

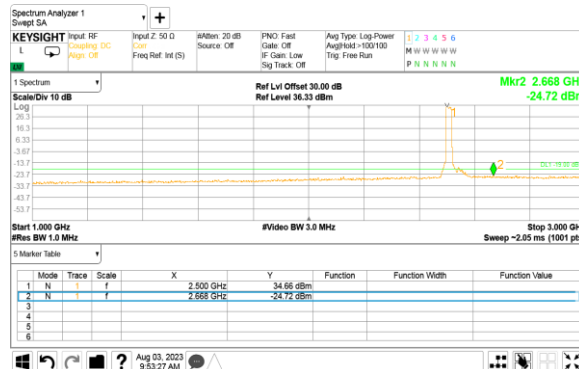


HERMON LABORATORIES

<b>Test specification:</b> Section 27.53, Spurious emissions at RF antenna connector			
<b>Test procedure:</b> 47 CFR, Sections 2.1051, 27.53			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date(s):</b> 02-Aug-23			
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %	<b>Air Pressure:</b> 1012 hPa	<b>Power:</b> 110 VAC, 60 Hz
<b>Remarks:</b>			

Plot 7.4.34 Spurious emission measurements in 1000 - 3000 MHz range at low carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1

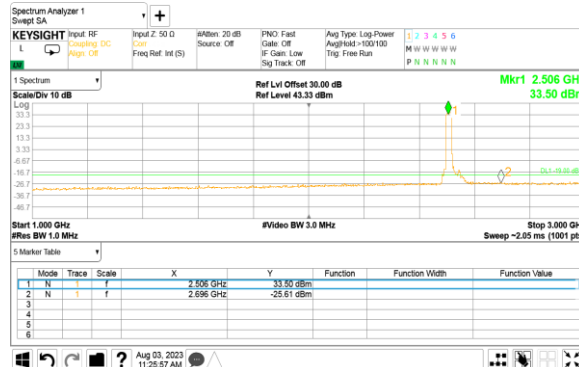


QPSK  
20 MHz  
ANTENNA CHAIN: #2

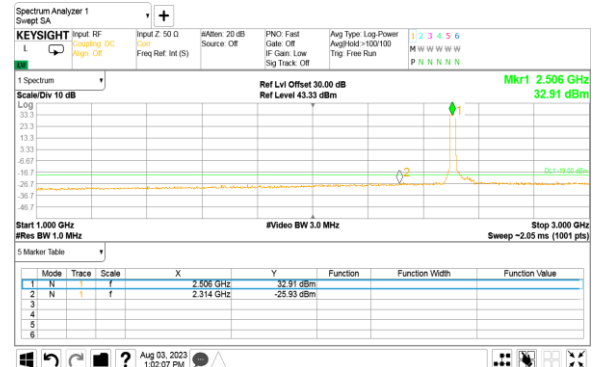


\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$

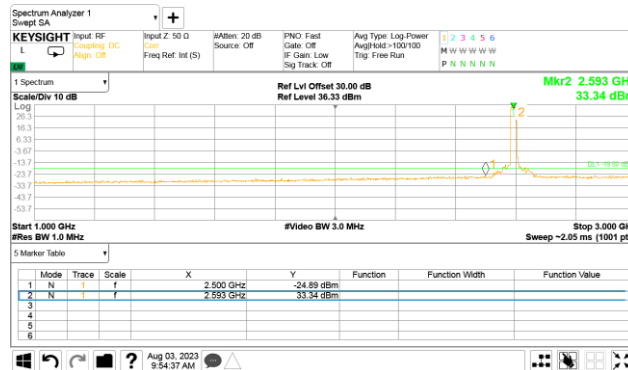


HERMON LABORATORIES

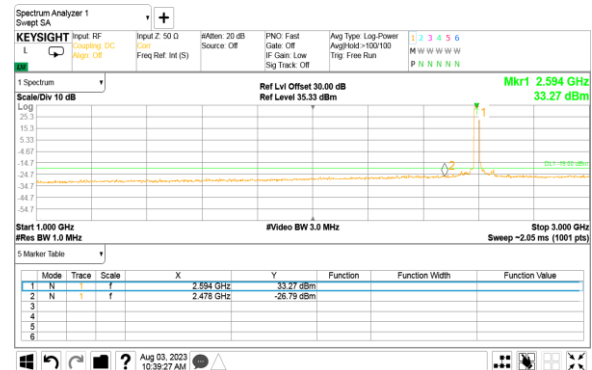
<b>Test specification:</b> Section 27.53, Spurious emissions at RF antenna connector			
<b>Test procedure:</b> 47 CFR, Sections 2.1051, 27.53			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date(s):</b> 02-Aug-23			
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %	<b>Air Pressure:</b> 1012 hPa	<b>Power:</b> 110 VAC, 60 Hz
<b>Remarks:</b>			

Plot 7.4.35 Spurious emission measurements in 1000 - 3000 MHz range at mid carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1

