

## 11.2.5 Block edge compliance

### Description:

The spectrum at the band edges must comply with the spurious emissions limits.

### Measurement:

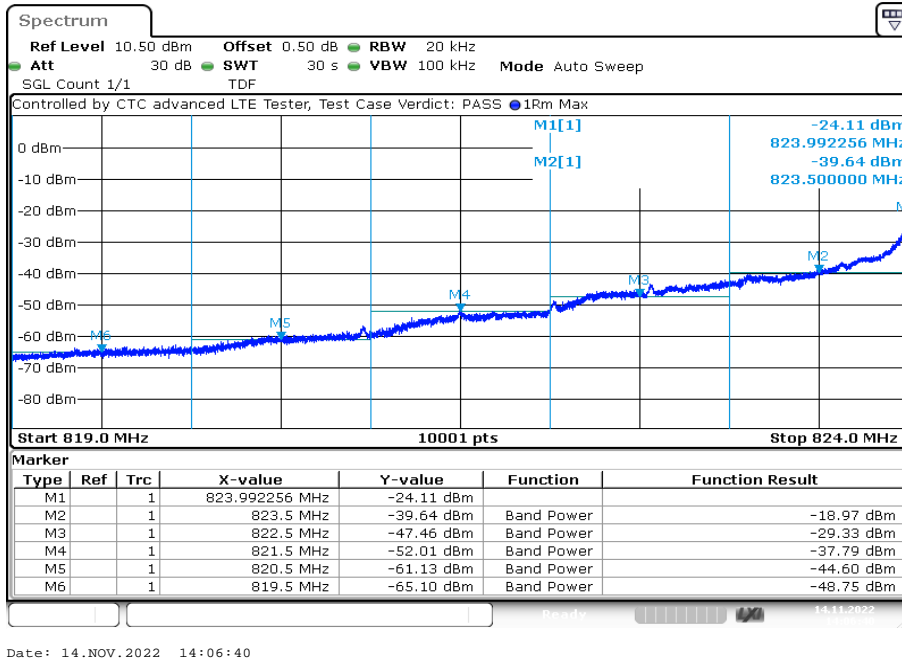
Measurement parameters	
Detector:	RMS
Sweep time:	30s
Resolution bandwidth:	> 1% of the emission bandwidth
Video bandwidth:	> 3xRBW
Span:	5 MHz
Trace mode:	Max Hold
Measurement function:	1 MHz band power
Used equipment:	See chapter 7.2 setup A
Measurement uncertainty:	See chapter 8
Measurement procedure:	FCC: § 2.1051

### Limits:

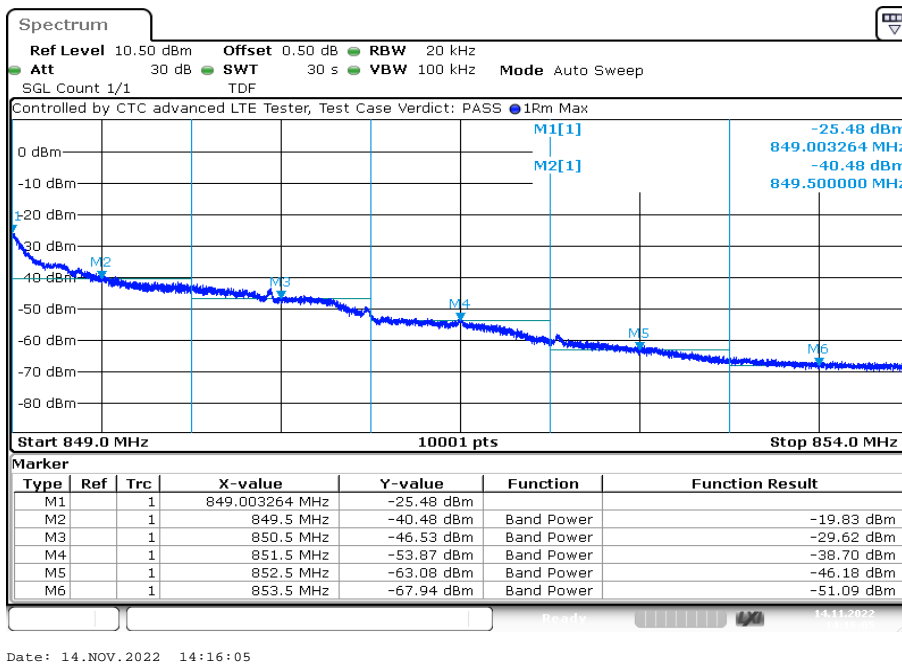
FCC
§ 22.917(a) & (b)
<p>(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least <b>43 + 10 log(P) dB</b>.</p> <p>(b)(1) In the spectrum below 1 GHz, instrumentation should employ a reference bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block, a RBW of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy, provided that the measured power is integrated over the full required reference bandwidth (i.e., 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.</p> <p>(b)(2) In the spectrum above 1 GHz, instrumentation should employ a reference bandwidth of 1 MHz.</p>
<p style="text-align: center;"><b>-13 dBm</b></p> <p style="text-align: center;">Correction factor according to KDB 890810 if RBW &lt; 1 % emission bandwidth:</p> <p style="text-align: center;"><input checked="" type="checkbox"/> N/A here</p> <p style="text-align: center;"><input type="checkbox"/> <math>10 \log (RBW1/RBW2) = X \text{ dB}</math>; whereas: <math>RBW1 = Y, RBW2 = Z</math></p>

**Results:**

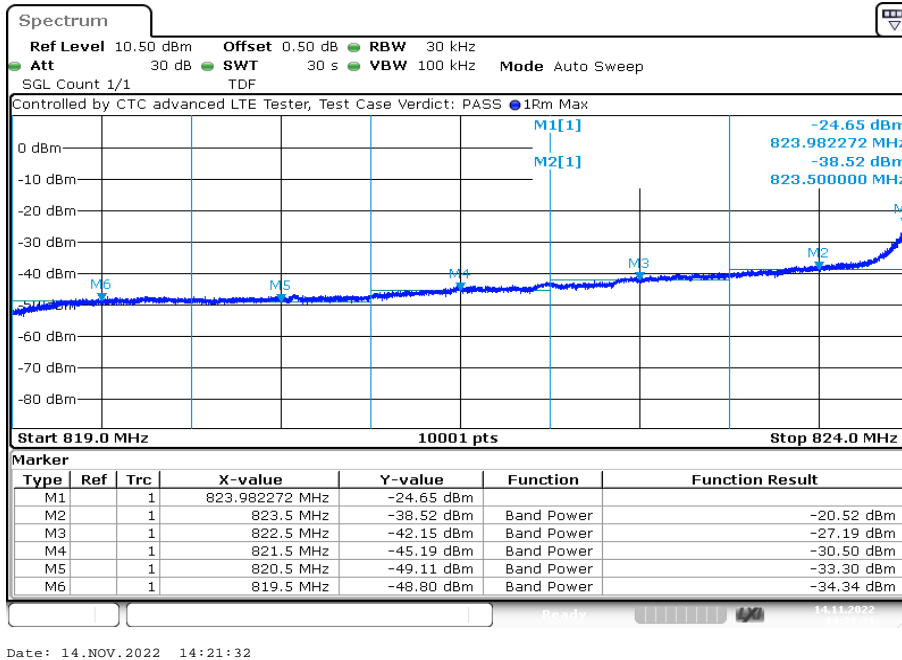
**Plot 1:** 1.4 MHz – QPSK - Lowest channel



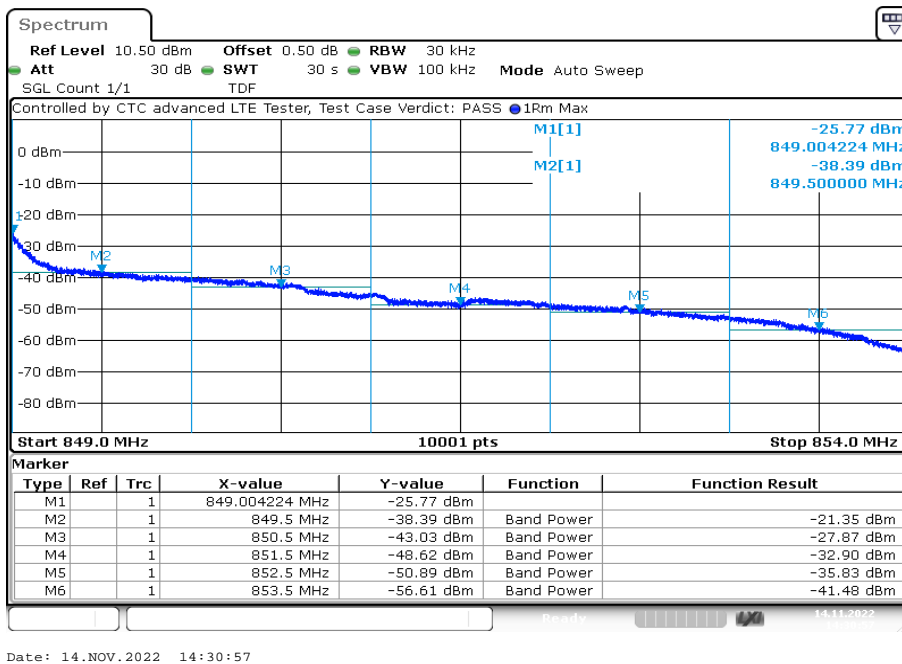
**Plot 2:** 1.4 MHz – QPSK - Highest channel



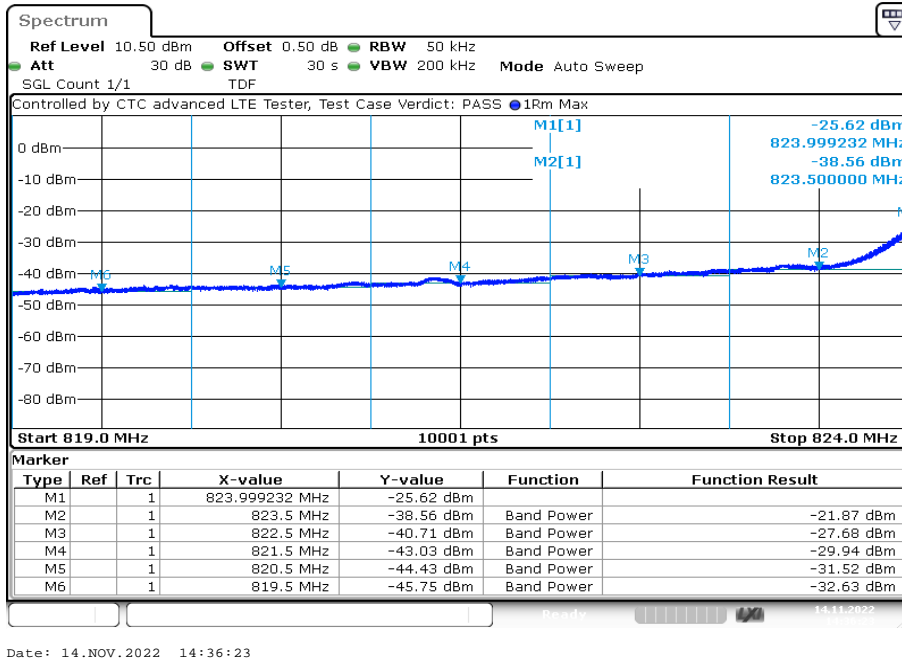
**Plot 3:** 3 MHz – QPSK - Lowest channel



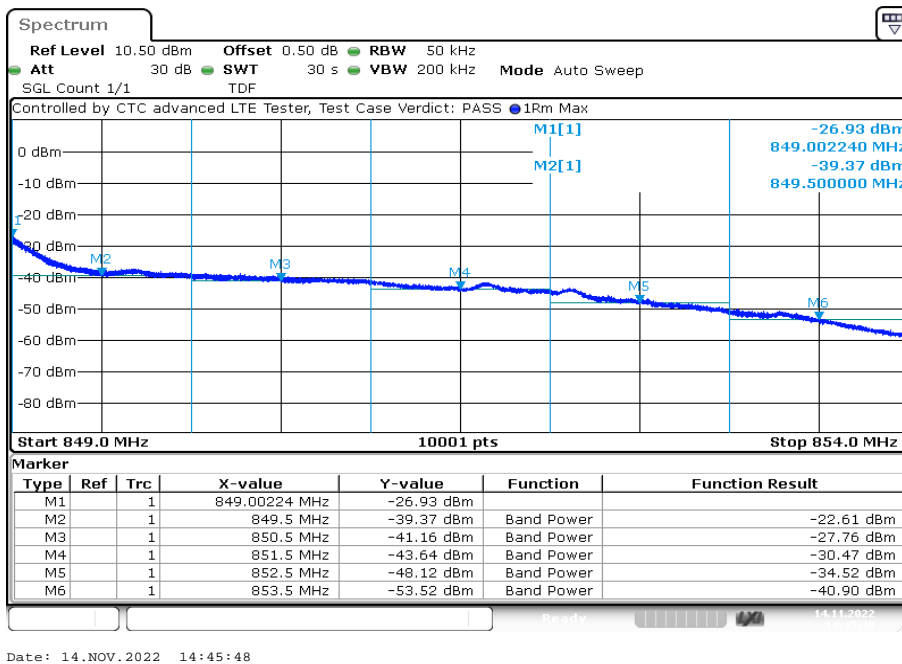
**Plot 4:** 3 MHz – QPSK - Highest channel



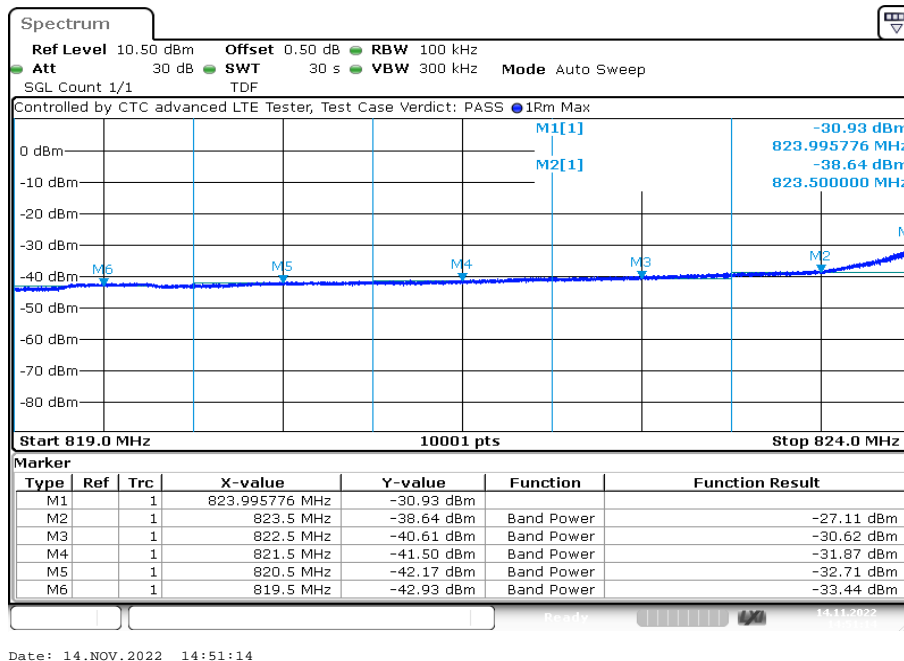
**Plot 5:** 5 MHz – QPSK - Lowest channel



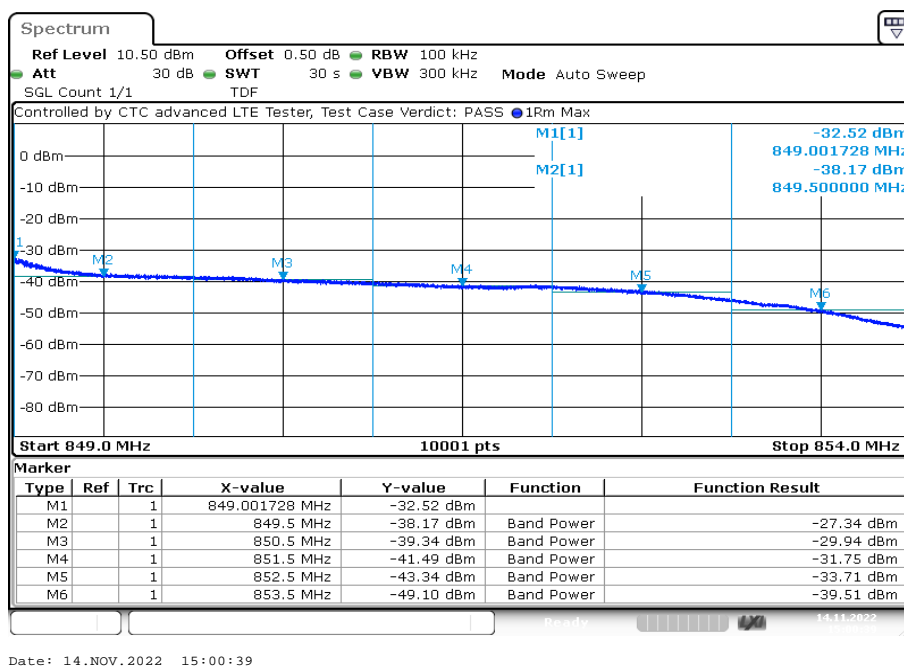
**Plot 6:** 5 MHz – QPSK - Highest channel



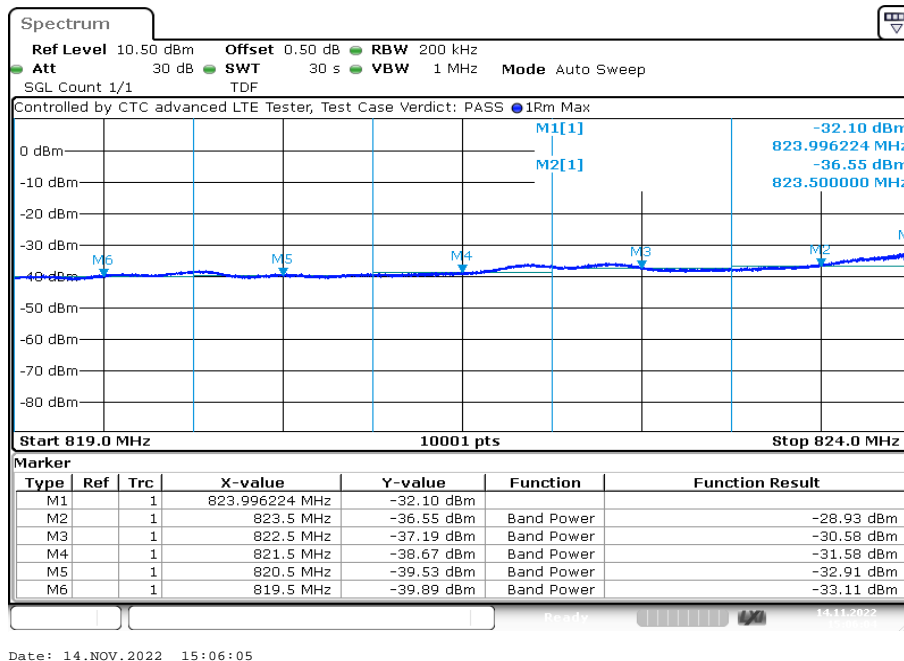
**Plot 7:** 10 MHz – QPSK - Lowest channel



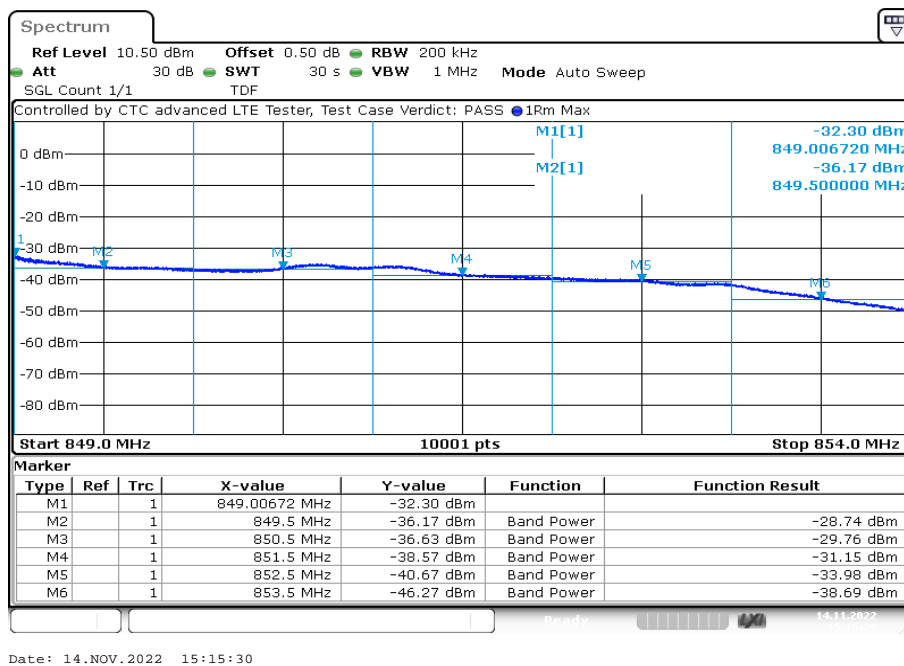
**Plot 8:** 10 MHz – QPSK - Highest channel



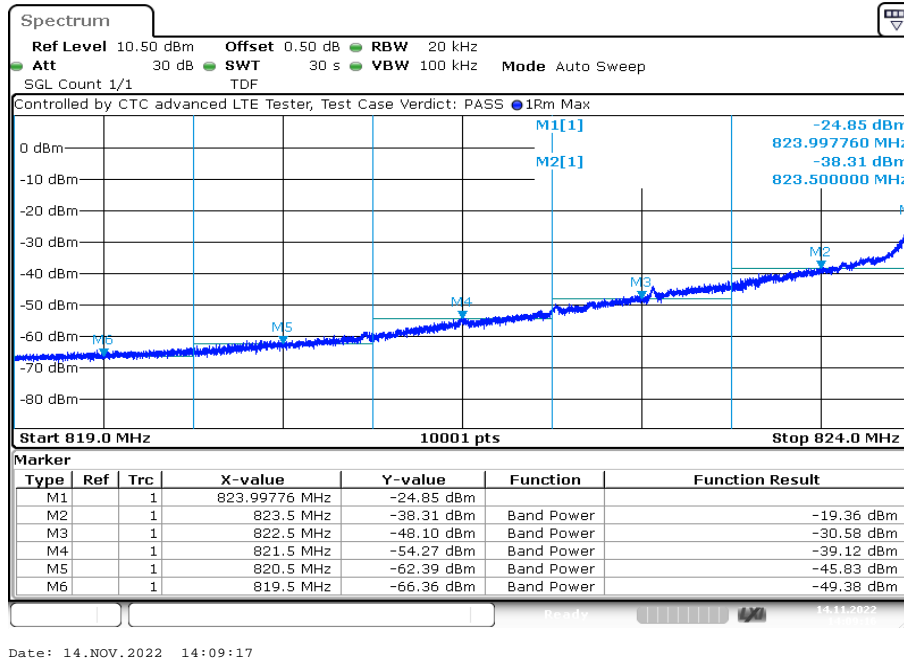
**Plot 9:** 15 MHz – QPSK - Lowest channel



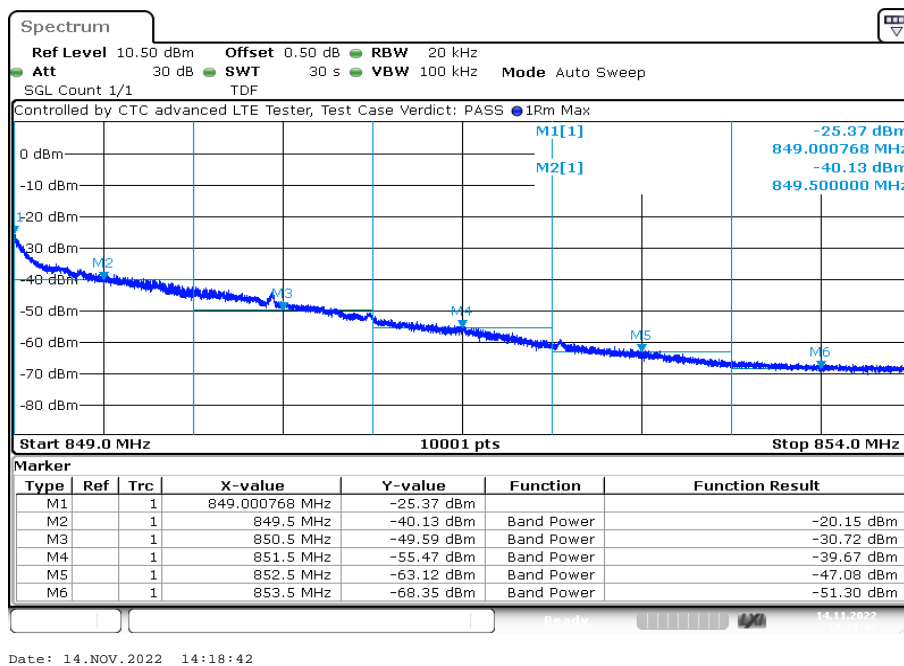
**Plot 10:** 15 MHz – QPSK - Highest channel



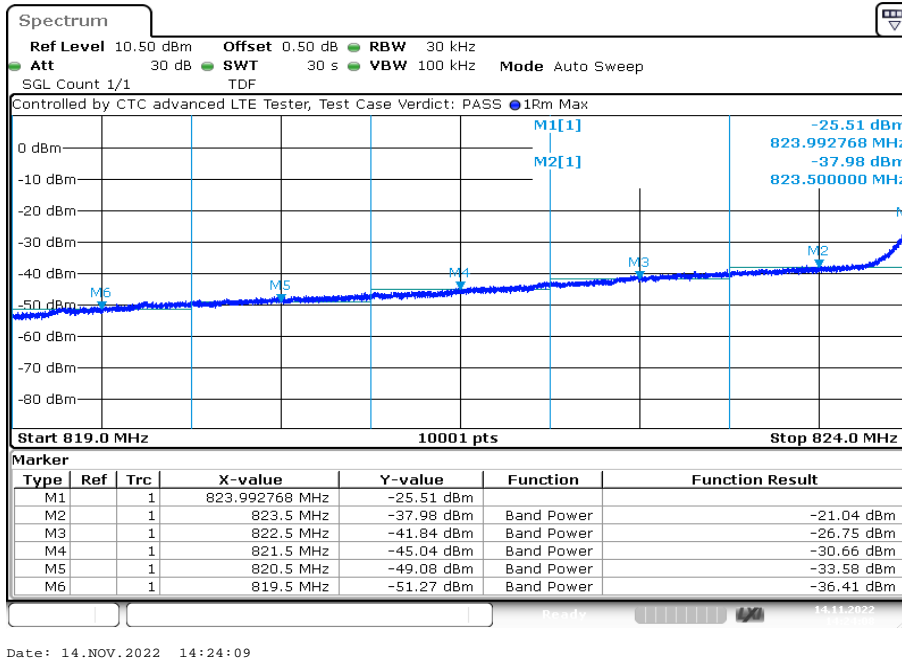
Plot 11: 1.4 MHz – 16-QAM - Lowest channel



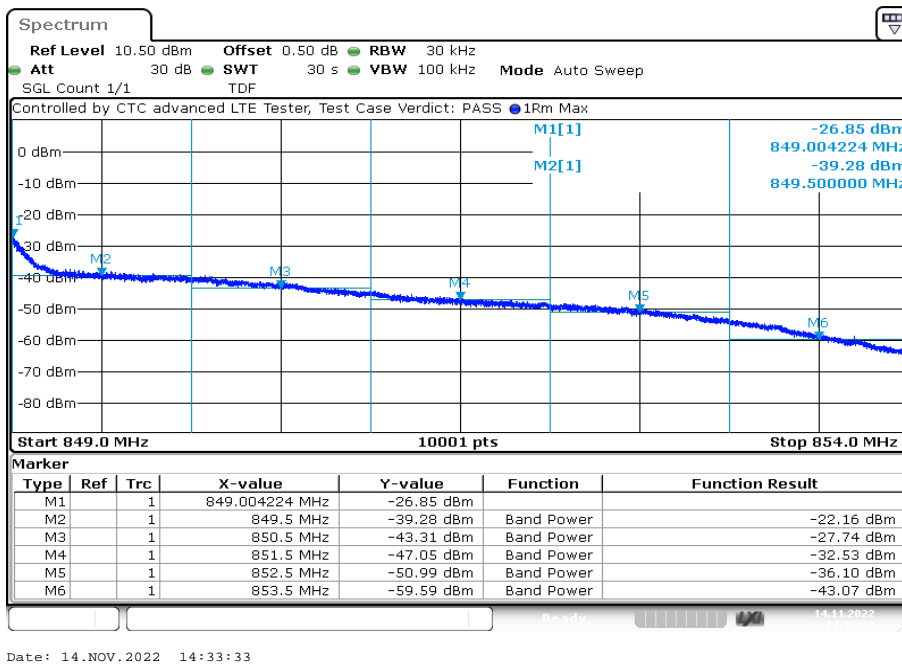
Plot 12: 1.4 MHz – 16-QAM - Highest channel



