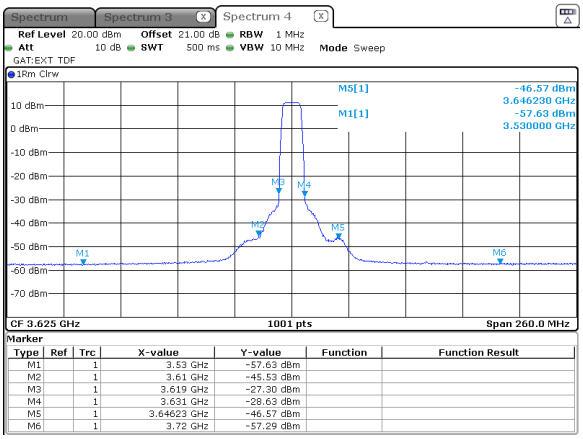
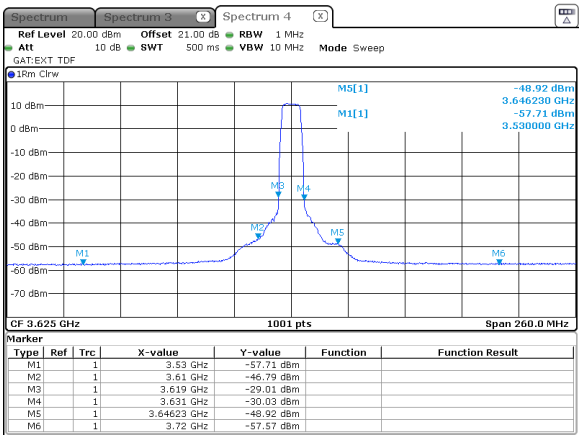
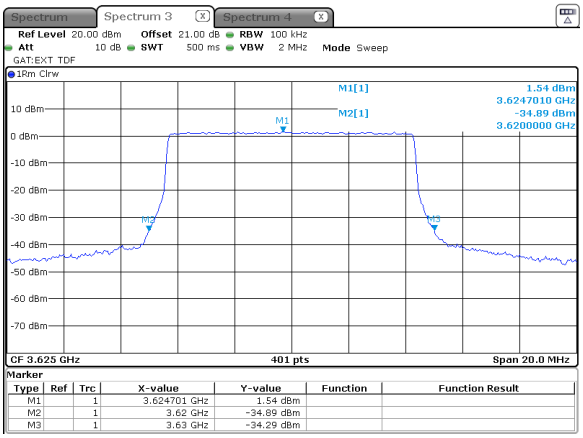
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

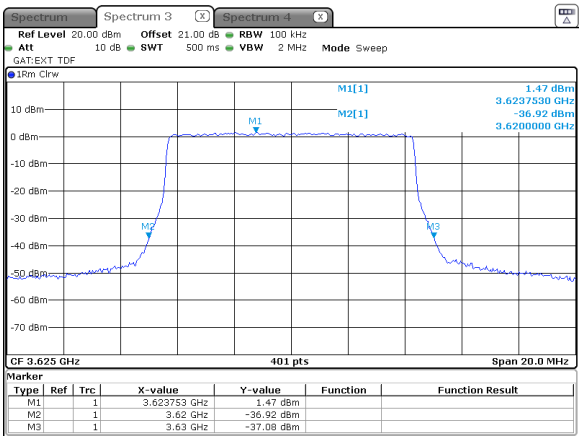
Plot 7.4.4 Emission outside the fundamental test results at mid carrier frequency

CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 2
Modulation: QPSK **Modulation: 256QAM**





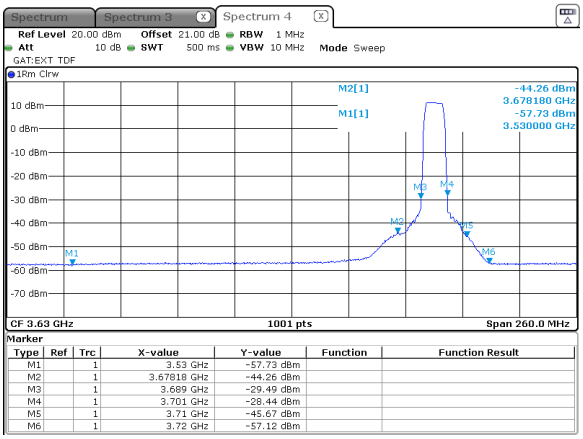


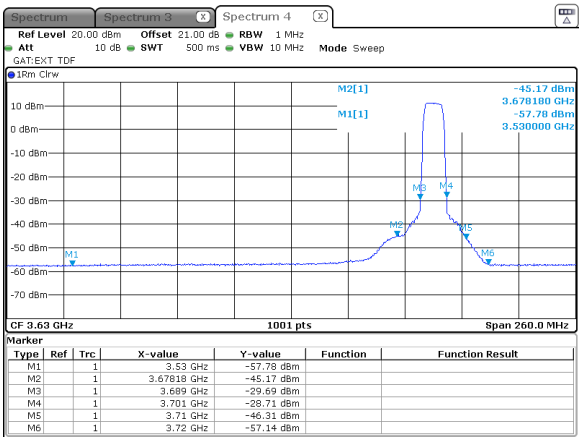


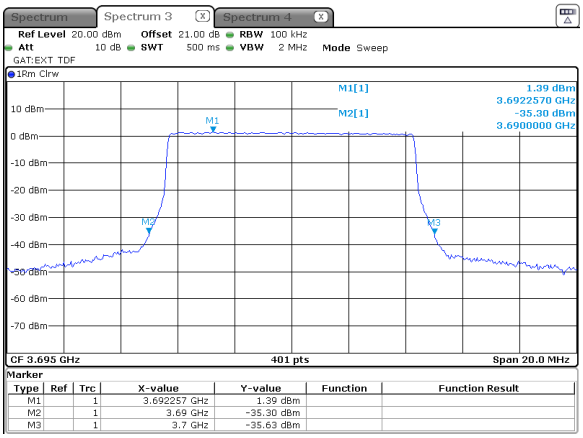
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

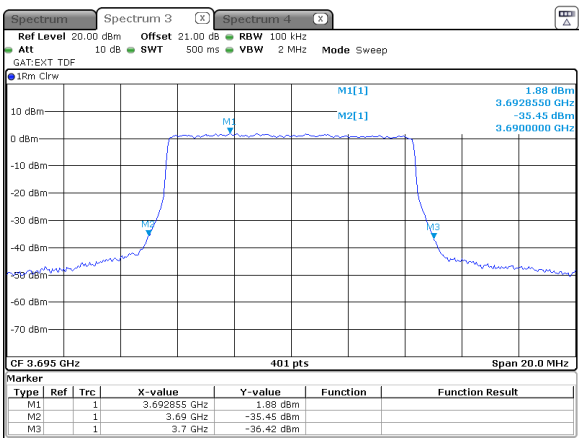
Plot 7.4.5 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1
Modulation: QPSK **Modulation: 256QAM**





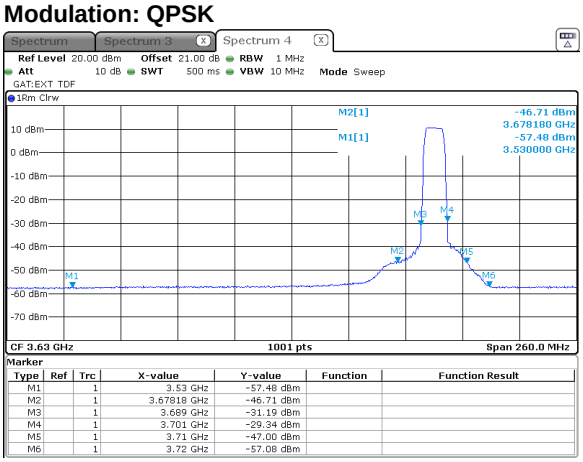


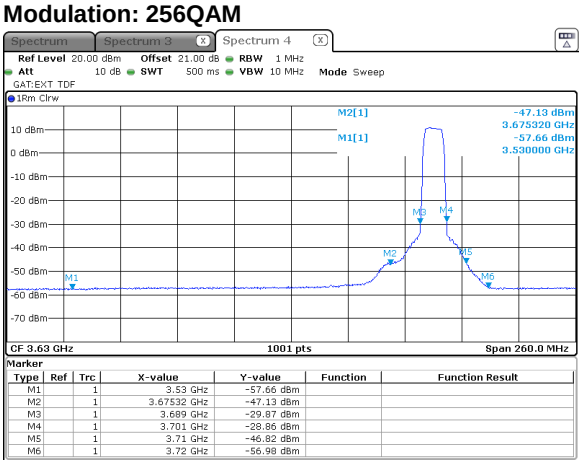


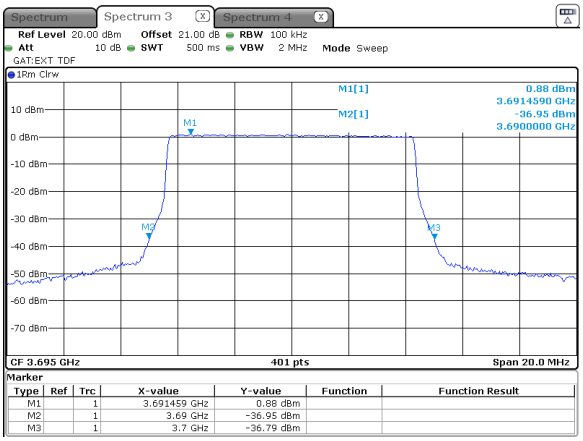
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

