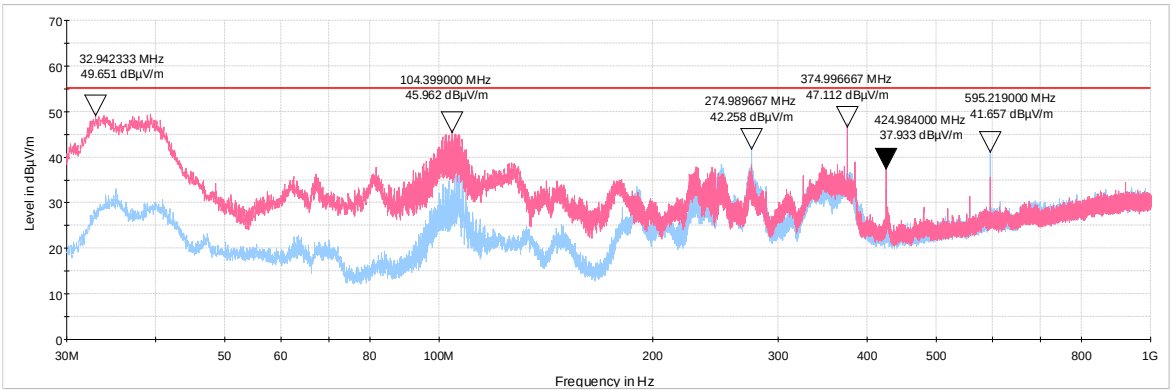
Test specification:	Section 96.41(e)(2), Radiated spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	24-Apr-23		
Temperature: 24 ºC	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

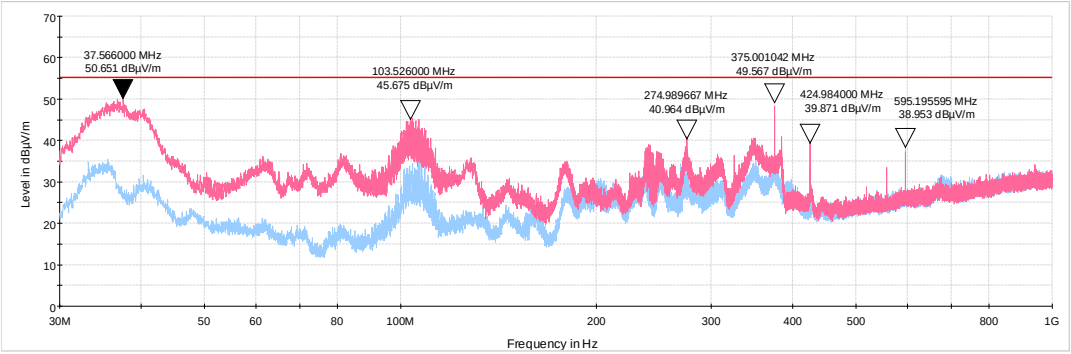
Plot 7.5.4 Radiated emission measurements in 30 - 1000 MHz range

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

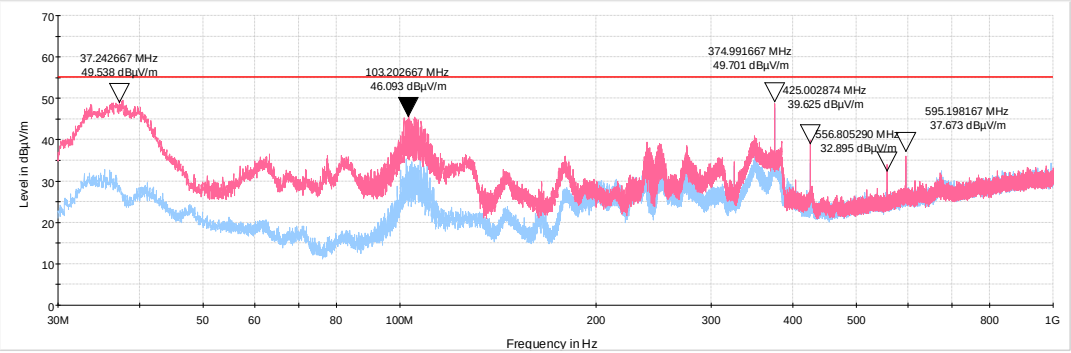
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 96.41(e)(2), Radiated spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	24-Apr-23		
Temperature: 24 ºC	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

