

TEST REPORT

ACCORDING TO: FCC 47CFR part 96

FOR:

Airspan Networks Inc.

AirSpan Indoor 5G NR Base station

Models: AirVelocity 1901 5G, 3.55-3.7GHz (n48) PoE

FCC ID: PIDAV1901

This report is in conformity with ISO/IEC 17025. The "A2LA Accredited" symbol endorsement applies only to the tests and calibrations that are listed in the scope of Hermon Laboratories accreditation. The test results relate only to the items tested.
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Table of contents

1	Applicant information	3
2	Equipment under test attributes	3
3	Manufacturer information	3
4	Test details	3
5	Tests summary	4
6	EUT description	5
6.1	General information	5
6.2	Ports and lines	5
6.3	Support and test equipment	5
6.4	Changes made in the EUT	5
6.5	Test configuration	6
6.6	Transmitter characteristics	7
6.7	Table of calculations for the MAX EIRP at frequency range 3550 – 3700 MHz	8
7	Transmitter tests according to 47CFR part 96	9
7.1	Maximum EIRP and maximum power spectral density	9
7.2	Peak-to-average power ratio (PAPR) test	34
7.3	Occupied bandwidth test	50
7.4	Emission outside the fundamental test	71
7.5	Radiated spurious emission measurements	97
7.6	Spurious emissions at RF antenna connector test	108
7.7	Frequency stability test	151
8	APPENDIX A Test equipment and ancillaries used for tests	153
9	APPENDIX B Test equipment correction factors	155
10	APPENDIX C Measurement uncertainties	160
11	APPENDIX D Test laboratory description	161
12	APPENDIX E Specification references	161
13	APPENDIX F Manufacturer's declaration	162
14	APPENDIX G Abbreviations and acronyms	163

1 Applicant information

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Contact name: Mr. Zion Levi

2 Equipment under test attributes

Product name: AirSpan Indoor 5G NR Base station
Product type: Transceiver
Model(s): AirStar 1200 5G, 3.55-3.7GHz (n48) PoE*
Serial number: ECCA61015CA0
Hardware version: 00
Software release: SR 19.50
Receipt date 03-Apr-22

*According to manufacturer's declaration provided in Appendix F the AirStar 1200 5G, 3.55-3.7GHz (n48) PoE and AirVelocity 1901 5G, 3.55-3.7GHz (n48) PoE have an identical radio frequency system and differ only in height of the cooling fins. Therefore, only the model AirStar 1200 5G, 3.55-3.7GHz (n48) PoE was tested.

3 Manufacturer information

Manufacturer name: Airspan Networks Inc.
Address: 777 Yamato, Road Suite 310 Boca Raton, FL 33431, USA
Telephone: +1 561 893 8670
Fax: +1 561 893 8671
E-Mail: zlevi@airspan.com
Contact name: Mr. Zion Levi

4 Test details

Project ID: 46669
Location: Hermon Laboratories Ltd. P.O. Box 23, Binyamina 3055001, Israel
Test started: 07-Feb-22
Test completed: 17-Feb-22
Test specification(s): FCC 47CFR part 96

5 Tests summary

Test	Status
Transmitter characteristics	
Section 96.41(b), Maximum EIRP and maximum power spectral density	Pass**
Section 96.41(g), Peak-to- average power ratio	Pass*
Section 2.1049, Occupied bandwidth	Pass*
Section 96.41(e), Emission mask	Pass*
Section 96.41(e)(2), Radiated spurious emissions	Pass**
Section 96.41(e)(3), Conducted spurious emissions	Pass*
Section 2.1055, Frequency stability	Pass*

*This test report is based on the test report AIRRAD_FCC.44706_Rev1 issued by Hermon Laboratories assuming that the original EUT configuration approved under FCC ID: PIDAST1200 was not changed except for sleight height difference of the cooling fins as stated in manufacturer's declaration (refer to Appendix F of the test report).




The cooling fins have no impact on the spurious emissions as they are made of the solid-state metal.

**These tests were performed again as a spot check of retesting at worst case settings as appears in the original test report

This test report supersedes the previously issued test report identified by Doc ID: AIRRAD_FCC.46669_Rev3

Testing was completed against all relevant requirements of the test standard. The results obtained indicate that the product under test complies in full with the requirements tested.

The test results relate only to the items tested. Pass/ fail decision was based on nominal values.

	Name and Title	Date	Signature
Tested by:	Mr. A. Morozov, test engineer, EMC & Radio	07-Feb-22 – 17-Feb-22	
Reviewed by:	Mrs. S. Peysahov Sheynin, test engineer, EMC & Radio	22-Dec-22	
Approved by:	Mr. M. Nikishin, EMC and Radio group leader	25-Dec-22	

6 EUT description

Note: The following data in this clause is provided by the customer and represents his sole responsibility

6.1 General information

The EUT is a Mobile Digital station, AirVelocity 1901 5G, 3.55-3.7GHz (n48) PoE, is part of a 5G broadband fixed cellular wireless access system. The system provides a radio link between an end-user (a subscriber) and a network to give high-speed data access.

The AirVelocity 1901's transceiver/receiver (Up to 256 QAM modulation, data rate up to 190 Mbps) equipped with a 8.7dBi Internal antenna. Advanced Antenna Techniques 2x1 MIMO are supported. The maximum RF output power (not including antenna gain) is 27.04 dBm for 8.7dBi and it can be reduced by software.

The AirVelocity is installed indoors. The Subscriber transmits and receives traffic to and from the base station respectively. The transceiver provides subscribers with "always-on" Internet, high speed data only, or data and voice (VoIP) services and is configured with a unique base station reference number, preventing the 5G UE from relocating to another subscriber premises without authorization.

Note: AirVelocity 1901 equipment defined as Category A CBSD (Citizens Broadband Radio Service Device) per FCC part 96 section 96.3(2).

Antennas 1/2 arrange one sector while antenna 1 is cross polarized to antenna 2. The transmitter output signals are completely uncorrelated.

This device supports 5G-NR TDD n48 band and the partial n77/n78 bands matching n48 band.

6.2 Ports and lines

Port type	Port description	Connected from	Connected to	Qty.	Cable type	Cable length, m
Power	POE	EUT	POE 56V	1	RG45	>3m
Signal	RS232*	EUT	Laptop	1	RG45	>3m
Signal	SFP port	EUT	SFP Adapter	1	Optic cable	>3m
Signal	DC power 48VDC**	EUT	VDC	1	NA	NA

* For maintenance

**Optionally

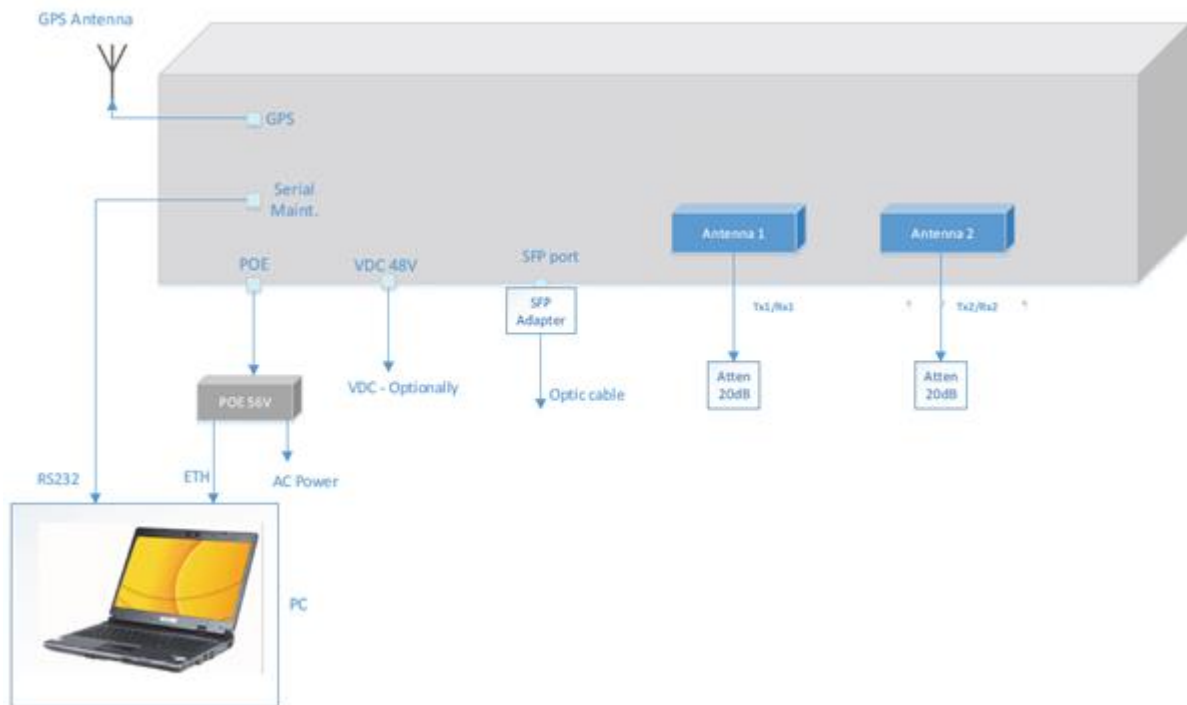
6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
PC	DELL	Latitude E7440	NA
POE adapter	PHIHONG	POE90U-1BT	NA
SFP adapter	Advice	SFP-10G-SMA40	NA
RF attenuator 20db	Mini-circuits	VAT-20+	NA

6.4 Changes made in the EUT

No changes were implemented in the EUT during testing.

6.5 Test configuration





6.6 Transmitter characteristics

Type of equipment					
V	Stand-alone (Equipment with or without its own control provisions)				
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)				
	Plug-in card (Equipment intended for a variety of host systems)				
Intended use		Condition of use			
	fixed	Always at a distance more than 2 m from all people			
V	mobile	Always at a distance more than 20 cm from all people			
	portable	May operate at a distance closer than 20 cm to human body			
Assigned frequency range		3550.0 – 3700.0 MHz			
Operating frequency (full bands)		3555.0 – 3695.0 MHz			
RF channel spacing		10 MHz, 20 MHz, 40 MHz			
Maximum rated output power		At transmitter 50 Ω RF output connector (per port)		27.04 dBm	
Is transmitter output power variable?		No			
		V	Yes	continuous variable	
				stepped variable with step size	0.25 dB
				minimum RF power	-30 dBm
		maximum RF power at antenna connector			dBm
Antenna connection					
unique coupling	V	standard connector	Integral	V with temporary RF connector without temporary RF connector	
Antenna/s technical characteristics					
Type	Manufacturer		Model number	Gain	
Internal	Airspan Networks		AW3867-1_2	8.7 dBi	
Transmitter aggregate data rate/s, Mbps					
Transmitter 26dBc power bandwidth		Type of modulation			
		QPSK	16QAM	64QAM	256QAM
10 MHz		10.7	22.7	47.3	71.5
20 MHz		23.4	45.4	95.0	143.0
40 MHz		46.8	90.8	190.0	285.0
Type of multiplexing		TDD			
Modulating test signal (baseband)		PRBS			
Maximum transmitter duty cycle in normal use		0.74			
Transmitter power source					
		Nominal rated voltage		Battery type	
	DC	Nominal rated voltage			
V	AC mains	Nominal rated voltage	48 VAC	Frequency	
Common power source for transmitter and receiver		V	yes	no	

6.7 Table of calculations for the MAX EIRP at frequency range 3550 – 3700 MHz

Antenna configuration	Antenna Vendor	Antenna Model Number	Antenna Peak Gain (dBi)	Signal Bandwidth (MHz)	Maximum Conducted Power (dBm)	EIRP (dBm/10MHz)	EIRP per Bandwidth (dBm)	Operational Category
1	Airspan Networks	AW3867-1_2	8.7	10.0	21.25	29.95	29.95	A
				20.0	23.88	29.97	32.58	
				40.0	27.04	29.97	35.74	



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):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

7 Transmitter tests according to 47CFR part 96

7.1 Maximum EIRP and maximum power spectral density

7.1.1 General

This test was performed to measure the maximum EIRP and maximum spectral power density at the transmitter RF antenna connector. Specification test limits are given in Table 7.1.1, Table 7.1.2.

Table 7.1.1 Maximum EIRP limits

Assigned frequency range, MHz	EIRP
	dBm/10 MHz
3550 - 3700	30.0

Table 7.1.2 Peak spectral power density limits

Assigned frequency range, MHz	Measurement bandwidth, MHz	Peak spectral power density, dBm
3550 - 3700	1.0	20.0

7.1.2 Test procedure

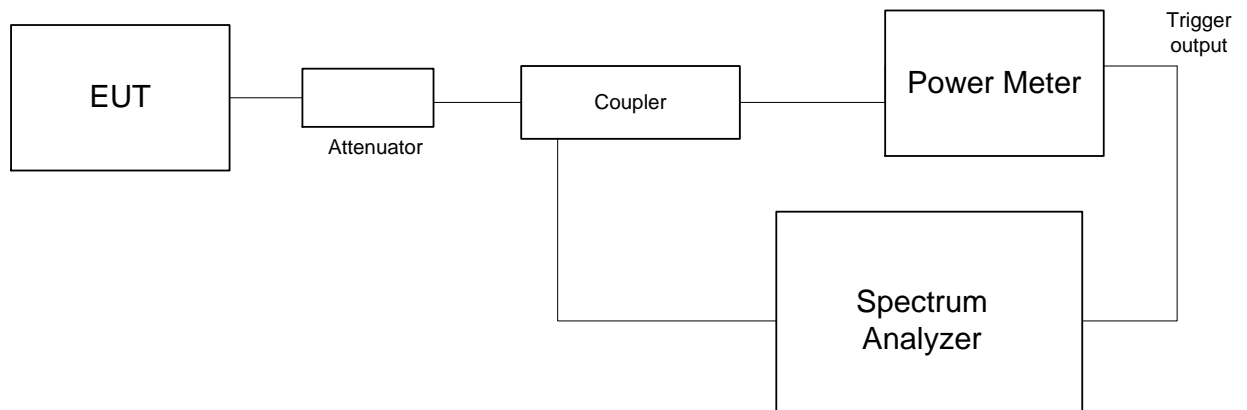
7.1.2.1 The EUT was set up as shown in Figure 7.1.1, energized and its proper operation was checked.

