



HERMON LABORATORIES

Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.4 Emission outside the fundamental test results at mid carrier frequency

CHANNEL SPACING:

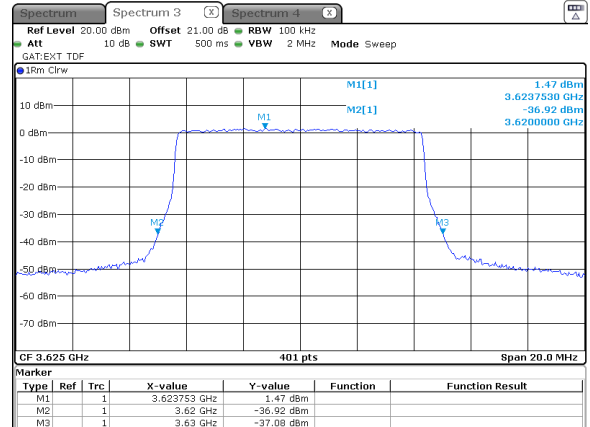
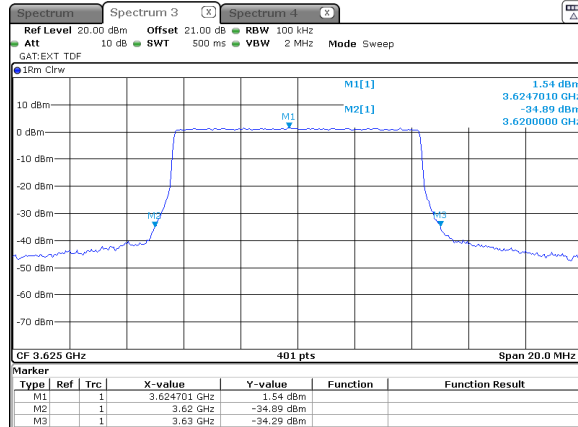
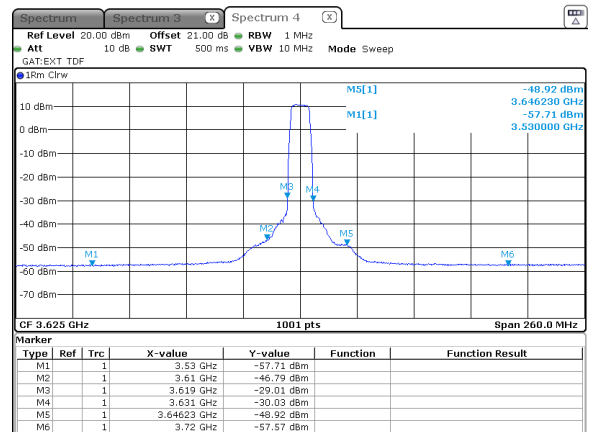
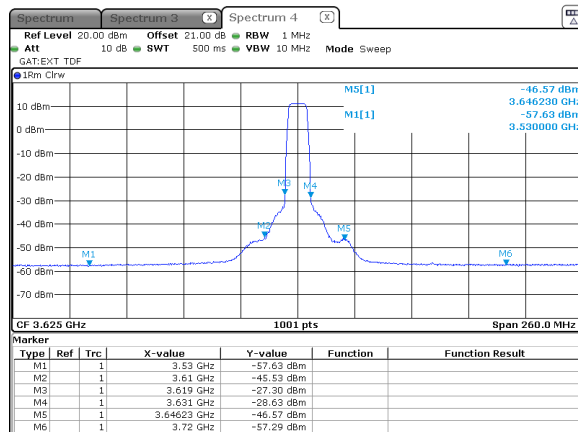
ANTENNA CHAIN:

Modulation: QPSK

10 MHz

2

Modulation: 256QAM





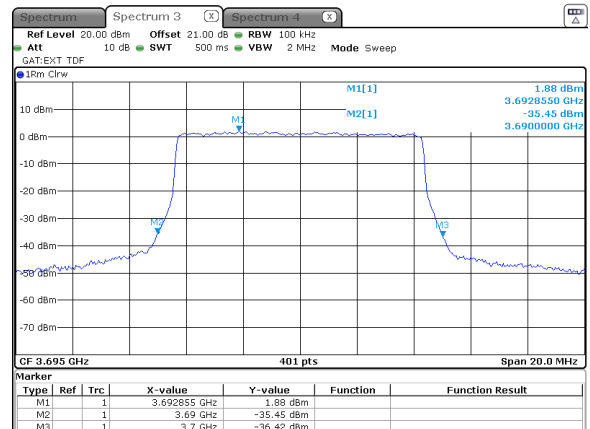
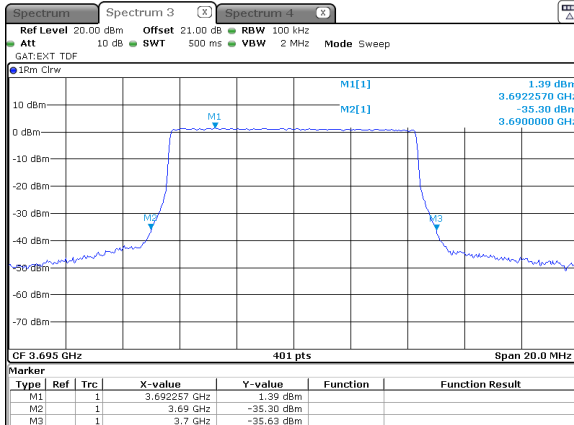
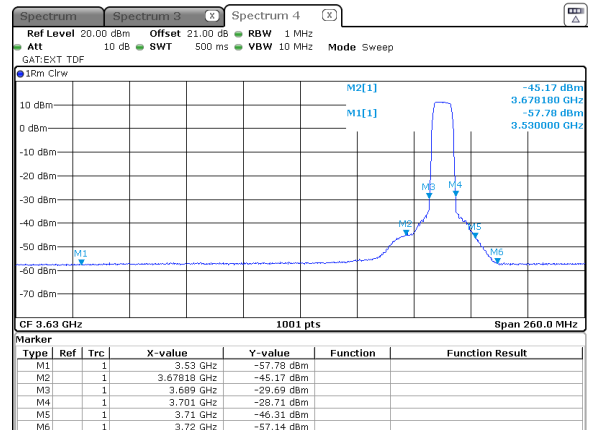
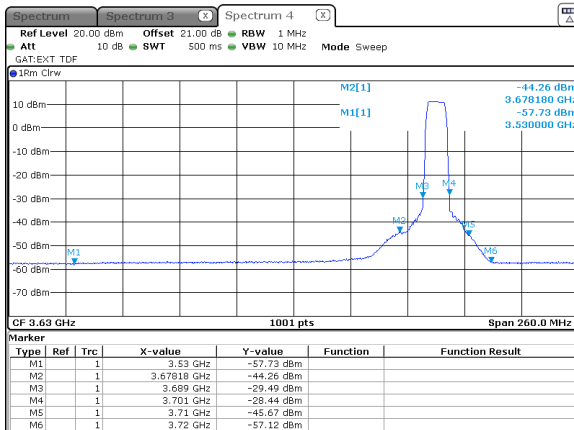
HERMON LABORATORIES

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.5 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK

10 MHz
1
Modulation: 256QAM



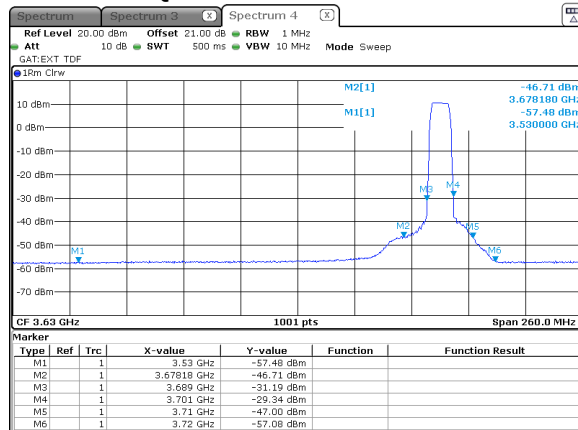


HERMON LABORATORIES

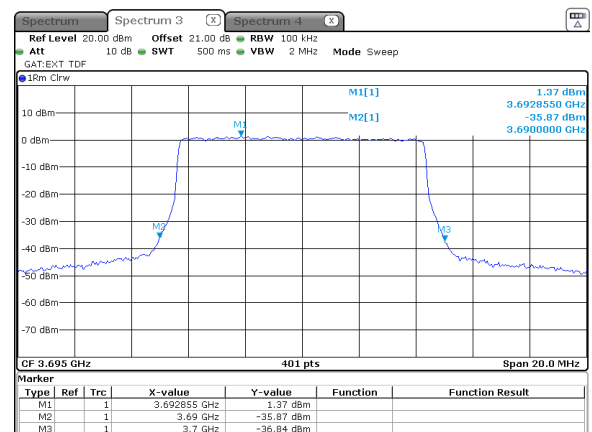
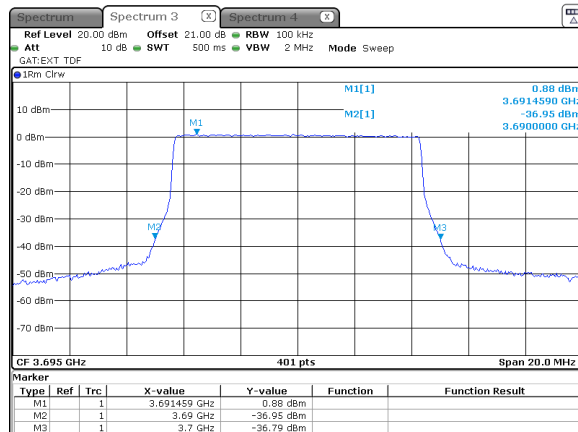
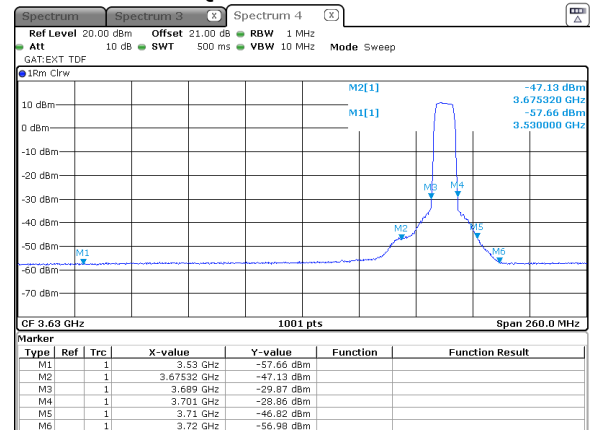
Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.6 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



