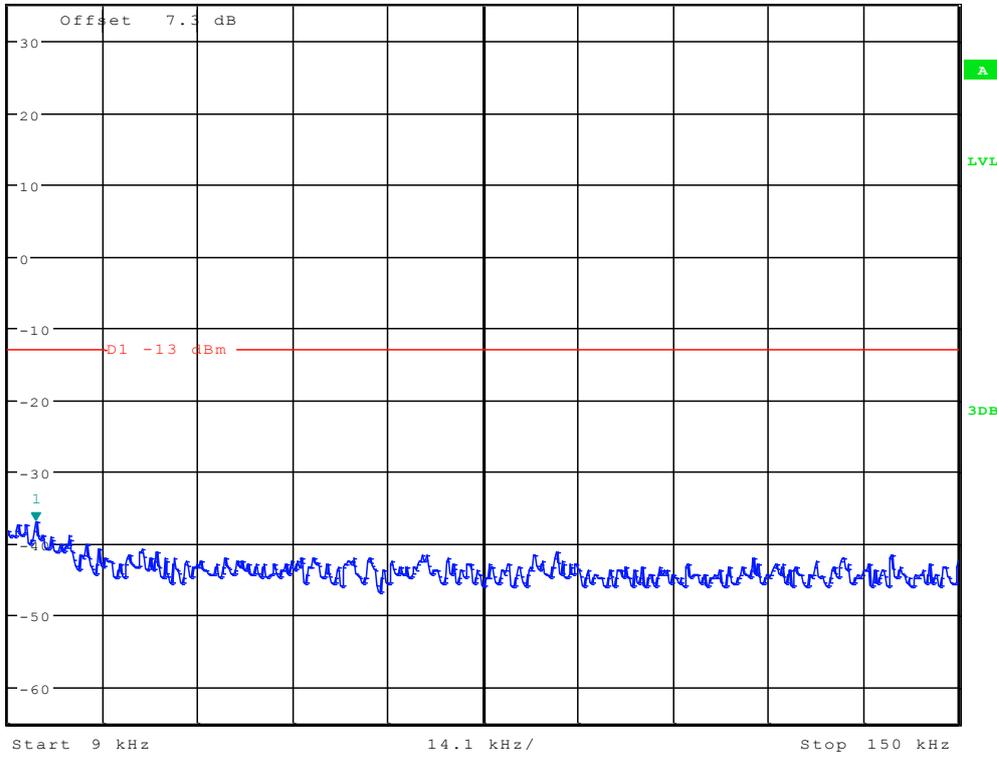


1.3.3.3 QPSK/full RBs



*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -36.98 dBm
Ref 35 dBm Att 55 dB SWT 145 ms 13.067307692 kHz

1 PK
MAXH



Date: 18.NOV.2011 23:06:21

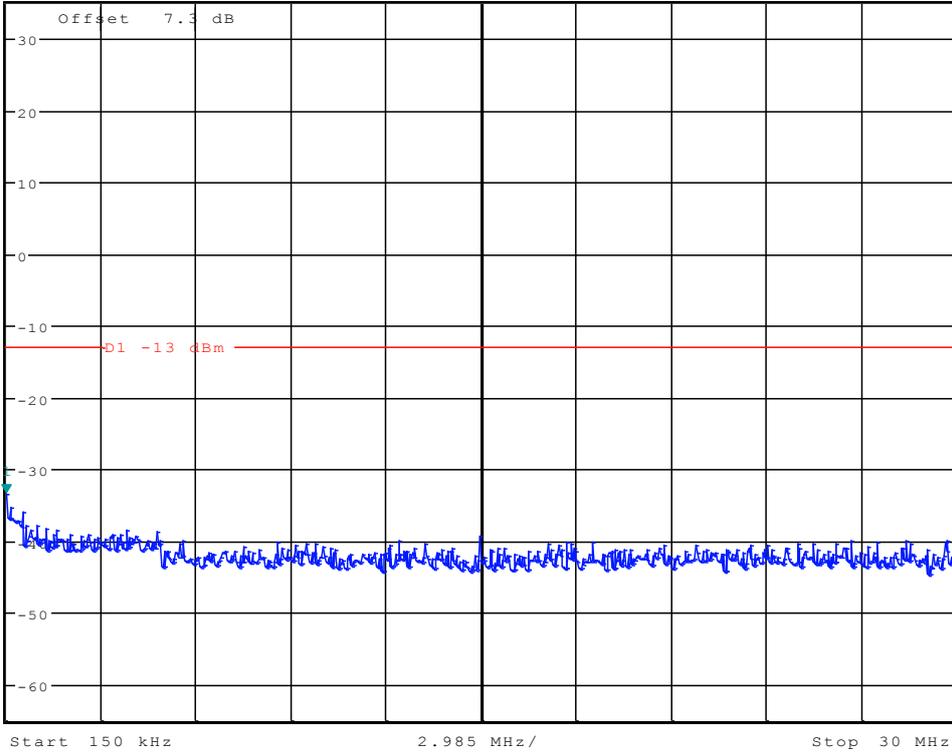


* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -33.30 dBm
SWT 300 ms 150.00000000 kHz

