RF TEST REPORT

Report No.:	SET2015-03460
Product:	Mobile WiFi
FCC ID:	QISE5573S-508
IC:	6369A-E5573S508
Model No.:	E5573s-508
Applicant:	Huawei Technologies Co., Ltd.
Address:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Dates of Testing:	03/02/2015 — 03/11/2015
Issued by:	CCIC-SET
Lab Location:	Electronic Testing Building, Shahe Road，Xili, Nanshan District, Shenzh China **Tel**：86 755 26627338 **Fax**：86 755 26627238

Test Report

Product..... :	Mobile WiFi
Brand Name ..... :	Huawei
Trade Name..... :	Huawei
Applicant..... :	Huawei Technologies Co., Ltd.
Applicant Address..... :	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Manufacturer..... :	Huawei Technologies Co., Ltd.
Manufacturer Address ..... :	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Test Standards..... :	47 CFR Part 2: 2013 47 CFR Part 22(H): 2013 47 CFR Part 24(E): 2013 47 CFR Part 27(L): 2013 RSS-Gen Issue 4, November 2014 RSS-132 Issue 3, January 2013 RSS-133 Issue 6, January 2013 RSS-139 Issue 2, February 2009 RSS-199 Issue 2, October 2014
Test Result ..... :	PASS
Tested by ..... :	2015.03.13 Haigang He，Test Engineer
Reviewed by..... :	2015.03.13 Zhu Qi, Senior Egineer
Approved by……..…:	2015.03.13 Wu Li'an，Manager

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Change History		
Issue	Date	Reason for change
1.0	2015-03-13	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Type	Mobile WiFi
IMEI No.	004401722470768
Hardware Version	CL1E5573SM
Software Version	21.200.01.01.00
EUT supports Radios application	GSM/GPRS/WCDMA/HSPA/HSPA+(Downlink Only)/LTE WLAN2.4GHz 802.11b/g/n (HT20/HT40)
Frequency Range	LTE Band 2 Tx: 1850.7MHz~1909.3MHz Rx: 1930.7MHz~1989.3MHz LTE Band 4 Tx: 1710.7MHz~1754.3MHz Rx: 2110.7MHz~2154.3MHz LTE Band 5 Tx: 824.7MHz~848.3MHz Rx: 869.7MHz~893.3MHz LTE Band 7 Tx: 2502.5MHz~2567.5MHz Rx: 2622.5MHz~2687.5MHz
Maximum Output Power to Antenna	LTE Band 2：23.70dBm LTE Band 4：23.69dBm LTE Band 5：23.64dBm LTE Band 7：22.40dBm
Bandwidth	LTE Band 2：5MHz/10MHz/15MHz/20MHz LTE Band 4：5MHz/10MHz/15MHz/20MHz LTE Band 5：5MHz/10MHz LTE Band 7：5MHz/10MHz/15MHz/20MHz
Modulation Type	QPSK/16QAM
Antenna Type	internal Antenna

1.2 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	BW (MHz)	Emission Designator	Frequency Tolerance (ppm)	Maximum ERP/EIRP(W)
Part 24	LTE Band 2	QPSK	5	4M56G7D	0.03	0.290
Part 24	LTE Band 2	16QAM	5	4M52W7D	-	0.242
Part 24	LTE Band 2	QPSK	10	9M20G7D	0.03	0.303
Part 24	LTE Band 2	16QAM	10	9M20W7D	-	0.241
Part 24	LTE Band 2	QPSK	15	13M6G7D	0.03	0.301
Part 24	LTE Band 2	16QAM	15	13M6W7D	-	0.245
Part 24	LTE Band 2	QPSK	20	18M8G7D	0.03	0.298
Part 24	LTE Band 2	16QAM	20	18M8W7D	-	0.237
Part 27	LTE Band 4	QPSK	5	4M52G7D	0.03	0.243
Part 27	LTE Band 4	16QAM	5	4M52W7D		0.192
Part 27	LTE Band 4	QPSK	10	8M96G7D	0.03	0.241
Part 27	LTE Band 4	16QAM	10	9M00W7D	-	0.187
Part 27	LTE Band 4	QPSK	15	13M6G7D	0.03	0.239
Part 27	LTE Band 4	16QAM	15	13M6W7D	-	0.187
Part 27	LTE Band 4	QPSK	20	18M8G7D	0.03	0.234
Part 27	LTE Band 4	16QAM	20	18M8W7D	-	0.183
Part 22	LTE Band 5	QPSK	5	4M52G7D	0.05	0.115
Part 22	LTE Band 5	16QAM	5	4M52W7D	-	0.084
Part 22	LTE Band 5	QPSK	10	9M00G7D	0.06	0.110
Part 22	LTE Band 5	16QAM	10	9M00W7D	-	0.088
Part 27	LTE Band 7	QPSK	5	4M52G7D	0.02	0.153
Part 27	LTE Band 7	16QAM	5	4M52W7D	-	0.116
Part 27	LTE Band 7	QPSK	10	8M96G7D	0.02	0.145
Part 27	LTE Band 7	16QAM	10	9M00W7D	-	0.118

Part 27	LTE Band 7	QPSK	15	13M6G7D	0.03	0.153
Part 27	LTE Band 7	16QAM	15	13M6W7D	-	0.123
Part 27	LTE Band 7	QPSK	20	18M7G7D	0.02	0.150
Part 27	LTE Band 7	16QAM	20	18M6W7D	-	0.119

1.3 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part 22, Part 24, and Part27 for the EUT FCC ID Certification:

1. 47 CFR Part 2, 22(H), 24(E), 27(L) 27(M)

2. ANSI/TIA/EIA-603-D-2010

3. FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

4. RSS-GEN Issue 3

5. RSS-132 Issue 3,

6. RSS-133 Issue 6

7. RSS-139 Issue 6

8. RSS-199 Issue 2

8. Notice 2012-DRS0126

Remark：
1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.
3. Per the section 2.2.3 of Notice of 2012-DRS0126, “Receivers Excluded from Industry Canada Requirements”, only radio communication receivers operating in stand-alone mode within the band 30-960MHz and scanner receivers are subject to Industry Canada requirements.

Test detailed items/section required by FCC/IC rules and results are as below:

No.	Section		Description	Limit	Result
	FCC	IC			
1	2.1046	N/A	Conducted Output Power	Reporting Only	PASS
2	24.232(d) 27.50(d)	RSS-133,6.4 RSS-139, 6.4	Peak to Average Radio	＜13dBm	PASS
3	2.1049	RSS-GEN,4.6	Occupied Bandwidth	Reporting Only	PASS

	22.917(b) 24.238(b) 27.53(g)	RSS-132, 5.5 RSS-133, 6.5 RSS-139, 6.5 RSS-199, 4.2			
4	2.1055 22.355 24.235 27.54	RSS-GEN, 4.7 RSS-132, 5.3 RSS-133, 6.3 RSS-139, 6.3 RSS-199,4.3	Frequency Stability	≤±2.5ppm	PASS
5	2.1051 22.917 24.238 27.53	RSS-GEN,4.9 RSS-132,5.5 RSS-133,6.5 RSS-139,6.5 RSS-199,4.6	Conducted Out of Band Emissions	< 43+10log10 (P[Watts])	PASS
6	2.1051 22.917 24.238 27.53	RSS-GEN, 4.9 RSS-132,5.5 RSS-133,6.5 RSS-139,6.5 RSS-199,4.6	Band Edge	< 43+10log10 (P[Watts])	PASS
7	22.913	RSS-132,5.4	Effective Radiated Power	＜7Watts	PASS
	24.232	RSS-133,6.4 RSS-199,4.4	Equivalent Isotropic Radiated Power	＜2Watts	PASS
	27.50(d)	RSS-139,6.4	Effective Radiated Power	＜1Watts	PASS
8	2.1053 22.917 24.238 27.53	RSS-GEN,4.9 RSS-132,5.5 RSS-133,6.5 RSS-139,6.5 RSS-199,4.6	Radiated Spurious Emissions	< 43+10log10 (P[Watts])	PASS

1.4 Test Configuration of Equipment Under Test

1.4.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Items	Band	Bandwidth(MHz)						Modulation		RB#			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	2	-	-	√	√	√	√	√	√	√	√	√	√	√	√
	4	-	-	√	√	√	√	√	√	√	√	√	√	√	√
	5	-	-	√	√	-	-	√	√	√	√	√	√	√	√

	7	-	-	√	√	√	√	√	√	√	√	√	√	√	√
Peak-to-Average Ratio	2	-	-	-	-	-	√	-	√	√	-	√	√	√	√
	4	-	-	-	-	-	√	-	√	√	-	√	√	√	√
	5	-	-	-	√	-	-	-	√	√	-	√	√	√	√
	7	-	-	-	-	-	√	-	√	√	-	√	√	√	√
26dB and 99% Bandwidth	2	-	-	√	√	√	√	√	√	-	-	√	-	√	-
	4	-	-	√	√	√	√	√	√	-	-	√	-	√	-
	5	-	-	√	√			√	√	-	-	√	-	√	-
	7	-	-	√	√	√	√	√	√	-	-	√	-	√	-
Conducted Band Edge	2	-	-	√	√	√	√	√	√	√	-	√	√	-	√
	4	-	-	√	√	√	√	√	√	√	-	√	√	-	√
	5	-	-	√	√			√	√	√	-	√	√	-	√
	7	-	-	√	√	√	√	√	√	√	-	√	√	-	√
Conducted Spurious Emission	2	-	-	√	√	√	√	√	√	√	-	-	√	√	√
	4	-	-	√	√	√	√	√	√	√	-	-	√	√	√
	5	-	-	√	√			√	√	√	-	-	√	√	√
	7			√	√	√	√	√	√	√	-	-	√	√	√
Frequency Stability	2	-	-	√	√	√	√	√	-	-	-	√	√	√	√
	4	-	-	√	√	√	√	√	-	-	-	√	√	√	√
	5	-	-	√	√	-	-	√	-	-	-	√	√	√	√
	7	-	-	√	√	√	√	√	-	-	-	√	√	√	√
ERP/EIRP	2	-	-	√	√	√	√	√	√	√	-	-	√	√	√
	4	-	-	√	√	√	√	√	√	√	-	-	√	√	√
	5	-	-	√	√	-	-	√	√	√	-	-	√	√	√
	7	-	-	√	√	√	√	√	√	√	-	-	√	√	√
Radiated Spurious Emission	2	-	-	√	√	√	√	√	-	√	-	-	√	√	√
	4	-	-	√	√	√	√	√	-	√	-	-	√	√	√
	5	-	-	√	√	-	-	√	-	√	-	-	√	√	√
	7	-	-	√	√	√	√	√	-	√	-	-	√	√	√
Note	**1. The mark “ √ ” means that this configuration is chosen for testing.** **2. The mark “-” means that is not chosen for testing.** **2. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.** **3. For E.R.P/E.I.R.P. measurement, the widest bandwidth and the bandwidth with the highest conducted power of each band is chosen for testing. Besides, the lowest bandwidth of each band is also measured for reporting only.**														

1.5 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 4dB and 10dB attenuator.

Example:

Offset (dB) = RF cable loss(dB) + attenuator factor(dB).
= 4 + 10 = 14 (dB)

1.6 Test Facilities

CNAS-Lab Code: L1659

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659. A 12.8*6.8*6.4 (m) fully anechoic chamber was used for the radiated spurious emissions test.

FCC-Registration No.: 406086

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 406086, valid time is until October 28, 2017.

IC-Registration No.: 11185A-1

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on July. 15, 2013, valid time is until July. 15, 2016.

1.7 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (℃):	20℃- 25℃
Relative Humidity (%):	40% -60%
Atmospheric Pressure (kPa):	86KPa-106KPa

2. 47 CFR PART 2, PART 27H REQUIREMENTS

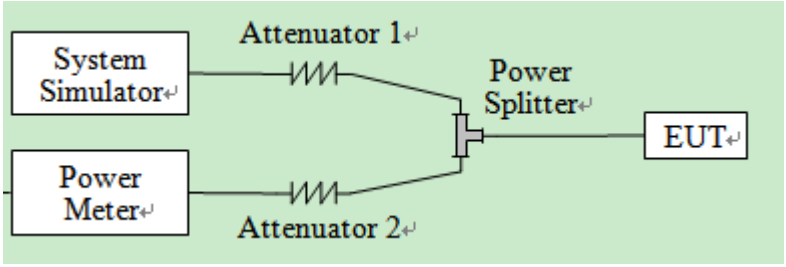
2.1 Conducted RF Output Power

2.1.1 Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

2.1.2 Test Description

1. Test Setup:



The EUT, which is powered by 3.8V DC power, is coupled to the Power Meter and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due Date
System Simulator	R&S	CMW500	149333	2014.07.21	2015.07.20
Power Meter	R&S	NRV2	1020.1809.02	2014.06.08	2015.06.07
Power Sensor	R&S	NRV-Z4	823.3618.03	2014.06.08	2015.06.07
Attenuator 1	Resent	10dB	(n.a.)	2014.06.11	2015.06.10
Attenuator 2	Resent	3dB	(n.a.)	2014.06.11	2015.06.10

2.1.3 Test Results

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.

1. LTE Band 2 Conducted Power Test Verdict:

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				18700	18900	19100
Frequency(MHz)				1860	1880	1900
20	QPSK	1	0	23.50	23.51	23.55
20	QPSK	1	49	23.52	**23.60**	23.58
20	QPSK	1	99	23.42	23.54	23.42
20	QPSK	50	0	22.99	22.87	22.93
20	QPSK	50	24	22.87	22.95	22.84
20	QPSK	50	49	22.84	22.79	22.82
20	QPSK	100	0	22.85	22.87	22.79
20	16QAM	1	0	22.50	22.41	22.51
20	16QAM	1	49	22.64	22.65	22.53
20	16QAM	1	99	22.44	22.50	22.55
20	16QAM	50	0	21.97	21.89	21.96
20	16QAM	50	24	21.85	21.97	21.78
20	16QAM	50	49	21.87	21.78	21.91
20	16QAM	100	0	21.79	21.85	21.83
Channel				18675	18900	19125
Frequency(MHz)				1857.5	1880	1902.5
15	QPSK	1	0	23.65	23.66	23.59
15	QPSK	1	37	**23.70**	23.68	23.65
15	QPSK	1	74	23.41	23.44	23.40
15	QPSK	36	0	22.91	22.80	22.77
15	QPSK	36	18	22.74	22.79	22.71
15	QPSK	36	37	22.91	22.95	22.83
15	QPSK	75	0	22.98	22.90	22.84
15	16QAM	1	0	22.71	22.63	22.67
15	16QAM	1	37	22.69	22.70	22.64
15	16QAM	1	74	22.57	22.62	22.65
15	16QAM	36	0	21.95	21.81	21.85
15	16QAM	36	18	21.84	21.76	21.79
15	16QAM	36	37	21.91	21.84	21.95
15	16QAM	75	0	21.79	21.75	21.87

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				18650	18900	19150
Frequency(MHz)				1855	1880	1905
10	QPSK	1	0	23.61	23.54	23.63
10	QPSK	1	24	23.62	23.61	**23.64**
10	QPSK	1	49	23.52	23.59	23.60
10	QPSK	25	0	22.74	22.76	22.85
10	QPSK	25	12	22.68	22.76	22.78
10	QPSK	25	24	22.74	22.80	22.75
10	QPSK	50	0	22.76	22.72	22.71
10	16QAM	1	0	22.71	22.68	22.62
10	16QAM	1	24	22.69	22.64	22.71
10	16QAM	1	49	22.55	22.51	22.48
10	16QAM	25	0	22.54	22.40	22.31
10	16QAM	25	12	21.86	21.94	21.81
10	16QAM	25	24	21.77	21.75	21.81
10	16QAM	50	0	21.84	21.81	21.75
Channel				18625	18900	19175
Frequency(MHz)				1852.5	1880	1907.5
5	QPSK	1	0	23.59	**23.62**	23.60
5	QPSK	1	12	23.52	23.57	23.55
5	QPSK	1	24	23.48	23.53	23.57
5	QPSK	12	0	22.74	22.83	22.82
5	QPSK	12	6	22.74	22.64	22.75
5	QPSK	12	11	22.71	22.67	22.77
5	QPSK	25	0	22.81	22.71	22.72
5	16QAM	1	0	22.47	22.55	22.44
5	16QAM	1	12	22.54	22.50	22.47
5	16QAM	1	24	22.45	22.39	22.46
5	16QAM	12	0	21.80	21.76	21.74
5	16QAM	12	6	21.69	21.63	21.75
5	16QAM	12	11	21.84	21.77	21.74
5	16QAM	25	0	21.66	21.71	21.69

2. LTE Band 4 Conducted Power Test Verdict:

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				20050	20175	20300
Frequency(MHz)				1720	1732.5	1745
20	QPSK	1	0	23.62	23.59	**23.66**
20	QPSK	1	49	23.54	23.55	23.57
20	QPSK	1	99	23.61	23.57	23.55
20	QPSK	50	0	22.72	22.84	22.87
20	QPSK	50	24	22.87	22.75	22.81
20	QPSK	50	49	22.74	22.72	22.82
20	QPSK	100	0	22.71	22.75	22.85
20	16QAM	1	0	22.60	22.63	22.61
20	16QAM	1	49	22.54	22.45	22.63
20	16QAM	1	99	22.44	22.50	22.54
20	16QAM	50	0	21.87	21.75	21.78
20	16QAM	50	24	21.79	21.77	21.80
20	16QAM	50	49	21.81	21.71	21.86
20	16QAM	100	0	21.74	21.65	21.81
Channel				20025	20175	20325
Frequency(MHz)				1717.5	1732.5	1747.5
15	QPSK	1	0	23.57	**23.65**	23.62
15	QPSK	1	37	23.53	23.51	23.64
15	QPSK	1	74	23.59	23.57	23.51
15	QPSK	36	0	22.82	22.77	22.84
15	QPSK	36	18	22.88	22.76	22.81
15	QPSK	36	37	22.76	22.74	22.80
15	QPSK	75	0	22.79	22.76	22.92
15	16QAM	1	0	22.46	22.57	22.63
15	16QAM	1	37	22.50	22.66	22.59
15	16QAM	1	74	22.57	22.62	22.58
15	16QAM	36	0	21.76	21.73	21.84
15	16QAM	36	18	21.69	21.73	21.77
15	16QAM	36	37	21.79	21.70	21.83
15	16QAM	75	0	21.78	21.71	21.81

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				20000	20175	20350
Frequency(MHz)				1715	1732.5	1750
10	QPSK	1	0	23.57	23.60	23.62
10	QPSK	1	24	23.67	**23.69**	23.65
10	QPSK	1	49	23.62	23.59	23.68
10	QPSK	25	0	22.94	22.86	22.85
10	QPSK	25	12	22.82	22.79	22.80
10	QPSK	25	24	22.78	22.80	22.85
10	QPSK	50	0	22.76	22.82	22.91
10	16QAM	1	0	22.67	22.55	22.64
10	16QAM	1	24	22.61	22.52	22.65
10	16QAM	1	49	22.68	22.72	22.56
10	16QAM	25	0	21.80	21.73	21.86
10	16QAM	25	12	21.84	21.75	21.82
10	16QAM	25	24	21.79	21.75	21.84
10	16QAM	50	0	21.82	21.74	21.79
Channel				19975	20175	20375
Frequency(MHz)				1712.5	1732.5	1752.5
5	QPSK	1	0	23.57	23.59	23.62
5	QPSK	1	12	23.55	23.58	23.60
5	QPSK	1	24	23.61	**23.63**	23.58
5	QPSK	12	0	22.71	22.77	22.82
5	QPSK	12	6	22.81	22.82	22.78
5	QPSK	12	11	22.81	22.73	22.77
5	QPSK	25	0	22.85	22.78	22.75
5	16QAM	1	0	22.47	22.46	22.60
5	16QAM	1	12	22.51	22.47	22.39
5	16QAM	1	24	22.59	22.51	22.55
5	16QAM	12	0	21.73	21.71	21.82
5	16QAM	12	6	21.66	21.62	21.69
5	16QAM	12	11	21.70	21.75	21.72
5	16QAM	25	0	21.83	21.72	21.70

3. LTE Band 5 Conducted Power Test Verdict:

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				20450	20525	20600
Frequency(MHz)				829	836.5	844
10	QPSK	1	0	23.58	23.45	23.53
10	QPSK	1	24	23.59	23.60	23.61
10	QPSK	1	49	23.63	**23.64**	23.59
10	QPSK	25	0	22.72	22.71	22.76
10	QPSK	25	12	22.67	22.76	22.82
10	QPSK	25	24	22.81	22.75	22.76
10	QPSK	50	0	22.69	22.66	22.67
10	16QAM	1	0	22.54	22.64	22.57
10	16QAM	1	24	22.60	22.51	22.53
10	16QAM	1	49	22.52	22.41	22.42
10	16QAM	25	0	21.81	21.76	21.85
10	16QAM	25	12	21.84	21.75	21.71
10	16QAM	25	24	21.82	21.74	21.76
10	16QAM	50	0	21.73	21.76	21.81
Channel				20425	20525	20625
Frequency(MHz)				826.5	836.5	846.5
5	QPSK	1	0	23.52	23.57	23.53
5	QPSK	1	12	23.49	23.53	23.56
5	QPSK	1	24	23.58	23.50	**23.59**
5	QPSK	12	0	22.80	22.93	22.87
5	QPSK	12	6	22.86	22.82	22.92
5	QPSK	12	11	22.76	22.86	22.79
5	QPSK	25	0	22.86	22.93	22.82
5	16QAM	1	0	22.24	22.29	22.19
5	16QAM	1	12	22.25	22.18	22.26
5	16QAM	1	24	22.53	22.47	22.44
5	16QAM	12	0	21.70	21.75	21.85
5	16QAM	12	6	21.62	21.75	21.69
5	16QAM	12	11	21.78	21.80	21.77
5	16QAM	25	0	21.71	21.82	21.74

4. LTE Band 7 Conducted Power Test Verdict:

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				20850	21100	21350
Frequency(MHz)				2510	2535	2560
20	QPSK	1	0	22.27	22.39	**22.40**
20	QPSK	1	49	22.34	22.25	22.33
20	QPSK	1	99	22.21	22.17	22.25
20	QPSK	50	0	21.72	21.84	21.87
20	QPSK	50	24	21.67	21.75	21.81
20	QPSK	50	49	21.64	21.72	21.82
20	QPSK	100	0	21.72	21.75	21.80
20	16QAM	1	0	21.60	21.55	21.61
20	16QAM	1	49	21.54	21.65	21.53
20	16QAM	1	99	21.58	21.60	21.54
20	16QAM	50	0	20.67	20.75	20.78
20	16QAM	50	24	20.69	20.67	20.70
20	16QAM	50	49	20.73	20.71	20.76
20	16QAM	100	0	20.74	20.65	20.81
Channel				20825	21100	21375
Frequency(MHz)				2507.5	2535	2562.5
15	QPSK	1	0	22.29	22.30	22.33
15	QPSK	1	37	22.34	**22.35**	22.29
15	QPSK	1	74	22.25	22.30	22.31
15	QPSK	36	0	21.77	21.80	21.82
15	QPSK	36	18	21.82	21.75	21.81
15	QPSK	36	37	21.64	21.72	21.76
15	QPSK	75	0	21.68	21.75	21.77
15	16QAM	1	0	21.50	21.57	21.43
15	16QAM	1	37	21.54	21.58	21.63
15	16QAM	1	74	21.49	21.50	21.46
15	16QAM	36	0	20.67	20.75	20.78
15	16QAM	36	18	20.69	20.67	20.72
15	16QAM	36	37	20.75	20.71	20.86
15	16QAM	75	0	20.74	20.69	20.81

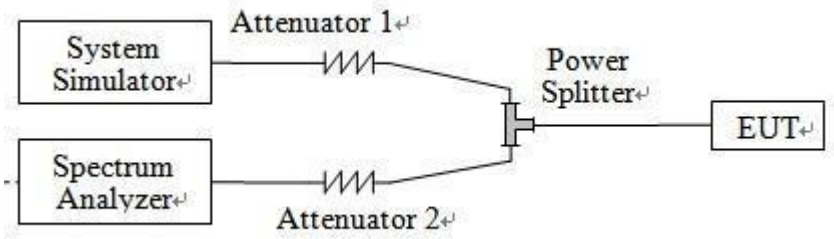
BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				20800	21100	21400
Frequency(MHz)				2505	2535	2565
10	QPSK	1	0	22.29	22.35	**22.37**
10	QPSK	1	24	22.34	22.30	22.29
10	QPSK	1	49	22.31	22.28	22.33
10	QPSK	25	0	21.82	21.80	21.85
10	QPSK	25	12	21.72	21.70	21.76
10	QPSK	25	24	21.69	21.72	21.82
10	QPSK	50	0	21.77	21.75	21.85
10	16QAM	1	0	21.30	21.41	21.45
10	16QAM	1	24	21.44	21.39	21.43
10	16QAM	1	49	21.33	21.20	21.34
10	16QAM	25	0	20.67	20.75	20.78
10	16QAM	25	12	20.69	20.67	20.80
10	16QAM	25	24	20.61	20.71	20.86
10	16QAM	50	0	20.54	20.65	20.61
Channel				20775	21100	21425
Frequency(MHz)				2502.5	2535	2567.5
5	QPSK	1	0	22.37	22.29	**22.38**
5	QPSK	1	12	22.34	22.35	22.36
5	QPSK	1	24	22.31	22.29	22.30
5	QPSK	12	0	21.82	21.74	21.77
5	QPSK	12	6	21.77	21.75	21.81
5	QPSK	12	11	21.74	21.72	21.78
5	QPSK	25	0	21.81	21.75	21.85
5	16QAM	1	0	21.40	21.31	21.37
5	16QAM	1	12	21.40	21.35	21.43
5	16QAM	1	24	21.44	21.38	21.24
5	16QAM	12	0	20.57	20.65	20.58
5	16QAM	12	6	20.79	20.77	20.80
5	16QAM	12	11	20.68	20.79	20.72
5	16QAM	25	0	20.72	20.65	20.81

2.2 Peak to Average Radio

2.2.1 Definition

According to FCC section 2.1049 and FCC 27.50(d), the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

2.2.2 Test Description



Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due Date
System Simulator	R&S	CMW500	149333	2014.07.21	2015.07.20
Spectrum Analyzer	R&S	FSW26	102032	2014.07.31	2015.07.30
Attenuator 1	Resent	10dB	(n.a.)	2014.06.11	2015.06.10
Attenuator 2	Resent	3dB	(n.a.)	2014.06.11	2015.06.10

2.2.3 Test Verdict

Here the lowest, middle and highest channels are selected to perform testing to verify the peak-to-average ratio.

Test procedures:

For LTE operating mode:

a. The EUT was connected to spectrum and system simulator via a power divider.

b. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.

c. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.

d. Record the deviation as Peak to Average Ratio.

1. Test Result of LTE Band 2 Peak-to-Average Ratio:

BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Peak to Average radio		Limit	Verdict
						dBm	Refer to Plot	dBm	
20	16QAM	18700	1860	1	0	5.34	Plot A1 to A6	13	PASS
				100	0	6.28			
	16QAM	18900	1880	1	0	5.74			PASS
				100	0	6.36			
	16QAM	19100	1900	1	0	4.88			PASS
				100	0	6.08			

2. Test Result of LTE Band 4 Peak-to-Average Ratio:

BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Peak to Average radio		Limit	Verdict
						dBm	Refer to Plot	dBm	
20	16QAM	20050	1720	1	0	4.64	Plot B1 to B6	13	PASS
				100	0	5.94			
	16QAM	20175	1732.5	1	0	4.36			PASS
				100	0	6.08			
	16QAM	20300	1745	1	0	4.88			PASS
				100	0	6.04			

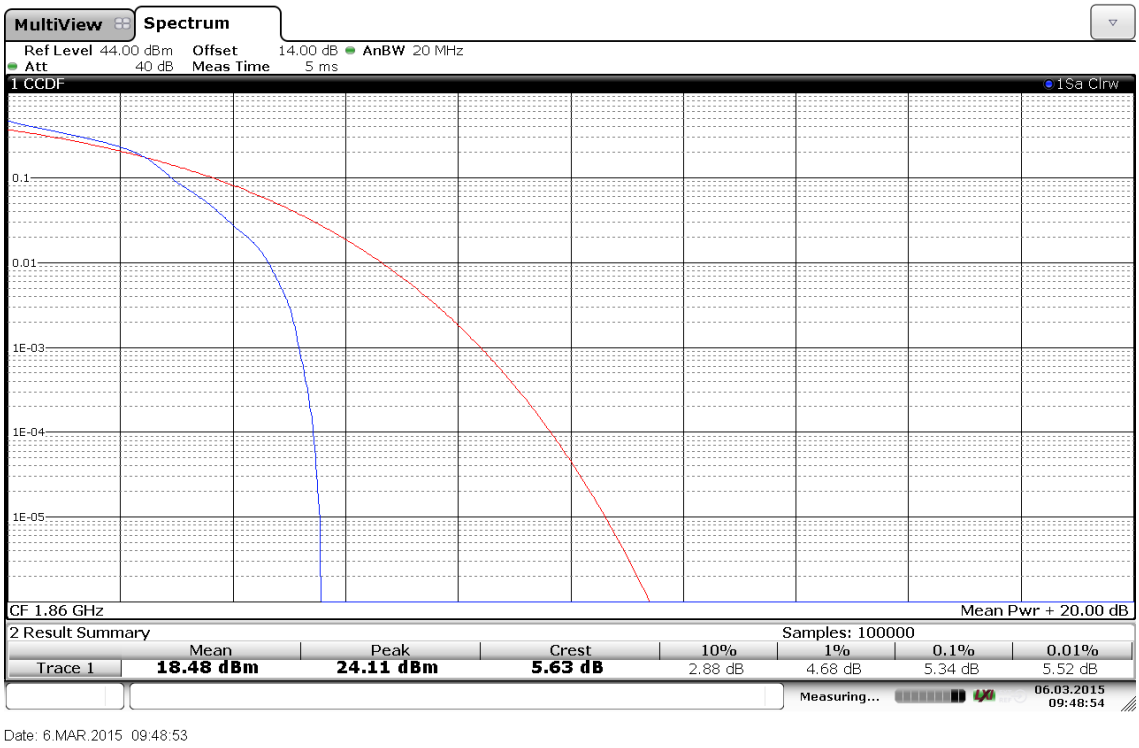
3. Test Result of LTE Band 5 Peak-to-Average Ratio:

BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Peak to Average radio		Limit	Verdict
						dBm	Refer to Plot	dBm	
10	16QAM	20450	829	1	0	5.10	Plot C1 to C6	13	PASS
				50	0	5.80			
	16QAM	20525	836.5	1	0	5.26			PASS
				50	0	6.06			
	16QAM	20600	844	1	0	5.14			PASS
				50	0	5.72			

4. Test Result of LTE Band 7 Peak-to-Average Ratio:

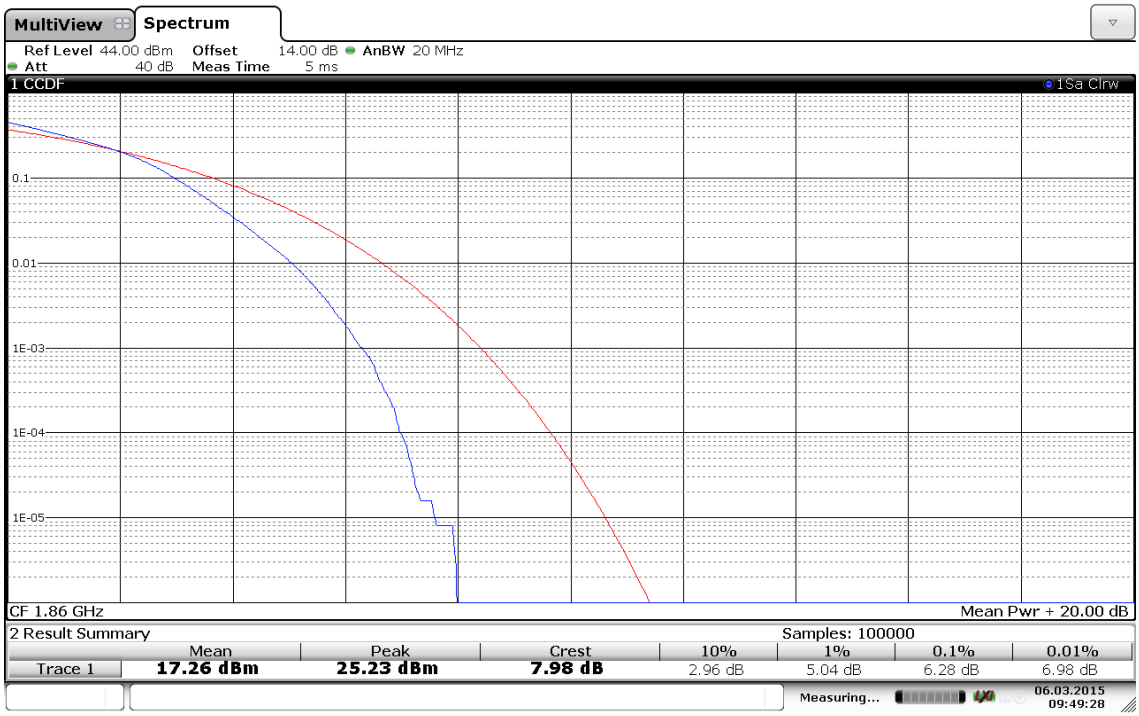
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Peak to Average radio		Limit	Verdict
						dBm	Refer to Plot	dBm	
20	16QAM	20850	2510	1	0	4.46	Plot D1 to D6	13	PASS
				100	0	5.44			
	16QAM	21100	2535	1	0	4.96			PASS
				100	0	5.62			
	16QAM	21350	2560	1	0	4.48			PASS
				100	0	5.66			

1. LTE Model Test Plots:



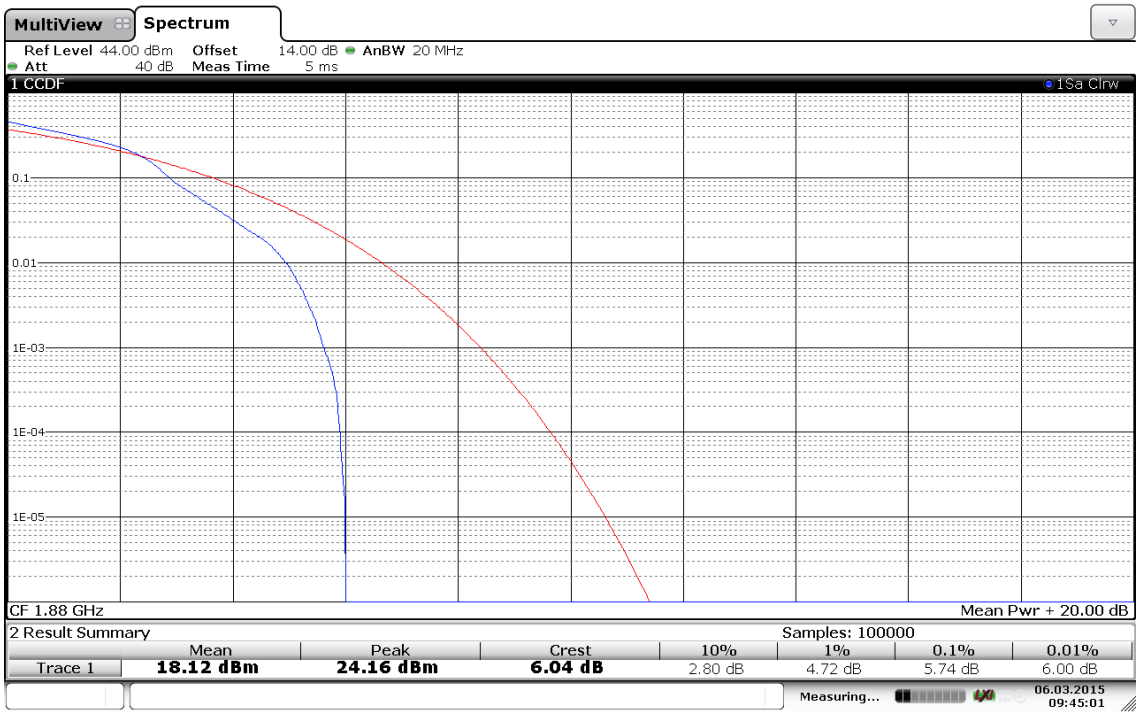
Date: 6.MAR.2015 09:48:53

(Plot A1: Band 2/20MHz/16QAM in Ch. 18700 1RB Size)



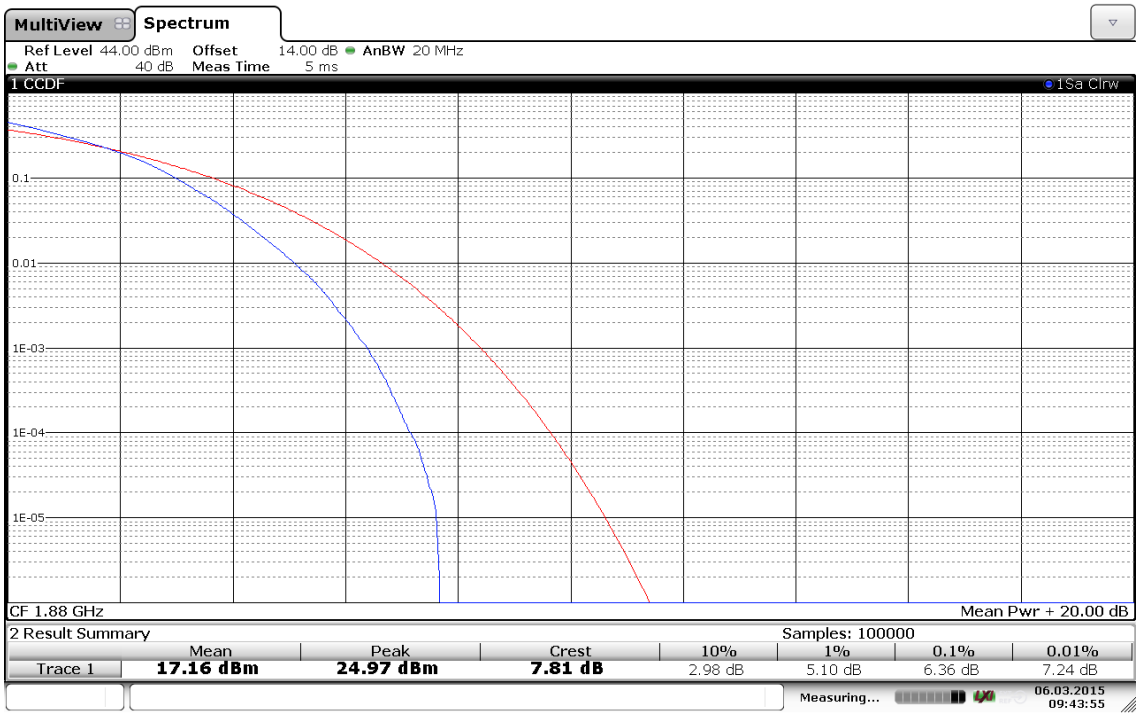
Date: 6.MAR.2015 09:49:29

(Plot A2: Band 2/20MHz/16QAM in Ch. 18700 100RB Size)

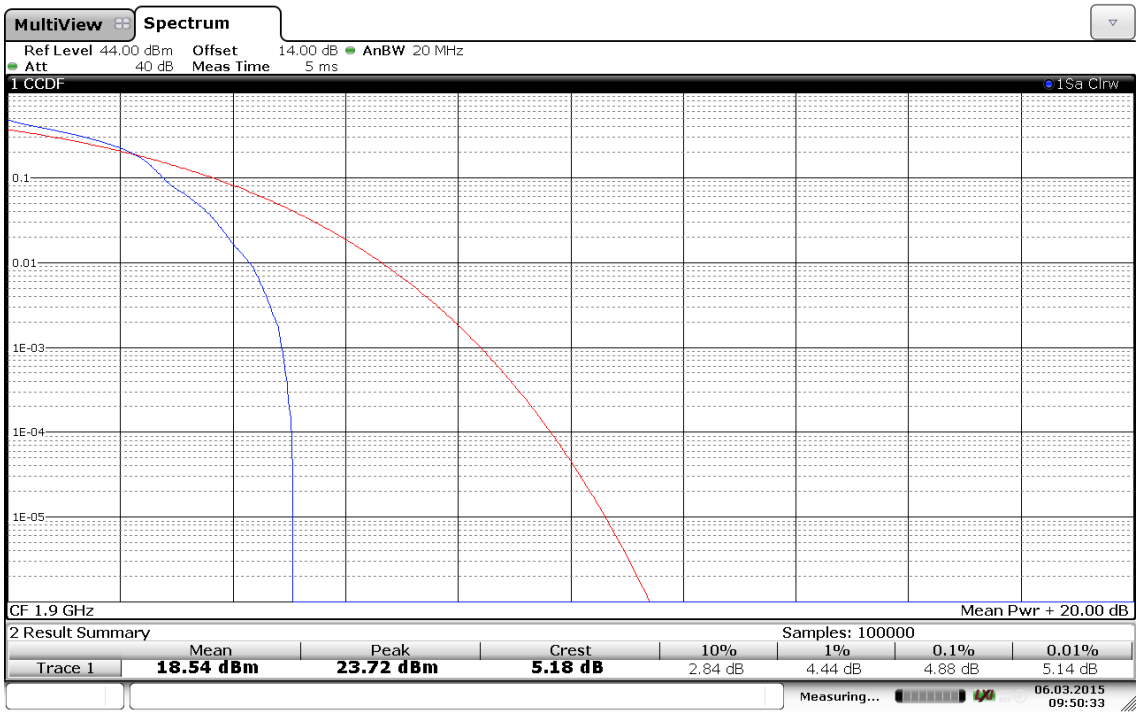


Date: 6.MAR.2015 09:45:01

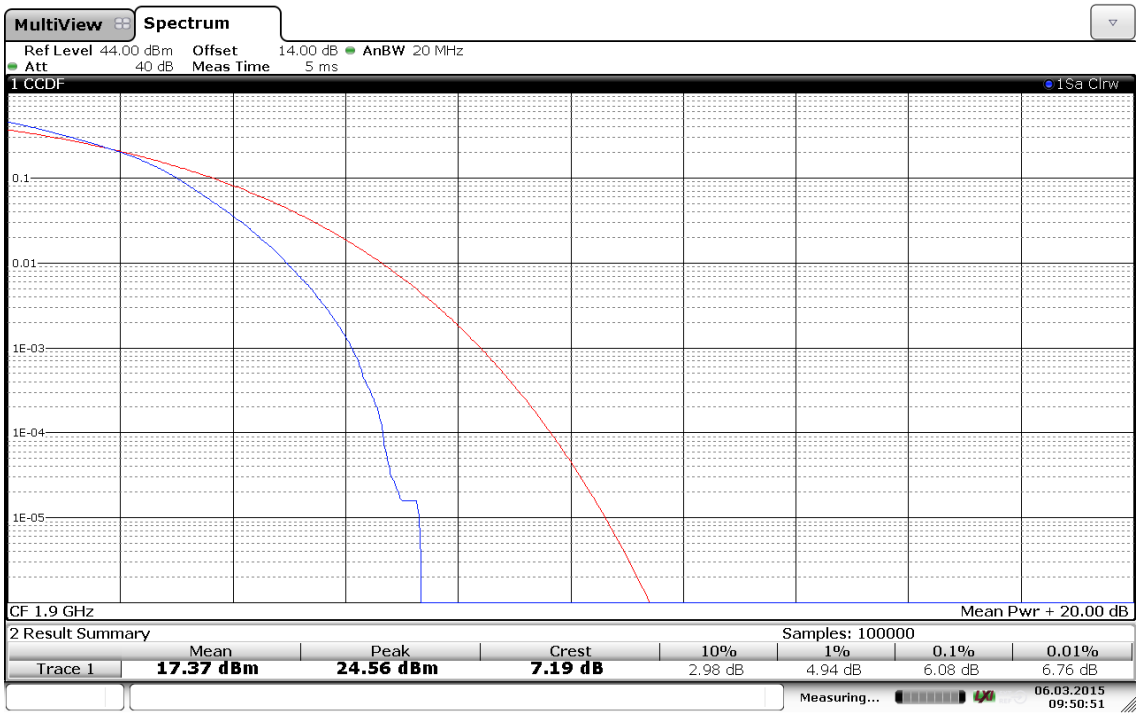
(Plot A3: Band 2/20MHz/16QAM in Ch.18900 1RB Size)



(Plot A4: Band 2/20MHz/16QAM in Ch.18900 100RB Size)

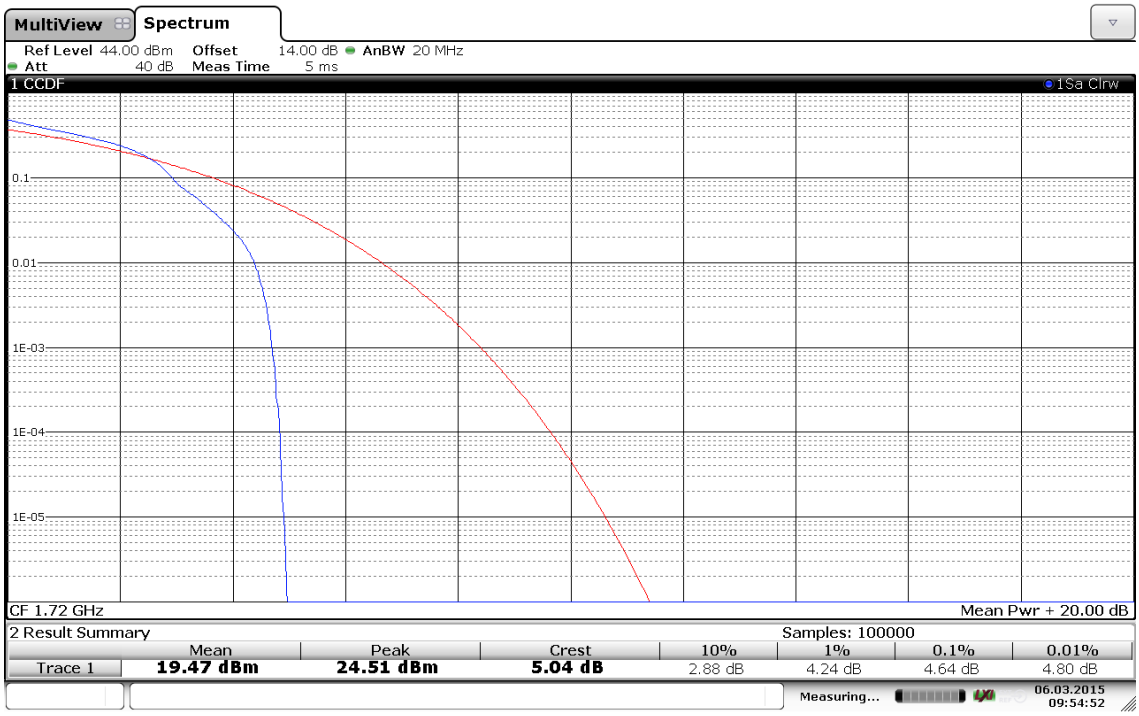


(Plot A5: Band 2/20MHz/16QAM in Ch.19100 1RB Size)



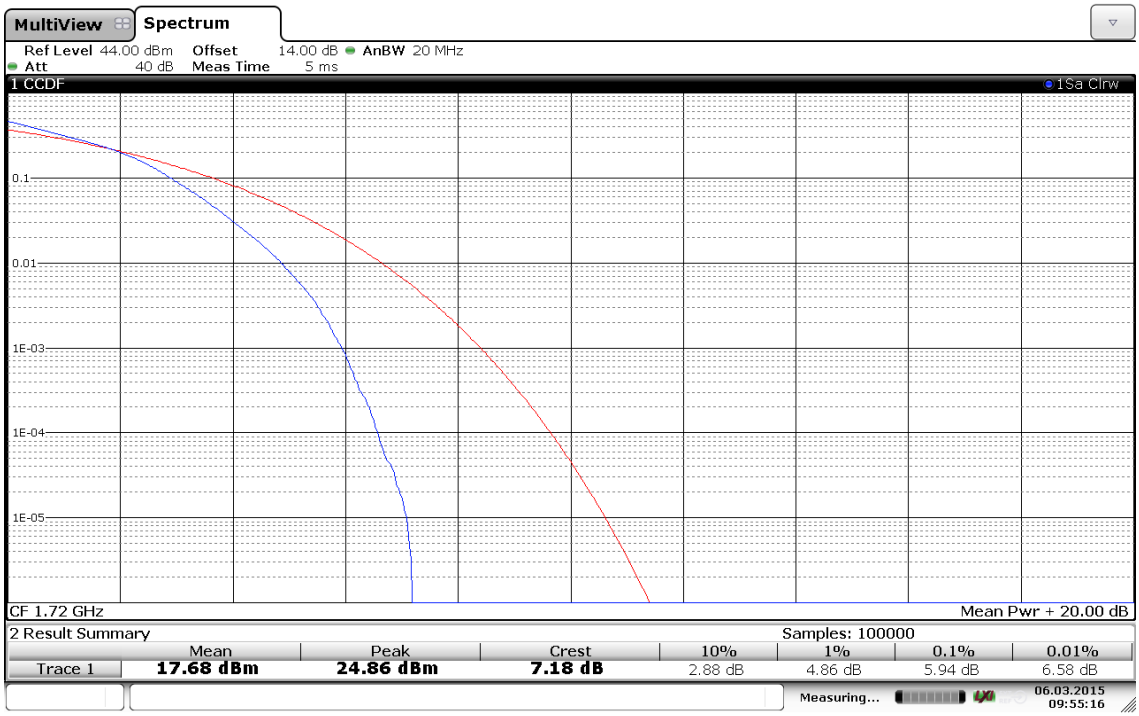
Date: 6.MAR.2015 09:50:52

(Plot A6: Band 2/20MHz/16QAM in Ch.19100 100RB Size)



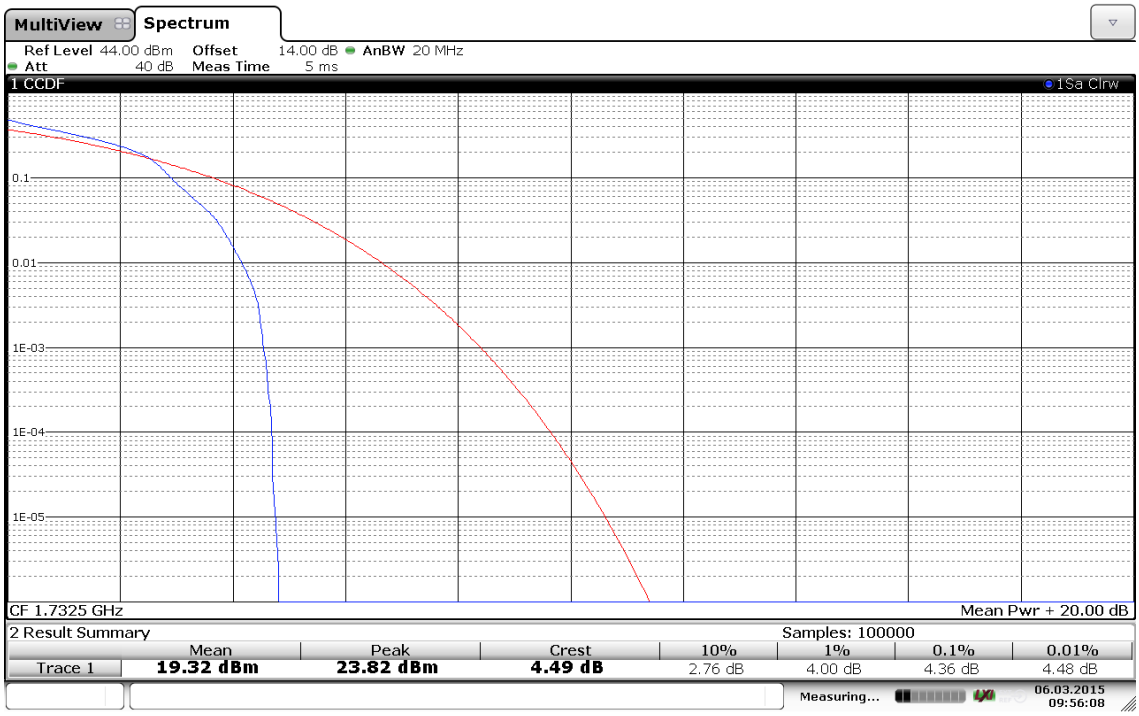
Date: 6.MAR.2015 09:54:52

(Plot B1: Band 4/20MHz/16QAM in Ch.20050 1RB Size)



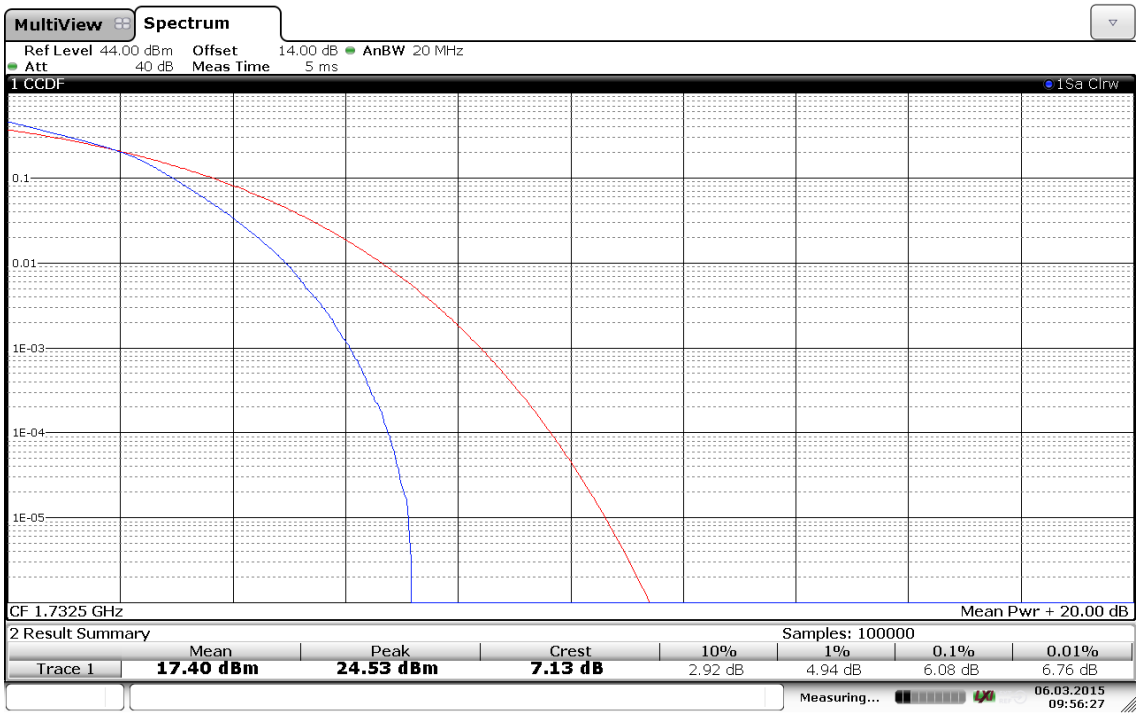
Date: 6.MAR.2015 09:55:16

(Plot B2: Band 4/20MHz/16QAM in Ch.20050 100RB Size)



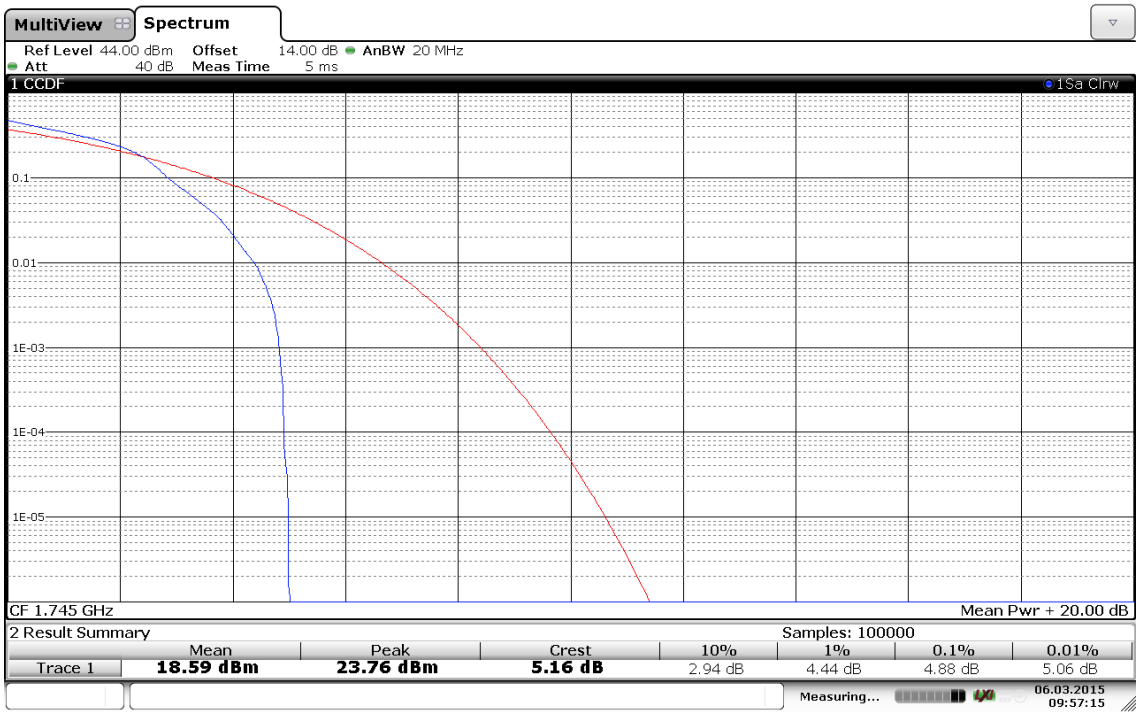
Date: 6.MAR.2015 09:56:07

(Plot B3: Band 4/20MHz/16QAM in Ch.20175 1RB Size)



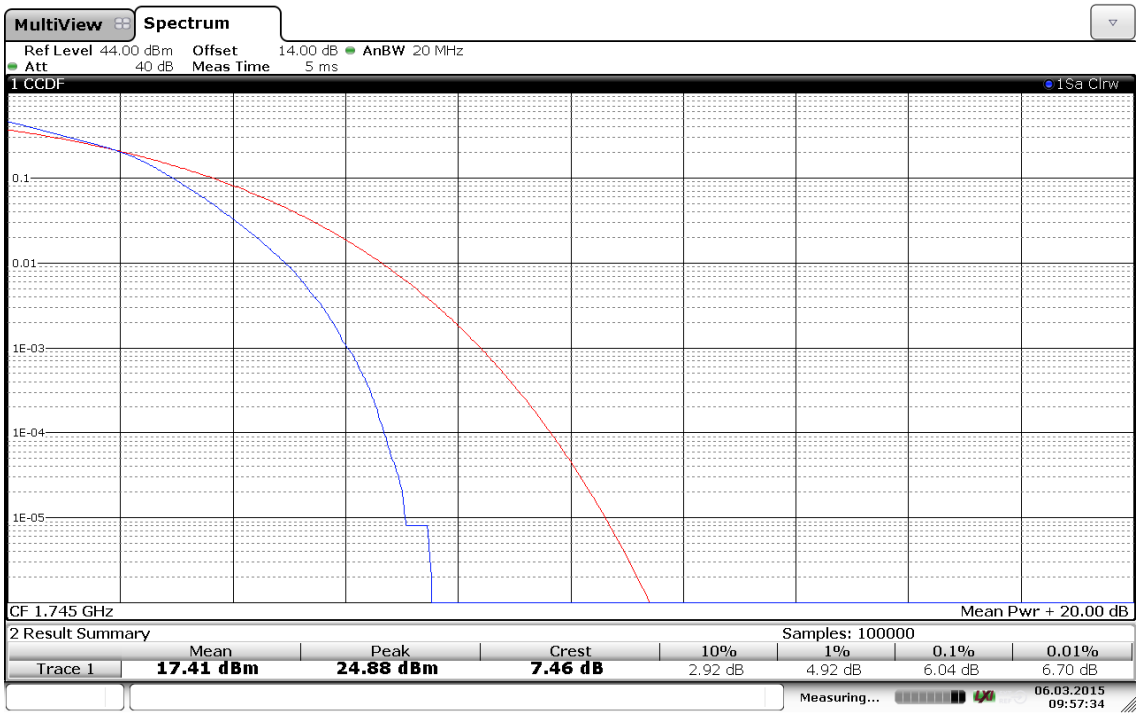
Date: 6.MAR.2015 09:56:27

(Plot B4: Band 4/20MHz/16QAM in Ch.20175 100RB Size)



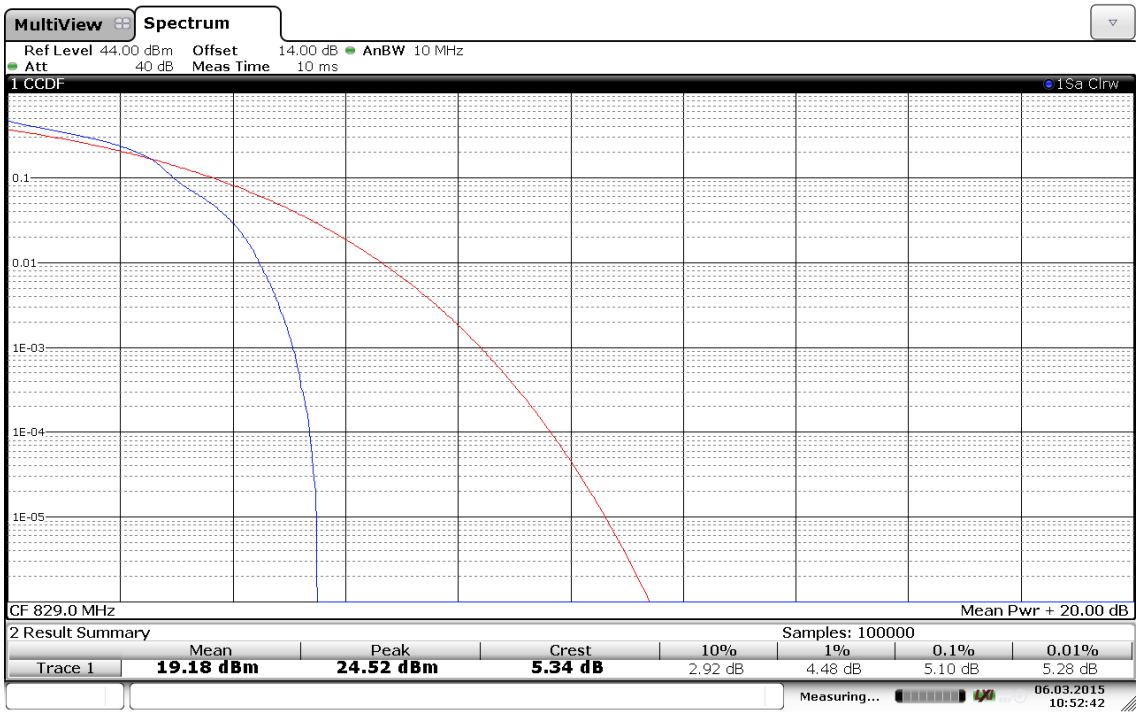
Date: 6.MAR.2015 09:57:15

(Plot B5: Band 4/20MHz/16QAM in Ch.20300 1RB Size)



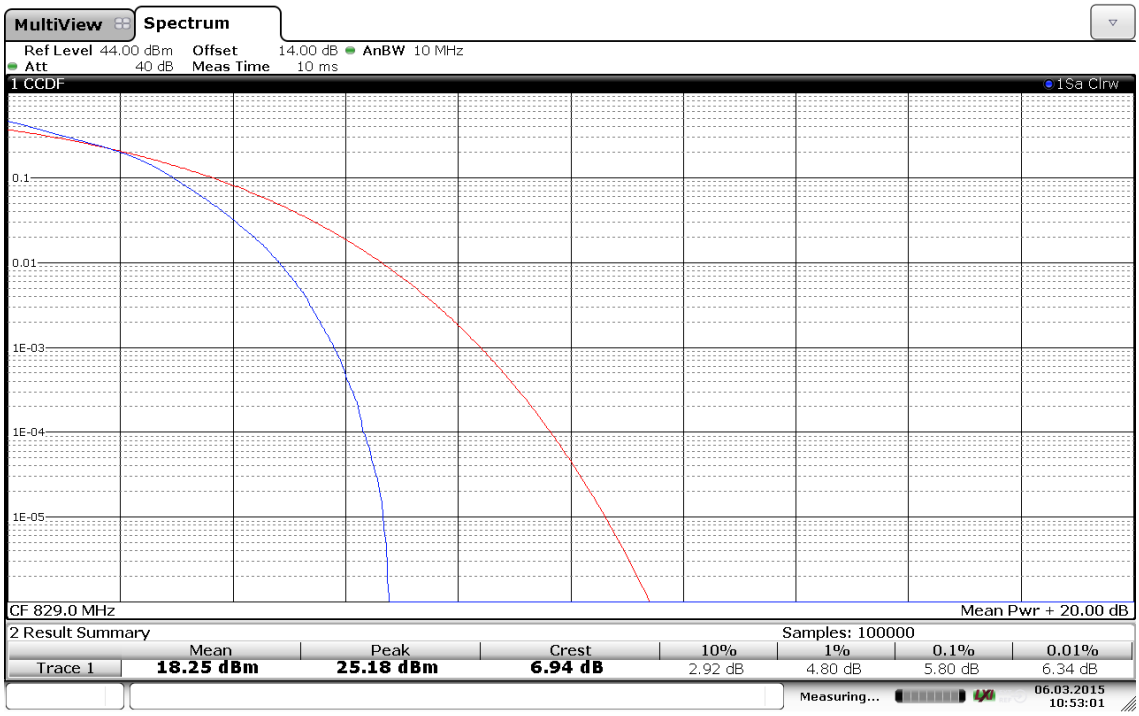
Date: 6.MAR.2015 09:57:34

(Plot B6: Band 4/20MHz/16QAM in Ch.20300 100RB Size)



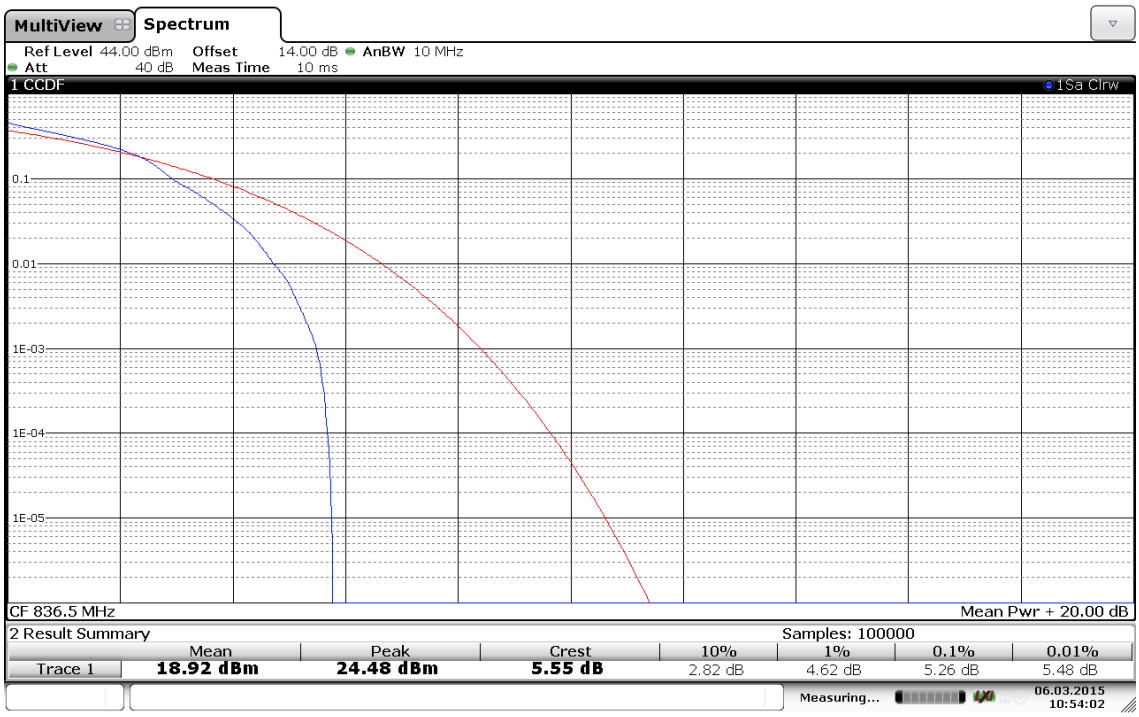
Date: 6.MAR.2015 10:52:42

(Plot C1: Band 5/10MHz/16QAM in Ch.20450 1RB Size)



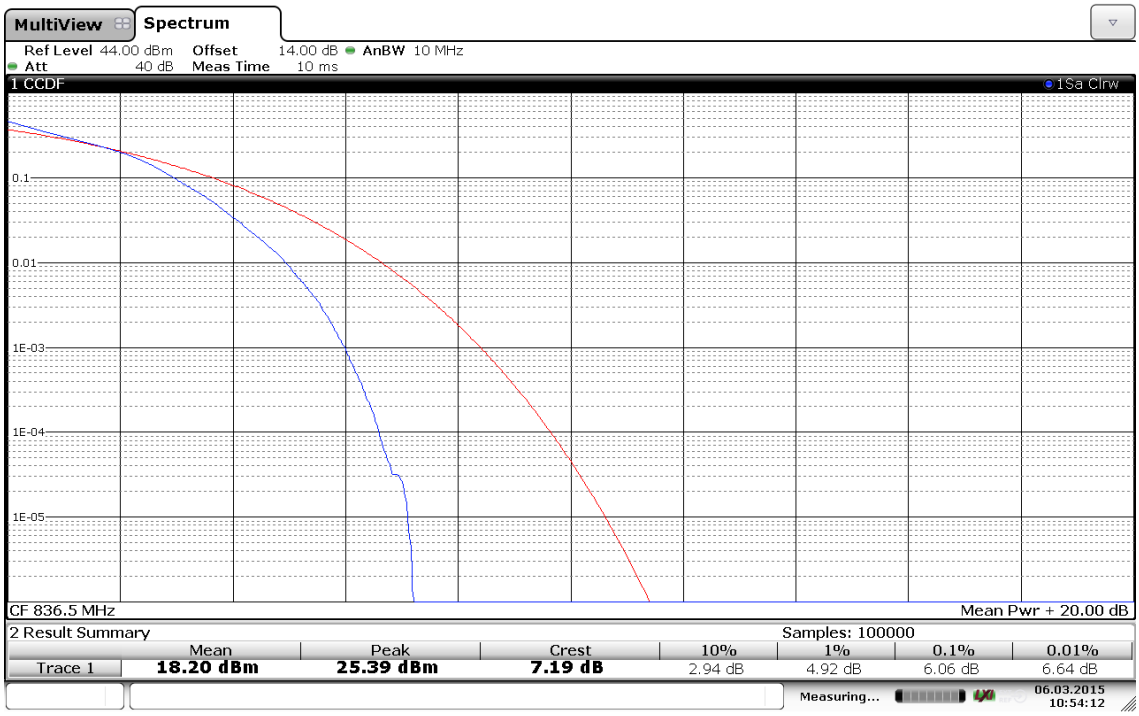
Date: 6.MAR.2015 10:53:01

(Plot C2: Band 5/10MHz/16QAM in Ch.20450 50RB Size)



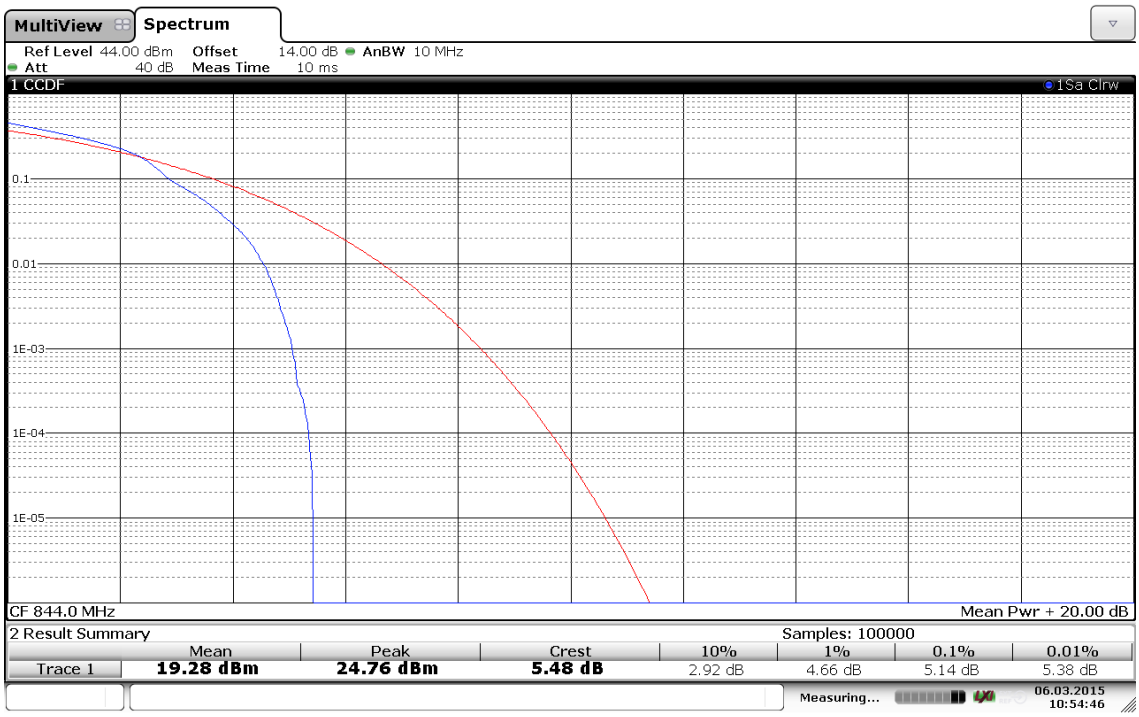
Date: 6.MAR.2015 10:54:01

(Plot C3: Band 5/10MHz/16QAM in Ch.20525 1RB Size)



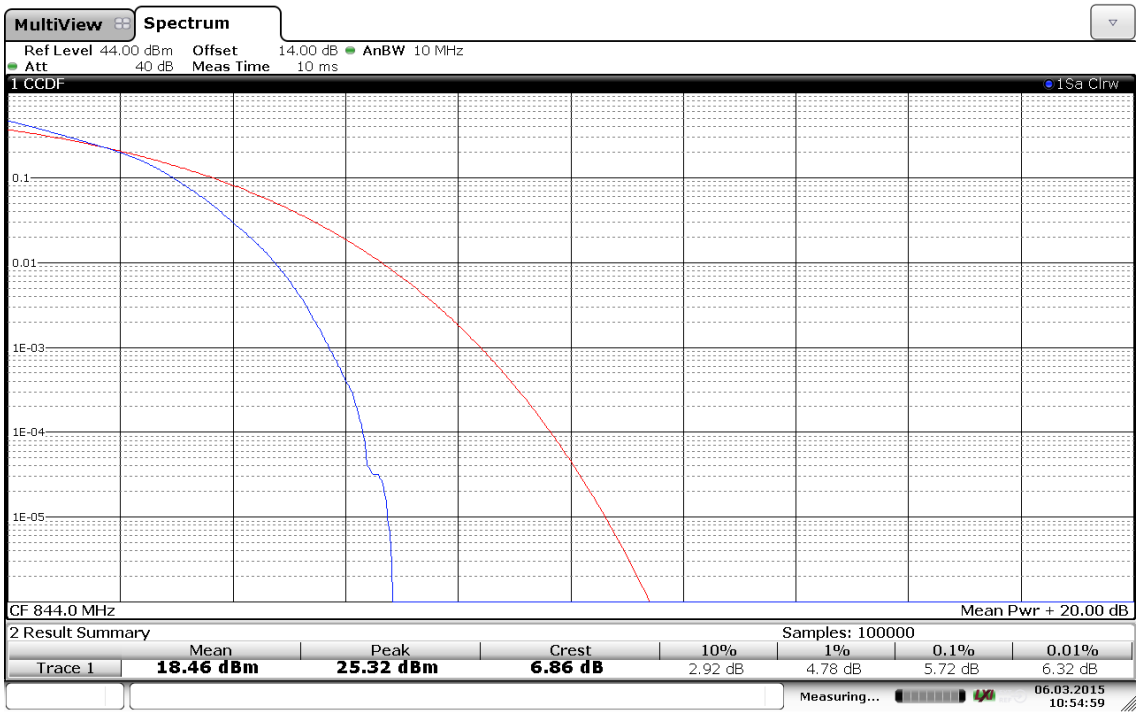
Date: 6.MAR.2015 10:54:11

(Plot C4: Band 5/10MHz/16QAM in Ch.20525 50RB Size)



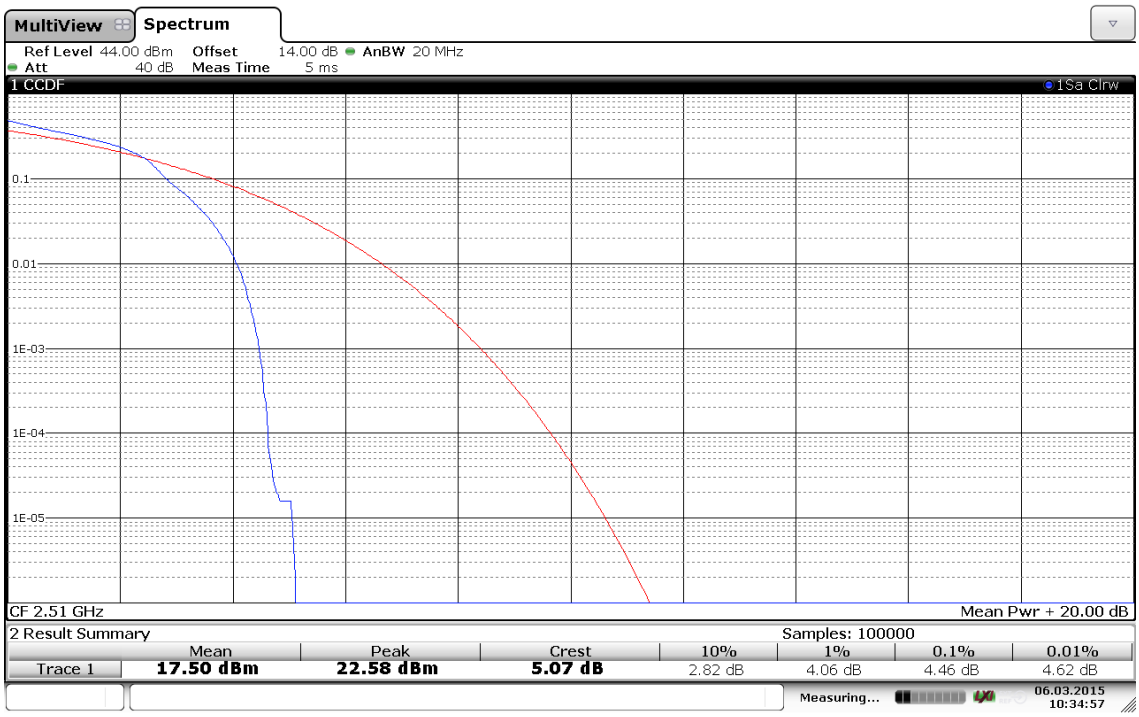
Date: 6.MAR.2015 10:54:46

(Plot C5: Band 5/10MHz/16QAM in Ch.20600 1RB Size)



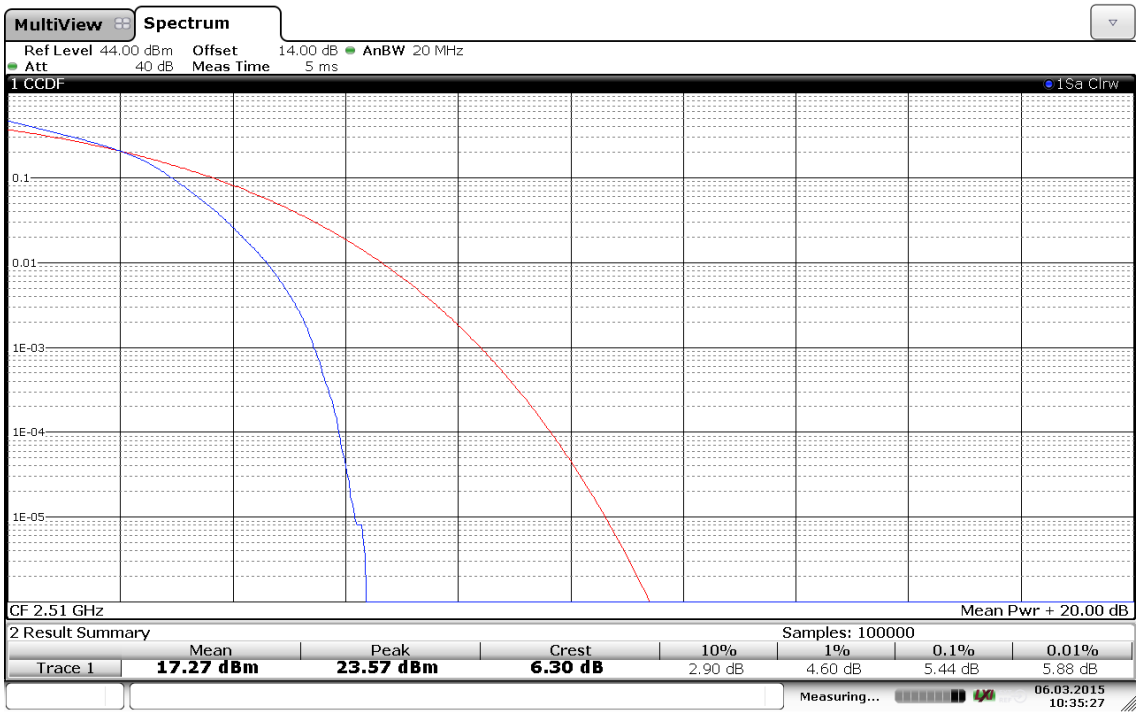
Date: 6.MAR.2015 10:54:59

(Plot C6: Band 5/10MHz/16QAM in Ch.20600 50RB Size)



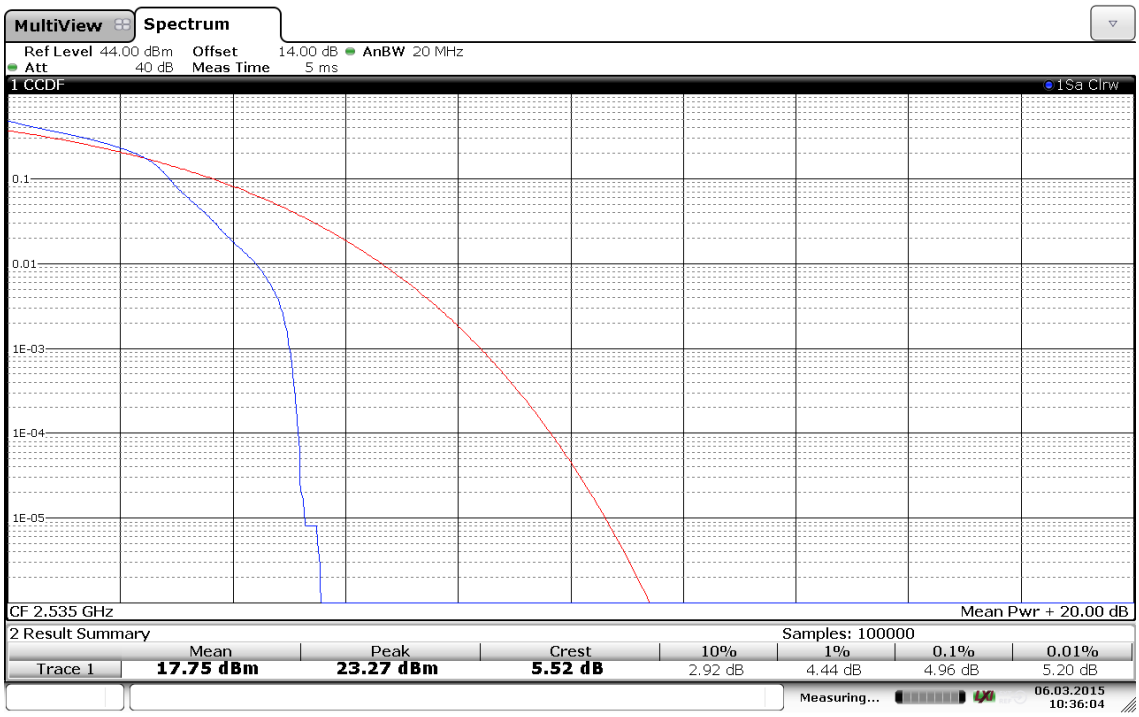
Date: 6.MAR.2015 10:34:56

(Plot D1: Band 7/20MHz/16QAM in Ch.20850 1RB Size)



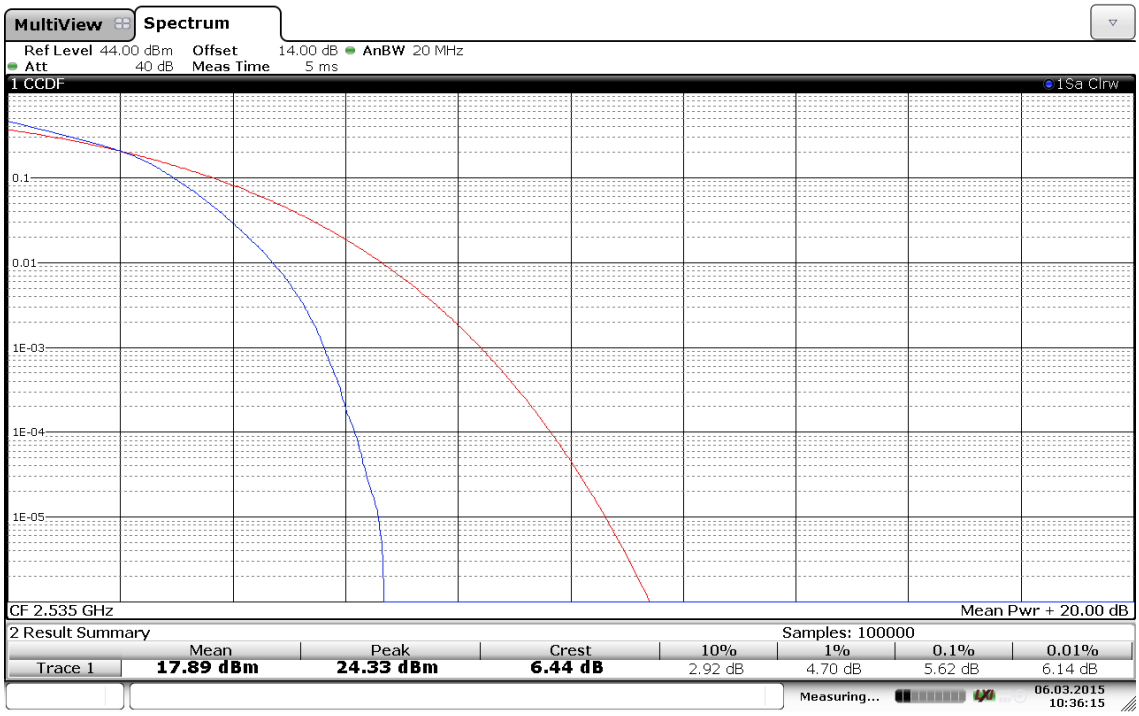
Date: 6.MAR.2015 10:35:27

(Plot D2: Band 7/20MHz/16QAM in Ch.20850 100RB Size)



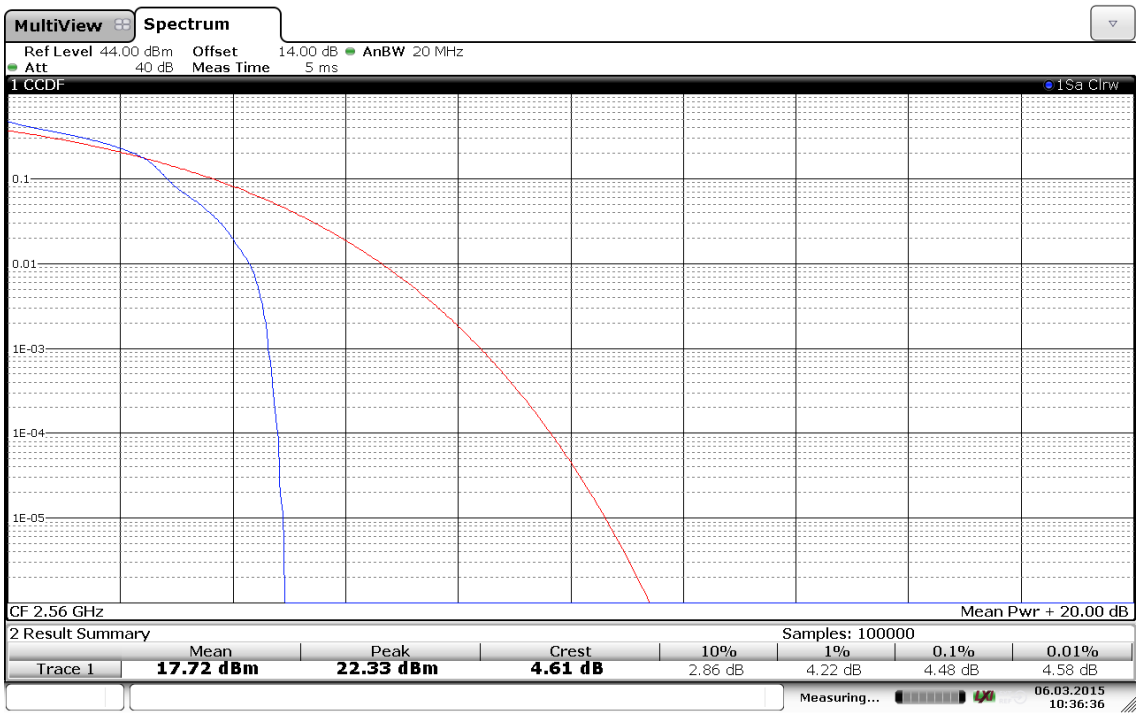
Date: 6.MAR.2015 10:36:04

(Plot D3: Band 7/20MHz/16QAM in Ch.21100 1RB Size)



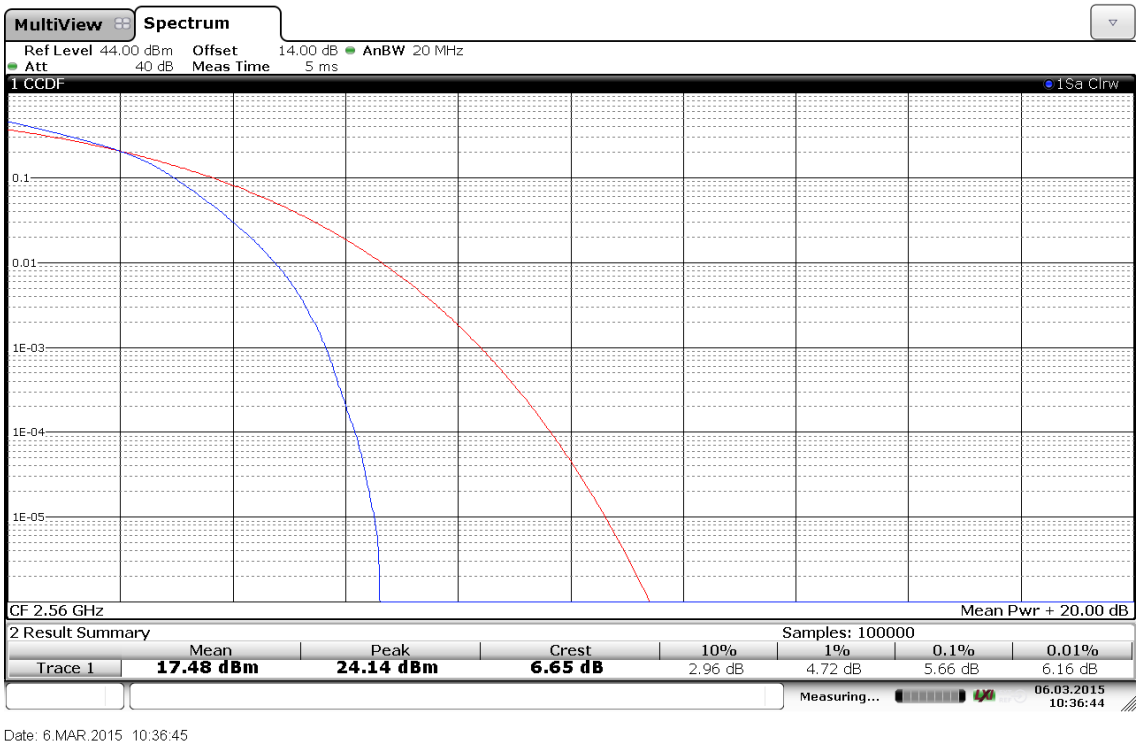
Date: 6.MAR.2015 10:36:14

(Plot D4: Band 7/20MHz/16QAM in Ch.21100 100RB Size)



Date: 6.MAR.2015 10:36:37

(Plot D5: Band 7/20MHz/16QAM in Ch.21350 1RB Size)



(Plot D6: Band 7/20MHz/16QAM in Ch.21350 100RB Size)

2.3 99% Occupied Bandwidth and 26dB Bandwidth

2.3.1 Definition

According to FCC section 2.1049, the occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

2.3.2 Test Description

See section 2.1.2 of this report.

2.3.3 Test Verdict

Here the middle channels are selected to perform testing to verify the 99% occupied bandwidth and 26dB Bandwidth.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.

2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF power with full RB sizes were measured.

