RF TEST REPORT

Report No.: SET2016-12703

Product: LTE/WCDMA/GSM（GPRS）Multi-Mode Digital Mobile Phone

FCC ID: SRQ-ZTEBLADEV7

Model No.: ZTE BLADE V7 / BLADE V7

Applicant: ZTE Corporation

Address: ZTE Plaza, Keji Road South, Shenzhen, China

Dates of Testing: 06/25/2016 — 09/28/2016

Issued by: CCIC-SET

Lab Location: Electronic Testing Building, Shahe Road, Xili Town, Shenzhen, 518055, China

Tel：86 755 26627338 **Fax**：86 755 26627238

This test report consists of 266 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CCIC-SET. The test results in the report only apply to the tested sample. The test report shall be invalid without all the signatures of testing engineers, reviewer and approver. Any objections must be raised to CCIC-SET within 15 days since the date when the report is received. It will not be taken into consideration beyond this limit.

Test Report

Product .....: LTE/WCDMA/GSM（GPRS）Multi-Mode Digital Mobile Phone

Brand Name.....: ZTE

Trade Name .....: ZTE

Applicant .....: ZTE Corporation

Applicant Address .....: ZTE Plaza, Keji Road South, Shenzhen, China

Manufacturer .....: ZTE Corporation

Manufacturer Address.....: ZTE Plaza, Keji Road South, Shenzhen, China

Test Standards .....: 47 CFR Part 2: Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
47 CFR Part 24(E): Personal Communications Services
47 CFR Part 27(L) 27(H) 27(M): Miscellaneous wireless communications services

Test Result……: PASS

Tested by ……: Chris You 2016.09.30

Chris You，Test Engineer

Reviewed by……: Zhu Qi 2016.09.30

Zhu Qi, Senior Egineer

Approved by……: Wu Lian 2016.09.30

Wu Li'an，Manager

Table of Contents

1. GENERAL INFORMATION 4

1.1 EUT Description 4

1.2 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator 5

1.3 Test Standards and Results 7

1.4 Test Configuration of Equipment Under Test 9

1.5 Measurement Results Explanation Example 10

1.6 Facilities and Accreditations 11

2. 47 CFR PART 2, PART 27H REQUIREMENTS 12

2.1 Conducted RF Output Power 12

2.2 Peak to Average Radio 23

2.3 99% Occupied Bandwidth and 26dB Bandwidth 38

2.4 Frequency Stability 81

2.5 Conducted Out of Band Emissions 87

2.6 Conducted Band Edge 149

2.7 Transmitter Radiated Power (EIRP/ERP) 231

2.8 Radiated Out of Band Emissions 241

3. LIST OF MEASURING EQUIPMENT 265

4. UNCERTAINTY OF EVALUATION 266

Change History		
Issue	Date	Reason for change
1.0	2016.09.30	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Type	LTE/WCDMA/GSM（GPRS） Multi-Mode Digital Mobile Phone
Hardware Version	ud5B
Software Version	TEL_MX_BLADE_V7V1.0.0
EUT supports Radios application	GSM/GPRS/EDGE/WCDMA/HSPA/LTE WLAN2.4GHz 802.11b/g/n (HT20/HT40) Bluetooth V3.0+EDR / Bluetooth V4.0 LE
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 7 Tx: 2502.5MHz~2567.5MHz Rx: 2622.5MHz~2687.5MHz LTE Band 12 Tx: 699.7MHz~715.3MHz Rx: 729.7MHz~745.3MHz
Maximum Output Power to Antenna	LTE Band 2：21.61dBm LTE Band 4：22.48dBm LTE Band 7：21.59dBm LTE Band 12：23.29dBm
Bandwidth	LTE Band 2：1.4MHz/3MHz/5MHz/10MHz/15MHz/20MHz LTE Band 4：1.4MHz/3MHz/5MHz/10MHz/15MHz/20MHz LTE Band 7：5MHz/10MHz/15MHz/20MHz LTE Band 12：1.4MHz/3MHz/5MHz/10MHz
Modulation Type	QPSK/16QAM
Antenna Type	Internal Antenna

Note: The EUT is a Mobile Phone，it contains 2 models，they are ZTE BLADE V7 and BLADE V7. They have the same size, appearance and internal structure, and the only difference is the model number.

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	1.4	1M10G7D	—	0.131
Part 24	LTE Band 2	16QAM	1.4	1M10W7D	—	0.108
Part 24	LTE Band 2	QPSK	3	2M74G7D	—	0.132
Part 24	LTE Band 2	16QAM	3	2M75W7D	—	0.108
Part 24	LTE Band 2	QPSK	5	4M54G7D	—	0.133
Part 24	LTE Band 2	16QAM	5	4M52W7D	—	0.109
Part 24	LTE Band 2	QPSK	10	8M96G7D	0.03	0.134
Part 24	LTE Band 2	16QAM	10	8M96W7D	0.03	0.109
Part 24	LTE Band 2	QPSK	15	13M6G7D	—	0.135
Part 24	LTE Band 2	16QAM	15	13M5W7D	—	0.110
Part 24	LTE Band 2	QPSK	20	18M6G7D	—	0.136
Part 24	LTE Band 2	16QAM	20	18M7W7D	—	0.110
Part 27	LTE Band 4	QPSK	1.4	1M09G7D	—	0.160
Part 27	LTE Band 4	16QAM	1.4	1M10W7D	—	0.132
Part 27	LTE Band 4	QPSK	3	2M74G7D	—	0.162
Part 27	LTE Band 4	16QAM	3	2M75W7D	—	0.133
Part 27	LTE Band 4	QPSK	5	4M56G7D	—	0.163
Part 27	LTE Band 4	16QAM	5	4M52W7D	—	0.134
Part 27	LTE Band 4	QPSK	10	8M96G7D	0.03	0.164
Part 27	LTE Band 4	16QAM	10	8M96W7D	0.03	0.134
Part 27	LTE Band 4	QPSK	15	13M6G7D	—	0.165
Part 27	LTE Band 4	16QAM	15	13M5W7D	—	0.135
Part 27	LTE Band 4	QPSK	20	18M6G7D	—	0.165
Part 27	LTE Band 4	16QAM	20	18M6W7D	—	0.136

Part 27	LTE Band 7	QPSK	5	4M54G7D	—	0.134
Part 27	LTE Band 7	16QAM	5	4M52W7D	—	0.109
Part 27	LTE Band 7	QPSK	10	8M96G7D	0.02	0.135
Part 27	LTE Band 7	16QAM	10	8M96W7D	0.02	0.110
Part 27	LTE Band 7	QPSK	15	13M6G7D	—	0.136
Part 27	LTE Band 7	16QAM	15	13M6W7D	—	0.110
Part 27	LTE Band 7	QPSK	20	18M7G7D	—	0.136
Part 27	LTE Band 7	16QAM	20	18M7W7D	—	0.111
Part 27	LTE Band 12	QPSK	1.4	1M10G7D	—	0.177
Part 27	LTE Band 12	16QAM	1.4	1M10W7D	—	0.142
Part 27	LTE Band 12	QPSK	3	2M74G7D	—	0.178
Part 27	LTE Band 12	16QAM	3	2M74W7D	—	0.143
Part 27	LTE Band 12	QPSK	5	4M54G7D	—	0.179
Part 27	LTE Band 12	16QAM	5	4M52W7D	—	0.143
Part 27	LTE Band 12	QPSK	10	9M00G7D	0.05	0.165
Part 27	LTE Band 12	16QAM	10	9M00W7D	0.05	0.135

1.3 Test Standards and Results

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

1.47 CFR Part 2, 24(E), 27(L), 27(M)

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

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

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

No.	Section	Description	Limit	Result
1	2.1046	Conducted RF Output Power	Reporting Only	PASS
2	24.232(d) 27.50(d)(5)	Peak to Average Radio	＜13dB	PASS
3	27.50(h)(2) 24.232(c)	Effective Radiated Power(Band 2/7)	EIRP＜2Watt	PASS PASS
	27.50(d)(4)	Effective Radiated Power(Band 4)	EIRP＜1Watt	PASS
	27.50(b)(10)	Effective Radiated Power(Band 12)	EIRP＜3Watt	PASS
4	2.1049 24.238(b) 27.53(h)(3) 27.53(m)(6)	Occupied Bandwidth	Reporting Only	PASS
5	2.1051 24.238(b) 27.53(g) 27.53(h)	Conducted Band Edge(Band 2/4/12)	＜ 43+10log10(P[watt])	PASS
	2.1051 27.53(m)(4)	Conducted Band Edge(Band 7)	＜5.5MHz: -13dBm ⩾5.5MHz: -25dBm	PASS

6	2.1051 24.238(a) 27.53(g) 27.53(h)	Conducted Spurious Emission (Band 2/4/12)	＜ 43+10log10(P[watt])	PASS
	2.1051 27.53(m)(4)	Conducted Spurious Emission (Band 7)	＜ 55+10log10(P[watt])	PASS
7	2.1053 24.238(a) 27.53(g) 27.53(h)	Radiated Spurious Emission (Band 2/4/12)	＜ 43+10log10(P[watt])	PASS
	2.1053 27.53(m)(4)	Radiated Spurious Emission (Band 7)	＜ 55+10log10(P[watt])	PASS
8	2.1055 24.235 27.54	Frequency Stability	＜2.5ppm	PASS

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.

1.4 Test Configuration of Equipment Under Test

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	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	7			√	√	√	√	√	√	√	√	√	√	√	√
	12	√	√	√	√			√	√	√	√	√	√	√	√
Peak-to-Average Ratio	2						√		√	√		√	√	√	√
	4						√		√	√		√	√	√	√
	7						√		√	√		√	√	√	√
	12				√				√	√		√	√	√	√
26dB and 99% Bandwidth	2	√	√	√	√	√	√	√	√			√		√	
	4	√	√	√	√	√	√	√	√			√		√	
	7			√	√	√	√	√	√			√		√	
	12	√	√	√	√			√	√			√		√	
Conducted Band Edge	2	√	√	√	√	√	√	√	√	√		√	√		√
	4	√	√	√	√	√	√	√	√	√		√	√		√
	7			√	√	√	√	√	√	√		√	√		√
	12	√	√	√	√			√	√	√		√	√		√
Conducted Spurious Emission	2	√	√	√	√	√	√	√	√	√			√	√	√
	4	√	√	√	√	√	√	√	√	√			√	√	√
	7			√	√	√	√	√	√	√			√	√	√
	12	√	√	√	√			√	√	√			√	√	√
Frequency Stability	2	√	√	√	√	√	√	√				√		√	
	4	√	√	√	√	√	√	√				√		√	
	7			√	√	√	√	√				√		√	
	12	√	√	√	√			√				√		√	
ERP/EIRP	2	√	√	√	√	√	√	√	√	√			√	√	√
	4	√	√	√	√	√	√	√	√	√			√	√	√
	7			√	√	√	√	√	√	√			√	√	√
	12	√	√	√	√			√	√	√			√	√	√
Radiated Spurious Emission	2	√	√	√	√	√	√	√		√			√	√	√
	4	√	√	√	√	√	√	√		√			√	√	√

	7			√	√	√	√	√		√			√	√	√
	12	√	√	√	√			√		√			√	√	√
Note	**1. The mark “ √ ” means that this configuration is 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 7.5dB and 10dB attenuator.

Example:

Offset (dB) = RF cable loss(dB) + attenuator factor(dB).
= 7 + 10 = 17 (dB)

1.6 Facilities and Accreditations

1.6.1 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.

1.6.2 Test Environment Conditions

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

Temperature (°C):	15℃- 35℃
Relative Humidity (%):	30% -60%
Atmospheric Pressure (kPa):	86KPa-106KPa

2. 47 CFR PART 2, PART 27H REQUIREMENTS

2.1 Conducted RF Output Power

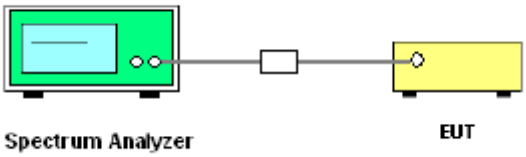
2.1.1 Requirement

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 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.1.3 Test Setup



2.1.4 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

2.1.5 Test Results

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	21.57	21.58	**21.61**
20		1	49	21.56	21.57	21.54
20		1	99	21.49	21.51	21.48
20		50	0	20.84	20.80	20.82
20		50	24	20.76	20.78	20.80
20		50	49	20.71	20.73	20.77
20		100	0	20.75	20.74	20.70
20	16QAM	1	0	20.52	20.45	20.44
20		1	49	20.47	20.42	20.43
20		1	99	20.42	20.44	20.39
20		50	0	19.85	19.78	19.74
20		50	24	19.51	19.59	19.65
20		50	49	19.55	19.52	19.54
20		100	0	19.51	19.52	19.52
Channel				18675	18900	19125
Frequency(MHz)				1857.5	1880	1902.5
15	QPSK	1	0	**21.58**	21.55	21.54
15		1	37	21.54	21.56	21.54
15		1	74	21.52	21.53	21.48
15		36	0	20.82	20.85	20.83
15		36	18	20.80	20.83	20.79
15		36	37	20.83	20.77	20.81
15		75	0	20.76	20.79	20.73
15	16QAM	1	0	20.49	20.45	20.44
15		1	37	20.33	20.40	20.39
15		1	74	20.35	20.37	20.31
15		36	0	19.63	19.71	19.62
15		36	18	19.65	19.62	19.59
15		36	37	19.61	19.64	19.71
15		75	0	19.57	19.52	19.58

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	21.54	**21.56**	21.53
10		1	24	21.51	21.49	21.54
10		1	49	21.52	21.47	21.48
10		25	0	20.84	20.82	20.83
10		25	12	20.82	20.85	20.85
10		25	24	20.79	20.80	20.84
10		50	0	20.78	20.75	20.76
10	16QAM	1	0	20.47	20.41	20.40
10		1	24	20.46	20.39	20.41
10		1	49	20.35	20.42	20.38
10		25	0	19.72	19.75	19.74
10		25	12	19.65	19.68	19.72
10		25	24	19.59	19.56	19.62
10		50	0	19.51	19.52	19.52
Channel				18625	18900	19175
Frequency(MHz)				1852.5	1880	1907.5
5	QPSK	1	0	21.51	21.53	**21.55**
5		1	12	21.47	21.46	21.49
5		1	24	21.48	21.47	21.46
5		12	0	20.81	20.79	20.82
5		12	6	20.82	20.84	20.79
5		12	11	20.81	20.78	20.77
5		25	0	20.74	20.81	20.82
5	16QAM	1	0	20.45	20.42	20.44
5		1	12	20.32	20.41	20.38
5		1	24	20.35	20.40	20.39
5		12	0	19.66	19.64	19.61
5		12	6	19.57	19.55	19.53
5		12	11	19.54	19.51	19.55
5		25	0	19.50	19.55	19.47

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				18615	18900	19185
Frequency(MHz)				1851.5	1880	1908.5
3	QPSK	1	0	**21.53**	21.49	21.51
3		1	7	21.47	21.44	21.45
3		1	14	21.46	21.47	21.42
3		8	0	20.85	20.82	20.80
3		8	4	20.78	20.81	20.83
3		8	7	20.84	20.78	20.85
3		15	0	20.79	20.79	20.83
3	16QAM	1	0	20.46	20.44	20.42
3		1	7	20.42	20.37	20.40
3		1	14	20.34	20.38	20.31
3		8	0	19.52	19.51	19.55
3		8	4	19.55	19.57	19.52
3		8	7	19.44	19.39	19.44
3		15	0	19.47	19.42	19.40
Channel				18607	18900	19193
Frequency(MHz)				1850.7	1732.5	1909.3
1.4	QPSK	1	0	21.47	**21.50**	21.47
1.4		1	2	21.43	21.48	21.46
1.4		1	5	21.44	21.46	21.48
1.4		3	0	20.80	20.77	20.82
1.4		3	1	20.84	20.88	20.83
1.4		3	2	20.84	20.87	20.81
1.4		6	0	20.78	20.76	20.73
1.4	16QAM	1	0	20.43	20.47	20.45
1.4		1	2	20.45	20.40	20.44
1.4		1	5	20.37	20.42	20.41
1.4		3	0	19.55	19.51	19.47
1.4		3	1	19.54	19.48	19.55
1.4		3	2	19.50	19.47	19.43
1.4		6	0	19.48	19.41	19.44

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	22.45	**22.48**	22.46
20		1	49	22.39	22.35	22.39
20		1	99	22.32	22.31	22.33
20		50	0	21.72	21.64	21.67
20		50	24	21.61	21.75	21.71
20		50	49	21.78	21.72	21.75
20		100	0	21.61	21.56	21.57
20	16QAM	1	0	21.12	21.21	21.14
20		1	49	21.10	21.15	21.13
20		1	99	21.14	21.10	21.07
20		50	0	20.57	20.49	20.52
20		50	24	20.49	20.47	20.50
20		50	49	20.51	20.55	20.46
20		100	0	20.54	20.55	20.41
Channel				20025	20175	20325
Frequency(MHz)				1717.5	1732.5	1747.5
15	QPSK	1	0	**22.46**	22.44	22.42
15		1	37	22.36	22.39	22.38
15		1	74	22.35	22.33	22.34
15		36	0	21.65	21.57	21.59
15		36	18	21.58	21.56	21.57
15		36	37	21.56	21.50	21.54
15		75	0	21.58	21.56	21.62
15	16QAM	1	0	21.22	21.17	21.23
15		1	37	21.20	21.15	21.19
15		1	74	21.09	21.12	21.18
15		36	0	20.56	20.53	20.58
15		36	18	20.59	20.63	20.60
15		36	37	20.41	20.51	20.43
15		75	0	20.52	20.54	20.51

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	22.42	**22.44**	22.41
10		1	24	22.35	22.39	22.38
10		1	49	22.34	22.34	22.33
10		25	0	21.64	21.66	21.68
10		25	12	21.72	21.65	21.70
10		25	24	21.57	21.60	21.55
10		50	0	21.55	21.62	21.58
10	16QAM	1	0	21.13	21.15	21.24
10		1	24	21.11	21. 22	21.15
10		1	49	21.18	21.09	21.16
10		25	0	20.65	20.63	20.70
10		25	12	20.58	20.60	20.62
10		25	24	20.62	20.68	20.64
10		50	0	20.59	20.64	20.53
Channel				19975	20175	20375
Frequency(MHz)				1712.5	1732.5	1752.5
5	QPSK	1	0	**22.41**	22.39	22.37
5		1	12	22.35	22.38	22.33
5		1	24	22.31	22.33	22.30
5		12	0	21.62	21.57	21.62
5		12	6	21.57	21.60	21.58
5		12	11	21.55	21.53	21.67
5		25	0	21.63	21.58	21.59
5	16QAM	1	0	21.17	21.26	21.10
5		1	12	21.21	21.17	21.12
5		1	24	21.19	21.21	21.15
5		12	0	20.65	20.71	20.68
5		12	6	20.56	20.62	20.65
5		12	11	20.65	20.64	20.62
5		25	0	20.53	20.58	20.50

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				19965	20175	20385
Frequency(MHz)				1711.5	1732.5	1753.5
3	QPSK	1	0	22.36	22.34	**22.38**
3		1	7	22.31	22.30	22.33
3		1	14	22.29	22.29	22.27
3		8	0	21.67	21.61	21.56
3		8	4	21.60	21.55	21.58
3		8	7	21.58	21.62	21.65
3		15	0	21.55	21.59	21.61
3	16QAM	1	0	21.21	21.12	21.15
3		1	7	21.17	21.15	21.13
3		1	14	21.12	21.10	21.06
3		8	0	20.63	20.65	20.72
3		8	4	20.54	20.58	20.55
3		8	7	20.63	20.68	20.65
3		15	0	20.62	20.66	20.58
Channel				19957	20175	20393
Frequency(MHz)				1710.7	1732.5	1754.3
1.4	QPSK	1	0	**22.37**	22.35	22.36
1.4		1	2	22.31	22.33	22.29
1.4		1	5	22.25	22.29	22.28
1.4		3	0	21.61	21.58	21.55
1.4		3	1	21.57	21.63	21.58
1.4		3	2	21.56	21.57	21.61
1.4		6	0	21.55	21.56	21.59
1.4	16QAM	1	0	21.22	21.17	21.19
1.4		1	2	21.13	21.14	21.21
1.4		1	5	21.21	21.12	21.14
1.4		3	0	20.65	20.71	20.67
1.4		3	1	20.59	20.63	20.67
1.4		3	2	20.60	20.58	20.57
1.4		6	0	20.69	20.62	20.63

3. 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	21.55	**21.59**	21.54
20		1	49	21.48	21.47	21.53
20		1	99	21.51	21.52	21.45
20		50	0	21.10	21.11	21.12
20		50	24	21.08	21.12	21.13
20		50	49	21.04	21.07	21.08
20		100	0	21.05	21.10	21.03
20	16QAM	1	0	20.77	20.75	20.72
20		1	49	20.69	20.67	20.70
20		1	99	20.64	20.61	20.66
20		50	0	20.37	20.35	20.32
20		50	24	20.29	20.27	20.30
20		50	49	20.34	20.31	20.26
20		100	0	20.30	20.25	20.31
Channel				20825	21100	21375
Frequency(MHz)				2507.5	2535	2562.5
15	QPSK	1	0	21.53	**21.57**	21.54
15		1	37	21.47	21.53	21.48
15		1	74	21.50	21.48	21.47
15		36	0	21.12	21.13	21.09
15		36	18	21.04	21.05	21.05
15		36	37	21.07	21. 04	21.11
15		75	0	21.04	21.13	21.05
15	16QAM	1	0	20.75	20.74	20.79
15		1	37	20.69	20.68	20.72
15		1	74	20.65	20.66	20.64
15		36	0	20.35	20.34	20.39
15		36	18	20.39	20.38	20.32
15		36	37	20.35	20.36	20.34
15		75	0	20.31	20.35	20.31

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	21.49	**21.54**	21.51
10		1	24	21.45	21.47	21.43
10		1	49	21.44	21.43	21.45
10		25	0	21.13	21.10	21.09
10		25	12	21.07	21.02	21.11
10		25	24	21.05	21.10	21.05
10		50	0	21.11	21.12	21.05
10	16QAM	1	0	20.70	20.64	20.63
10		1	24	20.61	20.65	20.64
10		1	49	20.65	20.60	20.59
10		25	0	20.38	20.34	20.33
10		25	12	20.31	20.65	20.34
10		25	24	20.25	20.30	20.35
10		50	0	20.30	20.27	20.29
Channel				20775	21100	21425
Frequency(MHz)				2502.5	2535	2567.5
5	QPSK	1	0	21.48	**21.52**	21.45
5		1	12	21.46	21.45	21.51
5		1	24	21.44	21.46	21.49
5		12	0	21.10	21.14	21.13
5		12	6	21.05	21.12	21.07
5		12	11	21.09	21.04	21.08
5		25	0	21.08	21.10	21.02
5	16QAM	1	0	20.74	20.70	20.72
5		1	12	20.65	20.61	20.70
5		1	24	20.65	20.66	20.60
5		12	0	20.34	20.30	20.32
5		12	6	20.25	20.28	20.30
5		12	11	20.25	20.26	20.20
5		25	0	20.29	20.30	20.27

4. LTE Band 12 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				23060	23095	23130
Frequency(MHz)				704	707.5	711
10	QPSK	1	0	23.22	**23.29**	23.25
10		1	24	23.24	23.22	23.23
10		1	49	23.22	23.19	23.20
10		25	0	22.61	22.56	22.58
10		25	12	22.52	22.58	22.60
10		25	24	22.47	22.50	22.55
10		50	0	22.45	22.52	22.48
10	16QAM	1	0	21.83	21.85	21.84
10		1	24	21.81	21.82	21.85
10		1	49	21.78	21.79	21.76
10		25	0	21.35	21.33	21.30
10		25	12	21.28	21.20	21.22
10		25	24	21.22	21.28	21.24
10		50	0	21.20	21.24	21.20
Channel				23035	23095	23155
Frequency(MHz)				701.5	707.5	713.5
5	QPSK	1	0	23.20	**23.25**	23.20
5		1	12	23.21	23.23	23.18
5		1	24	23.22	23.21	23.19
5		12	0	22.59	22.55	22.60
5		12	6	22.55	22.59	22.57
5		12	11	22.52	22.53	22.51
5		25	0	22.47	22.51	22.46
5	16QAM	1	0	21.83	21.88	21.85
5		1	12	21.84	21.86	21.81
5		1	24	21.79	21.75	21.79
5		12	0	21.32	21.35	21.30
5		12	6	21.28	21.23	21.26
5		12	11	21.25	21.21	21.27
5		25	0	21.21	21.25	21.22

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				23025	23095	23165
Frequency(MHz)				700.5	707.5	714.5
3	QPSK	1	0	23.18	**23.23**	23.22
3		1	7	23.16	23.20	23.15
3		1	14	23.21	23.18	23.17
3		8	0	22.53	22.54	22.59
3		8	4	22.51	22.55	22.56
3		8	7	22.57	22.54	22.53
3		15	0	22.48	22.50	22.45
3	16QAM	1	0	21.80	21.83	21.81
3		1	7	21.82	21.85	21.79
3		1	14	21.78	21.77	21.75
3		8	0	21.30	21.34	21.35
3		8	4	21.27	21.26	21.28
3		8	7	21.24	21.23	21.26
3		15	0	21.23	21.24	21.20
Channel				23017	23095	23173
Frequency(MHz)				699.7	707.5	715.3
1.4	QPSK	1	0	23.16	**23.20**	23.18
1.4		1	2	23.15	23.18	23.16
1.4		1	5	23.19	23.16	23.14
1.4		3	0	22.50	22.53	22.54
1.4		3	1	22.48	22.51	22.46
1.4		3	2	22.52	22.44	22.49
1.4		6	0	22.46	22.49	22.48
1.4	16QAM	1	0	21.82	21.80	21.84
1.4		1	2	21.80	21.75	21.77
1.4		1	5	21.76	21.74	21.73
1.4		3	0	21.29	21.33	21.35
1.4		3	1	21.25	21.21	21.23
1.4		3	2	21.26	21.23	21.28
1.4		6	0	21.21	21.24	21.25

2.2 Peak to Average Radio

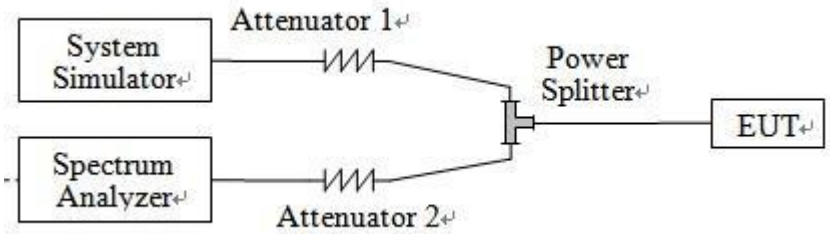
2.2.1 Definition

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

2.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

2.2.3 Test Description



2.2.4 Test Procedures

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

2.2.5 Test Results of 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
						dB	Refer to Plot	dB	
20	16QAM	18700	1860	1	0	4.39	Plot A1 to A6	13	PASS
				100	0	6.13			
	16QAM	18900	1880	1	0	5.70			PASS
				100	0	6.04			
	16QAM	19100	1900	1	0	4.43			PASS
				100	0	6.04			

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
						dB	Refer to Plot	dB	
20	16QAM	20050	1720	1	0	5.25	Plot B1 to B6	13	PASS
				100	0	6.25			
	16QAM	20175	1732.5	1	0	5.86			PASS
				100	0	6.07			
	16QAM	20300	1745	1	0	4.75			PASS
				100	0	6.05			

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

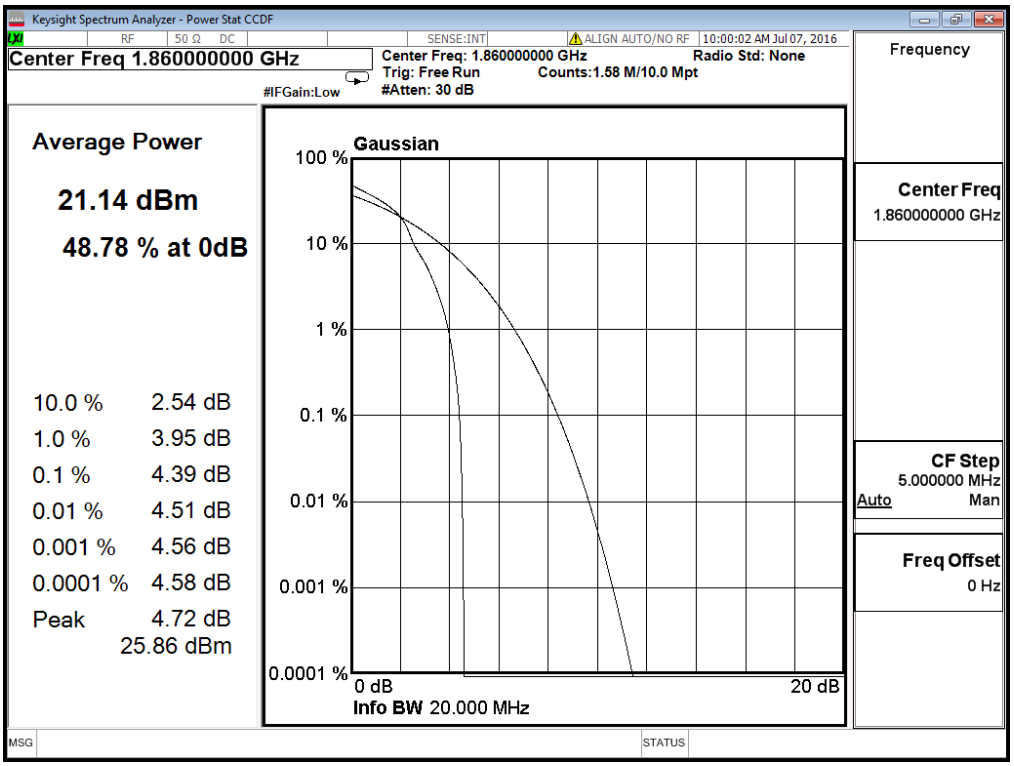
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Peak to Average radio		Limit	Verdict
						dB	Refer to Plot	dB	
20	16QAM	20850	2510	1	0	4.82	Plot C1 to C6	13	PASS
				100	0	5.86			
	16QAM	21100	2535	1	0	5.20			PASS
				100	0	5.95			
	16QAM	21350	2560	1	0	4.79			PASS
				100	0	6.05			

4. Test Result of LTE Band 12 Peak-to-Average Ratio:

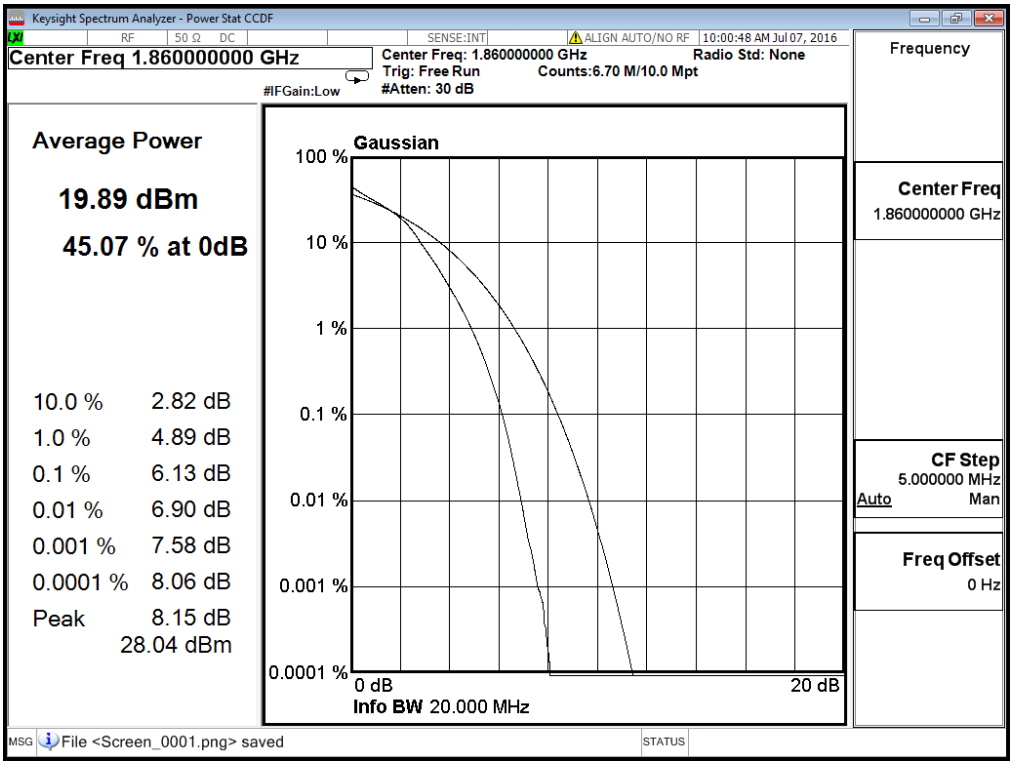
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Peak to Average radio		Limit	Verdict
						dB	Refer to Plot	dB	
10	16QAM	23060	704	1	0	5.87	Plot D1 to D6	13	PASS
				50	0	6.35			
	16QAM	23095	707.5	1	0	5.30			PASS
				50	0	6.36			
	16QAM	23130	711	1	0	5.57			PASS
				50	0	6.24			

Note: both QPSK/16QAM modulation modes were tested, only provide worst-case mode (16QAM) test plots here.

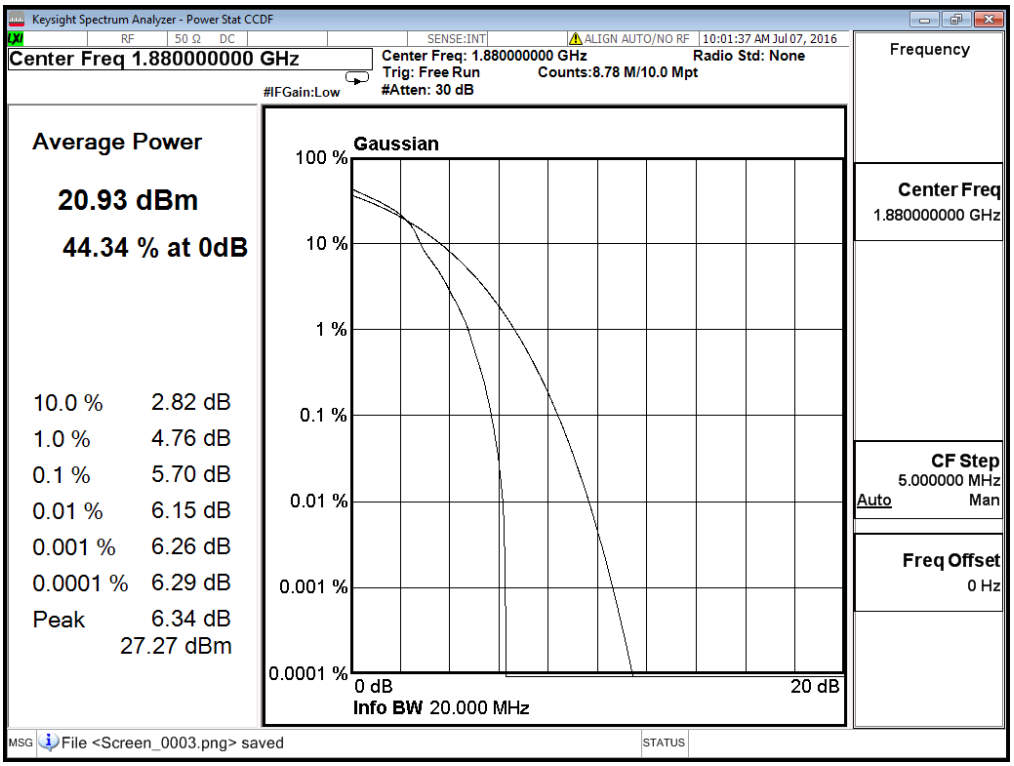
2.2.6 Test Results (Plots) of Peak-to-Average Ratio



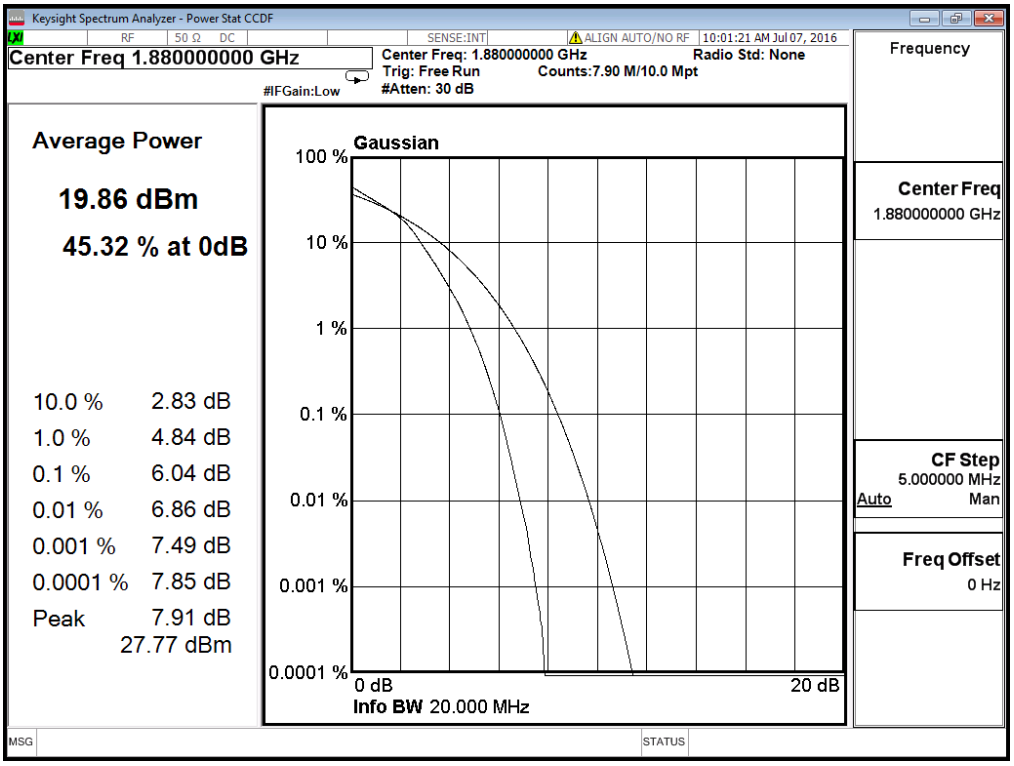
(Plot A1: Band 2/20MHz/16QAM in L Ch 1RB Size)



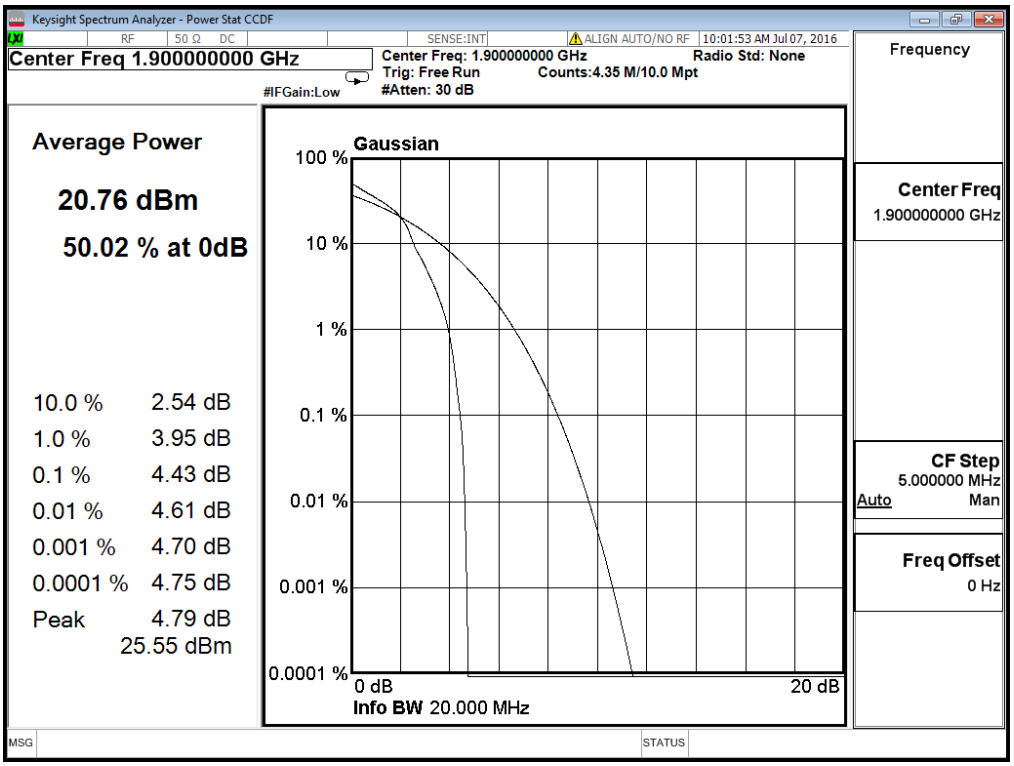
(Plot A2: Band 2/20MHz/16QAM in L Ch 100RB Size)



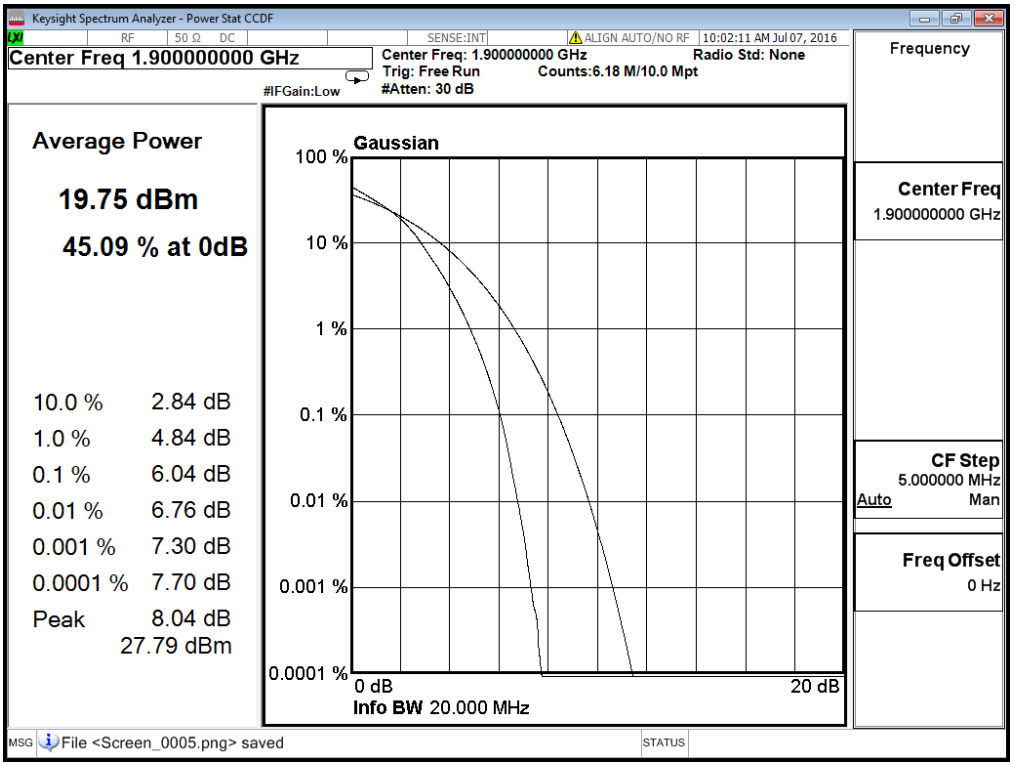
(Plot A3: Band 2/20MHz/16QAM in M Ch 1RB Size)



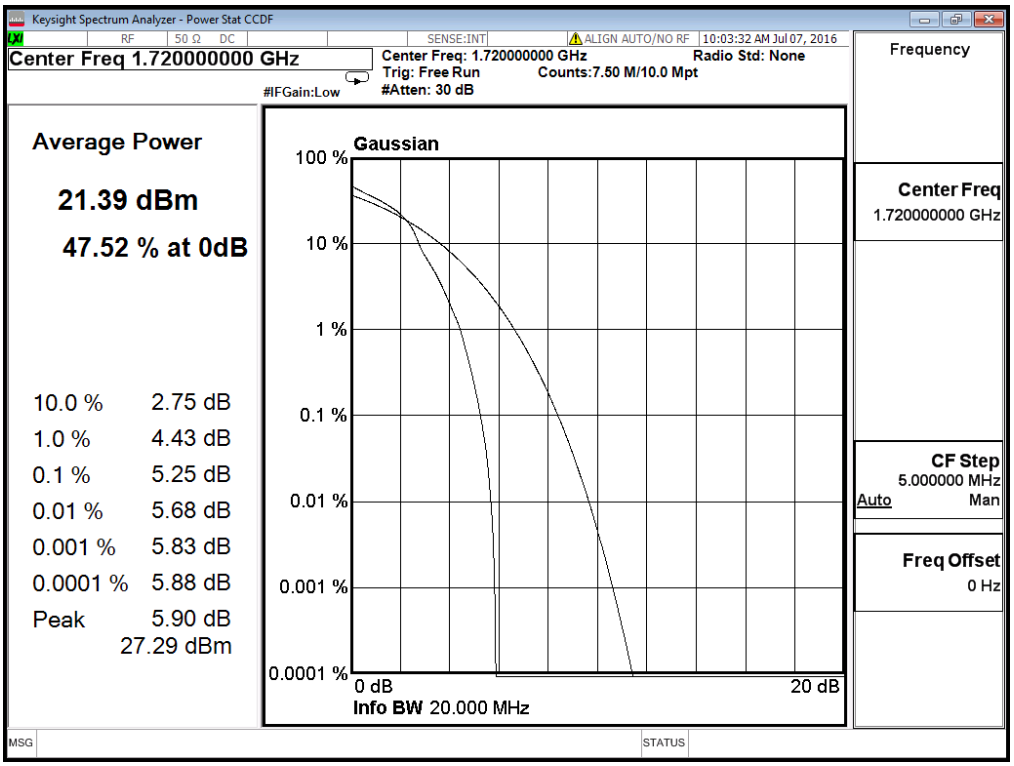
(Plot A4: Band 2/20MHz/16QAM in M Ch 100RB Size)



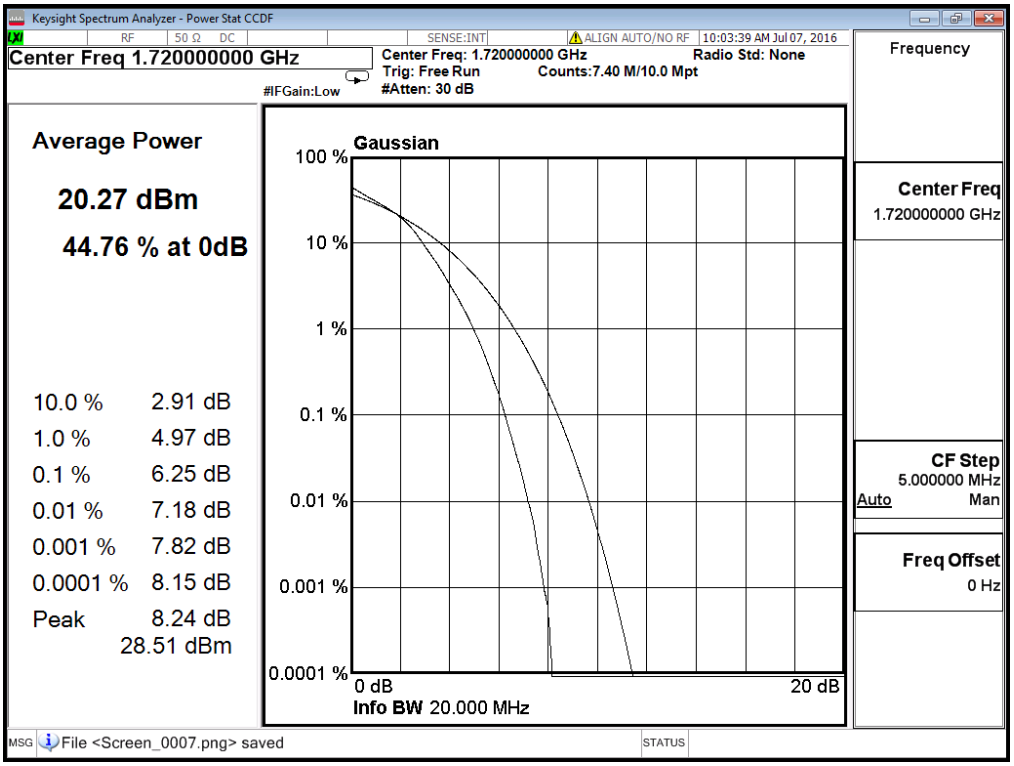
(Plot A5: Band 2/20MHz/16QAM in H Ch 1RB Size)



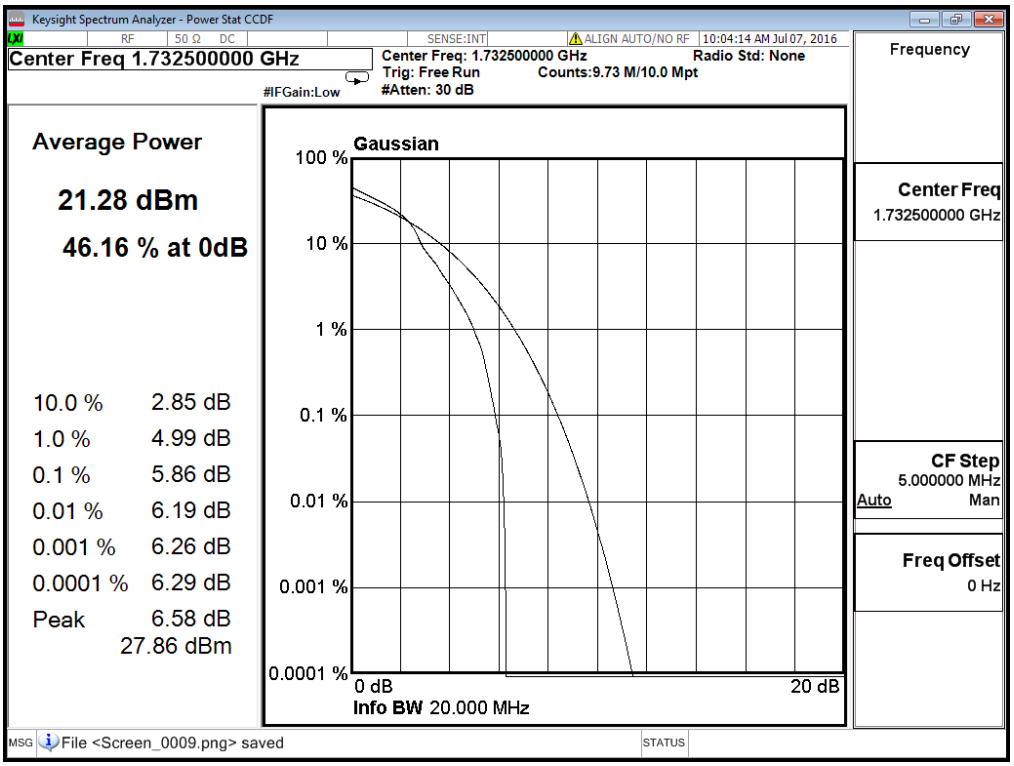
(Plot A6: Band 2/20MHz/16QAM in H Ch 100RB Size)



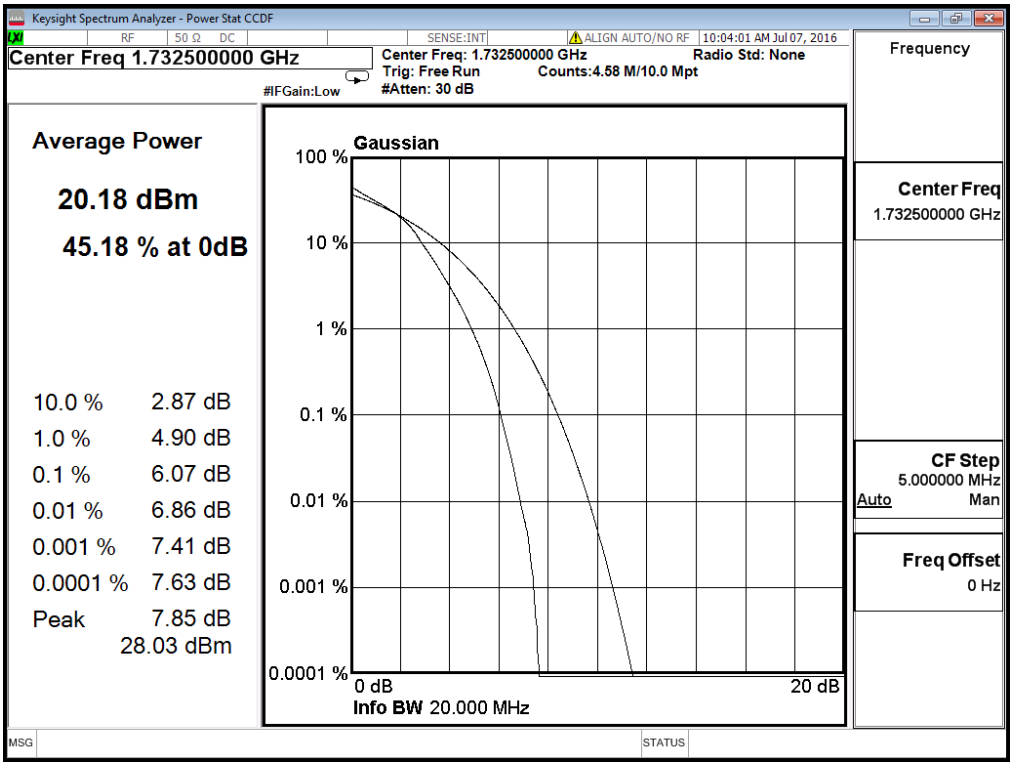
(Plot B1: Band 4/20MHz/16QAM in L Ch 1RB Size)



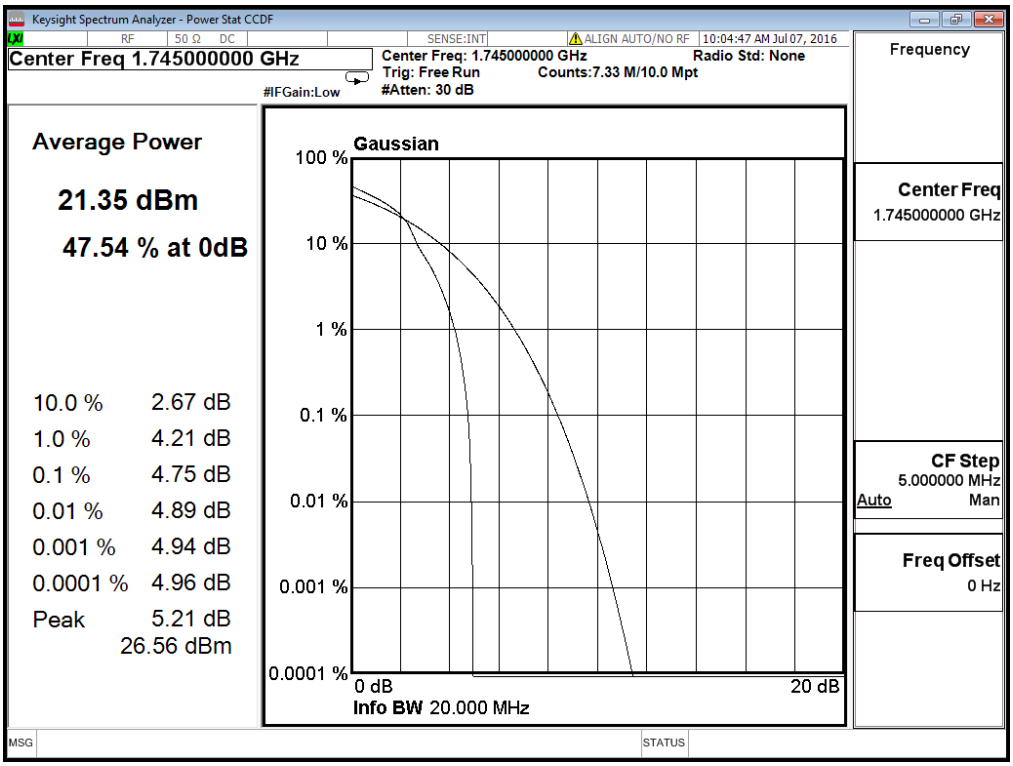
(Plot B2: Band 4/20MHz/16QAM in L Ch 100RB Size)



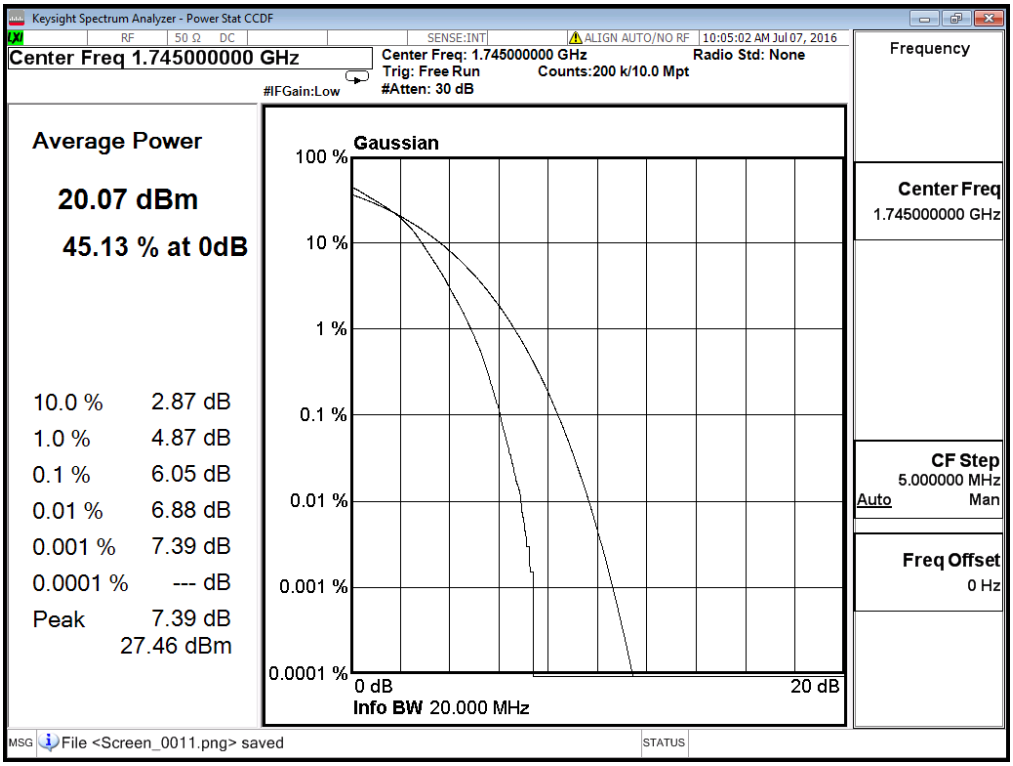
(Plot B3: Band 4/20MHz/16QAM in M Ch 1RB Size)



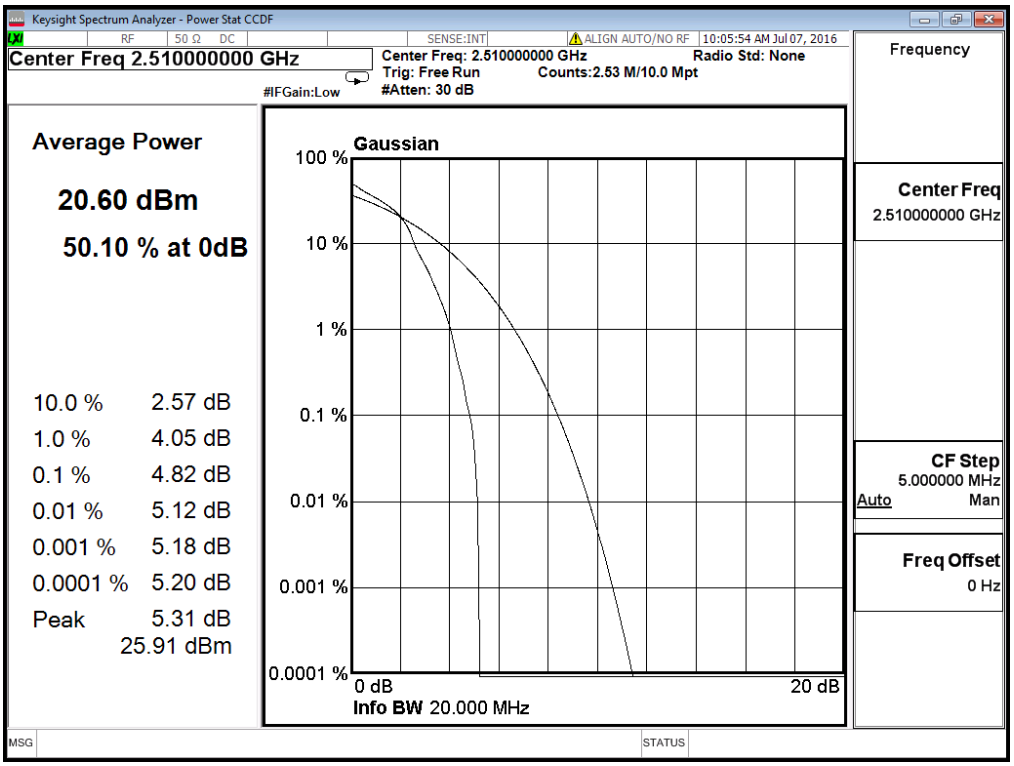
(Plot B4: Band 4/20MHz/16QAM in M Ch 100RB Size)



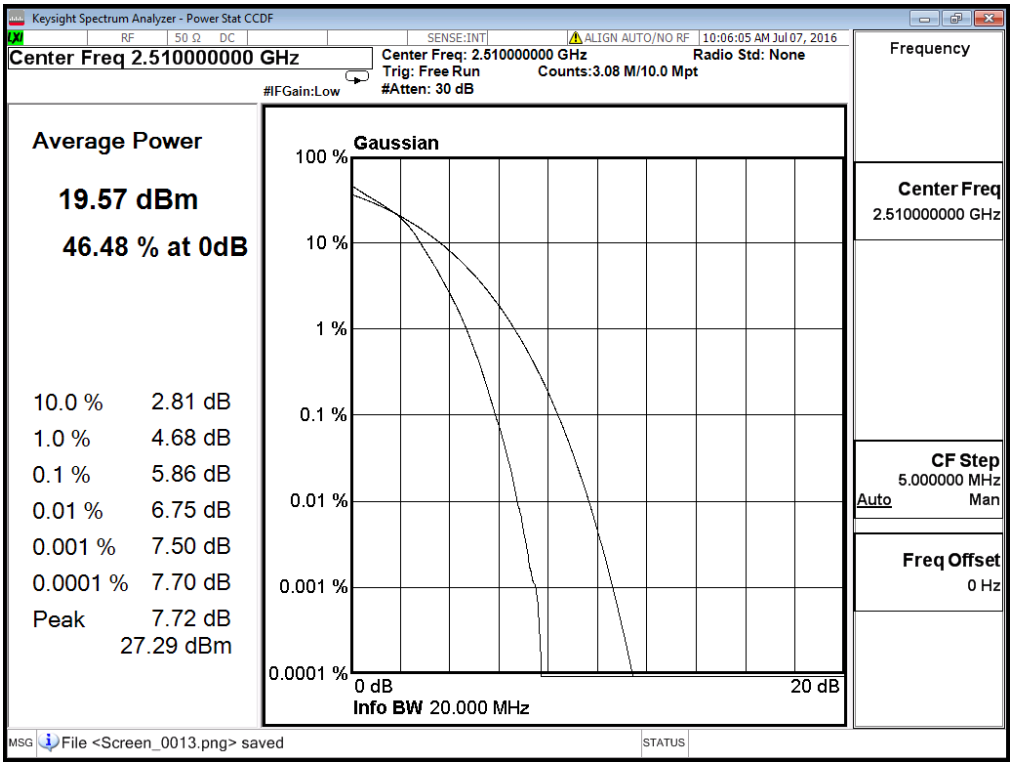
(Plot B5: Band 4/20MHz/16QAM in H Ch 1RB Size)



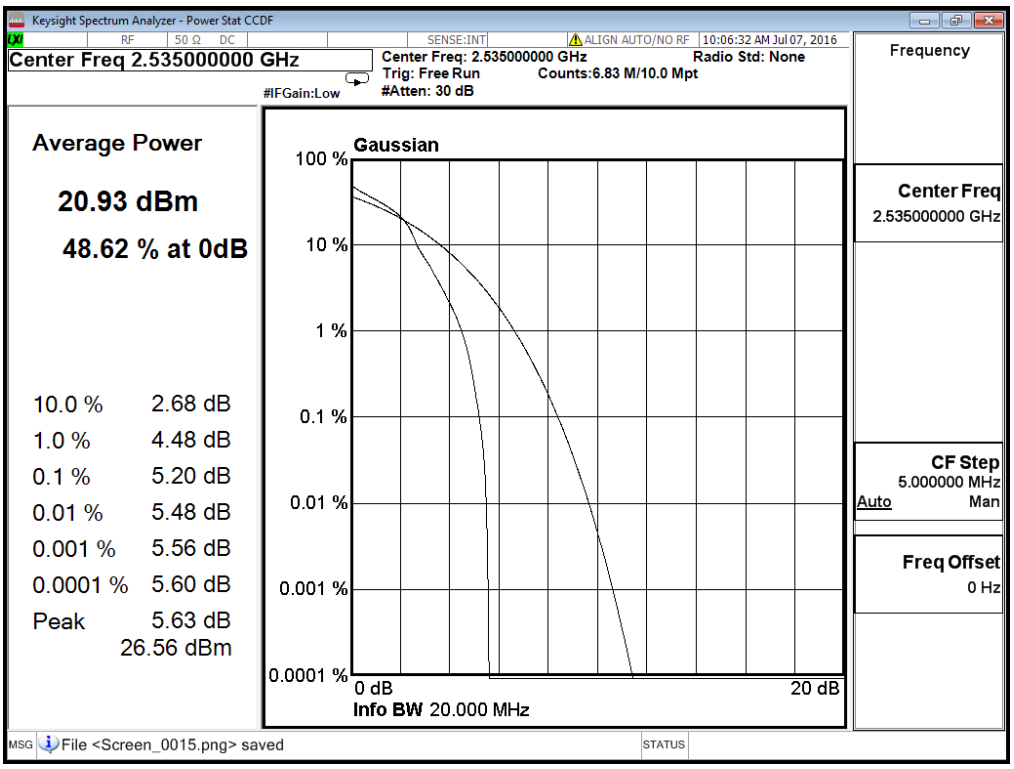
(Plot B6: Band 4/20MHz/16QAM in H Ch 100RB Size)



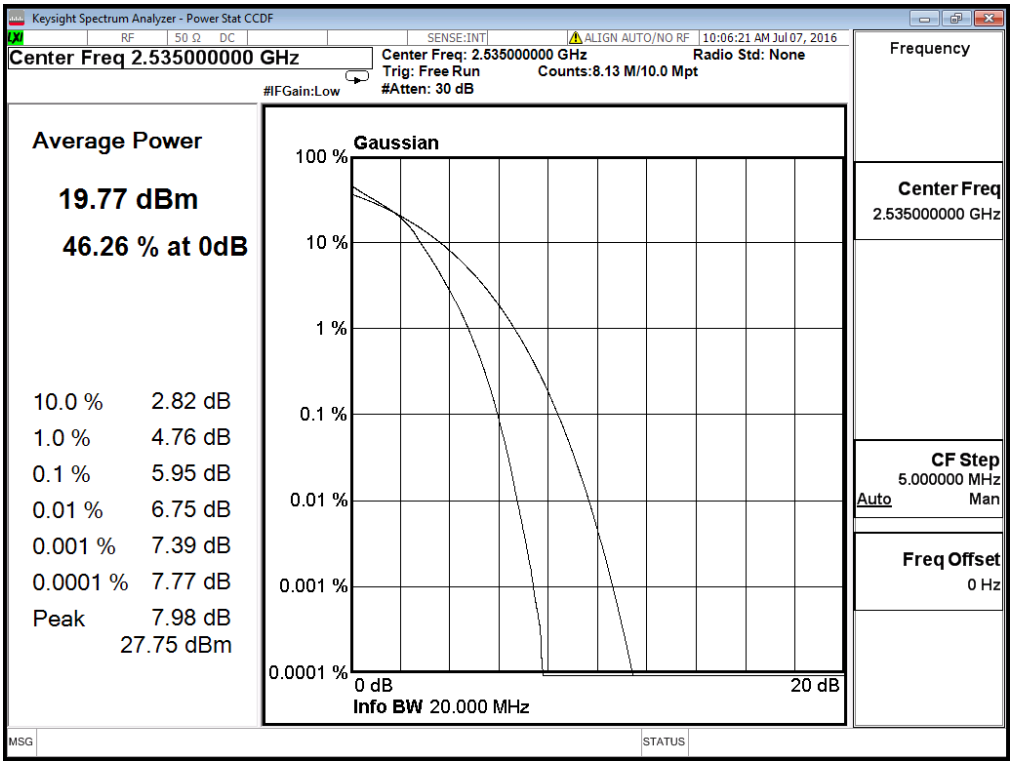
(Plot C1: Band 7/20MHz/16QAM in L Ch 1RB Size)



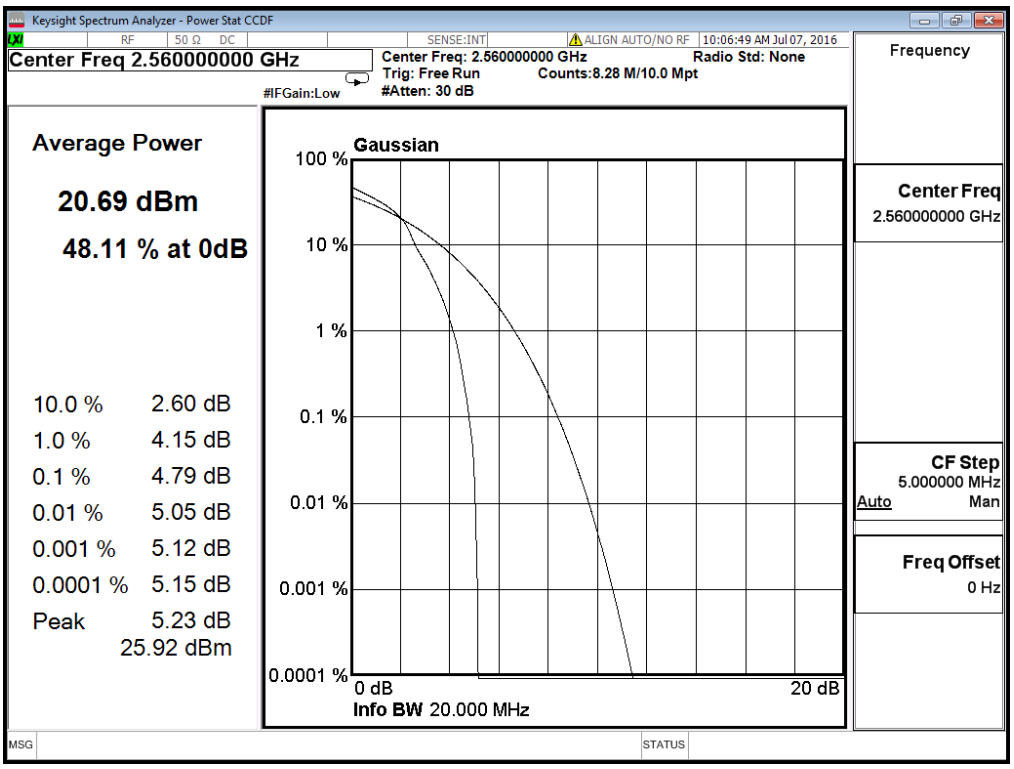
(Plot C2: Band 7/20MHz/16QAM in L Ch 100RB Size)



