

## PARTIAL TEST REPORT

**ACCORDING TO:**

**FCC 47CFR part 15 subpart C §15.247 (DTS) and subpart B,  
FCC 47CFR part 15 subpart C §15.247 (FHSS) and subpart B,  
FCC 47CFR part 15 subpart E §15.407**

**FOR:**

**CompuLab Ltd.  
Multi-Standard Module  
Model: Sterling-LWB5  
Part Number: LSR 450-0162C  
FCC ID: TFB-1004**

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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## 1 Applicant information

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**Contact name:** Mr. Dimitry Katkov

## 2 Equipment under test attributes

**Product name:** Multi-Standart Module  
**Trade Mark:**   
**Model(s):** Sterling-LWB5  
**Part Number:** LSR 450-0162C  
**Serial number:** 951054  
**Hardware version:** 1.11  
**Software release:** Linux ucm-imx8m-mini-laird 5.4.24-iot-gate-imx8-2.5-00125-gbf0f0e998a2b  
**Receipt date** 14-Mar-21

## 3 Manufacturer information

**Manufacturer name:** Laird Connectivity, Inc.  
**Address:** W66 N220 Commerce Court Cedarburg, Wisconsin 53012 USA  
**Telephone:** 262-375-3091  
**Fax:** 262-375-4248  
**E-mail:** [adam.alger@lairdconnect.com](mailto:adam.alger@lairdconnect.com)  
**Contact name:** Mr. Adam Alger

## 4 Test details

**Project ID:** 41918  
**Location:** Hermon Laboratories Ltd. P.O. Box 23, Binyamina 3055001, Israel  
**Test started:** 15-Mar-21  
**Test completed:** 24-May-21  
**Test specification(s):** FCC 47CFR part 15 subpart C §15.247 (DTS) and subpart B, FCC 47CFR part 15 subpart C §15.247 (FHSS) and subpart B, FCC 47CFR part 15 subpart E §15.407

## 5 Tests summary

Test	Status
<b>Transmitter characteristics according to FCC 15.247</b>	
FCC section 15.247(a)2, 6 dB bandwidth	Not required*
FCC section 15.247(b)3, Peak output power	Pass
FCC section 15.247(i), RF exposure	Pass, the exhibit to the application of certification is provided
FCC section 15.247(d), Radiated spurious emissions	Pass
FCC section 15.247(d), Emissions at band edges	Pass
FCC section 15.247(e), Peak power density	Not required*
FCC section 15.207(a), Conducted emission	Not required*
FCC section 15.203, Antenna requirement	Pass
<b>Unintentional emissions</b>	
FCC section 15.107, Class B, Conducted emission	Not required
FCC section 15.109, Radiated emission	Pass
<b>Transmitter characteristics according to FCC 15.407</b>	
FCC section 15.407(a)(5)/(e), 26 dB, 6 dB, occupied bandwidth	Not required*
FCC section 15.407(a)(1,3), Peak output power	Pass
FCC section 15.407(a)(1,3), Peak spectral power density	Not required*
FCC section 15.407(b), Conducted out of band emissions	Not required*
FCC section 15.407(b), Field strength of unwanted emissions	Pass
FCC section 15.407(b)(6), Conducted emissions	Not required*
FCC section 15.203, 15.407, The maximum EIRP at any elevation angle above 30 degrees	Not required*
FCC section 15.203, Antenna requirement	Pass
FCC section 15.407(f), RF exposure	Pass, the exhibit to the application of certification is provided
FCC section 15.407(c), Continuity of transmission	Not required *
FCC section 15.407(g) Frequency stability	Not required *

The module was approved under FCC ID: TFB-1004.





\*The relevant tests were performed to support Application for Class II permissive changes certification to reflect the following changes related to the addition LSR PN 002-0021 FlexPIFA antenna implemented in Compulab UCM-iMX8M module:

1. Different antenna trace.
2. Antenna connector change.



This test report supersedes the previously issued test report identified by Doc ID: COMRAD\_FCC.41918\_WiFi\_BLE

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
<b>Tested by:</b>	Mrs. E. Pitt, test engineer, EMC & Radio  Mr. A. Morozov, test engineer, EMC & Radio	15-Mar-21 – 24-May-21	 
<b>Reviewed by:</b>	Mrs. S. Peysahov Sheynin, test engineer, EMC & Radio	10-Sep-21	
<b>Approved by:</b>	Mr. S. Samokha, technical manager, EMC & Radio	24-Oct-21	

## 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 Sterling-LWB5 module. The Sterling-LWB5 is a 2.4 GHz and 5 GHz WLAN and Bluetooth combo module based on Cypress's BCM43353 silicon. The module has multiple antenna options:

Chip Antenna: Johanson Part # 2450AD14A5500 peak gain 1.0 dBi (2.4 GHz) / 4.0 dBi (5.5 GHz)\*

U.FL Antenna port utilizes the following antenna options:

LSR Part #001-0009 2.4 GHz Dipole Antenna peak gain 2.0 dBi (2.4 GHz & 5.5 GHz) \*

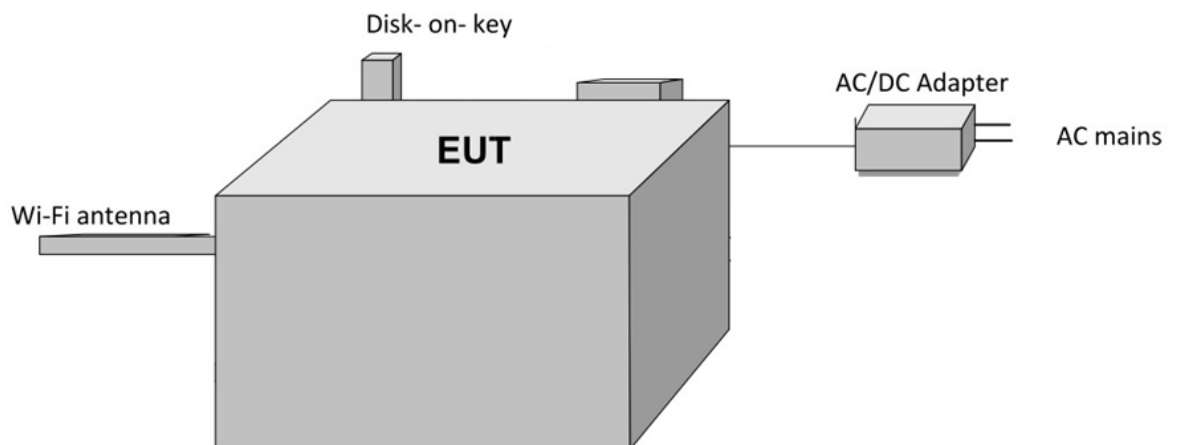
LSR Part #001-0016 2.4 GHz FlexPIFA peak gain 2.5 dBi (2.4 GHz) / 3.0 dBi (5.5 GHz) \*

LSR PN 002-0021 FlexPIFA with MHF4 connector, peak gain 2.5dBi (2.4GHz) / 3.0 dBi (5.5GHz)\*\*

\*The permitted antennas for use with the specified Sterling-LWB5 module, approved by FCC ID: TFB-1004.

\*\*The additional substituted equivalent antenna for a Class II permissive changes certification for use with the specified Sterling-LWB5 module being implemented in to Compublab UCM-iMX8M module.

### 6.2 Test configuration



### 6.3 Changes made in the EUT

No changes were implemented in the EUT during the testing.



### 6.4 Transmitter characteristics at Wi-Fi 2.4 GHz

<b>Assigned frequency ranges</b>		<b>2400.0 – 2483.5 MHz</b>						
<b>Operating frequencies</b>		2412 – 2462 MHz						
<b>Maximum rated output power</b>		Peak output power @ CCK 8.85 dBm						
		Peak output power @ BPSK 6.91 dBm						
		Peak output power @ 64-QAM 5.39 dBm						
<b>Is transmitter output power variable?</b>		<input checked="" type="checkbox"/>	No					
		<input type="checkbox"/>	Yes	continuous variable				
				stepped variable with stepsize		dB		
				minimum RF power		dBm		
maximum RF power		dBm						
<b>Antenna connection</b>								
<input checked="" type="checkbox"/>	unique coupling	<input type="checkbox"/>	standard connector	<input type="checkbox"/>	integral	<input checked="" type="checkbox"/>	with temporary RF connector without temporary RF connector	
<b>Antenna/s technical characteristics</b>								
<b>Type</b>		<b>Manufacturer</b>		<b>Model number</b>		<b>Gain</b>		
Dual Band Antenna		Laird Connectivity		LSR PN 001-0021		2.5 / 3 dBi		
<b>Type of modulation</b>						GFSK		
<b>Transmitter power source</b>								
	Battery	<b>Nominal rated voltage</b>		Battery type				
	DC	<b>Nominal rated voltage</b>		VDC				
<input checked="" type="checkbox"/>	AC mains	<b>Nominal rated voltage</b>		230 VAC	Frequency	50 Hz		



### 6.5 Transmitter characteristics BT and BLE protocols

<b>Assigned frequency range</b>		2400.0 – 2483.5 MHz		
<b>Operating frequency range</b>		2402.0 – 2480.0 MHz		
<b>Maximum rated output power</b>	Peak output power @ BLE	-10.69 dBm		
	Peak output power @ BT	-9.30 dBm		
<b>Is transmitter output power variable?</b>	X	No		
		Yes	continuous variable	
		Yes	stepped variable with stepsize	dB
		Yes	minimum RF power	dBm
	Yes	maximum RF power	dBm	
<b>Antenna connection</b>				
X	unique coupling	standard connector	integral	
			X with temporary RF connector without temporary RF connector	
<b>Antenna/s technical characteristics</b>				
Type	Manufacturer	Model number	Gain	
Dual Band Antenna	Laird Connectivity	LSR PN 001-0021	2.5 / 3 dBi	
<b>Type of modulation</b>		GFSK		
<b>Modulating test signal (baseband)</b>				
<b>Transmitter power source</b>				
	Battery	<b>Nominal rated voltage</b>	Battery type	
	DC	<b>Nominal rated voltage</b>	VDC	
X	AC mains	<b>Nominal rated voltage</b>	230 VAC	
		Frequency	50 Hz	





### 6.6 Transmitter characteristics at Wi-Fi 5 GHz

<b>Assigned frequency range</b>		5150.0 – 5250.0 MHz, 5725.0 – 5850.0 MHz			
<b>Operating frequency range</b>		5160.0 – 5245.0 MHz 5730.0 – 5845.0 MHz			
<b>RF channel spacing</b>		20 MHz, 40 MHz, 80 MHz			
<b>Maximum rated output power</b>		Peak (conducted) in 5160.0 – 5245.0 MHz		6.93 dBm for 20 MHz 2.42 dBm for 40 MHz 1.60 dBm for 80 MHz	
<b>Maximum rated output power</b>		Peak (conducted) in 5730.0 – 5845.0 MHz		6.80 dBm for 20 MHz 2.48 dBm for 40 MHz 1.61 dBm for 80 MHz	
<b>Antenna connection</b>					
V	unique coupling		standard connector		Integral
				V with temporary RF connector without temporary RF connector	
<b>Antenna/s technical characteristics</b>					
<b>Type</b>		<b>Manufacturer</b>		<b>Model number</b>	
Dual Band Antenna		Laird Connectivity		LSR PN 001-0021	
				<b>Gain</b>	
				2.5 / 3 dBi	
<b>Type of modulation</b>		GFSK			
<b>Modulating test signal (baseband)</b>					
<b>Transmitter power source</b>					
	Battery	<b>Nominal rated voltage</b>		Battery type	
	DC	<b>Nominal rated voltage</b>		VDC	
X	AC mains	<b>Nominal rated voltage</b>		Frequency	50 Hz



<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

## 7 Transmitter tests according to 47CFR part 15 subpart C requirements

### 7.1 Peak output power at Wi-Fi 2.4 GHz

#### 7.1.1 General

This test was performed to measure the maximum peak output power radiated by transmitter. Specification test limits are given in Table 7.1.1.

Table 7.1.1 Peak output power limits

Assigned frequency range, MHz	Maximum antenna gain, dBi	Peak output power*		Equivalent field strength limit @ 3m, dB(μV/m)**
		W	dBm	
902.0 – 928.0	6.0	1.0	30.0	131.2
<b>2400.0 – 2483.5</b>				
5725.0 – 5850.0				

\*- The limit is provided in terms of conducted RF power at the antenna connector. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power limit shall be reduced below the stated value as follows:

- by 1 dB for every 3 dB that the directional gain of antenna exceeds 6 dBi for fixed point-to-point transmitters operate in 2400-2483.5 MHz band;
- without any corresponding reduction for fixed point-to-point transmitters operate in 5725-5850 MHz band;
- by the amount in dB that the directional gain of antenna exceeds 6 dBi for the rest of transmitters.

\*\*- Equivalent field strength limit was calculated from the peak output power as follows:  $E = \sqrt{30 \times P \times G} / r$ , where P is peak output power in Watts, r is antenna to EUT distance in meters and G is transmitter antenna gain in dBi.

#### 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 resolution bandwidth of spectrum analyzer was set wider than 6 dB bandwidth of the EUT and the field strength of the EUT carrier frequency was measured with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360° and the measuring antenna height was swept in both vertical and horizontal polarizations.

7.1.2.4 The maximum field strength of the EUT carrier frequency was measured as provided in Table 7.1.2 and associated plots.

7.1.2.5 The maximum peak output power was calculated from the field strength of carrier as follows:

$$P = (E \times d)^2 / (30 \times G),$$

where P is the peak output power in W, E is the field strength in V/m, d is the test distance and G is the transmitter numeric antenna gain over an isotropic radiator.

The above equation was converted in logarithmic units for 3 m test distance:

$$\text{Peak output power in dBm} = \text{Field strength in dB}(\mu\text{V/m}) - \text{Transmitter antenna gain in dBi} - 95.2 \text{ dB}$$

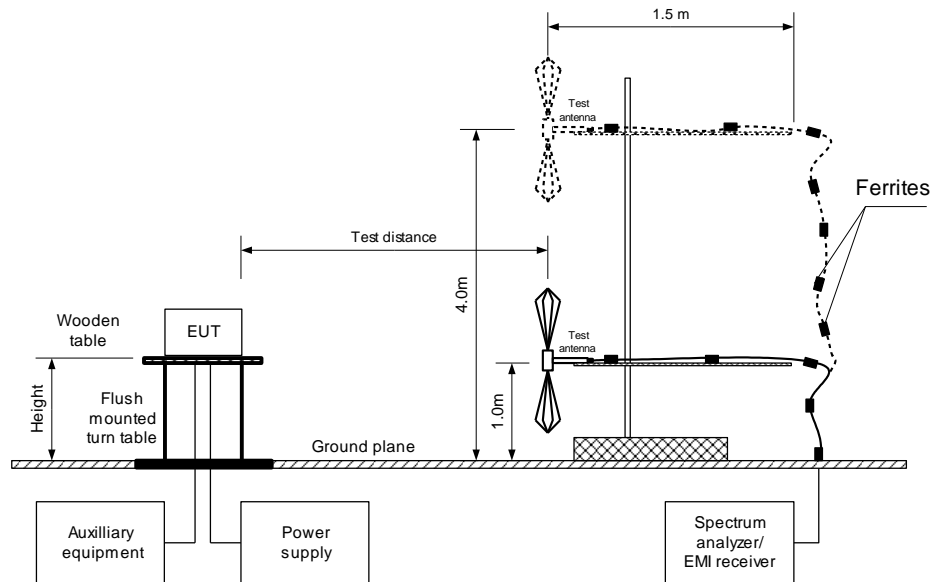
7.1.2.6 The worst test results (the lowest margins) were recorded in Table 7.1.2.



HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Figure 7.1.1 Setup for carrier field strength measurements





<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Table 7.1.2 Peak output power test results

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz  
TEST DISTANCE: 3 m  
TEST SITE: Semi anechoic chamber  
EUT HEIGHT: 1.5 m  
DETECTOR USED: Average  
DUTY CYCLE: 100%  
TEST ANTENNA TYPE: Double ridged guide (above 1000 MHz)  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
DETECTOR USED: Peak  
RESOLUTION BANDWIDTH: 1 MHz  
VIDEO BANDWIDTH: 8 MHz

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 1 Mbps

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	105.33	Vertical	1.5	200	2.5	7.63	30.0	-22.37	Pass
2437.0	105.83	Vertical	1.5	120	2.5	8.13	30.0	-21.87	Pass
2462.0	105.20	Vertical	1.5	150	2.5	7.50	30.0	-22.50	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 2 Mbps

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	105.42	Vertical	1.5	200	2.5	7.72	30.0	-22.28	Pass
2437.0	105.86	Vertical	1.5	120	2.5	8.16	30.0	-21.84	Pass
2462.0	105.31	Vertical	1.5	150	2.5	7.61	30.0	-22.39	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 5.5 Mbps

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	106.09	Vertical	1.5	200	2.5	8.39	30.0	-21.61	Pass
2437.0	106.55	Vertical	1.5	120	2.5	8.85	30.0	-21.15	Pass
2462.0	106.00	Vertical	1.5	150	2.5	8.30	30.0	-21.70	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 11 Mbps

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	105.52	Vertical	1.5	200	2.5	7.82	30.0	-22.18	Pass
2437.0	106.03	Vertical	1.5	120	2.5	8.33	30.0	-21.67	Pass
2462.0	105.40	Vertical	1.5	150	2.5	7.70	30.0	-22.30	Pass



<b>Test specification:</b> Section 15.247(b)3, Peak output power			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: BPSK / 6 Mbps

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	104.32	Vertical	1.5	200	2.5	6.62	30.0	-23.38	Pass
2437.0	104.61	Vertical	1.5	120	2.5	6.91	30.0	-23.09	Pass
2462.0	103.89	Vertical	1.5	150	2.5	6.19	30.0	-23.81	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: 64-QAM / 54 Mbps

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	102.73	Vertical	1.5	200	2.5	5.03	30.0	-24.97	Pass
2437.0	103.09	Vertical	1.5	120	2.5	5.39	30.0	-24.61	Pass
2462.0	102.30	Vertical	1.5	150	2.5	4.60	30.0	-25.40	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: BPSK / 6.5 Mbps

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	103.54	Vertical	1.5	200	2.5	5.84	30.0	-24.16	Pass
2437.0	103.89	Vertical	1.5	120	2.5	6.19	30.0	-23.81	Pass
2462.0	103.33	Vertical	1.5	150	2.5	5.63	30.0	-24.37	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: 64-QAM / 65 Mbps

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	101.96	Vertical	1.5	200	2.5	4.26	30.0	-25.74	Pass
2437.0	102.29	Vertical	1.5	120	2.5	4.59	30.0	-25.41	Pass
2462.0	101.73	Vertical	1.5	150	2.5	4.03	30.0	-25.97	Pass



<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

CHANNEL BANDWIDTH: 40 MHz  
MODULATION/BITRATE: BPSK / 13.5 Mbps

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2422.0	101.85	Vertical	1.5	200	2.5	4.15	30.0	-25.85	Pass
2442.0	101.04	Vertical	1.5	120	2.5	3.34	30.0	-26.66	Pass
2452.0	100.61	Vertical	1.5	150	2.5	2.91	30.0	-27.09	Pass

CHANNEL BANDWIDTH: 40 MHz  
MODULATION/BITRATE: 64-QAM / 135 Mbps

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2422.0	99.42	Vertical	1.5	200	2.5	1.72	30.0	-28.28	Pass
2442.0	98.49	Vertical	1.5	120	2.5	0.79	30.0	-29.21	Pass
2452.0	98.21	Vertical	1.5	150	2.5	0.51	30.0	-29.49	Pass

\*- EUT front panel refer to 0 degrees position of turntable.