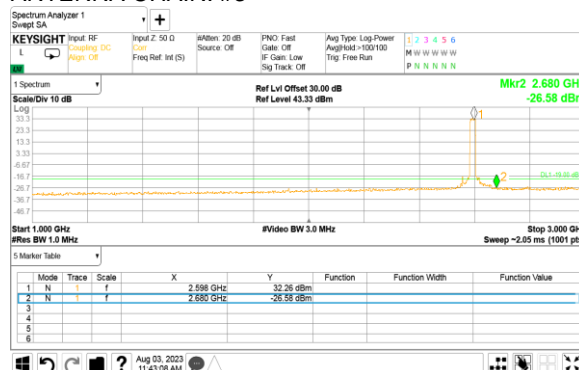


QPSK  
20 MHz  
ANTENNA CHAIN: #2

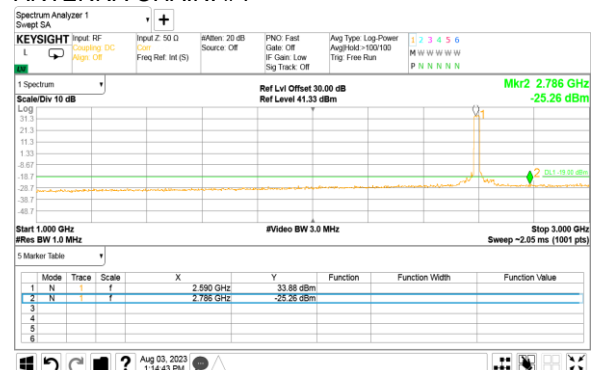


\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$



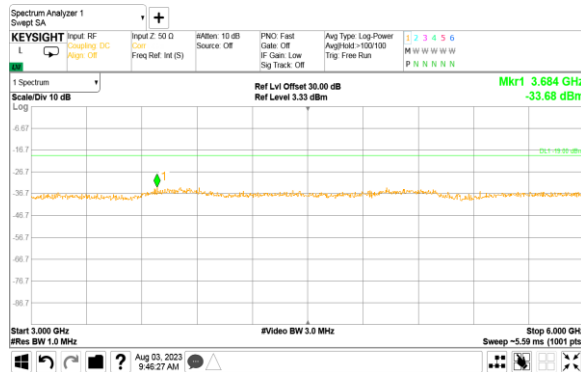


HERMON LABORATORIES

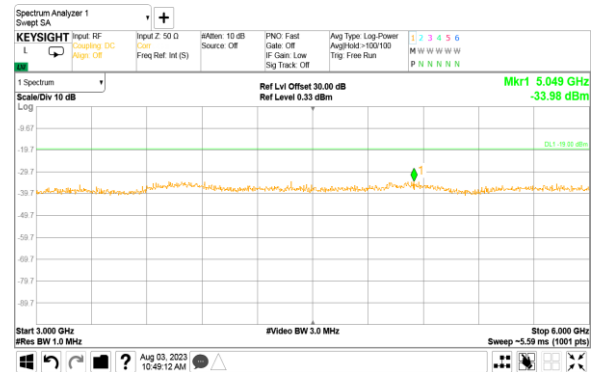
Test specification: Section 27.53, Spurious emissions at RF antenna connector			
Test procedure: 47 CFR, Sections 2.1051, 27.53			
Test mode: Compliance		Verdict: PASS	
Date(s): 02-Aug-23			
Temperature: 21 °C	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 60 Hz
Remarks:			

Plot 7.4.37 Spurious emission measurements in 3000 - 6000 MHz range at low carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1

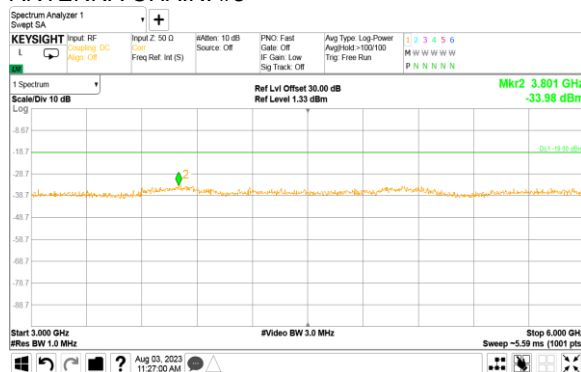


QPSK  
20 MHz  
ANTENNA CHAIN: #2

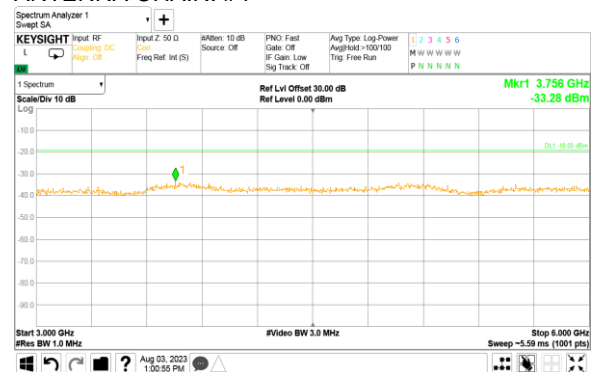


\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$

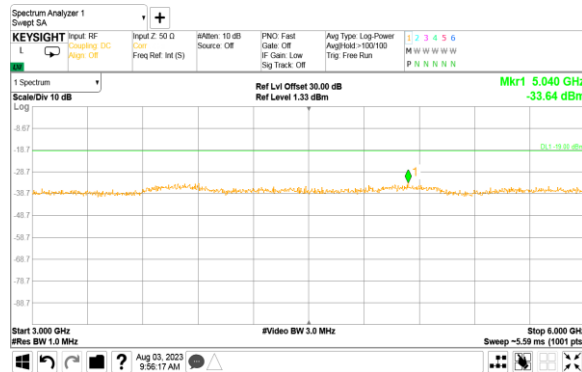


HERMON LABORATORIES

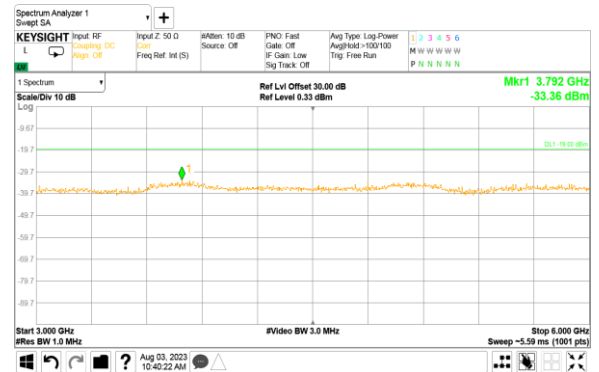
Test specification:		Section 27.53, Spurious emissions at RF antenna connector	
Test procedure:		47 CFR, Sections 2.1051, 27.53	
Test mode:		Verdict: PASS	
Date(s):			
02-Aug-23			
Temperature: 21 °C	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 60 Hz
Remarks:			

Plot 7.4.38 Spurious emission measurements in 3000 - 6000 MHz range at mid carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1

