

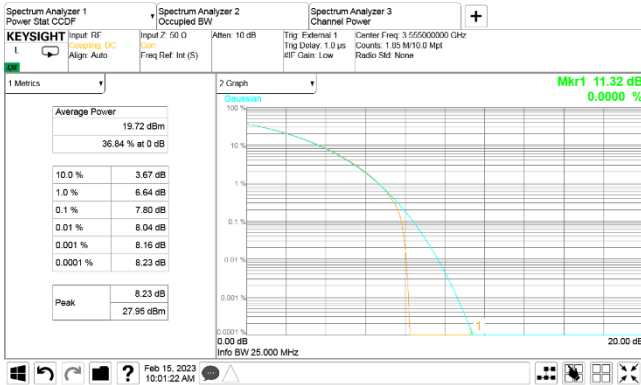


HERMON LABORATORIES

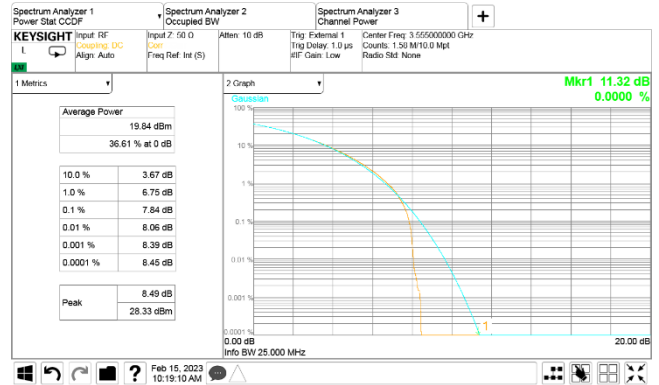
<b>Test specification:</b> Section 96.41(g), Peak-to- average power ratio	
<b>Test procedure:</b> Section 96.41(g)	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date(s):</b> 15-Feb-23 - 14-Feb-23	
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %
<b>Air Pressure:</b> 1013 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>	

Plot 7.2.1 Peak-to-average power ratio test results at low frequency

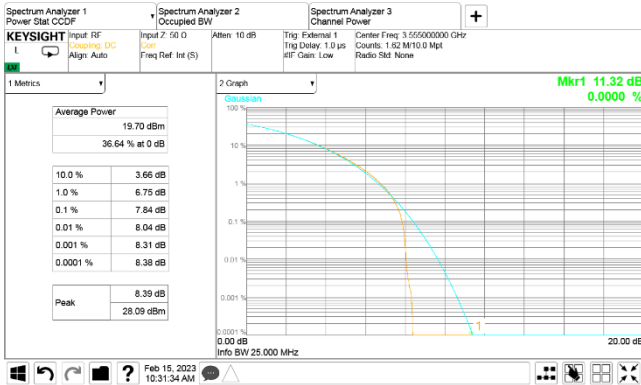
CHANNEL SPACING:  
ANTENNA PORT:  
Modulation: QPSK



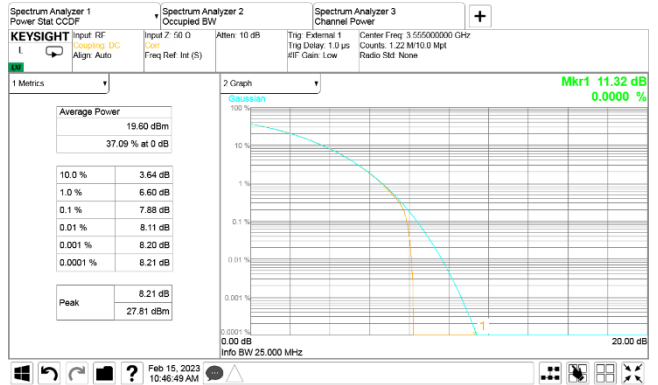
10 MHz  
1  
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



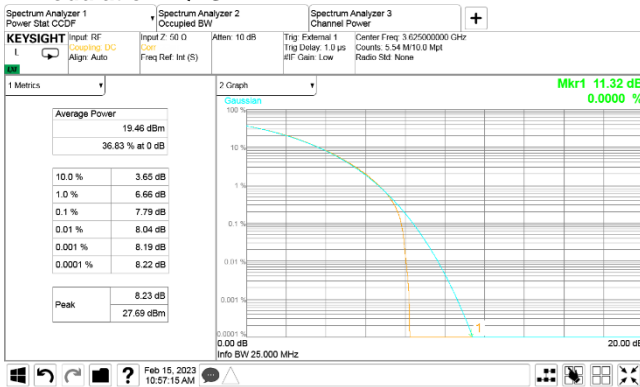


HERMON LABORATORIES

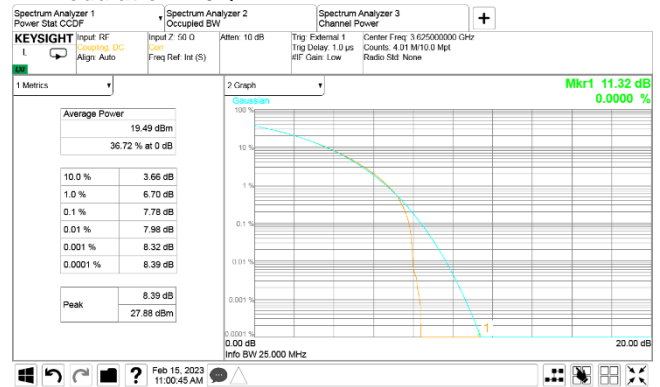
<b>Test specification:</b> Section 96.41(g), Peak-to- average power ratio	
<b>Test procedure:</b> Section 96.41(g)	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date(s):</b> 15-Feb-23 - 14-Feb-23	
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %
<b>Air Pressure:</b> 1013 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>	

