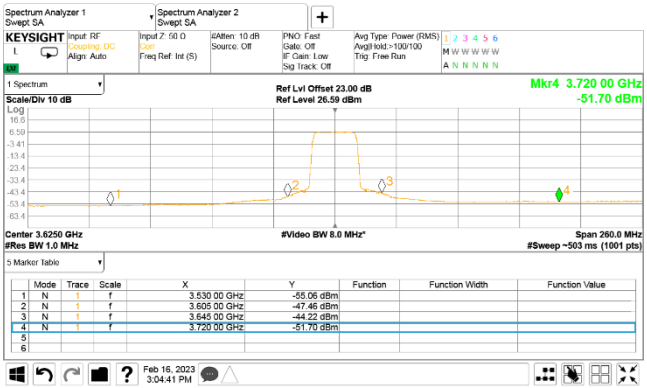
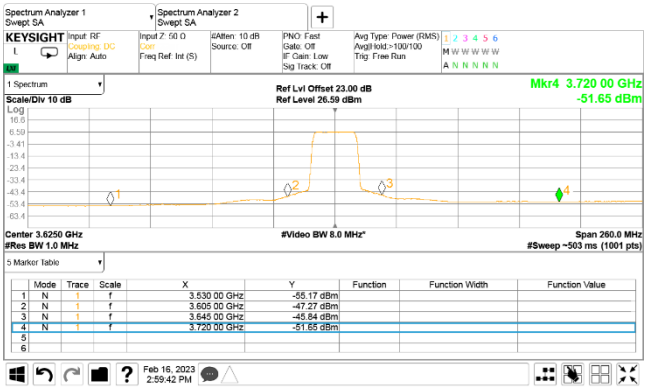
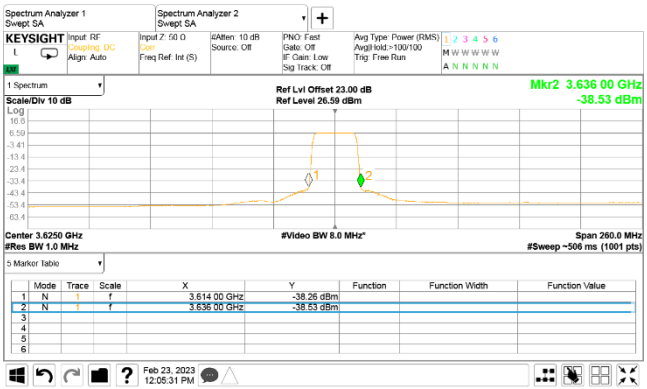
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	19-Feb-23 - 16-Feb-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1013 hPa	Power: 48 VAC
Remarks:			

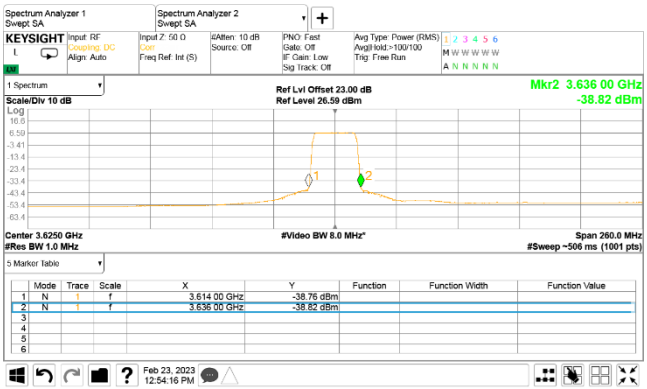
Plot 7.4.19 Emission mask test results at mid carrier frequency

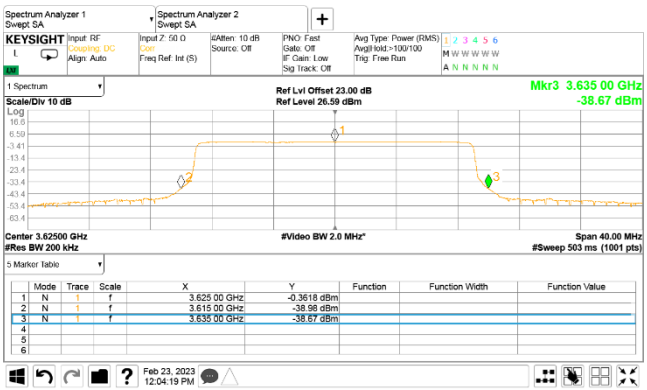
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 3
Modulation: QPSK **Modulation: 256QAM**

