12.3.5 Block edge compliance

Description:

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

Measurement:

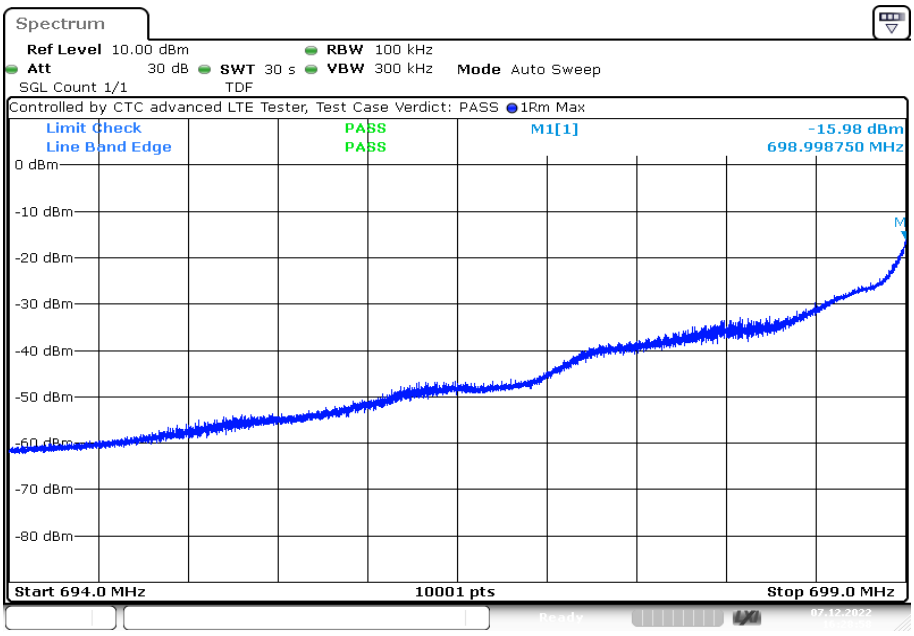
Measurement parameters	
Detector:	RMS
Sweep time:	See plots
Video bandwidth:	See plots
Resolution bandwidth:	See plots
Span:	1 MHz
Trace-Mode:	Max Hold
Used equipment:	See chapter 8.3 setup A
Measurement uncertainty:	See chapter 9
Measurement procedure	FCC: § 2.1051

Limits:

FCC
§ 27.53(g)
For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.
-13 dBm Correction factor according to KDB 890810 if RBW < 1 % emission bandwidth: ☒N/A here ☐10 log (RBW1/RBW2) = X dB; whereas: RBW1 = Y, RBW2 = Z

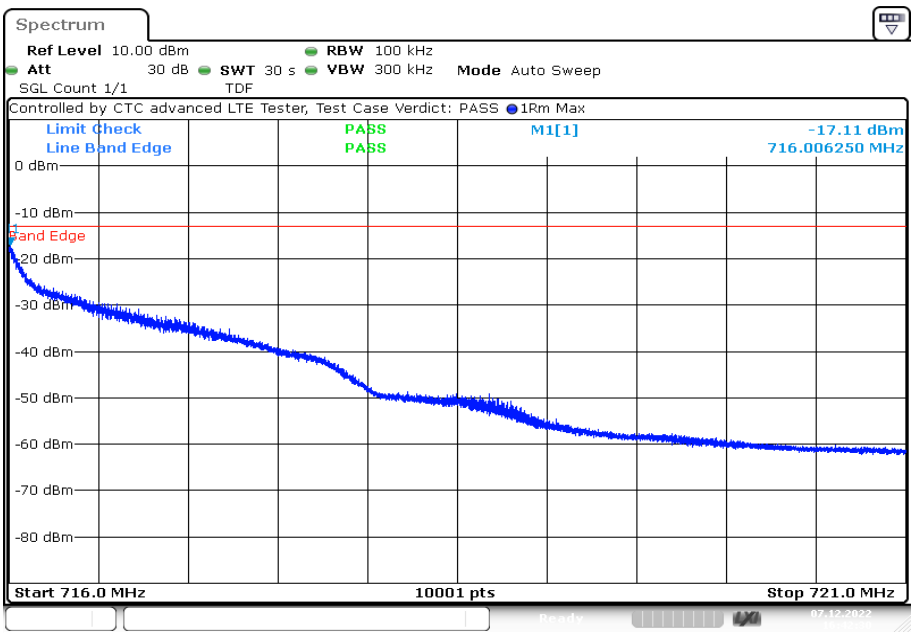
Results:

Plot 1: 1.4 MHz – QPSK - Lowest channel



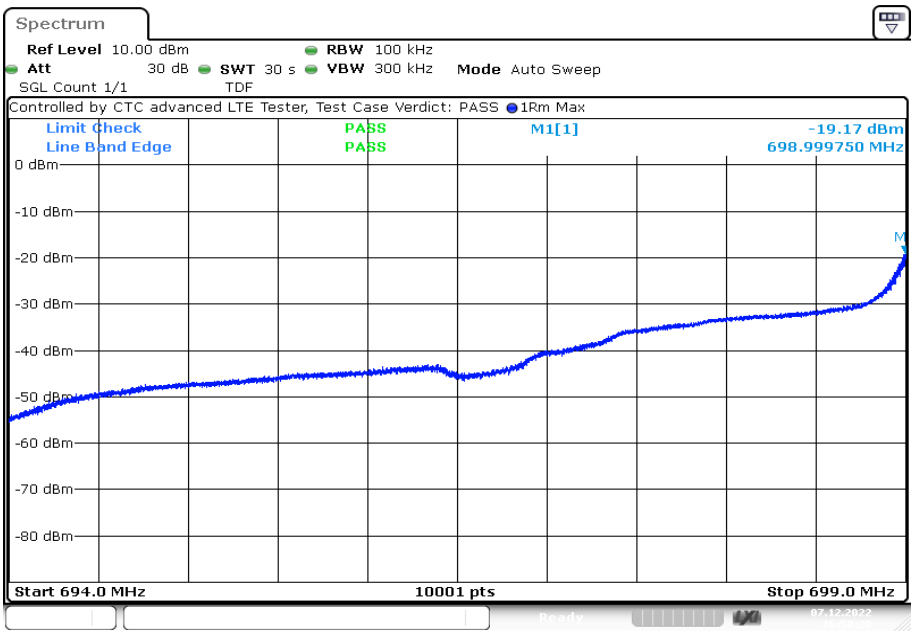
Date: 7.DEC.2022 16:28:58

Plot 2: 1.4 MHz – QPSK - Highest channel



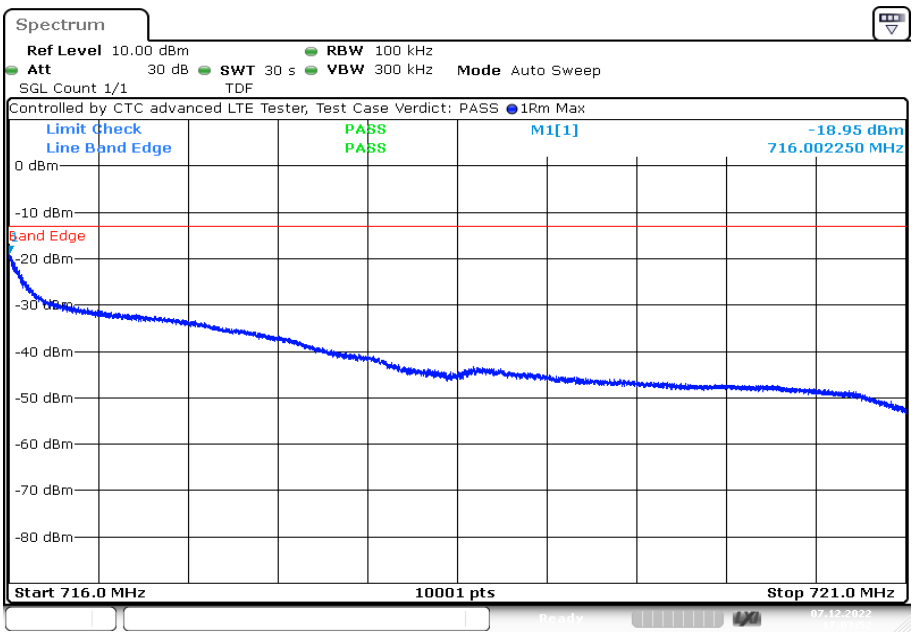
Date: 7.DEC.2022 16:42:30

Plot 3: 3 MHz – QPSK - Lowest channel



Date: 7.DEC.2022 16:50:20

Plot 4: 3 MHz – QPSK - Highest channel

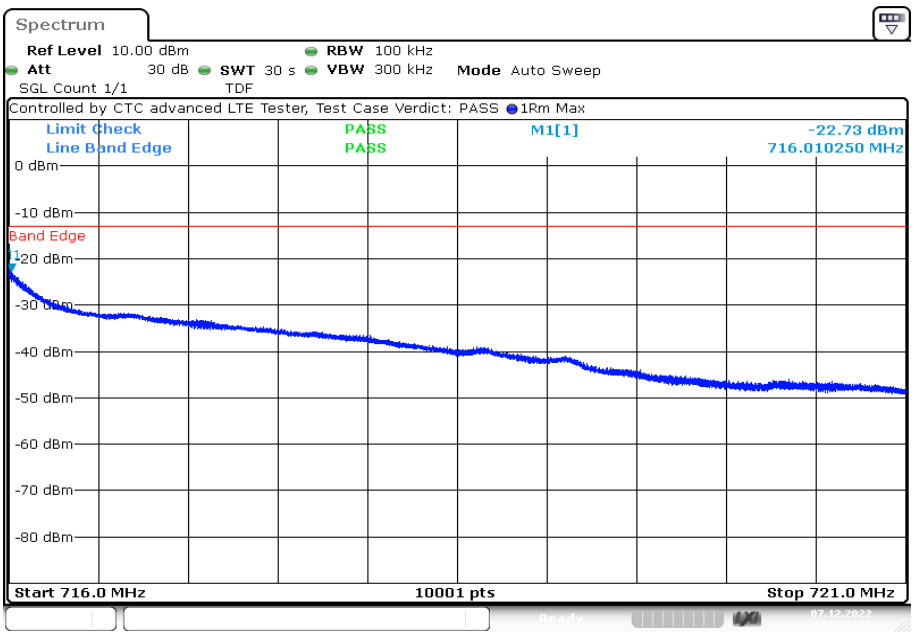


Date: 7.DEC.2022 17:03:52

Plot 5: 5 MHz – QPSK - Lowest channel

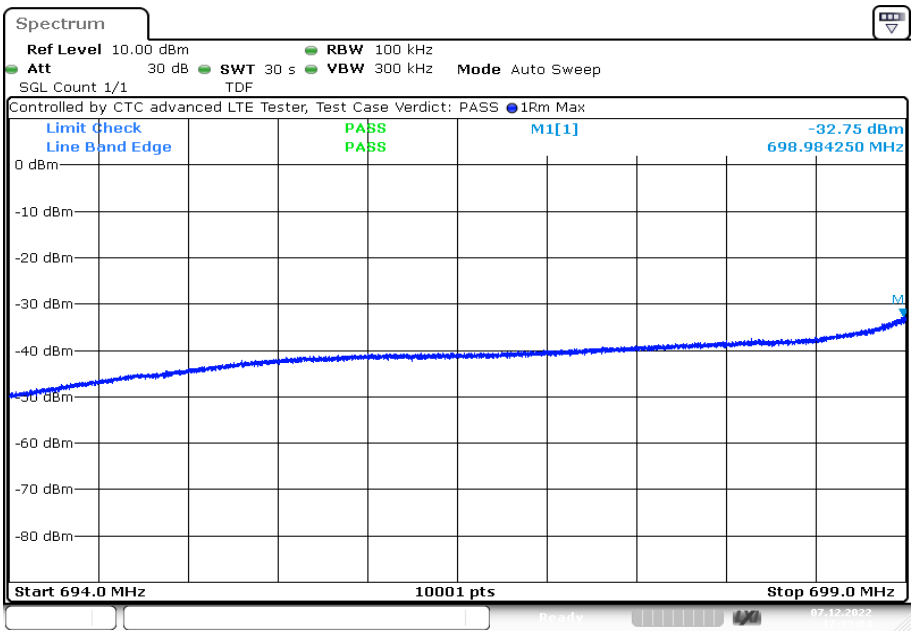
Date: 7.DEC.2022 17:11:42

Plot 6: 5 MHz – QPSK - Highest channel



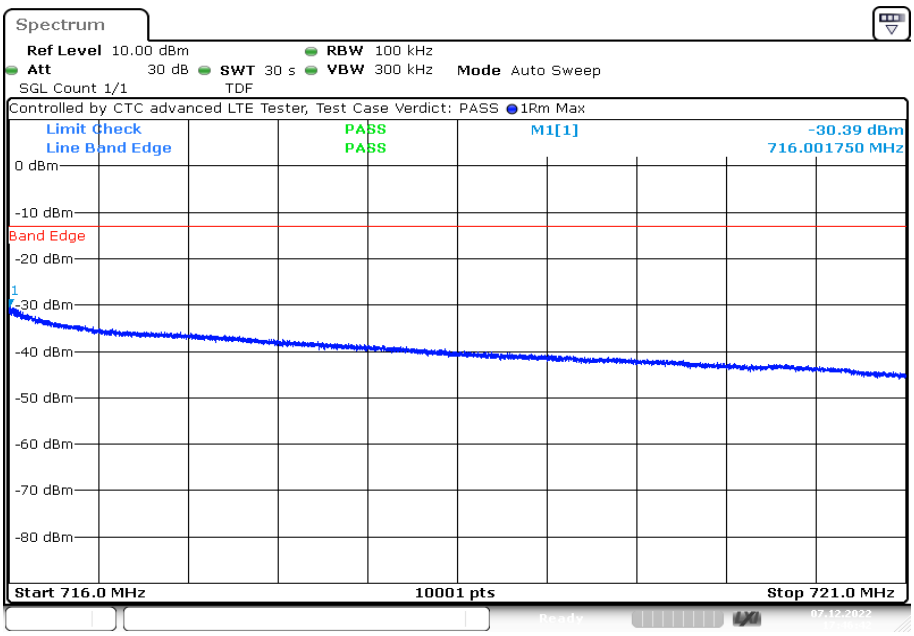
Date: 7.DEC.2022 17:25:14

Plot 7: 10 MHz – QPSK - Lowest channel



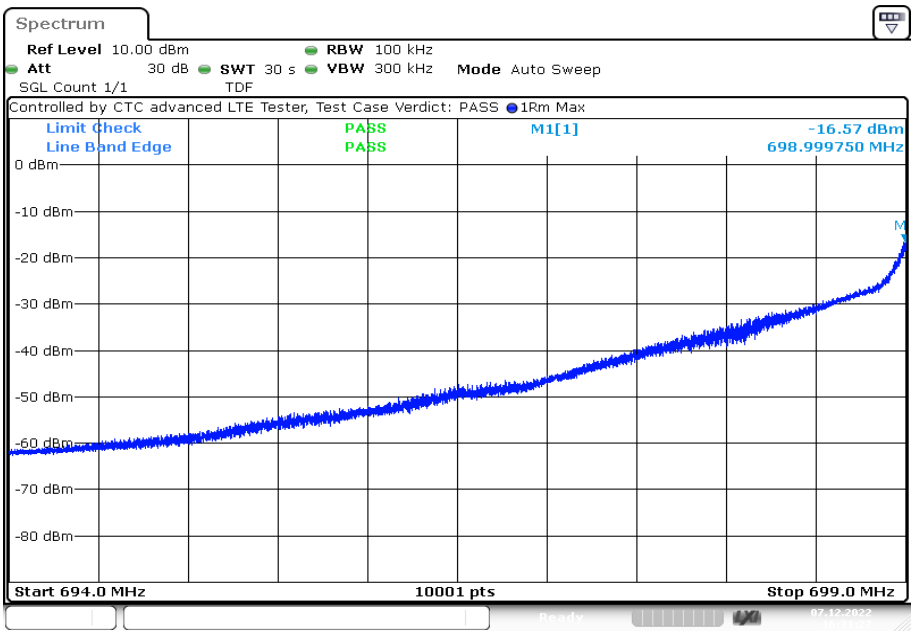
Date: 7.DEC.2022 17:33:04

Plot 8: 10 MHz – QPSK - Highest channel



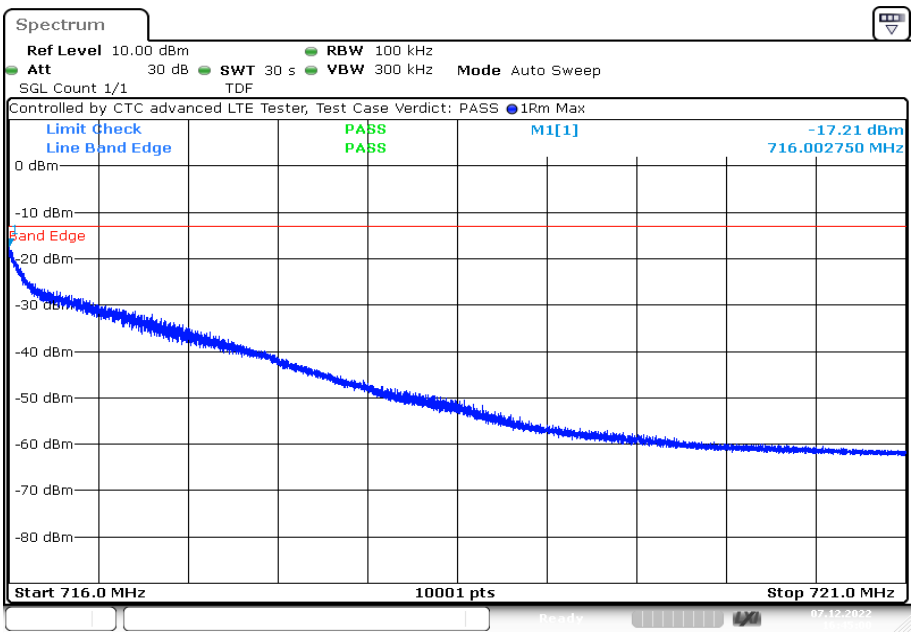
Date: 7.DEC.2022 17:46:42

Plot 9: 1.4 MHz – 16-QAM - Lowest channel



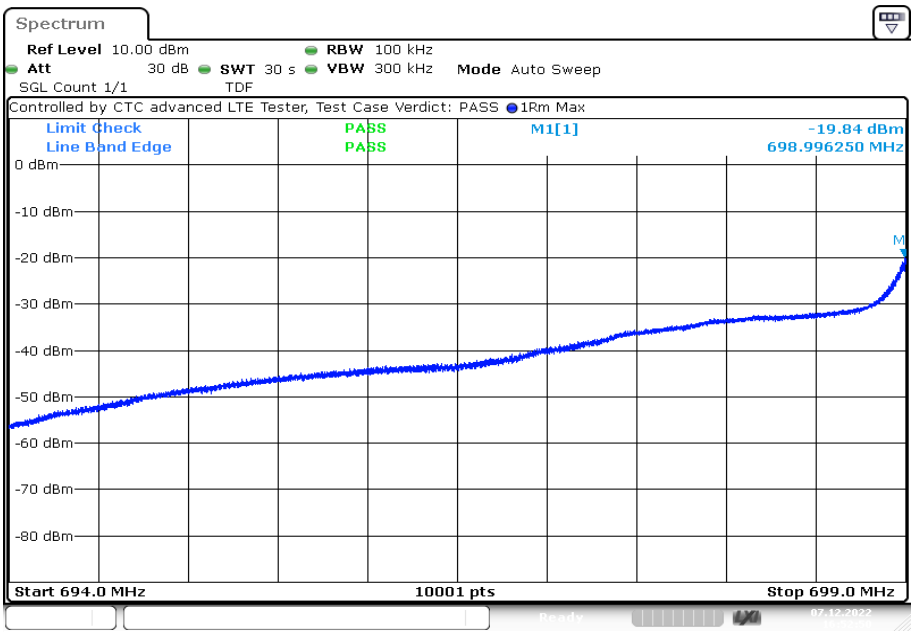
Date: 7.DEC.2022 16:31:27

Plot 10: 1.4 MHz – 16-QAM - Highest channel



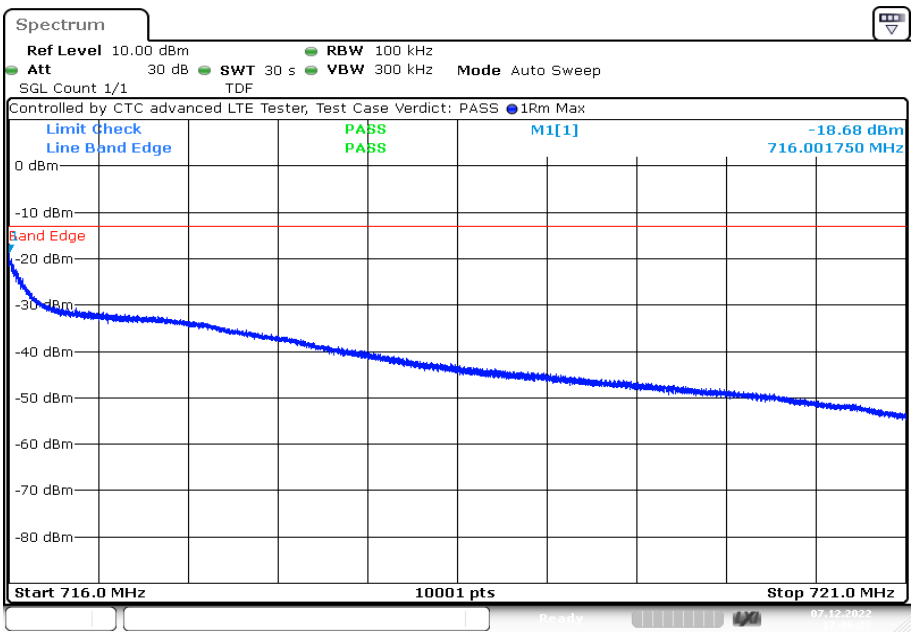
Date: 7.DEC.2022 16:45:00

Plot 11: 3 MHz – 16-QAM - Lowest channel



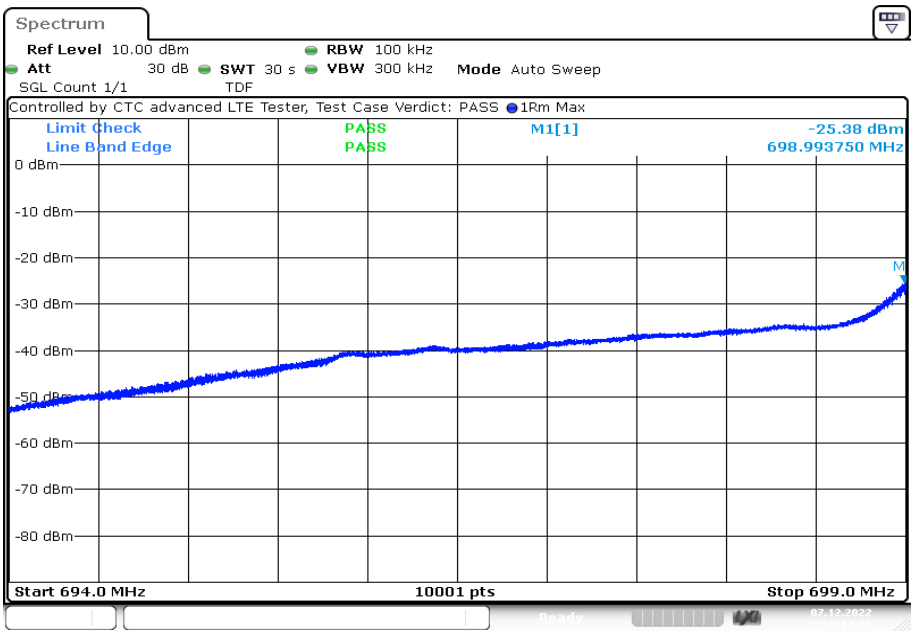
Date: 7.DEC.2022 16:52:50

Plot 12: 3 MHz – 16-QAM - Highest channel



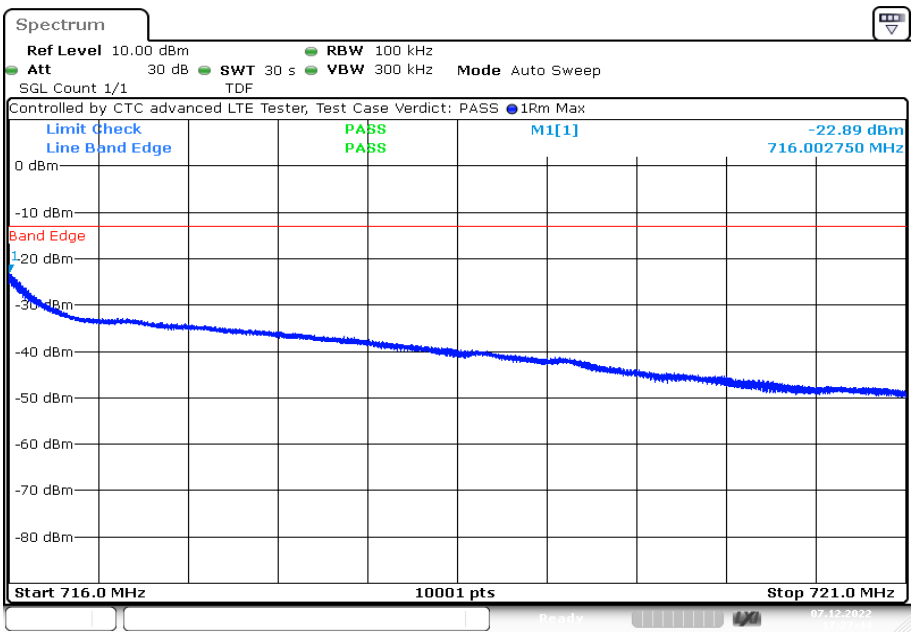
Date: 7.DEC.2022 17:06:22

Plot 13: 5 MHz – 16-QAM - Lowest channel



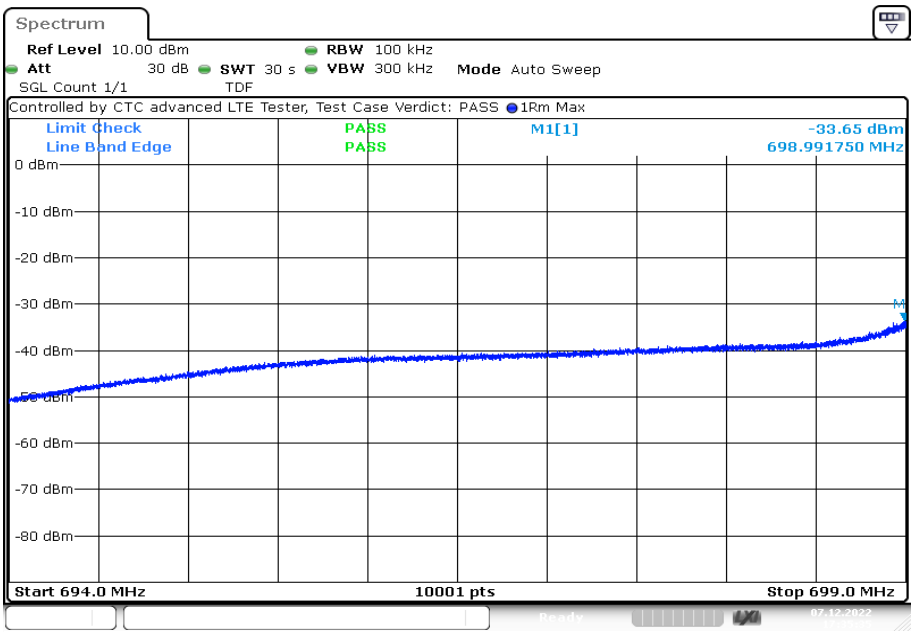
Date: 7.DEC.2022 17:14:12

Plot 14: 5 MHz – 16-QAM - Highest channel



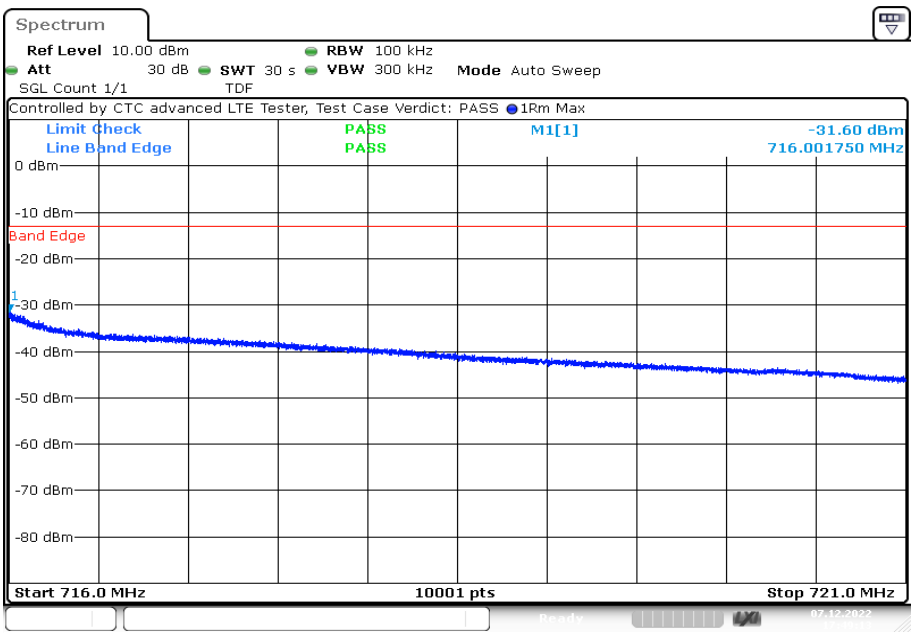
Date: 7.DEC.2022 17:27:44

Plot 15: 10 MHz – 16-QAM - Lowest channel



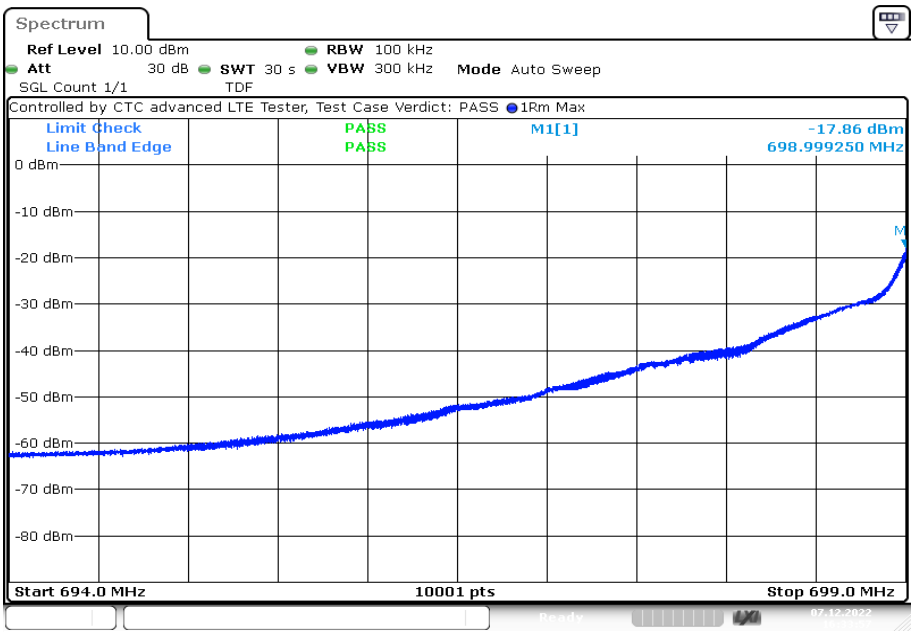
Date: 7.DEC.2022 17:35:35

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



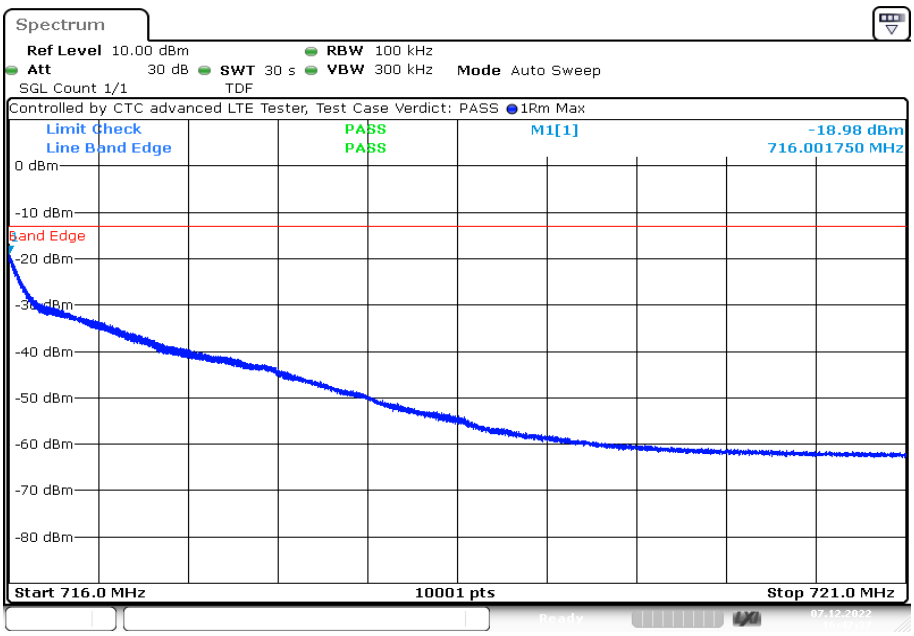
Date: 7.DEC.2022 17:49:13

Plot 17: 1.4 MHz – 64-QAM - Lowest channel



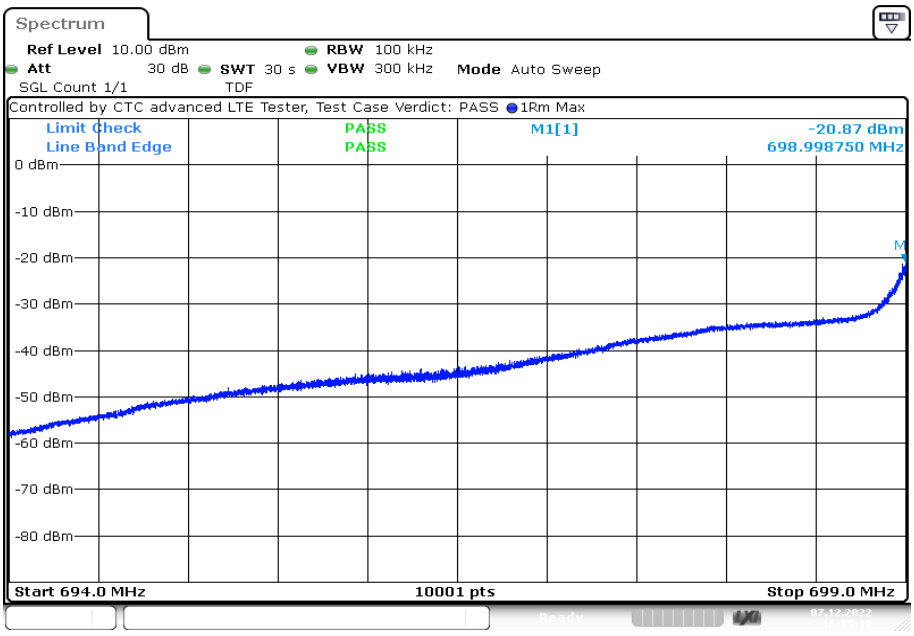
Date: 7.DEC.2022 16:33:57

Plot 18: 1.4 MHz – 64-QAM - Highest channel



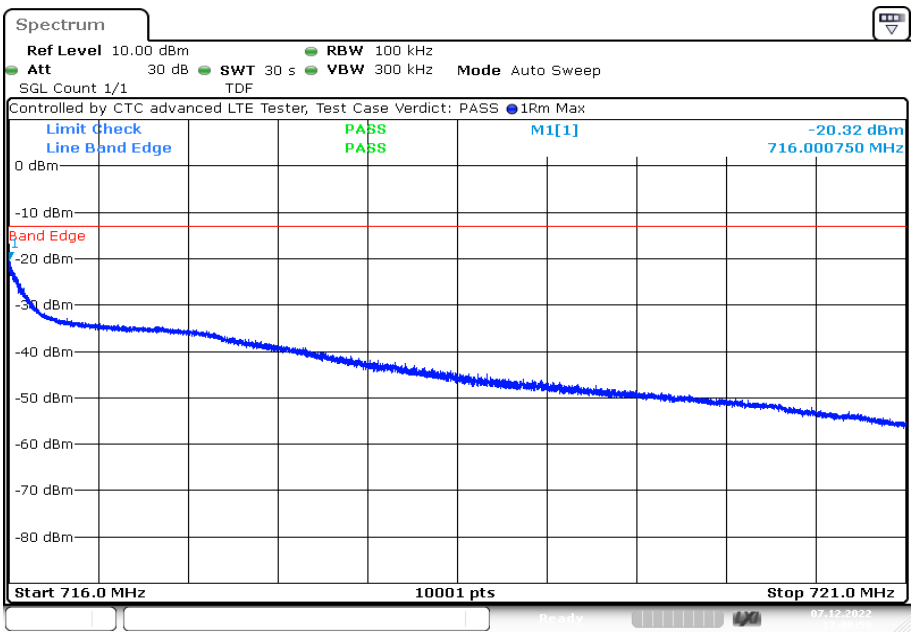
Date: 7.DEC.2022 16:47:37

Plot 19: 3 MHz – 64-QAM - Lowest channel



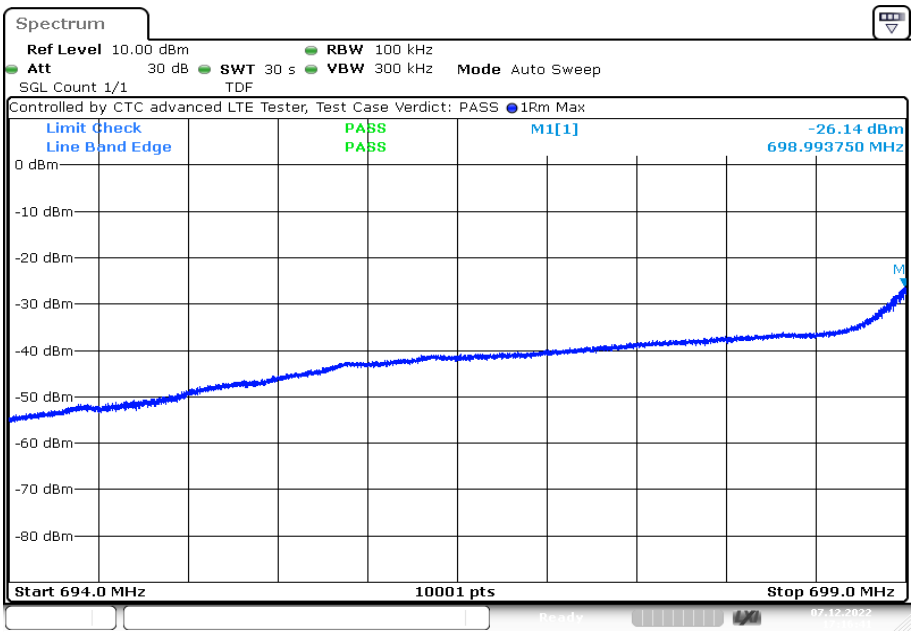
Date: 7.DEC.2022 16:55:19

Plot 20: 3 MHz – 64-QAM - Highest channel



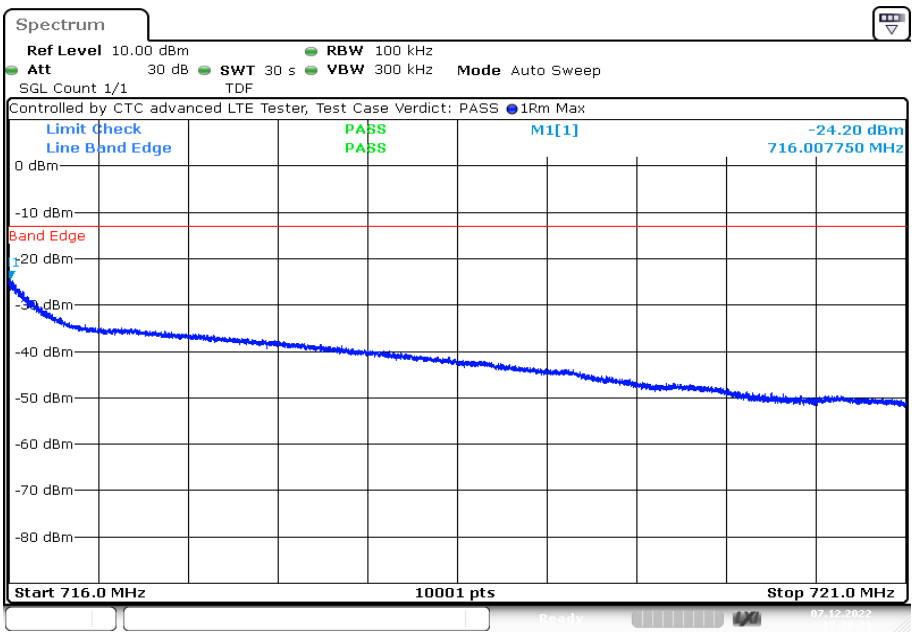
Date: 7.DEC.2022 17:08:59

Plot 21: 5 MHz – 64-QAM - Lowest channel



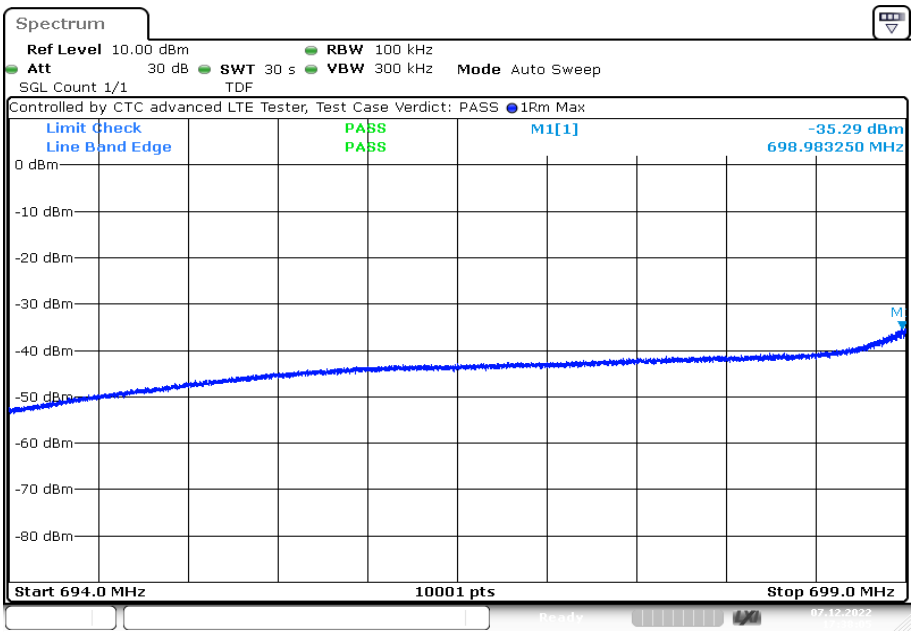
Date: 7.DEC.2022 17:16:41

Plot 22: 5 MHz – 64-QAM - Highest channel



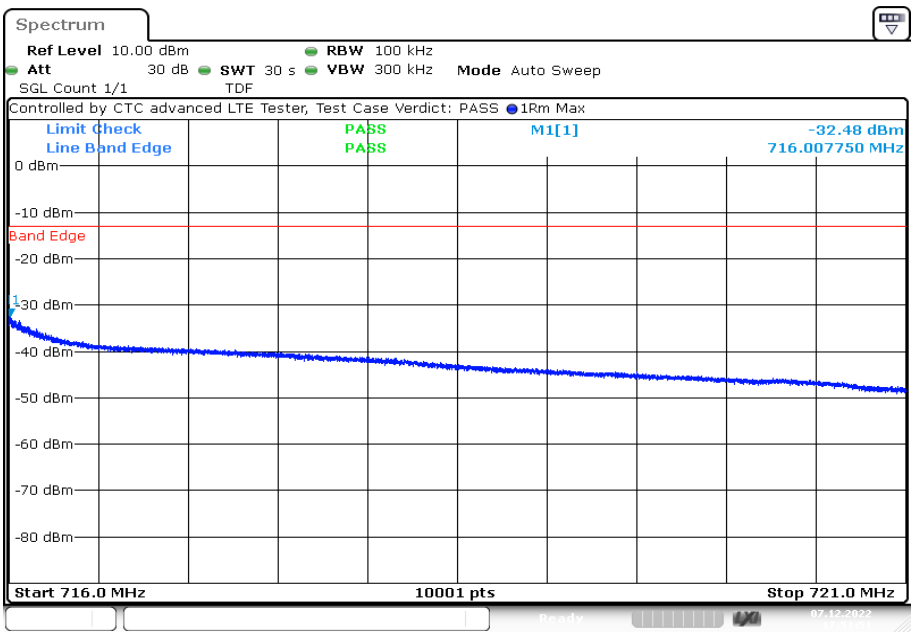
Date: 7.DEC.2022 17:30:21

Plot 23: 10 MHz – 64-QAM - Lowest channel



Date: 7.DEC.2022 17:38:05

Plot 24: 10 MHz – 64-QAM - Highest channel



Date: 7.DEC.2022 17:51:51

12.3.6 Occupied bandwidth

Description:

Measurement of the occupied bandwidth of the transmitted signal.

Measurement:

The table below lists the measured 99% power and -26dBc occupied bandwidths. Spectrum analyzer plots are included on the following pages.

Part 27.53 requires a measurement bandwidth of at least 1% of the occupied bandwidth.