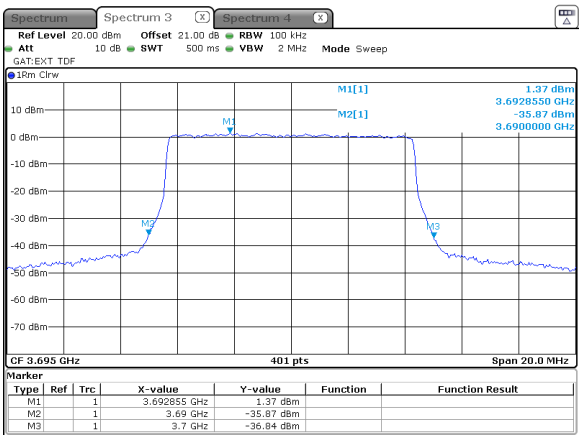
Plot 7.4.6 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 2
Modulation: QPSK **Modulation: 256QAM**





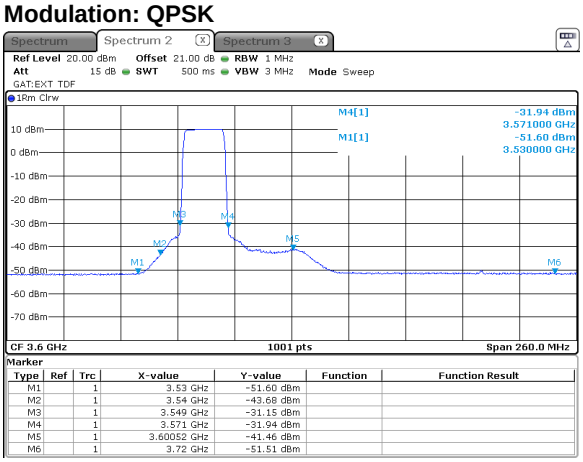


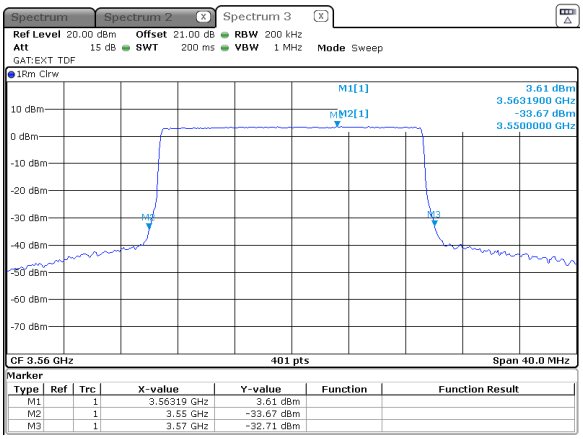


Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

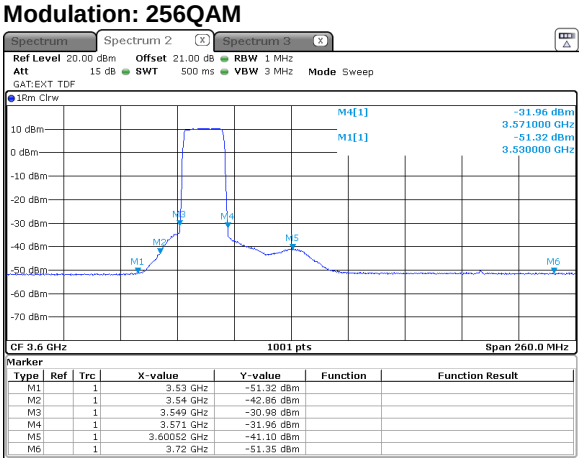
Plot 7.4.7 Emission outside the fundamental test results at low carrier frequency

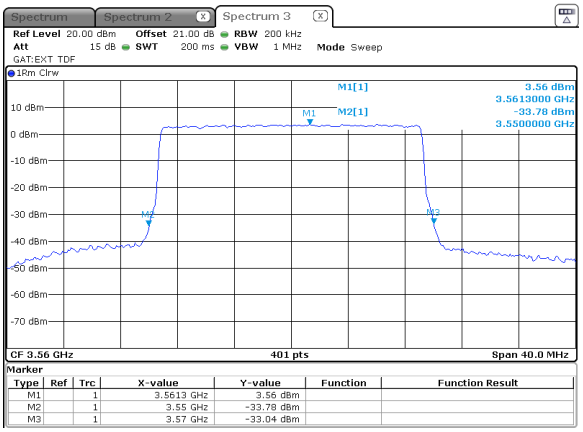
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1
Modulation: QPSK





Modulation: 256QAM

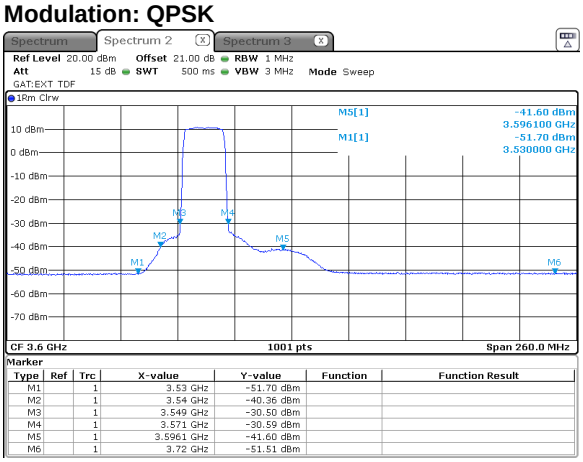


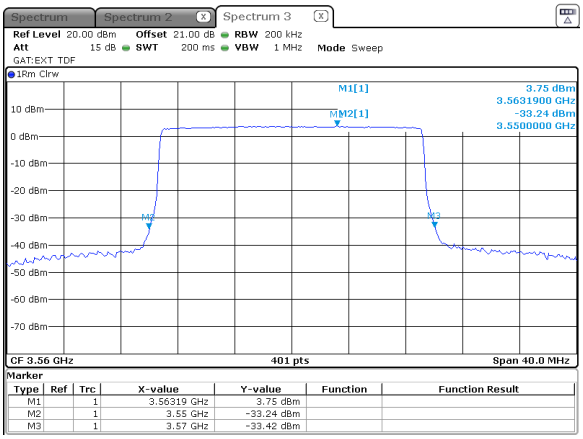


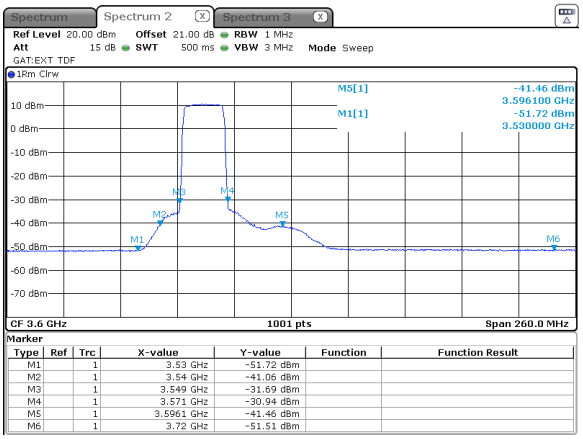
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

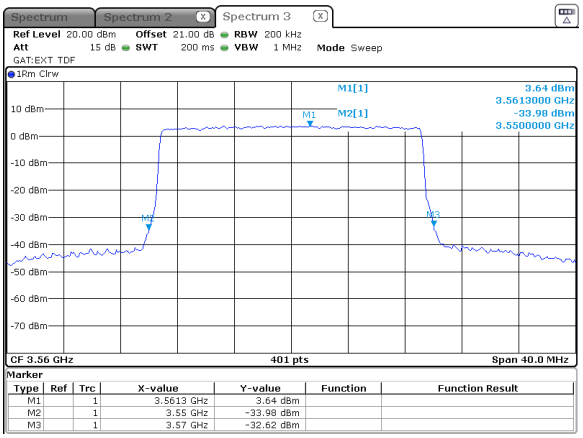
Plot 7.4.8 Emission outside the fundamental test results at low carrier frequency

CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 2
Modulation: QPSK **Modulation: 256QAM**