Ref 35 dBm

Att 55 dB

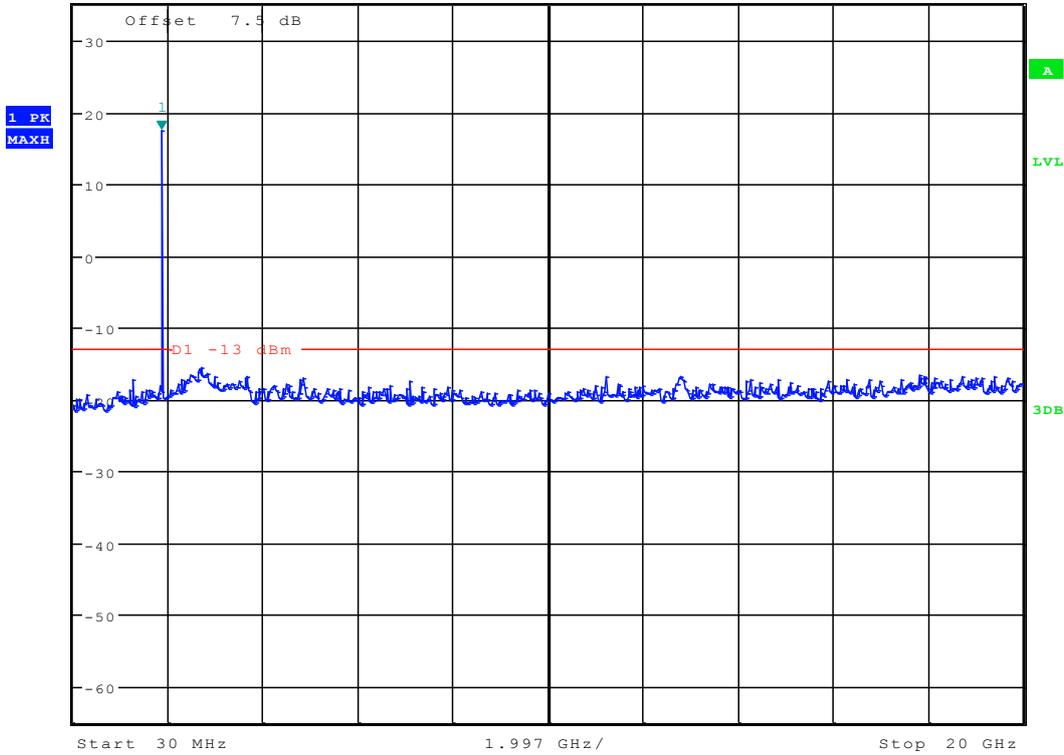
1 PK
MAXH



Date: 18.NOV.2011 23:07:03



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz 17.44 dBm
Ref 35 dBm Att 55 dB SWT 115 ms 1.886185897 GHz