\*\* - Peak output power was calculated from the field strength of carrier as follows:  $P = (E \times d)^2 / (30 \times G)$ , where P is the peak output power in W, E is the field strength in V/m, d is the test distance in meters and G is the transmitter numeric antenna gain over an isotropic radiator. The above equation was converted in logarithmic units for 3 m test distance: *Peak output power in dBm = Field strength in dB(µV/m) - Transmitter antenna gain in dBi - 95.2 dB*

\*\*\* - Margin = Peak output power – specification limit.

Note: Maximum peak output power was obtained at Unom (115%Unom, 85%Unom) input power voltage.

**Reference numbers of test equipment used**

HL 3818	HL 3903	HL 5902	HL 4933	HL 3442			
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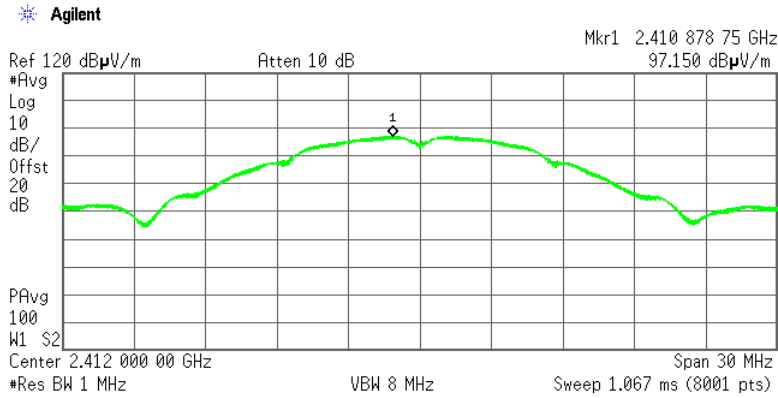
Full description is given in Appendix A.



<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.1 Field strength of carrier at low frequency**

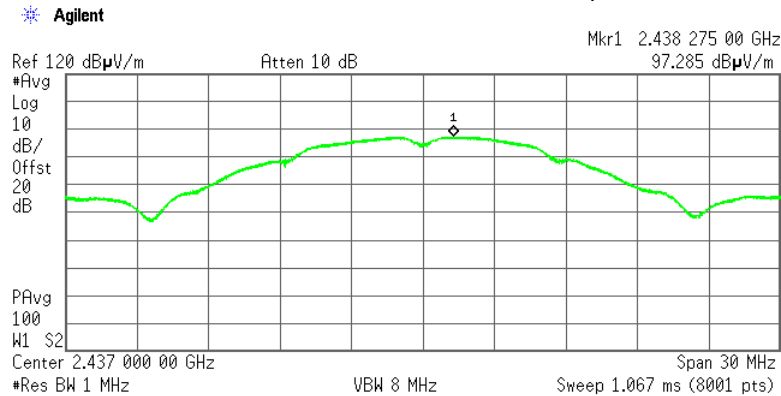
CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 1 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	Upper dBm
105.33 dBµV/m					
20.0000 MHz					

**Plot 7.1.2 Field strength of carrier at mid frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 1 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	Upper dBm
105.83 dBµV/m					
20.0000 MHz					

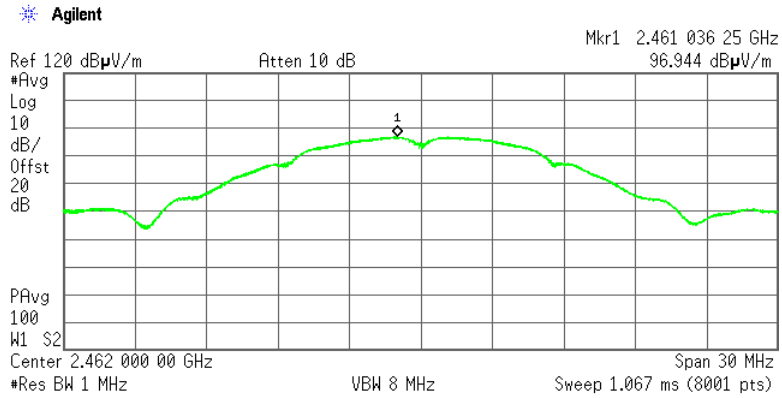


HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.3 Field strength of carrier at high frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 1 Mbps



RMS Results	Freq	Offset	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm
Carrier Power	2.46103625		20.0000						
					105.28				
	20.0000								

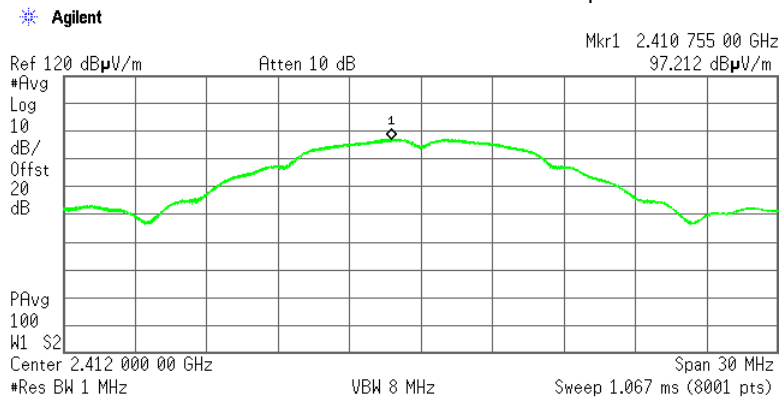




<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.4 Field strength of carrier at low frequency**

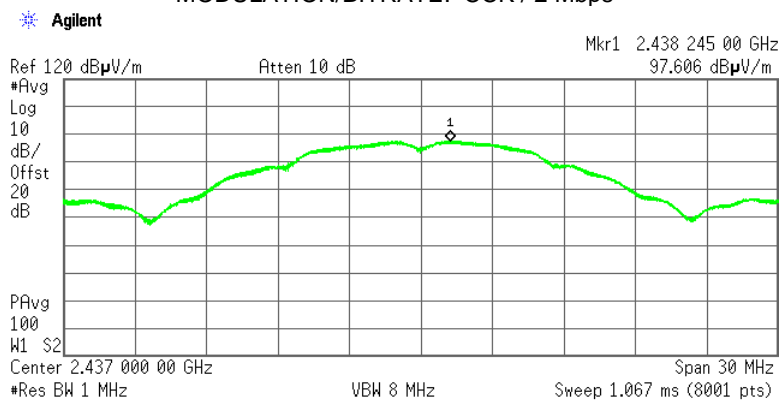
CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 2 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc Upper dBm
105.42 dBµV/m					
20.0000 MHz					

**Plot 7.1.5 Field strength of carrier at mid frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 2 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc Upper dBm
105.86 dBµV/m					
20.0000 MHz					

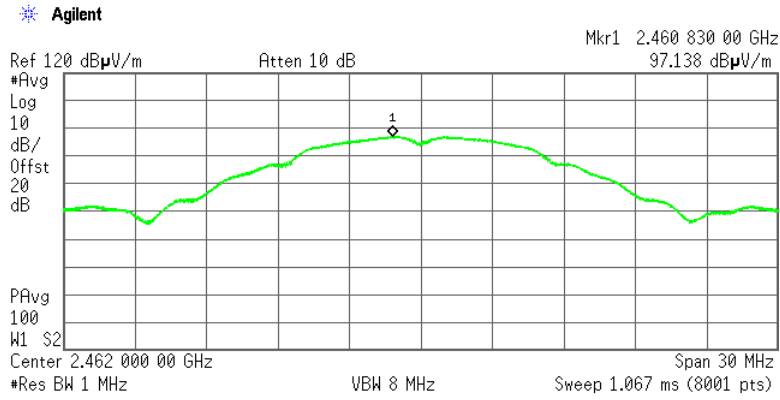


HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.6 Field strength of carrier at high frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 2 Mbps



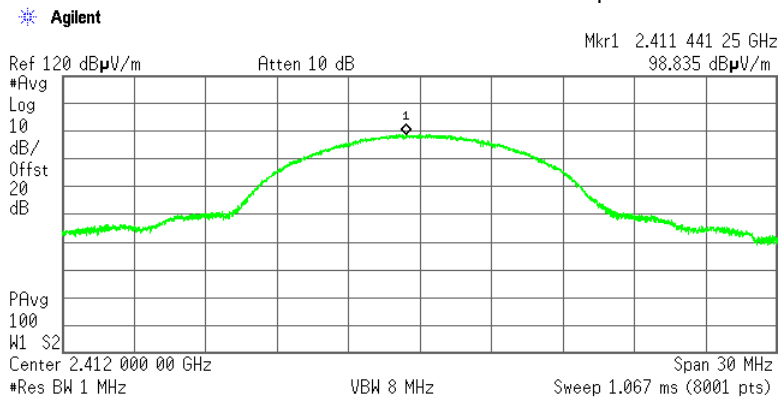
RMS Results	Freq	Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm
Carrier Power	2.46083000	0.0000	20.0000	97.138			
	2.46083000	0.0000	20.0000				



<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.7 Field strength of carrier at low frequency**

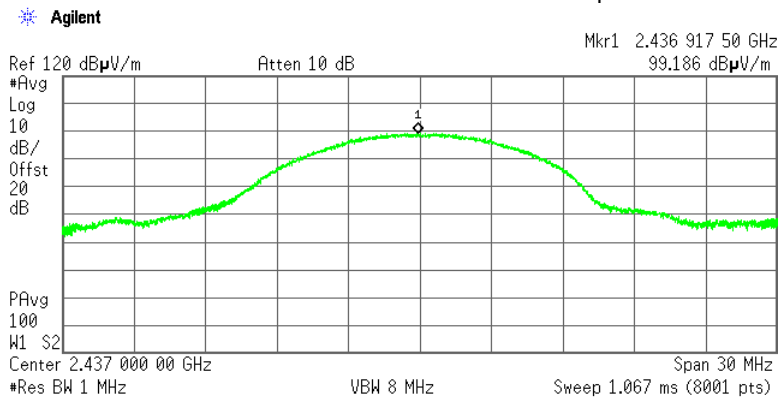
CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 5.5 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc Upper dBm
106.09 dBµV/m					
20.0000 MHz					

**Plot 7.1.8 Field strength of carrier at mid frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 5.5 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc Upper dBm
106.55 dBµV/m					
20.0000 MHz					

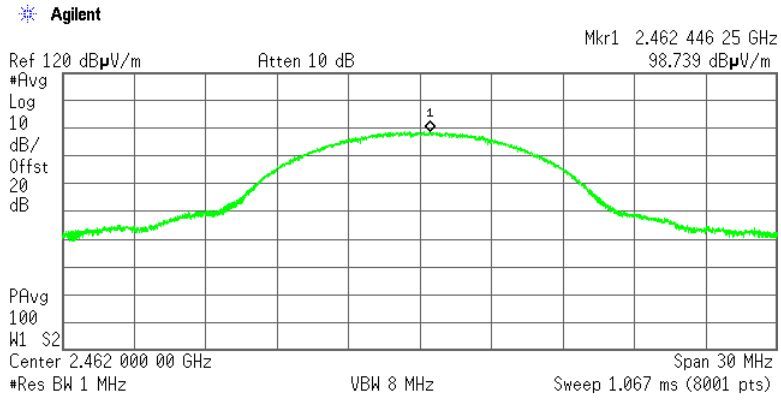


HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.9 Field strength of carrier at high frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 5.5 Mbps



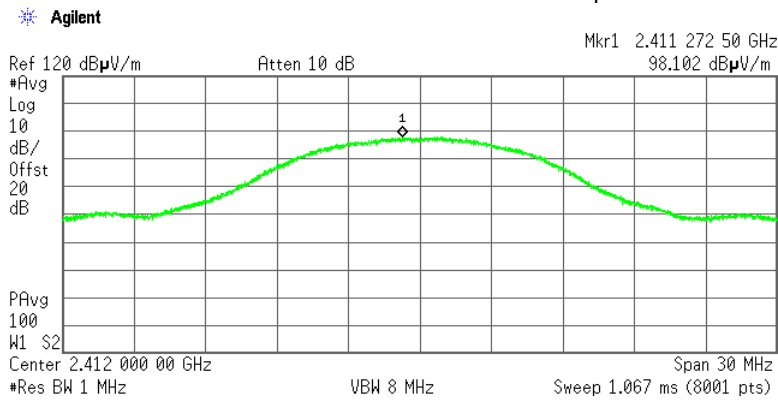
RMS Results							
	Freq	Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm
Carrier Power	2.46244625		20.0000				
					106.08		
	20.0000						



<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.10 Field strength of carrier at low frequency**

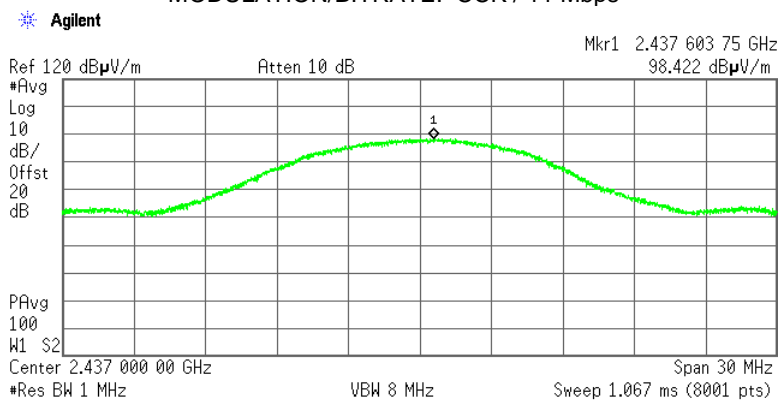
CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 11 Mbps



RMS Results						
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm
105.52 dBµV/m						
20.0000 MHz						

**Plot 7.1.11 Field strength of carrier at mid frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 11 Mbps



RMS Results						
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm
106.03 dBµV/m						
20.0000 MHz						

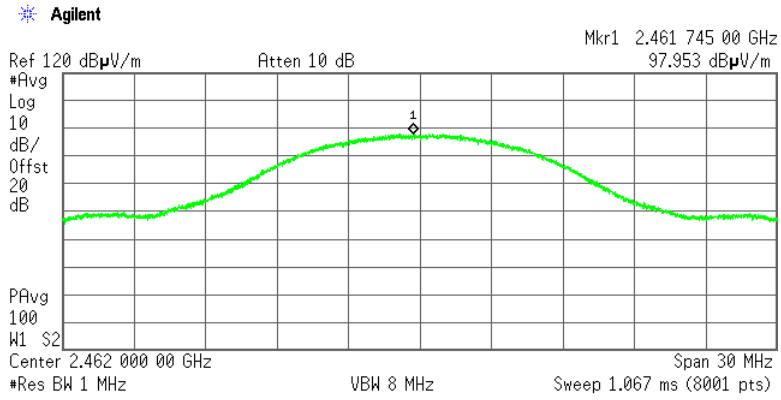


HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.12 Field strength of carrier at high frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 11 Mbps



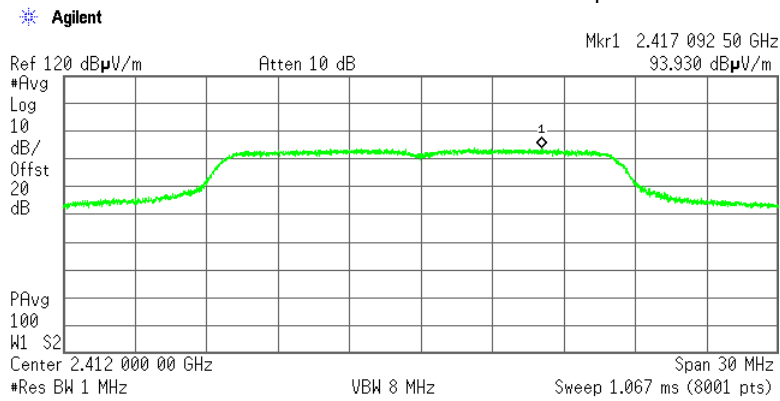
RMS Results	Freq	Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm
Carrier Power	2.461745	0.000000	20.0000	97.953			
	2.461745	0.000000	20.0000	105.48			
	2.461745	0.000000	20.0000				



<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.13 Field strength of carrier at low frequency**

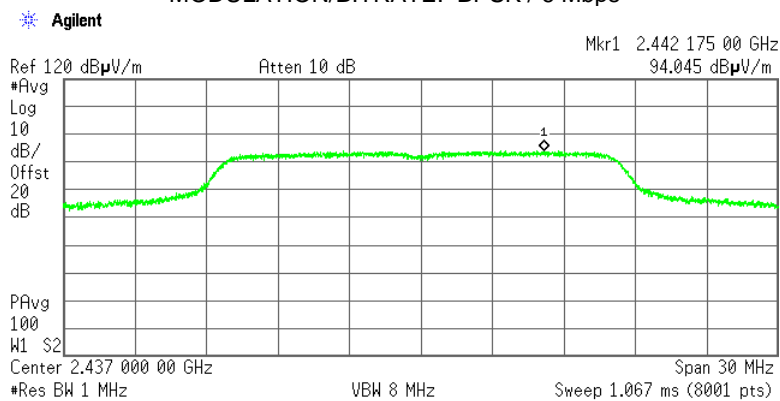
CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: BPSK / 6 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc Upper dBm
104.32 dBμV/m					
20.0000 MHz					

