



HERMON LABORATORIES

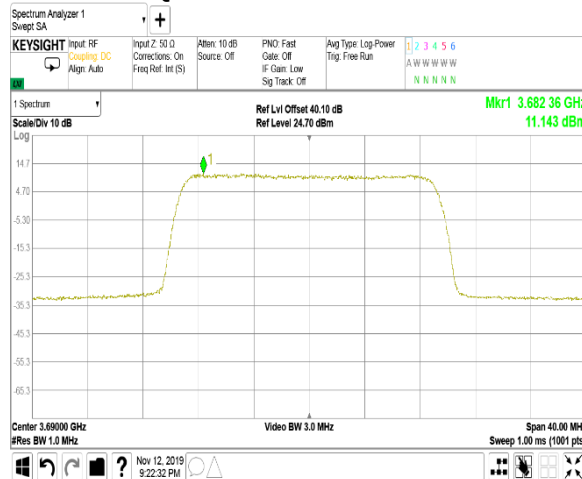
Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 14-Nov-19

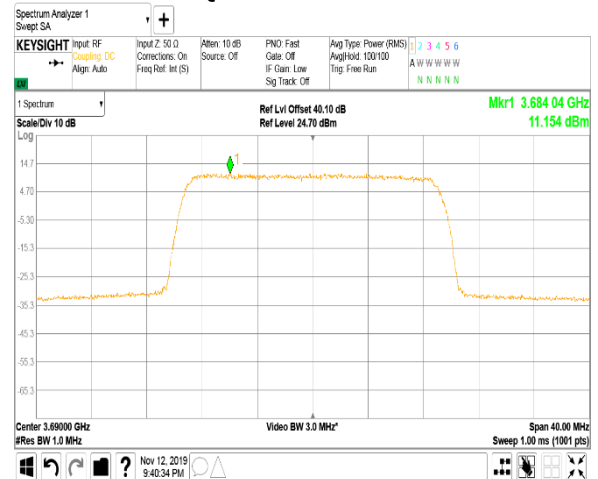
Test specification: Section 96.41(b), Maximum EIRP and maximum power spectral density			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 01-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

Plot 7.1.15 Peak spectral power density at high frequency

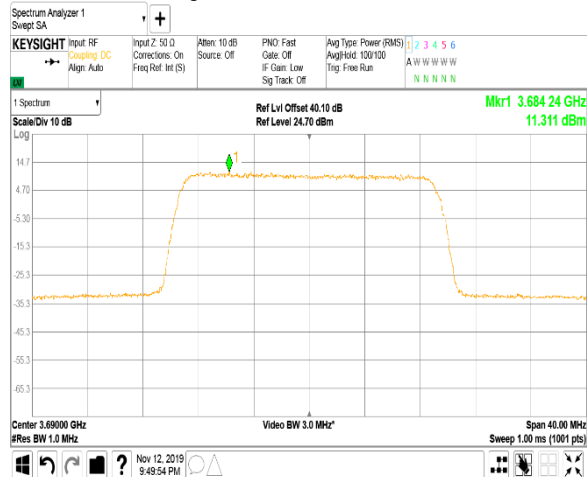
MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



QPSK
20 MHz
1
Modulation: 16QAM



Modulation: 64QAM





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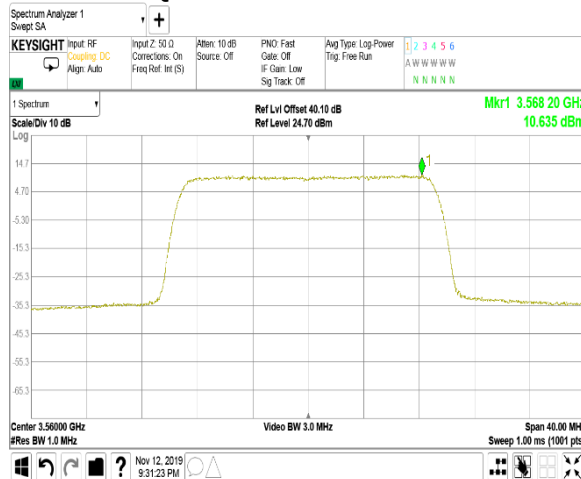
Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 14-Nov-19

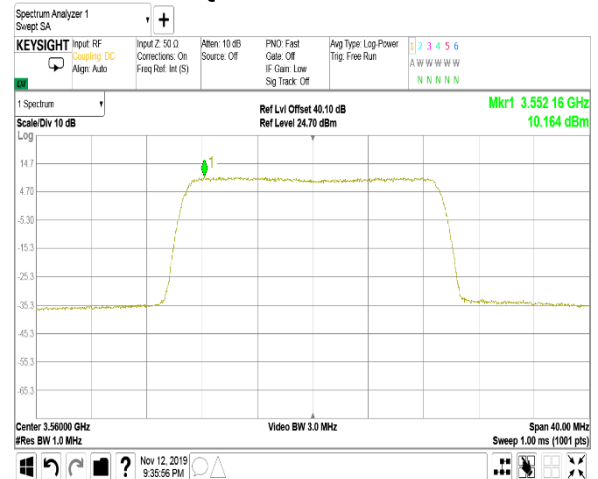
Test specification: Section 96.41(b), Maximum EIRP and maximum power spectral density			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 01-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

Plot 7.1.16 Peak spectral power density at low frequency within

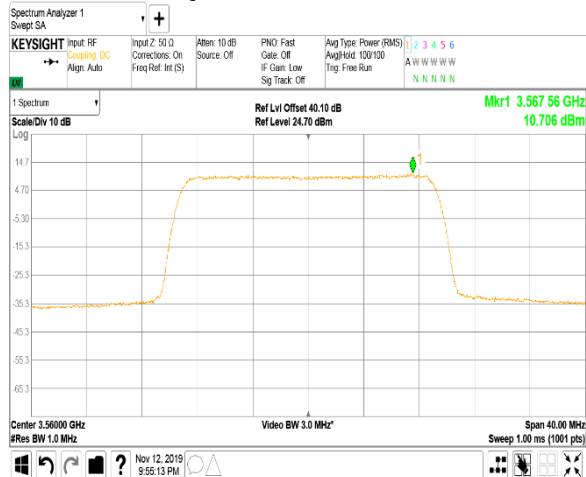
MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



QPSK
20 MHz
2
Modulation: 16QAM



Modulation: 64QAM





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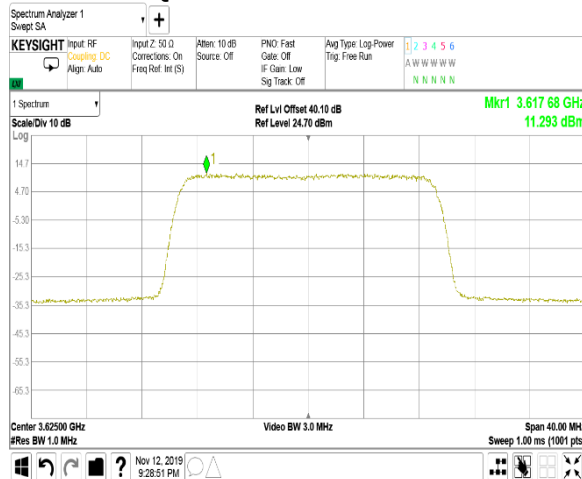
Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 14-Nov-19

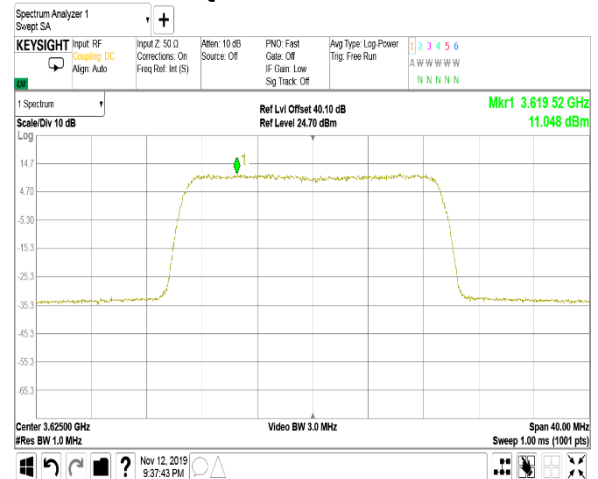
Test specification: Section 96.41(b), Maximum EIRP and maximum power spectral density			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 01-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

Plot 7.1.17 Peak spectral power density at mid frequency

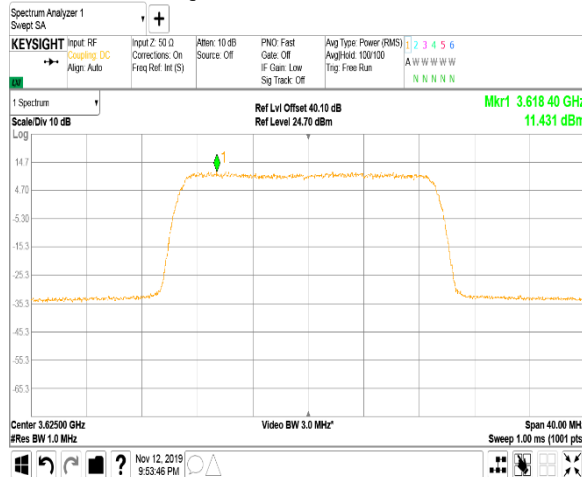
MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



QPSK
20 MHz
2
Modulation: 16QAM



Modulation: 64QAM



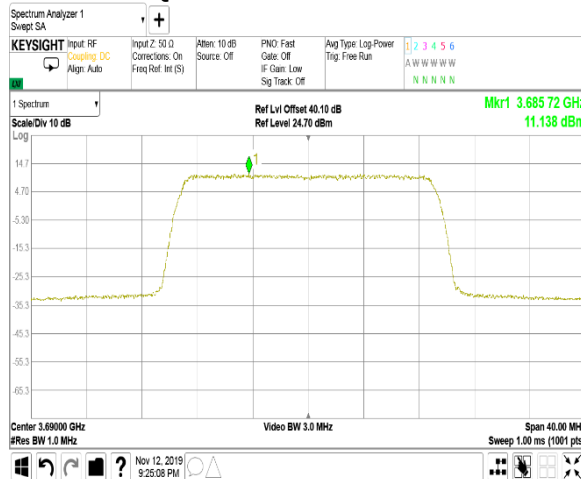


HERMON LABORATORIES

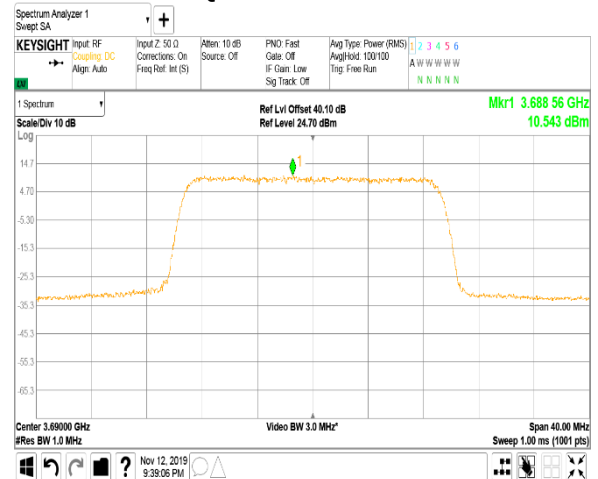
Test specification: Section 96.41(b), Maximum EIRP and maximum power spectral density			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 01-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