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

7.1.2.3 The frequency span of spectrum analyzer was set to capture the entire 6 dB band of the transmitter, in average mode with resolution bandwidth set to 1.0 MHz, video bandwidth wider than resolution bandwidth, sweep time and sufficient number of sweeps was allowed for trace stabilization.

7.1.2.4 Spectrum analyzer was set in average mode, sufficient number of sweeps was allowed for trace stabilization and peak spectral power density was measured as provided in Table 7.1.3, Table 7.1.4 and the associated plots.

Figure 7.1.1 Maximum EIRP and power spectral density test setup





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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): 07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Table 7.1.3 Maximum EIRP test results

ASSIGNED FREQUENCY RANGE:

3550.0 – 3700.0 MHz

DETECTOR USED:

Average (gated)

VIDEO BANDWIDTH:

≥ Resolution bandwidth

CHANNEL SPACING:

10 MHz

Frequency, MHz	RF Output power		Antenna gain, dBi	EIRP**, dBm/10 MHz	Limit, dBm/10 MHz	Margin, dB**	Verdict
	Chain RF#1, dBm	Chain RF#2, dBm					
Modulation QPSK*							
3555.0	21.14	21.25	8.7	29.95	30.0	-0.05	Pass
3625.0	21.24	21.22	8.7	29.94	30.0	-0.06	Pass
3695.0	21.23	21.16	8.7	29.93	30.0	-0.07	Pass
Modulation 16QAM							
3555.0	21.17	21.14	8.7	29.87	30.0	-0.13	Pass
3625.0	21.15	20.56	8.7	29.85	30.0	-0.15	Pass
3695.0	20.78	20.97	8.7	29.67	30.0	-0.33	Pass
Modulation 64QAM							
3555.0	21.11	21.07	8.7	29.81	30.0	-0.19	Pass
3625.0	21.14	20.91	8.7	29.84	30.0	-0.16	Pass
3695.0	20.84	21.10	8.7	29.80	30.0	-0.20	Pass
Modulation 256QAM							
3555.0	20.97	21.10	8.7	29.80	30.0	-0.20	Pass
3625.0	21.07	20.91	8.7	29.77	30.0	-0.23	Pass
3695.0	21.23	20.67	8.7	29.93	30.0	-0.07	Pass

*- This test was performed again as a spot check of retesting at worst case settings as appears in the original test report.

** - EIRP = Max SA reading (Chains #1&2) - 10*log[OBW(MHz) / 10 MHz] + Antenna gain =

Max SA reading + Antenna gain: The transmitter output signal are completely uncorrelated, antennas 1/2 is one sector.

** - Margin = EIRP, dBm – specification limit.



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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):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Table 7.1.4 Maximum EIRP test results (continue)

ASSIGNED FREQUENCY RANGE:

3550.0 – 3700.0 MHz

DETECTOR USED:

Average (gated)

VIDEO BANDWIDTH:

≥ Resolution bandwidth

CHANNEL SPACING:

20 MHz

Frequency, MHz	RF Output power		Antenna gain, dBi	EIRP*, dBm/20 MHz	EIRP*, dBm/10 MHz	Limit, dBm/10 MHz	Margin, dB**	Verdict
	Chain RF#1, dBm	Chain RF#2, dBm						
Modulation QPSK								
3560.0	23.36	23.88	8.70	32.58	29.97	30.0	-0.03	Pass
3625.0	23.87	23.81	8.70	32.57	29.96	30.0	-0.04	Pass
3690.0	23.75	23.48	8.70	32.45	29.84	30.0	-0.16	Pass
Modulation 16QAM								
3560.0	23.64	23.67	8.70	32.37	29.76	30.0	-0.24	Pass
3625.0	23.83	23.24	8.70	32.53	29.92	30.0	-0.08	Pass
3690.0	23.42	23.48	8.70	32.18	29.57	30.0	-0.43	Pass
Modulation 64QAM								
3560.0	23.74	23.86	8.70	32.56	29.95	30.0	-0.05	Pass
3625.0	23.82	23.48	8.70	32.52	29.91	30.0	-0.09	Pass
3690.0	23.40	23.58	8.70	32.28	29.67	30.0	-0.33	Pass
Modulation 256QAM								
3560.0	23.56	23.55	8.70	32.26	29.65	30.0	-0.35	Pass
3625.0	23.72	23.32	8.70	32.42	29.81	30.0	-0.19	Pass
3690.0	23.38	23.71	8.70	32.41	29.80	30.0	-0.20	Pass

*- EIRP = Max SA reading (Chains #1&2) - 10*log[OBW(MHz) / 10 MHz] + Antenna gain =

Max SA reading – 2.61 dB + Antenna gain: The transmitter output signal are completely uncorrelated, antennas 1/2 is one sector.

** - Margin = EIRP, dBm – specification limit.



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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):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Table 7.1.5 Maximum EIRP test results (continue)

ASSIGNED FREQUENCY RANGE:

3550.0 – 3700.0 MHz

DETECTOR USED:

Average (gated)

VIDEO BANDWIDTH:

≥ Resolution bandwidth

CHANNEL SPACING:

40 MHz

Frequency, MHz	RF Output power		Antenna gain, dBi	EIRP*, dBm/40 MHz	EIRP*, dBm/10 MHz	Limit, dBm/10 MHz	Margin, dB**	Verdict
	Chain RF#1, dBm	Chain RF#2, dBm						
Modulation QPSK								
3570.0	27.03	26.95	8.70	35.73	29.96	30.0	-0.04	Pass
3625.0	27.04	26.90	8.70	35.74	29.97	30.0	-0.03	Pass
3680.0	25.50	26.08	8.70	34.78	29.01	30.0	-0.99	Pass
Modulation 16QAM								
3570.0	26.73	26.40	8.70	35.43	29.66	30.0	-0.34	Pass
3625.0	26.99	26.76	8.70	35.69	29.92	30.0	-0.08	Pass
3680.0	25.43	26.01	8.70	34.71	28.94	30.0	-1.06	Pass
Modulation 64QAM								
3570.0	26.72	26.36	8.70	35.42	29.65	30.0	-0.35	Pass
3625.0	26.95	26.74	8.70	35.65	29.88	30.0	-0.12	Pass
3680.0	25.43	26.02	8.70	34.72	28.95	30.0	-1.05	Pass
Modulation 256QAM								
3570.0	27.01	26.39	8.70	35.71	29.94	30.0	-0.06	Pass
3625.0	26.96	26.85	8.70	35.66	29.89	30.0	-0.11	Pass
3680.0	25.41	26.01	8.70	34.71	28.94	30.0	-1.06	Pass

*- EIRP = Max SA reading (Chains #1&2) - 10*log[OBW(MHz) / 10 MHz] + Antenna gain =

Max SA reading – 5.77 dB + Antenna gain: The transmitter output signal are completely uncorrelated, antennas 1/2 is one sector.

** - Margin = EIRP, dBm – specification limit.



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): 07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Table 7.1.6 Peak spectral power density test results

ASSIGNED FREQUENCY RANGE: 3550.0 – 3700.0 MHz
 DETECTOR USED: Average (gated)
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 NUMBER OF CHAINS: 2
 CHANNEL SPACING: 10 MHz

Frequency, MHz	SA Reading, dBm/MHz		Antenna gain, dBi	Total PSD**, dBm/ MHz	Limit, dBm/MHz	Margin , dB	Verdi ct
	Chain RF#1	Chain RF#2					
Modulation QPSK*							
3555	11.17	11.28	8.7	19.98	20.0	-0.02	Pass
3625	11.29	11.27	8.7	19.99	20.0	-0.01	Pass
3695	11.26	11.19	8.7	19.96	20.0	-0.04	Pass
Modulation 16QAM							
3555	11.28	11.25	8.7	19.98	20.0	-0.02	Pass
3625	11.23	10.69	8.7	19.93	20.0	-0.07	Pass
3695	10.78	11.00	8.7	19.70	20.0	-0.30	Pass
Modulation 64QAM							
3555	11.24	11.25	8.7	19.95	20.0	-0.05	Pass
3625	11.22	10.80	8.7	19.92	20.0	-0.08	Pass
3695	10.78	11.14	8.7	19.84	20.0	-0.16	Pass
Modulation 256QAM							
3555	11.06	10.94	8.7	19.76	20.0	-0.24	Pass
3625	11.16	11.00	8.7	19.86	20.0	-0.14	Pass
3695	11.23	10.80	8.7	19.93	20.0	-0.07	Pass

* - This test was performed again as a spot check of retesting at worst case settings as appears in the original test report.

** - Total PSD = Max SA reading (Chains #1&2) + Antenna Gain: The transmitter output signals are completely uncorrelated, antennas 1/2 is one sector

** - Margin = Total PSD, dBm – specification limit.



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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): 07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Table 7.1.7 Peak spectral power density test results (continue)

ASSIGNED FREQUENCY RANGE: 3550.0 – 3700.0 MHz
DETECTOR USED: Average (gated)
VIDEO BANDWIDTH: ≥ Resolution bandwidth
NUMBER OF CHAINS: 2
CHANNEL SPACING: 20 MHz

Frequency, MHz	SA Reading, dBm/MHz		Antenna gain, dBi	Total PSD*, dBm/ MHz	Limit, dBm/MHz	Margin , dB	Verdi ct
	Chain RF#1	Chain RF#2					
Modulation QPSK							
3560.0	10.01	10.51	8.7	19.21	20.0	-0.79	Pass
3625.0	10.53	10.48	8.7	19.23	20.0	-0.77	Pass
3690.0	10.26	9.85	8.7	18.96	20.0	-1.04	Pass
Modulation 16QAM							
3560.0	10.41	10.44	8.7	19.14	20.0	-0.86	Pass
3625.0	10.57	10.19	8.7	19.27	20.0	-0.73	Pass
3690.0	9.98	10.14	8.7	18.84	20.0	-1.16	Pass
Modulation 64QAM							
3560.0	10.51	10.67	8.7	19.37	20.0	-0.63	Pass
3625.0	10.57	10.30	8.7	19.27	20.0	-0.73	Pass
3690.0	9.91	10.14	8.7	18.84	20.0	-1.16	Pass
Modulation 256QAM							
3560.0	10.30	10.37	8.7	19.07	20.0	-0.93	Pass
3625.0	10.49	10.27	8.7	19.19	20.0	-0.81	Pass
3690.0	9.94	10.27	8.7	18.97	20.0	-1.03	Pass

* - Total PSD = Max SA reading (Chains #1&2) + Antenna Gain: The transmitter output signal are completely uncorrelated, antennas 1/2 is one sector

** - Margin = Total PSD, dBm – specification limit.



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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):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Table 7.1.8 Peak spectral power density test results (continue)

ASSIGNED FREQUENCY RANGE: 3550.0 – 3700.0 MHz
DETECTOR USED: Average (gated)
VIDEO BANDWIDTH: ≥ Resolution bandwidth
NUMBER OF CHAINS: 2
CHANNEL SPACING: 40 MHz

Frequency, MHz	SA Reading, dBm/MHz		Antenna gain, dBi	Total PSD*, dBm/ MHz	Limit, dBm/MHz	Margin , dB	Verdi ct
	Chain RF#1	Chain RF#2					
Modulation QPSK							
3570.0	10.57	10.26	8.7	19.27	20.0	-0.73	Pass
3625.0	10.70	10.61	8.7	19.40	20.0	-0.60	Pass
3680.0	10.57	10.26	8.7	18.49	20.0	-1.51	Pass
Modulation 16QAM							
3570.0	10.50	10.18	8.7	19.20	20.0	-0.80	Pass
3625.0	10.62	10.67	8.7	19.37	20.0	-0.63	Pass
3680.0	9.16	9.82	8.7	18.52	20.0	-1.48	Pass
Modulation 64QAM							
3570.0	10.46	10.16	8.7	19.16	20.0	-0.84	Pass
3625.0	10.50	10.73	8.7	19.43	20.0	-0.57	Pass
3680.0	9.17	9.79	8.7	18.49	20.0	-1.51	Pass
Modulation 256QAM							
3570.0	10.58	10.14	8.7	19.28	20.0	-0.72	Pass
3625.0	10.51	10.41	8.7	19.21	20.0	-0.79	Pass
3680.0	9.01	9.82	8.7	18.52	20.0	-1.48	Pass

* - Total PSD = Max SA reading (Chains #1&2) + Antenna Gain: The transmitter output signal are completely uncorrelated, antennas 1/2 is one sector

** - Margin = Total PSD, dBm – specification limit.

Reference numbers of test equipment used

HL 3301	HL 3302	HL 4355	HL 4366	HL 6143			
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Full description is given in Appendix A.