1. Test Result of 99% Occupied Bandwidth and 26dB Bandwidth

LTE Band 2						
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)	Refer to Plot
5	18900	1880	QPSK	4.56	5.00	Plot A1 to A2
			16QAM	4.52	5.00	Plot A3 to A4
10	18900	1880	QPSK	9.20	10.28	Plot B1 to B2
			16QAM	9.20	10.24	Plot B3 to B4
15	18900	1880	QPSK	13.62	15.18	Plot C1 to C2
			16QAM	13.56	15.24	Plot C3 to C4
20	18900	1880	QPSK	18.80	21.44	Plot D1 to D2
			16QAM	18.80	21.52	Plot D3 to D4

LTE Band 4						
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)	Refer to Plot
5	20175	1732.5	QPSK	4.52	4.98	Plot E1 to E2
			16QAM	4.52	4.98	Plot E3 to E4
10	20175	1732.5	QPSK	8.96	9.80	Plot F1 to F2
			16QAM	9.00	9.80	Plot F3 to F4
15	20175	1732.5	QPSK	13.62	15.12	Plot G1 to G2
			16QAM	13.56	15.12	Plot G3 to G4
20	20175	1732.5	QPSK	18.80	21.60	Plot H1 to H2
			16QAM	18.80	21.60	Plot H3 to H4

LTE Band 5						
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)	Refer to Plot
5	20525	836.5	QPSK	4.52	5.00	Plot I1 to I2
			16QAM	4.52	4.98	Plot I3 to I4
10	20525	836.5	QPSK	9.00	9.84	Plot J1 to J2
			16QAM	9.00	9.88	Plot J3 to J4

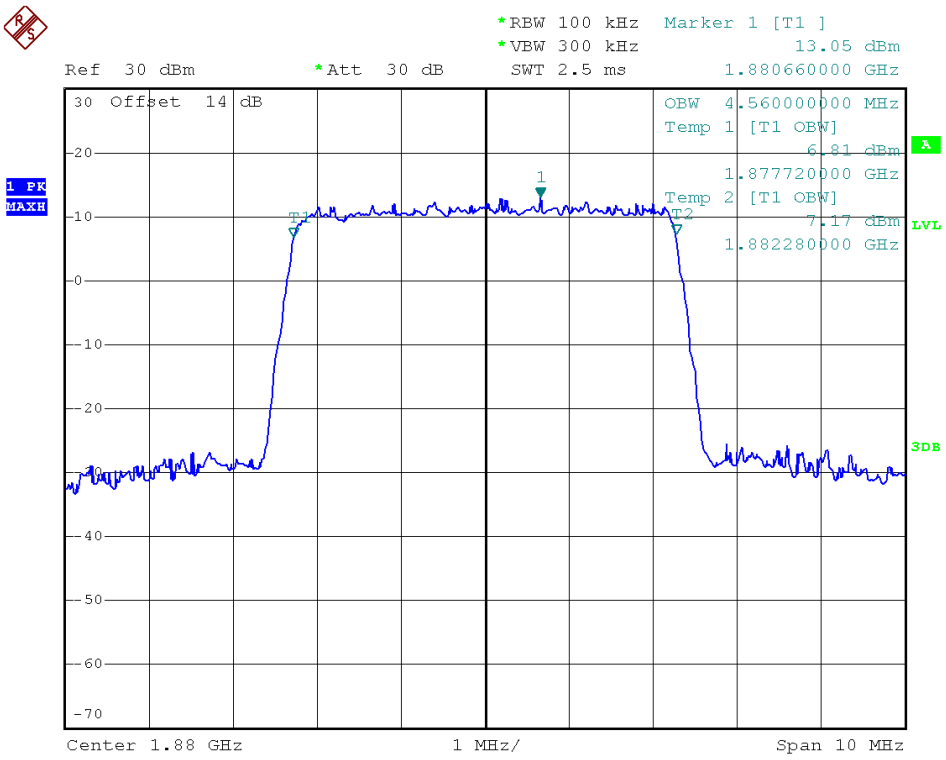
LTE Band 7						
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)	Refer to Plot
5	21100	2535	QPSK	4.52	4.98	Plot K1 to K2
			16QAM	4.52	5.00	Plot K3 to K4
10	21100	2535	QPSK	8.96	9.80	Plot L1 to L2
			16QAM	9.00	9.84	Plot L3 to L4
15	21100	2535	QPSK	13.62	15.12	Plot M1 to M2
			16QAM	13.56	15.06	Plot M3 to M4
20	21100	2535	QPSK	18.72	21.44	Plot N1 to N2
			16QAM	18.64	21.68	Plot N3 to N4

Note: The maximum RB configurations of the 99% Occupied Bandwidth and 26dB Bandwidth summary as below:

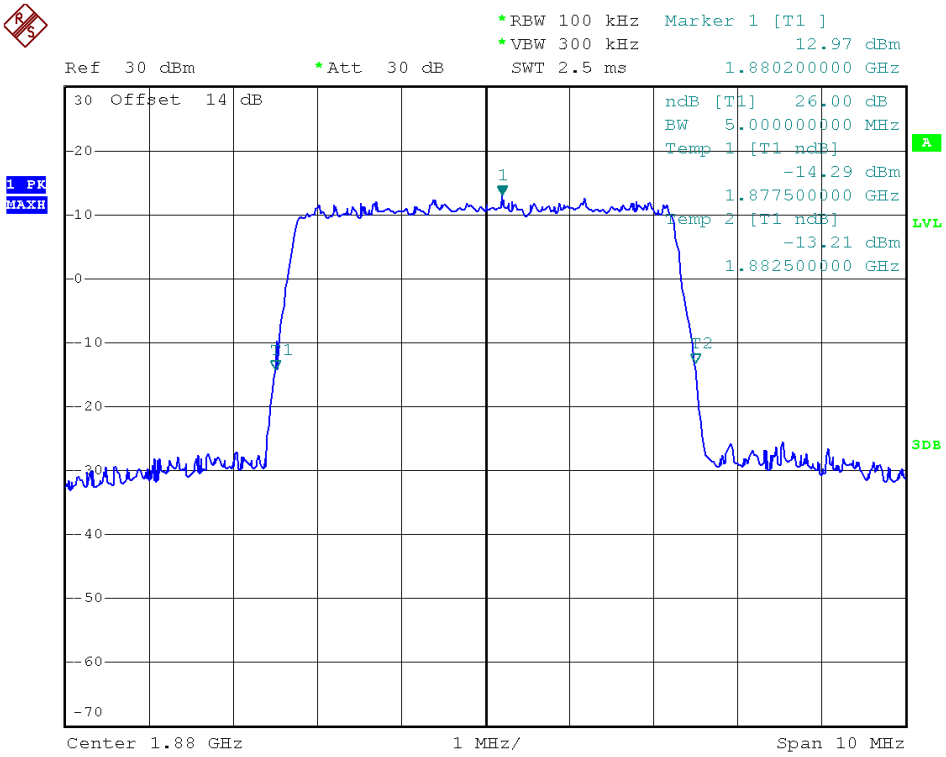
BW5MHz RB setting: RB Size 25,RB Offset 0 BW10MHz RB setting: RB Size 50,RB Offset 0

BW15MHz RB setting: RB Size 75,RB Offset 0 BW20MHz RB setting: RB Size 100,RB Offset 0

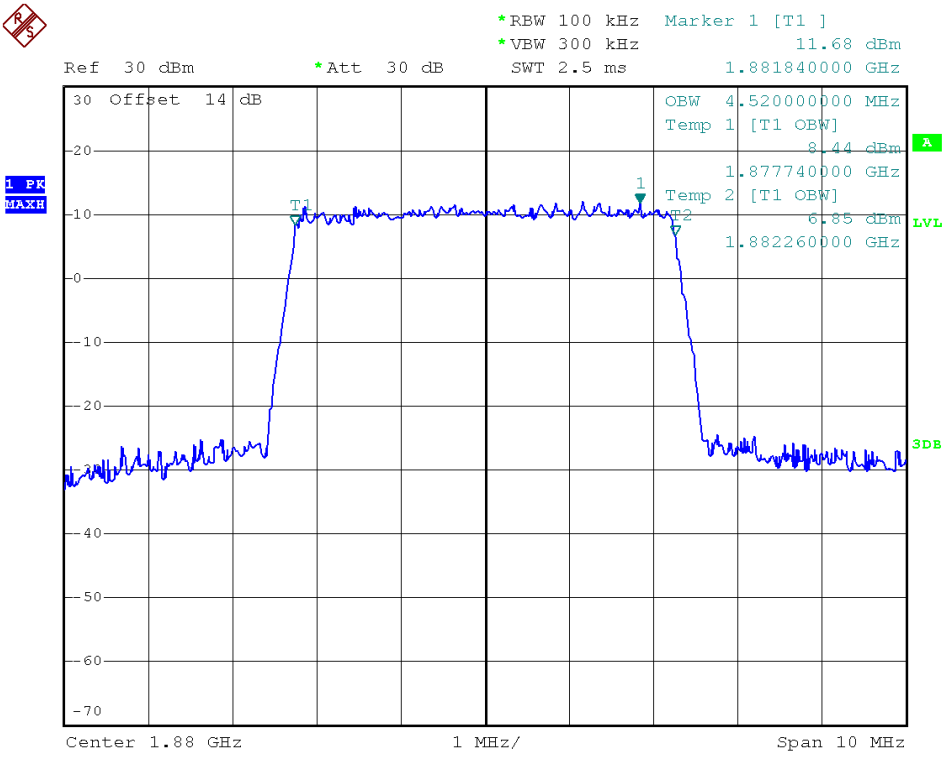
2. Test Plots:



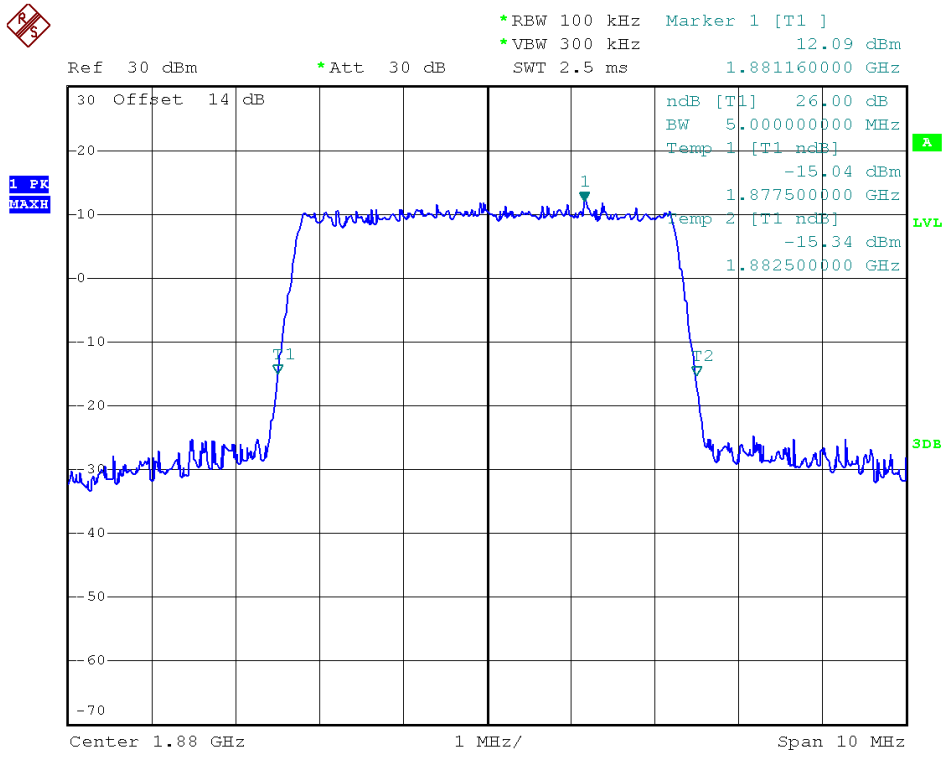
(Plot A1: 99% Occupied Bandwidth LTE Band 2/5MHz/QPSK)



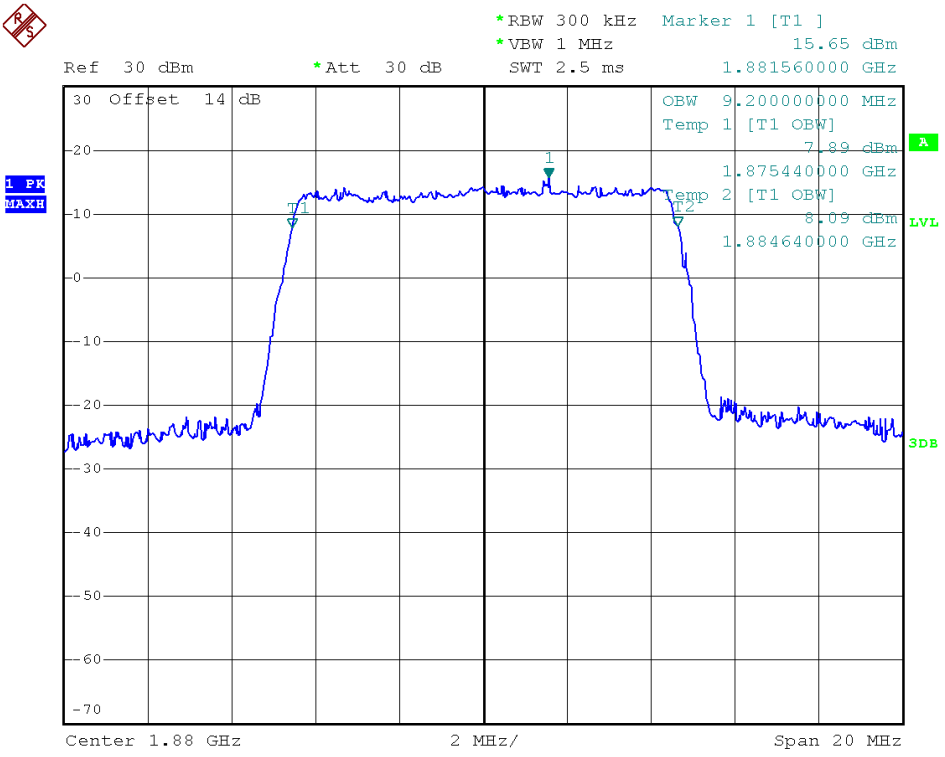
(Plot A2: 26dB Bandwidth LTE Band 2/5MHz/QPSK)



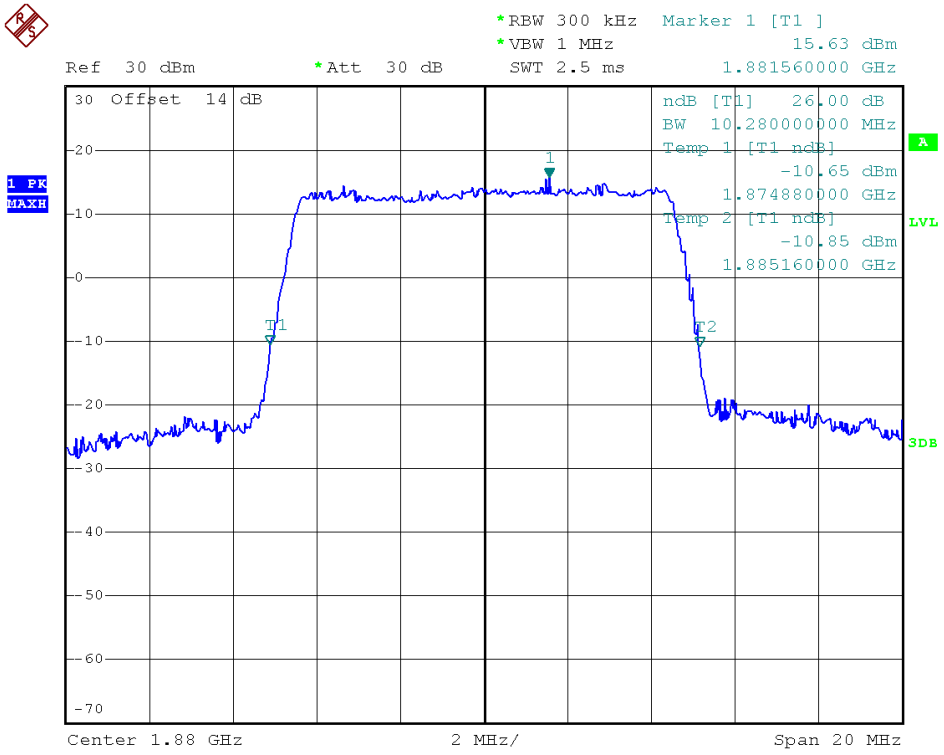
(Plot A3: 99% Occupied Bandwidth LTE Band 2/5MHz/16QAM)



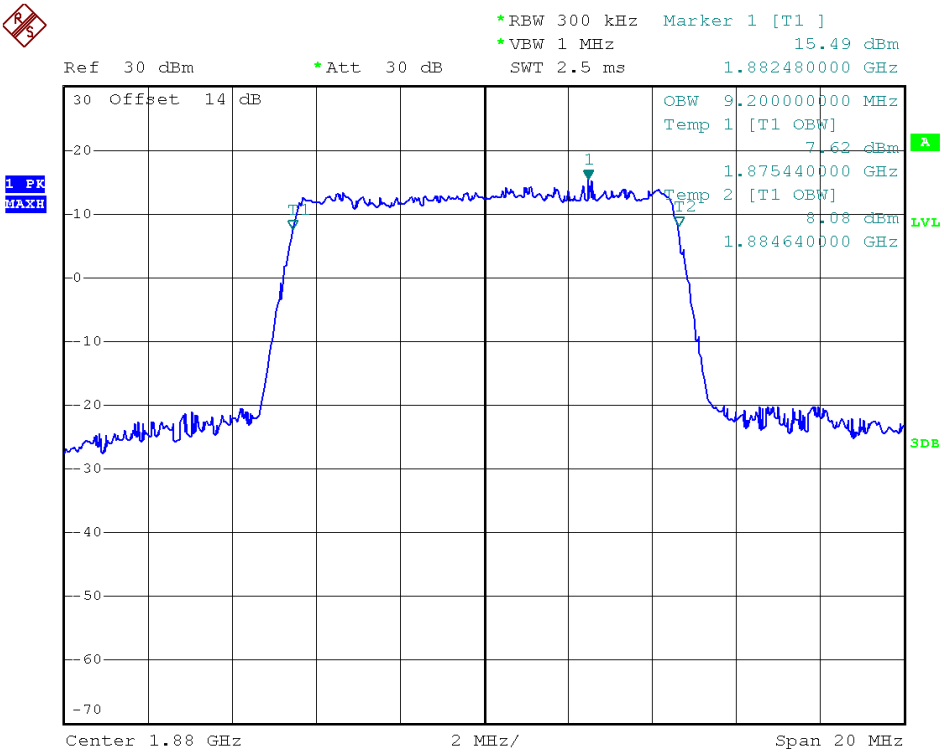
(Plot A4: 26dB Bandwidth LTE Band 2/5MHz/16QAM)



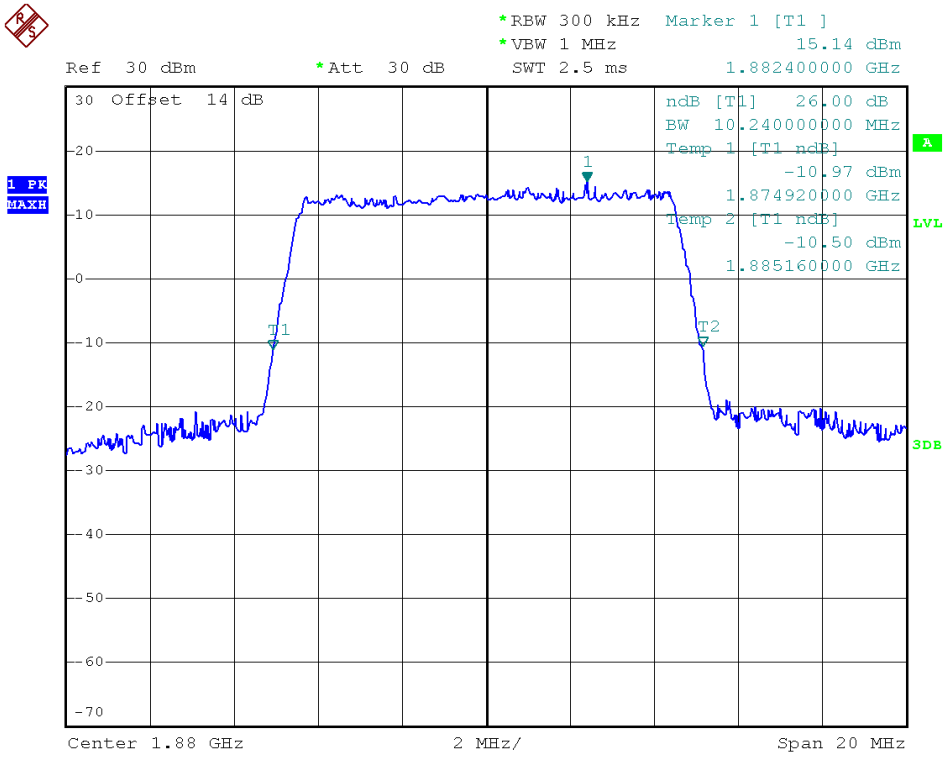
(Plot B1: 99% Occupied Bandwidth LTE Band 2/10MHz/QPSK)



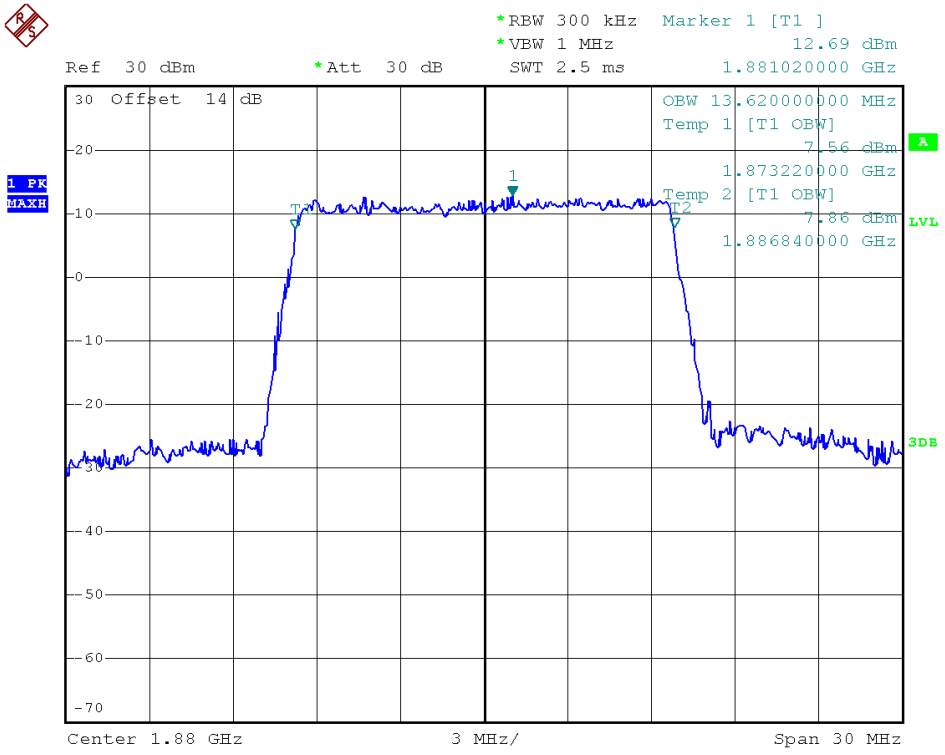
(Plot B2: 26dB Bandwidth LTE Band 2/10MHz/QPSK)



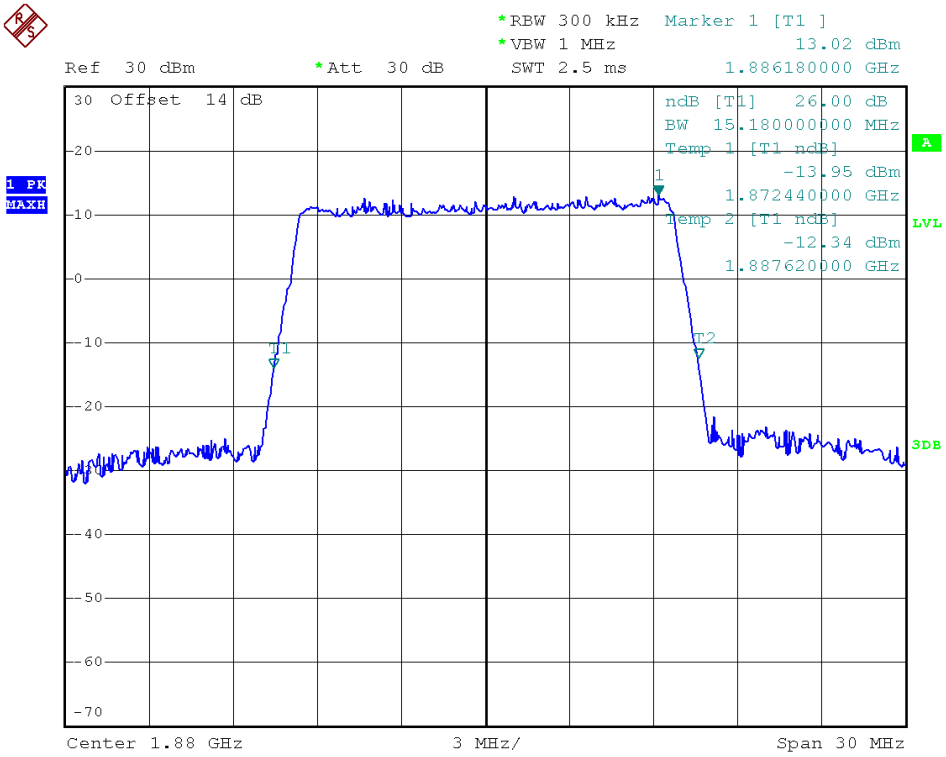
(Plot B3: 99% Occupied Bandwidth LTE Band 2/10MHz/16QAM)



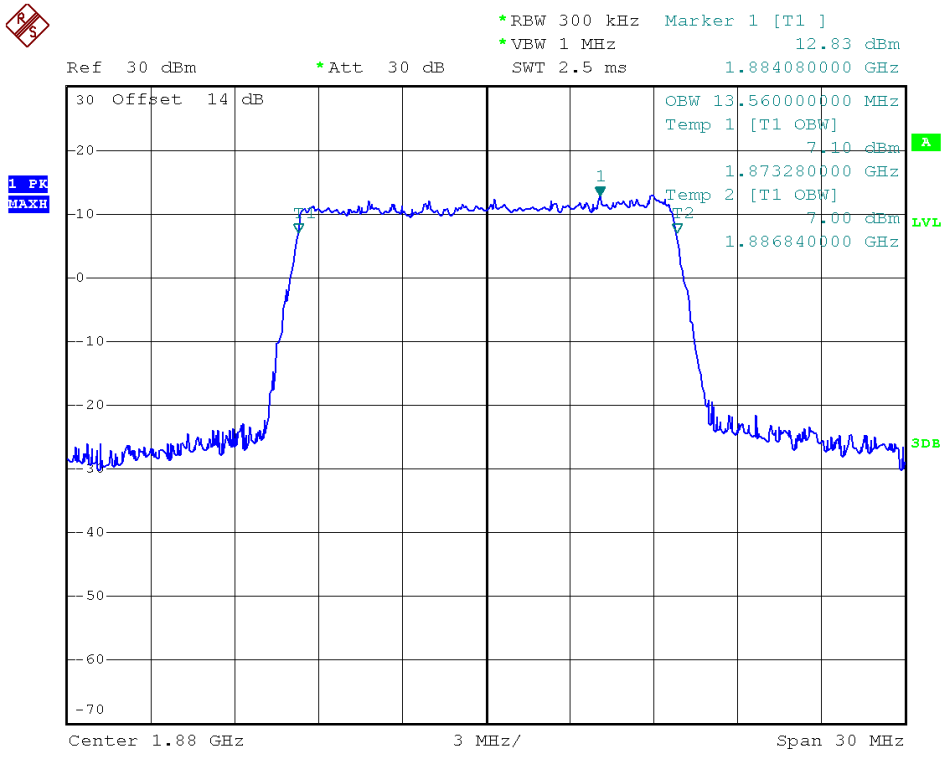
(Plot B4: 26dB Bandwidth LTE Band 2/10MHz/16QAM)



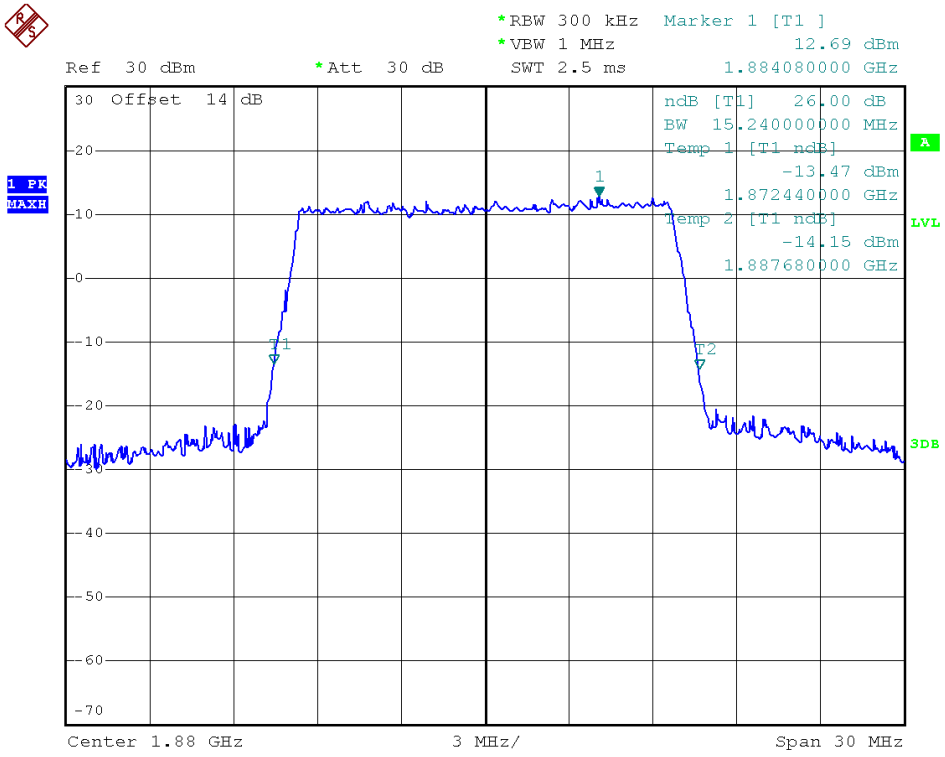
(Plot C1: 99% Occupied Bandwidth LTE Band 2/15MHz/QPSK)



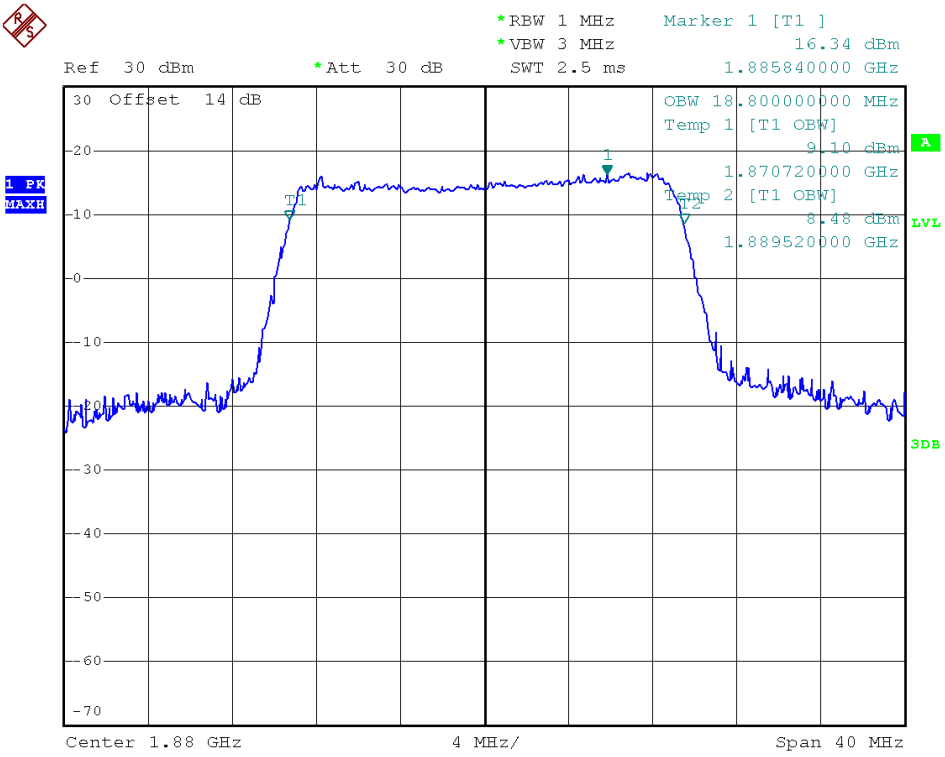
(Plot C2: 26dB Bandwidth LTE Band 2/15MHz/QPSK)



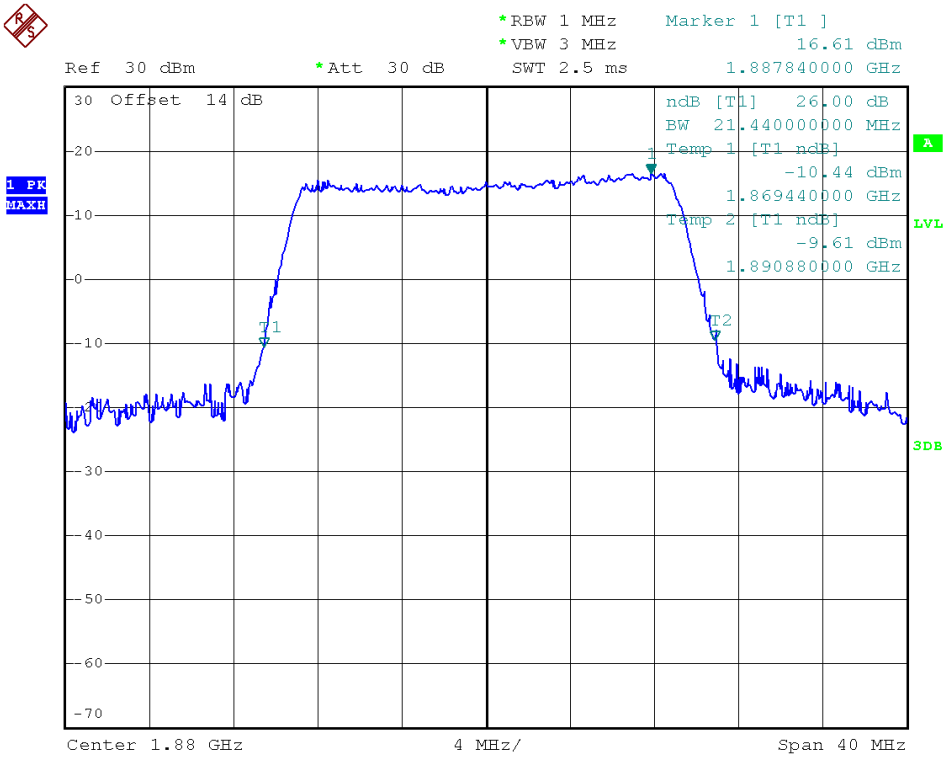
(Plot C3: 99% Occupied Bandwidth LTE Band 2/15MHz/16QAM)



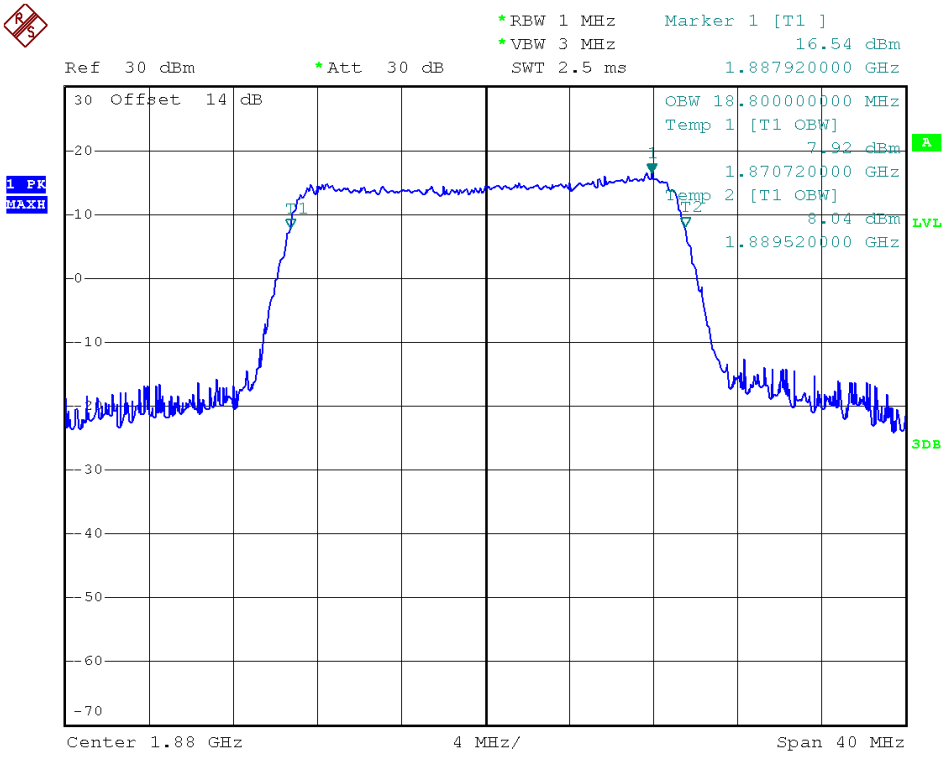
(Plot C4: 26dB Bandwidth LTE Band 2/15MHz/16QAM)



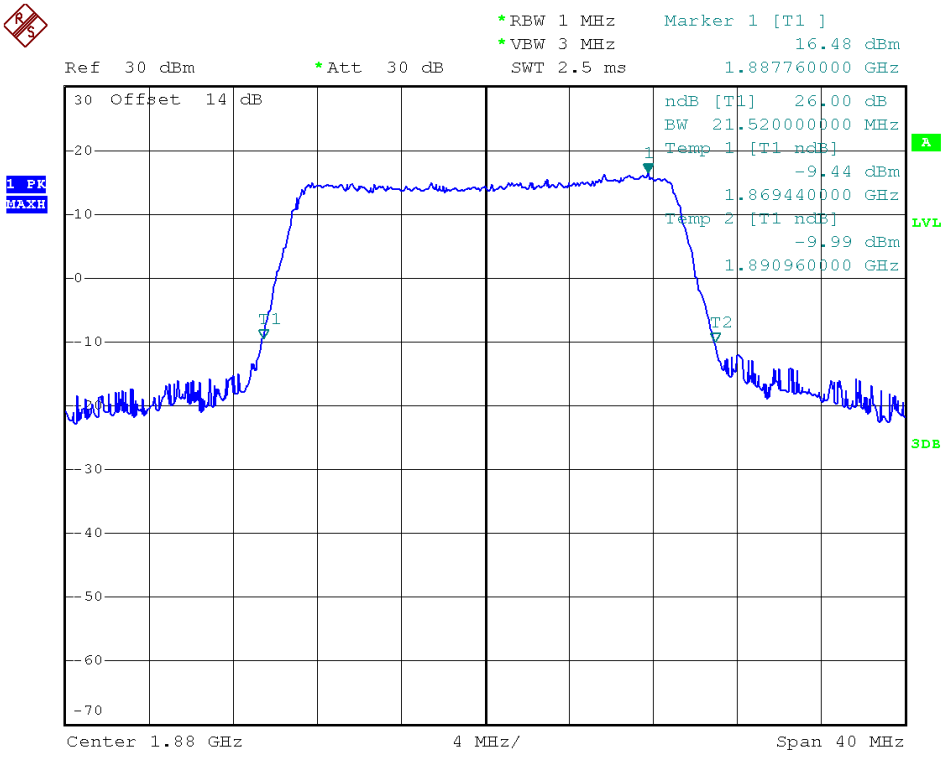
(Plot D1: 99% Occupied Bandwidth LTE Band 2/20MHz/QPSK



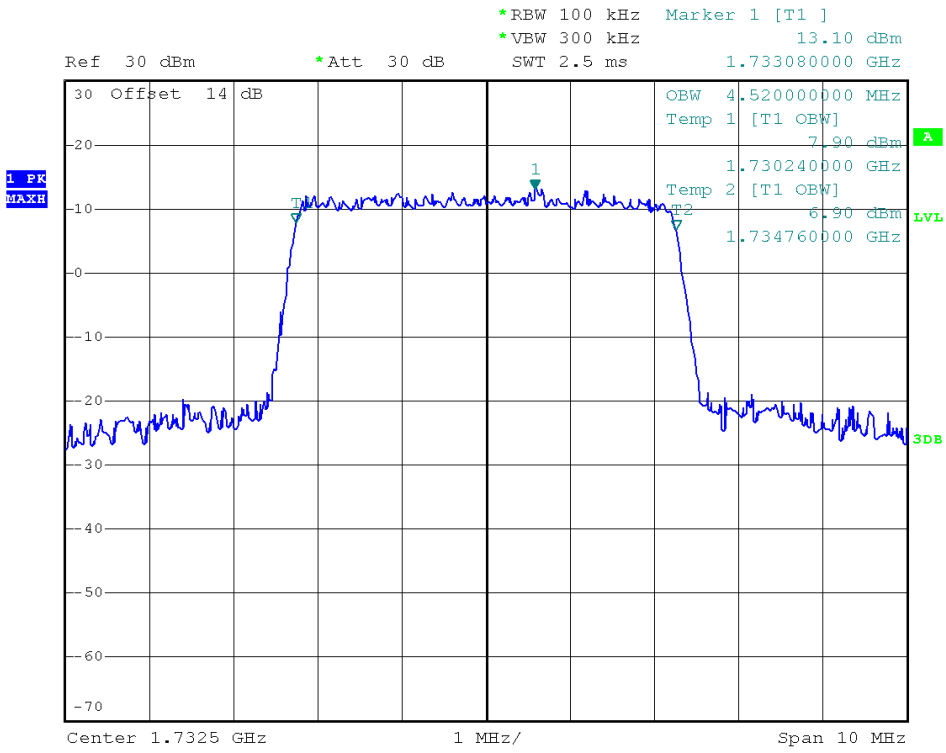
(Plot D2: 26dB Bandwidth LTE Band 2/20MHz/QPSK)



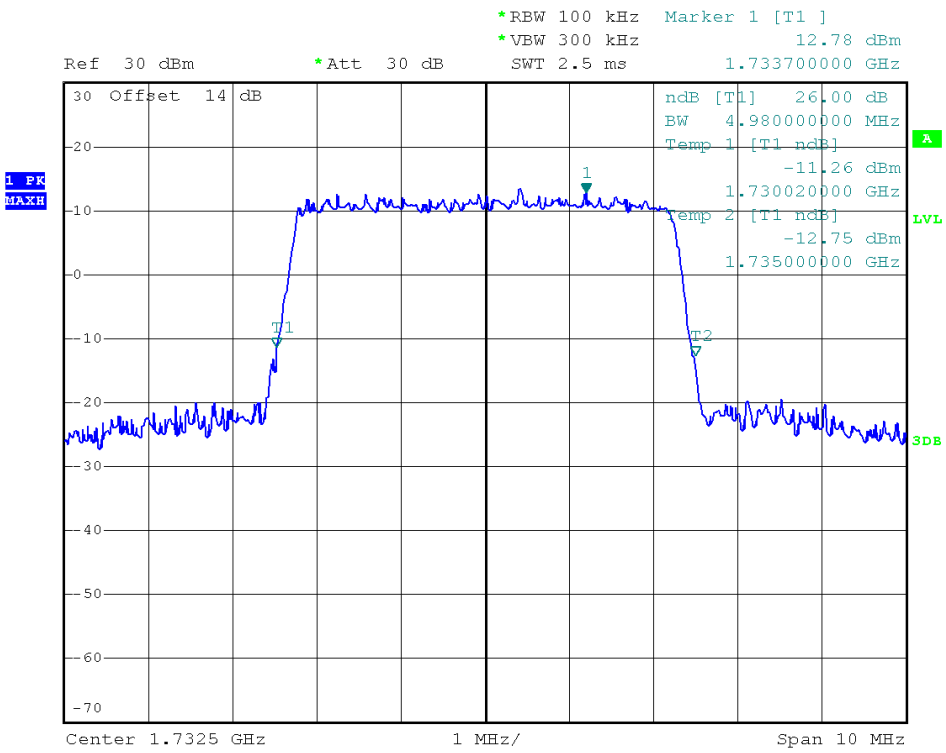
(Plot D3: 99% Occupied Bandwidth LTE Band 2/20MHz/16QAM)



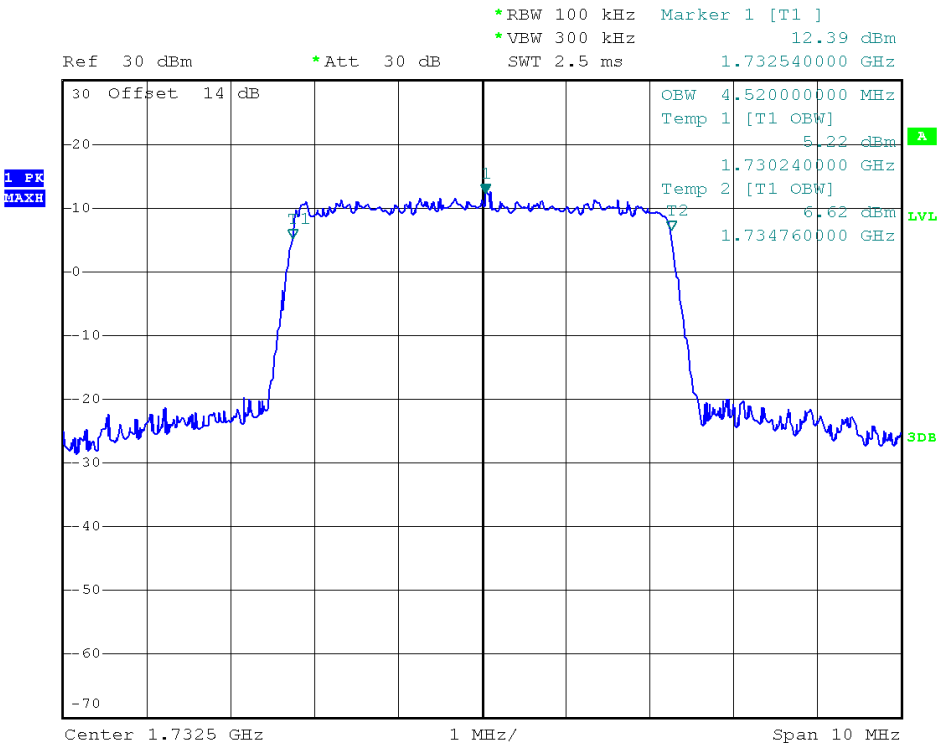
(Plot D4: 26dB Bandwidth LTE Band 2/20MHz/16QAM)



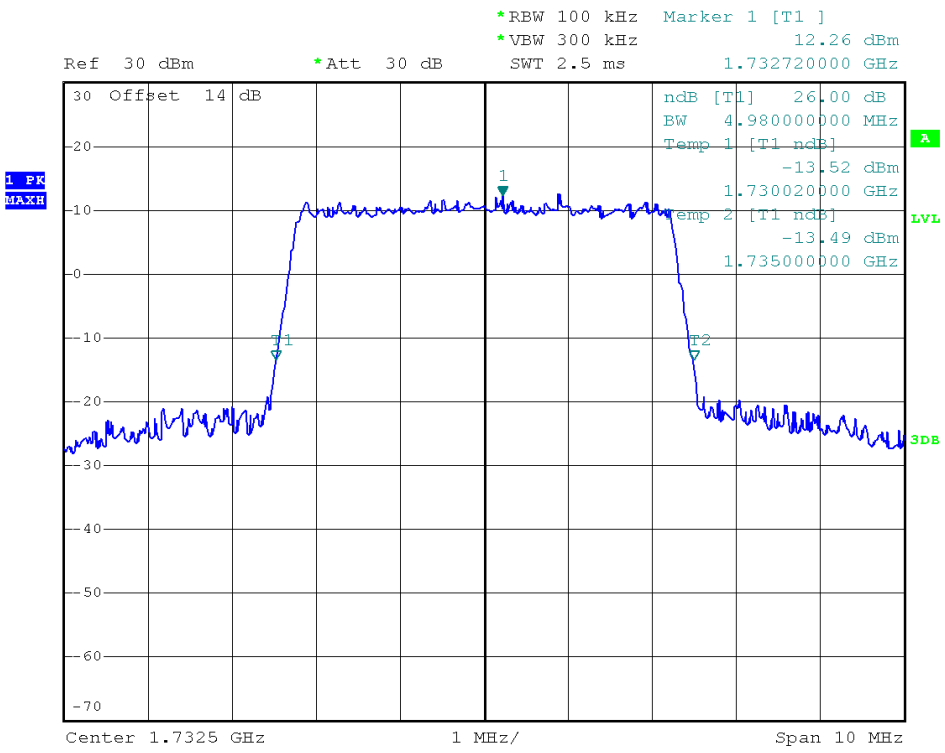
(Plot E1: 99% Occupied Bandwidth LTE Band 4/5MHz/QPSK)



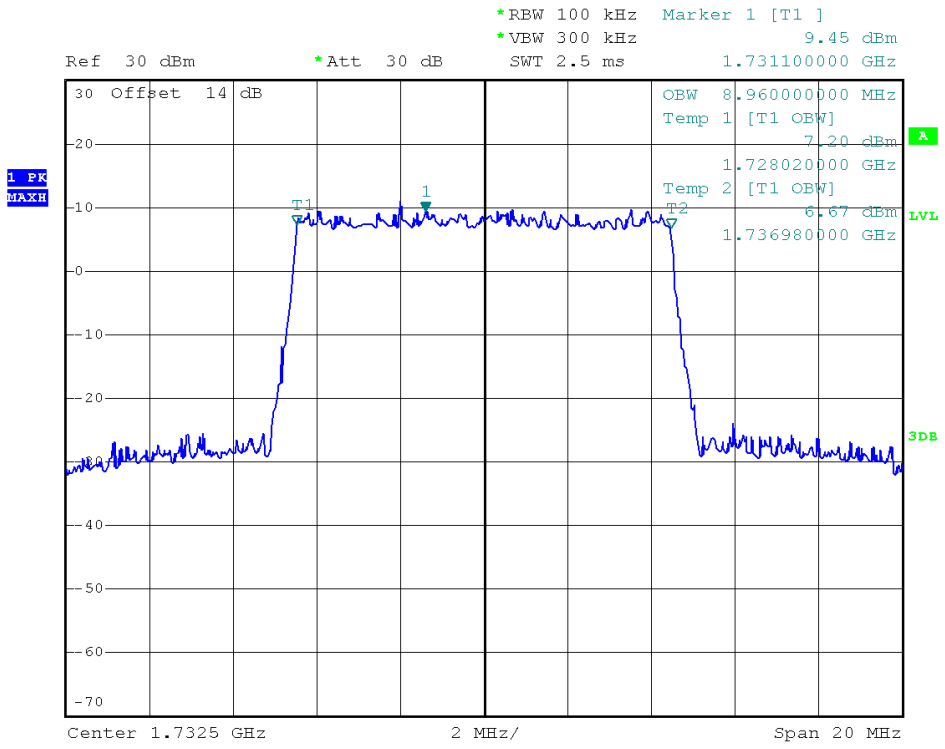
(Plot E2: 26dB Bandwidth LTE Band 4/5MHz/QPSK)



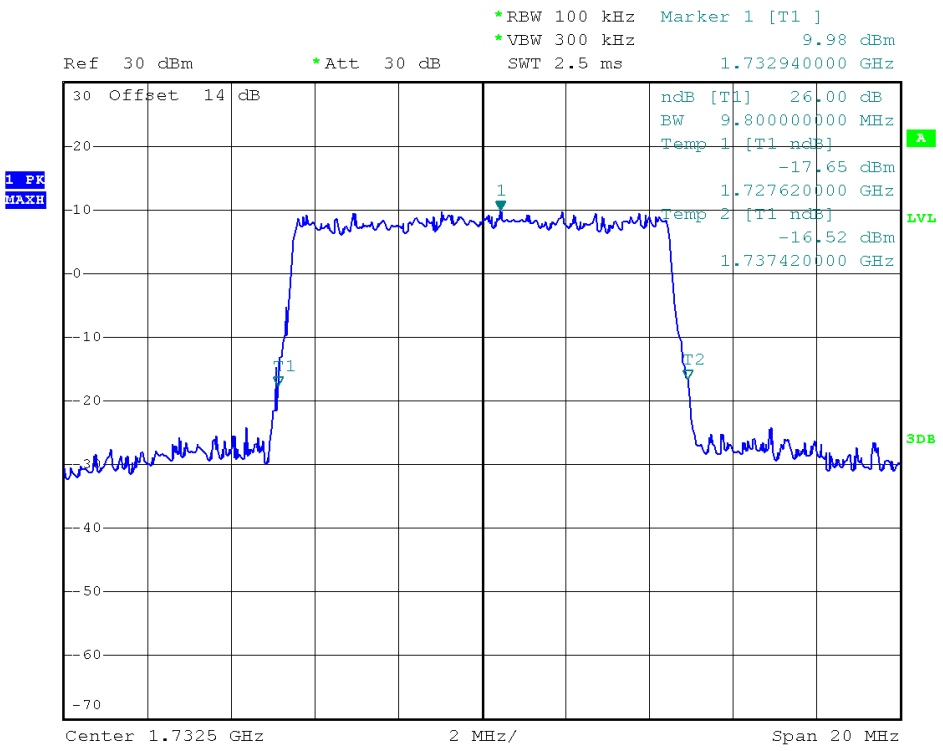
(Plot E3: 99% Occupied Bandwidth LTE Band 4/5MHz/16QAM)



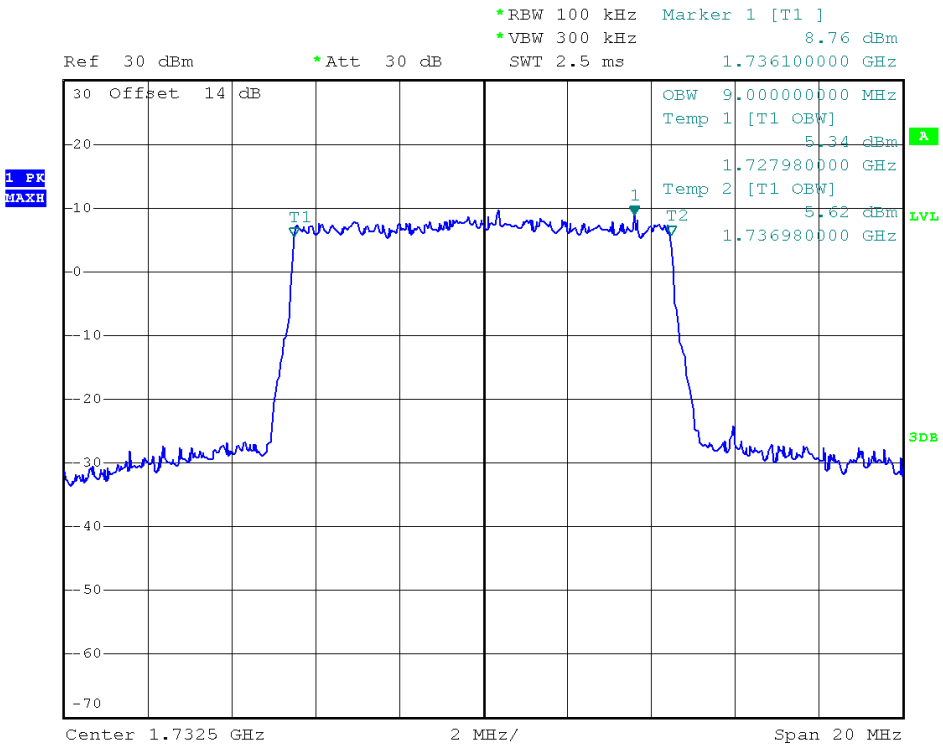
(Plot E4: 26dB Bandwidth LTE Band 4/5MHz/16QAM)



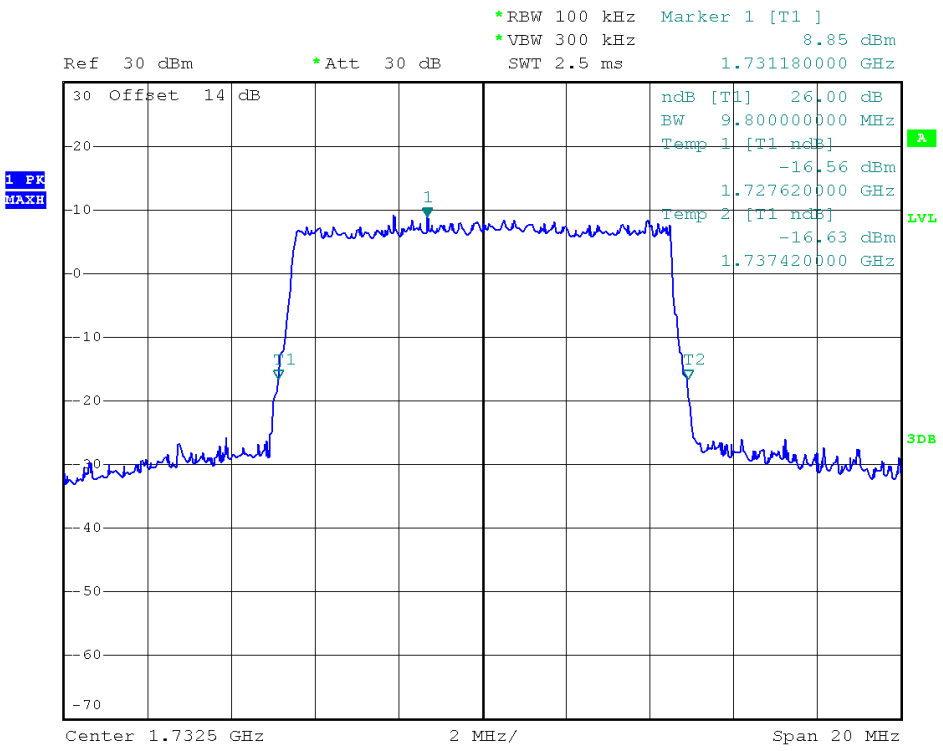
(Plot F1: 99% Occupied Bandwidth LTE Band 4/10MHz/QPSK)



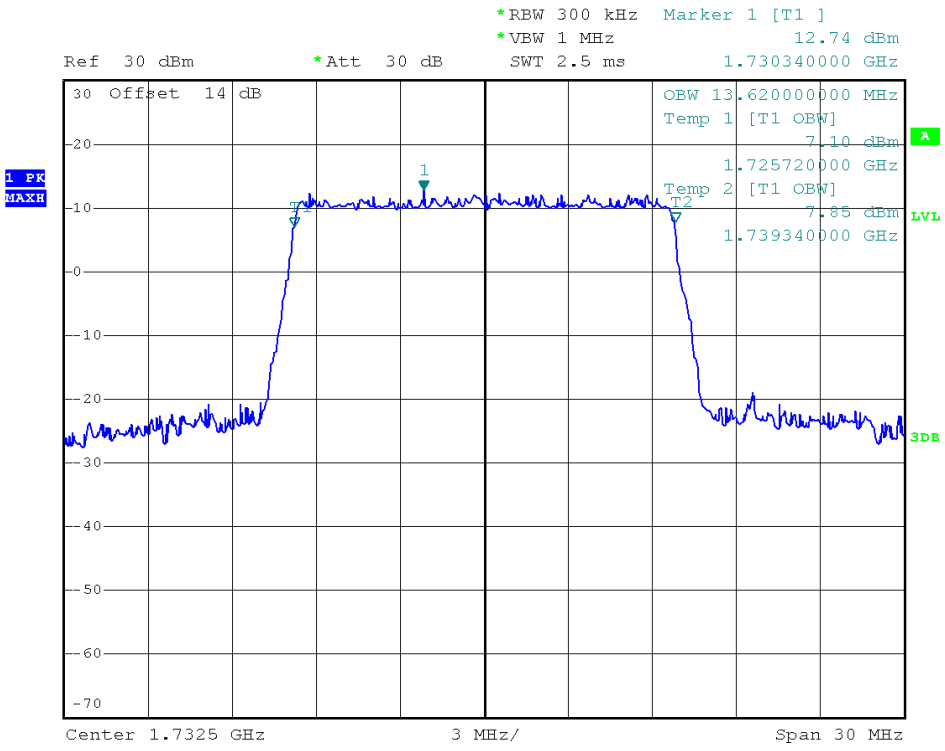
(Plot F2: 26dB Bandwidth LTE Band 4/10MHz/QPSK)



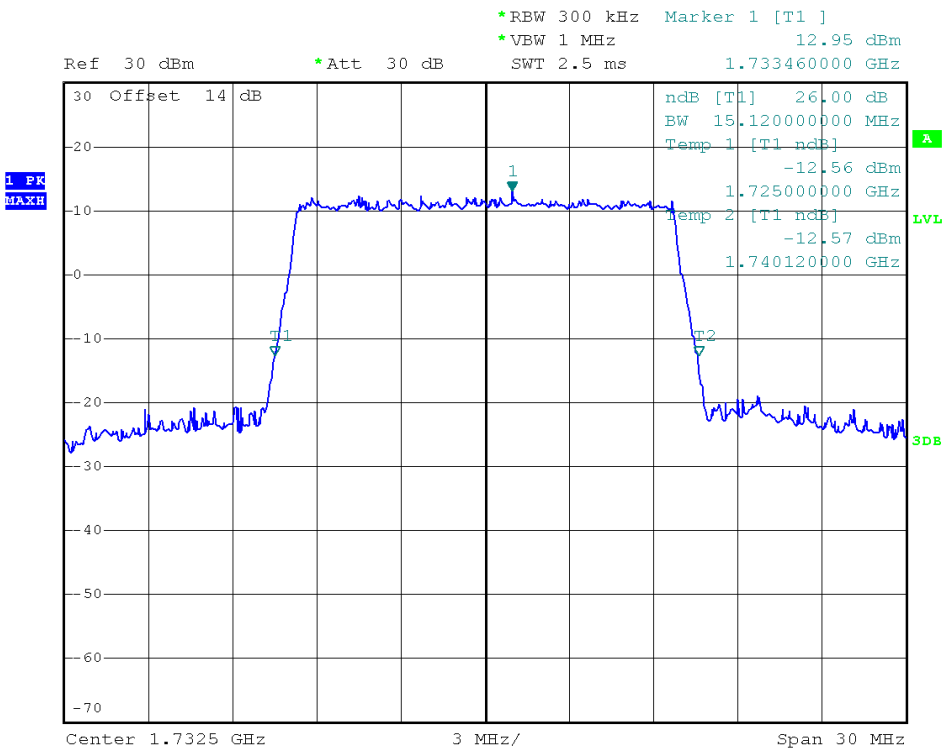
(Plot F3: 99% Occupied Bandwidth LTE Band 4/10MHz/16QAM)



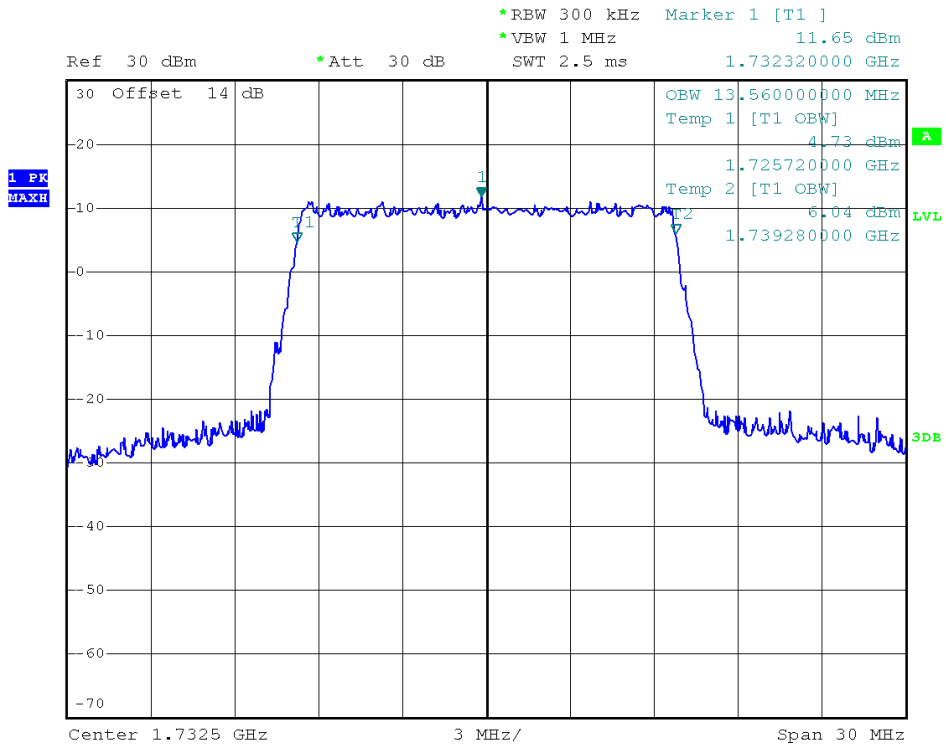
(Plot F4: 26dB Bandwidth LTE Band 4/10MHz/16QAM)



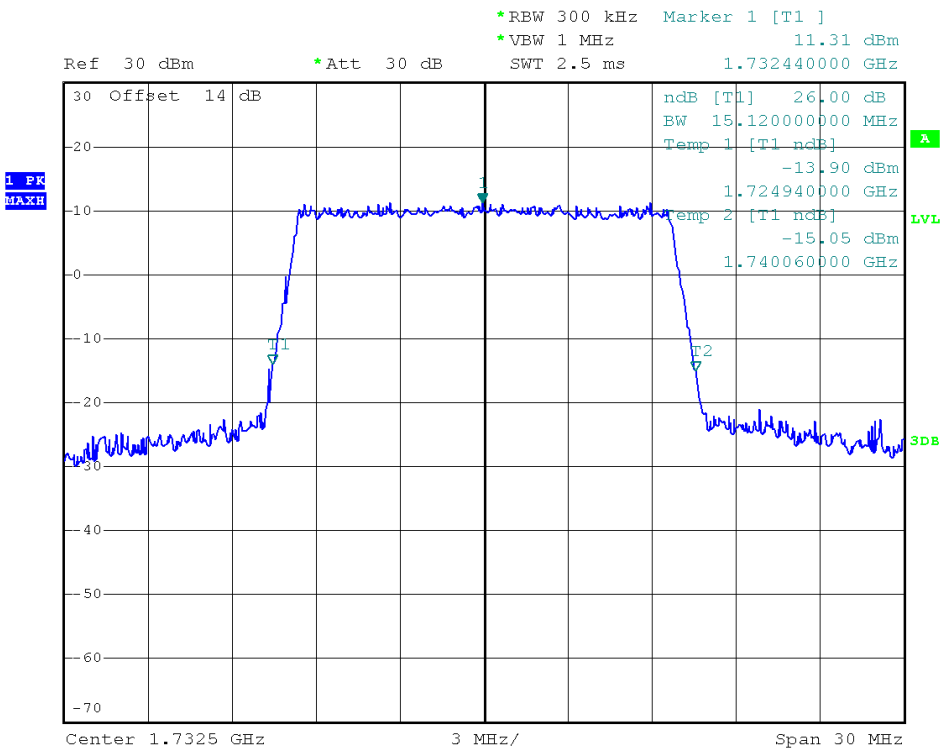
(Plot G1: 99% Occupied Bandwidth LTE Band 4/15MHz/QPSK)



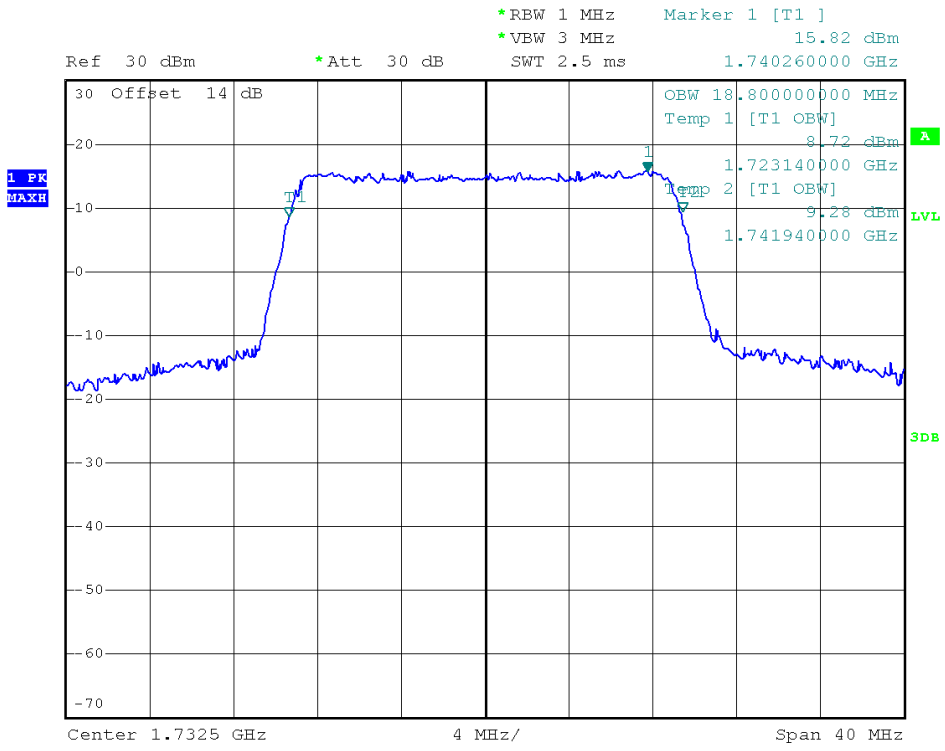
(Plot G2: 26dB Bandwidth LTE Band 4/15MHz/QPSK)



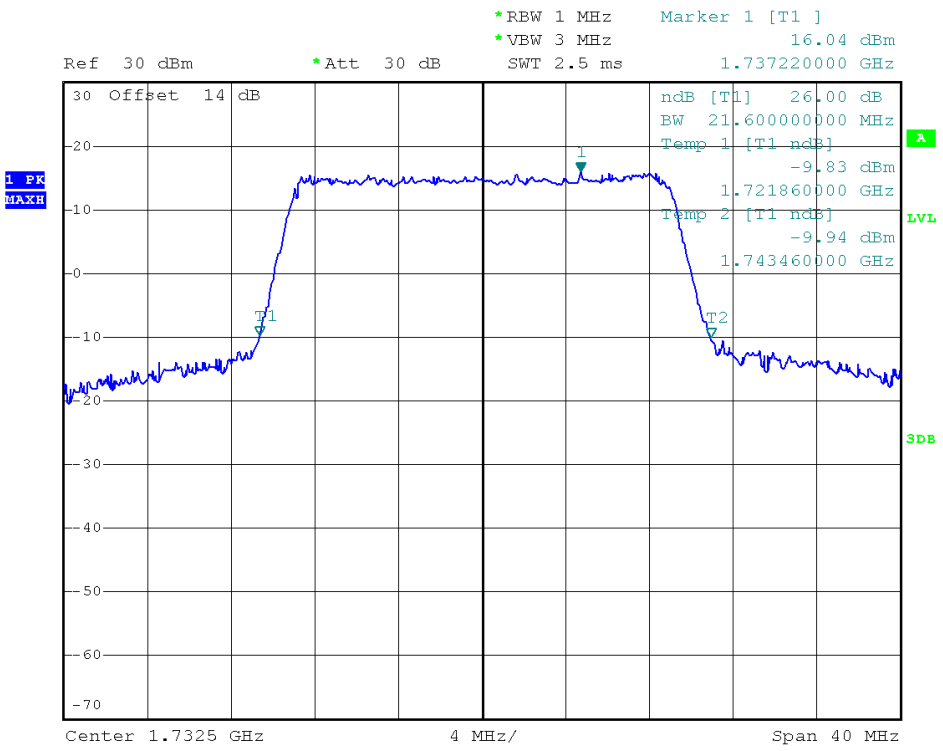
(Plot G3: 99% Occupied Bandwidth LTE Band 4/15MHz/16QAM)



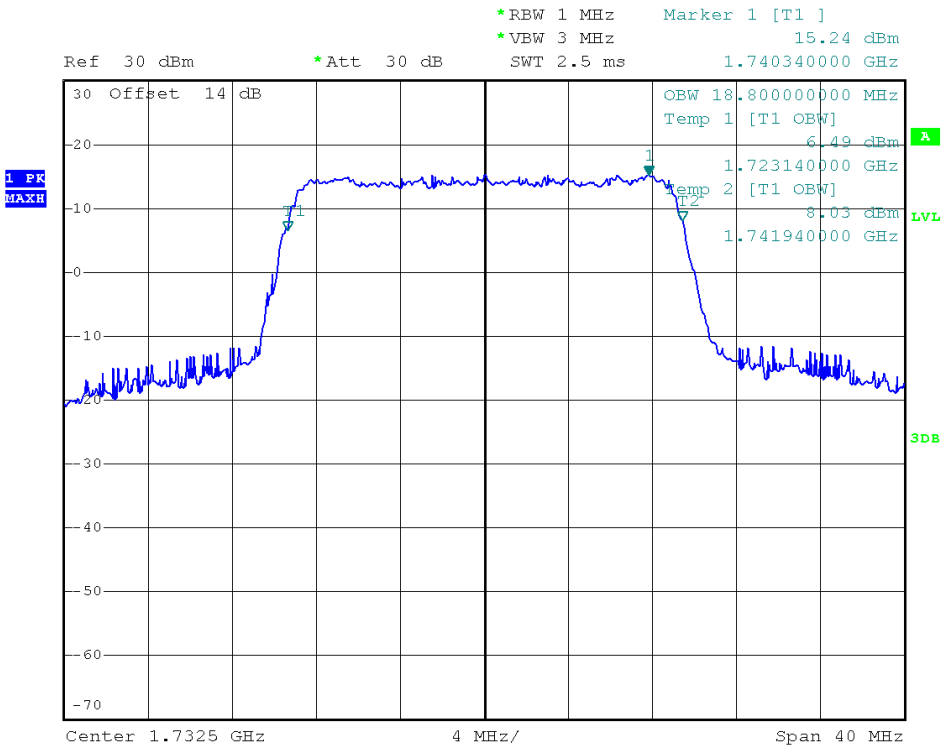
(Plot G4: 26dB Bandwidth LTE Band 4/15MHz/16QAM)



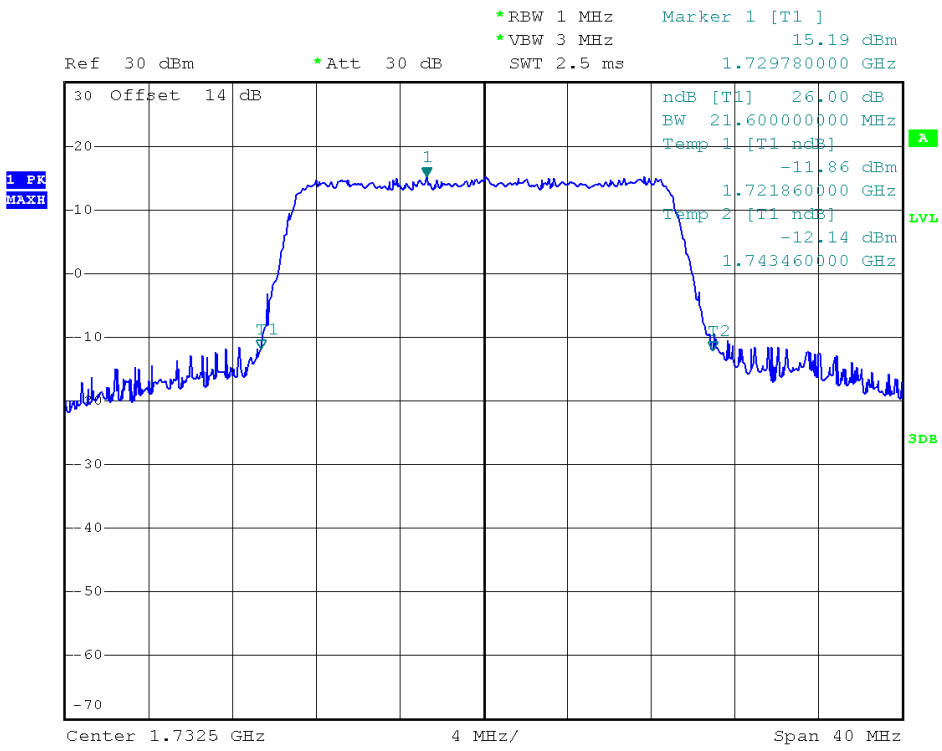
(Plot H1: 99% Occupied Bandwidth LTE Band 4/20MHz/QPSK)



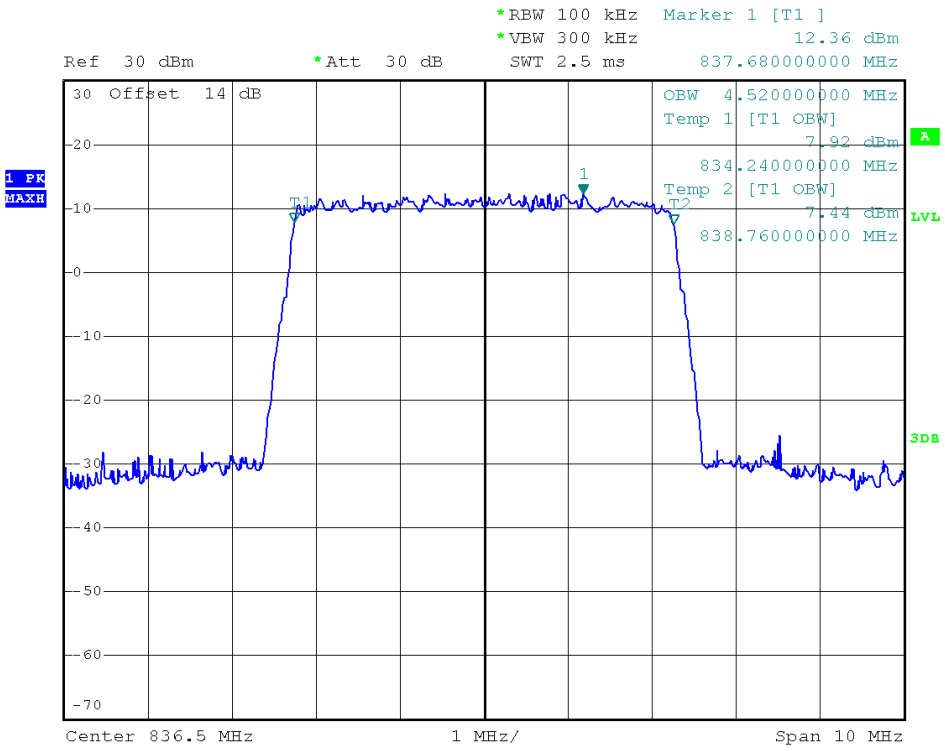
(Plot H2: 26dB Bandwidth LTE Band 4/20MHz/QPSK)



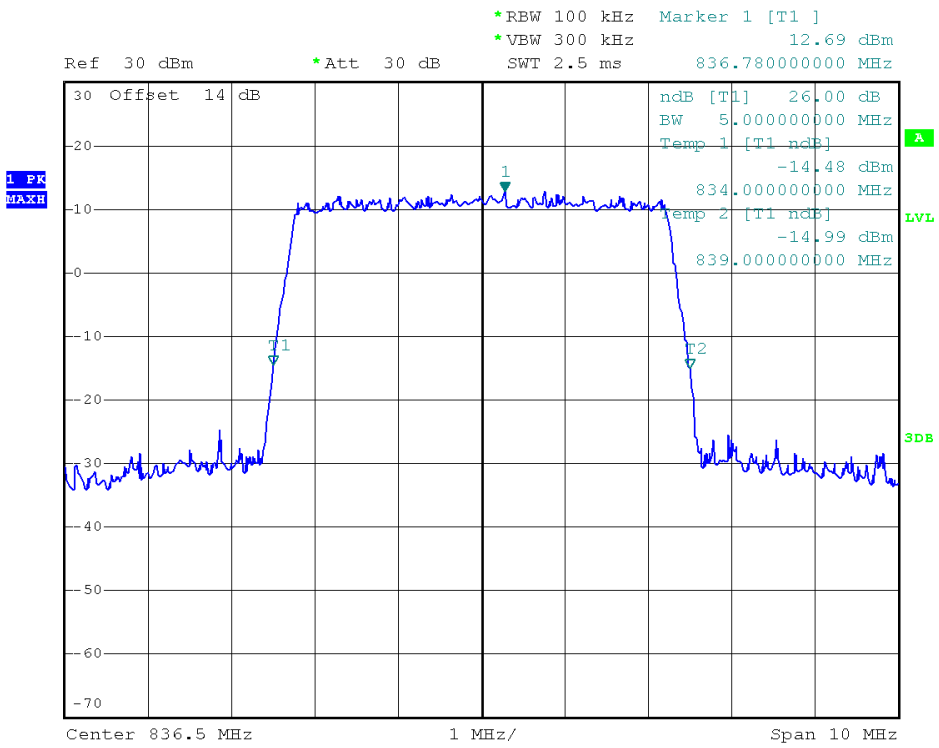
(Plot H3: 99% Occupied Bandwidth LTE Band 4/20MHz/16QAM)



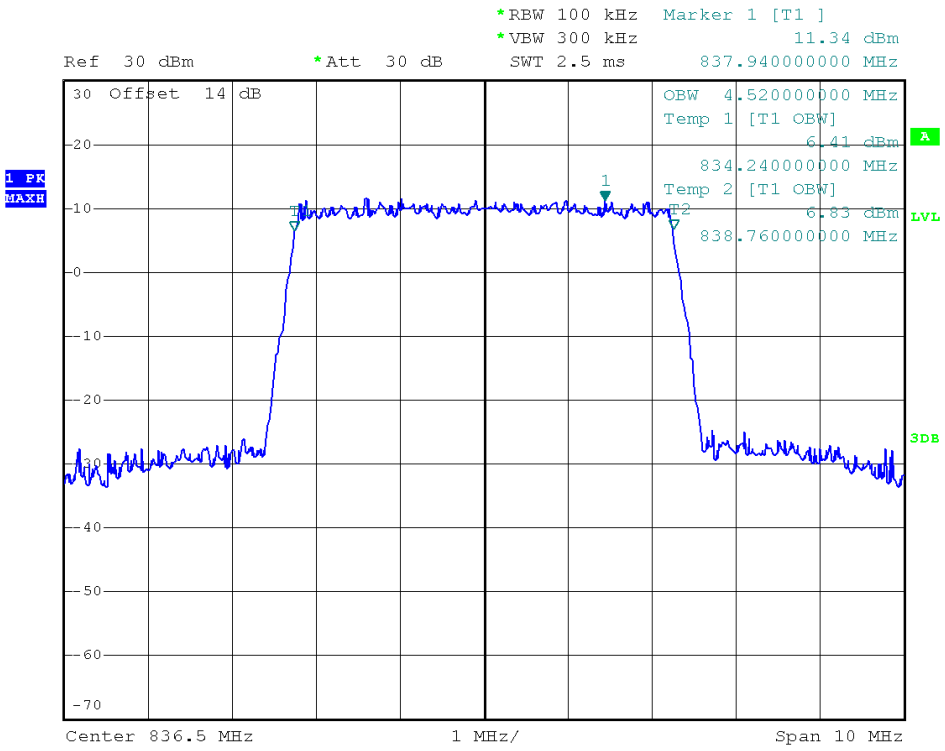
(Plot H4: 26dB Bandwidth LTE Band 4/20MHz/16QAM)



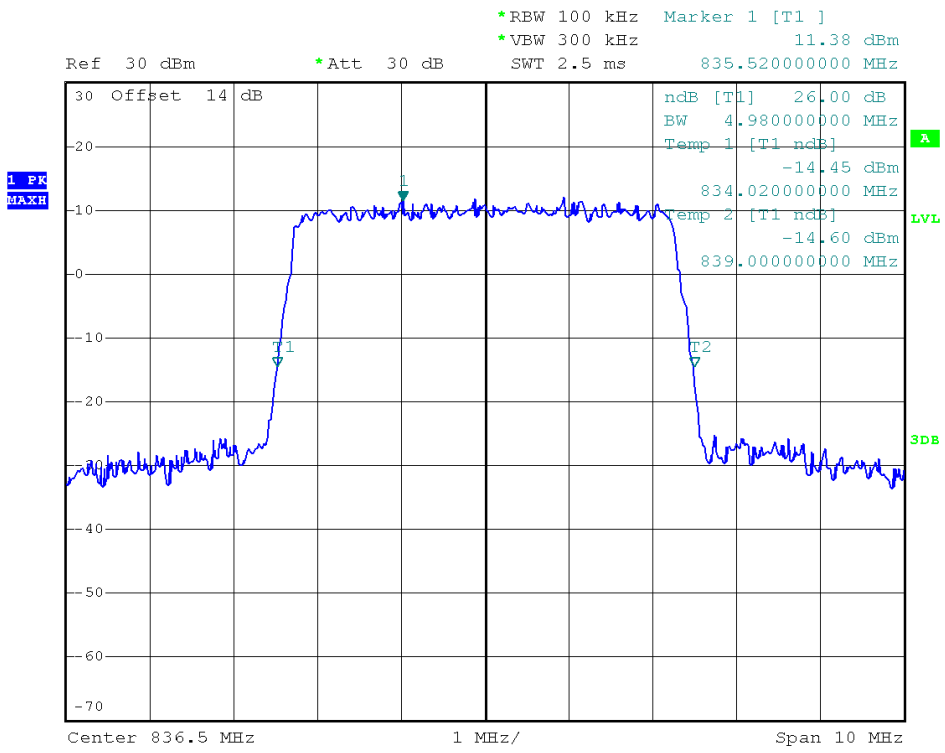
(Plot I1: 99% Occupied Bandwidth LTE Band 5/5MHz/QPSK)



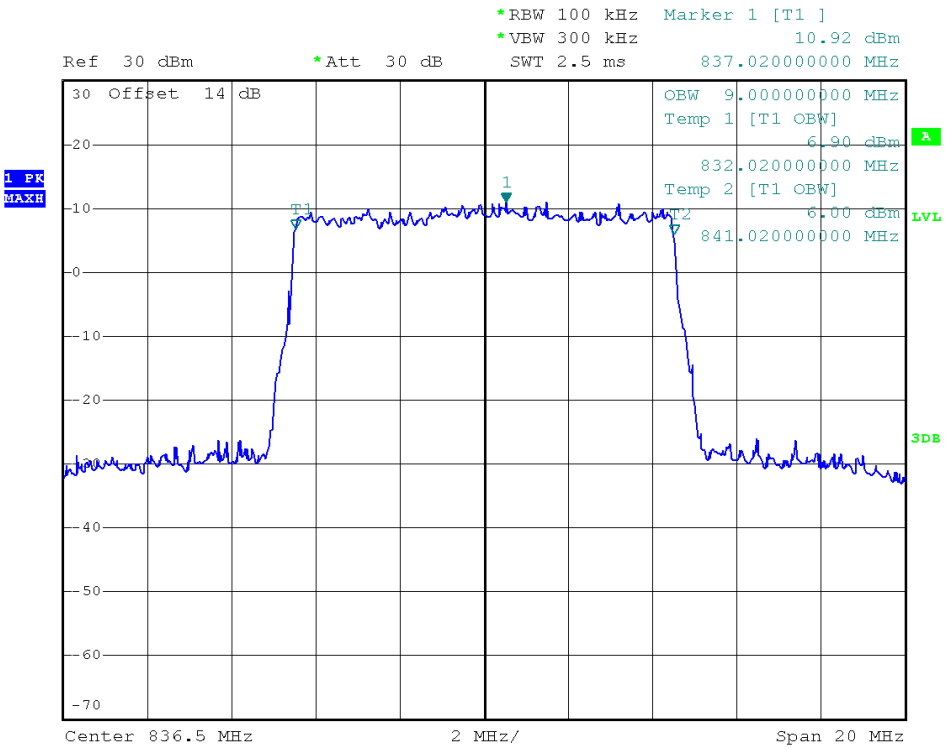
(Plot I2: 26dB Bandwidth LTE Band 5/5MHz/QPSK)



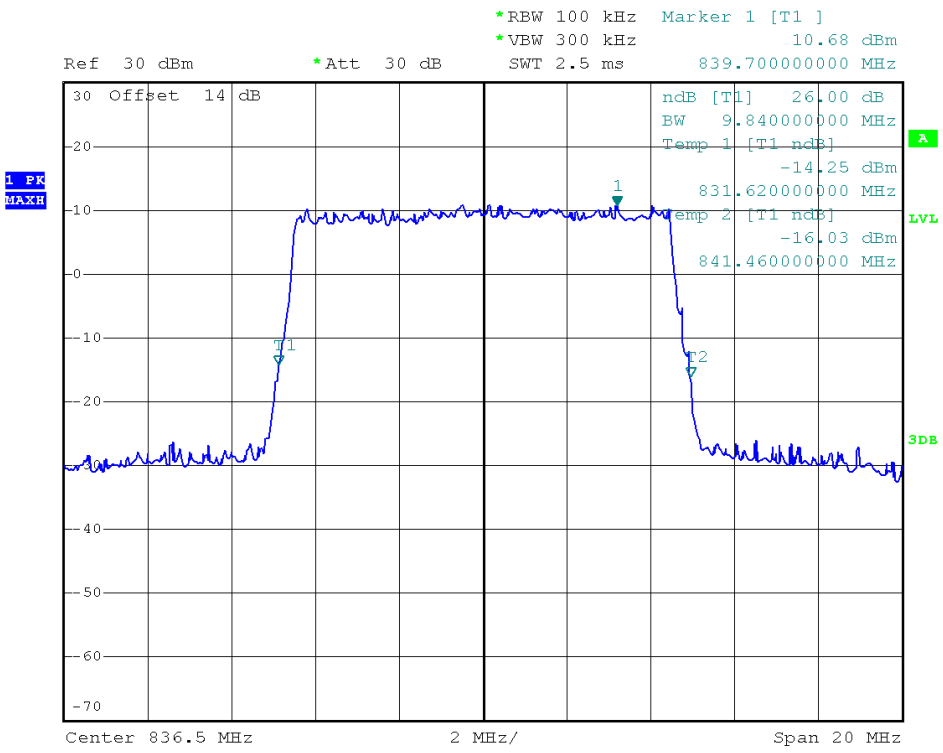
(Plot I3: 99% Occupied Bandwidth LTE Band 5/5MHz/16QAM)



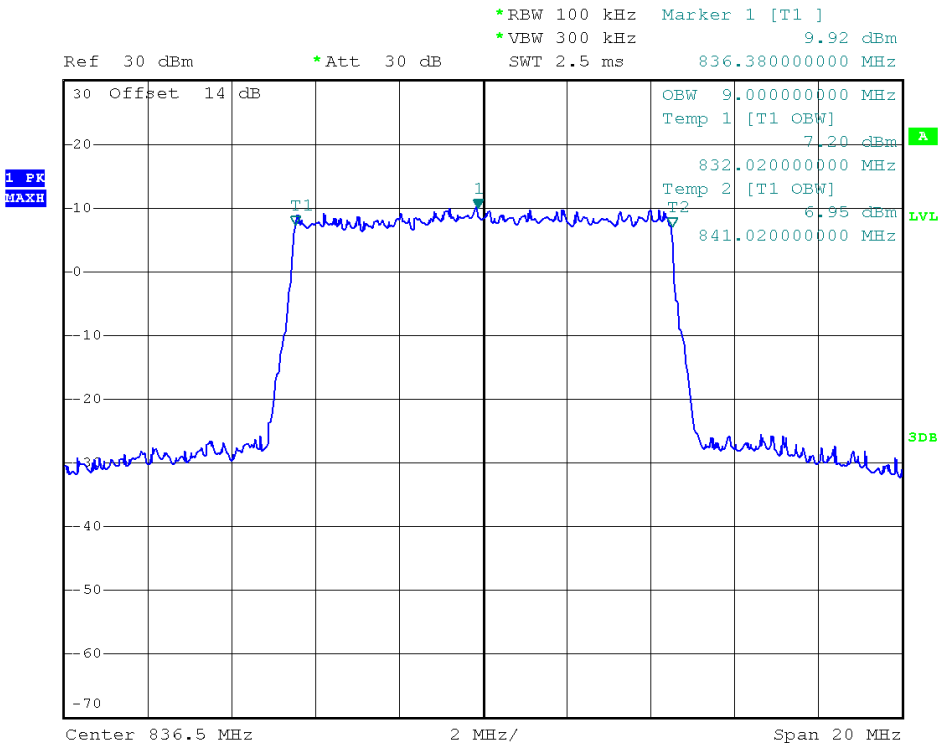
(Plot I4: 26dB Bandwidth LTE Band 5/5MHz/16QAM)



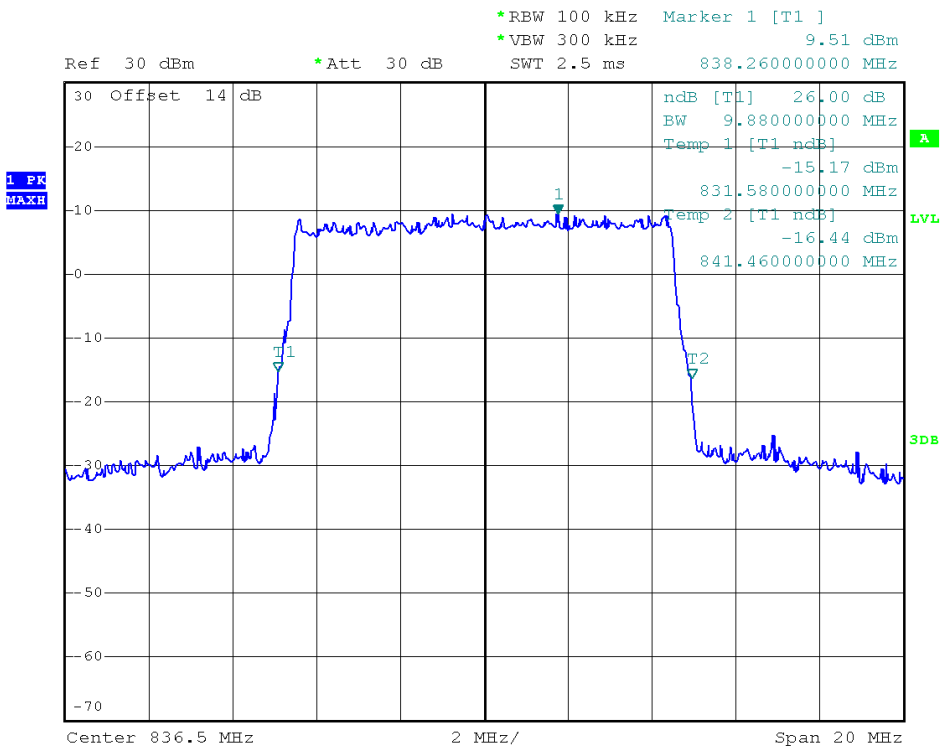
(Plot J1: 99% Occupied Bandwidth LTE Band 5/10MHz/QPSK)



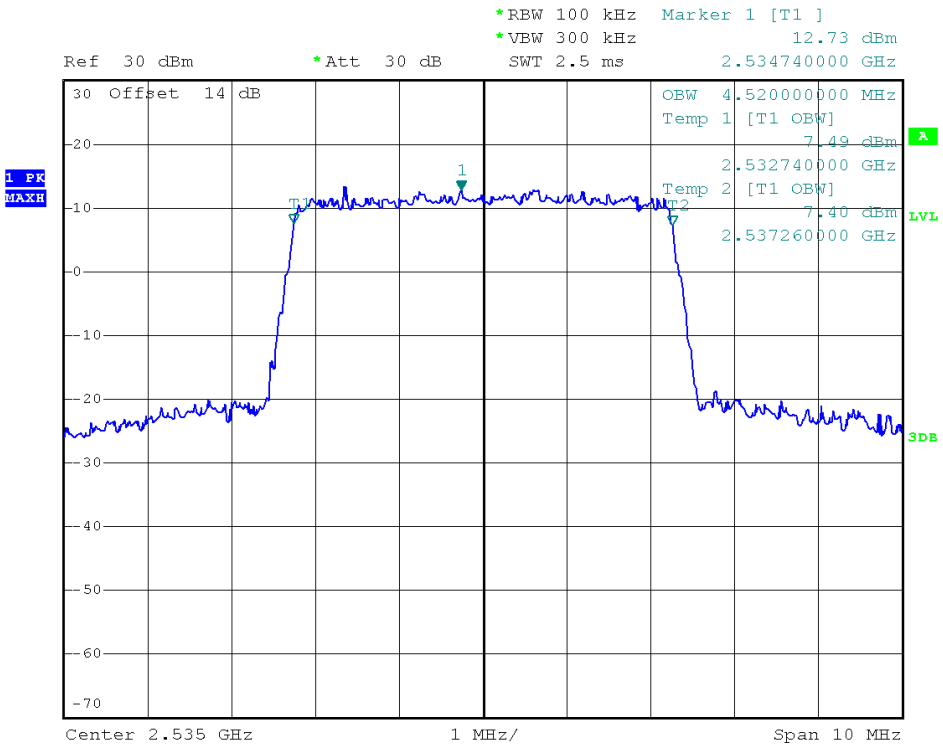
(Plot J2: 26dB Bandwidth LTE Band 5/10MHz/QPSK)



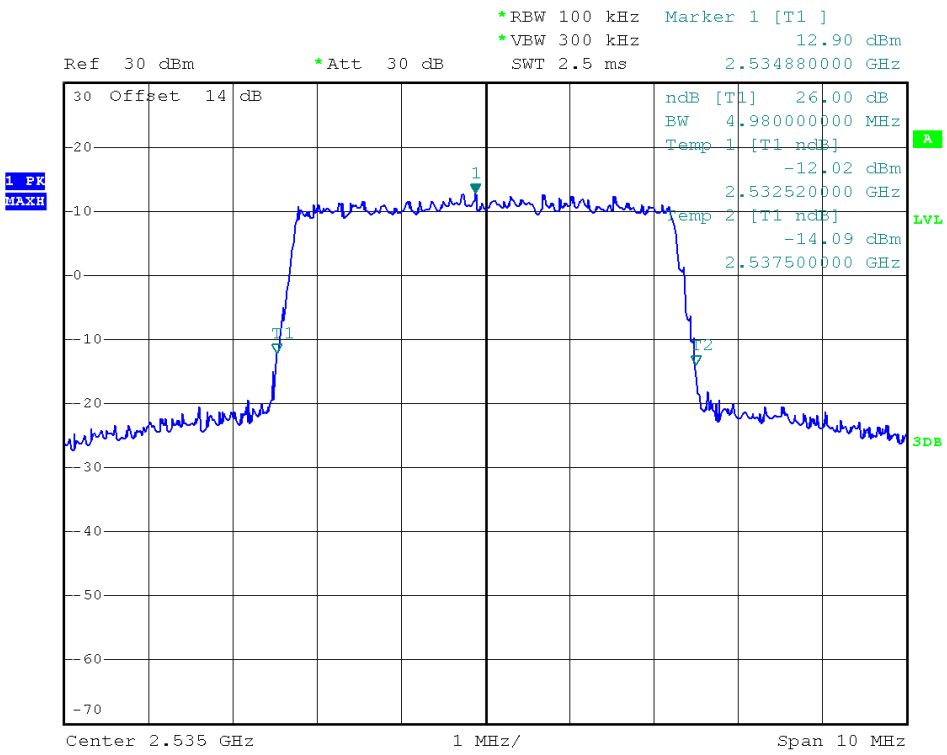
(Plot J3: 99% Occupied Bandwidth LTE Band 5/10MHz/16QAM)



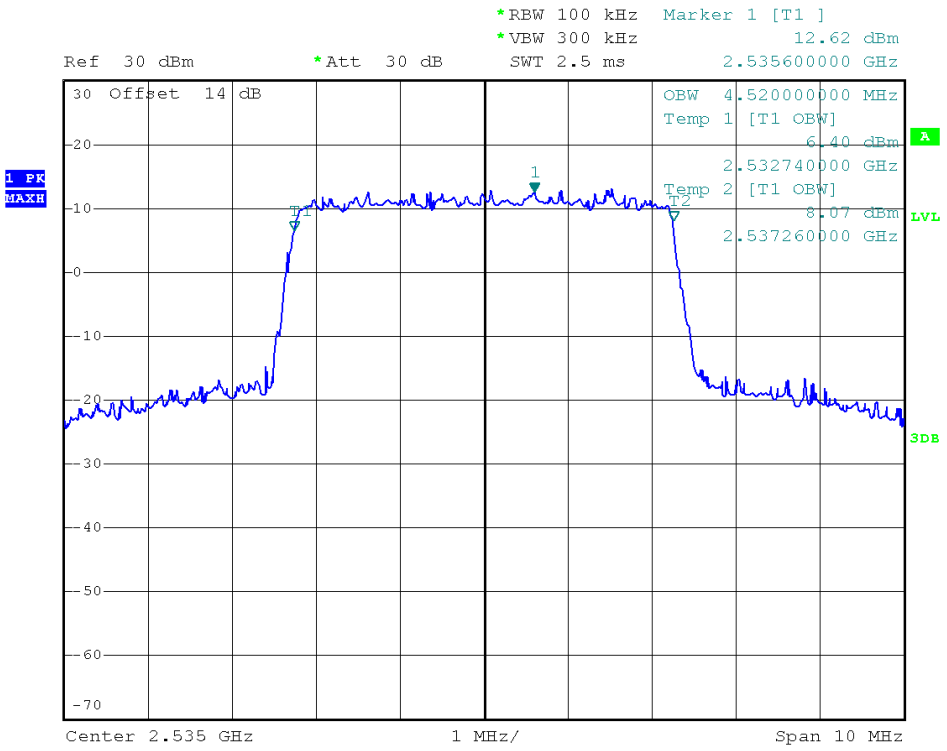
(Plot J4: 26dB Bandwidth LTE Band 5/10MHz/16QAM)