10 MHz
2
Modulation: 256QAM





HERMON LABORATORIES

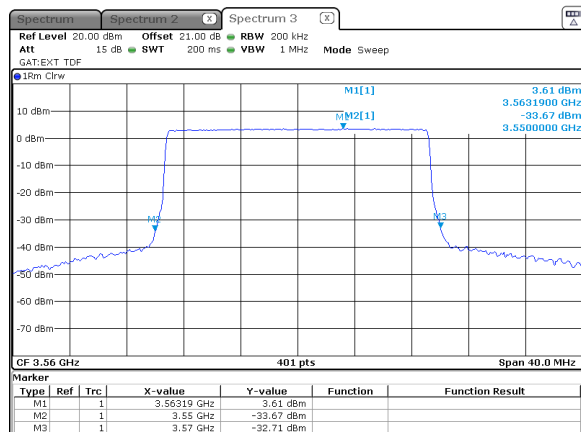
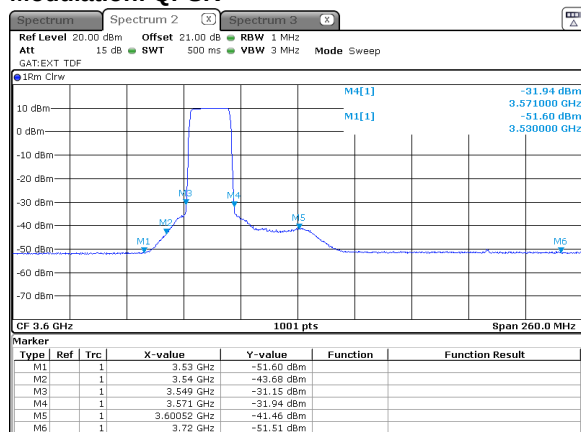
Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.7 Emission outside the fundamental test results at low carrier frequency

CHANNEL SPACING:

ANTENNA CHAIN:

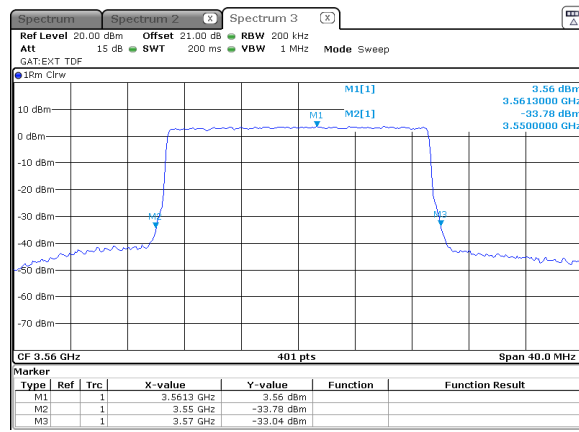
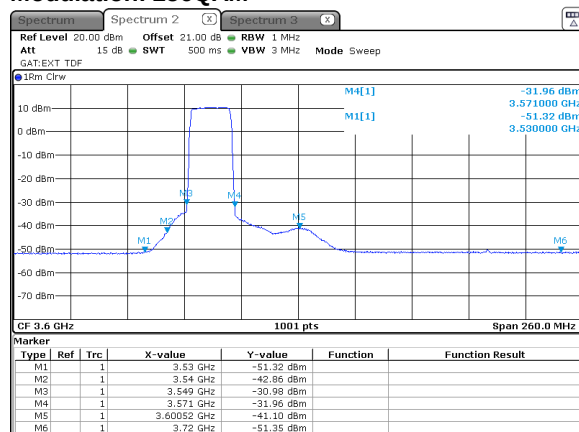
Modulation: QPSK



20 MHz

1

Modulation: 256QAM





HERMON LABORATORIES

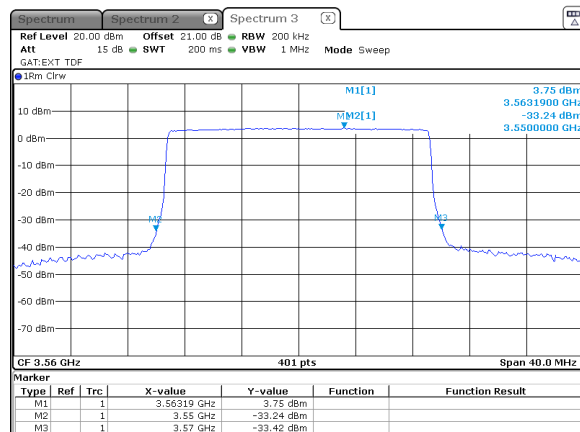
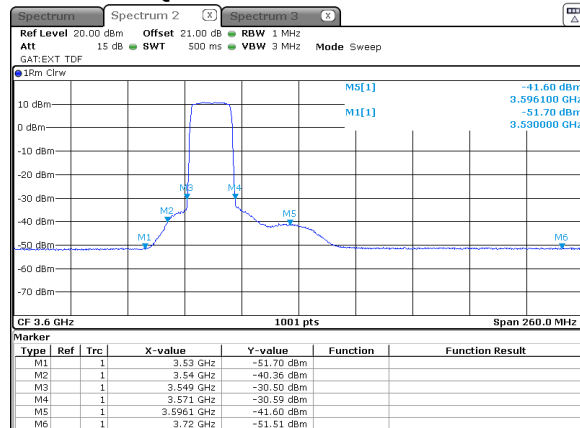
Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.8 Emission outside the fundamental test results at low carrier frequency

CHANNEL SPACING:

ANTENNA CHAIN:

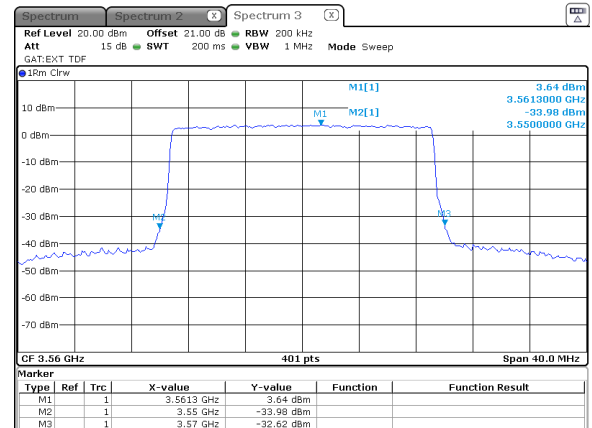
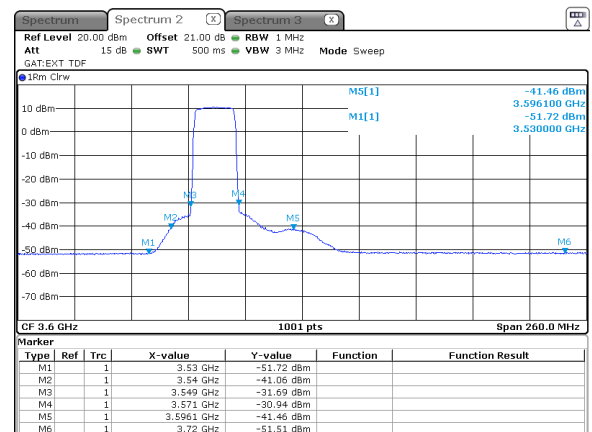
Modulation: QPSK



20 MHz

2

Modulation: 256QAM





HERMON LABORATORIES

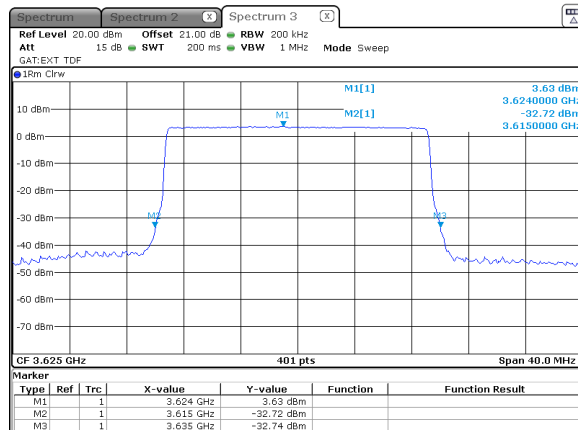
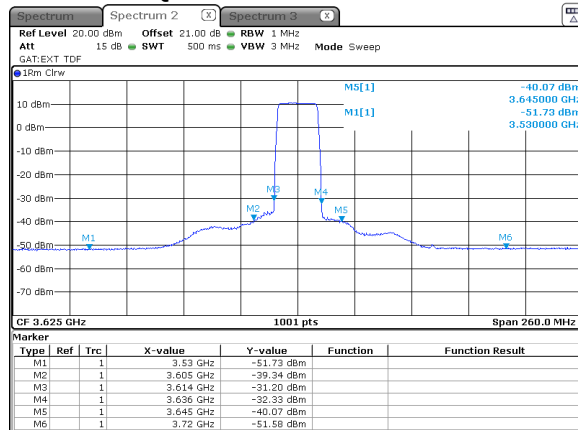
Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.9 Emission outside the fundamental test results at mid carrier frequency

CHANNEL SPACING:

ANTENNA CHAIN:

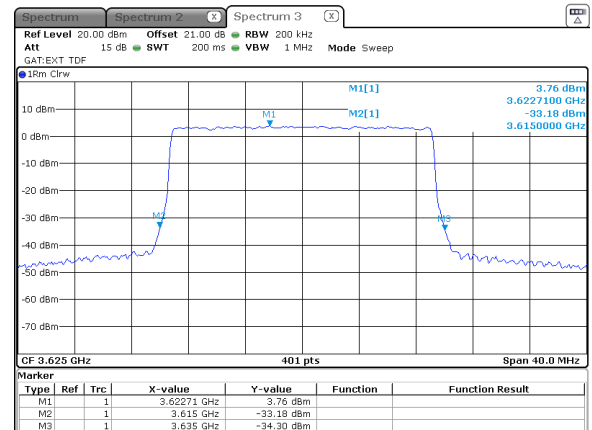
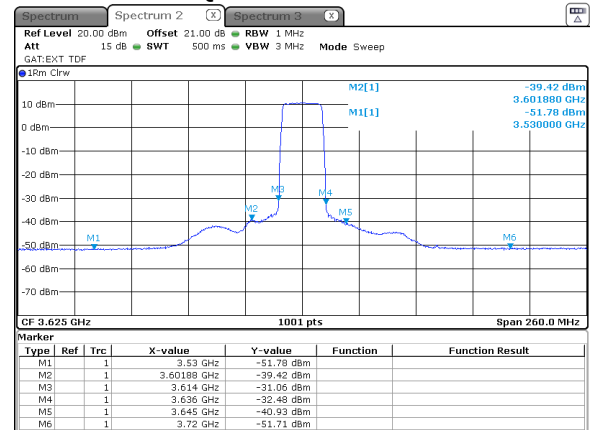
Modulation: QPSK



20 MHz

1

Modulation: 256QAM





HERMON LABORATORIES

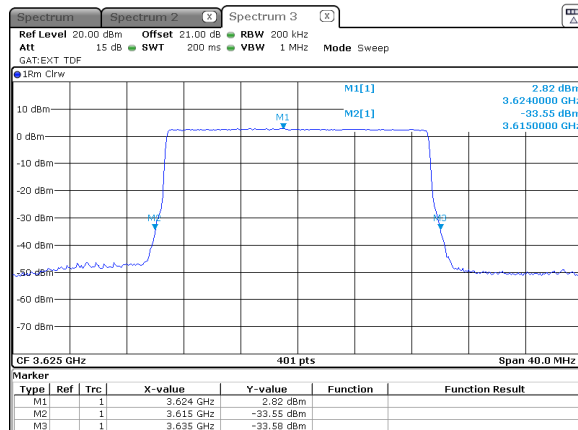
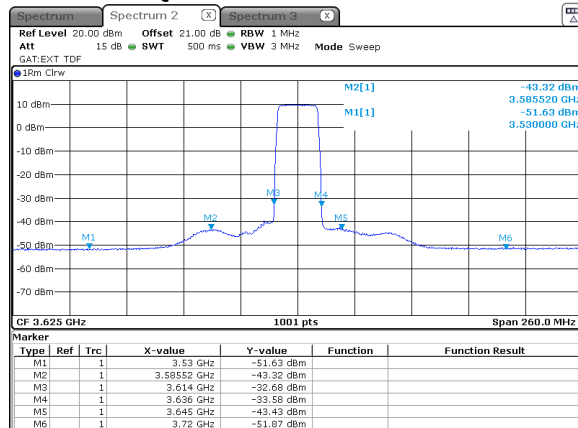
Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.10 Emission outside the fundamental test results at mid carrier frequency

CHANNEL SPACING:

ANTENNA CHAIN:

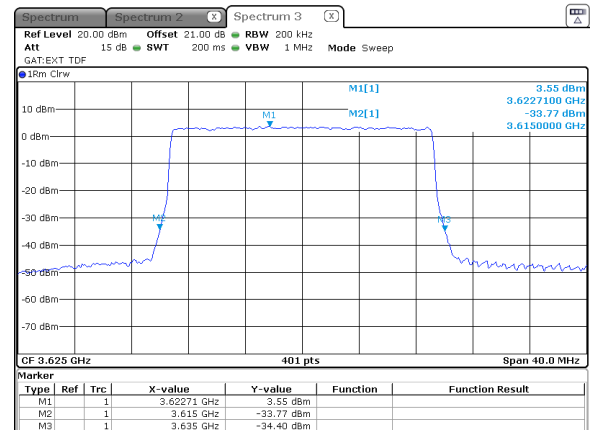
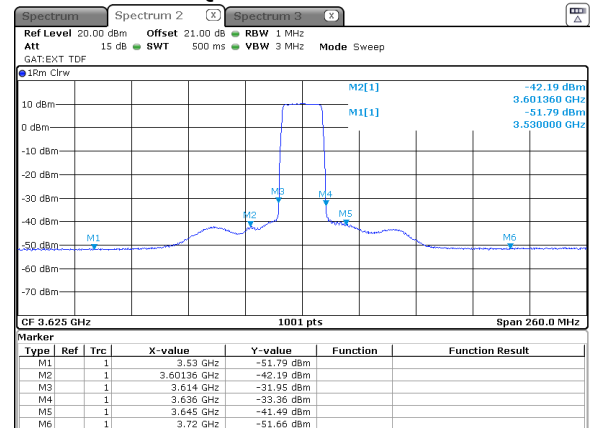
Modulation: QPSK



20 MHz

2

Modulation: 256QAM





HERMON LABORATORIES

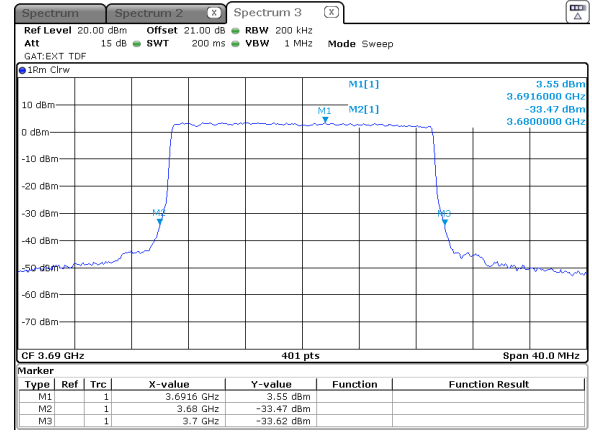
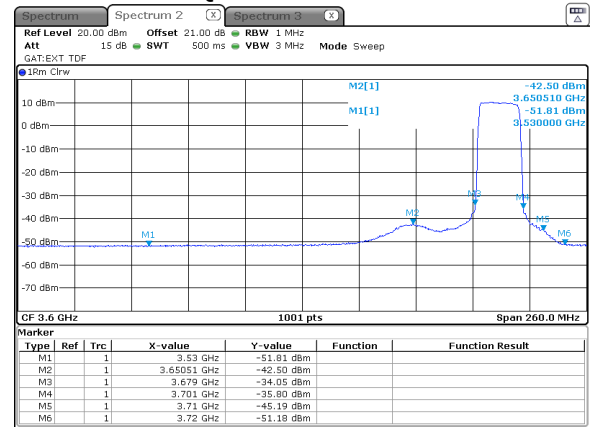
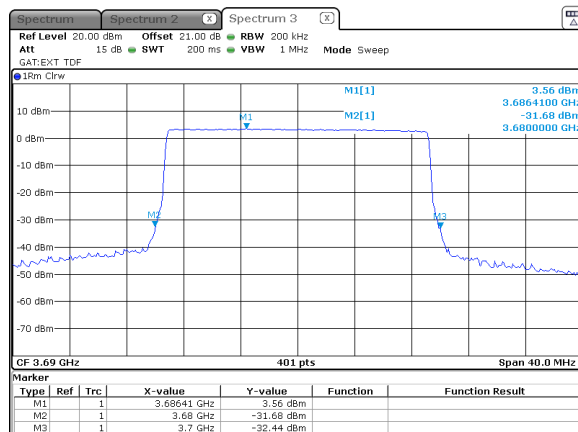
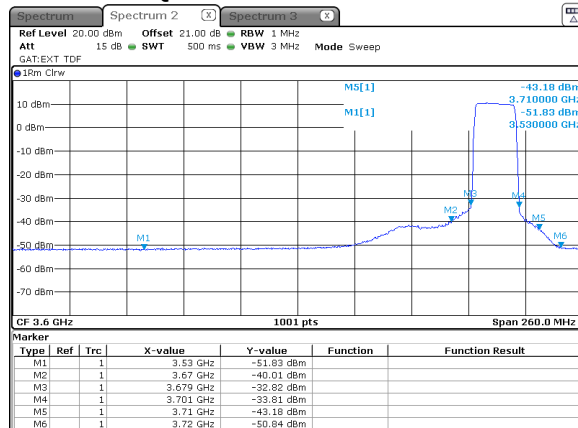
Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.11 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING:

ANTENNA CHAIN:

Modulation: QPSK





HERMON LABORATORIES

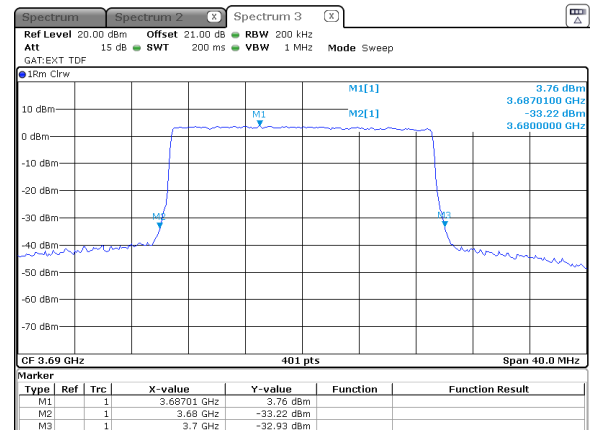
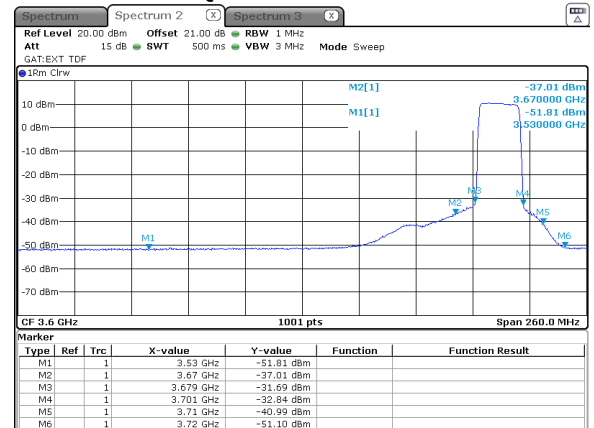
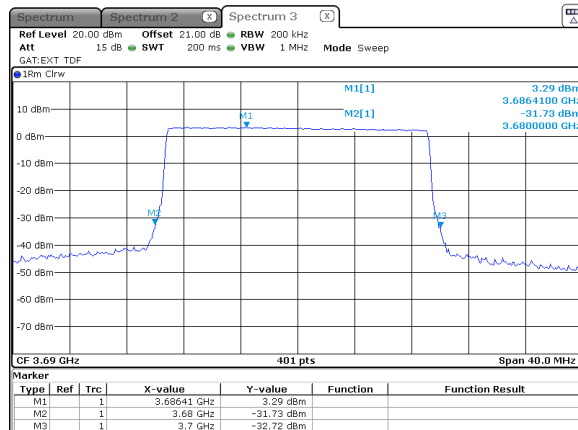
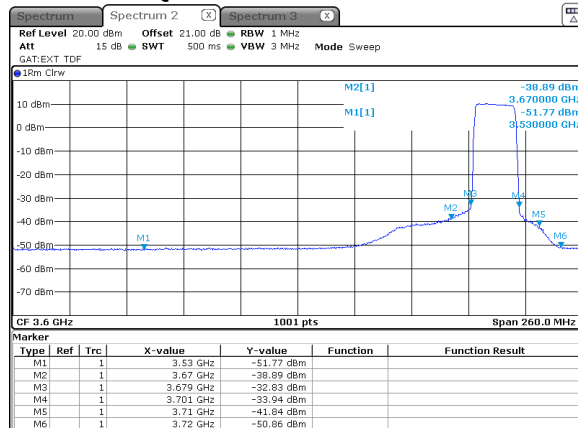
Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.12 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING:

ANTENNA CHAIN:

Modulation: QPSK





HERMON LABORATORIES

Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.13 Emission outside the fundamental test results at low carrier frequency

CHANNEL SPACING:

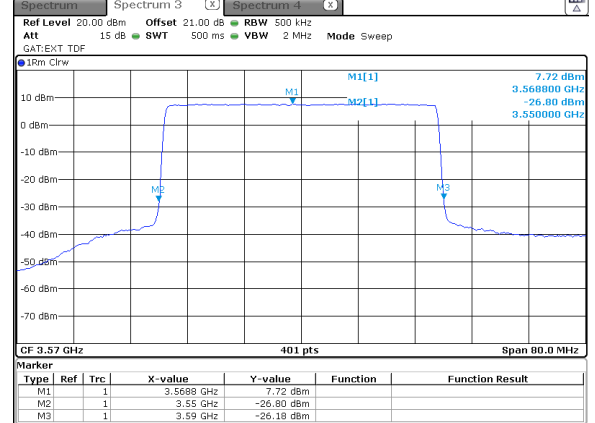
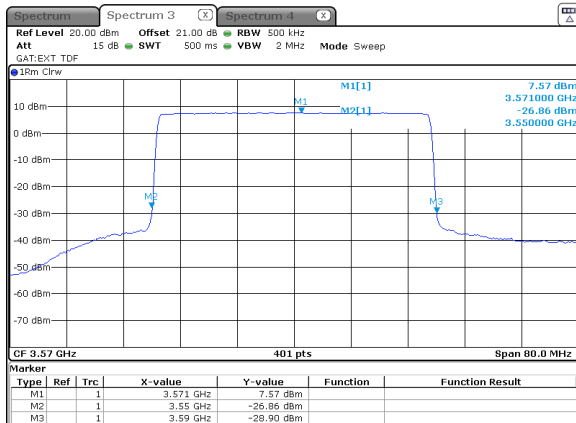
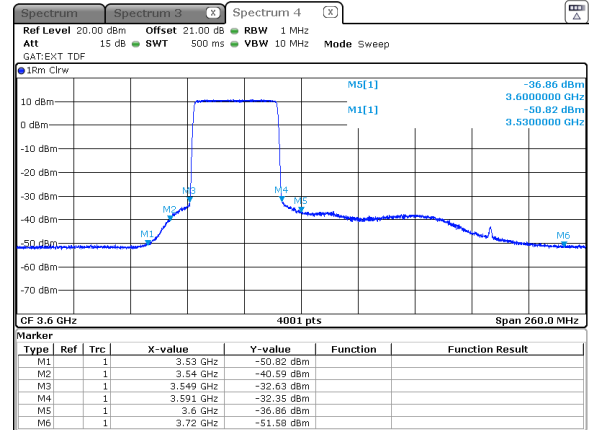
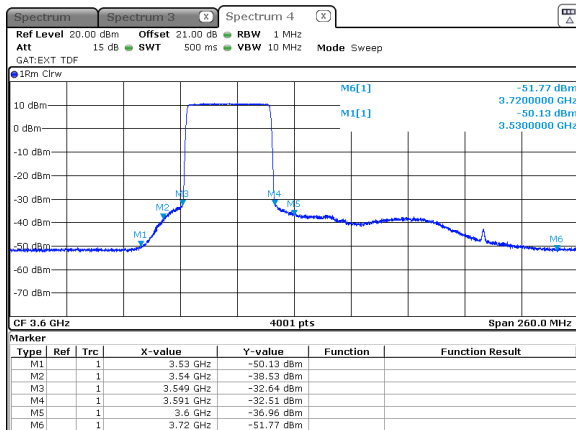
ANTENNA CHAIN:

Modulation: QPSK

40 MHz

1

Modulation: 256QAM





HERMON LABORATORIES

Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.14 Emission outside the fundamental test results at low carrier frequency

CHANNEL SPACING:

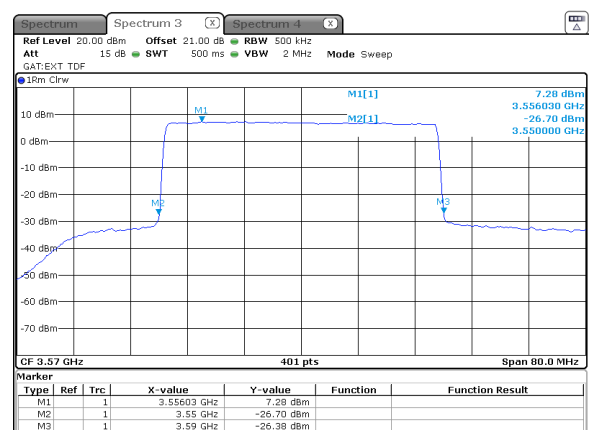
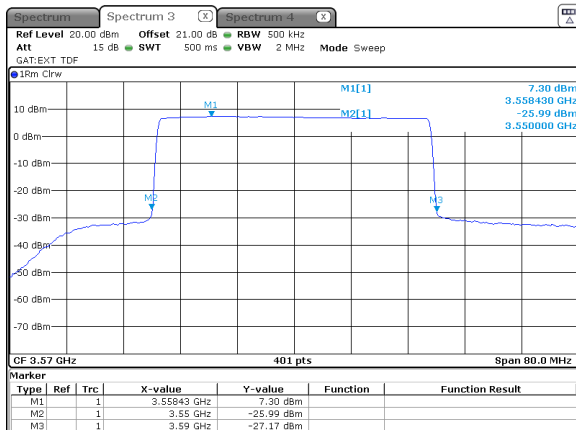
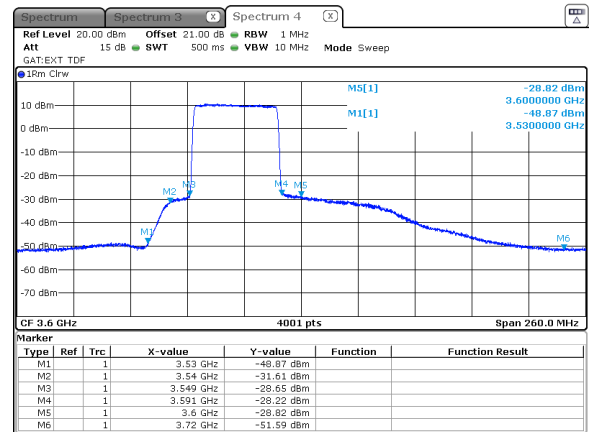
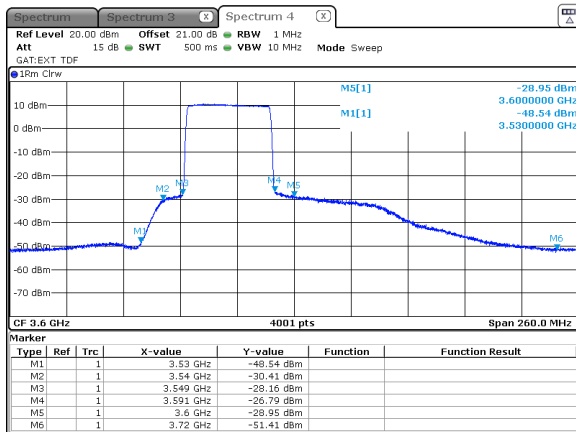
ANTENNA CHAIN:

Modulation: QPSK

40 MHz

2

Modulation: 256QAM





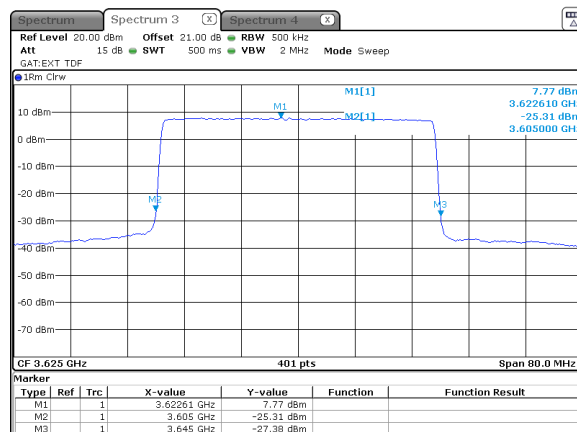
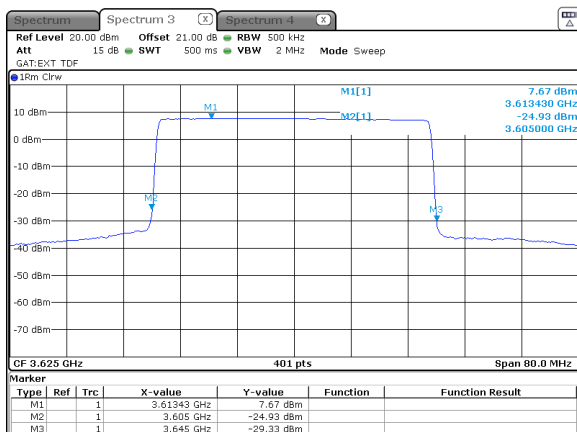
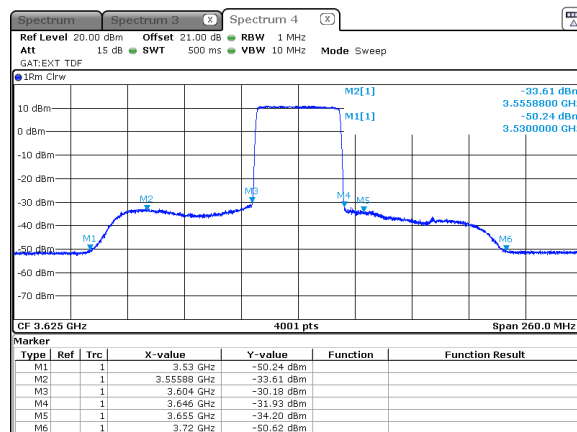
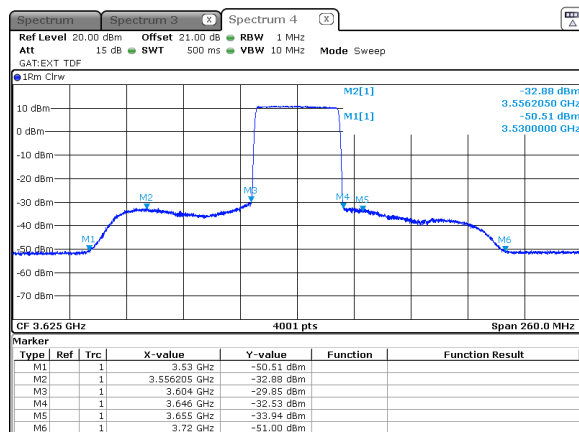
HERMON LABORATORIES

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.15 Emission outside the fundamental test results at mid carrier frequency

CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK

40 MHz
1
Modulation: 256QAM





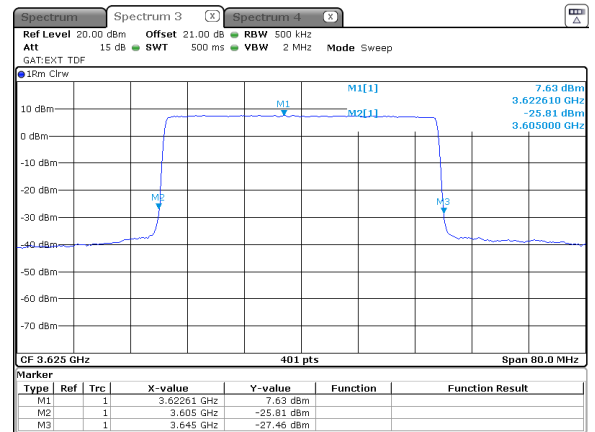
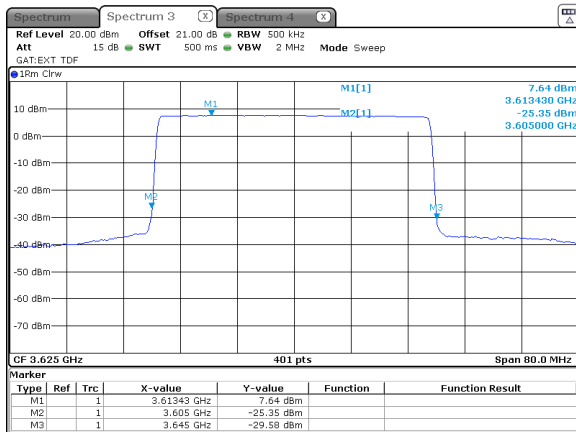
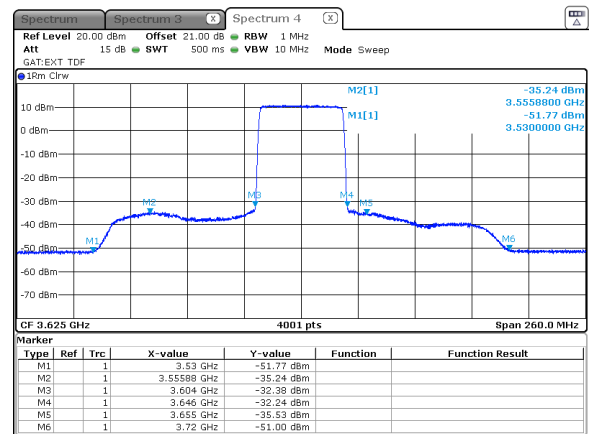
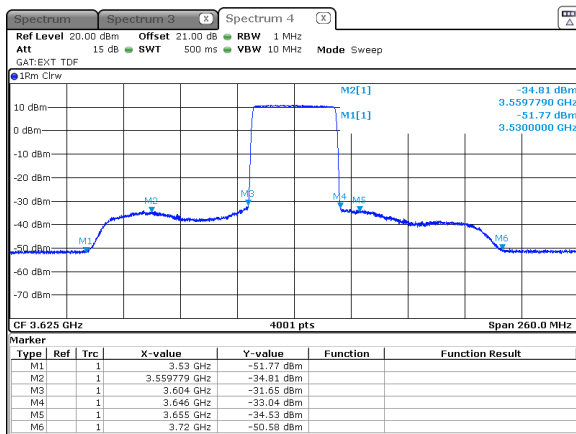
HERMON LABORATORIES

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.16 Emission outside the fundamental test results at mid carrier frequency

CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK

40 MHz
2
Modulation: 256QAM





HERMON LABORATORIES

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.17 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING:

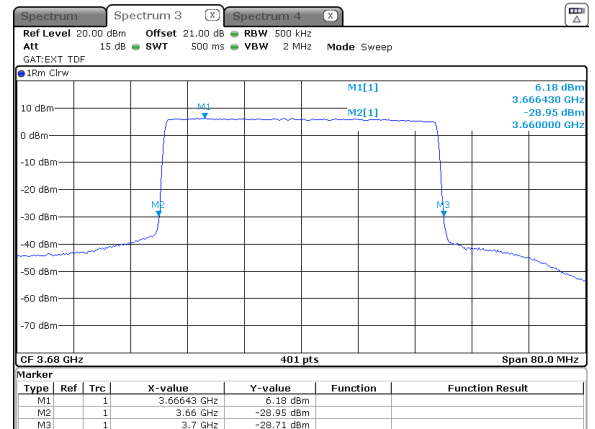
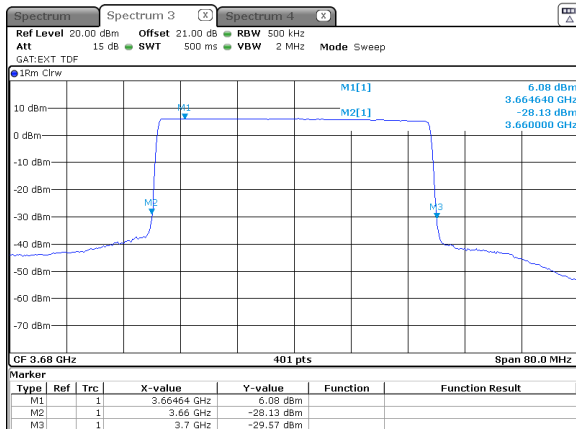
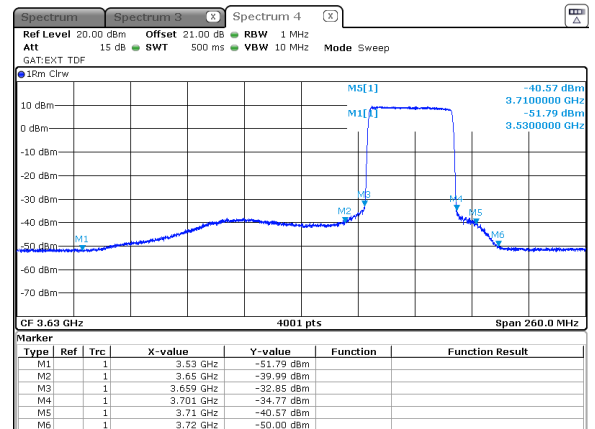
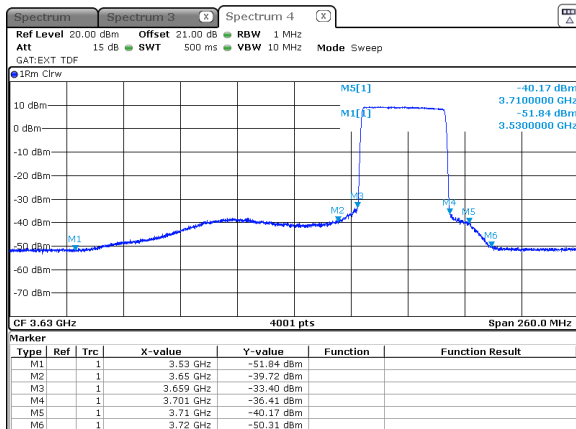
ANTENNA CHAIN:

Modulation: QPSK

40 MHz

1

Modulation: 256QAM





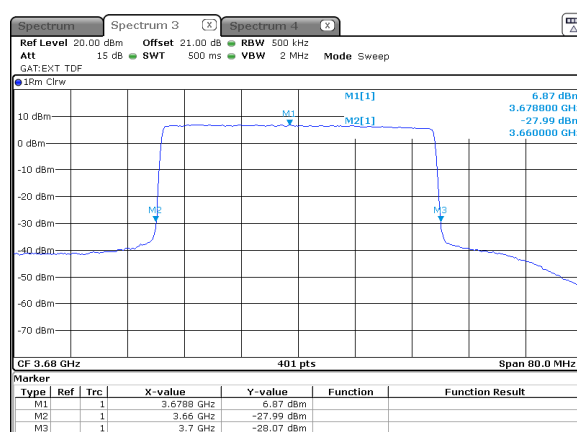
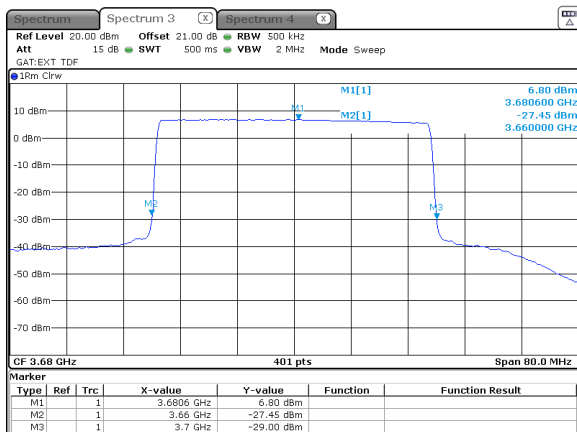
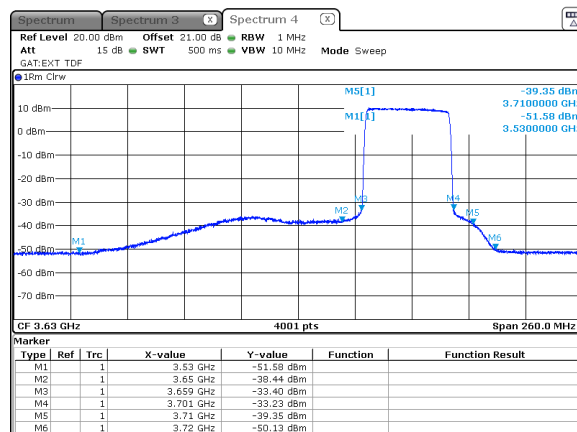
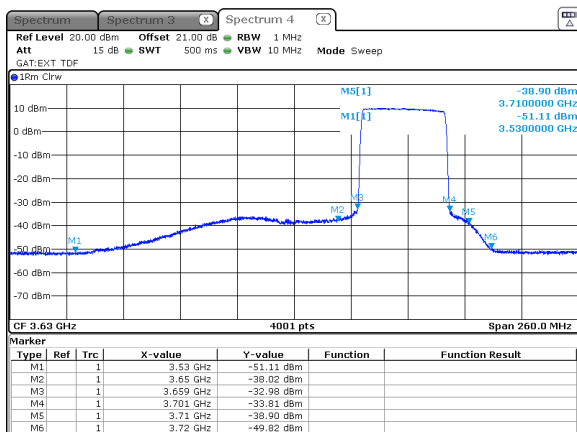
HERMON LABORATORIES

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.18 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK

40 MHz
2
Modulation: 256QAM





Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 17-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

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	EIRP of spurious, dBm	Equivalent field strength limit @ 3m, dB(μV/m)***
0.09 – below 3530.0	-40.0	55.2
3720.0 – 10th harmonic*	-40.0	55.2

*** - 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.



Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 17-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

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

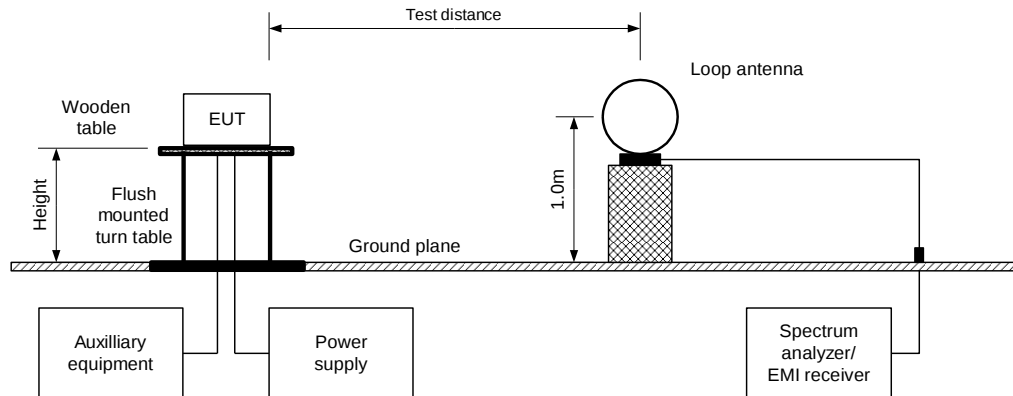
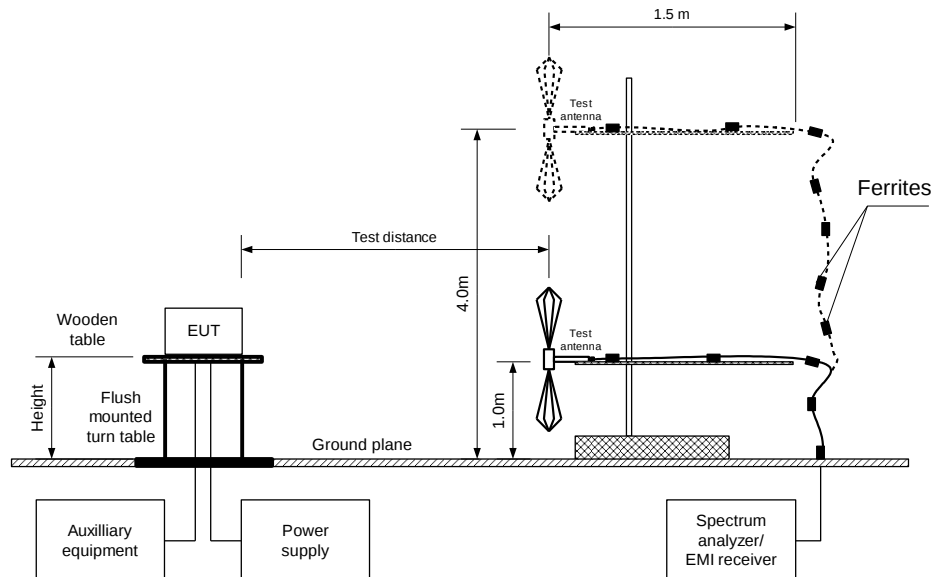


Figure 7.5.2 Setup for spurious emission field strength measurements above 30 MHz





Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 17-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Table 7.5.2 Spurious emission field strength test results

ASSIGNED FREQUENCY RANGE: 3550 - 3700 MHz
 TEST DISTANCE: 3 m
 TEST SITE: Semi anechoic chamber
 INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz
 DETECTOR USED: Peak
 VIDEO BANDWIDTH: > Resolution bandwidth
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
 Biconilog (30 MHz – 1000 MHz)
 MODULATION: 256 QAM
 OCCUPIED BANDWIDTH: 40 MHz (Output power and PSD Worst case)
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, cm	Turn-table position**, degrees	Verdict
Low carrier frequency 3570 MHz								
No emissions found 10 dB under the limit								Pass
Mid carrier frequency 3625 MHz								
No emissions found 10 dB under the limit								Pass
High carrier frequency 3680 MHz								
No emissions found 10 dB under the limit								Pass

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

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



HERMON LABORATORIES

Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 17-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Table 7.5.3 Field strength of spurious emissions above 1 GHz within restricted bands

ASSIGNED FREQUENCY RANGE: 3550 - 3700 MHz
 TEST DISTANCE: 3 m
 TEST SITE: Semi anechoic chamber
 INVESTIGATED FREQUENCY RANGE: 0.009 – 37000 MHz
 DETECTOR USED: PEAK / AVERAGE
 VIDEO BANDWIDTH: > Resolution bandwidth
 TEST ANTENNA TYPE: Double ridged guide (above 1000 MHz)
 MODULATION: 256 QAM
 OCCUPIED BANDWIDTH: 40 MHz (Output power and PSD Worst case)
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

TRANSMITTER OUTPUT POWER SETTINGS:											
Frequency, MHz	Peak			Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict	
	Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*					
Low carrier frequency 3570 MHz											
1374.56	40.66	75.20	-34.54	40.66	55.20	-14.54	Horizontal	150	138	Pass	
Mid carrier frequency 3625 MHz											
1374.56	40.15	75.20	-35.05	40.15	55.20	-15.05	Horizontal	150	70		
High carrier frequency 3680 MHz											
1374.56	40.78	75.20	-34.42	40.78	55.20	-14.42	Horizontal	150	18		

*- 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 3903	HL 4360	HL 4933	HL 4956	HL 5112	HL 5288	HL 5908	
---------	---------	---------	---------	---------	---------	---------	--

Full description is given in Appendix A.