HERMON LABORATORIES

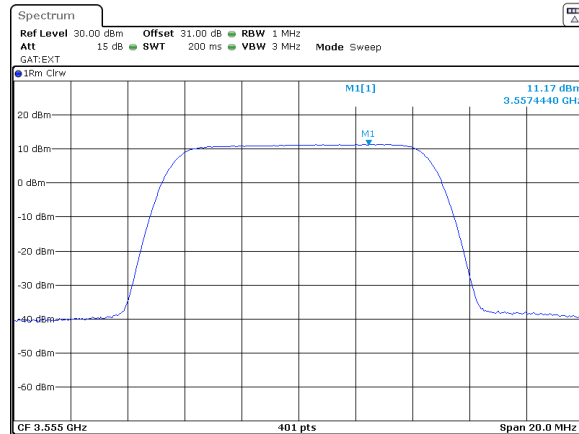
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.1 Peak spectral power density at low frequency

CHANNEL SPACING:

ANTENNA CHAIN:

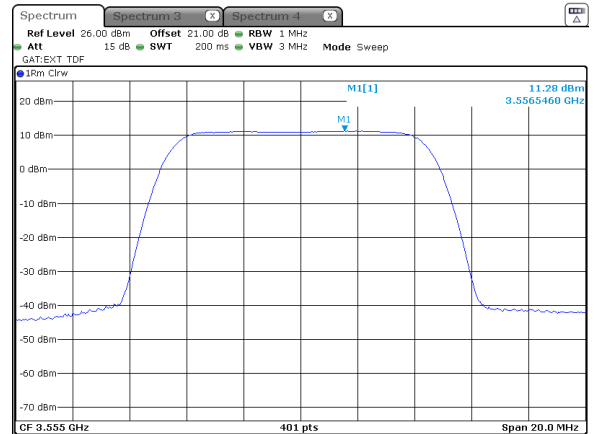
Modulation: QPSK



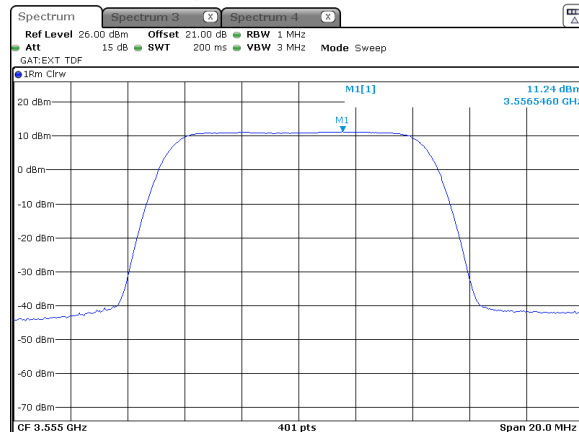
10 MHz

1

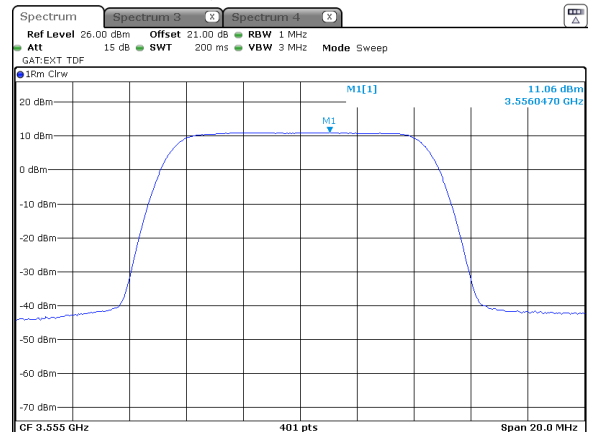
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



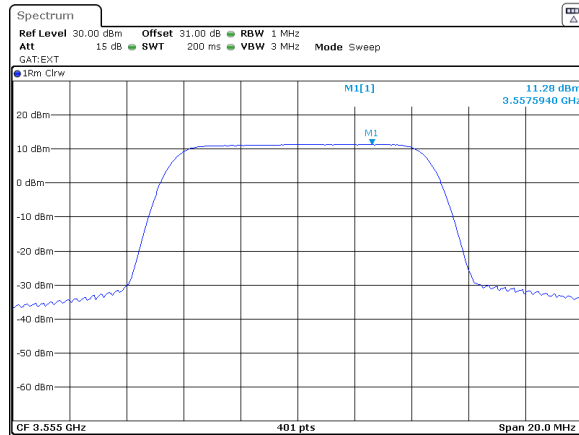


HERMON LABORATORIES

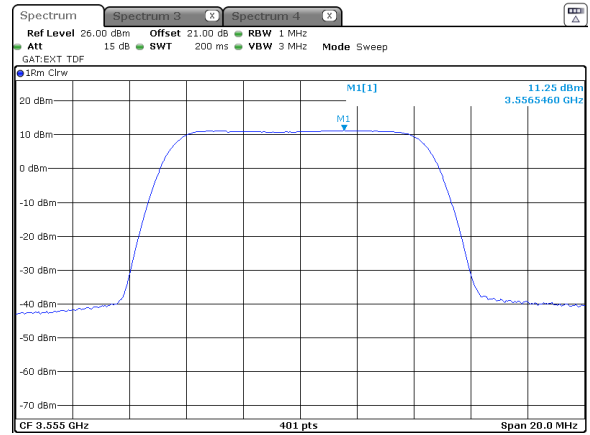
Test specification: Section 96.41(b), Maximum EIRP and maximum power spectral density			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.2 Peak spectral power density at low frequency

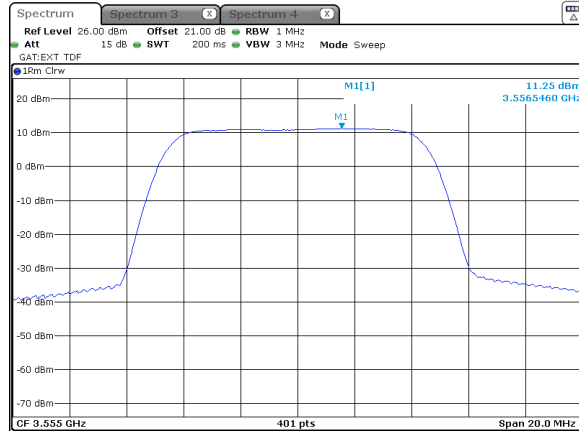
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



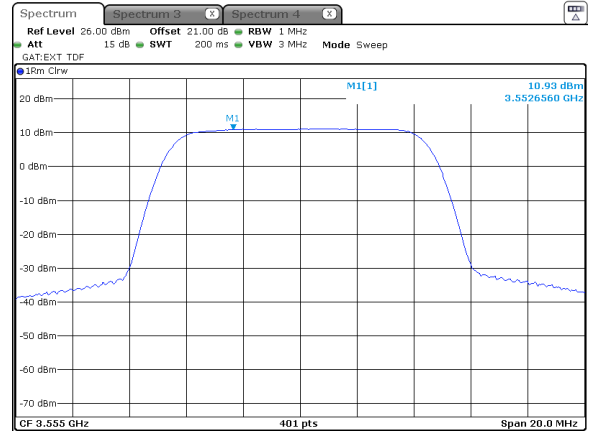
10 MHz
2
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM





HERMON LABORATORIES

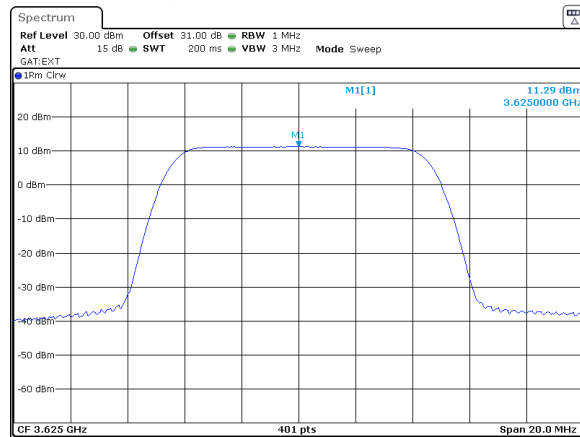
Test specification: Section 96.41(b), Maximum EIRP and maximum power spectral density			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.3 Peak spectral power density at mid frequency

CHANNEL SPACING:

ANTENNA CHAIN:

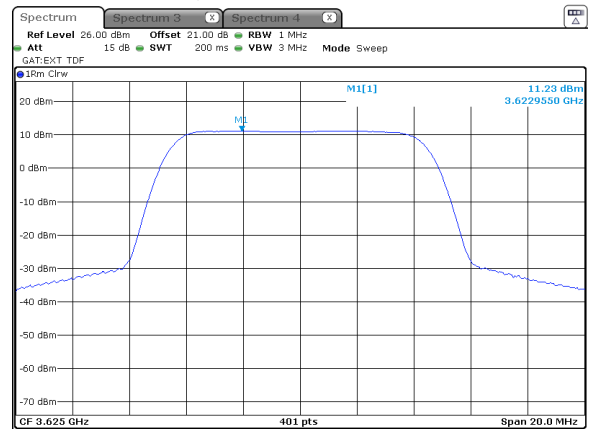
Modulation: QPSK



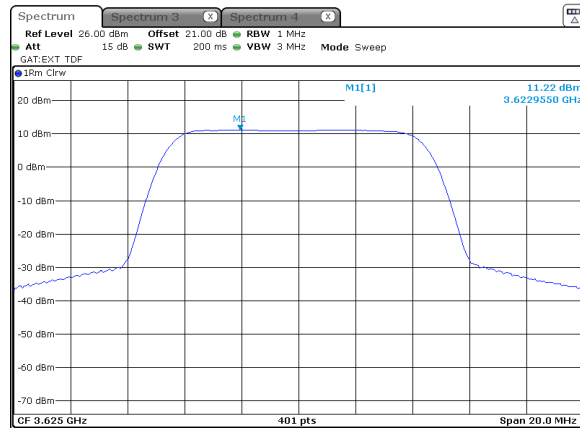
10 MHz

1

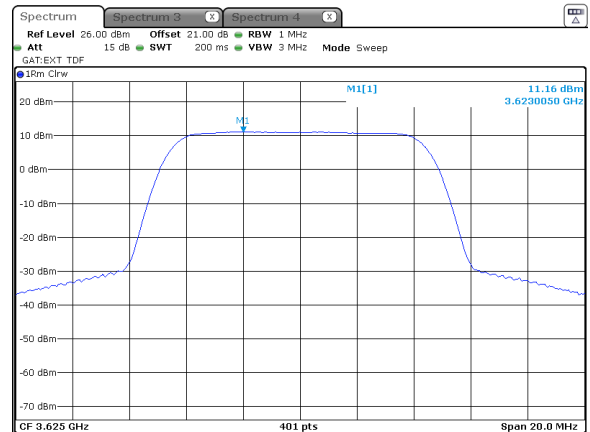
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



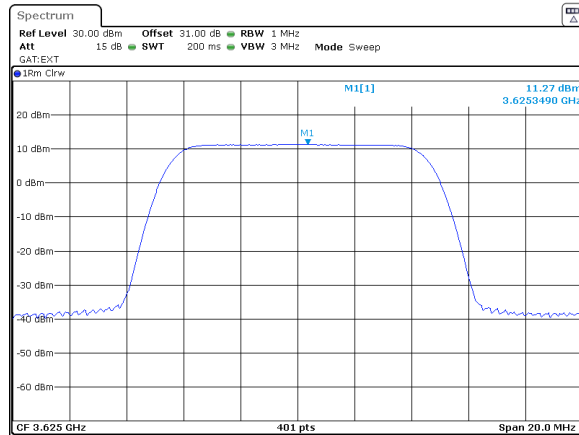


HERMON LABORATORIES

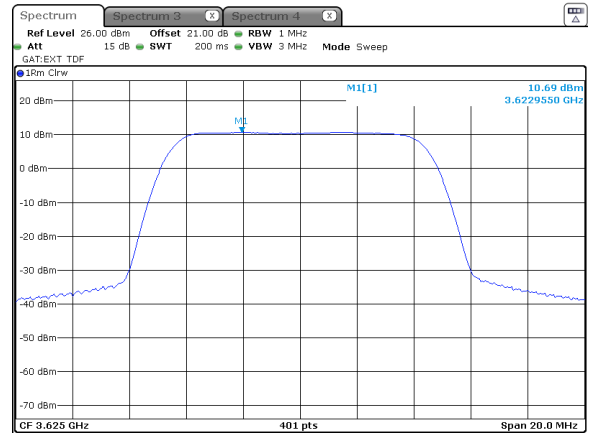
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.4 Peak spectral power density at mid frequency

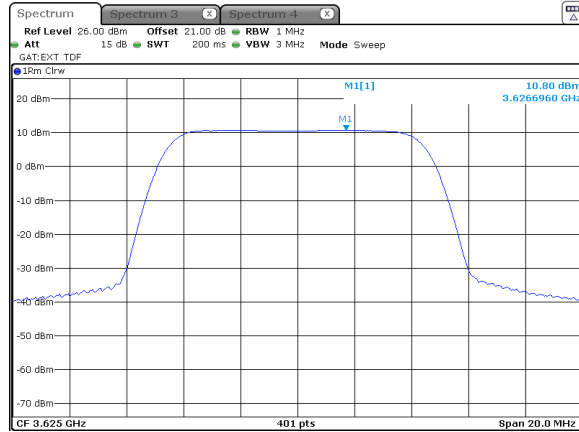
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



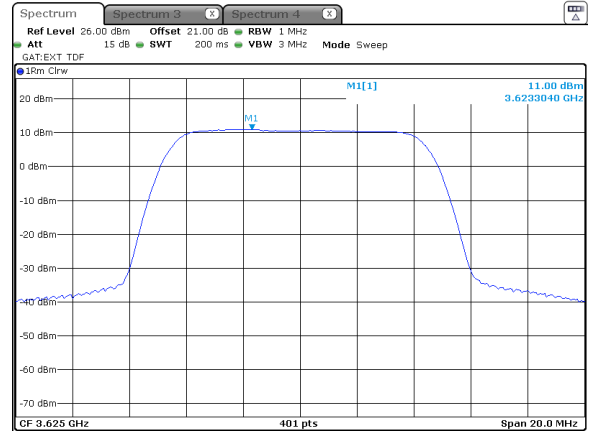
10 MHz
2
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



