

Test specification:		Section 15.215(c), Occupied bandwidth	
Test procedure:		47 CFR, Section 2.1049, ANSI C63.10, Section 9.3	
Test mode:		Verdict: PASS	
Date(s):			
19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

7.2 Occupied bandwidth test

7.2.1 General

This test was performed to verify that the 20 dB bandwidth of the emissions was contained within the standard specified frequency band according to FCC §15.215 requirements. Specification test limits are given in Table 7.2.1.

Table 7.2.1 Occupied bandwidth limits

Assigned frequency range, MHz	Modulation envelope reference points
57000 - 66000	99%

NOTE: Modulation envelope reference points provided in terms of attenuation below unmodulated carrier.

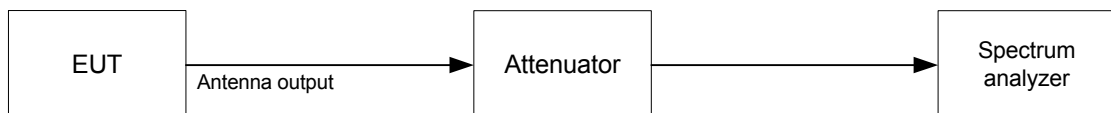
7.2.2 Test procedure

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 spectrum analyzer sweep time and bandwidth were set to capture all major modulation sidebands of emission and sweep time was set sufficiently slow to ensure peak measurements. Spectrum analyzer was set in peak hold mode and time sufficient for trace stabilization was allowed.

7.2.2.3 The peak of emission was measured. The transmitter occupied bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 7.2.2 and associated plots.

Figure 7.2.1 Occupied bandwidth test setup





Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance	Verdict: PASS		
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

Table 7.2.2 Occupied bandwidth test results

OPERATING FREQUENCY RANGE: 57000 –66000 MHz
DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: See table below
VIDEO BANDWIDTH: 3 x RBW
MODULATION ENVELOPE REFERENCE POINTS: 99 %

Frequency, MHz	RBW, kHz	Occupied bandwidth 99 %, MHz	OBW limit, MHz	Verdict
Emission Bandwidth 50 MHz				
Modulation 2QAM				
57025.0	1000.0	47.457	NA	Comply
61500.0	1000.0	47.347	NA	Comply
65975.0	1000.0	47.427	NA	Comply
Modulation 128QAM				
57025.0	1000.0	47.395	NA	Comply
61500.0	1000.0	47.459	NA	Comply
65975.0	1000.0	47.305	NA	Comply
Emission Bandwidth 100 MHz				
Modulation 2QAM				
57050.0	2000.0	94.829	NA	Comply
61500.0	2000.0	94.686	NA	Comply
65950.0	2000.0	94.737	NA	Comply
Modulation 256QAM				
57050.0	2000.0	94.771	NA	Comply
61500.0	2000.0	95.124	NA	Comply
65950.0	2000.0	94.751	NA	Comply
Emission Bandwidth 250 MHz				
Modulation 2QAM				
57125.0	5000.0	240.15	NA	Comply
61500.0	5000.0	240.47	NA	Comply
65875.0	5000.0	240.99	NA	Comply
Modulation 256QAM				
57125.0	5000.0	239.31	NA	Comply
61500.0	5000.0	239.70	NA	Comply
65875.0	5000.0	239.33	NA	Comply
Emission Bandwidth 500 MHz				
Modulation 2QAM				
57250.0	8000.0	469.98	NA	Comply
61500.0	8000.0	470.45	NA	Comply
65750.0	8000.0	470.95	NA	Comply
Modulation 64QAM				
57250.0	8000.0	472.96	NA	Comply
61500.0	8000.0	472.30	NA	Comply
65750.0	8000.0	474.64	NA	Comply

Reference numbers of test equipment used

HL 3903	HL 5376	HL 5380						
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Full description is given in Appendix A.

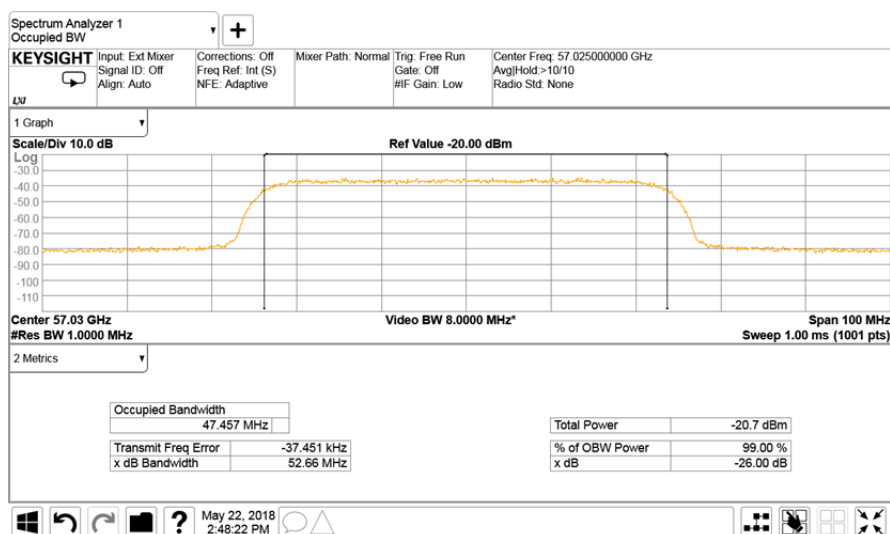


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

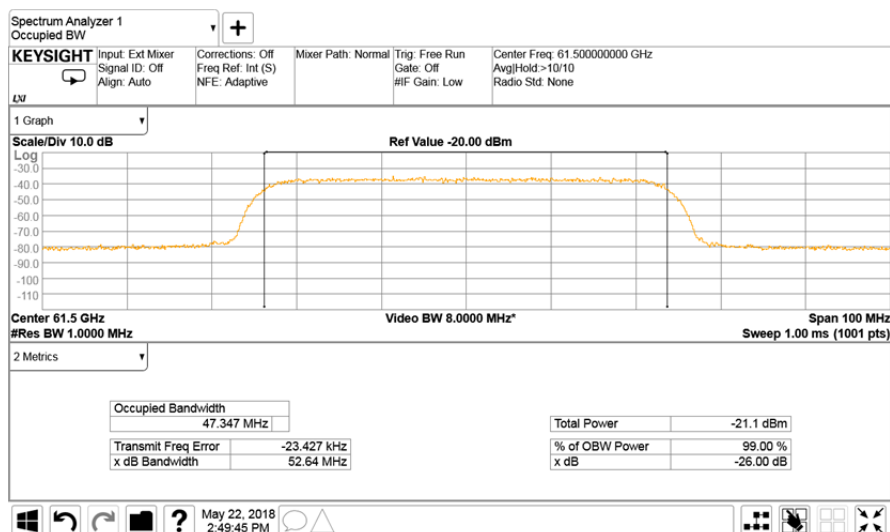
Plot 7.2.1 Occupied bandwidth test result at Low frequency