Plot 13: 3 MHz – 16-QAM - Lowest channel

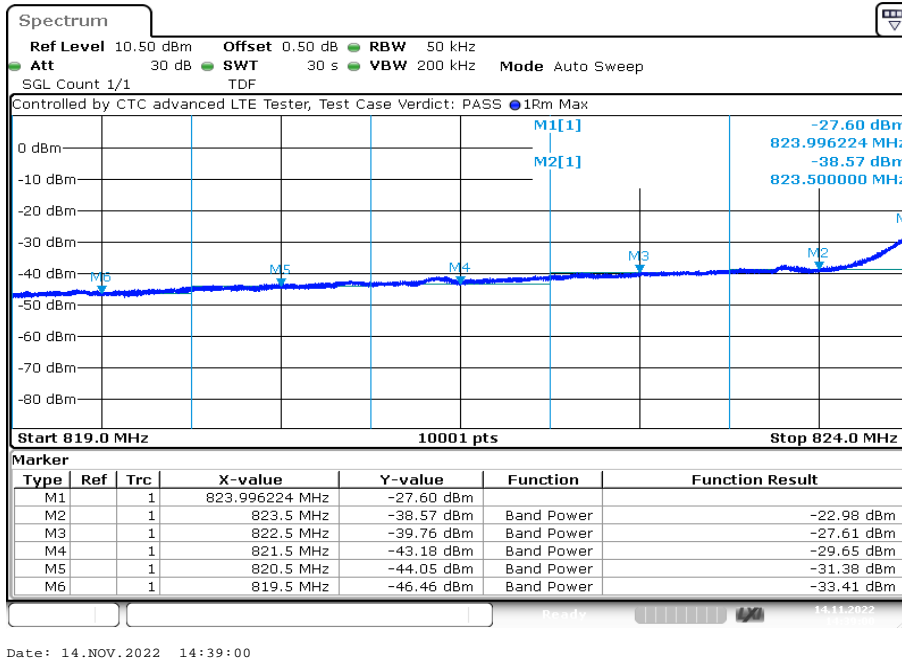


Plot 14: 3 MHz – 16-QAM - Highest channel

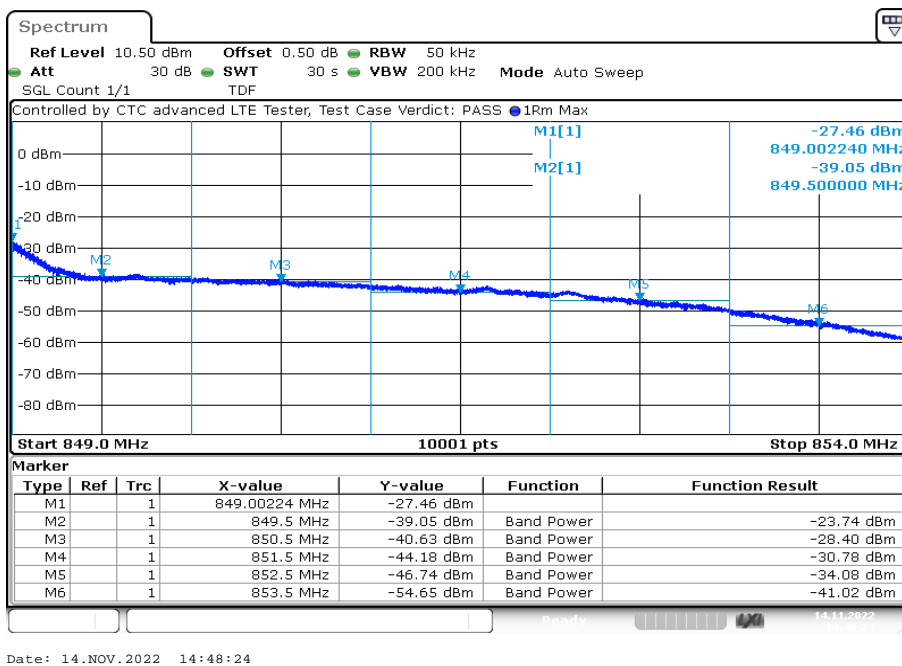




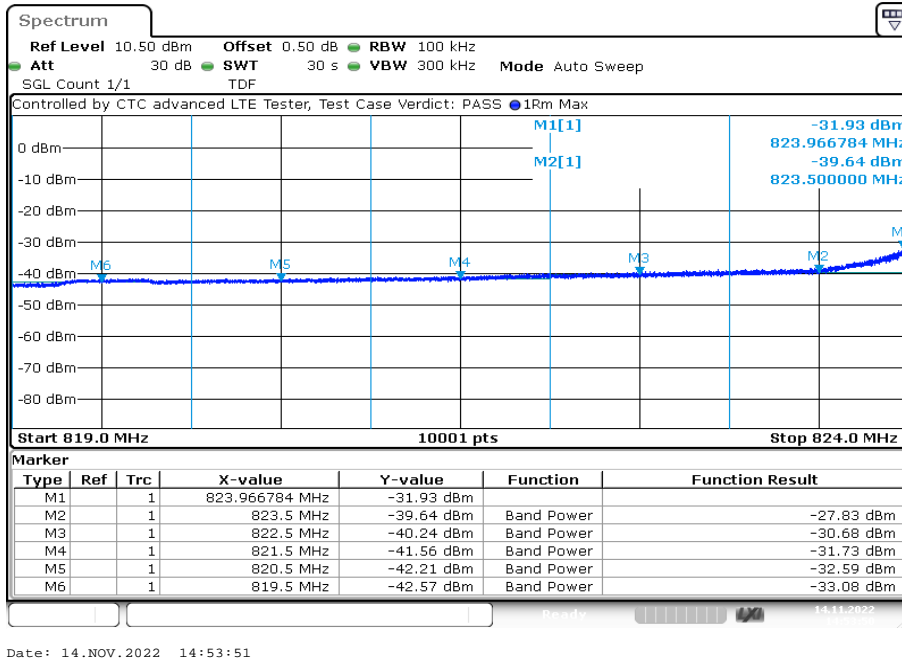
Plot 15: 5 MHz – 16-QAM - Lowest channel



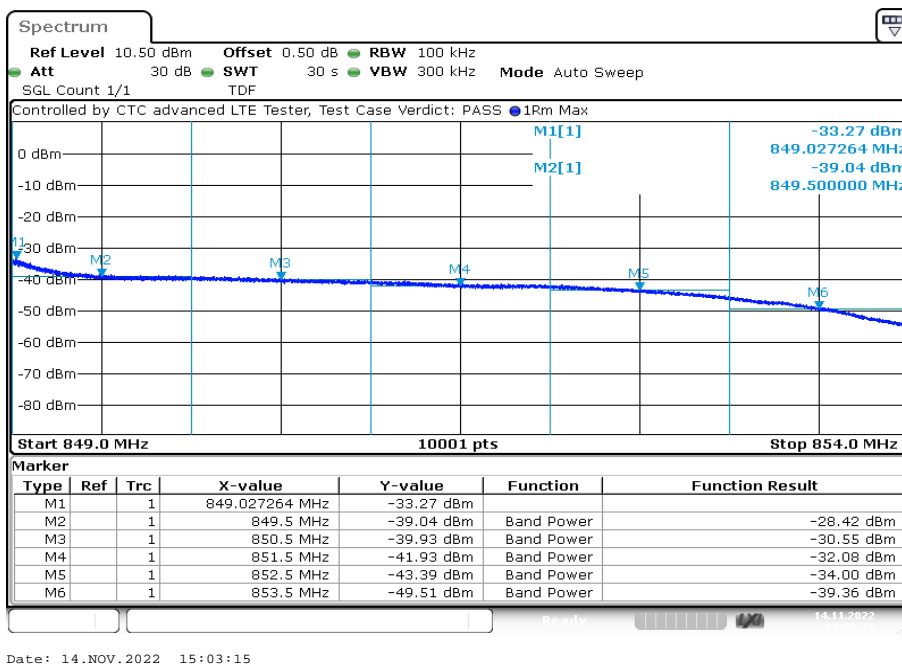
Plot 16: 5 MHz – 16-QAM - Highest channel



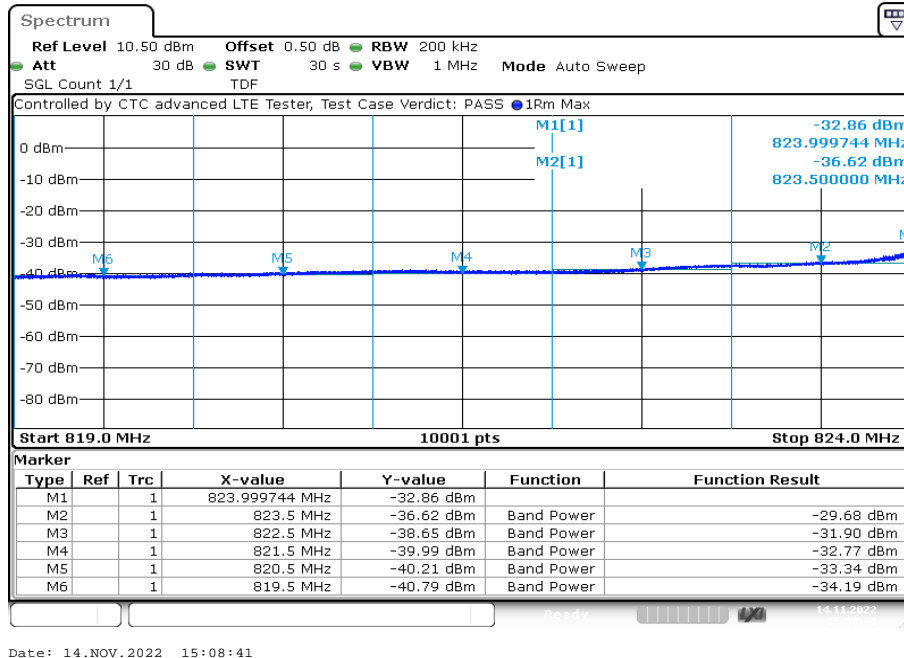
Plot 17: 10 MHz – 16-QAM - Lowest channel



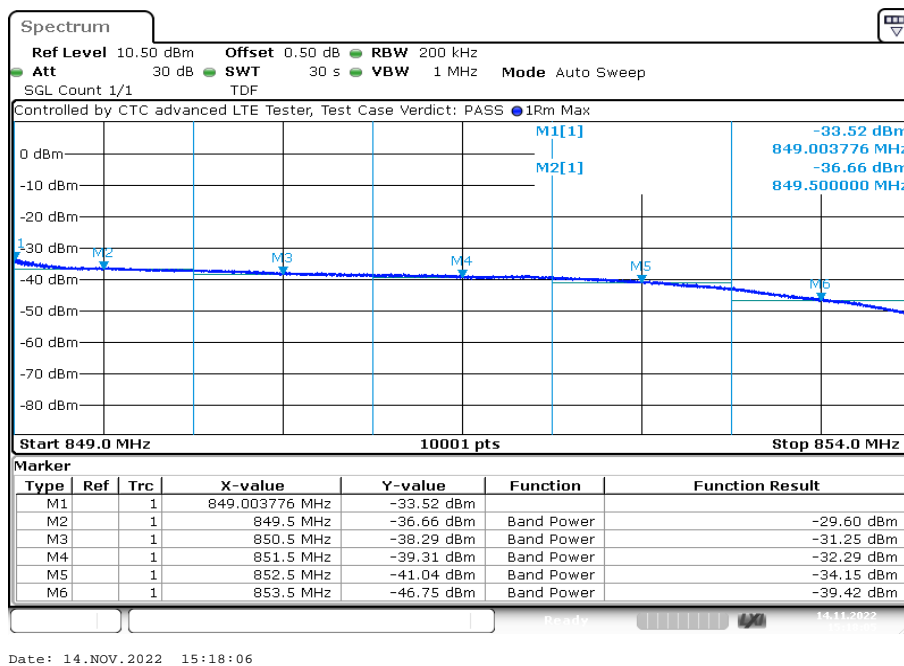
Plot 18: 10 MHz – 16-QAM - Highest channel



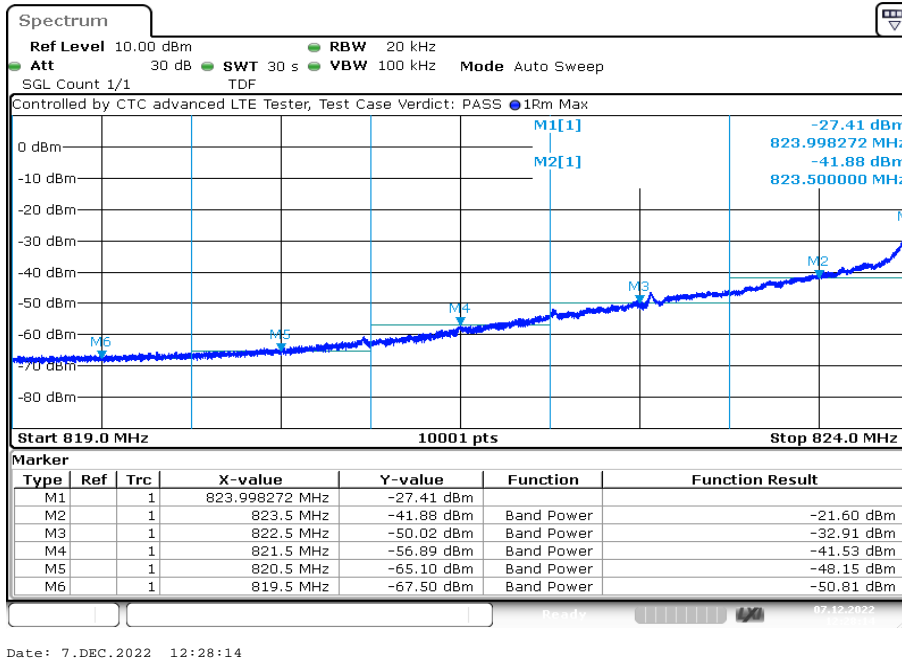
Plot 19: 15 MHz – 16-QAM - Lowest channel



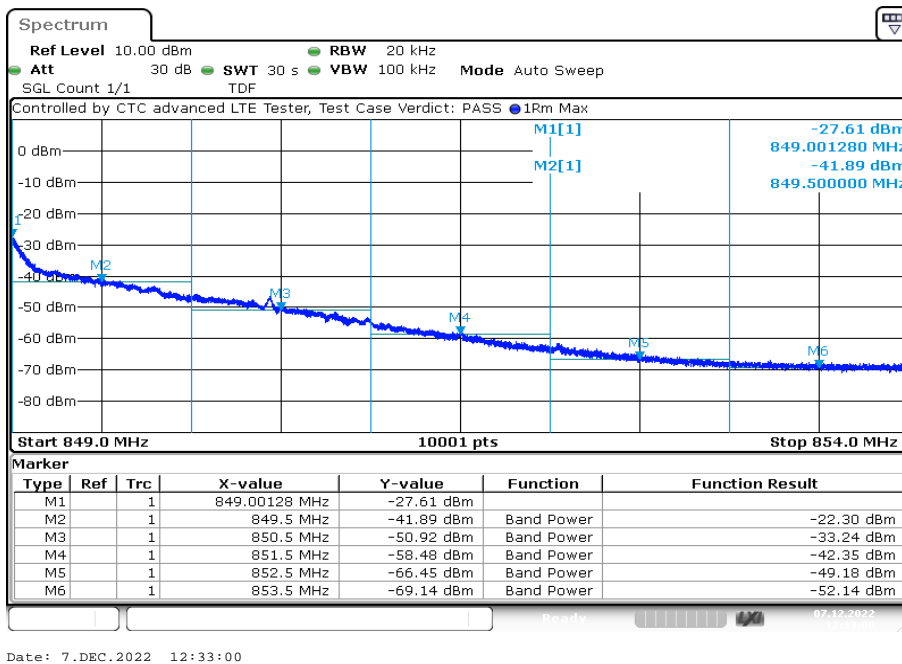
Plot 20: 15 MHz – 16-QAM - Highest channel



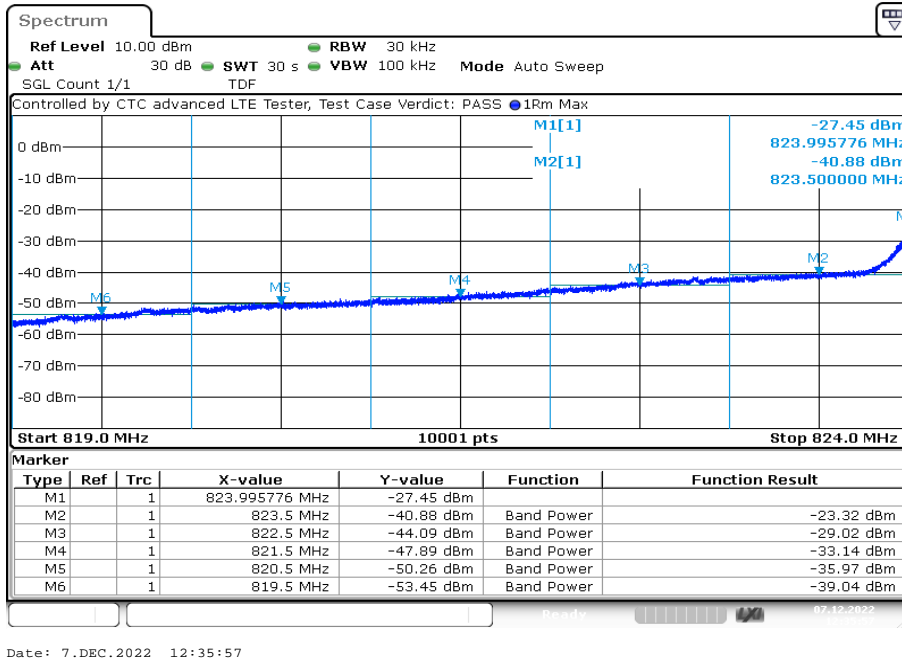
Plot 21: 1.4 MHz – 64-QAM - Lowest channel



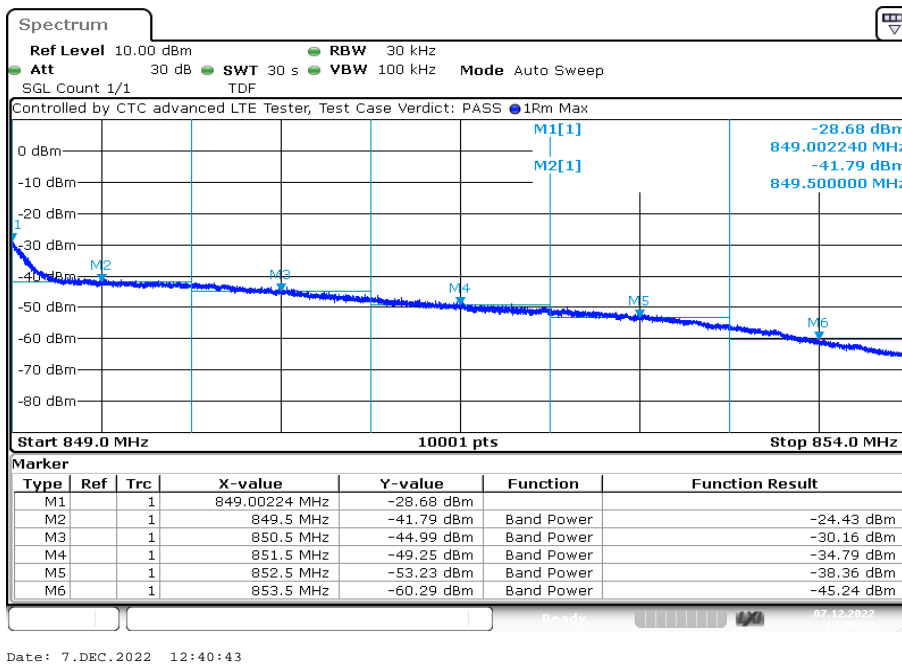
Plot 22: 1.4 MHz – 64-QAM - Highest channel



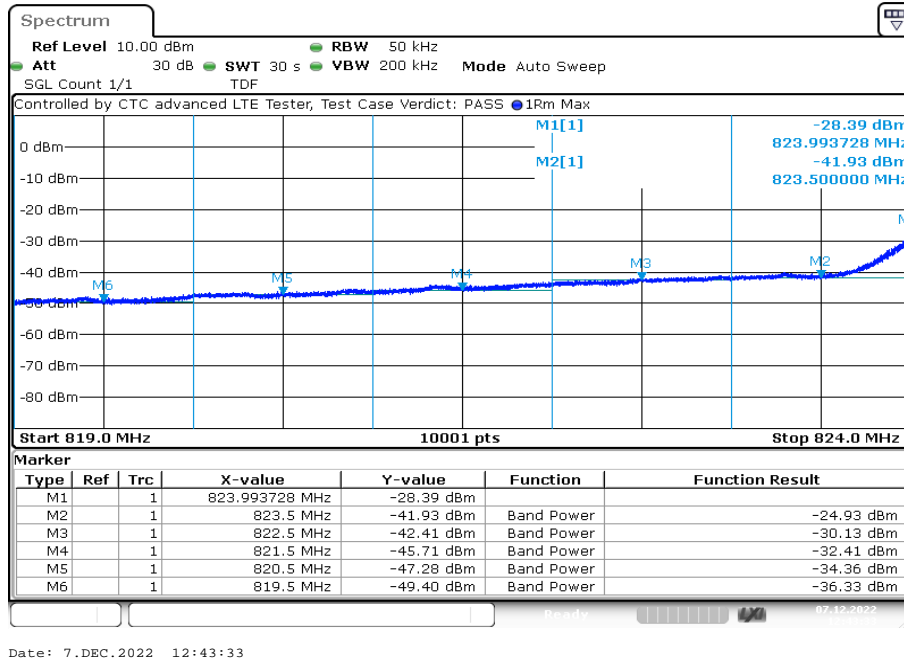
Plot 23: 3 MHz – 64-QAM - Lowest channel



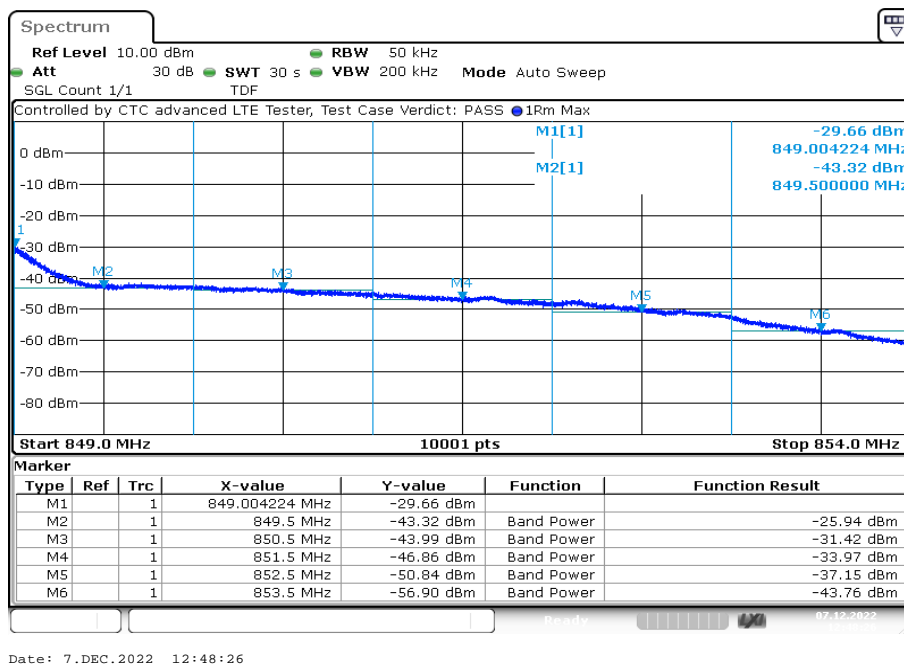
Plot 24: 3 MHz – 64-QAM - Highest channel



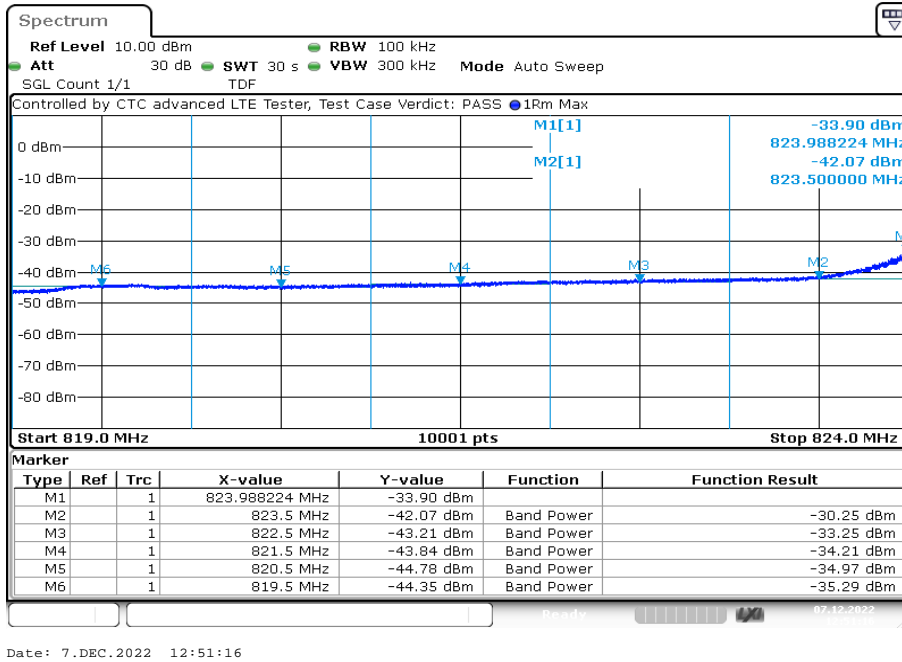
Plot 25: 5 MHz – 64-QAM - Lowest channel



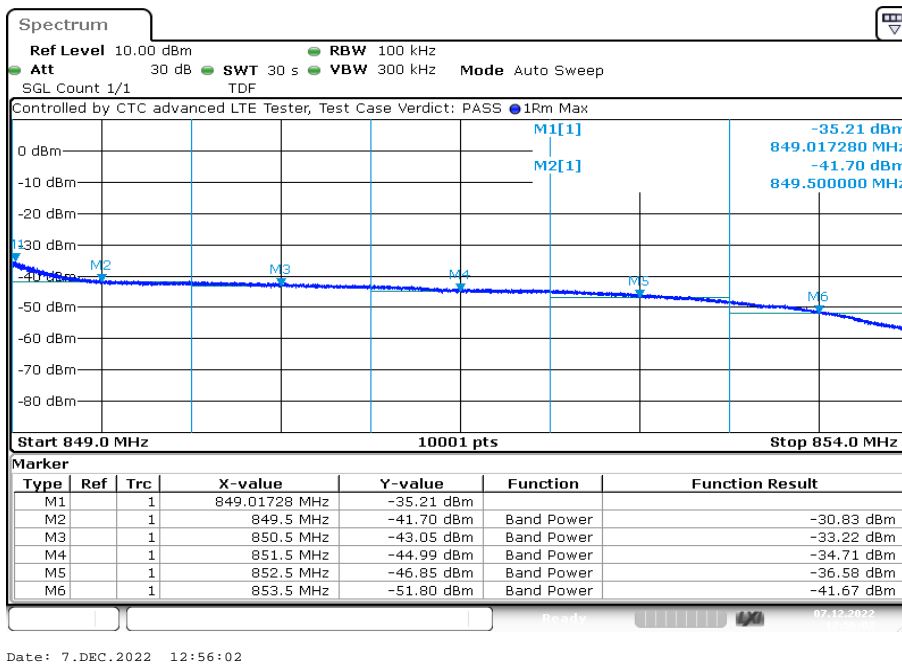
Plot 26: 5 MHz – 64-QAM - Highest channel



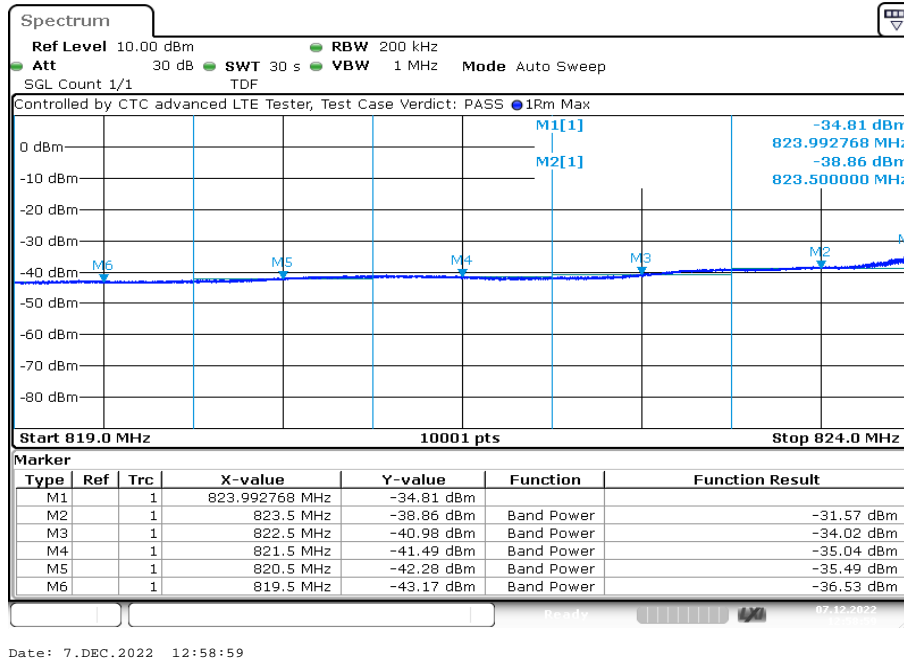
Plot 27: 10 MHz – 64-QAM - Lowest channel



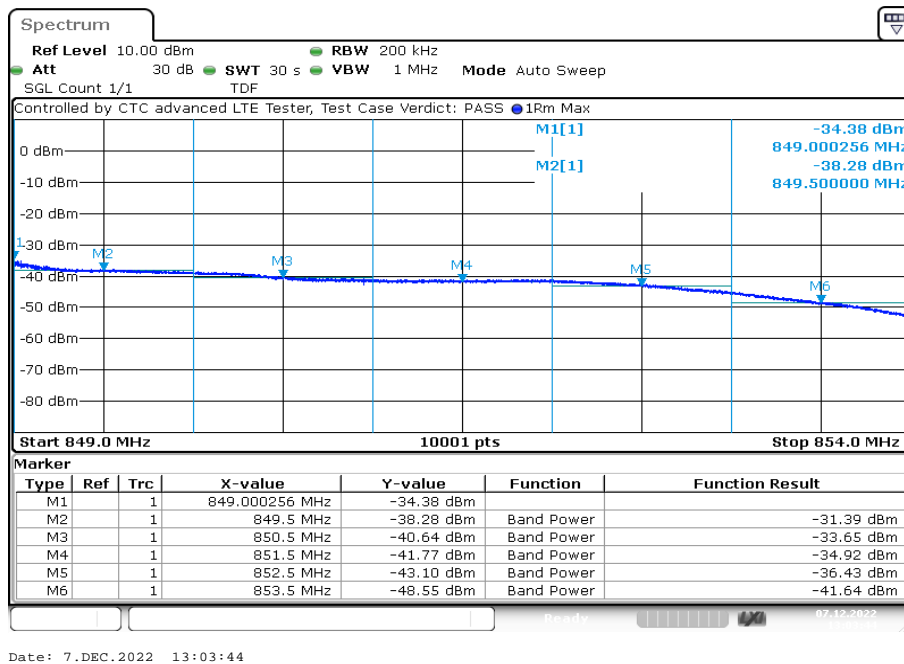
Plot 28: 10 MHz – 64-QAM - Highest channel



**Plot 29:** 15 MHz – 64-QAM - Lowest channel



**Plot 30:** 15 MHz – 64-QAM - Highest channel





## 11.2.6 Occupied bandwidth

### Description:

Measurement of the occupied bandwidth of the transmitted signal.

### Measurement:

Data were taken at the extreme and middle frequencies of the LTE bands 5 + 26a. The table below lists the measured 99% power and -26dBc occupied bandwidths. Spectrum analyzer plots are included on the following pages.