Measurement parameters	
Detector:	Peak
Sweep time:	See plots
Video bandwidth:	See plots
Resolution bandwidth:	See plots
Span:	2 x nominal bandwidth
Trace-Mode:	Max Hold
Used equipment:	See chapter 8.3 setup A
Measurement uncertainty:	See chapter 9
Measurement procedure	FCC: § 2.1049

Limits:

FCC
§ 2.1049
Reporting only

Results:

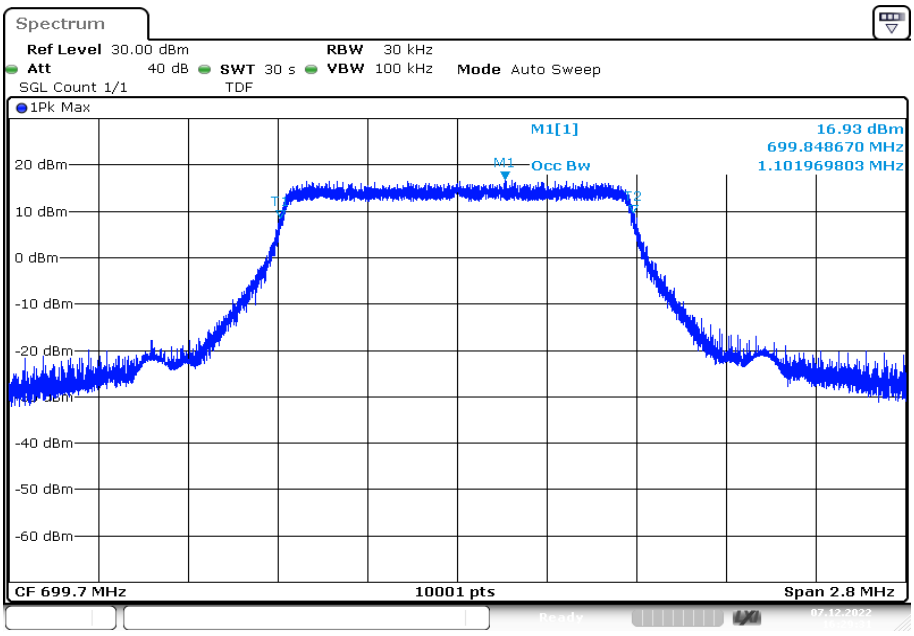
Occupied Bandwidth – QPSK			
Bandwidth	**Channel**	**99% OBW (MHz)**	**-26 dBc BW (MHz)**
1.4	lowest	1.10	1.38
	middle	1.10	1.38
	highest	1.10	1.38
3.0	lowest	2.75	3.17
	middle	2.75	3.14
	highest	2.74	3.14
5.0	lowest	4.52	5.19
	middle	4.52	5.20
	highest	4.51	5.15
10.0	lowest	8.99	10.18
	middle	9.03	10.21
	highest	9.11	10.31

Occupied Bandwidth – 16-QAM			
Bandwidth	**Channel**	**99% OBW (MHz)**	**-26 dBc BW (MHz)**
1.4	lowest	1.11	1.39
	middle	1.10	1.39
	highest	1.10	1.41
3.0	lowest	2.75	3.15
	middle	2.75	3.15
	highest	2.74	3.15
5.0	lowest	4.52	5.18
	middle	4.52	5.16
	highest	4.52	5.21
10.0	lowest	8.99	10.14
	middle	9.04	10.14
	highest	9.11	10.38

Occupied Bandwidth – 64-QAM			
Bandwidth	**Channel**	**99% OBW (MHz)**	**-26 dBc BW (MHz)**
1.4	lowest	1.10	1.40
	middle	1.10	1.35
	highest	1.10	1.38
3.0	lowest	2.74	3.15
	middle	2.74	3.14
	highest	2.74	3.14
5.0	lowest	4.52	5.19
	middle	4.51	5.21
	highest	4.52	5.19
10.0	lowest	8.98	10.21
	middle	9.02	10.17
	highest	9.11	10.35

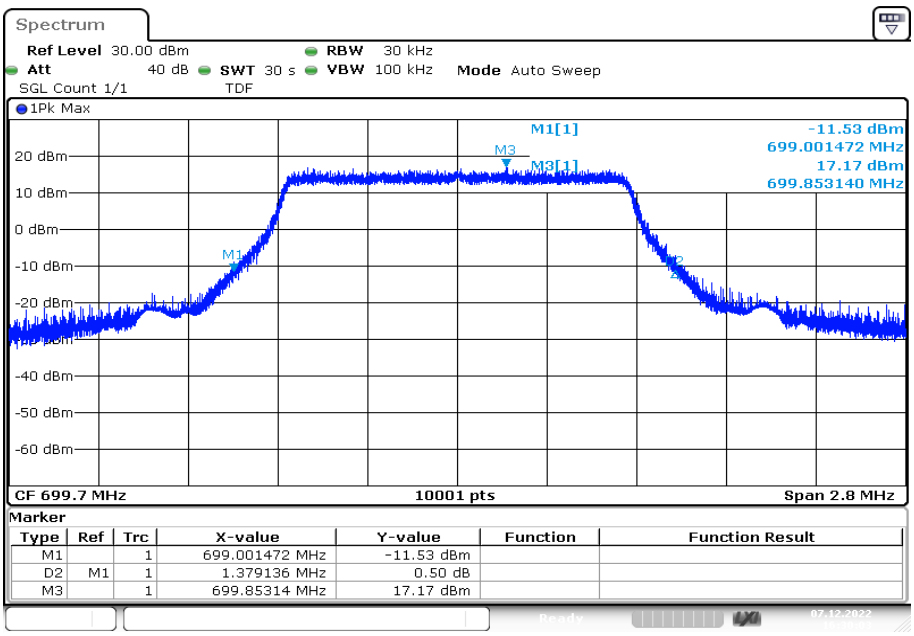
Plots:

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



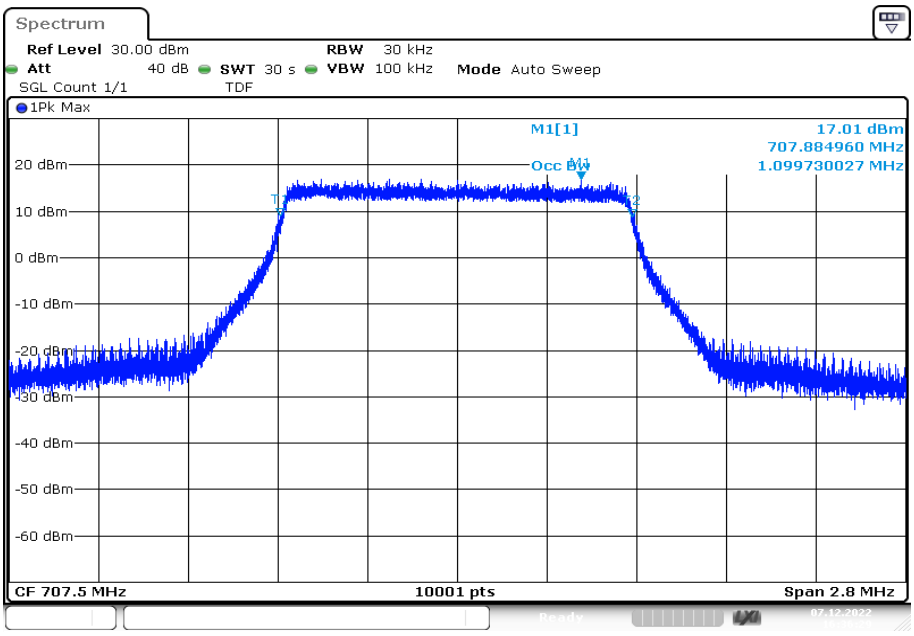
Date: 7.DEC.2022 16:29:31

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

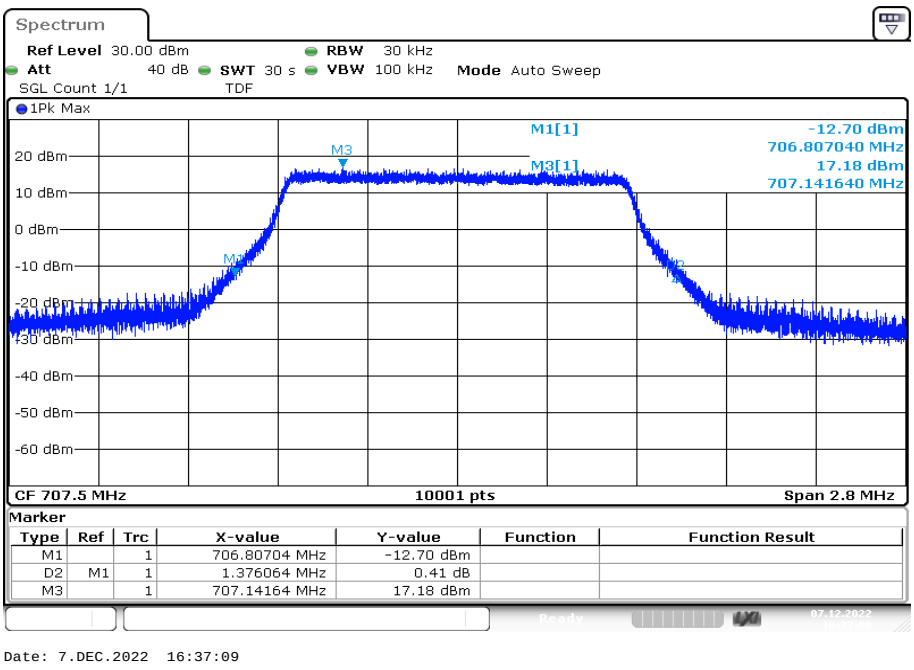


Date: 7.DEC.2022 16:30:03

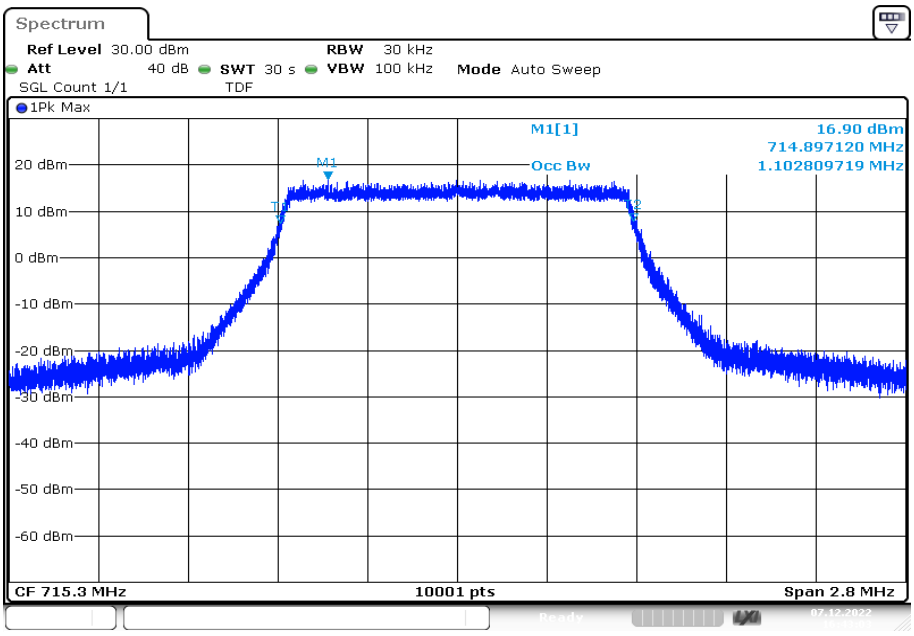
Plot 3: 1.4 MHz – QPSK – middle channel (99% - OBW)



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

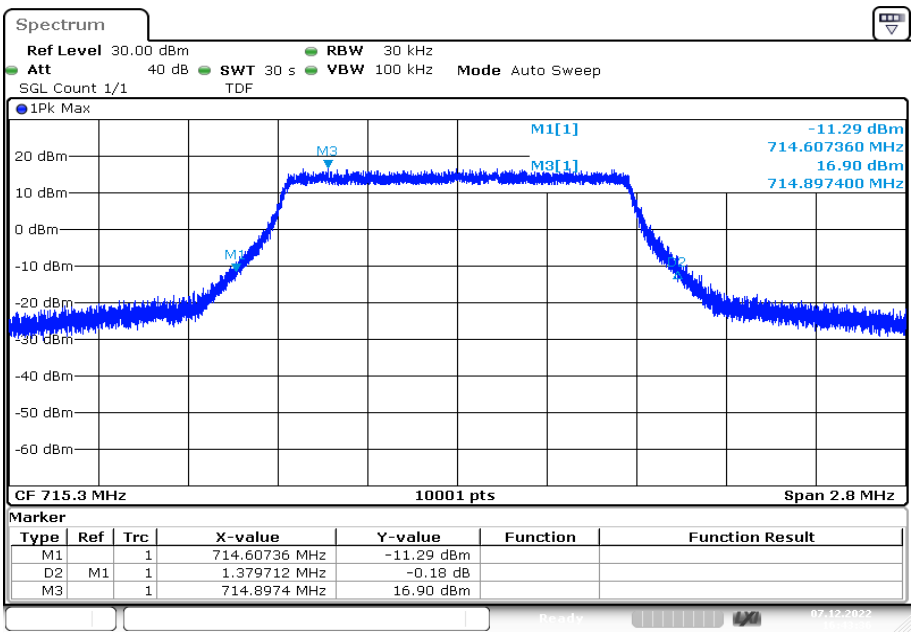


Plot 5: 1.4 MHz – QPSK - highest channel (99% - OBW)



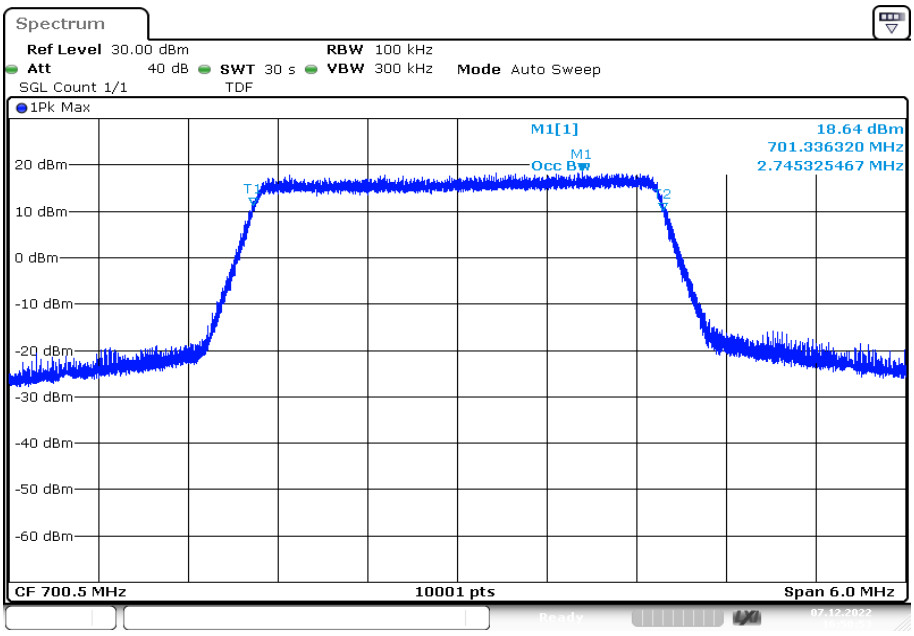
Date: 7.DEC.2022 16:43:03

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

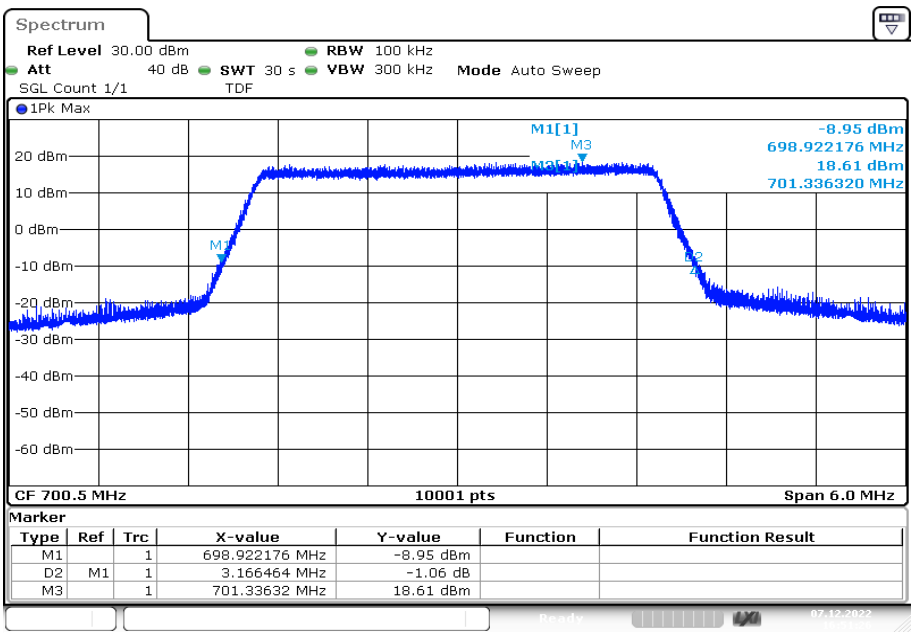


Date: 7.DEC.2022 16:43:36

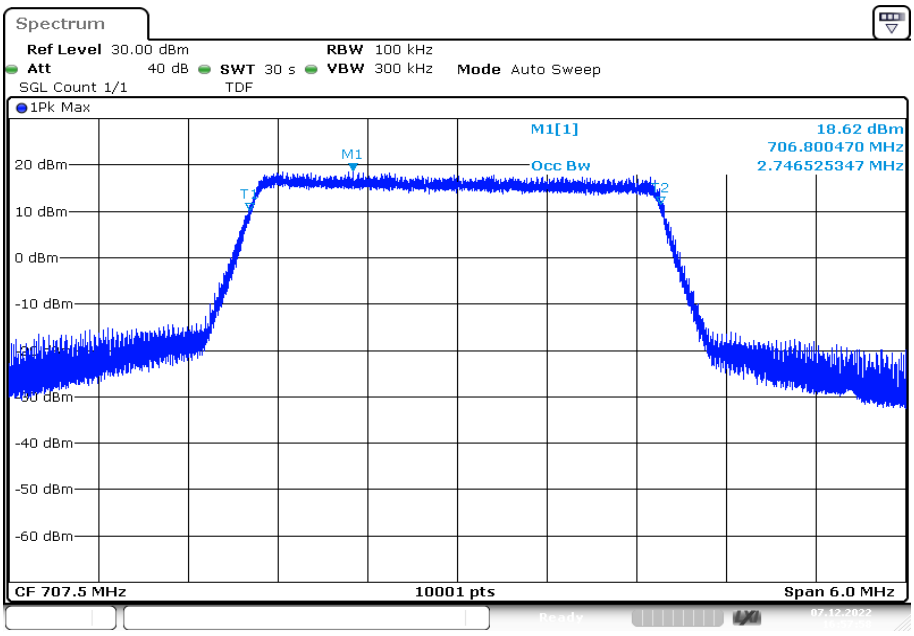
Plot 7: 3 MHz – QPSK - lowest channel (99% - OBW)



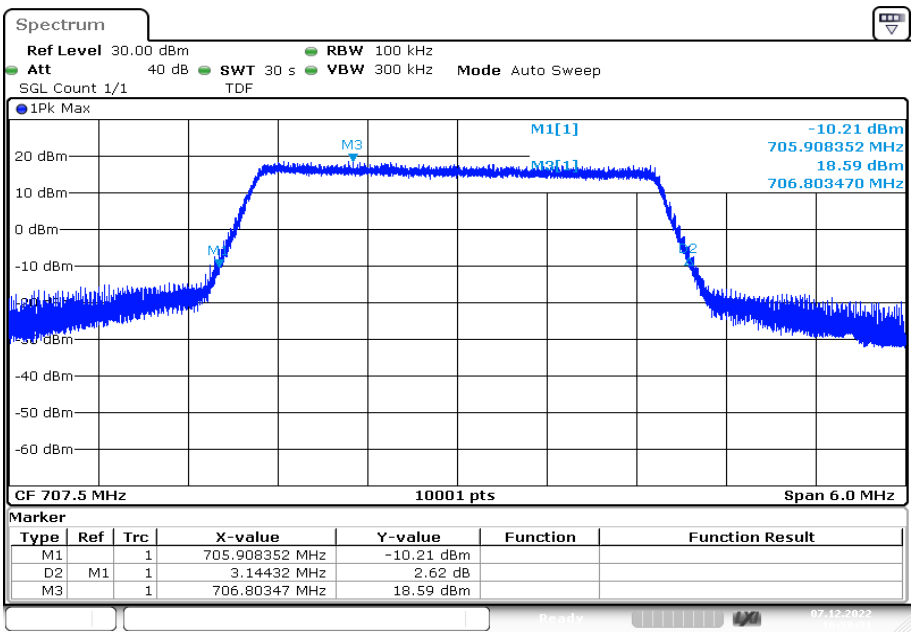
Plot 8: 3 MHz – QPSK - lowest channel (-26 dBc BW)



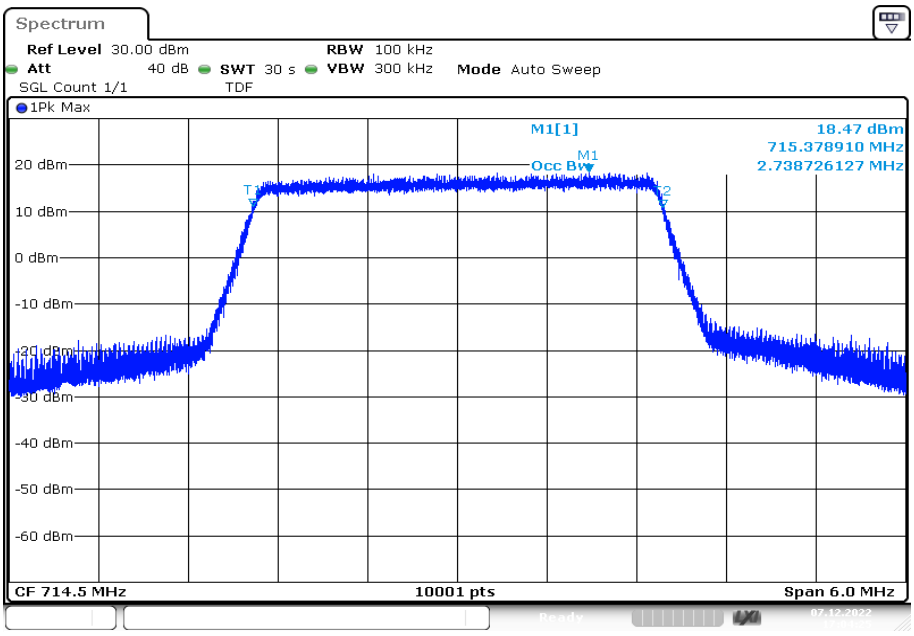
Plot 9: 3 MHz – QPSK - middle channel (99% - OBW)



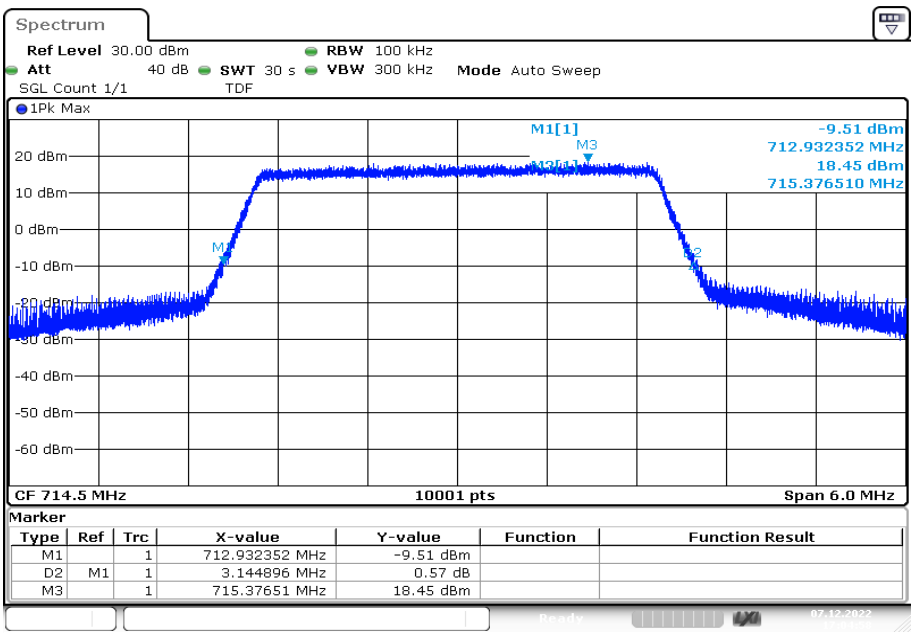
Plot 10: 3 MHz – QPSK - middle channel (-26 dBc BW)