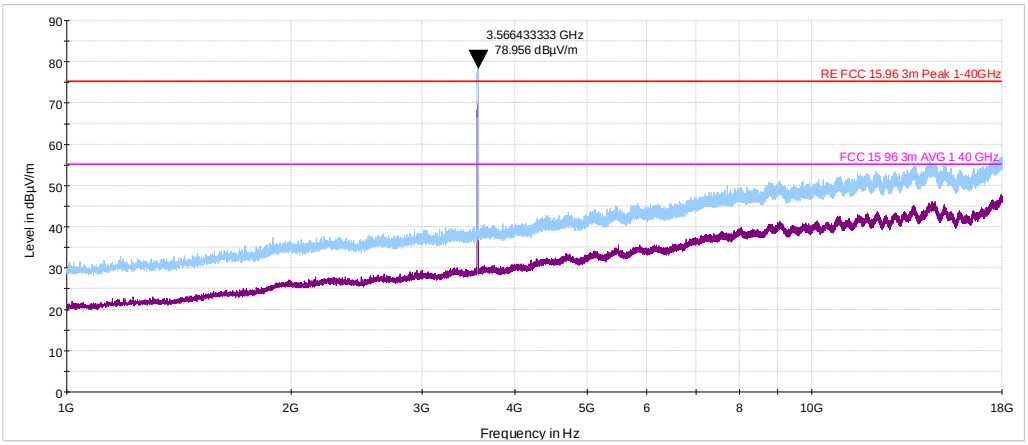
Plot 7.5.6 Radiated emission measurements in 30 - 1000 MHz range

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

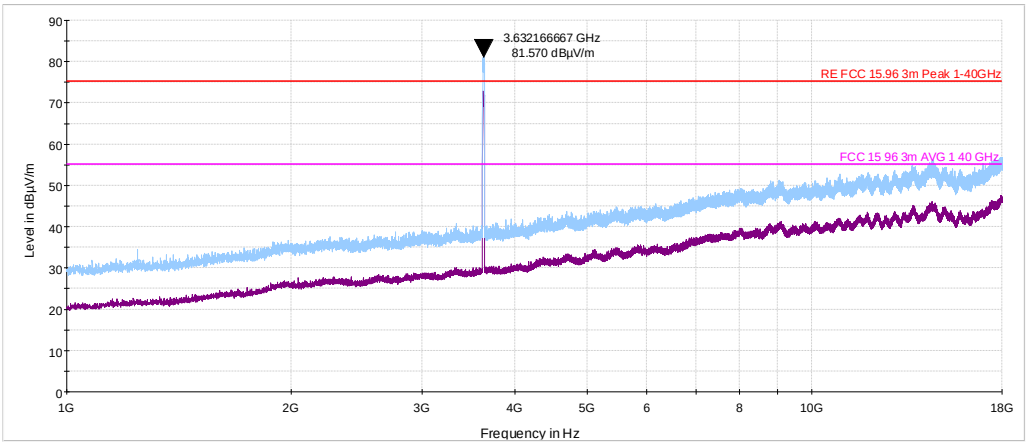
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 96.41(e)(2), Radiated spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	24-Apr-23		
Temperature: 24 ºC	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

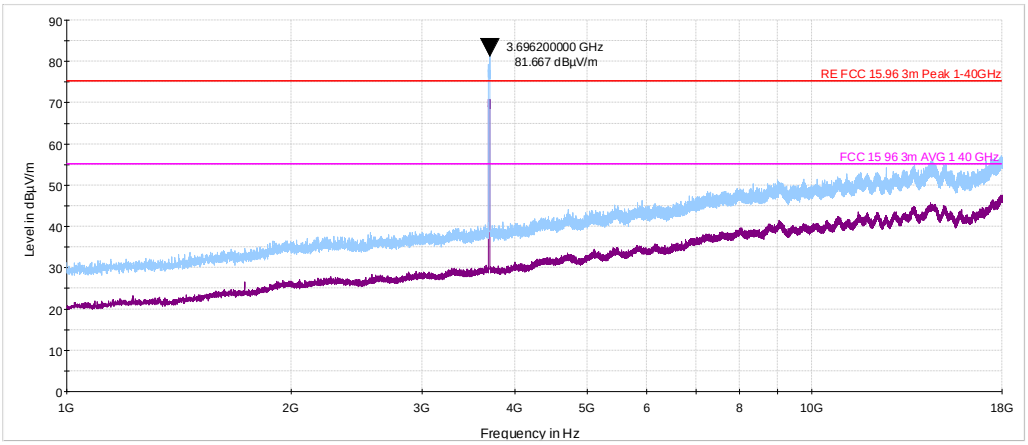
Plot 7.5.8 Radiated emission measurements in 1000 – 18000 MHz range

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



Plot 7.5.9 Radiated emission measurements in 1000 – 18000 MHz range

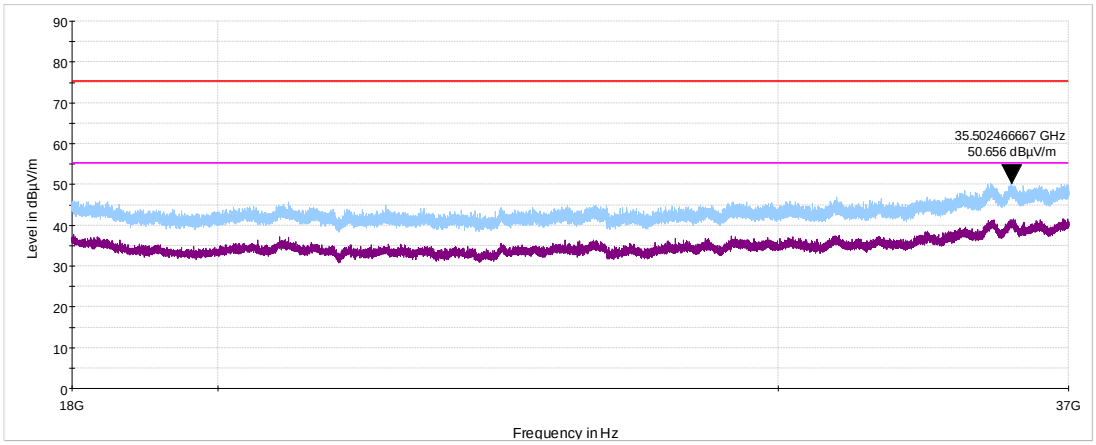
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 96.41(e)(2), Radiated spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	24-Apr-23		
Temperature: 24 ºC	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