**Plot 7.1.14 Field strength of carrier at mid frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: BPSK / 6 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc Upper dBm
104.61 dBμV/m					
20.0000 MHz					

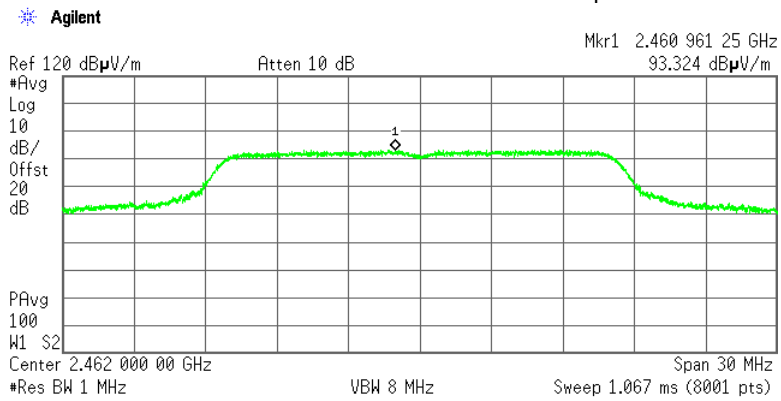


HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.15 Field strength of carrier at high frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: BPSK / 6 Mbps



RMS Results						
	Freq	Offset	Ref BW	dBc	Lower dBm	Upper dBm
Carrier Power	2.46096125		20.0000			
	2.46096125		20.0000			
	2.46096125		20.0000			



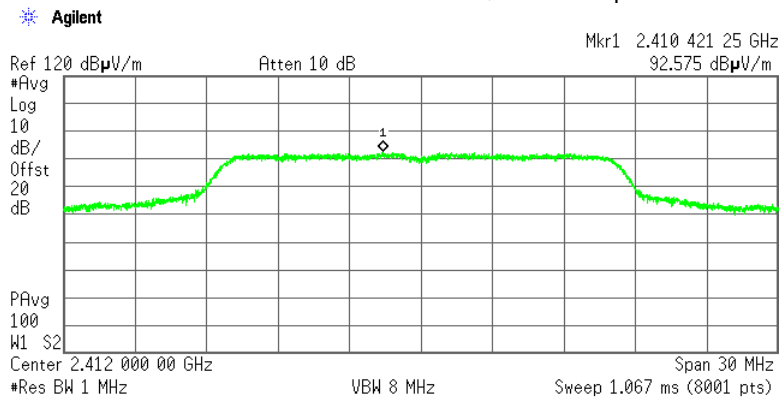


HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.16 Field strength of carrier at low frequency**

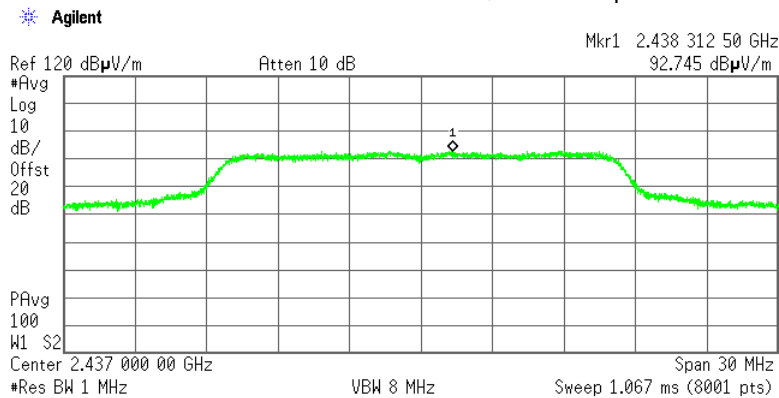
CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: 64-QAM / 54 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc Upper dBm
102.73 dBµV/m					
20.0000 MHz					

**Plot 7.1.17 Field strength of carrier at mid frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: 64-QAM / 54 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc Upper dBm
103.09 dBµV/m					
20.0000 MHz					

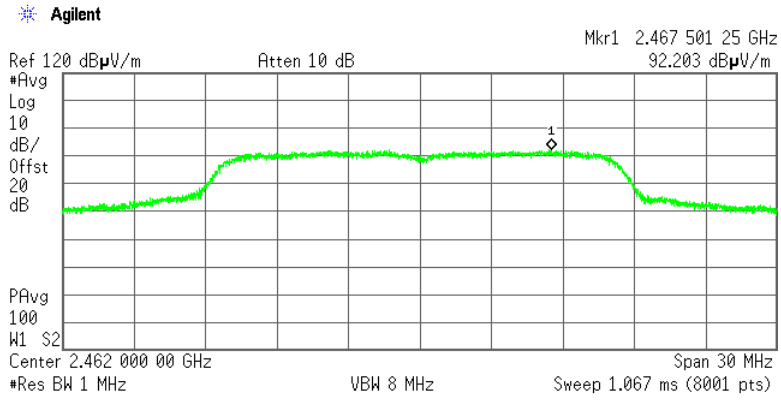


HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.18 Field strength of carrier at high frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: 64-QAM / 54 Mbps



RMS Results	Freq	Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm
Carrier Power	2.462000	0.0000	20.0000	102.38			
	2.462000	0.0000	20.0000				

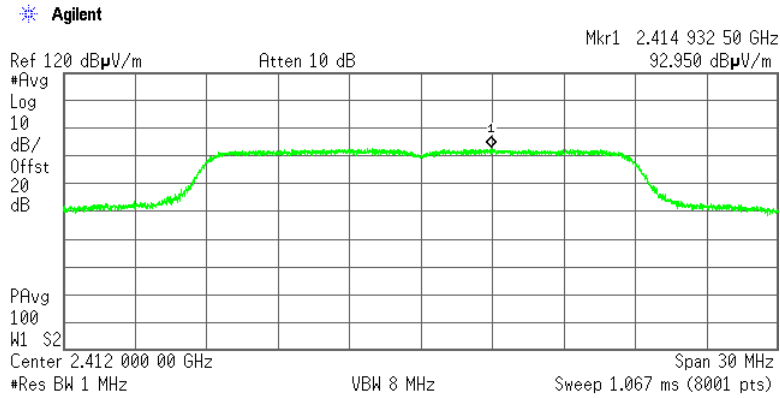


HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.19 Field strength of carrier at low frequency**

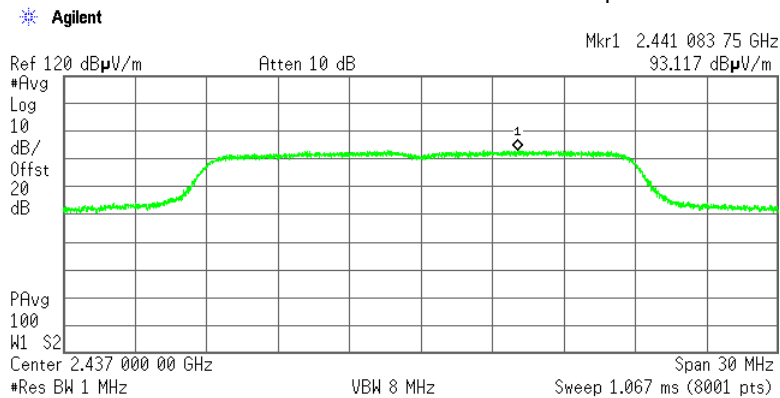
CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: BPSK / 6.5 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc Upper dBm
103.54 dBµV/m					
20.0000 MHz					

**Plot 7.1.20 Field strength of carrier at mid frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: BPSK / 6.5 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc Upper dBm
103.89 dBµV/m					
20.0000 MHz					

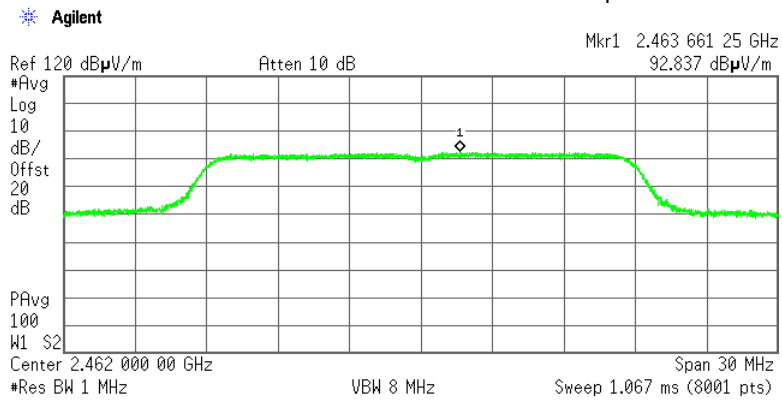


HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.21 Field strength of carrier at high frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: BPSK / 6.5 Mbps



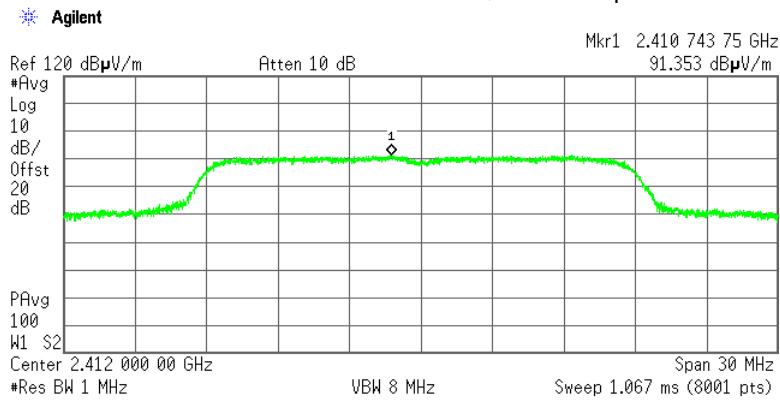
RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	Upper dBm
103.33 dBµV/m	20.0000 MHz				



<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.22 Field strength of carrier at low frequency**

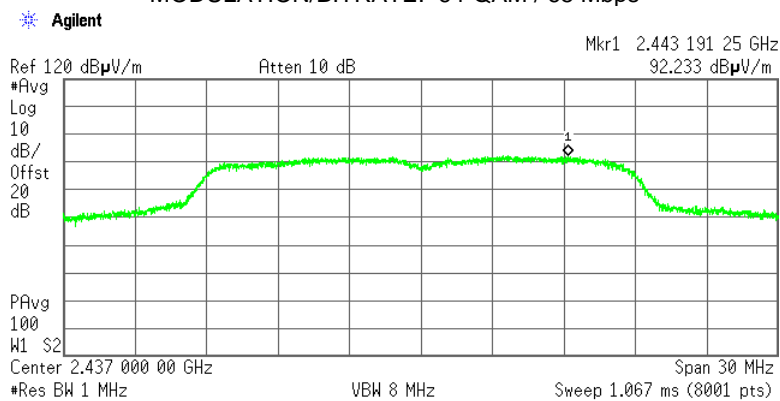
CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: 64-QAM / 65 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc Upper dBm
101.96 dBµV/m					
20.0000 MHz					

**Plot 7.1.23 Field strength of carrier at mid frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: 64-QAM / 65 Mbps



RMS Results					
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc Upper dBm
102.29 dBµV/m					
20.0000 MHz					

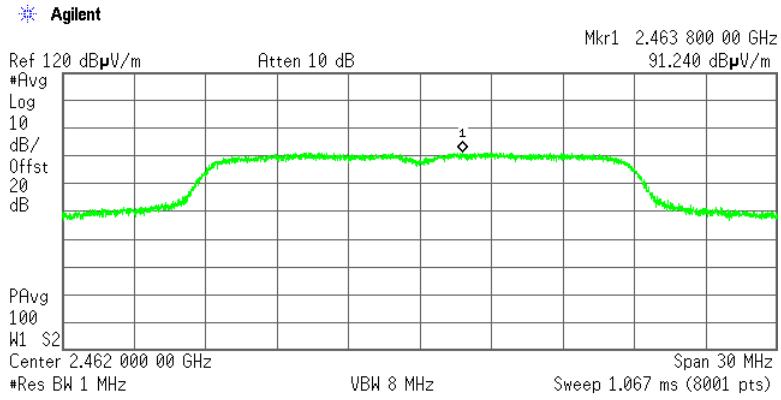


HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.24 Field strength of carrier at high frequency**

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: 64-QAM / 65 Mbps



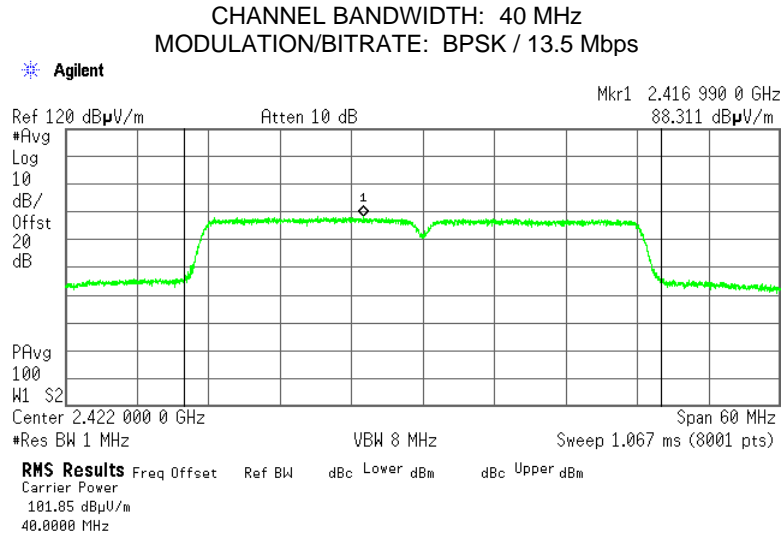
RMS Results						
	Freq	Offset	Ref BW	dBc	Lower dBm	Upper dBm
Carrier Power	2.462	0.000	20.0000	91.240		
	2.462	0.000	1.0000	101.73		
	2.462	0.000	1.0000			



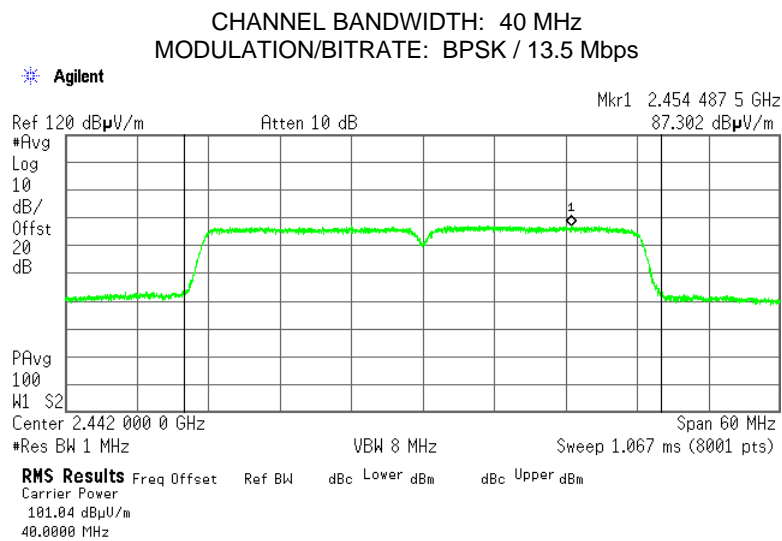
HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.1.25 Field strength of carrier at low frequency



Plot 7.1.26 Field strength of carrier at mid frequency



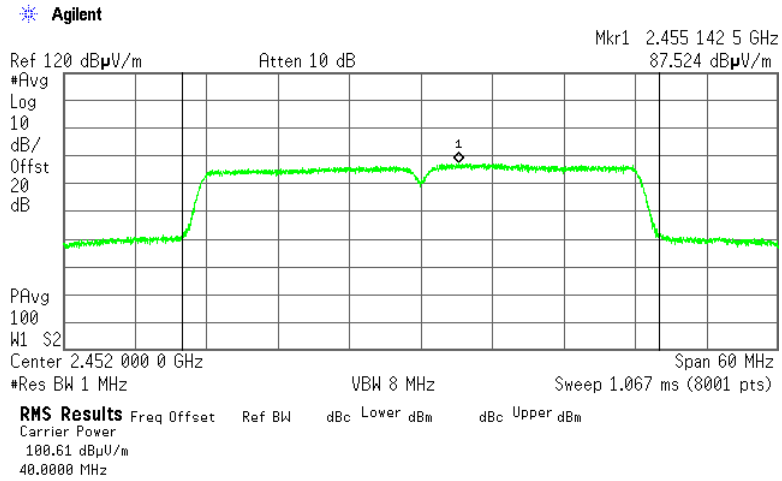


HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.27 Field strength of carrier at high frequency**