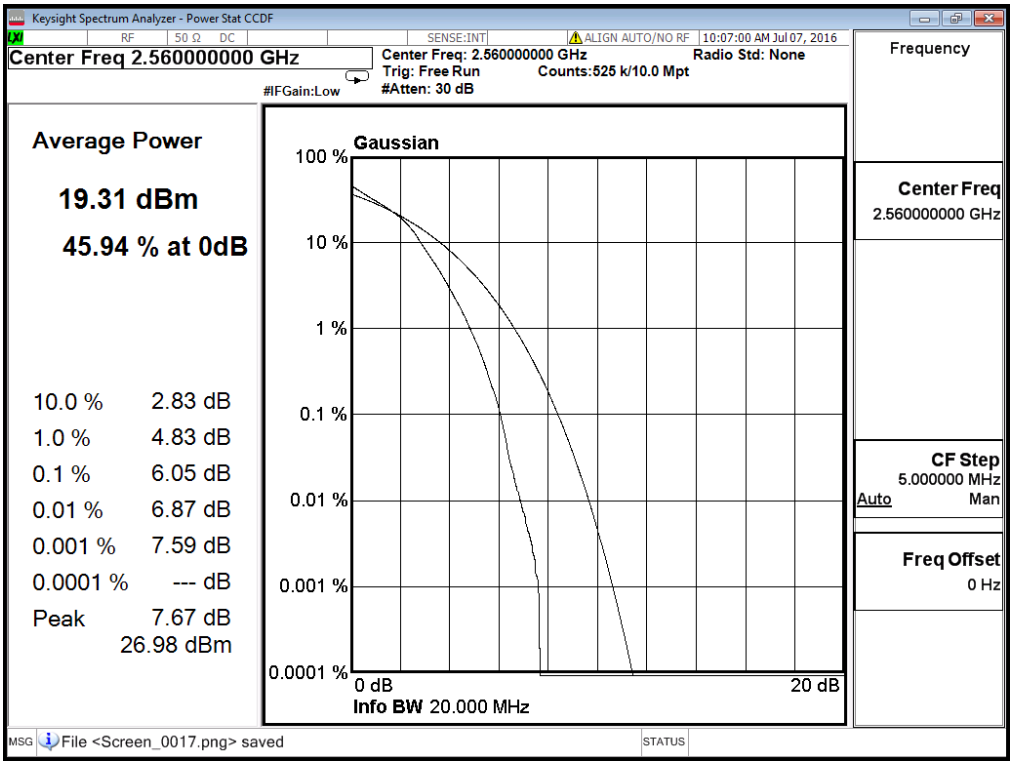
(Plot C3: Band 7/20MHz/16QAM in M Ch 1RB Size)



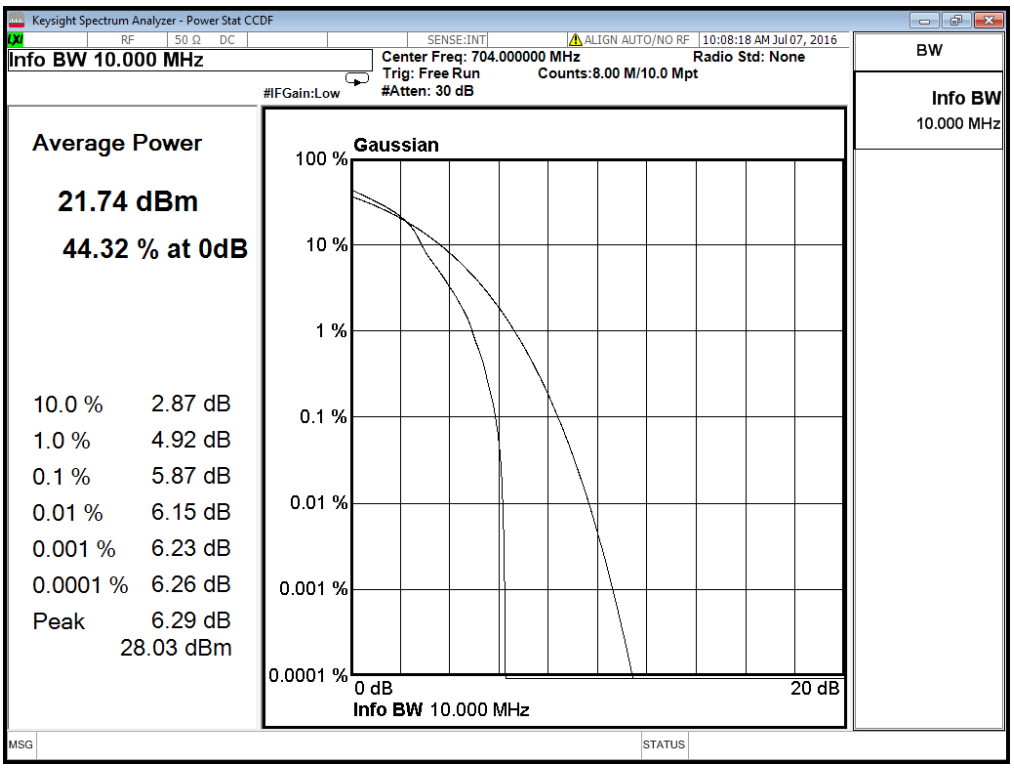
(Plot C4: Band 7/20MHz/16QAM in M Ch 100RB Size)



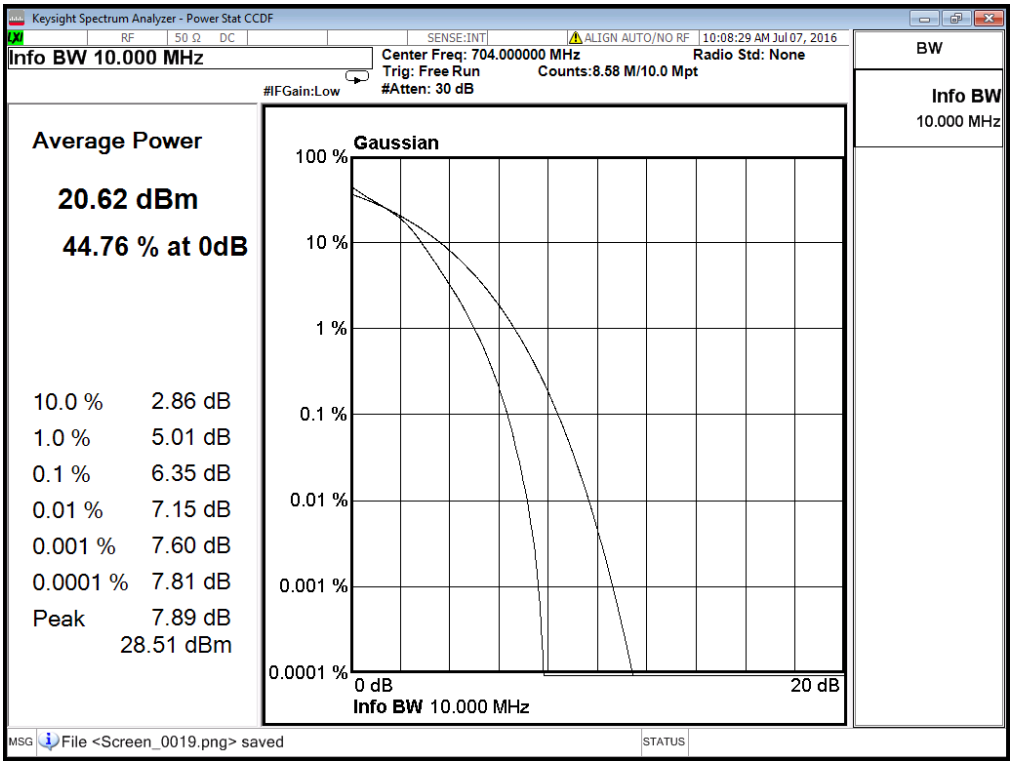
(Plot C5: Band 7/20MHz/16QAM in H Ch 1RB Size)



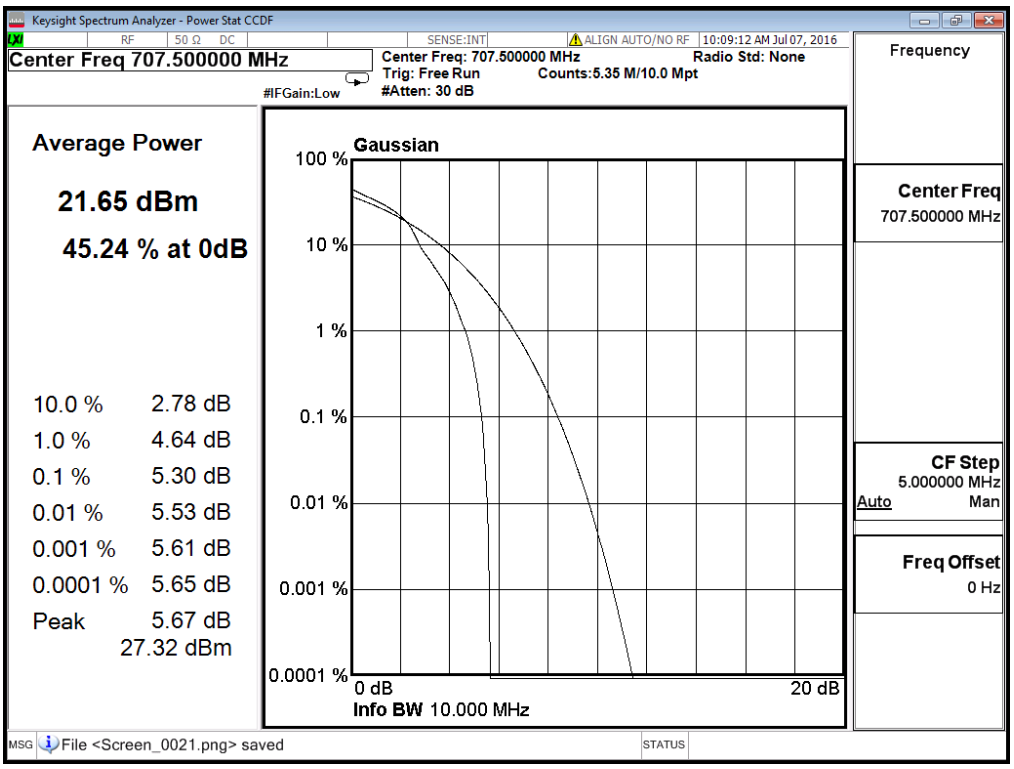
(Plot C6: Band 7/20MHz/16QAM in H Ch 100RB Size)



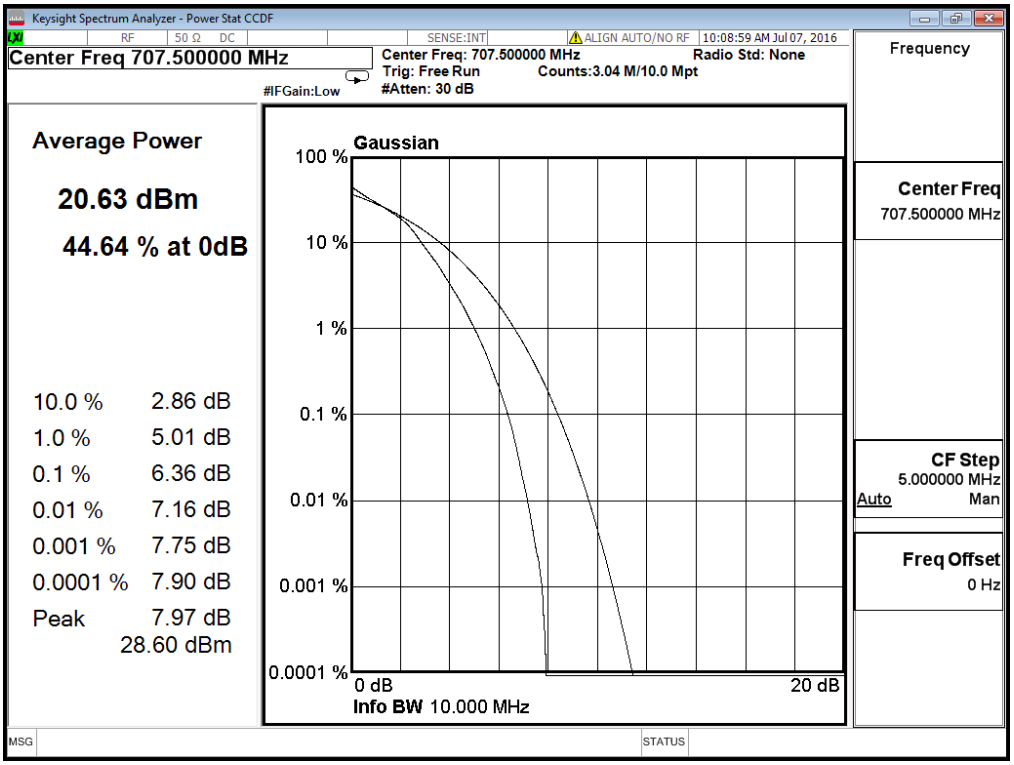
(Plot D1: Band 12/10MHz/16QAM in L Ch 1RB Size)



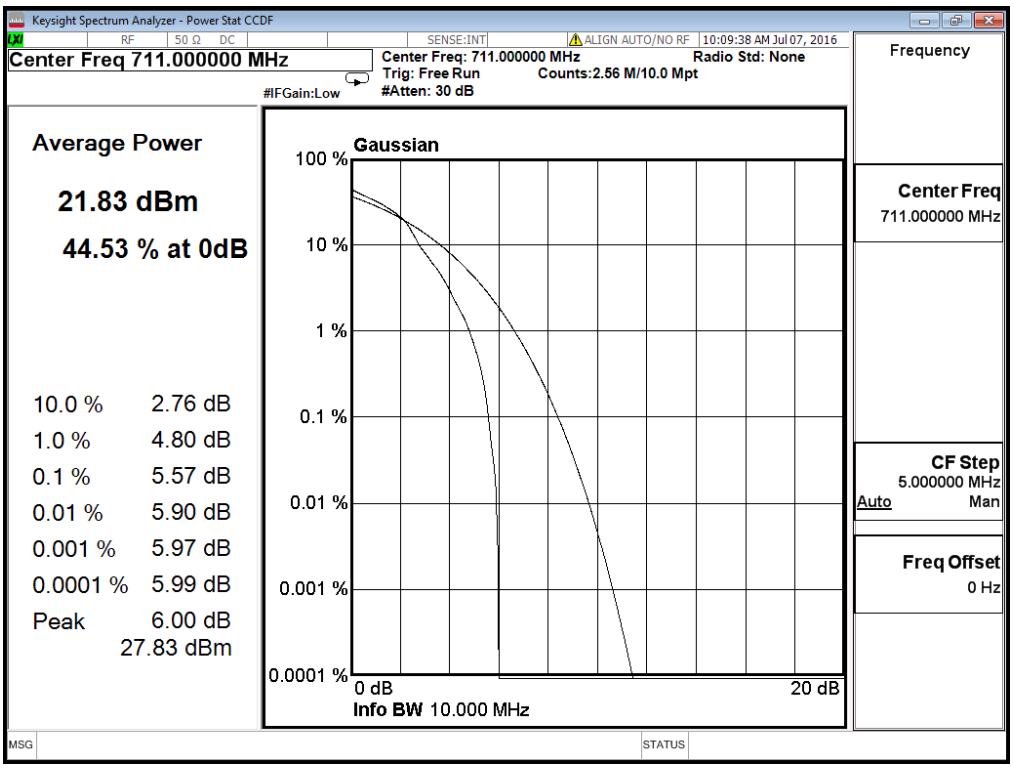
(Plot D2: Band 12/10MHz/16QAM in L Ch 50RB Size)



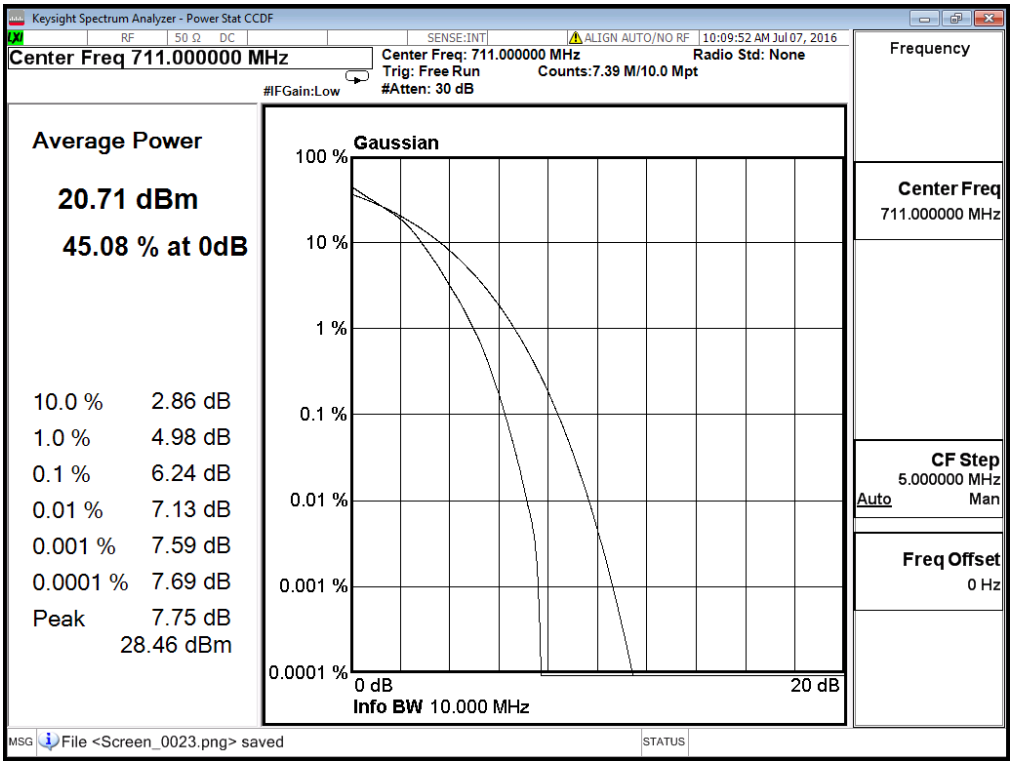
(Plot D3: Band 12/10MHz/16QAM in M Ch 1RB Size)



(Plot D4: Band 12/10MHz/16QAM in M Ch 50RB Size)



(Plot D5: Band 12/10MHz/16QAM in H Ch 1RB Size)



(Plot D6: Band 12/10MHz/16QAM in H Ch 50RB Size)

2.3 99% Occupied Bandwidth and 26dB Bandwidth

2.3.1 Definition

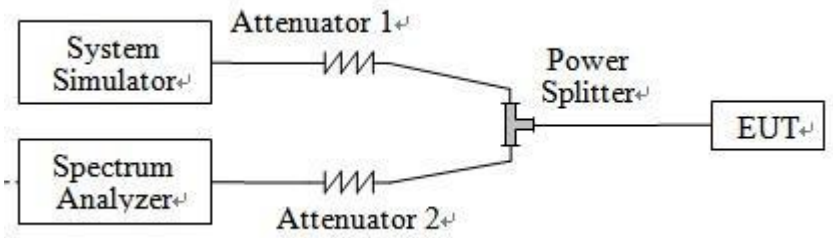
According to FCC section 2.1049, the occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

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 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

2.3.3 Test Setup



2.3.4 Test Procedures

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.

2.3.5 Test Result of 99% Occupied Bandwidth and 26dB Bandwidth

LTE Band 2					
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)
1.4	18900	1880	QPSK	1.10	1.28
			16QAM	1.10	1.27
3	18900	1880	QPSK	2.74	3.02
			16QAM	2.75	3.04
5	18900	1880	QPSK	4.54	5.08
			16QAM	4.52	5.04
10	18900	1880	QPSK	8.96	9.84
			16QAM	8.95	9.68
15	18900	1880	QPSK	13.56	15.12
			16QAM	13.50	15.06
20	18900	1880	QPSK	18.64	21.44
			16QAM	18.72	21.44

LTE Band 4					
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)
1.4	20175	1732.5	QPSK	1.09	1.28
			16QAM	1.10	1.30
3	20175	1732.5	QPSK	2.74	3.05
			16QAM	2.75	3.04
5	20175	1732.5	QPSK	4.56	5.06
			16QAM	4.52	5.08
10	20175	1732.5	QPSK	8.96	9.76
			16QAM	8.96	9.76
15	20175	1732.5	QPSK	13.56	15.06
			16QAM	13.50	15.06
20	20175	1732.5	QPSK	18.56	21.36
			16QAM	18.64	21.28

LTE Band 7					
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)
5	21100	2535	QPSK	4.54	5.08
			16QAM	4.52	5.06
10	21100	2535	QPSK	8.96	9.88
			16QAM	8.96	9.72
15	21100	2535	QPSK	13.56	15.06
			16QAM	13.56	14.94
20	21100	2535	QPSK	18.72	21.44
			16QAM	18.72	21.44

LTE Band 12					
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)
1.4	23095	707.5	QPSK	1.10	1.28
			16QAM	1.10	1.29
3	23095	707.5	QPSK	2.74	3.05
			16QAM	2.74	3.04
5	23095	707.5	QPSK	4.54	5.06
			16QAM	4.52	5.04
10	23095	707.5	QPSK	9.00	9.88
			16QAM	9.00	9.80

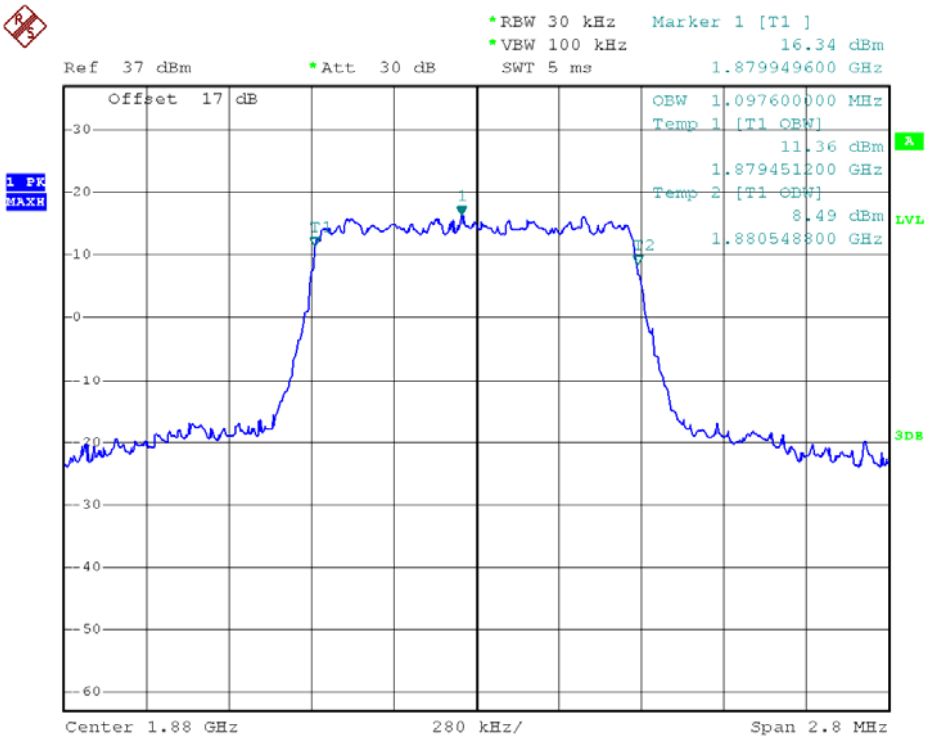
Note: The maximum RB configurations of the 99% Occupied Bandwidth and 26dB Bandwidth summary as below:

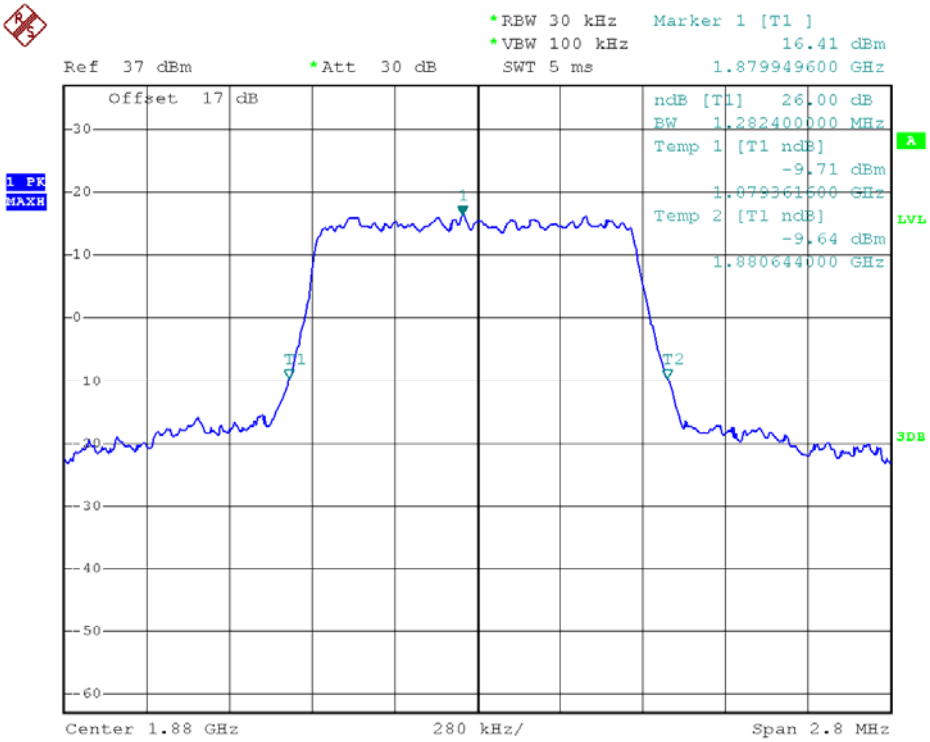
BW1.4MHz RB setting: RB Size 6,RB Offset 0 BW3MHz RB setting: RB Size 15,RB Offset 0

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

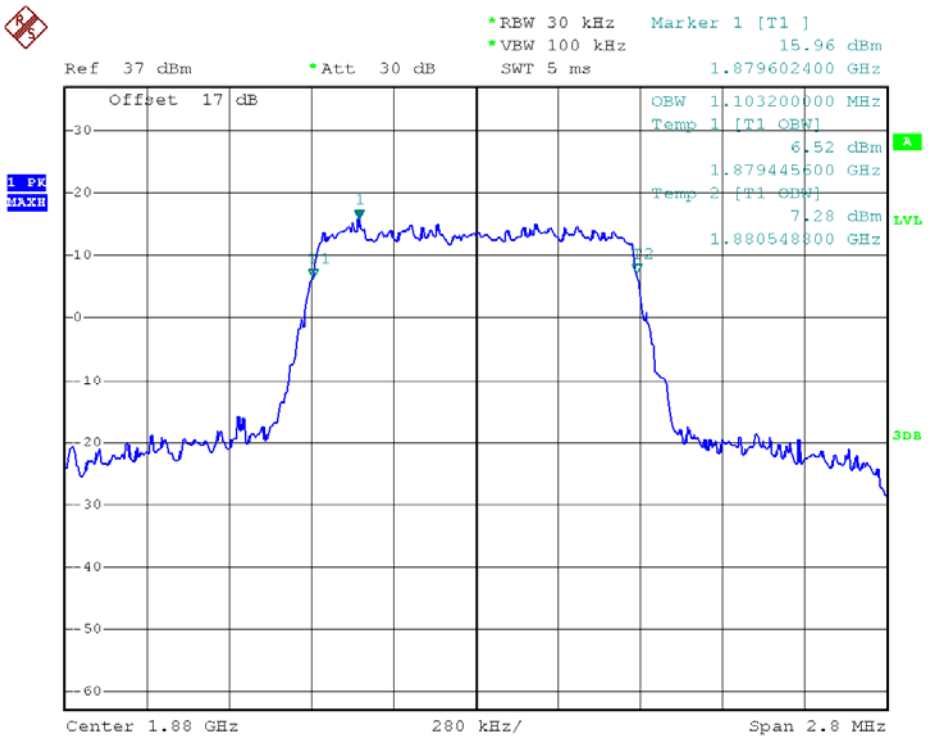
BW15MHz RB setting: RB Size 75,RB Offset 0 BW20MHz RB setting: RB Size 100,RB Offset 0

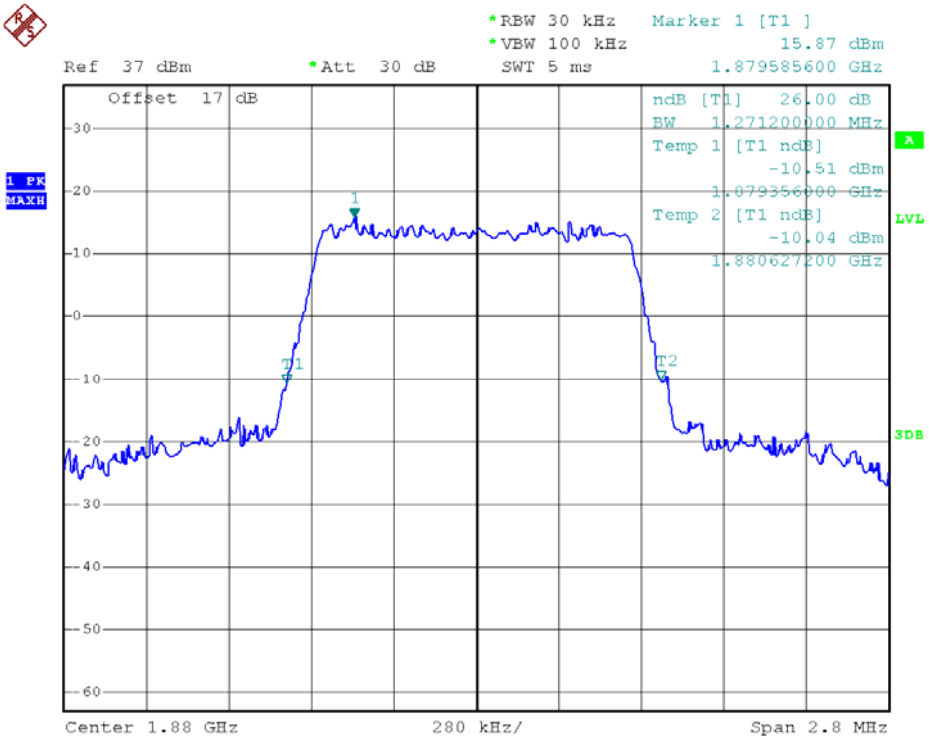
2.3.6 Test Result (Plots) of 99% Occupied Bandwidth and 26dB Bandwidth



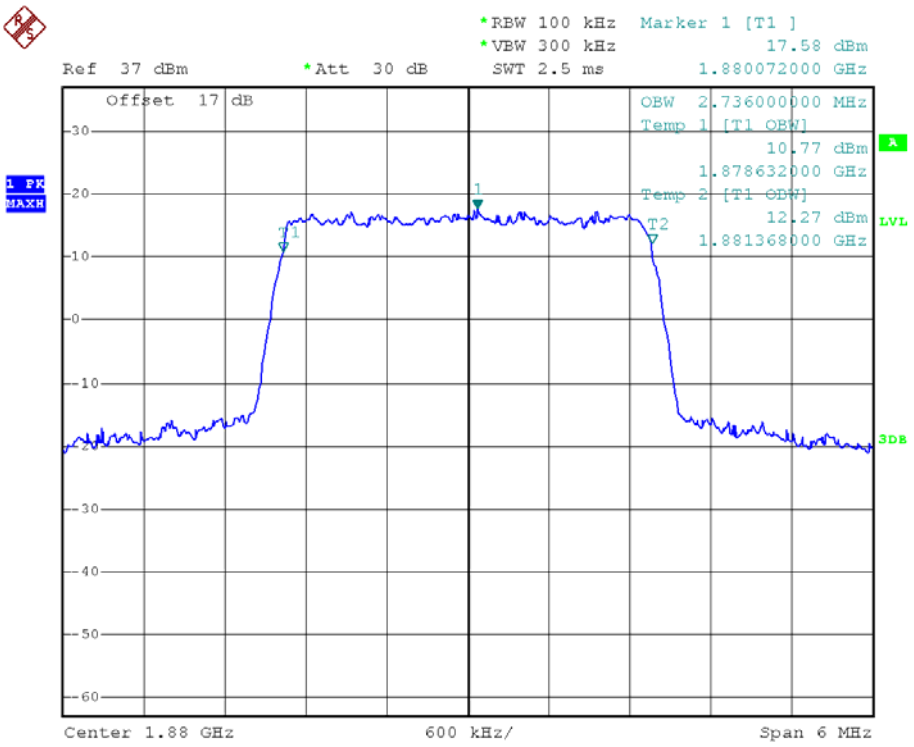


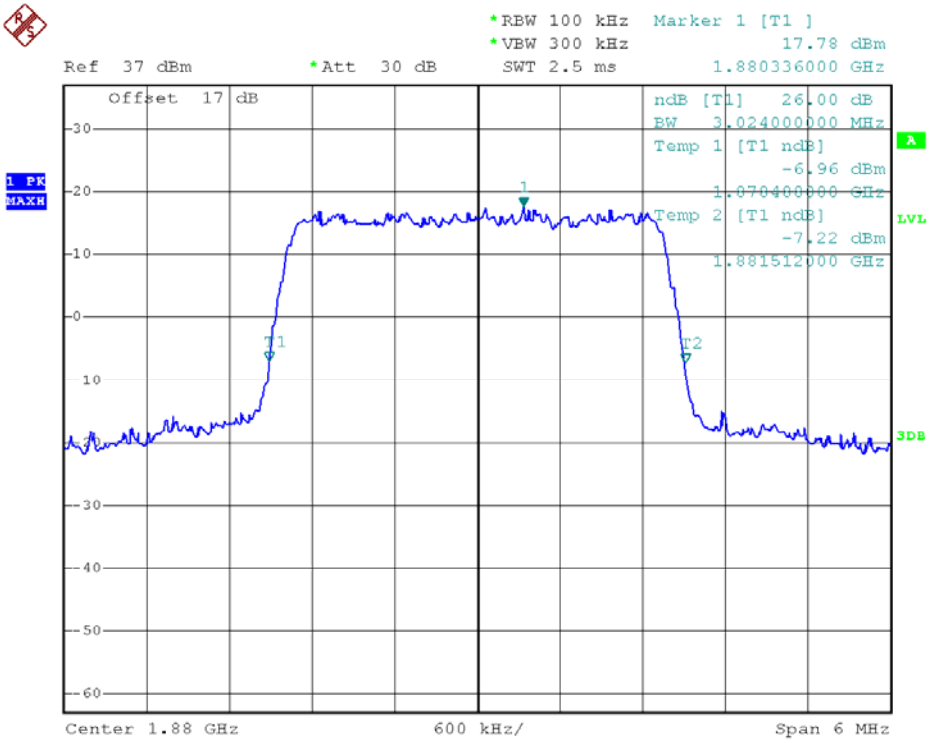
Occupied Bandwidth LTE Band 2 1.4MHz/QPSK



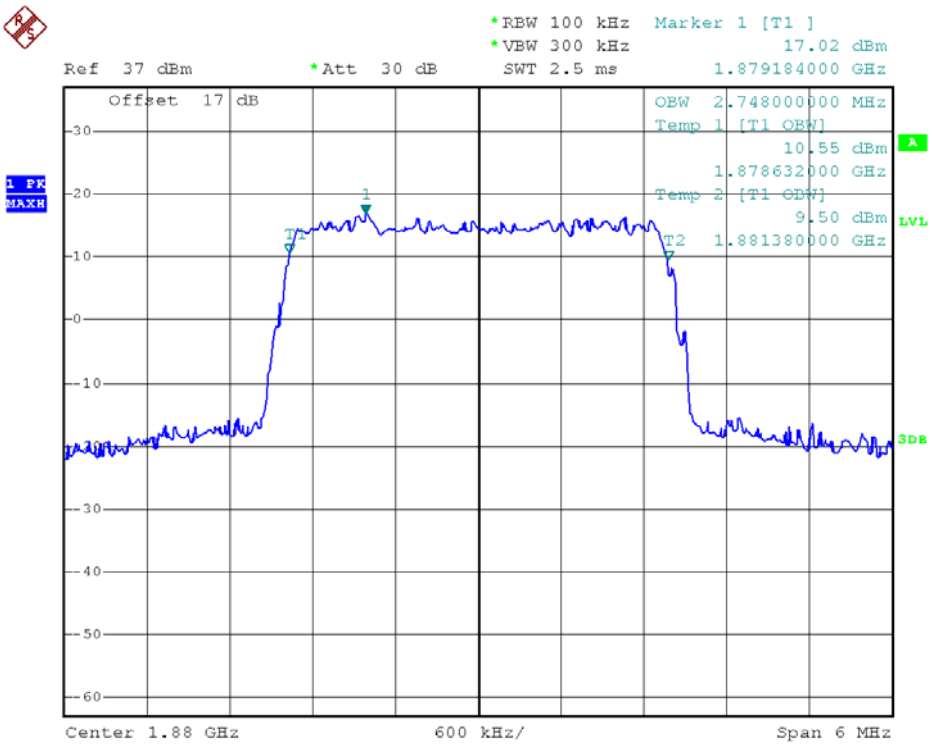


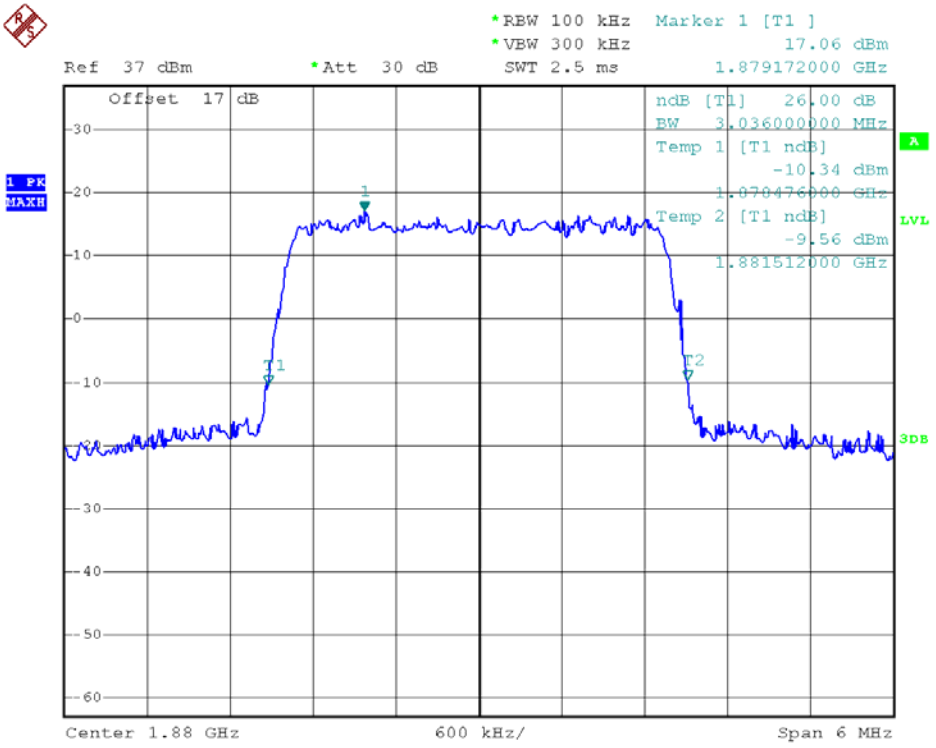
Occupied Bandwidth LTE Band 2 1.4MHz/16QAM



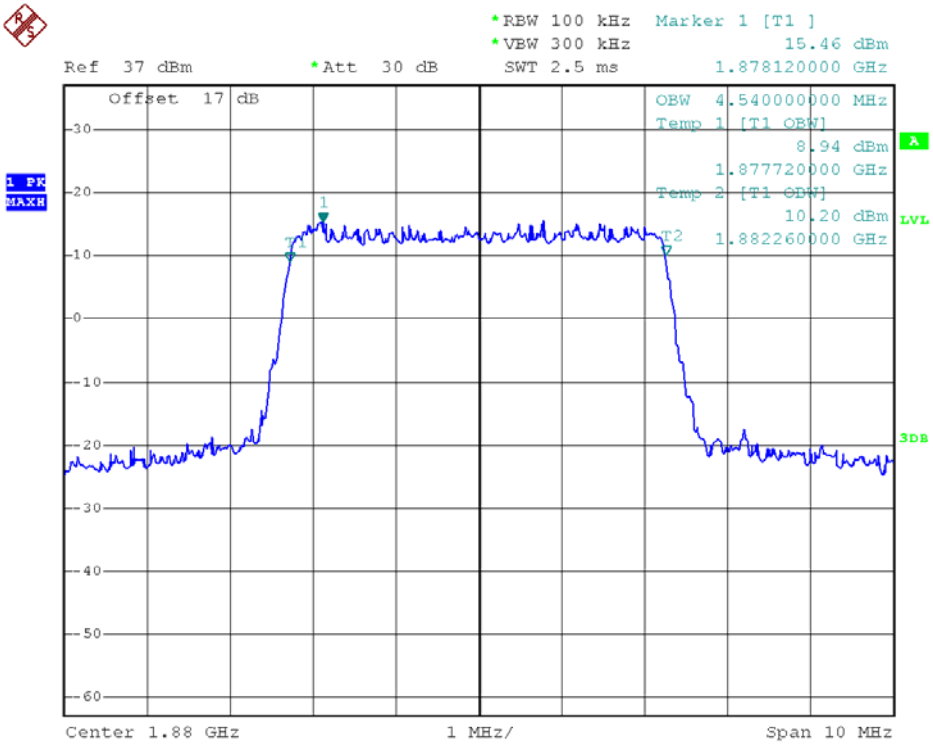


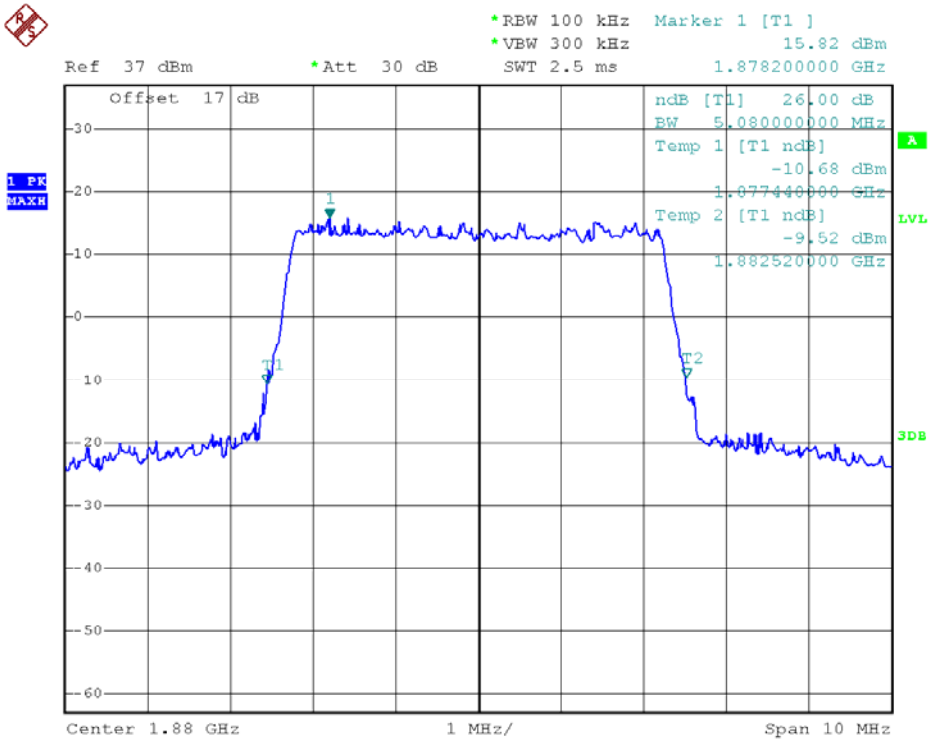
Occupied Bandwidth LTE Band 2/3MHz/QPSK



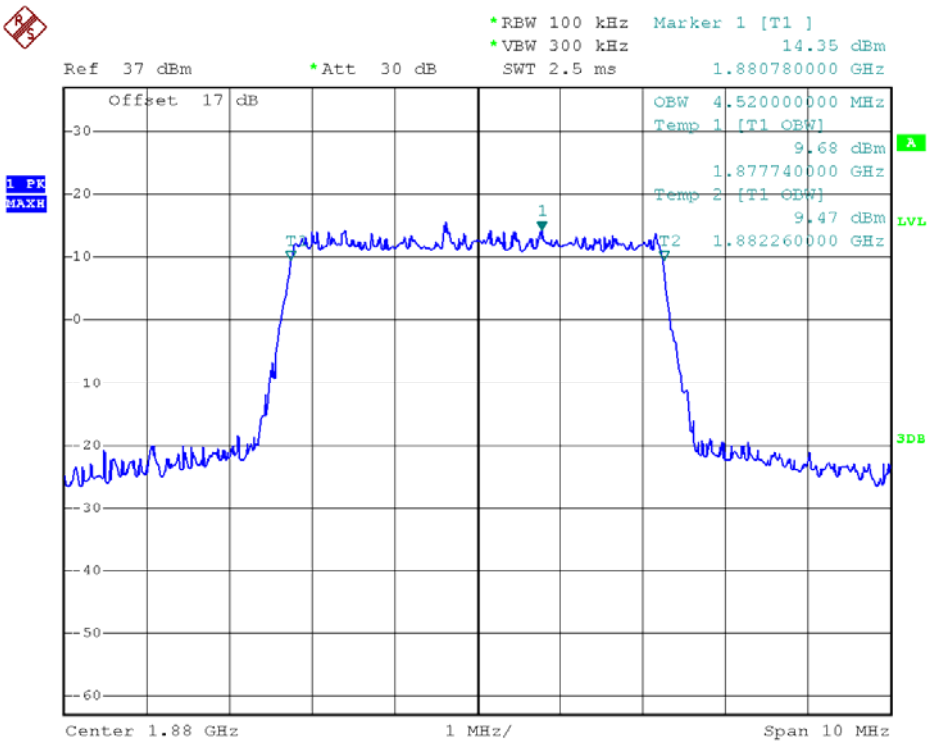


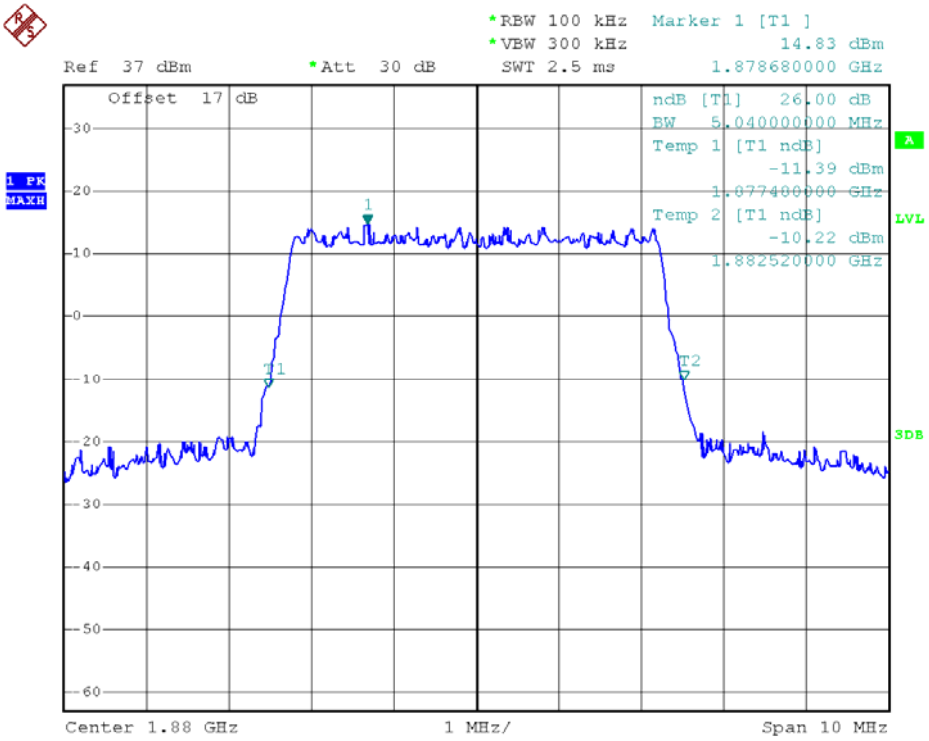
Occupied Bandwidth LTE Band 2/3MHz/16QAM



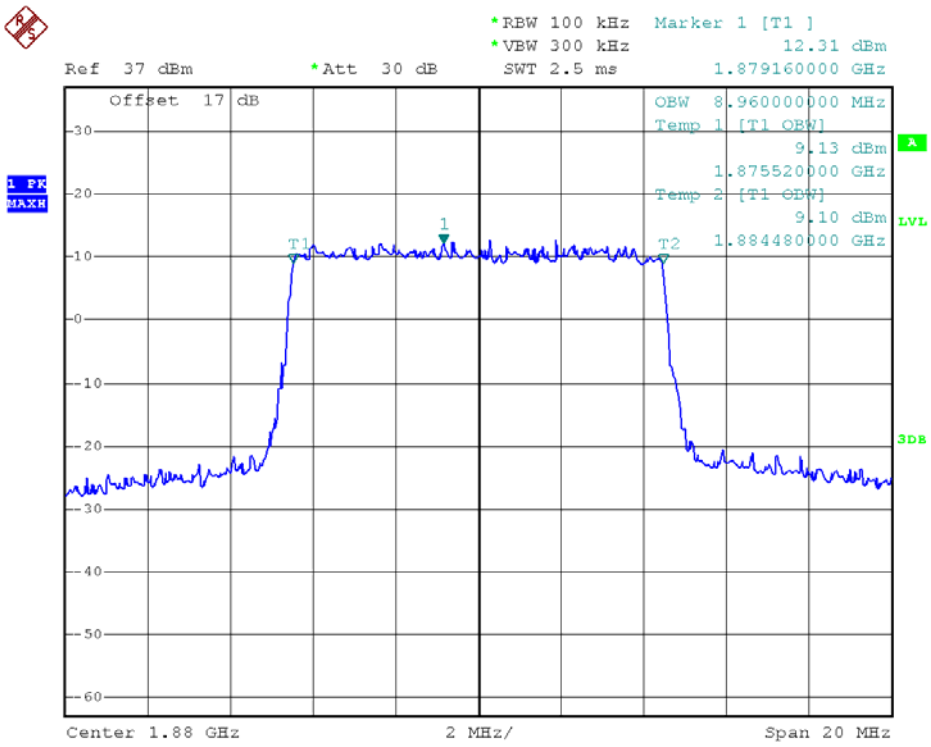


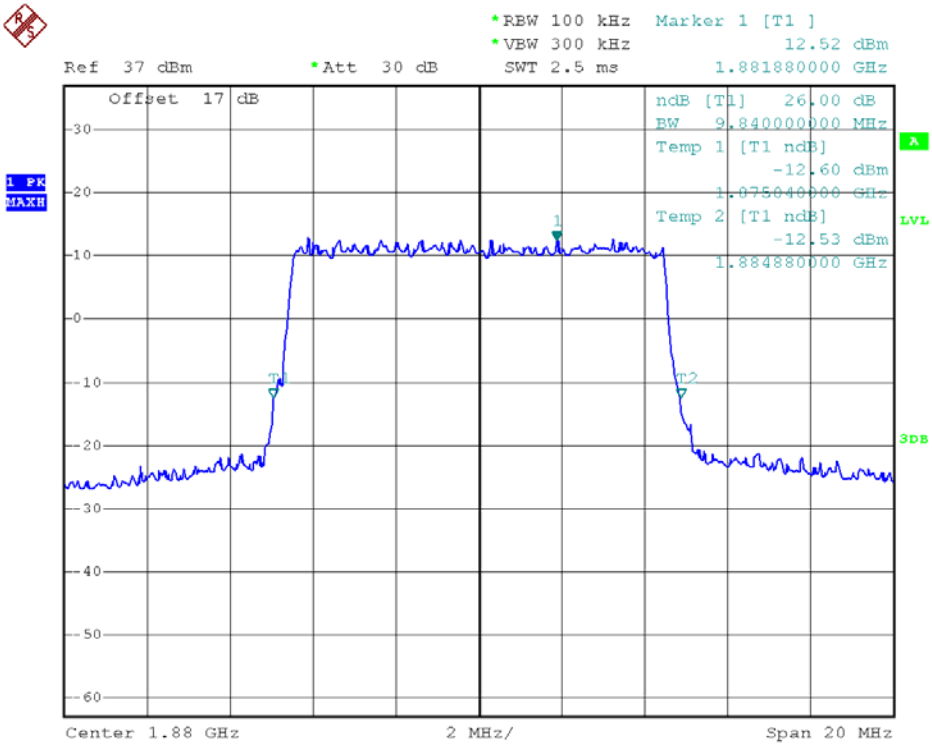
Occupied Bandwidth LTE Band 2/5MHz/QPSK



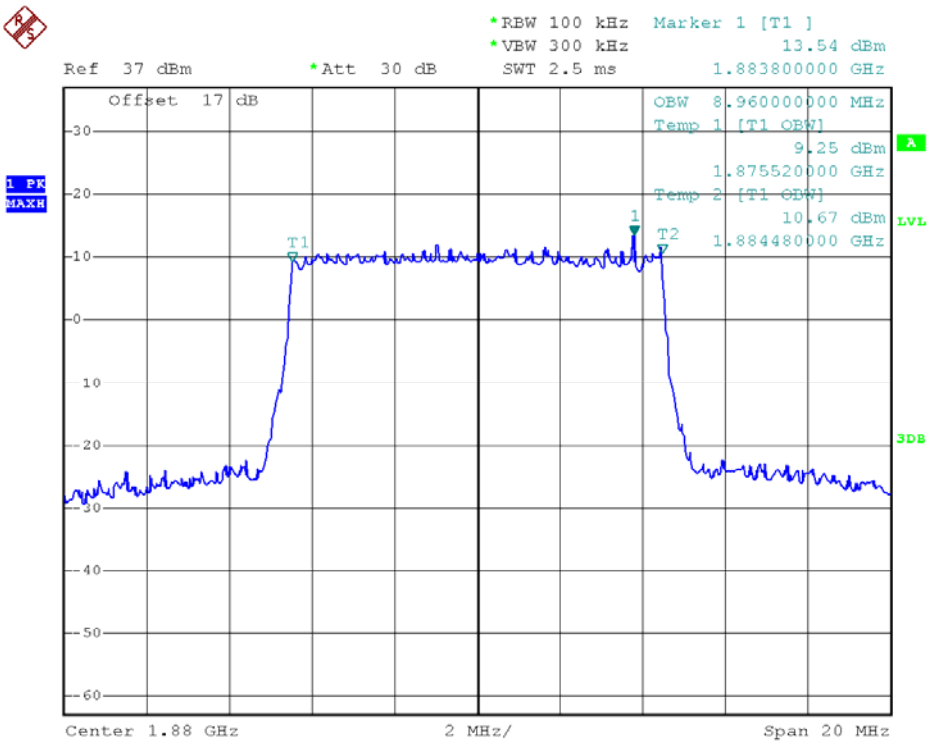


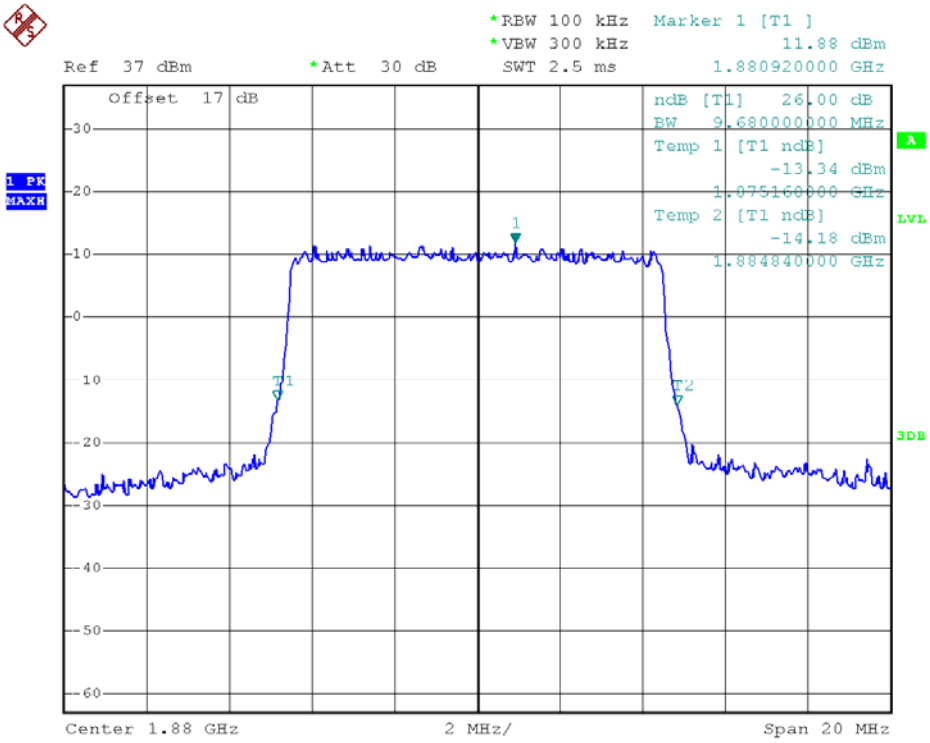
Occupied Bandwidth LTE Band 2/5MHz/16QAM



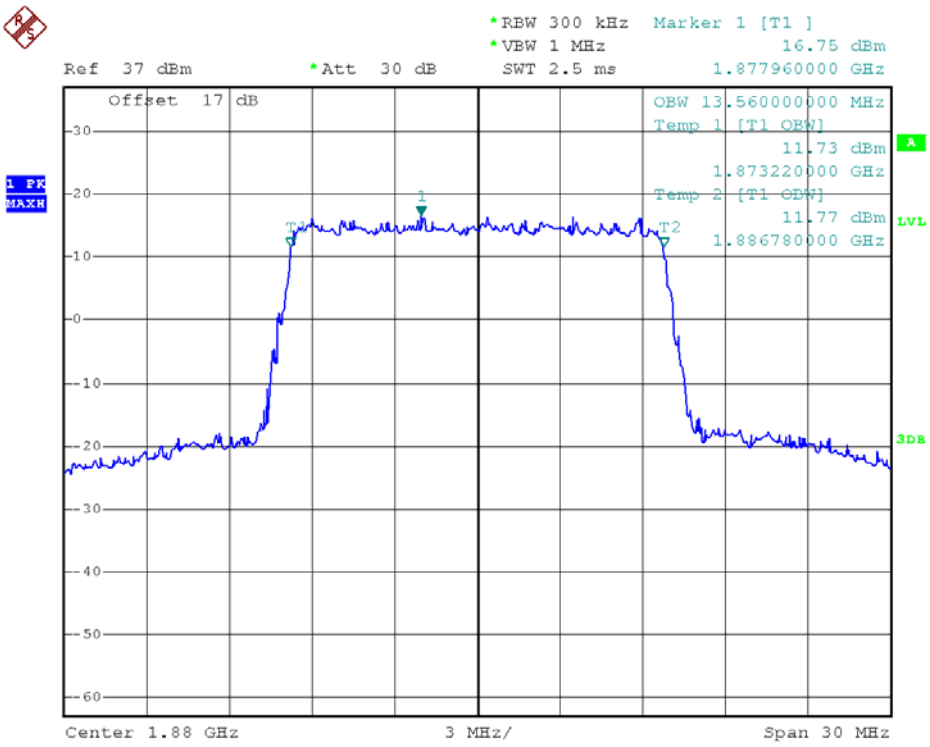


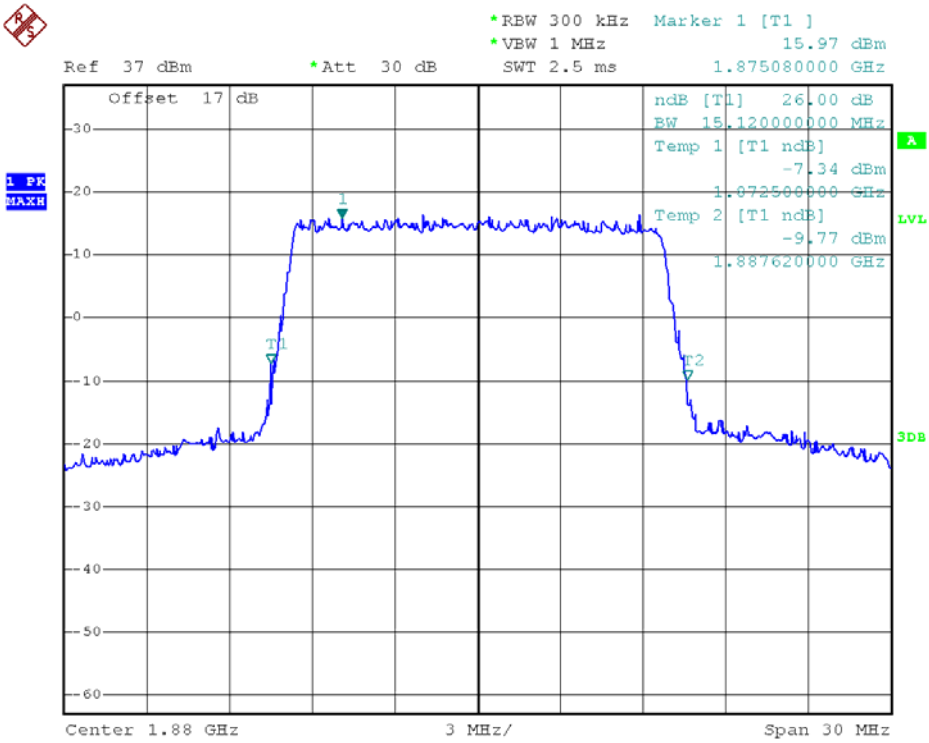
Occupied Bandwidth LTE Band 2/10MHz/QPSK



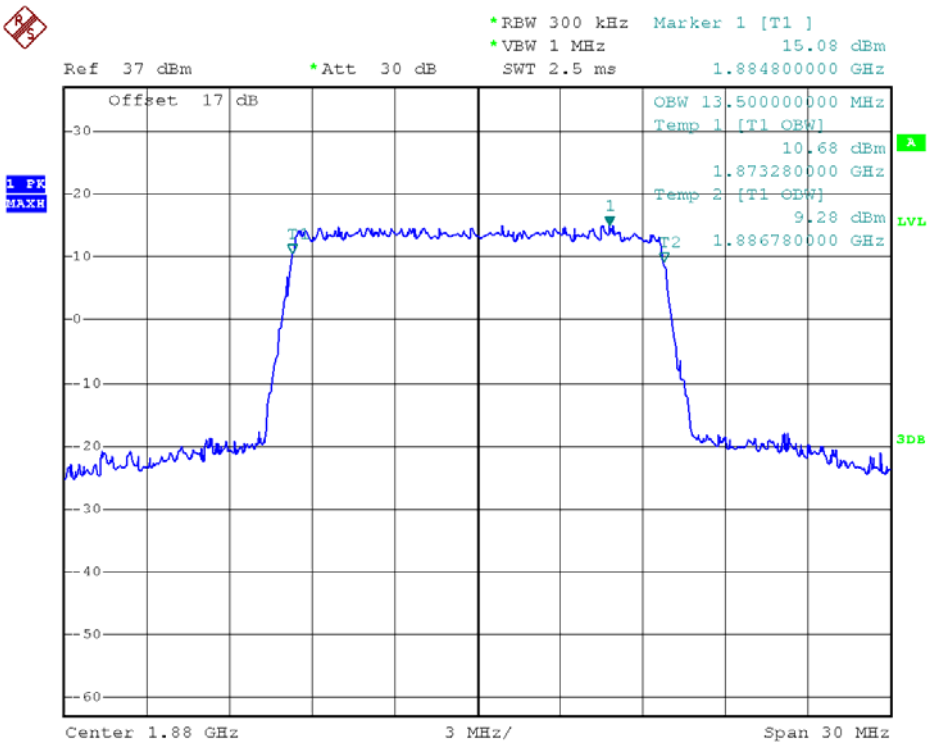


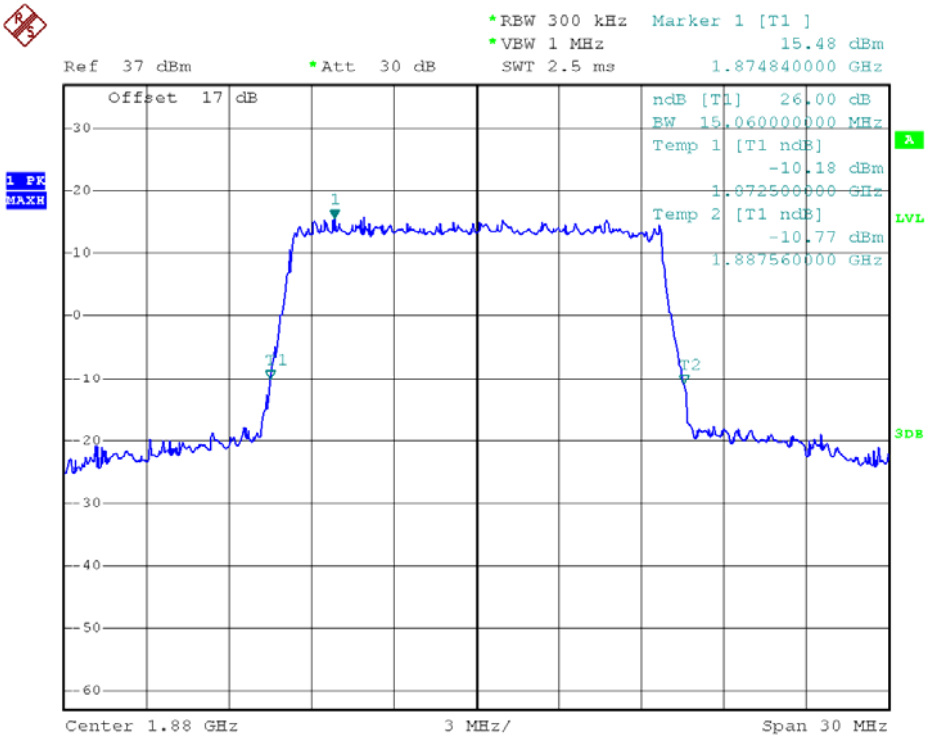
Occupied Bandwidth LTE Band 2/10MHz/16QAM



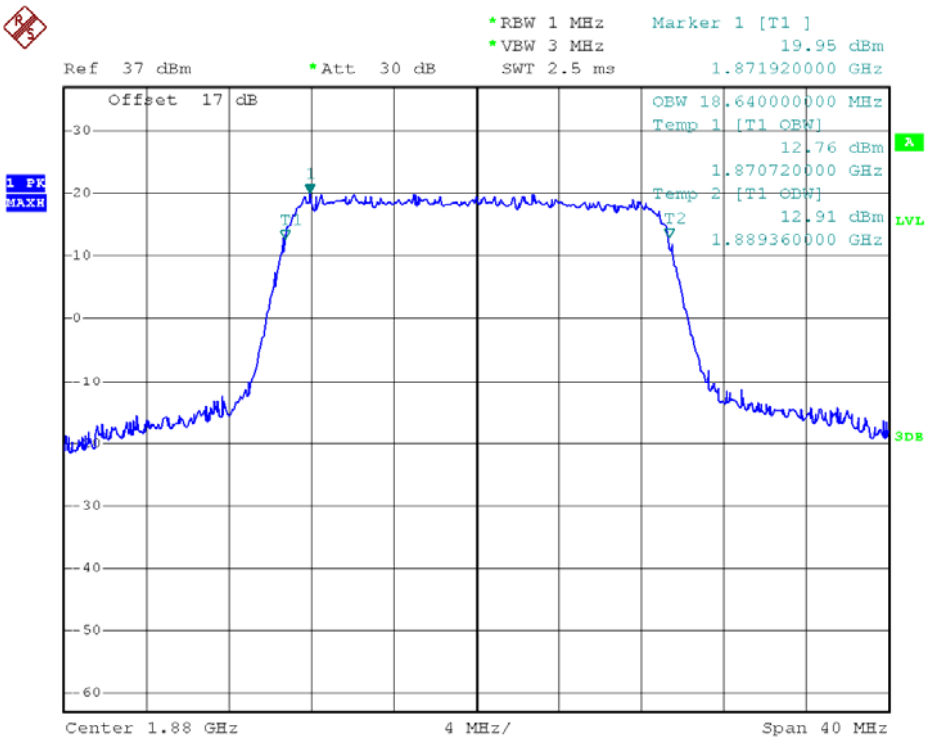


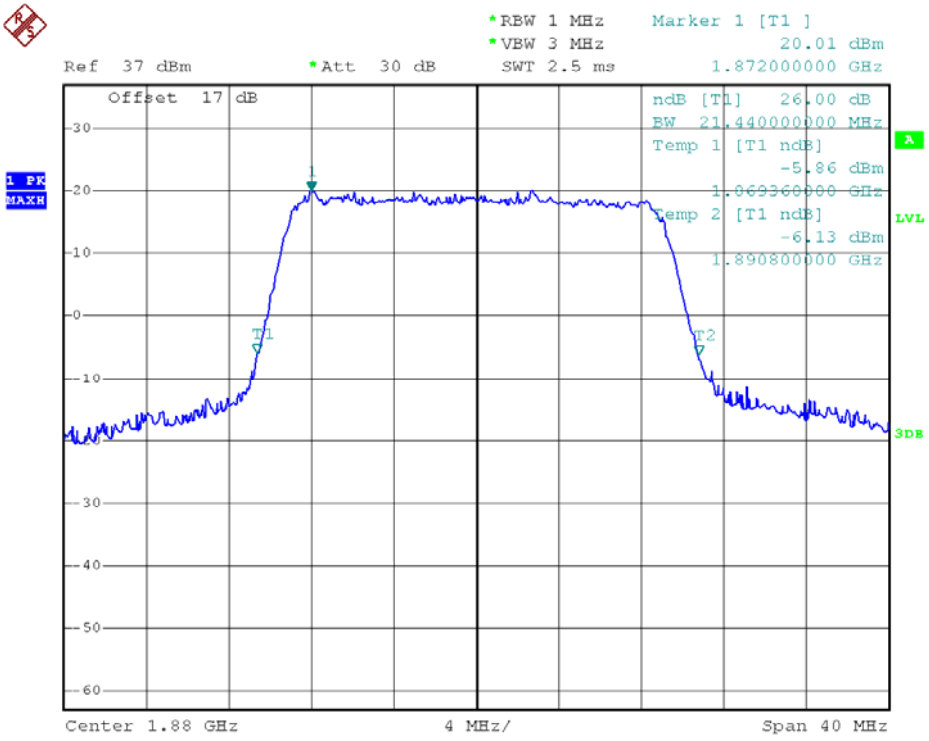
Occupied Bandwidth LTE Band 2/15MHz/QPSK