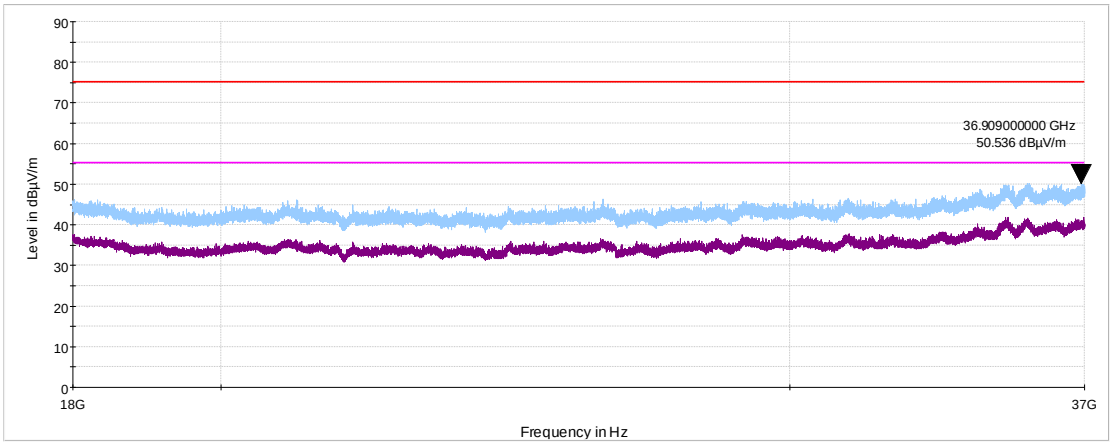
Plot 7.5.10 Radiated emission measurements in 18000 – 37000 MHz range

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):	24-Apr-23		
Temperature: 24 ºC	Relative Humidity: 52 %	Air Pressure: 1011 hPa	Power: 48 VDC
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

Test specification:	Section 96.41(e)(3), Conducted spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	13-Apr-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

7.6 Spurious emissions at RF antenna connector test

7.6.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 7.6.1.

Table 7.6.1 Spurious emission limits

Frequency, MHz	Conducted power of spurious, dBm/MHz
0.009– below 3530.0	-40.0
3720.0 – 10th harmonic*	-40.0

* - spurious emission limits do not apply to the in band emission within ± 250 % of the authorized bandwidth from the carrier; investigated in course of emission mask testing

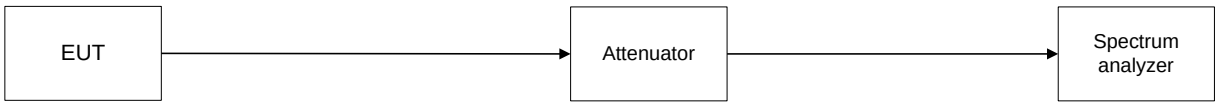
7.6.2 Test procedure

7.6.2.1 The EUT was set up as shown in Figure 7.6.1, energized and its proper operation was checked.

7.6.2.2 The EUT was adjusted to produce maximum available for end user RF output power.

7.6.2.3 The spurious emission was measured with spectrum analyzer as provided in Table 7.6.2 and Table 7.6.3 and associated plots.

Figure 7.6.1 Spurious emission test setup



Test specification:	Section 96.41(e)(3), Conducted spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	13-Apr-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

Table 7.6.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 3550 - 3700 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 37000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 256QAM
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
NUMBER ANTENNA PORTS: N = 4