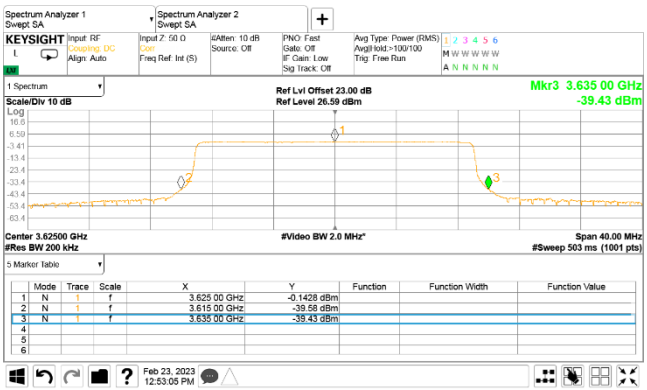










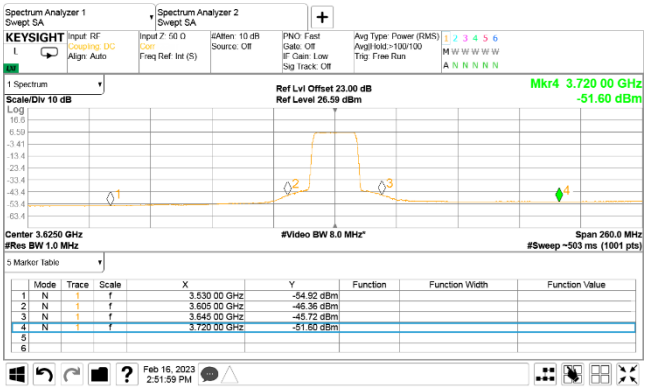


Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	19-Feb-23 - 16-Feb-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1013 hPa	Power: 48 VAC
Remarks:			

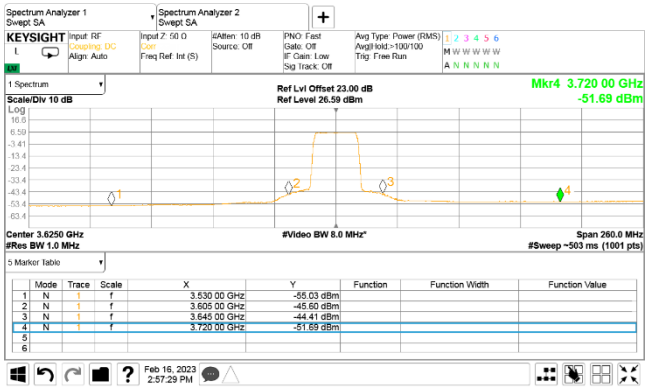
Plot 7.4.20 Emission mask test results at mid carrier frequency

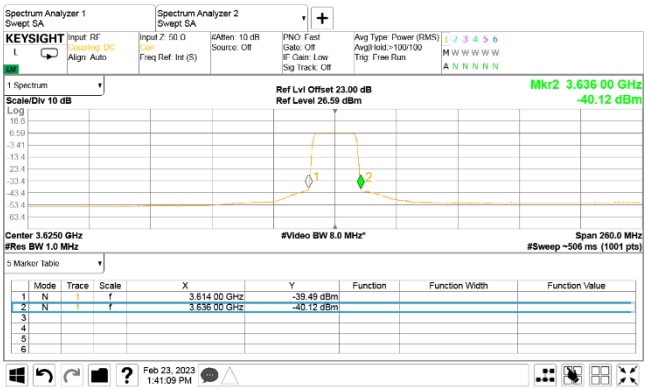
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 4

