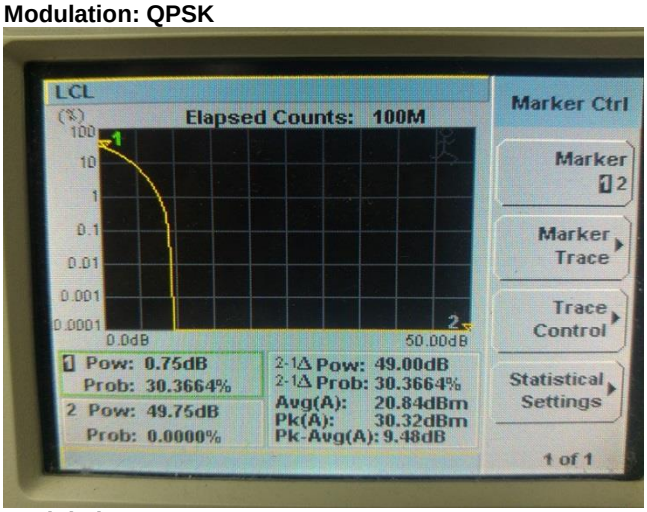
Test specification:	Section 96.41(g), Peak-to-average power ratio		
Test procedure:	Section 96.41(g)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 54 %	Air Pressure: 1010 hPa	Power: 56 VDC
Remarks:			

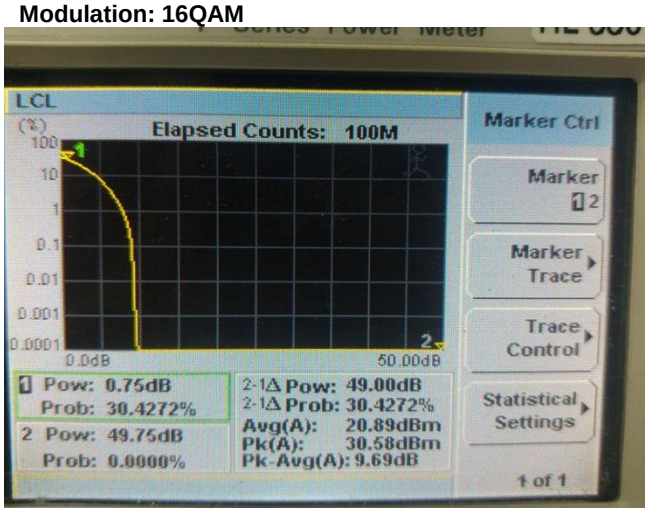
Plot 7.2.5 Peak output power test results at mid frequency

CHANNEL SPACING: 20 MHz
ANTENNA PORT: 1

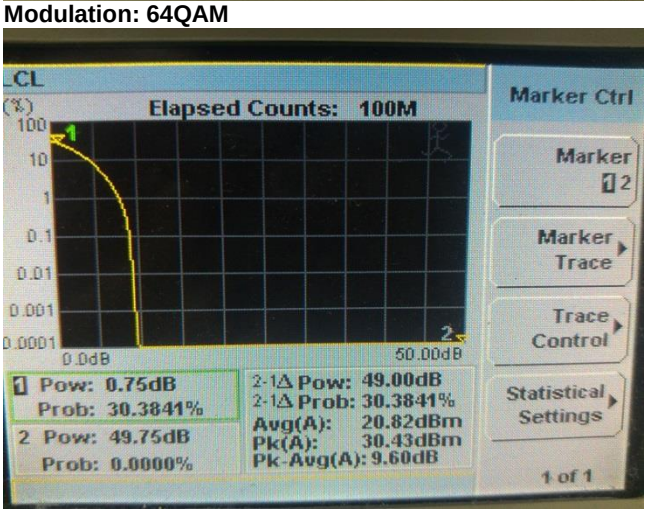
Modulation: QPSK



Modulation: 16QAM



Modulation: 64QAM

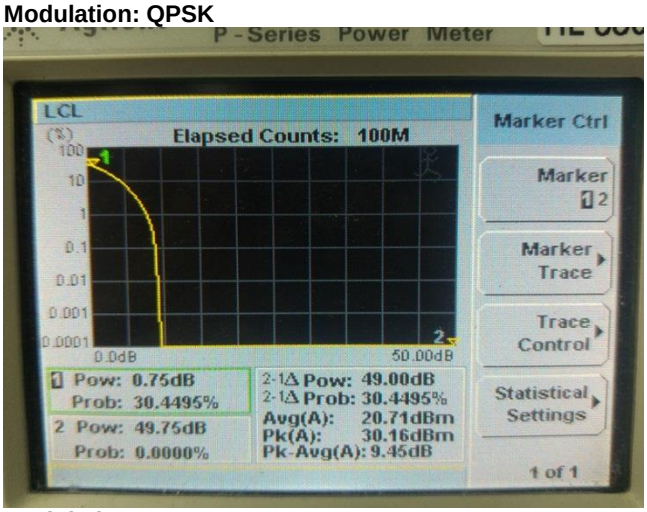


Test specification:	Section 96.41(g), Peak-to-average power ratio		
Test procedure:	Section 96.41(g)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 54 %	Air Pressure: 1010 hPa	Power: 56 VDC
Remarks:			

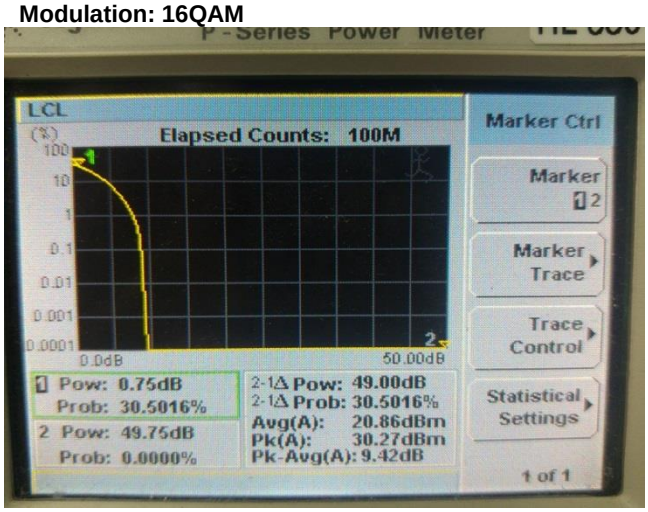
Plot 7.2.6 Peak output power test results at high frequency

CHANNEL SPACING: 20 MHz
ANTENNA PORT: 1

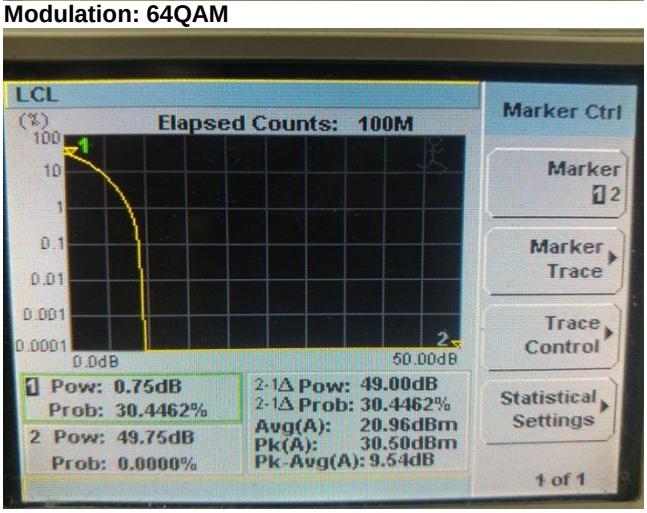
Modulation: QPSK



Modulation: 16QAM



Modulation: 64QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1010 hPa	Power: 56 VDC
Remarks:			

7.3 Occupied bandwidth test

7.3.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Occupied bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, %	Maximum allowed bandwidth, MHz
3550-3700	99	10/20

* - Modulation envelope reference points are provided in terms of attenuation below the unmodulated carrier.

7.3.2 Test procedure

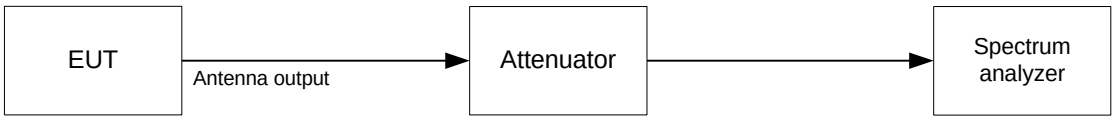
7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.

7.3.2.2 The EUT was set to transmit the unmodulated carrier and the reference peak power level was measured.

7.3.2.3 The EUT was set to transmit the normally modulated carrier.

7.3.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in Table 7.3.2 and the associated plots.

Figure 7.3.1 Occupied bandwidth test setup



Test specification:	**Section 2.1049, Occupied bandwidth**		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Apr-19		
Temperature: 24 ºC	**Relative Humidity:** 55 %	**Air Pressure:** 1010 hPa	**Power:** 56 VDC
Remarks:			

Table 7.3.2 Occupied bandwidth test results

DETECTOR USED: AVR
RESOLUTION BANDWIDTH: 300 kHz
VIDEO BANDWIDTH: 3 MHz
MODULATION ENVELOPE REFERENCE POINTS: 99%

CS=10 MHz

Modulation	Carrier frequency, MHz	Occupied bandwidth, MHz	Limit, MHz	Margin, MHz	Verdict
QPSK	3555	8.9984	10	-1.0011	Pass
	3625	9.0004	10	-0.9996	Pass
	3695	9.0037	10	-0.9963	Pass
16 QAM	3555	9.0031	10	-0.9969	Pass
	3625	8.9772	10	-1.0228	Pass
	3695	8.9882	10	-1.0118	Pass
64 QAM	3555	9.0040	10	-0.9960	Pass
	3625	8.9972	10	-1.0028	Pass
	3695	8.9691	10	-1.0309	Pass

CS=20 MHz

Modulation	Carrier frequency, MHz	Occupied bandwidth, MHz	Limit, MHz	Margin, kHz	Verdict
QPSK	3560	17.8031	20	-2.1969	Pass
	3625	17.8412	20	-2.1588	Pass
	3690	17.8134	20	-2.1866	Pass
16 QAM	3560	17.8334	20	-2.1666	Pass
	3625	17.7827	20	-2.2173	Pass
	3690	17.8007	20	-2.1993	Pass
64 QAM	3560	17.8493	20	-2.1507	Pass
	3625	17.8437	20	-2.1563	Pass
	3690	17.7972	20	-2.2028	Pass

Reference numbers of test equipment used

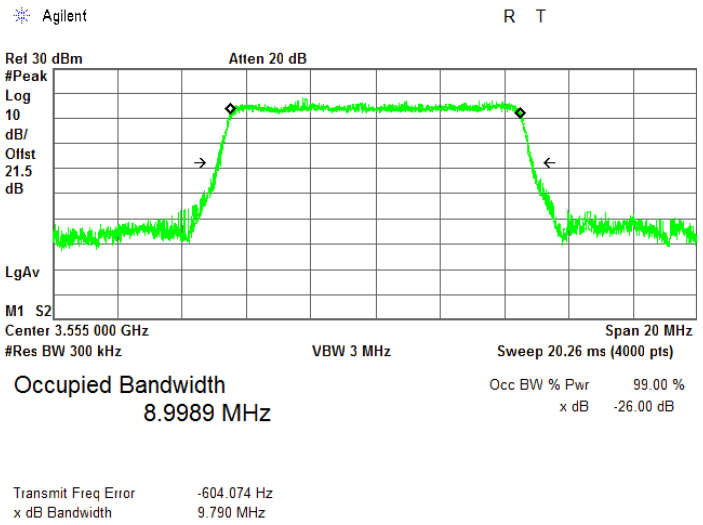
HL 3818							

Full description is given in Appendix A.

Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1010 hPa	Power: 56 VDC
Remarks:			

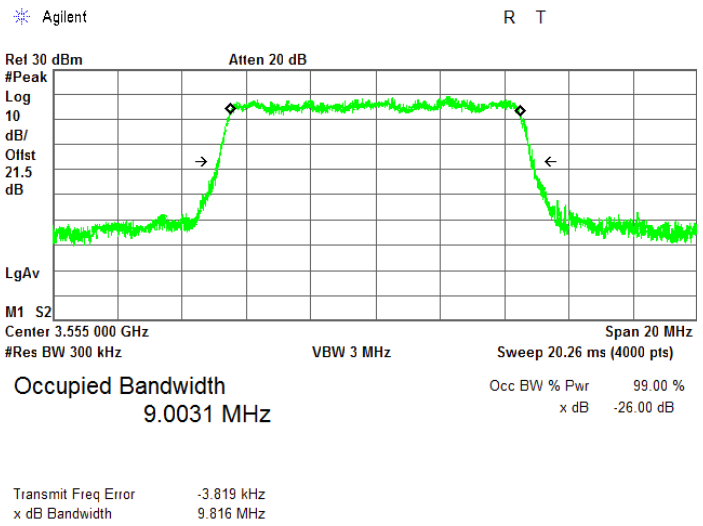
Plot 7.3.1 Occupied bandwidth test result at low frequency

MODULATION: QPSK
CHANNEL SPACING: 10 MHz



Plot 7.3.2 Occupied bandwidth test result at low frequency

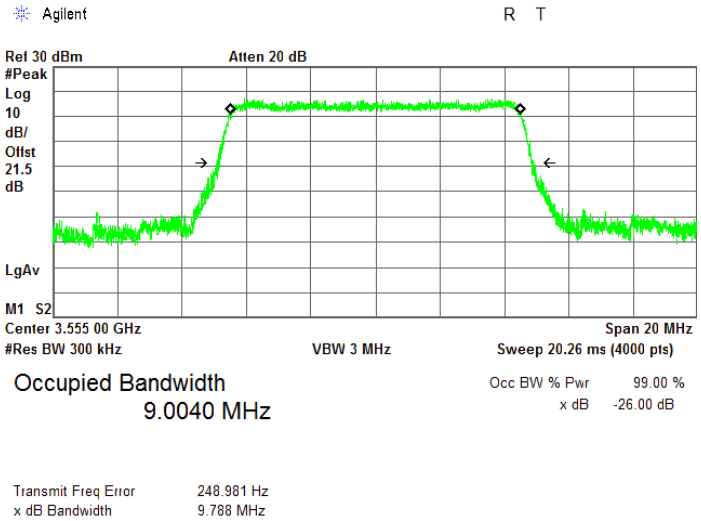
MODULATION: 16QAM
CHANNEL SPACING: 10 MHz



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1010 hPa	Power: 56 VDC
Remarks:			

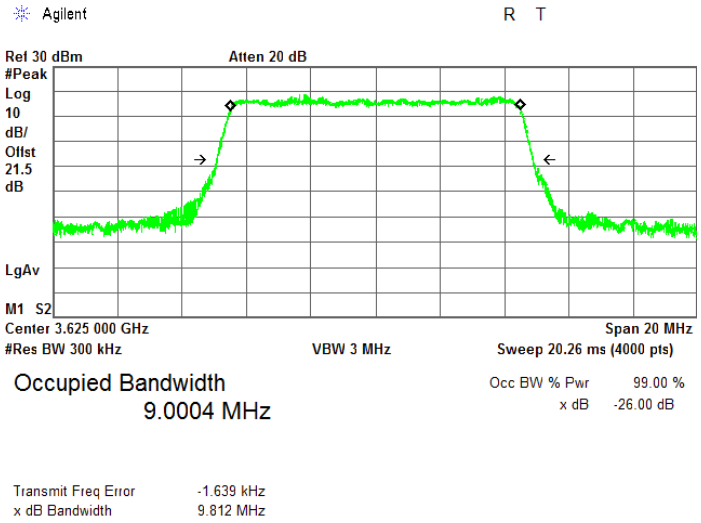
Plot 7.3.3 Occupied bandwidth test result at low frequency

MODULATION: 64QAM
CHANNEL SPACING: 10 MHz



Plot 7.3.4 Occupied bandwidth test result at mid frequency

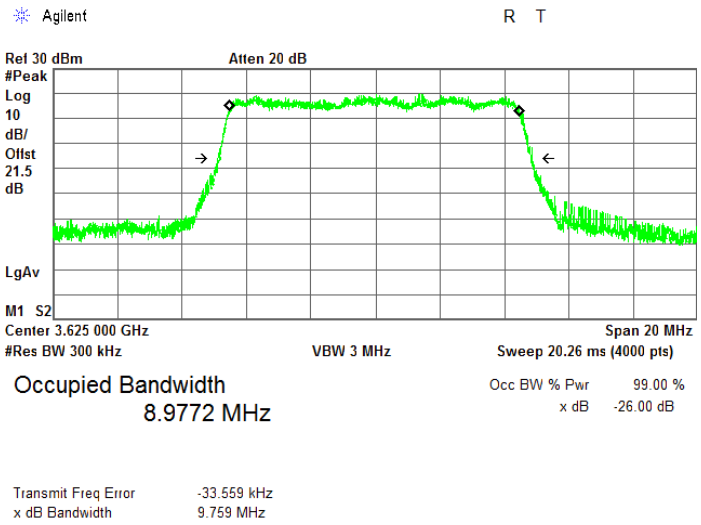
MODULATION: QPSK
CHANNEL SPACING: 10 MHz



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1010 hPa	Power: 56 VDC
Remarks:			

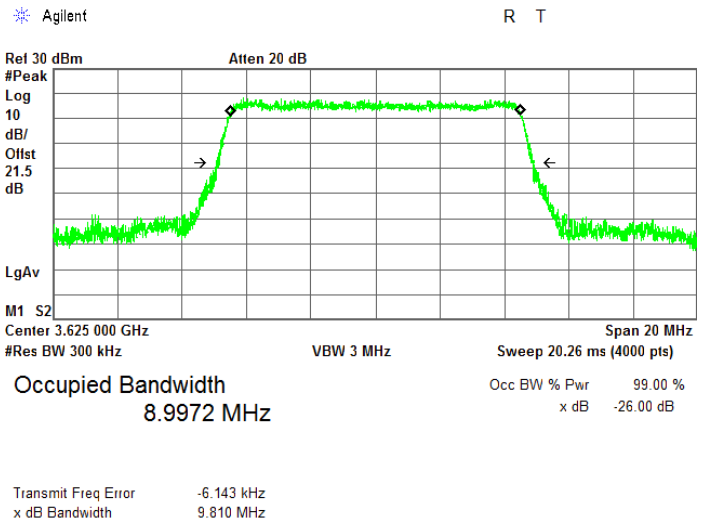
Plot 7.3.5 Occupied bandwidth test result at mid frequency

MODULATION: 16QAM
CHANNEL SPACING: 10 MHz



Plot 7.3.6 Occupied bandwidth test result at mid frequency

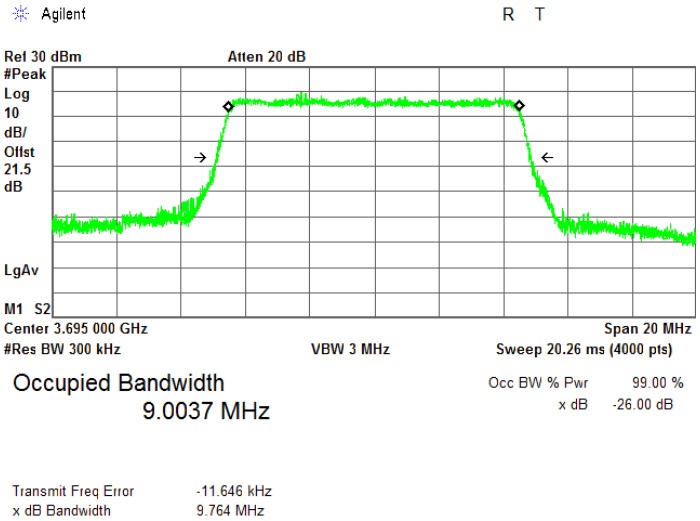
MODULATION: 64QAM
CHANNEL SPACING: 10 MHz



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1010 hPa	Power: 56 VDC
Remarks:			

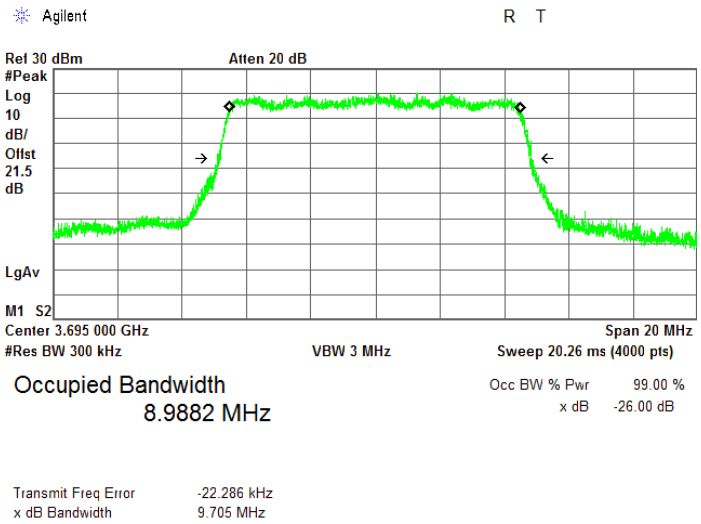
Plot 7.3.7 Occupied bandwidth test result at high frequency

MODULATION: QPSK
CHANNEL SPACING: 10 MHz



Plot 7.3.8 Occupied bandwidth test result at high frequency

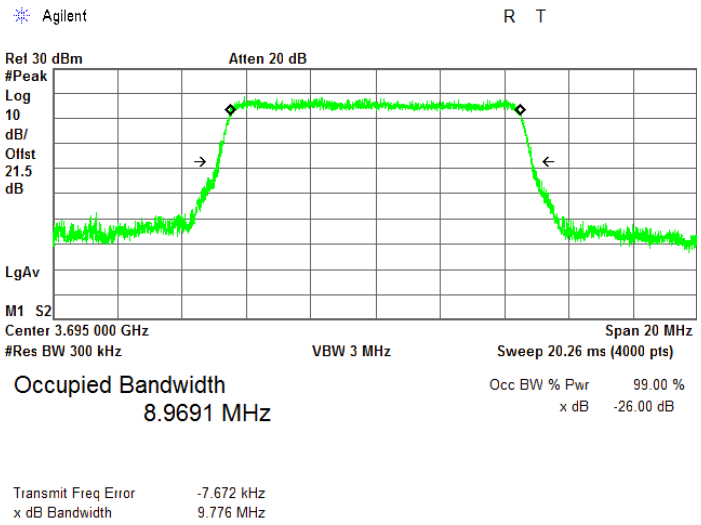
MODULATION: 16QAM
CHANNEL SPACING: 10 MHz



Test specification:	**Section 2.1049, Occupied bandwidth**		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Apr-19		
Temperature: 24 ºC	**Relative Humidity:** 55 %	**Air Pressure:** 1010 hPa	**Power:** 56 VDC
Remarks:			