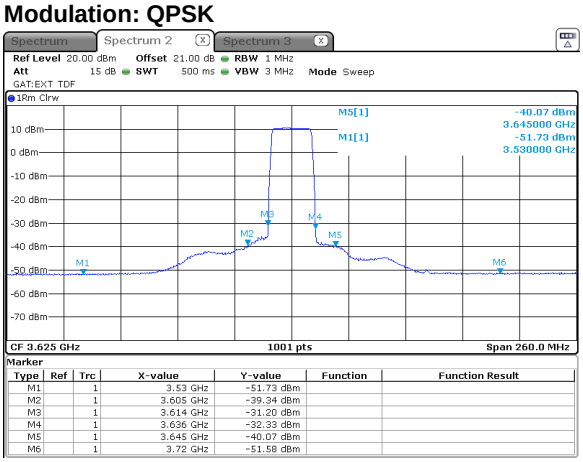


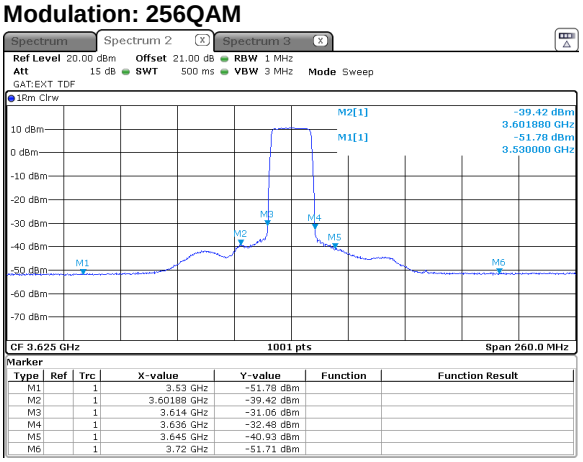


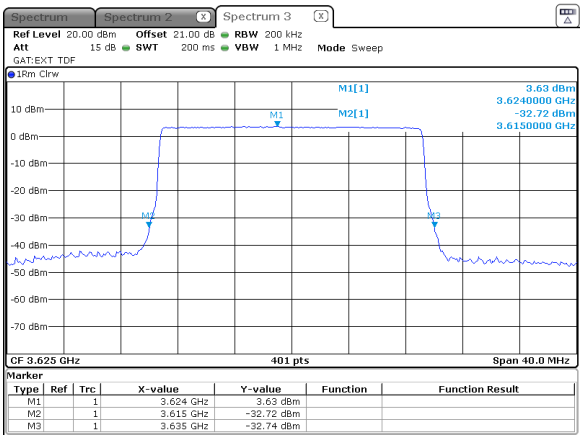
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

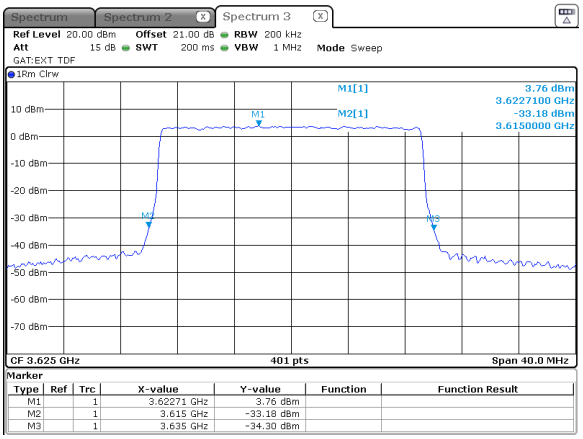
Plot 7.4.9 Emission outside the fundamental test results at mid carrier frequency

CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1
Modulation: QPSK





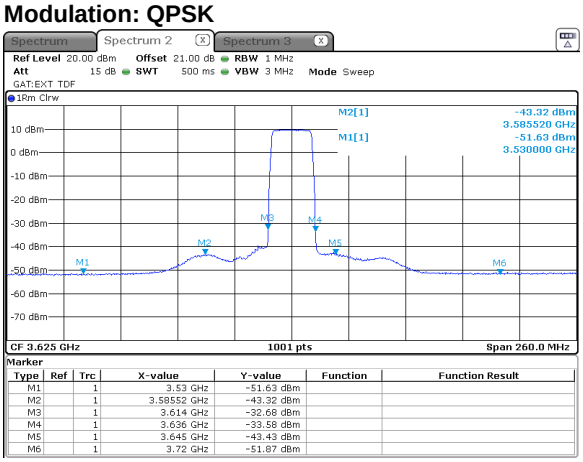


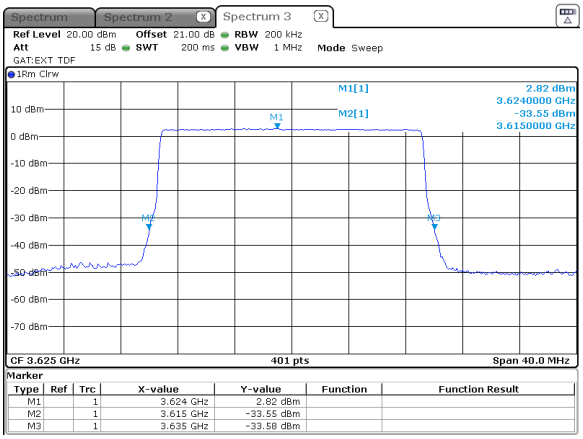


Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

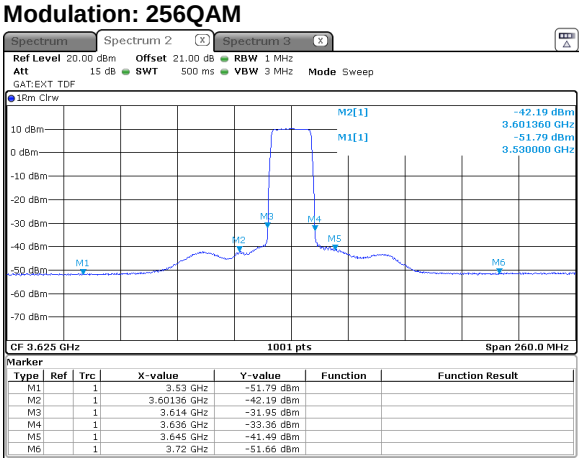
Plot 7.4.10 Emission outside the fundamental test results at mid carrier frequency

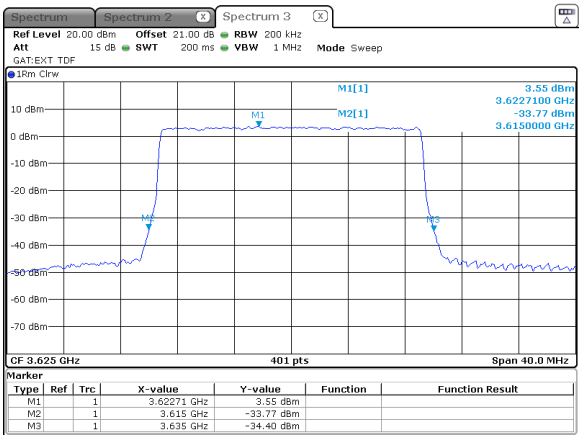
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 2
Modulation: QPSK





Modulation: 256QAM

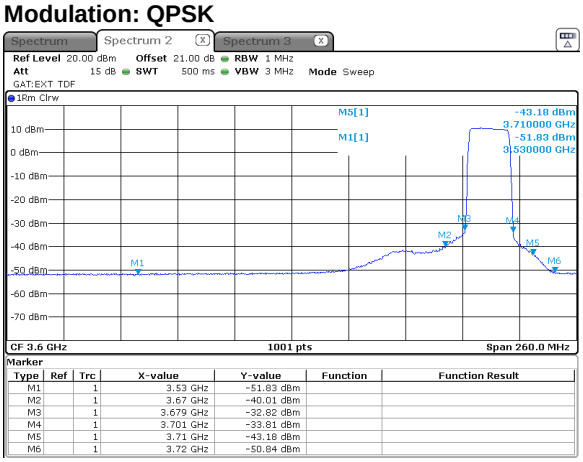


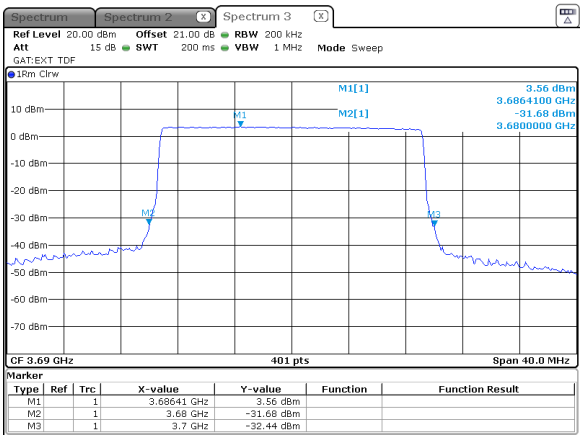


Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

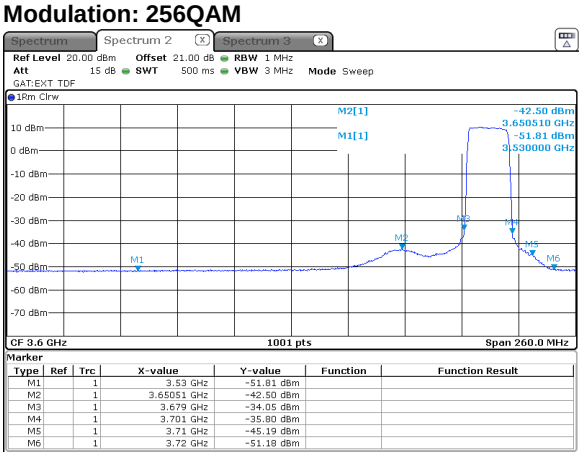
Plot 7.4.11 Emission outside the fundamental test results at high carrier frequency

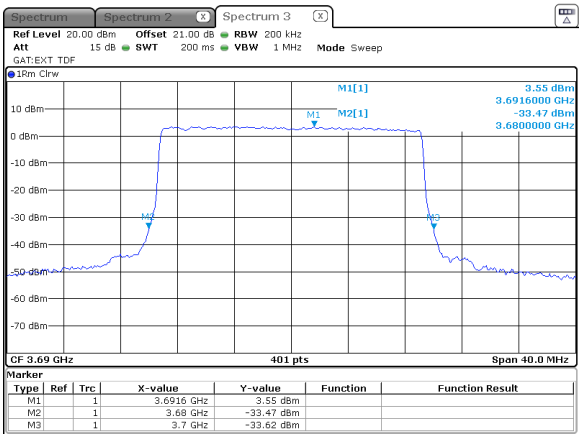
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1
Modulation: QPSK