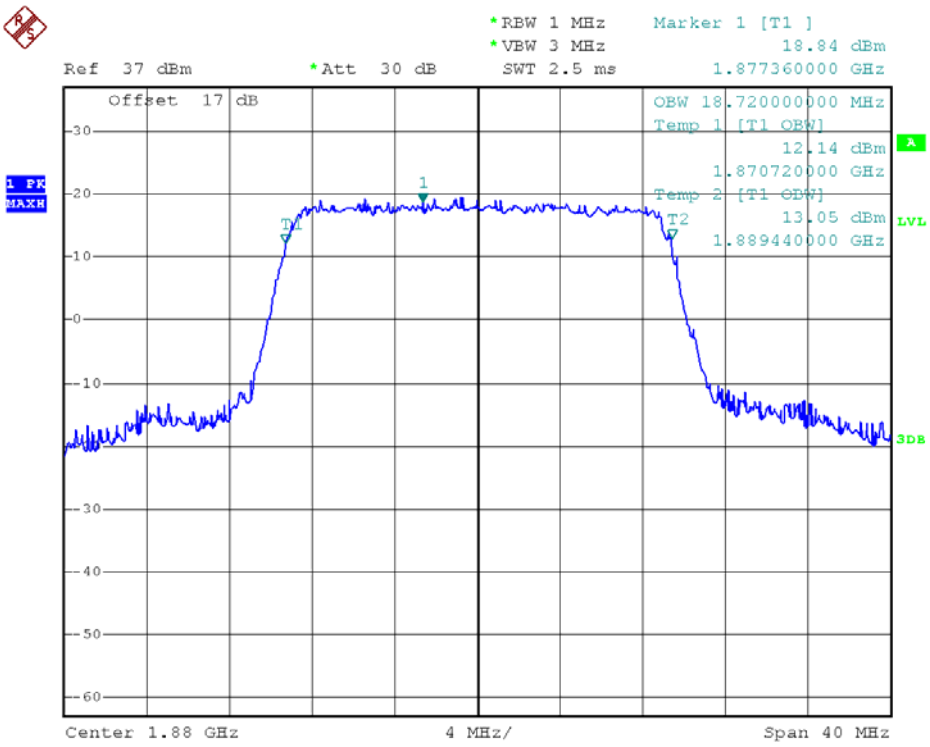


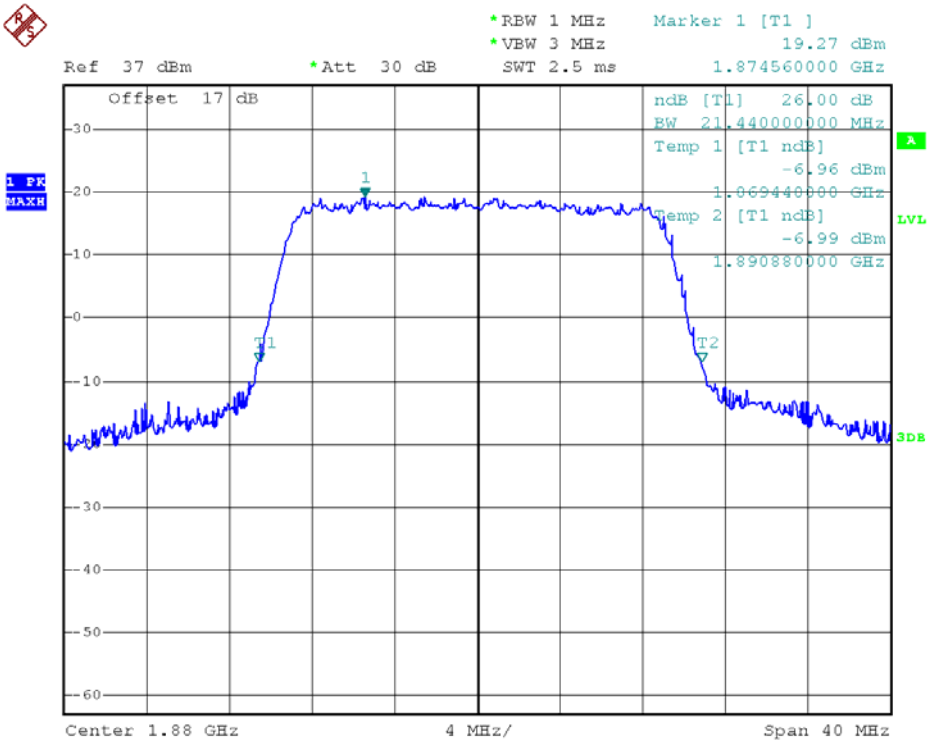
Occupied Bandwidth LTE Band 2/15MHz/16QAM



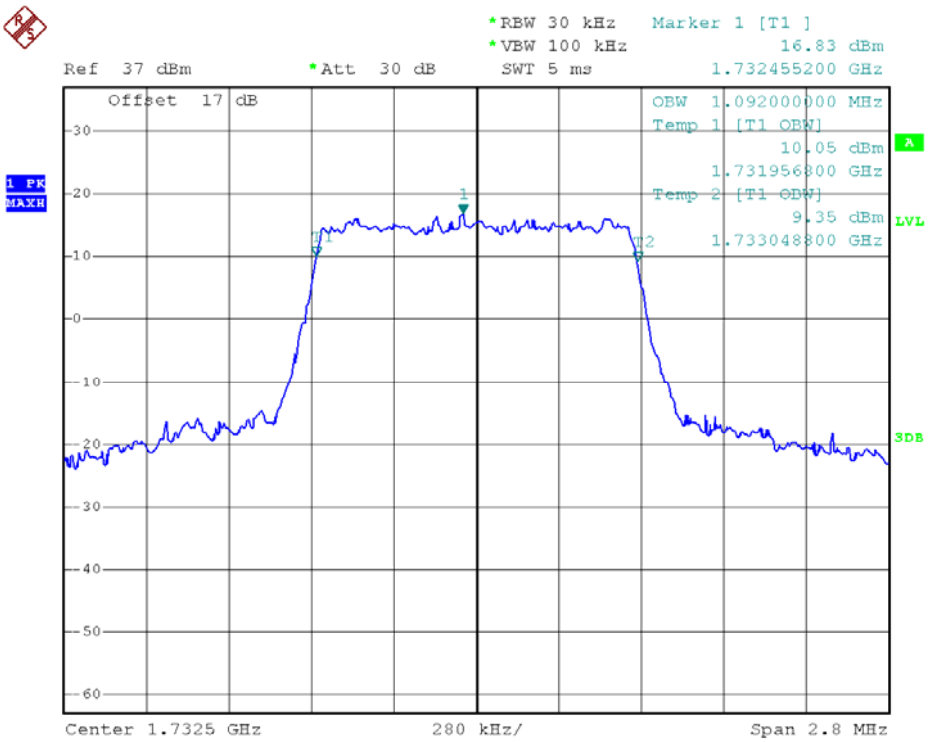


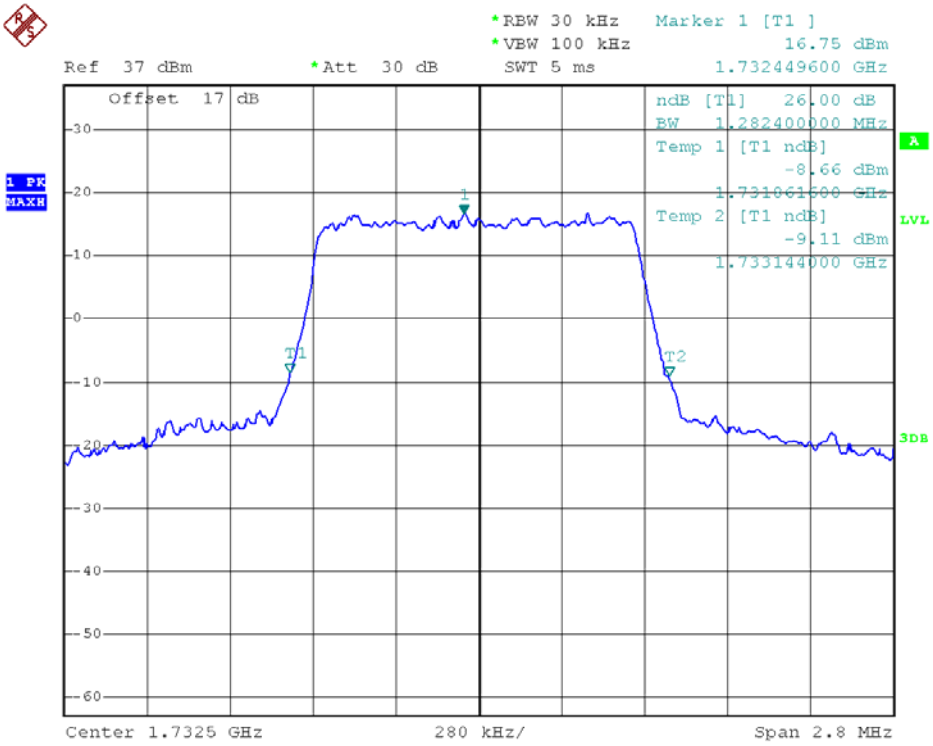
Occupied Bandwidth LTE Band 2/20MHz/QPSK



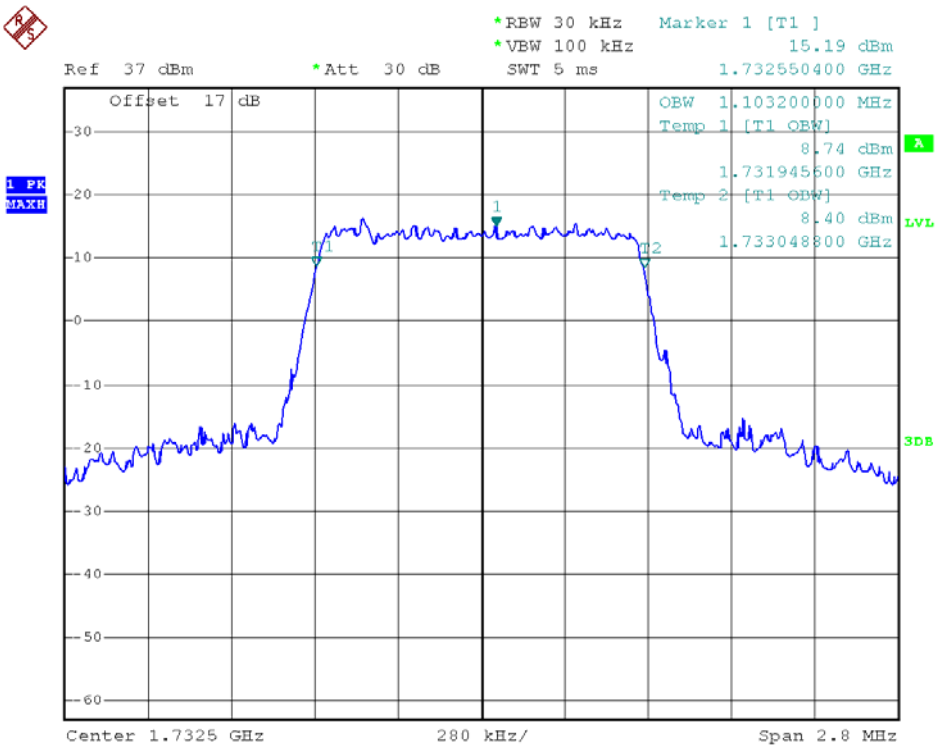


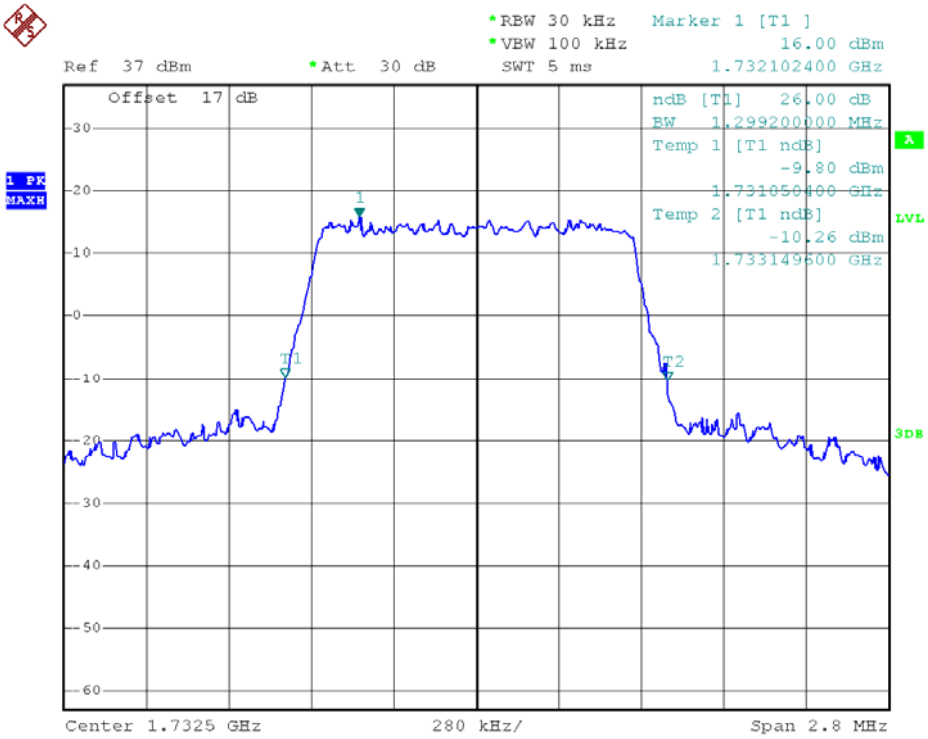
Occupied Bandwidth LTE Band 2/20MHz/16QAM



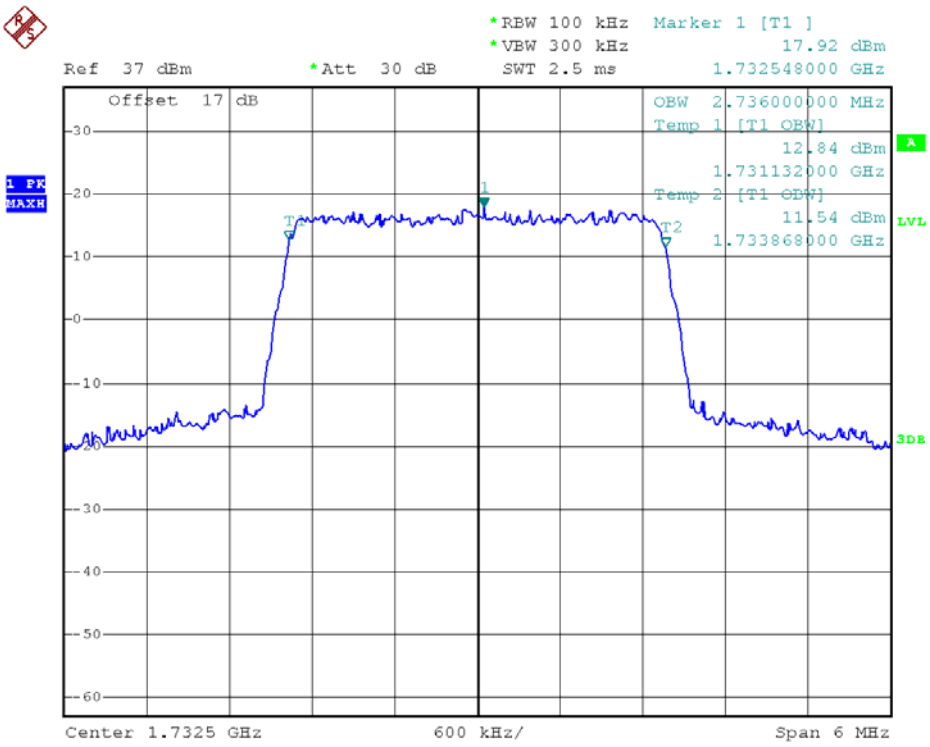


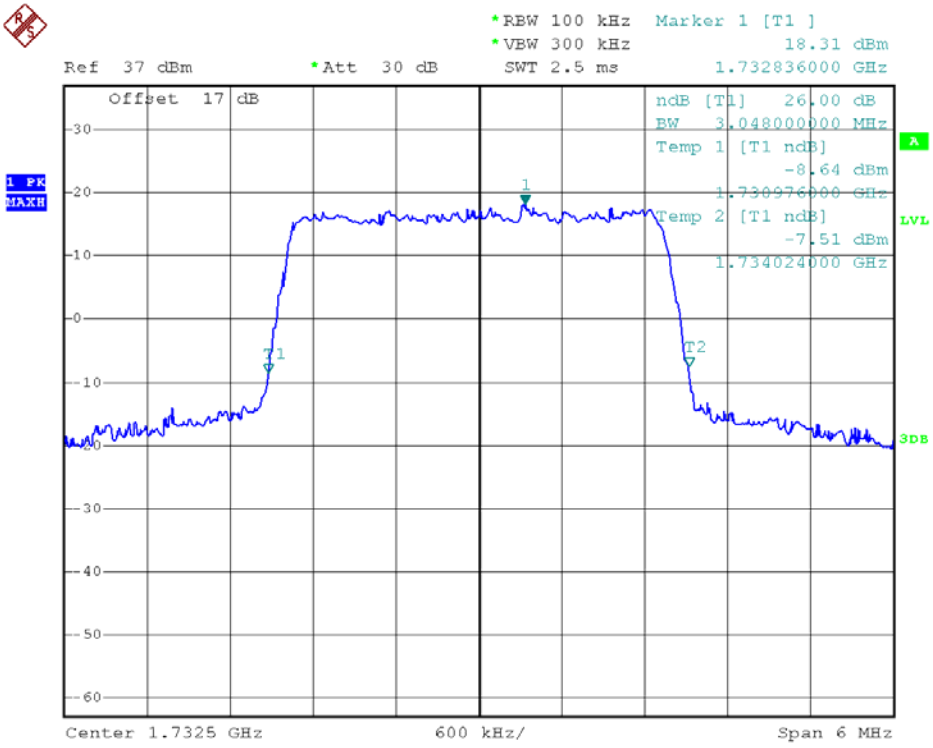
Occupied Bandwidth LTE Band 4/1.4MHz/QPSK



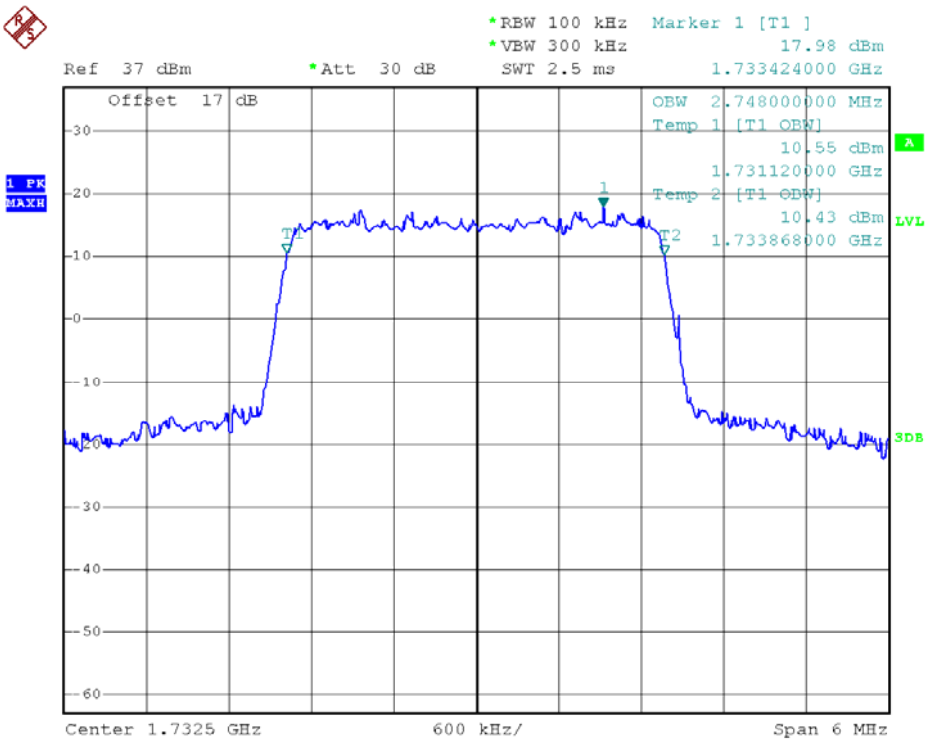


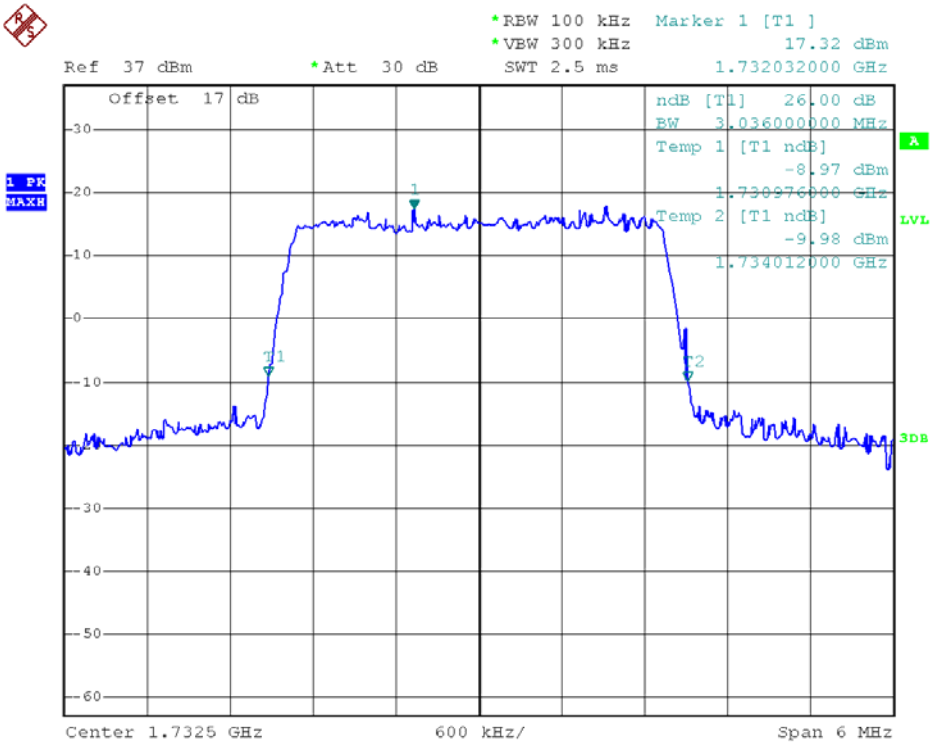
Occupied Bandwidth LTE Band 4/1.4MHz/16QAM



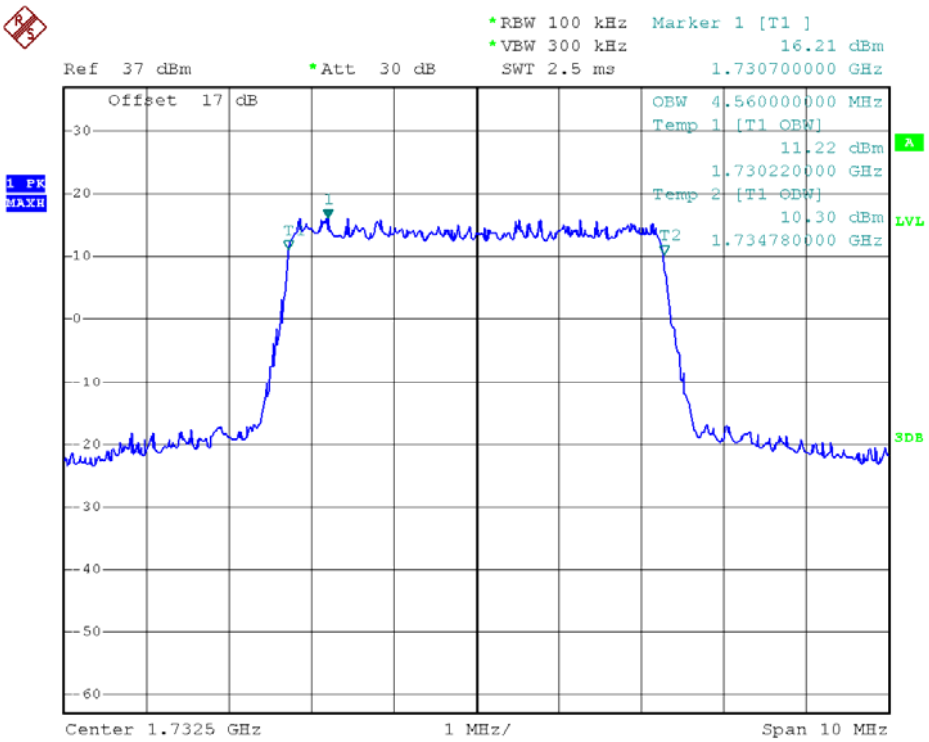


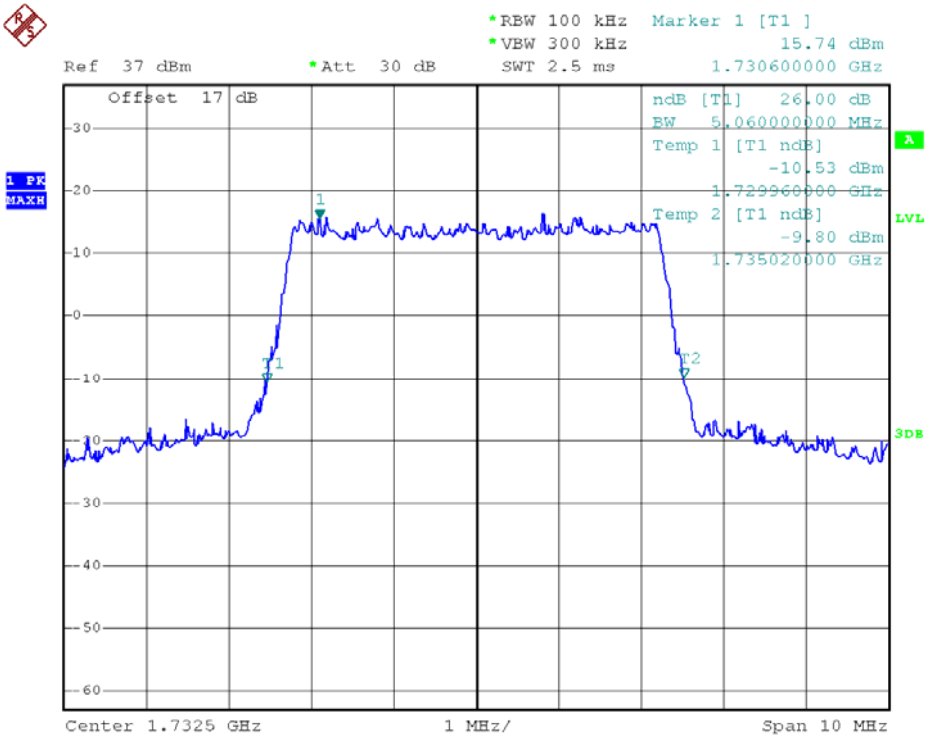
Occupied Bandwidth LTE Band 4/3MHz/QPSK



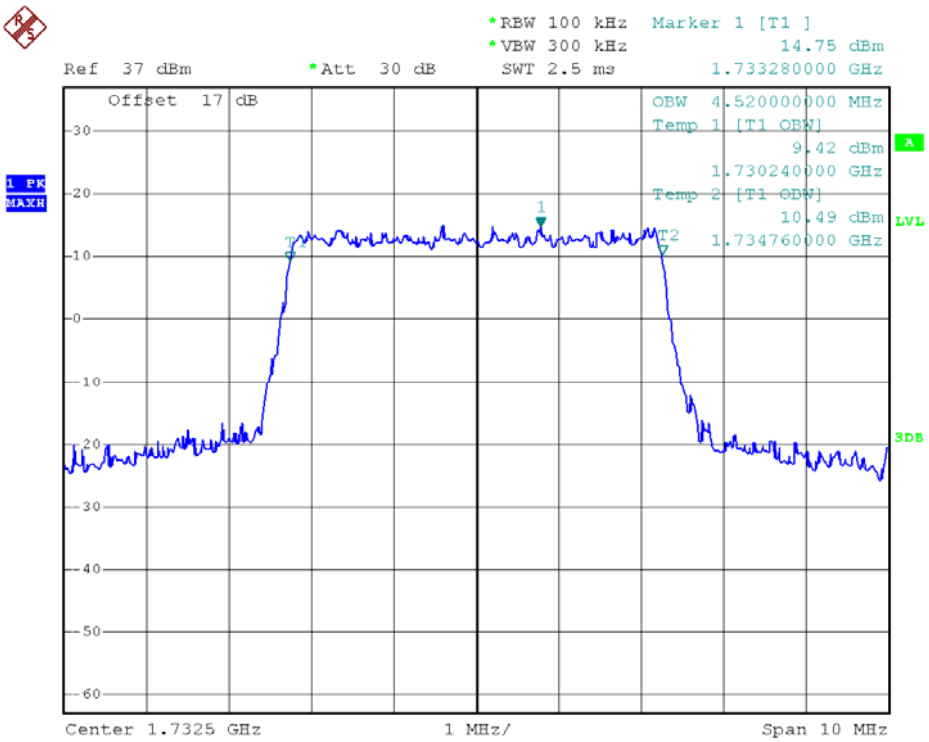


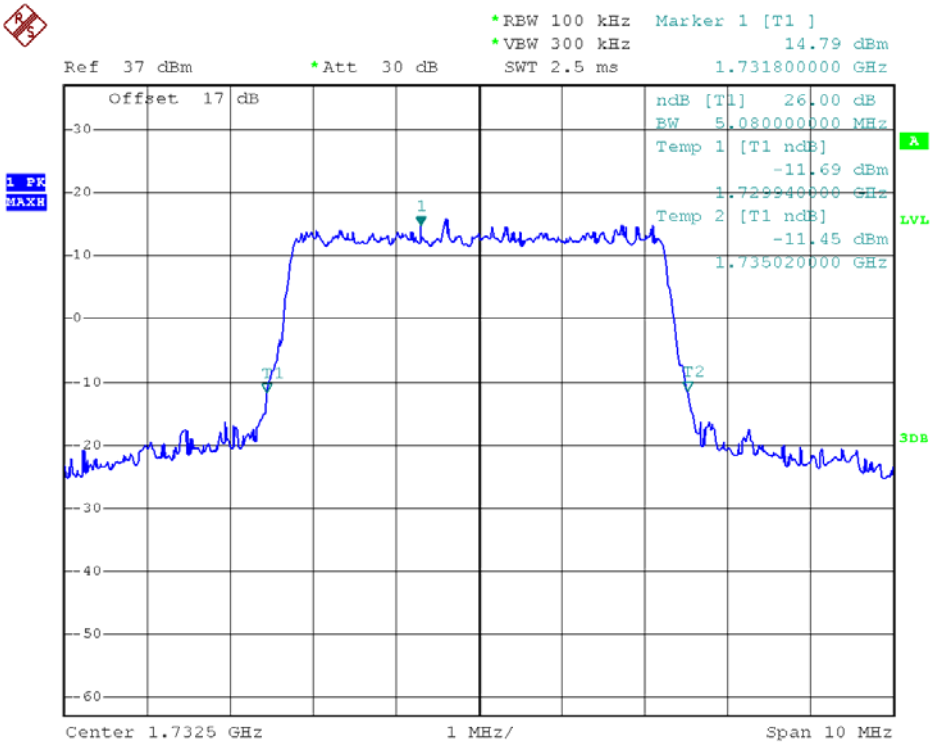
Occupied Bandwidth LTE Band 4/3MHz/16QAM



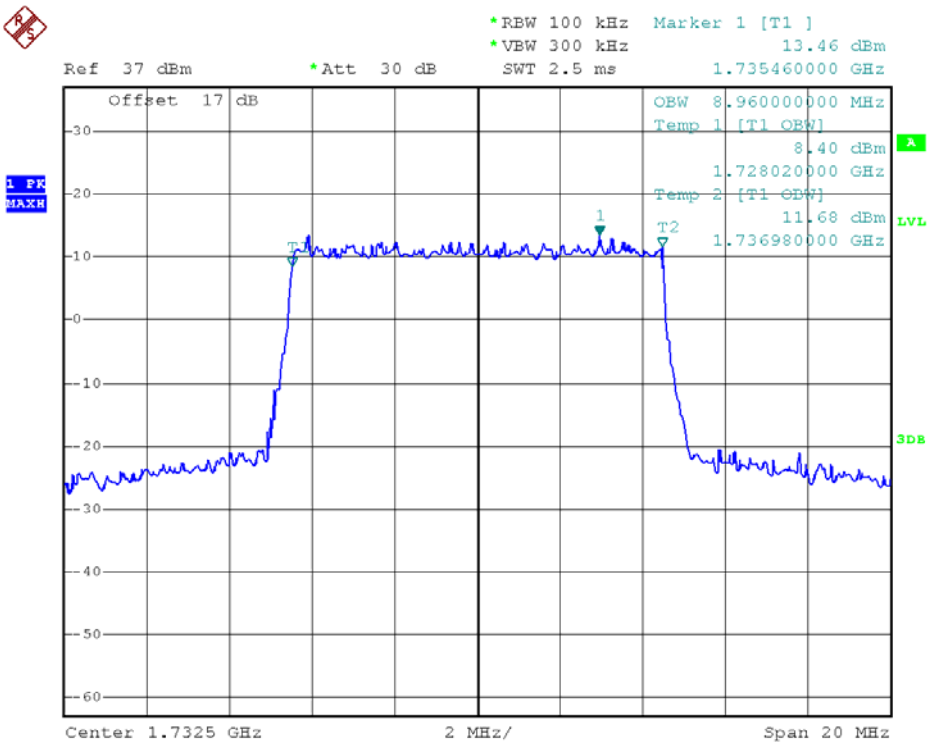


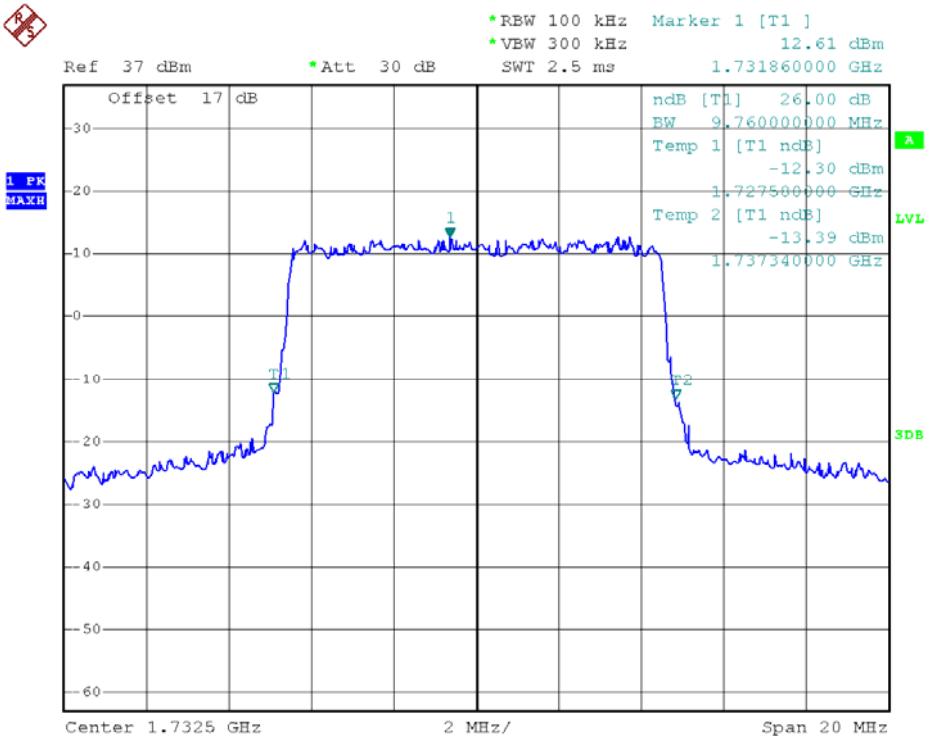
Occupied Bandwidth LTE Band 4/5MHz/QPSK



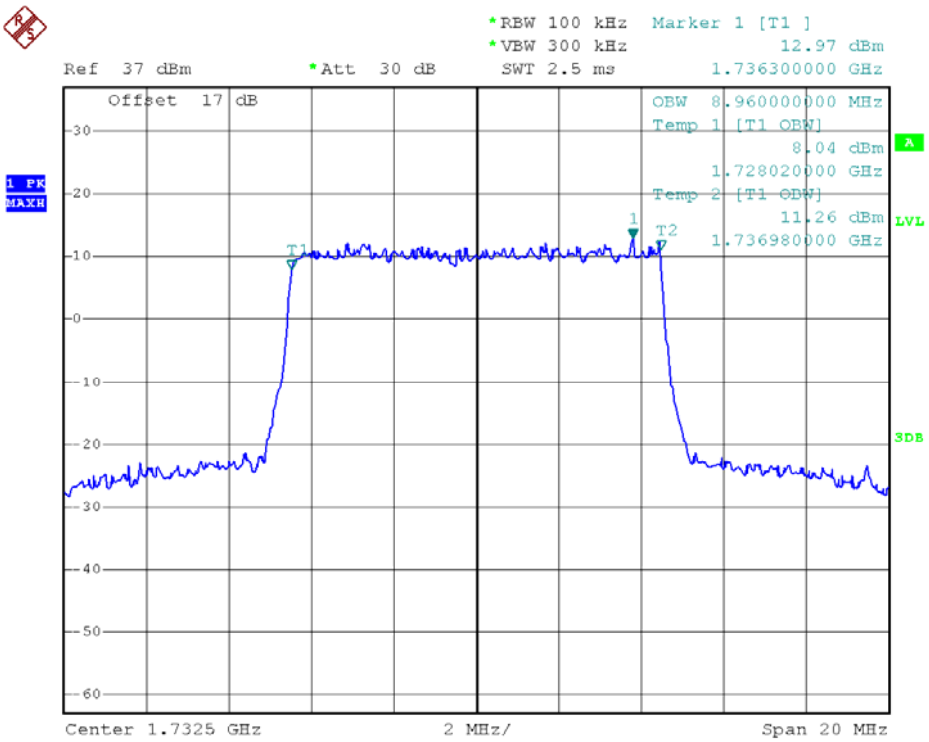


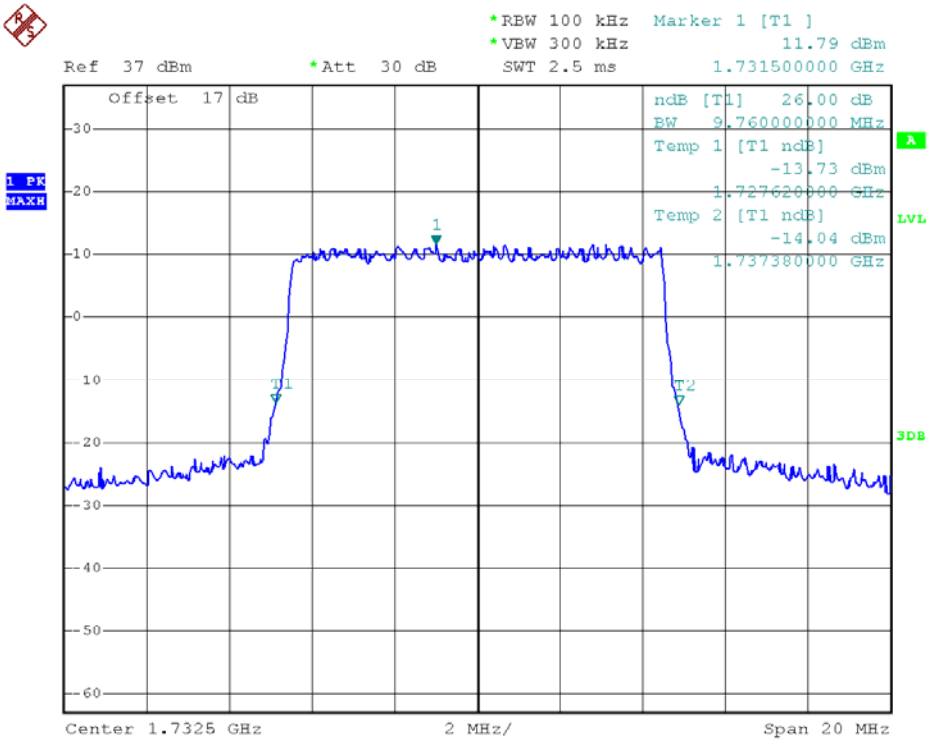
Occupied Bandwidth LTE Band 4/5MHz/16QAM



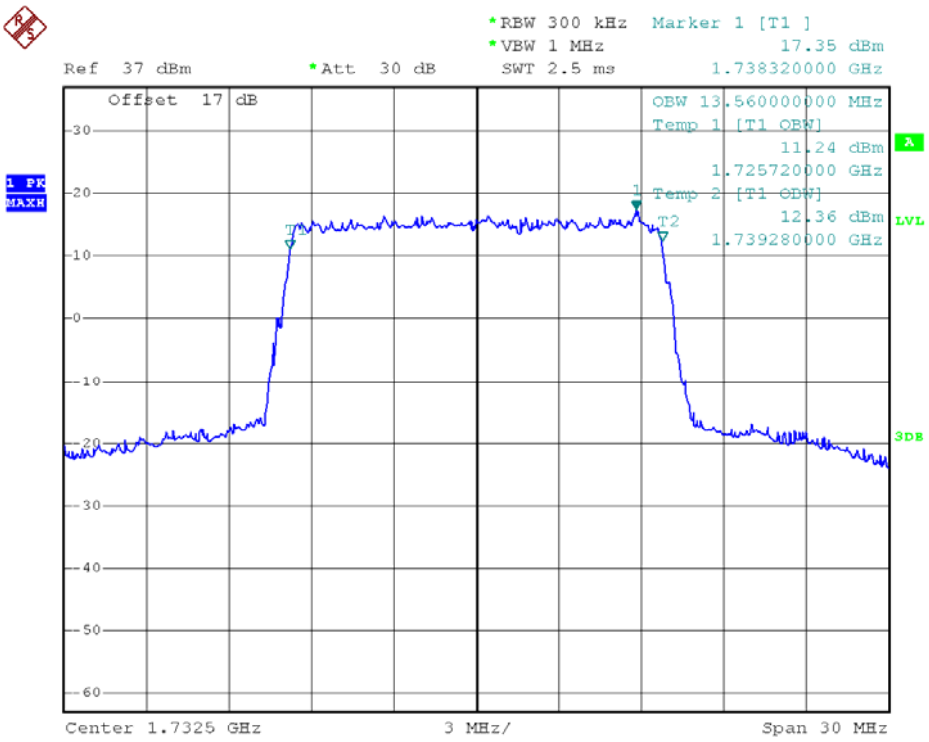


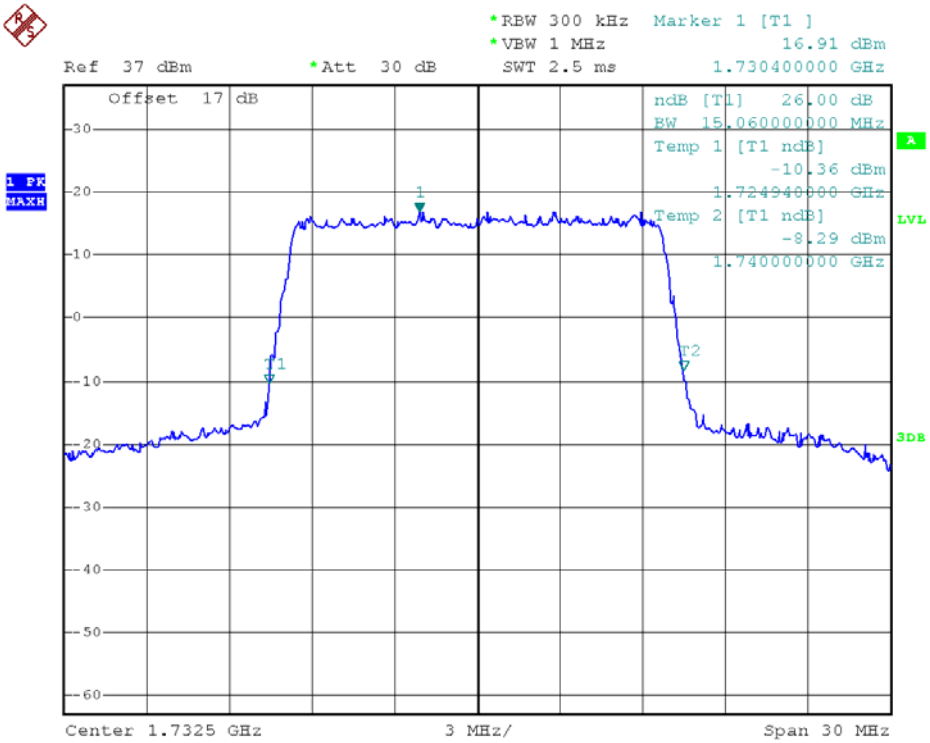
Occupied Bandwidth LTE Band 4/10MHz/QPSK



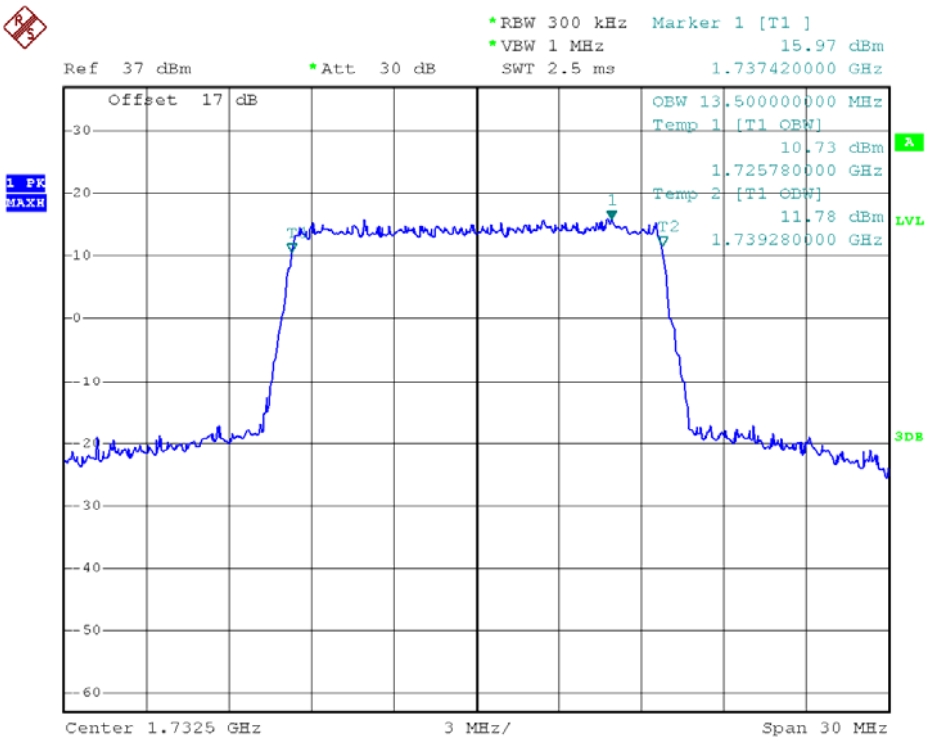


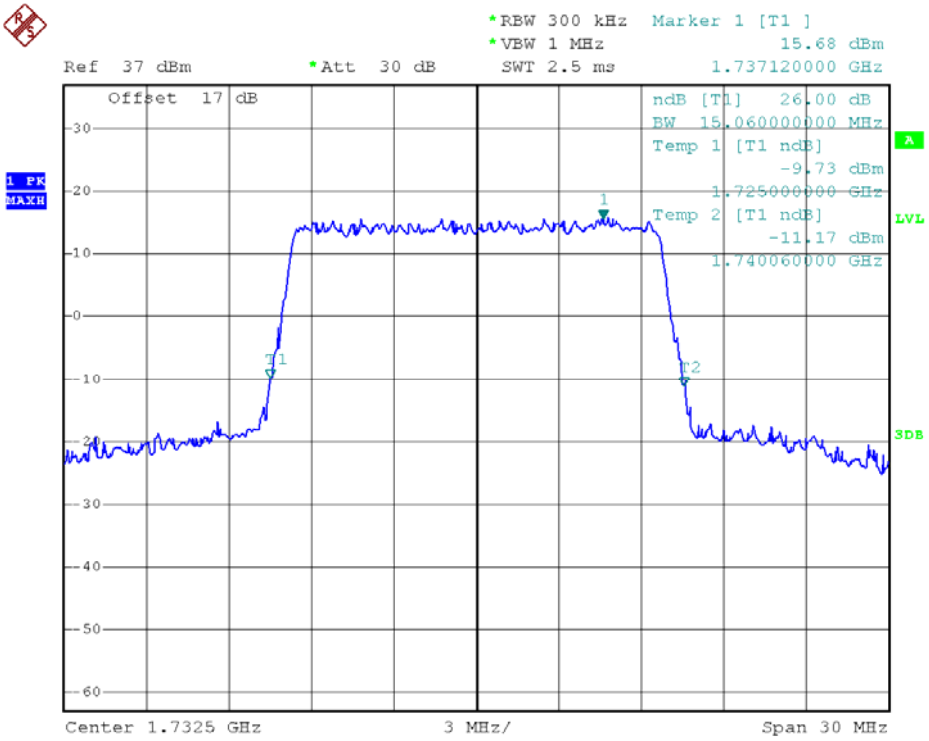
Occupied Bandwidth LTE Band 4/10MHz/16QAM



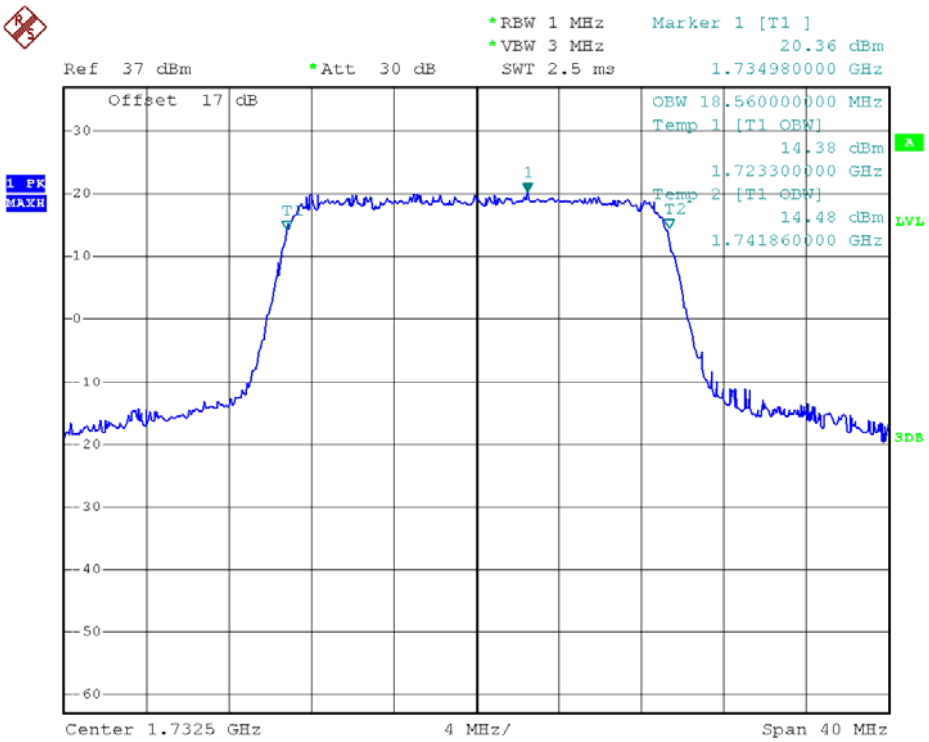


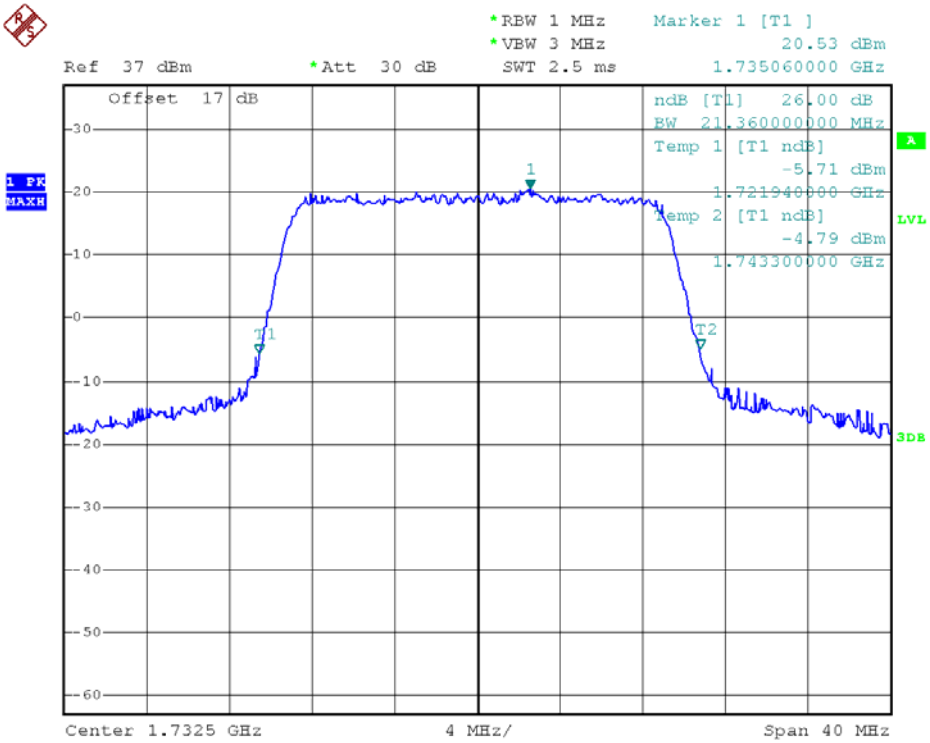
Occupied Bandwidth LTE Band 4/15MHz/QPSK



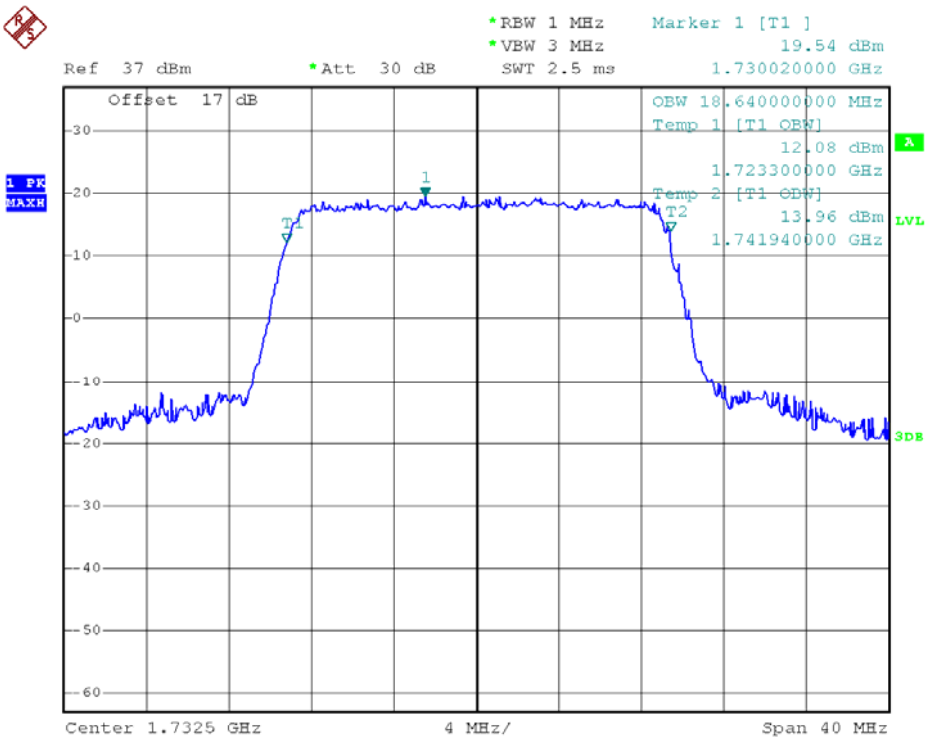


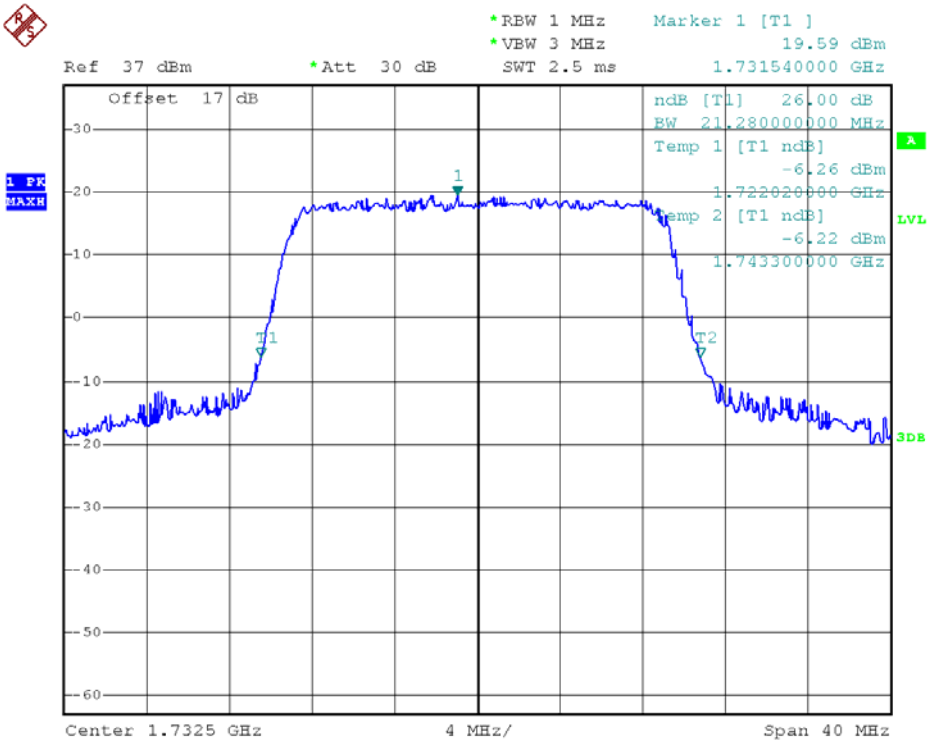
Occupied Bandwidth LTE Band 4/15MHz/16QAM



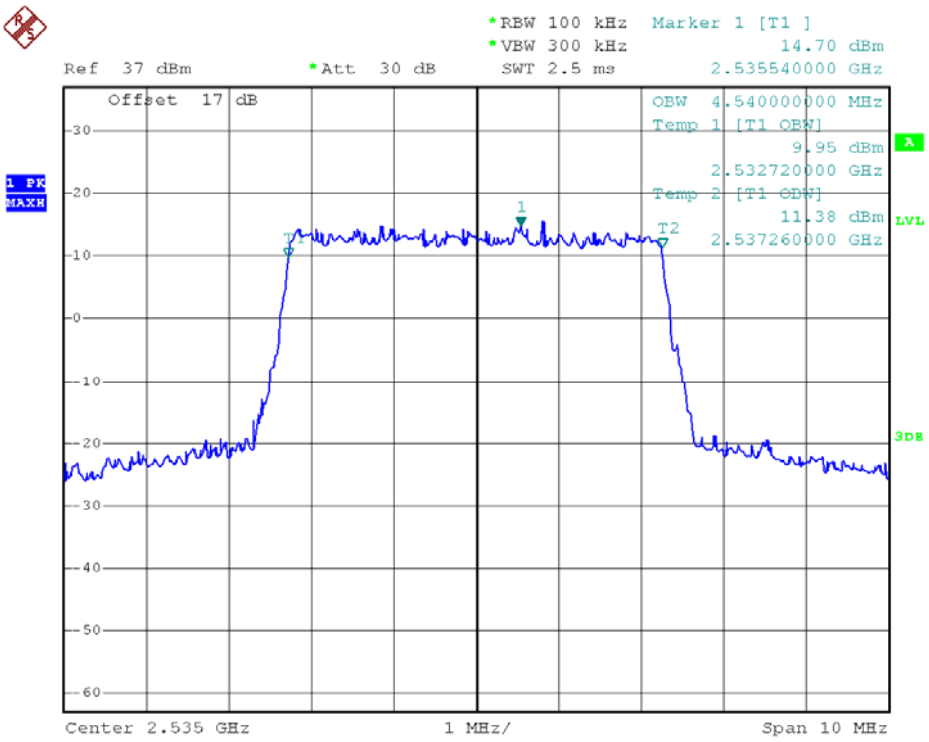


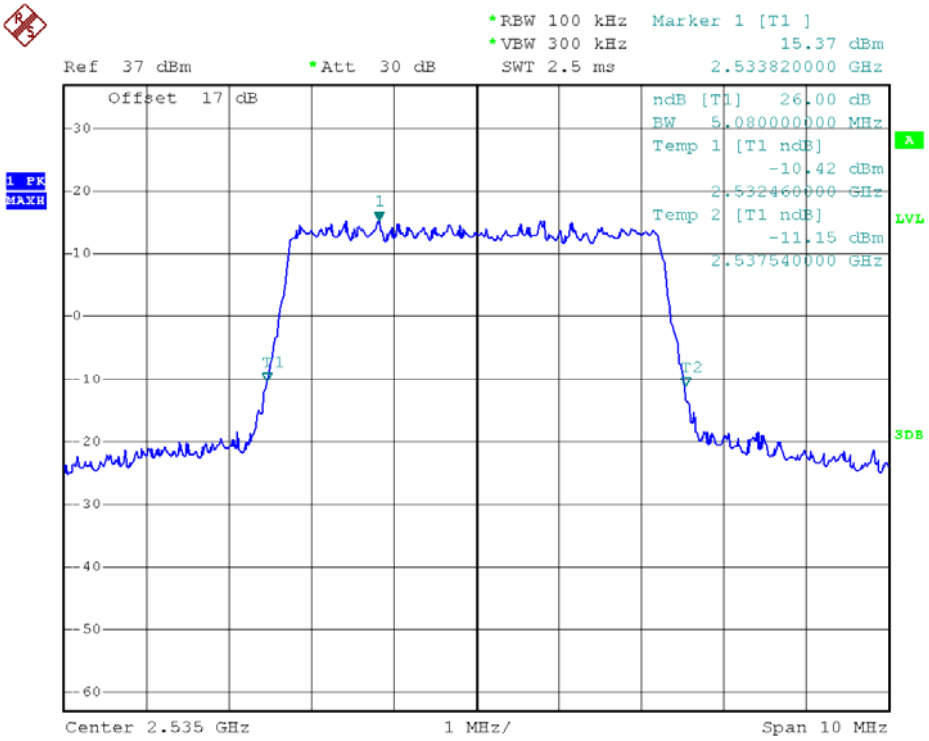
Occupied Bandwidth LTE Band 4/20MHz/QPSK



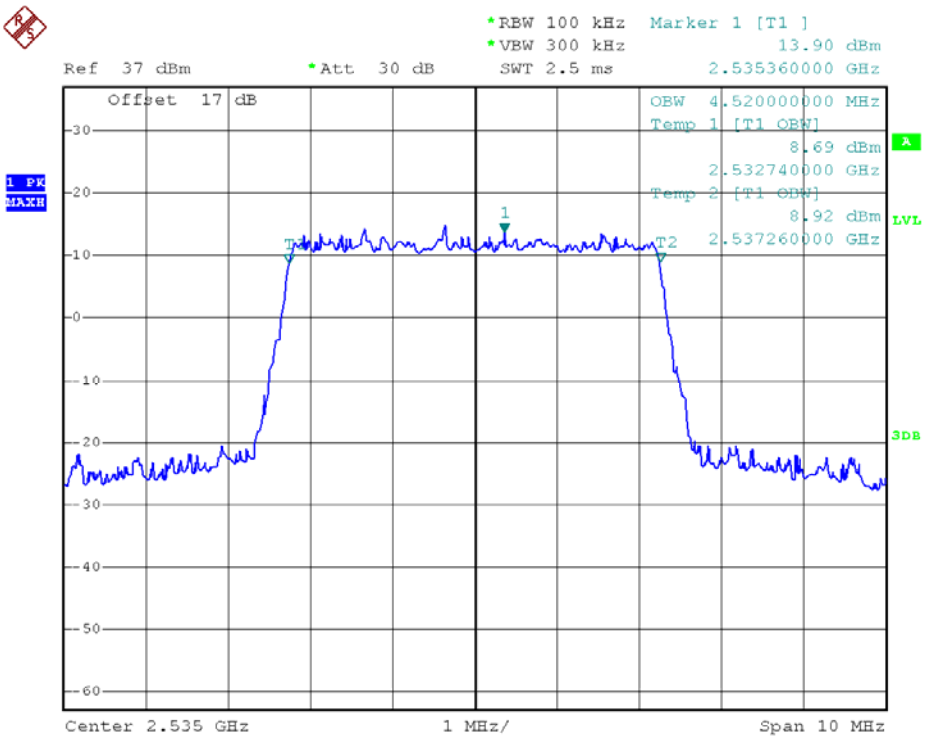


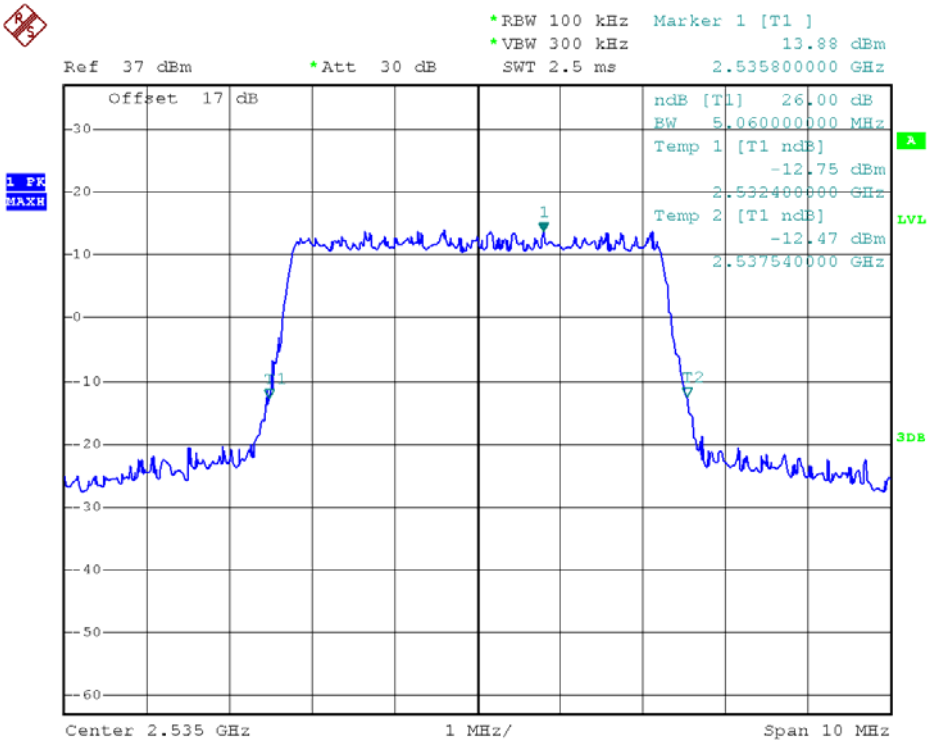
Occupied Bandwidth LTE Band 4/20MHz/16QAM



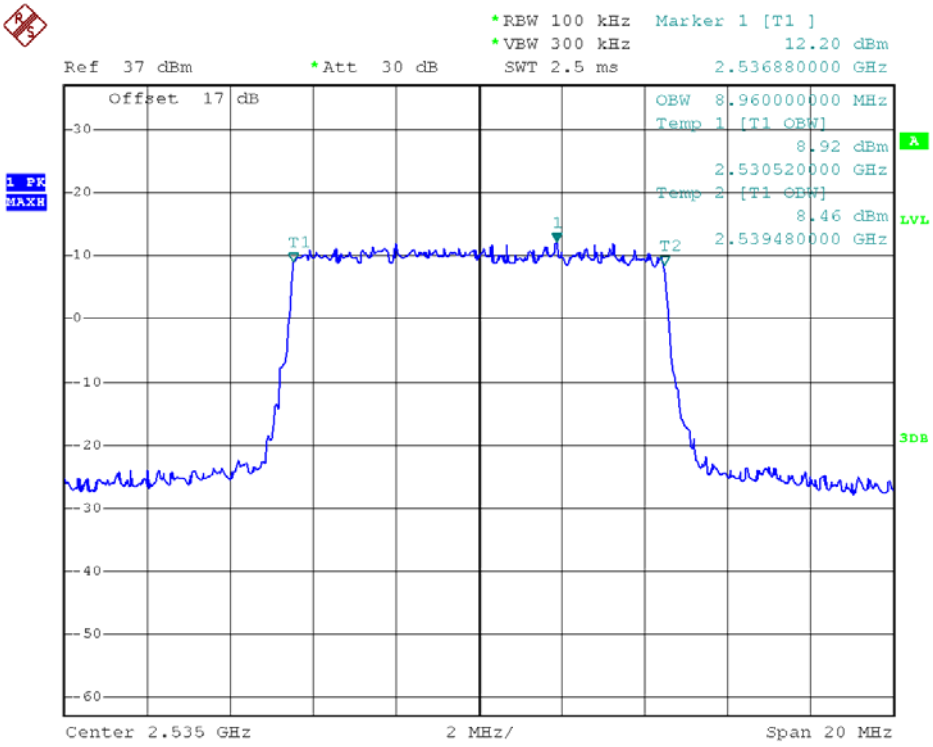


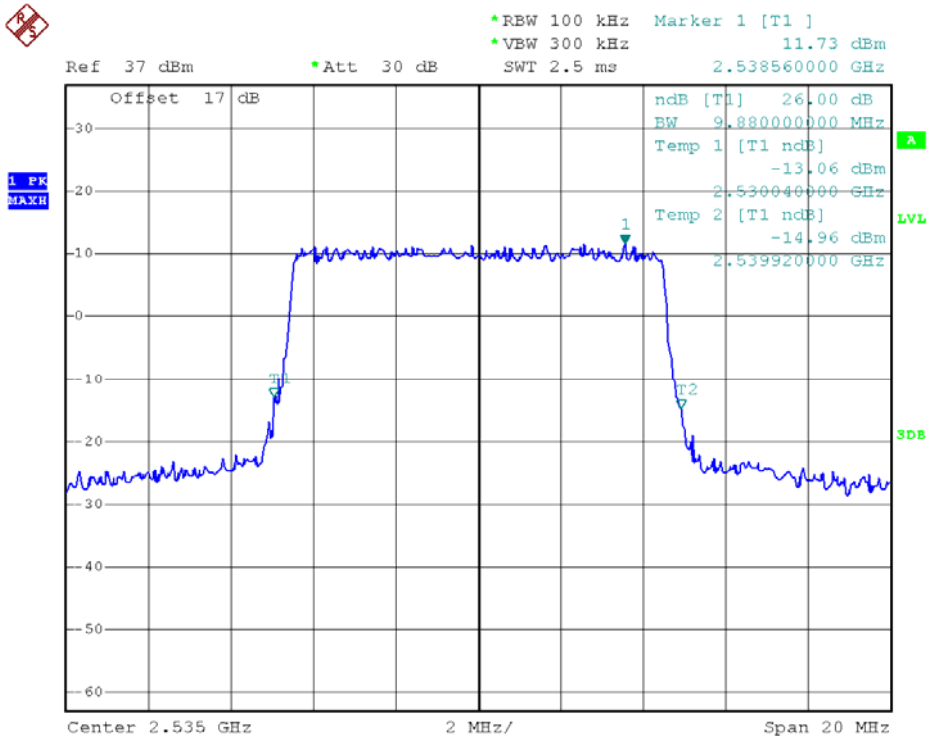
Occupied Bandwidth LTE Band 7/5MHz/QPSK



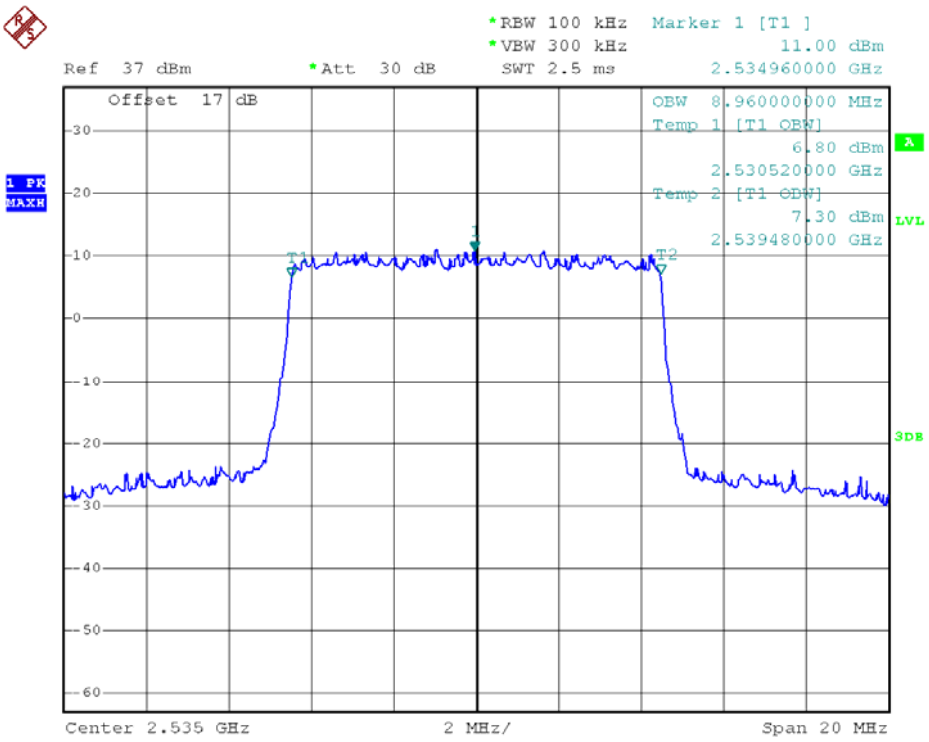


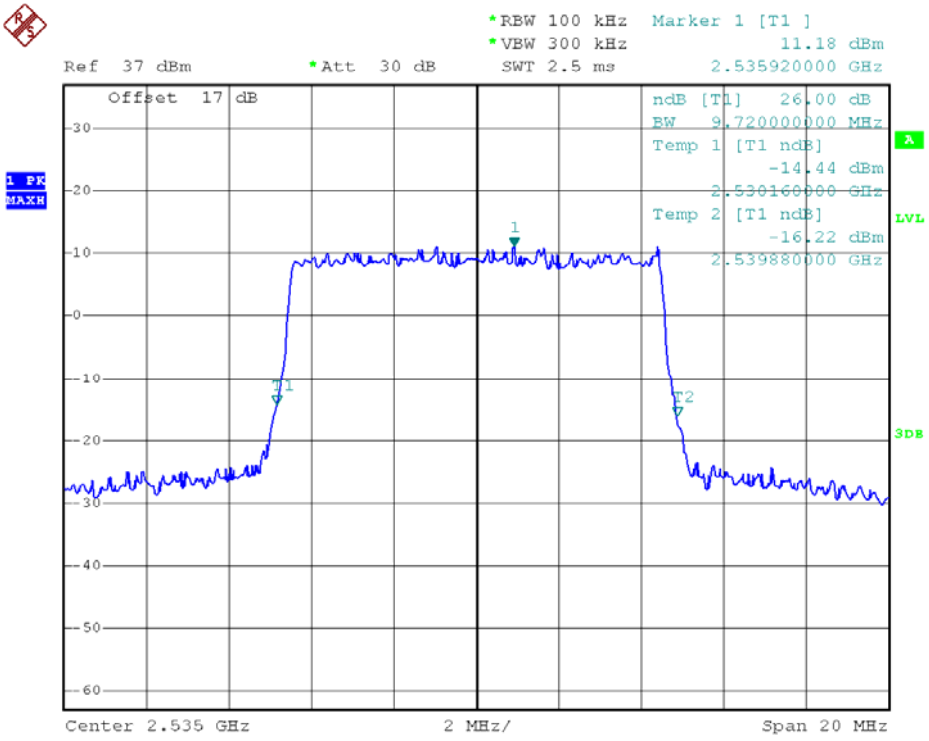
Occupied Bandwidth LTE Band 7/5MHz/16QAM