Plot 7.2.2 Peak-to-average power ratio test results at mid frequency

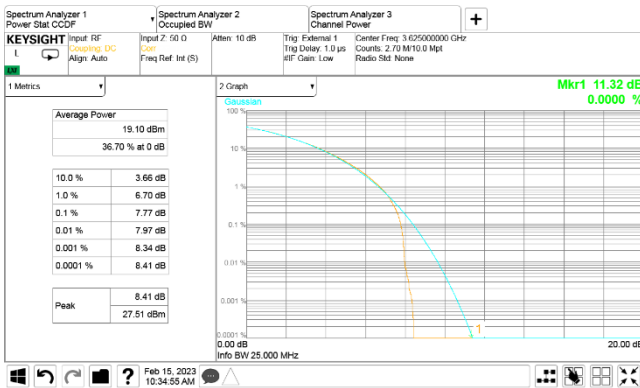
CHANNEL SPACING:  
ANTENNA PORT:  
Modulation: QPSK



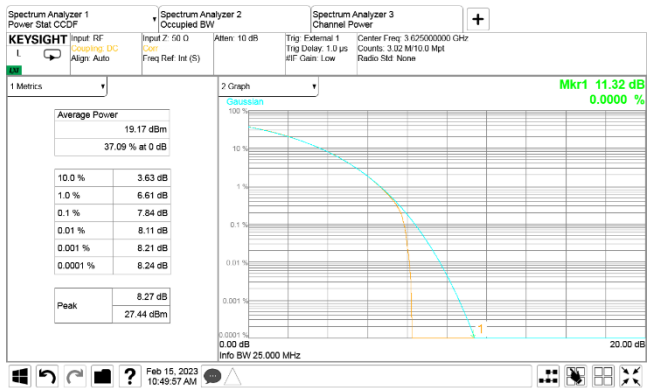
10 MHz  
1  
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM





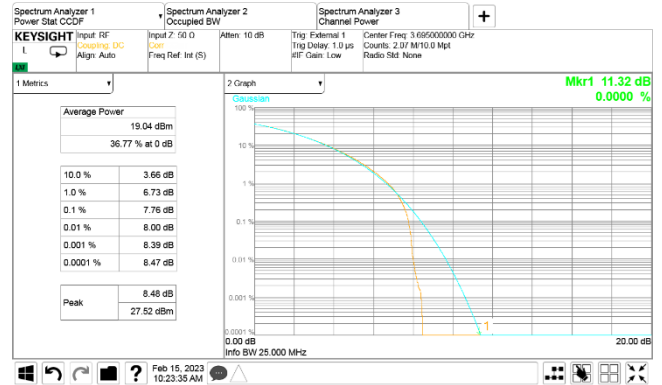
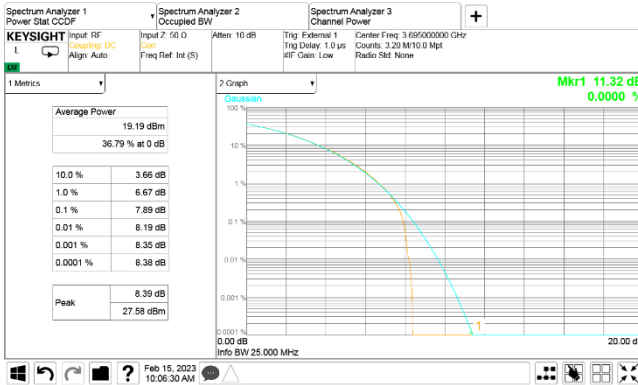
HERMON LABORATORIES

<b>Test specification:</b> Section 96.41(g), Peak-to- average power ratio	
<b>Test procedure:</b> Section 96.41(g)	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date(s):</b> 15-Feb-23 - 14-Feb-23	
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %
<b>Air Pressure:</b> 1013 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>	

Plot 7.2.3 Peak-to-average power ratio test results at high frequency

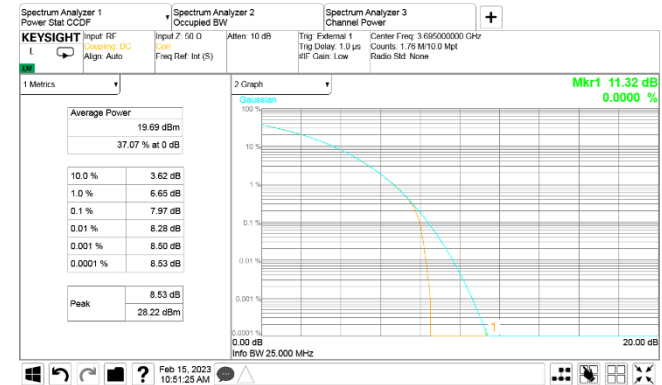
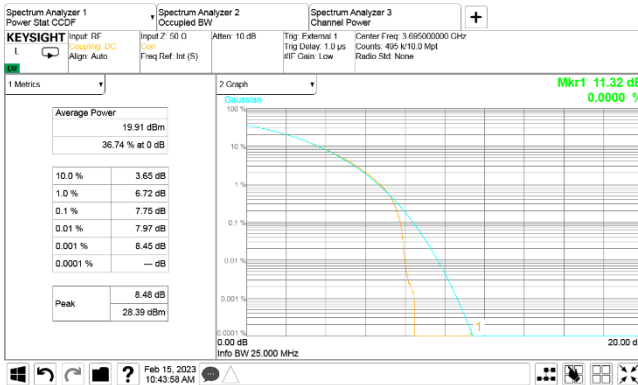
CHANNEL SPACING:  
ANTENNA PORT:  
Modulation: QPSK