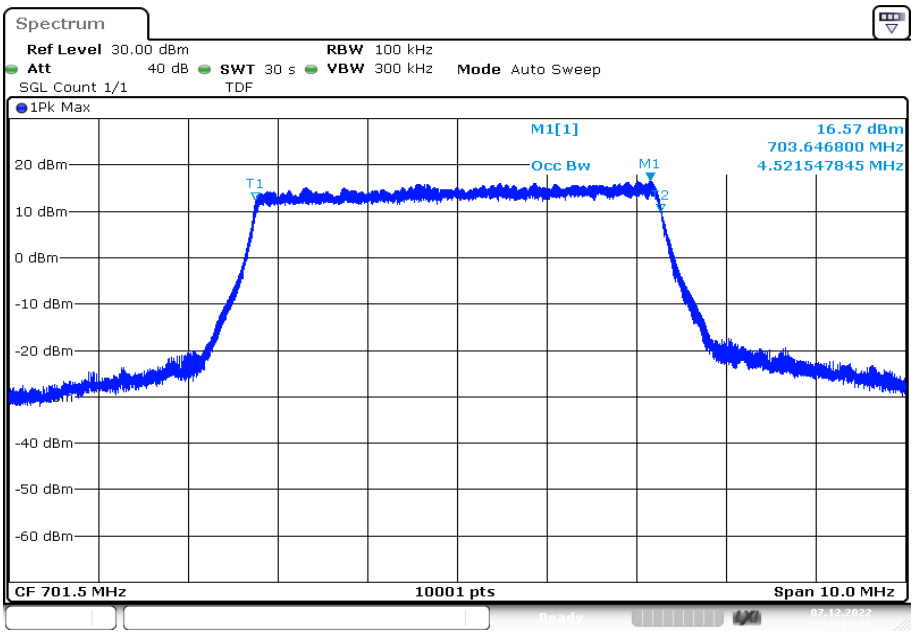
Plot 11: 3 MHz – QPSK - highest channel (99% - OBW)



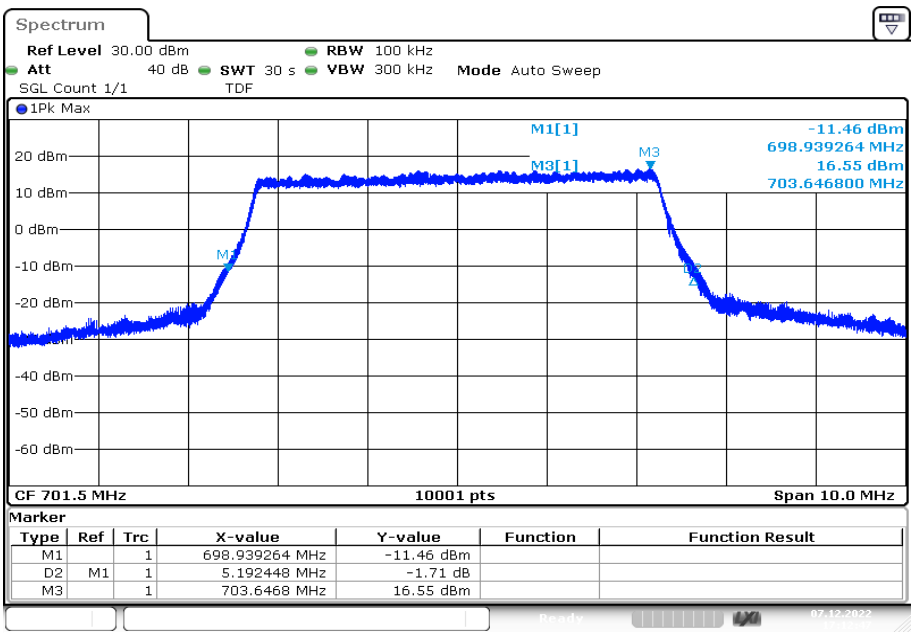
Plot 12: 3 MHz – QPSK - highest channel (-26 dBc BW)



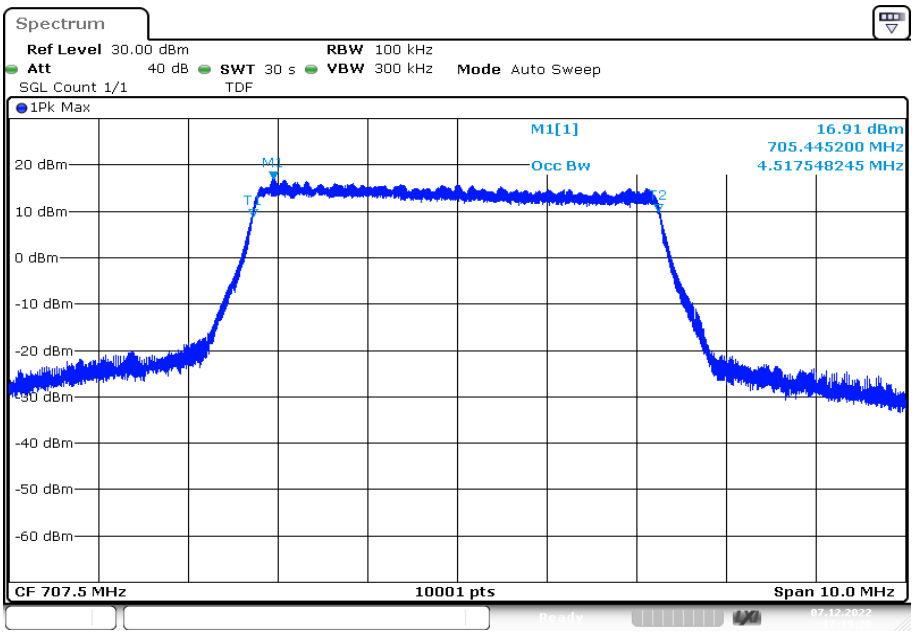
Plot 13: 5 MHz – QPSK - lowest channel (99% - OBW)



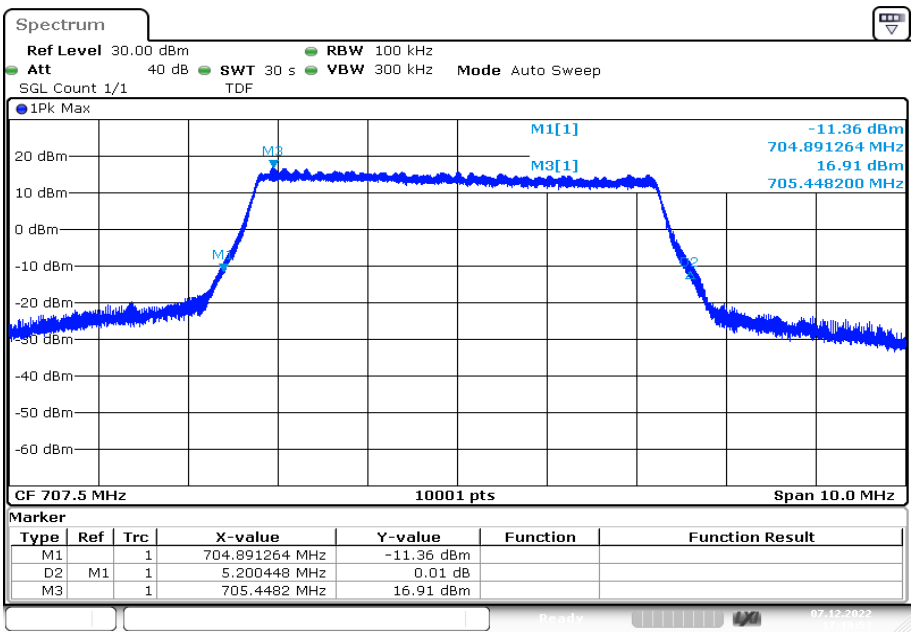
Plot 14: 5 MHz – QPSK - lowest channel (-26 dBc BW)



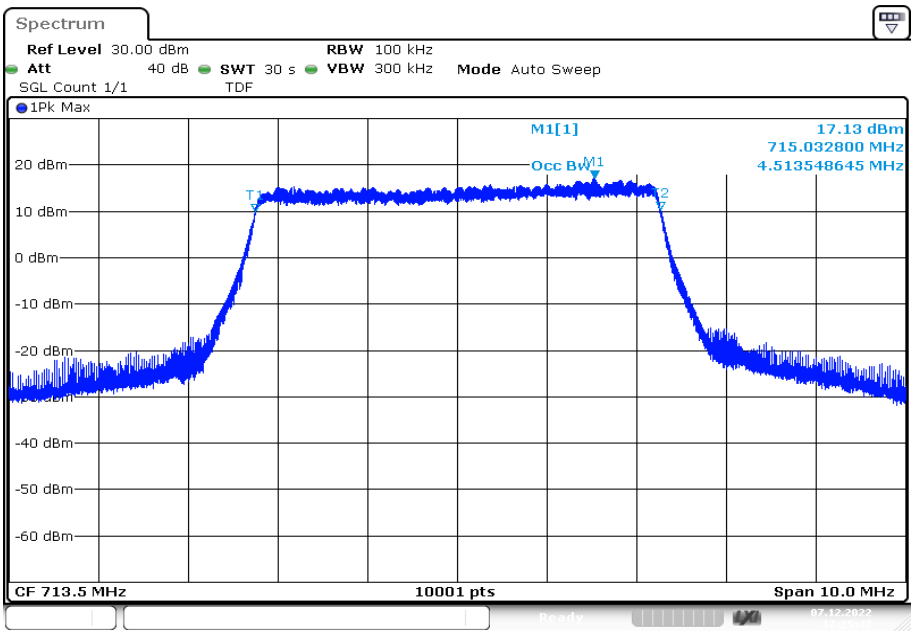
Plot 15: 5 MHz – QPSK - middle channel (99% - OBW)



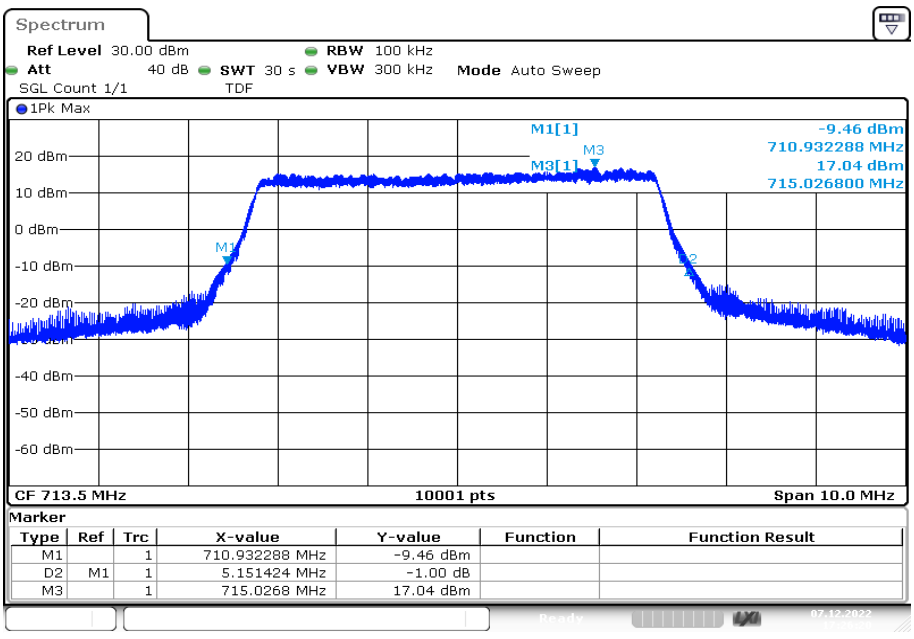
Plot 16: 5 MHz – QPSK - middle channel (-26 dBc BW)



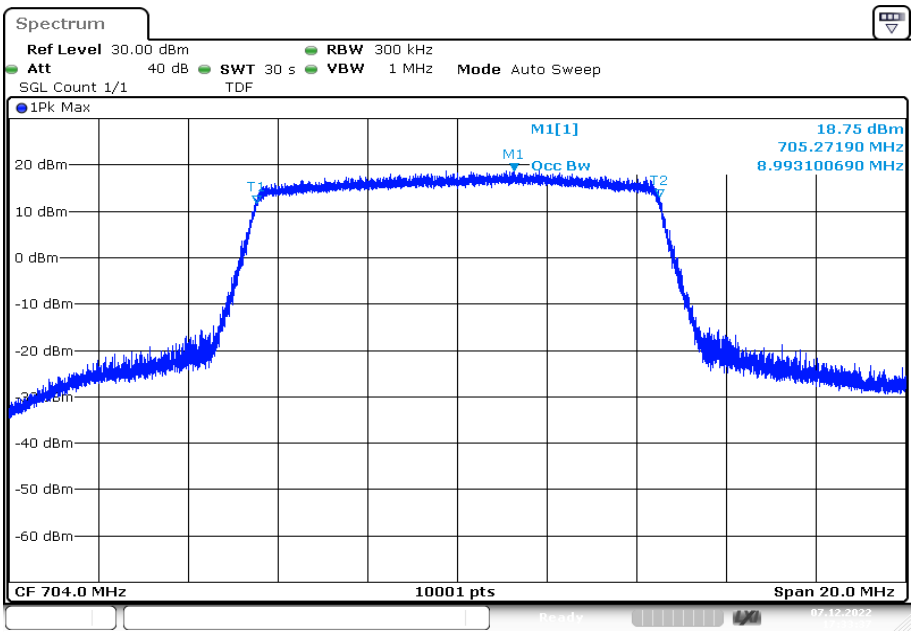
Plot 17: 5 MHz – QPSK - highest channel (99% - OBW)



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



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



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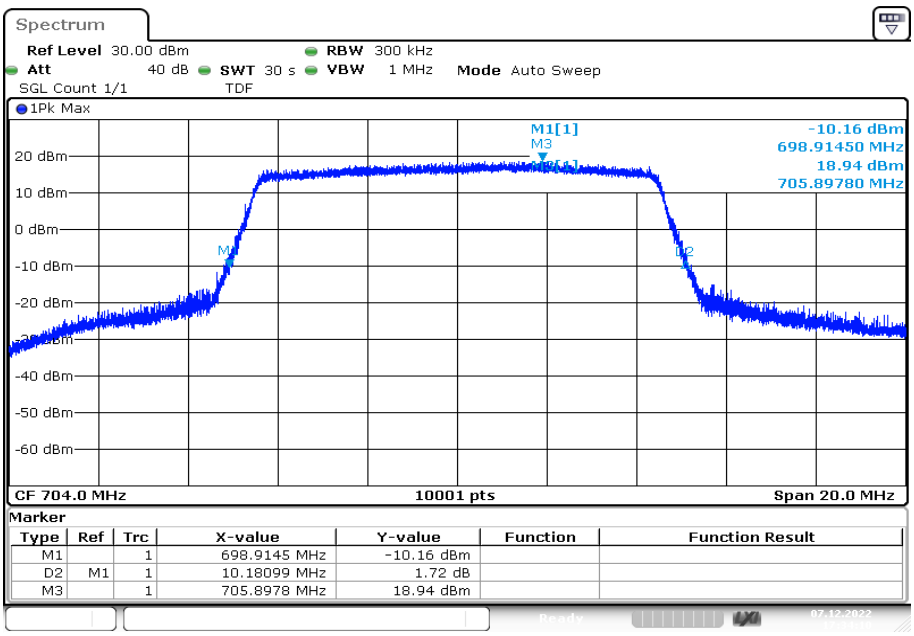
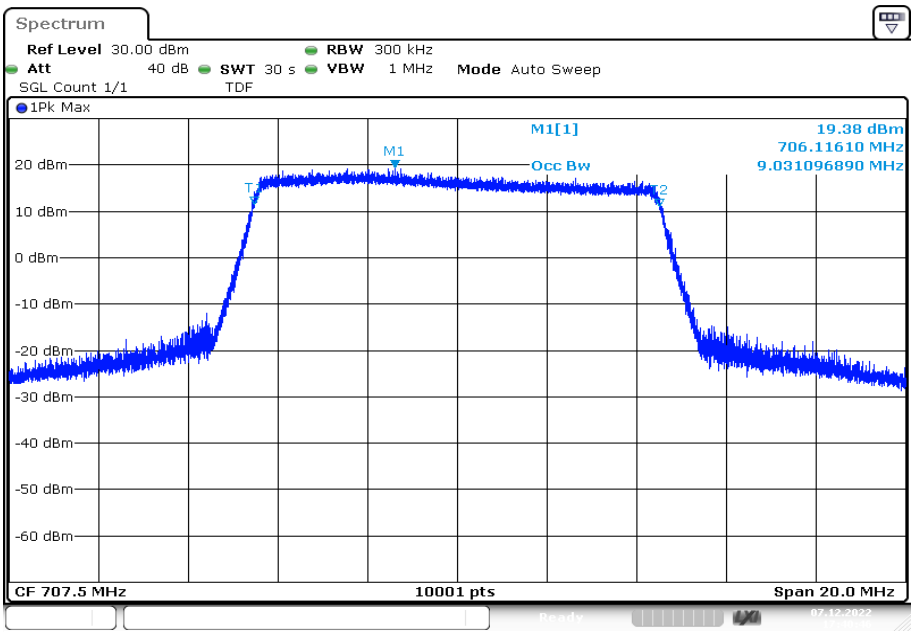
Plot 20: 10 MHz – QPSK - lowest channel (-26 dBc BW)

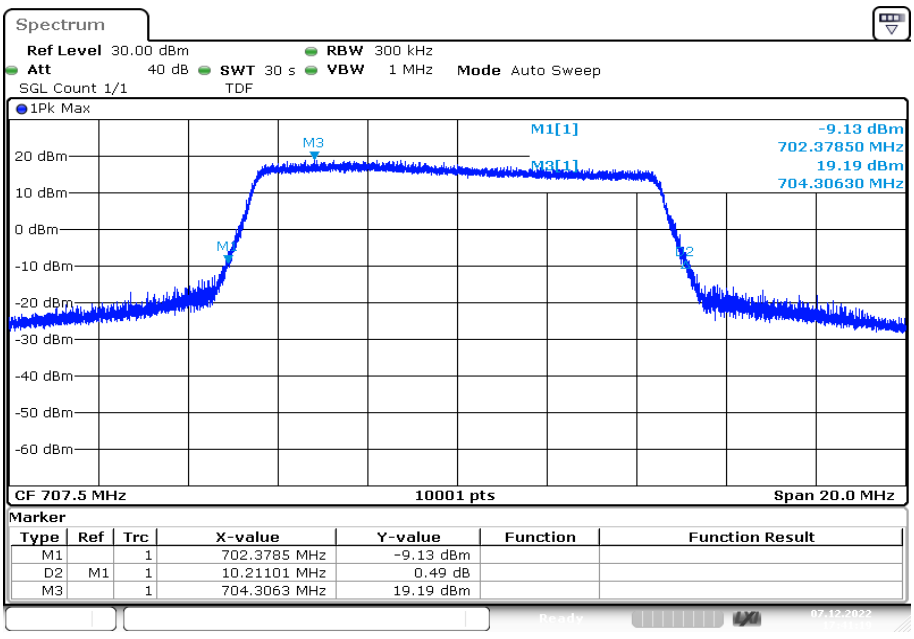


Date: 7.DEC.2022 17:34:10

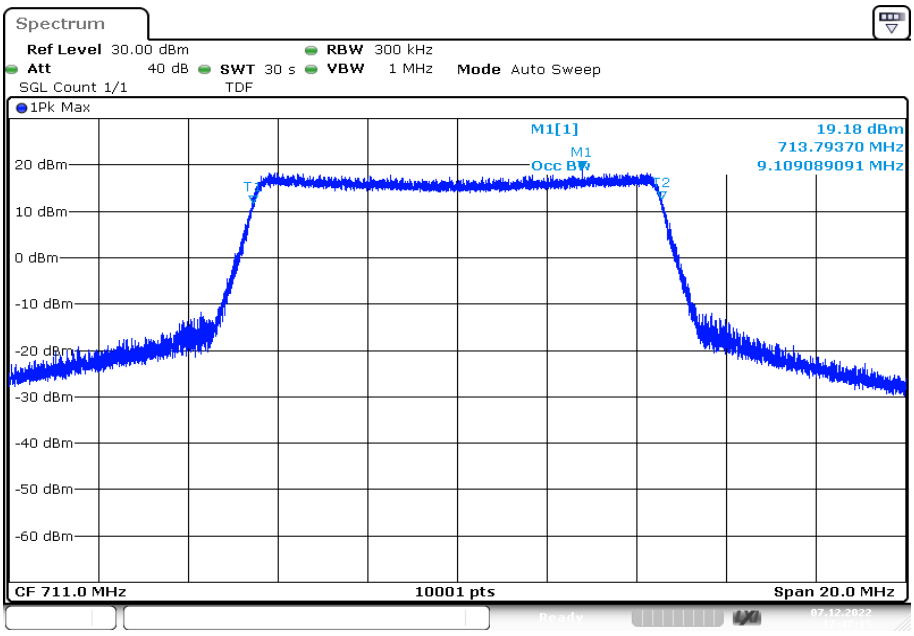
Plot 21: 10 MHz – QPSK - middle channel (99% - OBW)



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



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



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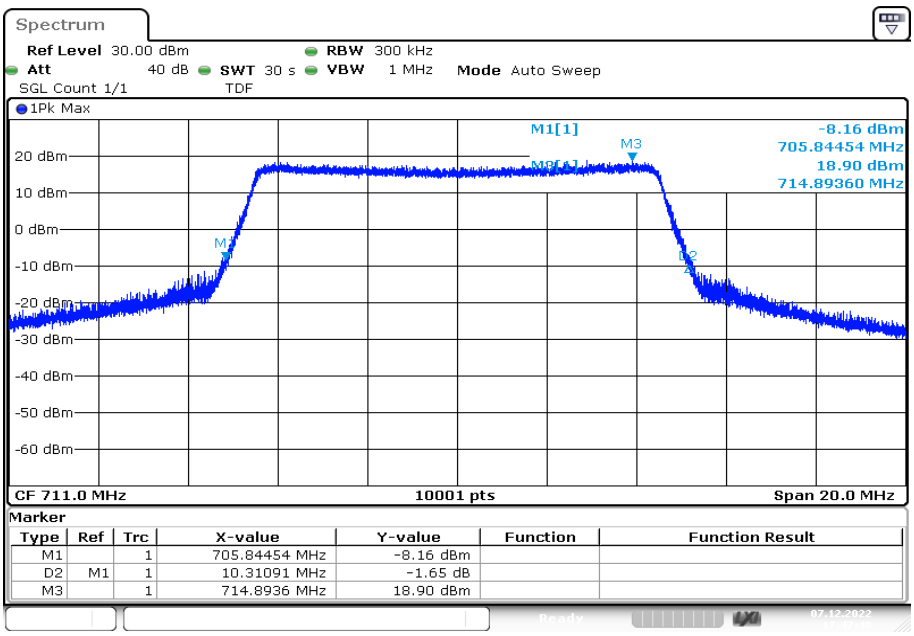
Plot 24: 10 MHz – QPSK - highest channel (-26 dBc BW)