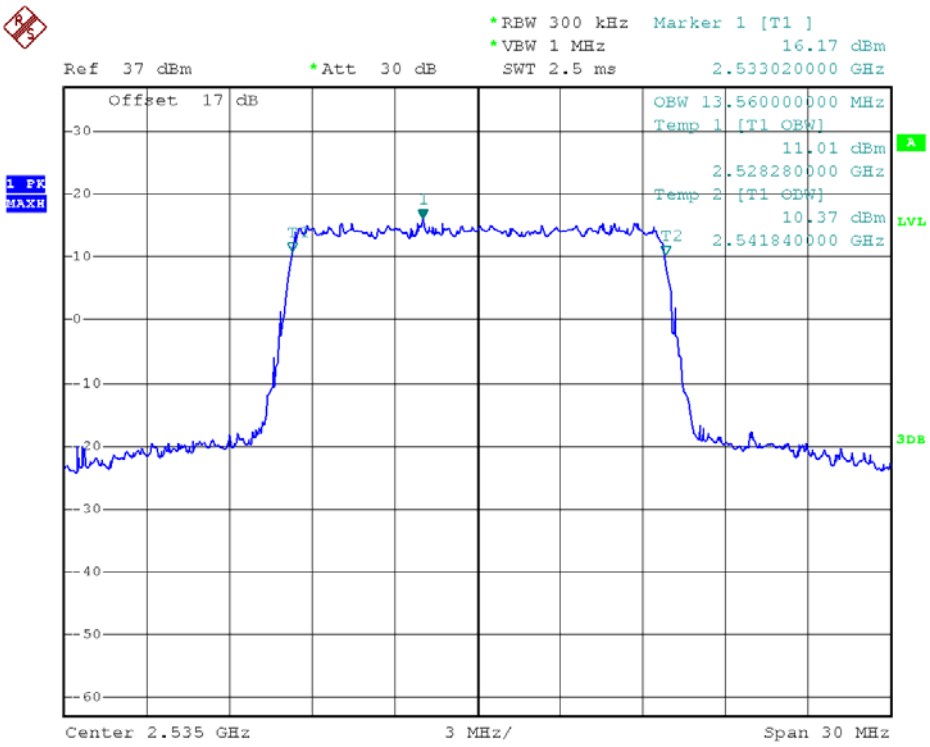


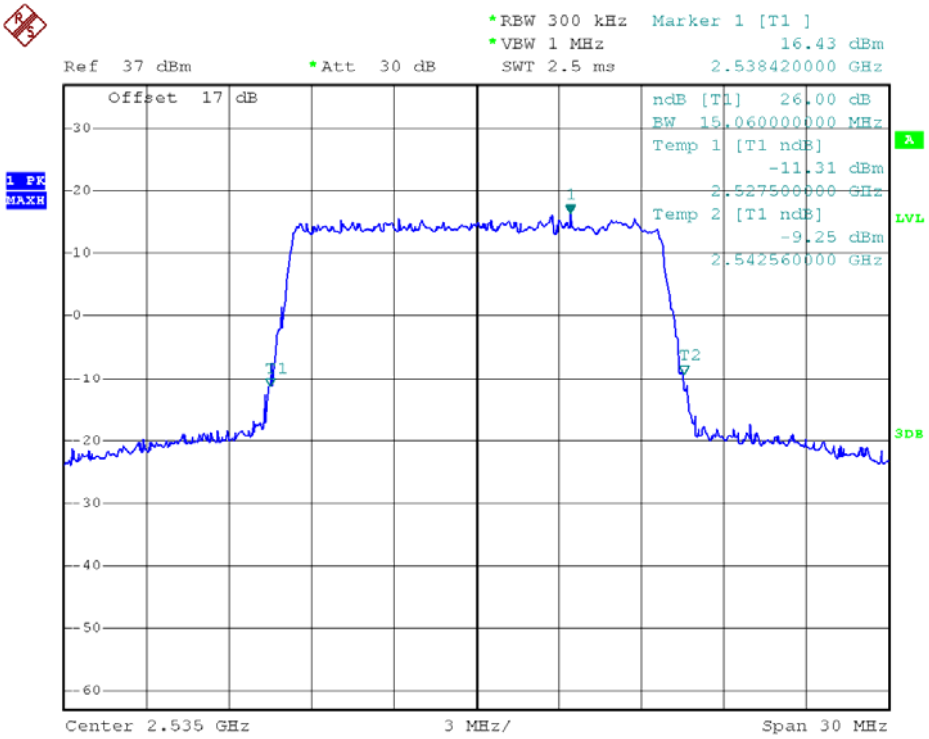
Occupied Bandwidth LTE Band 7/10MHz/QPSK



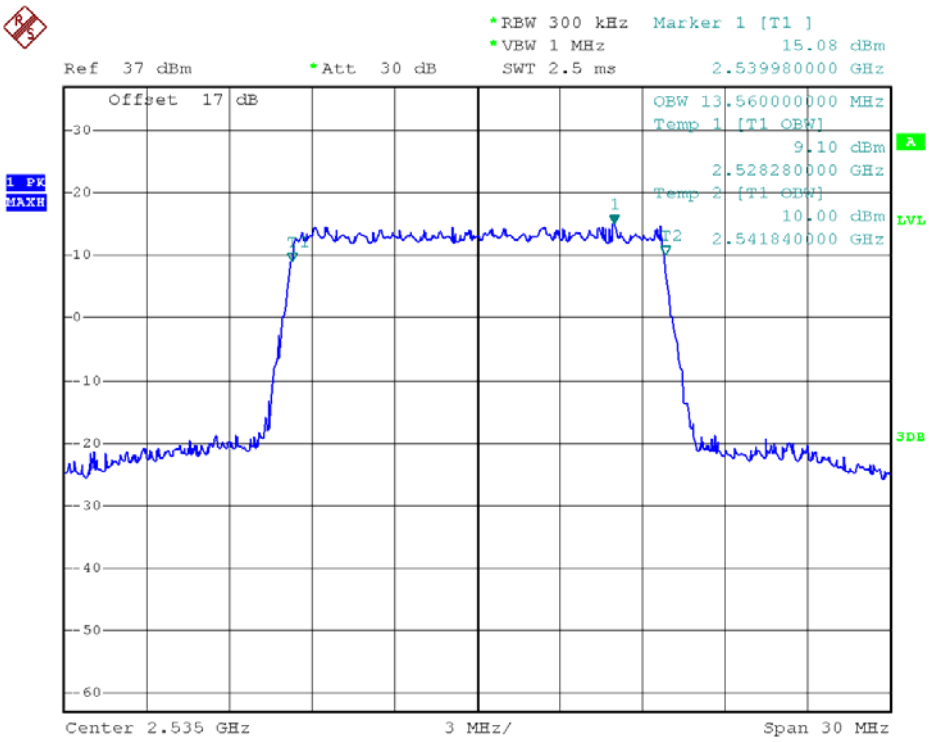


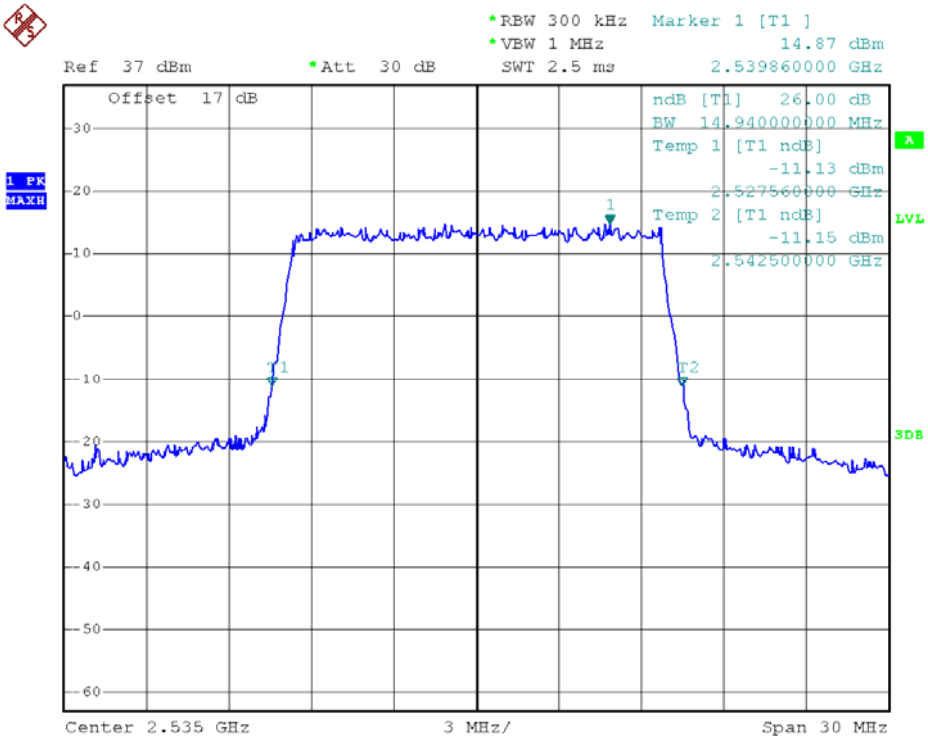
Occupied Bandwidth LTE Band 7/10MHz/16QAM



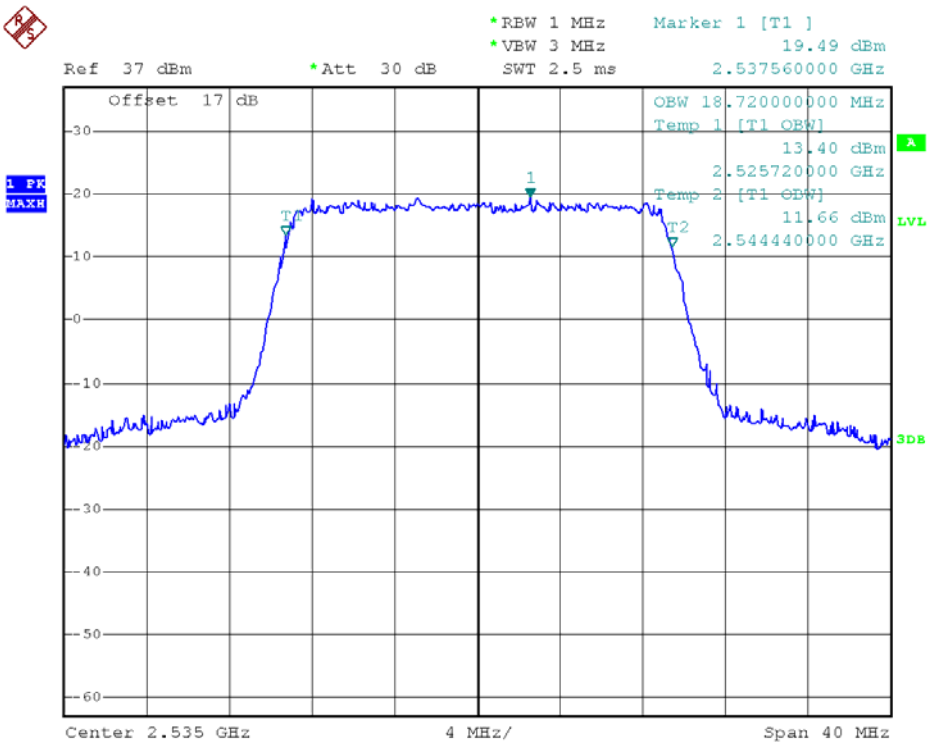


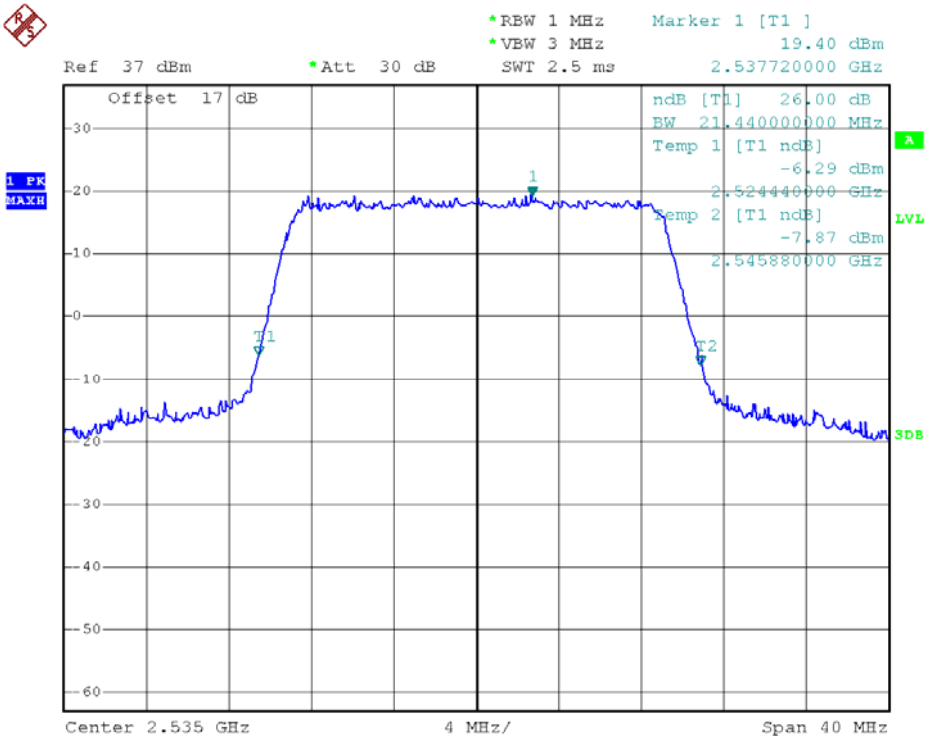
Occupied Bandwidth LTE Band 7/15MHz/QPSK



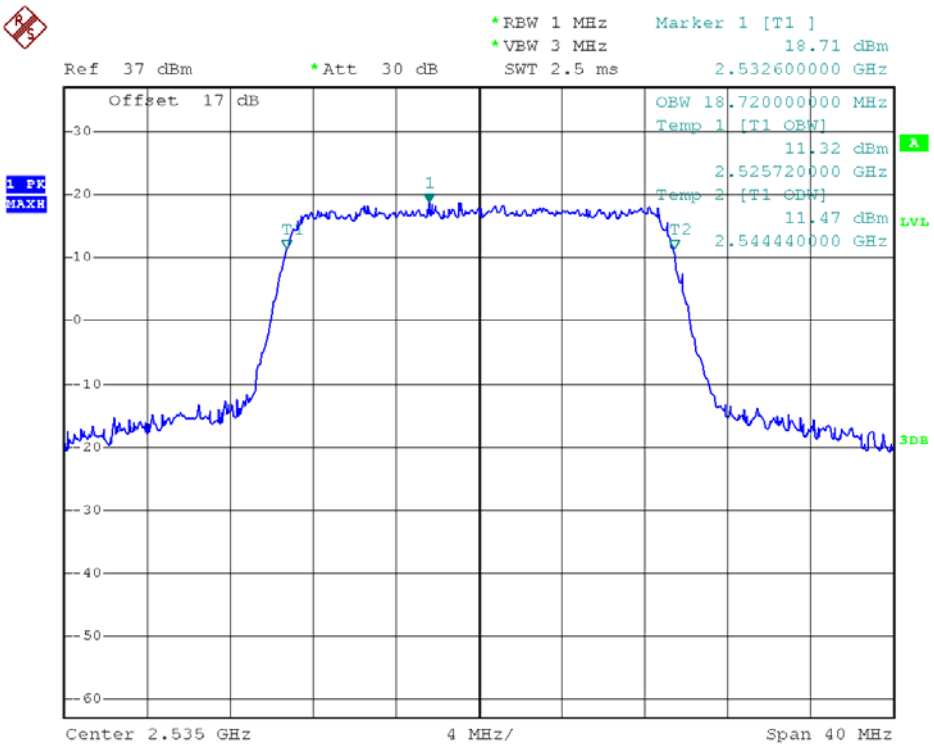


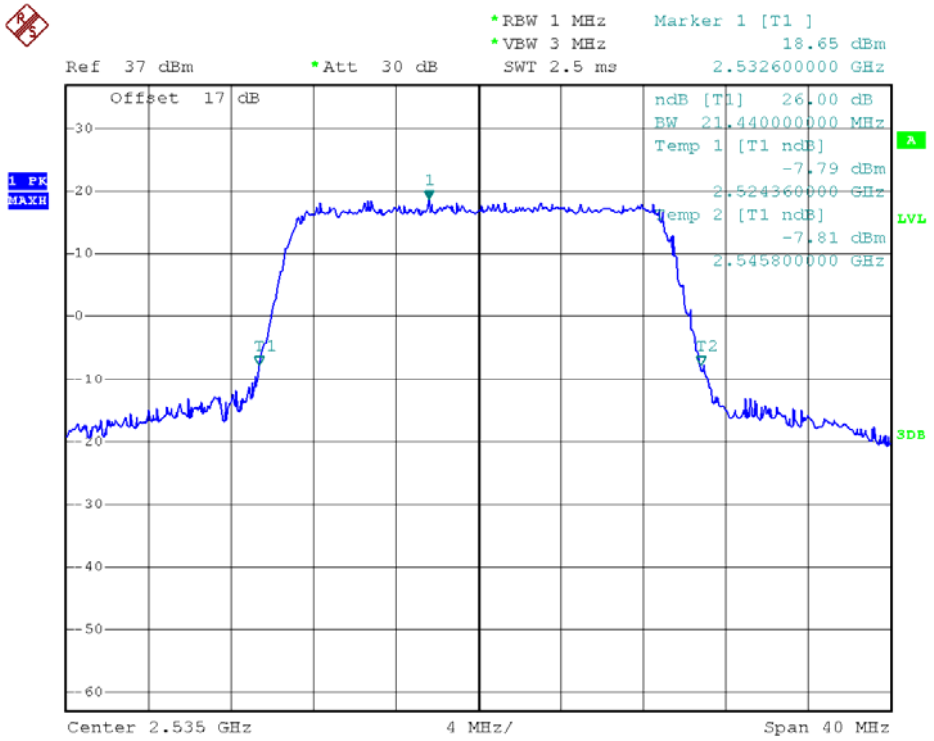
Occupied Bandwidth LTE Band 7/15MHz/16QAM



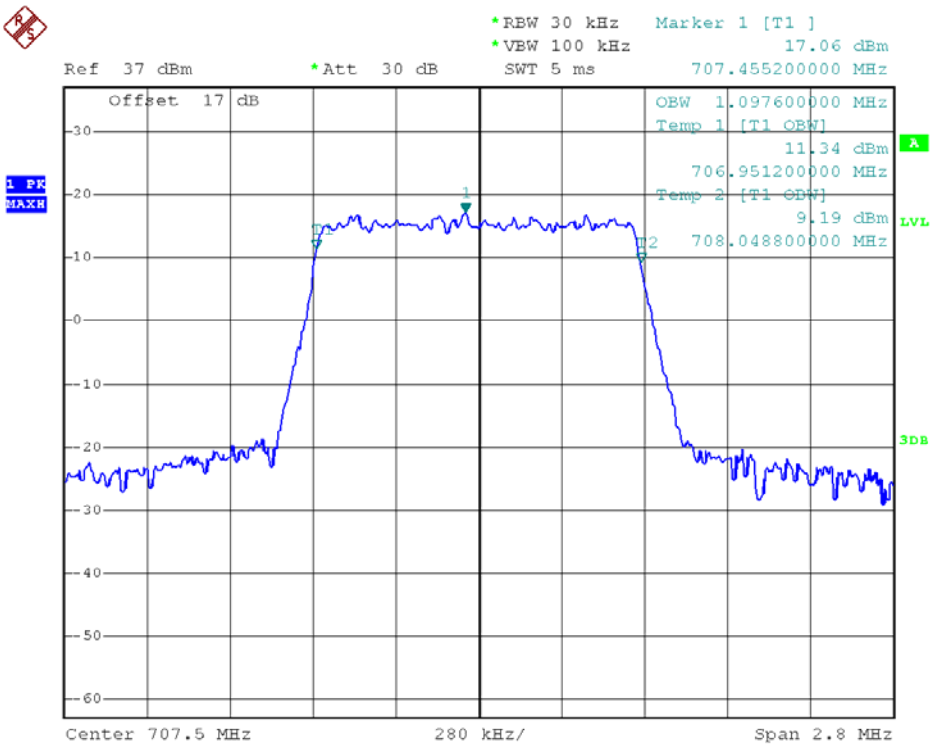


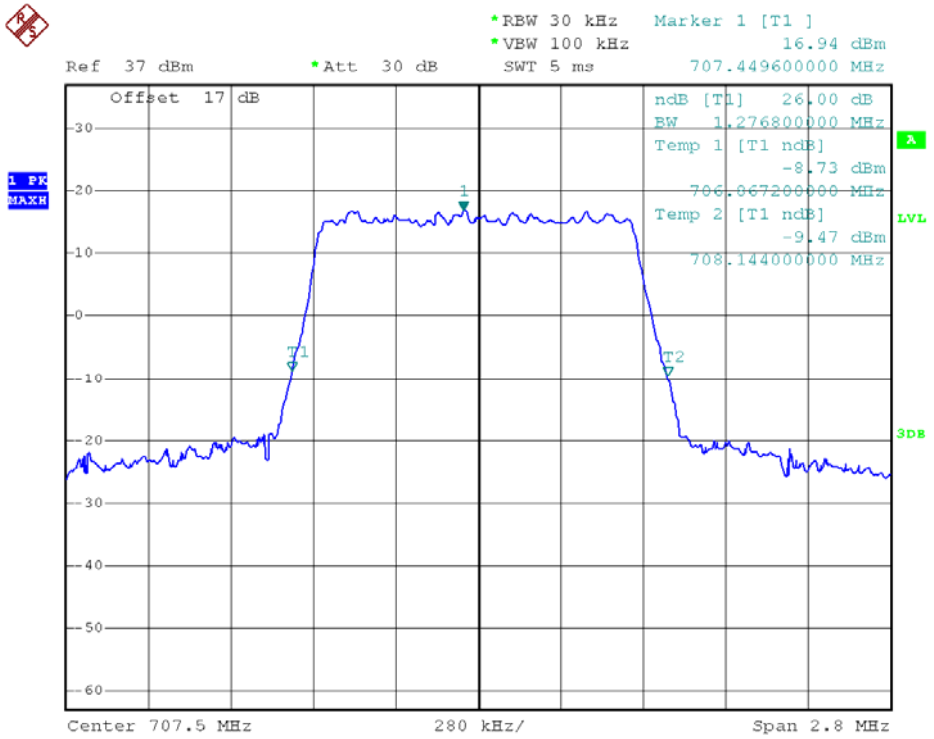
Occupied Bandwidth LTE Band 7/20MHz/QPSK



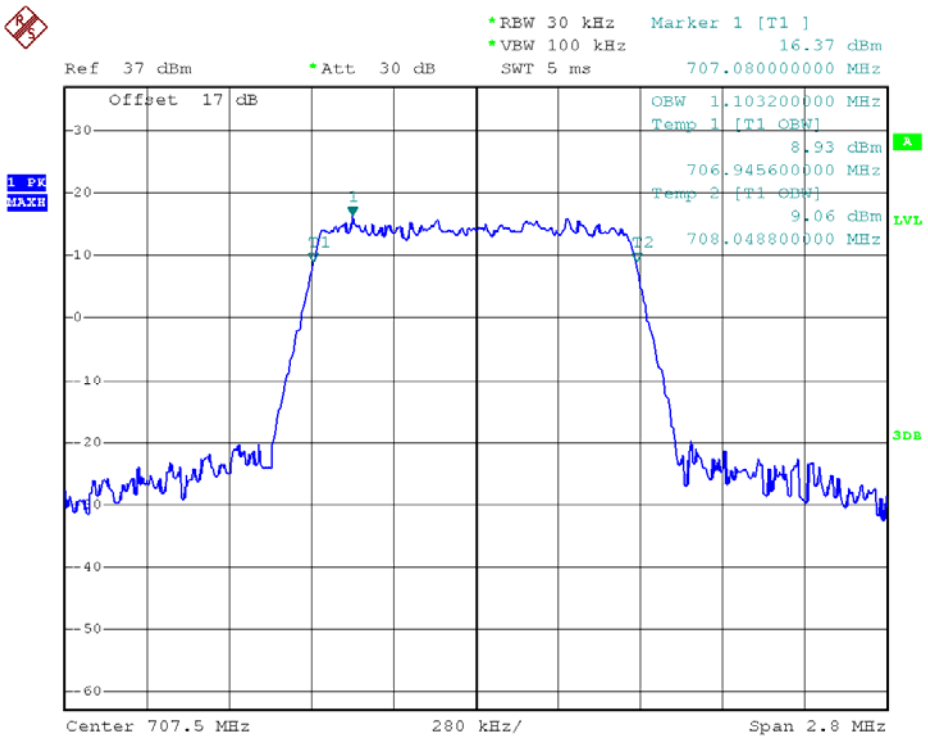


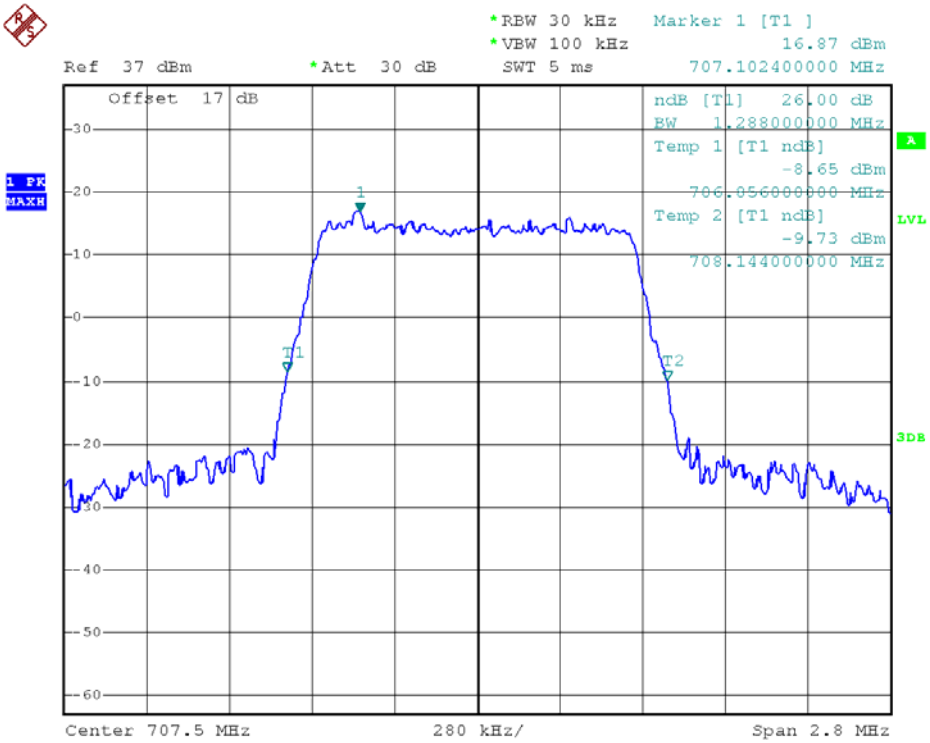
Occupied Bandwidth LTE Band 7/20MHz/16QAM



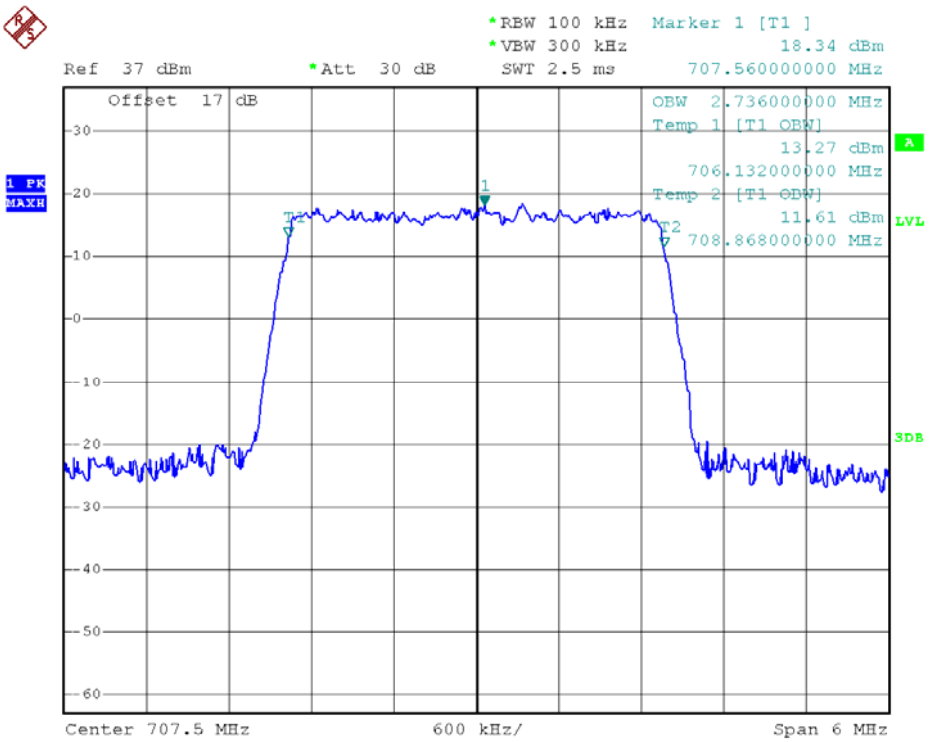


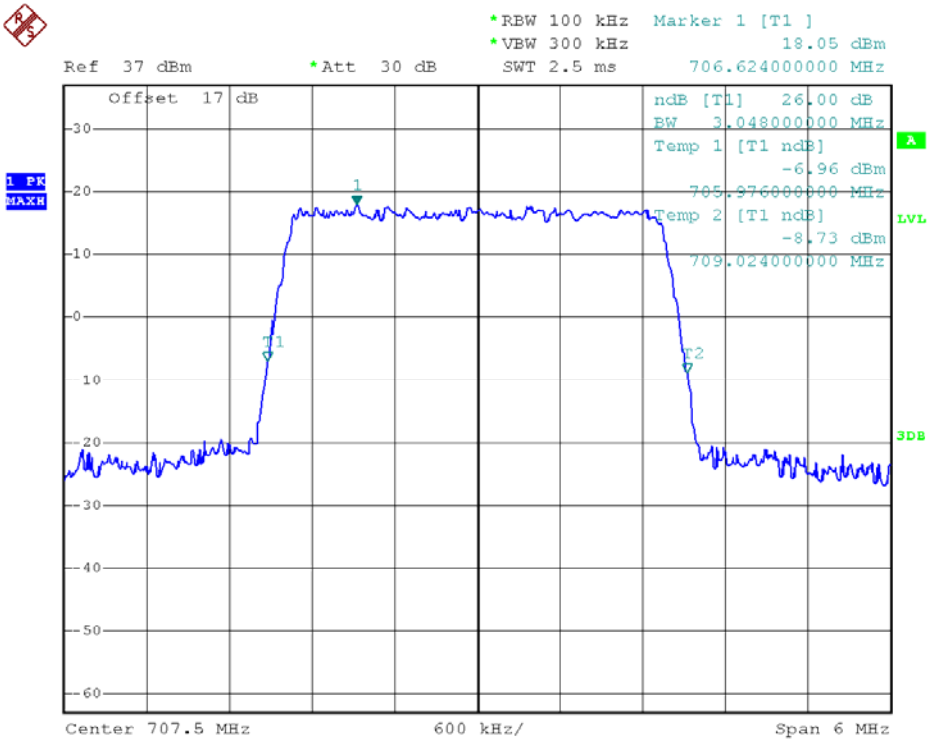
Occupied Bandwidth LTE Band 12/1.4MHz/QPSK



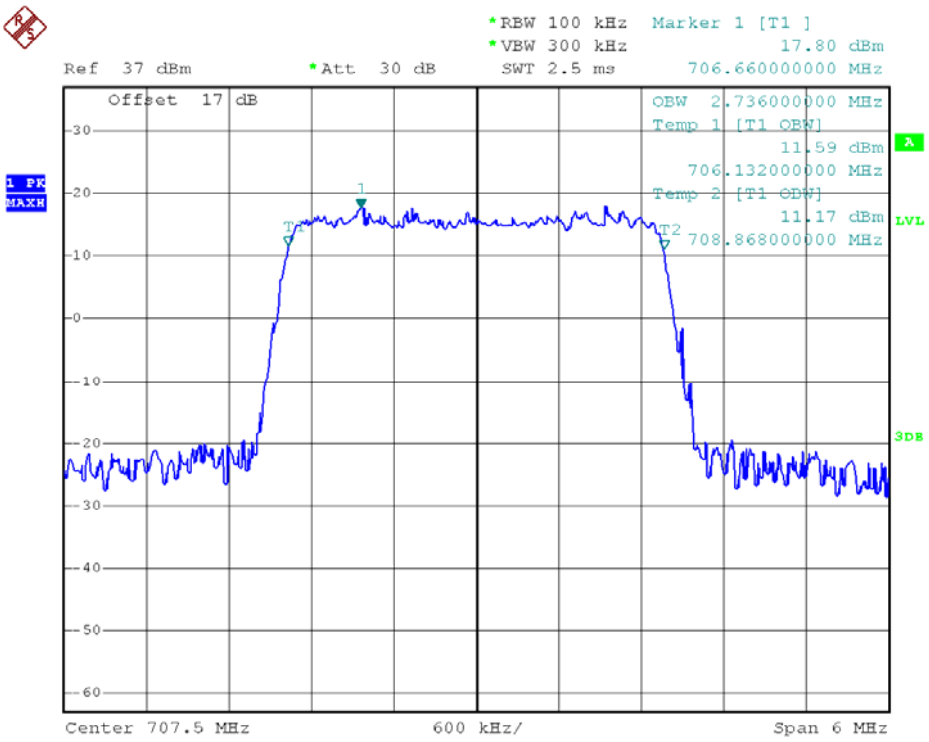


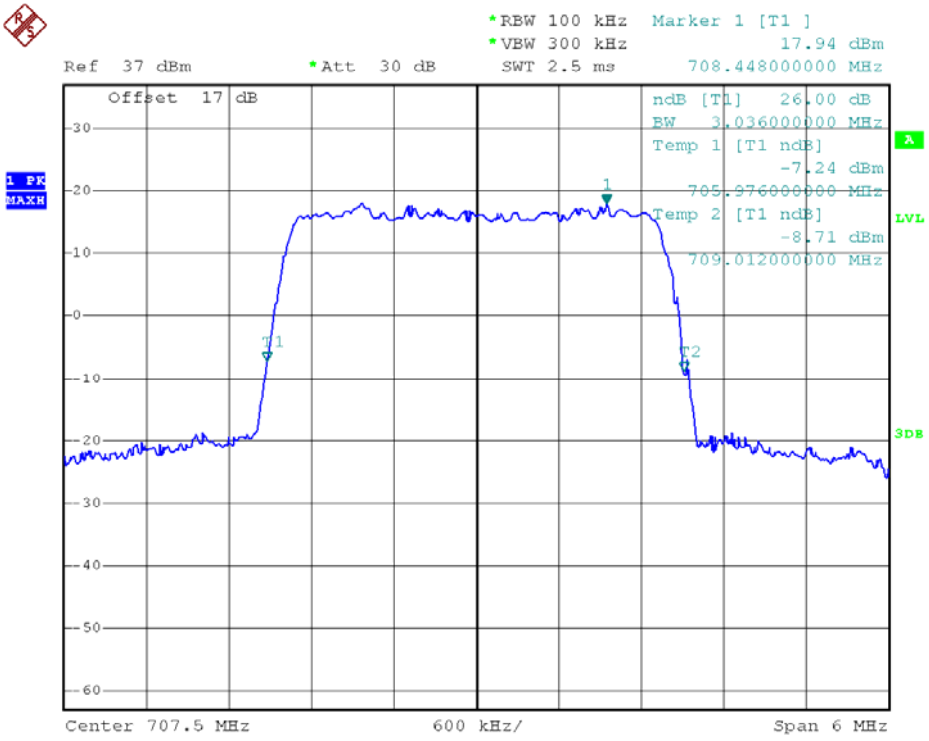
Occupied Bandwidth LTE Band 12/1.4MHz/16QAM



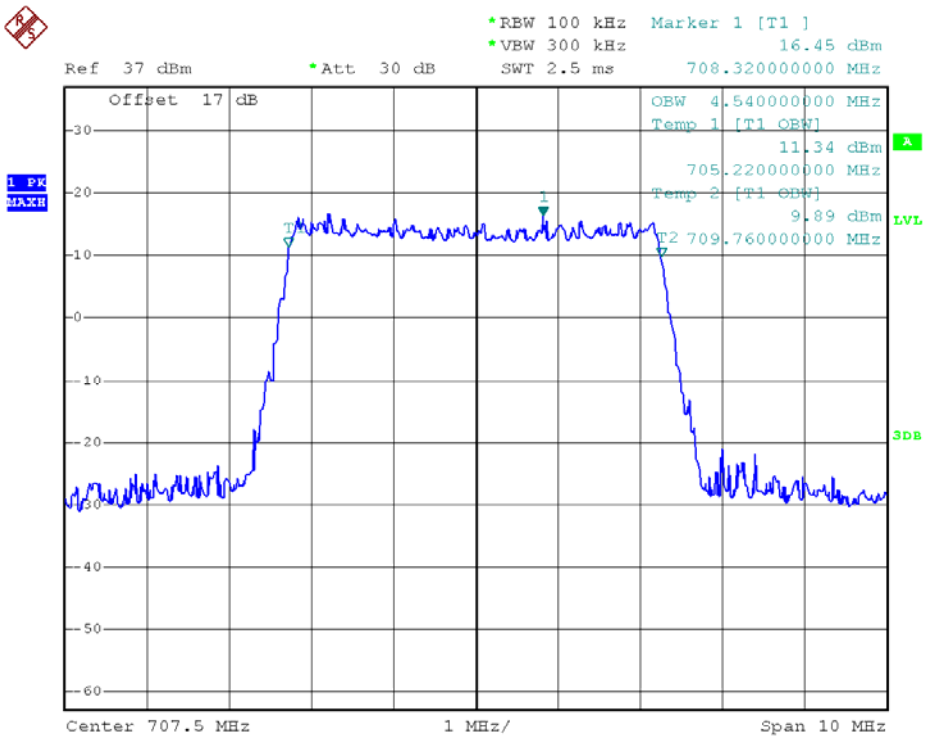


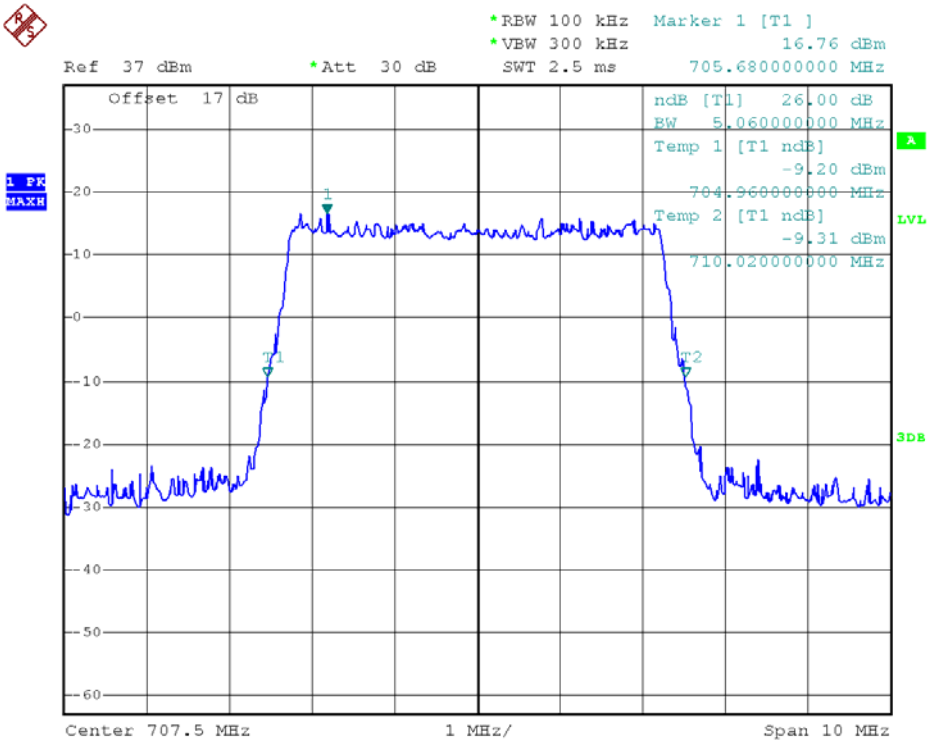
Occupied Bandwidth LTE Band 12/3MHz/QPSK



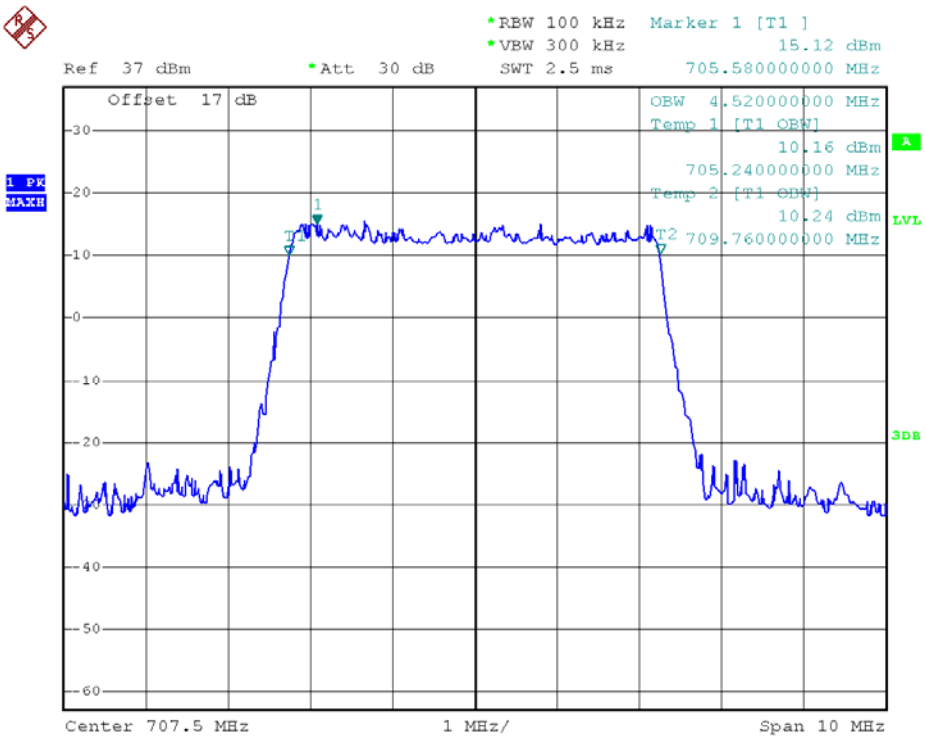


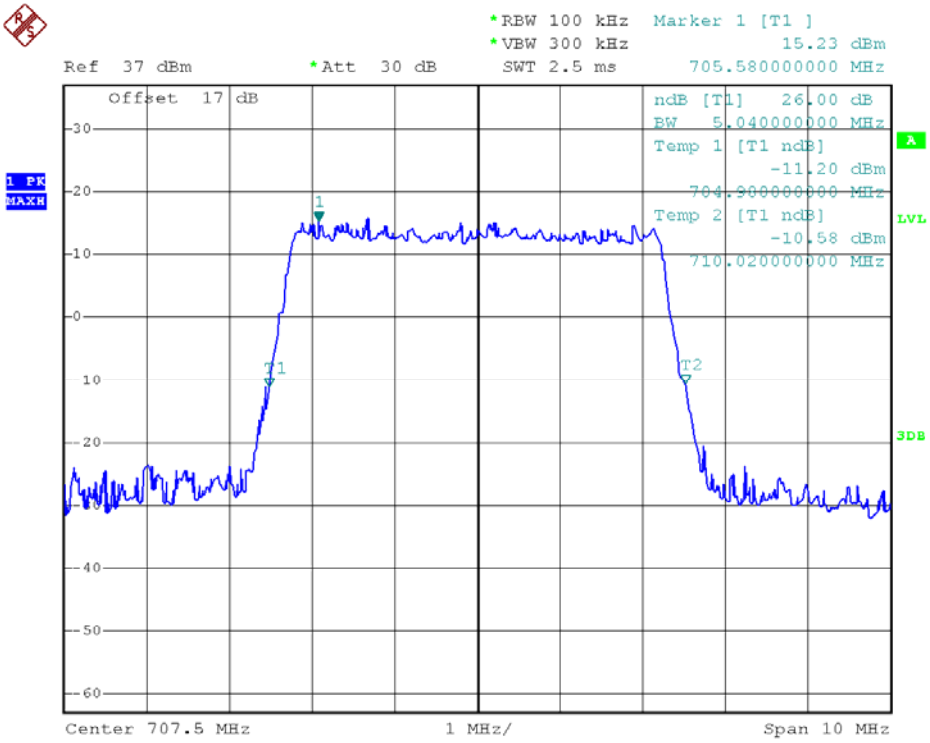
Occupied Bandwidth LTE Band 12/3MHz/16QAM



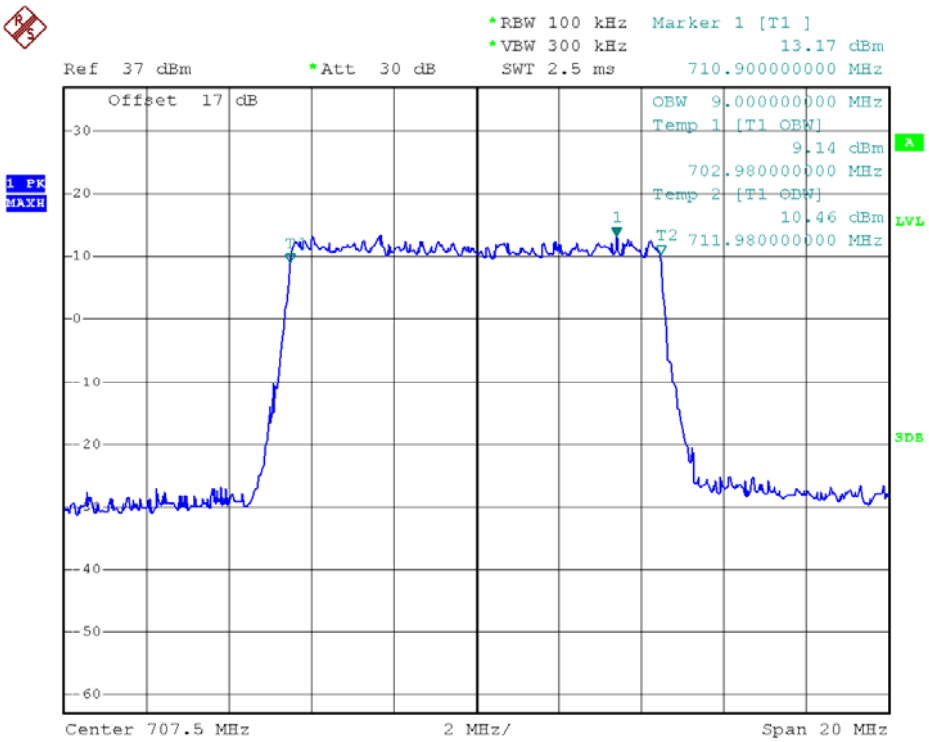


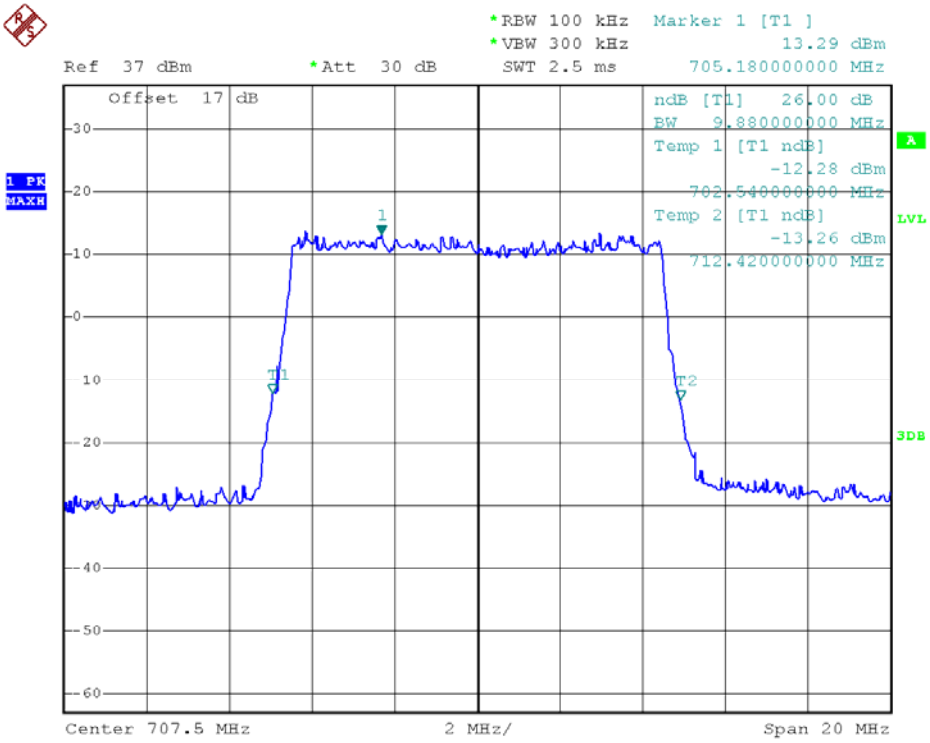
Occupied Bandwidth LTE Band 12/5MHz/QPSK



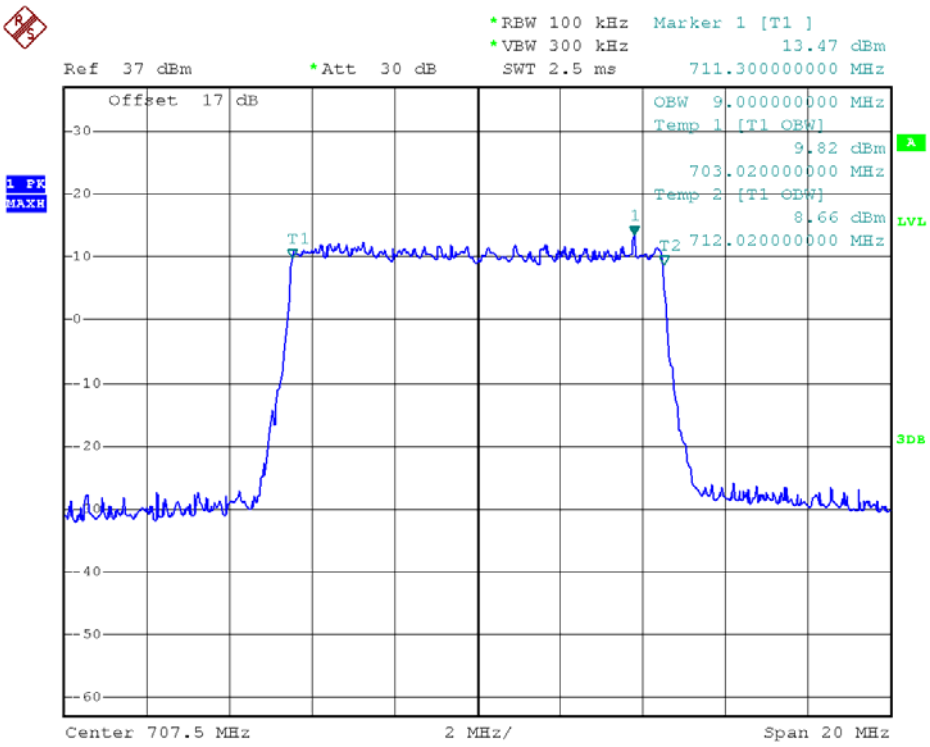


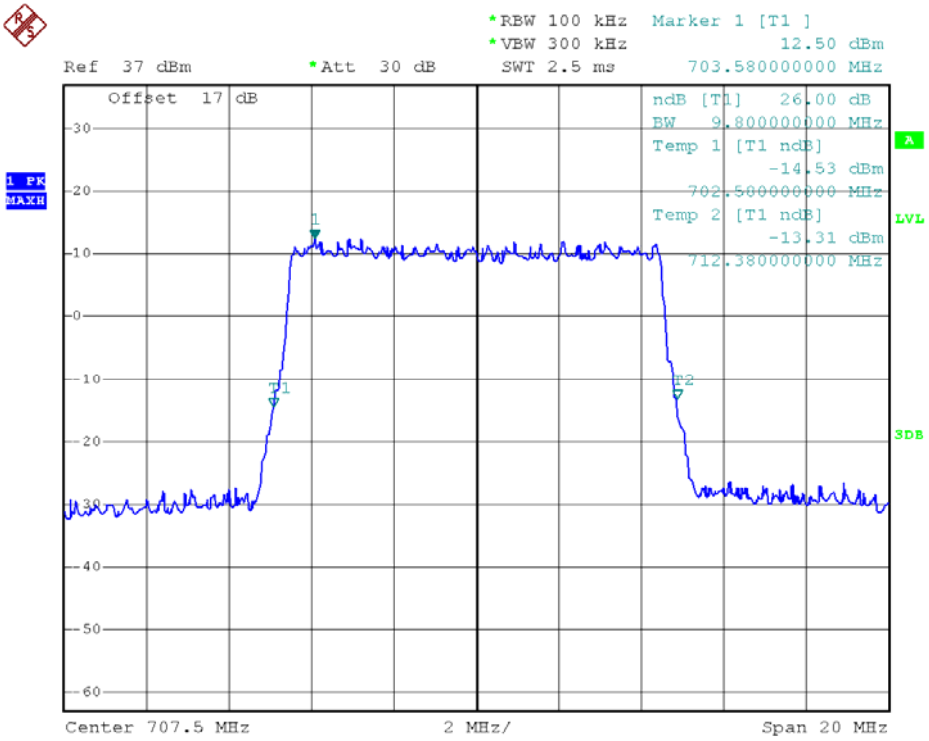
Occupied Bandwidth LTE Band 12/5MHz/16QAM





Occupied Bandwidth LTE Band 12/10MHz/QPSK





Occupied Bandwidth LTE Band 12/10MHz/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:

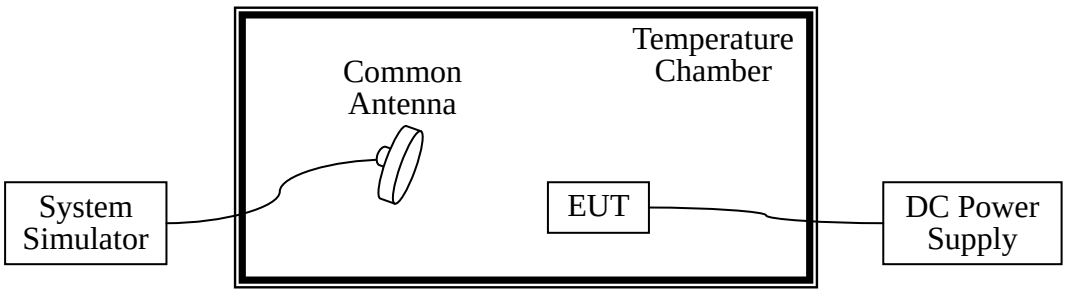
(a) The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.

(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 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.4.3 Test Setup



2.4.4 Test Procedures

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°C 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°C step up to 50°C. 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 nominal, highest and lowest extreme voltages were tested, which are specified by the applicant; the normal temperature here used is 25°C.
5. The variation in frequency was measured for the worst case.

2.4.5 Test Result of Frequency Stability

1. LTE Band 2, QPSK, BW 10MHz

Test Conditions		Frequency Deviation BW 10MHz Middle Channel 1880MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	34	0.02	2.5
	-20	20	0.01	
	-10	54	0.03	
	0	38	0.02	
	+10	16	0.01	
	+20	58	0.03	
	+30	24	0.01	
	+40	18	0.01	
	+55	49	0.03	
4.2	+25	35	0.02	
3.5	+25	22	0.01	

2. LTE Band 2, 16QAM, BW 10MHz

Test Conditions		Frequency Deviation BW 10MHz Middle Channel 1880MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	21	0.01	2.5
	-20	29	0.02	
	-10	52	0.03	
	0	32	0.02	
	+10	22	0.01	
	+20	23	0.01	
	+30	52	0.03	
	+40	17	0.01	
	+55	32	0.02	
4.2	+25	41	0.02	
3.5	+25	49	0.03	

3. LTE Band 4, QPSK ,BW 10MHz

Test Conditions		Frequency Deviation BW 10MHz Middle Channel 1732.5MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	26	0.02	2.5
	-20	48	0.03	
	-10	19	0.01	
	0	36	0.02	
	+10	18	0.01	
	+20	19	0.01	
	+30	21	0.01	
	+40	51	0.03	
	+55	27	0.02	
4.2	+25	32	0.02	
3.5	+25	23	0.01	

4. LTE Band 4, 16QAM ,BW 10MHz

Test Conditions		Frequency Deviation BW 10MHz Middle Channel 1732.5MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	18	0.01	2.5
	-20	52	0.03	
	-10	34	0.02	
	0	21	0.02	
	+10	33	0.02	
	+20	15	0.01	
	+30	33	0.02	
	+40	23	0.01	
	+55	17	0.01	
4.2	+25	54	0.03	
3.5	+25	33	0.02	

5. LTE Band 7, QPSK ,BW 10MHz

Test Conditions		Frequency Deviation BW 10MHz Middle Channel 2535MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	19	0.01	2.5
	-20	53	0.02	
	-10	41	0.02	
	0	22	0.01	
	+10	23	0.01	
	+20	35	0.01	
	+30	31	0.01	
	+40	23	0.01	
	+55	22	0.01	
4.2	+25	59	0.02	
3.5	+25	50	0.02	

6. LTE Band 7,16QAM ,BW 10MHz

Test Conditions		Frequency Deviation BW 10MHz Middle Channel 2535MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	26	0.01	2.5
	-20	48	0.02	
	-10	25	0.01	
	0	22	0.01	
	+10	23	0.01	
	+20	49	0.02	
	+30	27	0.01	
	+40	23	0.01	
	+55	23	0.01	
4.2	+25	55	0.02	
3.5	+25	24	0.01	

7. LTE Band 12, QPSK ,BW 10MHz

Test Conditions		Frequency Deviation BW 10MHz Middle Channel 707.5MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	9	0.01	2.5
	-20	15	0.02	
	-10	21	0.03	
	0	16	0.02	
	+10	23	0.03	
	+20	35	0.05	
	+30	21	0.03	
	+40	23	0.03	
	+55	32	0.04	
4.2	+25	29	0.04	
3.5	+25	38	0.05	

8. LTE Band 12, 16QAM ,BW 10MHz

Test Conditions		Frequency Deviation BW 10MHz Middle Channel 707.5MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	16	0.02	2.5
	-20	28	0.04	
	-10	15	0.02	
	0	10	0.01	
	+10	23	0.03	
	+20	27	0.04	
	+30	37	0.05	
	+40	24	0.03	
	+55	23	0.03	
4.2	+25	35	0.05	
3.5	+25	24	0.03	

2.5 Conducted Out of Band Emissions

2.5.1 Requirement

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.

For Band 7:

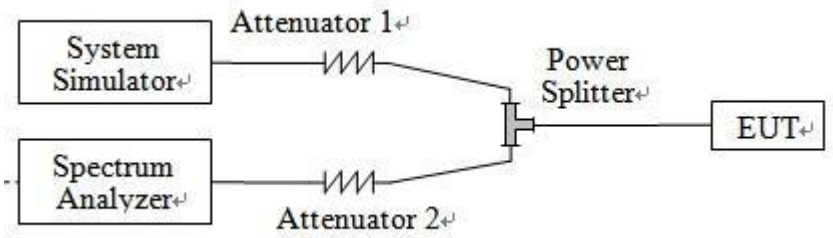
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power(P) by a factor of at least 55+10 log(P) dB. This calculated to be -25dBm.

It is measured by means of a calibrated spectrum analyzer and scanned from 30MHz up to a frequency including its 10th harmonic.