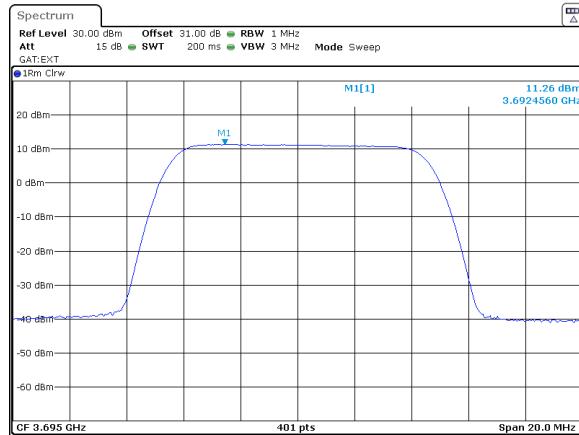


HERMON LABORATORIES

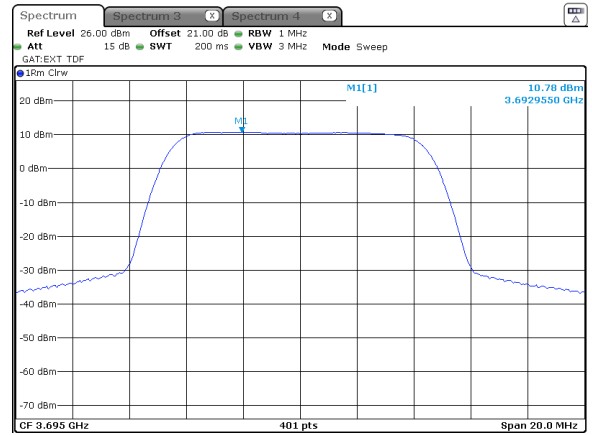
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.5 Peak spectral power density at high frequency

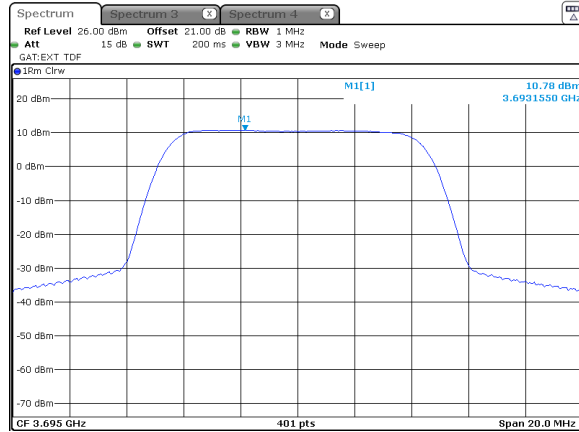
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



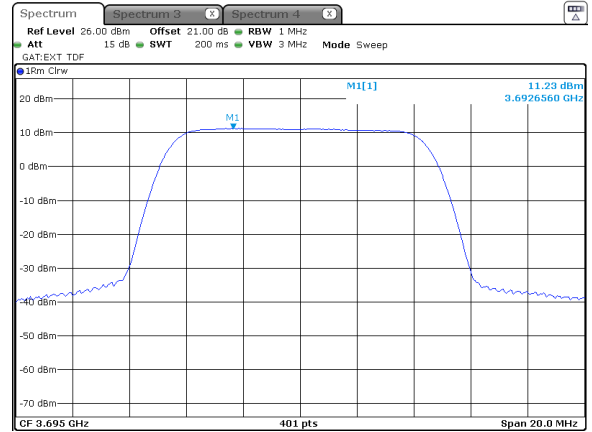
10 MHz
1
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



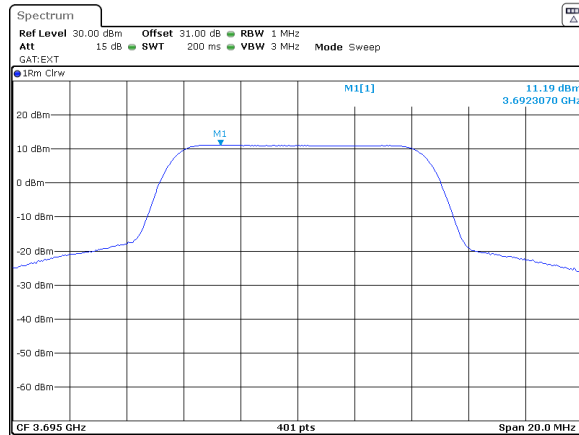


HERMON LABORATORIES

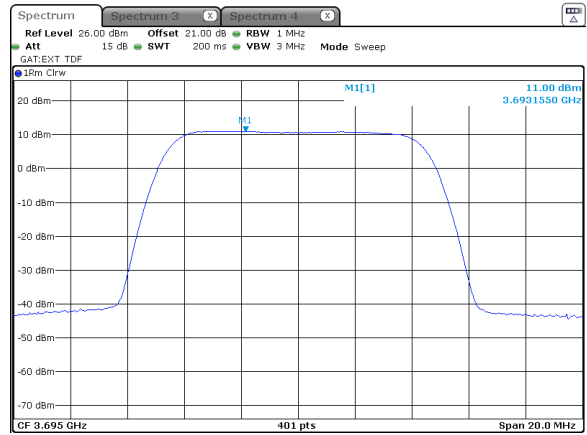
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.6 Peak spectral power density at high frequency

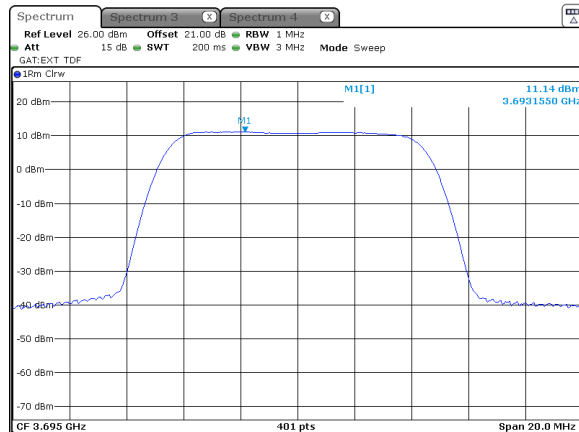
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



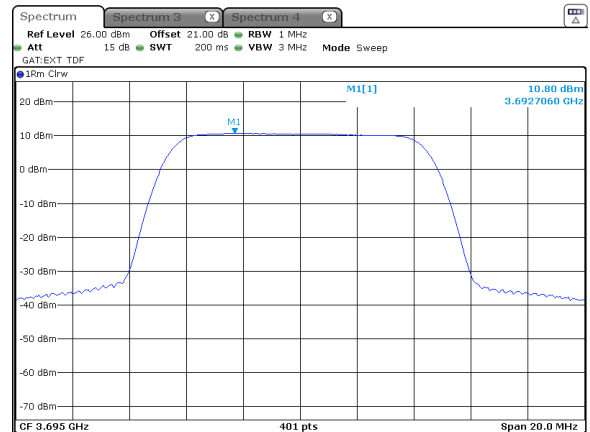
10 MHz
2
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



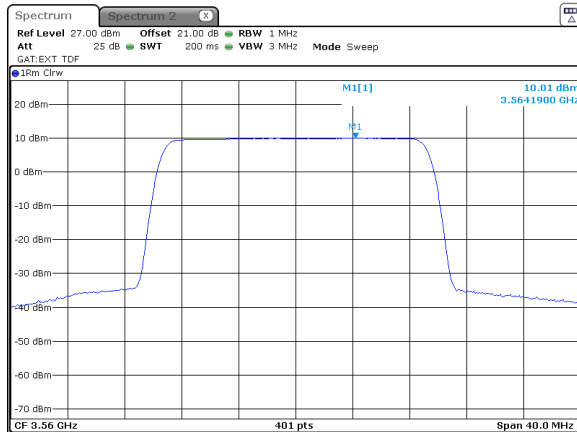


HERMON LABORATORIES

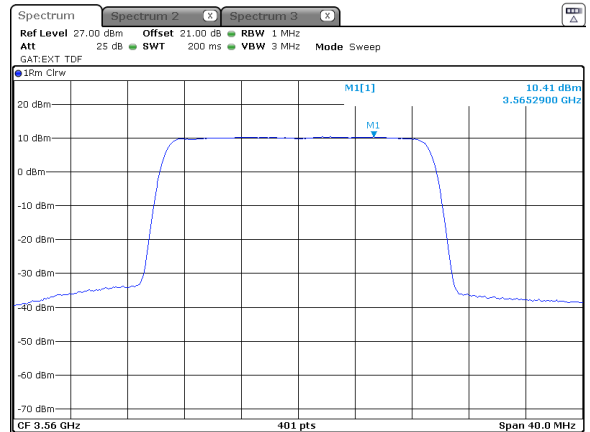
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.7 Peak spectral power density at low frequency

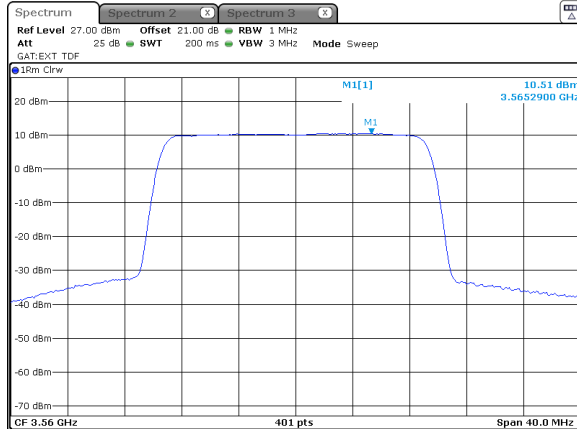
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



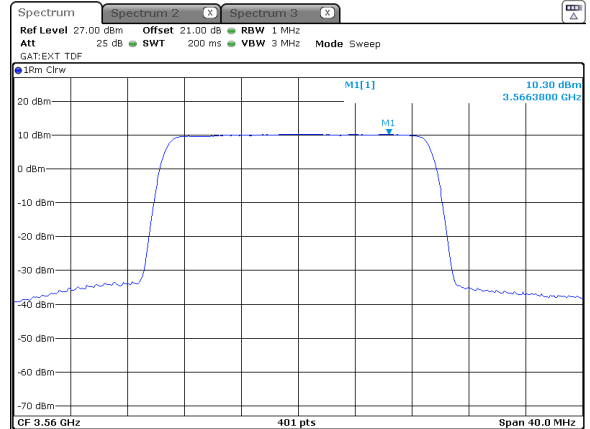
20 MHz
1
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



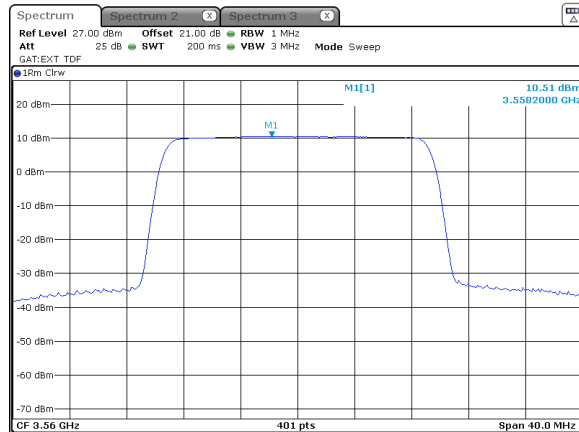


HERMON LABORATORIES

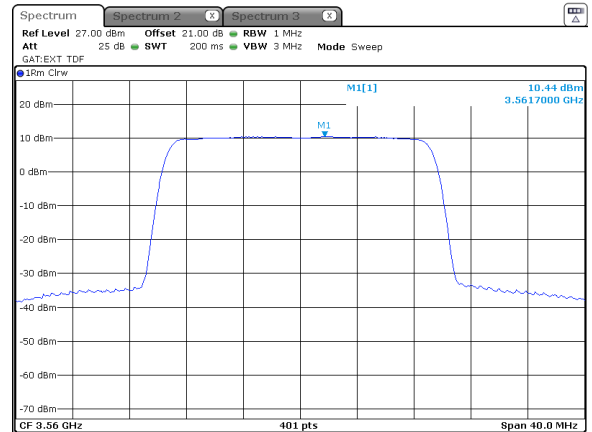
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.8 Peak spectral power density at low frequency

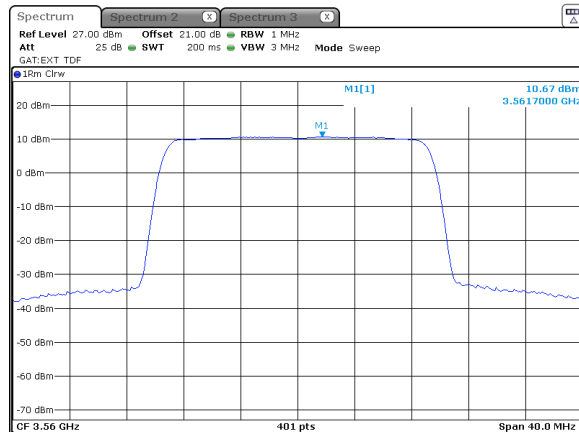
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



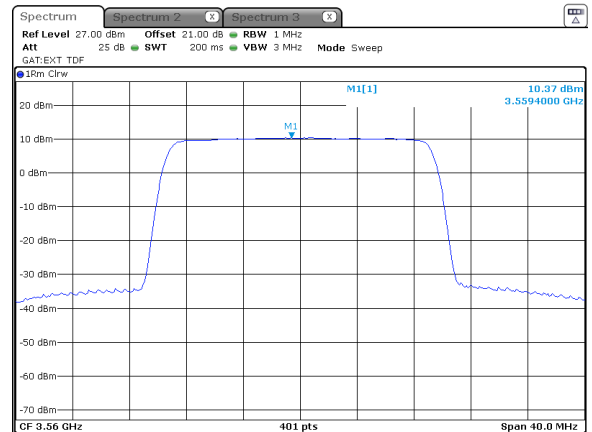
20 MHz
2
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