10 MHz  
1  
Modulation: 16QAM



Modulation: 64QAM

Modulation: 256QAM





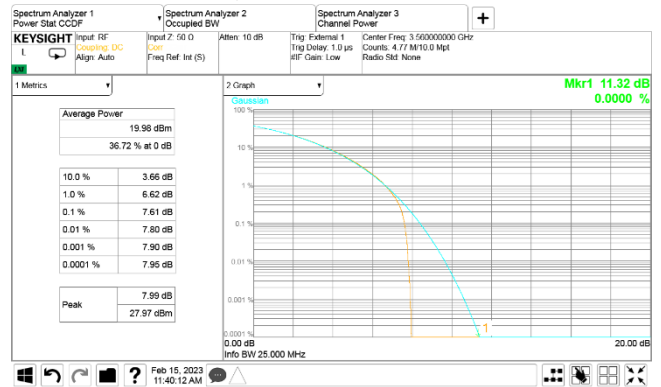
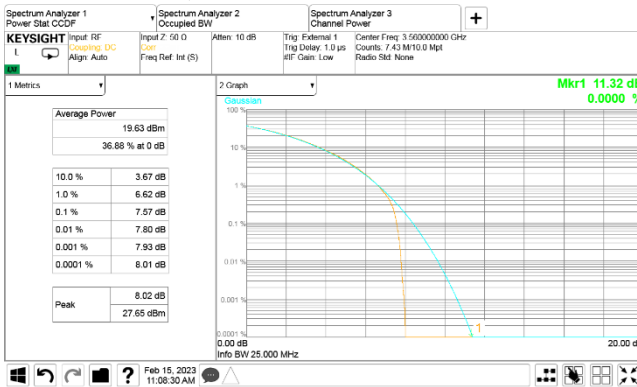
HERMON LABORATORIES

<b>Test specification:</b> Section 96.41(g), Peak-to- average power ratio	
<b>Test procedure:</b> Section 96.41(g)	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date(s):</b> 15-Feb-23 - 14-Feb-23	
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %
<b>Air Pressure:</b> 1013 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>	

Plot 7.2.4 Peak-to-average power ratio test results at low frequency

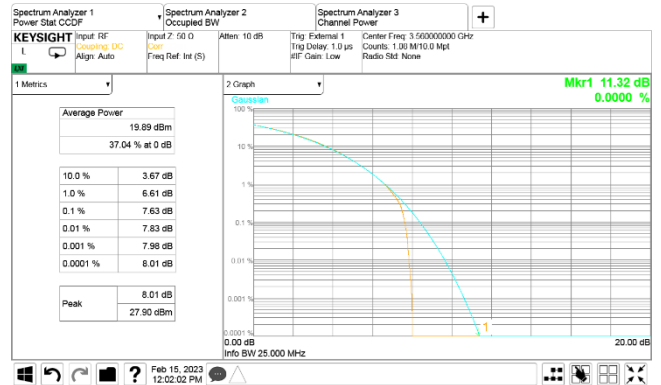
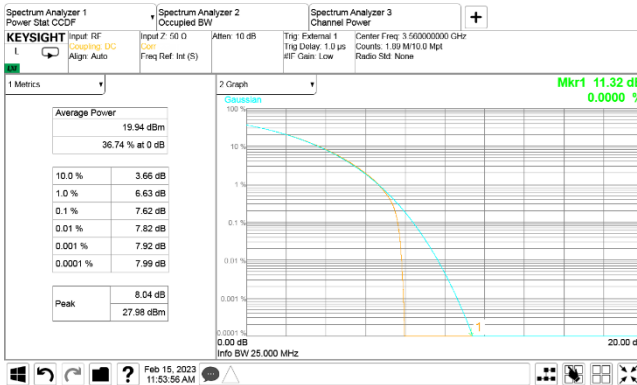
CHANNEL SPACING:  
ANTENNA PORT:  
Modulation: QPSK

20 MHz  
1  
Modulation: 16QAM



Modulation: 64QAM

Modulation: 256QAM





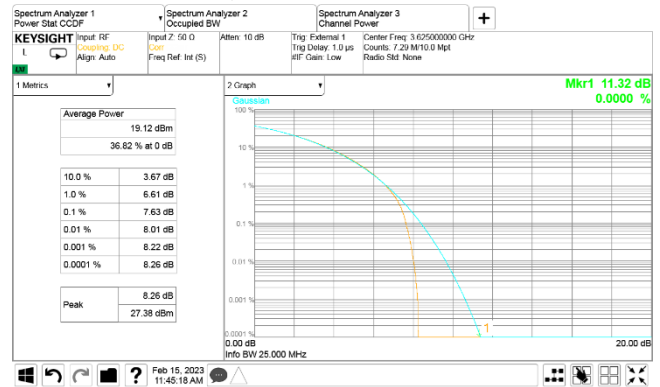
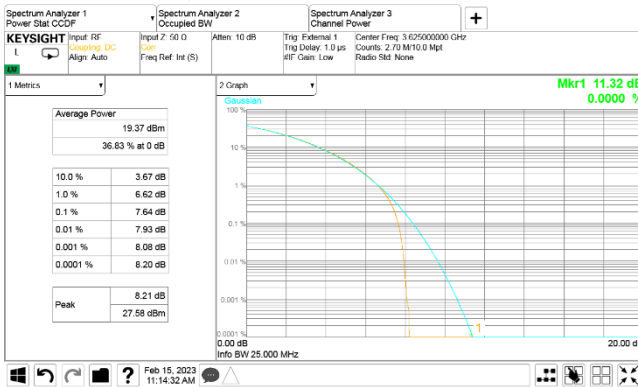
HERMON LABORATORIES

