### 12.3.5 Block edge compliance

**Description:**

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

For the measurement the lowest, middle and highest channel bandwidth was used. If spurious were found the other bandwidths were measured, too.

**Measurement:**

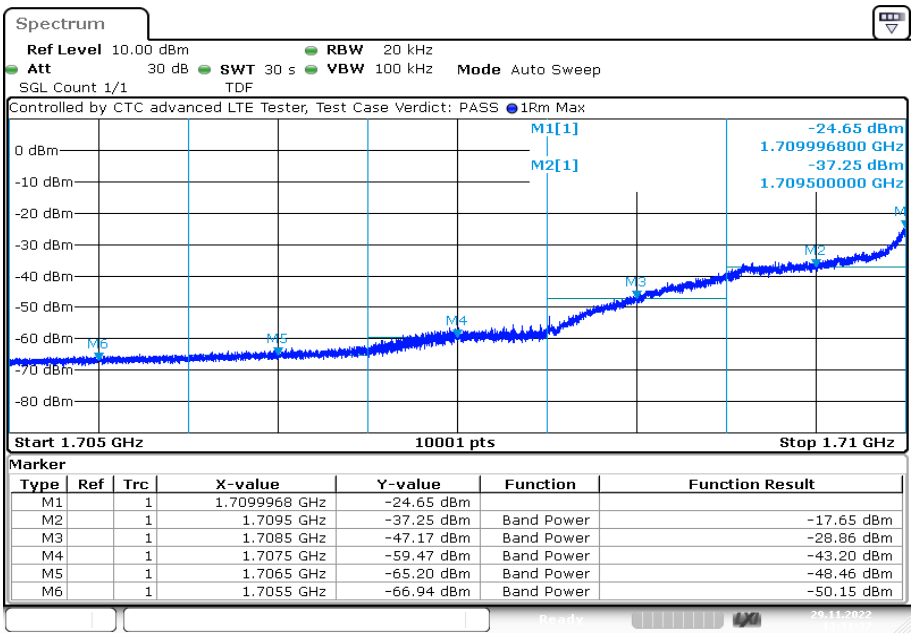
| Measurement parameters | |
|---|---|
| Detector: | RMS |
| Sweep time: | See plots |
| Video bandwidth: | See plots |
| Resolution bandwidth: | See plots |
| Span: | 1 MHz |
| Trace mode: | Max Hold |
| Used equipment: | See chapter 7.2 setup A |
| Measurement uncertainty: | See chapter 9 |
| Measurement procedure | FCC: § 2.1051 |

**Limits:**

| FCC |
|---|
| § 27.53(h)(1) & (3) |
| (1) Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.<br>(3) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz 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. 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. |
| **-13 dBm**<br><br>Correction factor according to KDB 890810 if RBW < 1 % emission bandwidth:<br>☒N/A here<br>☐10 log (RBW1/RBW2) = X dB; whereas: RBW1 = Y, RBW2 = Z |

**Results:**

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




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.7099968 GHz | -24.65 dBm | | |
| M2 | | 1 | 1.7095 GHz | -37.25 dBm | Band Power | -17.65 dBm |
| M3 | | 1 | 1.7085 GHz | -47.17 dBm | Band Power | -28.86 dBm |
| M4 | | 1 | 1.7075 GHz | -59.47 dBm | Band Power | -43.20 dBm |
| M5 | | 1 | 1.7065 GHz | -65.20 dBm | Band Power | -48.46 dBm |
| M6 | | 1 | 1.7055 GHz | -66.94 dBm | Band Power | -50.15 dBm |

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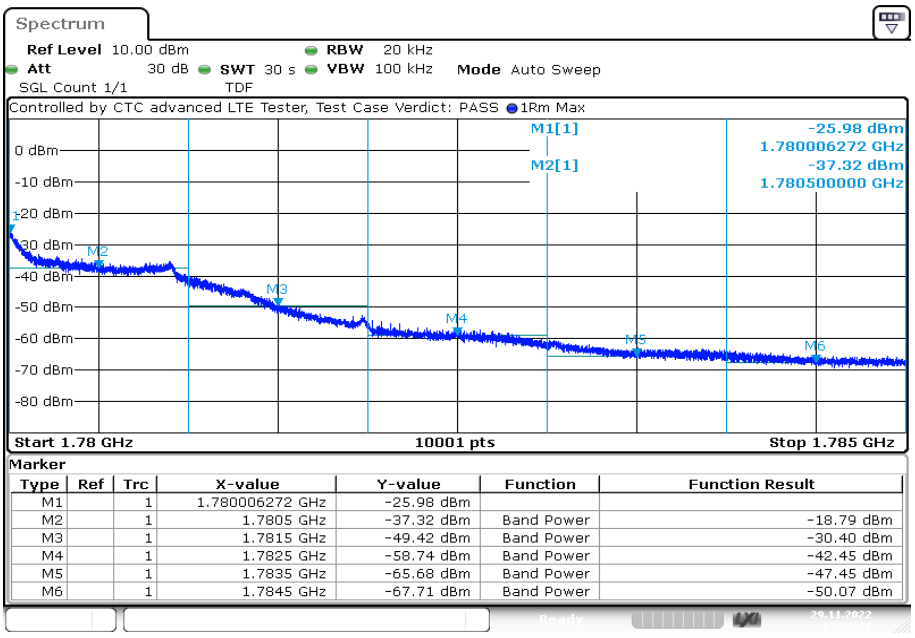
**Plot 2:** 1.4 MHz – QPSK - Highest channel




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.780006272 GHz | -25.98 dBm | | |
| M2 | | 1 | 1.7805 GHz | -37.32 dBm | Band Power | -18.79 dBm |
| M3 | | 1 | 1.7815 GHz | -49.42 dBm | Band Power | -30.40 dBm |
| M4 | | 1 | 1.7825 GHz | -58.74 dBm | Band Power | -42.45 dBm |
| M5 | | 1 | 1.7835 GHz | -65.68 dBm | Band Power | -47.45 dBm |
| M6 | | 1 | 1.7845 GHz | -67.71 dBm | Band Power | -50.07 dBm |

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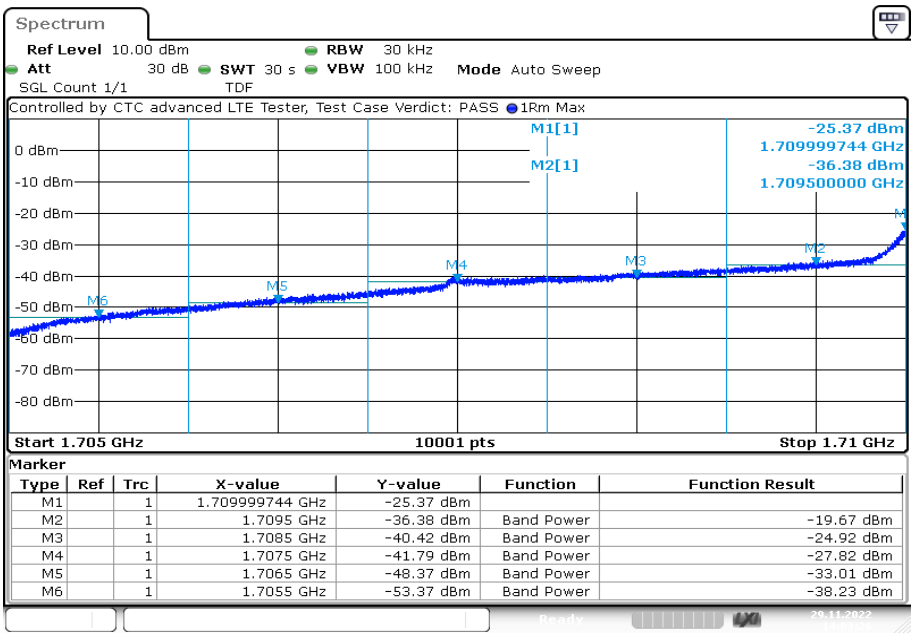
**Plot 3:** 3 MHz – QPSK - Lowest channel

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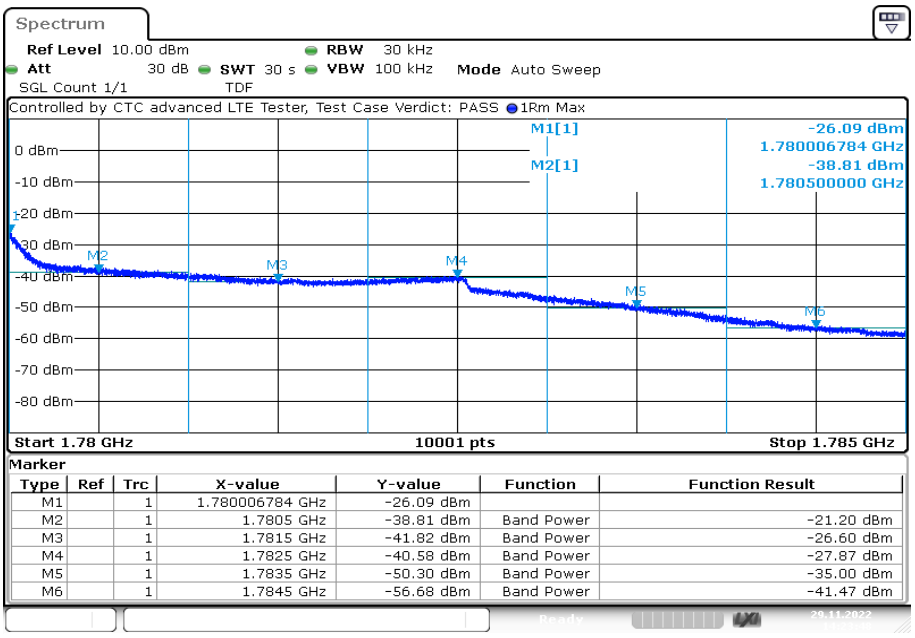
**Plot 4:** 3 MHz – QPSK - Highest channel

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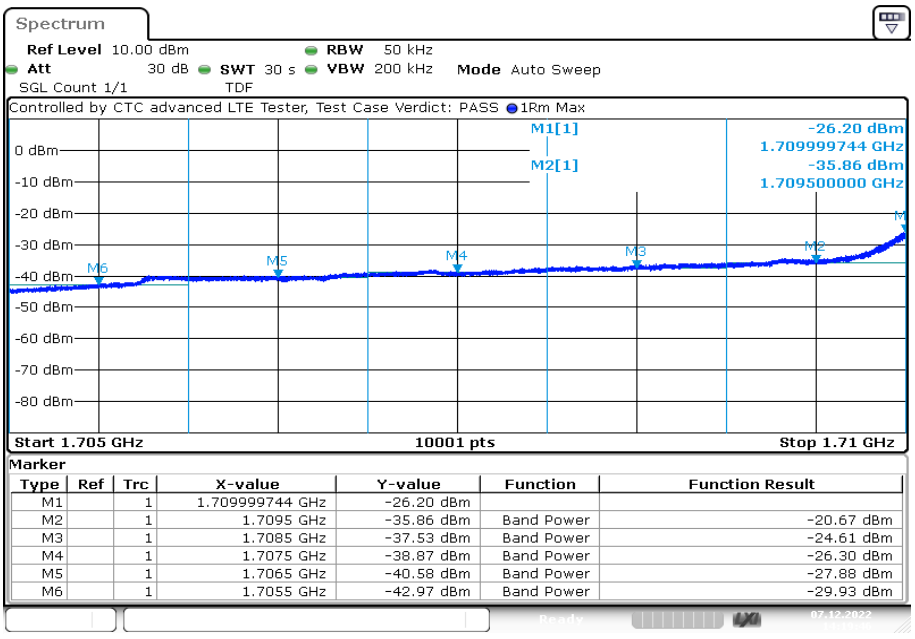
**Plot 5:** 5 MHz – QPSK - Lowest channel

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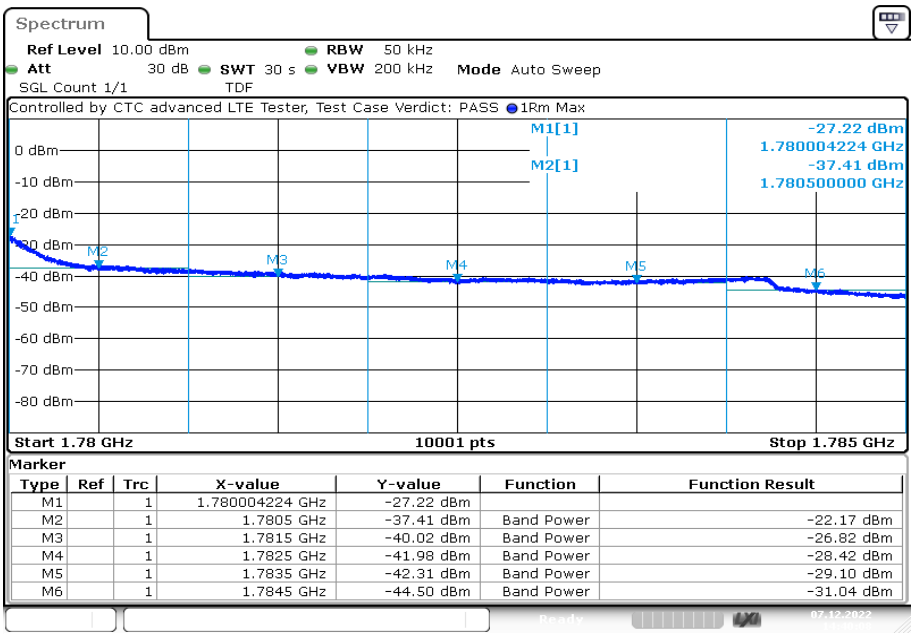
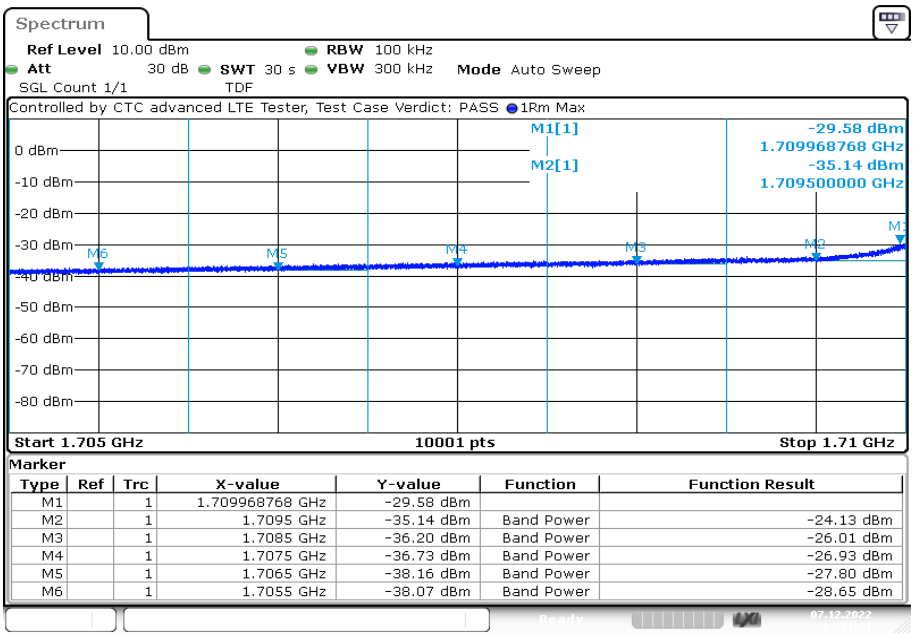
**Plot 6:** 5 MHz – QPSK - Highest channel




Date: 7.DEC.2022 14:40:08

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




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.709968768 GHz | -29.58 dBm | | |
| M2 | | 1 | 1.7095 GHz | -35.14 dBm | Band Power | -24.13 dBm |
| M3 | | 1 | 1.7085 GHz | -36.20 dBm | Band Power | -26.01 dBm |
| M4 | | 1 | 1.7075 GHz | -36.73 dBm | Band Power | -26.93 dBm |
| M5 | | 1 | 1.7065 GHz | -38.16 dBm | Band Power | -27.80 dBm |
| M6 | | 1 | 1.7055 GHz | -38.07 dBm | Band Power | -28.65 dBm |

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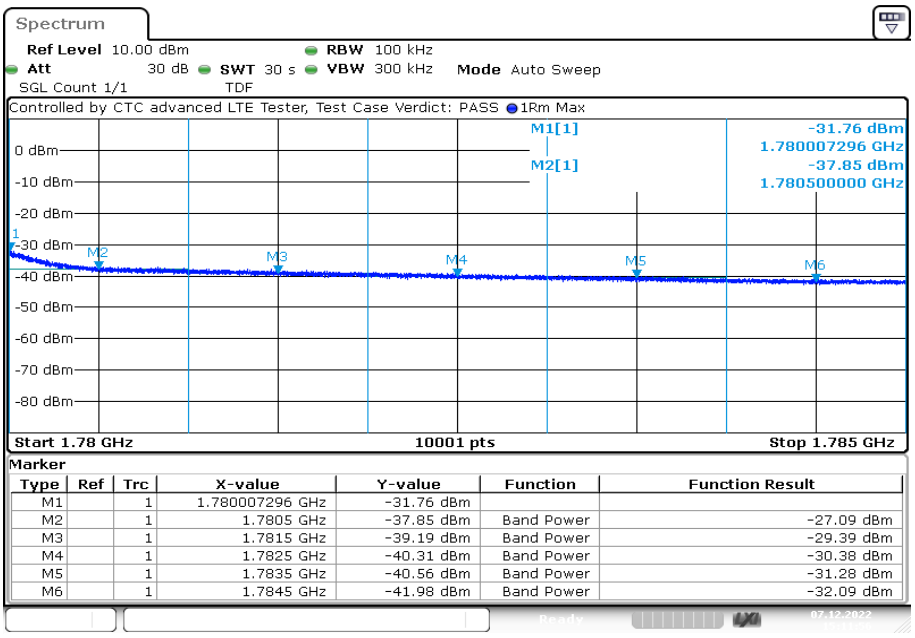
**Plot 8:** 10 MHz – QPSK - Highest channel




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.780007296 GHz | -31.76 dBm | | |
| M2 | | 1 | 1.7805 GHz | -37.85 dBm | Band Power | -27.09 dBm |
| M3 | | 1 | 1.7815 GHz | -39.19 dBm | Band Power | -29.39 dBm |
| M4 | | 1 | 1.7825 GHz | -40.31 dBm | Band Power | -30.38 dBm |
| M5 | | 1 | 1.7835 GHz | -40.56 dBm | Band Power | -31.28 dBm |
| M6 | | 1 | 1.7845 GHz | -41.98 dBm | Band Power | -32.09 dBm |

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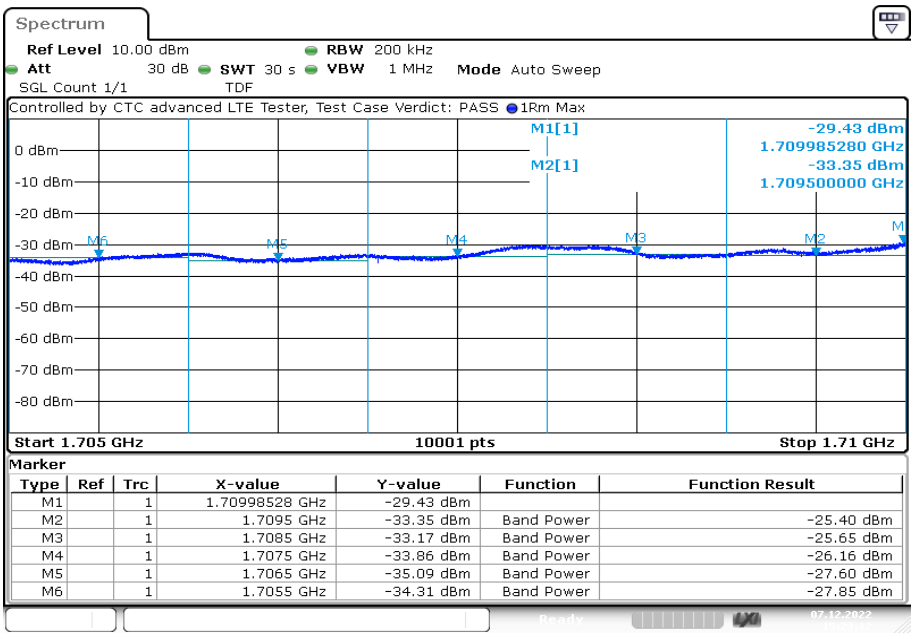
**Plot 9:** 15 MHz – QPSK - Lowest channel

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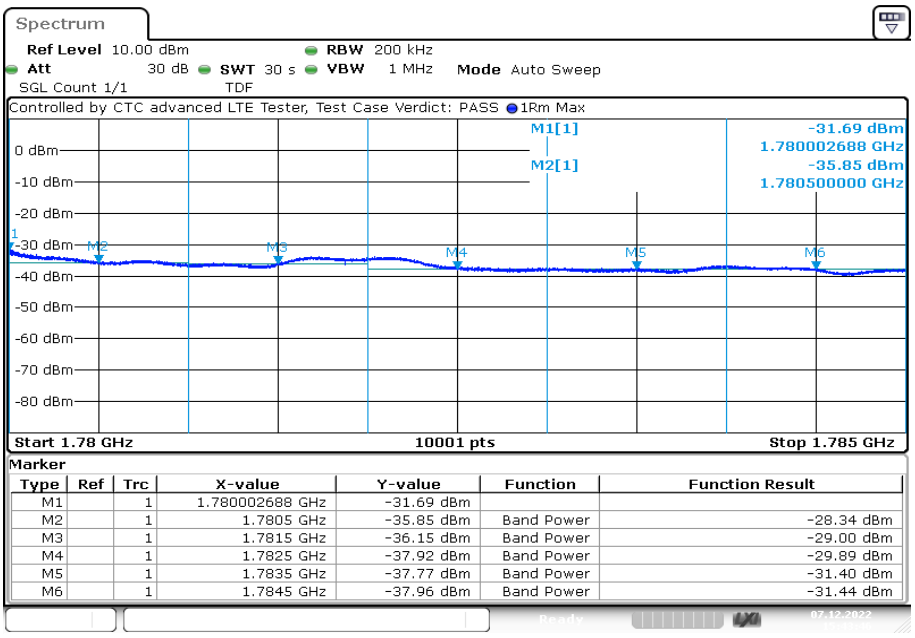
**Plot 10:** 15 MHz – QPSK - Highest channel

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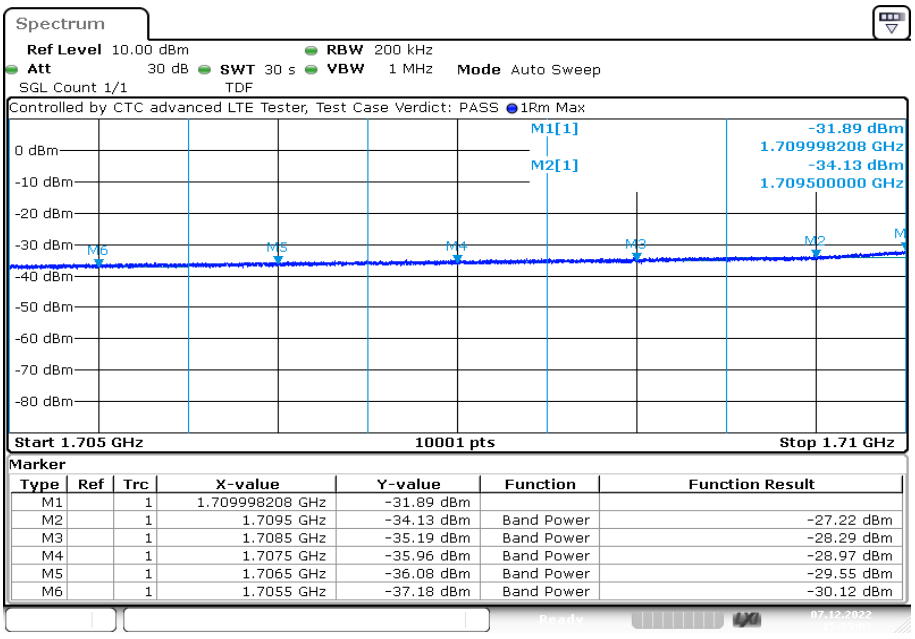
**Plot 11:** 20 MHz – QPSK - Lowest channel

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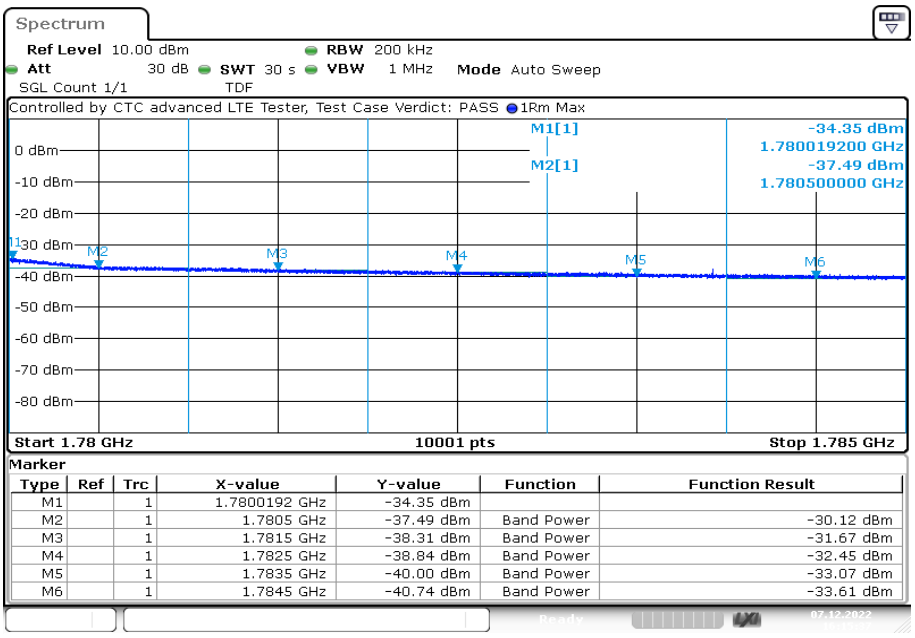
**Plot 12:** 20 MHz – QPSK - Highest channel

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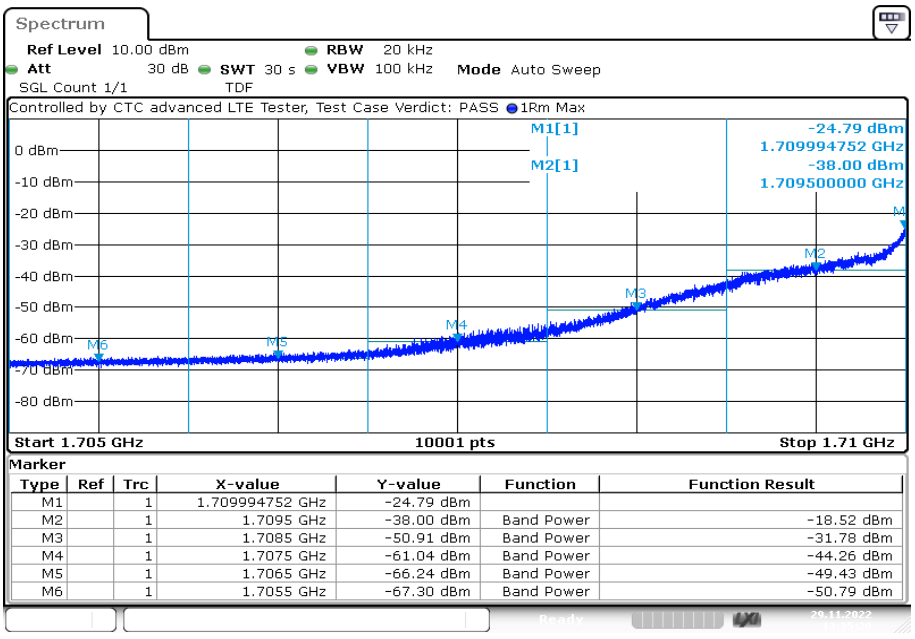
**Plot 13:** 1.4 MHz – 16-QAM - Lowest channel




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.709994752 GHz | -24.79 dBm | | |
| M2 | | 1 | 1.7095 GHz | -38.00 dBm | Band Power | -18.52 dBm |
| M3 | | 1 | 1.7085 GHz | -50.91 dBm | Band Power | -31.78 dBm |
| M4 | | 1 | 1.7075 GHz | -61.04 dBm | Band Power | -44.26 dBm |
| M5 | | 1 | 1.7065 GHz | -66.24 dBm | Band Power | -49.43 dBm |
| M6 | | 1 | 1.7055 GHz | -67.30 dBm | Band Power | -50.79 dBm |

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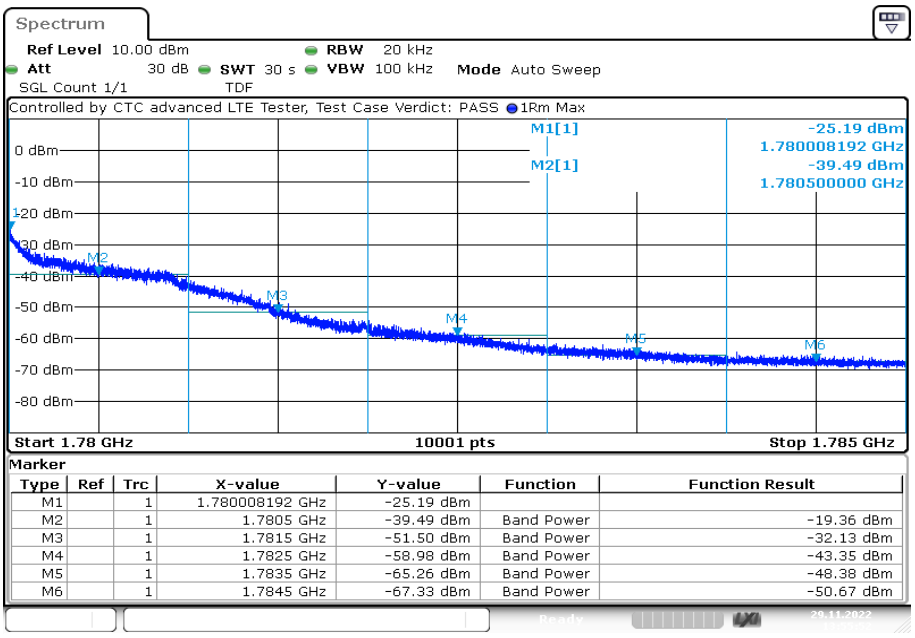
**Plot 14:** 1.4 MHz – 16-QAM - Highest channel




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.780008192 GHz | -25.19 dBm | | |
| M2 | | 1 | 1.7805 GHz | -39.49 dBm | Band Power | -19.36 dBm |
| M3 | | 1 | 1.7815 GHz | -51.50 dBm | Band Power | -32.13 dBm |
| M4 | | 1 | 1.7825 GHz | -58.98 dBm | Band Power | -43.35 dBm |
| M5 | | 1 | 1.7835 GHz | -65.26 dBm | Band Power | -48.38 dBm |
| M6 | | 1 | 1.7845 GHz | -67.33 dBm | Band Power | -50.67 dBm |

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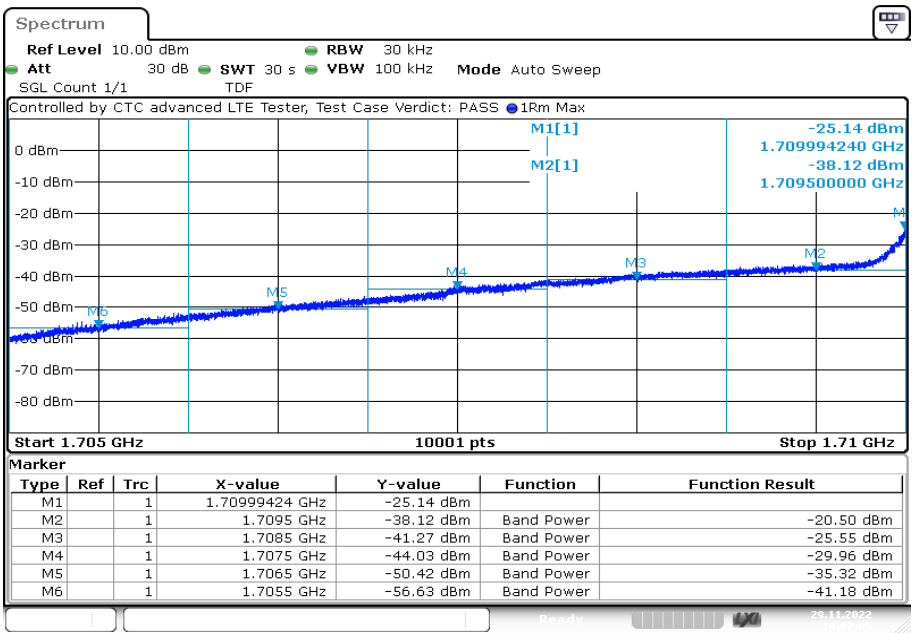
**Plot 15:** 3 MHz – 16-QAM - Lowest channel




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.70999424 GHz | -25.14 dBm | | |
| M2 | | 1 | 1.7095 GHz | -38.12 dBm | Band Power | -20.50 dBm |
| M3 | | 1 | 1.7085 GHz | -41.27 dBm | Band Power | -25.55 dBm |
| M4 | | 1 | 1.7075 GHz | -44.03 dBm | Band Power | -29.96 dBm |
| M5 | | 1 | 1.7065 GHz | -50.42 dBm | Band Power | -35.32 dBm |
| M6 | | 1 | 1.7055 GHz | -56.63 dBm | Band Power | -41.18 dBm |

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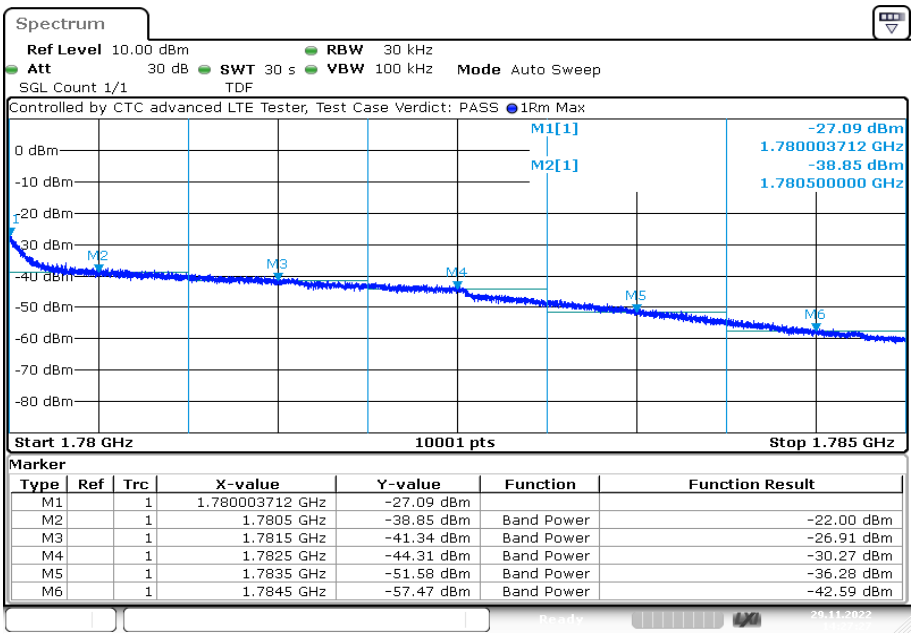
**Plot 16:** 3 MHz – 16-QAM - Highest channel




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.780003712 GHz | -27.09 dBm | | |
| M2 | | 1 | 1.7805 GHz | -38.85 dBm | Band Power | -22.00 dBm |
| M3 | | 1 | 1.7815 GHz | -41.34 dBm | Band Power | -26.91 dBm |
| M4 | | 1 | 1.7825 GHz | -44.31 dBm | Band Power | -30.27 dBm |
| M5 | | 1 | 1.7835 GHz | -51.58 dBm | Band Power | -36.28 dBm |
| M6 | | 1 | 1.7845 GHz | -57.47 dBm | Band Power | -42.59 dBm |