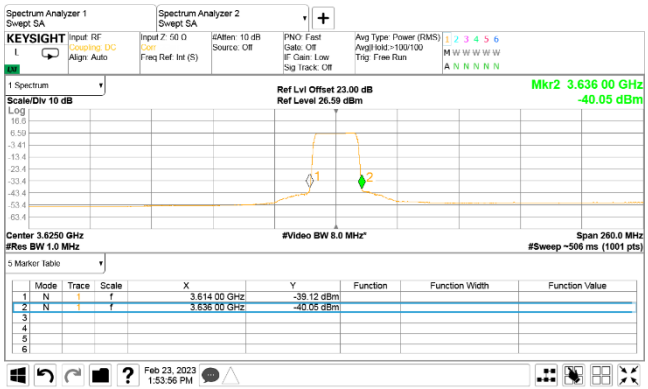
Modulation: QPSK

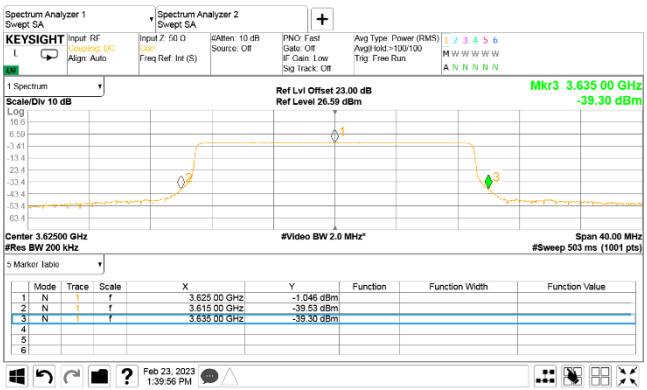


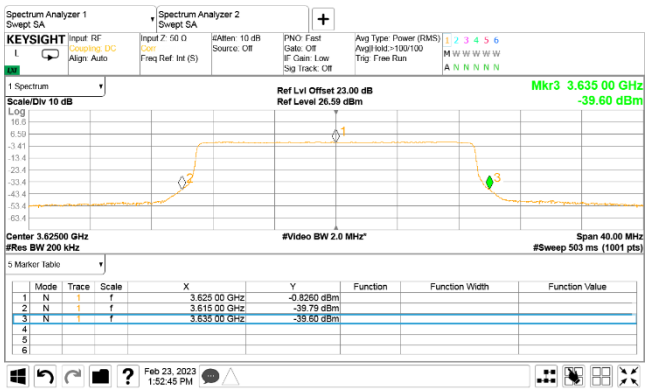
Modulation: 256QAM







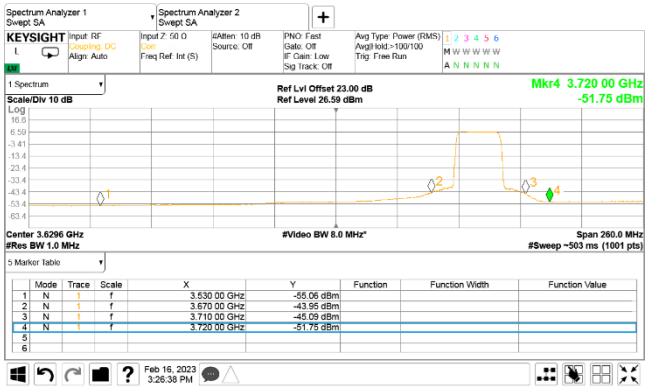


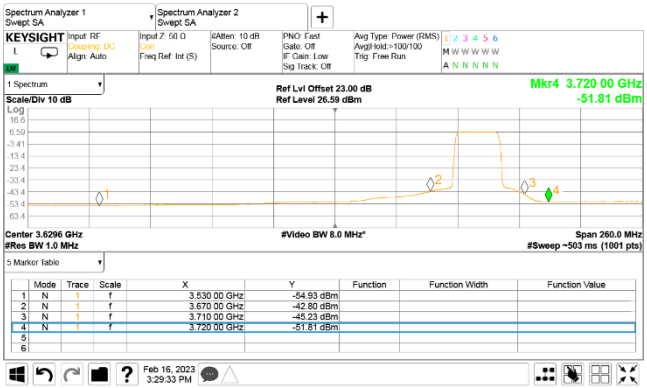


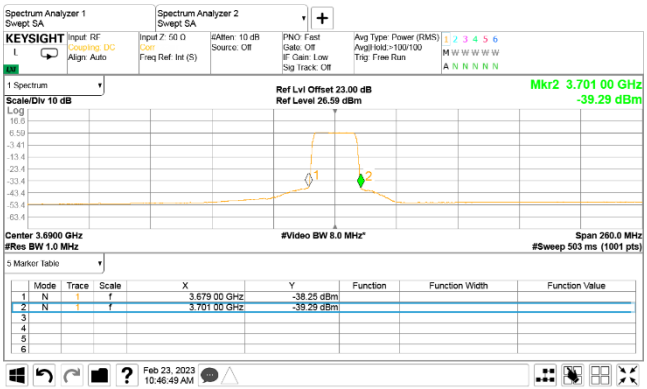
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	19-Feb-23 - 16-Feb-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1013 hPa	Power: 48 VAC
Remarks:			

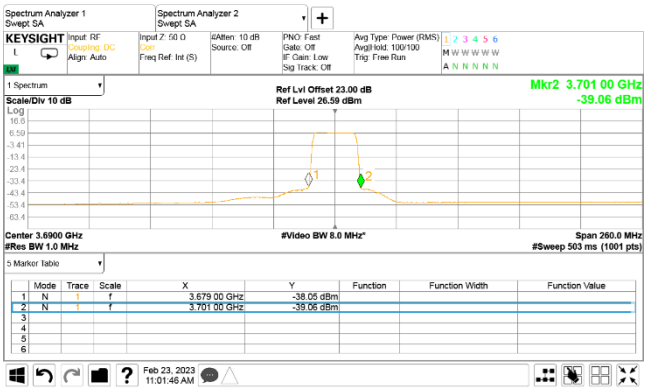
Plot 7.4.21 Emission mask test results at high carrier frequency

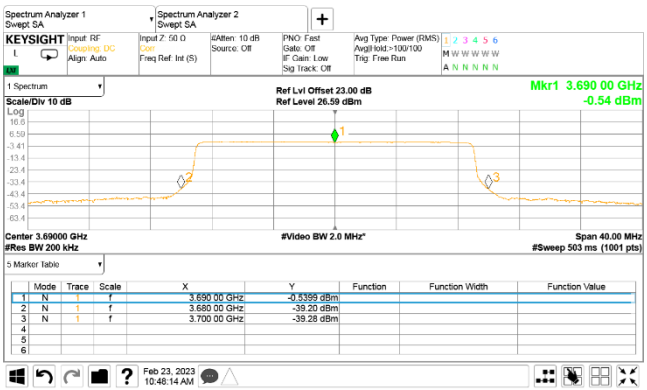
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1
Modulation: QPSK **Modulation: 256QAM**