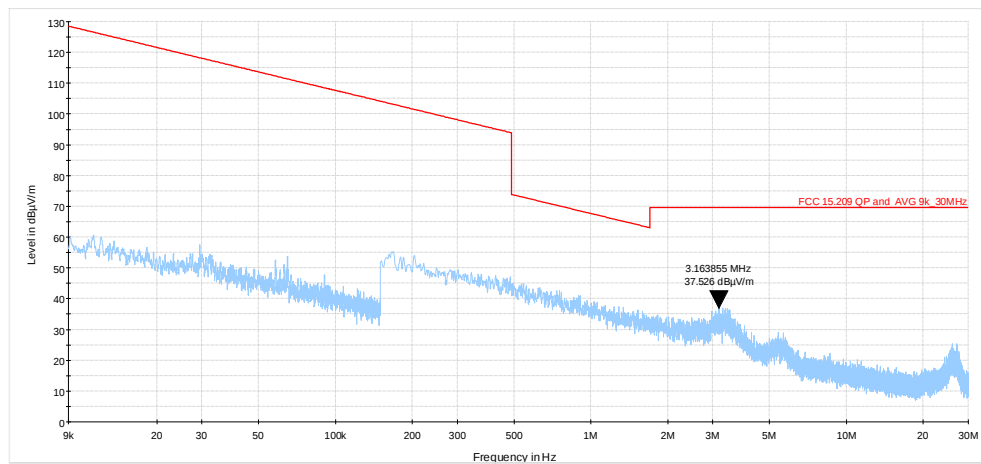


HERMON LABORATORIES

Test specification:		Section 96.41(e)(2), Radiated spurious emissions	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
17-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

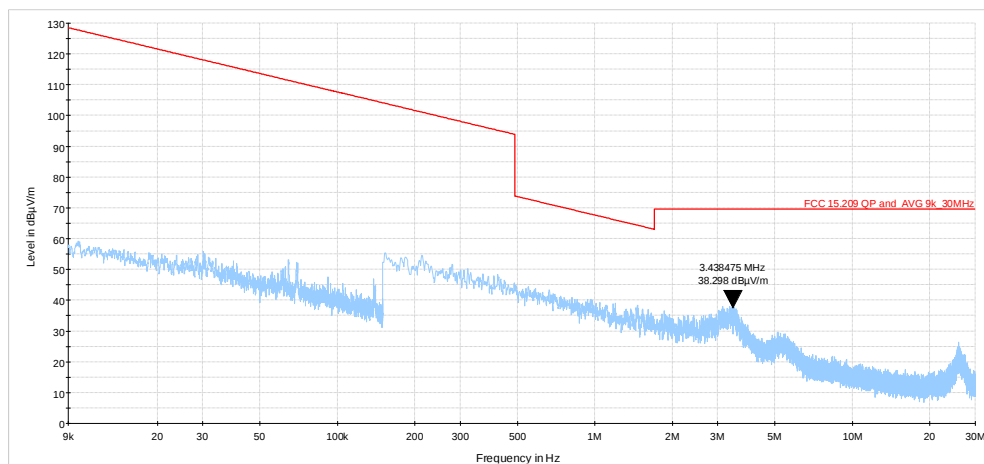
Plot 7.5.1 Radiated emission measurements in 9 kHz - 30 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
TEST DISTANCE: 3 m



Plot 7.5.2 Radiated emission measurements in 9 kHz - 30 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
TEST DISTANCE: 3 m



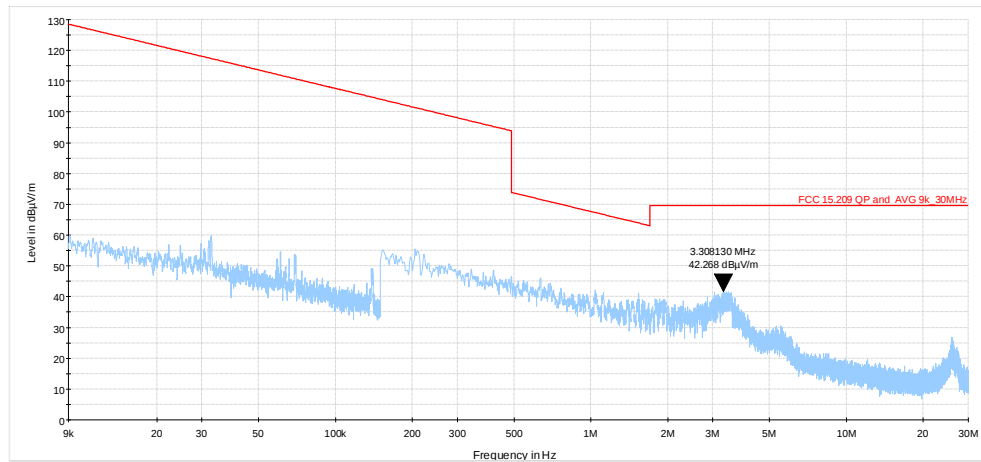


HERMON LABORATORIES

Test specification:		Section 96.41(e)(2), Radiated spurious emissions	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
17-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.5.3 Radiated emission measurements in 9 kHz - 30 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
TEST DISTANCE: 3 m



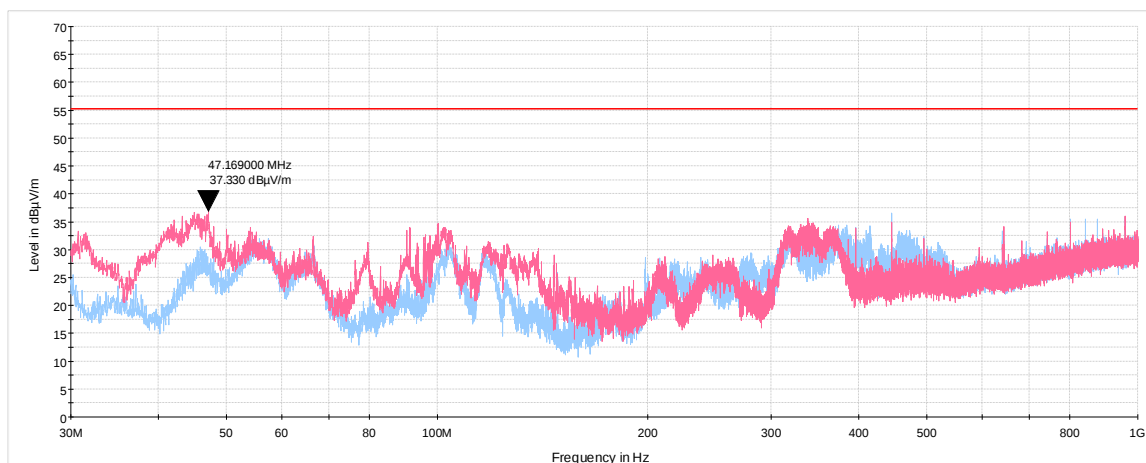


HERMON LABORATORIES

Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 17-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

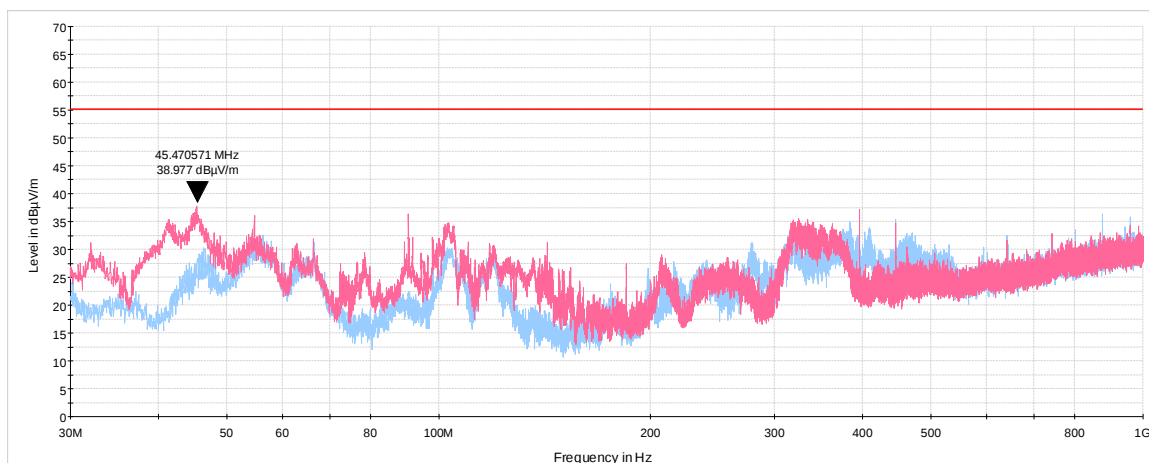
Plot 7.5.4 Radiated emission measurements in 30 - 1000 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Plot 7.5.5 Radiated emission measurements in 30 - 1000 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m