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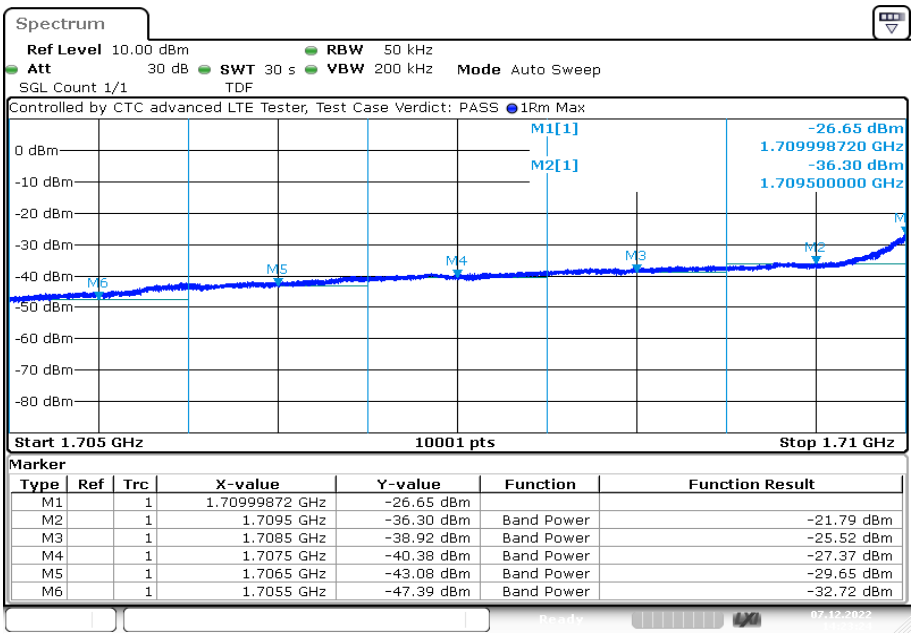
**Plot 17:** 5 MHz – 16-QAM - Lowest channel

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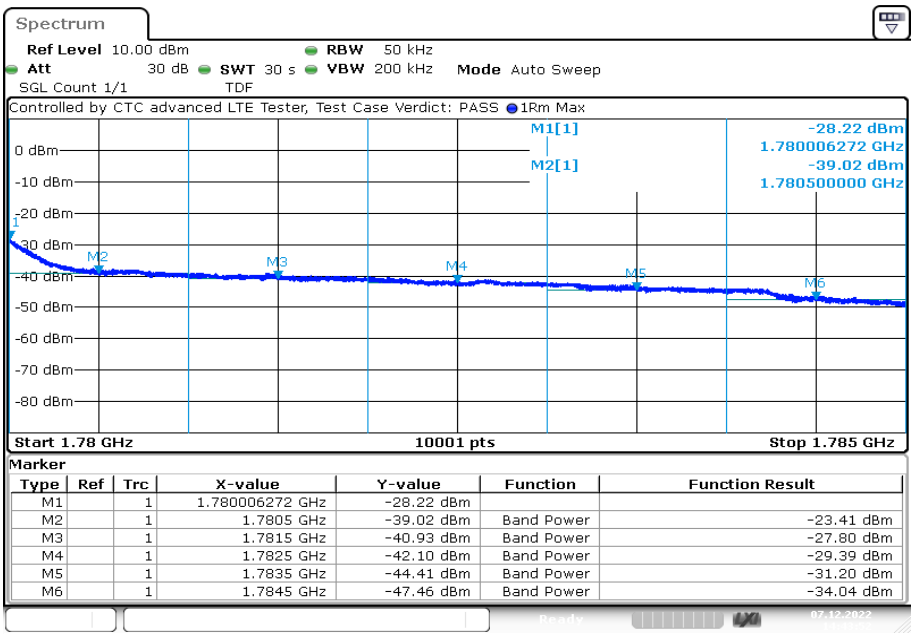
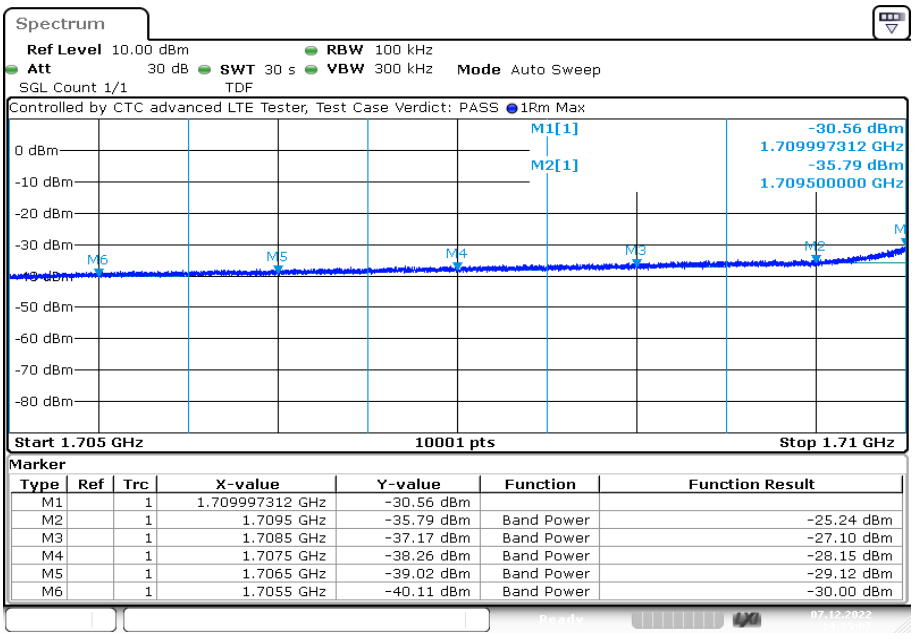
**Plot 18:** 5 MHz – 16-QAM - Highest channel



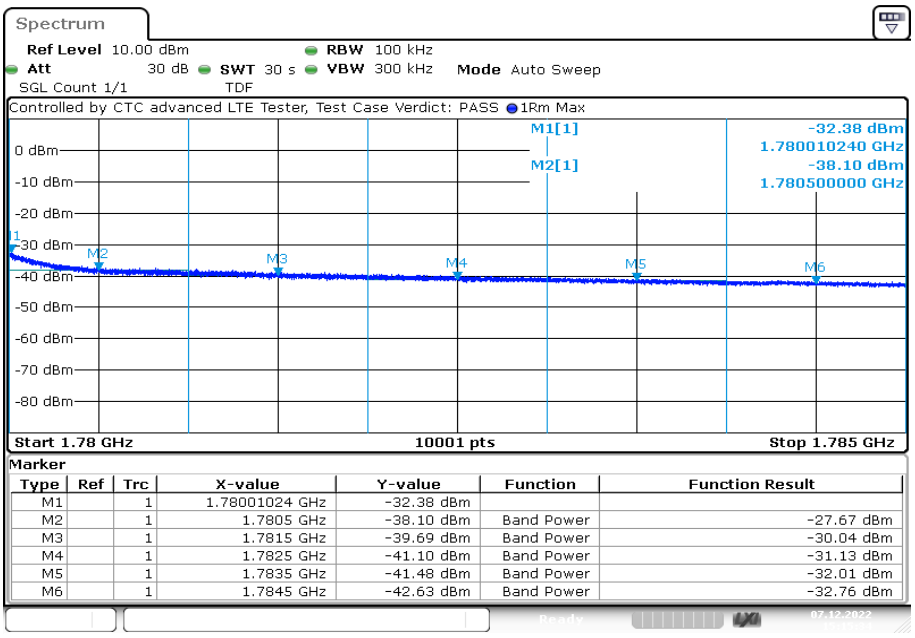

Date: 7.DEC.2022 14:43:52

**Plot 19:** 10 MHz – 16-QAM - Lowest channel



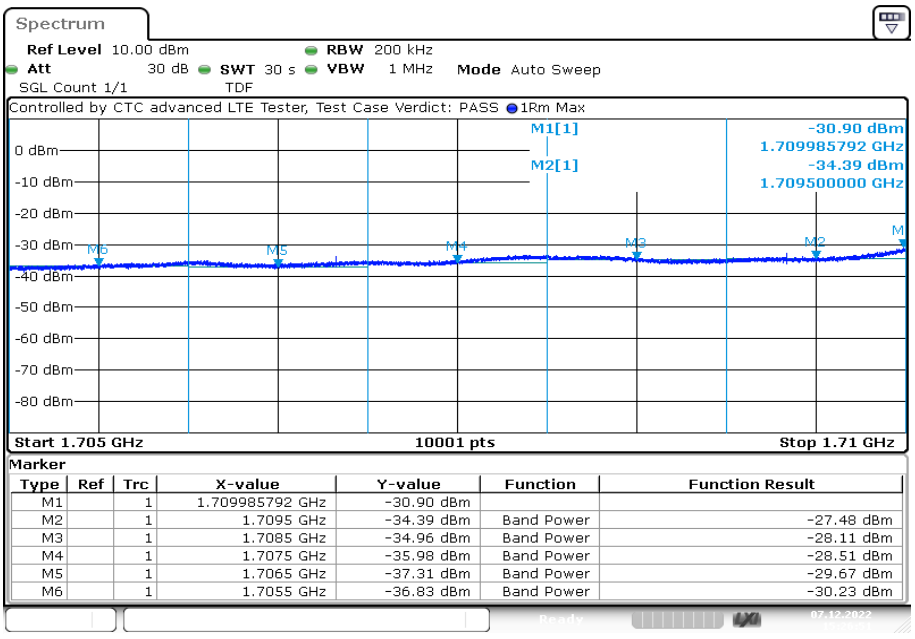

Date: 7.DEC.2022 14:55:07

**Plot 20:** 10 MHz – 16-QAM - Highest channel




Date: 7.DEC.2022 15:15:34

**Plot 21:** 15 MHz – 16-QAM - Lowest channel

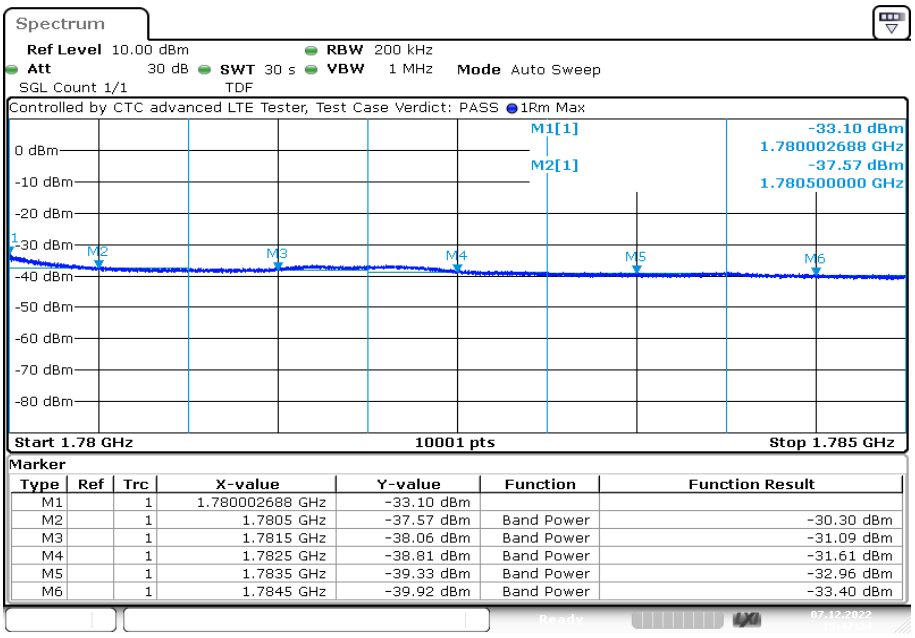



Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.709985792 GHz | -30.90 dBm | | |
| M2 | | 1 | 1.7095 GHz | -34.39 dBm | Band Power | -27.48 dBm |
| M3 | | 1 | 1.7085 GHz | -34.96 dBm | Band Power | -28.11 dBm |
| M4 | | 1 | 1.7075 GHz | -35.98 dBm | Band Power | -28.51 dBm |
| M5 | | 1 | 1.7065 GHz | -37.31 dBm | Band Power | -29.67 dBm |
| M6 | | 1 | 1.7055 GHz | -36.83 dBm | Band Power | -30.23 dBm |

Date: 7.DEC.2022 15:26:51

**Plot 22:** 15 MHz – 16-QAM - Highest channel

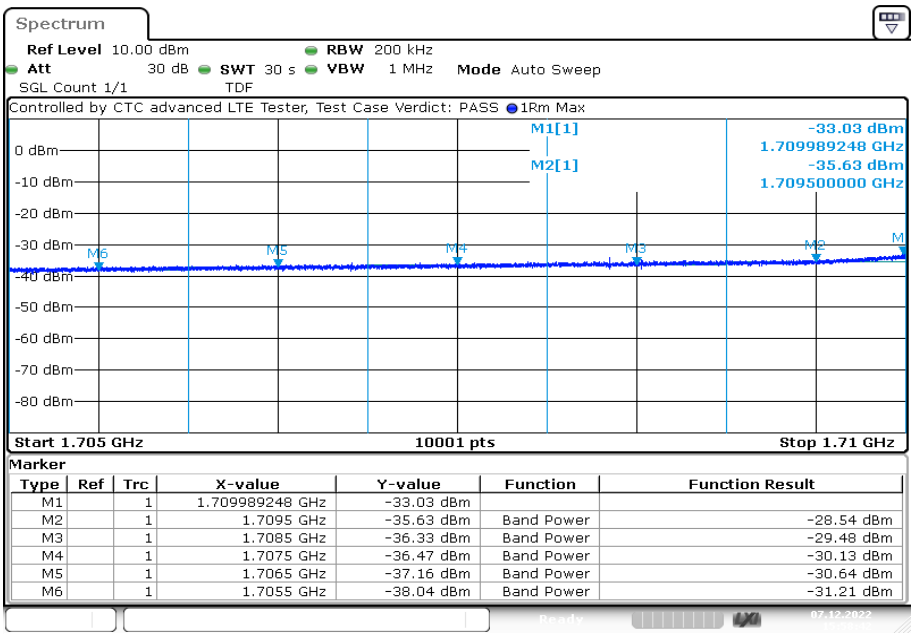



Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.780002688 GHz | -33.10 dBm | | |
| M2 | | 1 | 1.7805 GHz | -37.57 dBm | Band Power | -30.30 dBm |
| M3 | | 1 | 1.7815 GHz | -38.06 dBm | Band Power | -31.09 dBm |
| M4 | | 1 | 1.7825 GHz | -38.81 dBm | Band Power | -31.61 dBm |
| M5 | | 1 | 1.7835 GHz | -39.33 dBm | Band Power | -32.96 dBm |
| M6 | | 1 | 1.7845 GHz | -39.92 dBm | Band Power | -33.40 dBm |

Date: 7.DEC.2022 15:47:24

**Plot 23:** 20 MHz – 16-QAM - Lowest channel

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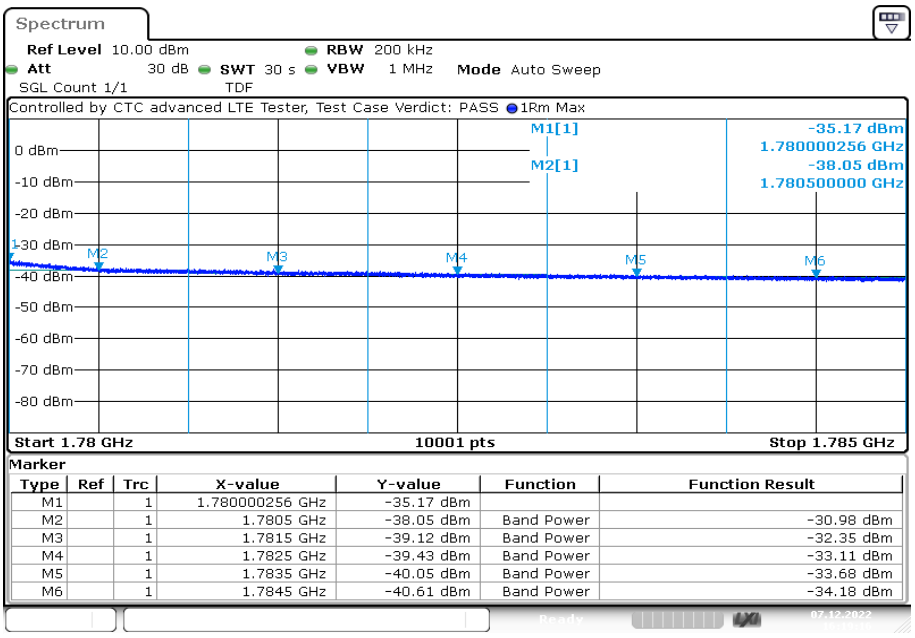
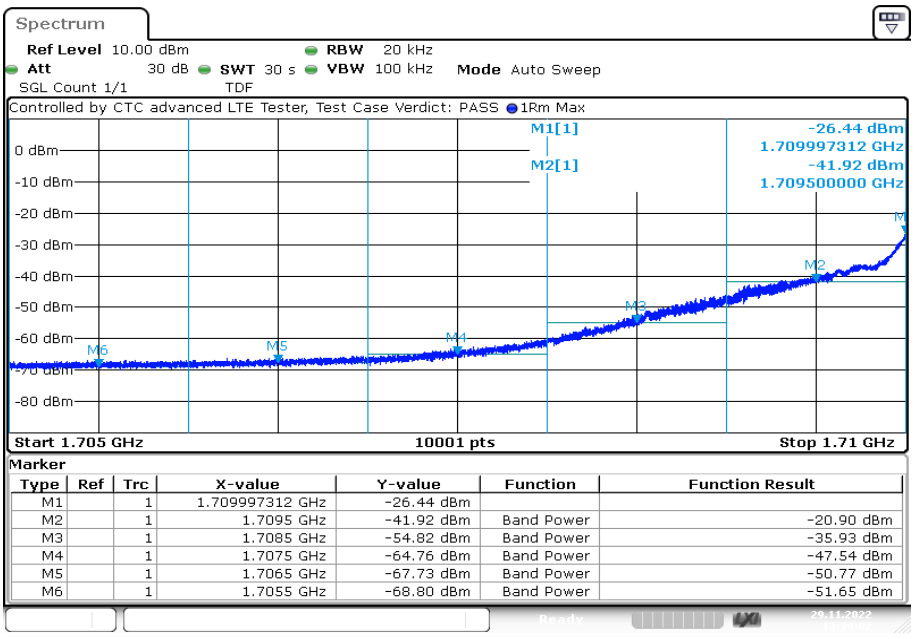
**Plot 24:** 20 MHz – 16-QAM - Highest channel




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

**Plot 25:** 1.4 MHz – 64-QAM - Lowest channel




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.709997312 GHz | -26.44 dBm | | |
| M2 | | 1 | 1.7095 GHz | -41.92 dBm | Band Power | -20.90 dBm |
| M3 | | 1 | 1.7085 GHz | -54.82 dBm | Band Power | -35.93 dBm |
| M4 | | 1 | 1.7075 GHz | -64.76 dBm | Band Power | -47.54 dBm |
| M5 | | 1 | 1.7065 GHz | -67.73 dBm | Band Power | -50.77 dBm |
| M6 | | 1 | 1.7055 GHz | -68.80 dBm | Band Power | -51.65 dBm |

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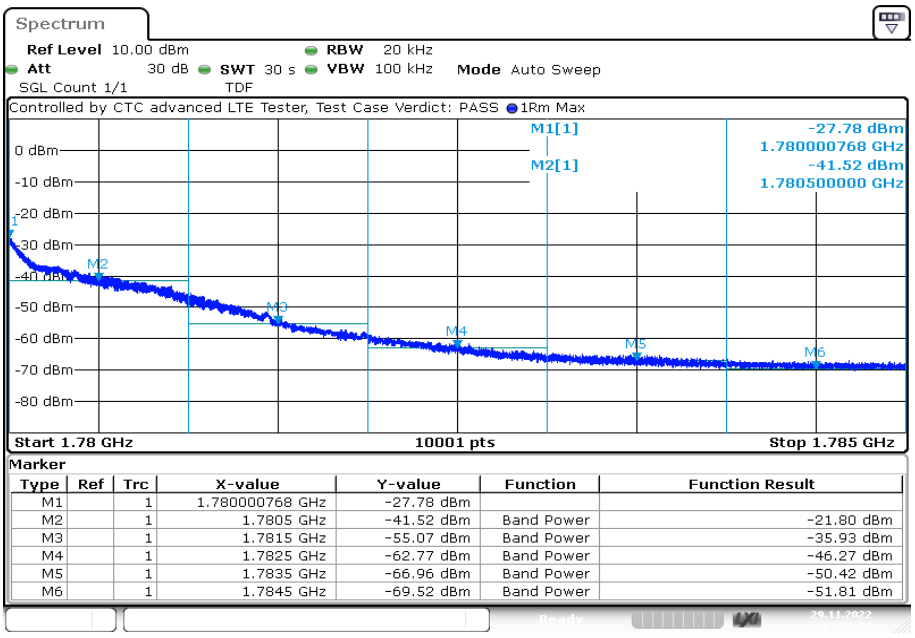
**Plot 26:** 1.4 MHz – 64-QAM - Highest channel

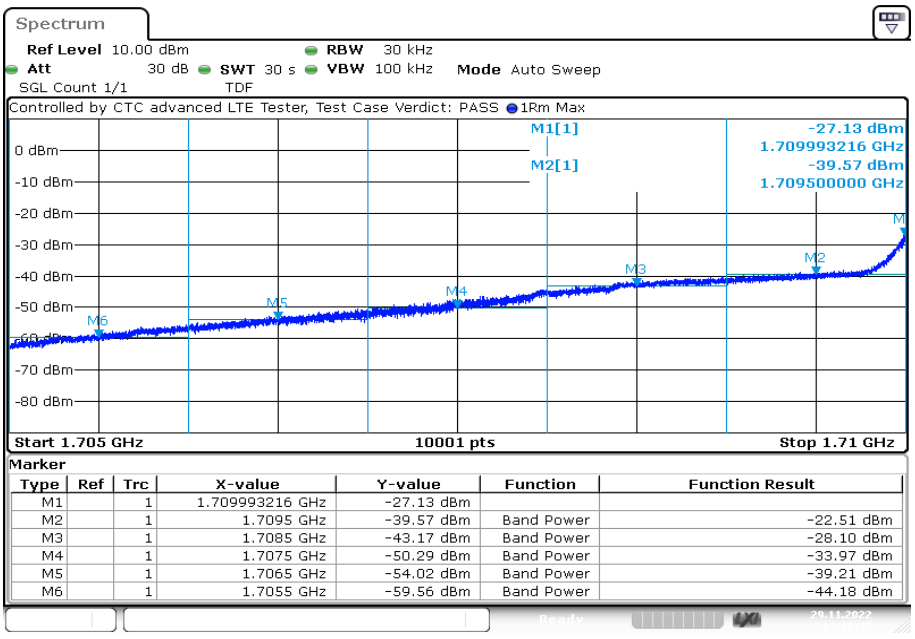



Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.780000768 GHz | -27.78 dBm | | |
| M2 | | 1 | 1.7805 GHz | -41.52 dBm | Band Power | -21.80 dBm |
| M3 | | 1 | 1.7815 GHz | -55.07 dBm | Band Power | -35.93 dBm |
| M4 | | 1 | 1.7825 GHz | -62.77 dBm | Band Power | -46.27 dBm |
| M5 | | 1 | 1.7835 GHz | -66.96 dBm | Band Power | -50.42 dBm |
| M6 | | 1 | 1.7845 GHz | -69.52 dBm | Band Power | -51.81 dBm |

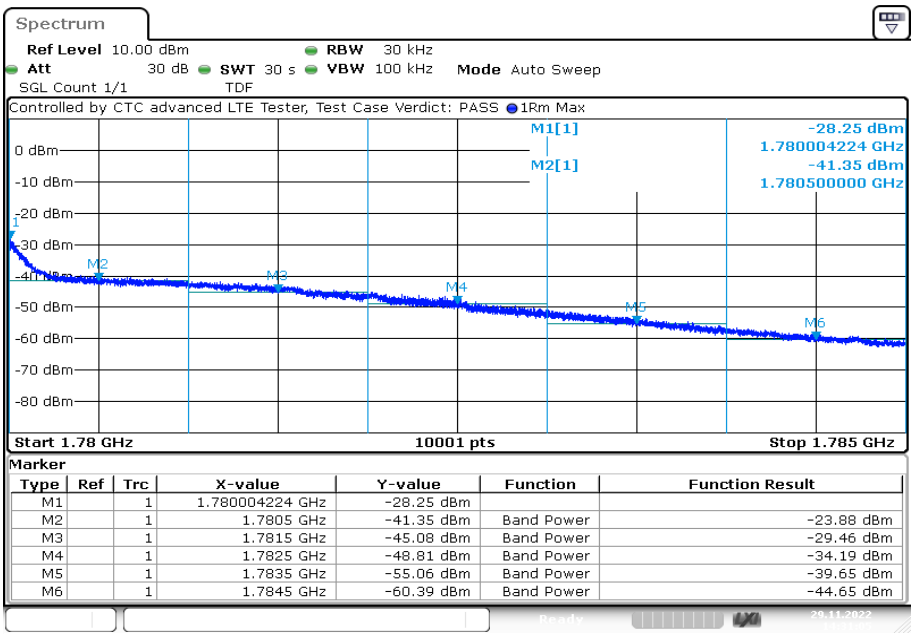
Date: 29.NOV.2022 13:59:32

**Plot 27:** 3 MHz – 64-QAM - Lowest channel



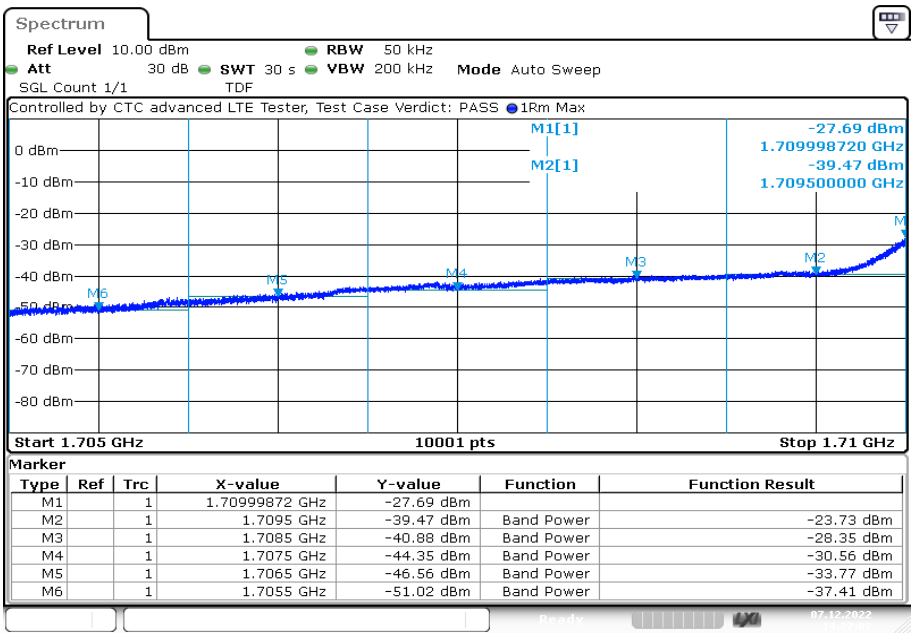

Date: 29.NOV.2022 14:10:45

**Plot 28:** 3 MHz – 64-QAM - Highest channel



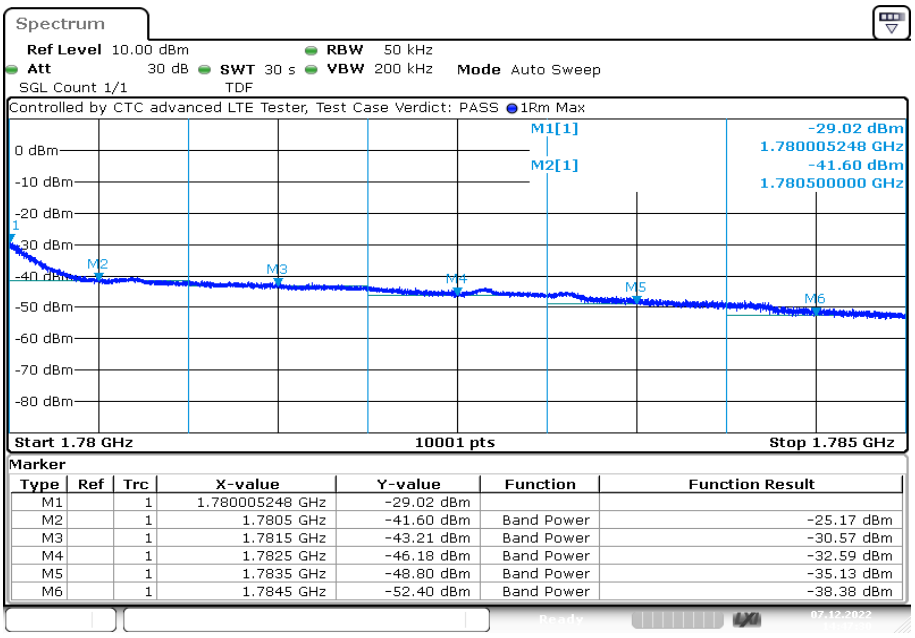

Date: 29.NOV.2022 14:31:05

**Plot 29:** 5 MHz – 64-QAM - Lowest channel



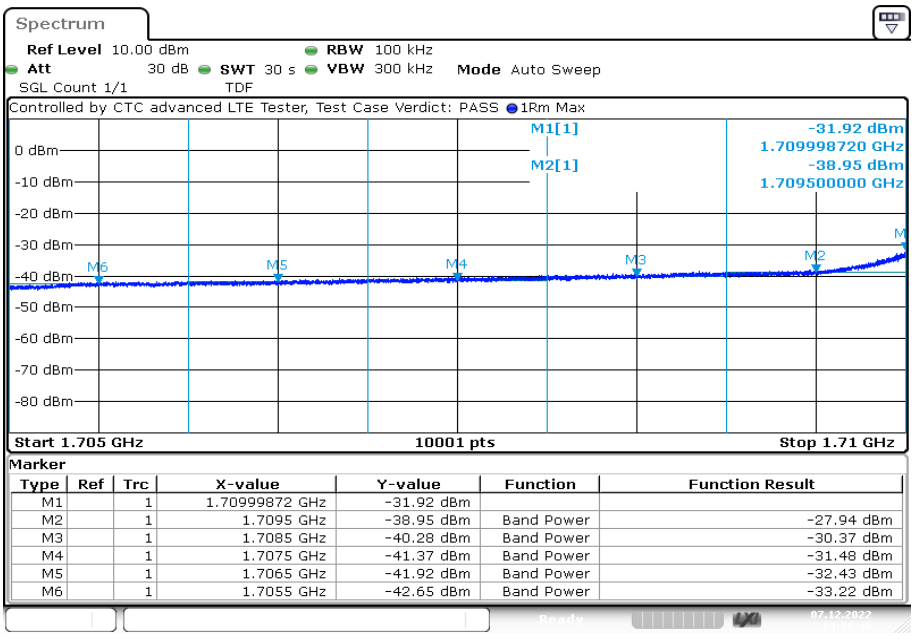

Date: 7.DEC.2022 14:27:02

**Plot 30:** 5 MHz – 64-QAM - Highest channel




Date: 7.DEC.2022 14:47:30

**Plot 31:** 10 MHz – 64-QAM - Lowest channel

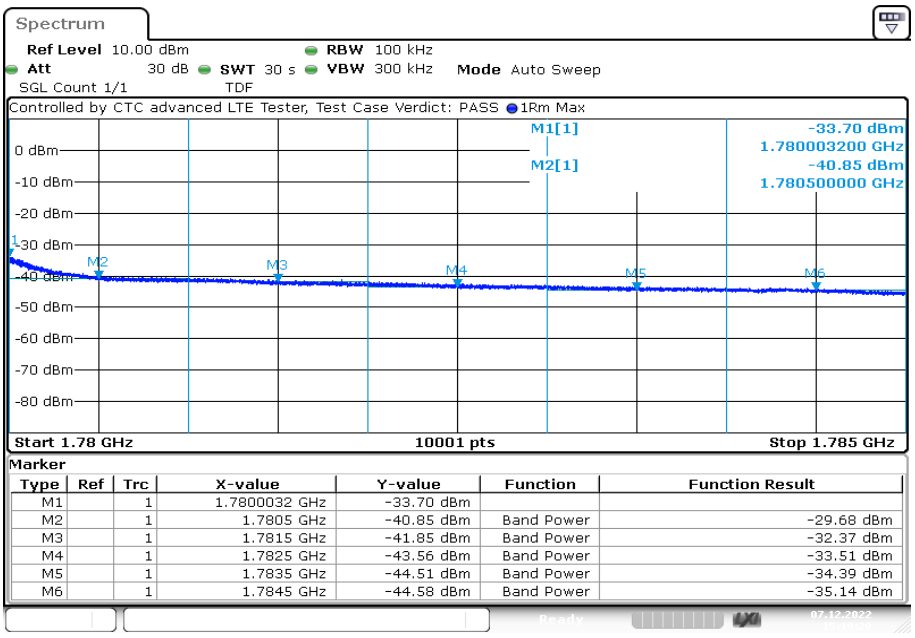



Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.70999872 GHz | -31.92 dBm | | |
| M2 | | 1 | 1.7095 GHz | -38.95 dBm | Band Power | -27.94 dBm |
| M3 | | 1 | 1.7085 GHz | -40.28 dBm | Band Power | -30.37 dBm |
| M4 | | 1 | 1.7075 GHz | -41.37 dBm | Band Power | -31.48 dBm |
| M5 | | 1 | 1.7065 GHz | -41.92 dBm | Band Power | -32.43 dBm |
| M6 | | 1 | 1.7055 GHz | -42.65 dBm | Band Power | -33.22 dBm |

Date: 7.DEC.2022 14:58:46

**Plot 32:** 10 MHz – 64-QAM - Highest channel

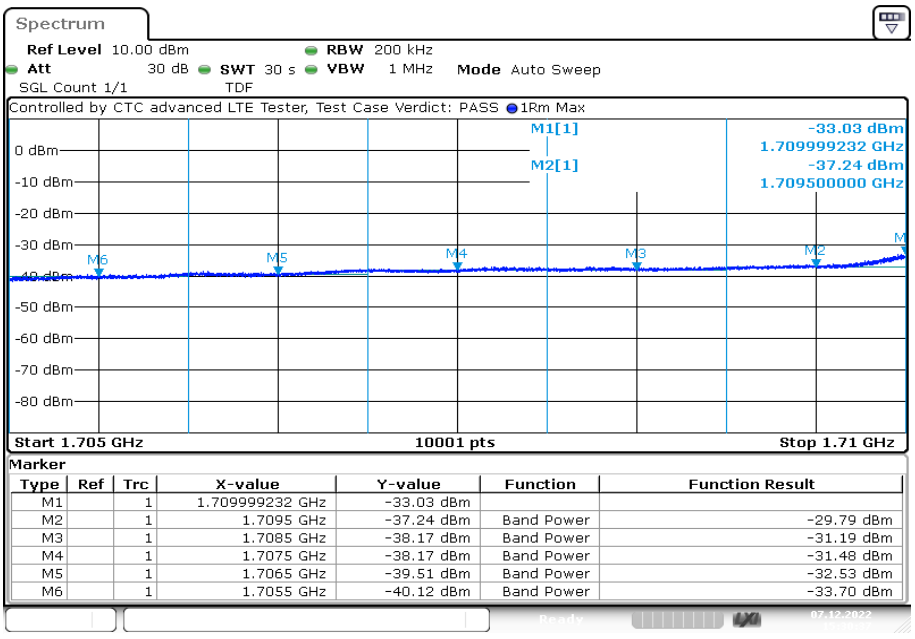



Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.7800032 GHz | -33.70 dBm | | |
| M2 | | 1 | 1.7805 GHz | -40.85 dBm | Band Power | -29.68 dBm |
| M3 | | 1 | 1.7815 GHz | -41.85 dBm | Band Power | -32.37 dBm |
| M4 | | 1 | 1.7825 GHz | -43.56 dBm | Band Power | -33.51 dBm |
| M5 | | 1 | 1.7835 GHz | -44.51 dBm | Band Power | -34.39 dBm |
| M6 | | 1 | 1.7845 GHz | -44.58 dBm | Band Power | -35.14 dBm |

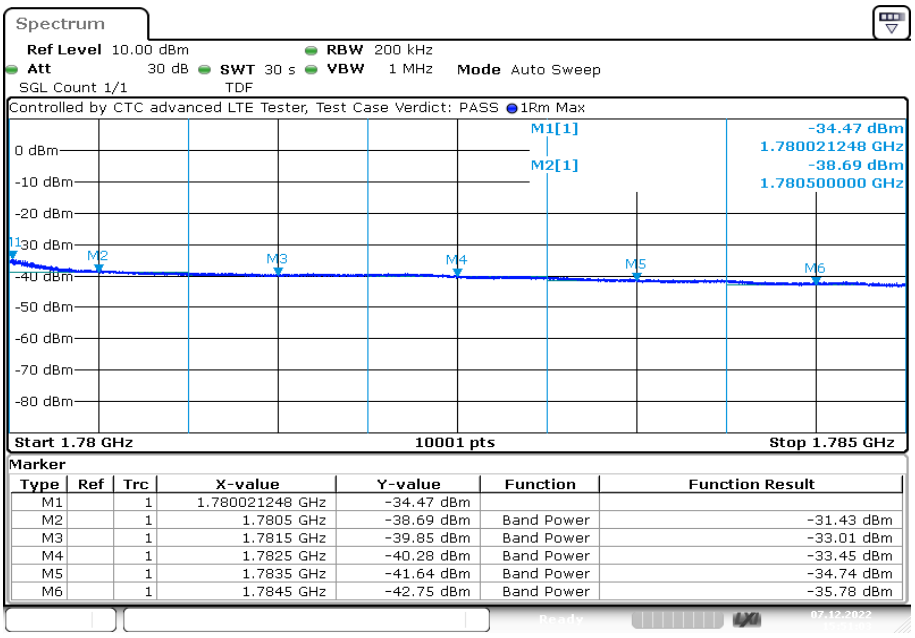
Date: 7.DEC.2022 15:19:20

**Plot 33:** 15 MHz – 64-QAM - Lowest channel



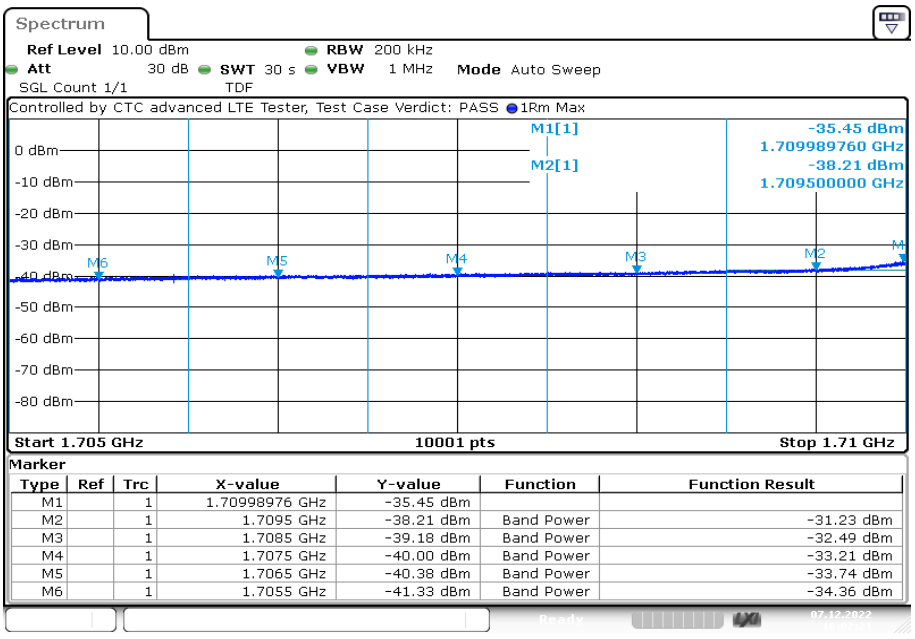

Date: 7.DEC.2022 15:30:37

**Plot 34:** 15 MHz – 64-QAM - Highest channel



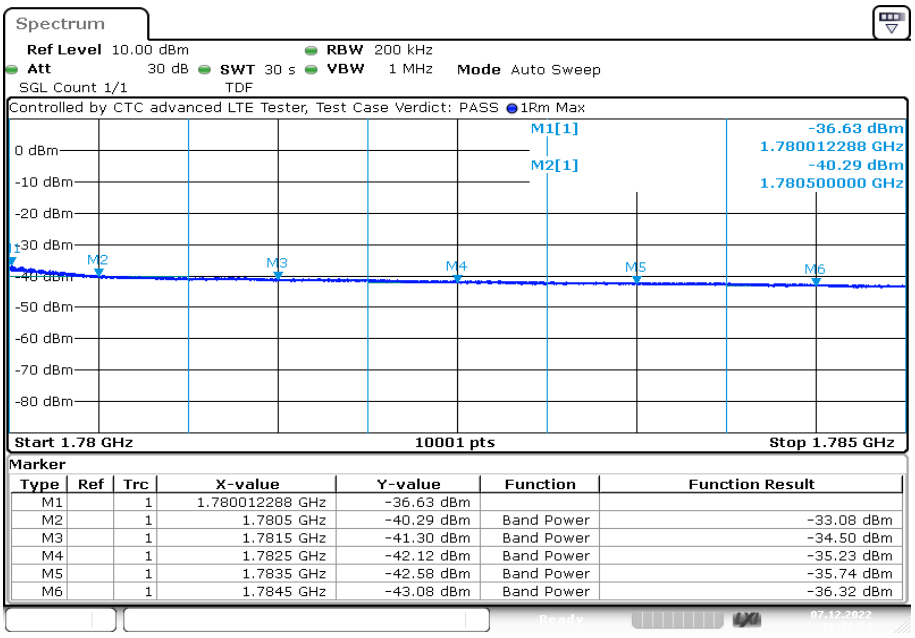

Date: 7.DEC.2022 15:51:03

**Plot 35:** 20 MHz – 64-QAM - Lowest channel




Date: 7.DEC.2022 16:02:21

**Plot 36:** 20 MHz – 64-QAM - Highest channel




Date: 7.DEC.2022 16:22:54

## 12.3.6 Occupied bandwidth

**Description:**

Measurement of the occupied bandwidth of the transmitted signal.

