



HERMON LABORATORIES

Report ID: AIRRAD_FCC.42554_CL2C_30MHz

Date of Issue: 8-Dec-21

Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.32 Emission outside the fundamental test results at mid carrier frequency

CHANNEL SPACING:

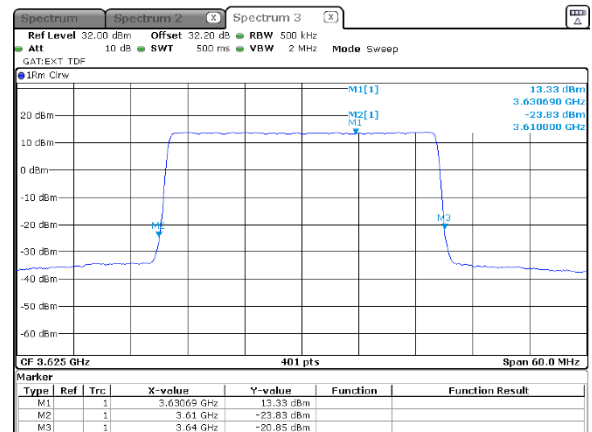
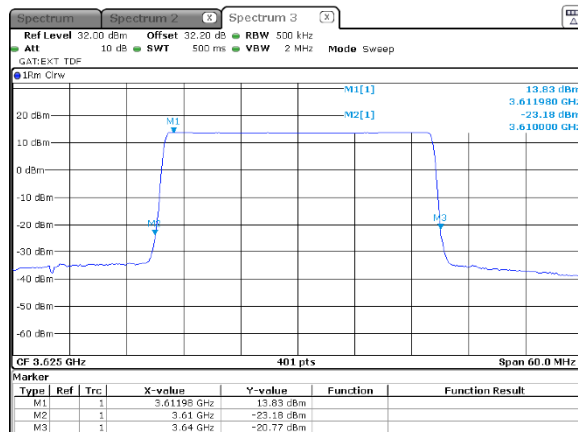
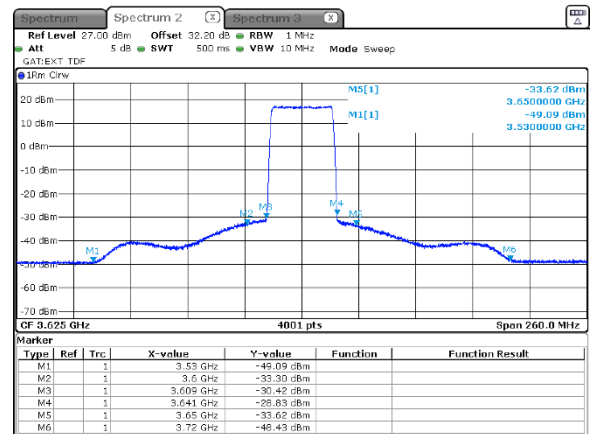
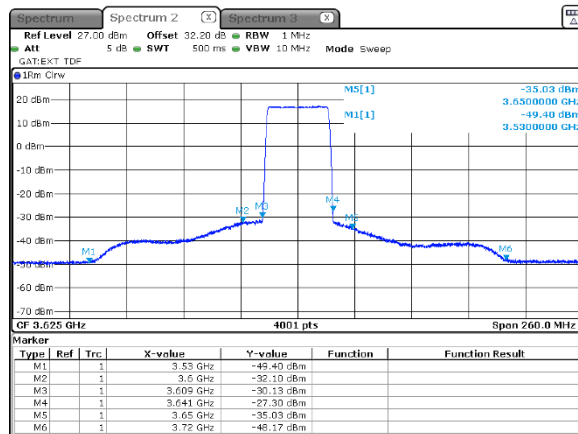
ANTENNA CHAIN:

Modulation: QPSK

30 MHz

4

Modulation: 256QAM





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Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.33 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING:

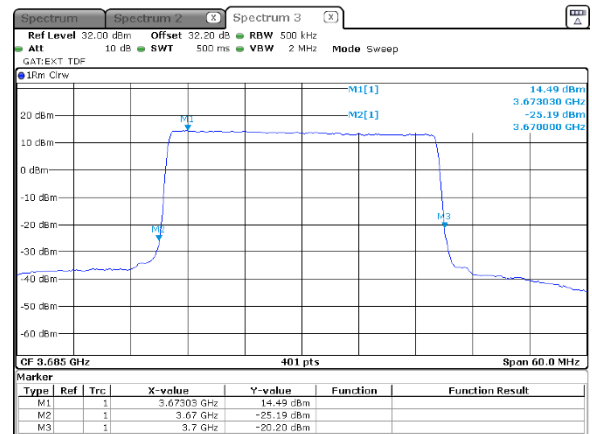
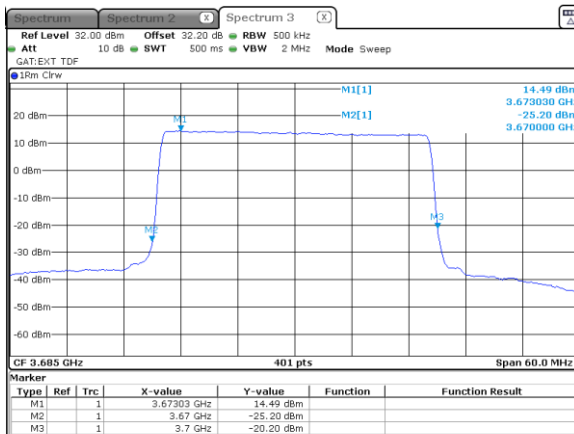
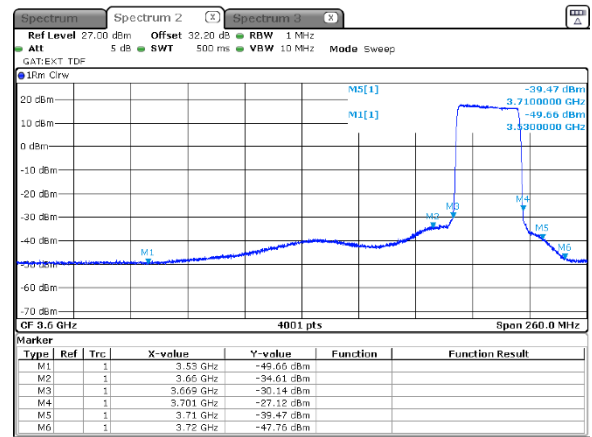
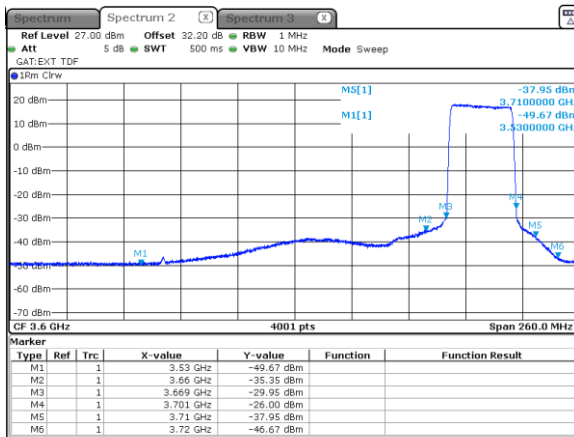
ANTENNA CHAIN:

Modulation: QPSK

30 MHz

1

Modulation: 256QAM





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Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.34 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING:

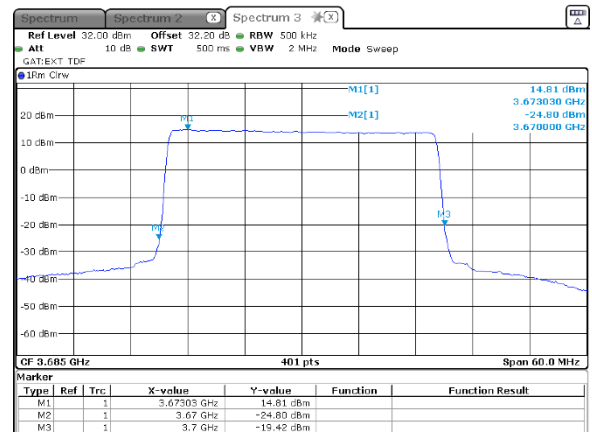
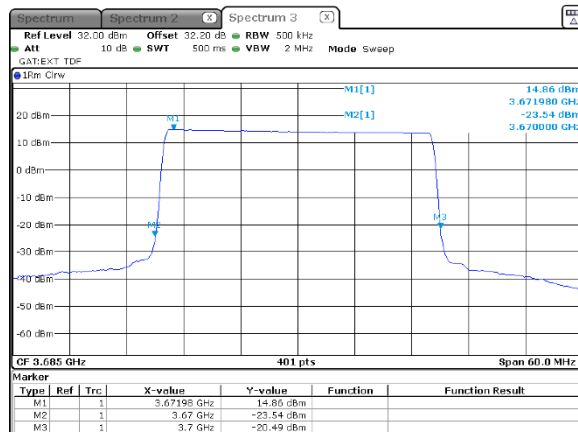
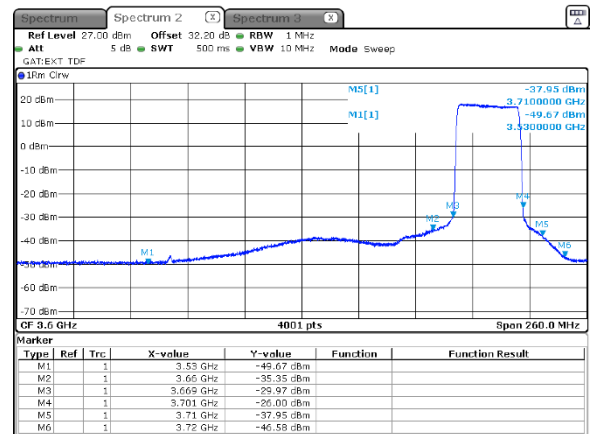
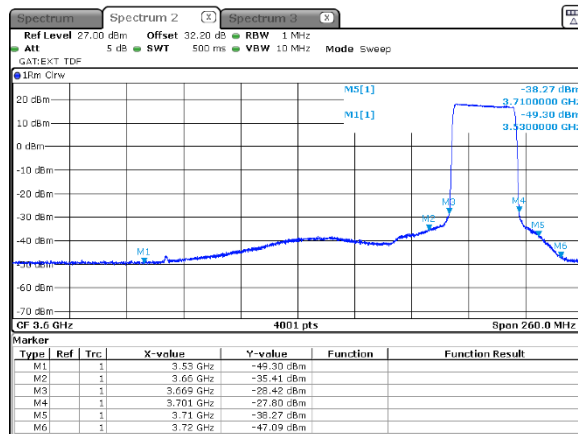
ANTENNA CHAIN:

Modulation: QPSK

30 MHz

2

Modulation: 256QAM





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Report ID: AIRRAD_FCC.42554_CL2C_30MHz

Date of Issue: 8-Dec-21

Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.35 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING:

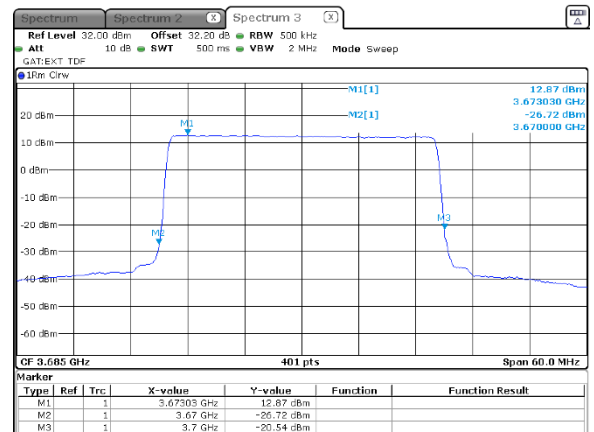
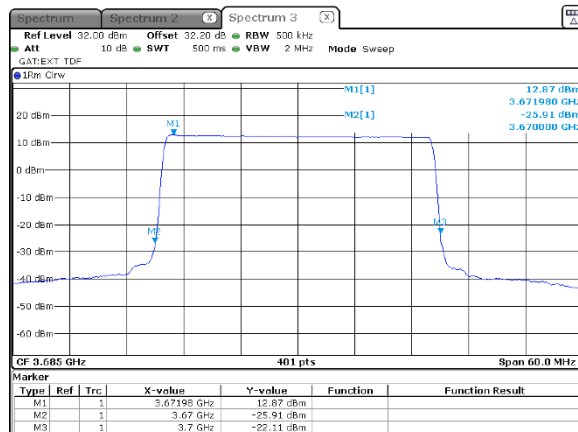
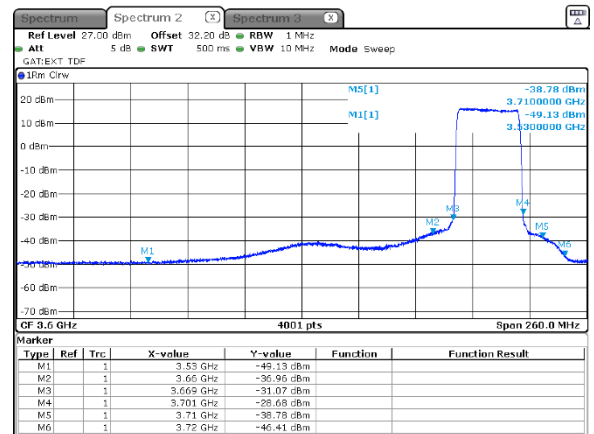
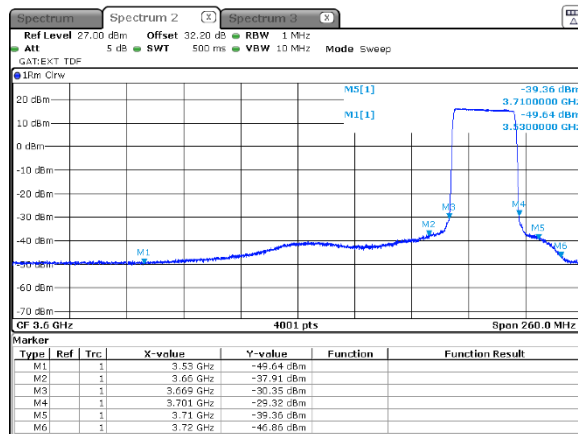
ANTENNA CHAIN:

Modulation: QPSK

30 MHz

3

Modulation: 256QAM





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Date of Issue: 8-Dec-21

Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.36 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING:

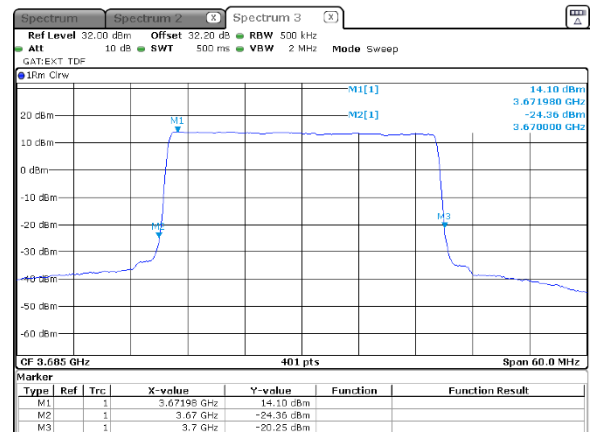
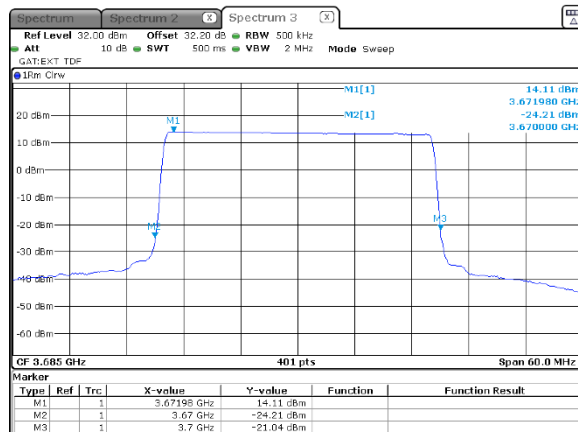
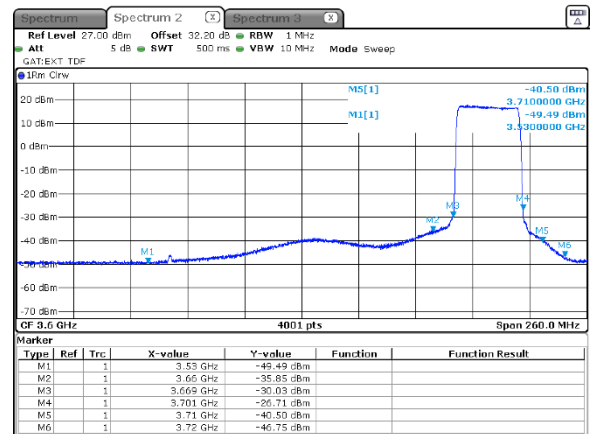
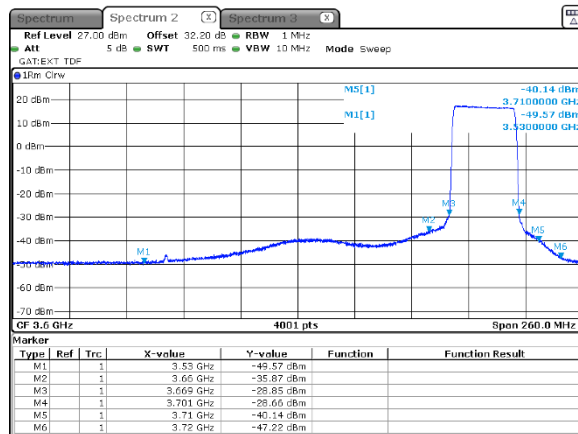
ANTENNA CHAIN:

Modulation: QPSK

30 MHz

4

Modulation: 256QAM





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Report ID: AIRRAD_FCC.42554_CL2C_30MHz

Date of Issue: 8-Dec-21

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.37 Emission outside the fundamental test results in 3470 - 3730 GHz range at low carrier frequency

CHANNEL SPACING:

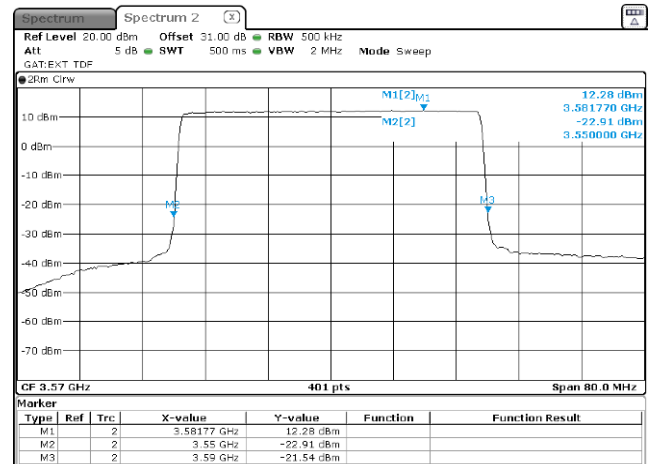
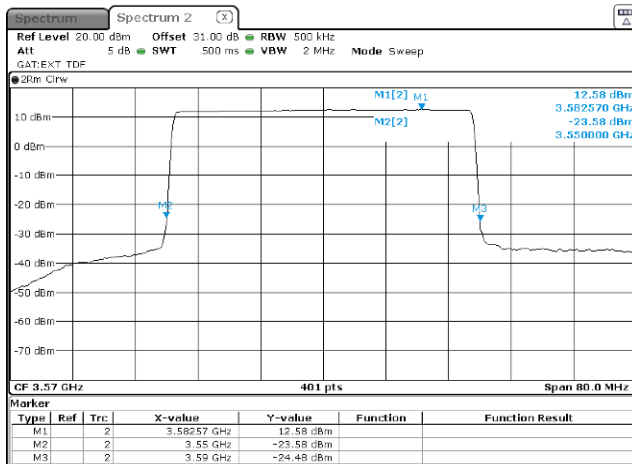
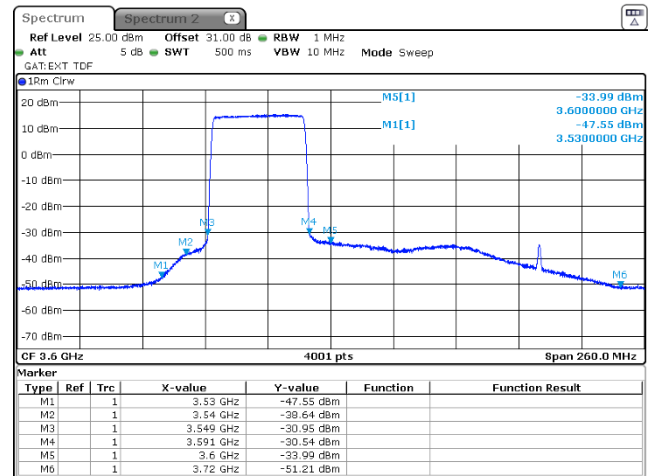
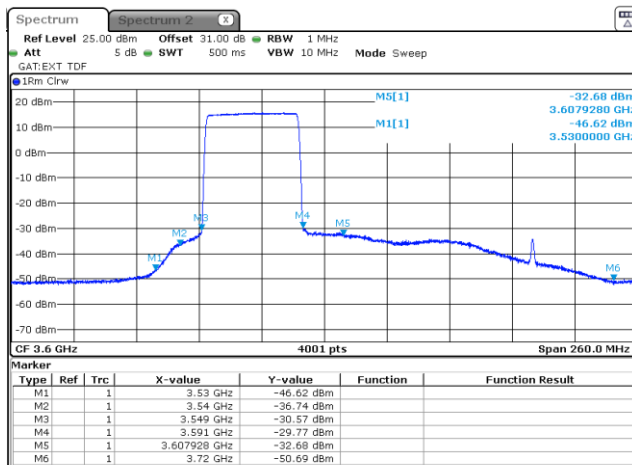
ANTENNA CHAIN:

Modulation: QPSK

40 MHz

1

Modulation: 256QAM





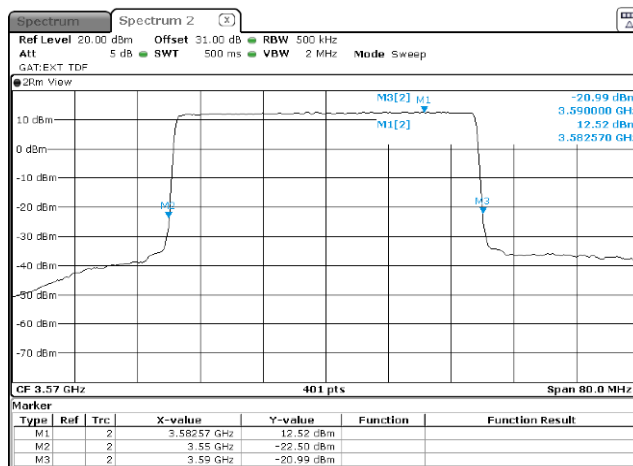
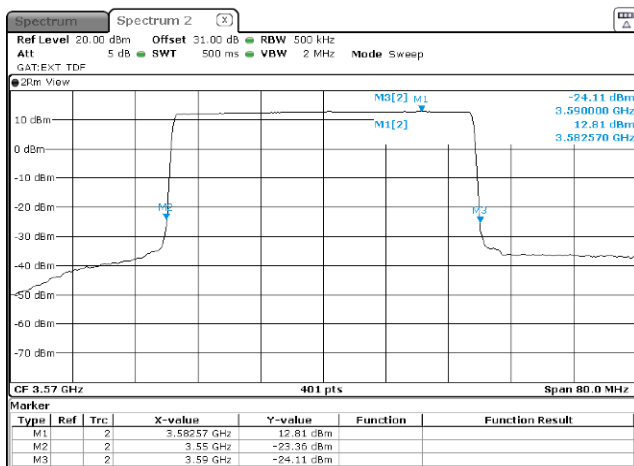
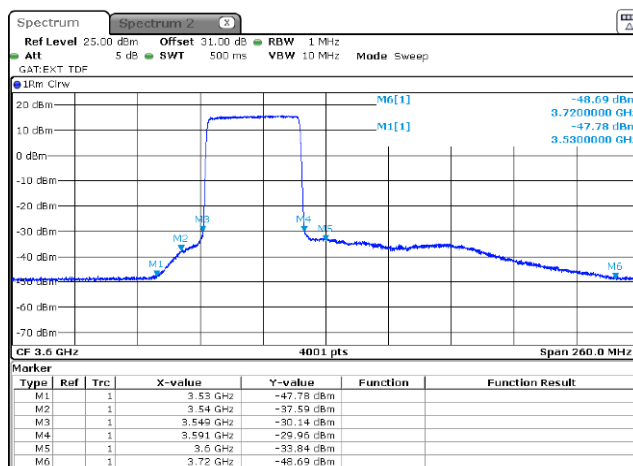
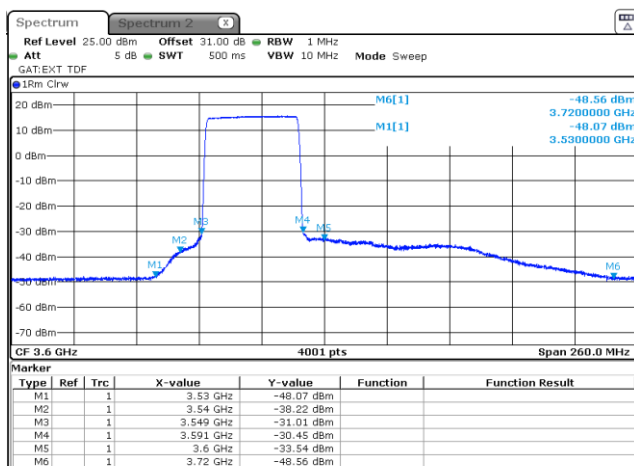
HERMON LABORATORIES

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.38 Emission outside the fundamental test results in 3470 - 3730 GHz range at low carrier frequency

CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK

40 MHz
2
Modulation: 256QAM





HERMON LABORATORIES

Report ID: AIRRAD_FCC.42554_CL2C_30MHz

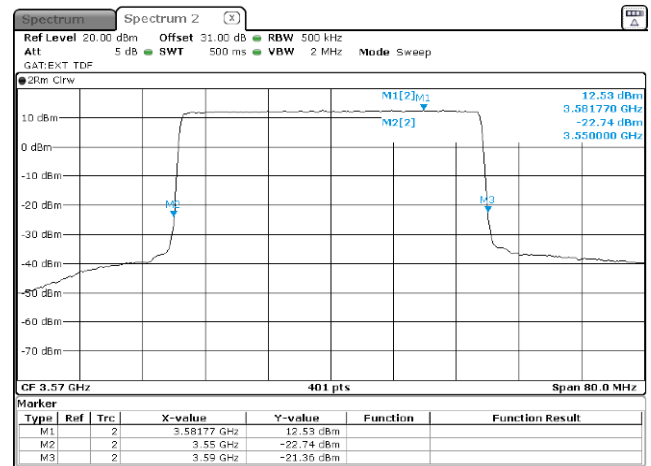
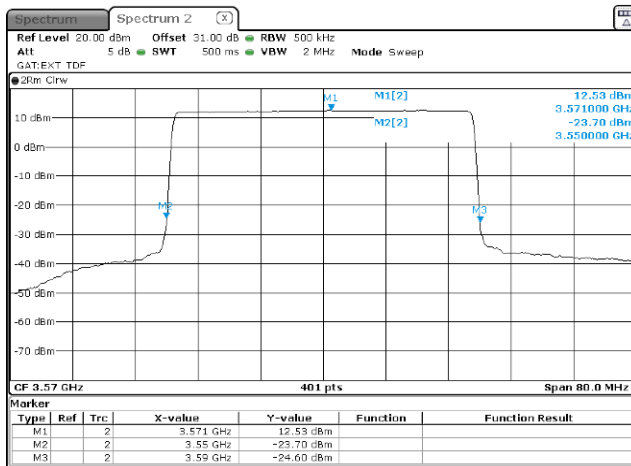
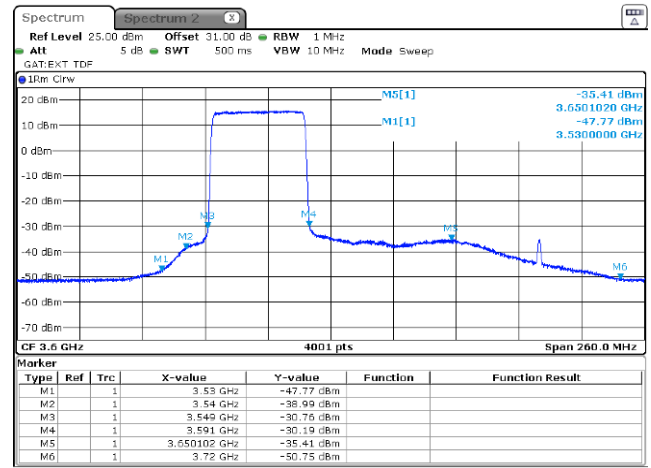
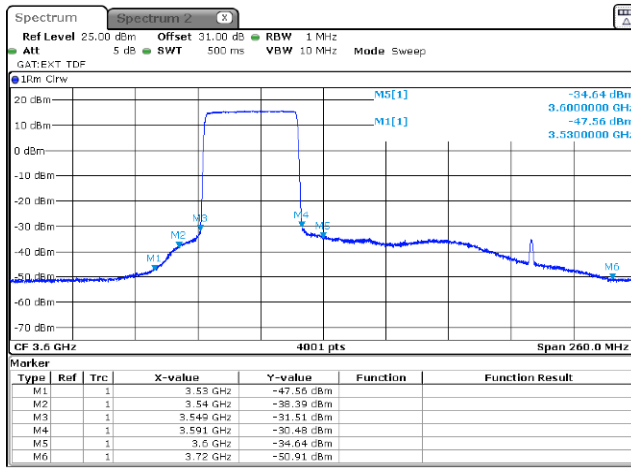
Date of Issue: 8-Dec-21