2.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

2.5.3 Test Setup



2.5.4 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.
8. For Band 7

   The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)

   = P(W)- [55 + 10log(P)] (dB)

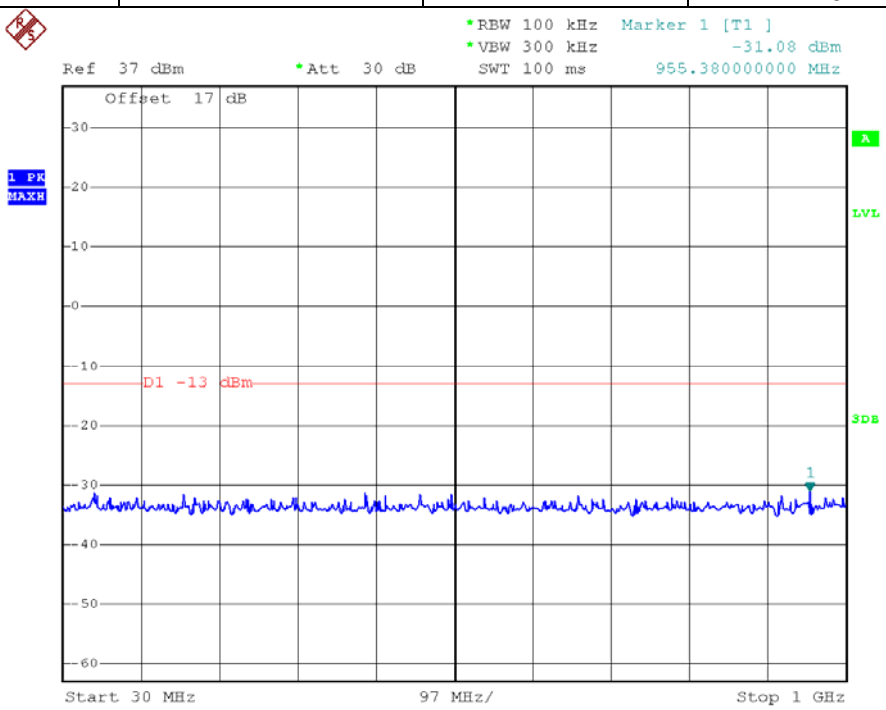
   = [30 + 10log(P)] (dBm) - [55 + 10log(P)] (dB)

   = -25dBm.
9. For 9KHz to 30MHz: the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

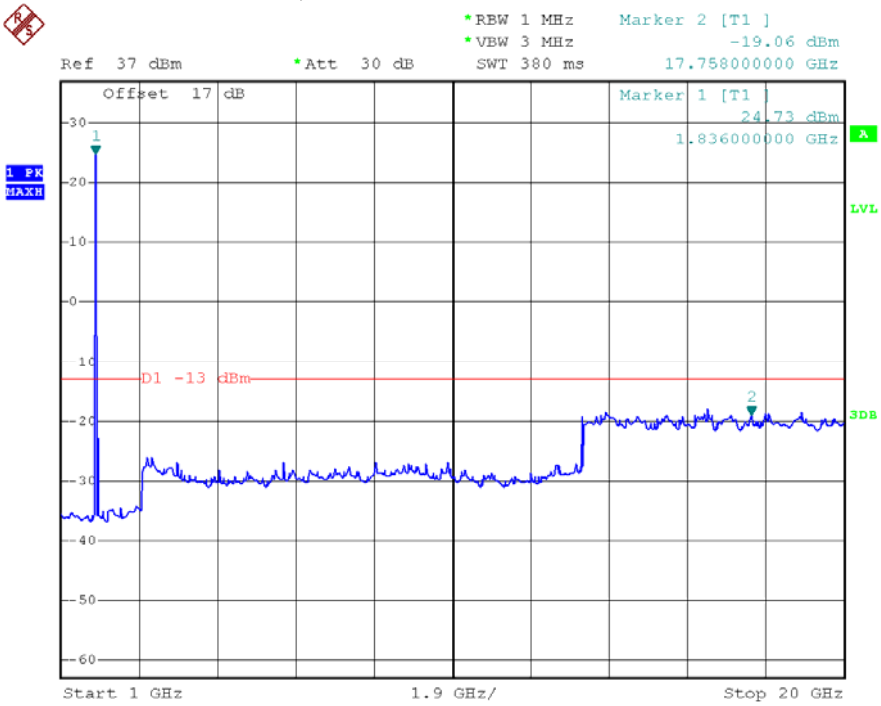
2.5.5 Test Result of Conducted Spurious Emission

Note: For 9 KHz to 30MHz: the amplitude of spurious emissions is attenuated by more than 20dB below the permissible value, so we not provide the test result here

Band	LTE Band 2	Channel	Low
Bandwidth	1.4MHz	Modulation	QPSK

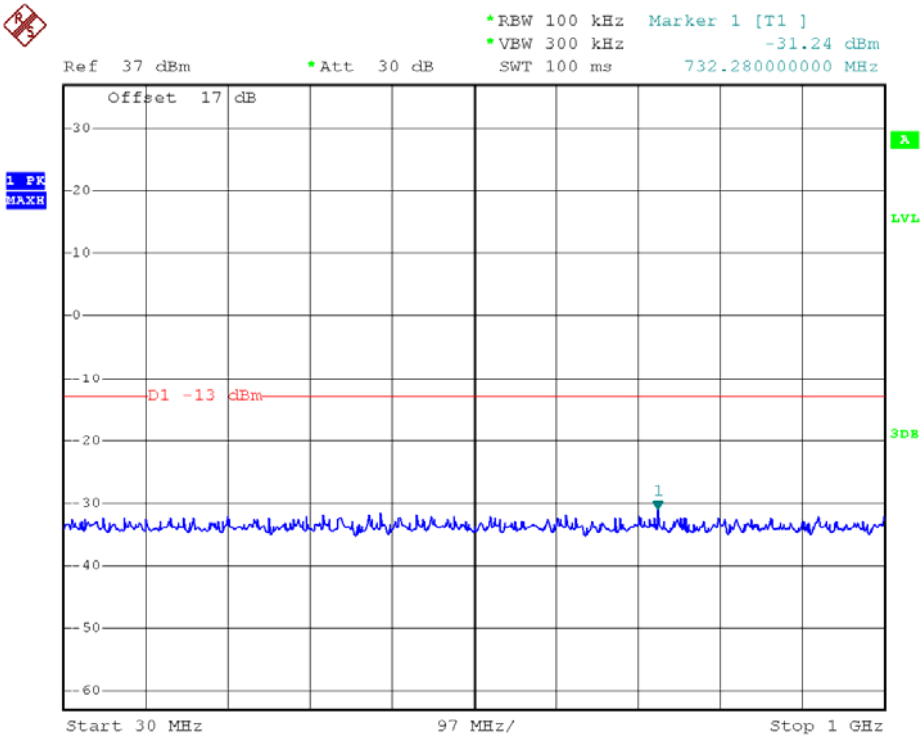


RB Size 1, RB Offset 0 30MHz to 1GHz

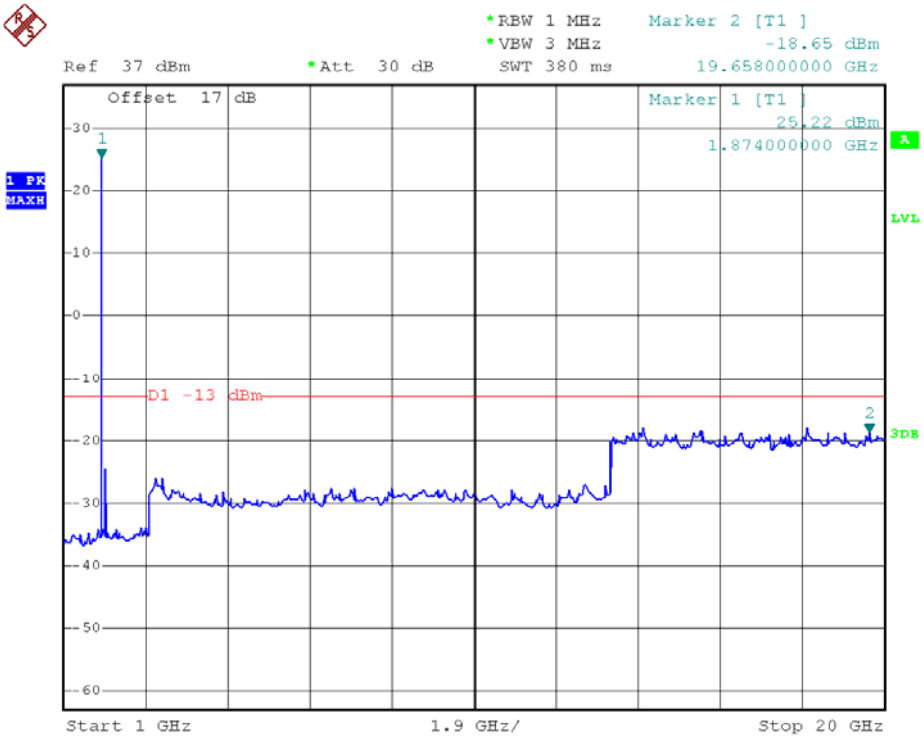


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Middle
Bandwidth	1.4MHz	Modulation	QPSK

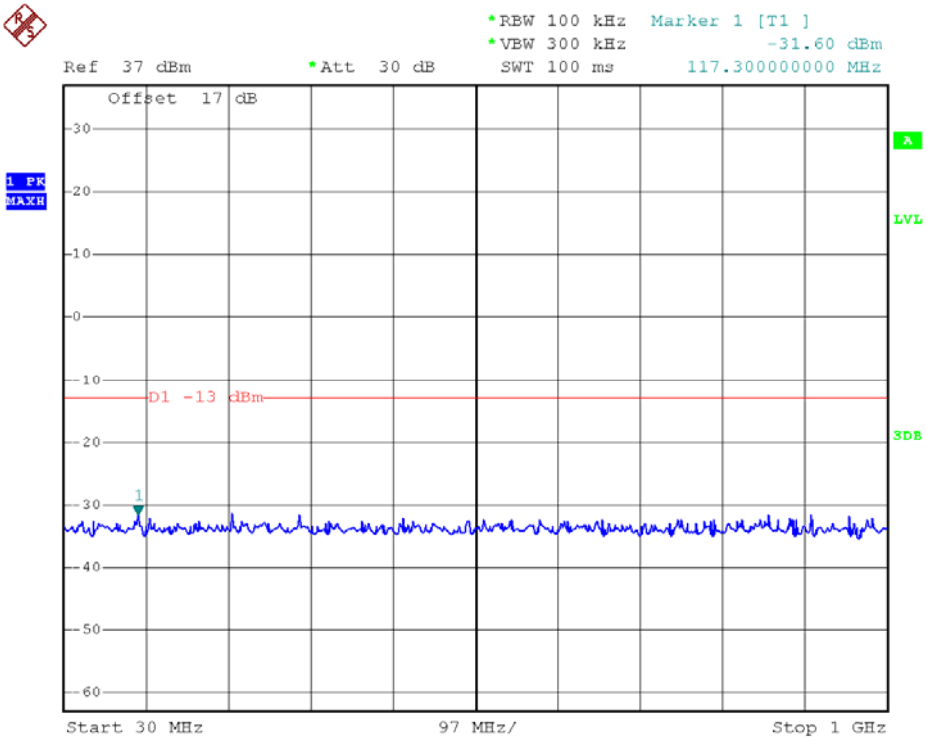


RB Size 1, RB Offset 0 30MHz to 1GHz

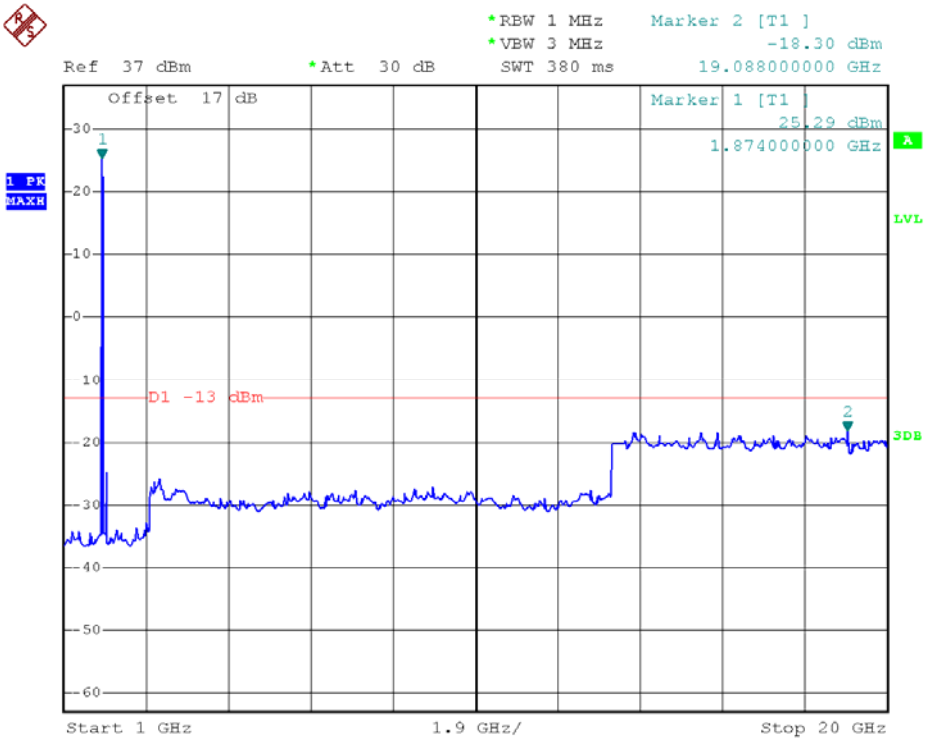


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	High
Bandwidth	1.4MHz	Modulation	QPSK

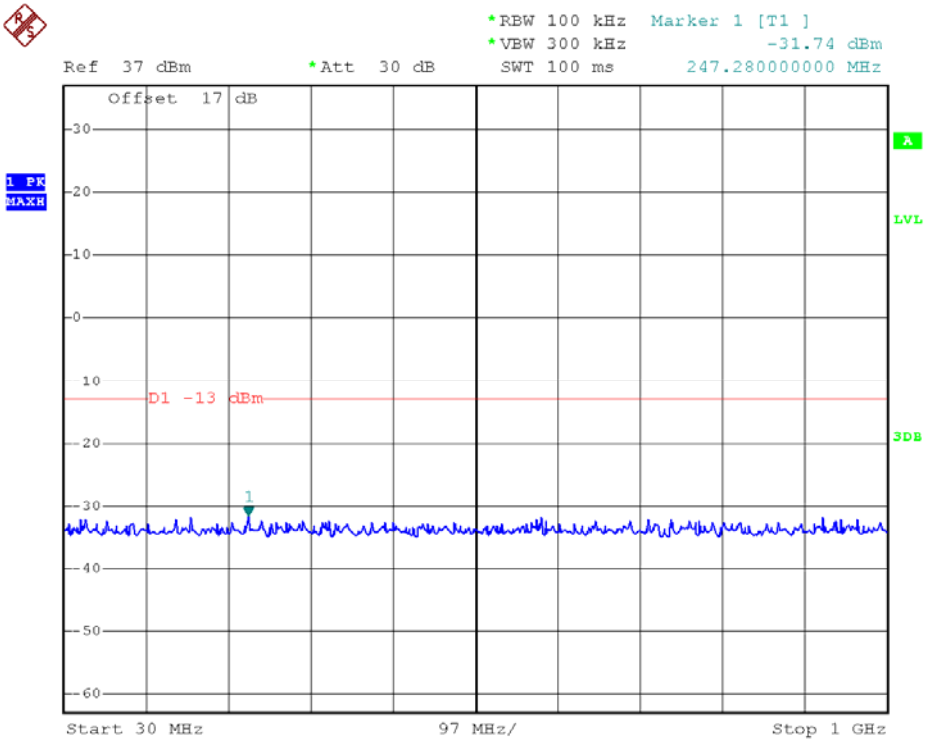


RB Size 1, RB Offset 0 30MHz to 1GHz

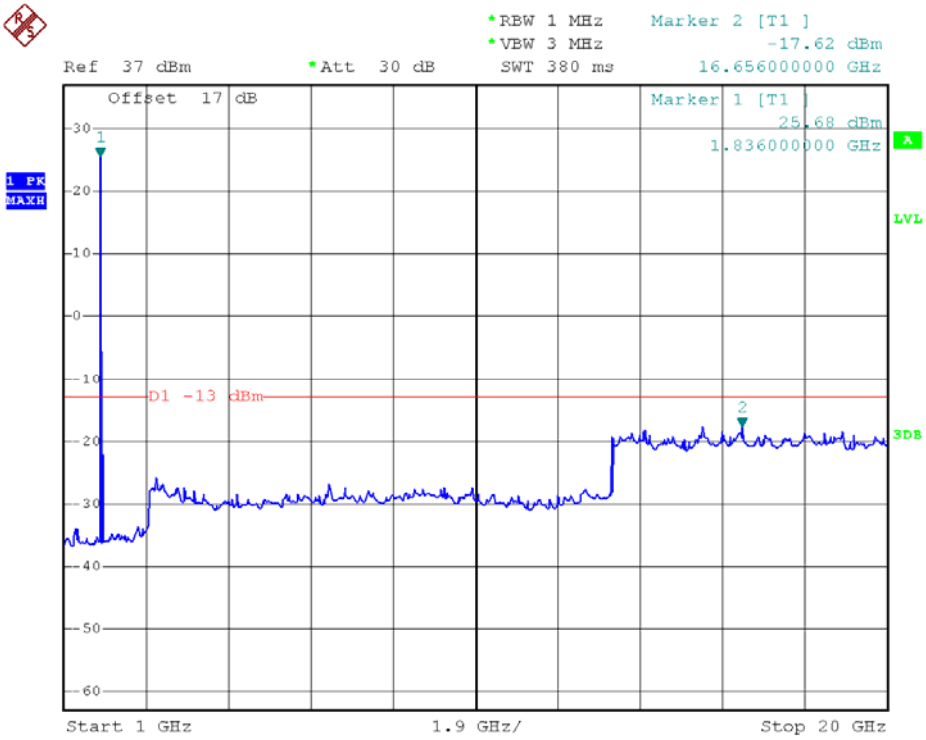


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Low
Bandwidth	3MHz	Modulation	QPSK

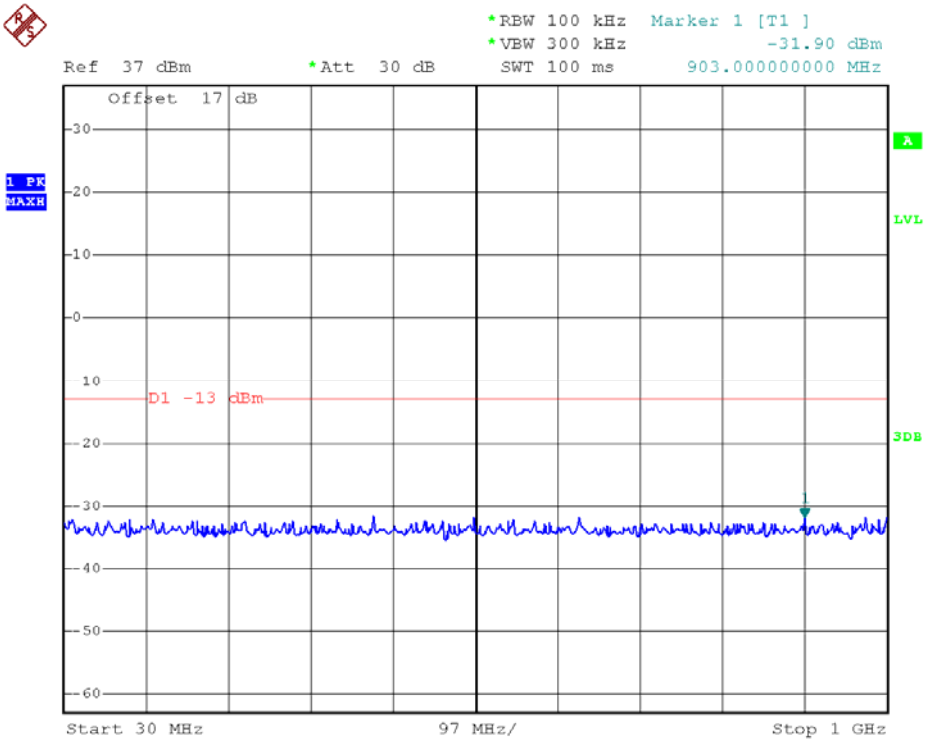


RB Size 1, RB Offset 0 30MHz to 1GHz

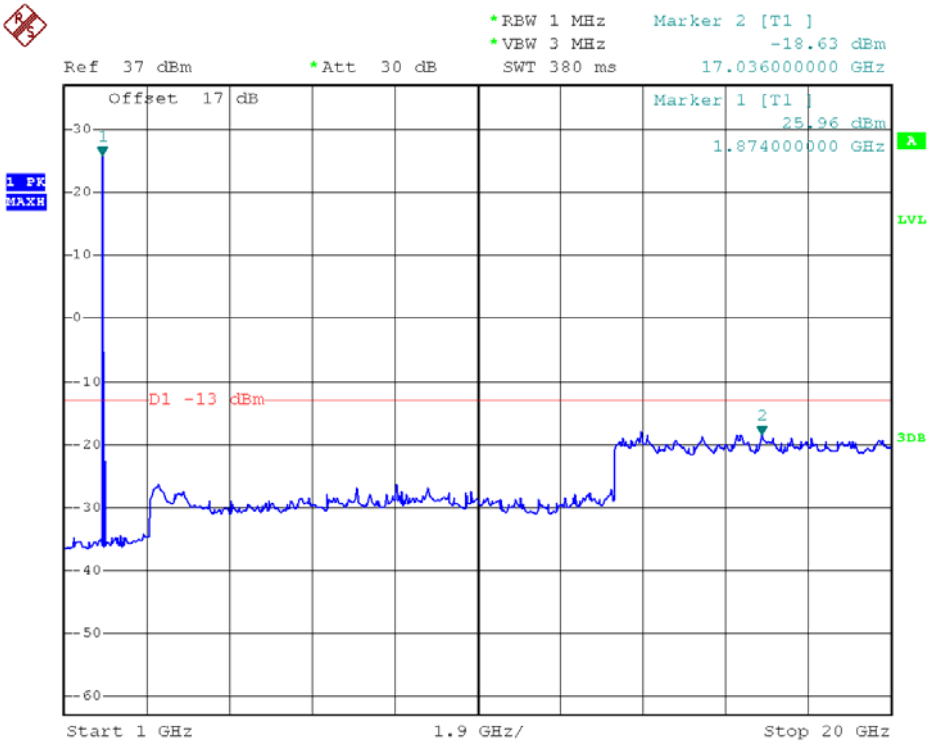


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Middle
Bandwidth	3MHz	Modulation	QPSK

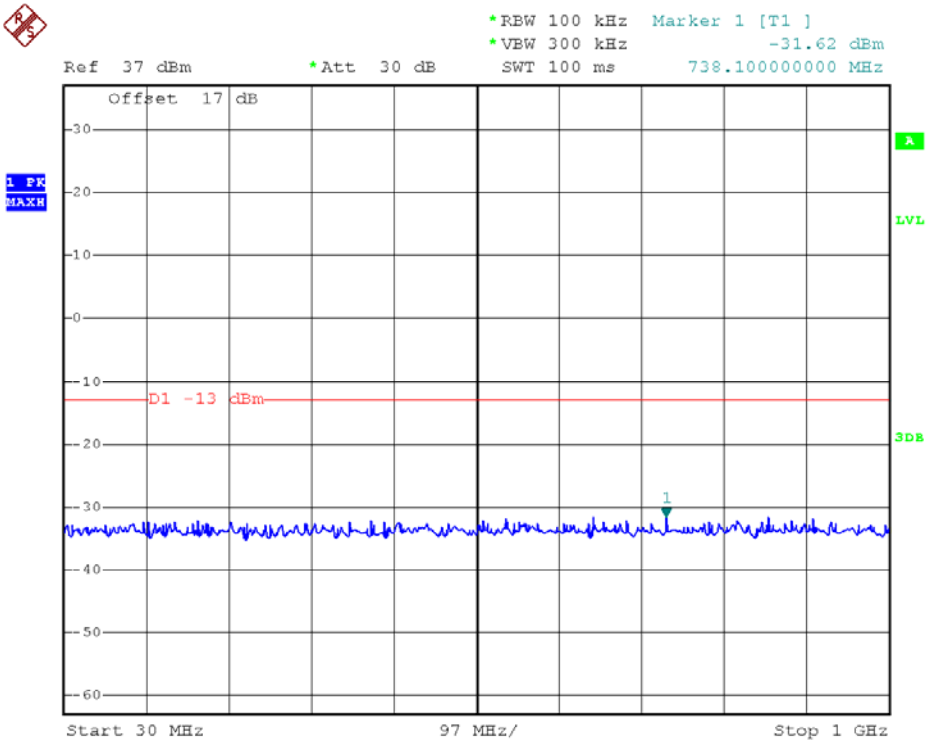


RB Size 1, RB Offset 0 30MHz to 1GHz

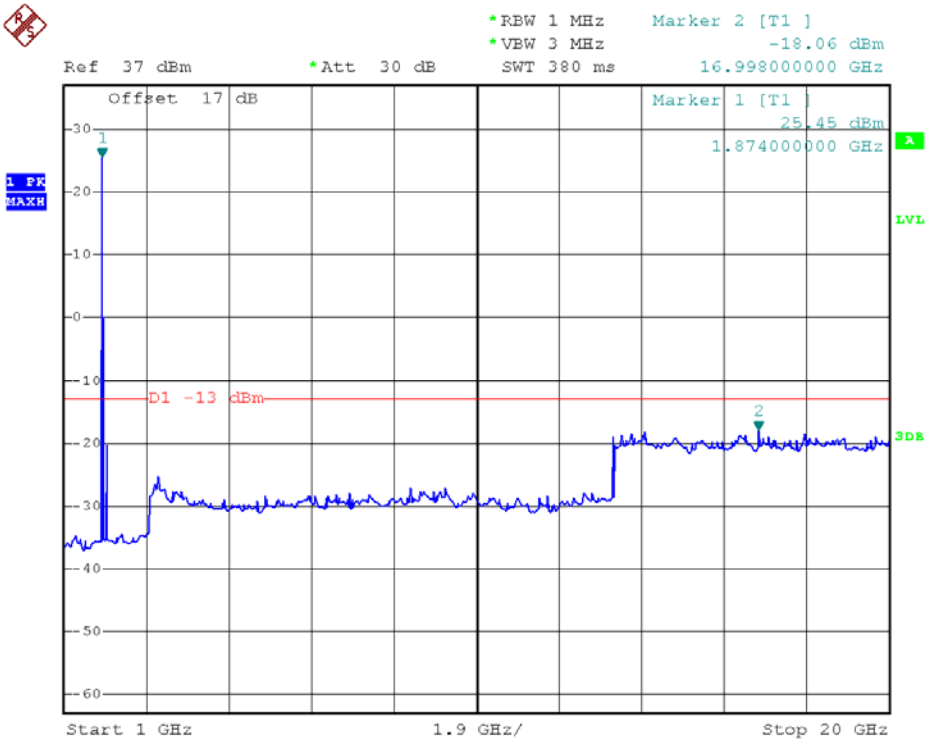


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	High
Bandwidth	3MHz	Modulation	QPSK

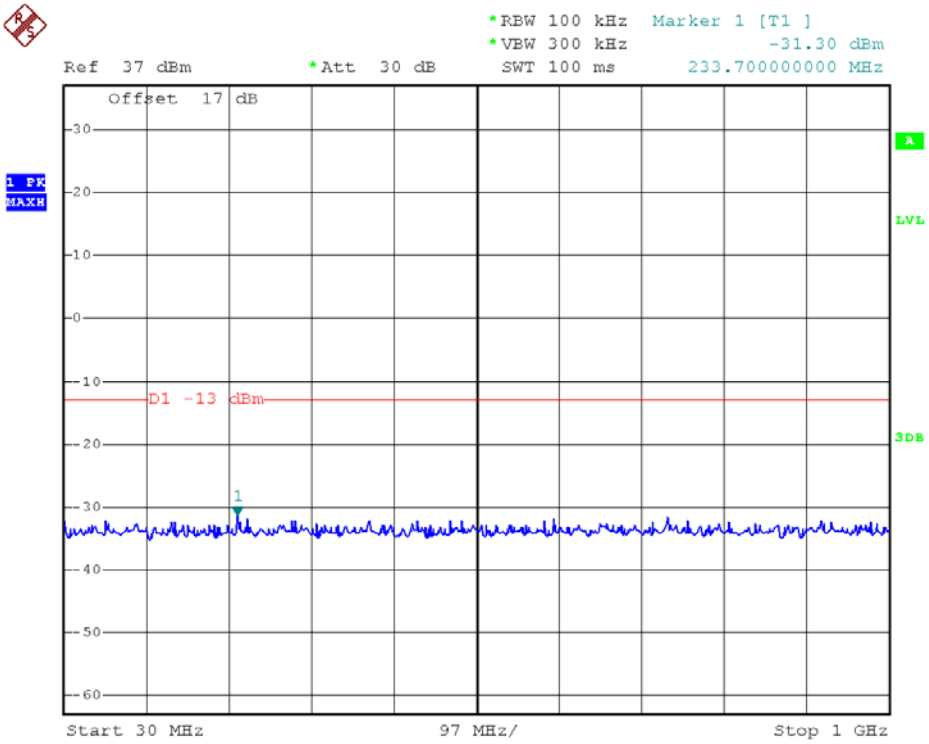


RB Size 1, RB Offset 0 30MHz to 1GHz

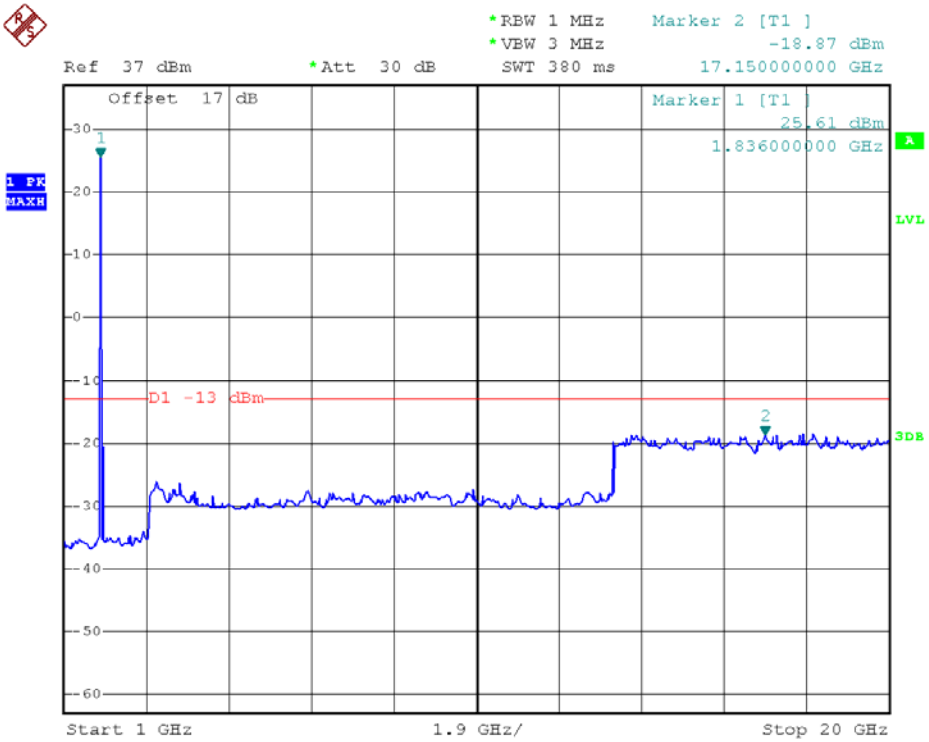


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Low
Bandwidth	5MHz	Modulation	QPSK

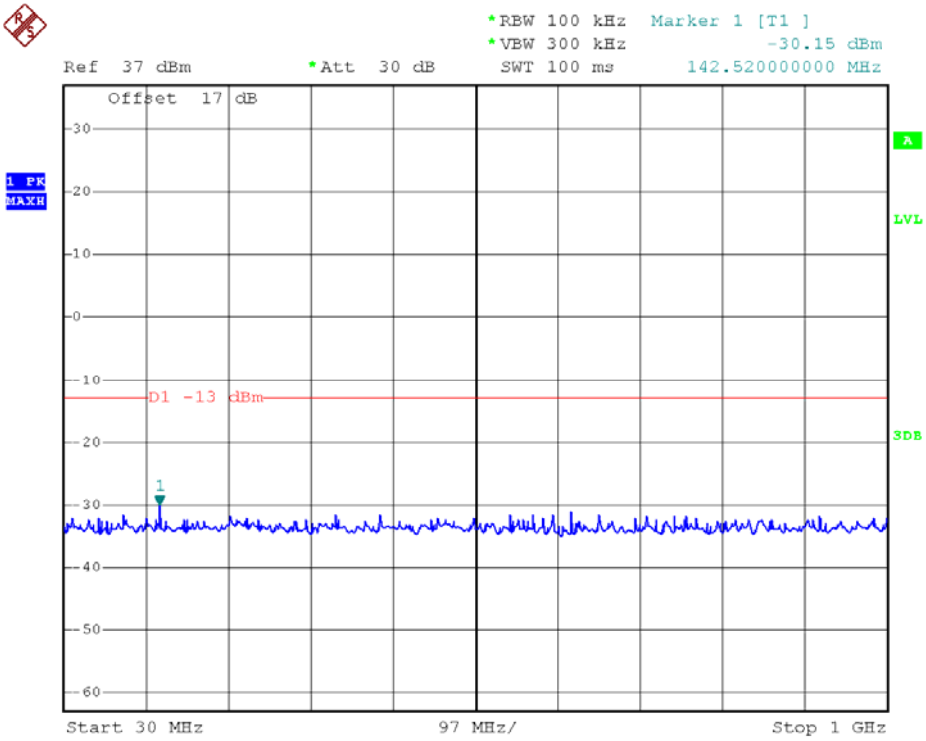


RB Size 1, RB Offset 0 30MHz to 1GHz

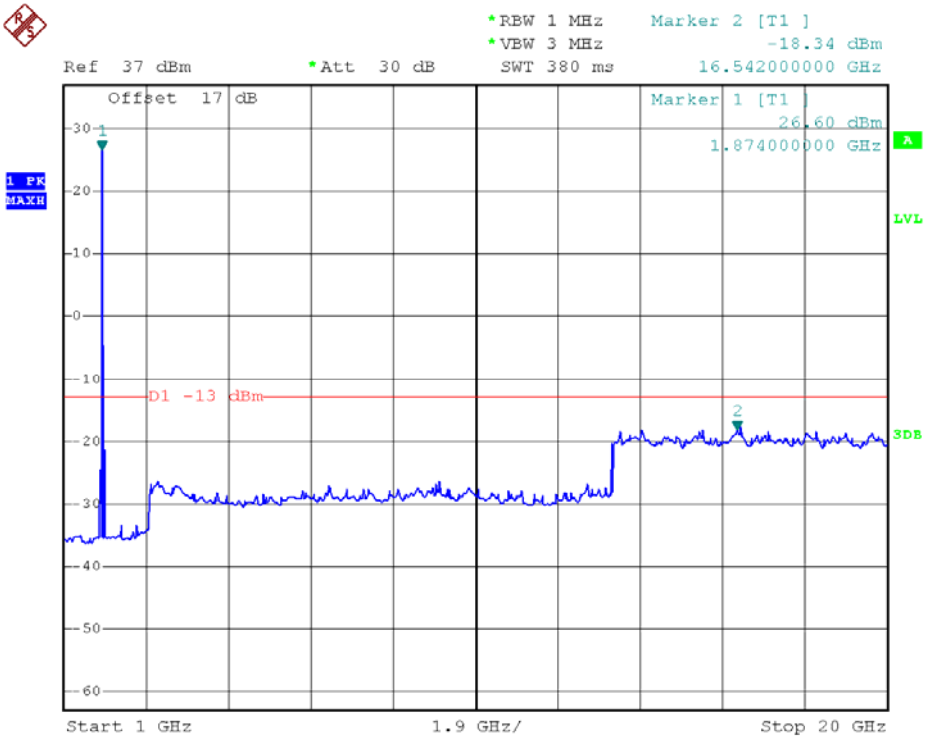


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Middle
Bandwidth	5MHz	Modulation	QPSK

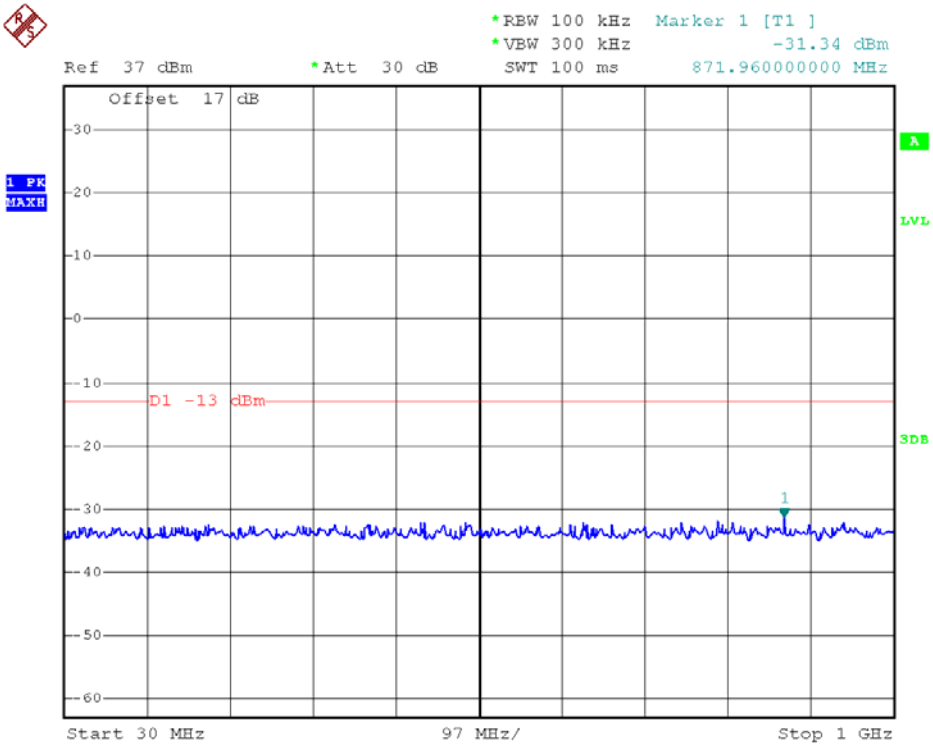


RB Size 1, RB Offset 0 30MHz to 1GHz

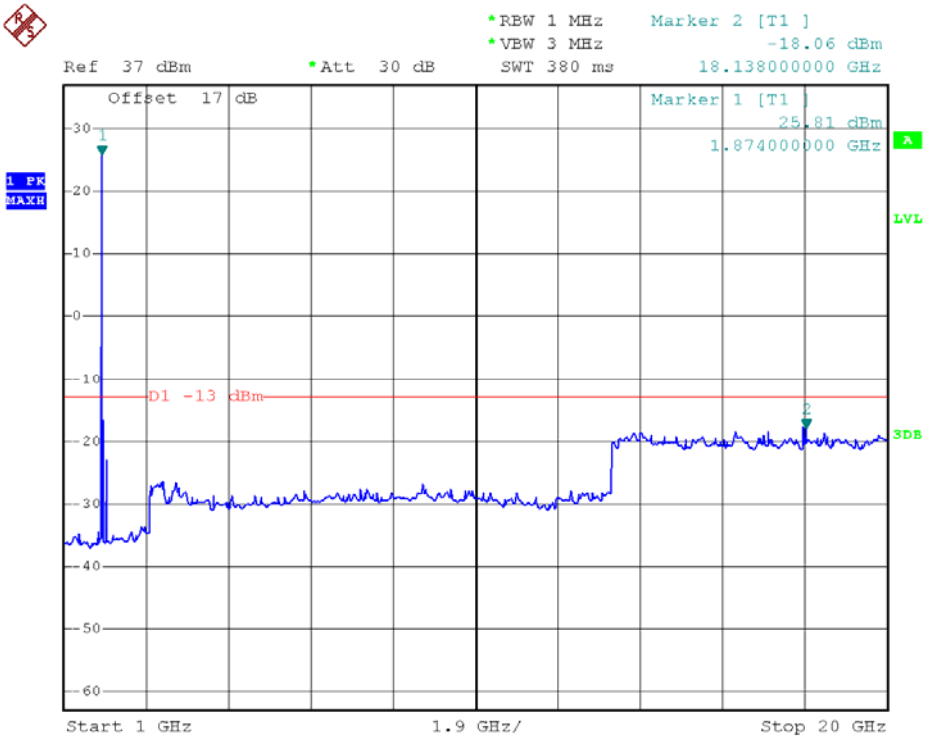


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	High
Bandwidth	5MHz	Modulation	QPSK

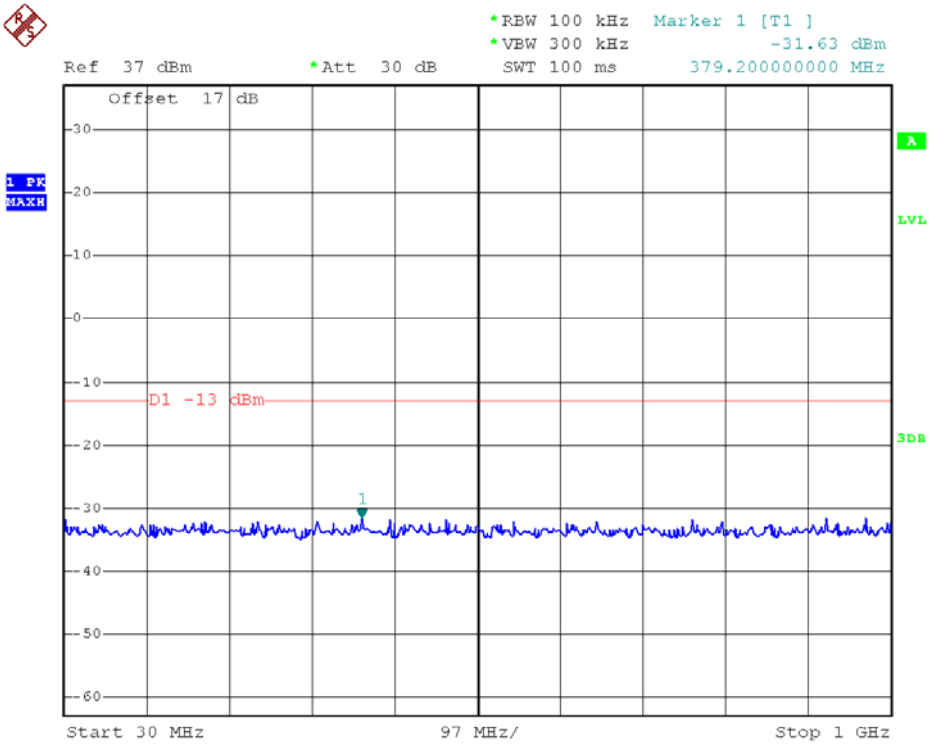


RB Size 1, RB Offset 0 30MHz to 1GHz

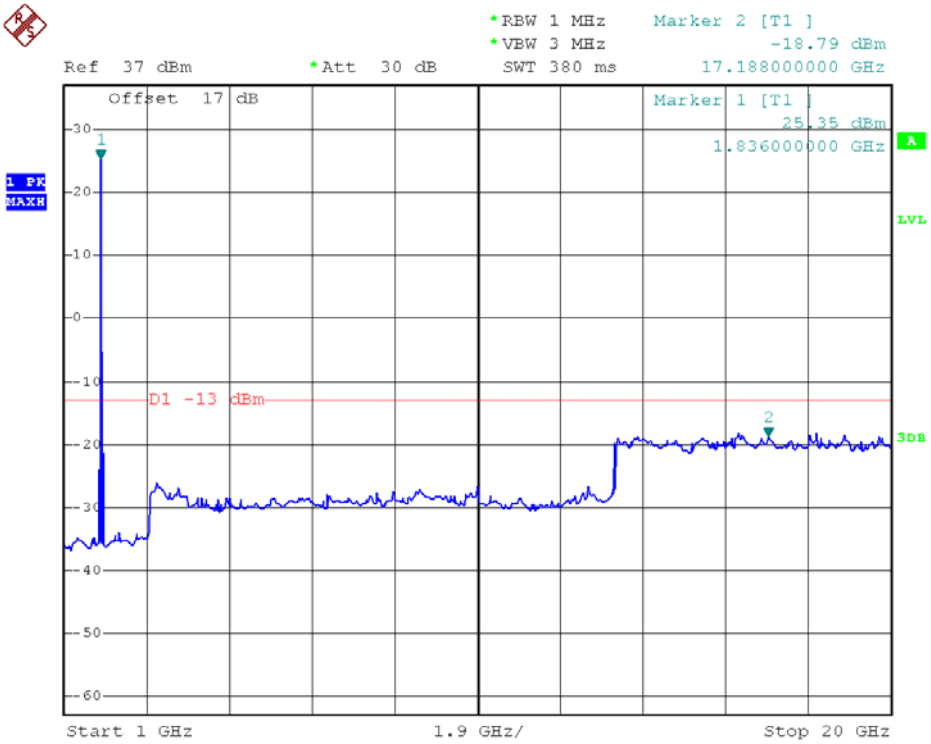


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Low
Bandwidth	10MHz	Modulation	QPSK

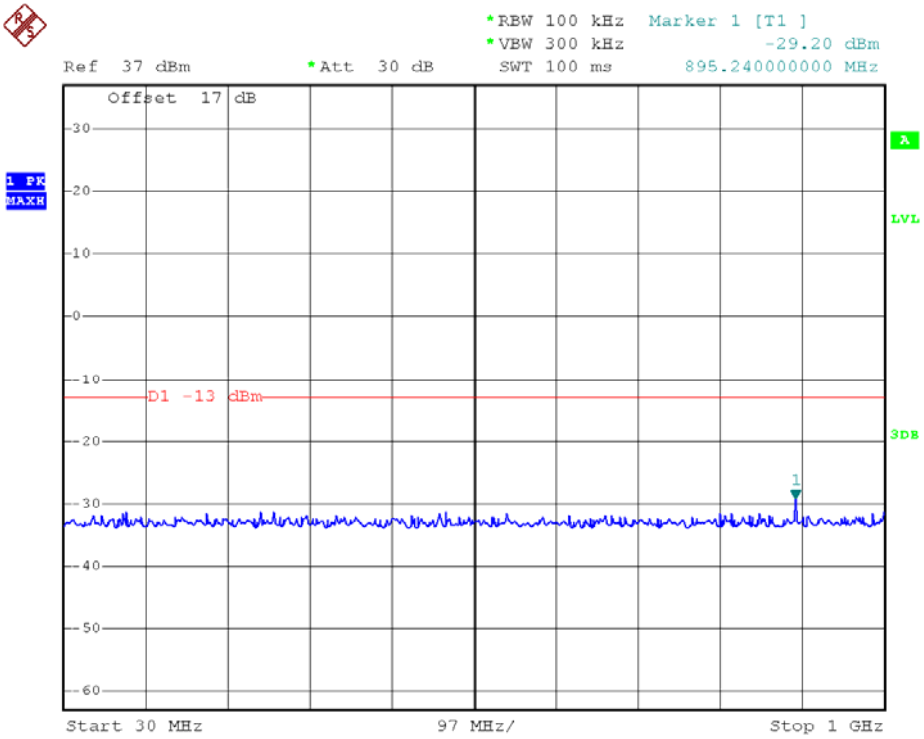


RB Size 1, RB Offset 0 30MHz to 1GHz

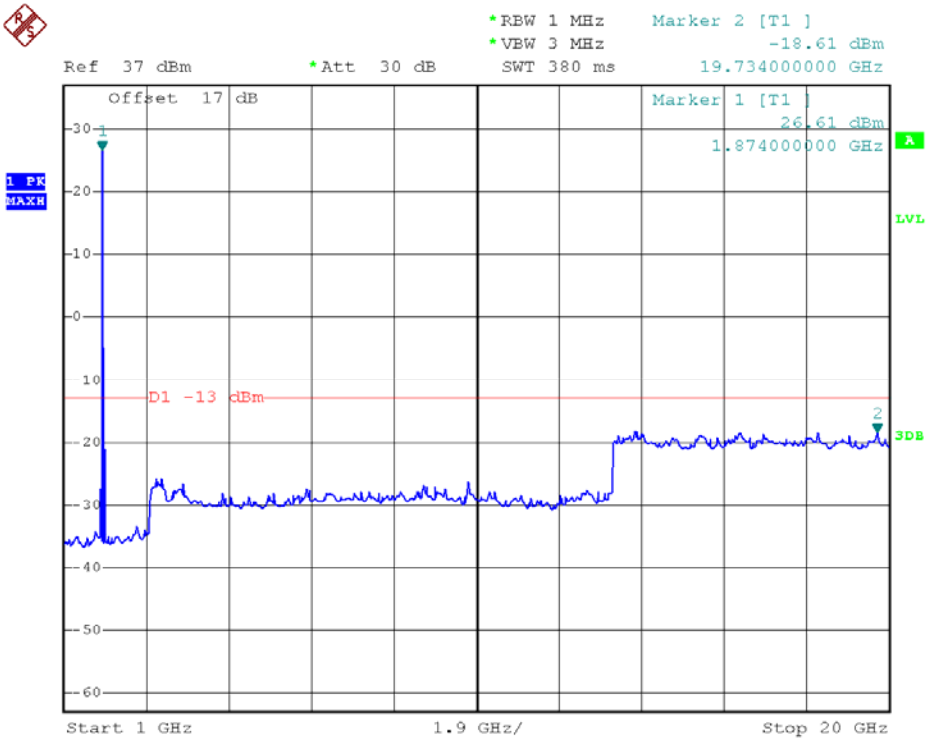


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Middle
Bandwidth	10MHz	Modulation	QPSK

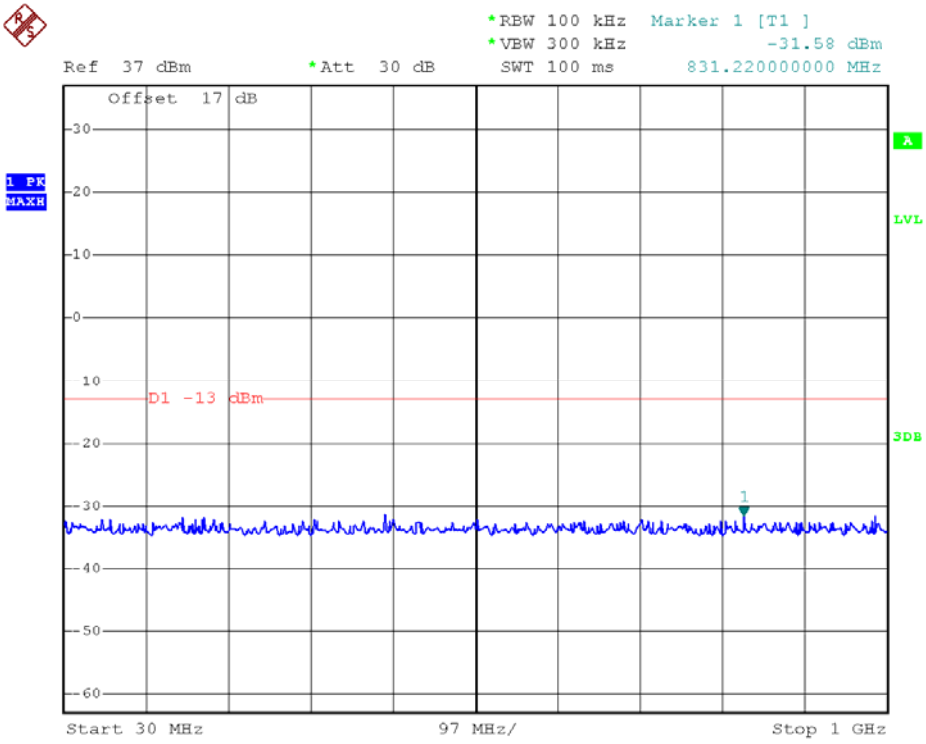


RB Size 1, RB Offset 0 30MHz to 1GHz

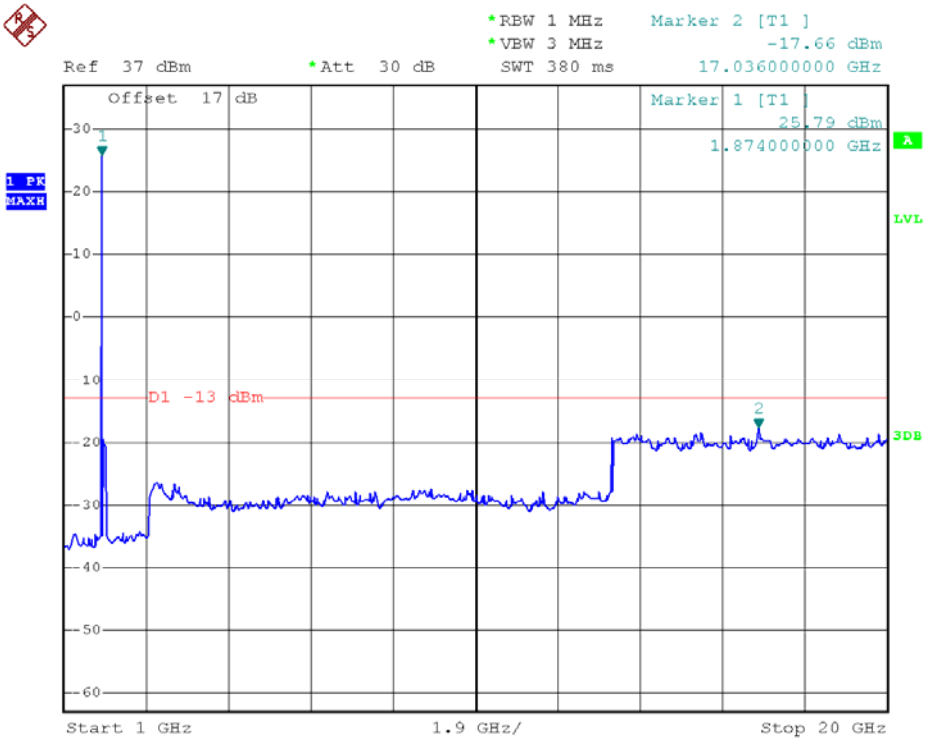


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	High
Bandwidth	10MHz	Modulation	QPSK

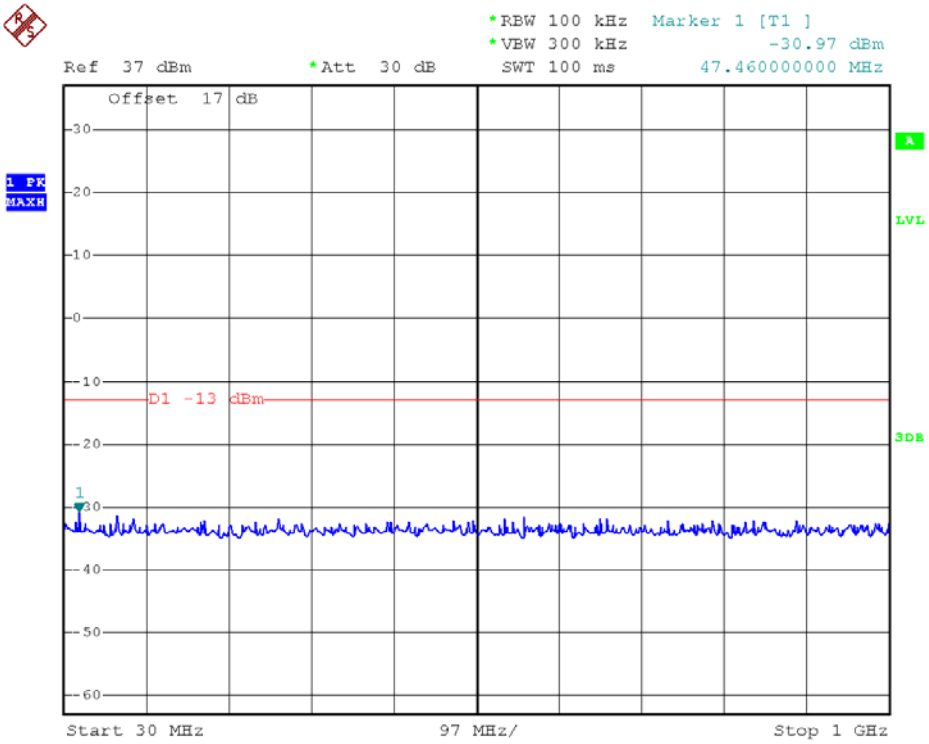


RB Size 1, RB Offset 0 30MHz to 1GHz

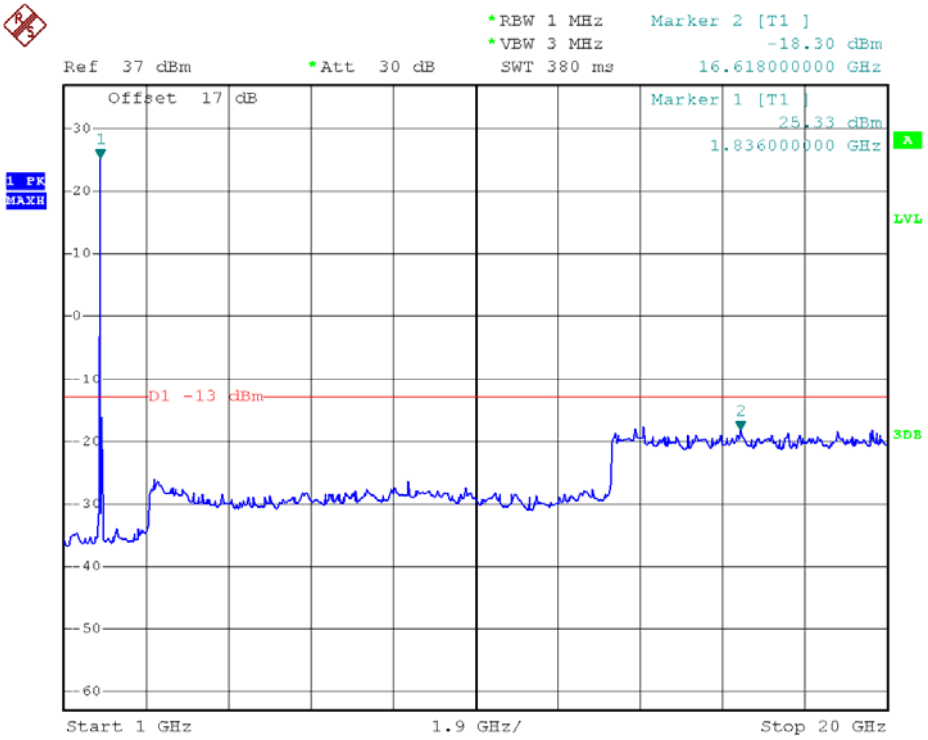


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Low
Bandwidth	15MHz	Modulation	QPSK

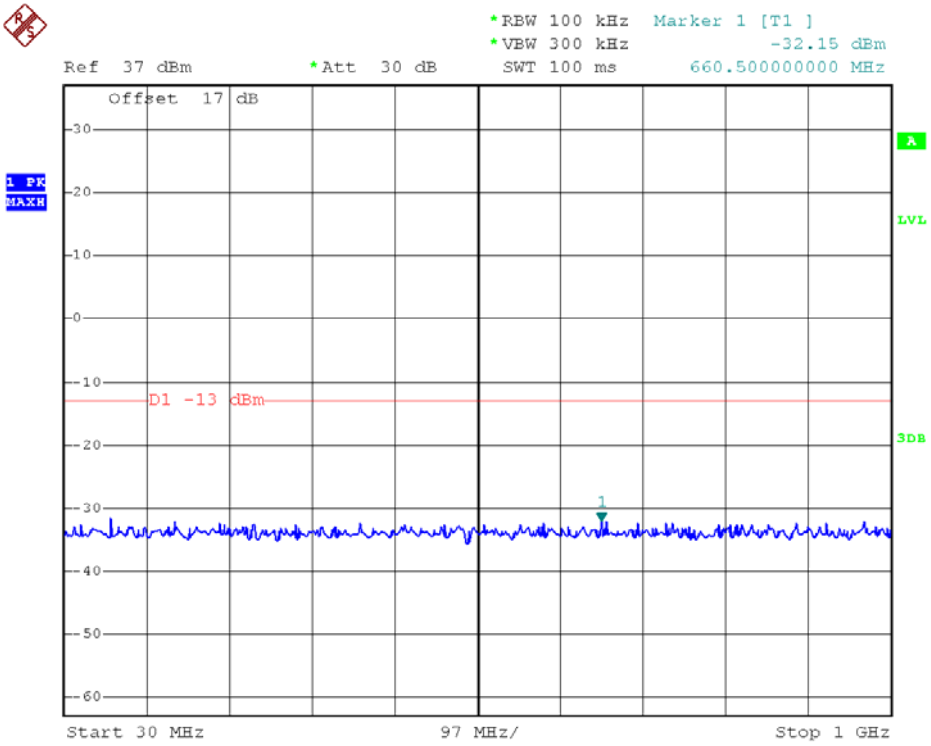


RB Size 1, RB Offset 0 30MHz to 1GHz

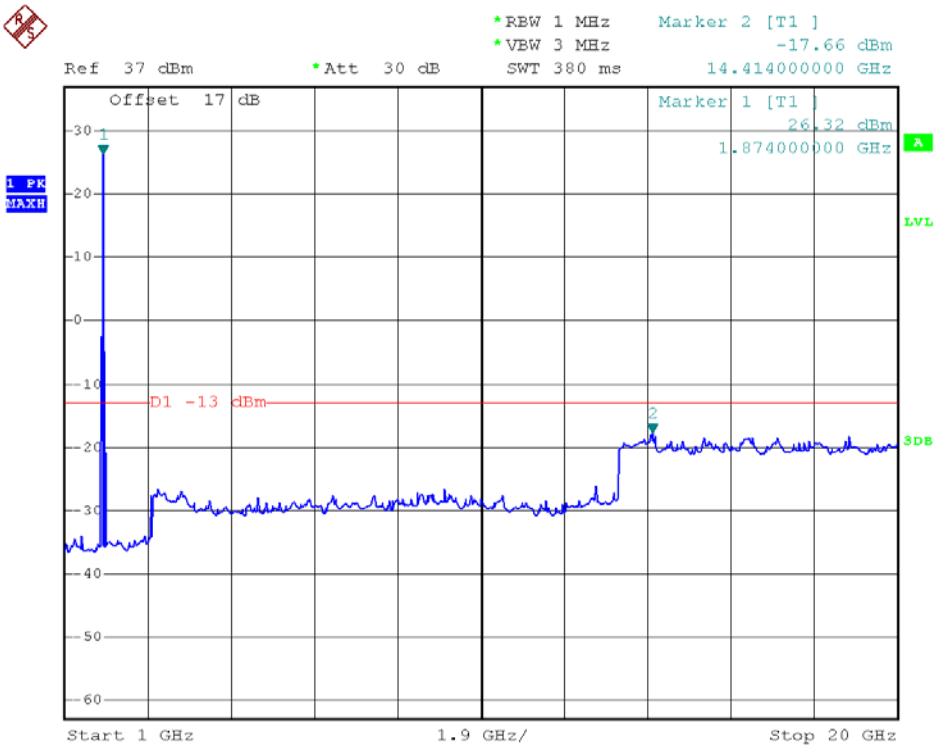


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Middle
Bandwidth	15MHz	Modulation	QPSK

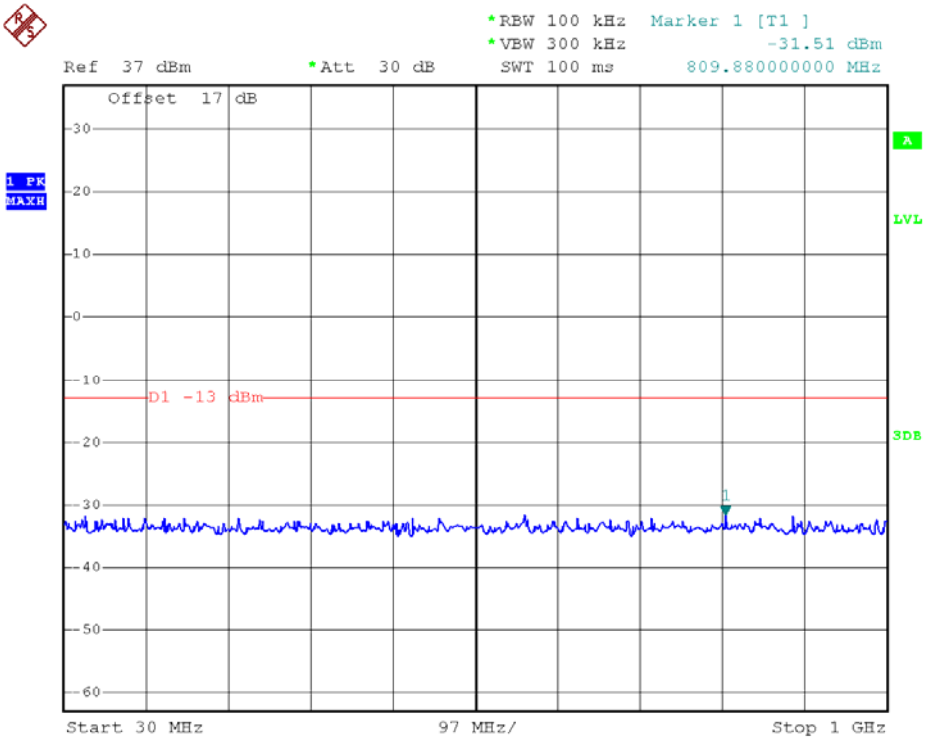


RB Size 1, RB Offset 0 30MHz to 1GHz

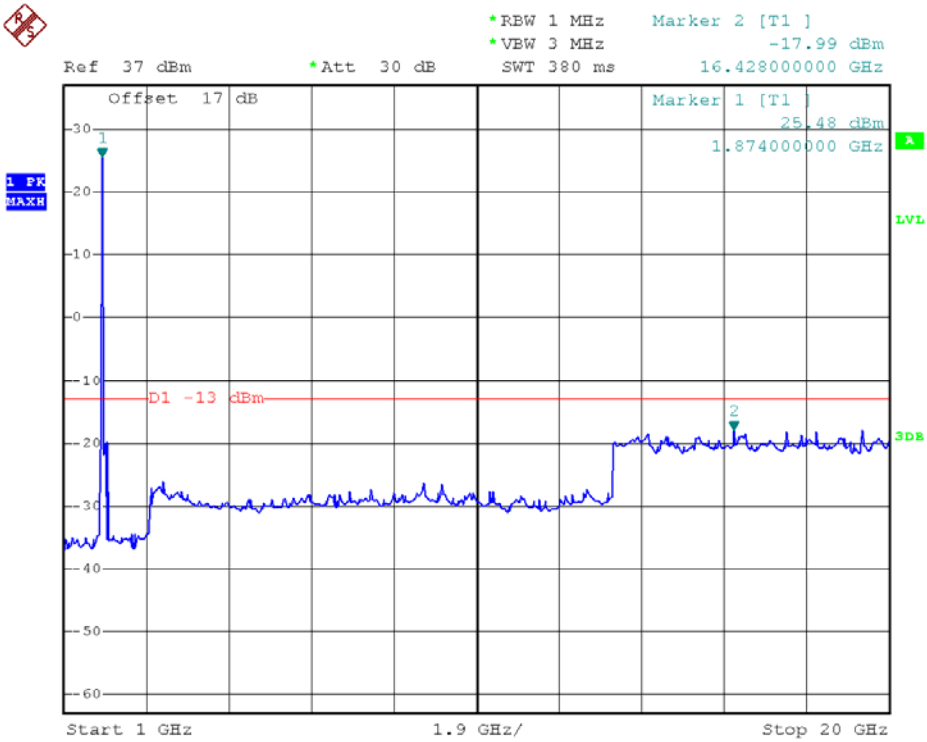


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	High
Bandwidth	15MHz	Modulation	QPSK

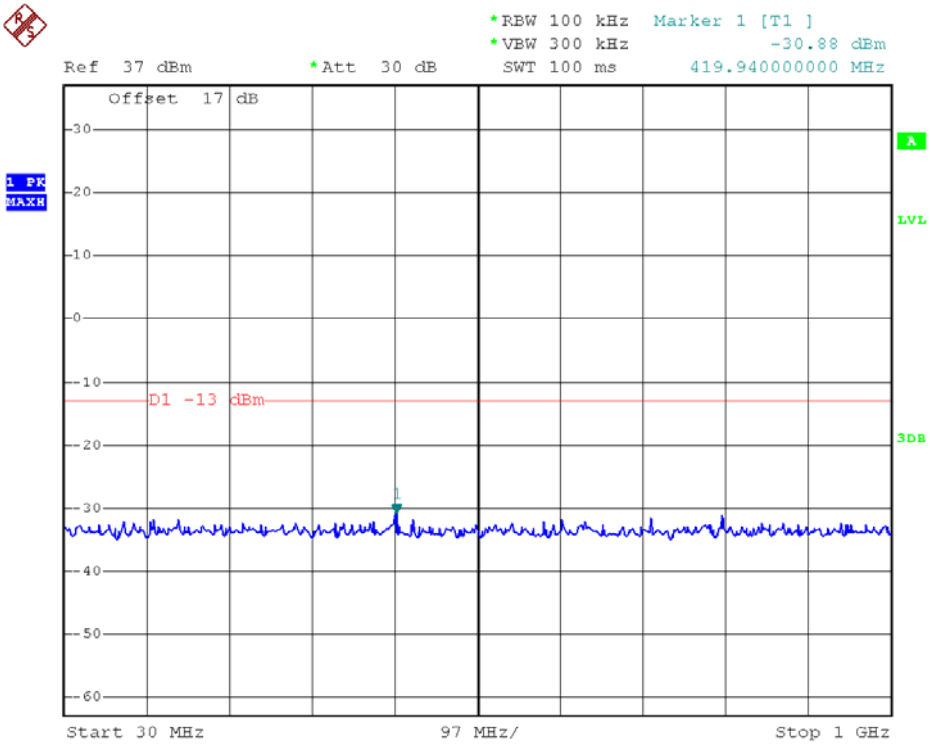


RB Size 1, RB Offset 0 30MHz to 1GHz

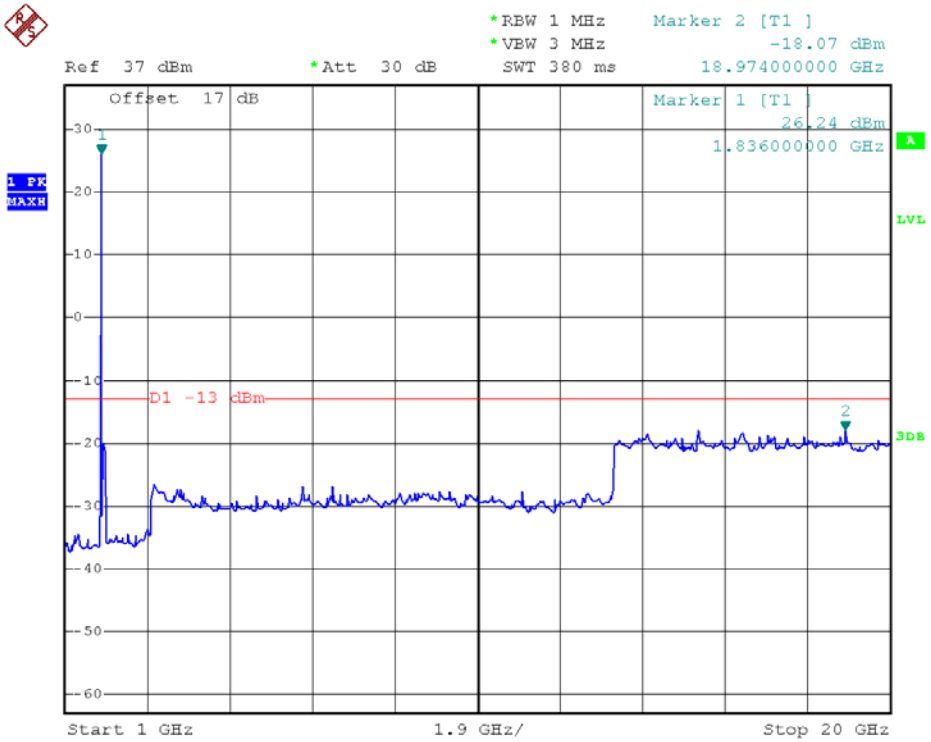


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Low
Bandwidth	20MHz	Modulation	QPSK

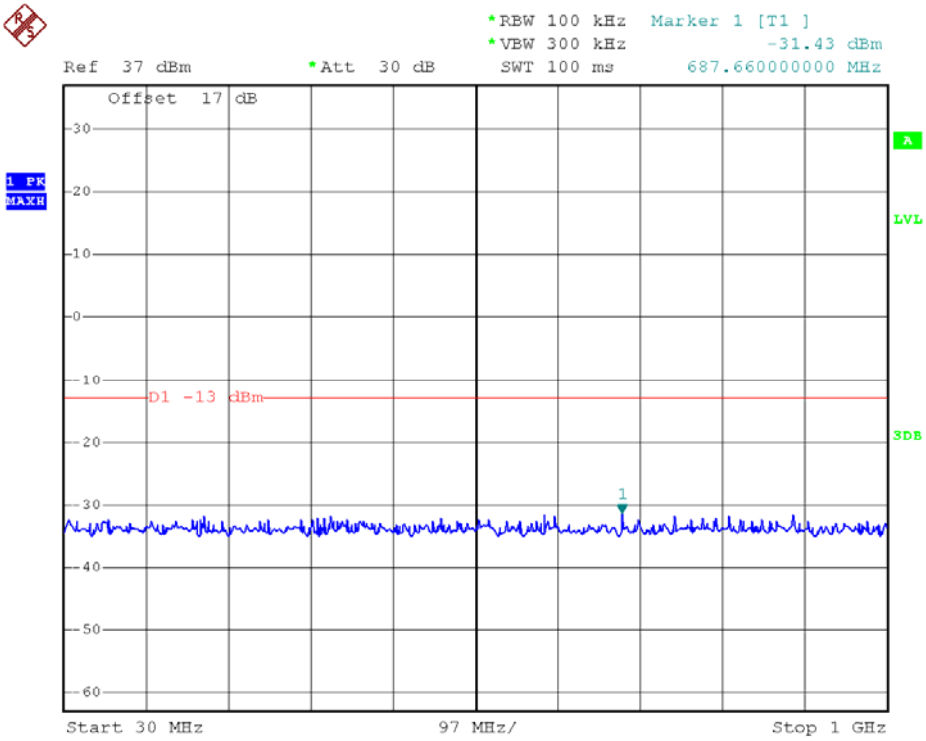


RB Size 1, RB Offset 0 30MHz to 1GHz

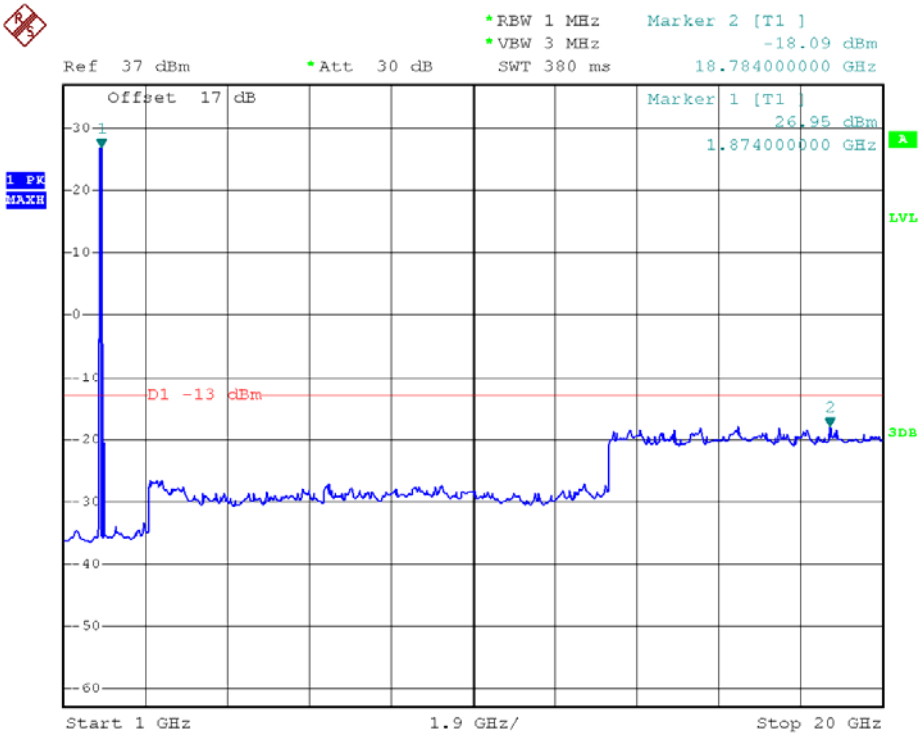


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Middle
Bandwidth	20MHz	Modulation	QPSK