CHANNEL BANDWIDTH: 40 MHz  
MODULATION/BITRATE: BPSK / 13.5 Mbps



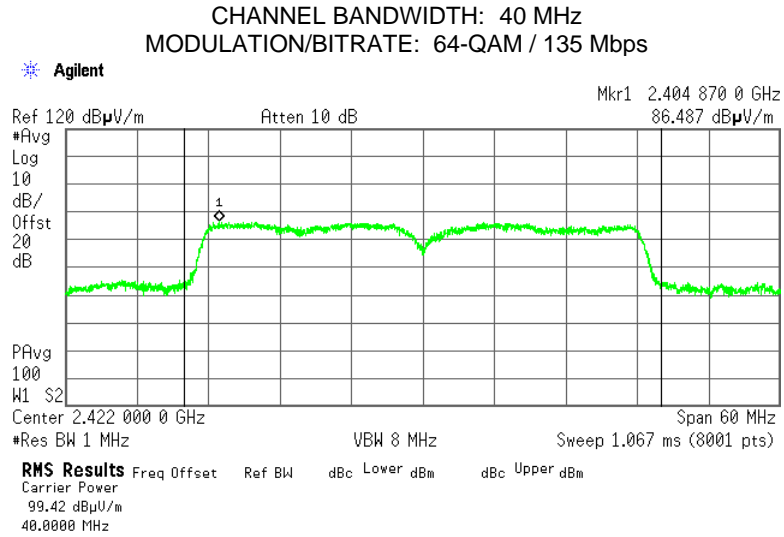




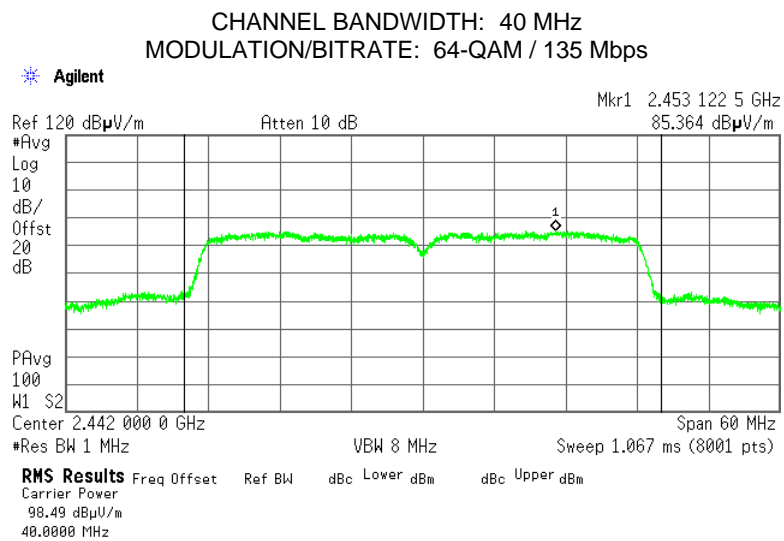
HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.1.28 Field strength of carrier at low frequency



Plot 7.1.29 Field strength of carrier at mid frequency



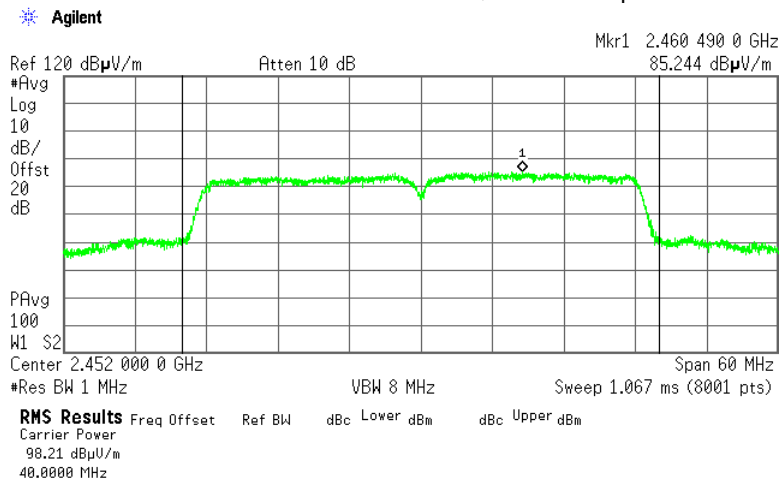


HERMON LABORATORIES

<b>Test specification: Section 15.247(b)3, Peak output power</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.9.1.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 08-Apr-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 48 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.1.30 Field strength of carrier at high frequency**

CHANNEL BANDWIDTH: 40 MHz  
MODULATION/BITRATE: 64-QAM / 135 Mbps





<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

## 7.2 Field strength of spurious emissions at Wi-Fi 2.4 GHz

### 7.2.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits are given in Table 7.2.1

Table 7.2.1 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m within restricted bands, dB(μV/m)*			Attenuation of field strength of spurious versus carrier outside restricted bands, dBc***
	Peak	Quasi Peak	Average	
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	20.0
0.090 – 0.110	NA	108.5 – 106.8**	NA	
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8**	
0.490 – 1.705	NA	73.8 – 63.0**	NA	
1.705 – 30.0*		69.5		
30 – 88		40.0		
88 – 216		43.5		
216 – 960		46.0		
960 - 1000		54.0		
1000 – 10 <sup>th</sup> harmonic		74.0		

\*- The limit for 3 m test distance was calculated using the inverse square distance extrapolation factor as follows:  
$$\text{Lim}_{S_2} = \text{Lim}_{S_1} + 40 \log (S_1/S_2),$$

where S<sub>1</sub> and S<sub>2</sub> – standard defined and test distance respectively in meters.

\*\* - The limit decreases linearly with the logarithm of frequency.

\*\*\* - The field strength limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency.

### 7.2.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz band

7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and the performance check was conducted.

7.2.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360° and the measuring antenna was rotated around its vertical axis.

7.2.2.3 The worst test results (the lowest margins) were recorded and shown in the associated plots.

### 7.2.3 Test procedure for spurious emission field strength measurements above 30 MHz

7.2.3.1 The EUT was set up as shown in Figure 7.2.2, Figure 7.2.3, energized and the performance check was conducted.

7.2.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360°, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal.

7.2.3.3 The worst test results (the lowest margins) were recorded and shown in the associated plots.



<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Figure 7.2.1 Setup for spurious emission field strength measurements below 30 MHz

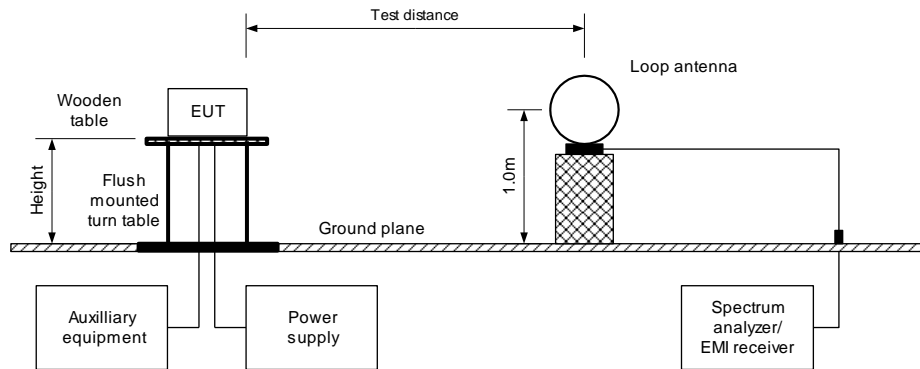
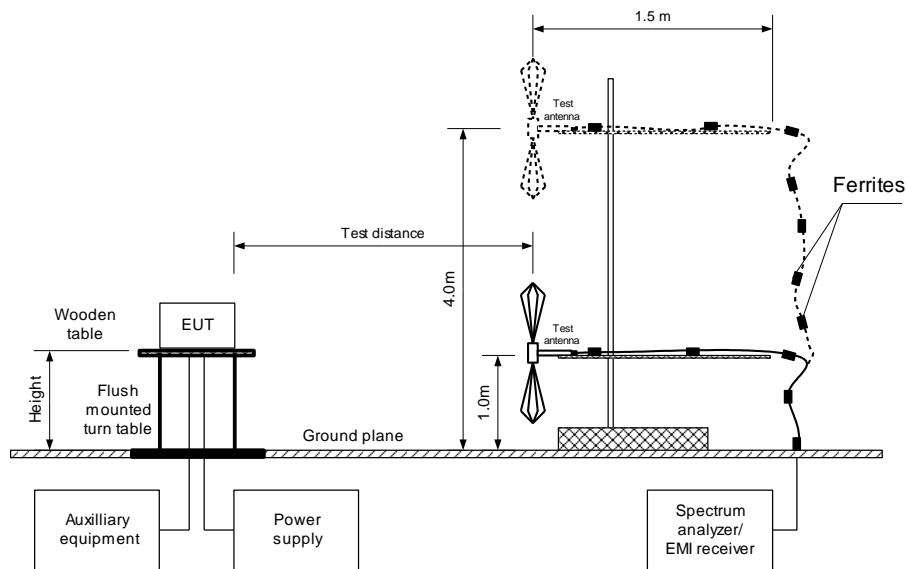


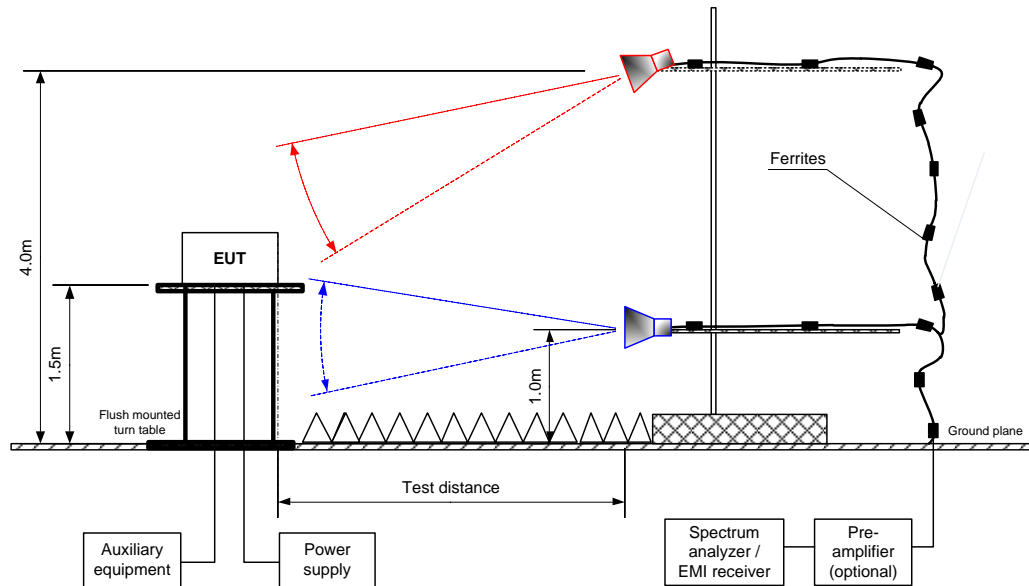
Figure 7.2.2 Setup for spurious emission field strength measurements in 30 – 1000 MHz





<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Figure 7.2.3 Setup for spurious emission field strength measurements above 1000 MHz





<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Table 7.2.2 Field strength of emissions outside restricted bands**

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 - 25000 MHz  
 TEST DISTANCE: 3 m  
 MODULATION: CCK  
 BIT RATE: 5.5 Mbps  
 DUTY CYCLE: 100 %  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 100 kHz  
 VIDEO BANDWIDTH: 300 kHz  
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)  
 Biconilog (30 MHz – 1000 MHz)  
 Double ridged guide (above 1000 MHz)

Frequency, MHz	Field strength of spurious, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	Field strength of carrier, dB(µV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB**	Verdict
<b>Low carrier frequency 2412.0 MHz</b>									
60.005789	45.25	V	1.00	180	106.09	60.84	20.0	40.84	Pass
<b>Mid carrier frequency 2437.0 MHz</b>									
60.014786	45.42	V	1.00	176	106.55	61.13	20.0	41.13	Pass
<b>High carrier frequency 2462.0 MHz</b>									
60.007933	45.19	V	1.00	180	106.00	60.81	20.0	40.81	Pass

\*- EUT front panel refers to 0 degrees position of turntable.  
 \*\*- Margin = Attenuation below carrier – specification limit.

**Table 7.2.3 Field strength of spurious emissions above 1 GHz within restricted bands**

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz  
 INVESTIGATED FREQUENCY RANGE: 1000 - 25000 MHz  
 TEST DISTANCE: 3 m  
 MODULATION: CCK  
 BIT RATE: 5.5 Mbps  
 DUTY CYCLE: 100 %  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 1000 kHz  
 TEST ANTENNA TYPE: Double ridged guide

Frequency, MHz	Antenna		Azimuth, degrees*	Peak field strength(VBW=3 MHz)			Average field strength(VBW=10 Hz)				Verdict
	Polarization	Height, m		Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Calculated, dB(µV/m)	Limit, dB(µV/m)	Margin, dB***	
<b>Low carrier frequency 2412.0 MHz</b>											
All emission were found below the limit										Pass	
<b>Mid carrier frequency 2437.0 MHz</b>											
All emission were found below the limit										Pass	
<b>High carrier frequency 2462.0 MHz</b>											
All emission were found below the limit										Pass	

\*- EUT front panel refers to 0 degrees position of turntable.  
 \*\*- Margin = Measured field strength - specification limit.  
 \*\*\*- Margin = Calculated field strength - specification limit,  
 where Calculated field strength = Measured field strength + average factor.



<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Table 7.2.4 Field strength of spurious emissions below 1 GHz within restricted bands

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz  
 TEST DISTANCE: 3 m  
 MODULATION: CCK  
 BIT RATE: 5.5 Mbps  
 DUTY CYCLE: 100 %  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 RESOLUTION BANDWIDTH: 0.2 kHz (9 kHz – 150 kHz)  
 9.0 kHz (150 kHz – 30 MHz)  
 120 kHz (30 MHz – 1000 MHz)  
 VIDEO BANDWIDTH: > Resolution bandwidth  
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)  
 Biconilog (30 MHz – 1000 MHz)

Frequency, MHz	Peak emission, dB(µV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
<b>Low carrier frequency 2412.0 MHz</b>								
120.010399	45.41	42.53	43.50	-0.97	V	1.04	-59	Pass
240.025400	38.69	36.75	46.00	-9.25	H	1.32	-131	
<b>Mid carrier frequency 2437.0 MHz</b>								
120.010399	45.52	42.59	43.50	-0.91	V	1.15	-45	Pass
<b>High carrier frequency 2462.0 MHz</b>								
120.010399	45.59	42.64	43.50	-0.86	V	1.09	-52	Pass

\*- Margin = Measured emission - specification limit.  
 \*\*- EUT front panel refer to 0 degrees position of turntable.



<b>Test specification:</b> Section 15.247(d), Radiated spurious emissions			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Table 7.2.5 Restricted bands according to FCC section 15.205

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.37625 - 8.38675	73 - 74.6	399.9 - 410	2690 - 2900	10.6 - 12.7
0.495 - 0.505	8.41425 - 8.41475	74.8 - 75.2	608 - 614	3260 - 3267	13.25 - 13.4
2.1735 - 2.1905	12.29 - 12.293	108 - 121.94	960 - 1240	3332 - 3339	14.47 - 14.5
4.125 - 4.128	12.51975 - 12.52025	123 - 138	1300 - 1427	3345.8 - 3358	15.35 - 16.2
4.17725 - 4.17775	12.57675 - 12.57725	149.9 - 150.05	1435 - 1626.5	3600 - 4400	17.7 - 21.4
4.20725 - 4.20775	13.36 - 13.41	156.52475 - 156.52525	1645.5 - 1646.5	4500 - 5150	22.01 - 23.12
6.215 - 6.218	16.42 - 16.423	156.7 - 156.9	1660 - 1710	5350 - 5460	23.6 - 24
6.26775 - 6.26825	16.69475 - 16.69525	162.0125 - 167.17	1718.8 - 1722.2	7250 - 7750	31.2 - 31.8
6.31175 - 6.31225	16.80425 - 16.80475	167.72 - 173.2	2200 - 2300	8025 - 8500	36.43 - 36.5
8.291 - 8.294	25.5 - 25.67	240 - 285	2310 - 2390	9000 - 9200	Above 38.6
8.362 - 8.366	37.5 - 38.25	322 - 335.4	2483.5 - 2500	9300 - 9500	

Table 7.2.6 Restricted bands according to RSS-Gen

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.291 - 8.294	16.80425 - 16.80475	399.9 - 410	3260 - 3267	10.6 - 12.7
2.1735 - 2.1905	8.362 - 8.366	25.5 - 25.67	608 - 614	3332 - 3339	13.25 - 13.4
3.020 - 3.026	8.37625 - 8.38675	37.5 - 38.25	960 - 1427	3345.8 - 3358	14.47 - 14.5
4.125 - 4.128	8.41425 - 8.41475	73 - 74.6	1435 - 1626.5	3500 - 4400	15.35 - 16.2
4.17725 - 4.17775	12.29 - 12.293	74.8 - 75.2	1645.5 - 1646.5	4500 - 5150	17.7 - 21.4
4.20725 - 4.20775	12.51975 - 12.52025	108 - 138	1660 - 1710	5350 - 5460	22.01 - 23.12
5.677 - 5.683	12.57675 - 12.57725	156.52475 - 156.52525	1718.8 - 1722.2	7250 - 7750	23.6 - 24
6.215 - 6.218	13.36 - 13.41	156.7 - 156.9	2200 - 2300	8025 - 8500	31.2 - 31.8
6.26775 - 6.26825	16.42 - 16.423	240 - 285	2310 - 2390	9000 - 9200	36.43 - 36.5
6.31175 - 6.31225	16.69475 - 16.69525	322 - 335.4	2655 - 2900	9300 - 9500	Above 38.6

Reference numbers of test equipment used

HL 4360	HL 3903	HL 4933	HL 446	HL 4956	HL 5288	HL 5085	HL 5112
HL 5902	HL 4378	HL 5286					

Full description is given in Appendix A.