Measurement parameters	
Detector:	Peak
Sweep time:	180s
Resolution bandwidth:	30 kHz
Video bandwidth:	100 kHz
Span:	2 x nominal BW
Trace mode:	Max Hold
Used equipment:	See chapter 7.2 setup A
Measurement uncertainty:	See chapter 8
Measurement procedure:	FCC: § 2.1049

### Limits:

FCC
§ 2.1049
Reporting only

**Results:**

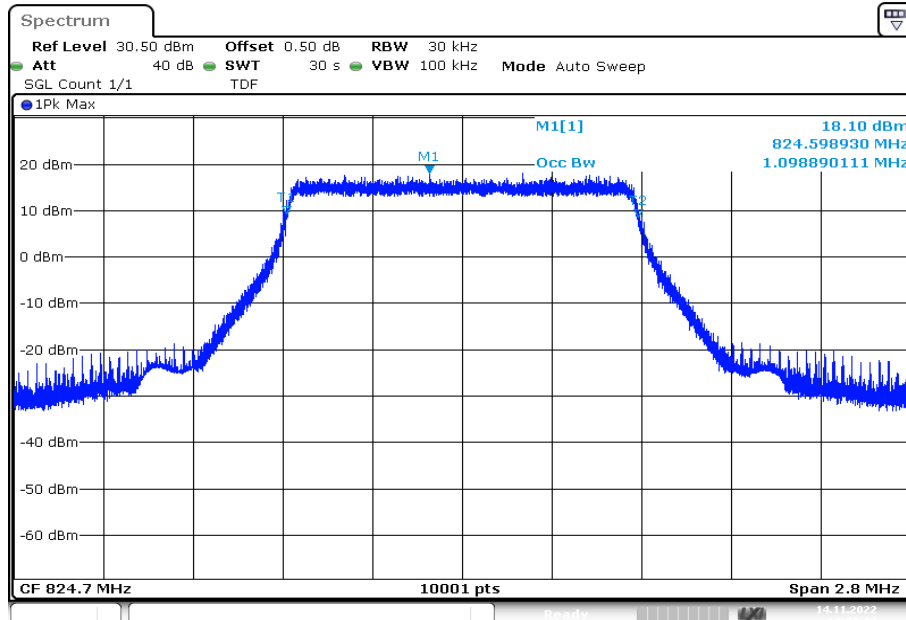
Occupied Bandwidth – QPSK – LTE 26a			
Bandwidth	Channel	99% OBW (MHz)	-26 dBc BW (MHz)
1.4	low	1.10	1.35
	mid	1.10	1.40
	high	1.10	1.36
3.0	low	2.74	3.16
	mid	2.75	3.15
	high	2.74	3.16
5.0	low	4.52	5.18
	mid	4.52	5.20
	high	4.52	5.17
10.0	low	9.04	10.23
	mid	9.07	10.27
	high	9.03	10.23
15.0	low	13.46	15.36
	mid	13.50	15.08
	high	13.45	14.97

Occupied Bandwidth – 16-QAM			
Bandwidth	Channel	99% OBW (MHz)	-26 dBc BW (MHz)
1.4	low	1.10	1.38
	mid	1.10	1.37
	high	1.11	1.39
3.0	low	2.75	3.15
	mid	2.75	3.16
	high	2.75	3.16
5.0	low	4.51	5.17
	mid	4.52	5.20
	high	4.52	5.15
10.0	low	9.04	10.21
	mid	9.07	10.25
	high	9.03	10.24
15.0	low	13.45	14.95
	mid	13.50	15.07
	high	13.46	14.95

Occupied Bandwidth – 64-QAM			
Bandwidth	Channel	99% OBW (MHz)	-26 dBc BW (MHz)
1.4	low	1.10	1.36
	mid	1.11	1.40
	high	1.10	1.37
3.0	low	2.74	3.15
	mid	2.74	3.17
	high	2.74	3.15
5.0	low	4.52	5.19
	mid	4.52	5.18
	high	4.52	5.19
10.0	low	9.03	10.24
	mid	9.07	10.33
	high	9.02	10.20
15.0	low	13.46	14.91
	mid	13.49	15.11
	high	13.45	15.00

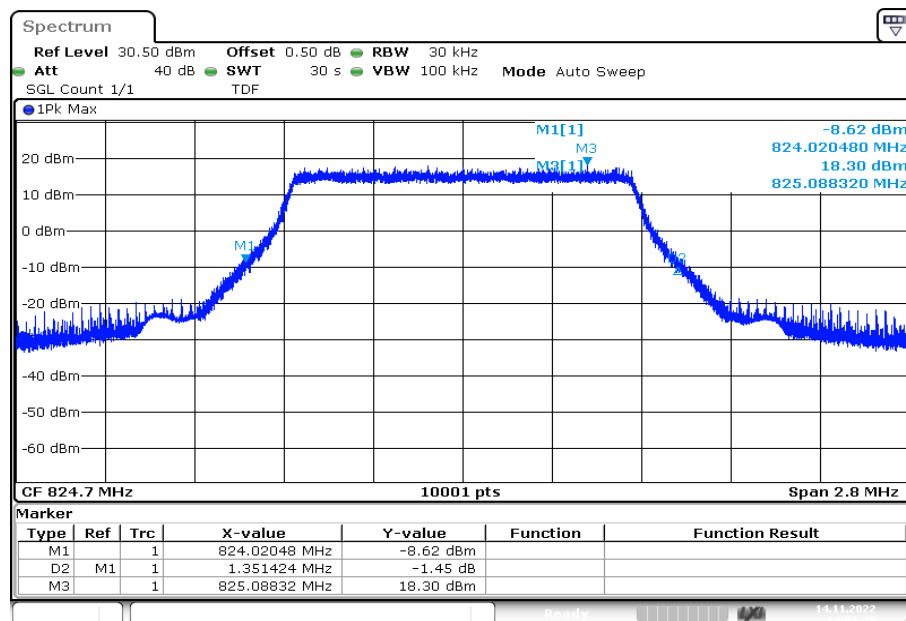
**Plots: LTE band 26a**

**Plot 1:** 1.4 MHz – QPSK - lowest channel (99% - OBW)



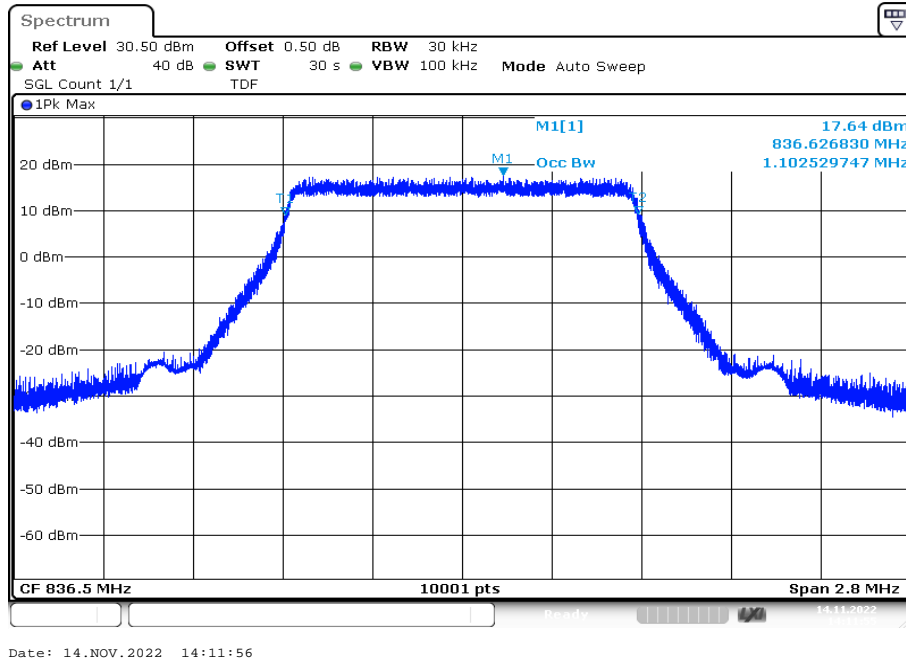
Date: 14.NOV.2022 14:07:13

**Plot 2:** 1.4 MHz – QPSK - lowest channel (-26 dBc BW)

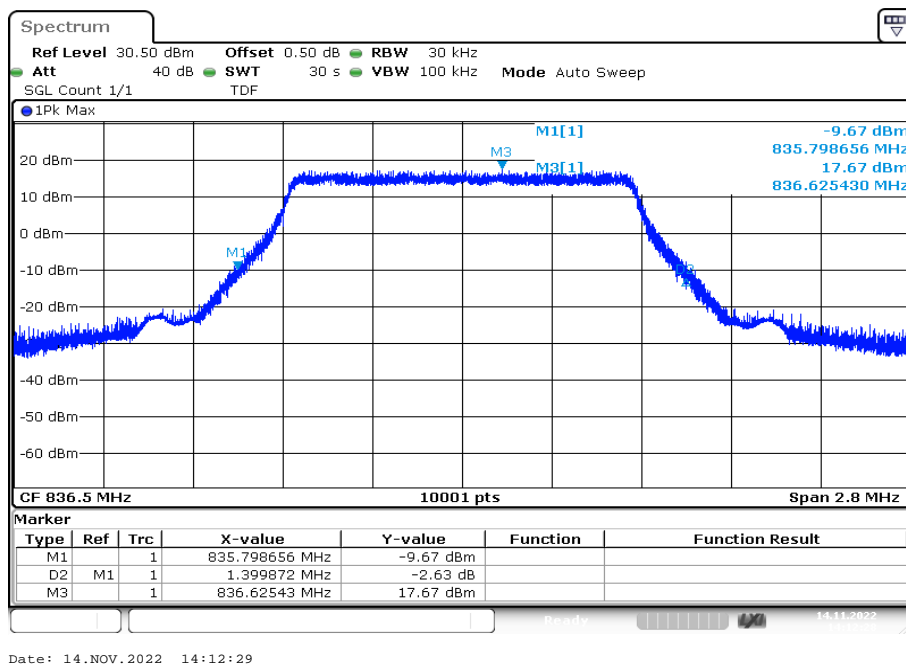


Date: 14.NOV.2022 14:07:46

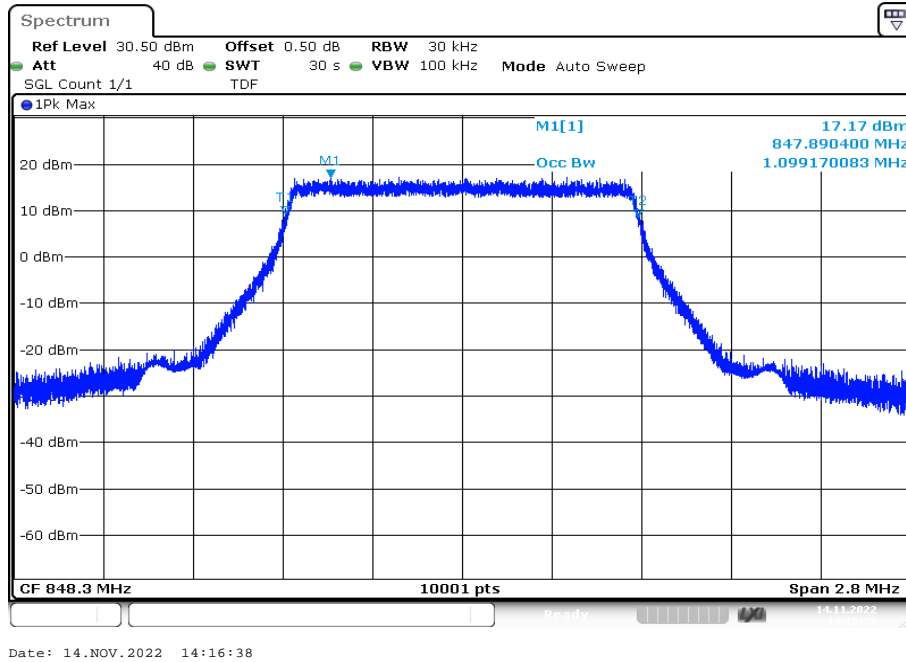
**Plot 3:** 1.4 MHz – QPSK – middle channel (99% - OBW)



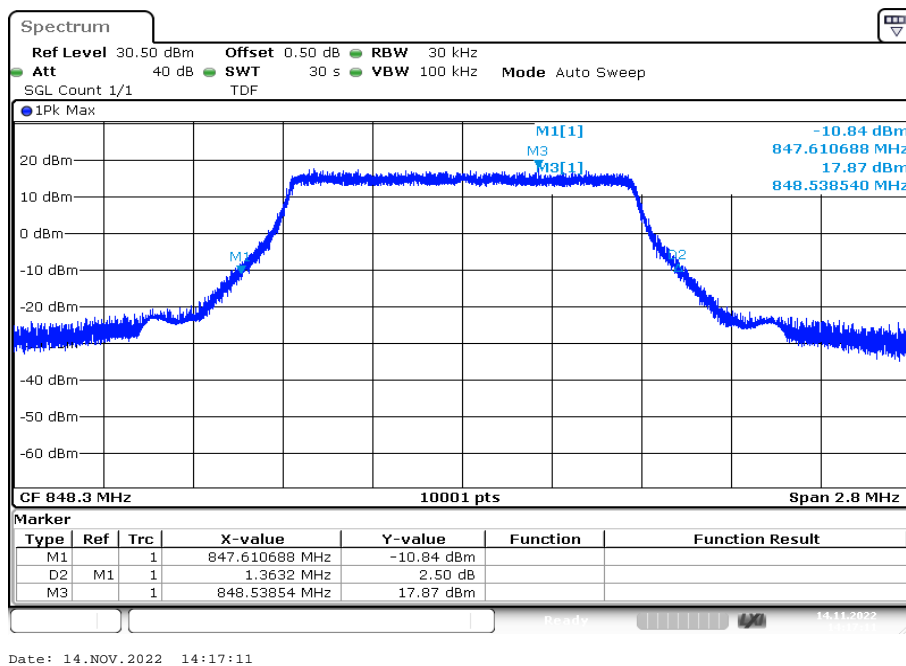
**Plot 4:** 1.4 MHz – QPSK – middle channel (-26 dBc BW)



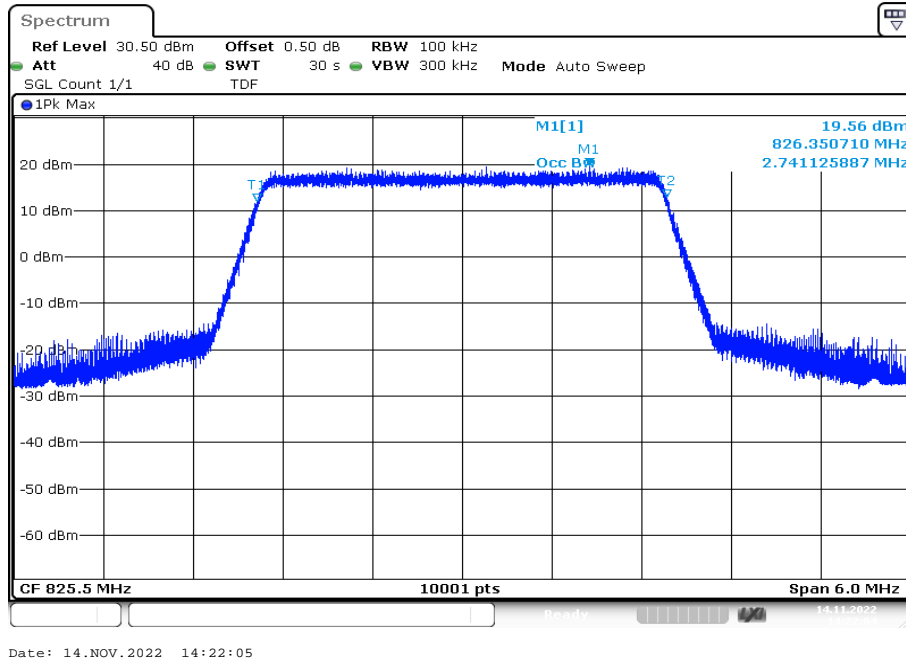
**Plot 5:** 1.4 MHz – QPSK - highest channel (99% - OBW)



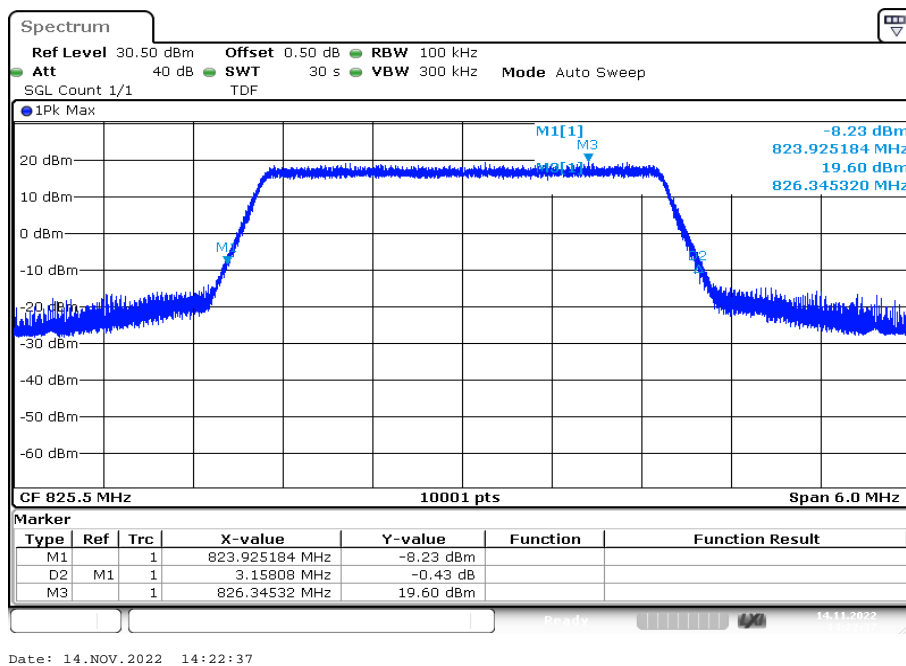
**Plot 6:** 1.4 MHz – QPSK - highest channel (-26 dBc BW)



**Plot 7:** 3 MHz – QPSK - lowest channel (99% - OBW)

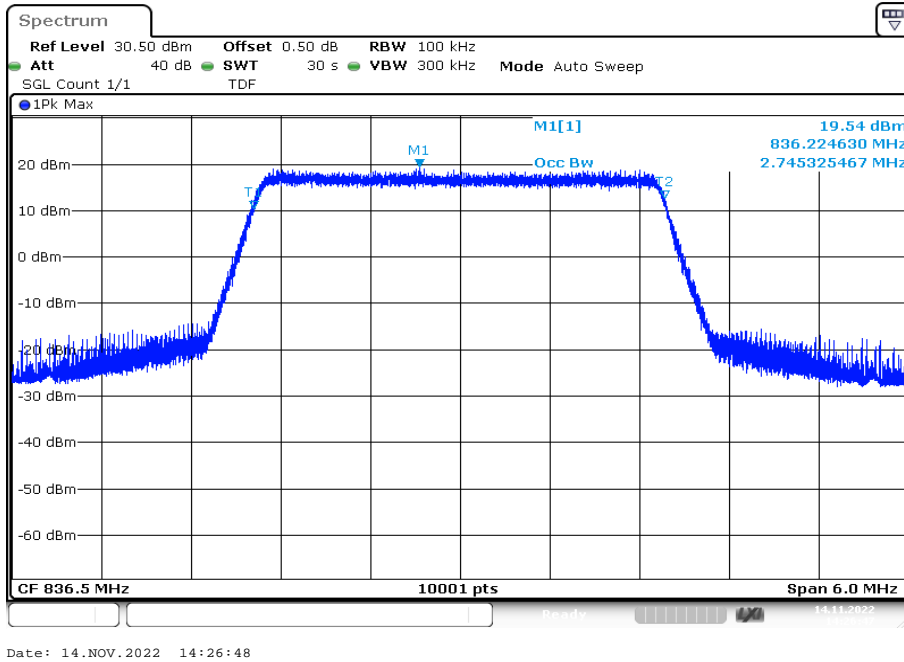


**Plot 8:** 3 MHz – QPSK - lowest channel (-26 dBc BW)

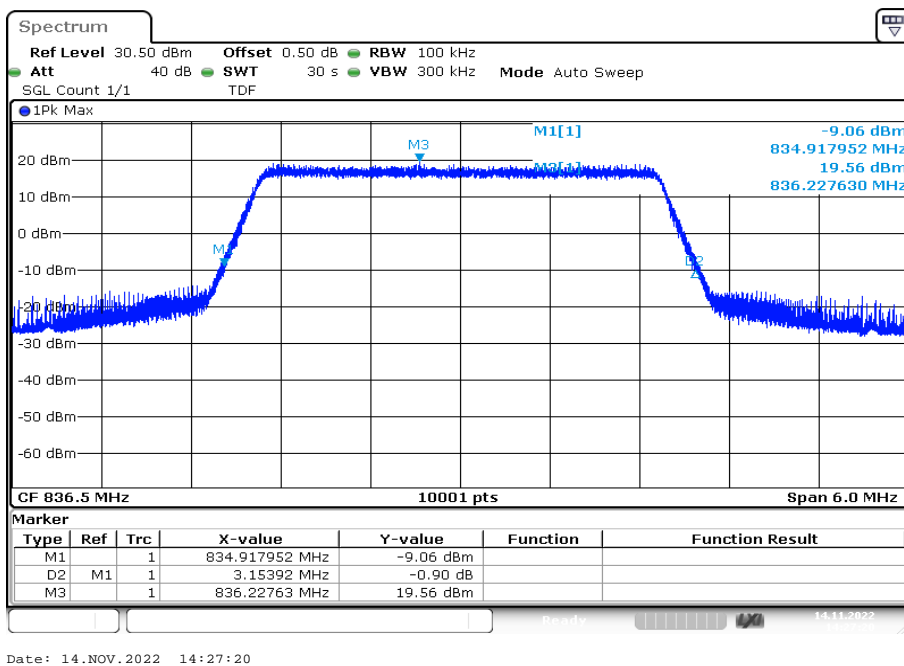




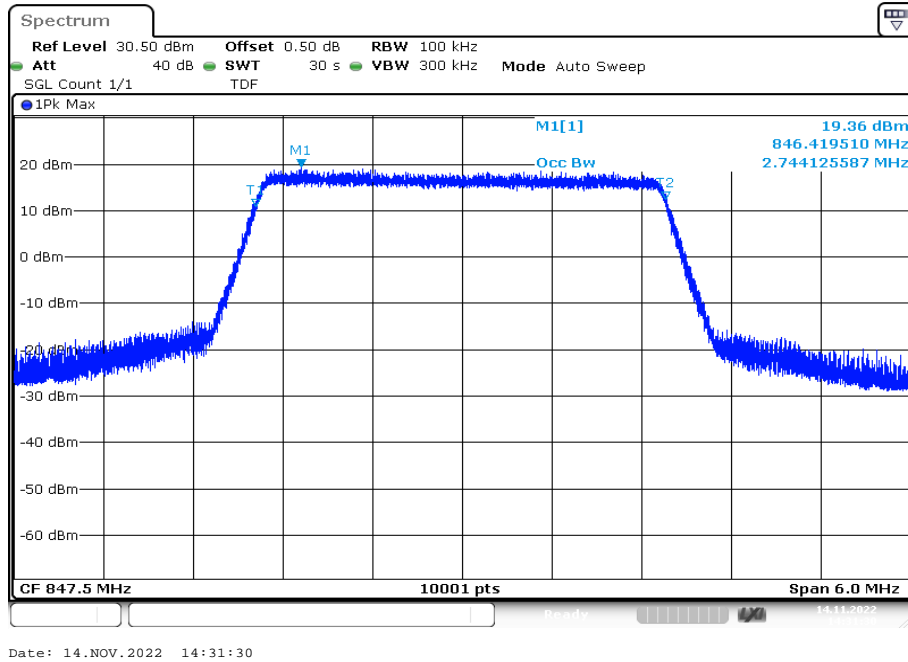
**Plot 9:** 3 MHz – QPSK - middle channel (99% - OBW)



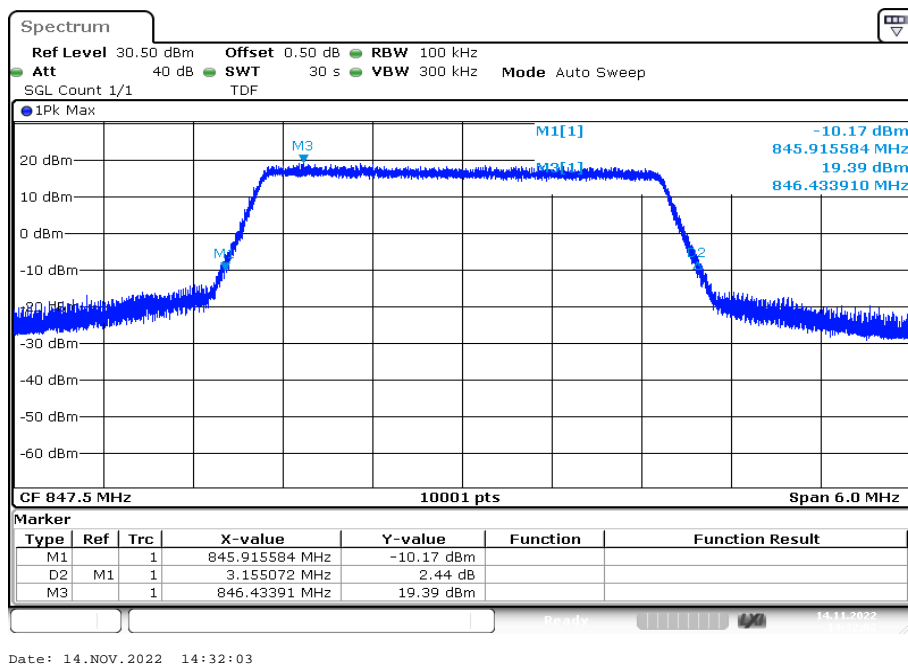
**Plot 10:** 3 MHz – QPSK - middle channel (-26 dBc BW)



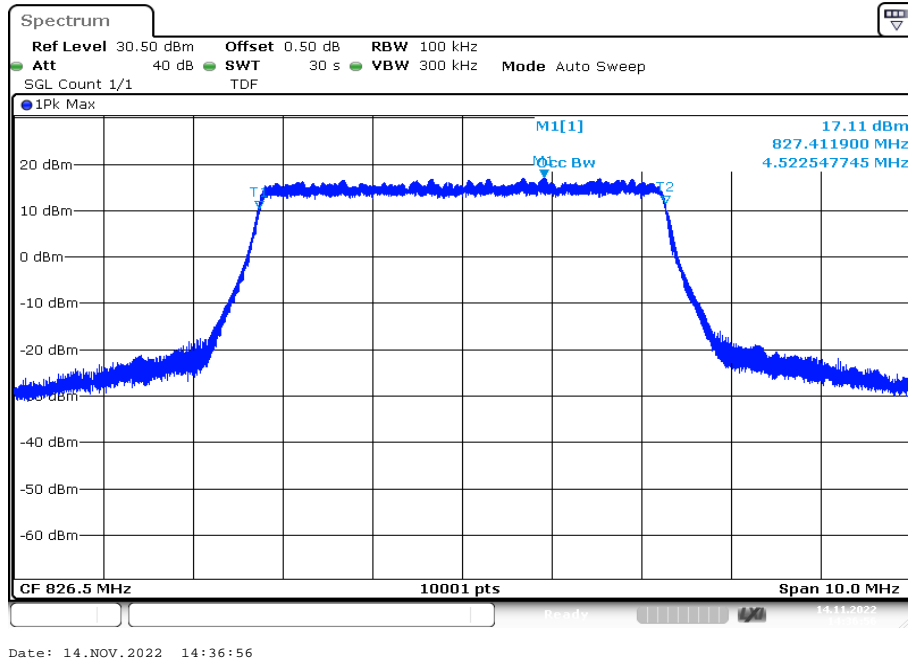
**Plot 11:** 3 MHz – QPSK - highest channel (99% - OBW)



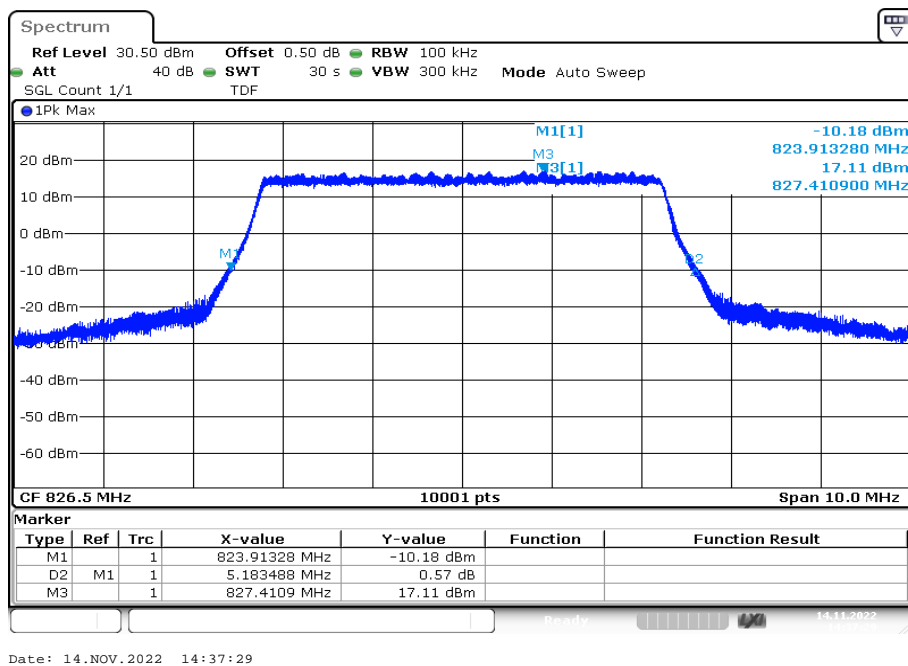
**Plot 12:** 3 MHz – QPSK - highest channel (-26 dBc BW)



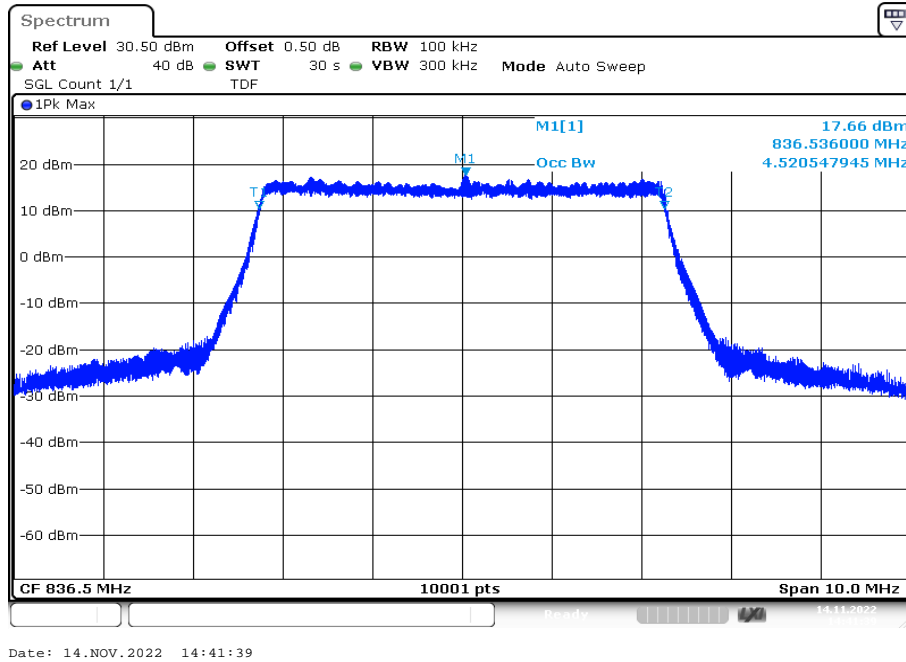
**Plot 13:** 5 MHz – QPSK - lowest channel (99% - OBW)