Modulation: 256QAM

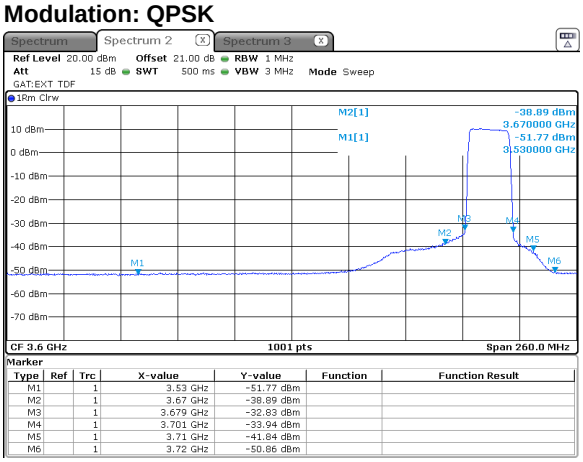


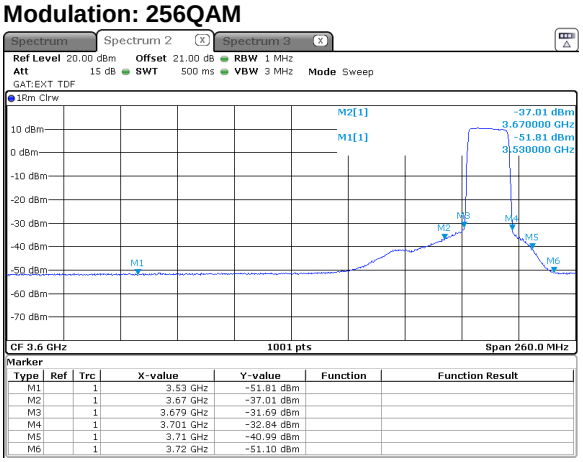


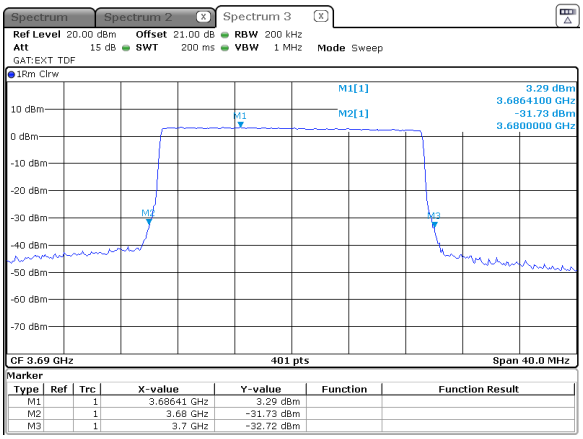
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

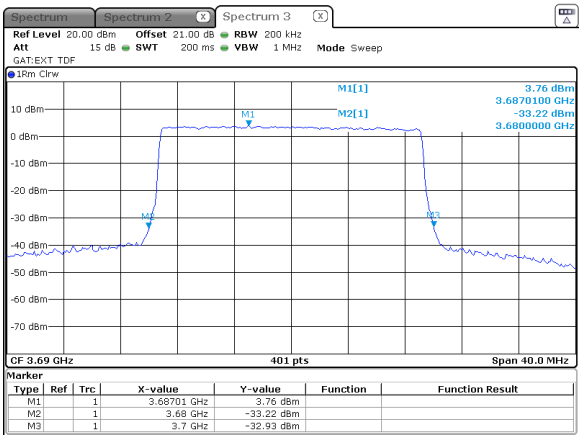
Plot 7.4.12 Emission outside the fundamental test results at high carrier frequency

CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 2
Modulation: QPSK





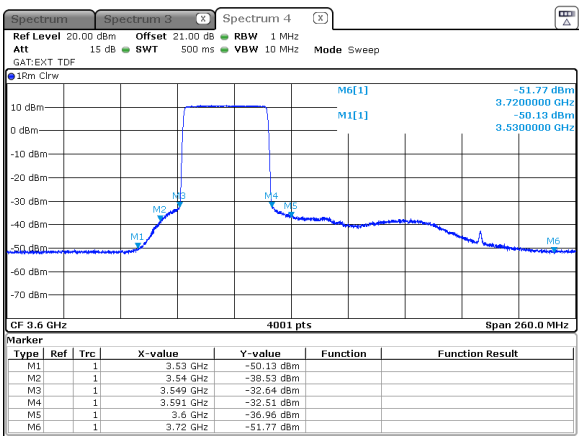


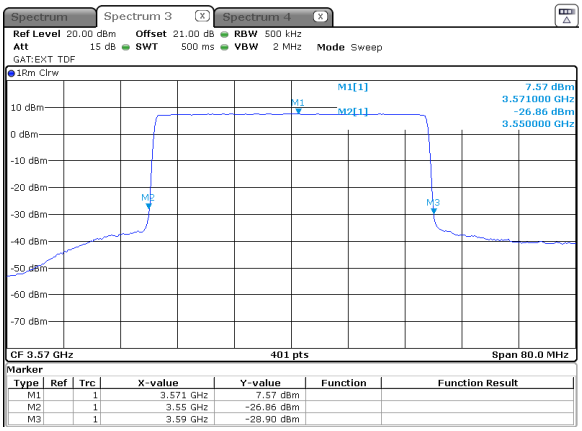


Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

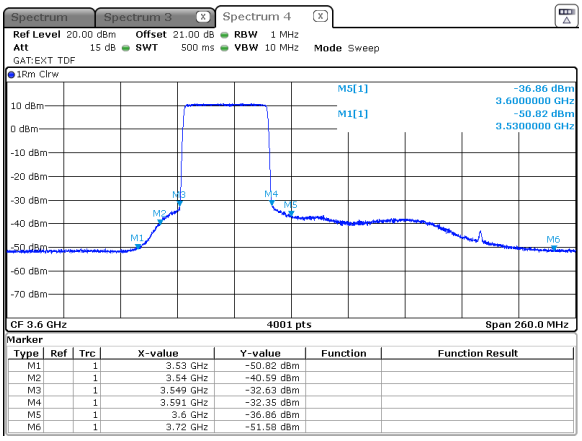
Plot 7.4.13 Emission outside the fundamental test results at low carrier frequency

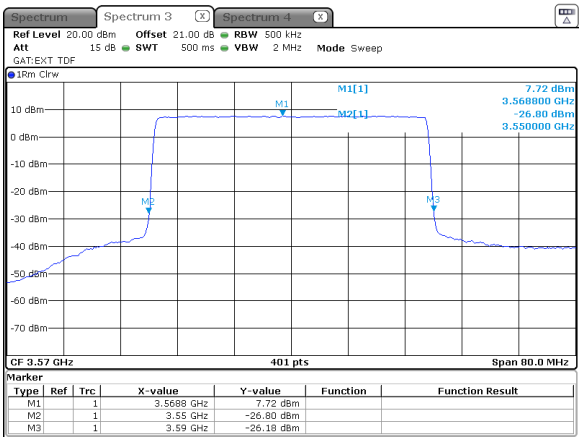
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1
Modulation: QPSK





Modulation: 256QAM



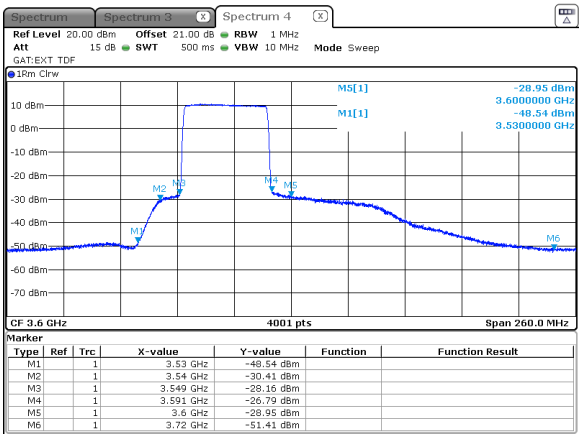


Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

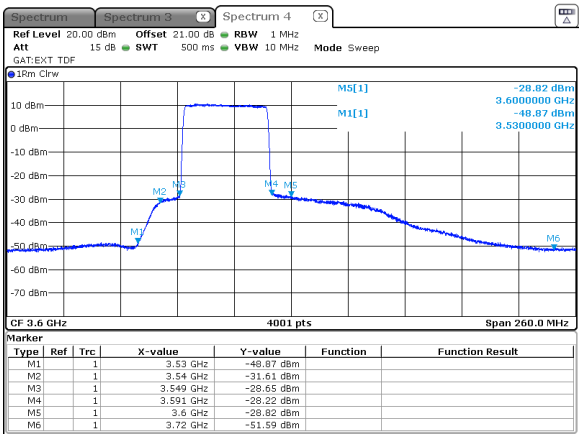
Plot 7.4.14 Emission outside the fundamental test results at low carrier frequency