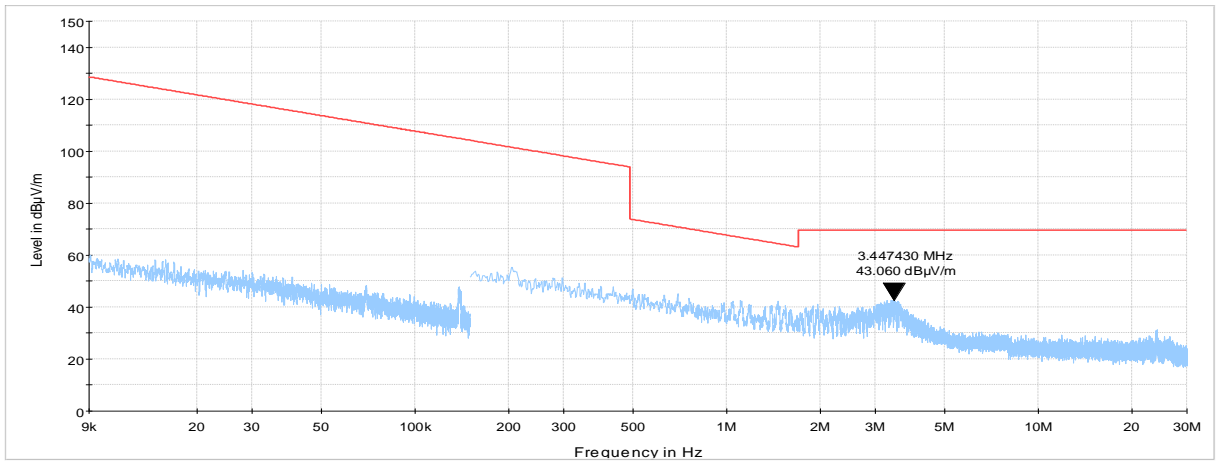




<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

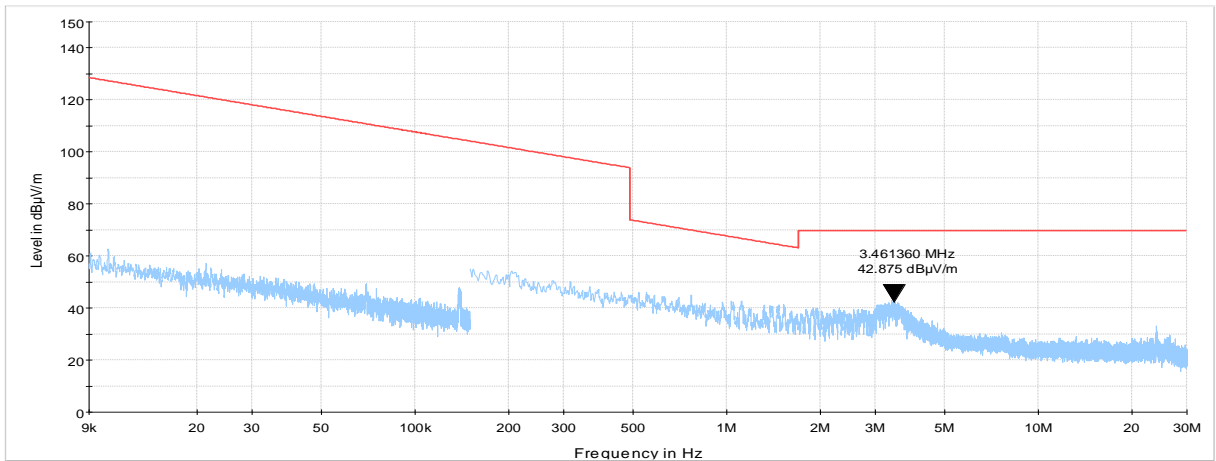
**Plot 7.2.1 Radiated emission measurements from 9 kHz to 30 MHz at the low carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical



**Plot 7.2.2 Radiated emission measurements from 9 kHz to 30 MHz at the mid carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical



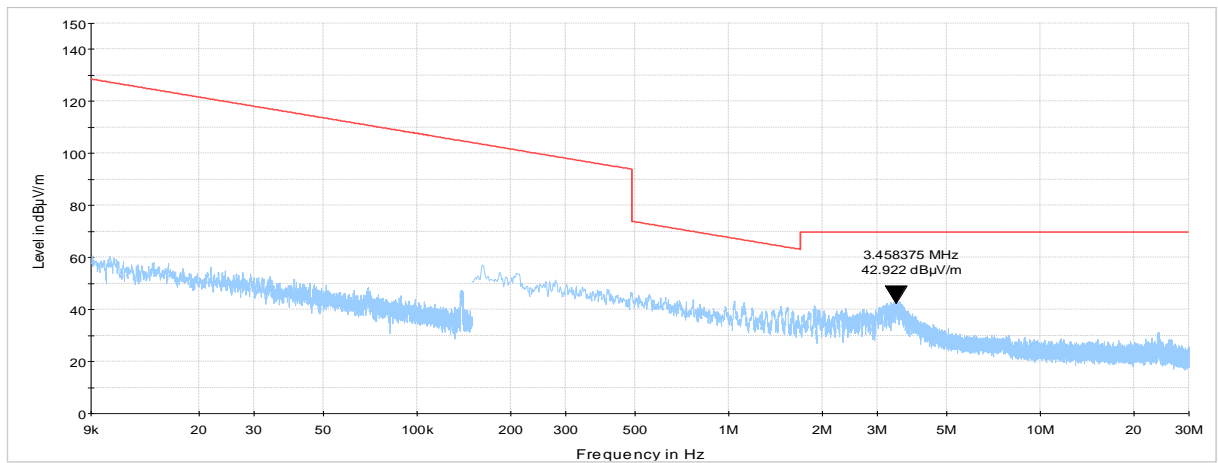


HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.2.3 Radiated emission measurements from 9 kHz to 30 MHz at the high carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical

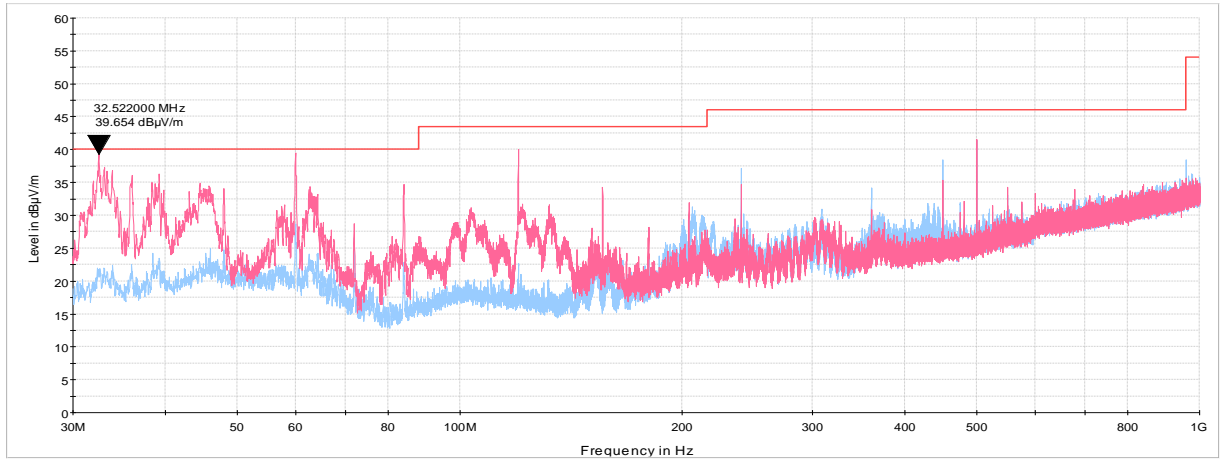




<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

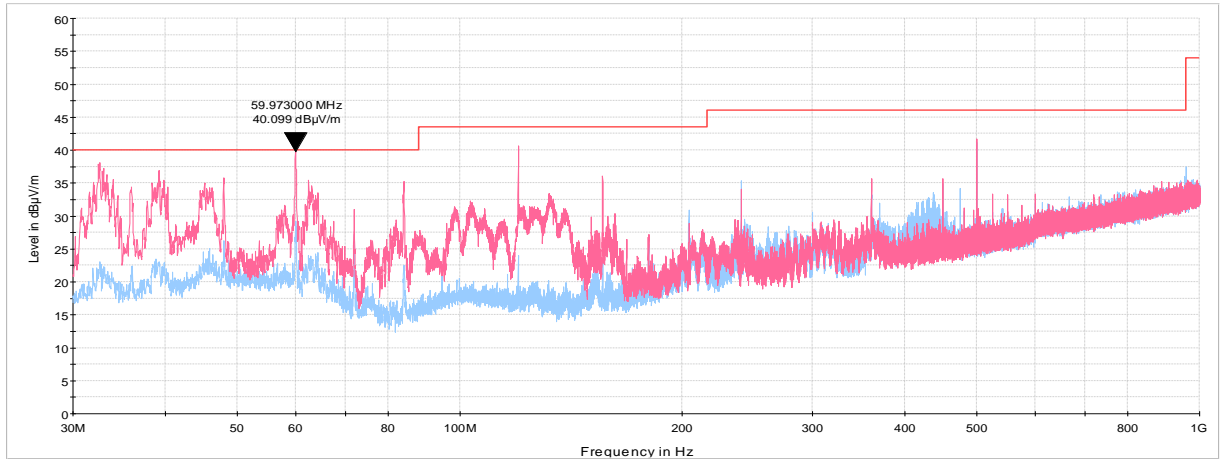
**Plot 7.2.4 Radiated emission measurements from 30 to 1000 MHz at the low carrier frequency**

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



**Plot 7.2.5 Radiated emission measurements from 30 to 1000 MHz at the mid carrier frequency**

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



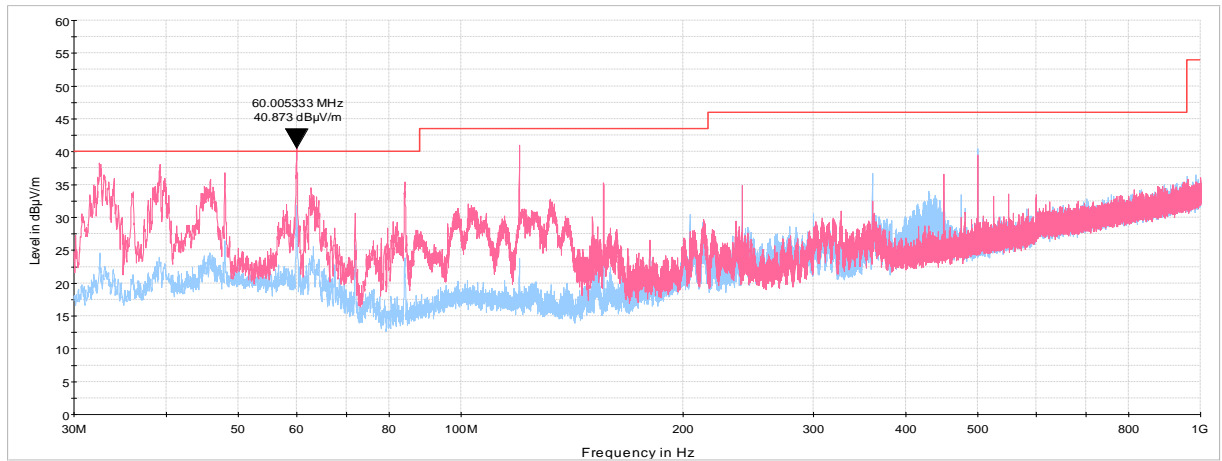


HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.2.6 Radiated emission measurements from 30 to 1000 MHz at the high carrier frequency**

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

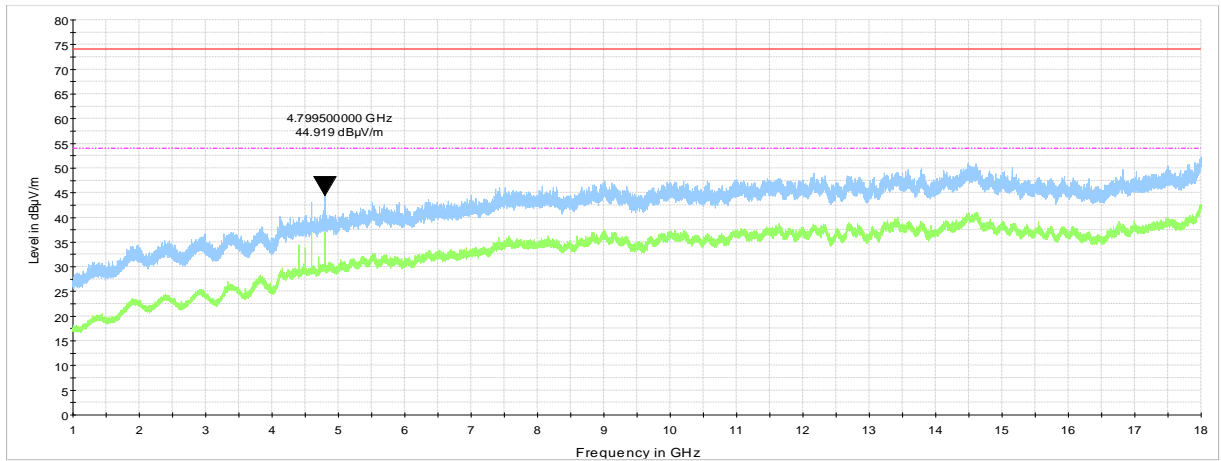




<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

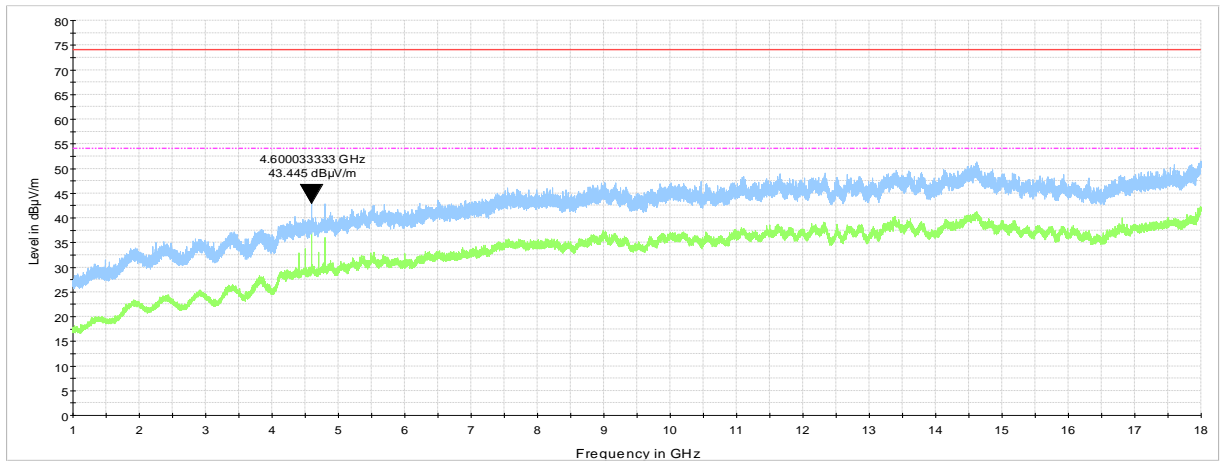
**Plot 7.2.7 Radiated emission measurements from 1000 to 18000 MHz at the low carrier frequency**

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



**Plot 7.2.8 Radiated emission measurements from 1000 to 18000 MHz at the mid carrier frequency**

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



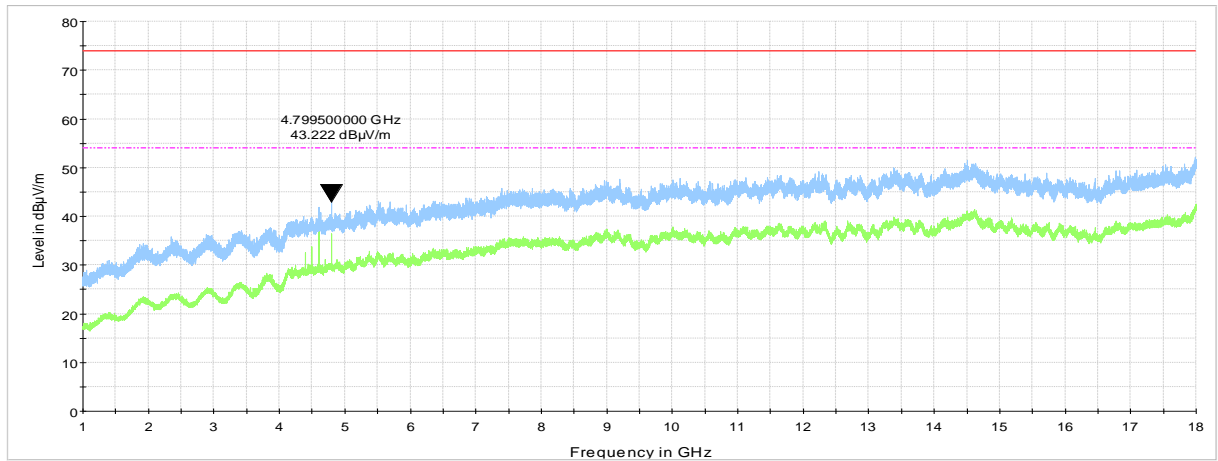


HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.2.9 Radiated emission measurements from 1000 to 18000 MHz at the high carrier frequency**

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

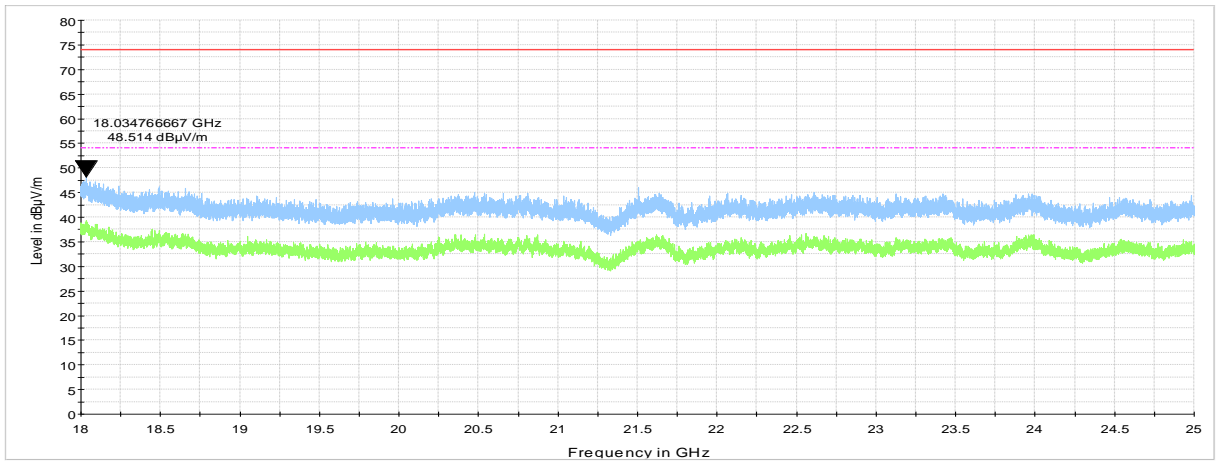




<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

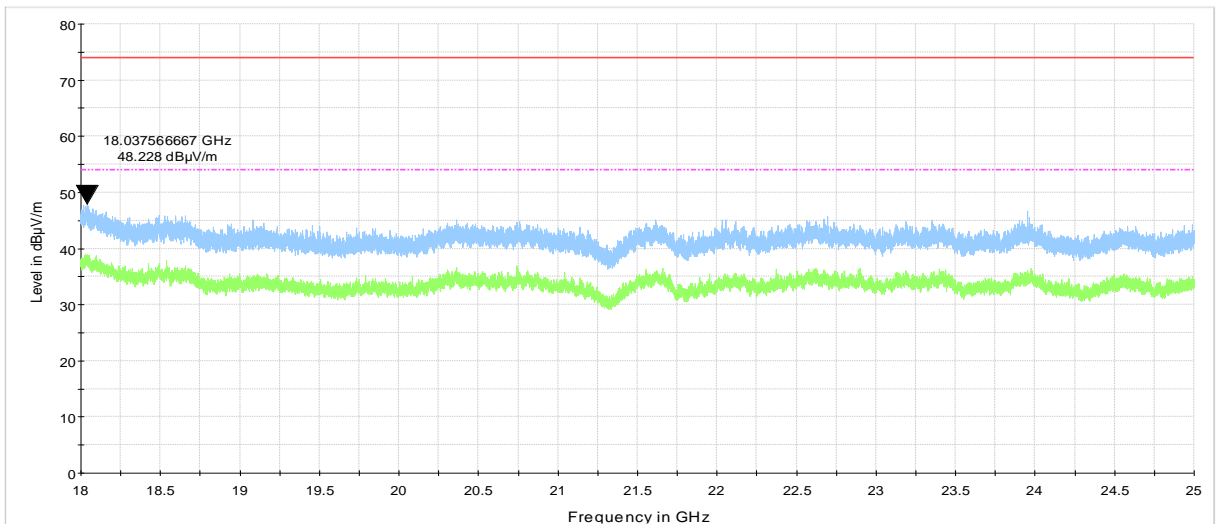
**Plot 7.2.10 Radiated emission measurements from 18 GHz to 25 GHz at the low carrier frequency**