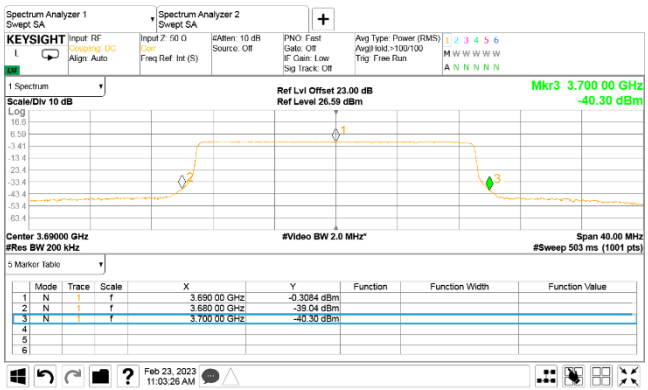










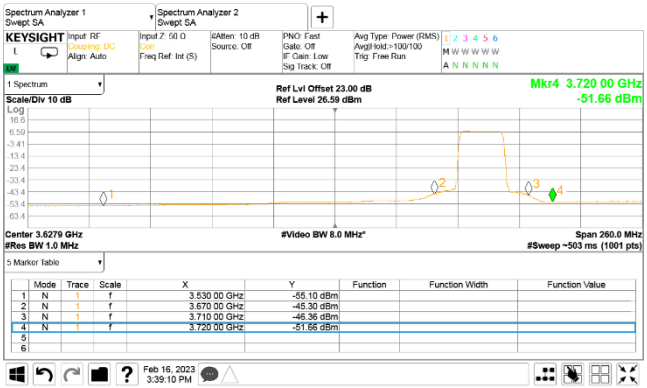


Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	19-Feb-23 - 16-Feb-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1013 hPa	Power: 48 VAC
Remarks:			

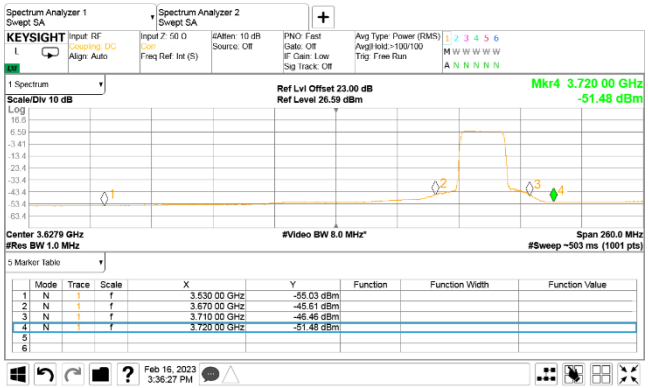
Plot 7.4.22 Emission mask test results at high carrier frequency

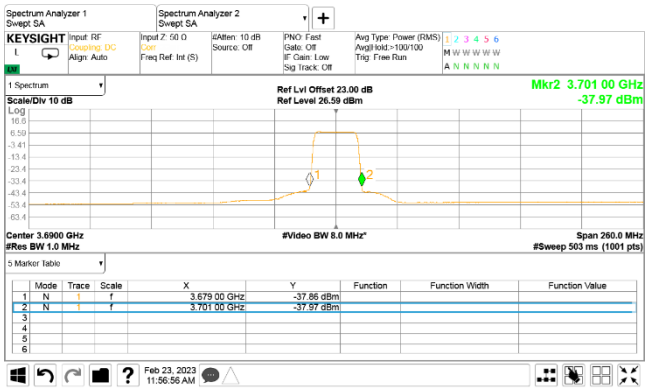
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 2