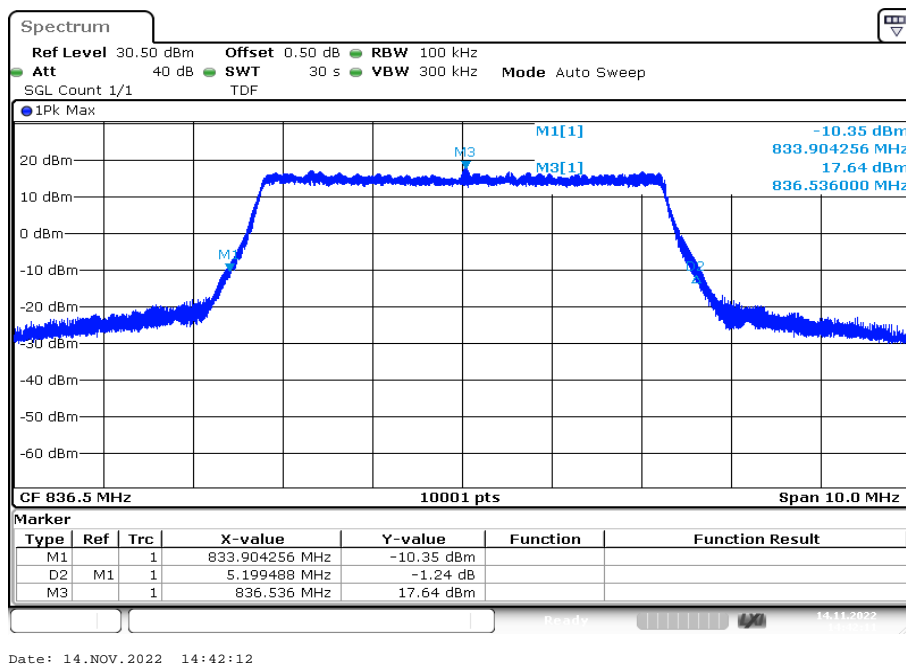
**Plot 14:** 5 MHz – QPSK - lowest channel (-26 dBc BW)



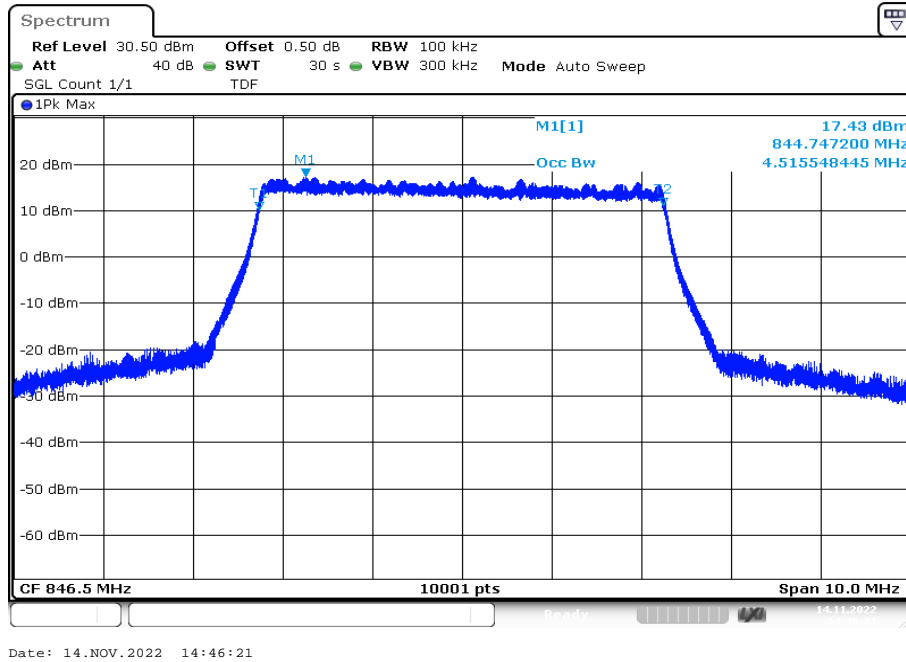
**Plot 15:** 5 MHz – QPSK - middle channel (99% - OBW)



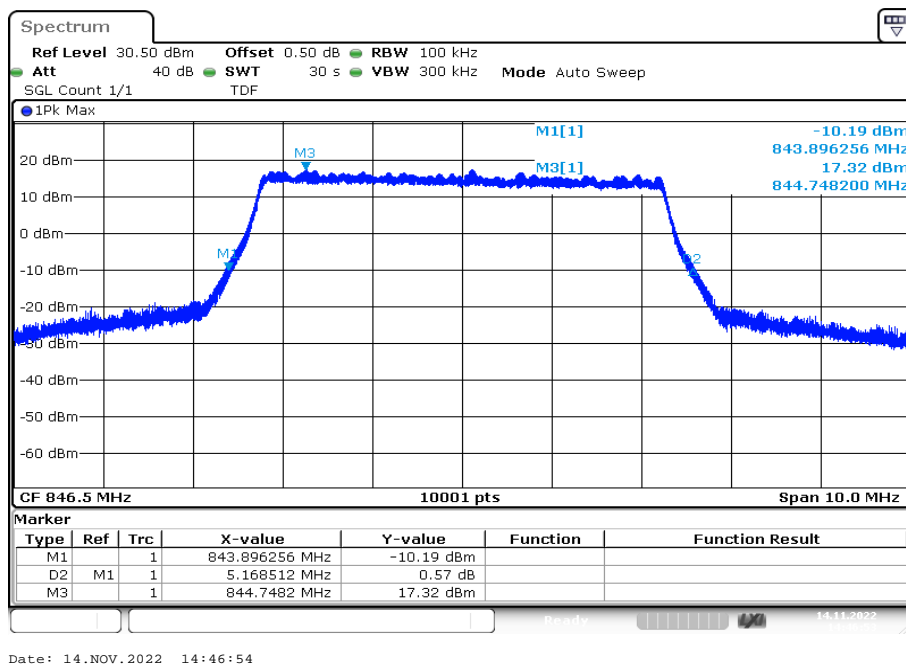
**Plot 16:** 5 MHz – QPSK - middle channel (-26 dBc BW)



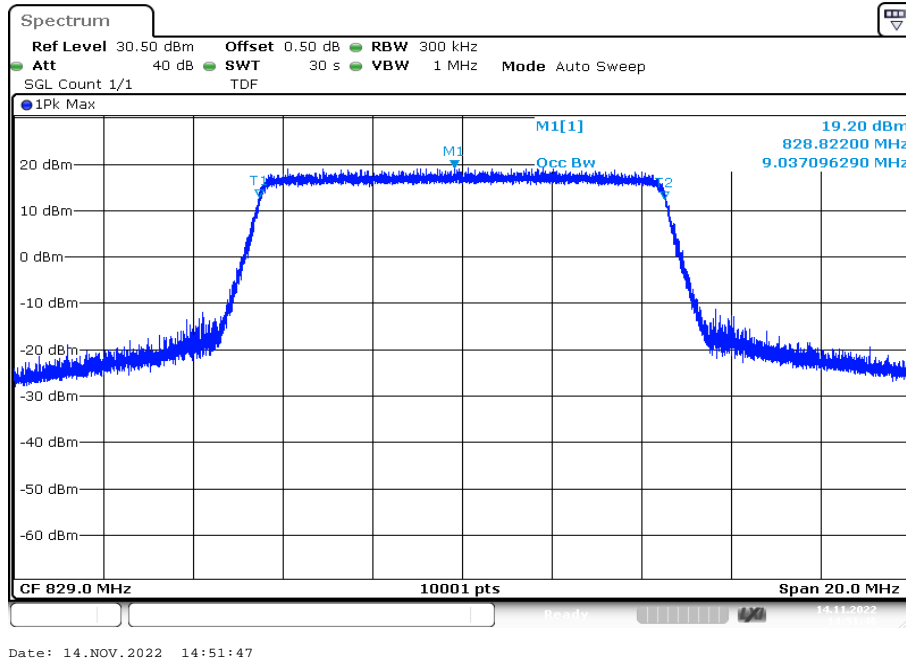
**Plot 17:** 5 MHz – QPSK - highest channel (99% - OBW)



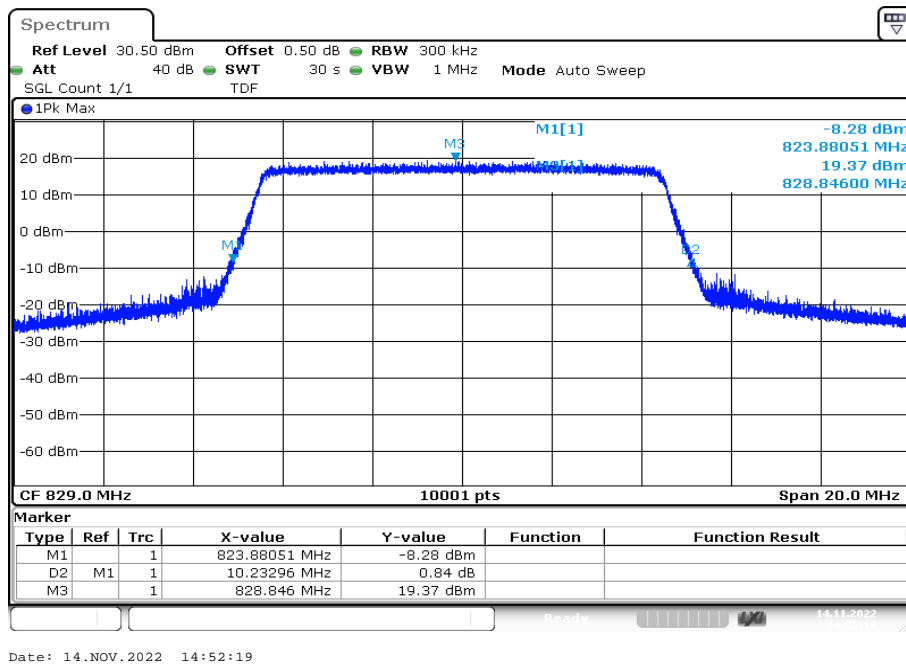
**Plot 18:** 5 MHz – QPSK - highest channel (-26 dBc BW)



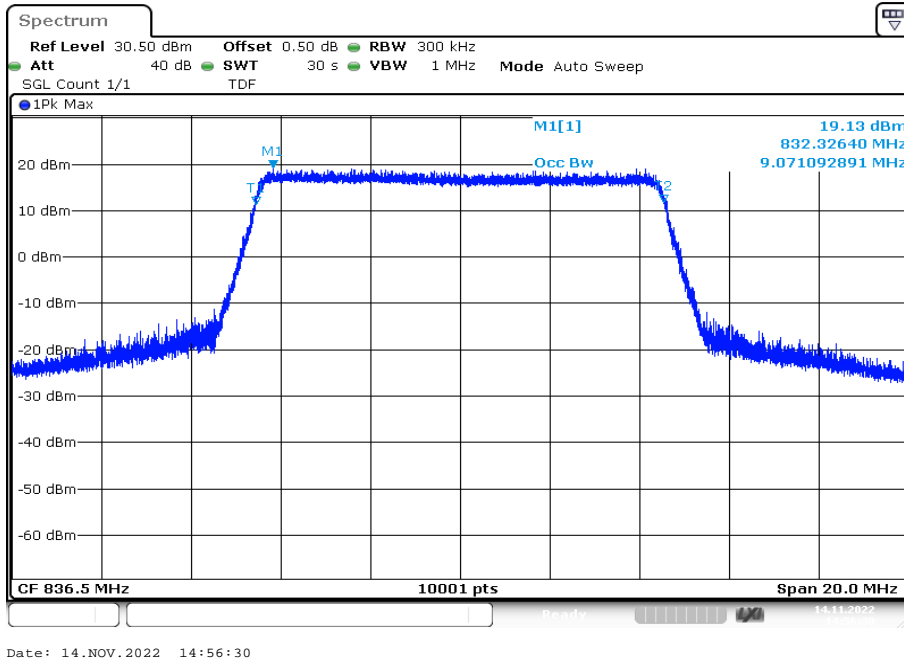
**Plot 19:** 10 MHz – QPSK - lowest channel (99% - OBW)



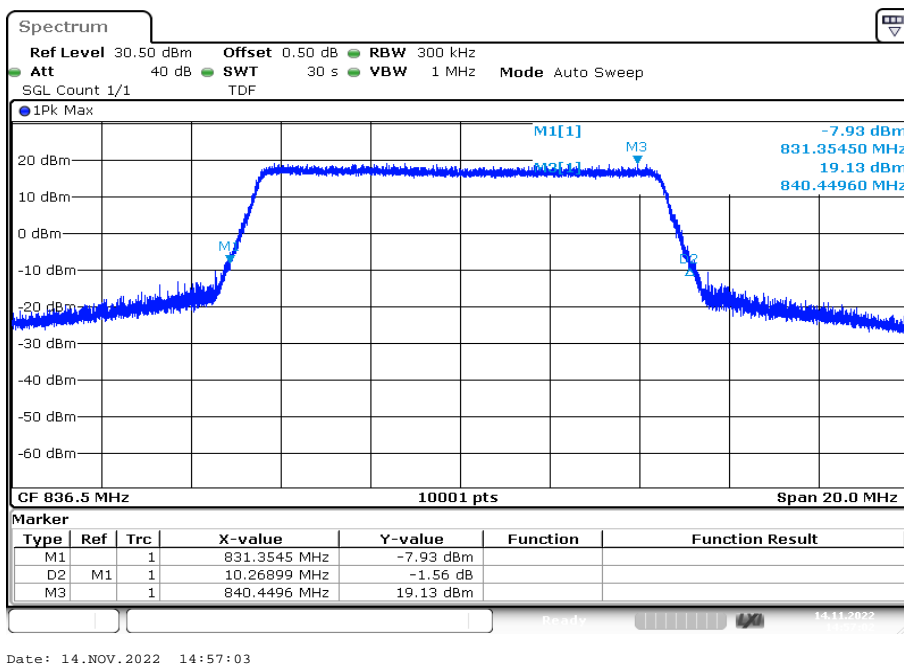
**Plot 20:** 10 MHz – QPSK - lowest channel (-26 dBc BW)



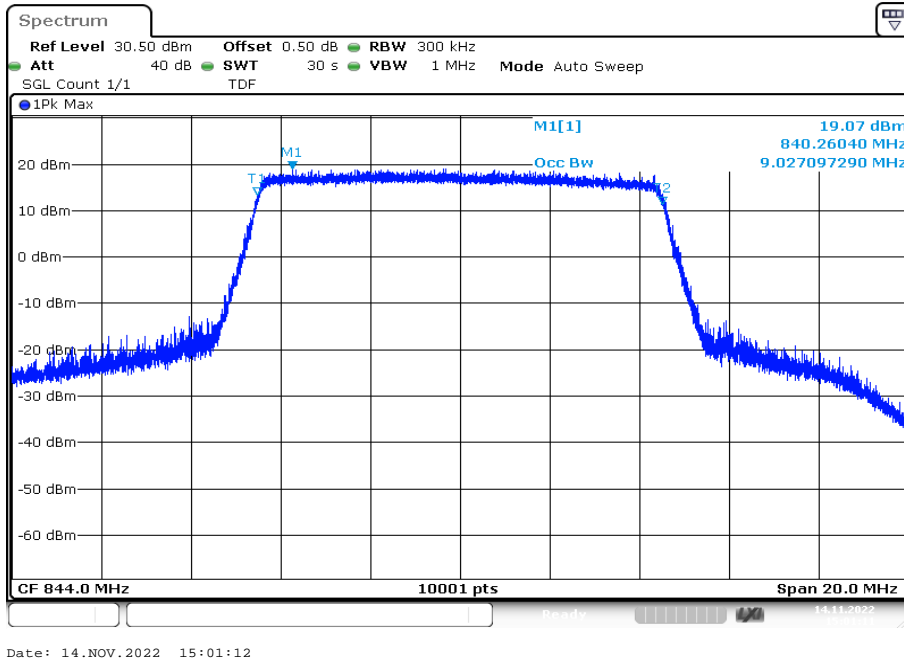
**Plot 21:** 10 MHz – QPSK - middle channel (99% - OBW)



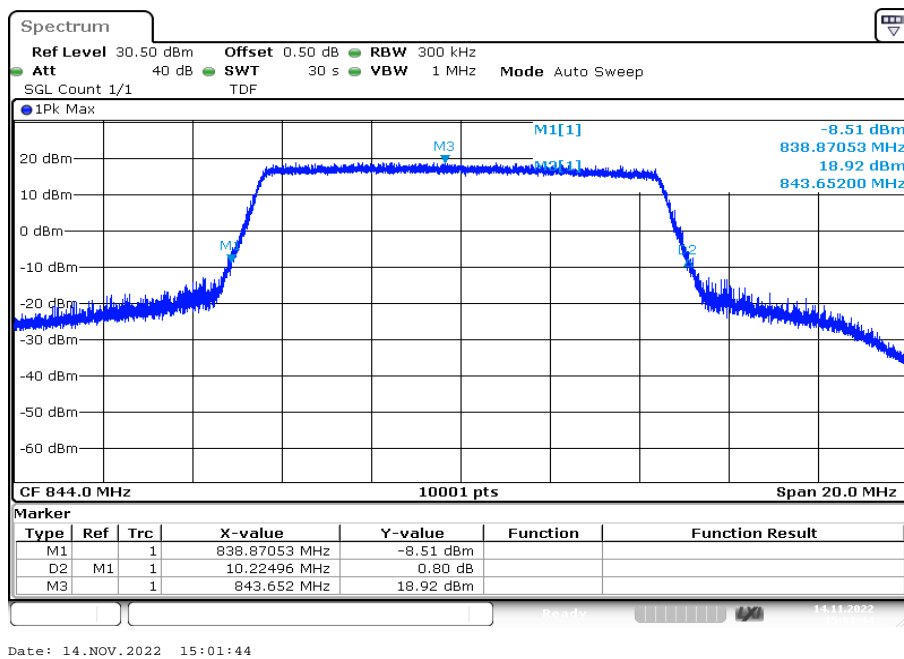
**Plot 22:** 10 MHz – QPSK - middle channel (-26 dBc BW)



**Plot 23:** 10 MHz – QPSK - highest channel (99% - OBW)

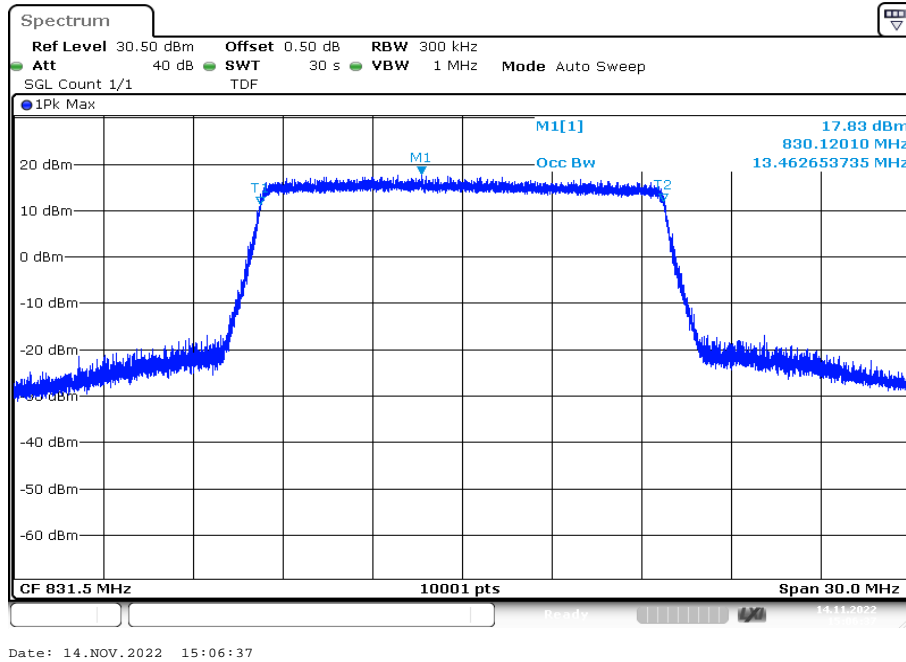


**Plot 24:** 10 MHz – QPSK - highest channel (-26 dBc BW)

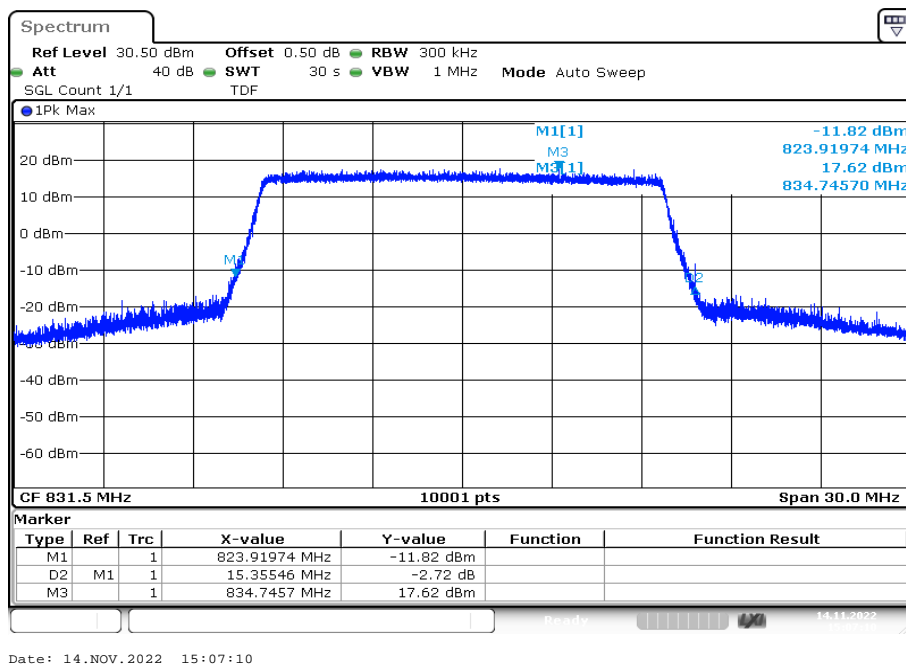




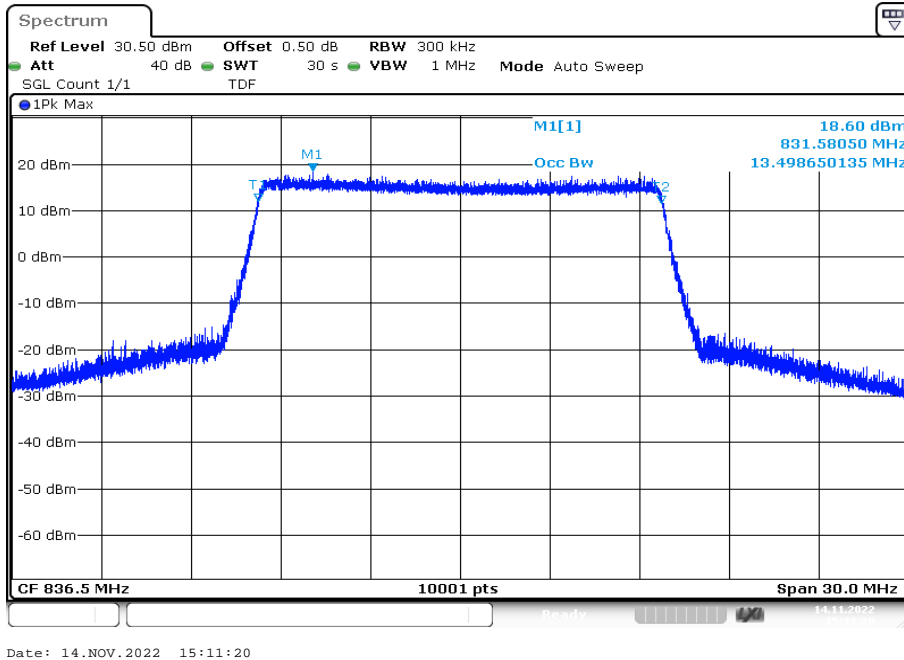
**Plot 25:** 15 MHz – QPSK - lowest channel (99% - OBW)



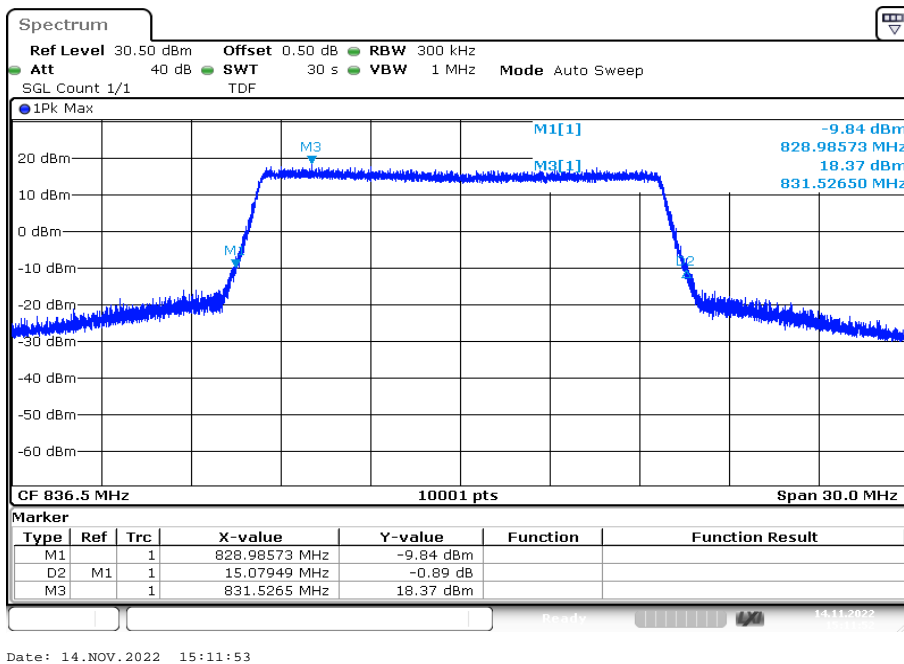
**Plot 26:** 15 MHz – QPSK - lowest channel (-26 dBc BW)



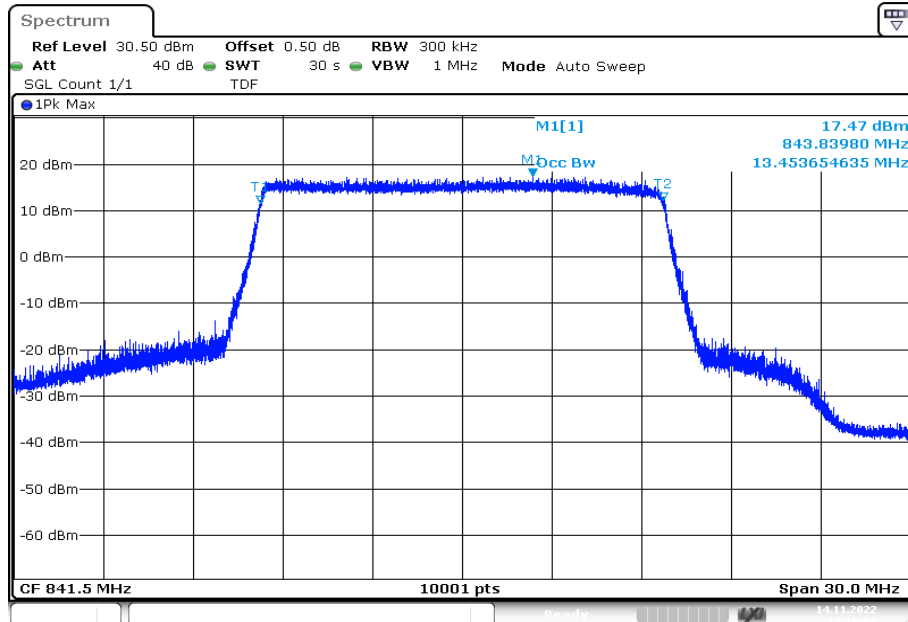
**Plot 27:** 15 MHz – QPSK - middle channel (99% - OBW)