Plot 7.3.9 Occupied bandwidth test result at high frequency

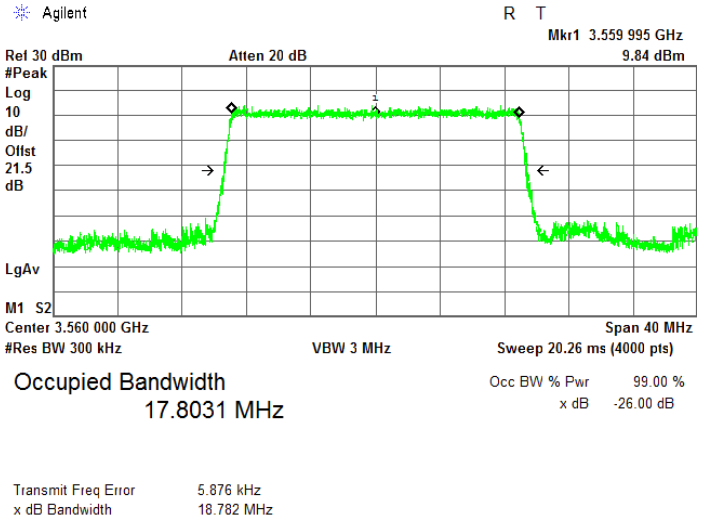
MODULATION: 64QAM
CHANNEL SPACING: 10 MHz



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1010 hPa	Power: 56 VDC
Remarks:			

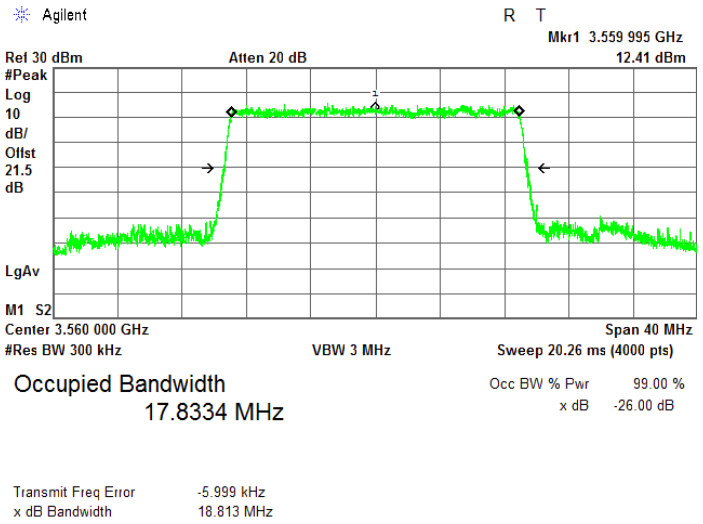
Plot 7.3.10 Occupied bandwidth test result at low frequency

MODULATION: QPSK
CHANNEL SPACING: 20 MHz



Plot 7.3.11 Occupied bandwidth test result at low frequency

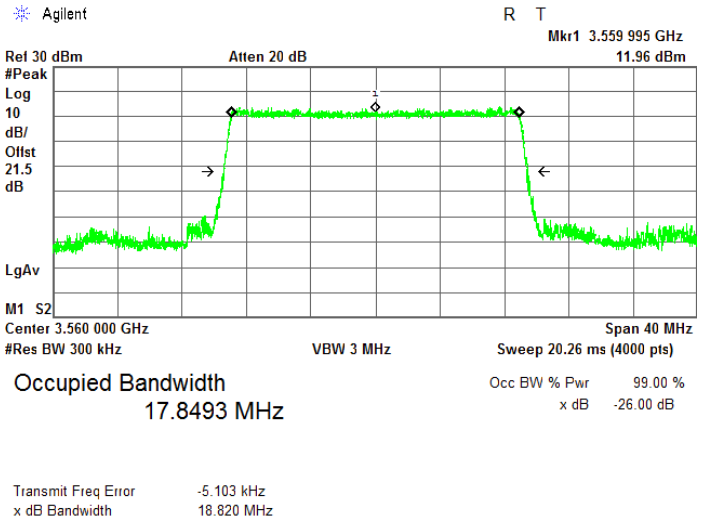
MODULATION: 16QAM
CHANNEL SPACING: 20 MHz



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1010 hPa	Power: 56 VDC
Remarks:			

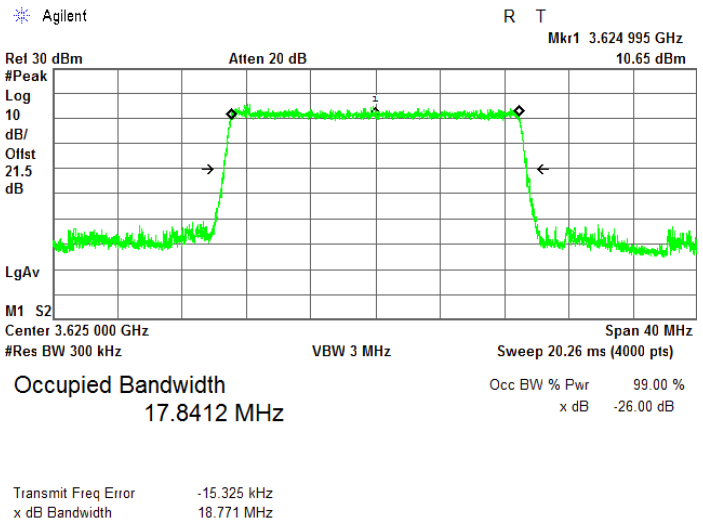
Plot 7.3.12 Occupied bandwidth test result at low frequency

MODULATION: 64QAM
CHANNEL SPACING: 20 MHz



Plot 7.3.13 Occupied bandwidth test result at mid frequency

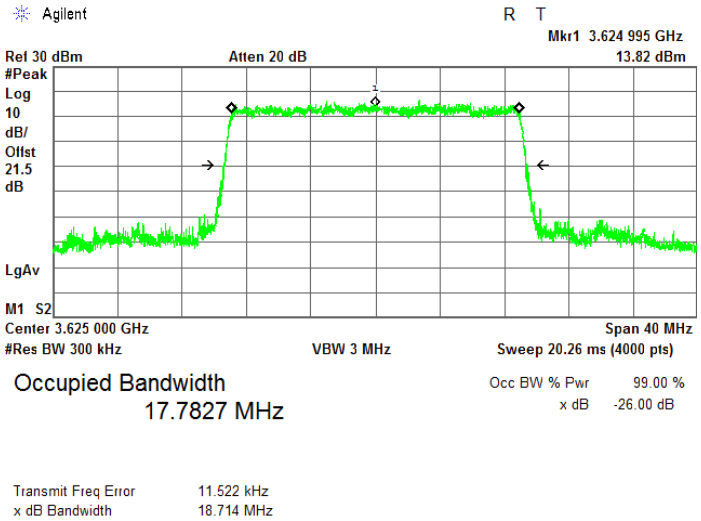
MODULATION: QPSK
CHANNEL SPACING: 20 MHz



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1010 hPa	Power: 56 VDC
Remarks:			

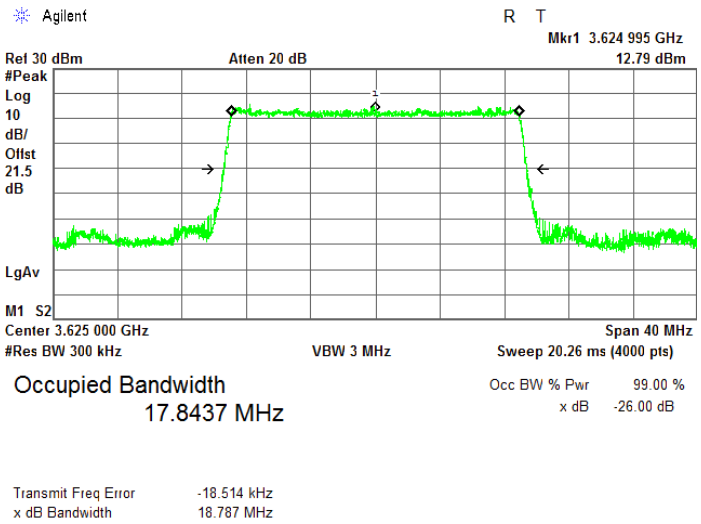
Plot 7.3.14 Occupied bandwidth test result at mid frequency

MODULATION: 16QAM
CHANNEL SPACING: 20 MHz



Plot 7.3.15 Occupied bandwidth test result at mid frequency

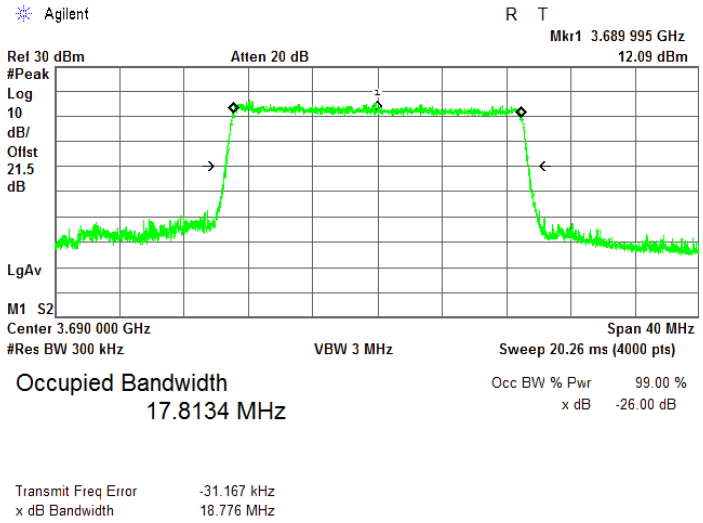
MODULATION: 64QAM
CHANNEL SPACING: 20 MHz



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	11-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1010 hPa	Power: 56 VDC
Remarks:			

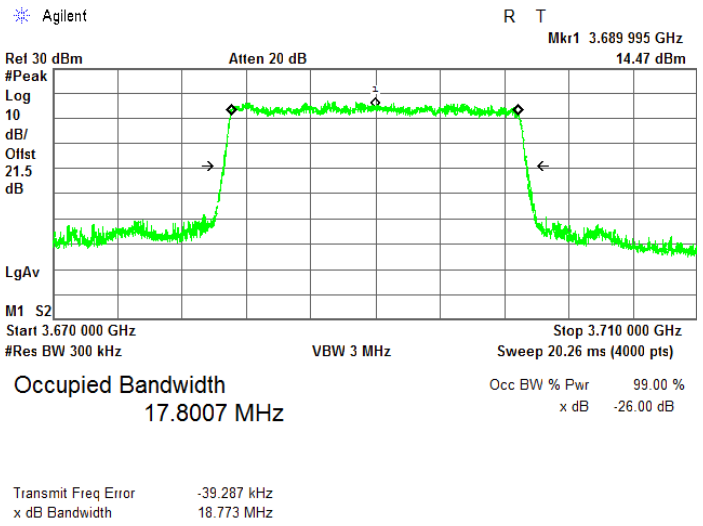
Plot 7.3.16 Occupied bandwidth test result at high frequency

MODULATION: QPSK
CHANNEL SPACING: 20 MHz



Plot 7.3.17 Occupied bandwidth test result at high frequency

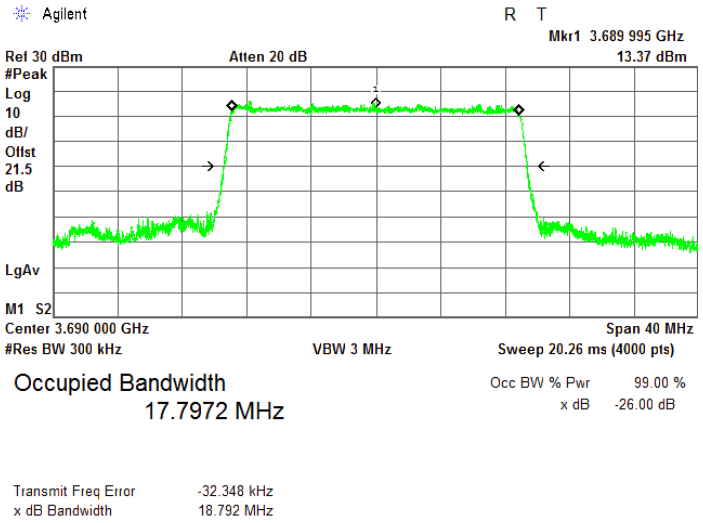
MODULATION: 16QAM
CHANNEL SPACING: 20 MHz



Test specification:	**Section 2.1049, Occupied bandwidth**		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Apr-19		
Temperature: 24 ºC	**Relative Humidity:** 55 %	**Air Pressure:** 1010 hPa	**Power:** 56 VDC
Remarks:			

Plot 7.3.18 Occupied bandwidth test result at high frequency

MODULATION: 64QAM
CHANNEL SPACING: 20 MHz



Test specification:	**Section 96.41(e)(1), Emission mask**		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	**Relative Humidity:** 55 %	**Air Pressure:** 1011 hPa	**Power:** 56 VDC
Remarks:			

7.4 Emission mask test

7.4.1 General

This test was performed to measure emission mask at RF antenna connector. Specification test limits are given in Table 7.4.1.