HERMON LABORATORIES

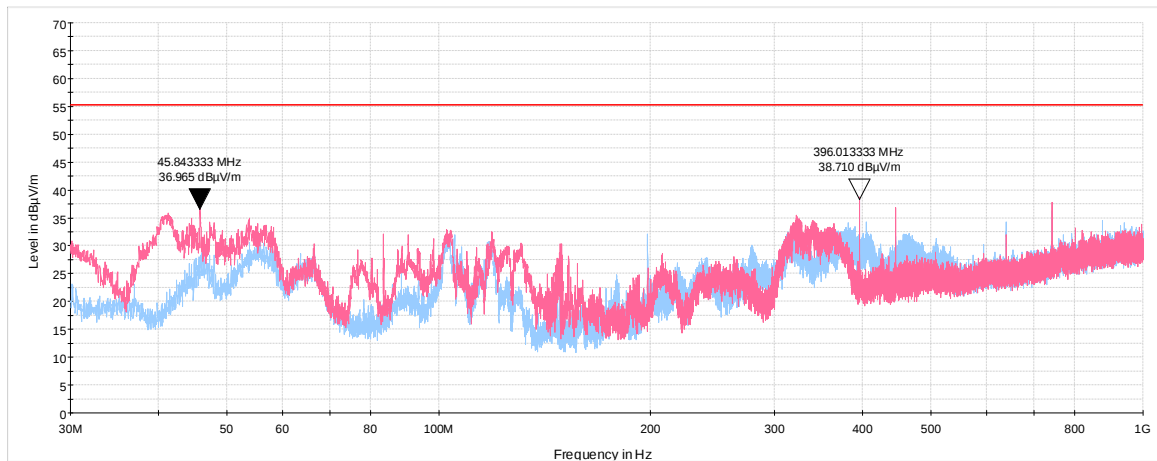
Report ID: AIRRAD_FCC.46669_Rev4.docx

Date of Issue: 25-Dec-22

Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 17-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

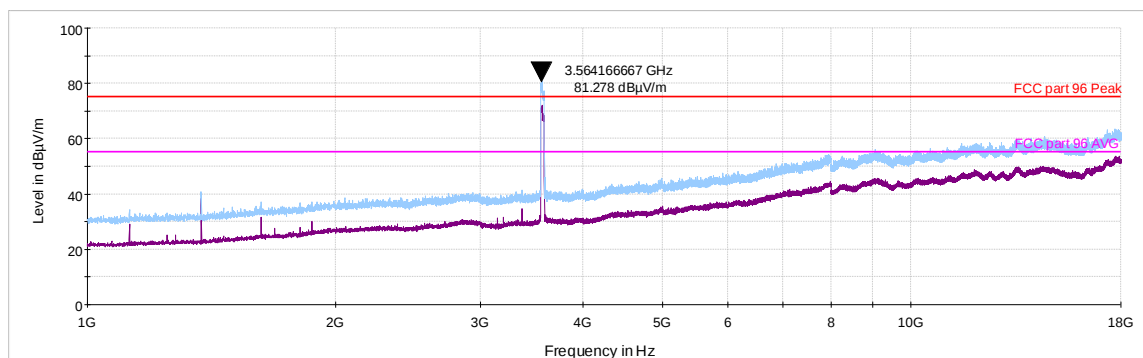
Plot 7.5.6 Radiated emission measurements in 30 - 1000 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Plot 7.5.7 Radiated emission measurements in 1000 – 18000 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



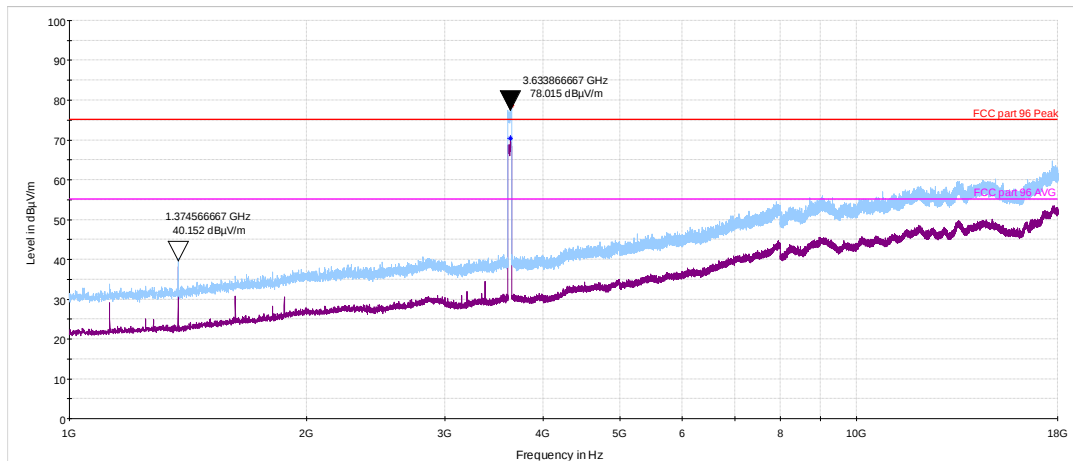
Note: 3564.1 MHz is low fundamental frequency



Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 17-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.5.8 Radiated emission measurements in 1000 – 18000 MHz range

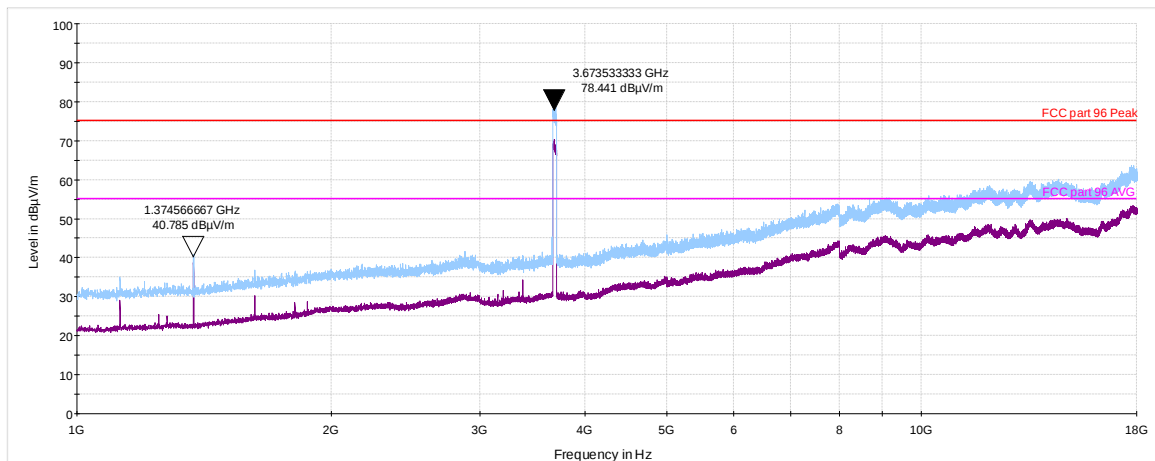
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Note: 3633.8 MHz is mid fundamental frequency

Plot 7.5.9 Radiated emission measurements in 1000 – 18000 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



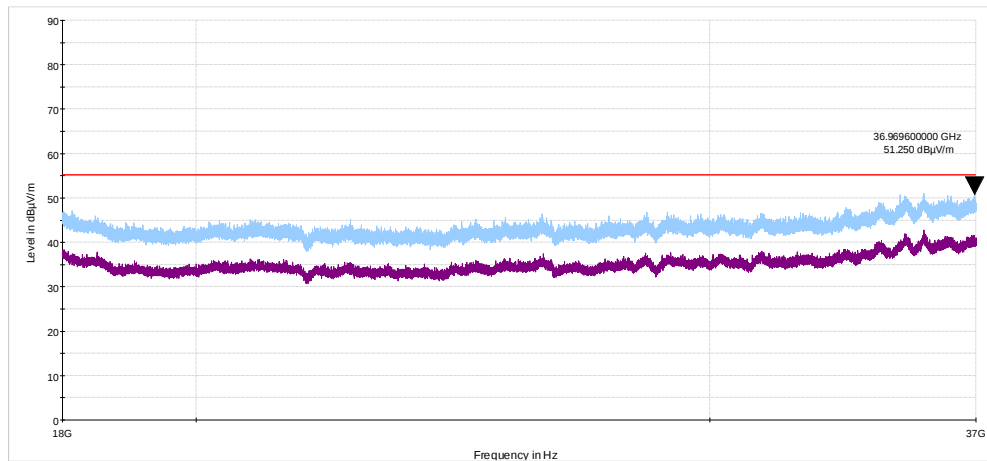
Note: 3673.5 MHz is high fundamental frequency



Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 17-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

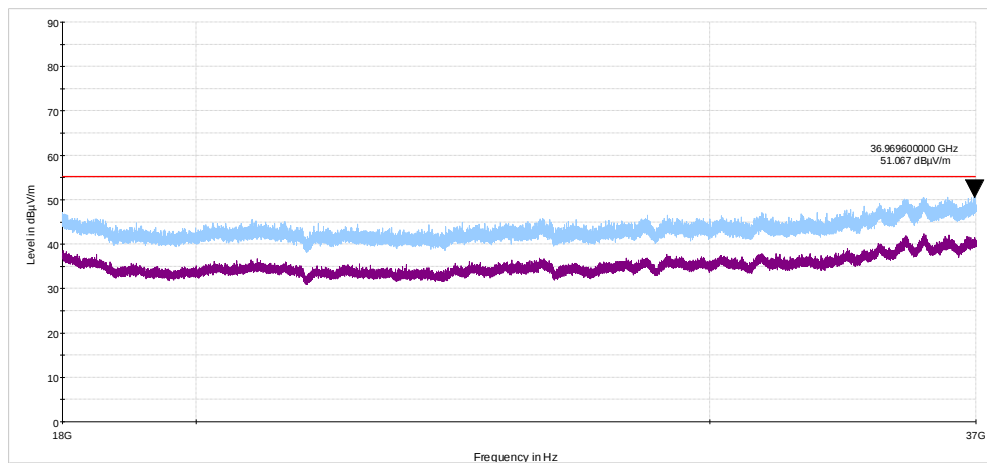
Plot 7.5.10 Radiated emission measurements in 18000 –37000 MHz range

TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Plot 7.5.11 Radiated emission measurements in 18000 –37000 MHz range

TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m





Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 17-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.5.12 Radiated emission measurements in 18000 –37000 MHz range

TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m