<b>Test specification:</b> Section 96.41(g), Peak-to- average power ratio			
<b>Test procedure:</b> Section 96.41(g)			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date(s):</b> 15-Feb-23 - 14-Feb-23			
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %	<b>Air Pressure:</b> 1013 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.2.5 Peak-to-average power ratio test results at mid frequency

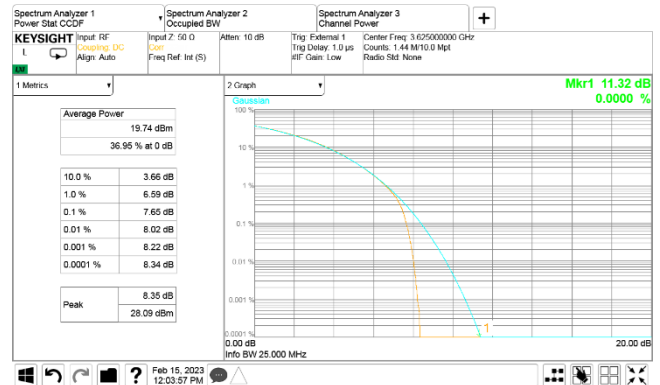
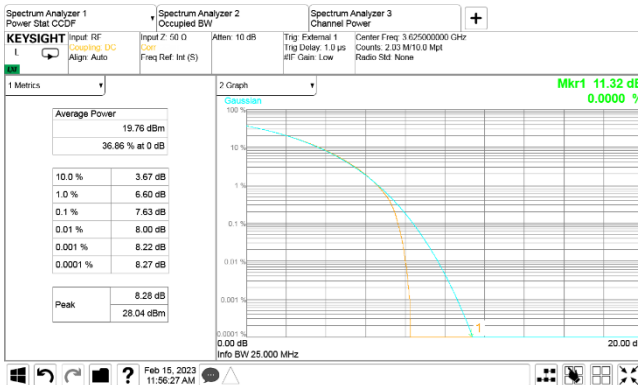
CHANNEL SPACING:  
ANTENNA PORT:  
Modulation: QPSK

20 MHz  
1  
Modulation: 16QAM



Modulation: 64QAM

Modulation: 256QAM





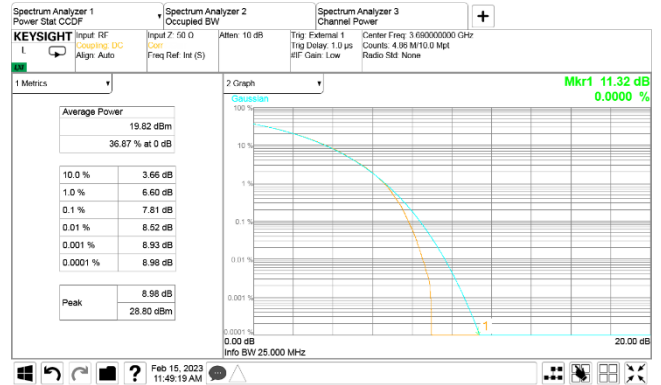
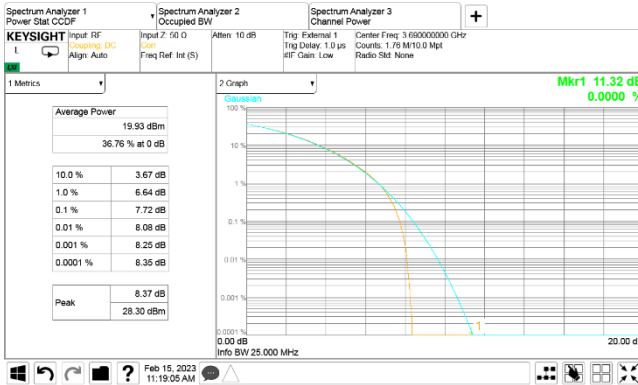
HERMON LABORATORIES

<b>Test specification:</b> Section 96.41(g), Peak-to- average power ratio	
<b>Test procedure:</b> Section 96.41(g)	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date(s):</b> 15-Feb-23 - 14-Feb-23	
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %
<b>Air Pressure:</b> 1013 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>	

Plot 7.2.6 Peak-to-average power ratio test results at high frequency

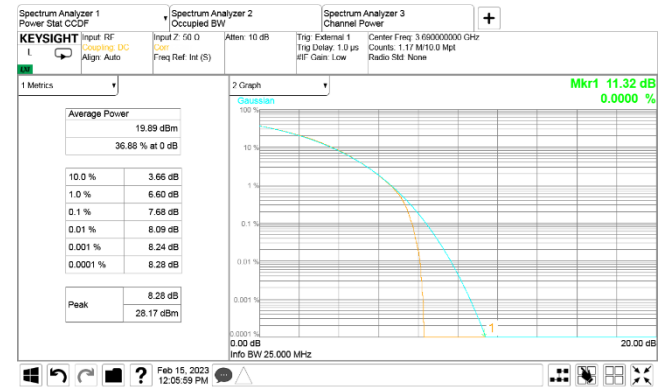
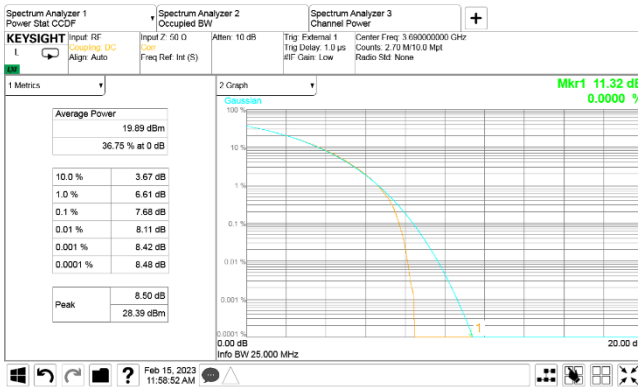
CHANNEL SPACING:  
ANTENNA PORT:  
Modulation: QPSK

20 MHz  
1  
Modulation: 16QAM



Modulation: 64QAM

Modulation: 256QAM





<b>Test specification: Section 2.1049, Occupied bandwidth</b>			
<b>Test procedure:</b> 47 CFR, Section 2.1049			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Feb-23			
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %	<b>Air Pressure:</b> 1012 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>			

### 7.3 Occupied bandwidth test

#### 7.3.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.3.1. The test results are provided in Table 1.1.7.3.2 and the associated plots.