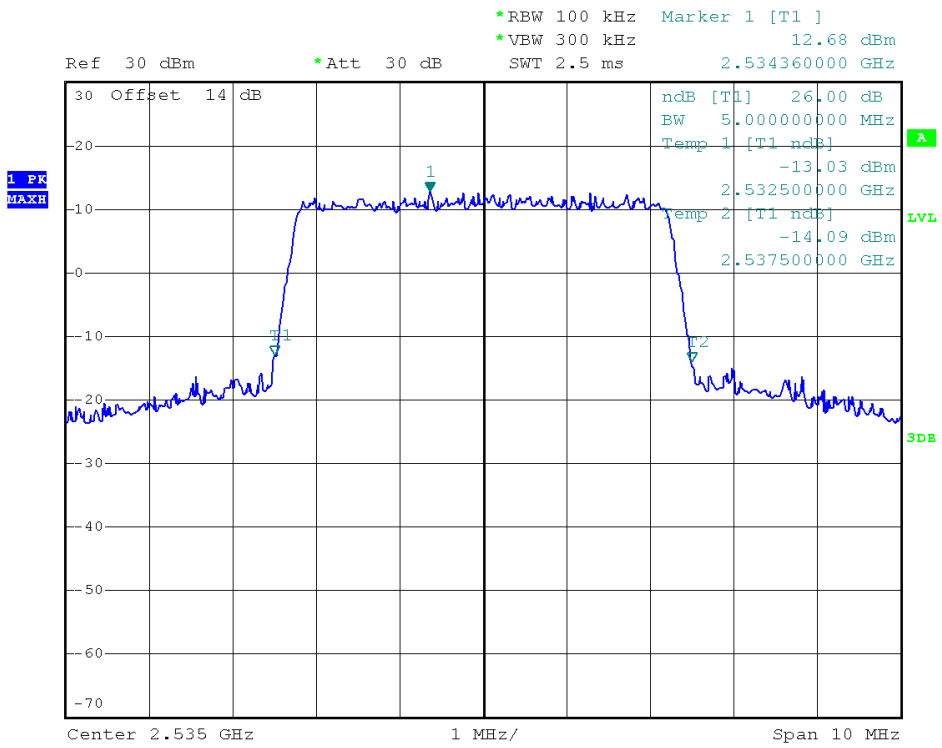
(Plot K1: 99% Occupied Bandwidth LTE Band 7/5MHz/QPSK)



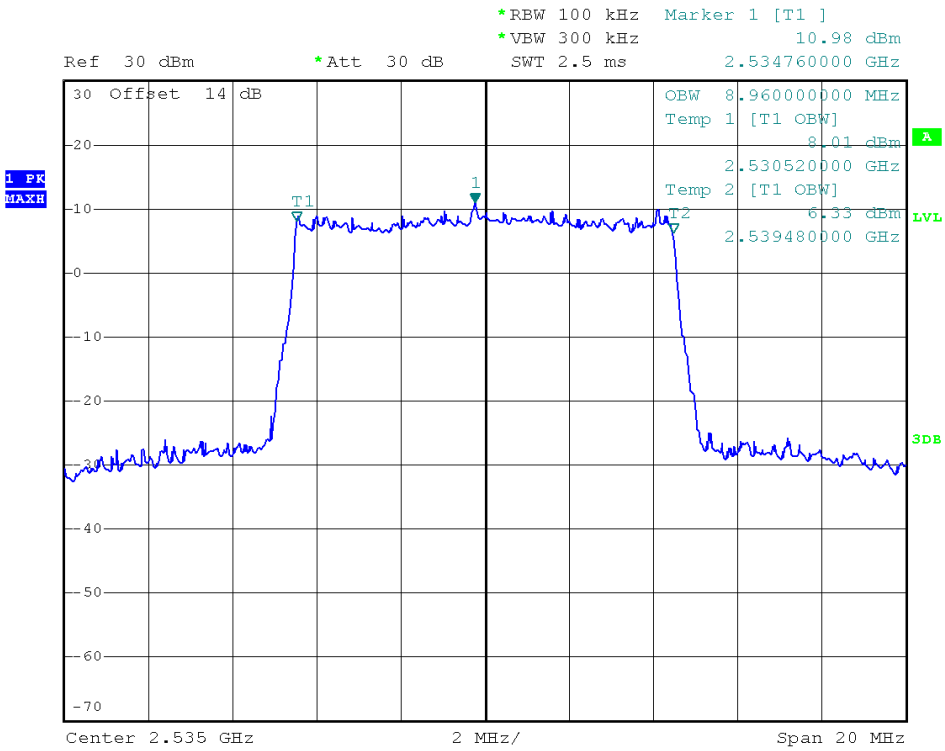
(Plot K2: 26dB Bandwidth LTE Band 7/5MHz/QPSK)



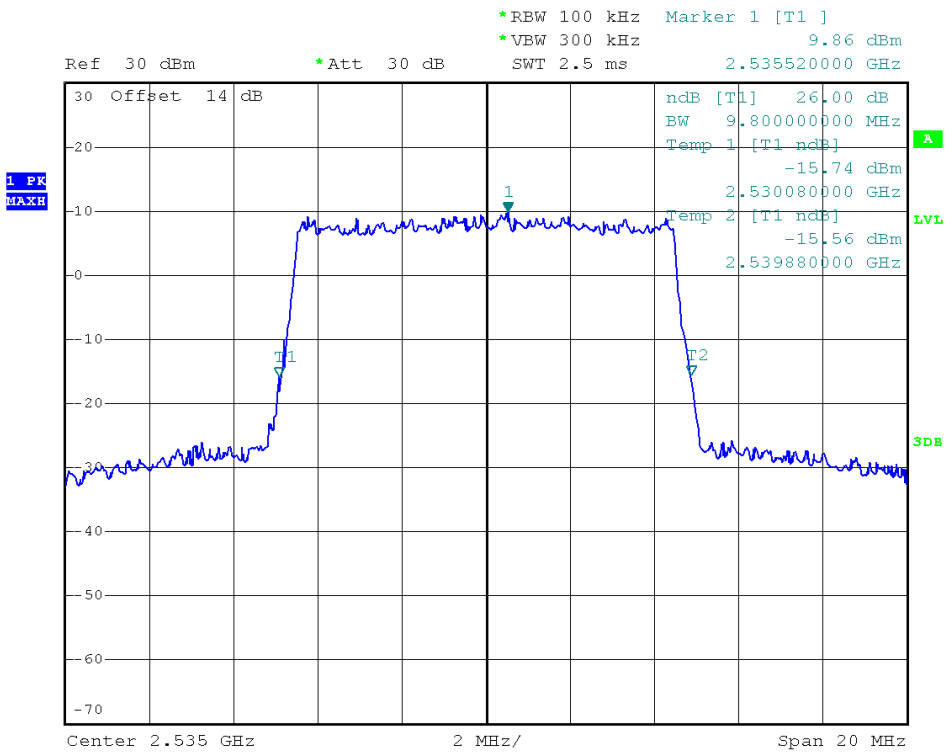
(Plot K3: 99% Occupied Bandwidth LTE Band 7/5MHz/16QAM)



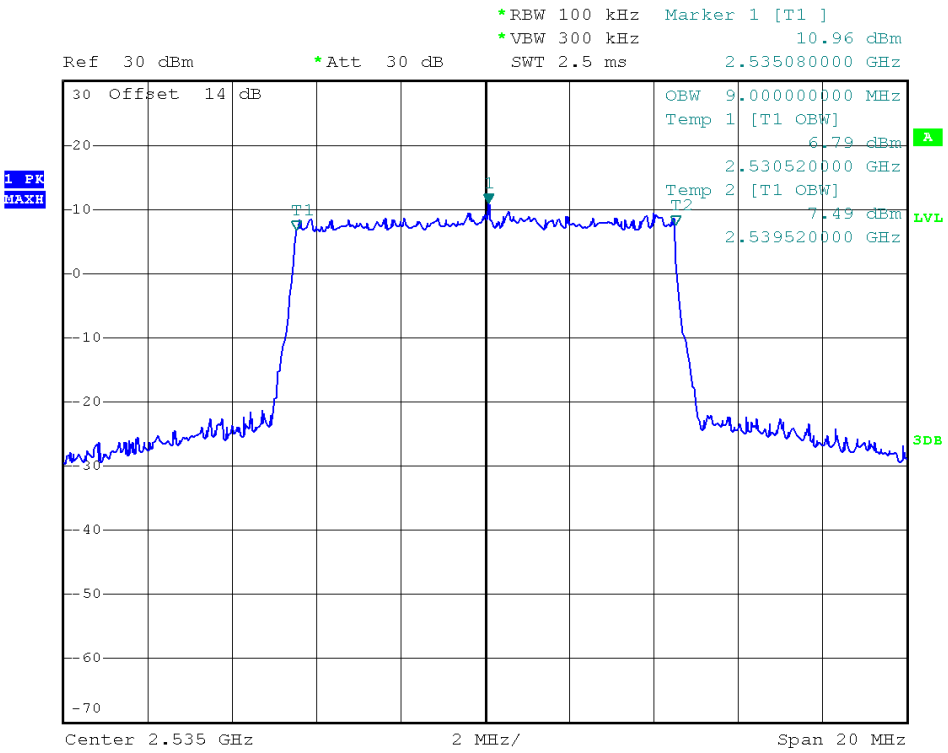
(Plot K4: 26dB Bandwidth LTE Band 7/5MHz/16QAM)



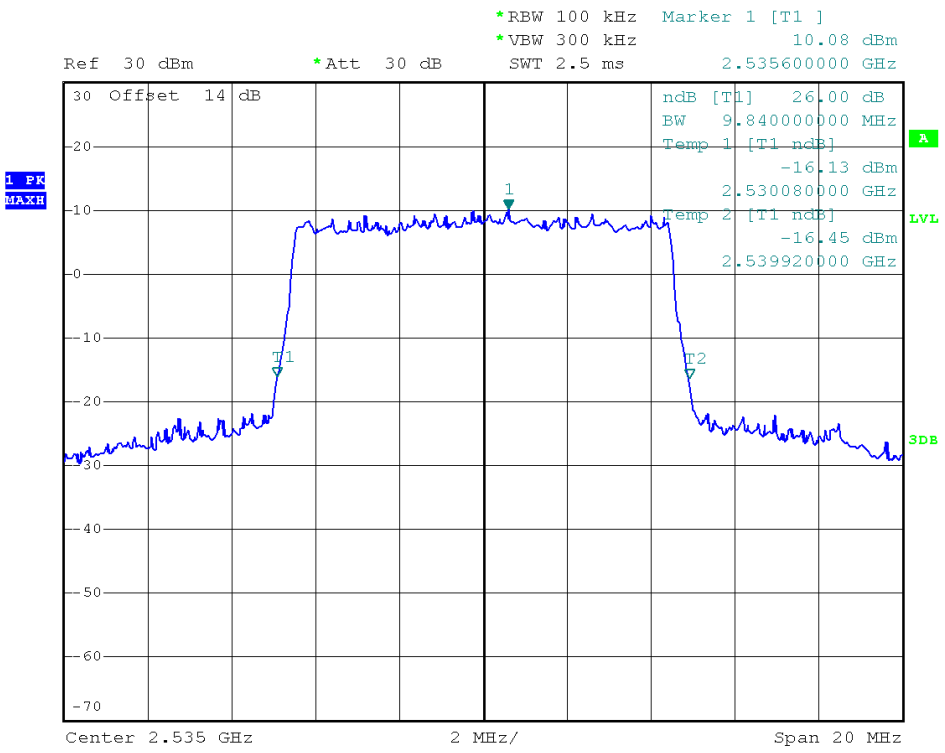
(Plot L1: 99% Occupied Bandwidth LTE Band 7/10MHz/QPSK)



(Plot L2: 26dB Bandwidth LTE Band 7/10MHz/QPSK)



(Plot L3: 99% Occupied Bandwidth LTE Band 7/10MHz/16QAM)



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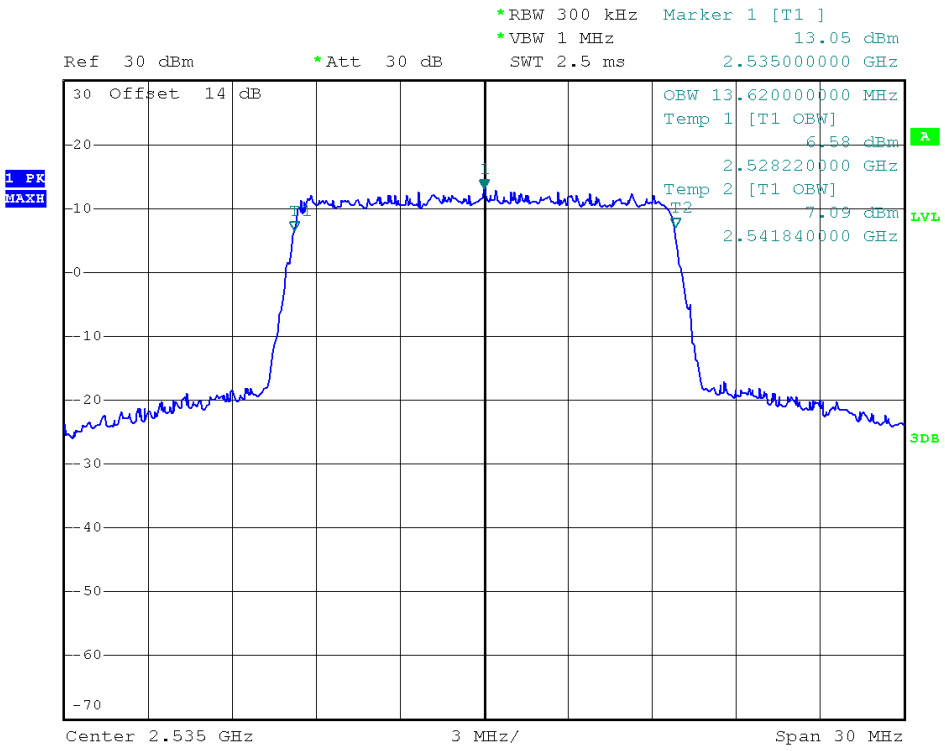
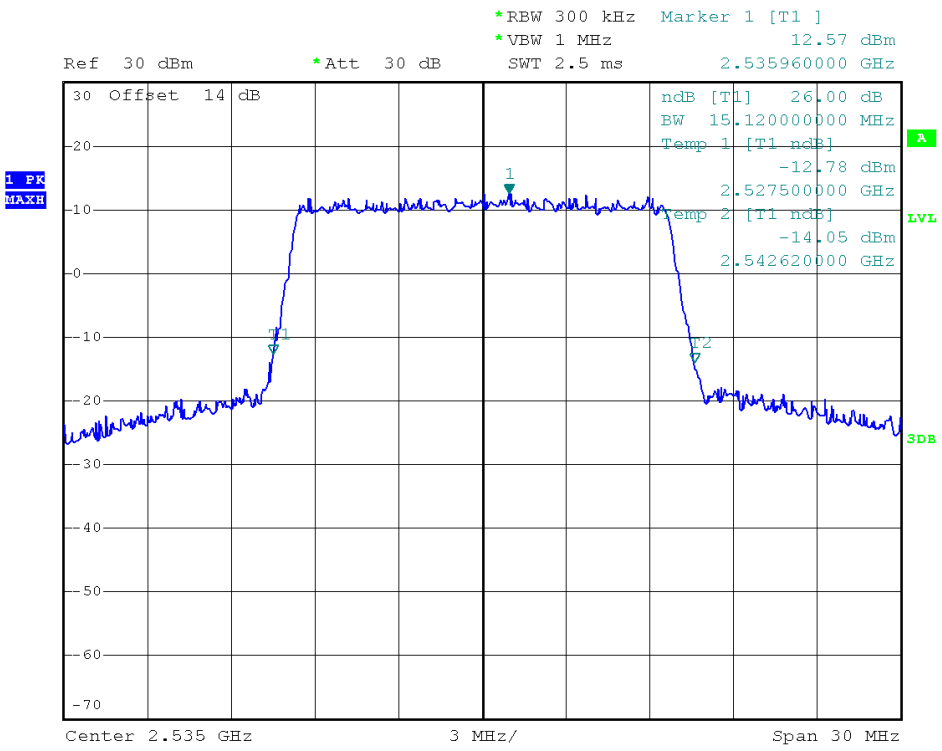


(Plot M1: 99% Occupied Bandwidth LTE Band 7/15MHz/QPSK)



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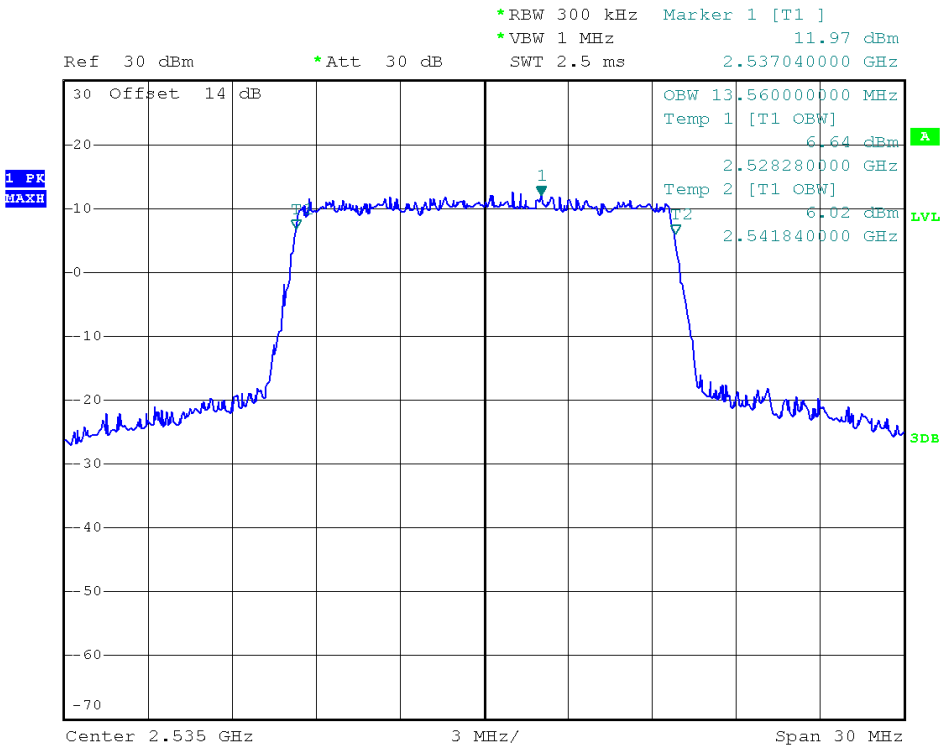

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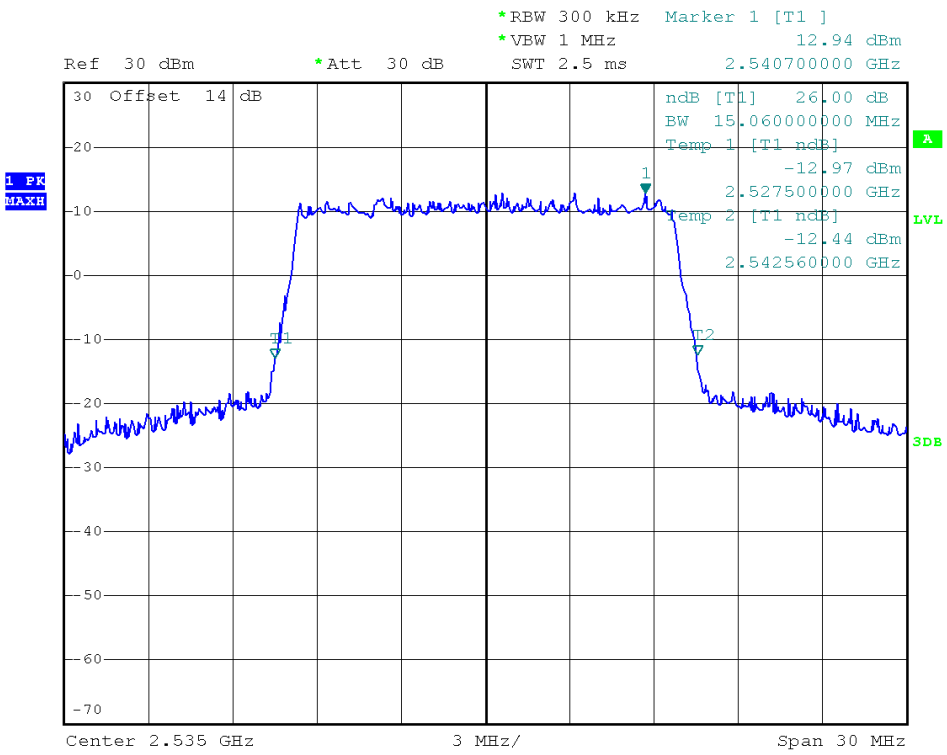
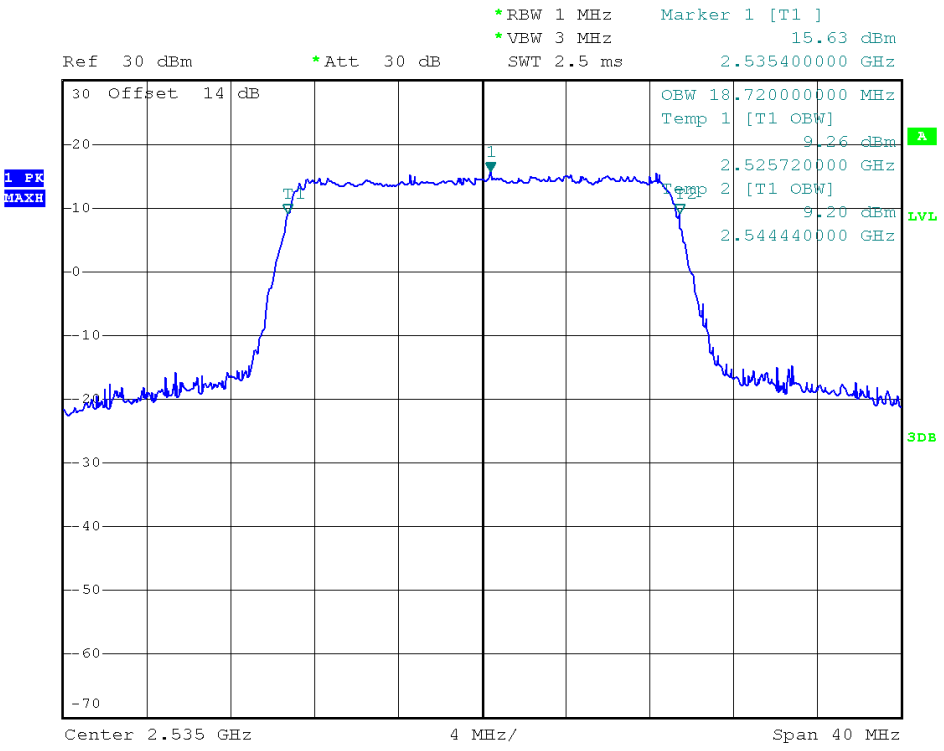
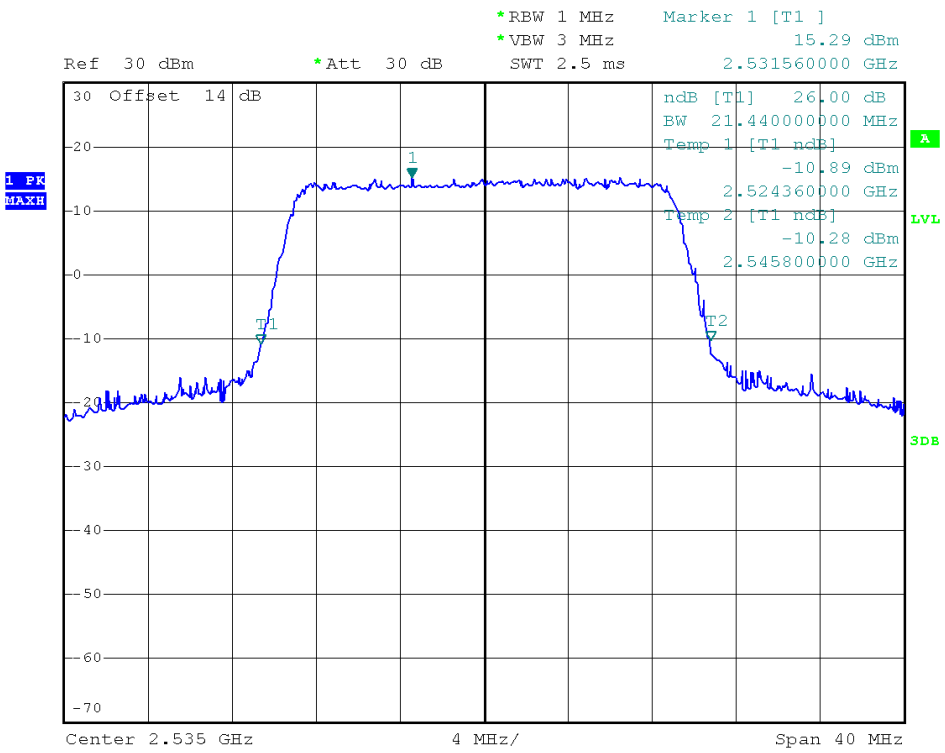


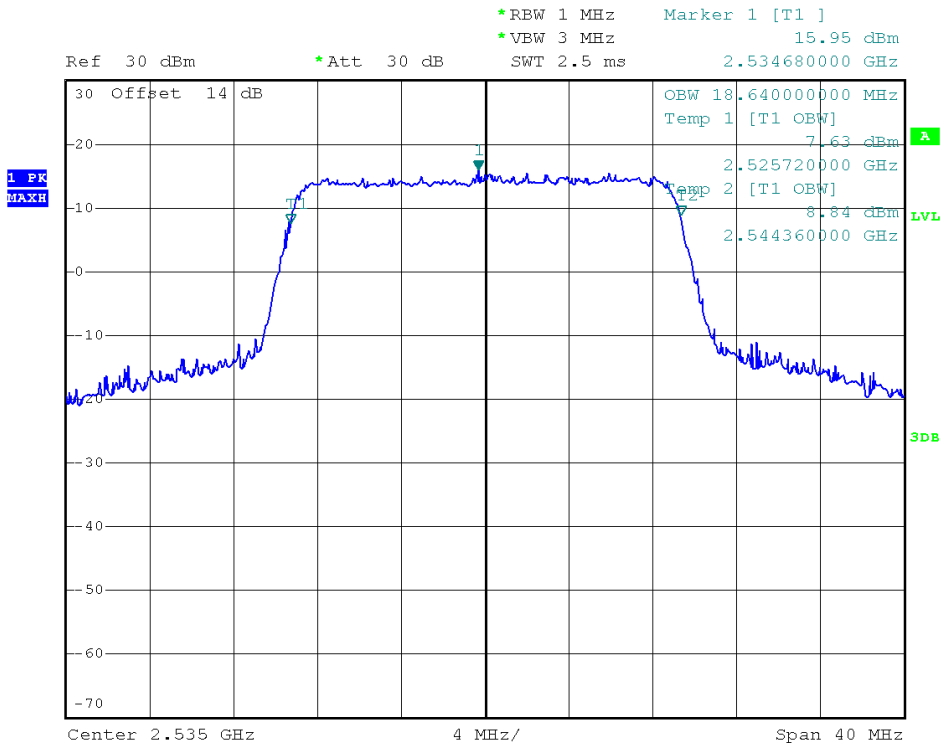
(Plot M4: 26dB Bandwidth LTE Band 7/15MHz/16QAM)



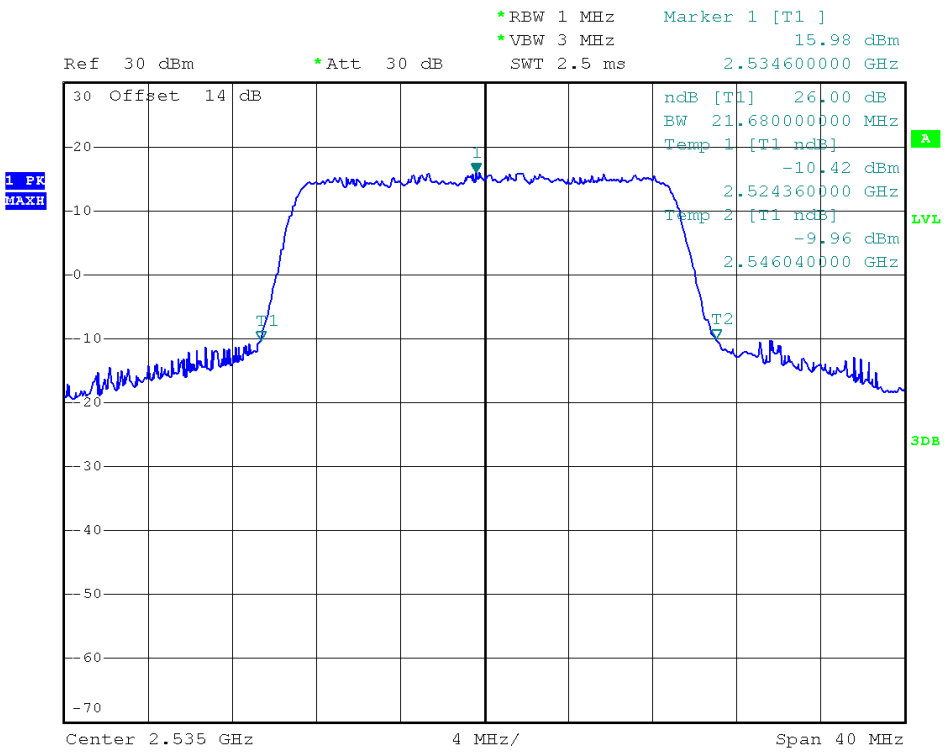
(Plot N1: 99% Occupied Bandwidth LTE Band 7/20MHz/QPSK)



(Plot N2: 26dB Bandwidth LTE Band 7/20MHz/QPSK)



(Plot N3: 99% Occupied Bandwidth LTE Band 7/20MHz/16QAM)



(Plot N4: 26dB Bandwidth LTE Band 7/20MHz/16QAM)

2.4 Frequency Stability

2.4.1 Requirement

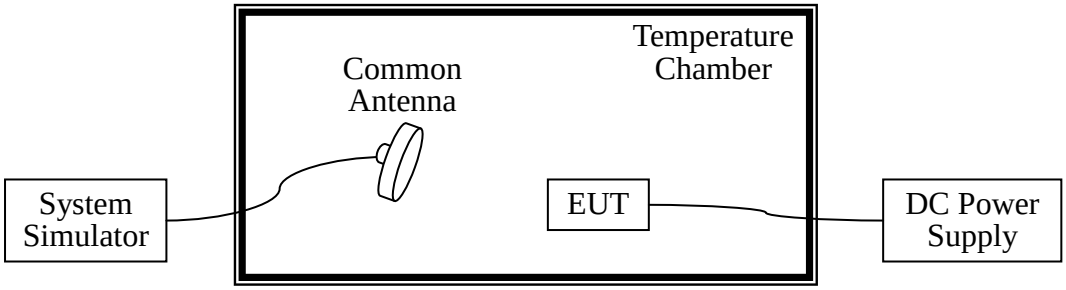
According to FCC section 27.54, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency. According to FCC section 2.1055, the test conditions are:

(a) The temperature is varied from -30℃ to +50℃ at intervals of not more than 10℃.

(b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

2.4.2 Test Description

1. Test Setup:



2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Data	Cal. Due Data
System Simulator	R&S	CMW500	149333	2014.07.21	2015.07.20
DC Power Supply	Good Will	GPS-3030DD	EF920938	2014.06.11	2015.06.10
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2014.06.11	2015.06.10
Cable	SUNHNER	SUCOFLEX 100	/	2014.06.05	2015.06.04

2.4.3 Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.8VDC, 4.2VDC and 3.6VDC, which are specified by the applicant; the normal temperature here used is 25℃.

1. The EUT was set up in the thermal chamber and connected with the system simulator.

2. With power OFF, the temperature was decreased to -30 ℃ and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.

3. With power OFF, the temperature was raised in 10 ℃ step up to 50 ℃. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

4. The variation in frequency was measured for the worst case.

2.4.4 Test Result of Frequency Stability

1. LTE Band 2, QPSK, BW 5MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 18625 (1852.5MHz)		Channel = 18900 (1880MHz)		Channel = 19175 (1907.5MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	20.79	±4631.25	46.68	±4700	22.69	±4768.75	PASS
	-20	44.54		28.10		2.39		
	-10	10.45		-4.27		**64.53**		
	0	10.88		36.69		12.66		
	+10	54.76		13.61		50.37		
	+20	2.46		12.15		-5.39		
	+30	27.07		23.94		35.13		
	+40	-8.66		13.56		-0.53		
	+50	14.23		47.64		37.40		
4.2	+25	63.35		52.86		31.75		
3.6	+25	35.82		3.68		58.60		

2. LTE Band 2, QPSK, BW 10MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 18650 (1855MHz)		Channel = 18900 (1880MHz)		Channel = 19150 (1905MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	54.22	±4637.5	23.41	±4700	7.86	±4762.5	PASS
	-20	42.78		37.93		29.51		
	-10	47.18		58.18		-7.86		
	0	0.81		-4.56		-9.17		
	+10	37.41		76.18		7.31		
	+20	18.65		69.90		31.29		
	+30	7.86		66.07		-7.54		
	+40	-1.46		76.85		64.57		
	+50	63.59		**79.91**		8.53		
4.2	+25	48.45		44.99		77.46		
3.6	+25	25.64		-8.66		68.75		

3. LTE Band 2, QPSK, BW 15MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 18675 (1857.5MHz)		Channel = 18900 (1880MHz)		Channel = 19125 (1902.5MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	7.01	±4643.75	-11.03	±4700	21.02	±4756.25	PASS
	-20	-13.74		-2.06		43.08		
	-10	28.59		12.88		20.65		
	0	-5.09		-21.75		-3.32		
	+10	50.44		-18.76		42.75		
	+20	-16.77		32.54		-2.32		
	+30	47.36		-18.89		23.12		
	+40	15.51		44.49		11.33		
	+50	41.05		40.72		-17.55		
4.2	+25	21.79		16.15		38.10		
3.6	+25	10.20		**52.34**		-12.06		

4. LTE Band 2, QPSK, BW 20MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 18700 (1860MHz)		Channel = 18900 (1880MHz)		Channel = 19100 (1900MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	-2.17	±4650	33.00	±4700	2.22	±4750	PASS
	-20	1.62		8.40		14.44		
	-10	33.49		-3.89		15.15		
	0	38.49		23.41		35.15		
	+10	6.64		-6.77		26.44		
	+20	19.16		30.32		10.15		
	+30	26.99		-1.36		43.42		
	+40	11.18		37.91		-1.15		
	+50	18.96		-8.98		33.87		
4.2	+25	39.46		6.68		**54.28**		
3.6	+25	19.87		-10.76		28.94		

5. LTE Band 4, QPSK, BW 5MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 19975 (1712.5MHz)		Channel = 20175 (1732.5MHz)		Channel = 20375 (1752.5MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	2.43	±4281.75	-3.41	±4331.25	43.07	±4383.75	PASS
	-20	20.89		19.91		13.23		
	-10	-5.88		52.80		28.86		
	0	8.65		21.06		12.39		
	+10	44.84		36.30		47.66		
	+20	4.30		-1.87		21.07		
	+30	-1.03		1.12		23.00		
	+40	44.55		34.58		40.56		
	+55	-5.68		5.73		29.13		
4.2	+25	**54.31**		41.00		2.35		
3.6	+25	29.72		33.14		50.52		

6. LTE Band 4, QPSK ,BW 10MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 20000 (1715MHz)		Channel = 20175 (1732.5MHz)		Channel = 20350 (1750MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	18.46	±4287.5	2.53	±4331.25	26.47	±4375	PASS
	-20	7.13		25.91		37.73		
	-10	7.42		2.81		-5.51		
	0	36.34		38.79		22.29		
	+10	2.47		11.35		41.22		
	+20	6.98		10.72		-8.03		
	+30	5.57		**44.62**		-11.01		
	+40	43.71		-1.16		30.52		
	+55	24.54		-17.33		25.40		
4.2	+25	17.81		1.94		-6.06		
3.6	+25	28.47		-23.80		-2.86		

7. LTE Band 4, QPSK ,BW 15MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 20025 (1717.5MHz)		Channel = 20175 (1732.5MHz)		Channel = 20325 (1747.5MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	33.26	±4293.75	15.73	±4331.25	**52.17**	±4368.75	PASS
	-20	42.12		-8.20		28.14		
	-10	-0.56		43.40		33.27		
	0	8.20		-13.79		24.72		
	+10	-13.04		28.82		1.91		
	+20	-14.56		25.83		19.59		
	+30	21.86		41.20		48.08		
	+40	-5.39		-10.03		31.98		
	+55	38.99		2.69		41.83		
4.2	+25	36.56		7.29		22.23		
3.6	+25	6.44		17.60		14.12		

8. LTE Band 4, QPSK ,BW 20MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 20050 (1720MHz)		Channel = 20175 (1732.5MHz)		Channel = 20300 (1745MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	-3.10	±4300	12.63	±4331.25	34.21	±4362.5	PASS
	-20	38.28		42.41		11.57		
	-10	-2.15		4.00		33.76		
	0	40.06		-7.89		9.18		
	+10	1.99		-8.11		25.52		
	+20	-19.86		32.78		16.15		
	+30	39.56		44.40		27.39		
	+40	**46.60**		-7.29		-0.96		
	+55	39.98		47.40		31.82		
4.2	+25	-15.71		3.60		-3.32		
3.6	+25	-17.70		-13.23		32.60		

9. LTE Band 5,QPSK ,BW 5MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 2425 (826.5MHz)		Channel = 20525 (836.5MHz)		Channel = 20625 (846.5MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	26.72	±2066.25	**44.96**	±2091.25	17.73	±2116.25	PASS
	-20	-3.05		3.15		32.38		
	-10	21.82		7.45		9.25		
	0	7.15		35.94		20.38		
	+10	4.57		24.73		31.34		
	+20	-4.46		18.56		35.03		
	+30	-3.40		28.96		1.30		
	+40	37.79		5.99		6.64		
	+55	15.42		24.53		17.29		
4.2	+25	22.88		16.25		26.34		
3.6	+25	10.76		10.45		20.17		

10. LTE Band 5,QPSK ,BW 10MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 20450 (829MHz)		Channel = 20525 (836.5MHz)		Channel = 20600 (844MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	39.77	±2072.5	21.14	±2091.25	35.12	±2110	PASS
	-20	25.85		-3.38		13.55		
	-10	7.56		36.27		18.40		
	0	42.14		12.16		4.40		
	+10	4.46		10.63		43.79		
	+20	-6.00		35.20		-5.80		
	+30	-0.30		4.47		26.83		
	+40	24.61		26.52		1.53		
	+55	-3.41		9.24		**48.60**		
4.2	+25	22.38		45.03		22.27		
3.6	+25	25.67		-2.05		-4.03		

11. LTE Band 7,QPSK ,BW 5MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 20775 (2502.5MHz)		Channel = 21100 (2535MHz)		Channel = 21425 (2567.5MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	40.66	±6256.25	10.30	±6337.5	29.30	±6418.75	PASS
	-20	47.17		27.88		53.05		
	-10	45.30		43.95		53.11		
	0	26.29		38.80		21.15		
	+10	-14.11		7.15		6.24		
	+20	22.93		44.96		25.64		
	+30	-6.06		0.39		40.21		
	+40	1.47		-4.98		**60.79**		
	+55	13.76		45.19		54.45		
4.2	+25	42.73		20.73		28.50		
3.6	+25	-15.84		26.61		31.63		

12. LTE Band 7,QPSK ,BW 10MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 20800 (2505MHz)		Channel = 21100 (2535MHz)		Channel = 21400 (2565MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	-0.82	±6262.5	7.68	±6337.5	47.46	±6412.5	PASS
	-20	38.38		**60.42**		43.93		
	-10	-2.04		28.61		39.78		
	0	41.86		60.04		5.07		
	+10	30.40		18.47		-6.70		
	+20	13.61		55.05		46.35		
	+30	12.31		56.75		33.31		
	+40	41.22		24.99		46.27		
	+55	1.45		35.15		56.59		
4.2	+25	8.52		40.78		2.90		
3.6	+25	-6.69		-1.83		-7.85		

13. LTE Band 7,QPSK ,BW 15MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 20825 (2507.5MHz)		Channel = 21100 (2535MHz)		Channel = 21375 (2562.5MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	58.21	±6268.75	64.14	±6337.5	2.03	±6406.25	PASS
	-20	34.61		46.52		44.28		
	-10	74.91		57.38		54.55		
	0	72.46		28.33		18.31		
	+10	37.49		28.83		32.55		
	+20	61.09		24.01		5.91		
	+30	53.40		77.33		20.19		
	+40	**77.39**		26.70		48.62		
	+55	21.73		1.96		54.32		
4.2	+25	64.16		47.74		73.88		
3.6	+25	16.13		13.76		23.09		

14. LTE Band 7,QPSK ,BW 20MHz

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 20850 (2510MHz)		Channel = 21100 (2535MHz)		Channel = 21350 (2560MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	41.30	±6275	9.55	±6337.5	34.92	±6400	PASS
	-20	16.79		-15.42		5.40		
	-10	0.27		-13.78		-16.64		
	0	12.04		-10.15		7.36		
	+10	42.21		1.92		**54.12**		
	+20	25.41		35.93		42.69		
	+30	31.54		33.03		-8.92		
	+40	40.85		23.28		43.97		
	+55	18.19		18.79		3.57		
4.2	+25	11.39		41.69		42.34		
3.6	+25	36.94		-14.65		-10.49		

2.5 Conducted Out of Band Emissions

2.5.1 Requirement

According to FCC section 27.53(h), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10*log(P)dB. This calculated to be -13dBm.

2.5.2 Test Description

See section 2.1.2 of this report.

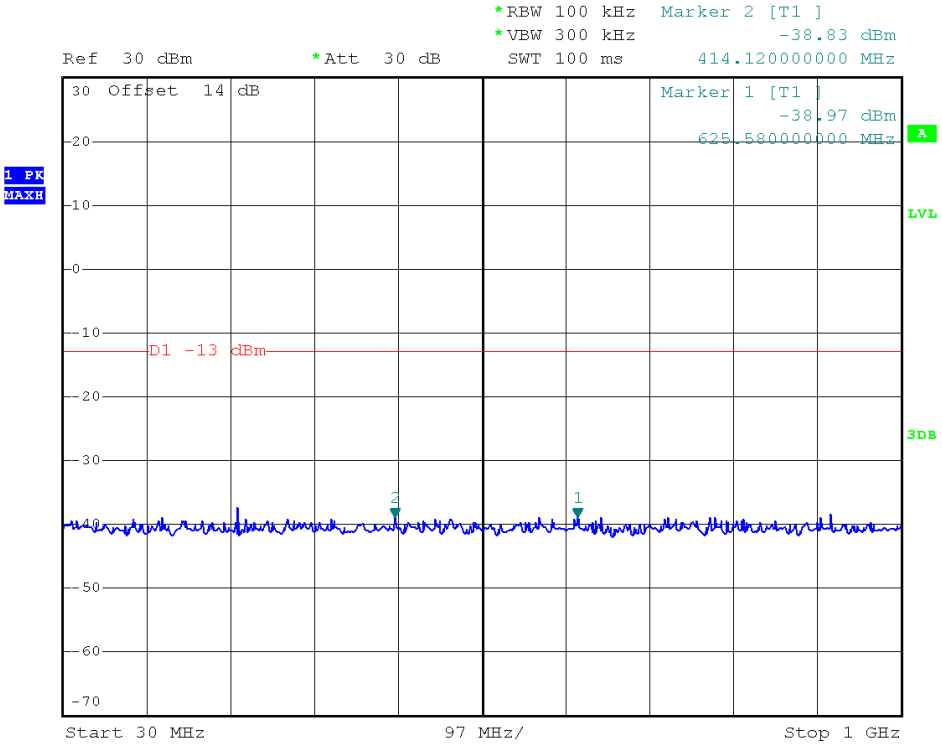
2.5.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

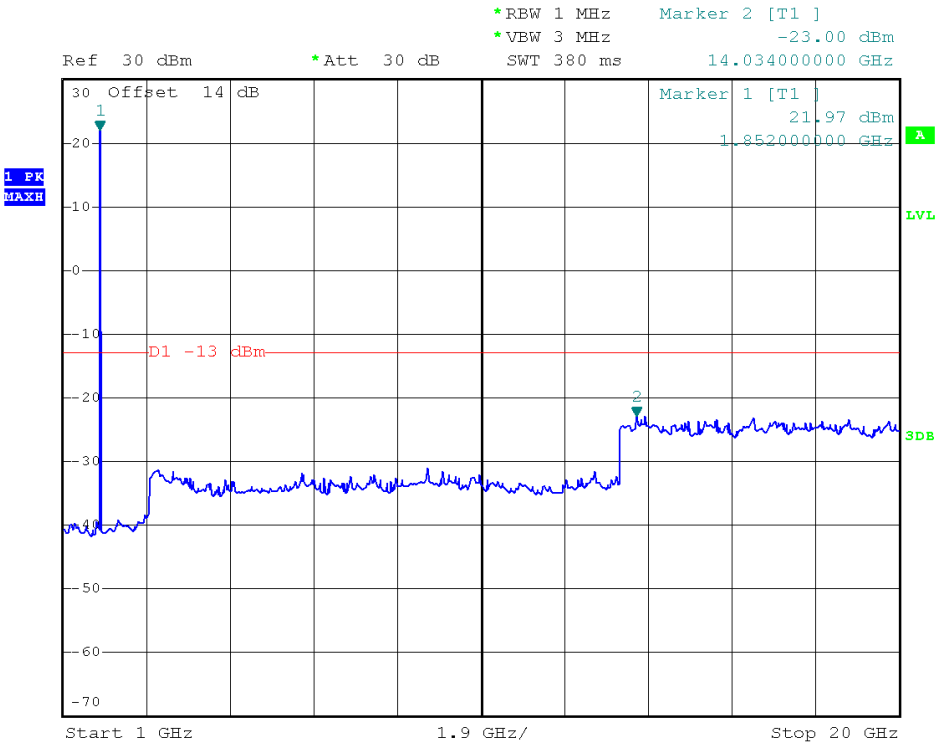
2.5.4 Test Result of Conducted Spurious Emission

The measurement frequency range is from 30MHz to the 10^{th} harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

Band	LTE Band 2	Channel	Low
Bandwidth	5MHz	Modulation	QPSK

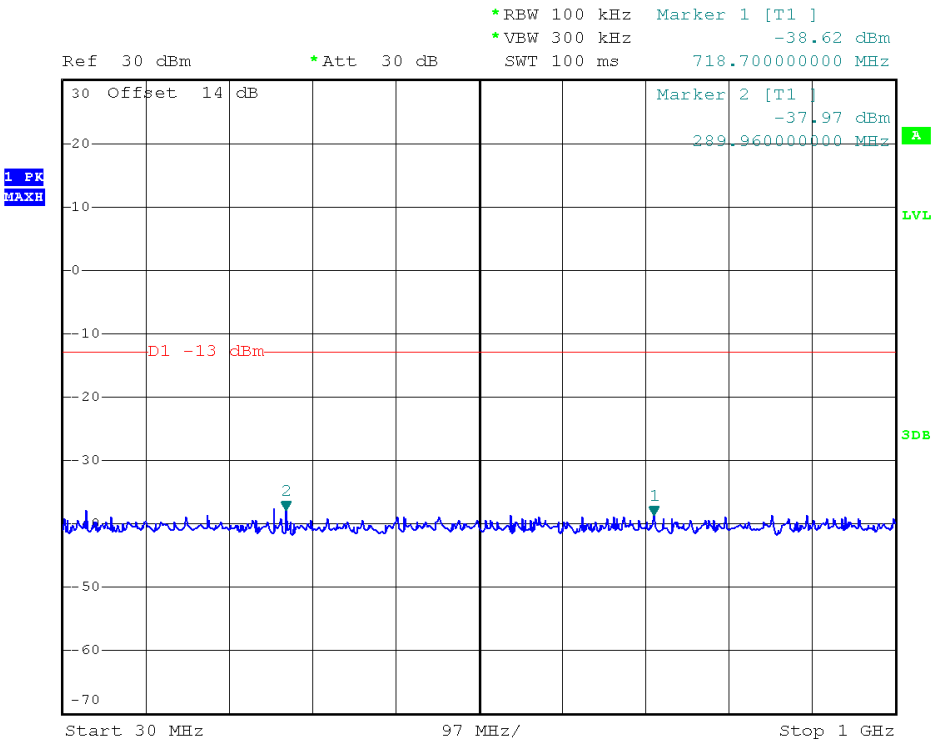


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

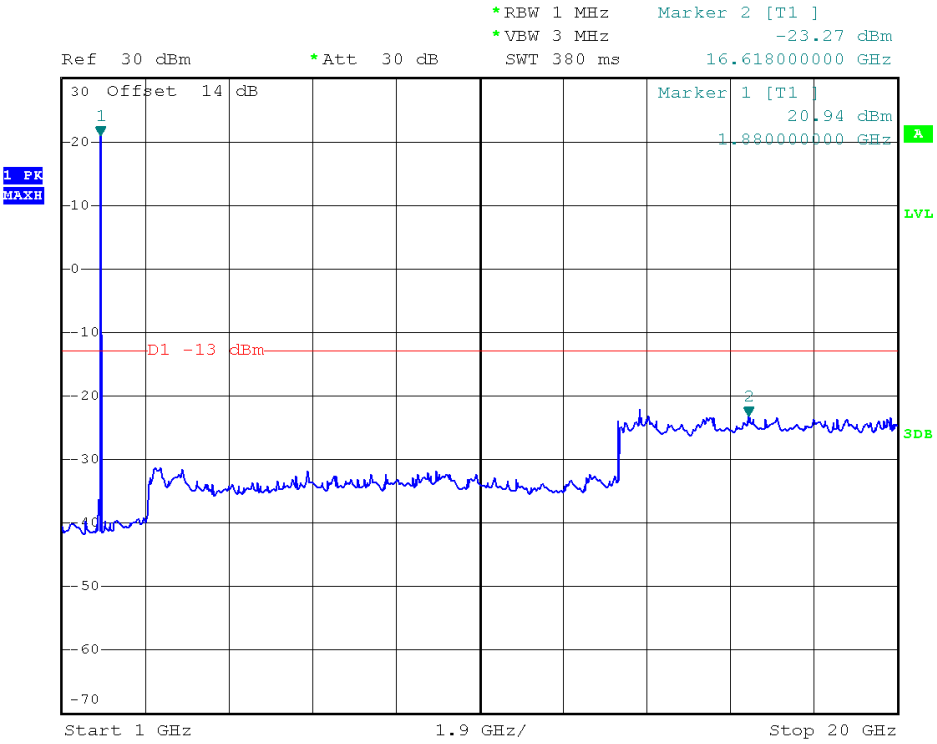


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 2	Channel	Middle
Bandwidth	5MHz	Modulation	QPSK

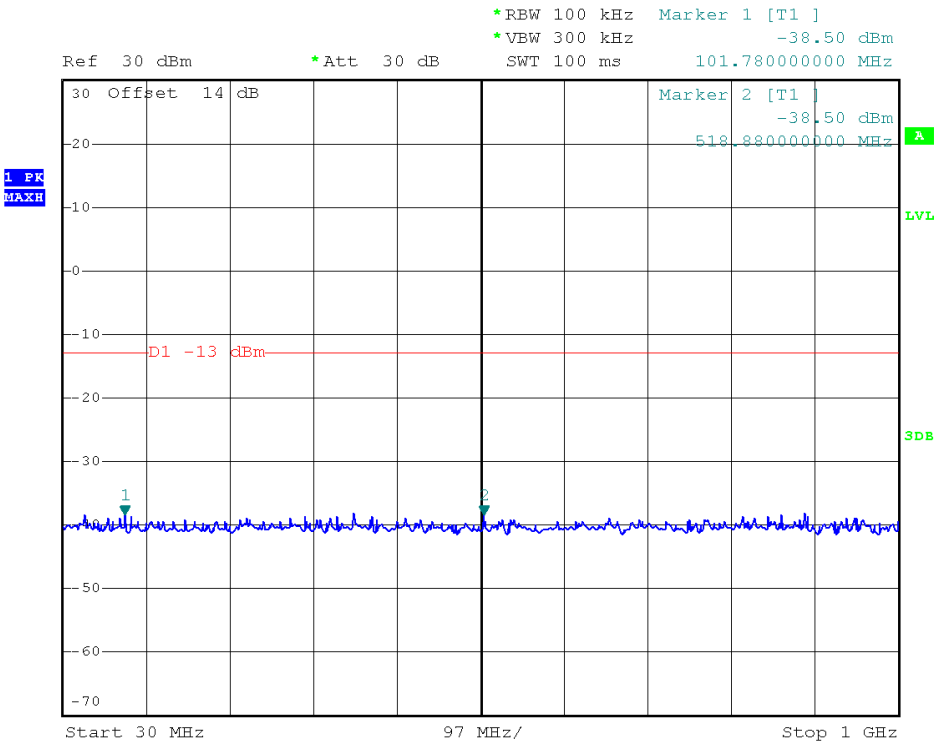


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

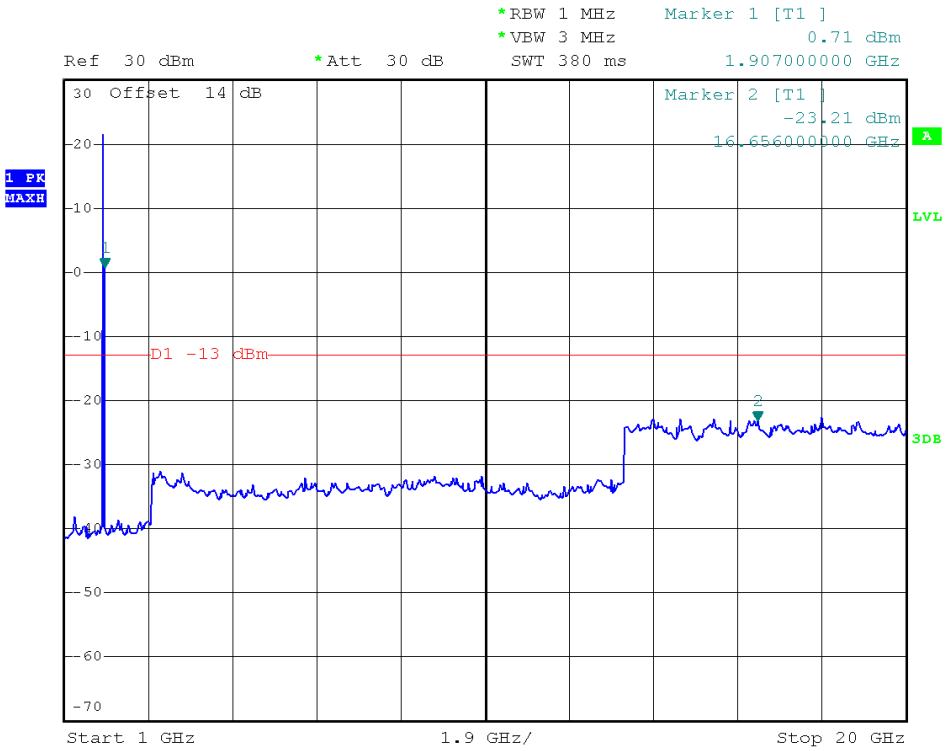


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 2	Channel	High
Bandwidth	5MHz	Modulation	QPSK

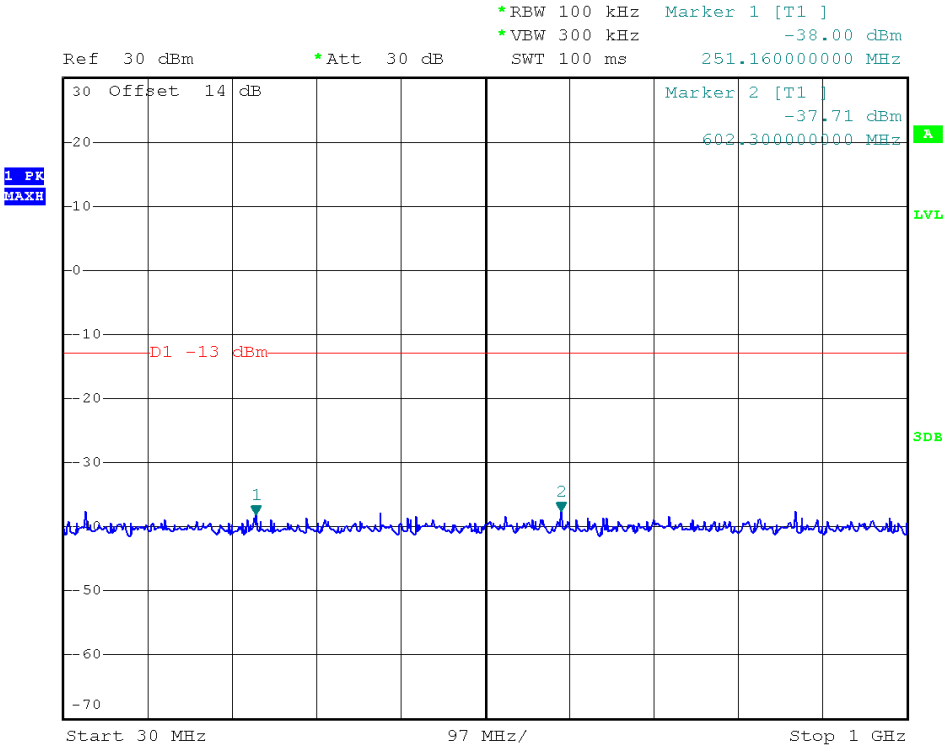


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

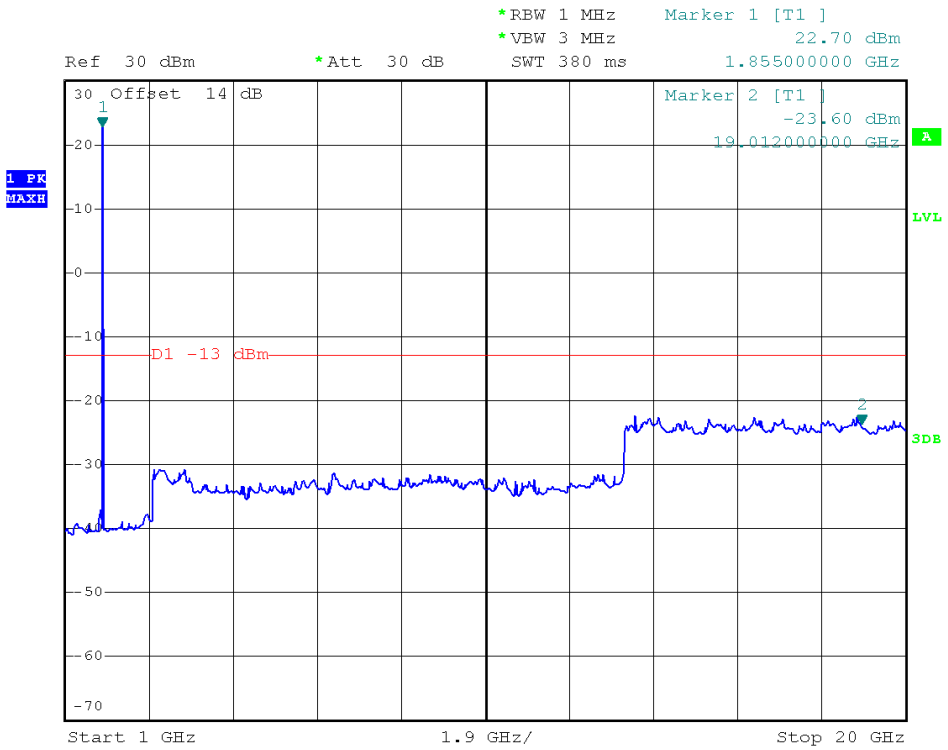


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 2	Channel	Low
Bandwidth	10MHz	Modulation	QPSK

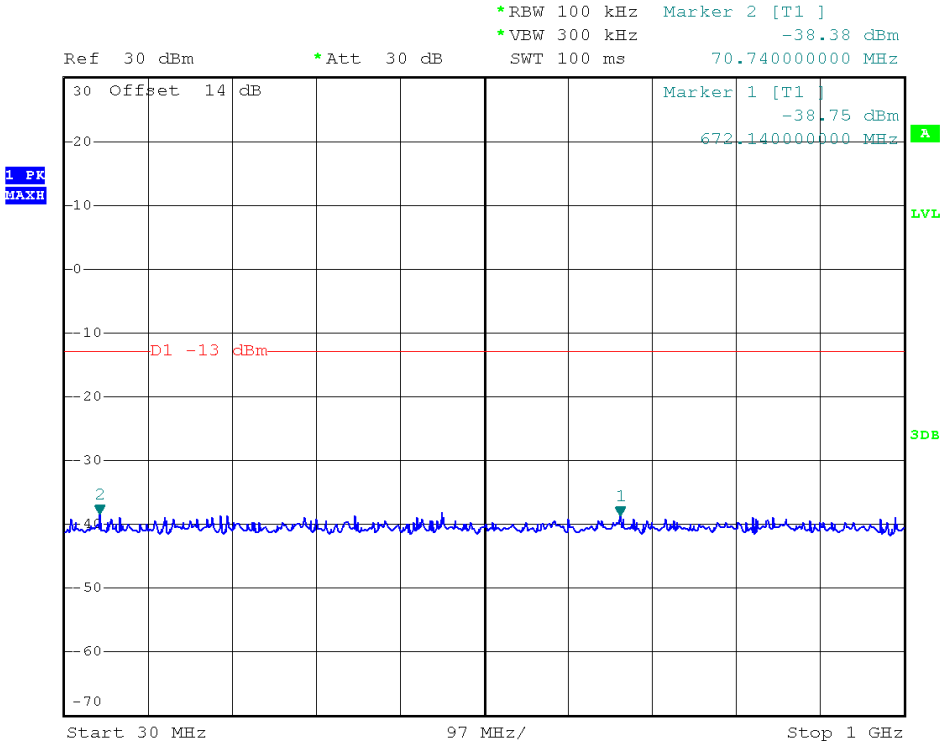


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

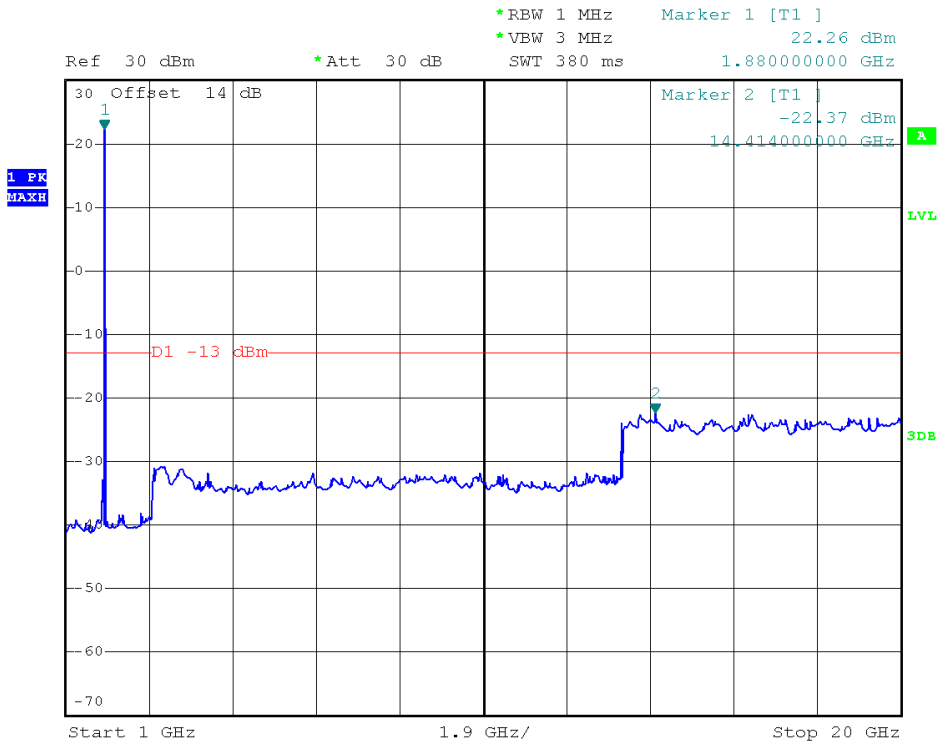


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 2	Channel	Middle
Bandwidth	10MHz	Modulation	QPSK

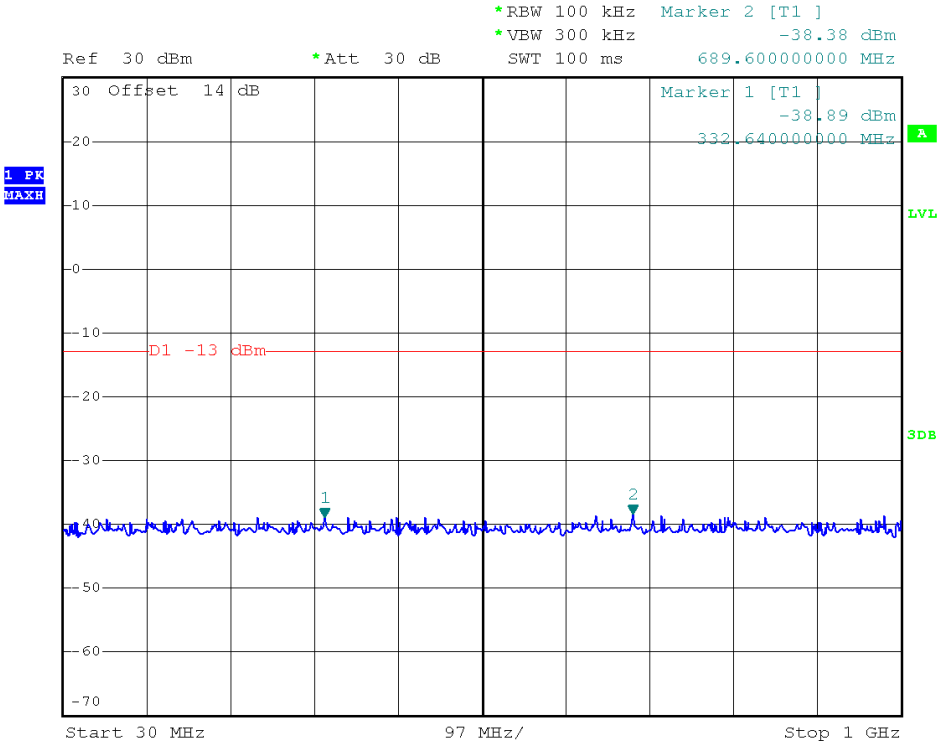


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

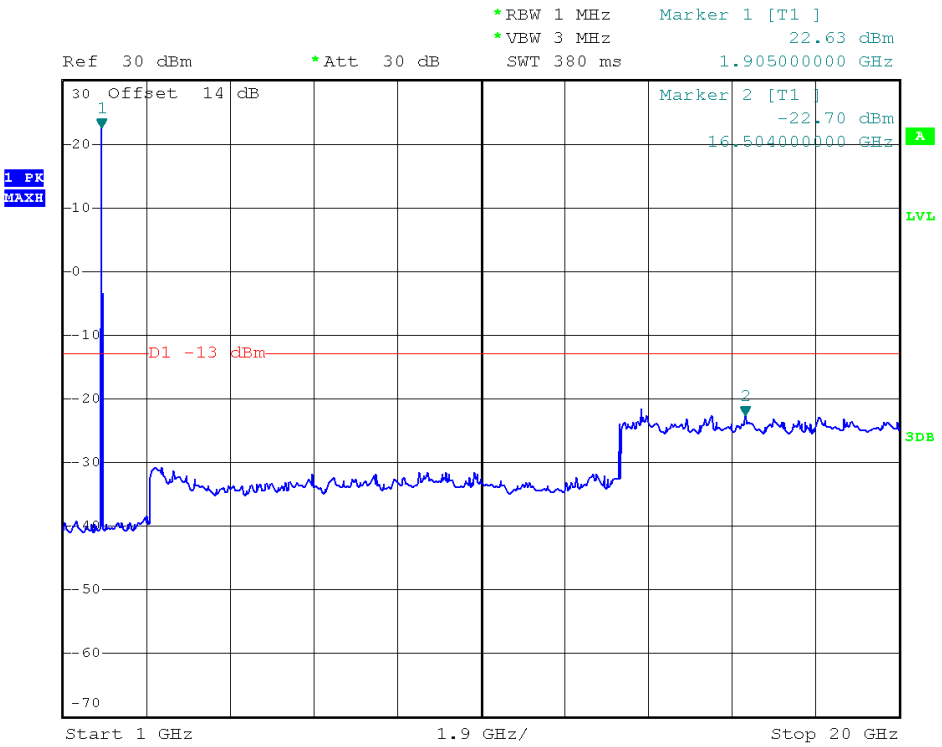


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 2	Channel	High
Bandwidth	10MHz	Modulation	QPSK

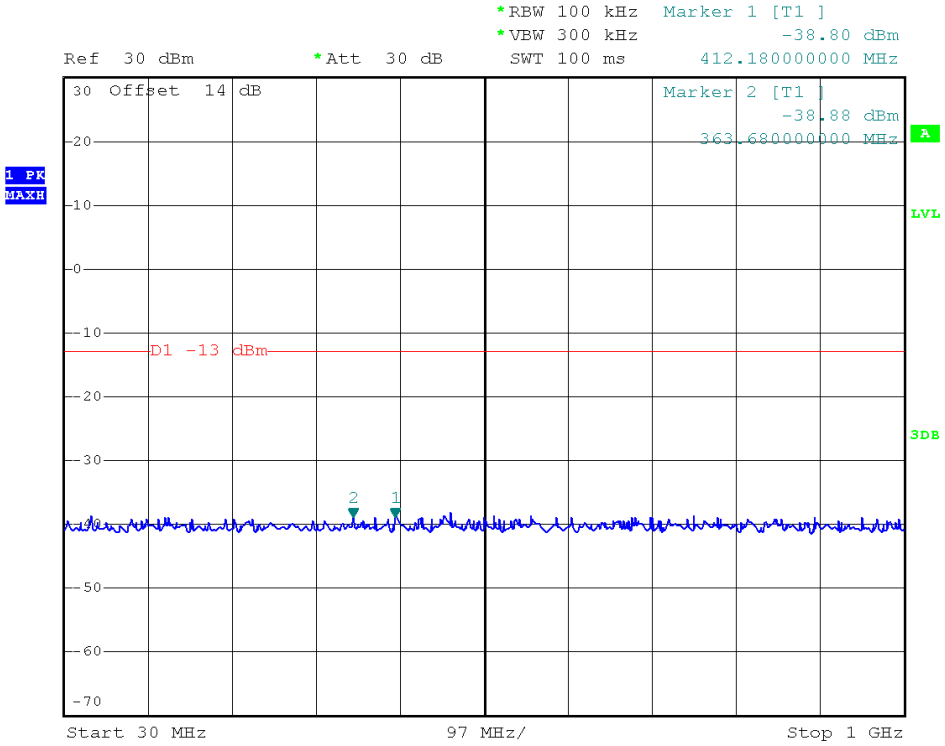


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

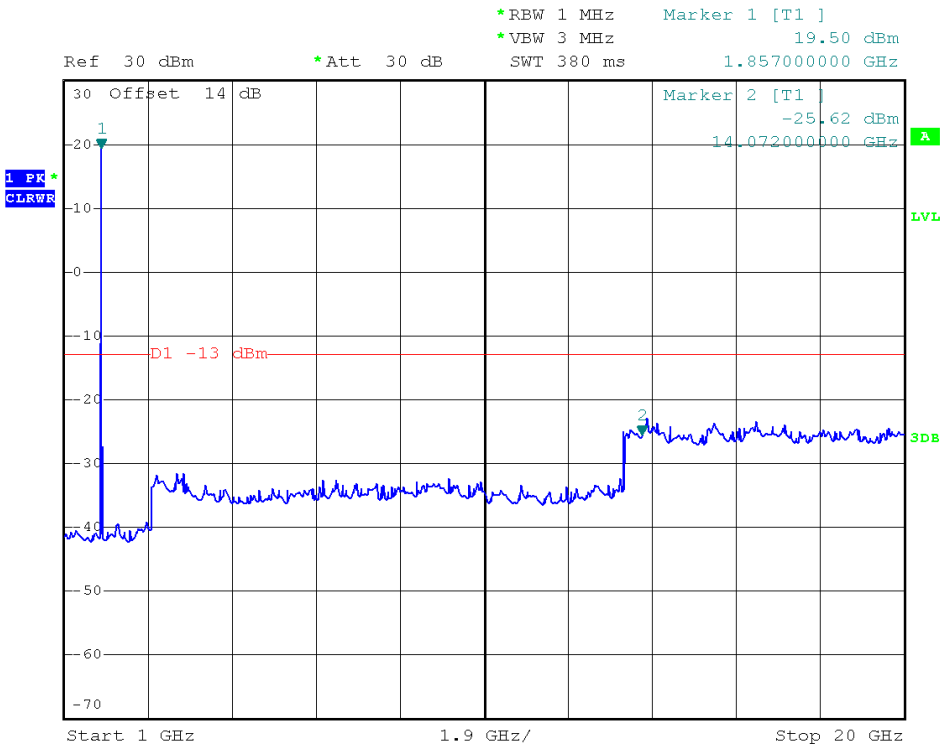


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 2	Channel	Low
Bandwidth	15MHz	Modulation	QPSK

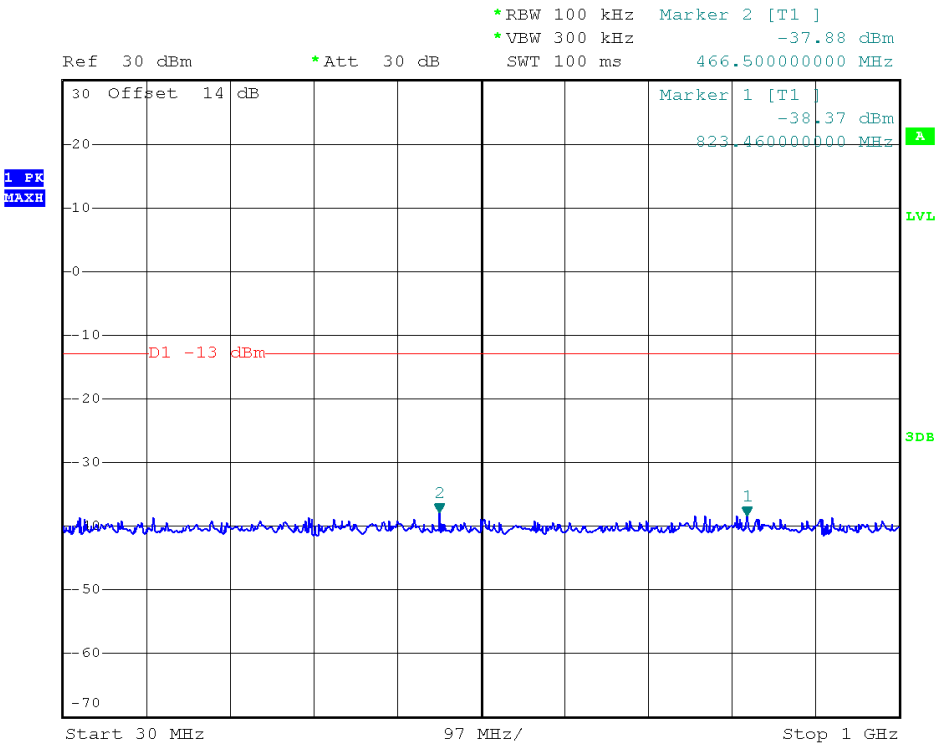


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

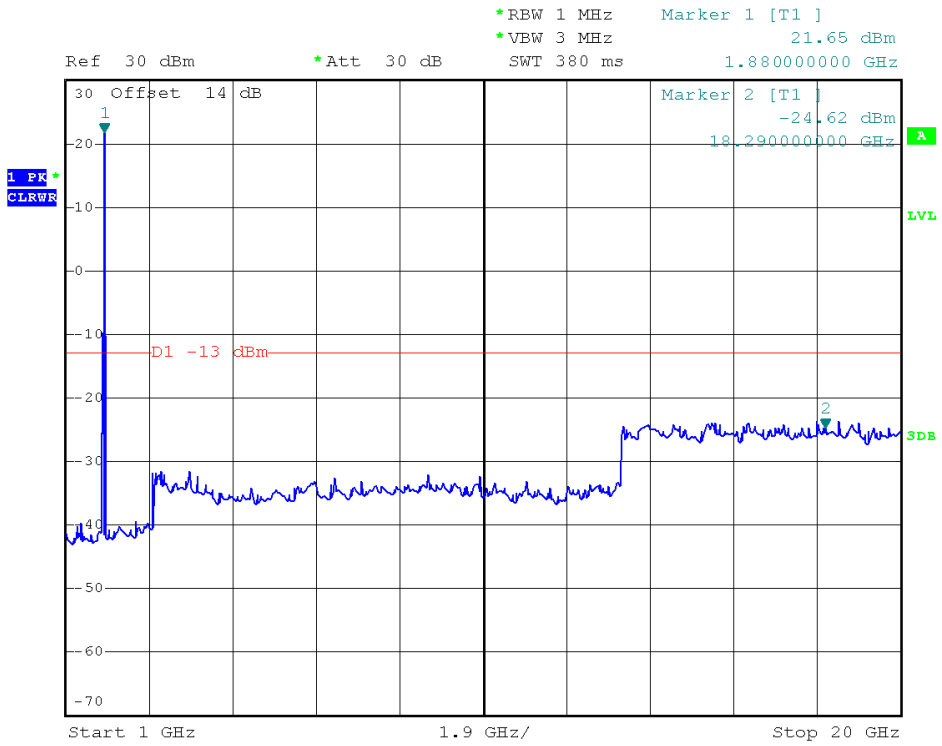


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 2	Channel	Middle
Bandwidth	15MHz	Modulation	QPSK

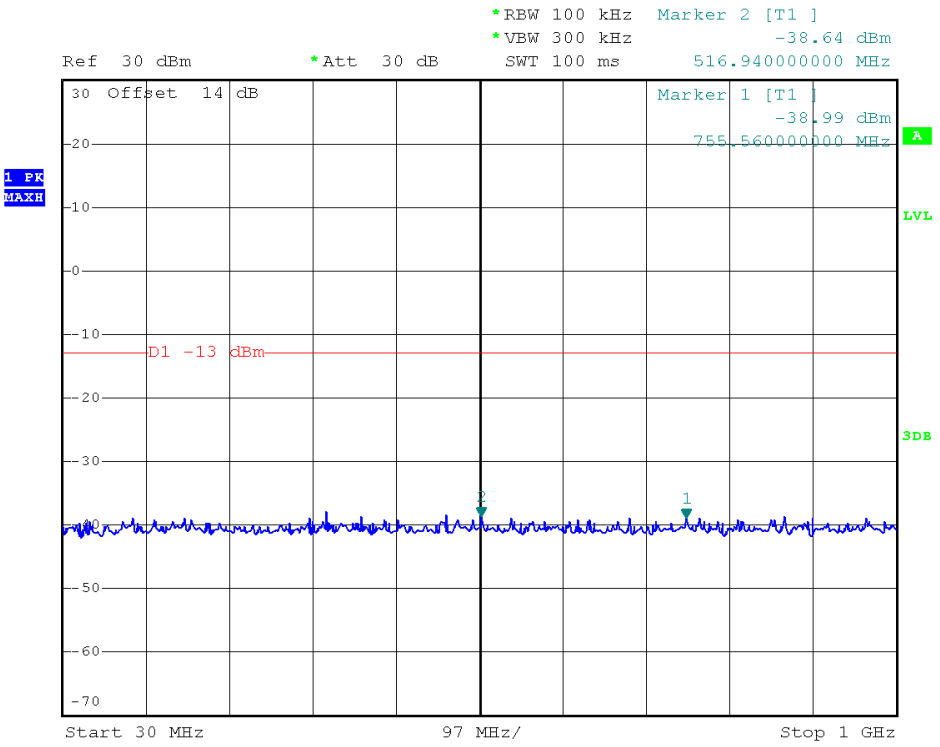


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

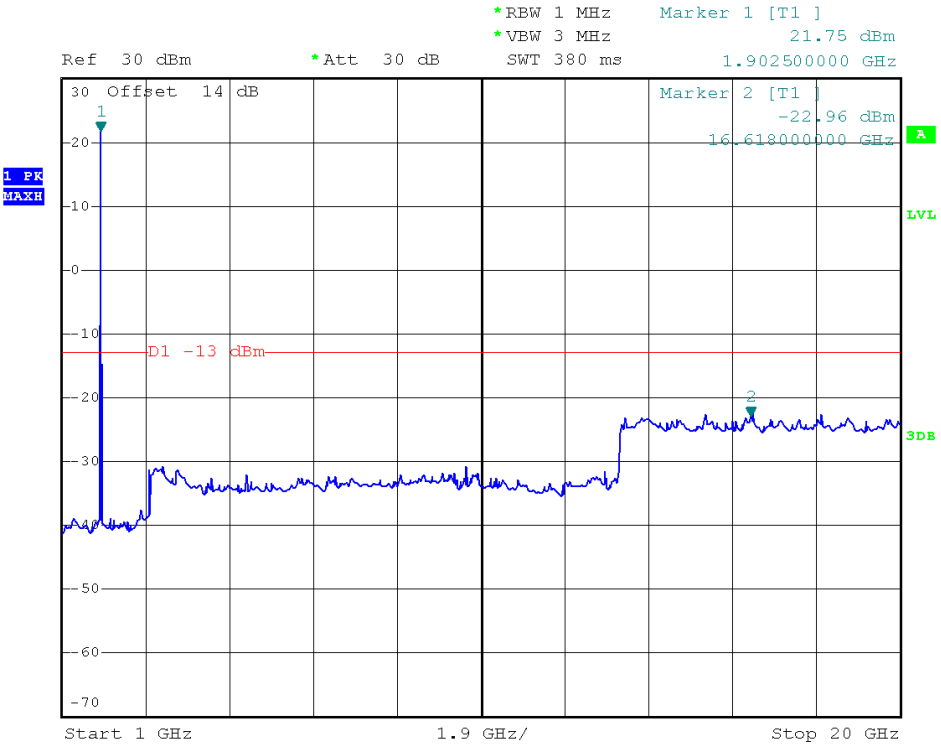


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 2	Channel	High
Bandwidth	15MHz	Modulation	QPSK

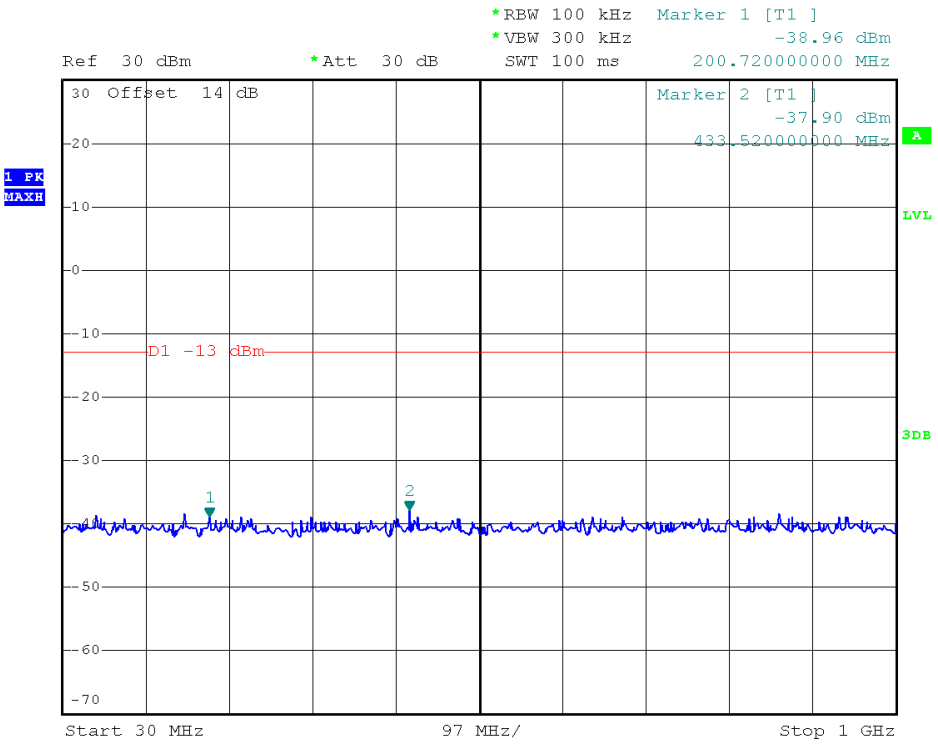


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

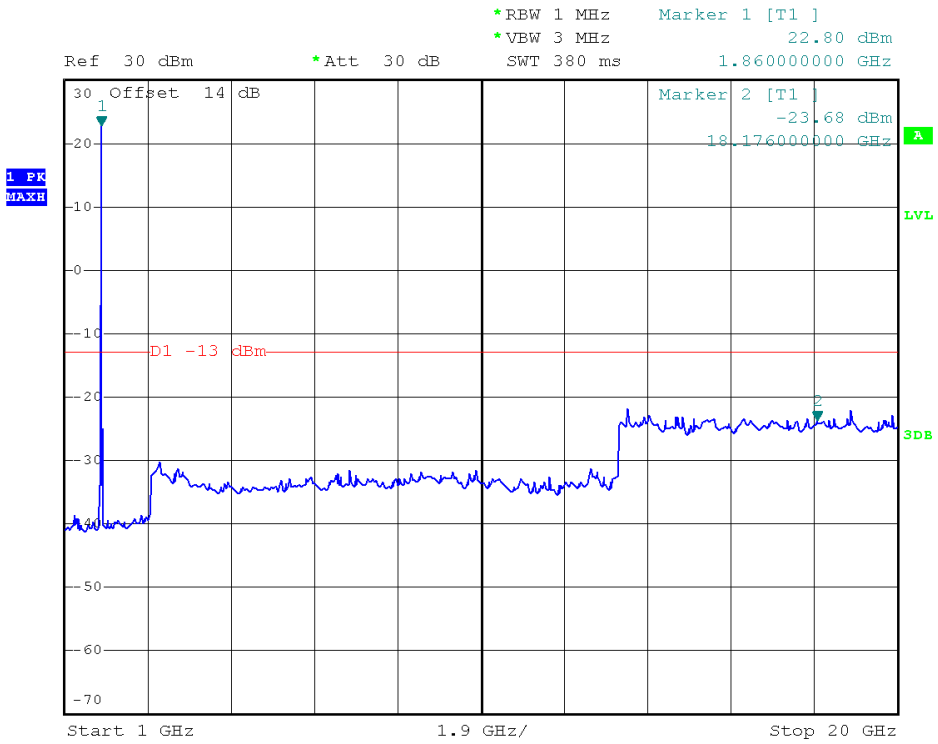


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 2	Channel	Low
Bandwidth	20MHz	Modulation	QPSK

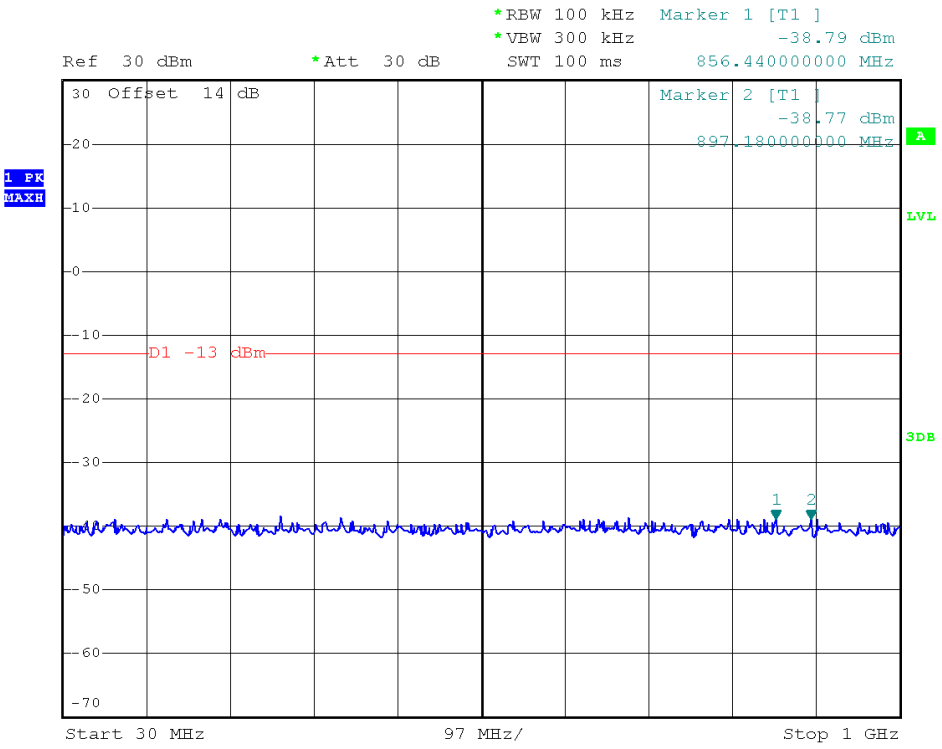


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

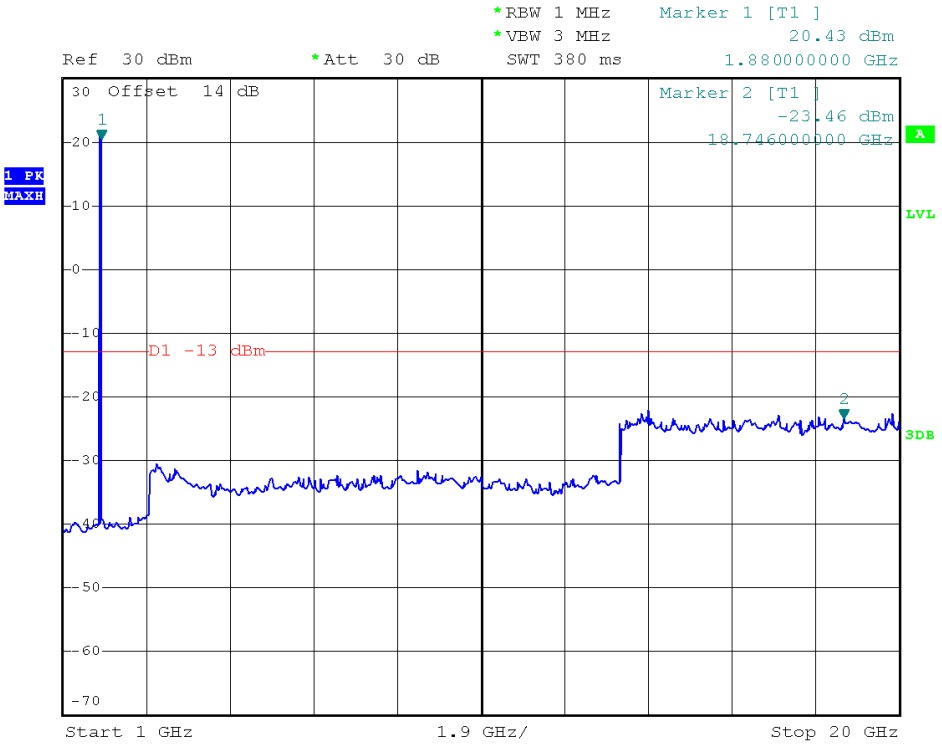


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 2	Channel	Middle
Bandwidth	20MHz	Modulation	QPSK

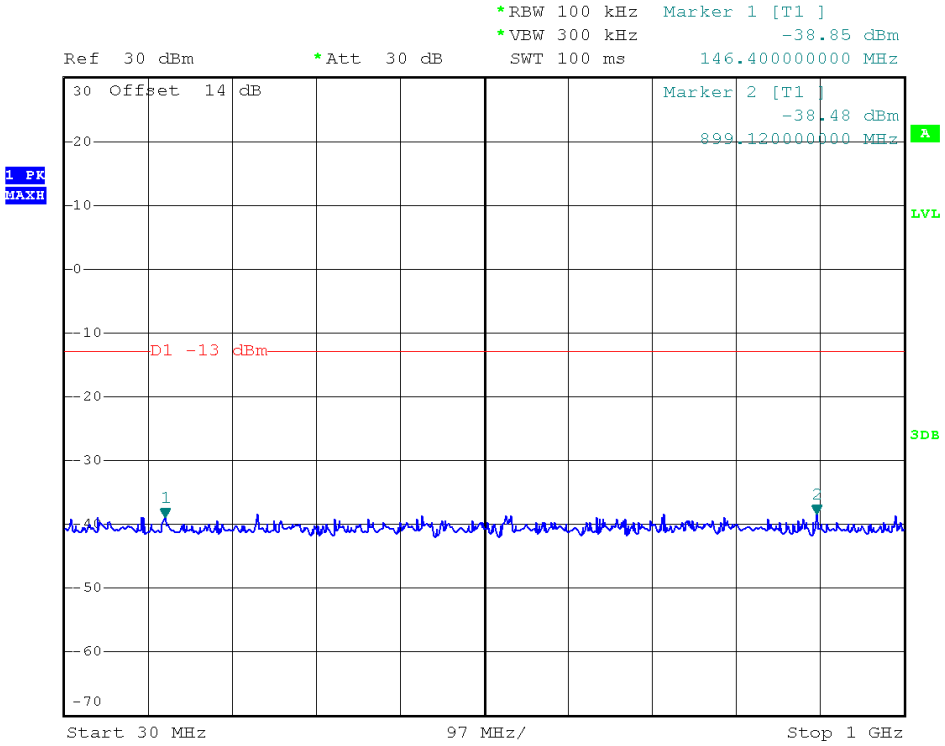


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

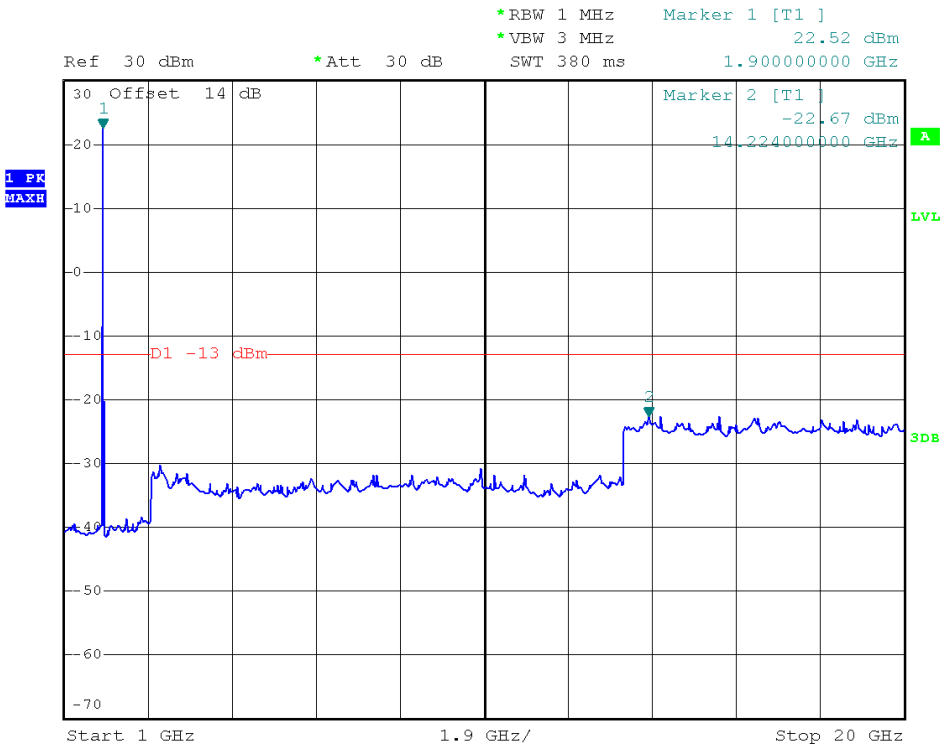


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 2	Channel	High
Bandwidth	20MHz	Modulation	QPSK