**Plot 28:** 15 MHz – QPSK - middle channel (-26 dBc BW)

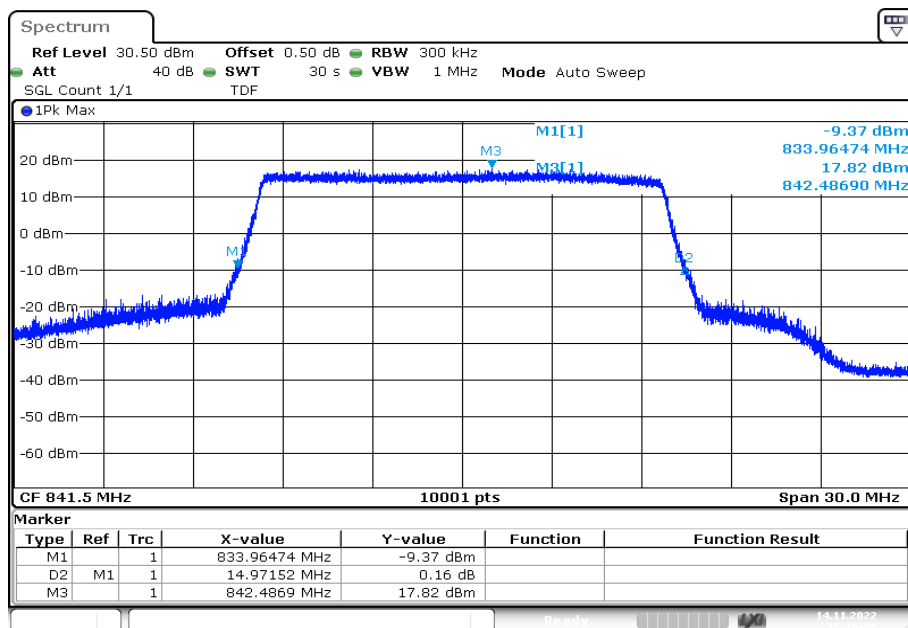


**Plot 29:** 15 MHz – QPSK - highest channel (99% - OBW)



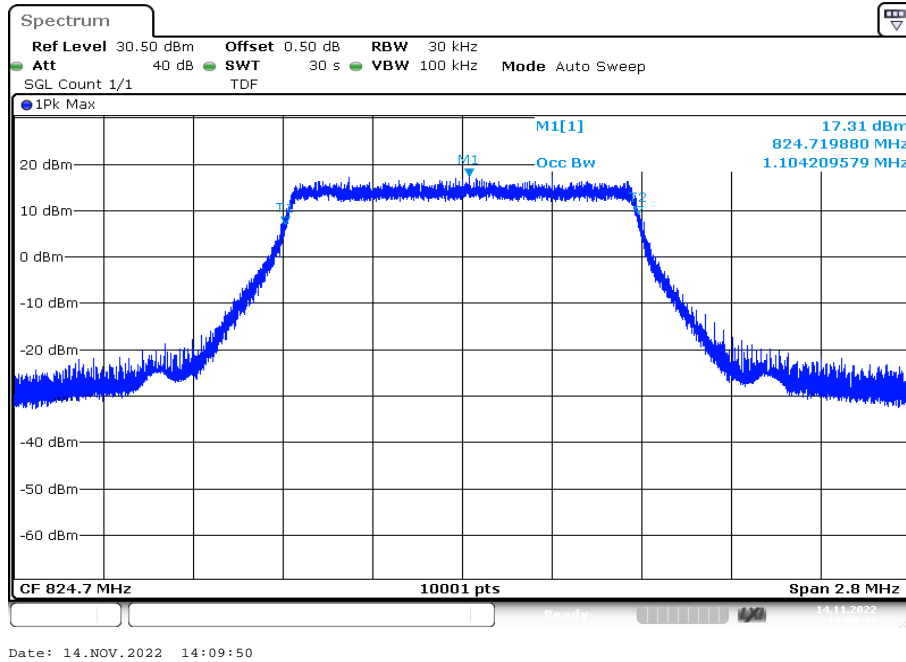
Date: 14.NOV.2022 15:16:02

**Plot 30:** 15 MHz – QPSK - highest channel (-26 dBc BW)

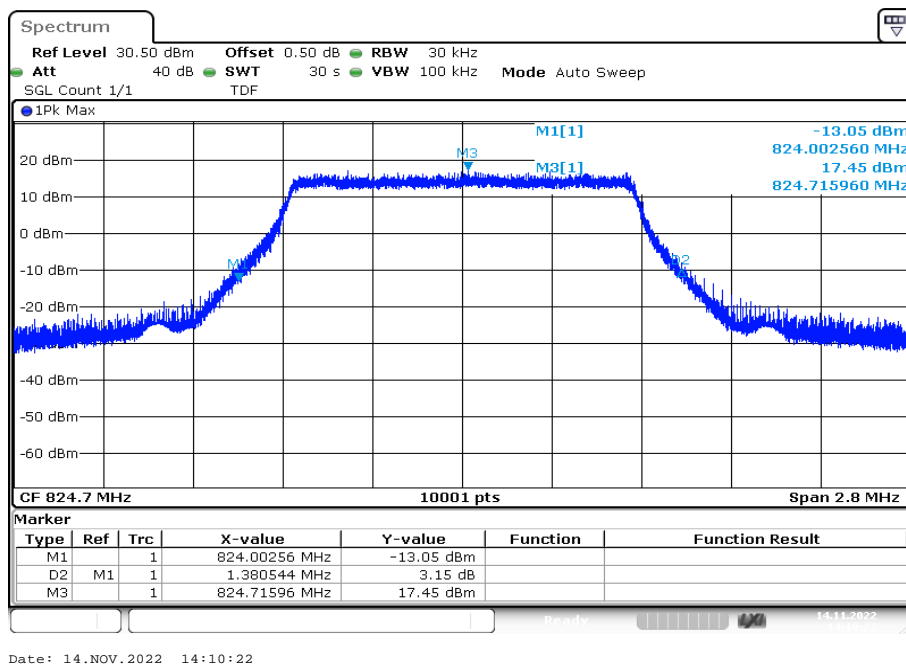


Date: 14.NOV.2022 15:16:35

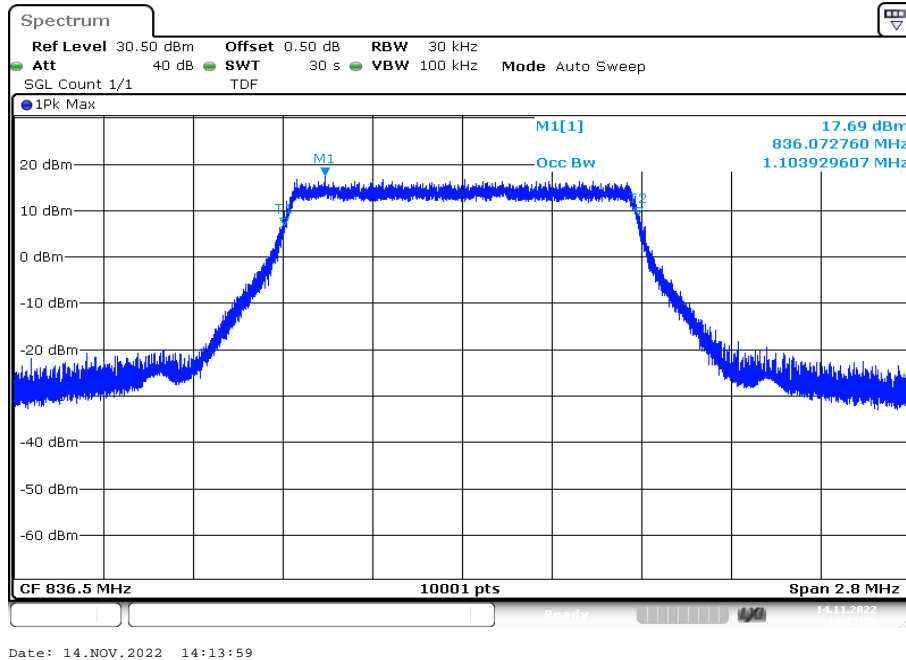
**Plot 31:** 1.4 MHz – 16-QAM - lowest channel (99% - OBW)



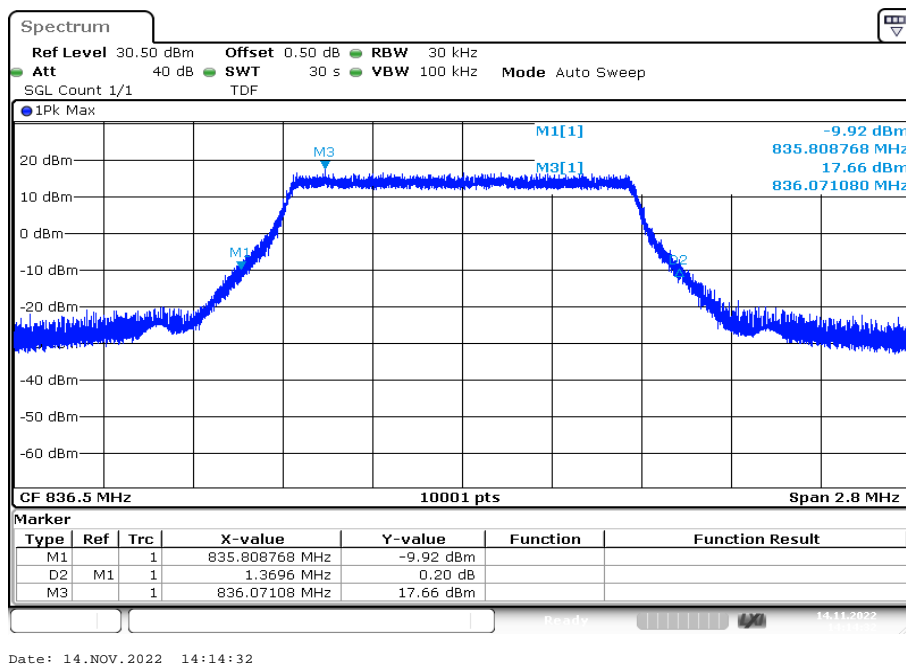
**Plot 32:** 1.4 MHz – 16-QAM - lowest channel (-26 dBc BW)



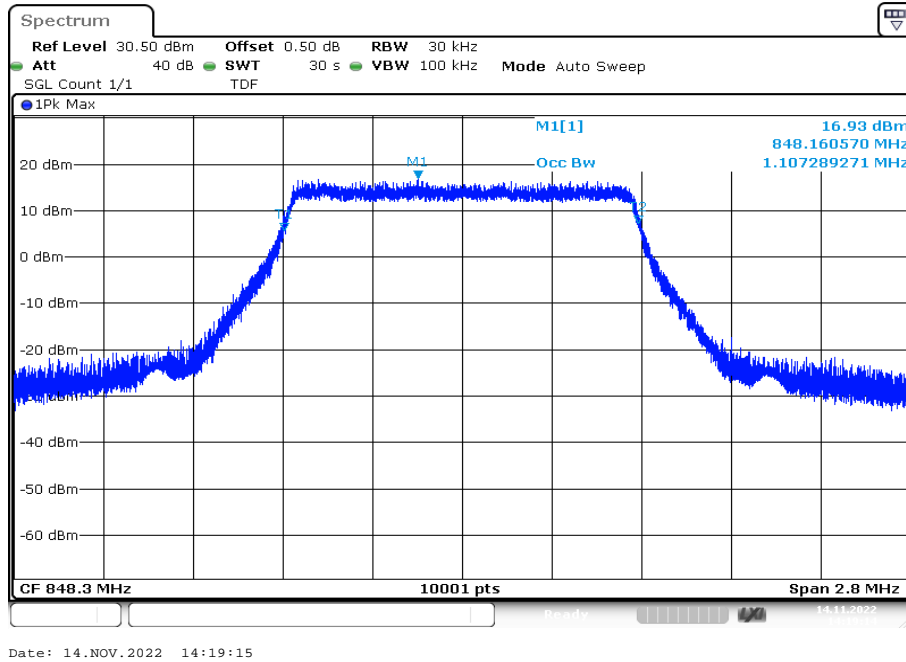
**Plot 33:** 1.4 MHz – 16-QAM - middle channel (99% - OBW)



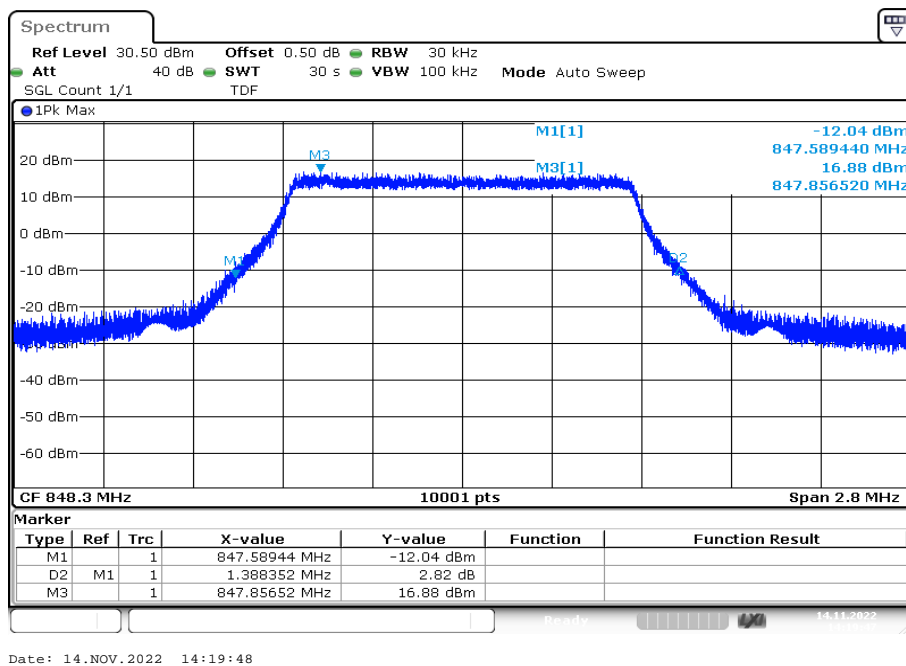
**Plot 34:** 1.4 MHz – 16-QAM - middle channel (-26 dBc BW)



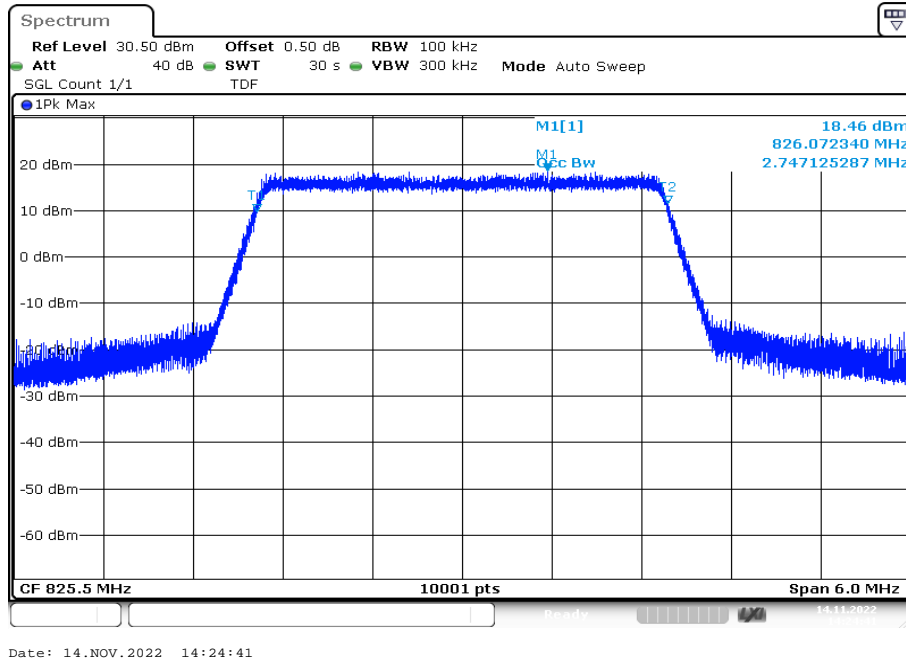
**Plot 35:** 1.4 MHz – 16-QAM - highest channel (99% - OBW)



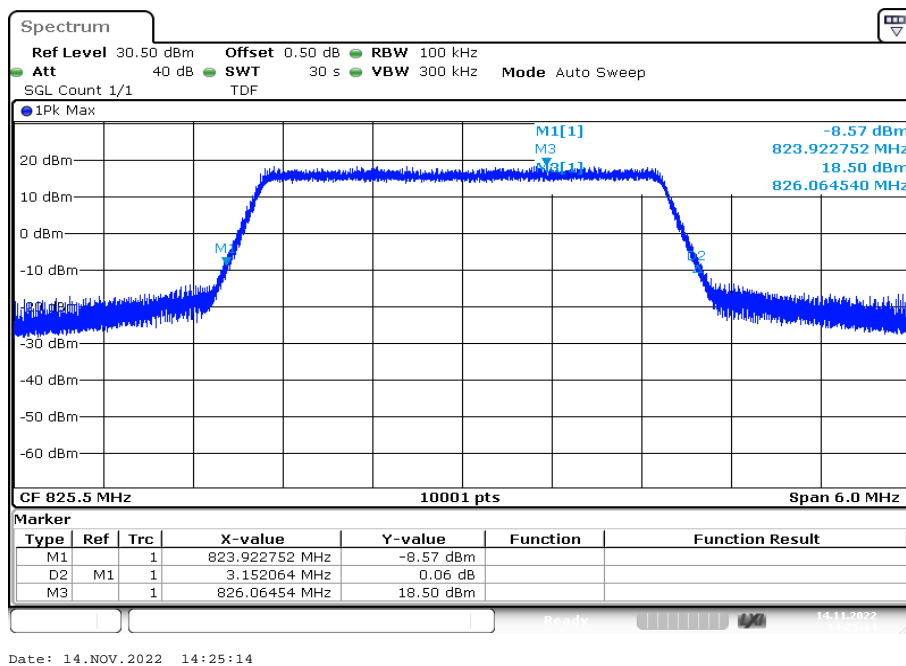
**Plot 36:** 1.4 MHz – 16-QAM - highest channel (-26 dBc BW)



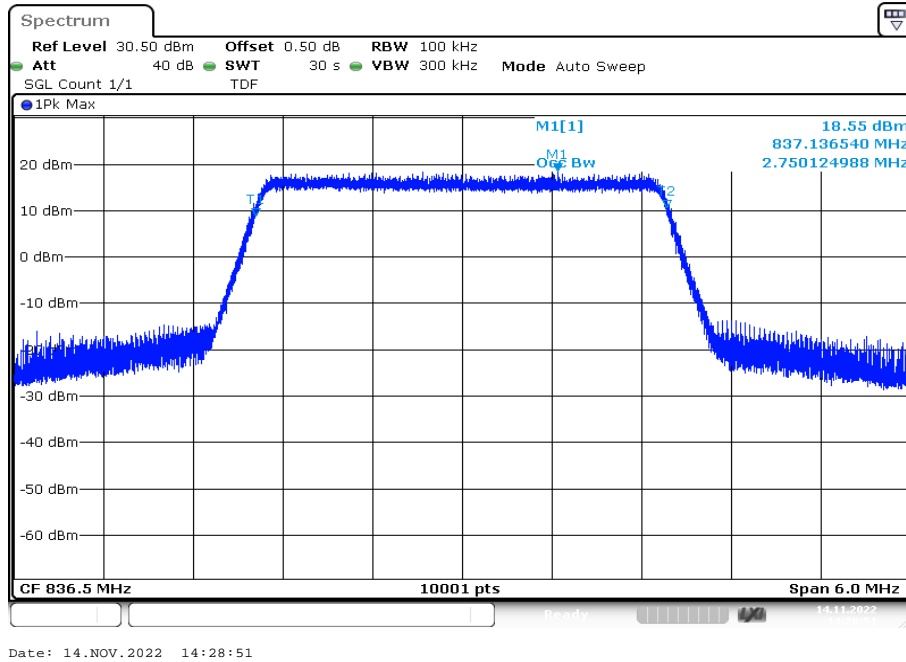
**Plot 37:** 3 MHz – 16-QAM - lowest channel (99% - OBW)



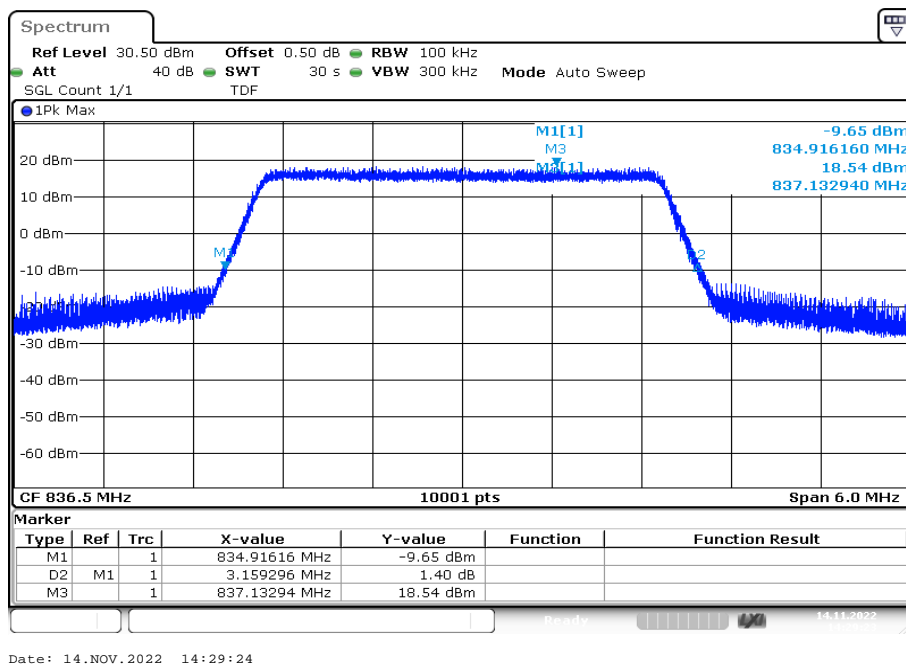
**Plot 38:** 3 MHz – 16-QAM - lowest channel (-26 dBc BW)



**Plot 39:** 3 MHz – 16-QAM - middle channel (99% - OBW)

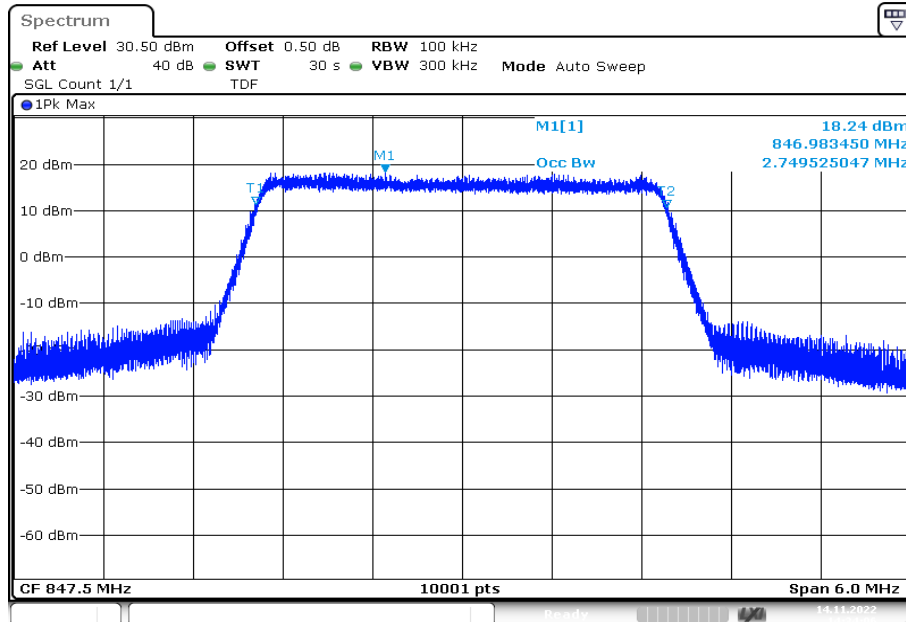


**Plot 40:** 3 MHz – 16-QAM - middle channel (-26 dBc BW)

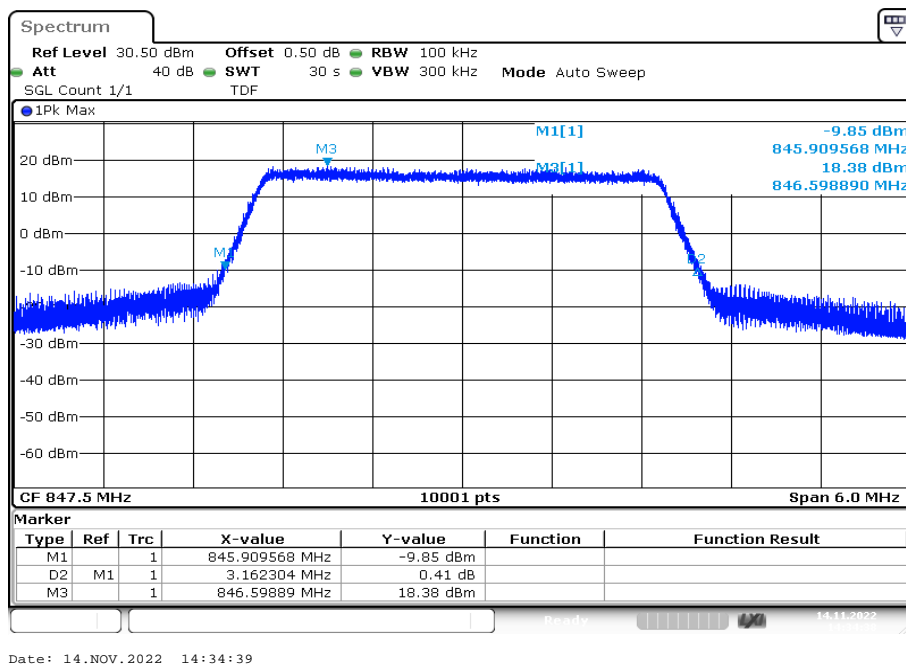




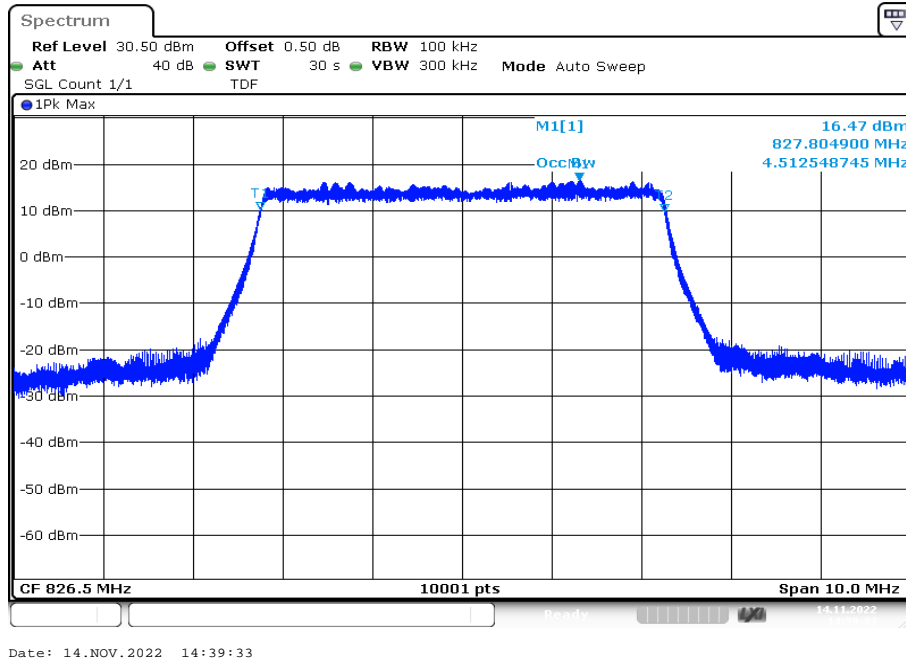
**Plot 41:** 3 MHz – 16-QAM - highest channel (99% - OBW)



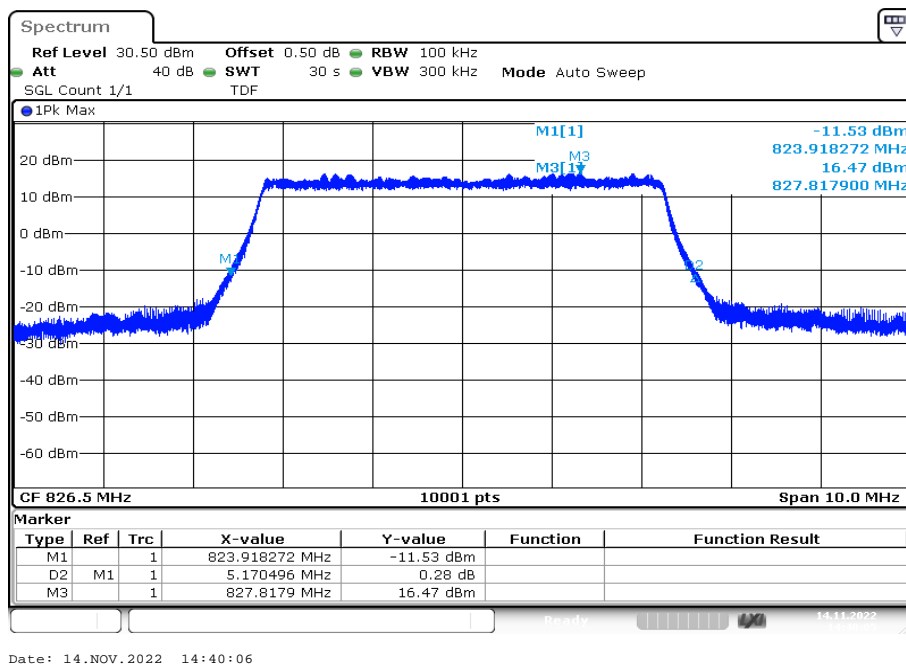
**Plot 42:** 3 MHz – 16-QAM - highest channel (-26 dBc BW)



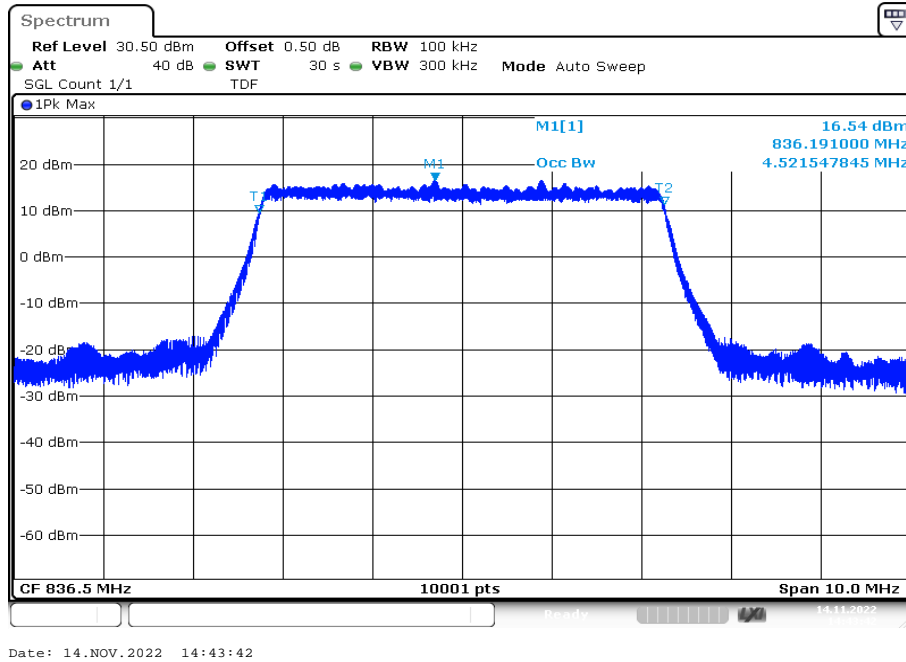
**Plot 43:** 5 MHz – 16-QAM - lowest channel (99% - OBW)