**Measurement:**

Similar to conducted emissions, occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the mid frequencies of the LTE band 66 frequency band. 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 7.4 setup A |
| Measurement uncertainty: | See chapter 9 |
| Measurement procedure | FCC: § 2.1049 |

**Limits:**

| FCC |
|---|
| § 2.1049 |
| Reporting only |

**Results:**

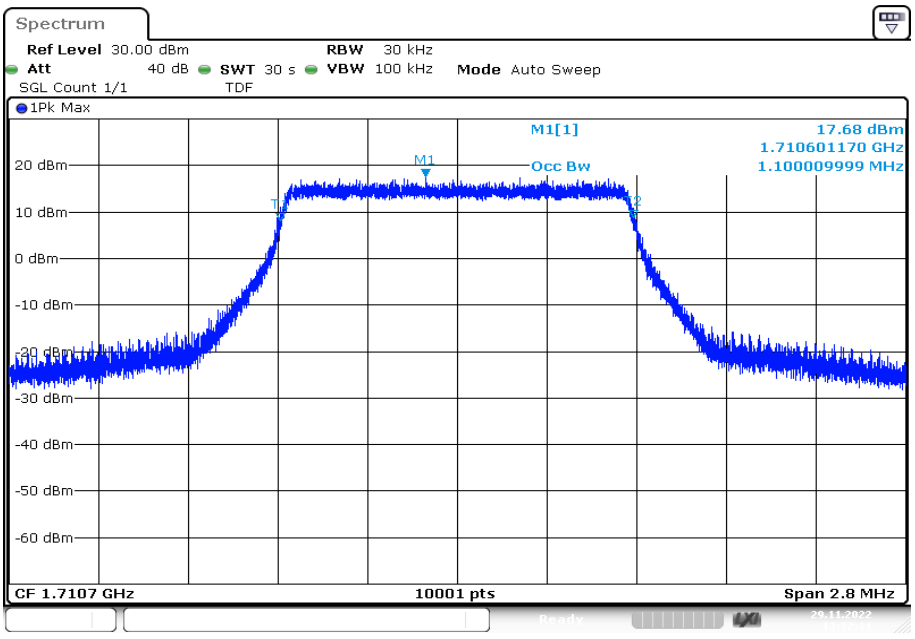
| Occupied Bandwidth – QPSK | | | |
|---|---|---|---|
| **Bandwidth** | **Channel** | **99% OBW (MHz)** | **-26 dBc BW (MHz)** |
| 1.4 | low | 1.10 | 1.36 |
| | mid | 1.10 | 1.39 |
| | high | 1.10 | 1.36 |
| 3.0 | low | 2.74 | 3.16 |
| | mid | 2.74 | 3.15 |
| | high | 2.75 | 3.16 |
| 5.0 | low | 4.52 | 5.18 |
| | mid | 4.53 | 5.24 |
| | high | 4.51 | 5.19 |
| 10.0 | low | 9.07 | 10.26 |
| | mid | 9.07 | 10.29 |
| | high | 9.06 | 10.36 |
| 15.0 | low | 13.49 | 15.07 |
| | mid | 13.48 | 15.09 |
| | high | 13.47 | 15.05 |
| 20.0 | low | 18.06 | 20.02 |
| | mid | 18.03 | 19.93 |
| | high | 18.03 | 20.20 |

| Occupied Bandwidth – 16-QAM | | | |
|---|---|---|---|
| **Bandwidth** | **Channel** | **99% OBW (MHz)** | **-26 dBc BW (MHz)** |
| 1.4 | low | 1.10 | 1.43 |
| | mid | 1.10 | 1.40 |
| | high | 1.11 | 1.41 |
| 3.0 | low | 2.75 | 3.17 |
| | mid | 2.74 | 3.14 |
| | high | 2.75 | 3.15 |
| 5.0 | low | 4.52 | 5.21 |
| | mid | 4.52 | 5.19 |
| | high | 4.52 | 5.17 |
| 10.0 | low | 9.08 | 10.29 |
| | mid | 9.08 | 10.28 |
| | high | 9.07 | 10.23 |
| 15.0 | low | 13.49 | 15.03 |
| | mid | 13.49 | 15.15 |
| | high | 13.49 | 14.98 |
| 20.0 | low | 18.06 | 20.15 |
| | mid | 18.03 | 20.12 |
| | high | 18.05 | 20.07 |

| Occupied Bandwidth – 64-QAM | | | |
|---|---|---|---|
| **Bandwidth** | **Channel** | **99% OBW (MHz)** | **-26 dBc BW (MHz)** |
| 1.4 | low | 1.10 | 1.38 |
| | mid | 1.11 | 1.41 |
| | high | 1.10 | 1.37 |
| 3.0 | low | 2.74 | 3.15 |
| | mid | 2.74 | 3.14 |
| | high | 2.74 | 3.14 |
| 5.0 | low | 4.52 | 5.16 |
| | mid | 4.52 | 5.23 |
| | high | 4.52 | 5.15 |
| 10.0 | low | 9.07 | 10.27 |
| | mid | 9.07 | 10.27 |
| | high | 9.06 | 10.32 |
| 15.0 | low | 13.48 | 14.98 |
| | mid | 13.48 | 15.05 |
| | high | 13.47 | 15.04 |
| 20.0 | low | 18.03 | 19.66 |
| | mid | 18.01 | 20.15 |
| | high | 18.02 | 20.11 |

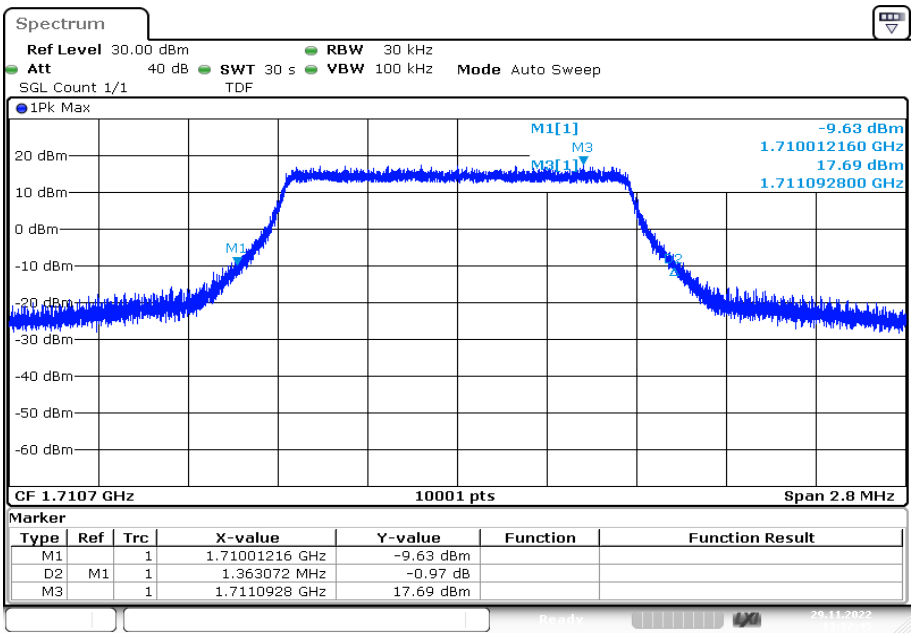
**Plots:**

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




Date: 29.NOV.2022 13:32:11

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

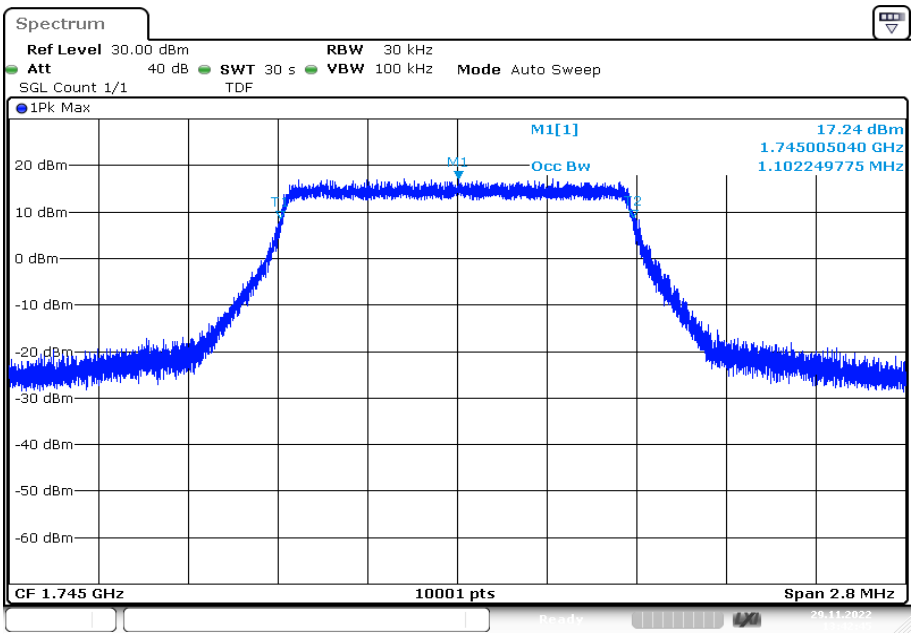



Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.71001216 GHz | -9.63 dBm | | |
| D2 | M1 | 1 | 1.363072 MHz | -0.97 dB | | |
| M3 | | 1 | 1.7110928 GHz | 17.69 dBm | | |

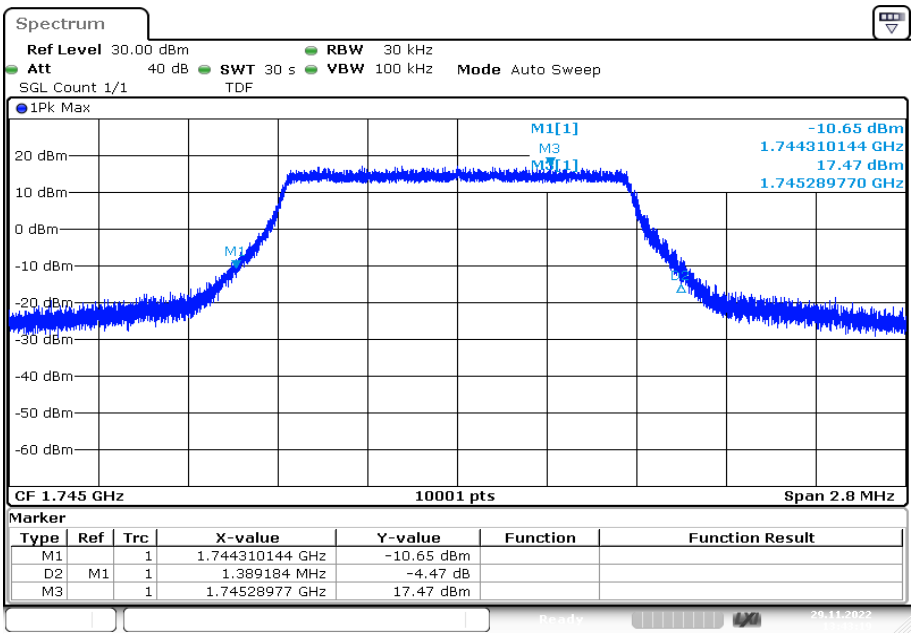
Date: 29.NOV.2022 13:32:45

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



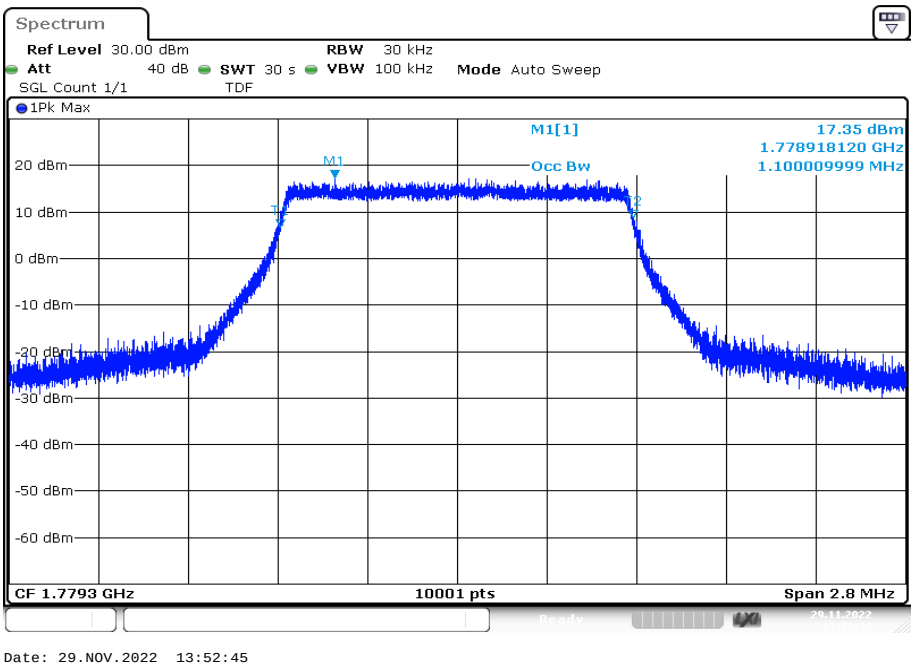

Date: 29.NOV.2022 13:42:46

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

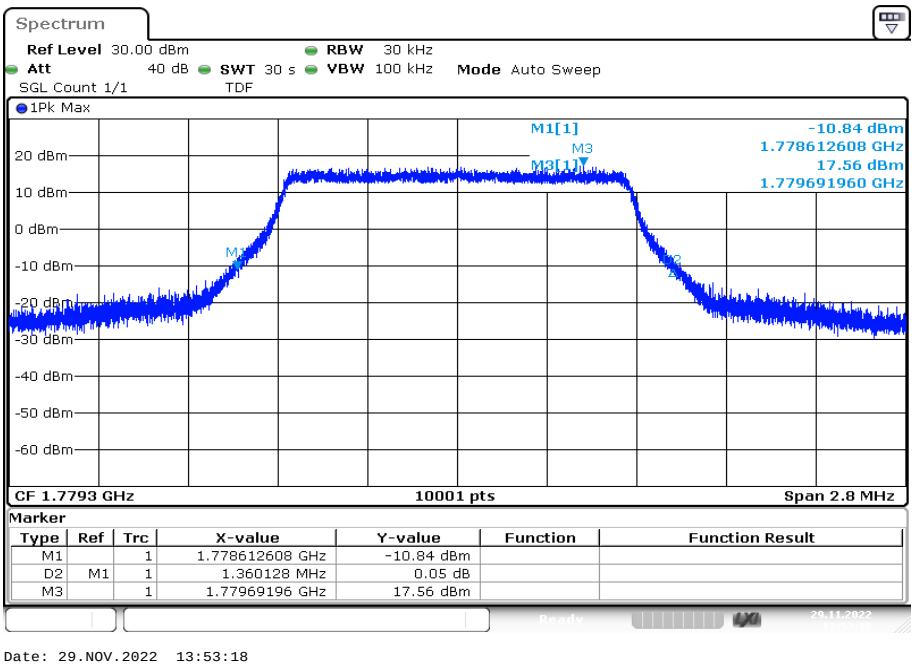



Date: 29.NOV.2022 13:43:20

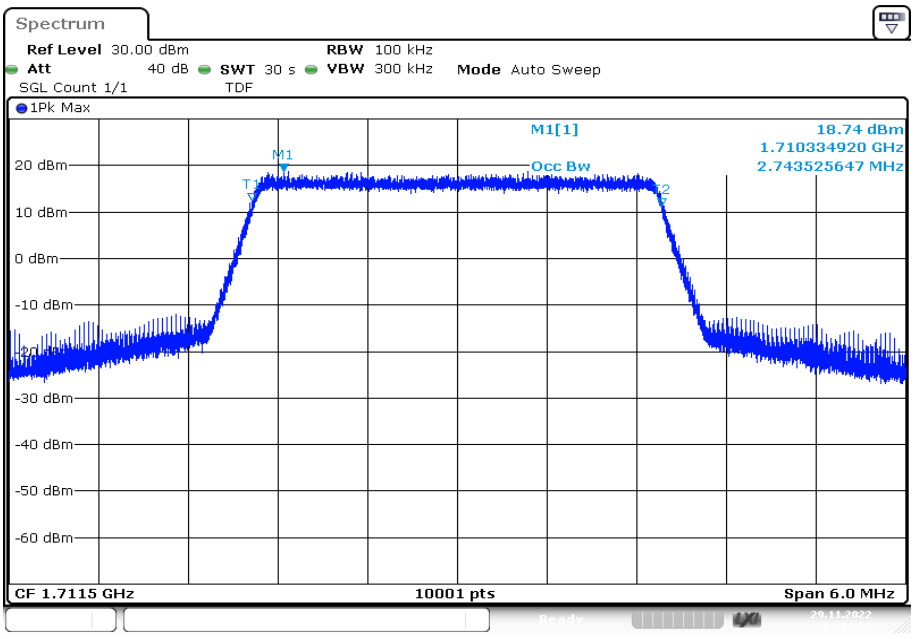
**Plot 5:** 1.4 MHz – QPSK - highest channel (99% - OBW)




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

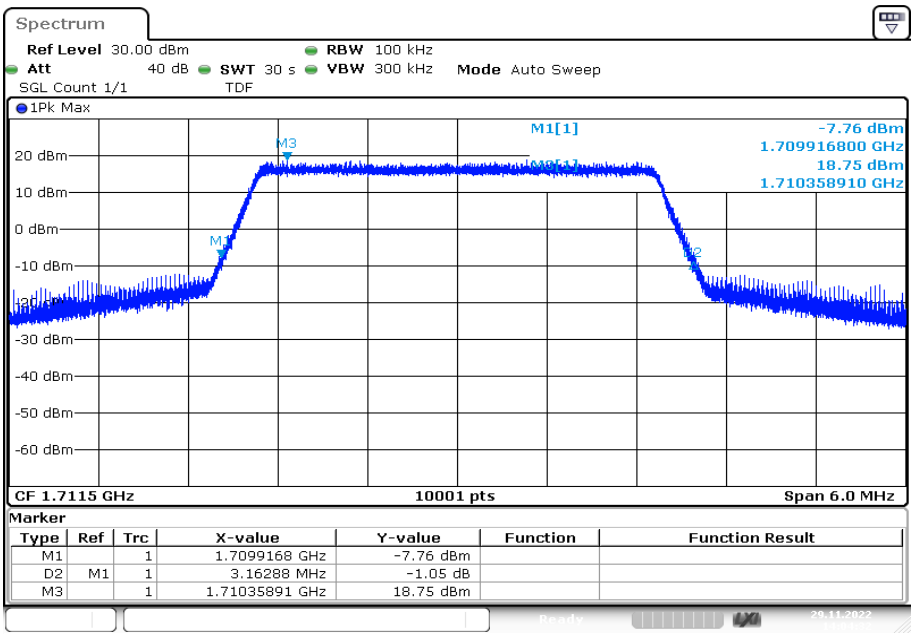


**Plot 7:** 3 MHz – QPSK - lowest channel (99% - OBW)



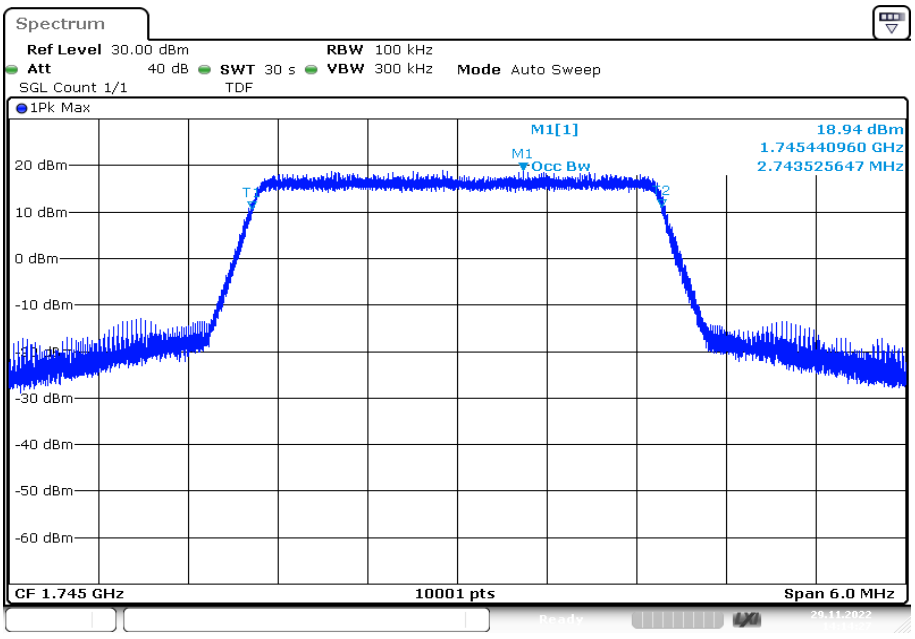

Date: 29.NOV.2022 14:03:59

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



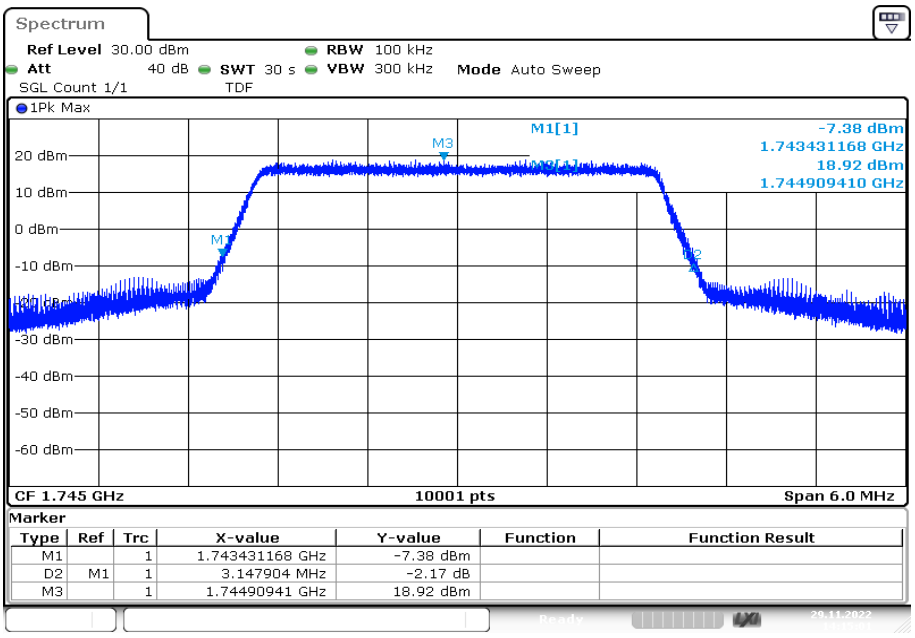

Date: 29.NOV.2022 14:04:32

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



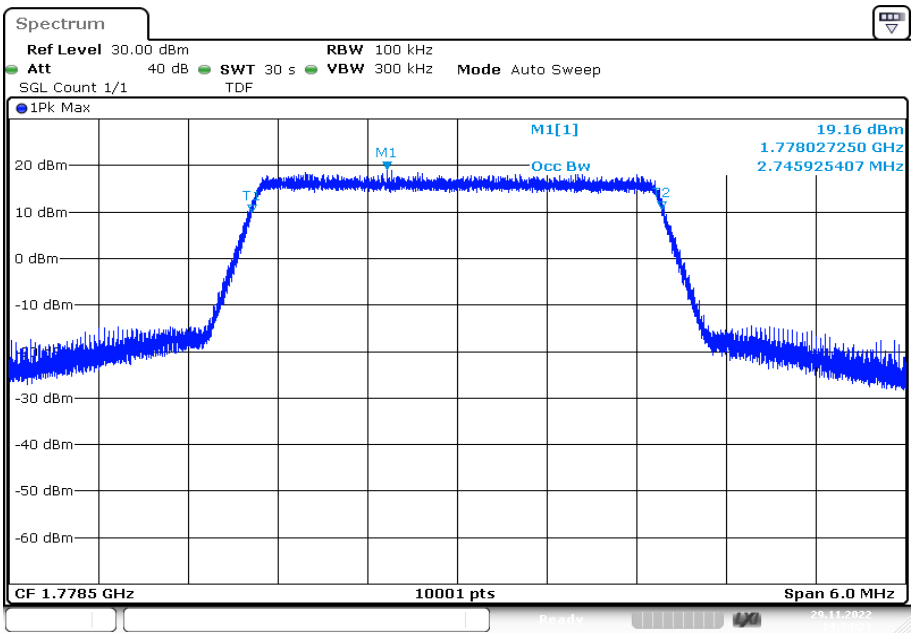

Date: 29.NOV.2022 14:14:28

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

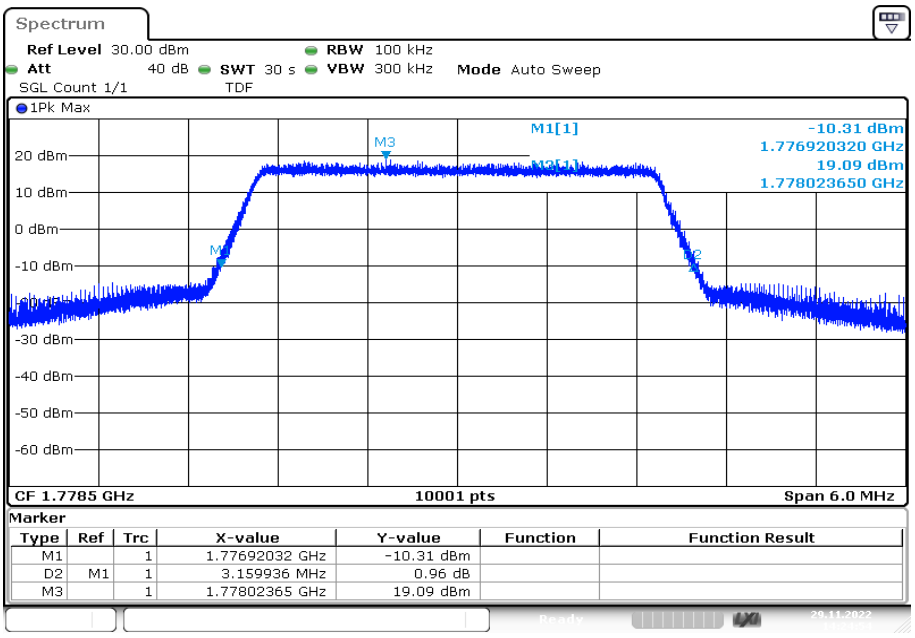



Date: 29.NOV.2022 14:15:01

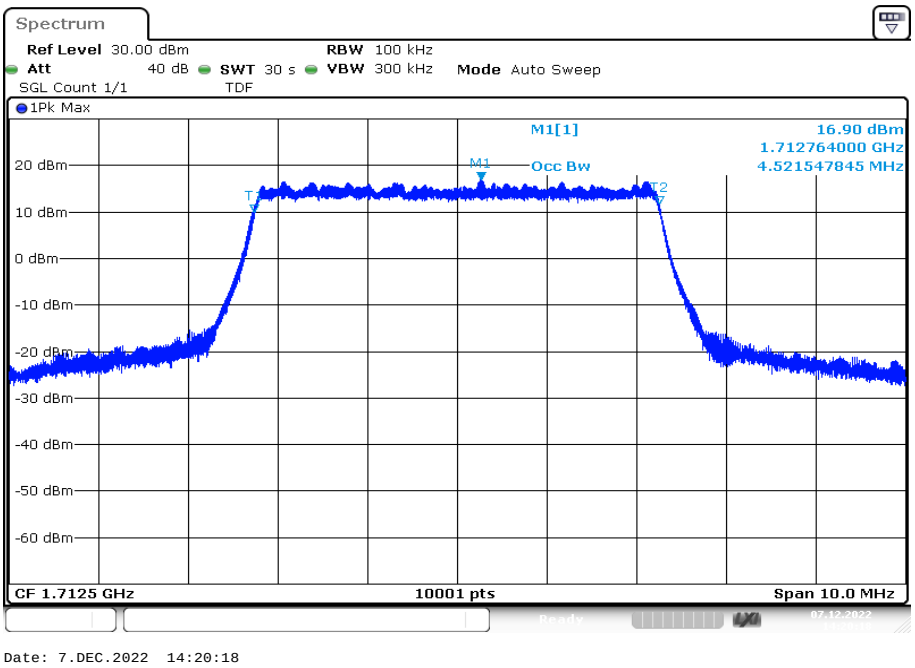
**Plot 11:** 3 MHz – QPSK - highest channel (99% - OBW)