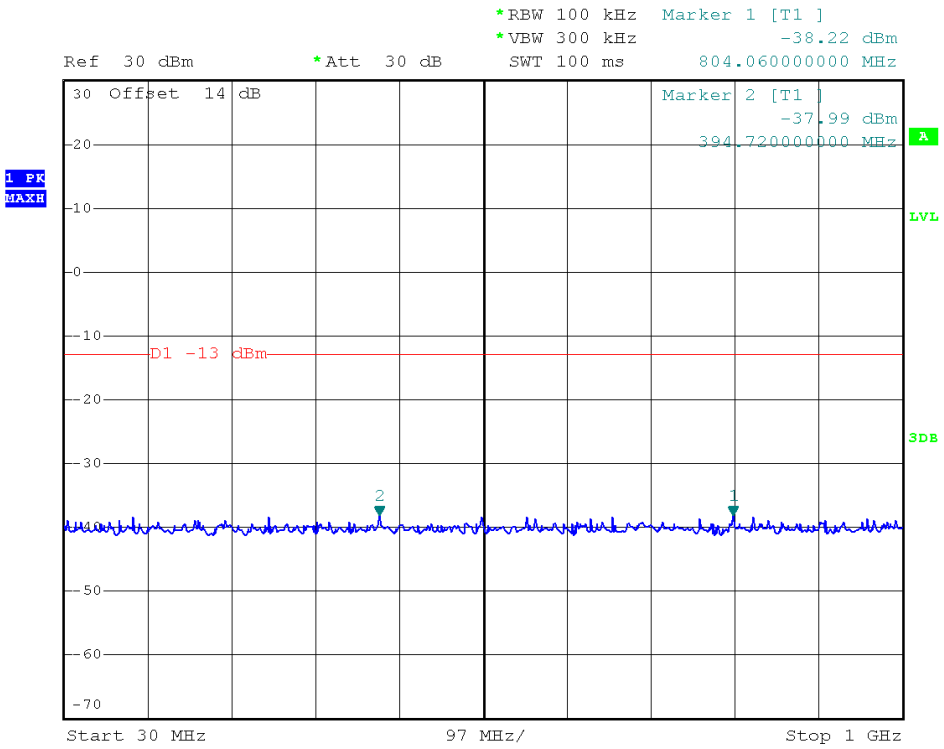


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

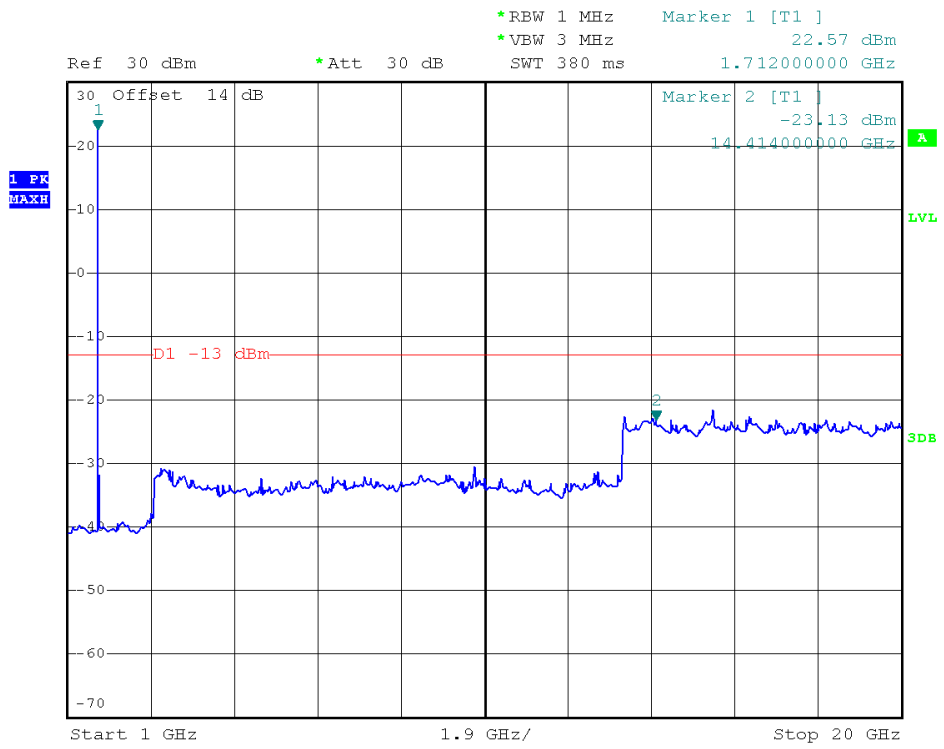


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 4	Channel	Low
Bandwidth	5MHz	Modulation	QPSK

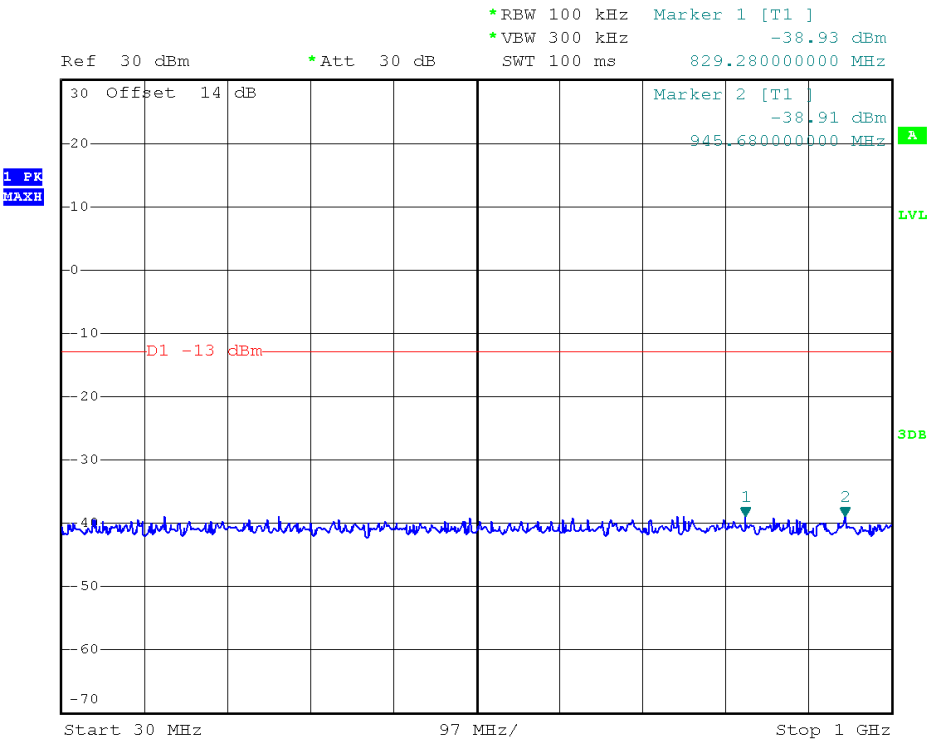


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

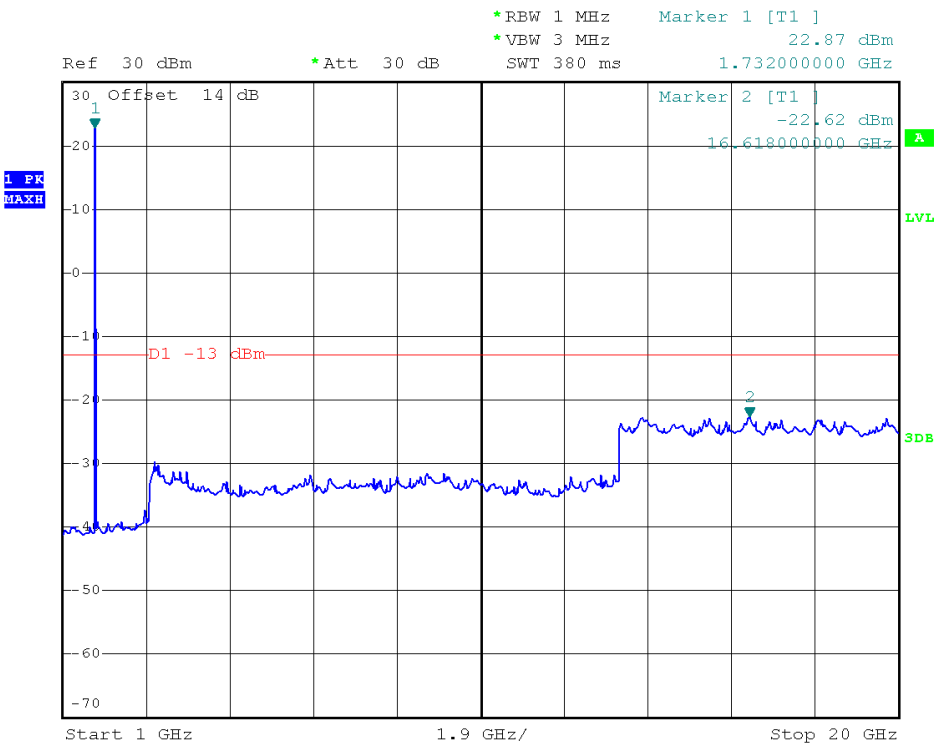


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 4	Channel	Middle
Bandwidth	5MHz	Modulation	QPSK

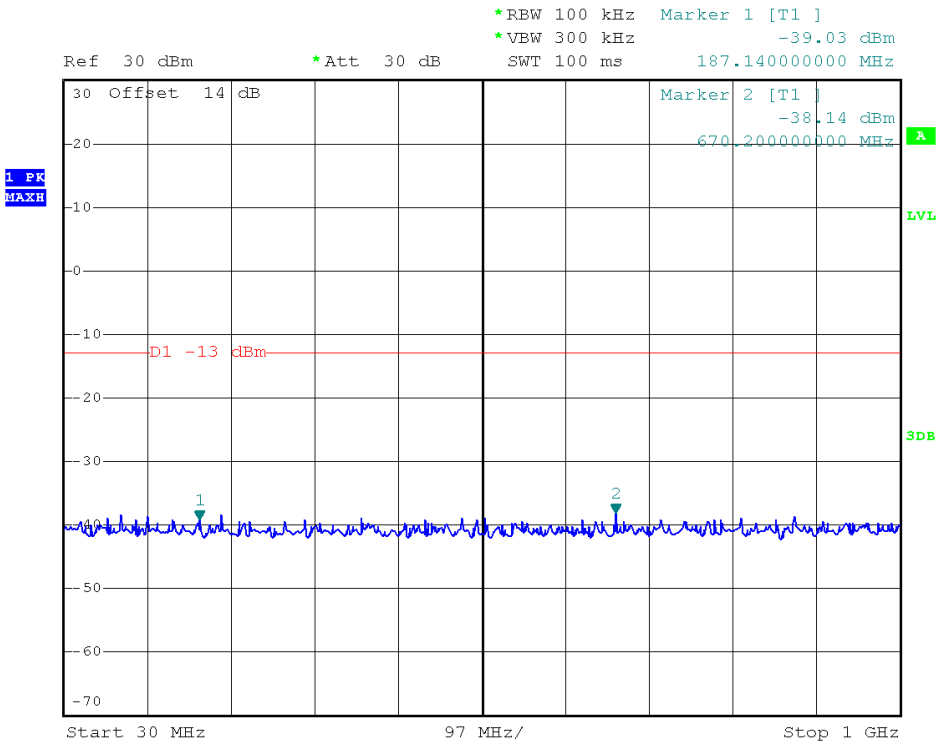


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

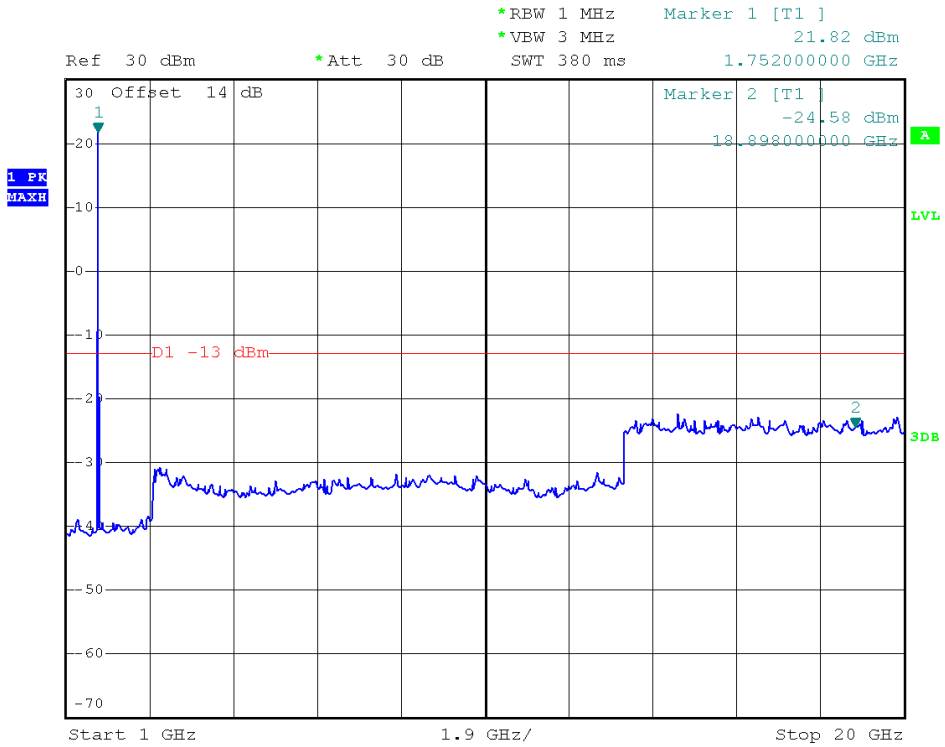


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 4	Channel	High
Bandwidth	5MHz	Modulation	QPSK

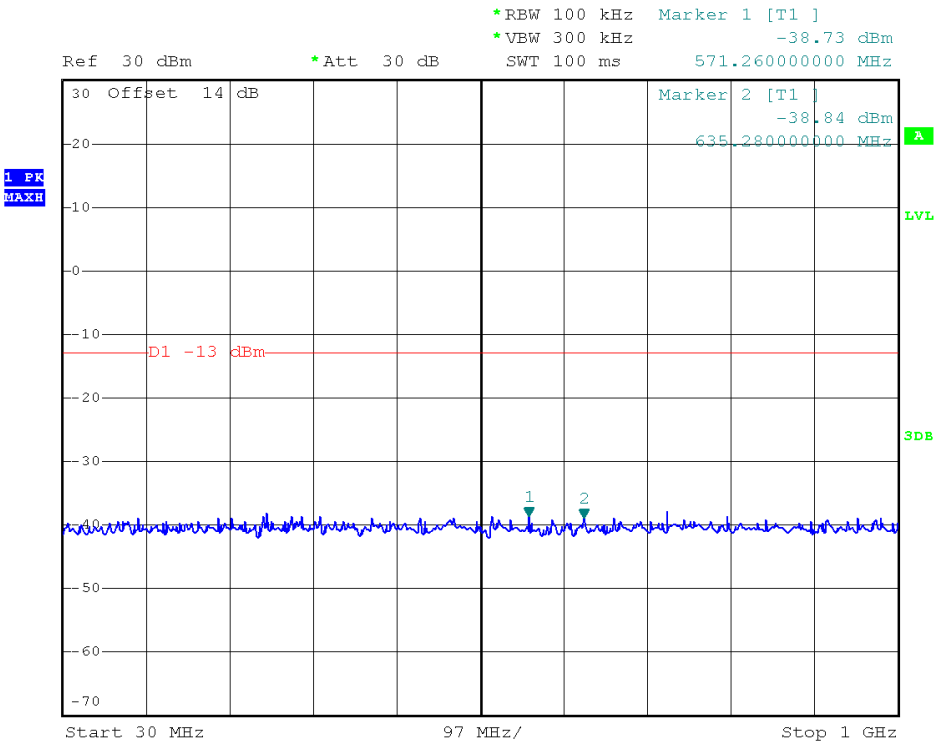


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

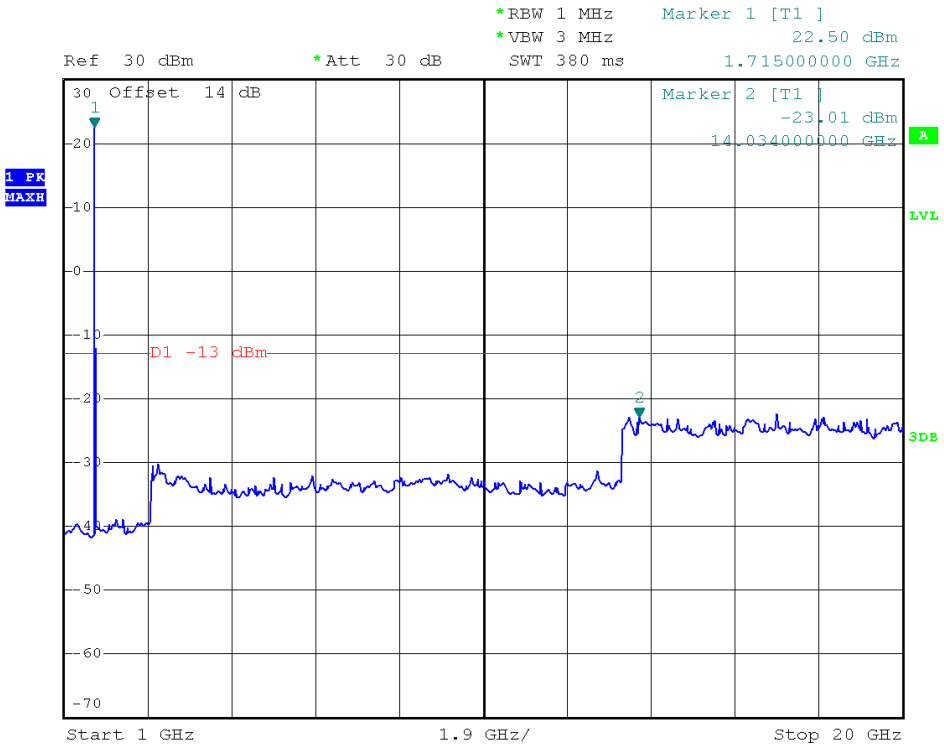


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 4	Channel	Low
Bandwidth	10MHz	Modulation	QPSK

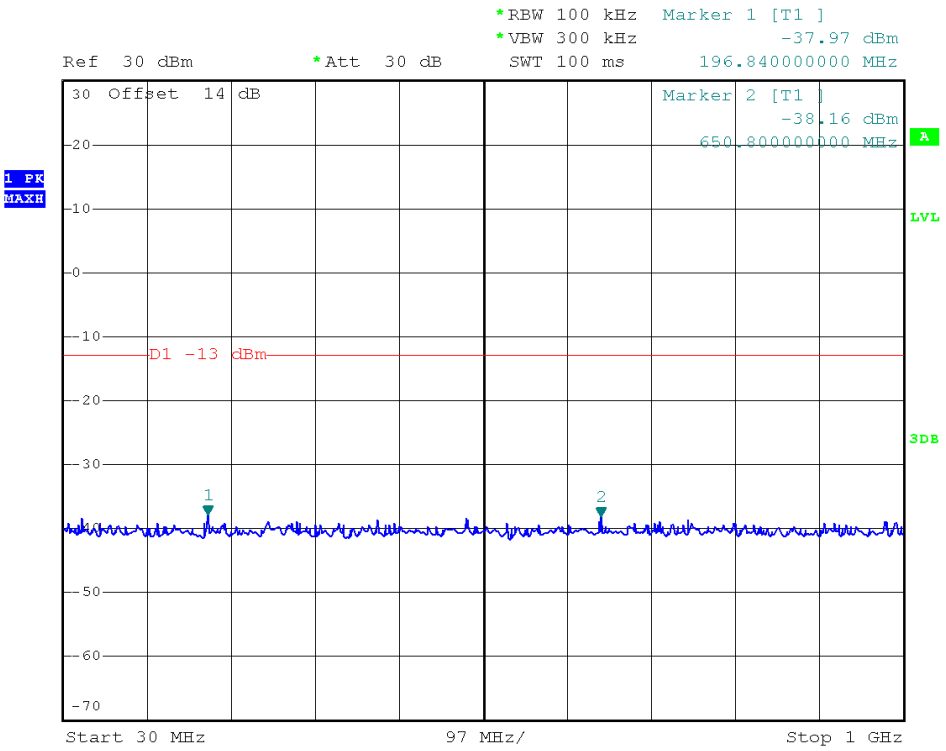


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

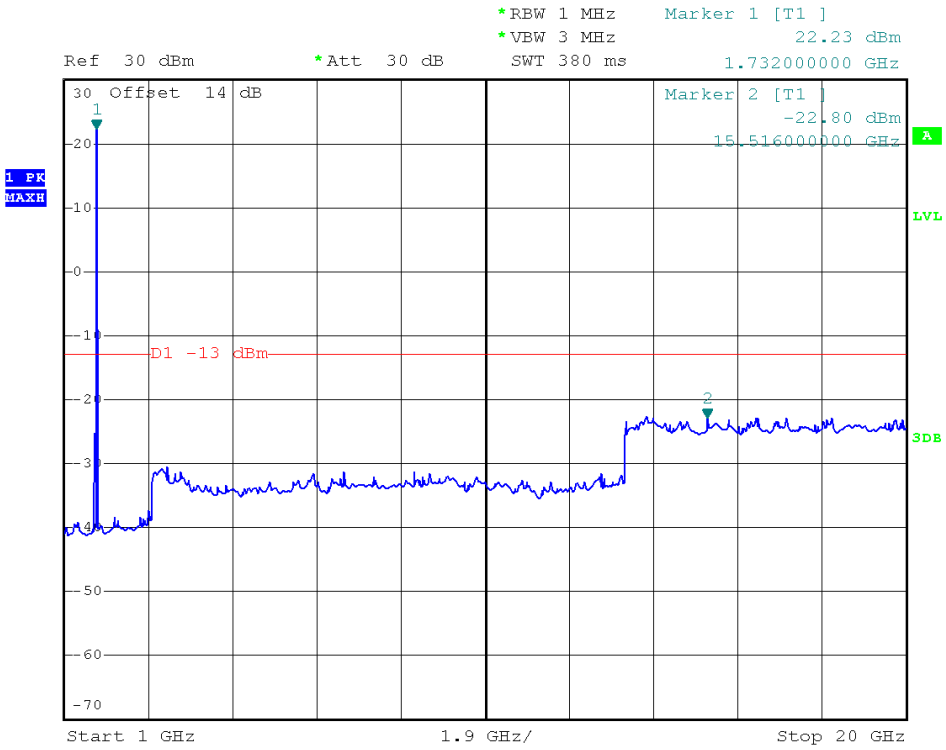


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 4	Channel	Middle
Bandwidth	10MHz	Modulation	QPSK

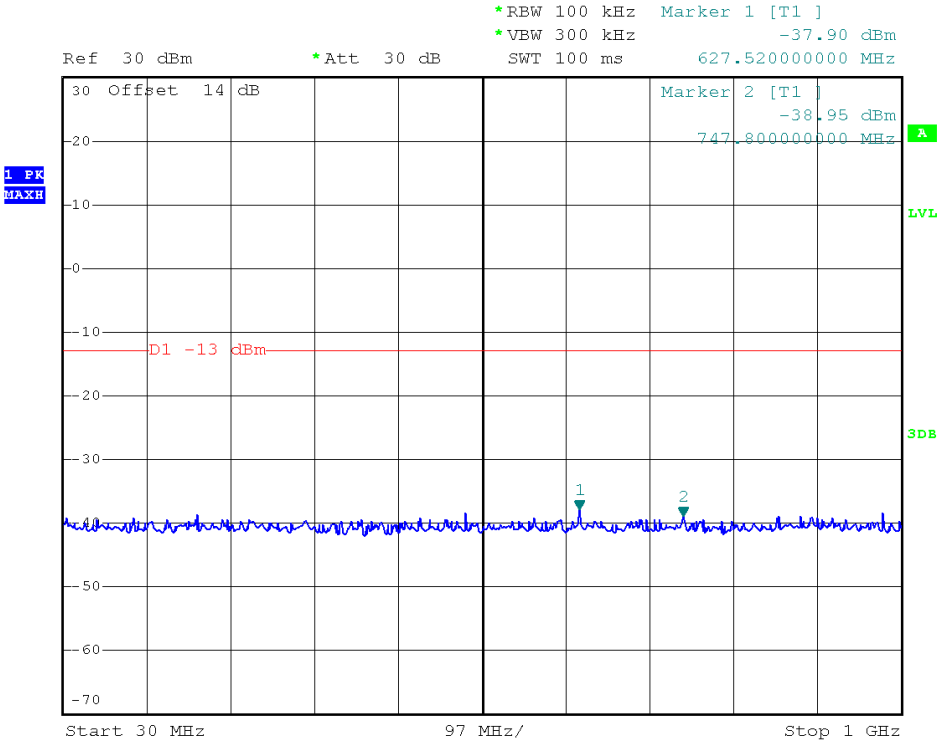


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

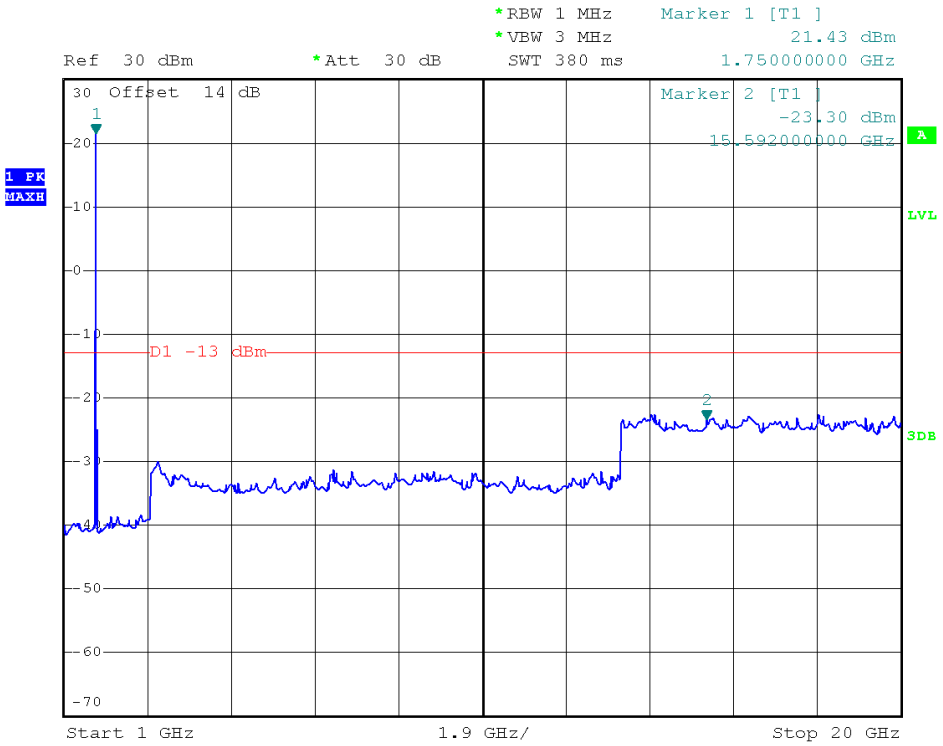


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 4	Channel	High
Bandwidth	10MHz	Modulation	QPSK

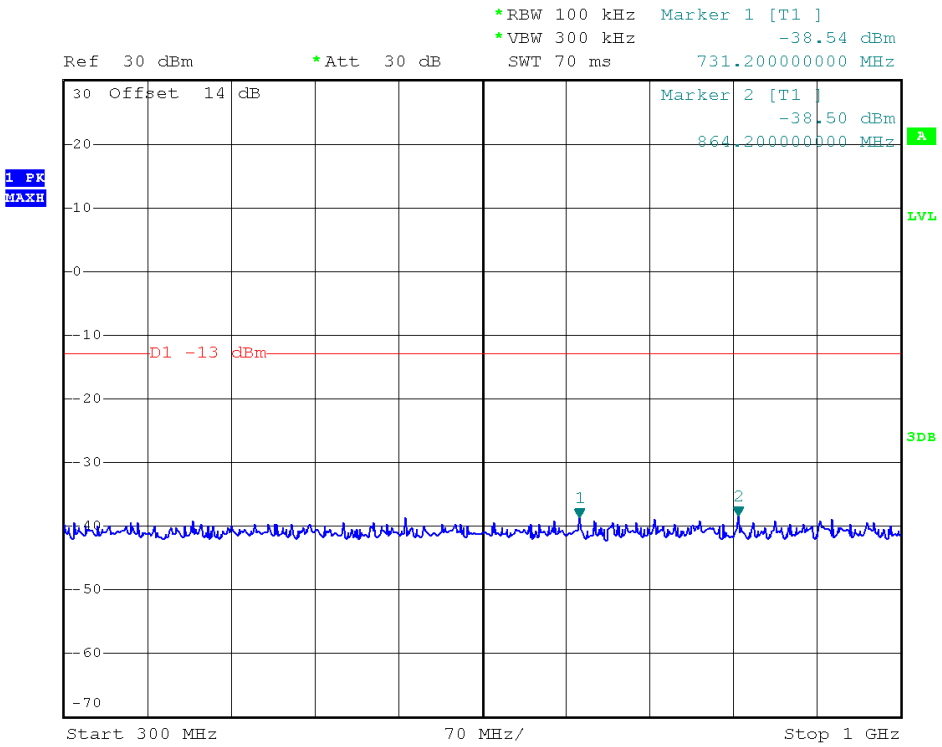


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

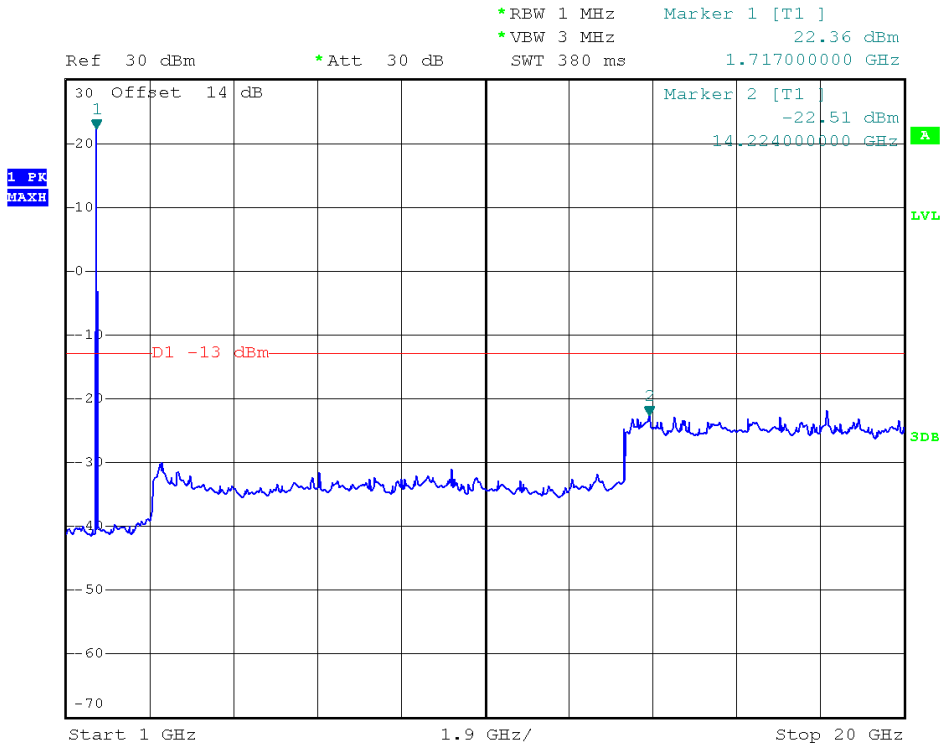


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 4	Channel	Low
Bandwidth	15MHz	Modulation	QPSK

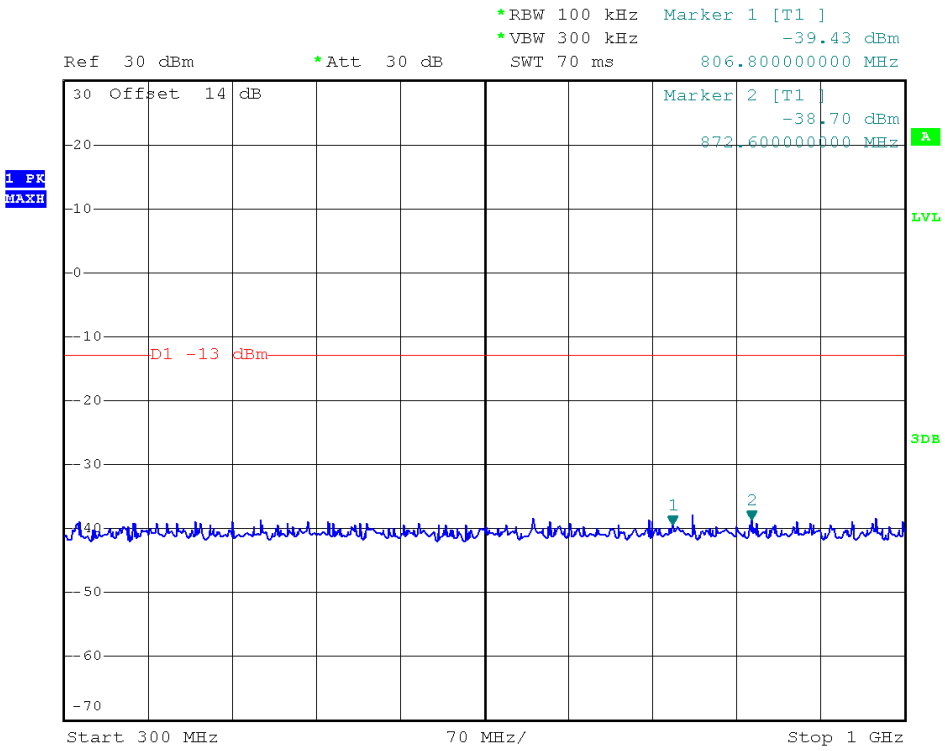


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

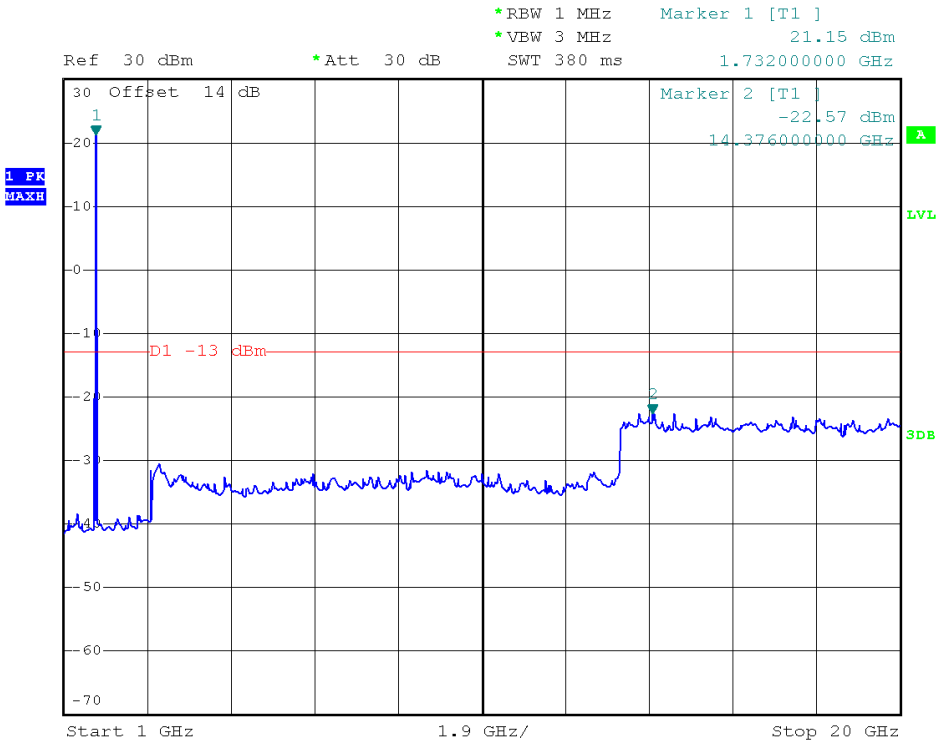


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 4	Channel	Middle
Bandwidth	15MHz	Modulation	QPSK

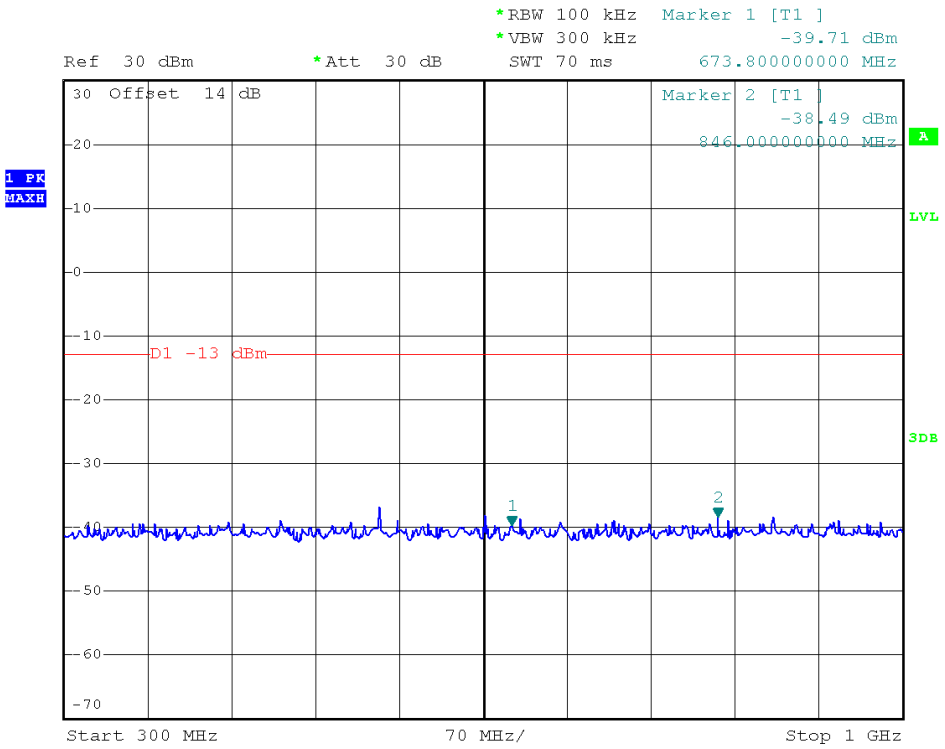


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

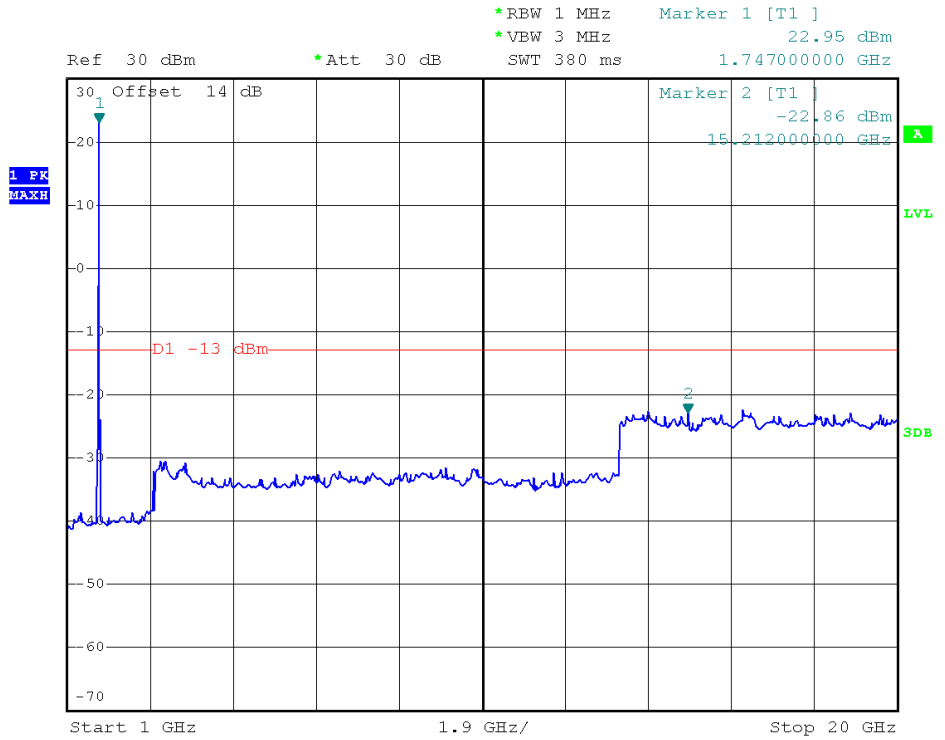


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 4	Channel	High
Bandwidth	15MHz	Modulation	QPSK

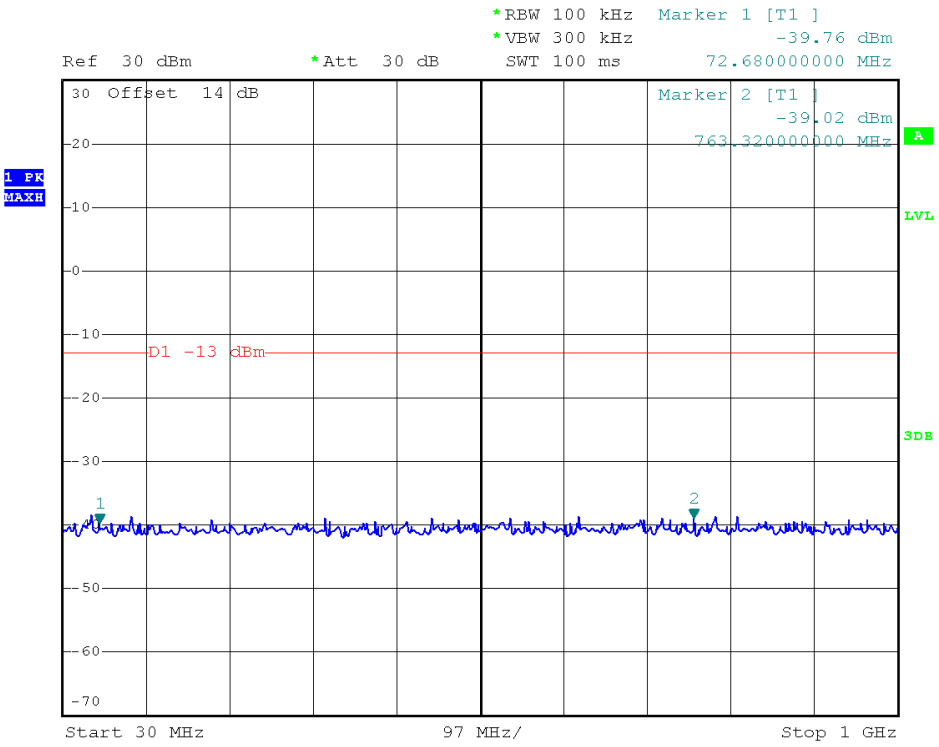


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

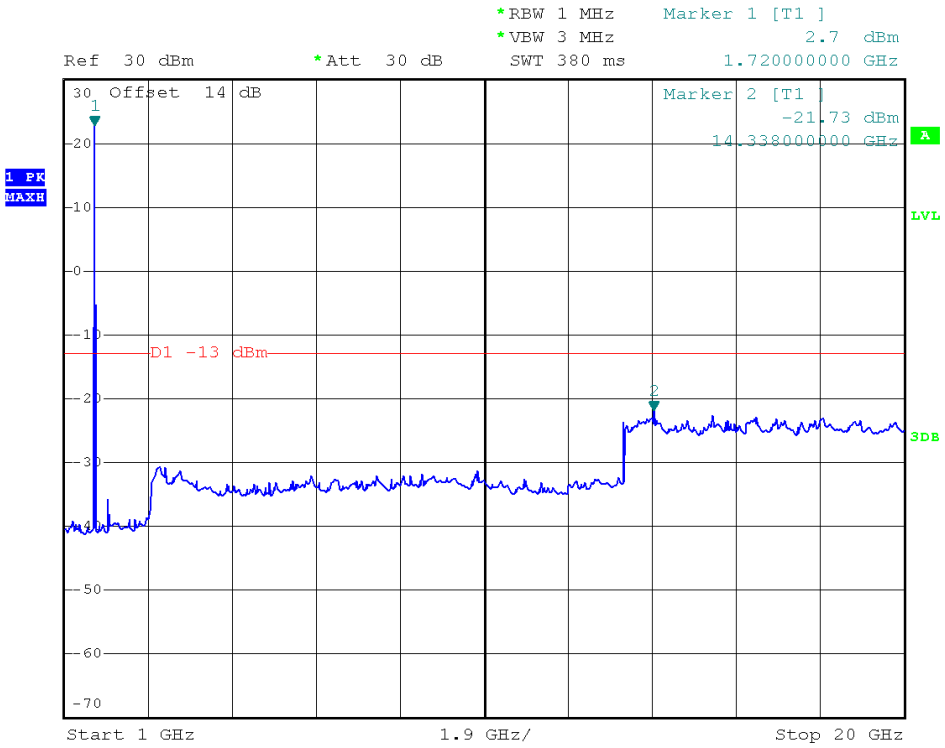


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 4	Channel	Low
Bandwidth	20MHz	Modulation	QPSK

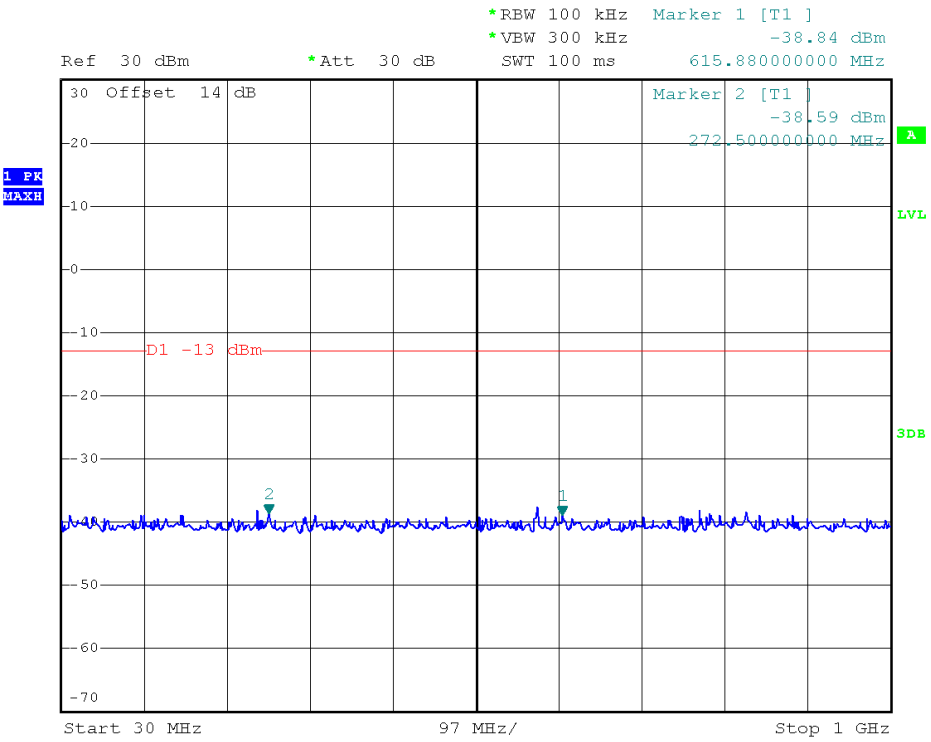


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

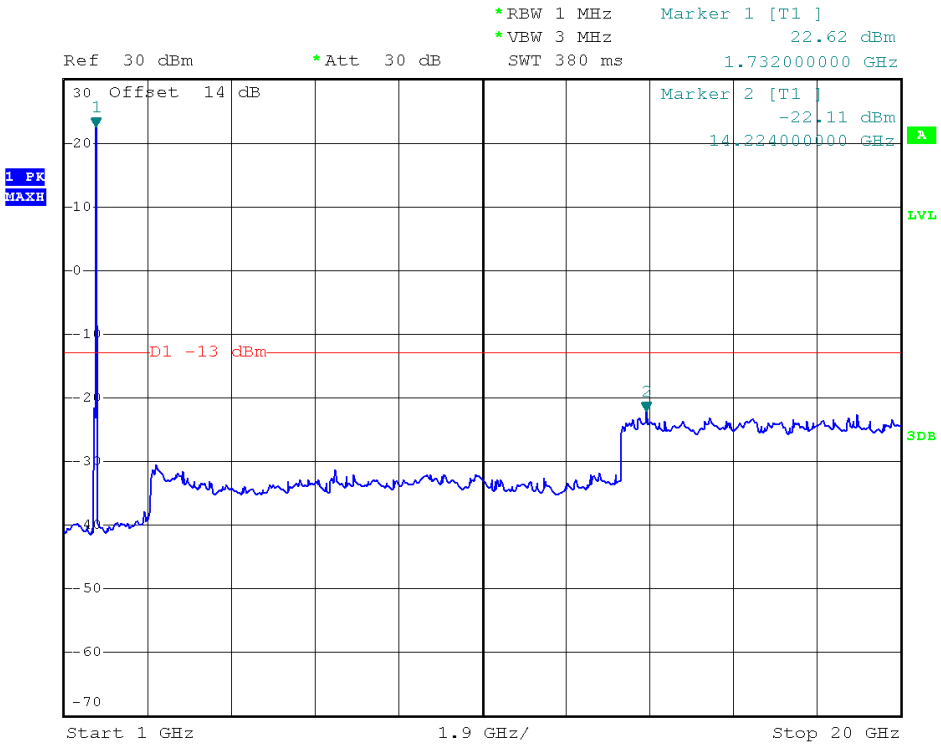


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 4	Channel	Middle
Bandwidth	20MHz	Modulation	QPSK

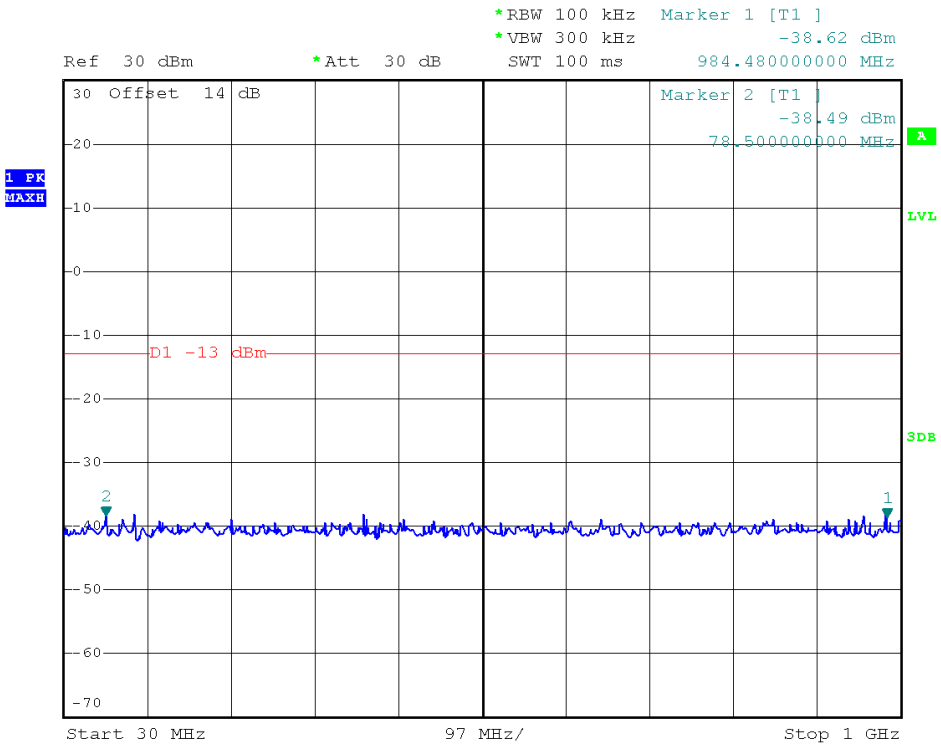


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

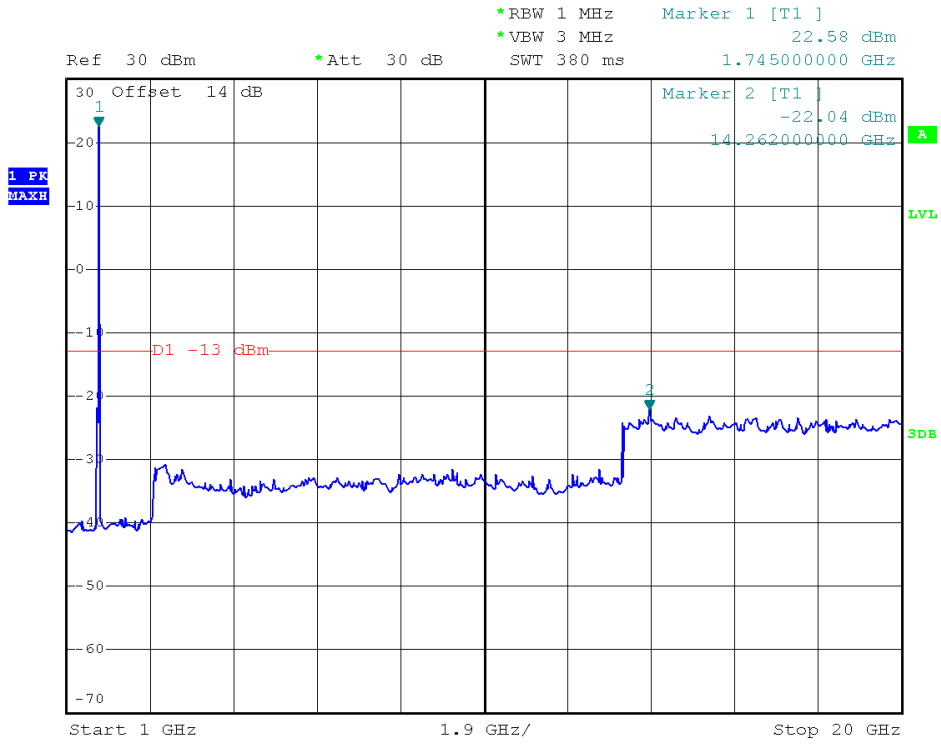


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 4	Channel	High
Bandwidth	20MHz	Modulation	QPSK

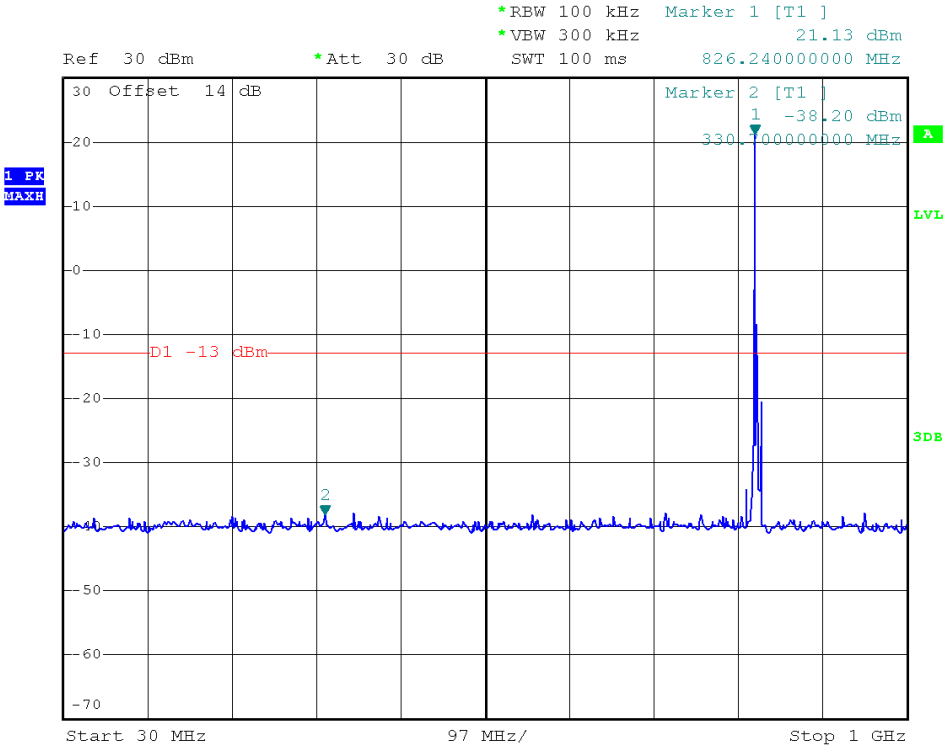


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

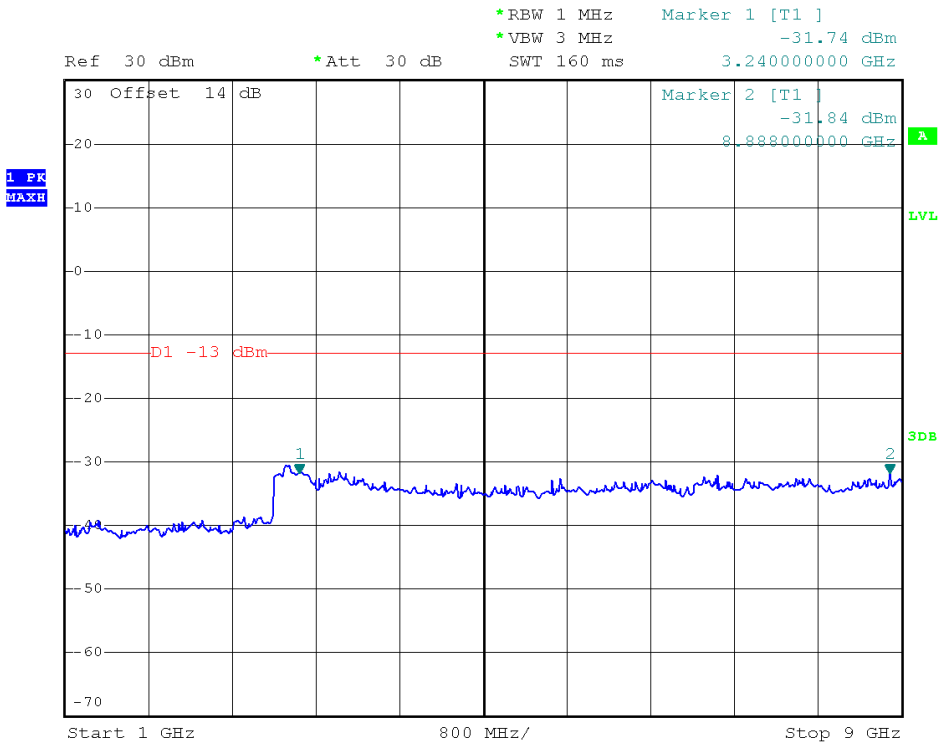


QPSK, (RB Size 1, RB Offset 0 1GHz to 20GHz)

Band	LTE Band 5	Channel:	Low
Bandwidth	5MHz	Modulation	QPSK

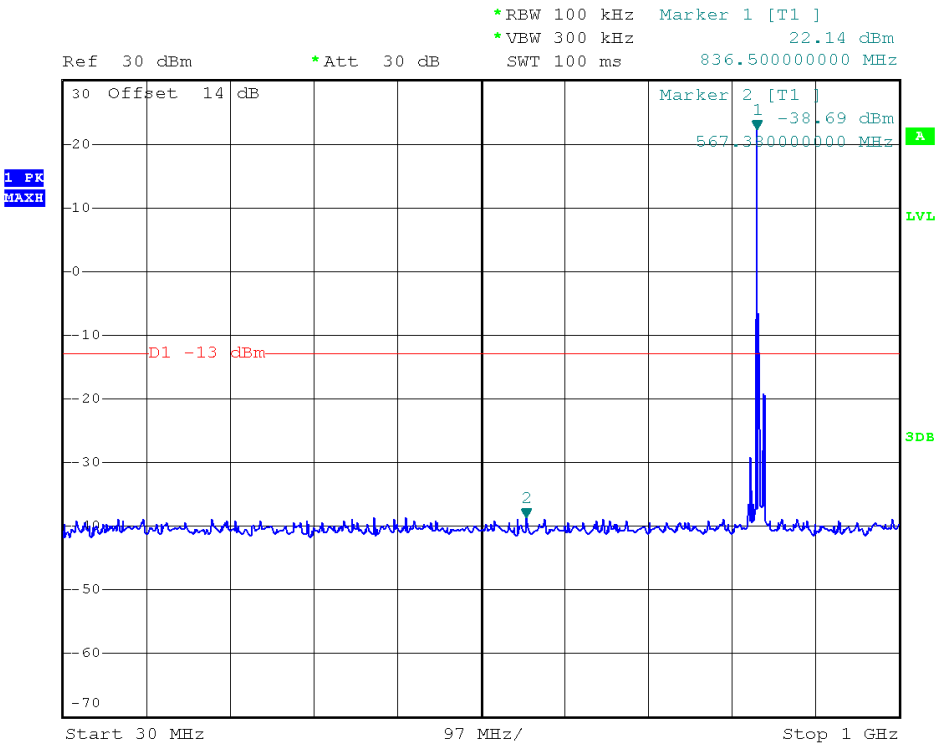


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

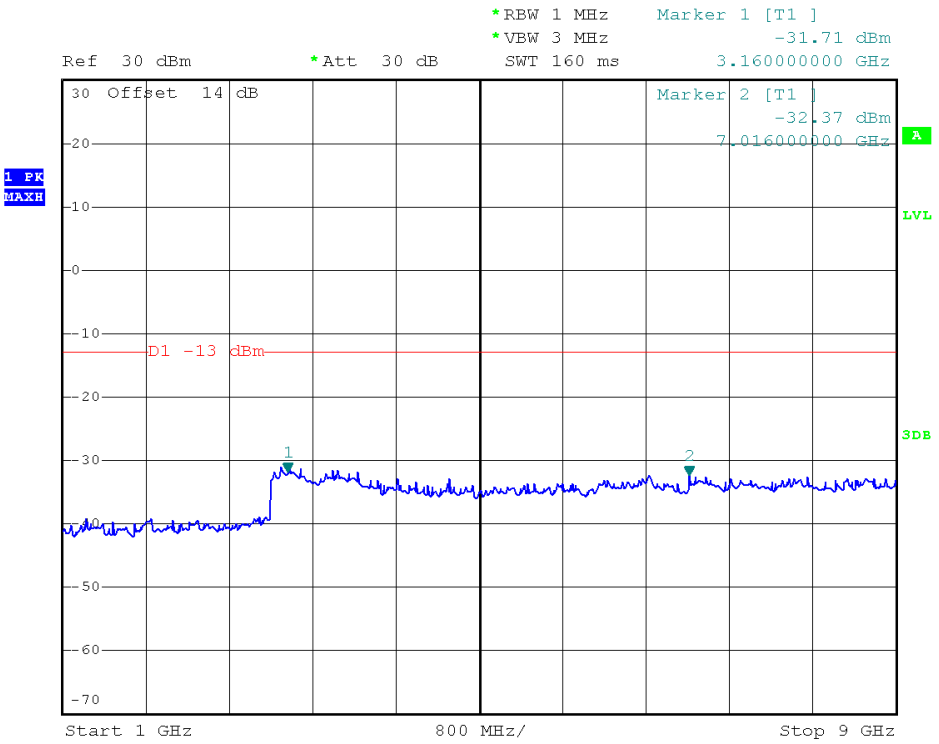


QPSK, (RB Size 1, RB Offset 0 1GHz to 9GHz)

Band	LTE Band 5	Channel	Middle
Bandwidth	5MHz	Modulation	QPSK

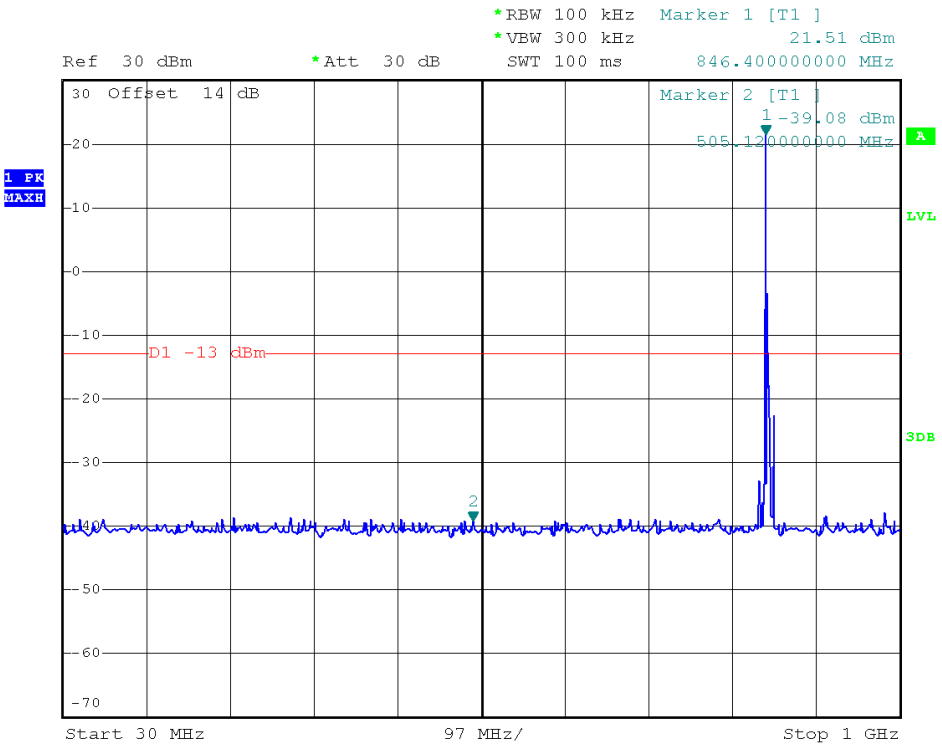


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

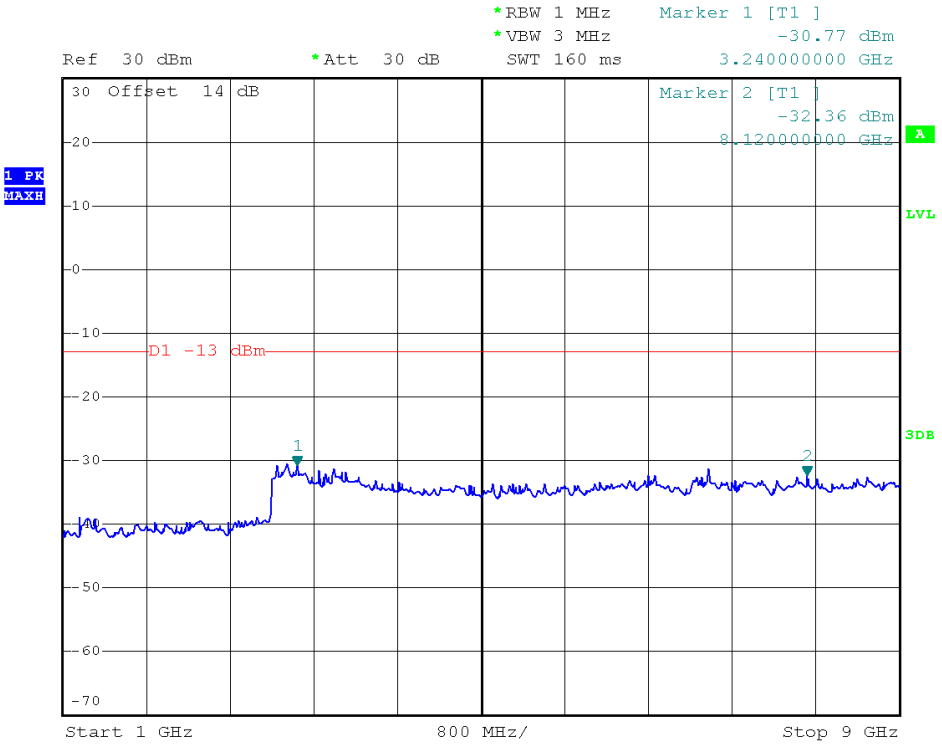


QPSK, (RB Size 1, RB Offset 0 1GHz to 9GHz)

Band	LTE Band 5	Channel	High
Bandwidth	5MHz	Modulation	QPSK

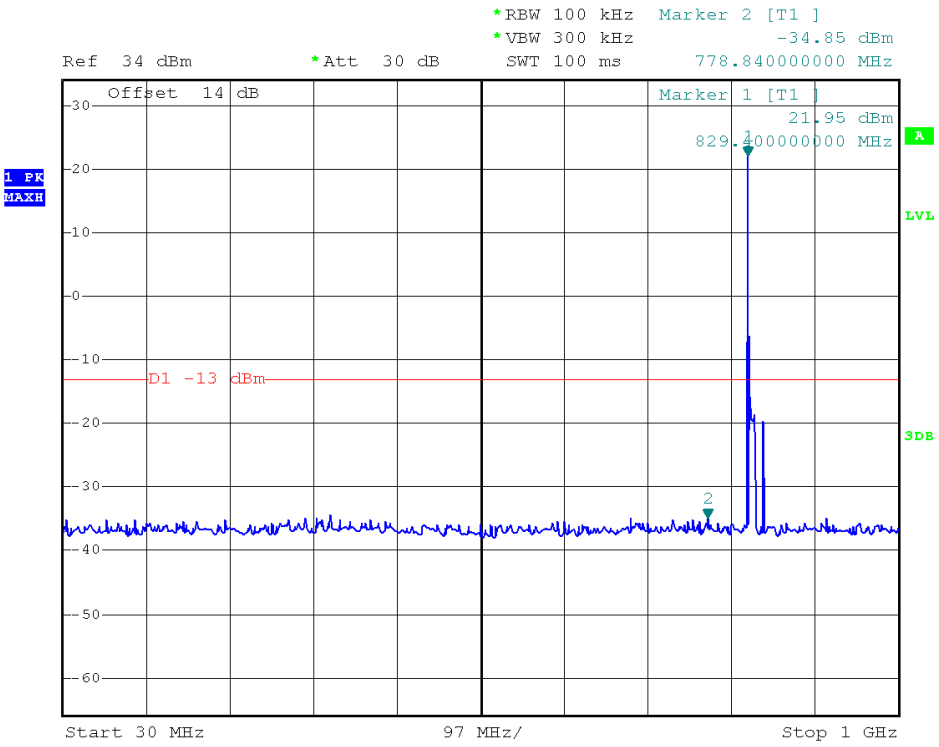


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

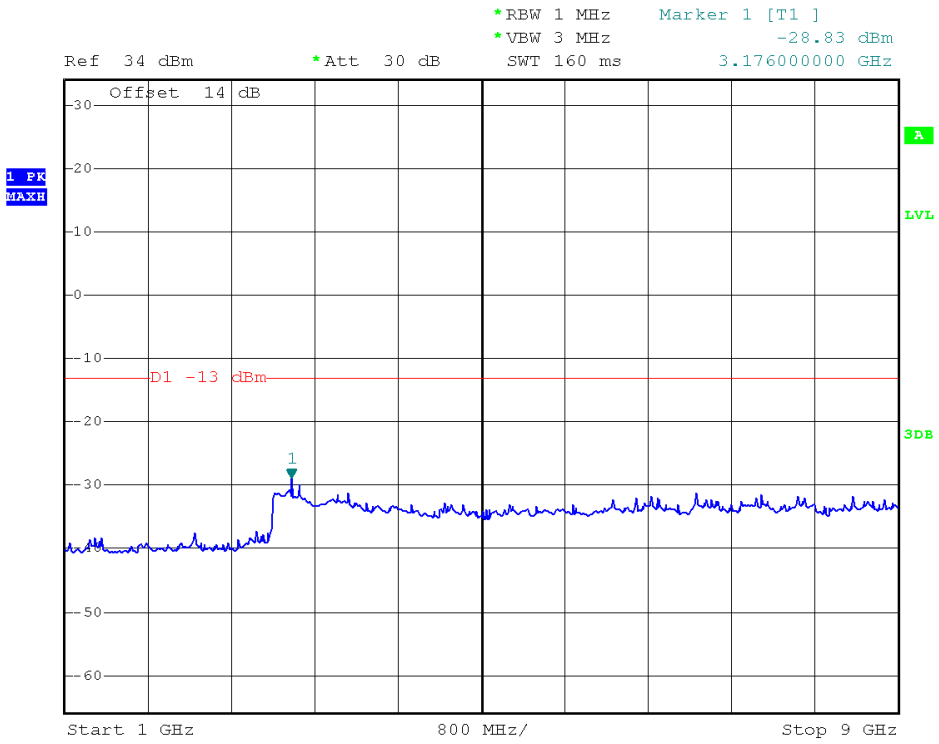


QPSK, (RB Size 1, RB Offset 0 1GHz to 9GHz)

Band	LTE Band 5	Channel:	Low
Bandwidth	10MHz	Modulation	QPSK

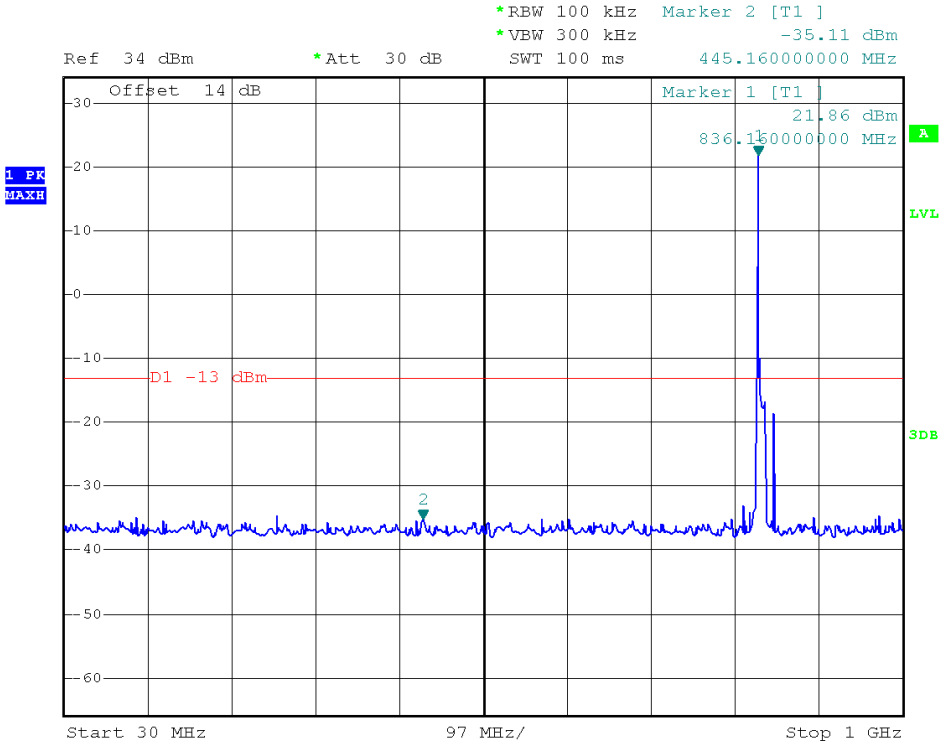


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

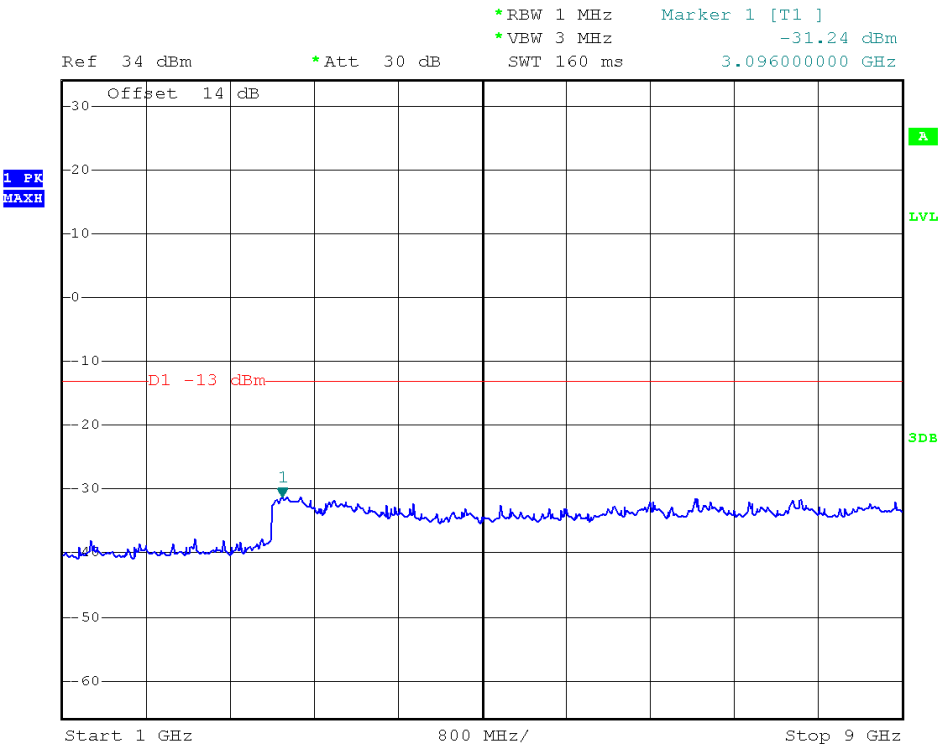


QPSK, (RB Size 1, RB Offset 0 1GHz to 9GHz)

Band	LTE Band 5	Channel	Middle
Bandwidth	10MHz	Modulation	QPSK

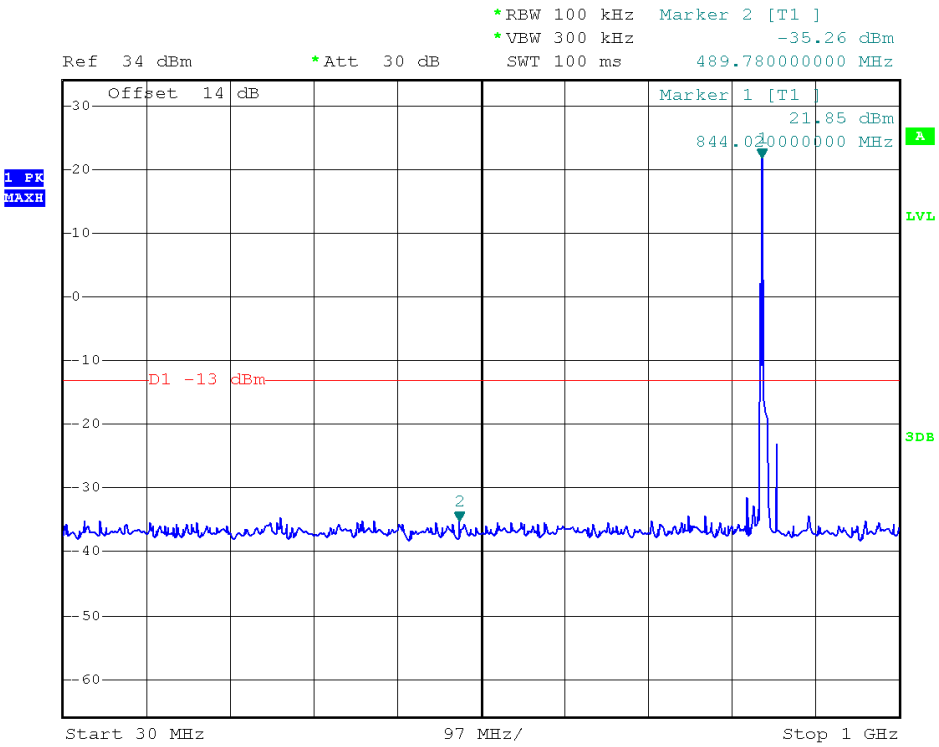


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

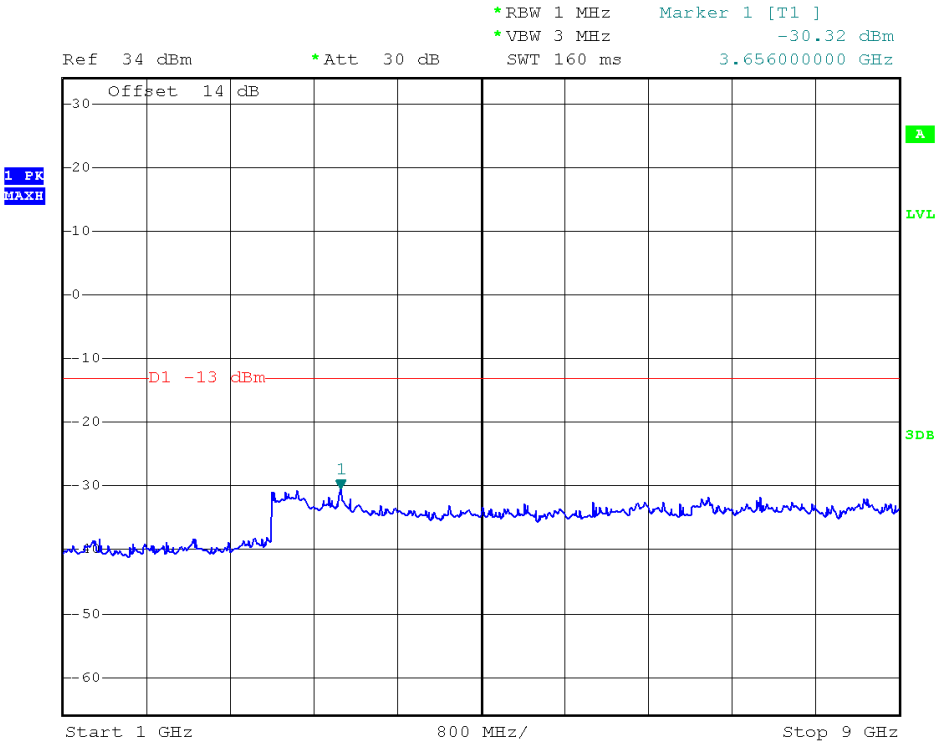


QPSK, (RB Size 1, RB Offset 0 1GHz to 9GHz)

Band	LTE Band 5	Channel	High
Bandwidth	10MHz	Modulation	QPSK

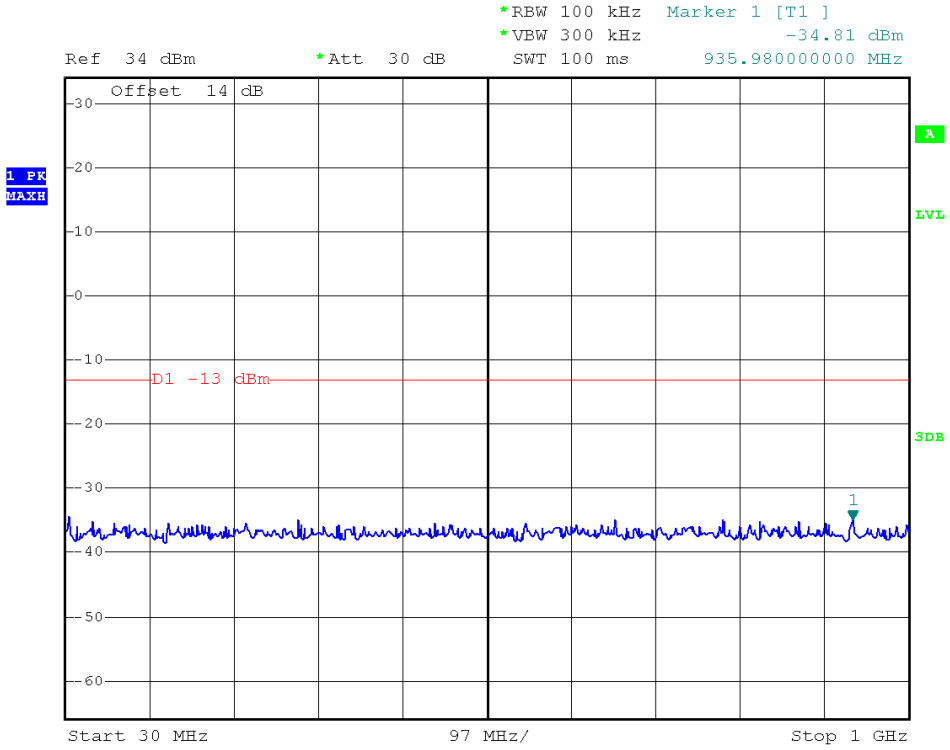


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

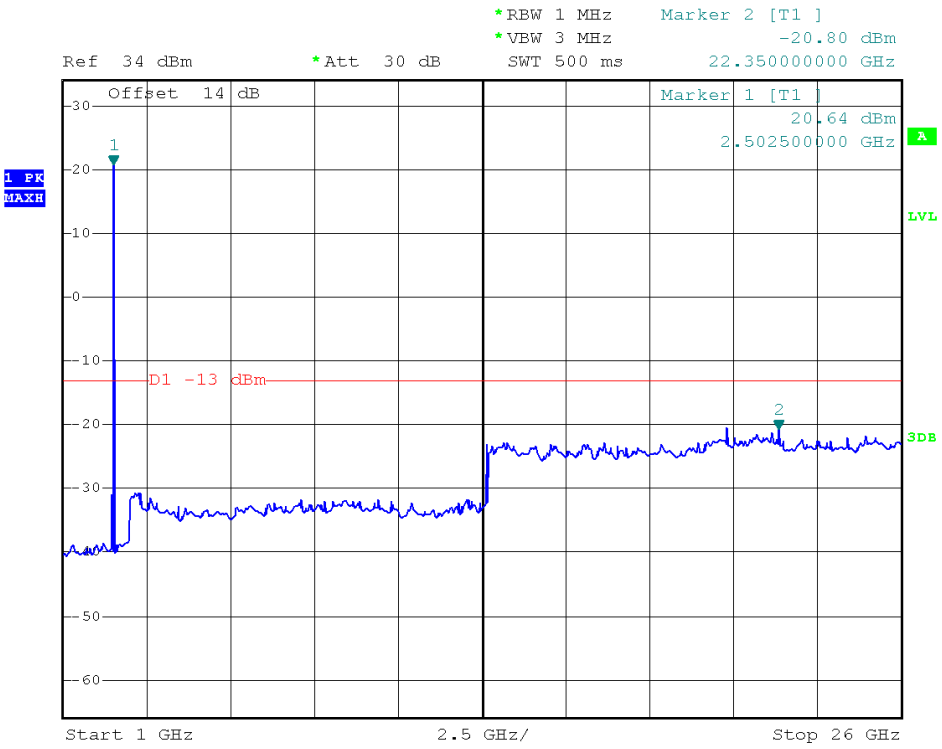


QPSK, (RB Size 1, RB Offset 0 1GHz to 9GHz)

Band	LTE Band 7	Channel:	Low
Bandwidth	5MHz	Modulation	QPSK

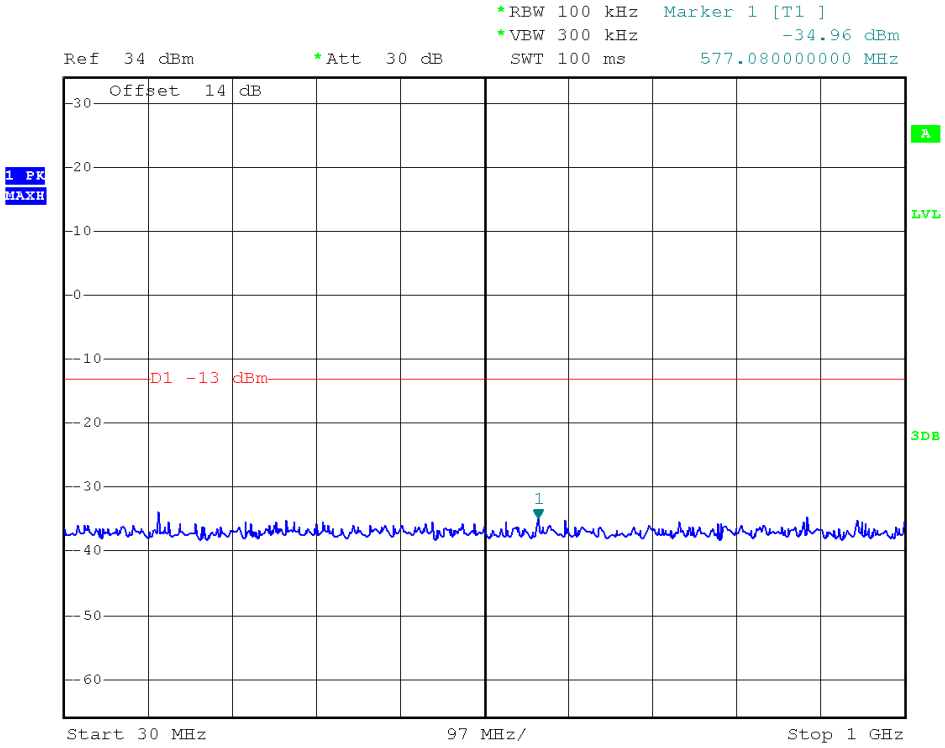


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

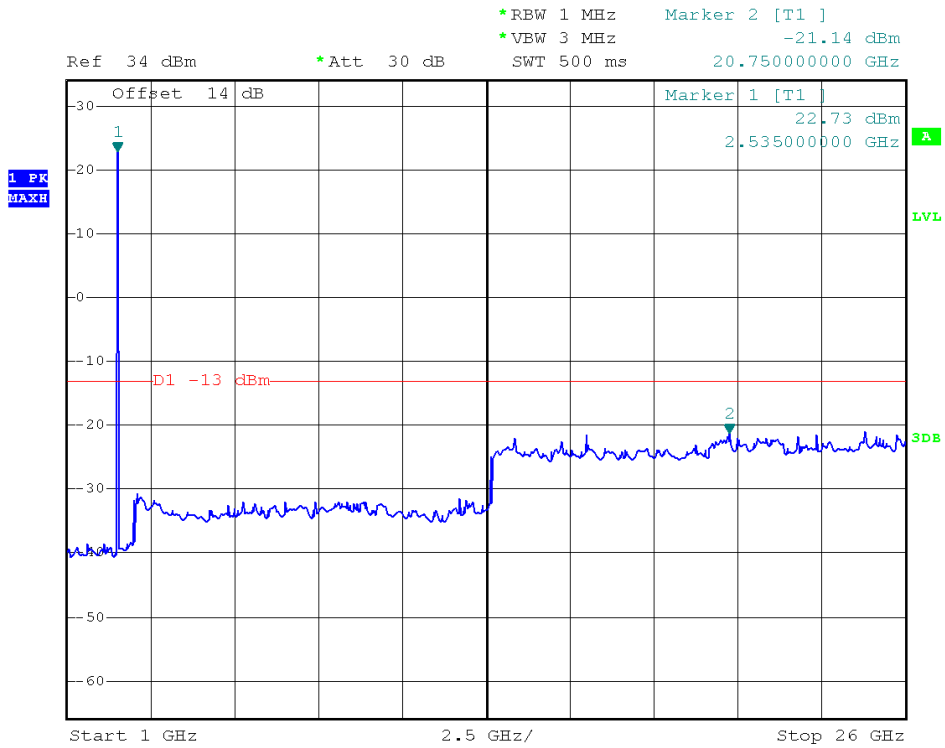


QPSK, (RB Size 1, RB Offset 0 1GHz to 26GHz)

Band	LTE Band 7	Channel	Middle
Bandwidth	5MHz	Modulation	QPSK

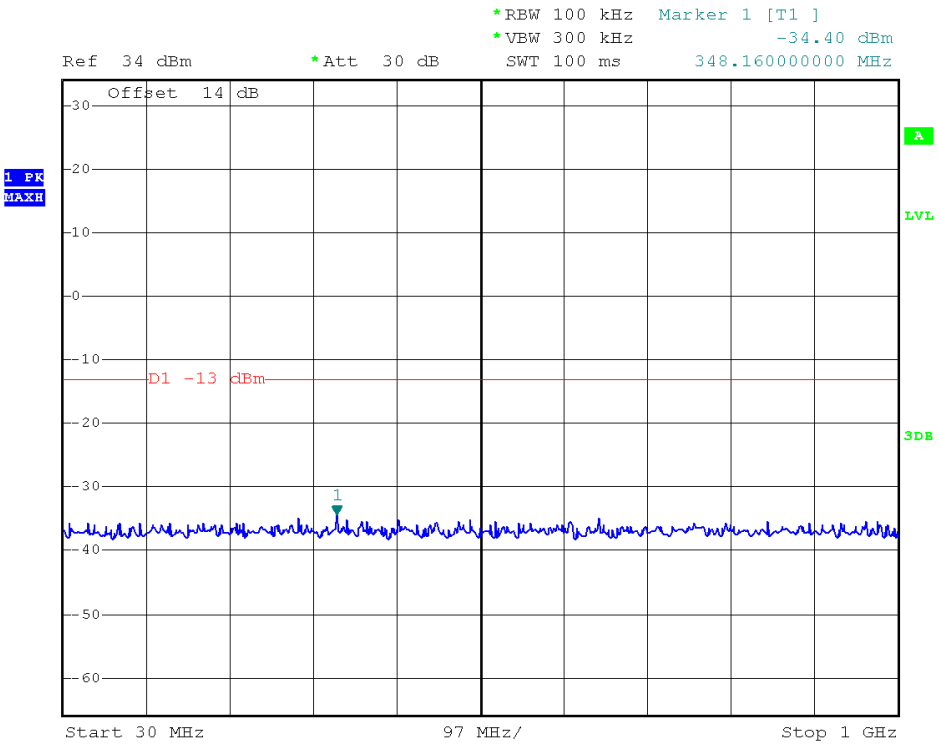


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

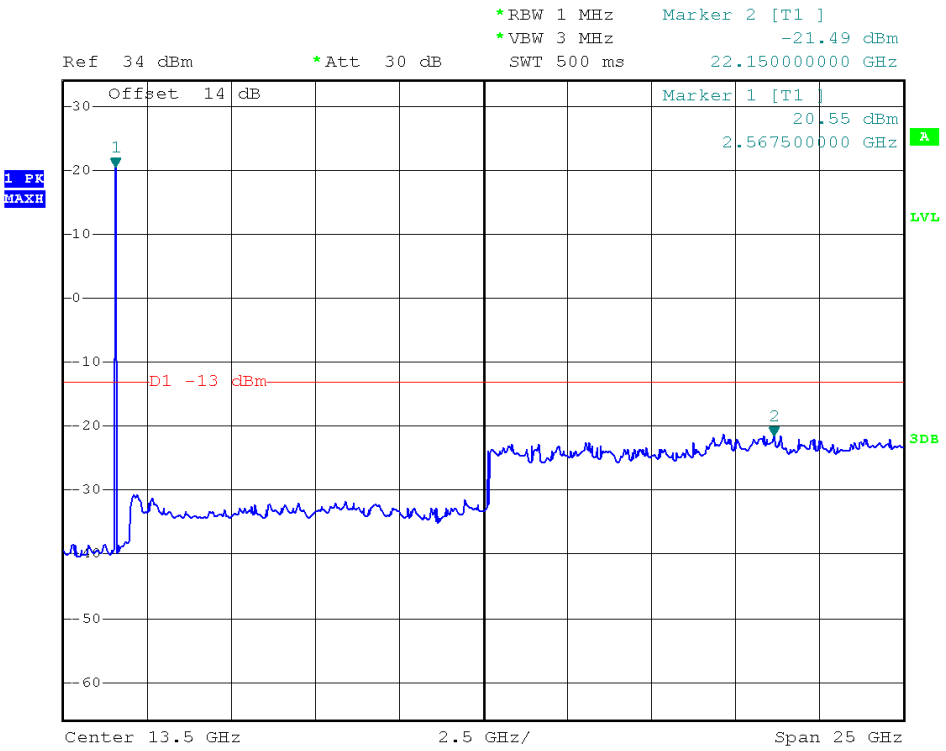


QPSK, (RB Size 1, RB Offset 0 1GHz to 26GHz)

Band	LTE Band 7	Channel	High
Bandwidth	5MHz	Modulation	QPSK

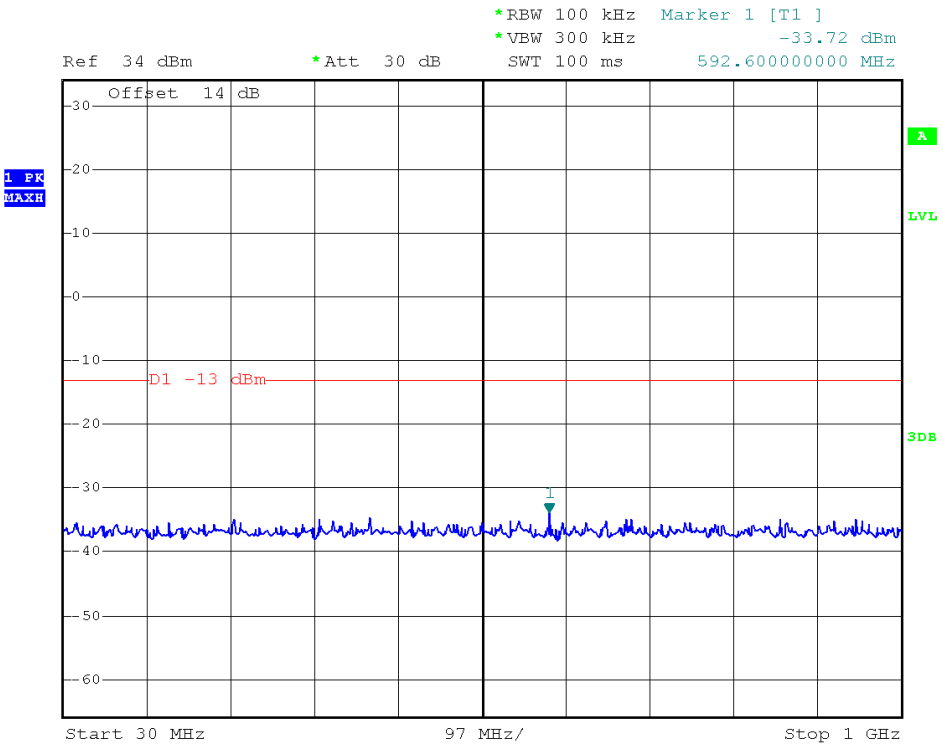


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

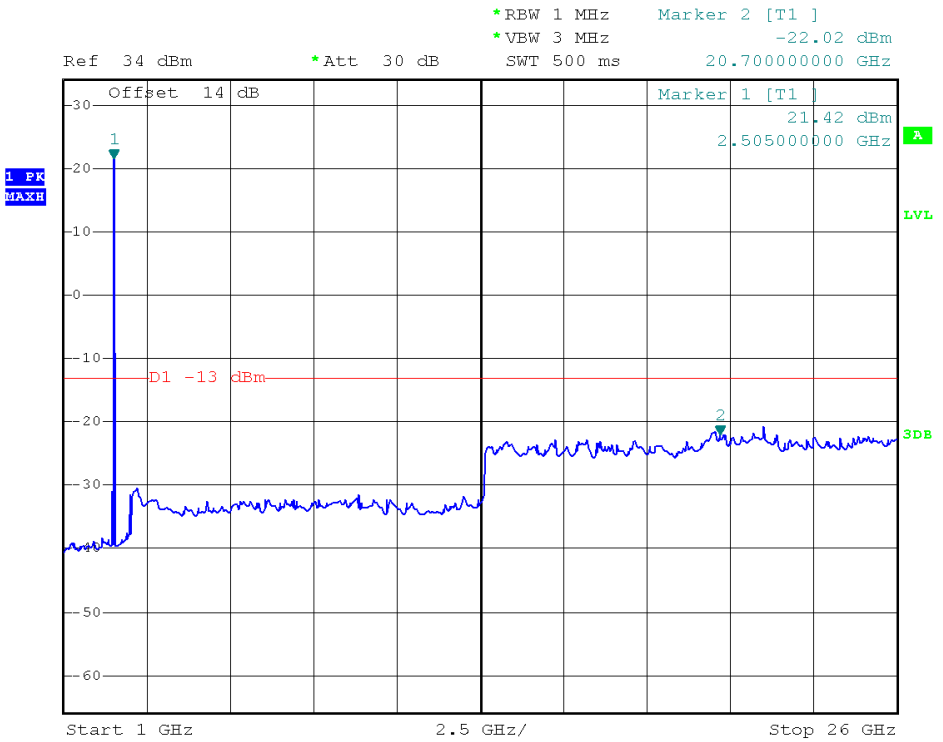


QPSK, (RB Size 1, RB Offset 0 1GHz to 26GHz)