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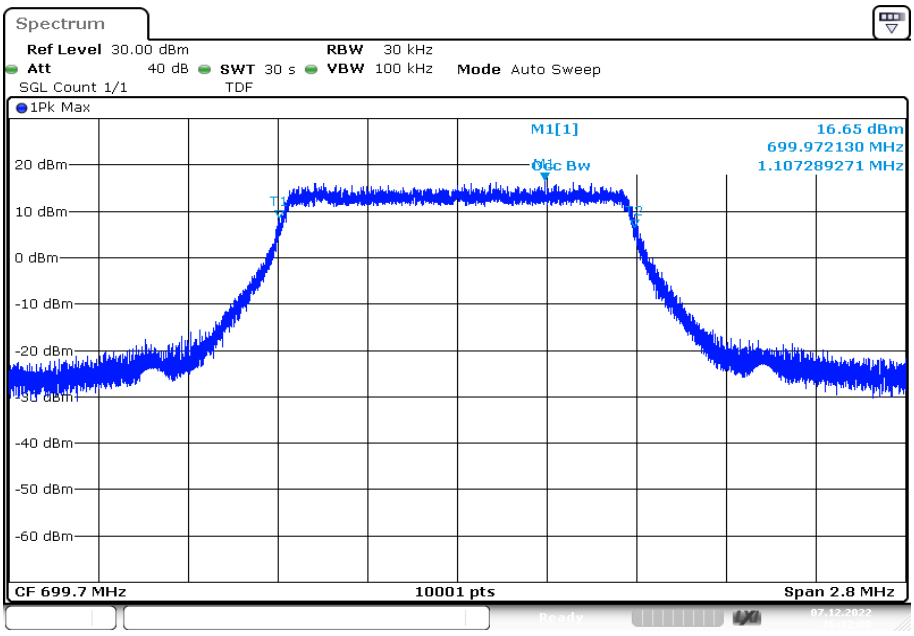
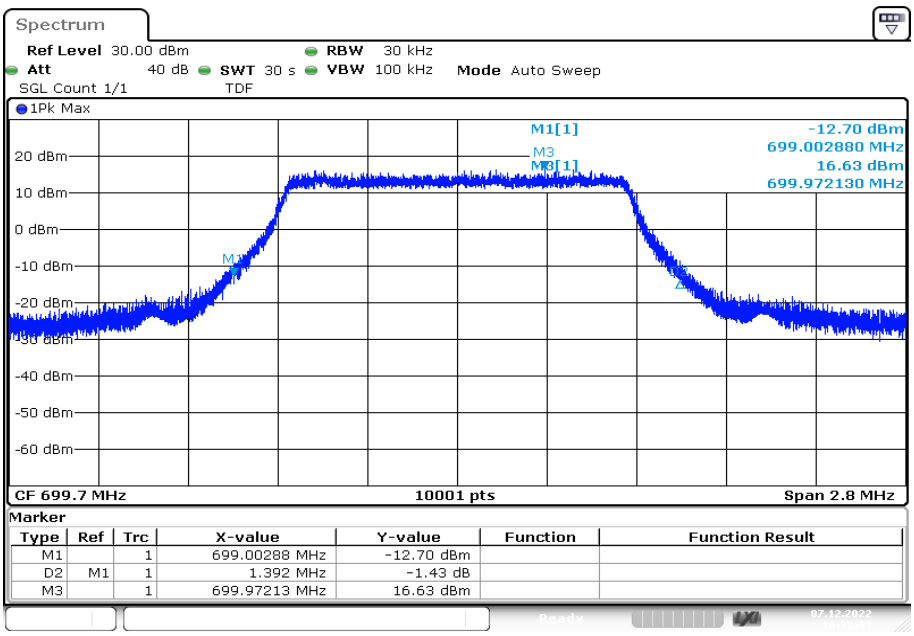
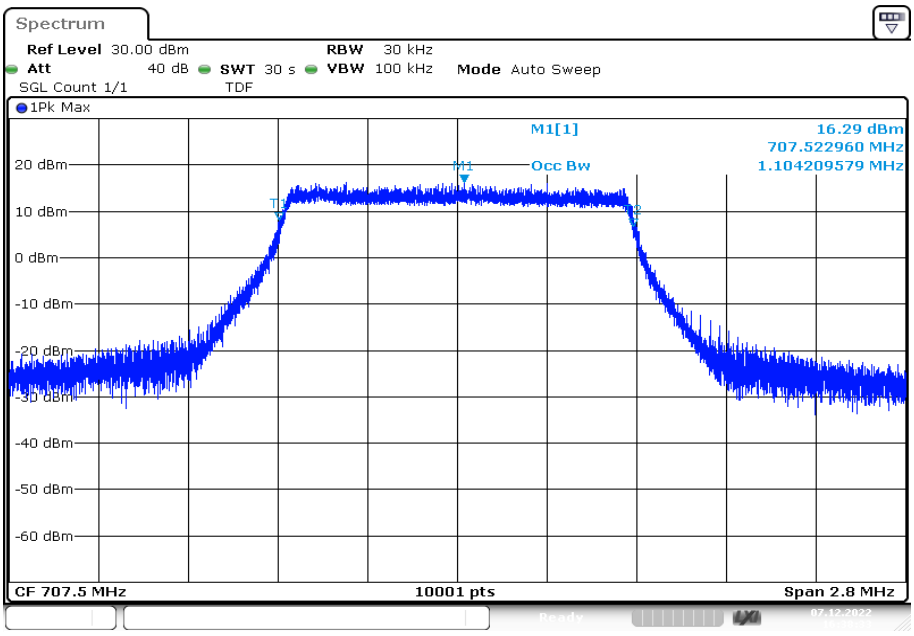
Plot 25: 1.4 MHz – 16-QAM - lowest channel (99% - OBW)



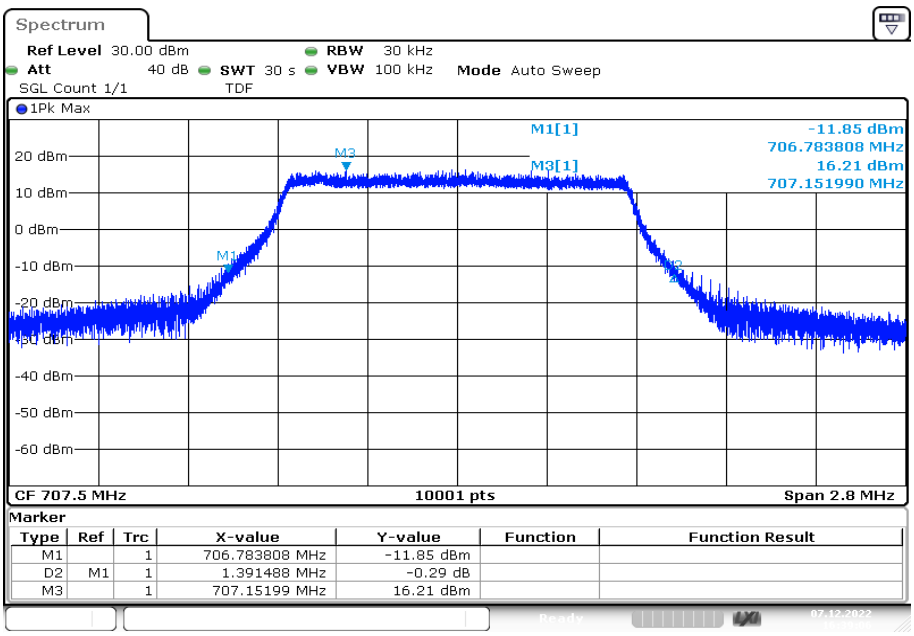
Plot 26: 1.4 MHz – 16-QAM - lowest channel (-26 dBc BW)



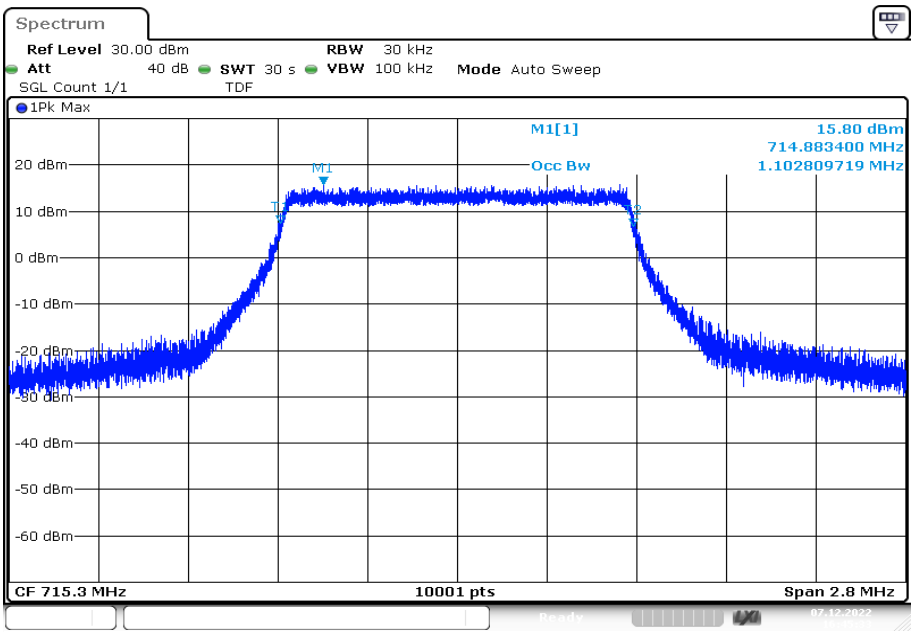
Plot 27: 1.4 MHz – 16-QAM - middle channel (99% - OBW)



Plot 28: 1.4 MHz – 16-QAM - middle channel (-26 dBc BW)



Plot 29: 1.4 MHz – 16-QAM - highest channel (99% - OBW)



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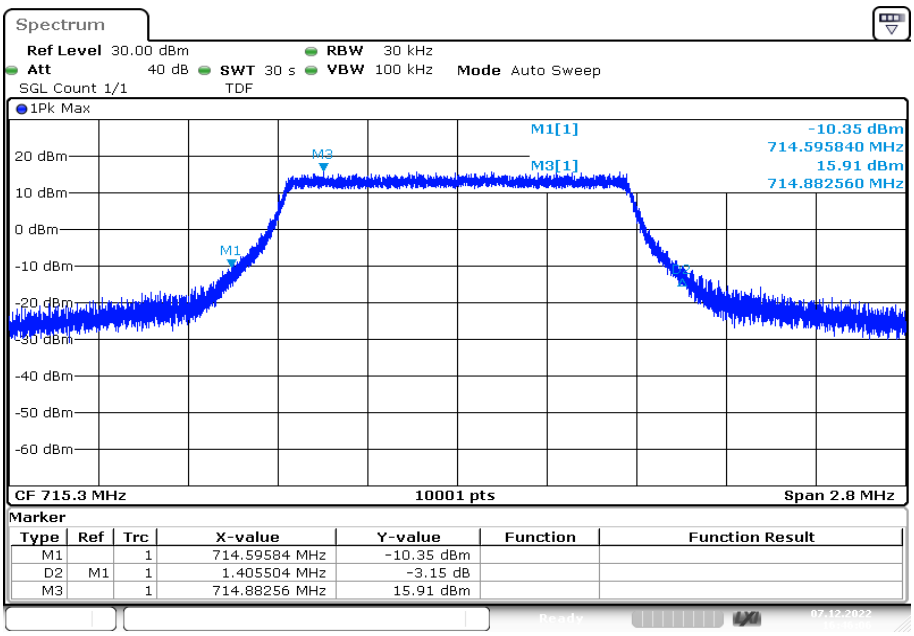
Plot 30: 1.4 MHz – 16-QAM - highest channel (-26 dBc BW)



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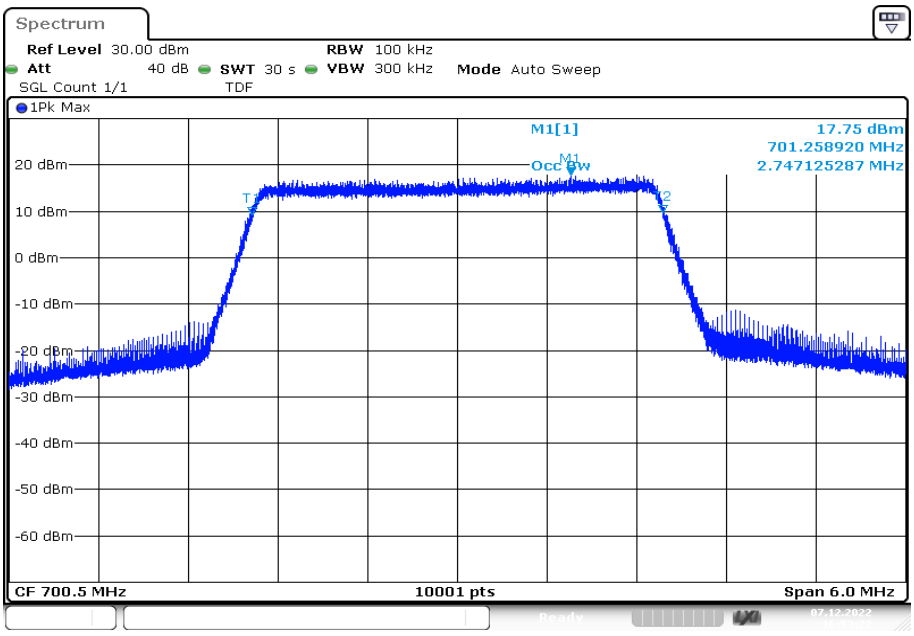
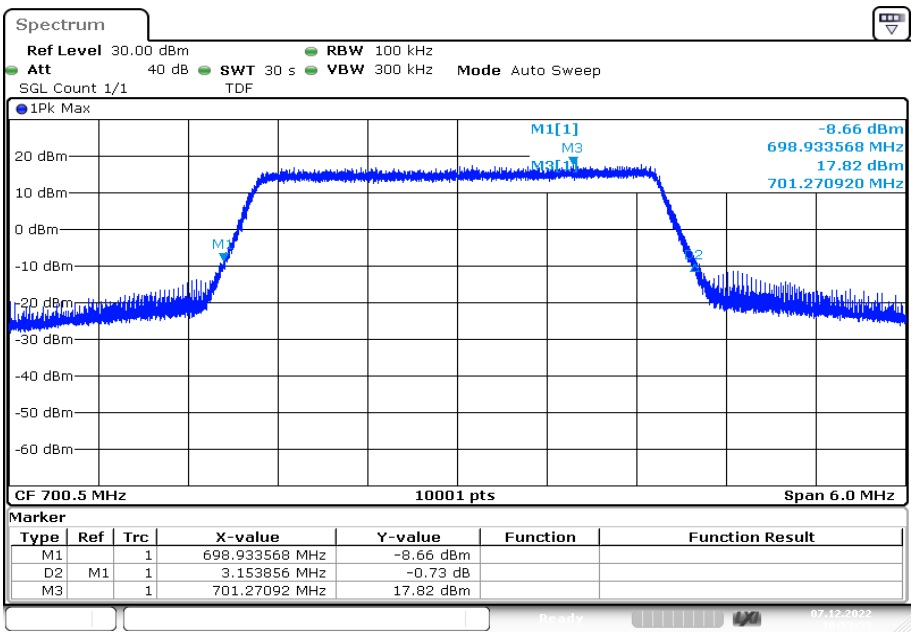
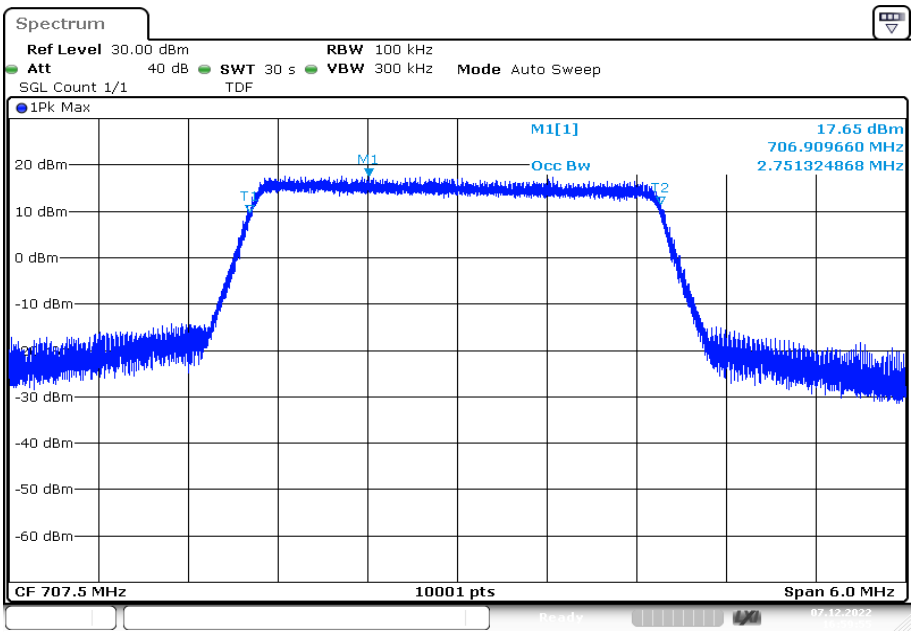
Plot 31: 3 MHz – 16-QAM - lowest channel (99% - OBW)



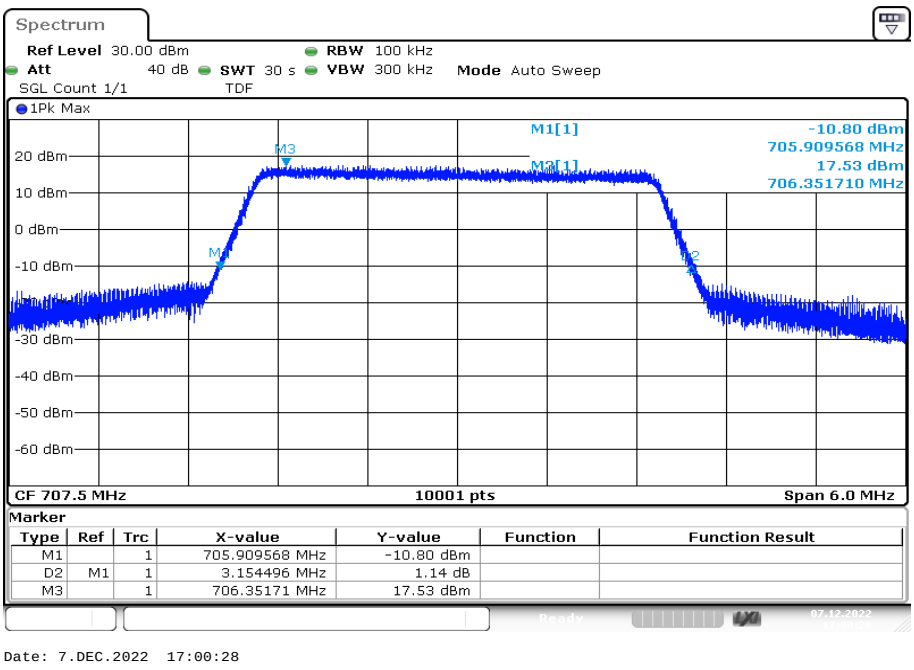
Plot 32: 3 MHz – 16-QAM - lowest channel (-26 dBc BW)



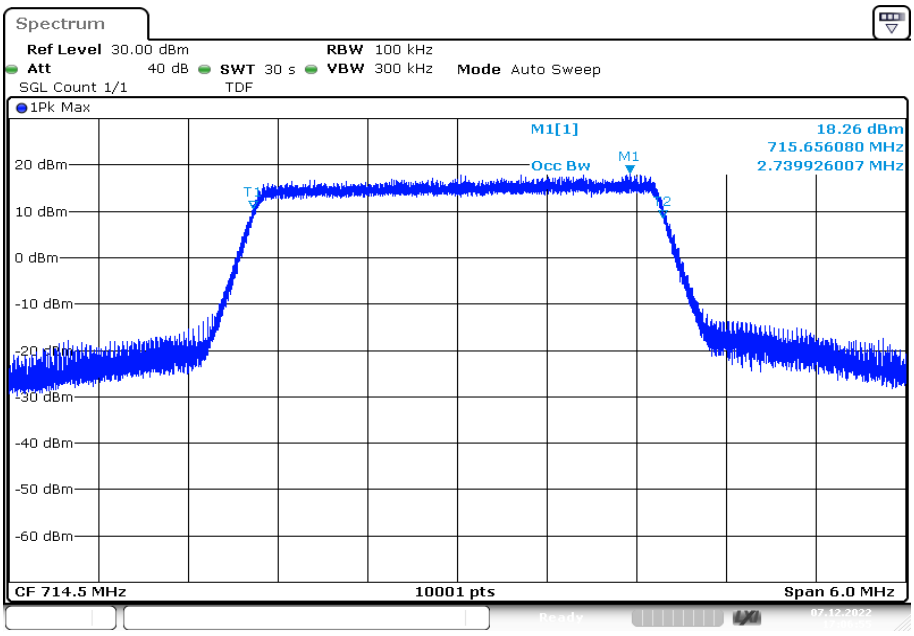
Plot 33: 3 MHz – 16-QAM - middle channel (99% - OBW)



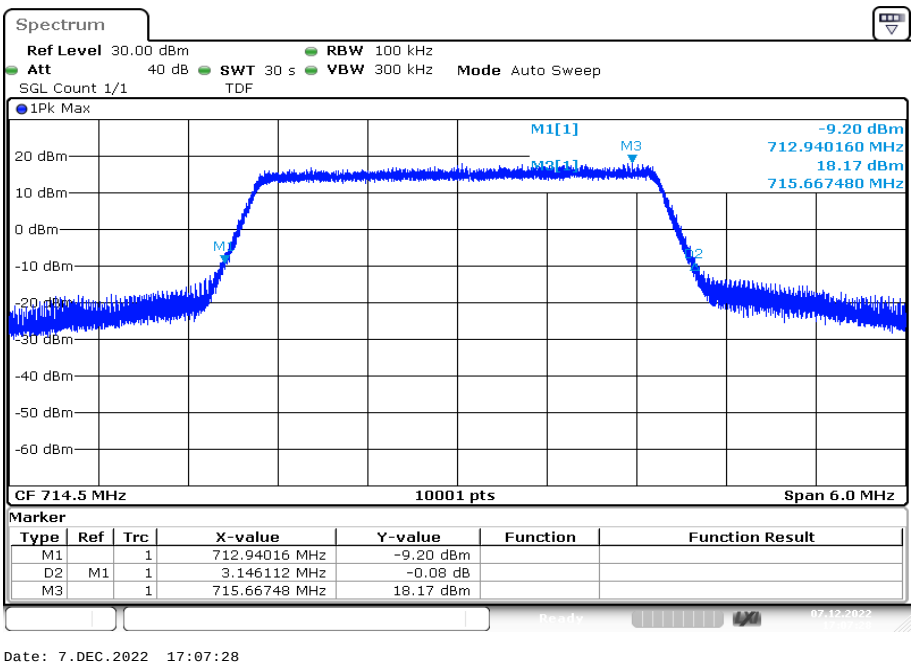
Plot 34: 3 MHz – 16-QAM - middle channel (-26 dBc BW)