Frequency, MHz	Peak power (VBW=3 MHz)				Average power (RMS)				Verdict
	Measured, dBm	Total, dBm**	Limit, dBm	Margin, dB*	Measured, dBm	Total, dBm**	Limit, dBm	Margin, dB*	
Channel bandwidth 10 MHz									
Low carrier frequency 3555 MHz									
421.72	-49.36	-43.36	-40	-3.36	-49.36	-43.36	-40	-3.36	Pass
421.56	-50.60	-44.60	-40	-4.6	-50.60	-44.60	-40	-4.6	
993.70	-51.94	-45.94	-40	-5.94	-51.94	-45.94	-40	-5.94	
994.50	-51.73	-45.73	-40	-5.73	-51.73	-45.73	-40	-5.73	
3527.88	-46.57	-40.57	-40	-0.57	-46.57	-40.57	-40	-0.57	
14872.0	-48.53	-42.53	-40	-2.53	-48.53	-42.53	-40	-2.53	
Mid carrier frequency 3625 MHz									
631.89	-50.51	-44.51	-40	-4.51	-50.51	-44.51	-40	-4.51	Pass
631.89	-52.16	-46.16	-40	-6.16	-52.16	-46.16	-40	-6.16	
209.94	-55.14	-49.14	-40	-9.14	-55.14	-49.14	-40	-9.14	
211.71	-54.95	-48.95	-40	-8.95	-54.95	-48.95	-40	-8.95	
1064.7	-48.68	-42.68	-40	-2.68	-48.68	-42.68	-40	-2.68	
3327.19	-49.33	-43.33	-40	-3.33	-49.33	-43.33	-40	-3.33	
15350.3	-48.86	-42.86	-40	-2.86	-48.86	-42.86	-40	-2.86	
High carrier frequency 3695 MHz									
279.45	-53.43	-47.43	-40	-7.43	-53.43	-47.43	-40	-7.43	Pass
840.11	-56.17	-50.17	-40	-10.17	-56.17	-50.17	-40	-10.17	
1134.7	-51.54	-45.54	-40	-5.54	-51.54	-45.54	-40	-5.54	
3363.49	-51.49	-45.49	-40	-5.49	-51.49	-45.49	-40	-5.49	
17904.8	-49.01	-43.01	-40	-3.01	-49.01	-43.01	-40	-3.01	

*****- Margin = Total spurious emission - specification limit.
****** - SA Reading over 1 chain = Max SA reading (Chains #1&2 or chains #3&4)
******* - Total emission = Maximum emission per chain + 10*log(N)

Test specification:	Section 96.41(e)(3), Conducted spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	13-Apr-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

Table 7.6.3 Spurious emission test results (continuation)

ASSIGNED FREQUENCY RANGE: 3550 - 3700 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 37000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 256QAM
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
NUMBER ANTENNA PORTS: N = 4

Frequency, MHz	Peak power (VBW=3 MHz)				Average power (RMS)				Verdict
	Measured, dBm	Total, dBm**	Limit, dBm	Margin, dB*	Measured, dBm	Total, dBm**	Limit, dBm	Margin, dB*	
Channel bandwidth 20 MHz									
Low carrier frequency 3560 MHz									
427.70	-48.79	-42.79	-40	-2.79	-48.79	-42.79	-40	-2.79	Pass
997.09	-52.03	-46.03	-40	-6.03	-52.03	-46.03	-40	-6.03	
3528.23	-47.85	-41.85	-40	-1.85	-47.85	-41.85	-40	-1.85	
3529.29	-49.57	-43.57	-40	-3.57	-49.57	-43.57	-40	-3.57	
3528.15	-46.63	-40.63	-40	-0.63	-46.63	-40.63	-40	-0.63	
3529.56	-46.85	-42.79	-40	-2.79	-46.85	-42.79	-40	-2.79	
Mid carrier frequency 3625 MHz									
628.01	-54.70	-48.7	-40	-8.7	-54.70	-48.7	-40	-8.7	Pass
1064.3	-51.57	-45.57	-40	-5.57	-51.57	-45.57	-40	-5.57	
High carrier frequency 3690 MHz									
274.28	-55.25	-49.25	-40	-9.25	-55.25	-49.25	-40	-9.25	Pass
816.19	-56.25	-50.25	-40	-10.25	-56.25	-50.25	-40	-10.25	
1127.36	-55.09	-49.09	-40	-9.09	-55.09	-49.09	-40	-9.09	

*****- Margin = Total spurious emission - specification limit.
****** - SA Reading over 1 chain = Max SA reading (Chains #1&2 or chains #3&4)
******* - Total emission = Maximum emission per chain + 10*log(N)

Reference numbers of test equipment used

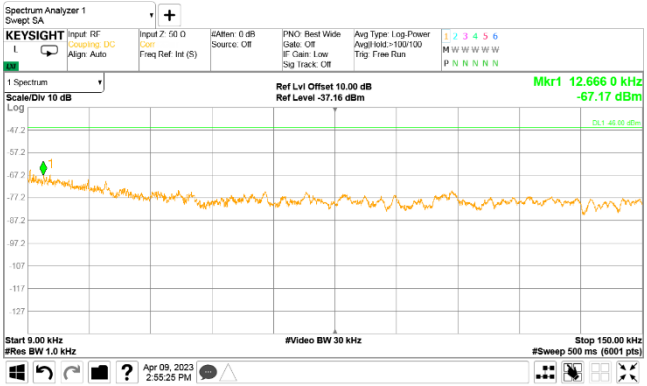
HL 2016	HL 3433	HL 5376	HL 5594	HL 5606			

Full description is given in Appendix A.