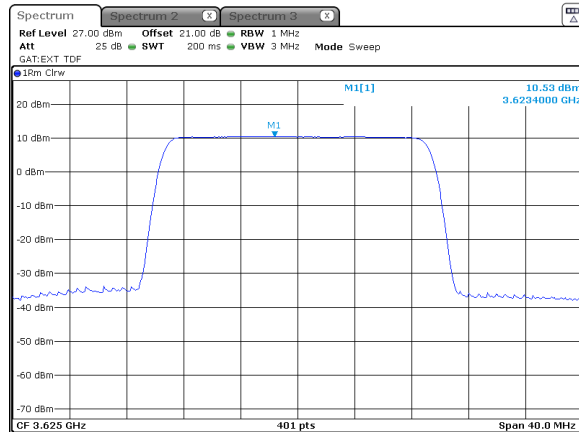


HERMON LABORATORIES

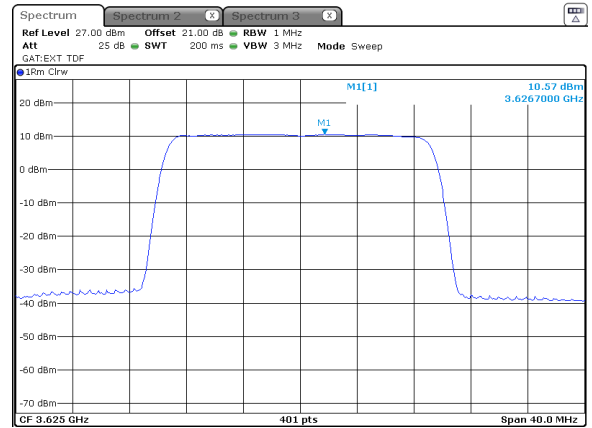
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.9 Peak spectral power density at mid frequency

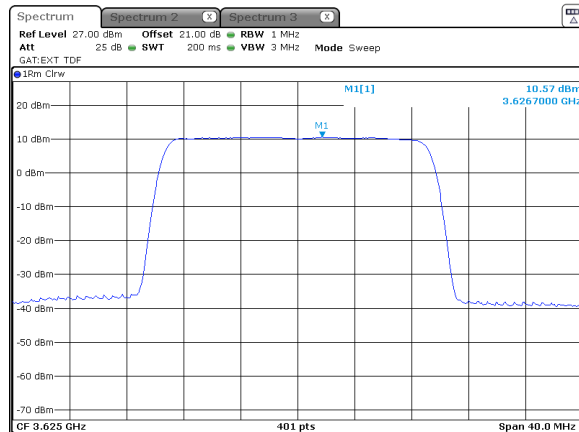
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



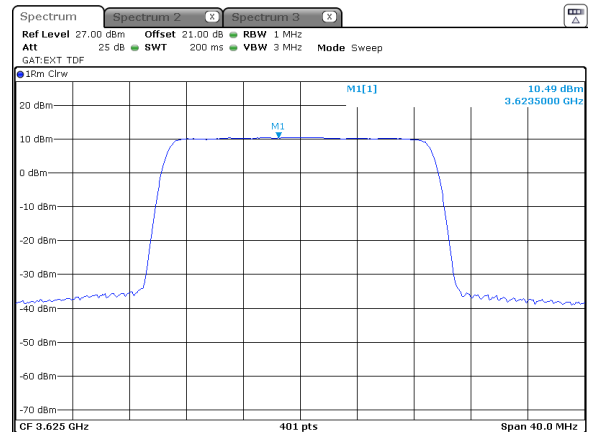
20 MHz
1
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



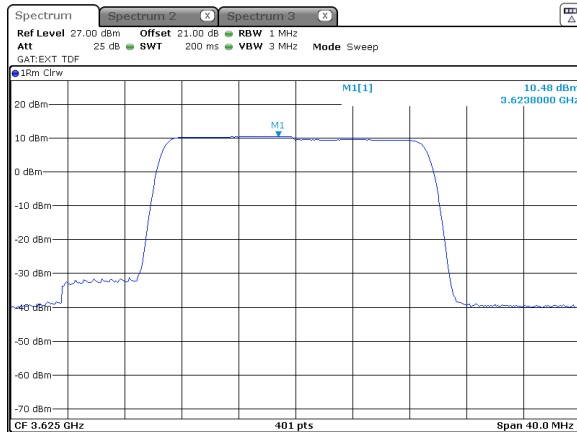


HERMON LABORATORIES

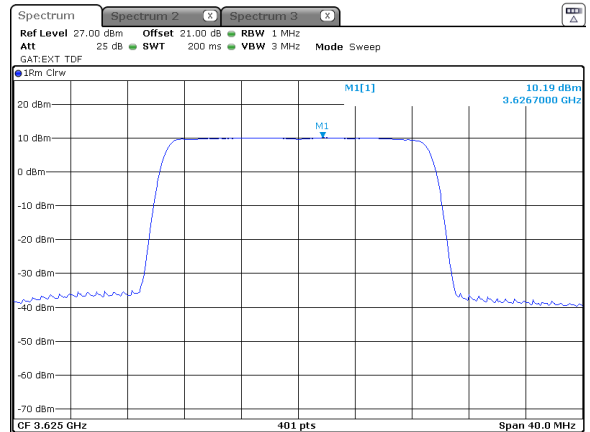
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.10 Peak spectral power density at mid frequency

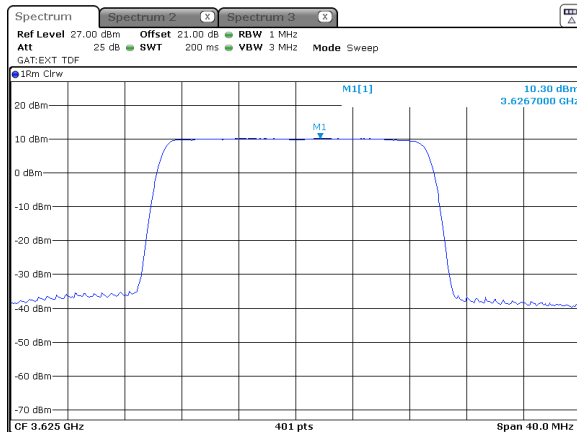
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



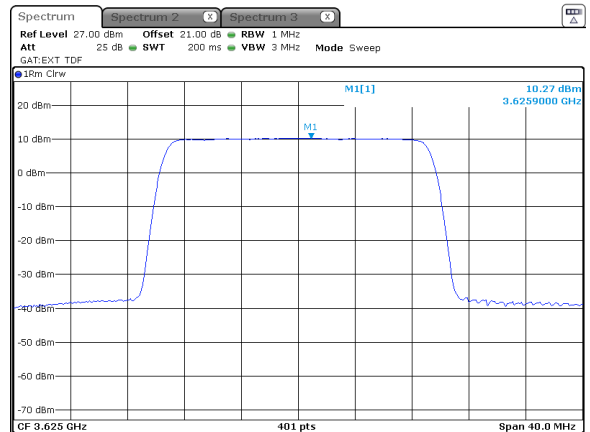
20 MHz
2
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



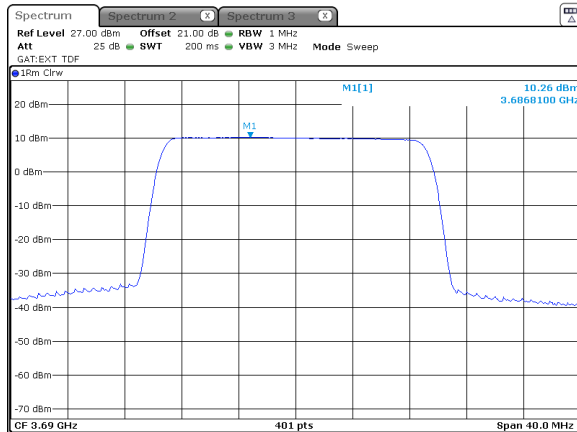


HERMON LABORATORIES

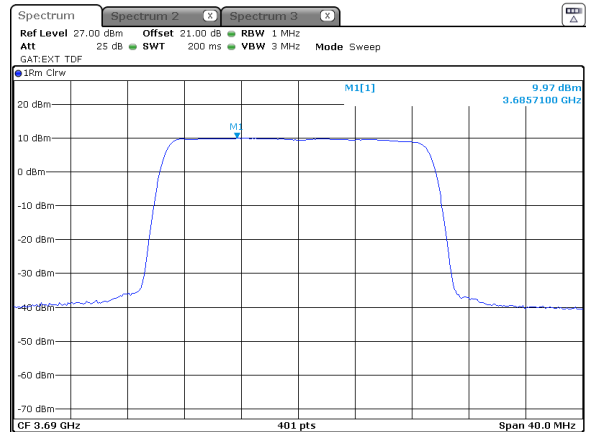
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.11 Peak spectral power density at high frequency

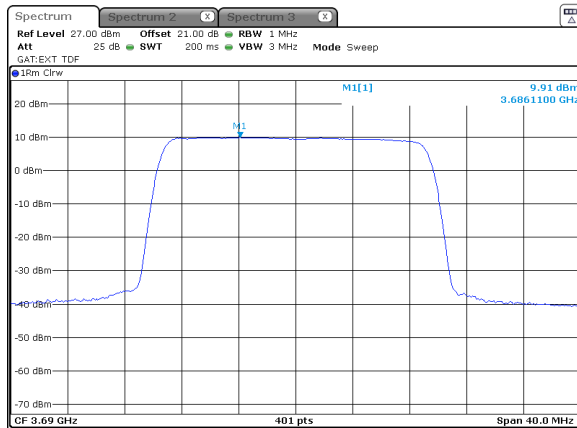
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



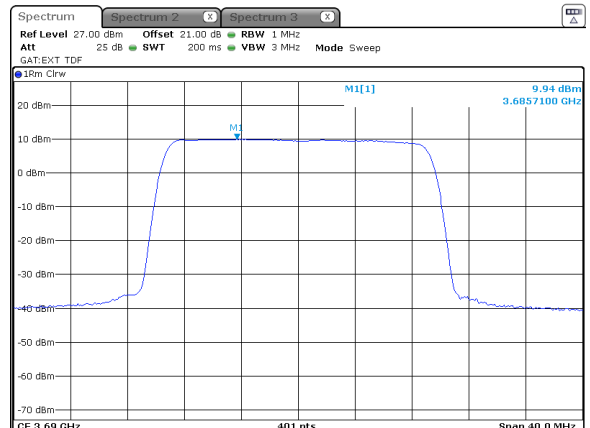
20 MHz
1
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



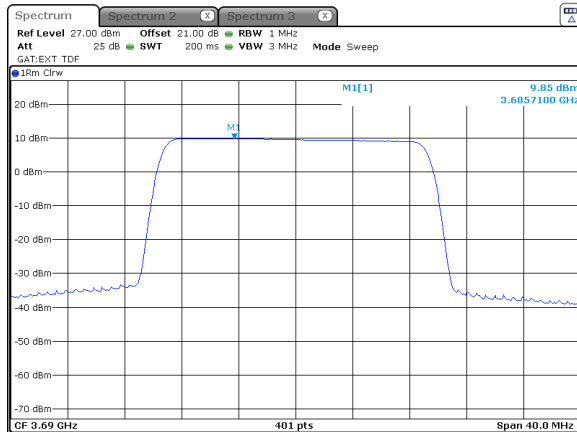


HERMON LABORATORIES

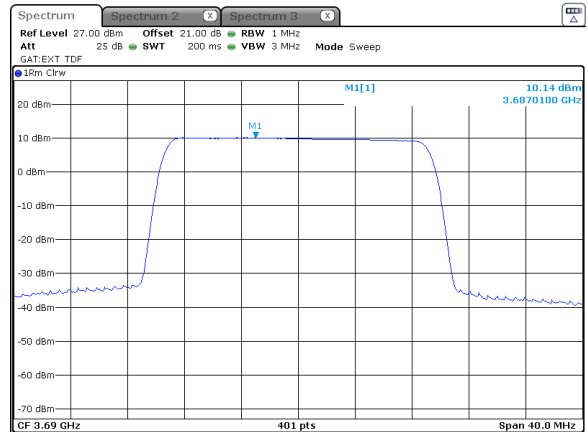
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.12 Peak spectral power density at high frequency

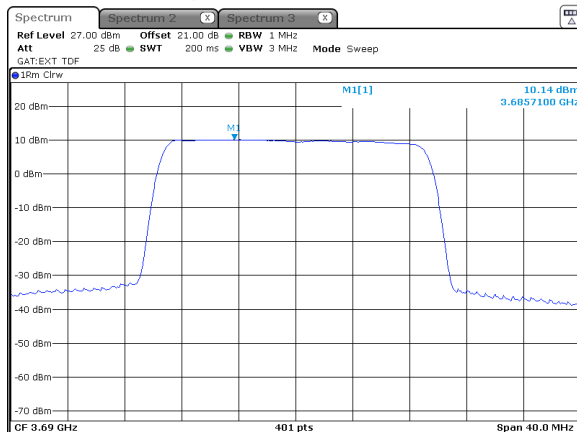
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



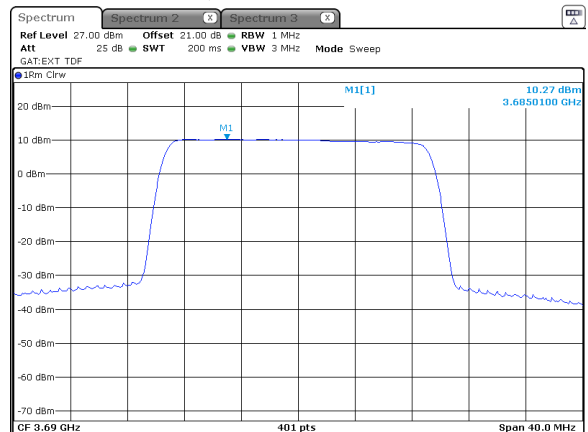
20 MHz
2
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM





HERMON LABORATORIES

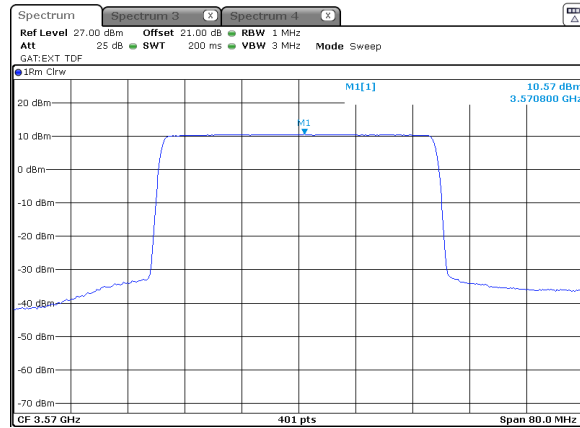
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.13 Peak spectral power density at low frequency

CHANNEL SPACING:

ANTENNA CHAIN:

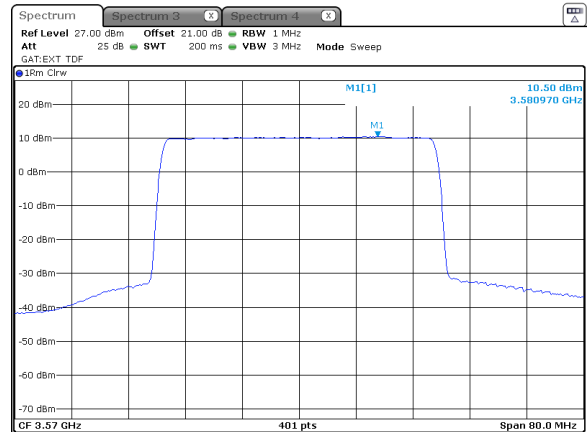
Modulation: QPSK



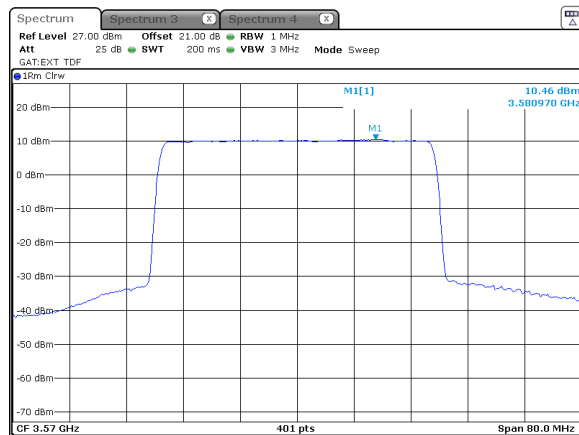
40 MHz

1

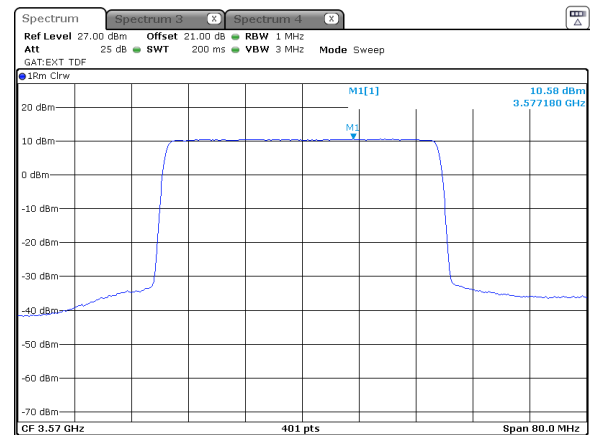
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM





HERMON LABORATORIES

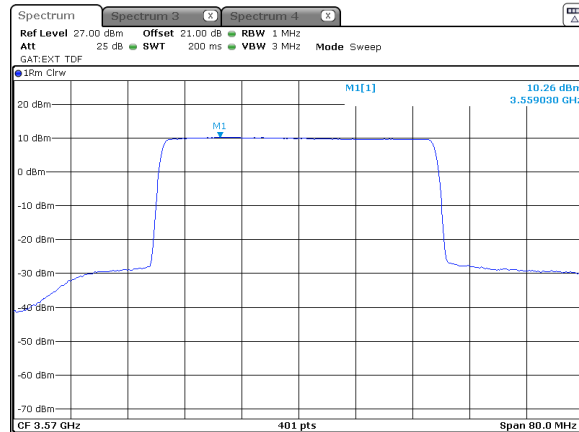
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.14 Peak spectral power density at low frequency

CHANNEL SPACING:

ANTENNA CHAIN:

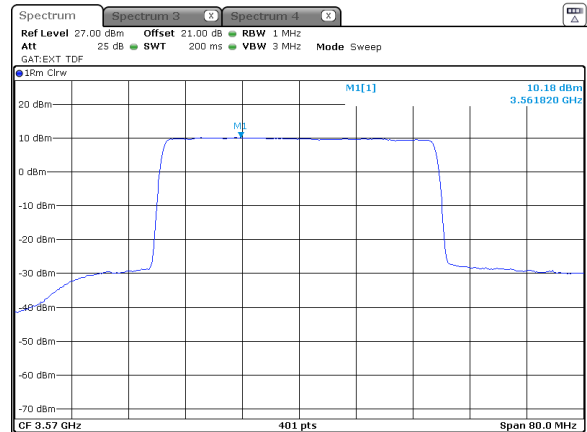
Modulation: QPSK



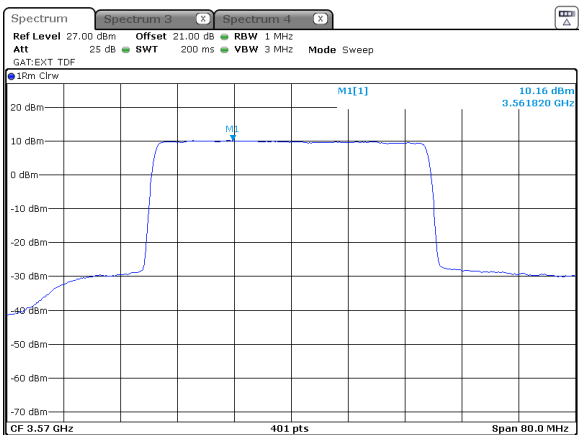
40 MHz

2

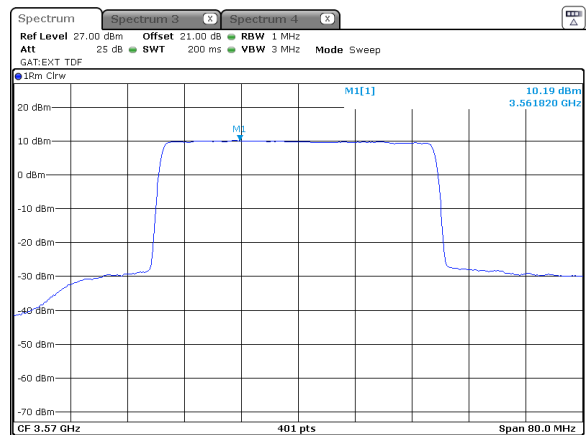
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



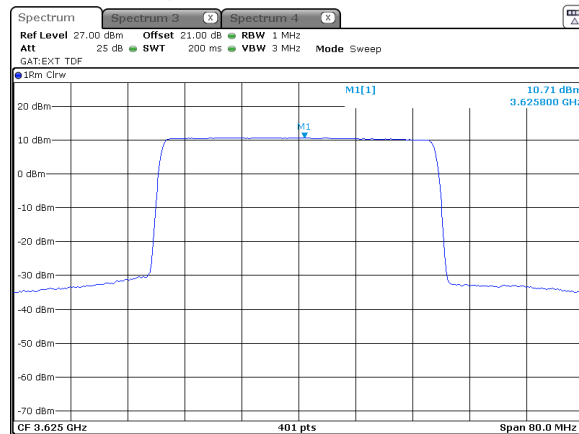


HERMON LABORATORIES

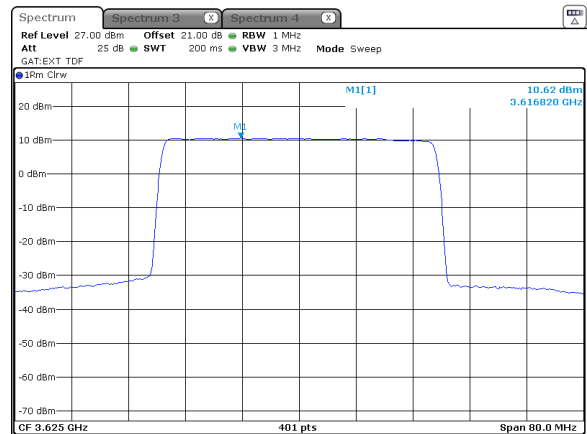
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.15 Peak spectral power density at mid frequency

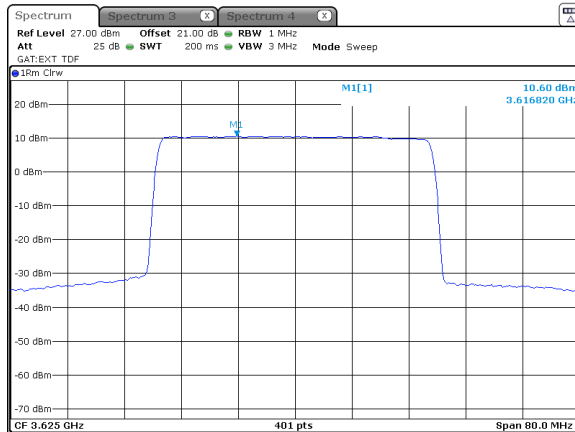
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



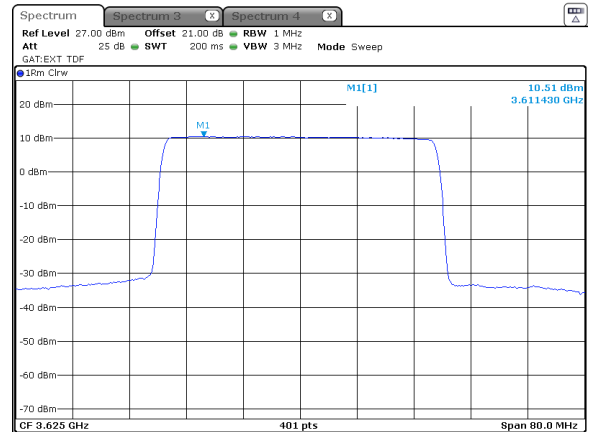
40 MHz
1
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



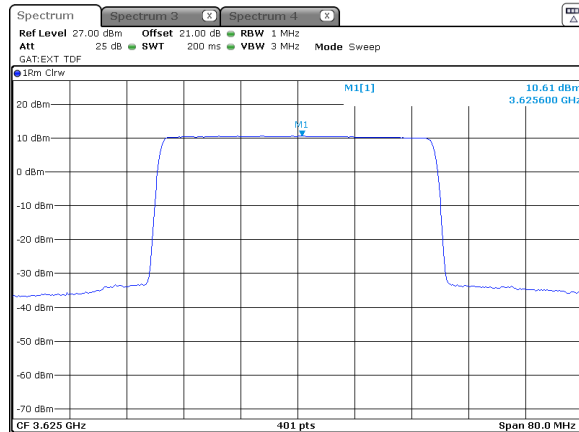


HERMON LABORATORIES

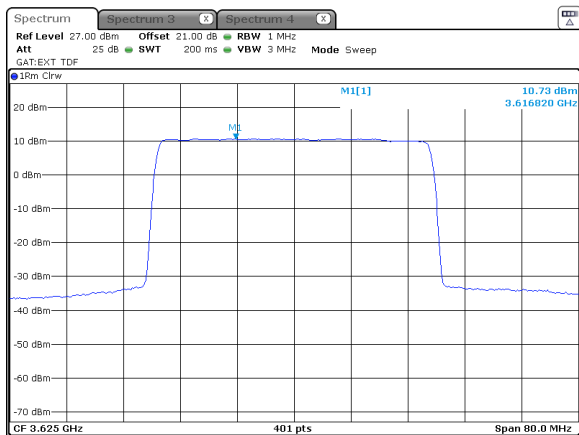
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.16 Peak spectral power density at mid frequency

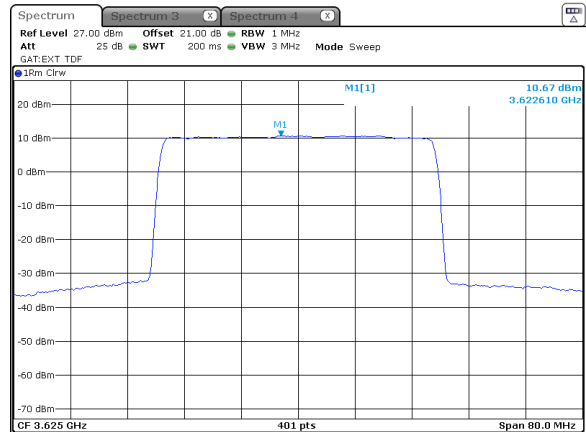
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