Plot 7.1.18 Peak spectral power density at high frequency

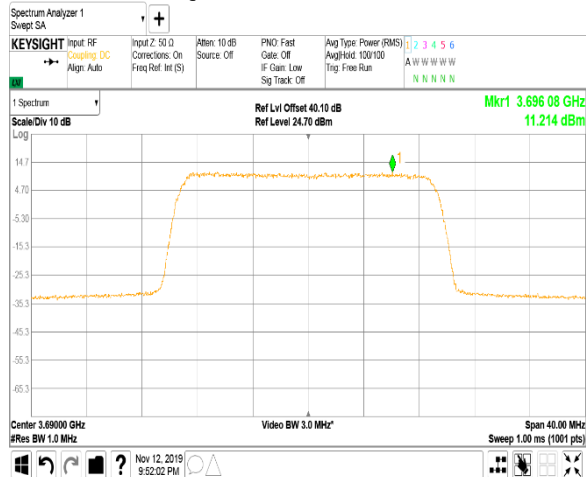
MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



QPSK
20 MHz
2
Modulation: 16QAM



Modulation: 64QAM



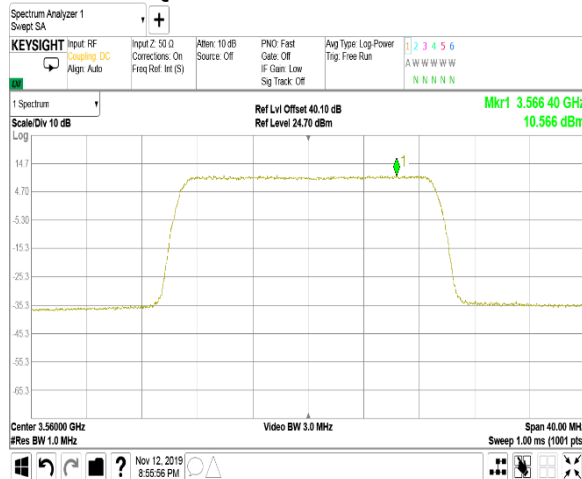


HERMON LABORATORIES

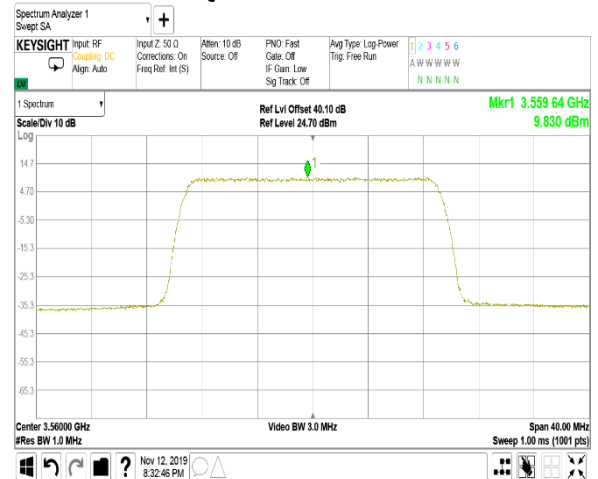
Test specification: Section 96.41(b), Maximum EIRP and maximum power spectral density			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 01-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

Plot 7.1.19 Peak spectral power density at low frequency within

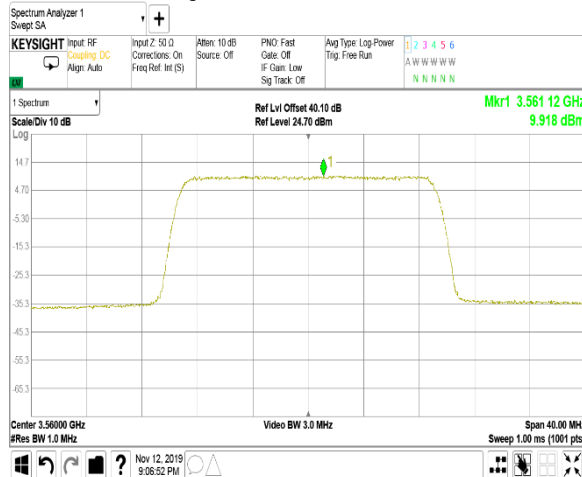
MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



QPSK
20 MHz
3
Modulation: 16QAM



Modulation: 64QAM



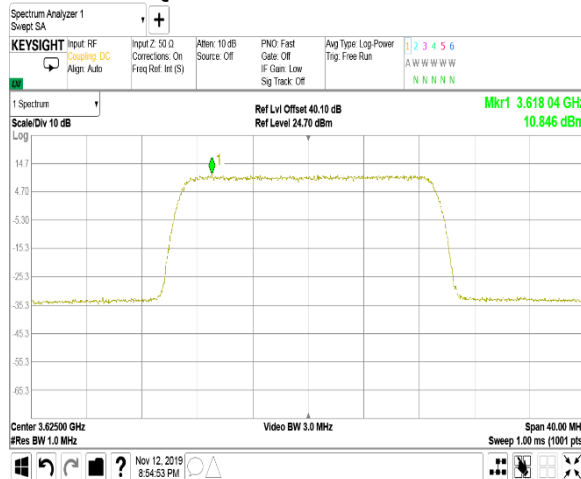


HERMON LABORATORIES

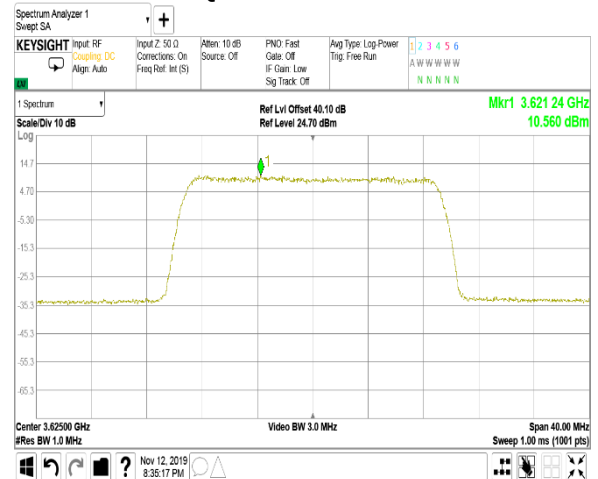
Test specification: Section 96.41(b), Maximum EIRP and maximum power spectral density			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 01-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

Plot 7.1.20 Peak spectral power density at mid frequency

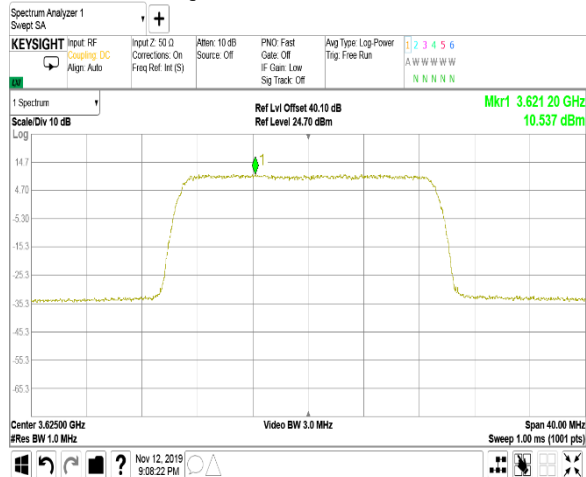
MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



QPSK
20 MHz
3
Modulation: 16QAM



Modulation: 64QAM





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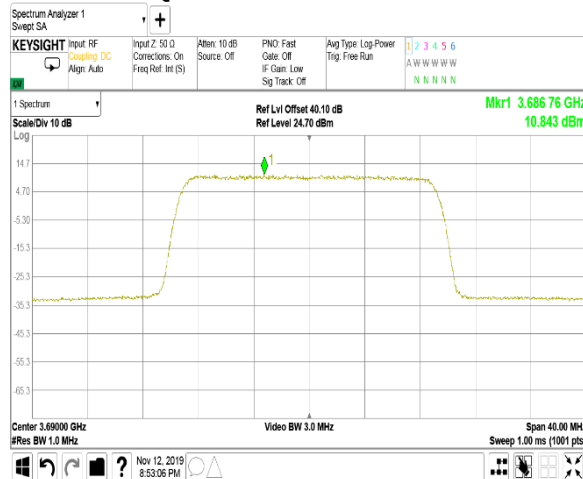
Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 14-Nov-19

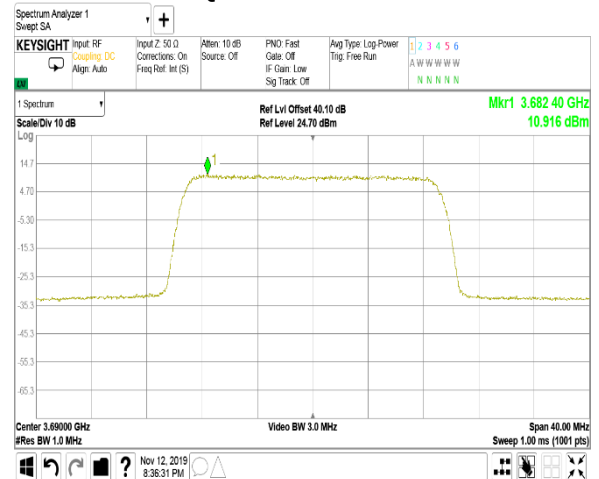
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
01-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

Plot 7.1.21 Peak spectral power density at high frequency

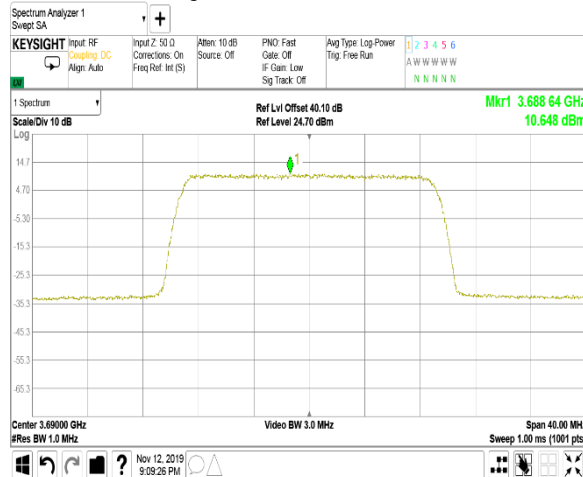
MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



QPSK
20 MHz
3
Modulation: 16QAM



Modulation: 64QAM





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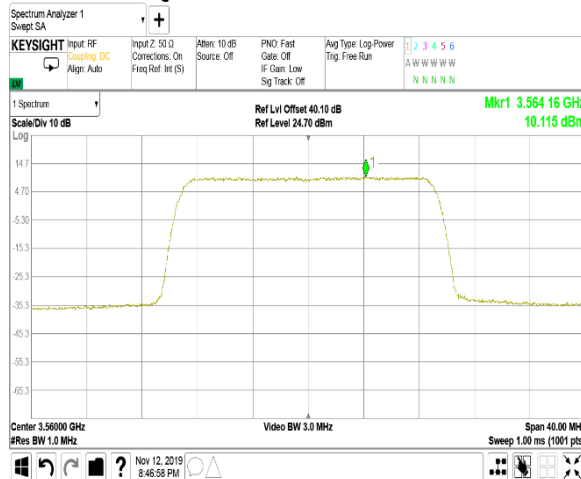
Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 14-Nov-19