Band	LTE Band 7	Channel:	Low
Bandwidth	10MHz	Modulation	QPSK

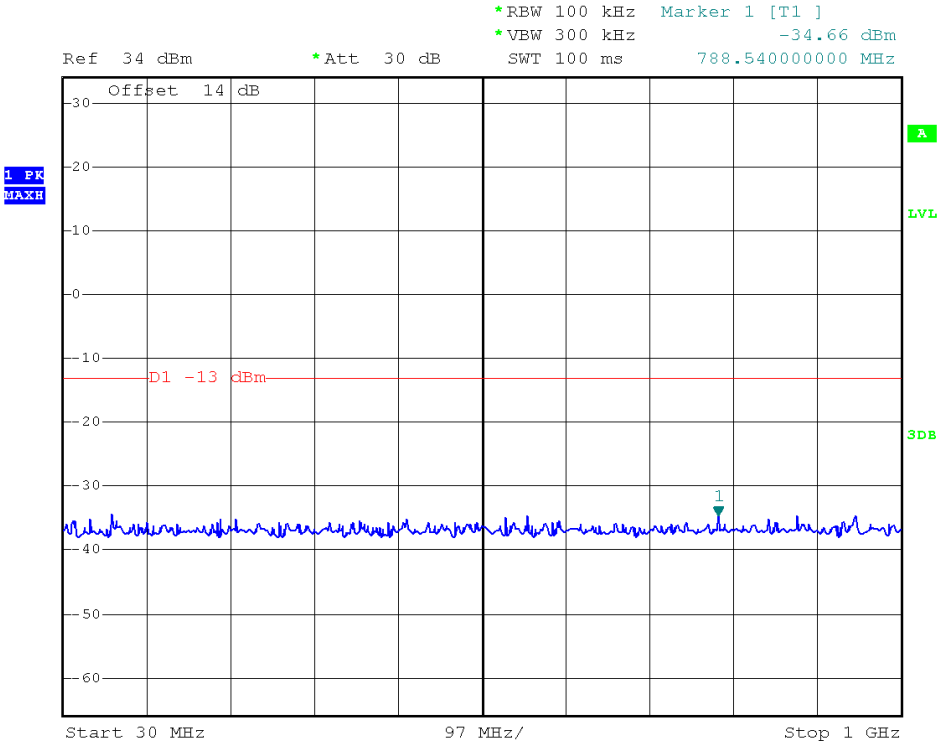


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

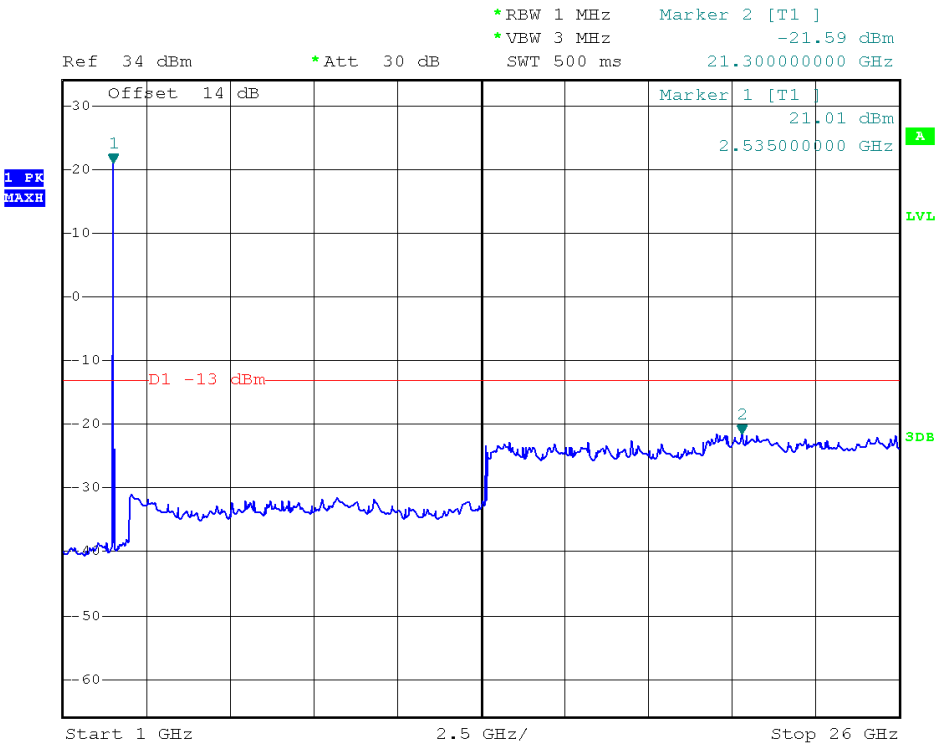


QPSK, (RB Size 1, RB Offset 0 1GHz to 26GHz)

Band	LTE Band 7	Channel	Middle
Bandwidth	10MHz	Modulation	QPSK

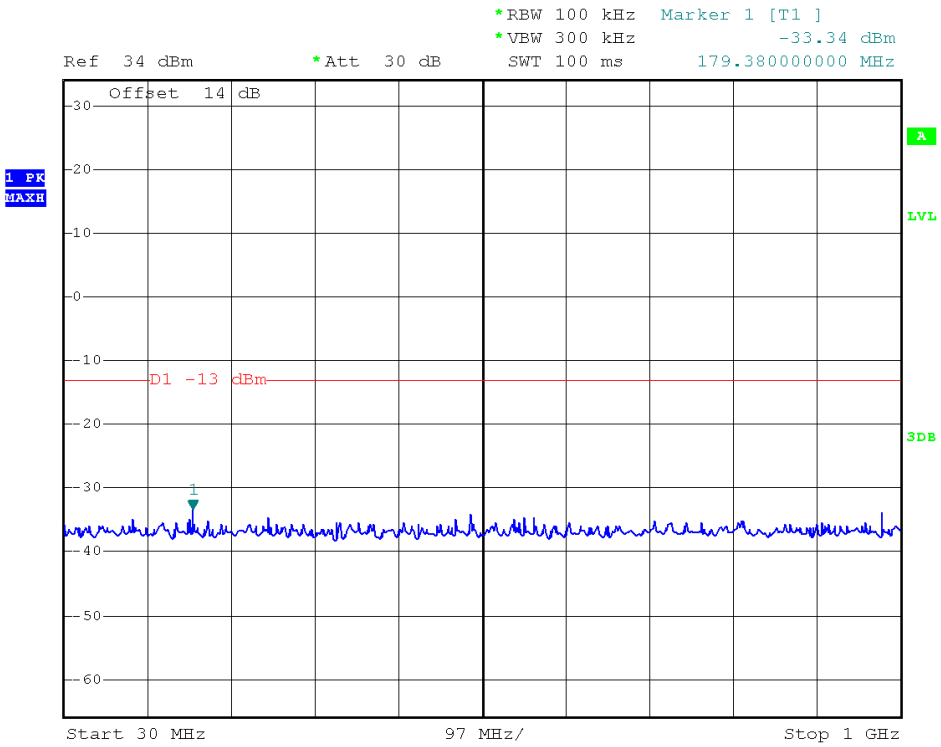


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

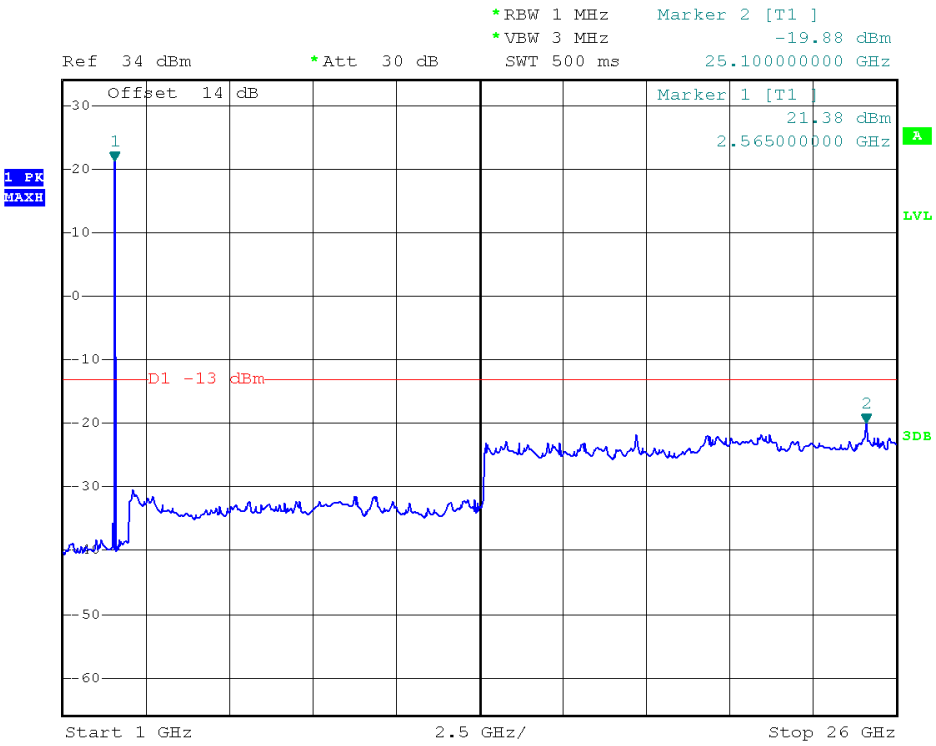


QPSK, (RB Size 1, RB Offset 0 1GHz to 26GHz)

Band	LTE Band 7	Channel	High
Bandwidth	10MHz	Modulation	QPSK

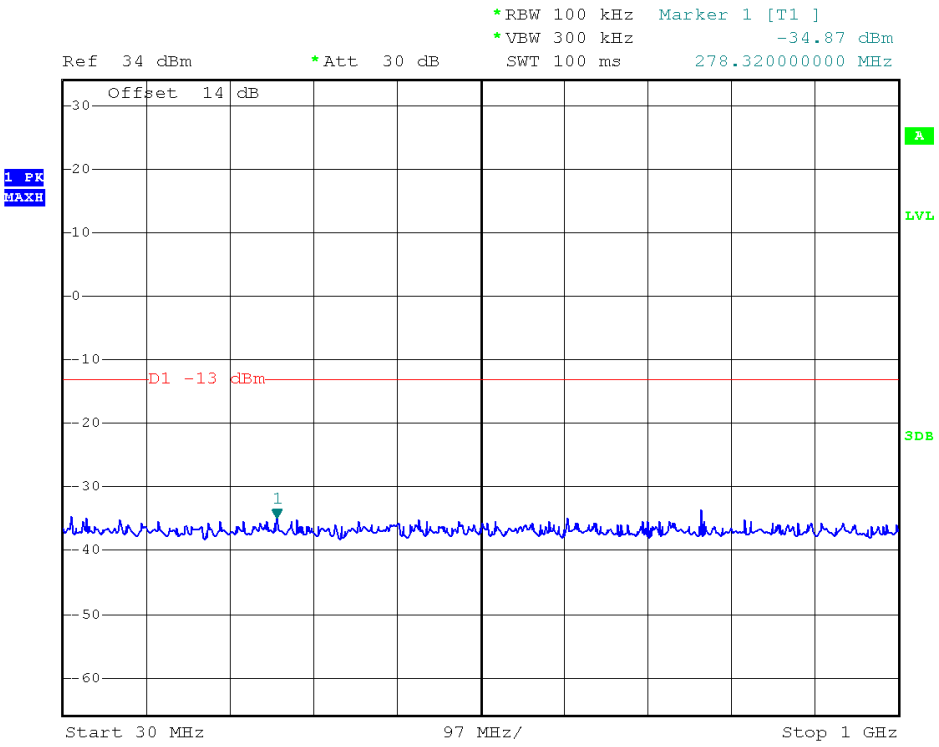


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

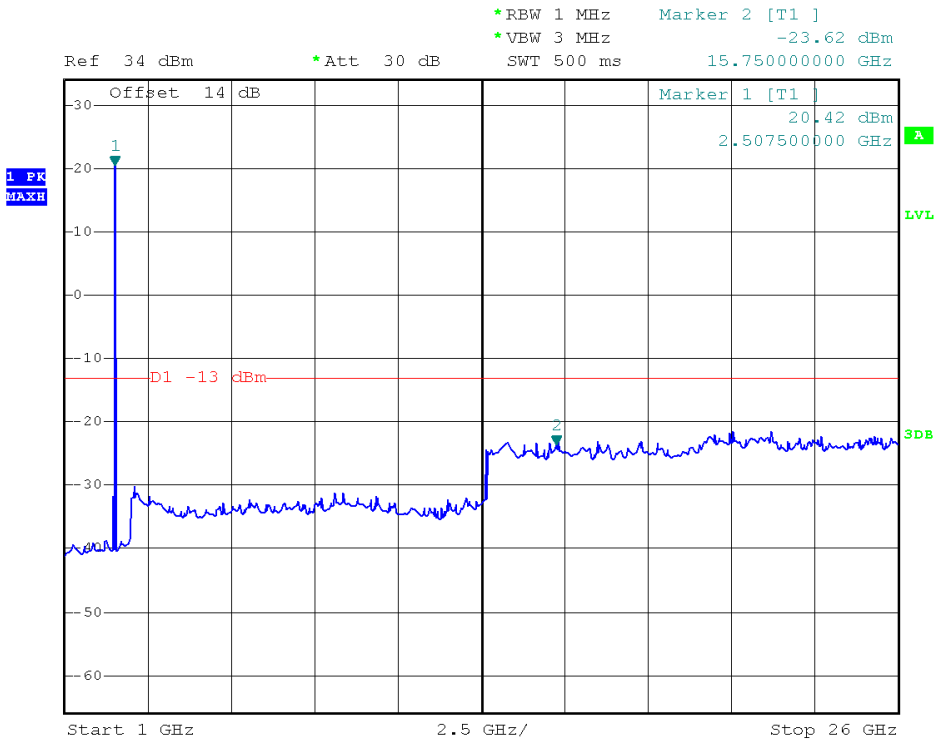


QPSK, (RB Size 1, RB Offset 0 1GHz to 26GHz)

Band	LTE Band 7	Channel:	Low
Bandwidth	15MHz	Modulation	QPSK

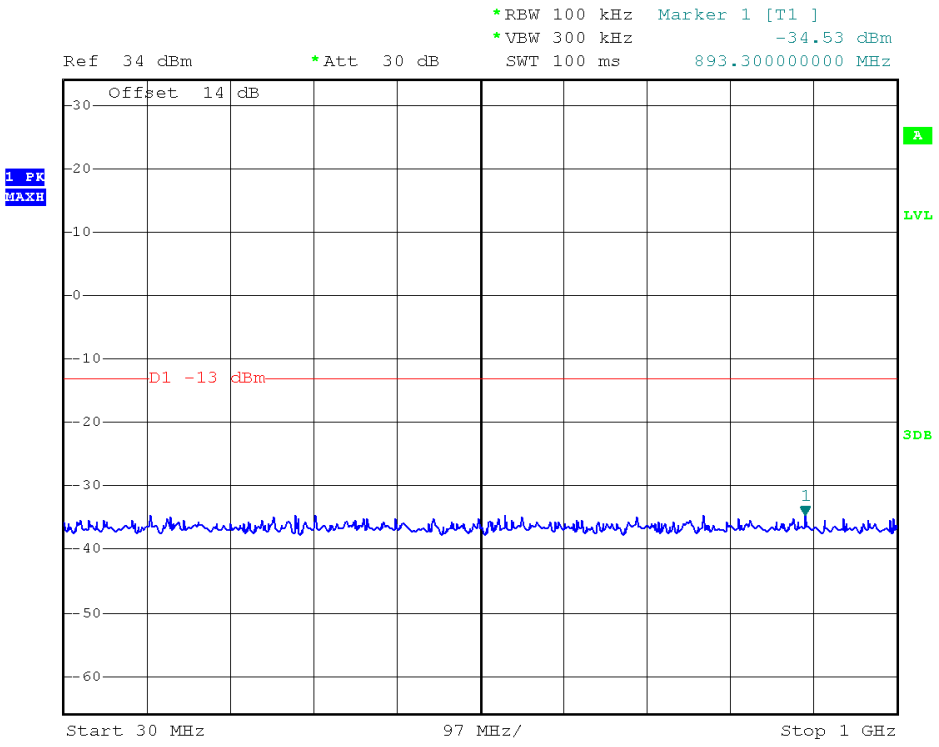


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

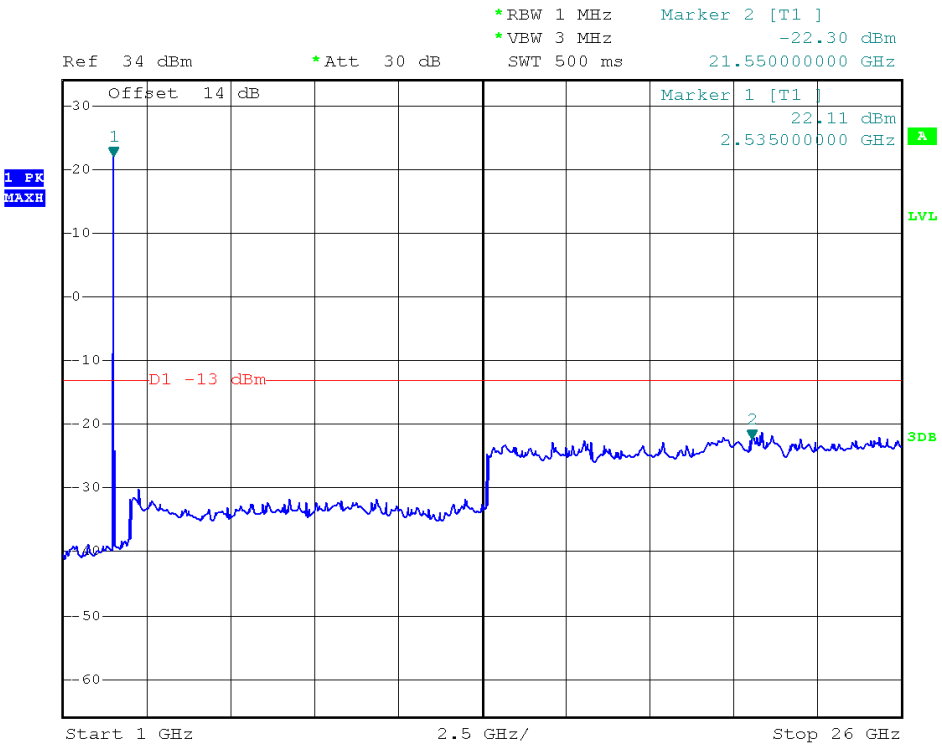


QPSK, (RB Size 1, RB Offset 0 1GHz to 26GHz)

Band	LTE Band 7	Channel	Middle
Bandwidth	15MHz	Modulation	QPSK

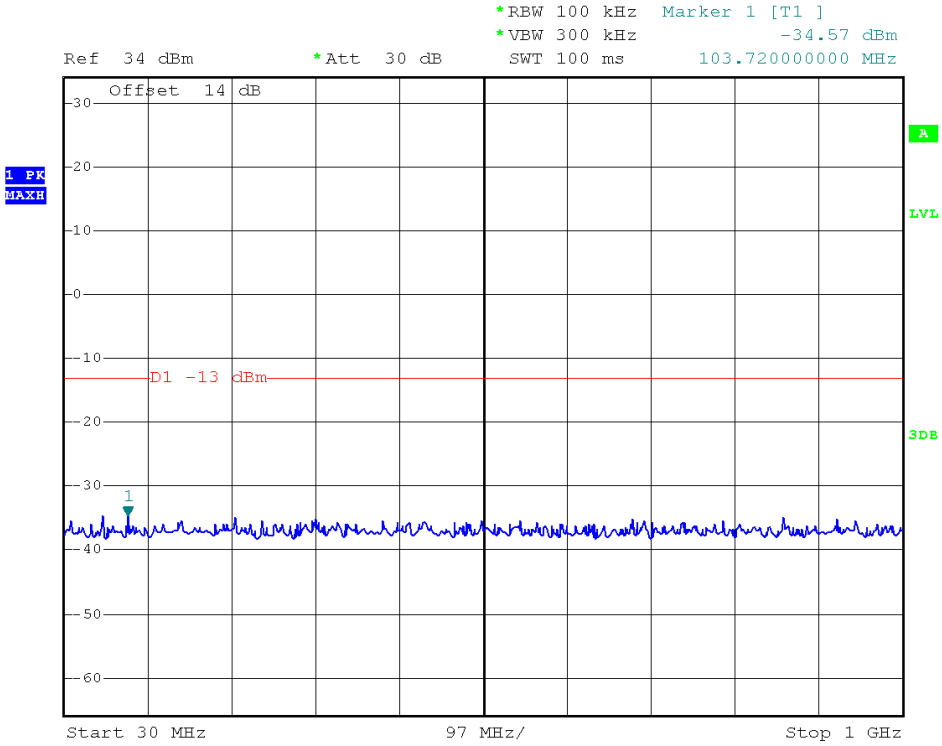


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

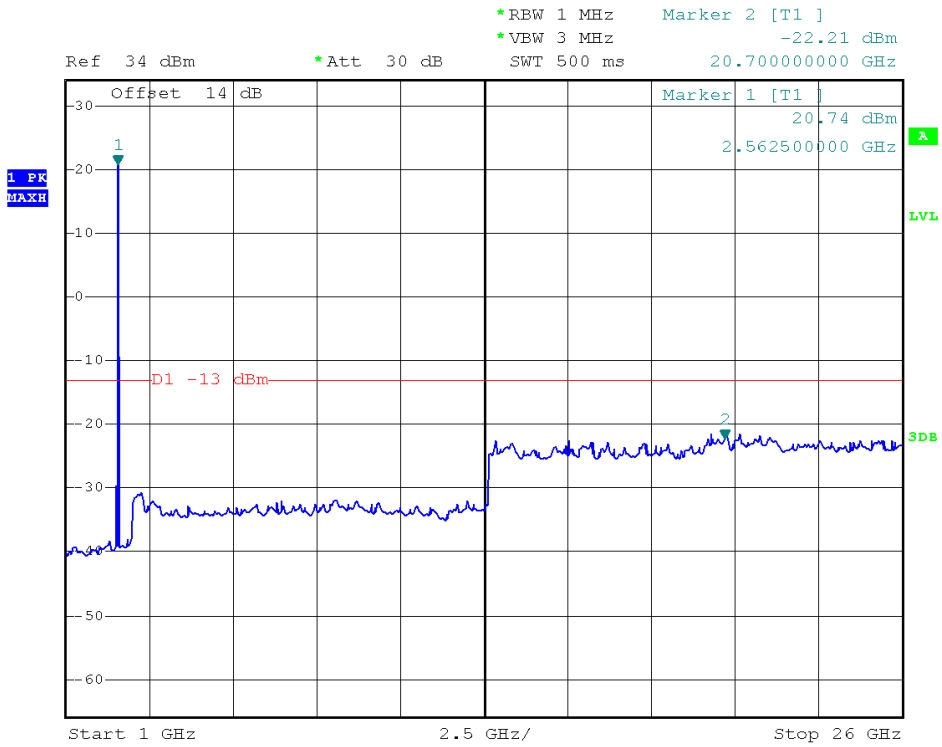


QPSK, (RB Size 1, RB Offset 0 1GHz to 26GHz)

Band	LTE Band 7	Channel	High
Bandwidth	15MHz	Modulation	QPSK

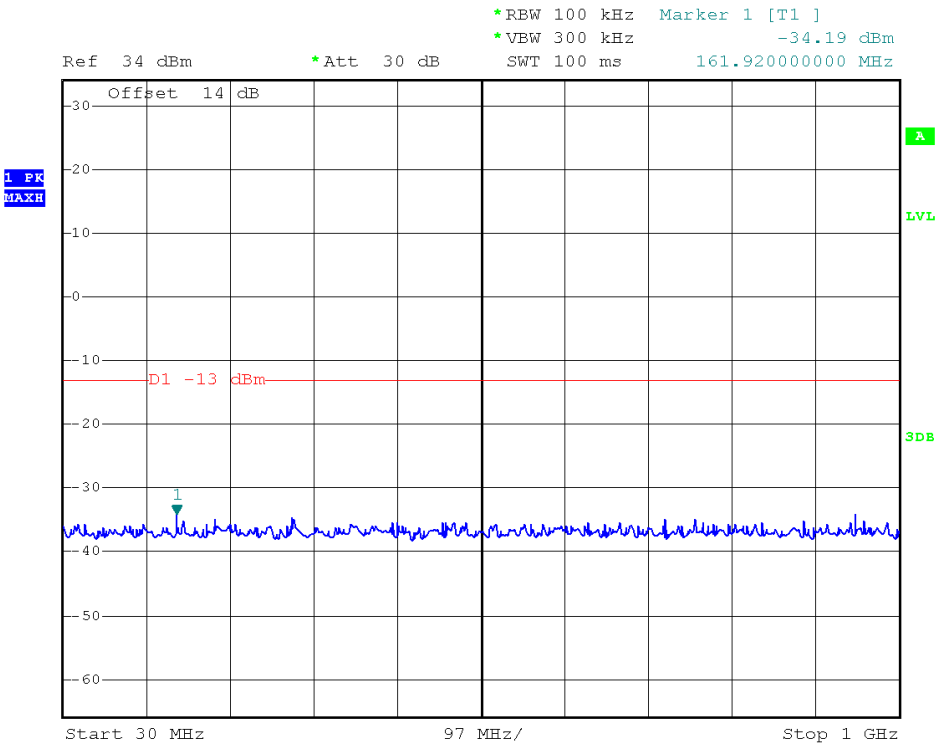


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

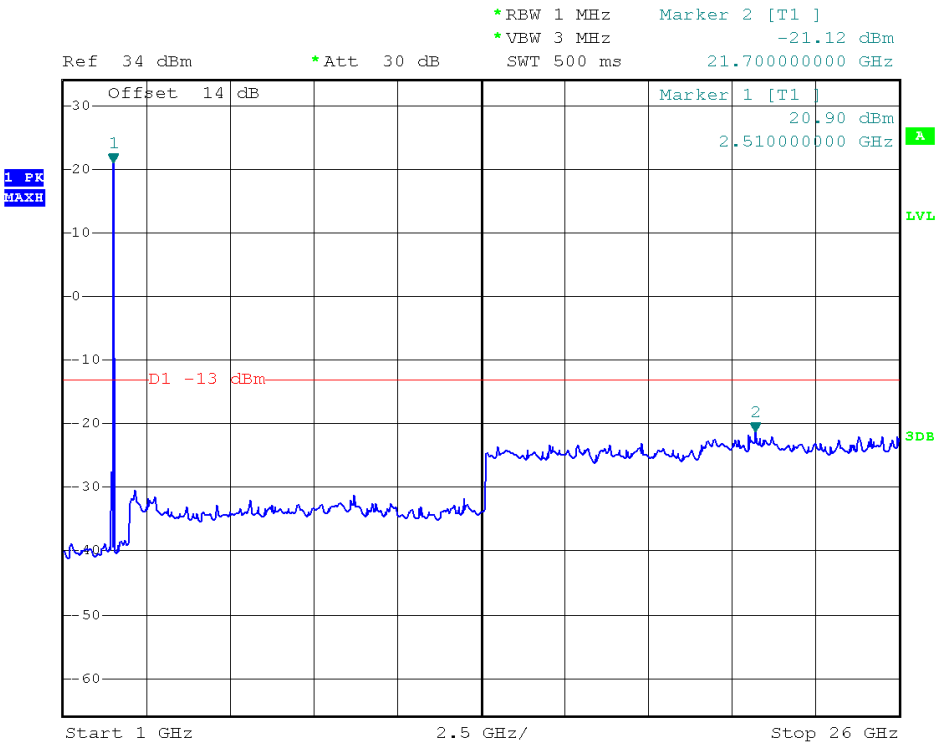


QPSK, (RB Size 1, RB Offset 0 1GHz to 26GHz)

Band	LTE Band 7	Channel:	Low
Bandwidth	20MHz	Modulation	QPSK

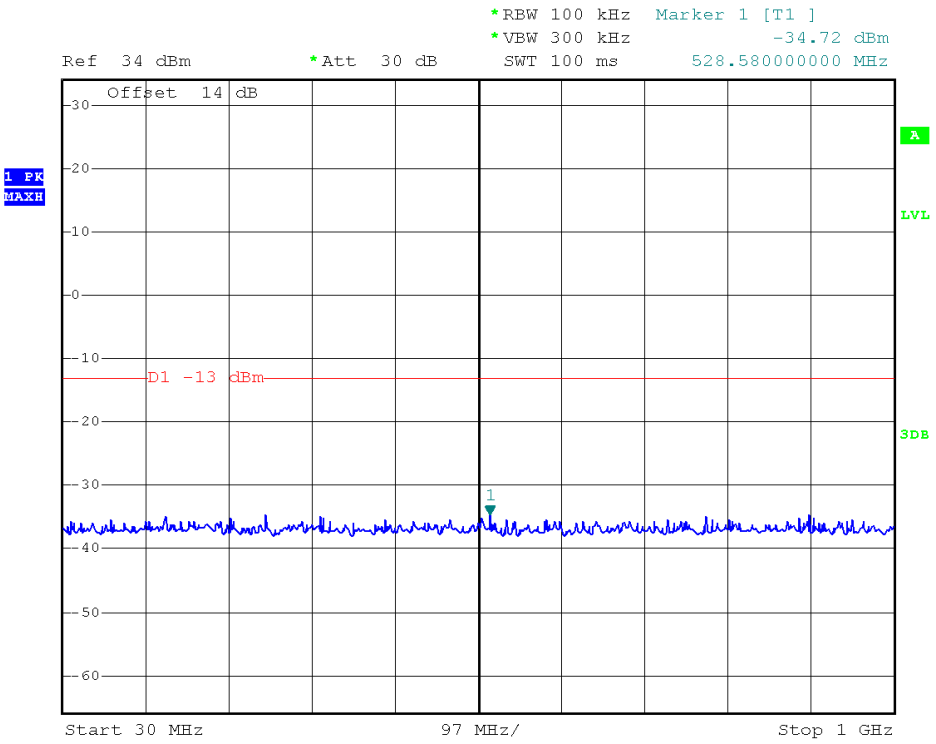


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

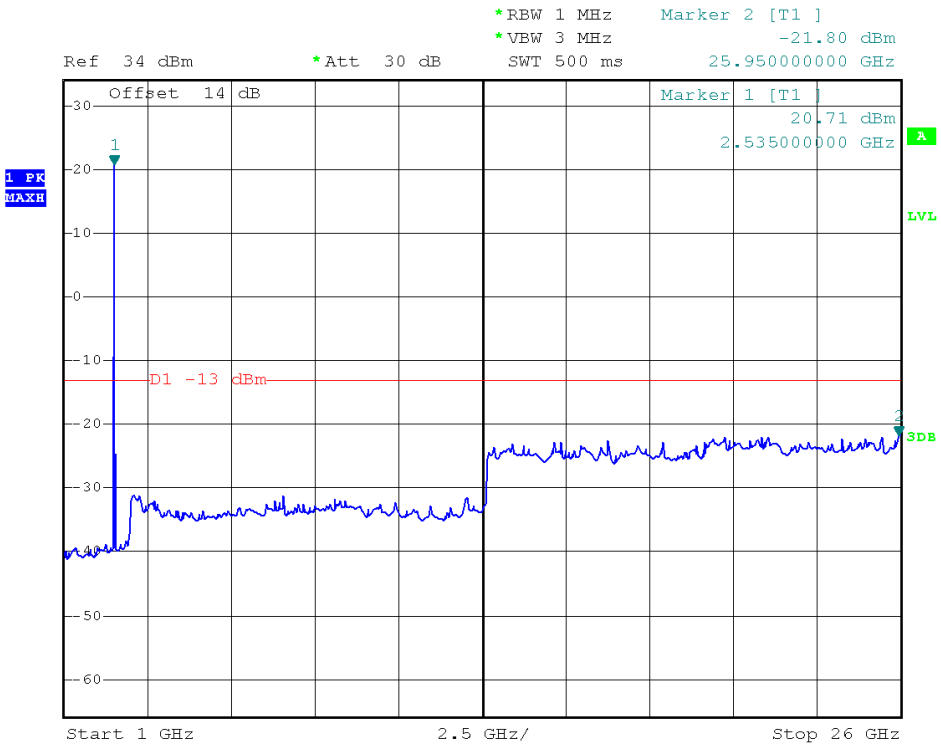


QPSK, (RB Size 1, RB Offset 0 1GHz to 26GHz)

Band	LTE Band 7	Channel	Middle
Bandwidth	20MHz	Modulation	QPSK

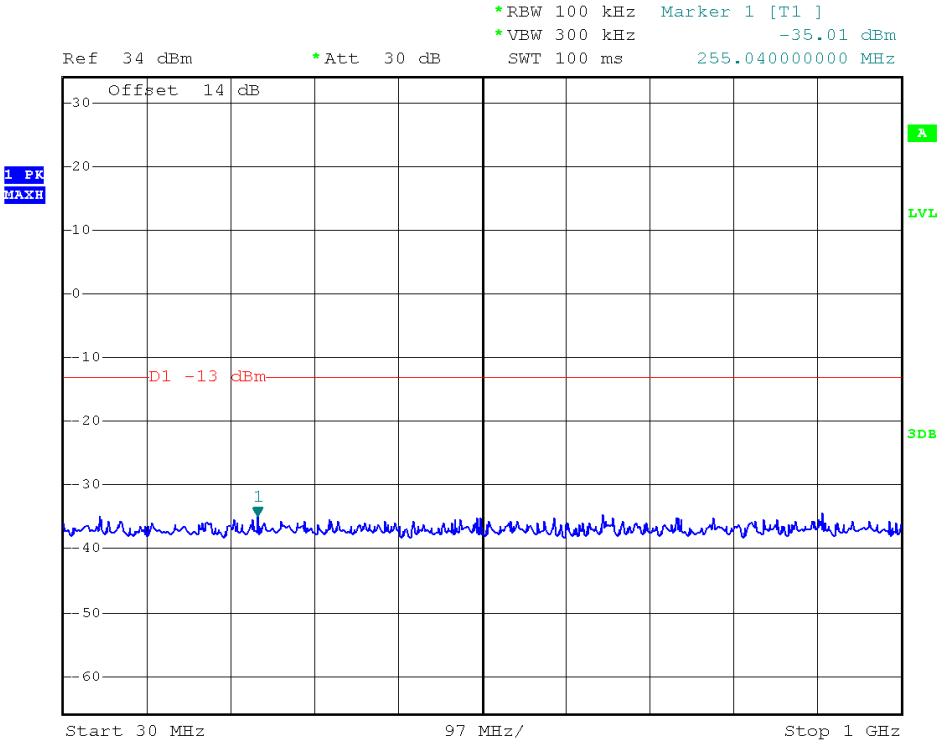


QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)

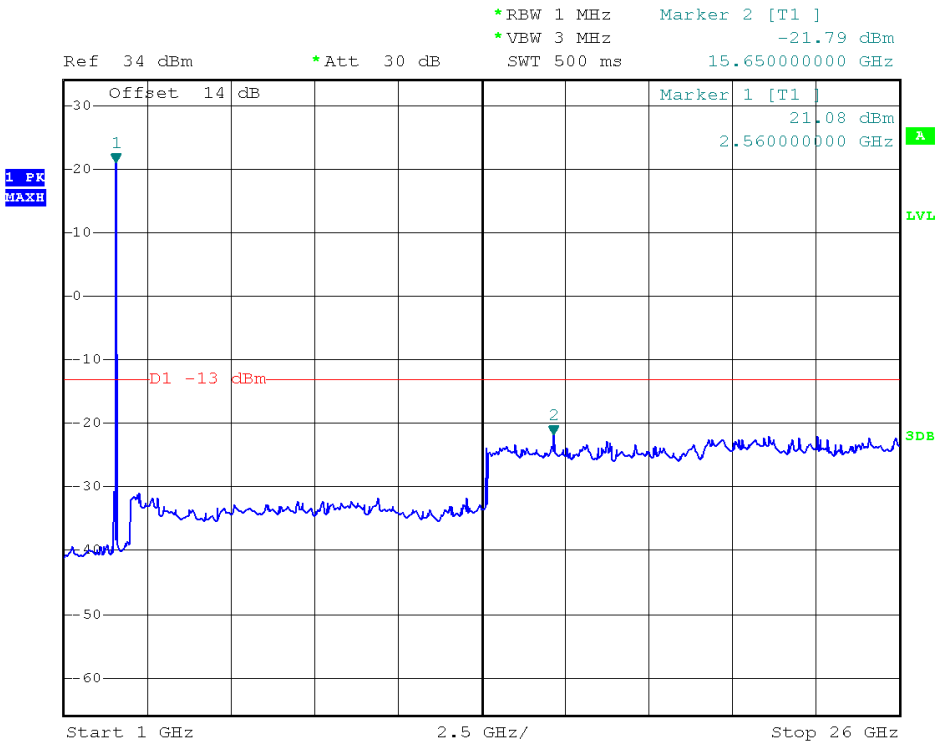


QPSK, (RB Size 1, RB Offset 0 1GHz to 26GHz)

Band	LTE Band 7	Channel	High
Bandwidth	20MHz	Modulation	QPSK



QPSK, (RB Size 1, RB Offset 0 30MHz to 1GHz)



QPSK, (RB Size 1, RB Offset 0 1GHz to 26GHz)

2.6 Conducted Band Edge

2.6.1 Requirement

27.53(g) for Band 17

For operations in the 698 -746 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

27.53(h) for Band 4

For operations in the 1710 – 1755 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

2.6.2 Test Description

See section 2.1.2 of this report.

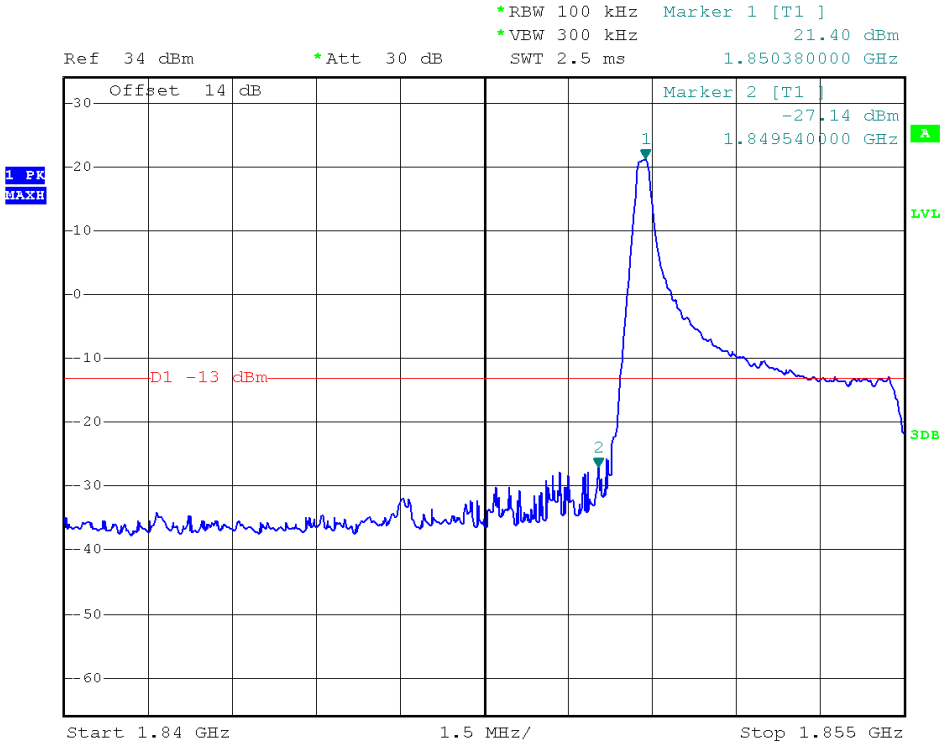
2.6.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with RMS detector.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
5. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

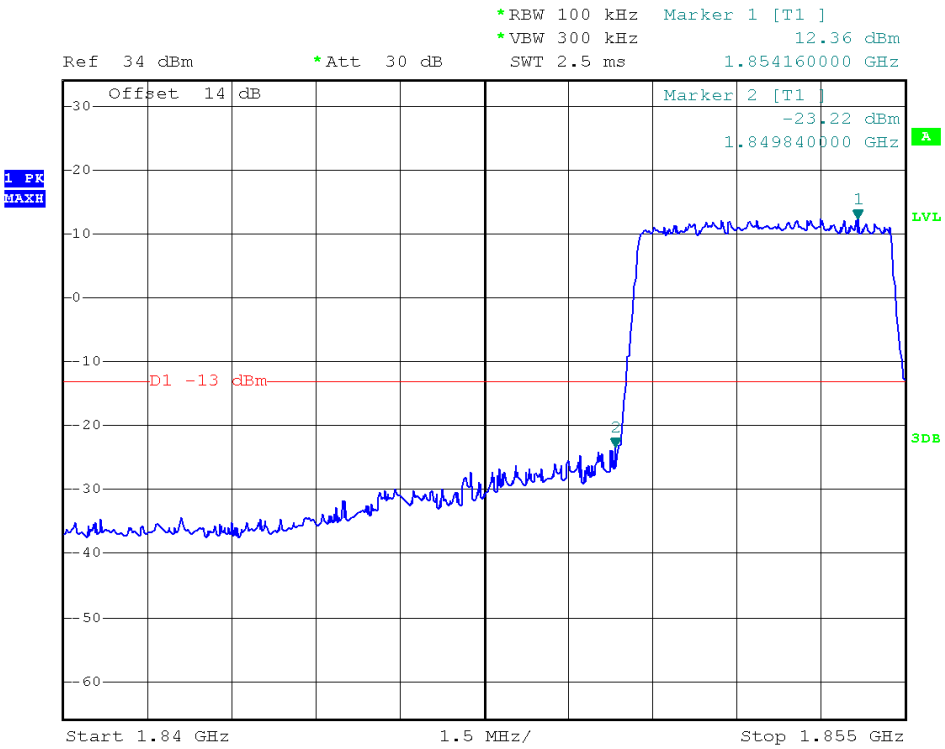
2.6.4 Test Result of Conducted Band Edge

The lowest and highest channels are tested to verify the band edge emissions.

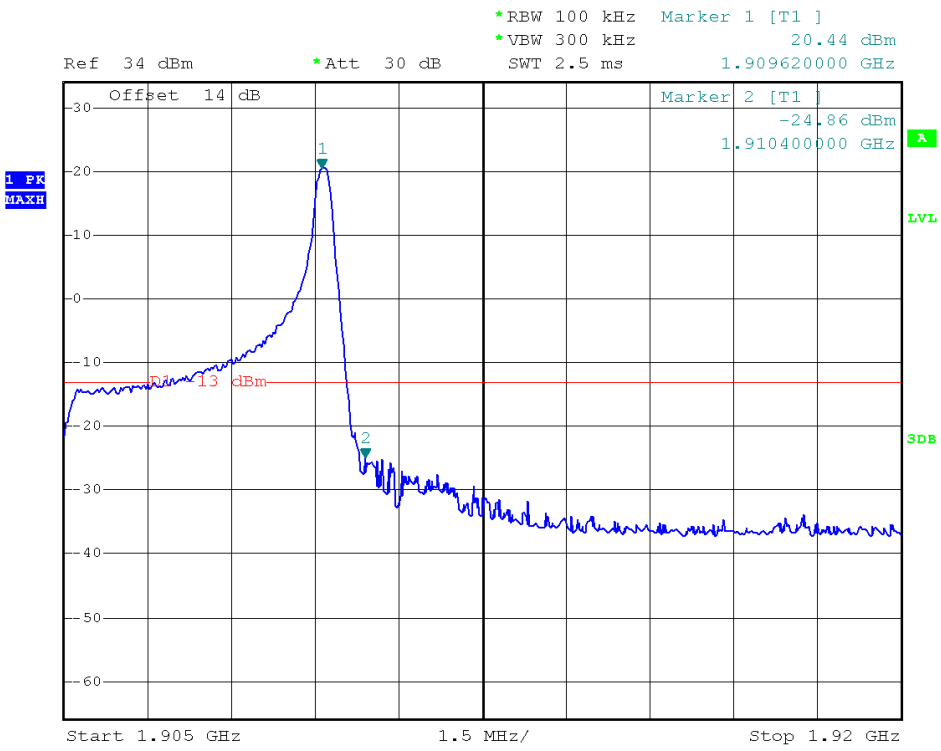
Band	LTE Band 2	Modulation	QPSK
Bandwidth	5MHz		



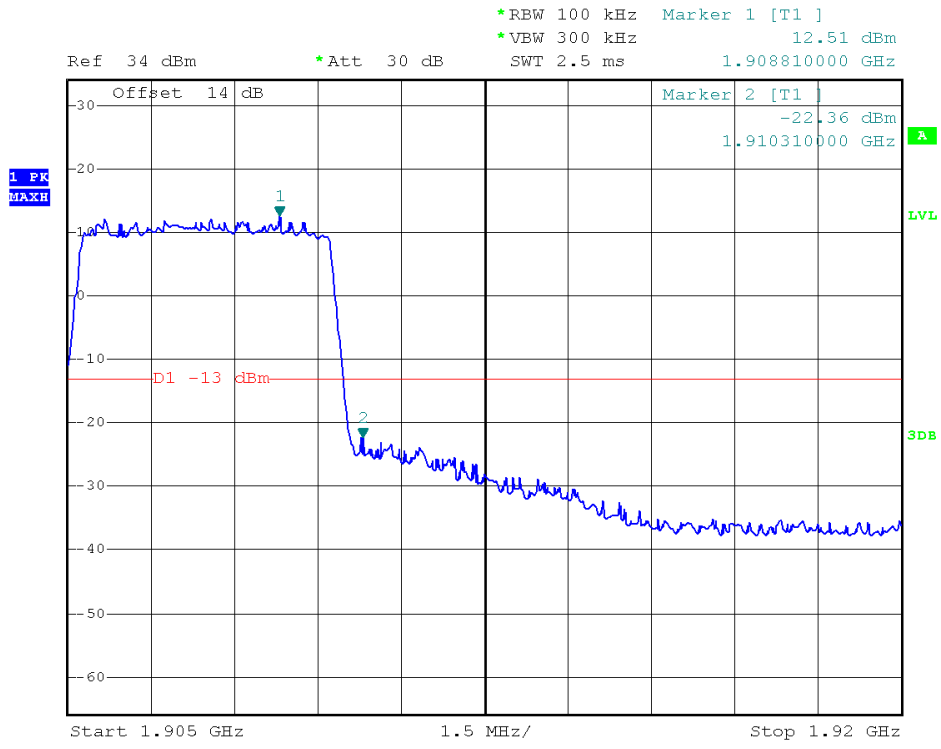
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0

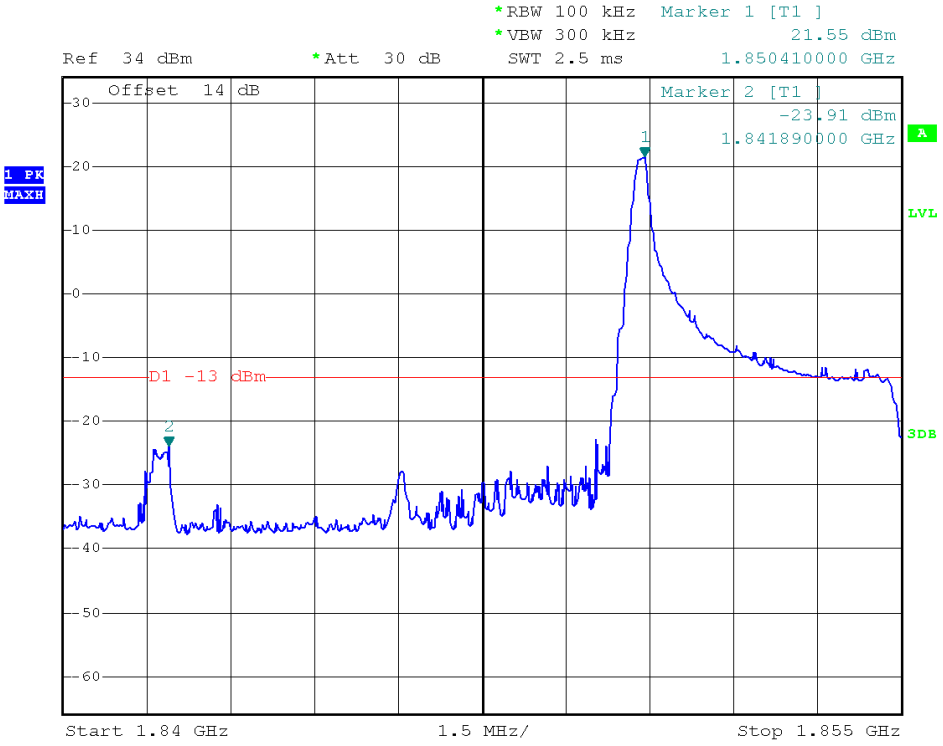


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24

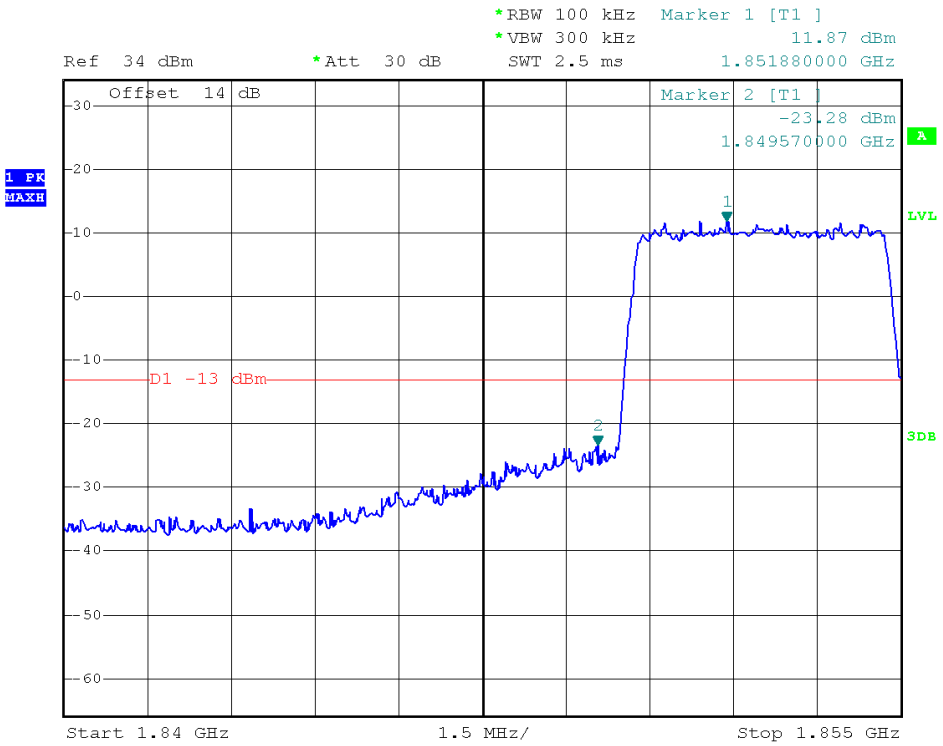


Higher Band Edge Plot for QPSK-RB Size 25, RB Offset 0

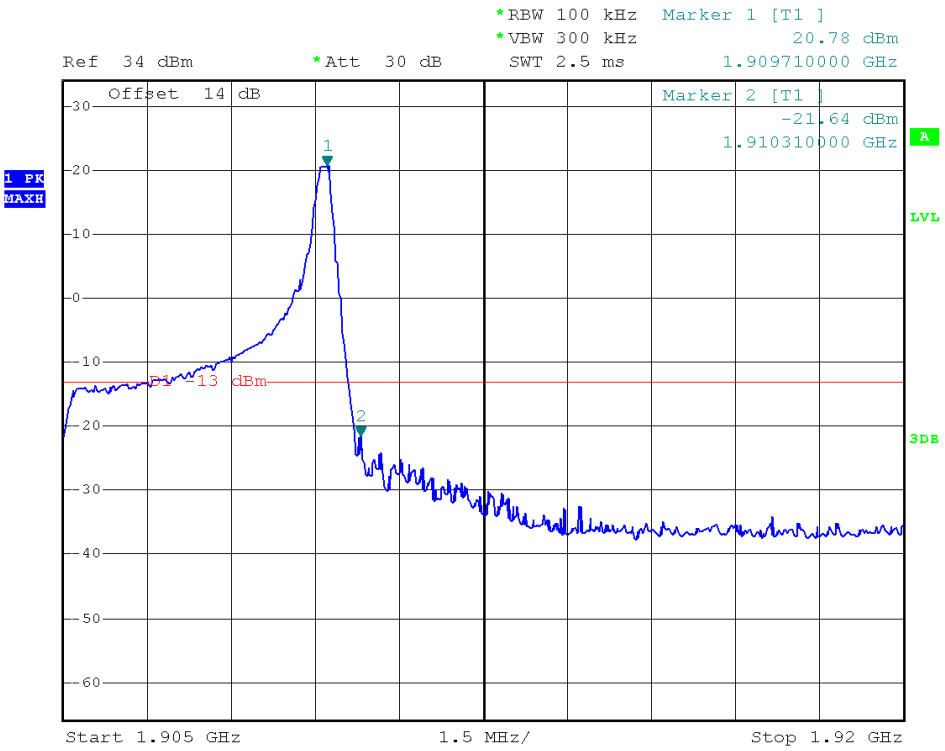
Band	LTE Band 2	Modulation	16QAM
Bandwidth	5MHz		



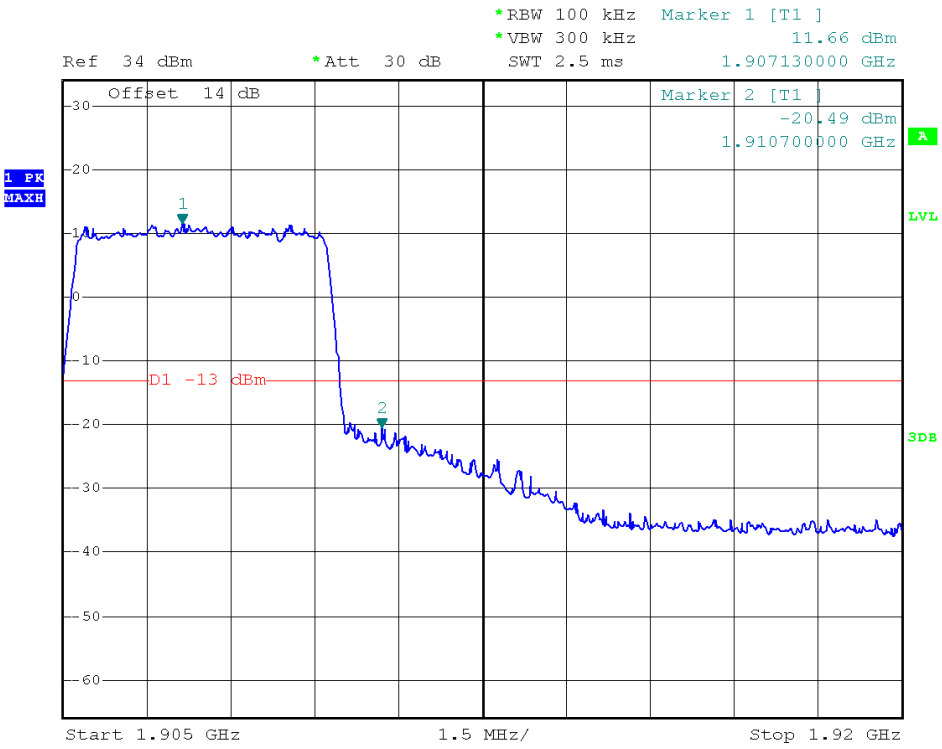
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM-RB Size 25, RB Offset 0

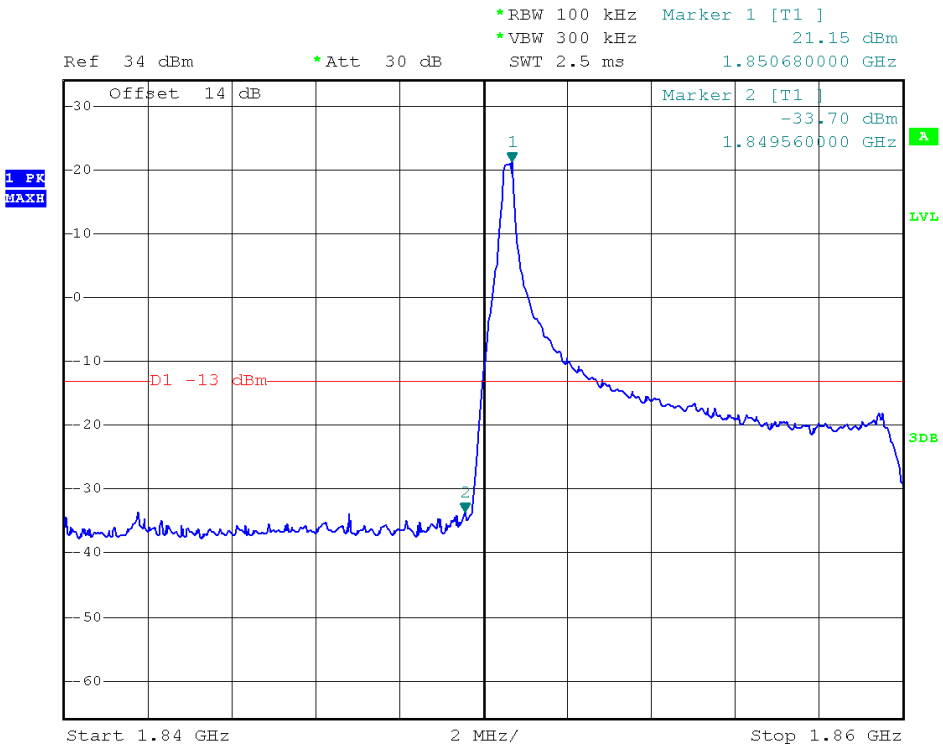


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 24

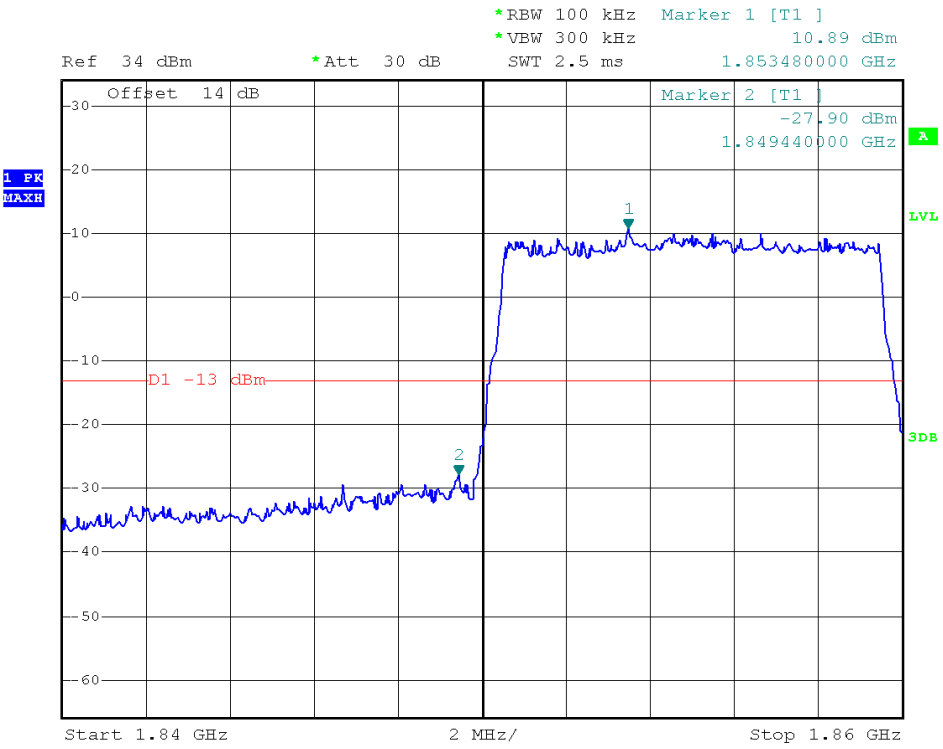


Higher Band Edge Plot for 16QAM-RB Size 25, RB Offset 0

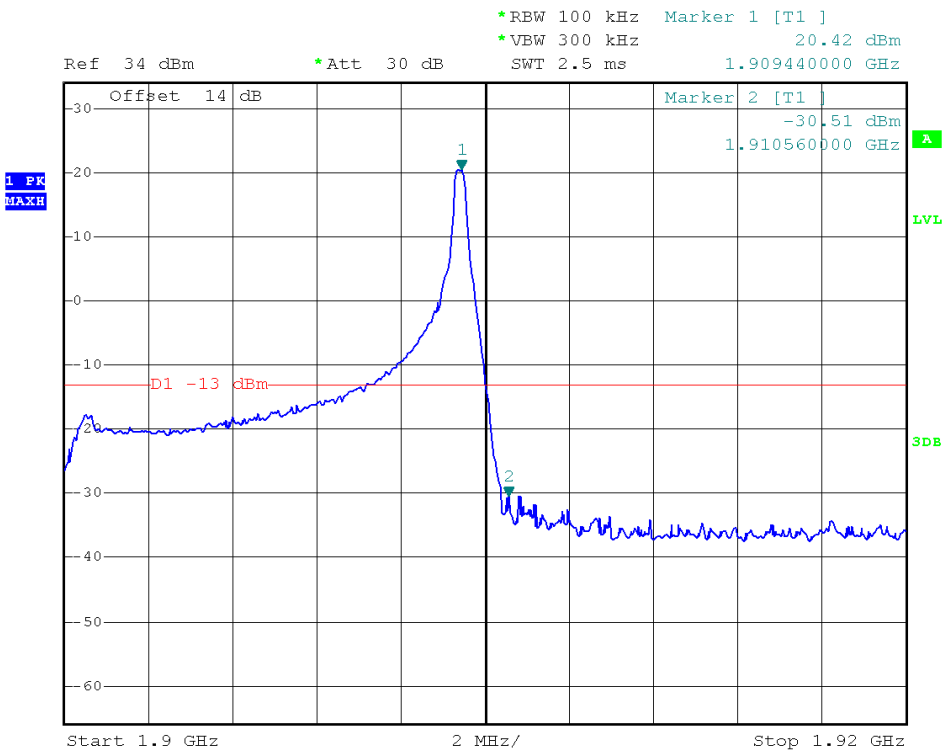
Band	LTE Band 2	Modulation	QPSK
Bandwidth	10MHz		



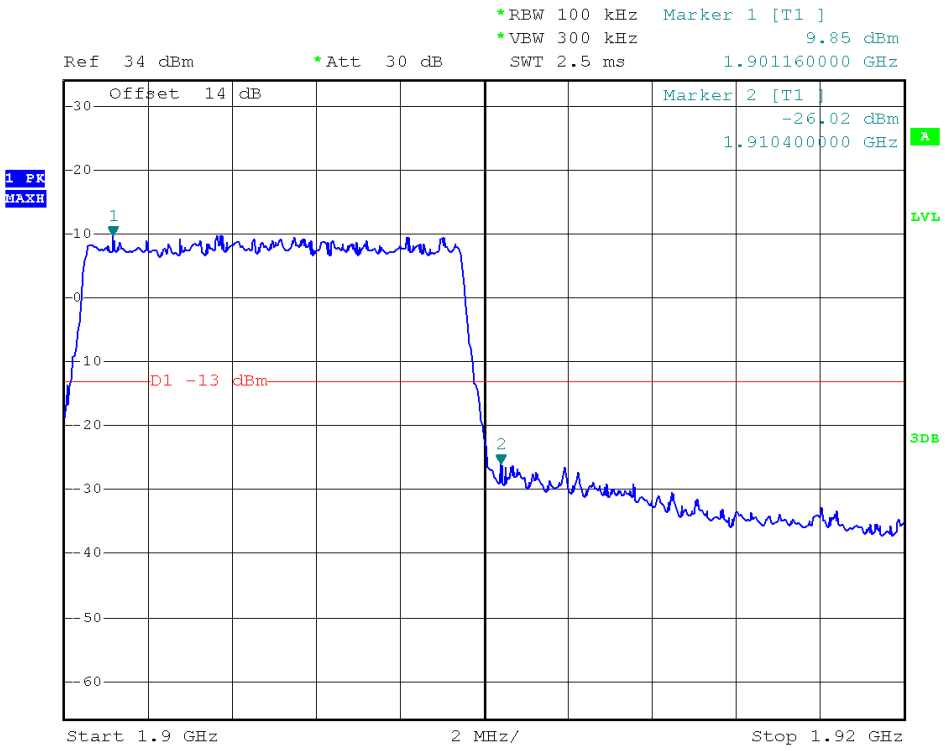
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 50, RB Offset 0

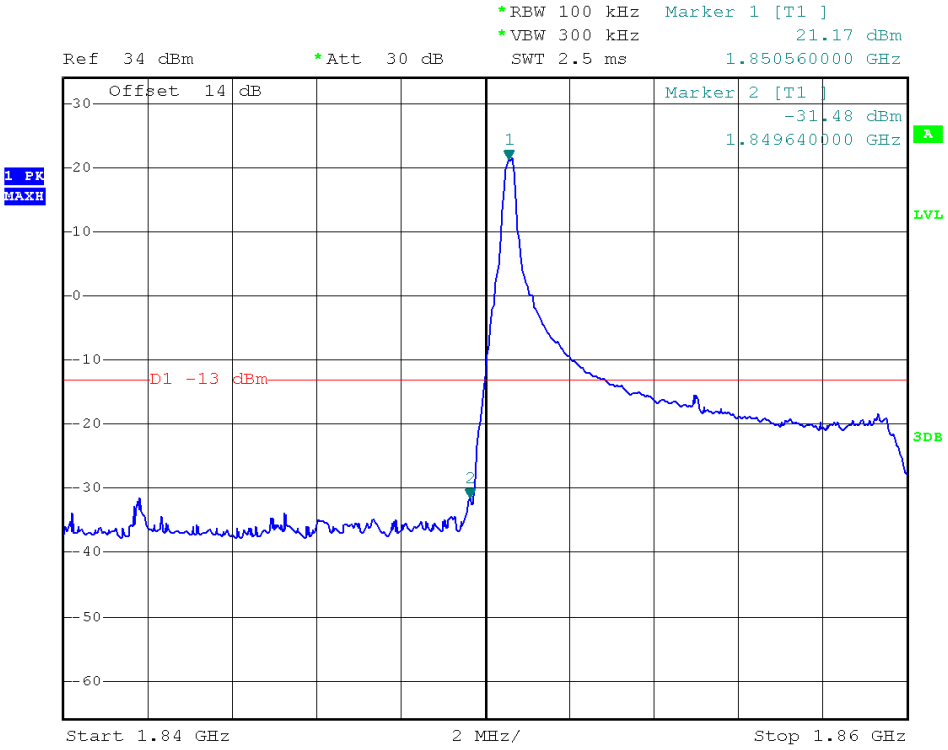


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 49

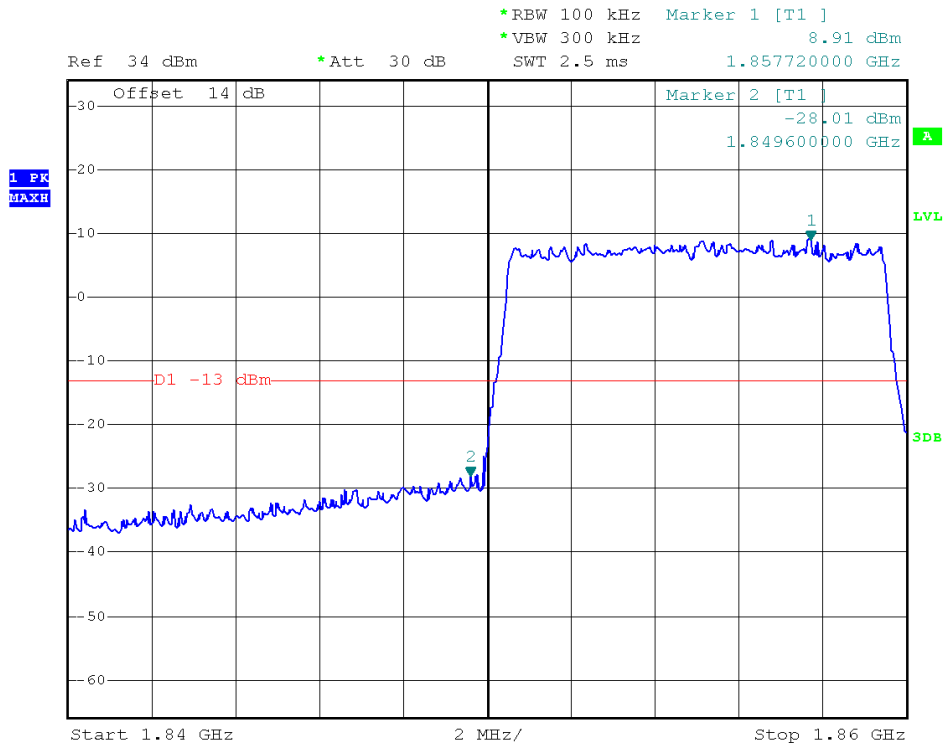


Higher Band Edge Plot for QPSK-RB Size 50, RB Offset 0

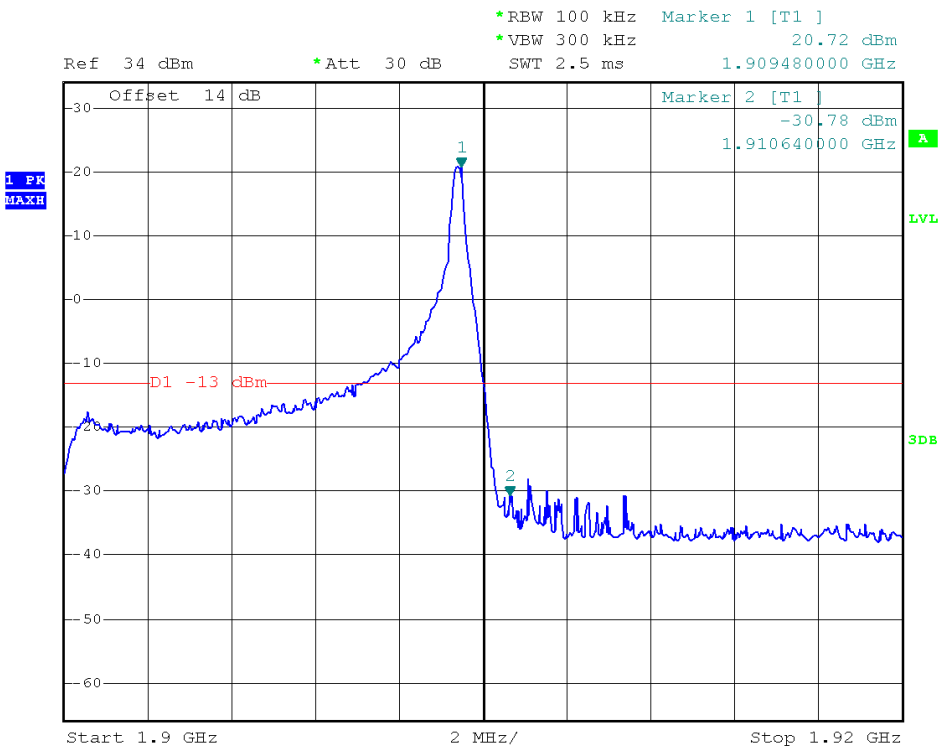
Band	LTE Band 2	Modulation	16QAM
Bandwidth	10MHz		



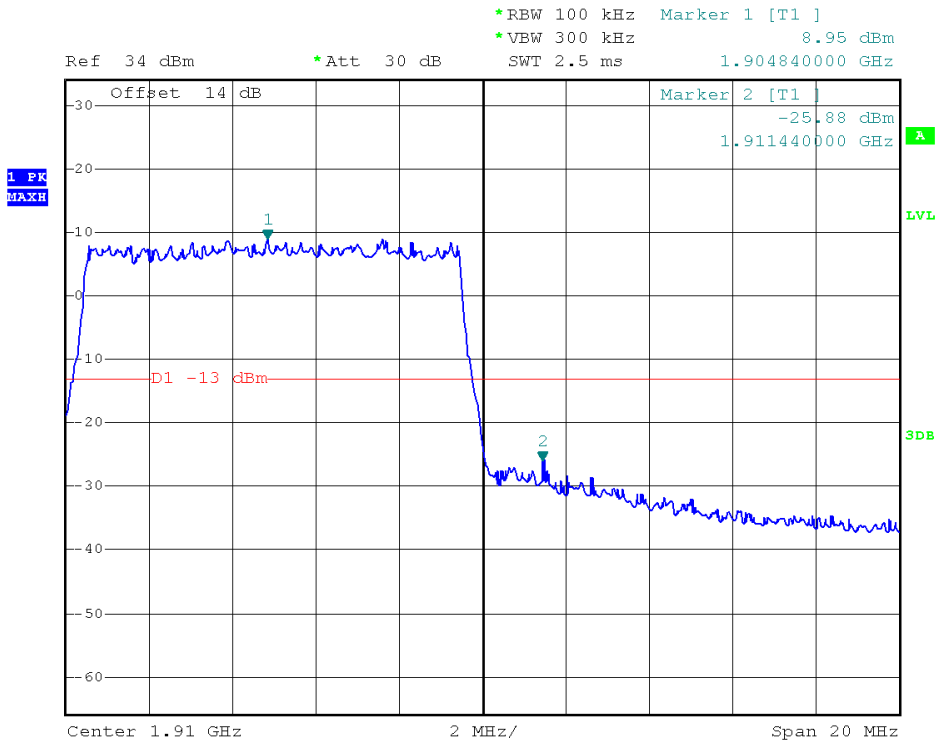
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM-RB Size 50, RB Offset 0

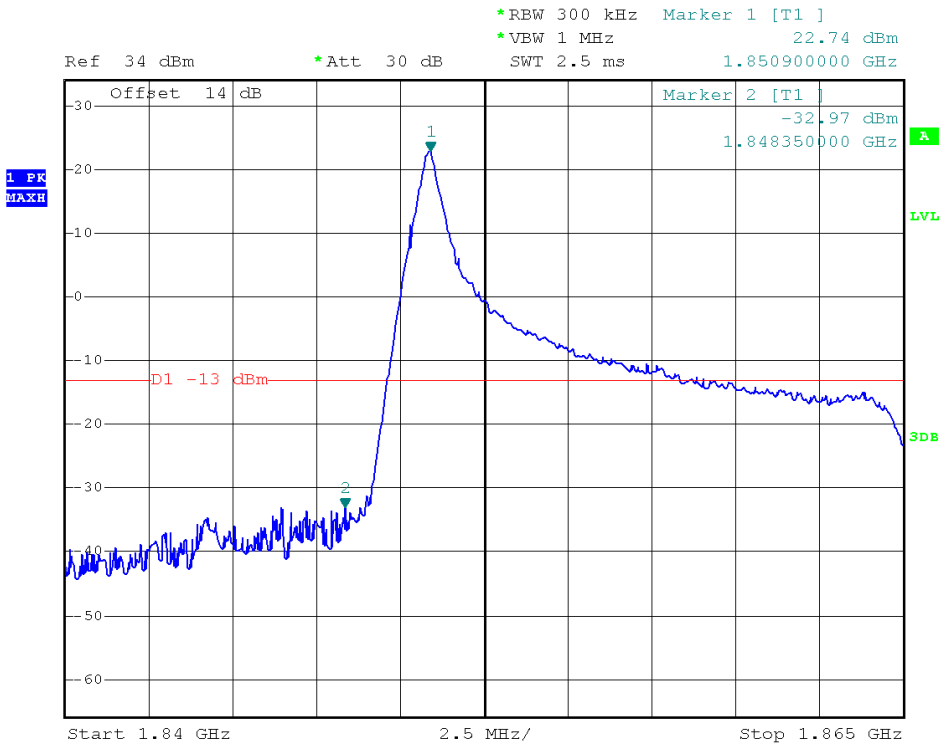


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 49

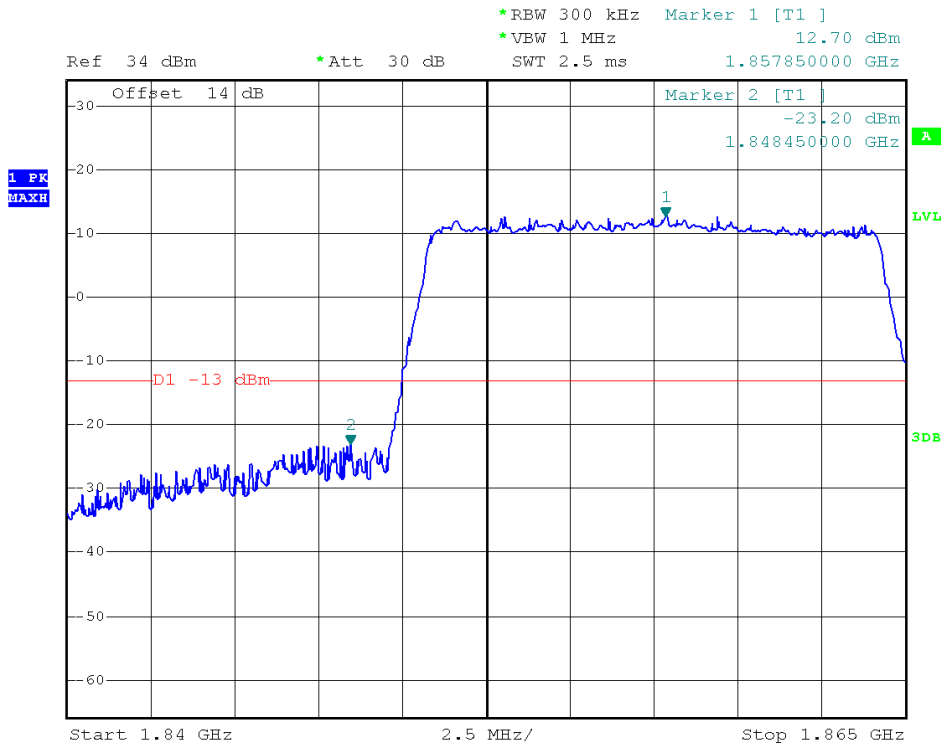


Higher Band Edge Plot for 16QAM-RB Size 50, RB Offset 0

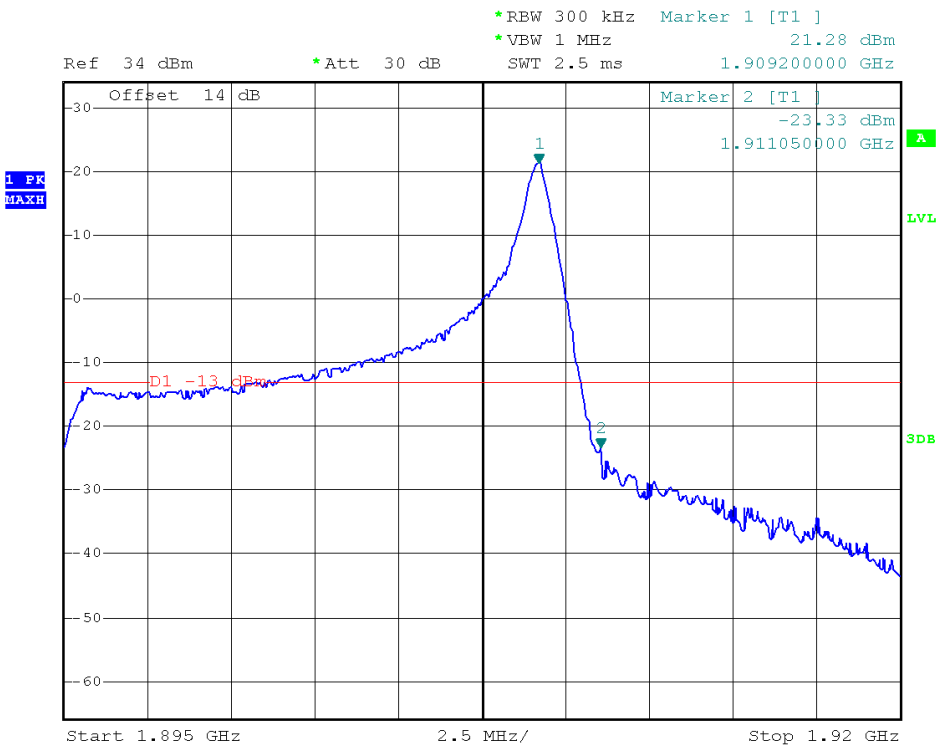
Band	LTE Band 2	Modulation	QPSK
Bandwidth	15MHz		



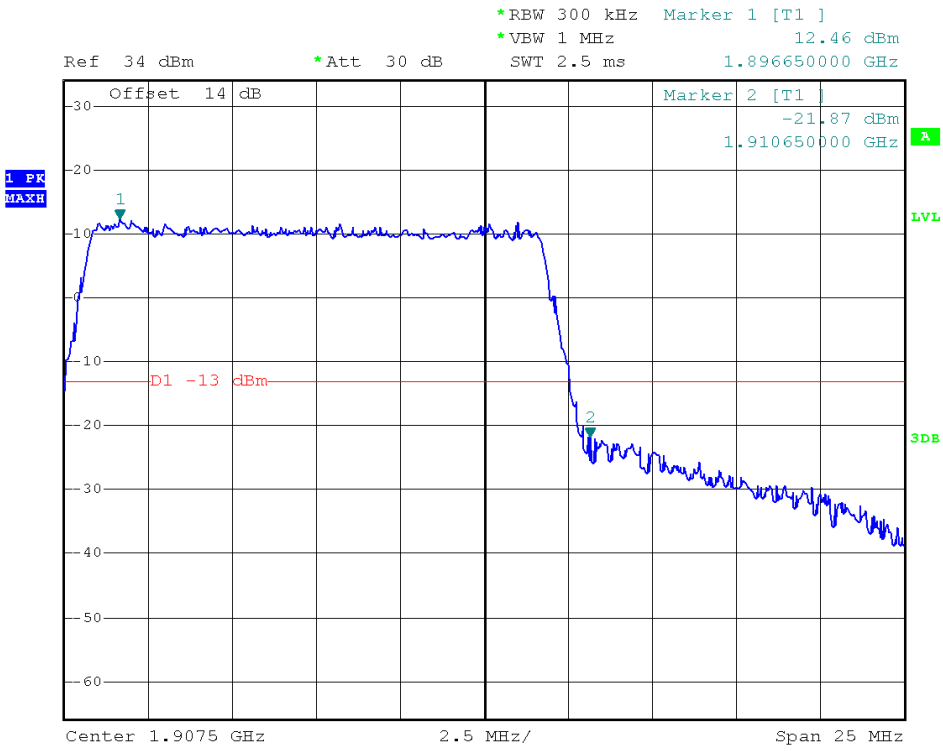
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 75, RB Offset 0

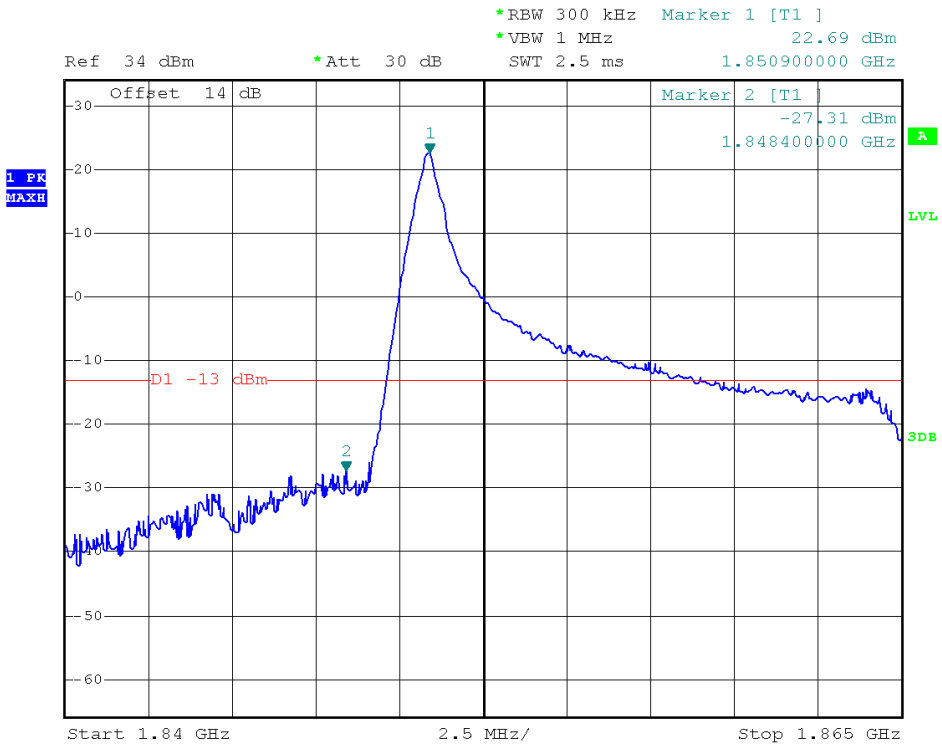


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 74

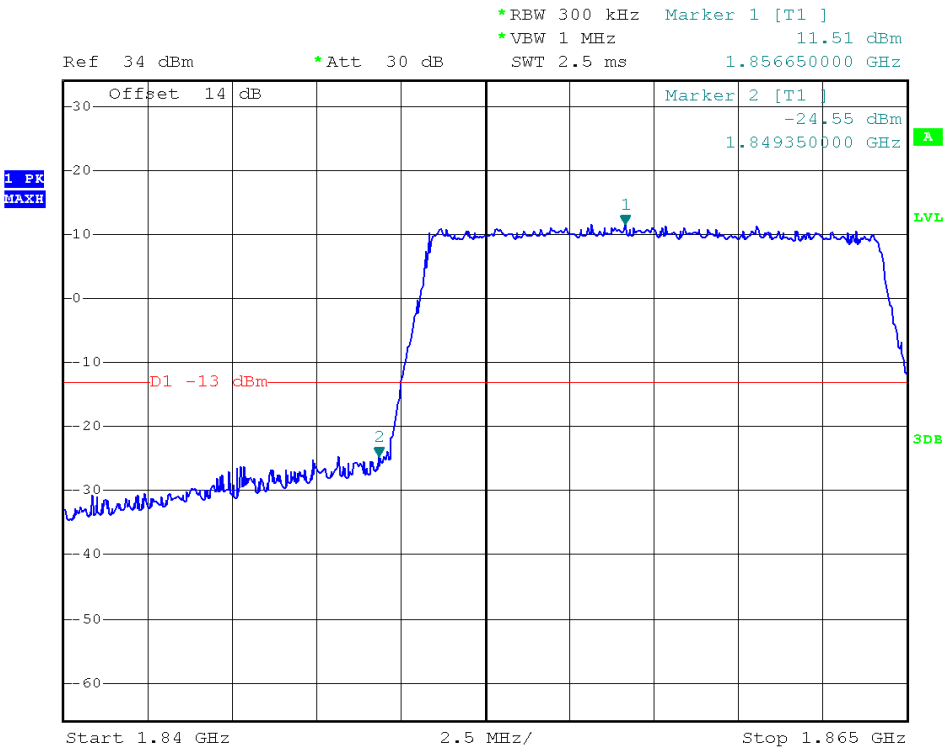


Higher Band Edge Plot for QPSK-RB Size 75, RB Offset 0

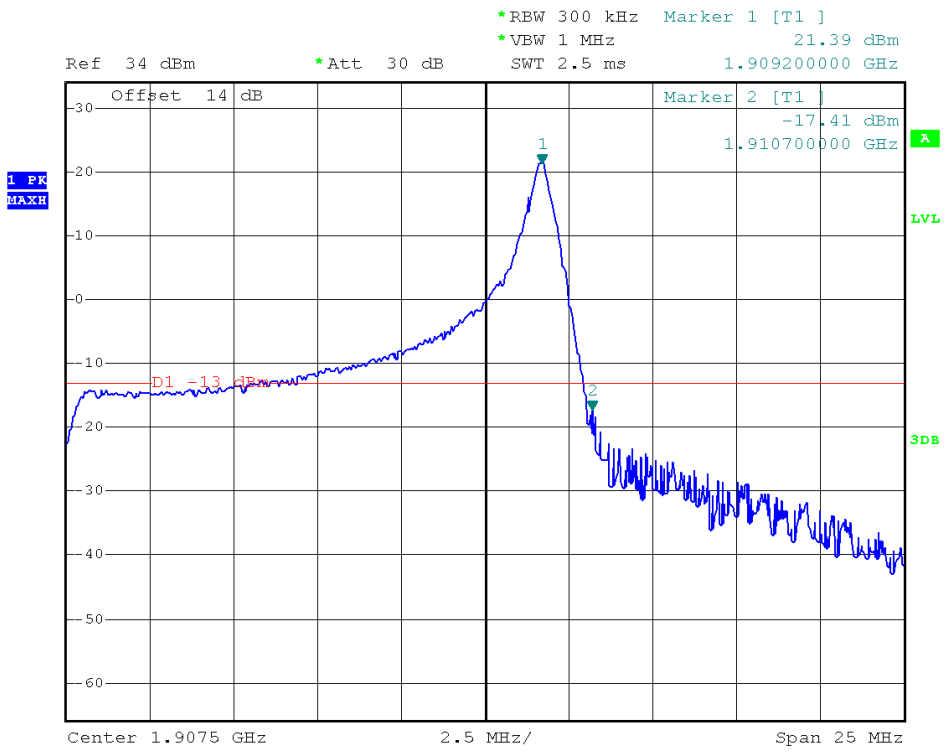
Band	LTE Band 2	Modulation	16QAM
Bandwidth	15MHz		



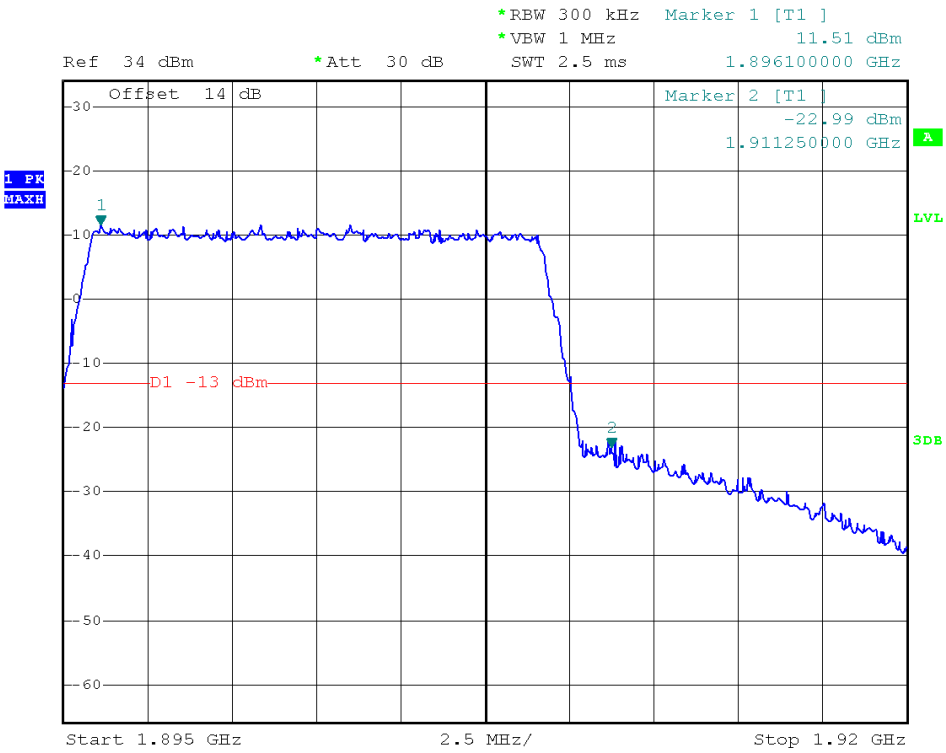
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM-RB Size 75, RB Offset 0

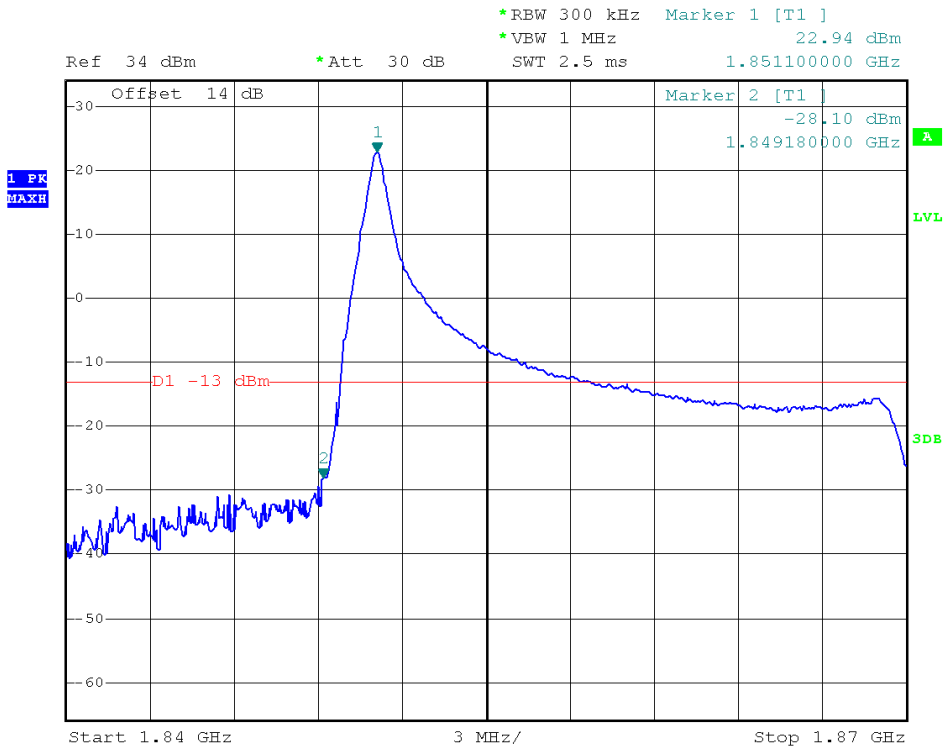


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 74

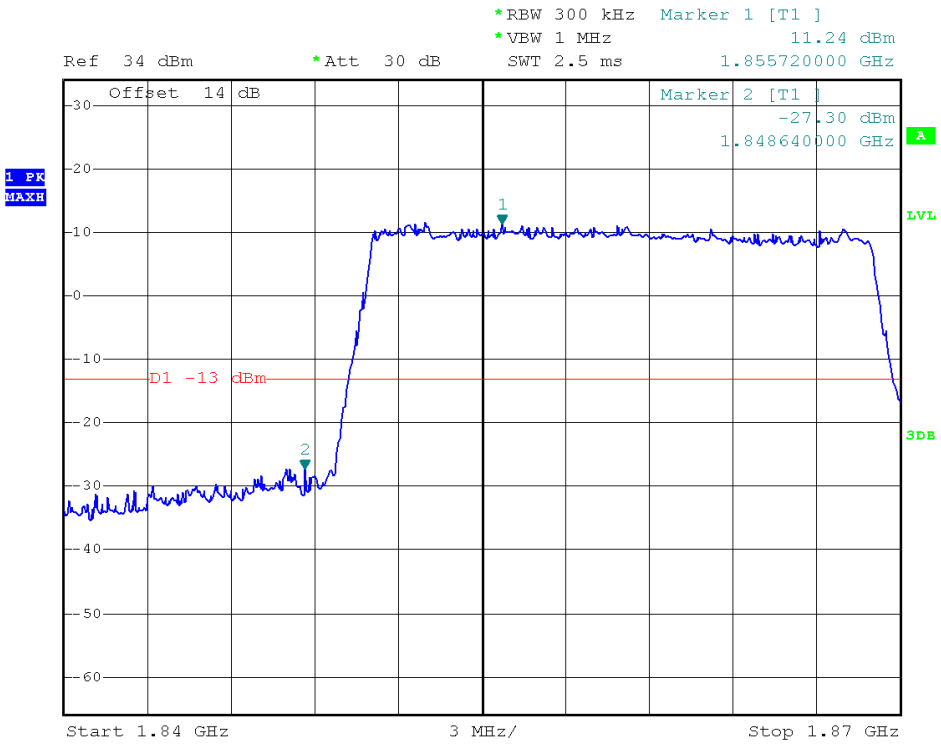


Higher Band Edge Plot for 16QAM-RB Size 75, RB Offset 0

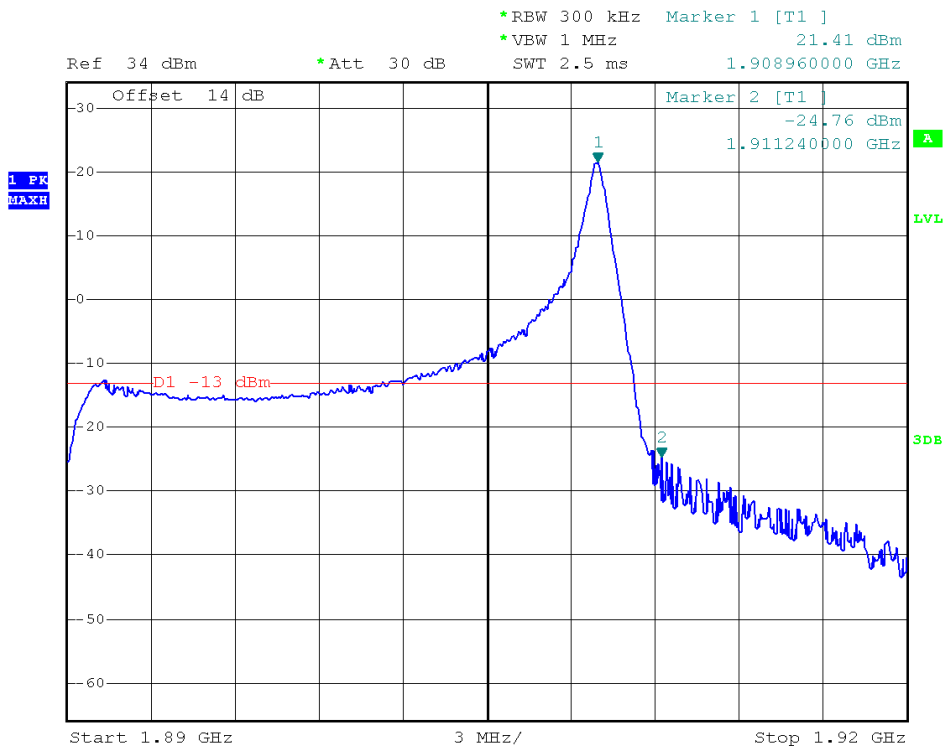
Band	LTE Band 2	Modulation	QPSK
Bandwidth	20MHz		



