

TEST REPORT

ACCORDING TO: FCC 47CFR part 15 subpart C §15.247 (DTS),
RSS-247 Issue 3:2023, RSS-Gen Issue 5

FOR:

Essence Future Living 2010 LTD

Indoor personal home device

Model: ES901BUL2

FCC ID: 2BEYK-ES901BUL2

IC: 33363-ES901BUL2

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

Client name: Essence Future Living 2010 LTD
Address: 12 Abba Eban Avenue, Ackerstein Towers Bldg. D, P.O.Box 2073, Herzliya 4612001, Israel
Telephone: +972(73)2447-742
E-mail: lgalze@essence-grp.com
Contact name: Mr. Igal Zertser

2 Equipment under test attributes

Product name: Indoor personal home device
Product type: Transmitter
Model(s): ES901BUL2
Serial number: 3124095E0000336C
Hardware version: 3.C
Software release: 0.5
Receipt date 27-Aug-24

3 Manufacturer information

Manufacturer name: Essence Future Living 2010 LTD
Address: 12 Abba Eban Avenue, Ackerstein Towers Bldg. D, P.O.Box 2073, Herzliya 4612001, Israel
Telephone: +972 732 447 735
E-Mail: israelgo@essence-grp.com
Contact name: Mr. Israel Gottesman

4 Test details

Project ID: 55235
Location: Hermon Laboratories Ltd. 66 HaTachana str., P.O. Box 23, Binyamina 3055001, Israel
Test started: 03-Nov-24
Test completed: 12-Nov-24
Test specification(s): FCC 47CFR part 15 subpart C §15.247 (DTS)
RSS-247 Issue 3:2023, RSS-Gen Issue 5

5 Tests summary

Test	Status
Transmitter characteristics	
FCC Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth	Pass
FCC Section 15.247(b)3/ RSS-247 section 5.4(4), Peak output power	Pass
FCC section 15.247(i) / RSS-102 section 2.5.1, RF exposure	Pass, the exhibit to the application of certification is provided
FCC Section 15.247(d) / RSS-247 section 5.5, Radiated spurious emissions	Pass
FCC Section 15.247(d)/ RSS-247 section 5.5, Emissions at band edges	Pass
FCC Section 15.247(e) / RSS-247 section 5.2(2), Peak power density	Pass
FCC section 15.203 / RSS-Gen section 8.3, Antenna requirement	Pass
FCC section 15.207(a) / RSS-Gen section 8.8, Conducted emission	Pass

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:	Mrs. E. Pitt , test engineer, EMC & Radio Mr. S. Sugatov, test engineer, EMC & Radio	03-Nov-24 – 12-Nov-24	 
Reviewed by:	Mrs. S. Peysahov Sheynin, certification engineer, EMC & Radio	28-Nov-24	
Approved by:	Mr. M. Nikishin, group leader, EMC & Radio	01-Jan-25	

6 EUT description

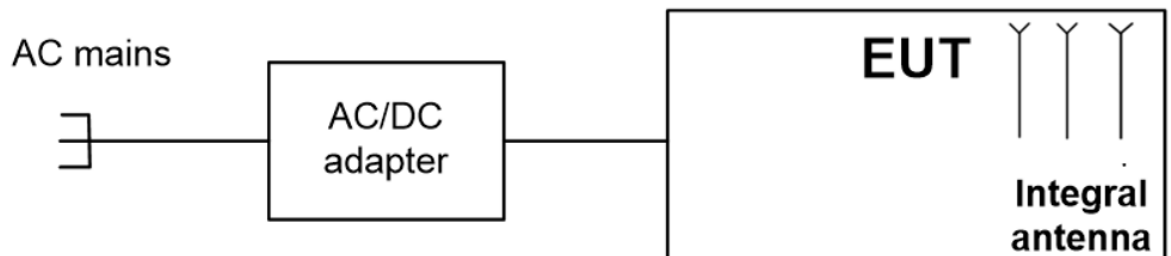
Note: The following data in this clause is provided by the customer and represents his sole responsibility

6.1 General information

The EUT is ES901BUL2 is Indoor personal home devices powered from 5 VDC external AC/DC adaptor through USD-C type connector and it is dedicated for indoor table-top home/domestic operation, assuming declared separation distance to humans is 20cm²

The device contains the following RF connections: BLE/WiFi used for maintenance and 5 GHz ASK, used as RF technology to support human day balance, and body resonance by light.