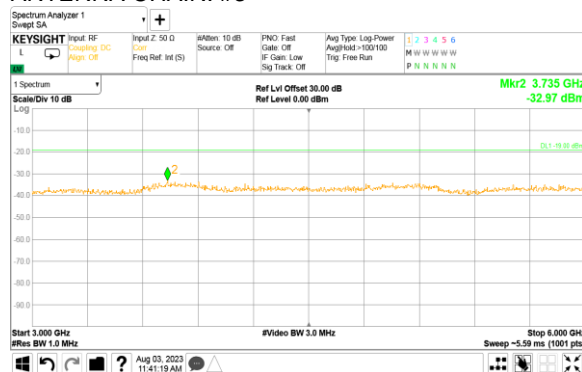


QPSK  
20 MHz  
ANTENNA CHAIN: #2



\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$

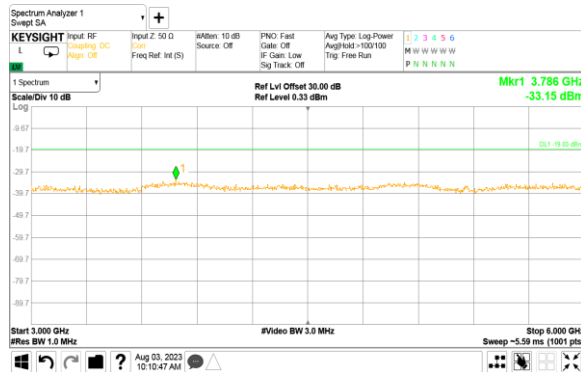


HERMON LABORATORIES

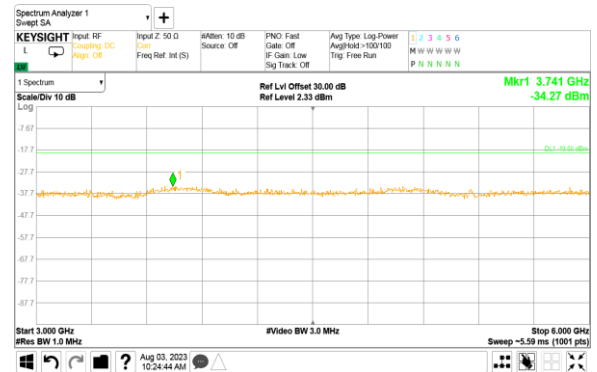
Test specification: Section 27.53, Spurious emissions at RF antenna connector			
Test procedure: 47 CFR, Sections 2.1051, 27.53			
Test mode: Compliance		Verdict: PASS	
Date(s): 02-Aug-23			
Temperature: 21 °C	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 60 Hz
Remarks:			

Plot 7.4.39 Spurious emission measurements in 3000 - 6000 MHz range at high carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1

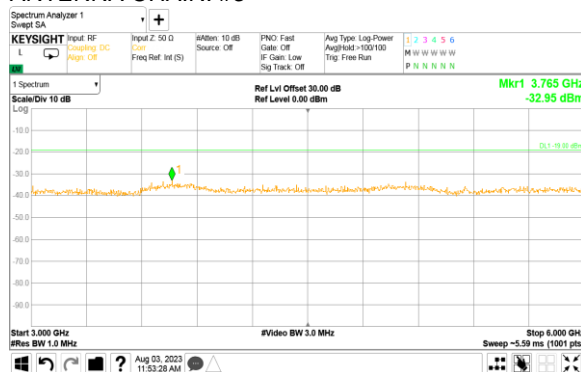


QPSK  
20 MHz  
ANTENNA CHAIN: #2

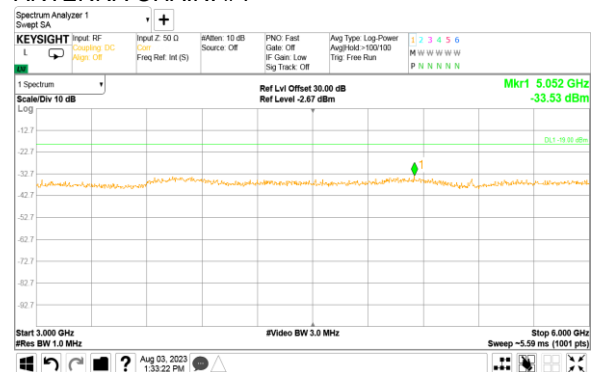


\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$

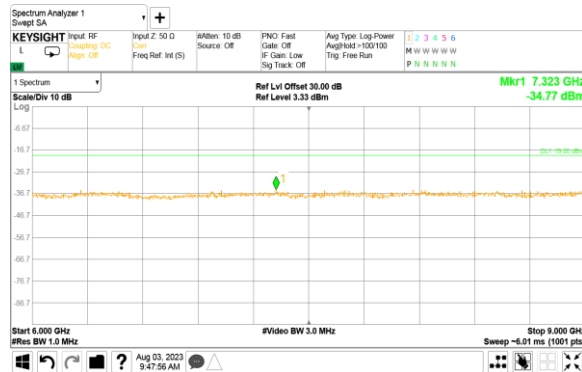


HERMON LABORATORIES

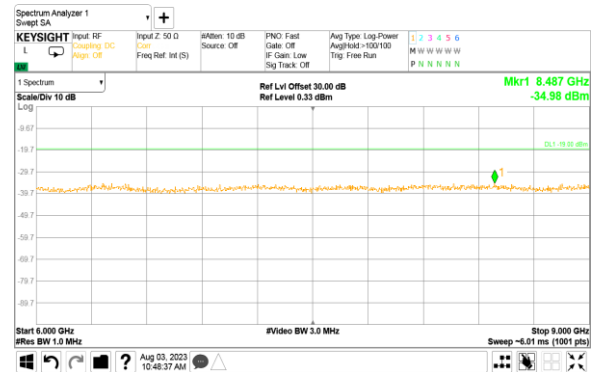
Test specification: Section 27.53, Spurious emissions at RF antenna connector			
Test procedure: 47 CFR, Sections 2.1051, 27.53			
Test mode: Compliance		Verdict: PASS	
Date(s): 02-Aug-23			
Temperature: 21 °C	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 60 Hz
Remarks:			

Plot 7.4.40 Spurious emission measurements in 6000-9000 MHz range at low carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1

