12.2.5 Block edge compliance

Description:

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

Measurement:

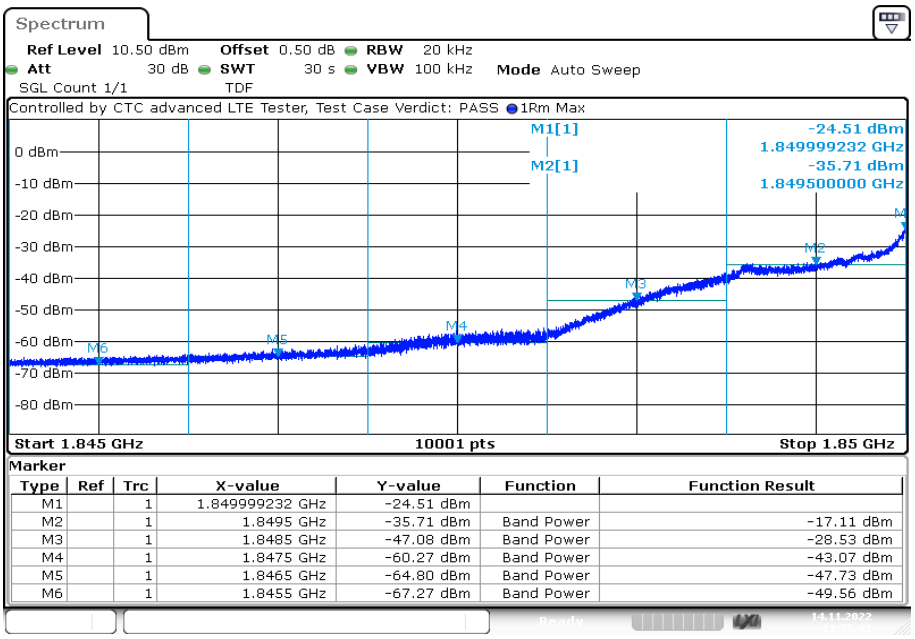
Measurement parameters	
Detector:	RMS
Sweep time:	180 sec.
Video bandwidth:	100 kHz
Resolution bandwidth:	20 kHz
Span:	1 MHz steps
Trace-Mode:	Max Hold
Used equipment:	See chapter 8.4 setup A
Measurement uncertainty:	See chapter 9
Measurement procedure	FCC: § 2.1051

Limits:

FCC
§ 24.238 (a) & (b)
(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least **43 + 10 log(P) dB**. (b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
-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



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849999232 GHz	-24.51 dBm		
M2		1	1.8495 GHz	-35.71 dBm	Band Power	-17.11 dBm
M3		1	1.8485 GHz	-47.08 dBm	Band Power	-28.53 dBm
M4		1	1.8475 GHz	-60.27 dBm	Band Power	-43.07 dBm
M5		1	1.8465 GHz	-64.80 dBm	Band Power	-47.73 dBm
M6		1	1.8455 GHz	-67.27 dBm	Band Power	-49.56 dBm

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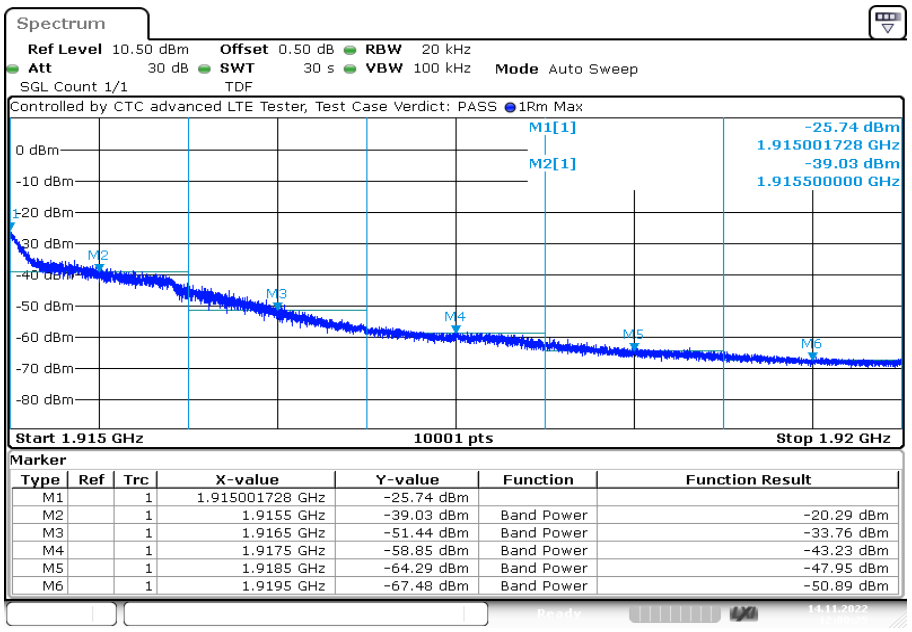
Plot 2: 1.4 MHz – QPSK - Highest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915001728 GHz	-25.74 dBm		
M2		1	1.9155 GHz	-39.03 dBm	Band Power	-20.29 dBm
M3		1	1.9165 GHz	-51.44 dBm	Band Power	-33.76 dBm
M4		1	1.9175 GHz	-58.85 dBm	Band Power	-43.23 dBm
M5		1	1.9185 GHz	-64.29 dBm	Band Power	-47.95 dBm
M6		1	1.9195 GHz	-67.48 dBm	Band Power	-50.89 dBm

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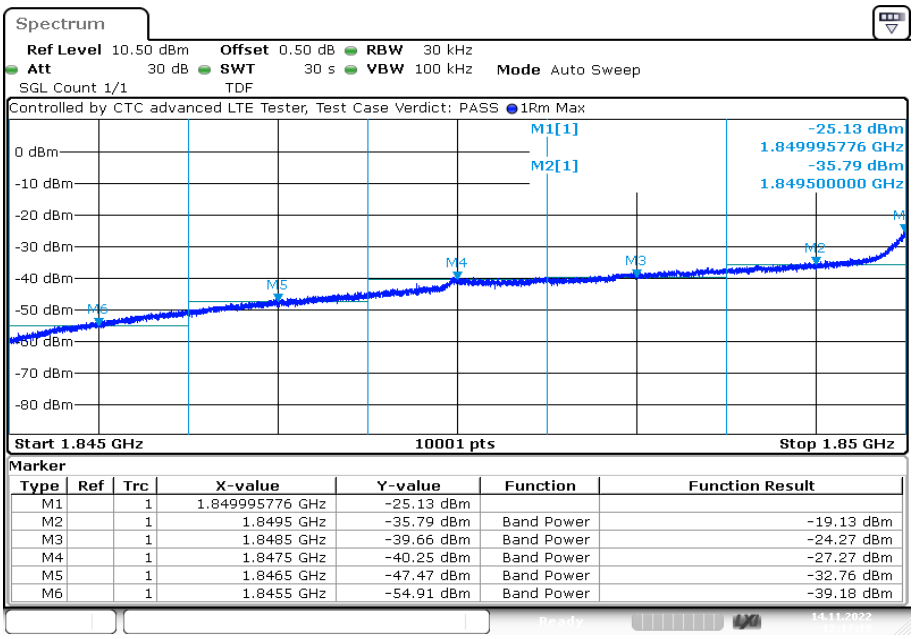
Plot 3: 3 MHz – QPSK - Lowest channel

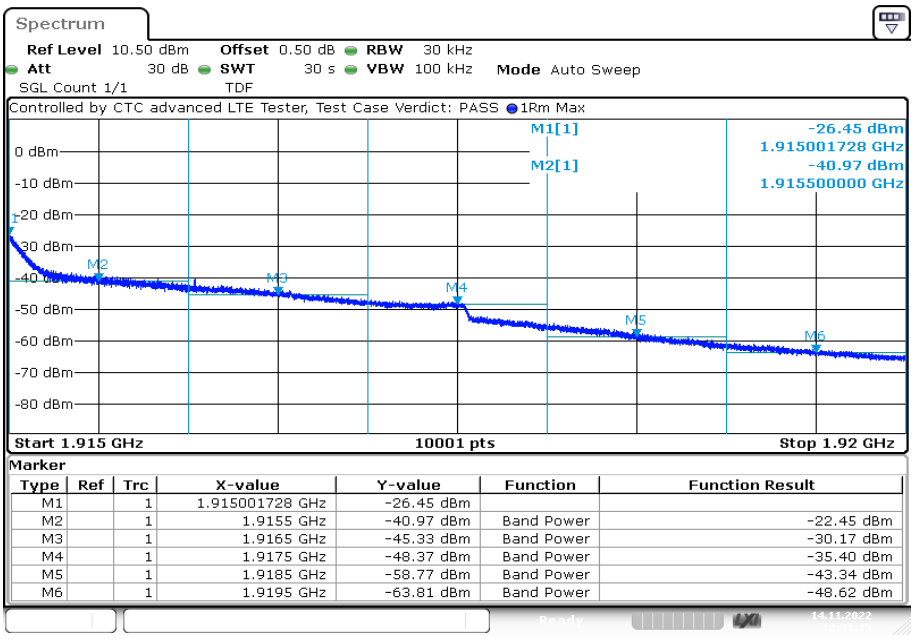


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849995776 GHz	-25.13 dBm		
M2		1	1.8495 GHz	-35.79 dBm	Band Power	-19.13 dBm
M3		1	1.8485 GHz	-39.66 dBm	Band Power	-24.27 dBm
M4		1	1.8475 GHz	-40.25 dBm	Band Power	-27.27 dBm
M5		1	1.8465 GHz	-47.47 dBm	Band Power	-32.76 dBm
M6		1	1.8455 GHz	-54.91 dBm	Band Power	-39.18 dBm

Date: 14.NOV.2022 12:17:20

Plot 4: 3 MHz – QPSK - Highest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915001728 GHz	-26.45 dBm		
M2		1	1.9155 GHz	-40.97 dBm	Band Power	-22.45 dBm
M3		1	1.9165 GHz	-45.33 dBm	Band Power	-30.17 dBm
M4		1	1.9175 GHz	-48.37 dBm	Band Power	-35.40 dBm
M5		1	1.9185 GHz	-58.77 dBm	Band Power	-43.34 dBm
M6		1	1.9195 GHz	-63.81 dBm	Band Power	-48.62 dBm

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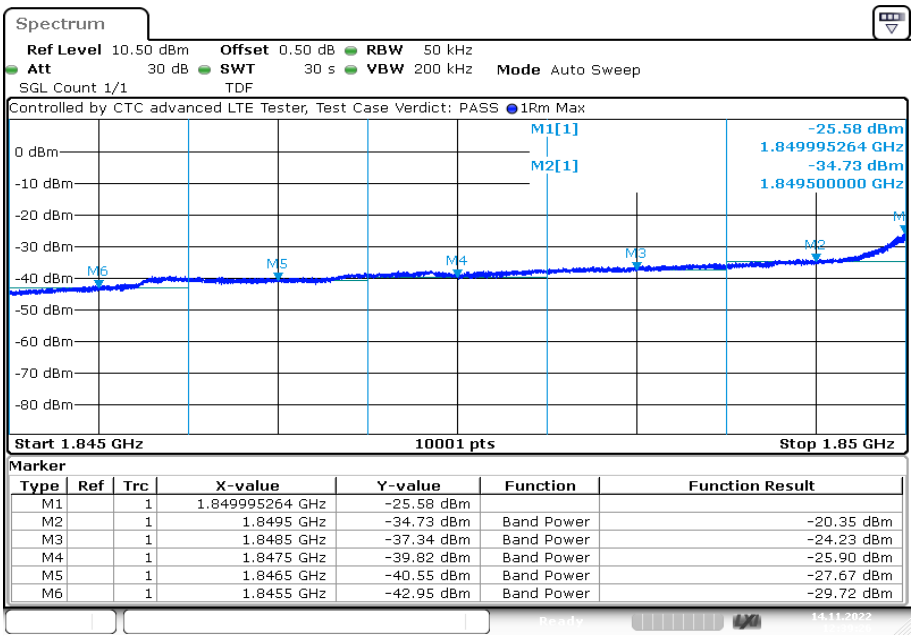
Plot 5: 5 MHz – QPSK - Lowest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849995264 GHz	-25.58 dBm		
M2		1	1.8495 GHz	-34.73 dBm	Band Power	-20.35 dBm
M3		1	1.8485 GHz	-37.34 dBm	Band Power	-24.23 dBm
M4		1	1.8475 GHz	-39.82 dBm	Band Power	-25.90 dBm
M5		1	1.8465 GHz	-40.55 dBm	Band Power	-27.67 dBm
M6		1	1.8455 GHz	-42.95 dBm	Band Power	-29.72 dBm

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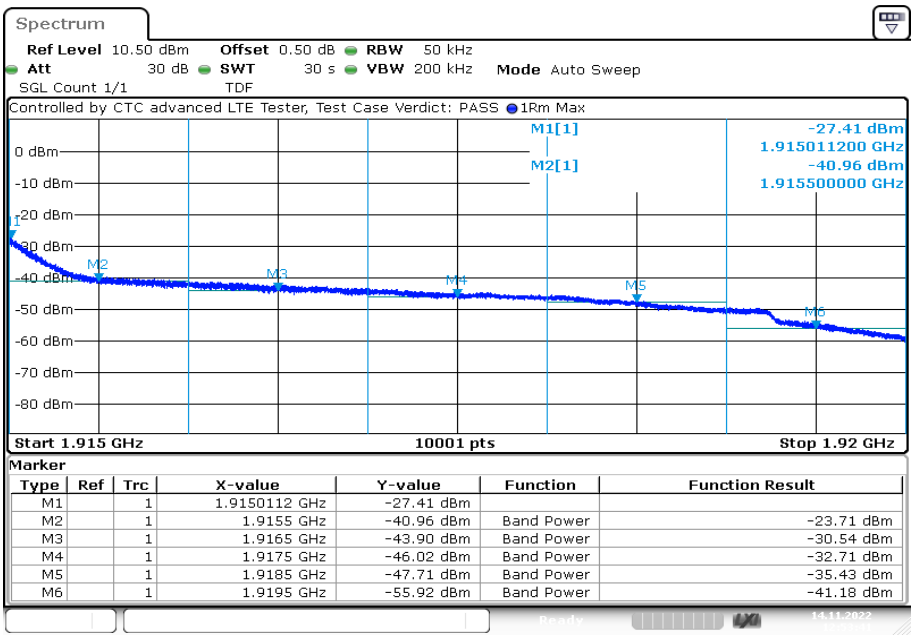
Plot 6: 5 MHz – QPSK - Highest channel

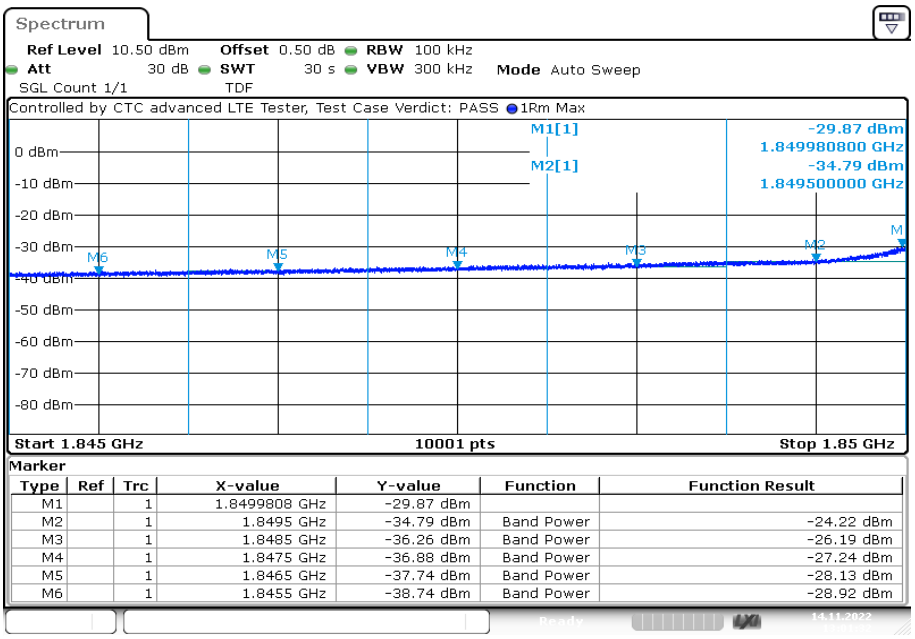


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.9150112 GHz	-27.41 dBm		
M2		1	1.9155 GHz	-40.96 dBm	Band Power	-23.71 dBm
M3		1	1.9165 GHz	-43.90 dBm	Band Power	-30.54 dBm
M4		1	1.9175 GHz	-46.02 dBm	Band Power	-32.71 dBm
M5		1	1.9185 GHz	-47.71 dBm	Band Power	-35.43 dBm
M6		1	1.9195 GHz	-55.92 dBm	Band Power	-41.18 dBm

Date: 14.NOV.2022 12:53:41

Plot 7: 10 MHz – QPSK - Lowest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.8499808 GHz	-29.87 dBm		
M2		1	1.8495 GHz	-34.79 dBm	Band Power	-24.22 dBm
M3		1	1.8485 GHz	-36.26 dBm	Band Power	-26.19 dBm
M4		1	1.8475 GHz	-36.88 dBm	Band Power	-27.24 dBm
M5		1	1.8465 GHz	-37.74 dBm	Band Power	-28.13 dBm
M6		1	1.8455 GHz	-38.74 dBm	Band Power	-28.92 dBm

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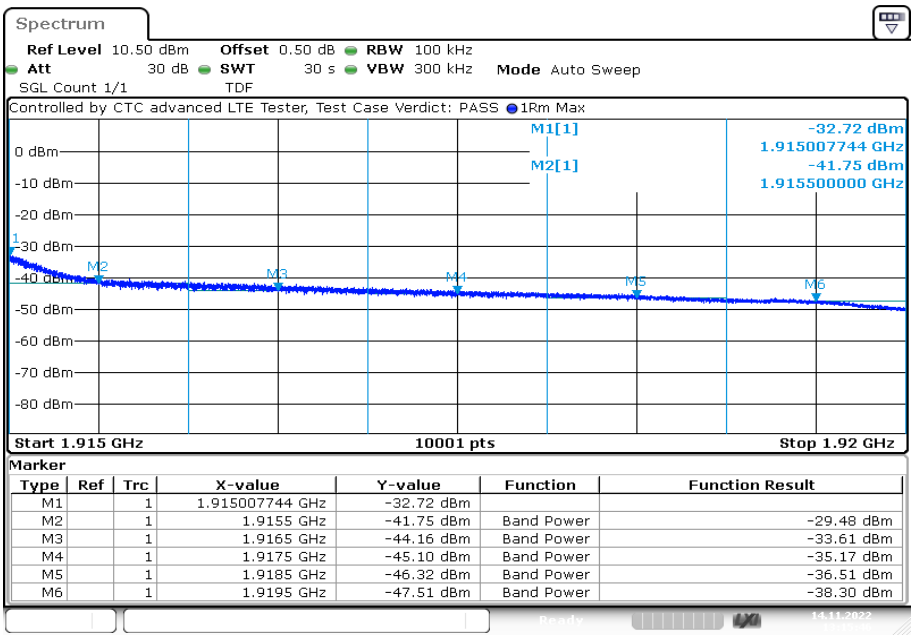
Plot 8: 10 MHz – QPSK - Highest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915007744 GHz	-32.72 dBm		
M2		1	1.9155 GHz	-41.75 dBm	Band Power	-29.48 dBm
M3		1	1.9165 GHz	-44.16 dBm	Band Power	-33.61 dBm
M4		1	1.9175 GHz	-45.10 dBm	Band Power	-35.17 dBm
M5		1	1.9185 GHz	-46.32 dBm	Band Power	-36.51 dBm
M6		1	1.9195 GHz	-47.51 dBm	Band Power	-38.30 dBm

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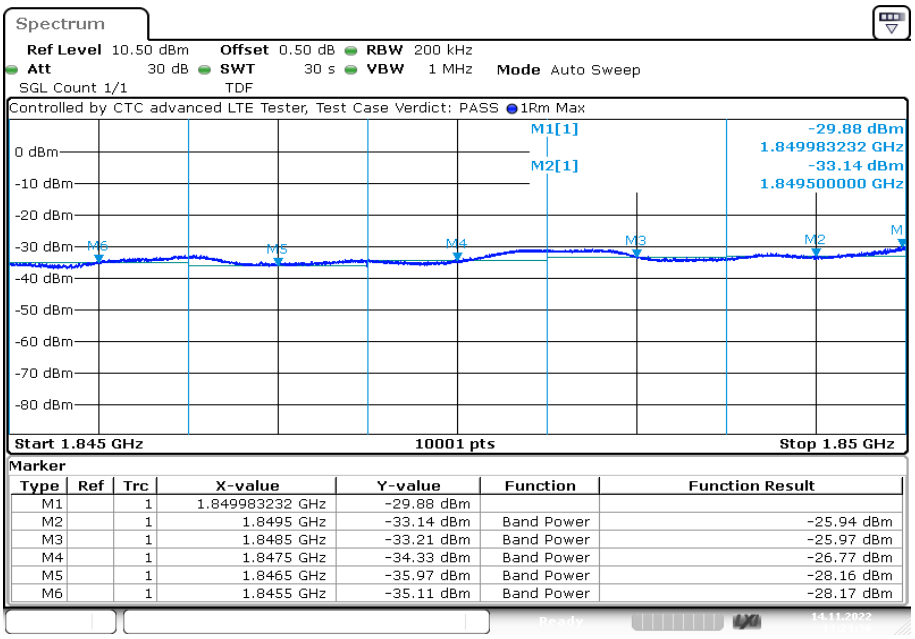
Plot 9: 15 MHz – QPSK - Lowest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849983232 GHz	-29.88 dBm		
M2		1	1.8495 GHz	-33.14 dBm	Band Power	-25.94 dBm
M3		1	1.8485 GHz	-33.21 dBm	Band Power	-25.97 dBm
M4		1	1.8475 GHz	-34.33 dBm	Band Power	-26.77 dBm
M5		1	1.8465 GHz	-35.97 dBm	Band Power	-28.16 dBm
M6		1	1.8455 GHz	-35.11 dBm	Band Power	-28.17 dBm

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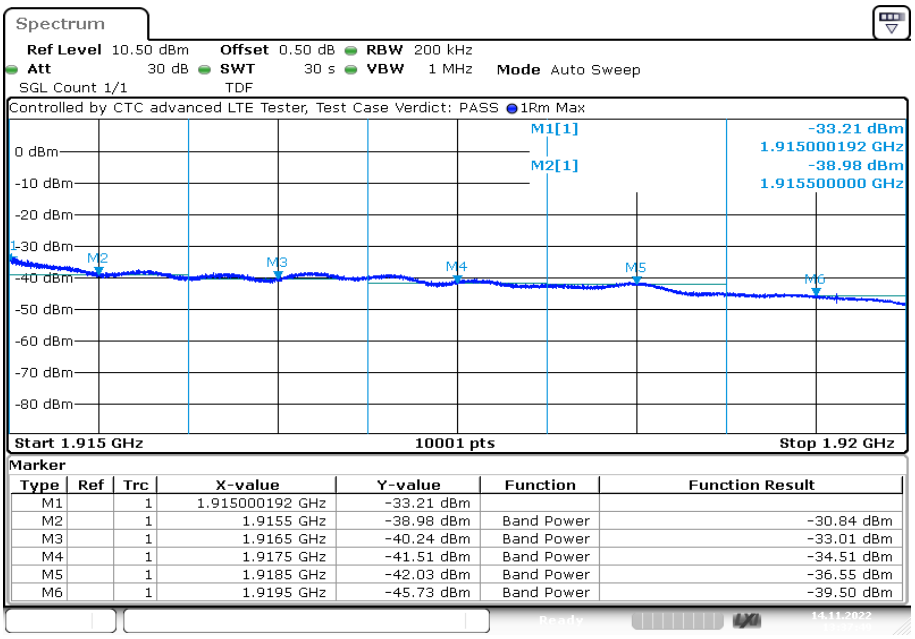
Plot 10: 15 MHz – QPSK - Highest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915000192 GHz	-33.21 dBm		
M2		1	1.9155 GHz	-38.98 dBm	Band Power	-30.84 dBm
M3		1	1.9165 GHz	-40.24 dBm	Band Power	-33.01 dBm
M4		1	1.9175 GHz	-41.51 dBm	Band Power	-34.51 dBm
M5		1	1.9185 GHz	-42.03 dBm	Band Power	-36.55 dBm
M6		1	1.9195 GHz	-45.73 dBm	Band Power	-39.50 dBm

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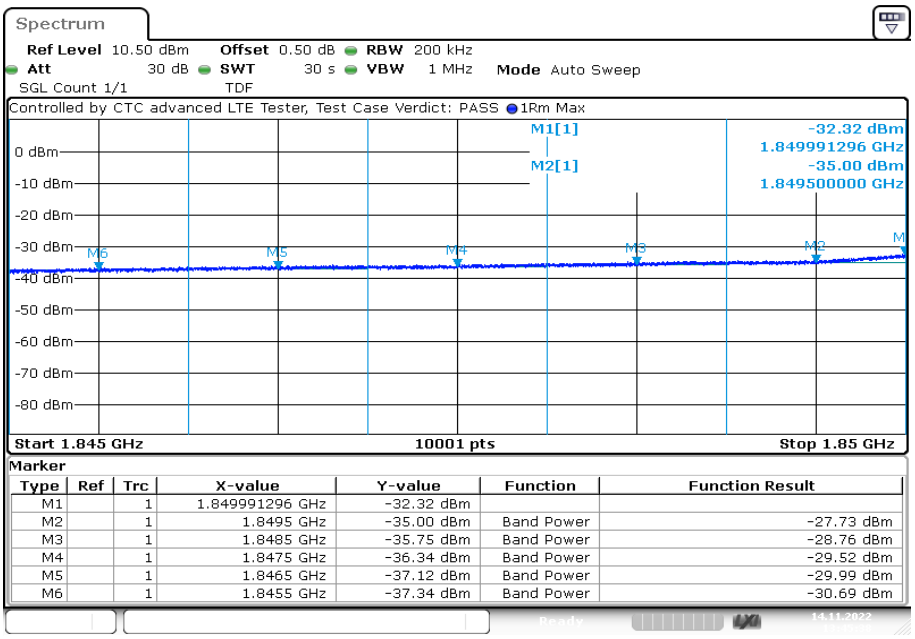
Plot 11: 20 MHz – QPSK - Lowest channel

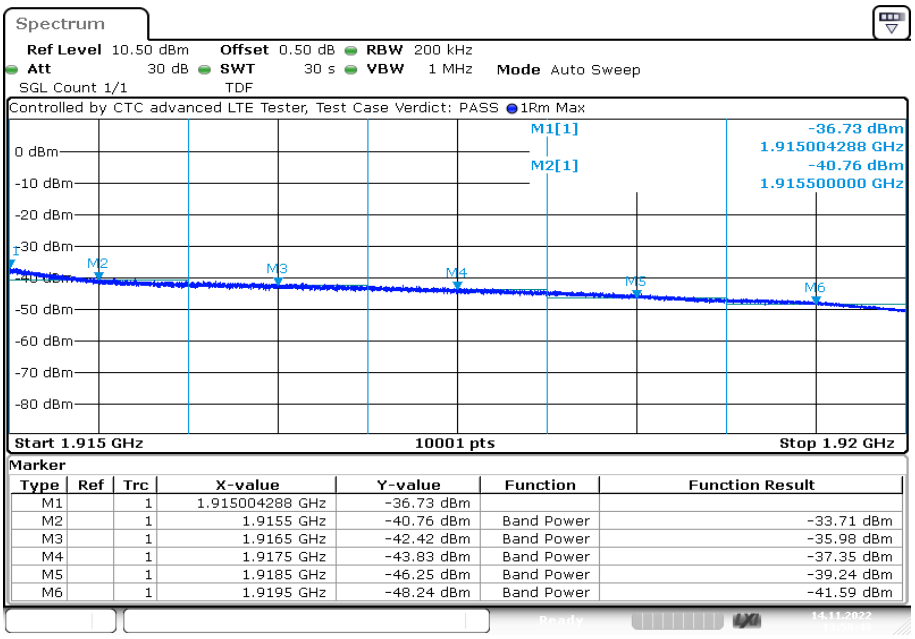


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849991296 GHz	-32.32 dBm		
M2		1	1.8495 GHz	-35.00 dBm	Band Power	-27.73 dBm
M3		1	1.8485 GHz	-35.75 dBm	Band Power	-28.76 dBm
M4		1	1.8475 GHz	-36.34 dBm	Band Power	-29.52 dBm
M5		1	1.8465 GHz	-37.12 dBm	Band Power	-29.99 dBm
M6		1	1.8455 GHz	-37.34 dBm	Band Power	-30.69 dBm

Date: 14.NOV.2022 13:45:38

Plot 12: 20 MHz – QPSK - Highest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915004288 GHz	-36.73 dBm		
M2		1	1.9155 GHz	-40.76 dBm	Band Power	-33.71 dBm
M3		1	1.9165 GHz	-42.42 dBm	Band Power	-35.98 dBm
M4		1	1.9175 GHz	-43.83 dBm	Band Power	-37.35 dBm
M5		1	1.9185 GHz	-46.25 dBm	Band Power	-39.24 dBm
M6		1	1.9195 GHz	-48.24 dBm	Band Power	-41.59 dBm

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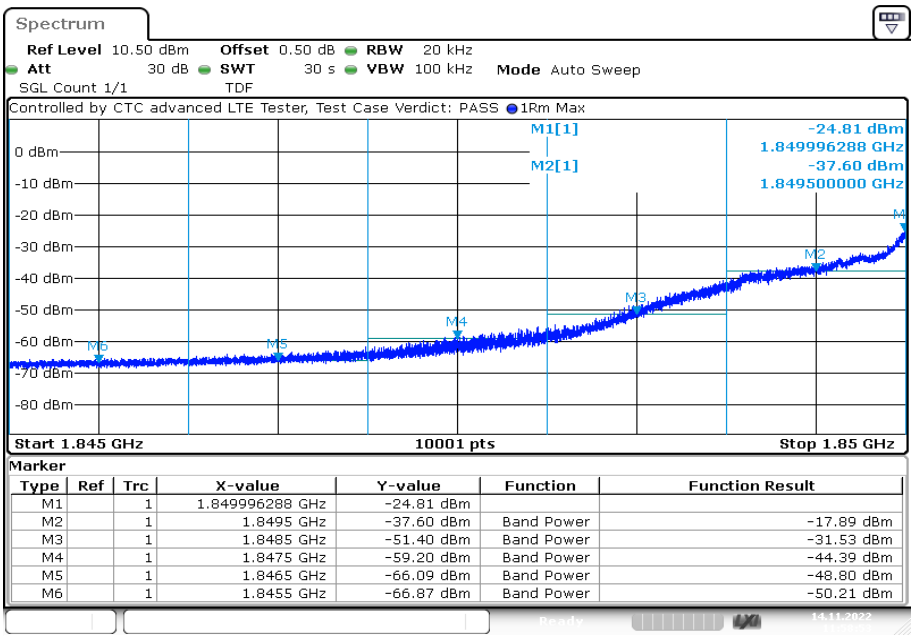
Plot 13: 1.4 MHz – 16-QAM - Lowest channel

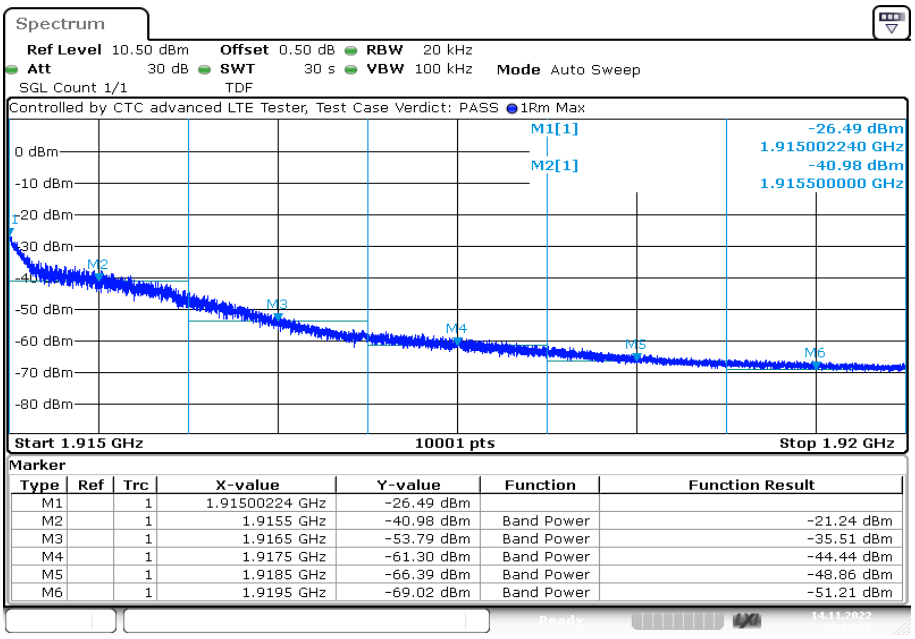


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849996288 GHz	-24.81 dBm		
M2		1	1.8495 GHz	-37.60 dBm	Band Power	-17.89 dBm
M3		1	1.8485 GHz	-51.40 dBm	Band Power	-31.53 dBm
M4		1	1.8475 GHz	-59.20 dBm	Band Power	-44.39 dBm
M5		1	1.8465 GHz	-66.09 dBm	Band Power	-48.80 dBm
M6		1	1.8455 GHz	-66.87 dBm	Band Power	-50.21 dBm

Date: 14.NOV.2022 11:58:53

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

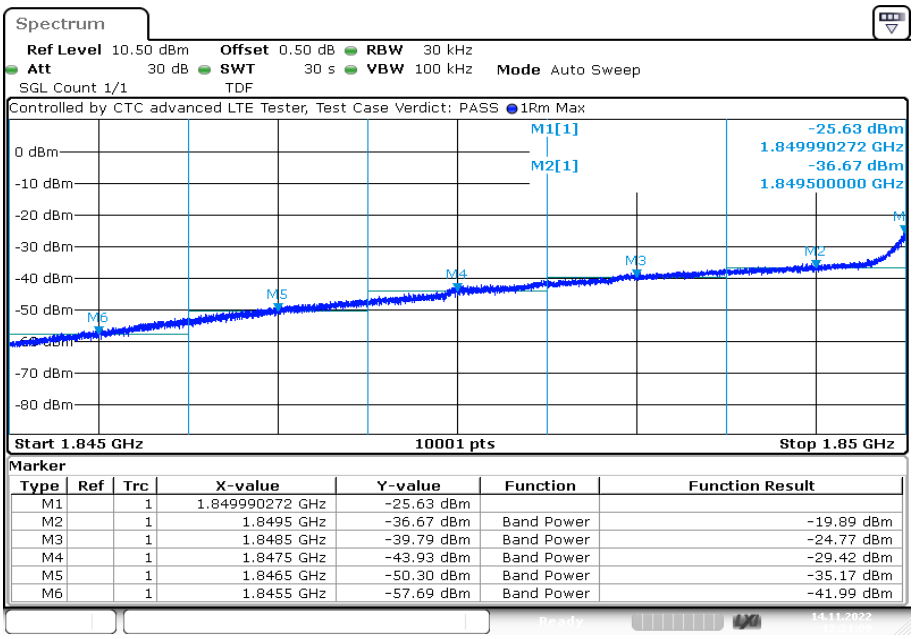


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.91500224 GHz	-26.49 dBm		
M2		1	1.9155 GHz	-40.98 dBm	Band Power	-21.24 dBm
M3		1	1.9165 GHz	-53.79 dBm	Band Power	-35.51 dBm
M4		1	1.9175 GHz	-61.30 dBm	Band Power	-44.44 dBm
M5		1	1.9185 GHz	-66.39 dBm	Band Power	-48.86 dBm
M6		1	1.9195 GHz	-69.02 dBm	Band Power	-51.21 dBm