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

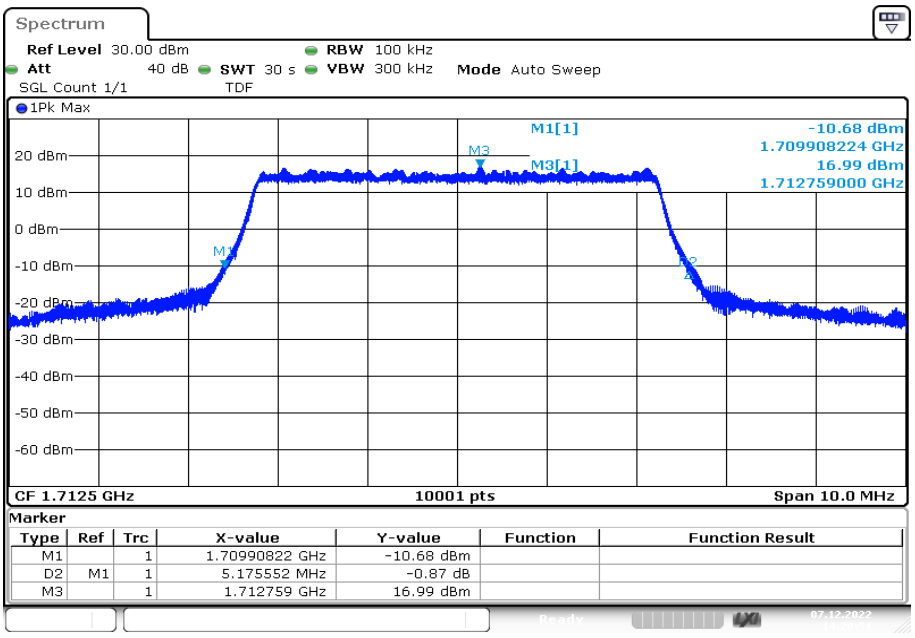


**Plot 13:** 5 MHz – QPSK - lowest channel (99% - OBW)



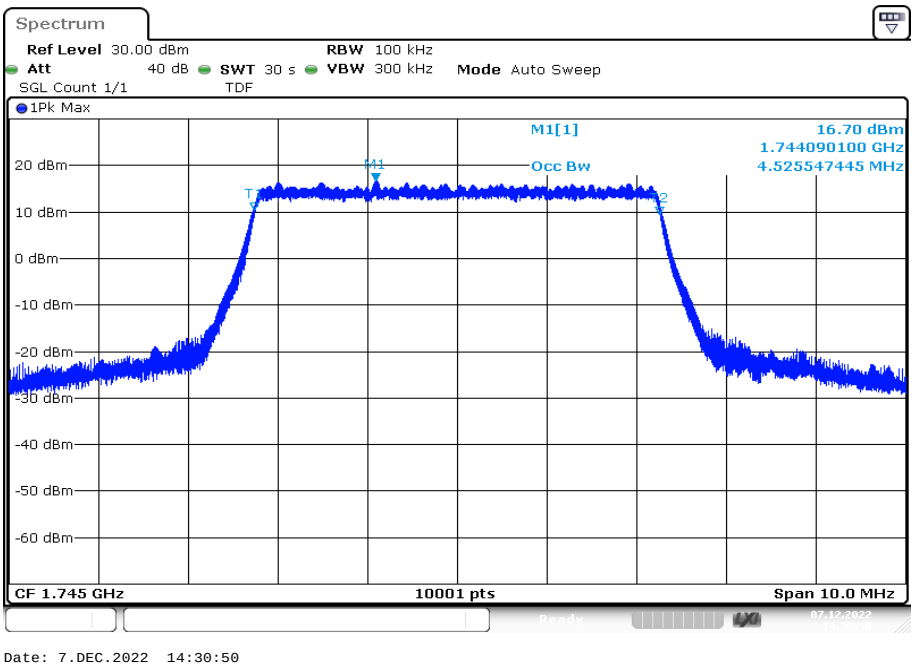

Date: 7.DEC.2022 14:20:18

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

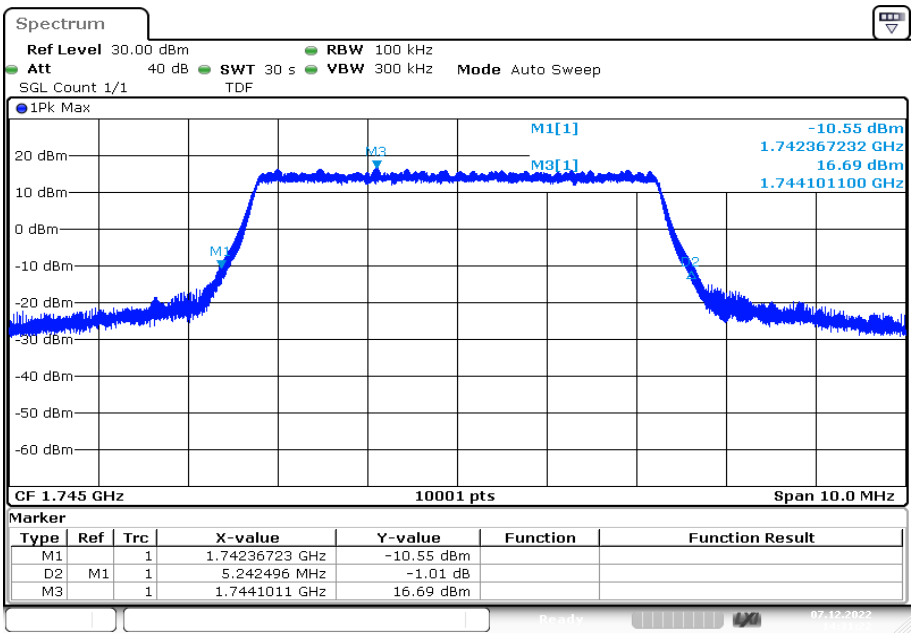



Date: 7.DEC.2022 14:20:51

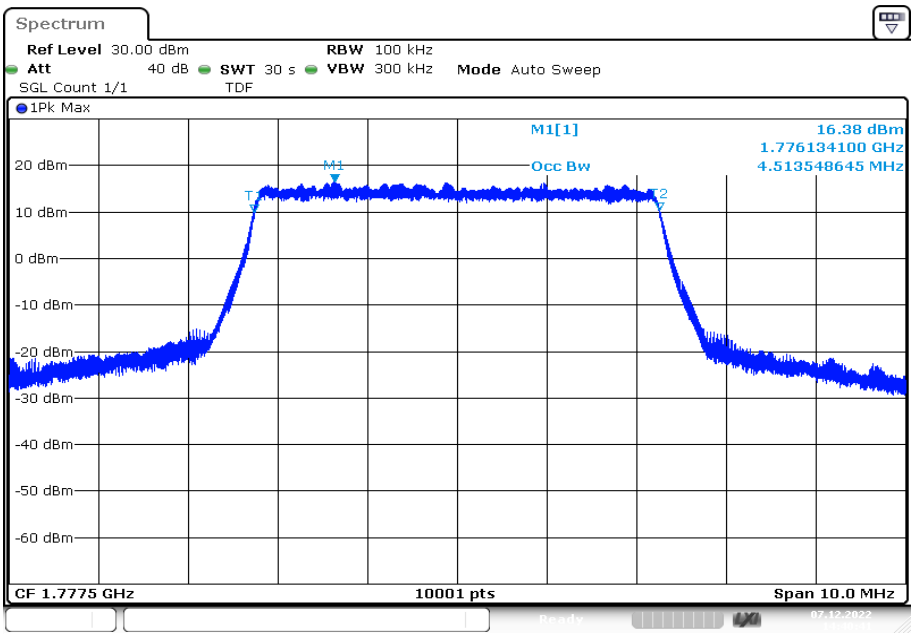
**Plot 15:** 5 MHz – QPSK - middle channel (99% - OBW)



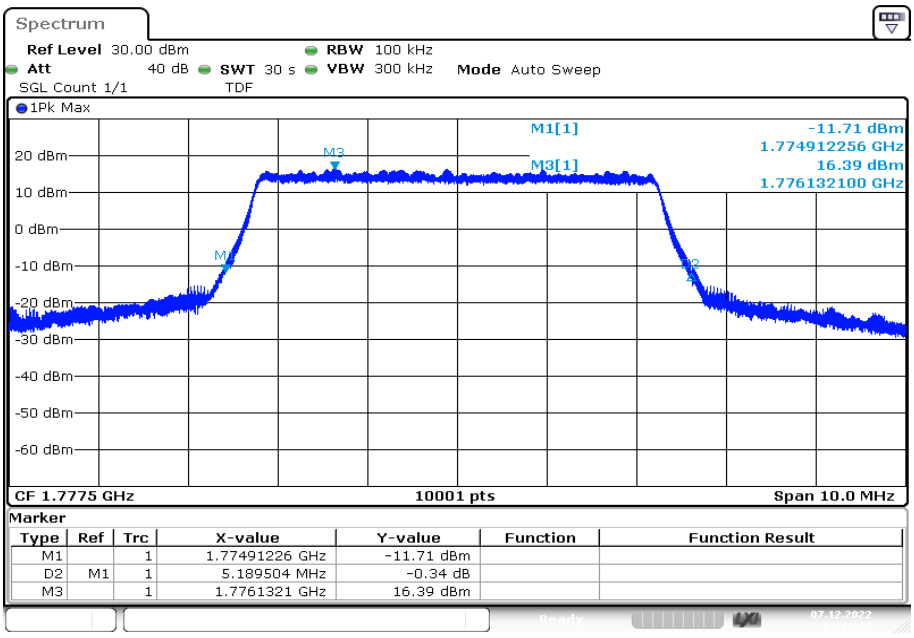

**Plot 16:** 5 MHz – QPSK - middle channel (-26 dBc BW)



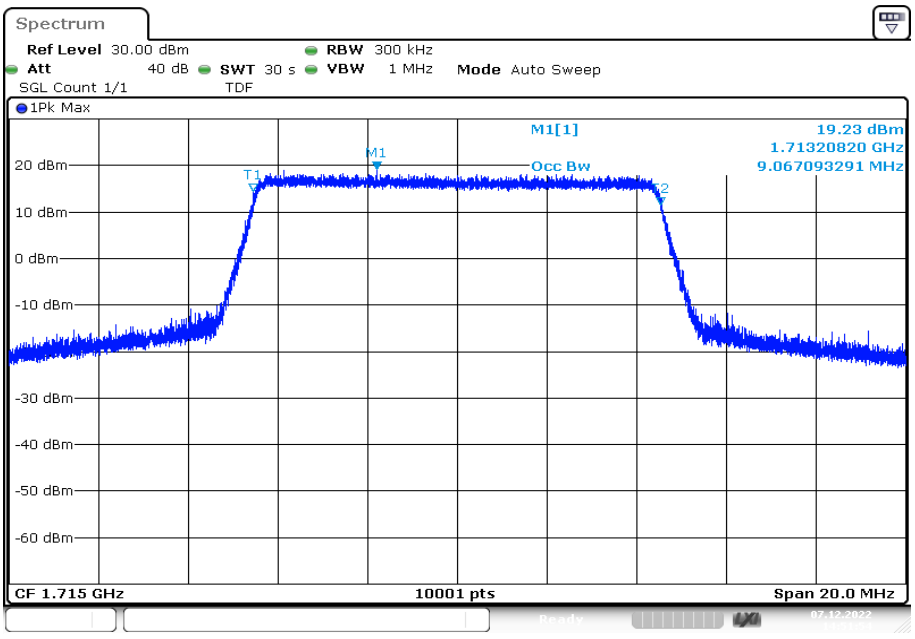
**Plot 17:** 5 MHz – QPSK - highest channel (99% - OBW)




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

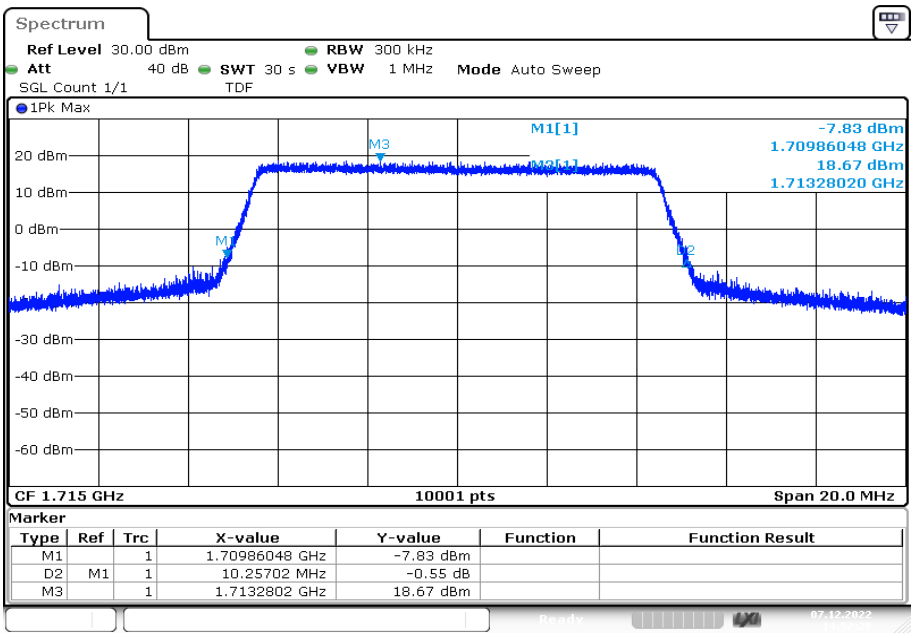


**Plot 19:** 10 MHz – QPSK - lowest channel (99% - OBW)



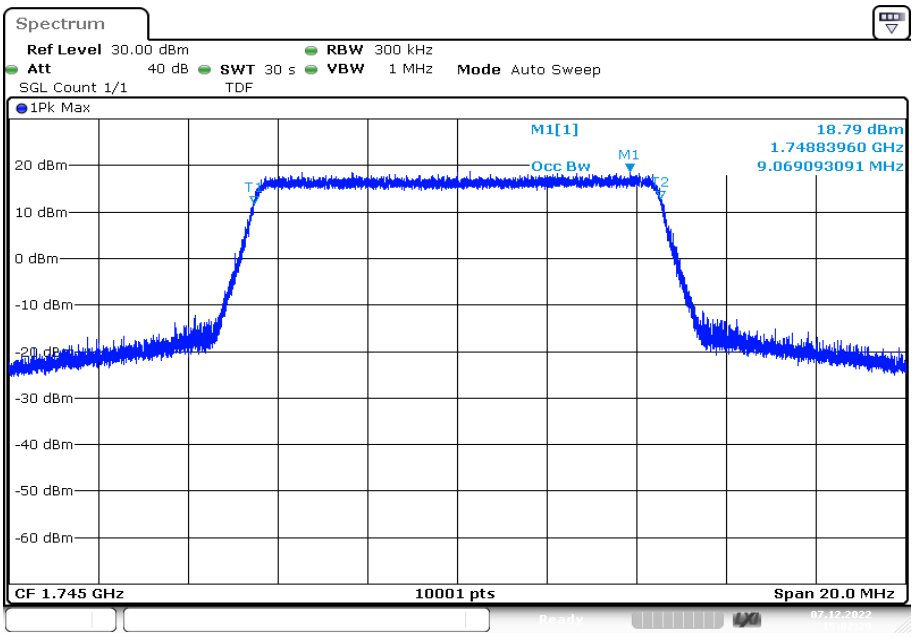

Date: 7.DEC.2022 14:51:54

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



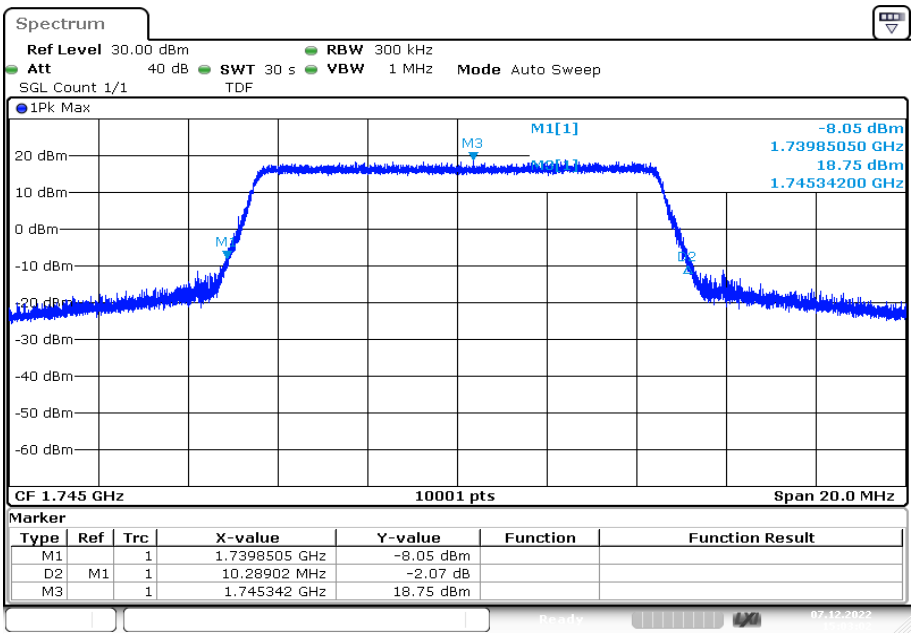

Date: 7.DEC.2022 14:52:28

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



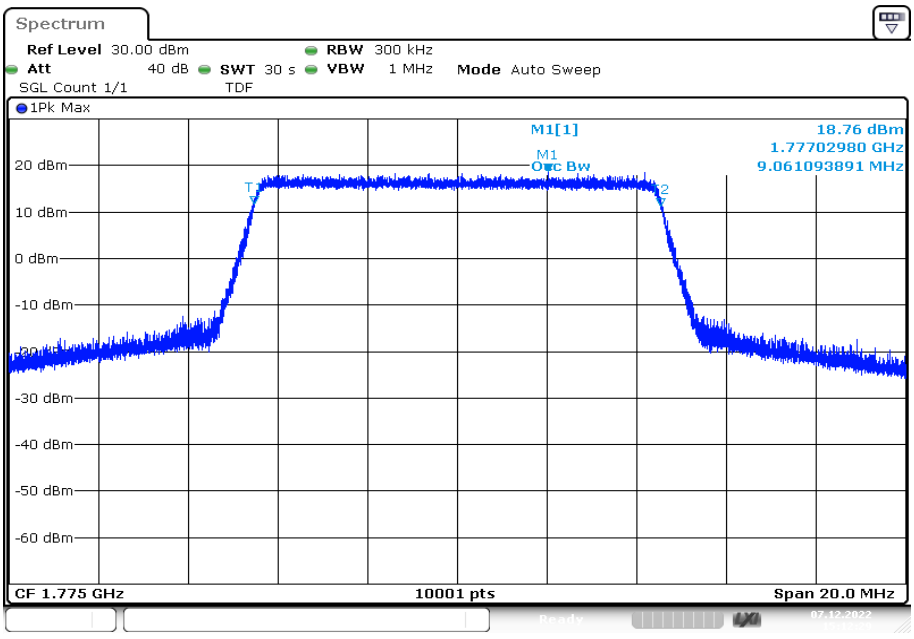

Date: 7.DEC.2022 15:02:29

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

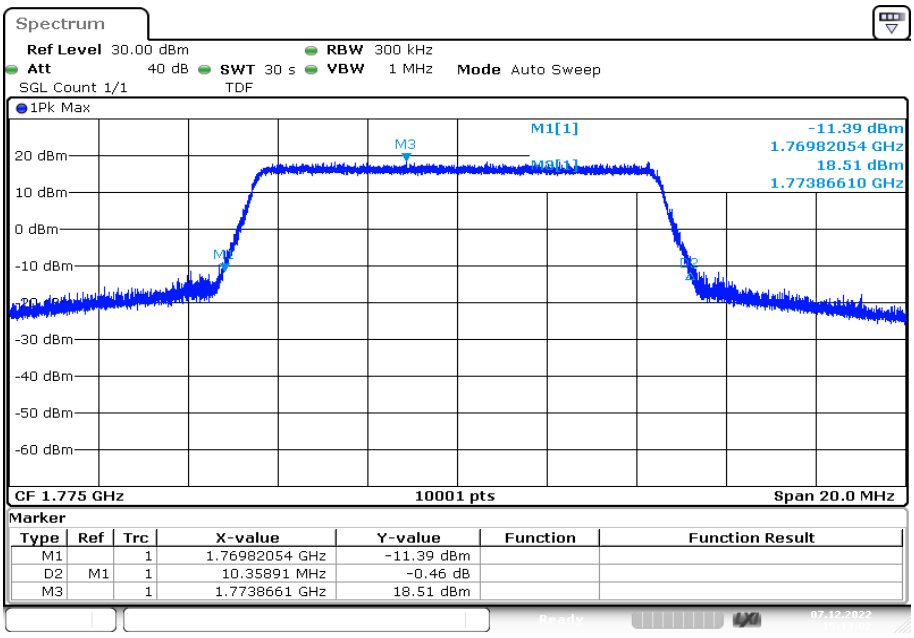



Date: 7.DEC.2022 15:03:02

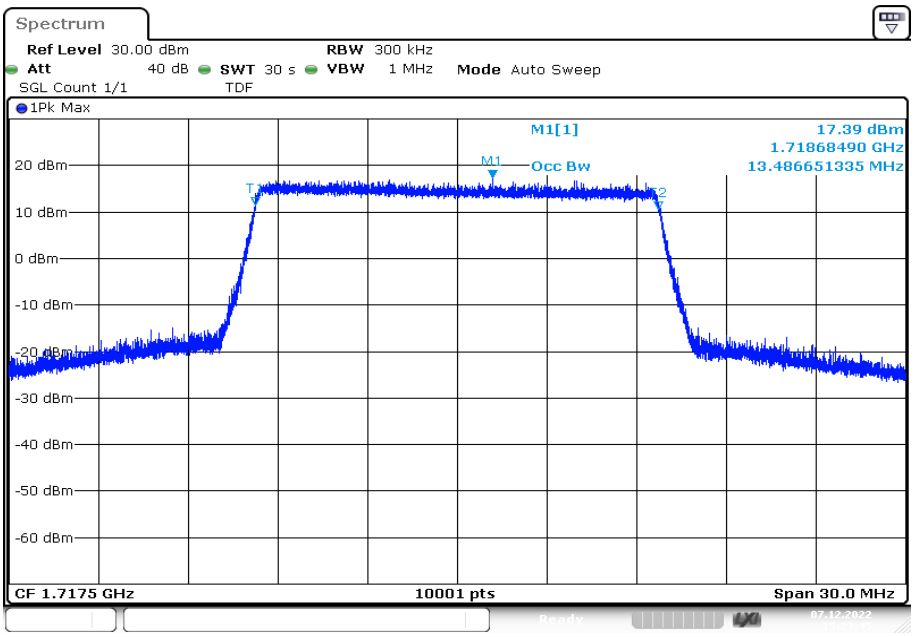
**Plot 23:** 10 MHz – QPSK - highest channel (99% - OBW)



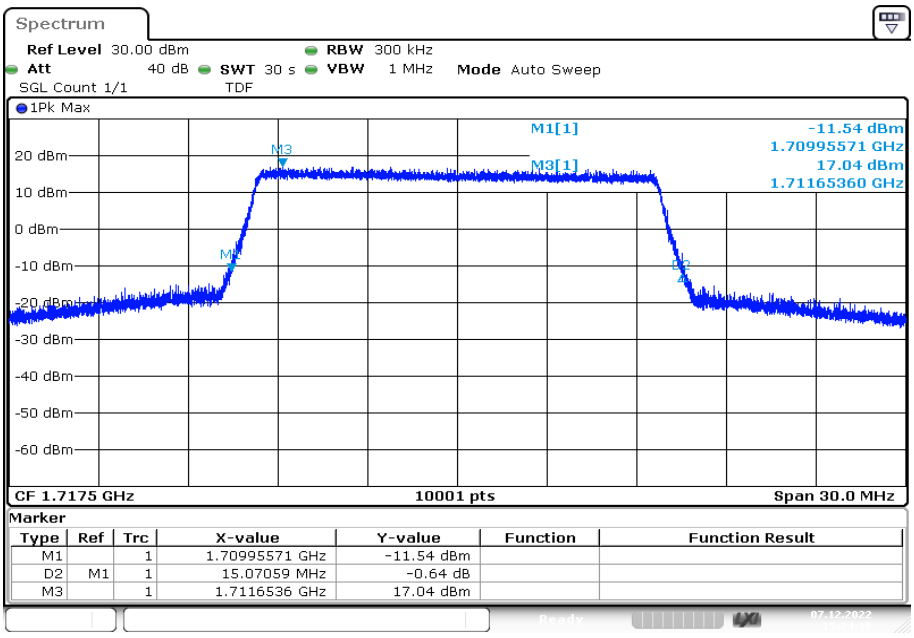

**Plot 24:** 10 MHz – QPSK - highest channel (-26 dBc BW)



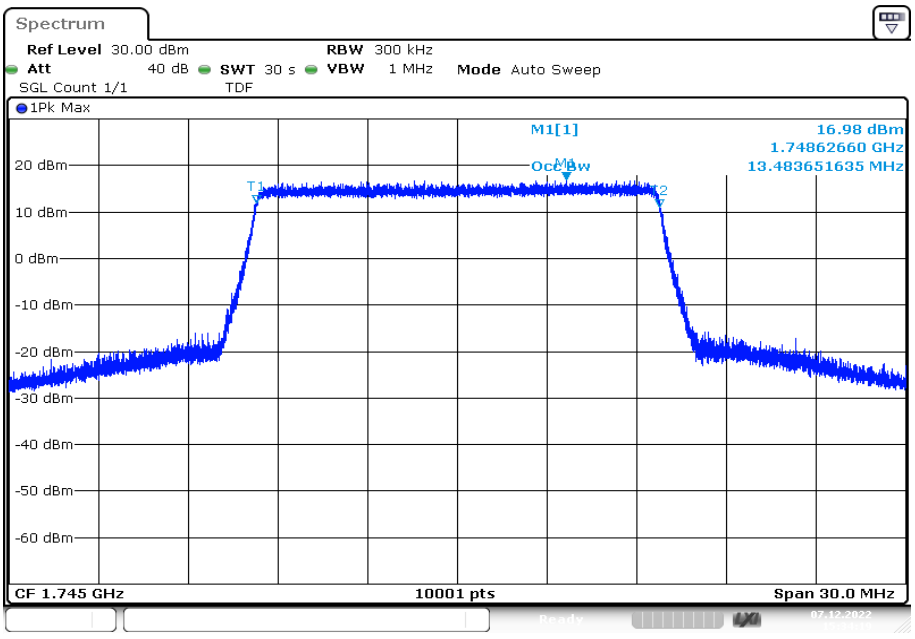
**Plot 25:** 15 MHz – QPSK - lowest channel (99% - OBW)



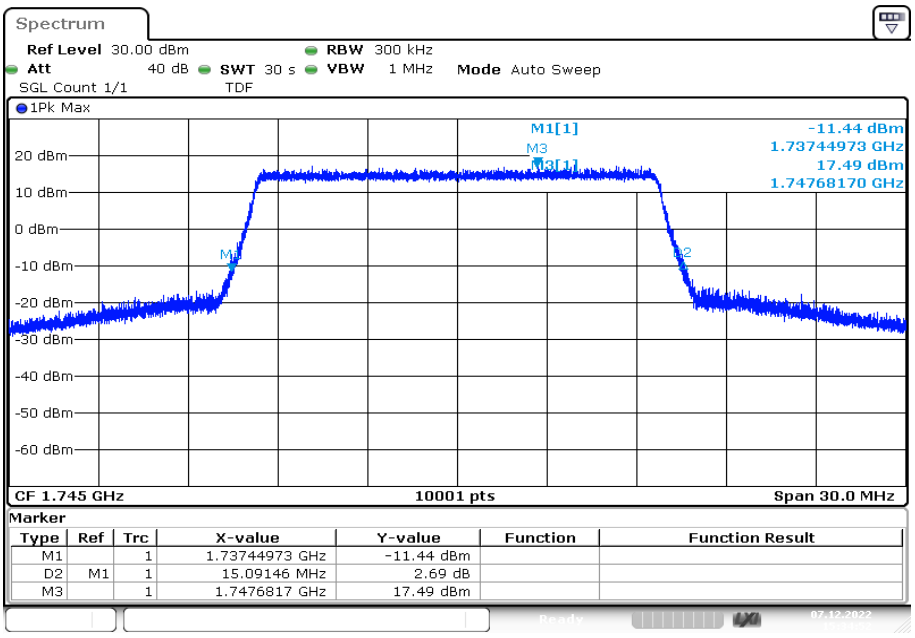

**Plot 26:** 15 MHz – QPSK - lowest channel (-26 dBc BW)



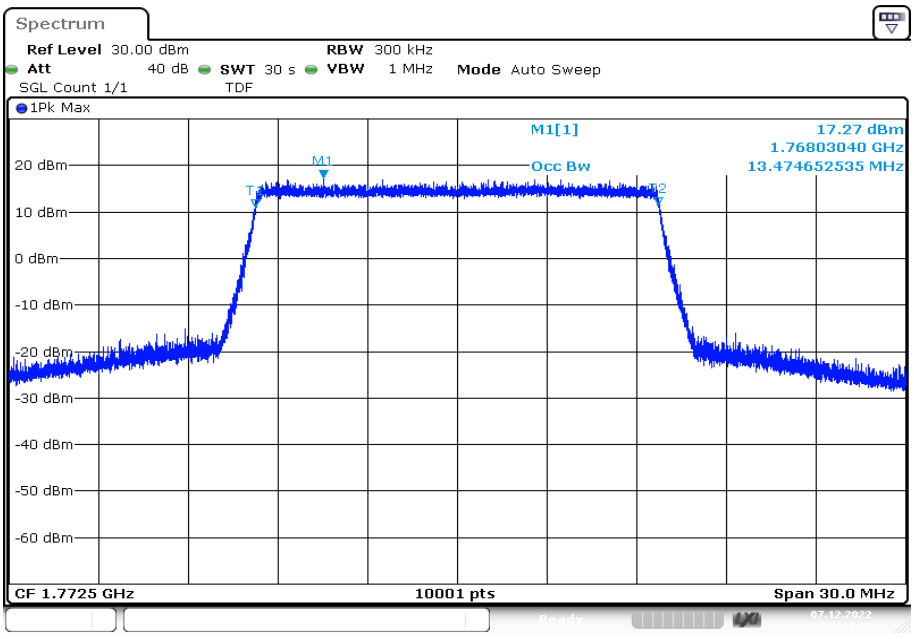
**Plot 27:** 15 MHz – QPSK - middle channel (99% - OBW)



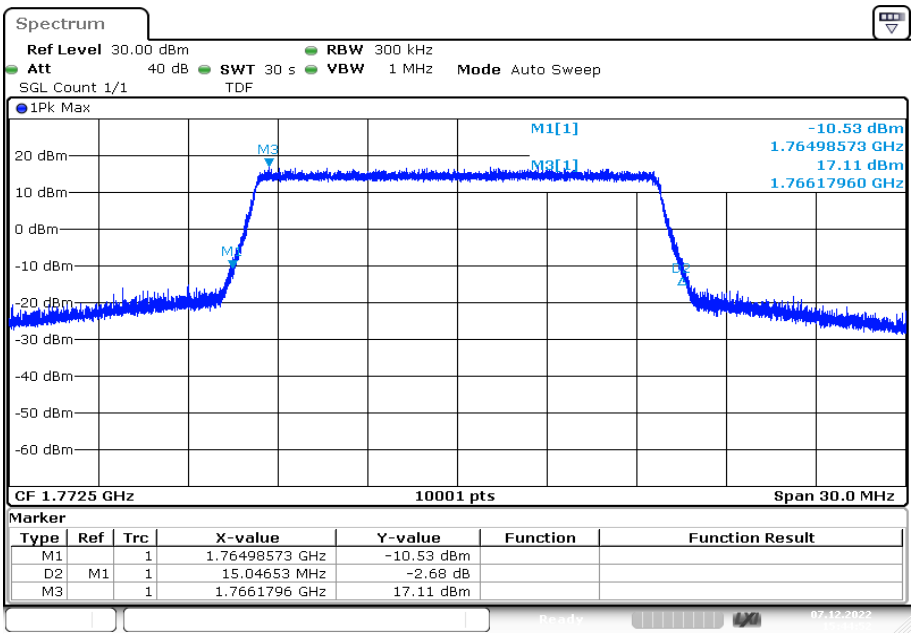

**Plot 28:** 15 MHz – QPSK - middle channel (-26 dBc BW)



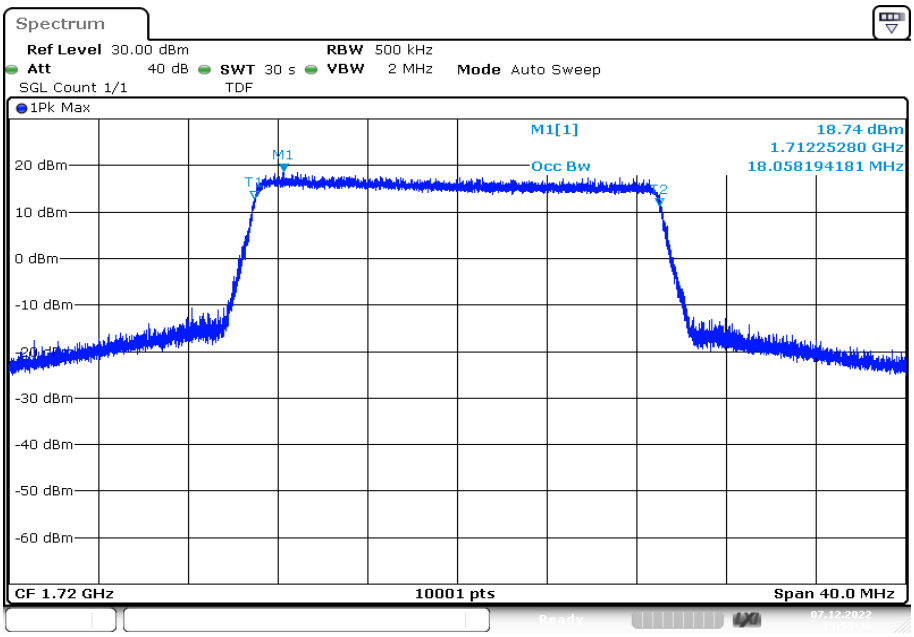
**Plot 29:** 15 MHz – QPSK - highest channel (99% - OBW)