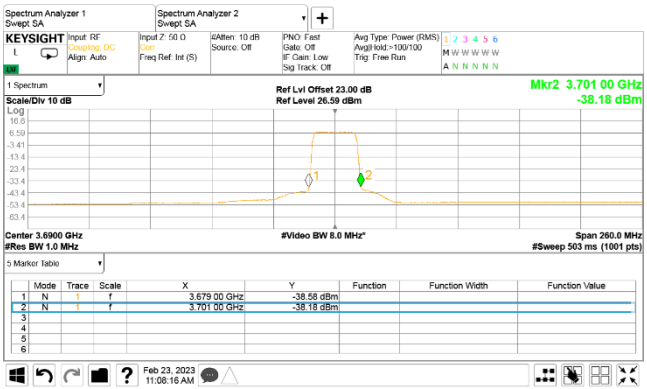
Modulation: QPSK

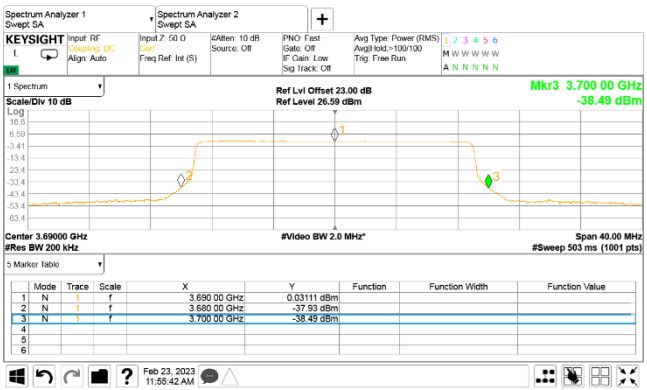


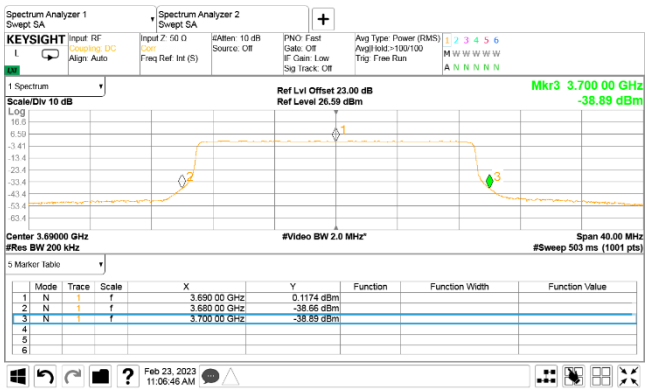
Modulation: 256QAM







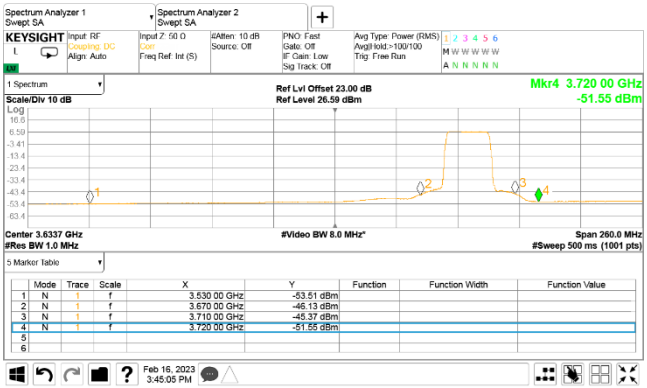


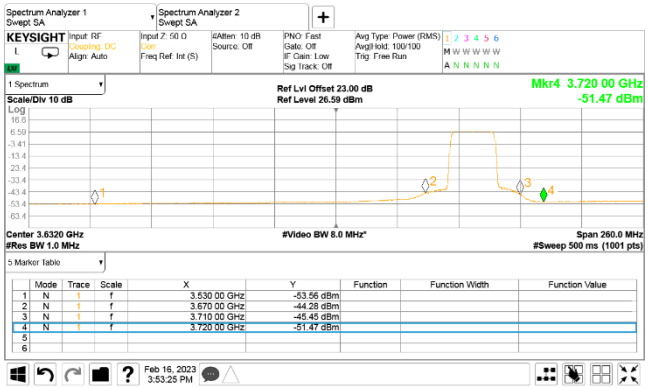


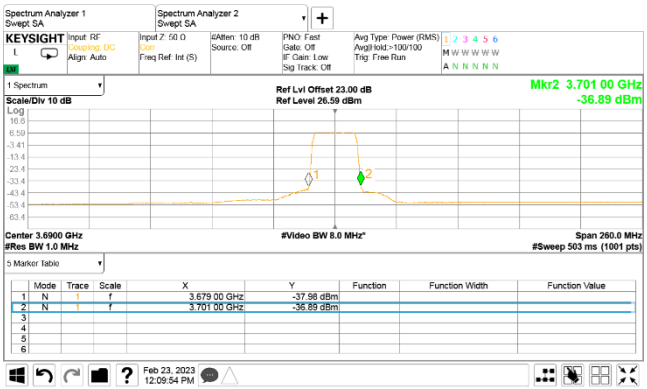
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	19-Feb-23 - 16-Feb-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1013 hPa	Power: 48 VAC
Remarks:			

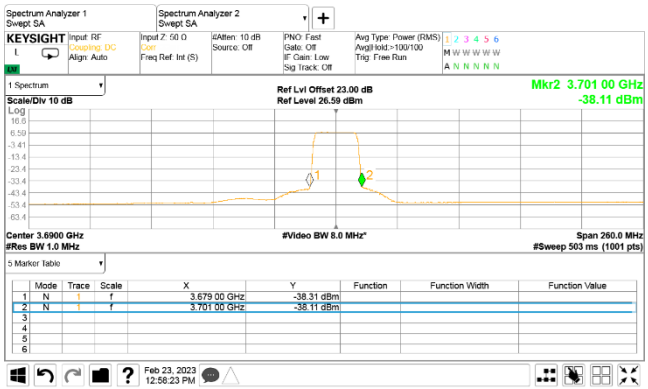
Plot 7.4.23 Emission mask test results at high carrier frequency

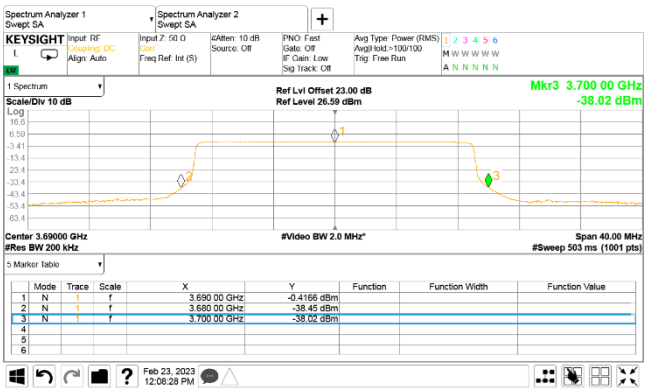
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 3
Modulation: QPSK **Modulation: 256QAM**