Table 7.4.1 Emission mask limits

Frequency displacement from frequency block	Limit*, dBm/MHz	RBW, kHz
Channel Spacing 10 MHz		
0 – 1 MHz	- 13	100
0 – 10 MHz	- 13	1000
10 – 20 MHz	- 25	1000
Above 3530 MHz and below 3720 MHz	- 25	1000
Below 3530 MHz and above 3720 MHz	- 40	1000
Channel Spacing 20 MHz		
0 – 1 MHz	- 13	200
0 – 10 MHz	- 13	1000
10 – 20 MHz	- 25	1000
Above 3530 MHz and below 3720 MHz	- 25	1000
Below 3530 MHz and above 3720 MHz	- 40	1000

* - Limit at each antenna connector (amount of antennas N = 2)

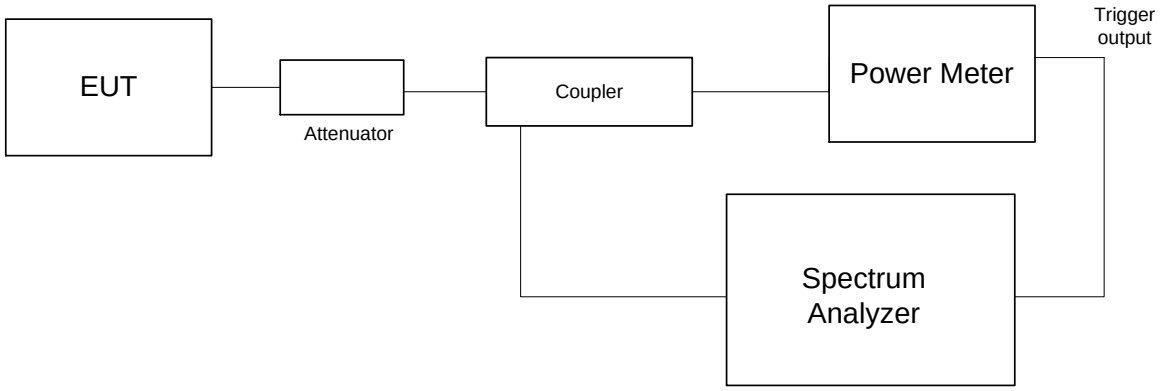
7.4.2 Test procedure

7.4.2.1 The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.

7.4.2.2 The emission mask was measured with spectrum analyzer as provided in Table 7.3.2, Table 7.3.3 and the the associated plots.

Test specification:	Section 96.41(e)(1), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 56 VDC
Remarks:			

Figure 7.4.1 Emission mask test setup



Test specification:	Section 96.41(e)(1), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 56 VDC
Remarks:			

Table 7.4.2 Emission mask test results, CS=10 MHz

Modulation	Carrier frequency, MHz	Frequency displacement from EA frequency block	Meas result, dBm/MHz	Test result**, dBm/MHz	Limit*, dBm/MHz	Verdict
QPSK	Low	Within 0 to 10 MHz	-33.42	-31.75	-16	Pass
		Greater than 10 MHz	-52.86	-51.19	-28	Pass
		Below 3530 MHz	-58.10	-56.43	-43	Pass
	Mid	Within 0 to 10 MHz	-33.68	-32.01	-16	Pass
		Greater than 10 MHz	-53.21	-51.54	-28	Pass
	High	Within 0 to 10 MHz	-32.24	-30.57	-16	Pass
		Greater than 10 MHz	-52.20	-50.53	-28	Pass
		Above 3720 MHz	-58.46	-56.79	-43	Pass
16 QAM	Low	Within 0 to 10 MHz	-33.39	-31.72	-16	Pass
		Greater than 10 MHz	-52.05	-50.38	-28	Pass
		Below 3530 MHz	-57.68	-56.01	-43	Pass
	Mid	Within 0 to 10 MHz	-33.27	-31.60	-16	Pass
		Greater than 10 MHz	-53.23	-51.56	-28	Pass
	High	Within 0 to 10 MHz	-32.00	-30.33	-16	Pass
		Greater than 10 MHz	-53.11	-51.44	-28	Pass
		Above 3720 MHz	-58.44	-56.77	-43	Pass
64 QAM	Low	Within 0 to 10 MHz	-33.40	-31.73	-16	Pass
		Greater than 10 MHz	-53.35	-51.68	-28	Pass
		Below 3530 MHz	-57.99	-56.32	-43	Pass
	Mid	Within 0 to 10 MHz	-33.11	-31.44	-16	Pass
		Greater than 10 MHz	-54.12	-52.45	-28	Pass
	High	Within 0 to 10 MHz	-32.21	-30.54	-16	Pass
		Greater than 10 MHz	-52.51	-50.84	-28	Pass
		Above 3720 MHz	-58.41	-56.74	-43	Pass

*The limit was reduced 3 dB due to 2 antennae.
DC factor=10 x log (1/duty cycle)= 10 x log(1/0.68) = 1.67 dB
** Test result = Meas result + DC factor

Test specification:	**Section 96.41(e)(1), Emission mask**		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	**Relative Humidity:** 55 %	**Air Pressure:** 1011 hPa	**Power:** 56 VDC
Remarks:			

Table 7.4.3 Emission mask test results, CS=20 MHz

Modulation	Carrier frequency, MHz	Frequency displacement from EA frequency block	Meas result, dBm/MHz	Test result**, dBm/MHz	Limit*, dBm/MHz	Verdict
QPSK	Low	Within 0 to 10 MHz	-43.14	-41.47	-16	Pass
		Greater than 10 MHz	-49.06	-47.39	-28	Pass
		Below 3530 MHz	-58.94	-57.27	-43	Pass
	Mid	Within 0 to 10 MHz	-42.63	-40.96	-16	Pass
		Greater than 10 MHz	-50.05	-48.38	-28	Pass
	High	Within 0 to 10 MHz	-42.16	-40.49	-16	Pass
		Greater than 10 MHz	-50.90	-49.23	-28	Pass
		Above 3720 MHz	-51.93	-60.26	-43	Pass
16 QAM	Low	Within 0 to 10 MHz	-42.19	-40.52	-16	Pass
		Greater than 10 MHz	-47.89	-46.22	-28	Pass
		Below 3530 MHz	-58.83	-57.66	-43	Pass
	Mid	Within 0 to 10 MHz	-44.54	-42.87	-16	Pass
		Greater than 10 MHz	-50.43	-48.76	-28	Pass
	High	Within 0 to 10 MHz	-41.42	-39.75	-16	Pass
		Greater than 10 MHz	-49.35	-47.68	-28	Pass
		Above 3720 MHz	-61.89	-60.22	-43	Pass
64 QAM	Low	Within 0 to 10 MHz	-43.47	-41.8	-16	Pass
		Greater than 10 MHz	-46.86	-45.19	-28	Pass
		Below 3530 MHz	-55.54	-53.87	-43	Pass
	Mid	Within 0 to 10 MHz	-43.44	-41.77	-16	Pass
		Greater than 10 MHz	-50.13	-48.46	-28	Pass
	High	Within 0 to 10 MHz	-42.37	-40.70	-16	Pass
		Greater than 10 MHz	-49.86	-48.19	-28	Pass
		Above 3720 MHz	-62.14	-60.47	-43	Pass

*The limit was reduced 3 dB due to 2 antennae.
DC factor=10 x log (1/duty cycle)= 10 x log(1/0.68) = 1.67 dB
** Test result = Meas result + DC factor

Reference numbers of test equipment used

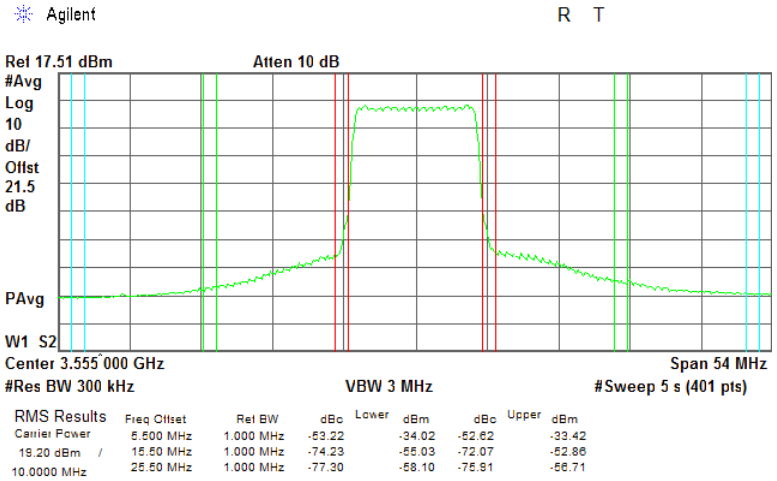
HL 3818	HL 3903						

Full description is given in Appendix A.

Test specification:	Section 96.41(e)(1), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 56 VDC
Remarks:			

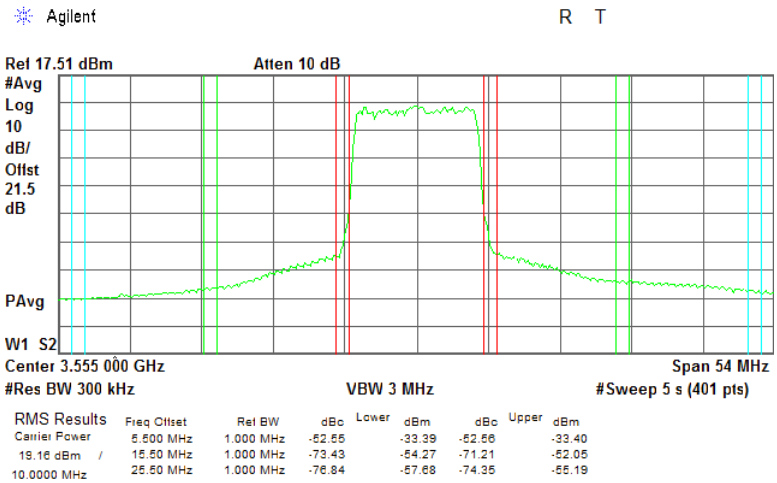
Plot 7.4.1 Emission mask test results at low carrier frequency

MODULATION: QPSK
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Plot 7.4.2 Emission mask test results at low carrier frequency

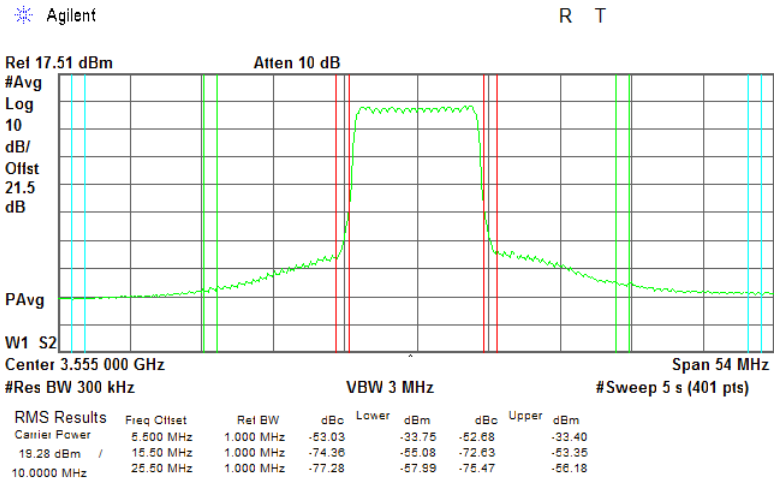
MODULATION: 16QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Test specification:	Section 96.41(e)(1), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 56 VDC
Remarks:			