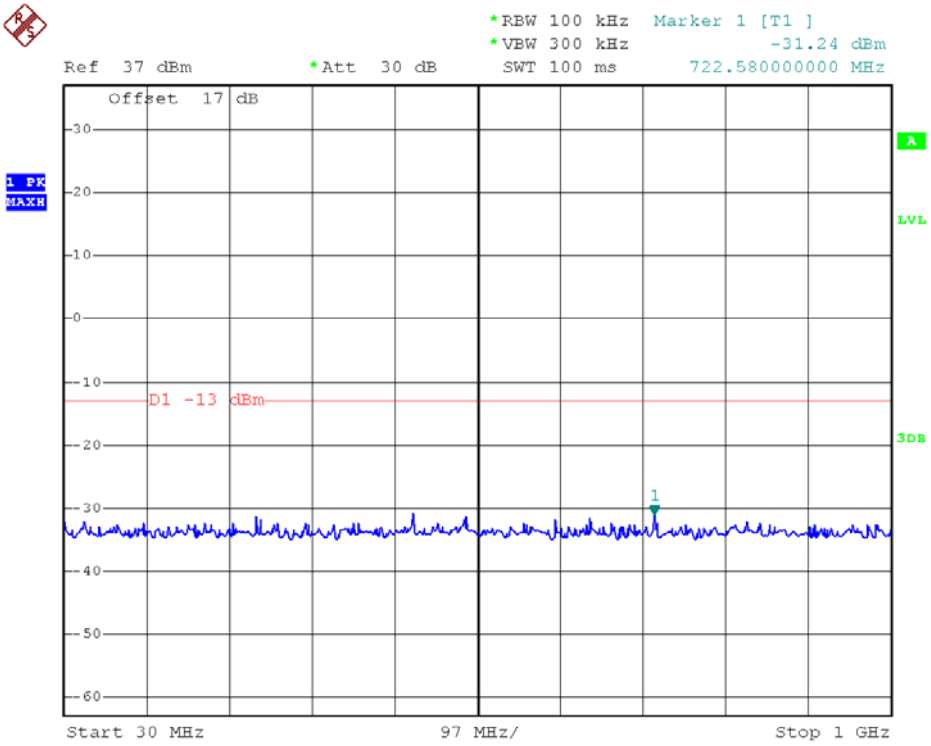


RB Size 1, RB Offset 0 30MHz to 1GHz

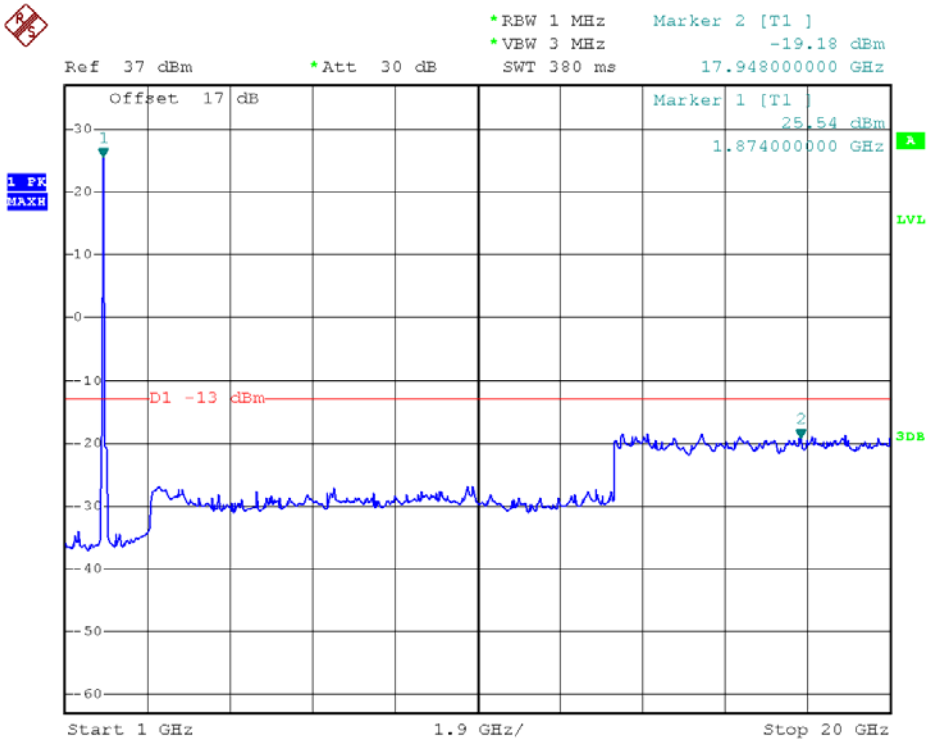


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	High
Bandwidth	20MHz	Modulation	QPSK

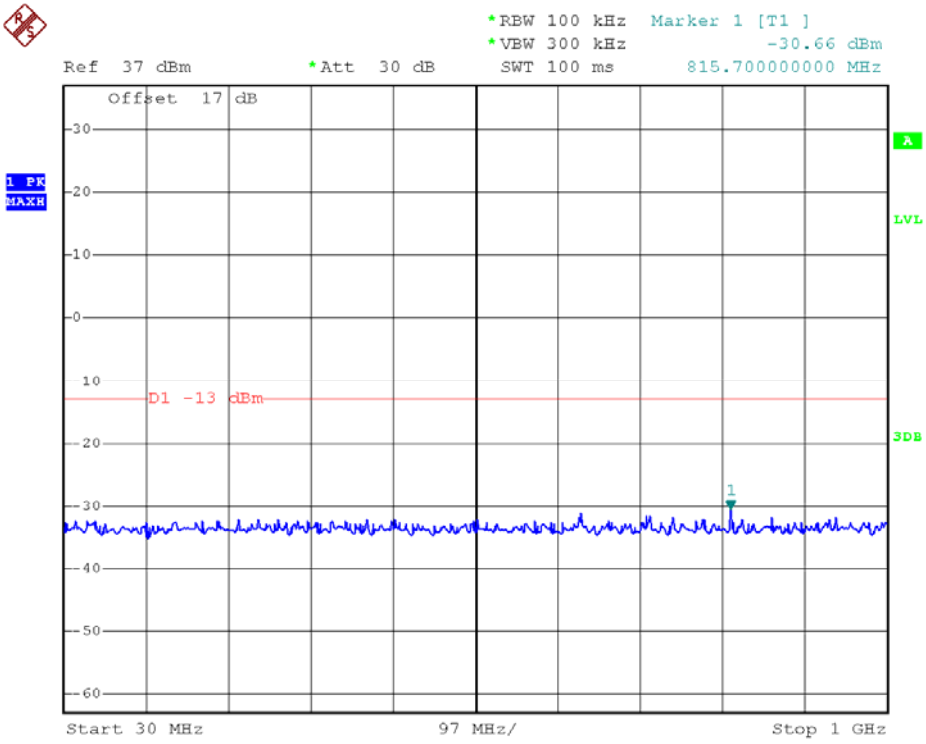


RB Size 1, RB Offset 0 30MHz to 1GHz

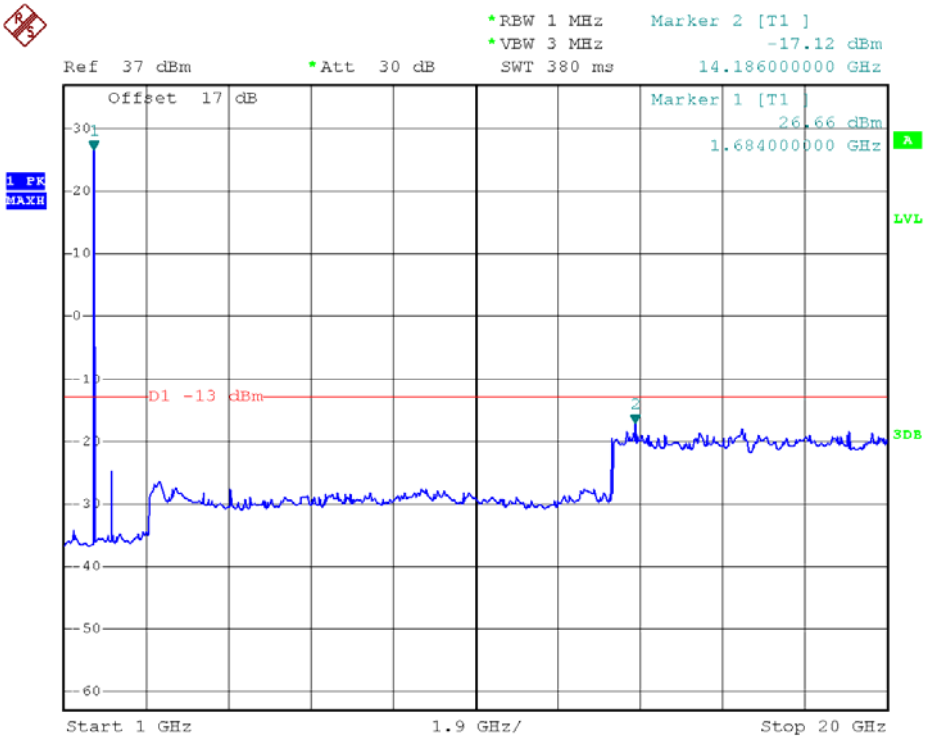


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Low
Bandwidth	1.4MHz	Modulation	QPSK

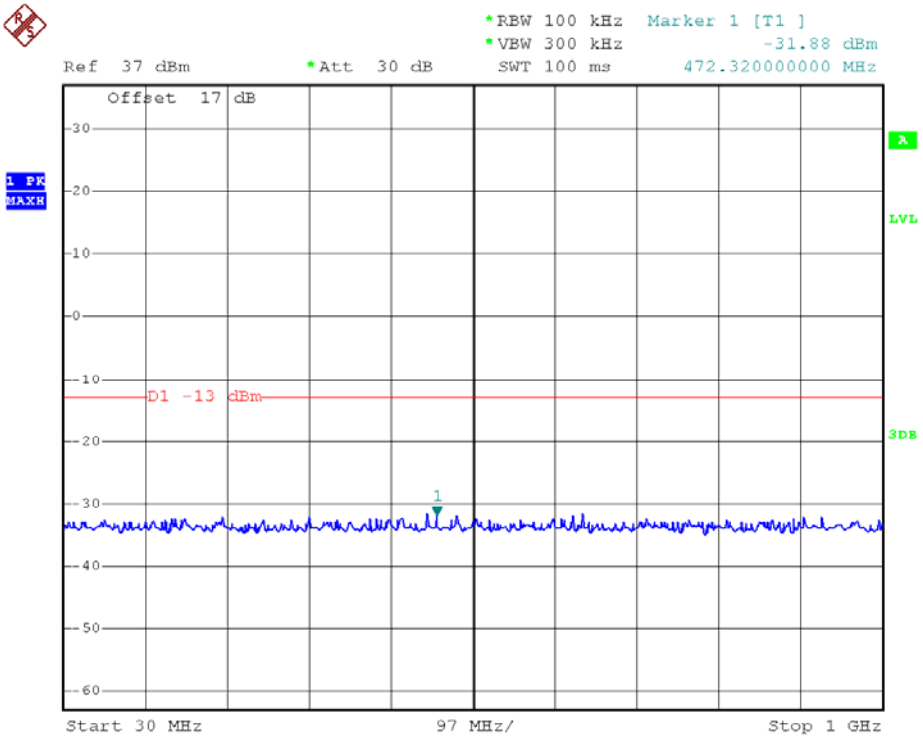


RB Size 1, RB Offset 0 30MHz to 1GHz

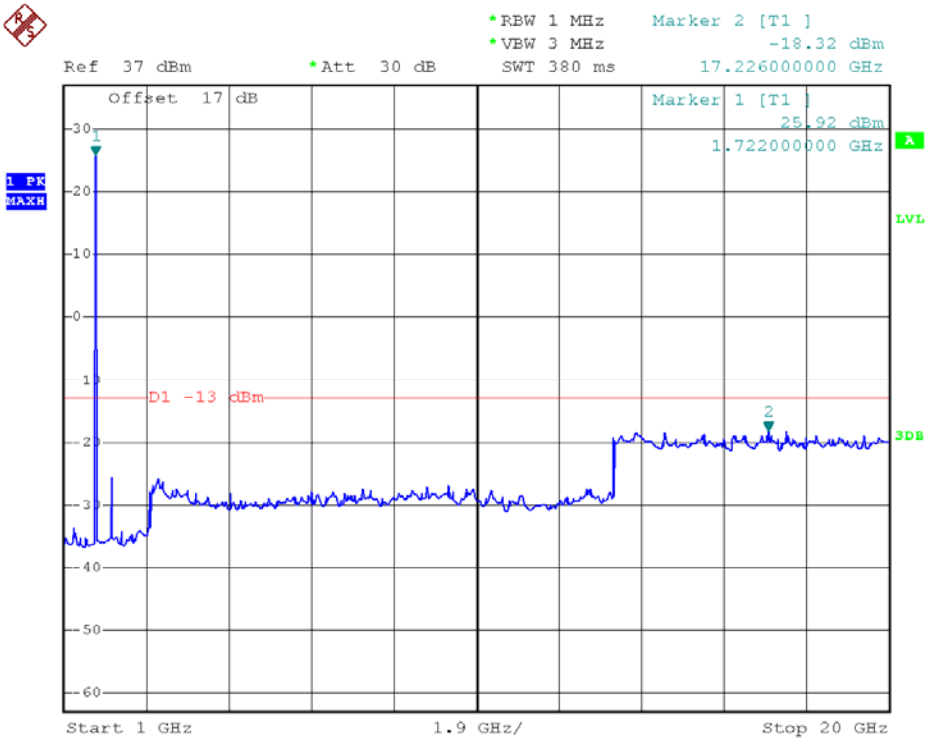


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Middle
Bandwidth	1.4MHz	Modulation	QPSK

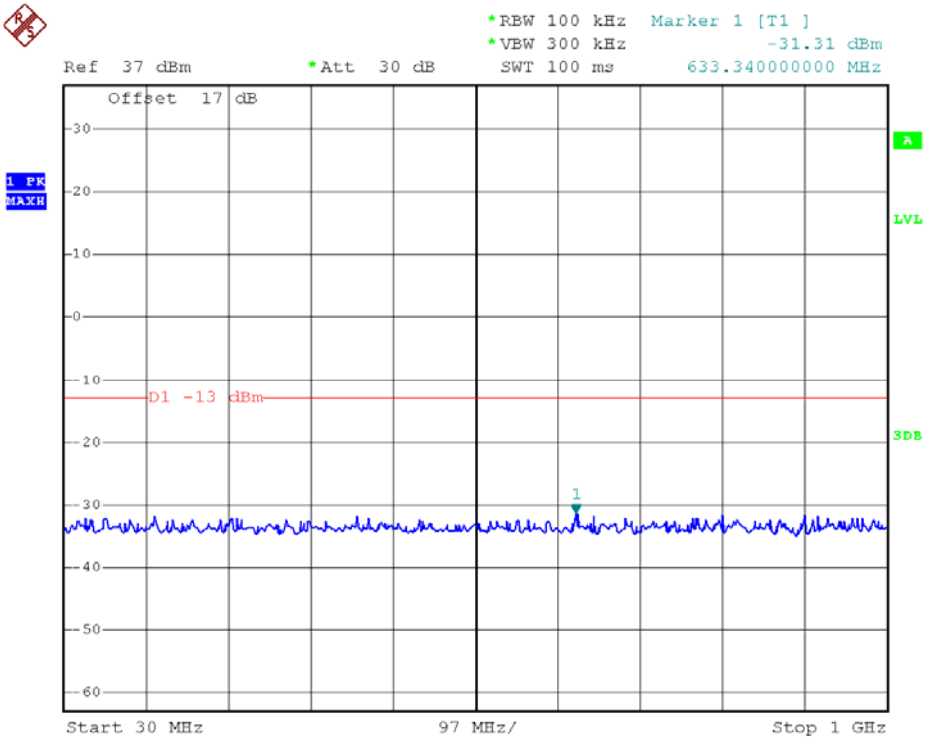


RB Size 1, RB Offset 0 30MHz to 1GHz

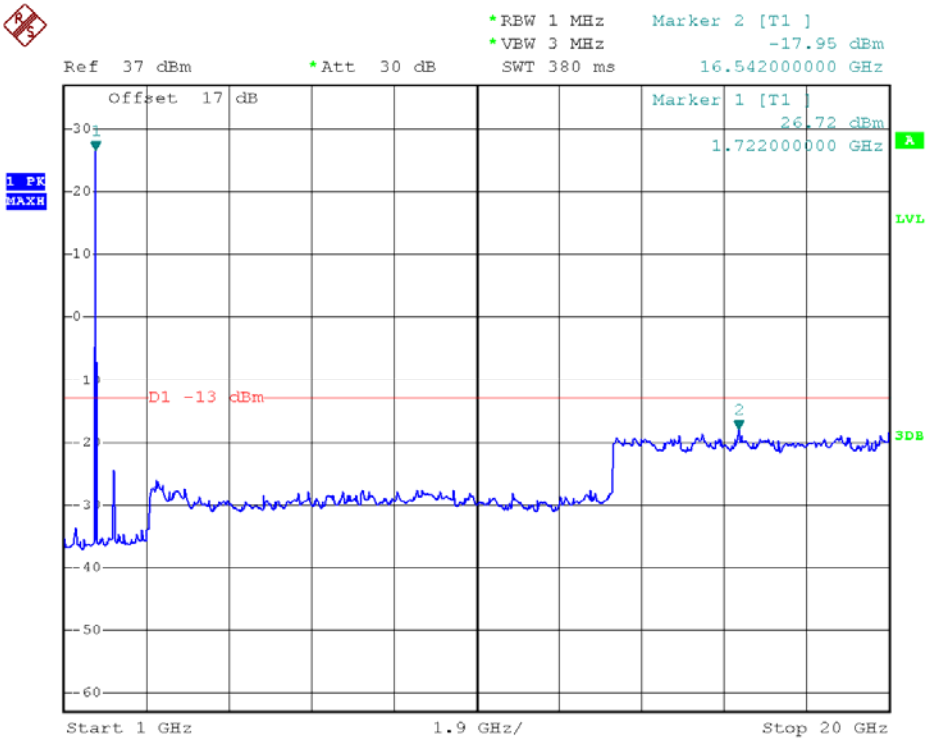


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	High
Bandwidth	1.4MHz	Modulation	QPSK

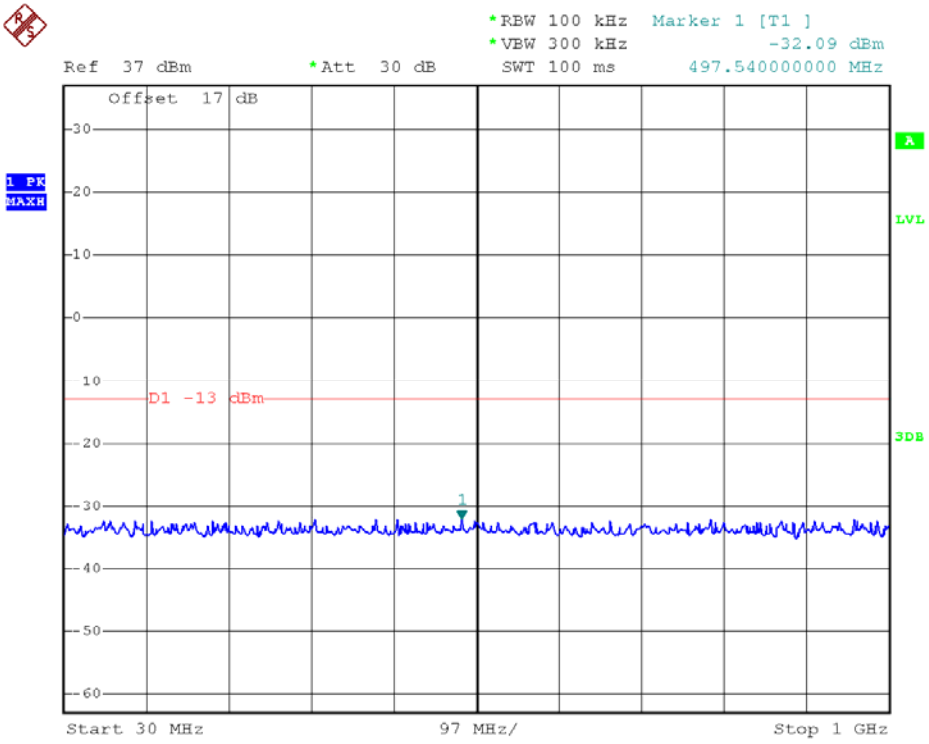


RB Size 1, RB Offset 0 30MHz to 1GHz

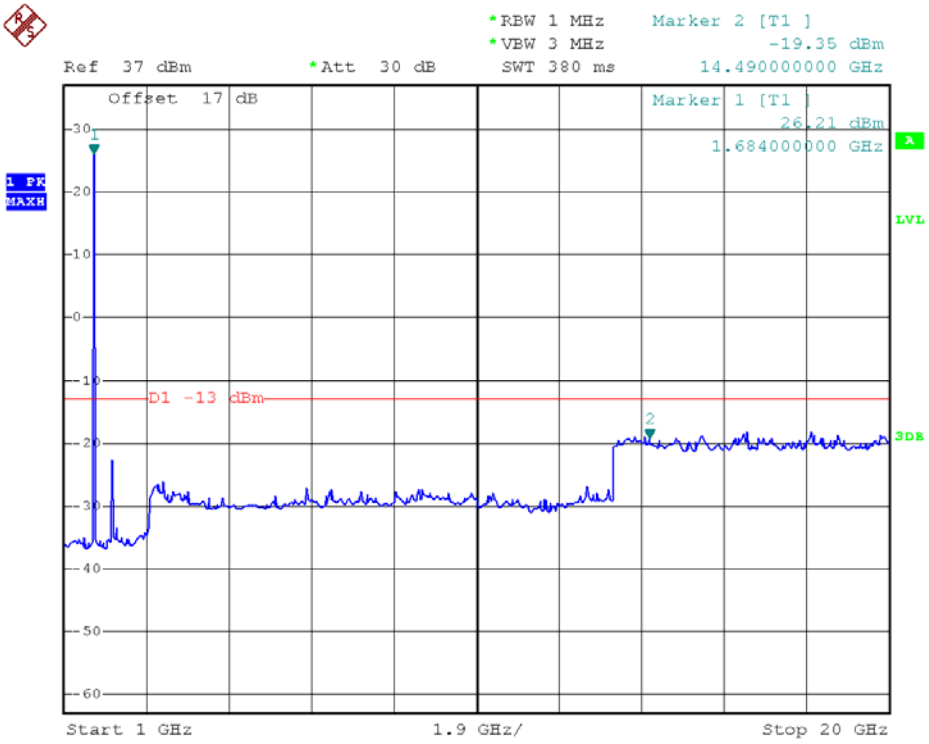


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Low
Bandwidth	3MHz	Modulation	QPSK

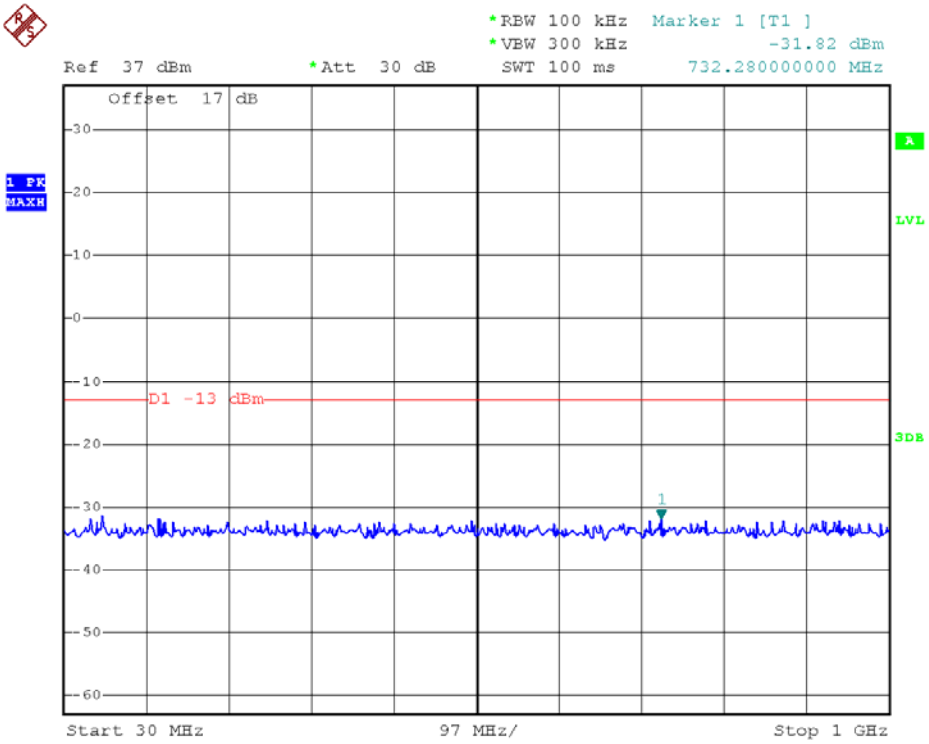


RB Size 1, RB Offset 0 30MHz to 1GHz

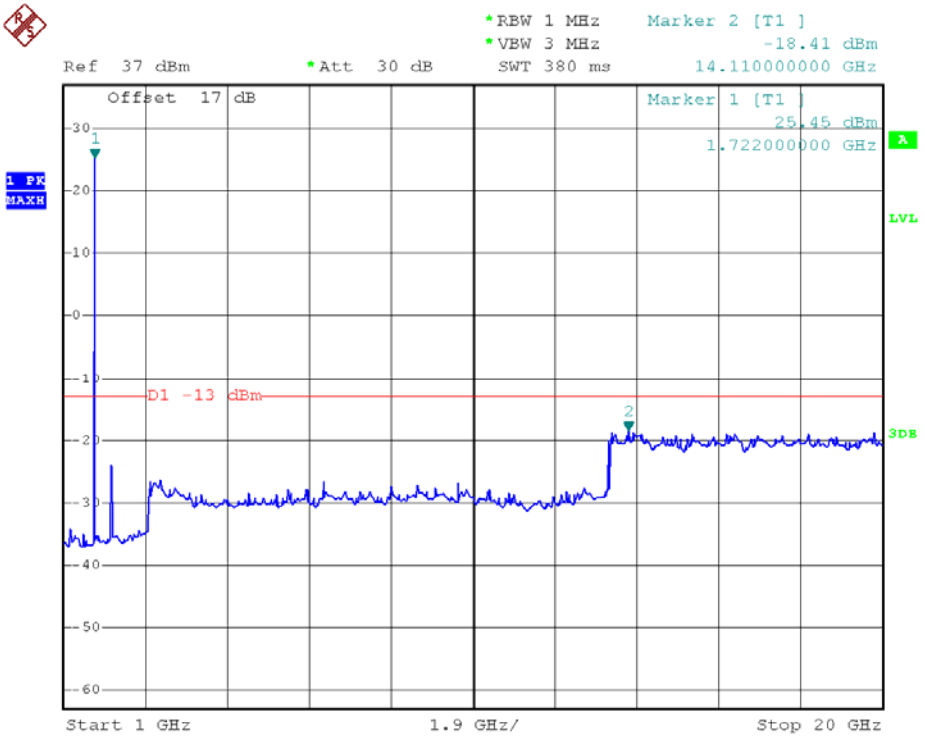


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Middle
Bandwidth	3MHz	Modulation	QPSK

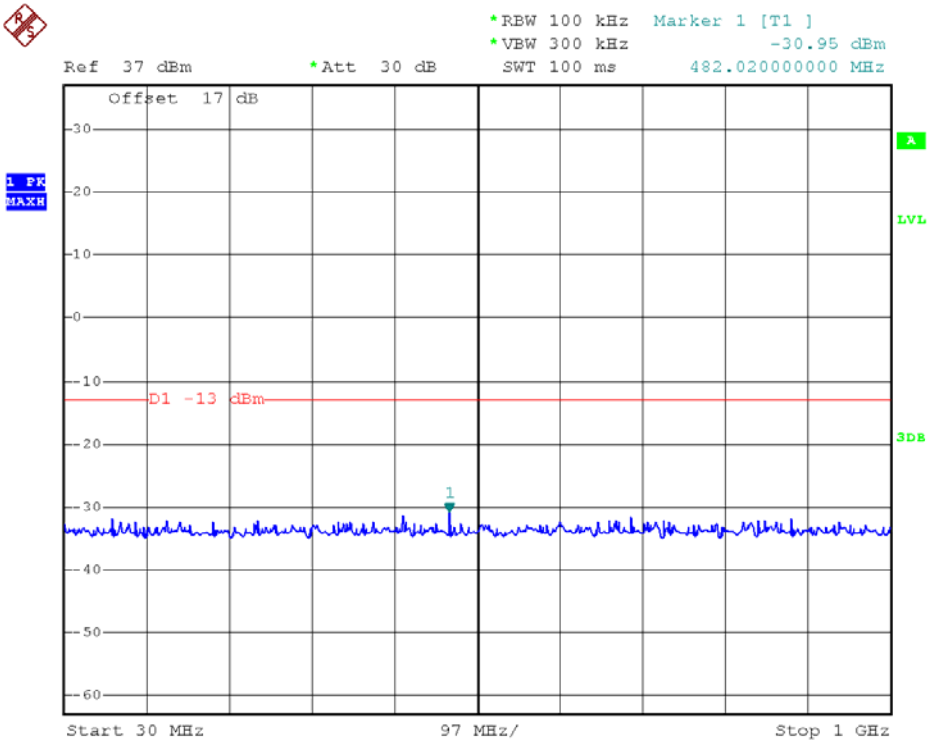


RB Size 1, RB Offset 0 30MHz to 1GHz

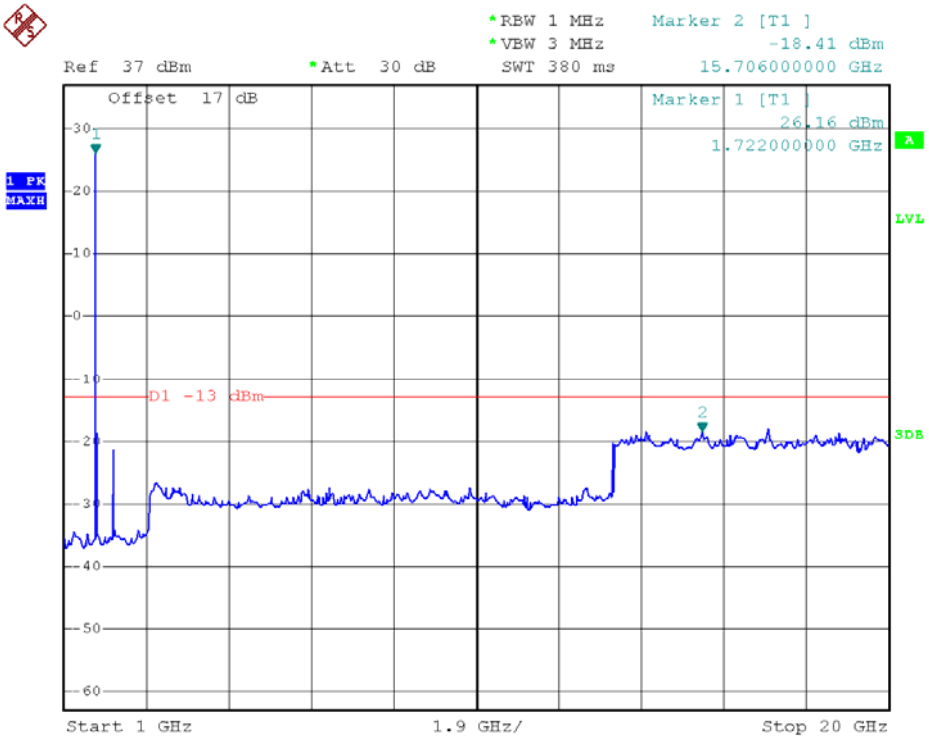


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	High
Bandwidth	3MHz	Modulation	QPSK

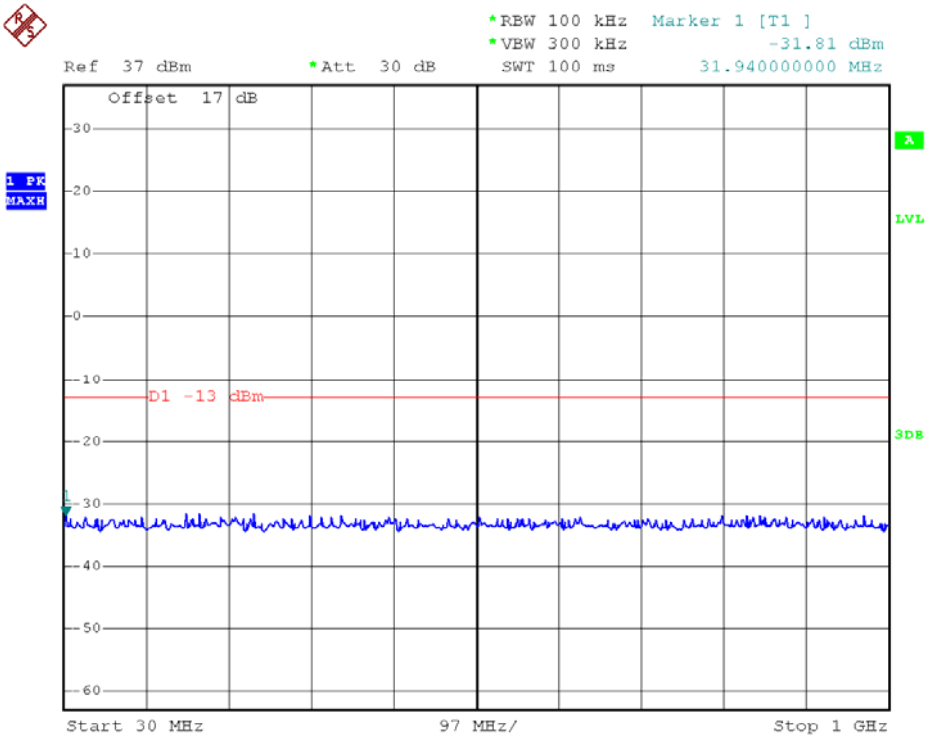


RB Size 1, RB Offset 0 30MHz to 1GHz

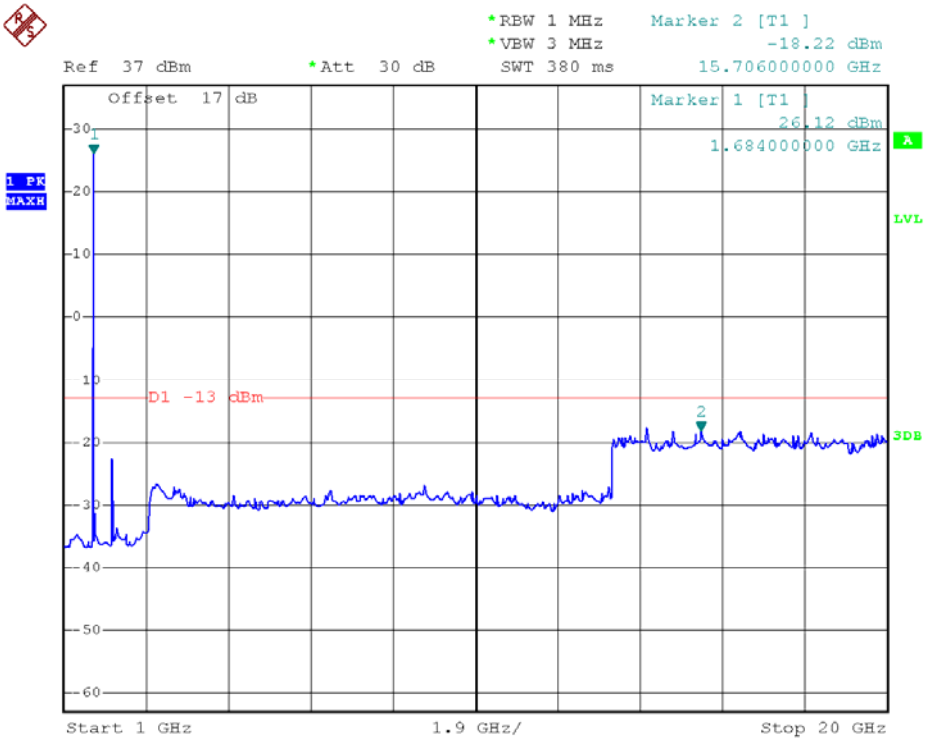


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Low
Bandwidth	5MHz	Modulation	QPSK

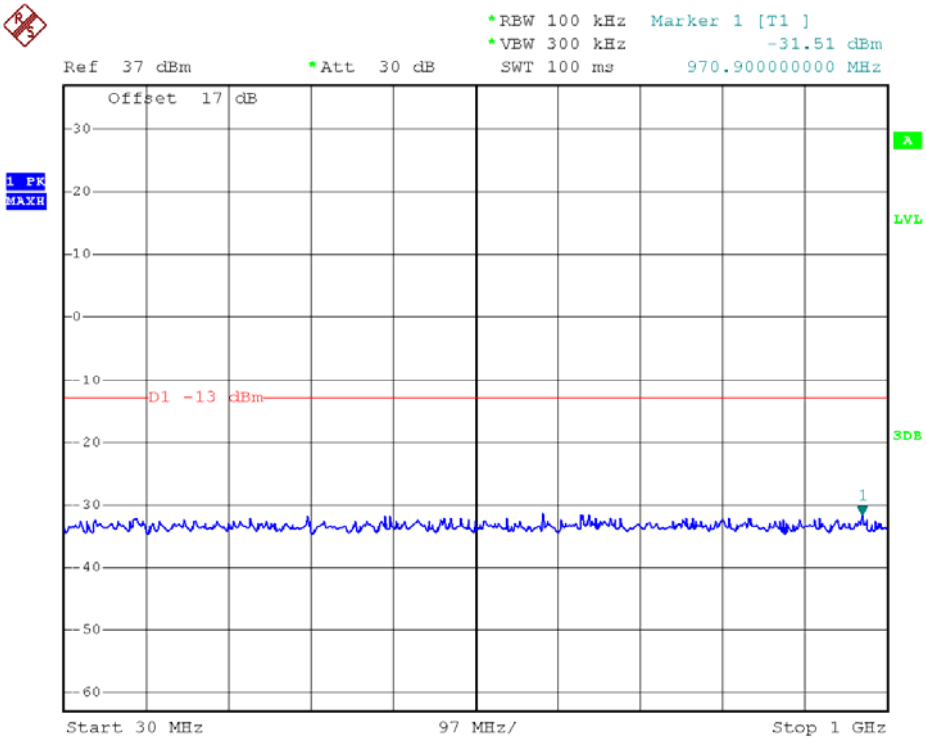


RB Size 1, RB Offset 0 30MHz to 1GHz

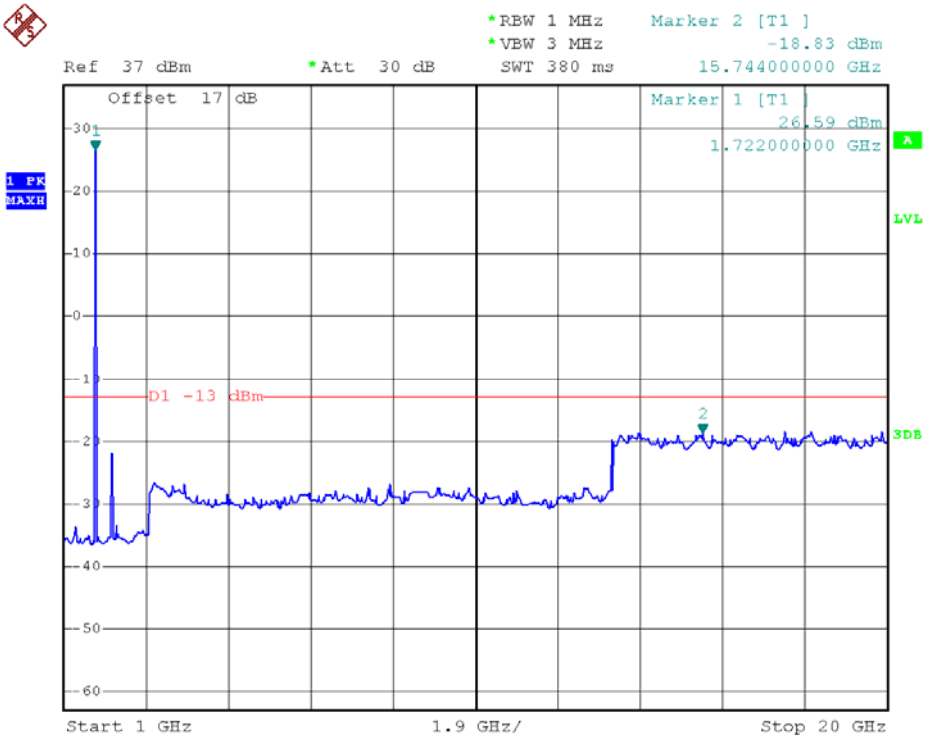


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Middle
Bandwidth	5MHz	Modulation	QPSK

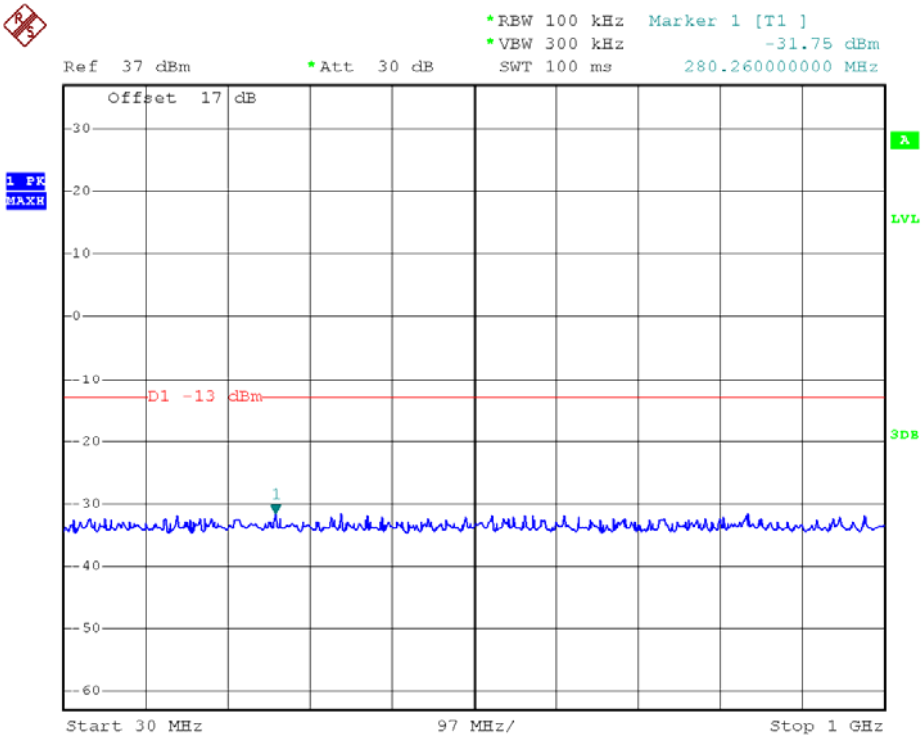


RB Size 1, RB Offset 0 30MHz to 1GHz

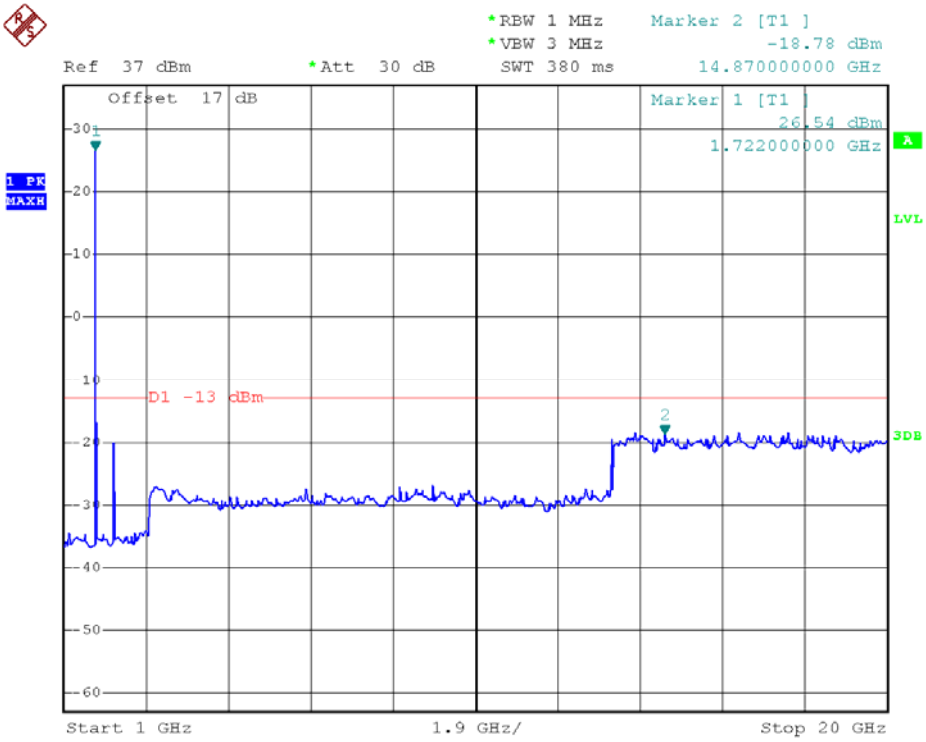


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	High
Bandwidth	5MHz	Modulation	QPSK

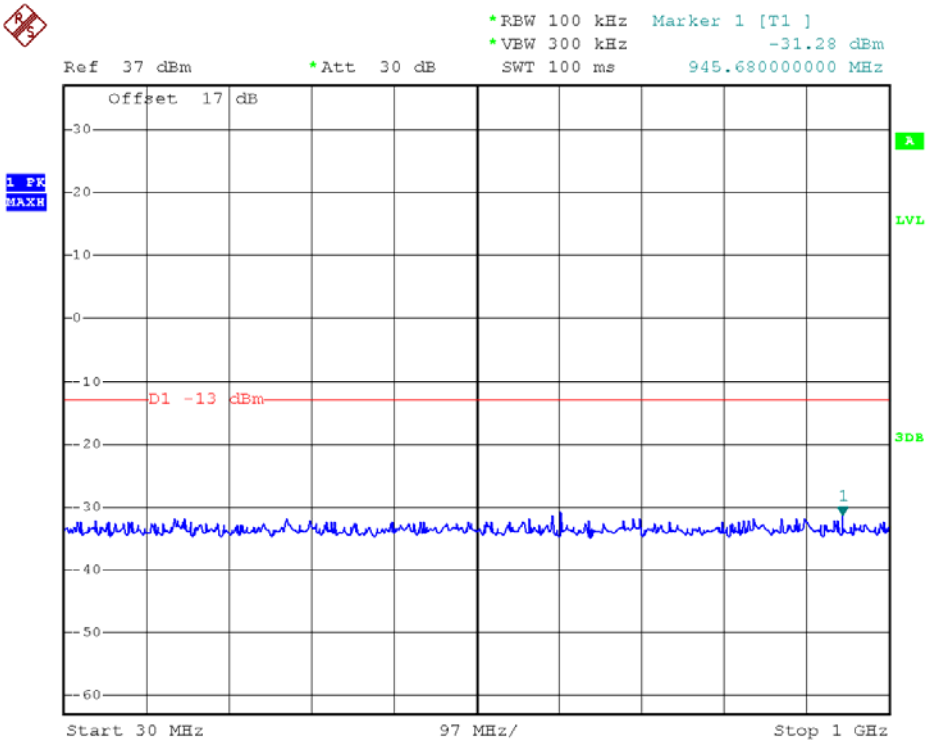


RB Size 1, RB Offset 0 30MHz to 1GHz

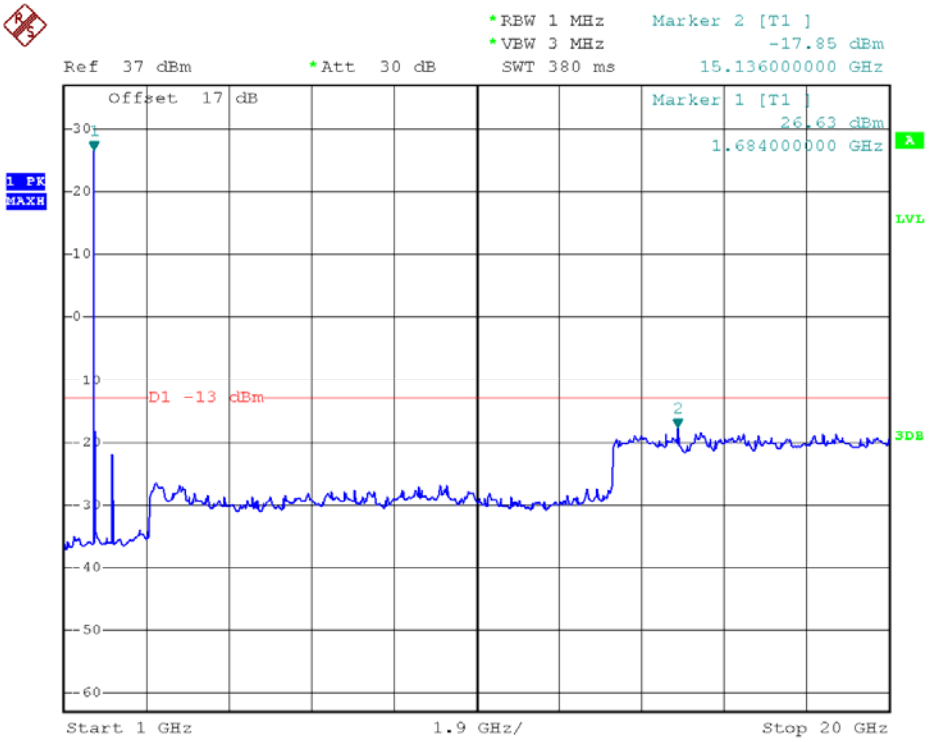


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Low
Bandwidth	10MHz	Modulation	QPSK

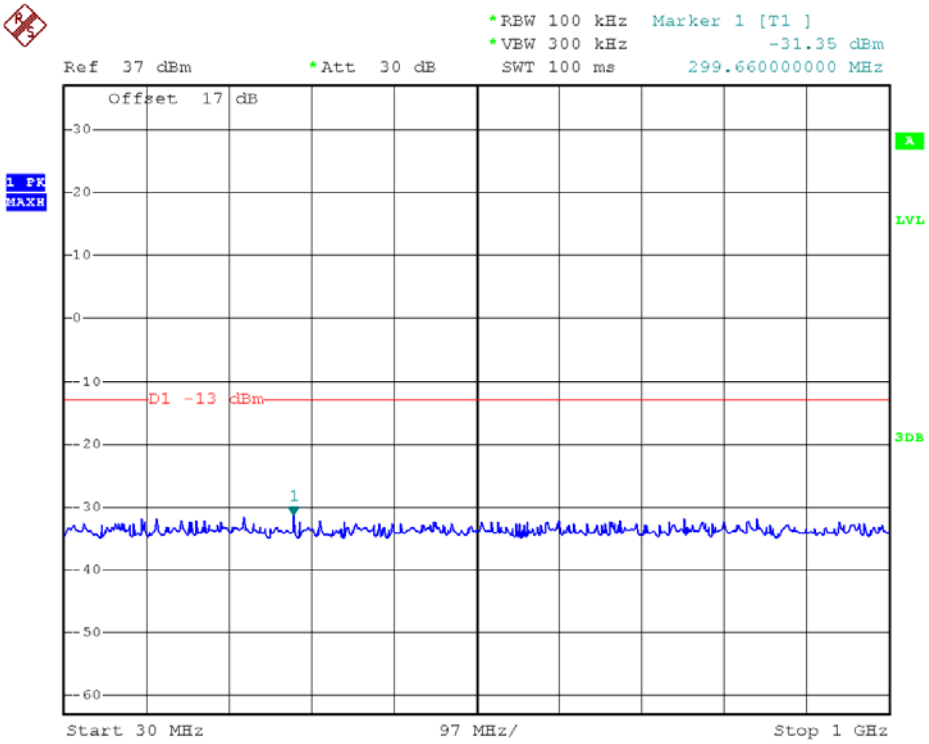


RB Size 1, RB Offset 0 30MHz to 1GHz

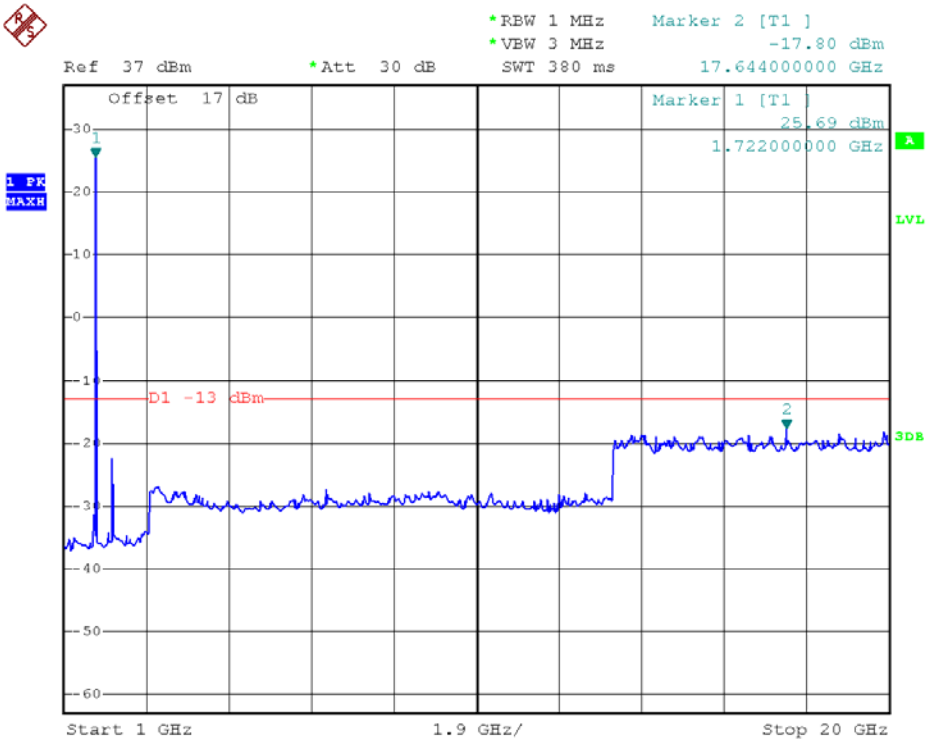


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Middle
Bandwidth	10MHz	Modulation	QPSK

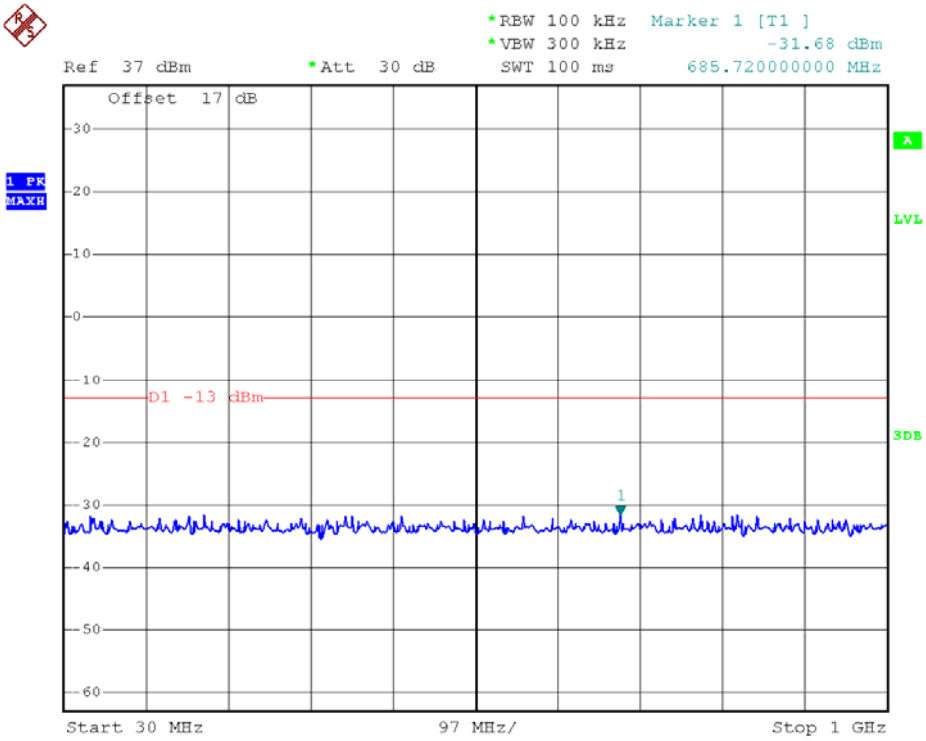


RB Size 1, RB Offset 0 30MHz to 1GHz

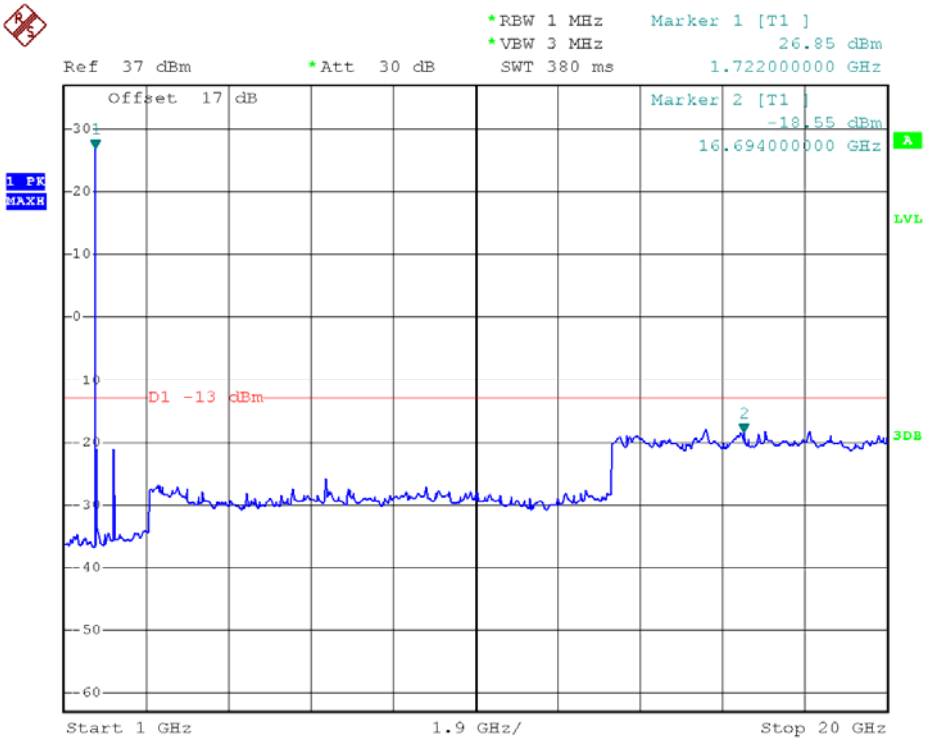


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	High
Bandwidth	10MHz	Modulation	QPSK

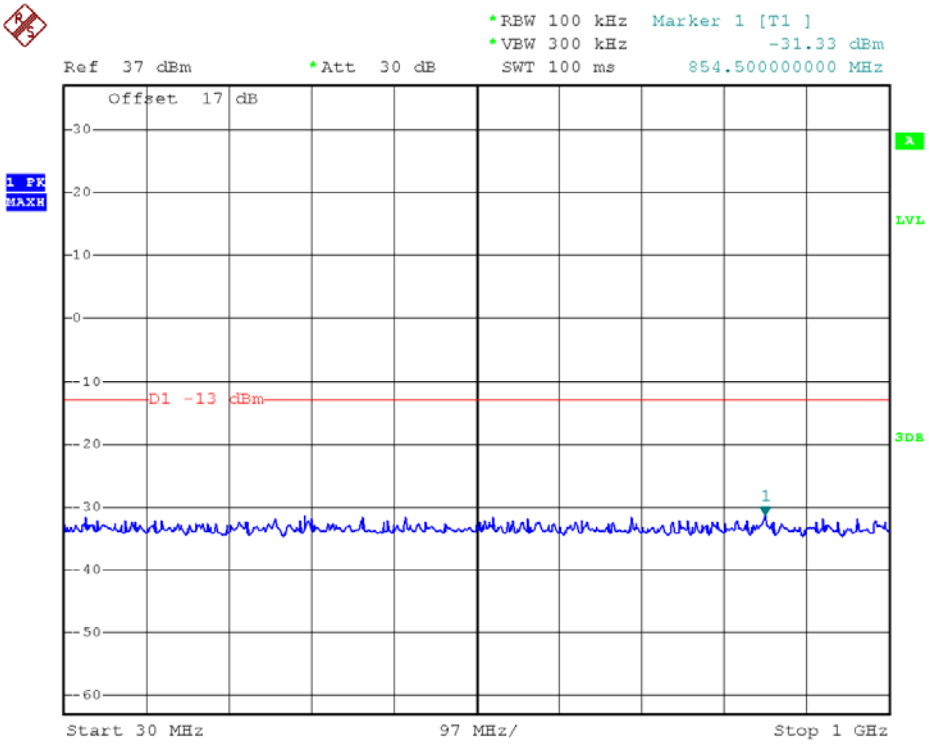


RB Size 1, RB Offset 0 30MHz to 1GHz

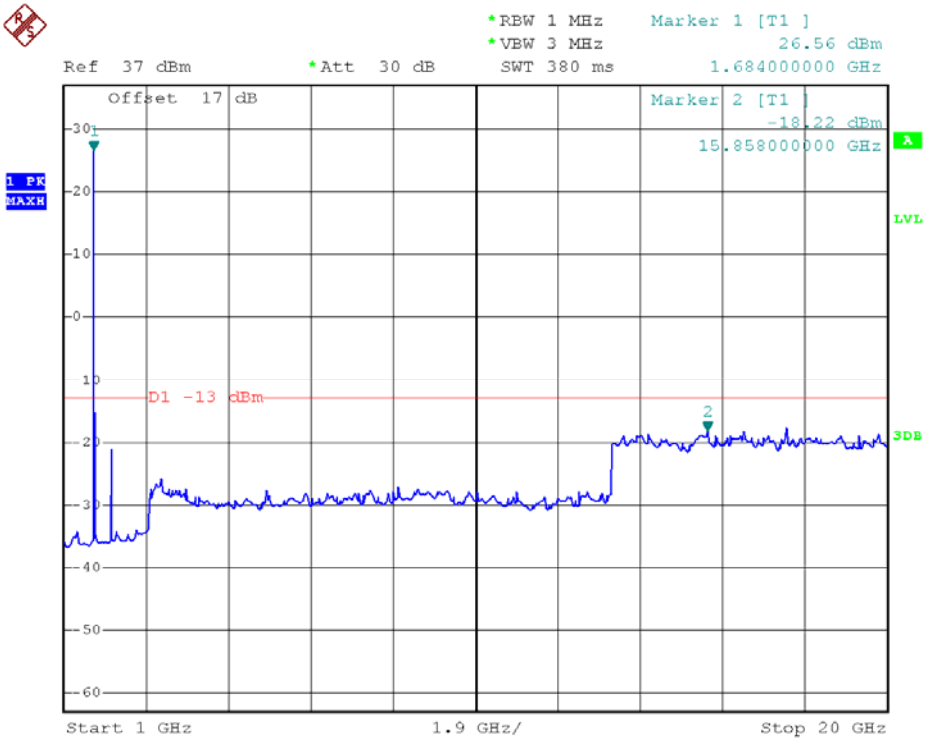


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Low
Bandwidth	15MHz	Modulation	QPSK

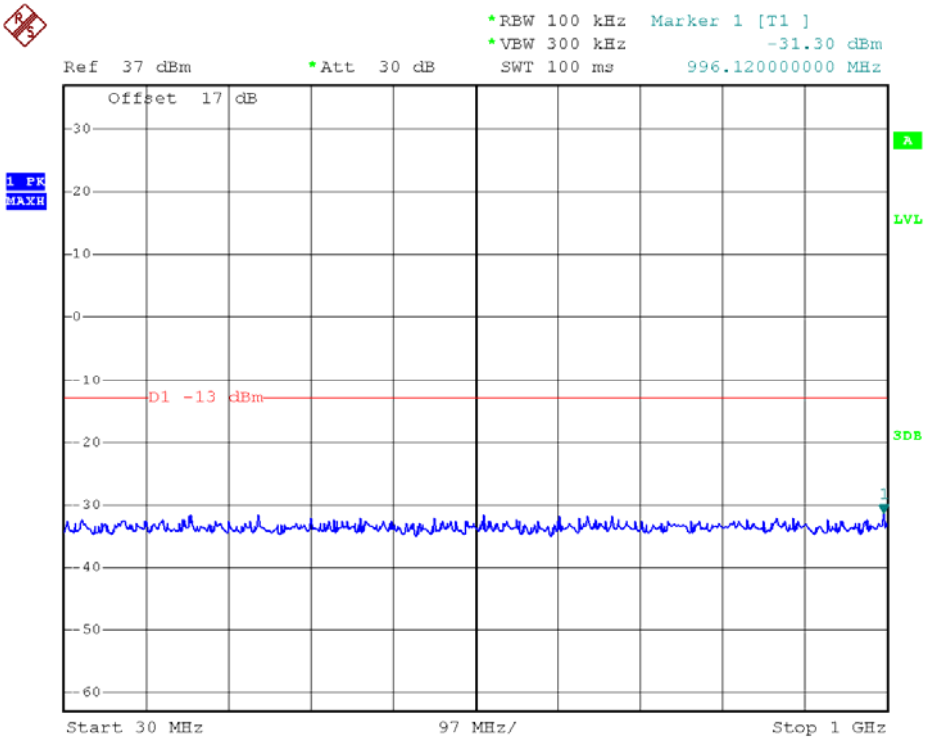


RB Size 1, RB Offset 0 30MHz to 1GHz

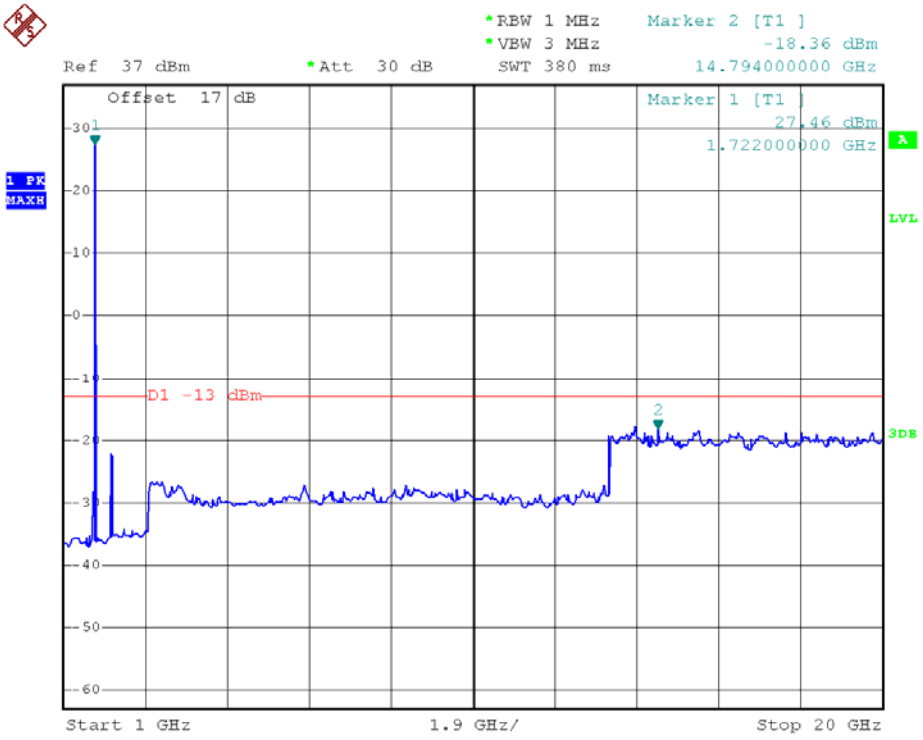


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Middle
Bandwidth	15MHz	Modulation	QPSK

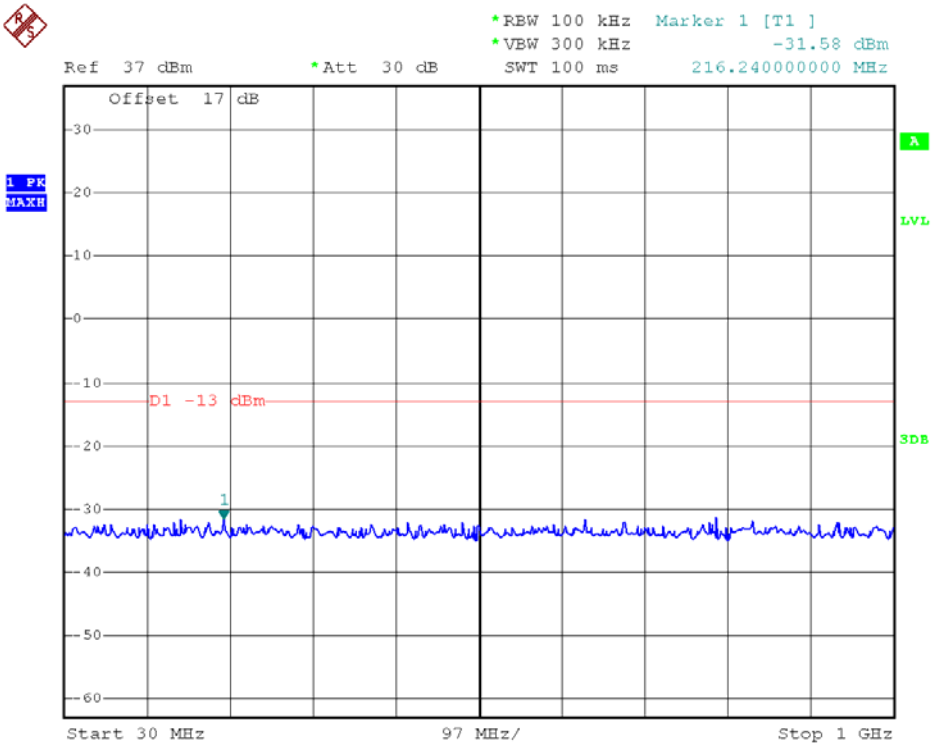


RB Size 1, RB Offset 0 30MHz to 1GHz

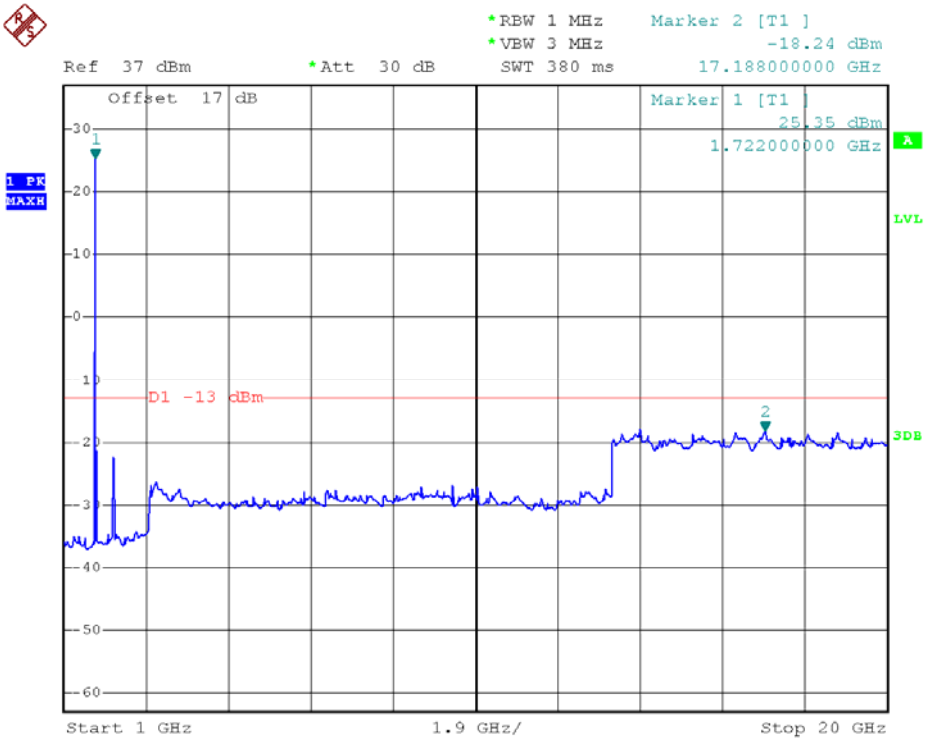


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	High
Bandwidth	15MHz	Modulation	QPSK