MODULATION:	2QAM
EMISSION BANDWIDTH:	50 MHz
CARRIER FREQUENCY:	57025 MHz



Plot 7.2.2 Occupied bandwidth test result at Mid frequency

MODULATION:	2QAM
EMISSION BANDWIDTH:	50 MHz
at mid frequency	61500 MHz



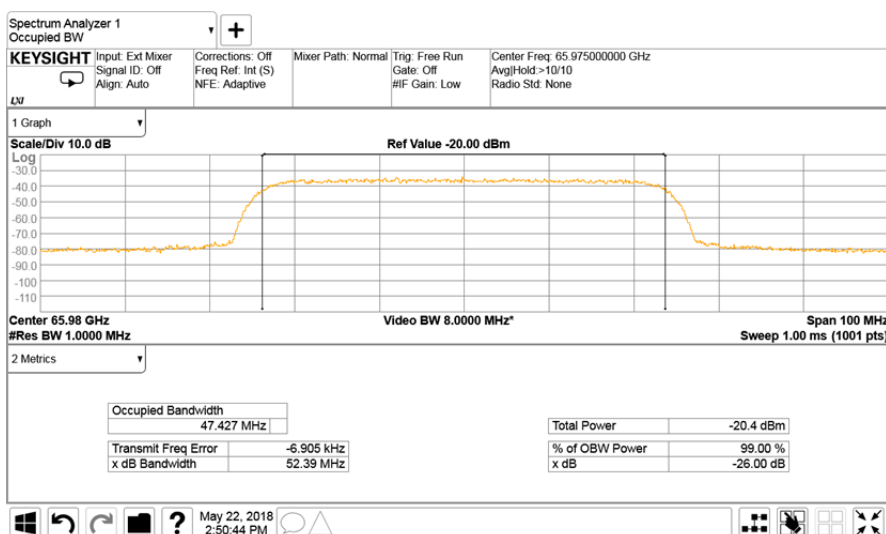


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

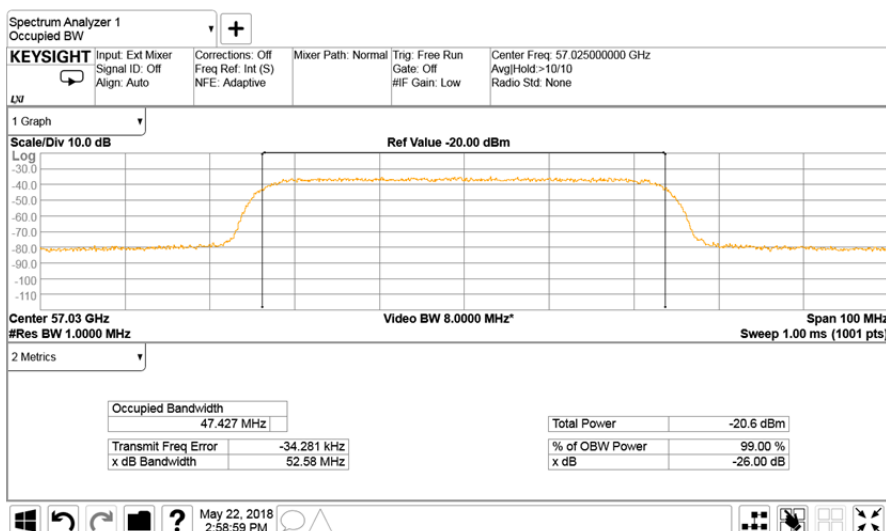
Plot 7.2.3 Occupied bandwidth test result at High frequency

MODULATION:	2QAM
EMISSION BANDWIDTH:	50 MHz
at High frequency	65975 MHz



Plot 7.2.4 Occupied bandwidth test result at Low frequency

MODULATION:	4QAM
EMISSION BANDWIDTH:	50 MHz
at low frequency	57025MHz



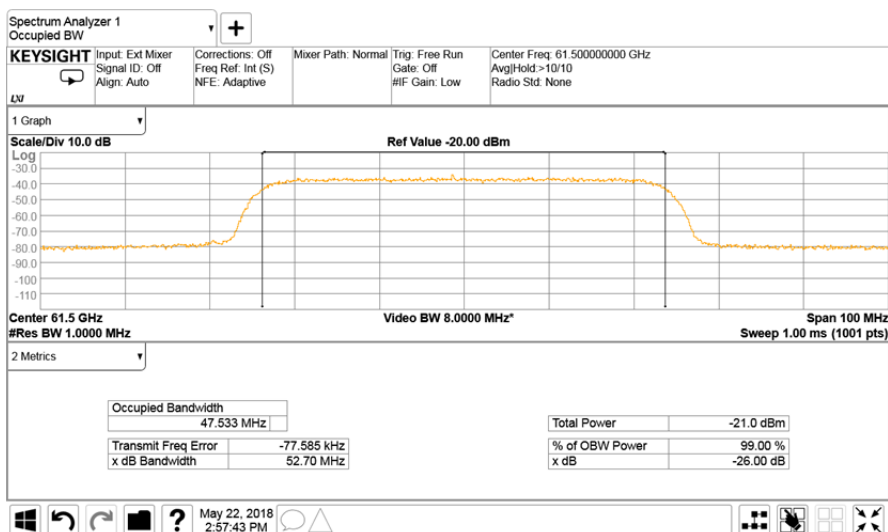


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

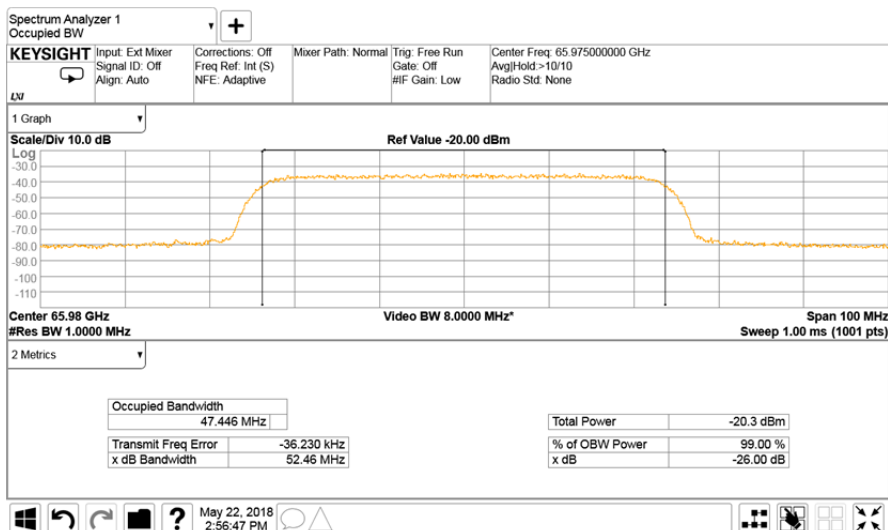
Plot 7.2.5 Occupied bandwidth test result at Mid frequency

MODULATION:	4QAM
EMISSION BANDWIDTH:	50 MHz
at mid frequency	61500 MHz



Plot 7.2.6 Occupied bandwidth test result at High frequency

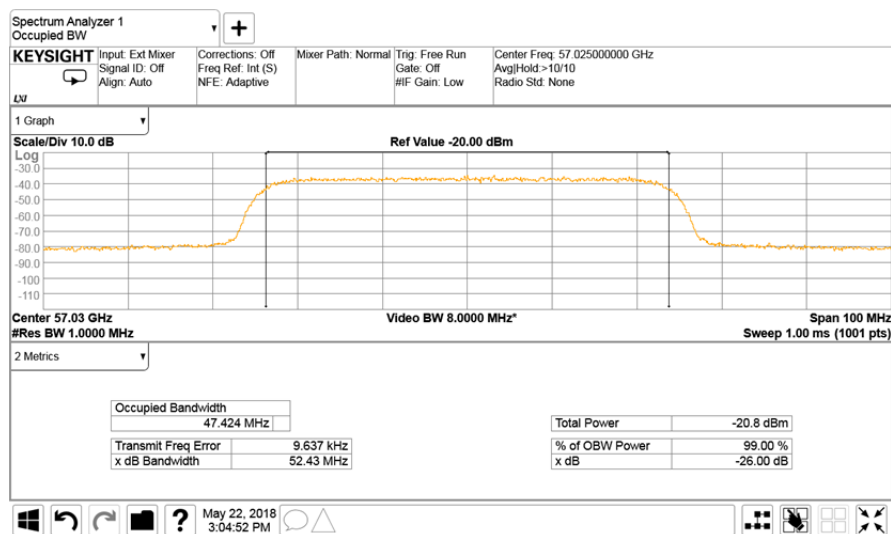
MODULATION:	4QAM
EMISSION BANDWIDTH:	50 MHz
at High frequency	65975 MHz



Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

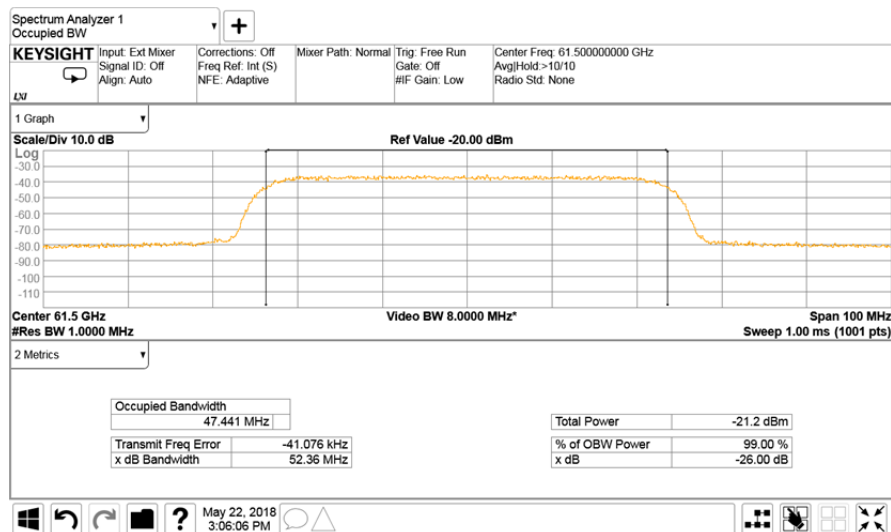
Plot 7.2.7 Occupied bandwidth test result at Low frequency