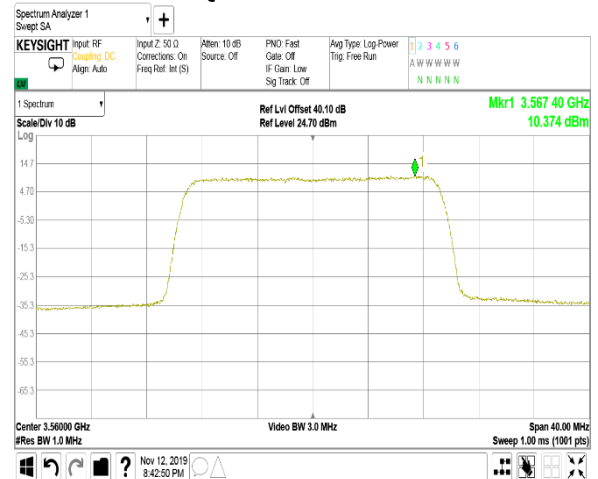
Test specification: Section 96.41(b), Maximum EIRP and maximum power spectral density			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 01-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

Plot 7.1.22 Peak spectral power density at low frequency within

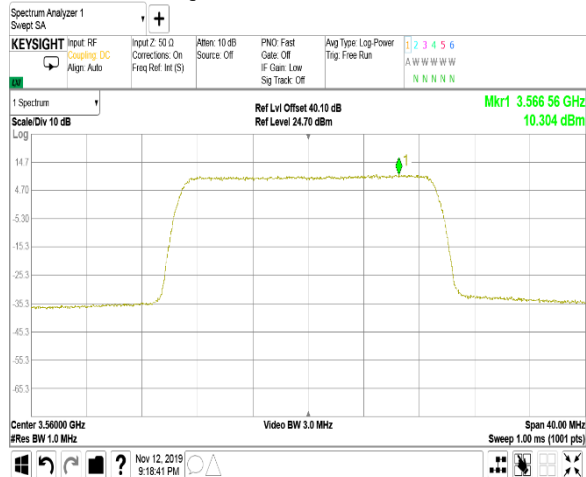
MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



QPSK
20 MHz
4
Modulation: 16QAM



Modulation: 64QAM





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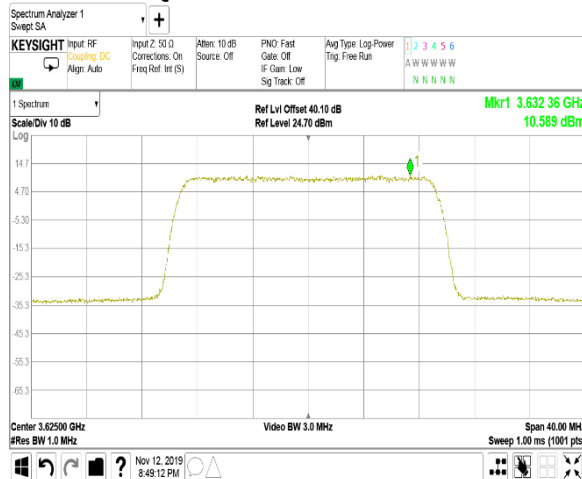
Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 14-Nov-19

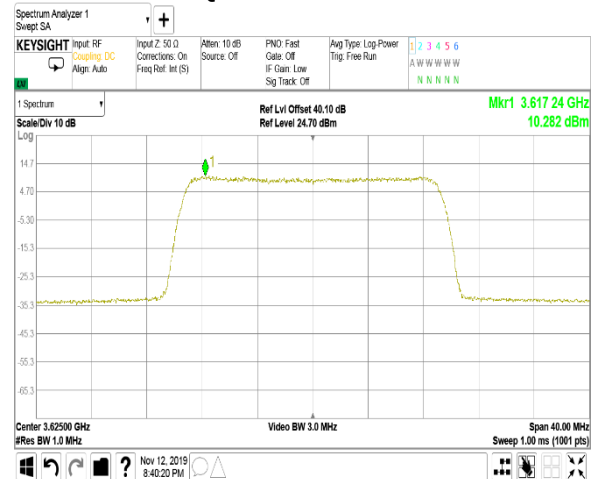
Test specification: Section 96.41(b), Maximum EIRP and maximum power spectral density			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 01-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

Plot 7.1.23 Peak spectral power density at mid frequency

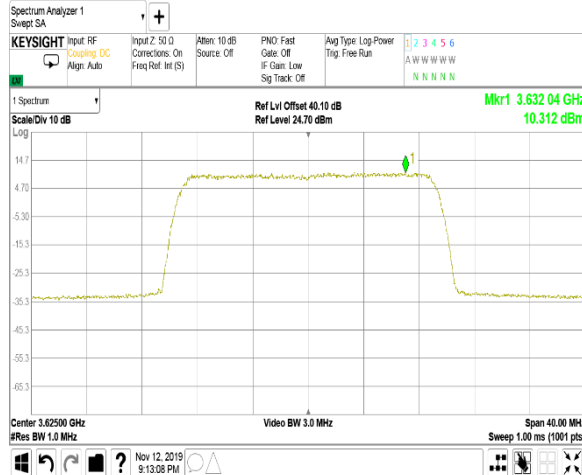
MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



QPSK
20 MHz
4
Modulation: 16QAM



Modulation: 64QAM





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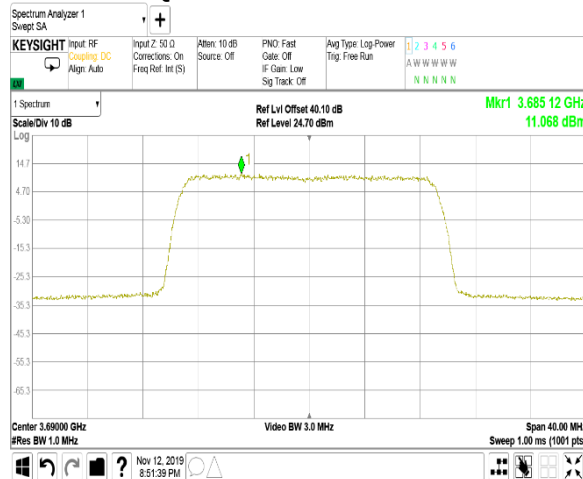
Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 14-Nov-19

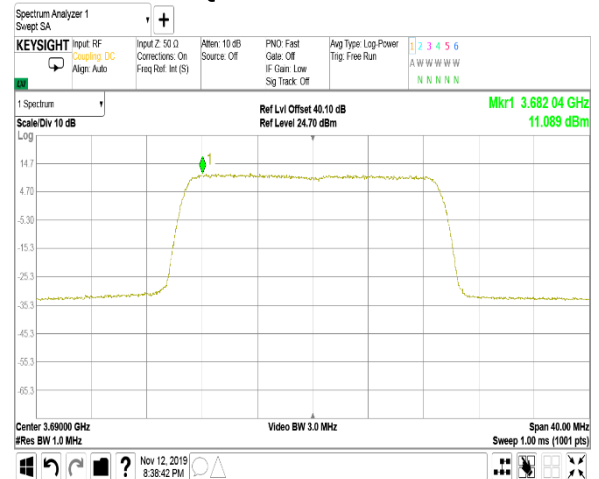
Test specification: Section 96.41(b), Maximum EIRP and maximum power spectral density			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 01-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

Plot 7.1.24 Peak spectral power density at high frequency

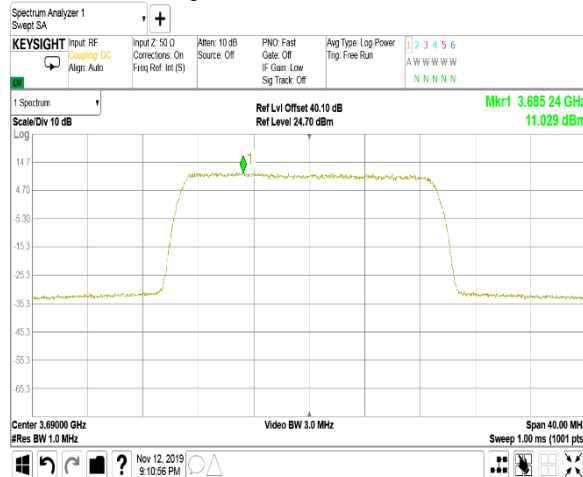
MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



QPSK
20 MHz
4
Modulation: 16QAM



Modulation: 64QAM





HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 14-Nov-19

Test specification: Section 96.41(b), Maximum EIRP and maximum power spectral density			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 01-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VDC
Remarks:			

Plot 7.1.25 Transmission pulse duration and pulse period



Duty cycle factor = $10 \cdot \log(6.82/10) = -1.66$ dB



Test specification: Section 96.41(g), Peak-to- average power ratio			
Test procedure: Section 96.41(g)			
Test mode: Compliance		Verdict: PASS	
Date(s): 29-Oct-18 - 01-Nov-18			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

7.2 Peak-to-average power ratio (PAPR) test

7.2.1 General

This test was performed to measure the peak to average power ratio at RF antenna connector. Specification test limits are given in Table 7.2.1.

Table 7.2.1 Peak-to-average power ratio limits

Assigned frequency range, MHz	Peak to average power ratio limit	
	Probability, %	dB
3550.0 – 3700.0	0.1	13.0

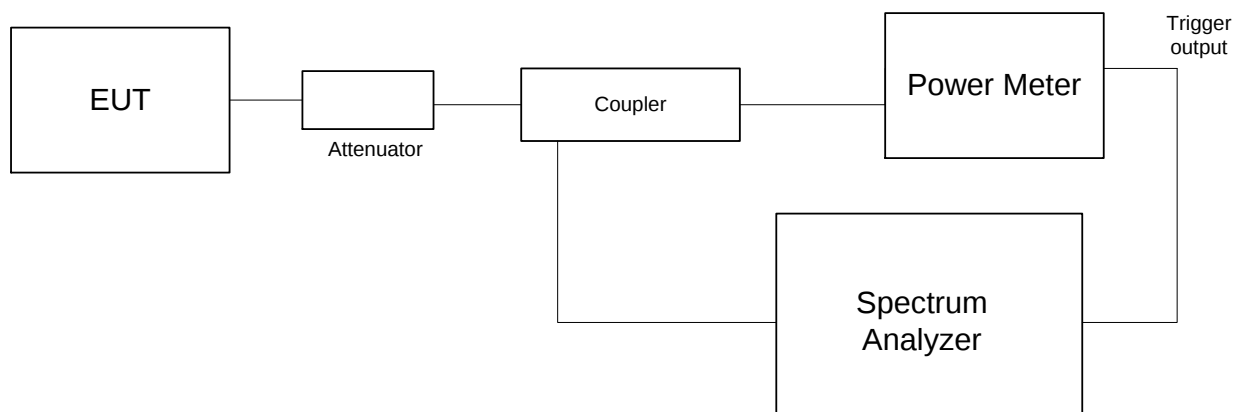
7.2.2 Test procedure

7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and its proper operation was checked.

7.2.2.2 The EUT was adjusted to produce maximum available to the end user RF output power.

7.2.2.3 The peak to average power ratio was measured with power meter as provided in Table 7.2.2 and the associated plots.