Date: 14.NOV.2022 12:13:16

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

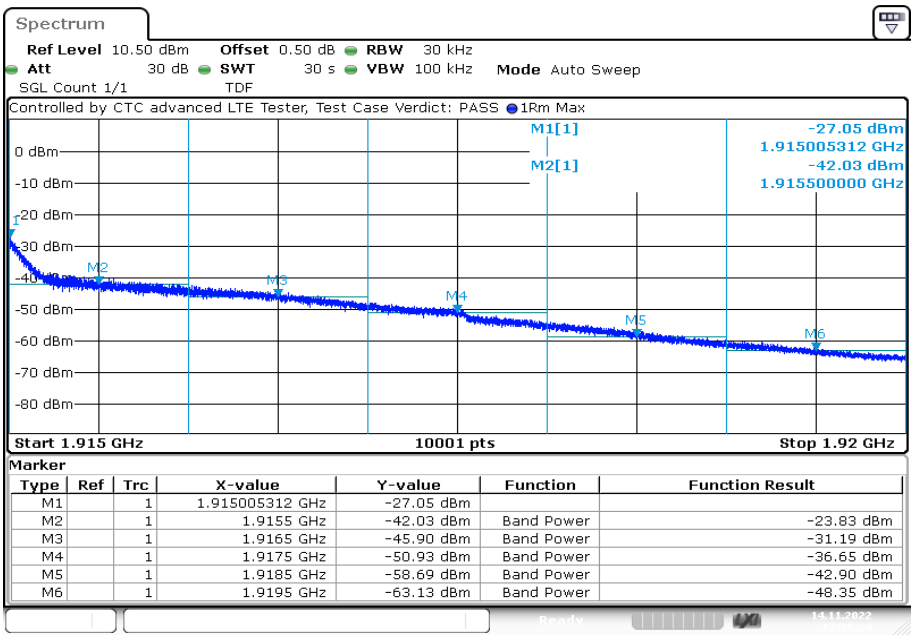


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849990272 GHz	-25.63 dBm		
M2		1	1.8495 GHz	-36.67 dBm	Band Power	-19.89 dBm
M3		1	1.8485 GHz	-39.79 dBm	Band Power	-24.77 dBm
M4		1	1.8475 GHz	-43.93 dBm	Band Power	-29.42 dBm
M5		1	1.8465 GHz	-50.30 dBm	Band Power	-35.17 dBm
M6		1	1.8455 GHz	-57.69 dBm	Band Power	-41.99 dBm

Date: 14.NOV.2022 12:21:09

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

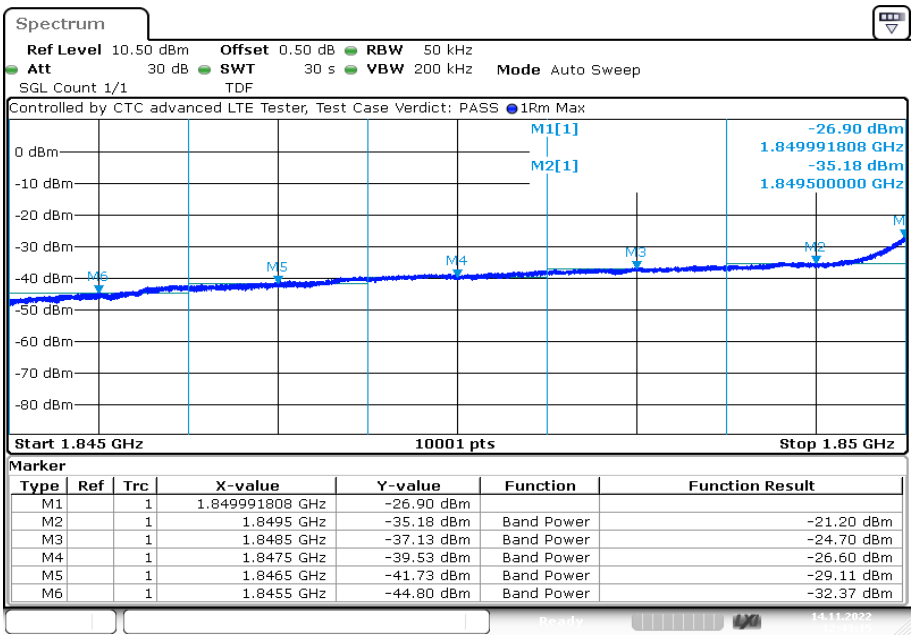


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915005312 GHz	-27.05 dBm		
M2		1	1.9155 GHz	-42.03 dBm	Band Power	-23.83 dBm
M3		1	1.9165 GHz	-45.90 dBm	Band Power	-31.19 dBm
M4		1	1.9175 GHz	-50.93 dBm	Band Power	-36.65 dBm
M5		1	1.9185 GHz	-58.69 dBm	Band Power	-42.90 dBm
M6		1	1.9195 GHz	-63.13 dBm	Band Power	-48.35 dBm

Date: 14.NOV.2022 12:35:24

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

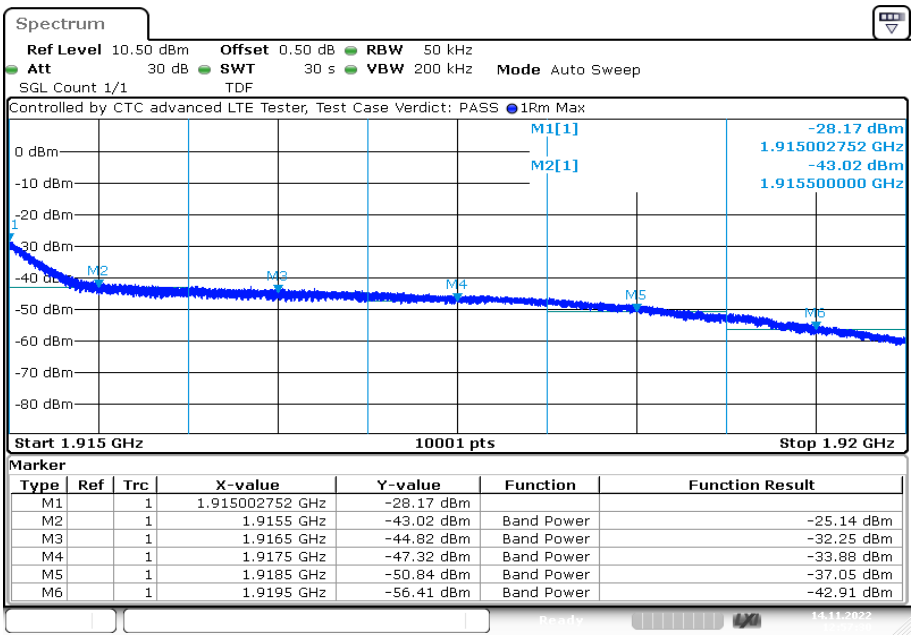


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849991808 GHz	-26.90 dBm		
M2		1	1.8495 GHz	-35.18 dBm	Band Power	-21.20 dBm
M3		1	1.8485 GHz	-37.13 dBm	Band Power	-24.70 dBm
M4		1	1.8475 GHz	-39.53 dBm	Band Power	-26.60 dBm
M5		1	1.8465 GHz	-41.73 dBm	Band Power	-29.11 dBm
M6		1	1.8455 GHz	-44.80 dBm	Band Power	-32.37 dBm

Date: 14.NOV.2022 12:43:16

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

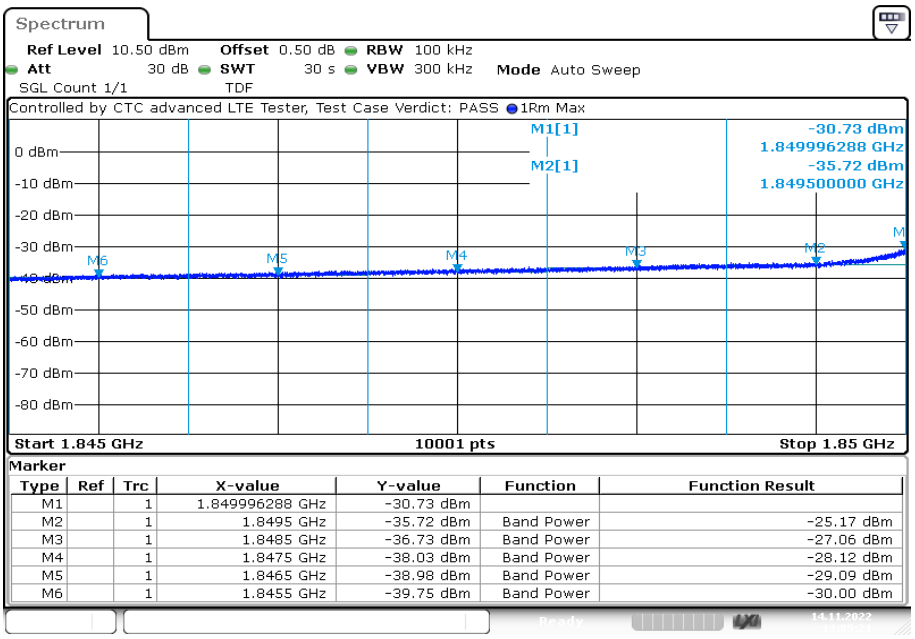


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915002752 GHz	-28.17 dBm		
M2		1	1.9155 GHz	-43.02 dBm	Band Power	-25.14 dBm
M3		1	1.9165 GHz	-44.82 dBm	Band Power	-32.25 dBm
M4		1	1.9175 GHz	-47.32 dBm	Band Power	-33.88 dBm
M5		1	1.9185 GHz	-50.84 dBm	Band Power	-37.05 dBm
M6		1	1.9195 GHz	-56.41 dBm	Band Power	-42.91 dBm

Date: 14.NOV.2022 12:57:30

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

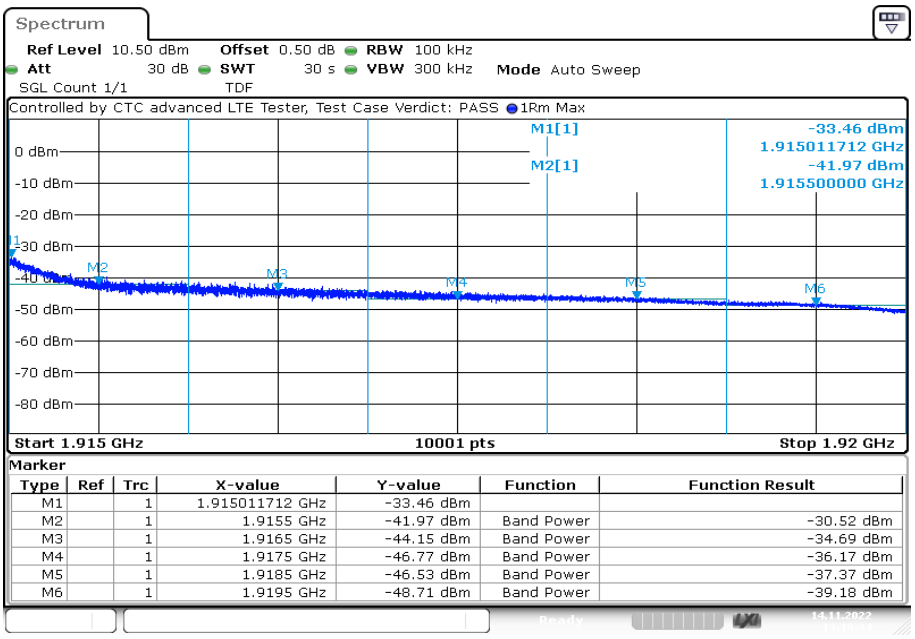


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849996288 GHz	-30.73 dBm		
M2		1	1.8495 GHz	-35.72 dBm	Band Power	-25.17 dBm
M3		1	1.8485 GHz	-36.73 dBm	Band Power	-27.06 dBm
M4		1	1.8475 GHz	-38.03 dBm	Band Power	-28.12 dBm
M5		1	1.8465 GHz	-38.98 dBm	Band Power	-29.09 dBm
M6		1	1.8455 GHz	-39.75 dBm	Band Power	-30.00 dBm

Date: 14.NOV.2022 13:05:21

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

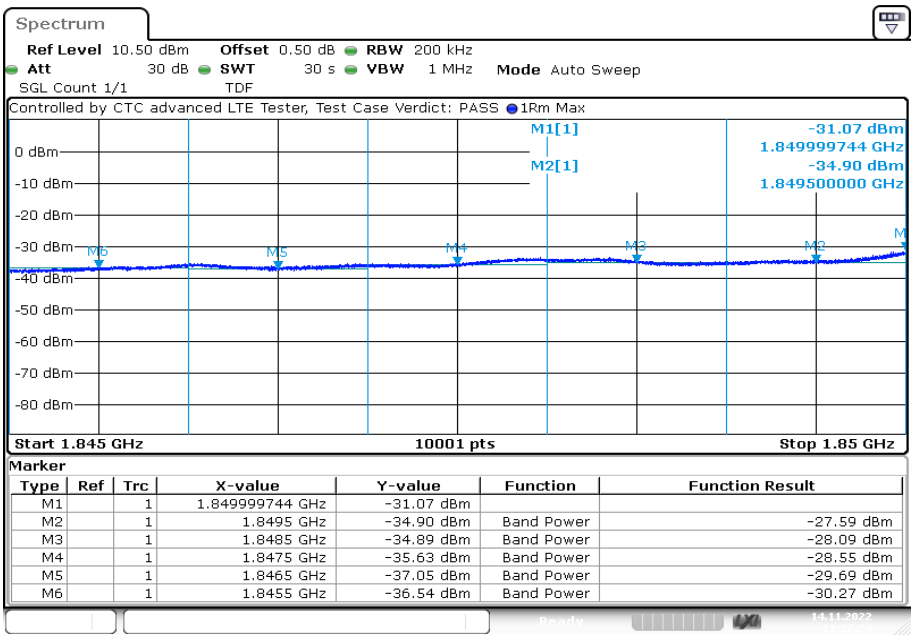


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915011712 GHz	-33.46 dBm		
M2		1	1.9155 GHz	-41.97 dBm	Band Power	-30.52 dBm
M3		1	1.9165 GHz	-44.15 dBm	Band Power	-34.69 dBm
M4		1	1.9175 GHz	-46.77 dBm	Band Power	-36.17 dBm
M5		1	1.9185 GHz	-46.53 dBm	Band Power	-37.37 dBm
M6		1	1.9195 GHz	-48.71 dBm	Band Power	-39.18 dBm

Date: 14.NOV.2022 13:19:35

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

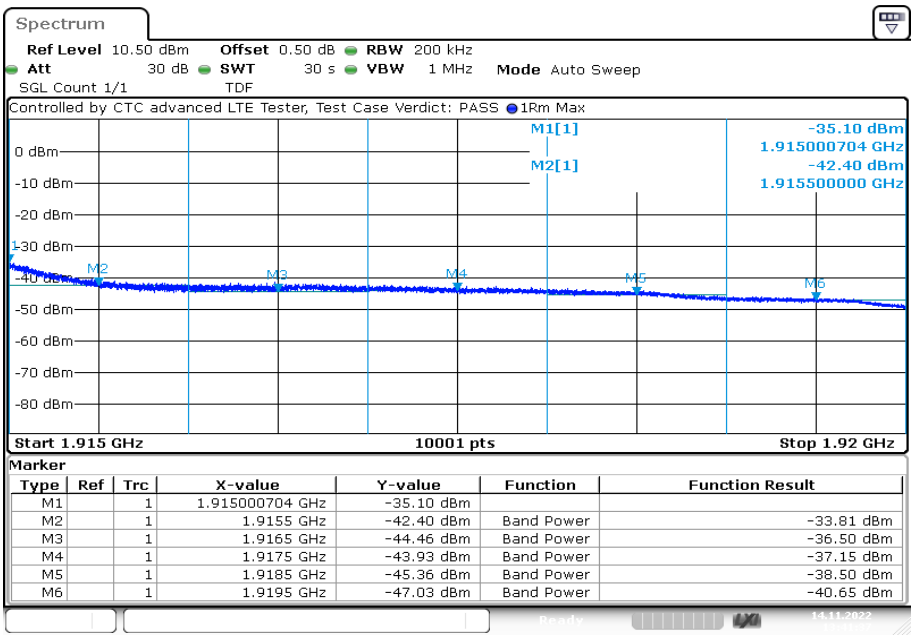


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849999744 GHz	-31.07 dBm		
M2		1	1.8495 GHz	-34.90 dBm	Band Power	-27.59 dBm
M3		1	1.8485 GHz	-34.89 dBm	Band Power	-28.09 dBm
M4		1	1.8475 GHz	-35.63 dBm	Band Power	-28.55 dBm
M5		1	1.8465 GHz	-37.05 dBm	Band Power	-29.69 dBm
M6		1	1.8455 GHz	-36.54 dBm	Band Power	-30.27 dBm

Date: 14.NOV.2022 13:27:25

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



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915000704 GHz	-35.10 dBm		
M2		1	1.9155 GHz	-42.40 dBm	Band Power	-33.81 dBm
M3		1	1.9165 GHz	-44.46 dBm	Band Power	-36.50 dBm
M4		1	1.9175 GHz	-43.93 dBm	Band Power	-37.15 dBm
M5		1	1.9185 GHz	-45.36 dBm	Band Power	-38.50 dBm
M6		1	1.9195 GHz	-47.03 dBm	Band Power	-40.65 dBm

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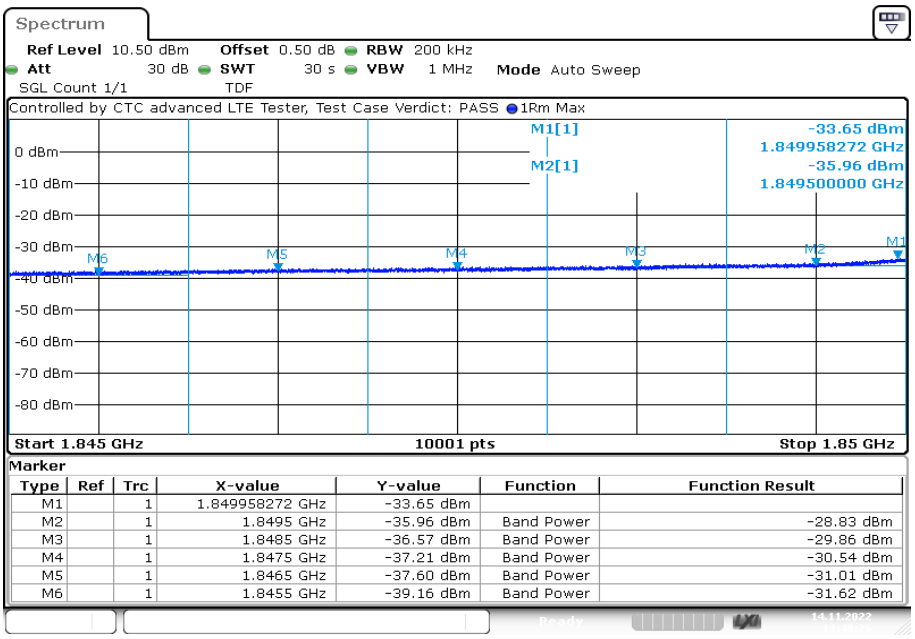
Plot 23: 20 MHz – 16-QAM - Lowest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849958272 GHz	-33.65 dBm		
M2		1	1.8495 GHz	-35.96 dBm	Band Power	-28.83 dBm
M3		1	1.8485 GHz	-36.57 dBm	Band Power	-29.86 dBm
M4		1	1.8475 GHz	-37.21 dBm	Band Power	-30.54 dBm
M5		1	1.8465 GHz	-37.60 dBm	Band Power	-31.01 dBm
M6		1	1.8455 GHz	-39.16 dBm	Band Power	-31.62 dBm

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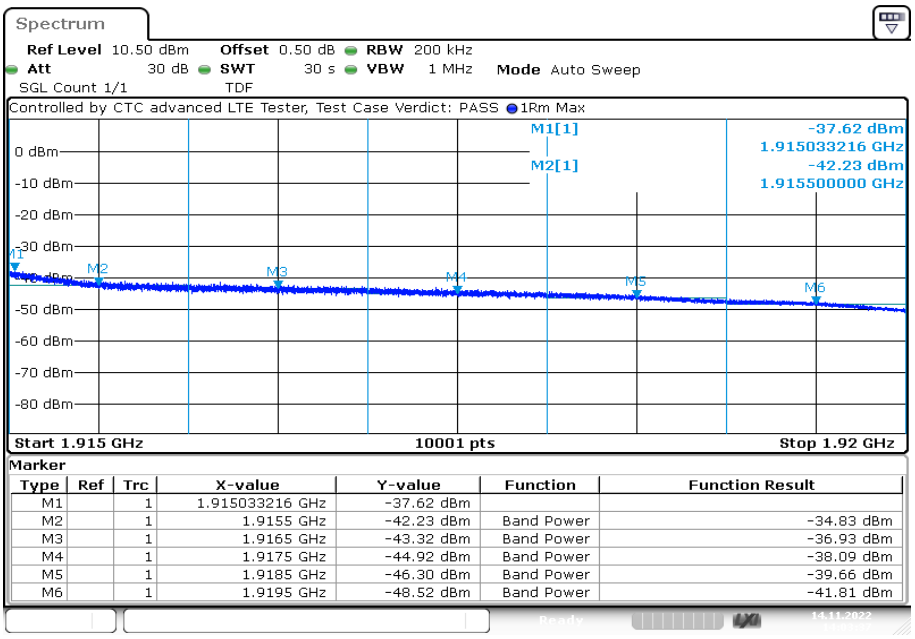
Plot 24: 20 MHz – 16-QAM - Highest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915033216 GHz	-37.62 dBm		
M2		1	1.9155 GHz	-42.23 dBm	Band Power	-34.83 dBm
M3		1	1.9165 GHz	-43.32 dBm	Band Power	-36.93 dBm
M4		1	1.9175 GHz	-44.92 dBm	Band Power	-38.09 dBm
M5		1	1.9185 GHz	-46.30 dBm	Band Power	-39.66 dBm
M6		1	1.9195 GHz	-48.52 dBm	Band Power	-41.81 dBm

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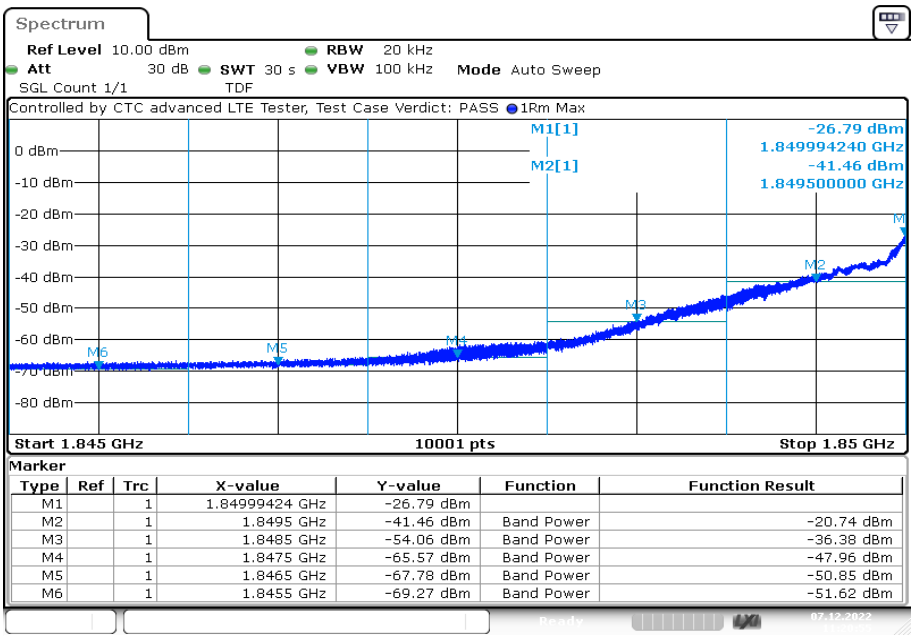
Plot 25: 1.4 MHz – 64-QAM - Lowest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.84999424 GHz	-26.79 dBm		
M2		1	1.8495 GHz	-41.46 dBm	Band Power	-20.74 dBm
M3		1	1.8485 GHz	-54.06 dBm	Band Power	-36.38 dBm
M4		1	1.8475 GHz	-65.57 dBm	Band Power	-47.96 dBm
M5		1	1.8465 GHz	-67.78 dBm	Band Power	-50.85 dBm
M6		1	1.8455 GHz	-69.27 dBm	Band Power	-51.62 dBm

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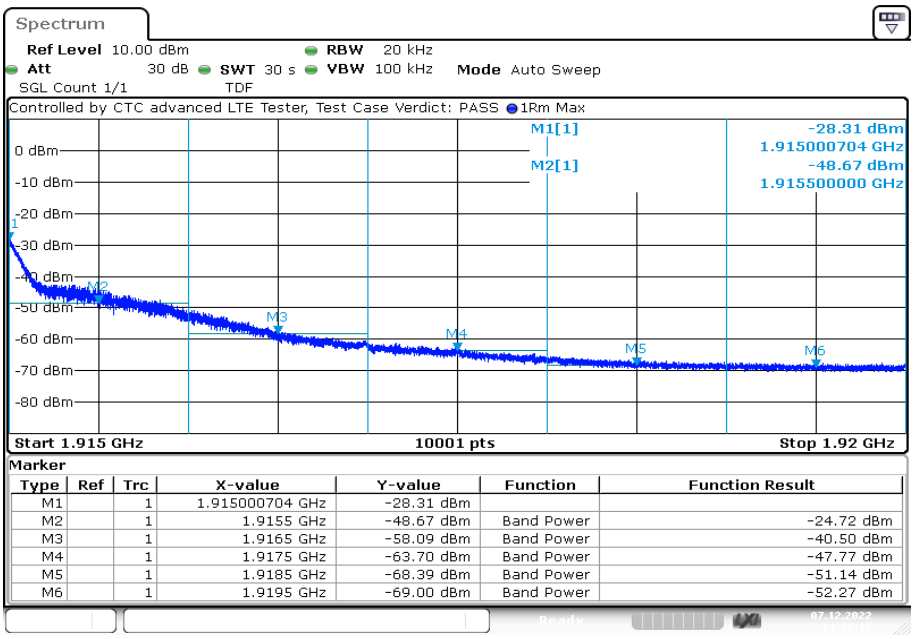
Plot 26: 1.4 MHz – 64-QAM - Highest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915000704 GHz	-28.31 dBm		
M2		1	1.9155 GHz	-48.67 dBm	Band Power	-24.72 dBm
M3		1	1.9165 GHz	-58.09 dBm	Band Power	-40.50 dBm
M4		1	1.9175 GHz	-63.70 dBm	Band Power	-47.77 dBm
M5		1	1.9185 GHz	-68.39 dBm	Band Power	-51.14 dBm
M6		1	1.9195 GHz	-69.00 dBm	Band Power	-52.27 dBm

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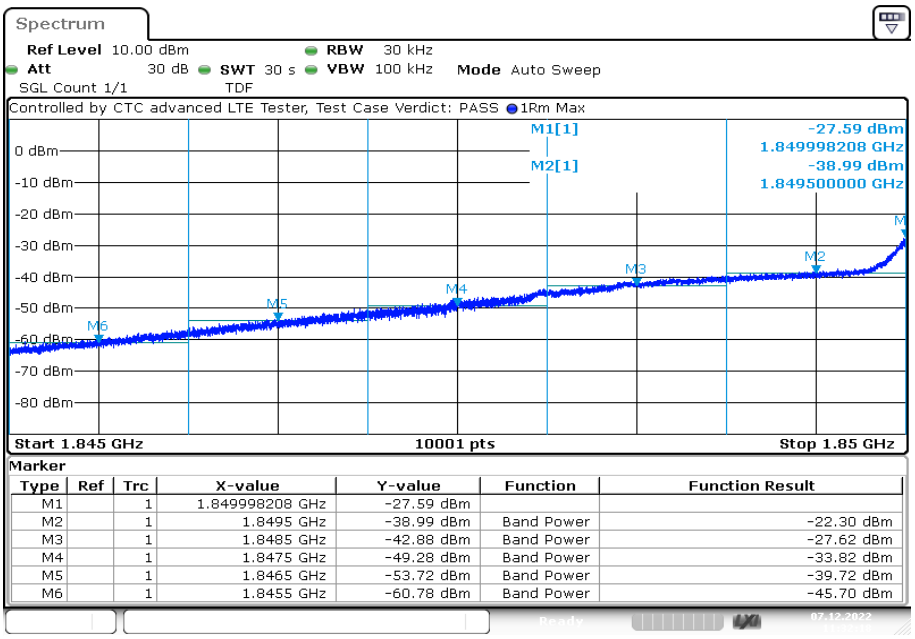
Plot 27: 3 MHz – 64-QAM - Lowest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849998208 GHz	-27.59 dBm		
M2		1	1.8495 GHz	-38.99 dBm	Band Power	-22.30 dBm
M3		1	1.8485 GHz	-42.88 dBm	Band Power	-27.62 dBm
M4		1	1.8475 GHz	-49.28 dBm	Band Power	-33.82 dBm
M5		1	1.8465 GHz	-53.72 dBm	Band Power	-39.72 dBm
M6		1	1.8455 GHz	-60.78 dBm	Band Power	-45.70 dBm

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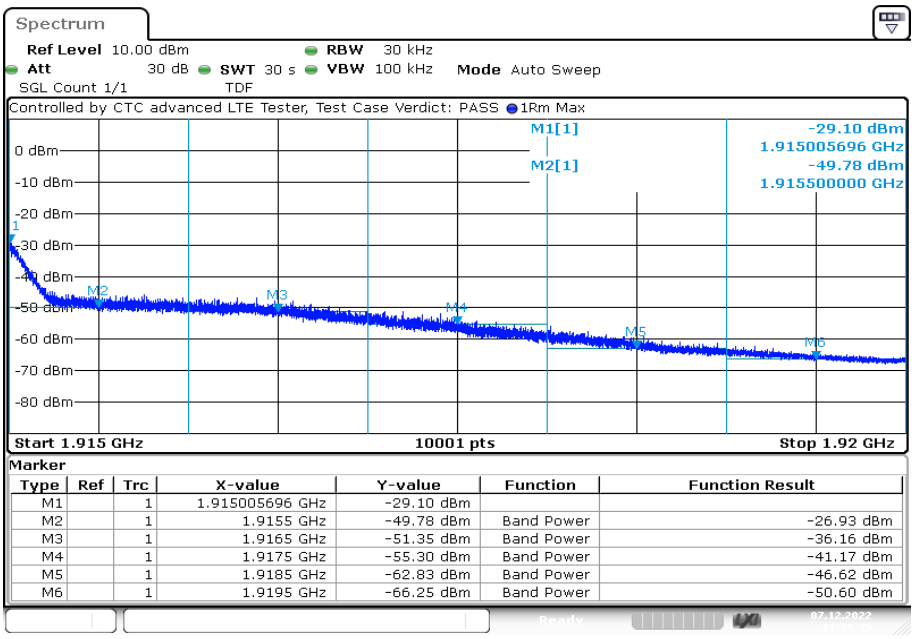
Plot 28: 3 MHz – 64-QAM - Highest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915005696 GHz	-29.10 dBm		
M2		1	1.9155 GHz	-49.78 dBm	Band Power	-26.93 dBm
M3		1	1.9165 GHz	-51.35 dBm	Band Power	-36.16 dBm
M4		1	1.9175 GHz	-55.30 dBm	Band Power	-41.17 dBm
M5		1	1.9185 GHz	-62.83 dBm	Band Power	-46.62 dBm
M6		1	1.9195 GHz	-66.25 dBm	Band Power	-50.60 dBm

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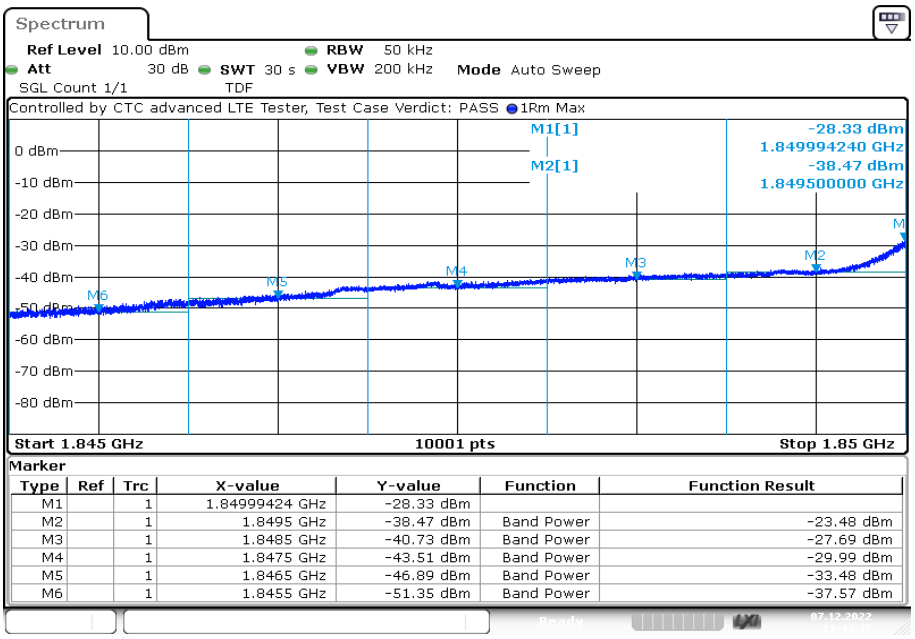
Plot 29: 5 MHz – 64-QAM - Lowest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.84999424 GHz	-28.33 dBm		
M2		1	1.8495 GHz	-38.47 dBm	Band Power	-23.48 dBm
M3		1	1.8485 GHz	-40.73 dBm	Band Power	-27.69 dBm
M4		1	1.8475 GHz	-43.51 dBm	Band Power	-29.99 dBm
M5		1	1.8465 GHz	-46.89 dBm	Band Power	-33.48 dBm
M6		1	1.8455 GHz	-51.35 dBm	Band Power	-37.57 dBm

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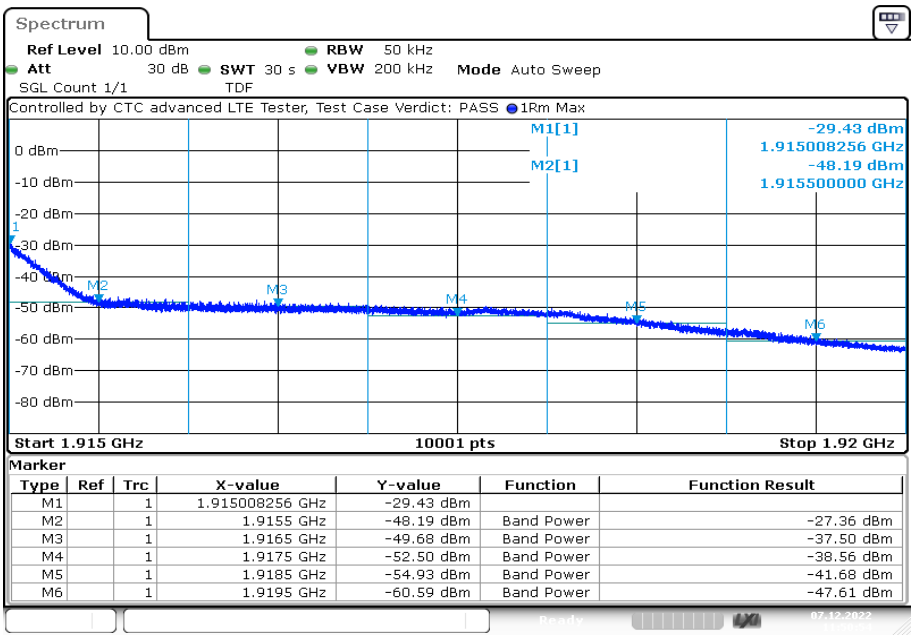
Plot 30: 5 MHz – 64-QAM - Highest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915008256 GHz	-29.43 dBm		
M2		1	1.9155 GHz	-48.19 dBm	Band Power	-27.36 dBm
M3		1	1.9165 GHz	-49.68 dBm	Band Power	-37.50 dBm
M4		1	1.9175 GHz	-52.50 dBm	Band Power	-38.56 dBm
M5		1	1.9185 GHz	-54.93 dBm	Band Power	-41.68 dBm
M6		1	1.9195 GHz	-60.59 dBm	Band Power	-47.61 dBm

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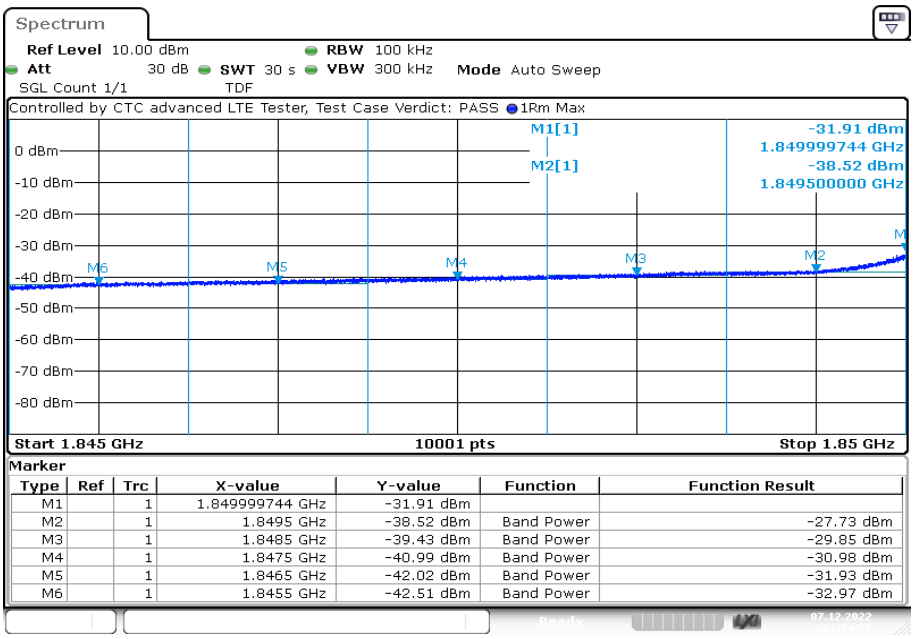
Plot 31: 10 MHz – 64-QAM - Lowest channel