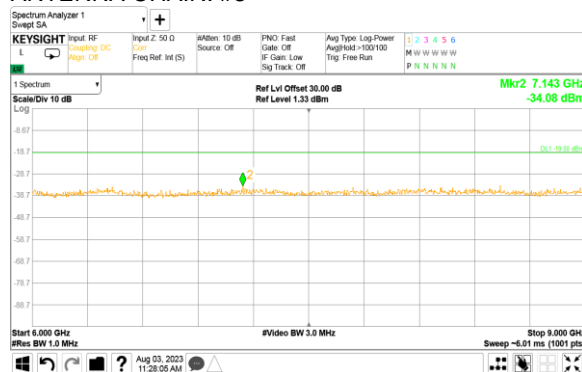


QPSK  
20 MHz  
ANTENNA CHAIN: #2

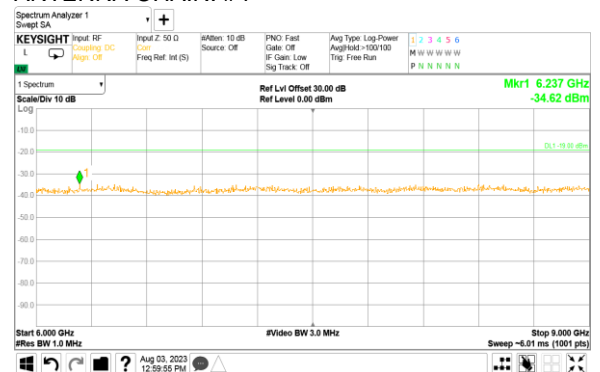


\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$

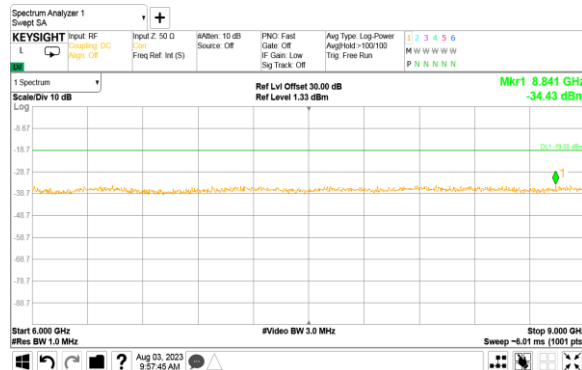


HERMON LABORATORIES

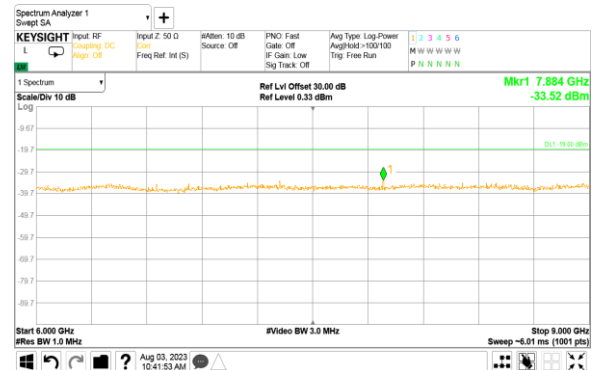
<b>Test specification:</b>		<b>Section 27.53, Spurious emissions at RF antenna connector</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1051, 27.53	
<b>Test mode:</b>		Compliance	<b>Verdict:</b> PASS
<b>Date(s):</b>		02-Aug-23	
<b>Temperature:</b> 21 °C	<b>Relative Humidity:</b> 54 %	<b>Air Pressure:</b> 1012 hPa	<b>Power:</b> 110 VAC, 60 Hz
<b>Remarks:</b>			

Plot 7.4.41 Spurious emission measurements in 6000-9000 MHz range at mid carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1

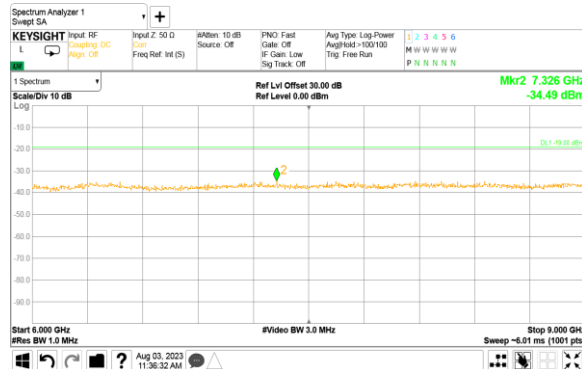


QPSK  
20 MHz  
ANTENNA CHAIN: #2

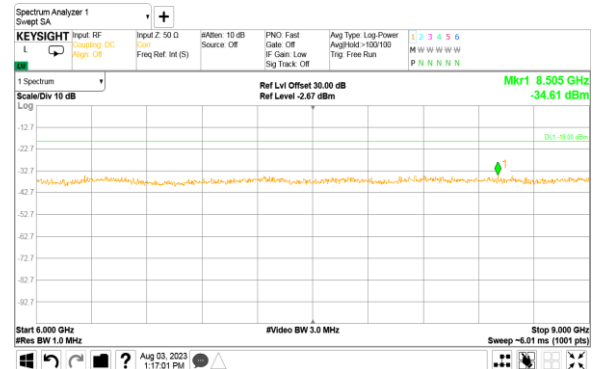


\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$



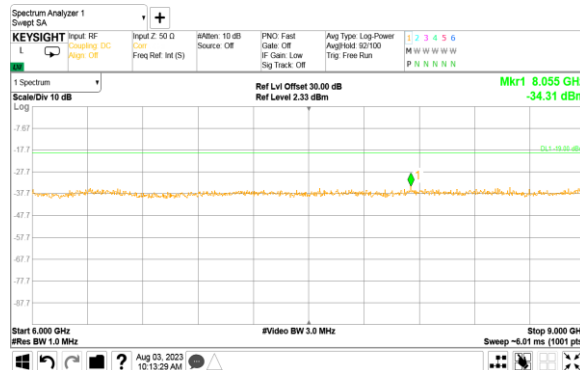


HERMON LABORATORIES

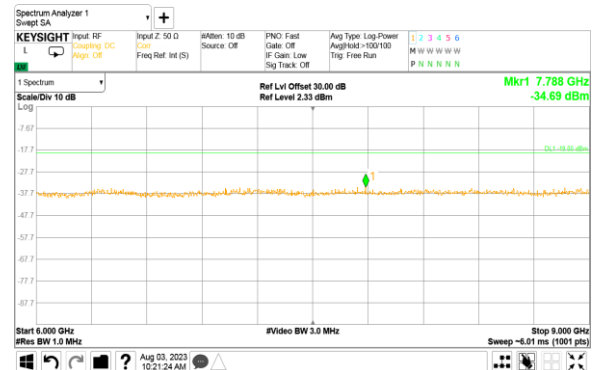
Test specification: Section 27.53, Spurious emissions at RF antenna connector			
Test procedure: 47 CFR, Sections 2.1051, 27.53			
Test mode: Compliance		Verdict: PASS	
Date(s): 02-Aug-23			
Temperature: 21 °C	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 60 Hz
Remarks:			

Plot 7.4.42 Spurious emission measurements in 6000-9000 MHz range at high carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1