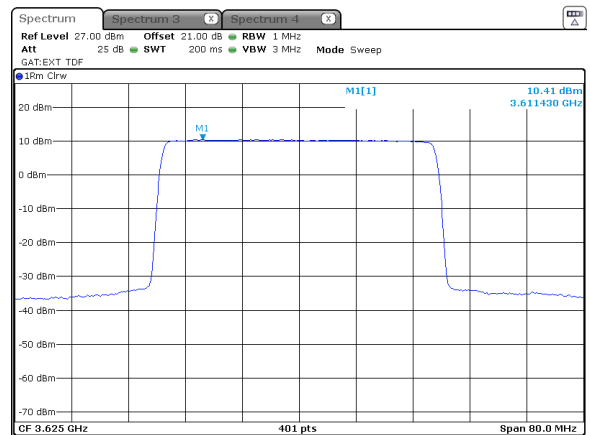
Modulation: 64QAM



40 MHz
2
Modulation: 16QAM



Modulation: 256QAM



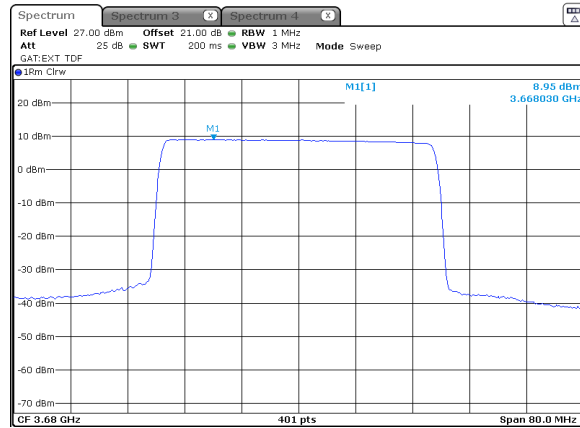


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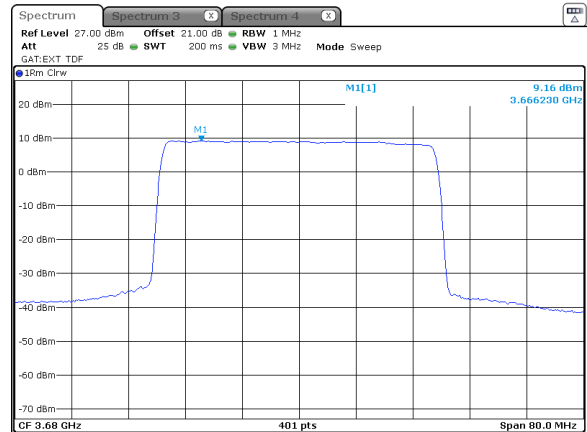
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.17 Peak spectral power density at high frequency

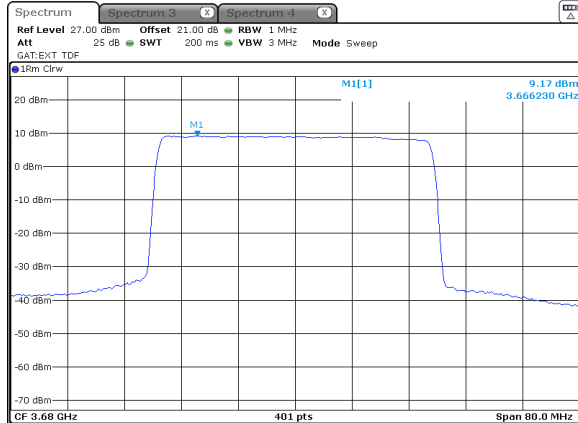
CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK



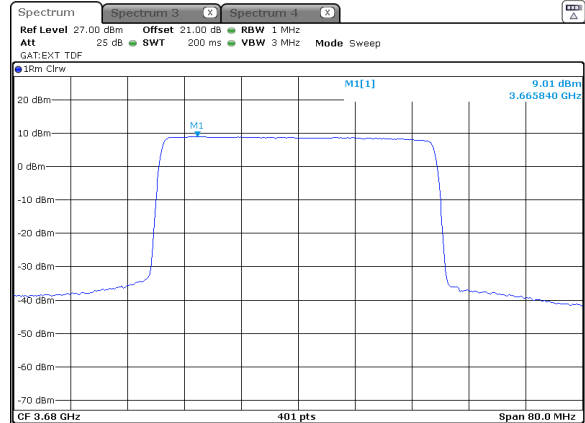
40 MHz
1
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM





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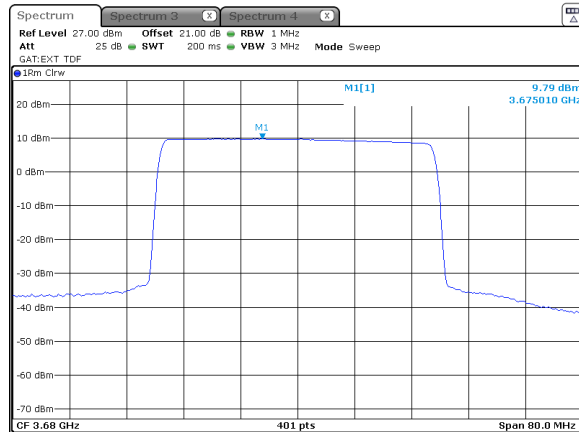
Test specification:		Section 96.41(b), Maximum EIRP and maximum power spectral density	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
07-Feb-22			
Temperature: 24 °C	Relative Humidity: 55 %	Air Pressure: 1011 hPa	Power: 48 VAC
Remarks:			

Plot 7.1.18 Peak spectral power density at high frequency

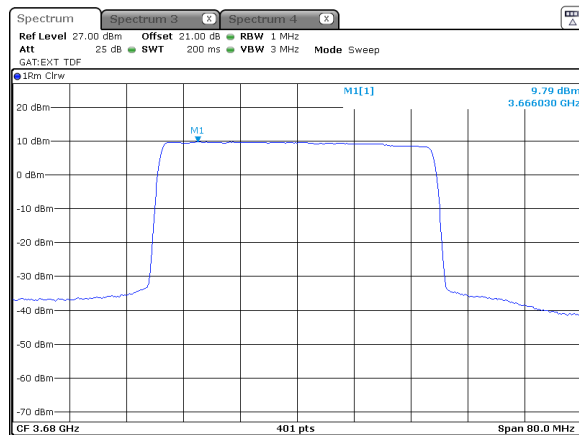
CHANNEL SPACING:

ANTENNA CHAIN:

Modulation: QPSK



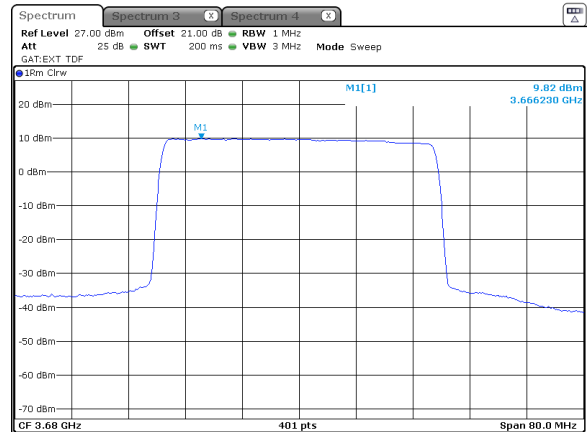
Modulation: 64QAM



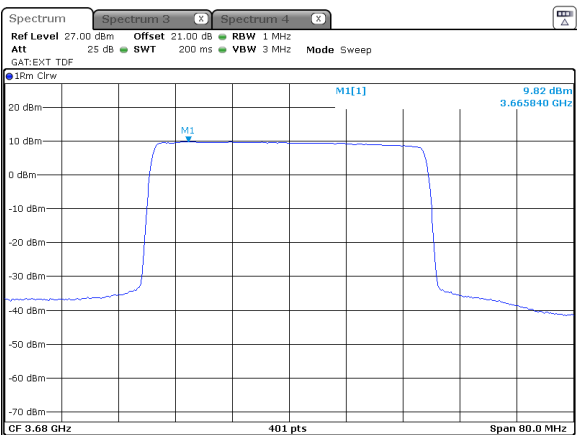
40 MHz

2

Modulation: 16QAM



Modulation: 256QAM





Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
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

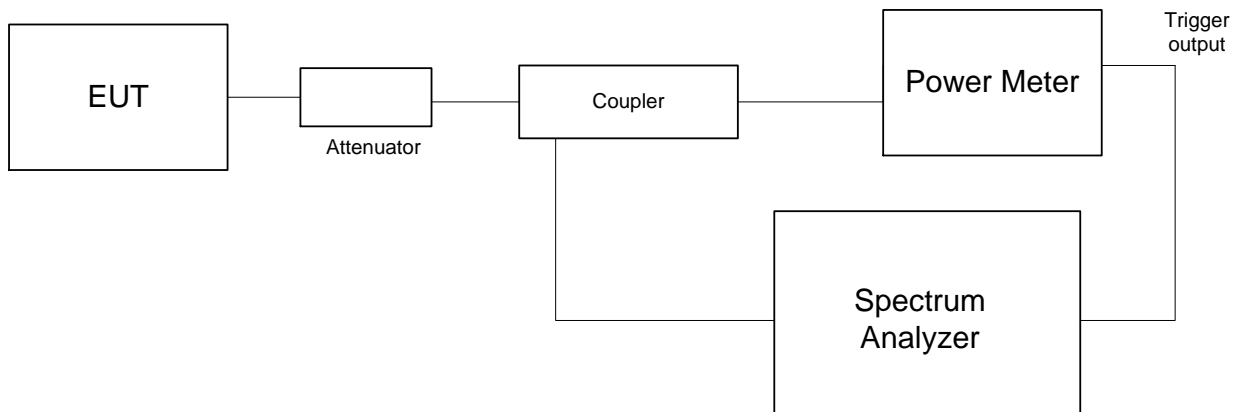
7.2.2 Test procedure

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





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Test specification: Section 96.41(g), Peak-to- average power ratio			
Test procedure: Section 96.41(g)			
Test mode: Compliance		Verdict: PASS	
Date(s): 08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
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	8.67	13.0	-4.33	Pass
3625.0	8.81	13.0	-4.19	Pass
3695.0	8.75	13.0	-4.25	Pass
Modulation 16QAM				
3555.0	8.43	13.0	-4.57	Pass
3625.0	8.55	13.0	-4.45	Pass
3695.0	8.52	13.0	-4.48	Pass
Modulation 64QAM				
3555.0	8.43	13.0	-4.57	Pass
3625.0	8.55	13.0	-4.45	Pass
3695.0	8.52	13.0	-4.48	Pass
Modulation 256QAM				
3555.0	8.43	13.0	-4.57	Pass
3625.0	8.52	13.0	-4.48	Pass
3695.0	8.49	13.0	-4.51	Pass



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Test specification: Section 96.41(g), Peak-to- average power ratio			
Test procedure: Section 96.41(g)			
Test mode: Compliance		Verdict: PASS	
Date(s): 08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Table 7.2.3 Peak-to-average power ratio test results (continue)

OPERATING FREQUENCY RANGE: 3550 – 3700 MHz
DETECTOR USED: Peak/Average
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Channel spacing 20 MHz				
Modulation QPSK				
3560.0	8.58	13.0	-4.42	Pass
3625.0	8.46	13.0	-4.54	Pass
3690.0	8.52	13.0	-4.48	Pass
Modulation 16QAM				
3560.0	8.14	13.0	-4.86	Pass
3625.0	8.12	13.0	-4.88	Pass
3690.0	8.53	13.0	-4.47	Pass
Modulation 64QAM				
3560.0	8.17	13.0	-4.83	Pass
3625.0	8.23	13.0	-4.77	Pass
3690.0	8.23	13.0	-4.77	Pass
Modulation 256QAM				
3560.0	8.26	13.0	-4.74	Pass
3625.0	8.32	13.0	-4.68	Pass
3690.0	8.32	13.0	-4.68	Pass



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Report ID: AIRRAD_FCC.46669_Rev4.docx

Date of Issue: 25-Dec-22

Test specification: Section 96.41(g), Peak-to- average power ratio			
Test procedure: Section 96.41(g)			
Test mode: Compliance		Verdict: PASS	
Date(s): 08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Table 7.2.4 Peak-to-average power ratio test results (continue)

OPERATING FREQUENCY RANGE: 3550 – 3700 MHz
DETECTOR USED: Peak/Average
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Channel spacing 40 MHz				
Modulation QPSK				
3570.0	9.50	13.0	-3.50	Pass
3625.0	9.46	13.0	-3.54	Pass
3680.0	9.44	13.0	-3.56	Pass
Modulation 16QAM				
3570.0	9.35	13.0	-3.65	Pass
3625.0	9.32	13.0	-3.68	Pass
3680.0	9.25	13.0	-3.75	Pass
Modulation 64QAM				
3570.0	9.36	13.0	-3.64	Pass
3625.0	9.30	13.0	-3.70	Pass
3680.0	9.24	13.0	-3.76	Pass
Modulation 256QAM				
3570.0	9.36	13.0	-3.64	Pass
3625.0	9.32	13.0	-3.68	Pass
3680.0	9.22	13.0	-3.78	Pass

Reference numbers of test equipment used

HL 3301	HL 3302	HL 4355	HL 4366	HL 6143			
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Full description is given in Appendix A.