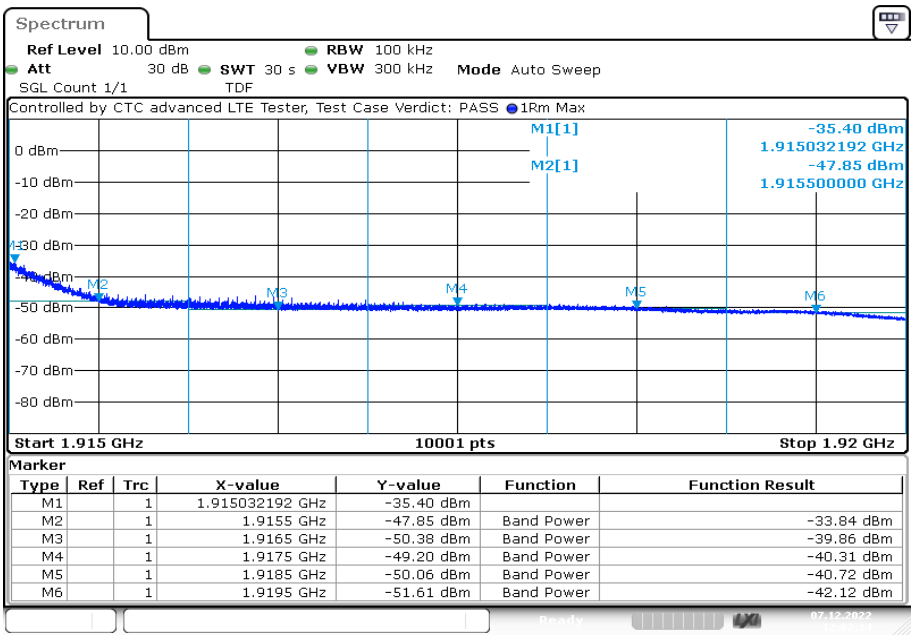


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.849999744 GHz	-31.91 dBm		
M2		1	1.8495 GHz	-38.52 dBm	Band Power	-27.73 dBm
M3		1	1.8485 GHz	-39.43 dBm	Band Power	-29.85 dBm
M4		1	1.8475 GHz	-40.99 dBm	Band Power	-30.98 dBm
M5		1	1.8465 GHz	-42.02 dBm	Band Power	-31.93 dBm
M6		1	1.8455 GHz	-42.51 dBm	Band Power	-32.97 dBm

Date: 7.DEC.2022 11:54:57

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

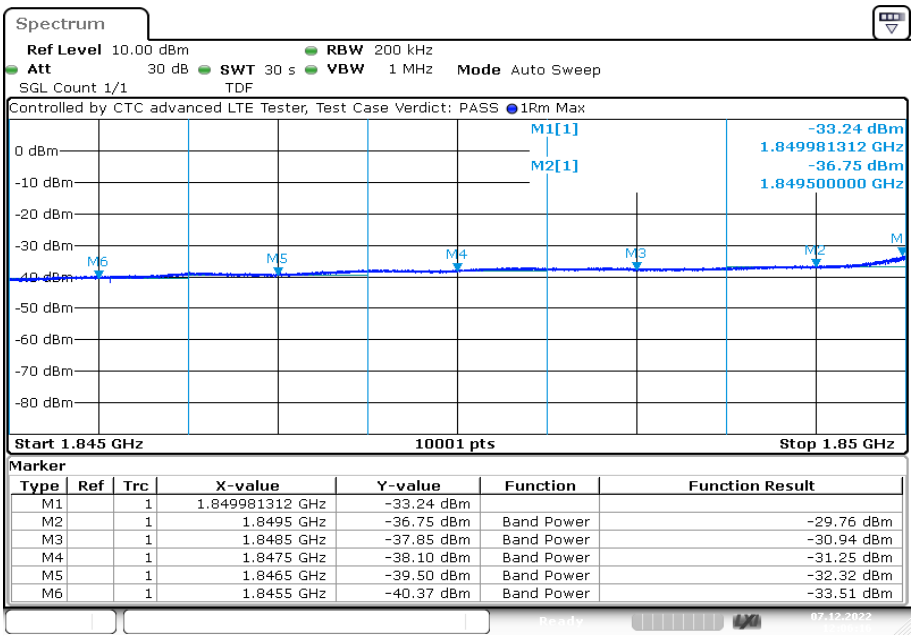


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915032192 GHz	-35.40 dBm		
M2		1	1.9155 GHz	-47.85 dBm	Band Power	-33.84 dBm
M3		1	1.9165 GHz	-50.38 dBm	Band Power	-39.86 dBm
M4		1	1.9175 GHz	-49.20 dBm	Band Power	-40.31 dBm
M5		1	1.9185 GHz	-50.06 dBm	Band Power	-40.72 dBm
M6		1	1.9195 GHz	-51.61 dBm	Band Power	-42.12 dBm

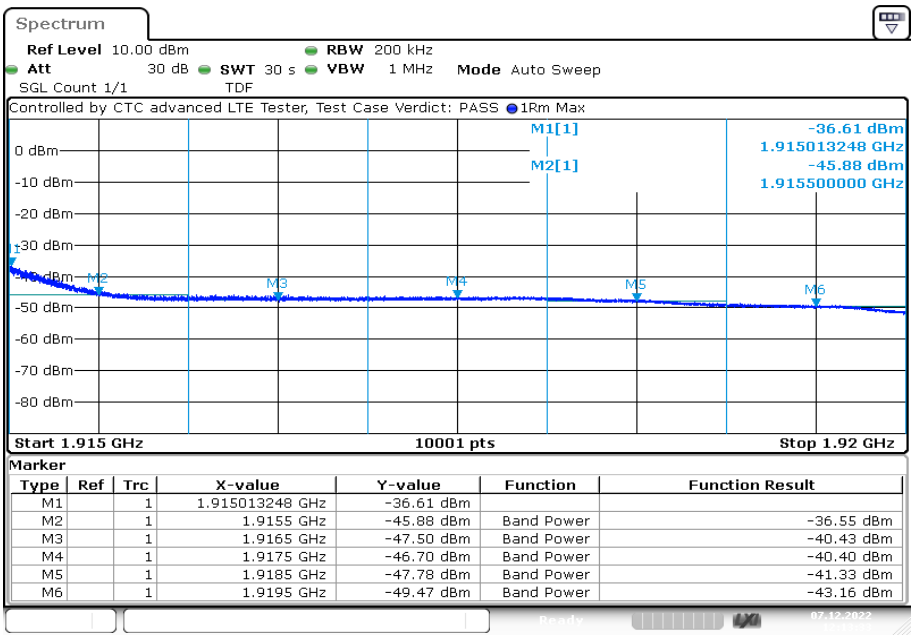
Date: 7.DEC.2022 12:02:14

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



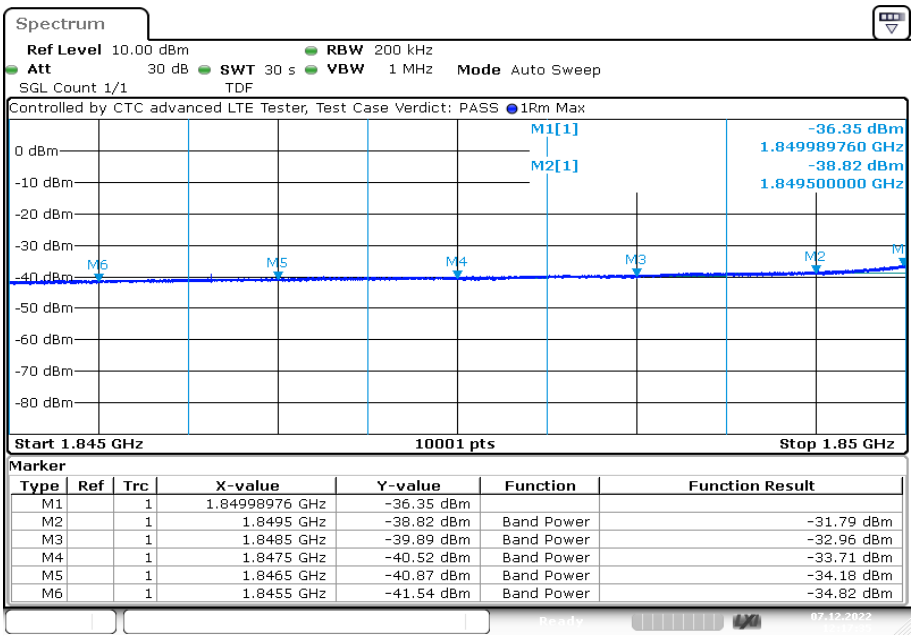
Date: 7.DEC.2022 12:06:16

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



Date: 7.DEC.2022 12:13:33

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



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.84998976 GHz	-36.35 dBm		
M2		1	1.8495 GHz	-38.82 dBm	Band Power	-31.79 dBm
M3		1	1.8485 GHz	-39.89 dBm	Band Power	-32.96 dBm
M4		1	1.8475 GHz	-40.52 dBm	Band Power	-33.71 dBm
M5		1	1.8465 GHz	-40.87 dBm	Band Power	-34.18 dBm
M6		1	1.8455 GHz	-41.54 dBm	Band Power	-34.82 dBm

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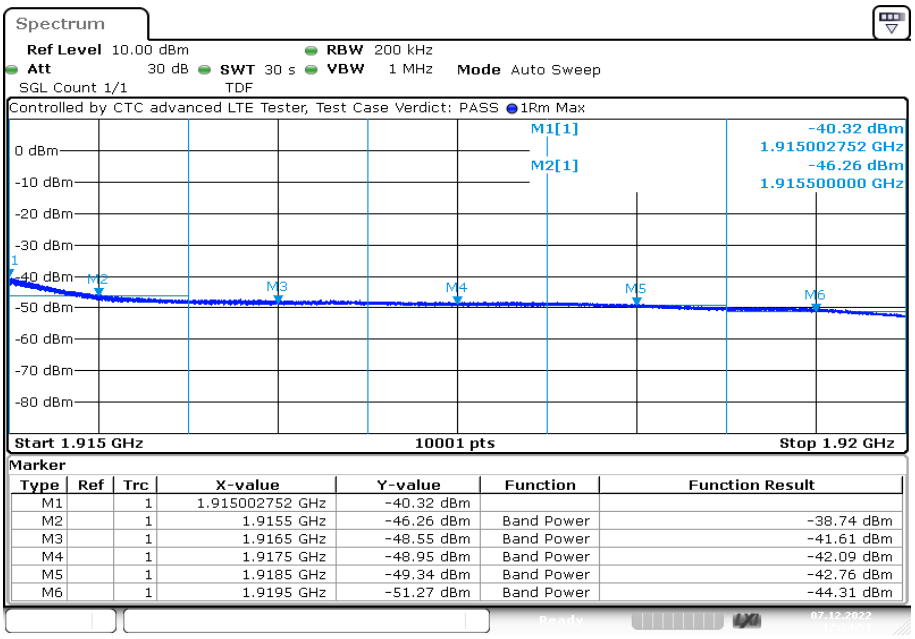
Plot 36: 20 MHz – 64-QAM - Highest channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.915002752 GHz	-40.32 dBm		
M2		1	1.9155 GHz	-46.26 dBm	Band Power	-38.74 dBm
M3		1	1.9165 GHz	-48.55 dBm	Band Power	-41.61 dBm
M4		1	1.9175 GHz	-48.95 dBm	Band Power	-42.09 dBm
M5		1	1.9185 GHz	-49.34 dBm	Band Power	-42.76 dBm
M6		1	1.9195 GHz	-51.27 dBm	Band Power	-44.31 dBm

Date: 7.DEC.2022 12:24:51

12.2.6 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 extreme and mid frequencies of the LTE band 25 frequency band. The table below lists the measured 99% power and -26dBc occupied bandwidths. Spectrum analyzer plots are included on the following pages.

Measurement parameters	
Detector:	Peak
Sweep time:	180s
Video bandwidth:	100 kHz
Resolution bandwidth:	30 kHz
Span:	2 x nominal bandwidth
Trace-Mode:	Max Hold
Used equipment:	See chapter 8.4 setup A
Measurement uncertainty:	See chapter 9
Measurement procedure	FCC: § 2.1049

Limits:

FCC
§ 2.1049
Reporting only

Results:

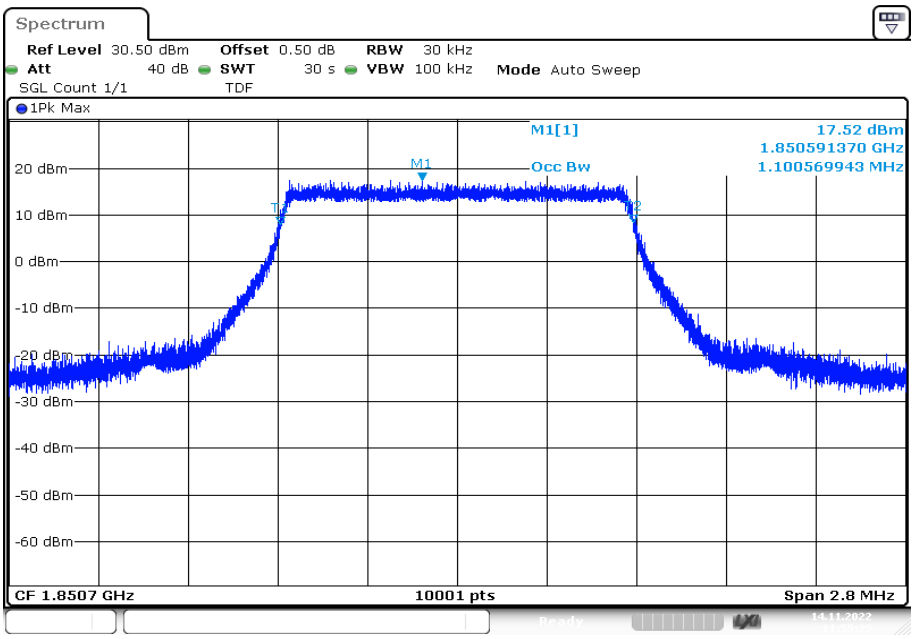
Occupied Bandwidth – QPSK			
Bandwidth	**Channel**	**99% OBW (MHz)**	**-26 dBc BW (MHz)**
1.4	low	1.10	1.37
	mid	1.10	1.39
	high	1.10	1.37
3.0	low	2.74	3.16
	mid	2.75	3.16
	high	2.74	3.15
5.0	low	4.53	5.25
	mid	4.53	5.22
	high	4.52	5.20
10.0	low	9.03	10.34
	mid	9.08	10.30
	high	9.08	10.31
15.0	low	13.49	15.10
	mid	13.49	15.07
	high	13.48	15.01
20.0	low	18.05	20.19
	mid	18.03	20.01
	high	18.04	20.73

Occupied Bandwidth – 16-QAM			
Bandwidth	**Channel**	**99% OBW (MHz)**	**-26 dBc BW (MHz)**
1.4	low	1.10	1.40
	mid	1.10	1.38
	high	1.11	1.41
3.0	low	2.74	3.19
	mid	2.74	3.17
	high	2.74	3.16
5.0	low	4.52	5.22
	mid	4.53	5.26
	high	4.52	5.21
10.0	low	9.08	10.33
	mid	9.08	10.28
	high	9.08	10.28
15.0	low	13.50	15.13
	mid	13.49	15.00
	high	13.48	15.14
20.0	low	18.04	20.14
	mid	18.03	20.03
	high	18.04	20.06

Occupied Bandwidth – 64-QAM			
Bandwidth	**Channel**	**99% OBW (MHz)**	**-26 dBc BW (MHz)**
1.4	low	1.10	1.38
	mid	1.11	1.38
	high	1.10	1.39
3.0	low	2.74	3.15
	mid	2.74	3.15
	high	2.74	3.13
5.0	low	4.52	5.21
	mid	4.52	5.19
	high	4.51	5.18
10.0	low	9.07	10.34
	mid	9.08	10.35
	high	9.06	10.23
15.0	low	13.50	15.00
	mid	13.48	15.08
	high	13.48	14.97
20.0	low	18.07	20.13
	mid	18.03	20.13
	high	18.01	20.06

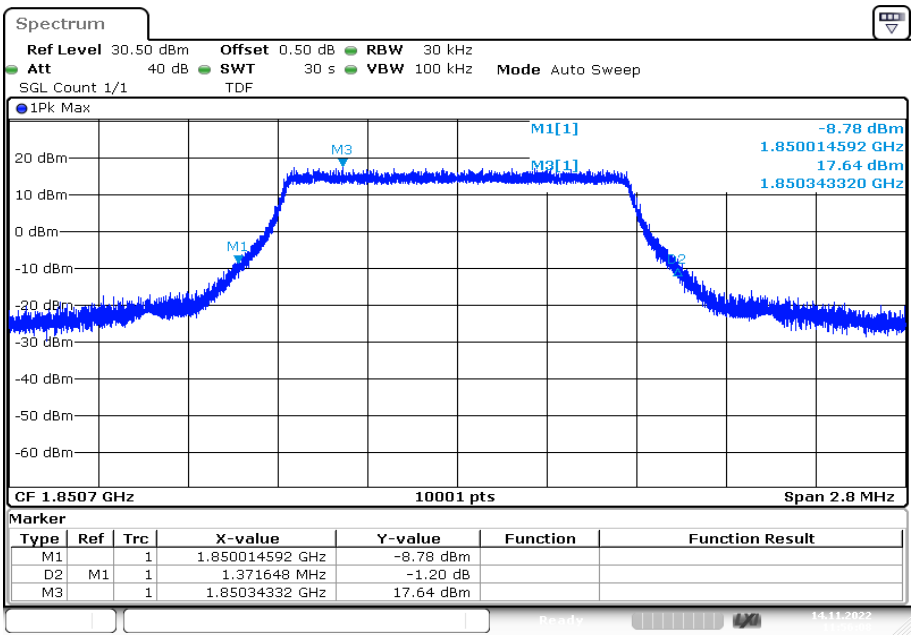
Plots:

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



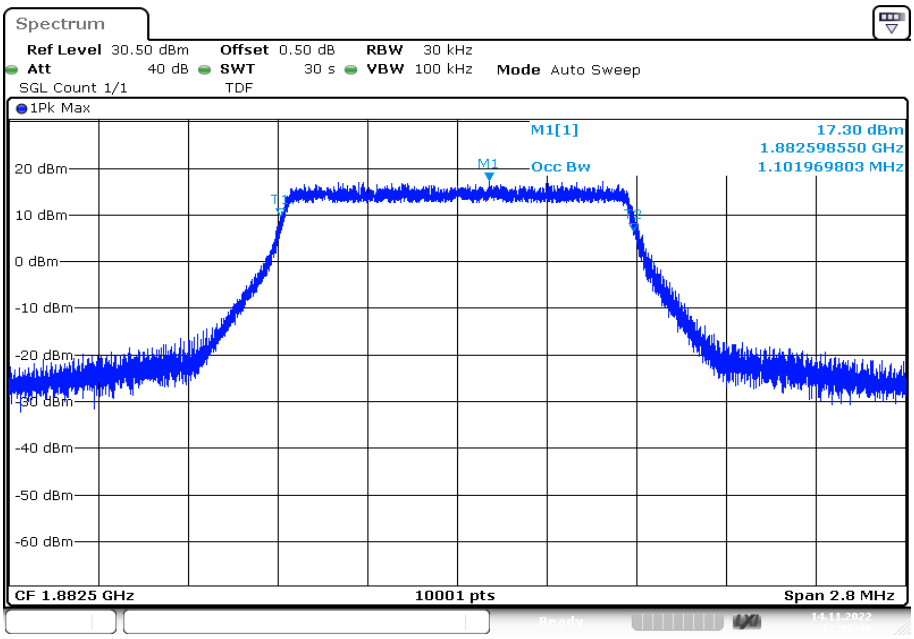
Date: 14.NOV.2022 11:55:35

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



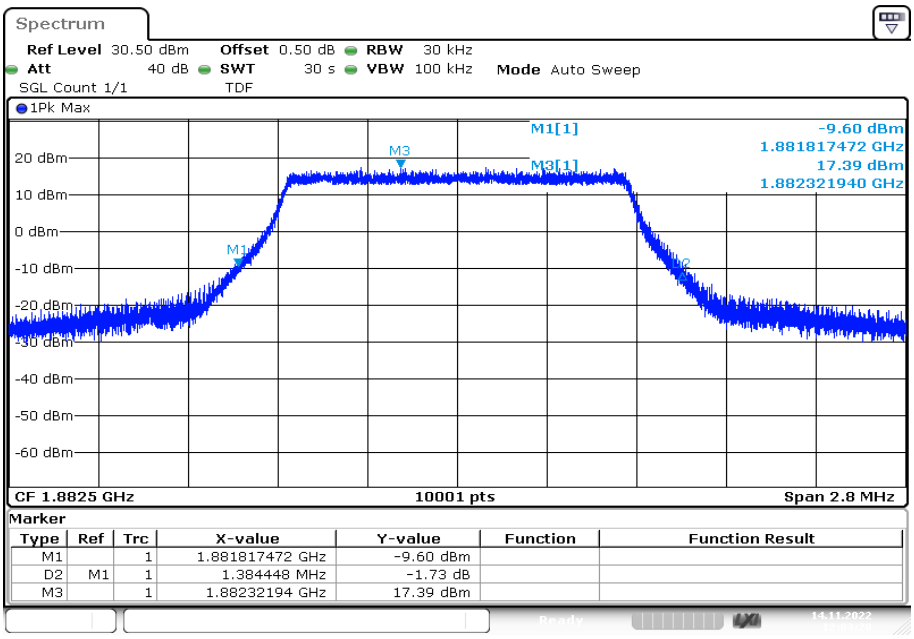
Date: 14.NOV.2022 11:56:09

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



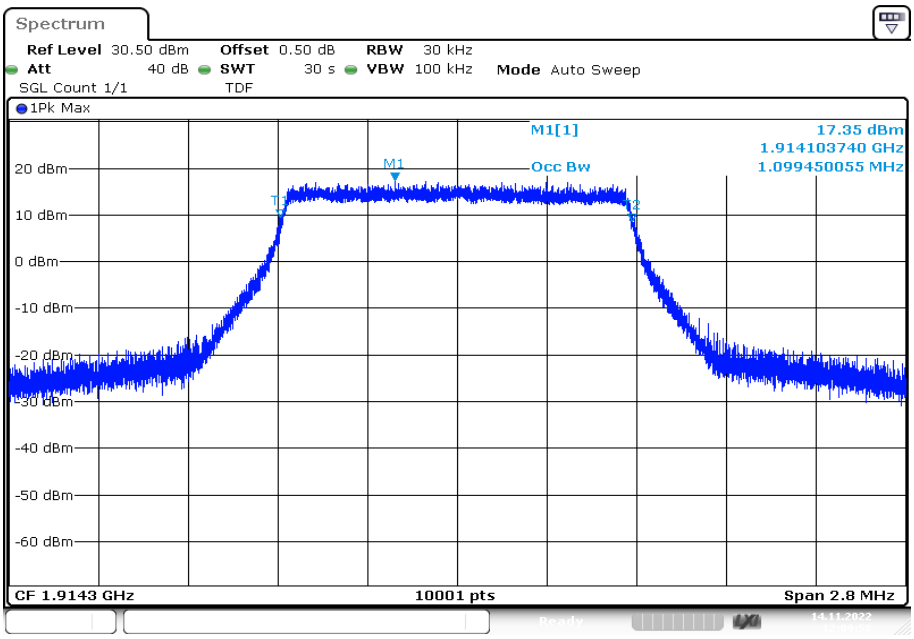
Date: 14.NOV.2022 12:02:47

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



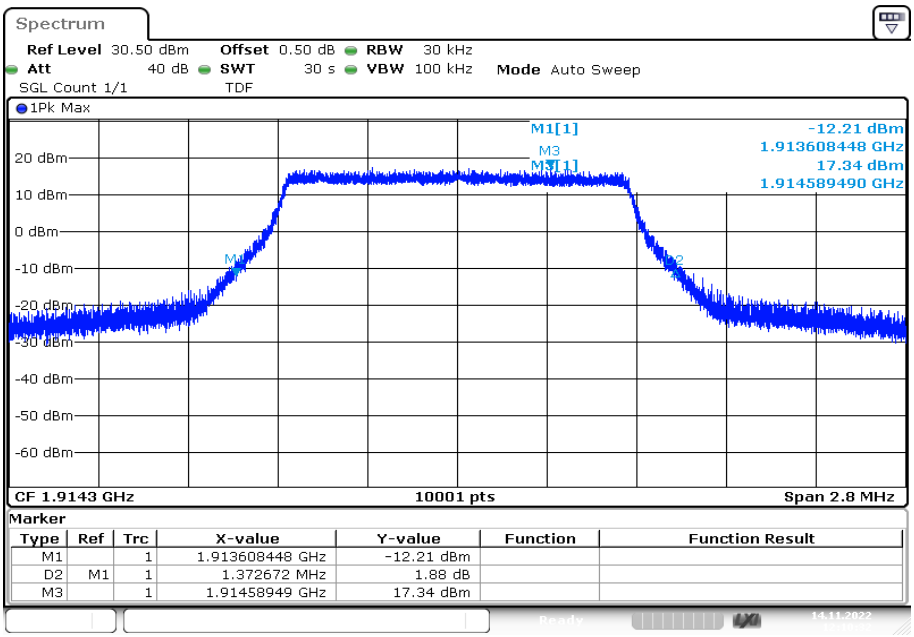
Date: 14.NOV.2022 12:03:21

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



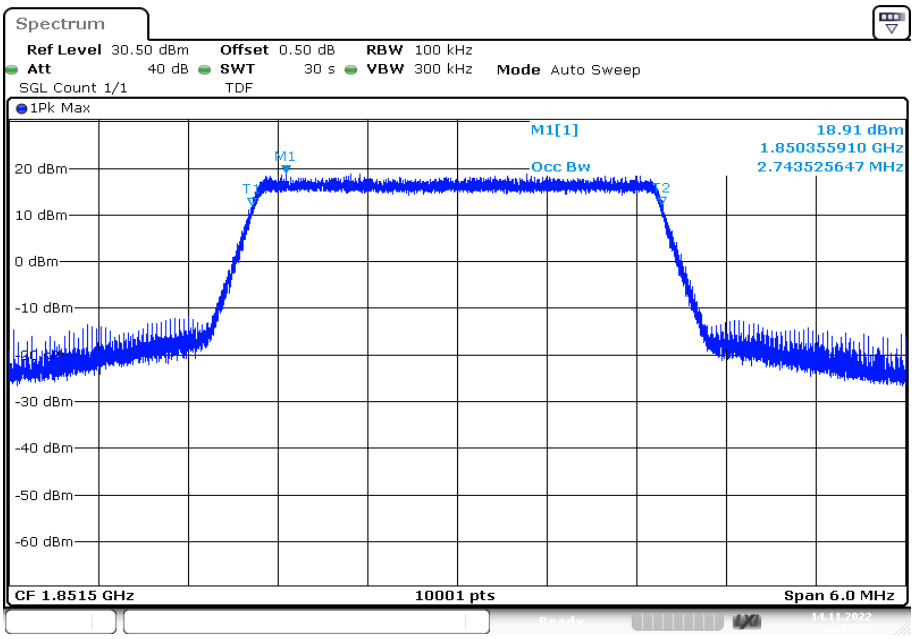
Date: 14.NOV.2022 12:09:59

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



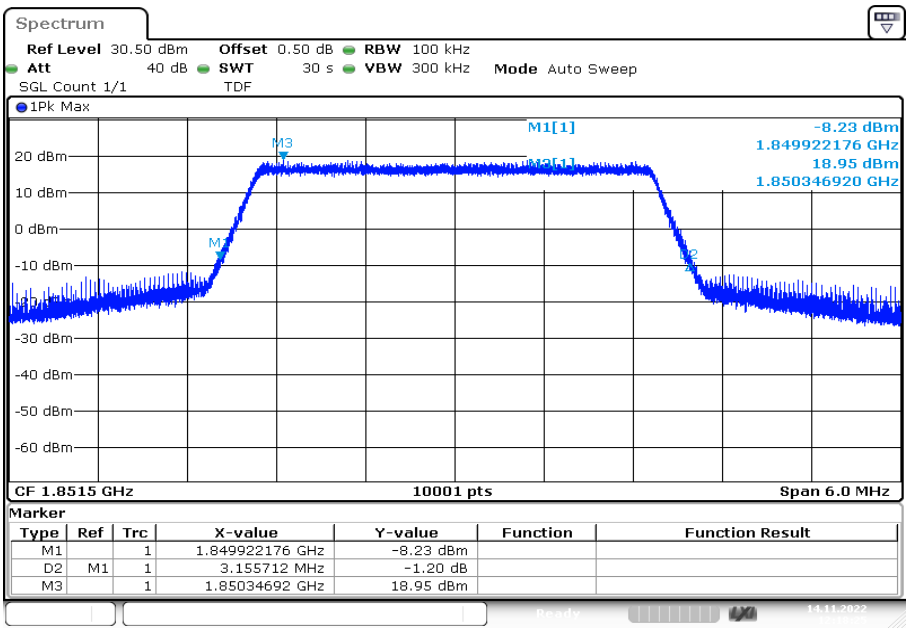
Date: 14.NOV.2022 12:10:32

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



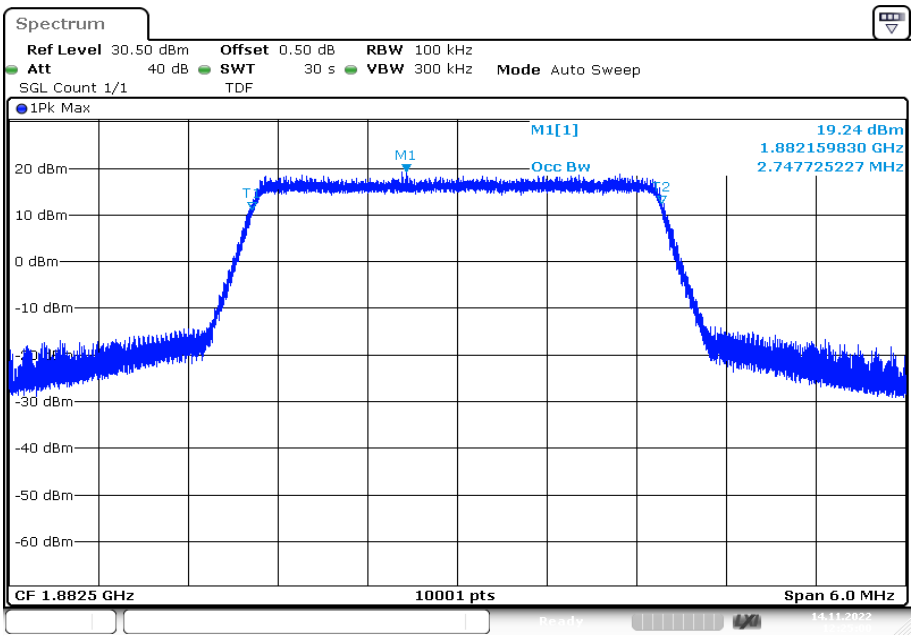
Date: 14.NOV.2022 12:17:52

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



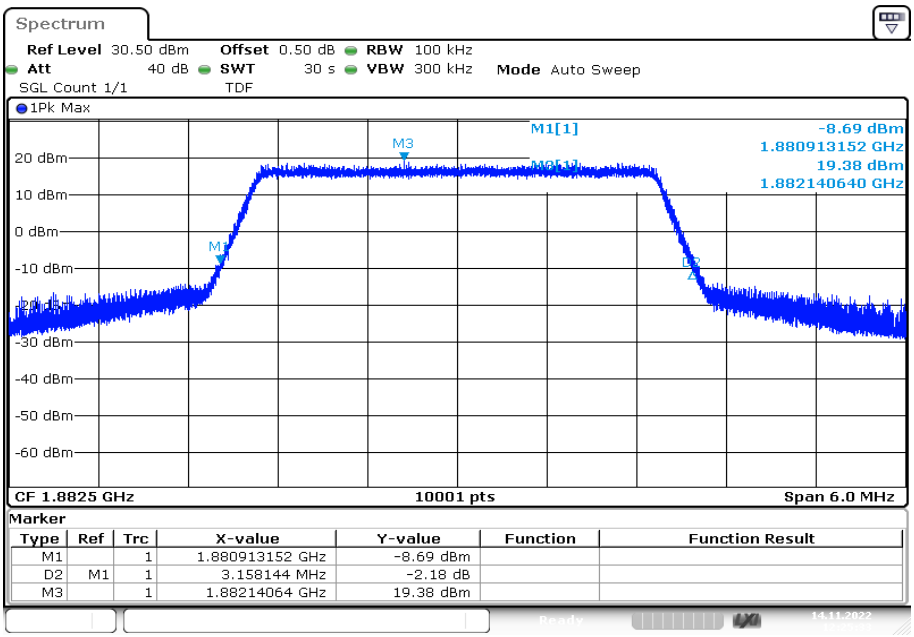
Date: 14.NOV.2022 12:18:26

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



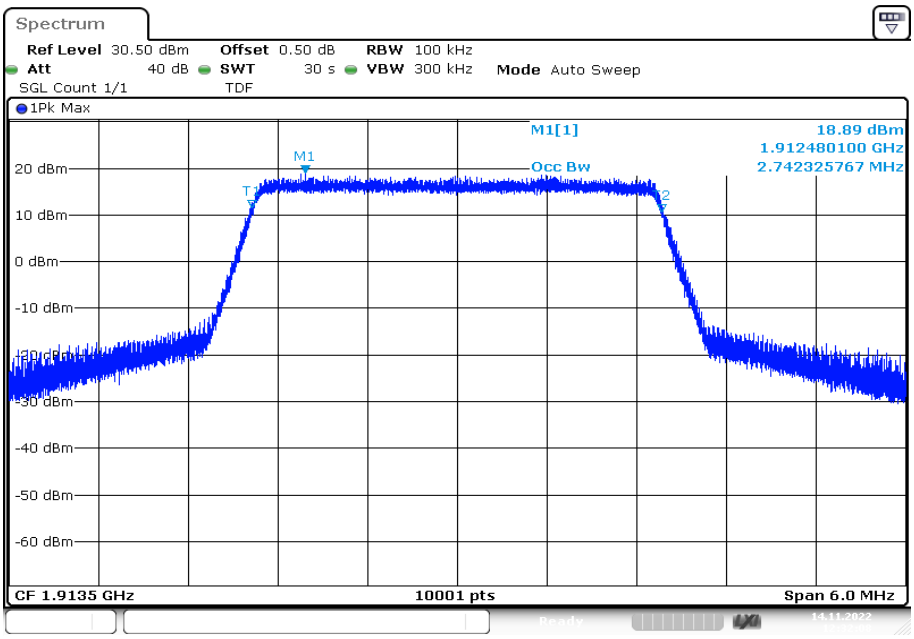
Date: 14.NOV.2022 12:25:00

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



Date: 14.NOV.2022 12:25:33

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



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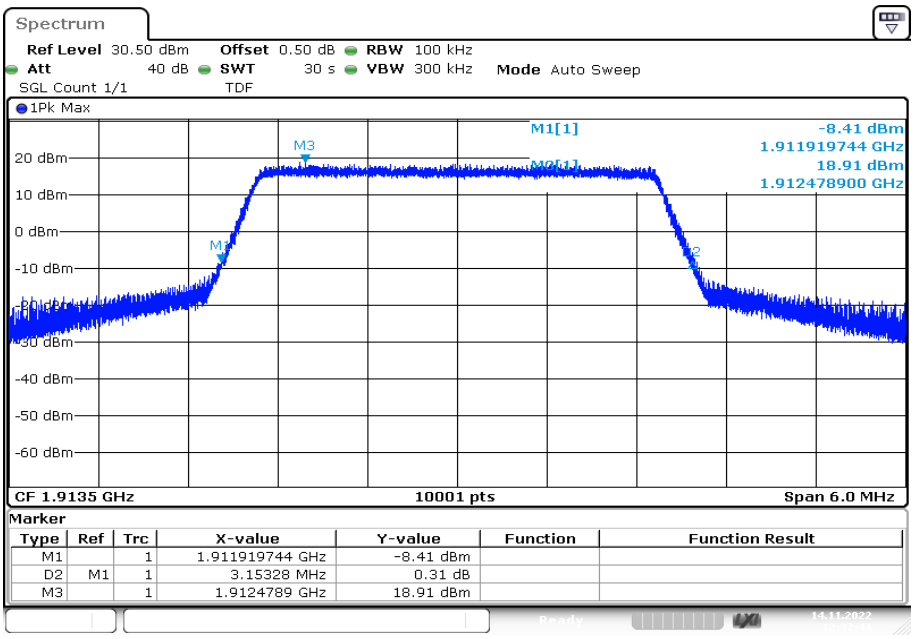
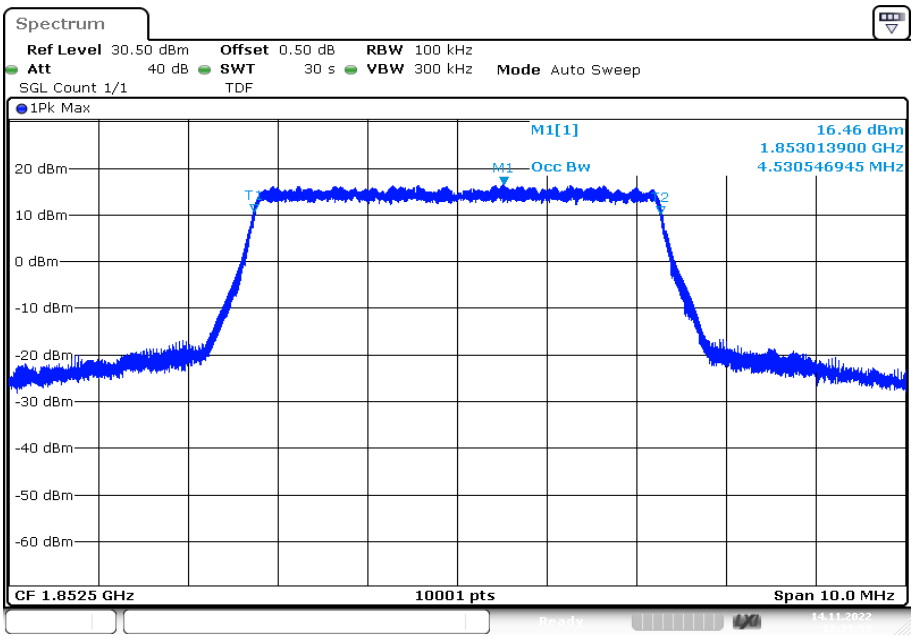
Plot 12: 3 MHz – QPSK - highest channel (-26 dBc BW)