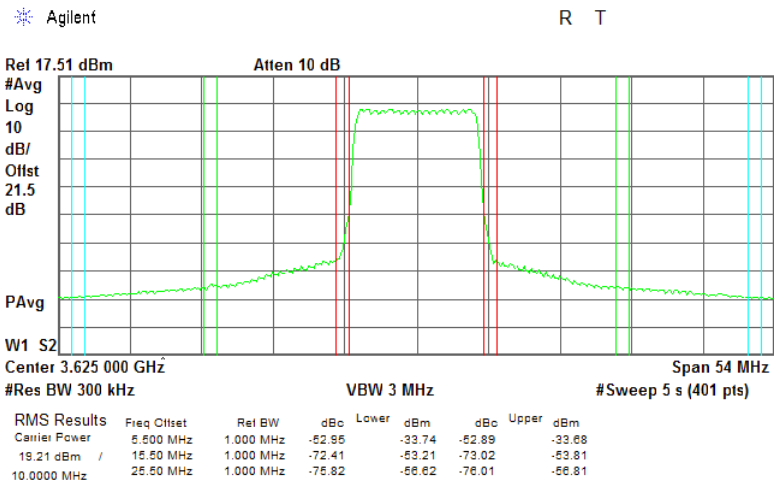
Plot 7.4.3 Emission mask test results at low carrier frequency

MODULATION: 64QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Plot 7.4.4 Emission mask test results at mid carrier frequency

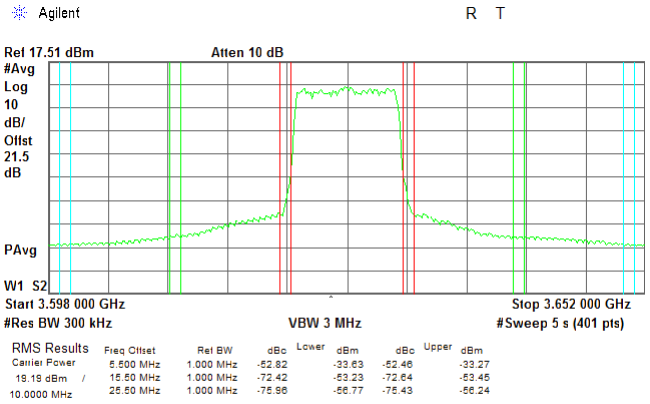
MODULATION: QPSK
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Test specification:	Section 96.41(e)(1), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 56 VDC
Remarks:			

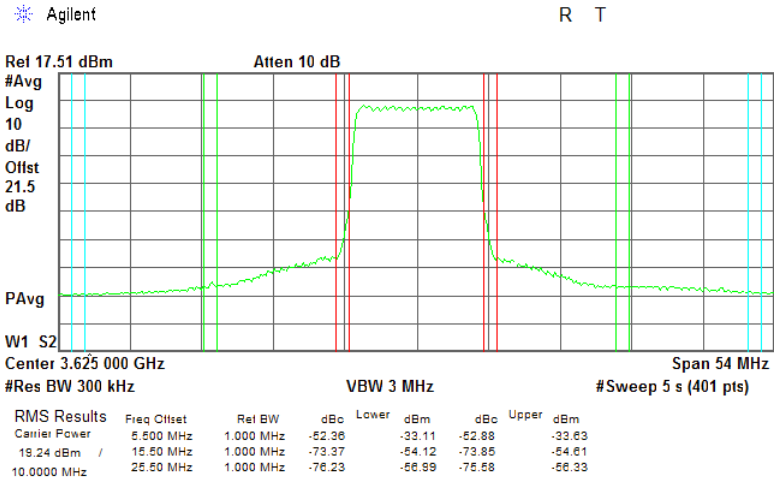
Plot 7.4.5 Emission mask test results at mid carrier frequency

MODULATION: 16QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Plot 7.4.6 Emission mask test results at mid carrier frequency

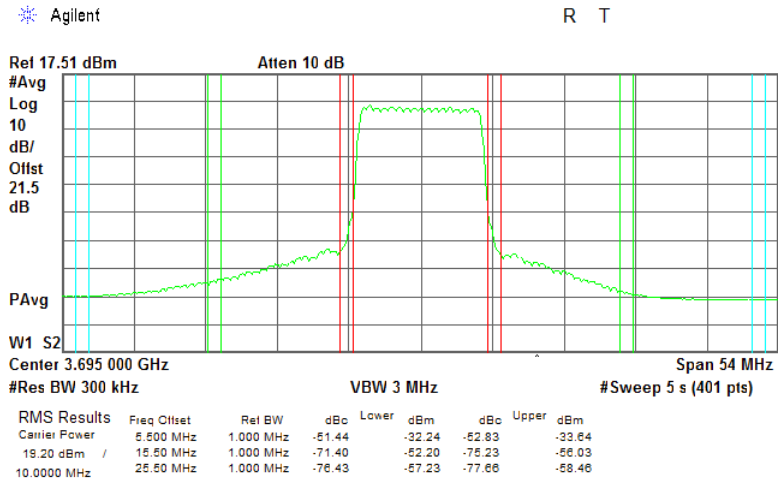
MODULATION: 64QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Test specification:	Section 96.41(e)(1), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 56 VDC
Remarks:			

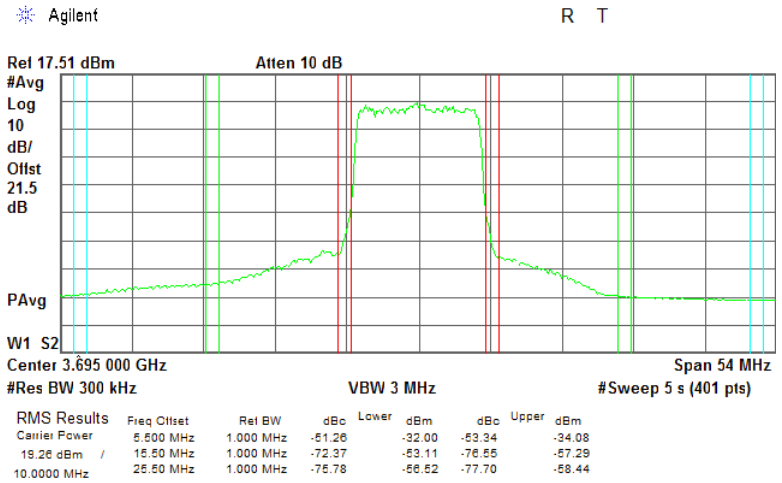
Plot 7.4.7 Emission mask test results at high carrier frequency

MODULATION: QPSK
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Plot 7.4.8 Emission mask test results at high carrier frequency

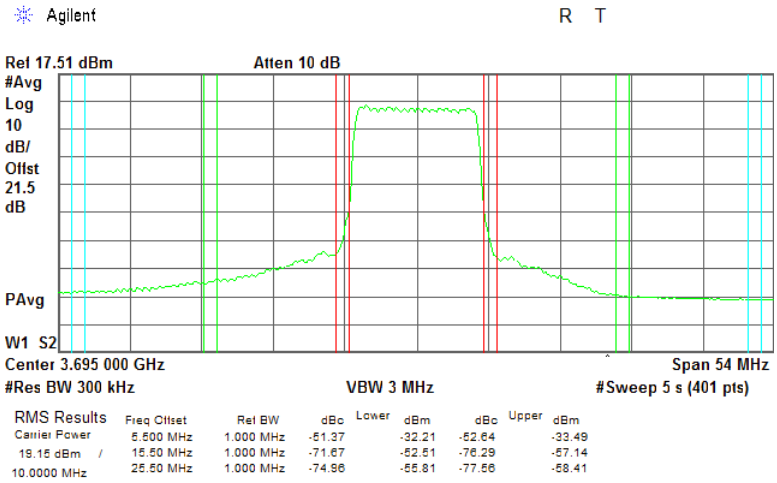
MODULATION: 16QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Test specification:	Section 96.41(e)(1), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 56 VDC
Remarks:			

Plot 7.4.9 Emission mask test results at high carrier frequency

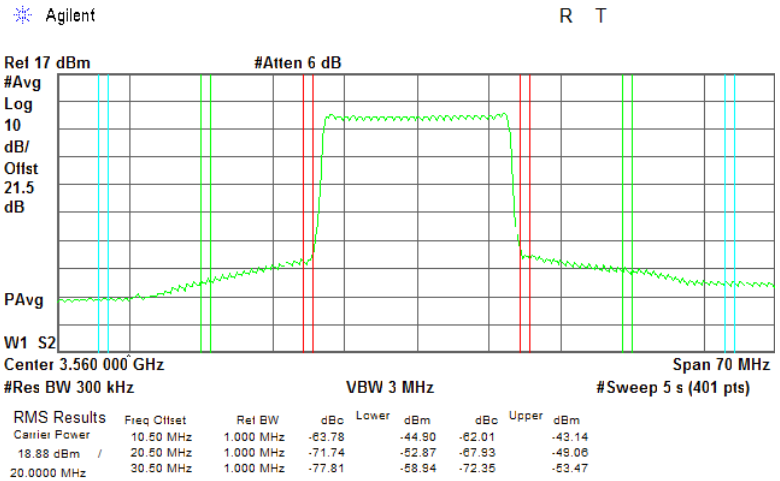
MODULATION:	64QAM
CHANNEL SPACING:	10 MHz
ANTENNA CHAIN:	1



Test specification:	Section 96.41(e)(1), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 56 VDC
Remarks:			

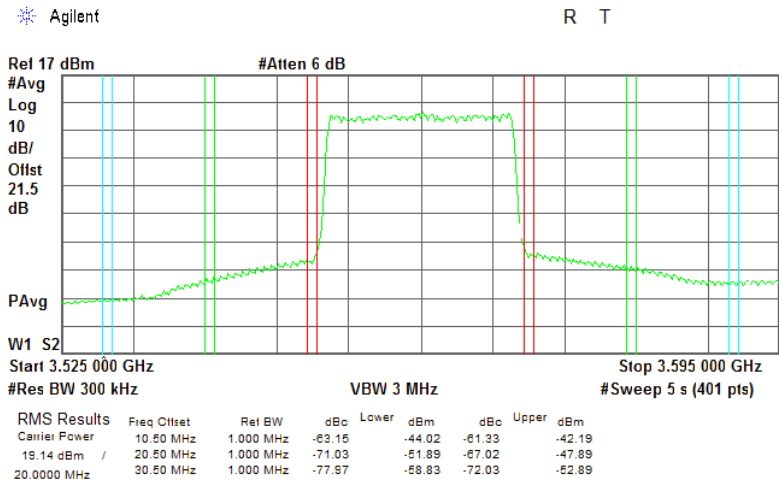
Plot 7.4.10 Emission mask test results at low carrier frequency

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



Plot 7.4.11 Emission mask test results at low carrier frequency

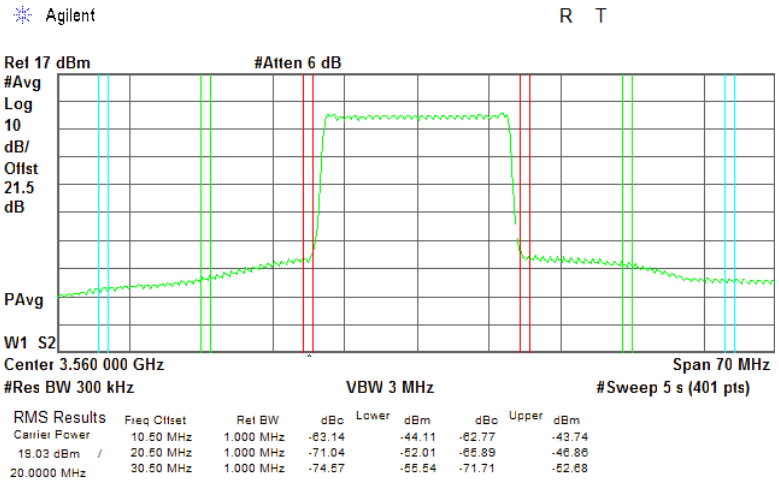
MODULATION: 16QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Test specification:	Section 96.41(e)(1), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 56 VDC
Remarks:			