Date: 18.NOV.2011 23:44:18



END



Appendix F

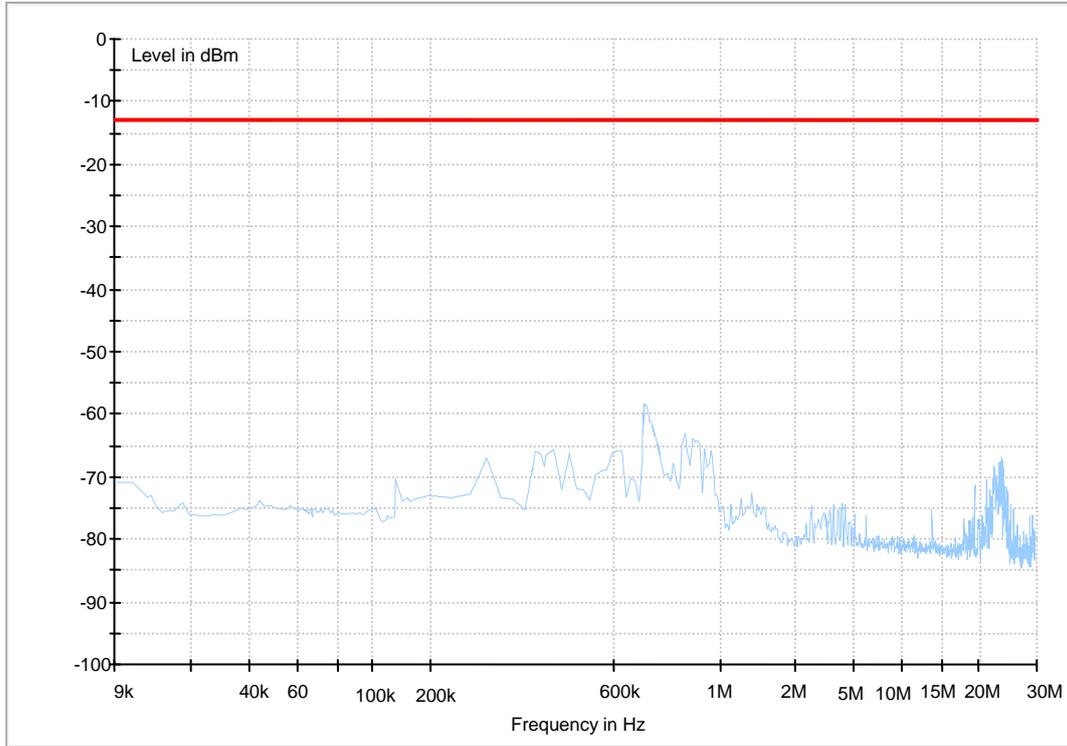
Radiated spurious emission

According to FCC Part 2.1053& Part 24.238

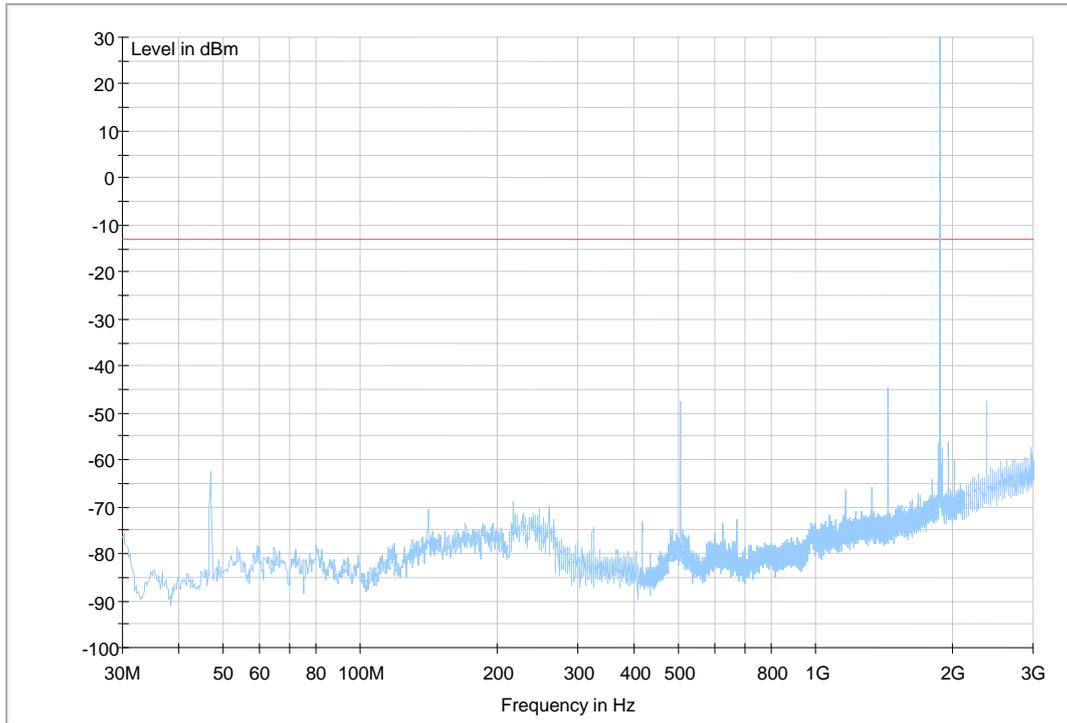


NOTE1: QPSK output power higher than 16QAM, so only test the QPSK mode.
NOTE2: All relevant operation modes have been tested, and the worst case data is included in this report.

**LTE Band 2 (1.4MHz)
(9KHz~30MHz)**

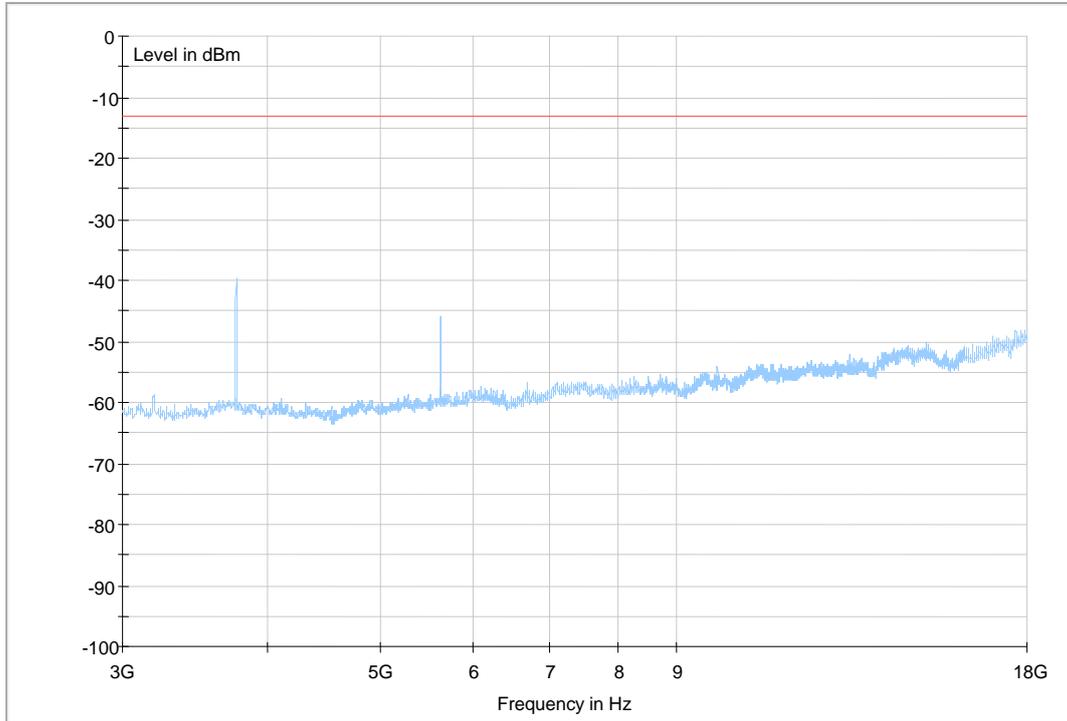


(30MHz ~3GHz)