MODULATION:	8QAM
EMISSION BANDWIDTH:	50 MHz
at low frequency	57025MHz



Plot 7.2.8 Occupied bandwidth test result at Mid frequency

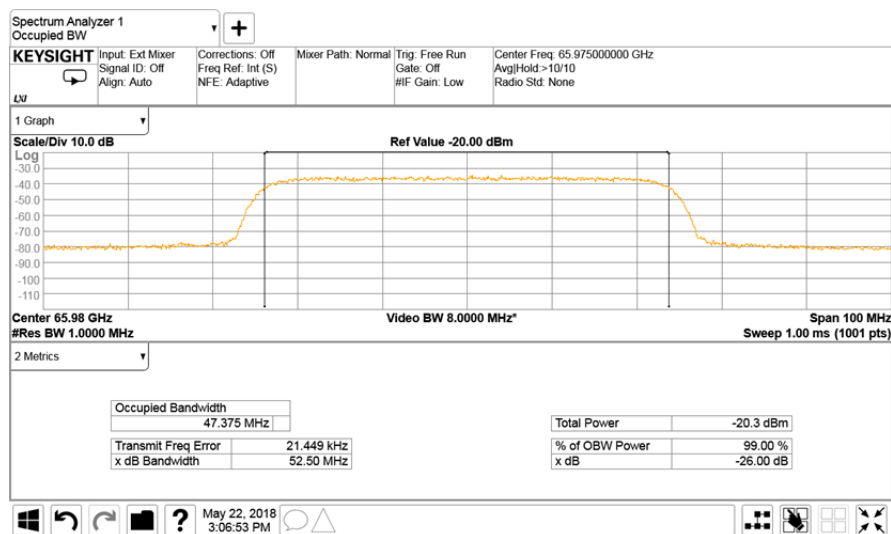
MODULATION:	8QAM
EMISSION BANDWIDTH:	50 MHz
at mid frequency	61500 MHz



Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

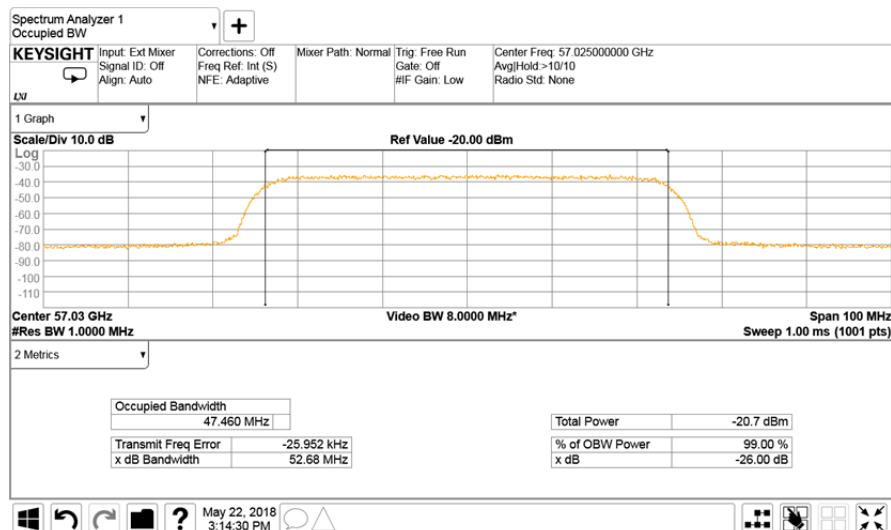
Plot 7.2.9 Occupied bandwidth test result at High frequency

MODULATION:	8QAM
EMISSION BANDWIDTH:	50 MHz
at High frequency	65975 MHz



Plot 7.2.10 Occupied bandwidth test result at Low frequency

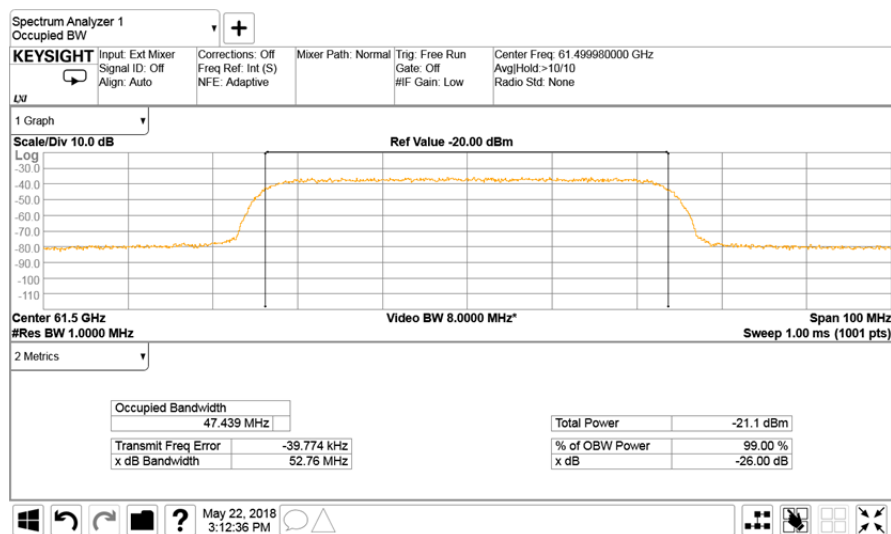
MODULATION:	16QAM
EMISSION BANDWIDTH:	50 MHz
at low frequency	57025 MHz



Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

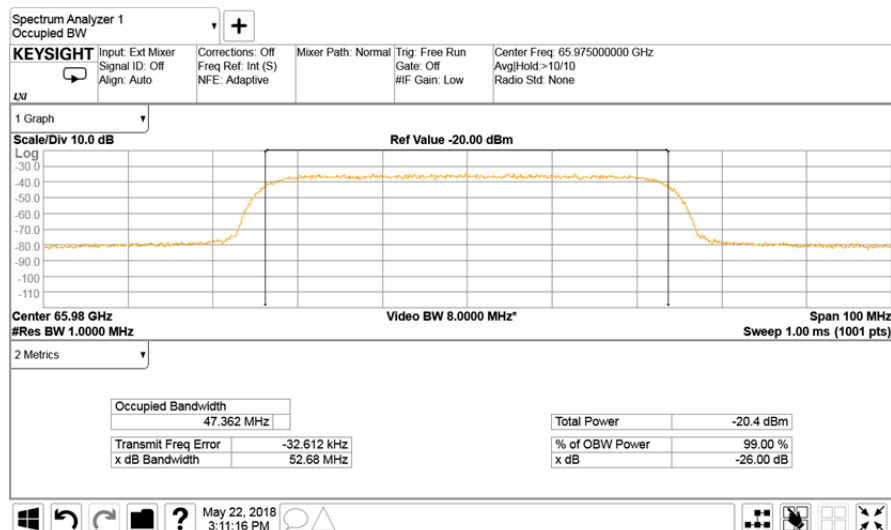
Plot 7.2.11 Occupied bandwidth test result at Mid frequency

MODULATION:	16QAM
EMISSION BANDWIDTH:	50 MHz
at mid frequency	61500 MHz



Plot 7.2.12 Occupied bandwidth test result at High frequency

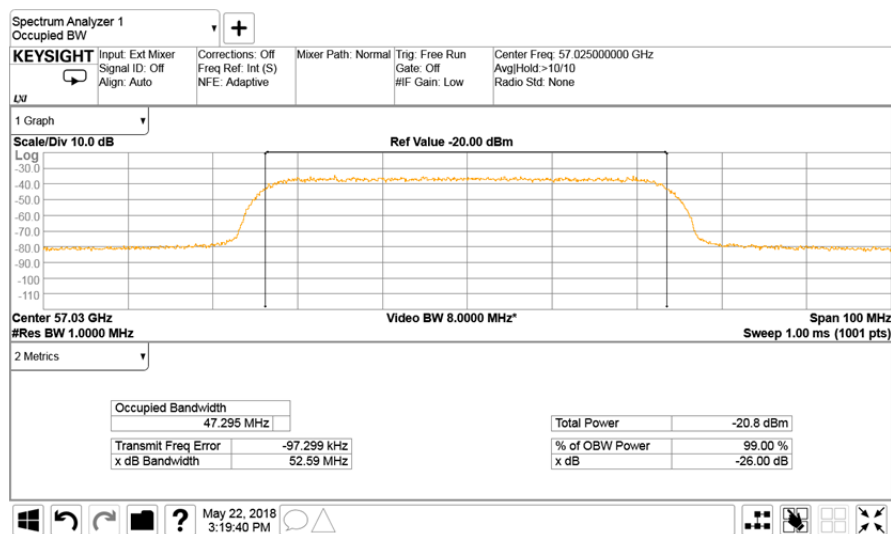
MODULATION:	16QAM
EMISSION BANDWIDTH:	50 MHz
at High frequency	65975 MHz



Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

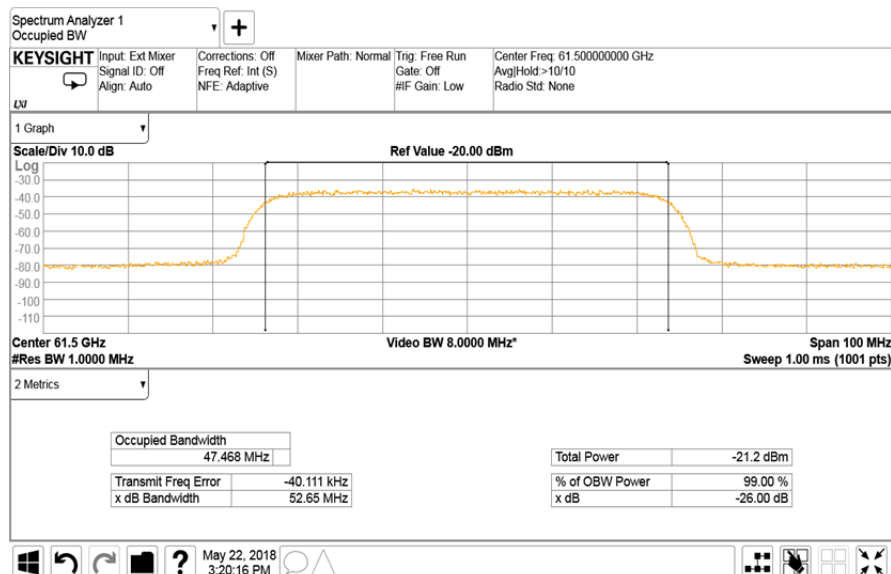
Plot 7.2.13 Occupied bandwidth test result at Low frequency

MODULATION:	32QAM
EMISSION BANDWIDTH:	50 MHz
at low frequency	57025 MHz



Plot 7.2.14 Occupied bandwidth test result at Mid frequency

MODULATION:	32QAM
EMISSION BANDWIDTH:	50 MHz
at mid frequency	61500 MHz



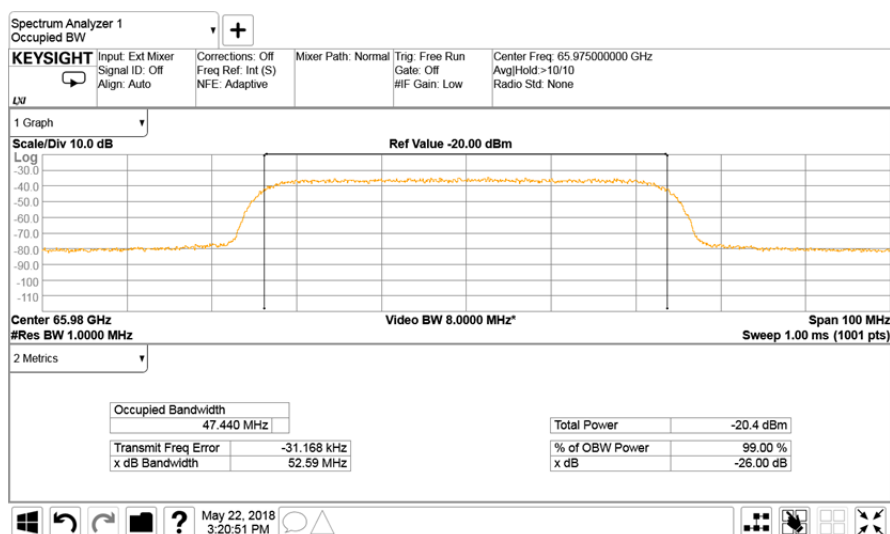


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

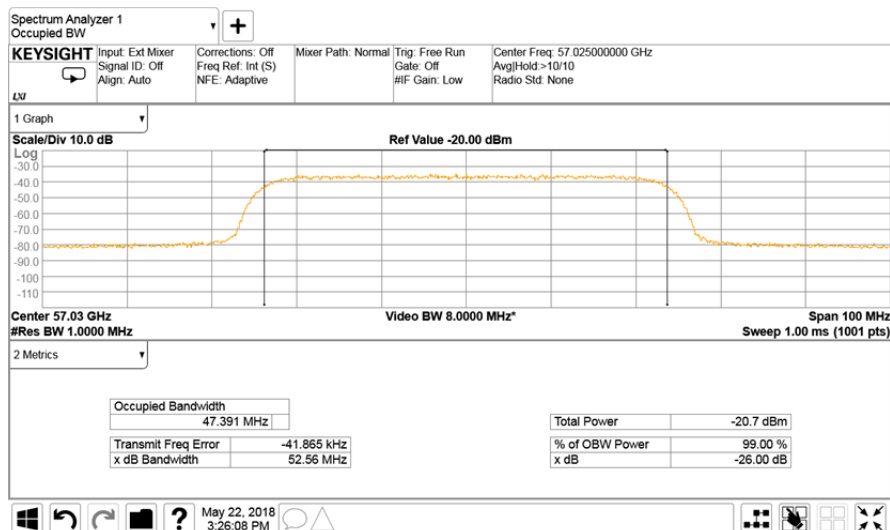
Plot 7.2.15 Occupied bandwidth test result at High frequency

MODULATION:	32QAM
EMISSION BANDWIDTH:	50 MHz
at High frequency	65975 MHz



Plot 7.2.16 Occupied bandwidth test result at Low frequency

MODULATION:	64QAM
EMISSION BANDWIDTH:	50 MHz
at low frequency	57025 MHz



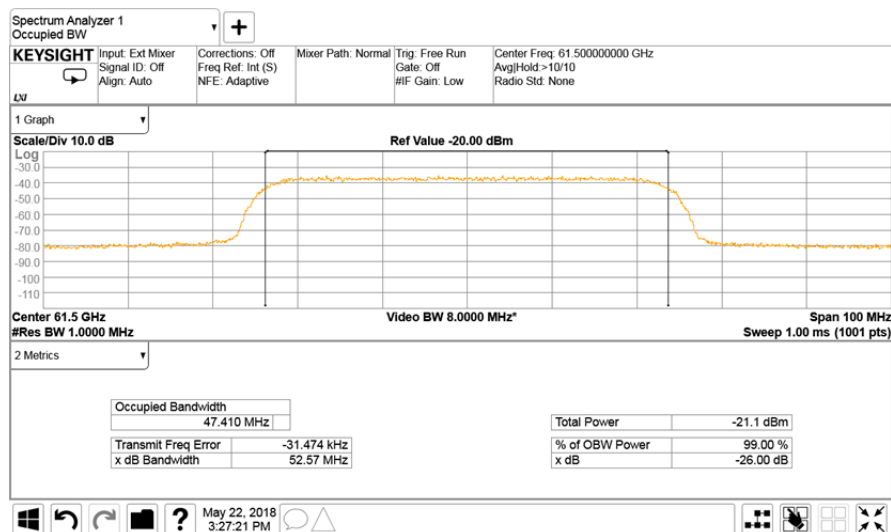


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

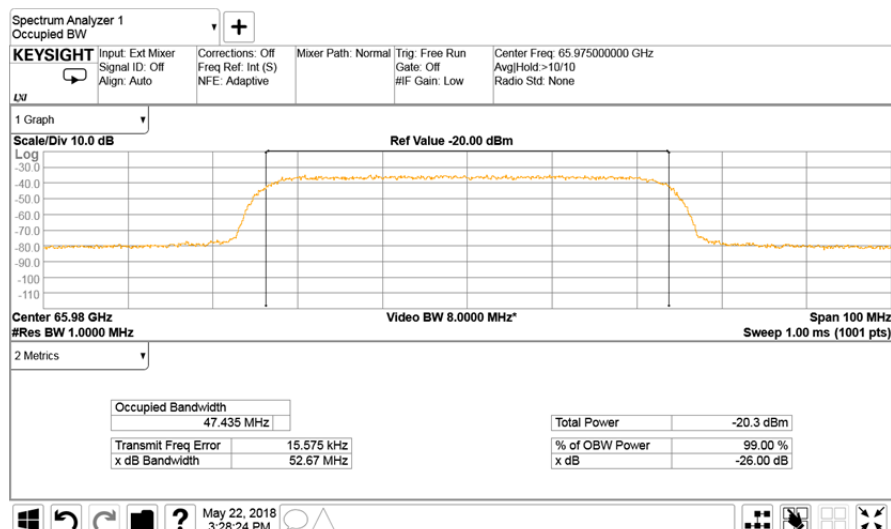
Plot 7.2.17 Occupied bandwidth test result at Mid frequency