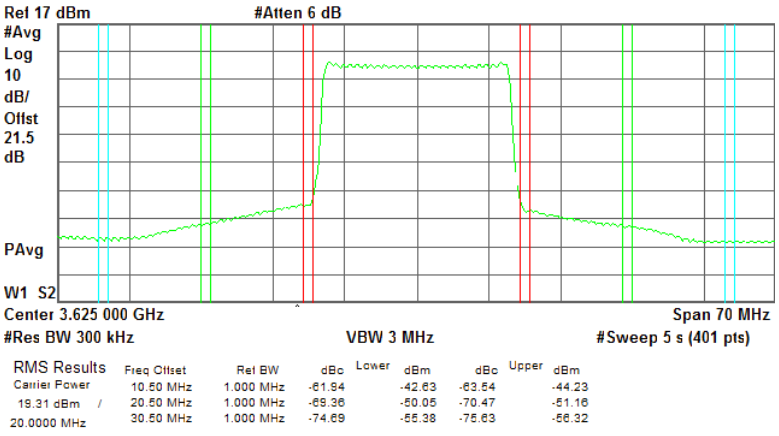
Plot 7.4.12 Emission mask test results at low carrier frequency

MODULATION: 64QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Plot 7.4.13 Emission mask test results at mid carrier frequency

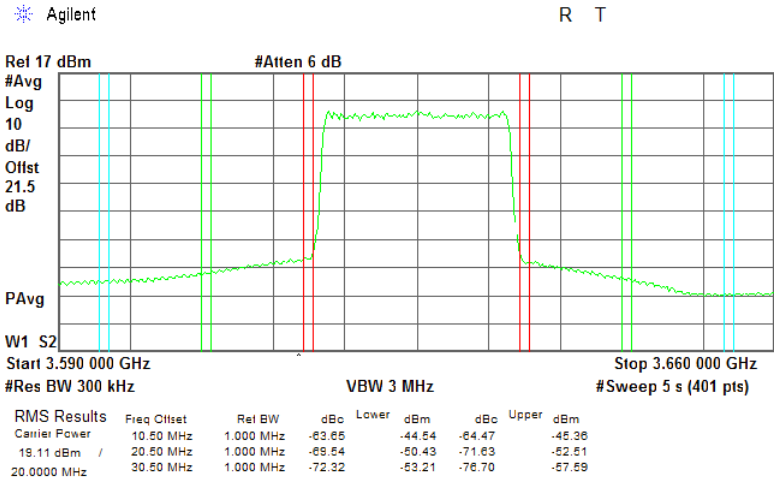
MODULATION: QPSK
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Test specification:	Section 96.41(e)(1), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 56 VDC
Remarks:			

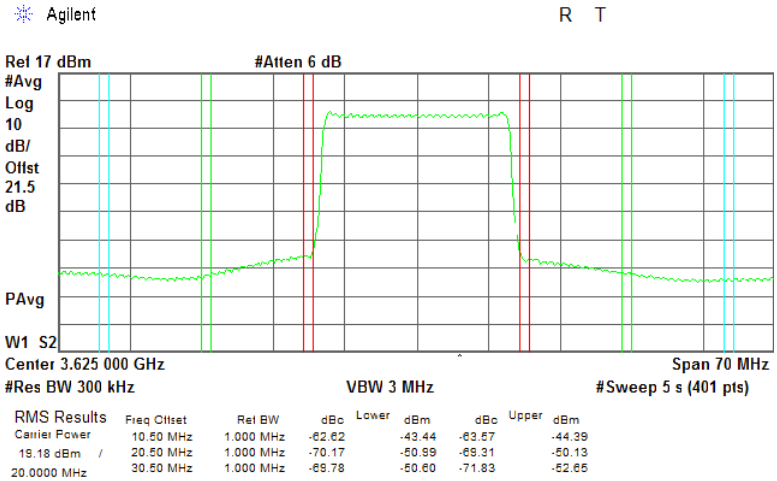
Plot 7.4.14 Emission mask test results at mid carrier frequency

MODULATION: 16QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Plot 7.4.15 Emission mask test results at mid carrier frequency

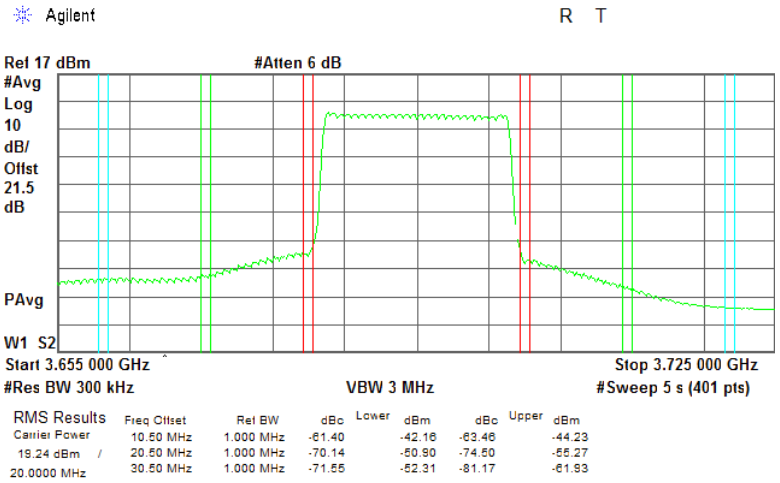
MODULATION: 64QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Test specification:	Section 96.41(e)(1), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 56 VDC
Remarks:			

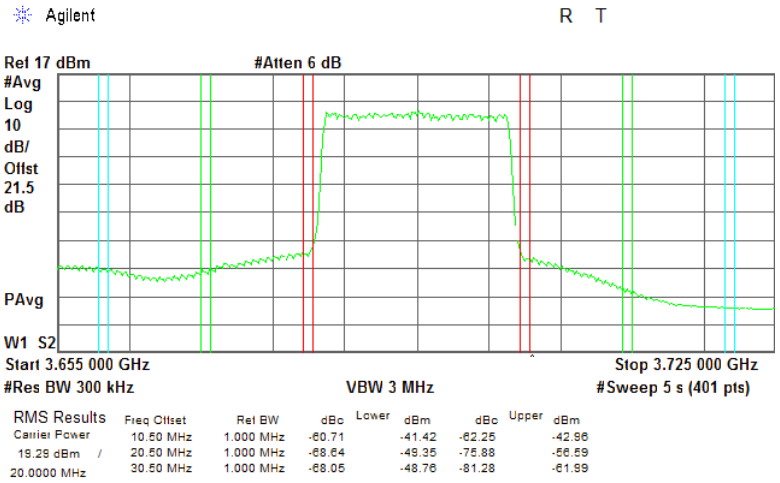
Plot 7.4.16 Emission mask test results at high carrier frequency

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



Plot 7.4.17 Emission mask test results at high carrier frequency

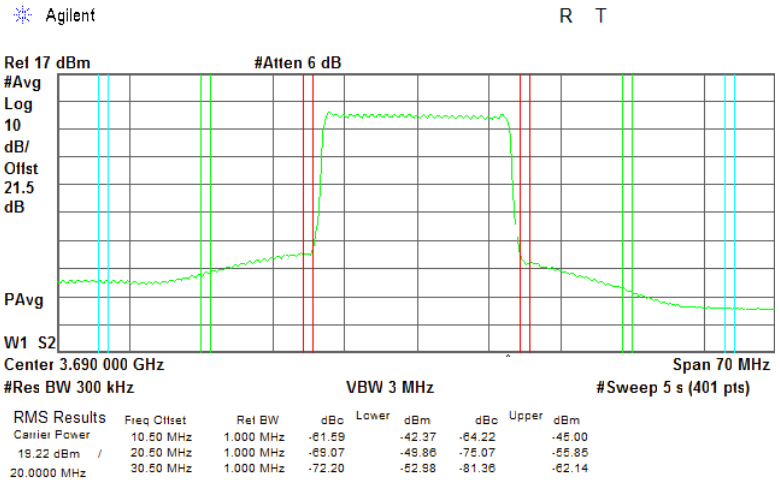
MODULATION: 16QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Test specification:	Section 96.41(e)(1), Emission mask		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 56 VDC
Remarks:			

Plot 7.4.18 Emission mask test results at high carrier frequency

MODULATION: 64QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Test specification:	**Section 96.41(e)(2), Radiated spurious emissions**		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	04-Apr-19 - 14-Apr-19		
Temperature: 24 ºC	**Relative Humidity:** 52 %	**Air Pressure:** 1009 hPa	**Power:** 56 VDC
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

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):	04-Apr-19 - 14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 52 %	Air Pressure: 1009 hPa	Power: 56 VDC
Remarks:			

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

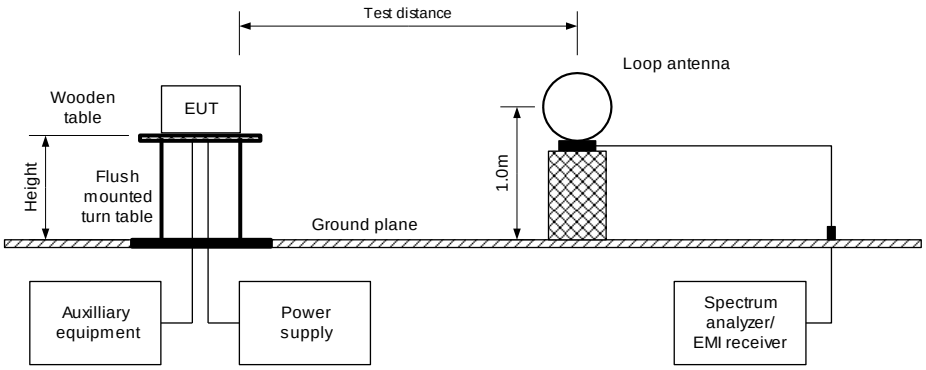
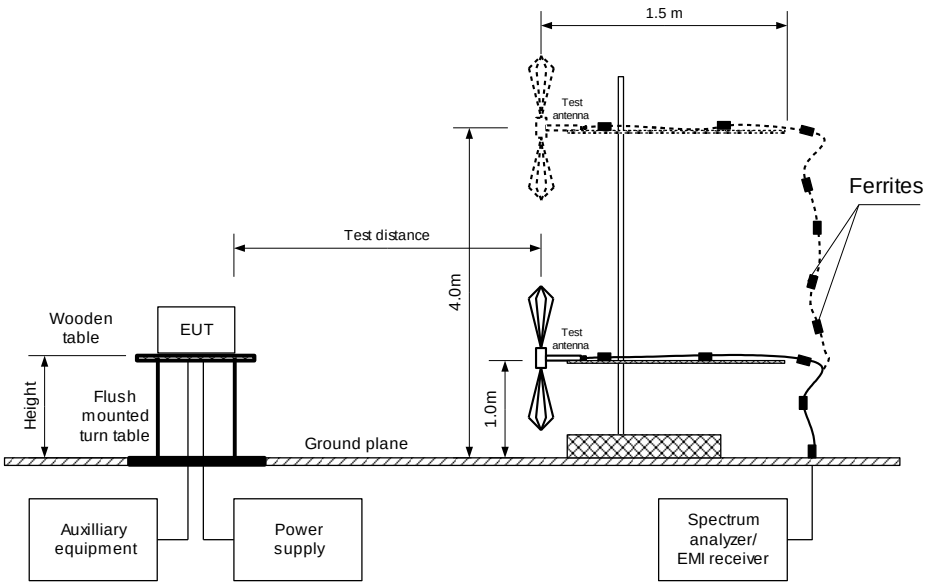