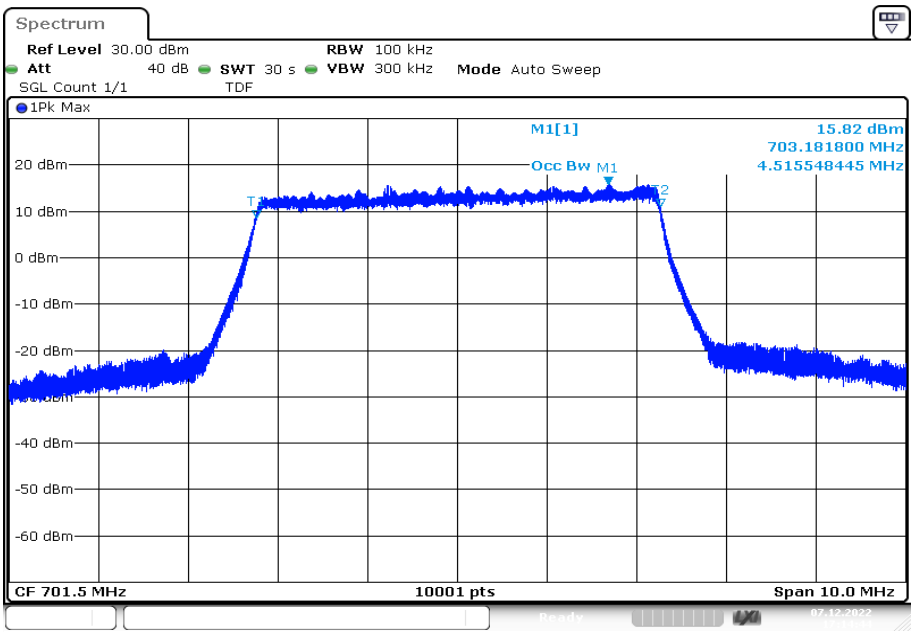
Plot 35: 3 MHz – 16-QAM - highest channel (99% - OBW)



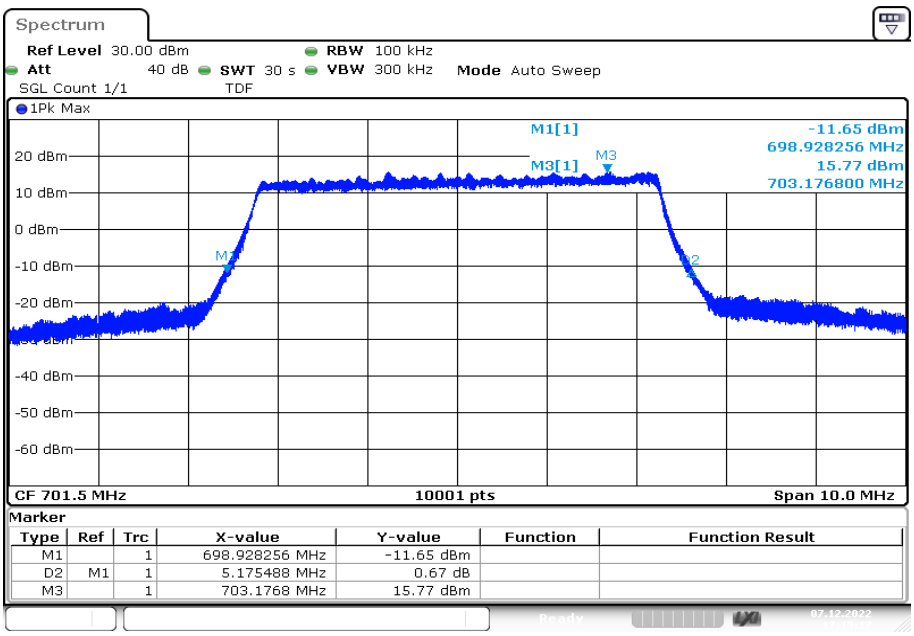
Plot 36: 3 MHz – 16-QAM - highest channel (-26 dBc BW)



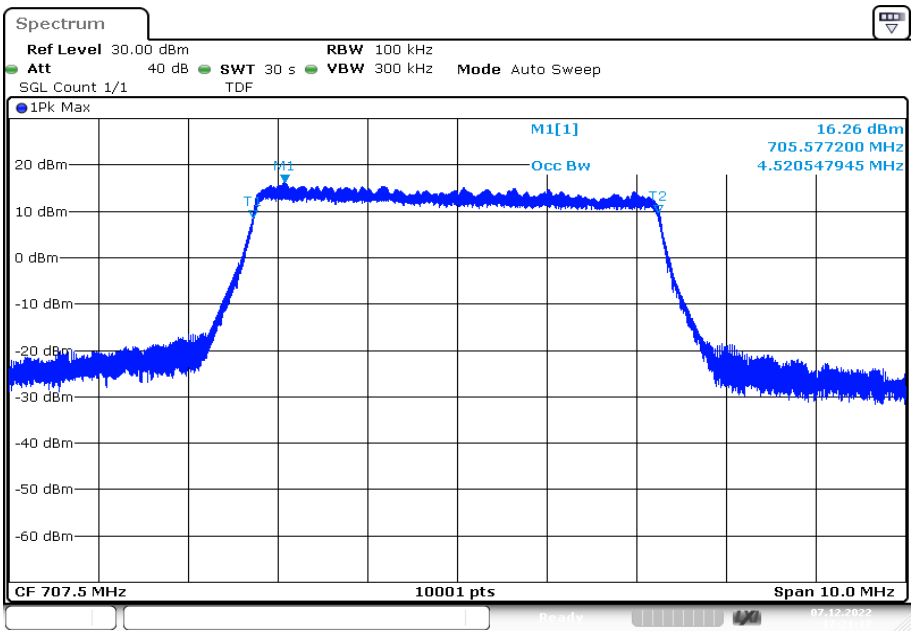
Plot 37: 5 MHz – 16-QAM - lowest channel (99% - OBW)



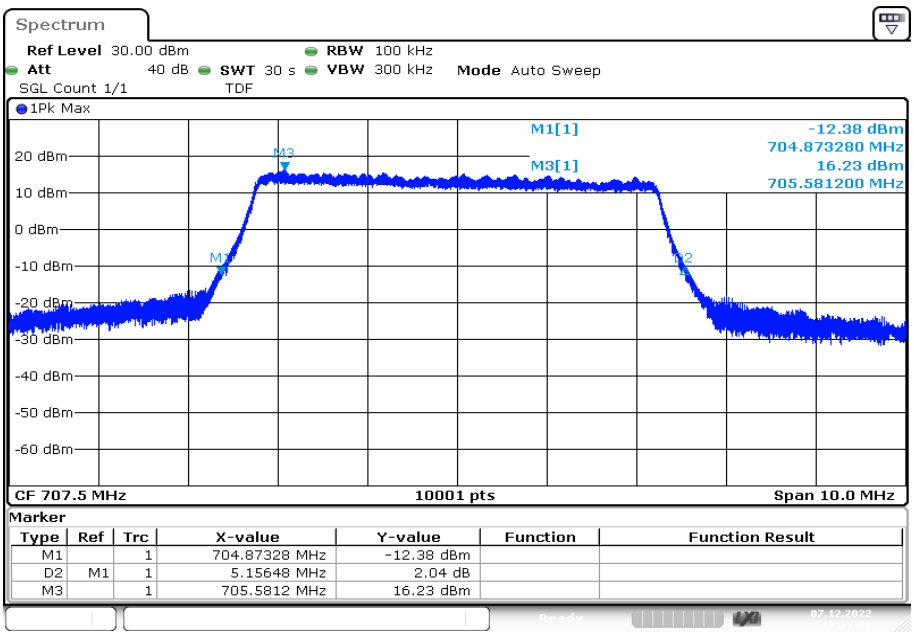
Plot 38: 5 MHz – 16-QAM - lowest channel (-26 dBc BW)



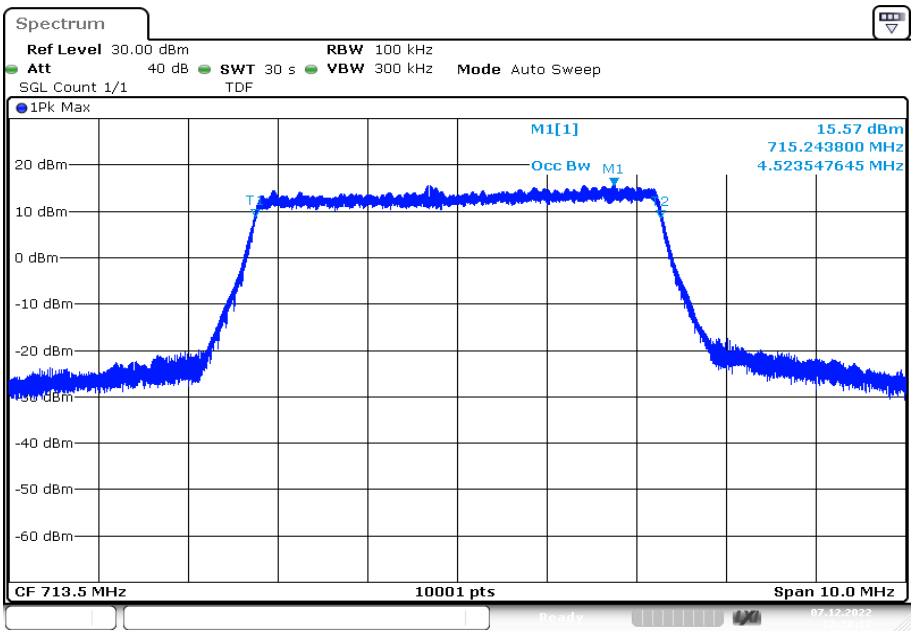
Plot 39: 5 MHz – 16-QAM - middle channel (99% - OBW)



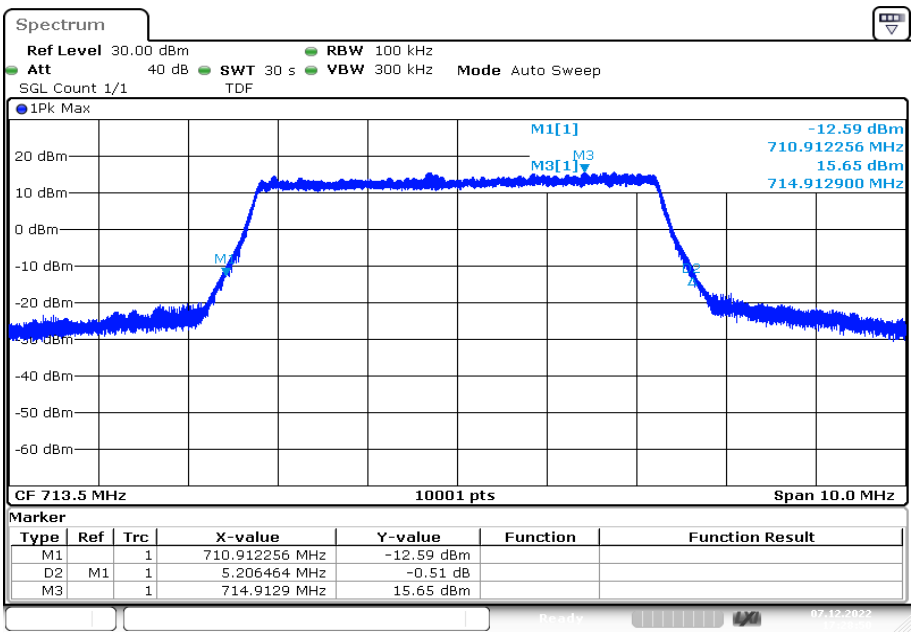
Plot 40: 5 MHz – 16-QAM - middle channel (-26 dBc BW)



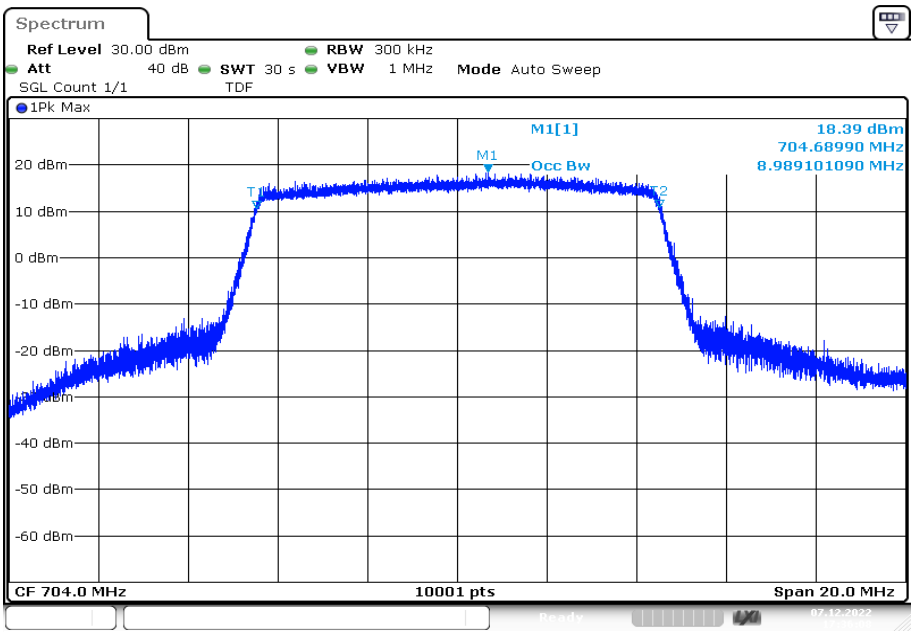
Plot 41: 5 MHz – 16-QAM - highest channel (99% - OBW)



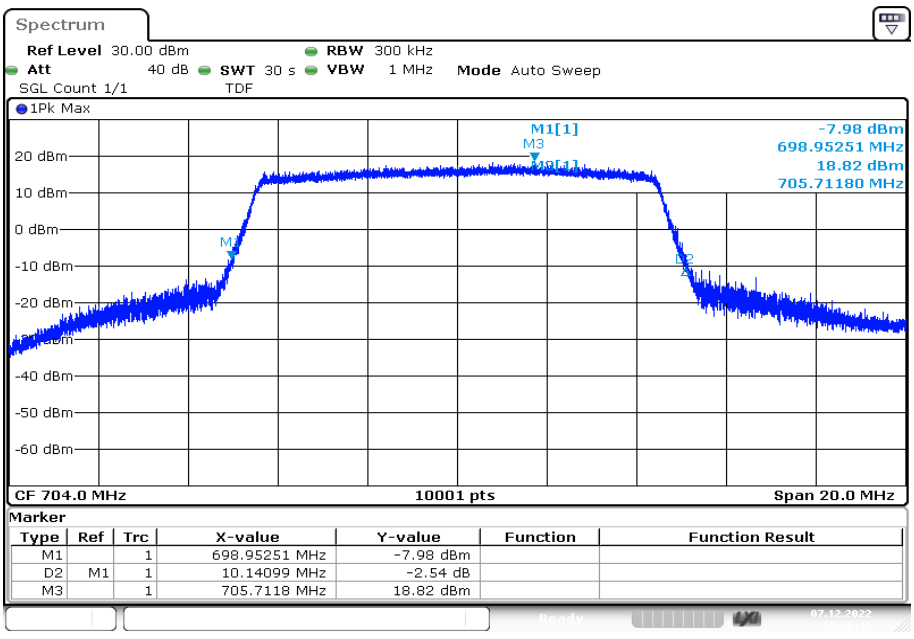
Plot 42: 5 MHz – 16-QAM - highest channel (-26 dBc BW)



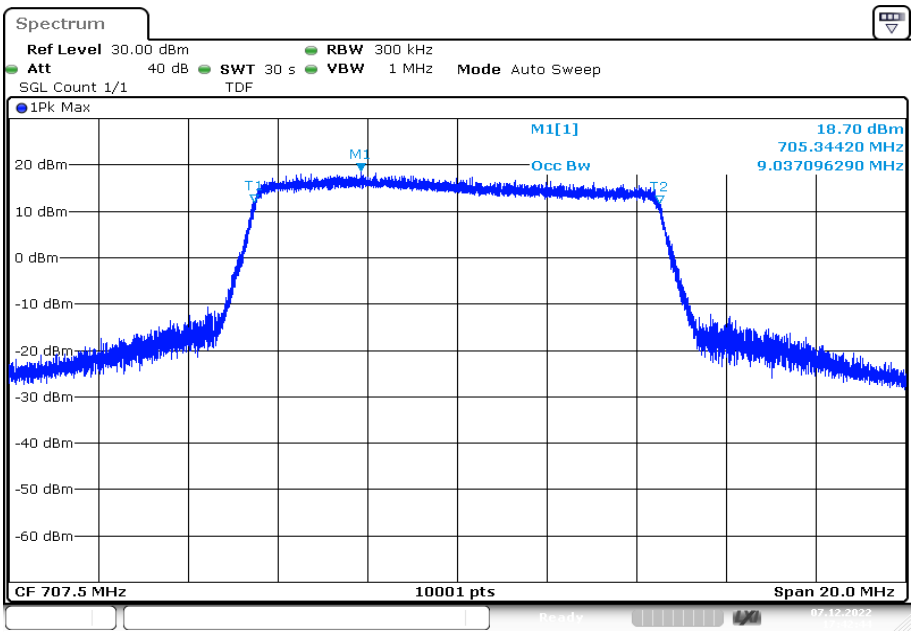
Plot 43: 10 MHz – 16-QAM - lowest channel (99% - OBW)



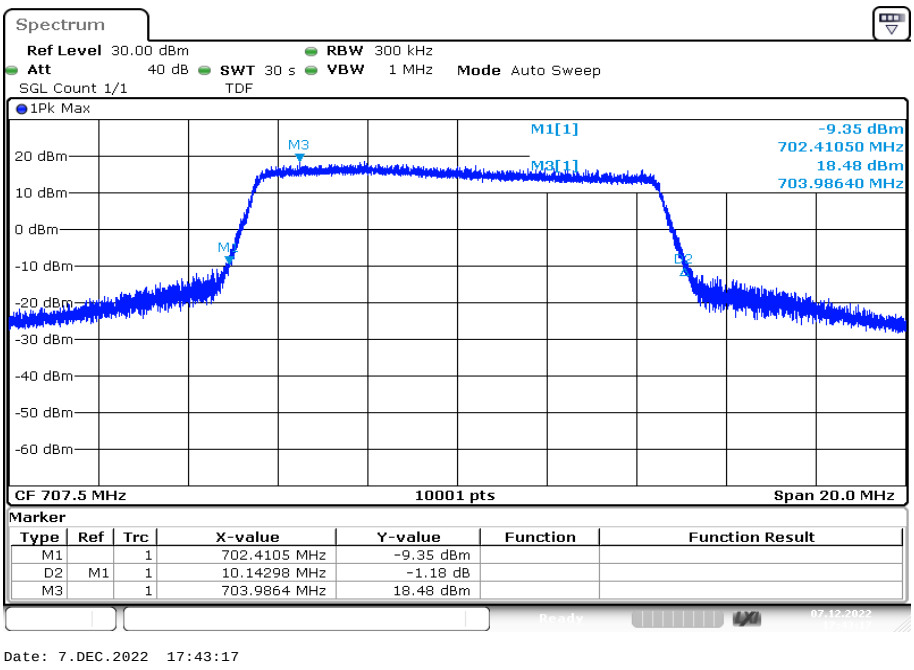
Plot 44: 10 MHz – 16-QAM - lowest channel (-26 dBc BW)



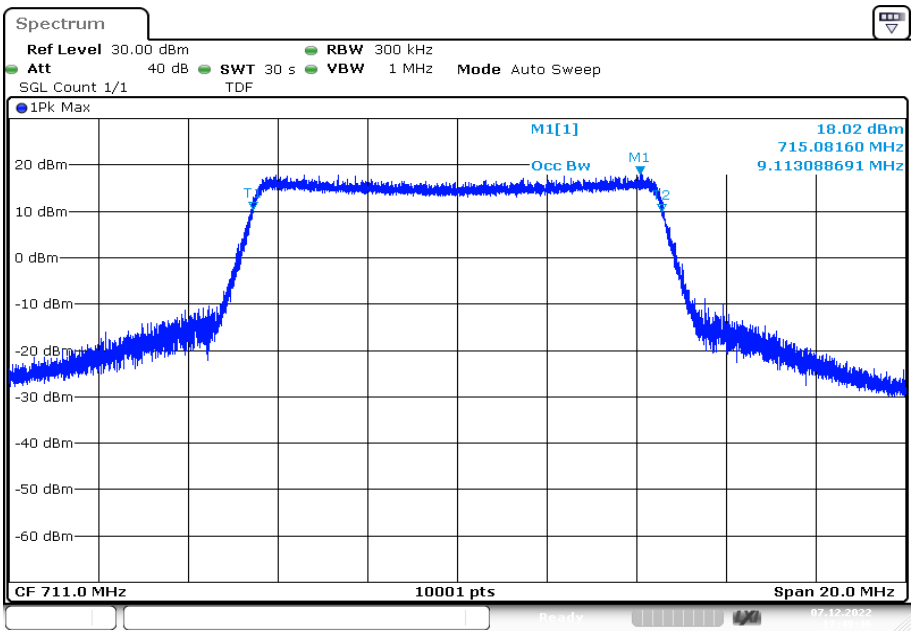
Plot 45: 10 MHz – 16-QAM - middle channel (99% - OBW)



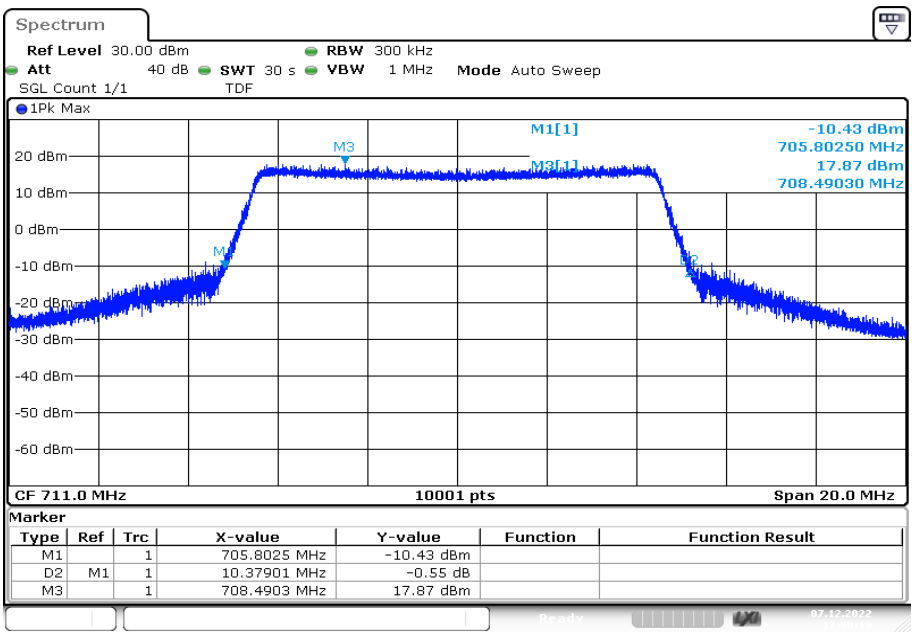
Plot 46: 10 MHz – 16-QAM - middle channel (-26 dBc BW)



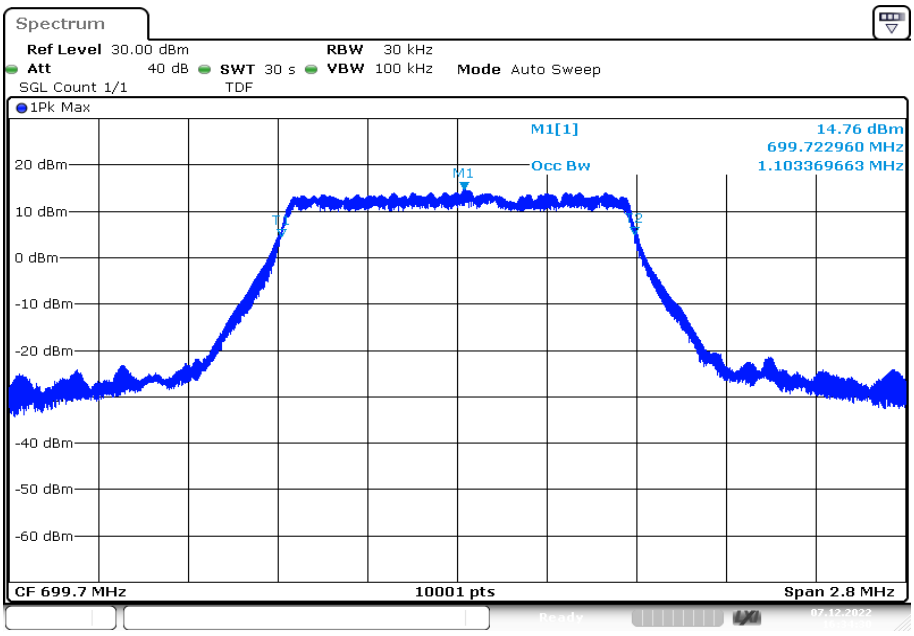
Plot 47: 10 MHz – 16-QAM - highest channel (99% - OBW)