Table 7.3.1 Occupied bandwidth limits

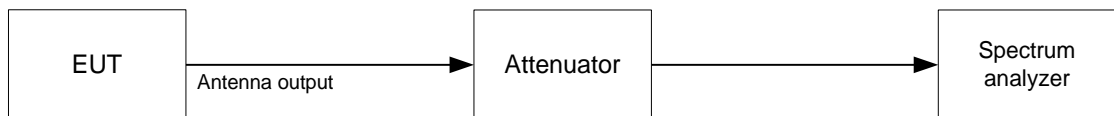
Assigned frequency, MHz	Modulation envelope reference points*, %	Maximum allowed bandwidth, MHz
3550 - 3700	99	10, 20 MHz

\* - Modulation envelope reference points are provided in terms of attenuation below the unmodulated carrier.

#### 7.3.2 Test procedure

- 7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.
- 7.3.2.2 The EUT was set to transmit the unmodulated carrier and the reference peak power level was measured.
- 7.3.2.3 The EUT was set to transmit the normally modulated carrier.
- 7.3.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in Table 1.1.7.3.2 and the associated plots.

Figure 7.3.1 Occupied bandwidth test setup





<b>Test specification: Section2.1049, Occupied bandwidth</b>			
<b>Test procedure:</b> 47 CFR, Section 2.1049			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Feb-23			
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %	<b>Air Pressure:</b> 1012 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>			

Table 1.1.7.3.2 Occupied bandwidth test results

DETECTOR USED: Peak hold  
RESOLUTION BANDWIDTH: 1 – 5% of the OBW  
VIDEO BANDWIDTH: > RBW  
MODULATION ENVELOPE REFERENCE POINTS: 99%

Carrier frequency, MHz	Occupied bandwidth, MHz	Limit, MHz	Margin, MHz	Verdict
<b>Channel spacing 10 MHz</b>				
<b>Modulation QPSK</b>				
3555.0	9.000	10.0	-1.000	Pass
3625.0	9.009	10.0	-0.991	Pass
3695.0	8.986	10.0	-1.014	Pass
<b>Modulation 16QAM</b>				
3555.0	9.011	10.0	-0.989	Pass
3625.0	9.022	10.0	-0.978	Pass
3695.0	8.986	10.0	-1.014	Pass
<b>Modulation 64QAM</b>				
3555.0	8.999	10.0	-1.001	Pass
3625.0	8.992	10.0	-1.008	Pass
3695.0	9.017	10.0	-0.983	Pass
<b>Modulation 256QAM</b>				
3555.0	8.983	10.0	-1.017	Pass
3625.0	8.963	10.0	-1.037	Pass
3695.0	8.998	10.0	-1.002	Pass

Carrier frequency, MHz	Occupied bandwidth, MHz	Limit, MHz	Margin, MHz	Verdict
<b>Channel spacing 20 MHz</b>				
<b>Modulation QPSK</b>				
3560.0	17.749	20.0	-2.251	Pass
3625.0	17.763	20.0	-2.237	Pass
3690.0	17.736	20.0	-2.264	Pass
<b>Modulation 16QAM</b>				
3560.0	17.730	20.0	-2.27	Pass
3625.0	17.815	20.0	-2.185	Pass
3690.0	17.781	20.0	-2.219	Pass
<b>Modulation 64QAM</b>				
3560.0	17.764	20.0	-2.236	Pass
3625.0	17.768	20.0	-2.232	Pass
3690.0	17.772	20.0	-2.228	Pass
<b>Modulation 256QAM</b>				
3560.0	17.800	20.0	-2.2	Pass
3625.0	17.774	20.0	-2.226	Pass
3690.0	17.790	20.0	-2.21	Pass

## Reference numbers of test equipment used

HL 4355	HL 4366	HL 6143				
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Full description is given in Appendix A