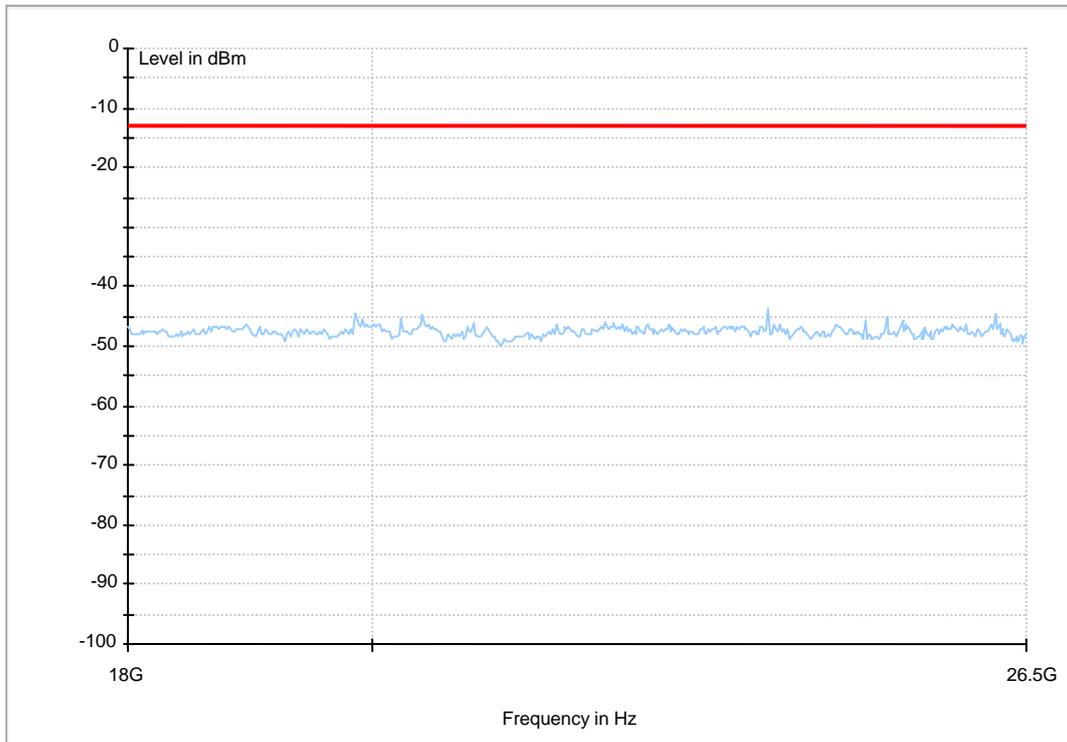




(3GHz~18GHz)



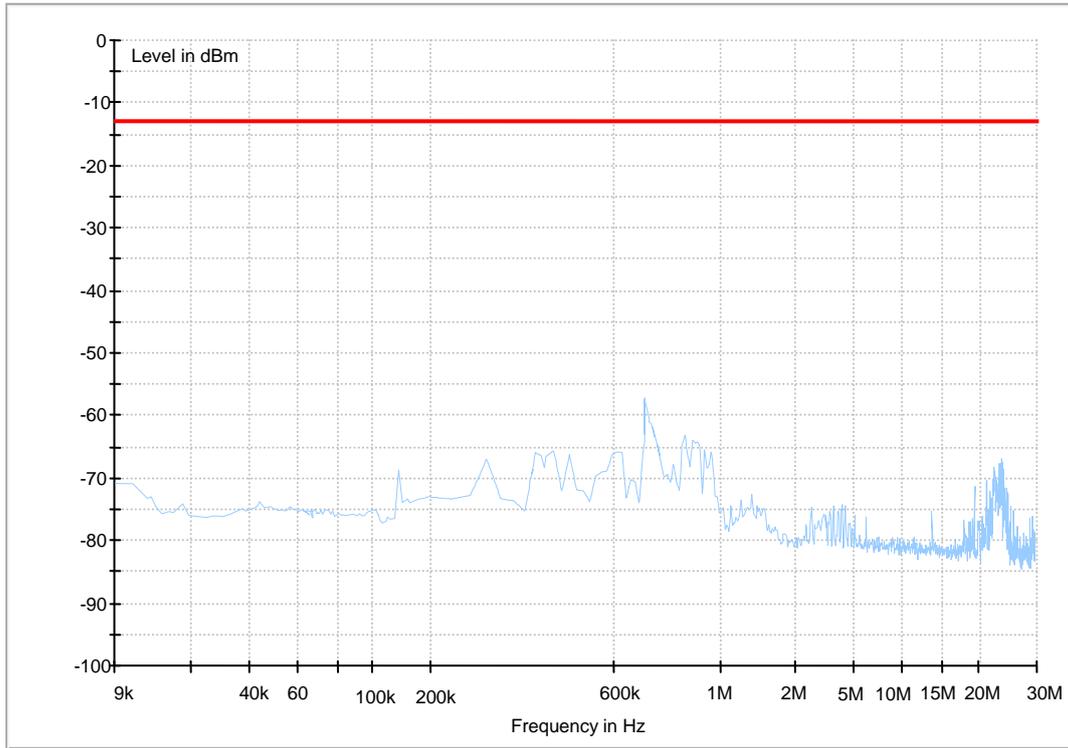
(18GHz~26.5GHz)