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

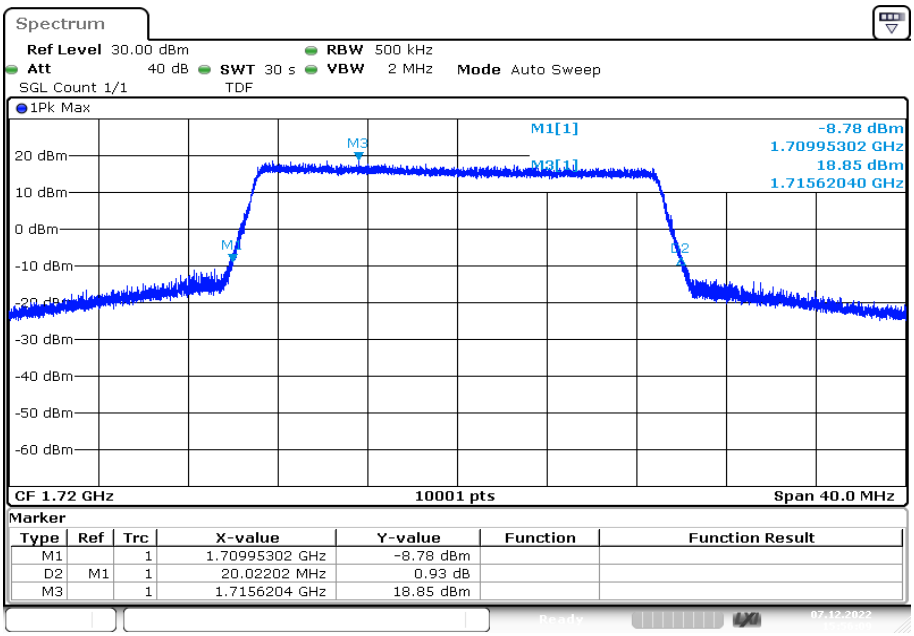


**Plot 31:** 20 MHz – QPSK - lowest channel (99% - OBW)



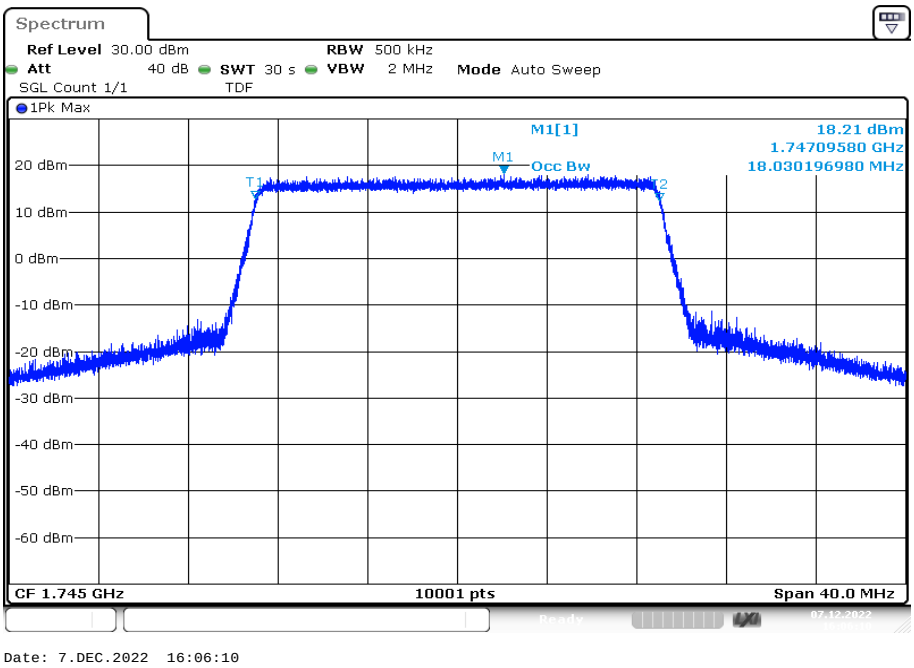

Date: 7.DEC.2022 15:55:36

**Plot 32:** 20 MHz – QPSK - lowest channel (-26 dBc BW)



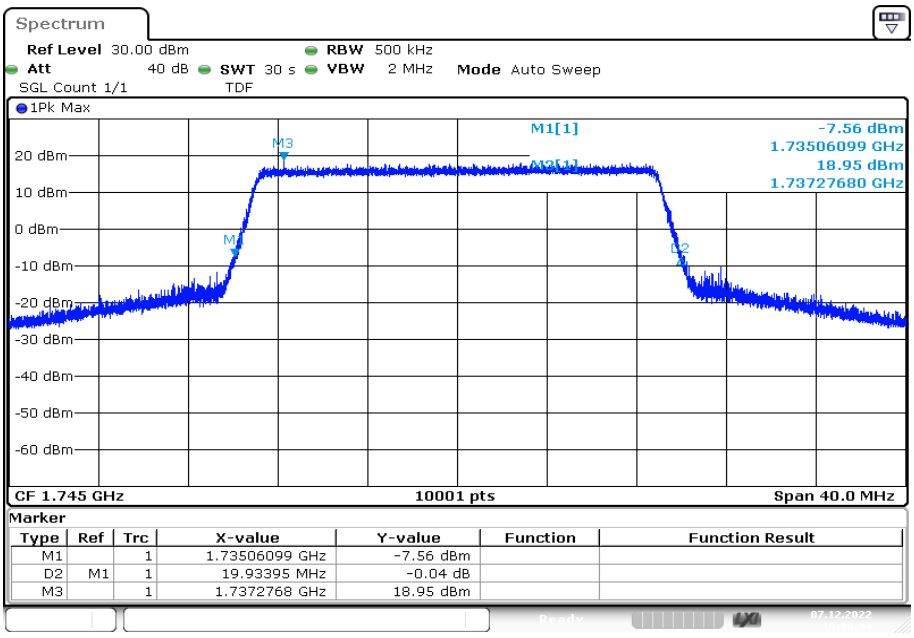

Date: 7.DEC.2022 15:56:09

**Plot 33:** 20 MHz – QPSK - middle channel (99% - OBW)




Date: 7.DEC.2022 16:06:10

**Plot 34:** 20 MHz – QPSK - middle channel (-26 dBc BW)

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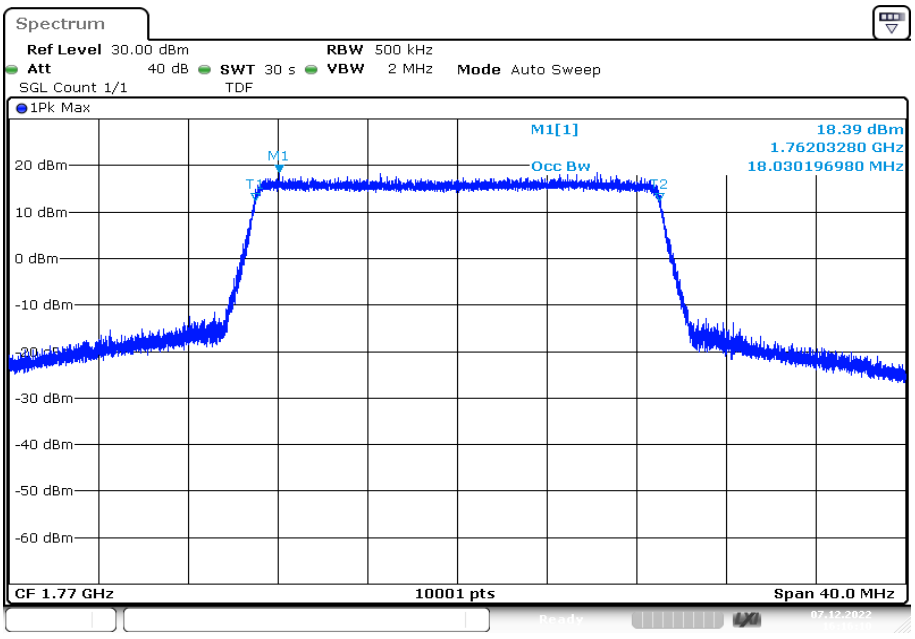
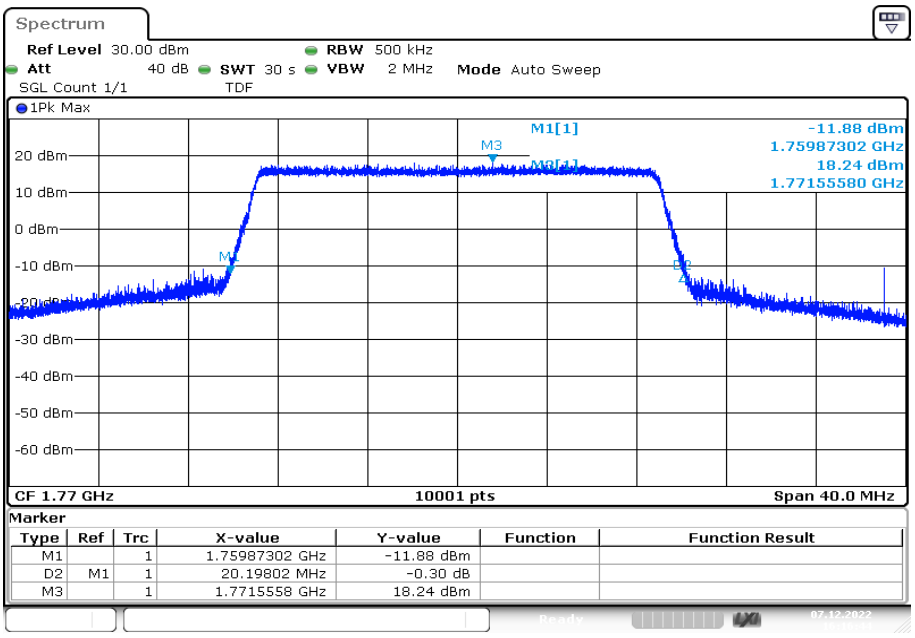
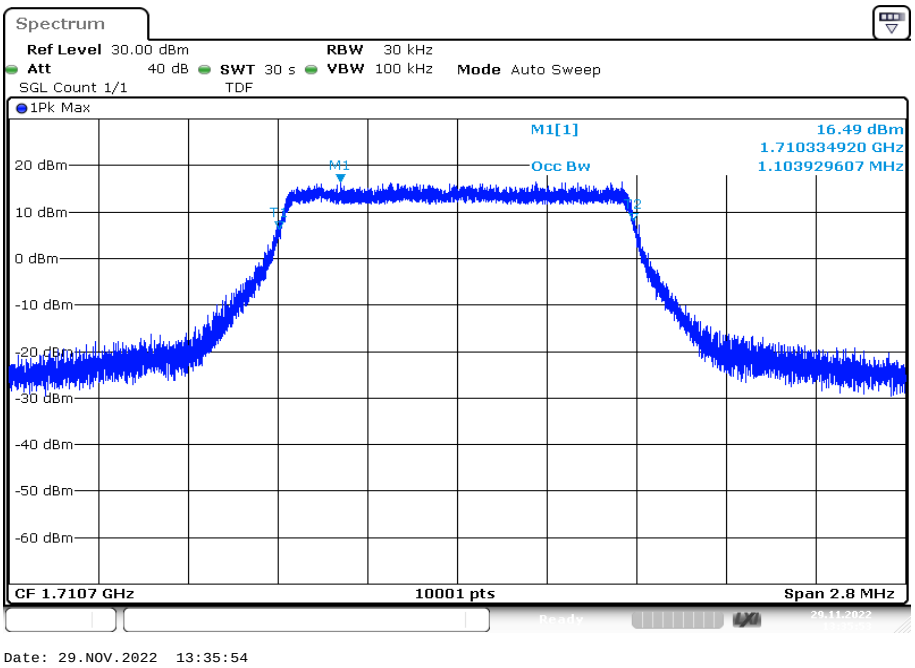
**Plot 35:** 20 MHz – QPSK - highest channel (99% - OBW)



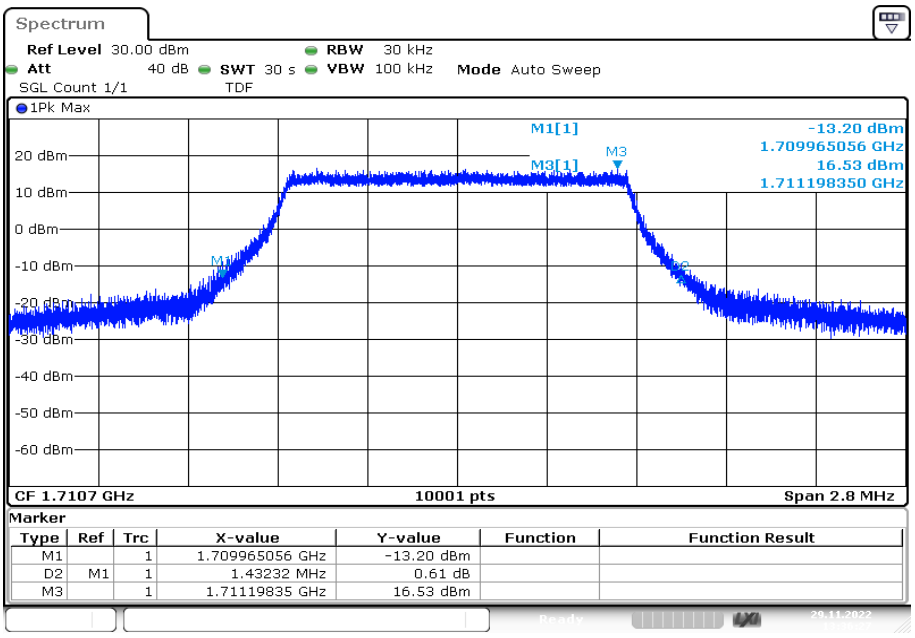

**Plot 36:** 20 MHz – QPSK - highest channel (-26 dBc BW)



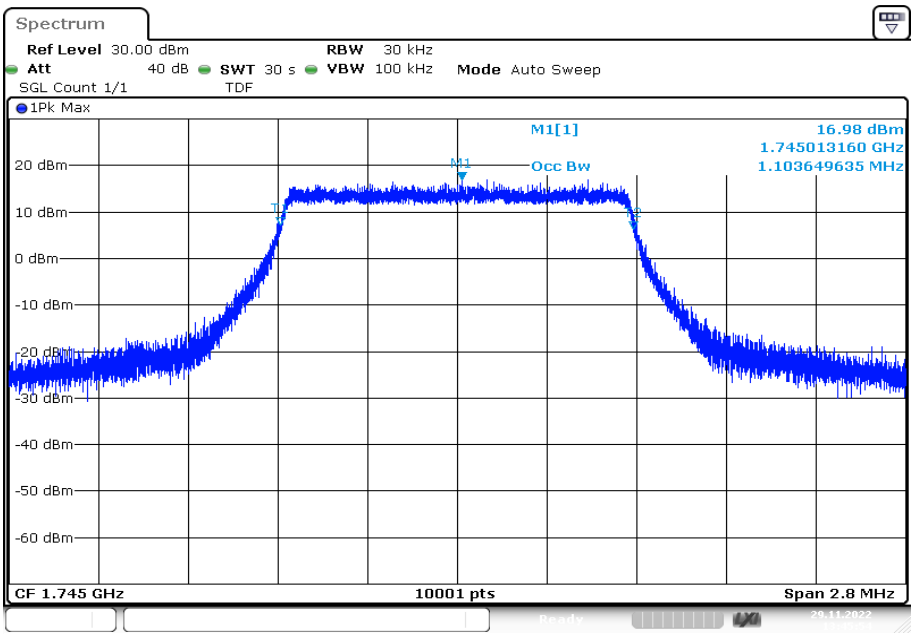
**Plot 37:** 1.4 MHz – 16-QAM - lowest channel (99% - OBW)



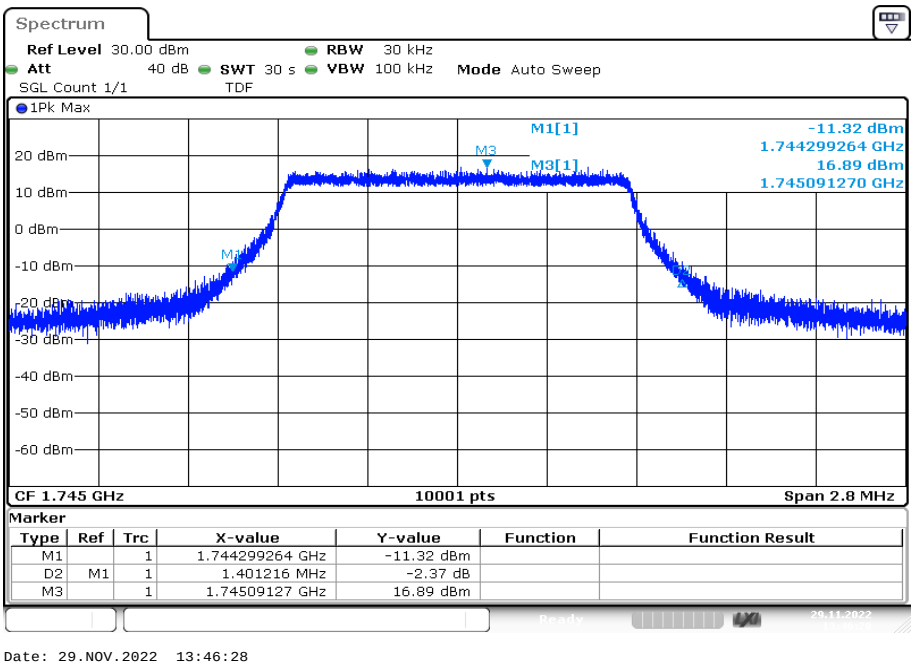

**Plot 38:** 1.4 MHz – 16-QAM - lowest channel (-26 dBc BW)



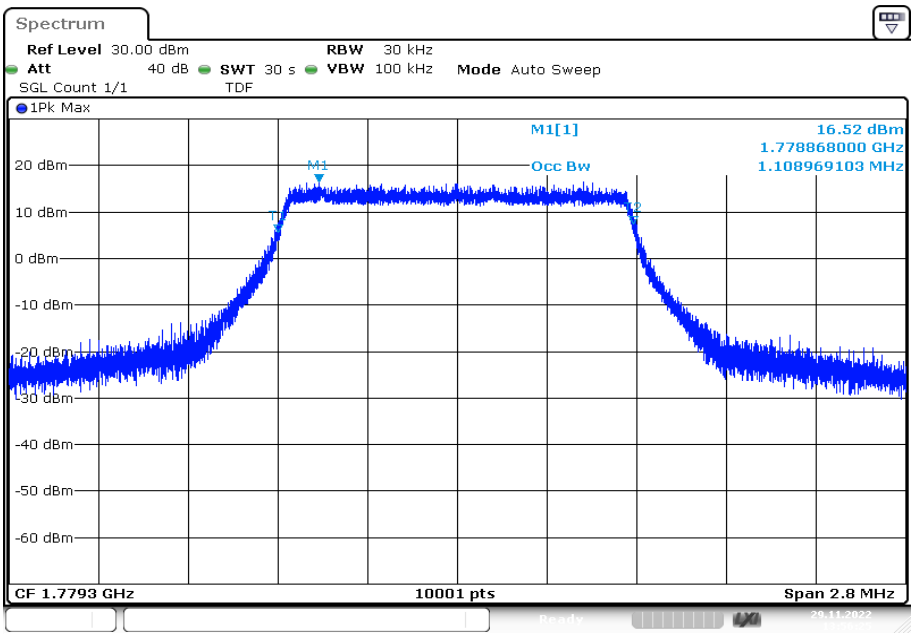
**Plot 39:** 1.4 MHz – 16-QAM - middle channel (99% - OBW)



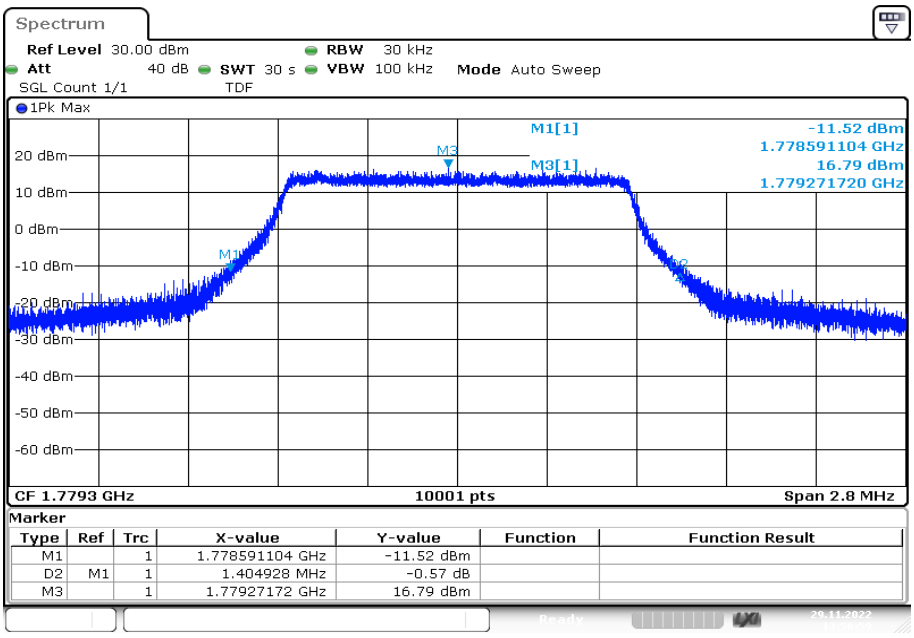

**Plot 40:** 1.4 MHz – 16-QAM - middle channel (-26 dBc BW)



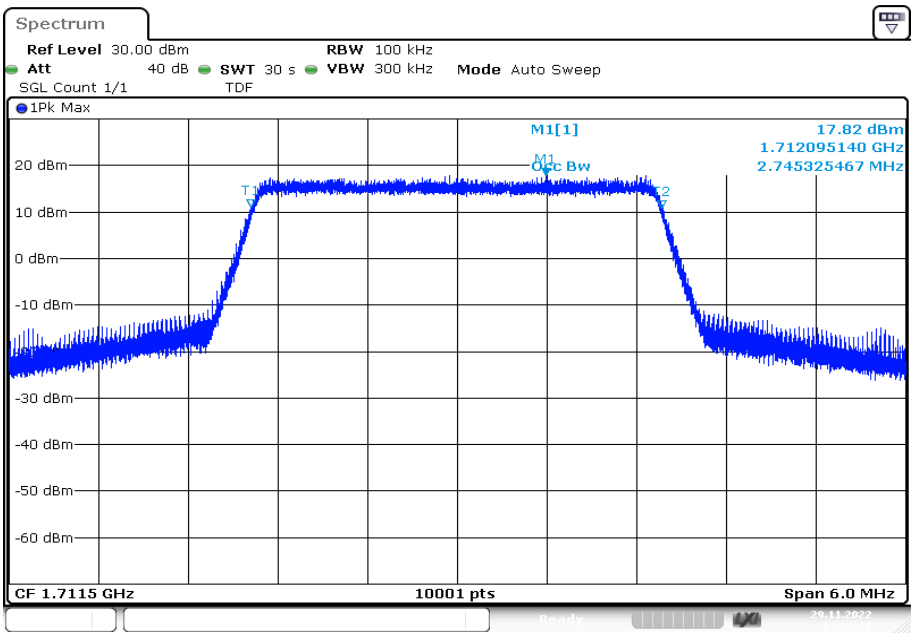
**Plot 41:** 1.4 MHz – 16-QAM - highest channel (99% - OBW)



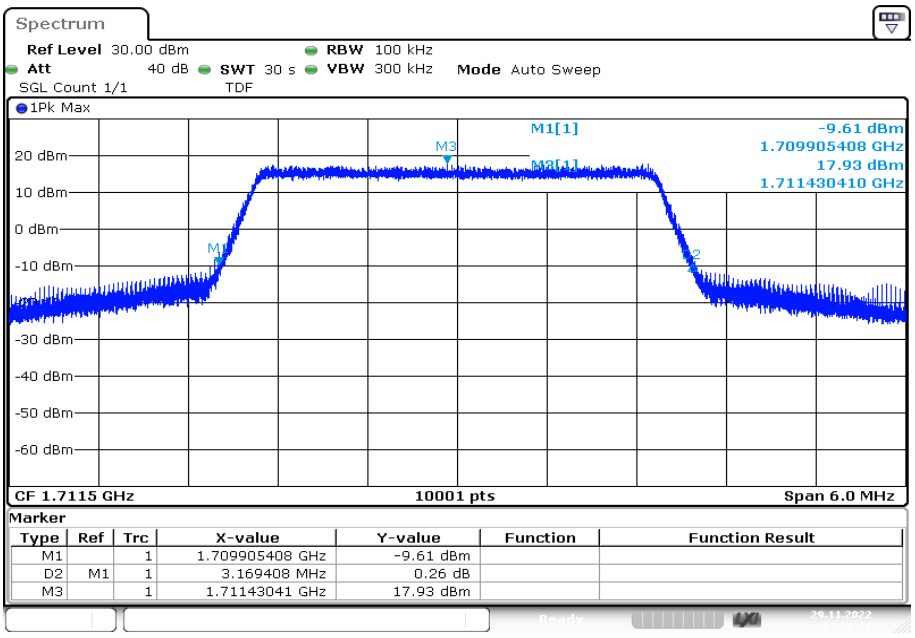

**Plot 42:** 1.4 MHz – 16-QAM - highest channel (-26 dBc BW)



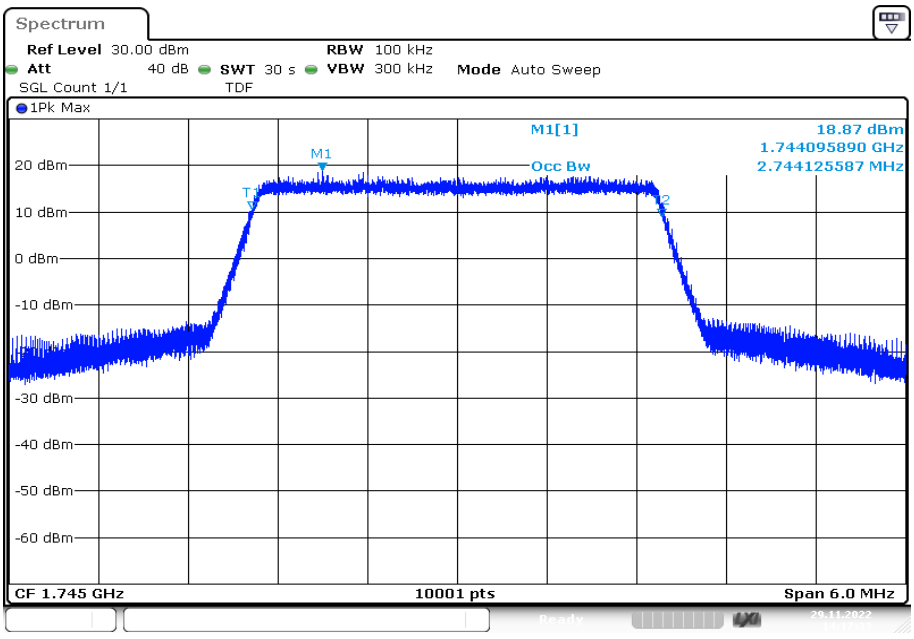
**Plot 43:** 3 MHz – 16-QAM - lowest channel (99% - OBW)



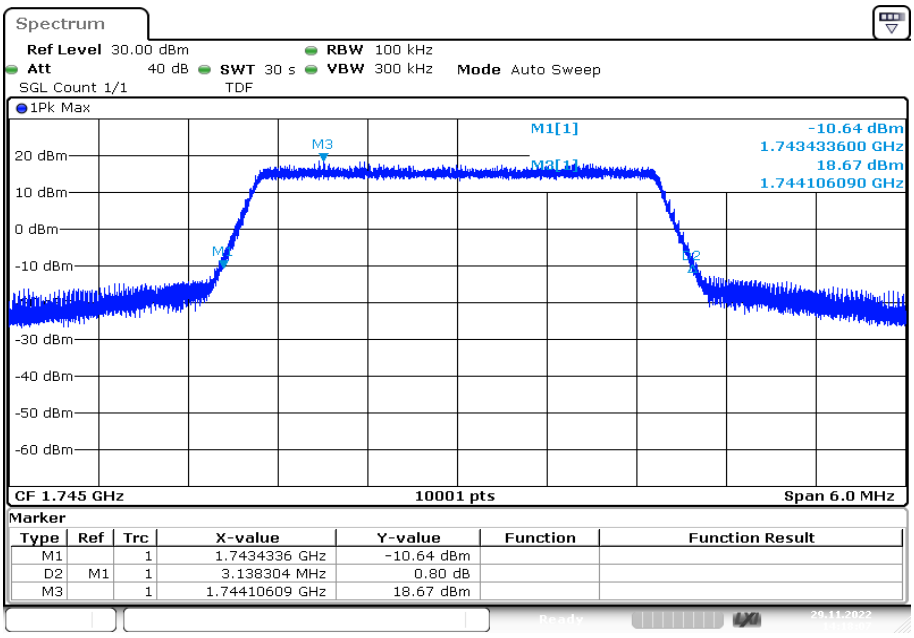

**Plot 44:** 3 MHz – 16-QAM - lowest channel (-26 dBc BW)



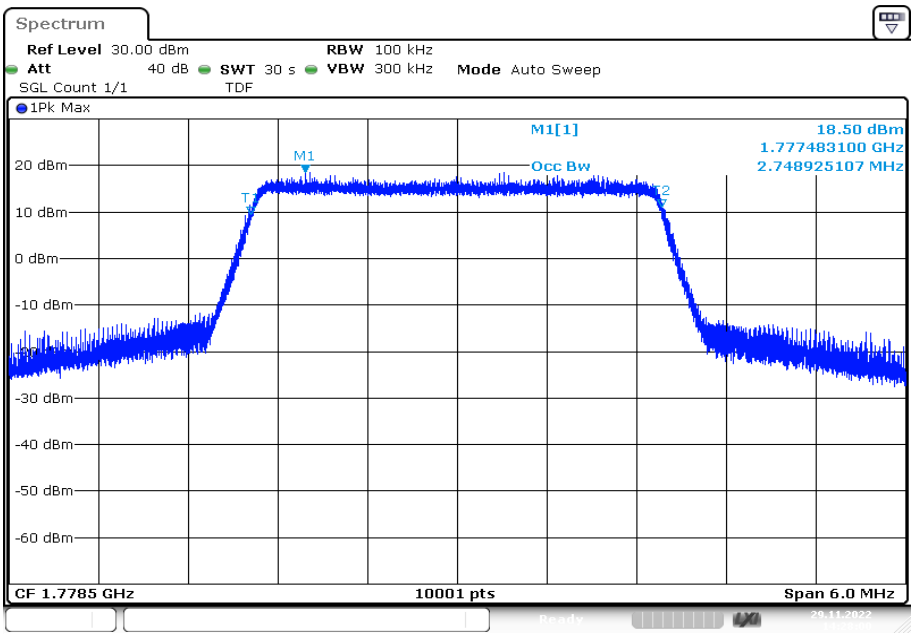
**Plot 45:** 3 MHz – 16-QAM - middle channel (99% - OBW)



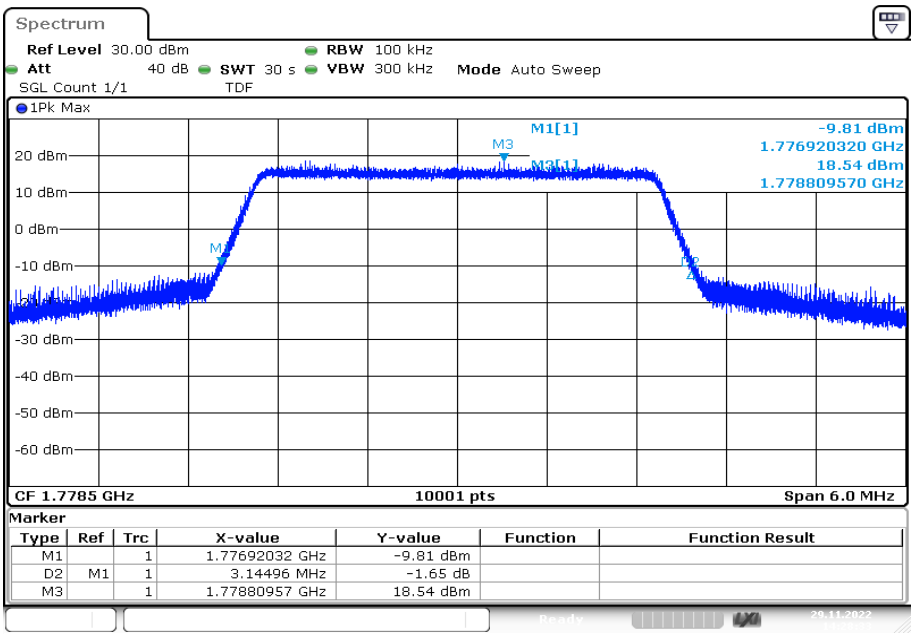

**Plot 46:** 3 MHz – 16-QAM - middle channel (-26 dBc BW)



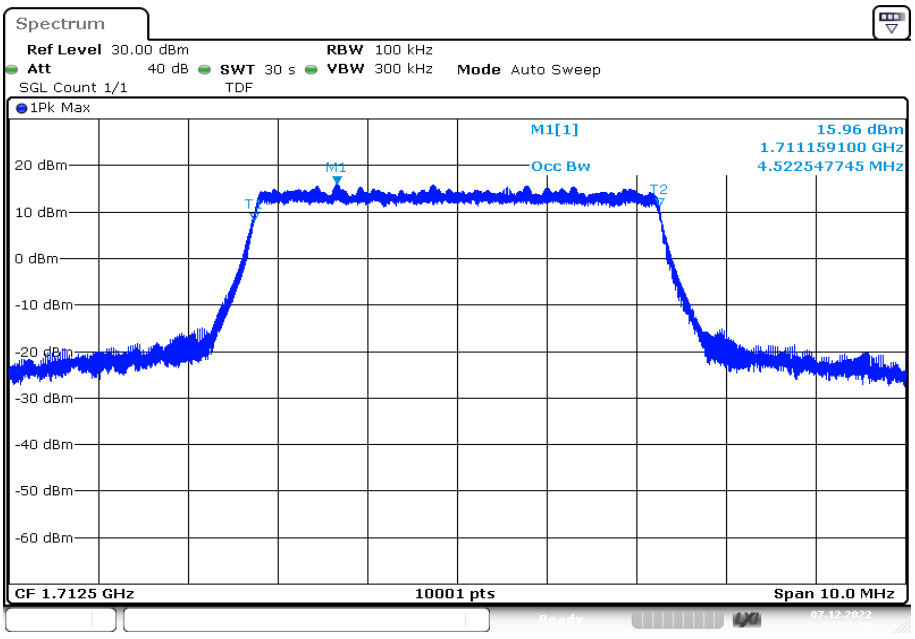
**Plot 47:** 3 MHz – 16-QAM - highest channel (99% - OBW)



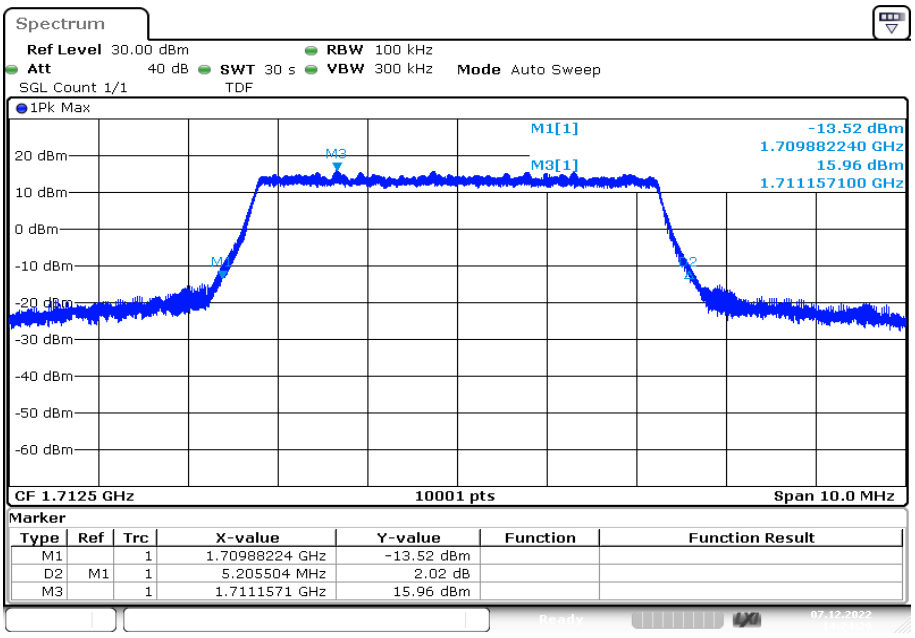

**Plot 48:** 3 MHz – 16-QAM - highest channel (-26 dBc BW)



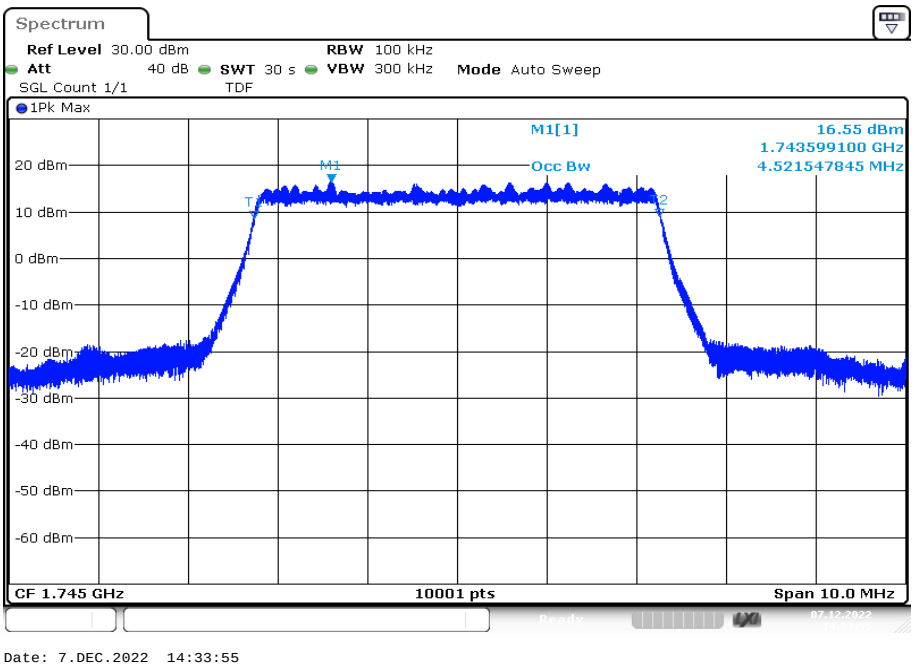
**Plot 49:** 5 MHz – 16-QAM - lowest channel (99% - OBW)



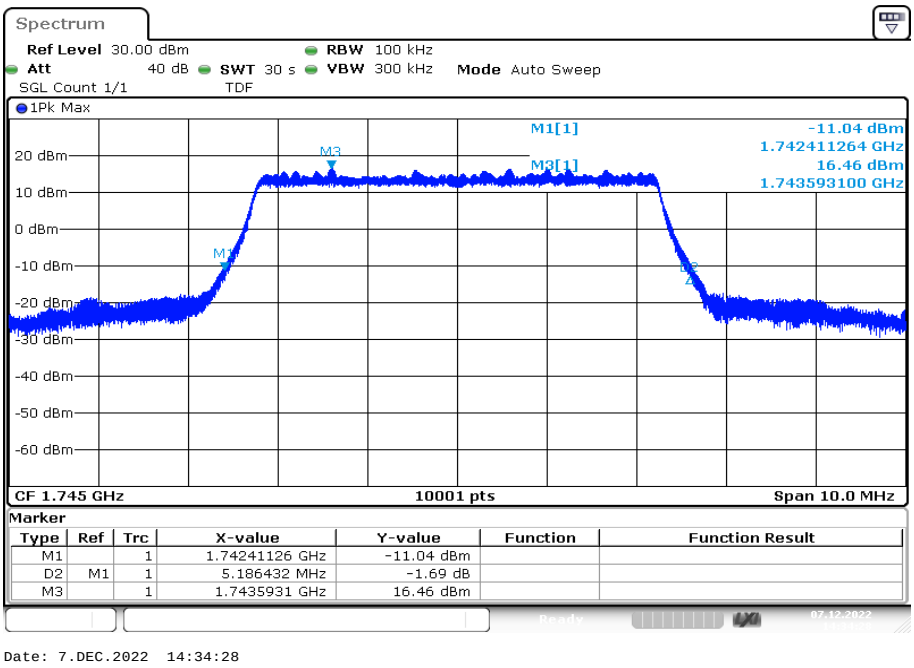

**Plot 50:** 5 MHz – 16-QAM - lowest channel (-26 dBc BW)



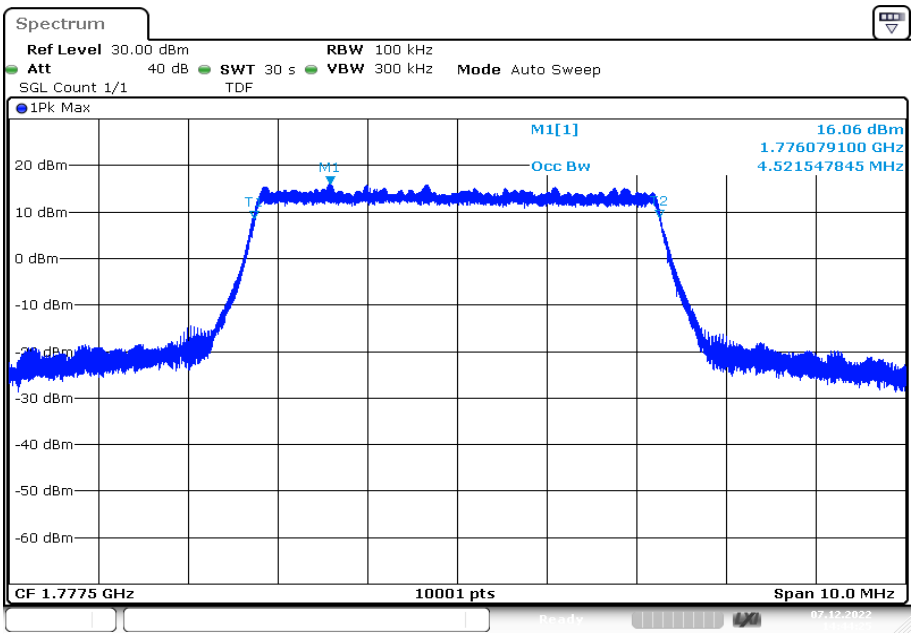
**Plot 51:** 5 MHz – 16-QAM - middle channel (99% - OBW)