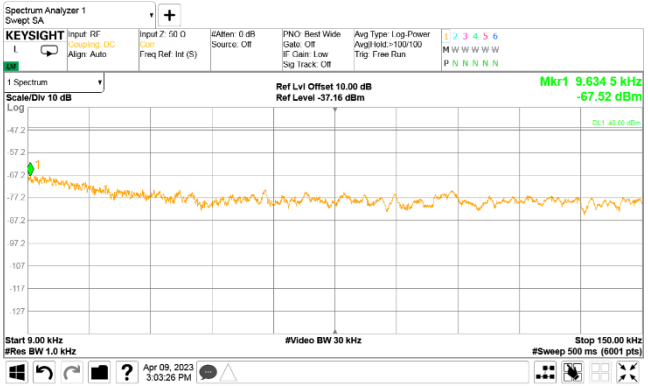
Test specification:	Section 96.41(e)(3), Conducted spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	13-Apr-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

Plot 7.6.1 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency

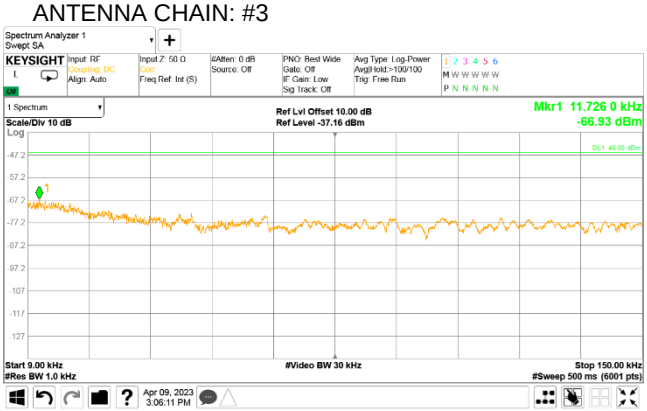
MODULATION: 256QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: #1



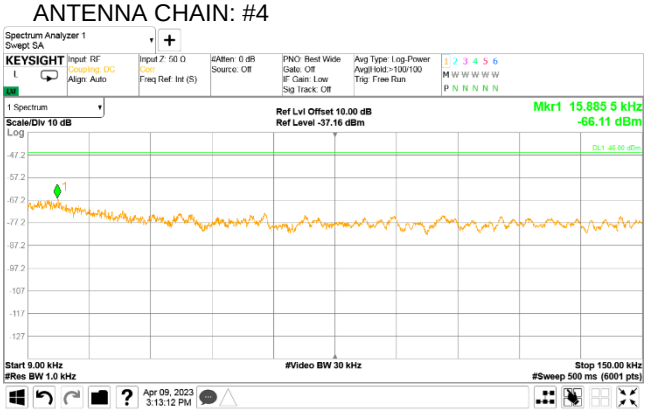
ANTENNA CHAIN: #2



ANTENNA CHAIN: #3



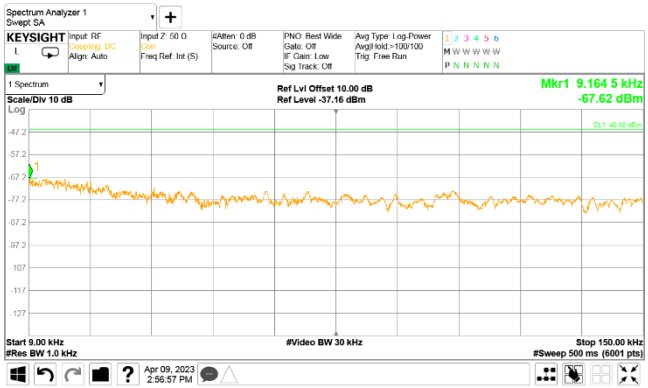
ANTENNA CHAIN: #4



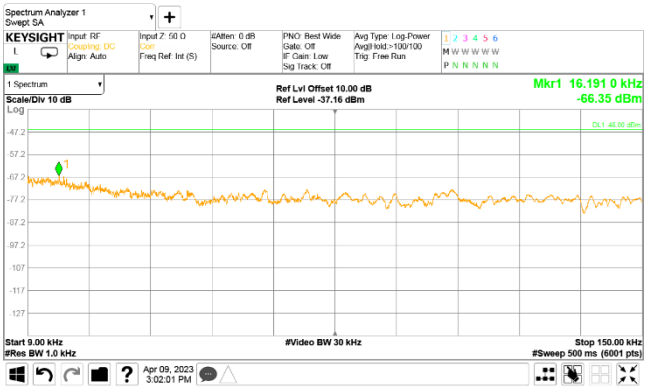
Test specification:	Section 96.41(e)(3), Conducted spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	13-Apr-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

Plot 7.6.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency

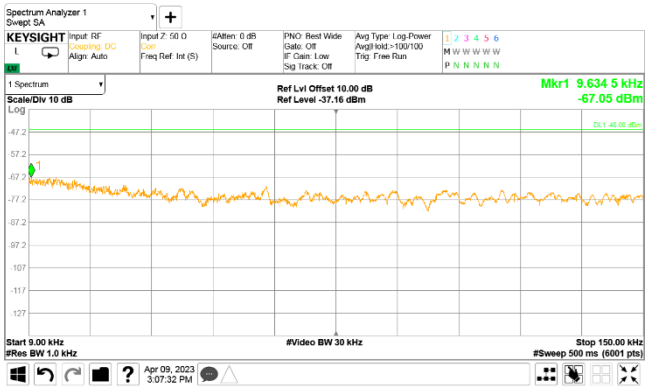
MODULATION: 256QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: #1