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.39 Emission outside the fundamental test results in 3470 - 3730 GHz range at low carrier frequency

CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK

40 MHz
3
Modulation: 256QAM





HERMON LABORATORIES

Report ID: AIRRAD_FCC.42554_CL2C_30MHz

Date of Issue: 8-Dec-21

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.40 Emission outside the fundamental test results in 3470 - 3730 GHz range at low carrier frequency

CHANNEL SPACING:

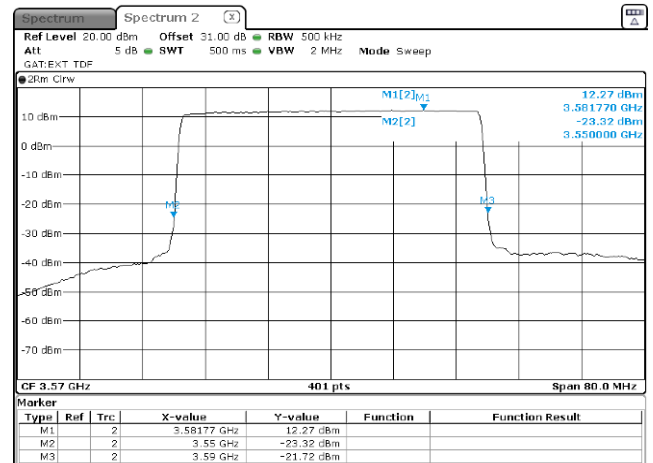
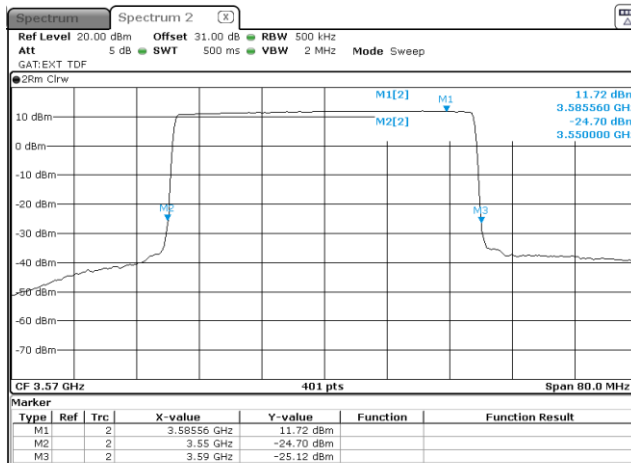
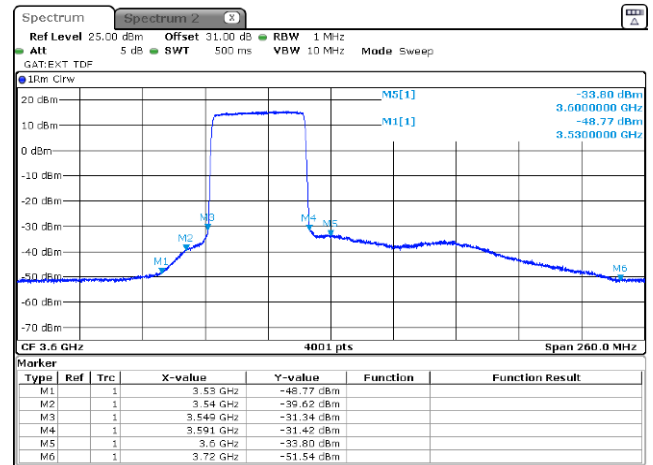
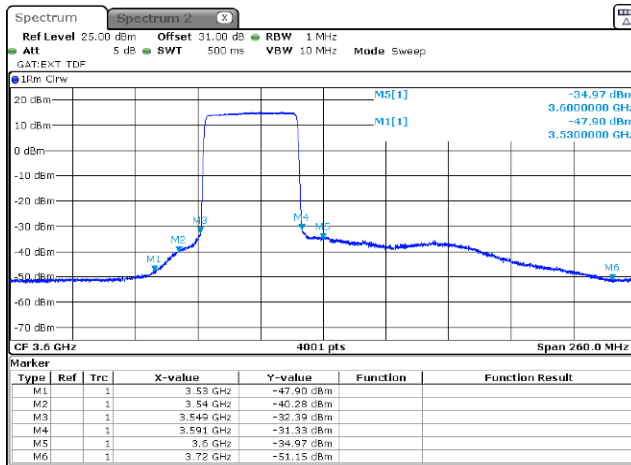
ANTENNA CHAIN:

Modulation: QPSK

40 MHz

4

Modulation: 256QAM





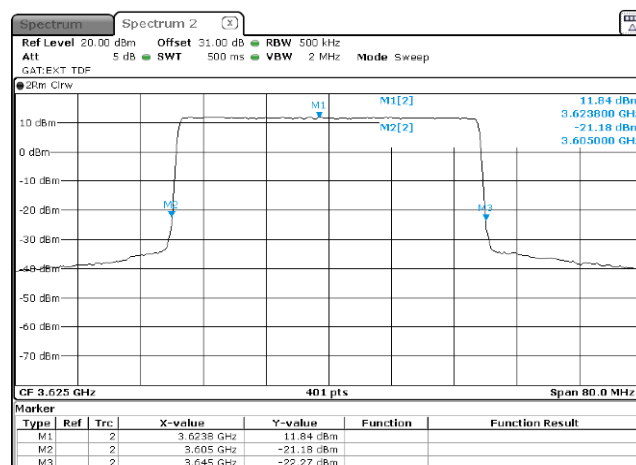
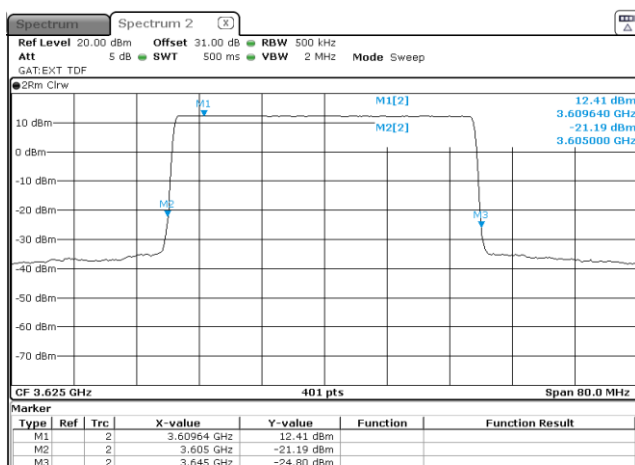
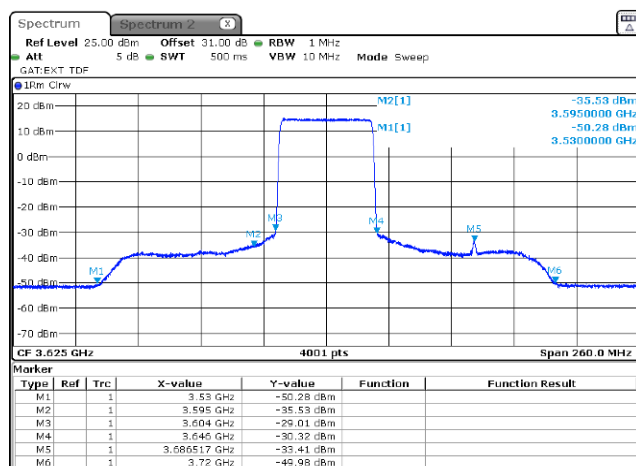
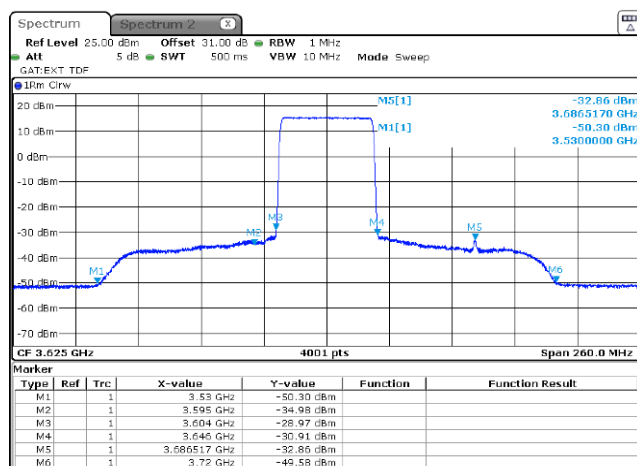
HERMON LABORATORIES

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.41 Emission outside the fundamental test results in 3495 - 3755 GHz range at mid carrier frequency

CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK

40 MHz
1
Modulation: 256QAM



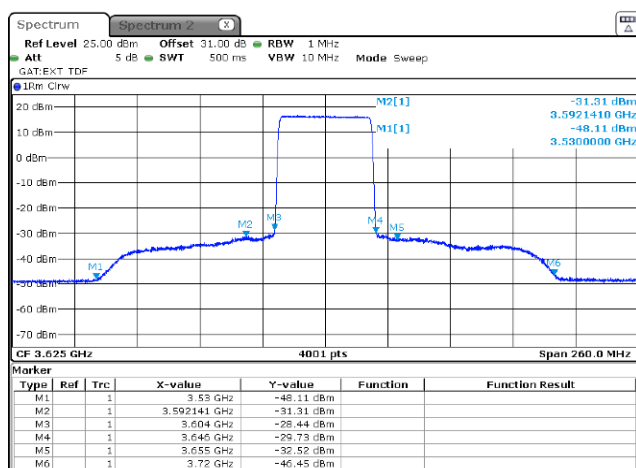


HERMON LABORATORIES

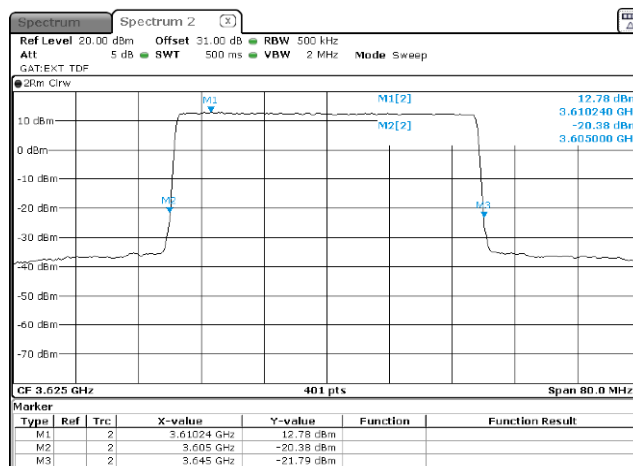
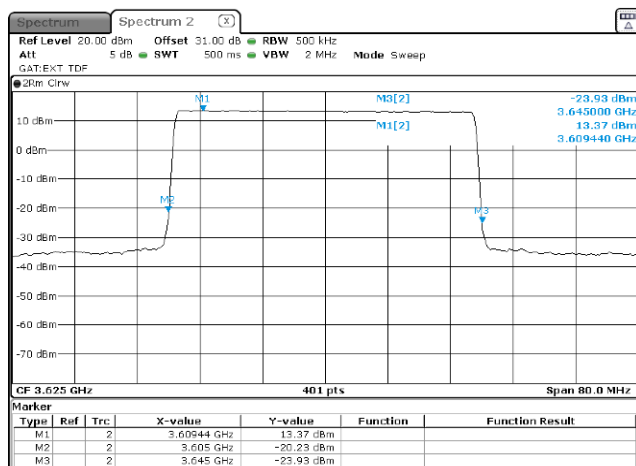
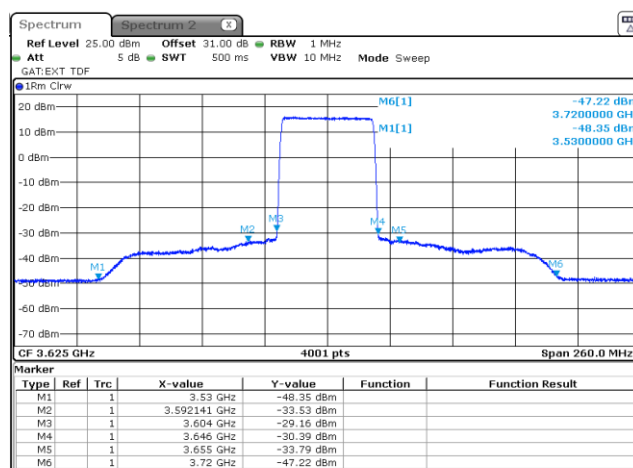
Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.42 Emission outside the fundamental test results in 3495 - 3755 GHz range at mid carrier frequency

CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



40 MHz
2
Modulation: 256QAM





HERMON LABORATORIES

Report ID: AIRRAD_FCC.42554_CL2C_30MHz

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Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.43 Emission outside the fundamental test results in 3495 - 3755 GHz range at mid carrier frequency

CHANNEL SPACING:

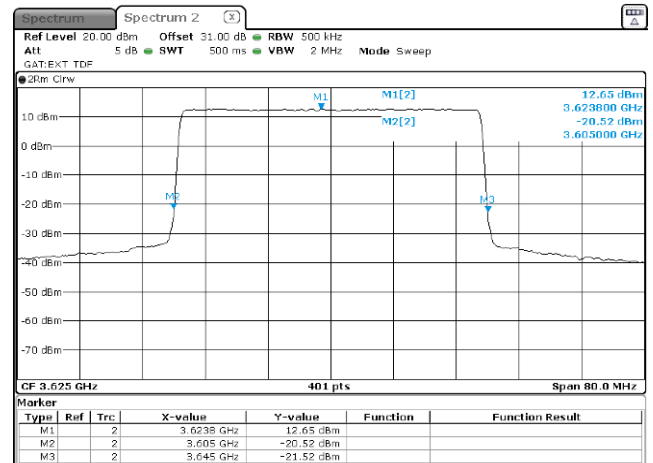
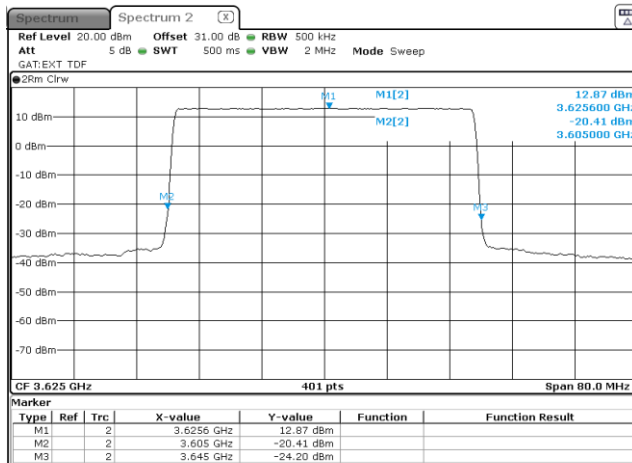
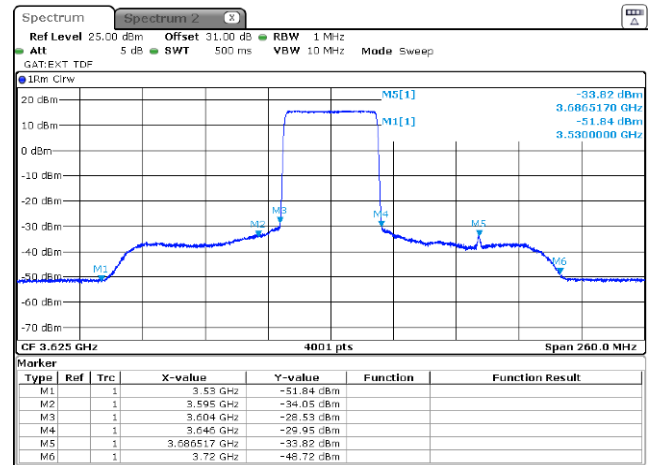
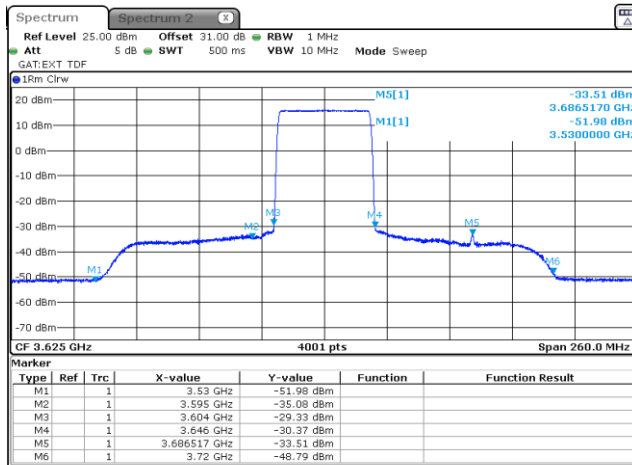
ANTENNA CHAIN:

Modulation: QPSK

40 MHz

3

Modulation: 256QAM





HERMON LABORATORIES

Report ID: AIRRAD_FCC.42554_CL2C_30MHz

Date of Issue: 8-Dec-21

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.44 Emission outside the fundamental test results in 3495 - 3755 GHz range at mid carrier frequency

CHANNEL SPACING:

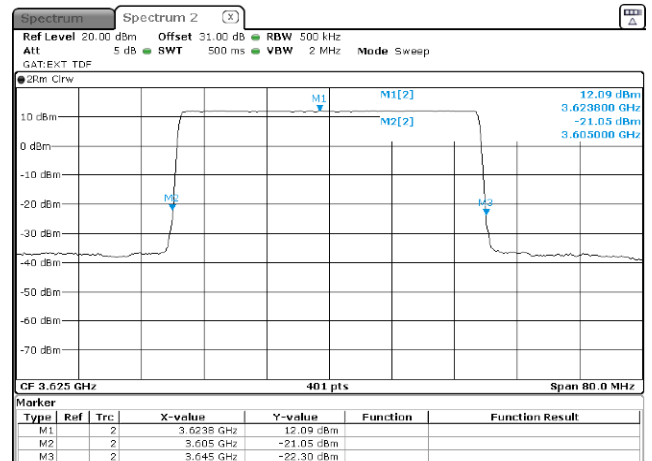
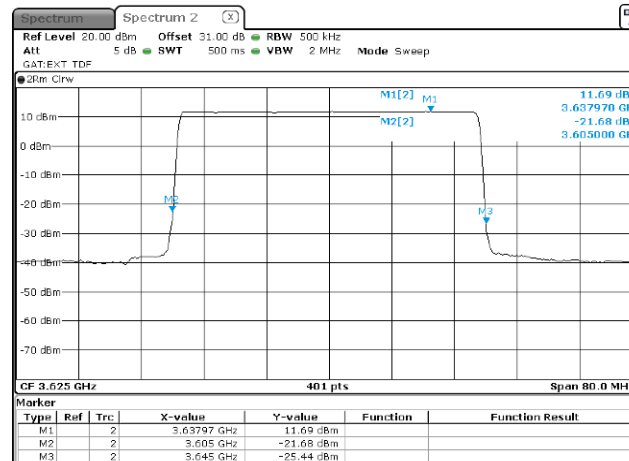
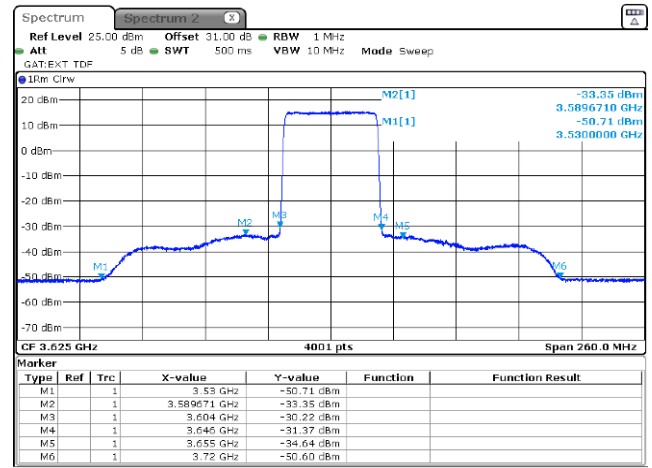
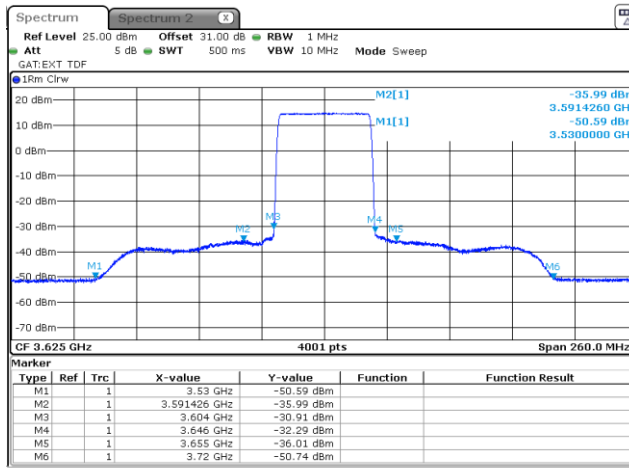
ANTENNA CHAIN:

Modulation: QPSK

40 MHz

4

Modulation: 256QAM





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Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.45 Emission outside the fundamental test results in 3500 - 3760 GHz range at high carrier frequency

CHANNEL SPACING:

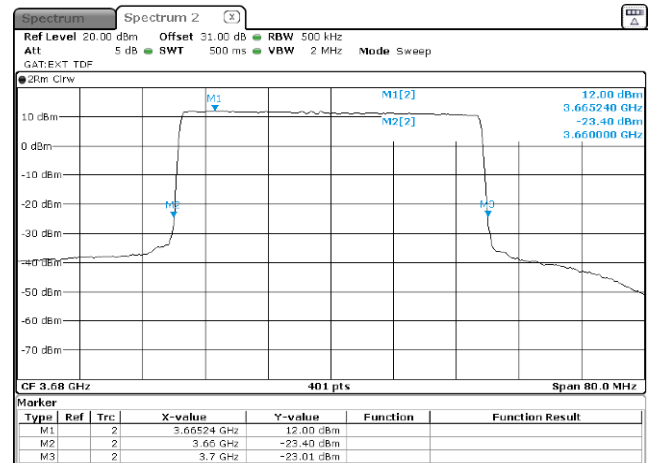
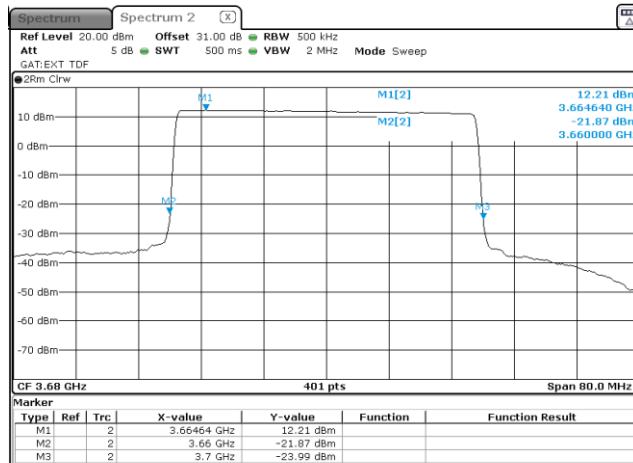
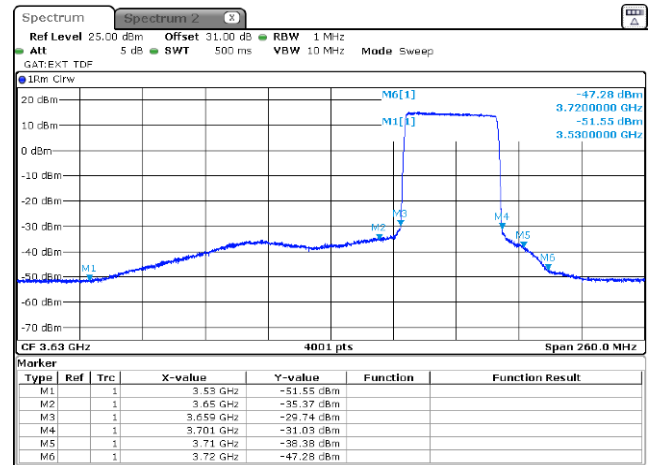
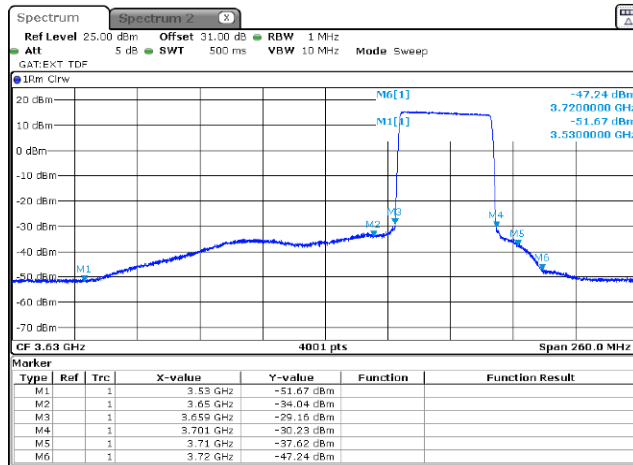
ANTENNA CHAIN:

Modulation: QPSK

40 MHz

1

Modulation: 256QAM





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Report ID: AIRRAD_FCC.42554_CL2C_30MHz

Date of Issue: 8-Dec-21

Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.46 Emission outside the fundamental test results in 3470 - 3730 GHz range at high carrier frequency

CHANNEL SPACING:

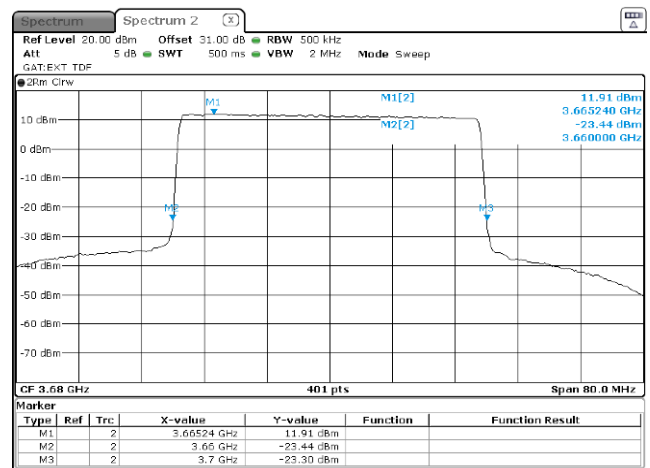
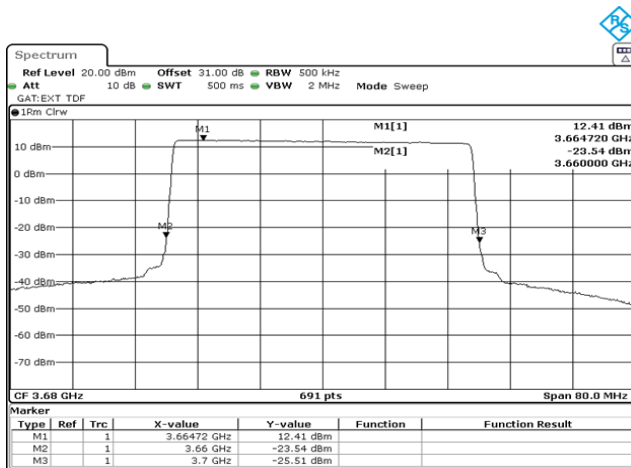
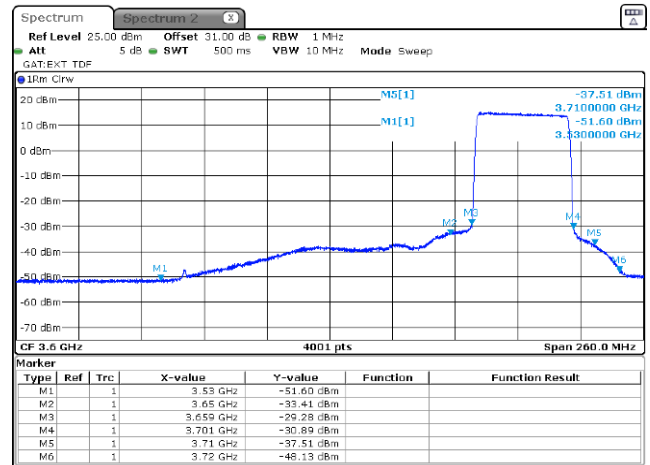
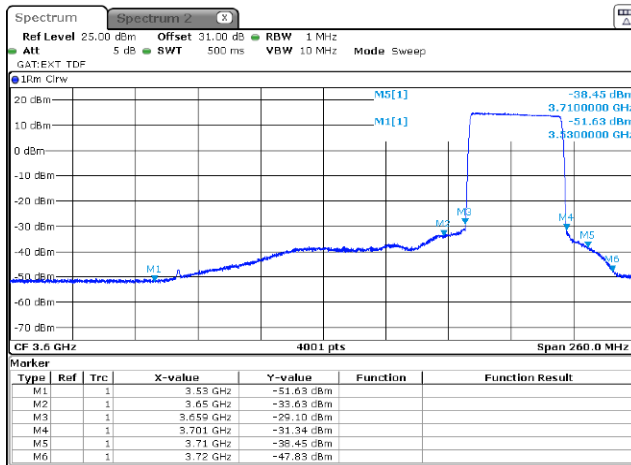
ANTENNA CHAIN:

Modulation: QPSK

40 MHz

2

Modulation: 256QAM





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Report ID: AIRRAD_FCC.42554_CL2C_30MHz

Date of Issue: 8-Dec-21

Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.47 Emission outside the fundamental test results in 3500 - 3760 GHz range at high carrier frequency

CHANNEL SPACING:

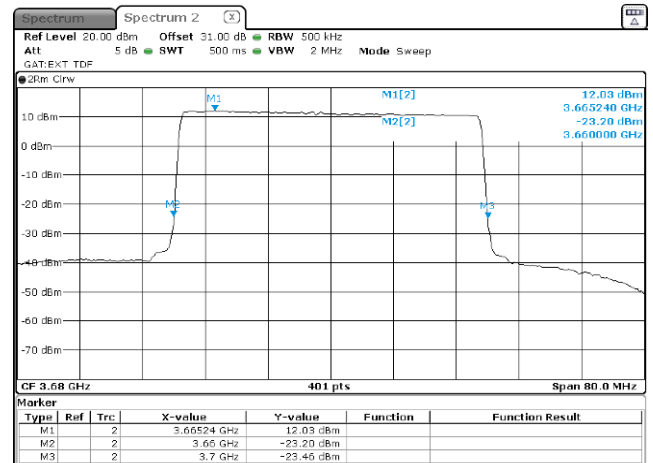
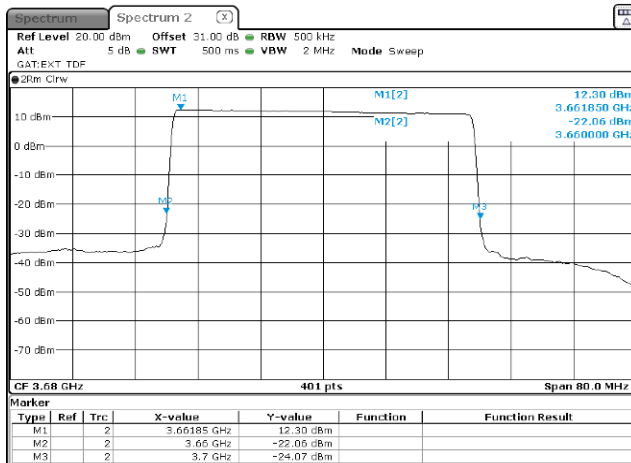
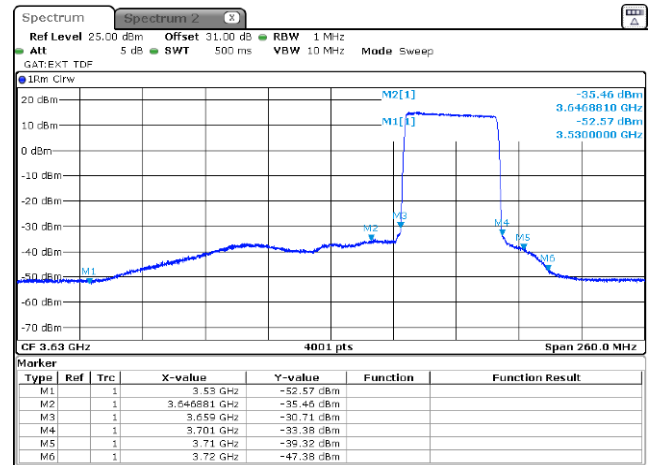
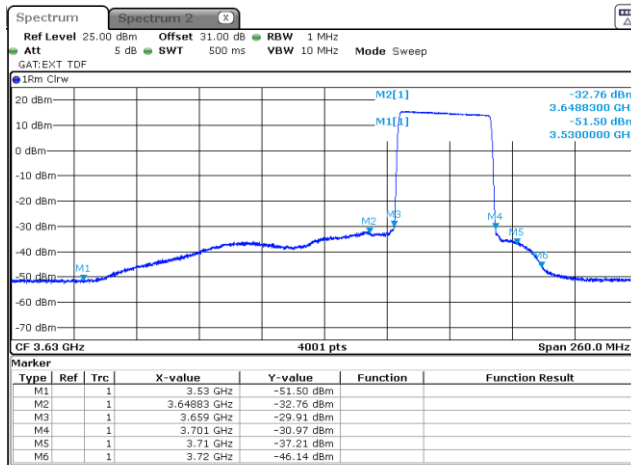
ANTENNA CHAIN:

Modulation: QPSK

40 MHz

3

Modulation: 256QAM





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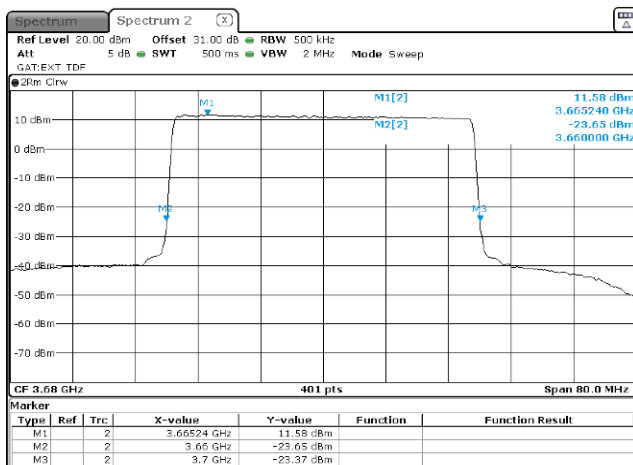
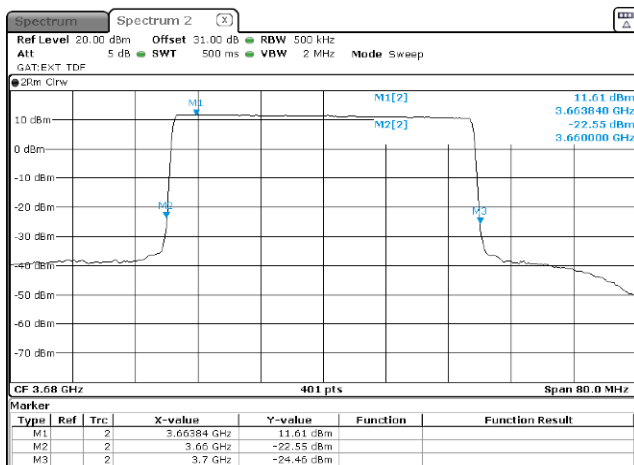
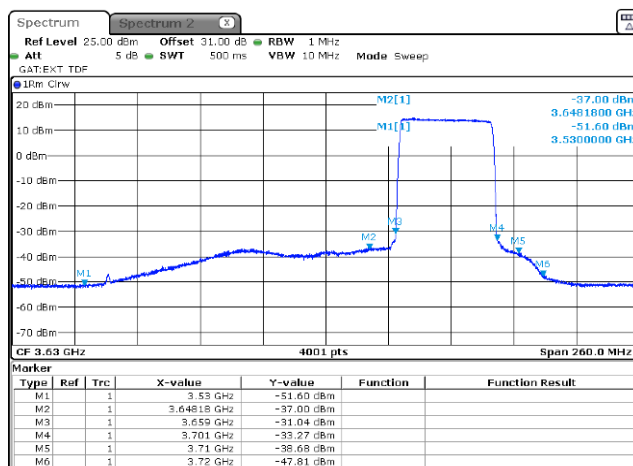
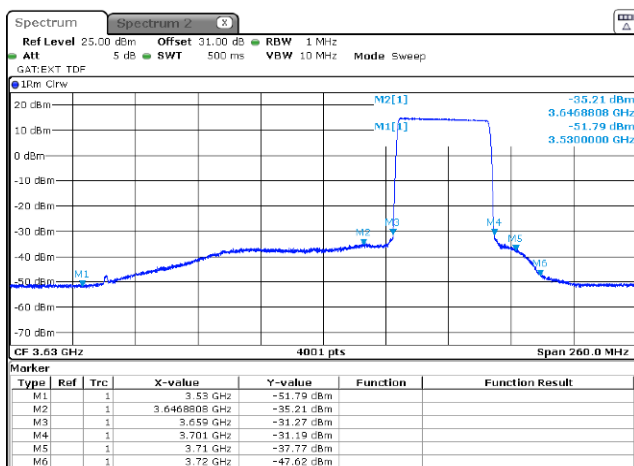
Report ID: AIRRAD_FCC.42554_CL2C_30MHz
Date of Issue: 8-Dec-21

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21 – 24-Nov-21			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.48 Emission outside the fundamental test results in 3500 - 3760 GHz range at high carrier frequency

CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK

40 MHz
4
Modulation: 256QAM





Test specification:		Section 96.41(e)(2), Radiated spurious emissions	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
25-Aug-21			
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): 25-Aug-21			
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