**Plot 52:** 5 MHz – 16-QAM - middle channel (-26 dBc BW)



**Plot 53:** 5 MHz – 16-QAM - highest channel (99% - OBW)

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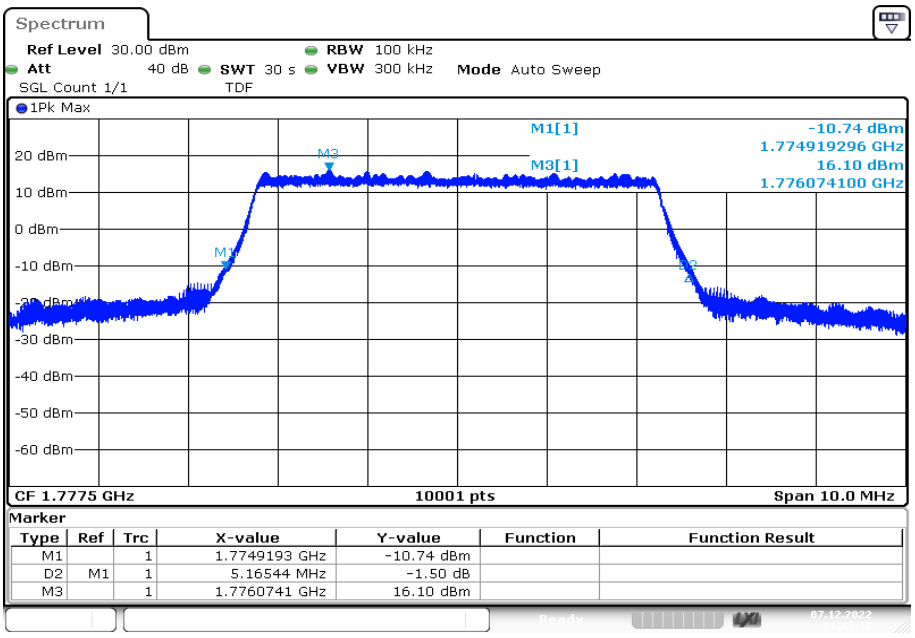
**Plot 54:** 5 MHz – 16-QAM - highest channel (-26 dBc BW)

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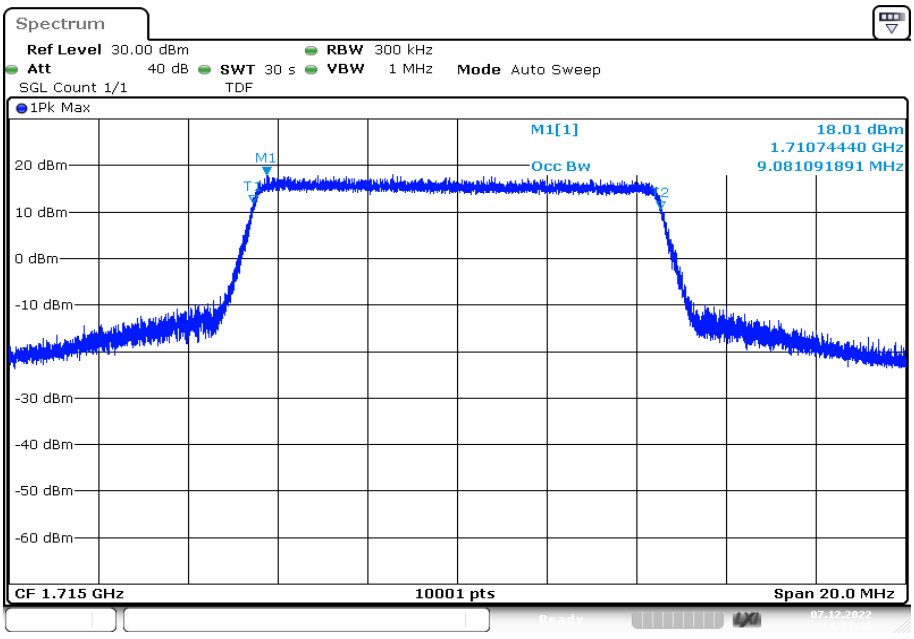
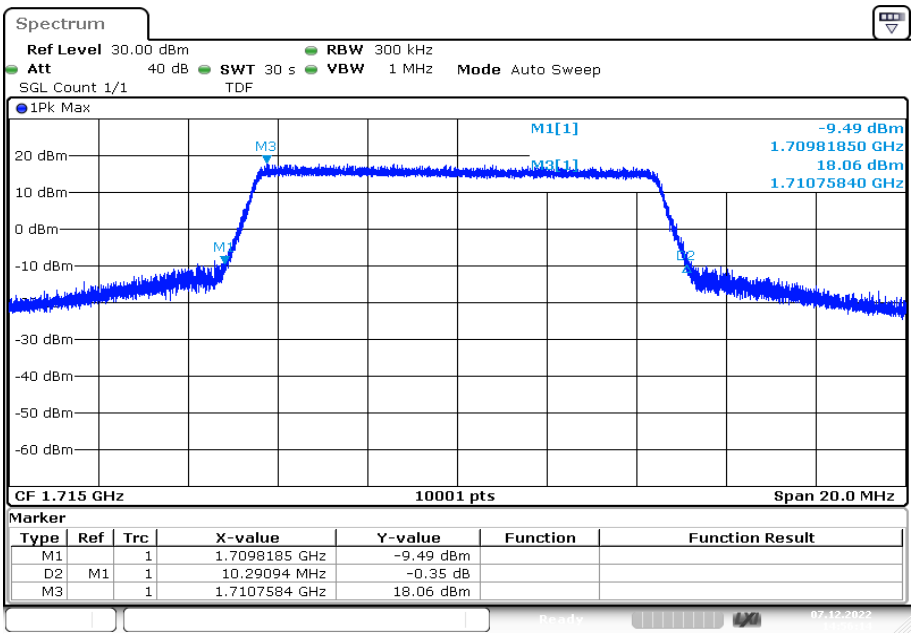
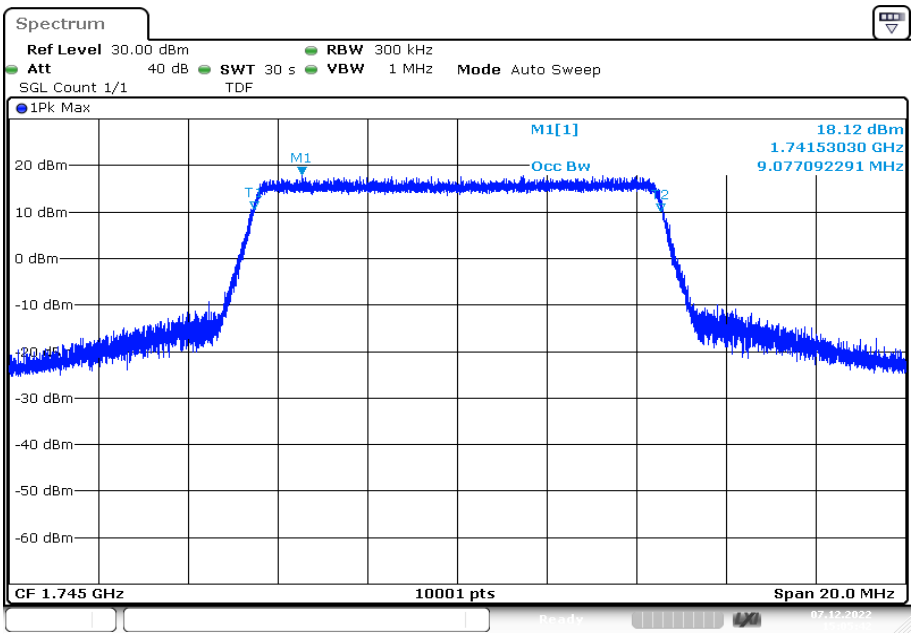
**Plot 55:** 10 MHz – 16-QAM - lowest channel (99% - OBW)




**Plot 56:** 10 MHz – 16-QAM - lowest channel (-26 dBc BW)



**Plot 57:** 10 MHz – 16-QAM - middle channel (99% - OBW)

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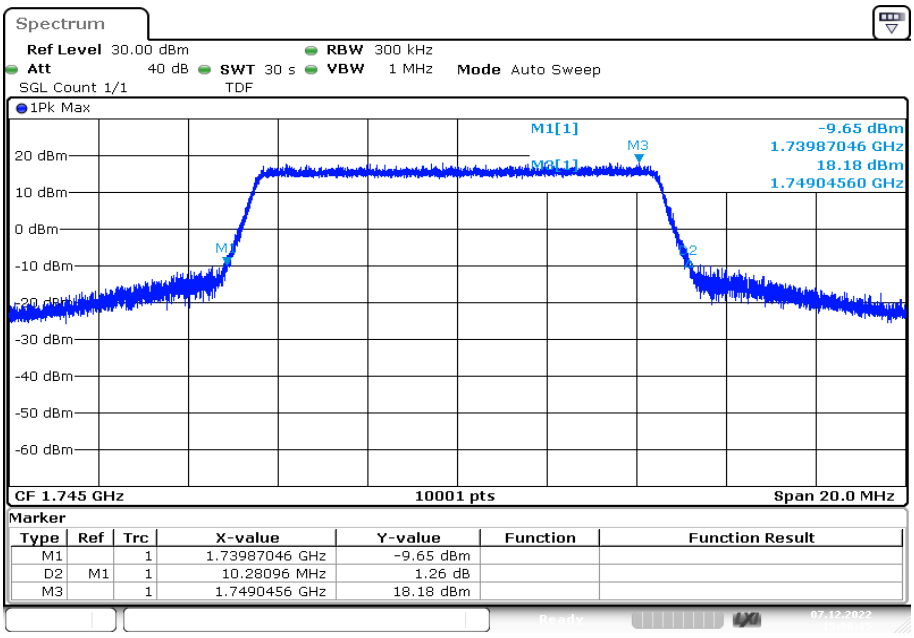
**Plot 58:** 10 MHz – 16-QAM - middle channel (-26 dBc BW)

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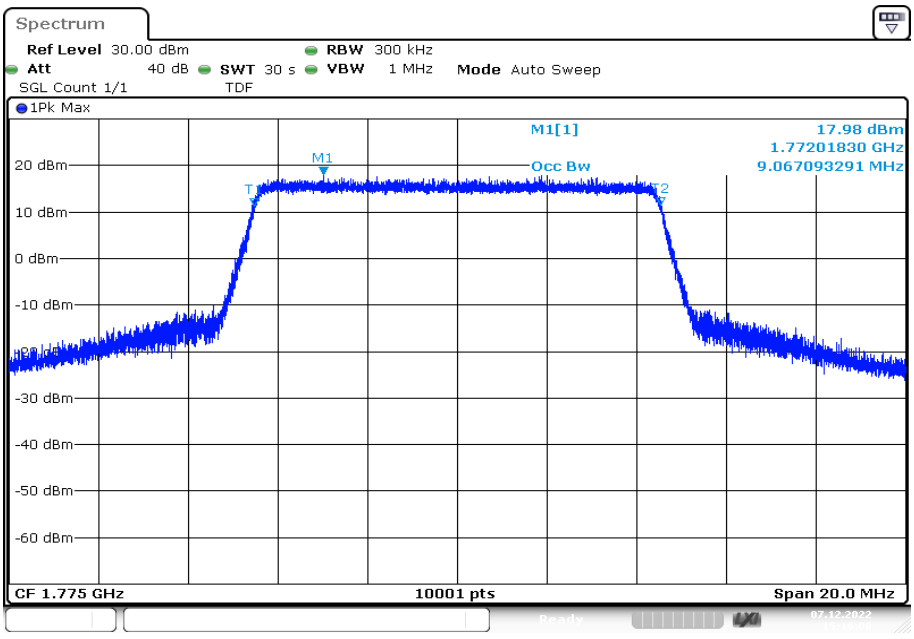
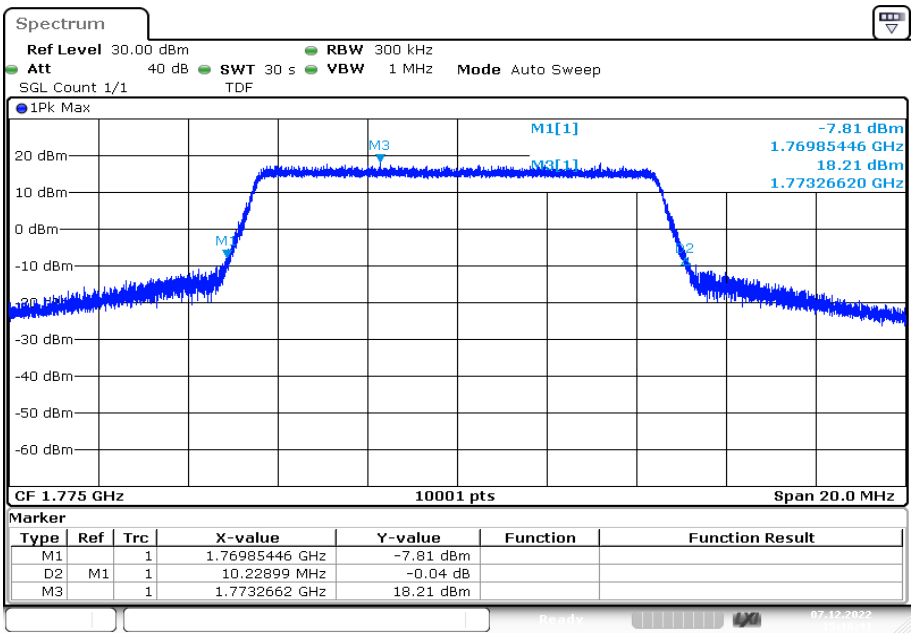
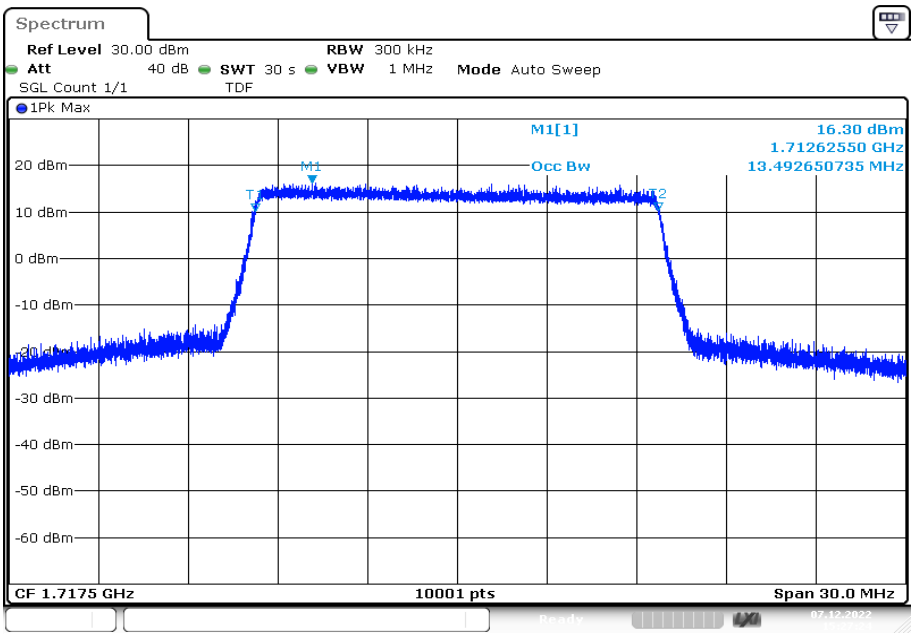
**Plot 59:** 10 MHz – 16-QAM - highest channel (99% - OBW)



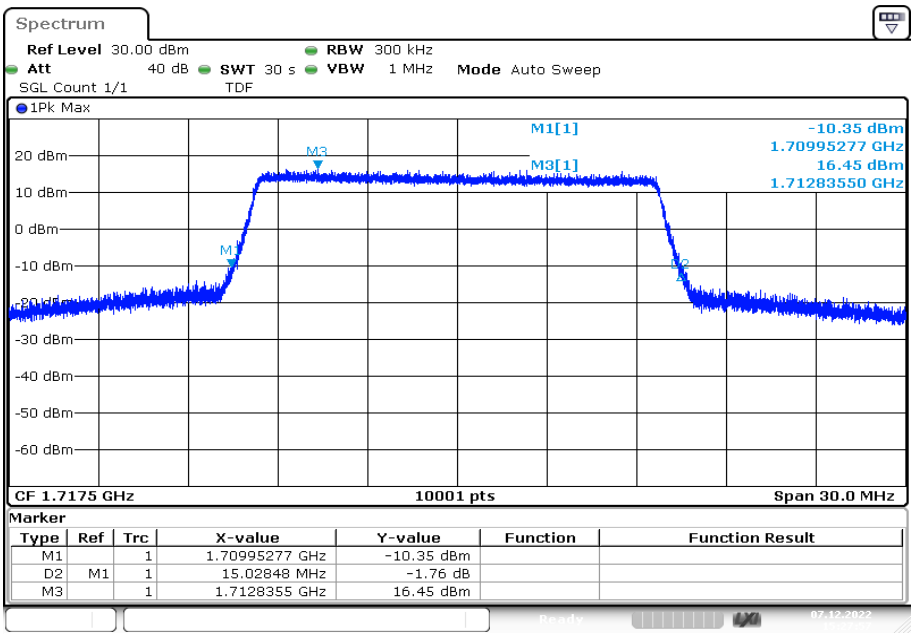

**Plot 60:** 10 MHz – 16-QAM - highest channel (-26 dBc BW)



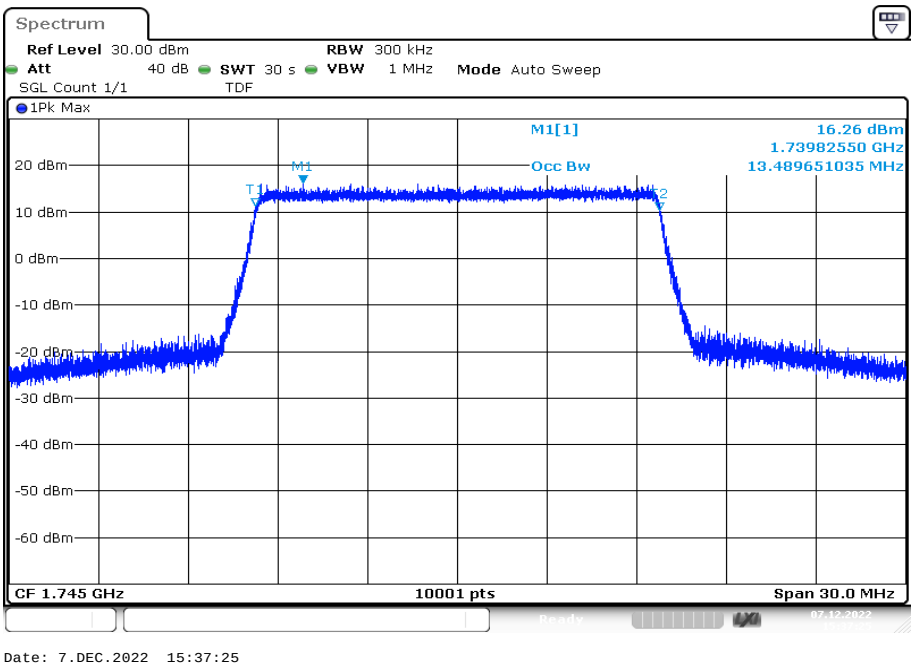
**Plot 61:** 15 MHz – 16-QAM - lowest channel (99% - OBW)



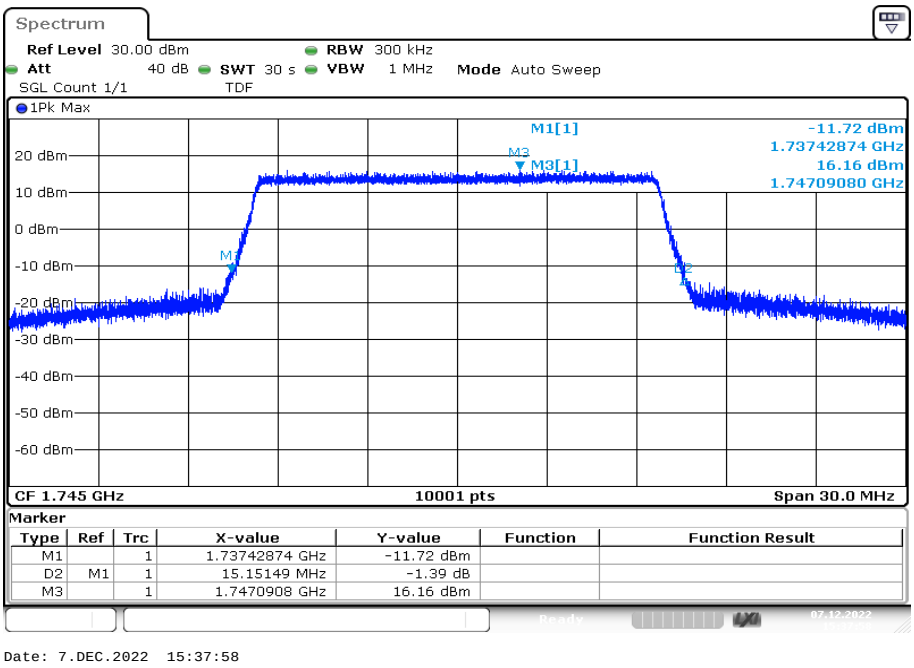

**Plot 62:** 15 MHz – 16-QAM - lowest channel (-26 dBc BW)



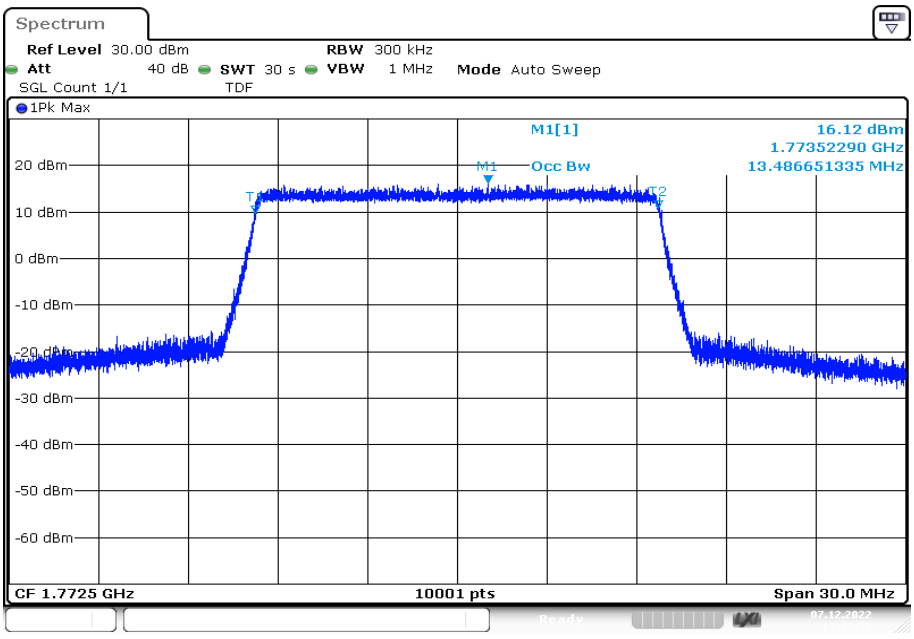
**Plot 63:** 15 MHz – 16-QAM - middle channel (99% - OBW)



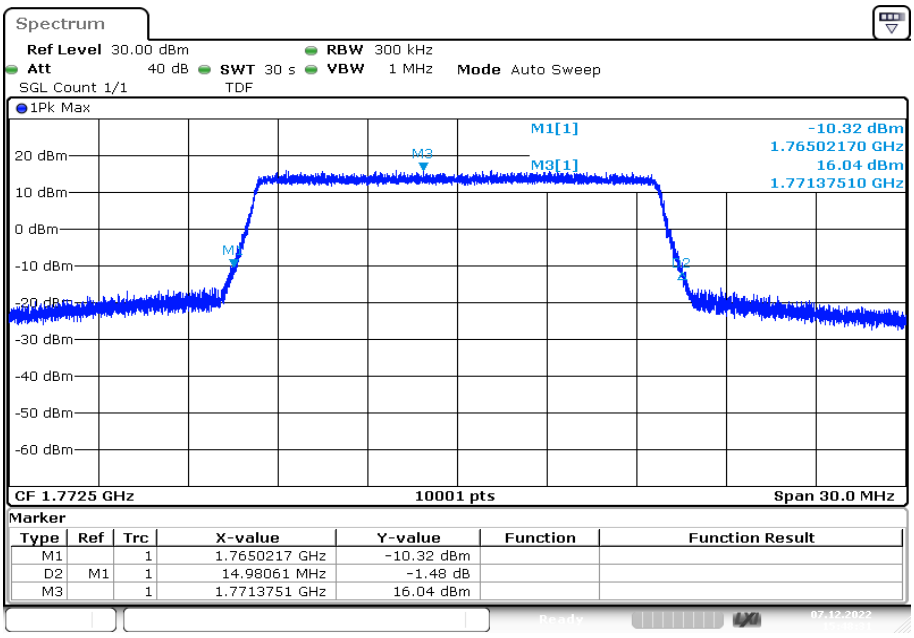

**Plot 64:** 15 MHz – 16-QAM - middle channel (-26 dBc BW)



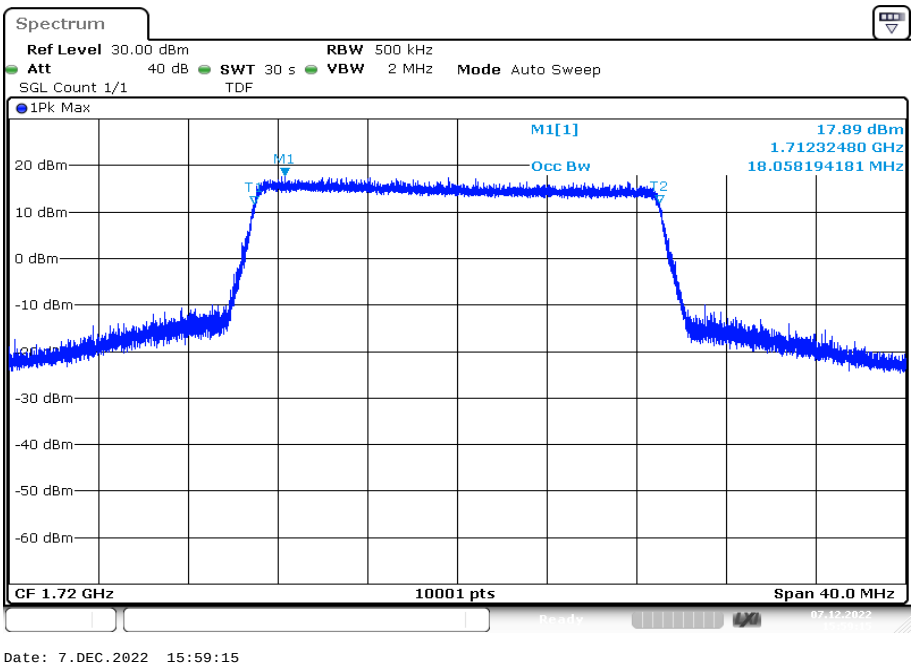
**Plot 65:** 15 MHz – 16-QAM - highest channel (99% - OBW)



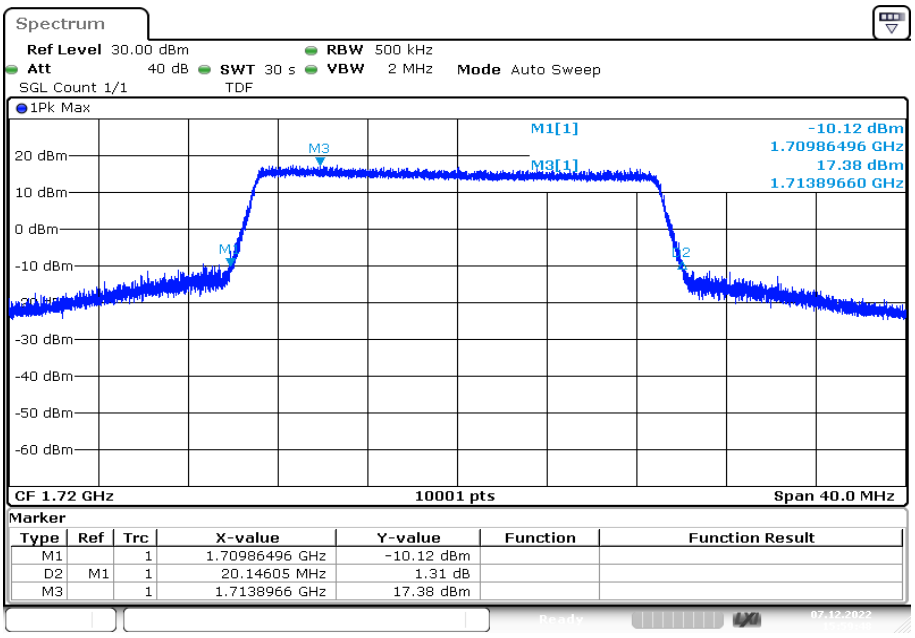

**Plot 66:** 15 MHz – 16-QAM - highest channel (-26 dBc BW)



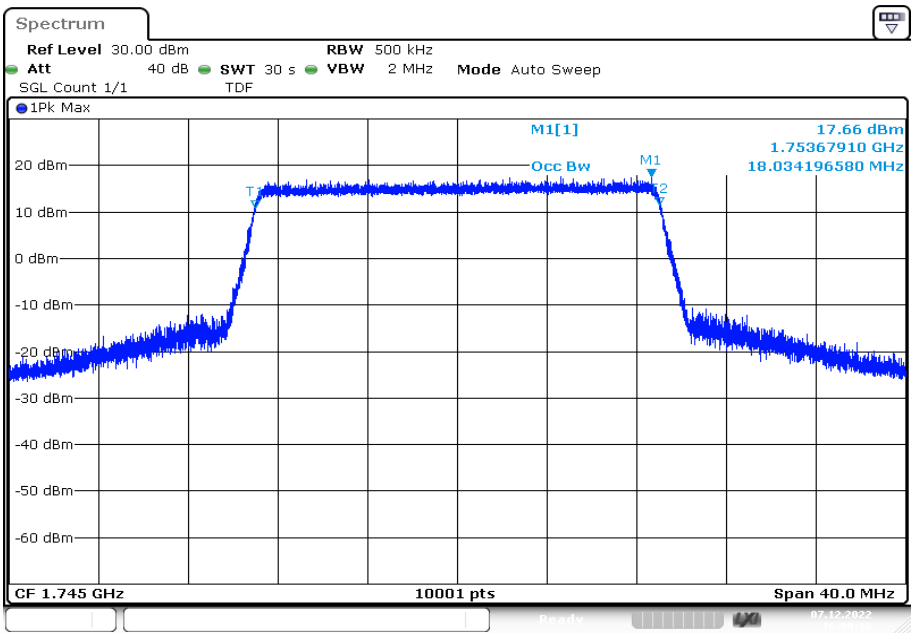
**Plot 67:** 20 MHz – 16-QAM - lowest channel (99% - OBW)




**Plot 68:** 20 MHz – 16-QAM - lowest channel (-26 dBc BW)



**Plot 69:** 20 MHz – 16-QAM - middle channel (99% - OBW)

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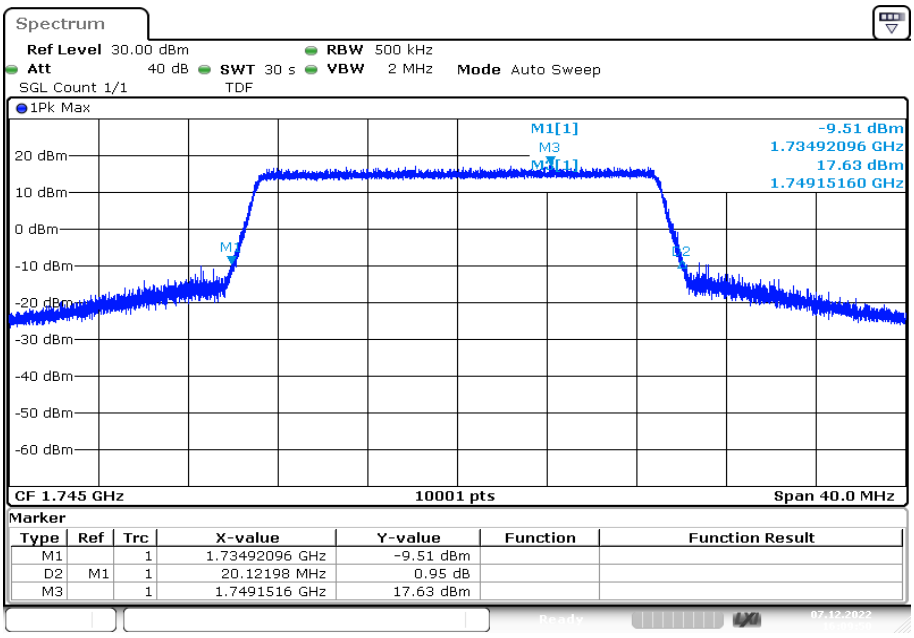
**Plot 70:** 20 MHz – 16-QAM - middle channel (-26 dBc BW)