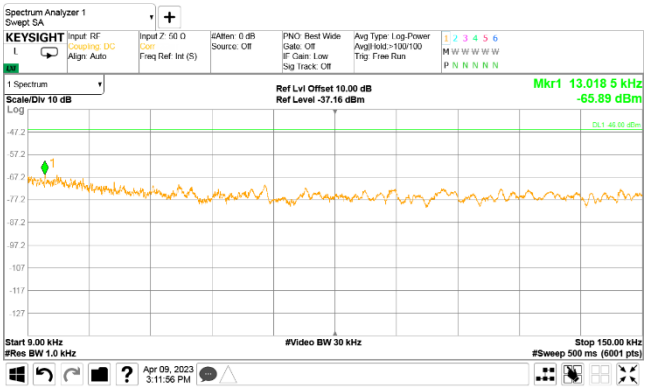
ANTENNA CHAIN: #2



ANTENNA CHAIN: #3



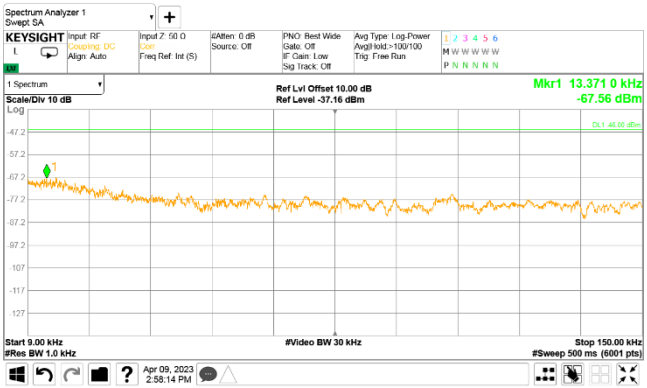
ANTENNA CHAIN: #4



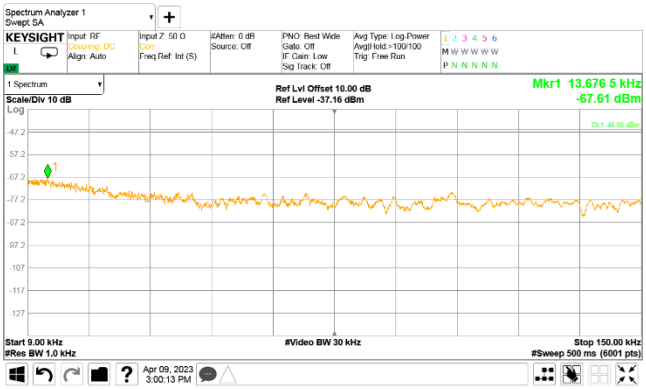
Test specification:	Section 96.41(e)(3), Conducted spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	13-Apr-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

Plot 7.6.3 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency

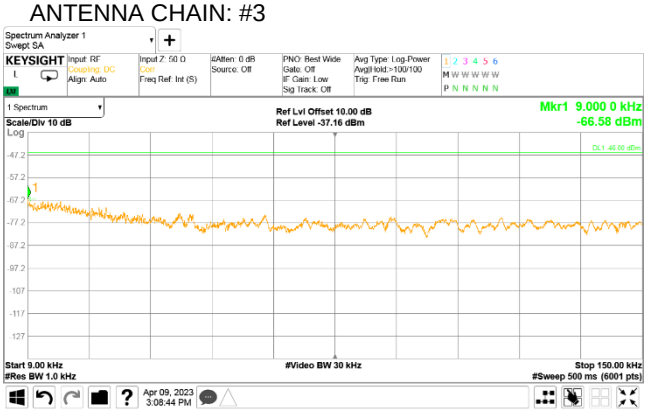
MODULATION: 256QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: #1