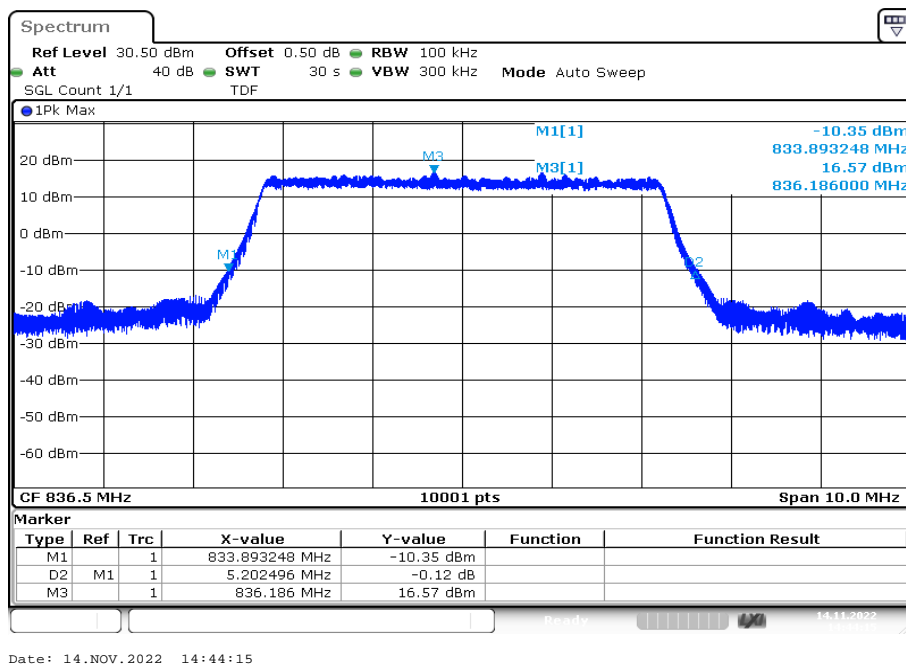
**Plot 44:** 5 MHz – 16-QAM - lowest channel (-26 dBc BW)



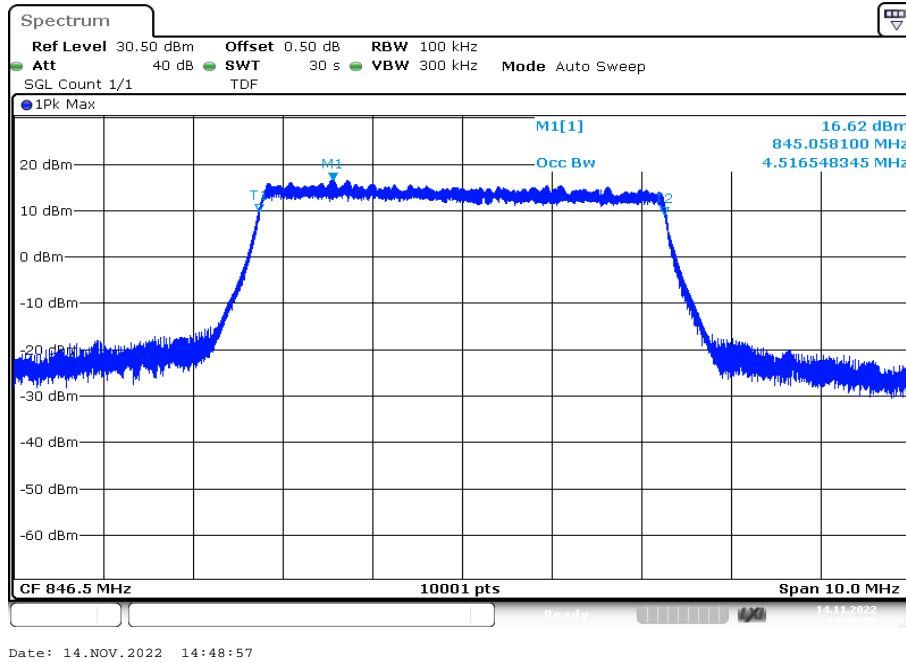
**Plot 45:** 5 MHz – 16-QAM - middle channel (99% - OBW)



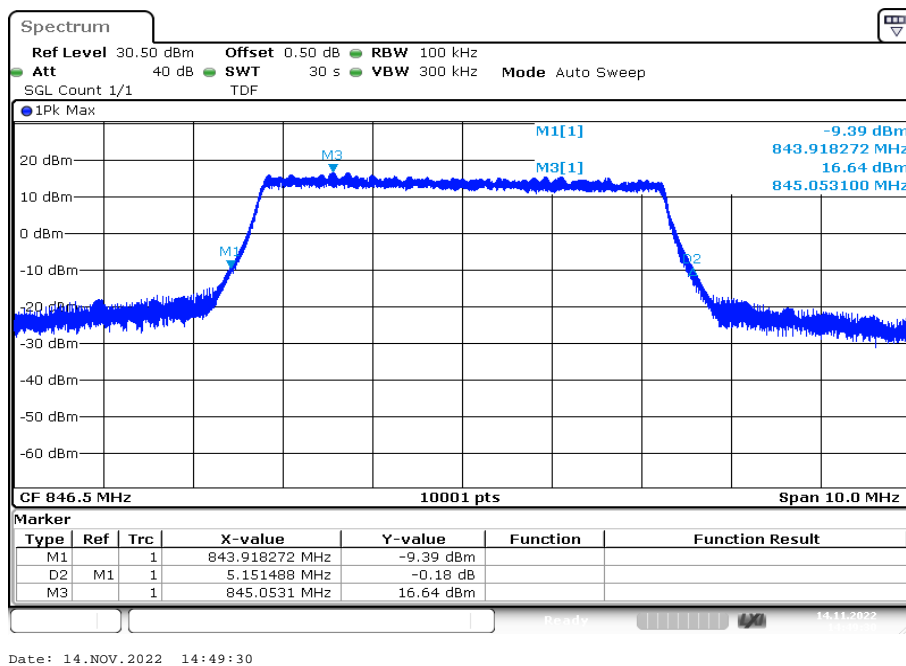
**Plot 46:** 5 MHz – 16-QAM - middle channel (-26 dBc BW)



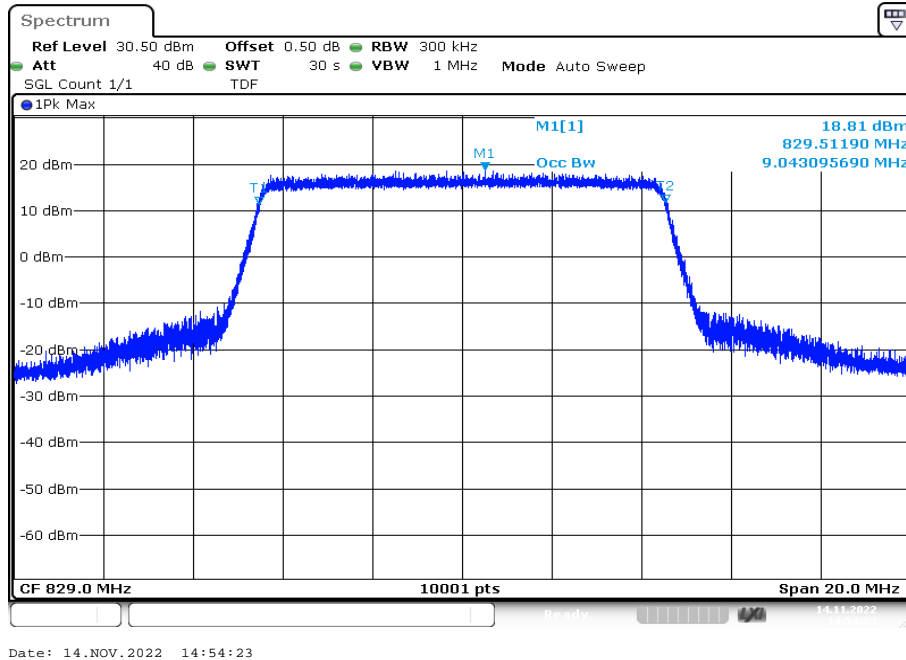
**Plot 47:** 5 MHz – 16-QAM - highest channel (99% - OBW)



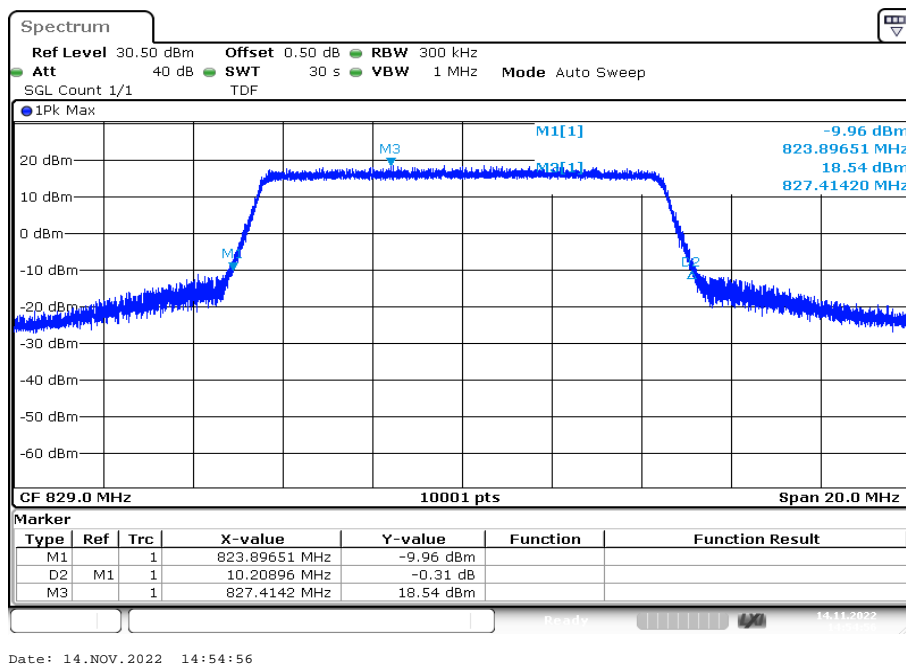
**Plot 48:** 5 MHz – 16-QAM - highest channel (-26 dBc BW)



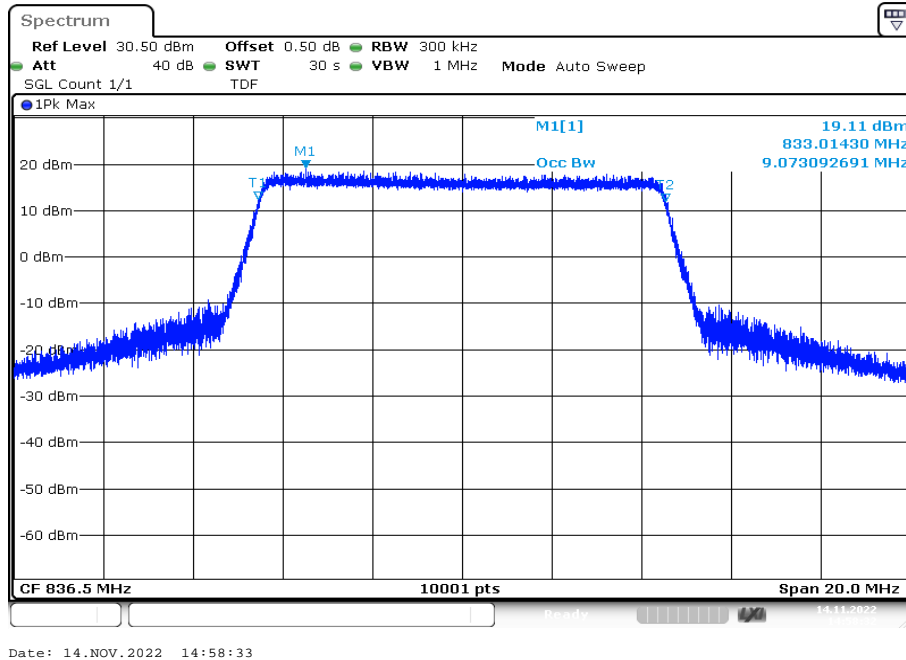
**Plot 49:** 10 MHz – 16-QAM - lowest channel (99% - OBW)



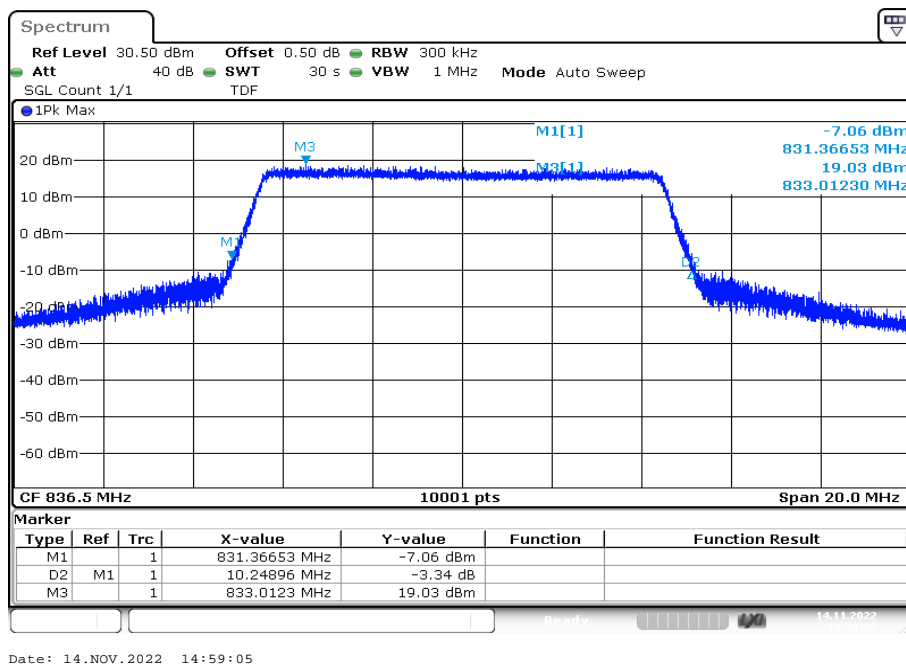
**Plot 50:** 10 MHz – 16-QAM - lowest channel (-26 dBc BW)



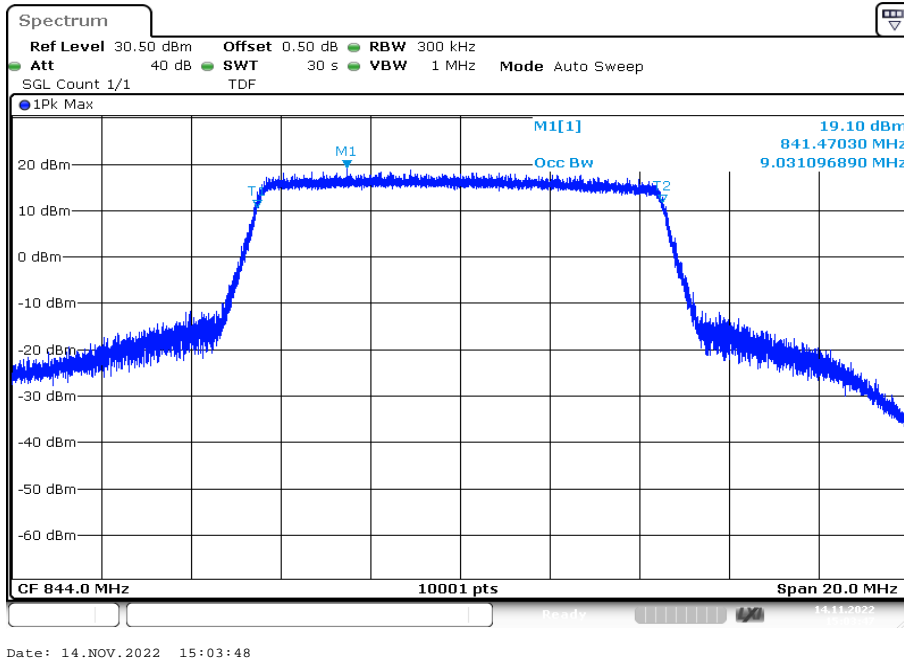
**Plot 51:** 10 MHz – 16-QAM - middle channel (99% - OBW)



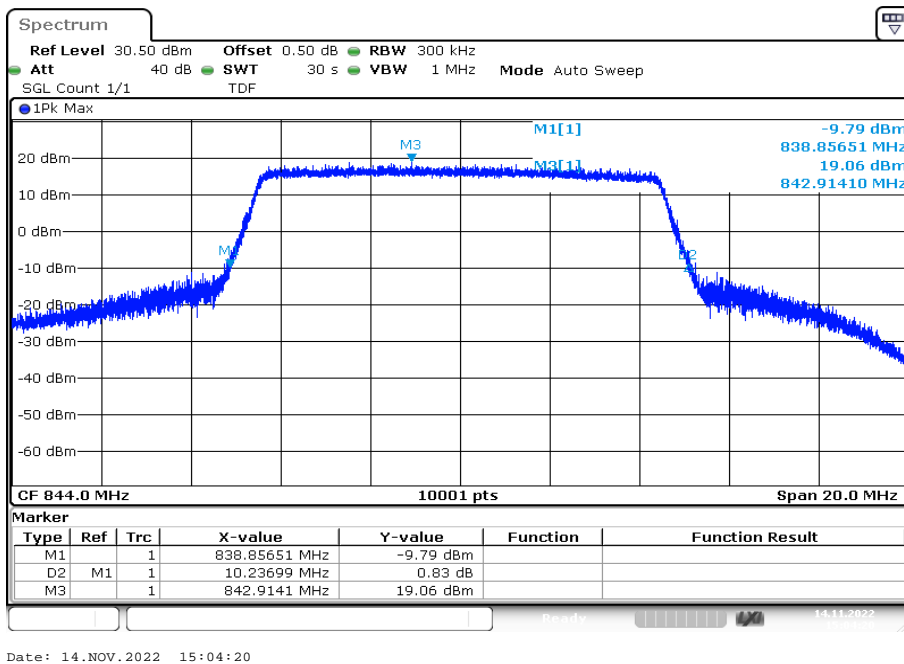
**Plot 52:** 10 MHz – 16-QAM - middle channel (-26 dBc BW)



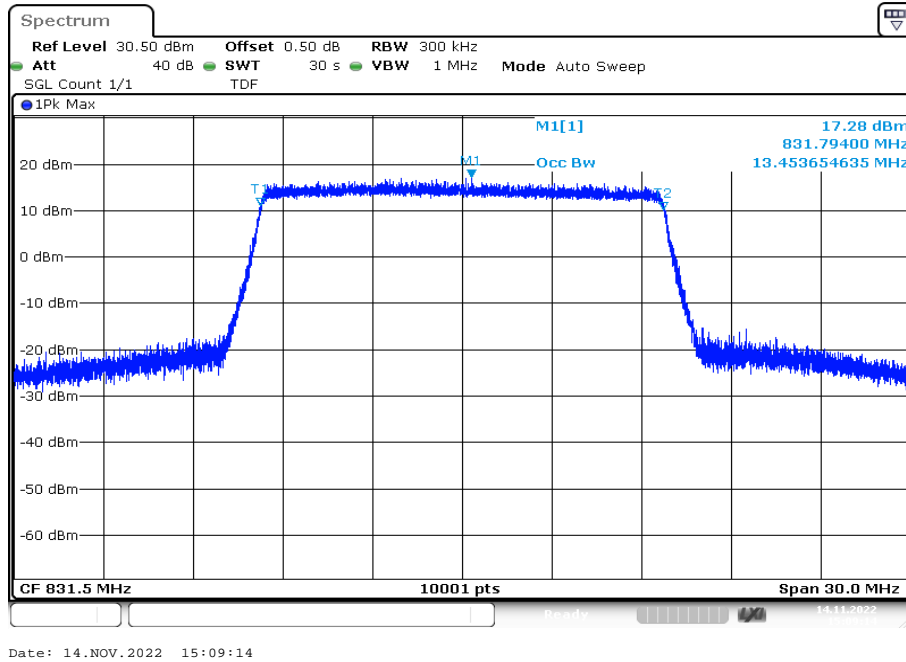
**Plot 53:** 10 MHz – 16-QAM - highest channel (99% - OBW)



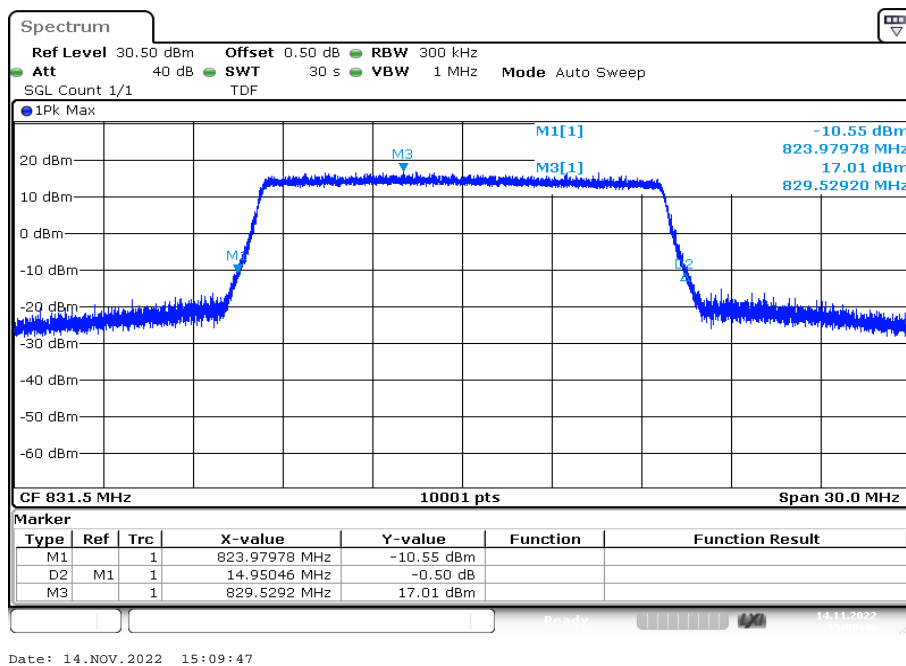
**Plot 54:** 10 MHz – 16-QAM - highest channel (-26 dBc BW)



**Plot 55:** 15 MHz – 16-QAM - lowest channel (99% - OBW)

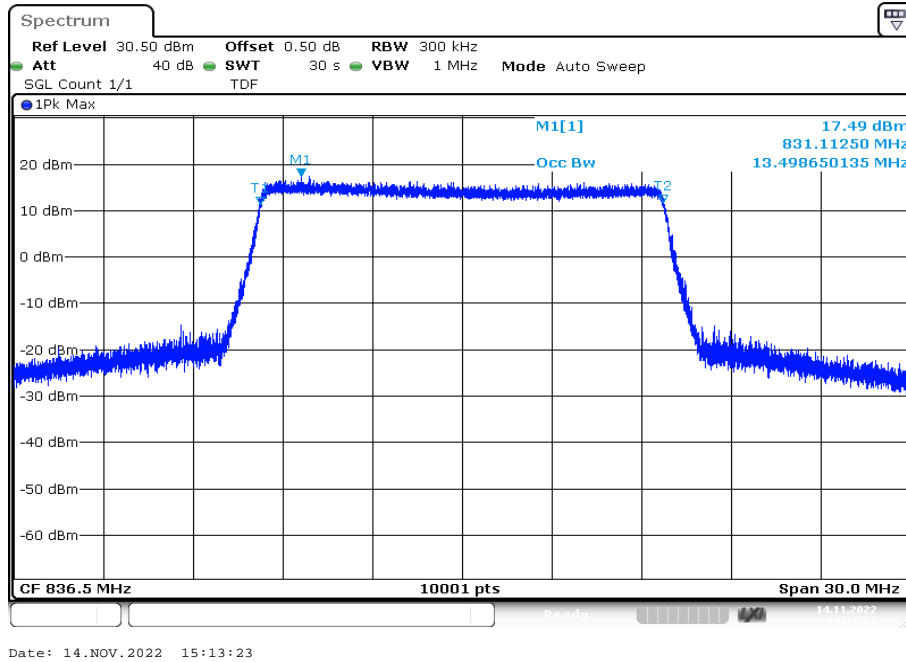


**Plot 56:** 15 MHz – 16-QAM - lowest channel (-26 dBc BW)

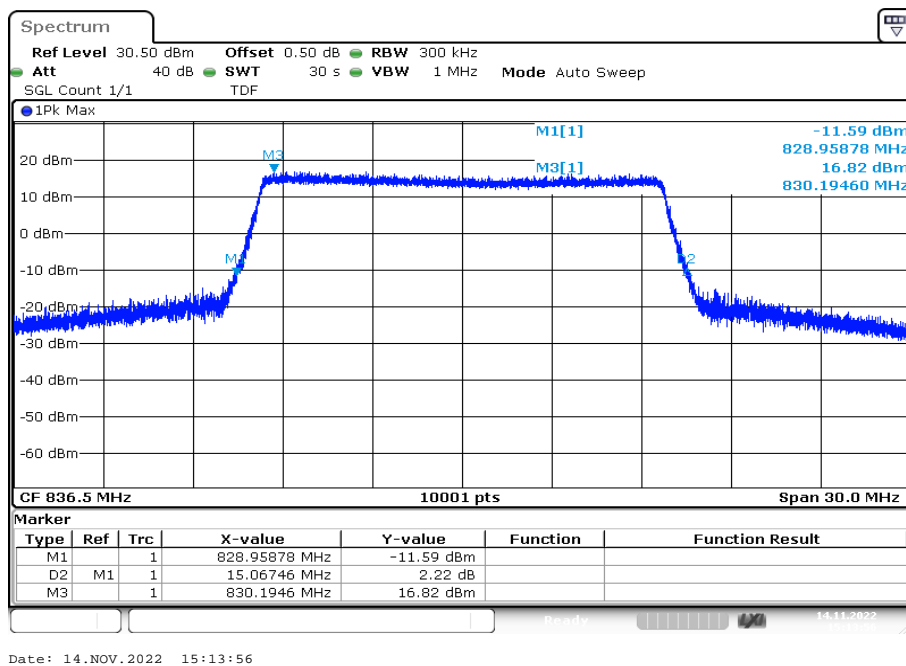




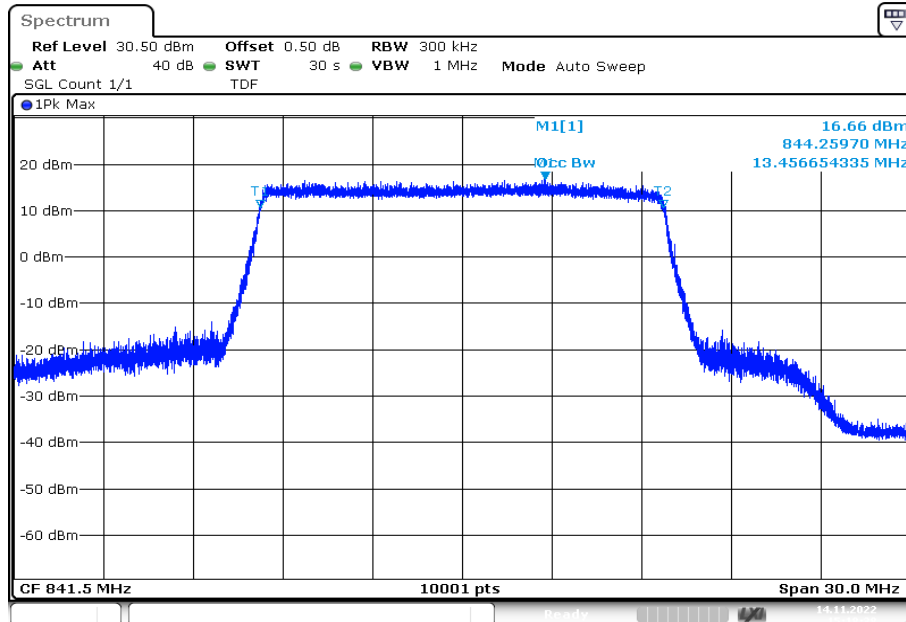
**Plot 57:** 15 MHz – 16-QAM - middle channel (99% - OBW)