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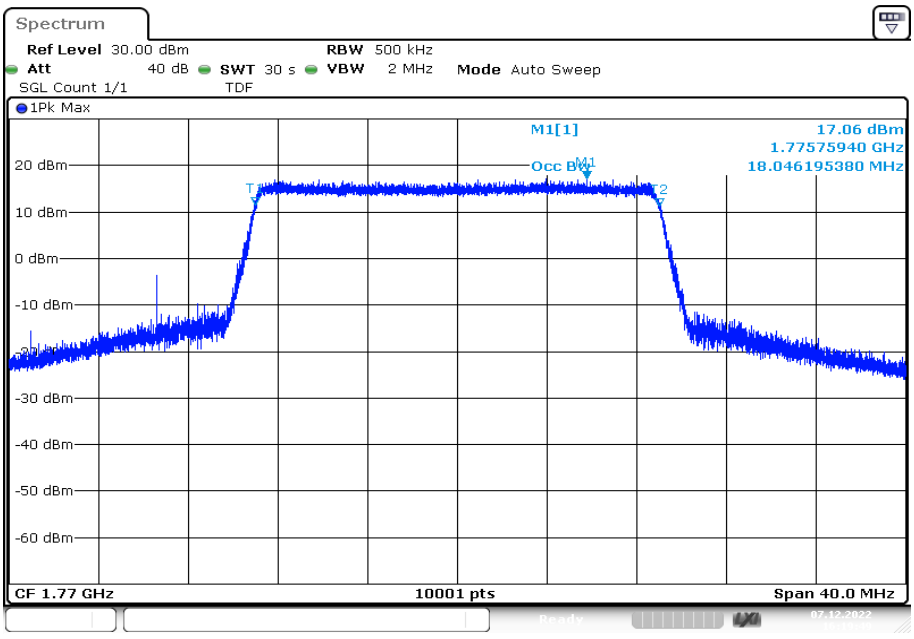
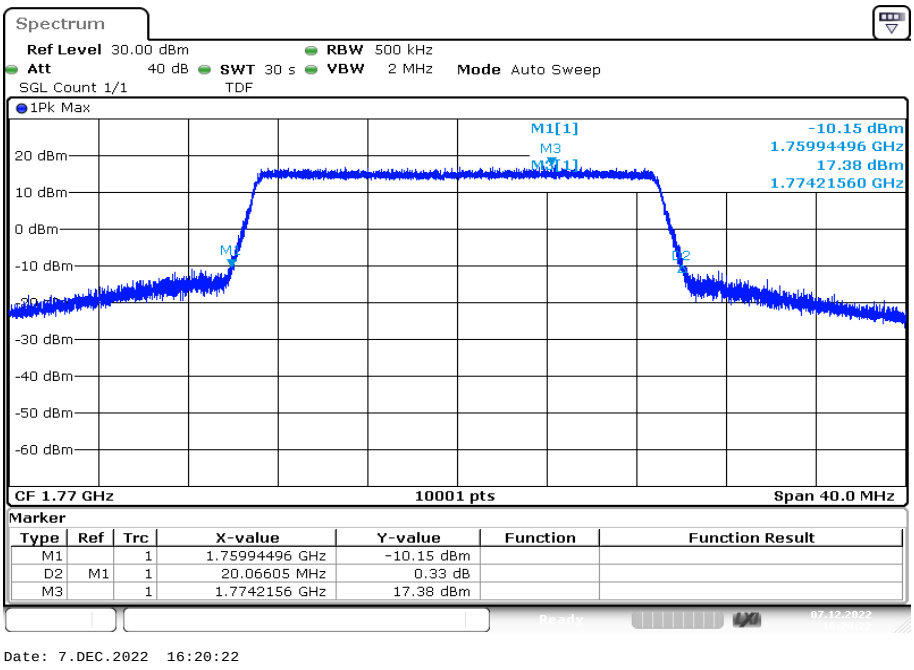
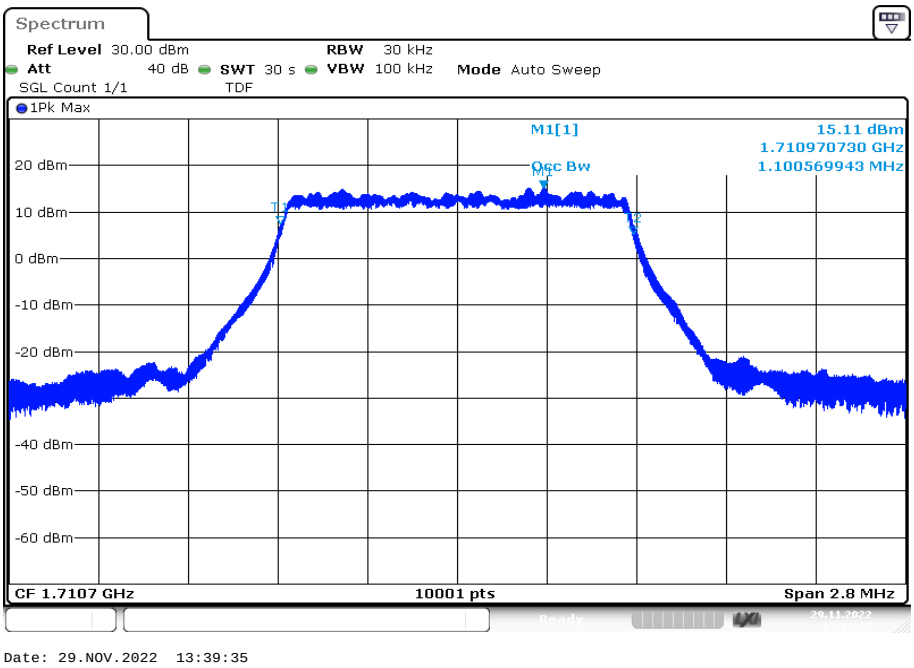
**Plot 71:** 20 MHz – 16-QAM - highest channel (99% - OBW)



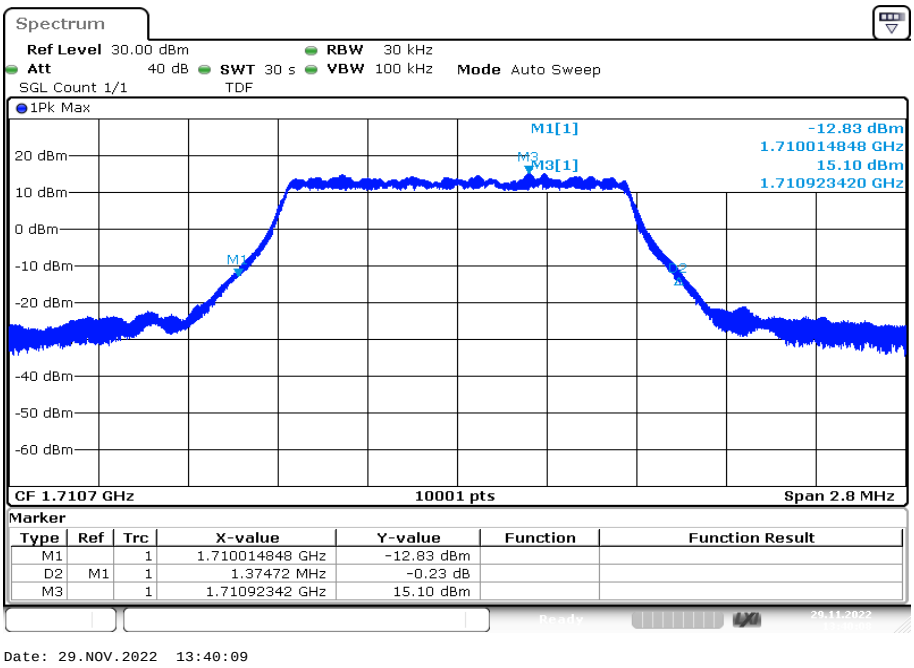

**Plot 72:** 20 MHz – 16-QAM - highest channel (-26 dBc BW)



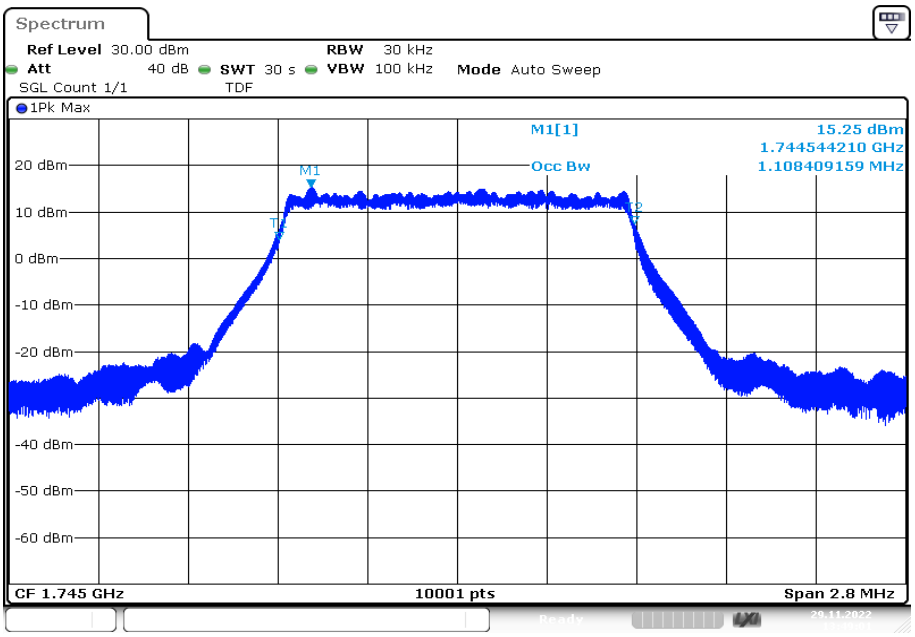
**Plot 73:** 1.4 MHz – 64-QAM - lowest channel (99% - OBW)



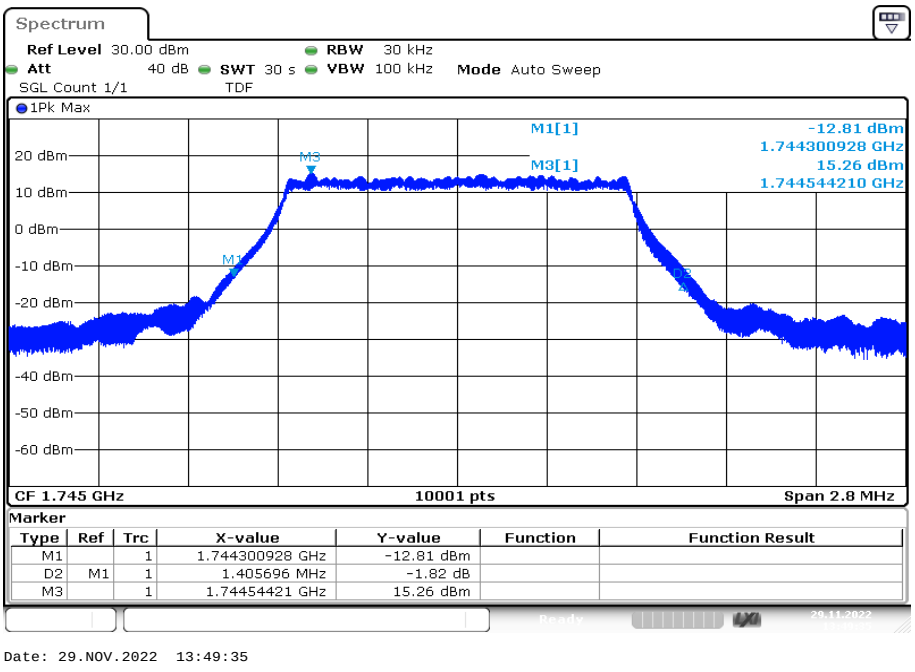

**Plot 74:** 1.4 MHz – 64-QAM - lowest channel (-26 dBc BW)



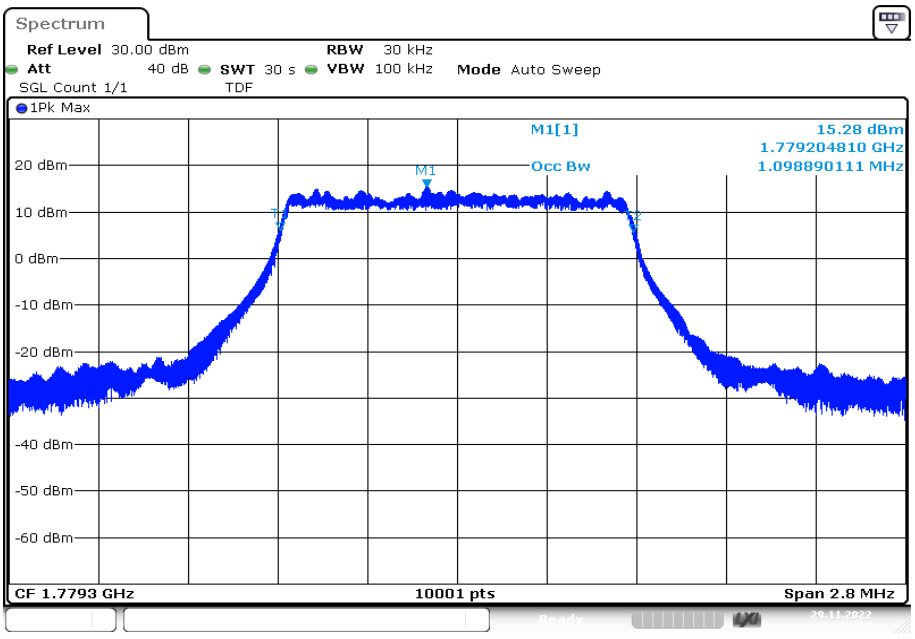
**Plot 75:** 1.4 MHz – 64-QAM - middle channel (99% - OBW)



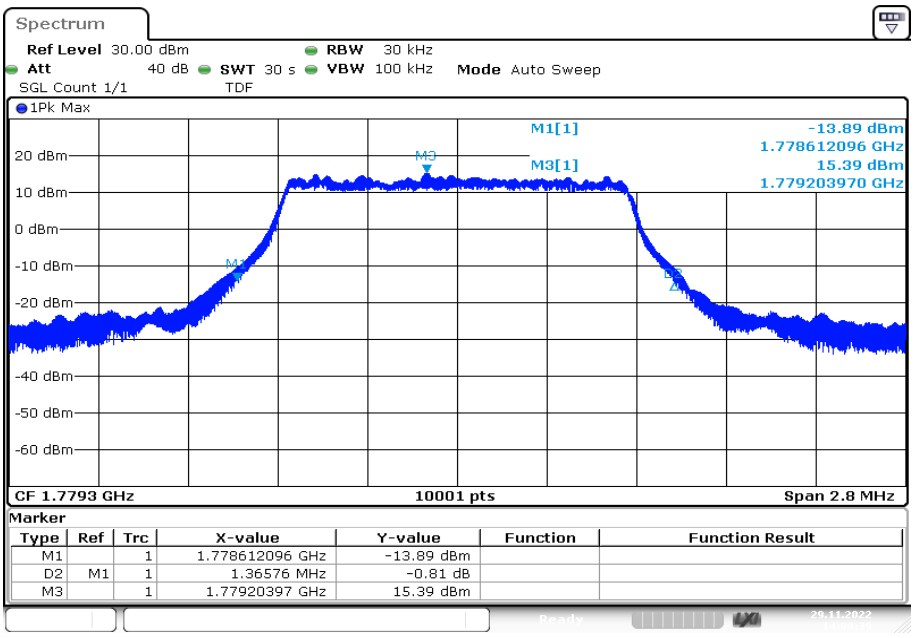

**Plot 76:** 1.4 MHz – 64-QAM - middle channel (-26 dBc BW)



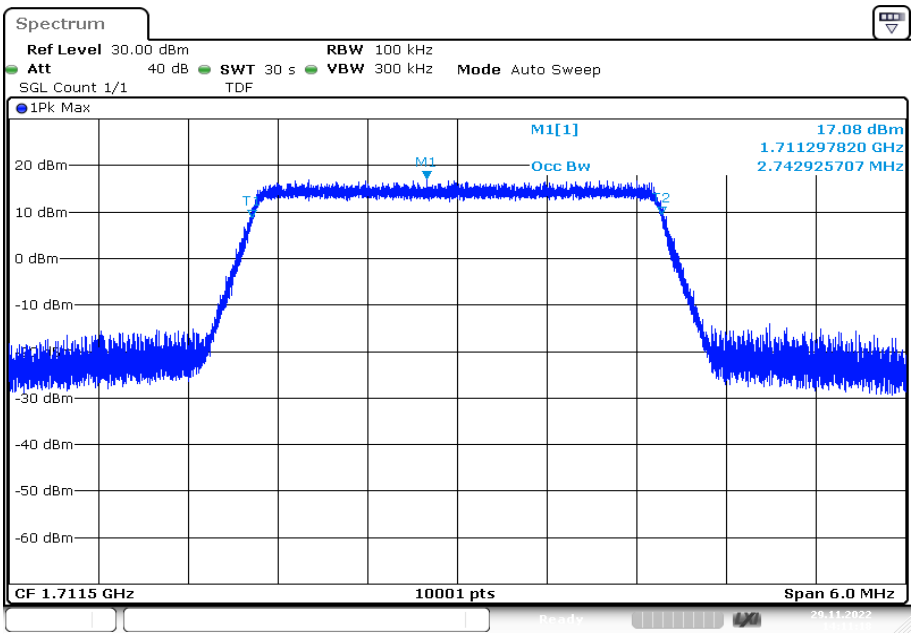
**Plot 77:** 1.4 MHz – 64-QAM - highest channel (99% - OBW)



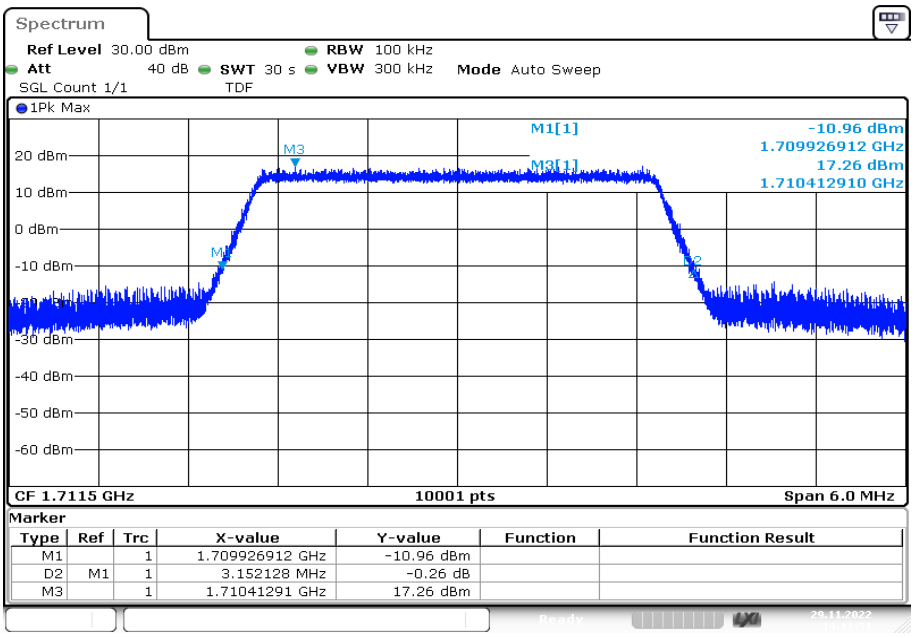

**Plot 78:** 1.4 MHz – 64-QAM - highest channel (-26 dBc BW)



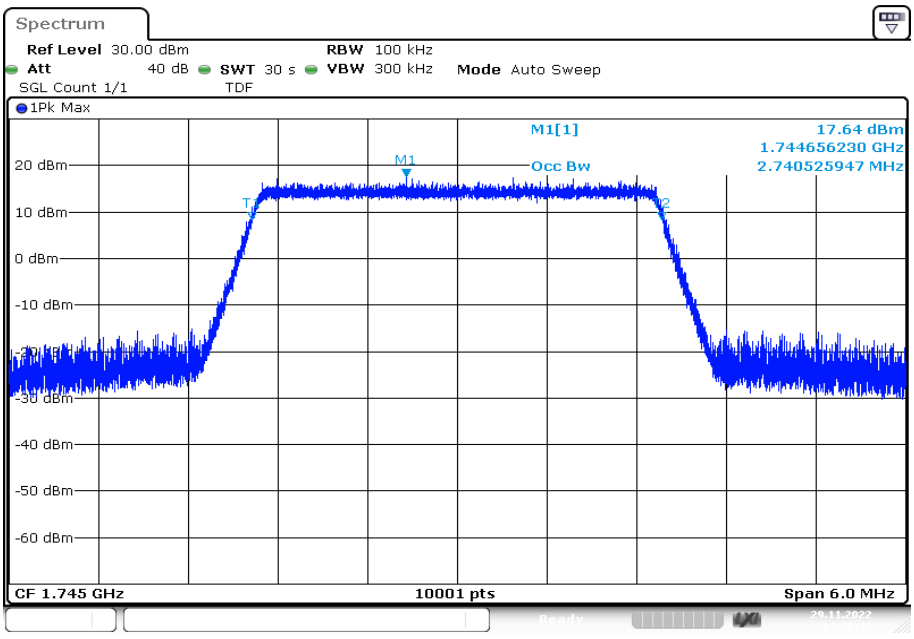
**Plot 79:** 3 MHz – 64-QAM - lowest channel (99% - OBW)



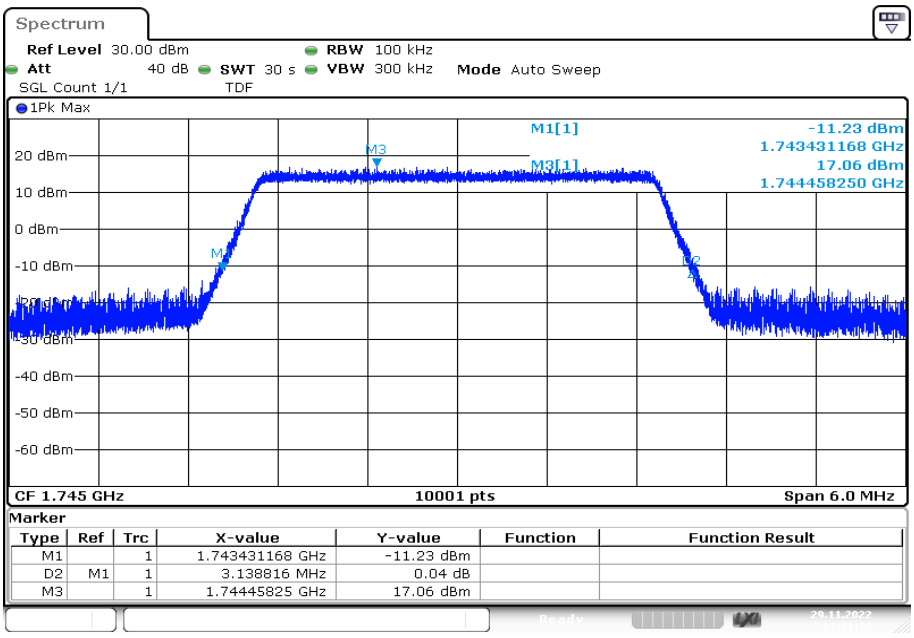

**Plot 80:** 3 MHz – 64-QAM - lowest channel (-26 dBc BW)



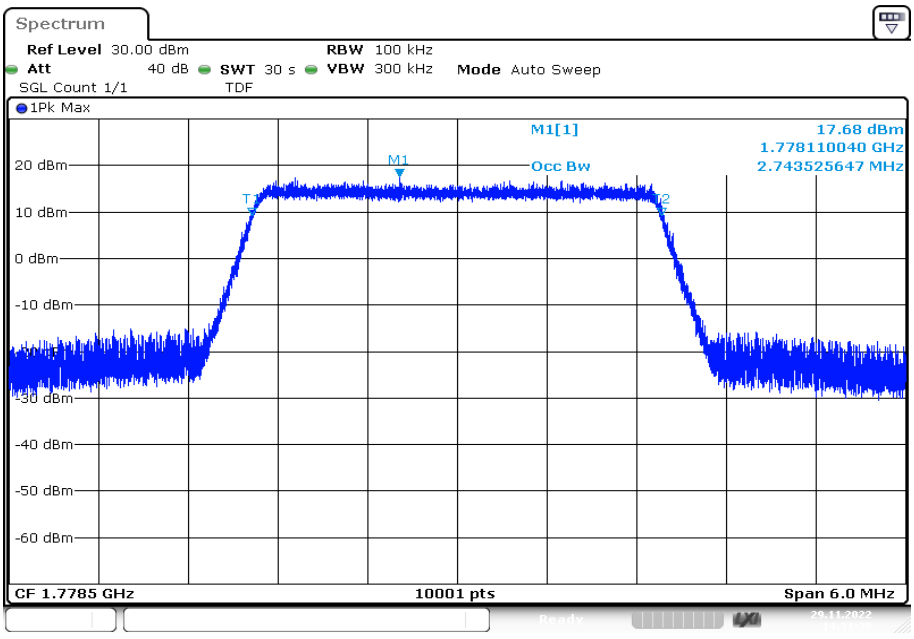
**Plot 81:** 3 MHz – 64-QAM - middle channel (99% - OBW)



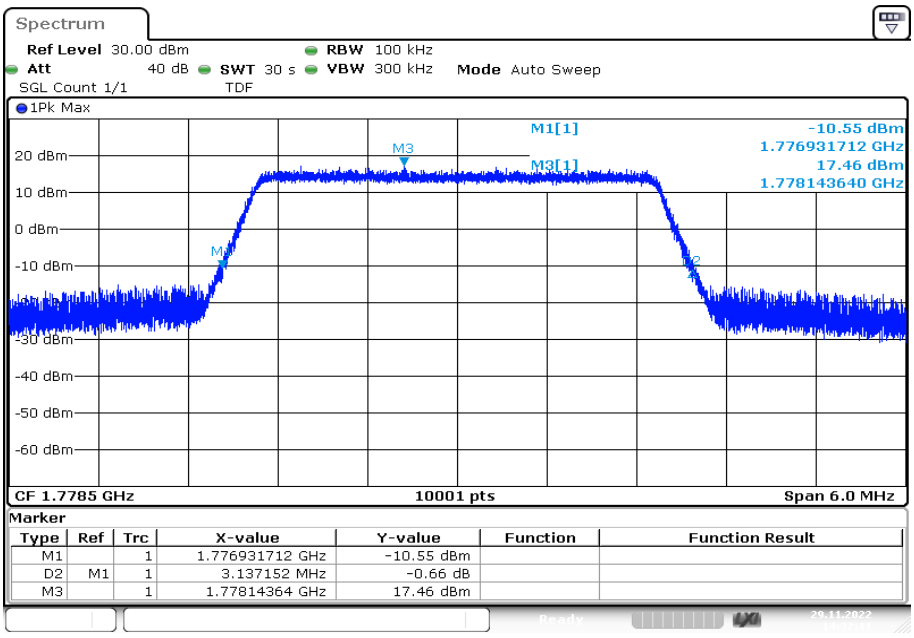

**Plot 82:** 3 MHz – 64-QAM - middle channel (-26 dBc BW)



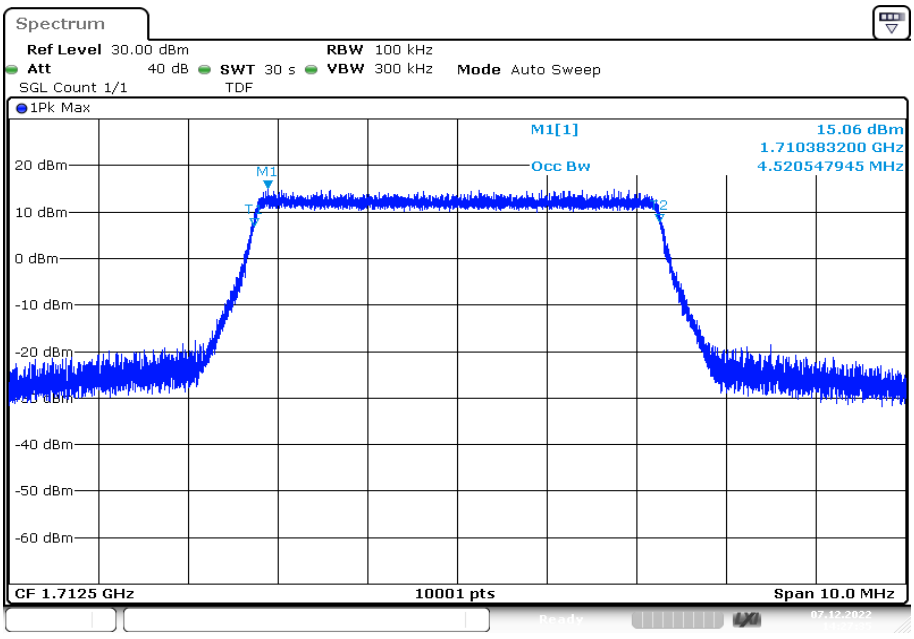
**Plot 83:** 3 MHz – 64-QAM - highest channel (99% - OBW)



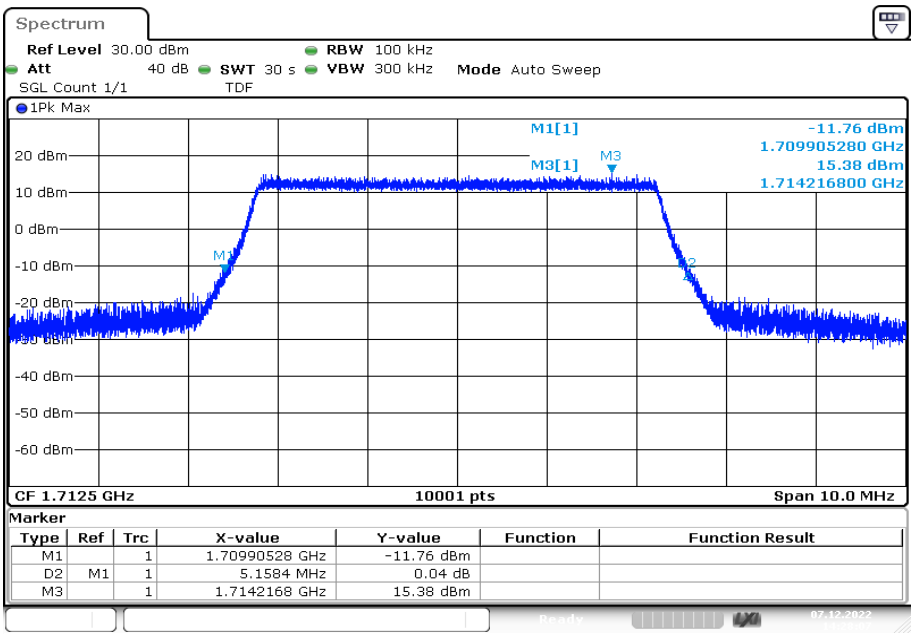

**Plot 84:** 3 MHz – 64-QAM - highest channel (-26 dBc BW)



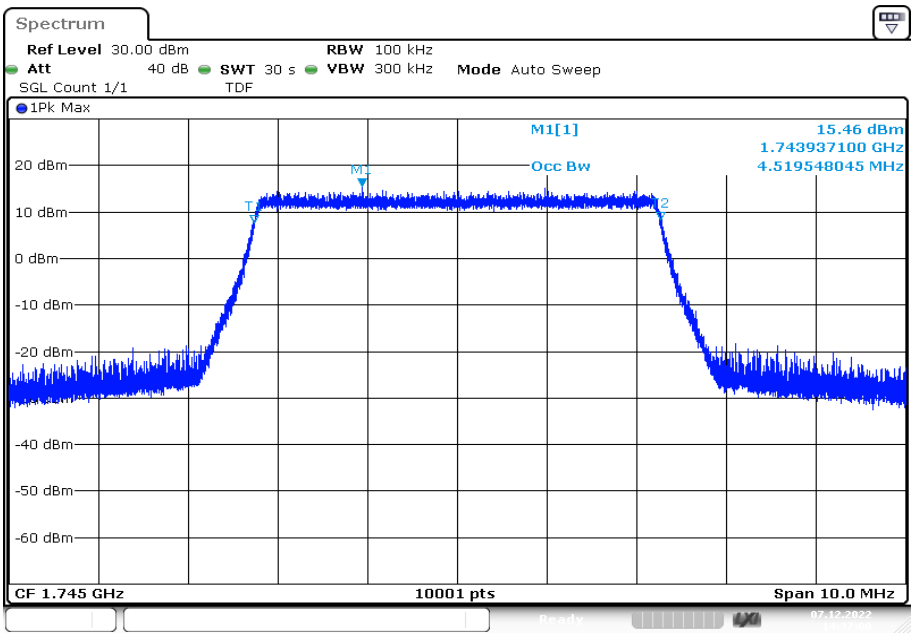
**Plot 85:** 5 MHz – 64-QAM - lowest channel (99% - OBW)



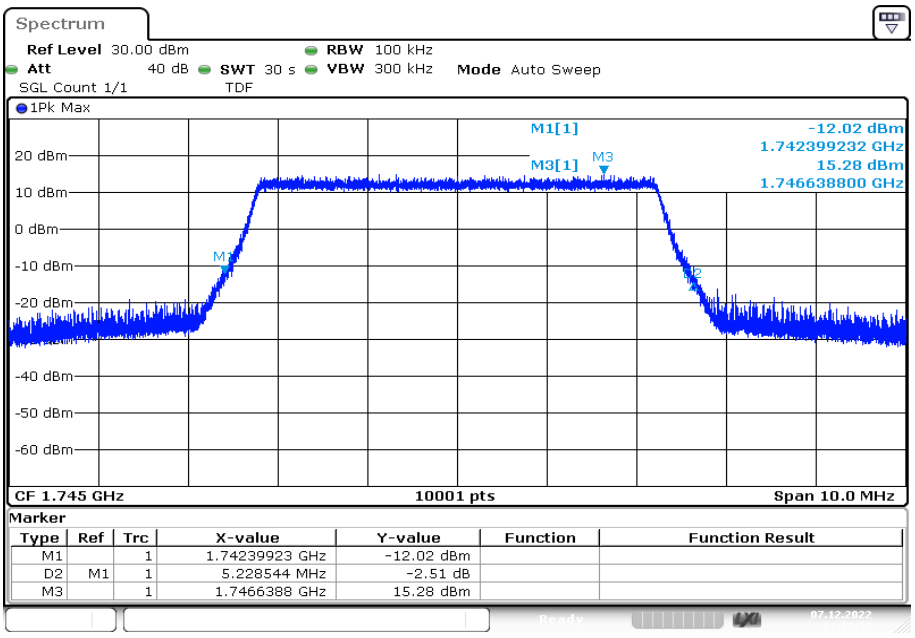

**Plot 86:** 5 MHz – 64-QAM - lowest channel (-26 dBc BW)



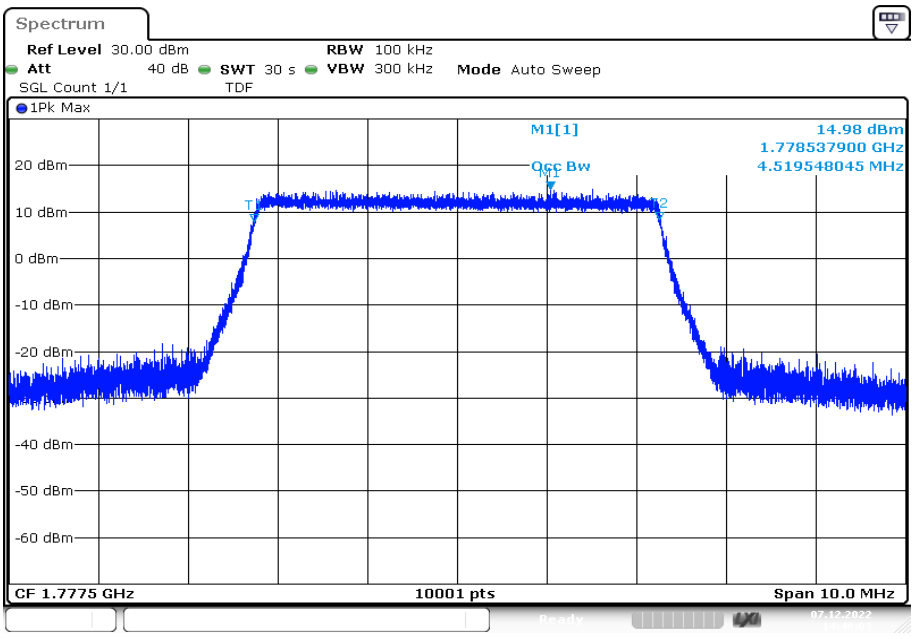
**Plot 87:** 5 MHz – 64-QAM - middle channel (99% - OBW)




**Plot 88:** 5 MHz – 64-QAM - middle channel (-26 dBc BW)



**Plot 89:** 5 MHz – 64-QAM - highest channel (99% - OBW)

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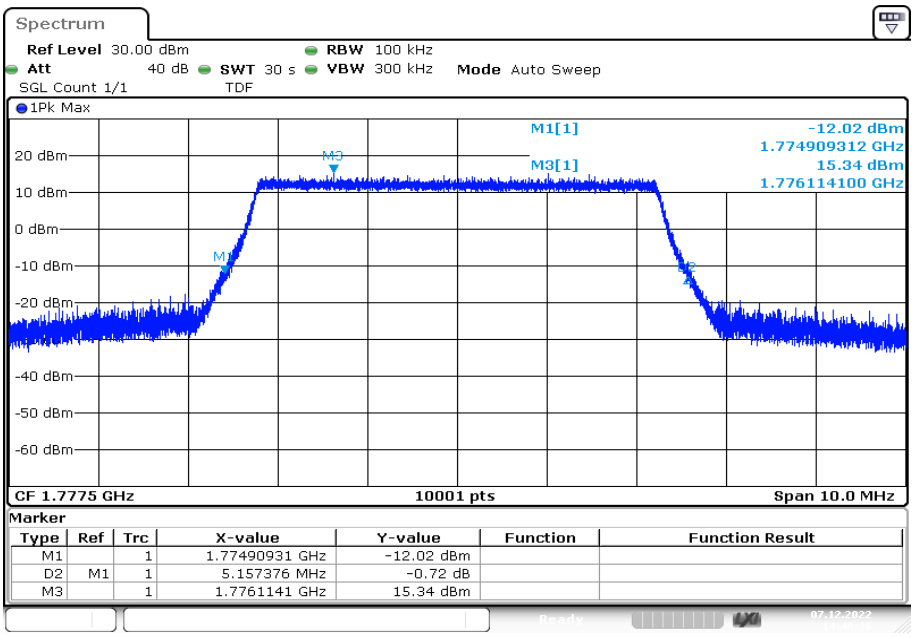
**Plot 90:** 5 MHz – 64-QAM - highest channel (-26 dBc BW)