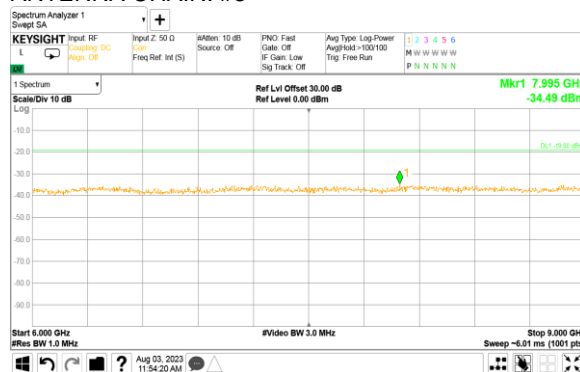


QPSK  
20 MHz  
ANTENNA CHAIN: #2

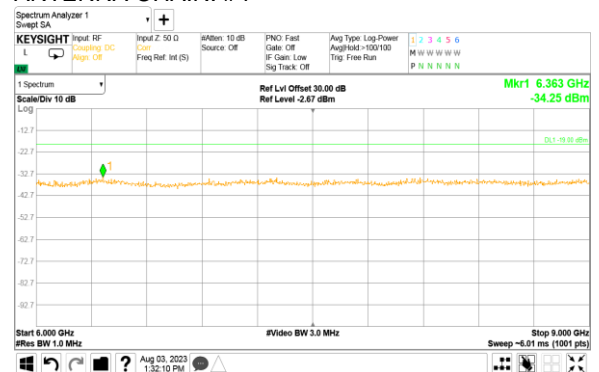


\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$

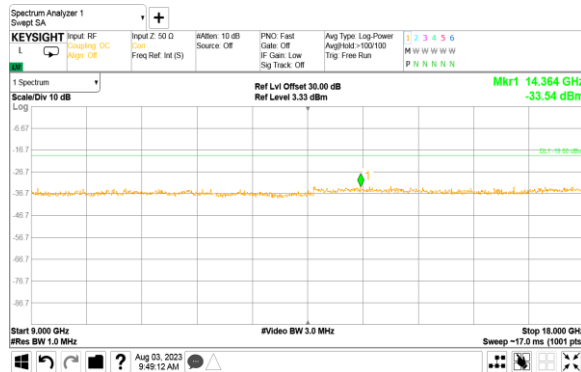


HERMON LABORATORIES

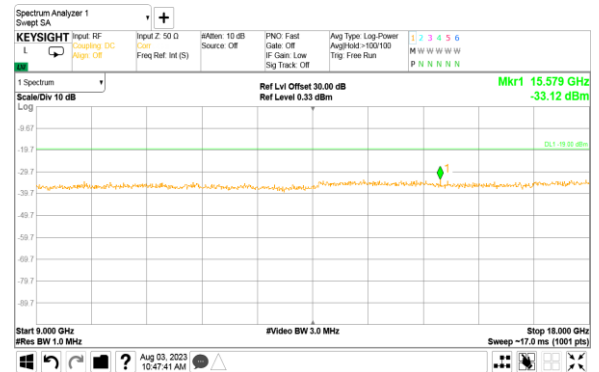
Test specification: Section 27.53, Spurious emissions at RF antenna connector			
Test procedure: 47 CFR, Sections 2.1051, 27.53			
Test mode: Compliance		Verdict: PASS	
Date(s): 02-Aug-23			
Temperature: 21 °C	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 60 Hz
Remarks:			

Plot 7.4.43 Spurious emission measurements in 9000 - 18000 MHz range at low carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1



QPSK  
20 MHz  
ANTENNA CHAIN: #2



\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$

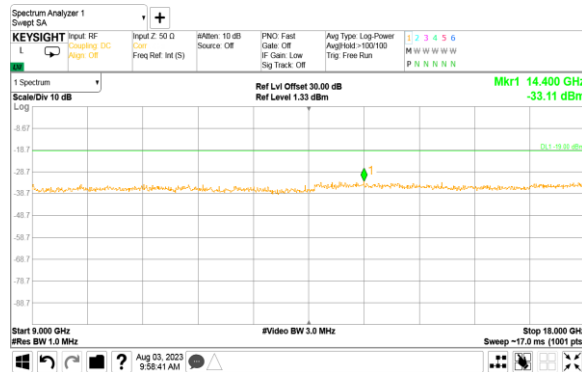


HERMON LABORATORIES

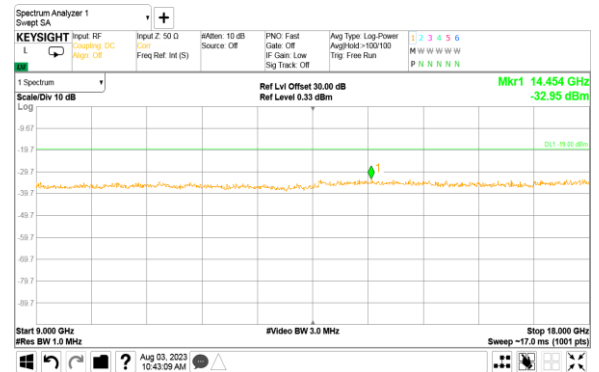
Test specification: Section 27.53, Spurious emissions at RF antenna connector	
Test procedure: 47 CFR, Sections 2.1051, 27.53	
Test mode: Compliance	Verdict: PASS
Date(s): 02-Aug-23	
Temperature: 21 °C	Relative Humidity: 54 %
Air Pressure: 1012 hPa	Power: 110 VAC, 60 Hz
Remarks:	

Plot 7.4.44 Spurious emission measurements in 9000 - 18000 MHz range at mid carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1