Figure 7.5.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	**Section 96.41(e)(2), Radiated spurious emissions**		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	04-Apr-19 - 14-Apr-19		
Temperature: 24 ºC	**Relative Humidity:** 52 %	**Air Pressure:** 1009 hPa	**Power:** 56 VDC
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
EUT HEIGHT: 0.8 m
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: QPSK
MODULATING SIGNAL: PRBS
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 3555 MHz								
112.666783	38.65	55.20	-16.55	100	V	104.0	149.0	Pass
114.969645	38.88	55.20	-16.32	100	V	102.0	-156.0	Pass
143.008957	35.66	55.20	-19.54	100	V	102.0	-180.0	Pass
499.985666	33.69	55.20	-21.51	100	V	102.0	-180.0	Pass
999.977500	36.32	55.20	-18.88	100	V	104.0	149.0	Pass
Mid carrier frequency 3625 MHz								
116.610090	36.36	55.20	-18.84	100	V	100.0	149.0	Pass
144.061698	34.23	55.20	-20.97	100	V	100.0	-156.0	Pass
699.994999	37.90	55.20	-17.30	100	V	102.0	-180.0	Pass
824.982417	38.66	55.20	-16.54	100	V	132.0	-180.0	Pass
High carrier frequency 3695 MHz								
114.539335	37.45	55.20	-17.75	100	V	102.0	-180.0	Pass
143.026927	35.18	55.20	-20.02	100	V	100.0	-180.0	Pass
699.987999	38.00	55.20	-17.20	100	V	100.0	180.0	Pass
964.442159	34.21	55.20	-20.99	100	H	268.0	-78.0	Pass

*****- Margin = Field strength of spurious – calculated field strength limit.
******- EUT front panel refers to 0 degrees position of turntable.
*** - Limit was calculated according to ANSI C63.26 Section 5.2.7 requirements [(the relationship 5.2.7 c)] at the measured 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):	04-Apr-19 - 14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 52 %	Air Pressure: 1009 hPa	Power: 56 VDC
Remarks:			

Table 7.5.2 Spurious emission field strength test results (continued)

TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / AVERAGE
FREQUENCY RANGE: 1000 MHz – 37000 MHz
Double ridged guide (above 1000 MHz)
RESOLUTION BANDWIDTH: 1000 kHz

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										
7110.617500	62.48	75.20	-12.72	46.71	55.20	-8.49	H	154.0	-136.0	
Mid carrier frequency 3625 MHz										
7251.042500	60.93	75.20	-14.27	44.95	55.20	-10.25	H	179.0	180.0	
10876.6000	57.98	75.20	-17.22	42.03	55.20	-13.17	H	179.0	-136.0	Pass
14303.4677	51.40	75.20	-23.80	37.81	55.20	-17.39	H	128.0	-102.0	
High carrier frequency 3695 MHz										
7391.854833	63.29	75.20	-11.91	47.08	55.20	-8.12	H	155.0	-110.0	

*****- Margin = Field strength of spurious – calculated field strength limit.
******- EUT front panel refers to 0 degrees position of turntable.
*** - Limit was calculated according to ANSI C63.26 Section 5.2.7 requirements [(the relationship 5.2.7 c)] at the measured distance 3 m.

Reference numbers of test equipment used

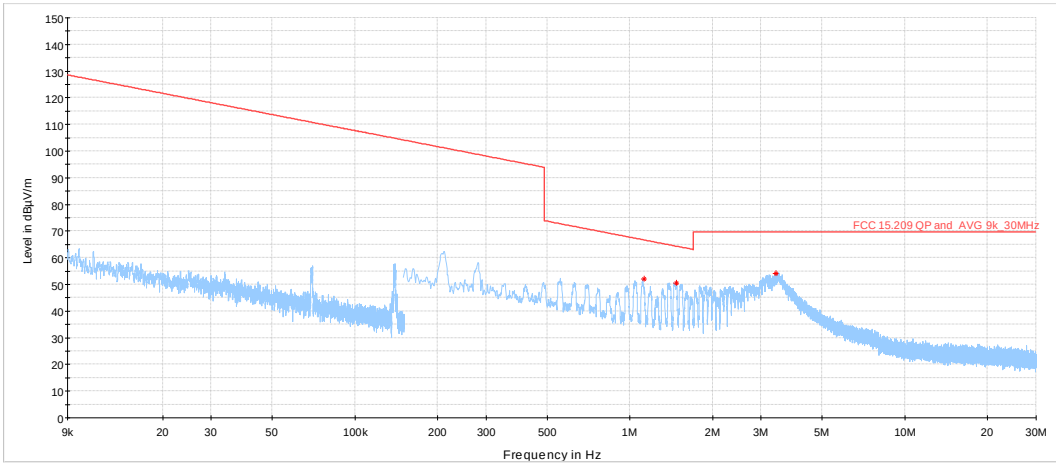
HL 3903	HL 4360	HL 4933	HL 4956	HL 5112	HL 5288	HL 5405	

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):	04-Apr-19 - 14-Apr-19		
Temperature: 24 ºC	**Relative Humidity:** 52 %	**Air Pressure:** 1009 hPa	**Power:** 56 VDC
Remarks:			

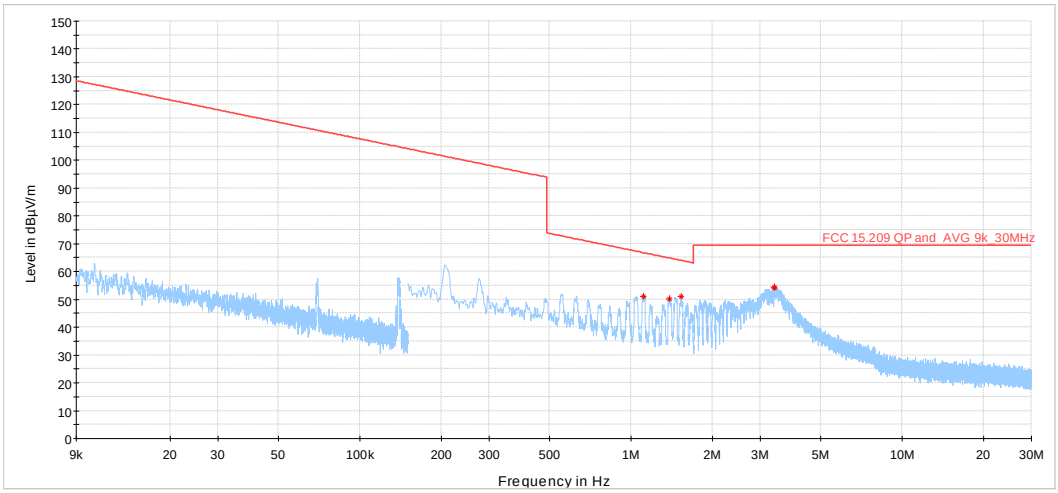
Plot 7.5.1 Radiated emission measurements in 9 kHz – 30 MHz range

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



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

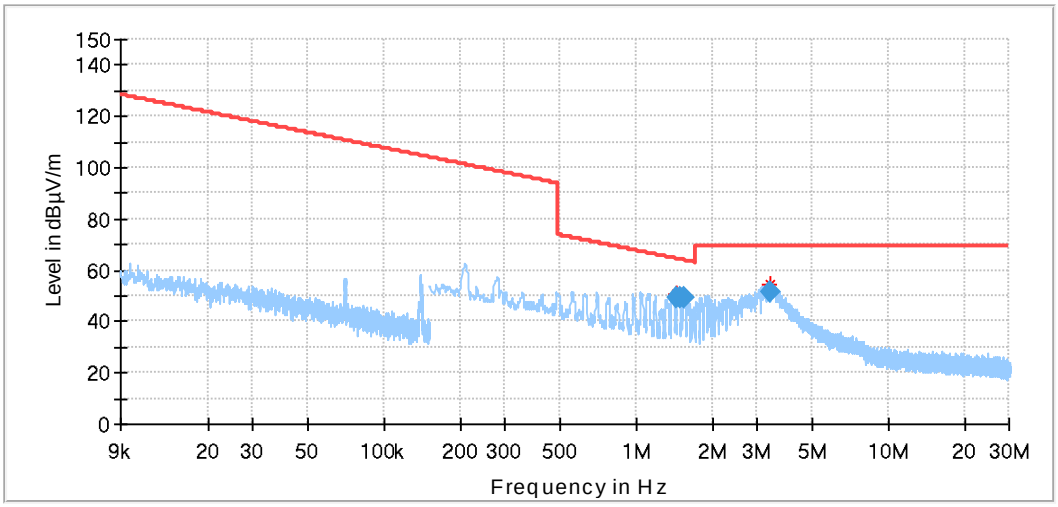
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 96.41(e)(2), Radiated spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	04-Apr-19 - 14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 52 %	Air Pressure: 1009 hPa	Power: 56 VDC
Remarks:			

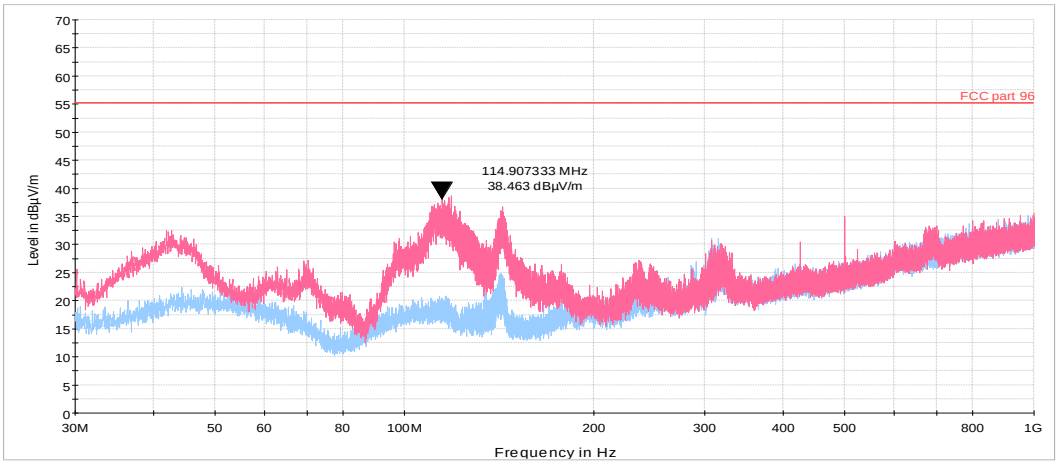
Plot 7.5.3 Radiated emission measurements in 9 kHz – 30 MHz range

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



Plot 7.5.4 Radiated emission measurements in 30 - 1000 MHz range

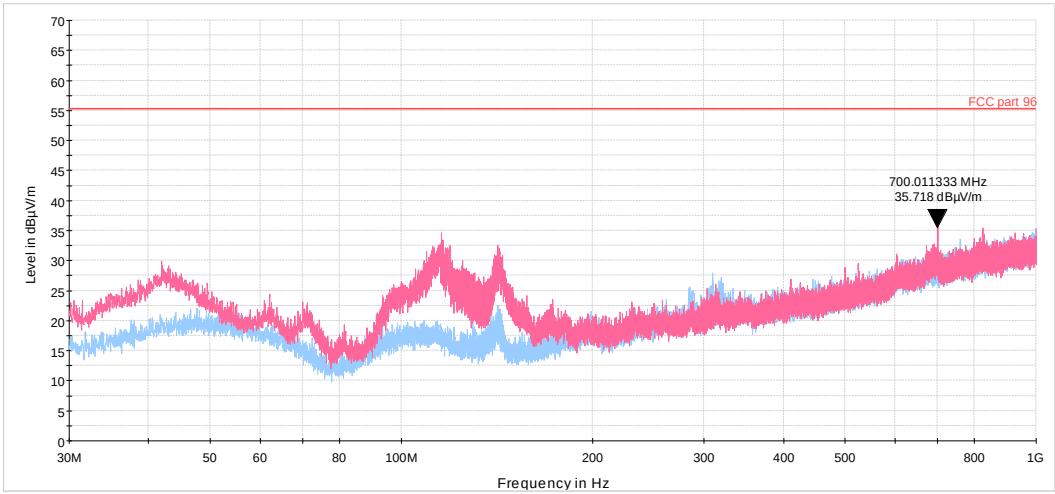
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 96.41(e)(2), Radiated spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	04-Apr-19 - 14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 52 %	Air Pressure: 1009 hPa	Power: 56 VDC
Remarks:			