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



**Plot 7.2.11 Radiated emission measurements from 18 GHz to 25 GHz at the mid carrier frequency**

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



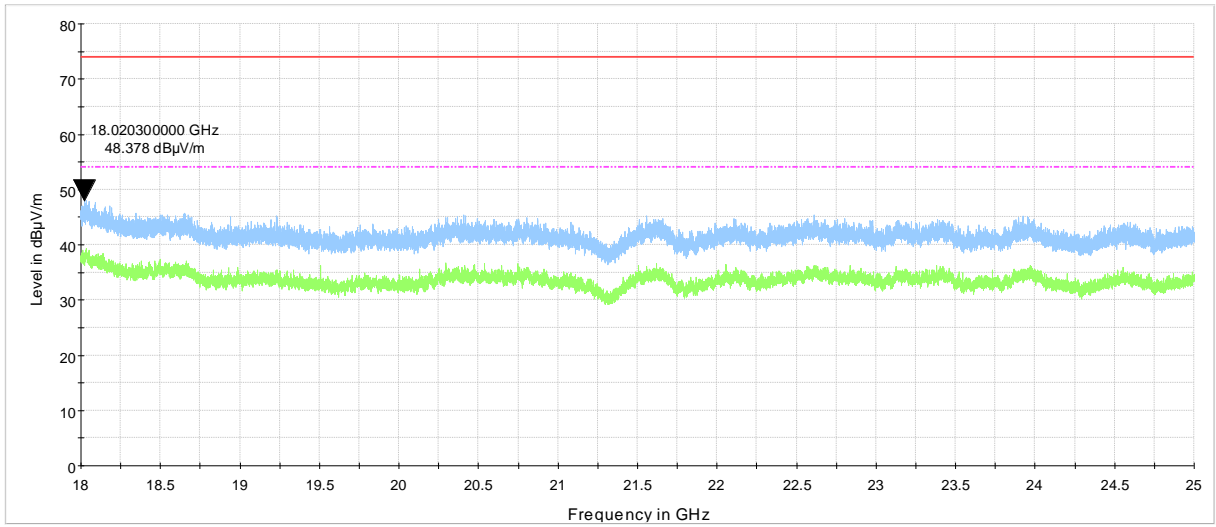


HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Radiated spurious emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 06-Apr-21 - 19-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 47 %	<b>Air Pressure:</b> 1017 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

**Plot 7.2.12 Radiated emission measurements from 18 GHz to 25 GHz at the high carrier frequency**

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







<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

### 7.3 Band edge radiated emissions at Wi-Fi 2.4 GHz

#### 7.3.1 General

This test was performed to measure emissions, radiated from the EUT at the assigned frequency band edges. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Band edge emission limits

Output power	Assigned frequency, MHz	Attenuation below carrier*, dBc	Field strength at 3 m within restricted bands, dB(μV/m)	
			Peak	Average
Peak	902.0 – 928.0	20.0	74.0	54.0
	2400.0 – 2483.5			
	5725.0 – 5850.0			
Averaged over a time interval	902.0 – 928.0	30.0	74.0	54.0
	<b>2400.0 – 2483.5</b>			
	5725.0 – 5850.0			

\* - Band edge emission limit is provided in terms of attenuation below the peak of modulated carrier measured with the same resolution bandwidth.

#### 7.3.2 Test procedure

- 7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized normally modulated at the maximum data rate and its proper operation was checked.
- 7.3.2.2 The EUT was adjusted to produce maximum available to end user RF output power at the lowest carrier frequency.
- 7.3.2.3 The spectrum analyzer span was set to capture the carrier frequency and associated modulation products. The resolution bandwidth was set wider than 1 % of the frequency span.
- 7.3.2.4 The spectrum analyzer was set in max hold mode and allowed trace to stabilize. The highest emission level within the authorized band was measured.
- 7.3.2.5 The maximum band edge emission and modulation product outside of the band were measured as provided in Table 7.3.2 and associated plots and referenced to the highest emission level measured within the authorized band.
- 7.3.2.6 The above procedure was repeated with the EUT adjusted to produce maximum RF output power at the highest carrier frequency.
- 7.3.2.7 The above procedure was repeated with the frequency hopping function enabled.

Figure 7.3.1 Band edge emission test setup





<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Table 7.3.2 Band edge emission outside restricted bands test results

ASSIGNED FREQUENCY RANGE: 2400.0 – 2483.5 MHz  
DETECTOR USED: Peak  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
RESOLUTION BANDWIDTH: 100 kHz  
VIDEO BANDWIDTH: ≥ RBW

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 1 Mbps

Frequency, MHz	Band edge emission, dB(μV/m)	Emission at carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	59.72	94.87	35.15	30.0	5.15	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 2 Mbps

Frequency, MHz	Band edge emission, dB(μV/m)	Emission at carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	59.30	94.55	35.25	30.0	5.25	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 5.5 Mbps

Frequency, MHz	Band edge emission, dBm	Emission at carrier, dBm	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	52.04	94.06	42.02	30.0	12.02	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 11 Mbps

Frequency, MHz	Band edge emission, dB(μV/m)	Emission at carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	54.43	93.39	38.96	30.0	8.96	Pass



<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: BPSK / 6 Mbps

Frequency, MHz	Band edge emission, dB(μV/m)	Emission at carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	46.26	88.71	42.45	30.0	12.45	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: 64-QAM / 54 Mbps

Frequency, MHz	Band edge emission, dB(μV/m)	Emission at carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	47.53	89.13	41.60	30.0	11.60	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: BPSK / 6.5 Mbps

Frequency, MHz	Band edge emission, dB(μV/m)	Emission at carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	46.31	87.20	40.89	30.0	10.89	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: 64-QAM / 65 Mbps

Frequency, MHz	Band edge emission, dB(μV/m)	Emission at carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	43.75	87.49	43.74	30.0	13.74	Pass

CHANNEL BANDWIDTH: 40 MHz  
MODULATION/BITRATE: BPSK / 13.5 Mbps

Frequency, MHz	Band edge emission, dB(μV/m)	Emission at carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	40.95	82.01	41.06	30.0	11.06	Pass

CHANNEL BANDWIDTH: 40 MHz  
MODULATION/BITRATE: 64-QAM / 135 Mbps

Frequency, MHz	Band edge emission, dB(μV/m)	Emission at carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	41.65	81.47	39.82	30.0	9.82	Pass

\*- Margin = Attenuation below carrier – specification limit.



<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Table 7.3.3 Band edge emission inside restricted bands test results

ASSIGNED FREQUENCY RANGE: 2400.0 – 2483.5 MHz  
DETECTOR USED: Peak  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
VIDEO BANDWIDTH: ≥ RBW

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 1 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
2385.83	59.88	74.0	-14.12	50.02	54.0	-3.98	Pass
2483.50	58.64	74.0	-15.36	48.71	54.0	-5.29	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 2 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
2387.10	59.38	74.0	-14.62	50.15	54.0	-3.85	Pass
2483.50	58.78	74.0	-15.22	48.58	54.0	-5.42	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 5.5 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
2385.61	58.90	74.0	-15.10	47.76	54.0	-6.24	Pass
2483.50	59.19	74.0	-14.81	46.52	54.0	-7.48	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: CCK / 11 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
2387.14	59.27	74.0	-14.73	47.73	54.0	-6.27	Pass
2483.50	59.02	74.0	-14.98	46.99	54.0	-7.01	Pass



<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: BPSK / 6 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2389.93	60.78	74.0	-13.22	48.65	54.0	-5.35	Pass
2483.76	58.59	74.0	-15.41	46.58	54.0	-7.42	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: 64-QAM / 54 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2389.89	63.42	74.0	-10.58	47.96	54.0	-6.04	Pass
2483.63	62.00	74.0	-12.00	47.22	54.0	-6.78	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: BPSK / 6.5 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2389.31	60.86	74.0	-13.14	47.11	54.0	-6.89	Pass
2484.79	58.31	74.0	-15.69	46.24	54.0	-7.76	Pass

CHANNEL BANDWIDTH: 20 MHz  
MODULATION/BITRATE: 64-QAM / 65 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2390.00	61.90	74.0	-12.10	46.50	54.0	-7.50	Pass
2483.69	61.43	74.0	-12.57	45.98	54.0	-8.02	Pass

CHANNEL BANDWIDTH: 40 MHz  
MODULATION/BITRATE: BPSK / 13.5 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2387.14	59.90	74.0	-14.10	47.65	54.0	-6.35	Pass
2486.99	58.55	74.0	-15.45	46.33	54.0	-7.67	Pass

CHANNEL BANDWIDTH: 40 MHz  
MODULATION/BITRATE: 64-QAM / 135 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2389.46	60.93	74.0	-13.07	47.11	54.0	-6.89	Pass
2485.57	58.33	74.0	-15.67	45.89	54.0	-8.11	Pass

Reference numbers of test equipment used

HL 3818	HL 3903	HL 5902	HL 4933	HL 3442			
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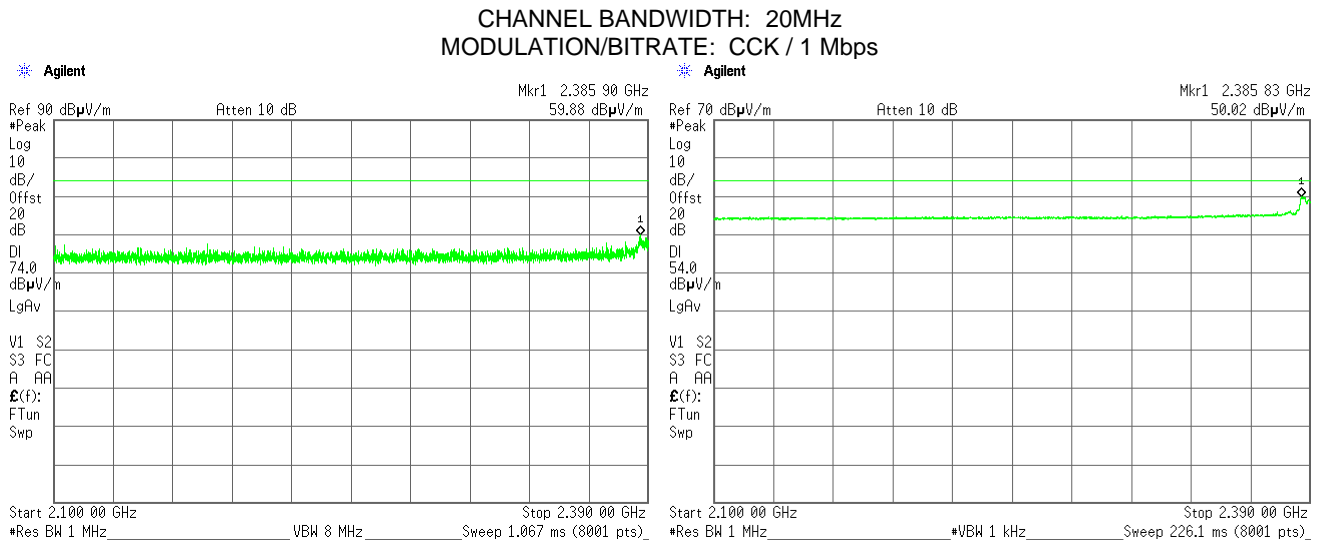
Full description is given in Appendix A.



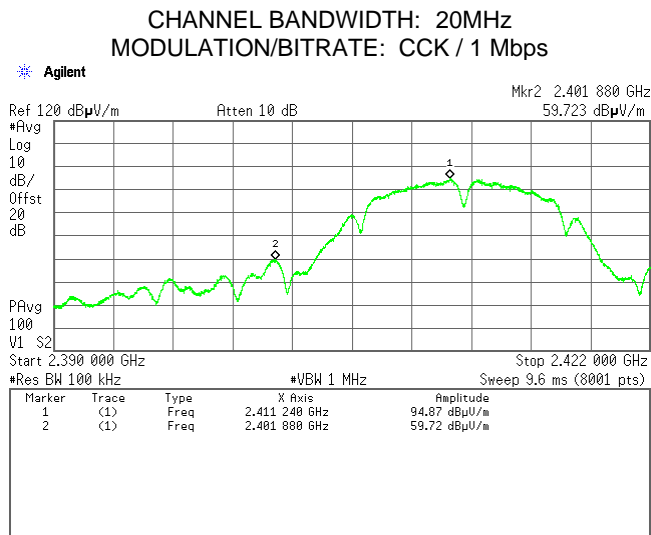
HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.1 The highest emission level within restricted band at low carrier frequency



Plot 7.3.2 The highest emission level outside restricted band at low carrier frequency

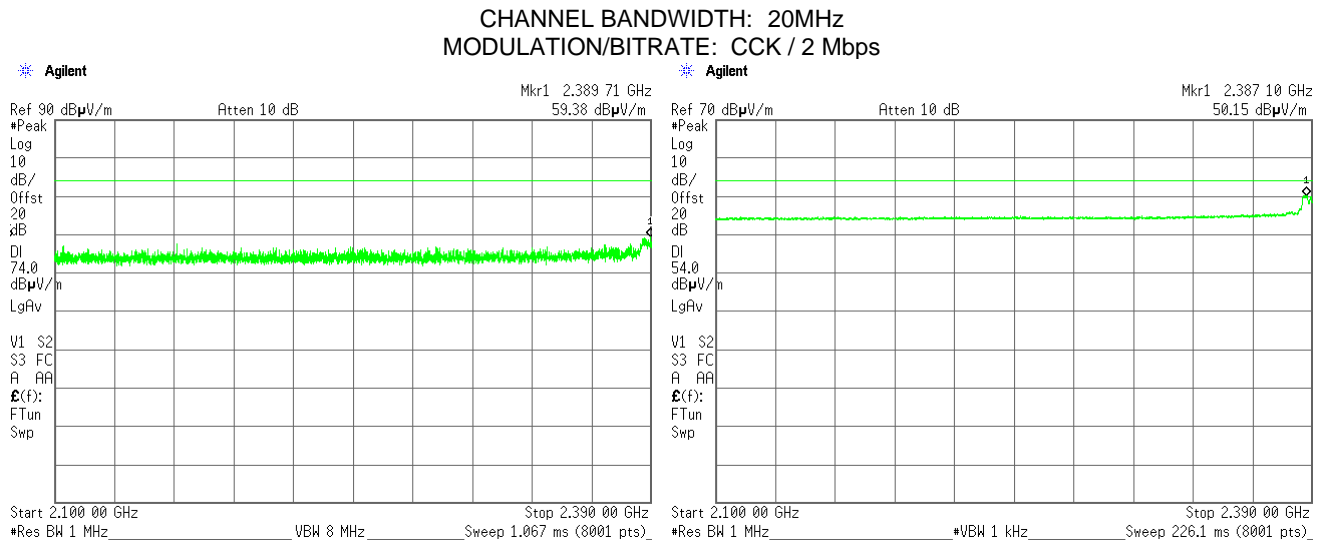




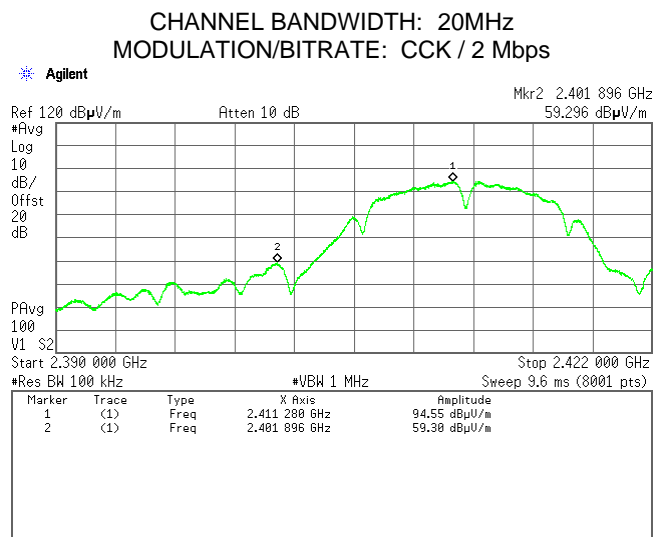
HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.3 The highest emission level within restricted band at low carrier frequency



Plot 7.3.4 The highest emission level outside restricted band at low carrier frequency