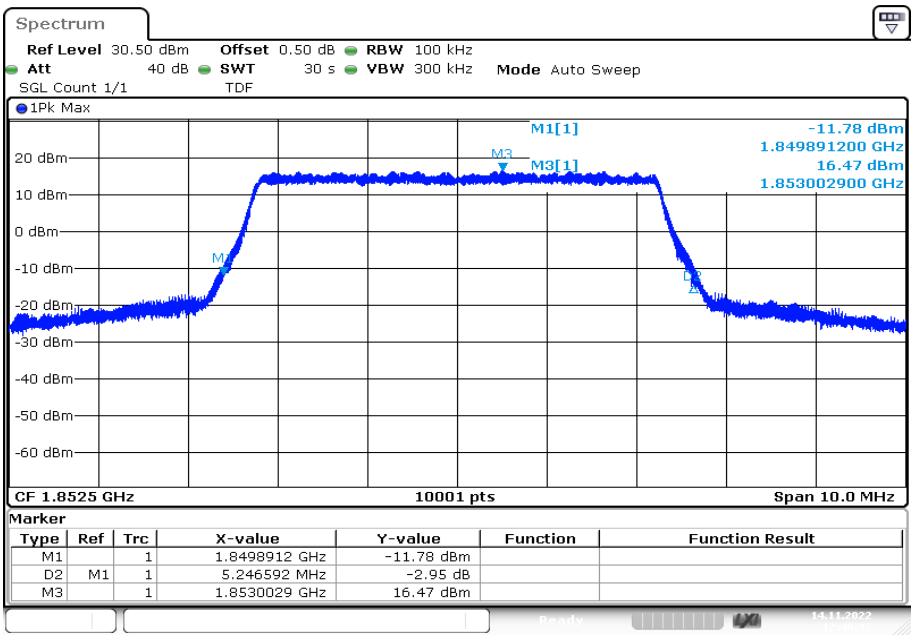


Date: 14.NOV.2022 12:32:41

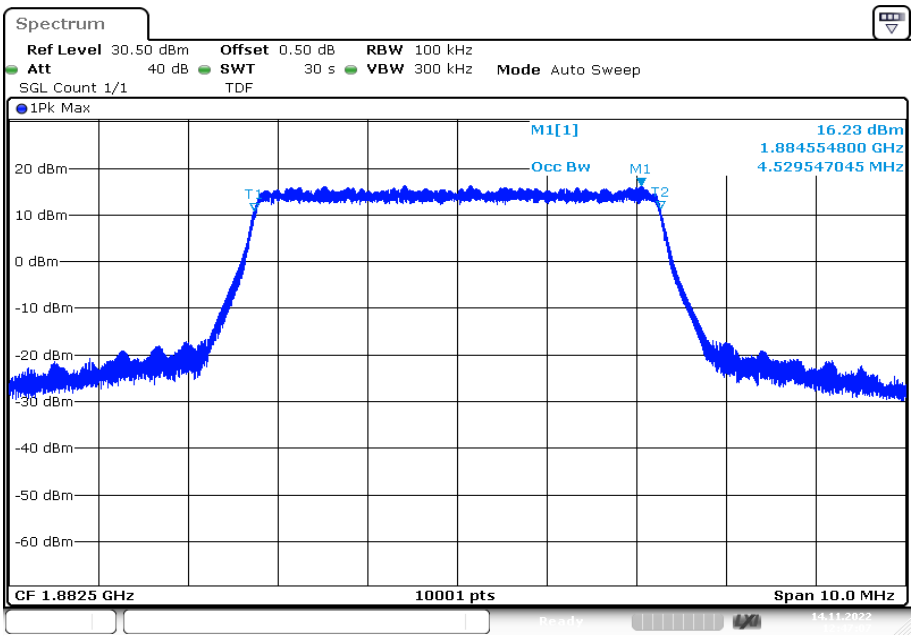
Plot 13: 5 MHz – QPSK - lowest channel (99% - OBW)



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

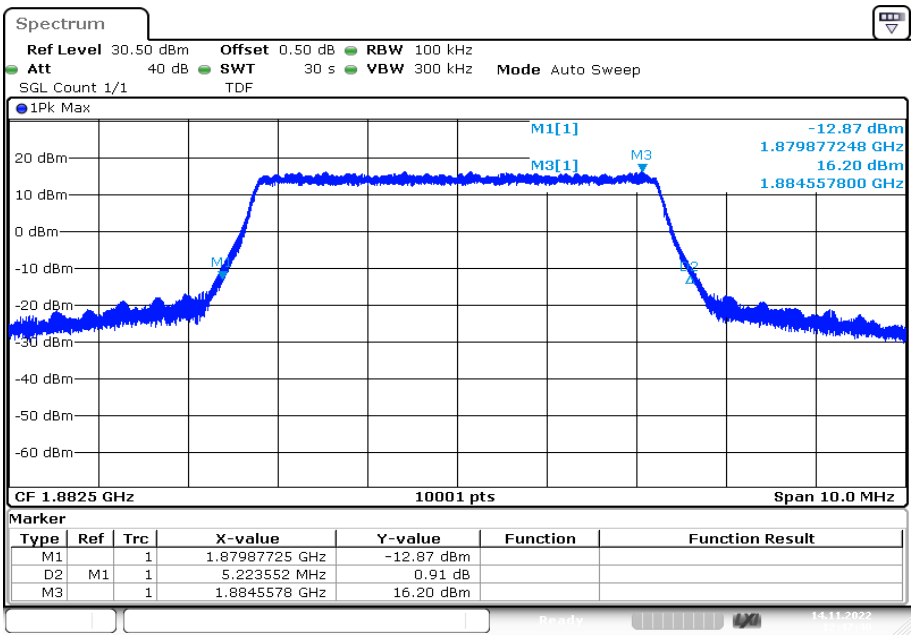


Plot 15: 5 MHz – QPSK - middle channel (99% - OBW)