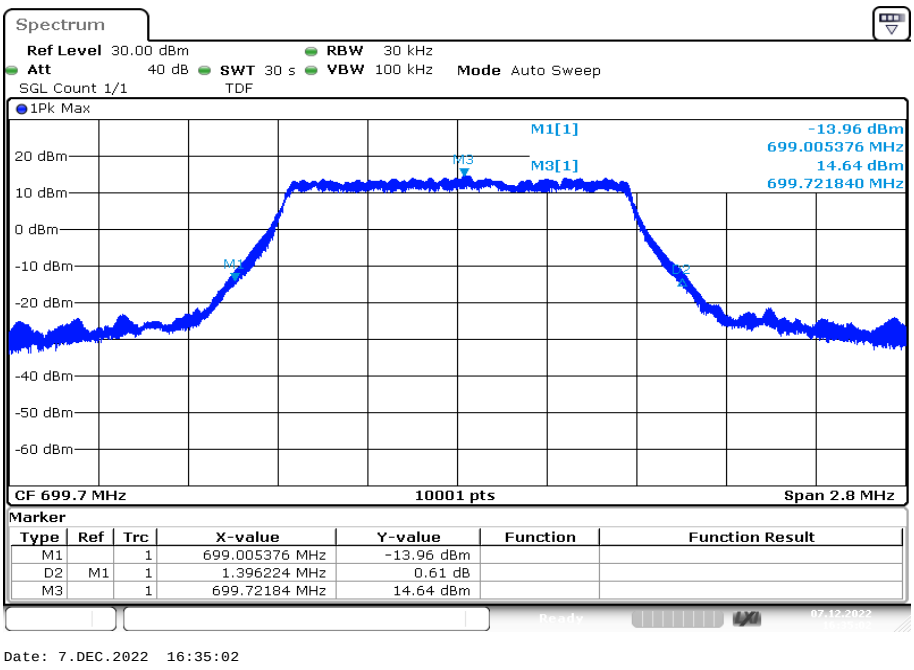
Plot 48: 10 MHz – 16-QAM - highest channel (-26 dBc BW)



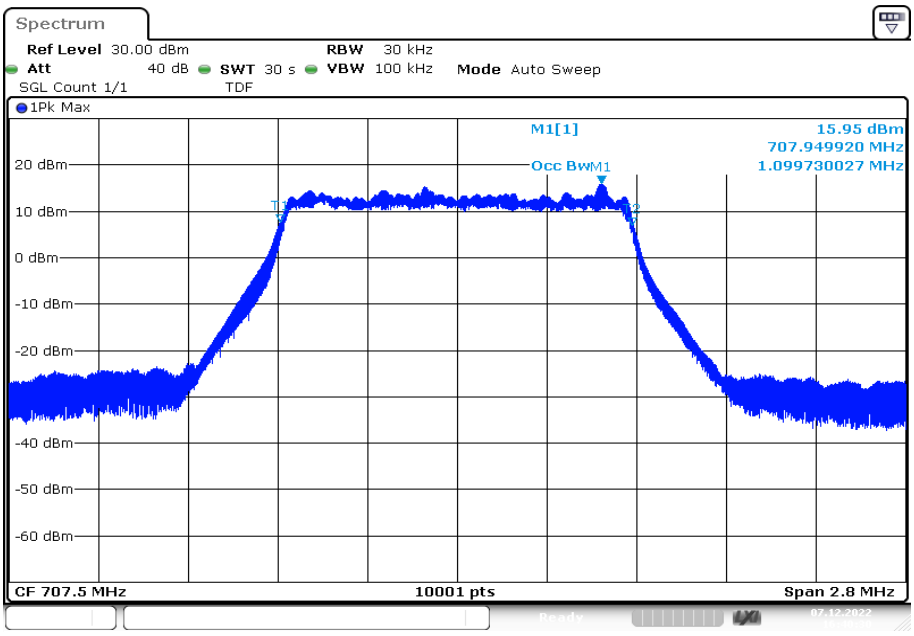
Plot 49: 1.4 MHz – 64-QAM - lowest channel (99% - OBW)



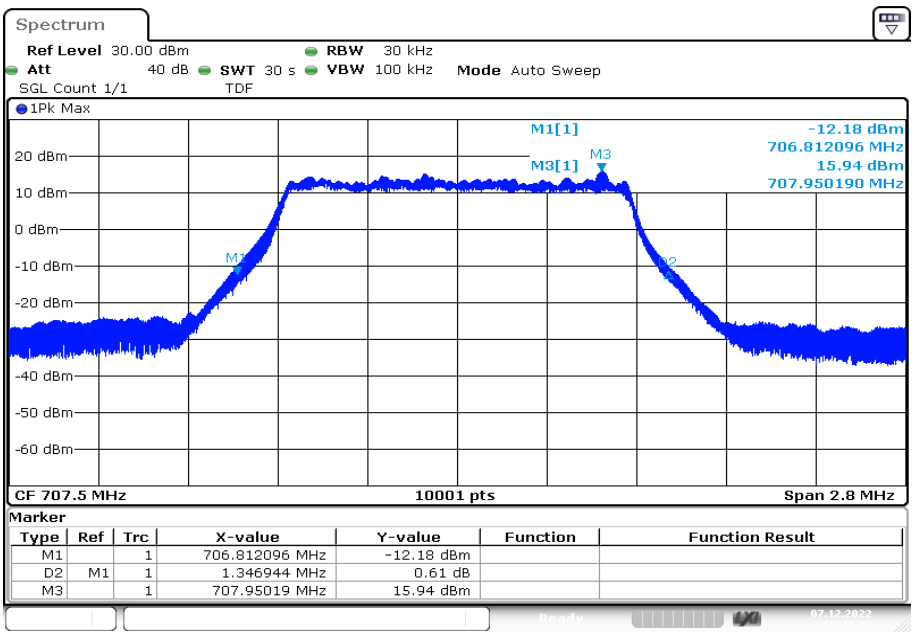
Plot 50: 1.4 MHz – 64-QAM - lowest channel (-26 dBc BW)



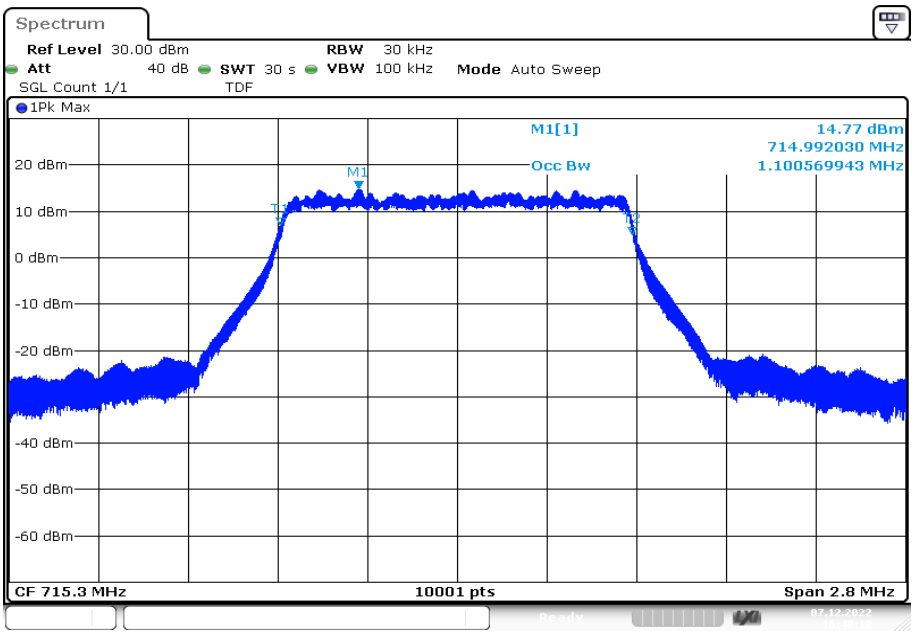
Plot 51: 1.4 MHz – 64-QAM - middle channel (99% - OBW)



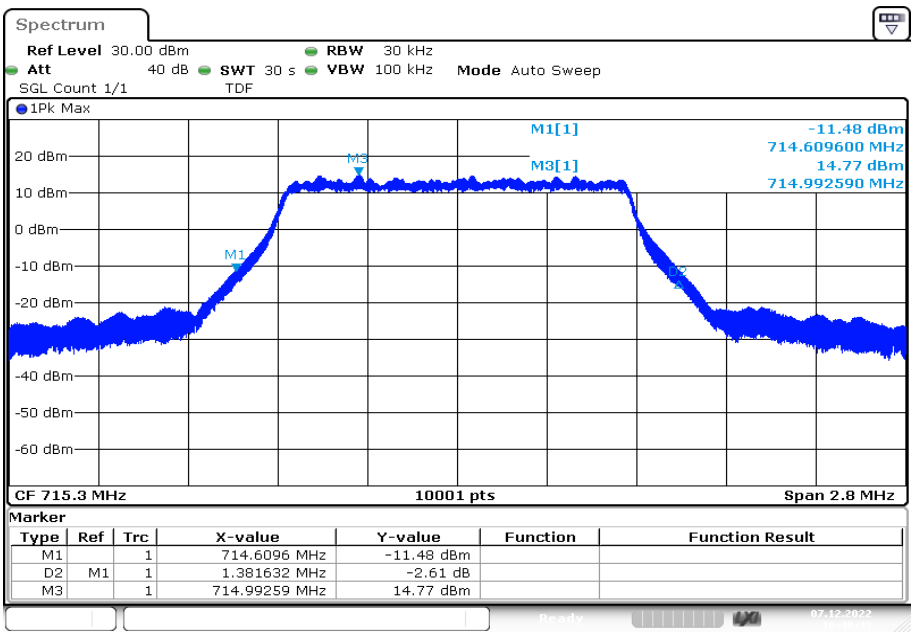
Plot 52: 1.4 MHz – 64-QAM - middle channel (-26 dBc BW)



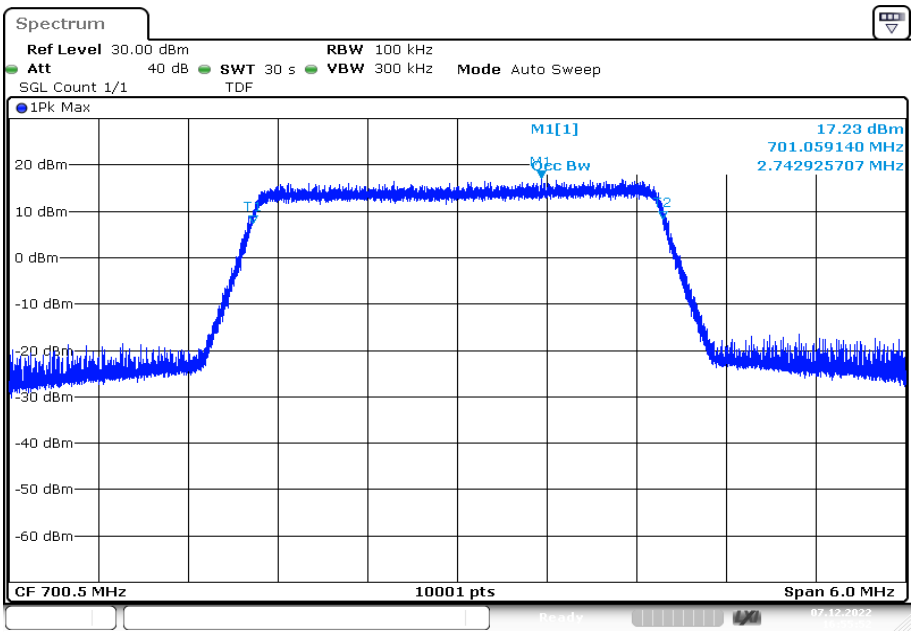
Plot 53: 1.4 MHz – 64-QAM - highest channel (99% - OBW)



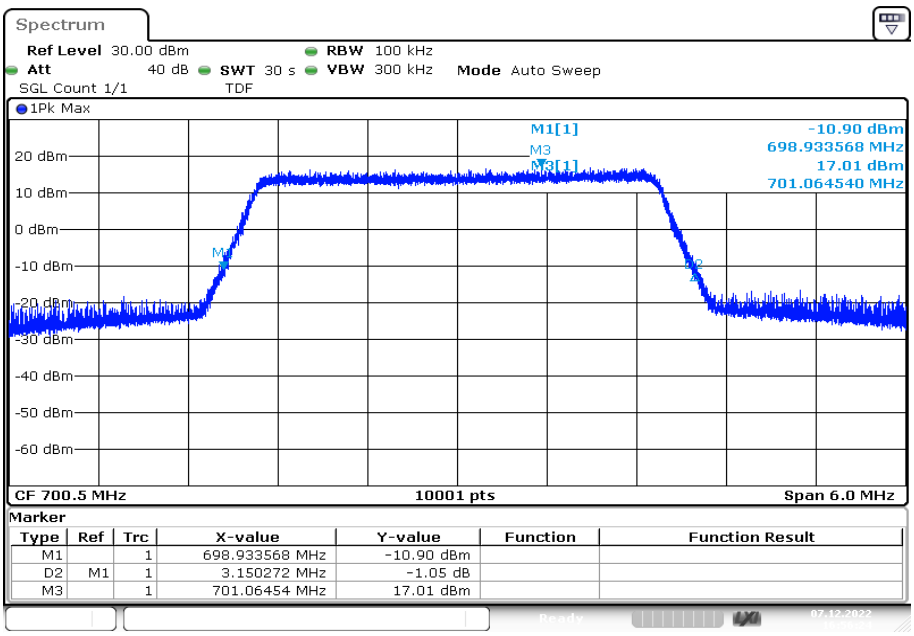
Plot 54: 1.4 MHz – 64-QAM - highest channel (-26 dBc BW)



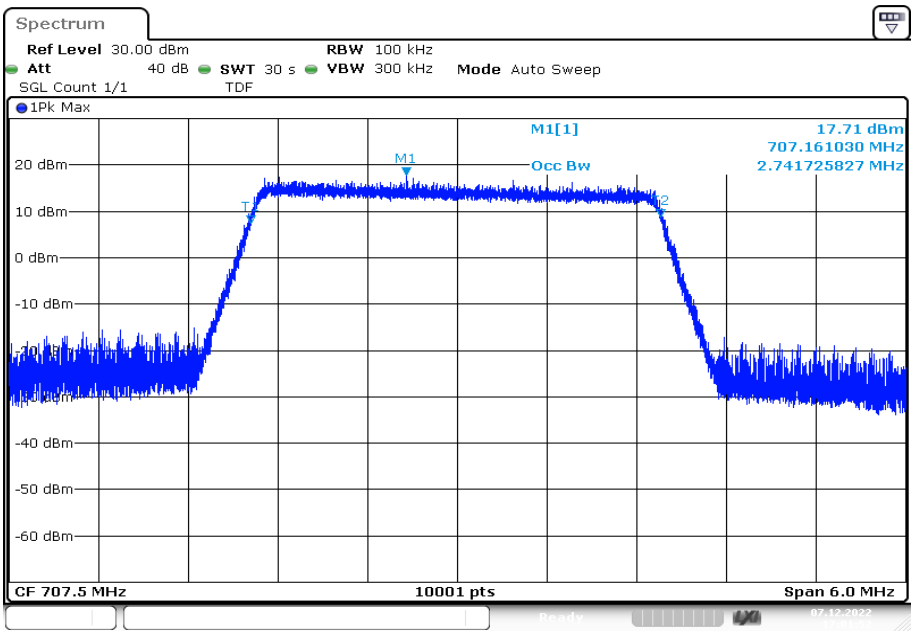
Plot 55: 3 MHz – 64-QAM - lowest channel (99% - OBW)



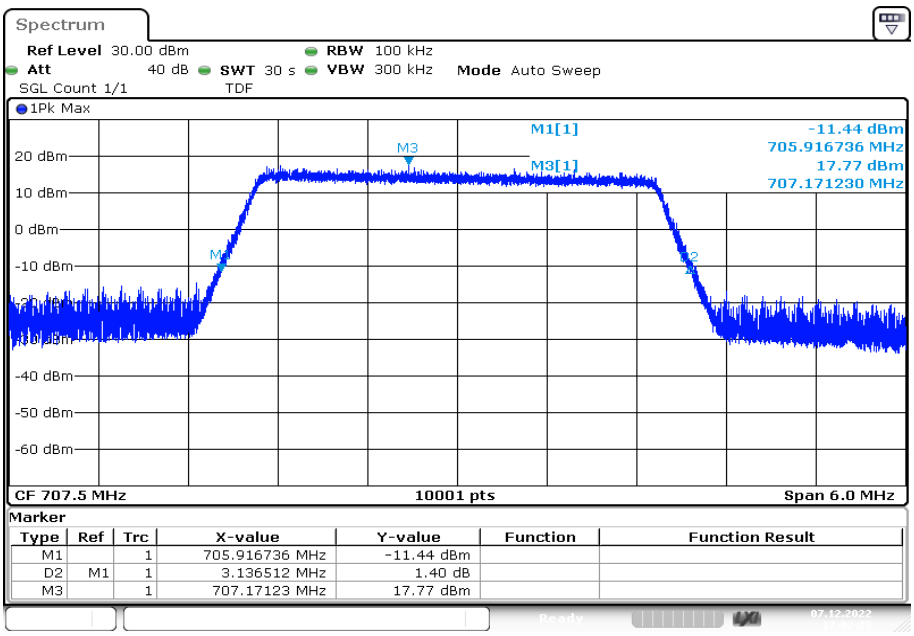
Plot 56: 3 MHz – 64-QAM - lowest channel (-26 dBc BW)



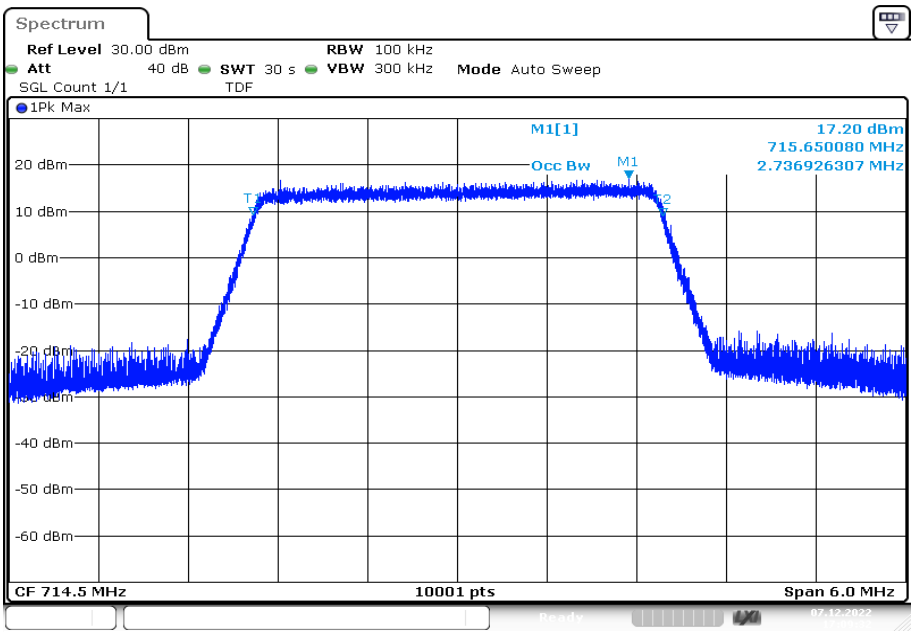
Plot 57: 3 MHz – 64-QAM - middle channel (99% - OBW)



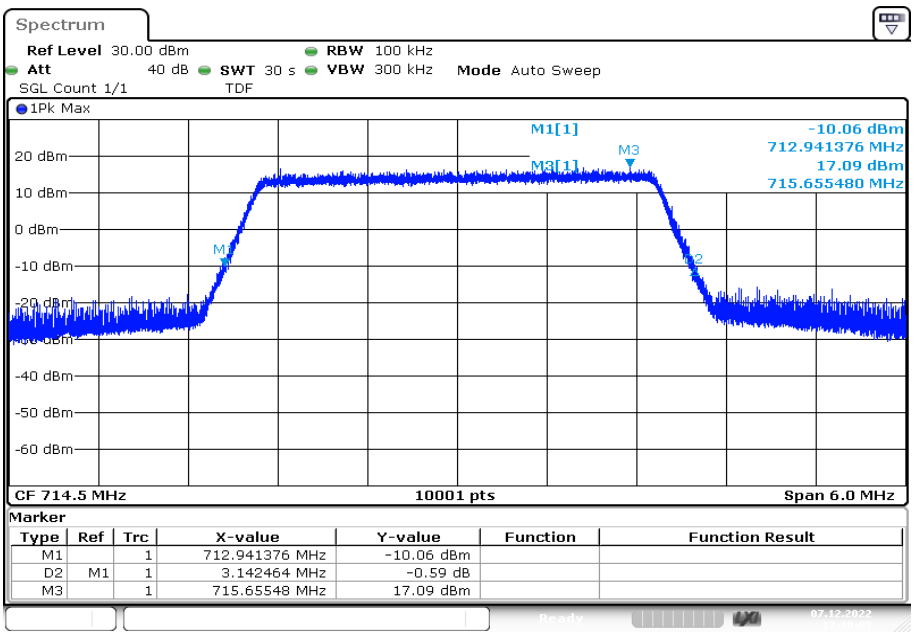
Plot 58: 3 MHz – 64-QAM - middle channel (-26 dBc BW)



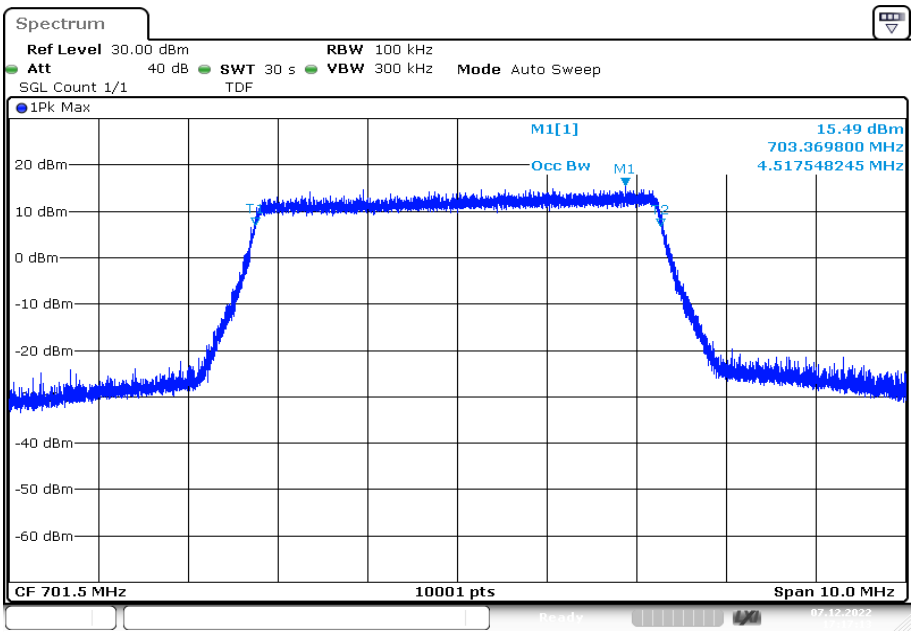
Plot 59: 3 MHz – 64-QAM - highest channel (99% - OBW)