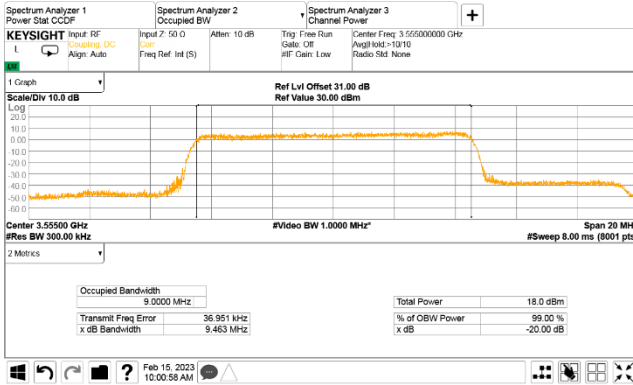


HERMON LABORATORIES

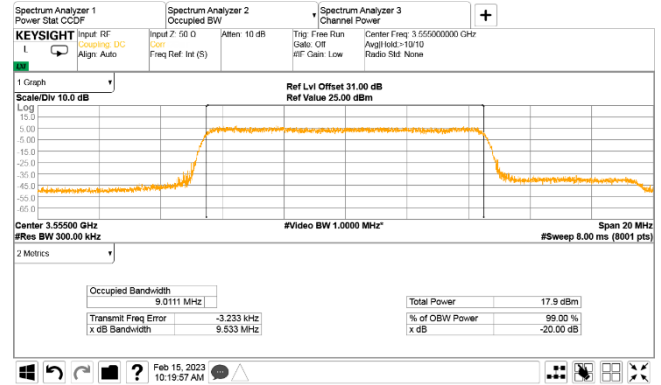
<b>Test specification:</b> Section2.1049, Occupied bandwidth			
<b>Test procedure:</b> 47 CFR, Section 2.1049			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date(s):</b> 15-Feb-23			
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %	<b>Air Pressure:</b> 1012 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.1 Occupied bandwidth test result at low frequency

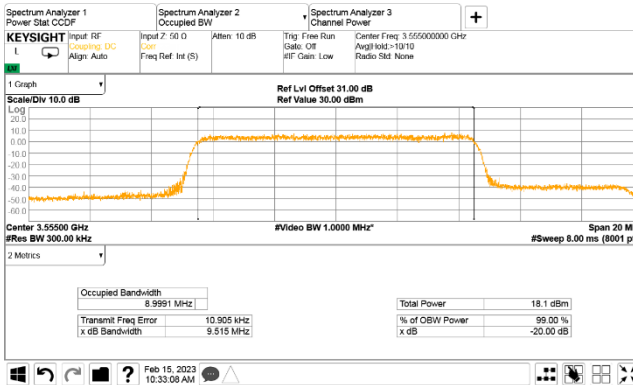
CHANNEL SPACING:  
ANTENNA PORT:  
Modulation: QPSK



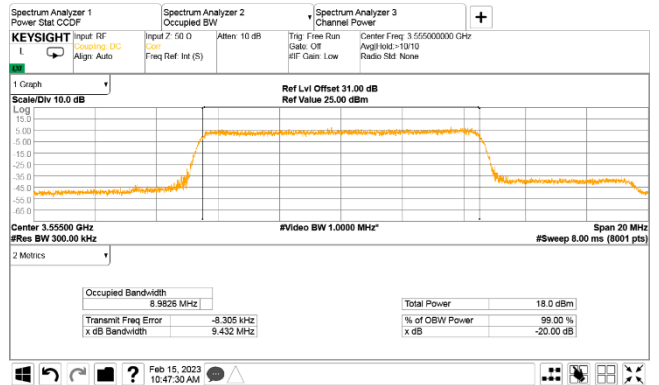
10 MHz  
1  
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



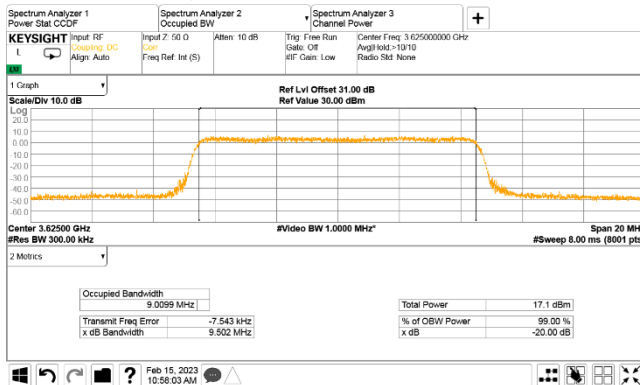


HERMON LABORATORIES

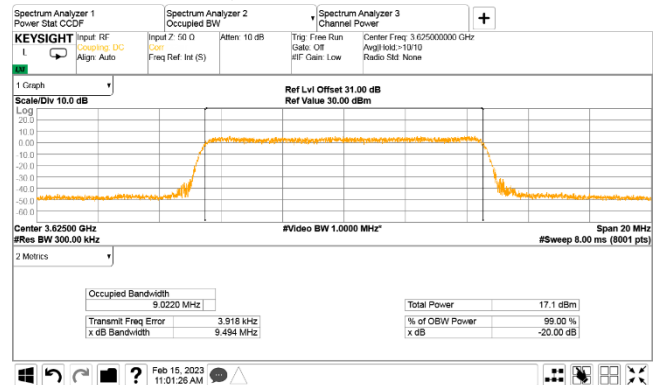
<b>Test specification:</b> Section2.1049, Occupied bandwidth			
<b>Test procedure:</b> 47 CFR, Section 2.1049			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date(s):</b> 15-Feb-23			
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %	<b>Air Pressure:</b> 1012 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.2 Occupied bandwidth test result at mid frequency

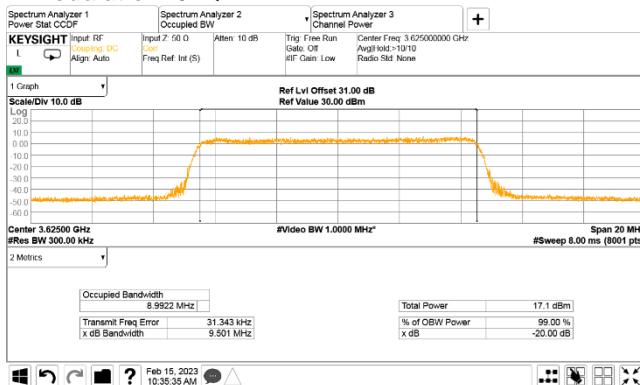
CHANNEL SPACING:  
ANTENNA PORT:  
Modulation: QPSK