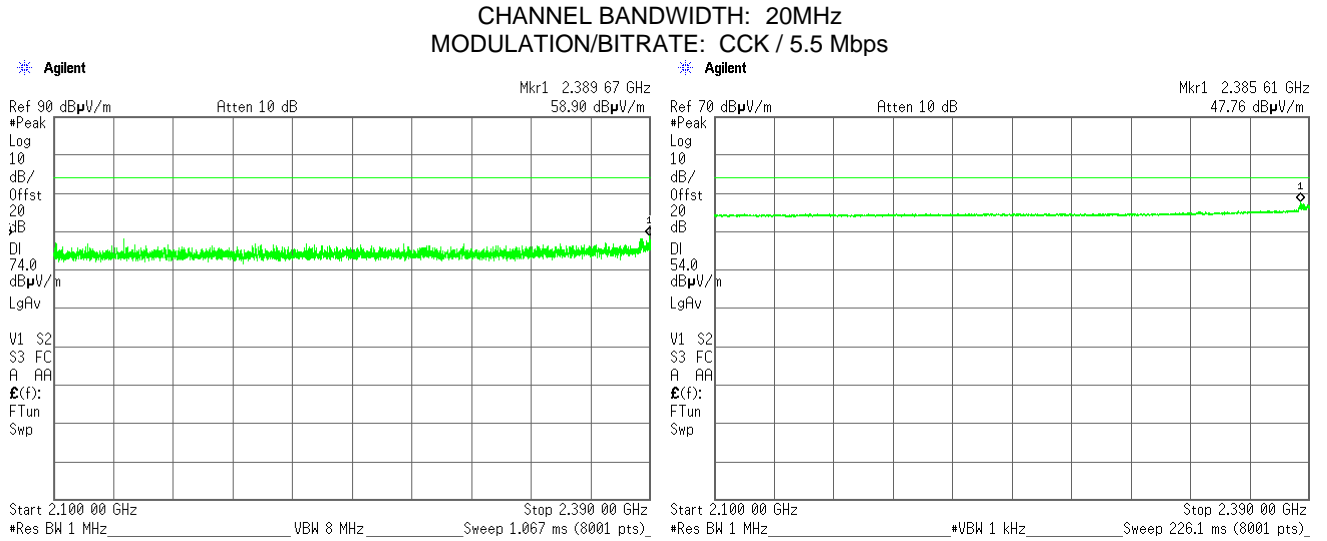




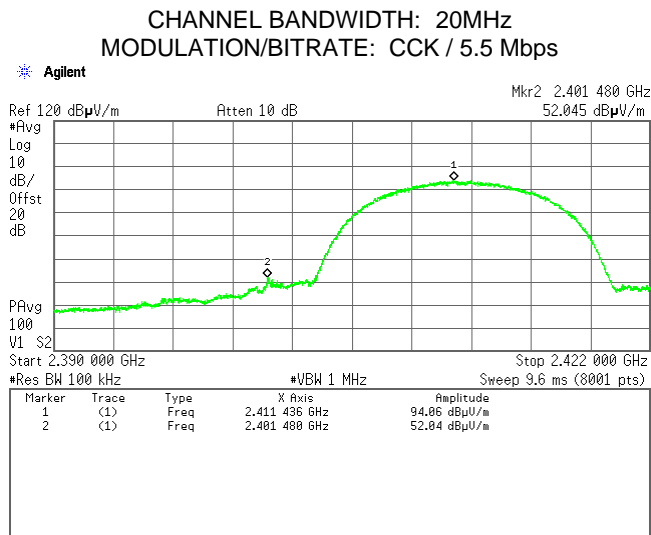
HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.5 The highest emission level within restricted band at low carrier frequency



Plot 7.3.6 The highest emission level outside restricted band at low carrier frequency



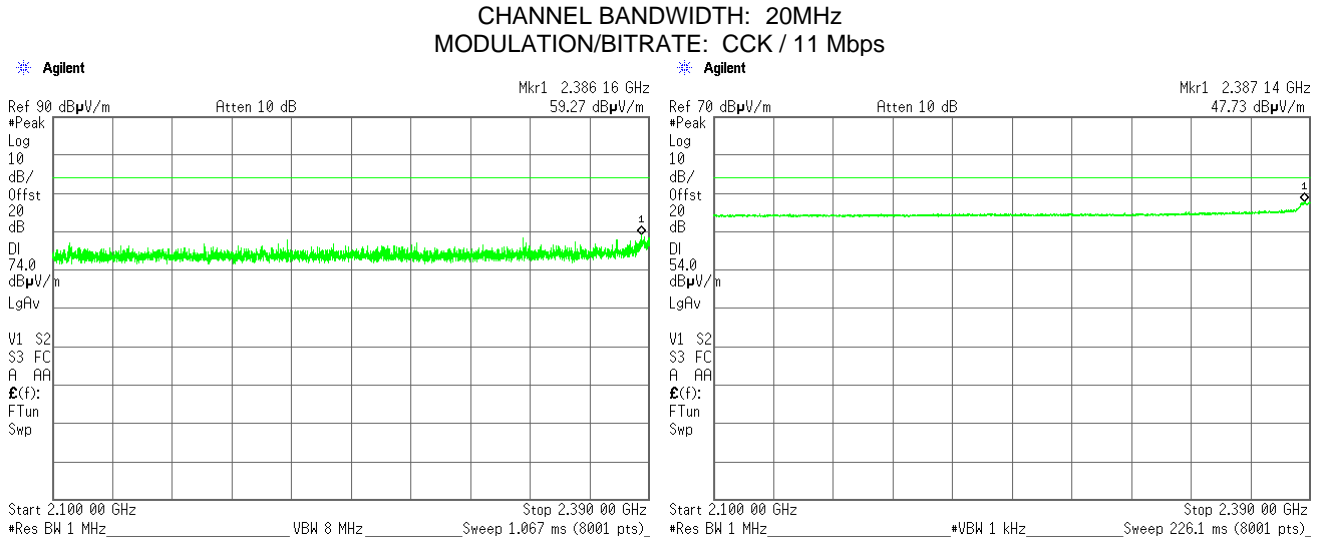




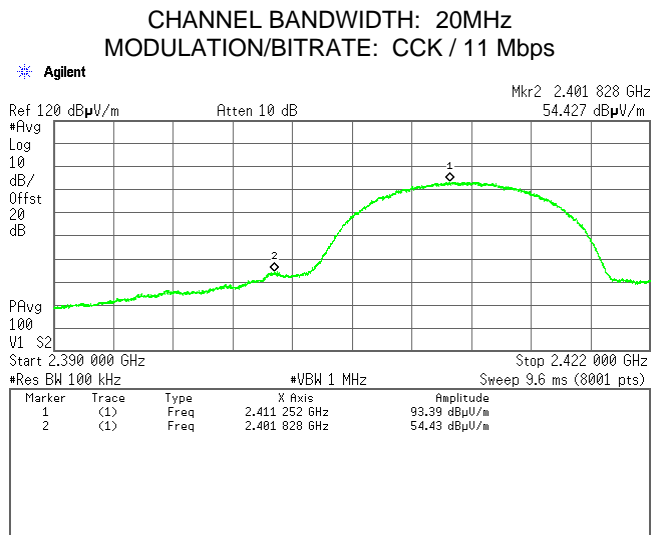
HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.7 The highest emission level within restricted band at low carrier frequency



Plot 7.3.8 The highest emission level outside restricted band at low carrier frequency

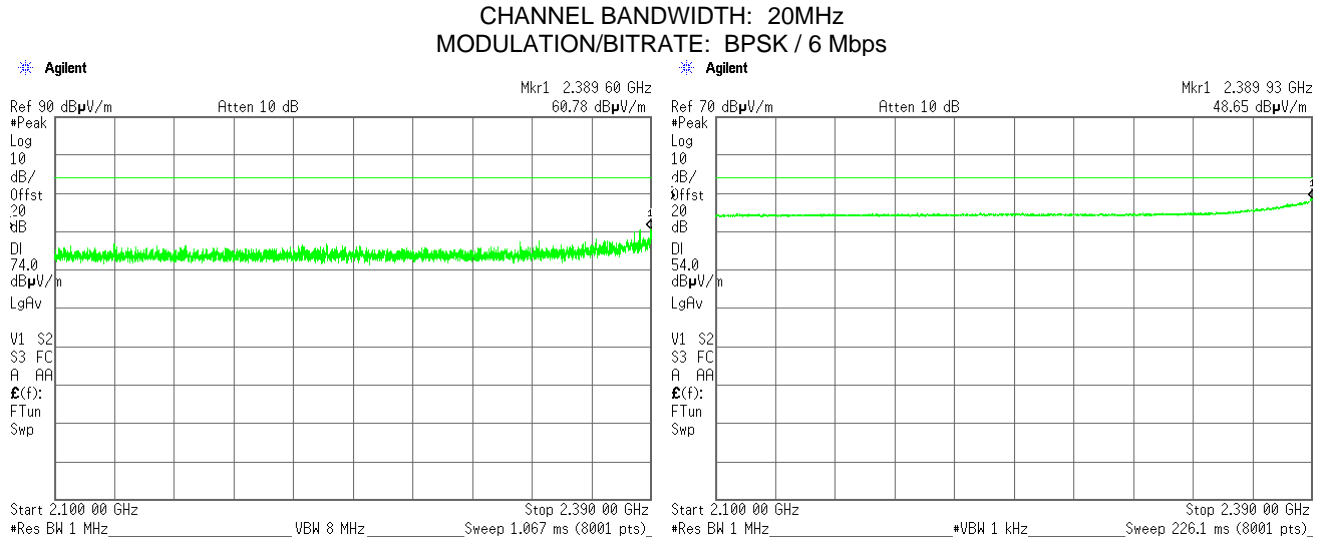




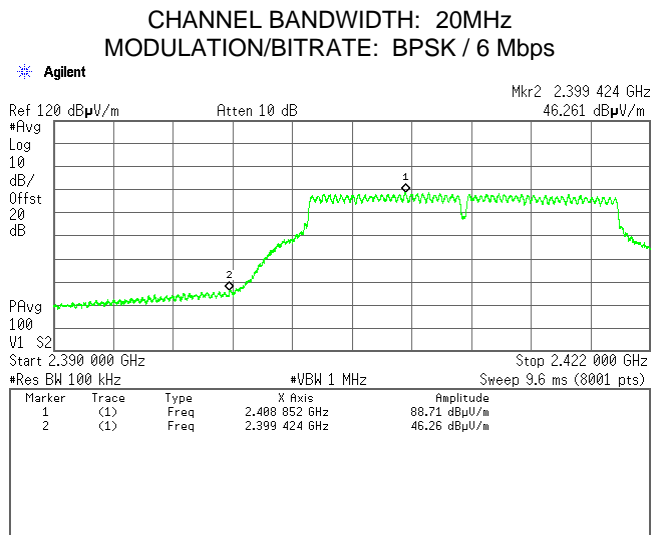
HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.9 The highest emission level within restricted band at low carrier frequency



Plot 7.3.10 The highest emission level outside restricted band at low carrier frequency

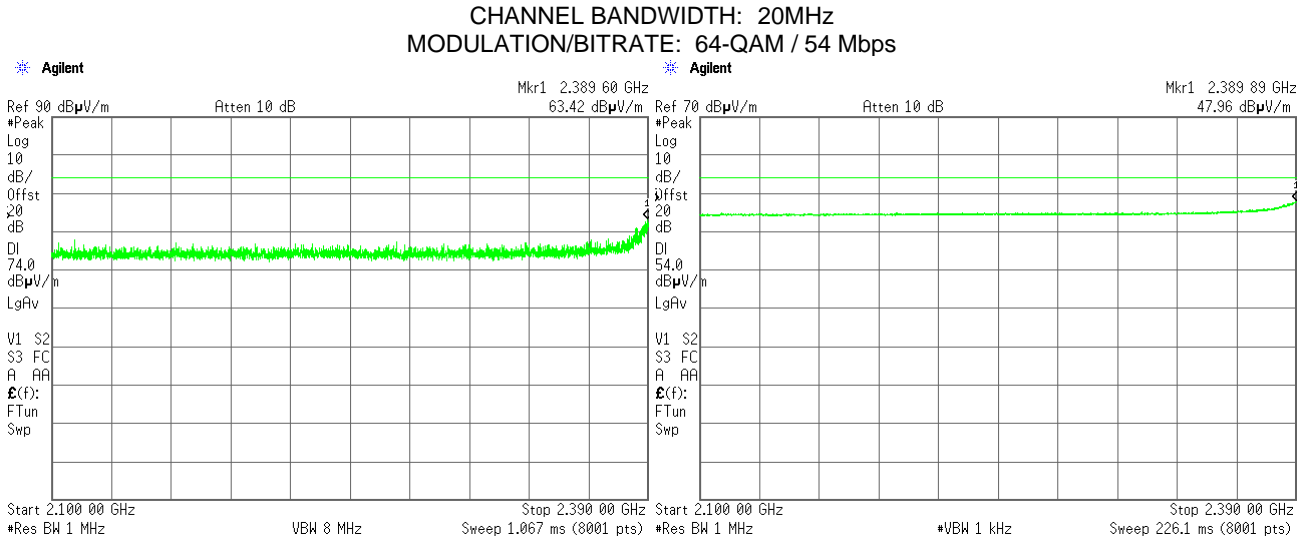




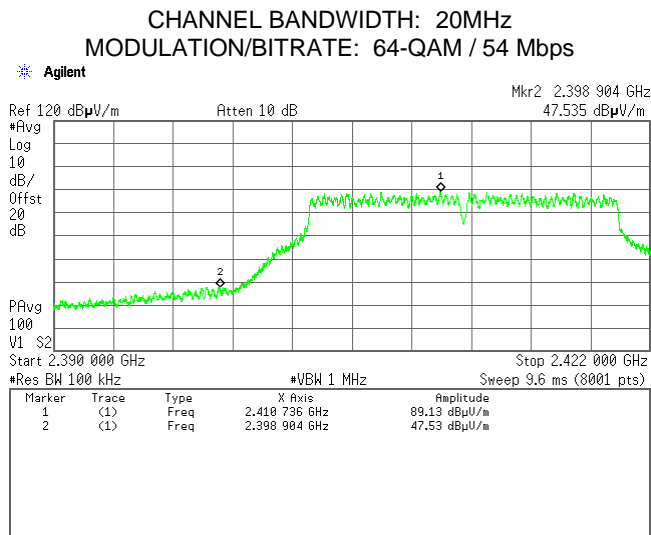
HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.11 The highest emission level within restricted band at low carrier frequency



Plot 7.3.12 The highest emission level outside restricted band at low carrier frequency

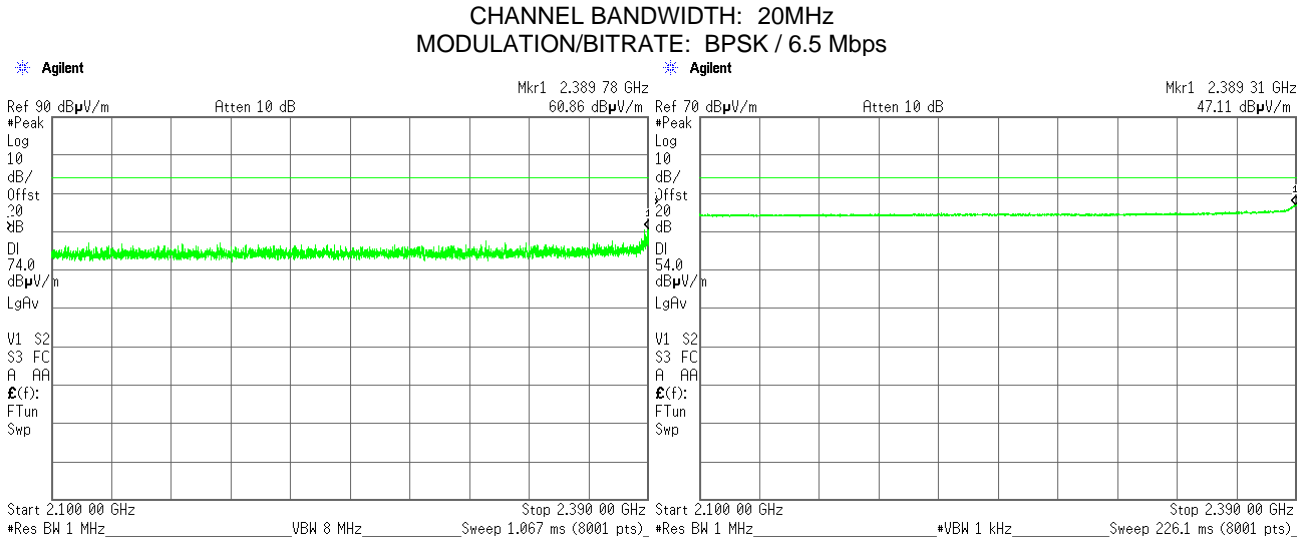




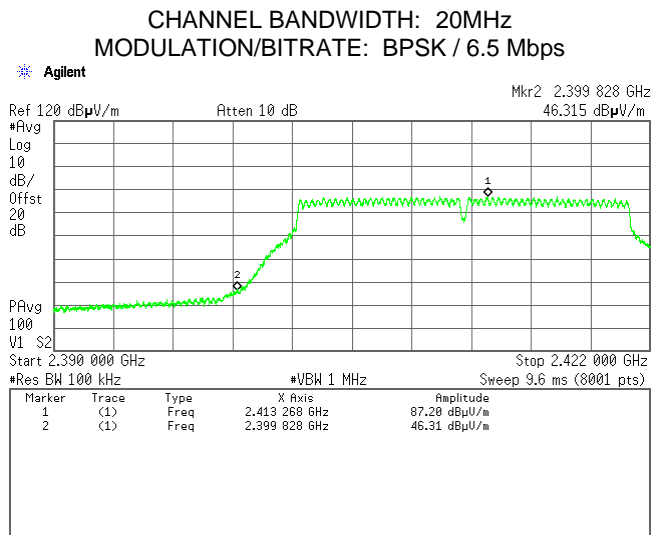
HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.13 The highest emission level within restricted band at low carrier frequency



Plot 7.3.14 The highest emission level outside restricted band at low carrier frequency