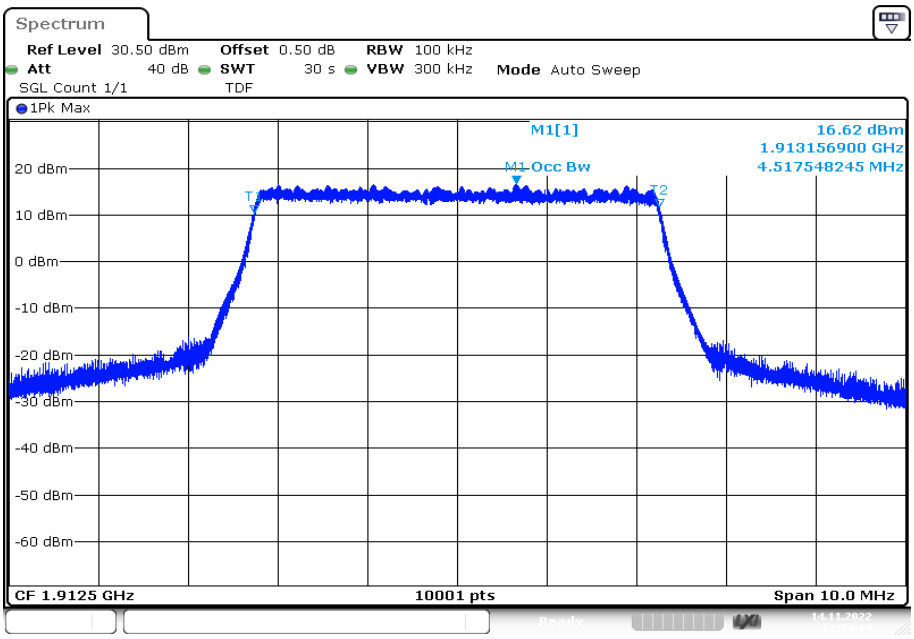
Date: 14.NOV.2022 12:47:07

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



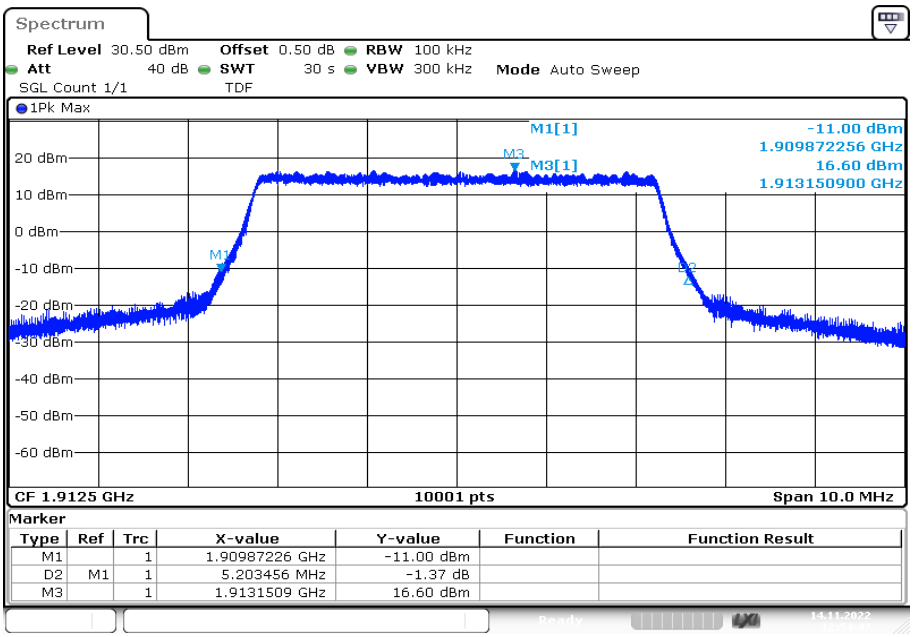
Date: 14.NOV.2022 12:47:40

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



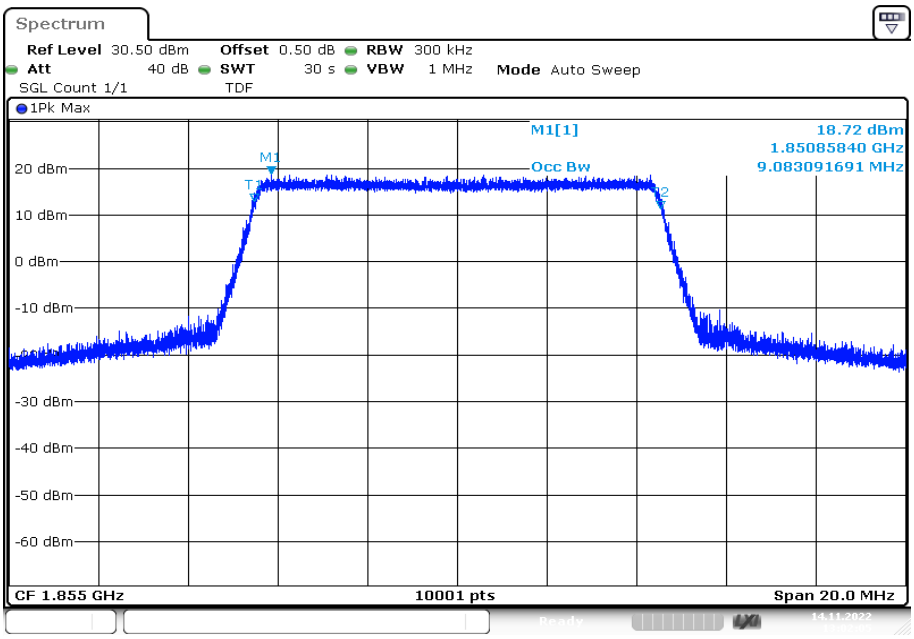
Date: 14.NOV.2022 12:54:14

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



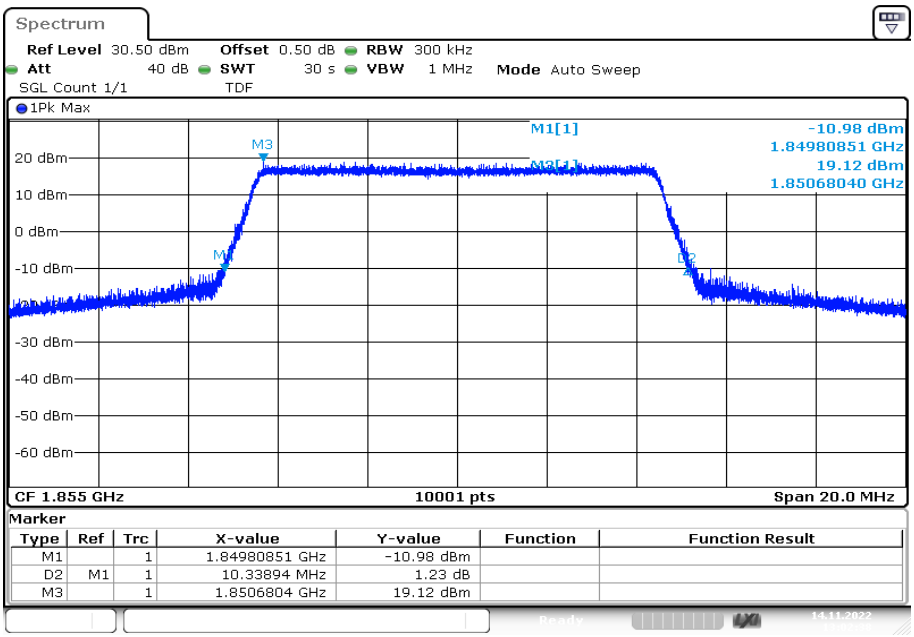
Date: 14.NOV.2022 12:54:48

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



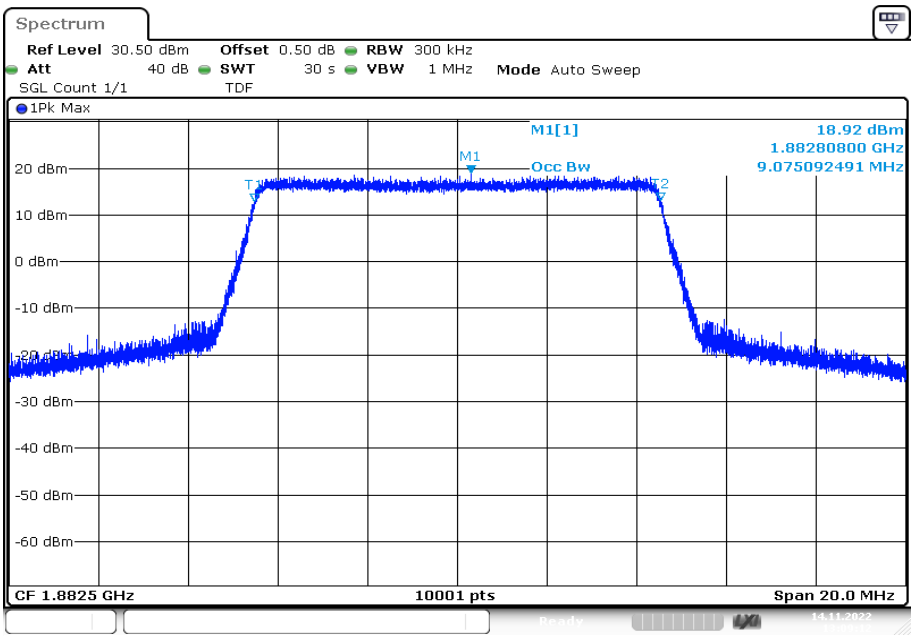
Date: 14.NOV.2022 13:02:05

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



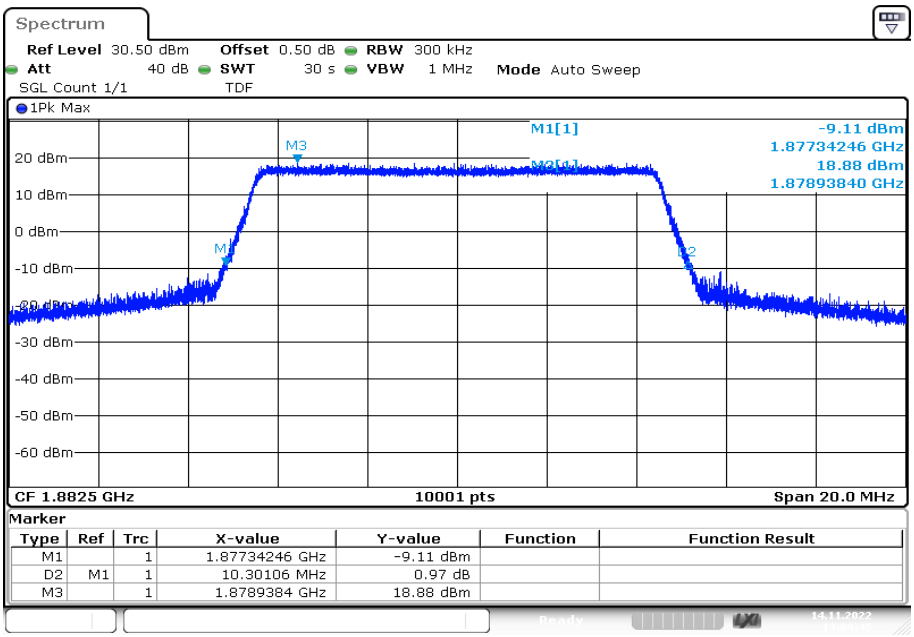
Date: 14.NOV.2022 13:02:38

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



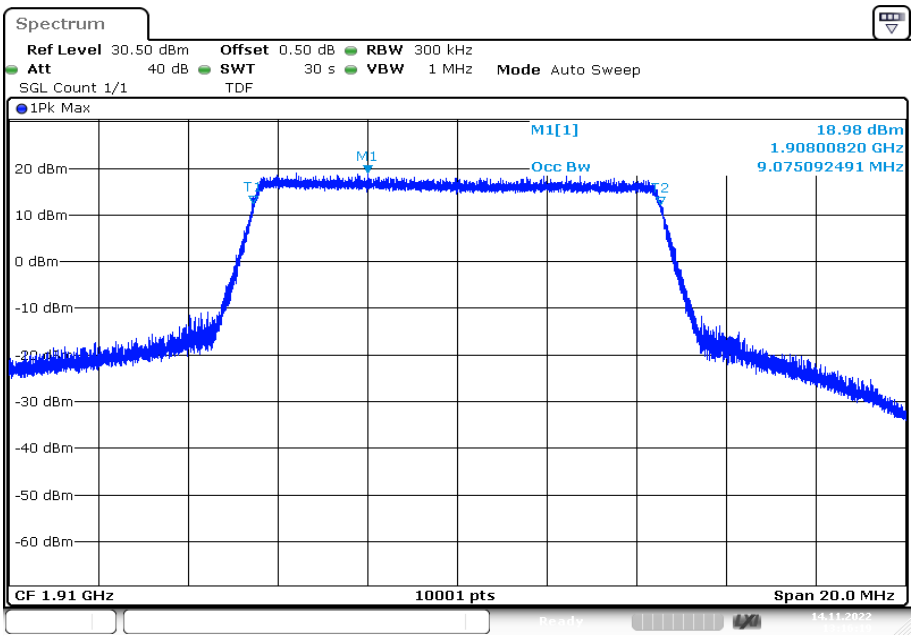
Date: 14.NOV.2022 13:09:12

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



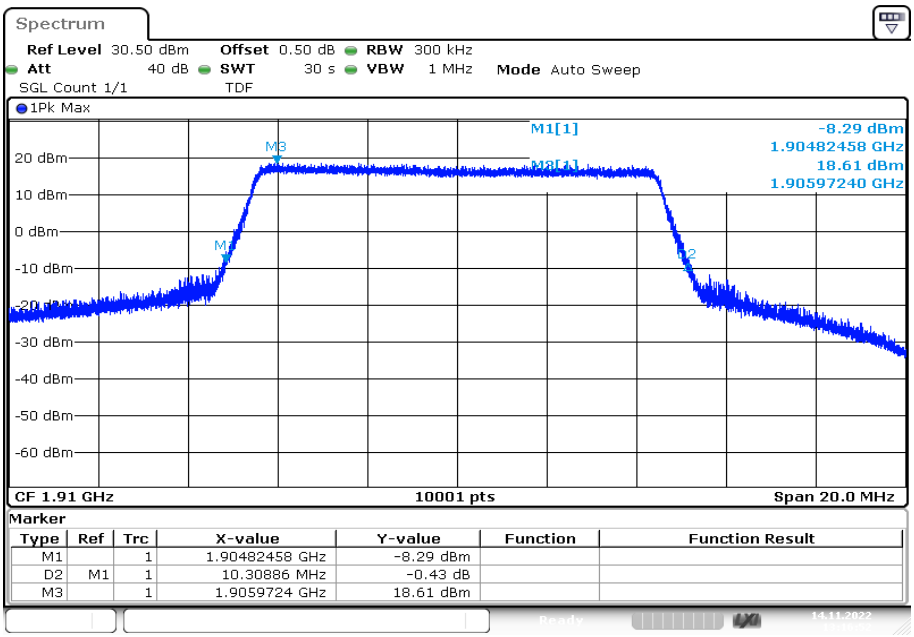
Date: 14.NOV.2022 13:09:45

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



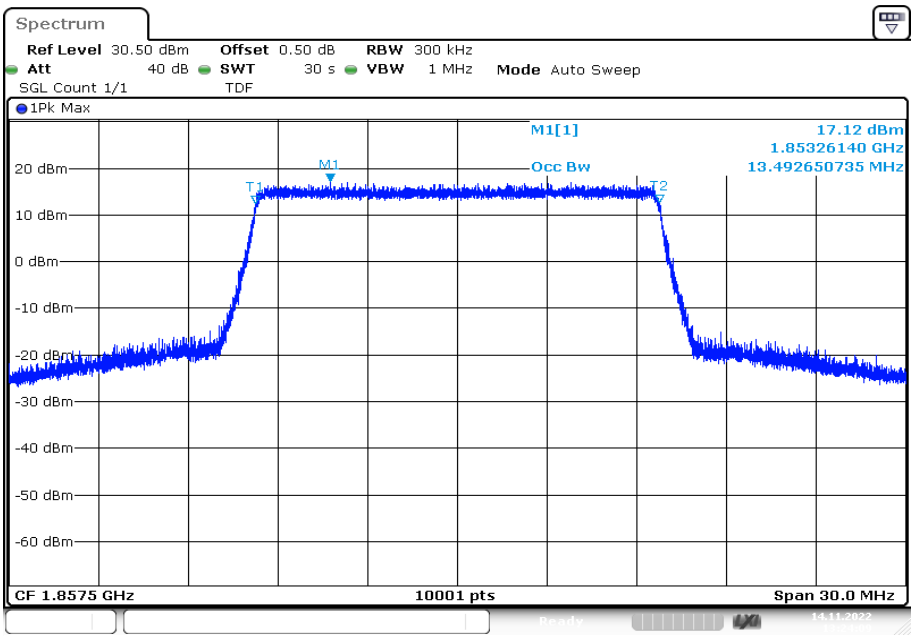
Date: 14.NOV.2022 13:16:19

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



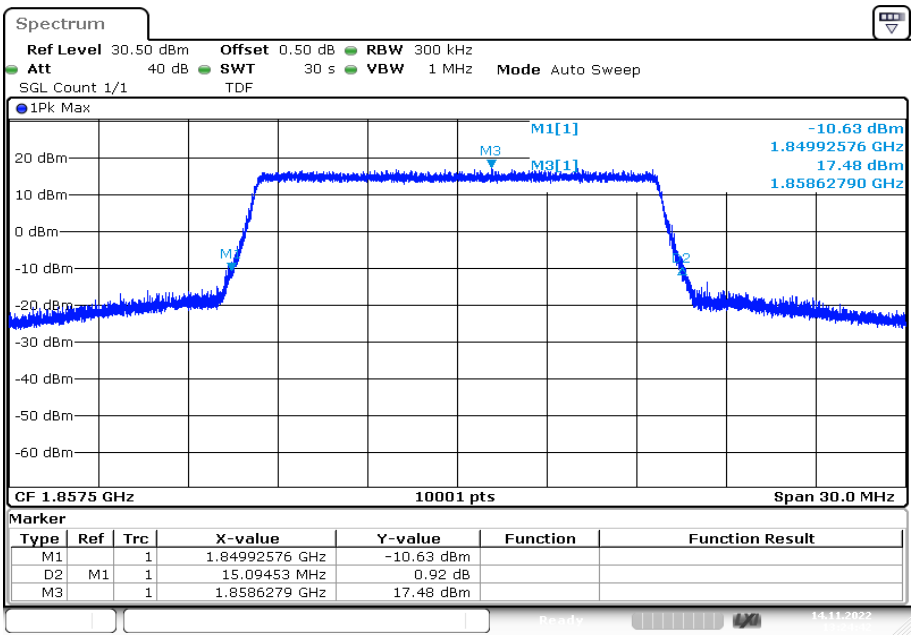
Date: 14.NOV.2022 13:16:52

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



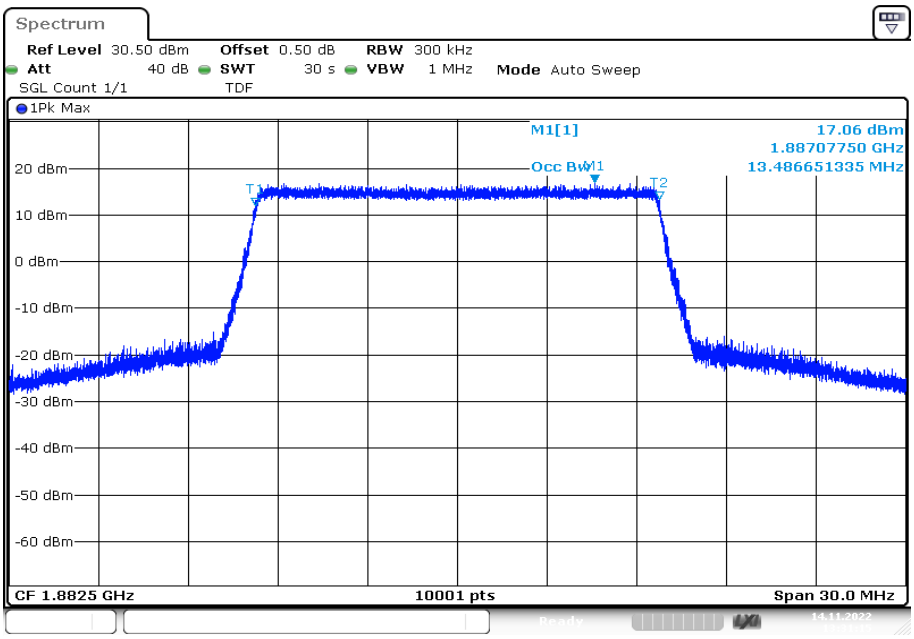
Date: 14.NOV.2022 13:24:09

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



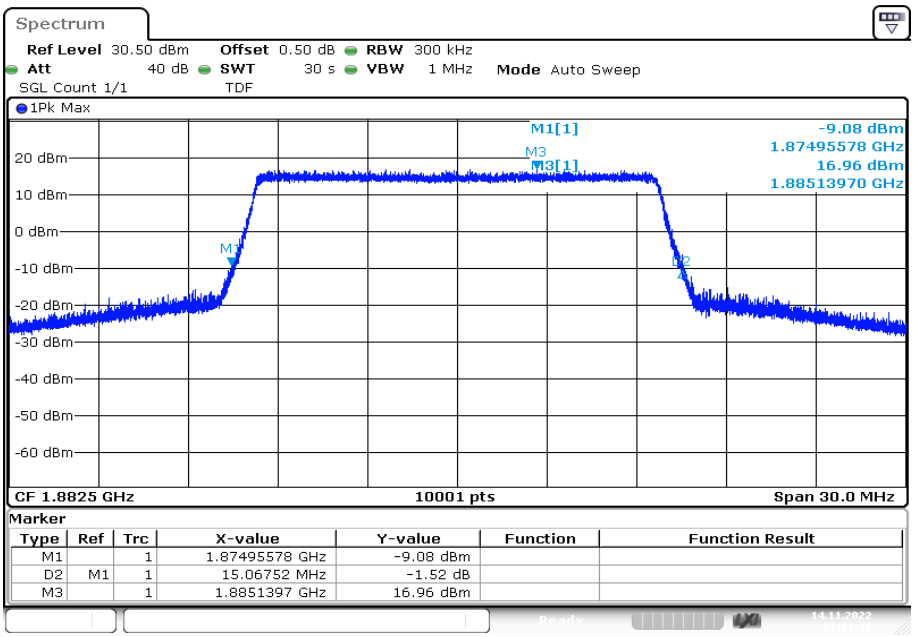
Date: 14.NOV.2022 13:24:42

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



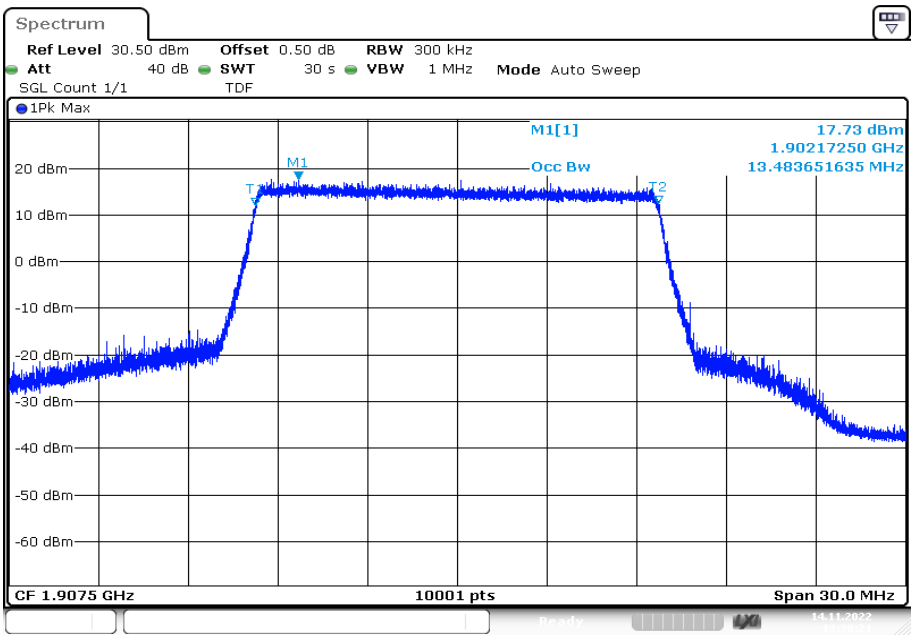
Date: 14.NOV.2022 13:31:16

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



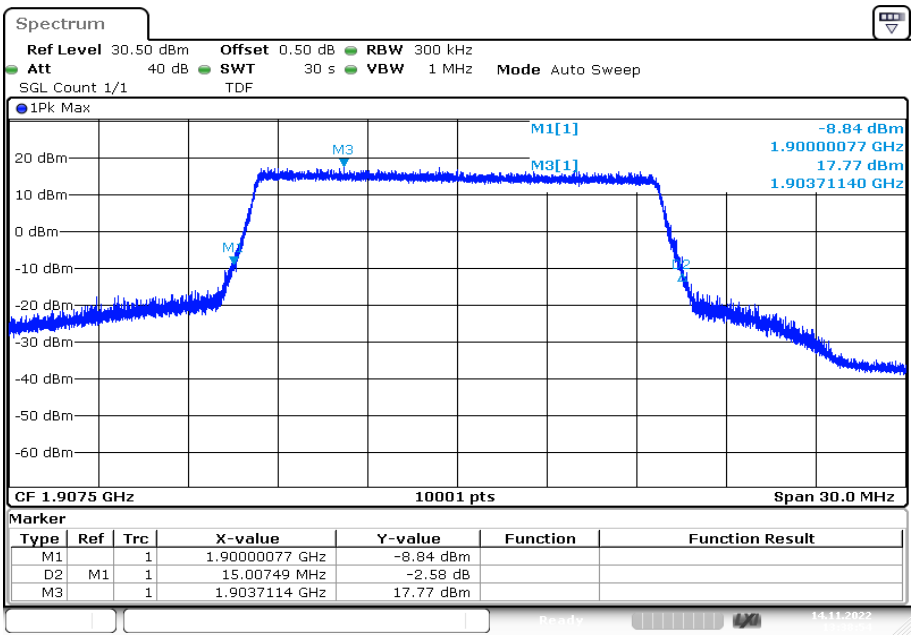
Date: 14.NOV.2022 13:31:48

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



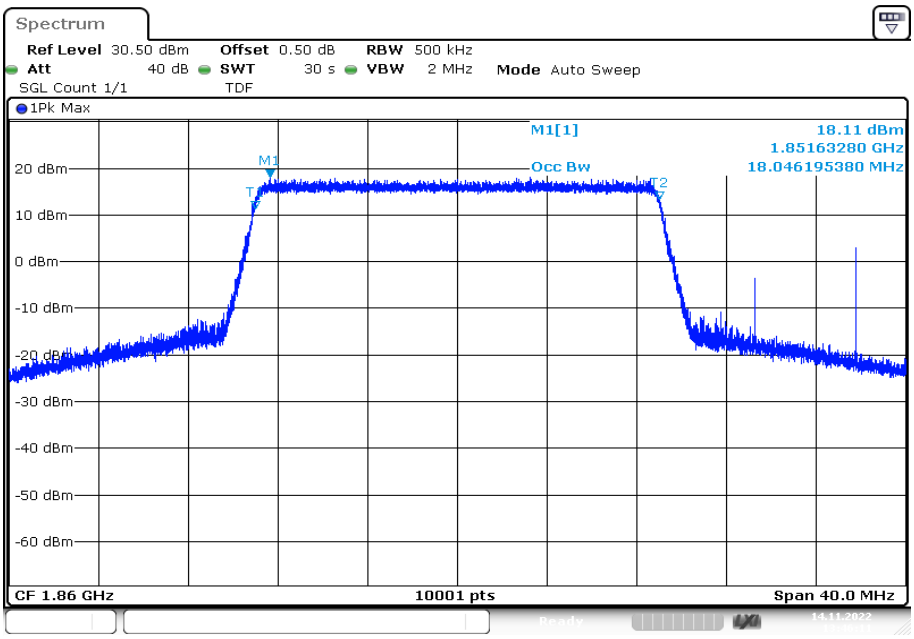
Date: 14.NOV.2022 13:38:22

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



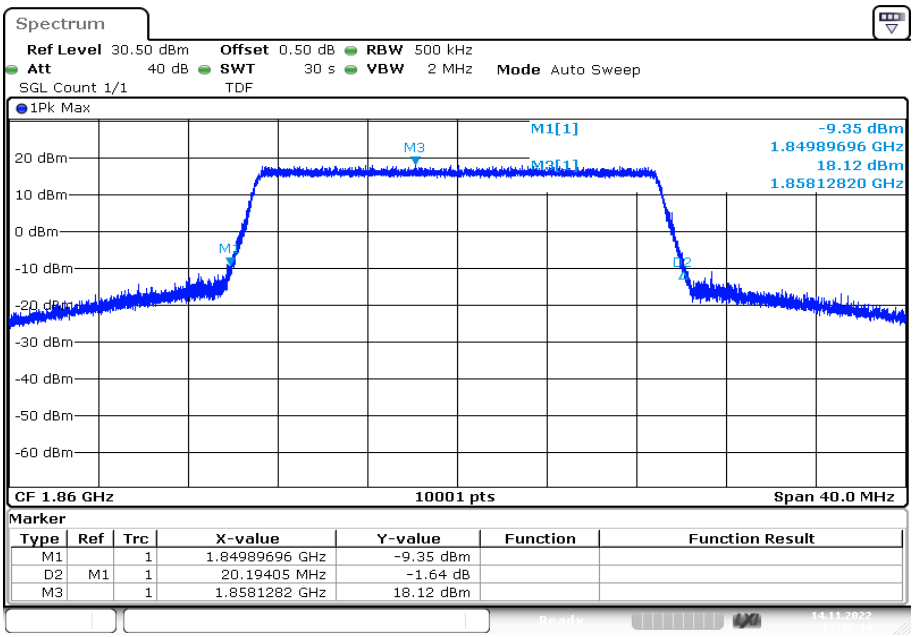
Date: 14.NOV.2022 13:38:55

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



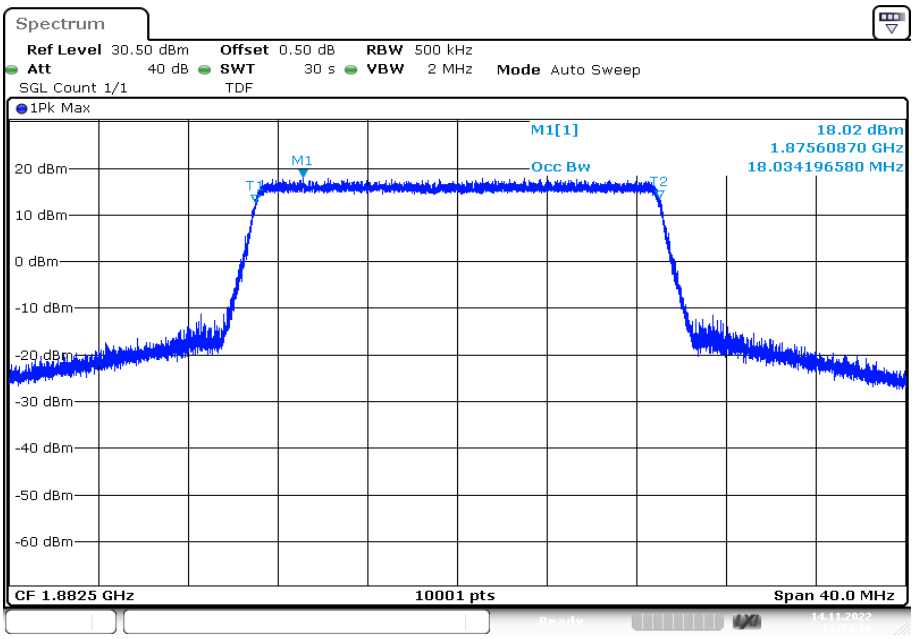
Date: 14.NOV.2022 13:46:11

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



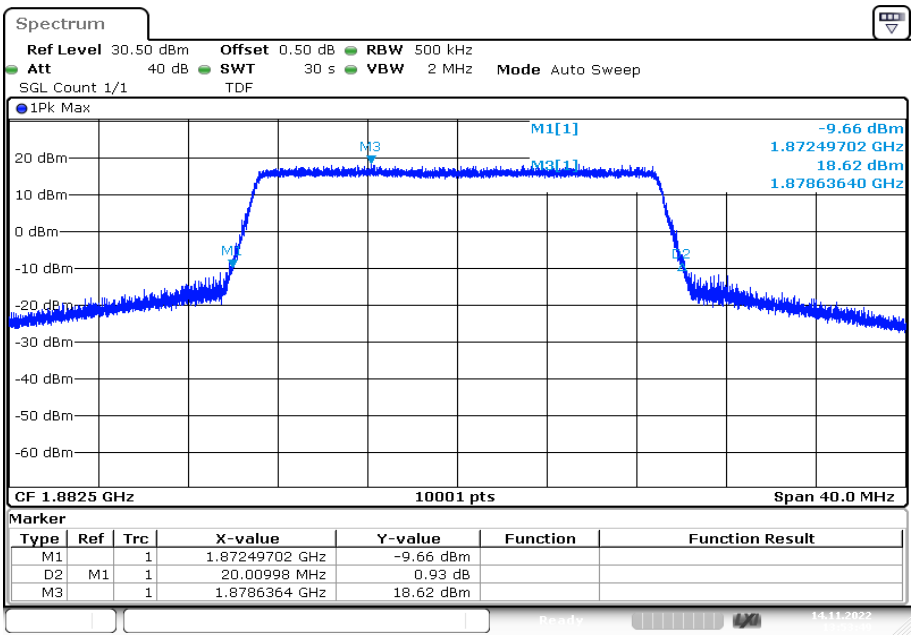
Date: 14.NOV.2022 13:46:44

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



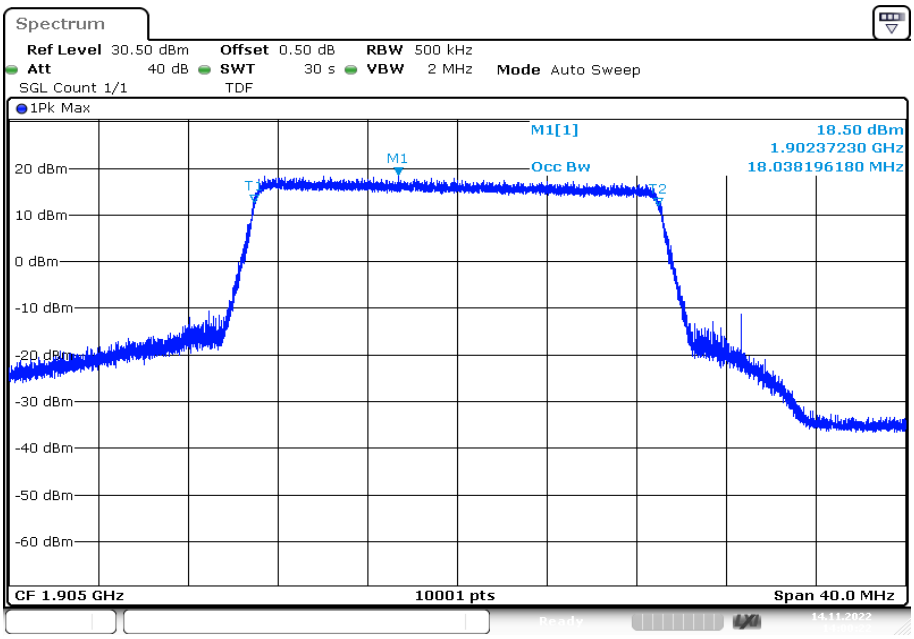
Date: 14.NOV.2022 13:53:17

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



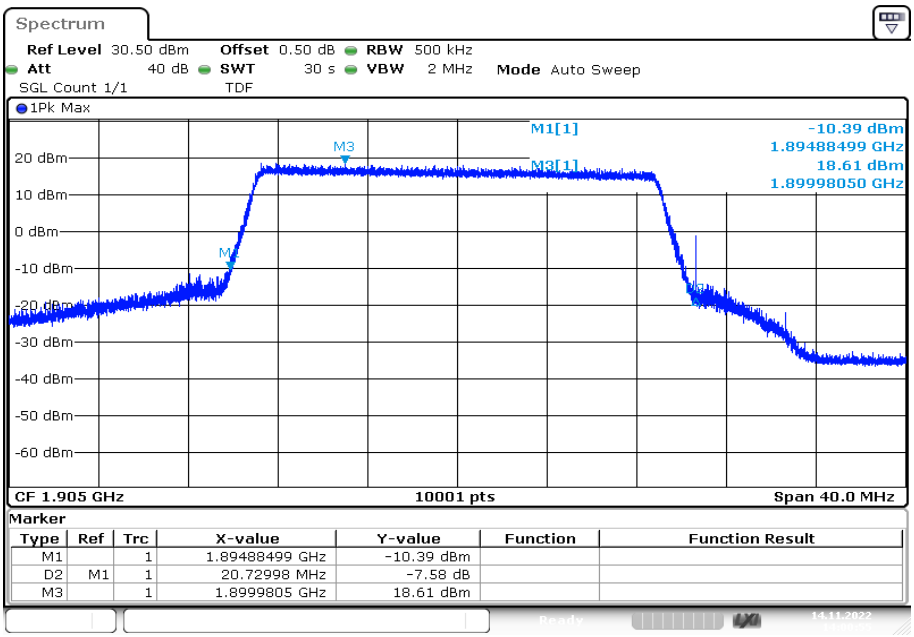
Date: 14.NOV.2022 13:53:49

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



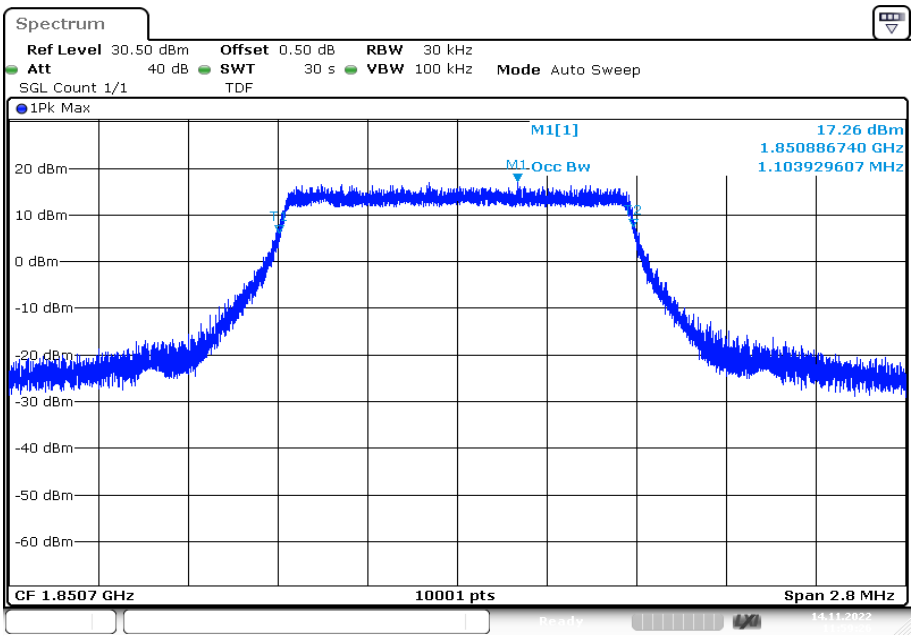
Date: 14.NOV.2022 14:00:22

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



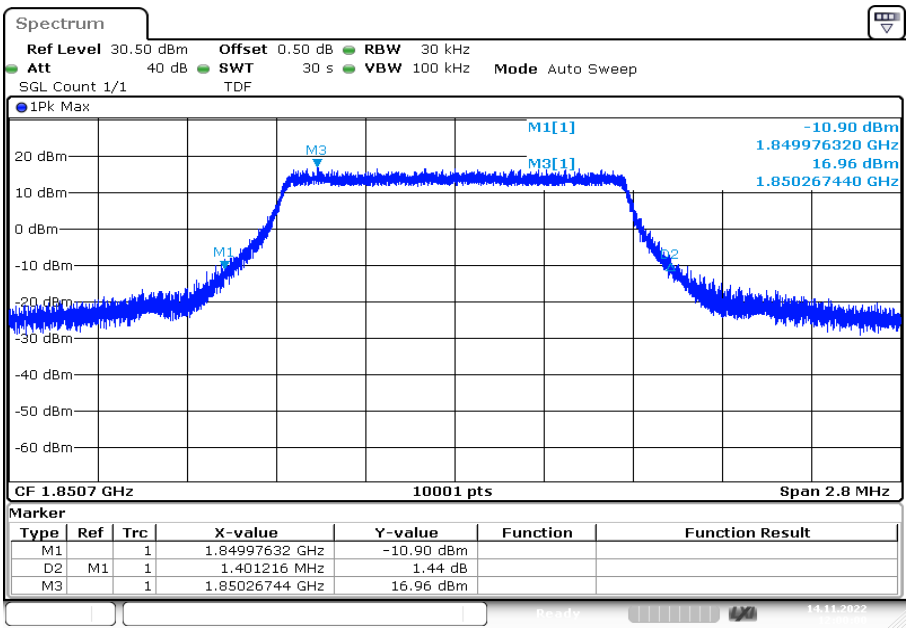
Date: 14.NOV.2022 14:00:55

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



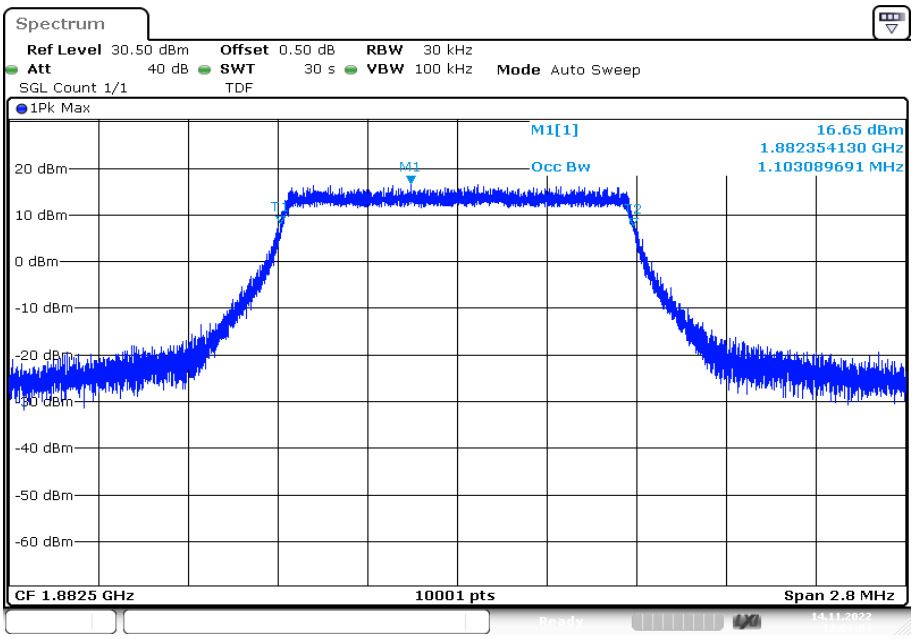
Date: 14.NOV.2022 11:59:27

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



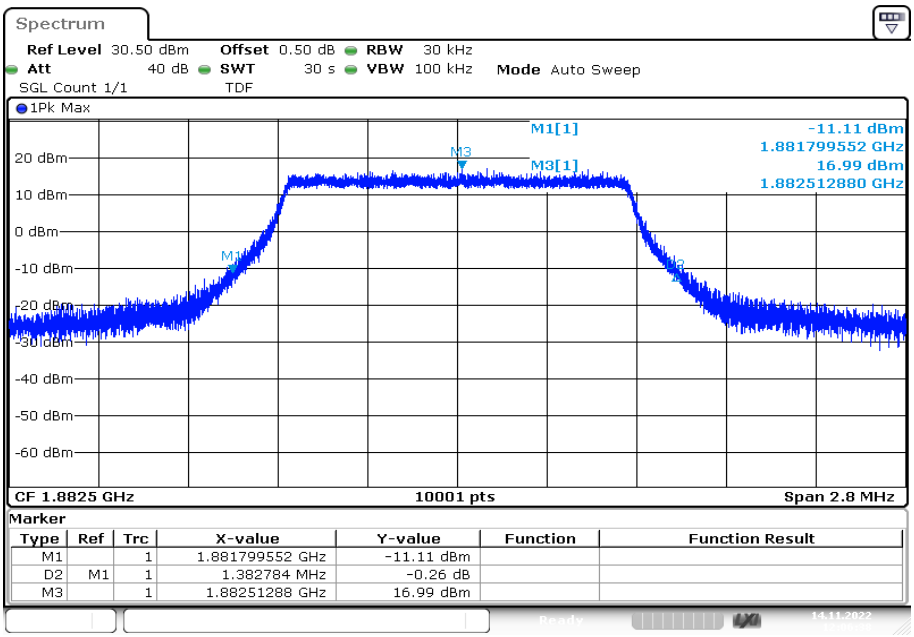
Date: 14.NOV.2022 12:00:00

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



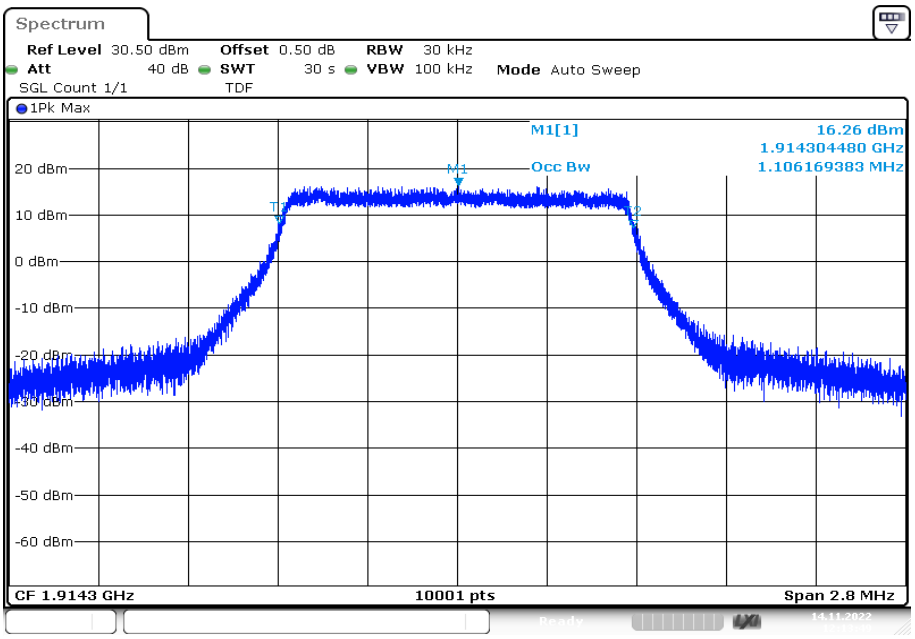
Date: 14.NOV.2022 12:06:05

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



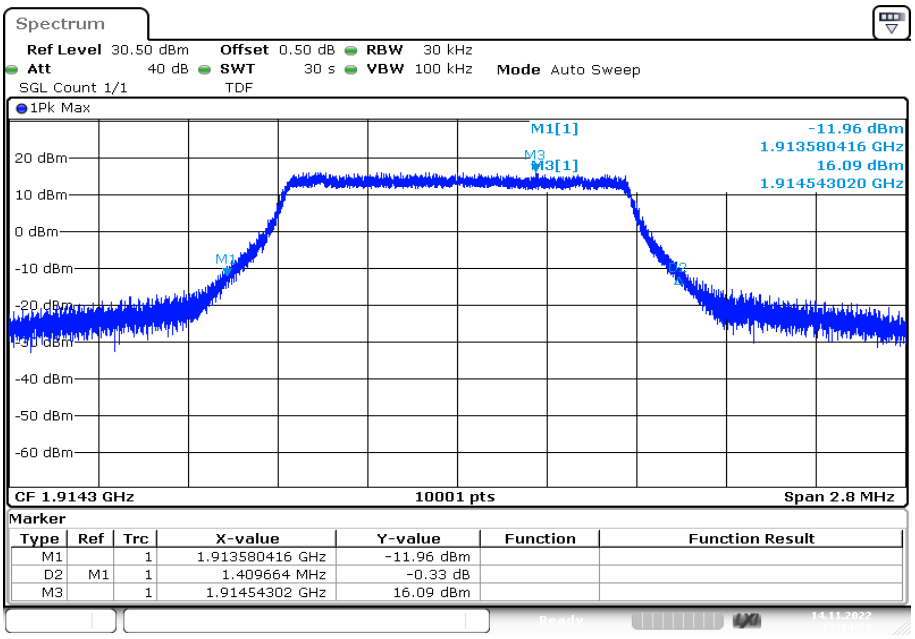
Date: 14.NOV.2022 12:06:38

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



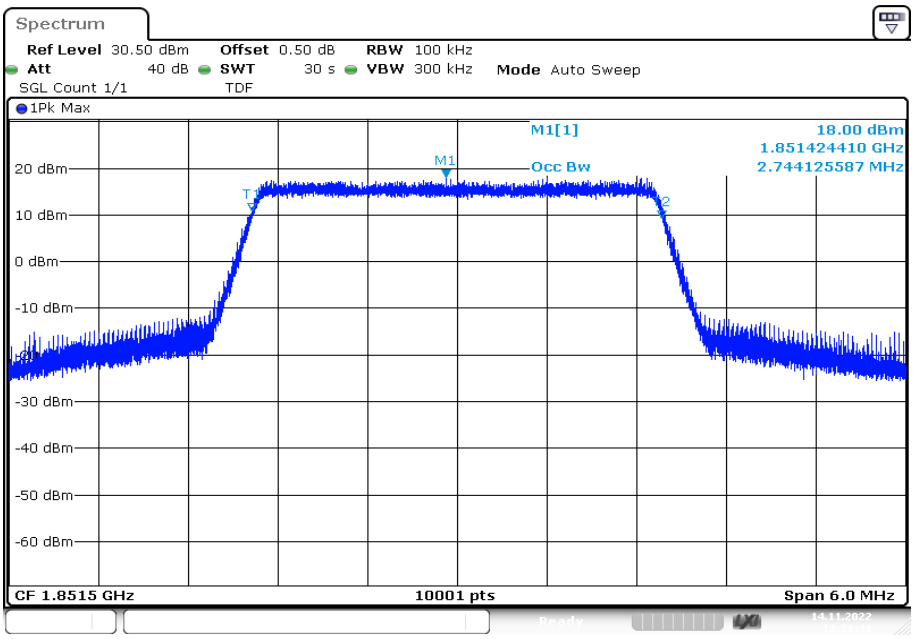
Date: 14.NOV.2022 12:13:50

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



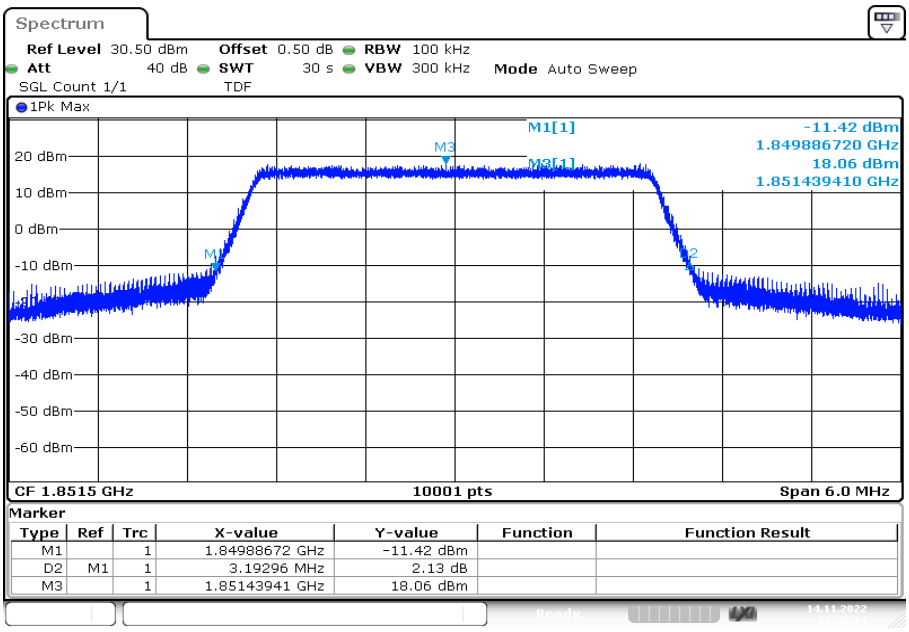
Date: 14.NOV.2022 12:14:23

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



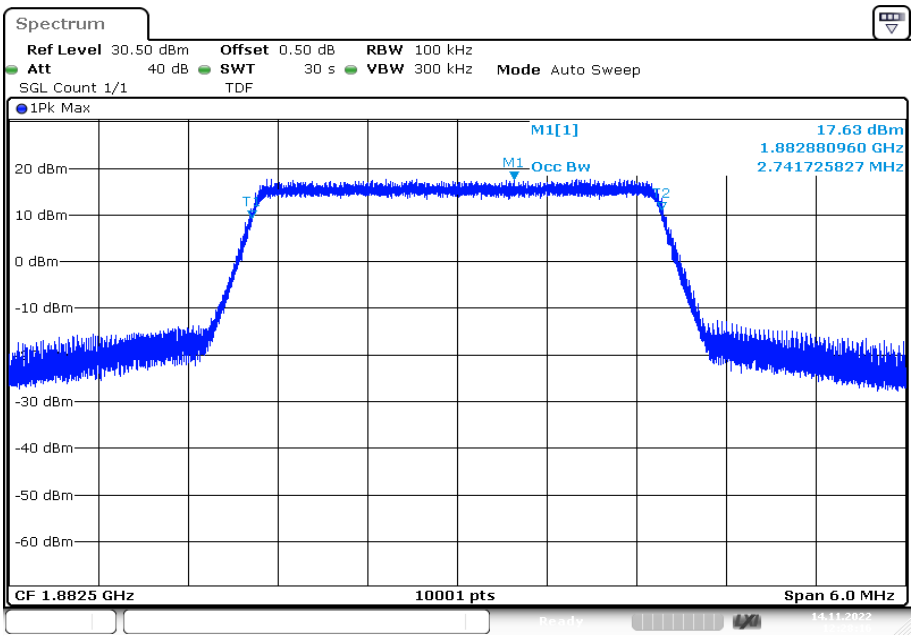