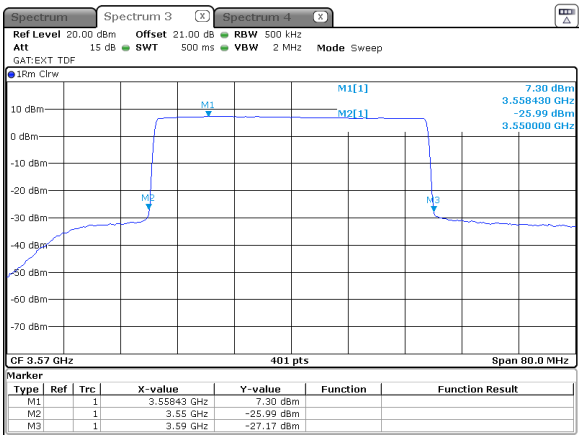
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 2

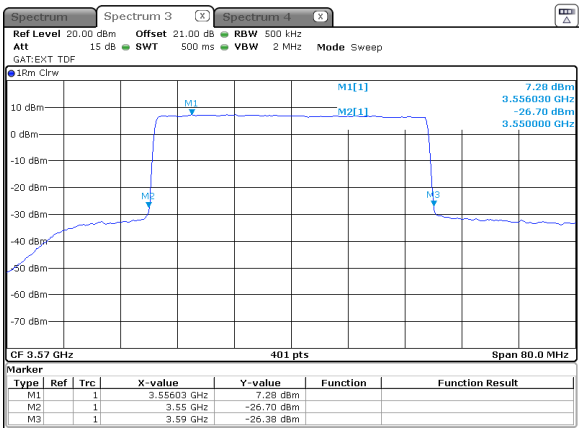
Modulation: QPSK



Modulation: 256QAM



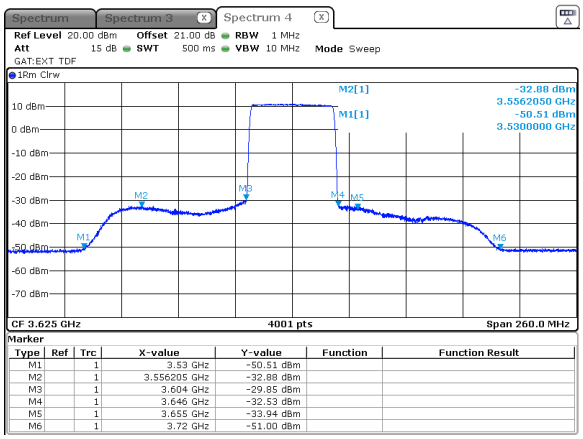


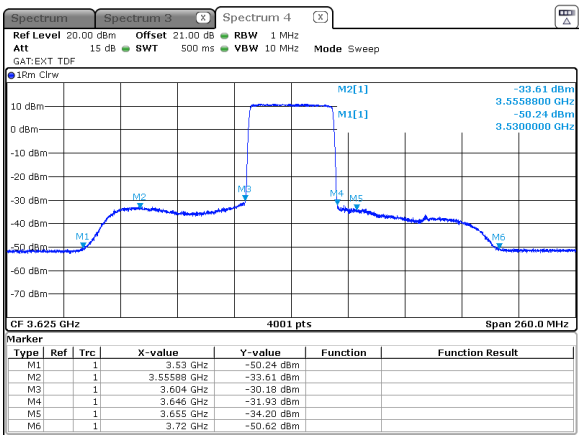


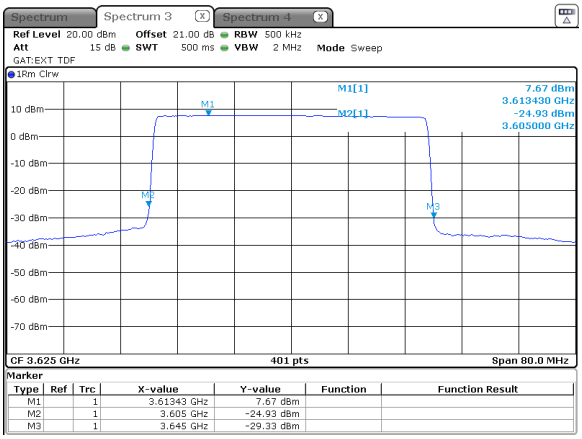
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

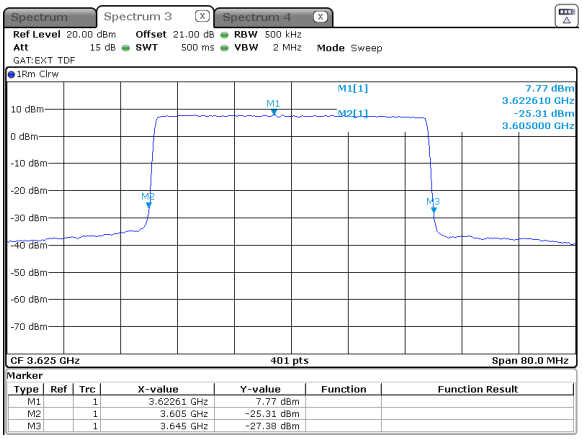
Plot 7.4.15 Emission outside the fundamental test results at mid carrier frequency

CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1
Modulation: QPSK **Modulation: 256QAM**







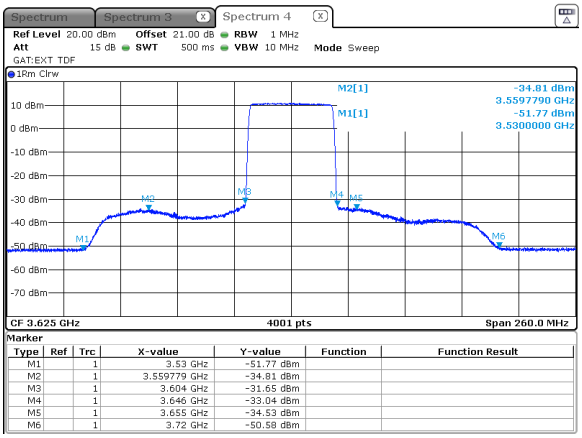


Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

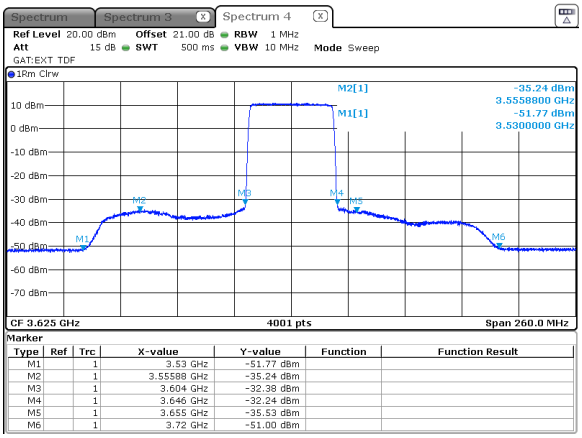
Plot 7.4.16 Emission outside the fundamental test results at mid carrier frequency

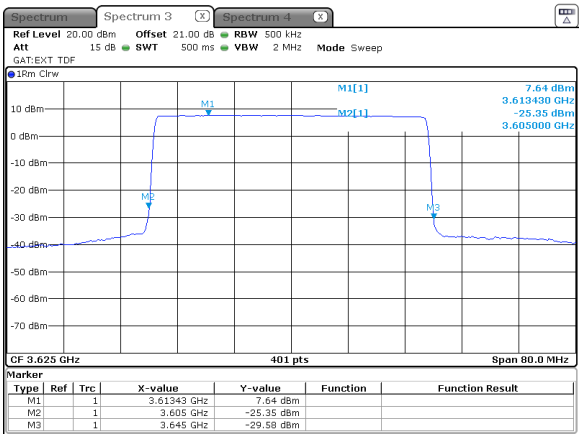
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 2

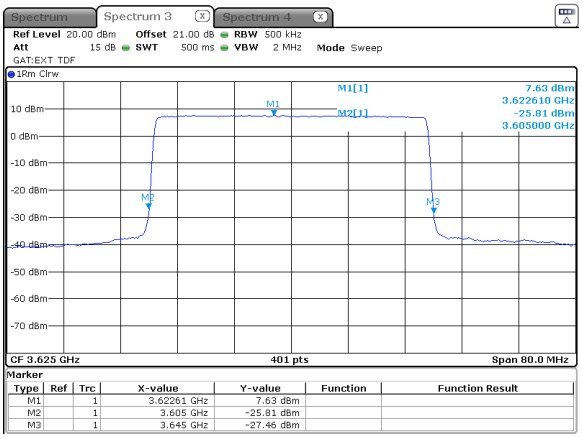
Modulation: QPSK



Modulation: 256QAM





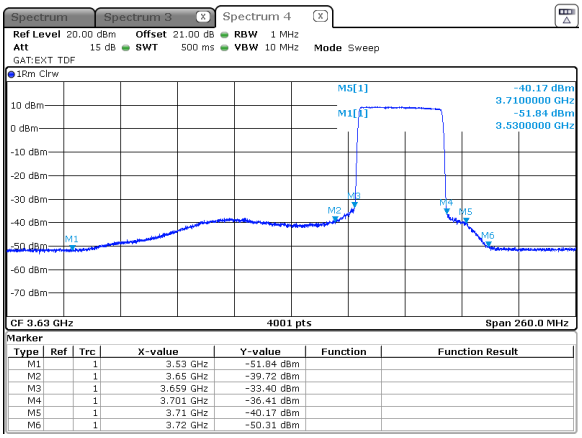


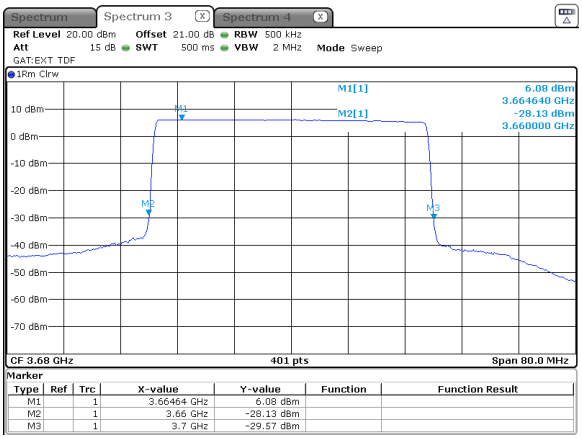
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