Figure 7.2.1 Peak-to-average power ratio test setup





Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
29-Oct-18 - 01-Nov-18			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Table 7.2.2 Peak-to-average power ratio test results

OPERATING FREQUENCY RANGE:

3550 – 3700 MHz

DETECTOR USED:

Peak/Average

MODULATING SIGNAL:

PRBS

TRANSMITTER OUTPUT POWER SETTINGS:

Maximum

Carrier frequency, MHz	Peak to average ratio, dB	Limit, dBm	Margin, dB	Verdict
Channel spacing 10 MHz				
Modulation QPSK				
3555.0	10.89	13.0	-2.11	Pass
3625.0	11.05	13.0	-1.95	Pass
3695.0	11.22	13.0	-1.78	Pass
Modulation 16QAM				
3555.0	10.49	13.0	-2.51	Pass
3625.0	10.57	13.0	-2.43	Pass
3695.0	10.64	13.0	-2.36	Pass
Modulation 64QAM				
3555.0	10.57	13.0	-2.43	Pass
3625.0	10.63	13.0	-2.37	Pass
3695.0	10.62	13.0	-2.38	Pass
Channel spacing 20 MHz				
Modulation QPSK				
3560.0	10.48	13.0	-2.52	Pass
3625.0	10.49	13.0	-2.51	Pass
3690.0	10.49	13.0	-2.51	Pass
Modulation 16QAM				
3560.0	10.57	13.0	-2.43	Pass
3625.0	10.54	13.0	-2.46	Pass
3690.0	10.53	13.0	-2.47	Pass
Modulation 64QAM				
3560.0	10.62	13.0	-2.38	Pass
3625.0	10.63	13.0	-2.37	Pass
3690.0	10.64	13.0	-2.36	Pass

Reference numbers of test equipment used

HL 3301	HL 3302	HL 3787			
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Full description is given in Appendix A.



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Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
29-Oct-18 - 01-Nov-18			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.2.1 Peak-to-average power ratio test results at low frequency

CHANNEL SPACING:

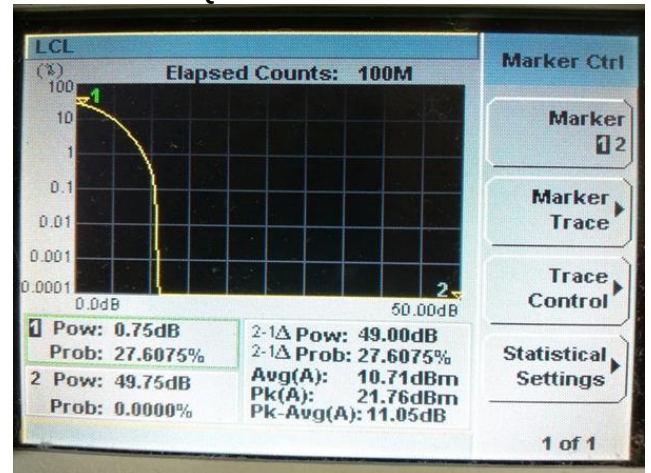
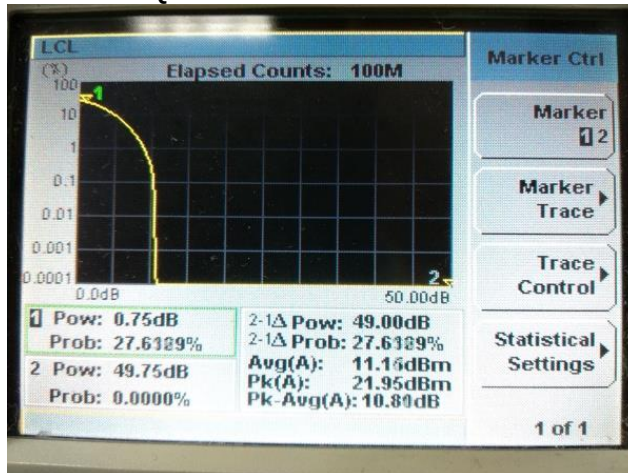
ANTENNA PORT:

Modulation: QPSK

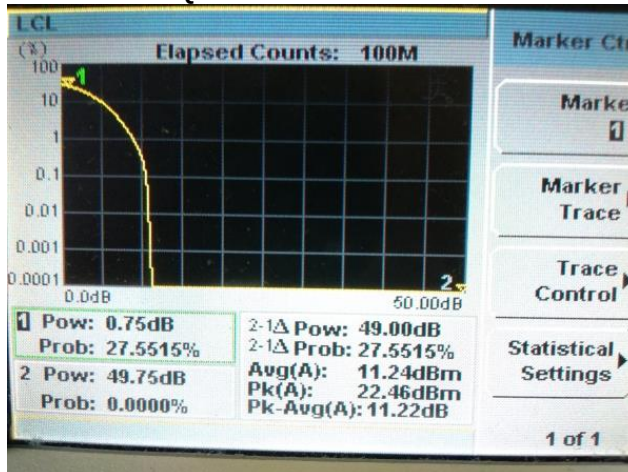
10 MHz

1

Modulation: 16QAM



Modulation: 64QAM





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Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
29-Oct-18 - 01-Nov-18			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.2.2 Peak-to-average power ratio test results at mid frequency

CHANNEL SPACING:

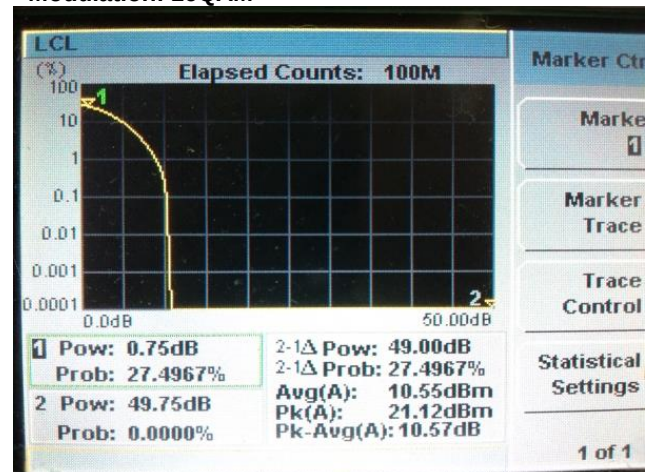
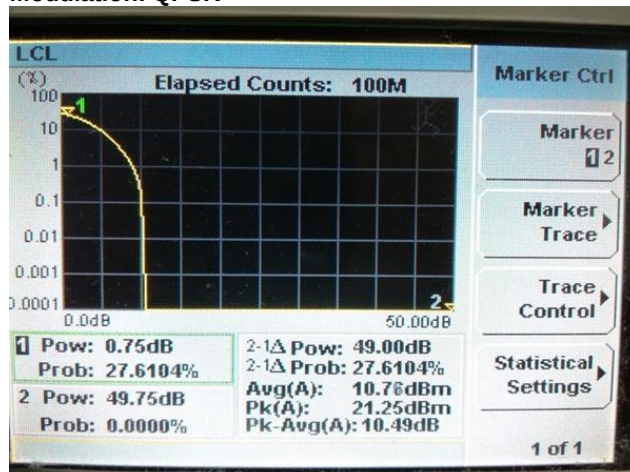
ANTENNA PORT:

Modulation: QPSK

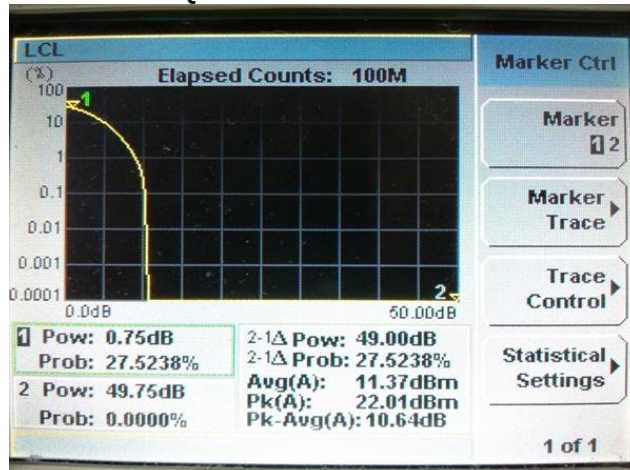
10 MHz

1

Modulation: 16QAM



Modulation: 64QAM





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Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
29-Oct-18 - 01-Nov-18			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.2.3 Peak-to-average power ratio test results at high frequency

CHANNEL SPACING:

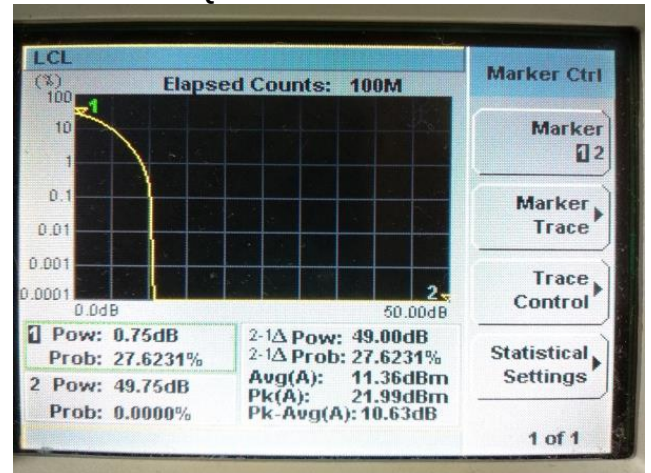
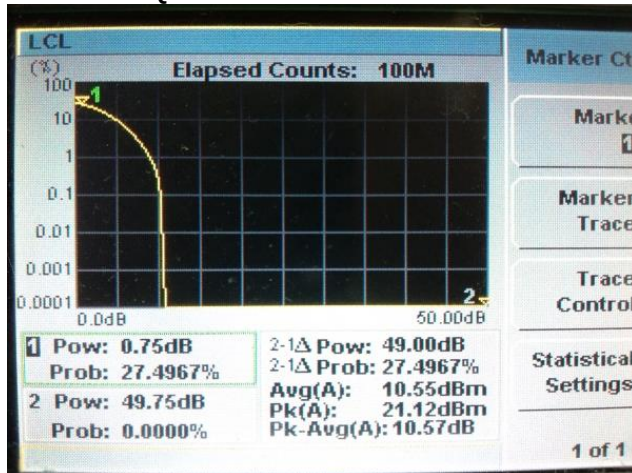
ANTENNA PORT:

Modulation: QPSK

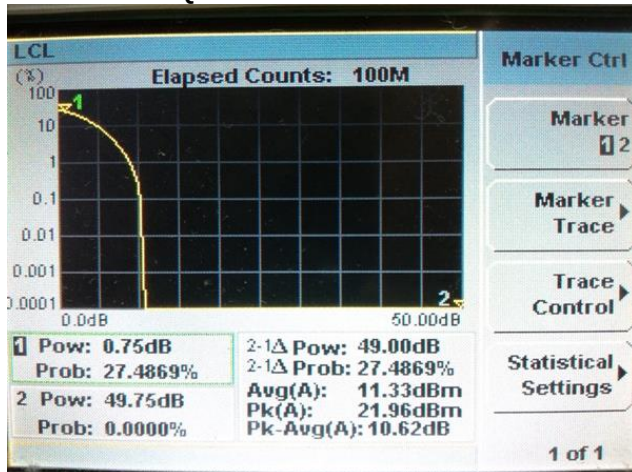
10 MHz

1

Modulation: 16QAM



Modulation: 64QAM





HERMON LABORATORIES

Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
29-Oct-18 - 01-Nov-18			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.2.4 Peak-to-average power ratio test results at low frequency