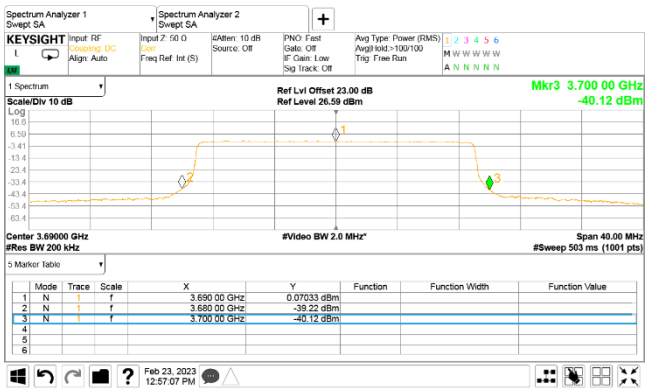








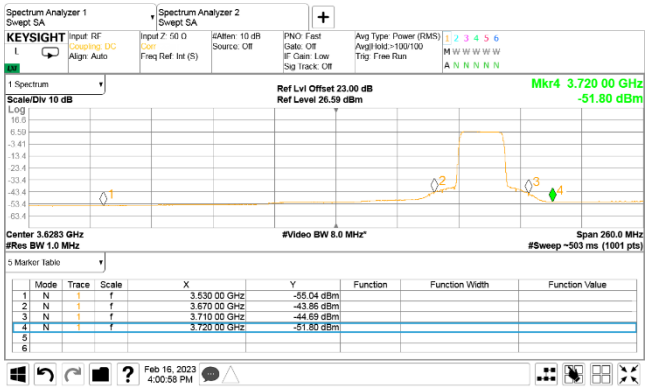


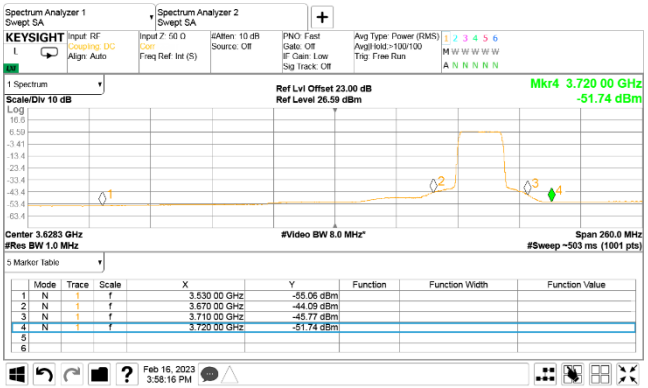


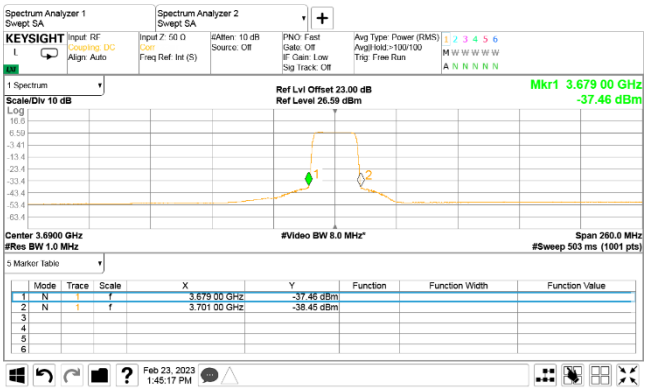
Test specification:	Section 96.41(e), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	19-Feb-23 - 16-Feb-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1013 hPa	Power: 48 VAC
Remarks:			

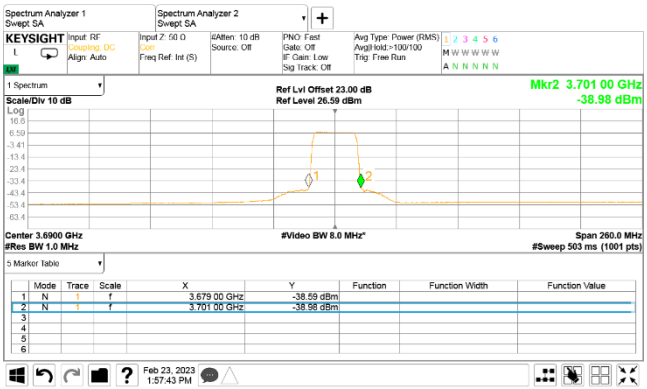
Plot 7.4.24 Emission mask test results at high carrier frequency

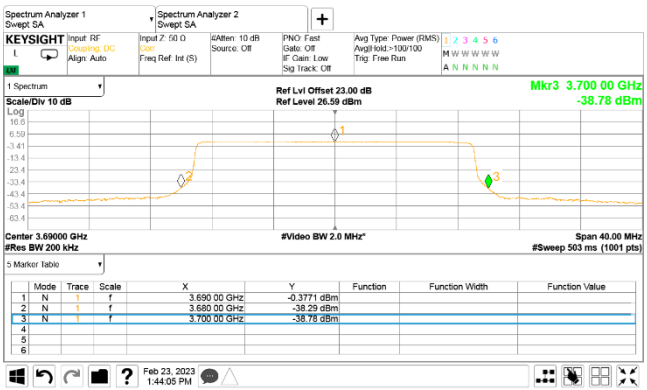
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 4
Modulation: QPSK **Modulation: 256QAM**

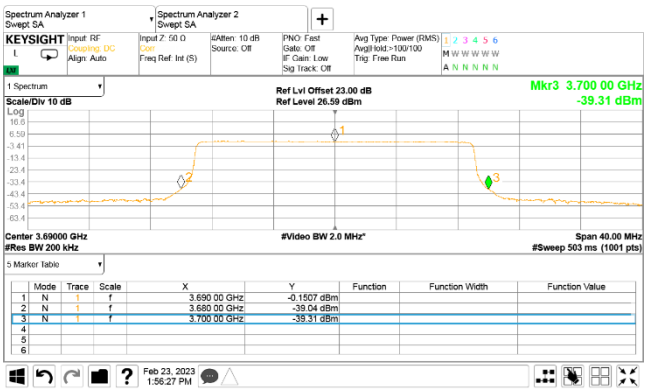












Test specification:	Section 96.41(e)(2), Radiated spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	
Date(s):			
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