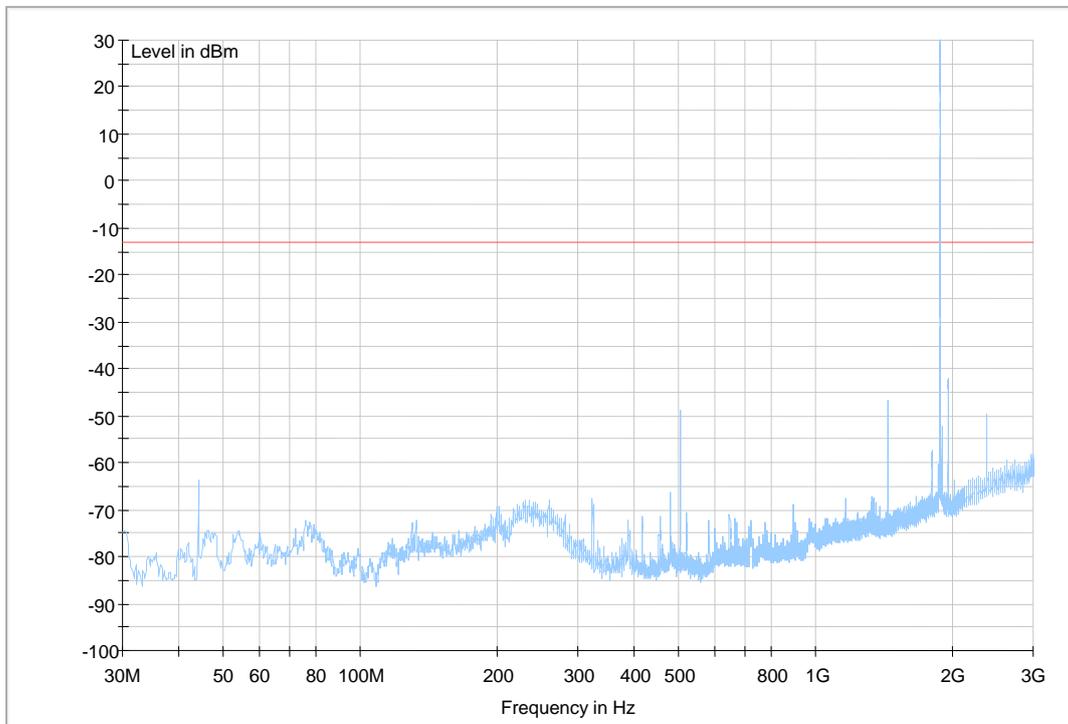


LTE Band II (5MHz)

(9KHz~30MHz)

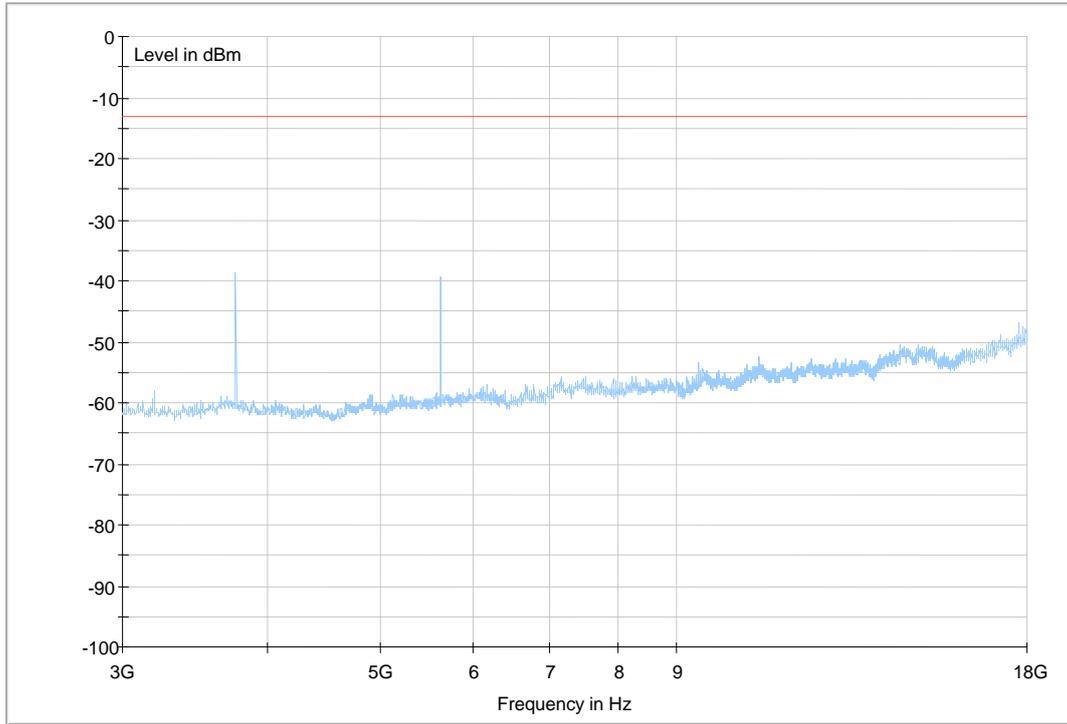


(30MHz~3GHz)