CHANNEL SPACING:

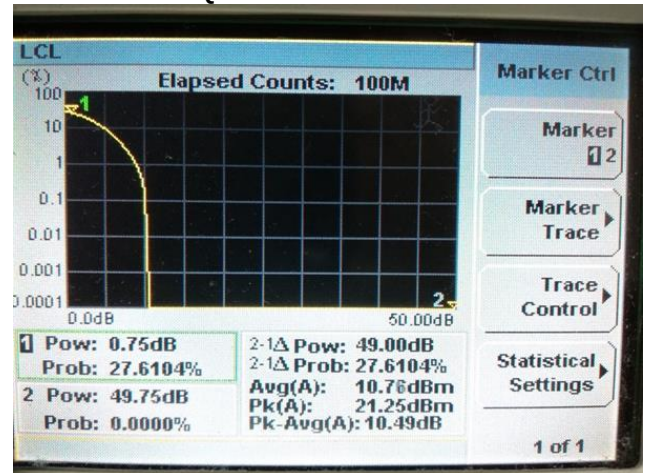
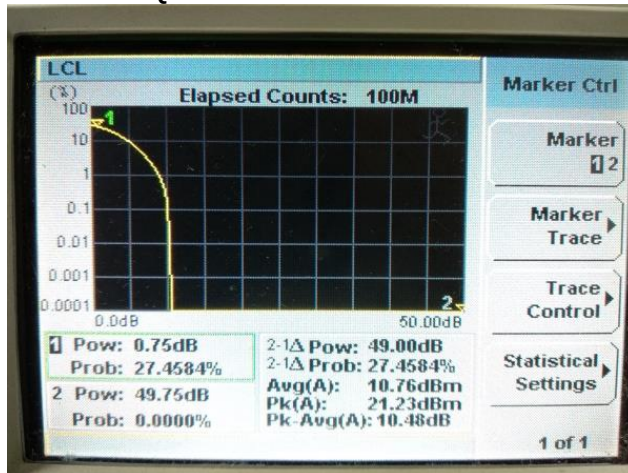
ANTENNA PORT:

Modulation: QPSK

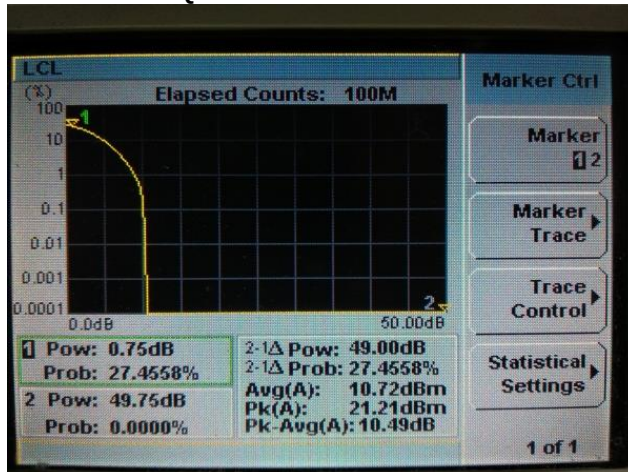
20 MHz

1

Modulation: 16QAM



Modulation: 64QAM





HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
29-Oct-18 - 01-Nov-18			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.2.5 Peak-to-average power ratio test results at mid frequency

CHANNEL SPACING:

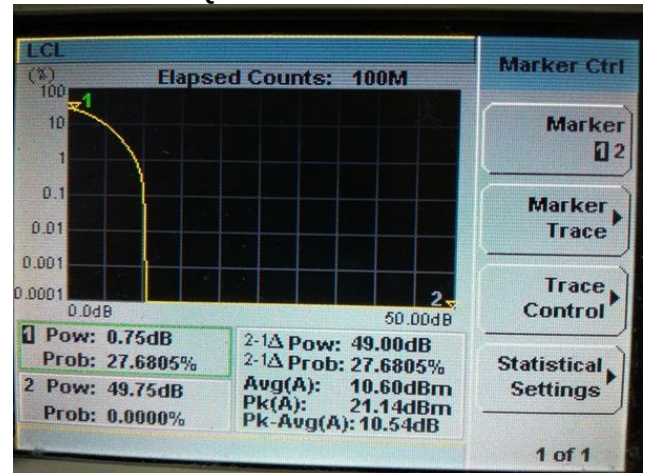
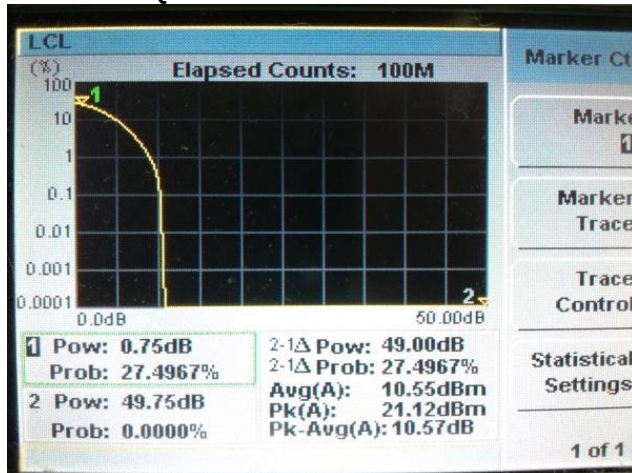
ANTENNA PORT:

Modulation: QPSK

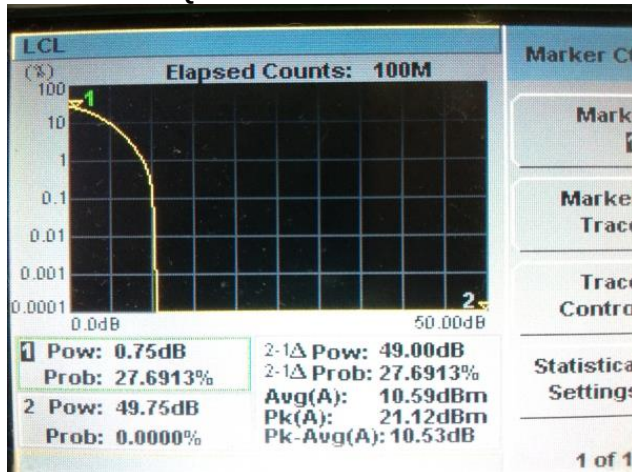
20 MHz

1

Modulation: 16QAM



Modulation: 64QAM





HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
29-Oct-18 - 01-Nov-18			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.2.6 Peak-to-average power ratio test results at high frequency

CHANNEL SPACING:

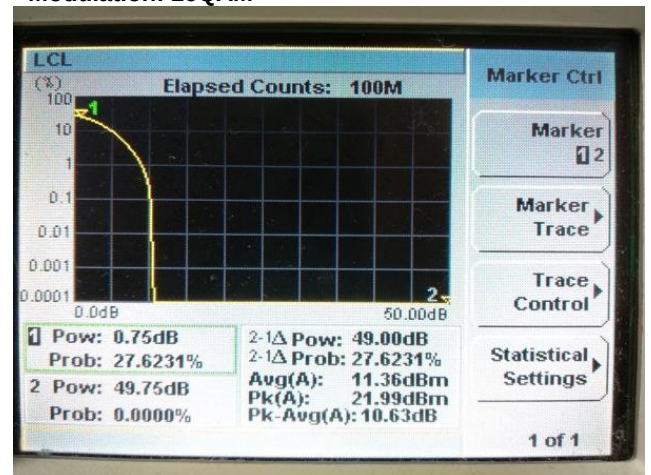
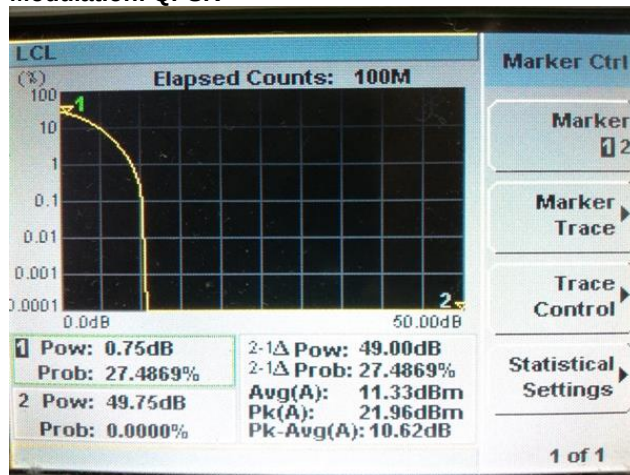
ANTENNA PORT:

Modulation: QPSK

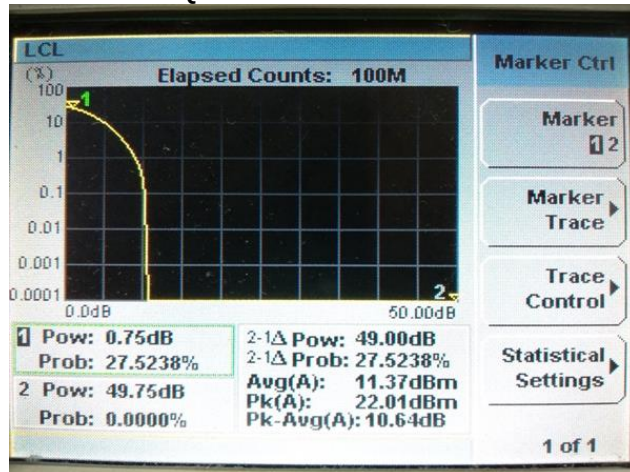
20 MHz

1

Modulation: 16QAM



Modulation: 64QAM





Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 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 MHz

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

7.3.2 Test procedure

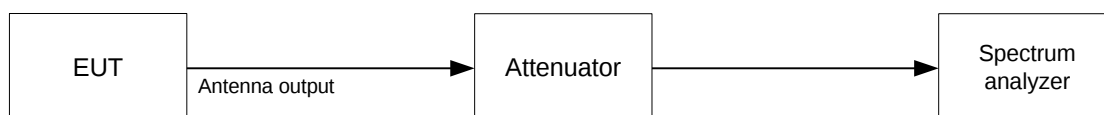
7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.

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: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

Table 7.3.2 Occupied bandwidth test results

DETECTOR USED: Peak hold
 RESOLUTION BANDWIDTH: 1 – 5% of the OBW
 VIDEO BANDWIDTH: > RBW
 MODULATION ENVELOPE REFERENCE POINTS: 99%

Carrier frequency, MHz	Occupied bandwidth, MHz	Limit, MHz	Margin, MHz	Verdict
Channel spacing 10 MHz				
Modulation QPSK				
3555.0	8.9506	10.0	-1.0494	Pass
3625.0	8.9584	10.0	-1.0416	Pass
3695.0	8.9443	10.0	-1.0557	Pass
Modulation 16QAM				
3555.0	8.9462	10.0	-1.0538	Pass
3625.0	8.9396	10.0	-1.0604	Pass
3695.0	8.9342	10.0	-1.0658	Pass
Modulation 64QAM				
3555.0	8.9288	10.0	-1.0712	Pass
3625.0	8.9318	10.0	-1.0682	Pass
3695.0	8.9470	10.0	-1.0530	Pass
Channel spacing 20 MHz				
Modulation QPSK				
3560.0	17.8749	20.0	-2.1251	Pass
3625.0	17.8801	20.0	-2.1199	Pass
3690.0	17.8568	20.0	-2.1432	Pass
Modulation 16QAM				
3560.0	17.8495	20.0	-2.1505	Pass
3625.0	17.8480	20.0	-2.1520	Pass
3690.0	17.8555	20.0	-2.1445	Pass
Modulation 64QAM				
3560.0	17.8611	20.0	-2.1389	Pass
3625.0	17.8811	20.0	-2.1189	Pass
3690.0	17.8603	20.0	-2.1397	Pass

Reference numbers of test equipment used

HL 3787	HL 3818	HL 3903			
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Full description is given in Appendix A.



HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

Test specification:		Section2.1049, Occupied bandwidth	
Test procedure:		47 CFR, Section 2.1049	
Test mode:		Verdict: PASS	
Date(s):			
04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

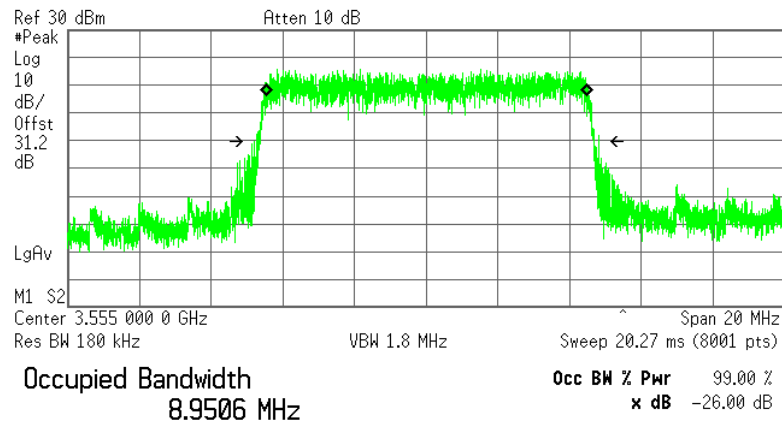
Plot 7.3.1 Occupied bandwidth test result at low frequency

MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:

QPSK
10 MHz
1

Agilent

R T



Transmit Freq Error 4.520 kHz
x dB Bandwidth 9.617 MHz

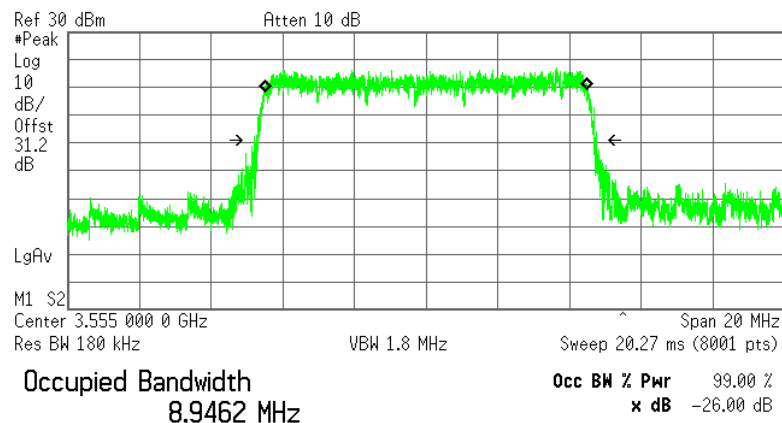
Plot 7.3.2 Occupied bandwidth test result at low frequency

MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:

16QAM
10 MHz
1

Agilent

R T



Transmit Freq Error 1.555 kHz
x dB Bandwidth 9.549 MHz



HERMON LABORATORIES

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Date of Issue: 23-Jan-19

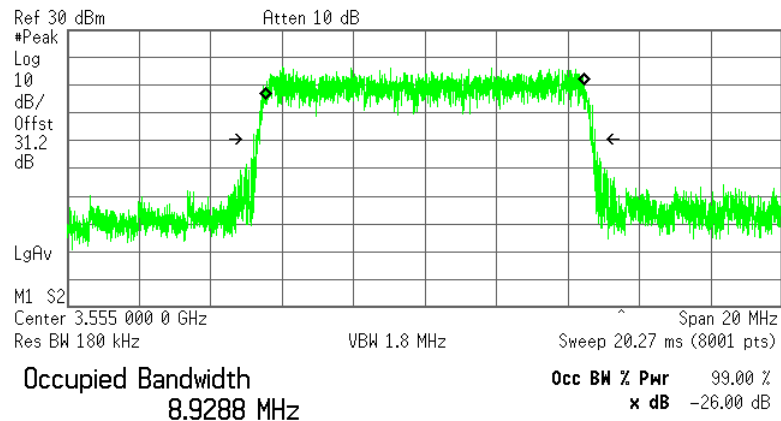
Test specification:		Section2.1049, Occupied bandwidth	
Test procedure:		47 CFR, Section 2.1049	
Test mode:		Verdict: PASS	
Date(s):			
04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

Plot 7.3.3 Occupied bandwidth test result at low frequency

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

Agilent

R T



Transmit Freq Error -3.896 kHz
x dB Bandwidth 9.548 MHz



HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

Test specification:		Section2.1049, Occupied bandwidth	
Test procedure:		47 CFR, Section 2.1049	
Test mode:		Verdict: PASS	
Date(s):			
04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

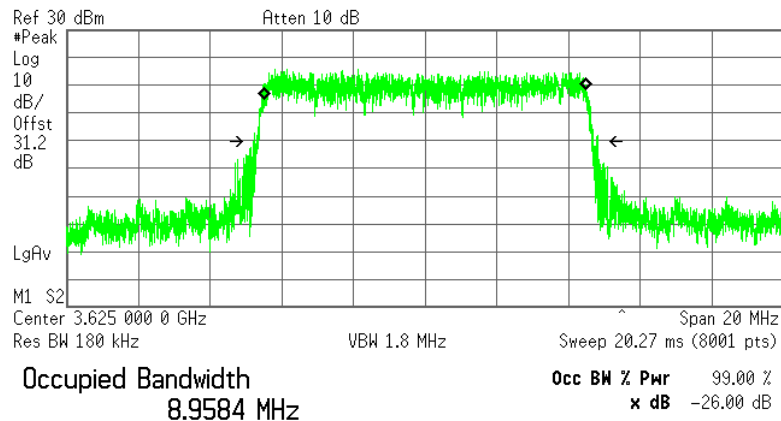
Plot 7.3.4 Occupied bandwidth test result at mid frequency

MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:

QPSK
10 MHz
1

Agilent

R T



Transmit Freq Error -2.900 kHz
x dB Bandwidth 9.565 MHz

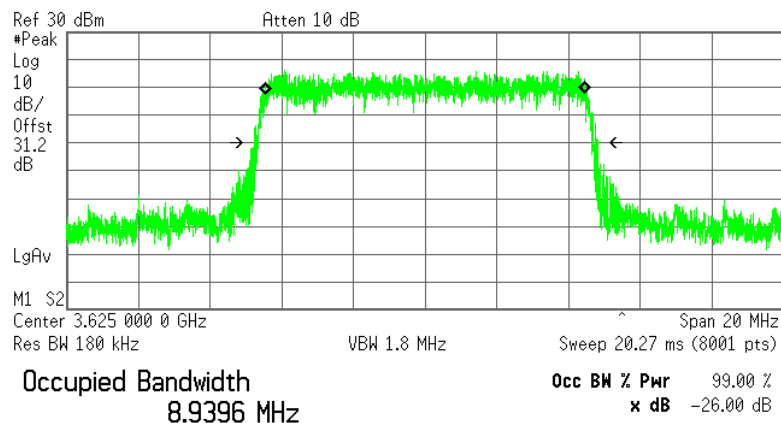
Plot 7.3.5 Occupied bandwidth test result at mid frequency

MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:

16QAM
10 MHz
1

Agilent

R T



Transmit Freq Error 910.654 Hz
x dB Bandwidth 9.559 MHz



HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

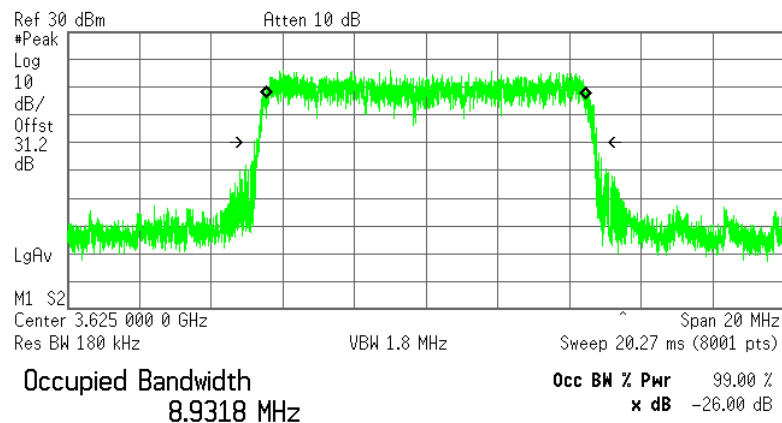
Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

Plot 7.3.6 Occupied bandwidth test result at mid frequency

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

Agilent

R T



Transmit Freq Error 3.077 kHz
x dB Bandwidth 9.549 MHz



HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

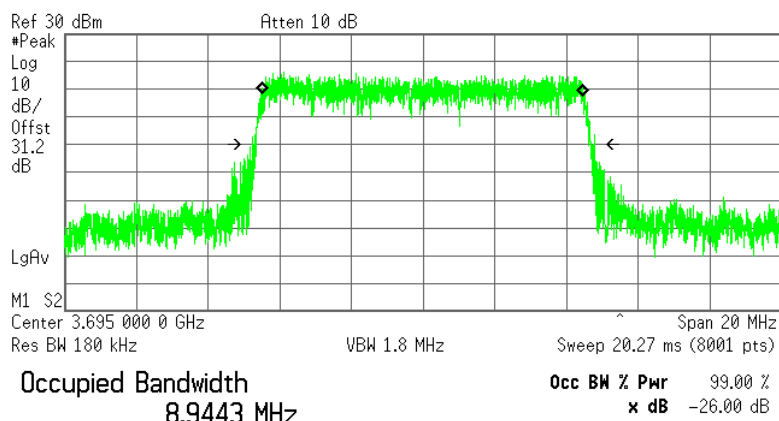
Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

Plot 7.3.7 Occupied bandwidth test result at high frequency

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

Agilent

R T



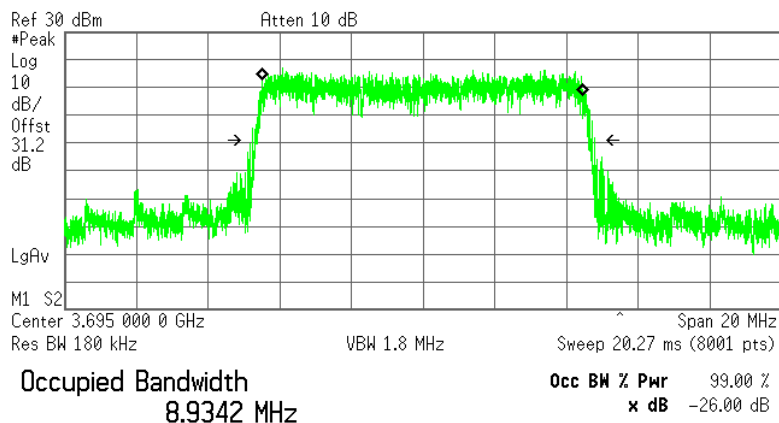
Transmit Freq Error -5.716 kHz
x dB Bandwidth 9.563 MHz

Plot 7.3.8 Occupied bandwidth test result at high frequency

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

Agilent

R T



Transmit Freq Error -10.697 kHz
x dB Bandwidth 9.550 MHz



HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

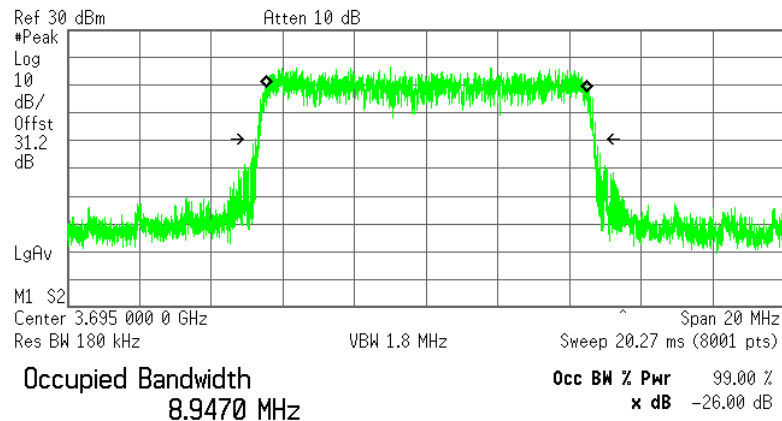
Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

Plot 7.3.9 Occupied bandwidth test result at high frequency

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

Agilent

R T



Transmit Freq Error 3.343 kHz
x dB Bandwidth 9.478 MHz

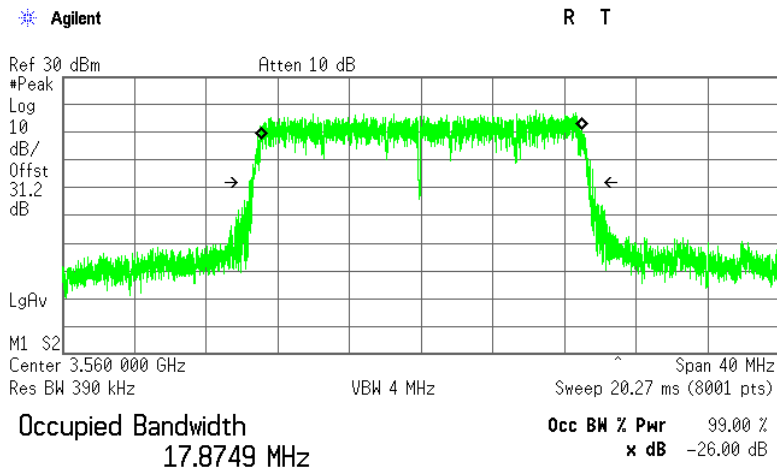


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

Plot 7.3.10 Occupied bandwidth test result at low frequency

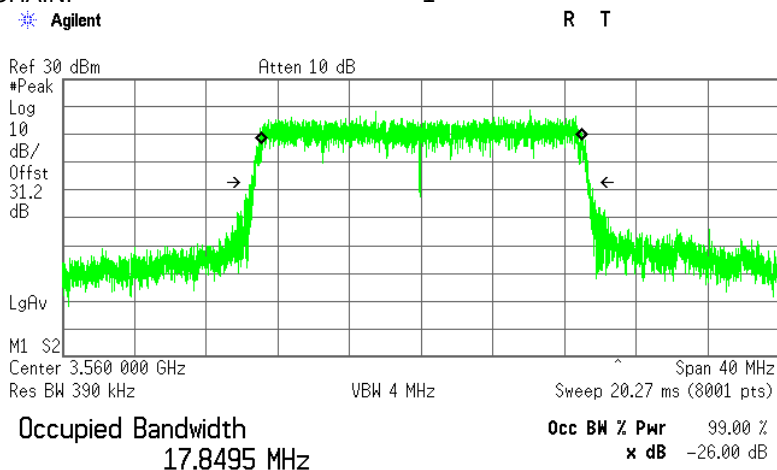
MODULATION: QPSK
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Transmit Freq Error 39.736 kHz
x dB Bandwidth 19.151 MHz

Plot 7.3.11 Occupied bandwidth test result at low frequency

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



Transmit Freq Error 23.671 kHz
x dB Bandwidth 18.874 MHz



HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

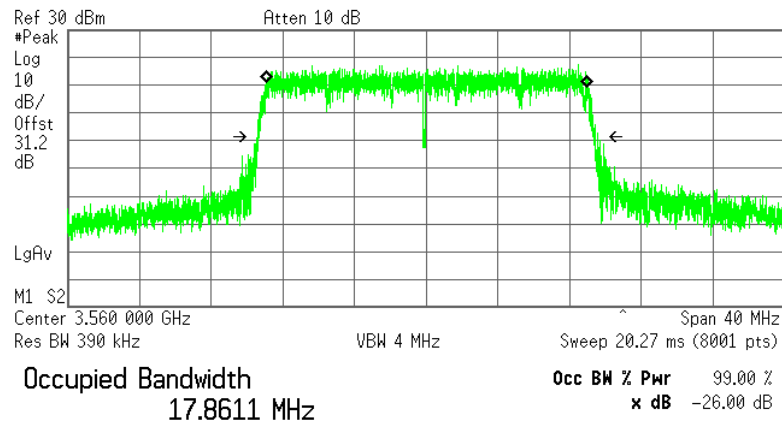
Test specification:		Section2.1049, Occupied bandwidth	
Test procedure:		47 CFR, Section 2.1049	
Test mode:		Verdict: PASS	
Date(s):			
04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

Plot 7.3.12 Occupied bandwidth test result at low frequency

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

Agilent

R T



Transmit Freq Error 45.242 kHz
x dB Bandwidth 18.972 MHz



HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

Test specification:		Section2.1049, Occupied bandwidth	
Test procedure:		47 CFR, Section 2.1049	
Test mode:		Verdict: PASS	
Date(s):			
04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

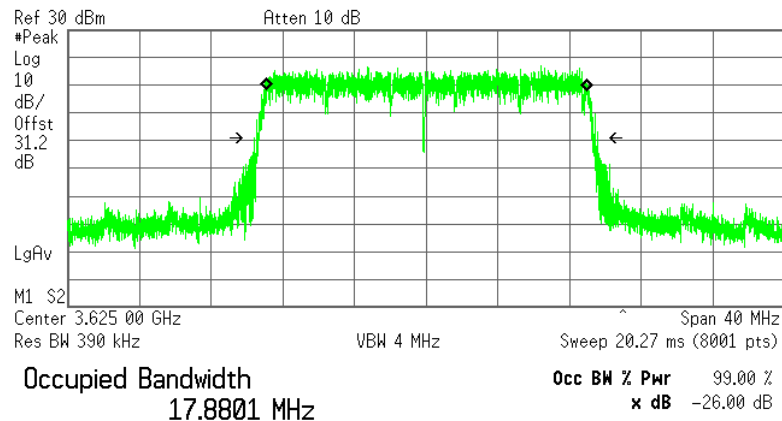
Plot 7.3.13 Occupied bandwidth test result at mid frequency

MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:

QPSK
20 MHz
1

Agilent

R T



Transmit Freq Error 16.951 kHz
Occupied Bandwidth 19.152 MHz

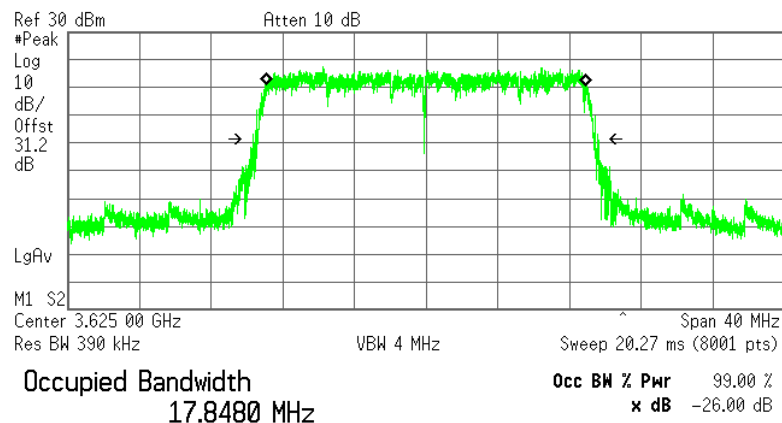
Plot 7.3.14 Occupied bandwidth test result at mid frequency

MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:

16QAM
20 MHz
1

Agilent

R T



Transmit Freq Error 7.785 kHz
x dB Bandwidth 19.239 MHz



HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

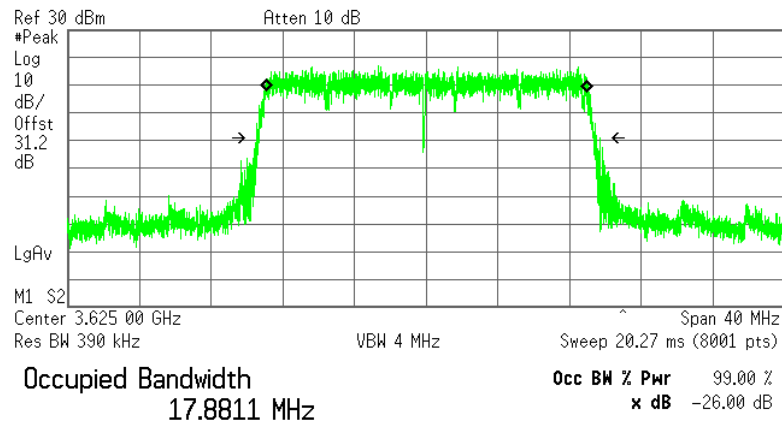
Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

Plot 7.3.15 Occupied bandwidth test result at mid frequency

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

Agilent

R T



Transmit Freq Error 28.943 kHz
x dB Bandwidth 19.154 MHz



HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

Test specification:		Section2.1049, Occupied bandwidth	
Test procedure:		47 CFR, Section 2.1049	
Test mode:		Verdict: PASS	
Date(s):			
04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

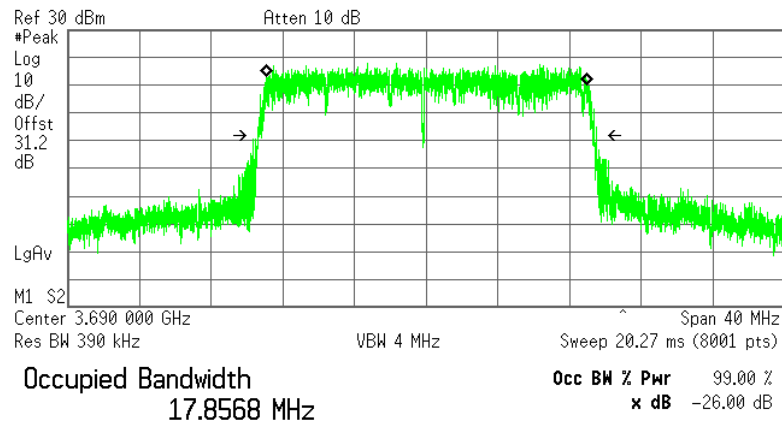
Plot 7.3.16 Occupied bandwidth test result at high frequency

MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:

QPSK
20 MHz
1

Agilent

R T



Transmit Freq Error 26.026 kHz
x dB Bandwidth 18.882 MHz

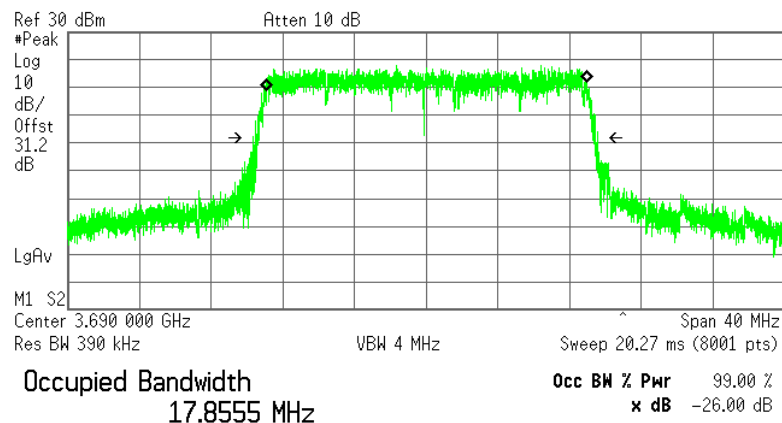
Plot 7.3.17 Occupied bandwidth test result at high frequency

MODULATION:
CHANNEL SPACING:
ANTENNA CHAIN:

16QAM
20 MHz
1

Agilent

R T



Transmit Freq Error 22.294 kHz
x dB Bandwidth 19.226 MHz



HERMON LABORATORIES

Report ID: AIRRAD_FCC.31512_rev7

Date of Issue: 23-Jan-19

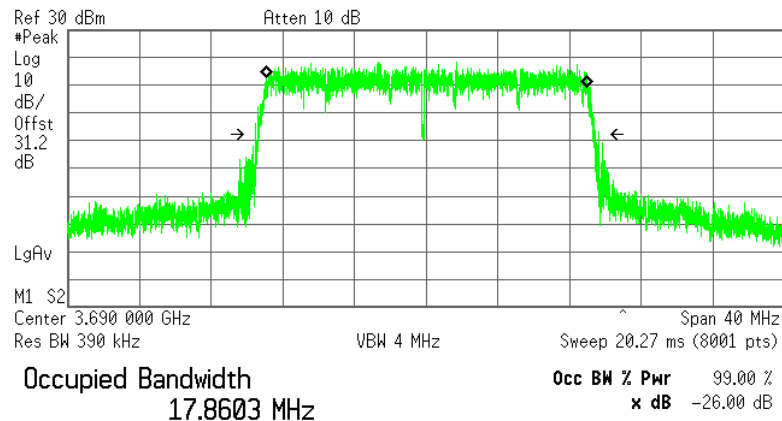
Test specification:		Section2.1049, Occupied bandwidth	
Test procedure:		47 CFR, Section 2.1049	
Test mode:		Verdict: PASS	
Date(s):			
04-Oct-18 - 24-Oct-18			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VDC
Remarks:			

Plot 7.3.18 Occupied bandwidth test result at high frequency

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

Agilent

R T



Transmit Freq Error 20.821 kHz
x dB Bandwidth 19.151 MHz



Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 28-Oct-18 - 01-Nov-18			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

7.4 Emission outside the fundamental test

7.4.1 General

This test was performed to measure Emission outside the fundamental at RF antenna connector. Specification test limits are given in Table 7.4.1.

Table 7.4.1 Emission outside the fundamental 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	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

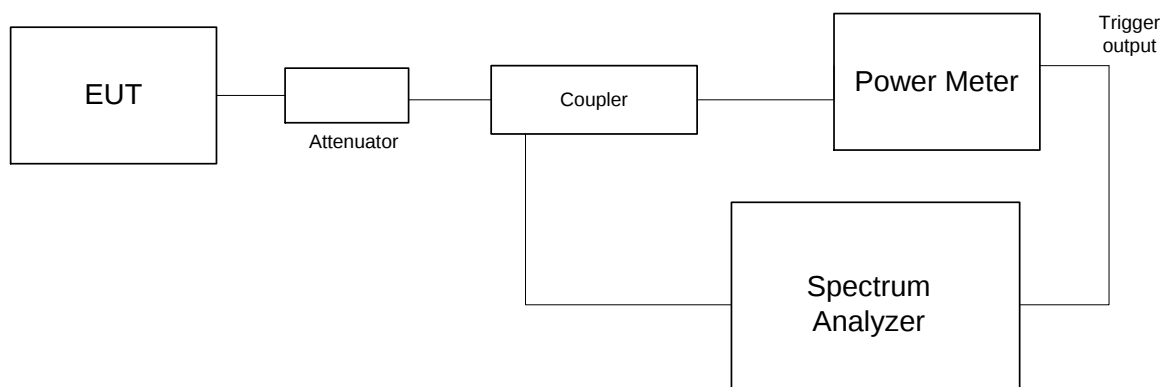
* - Limit at each antenna connector (amount of antennas N = 2)

7.4.2 Test procedure

7.4.2.1 The EUT was set up as shown in Figure 7.4.1, energized and its proper operation was checked.

7.4.2.2 The Emission outside the fundamental was measured with spectrum analyzer as provided in Table 7.4.2, Table 7.4.3 and the the associated plots.

Figure 7.4.1 Emission outside the fundamental test setup





Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
28-Oct-18 - 01-Nov-18			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Table 7.4.2 Emission outside the fundamental test results

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz
 DETECTOR USED: Average (gated)
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 EBW: 10 MHz
 NUMBER OF CHAINS: 2
 ANTENNA PORT: #1

Frequency MHz	Band edge	SA reading over 1 chain, dBm	Total band edge*, dBm	RBW, kHz	Integration BW, kHz	Limit, dBm	Verdict
QPSK							
Low frequency 3555.0 MHz							
3550.00	Low	-26.41	-23.41	100	NA	-13.0	Pass
3530.00	Low	-49.74	-46.74	100	1000	-25.0	
3560.00	High	-27.16	-24.16	100	1000	-13.0	
3570.00	High	-43.91	-40.91	100	1000	-25.0	
Mid frequency 3625.0 MHz							
3620.00	Low	-28.99	-25.99	100	NA	-13.0	Pass
3610.00	Low	-44.64	-41.64	100	1000	-25.0	
3630.00	High	-29.03	-26.03	100	NA	-13.0	
3650.00	High	-44.08	-41.08	100	1000	-25.0	
High frequency 3695.0 MHz							
3690.00	Low	-27.10	-24.10	100	NA	-13.0	Pass
3680.00	Low	-45.68	-42.68	100	1000	-25.0	
3700.00	High	-28.80	-25.80	100	NA	-13.0	
3710.00	High	-46.52	-43.52	100	1000	-25.0	
16 QAM							
Low frequency 3555.0 MHz							
3550.00	Low	-32.85	-29.86	100	NA	-13.0	Pass
3530.00	Low	-48.70	-45.70	100	1000	-40.0	
3560.00	High	-29.67	-26.67	100	NA	-13.0	
3570.00	High	-41.37	-38.37	100	1000	-25.0	
Mid frequency 3625.0 MHz							
3620.00	Low	-28.45	-25.45	100	NA	-13.0	Pass
3610.00	Low	-44.97	-41.97	100	1000	-25.0	
3630.00	High	-32.56	-29.56	100	NA	-13.0	
3650.00	High	-44.15	-41.15	100	1000	-25.0	
High frequency 2680.0 MHz							
3690.00	Low	-29.25	-26.25	100	NA	-13.0	Pass
3680.00	Low	-43.18	-40.18	100	1000	-25.0	
3700.00	High	-28.23	-25.23	100	NA	-13.0	
3720.00	High	-50.02	-47.02	100	1000	-40.0	
64 QAM							
Low frequency 3555.0 MHz							
3550.00	Low	-27.80	-24.80	100	NA	-13.0	Pass
3530.00	Low	-51.16	-48.16	100	1000	-40.0	
3560.00	High	-24.21	-21.21	100	NA	-13.0	
3580.00	High	-44.97	-41.97	100	1000	-25.0	
Mid frequency 3625.0 MHz							
3620.00	Low	-26.87	-23.87	100	NA	-13.0	Pass
3610.00	Low	-43.86	-40.86	100	1000	-25.0	
3630.00	High	-25.50	-22.50	100	NA	-13.0	
3650.00	High	-44.08	-41.08	100	1000	-25.0	
High frequency 3695.0 MHz							
3690.00	Low	-23.82	-20.82	100	NA	-13.0	Pass
3689.50	Low	-28.03	-25.03	100	1000	-25.0	
3700.00	High	-25.05	-22.05	100	NA	-13.0	
3720.00	High	-50.12	-47.12	100	1000	-40.0	

* - Total band edge = SA reading + 10*log(N) = SA reading +3 dB



Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 28-Oct-18 - 01-Nov-18			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Table 7.4.3 Emission outside the fundamental test results

ASSIGNED FREQUENCY RANGE: 3550.0 – 3700.0 MHz
 DETECTOR USED: Average (gated)
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 EBW: 20 MHz
 NUMBER OF CHAINS: 2
 ANTENNA PORT: #1

ANTENNA PORT. #1

Frequency MHz	Band edge	SA reading over 1 chain, dBm	Total band edge*, dBm	RBW, kHz	Integration BW, kHz	Limit, dBm	Verdict
QPSK							
Low frequency 3560.0 MHz							
3550.00	Low	-27.59	-24.59	100	NA	-13.0	Pass
3548.50	Low	-30.59	-27.59	100	1000	-25.0	
3570.00	High	-28.00	-25.00	100	NA	-13.0	
3580.00	High	-38.93	-35.93	100	1000	-25.0	
Mid frequency 3625.0 MHz							
3615.00	Low	-31.32	-28.32	100	NA	-13.0	Pass
3605.00	Low	-42.29	-39.29	100	1000	-25.0	
3635.00	High	-29.60	-26.60	100	NA	-13.0	
3645.00	High	-41.82	-38.82	100	1000	-25.0	
High frequency 3690.0 MHz							
3680.00	Low	-29.29	-26.29	100	NA	-13.0	Pass
3670.00	Low	-42.14	-39.14	100	1000	-25.0	
3700.00	High	-29.70	-26.70	100	NA	-13.0	
3710.00	High	-45.20	-42.20	100	1000	-25.0	
16 QAM							
Low frequency 3560.0 MHz							
3550.00	Low	-30.24	-27.24	100	NA	-13.0	Pass
3548.50	Low	-30.98	-27.98	100	1000	-13.0	
3570.00	High	-29.59	-26.59	100	NA	-13.0	
3571.50	High	-30.35	-27.35	100	1000	-13.0	
Mid frequency 3625.0 MHz							
3615.00	Low	-27.70	-24.70	100	NA	-13.0	Pass
3605.00	Low	-42.25	-39.25	100	1000	-25.0	
3635.00	High	-27.28	-24.28	100	NA	-13.0	
3645.00	High	-42.30	-39.30	100	1000	-25.0	
High frequency 3690.0 MHz							
3680.00	Low	-27.26	-24.26	100	NA	-13.0	Pass
3670.00	Low	-42.69	-39.69	100	1000	-25.0	
3700.00	High	-29.52	-26.52	100	NA	-13.0	
3710.00	High	-44.91	-41.91	100	1000	-25.0	