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:	
Date(s):			
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

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

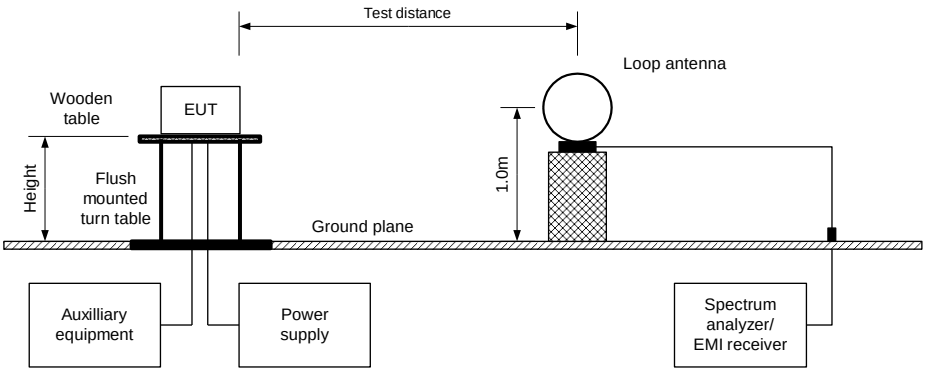
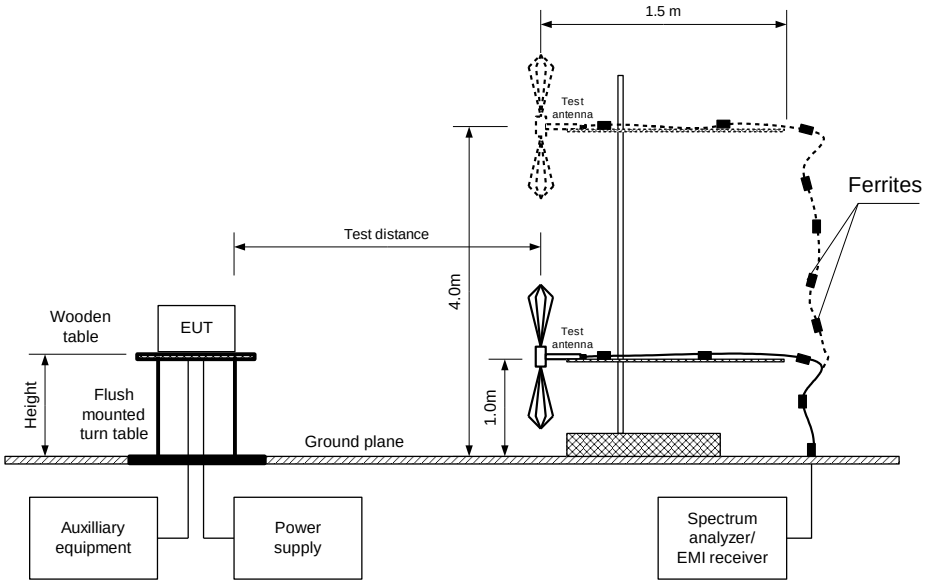
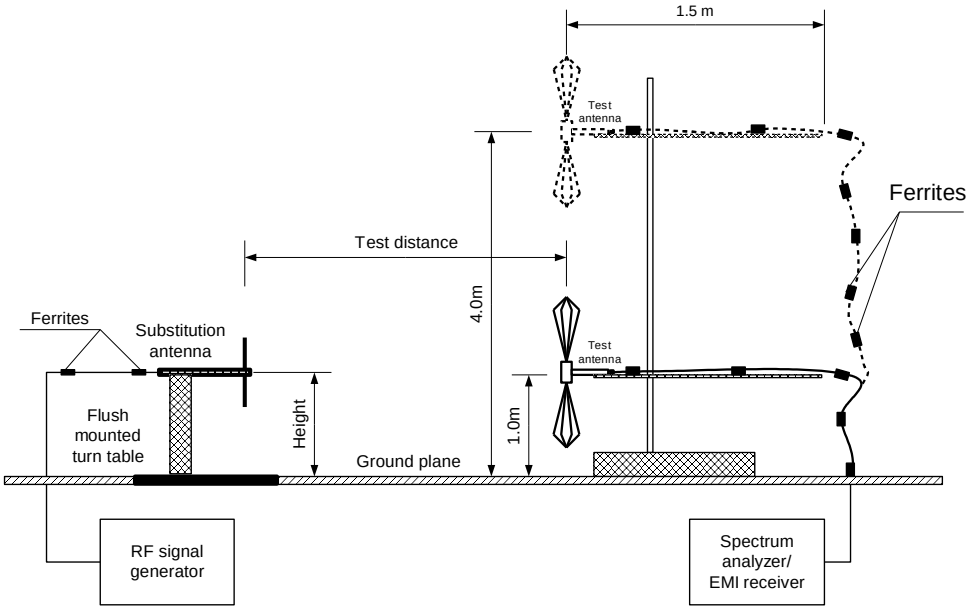


Figure 7.5.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	Section 96.41(e)(2), Radiated spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	
Date(s):			
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