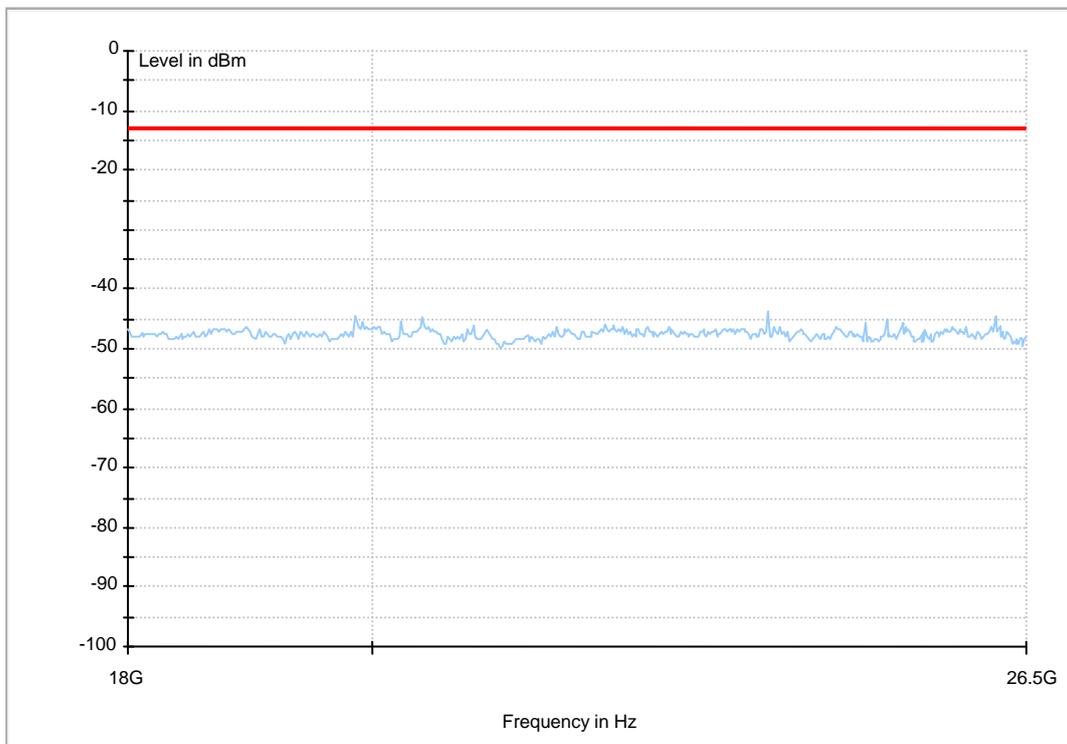




(3GHz~18GHz)

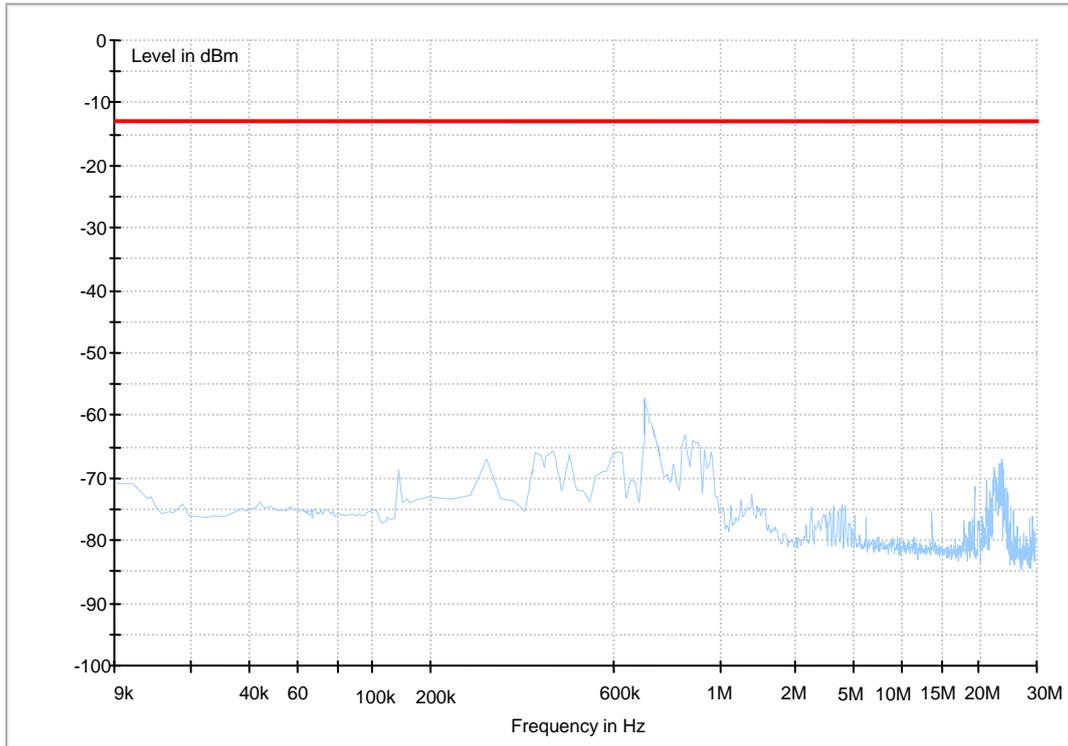


(18GHz~26.5GHz)