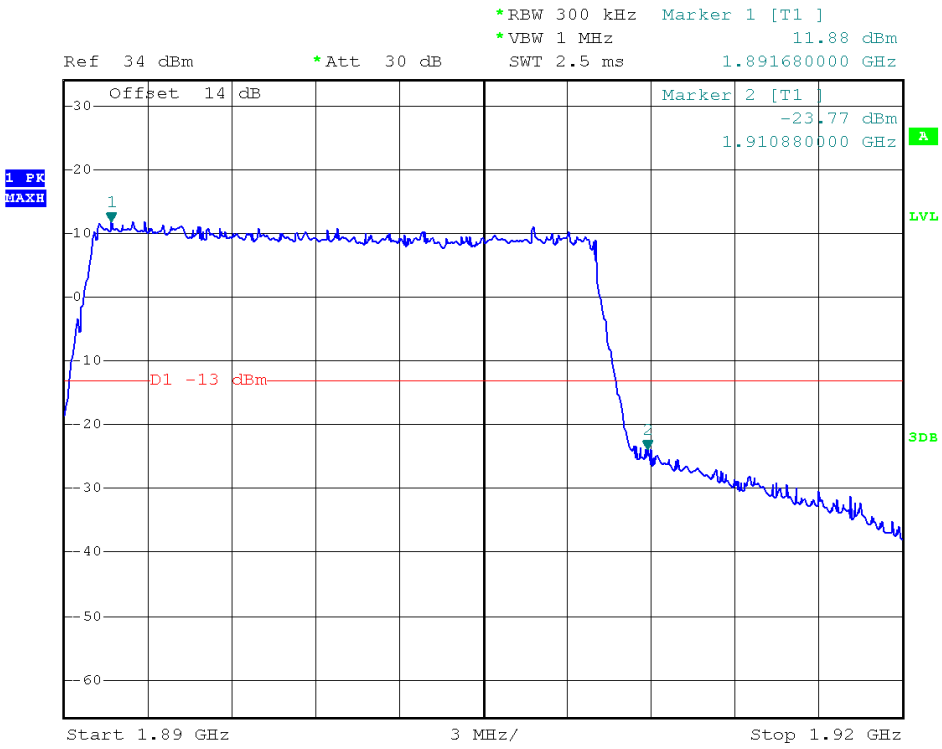
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 100, RB Offset 0

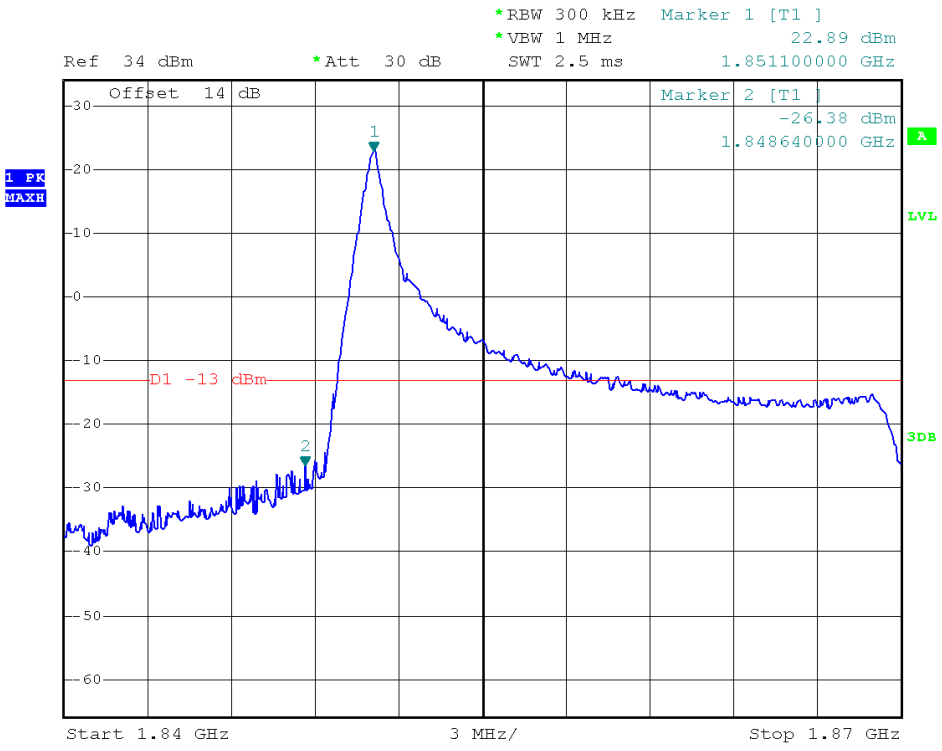


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 99

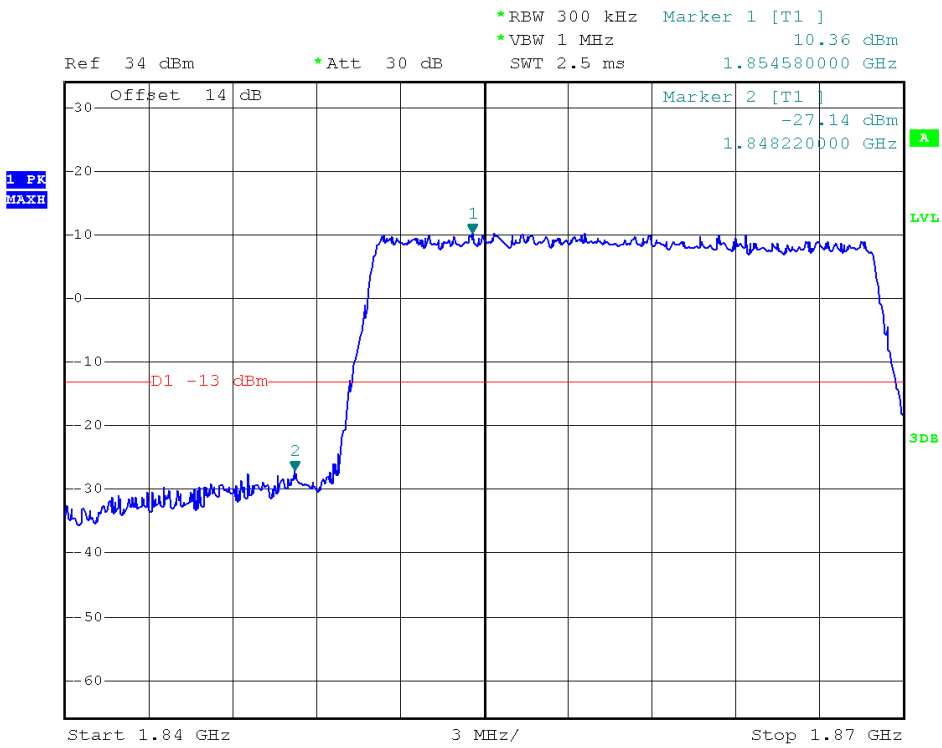


Higher Band Edge Plot for QPSK-RB Size 100, RB Offset 0

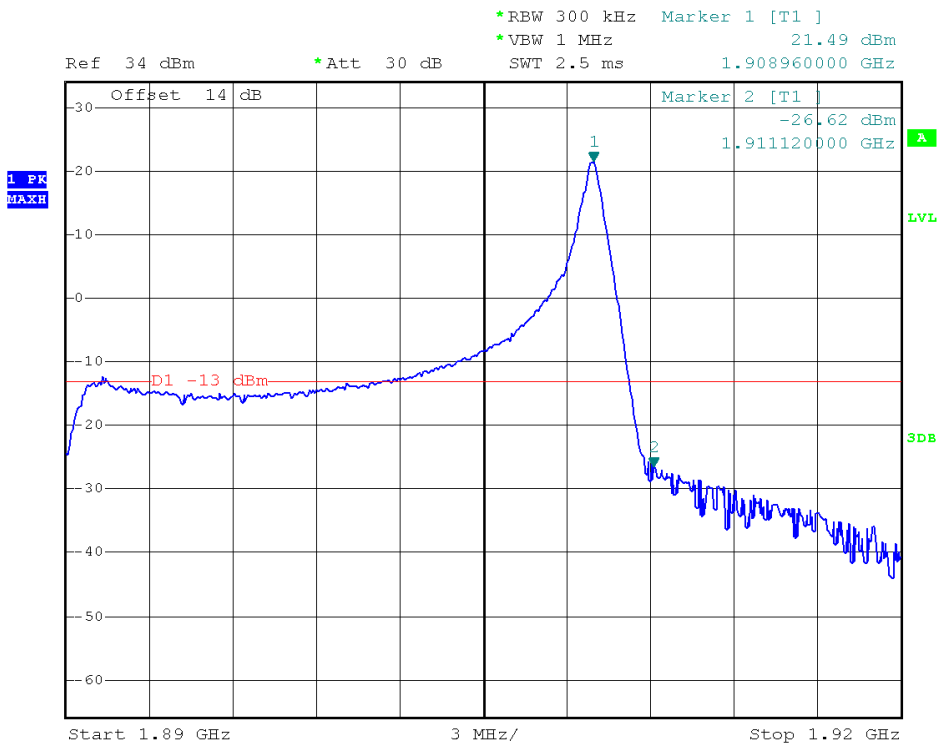
Band	LTE Band 2	Modulation	16QAM
Bandwidth	20MHz		



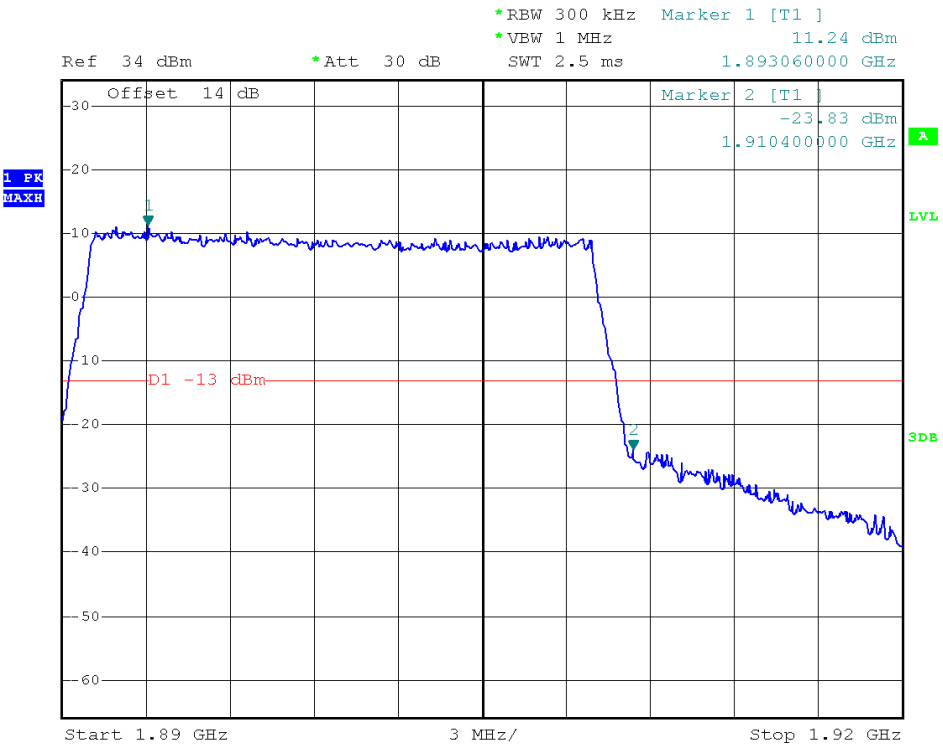
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM-RB Size 100, RB Offset 0

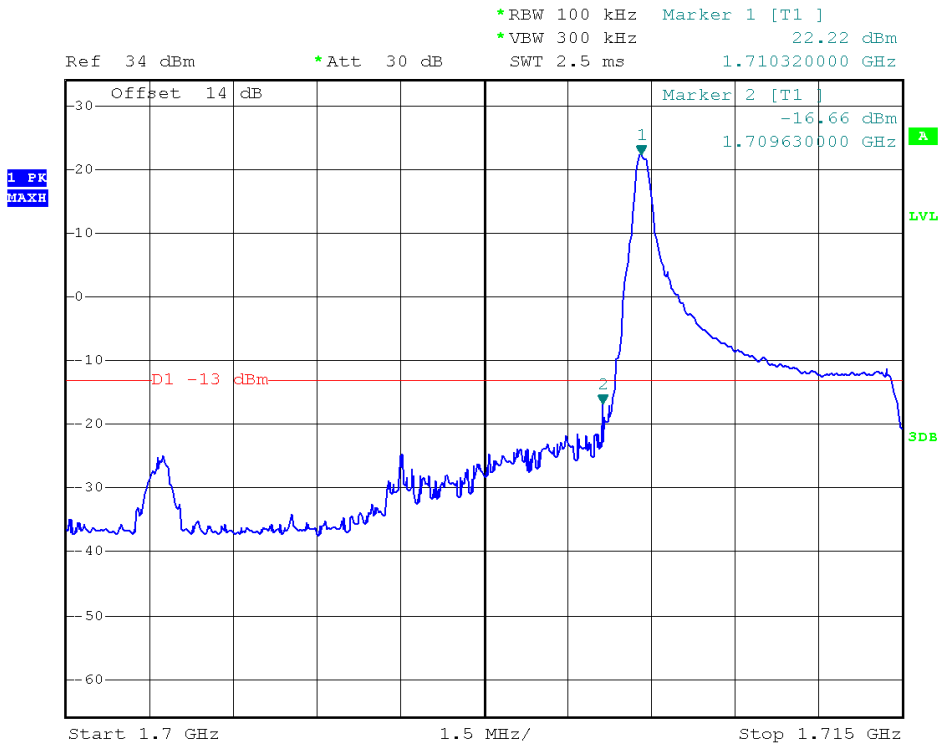


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 99

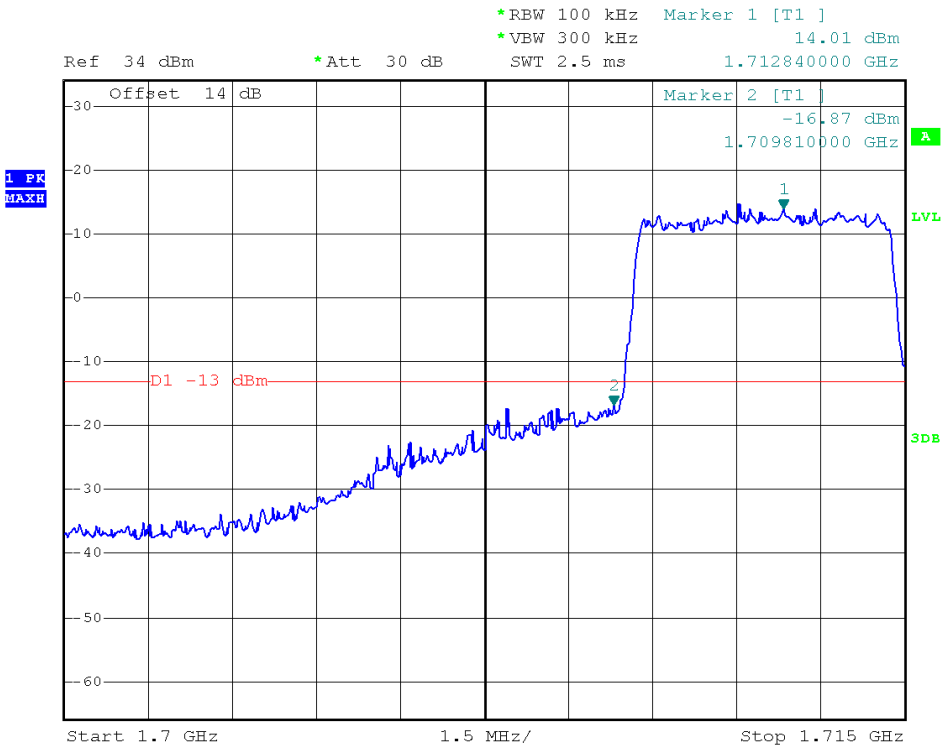


Higher Band Edge Plot for 16QAM-RB Size 100, RB Offset 0

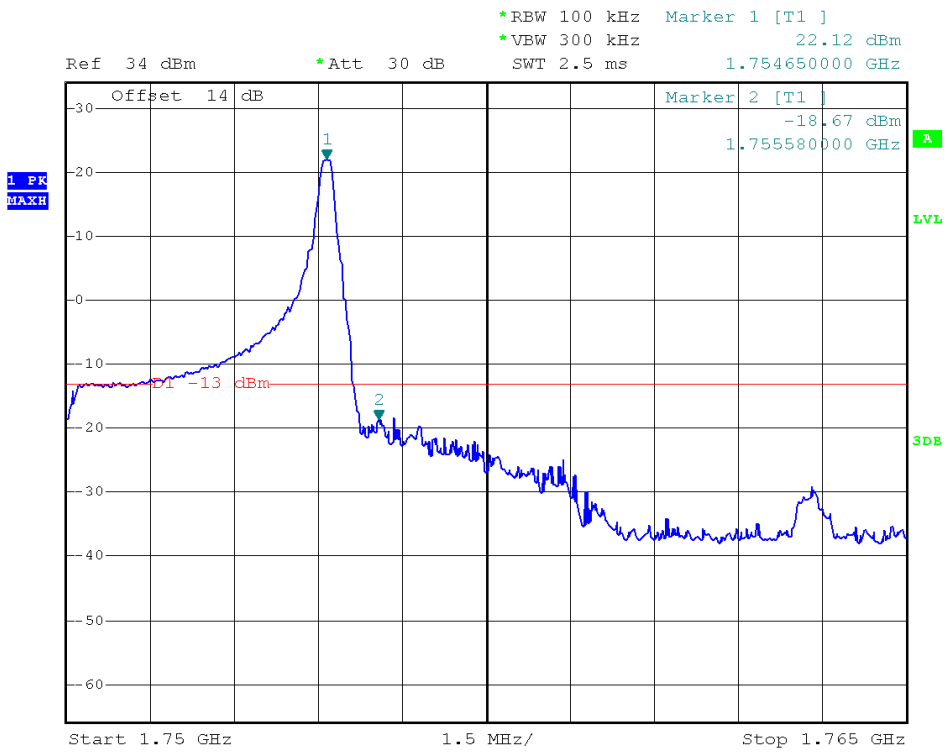
Band	LTE Band 4	Modulation	QPSK
Bandwidth	5MHz		



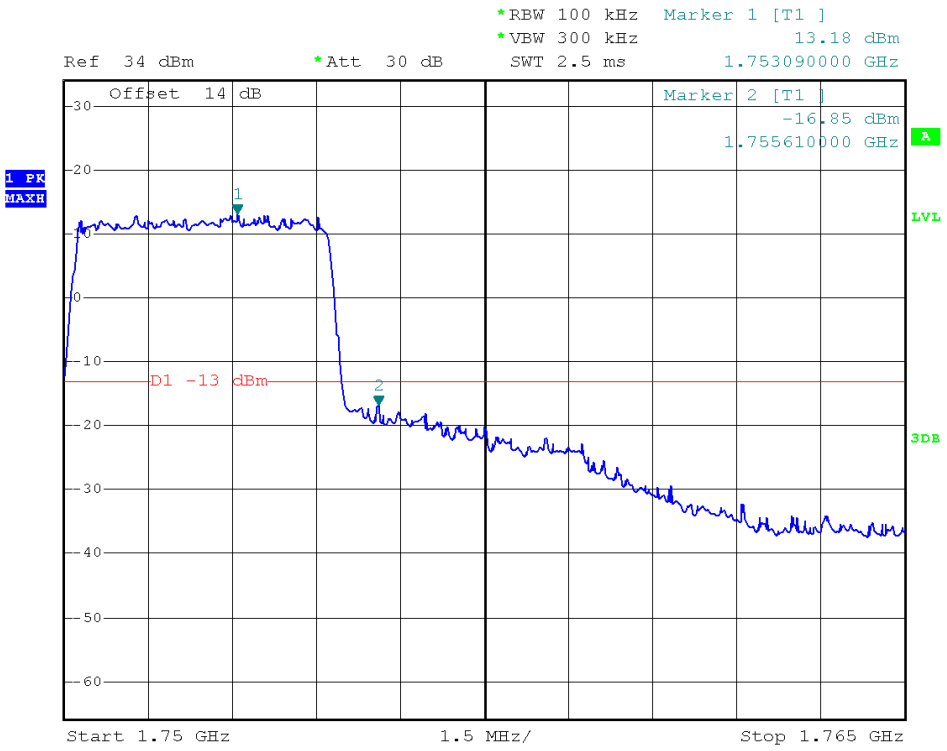
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0

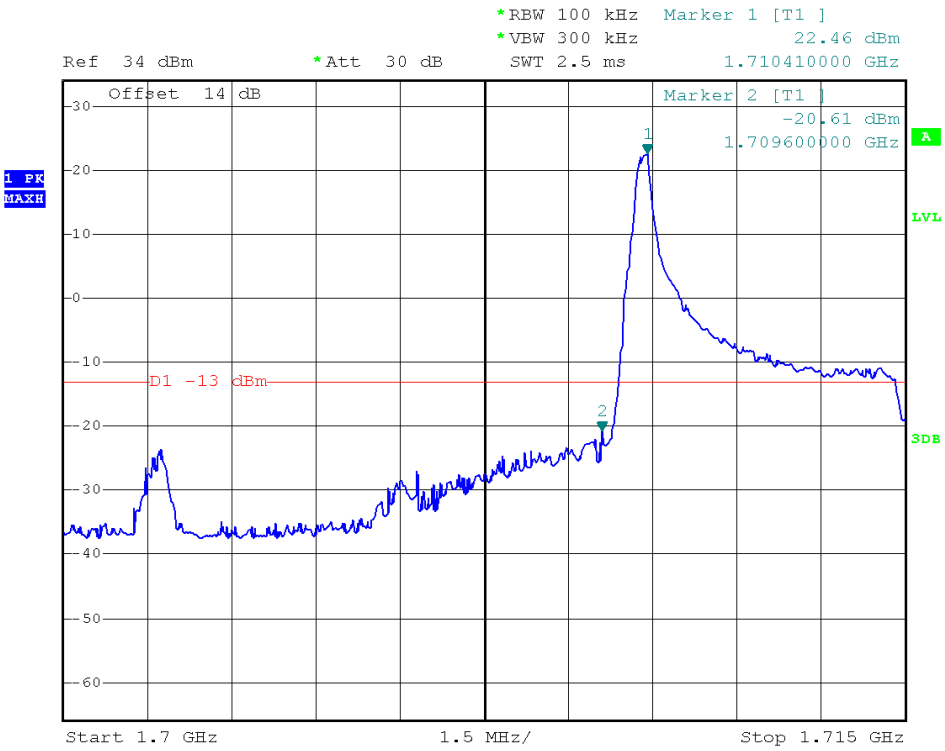


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24

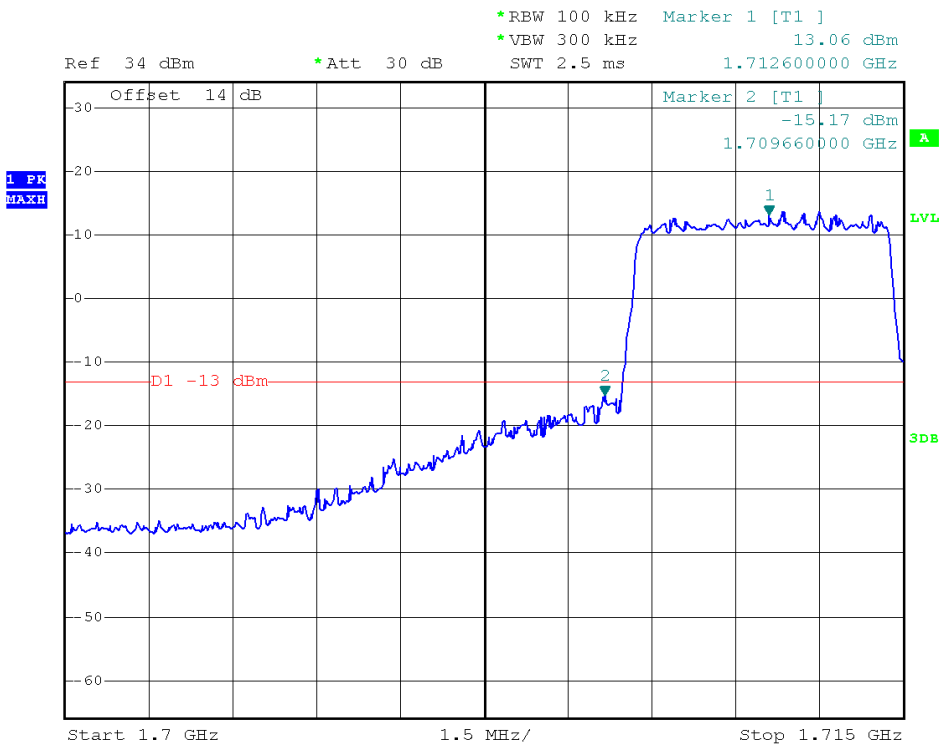


Higher Band Edge Plot for QPSK-RB Size 25, RB Offset 0

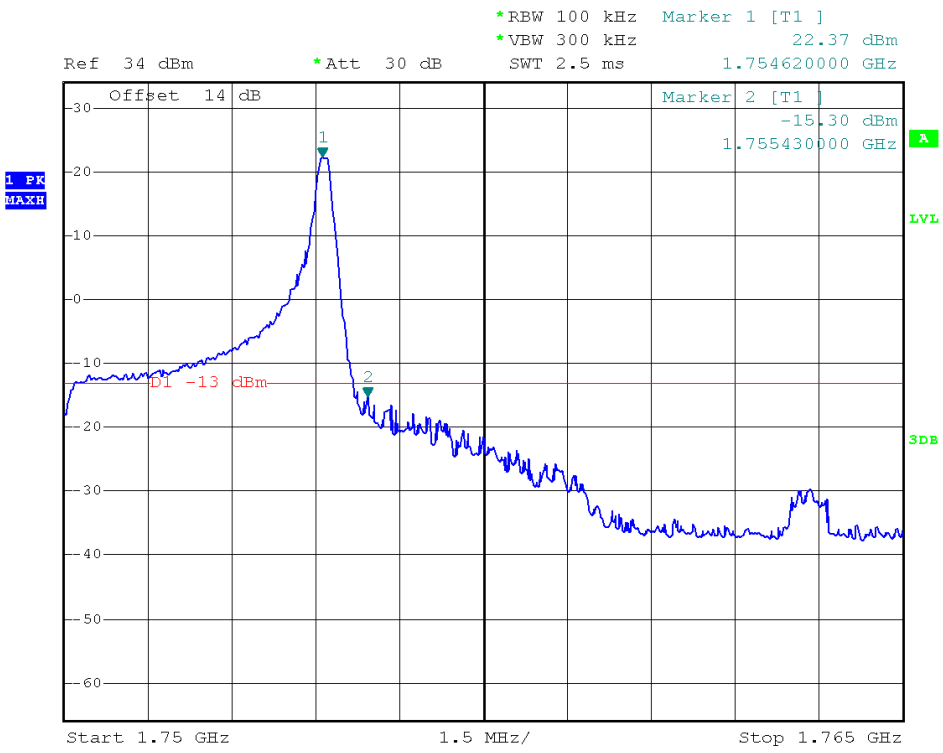
Band	LTE Band 4	Modulation	16QAM
Bandwidth	5MHz		



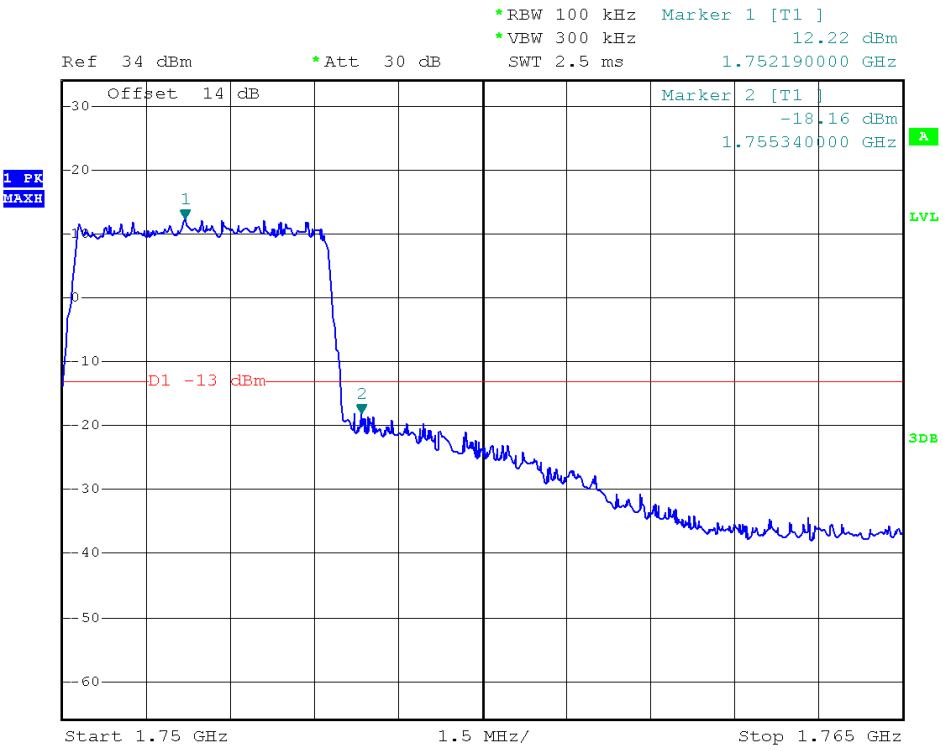
Lower Band Edge Plot for 16QAM -RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM -RB Size 25, RB Offset 0

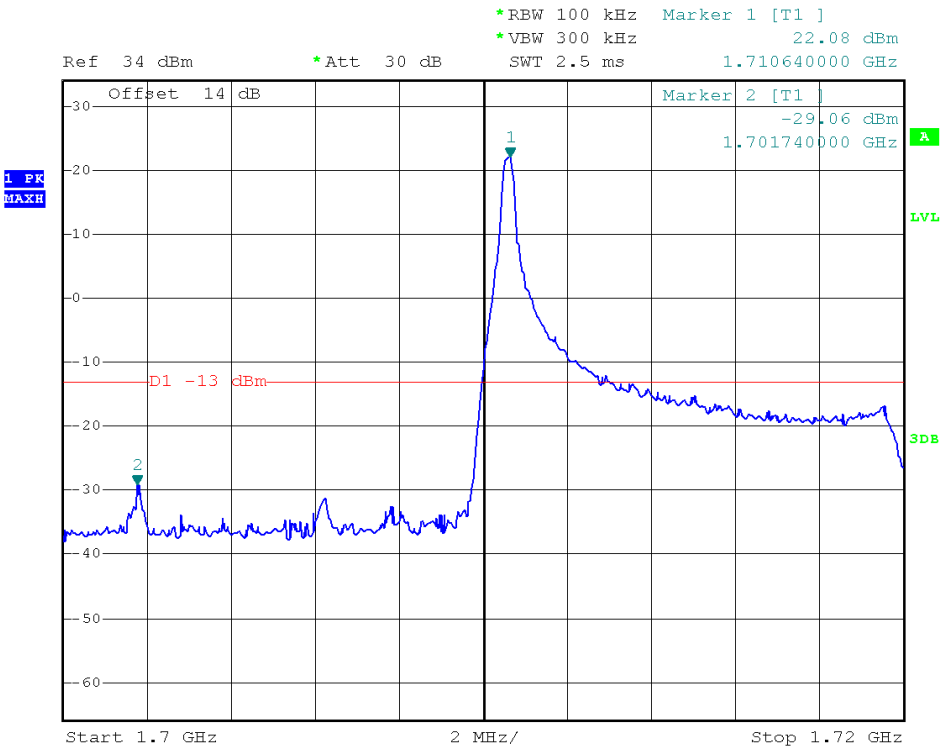


Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 24

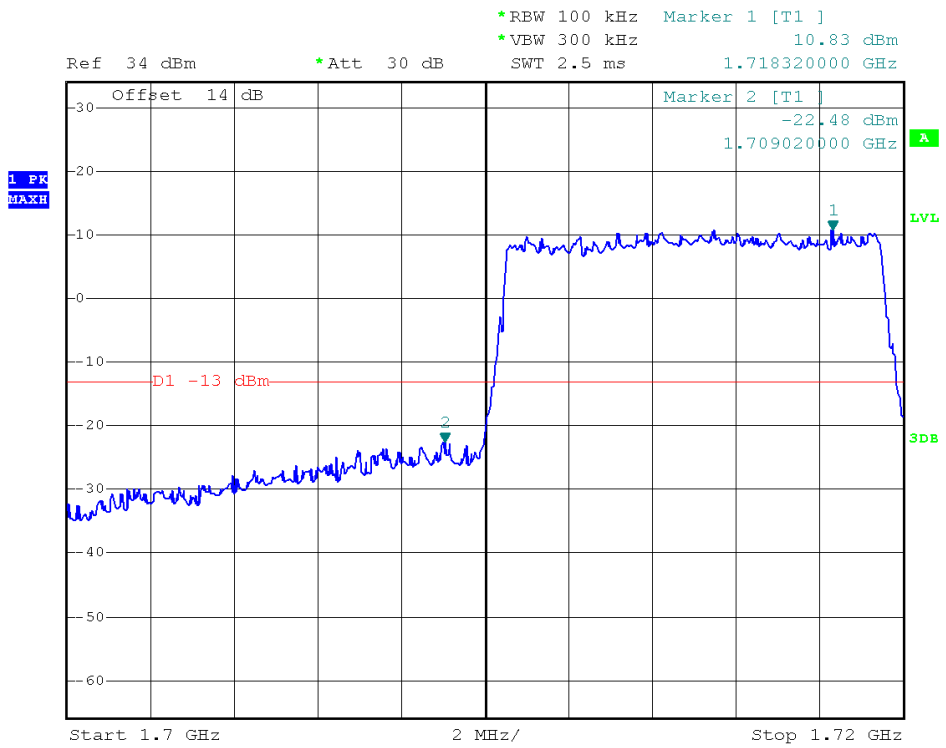


Higher Band Edge Plot for 16QAM -RB Size 25, RB Offset 0

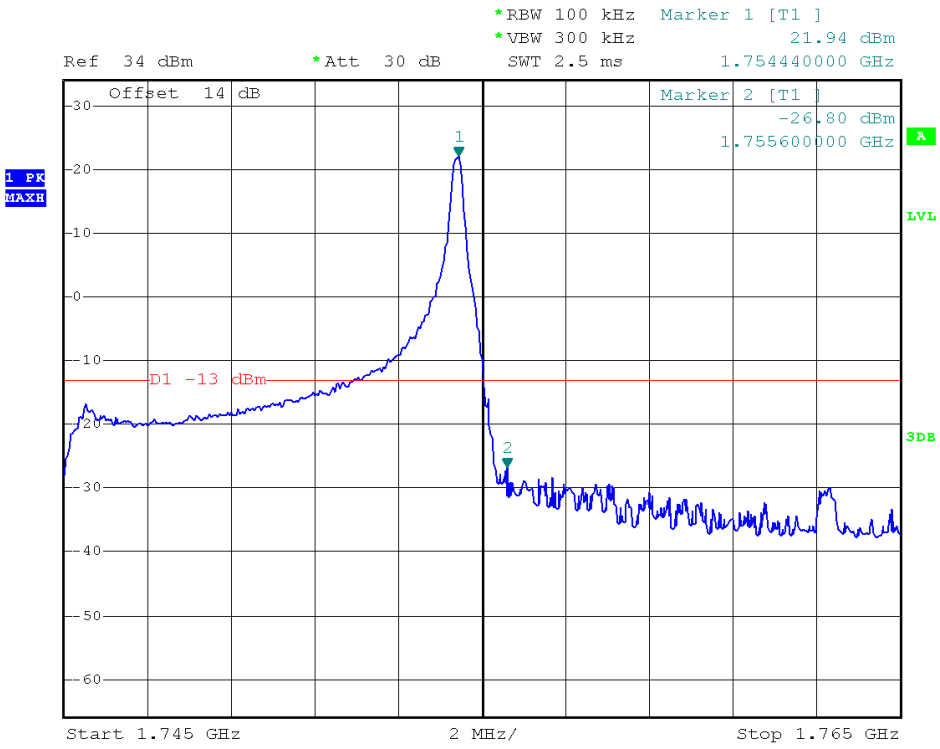
Band	LTE Band 4	Modulation	QPSK
Bandwidth	10MHz		



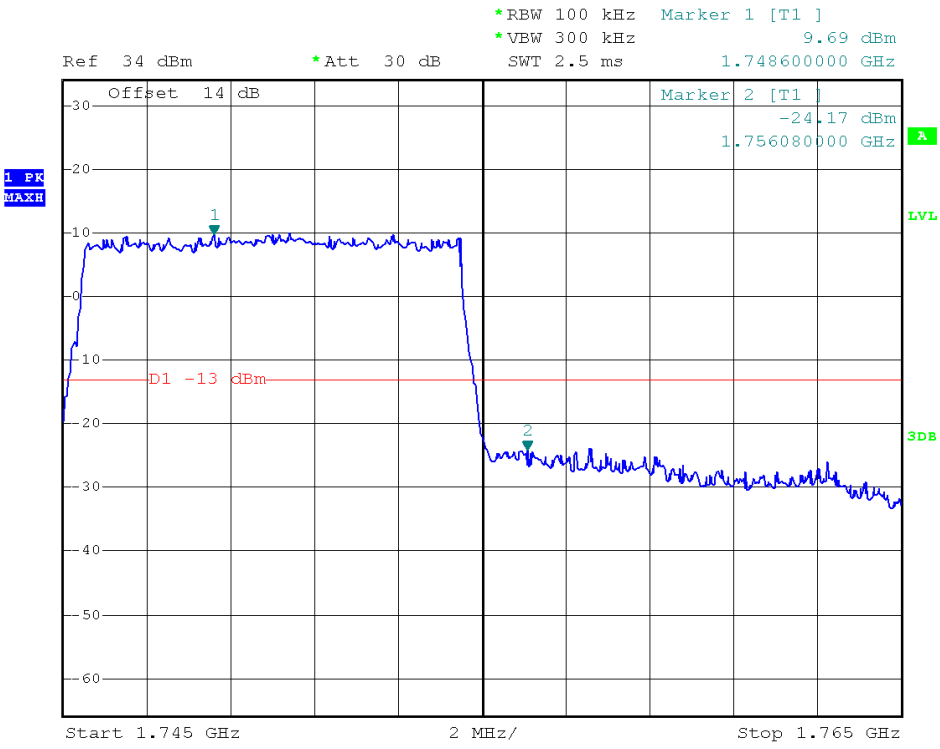
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 50, RB Offset 0

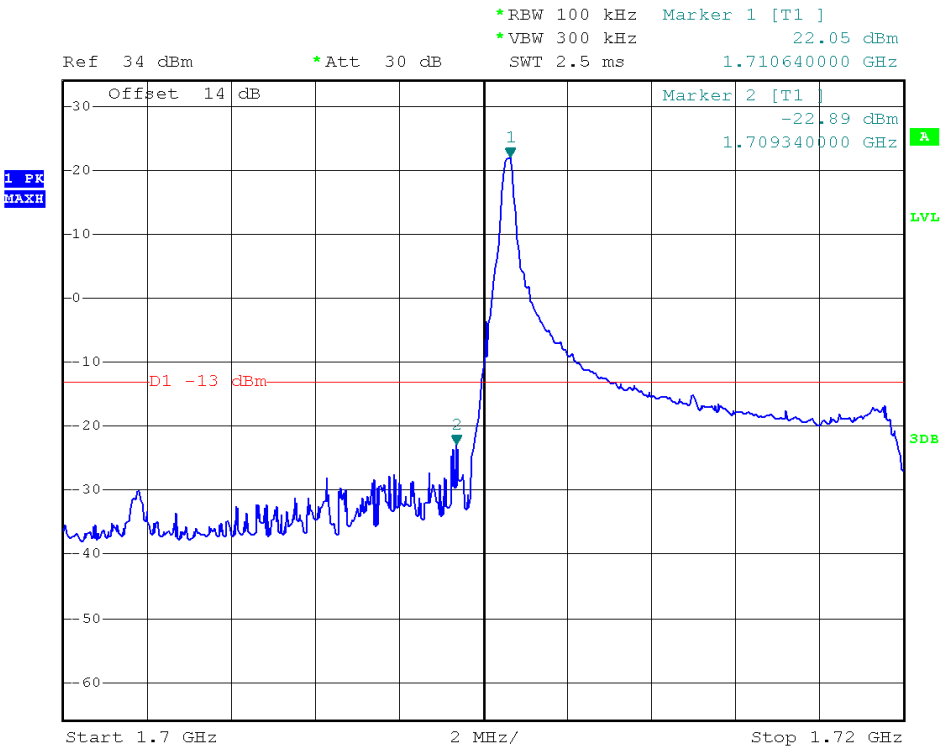


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 49

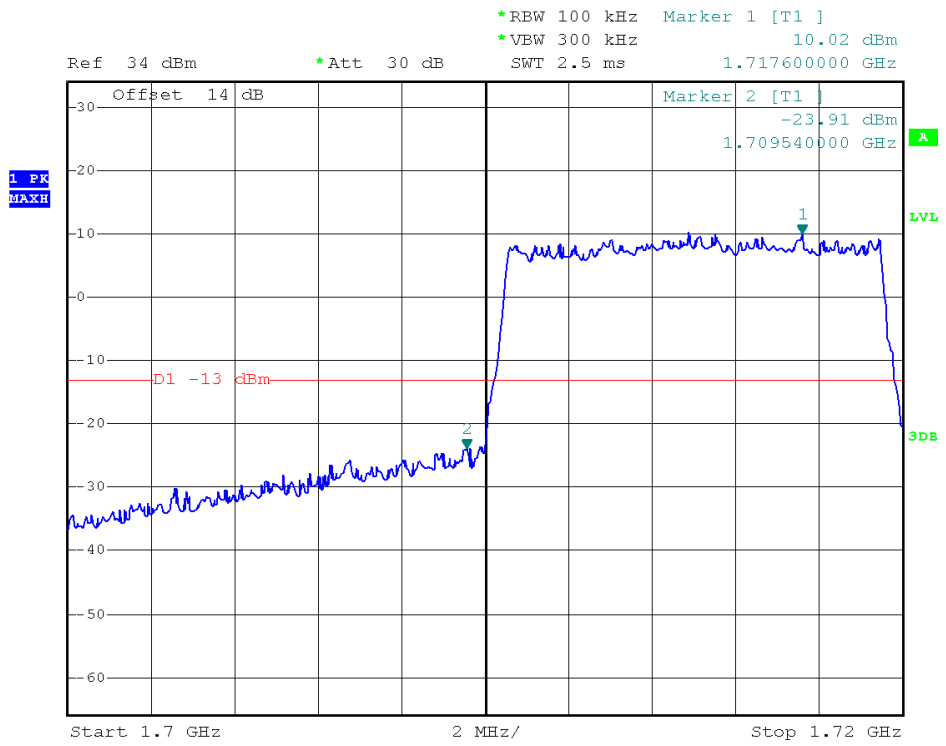


Higher Band Edge Plot for QPSK-RB Size 50, RB Offset 0

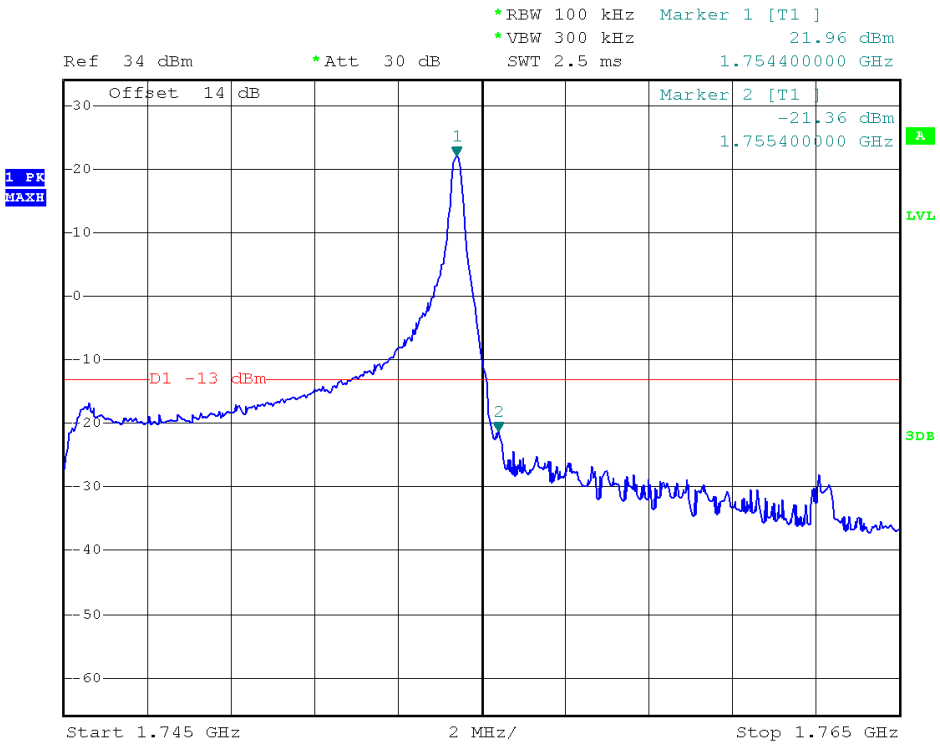
Band	LTE Band 4	Modulation	16QAM
Bandwidth	10MHz		



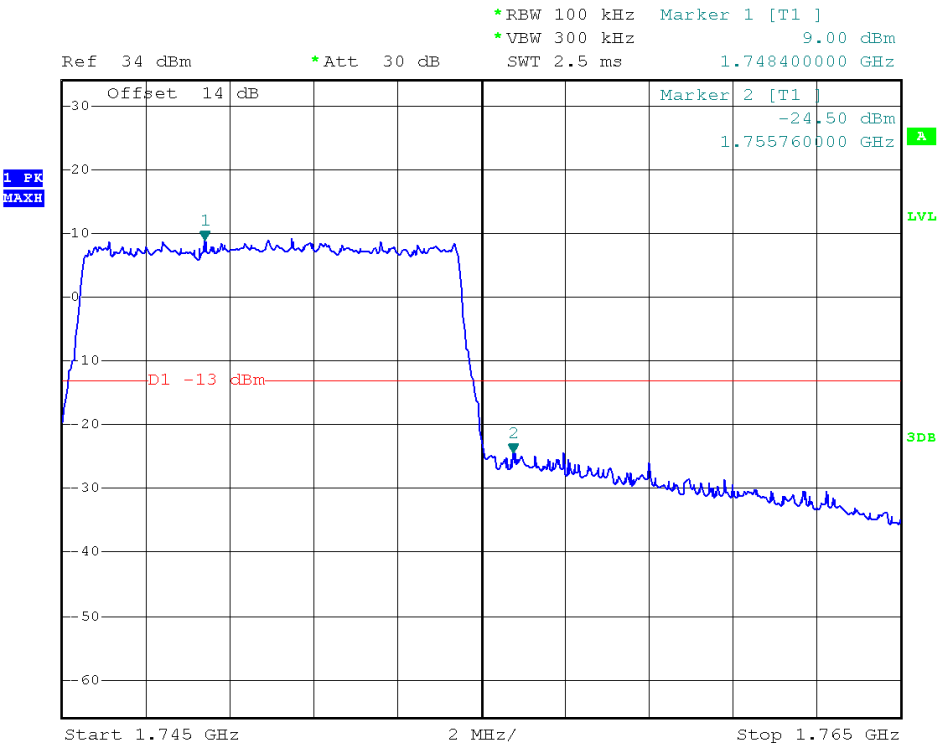
Lower Band Edge Plot for 16QAM -RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM -RB Size 50, RB Offset 0

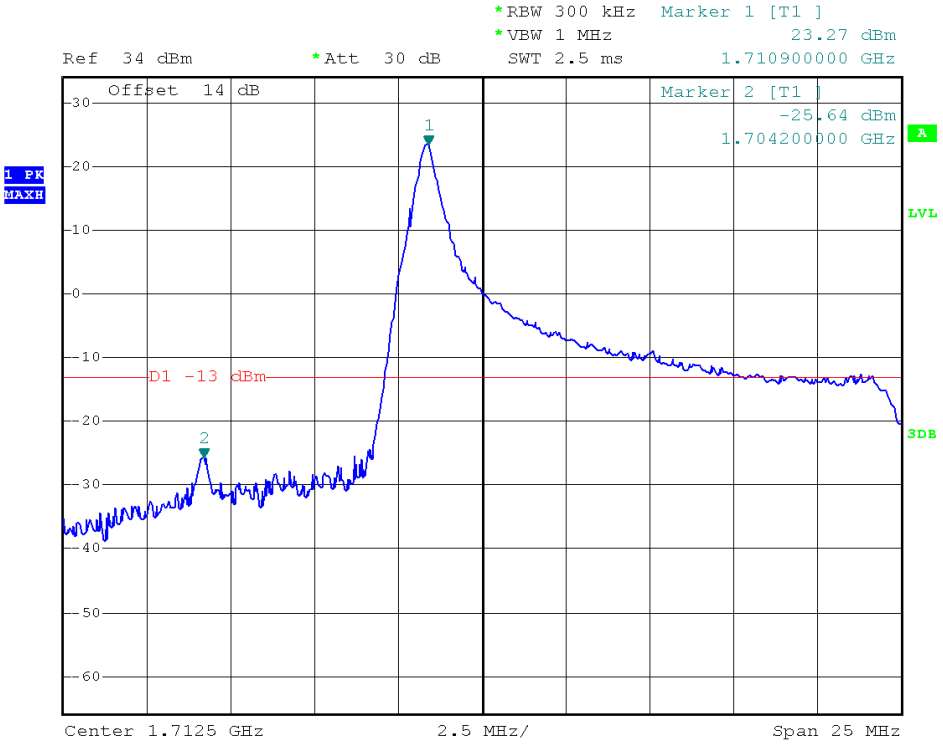


Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 49

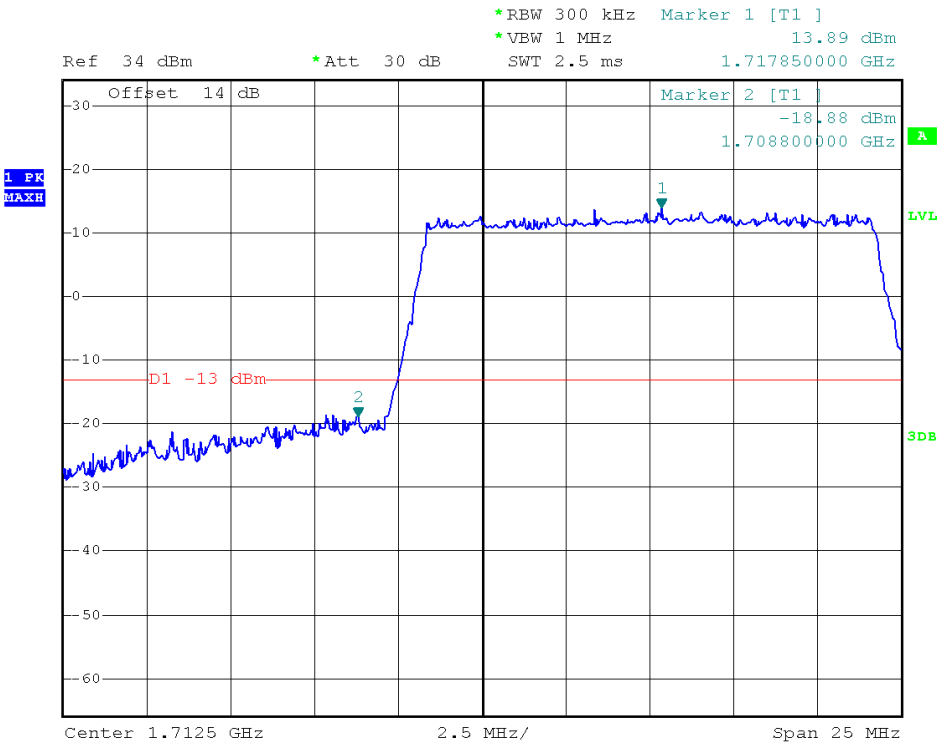


Higher Band Edge Plot for 16QAM -RB Size 50, RB Offset 0

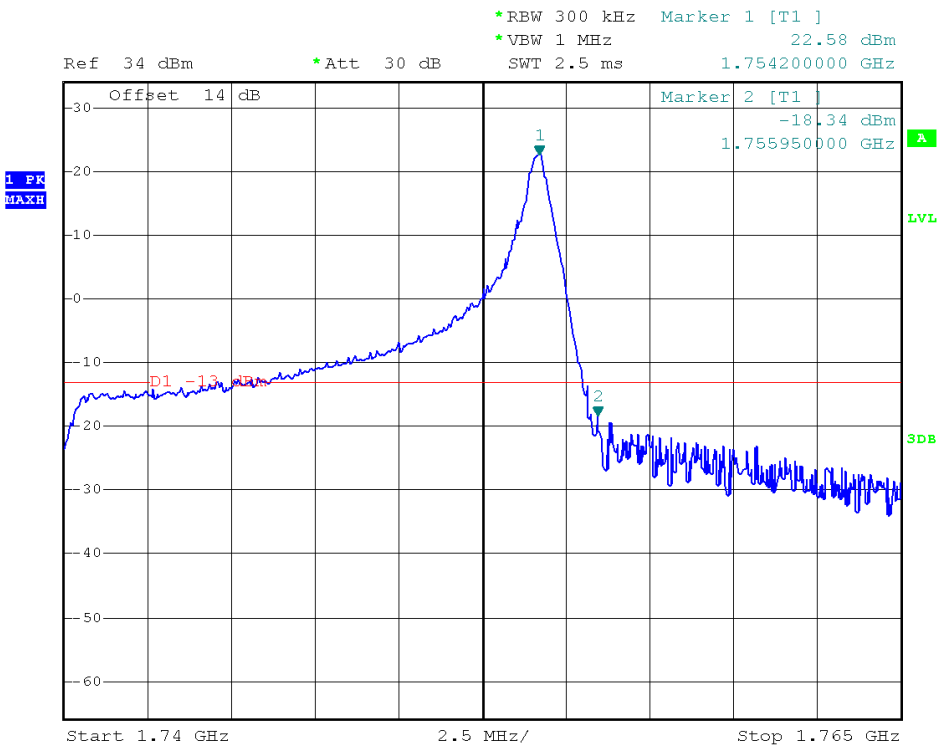
Band	LTE Band 4	Modulation	QPSK
Bandwidth	15MHz		



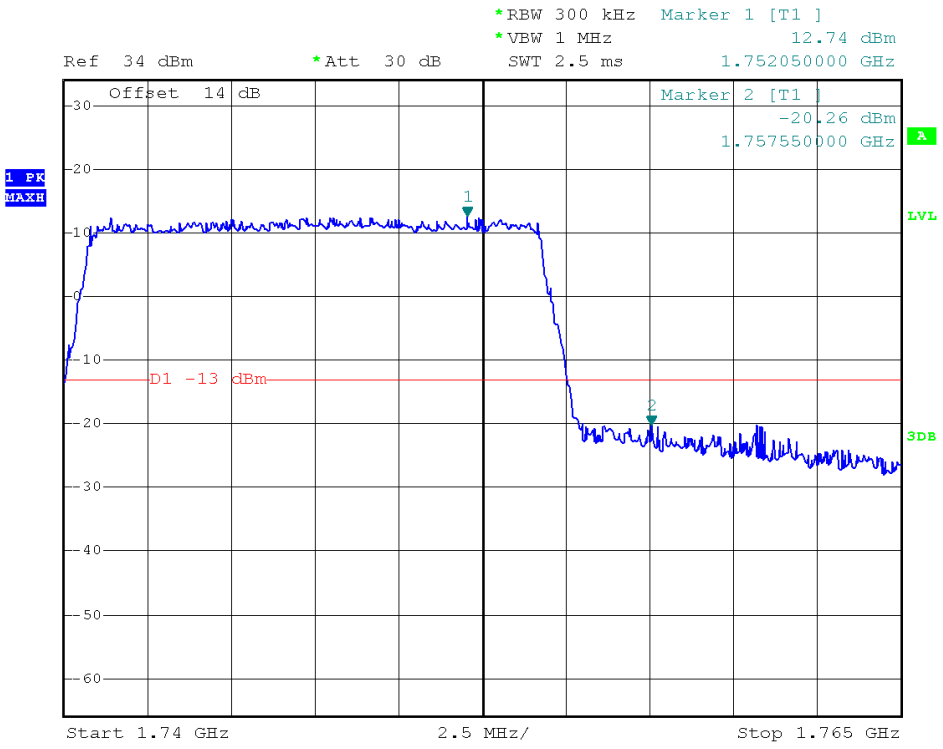
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 75, RB Offset 0

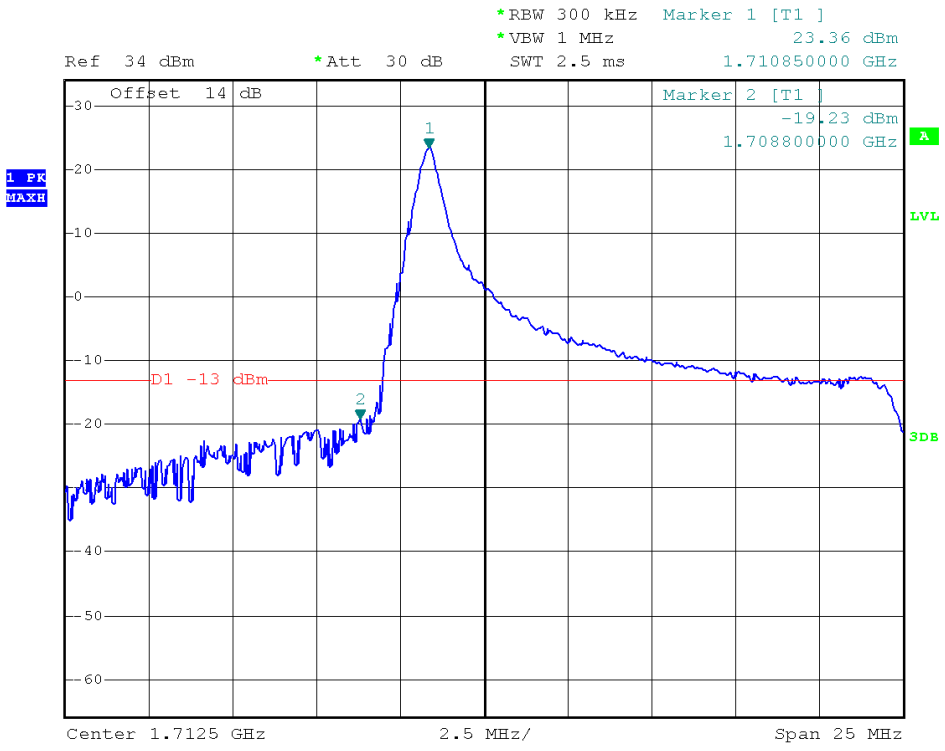


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 74

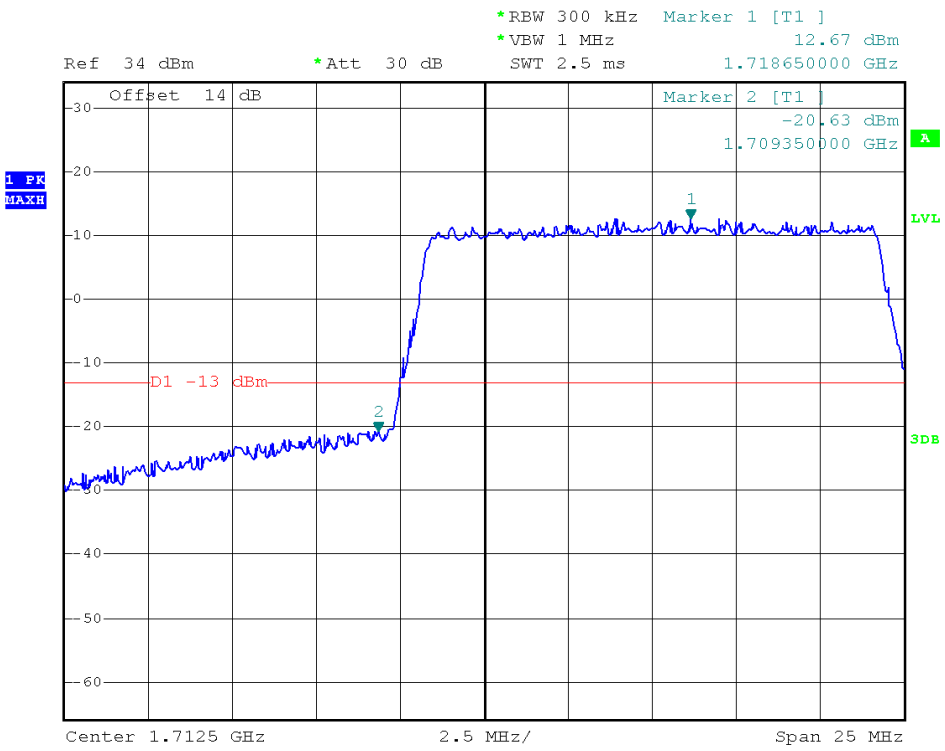


Higher Band Edge Plot for QPSK-RB Size 75, RB Offset 0

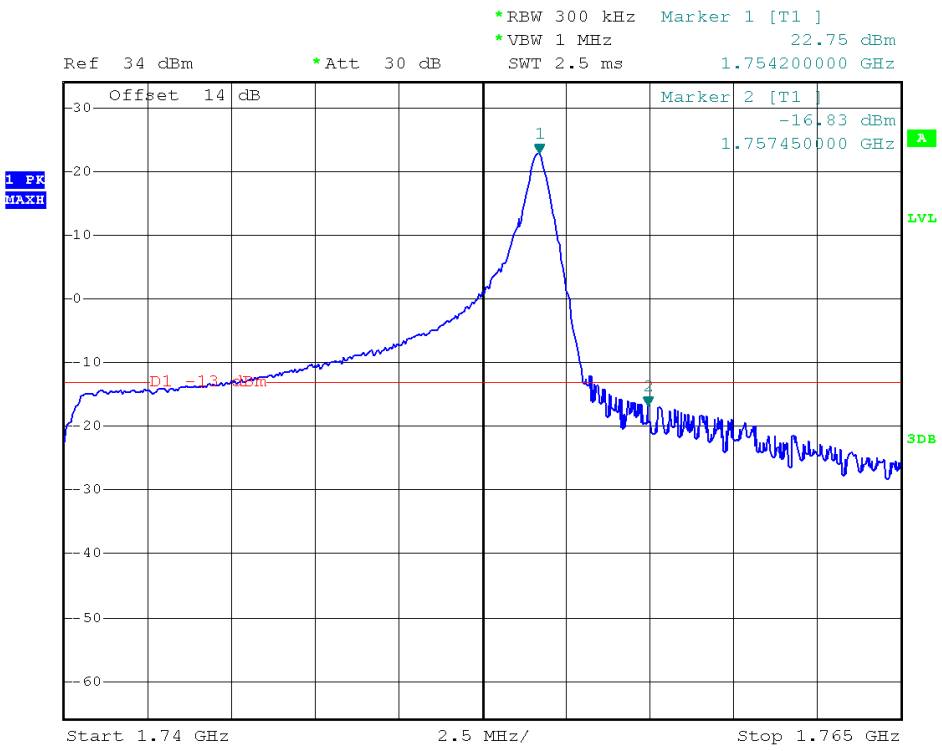
Band	LTE Band 4	Modulation	16QAM
Bandwidth	15MHz		



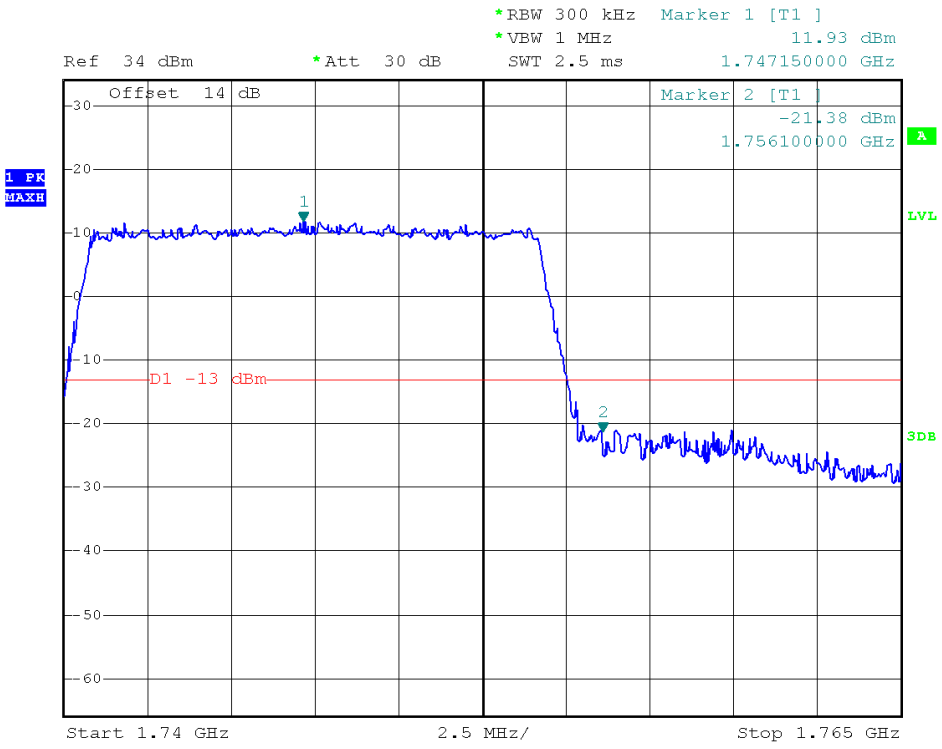
Lower Band Edge Plot for 16QAM -RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM -RB Size 75, RB Offset 0

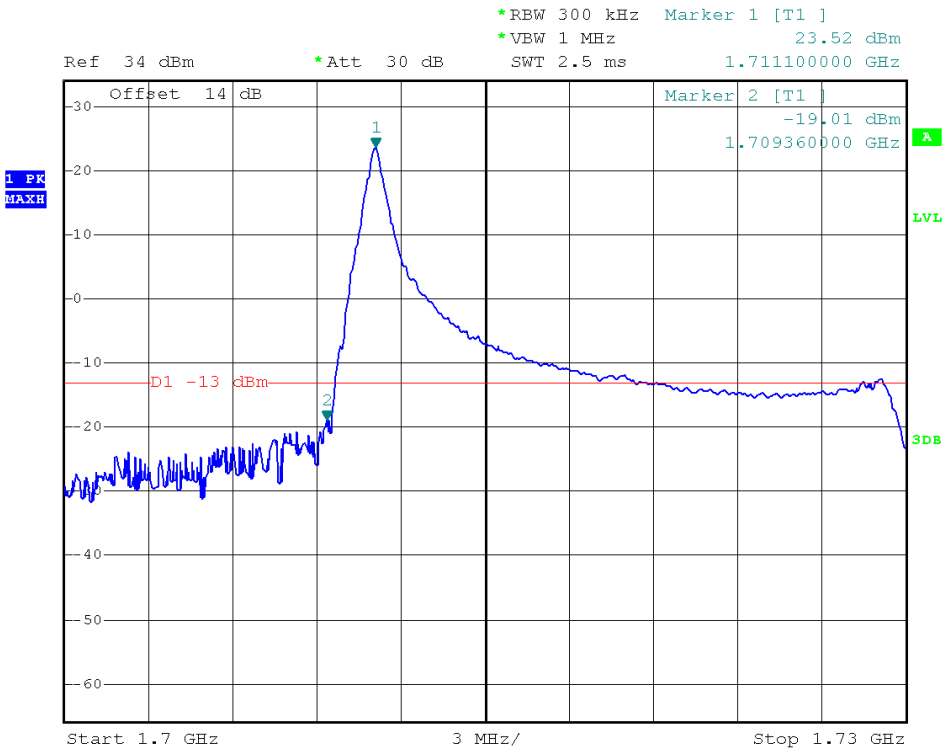


Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 74

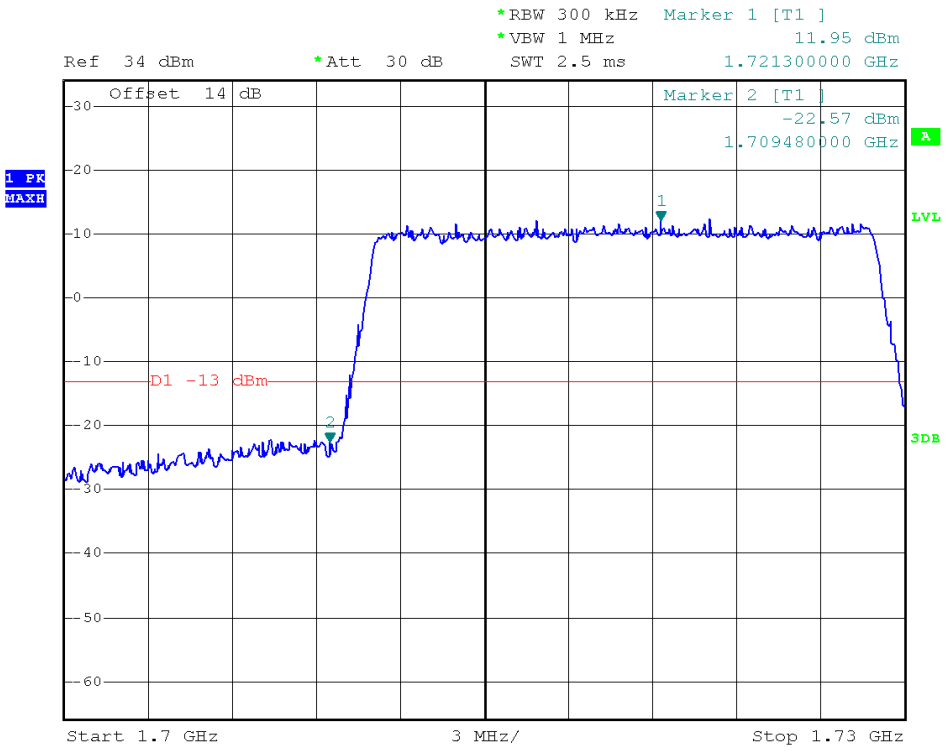


Higher Band Edge Plot for 16QAM -RB Size 75, RB Offset 0

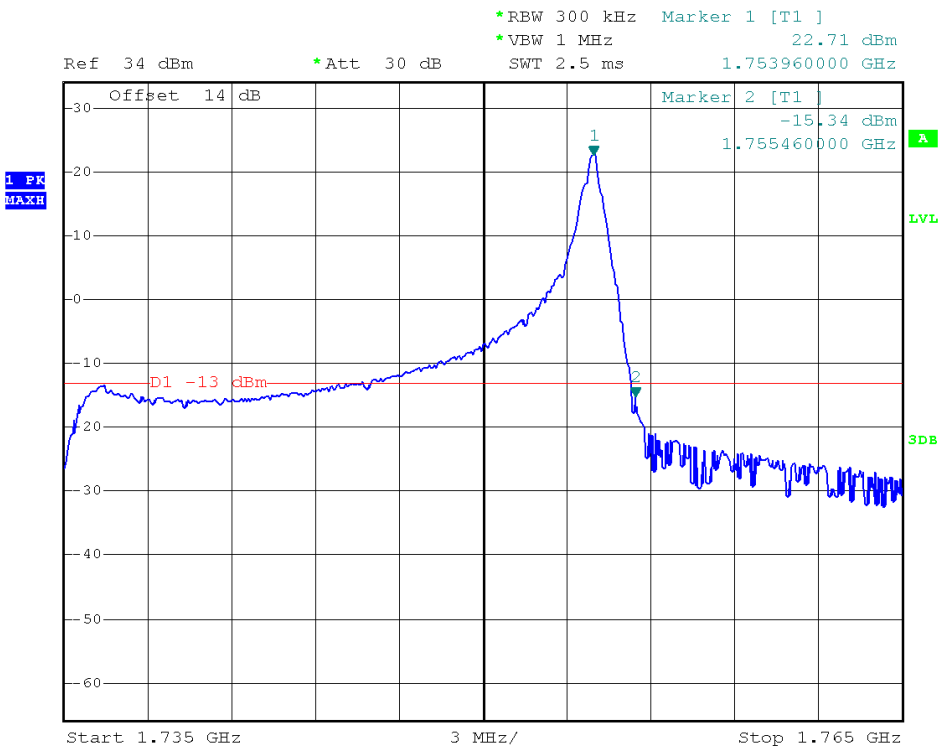
Band	LTE Band 4	Modulation	QPSK
Bandwidth	20MHz		



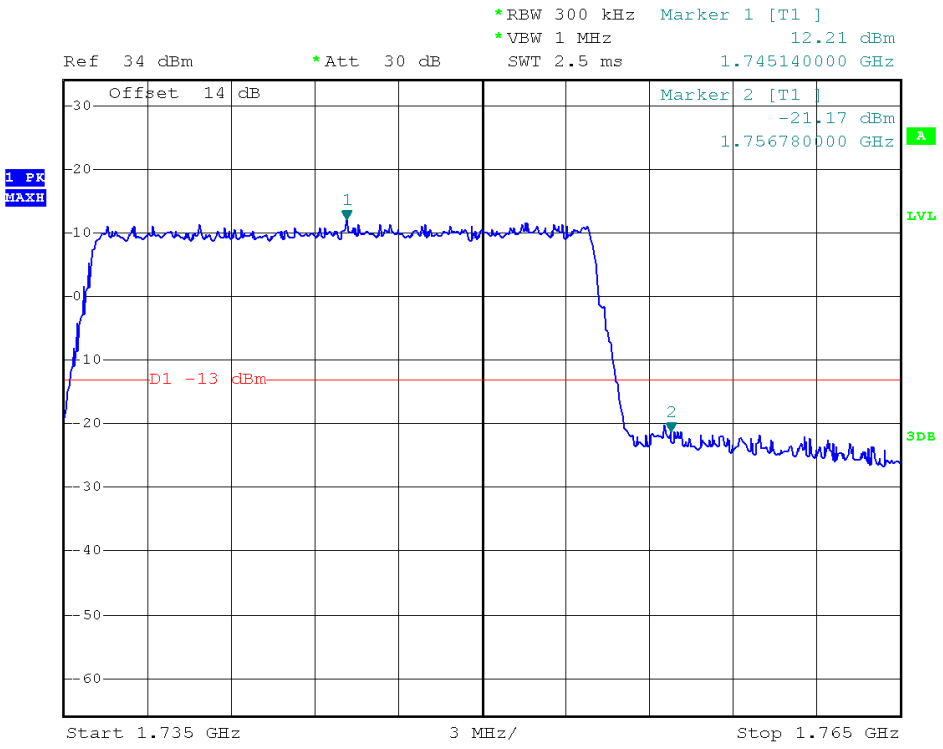
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 100, RB Offset 0

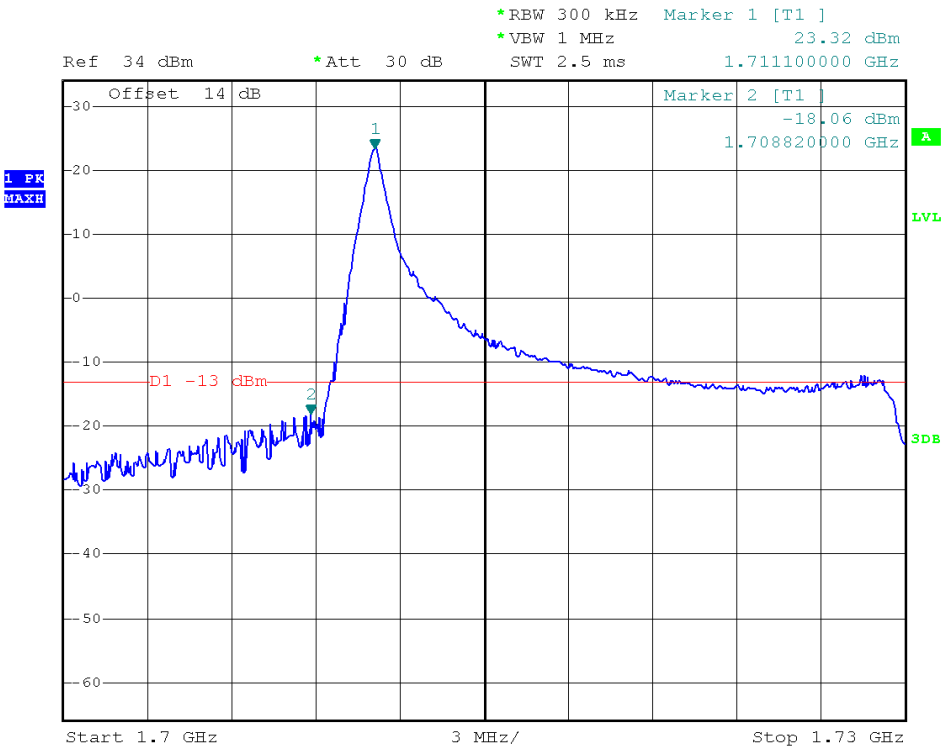


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 99

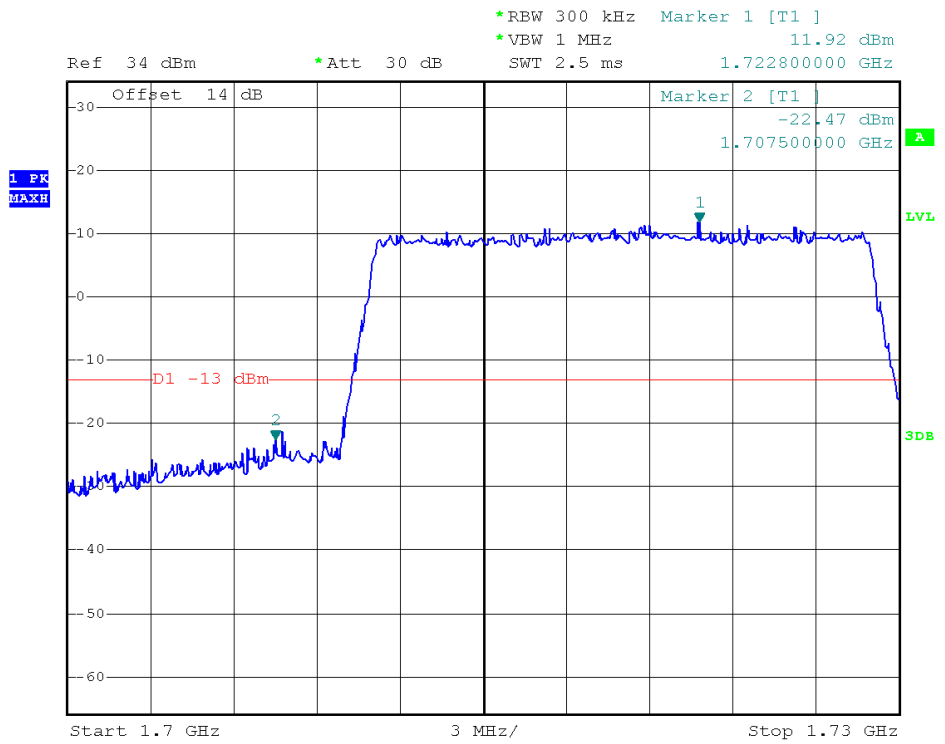


Higher Band Edge Plot for QPSK-RB Size 100, RB Offset 0

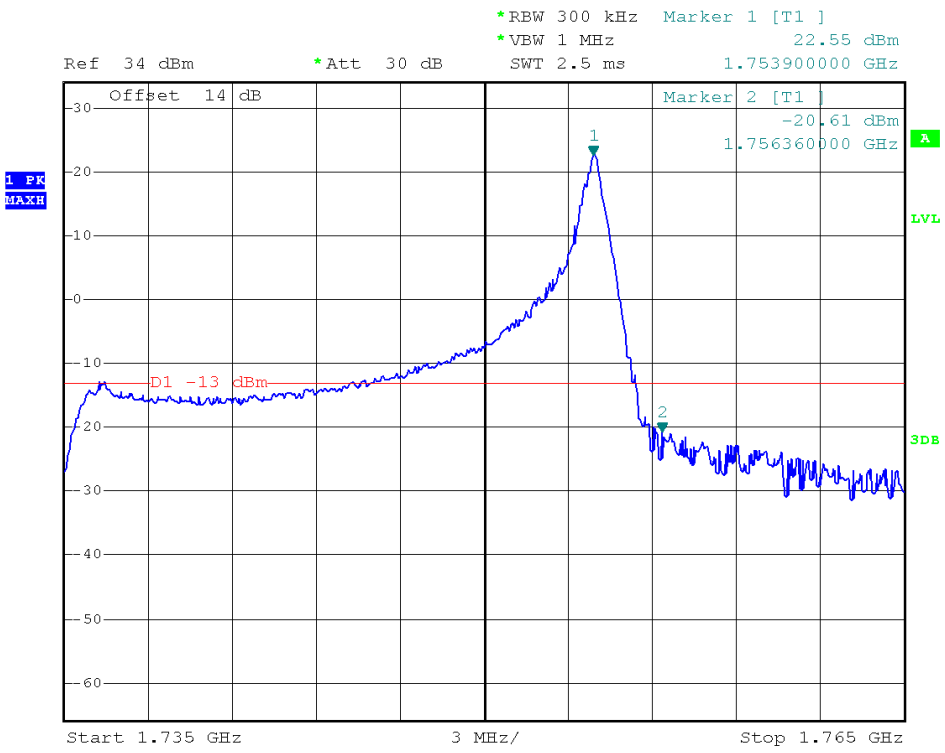
Band	LTE Band 4	Modulation	16QAM
Bandwidth	20MHz		



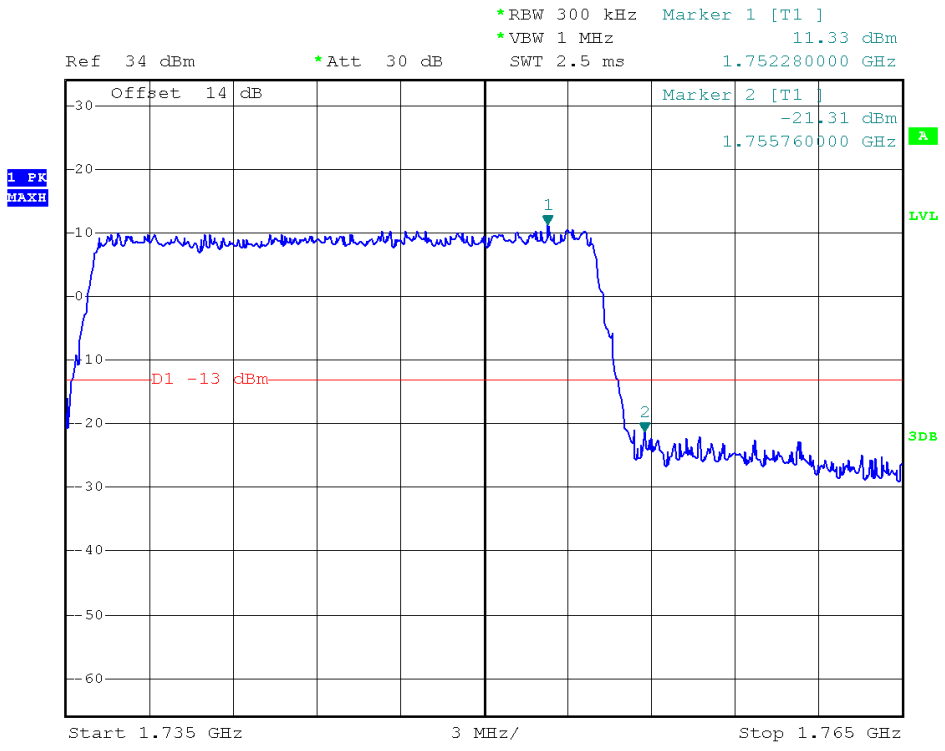
Lower Band Edge Plot for 16QAM -RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM -RB Size 100, RB Offset 0

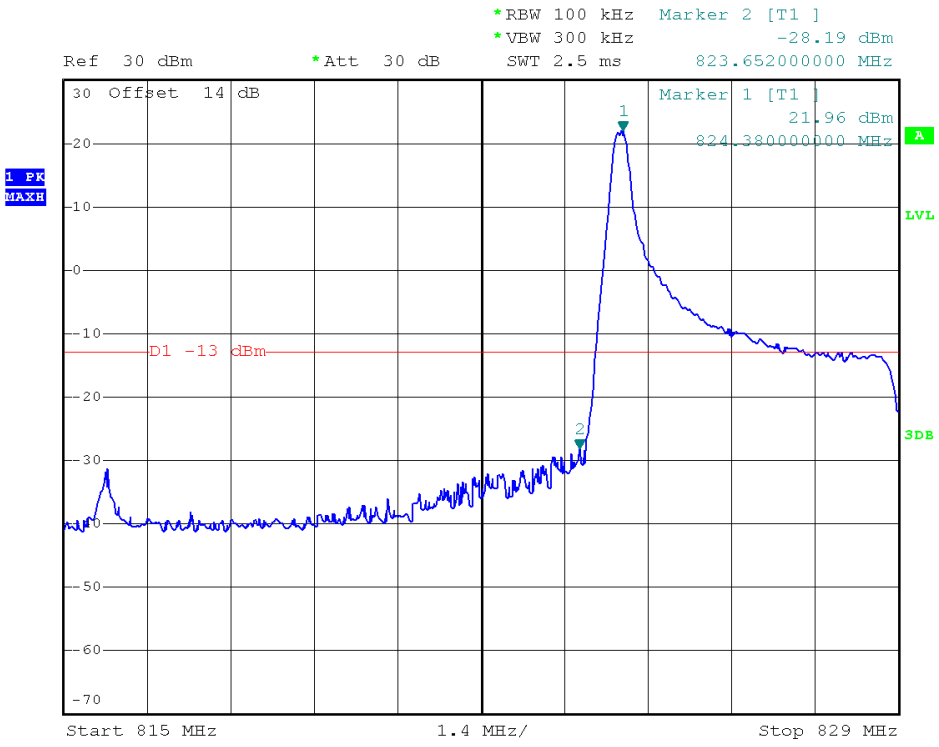


Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 99

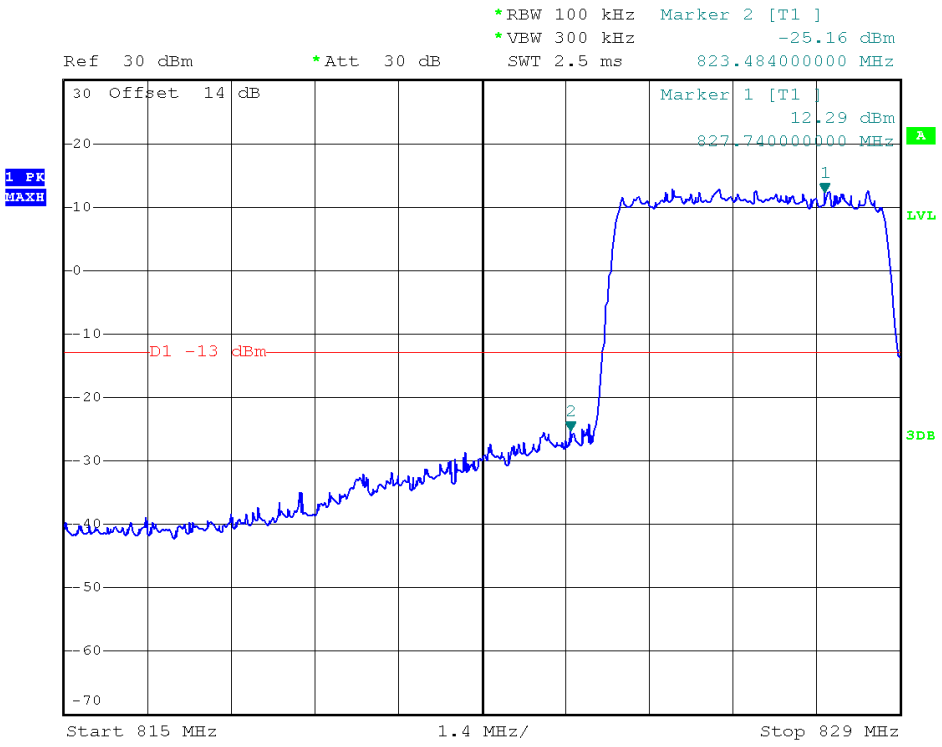


Higher Band Edge Plot for 16QAM -RB Size 100, RB Offset 0

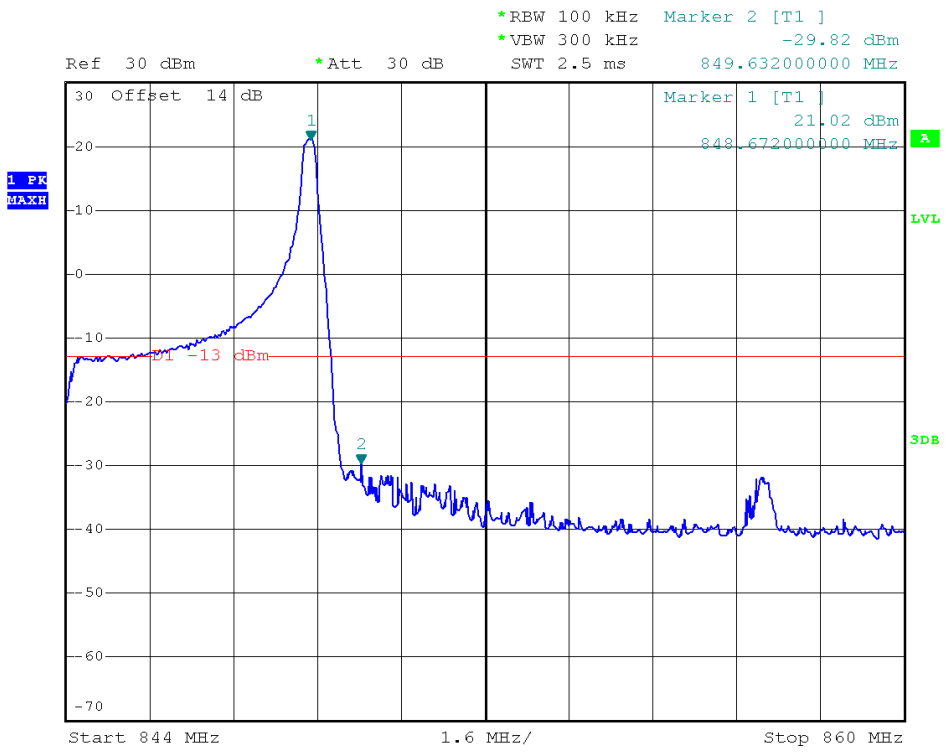
Band	LTE Band 5	Modulation	QPSK
Bandwidth	5MHz		



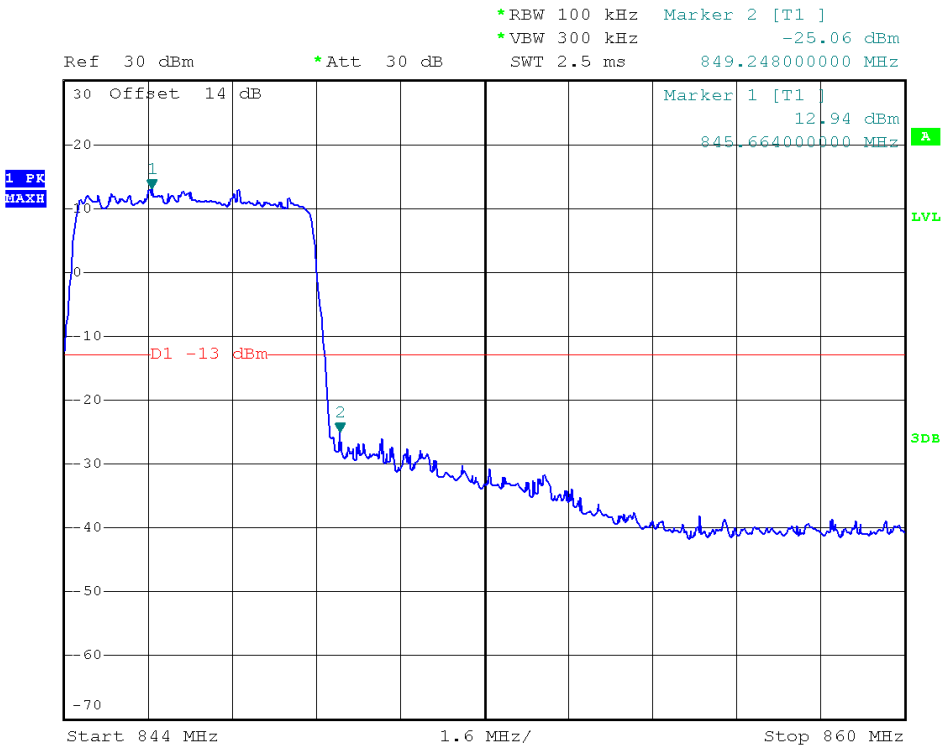
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0