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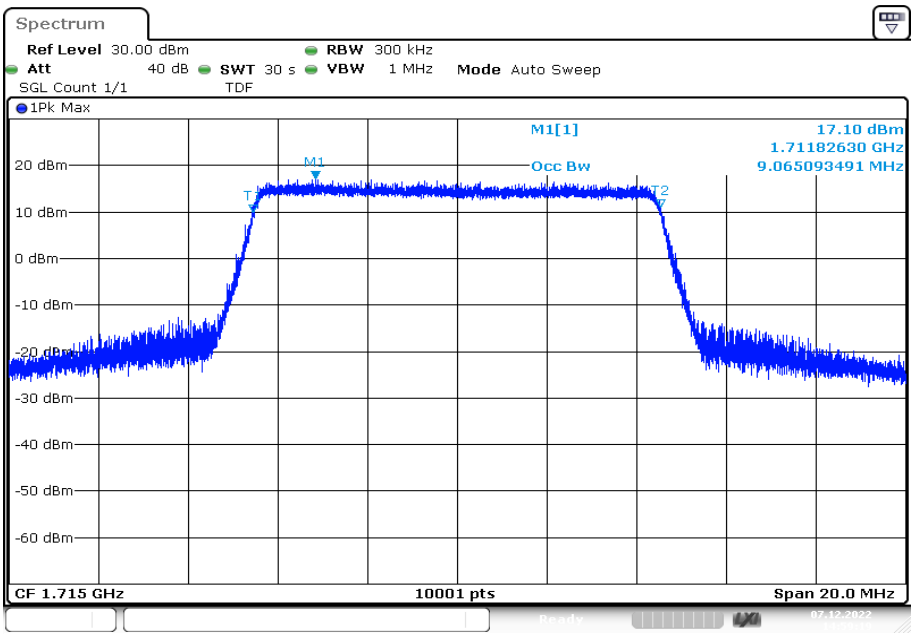
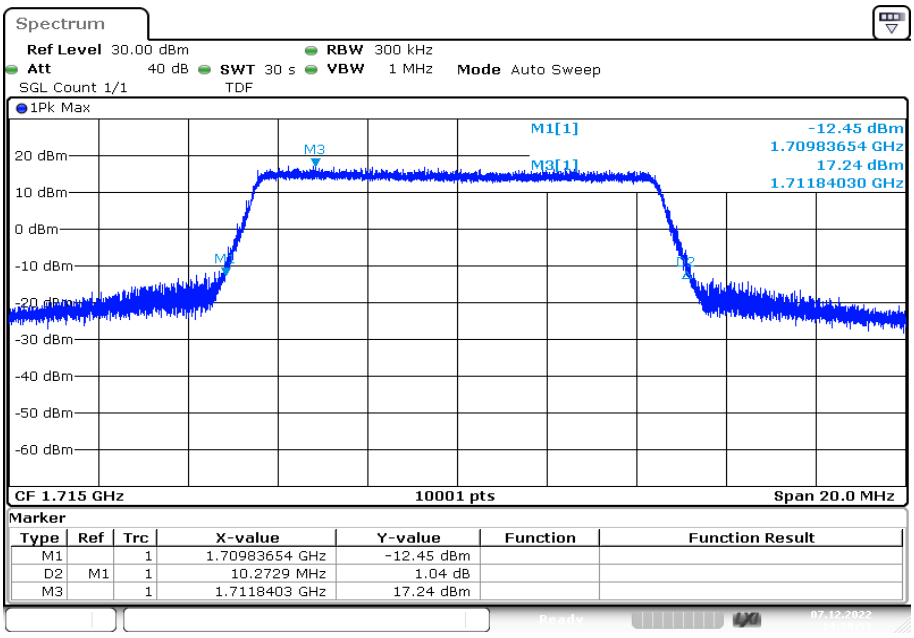
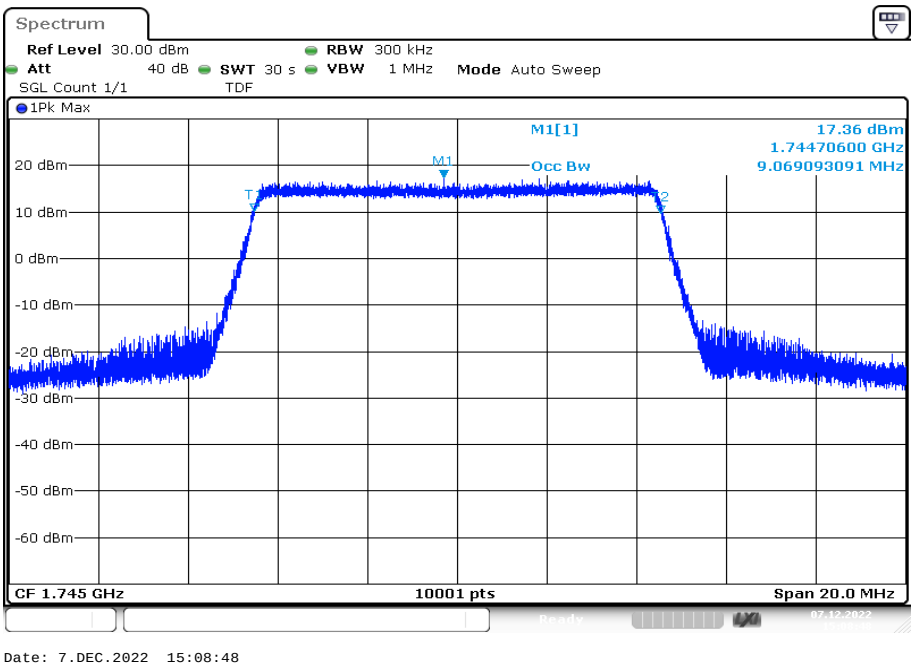
**Plot 91:** 10 MHz – 64-QAM - lowest channel (99% - OBW)



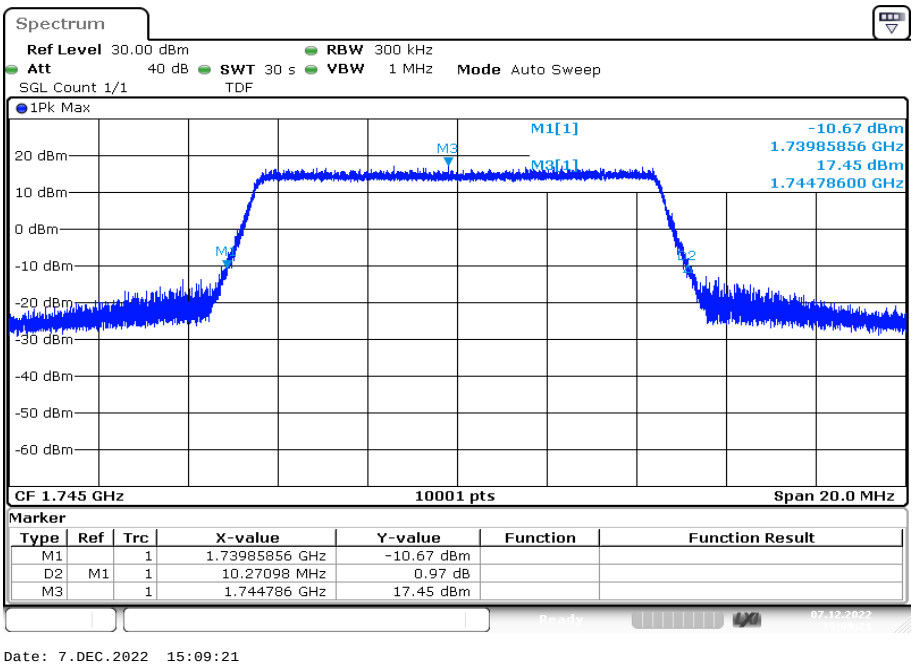

**Plot 92:** 10 MHz – 64-QAM - lowest channel (-26 dBc BW)



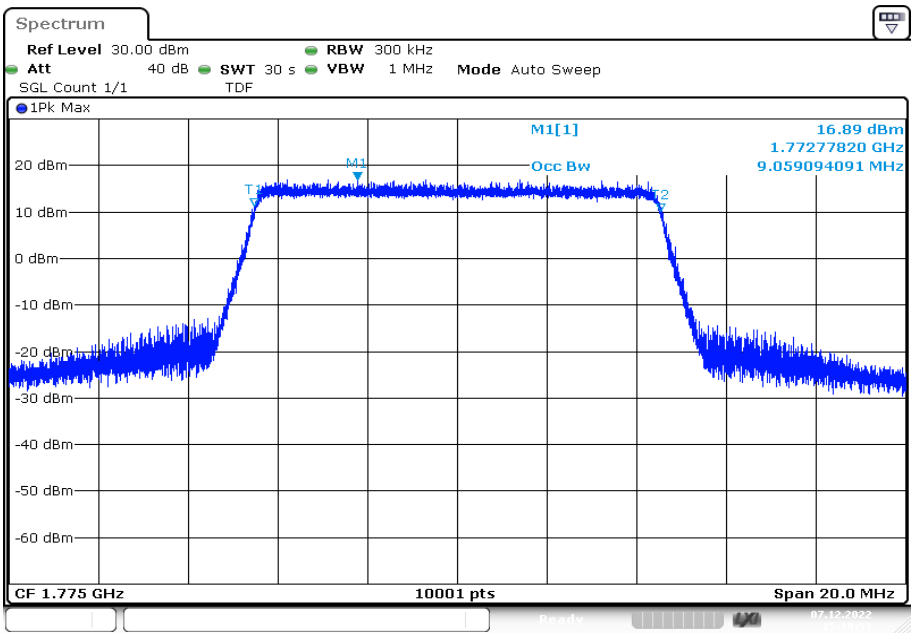
**Plot 93:** 10 MHz – 64-QAM - middle channel (99% - OBW)



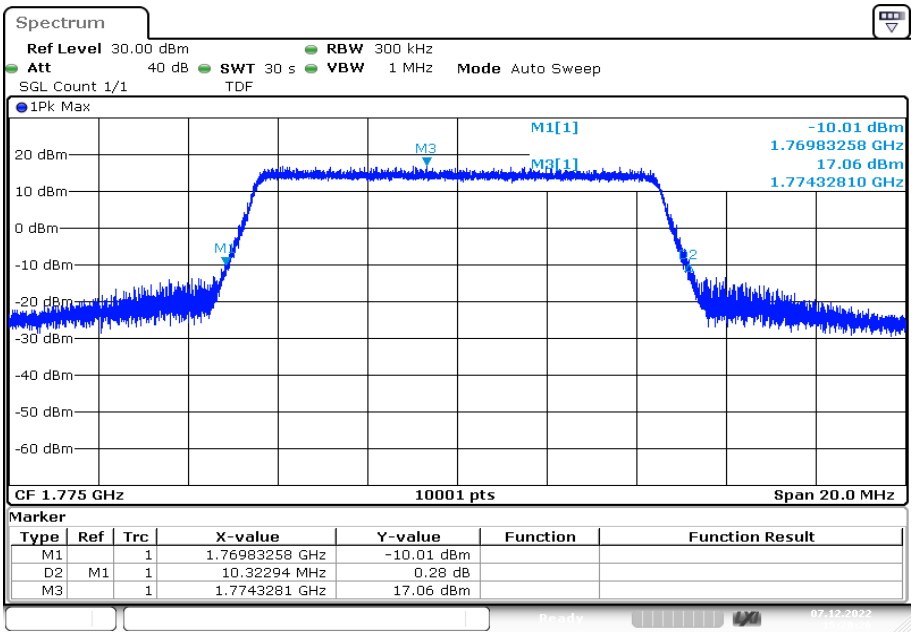

**Plot 94:** 10 MHz – 64-QAM - middle channel (-26 dBc BW)



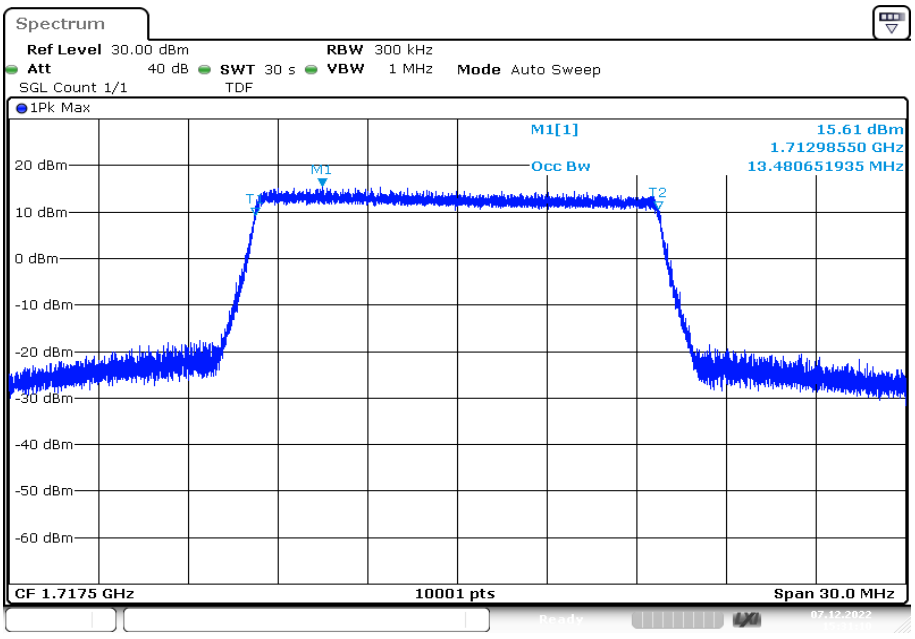
**Plot 95:** 10 MHz – 64-QAM - highest channel (99% - OBW)



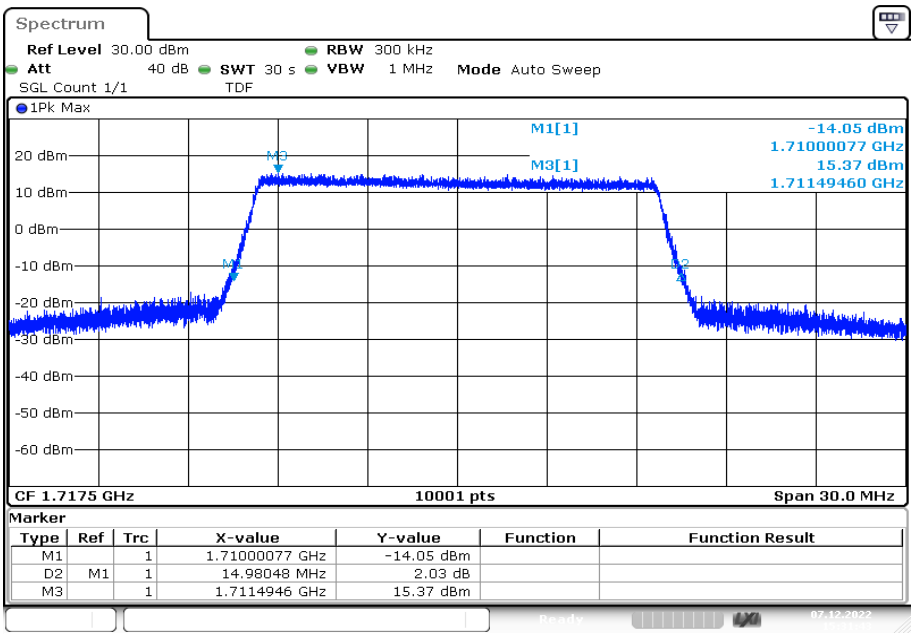

**Plot 96:** 10 MHz – 64-QAM - highest channel (-26 dBc BW)



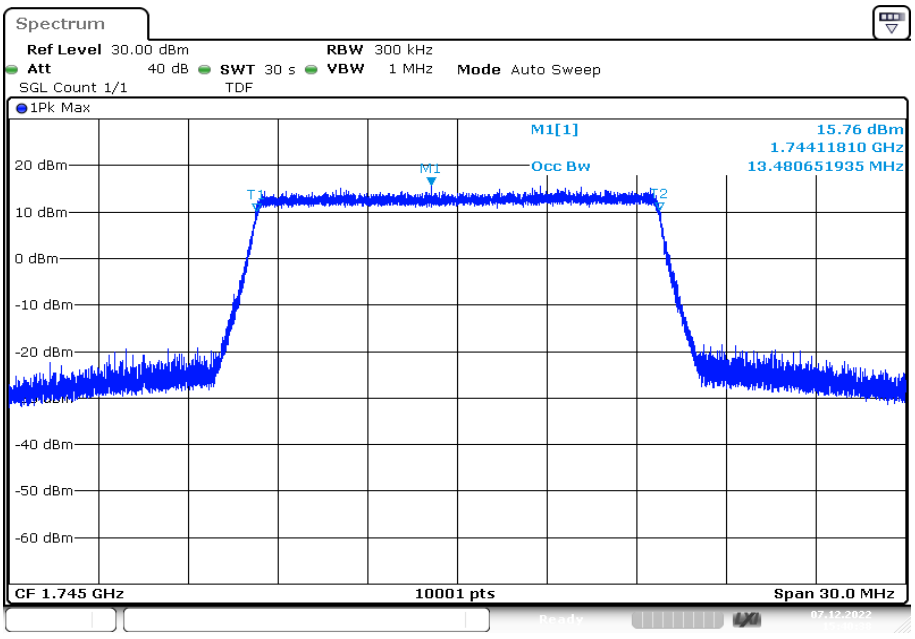
**Plot 97:** 15 MHz – 16-QAM - lowest channel (99% - OBW)



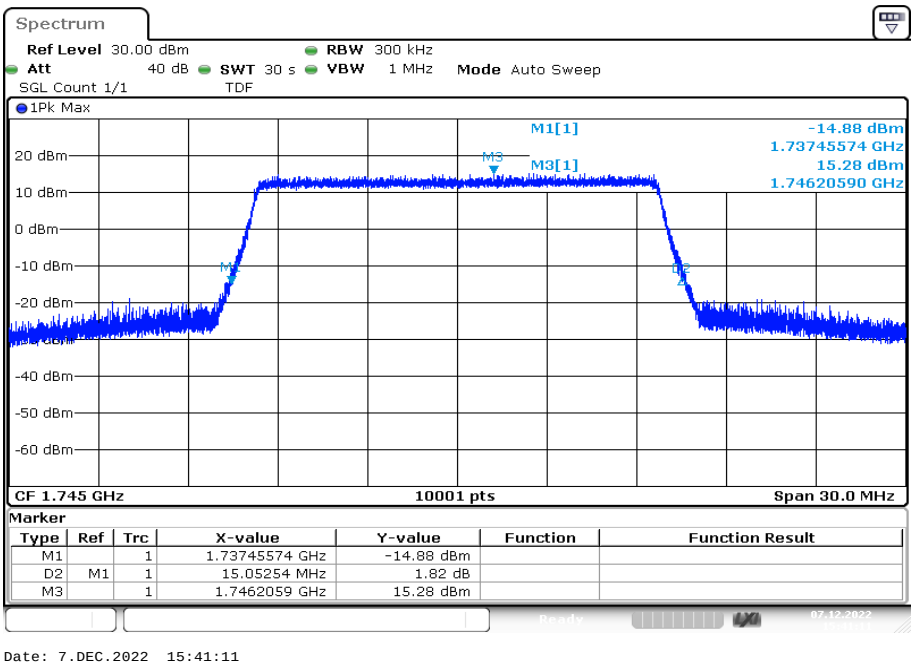

**Plot 98:** 15 MHz – 16-QAM - lowest channel (-26 dBc BW)



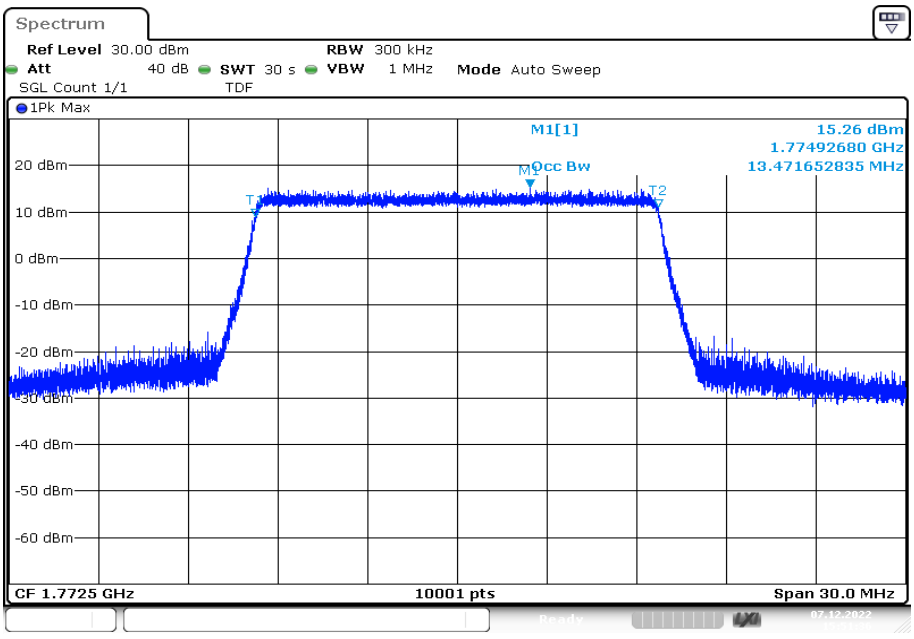
**Plot 99:** 15 MHz – 64-QAM - middle channel (99% - OBW)



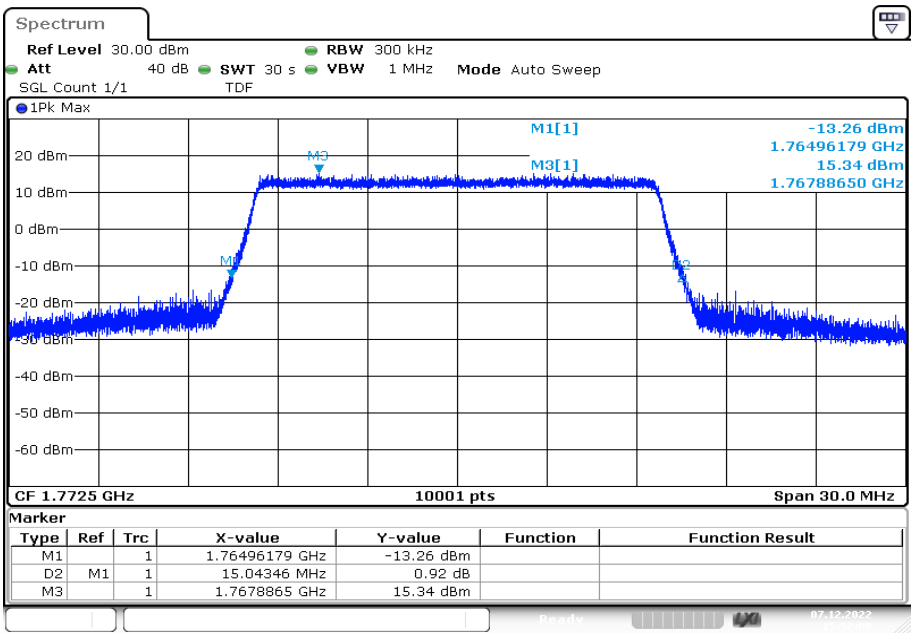

**Plot 100:** 15 MHz – 64-QAM - middle channel (-26 dBc BW)



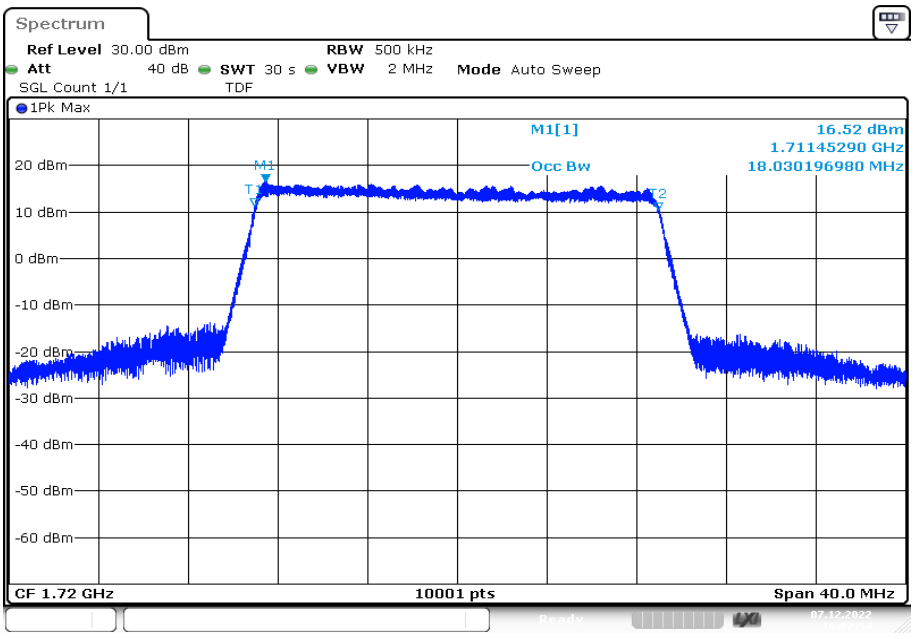
**Plot 101:** 15 MHz – 64-QAM - highest channel (99% - OBW)



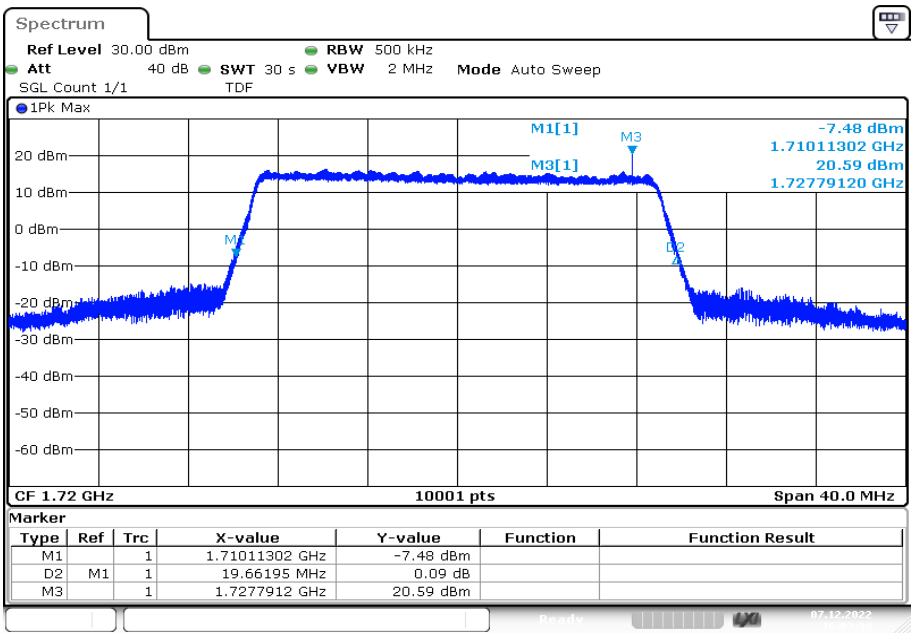

**Plot 102:** 15 MHz – 64-QAM - highest channel (-26 dBc BW)



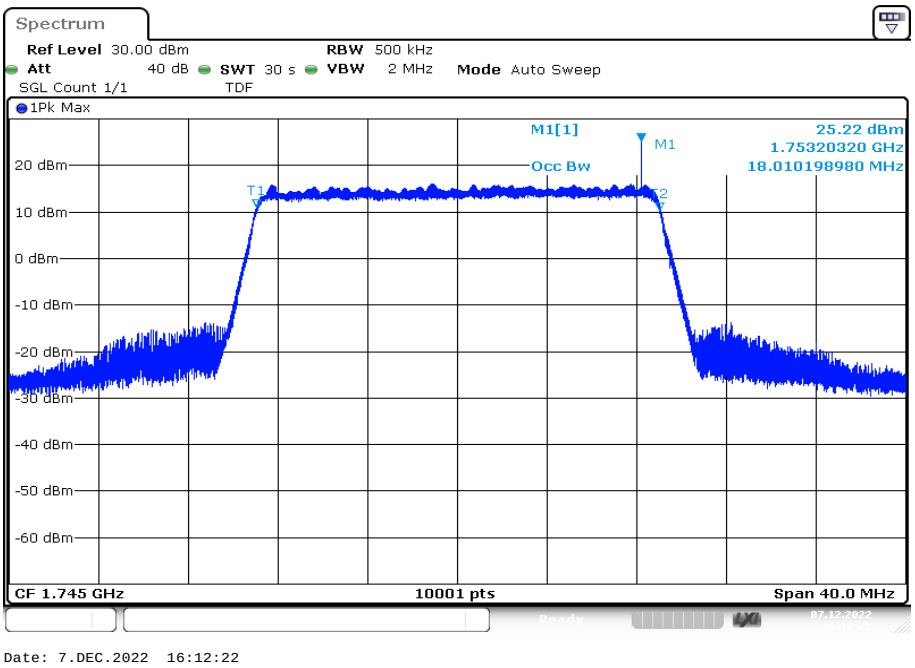
**Plot 103:** 20 MHz – 64-QAM - lowest channel (99% - OBW)




**Plot 104:** 20 MHz – 64-QAM - lowest channel (-26 dBc BW)

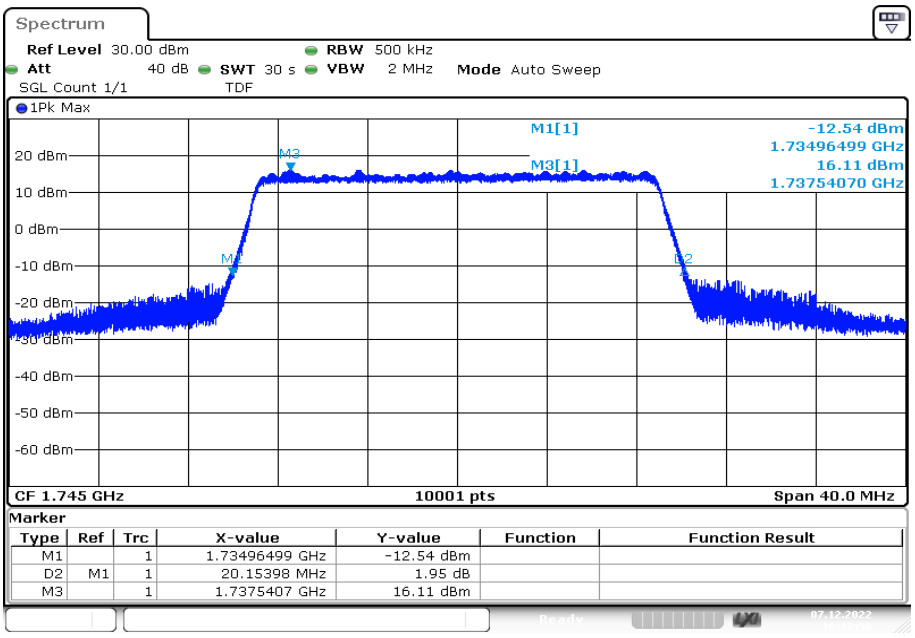


**Plot 105:** 20 MHz – 64-QAM - middle channel (99% - OBW)



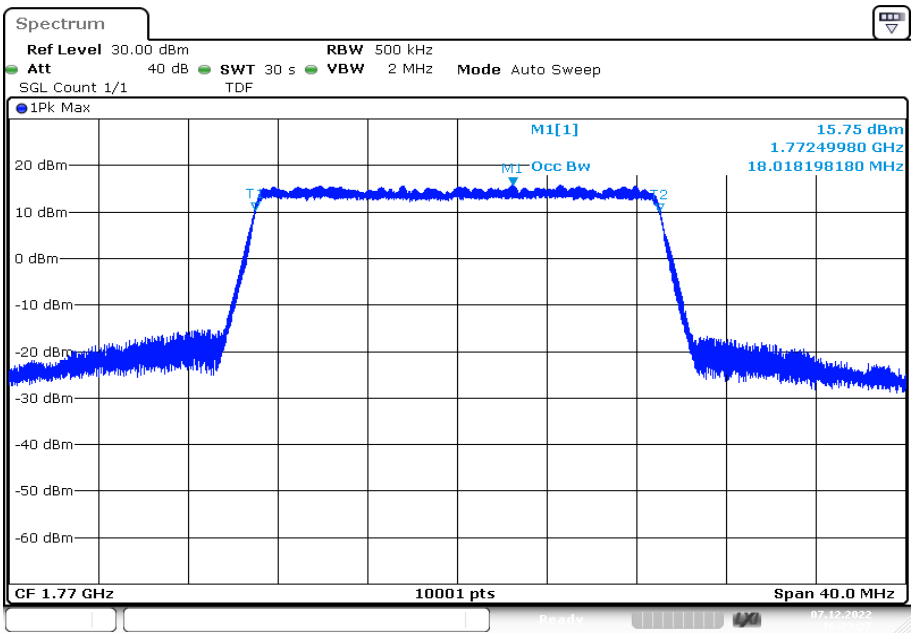

Date: 7.DEC.2022 16:12:22

**Plot 106:** 20 MHz – 64-QAM - middle channel (-26 dBc BW)



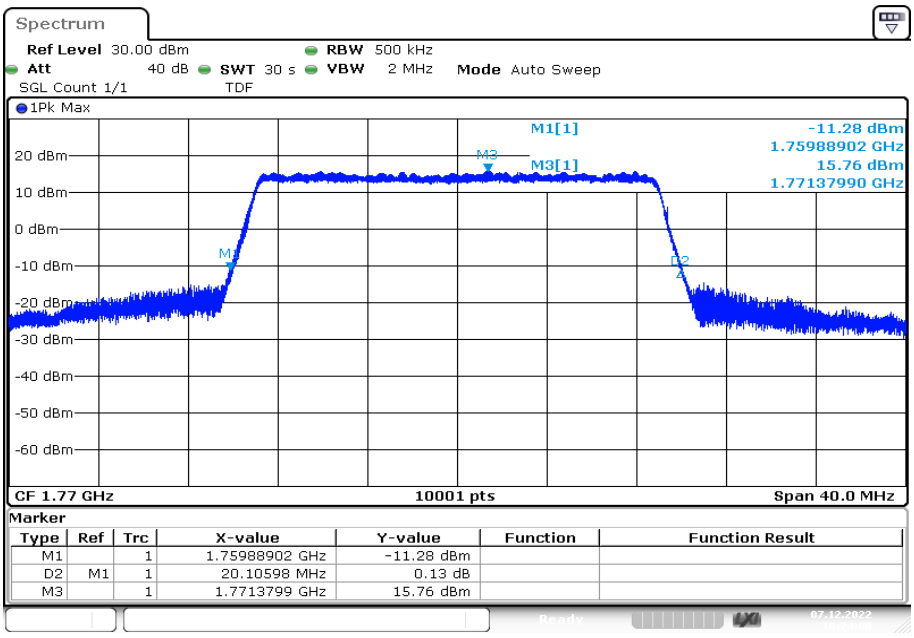

Date: 7.DEC.2022 16:12:56

**Plot 107:** 20 MHz – 64-QAM - highest channel (99% - OBW)




Date: 7.DEC.2022 16:23:27

**Plot 108:** 20 MHz – 64-QAM - highest channel (-26 dBc BW)

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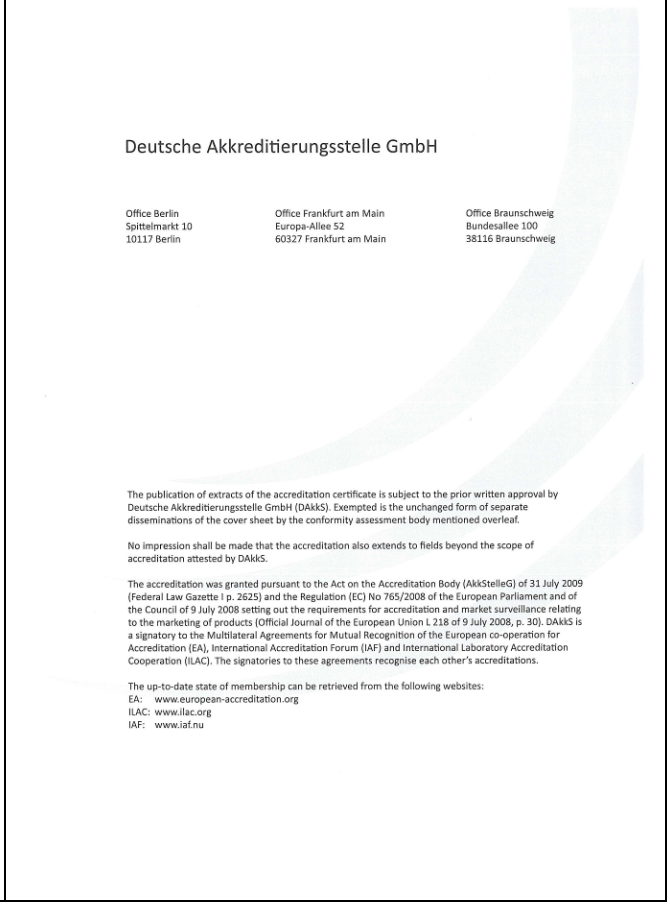
## 13 Glossary

| | |
|---|---|
| **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 | 2023-01-17 |

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

| first page | last page |
|---|---|
|  |  |



**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

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