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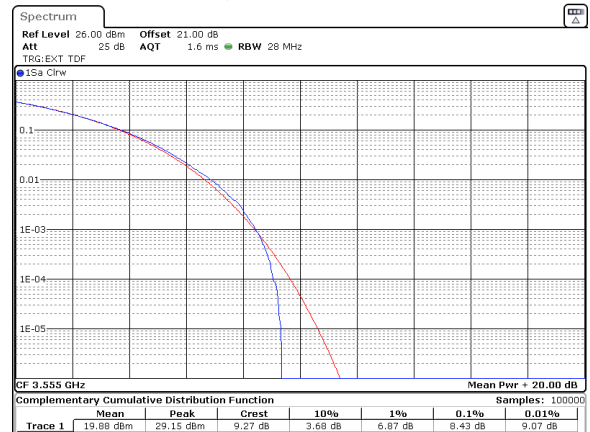
Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

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



Modulation: 256QAM



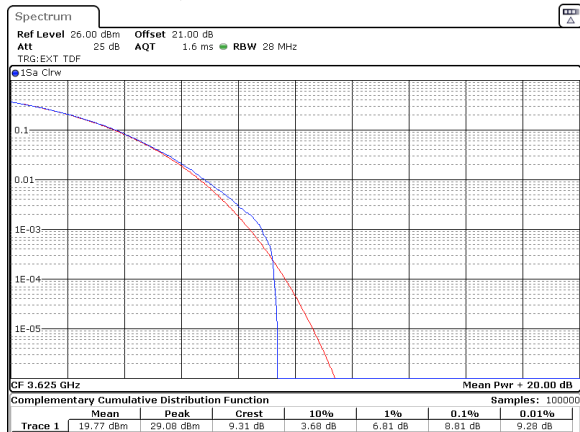


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Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

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

CHANNEL SPACING:
ANTENNA PORT:
Modulation: QPSK



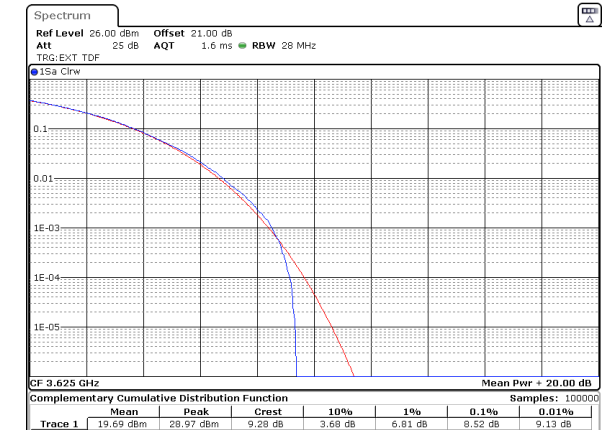
10 MHz
1
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM





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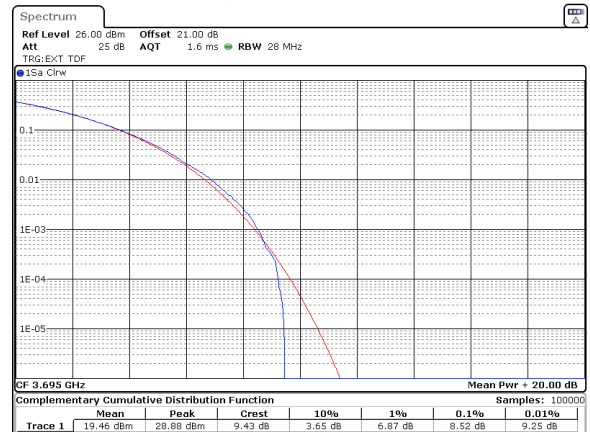
Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

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

CHANNEL SPACING:
ANTENNA PORT:
Modulation: QPSK



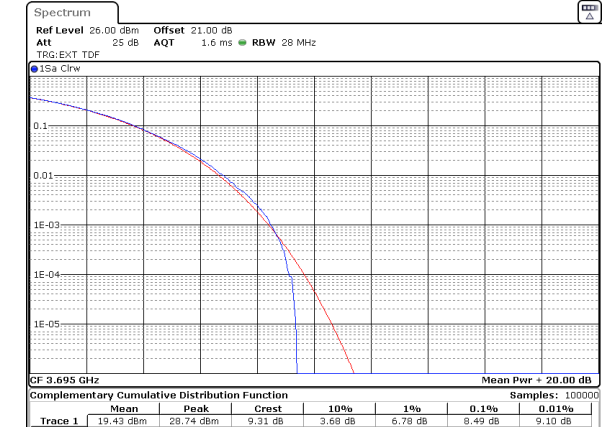
10 MHz
1
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



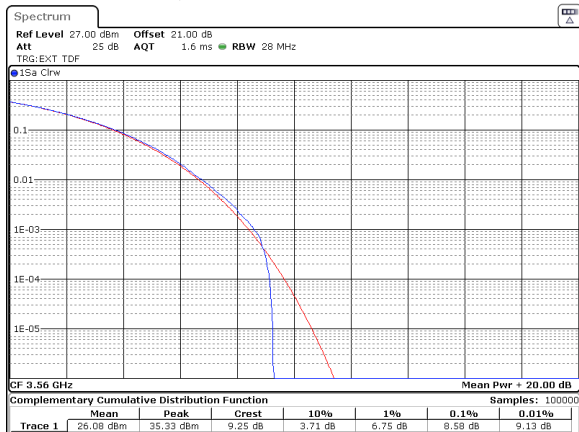


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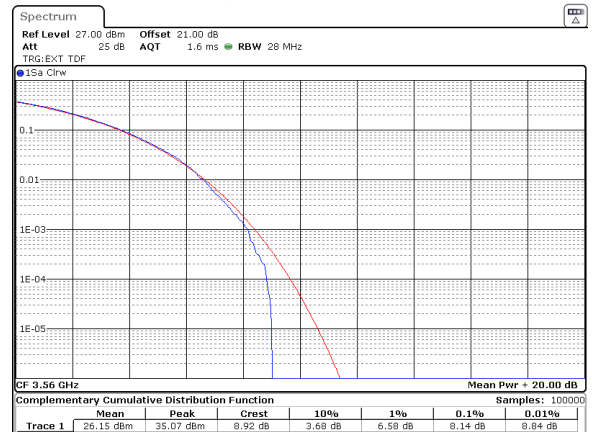
Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

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

CHANNEL SPACING:
ANTENNA PORT:
Modulation: QPSK



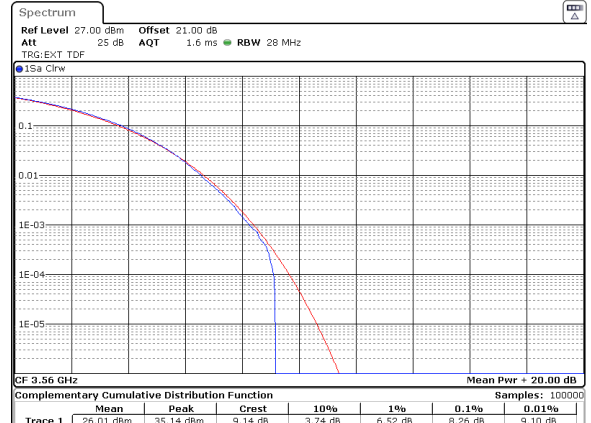
20 MHz
1
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



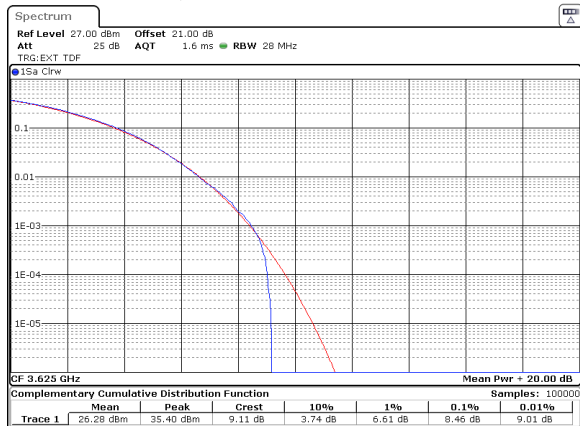


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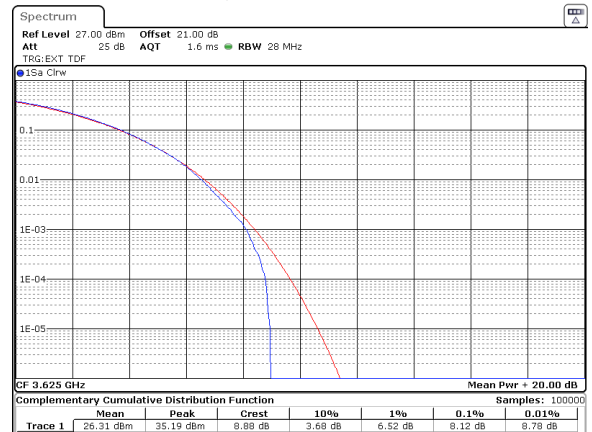
Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

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

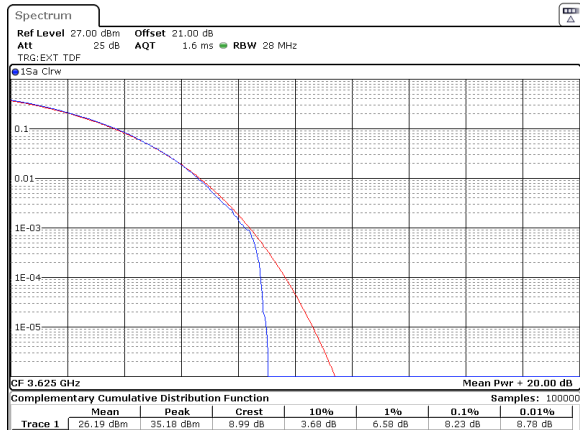
CHANNEL SPACING:
ANTENNA PORT:
Modulation: QPSK



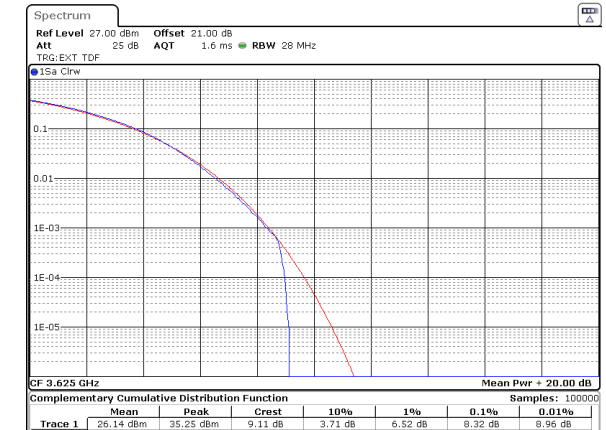
20 MHz
1
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM



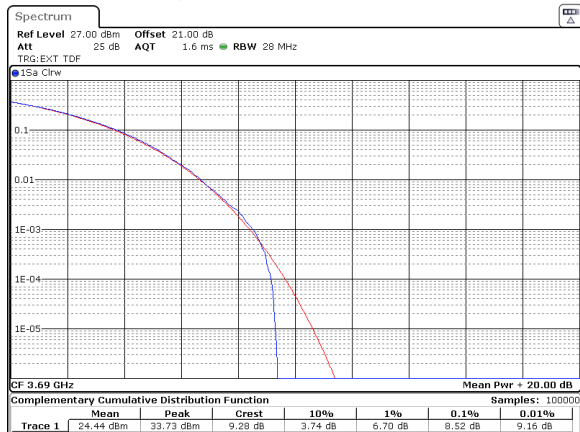


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Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

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

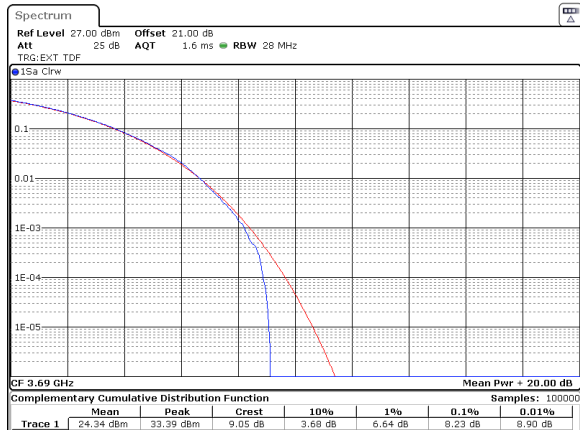
CHANNEL SPACING:
ANTENNA PORT:
Modulation: QPSK



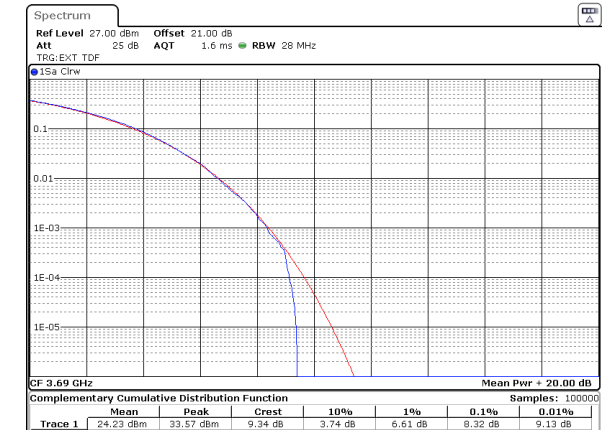
20 MHz
1
Modulation: 16QAM



Modulation: 64QAM



Modulation: 256QAM





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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	
Compliance			
Date(s):		08-Feb-22	
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.2.7 Peak-to-average power ratio test results at low frequency

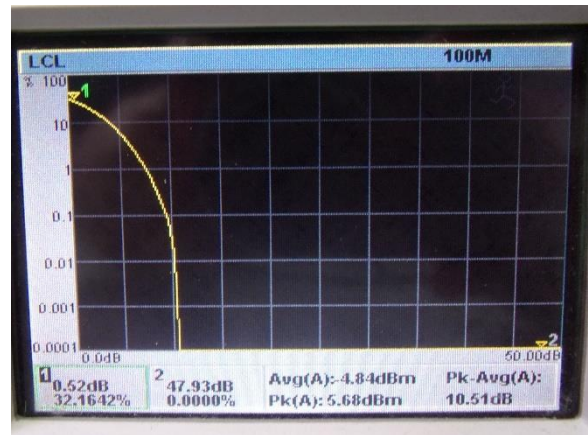
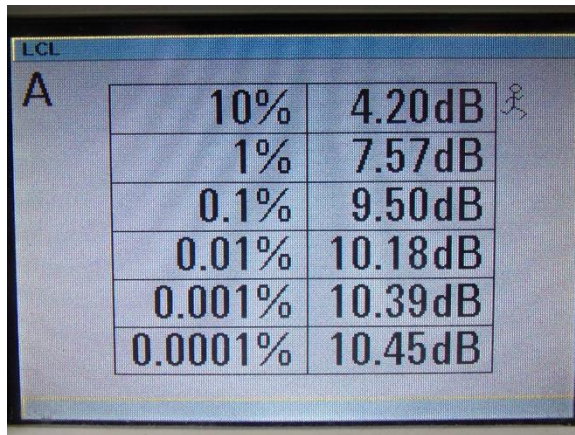
CHANNEL SPACING:

40 MHz

ANTENNA PORT:

1

Modulation: QPSK



Modulation: 16QAM