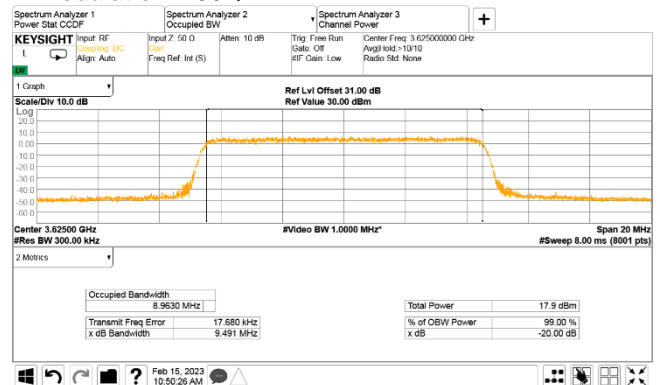
10 MHz  
1  
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM





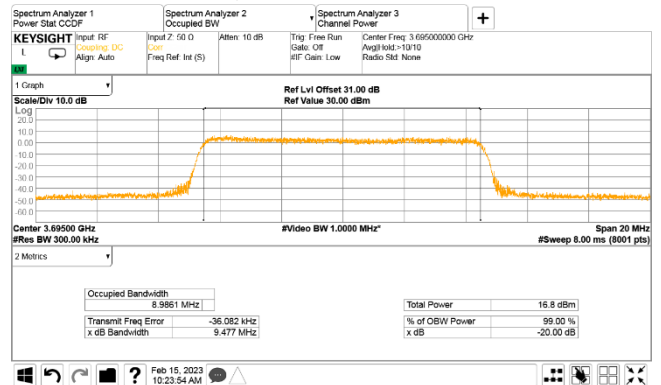
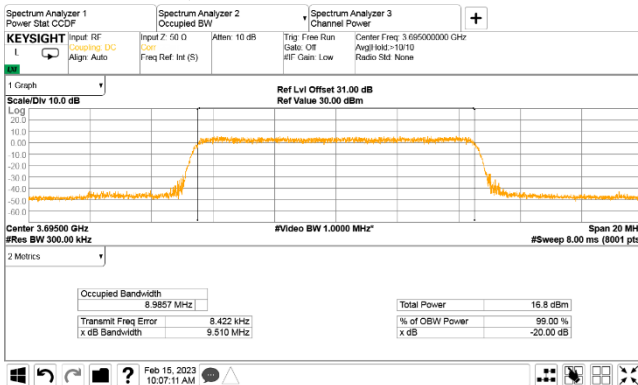
HERMON LABORATORIES

<b>Test specification:</b> Section2.1049, Occupied bandwidth			
<b>Test procedure:</b> 47 CFR, Section 2.1049			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date(s):</b> 15-Feb-23			
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %	<b>Air Pressure:</b> 1012 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.3 Occupied bandwidth test result at high frequency

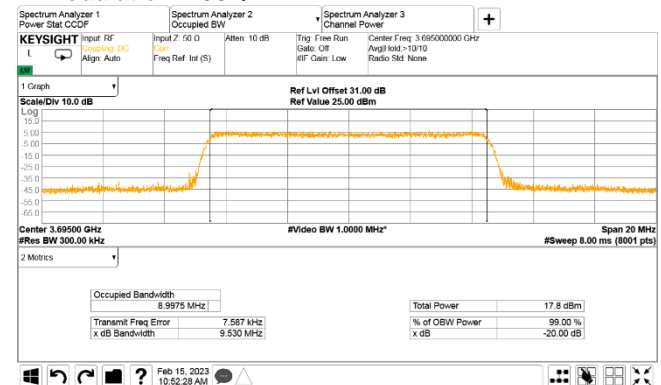
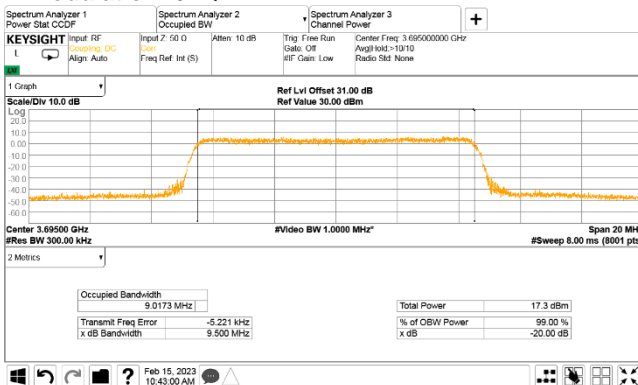
CHANNEL SPACING:  
ANTENNA PORT:  
Modulation: QPSK