Date: 14.NOV.2022 12:21:42

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



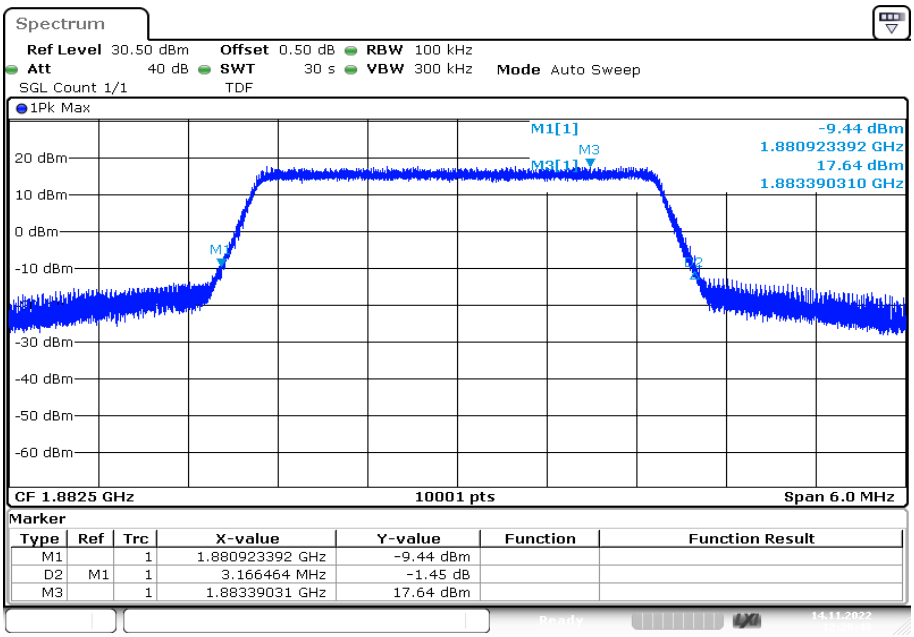
Date: 14.NOV.2022 12:22:14

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



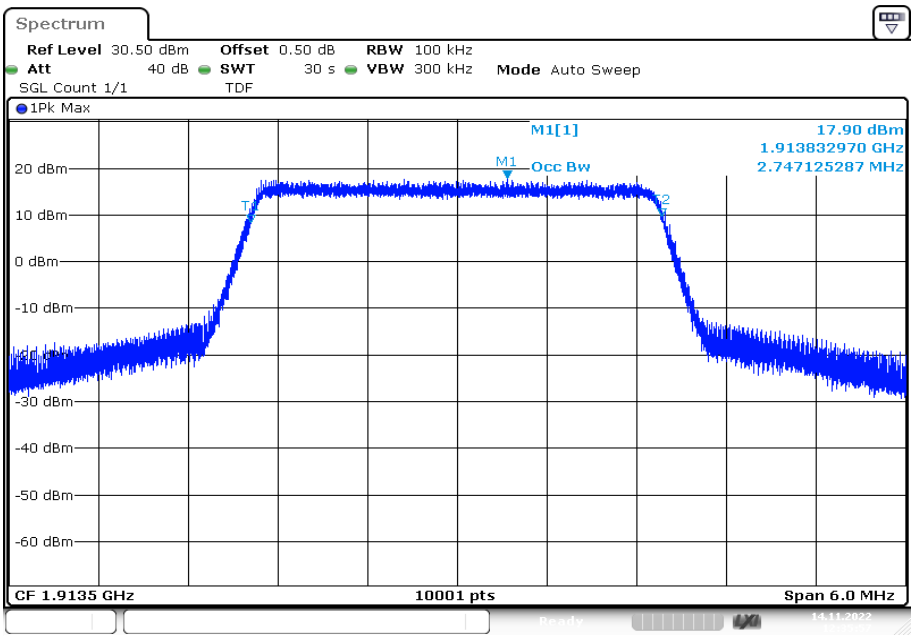
Date: 14.NOV.2022 12:28:16

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



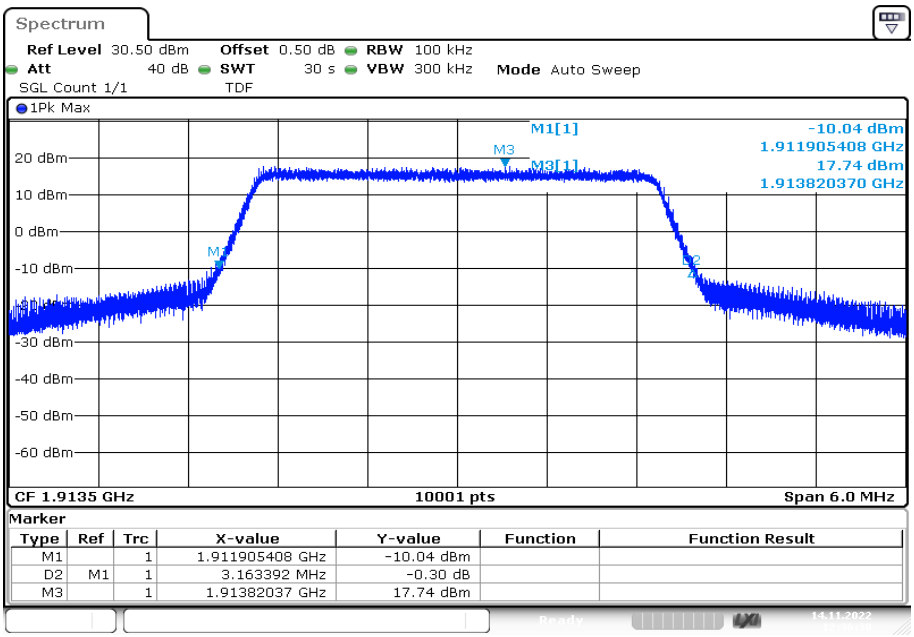
Date: 14.NOV.2022 12:28:49

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



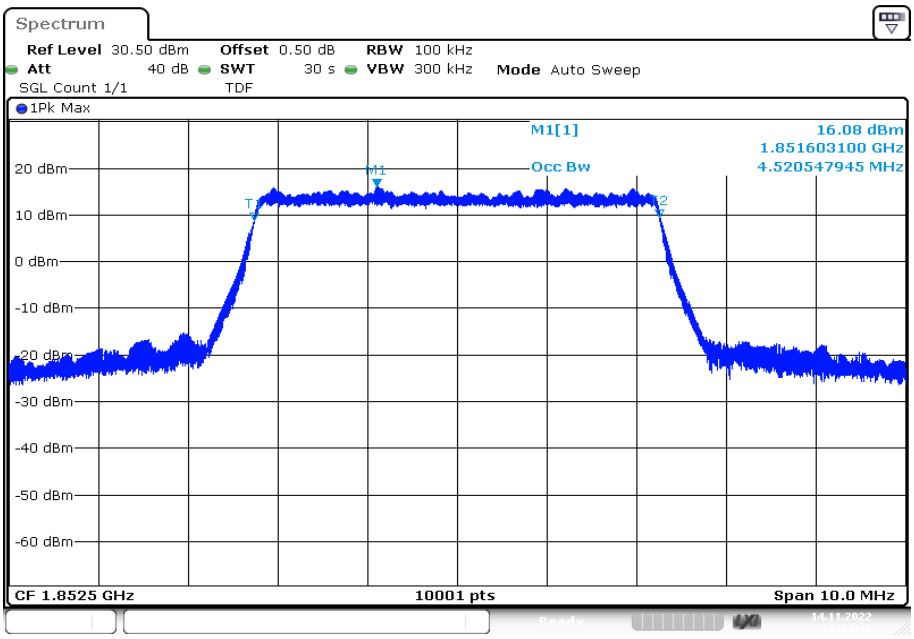
Date: 14.NOV.2022 12:35:57

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



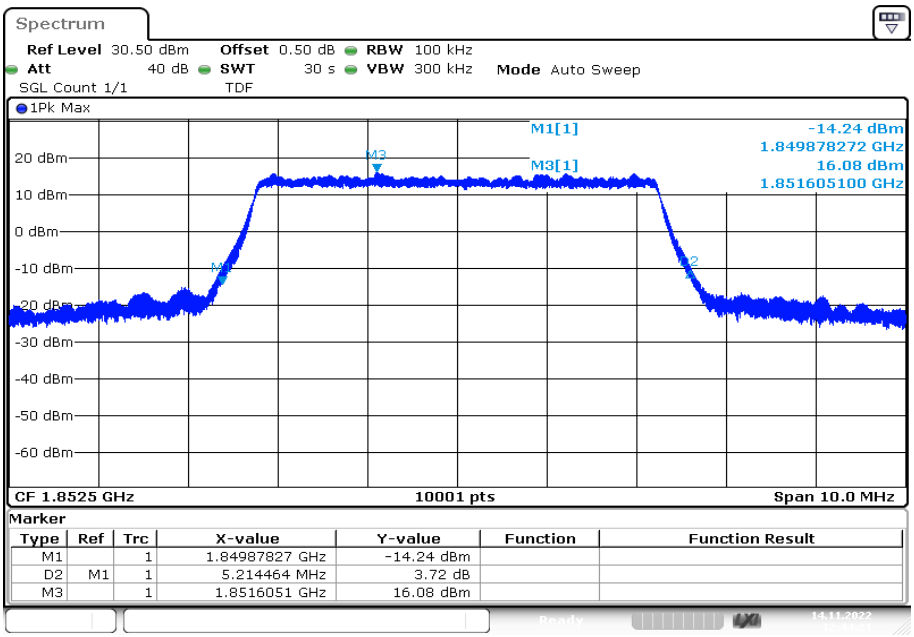
Date: 14.NOV.2022 12:36:30

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



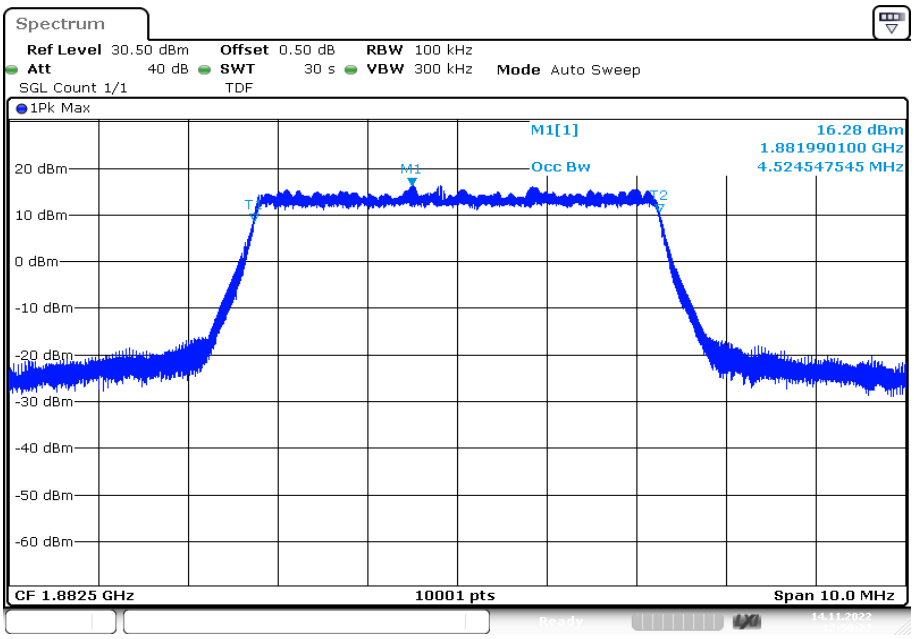
Date: 14.NOV.2022 12:43:49

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



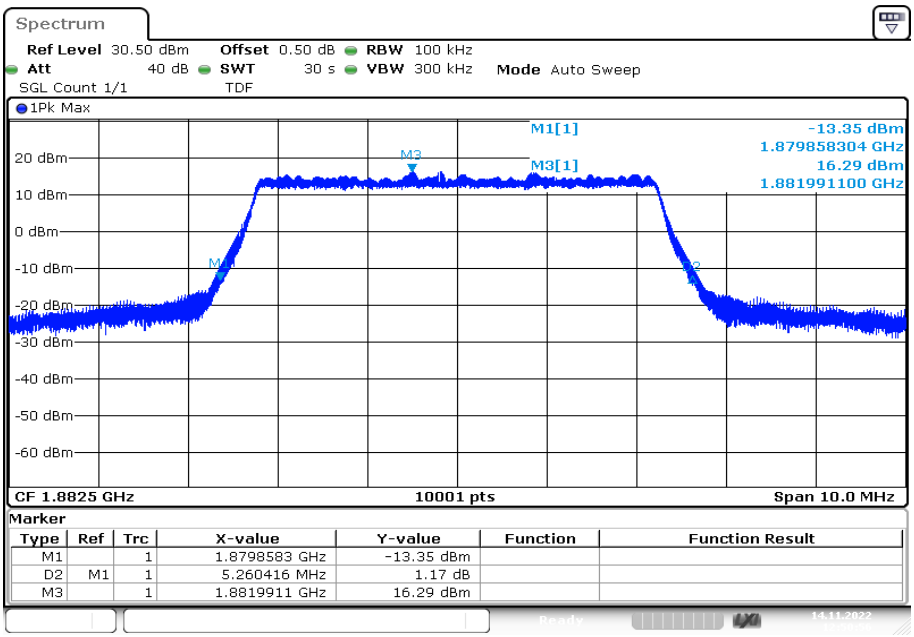
Date: 14.NOV.2022 12:44:22

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



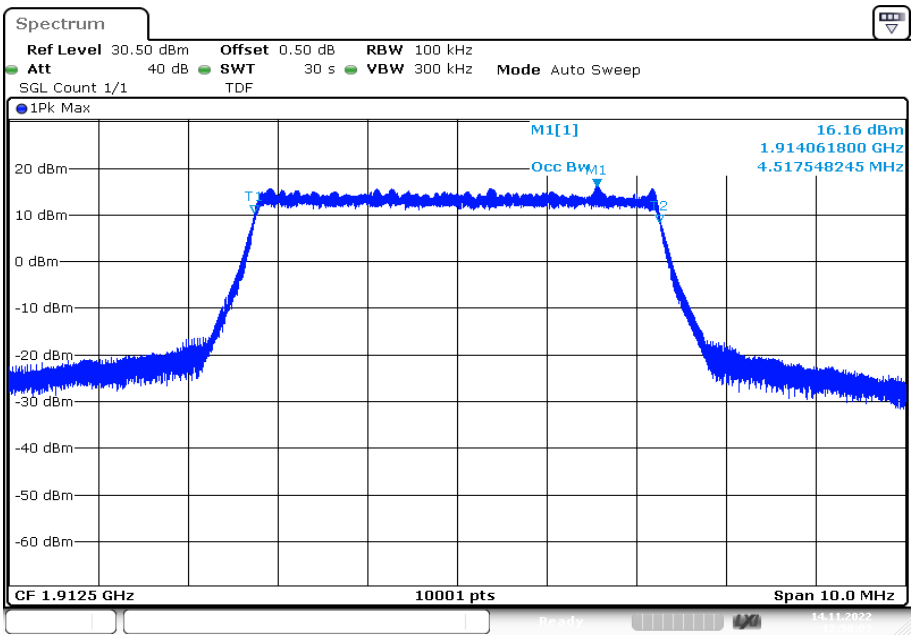
Date: 14.NOV.2022 12:50:23

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



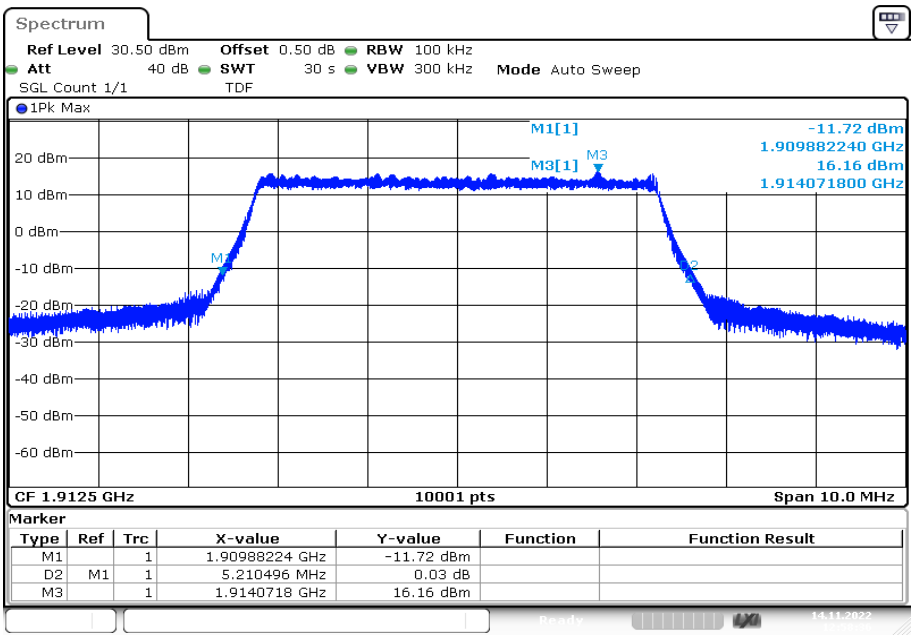
Date: 14.NOV.2022 12:50:56

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



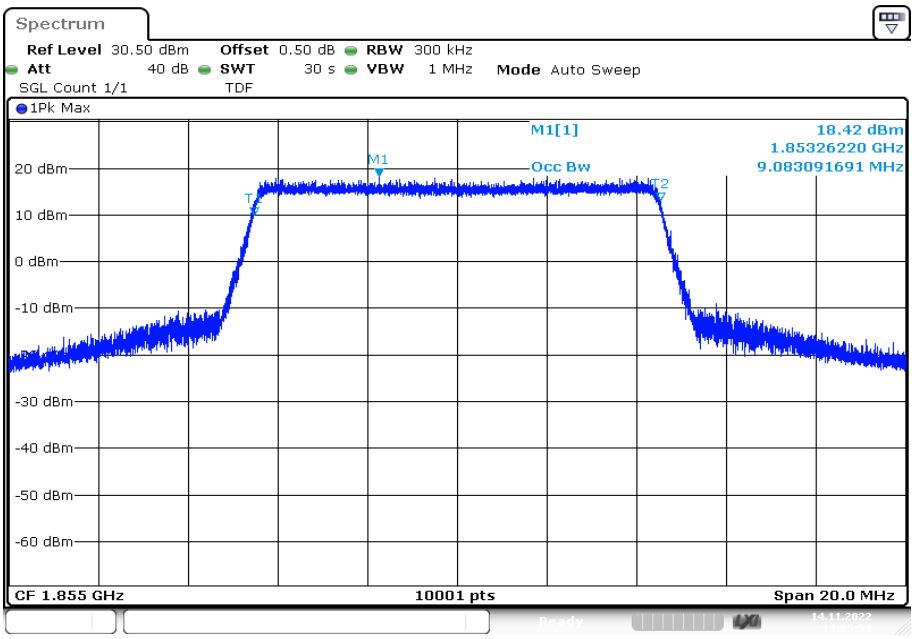
Date: 14.NOV.2022 12:58:03

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



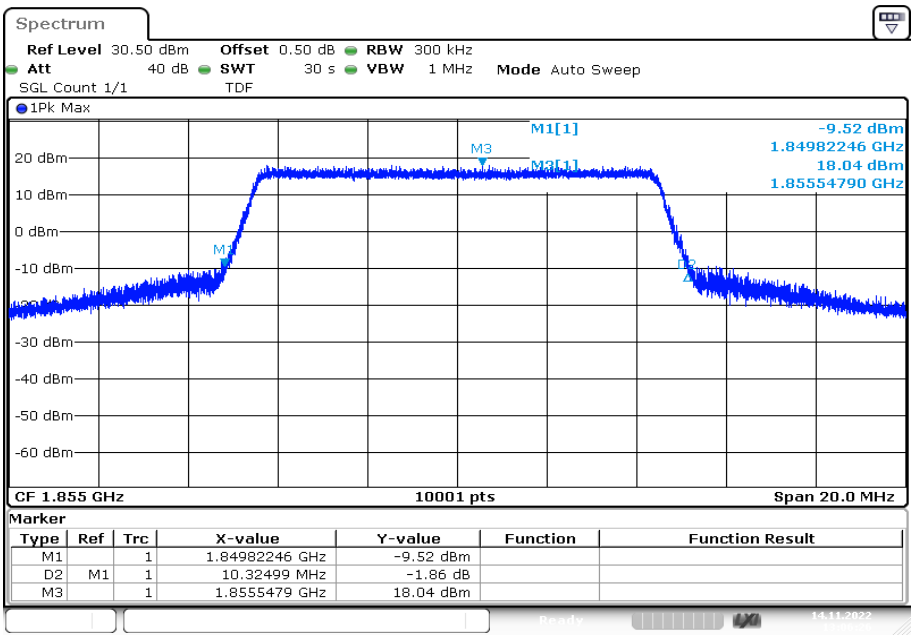
Date: 14.NOV.2022 12:58:36

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



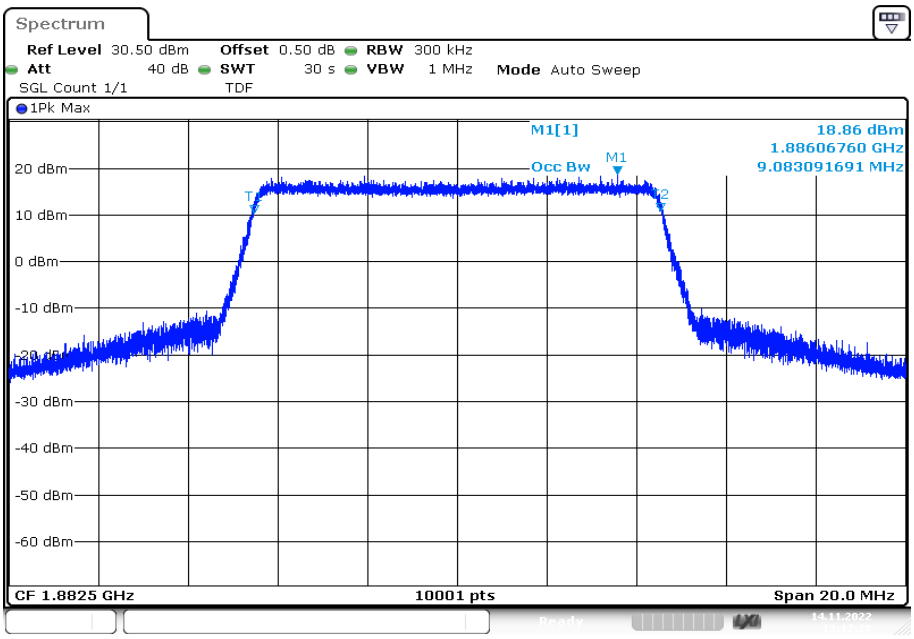
Date: 14.NOV.2022 13:05:54

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



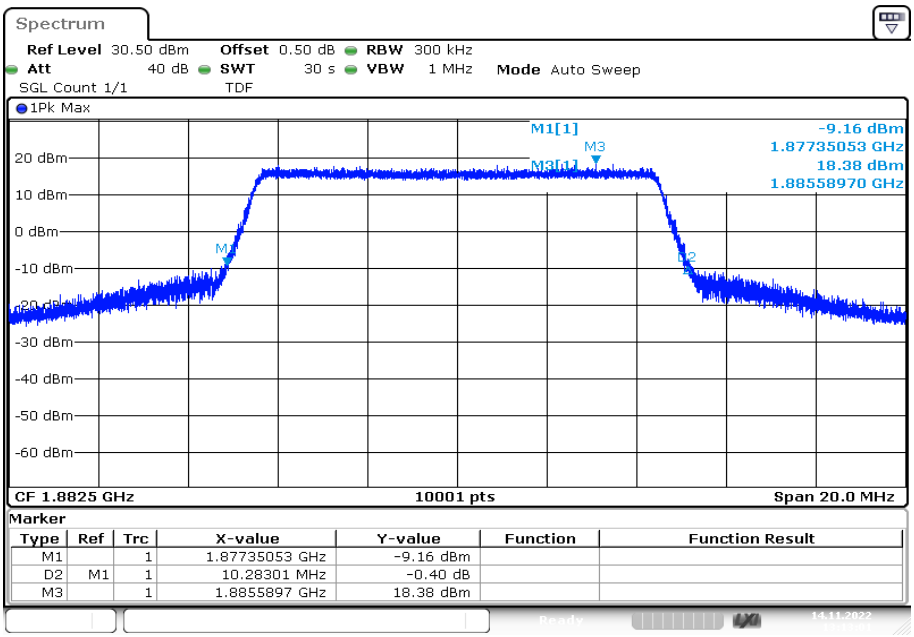
Date: 14.NOV.2022 13:06:27

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



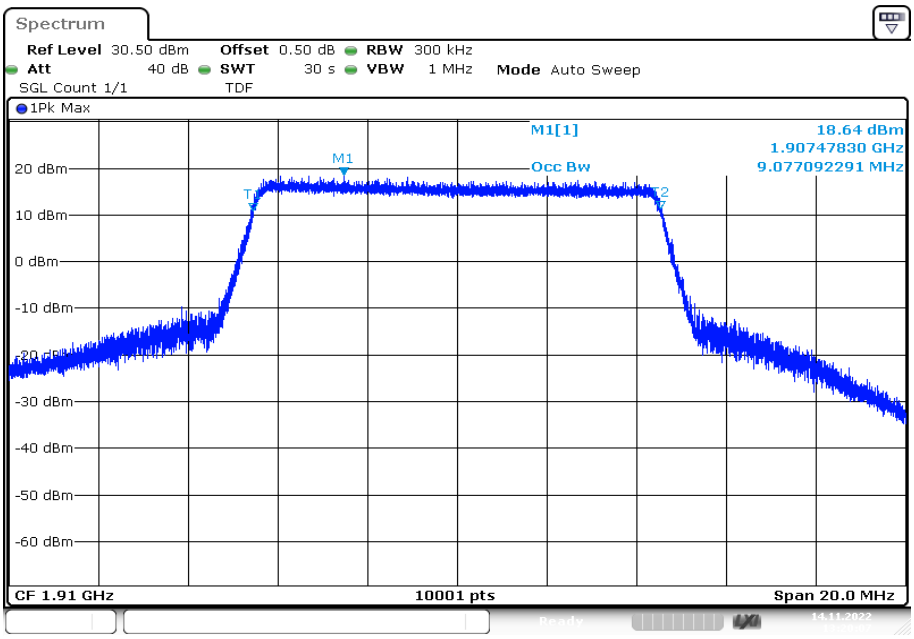
Date: 14.NOV.2022 13:12:28

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



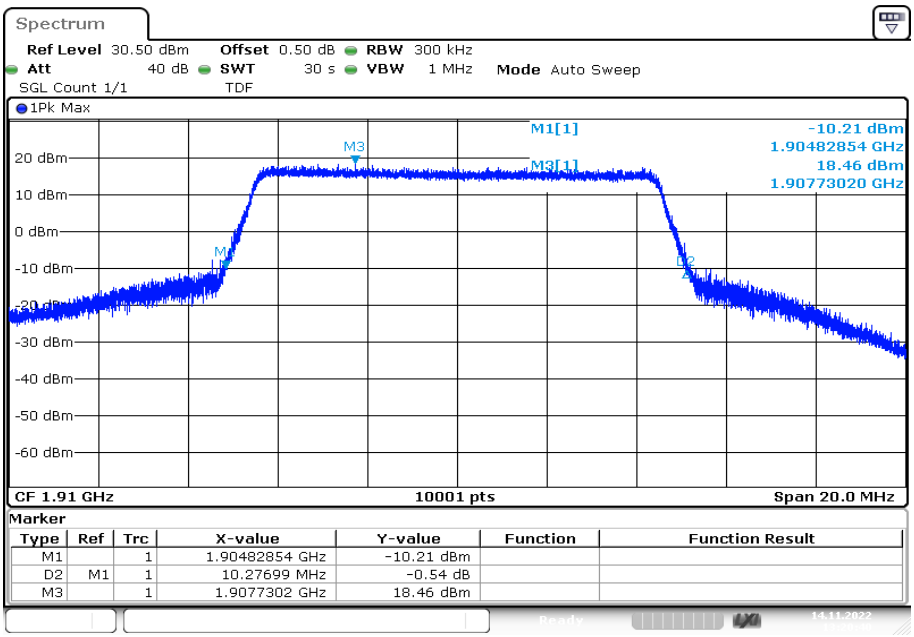
Date: 14.NOV.2022 13:13:01

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



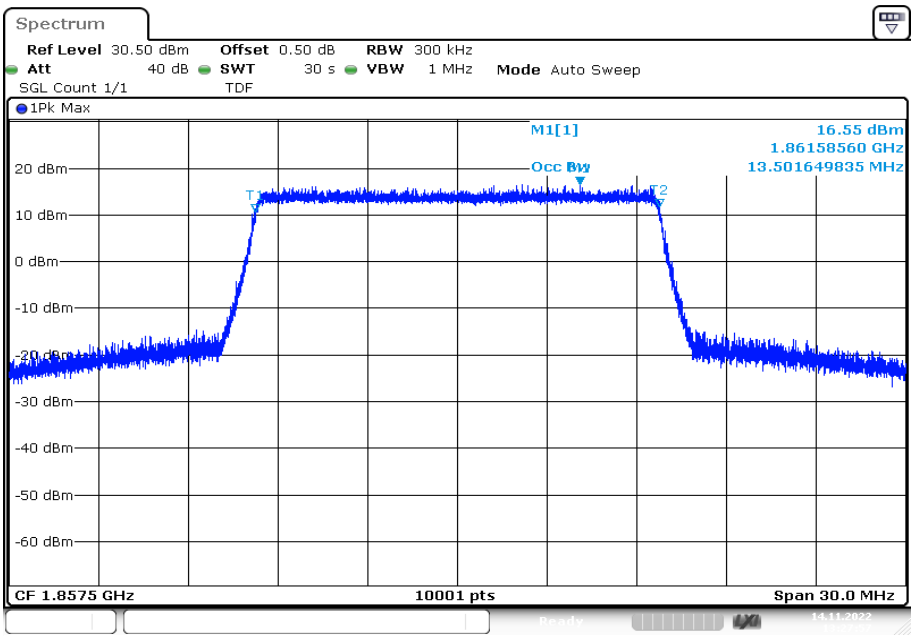
Date: 14.NOV.2022 13:20:08

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



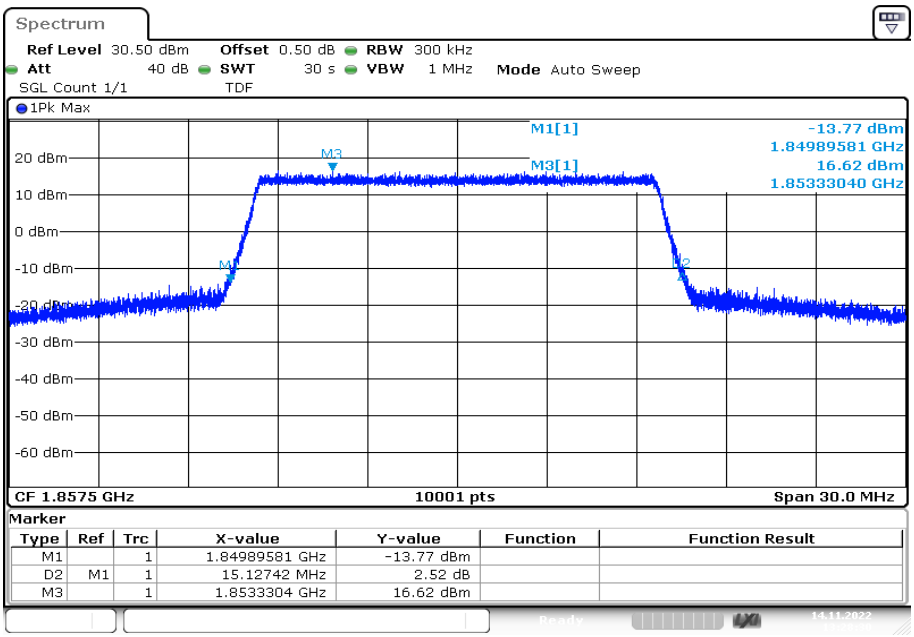
Date: 14.NOV.2022 13:20:41

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



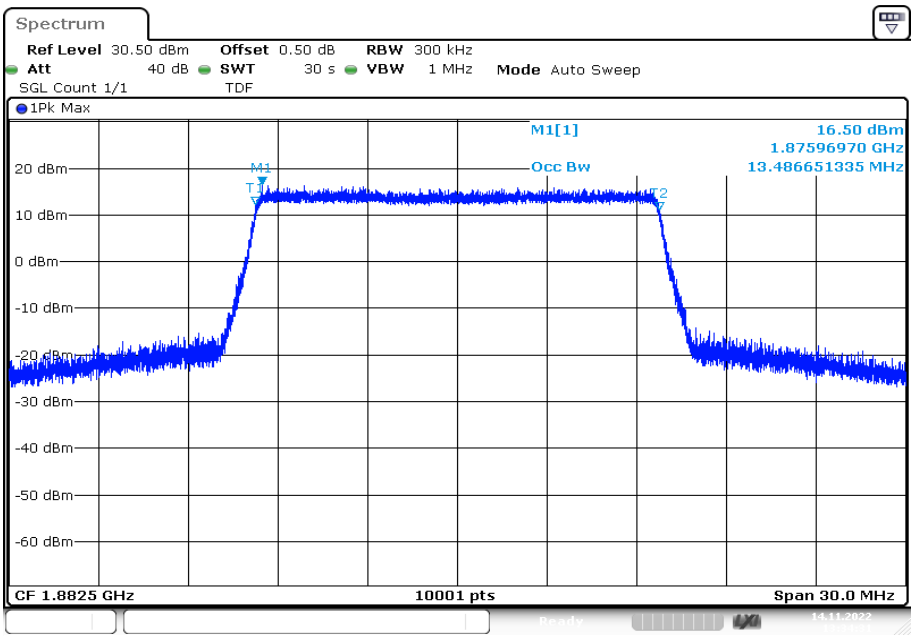
Date: 14.NOV.2022 13:27:58

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



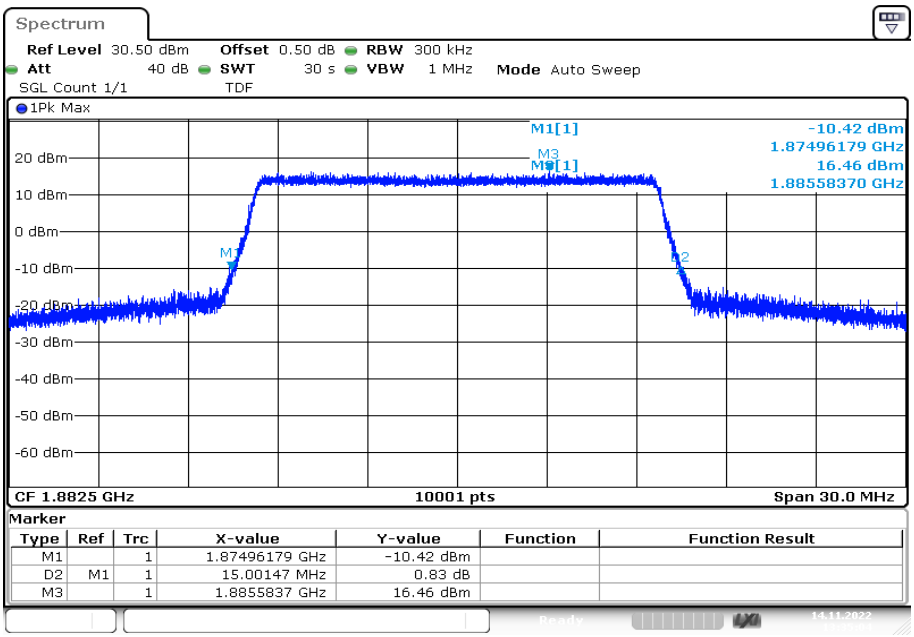
Date: 14.NOV.2022 13:28:30

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



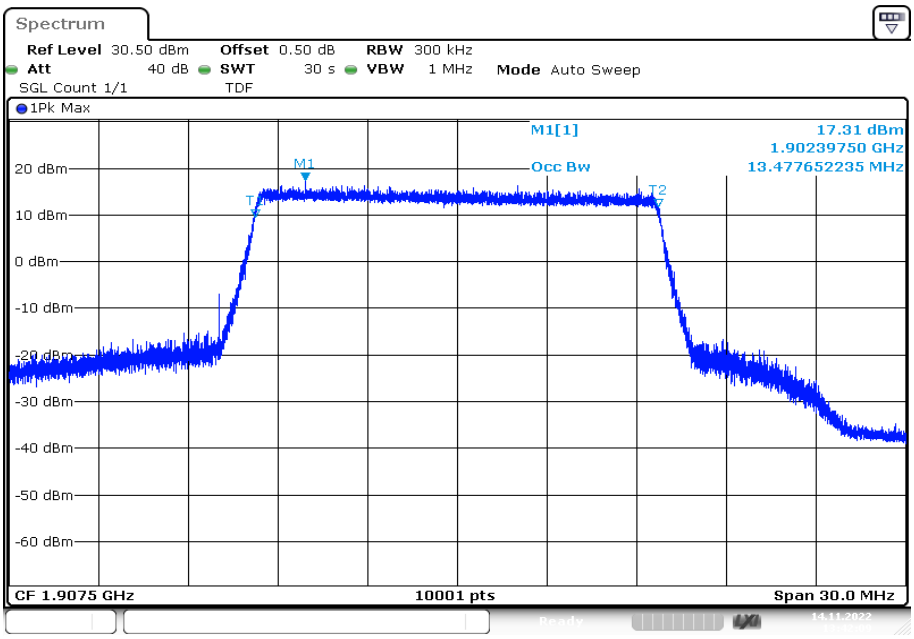
Date: 14.NOV.2022 13:34:31

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



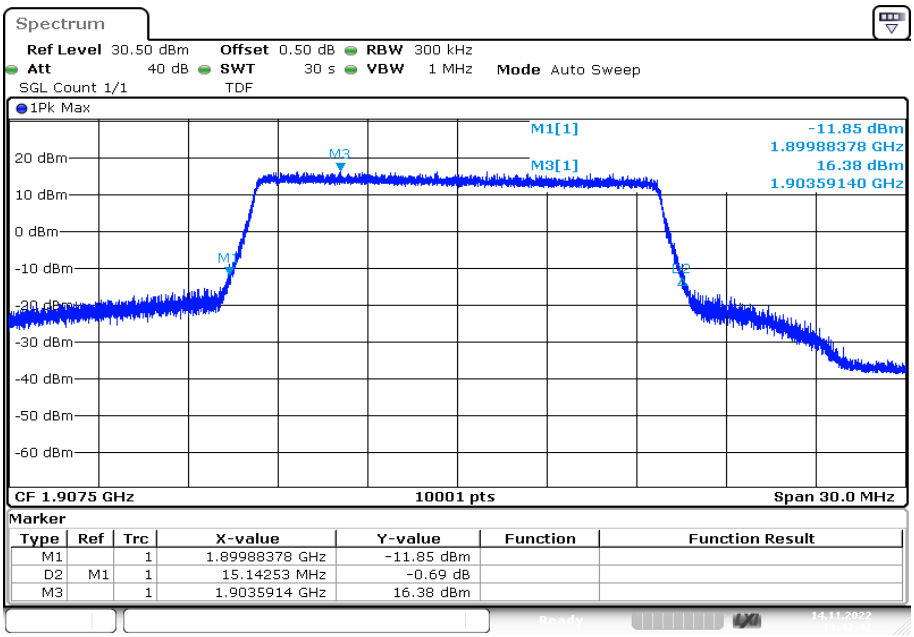
Date: 14.NOV.2022 13:35:04

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



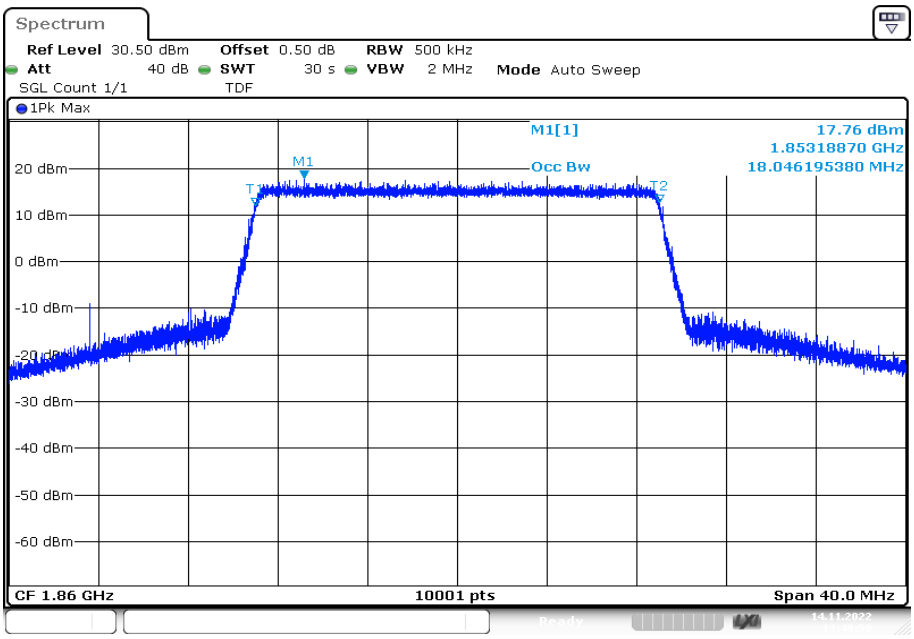
Date: 14.NOV.2022 13:42:10

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



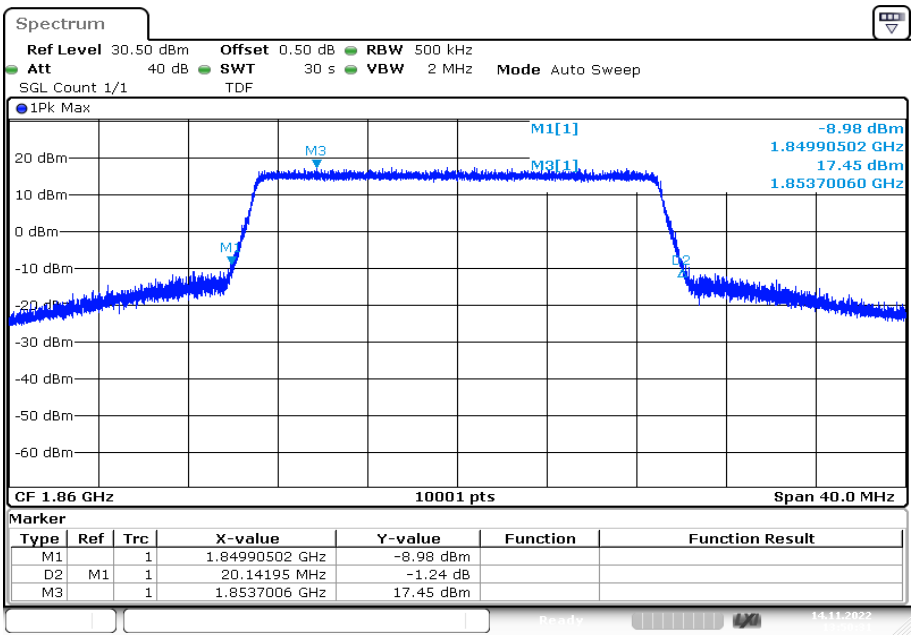
Date: 14.NOV.2022 13:42:43

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



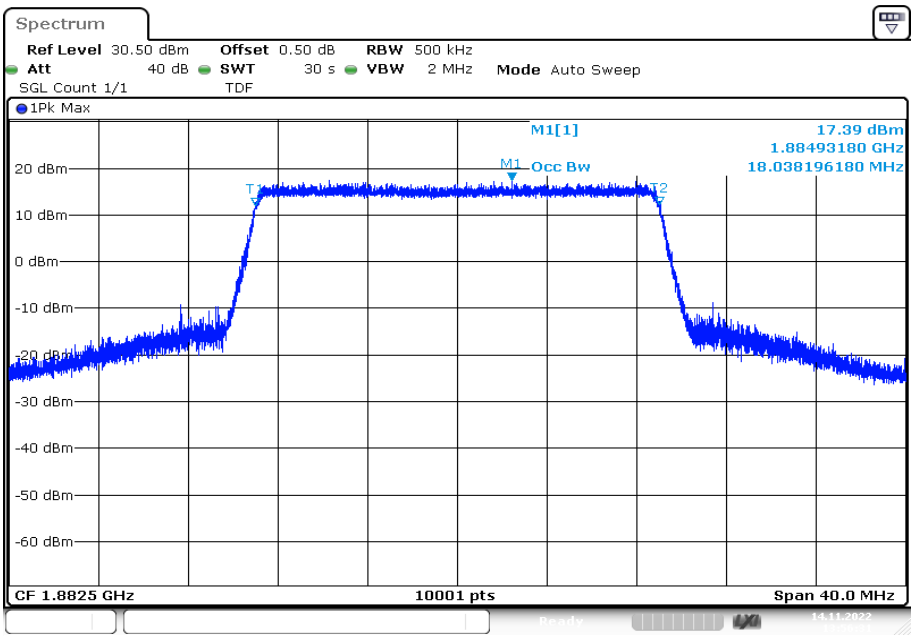
Date: 14.NOV.2022 13:49:59

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



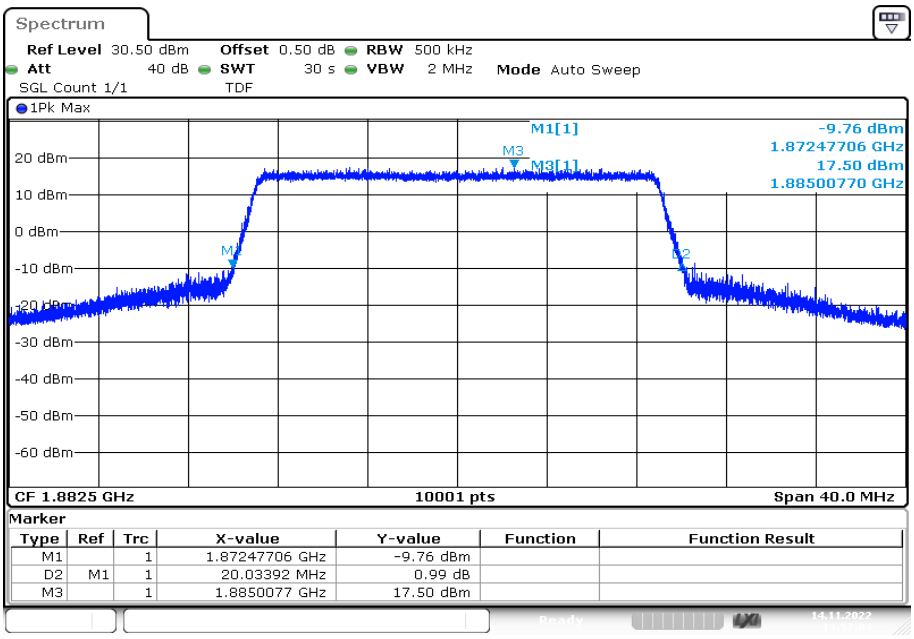
Date: 14.NOV.2022 13:50:32

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



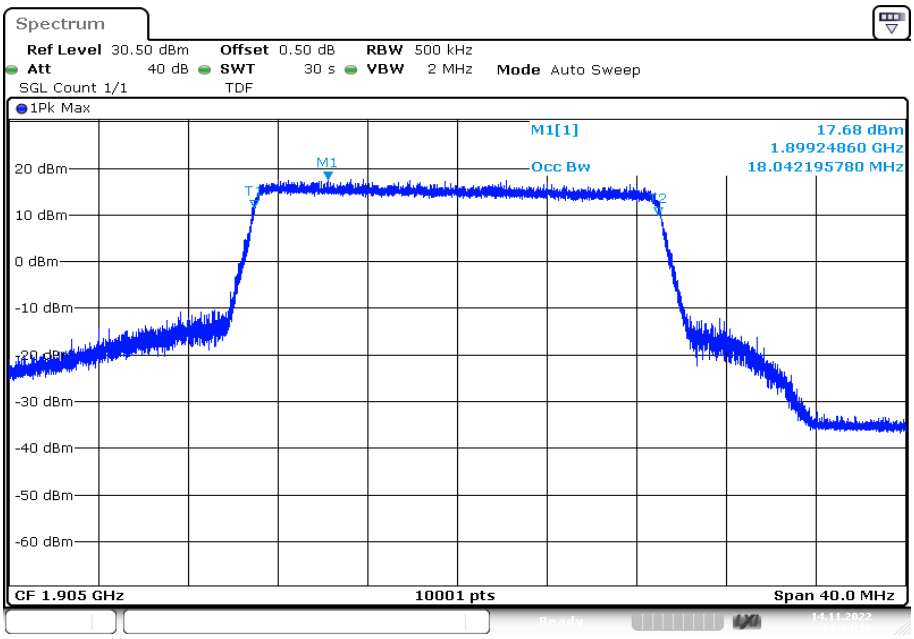
Date: 14.NOV.2022 13:56:32

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

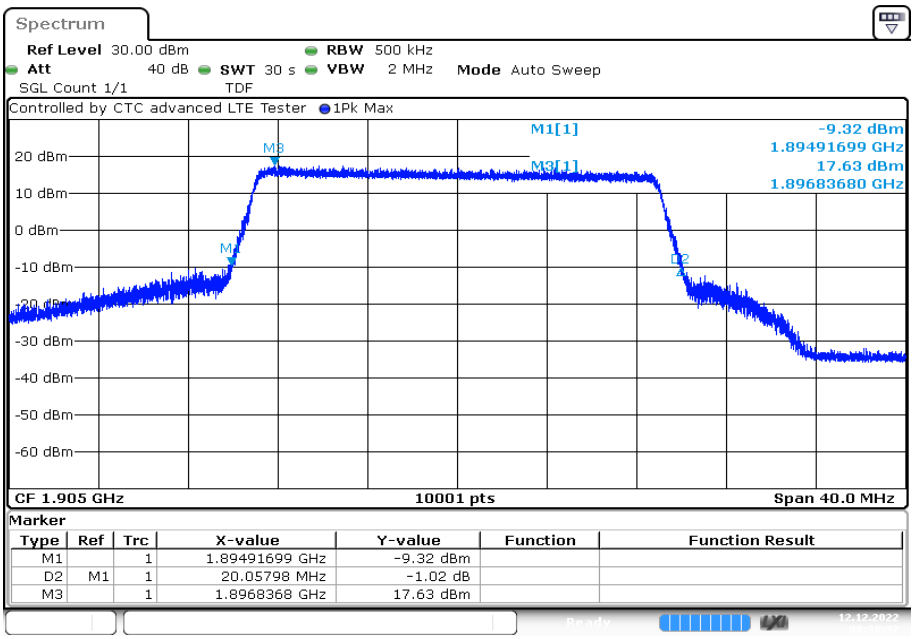


Date: 14.NOV.2022 13:57:05

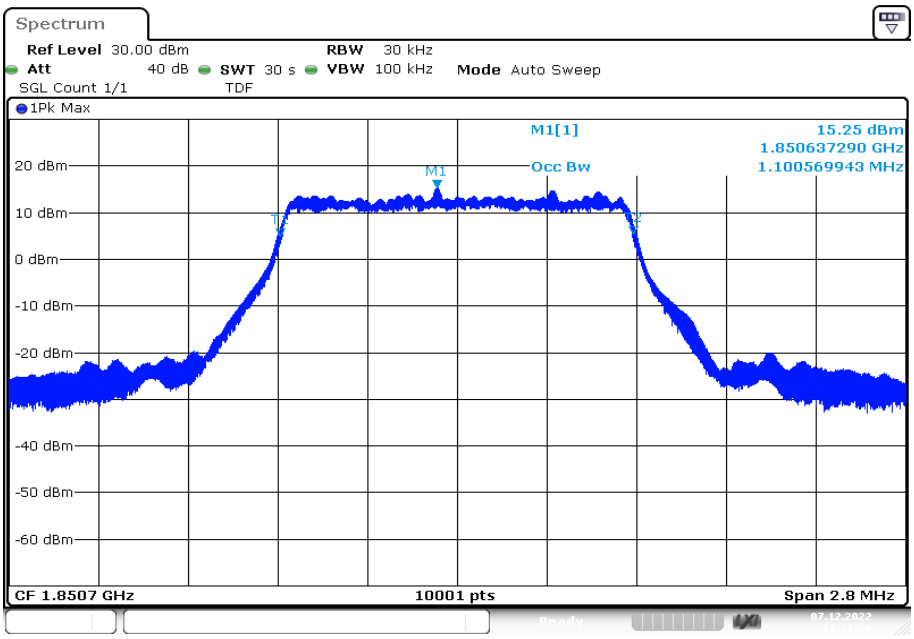
Plot 71: 20 MHz – 16-QAM - highest channel (99% - OBW)