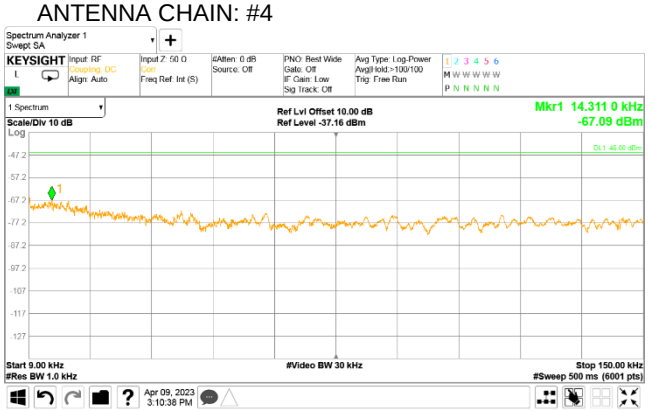
ANTENNA CHAIN: #2



ANTENNA CHAIN: #3



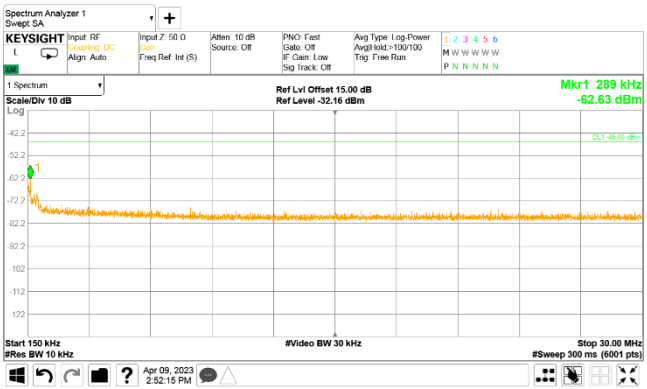
ANTENNA CHAIN: #4



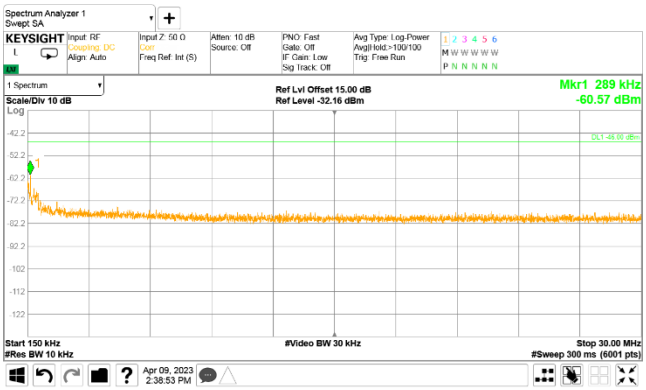
Test specification:	Section 96.41(e)(3), Conducted spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	13-Apr-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

Plot 7.6.4 Spurious emission measurements in 150 kHz - 30 MHz range at low carrier frequency

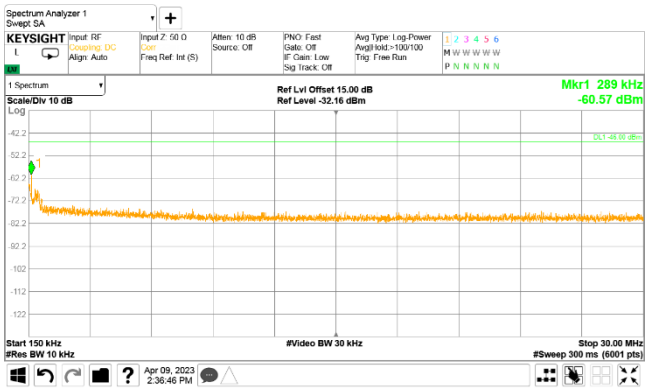
MODULATION: 256QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: #1



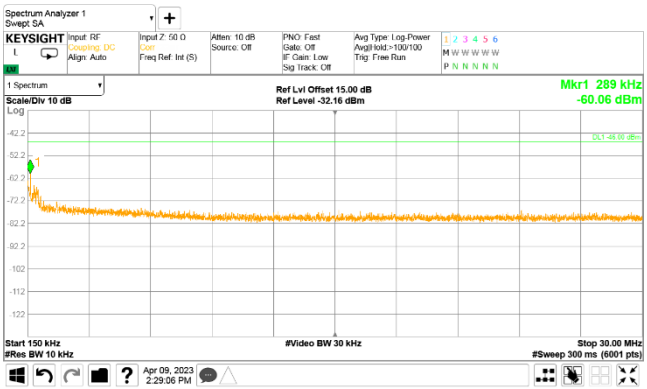
ANTENNA CHAIN: #2



ANTENNA CHAIN: #3



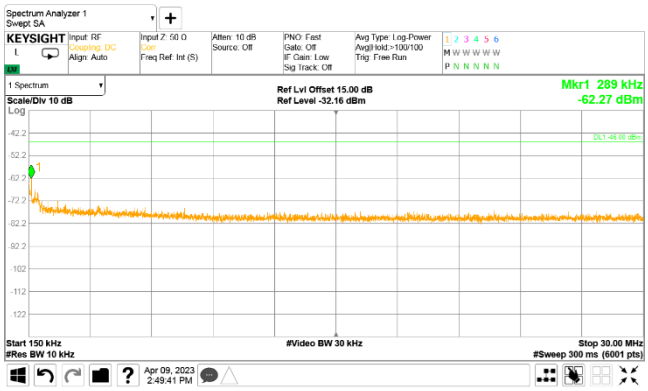
ANTENNA CHAIN: #4



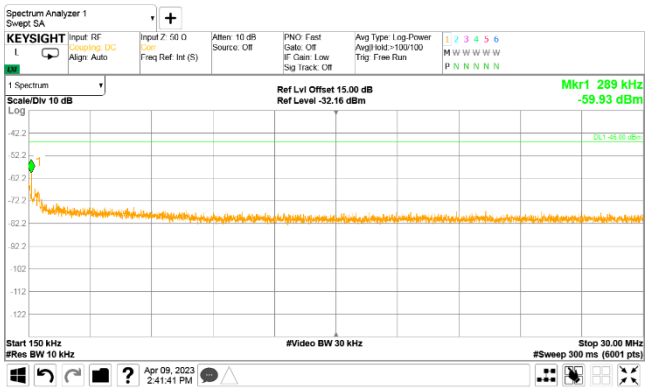
Test specification:	Section 96.41(e)(3), Conducted spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	13-Apr-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