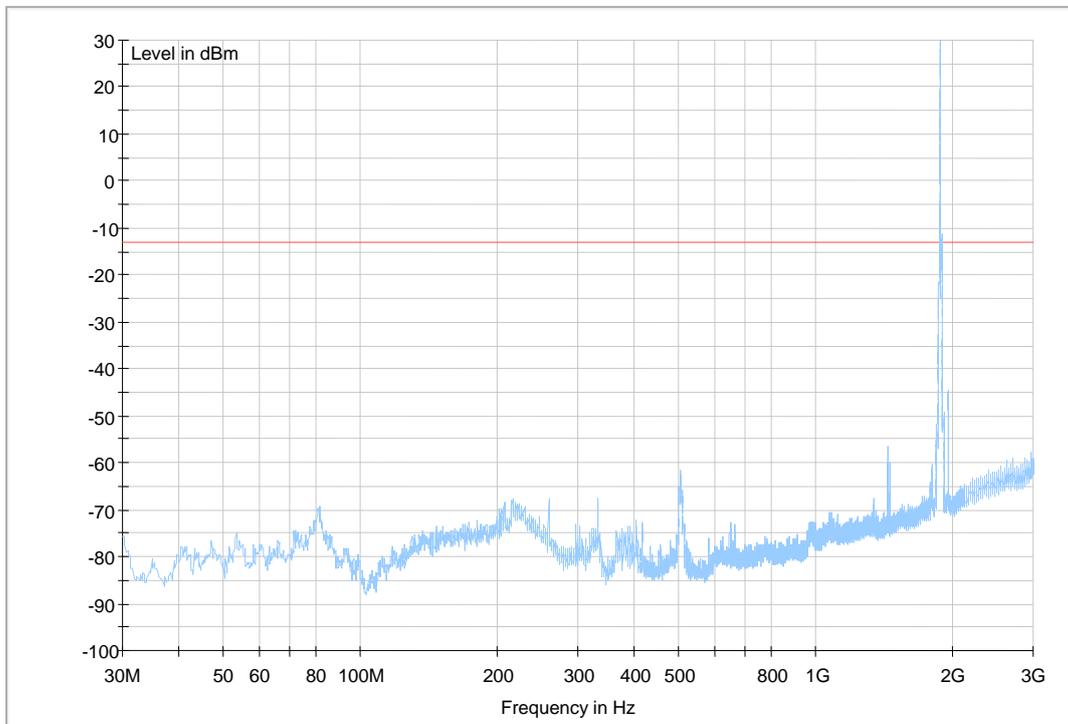


LTE Band II (10MHz)

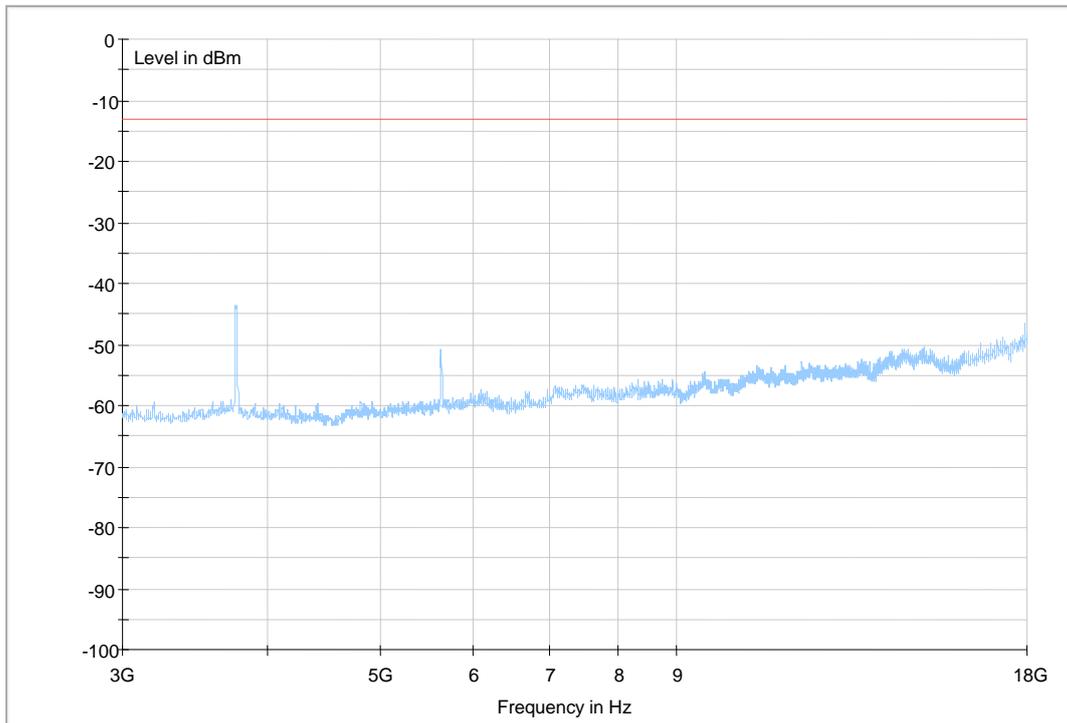
(9KHz~30MHz)