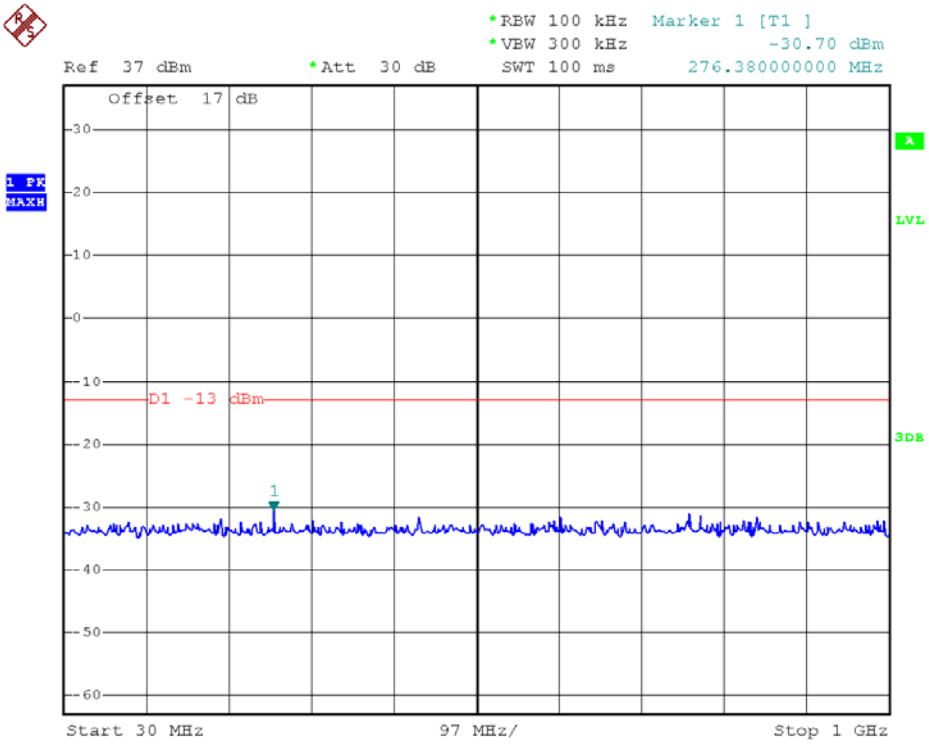


RB Size 1, RB Offset 0 30MHz to 1GHz

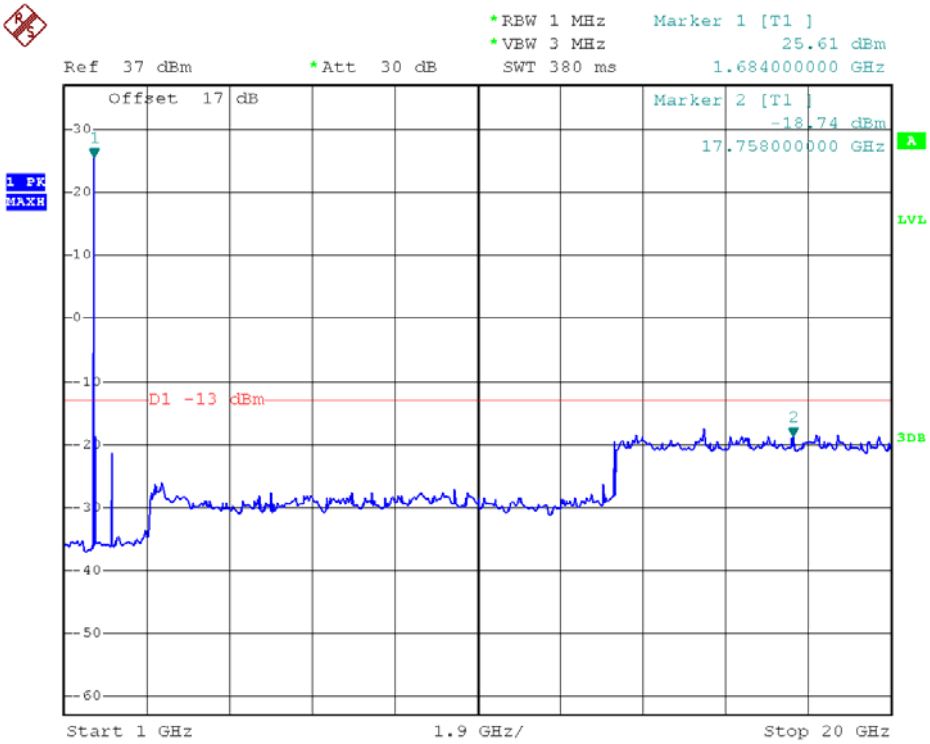


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Low
Bandwidth	20MHz	Modulation	QPSK

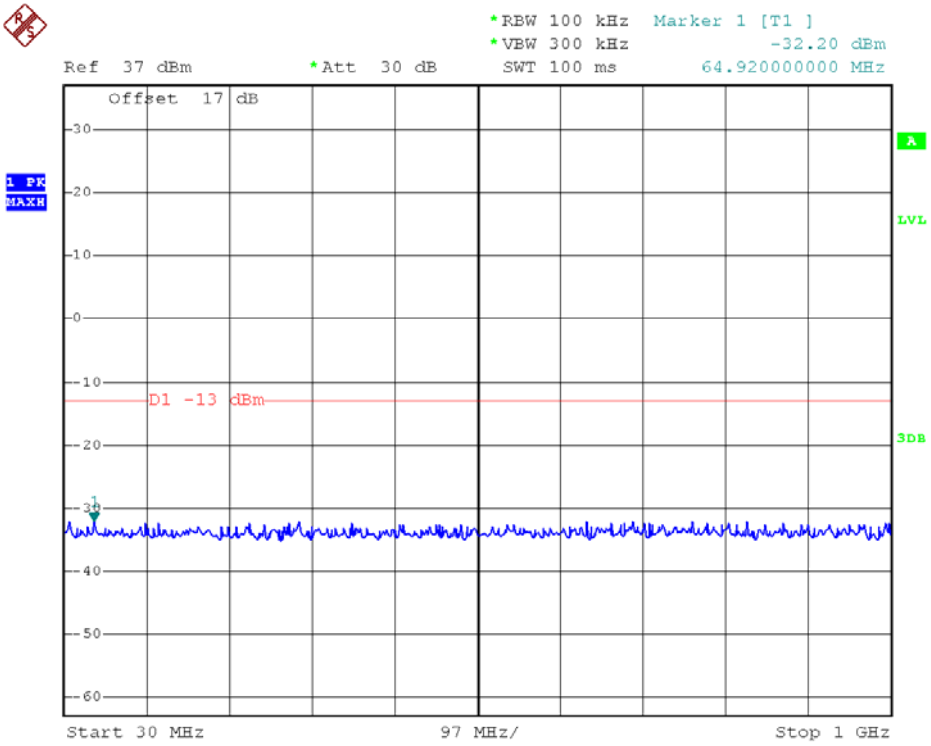


RB Size 1, RB Offset 0 30MHz to 1GHz

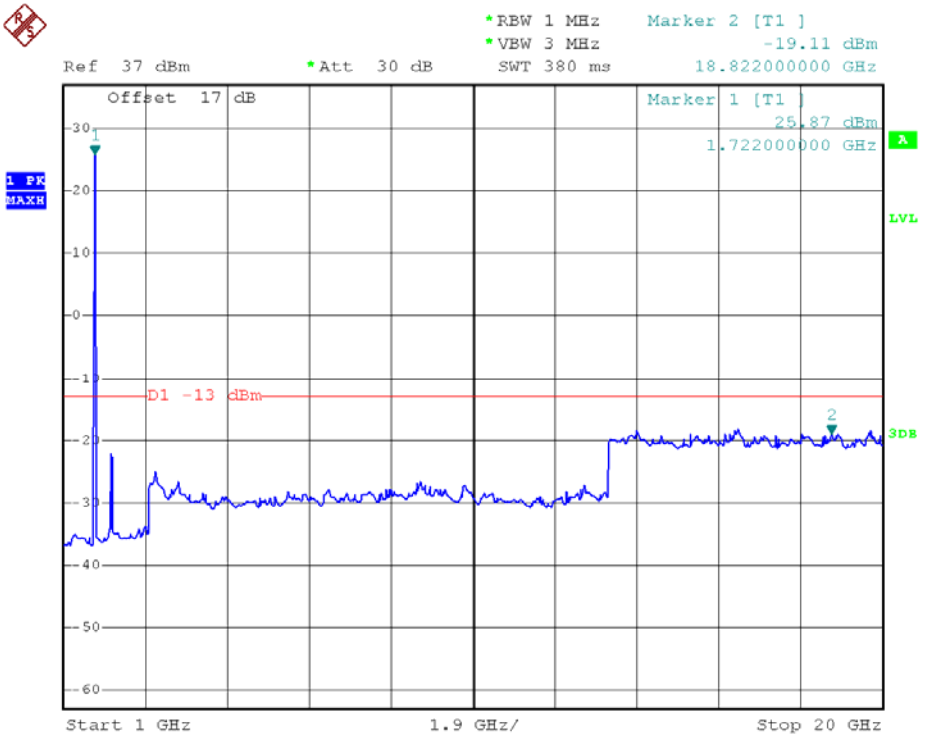


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Middle
Bandwidth	20MHz	Modulation	QPSK

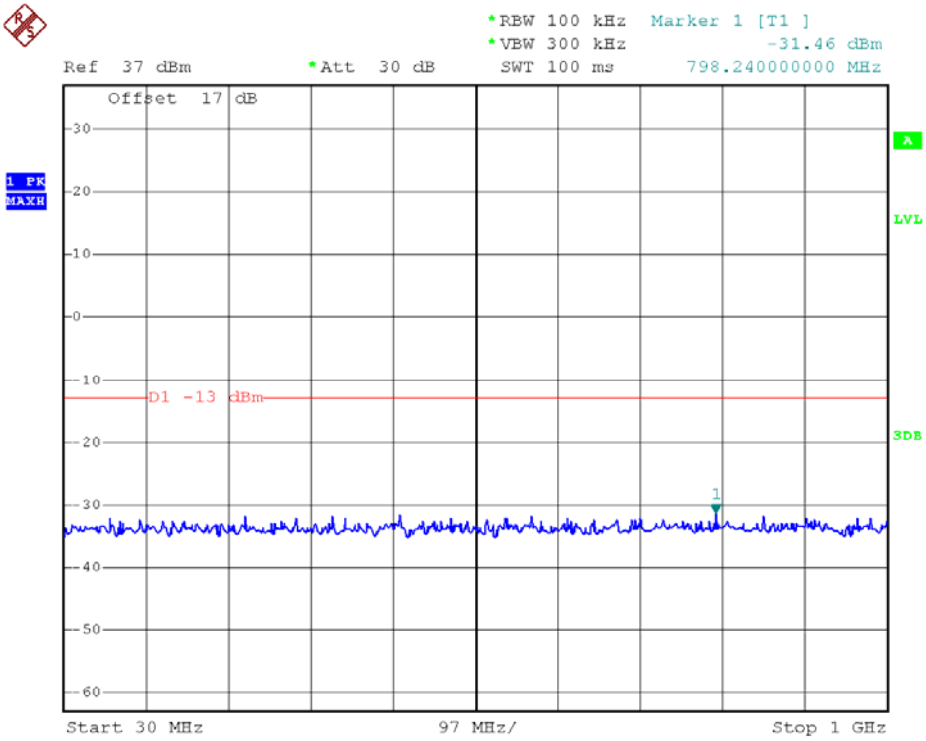


RB Size 1, RB Offset 0 30MHz to 1GHz

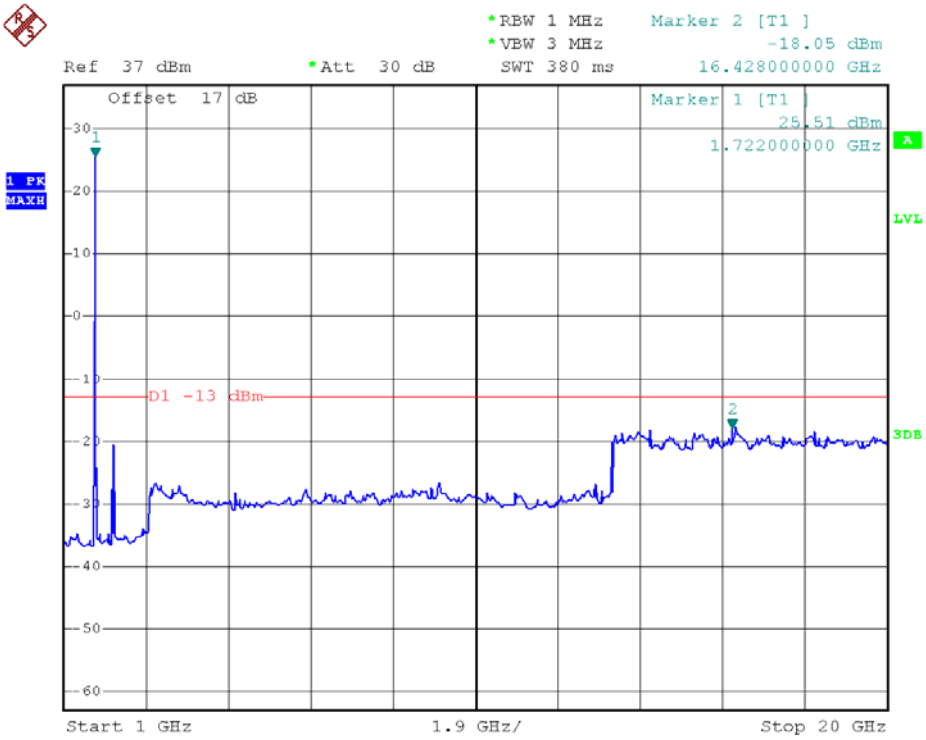


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	High
Bandwidth	20MHz	Modulation	QPSK

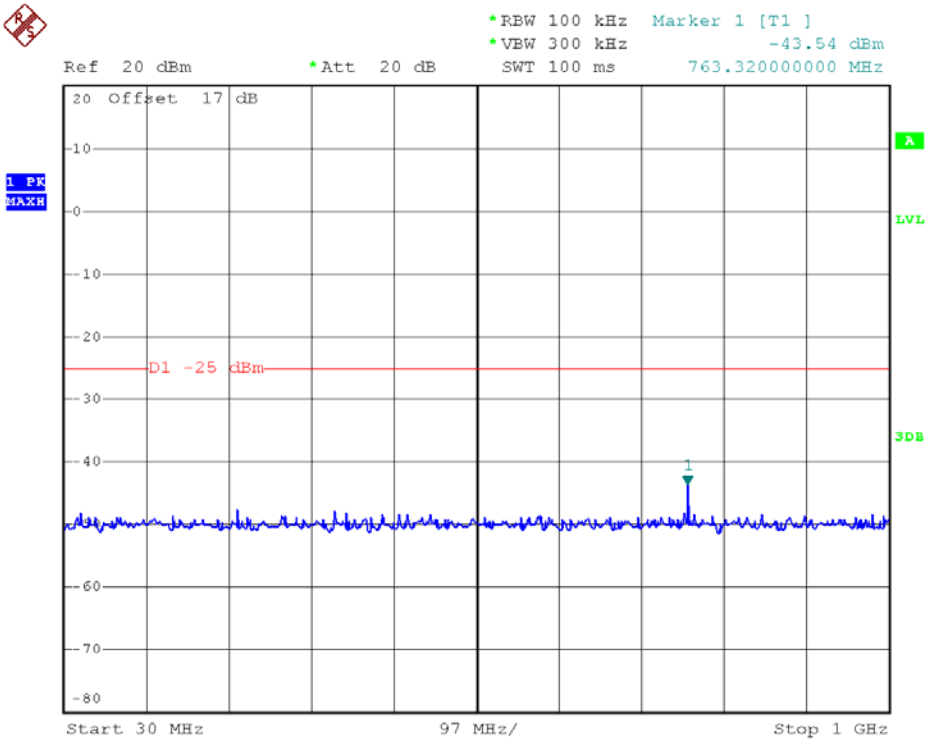


RB Size 1, RB Offset 0 30MHz to 1GHz

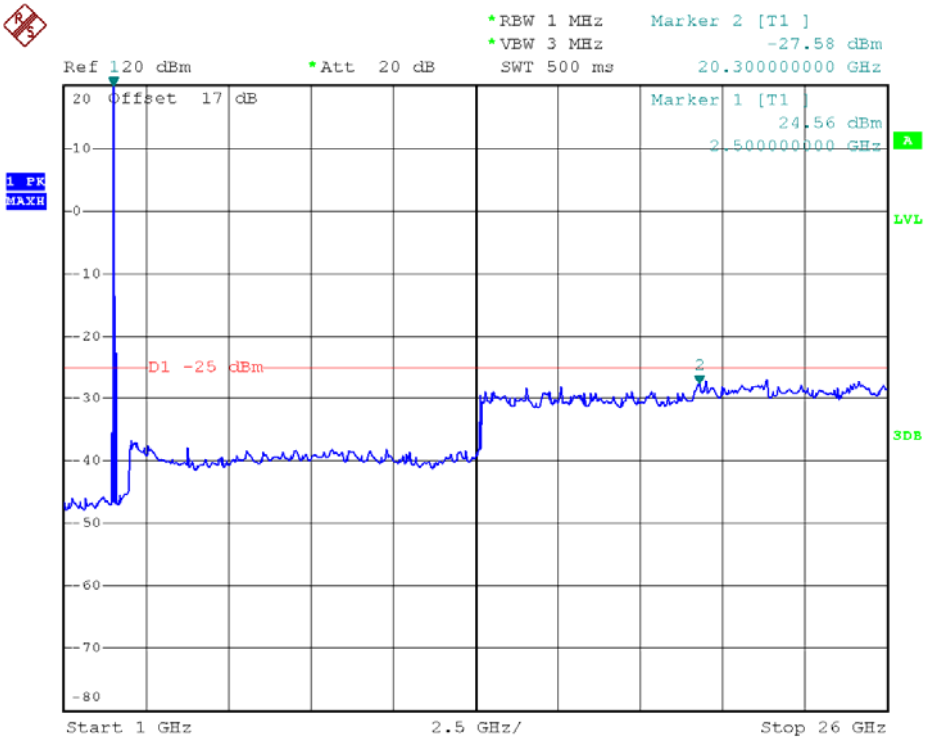


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 7	Channel	Low
Bandwidth	5MHz	Modulation	QPSK