Plot 7.6.5 Spurious emission measurements in 150 kHz - 30 MHz range at mid carrier frequency

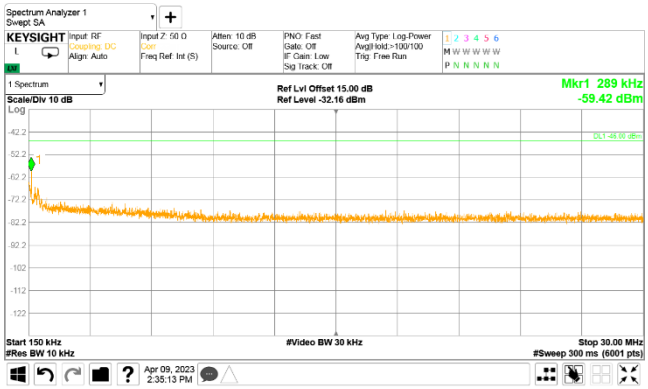
MODULATION: 256QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: #1



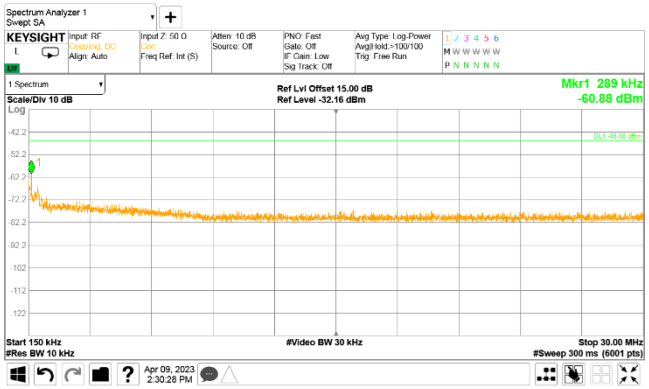
ANTENNA CHAIN: #2



ANTENNA CHAIN: #3



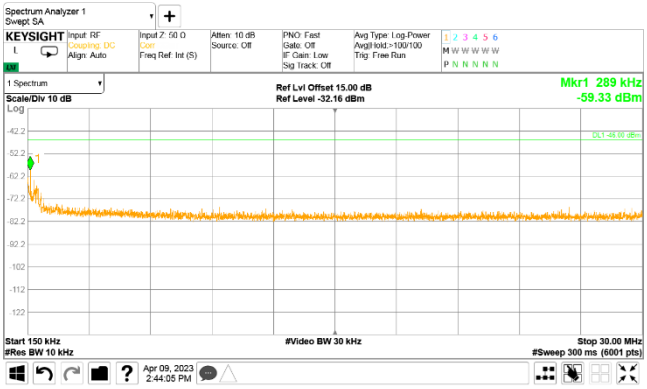
ANTENNA CHAIN: #4



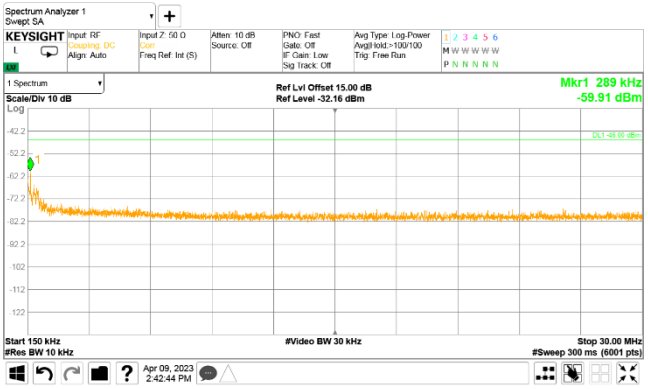
Test specification:	Section 96.41(e)(3), Conducted spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	13-Apr-23		
Temperature: 21 ºC	Relative Humidity: 54 %	Air Pressure: 1012 hPa	Power: 110 VAC, 50 Hz
Remarks:			

Plot 7.6.6 Spurious emission measurements in 150 kHz - 30 MHz range at high carrier frequency

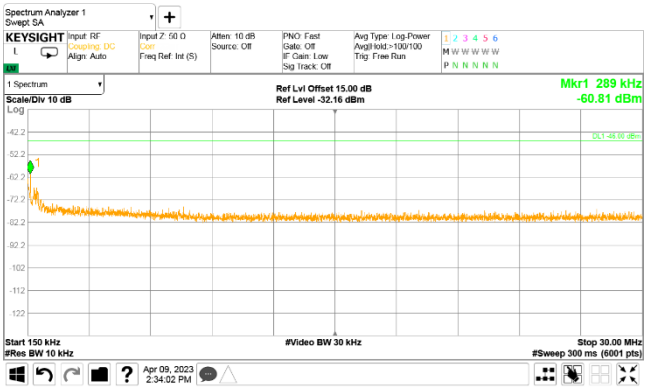
MODULATION: 256QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: #1



ANTENNA CHAIN: #2



ANTENNA CHAIN: #3



ANTENNA CHAIN: #4