10 MHz  
1  
Modulation: 16QAM



Modulation: 64QAM

Modulation: 256QAM



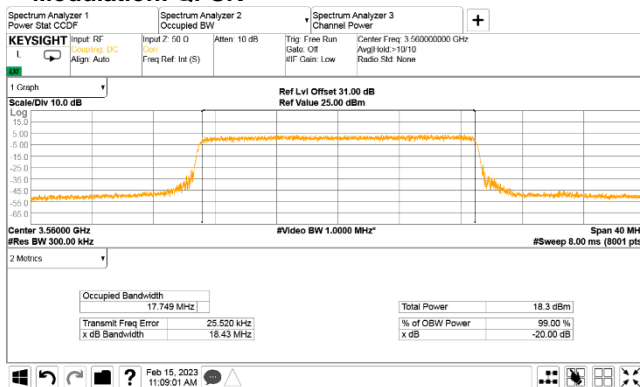


HERMON LABORATORIES

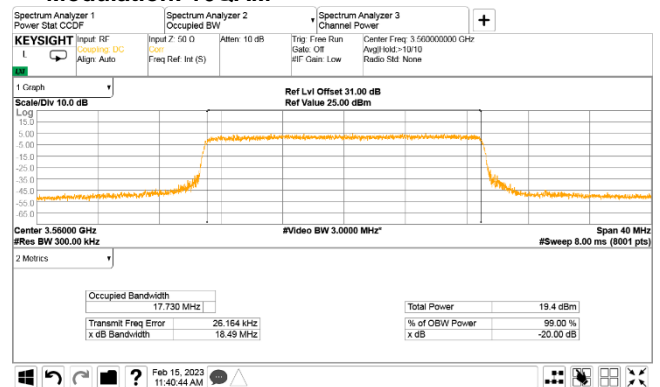
<b>Test specification:</b> Section2.1049, Occupied bandwidth			
<b>Test procedure:</b> 47 CFR, Section 2.1049			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date(s):</b> 15-Feb-23			
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %	<b>Air Pressure:</b> 1012 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.4 Occupied bandwidth test result at low frequency

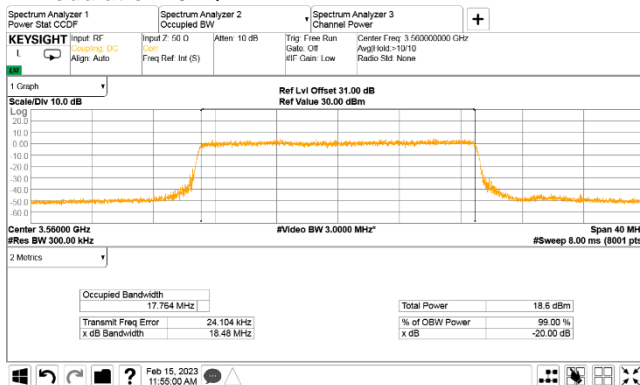
CHANNEL SPACING:  
ANTENNA PORT:  
Modulation: QPSK



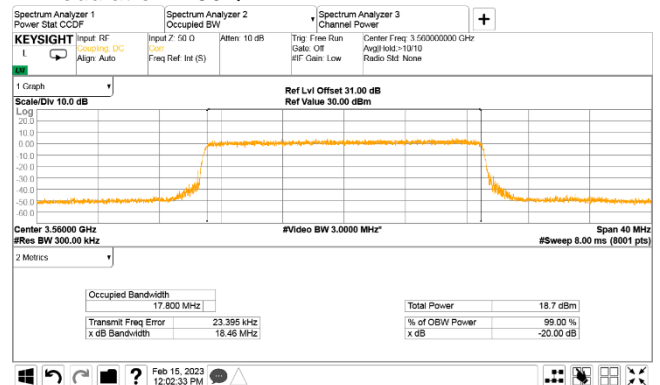
20 MHz  
1  
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



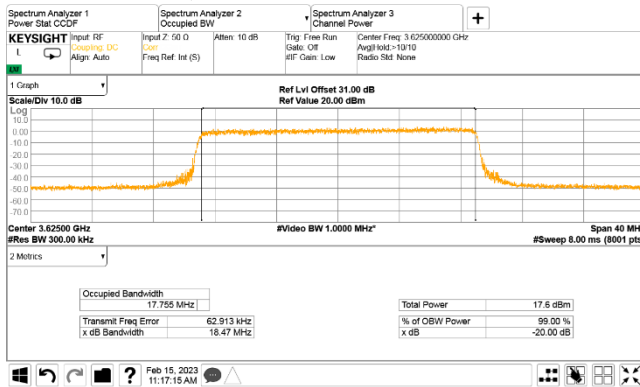


HERMON LABORATORIES

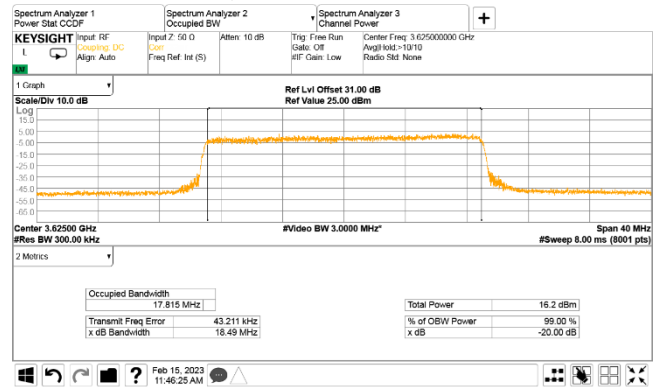
<b>Test specification:</b> Section2.1049, Occupied bandwidth			
<b>Test procedure:</b> 47 CFR, Section 2.1049			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date(s):</b> 15-Feb-23			
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %	<b>Air Pressure:</b> 1012 hPa	<b>Power:</b> 110 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.5 Occupied bandwidth test result at mid frequency

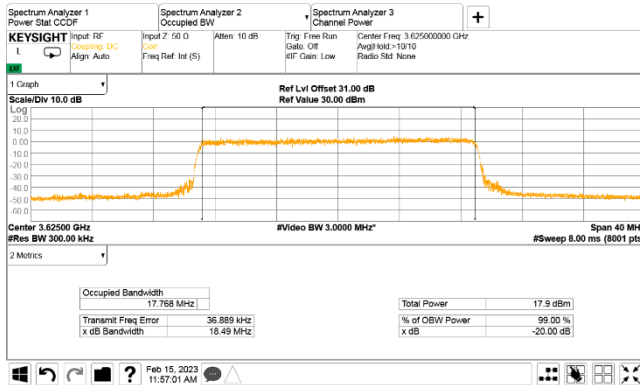
CHANNEL SPACING:  
ANTENNA PORT:  
Modulation: QPSK



20 MHz  
1  
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM