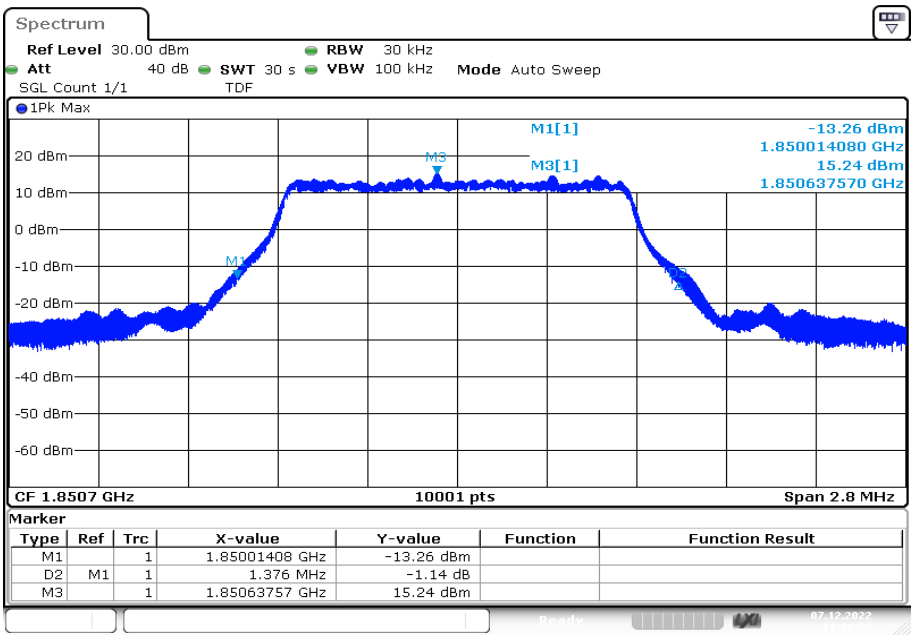
Plot 72: 20 MHz – 16-QAM - highest channel (-26 dBc BW)



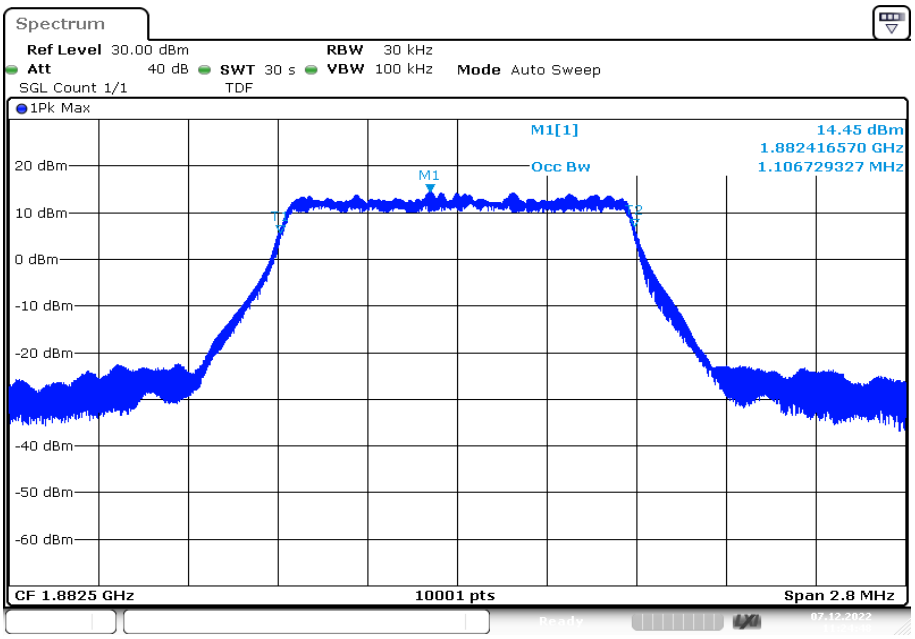
Plot 73: 1.4 MHz – 64-QAM - lowest channel (99% - OBW)



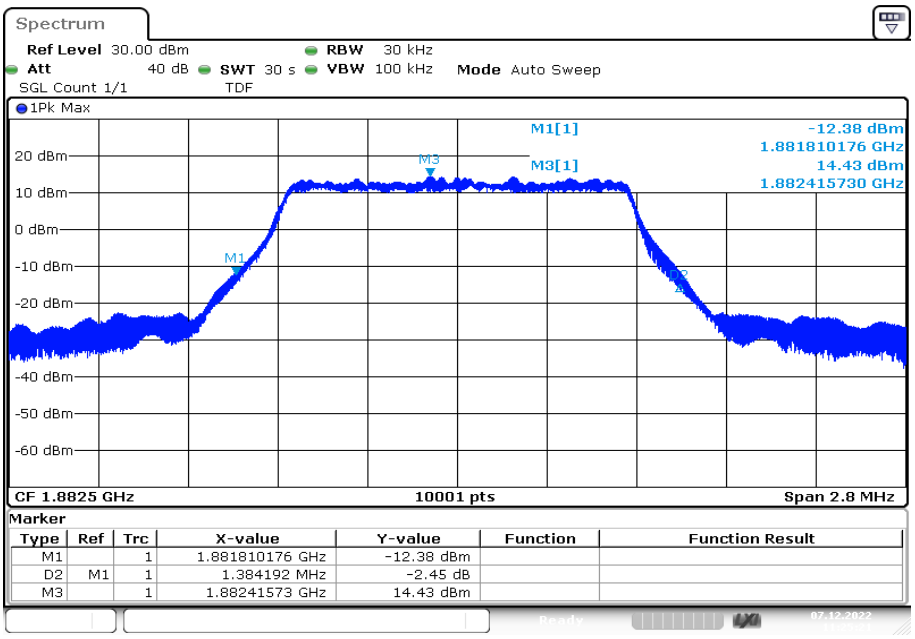
Plot 74: 1.4 MHz – 64-QAM - lowest channel (-26 dBc BW)



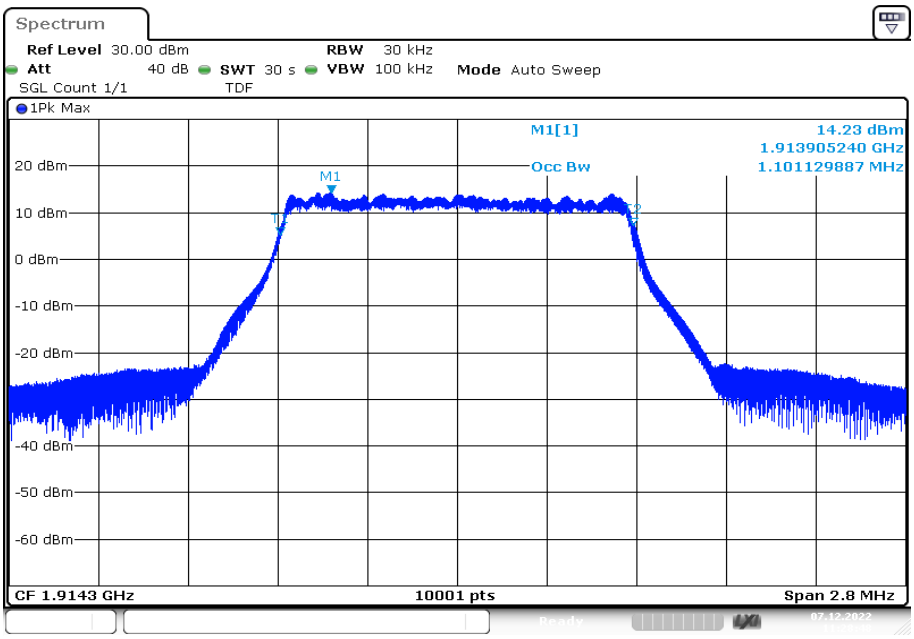
Plot 75: 1.4 MHz – 64-QAM - middle channel (99% - OBW)



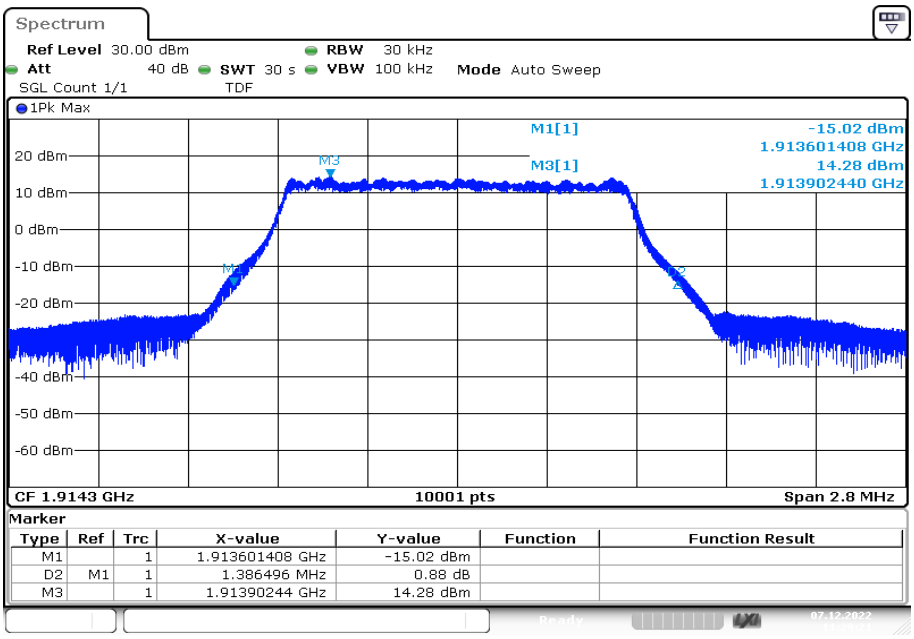
Plot 76: 1.4 MHz – 64-QAM - middle channel (-26 dBc BW)



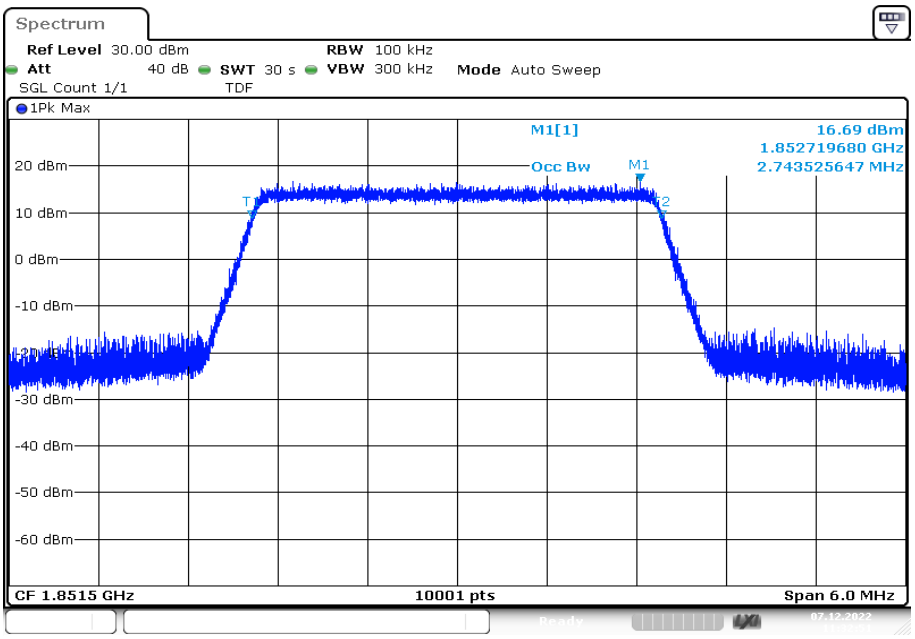
Plot 77: 1.4 MHz – 64-QAM - highest channel (99% - OBW)



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

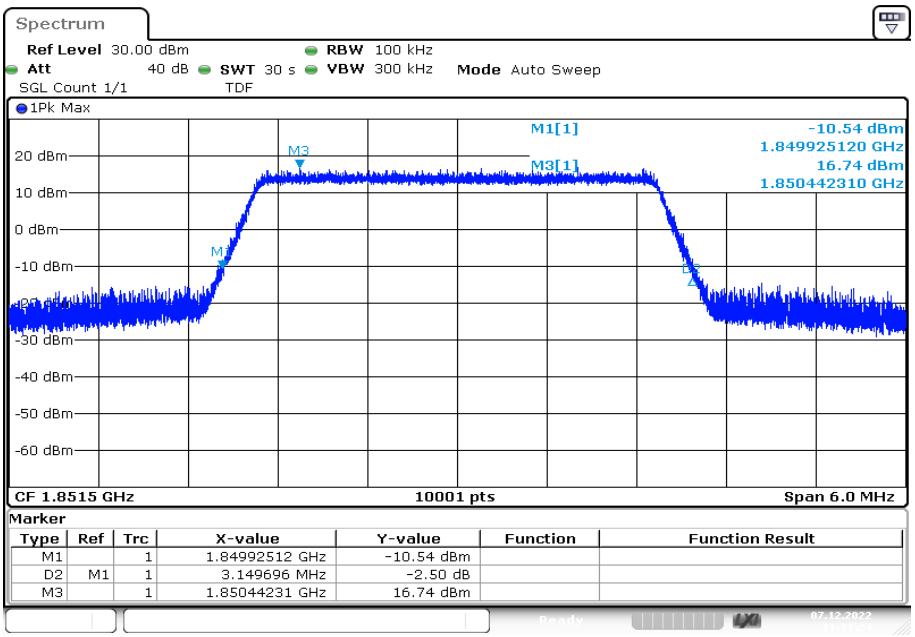


Plot 79: 3 MHz – 64-QAM - lowest channel (99% - OBW)



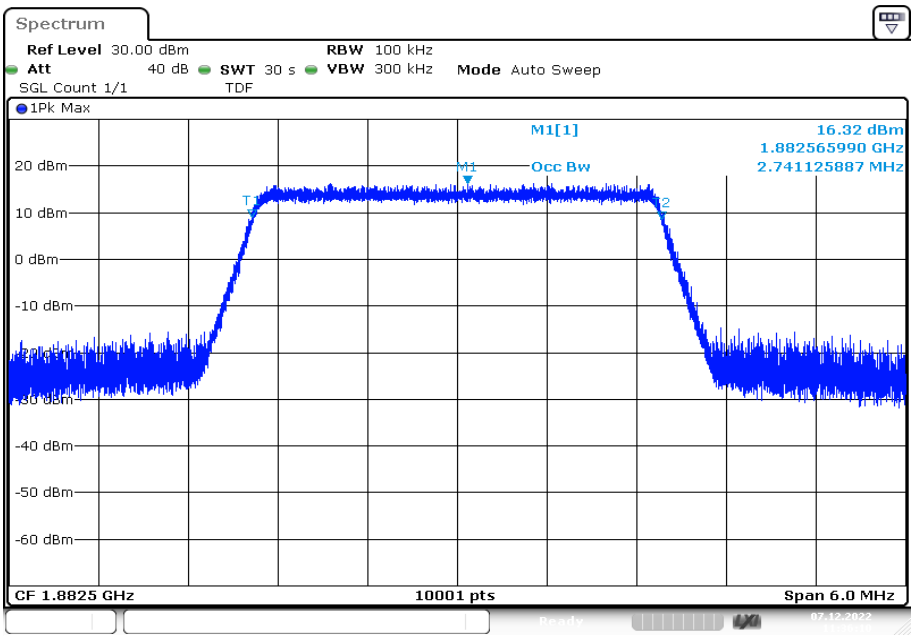
Date: 7.DEC.2022 11:32:51

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

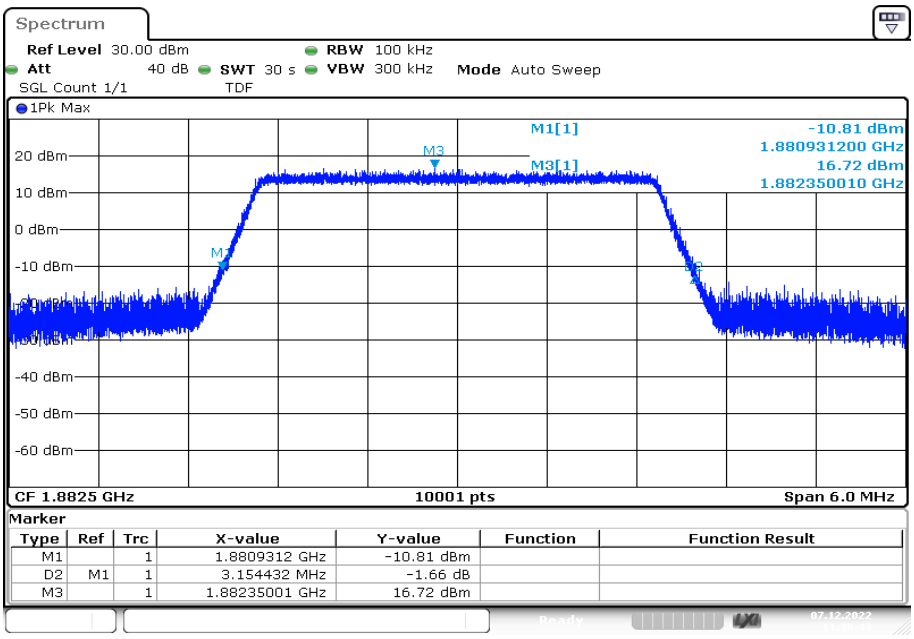


Date: 7.DEC.2022 11:33:24

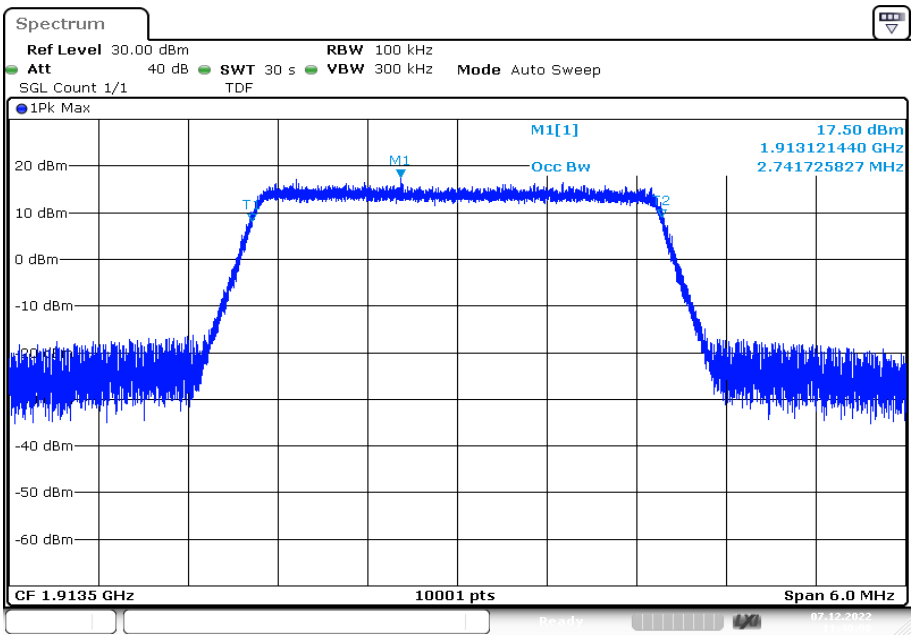
Plot 81: 3 MHz – 64-QAM - middle channel (99% - OBW)



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

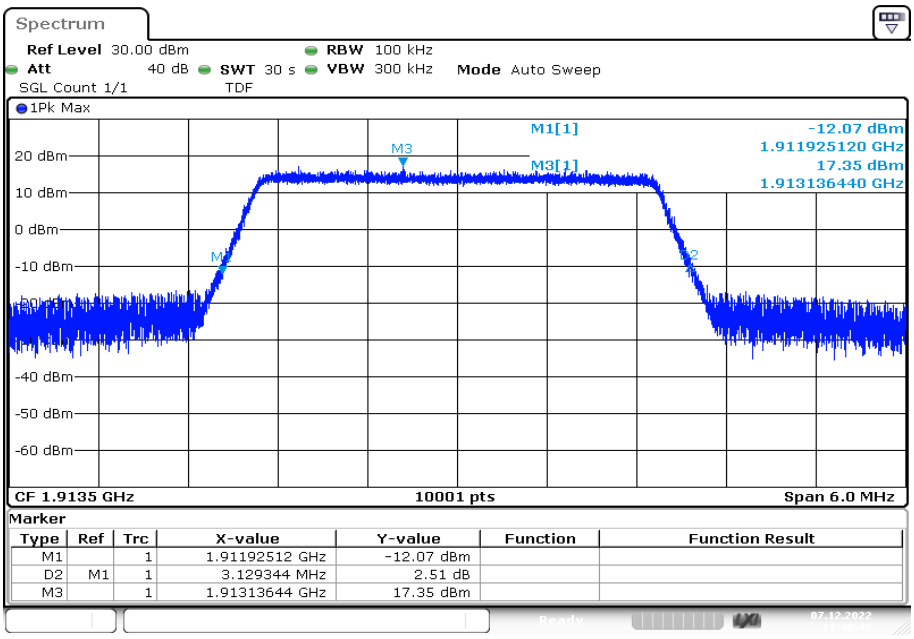


Plot 83: 3 MHz – 64-QAM - highest channel (99% - OBW)