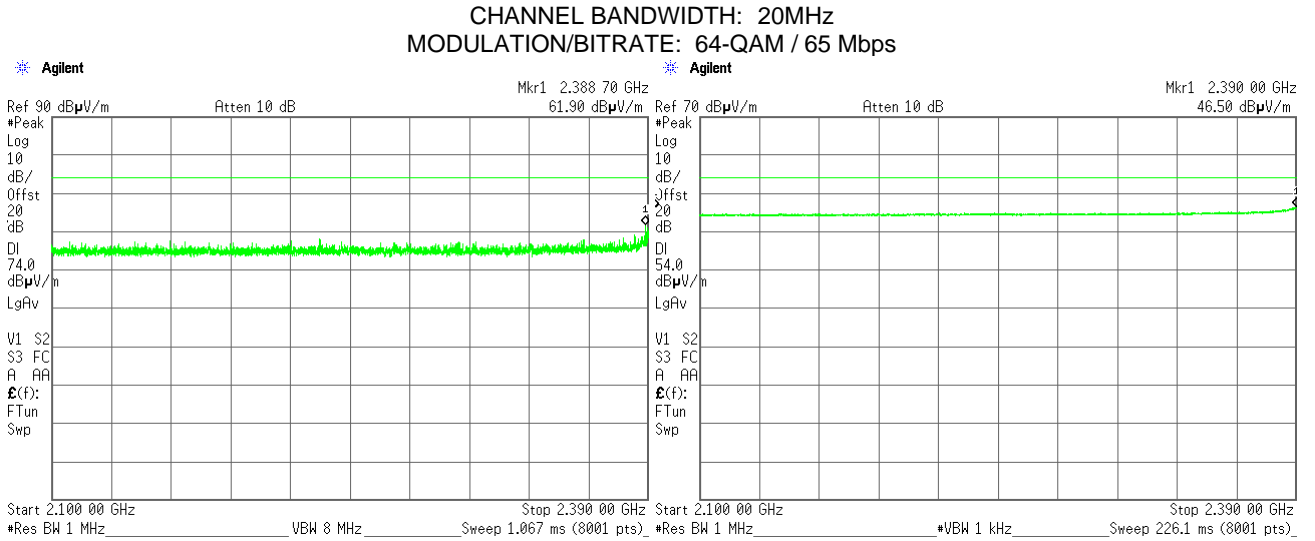




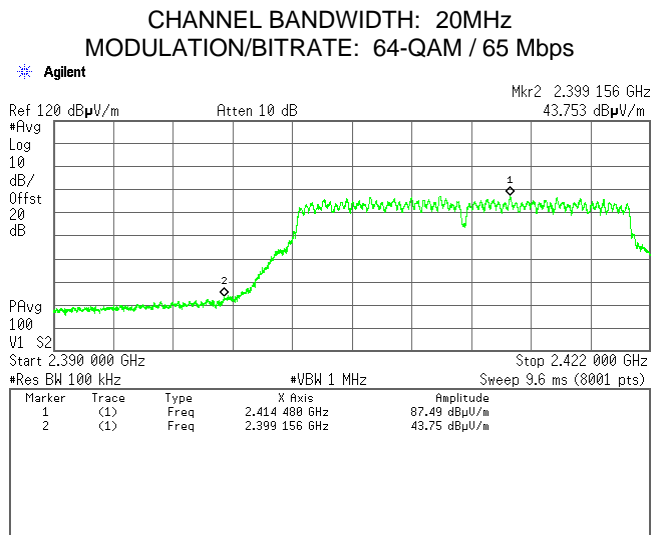
HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.15 The highest emission level within restricted band at low carrier frequency



Plot 7.3.16 The highest emission level outside restricted band at low carrier frequency

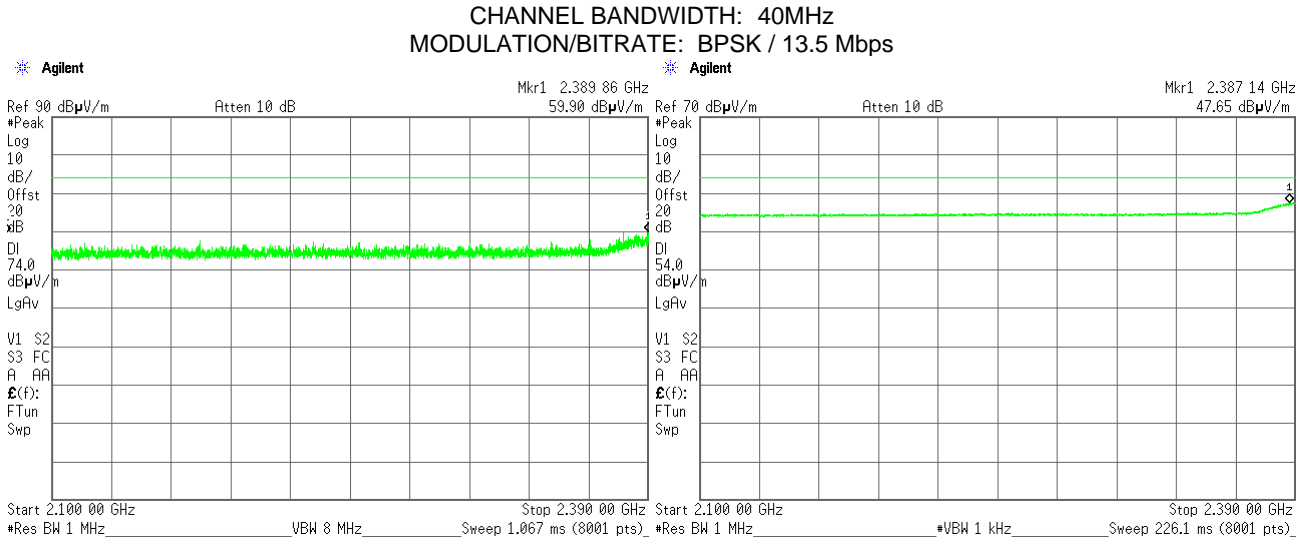




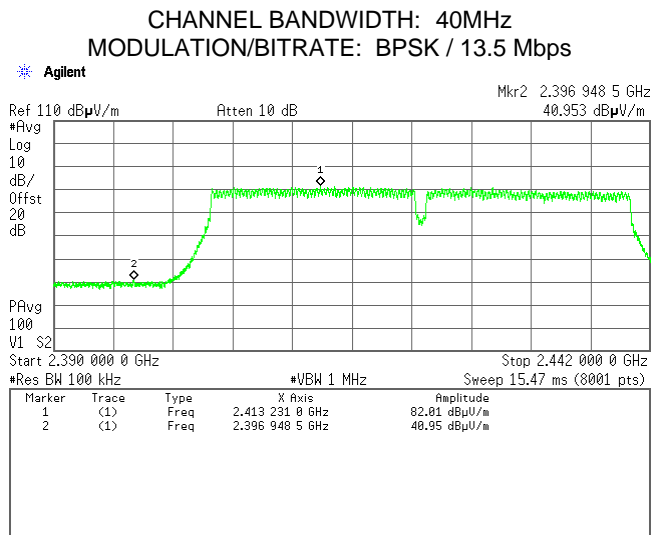
HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.17 The highest emission level within restricted band at low carrier frequency



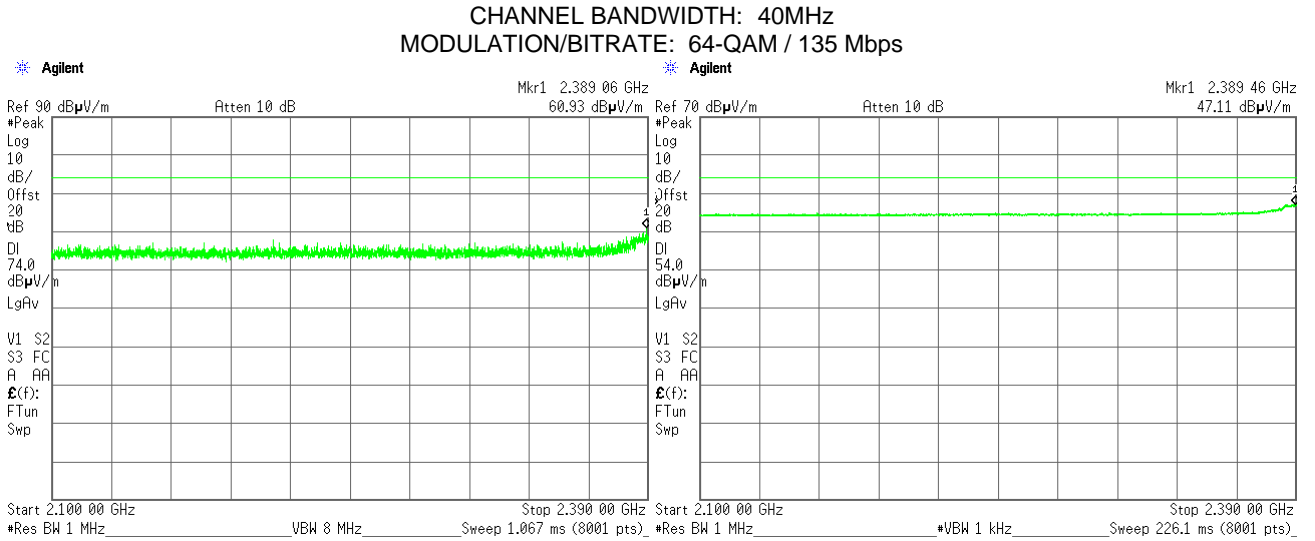
Plot 7.3.18 The highest emission level outside restricted band at low carrier frequency



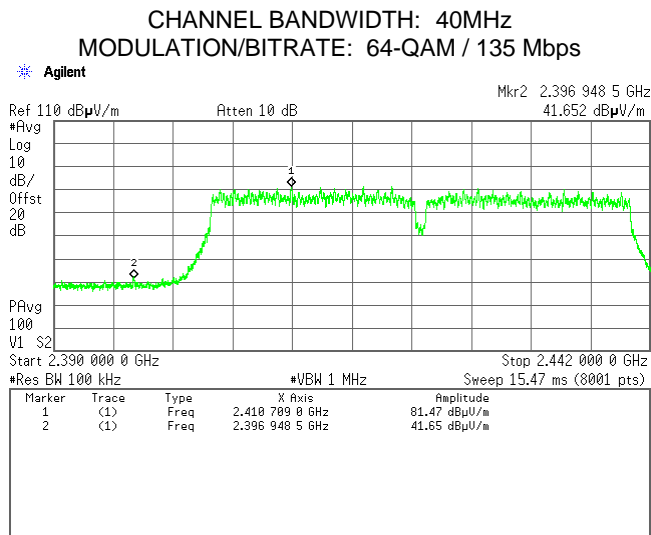


<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.19 The highest emission level within restricted band at low carrier frequency



Plot 7.3.20 The highest emission level outside restricted band at low carrier frequency

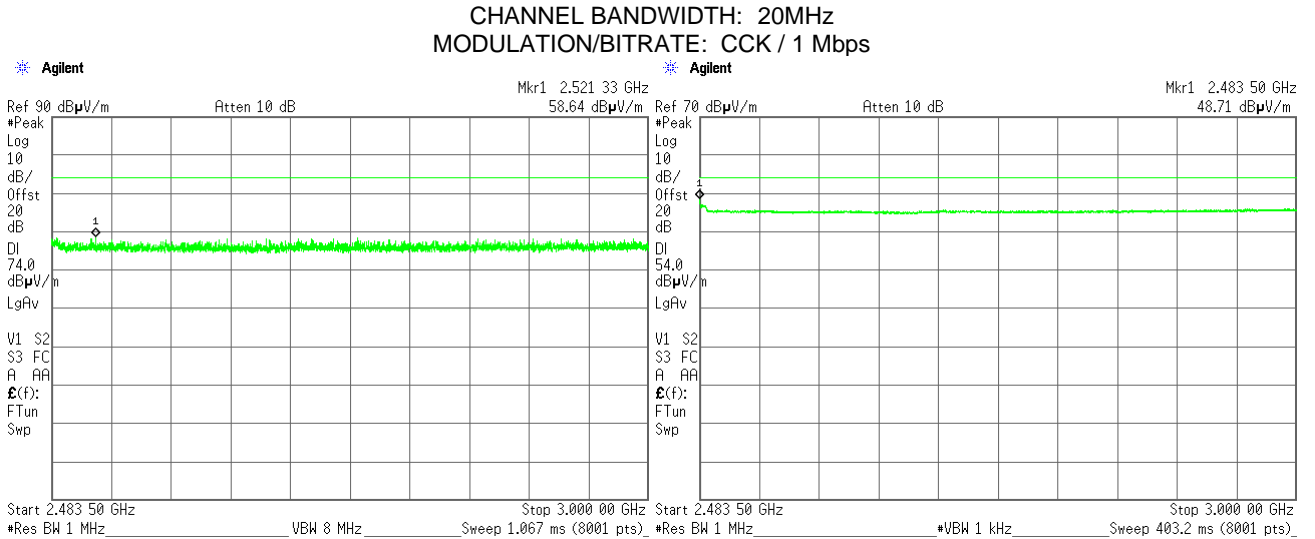




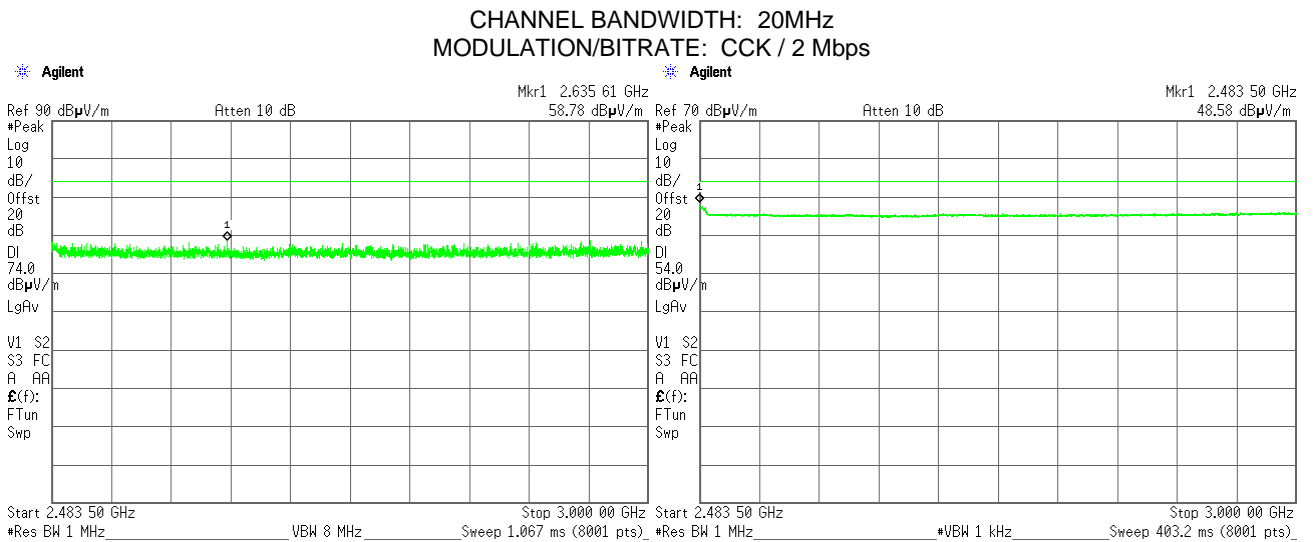
HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.21 The highest emission level within restricted band at high carrier frequency



Plot 7.3.22 The highest emission level within restricted band at high carrier frequency



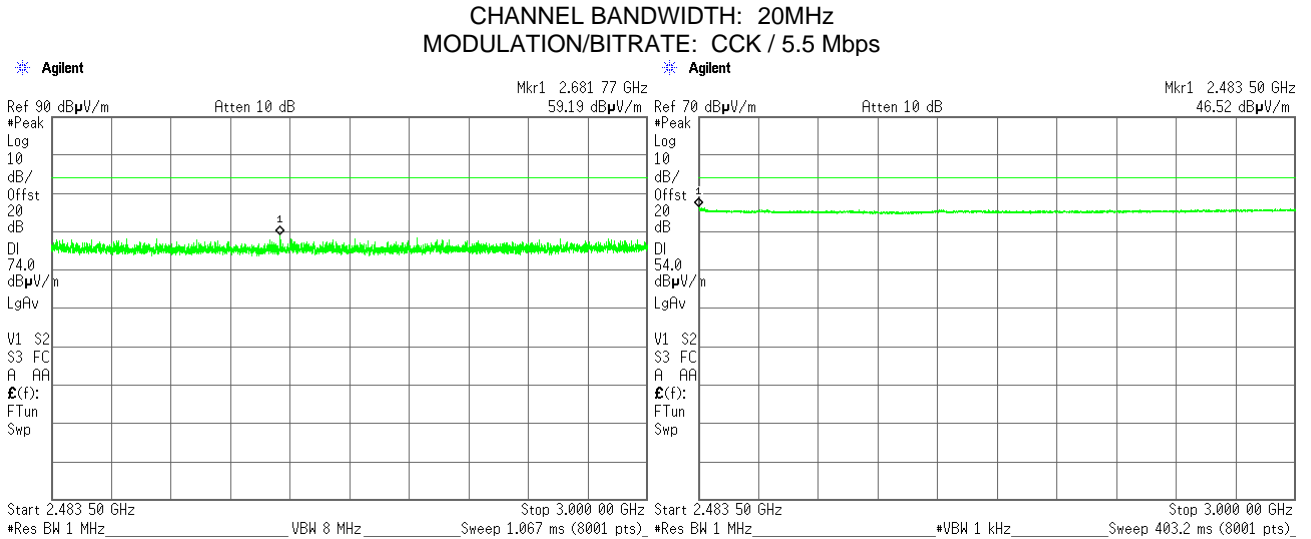




HERMON LABORATORIES

<b>Test specification: Section 15.247(d), Band edge emissions</b>			
<b>Test procedure:</b> ANSI C63.10 section 11.12.1			
<b>Test mode:</b> Compliance		<b>Verdict: PASS</b>	
<b>Date(s):</b> 15-Mar-21 - 18-May-21			
<b>Temperature:</b> 23 °C	<b>Relative Humidity:</b> 49 %	<b>Air Pressure:</b> 1007 hPa	<b>Power:</b> 230 VAC, 50 Hz
<b>Remarks:</b>			

Plot 7.3.23 The highest emission level within restricted band at high carrier frequency



Plot 7.3.24 The highest emission level within restricted band at high carrier frequency