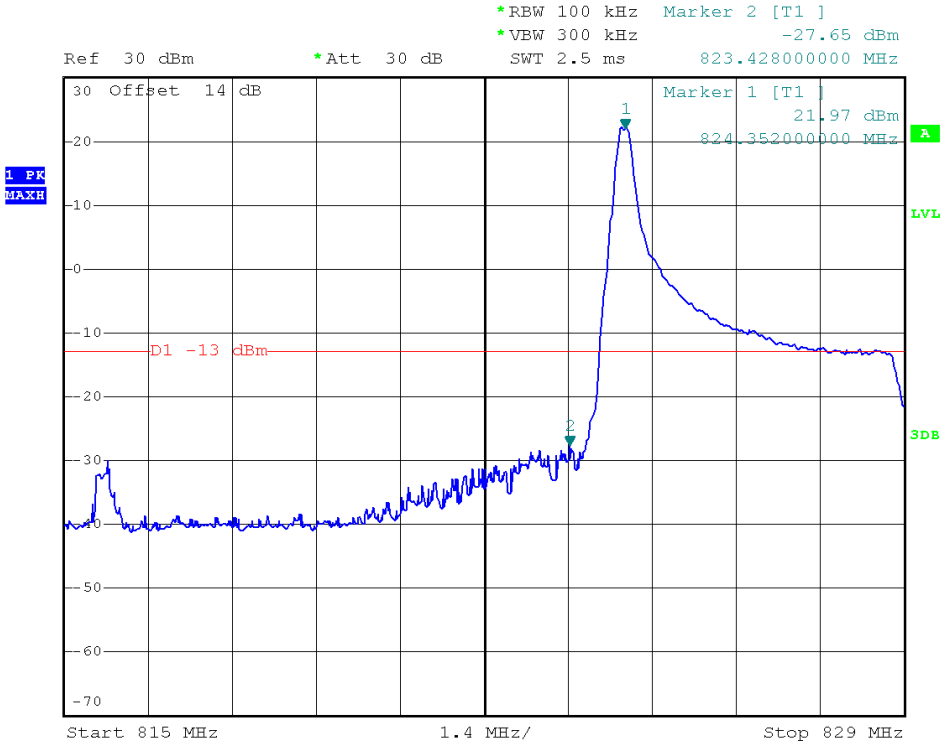


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24

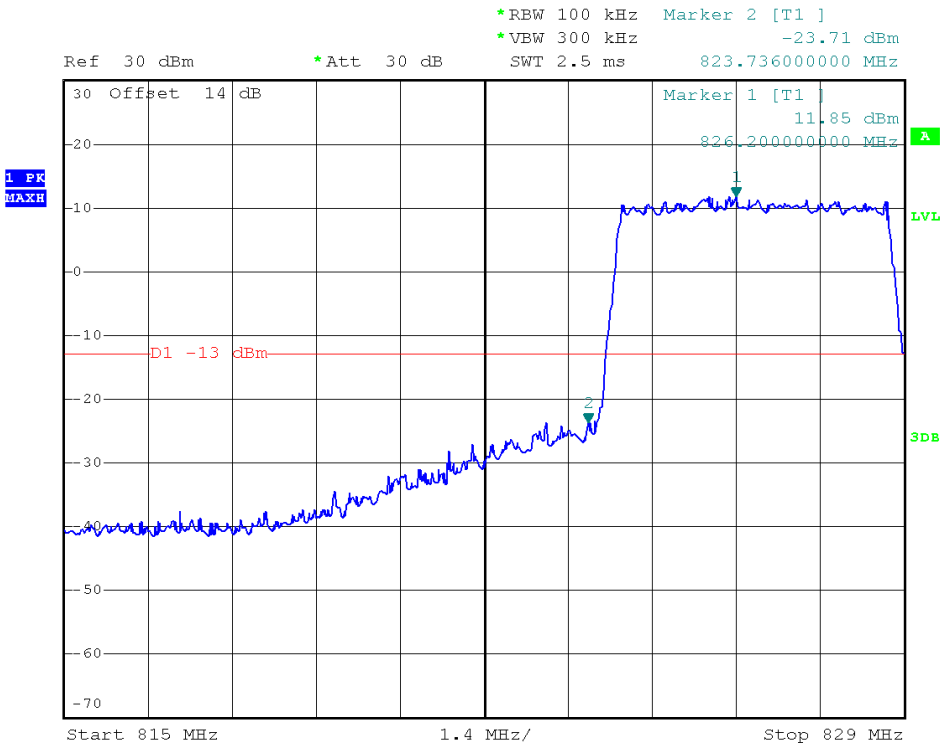


Higher Band Edge Plot for QPSK-RB Size 25, RB Offset 0

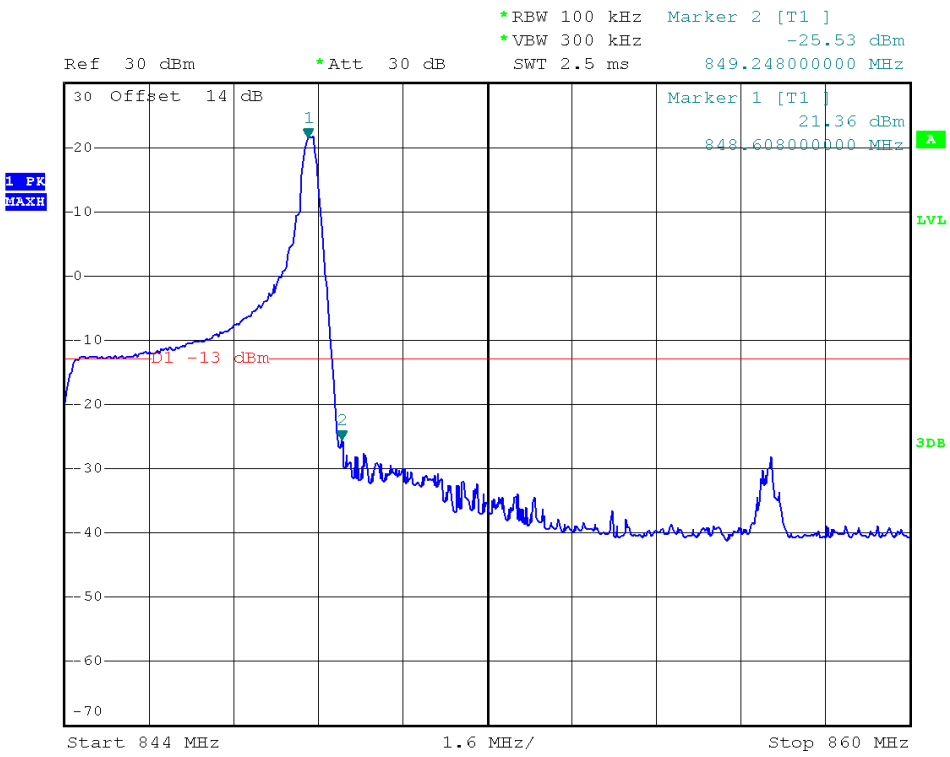
Band	LTE Band 5	Modulation	16QAM
Bandwidth	5MHz		



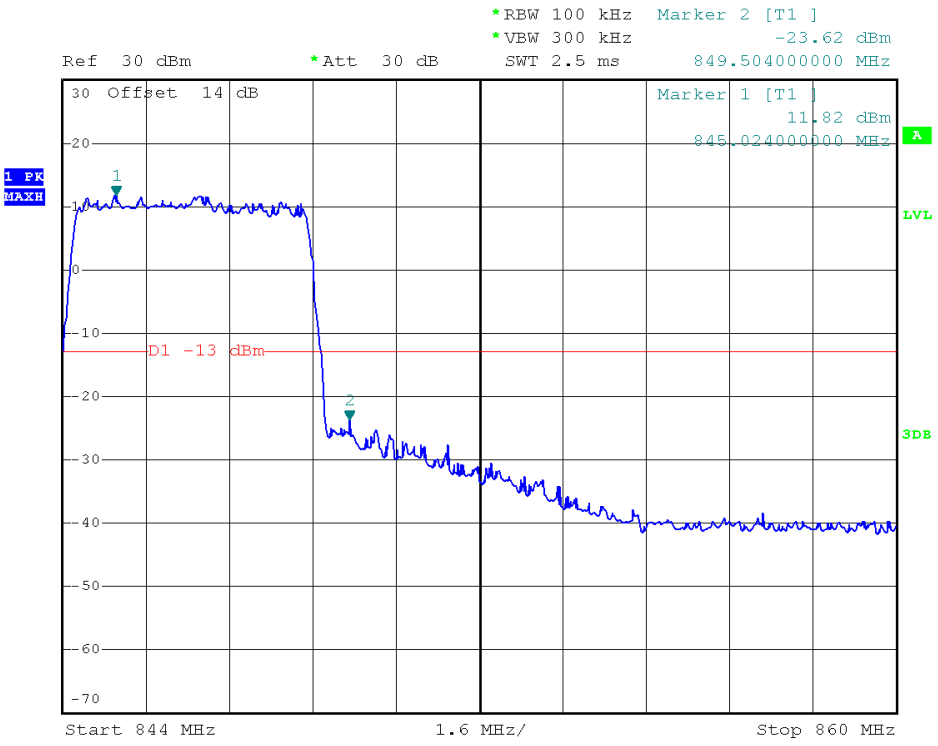
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM -RB Size 25, RB Offset 0

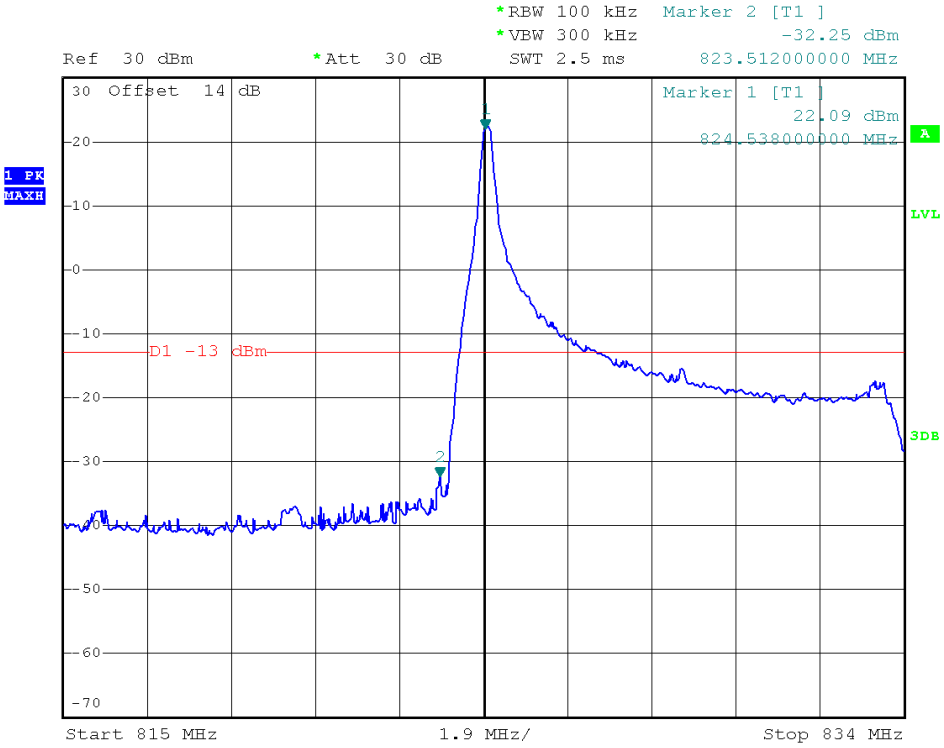


Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 24

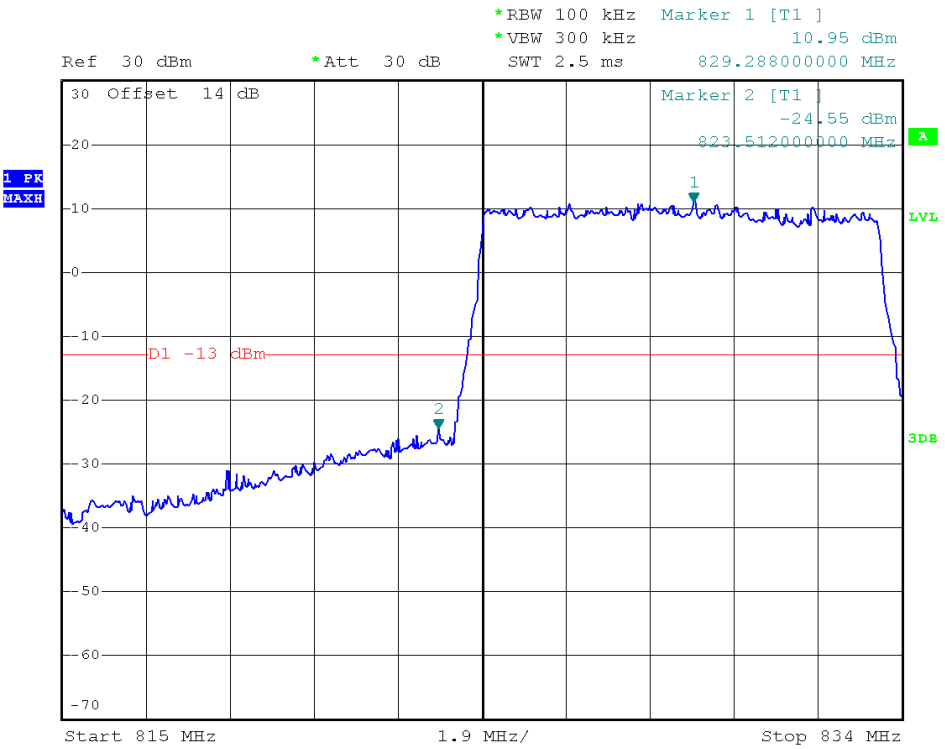


Higher Band Edge Plot for 16QAM -RB Size 25, RB Offset 0

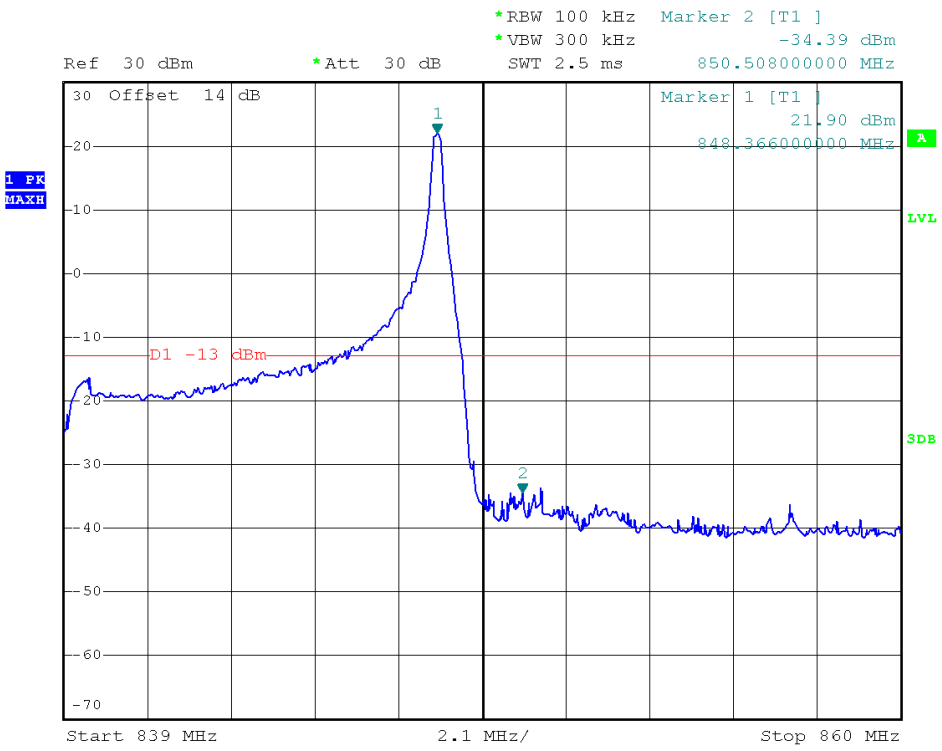
Band	LTE Band 5	Modulation	QPSK
Bandwidth	10MHz		



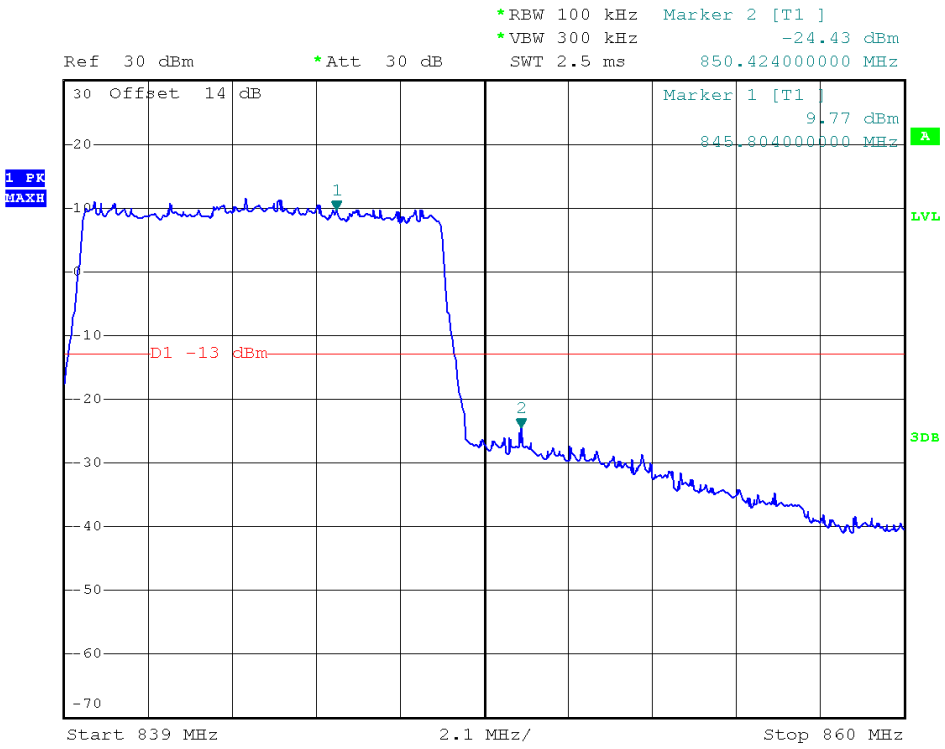
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 50, RB Offset 0

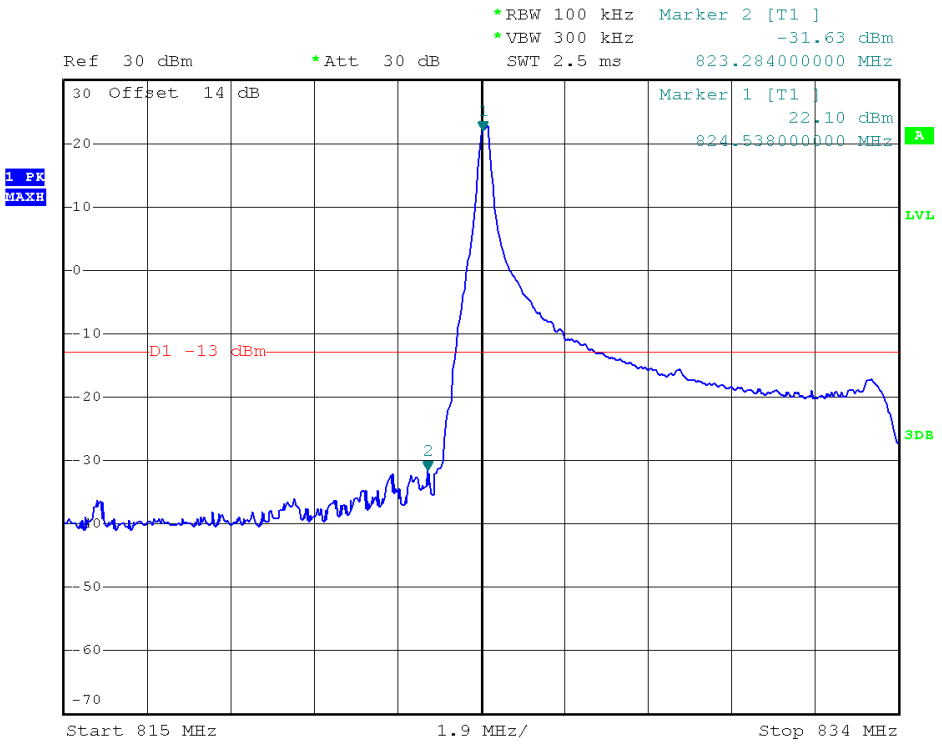


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 49

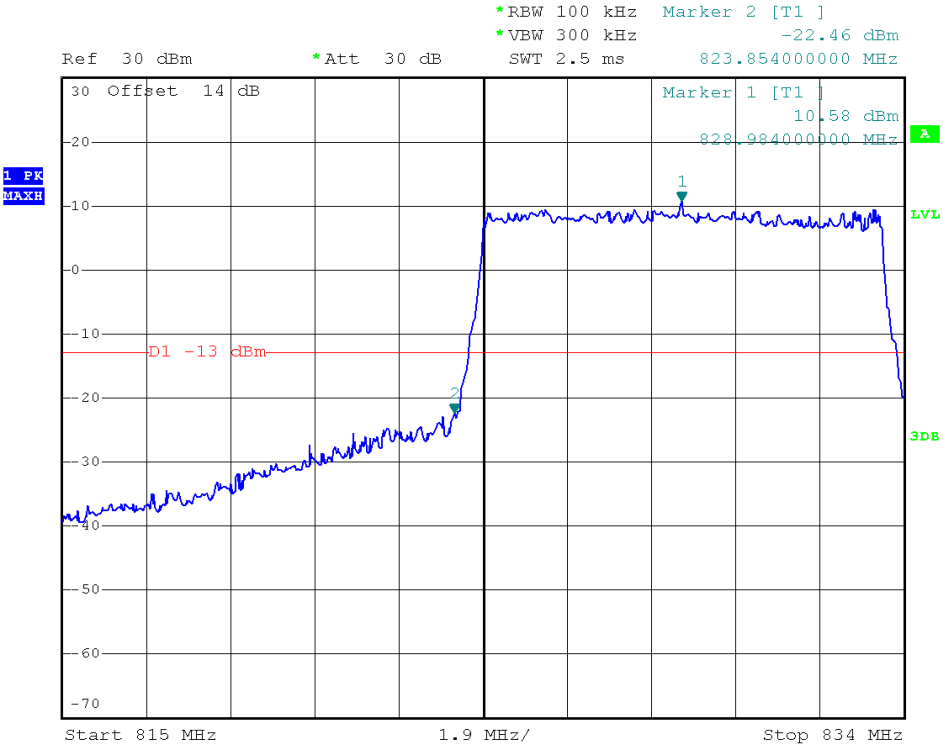


Higher Band Edge Plot for QPSK-RB Size 50, RB Offset 0

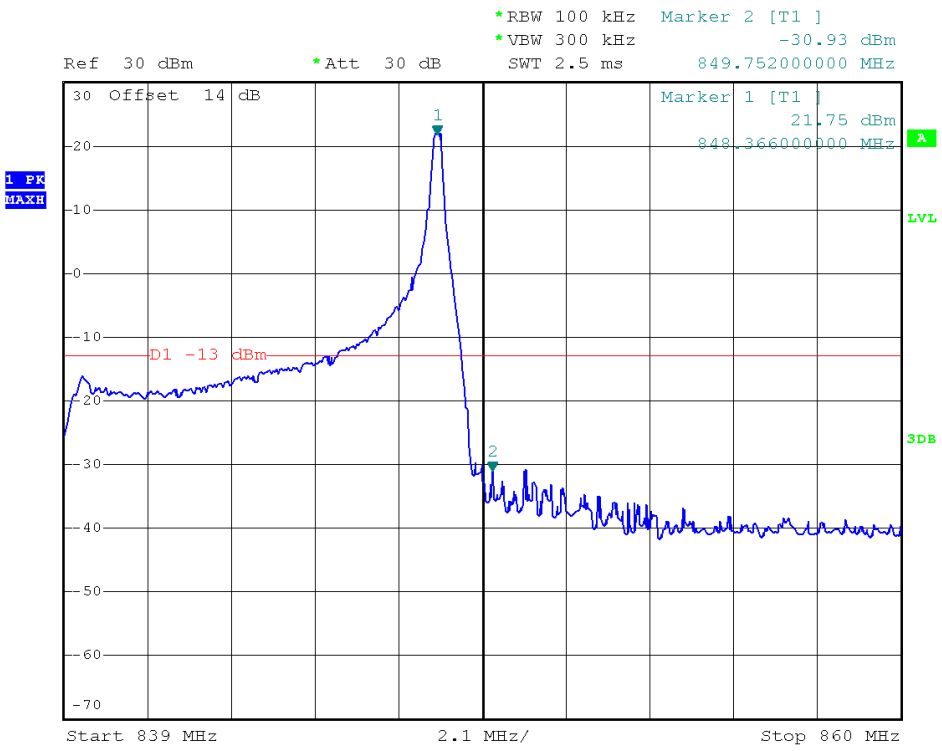
Band	LTE Band 5	Modulation	16QAM
Bandwidth	10MHz		



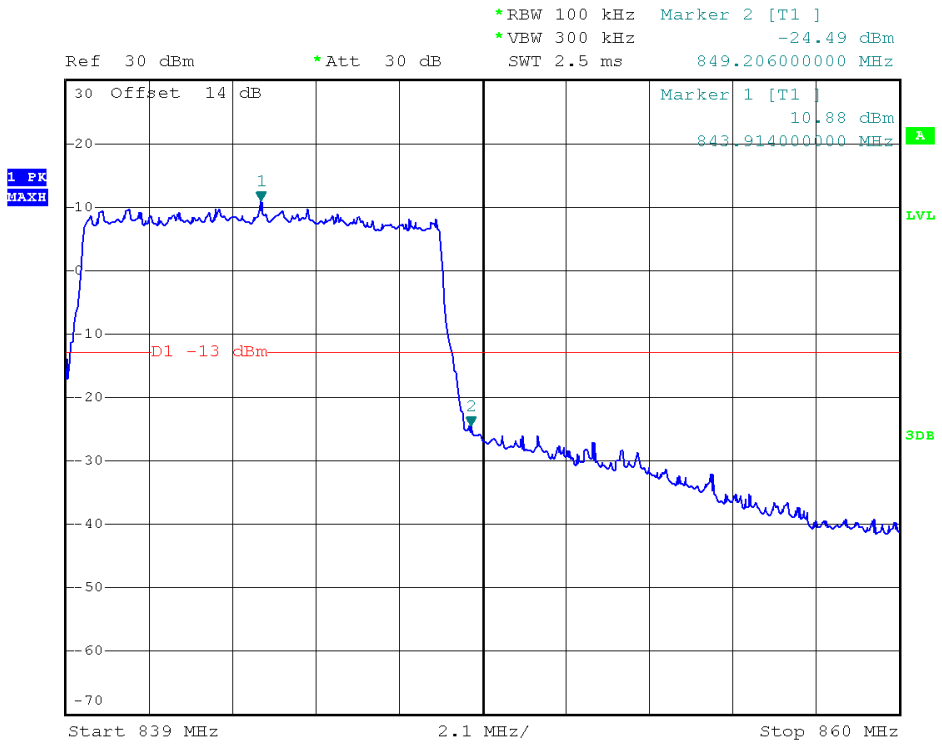
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM -RB Size 50, RB Offset 0

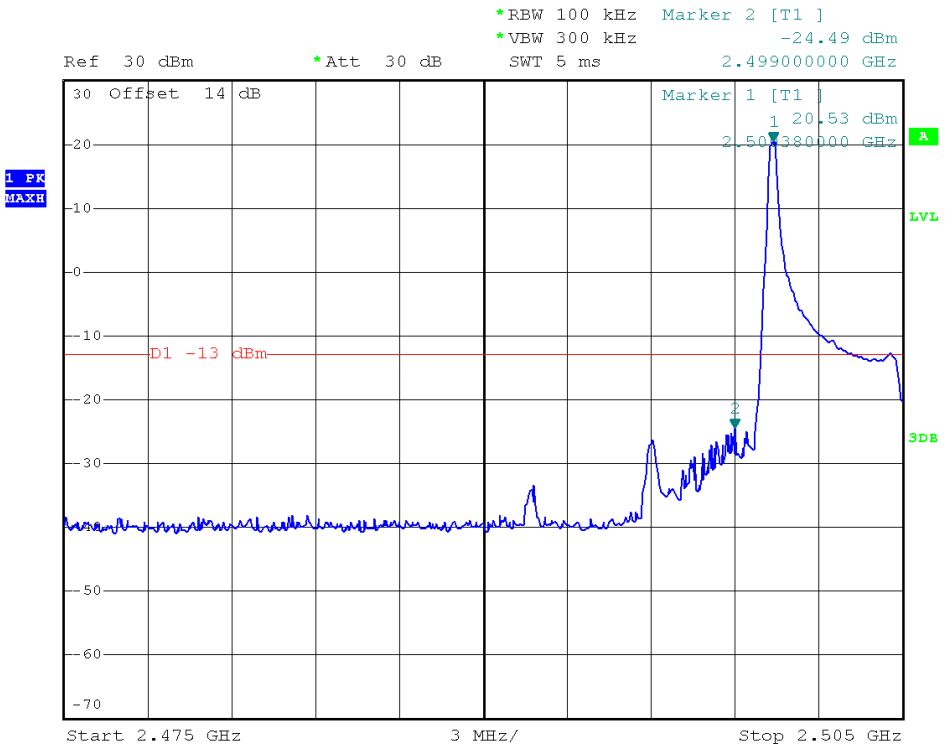


Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 49

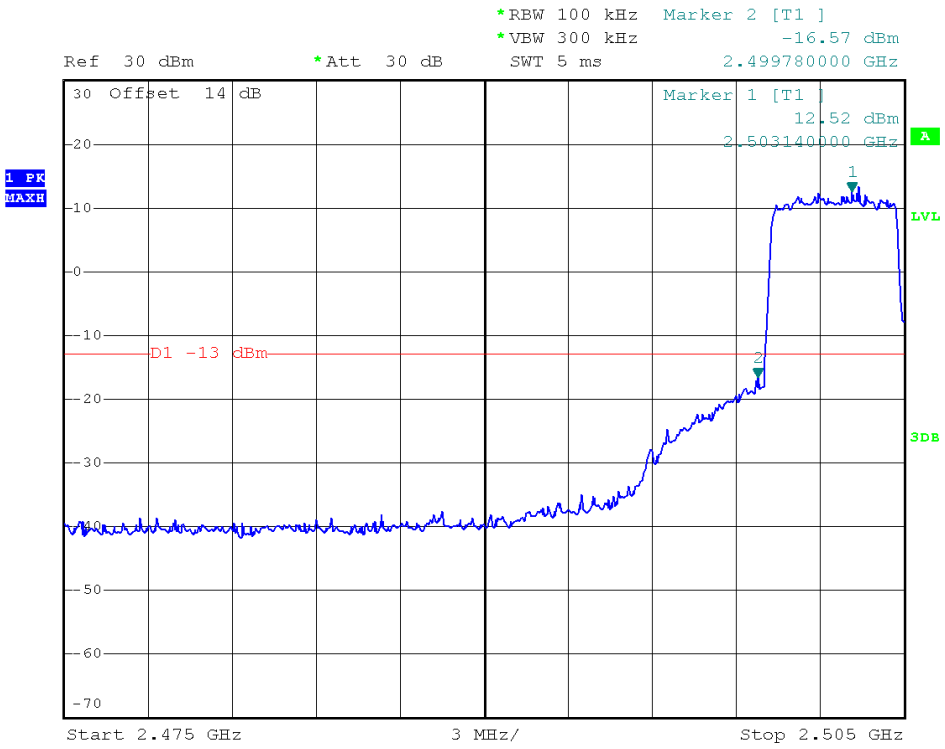


Higher Band Edge Plot for 16QAM -RB Size 50, RB Offset 0

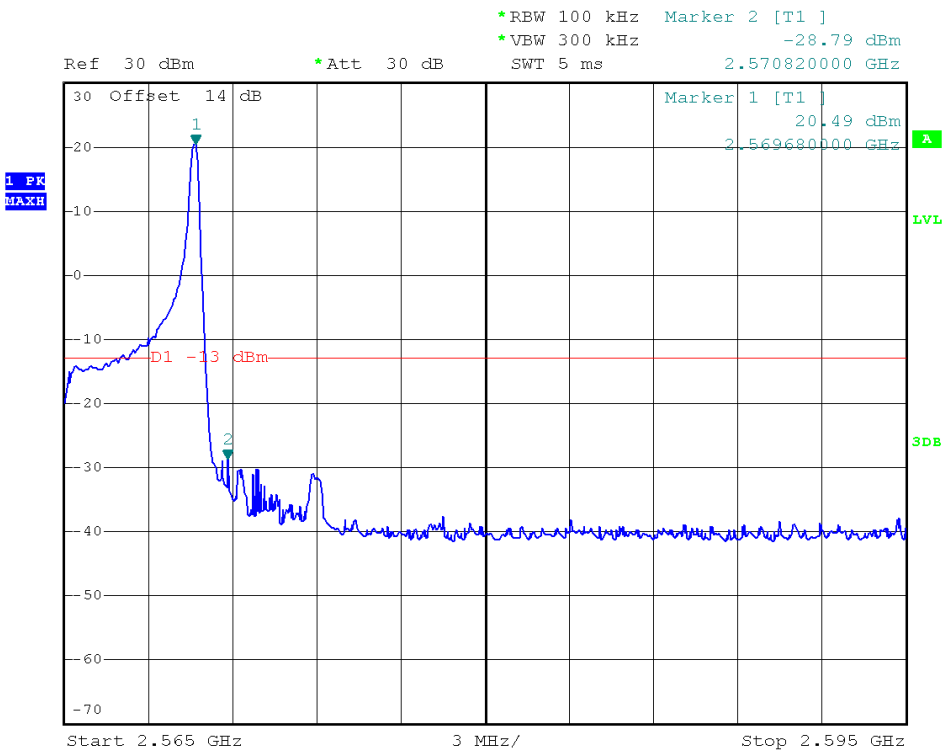
Band	LTE Band 7	Modulation	QPSK
Bandwidth	5MHz		



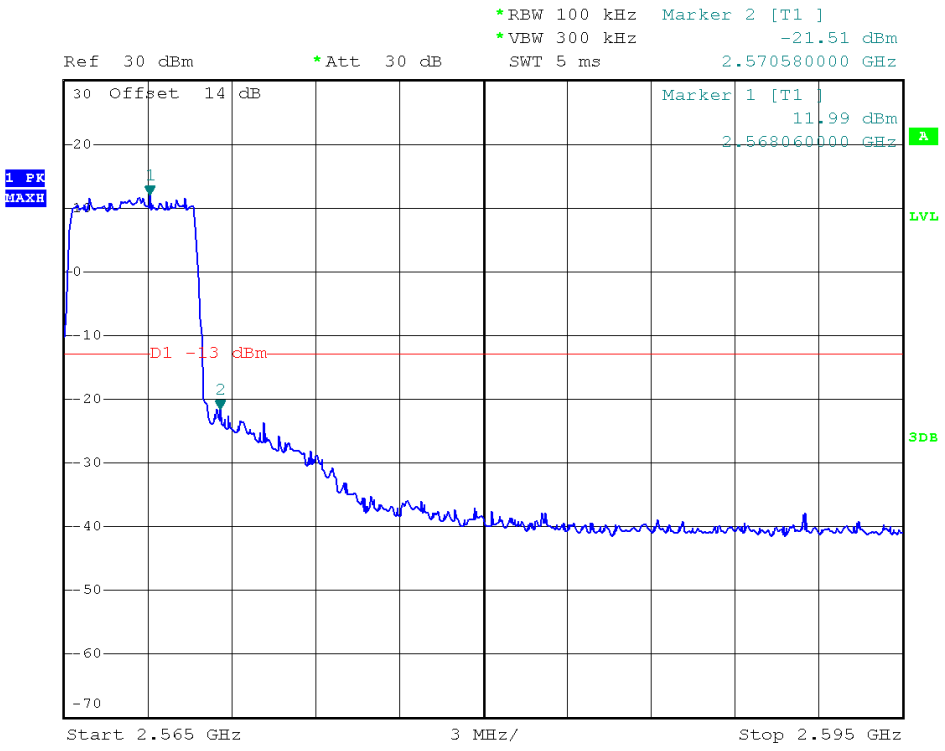
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0

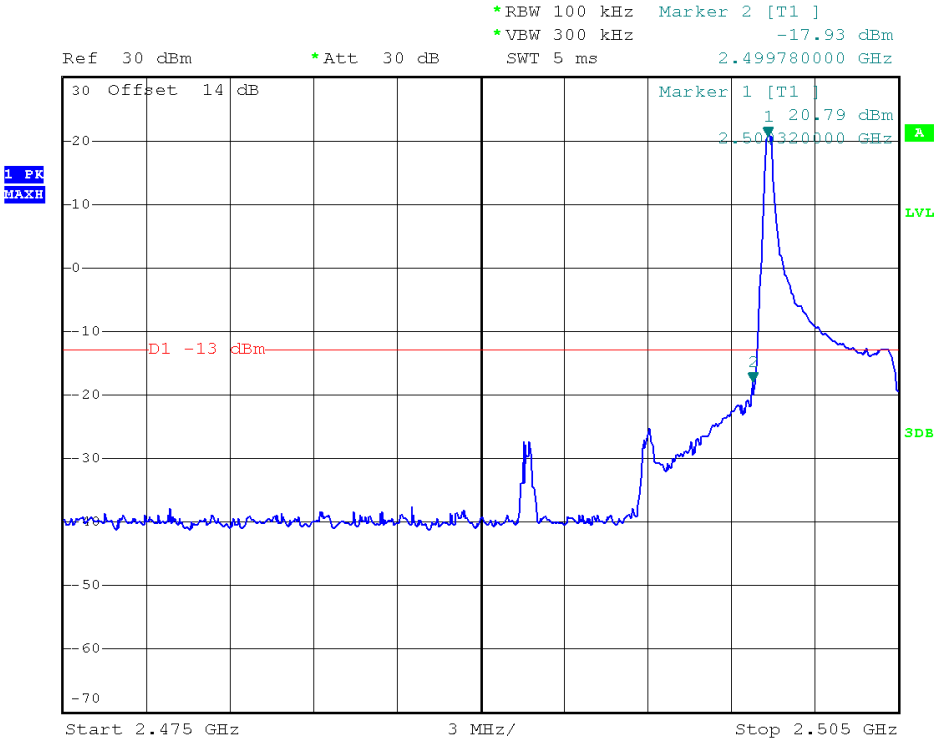


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24

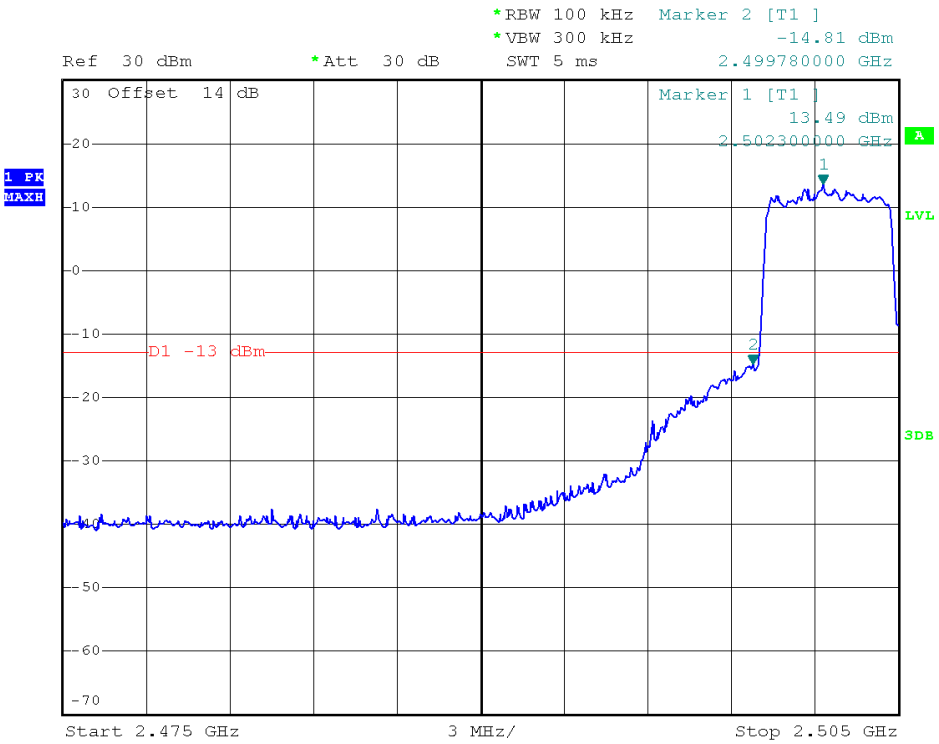


Higher Band Edge Plot for QPSK-RB Size 25, RB Offset 0

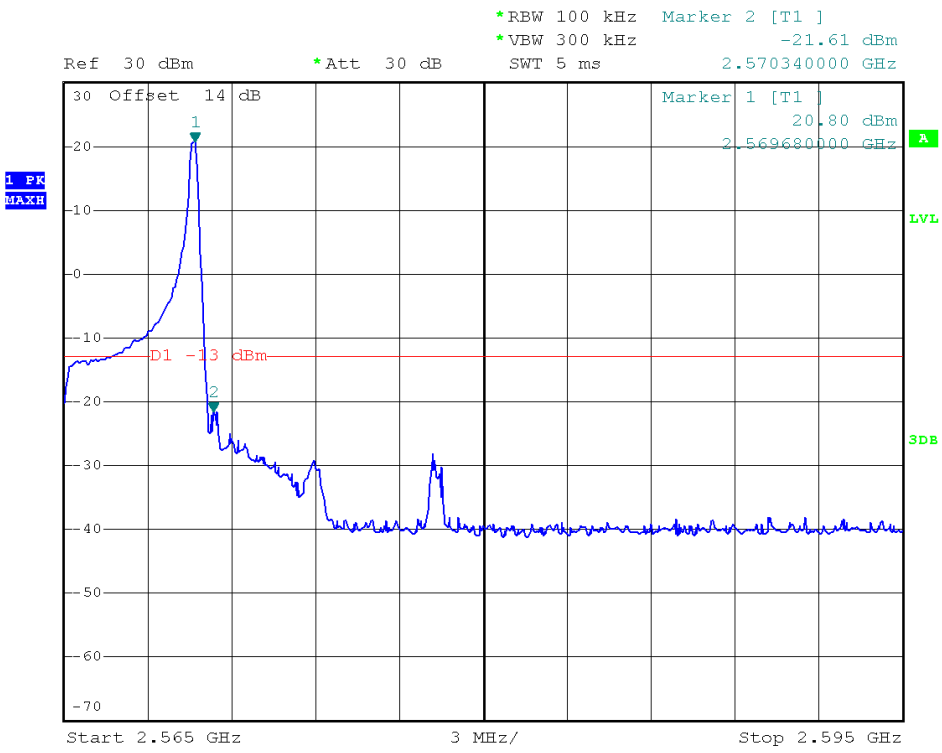
Band	LTE Band 7	Modulation	16QAM
Bandwidth	5MHz		



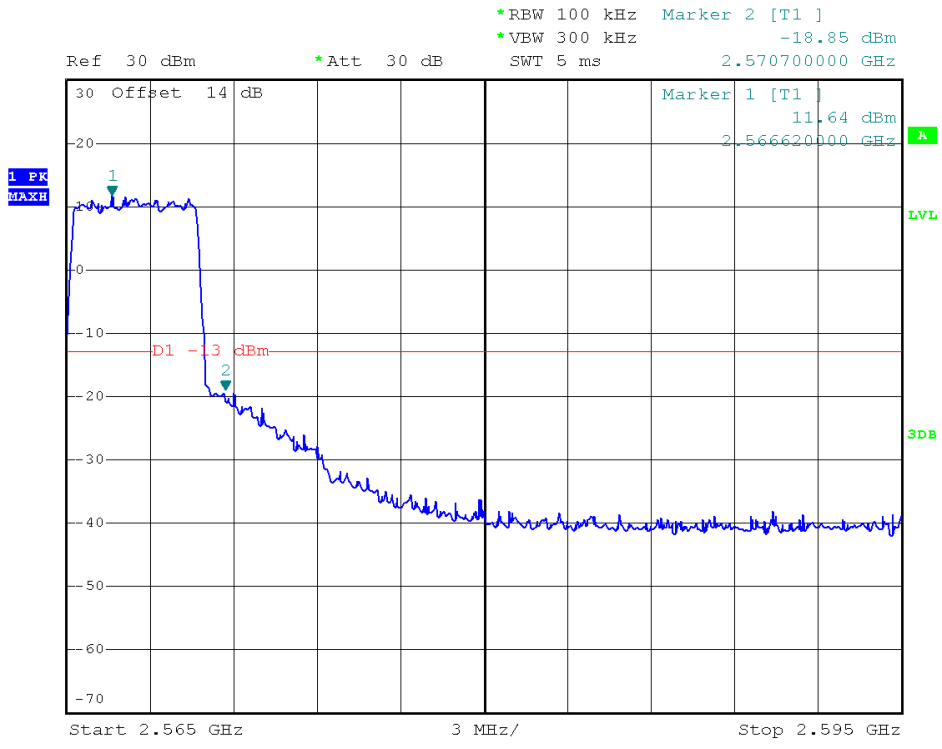
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM -RB Size 25, RB Offset 0

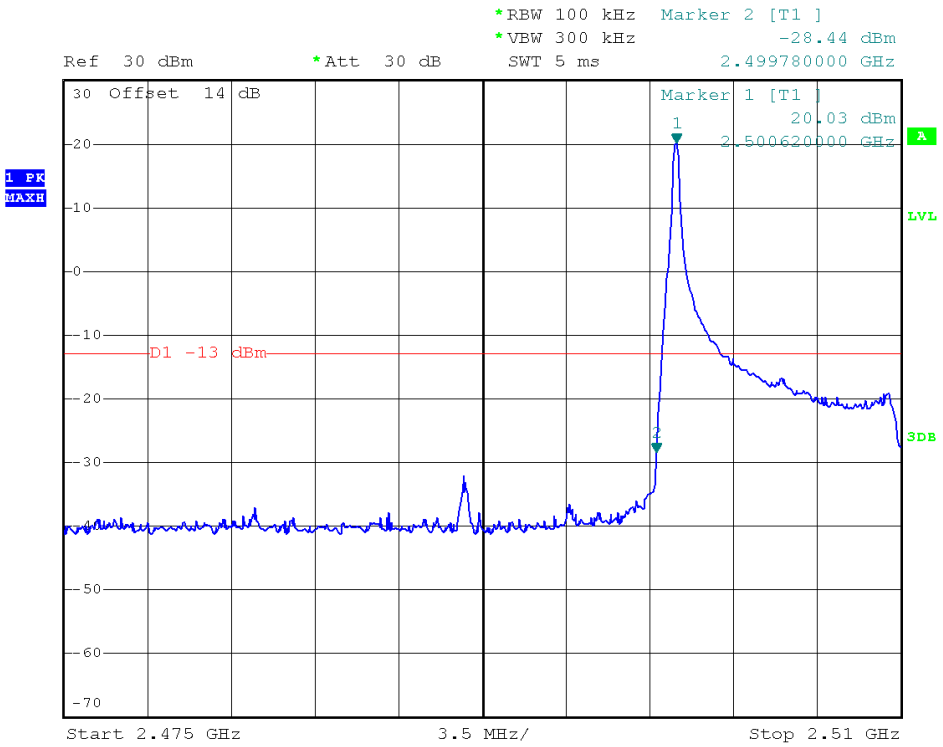


Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 24

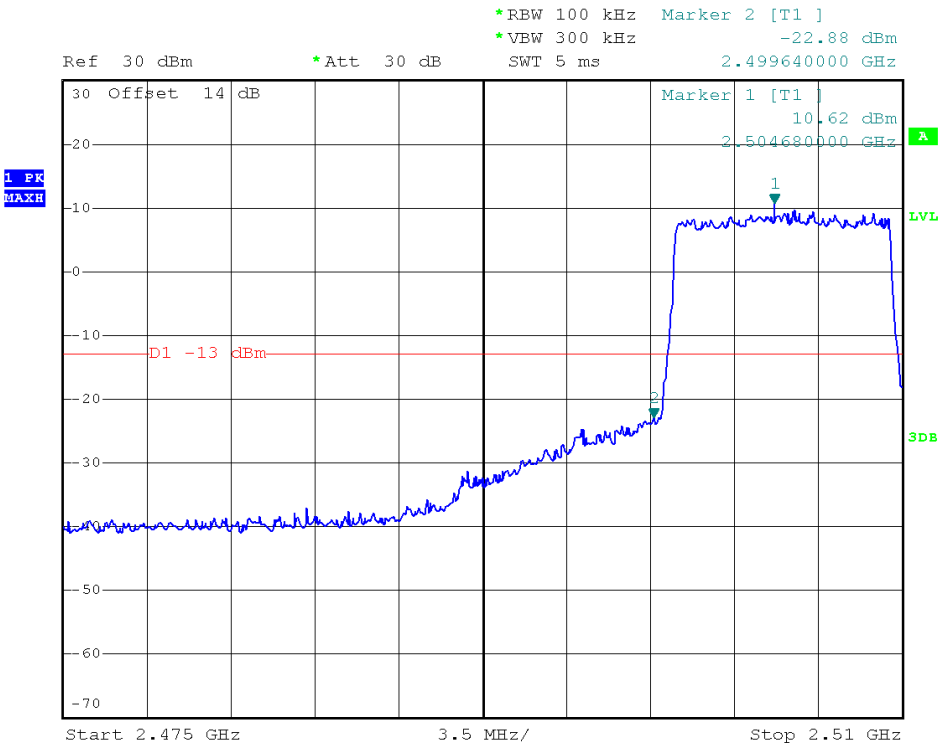


Higher Band Edge Plot for 16QAM -RB Size 25, RB Offset 0

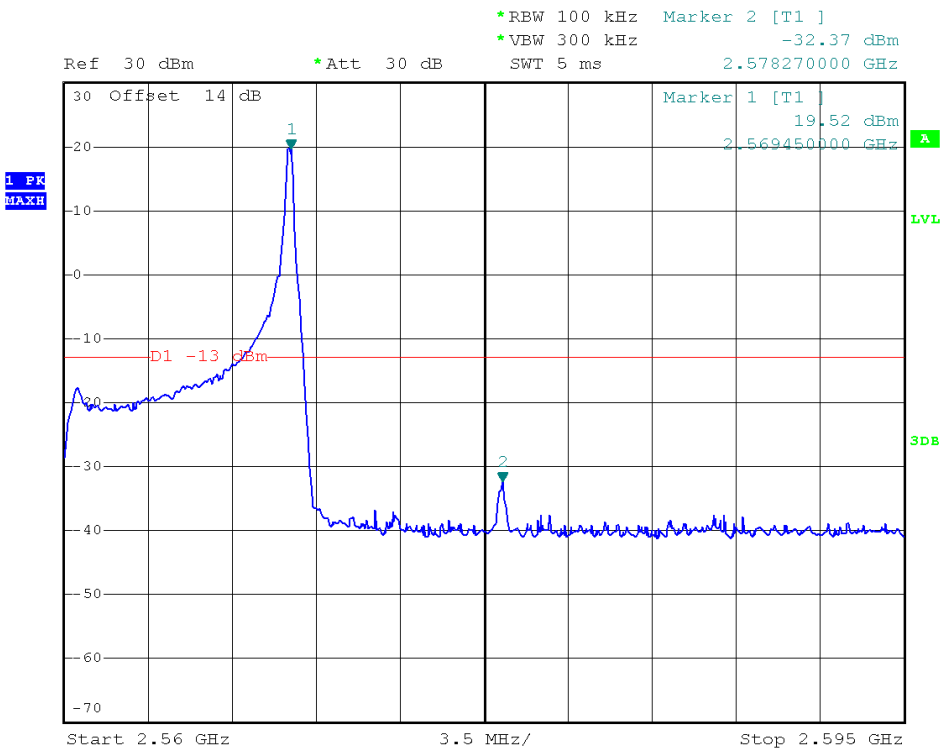
Band	LTE Band 7	Modulation	QPSK
Bandwidth	10MHz		



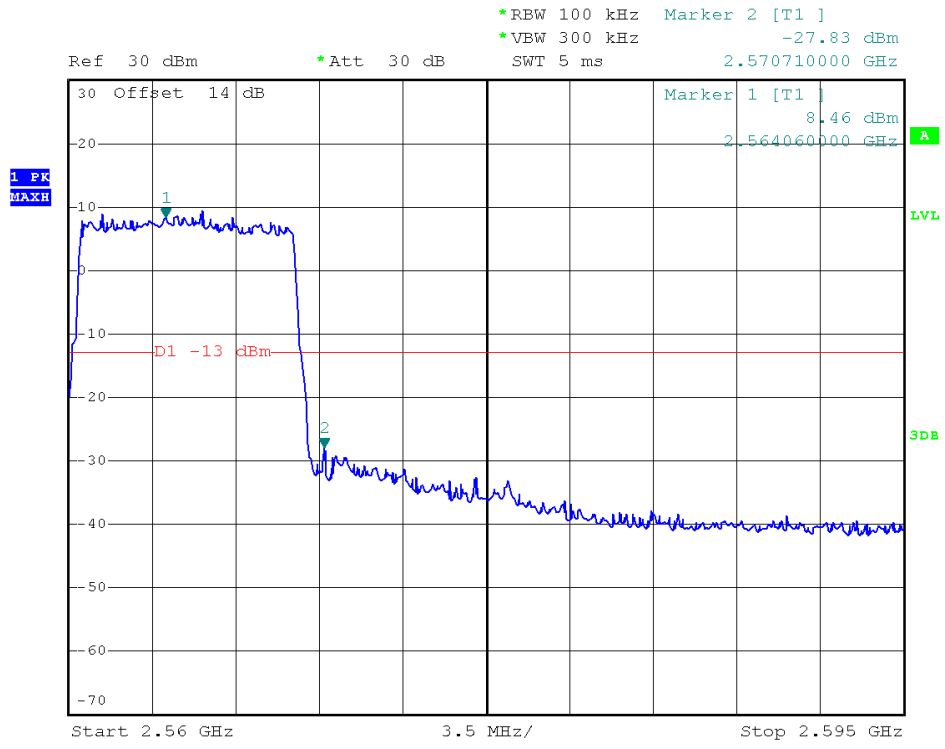
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 50, RB Offset 0

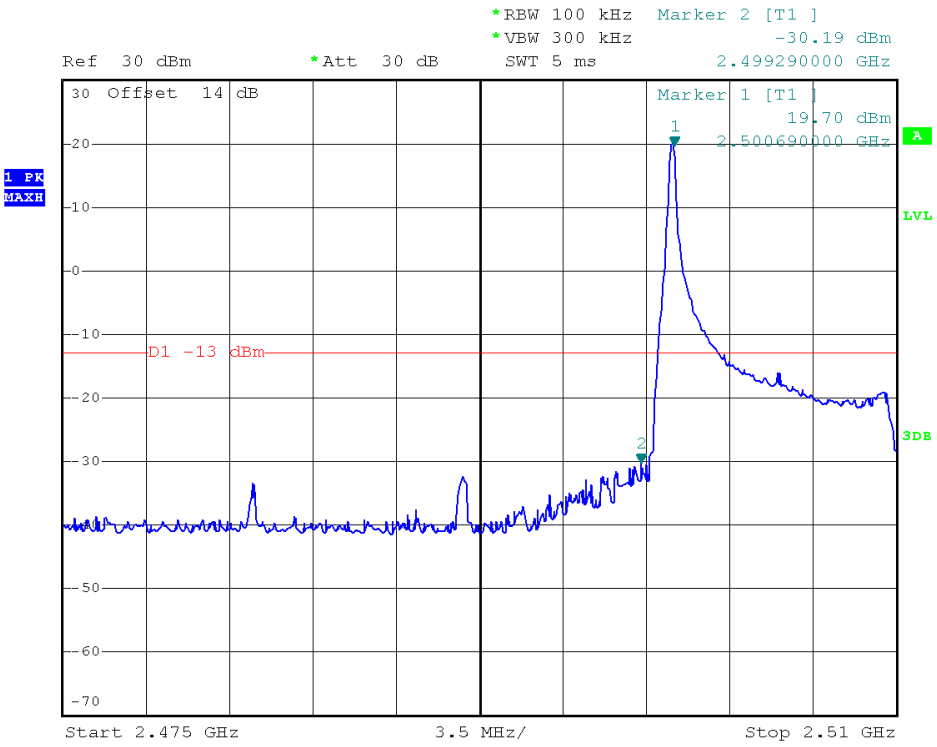


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 49

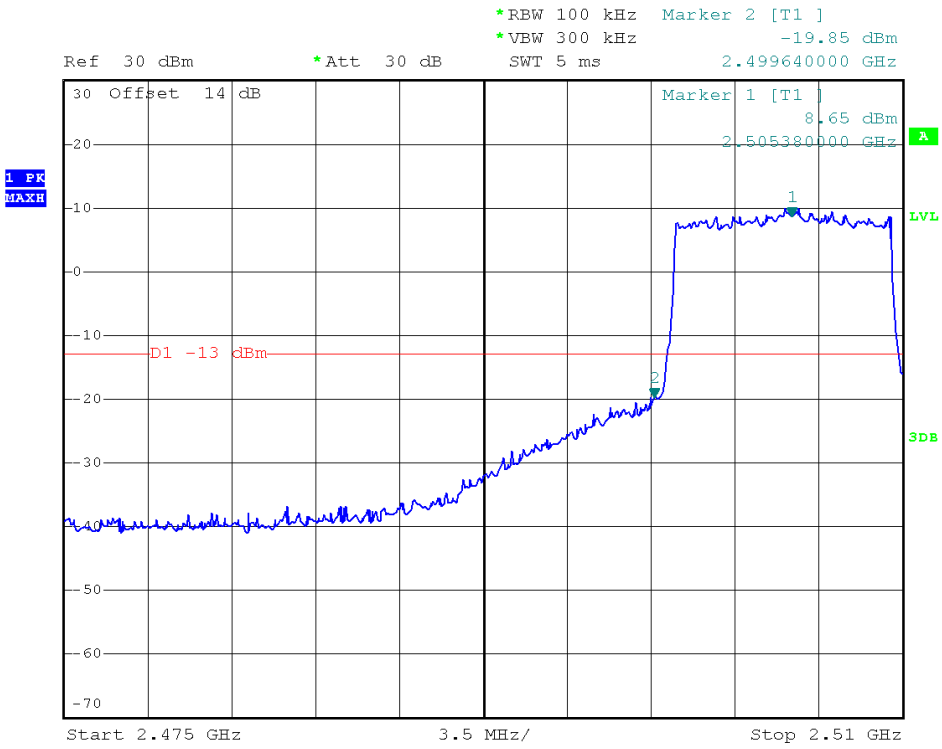


Higher Band Edge Plot for QPSK-RB Size 50, RB Offset 0

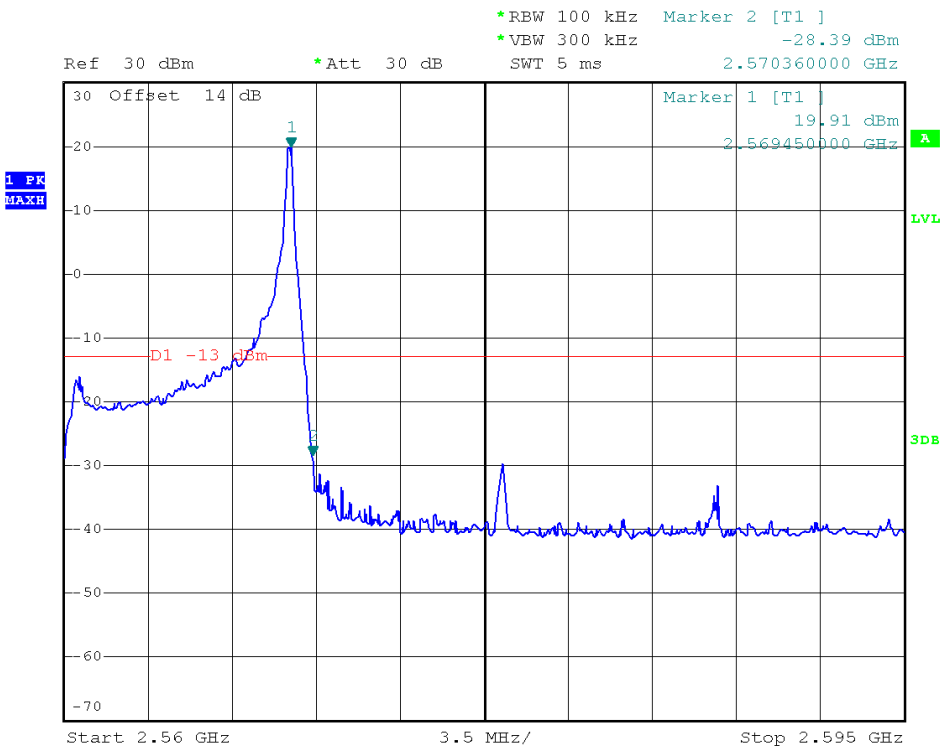
Band	LTE Band 7	Modulation	16QAM
Bandwidth	10MHz		



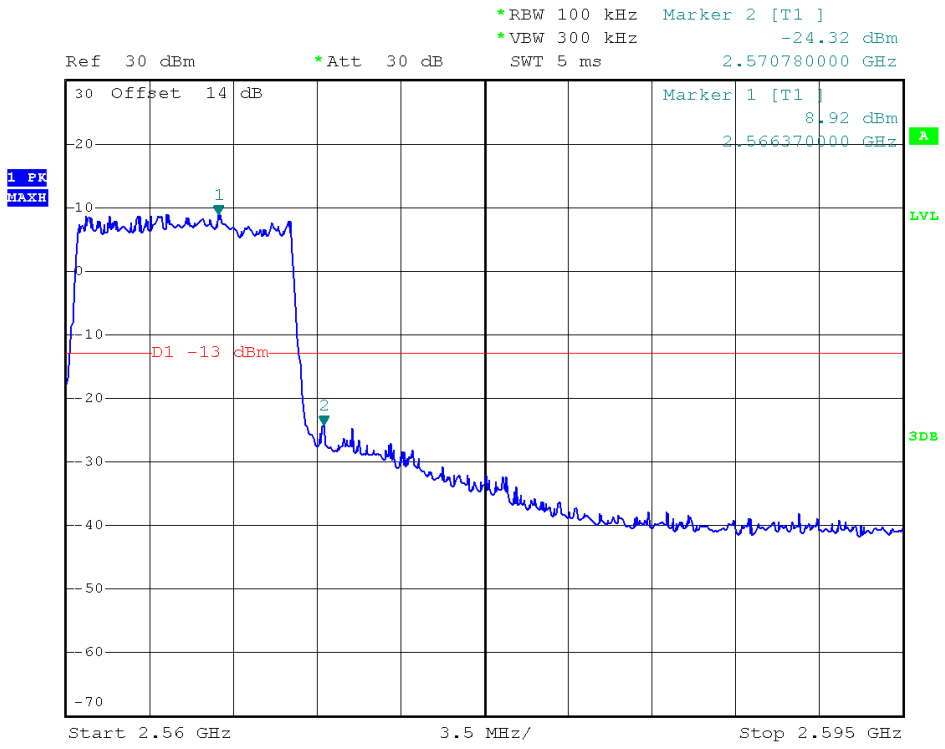
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM -RB Size 50, RB Offset 0

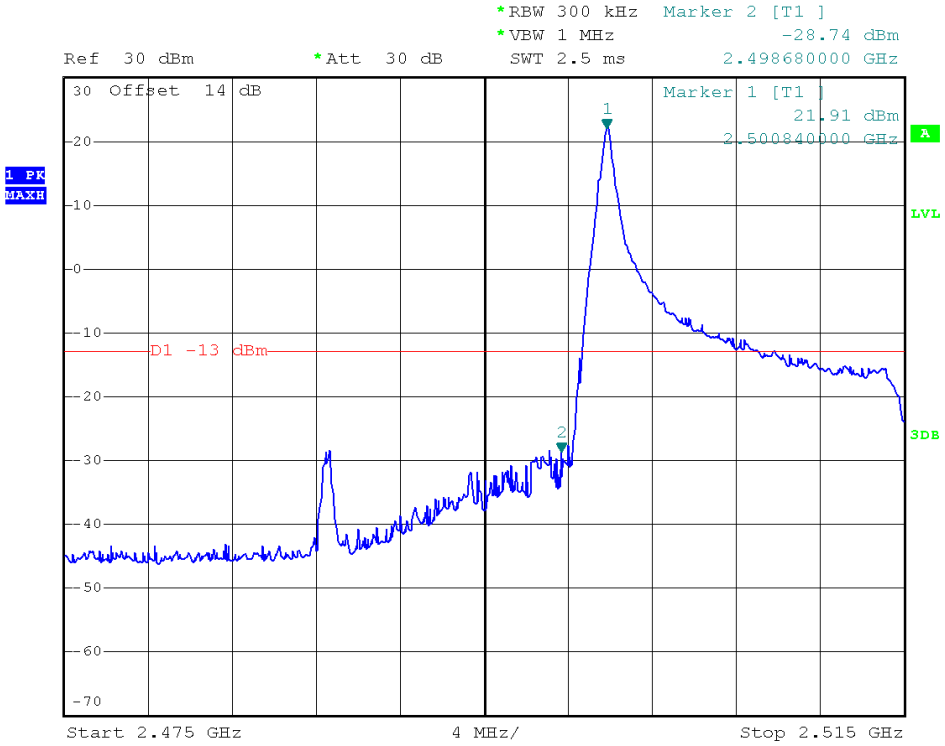


Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 49

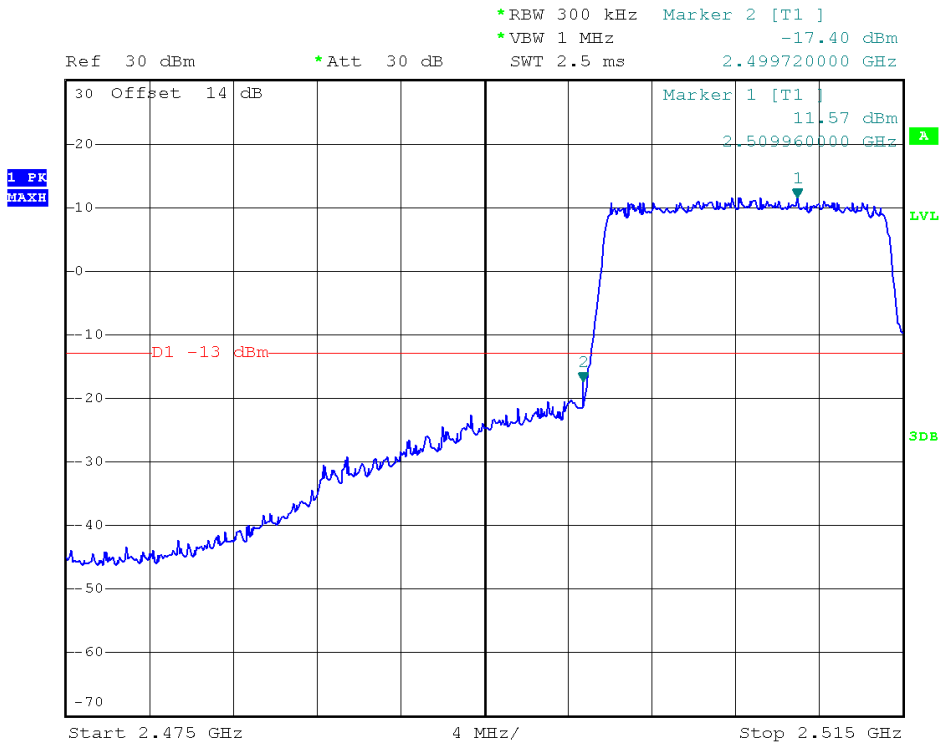


Higher Band Edge Plot for 16QAM -RB Size 50, RB Offset 0

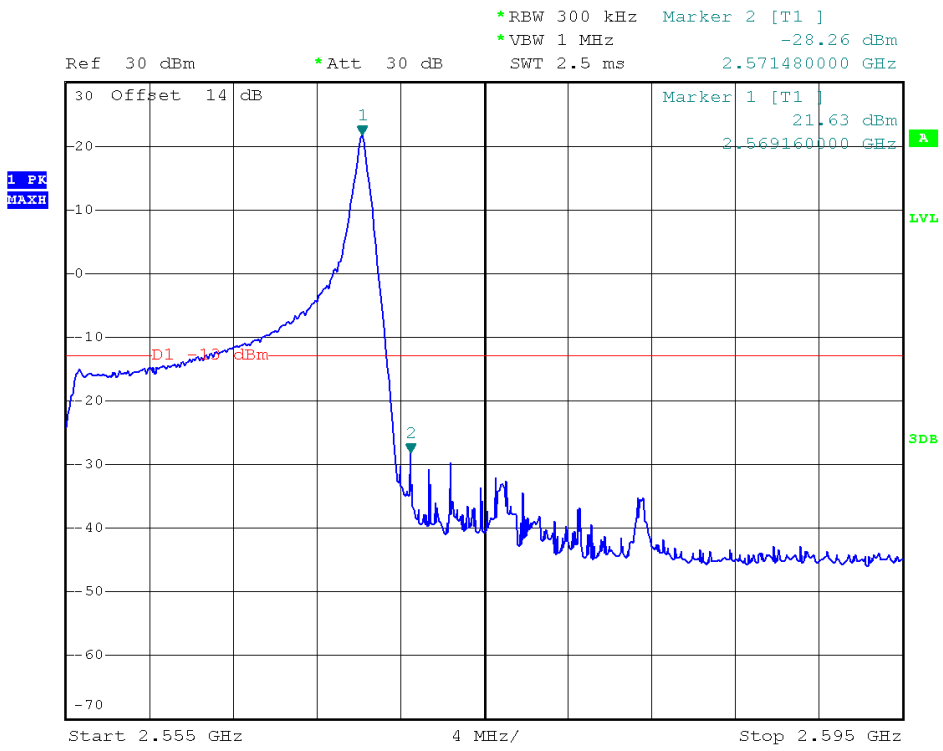
Band	LTE Band 7	Modulation	QPSK
Bandwidth	15MHz		



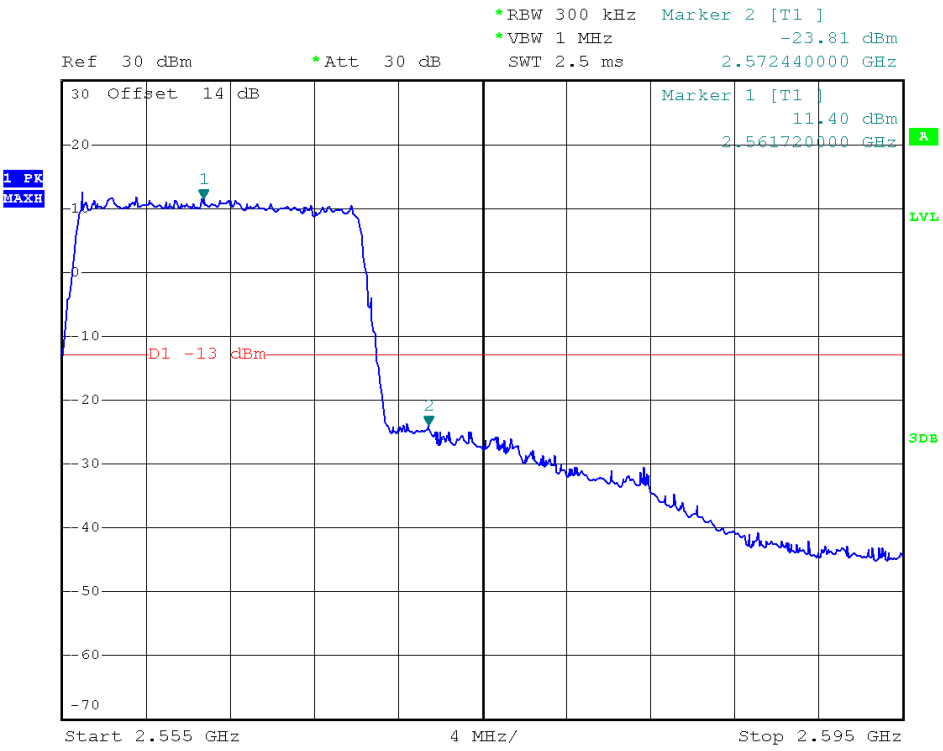
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 75, RB Offset 0

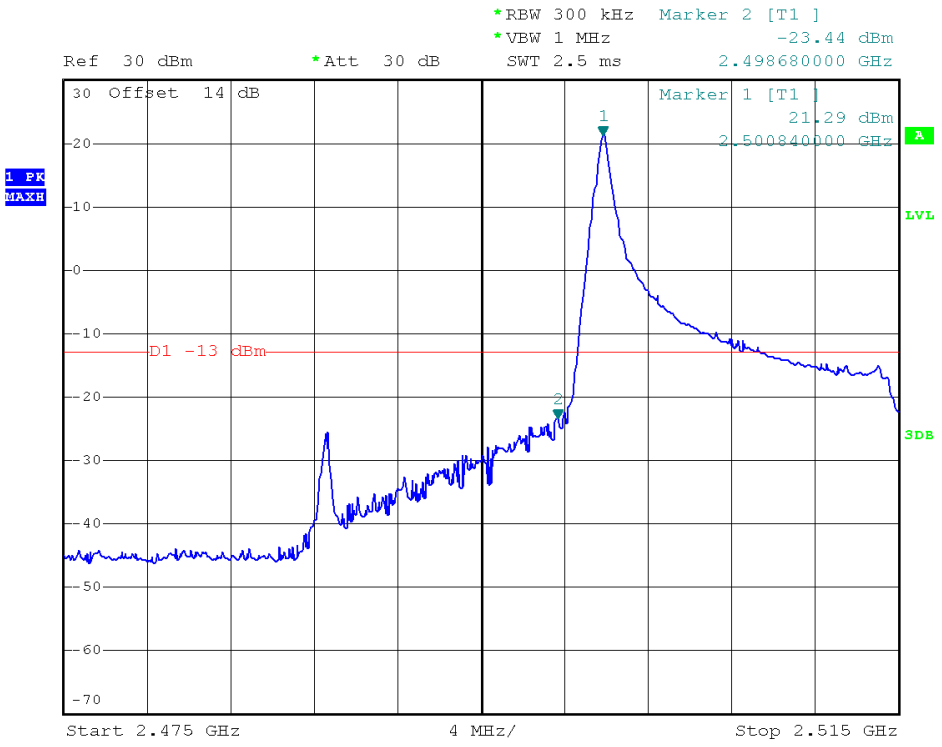


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 74

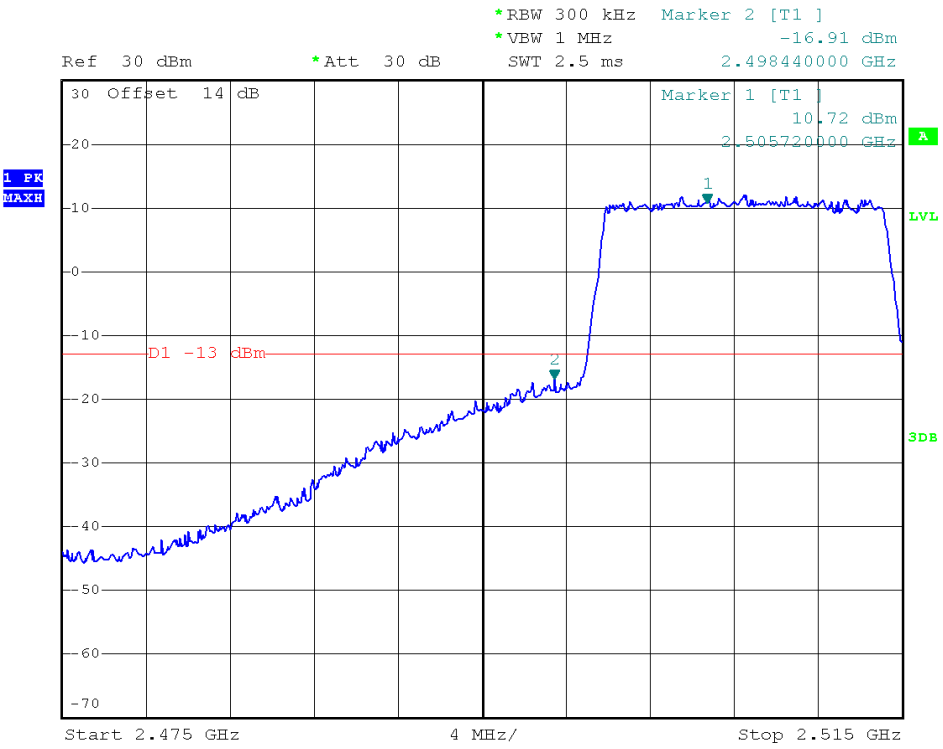


Higher Band Edge Plot for QPSK-RB Size 75, RB Offset 0

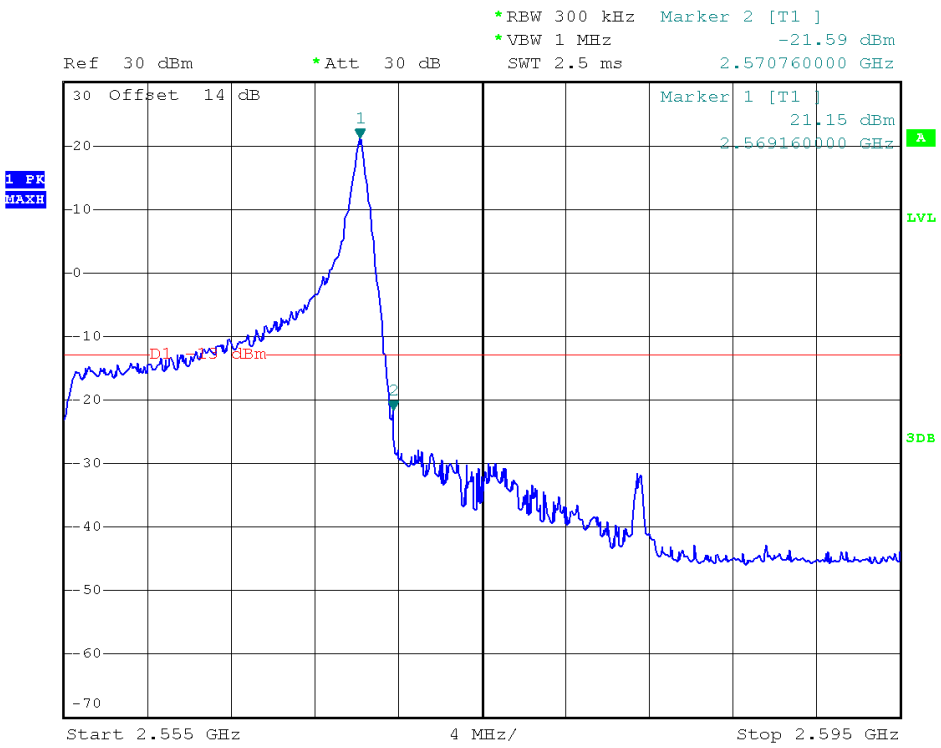
Band	LTE Band 7	Modulation	16QAM
Bandwidth	15MHz		



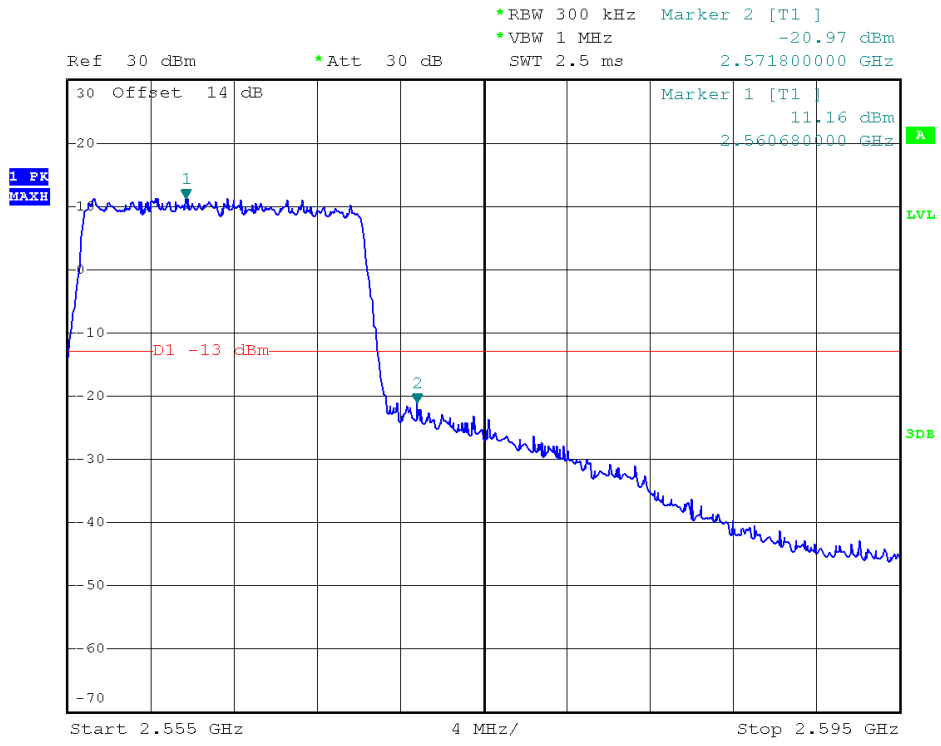
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM -RB Size 75, RB Offset 0

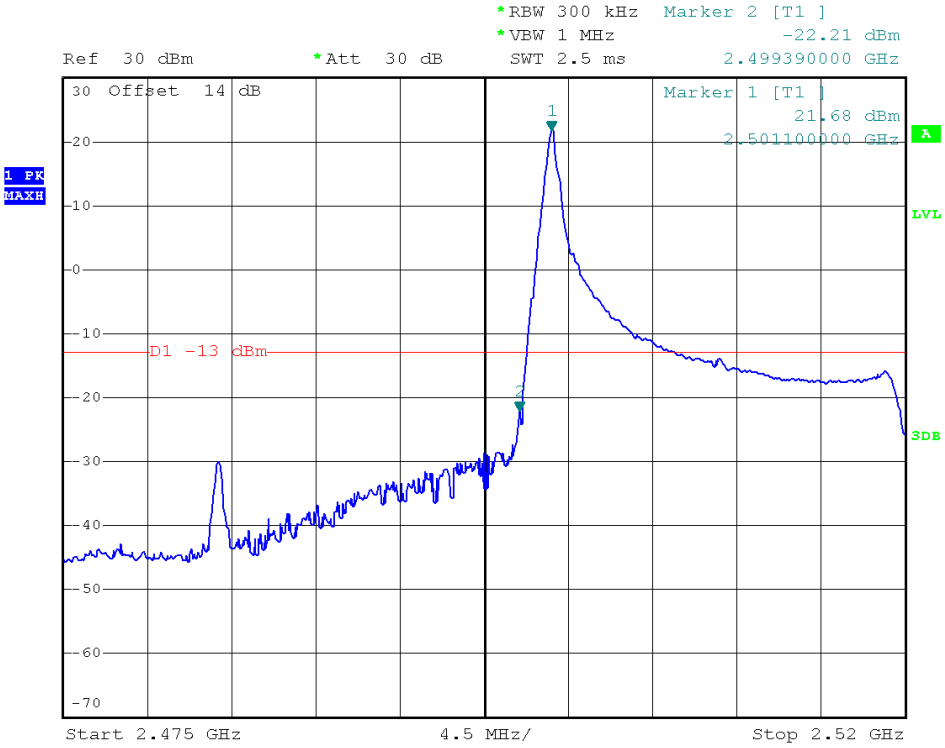


Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 74

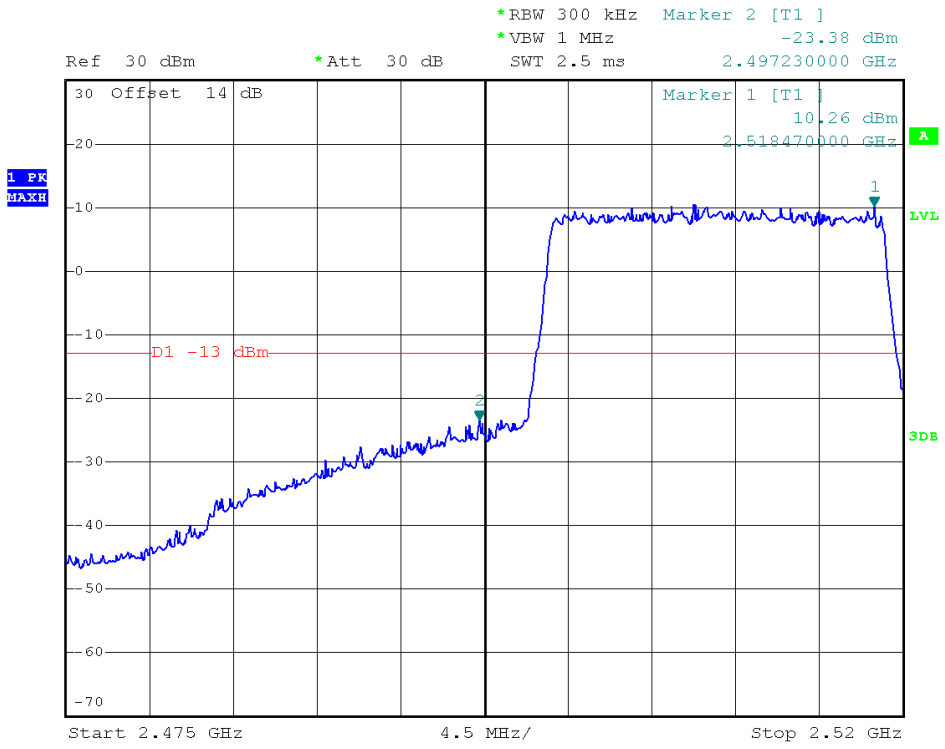


Higher Band Edge Plot for 16QAM -RB Size 75, RB Offset 0

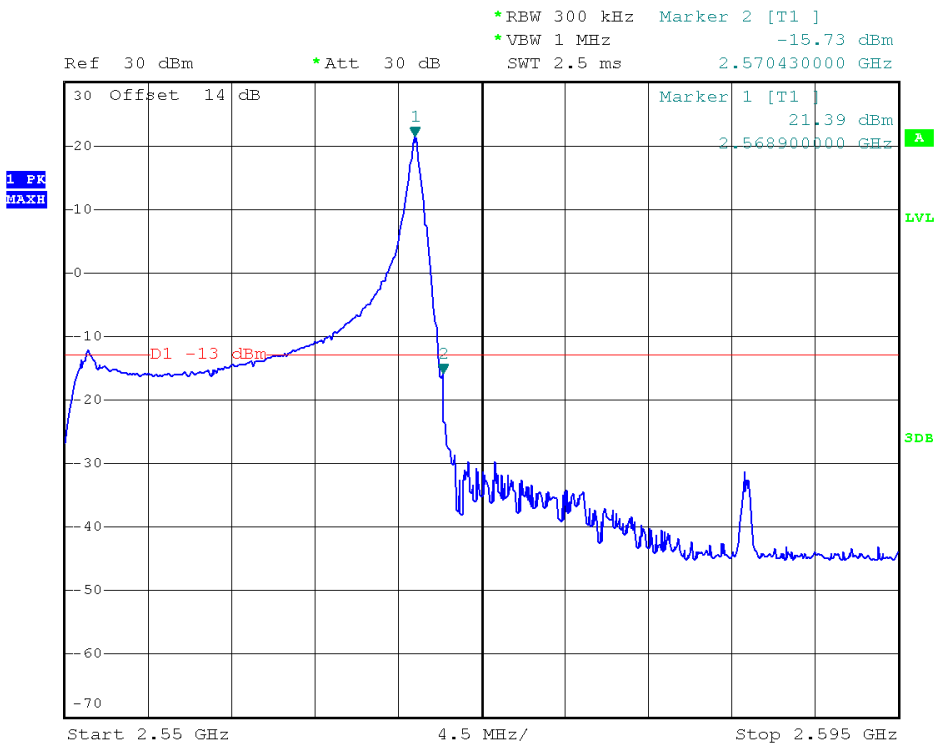
Band	LTE Band 7	Modulation	QPSK
Bandwidth	20MHz		



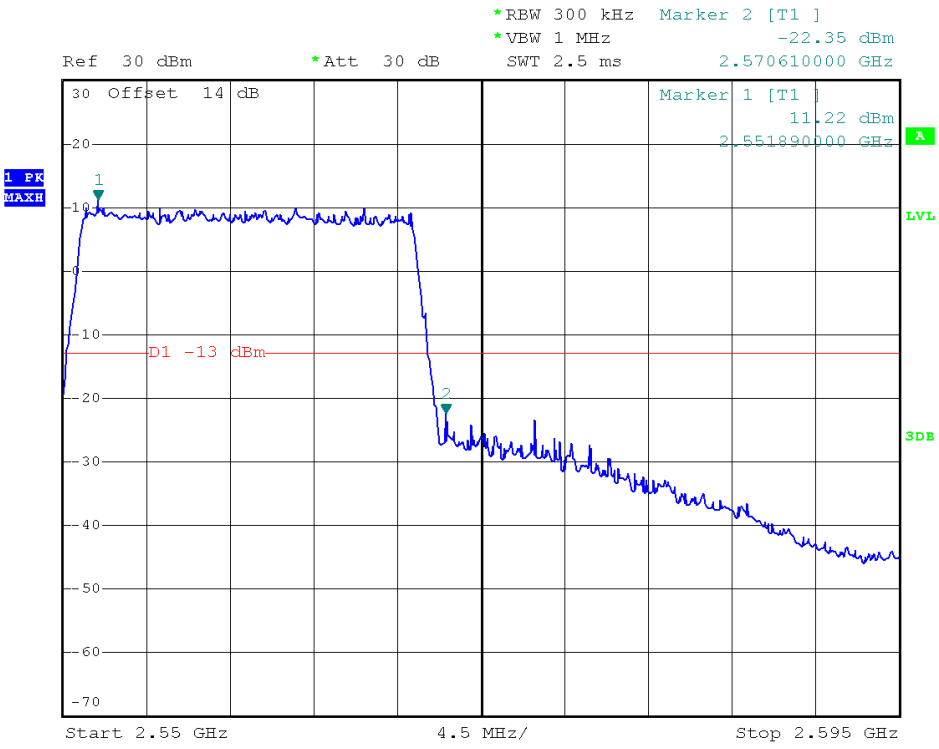
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 100, RB Offset 0

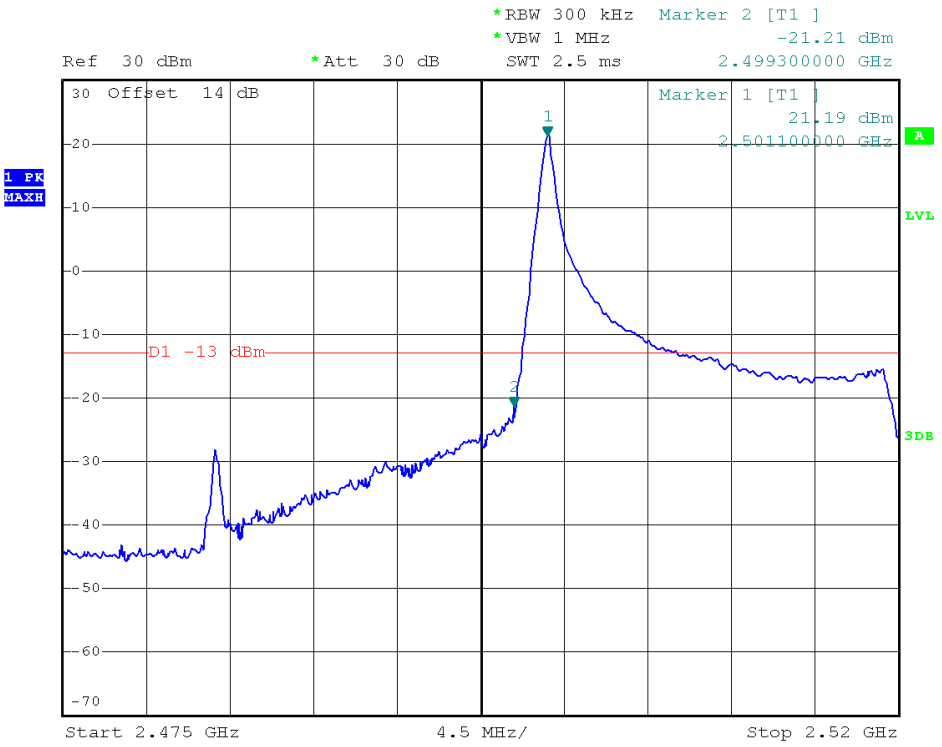


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 99

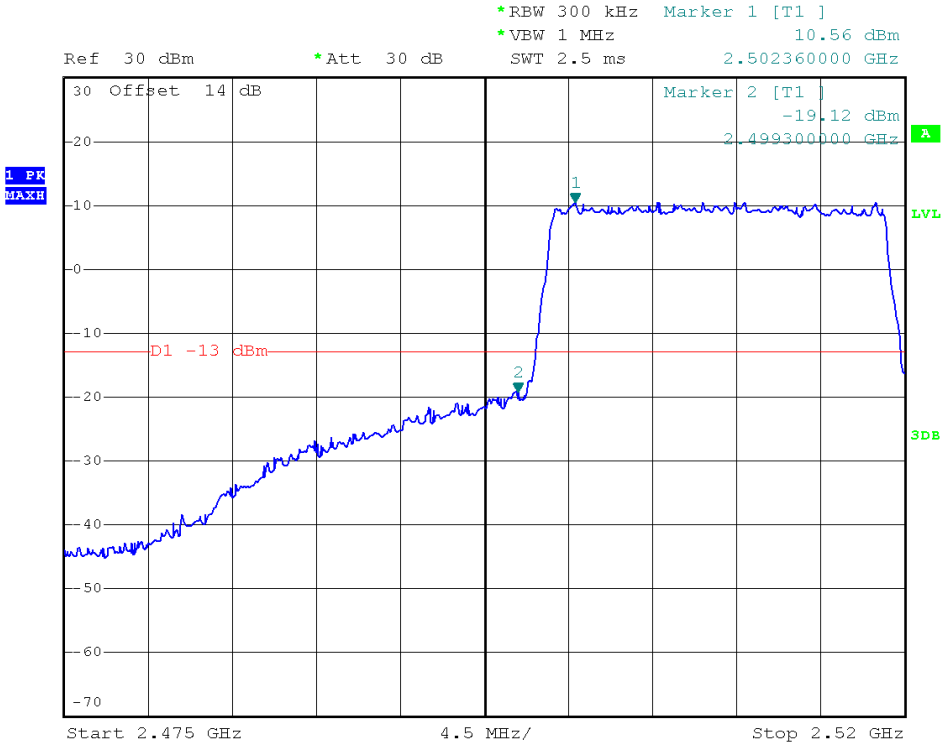


Higher Band Edge Plot for QPSK-RB Size 100, RB Offset 0

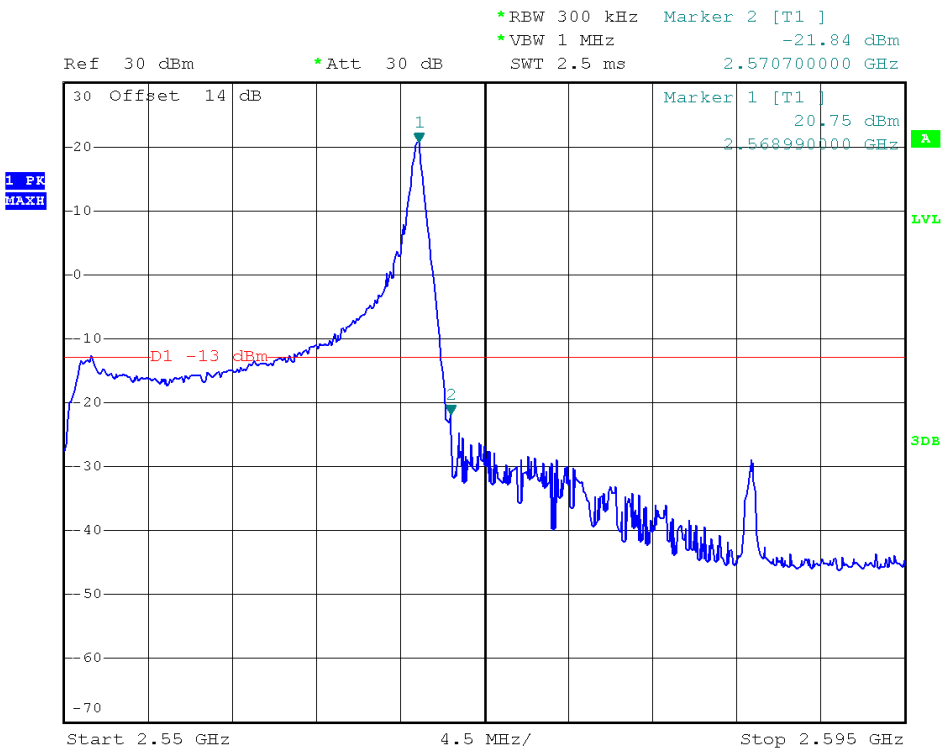
Band	LTE Band 7	Modulation	16QAM
Bandwidth	20MHz		



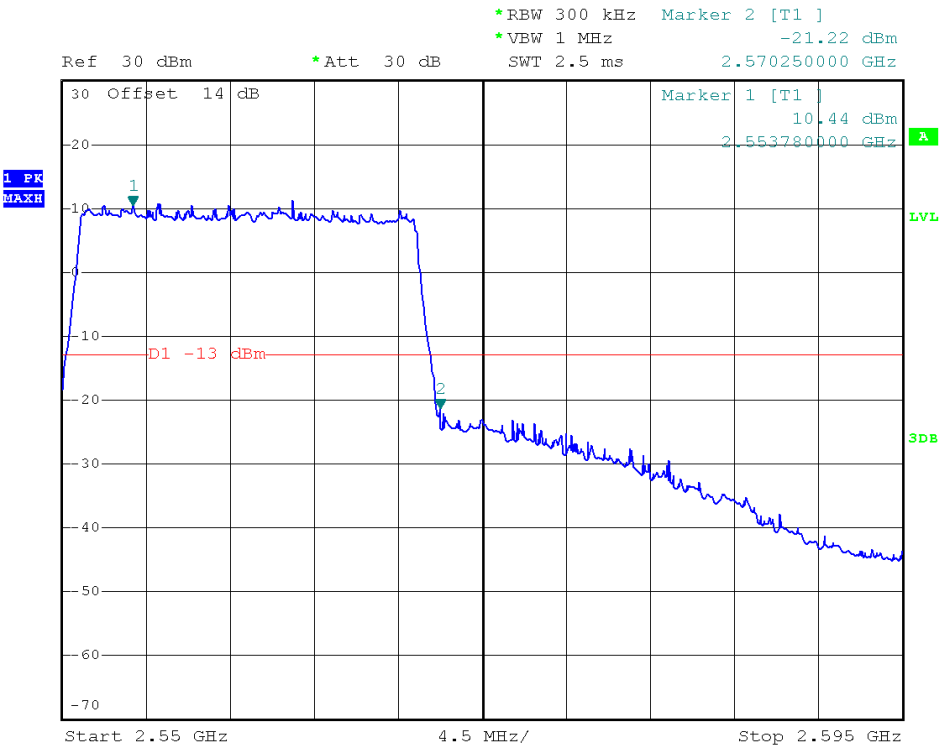
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM -RB Size 100, RB Offset 0



Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 99



Higher Band Edge Plot for 16QAM -RB Size 100, RB Offset 0

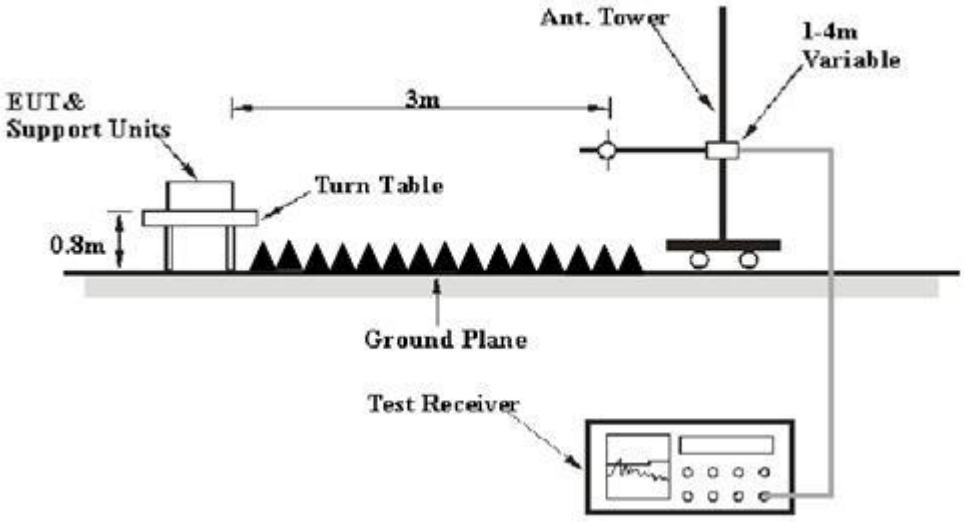
2.7 Transmitter Radiated Power (EIRP/ERP)

2.7.1 Requirement

Effective radiated power output measurements by substitution method according to ANSI / TIA /EIA-603-D-2010, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. Mobile and portable (hand-held) stations operating are limited to average ERP of 3 watts.