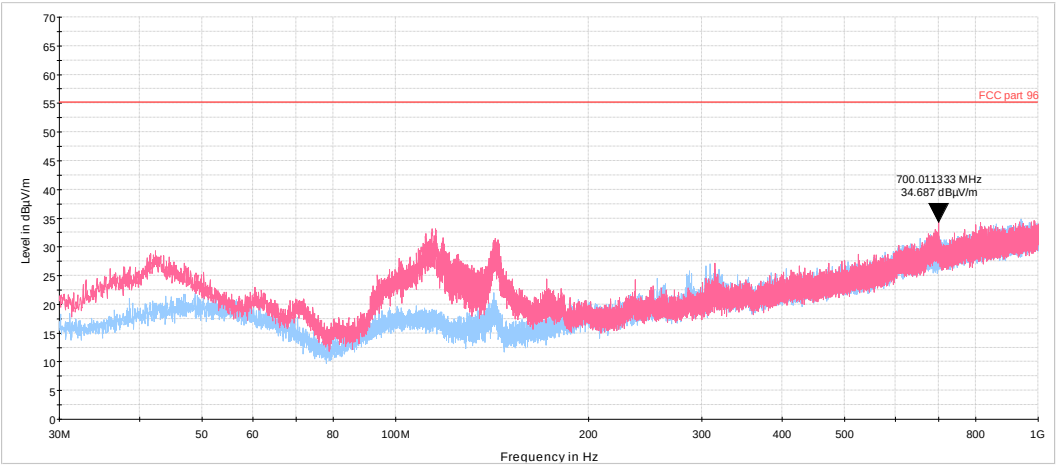
Plot 7.5.5 Radiated emission measurements in 30 - 1000 MHz range

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



Plot 7.5.6 Radiated emission measurements in 30 - 1000 MHz range

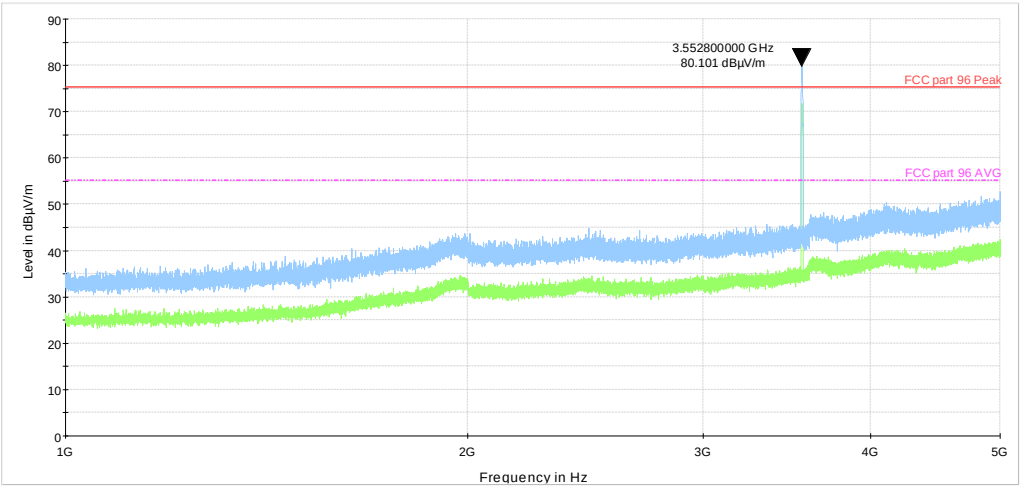
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 96.41(e)(2), Radiated spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	04-Apr-19 - 14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 52 %	Air Pressure: 1009 hPa	Power: 56 VDC
Remarks:			

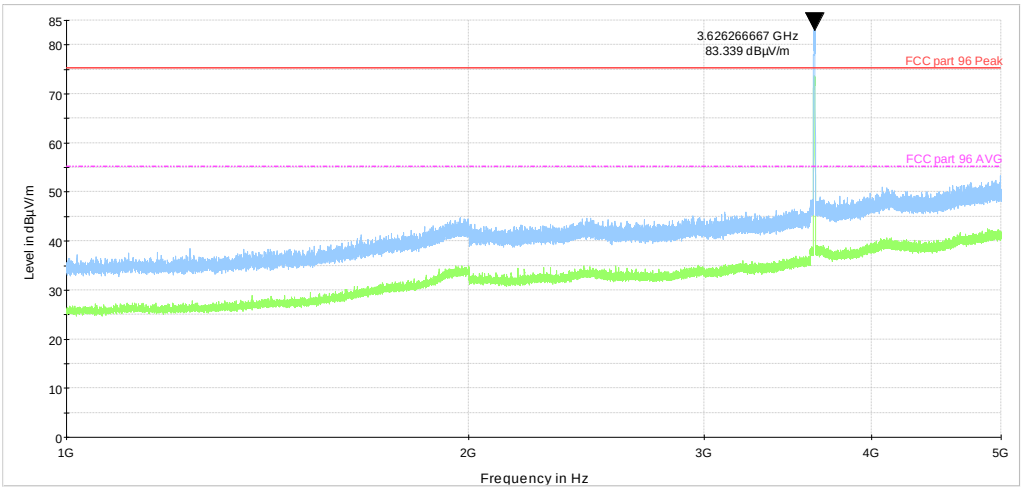
Plot 7.5.7 Radiated emission measurements in 1000 – 5000 MHz range

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



Plot 7.5.8 Radiated emission measurements in 1000 – 5000 MHz range

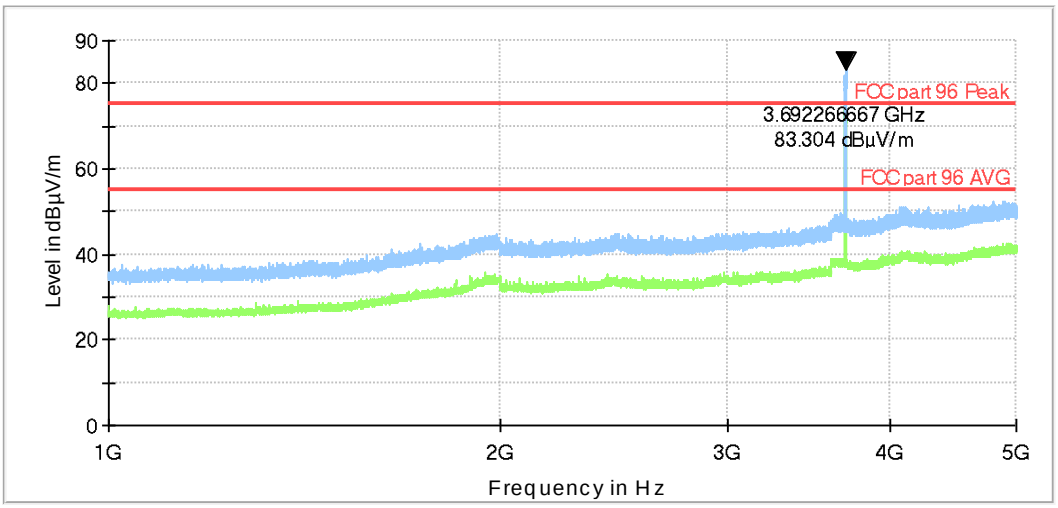
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 96.41(e)(2), Radiated spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	04-Apr-19 - 14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 52 %	Air Pressure: 1009 hPa	Power: 56 VDC
Remarks:			

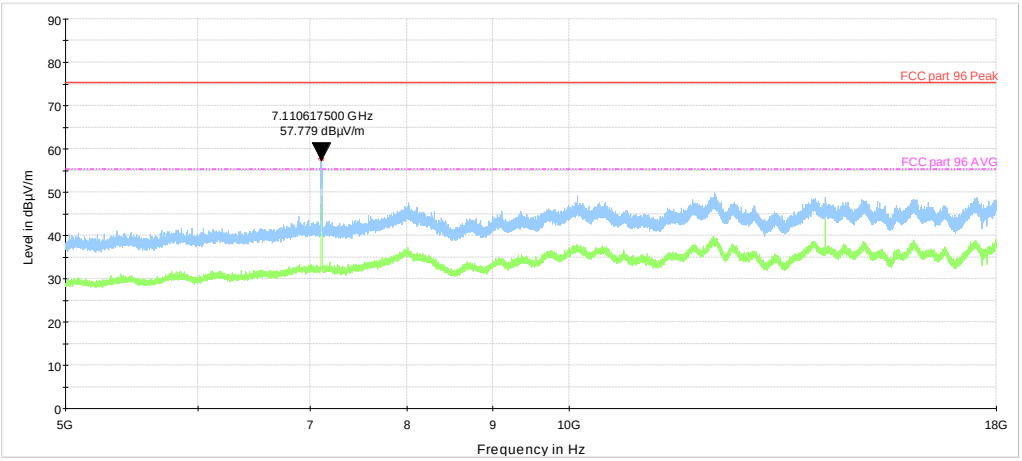
Plot 7.5.9 Radiated emission measurements in 1000 – 5000 MHz range

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



Plot 7.5.10 Radiated emission measurements in 5000 – 18000 MHz range

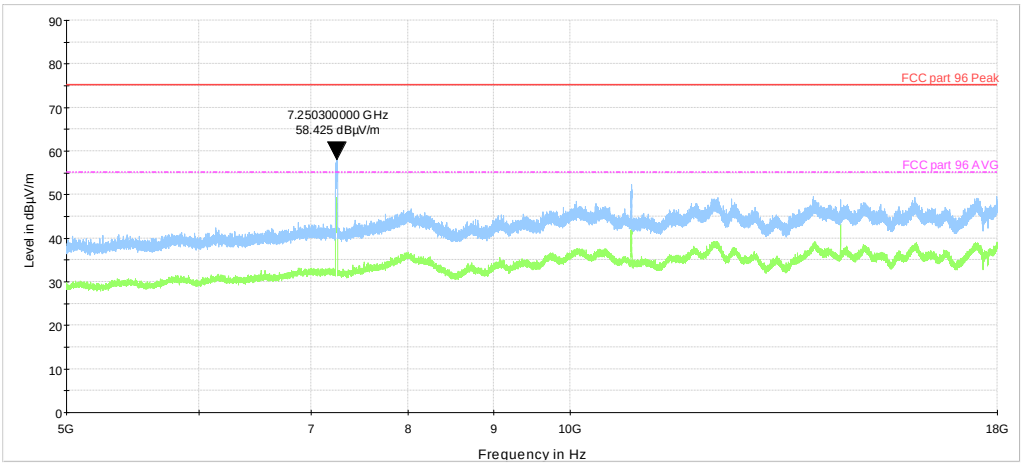
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 96.41(e)(2), Radiated spurious emissions		
Test procedure:	Section 96.41(e)(3)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	04-Apr-19 - 14-Apr-19		
Temperature: 24 ºC	Relative Humidity: 52 %	Air Pressure: 1009 hPa	Power: 56 VDC
Remarks:			

Plot 7.5.11 Radiated emission measurements in 5000 – 18000 MHz range

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



Plot 7.5.12 Radiated emission measurements in 5000 – 18000 MHz range

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