QPSK  
20 MHz  
ANTENNA CHAIN: #2



\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$

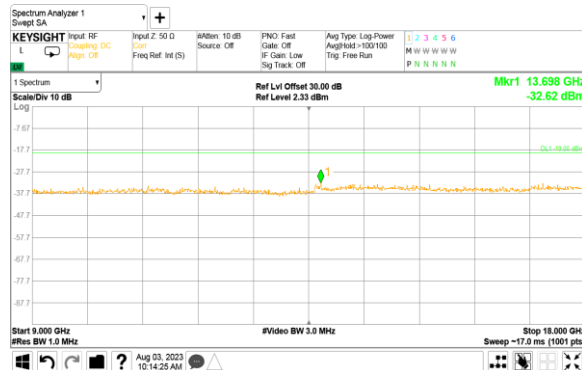


HERMON LABORATORIES

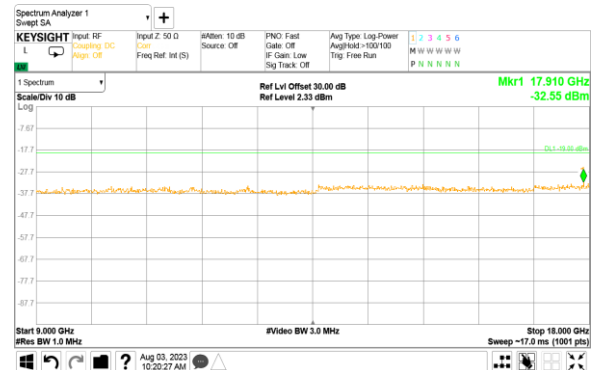
Test specification:		Section 27.53, Spurious emissions at RF antenna connector	
Test procedure:		47 CFR, Sections 2.1051, 27.53	
Test mode:		Verdict: PASS	
Date(s):			
02-Aug-23			
Temperature: 21 °C	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 60 Hz
Remarks:			

Plot 7.4.45 Spurious emission measurements in 9000 - 18000 MHz range at high carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1



QPSK  
20 MHz  
ANTENNA CHAIN: #2

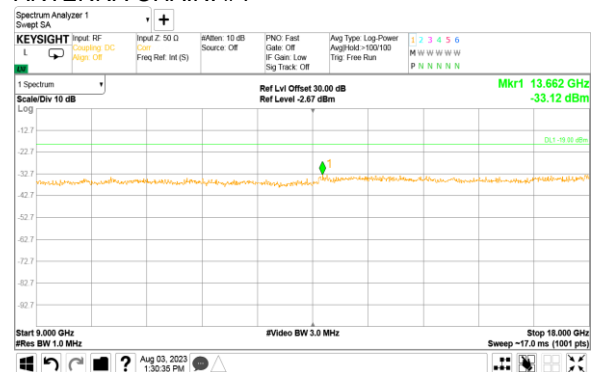


\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$

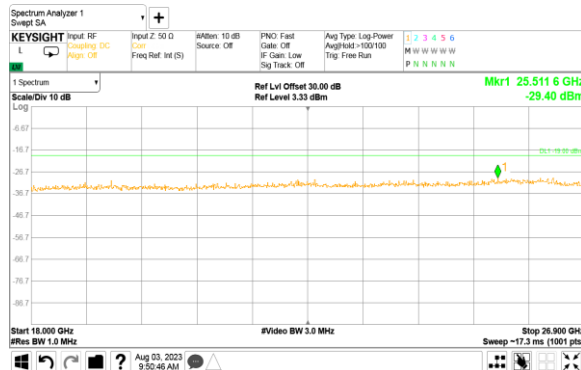


HERMON LABORATORIES

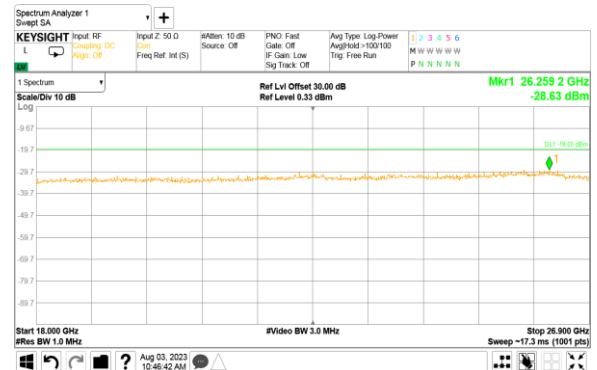
Test specification: Section 27.53, Spurious emissions at RF antenna connector			
Test procedure: 47 CFR, Sections 2.1051, 27.53			
Test mode: Compliance		Verdict: PASS	
Date(s): 02-Aug-23			
Temperature: 21 °C	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 60 Hz
Remarks:			

Plot 7.4.46 Spurious emission measurements in 18000 - 26900 MHz range at low carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1

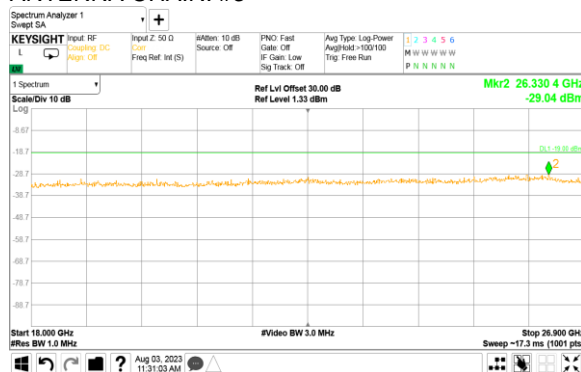


QPSK  
20 MHz  
ANTENNA CHAIN: #2

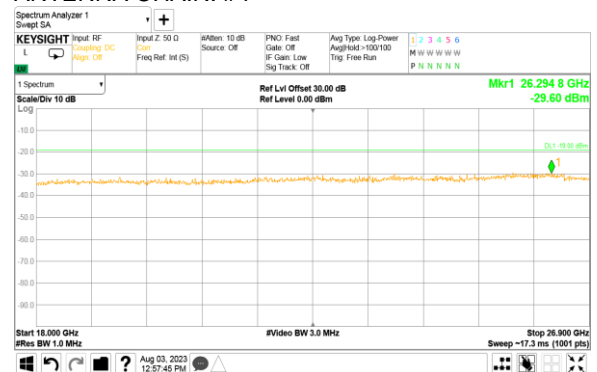


\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$

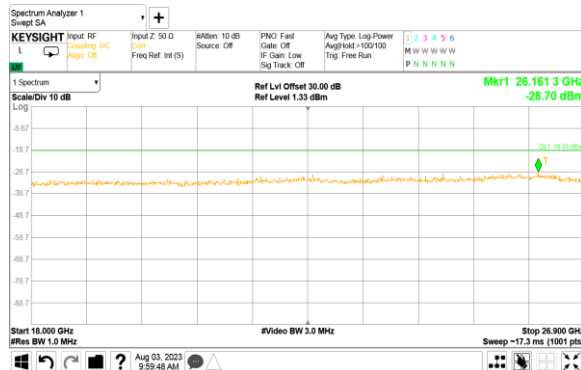


HERMON LABORATORIES

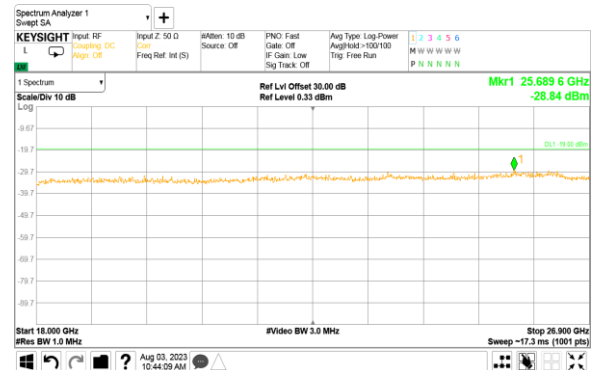
Test specification: Section 27.53, Spurious emissions at RF antenna connector			
Test procedure: 47 CFR, Sections 2.1051, 27.53			
Test mode: Compliance		Verdict: PASS	
Date(s): 02-Aug-23			
Temperature: 21 °C	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 60 Hz
Remarks:			