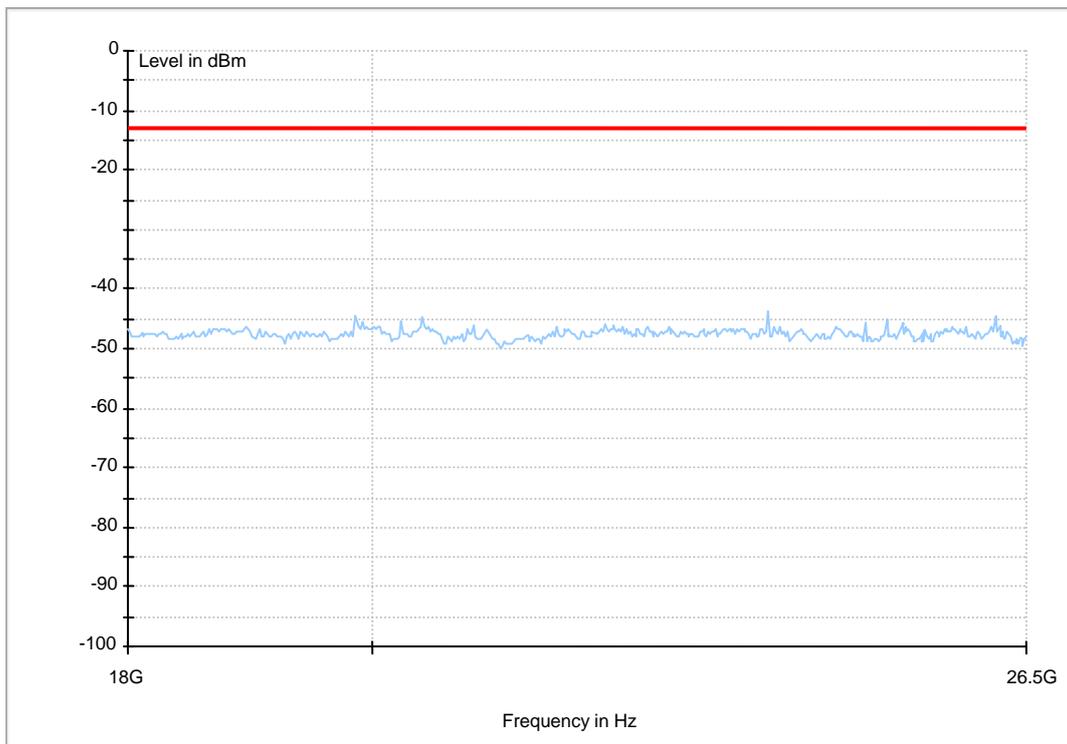
(30MHz~3GHz)



(3GHz~18GHz)



(18GHz~26.5GHz)





Appendix G

Frequency Stability According to FCC Part 2.1055& Part 24.235



Frequency Error vs. Temperature:

Test Mode	RF Ch.	Volt.	Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Freq. vs. 20 °C [ppm]	Limit [ppm]	Verdict
TM 1(1.4M)	M	100%	-30 °C	-9	-0.00479	---	±2.5	Pass
			-20 °C	-12	-0.00638	---	±2.5	Pass
			-10 °C	13	0.006915	---	±2.5	Pass
			0 °C	17	0.009043	---	±2.5	Pass
			10 °C	-13	-0.00691	---	±2.5	Pass
			20 °C	-9	-0.00479	---	±2.5	Pass
			30 °C	15	0.007979	---	±2.5	Pass
			40 °C	-9	-0.00479	---	±2.5	Pass
			50 °C	-11	-0.00585	---	±2.5	Pass
TM 1(3M)	M	100%	-30 °C	10	0.005319	---	±2.5	Pass
			-20 °C	8	0.004255	---	±2.5	Pass
			-10 °C	-9	-0.00479	---	±2.5	Pass
			0 °C	-20	-0.01064	---	±2.5	Pass
			10 °C	15	0.007979	---	±2.5	Pass
			20 °C	-12	-0.00638	---	±2.5	Pass
			30 °C	12	0.006383	---	±2.5	Pass
			40 °C	-8	-0.00426	---	±2.5	Pass
			50 °C	-9	-0.00479	---	±2.5	Pass
TM 1(5M)	M	100%	-30 °C	7	0.003723	---	±2.5	Pass
			-20 °C	-17	-0.00904	---	±2.5	Pass
			-10 °C	15	0.007979	---	±2.5	Pass
			0 °C	-19	-0.01011	---	±2.5	Pass
			10 °C	15	0.007979	---	±2.5	Pass
			20 °C	13	0.006915	---	±2.5	Pass
			30 °C	12	0.006383	---	±2.5	Pass
			40 °C	-10	-0.00532	---	±2.5	Pass
			50 °C	-9	-0.00479	---	±2.5	Pass
TM 1(10M)	M	100%	-30 °C	8	0.004255	---	±2.5	Pass
			-20 °C	-16	-0.00851	---	±2.5	Pass
			-10 °C	20	0.010638	---	±2.5	Pass
			0 °C	-18	-0.00957	---	±2.5	Pass
			10 °C	-15	-0.00798	---	±2.5	Pass
			20 °C	-10	-0.00532	---	±2.5	Pass
			30 °C	15	0.007979	---	±2.5	Pass
			40 °C	-10	-0.00532	---	±2.5	Pass
			50 °C	14	0.007447	---	±2.5	Pass



Frequency Error vs. Voltage:

Test Mode	RF Ch.	Temp.	Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Freq. vs. 20 °C [ppm]	Limit [ppm]	Verdict
TM4(1.4M)	M	20 °C	VL	13	0.006915	---	±2.5	Pass
			VN	-14	-0.00745	---	±2.5	Pass
			VH	19	0.010106	---	±2.5	Pass
TM4(3M)	M	20 °C	VL	12	0.006383	---	±2.5	Pass
			VN	-17	-0.00904	---	±2.5	Pass
			VH	-9	-0.00479	---	±2.5	Pass
TM4(5M)	M	20 °C	VL	-10	-0.00532	---	±2.5	Pass
			VN	13	0.006915	---	±2.5	Pass
			VH	-16	-0.00851	---	±2.5	Pass
TM4(10M)	M	20 °C	VL	17	0.009043	---	±2.5	Pass
			VN	-12	-0.00638	---	±2.5	Pass
			VH	-11	-0.00585	---	±2.5	Pass