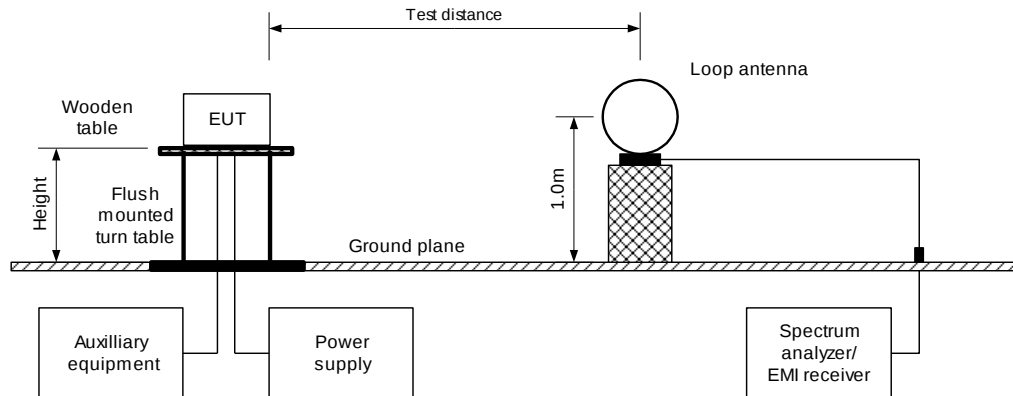
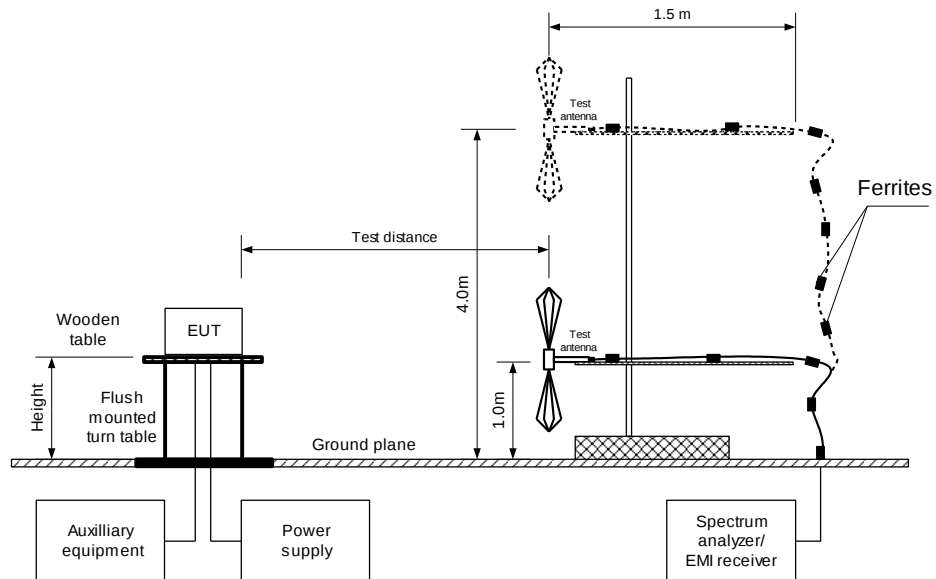


Figure 7.5.2 Setup for spurious emission field strength measurements above 30 MHz





Test specification:		Section 96.41(e)(2), Radiated spurious emissions	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
25-Aug-21			
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, m	Turn-table position**, degrees
320	43.1	55.20	-12.1	100	Horizontal	1.0	45
360	51.9	55.20	-3.3	100	Horizontal	1.0	37
400	45.8	55.20	-9.4	100	Vertical	1.0	180
500	53.2	55.20	-2.0	100	Vertical	1.0	178

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

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



Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21			
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
 DETECTOR USED: Peak
 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: Maximum										
Frequency, MHz	Antenna		Azimuth, degrees*	Peak field strength(VBW=3 MHz)			Average field strength(VBW=10 Hz)			Verdict
	Polarization	Height, m		Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB***	
Low carrier frequency										
1029.5	Vertical	1.0	46	41.6	75.2	-33.6	41.6	55.2	-13.6	Pass
Mid carrier frequency										
1069.7	Vertical	1.0	45	39.8	75.2	-35.4	39.8	55.2	-15.4	Pass
High carrier frequency										
1029.5	Vertical	1.0	53	41.5	75.2	-33.7	41.5	55.2	-13.7	Pass
2030.8	Vertical	1.0	46	39.7	75.2	-32.5	39.7	55.2	-15.5	Pass

Reference numbers of test equipment used

HL 5902	HL 0446	HL 4372	HL 0661	HL 3903	HL 4280	HL 4360	HL 4933
HL 4956	HL 5112	HL 5288					

Full description is given in Appendix A.



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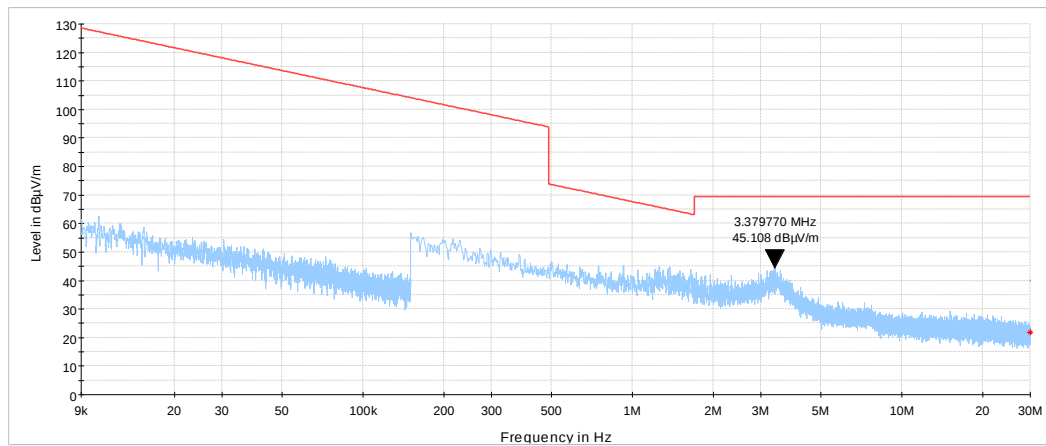
Report ID: AIRRAD_FCC.42554_CL2C_30MHz

Date of Issue: 8-Dec-21

Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

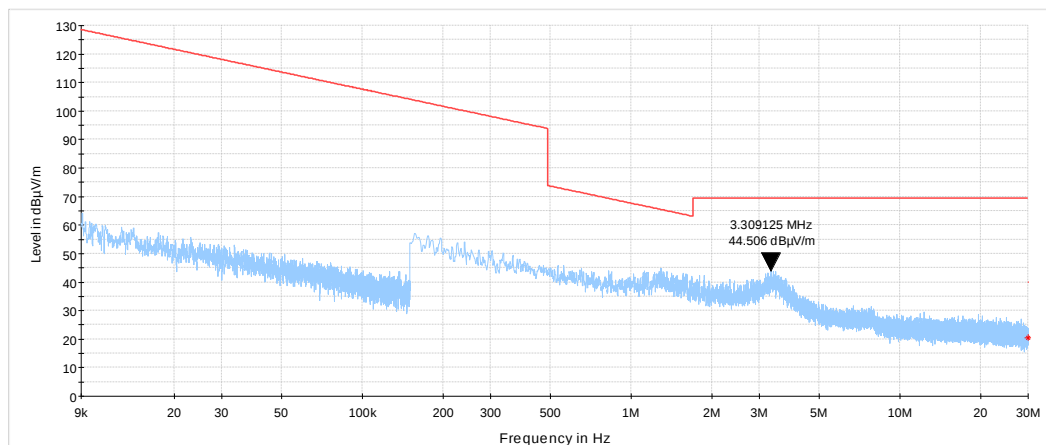
Plot 7.5.1 Radiated emission measurements in 9 kHz - 30 MHz range

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





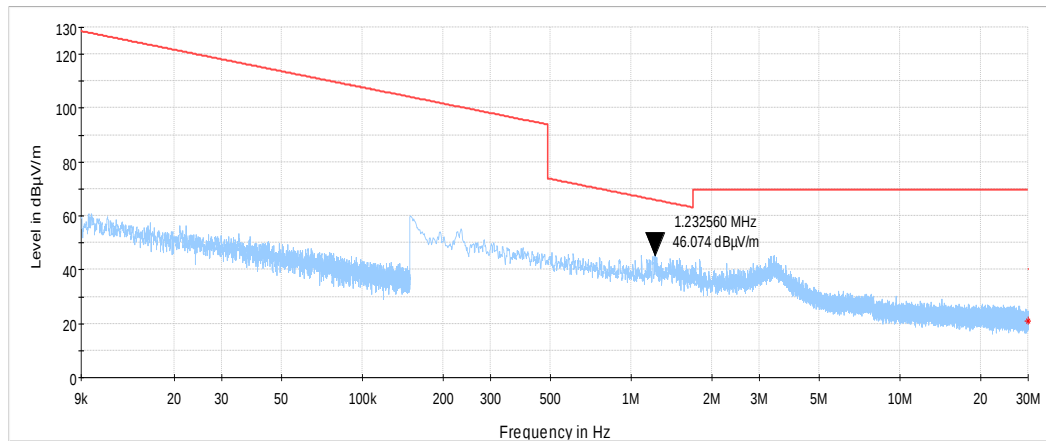
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Report ID: AIRRAD_FCC.42554_CL2C_30MHz
Date of Issue: 8-Dec-21

Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21			
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





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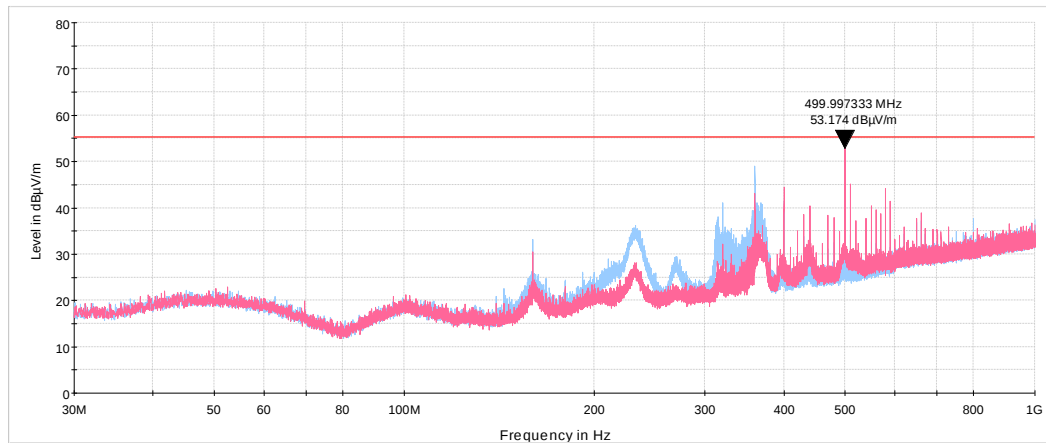
Report ID: AIRRAD_FCC.42554_CL2C_30MHz

Date of Issue: 8-Dec-21

Test specification: Section 96.41(e)(2), Radiated spurious emissions			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 25-Aug-21			
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