Plot 7.4.47 Spurious emission measurements in 18000 - 26900 MHz range at mid carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1

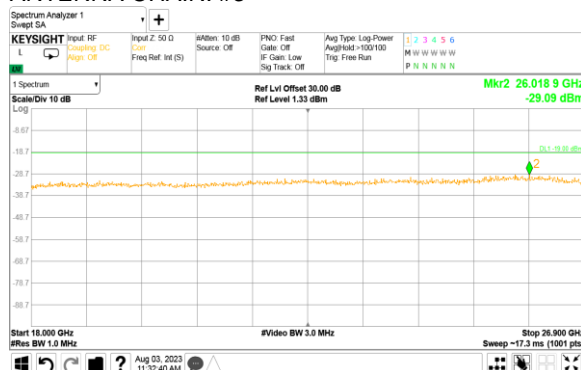


QPSK  
20 MHz  
ANTENNA CHAIN: #2

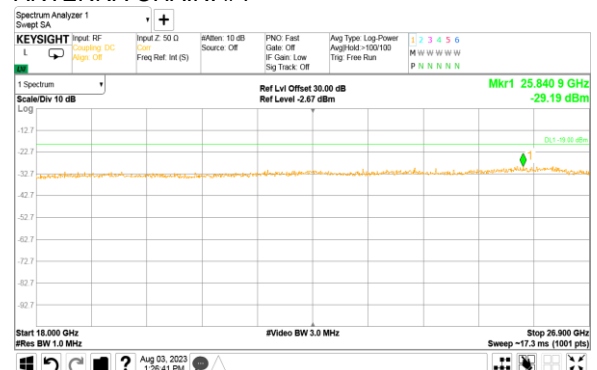


\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$

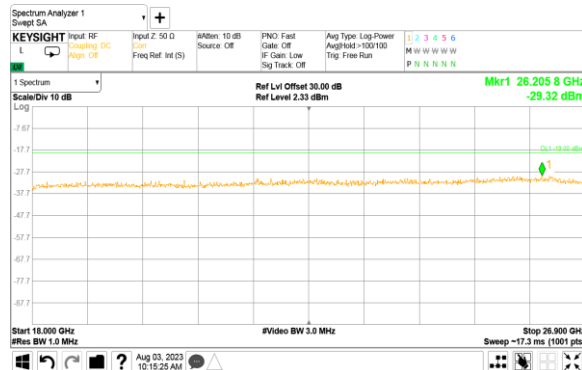


HERMON LABORATORIES

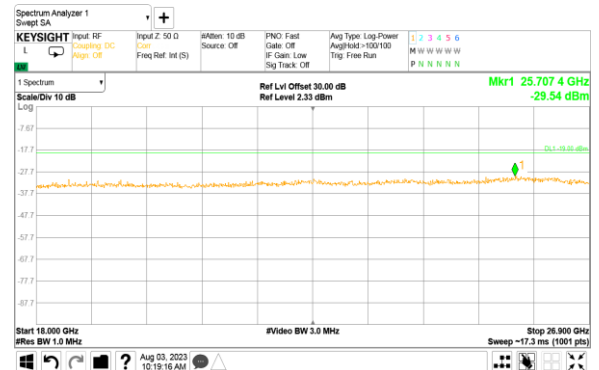
Test specification: Section 27.53, Spurious emissions at RF antenna connector			
Test procedure: 47 CFR, Sections 2.1051, 27.53			
Test mode: Compliance		Verdict: PASS	
Date(s): 02-Aug-23			
Temperature: 21 °C	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 60 Hz
Remarks:			

Plot 7.4.48 Spurious emission measurements in 18000 - 26900 MHz range at high carrier frequency

MODULATION:  
CHANNEL SPACING:  
ANTENNA CHAIN: #1

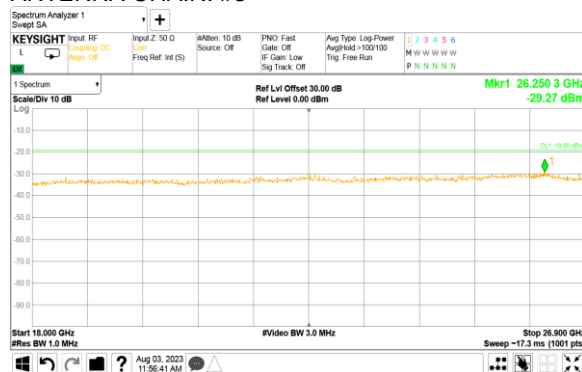


QPSK  
20 MHz  
ANTENNA CHAIN: #2



\* The limit line is  $43+10\log P(W)-10*\log(N)$

ANTENNA CHAIN: #3



ANTENNA CHAIN: #4



\* The limit line is  $43+10\log P(W)-10*\log(N)$



<b>Test specification:</b> Section 27.53, Radiated spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1053;			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date(s):</b> 31-Jul-23			
<b>Temperature:</b> 25 °C	<b>Relative Humidity:</b> 41 %	<b>Air Pressure:</b> 1002 hPa	<b>Power:</b> 120 VAC, 60 Hz
<b>Remarks:</b>			

## 7.5 Radiated spurious emission measurements

### 7.5.1 General

This test was performed to measure radiated spurious emissions from the EUT. Specification test limits are given in Table 7.5.1.