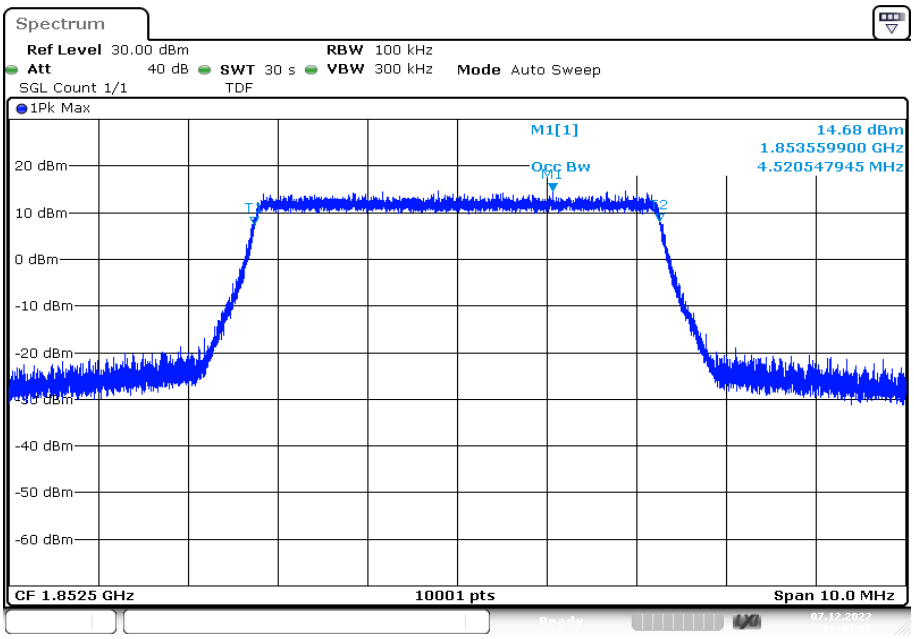
Date: 7.DEC.2022 11:40:08

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



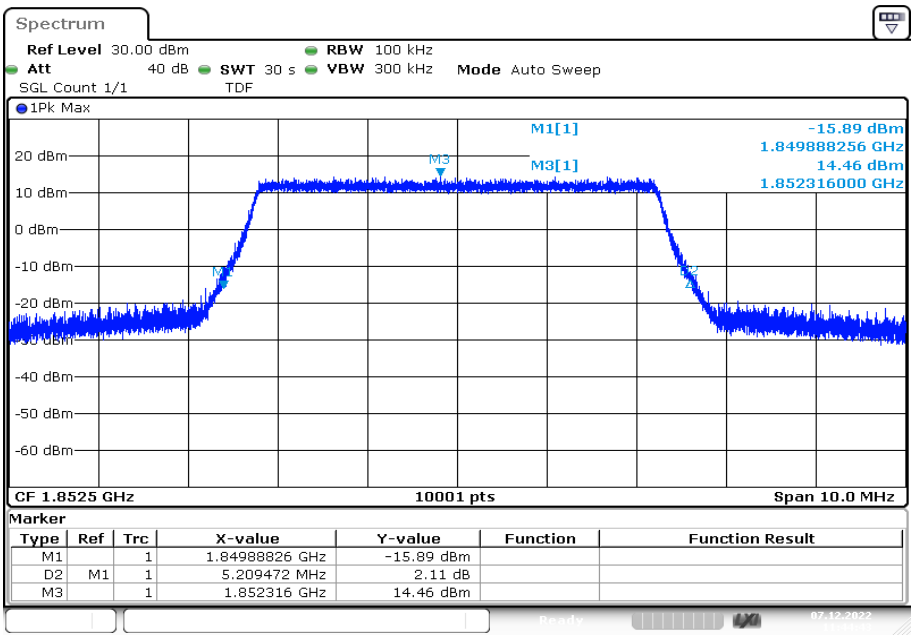
Date: 7.DEC.2022 11:40:42

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



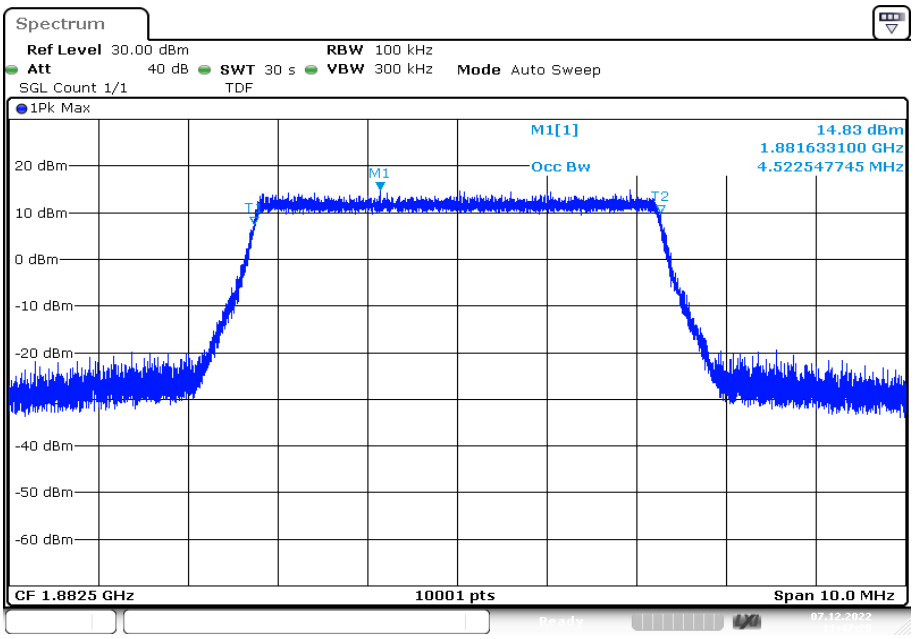
Date: 7.DEC.2022 11:44:10

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



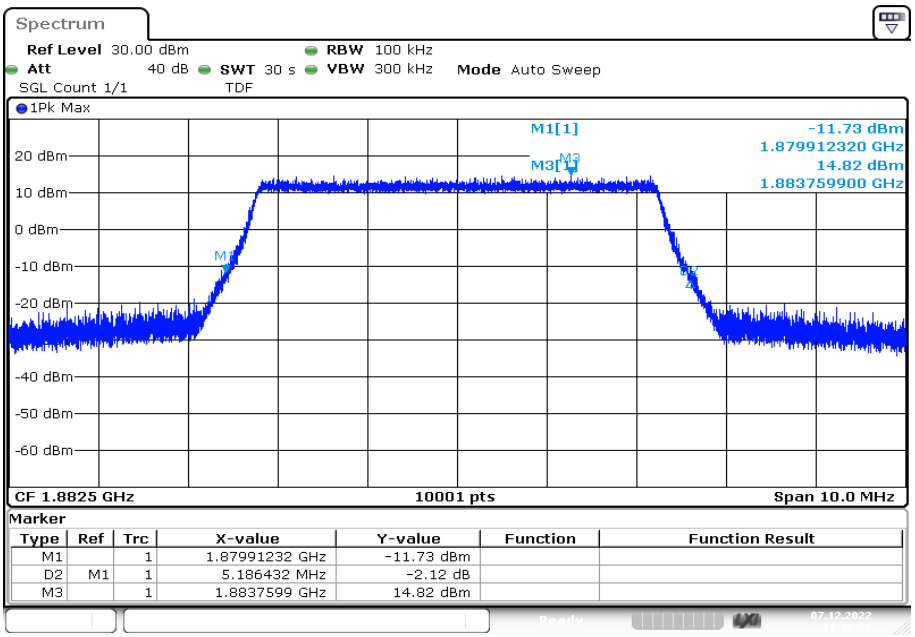
Date: 7.DEC.2022 11:44:43

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



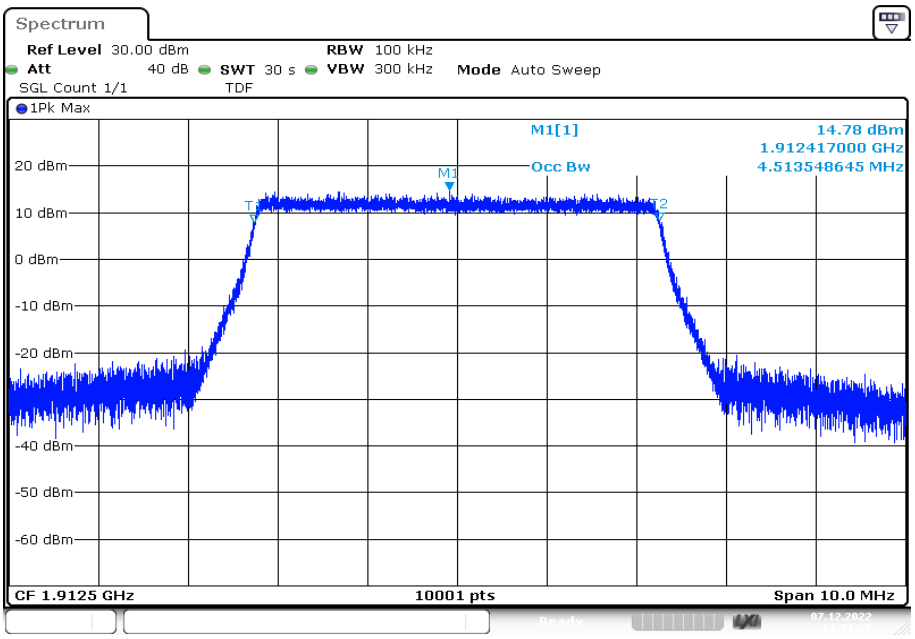
Date: 7.DEC.2022 11:47:29

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



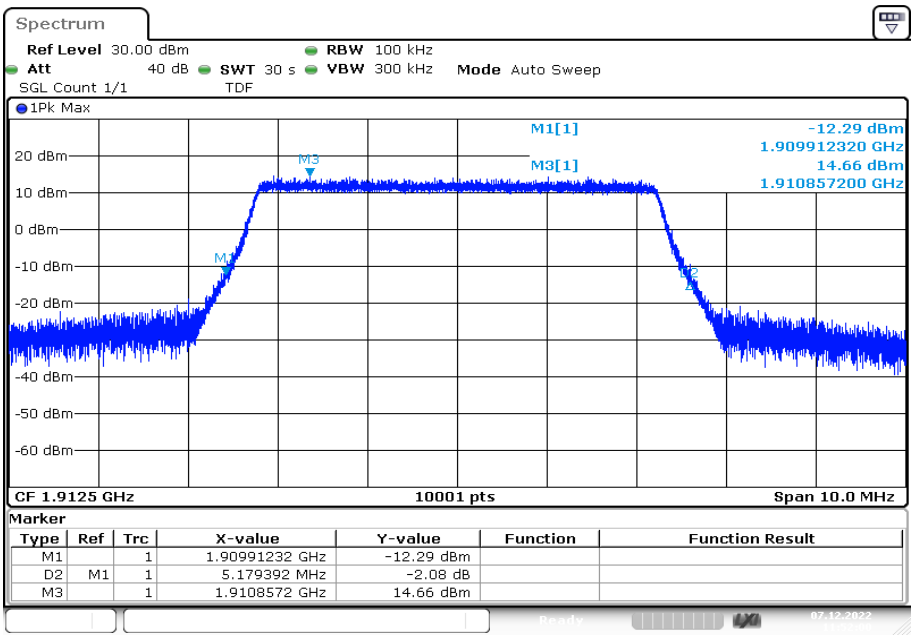
Date: 7.DEC.2022 11:48:02

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



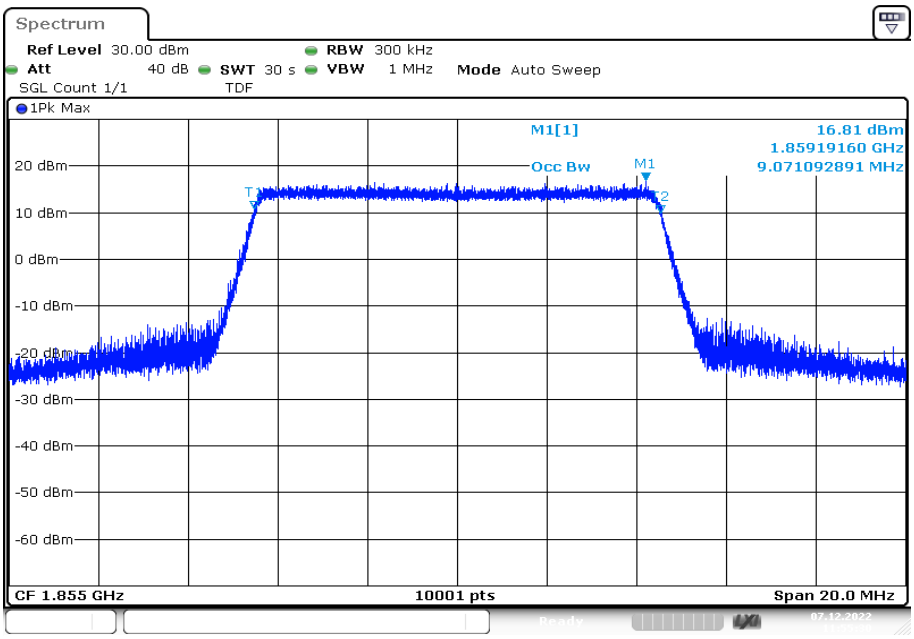
Date: 7.DEC.2022 11:51:27

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

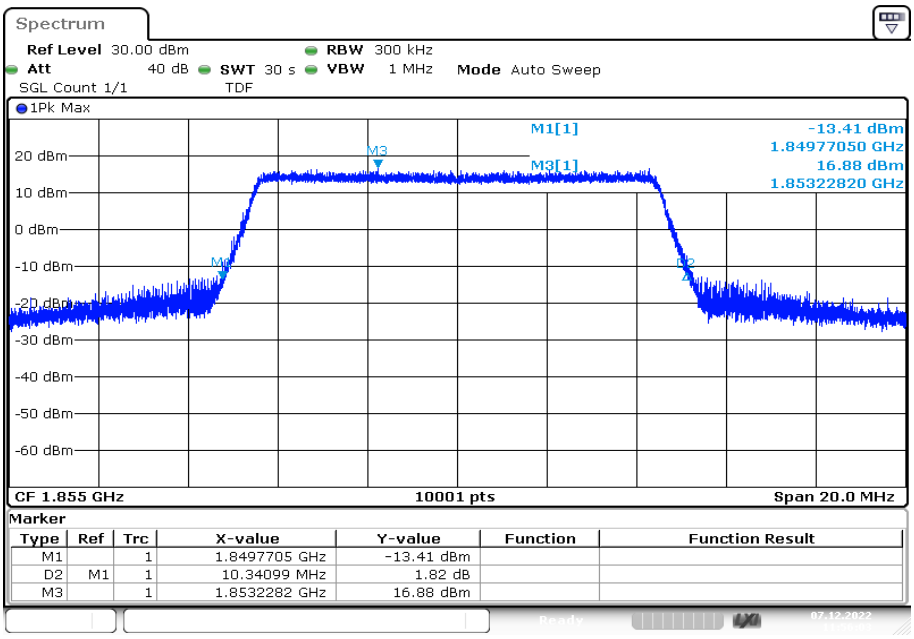


Date: 7.DEC.2022 11:52:01

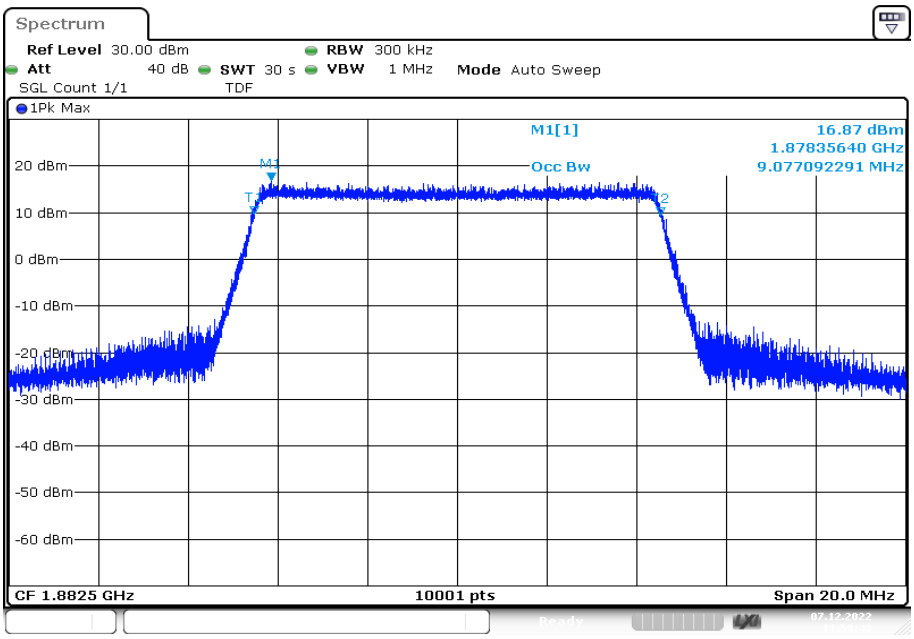
Plot 91: 10 MHz – 64-QAM - lowest channel (99% - OBW)



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

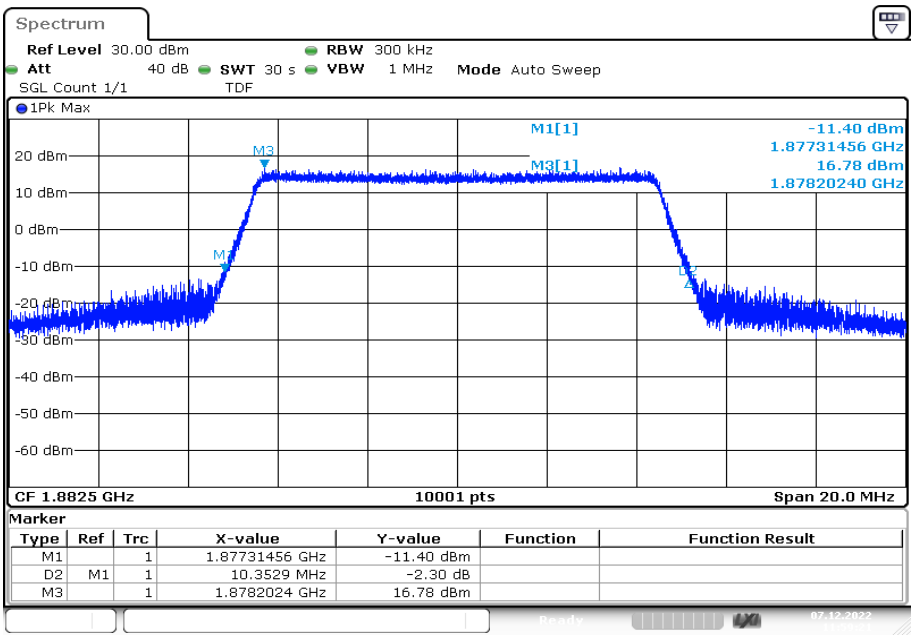


Plot 93: 10 MHz – 64-QAM - middle channel (99% - OBW)



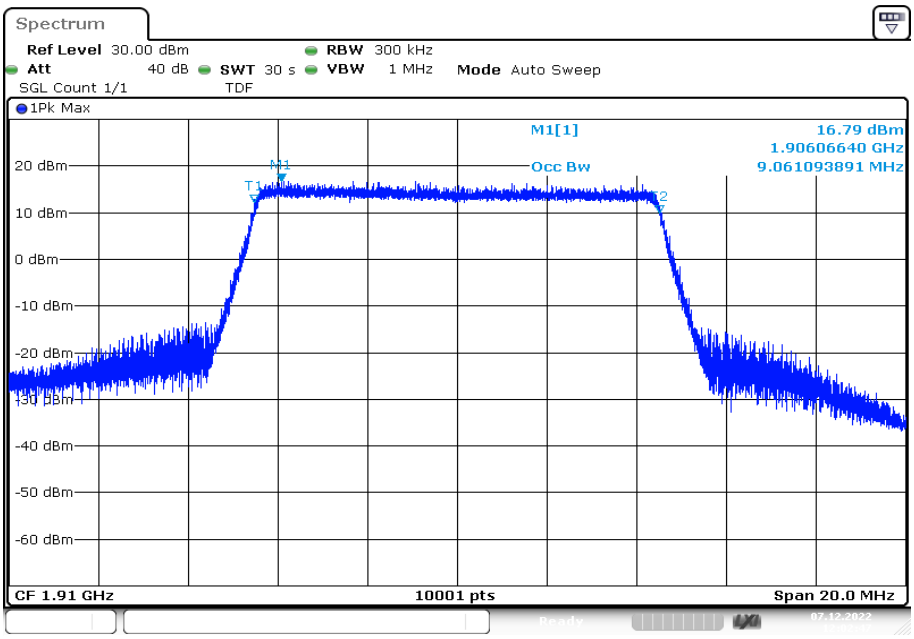
Date: 7.DEC.2022 11:58:49

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



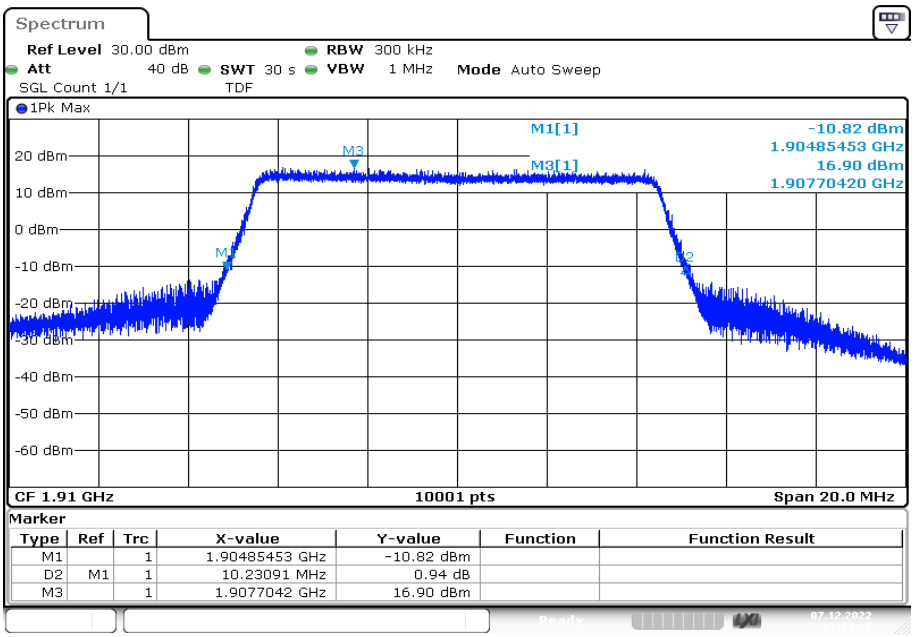
Date: 7.DEC.2022 11:59:21

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



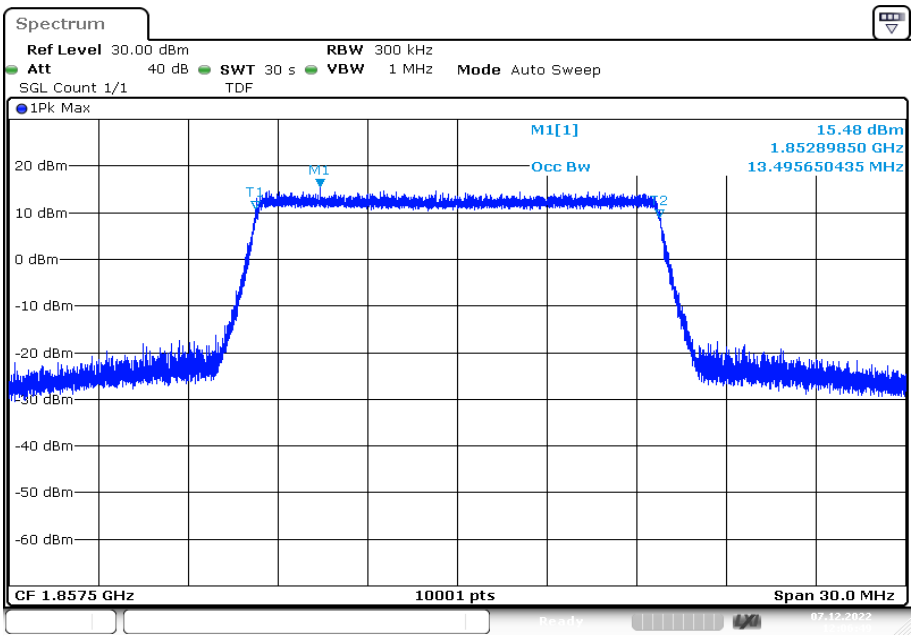
Date: 7.DEC.2022 12:02:47

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



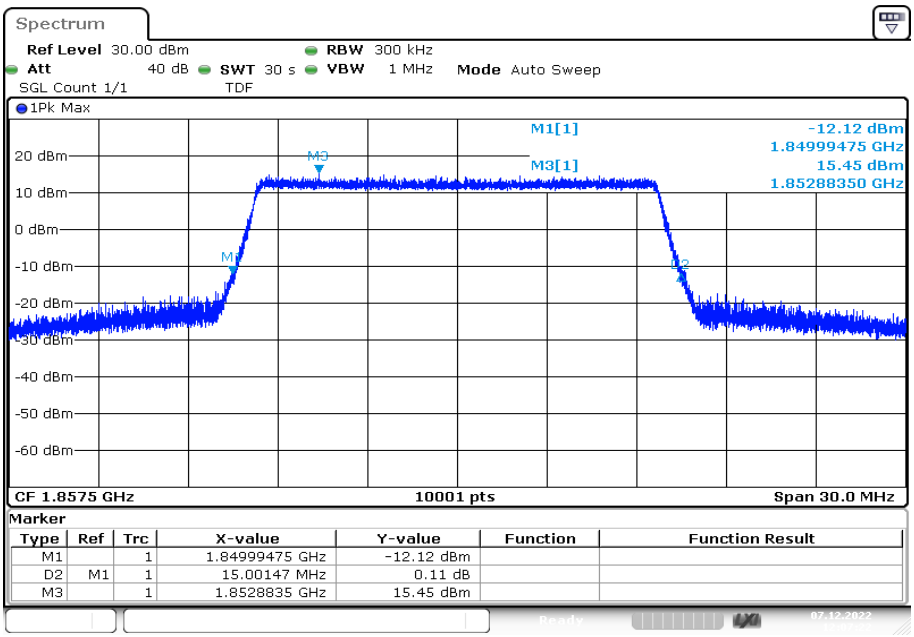
Date: 7.DEC.2022 12:03:20

Plot 97: 15 MHz –64-QAM - lowest channel (99% - OBW)



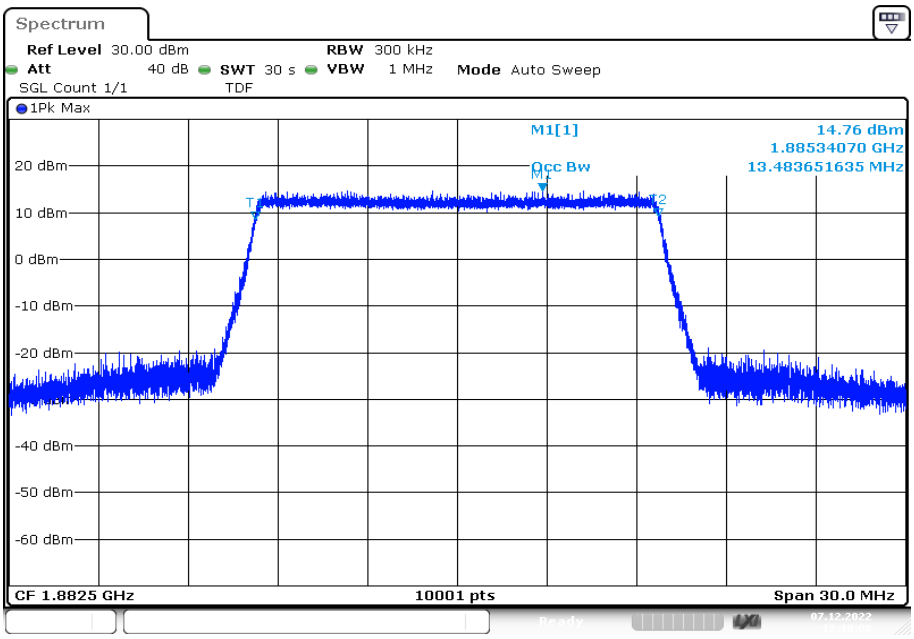
Date: 7.DEC.2022 12:06:49

Plot 98: 15 MHz – 64-QAM - lowest channel (-26 dBc BW)

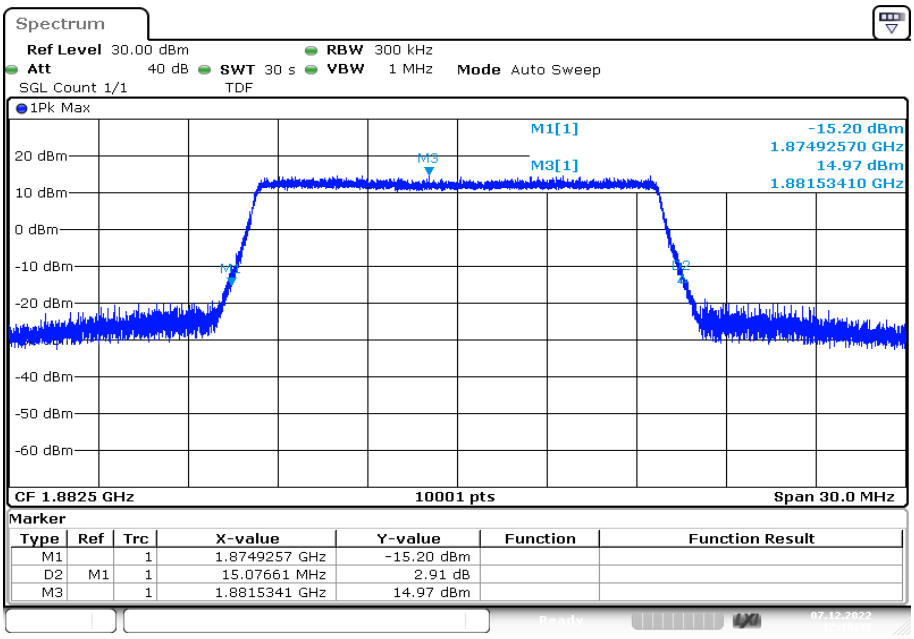


Date: 7.DEC.2022 12:07:22

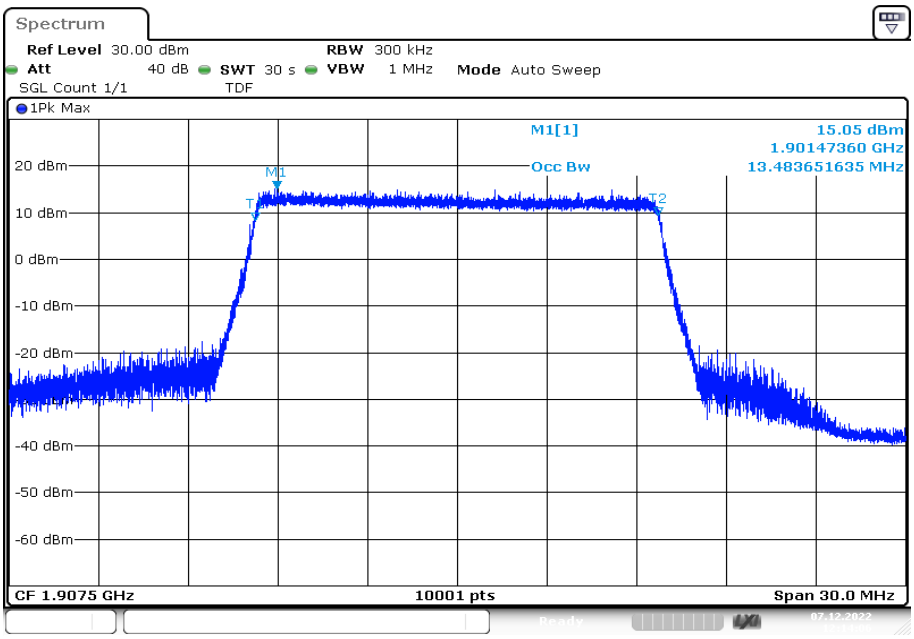
Plot 99: 15 MHz – 64-QAM - middle channel (99% - OBW)



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

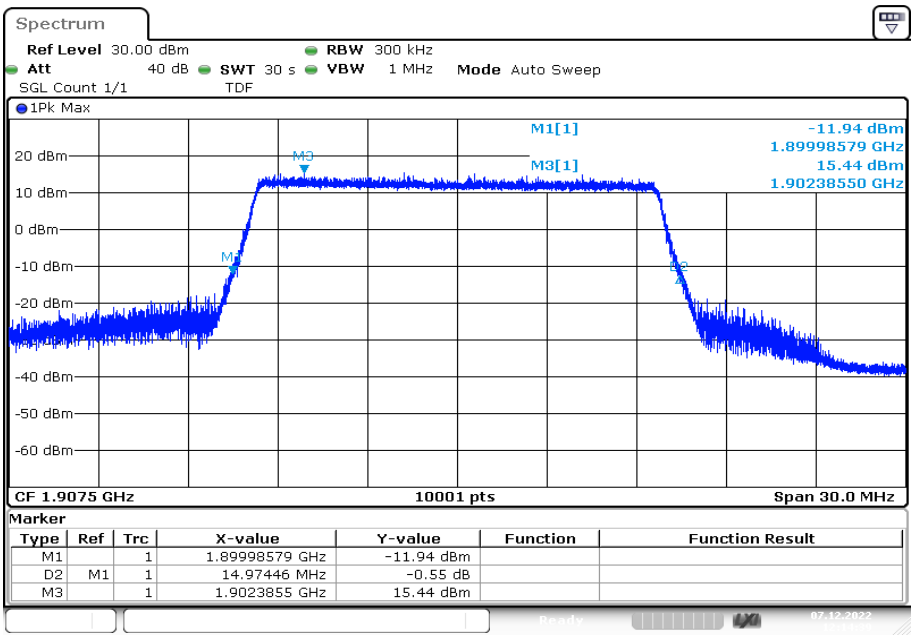


Plot 101: 15 MHz – 64-QAM - highest channel (99% - OBW)



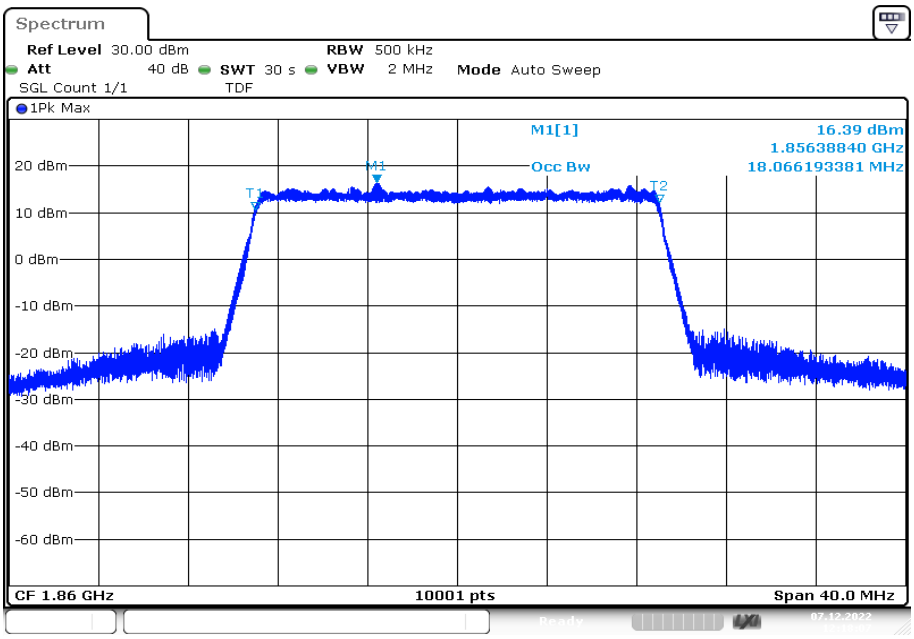
Date: 7.DEC.2022 12:14:06

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



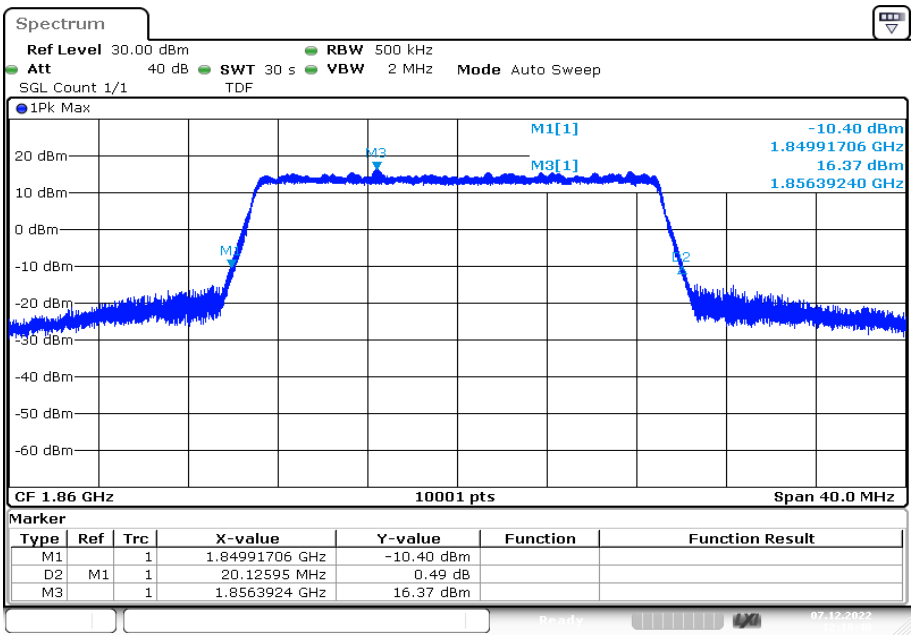
Date: 7.DEC.2022 12:14:39

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



Date: 7.DEC.2022 12:18:08

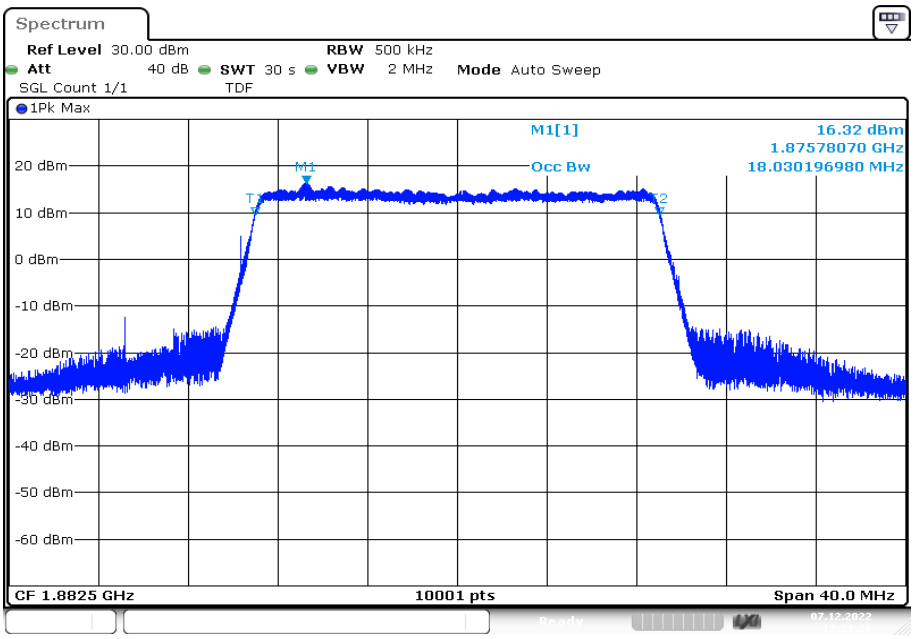
Plot 104: 20 MHz – 64-QAM - lowest channel (-26 dBc BW)



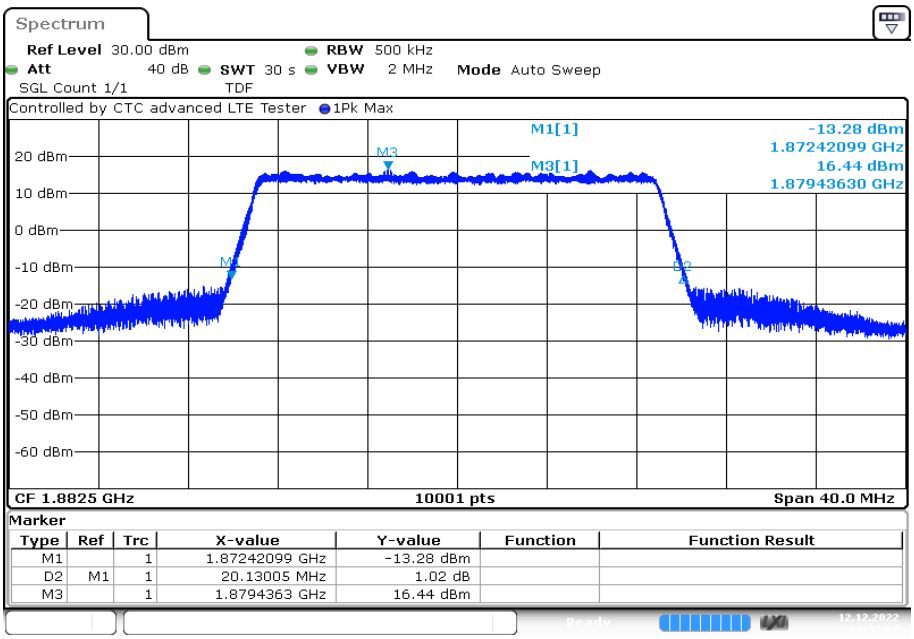
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.84991706 GHz	-10.40 dBm		
D2	M1	1	20.12595 MHz	0.49 dB		
M3		1	1.8563924 GHz	16.37 dBm		

Date: 7.DEC.2022 12:18:41

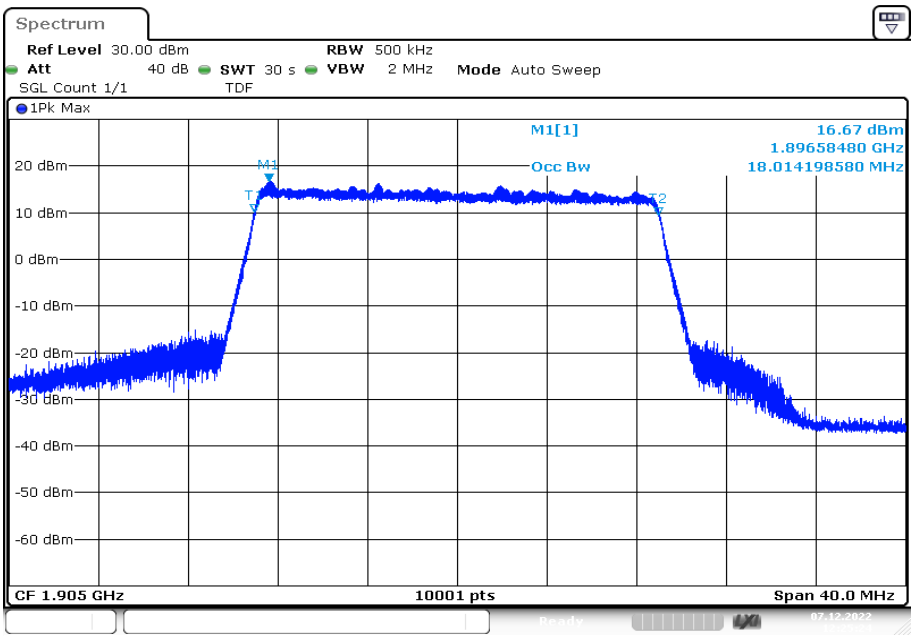
Plot 105: 20 MHz – 64-QAM - middle channel (99% - OBW)



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

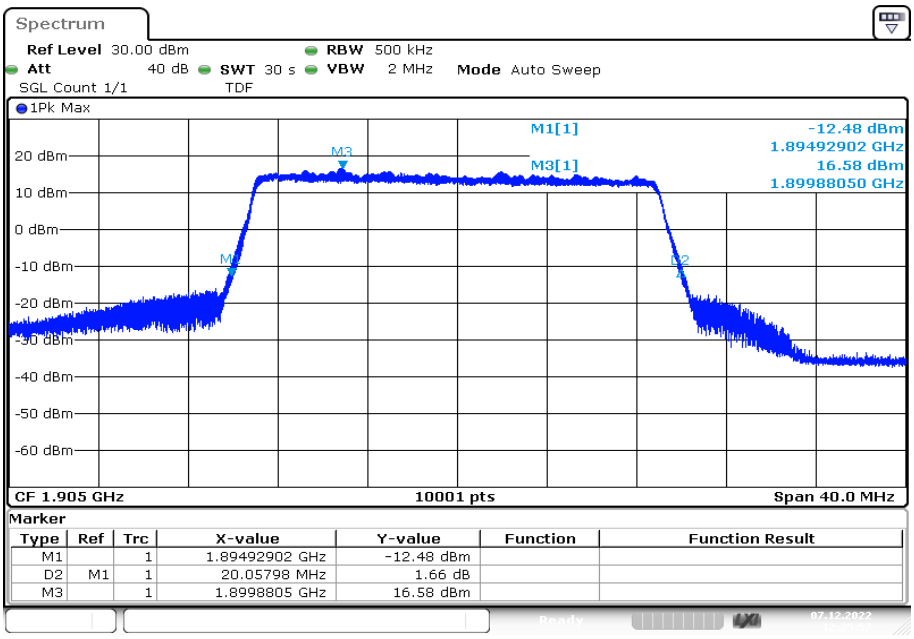


Plot 107: 20 MHz – 64-QAM - highest channel (99% - OBW)



Date: 7.DEC.2022 12:25:24

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



Date: 7.DEC.2022 12:25:57

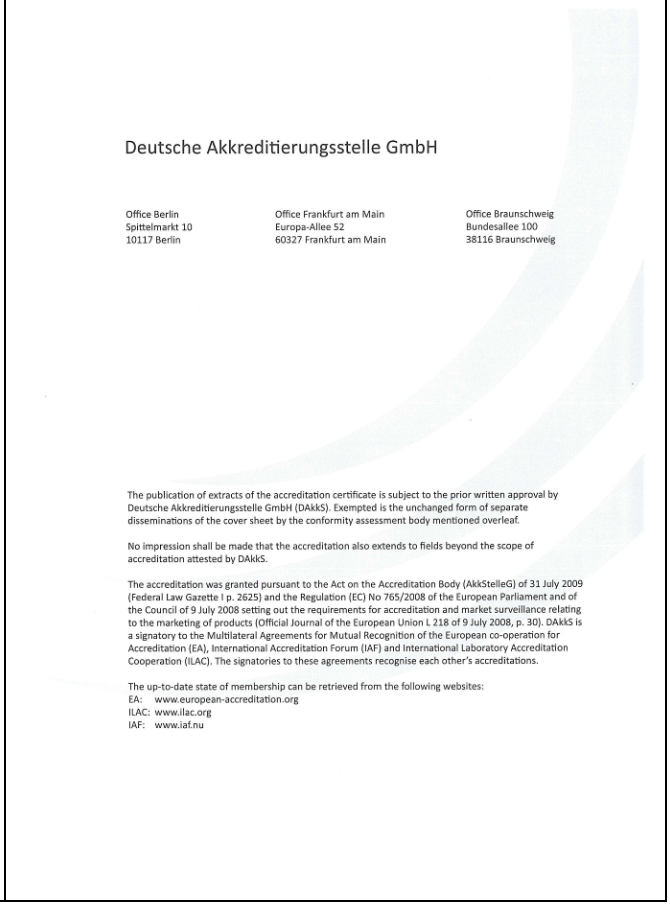
13 Glossary

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

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 ################################