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

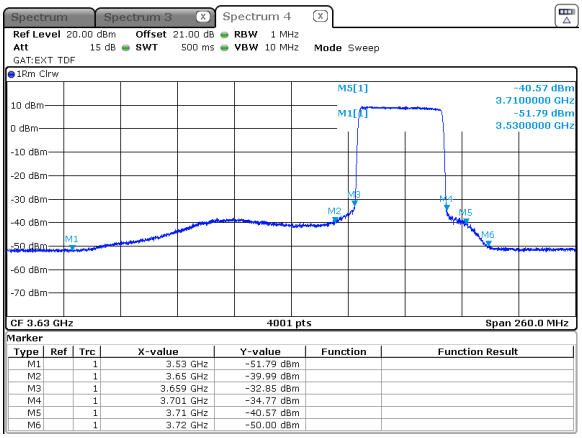
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1

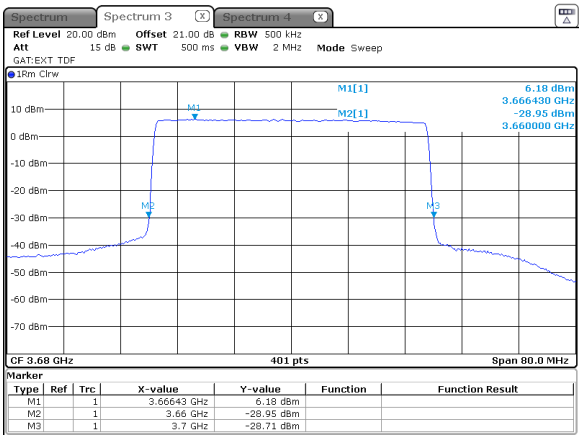
Modulation: QPSK





Modulation: 256QAM



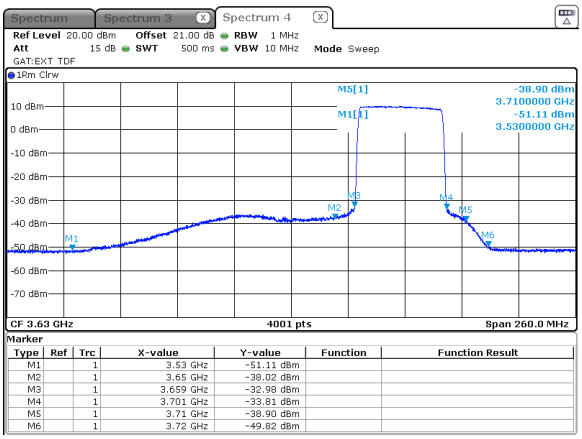


Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Feb-22		
Temperature: 24.2 ºC	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

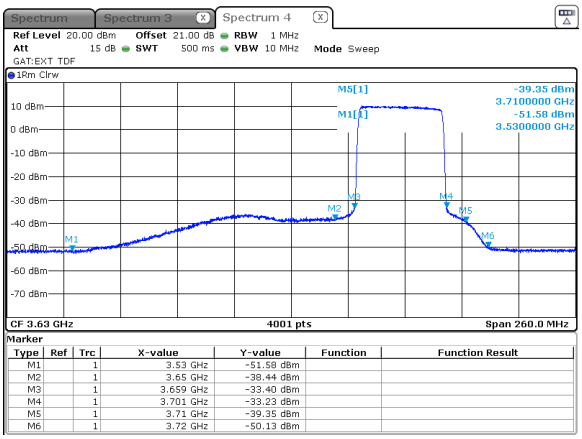
Plot 7.4.18 Emission outside the fundamental test results at high carrier frequency

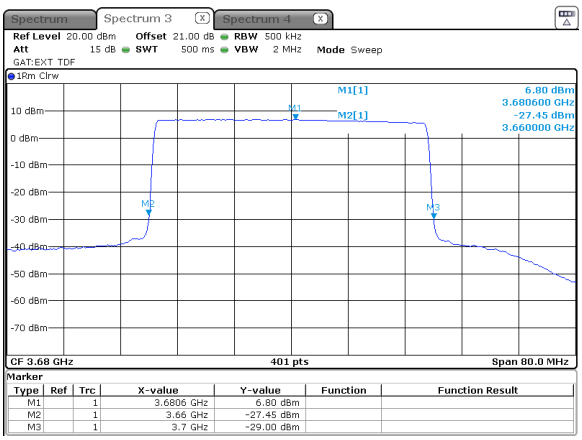
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 2

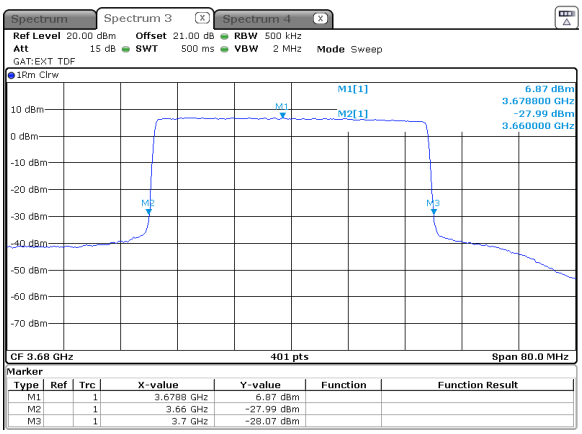
Modulation: QPSK



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 ºC	**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×P×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 360^0 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 360^0 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 ºC	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

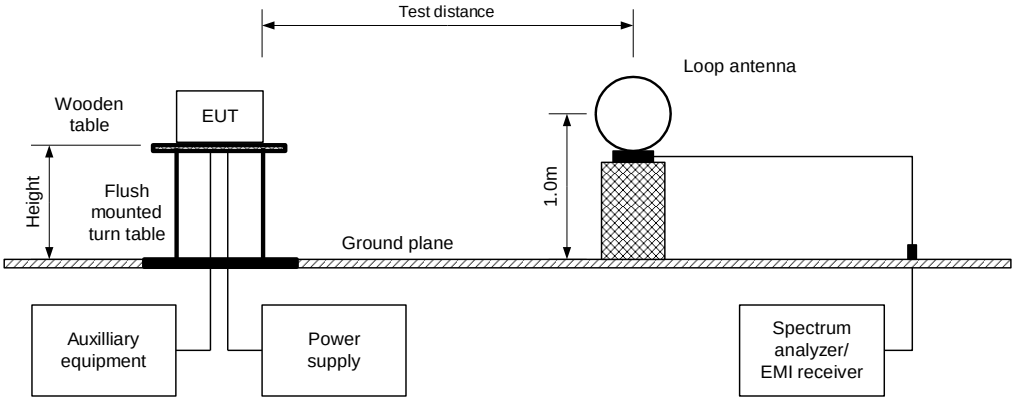
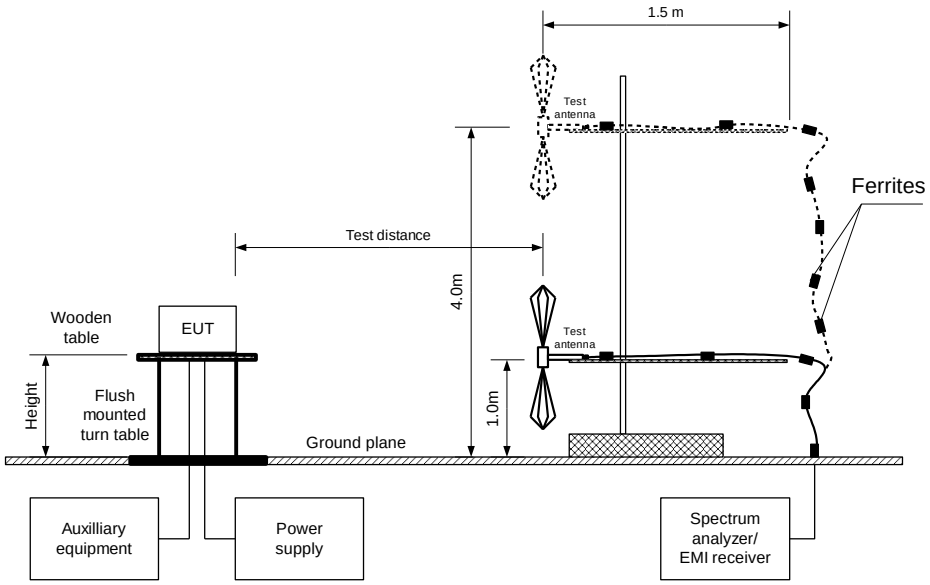


Figure 7.5.2 Setup for spurious emission field strength measurements above 30 MHz



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 ºC	**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.