**Plot 58:** 15 MHz – 16-QAM - middle channel (-26 dBc BW)

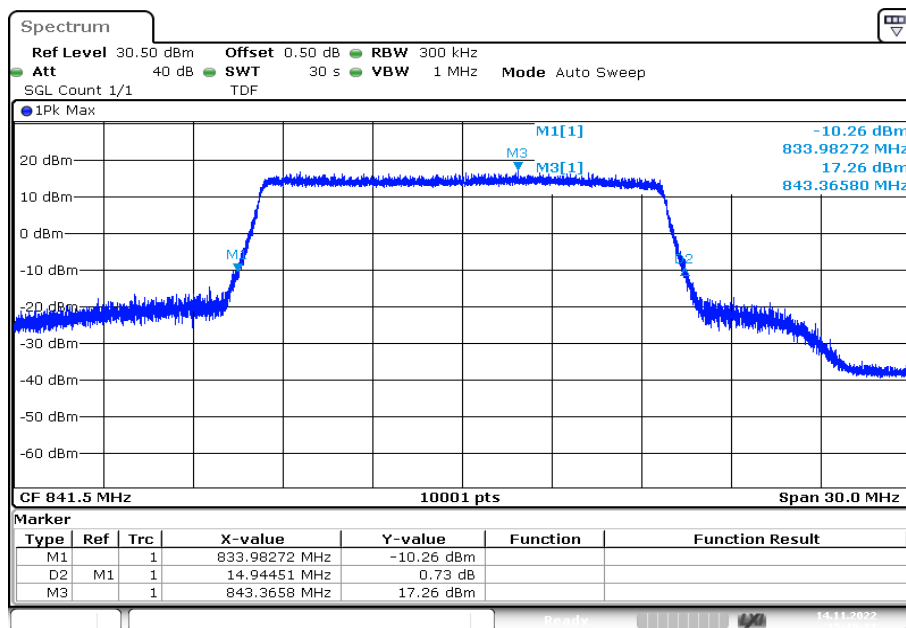


**Plot 59:** 15 MHz – 16-QAM - highest channel (99% - OBW)



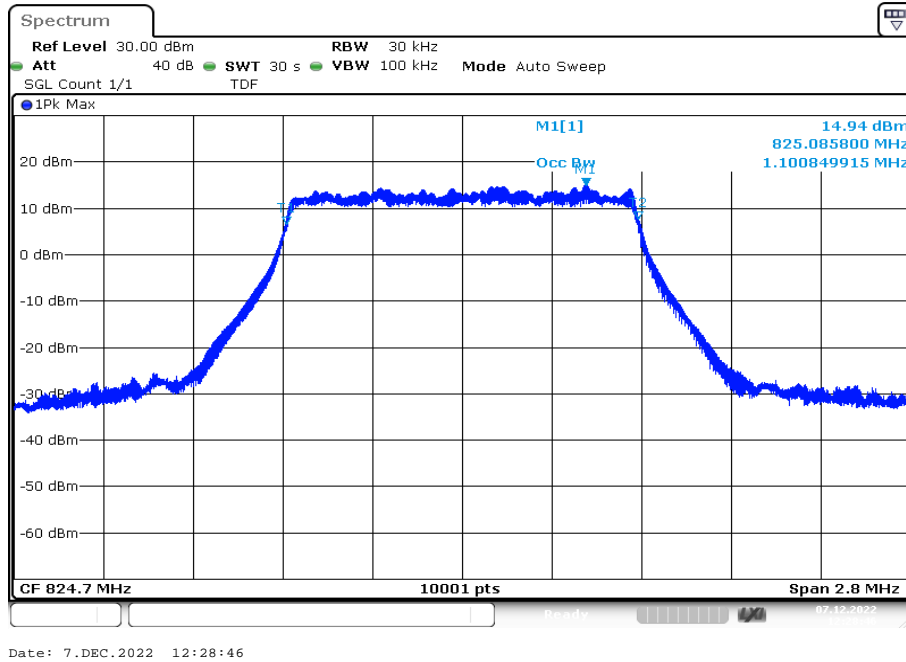
Date: 14.NOV.2022 15:18:39

**Plot 60:** 15 MHz – 16-QAM - highest channel (-26 dBc BW)

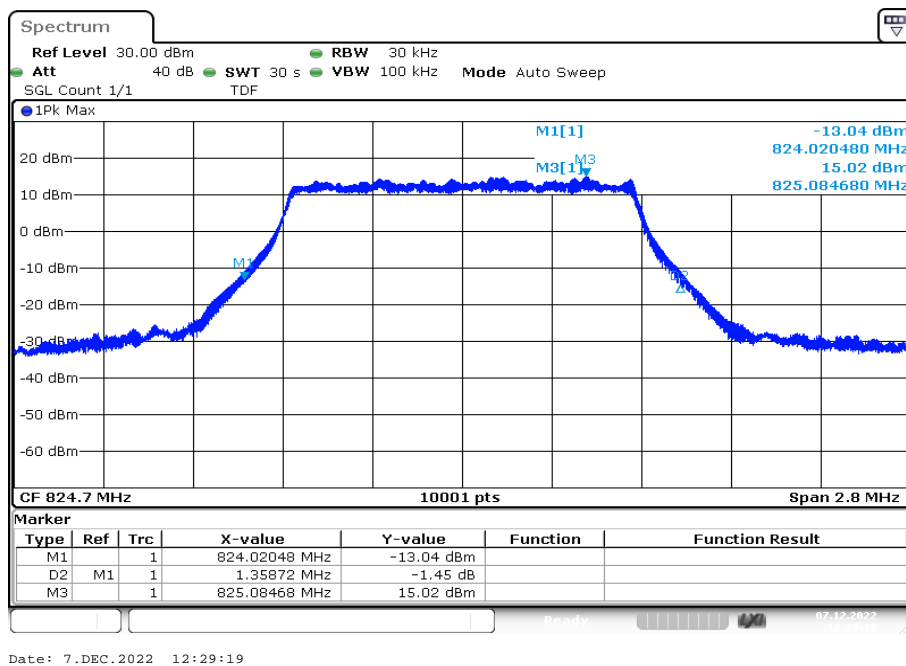


Date: 14.NOV.2022 15:19:11

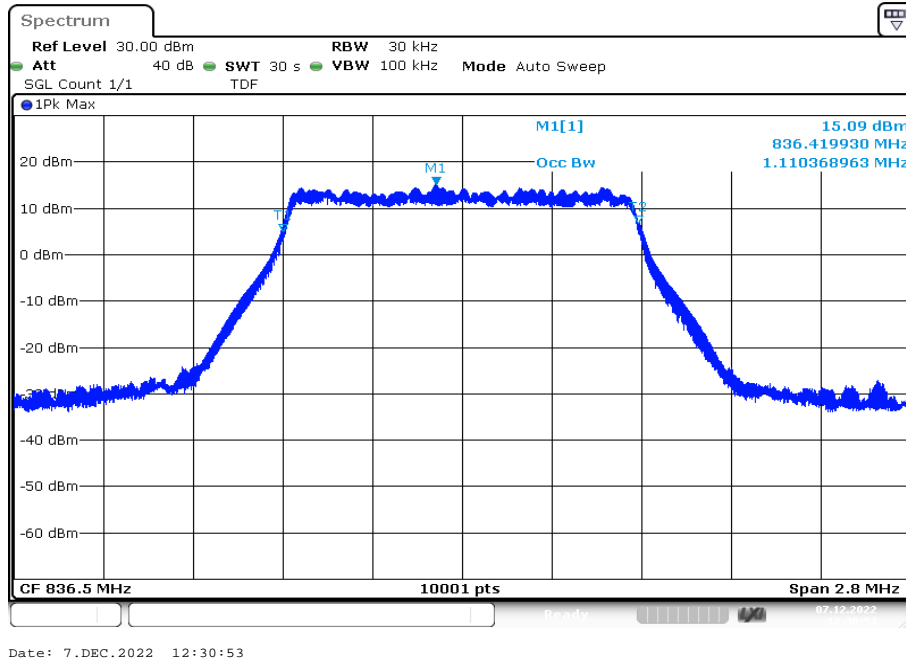
**Plot 61:** 1.4 MHz – 64-QAM - lowest channel (99% - OBW)



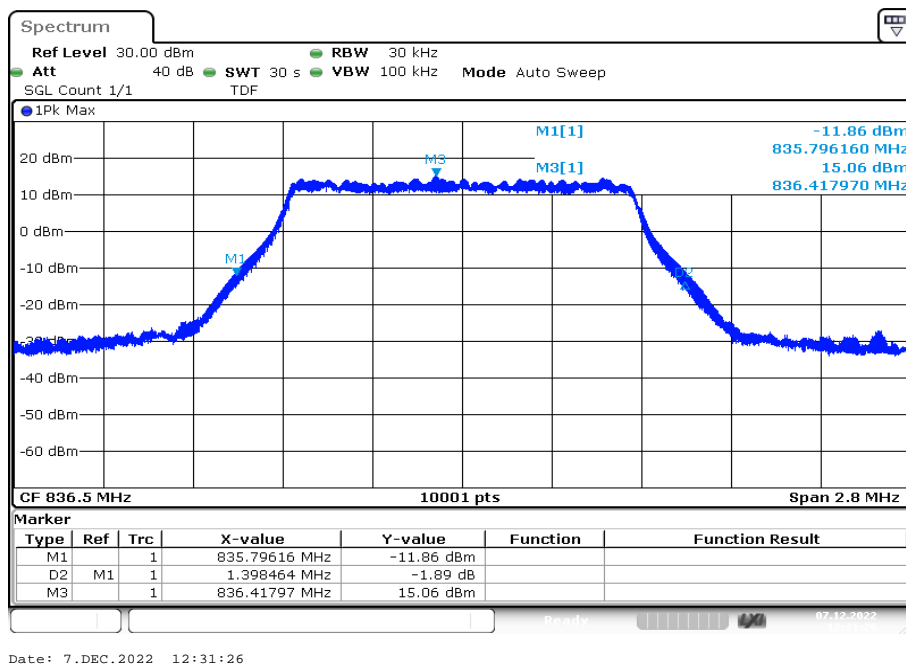
**Plot 62:** 1.4 MHz – 64-QAM - lowest channel (-26 dBc BW)



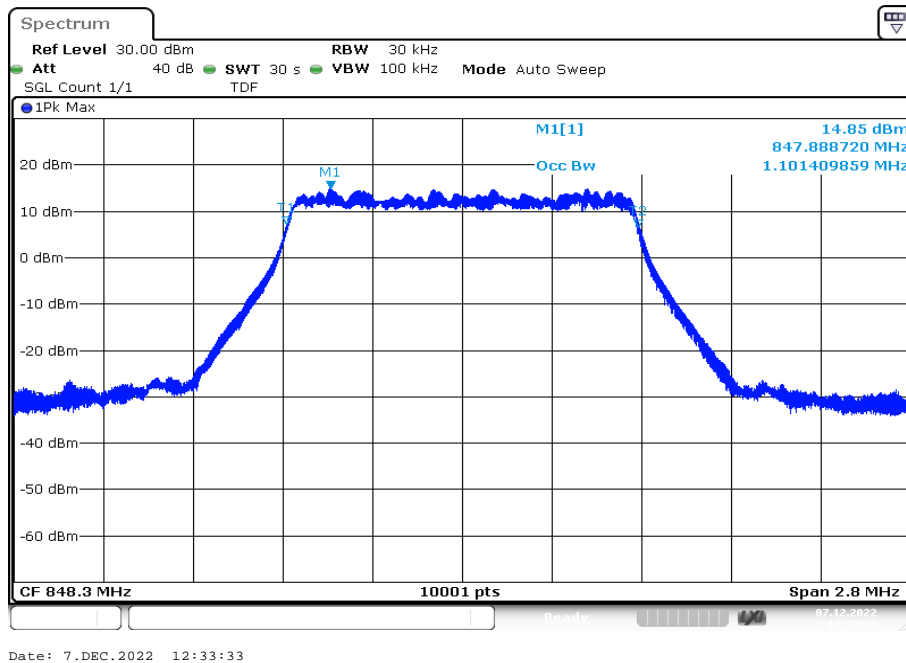
**Plot 63:** 1.4 MHz – 64-QAM - middle channel (99% - OBW)



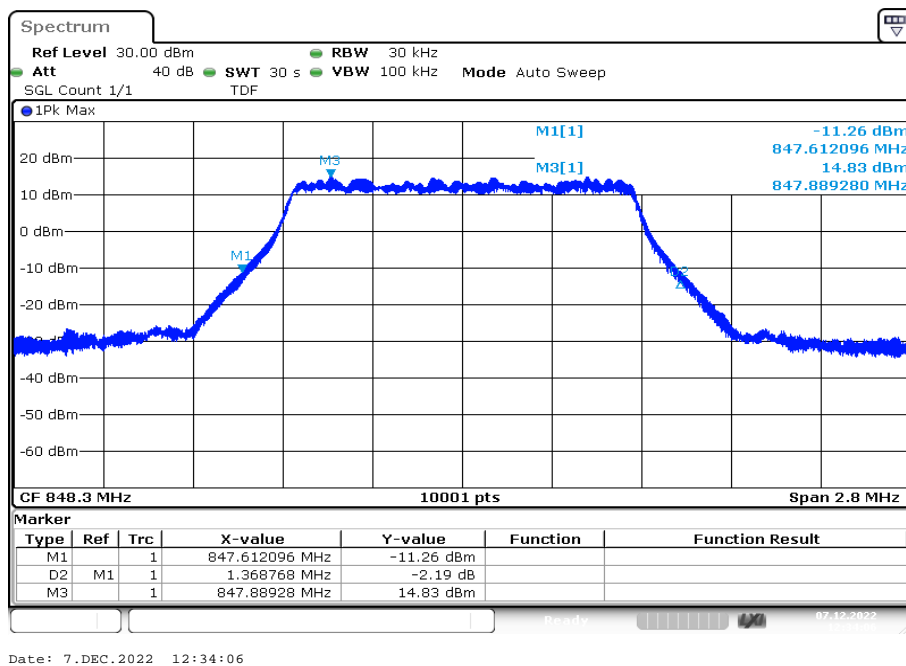
**Plot 64:** 1.4 MHz – 64-QAM - middle channel (-26 dBc BW)



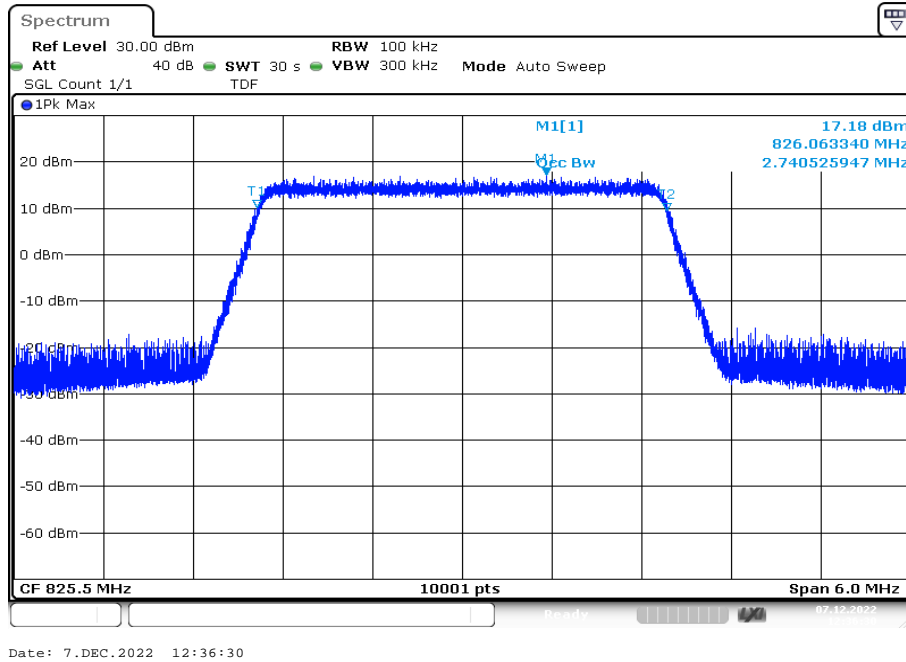
**Plot 65:** 1.4 MHz – 64-QAM - highest channel (99% - OBW)



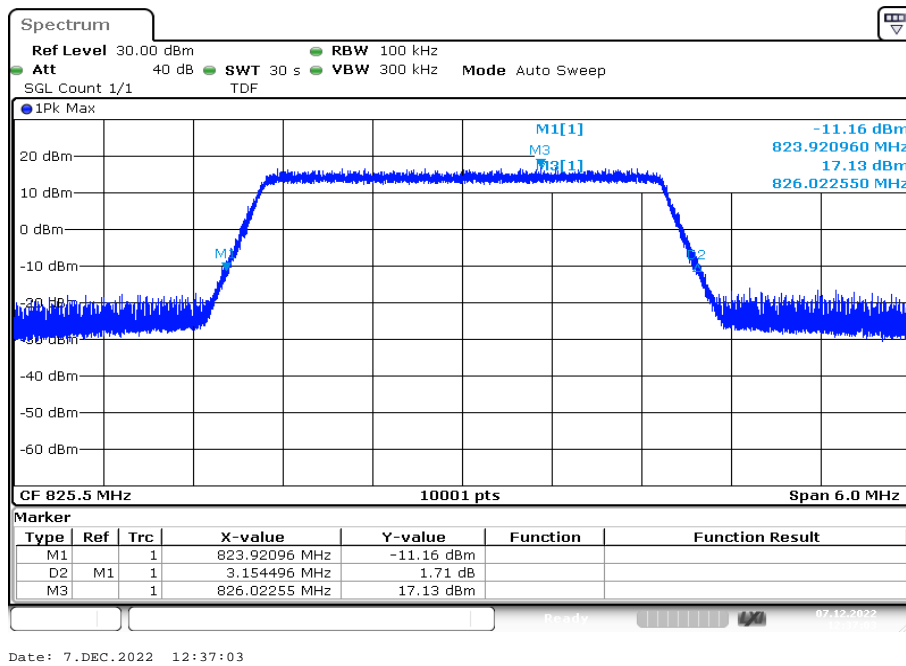
**Plot 66:** 1.4 MHz – 64-QAM - highest channel (-26 dBc BW)



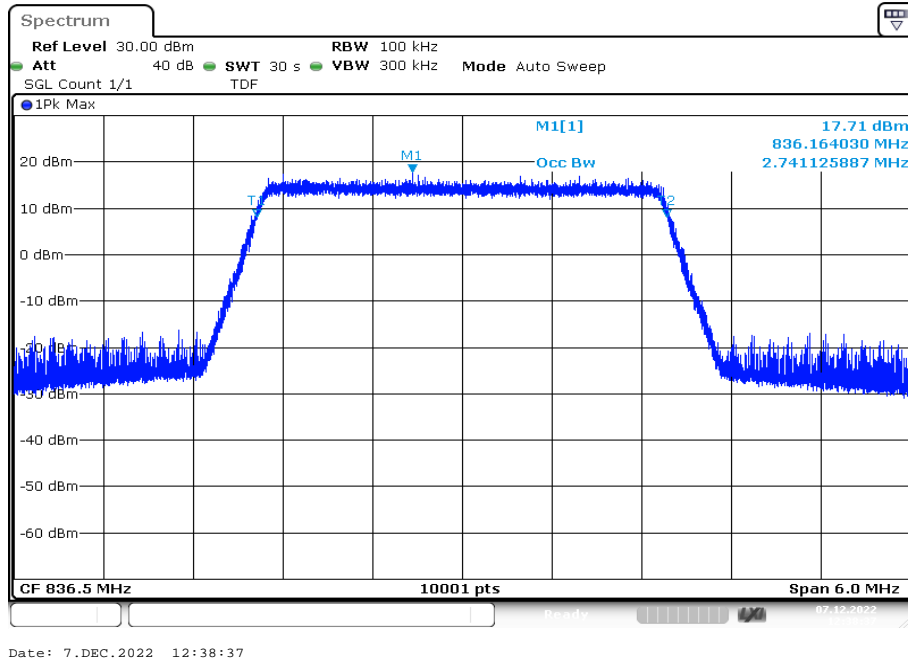
**Plot 67:** 3 MHz – 64-QAM - lowest channel (99% - OBW)



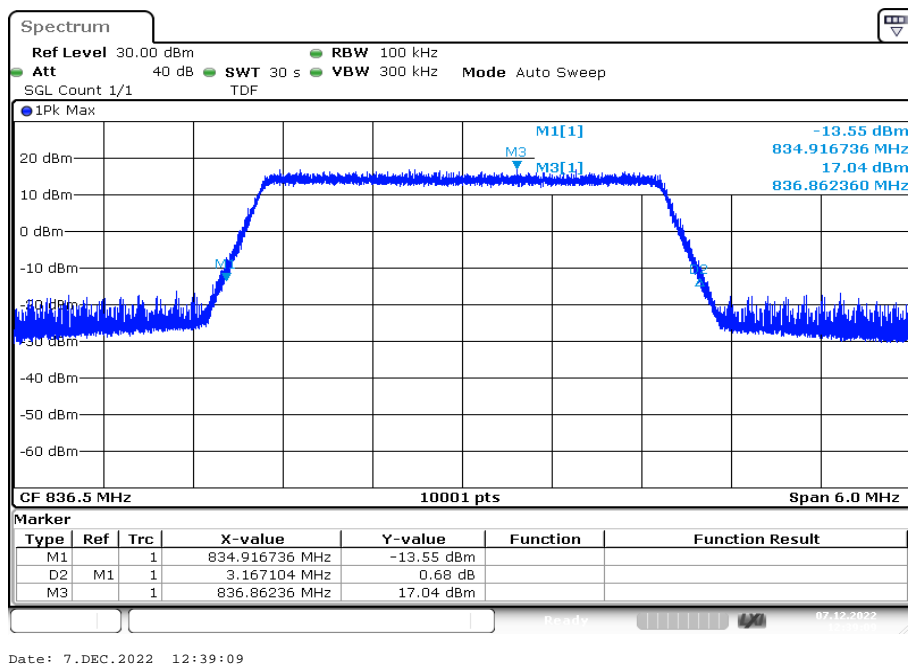
**Plot 68:** 3 MHz – 64-QAM - lowest channel (-26 dBc BW)



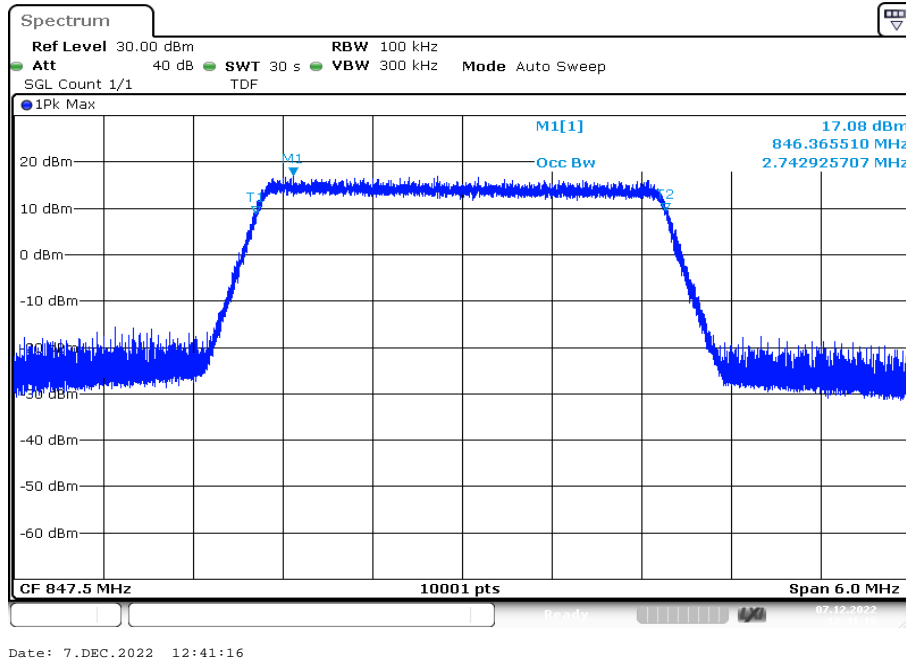
**Plot 69:** 3 MHz – 64-QAM - middle channel (99% - OBW)



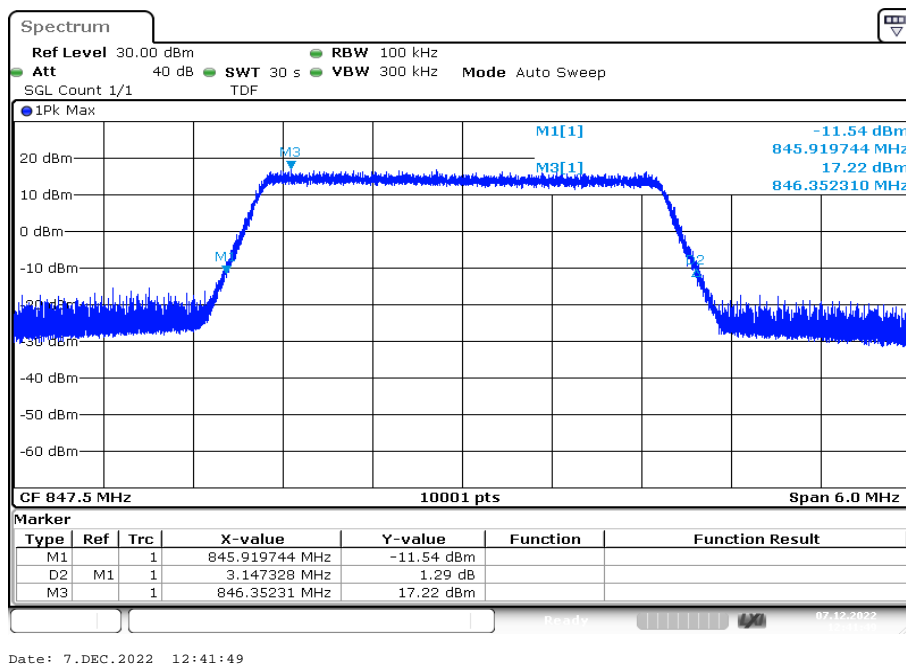
**Plot 70:** 3 MHz – 64-QAM - middle channel (-26 dBc BW)



**Plot 71:** 3 MHz – 64-QAM - highest channel (99% - OBW)

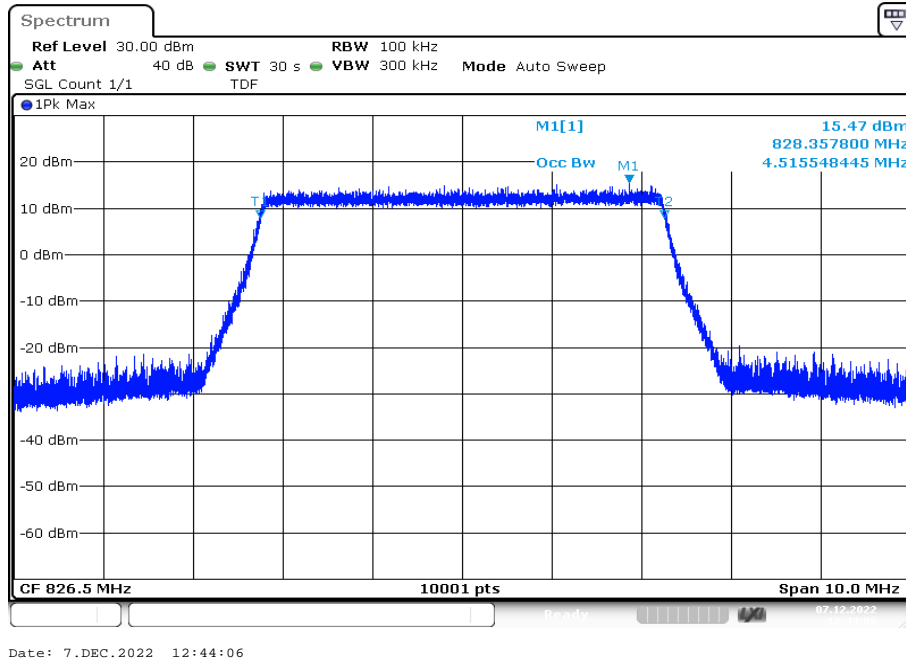


**Plot 72:** 3 MHz – 64-QAM - highest channel (-26 dBc BW)

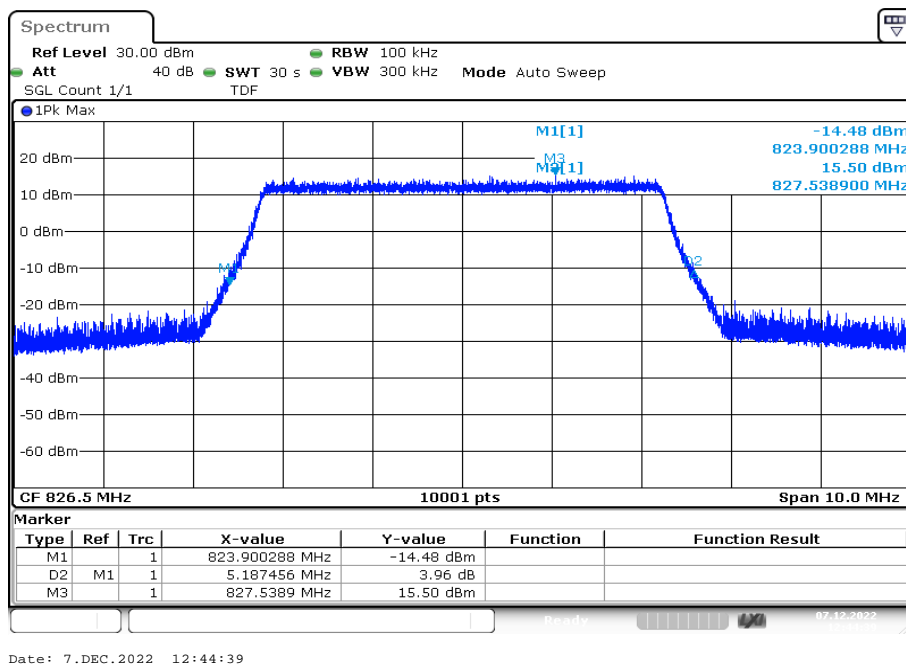




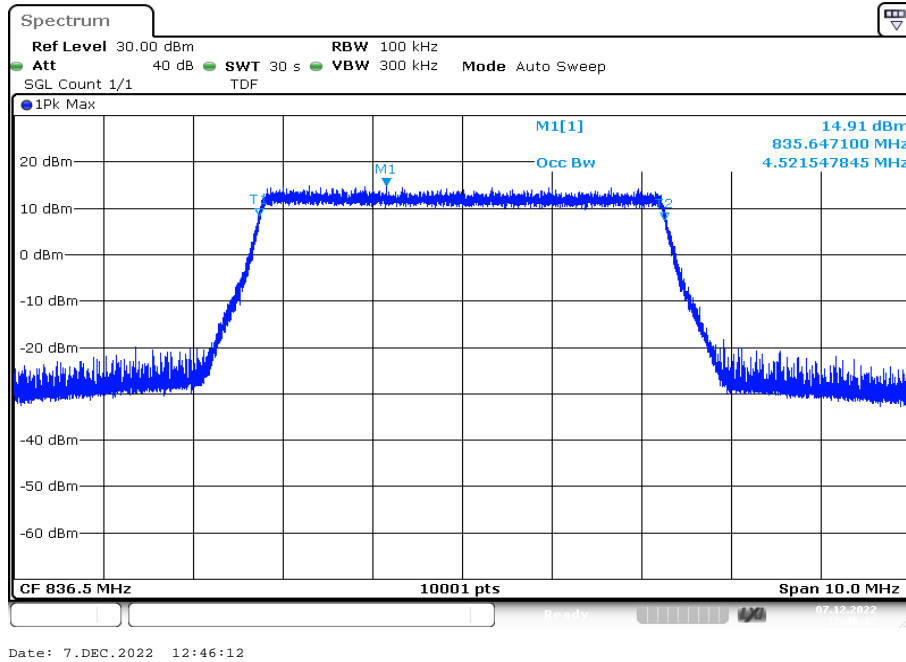
**Plot 73:** 5 MHz – 64-QAM - lowest channel (99% - OBW)



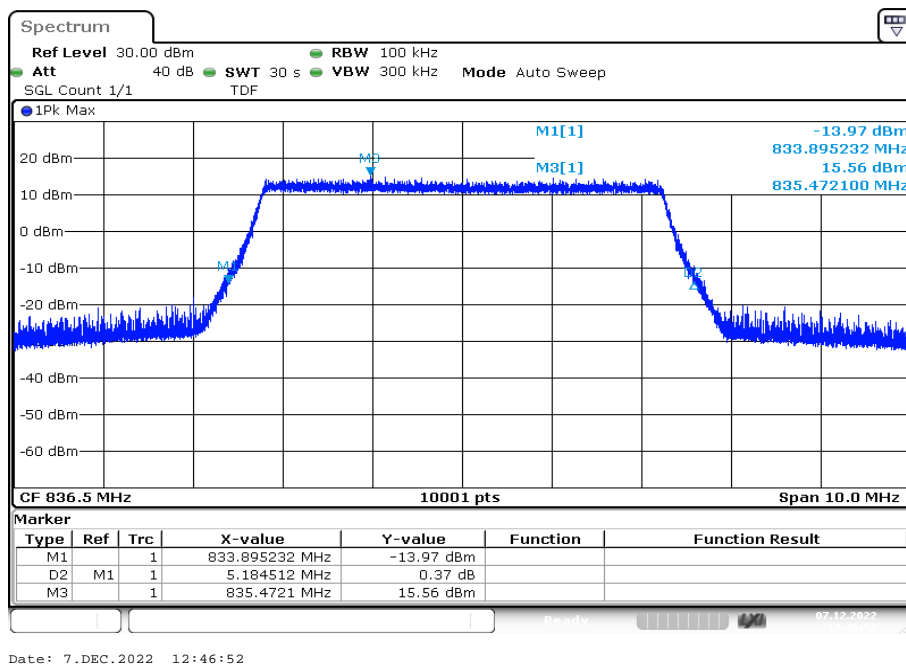
**Plot 74:** 5 MHz – 64-QAM - lowest channel (-26 dBc BW)