Figure 7.5.3 Setup for substitution ERP measurements of spurious



Test specification:	**Section 96.41(e)(2), Radiated spurious emissions**		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	**Verdict:**	
Date(s):			
Temperature: 21 ºC	**Relative Humidity:** 54 %	**Air Pressure:** 1012 hPa	**Power:** 110 VAC, 50 Hz
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: 256QAM
OCCUPIED BANDWIDTH 20 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
Low carrier frequency 3555 MHz							
33.43	45.89	55.20	-9.31	100	V	2.25	73
216.89	46.12	55.20	-9.08	100	V	1.02	8.0
284.13	41.50	55.20	-13.70	100	V	1.02	59
374.99	47.04	55.20	-8.16	100	H	1.02	26
Mid carrier frequency 3625 MHz							
218.76	50.12	55.20	-5.08	100	V	1.0	-4
301.47	44.21	55.20	-10.99	100	H	1.0	60
374.96	44.26	55.20	-10.94	100	H	1.0	27
High carrier frequency 3695 MHz							
226.84	49.56	55.20	-5.64	100	V	1.0	-21
301.47	44.11	55.20	-11.09	100	H	1.0	57
374.99	47.02	55.20	-8.18	100	H	1.0	25
874.93	40.91	55.20	-14.29	100	H	1.42	-22

*****- 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:**	
Date(s):			
Temperature: 21 ºC	**Relative Humidity:** 54 %	**Air Pressure:** 1012 hPa	**Power:** 110 VAC, 50 Hz
Remarks:			

Table 7.5.3 Field strength of spurious emissions above 1 GHz

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	20 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 3555 MHz										
7118.87	58.15	75.20	-17.05	48.62	55.20	-6.58	H	1.44	-145	Pass
Mid carrier frequency 3625 MHz										
7250.07	59.91	75.20	-15.29	48.88	55.20	-6.32	H	2.15	-145	Pass
10871.78	56.16	75.20	-19.04	43.57	55.20	-11.63	H	2.30	-145	Pass
High carrier frequency 3695 MHz										
7379.96	63.47	75.20	-11.73	47.79	55.20	-7.41	H	1.65	-135	Pass
11078.16	61.56	75.20	-13.64	44.89	55.20	-10.31	H	2.08	-136	Pass

*****- 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

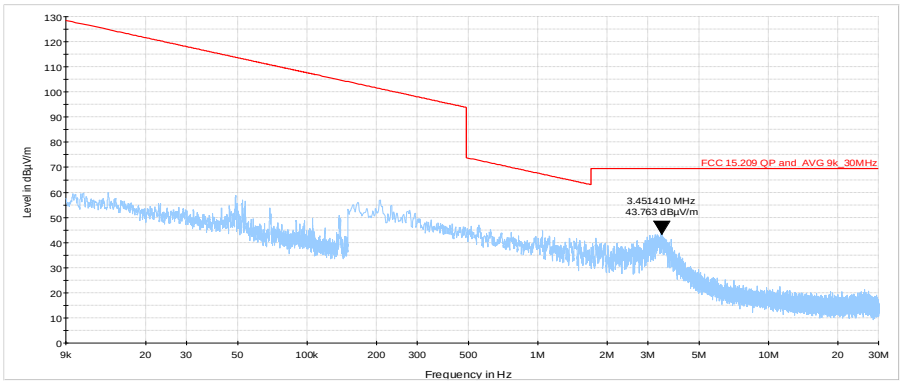
HL 0446	HL 3903	HL 4933	HL 4956	HL 5288	HL 5902	HL 7585	

Full description is given in Appendix A.

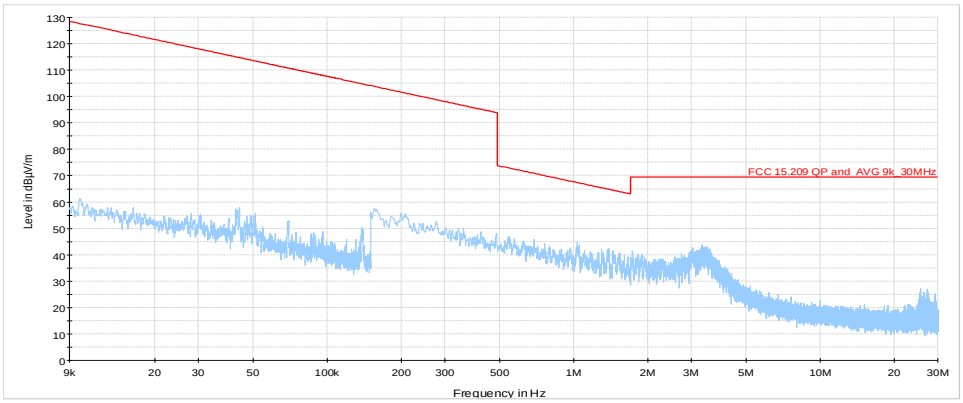
Test specification:	Section 96.41(e)(2), Radiated spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	
Date(s):			
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

Plot 7.5.1 Radiated emission measurements in 9 – 30 MHz range

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



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:**	
Date(s):			
Temperature: 21 ºC	**Relative Humidity:** 54 %	**Air Pressure:** 1012 hPa	**Power:** 110 VAC, 50 Hz
Remarks:			

Plot 7.5.2 Radiated emission measurements in 9 – 30 MHz range

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