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 ºC	**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

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										Pass
1374.56	40.66	75.20	-34.54	40.66	55.20	-14.54	Horizontal	150	138	
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

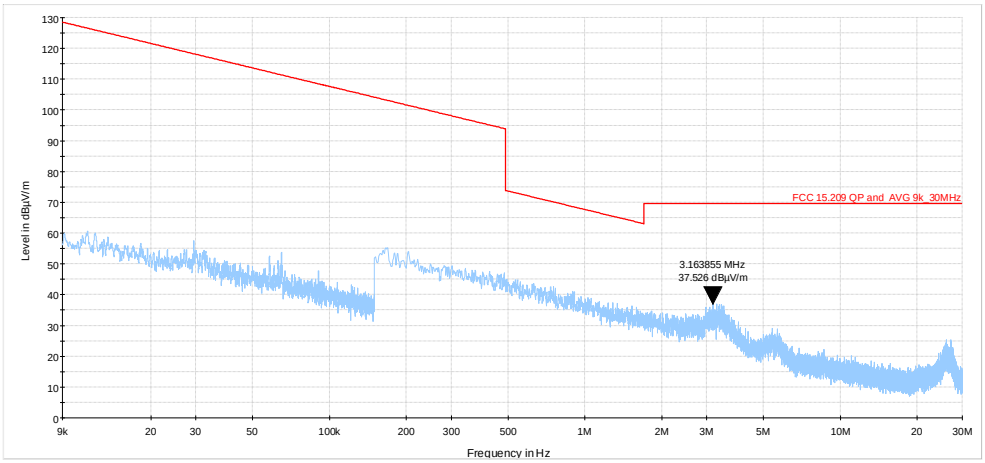
HL 3903	HL 4360	HL 4933	HL 4956	HL 5112	HL 5288	HL 5908	

Full description is given in Appendix A.

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 ºC	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

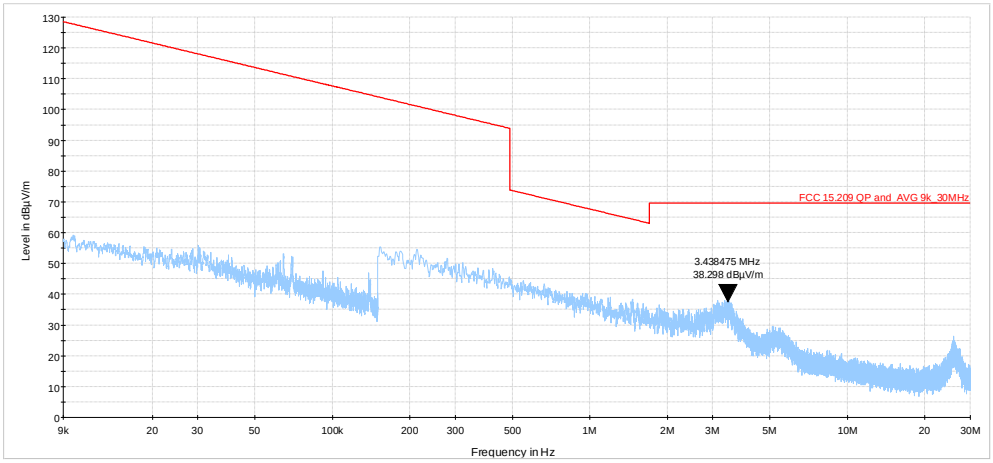
Plot 7.5.1 Radiated emission measurements in 9 kHz - 30 MHz range

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

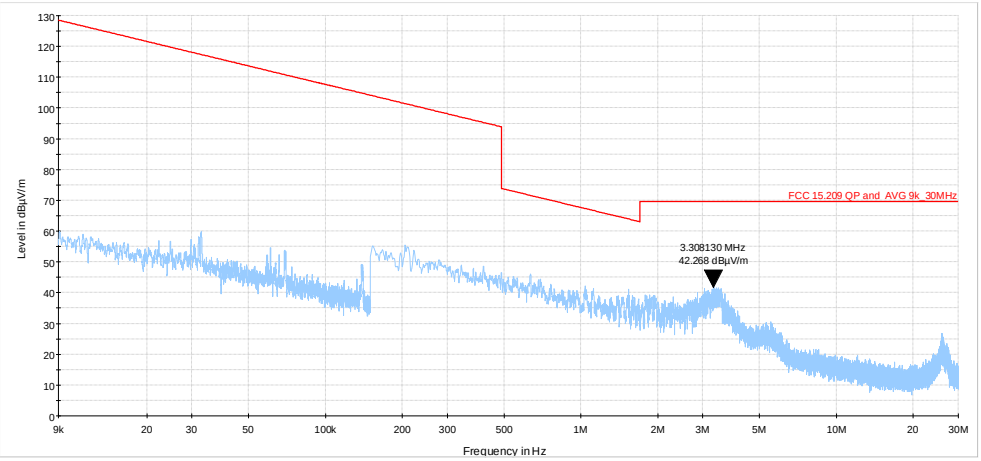
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
TEST DISTANCE: 3 m



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 ºC	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

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

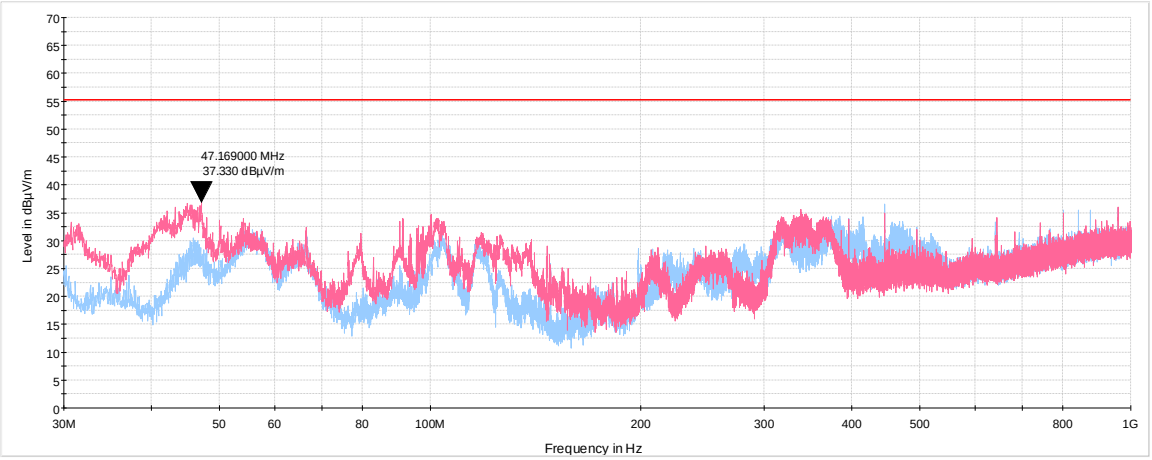
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
TEST DISTANCE: 3 m



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 ºC	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

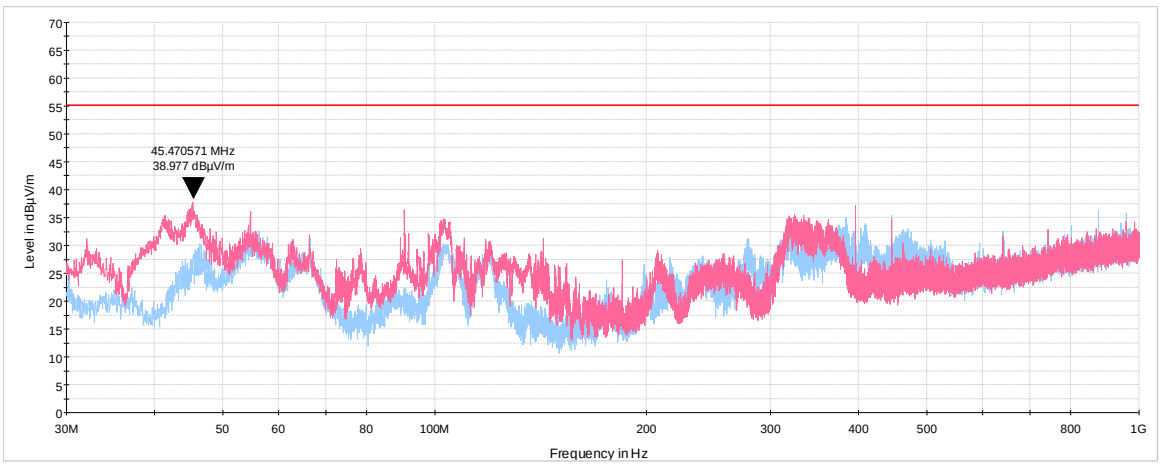
Plot 7.5.4 Radiated emission measurements in 30 - 1000 MHz range