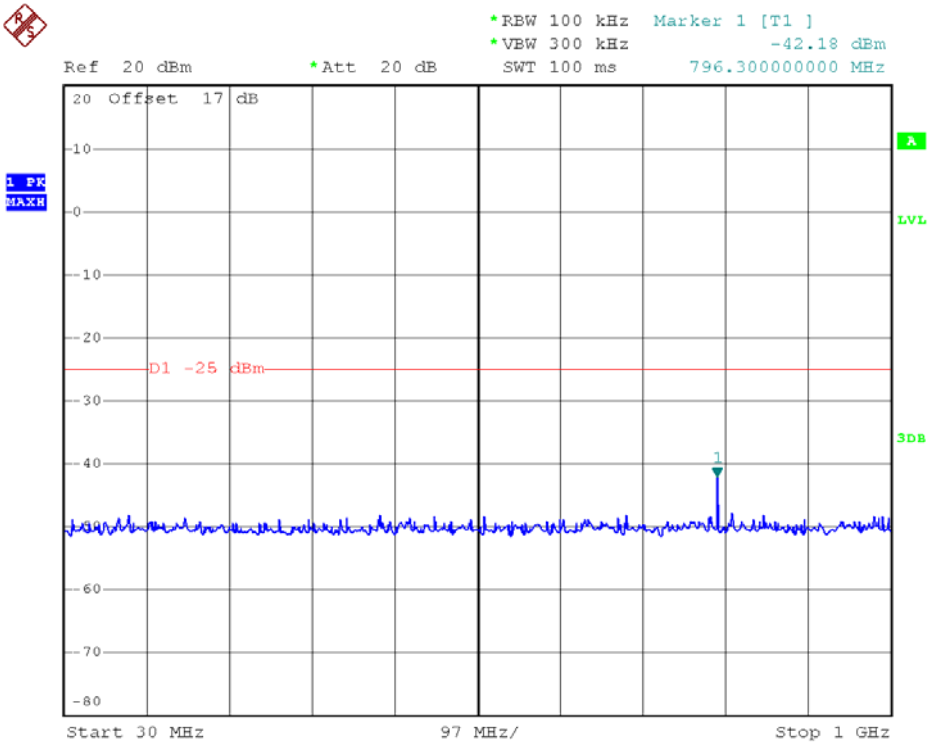


RB Size 1, RB Offset 0 30MHz to 1GHz

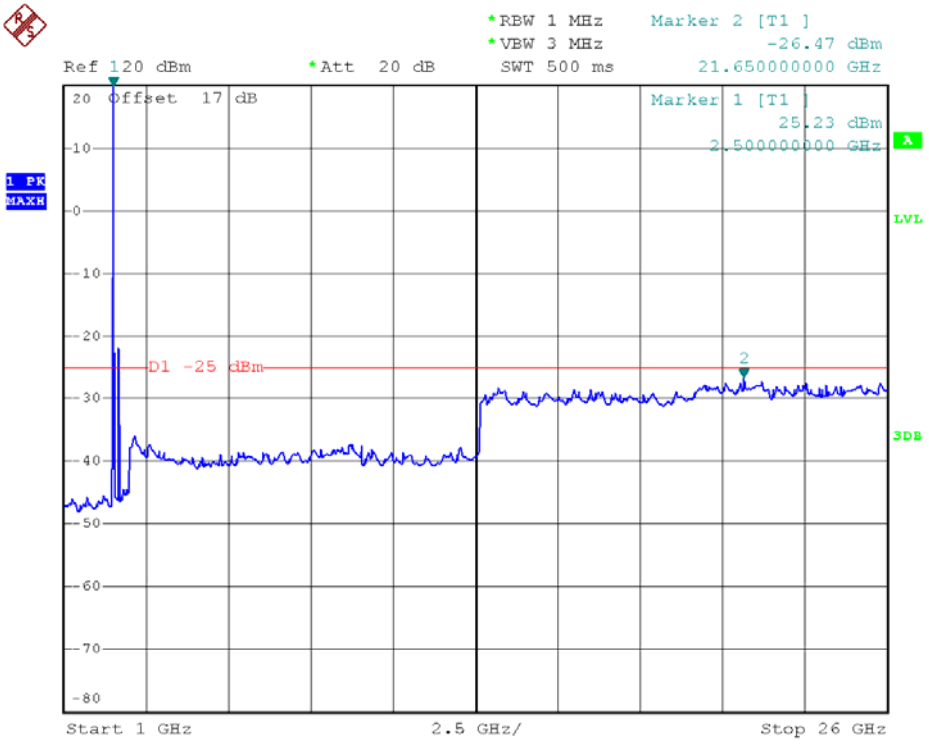


RB Size 1, RB Offset 0 1GHz to 26GHz

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

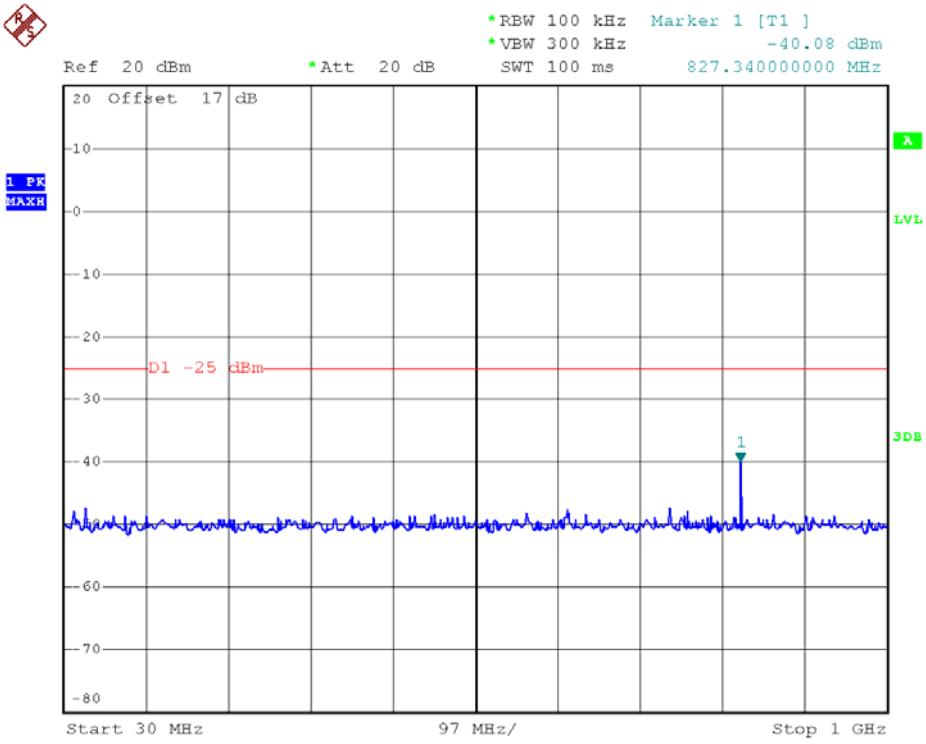


RB Size 1, RB Offset 0 30MHz to 1GHz

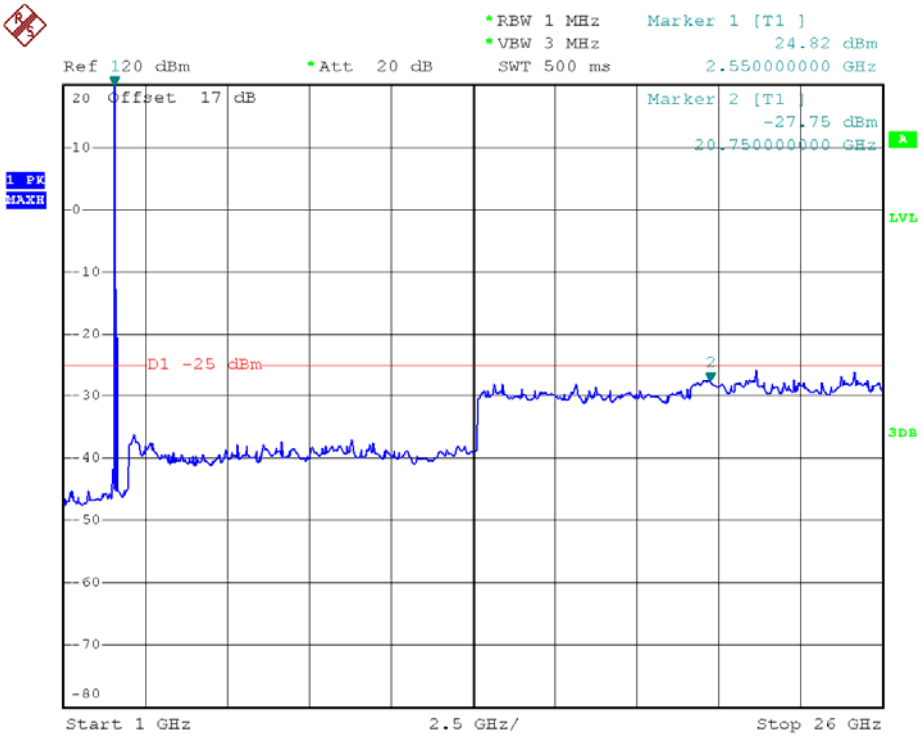


RB Size 1, RB Offset 0 1GHz to 26GHz

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

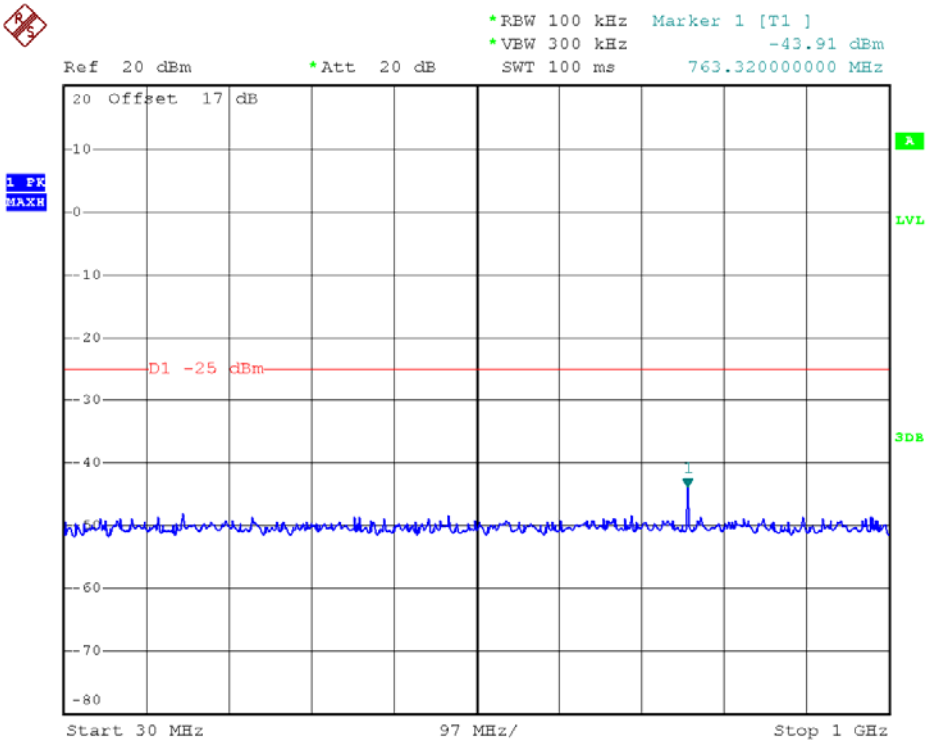


RB Size 1, RB Offset 0 30MHz to 1GHz

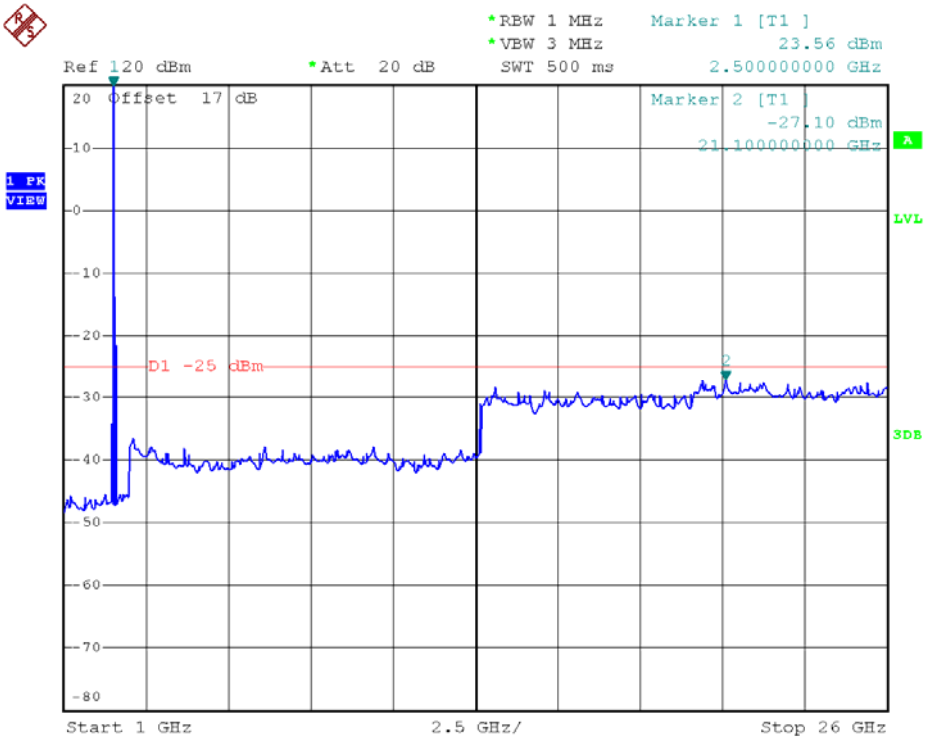


RB Size 1, RB Offset 0 1GHz to 26GHz

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

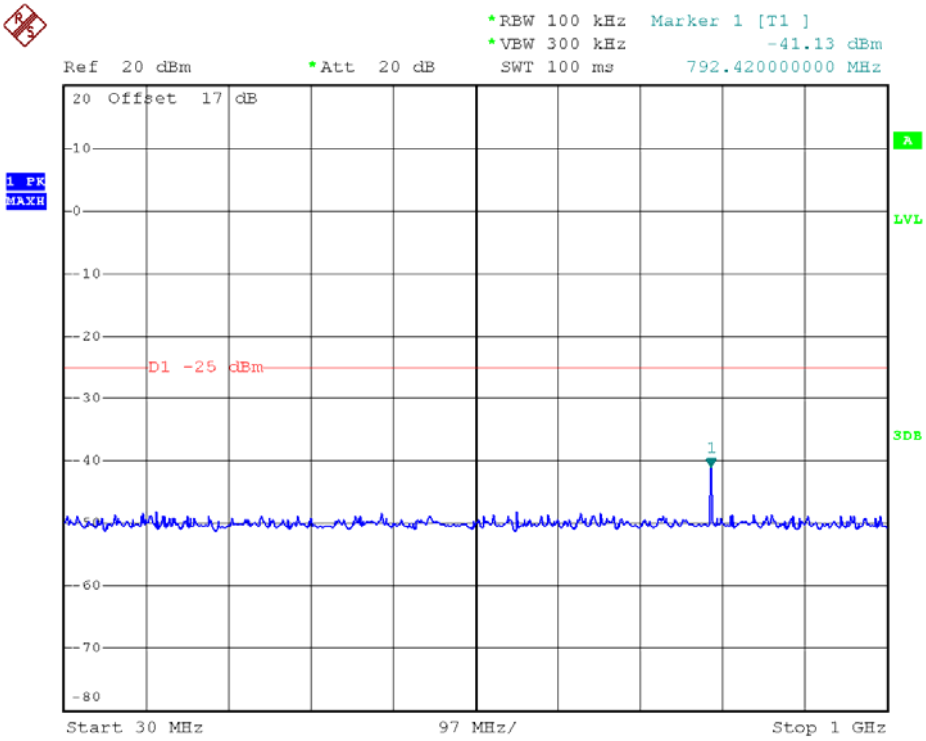


RB Size 1, RB Offset 0 30MHz to 1GHz

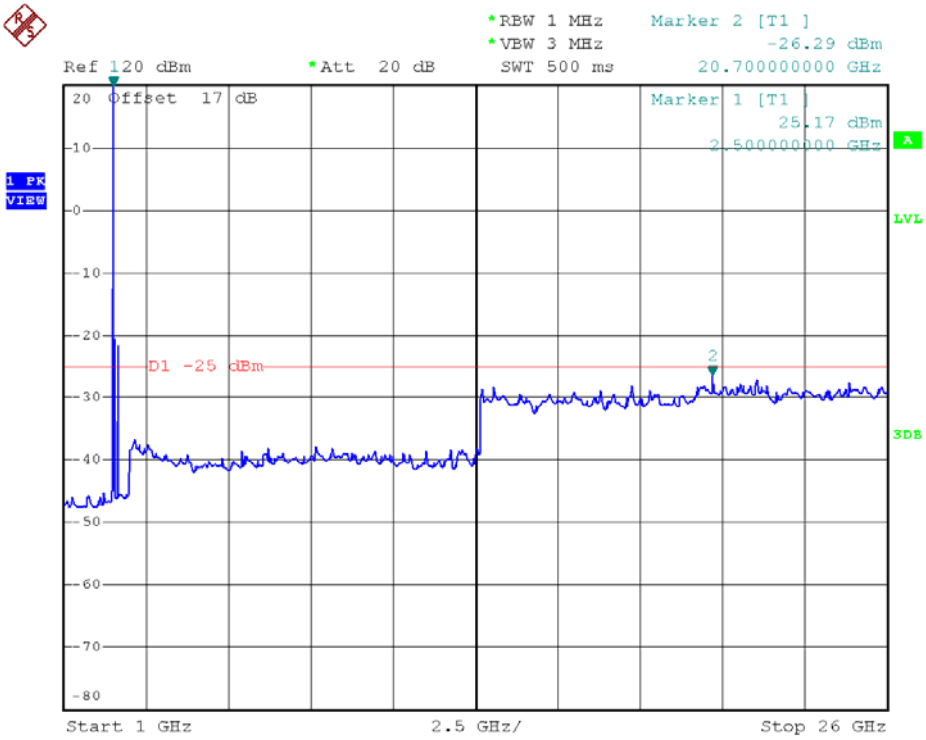


RB Size 1, RB Offset 0 1GHz to 26GHz

Band	LTE Band 7	Channel	Middle
Bandwidth	10MHz	Modulation	QPSK

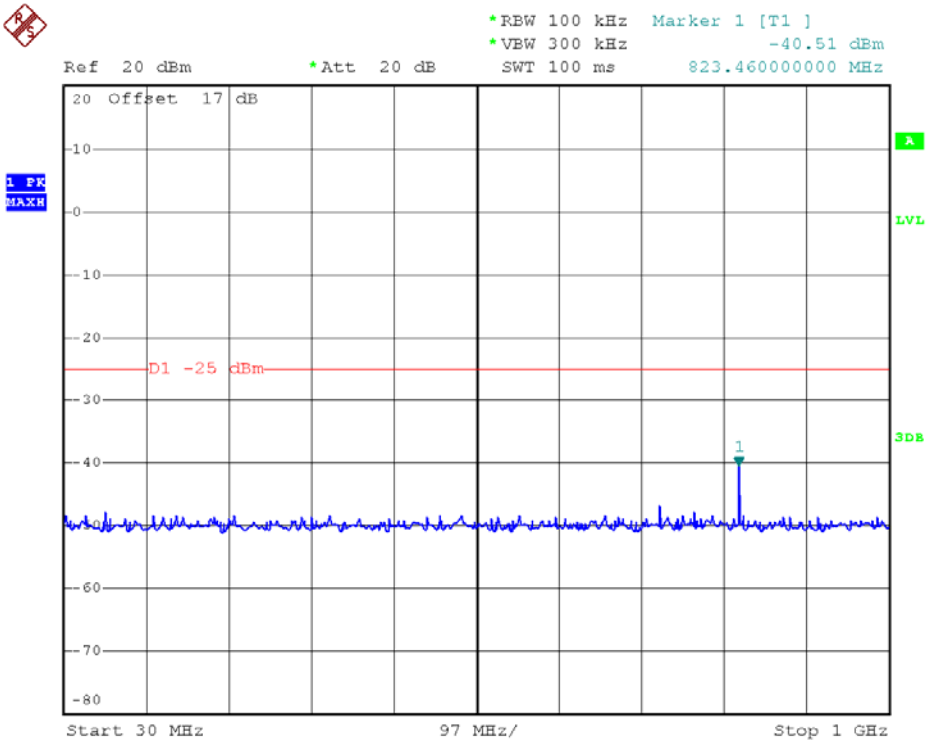


RB Size 1, RB Offset 0 30MHz to 1GHz

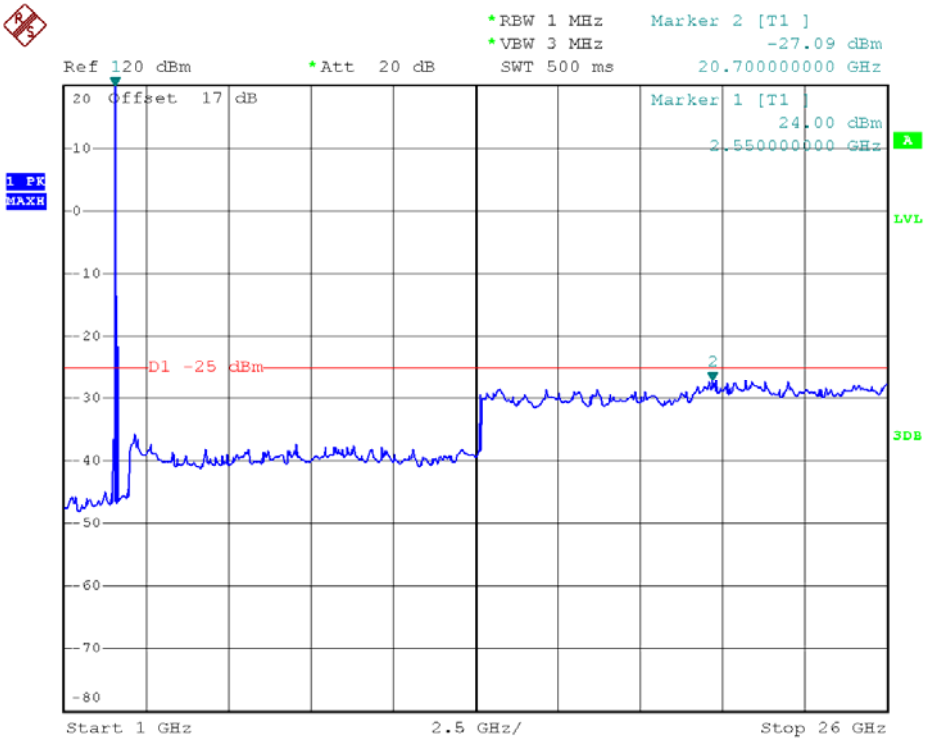


RB Size 1, RB Offset 0 1GHz to 26GHz

Band	LTE Band 7	Channel	High
Bandwidth	10MHz	Modulation	QPSK

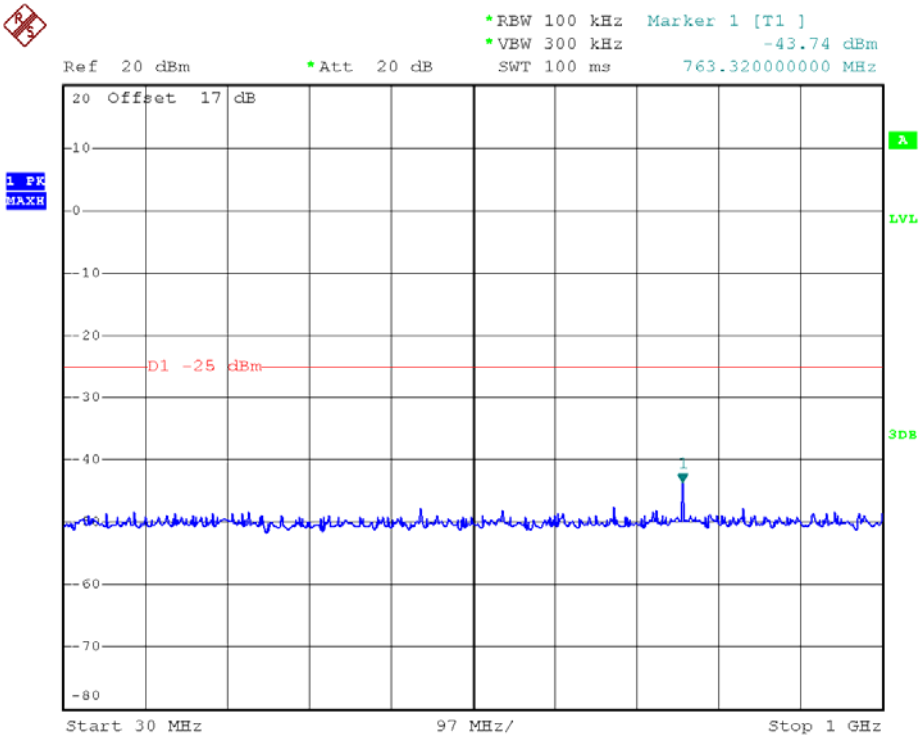


RB Size 1, RB Offset 0 30MHz to 1GHz

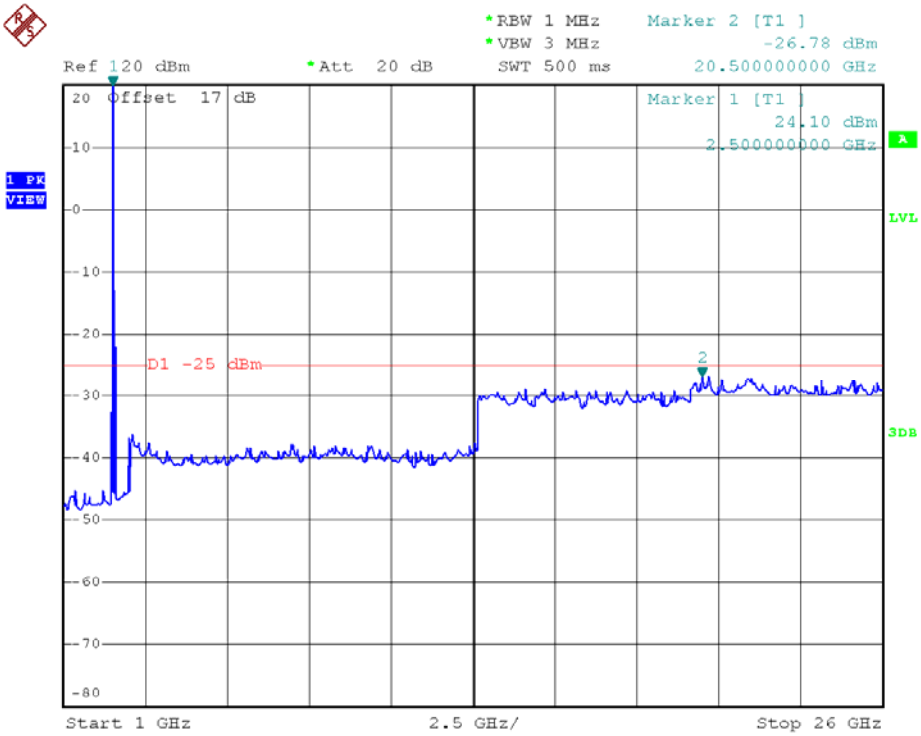


RB Size 1, RB Offset 0 1GHz to 26GHz

Band	LTE Band 7	Channel	Low
Bandwidth	15MHz	Modulation	QPSK

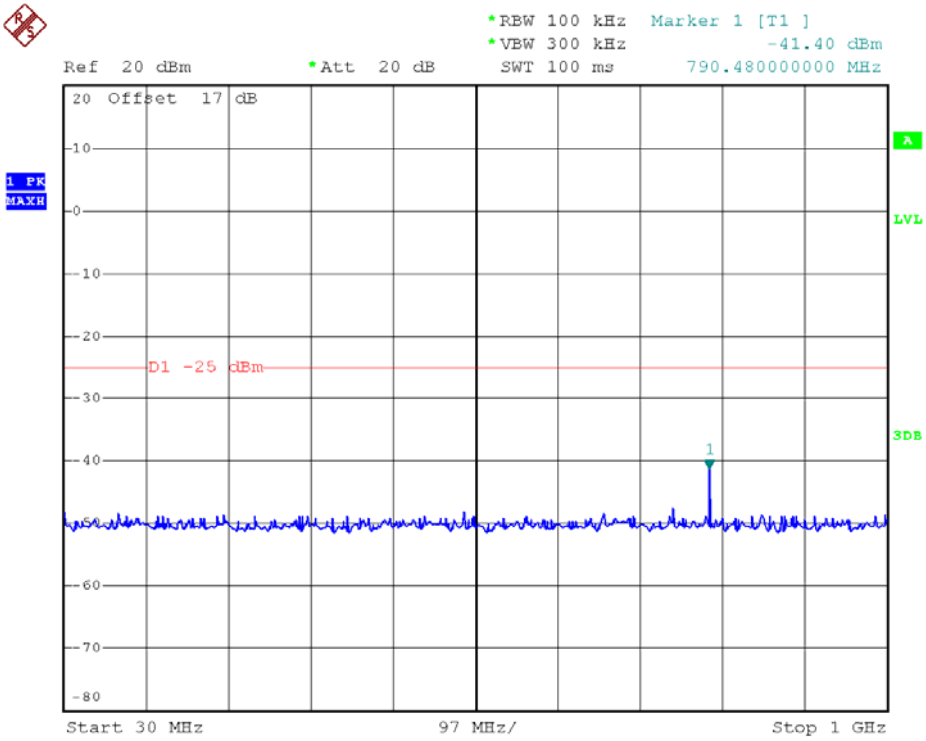


RB Size 1, RB Offset 0 30MHz to 1GHz

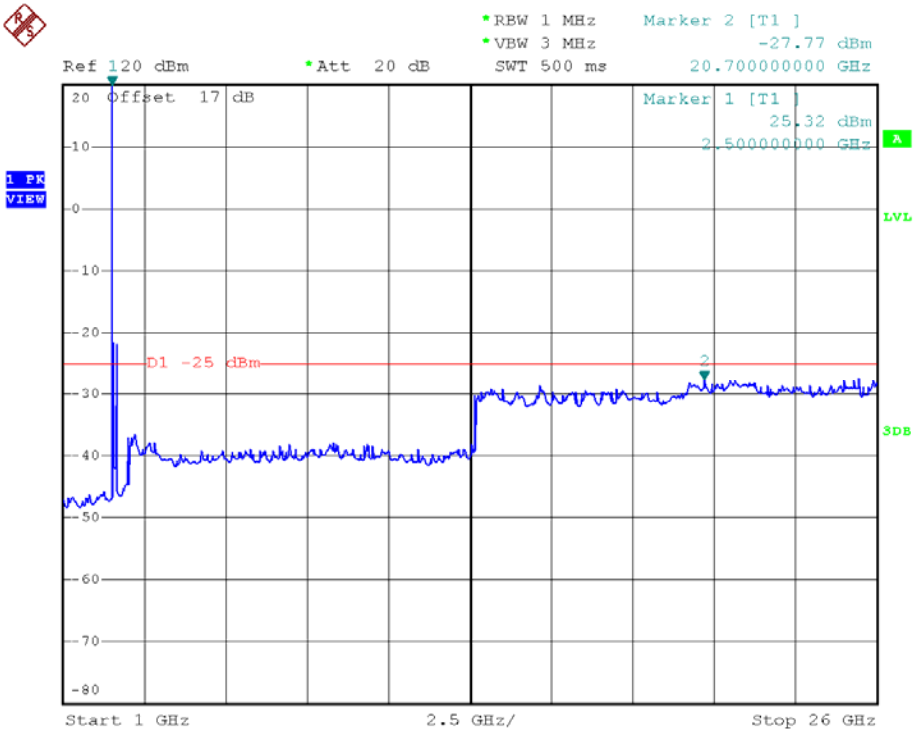


RB Size 1, RB Offset 0 1GHz to 26GHz

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

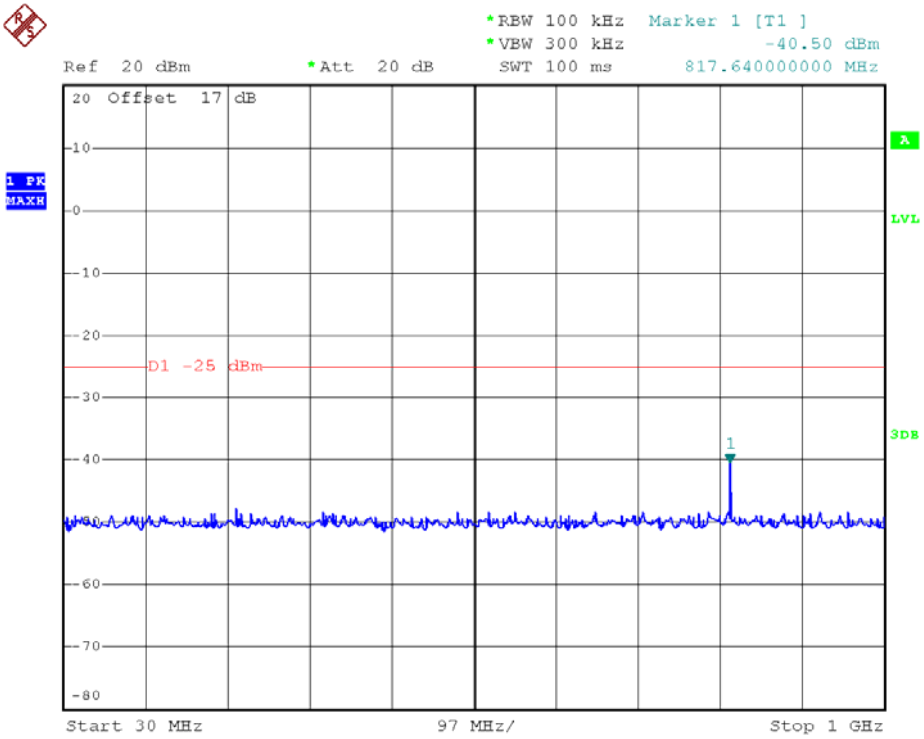


RB Size 1, RB Offset 0 30MHz to 1GHz

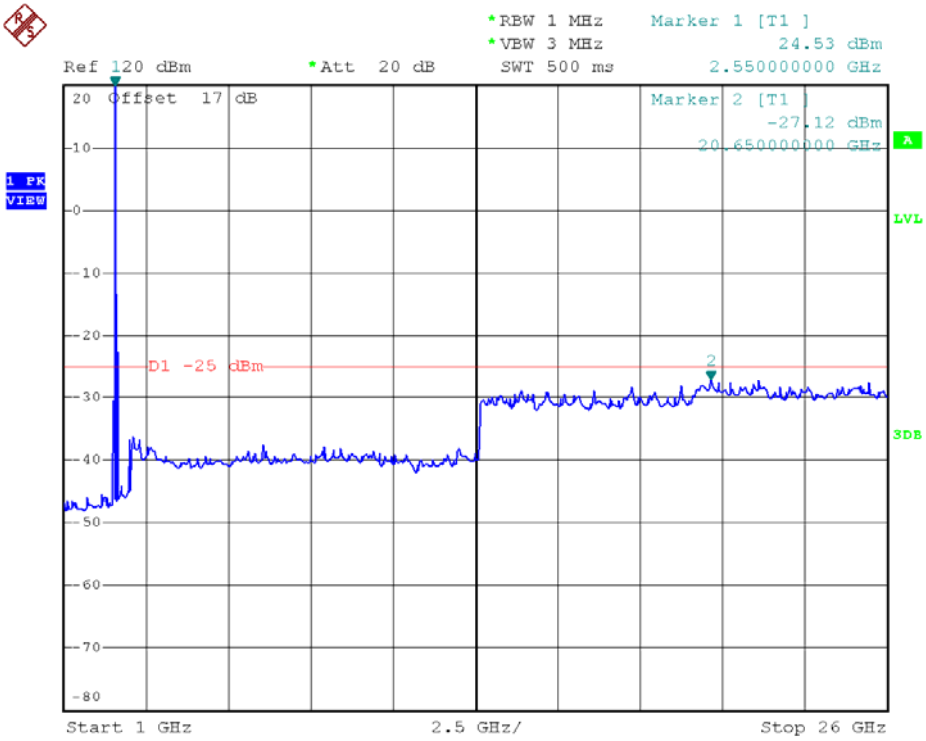


RB Size 1, RB Offset 0 1GHz to 26GHz

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

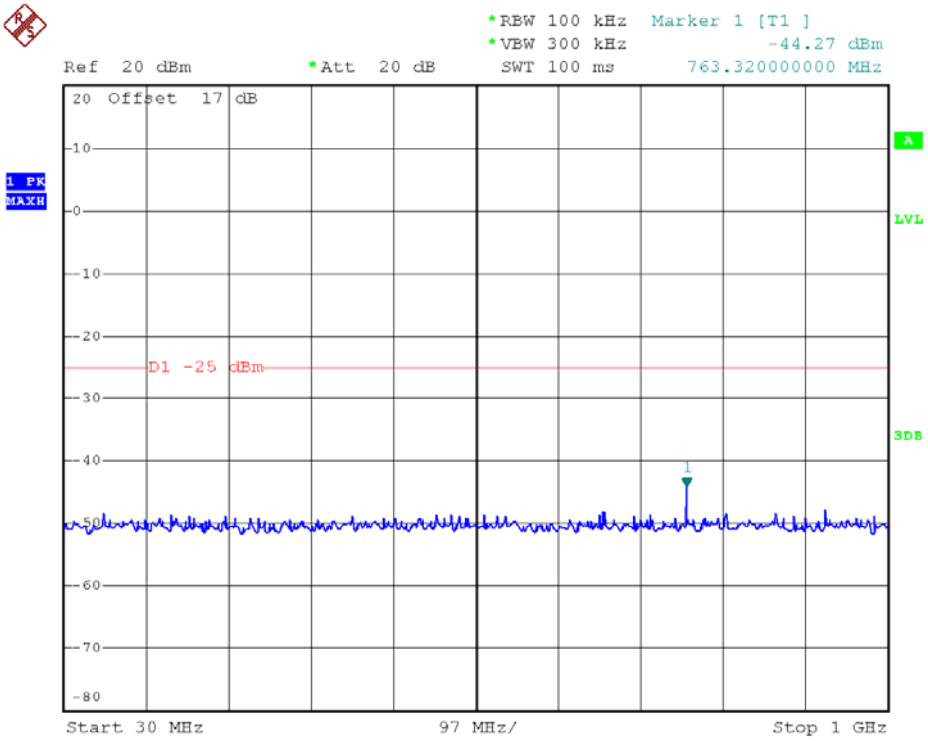


RB Size 1, RB Offset 0 30MHz to 1GHz

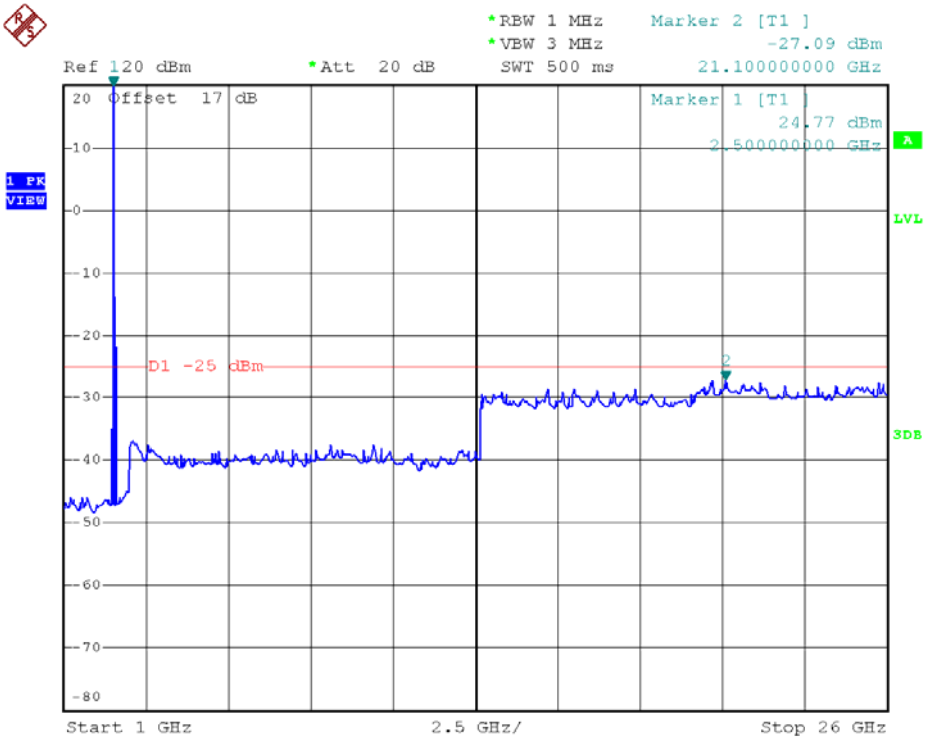


RB Size 1, RB Offset 0 1GHz to 26GHz

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

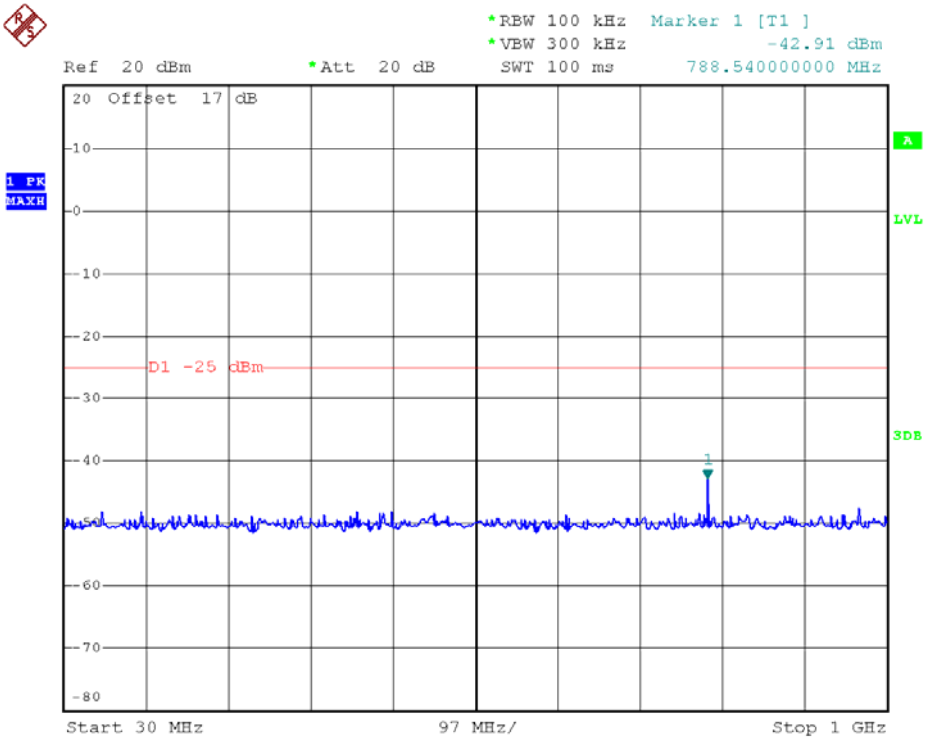


RB Size 1, RB Offset 0 30MHz to 1GHz

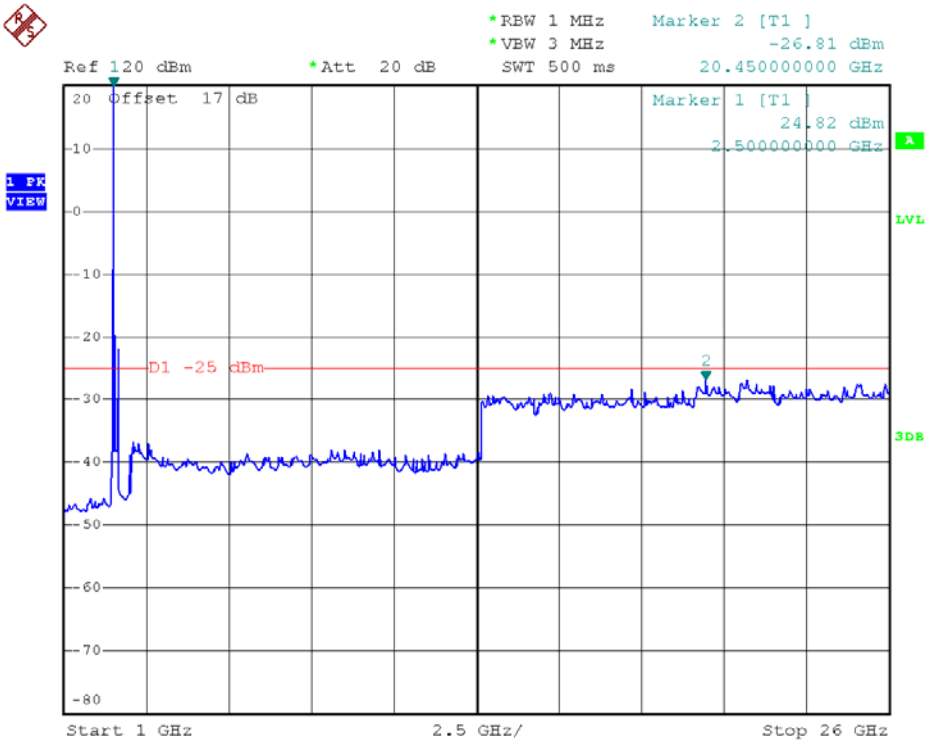


RB Size 1, RB Offset 0 1GHz to 26GHz

Band	LTE Band 7	Channel	Middle
Bandwidth	20MHz	Modulation	QPSK

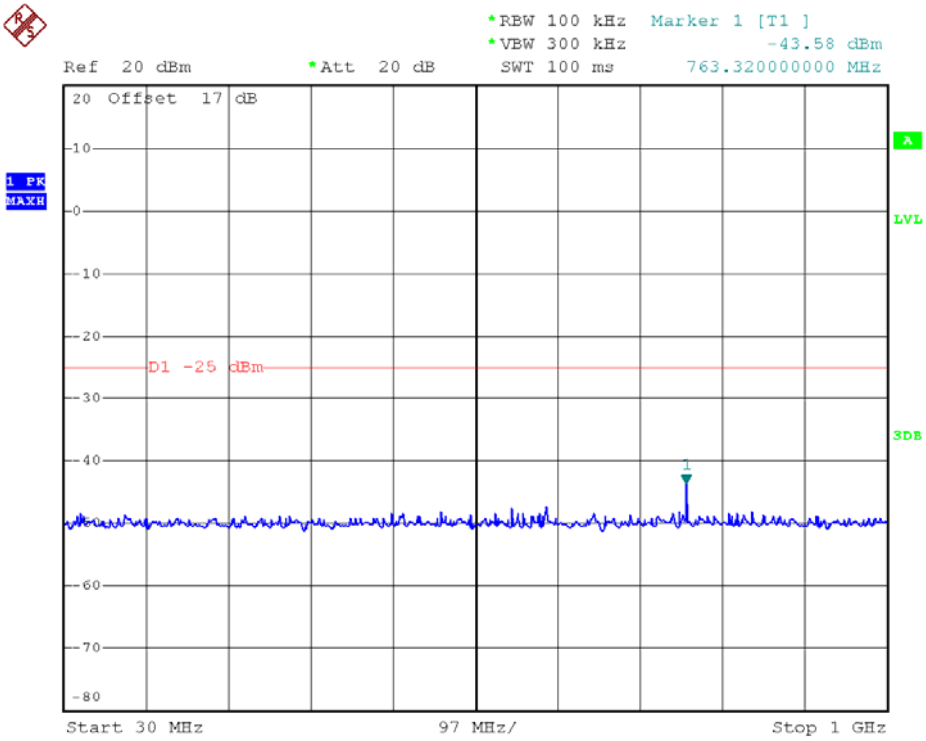


RB Size 1, RB Offset 0 30MHz to 1GHz

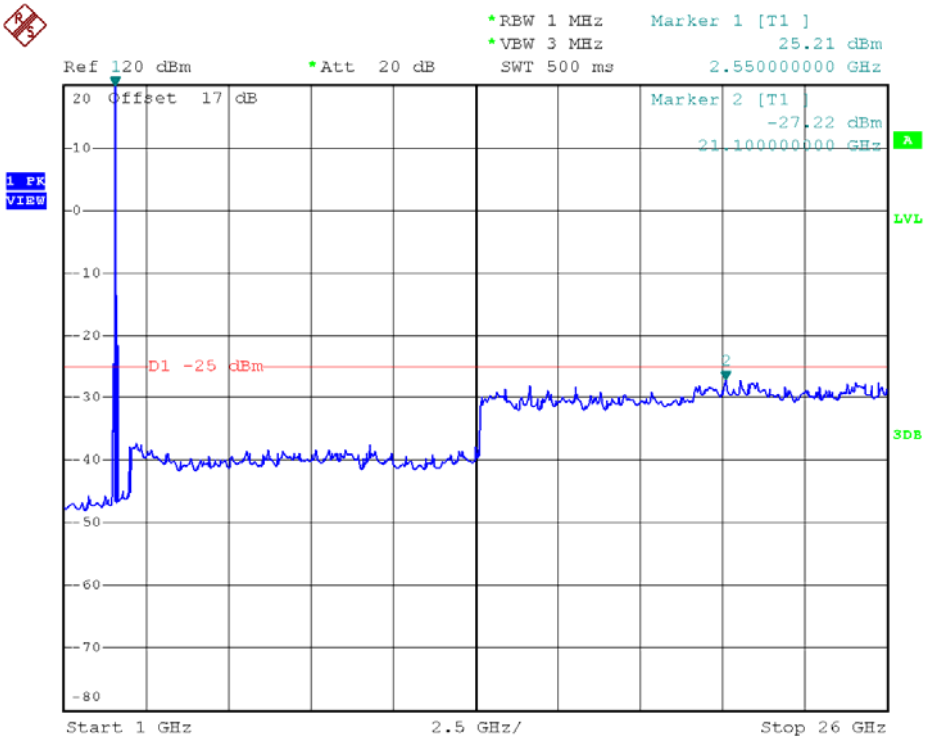


RB Size 1, RB Offset 0 1GHz to 26GHz

Band	LTE Band 7	Channel	High
Bandwidth	20MHz	Modulation	QPSK

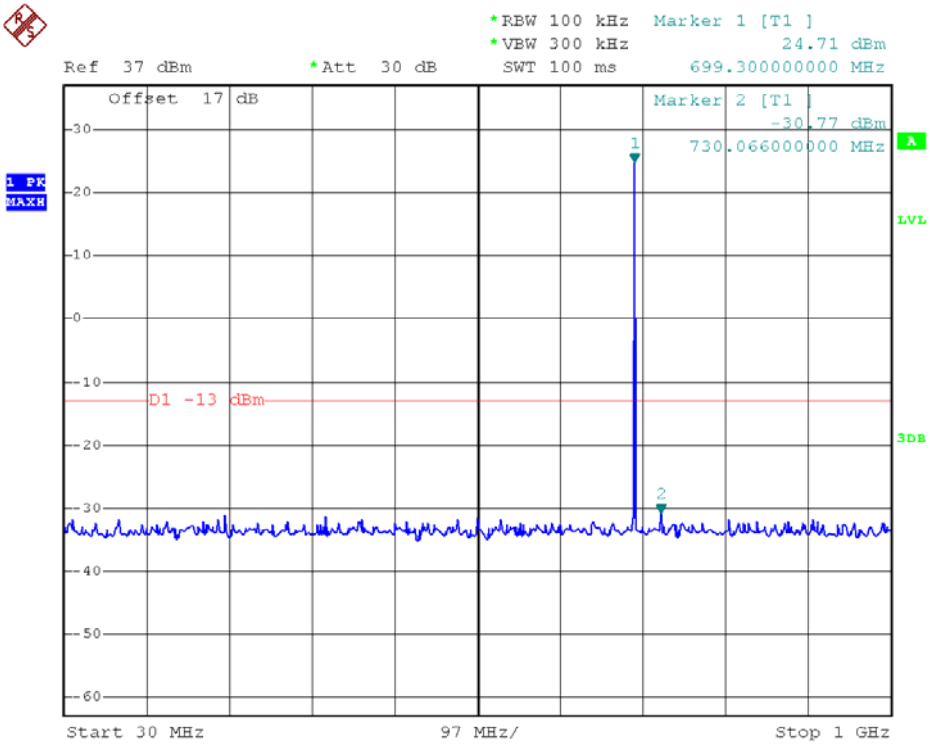


RB Size 1, RB Offset 0 30MHz to 1GHz

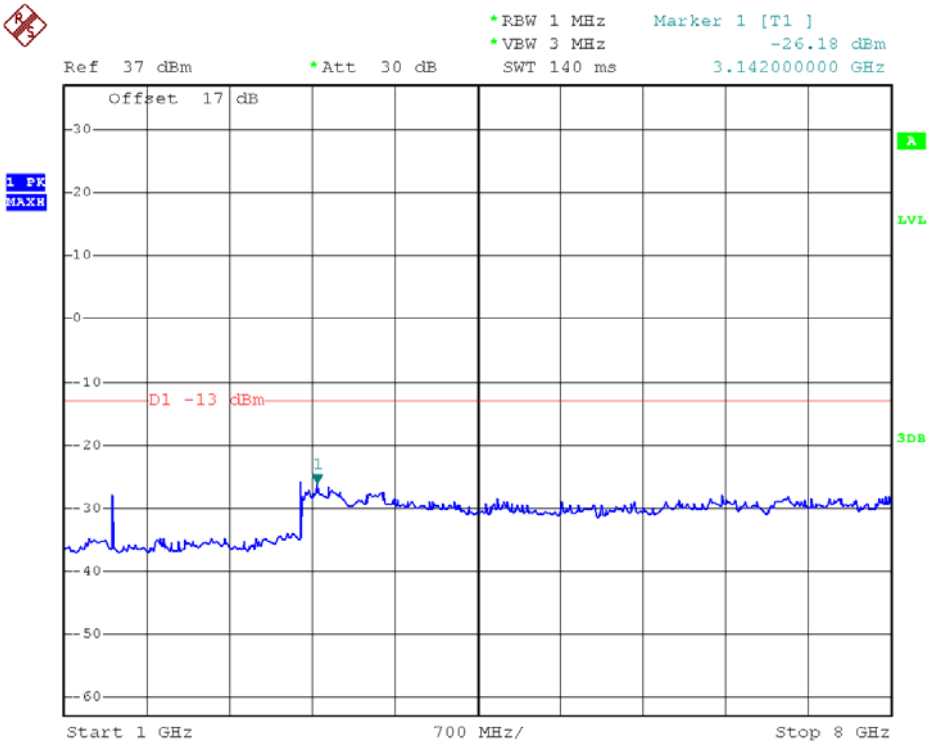


RB Size 1, RB Offset 0 1GHz to 26GHz

Band	LTE Band 12	Channel	Low
Bandwidth	1.4MHz	Modulation	QPSK

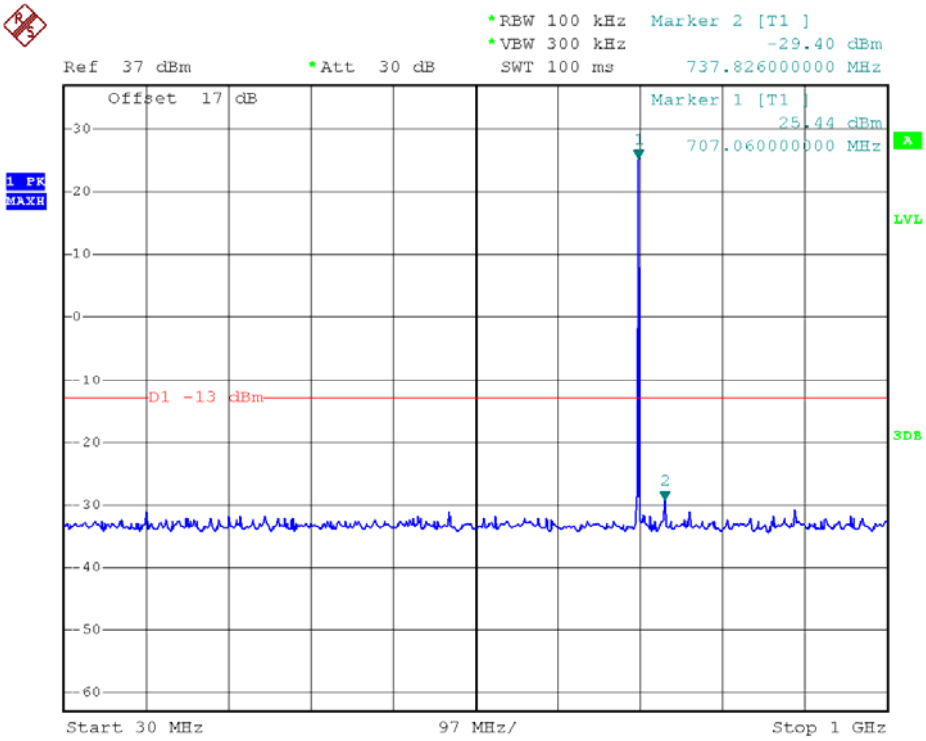


RB Size 1, RB Offset 0 30MHz to 1GHz

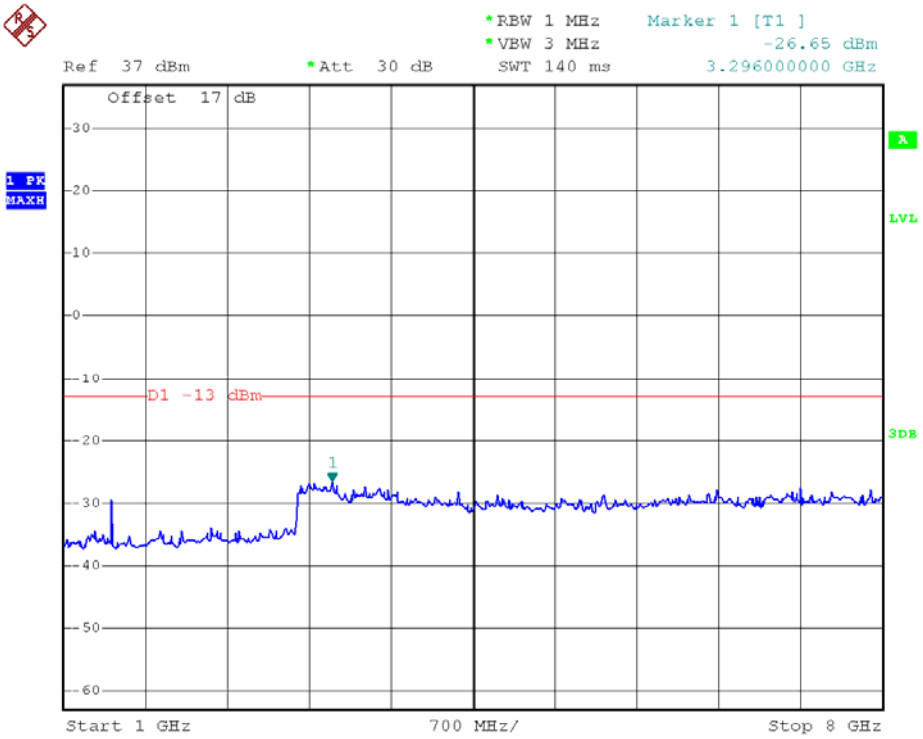


RB Size 1, RB Offset 0 1GHz to 8GHz

Band	LTE Band 12	Channel:	Middle
Bandwidth	1.4MHz	Modulation	QPSK

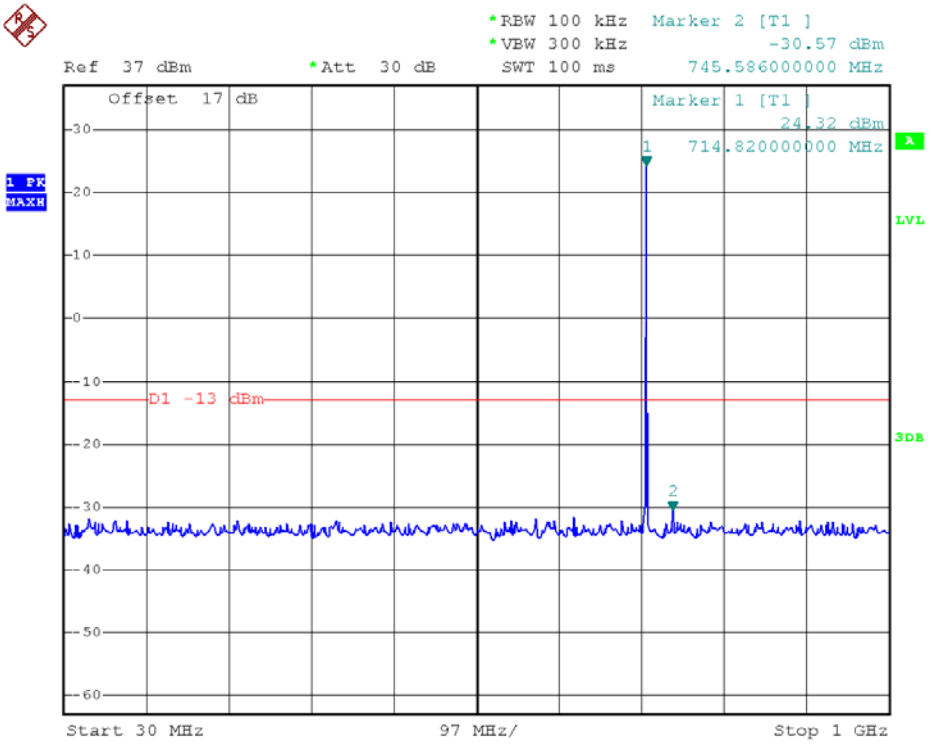


RB Size 1, RB Offset 0 30MHz to 1GHz

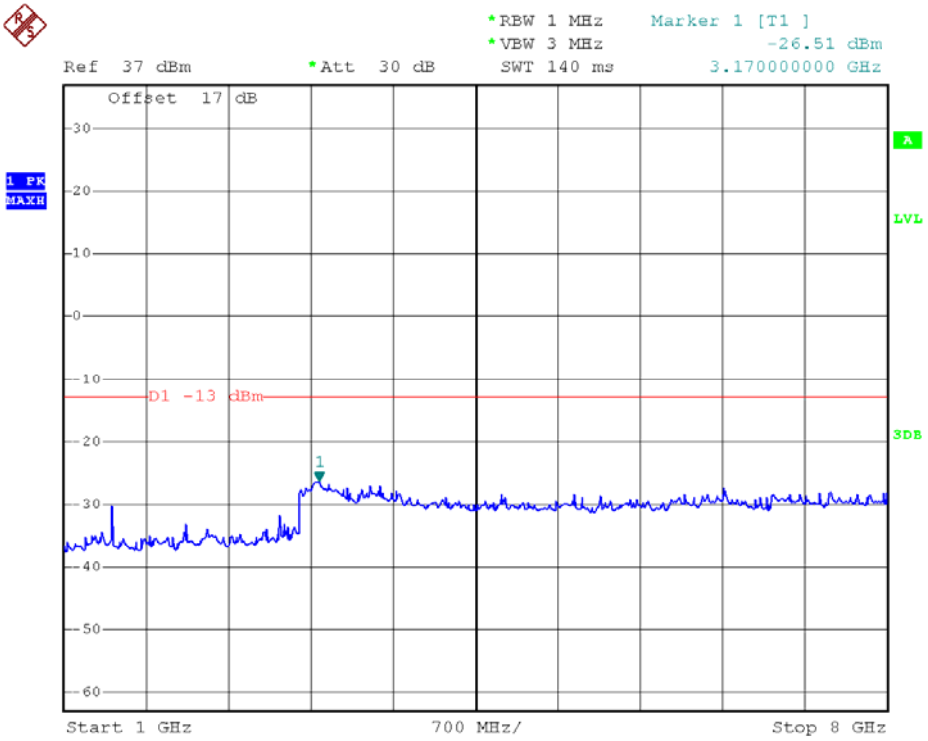


RB Size 1, RB Offset 0 1GHz to 8GHz

Band	LTE Band 12	Channel:	High
Bandwidth	1.4MHz	Modulation	QPSK

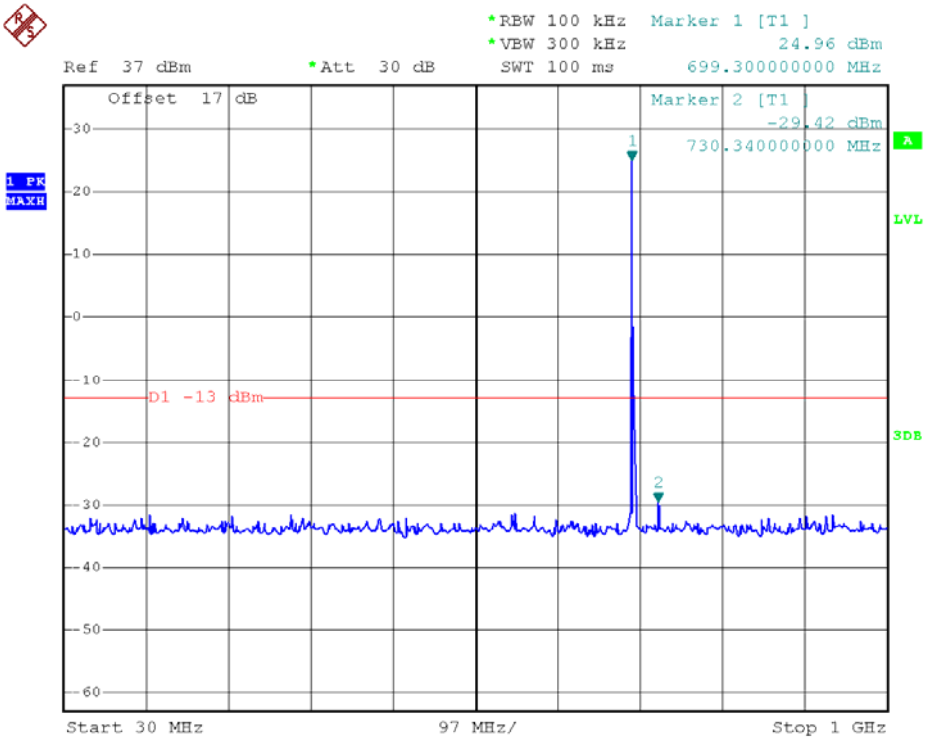


RB Size 1, RB Offset 0 30MHz to 1GHz

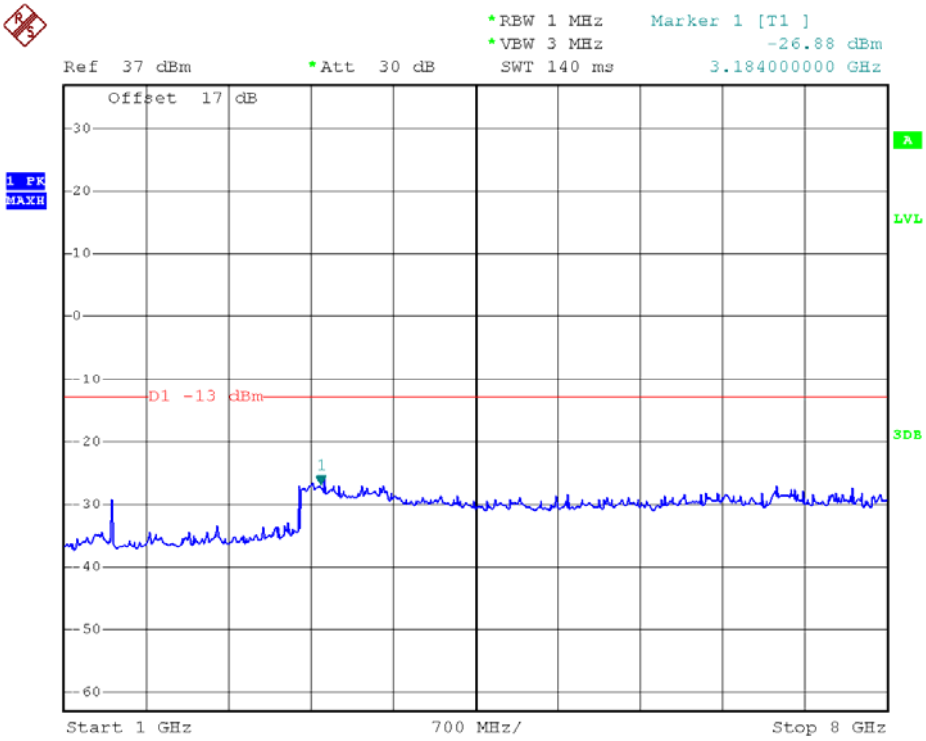


RB Size 1, RB Offset 0 1GHz to 8GHz

Band	LTE Band 12	Channel:	Low
Bandwidth	3MHz	Modulation	QPSK

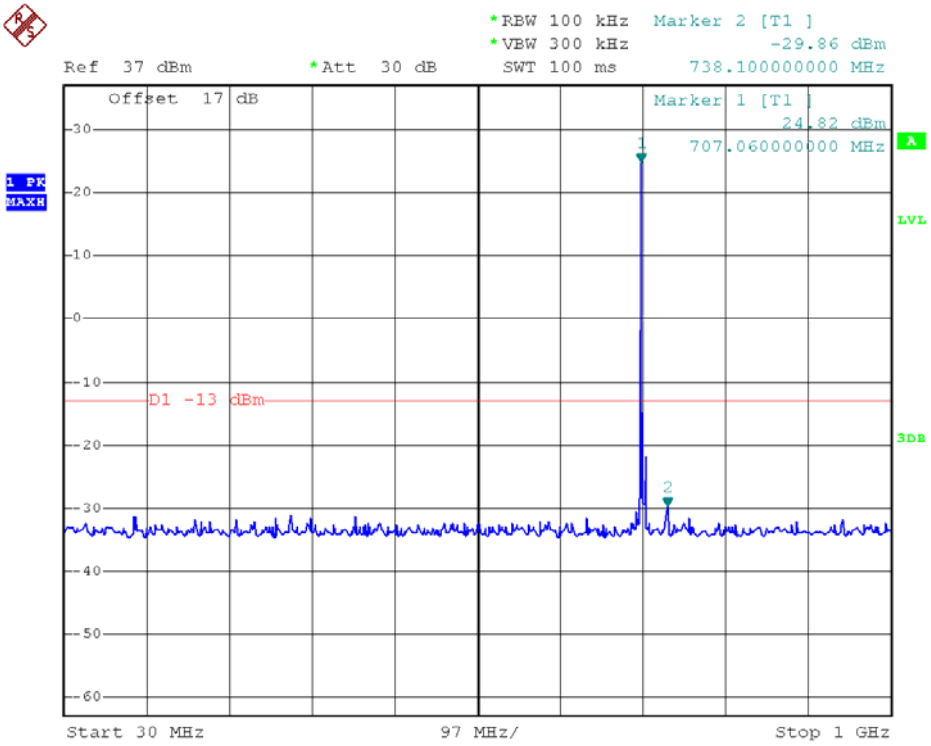


RB Size 1, RB Offset 0 30MHz to 1GHz

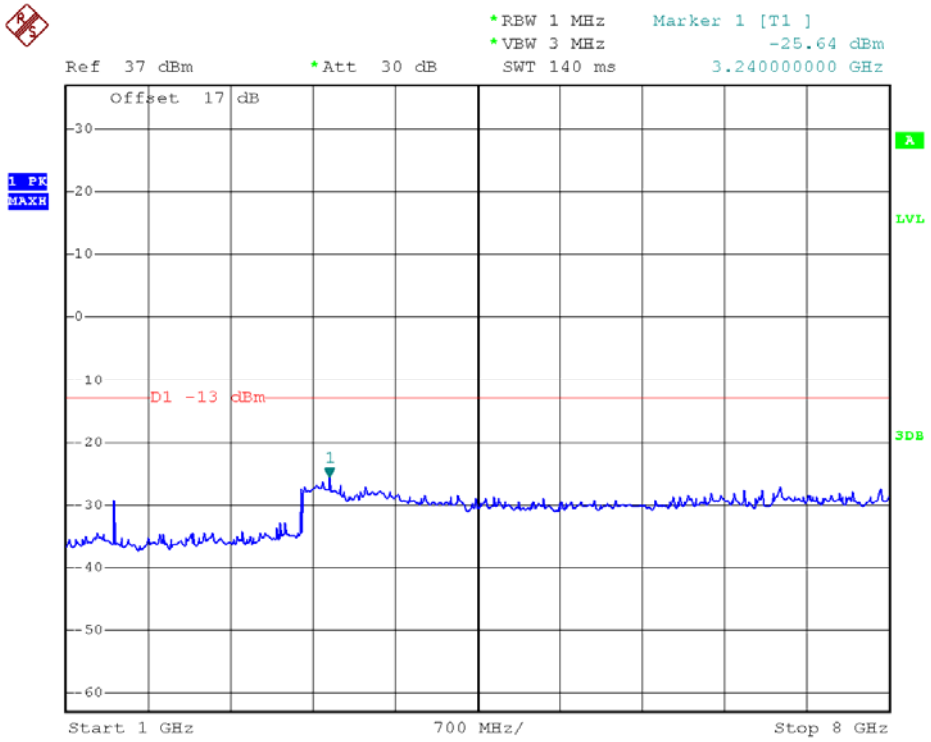


RB Size 1, RB Offset 0 1GHz to 8GHz

Band	LTE Band 12	Channel	Middle
Bandwidth	3MHz	Modulation	QPSK

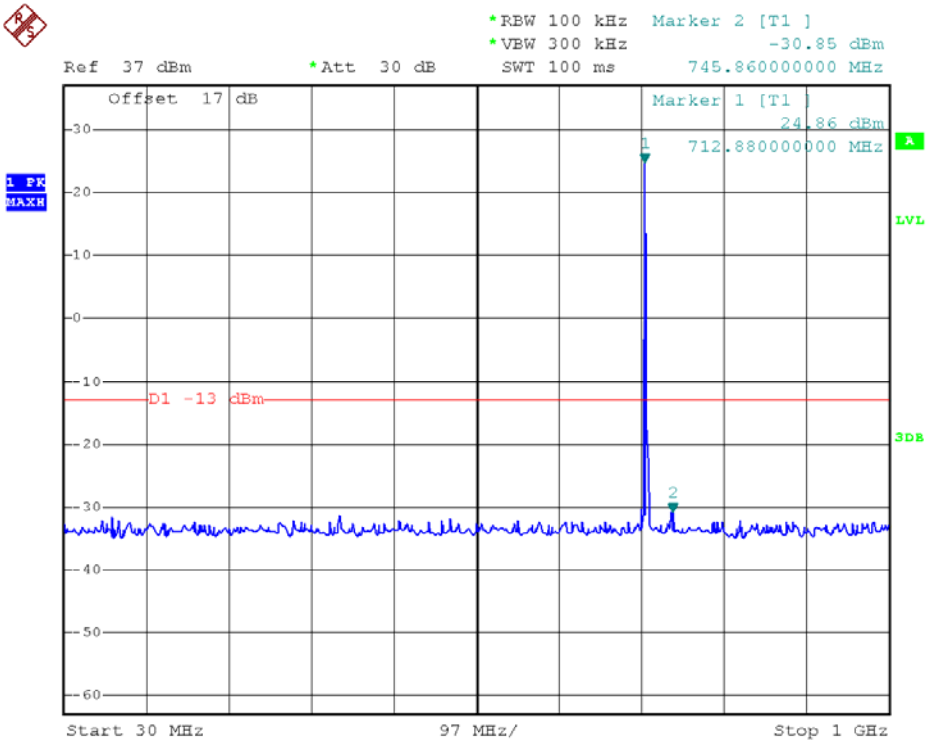


RB Size 1, RB Offset 0 30MHz to 1GHz

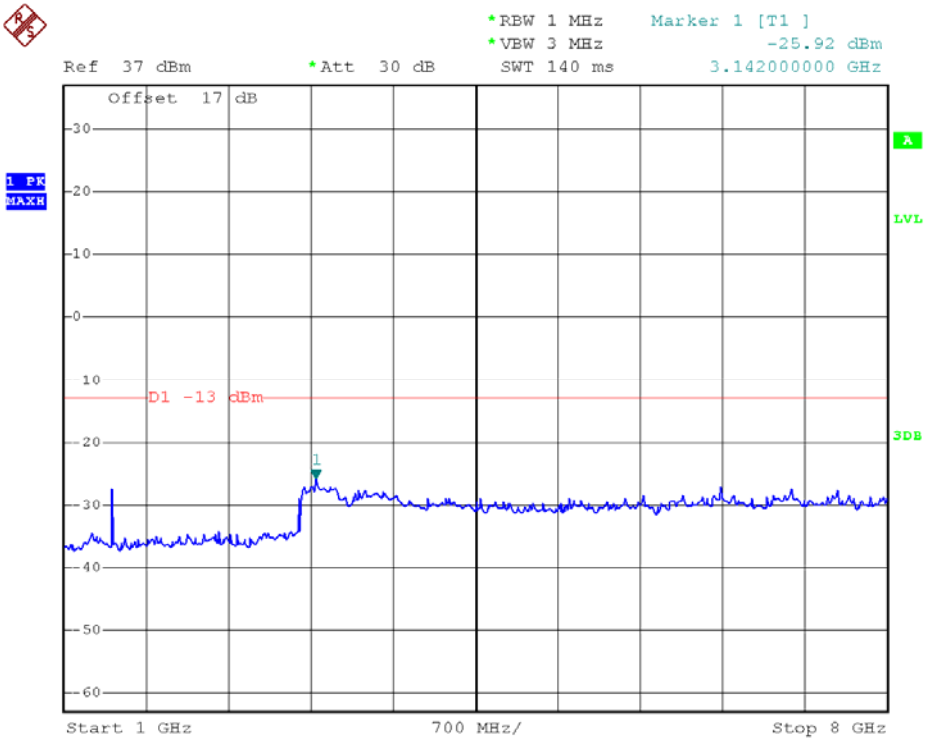


RB Size 1, RB Offset 0 1GHz to 8GHz

Band	LTE Band 12	Channel	High
Bandwidth	3MHz	Modulation	QPSK

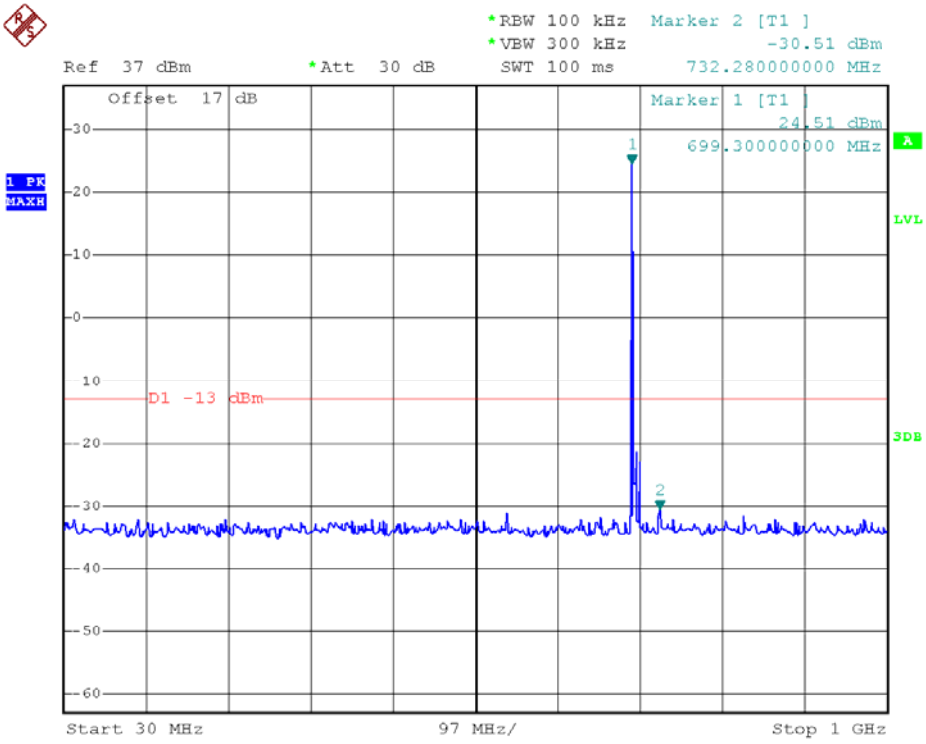


RB Size 1, RB Offset 0 30MHz to 1GHz

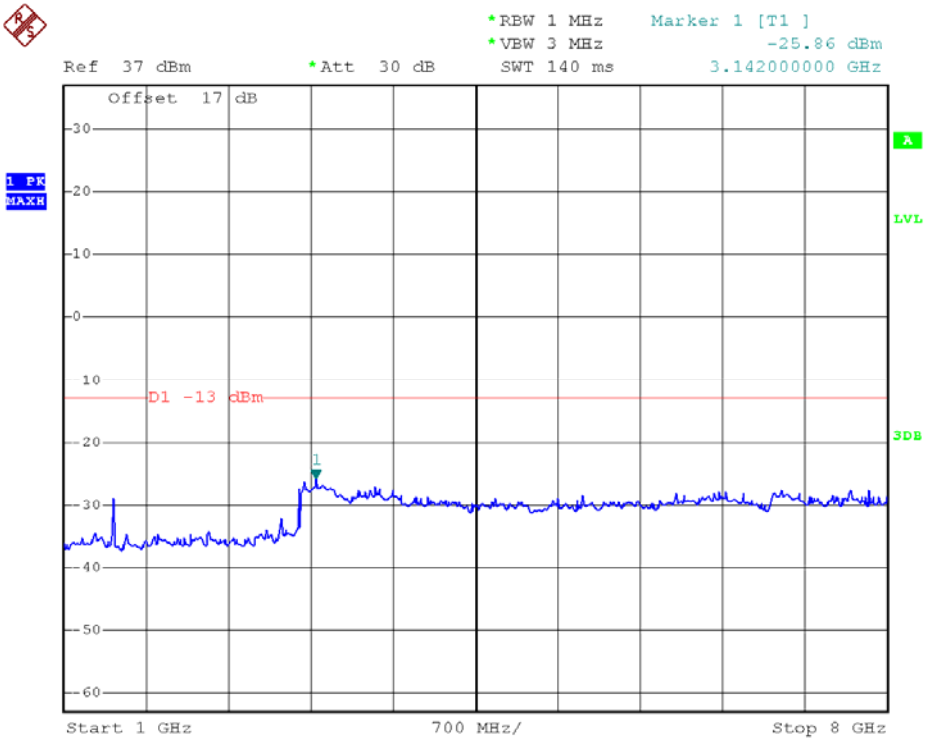


RB Size 1, RB Offset 0 1GHz to 8GHz

Band	LTE Band 12	Channel	Low
Bandwidth	5MHz	Modulation	QPSK

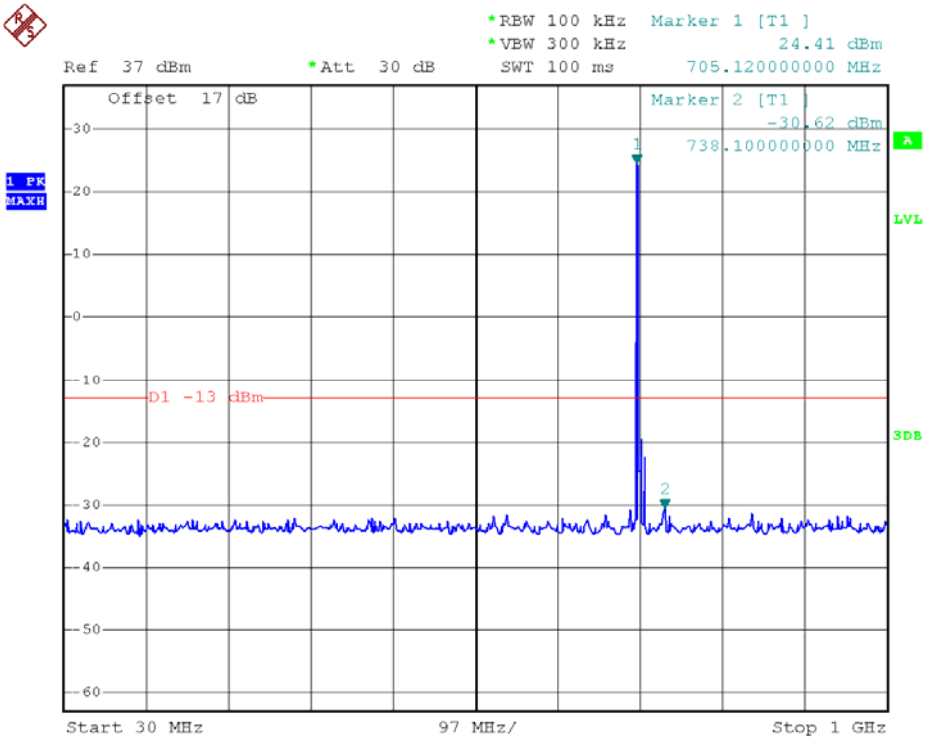


RB Size 1, RB Offset 0 30MHz to 1GHz

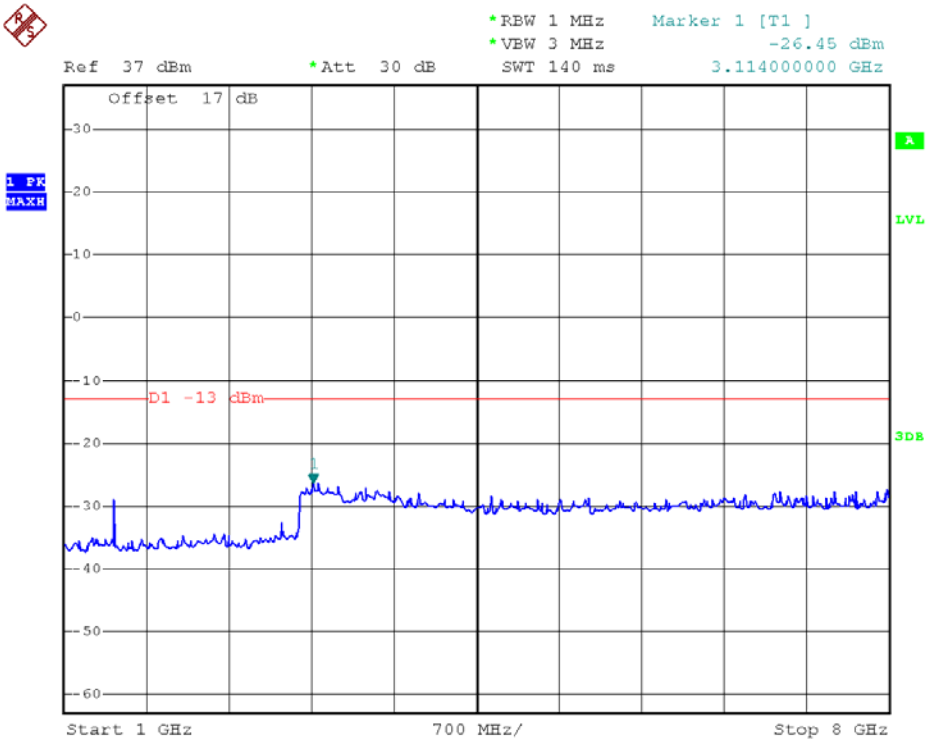


RB Size 1, RB Offset 0 1GHz to 8GHz

Band	LTE Band 12	Channel:	Middle
Bandwidth	5MHz	Modulation	QPSK

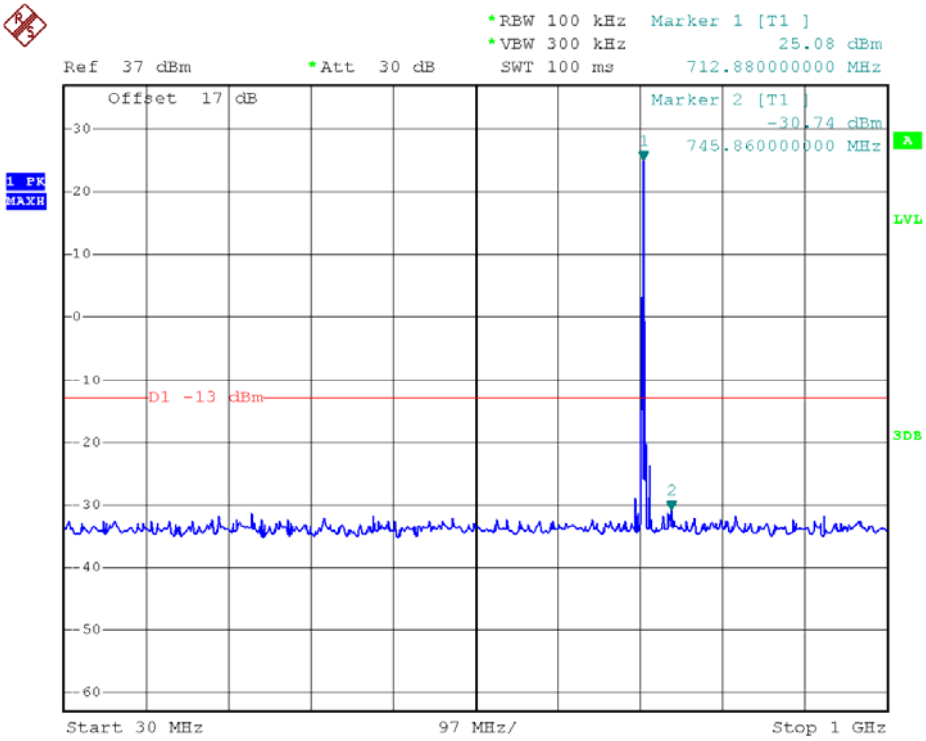


RB Size 1, RB Offset 0 30MHz to 1GHz

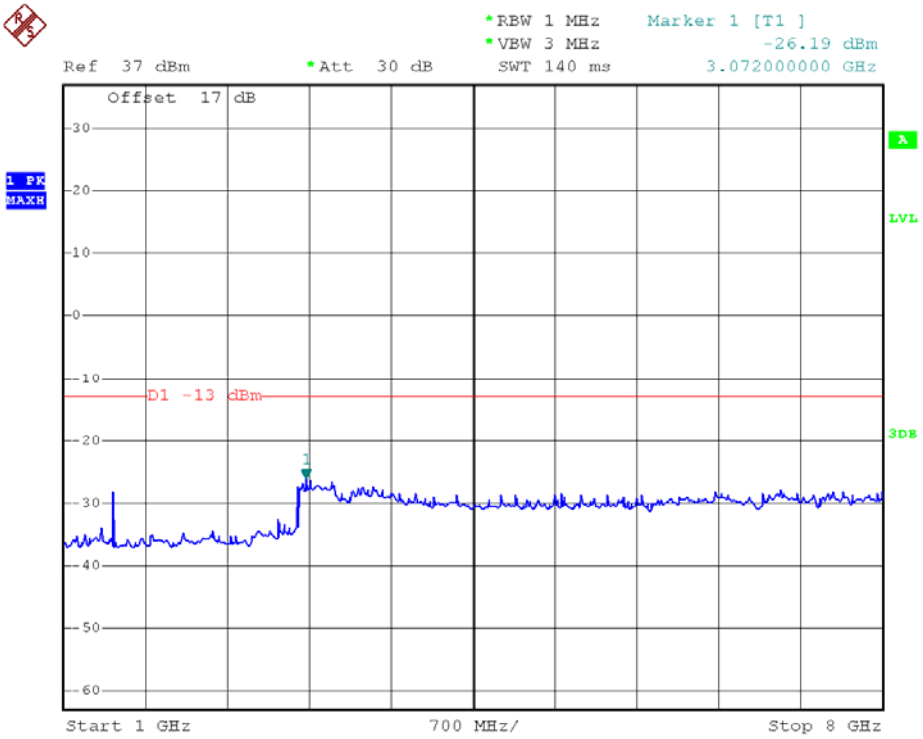


RB Size 1, RB Offset 0 1GHz to 8GHz

Band	LTE Band 12	Channel:	High
Bandwidth	5MHz	Modulation	QPSK

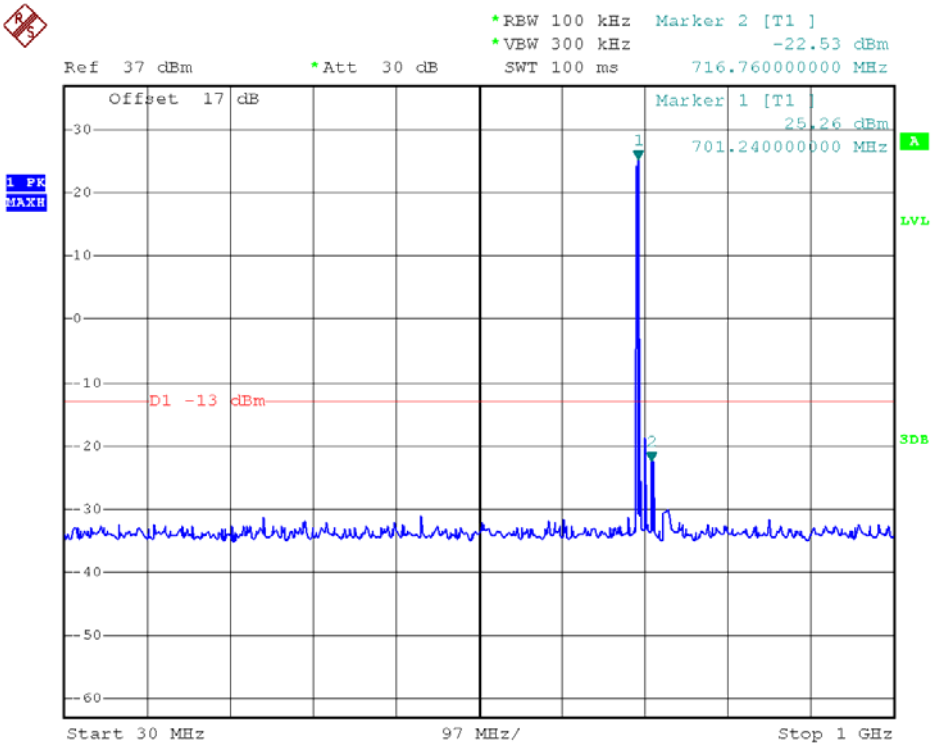


RB Size 1, RB Offset 0 30MHz to 1GHz

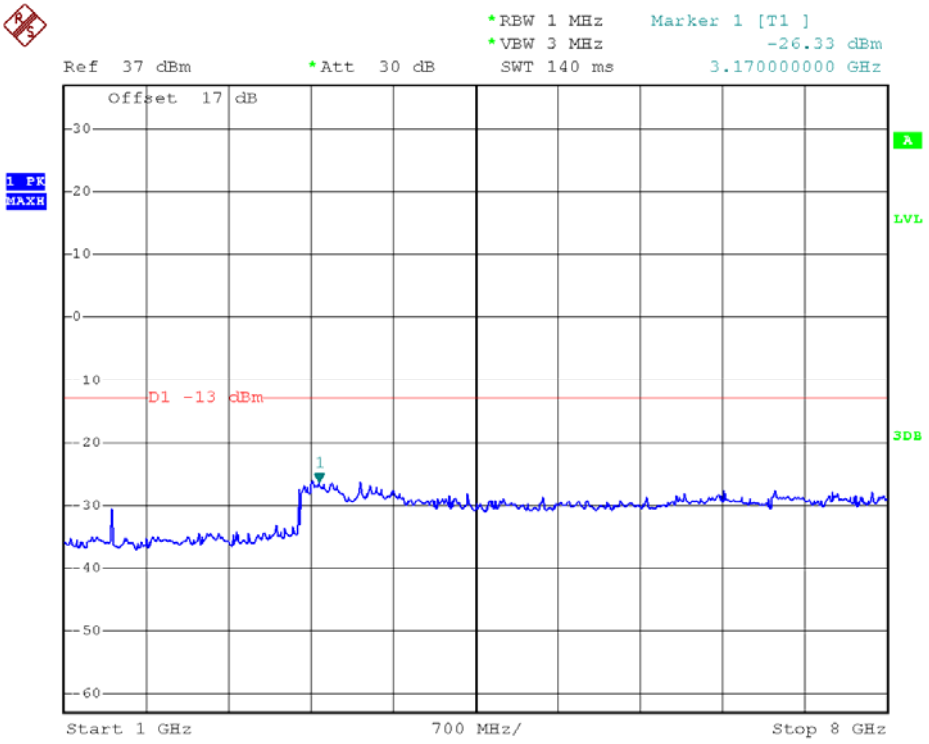


RB Size 1, RB Offset 0 1GHz to 8GHz

Band	LTE Band 12	Channel:	Low
Bandwidth	10MHz	Modulation	QPSK

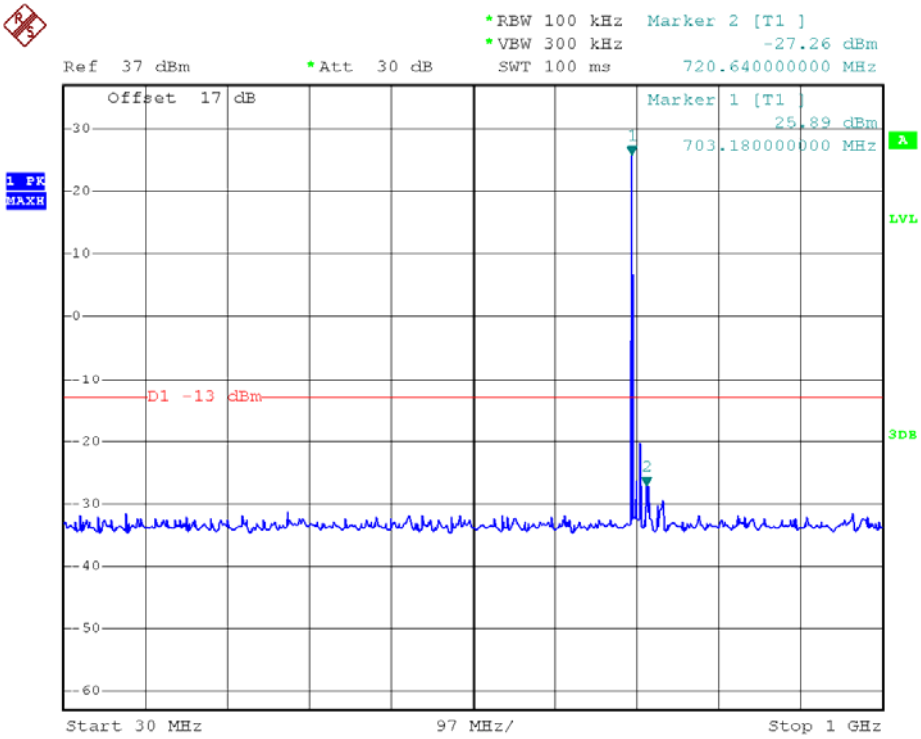


RB Size 1, RB Offset 0 30MHz to 1GHz

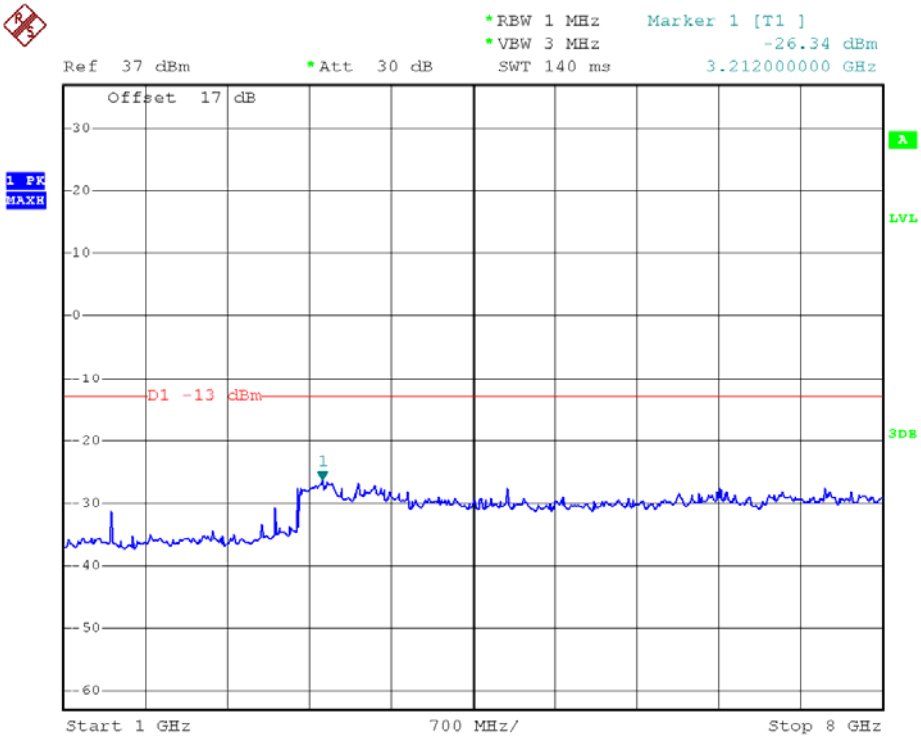


RB Size 1, RB Offset 0 1GHz to 8GHz

Band	LTE Band 12	Channel	Middle
Bandwidth	10MHz	Modulation	QPSK

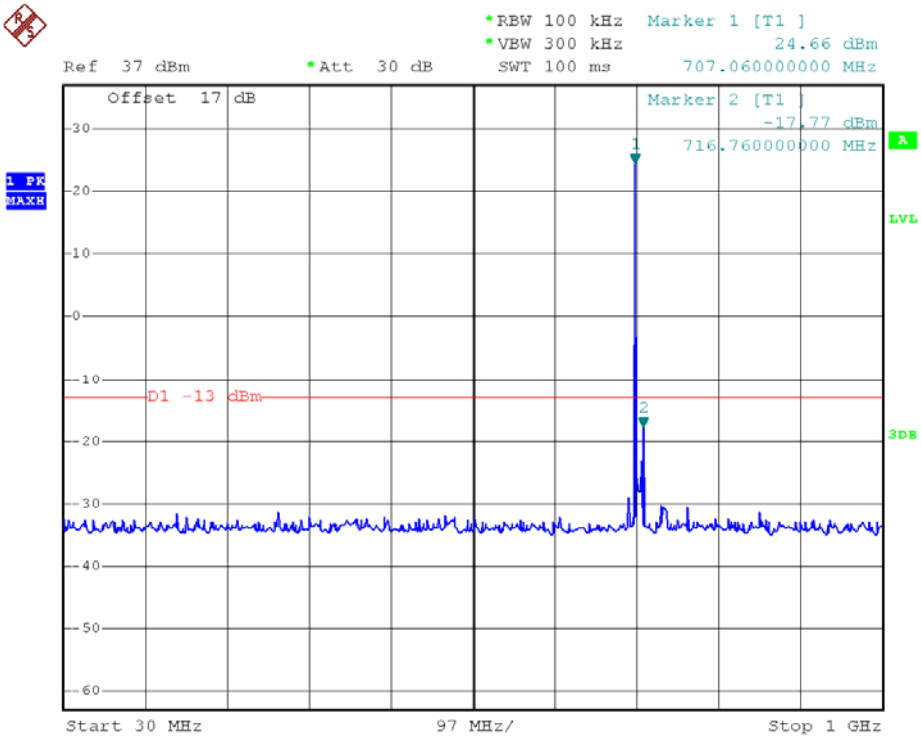


RB Size 1, RB Offset 0 30MHz to 1GHz

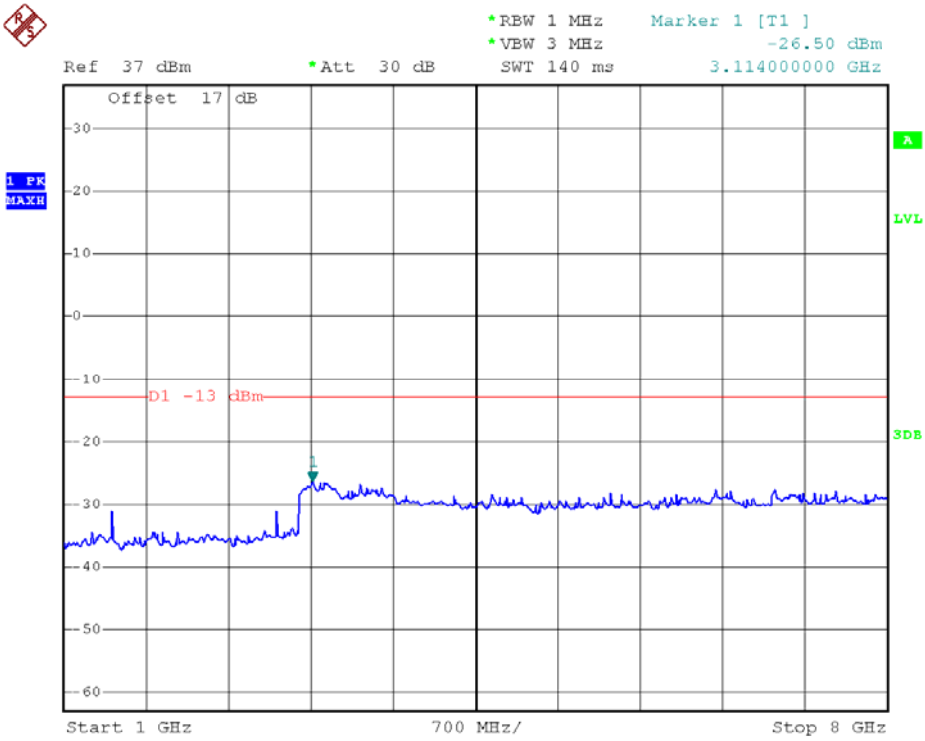


RB Size 1, RB Offset 0 1GHz to 8GHz

Band	LTE Band 12	Channel	High
Bandwidth	10MHz	Modulation	QPSK



RB Size 1, RB Offset 0 30MHz to 1GHz



RB Size 1, RB Offset 0 1GHz to 8GHz

2.6 Conducted Band Edge

2.6.1 Description of Conducted Band Edge Measurement

24.238(a) for Band 2

For operations in the 1850 -1910 MHz band, the FCC limit is 43 + 10log10 (P [Watts]) dB below the transmitter power P(Watts) in a 1MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to a 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.

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.

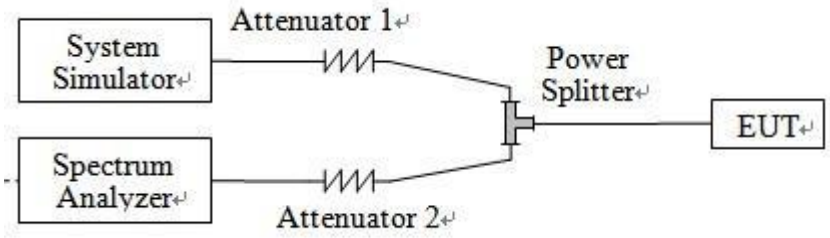
27.53 (m)(4) for Band 7

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

2.6.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.6.3 Test Setup

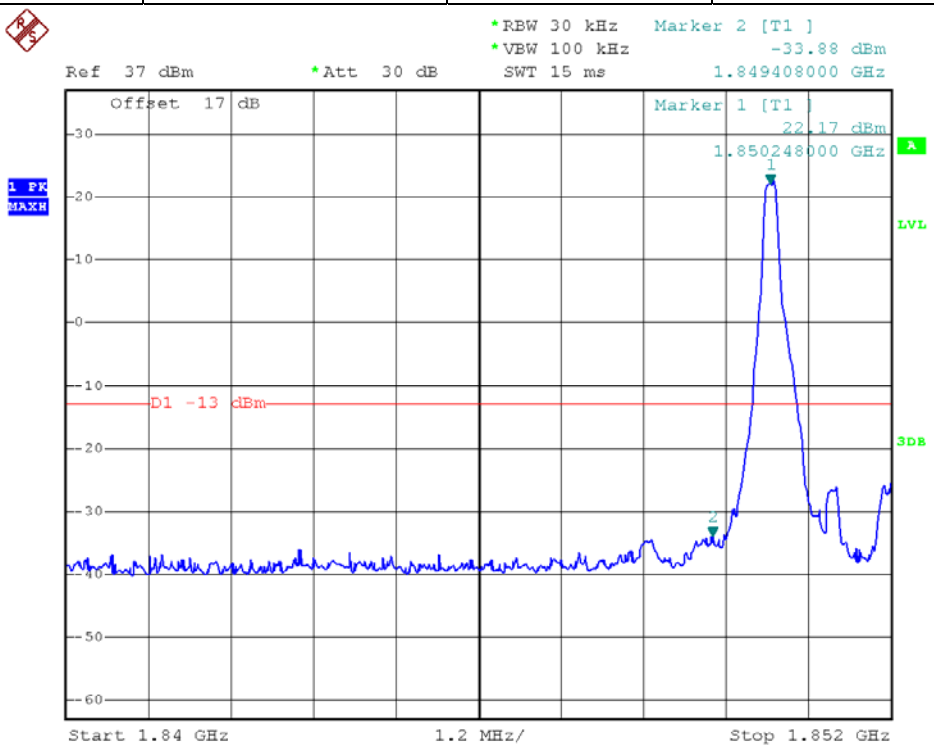


2.6.4 Test Procedures

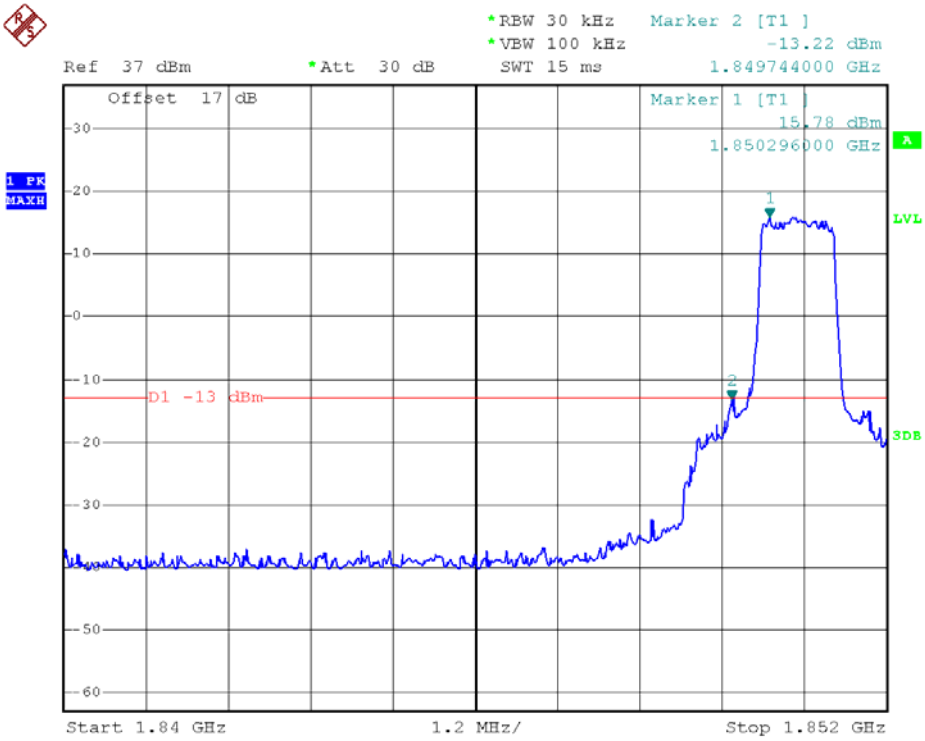
1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set RBW>= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with RMS detector.
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.
   <For Band 7>
   The limit line is derived from 55+ 10log (P)dB below the transmitter power P(Watts)
   = P(W)- [55 + 10log(P)] (dB)
   = [30 + 10log (P)] (dBm) - [55 + 10log (P)] (dB)
   = -25dBm.

2.6.5 Test Result of Conducted Band Edge

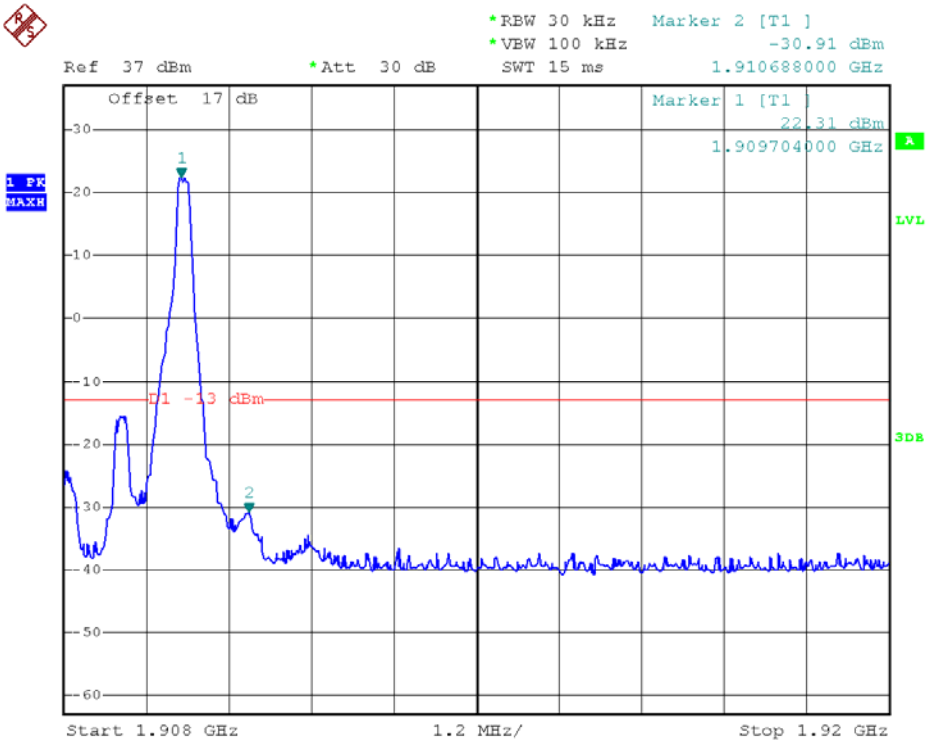
Band	LTE Band 2	Modulation	QPSK
Bandwidth	1.4MHz		



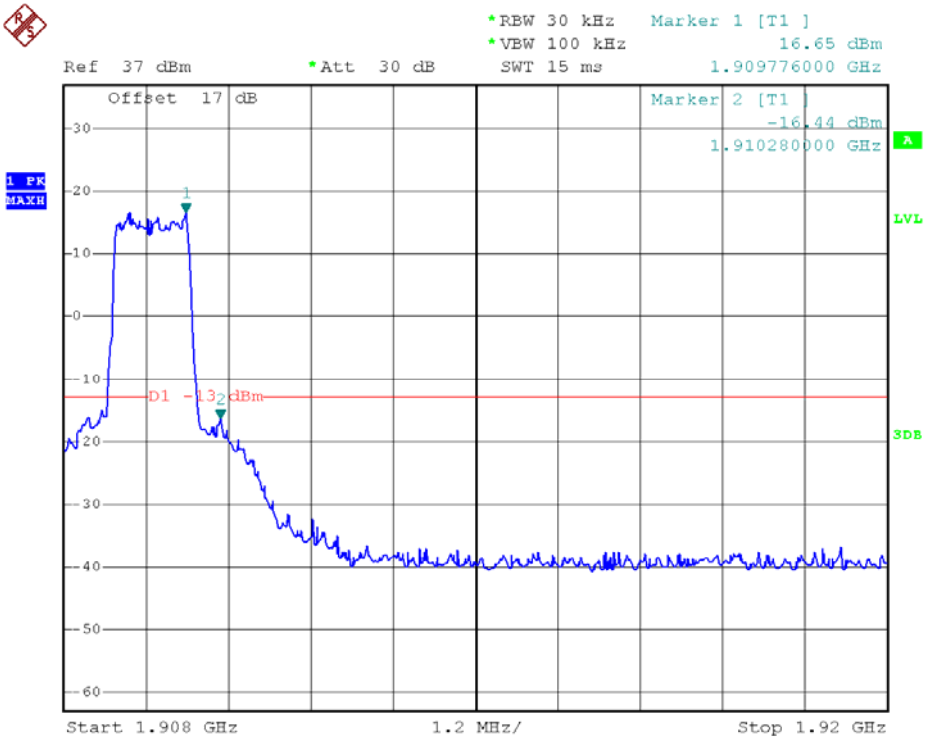
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 6, RB Offset 0

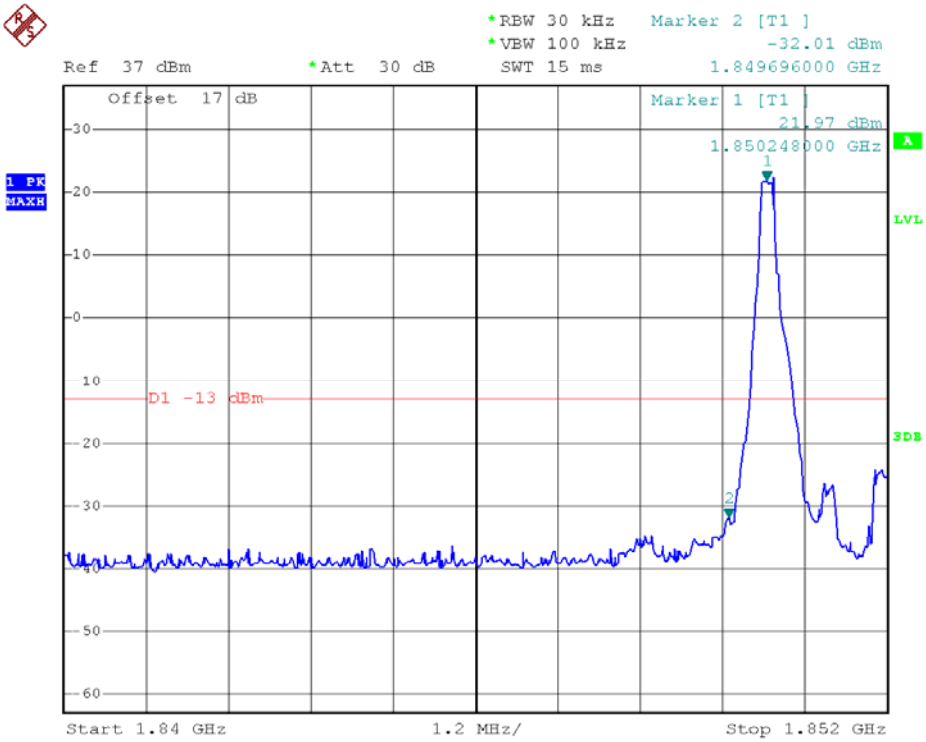


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 5

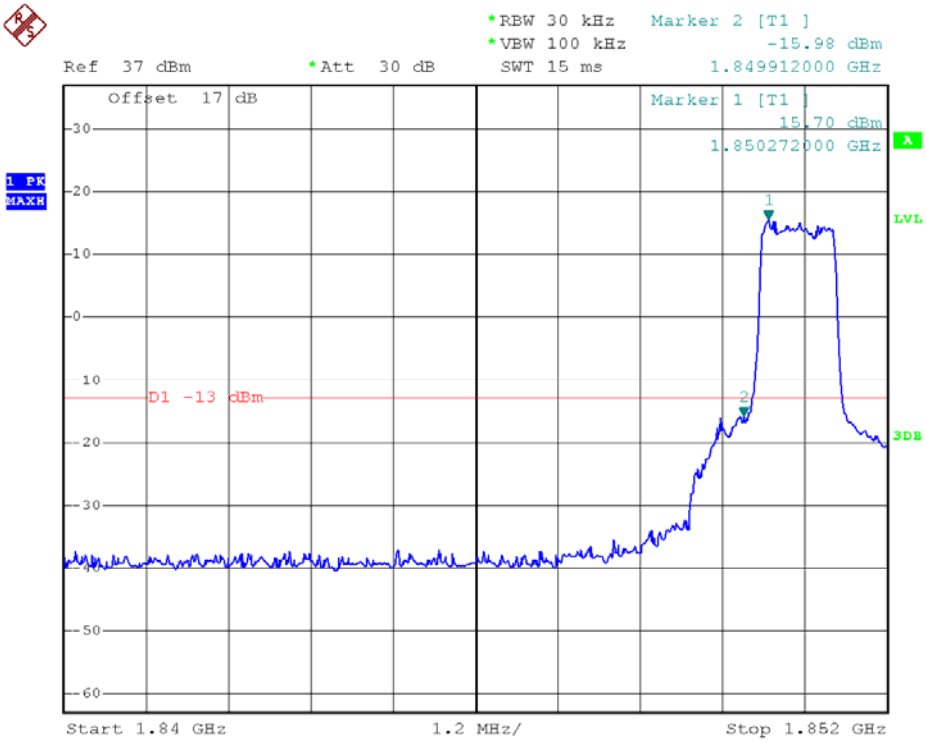


Higher Band Edge Plot for QPSK-RB Size 6, RB Offset 0

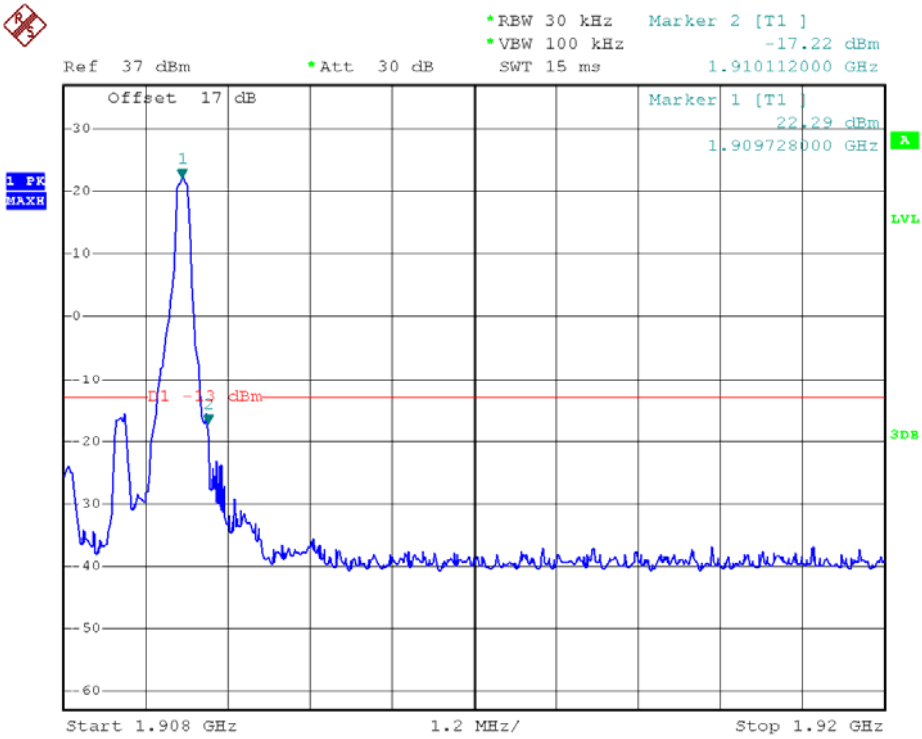
Band	LTE Band 2	Modulation	16QAM
Bandwidth	1.4MHz		



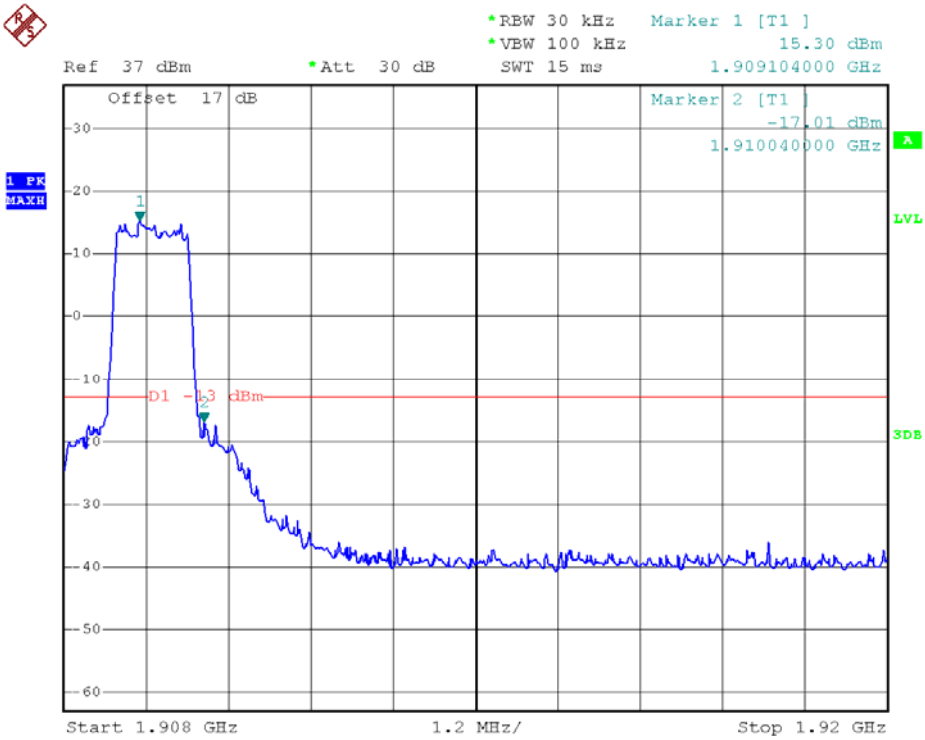
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM-RB Size 6, RB Offset 0



Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 5



Higher Band Edge Plot for 16QAM-RB Size 6, RB Offset 0