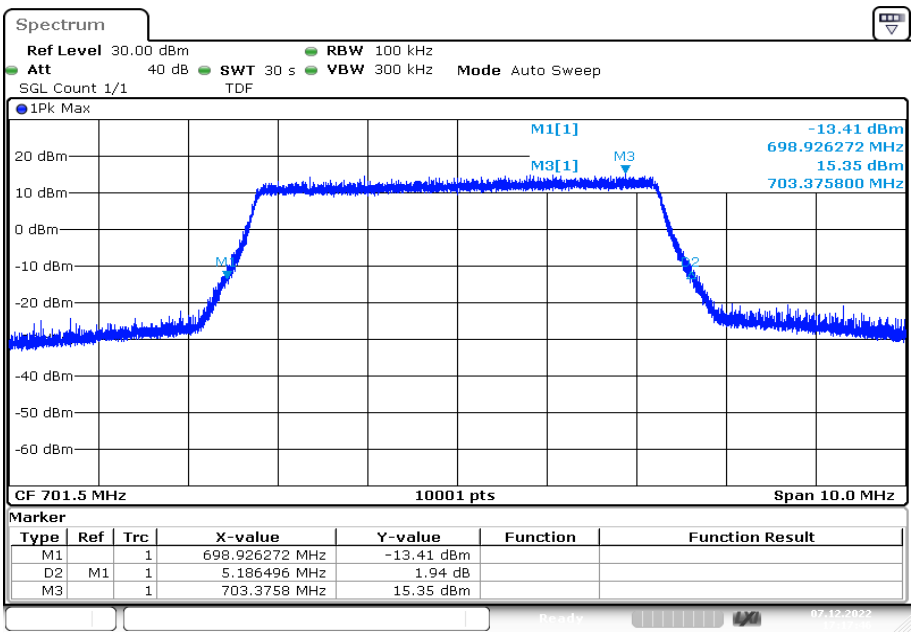
Plot 60: 3 MHz – 64-QAM - highest channel (-26 dBc BW)



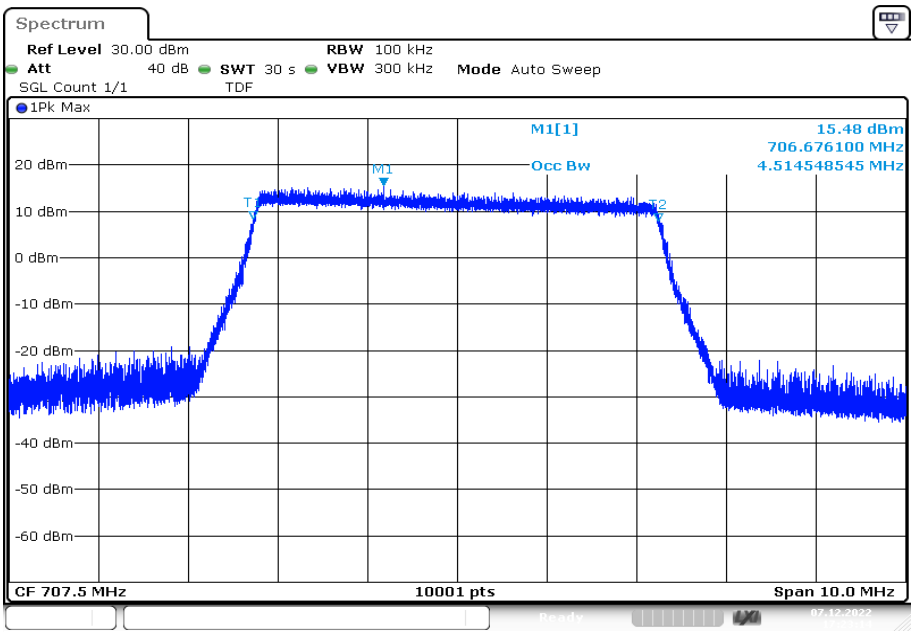
Plot 61: 5 MHz – 64-QAM - lowest channel (99% - OBW)



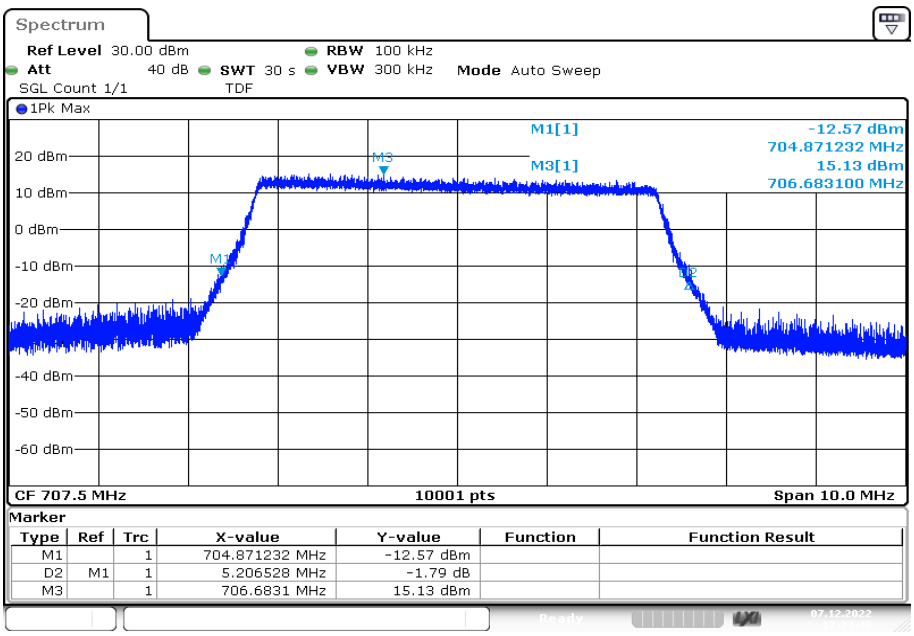
Plot 62: 5 MHz – 64-QAM - lowest channel (-26 dBc BW)



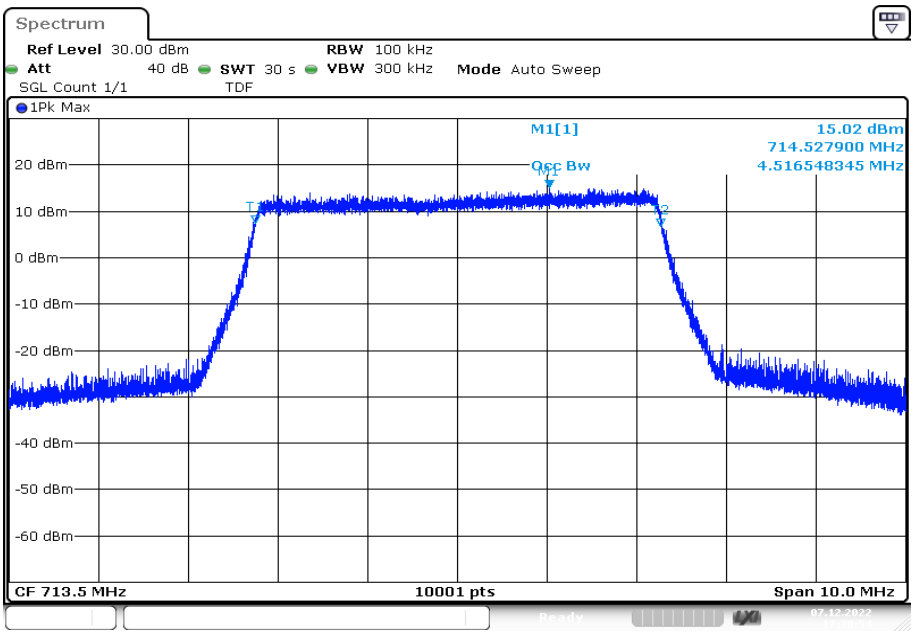
Plot 63: 5 MHz – 64-QAM - middle channel (99% - OBW)



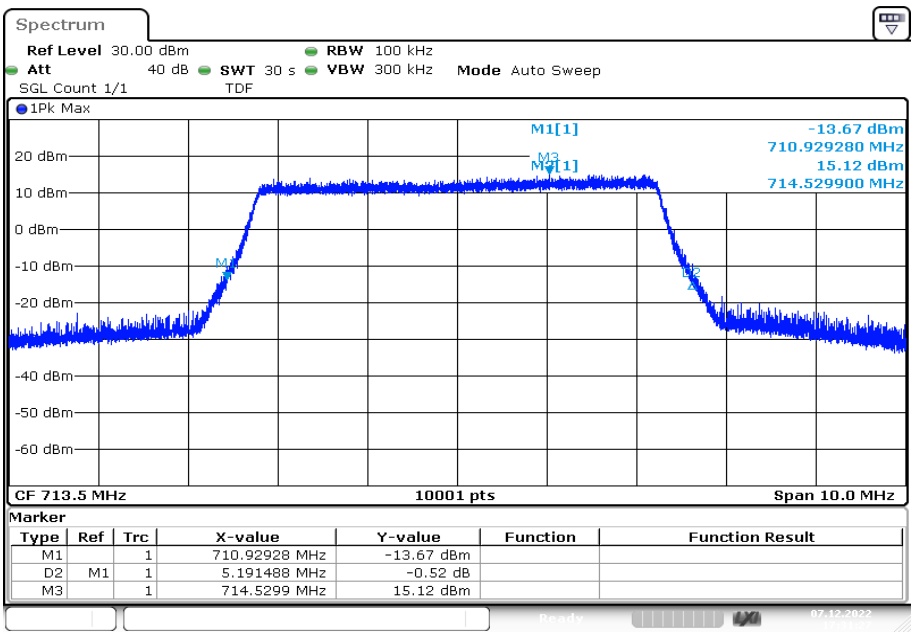
Plot 64: 5 MHz – 64-QAM - middle channel (-26 dBc BW)



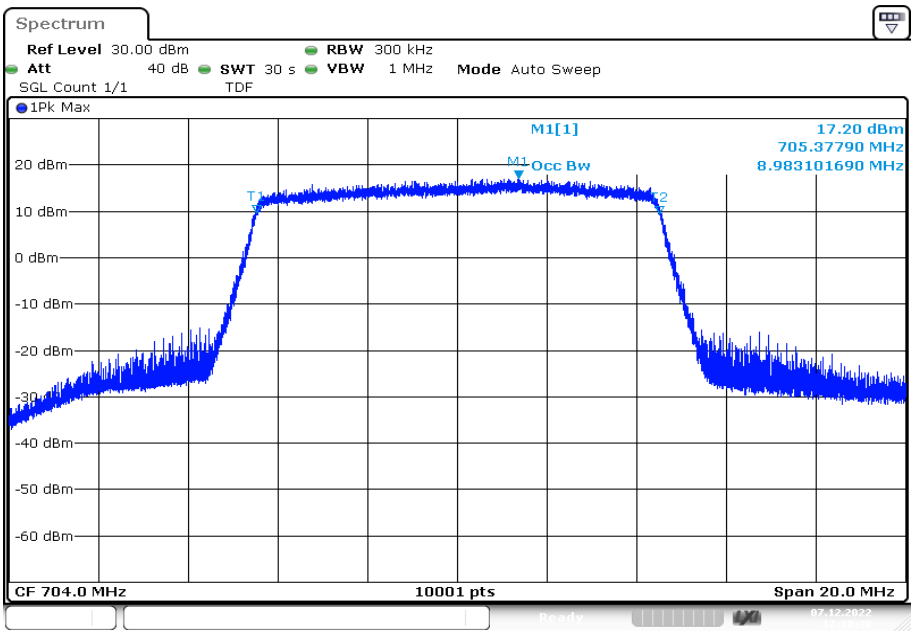
Plot 65: 5 MHz – 64-QAM - highest channel (99% - OBW)



Plot 66: 5 MHz – 64-QAM - highest channel (-26 dBc BW)



Plot 67: 10 MHz – 64-QAM - lowest channel (99% - OBW)



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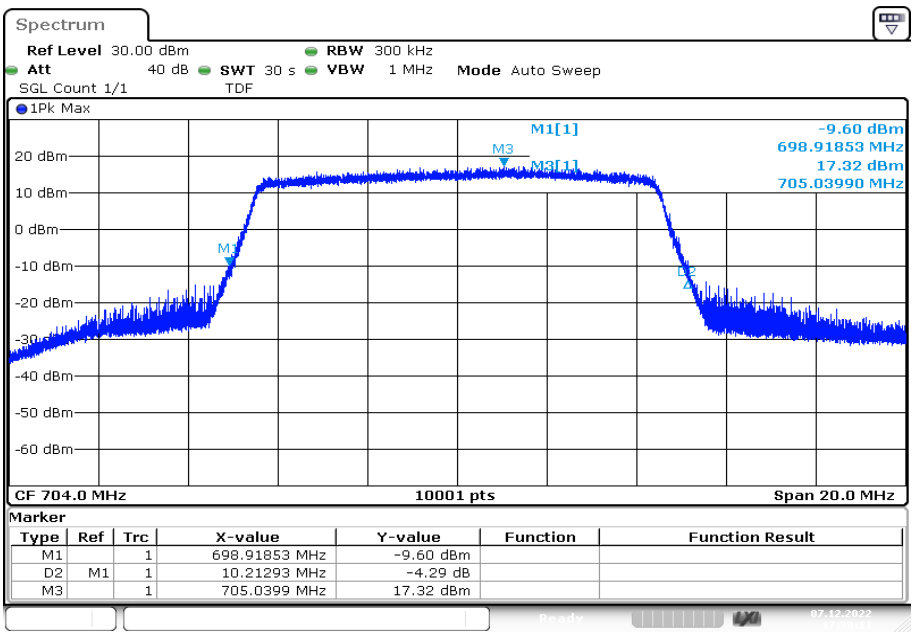
Plot 68: 10 MHz – 64-QAM - lowest channel (-26 dBc BW)



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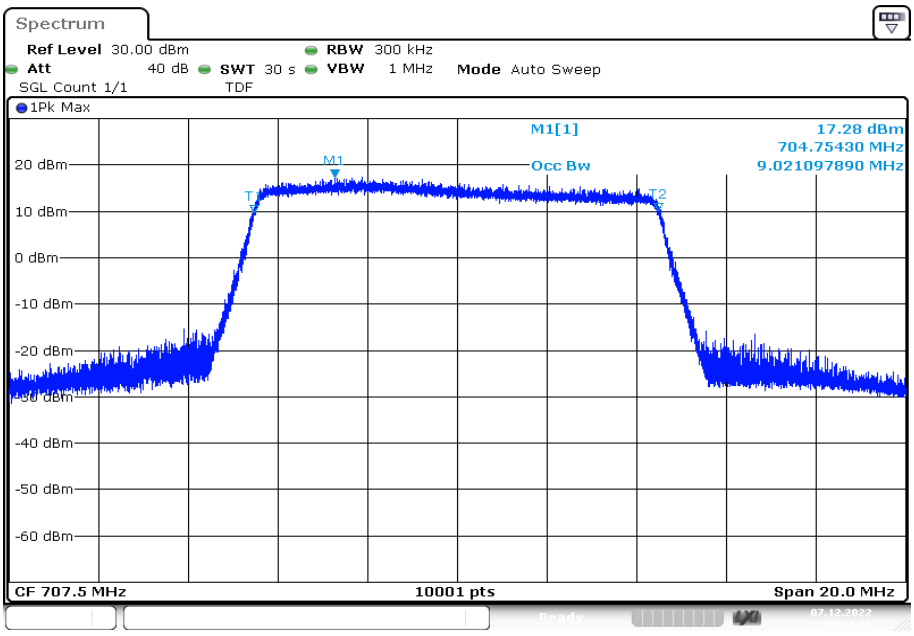
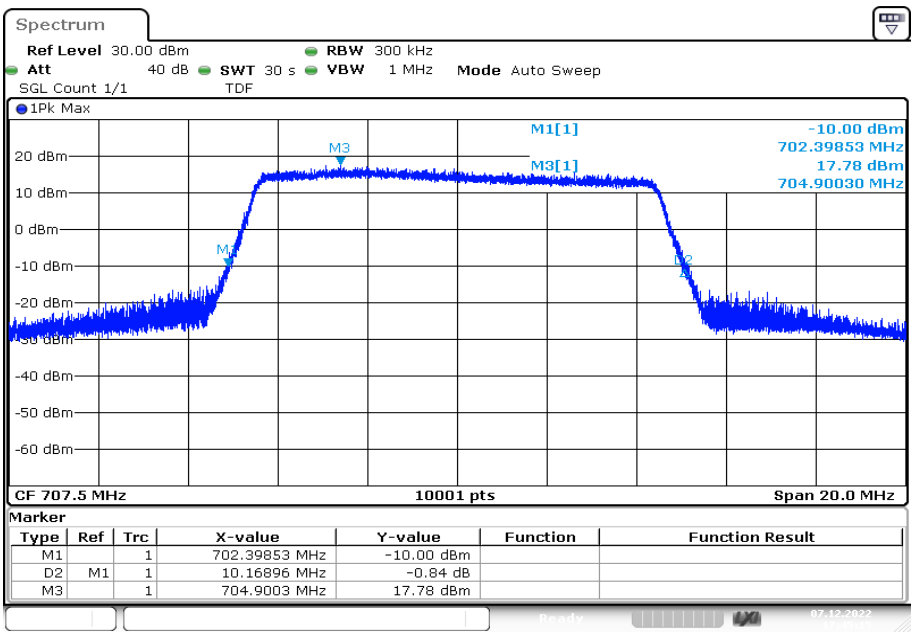
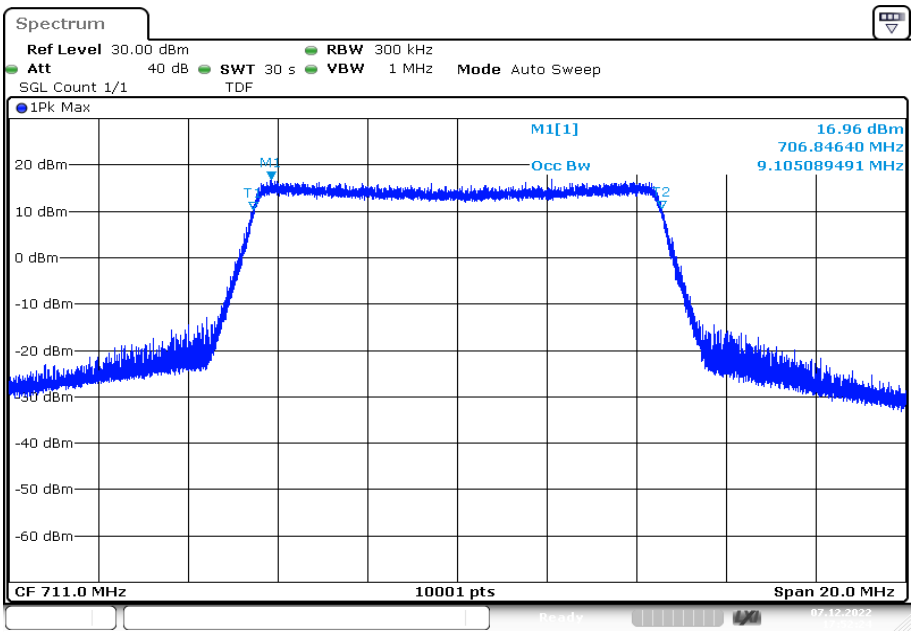
Plot 69: 10 MHz – 64-QAM - middle channel (99% - OBW)



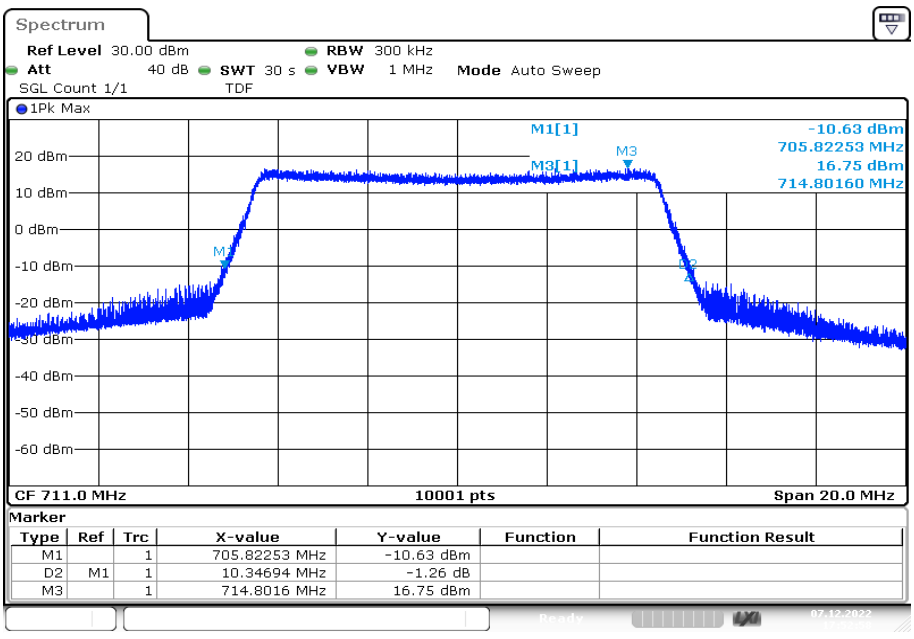
Plot 70: 10 MHz – 64-QAM - middle channel (-26 dBc BW)



Plot 71: 10 MHz – 64-QAM - highest channel (99% - OBW)



Plot 72: 10 MHz – 64-QAM - highest channel (-26 dBc BW)



13 Glossary

EUT	Equipment under test
DUT	Device under test
UUT	Unit under test
GUE	GNSS User Equipment
ETSI	European Telecommunications Standards Institute
EN	European Standard
FCC	Federal Communications Commission
FCC ID	Company Identifier at FCC
IC	Industry Canada
PMN	Product marketing name
HMN	Host marketing name
HVIN	Hardware version identification number
FVIN	Firmware version identification number
EMC	Electromagnetic Compatibility
HW	Hardware
SW	Software
Inv No	Inventory number
S/N or SN	Serial number
C	Compliant
NC	Not compliant
NA	Not applicable
NP	Not performed
PP	Positive peak
QP	Quasi peak
AVG	Average
OC	Operating channel
OCW	Operating channel bandwidth
OBW	Occupied bandwidth
OOB	Out of band
DFS	Dynamic frequency selection
CAC	Channel availability check
OP	Occupancy period
NOP	Non occupancy period
DC	Duty cycle
PER	Packet error rate
CW	Clean wave
MC	Modulated carrier
WLAN	Wireless local area network
RLAN	Radio local area network
DSSS	Dynamic sequence spread spectrum
OFDM	Orthogonal frequency division multiplexing
FHSS	Frequency hopping spread spectrum
GNSS	Global Navigation Satellite System
C/N_0	Carrier to noise-density ratio, expressed in dB-Hz

14 Document history

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

15 Accreditation Certificate – D-PL-12076-01-05

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

https://wwwdakksde/files/data/as/pdf/D-PL-12076-01-05epdf

or

https://ctcadvancedcom/app/uploads/2020/06/D-PL-12076-01-05_TCB_USApdf

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