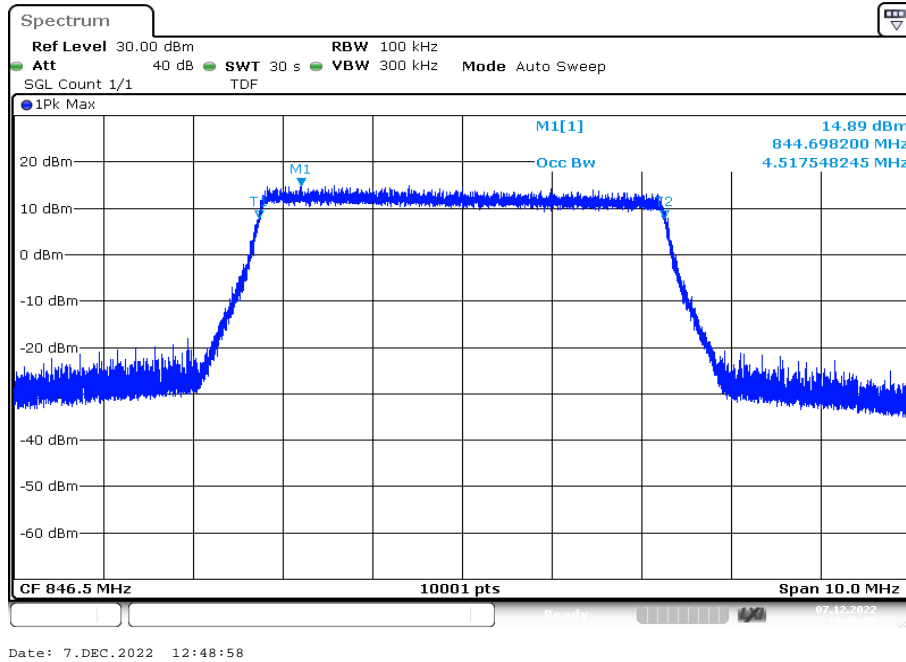
**Plot 75:** 5 MHz – 64-QAM - middle channel (99% - OBW)



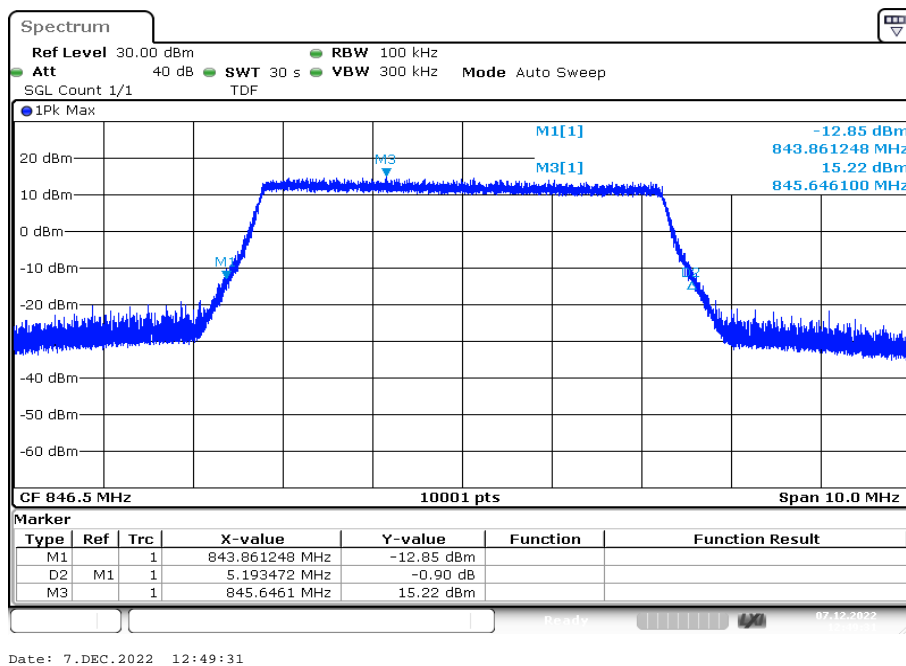
**Plot 76:** 5 MHz – 64-QAM - middle channel (-26 dBc BW)



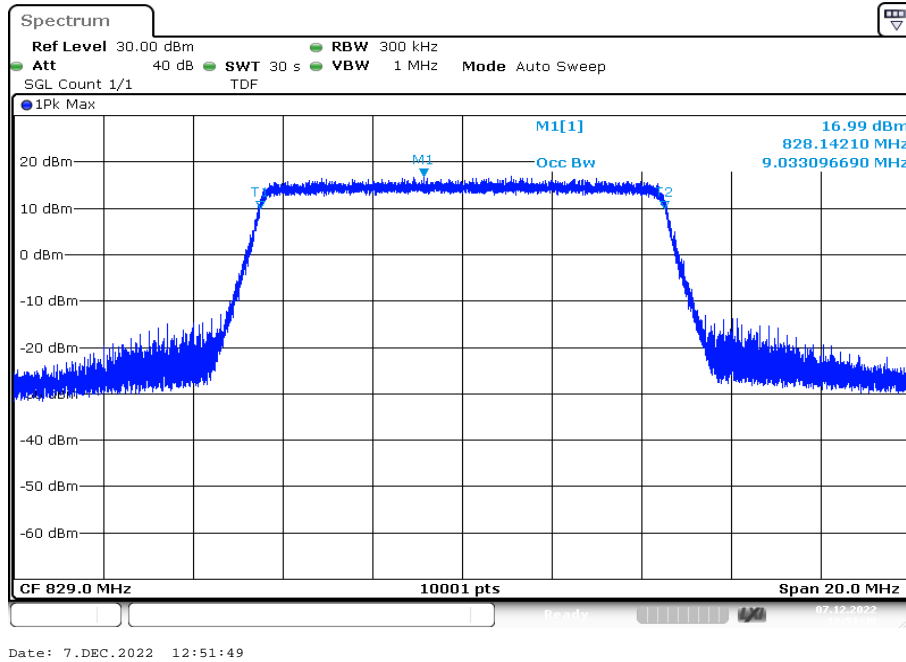
**Plot 77:** 5 MHz – 64-QAM - highest channel (99% - OBW)



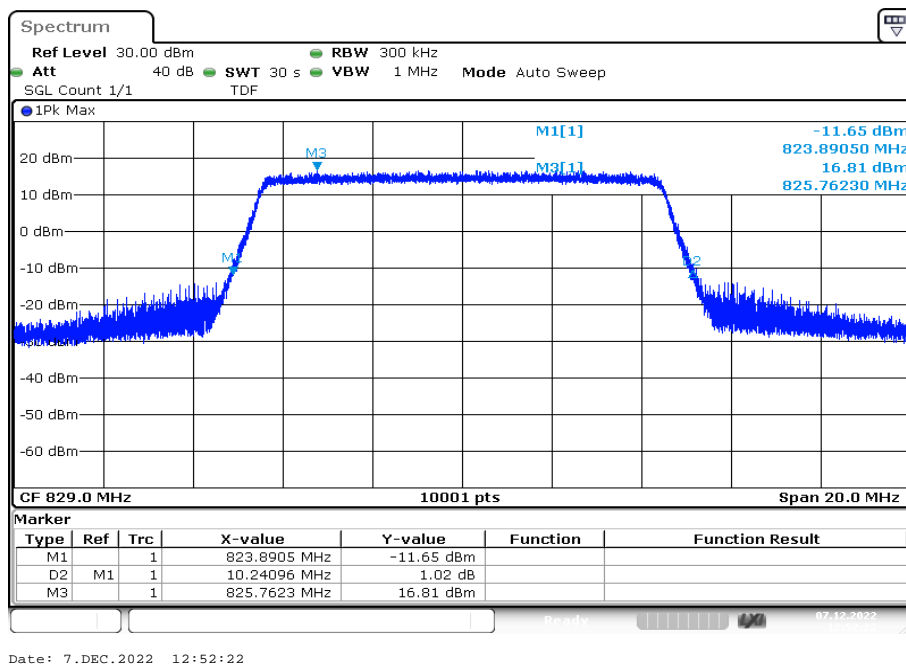
**Plot 78:** 5 MHz – 64-QAM - highest channel (-26 dBc BW)



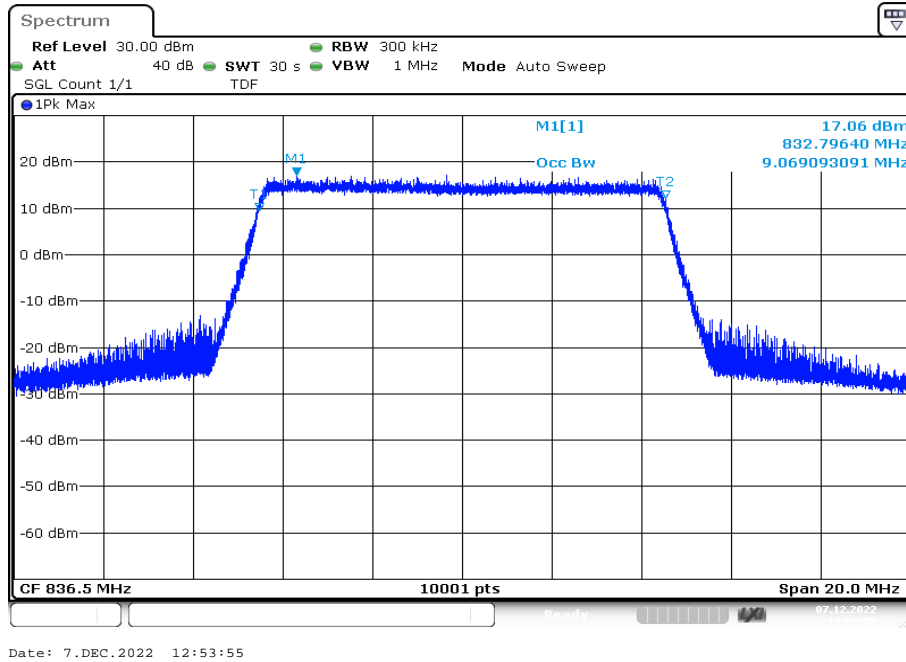
**Plot 79:** 10 MHz – 64-QAM - lowest channel (99% - OBW)



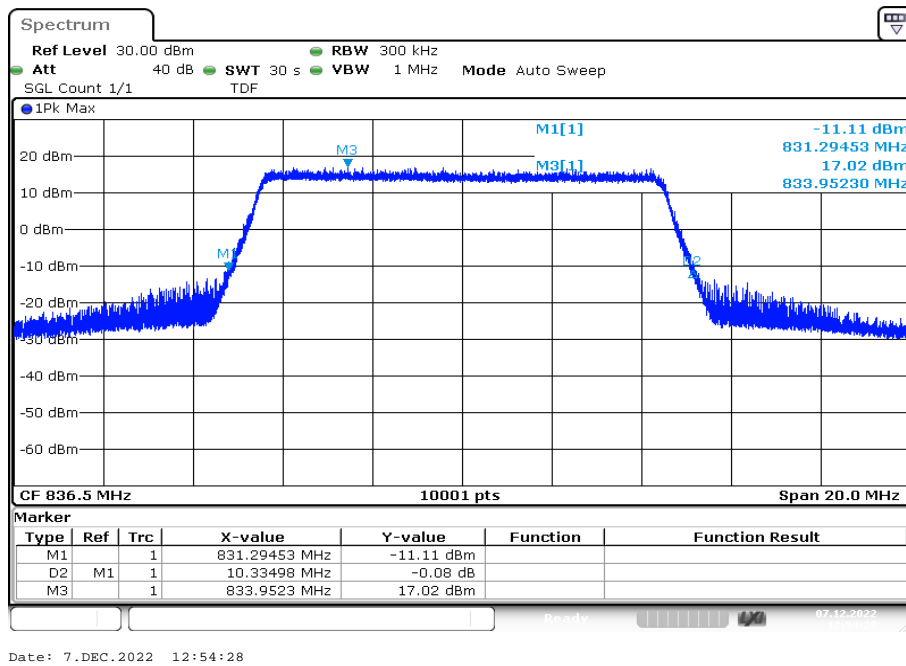
**Plot 80:** 10 MHz – 64-QAM - lowest channel (-26 dBc BW)



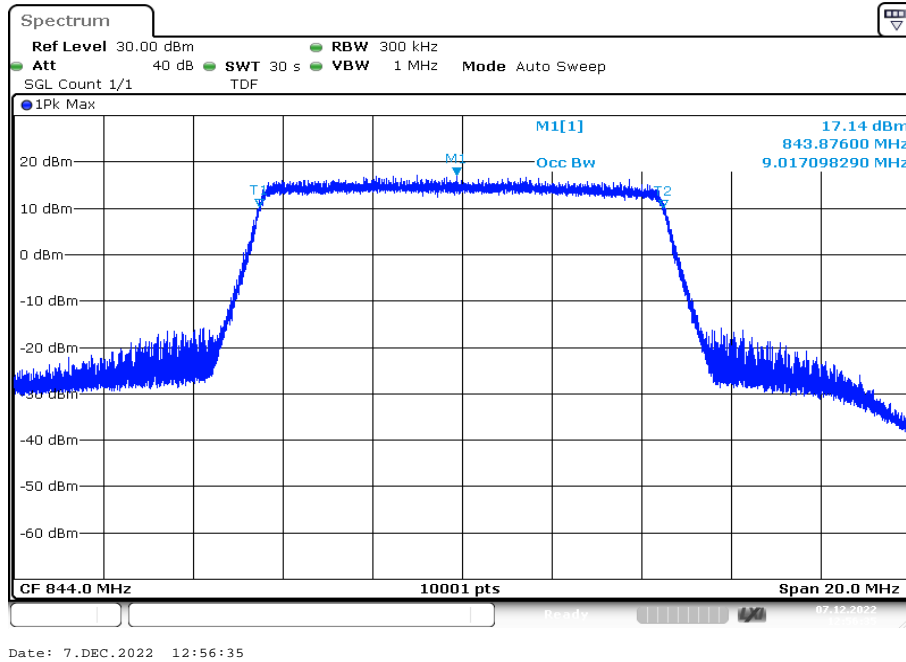
**Plot 81:** 10 MHz – 64-QAM - middle channel (99% - OBW)



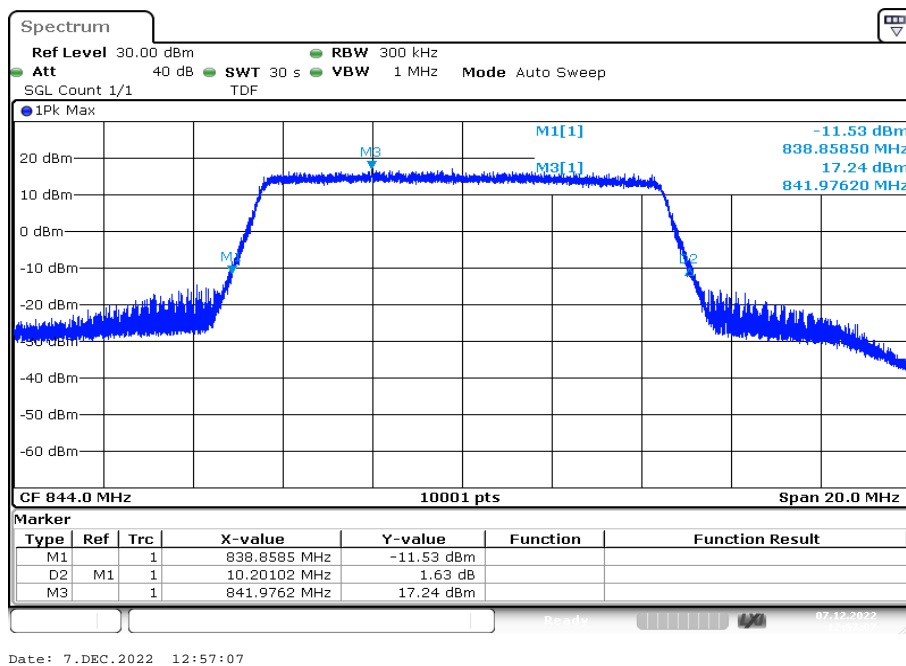
**Plot 82:** 10 MHz – 64-QAM - middle channel (-26 dBc BW)



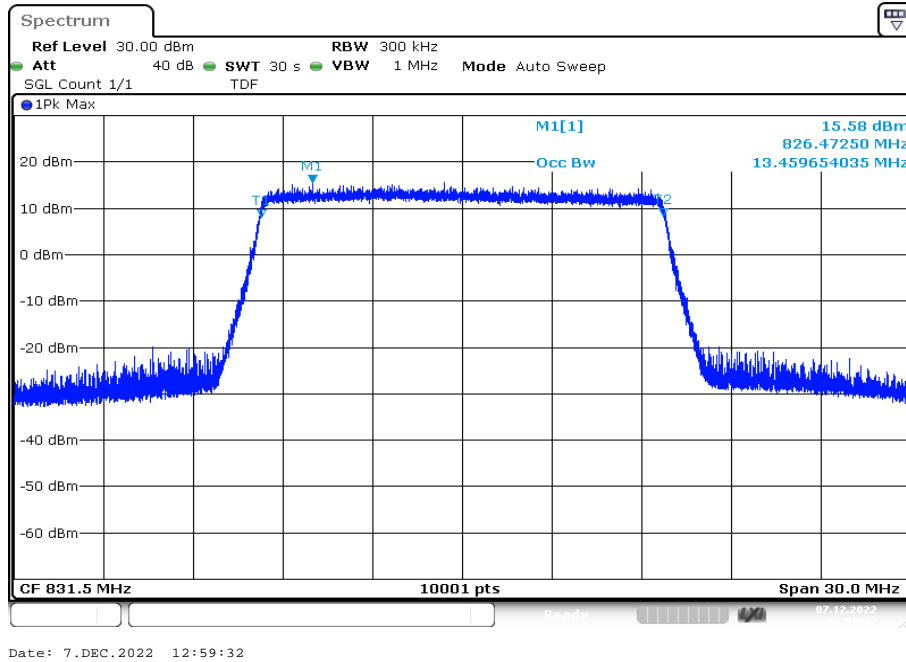
**Plot 83:** 10 MHz – 64-QAM - highest channel (99% - OBW)



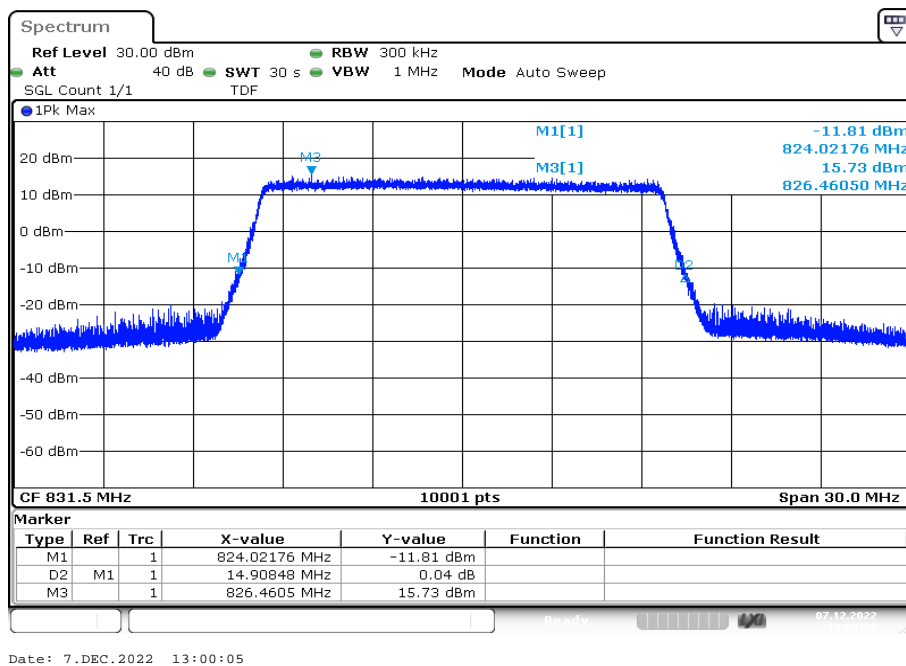
**Plot 84:** 10 MHz – 64-QAM - highest channel (-26 dBc BW)



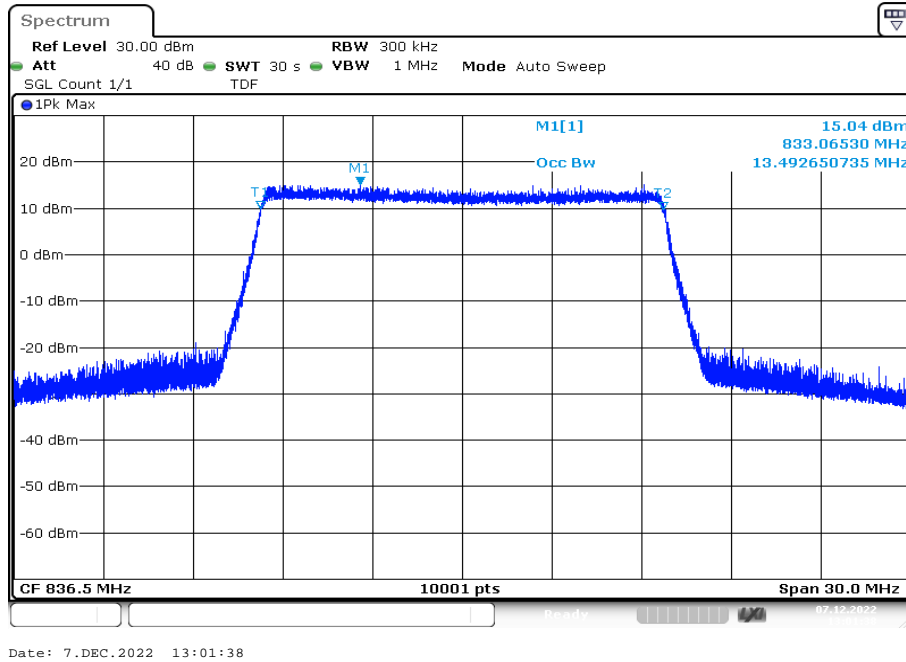
**Plot 85:** 15 MHz – 64-QAM - lowest channel (99% - OBW)



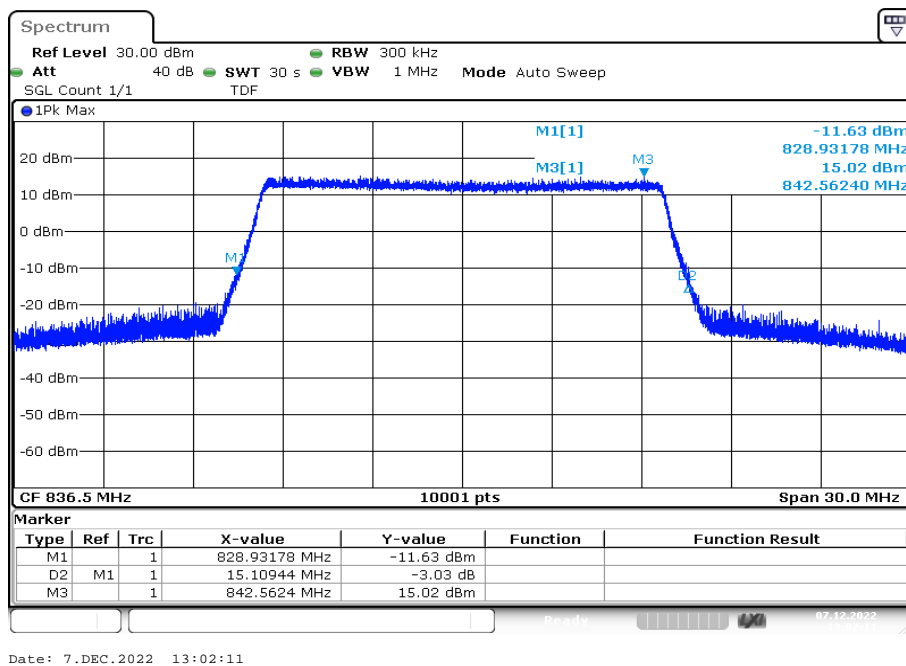
**Plot 86:** 15 MHz – 64-QAM - lowest channel (-26 dBc BW)



**Plot 87:** 15 MHz – 64-QAM - middle channel (99% - OBW)

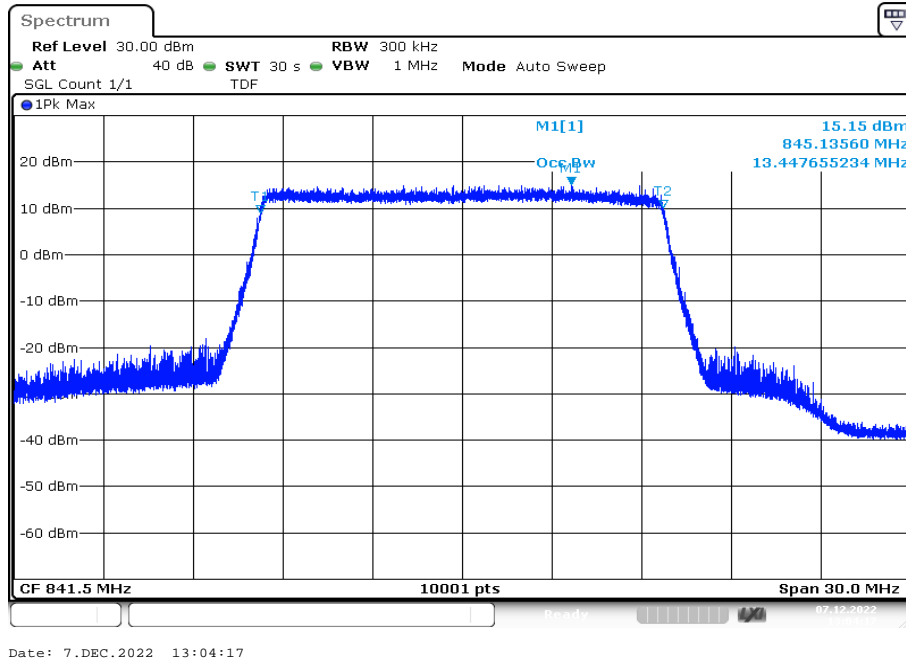


**Plot 88:** 15 MHz – 64-QAM - middle channel (-26 dBc BW)

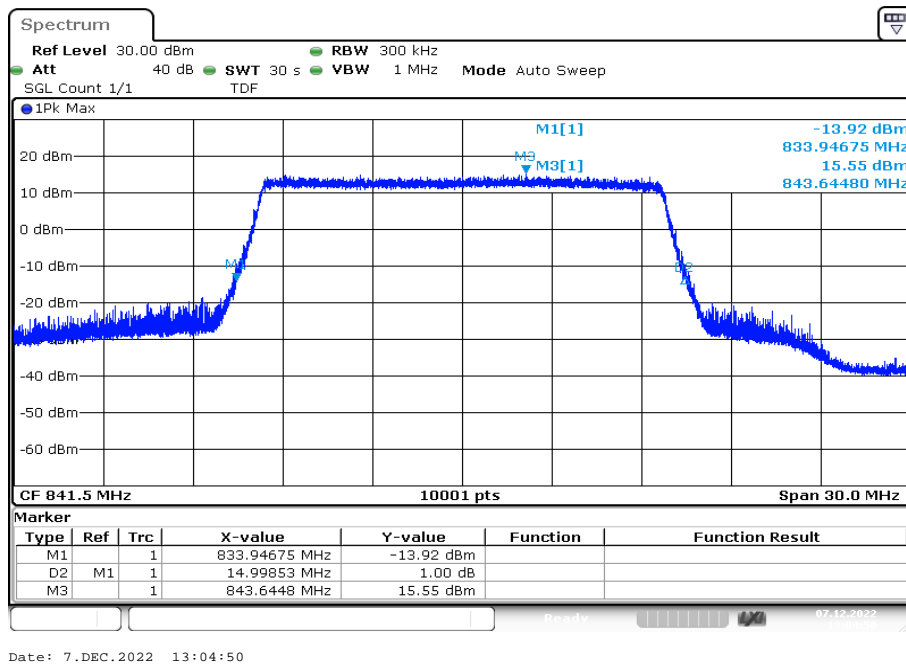




**Plot 89:** 15 MHz – 64-QAM - highest channel (99% - OBW)



**Plot 90:** 15 MHz – 64-QAM - highest channel (-26 dBc BW)



## 12 Glossary

<b>EUT</b>	Equipment under test
<b>DUT</b>	Device under test
<b>UUT</b>	Unit under test
<b>GUE</b>	GNSS User Equipment
<b>ETSI</b>	European Telecommunications Standards Institute
<b>EN</b>	European Standard
<b>FCC</b>	Federal Communications Commission
<b>FCC ID</b>	Company Identifier at FCC
<b>IC</b>	Industry Canada
<b>PMN</b>	Product marketing name
<b>HMN</b>	Host marketing name
<b>HVIN</b>	Hardware version identification number
<b>FVIN</b>	Firmware version identification number
<b>EMC</b>	Electromagnetic Compatibility
<b>HW</b>	Hardware
<b>SW</b>	Software
<b>Inv. No.</b>	Inventory number
<b>S/N or SN</b>	Serial number
<b>C</b>	Compliant
<b>NC</b>	Not compliant
<b>NA</b>	Not applicable
<b>NP</b>	Not performed
<b>PP</b>	Positive peak
<b>QP</b>	Quasi peak
<b>AVG</b>	Average
<b>OC</b>	Operating channel
<b>OCW</b>	Operating channel bandwidth
<b>OBW</b>	Occupied bandwidth
<b>OOB</b>	Out of band
<b>DFS</b>	Dynamic frequency selection
<b>CAC</b>	Channel availability check
<b>OP</b>	Occupancy period
<b>NOP</b>	Non occupancy period
<b>DC</b>	Duty cycle
<b>PER</b>	Packet error rate
<b>CW</b>	Clean wave
<b>MC</b>	Modulated carrier
<b>WLAN</b>	Wireless local area network
<b>RLAN</b>	Radio local area network
<b>DSSS</b>	Dynamic sequence spread spectrum
<b>OFDM</b>	Orthogonal frequency division multiplexing
<b>FHSS</b>	Frequency hopping spread spectrum
<b>GNSS</b>	Global Navigation Satellite System
<b>C/N<sub>0</sub></b>	Carrier to noise-density ratio, expressed in dB-Hz

**13 Document history**

Version	Applied changes	Date of release
-/-	Initial release	2023-01-16

**14 Accreditation Certificate – D-PL-12076-01-05**

first page	last page
 <p>The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH. <a href="https://www.dakks.de/en/content/accredited-bodies-dakks">https://www.dakks.de/en/content/accredited-bodies-dakks</a> See notes essential.</p>	 <p>The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkkS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.</p> <p>No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkkS.</p> <p>The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAkkS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.</p> <p>The up-to-date state of membership can be retrieved from the following websites: EA: <a href="http://www.european-accreditation.org">www.european-accreditation.org</a> ILAC: <a href="http://www.ilac.org">www.ilac.org</a> IAF: <a href="http://www.iaf.nu">www.iaf.nu</a></p>

**Note: The current certificate annex is published on the websites (link see below).**

<https://www.dakks.de/files/data/as/pdf/D-PL-12076-01-05e.pdf>

or

[https://ctcadvanced.com/app/uploads/2020/06/D-PL-12076-01-05\\_TCB\\_USA.pdf](https://ctcadvanced.com/app/uploads/2020/06/D-PL-12076-01-05_TCB_USA.pdf)

##### END OF TEST REPORT #####