MODULATION:	64QAM
EMISSION BANDWIDTH:	50 MHz
at mid frequency	61500 MHz



Plot 7.2.18 Occupied bandwidth test result at High frequency

MODULATION:	64QAM
EMISSION BANDWIDTH:	50 MHz
at High frequency	65975 MHz



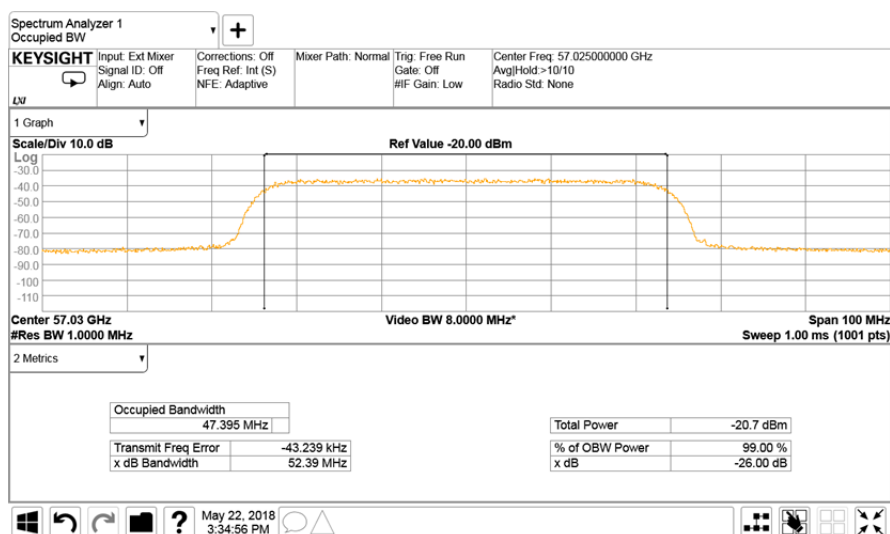


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

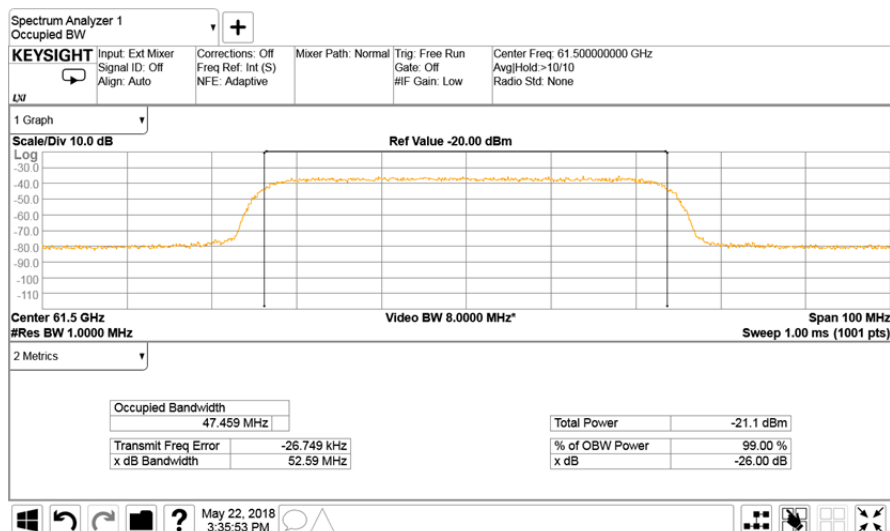
Plot 7.2.19 Occupied bandwidth test result at Low frequency

MODULATION:	128QAM
EMISSION BANDWIDTH:	50 MHz
at low frequency	57025 MHz



Plot 7.2.20 Occupied bandwidth test result at Mid frequency

MODULATION:	128QAM
EMISSION BANDWIDTH:	50 MHz
at mid frequency	61500 MHz



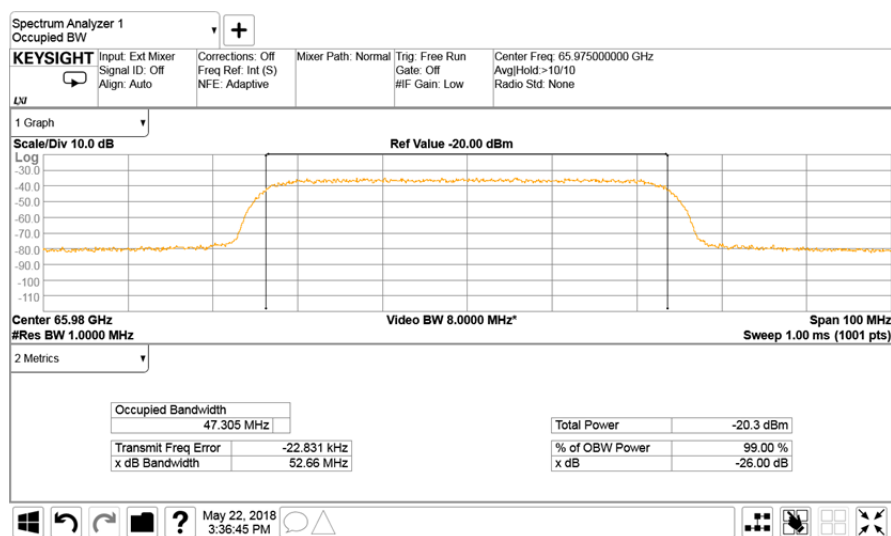


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

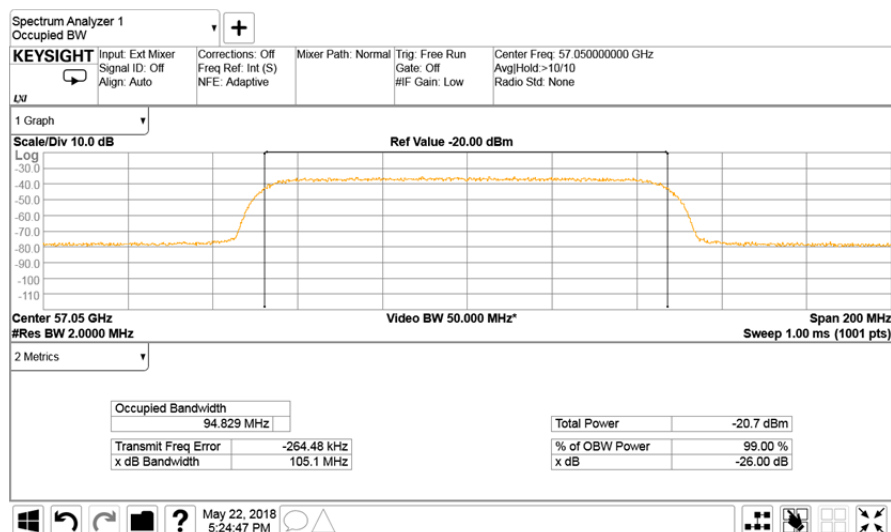
Plot 7.2.21 Occupied bandwidth test result at High frequency

MODULATION:	128QAM
EMISSION BANDWIDTH:	50 MHz
at High frequency	65975 MHz



Plot 7.2.22 Occupied bandwidth test result at Low frequency

MODULATION:	2QAM
EMISSION BANDWIDTH:	100 MHz
at low frequency	57050 MHz



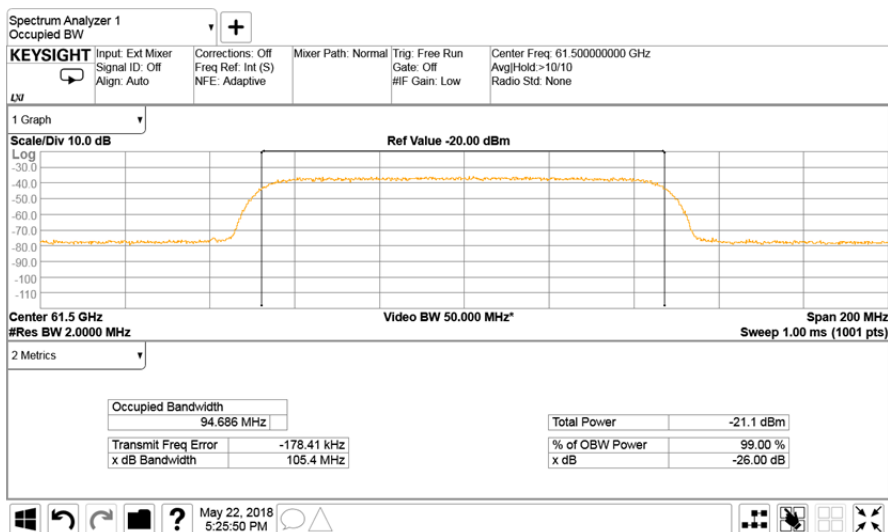


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

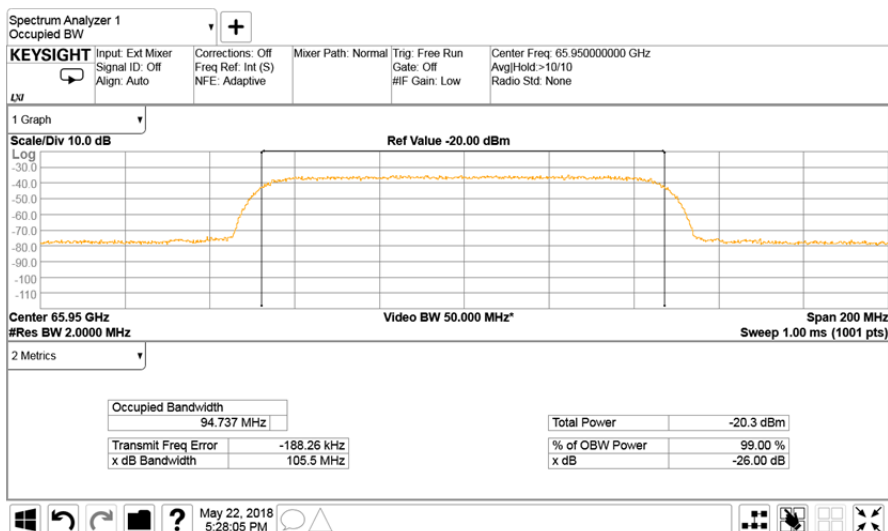
Plot 7.2.23 Occupied bandwidth test result at Mid frequency

MODULATION:	2QAM
EMISSION BANDWIDTH:	100 MHz
at mid frequency	61500 MHz



Plot 7.2.24 Occupied bandwidth test result at High frequency

MODULATION:	2QAM
EMISSION BANDWIDTH:	100 MHz
at High frequency	65950 MHz



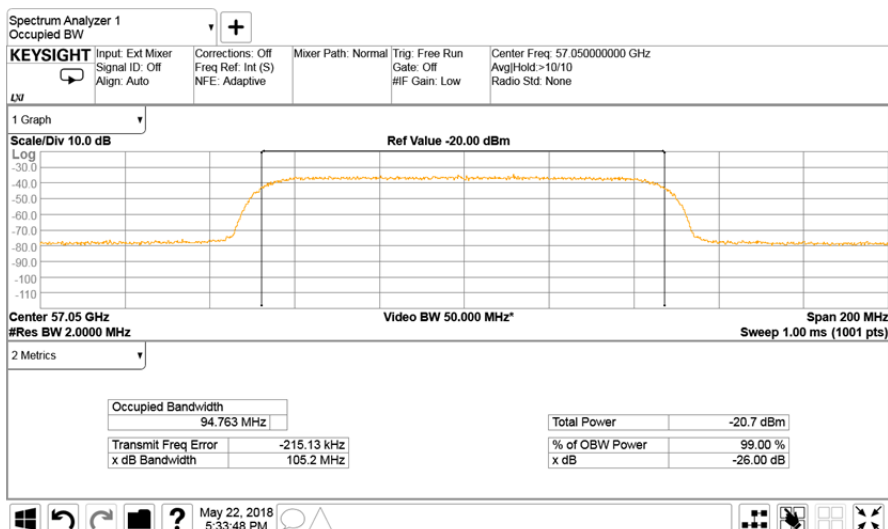


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

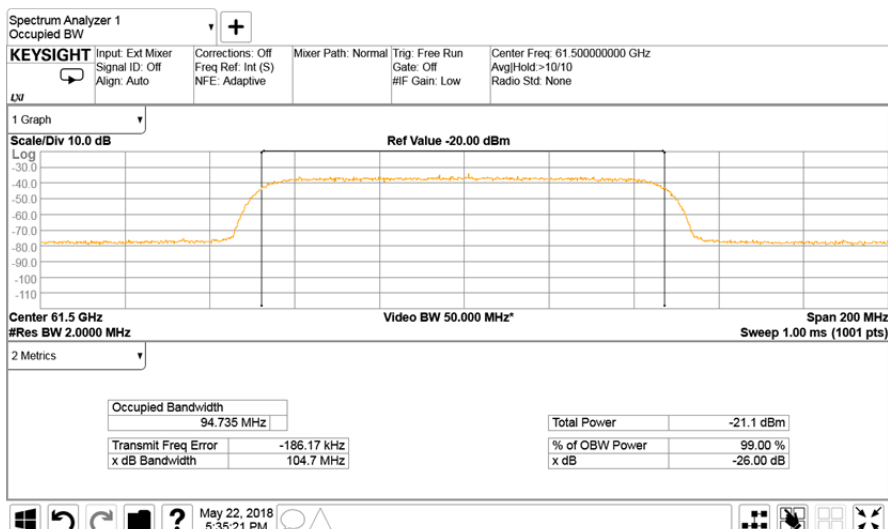
Plot 7.2.25 Occupied bandwidth test result at Low frequency

MODULATION:	4QAM
EMISSION BANDWIDTH:	100 MHz
at low frequency	57050 MHz



Plot 7.2.26 Occupied bandwidth test result at Mid frequency

MODULATION:	4QAM
EMISSION BANDWIDTH:	100 MHz
at mid frequency	61500 MHz



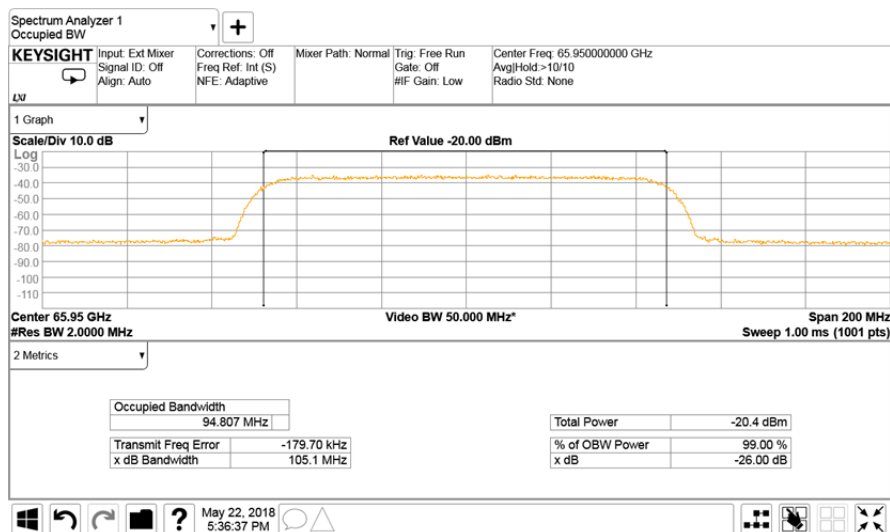


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

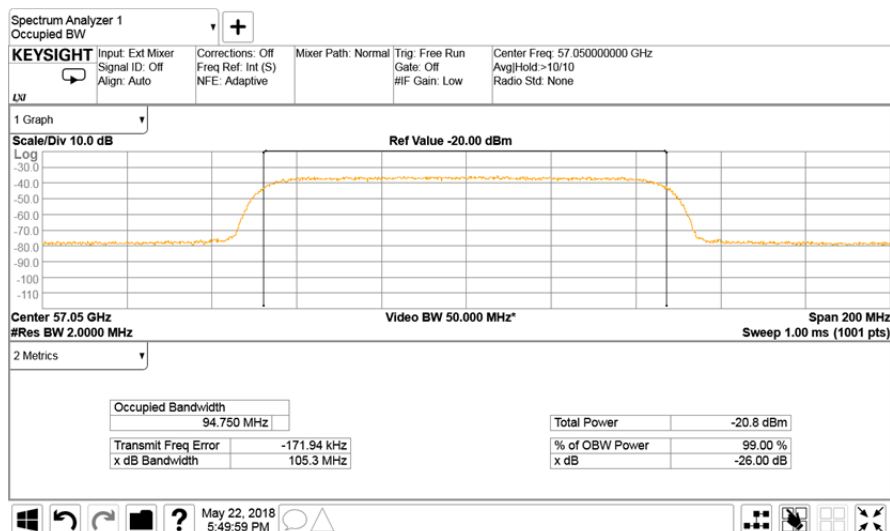
Plot 7.2.27 Occupied bandwidth test result at High frequency

MODULATION:	4QAM
EMISSION BANDWIDTH:	100 MHz
at High frequency	65950 MHz



Plot 7.2.28 Occupied bandwidth test result at Low frequency

MODULATION:	8QAM
EMISSION BANDWIDTH:	100 MHz
at low frequency	57050 MHz



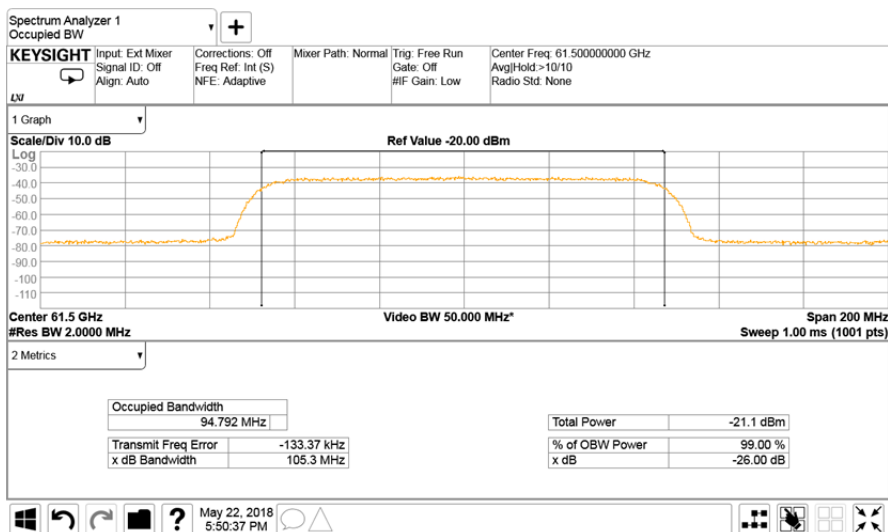


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

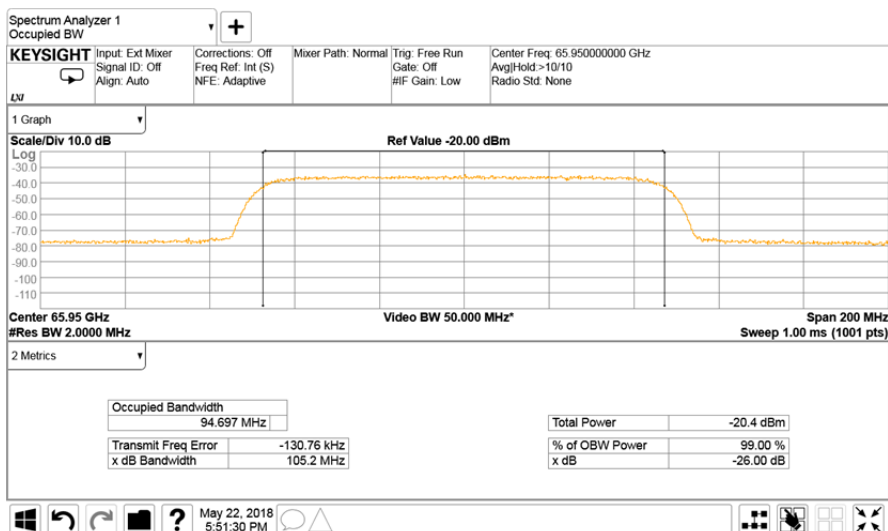
Plot 7.2.29 Occupied bandwidth test result at Mid frequency

MODULATION:	8QAM
EMISSION BANDWIDTH:	100 MHz
at mid frequency	61500 MHz



Plot 7.2.30 Occupied bandwidth test result at High frequency

MODULATION:	8QAM
EMISSION BANDWIDTH:	100 MHz
at High frequency	65950 MHz



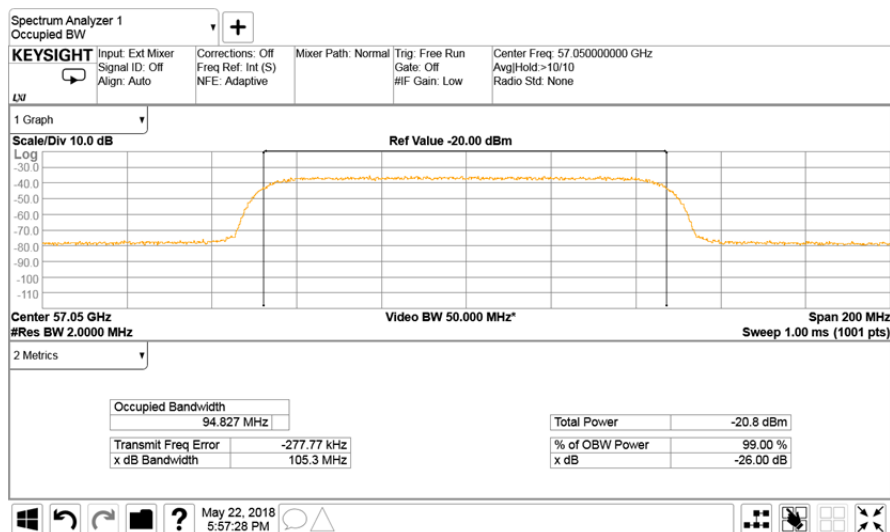


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

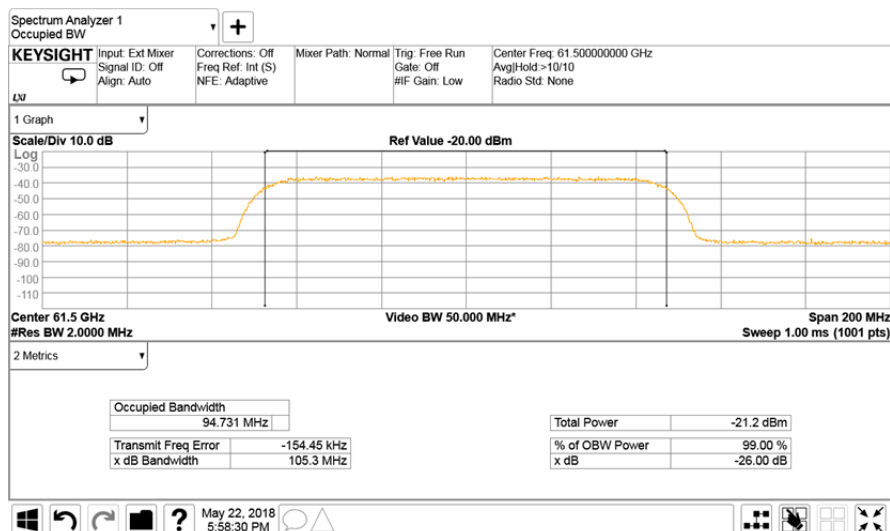
Plot 7.2.31 Occupied bandwidth test result at Low frequency

MODULATION:	16QAM
EMISSION BANDWIDTH:	100 MHz
at low frequency	57050 MHz



Plot 7.2.32 Occupied bandwidth test result at Mid frequency

MODULATION:	16QAM
EMISSION BANDWIDTH:	100 MHz
at mid frequency	61500 MHz



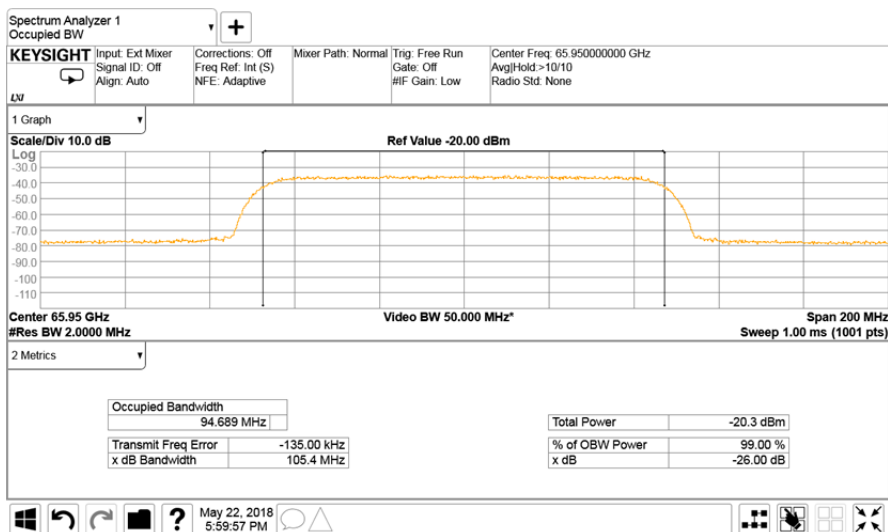


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

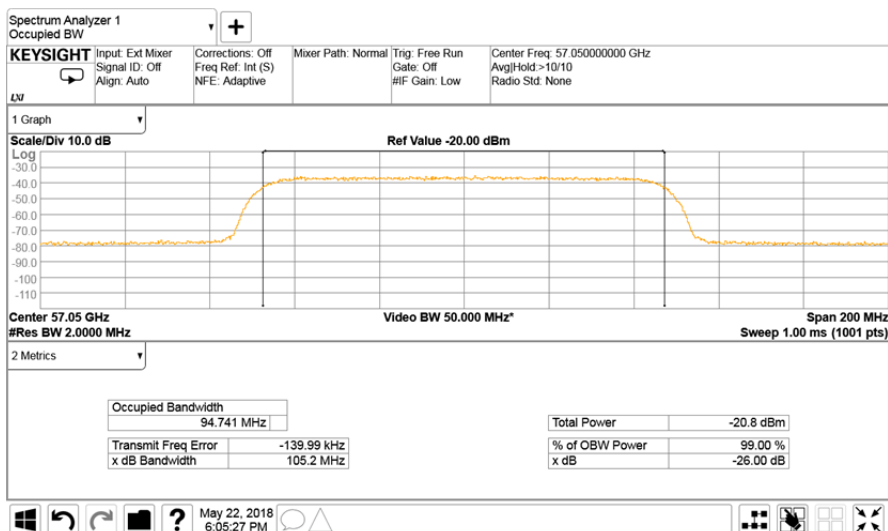
Plot 7.2.33 Occupied bandwidth test result at High frequency

MODULATION:	16QAM
EMISSION BANDWIDTH:	100 MHz
at High frequency	65950 MHz



Plot 7.2.34 Occupied bandwidth test result at Low frequency

MODULATION:	32QAM
EMISSION BANDWIDTH:	100 MHz
at low frequency	57050 MHz



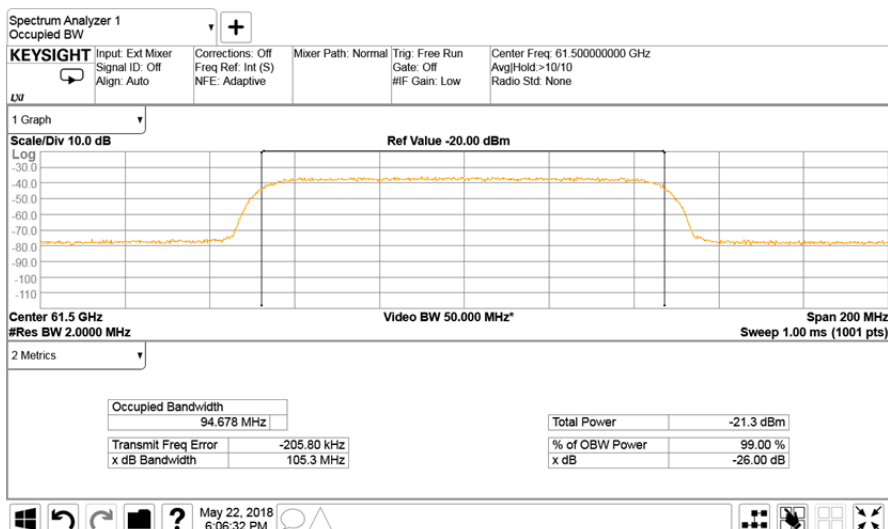


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

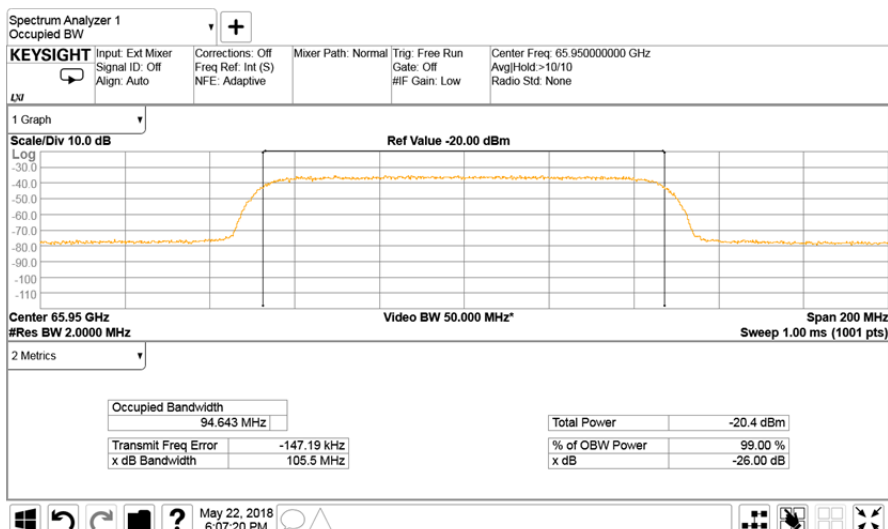
Plot 7.2.35 Occupied bandwidth test result at Mid frequency

MODULATION:	32QAM
EMISSION BANDWIDTH:	100 MHz
at mid frequency	61500 MHz



Plot 7.2.36 Occupied bandwidth test result at High frequency

MODULATION:	32QAM
EMISSION BANDWIDTH:	100 MHz
at High frequency	65950 MHz



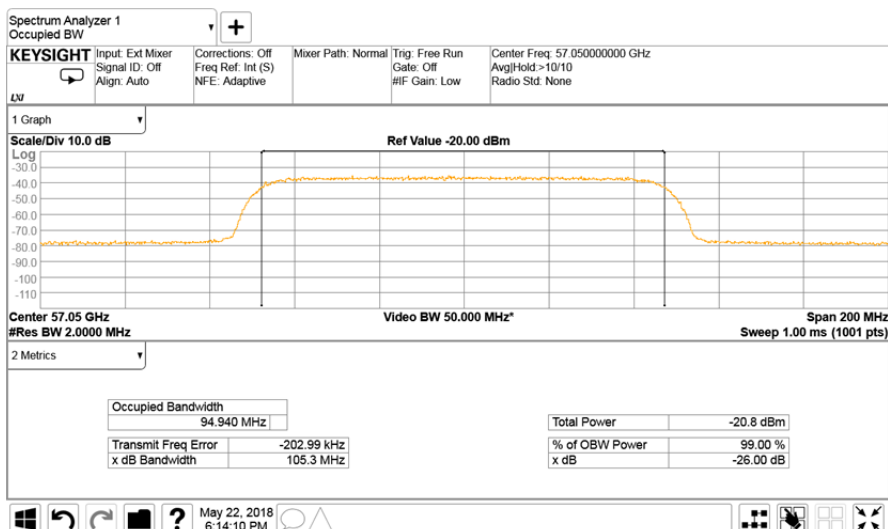


HERMON LABORATORIES

Test specification: Section 15.215(c), Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049, ANSI C63.10, Section 9.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Jun-18 - 27-Jun-18			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: -48 VDC
Remarks:			

Plot 7.2.37 Occupied bandwidth test result at Low frequency

MODULATION:	64QAM
EMISSION BANDWIDTH:	100 MHz
at low frequency	57050 MHz



Plot 7.2.38 Occupied bandwidth test result at Mid frequency

MODULATION:	64QAM
EMISSION BANDWIDTH:	100 MHz
at mid frequency	61500 MHz