2.7.2 Test Description

1. Test Setup:



The EUT, which is powered by the DC 3.8V Power Supply directly, is located in a 3m Full-Anechoic Chamber; the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading.

A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power, and only the test result of the maximum output power was recorded.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due Date
System Simulator	R&S	CMW500	149333	2014.07.21	2015.07.20
EMI Test Receiver	R&S	ESIB26	100130	2014.07.07	2015.07.06
Full-Anechoic Chamber	Albatross～Projects	12.8m*6.8m*6.4m	A0412372	2014.01.05	2015.01.04
Double ridge horn antenna(1GHz~18GHz)	R&S	HF906	100150	2014.06.11	2015.06.10
Horn antenna (18GHz~26.5GHz)	R&S	HM118	101286	2014.06.11	2015.06.10
Broadband antenna (30MHz~1GHz)	R&S	HL562	101341	2014.06.11	2015.06.10
Cable	SUNHNER	SUCOFLEX 100	/	2014.06.05	2015.06.04
Cable	SUNHNER	SUCOFLEX 104	/	2014.06.05	2015.06.04

2.7.3 Test Procedures

1. The EUT was placed on a turntable with 1.5 meter height in a fully anechoic chamber.
2. The EUT was set at 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer which used a channel power option across EUT's signal bandwidth per section 4.0 of KDB 971168 D01.
4. The table was rotated 360 degrees to determine the position of the highest radiated power.
5. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
6. Taking the record of maximum ERP/EIRP.
7. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
8. The conducted power at the terminal of the dipole antenna is measured.
9. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
10. ERP/EIRP = Ps + Et – Es + Gs = Ps + Rt – Rs + Gs

Ps (dBm)：Input power to substitution antenna.
Gs (dBi or dBd)：Substitution antenna Gain.
Et = Rt + AF
Es = Rs + AF
AF (dB/m)：Receive antenna factor
Rt：The highest received signal in spectrum analyzer for EUT.
Rs：The highest received signal in spectrum analyzer for substitution antenna.

2.7.4 Test Result of ERP/EIRP

1. LTE Band 2 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	ERP (dBm)	H/V	Verdict
			RB Size	RB Offset				
2	5	QPSK	1	0	1852.5	24.57	H	PASS
2	5	QPSK	1	0	1880	24.62	H	PASS
2	5	QPSK	1	0	1907.5	**24.63**	H	PASS
2	5	QPSK	1	0	1852.5	24.90	V	PASS
2	5	QPSK	1	0	1880	24.93	V	PASS
2	5	QPSK	1	0	1907.5	24.81	V	PASS
2	5	16QAM	1	12	1852.5	23.77	H	PASS
2	5	16QAM	1	24	1880	23.69	H	PASS
2	5	16QAM	1	0	1907.5	23.78	H	PASS
2	5	16QAM	1	12	1852.5	23.75	V	PASS
2	5	16QAM	1	24	1880	23.80	V	PASS
2	5	16QAM	1	0	1907.5	**23.84**	V	PASS
2	10	QPSK	1	24	1855	24.61	H	PASS
2	10	QPSK	1	24	1880	24.54	H	PASS
2	10	QPSK	1	24	1905	24.57	H	PASS
2	10	QPSK	1	24	1855	**24.81**	V	PASS
2	10	QPSK	1	24	1880	24.74	V	PASS
2	10	QPSK	1	24	1905	24.75	V	PASS
2	10	16QAM	1	24	1855	23.54	H	PASS
2	10	16QAM	1	49	1880	23.62	H	PASS
2	10	16QAM	1	24	1905	23.65	H	PASS
2	10	16QAM	1	24	1855	**23.82**	V	PASS
2	10	16QAM	1	49	1880	23.71	V	PASS
2	10	16QAM	1	24	1905	23.81	V	PASS
2	15	QPSK	1	37	1857.5	24.51	H	PASS
2	15	QPSK	1	37	1880	24.62	H	PASS
2	15	QPSK	1	37	1902.5	24.57	H	PASS
2	15	QPSK	1	37	1857.5	24.75	V	PASS
2	15	QPSK	1	37	1880	**24.79**	V	PASS
2	15	QPSK	1	37	1902.5	24.77	V	PASS
2	15	16QAM	1	74	1857.5	23.61	H	PASS
2	15	16QAM	1	37	1880	23.55	H	PASS
2	15	16QAM	1	74	1902.5	23.63	H	PASS

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	ERP (dBm)	H/V	Verdict
			RB Size	RB Offset				
2	15	16QAM	1	74	1857.5	**23.89**	V	PASS
2	15	16QAM	1	37	1880	23.80	V	PASS
2	15	16QAM	1	74	1902.5	23.79	V	PASS
2	20	QPSK	1	49	1860	24.65	H	PASS
2	20	QPSK	1	49	1880	24.62	H	PASS
2	20	QPSK	1	49	1900	24.56	H	PASS
2	20	QPSK	1	49	1860	24.70	V	PASS
2	20	QPSK	1	49	1880	**24.74**	V	PASS
2	20	QPSK	1	49	1900	24.68	V	PASS
2	20	16QAM	1	99	1860	23.53	H	PASS
2	20	16QAM	1	0	1880	23.66	H	PASS
2	20	16QAM	1	0	1900	23.50	H	PASS
2	20	16QAM	1	99	1860	23.73	V	PASS
2	20	16QAM	1	0	1880	23.66	V	PASS
2	20	16QAM	1	0	1900	**23.74**	V	PASS

2. LTE Band 4 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	ERP (dBm)	H/V	Verdict
			RB Size	RB Offset				
4	5	QPSK	1	0	1712.5	23.62	H	PASS
4	5	QPSK	1	0	1732.5	23.52	H	PASS
4	5	QPSK	1	0	1752.5	23.49	H	PASS
4	5	QPSK	1	0	1712.5	**23.86**	V	PASS
4	5	QPSK	1	0	1732.5	23.80	V	PASS
4	5	QPSK	1	0	1752.5	23.76	V	PASS
4	5	16QAM	1	12	1712.5	22.65	H	PASS
4	5	16QAM	1	24	1732.5	22.58	H	PASS
4	5	16QAM	1	0	1752.5	22.66	H	PASS
4	5	16QAM	1	12	1712.5	22.72	V	PASS
4	5	16QAM	1	24	1732.5	**22.83**	V	PASS
4	5	16QAM	1	0	1752.5	22.80	V	PASS
4	10	QPSK	1	24	1715	23.57	H	PASS
4	10	QPSK	1	24	1732.5	23.59	H	PASS
4	10	QPSK	1	24	1750	23.51	H	PASS
4	10	QPSK	1	24	1715	23.77	V	PASS
4	10	QPSK	1	24	1732.5	**23.82**	V	PASS
4	10	QPSK	1	24	1750	23.73	V	PASS
4	10	16QAM	1	24	1715	22.59	H	PASS
4	10	16QAM	1	49	1732.5	22.55	H	PASS
4	10	16QAM	1	24	1750	22.63	H	PASS
4	10	16QAM	1	24	1715	22.72	V	PASS
4	10	16QAM	1	49	1732.5	22.65	V	PASS
4	10	16QAM	1	24	1750	**22.73**	V	PASS
4	15	QPSK	1	37	1717.5	23.54	H	PASS
4	15	QPSK	1	37	1732.5	23.60	H	PASS
4	15	QPSK	1	37	1747.5	23.57	H	PASS
4	15	QPSK	1	37	1717.5	23.73	V	PASS
4	15	QPSK	1	37	1732.5	23.75	V	PASS
4	15	QPSK	1	37	1747.5	**23.79**	V	PASS
4	15	16QAM	1	74	1717.5	22.54	H	PASS
4	15	16QAM	1	37	1732.5	22.52	H	PASS
4	15	16QAM	1	74	1747.5	22.61	H	PASS
4	15	16QAM	1	74	1717.5	22.66	V	PASS
4	15	16QAM	1	37	1732.5	**22.71**	V	PASS
4	15	16QAM	1	74	1747.5	22.69	V	PASS

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	ERP (dBm)	H/V	Verdict
			RB Size	RB Offset				
4	20	QPSK	1	49	1720	23.63	H	PASS
4	20	QPSK	1	49	1732.5	23.55	H	PASS
4	20	QPSK	1	49	1745	23.52	H	PASS
4	20	QPSK	1	49	1720	**23.69**	V	PASS
4	20	QPSK	1	49	1732.5	23.64	V	PASS
4	20	QPSK	1	49	1745	23.58	V	PASS
4	20	16QAM	1	99	1720	**22.63**	H	PASS
4	20	16QAM	1	0	1732.5	22.56	H	PASS
4	20	16QAM	1	0	1745	22.55	H	PASS
4	20	16QAM	1	99	1720	22.39	V	PASS
4	20	16QAM	1	0	1732.5	22.46	V	PASS
4	20	16QAM	1	0	1745	22.54	V	PASS

3. LTE Band 5 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	ERP (dBm)	H/V	Verdict
			RB Size	RB Offset				
5	5	QPSK	1	0	826.5	**20.62**	H	PASS
5	5	QPSK	1	0	836.5	20.52	H	PASS
5	5	QPSK	1	0	846.5	20.49	H	PASS
5	5	QPSK	1	0	826.5	19.86	V	PASS
5	5	QPSK	1	0	836.5	19.80	V	PASS
5	5	QPSK	1	0	846.5	19.76	V	PASS
5	5	16QAM	1	12	826.5	19.25	H	PASS
5	5	16QAM	1	24	836.5	19.18	H	PASS
5	5	16QAM	1	0	846.5	**19.26**	H	PASS
5	5	16QAM	1	12	826.5	19.12	V	PASS
5	5	16QAM	1	24	836.5	18.95	V	PASS
5	5	16QAM	1	0	846.5	18.99	V	PASS
5	10	QPSK	1	24	829	20.37	H	PASS
5	10	QPSK	1	24	836.5	20.29	H	PASS
5	10	QPSK	1	24	844	**20.41**	H	PASS
5	10	QPSK	1	24	829	20.17	V	PASS
5	10	QPSK	1	24	836.5	20.22	V	PASS
5	10	QPSK	1	24	844	20.03	V	PASS
5	10	16QAM	1	24	829	19.29	H	PASS
5	10	16QAM	1	49	836.5	19.35	H	PASS
5	10	16QAM	1	24	844	**19.43**	H	PASS
5	10	16QAM	1	24	829	18.92	V	PASS
5	10	16QAM	1	49	836.5	19.05	V	PASS
5	10	16QAM	1	24	844	19.13	V	PASS

4. LTE Band 7 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	ERP (dBm)	H/V	Verdict
			RB Size	RB Offset				
7	5	QPSK	1	0	2502.5	21.62	H	PASS
7	5	QPSK	1	0	2535	21.52	H	PASS
7	5	QPSK	1	0	2567.5	21.49	H	PASS
7	5	QPSK	1	0	2502.5	**21.86**	V	PASS
7	5	QPSK	1	0	2535	21.80	V	PASS
7	5	QPSK	1	0	2567.5	21.76	V	PASS
7	5	16QAM	1	12	2502.5	20.65	H	PASS
7	5	16QAM	1	24	2535	20.58	H	PASS
7	5	16QAM	1	0	2567.5	**20.66**	H	PASS
7	5	16QAM	1	12	2502.5	20.42	V	PASS
7	5	16QAM	1	24	2535	20.55	V	PASS
7	5	16QAM	1	0	2567.5	20.40	V	PASS
7	10	QPSK	1	24	2505	21.57	H	PASS
7	10	QPSK	1	24	2535	21.59	H	PASS
7	10	QPSK	1	24	2565	21.51	H	PASS
7	10	QPSK	1	24	2505	21.57	V	PASS
7	10	QPSK	1	24	2535	**21.62**	V	PASS
7	10	QPSK	1	24	2565	21.43	V	PASS
7	10	16QAM	1	24	2505	20.59	H	PASS
7	10	16QAM	1	49	2535	20.55	H	PASS
7	10	16QAM	1	24	2565	20.63	H	PASS
7	10	16QAM	1	24	2505	**20.72**	V	PASS
7	10	16QAM	1	49	2535	20.55	V	PASS
7	10	16QAM	1	24	2565	20.63	V	PASS
7	15	QPSK	1	37	2507.5	21.54	H	PASS
7	15	QPSK	1	37	2535	21.60	H	PASS
7	15	QPSK	1	37	2562.5	21.57	H	PASS
7	15	QPSK	1	37	2507.5	21.73	V	PASS
7	15	QPSK	1	37	2535	**21.85**	V	PASS
7	15	QPSK	1	37	2562.5	21.79	V	PASS
7	15	16QAM	1	74	2507.5	20.54	H	PASS
7	15	16QAM	1	37	2535	20.52	H	PASS
7	15	16QAM	1	74	2562.5	20.61	H	PASS
7	15	16QAM	1	74	2507.5	20.86	V	PASS
7	15	16QAM	1	37	2535	20.81	V	PASS
7	15	16QAM	1	74	2562.5	**20.89**	V	PASS

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	ERP (dBm)	H/V	Verdict
			RB Size	RB Offset				
7	20	QPSK	1	49	2510	21.73	H	PASS
7	20	QPSK	1	49	2535	**21.75**	H	PASS
7	20	QPSK	1	49	2560	21.52	H	PASS
7	20	QPSK	1	49	2510	21.69	V	PASS
7	20	QPSK	1	49	2535	21.64	V	PASS
7	20	QPSK	1	49	2560	21.58	V	PASS
7	20	16QAM	1	99	2510	20.83	H	PASS
7	20	16QAM	1	0	2535	**20.76**	H	PASS
7	20	16QAM	1	0	2560	20.75	H	PASS
7	20	16QAM	1	99	2510	20.63	V	PASS
7	20	16QAM	1	0	2535	20.56	V	PASS
7	20	16QAM	1	0	2560	20.44	V	PASS

2.8 Radiated Out of Band Emissions

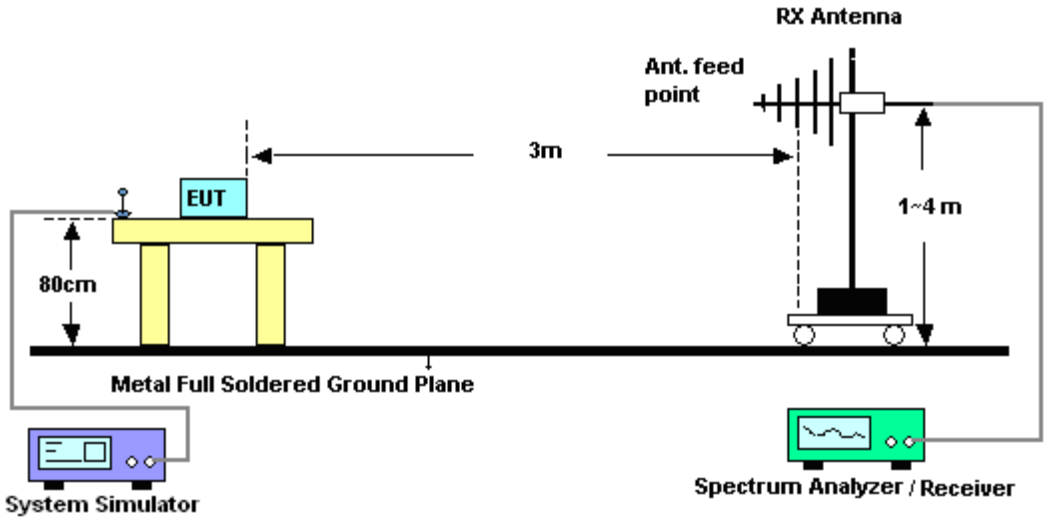
2.8.1 Requirement

The radiated spurious emission was measured by substitution method according to ANSI / TIA /EIA-603-D-2010. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

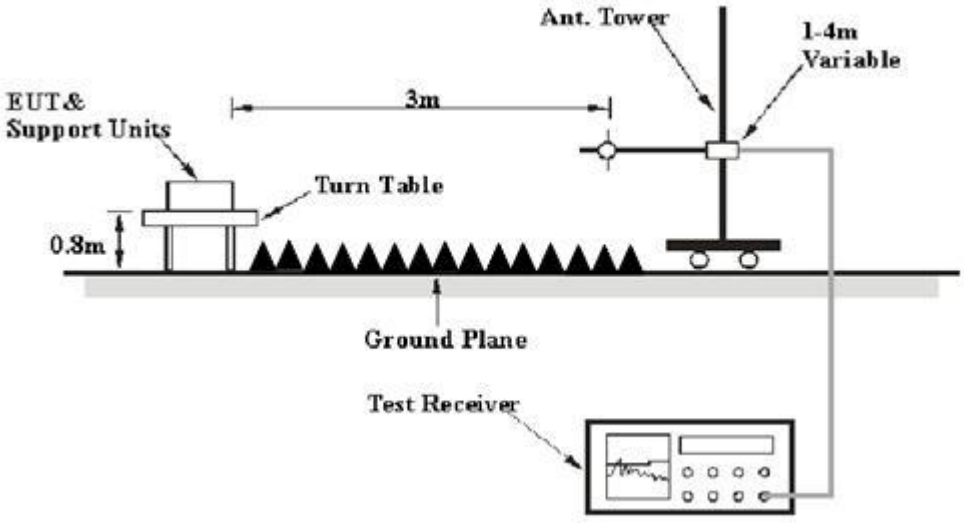
For LTE Band 7
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

2.8.2 Test Description

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due Date
System Simulator	R&S	CMW500	149333	2014.07.21	2015.07.20
EMI Test Receiver	R&S	ESIB26	100130	2014.07.07	2015.07.06
Full-Anechoic Chamber	Albatross～Projects	12.8m*6.8m*6.4m	A0412372	2015.01.05	2016.01.04
Double ridge horn antenna(1GHz~18GHz)	R&S	HF906	100150	2014.06.11	2015.06.10
Broadband antenna (30MHz~1GHz)	R&S	HL562	101341	2014.06.11	2015.06.10
Horn antenna (18GHz~26.5GHz)	R&S	HM118	101286	2014.06.11	2015.06.10
Cable	SUNHNER	SUCOFLEX 100	/	2014.06.05	2015.06.04
Cable	SUNHNER	SUCOFLEX 104	/	2014.06.05	2015.06.04

2.8.3 Test Procedures

1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.

5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
= P(W)- [43 + 10log(P)] (dB)
= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
= -13dBm.
11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (dBm) = EIRP - 2.15

2.8.4 Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. Both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The variation in frequency was measured for the worst case.

1. Test Verdict:

LTE Band 2

BW (MHz)	Channel	Frequency (MHz)	RB Size	RB Offset	Measured Max. Spurious Emission (dBm)		Limit (dBm)
					Test Antenna Horizontal	Test Antenna Vertical	
5	19975	1712.5	1	0	< -25	< -25	-13
5	20175	1732.5	1	0	< -25	< -25	
5	20375	1752.5	1	0	< -25	< -25	
10	20000	1715	1	0	< -25	< -25	
10	20175	1732.5	1	0	< -25	< -25	
10	20350	1750	1	0	< -25	< -25	
15	20025	1717.5	1	0	< -25	< -25	
15	20175	1732.5	1	0	< -25	< -25	
15	20325	1747.5	1	0	< -25	< -25	
20	20050	1720	1	0	< -25	< -25	
20	20175	1732.5	1	0	< -25	< -25	
20	20300	1745	1	0	< -25	< -25	

LTE Band 4

BW (MHz)	Channel	Frequency (MHz)	RB Size	RB Offset	Measured Max. Spurious Emission (dBm)		Limit (dBm)
					Test Antenna Horizontal	Test Antenna Vertical	
5	19975	1712.5	1	0	< -25	< -25	-13
5	20175	1732.5	1	0	< -25	< -25	
5	20375	1752.5	1	0	< -25	< -25	
10	20000	1715	1	0	< -25	< -25	
10	20175	1732.5	1	0	< -25	< -25	
10	20350	1750	1	0	< -25	< -25	
15	20025	1717.5	1	0	< -25	< -25	
15	20175	1732.5	1	0	< -25	< -25	
15	20325	1747.5	1	0	< -25	< -25	
20	20050	1720	1	0	< -25	< -25	
20	20175	1732.5	1	0	< -25	< -25	
20	20300	1745	1	0	< -25	< -25	

LTE Band 5

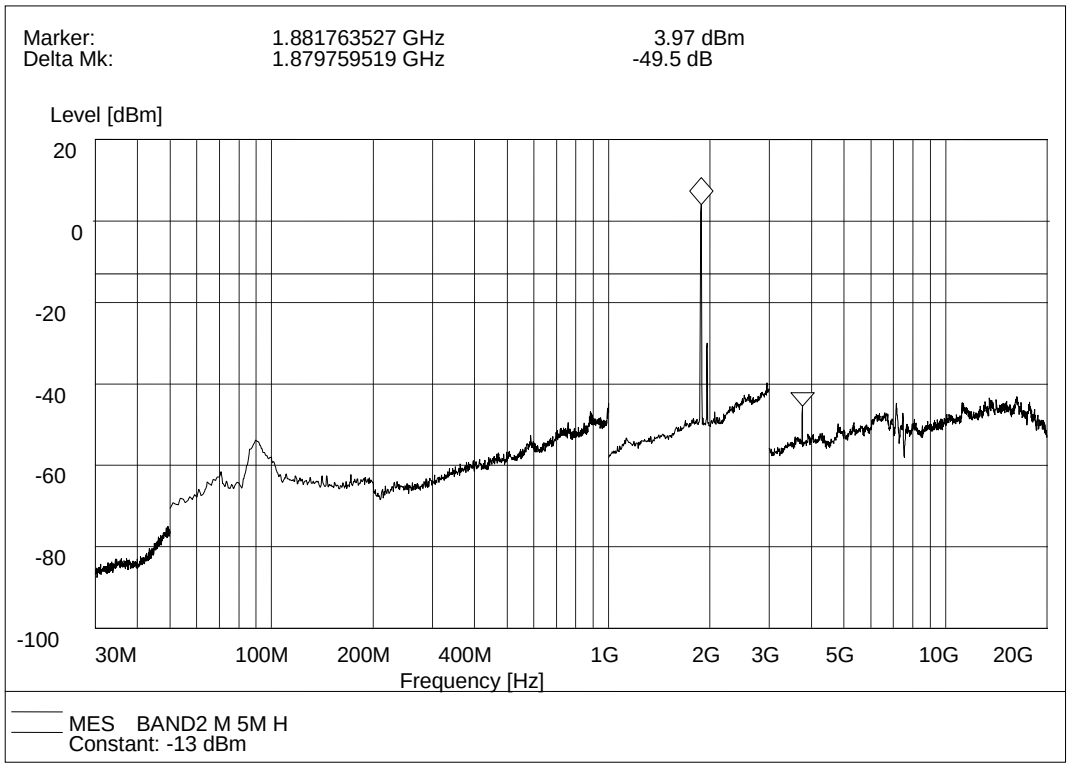
BW (MHz)	Channel	Frequency (MHz)	RB Size	RB Offset	Measured Max. Spurious Emission (dBm)		Limit (dBm)
					Test Antenna Horizontal	Test Antenna Vertical	
5	20425	826.5	1	0	< -25	< -25	-13
5	20525	836.5	1	0	< -25	< -25	
5	20625	846.5	1	0	< -25	< -25	
10	20450	829	1	0	< -25	< -25	
10	20525	836.5	1	0	< -25	< -25	
10	20600	844	1	0	< -25	< -25	

LTE Band 7

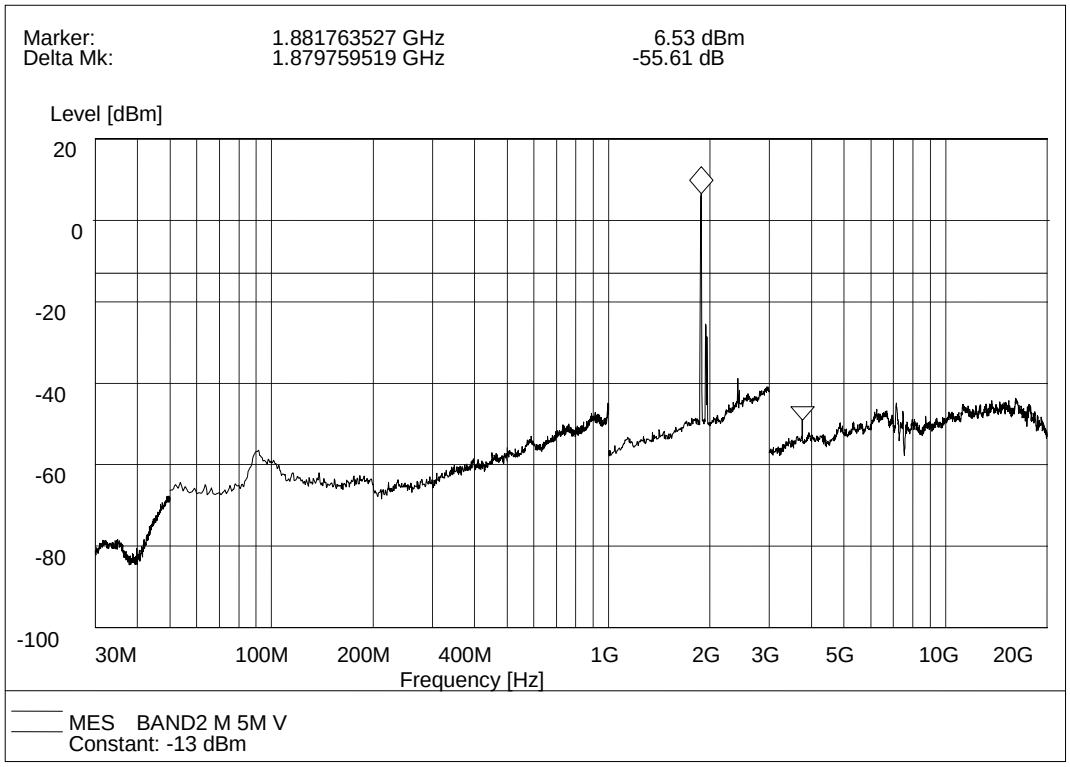
BW (MHz)	Channel	Frequency (MHz)	RB Size	RB Offset	Measured Max. Spurious Emission (dBm)		Limit (dBm)
					Test Antenna Horizontal	Test Antenna Vertical	
5	20775	2502.5	1	0	< -25	< -25	-13
5	21100	2535	1	0	< -25	< -25	
5	21425	2567.5	1	0	< -25	< -25	
10	20800	2505	1	0	< -25	< -25	
10	21100	2535	1	0	< -25	< -25	
10	21400	2565	1	0	< -25	< -25	
15	20825	2507.5	1	0	< -25	< -25	
15	21100	2535	1	0	< -25	< -25	
15	21375	2562.5	1	0	< -25	< -25	
20	20850	2510	1	0	< -25	< -25	
20	21100	2535	1	0	< -25	< -25	
20	21350	2560	1	0	< -25	< -25	

Note: All Spurious Emission tests were performed in X, Y, Z axis direction and low, middle, high channel. And only the worst axis test condition was recorded in this test report.

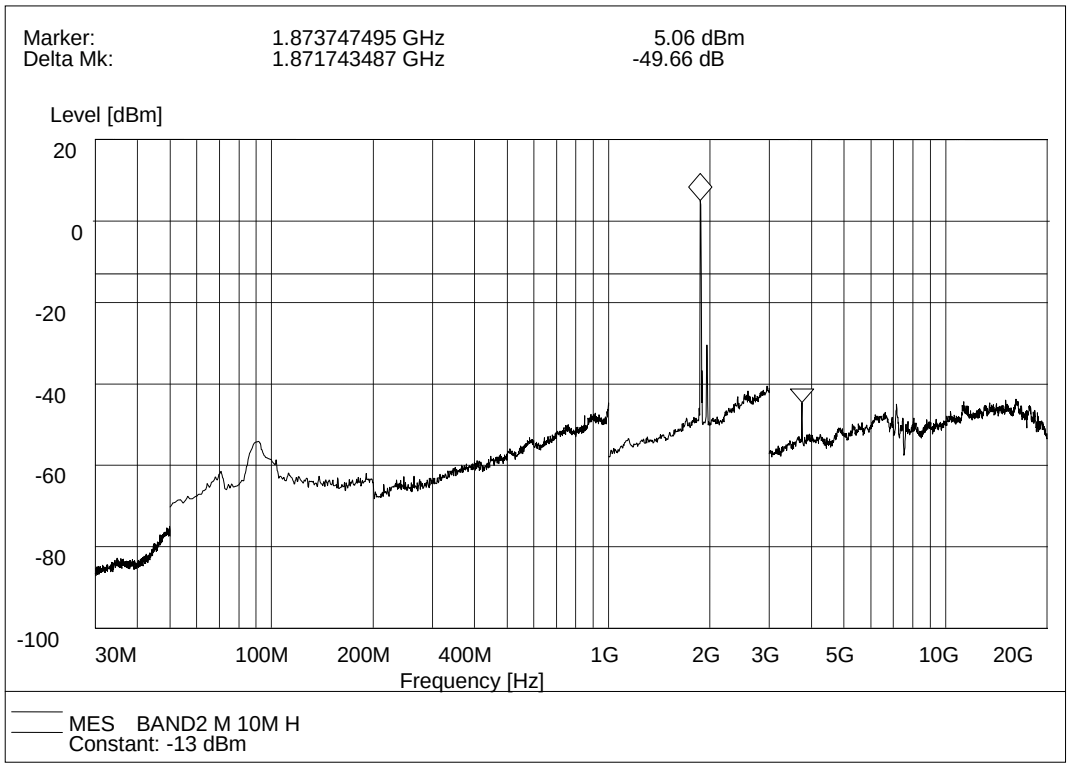
2. Test Plots for the Whole Measurement Frequency Range:



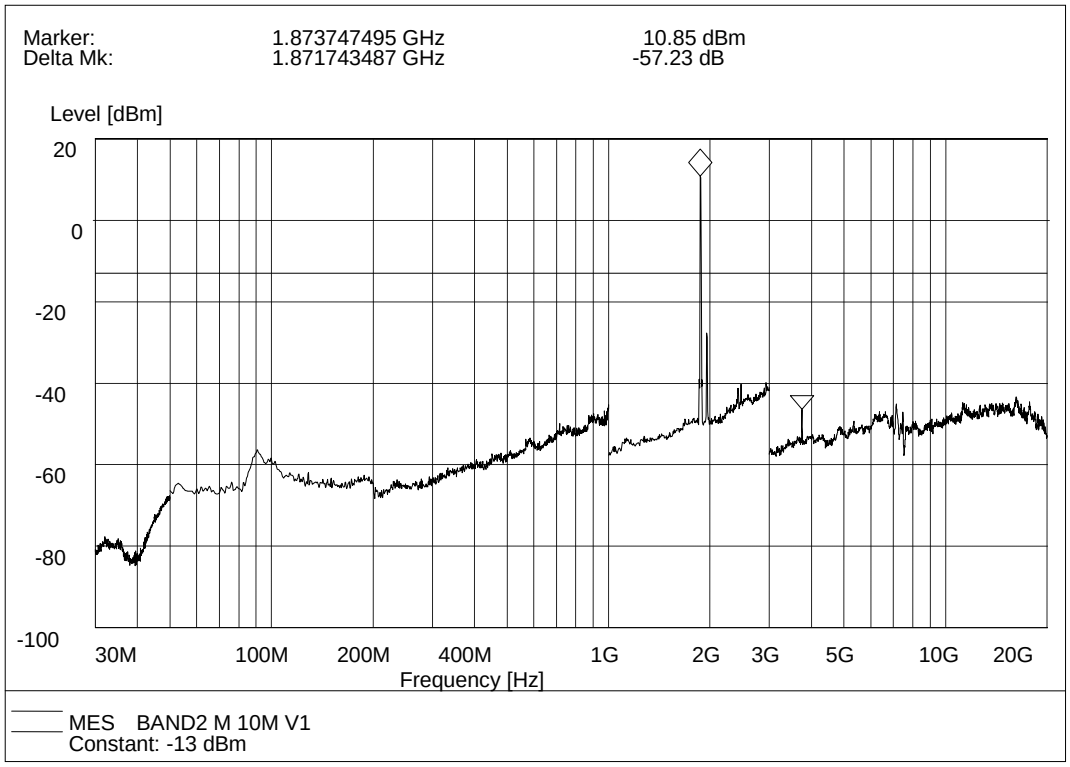
LTE Band 2 QPSK 5MHz BW Test Antenna Horizontal



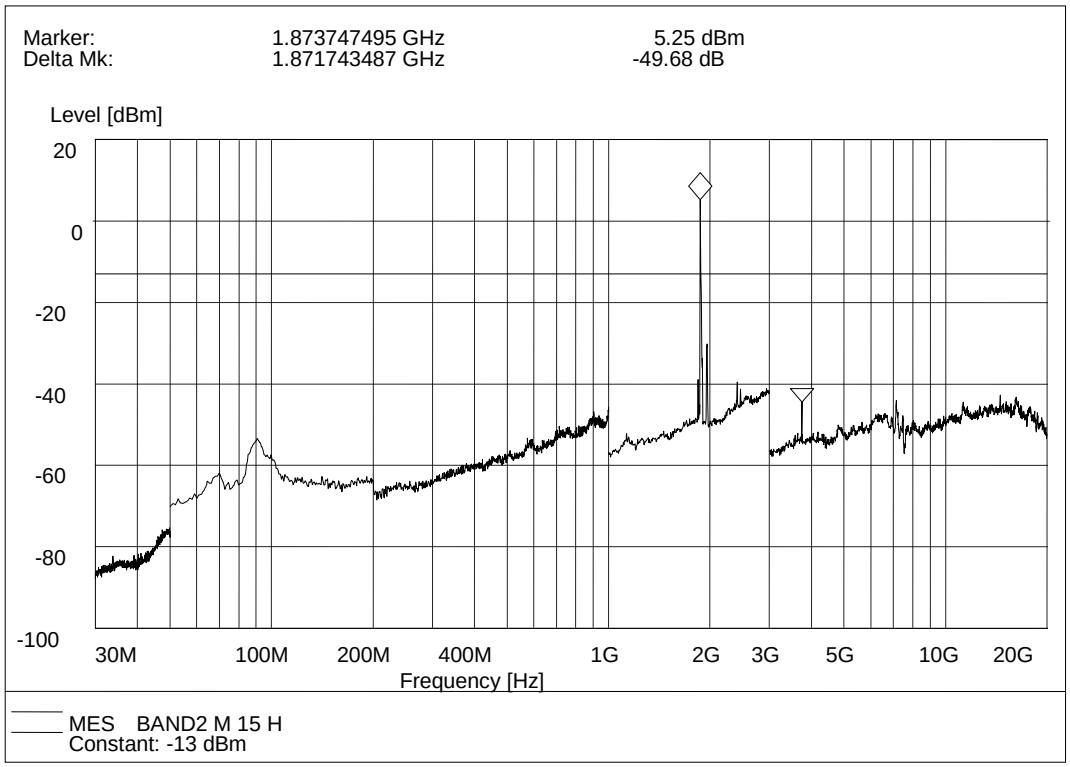
LTE Band 2 QPSK 5MHz BW Test Antenna Vertical



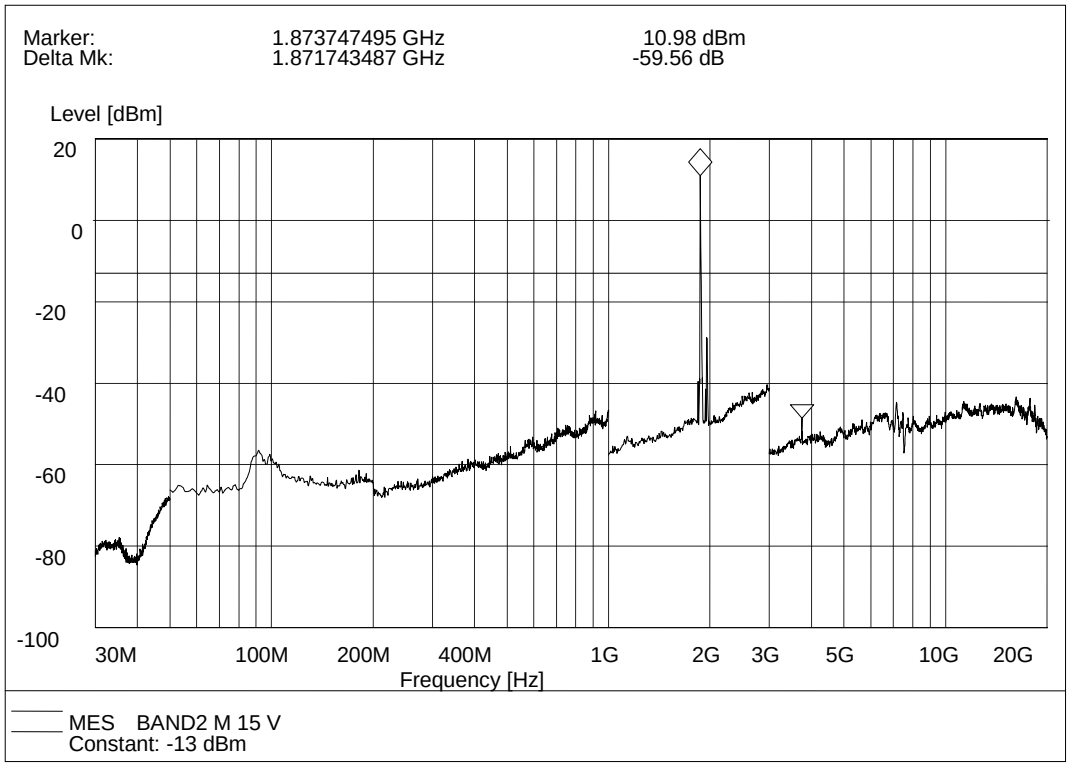
LTE Band 2 QPSK 10MHz BW Test Antenna Horizontal



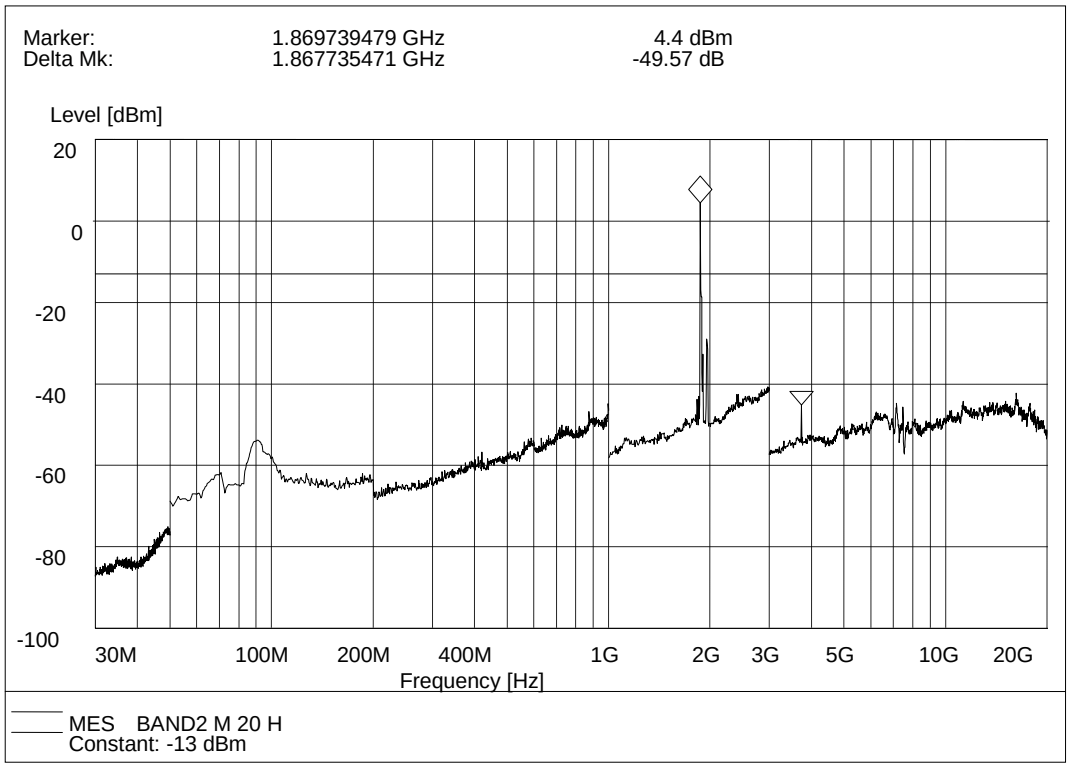
LTE Band 2 QPSK 10MHz BW Test Antenna Vertical



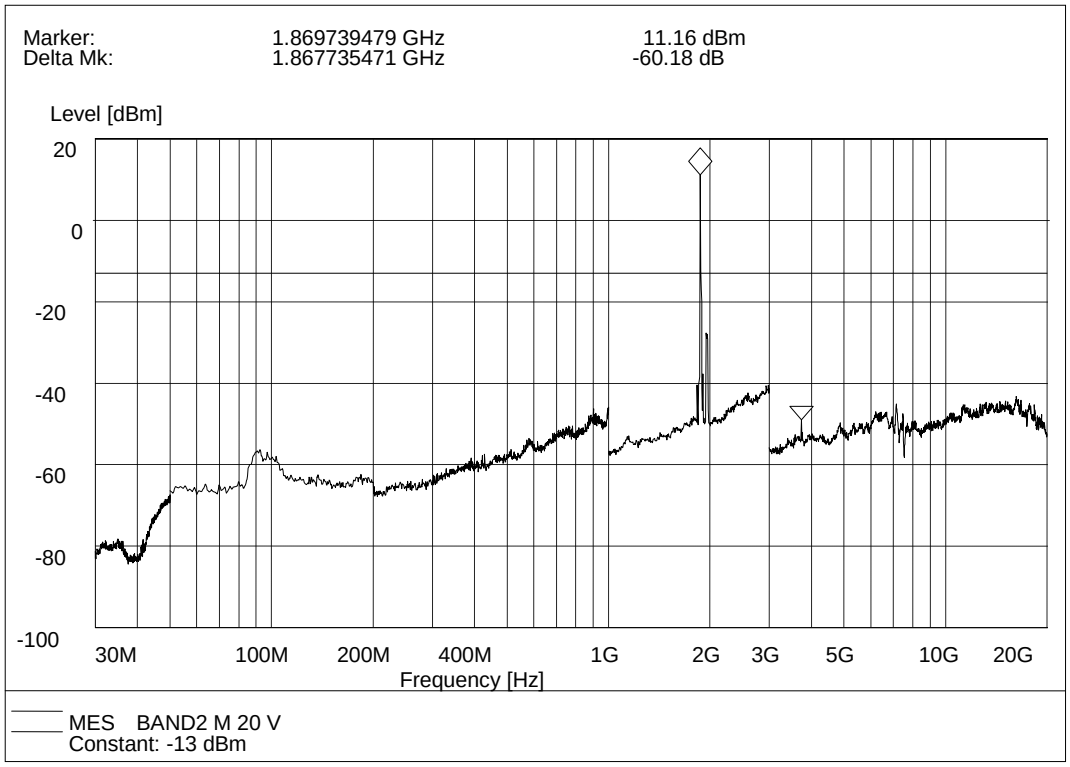
LTE Band 2 QPSK 15MHz BW Test Antenna Horizontal



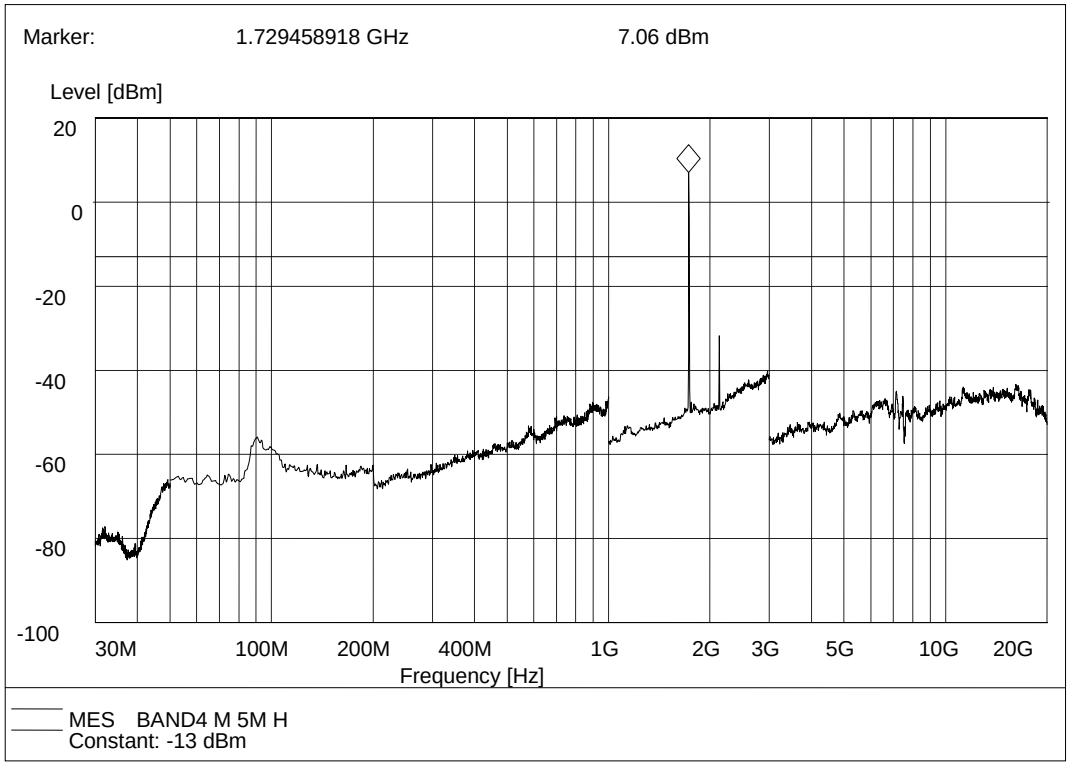
LTE Band 2 QPSK 15MHz BW Test Antenna Vertical



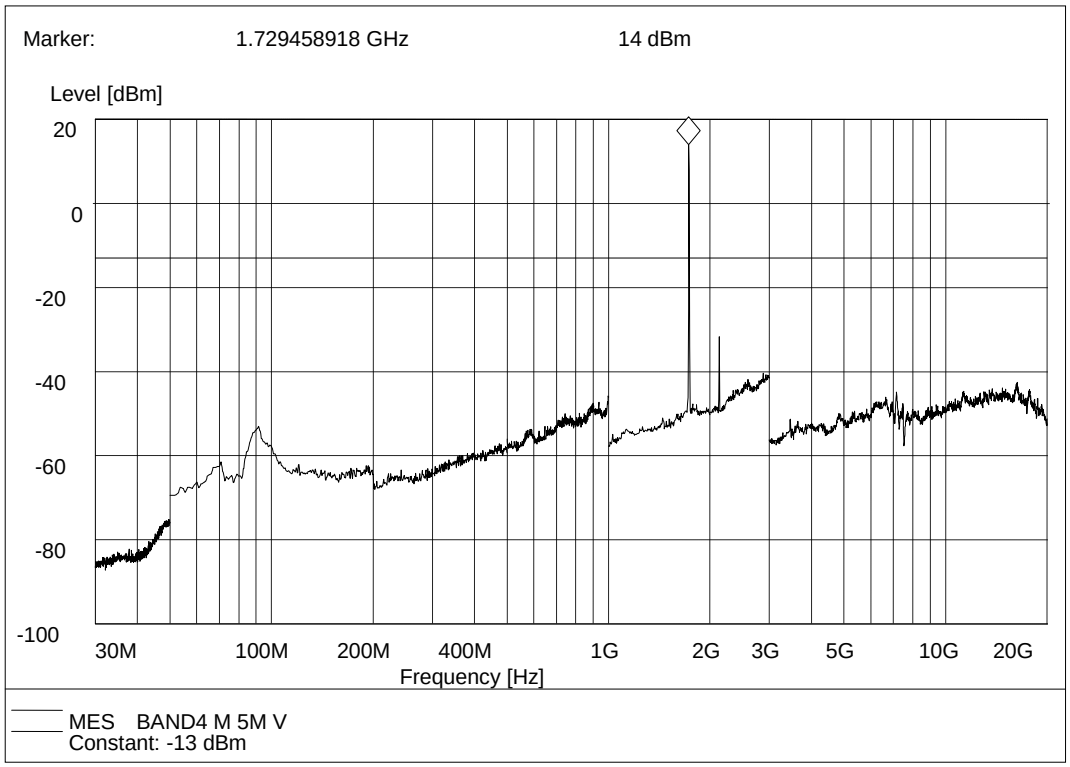
LTE Band 2 QPSK 20MHz BW Test Antenna Horizontal



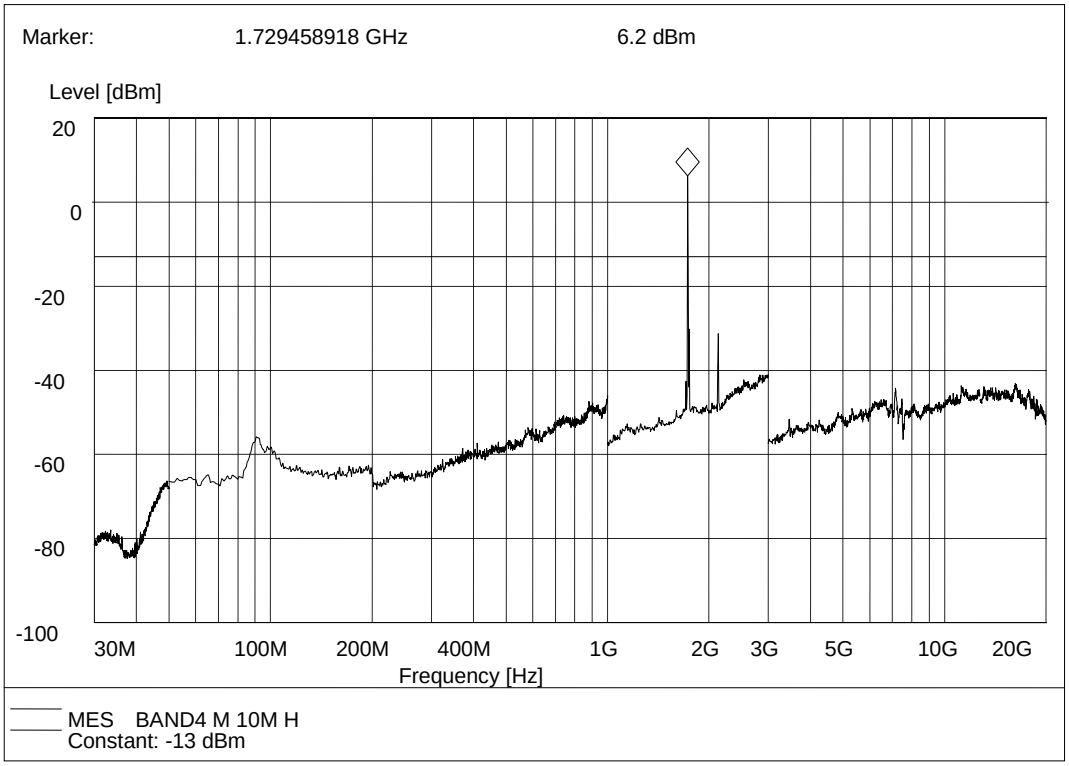
LTE Band 2 QPSK 20MHz BW Test Antenna Vertical



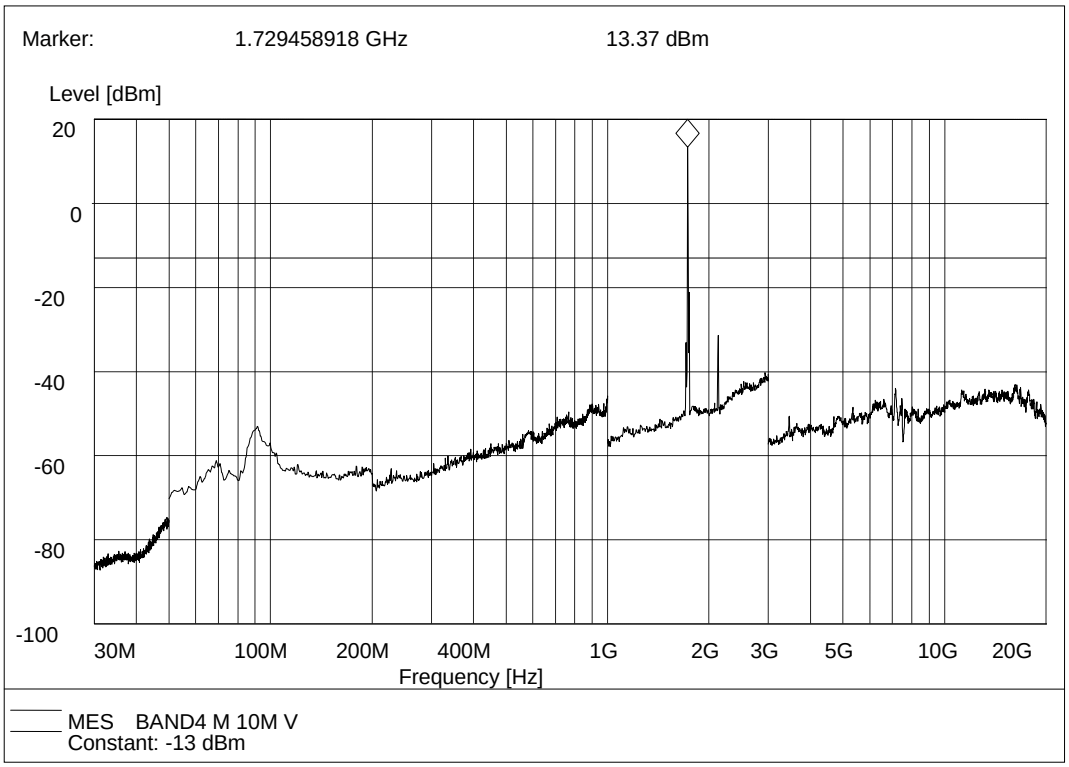
` LTE Band 4 QPSK 5MHz BW Test Antenna Horizontal



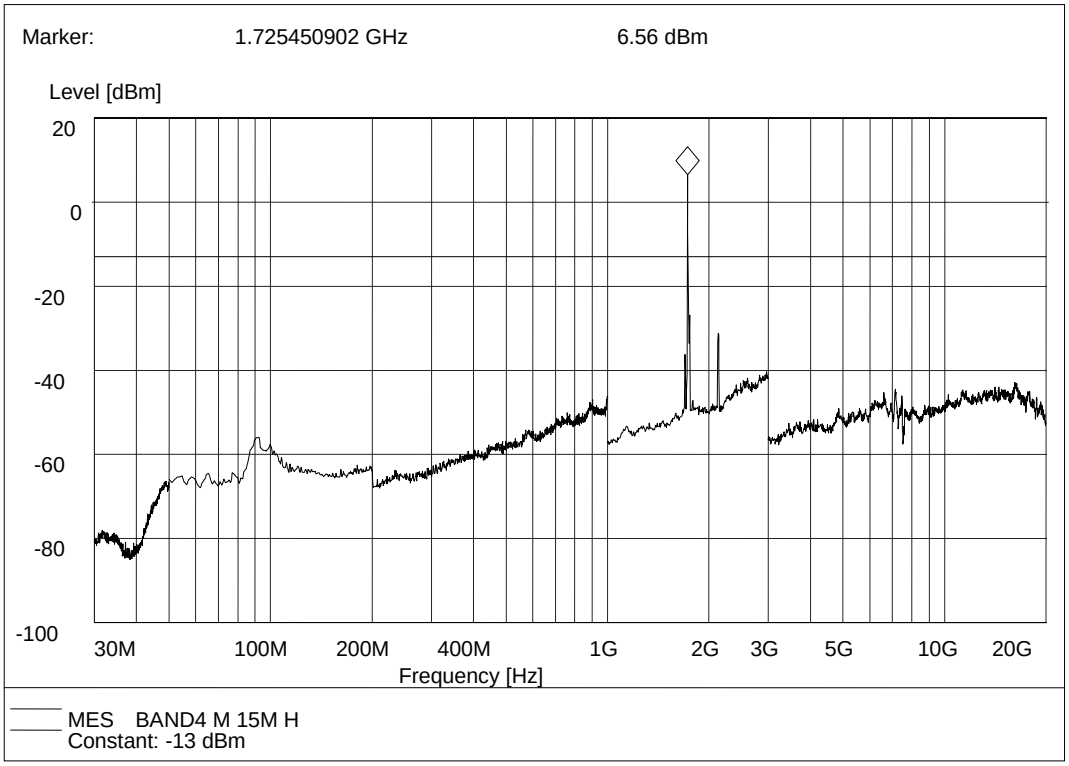
LTE Band 4 QPSK 5MHz BW Test Antenna Vertical



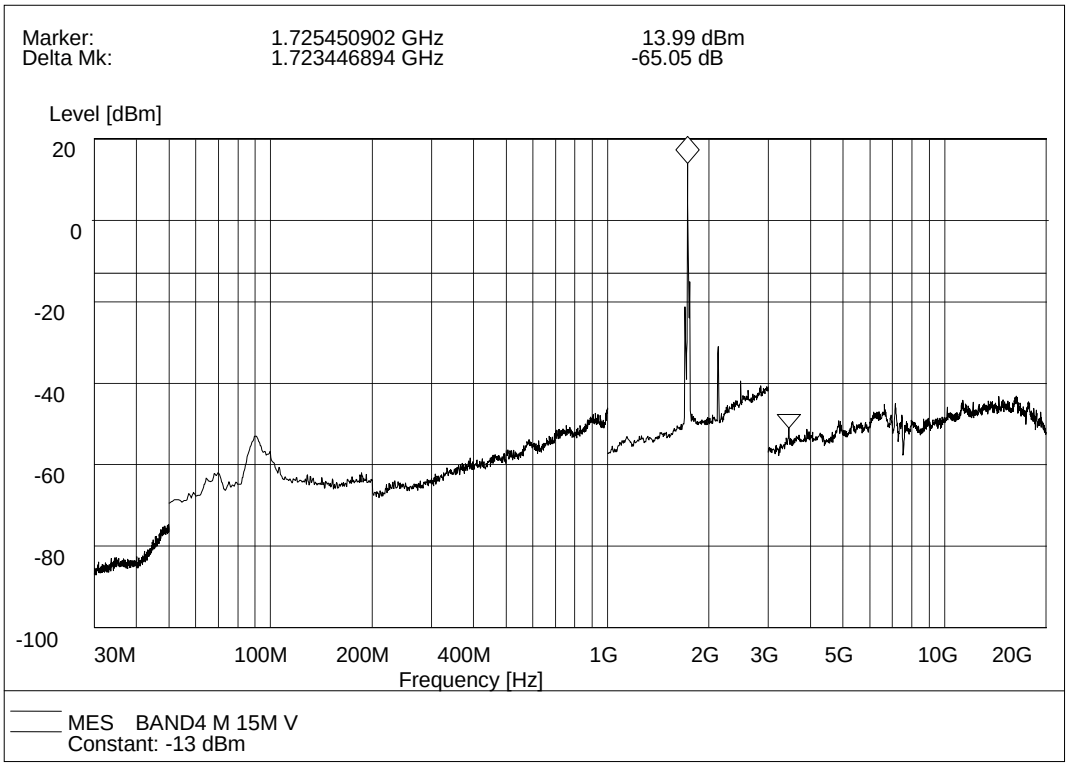
` LTE Band 4 QPSK 10MHz BW Test Antenna Horizontal



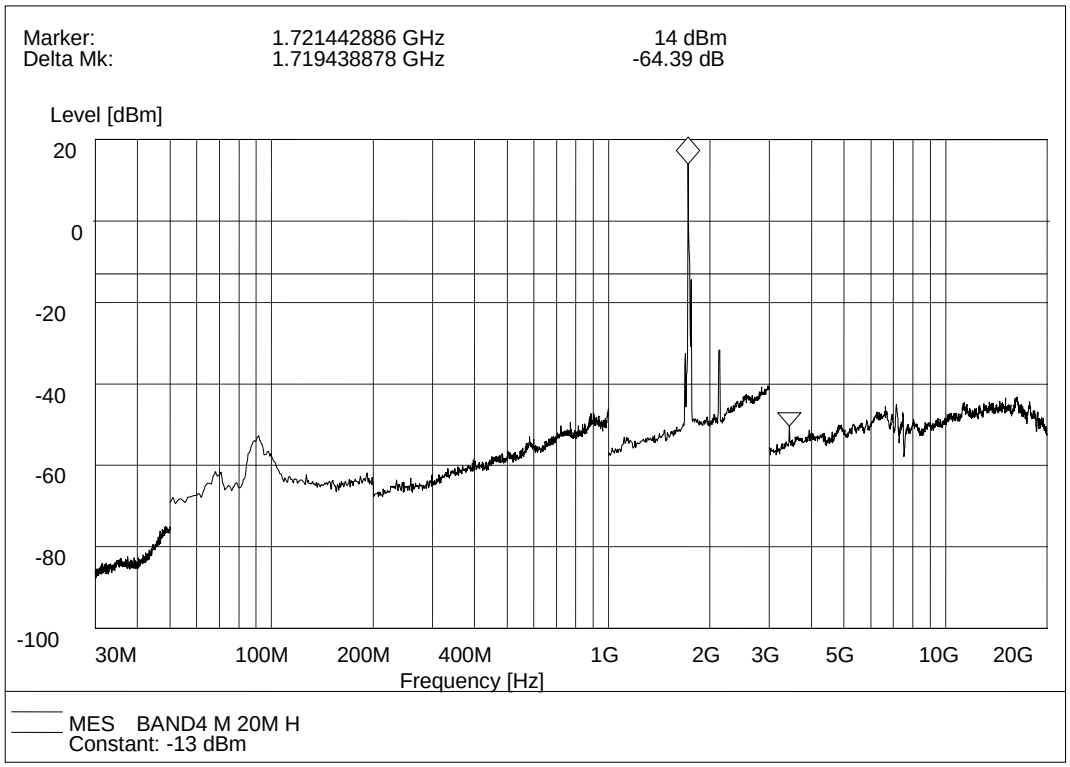
LTE Band 4 QPSK 10MHz BW Test Antenna Vertical



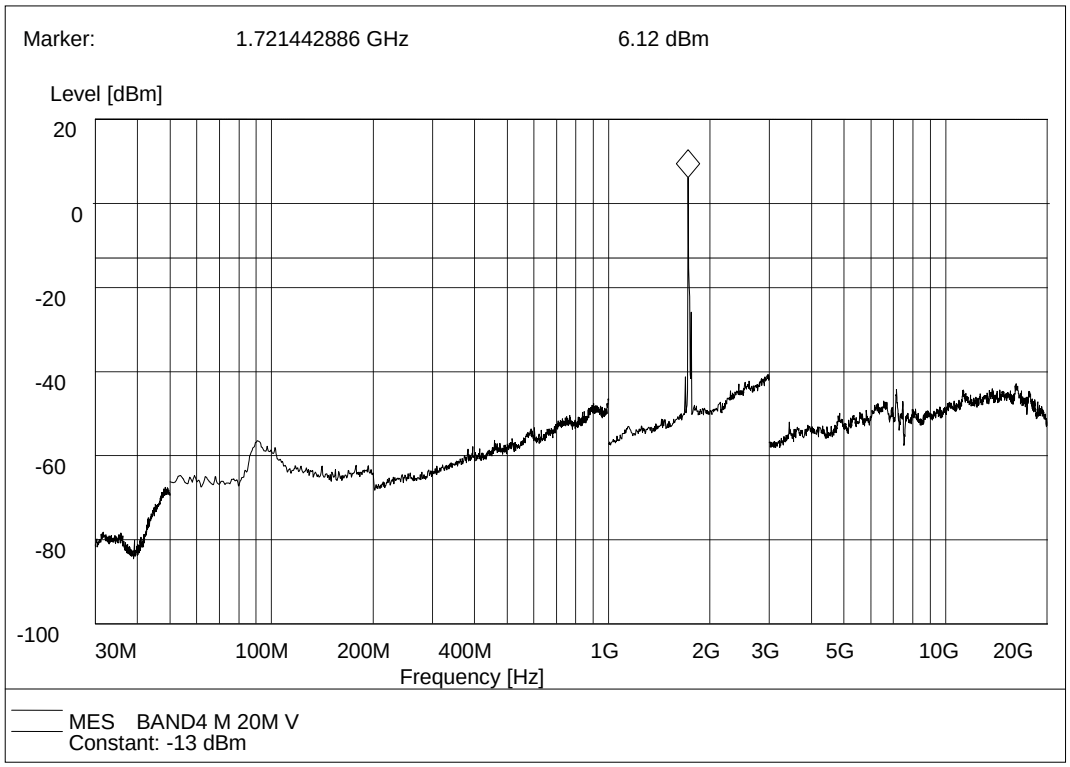
` LTE Band 4 QPSK 15MHz BW Test Antenna Horizontal



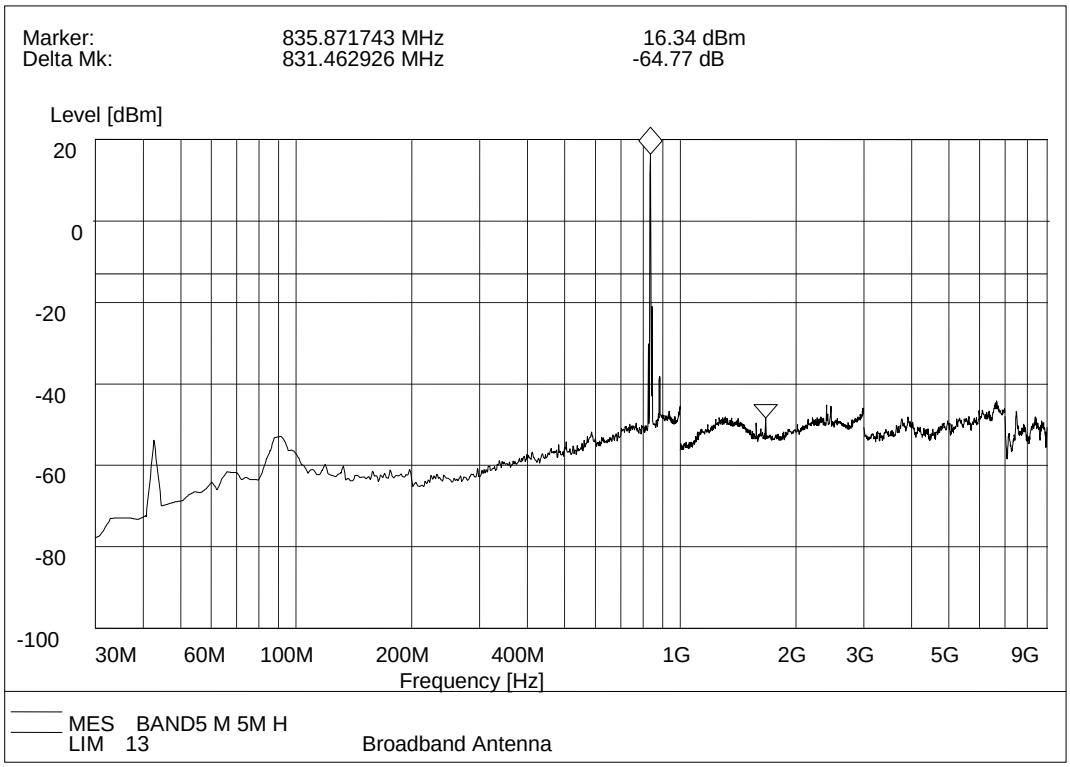
LTE Band 4 QPSK 15MHz BW Test Antenna Vertical



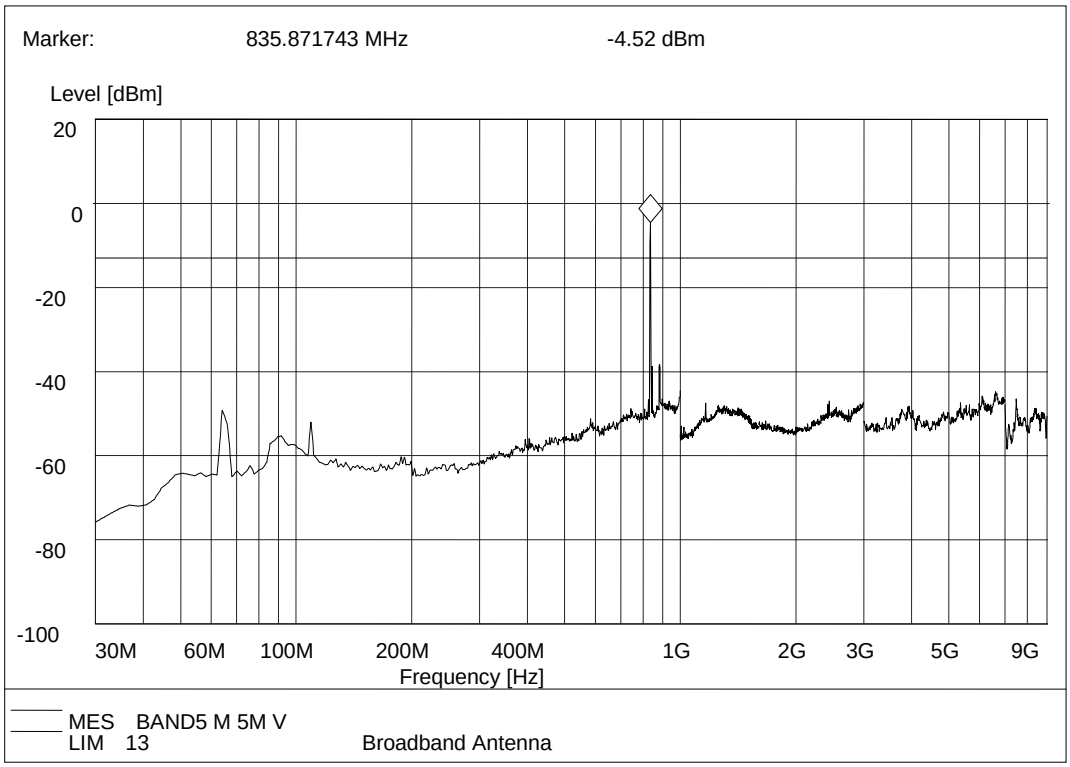
` LTE Band 4 QPSK 20MHz BW Test Antenna Horizontal



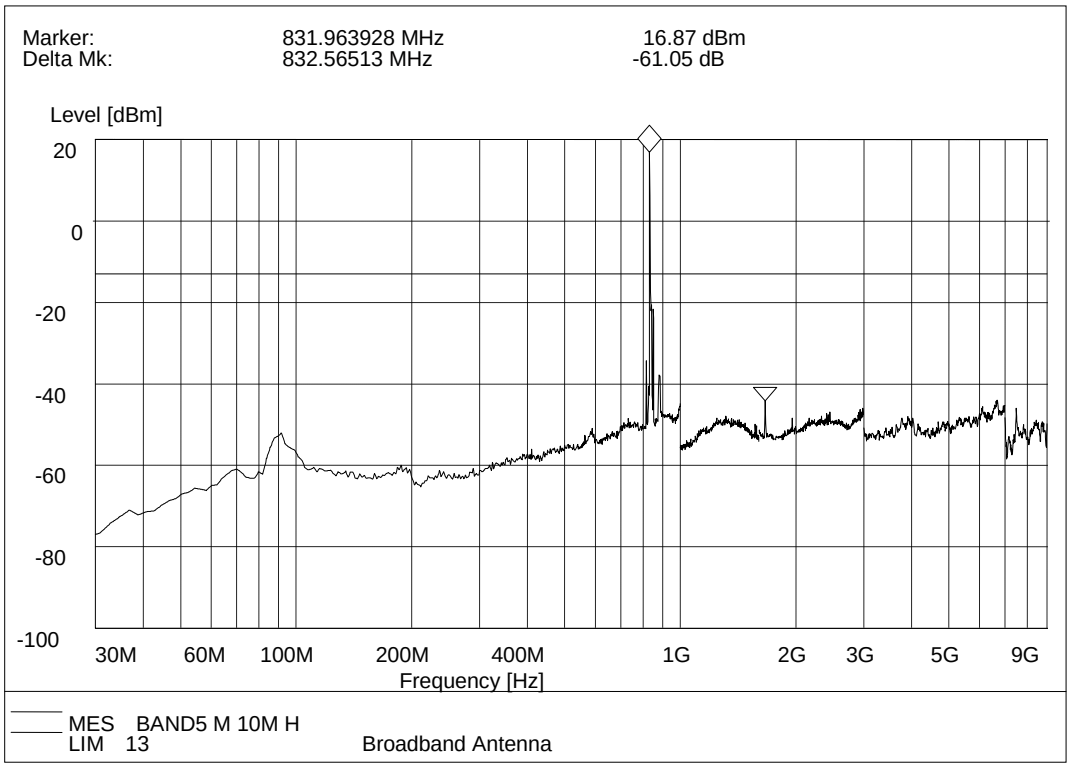
LTE Band 4 QPSK 20MHz BW Test Antenna Vertical



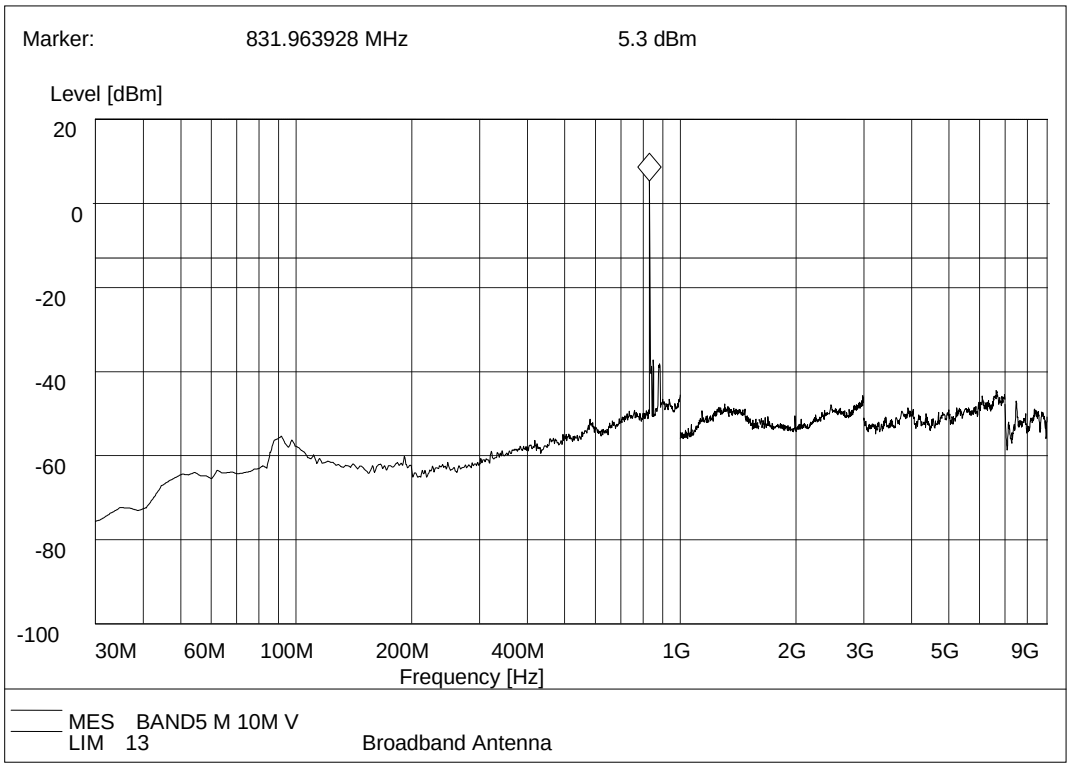
` LTE Band 5 QPSK 5MHz BW Test Antenna Horizontal



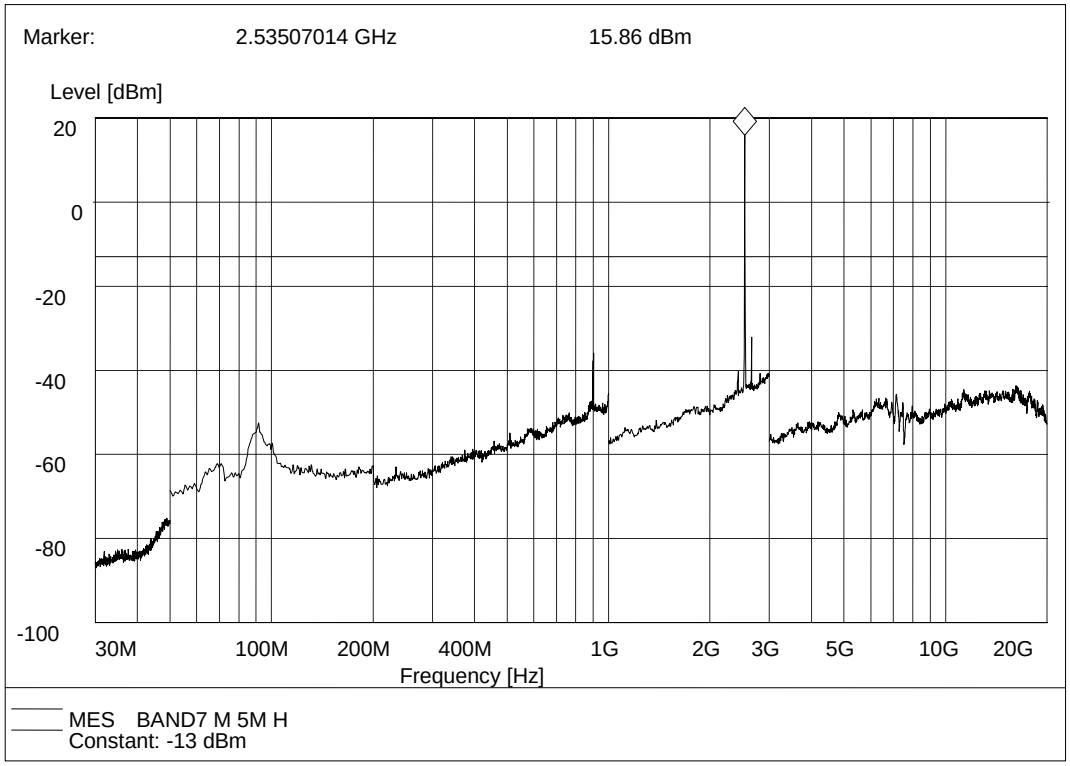
LTE Band 5 QPSK 5MHz BW Test Antenna Vertical



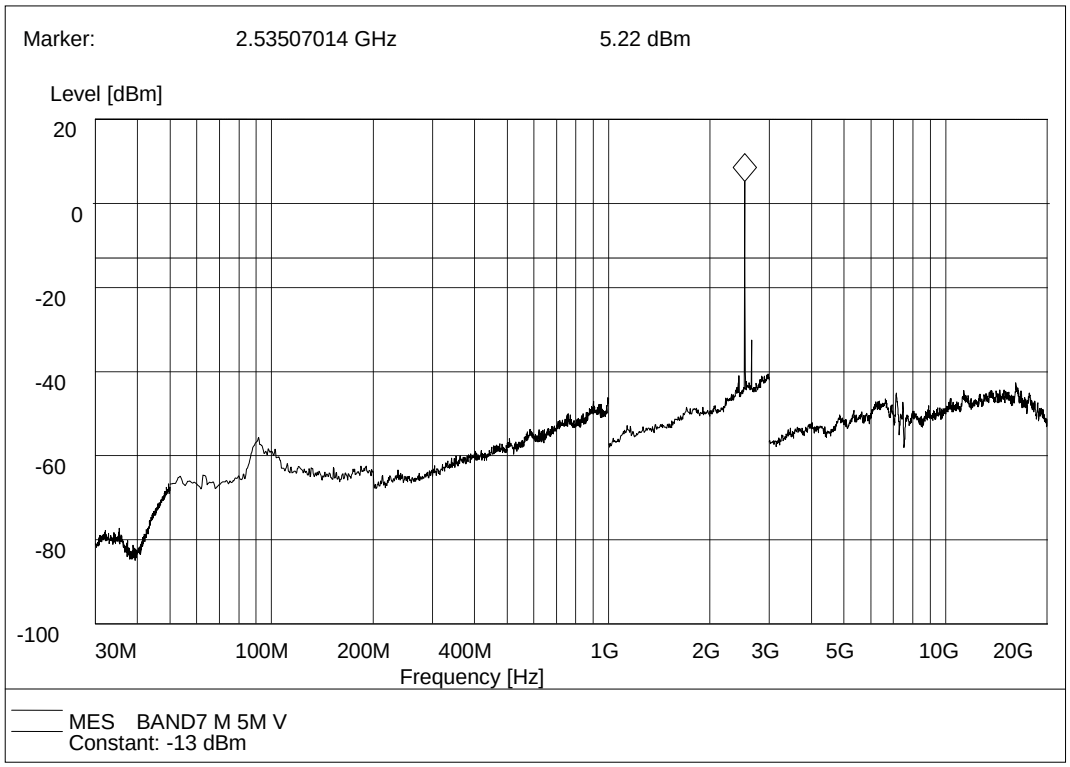
` LTE Band 5 QPSK 10MHz BW Test Antenna Horizontal



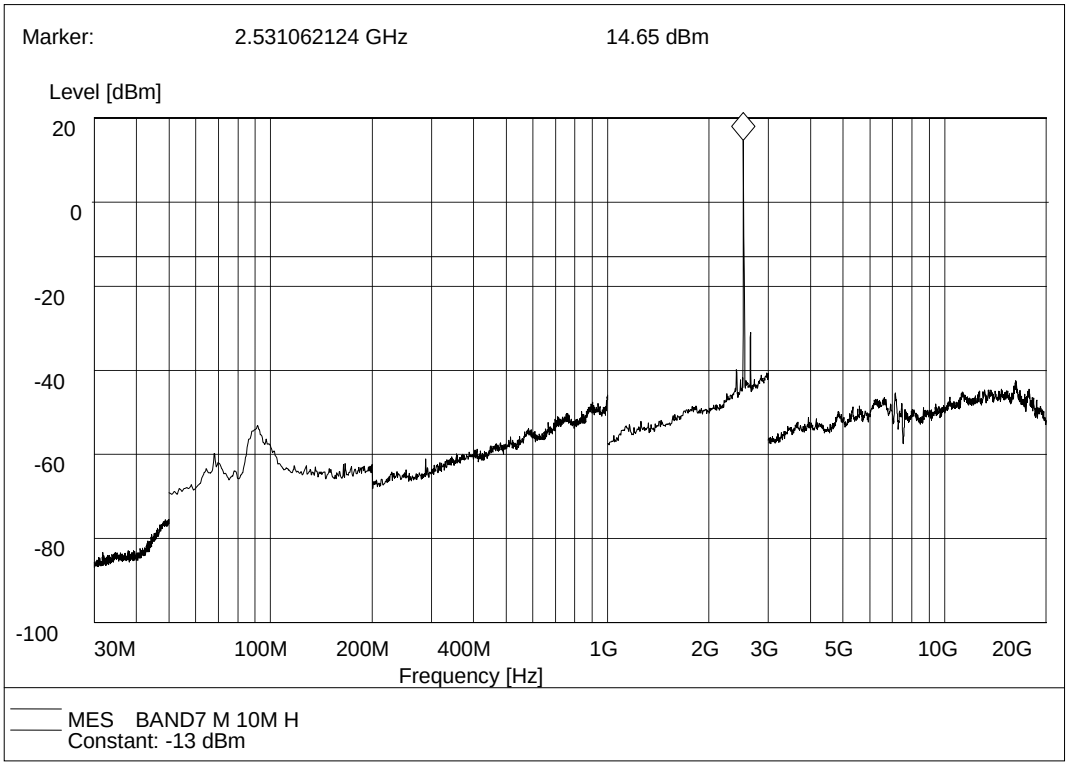
LTE Band 5 QPSK 10MHz BW Test Antenna Vertical



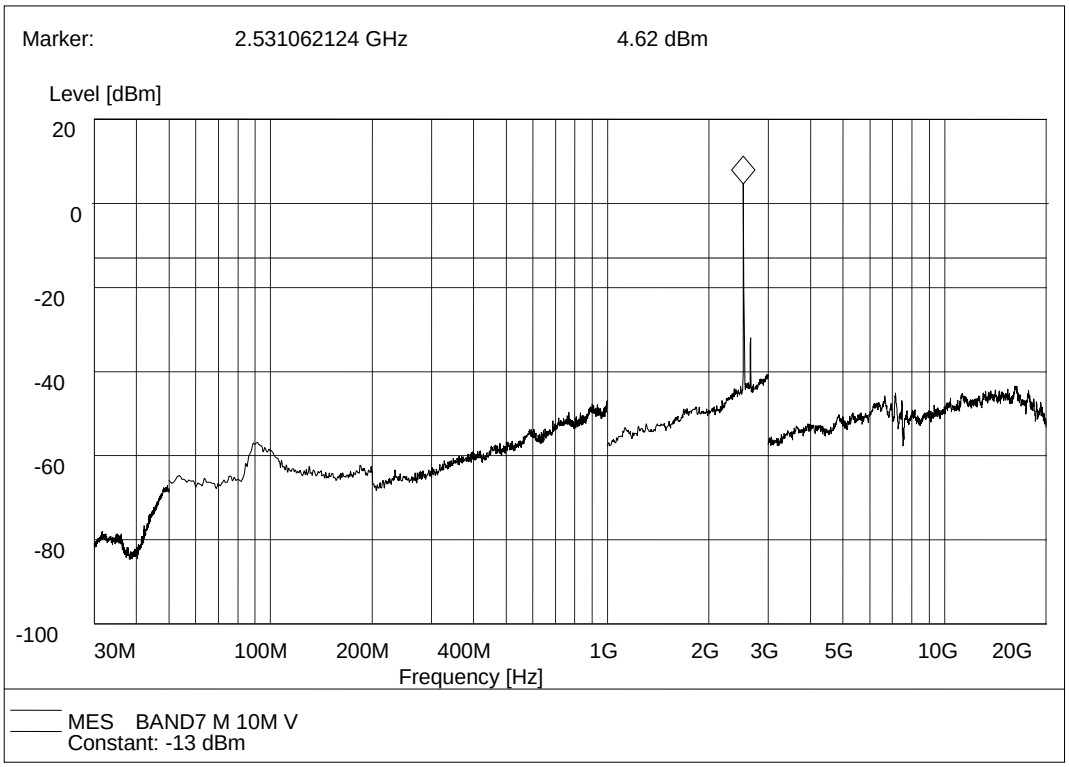
` LTE Band 7 QPSK 5MHz BW Test Antenna Horizontal



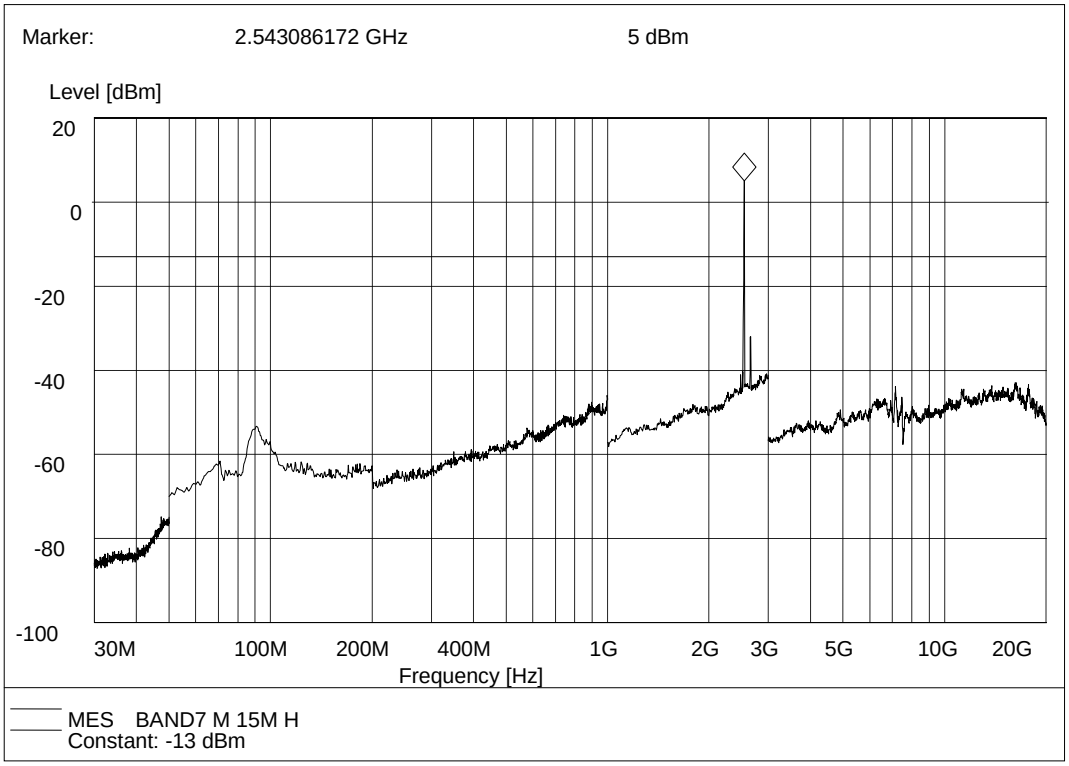
LTE Band 7 QPSK 5MHz BW Test Antenna Vertical



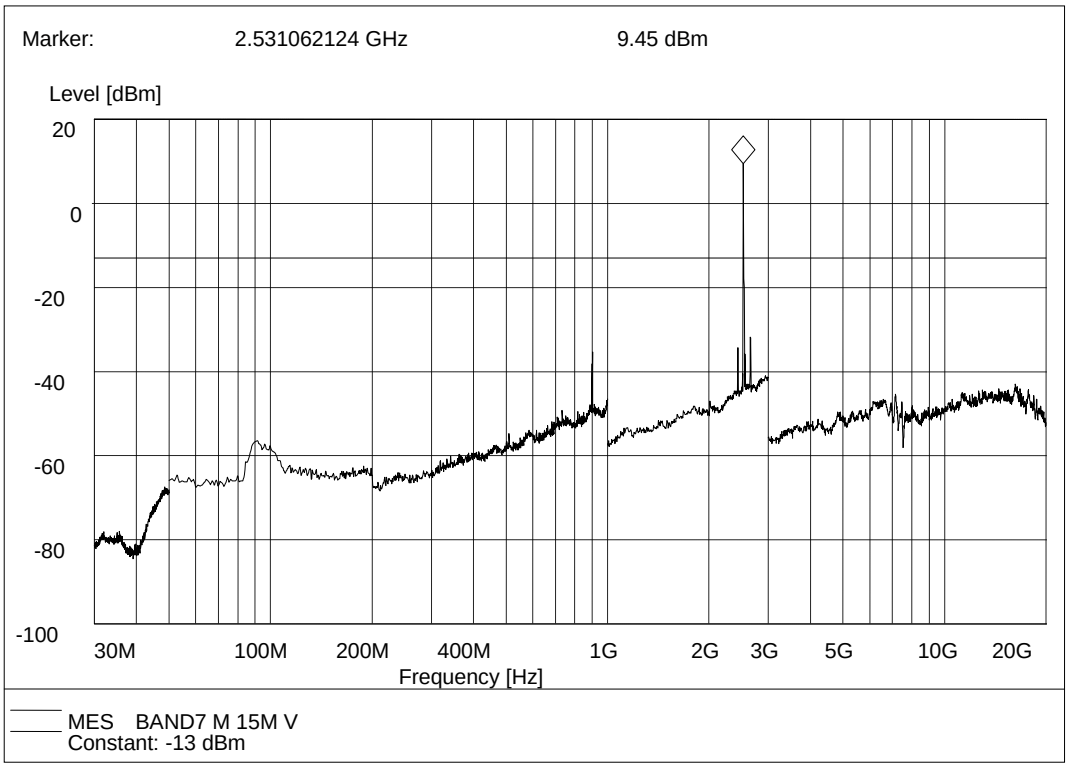
` LTE Band 7 QPSK 10MHz BW Test Antenna Horizontal



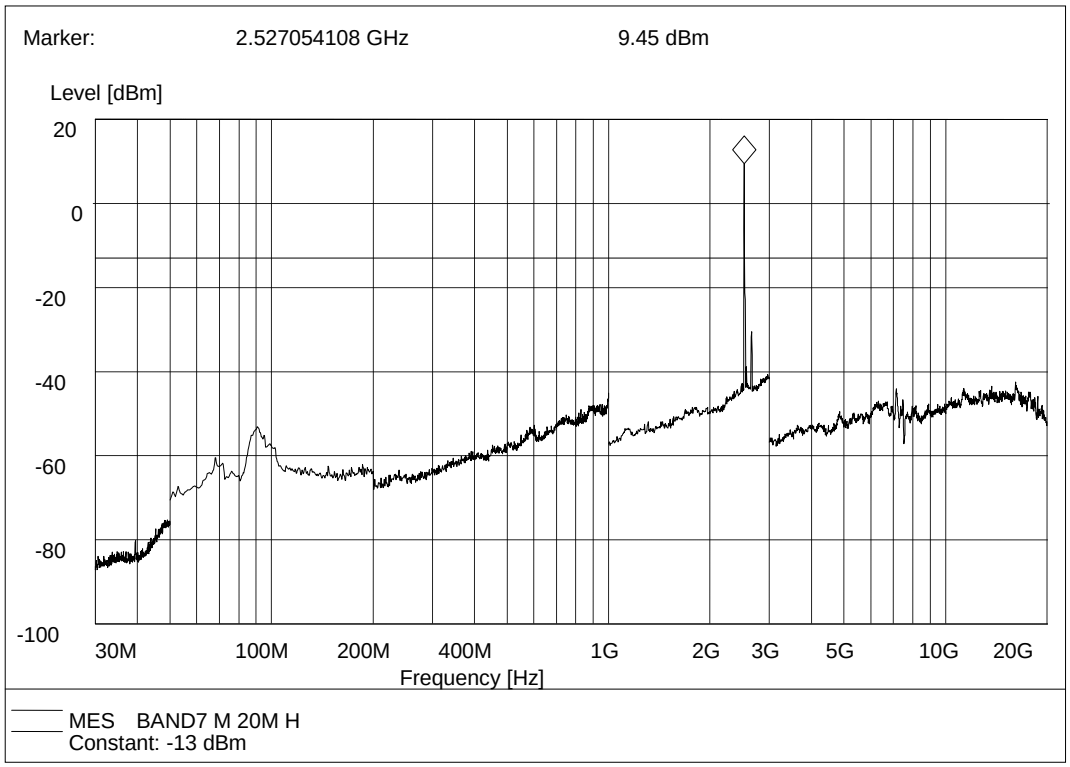
LTE Band 7 QPSK 10MHz BW Test Antenna Vertical



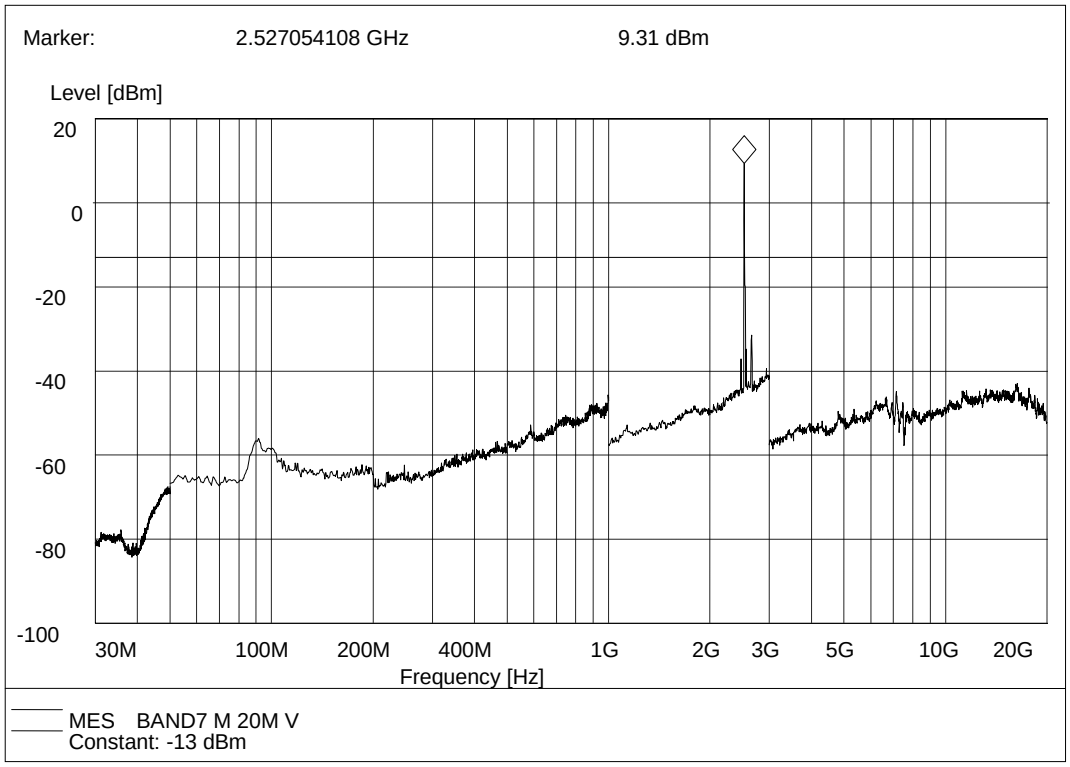
` LTE Band 7 QPSK 15MHz BW Test Antenna Horizontal



LTE Band 7 QPSK 15MHz BW Test Antenna Vertical



` LTE Band 7 QPSK 20MHz BW Test Antenna Horizontal



LTE Band 7 QPSK 20MHz BW Test Antenna Vertical

** END OF REPORT **