**Table 7.5.1 Radiated spurious emission test limits**

Frequency, MHz	Attenuation below carrier, dBc	ERP of spurious, dBm	Equivalent field strength limit @ 3m, dB(μV/m)***
Base and fixed user stations			
<b>0.009 – 10<sup>th</sup> harmonic*</b>	<b>43+10logP**</b>	<b>-13</b>	<b>84.4</b>

\* - Excluding the band emission

\*\* - P is transmitter output power in Watts

\*\*\* - Equivalent field strength limit was calculated from maximum allowed ERP of spurious as follows:  $E = \sqrt{30 \times P \times 1.64} / r$ , where P is ERP in Watts, 1.64 is numeric gain of ideal dipole and r is antenna to EUT distance in meters

### 7.5.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz band

**7.5.2.1** The EUT was set up as shown in Figure 7.5.1, energized and the performance check was conducted.

**7.5.2.2** The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360° and the measuring antenna was rotated around its vertical axis.

**7.5.2.3** The worst test results (the lowest margins) were recorded in Table 7.5.2 and shown in the associated plots.

### 7.5.3 Test procedure for spurious emission field strength measurements above 30 MHz

**7.5.3.1** The EUT was set up as shown in Figure 7.5.2, energized and the performance check was conducted.

**7.5.3.2** The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360° and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal, polarizations.

**7.5.3.3** The worst test results (the lowest margins) were recorded in Table 7.5.2 and shown in the associated plots.





<b>Test specification:</b> <b>Section 27.53, Radiated spurious emissions</b>			
<b>Test procedure:</b> 47 CFR, Sections 2.1053;			
<b>Test mode:</b> Compliance		<b>Verdict:</b> <b>PASS</b>	
<b>Date(s):</b> 31-Jul-23			
<b>Temperature:</b> 25 °C	<b>Relative Humidity:</b> 41 %	<b>Air Pressure:</b> 1002 hPa	<b>Power:</b> 120 VAC, 60 Hz
<b>Remarks:</b>			

Figure 7.5.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz band

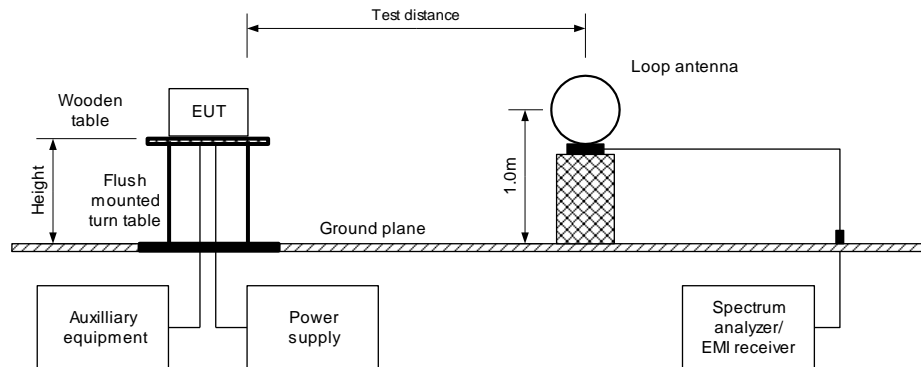
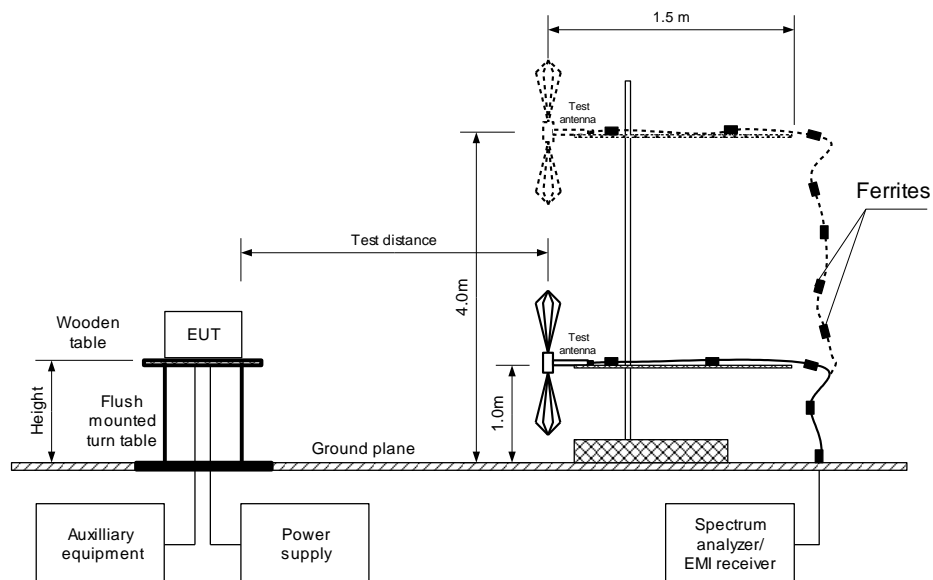


Figure 7.5.2 Setup for spurious emission field strength measurements above 30 MHz





Test specification:		Section 27.53, Radiated spurious emissions	
Test procedure:		47 CFR, Sections 2.1053;	
Test mode:		Verdict: PASS	
Date(s):			
31-Jul-23			
Temperature: 25 °C	Relative Humidity: 41 %	Air Pressure: 1002 hPa	Power: 120 VAC, 60 Hz
Remarks:			

**Table 7.5.2 Spurious emission field strength test results**

ASSIGNED FREQUENCY RANGE: 2496-2690 MHz  
 TEST DISTANCE: 3 m  
 TEST SITE: Semi anechoic chamber  
 EUT HEIGHT: 0.8 m  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 26900 MHz  
 DETECTOR USED: Peak  
 VIDEO BANDWIDTH: > Resolution bandwidth  
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)  
 Biconical (30 MHz – 200 MHz)  
 Log periodic (200 MHz – 1000 MHz)  
 Biconilog (30 MHz – 1000 MHz)  
 Double ridged guide (above 1000 MHz)  
 MODULATION: 256 QAM  
 OPERATION CHANNEL WIDTH: 10 MHz  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, m	Turn-table position**, degrees
<b>Low carrier frequency</b>							
No emissions were found							
<b>Mid carrier frequency</b>							
No emissions were found							
<b>High carrier frequency</b>							
No emissions were found							

\*- Margin = Field strength of spurious – calculated field strength limit.

\*\* - EUT front panel refers to 0 degrees position of turntable.

**Reference numbers of test equipment used**

HL 0446	HL 3903	HL 4933	HL 4956	HL 5112	HL 5288	HL 5902	HL 7802
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Full description is given in Appendix A.