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

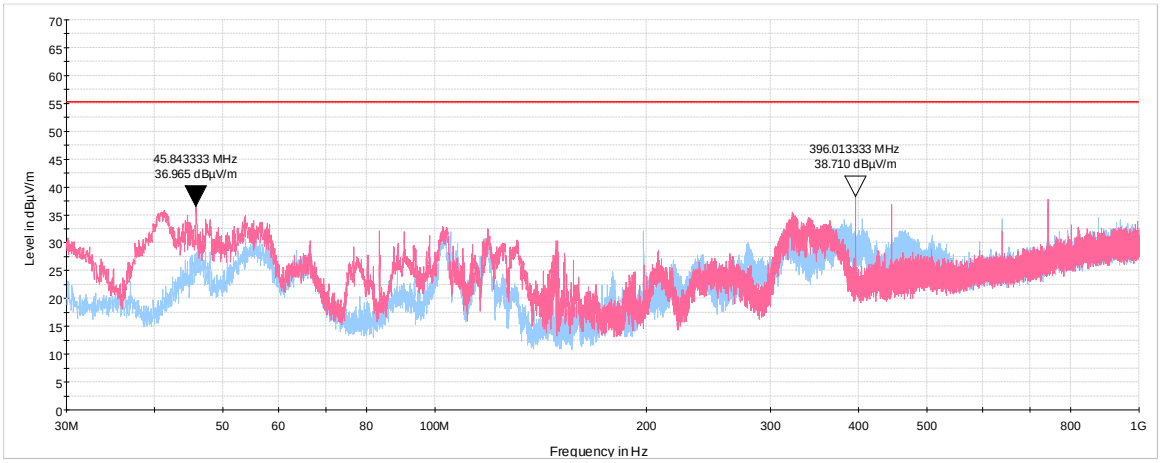
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



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 ºC	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

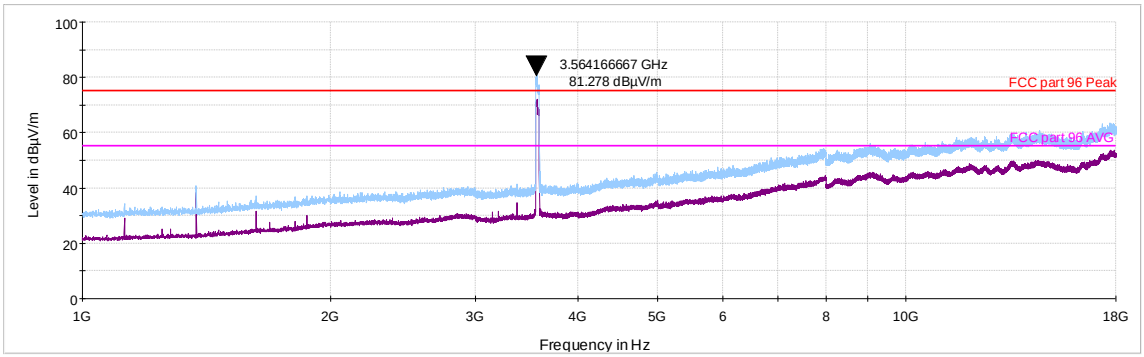
Plot 7.5.6 Radiated emission measurements in 30 - 1000 MHz range

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

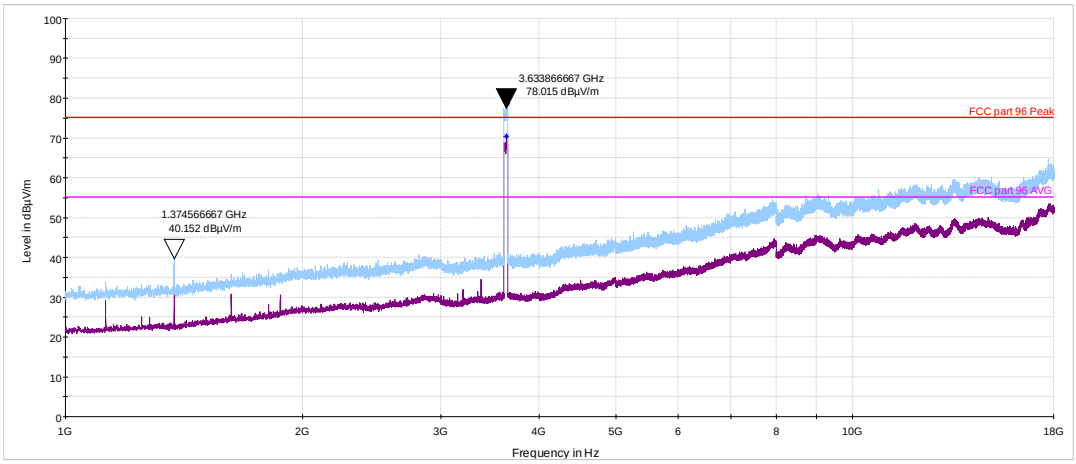


Note: 3564.1 MHz is low fundamental frequency

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 ºC	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.5.8 Radiated emission measurements in 1000 – 18000 MHz range

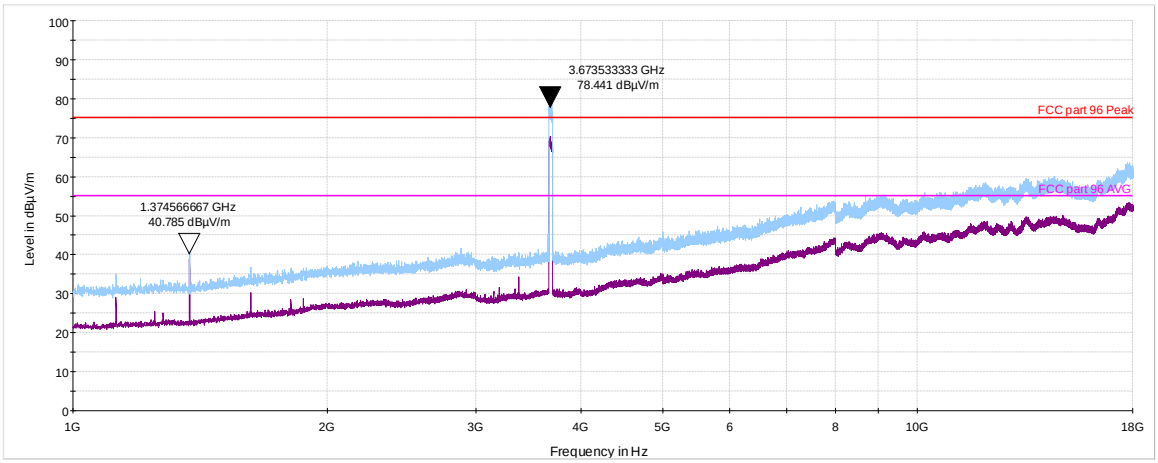
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



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

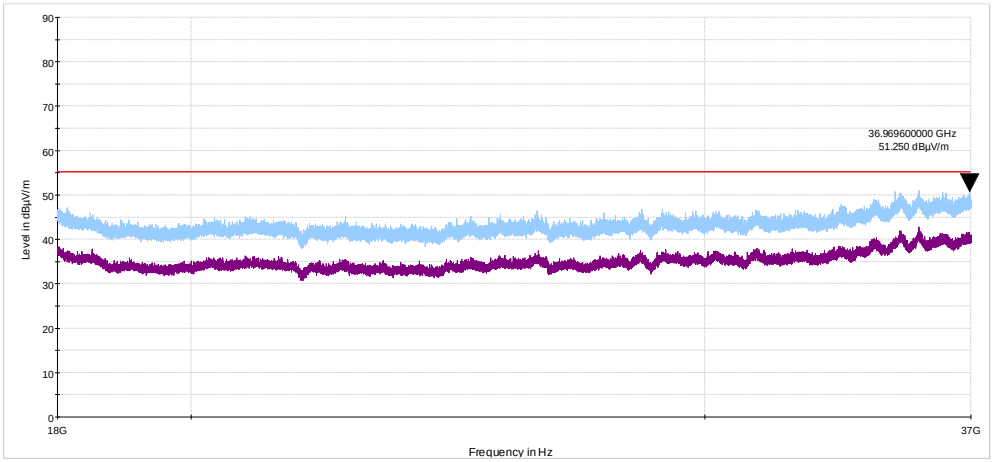


Note: 3673.5 MHz is high fundamental frequency

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 ºC	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

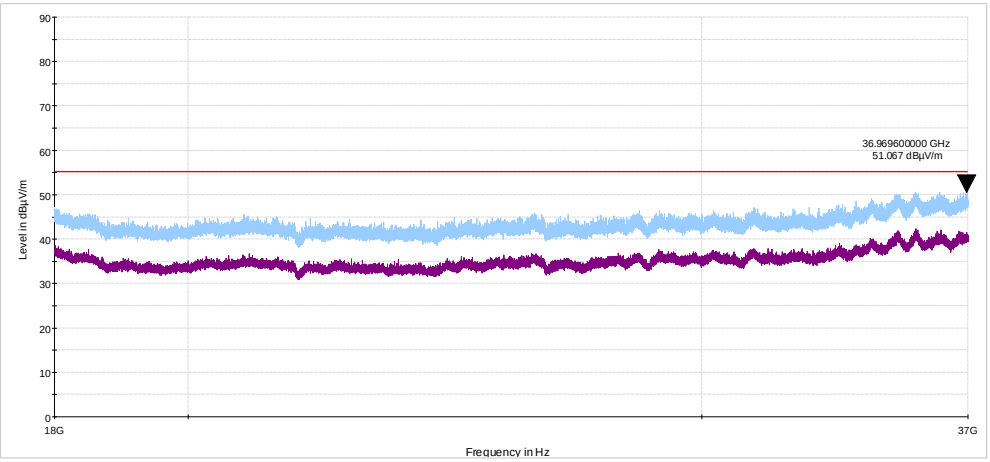
Plot 7.5.10 Radiated emission measurements in 18000 –37000 MHz range

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 ºC	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