6.2 Test configuration



6.3 Transmitter characteristics

Type of equipment					
☒	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)				
Assigned frequency range		2400 -2483.5 MHz			
Operating frequencies		2412-2462 MHz			
Maximum rated output power		Peak output power @ CCK 12.56 dBm at 20 MHz channel bandwidth			
		Peak output power @ BPSK 12.85 dBm at 20 MHz channel bandwidth			
		Peak output power @ BPSK 12.86 dBm at 40 MHz channel bandwidth			
		Peak output power @ 64-QAM 12.81 dBm at 20 MHz channel bandwidth			
		Peak output power @ 64-QAM 12.91 dBm at 40 MHz channel bandwidth			
Is transmitter output power variable?		☒	No		
		☐	Yes		
			continuous variable		
			stepped variable with stepsize dB		
			minimum RF power dBm		
			maximum RF power dBm		
Antenna connection					
unique coupling		standard connector		☒	Integral
				☒	with temporary RF connector
				☒	without temporary RF connector
Antenna/s technical characteristics					
Type		Manufacturer / Design		Model number	
Integral		Essence Security		printed	
				Gain	
				Typ peak gain: 2.5 dBi	
WiFi interface					
Transmitter aggregate data rate/s		1 / 2 / 5.5 / 11 / 6 / 54 / 6.5 / 65 Mbps*			
Type of modulation		DBPSK / CCK / BPSK / 64-QAM*			
Modulating test signal (baseband)		NA			
Transmitter power source					
	Battery	Nominal rated voltage		Battery type	
	DC	Nominal rated voltage			
☒	AC mains	Nominal rated voltage		120 VAC	Frequency 60 Hz

***Type of WiFi standard:**

802.11b (1 Mbps) –DSSS DBPSK
802.11b (11 Mbps) – DSSS CCK

802.11g (6 Mbps) – OFDM BPSK
802.11g (54 Mbps) -OFDM 64 QAM

802.11n HT20, MCS0 (6.5 Mbps) – OFDM BPSK
802.11n HT20, MCS7 (65 Mbps) – OFDM 64-QAM

802.11n HT40, MCS0 (6.5 Mbps) -OFDM BPSK
802.11n HT40, MCS7 (65 Mbps) – OFDM 64-QAM



Test specification:		Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth	
Test procedure:		ANSI C63.10 section 11.8.1	
Test mode:		Verdict: PASS	
Date(s):			
11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

7 Transmitter tests according to 47CFR part 15 subpart C and RSS-247 requirements

7.1 Minimum 6 dB bandwidth

7.1.1 General

This test was performed to measure 6 dB bandwidth of the EUT carrier frequency. Specification test limits are given in Table 7.1.1.

Table 7.1.1 6 dB bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, dBc	Minimum bandwidth, kHz
2400.0 – 2483.5	6.0	500.0

* - Modulation envelope reference points provided in terms of attenuation below the peak of modulated carrier.

Table 7.1.2 The 99% bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points	Limit, kHz
2400.0 – 2483.5	99%	NA

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.

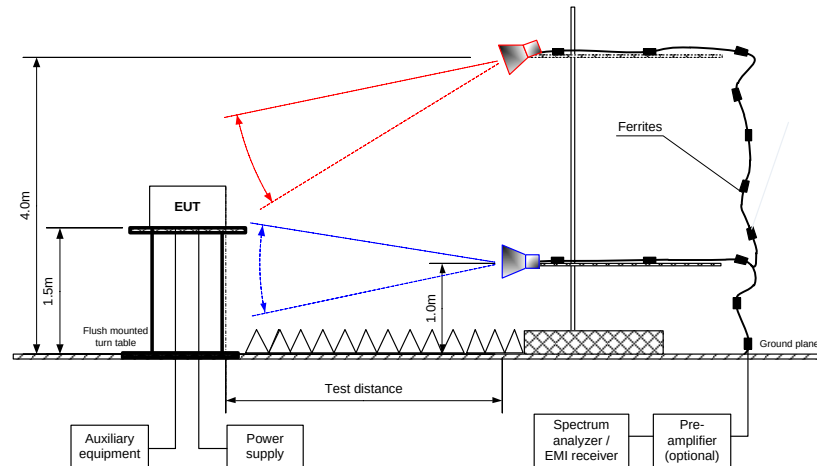
7.1.2.2 The EUT was set to transmit modulated carrier.

7.1.2.3 The transmitter minimum 6 dB bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 7.1.3 and associated plot.



Test specification:		Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth	
Test procedure:		ANSI C63.10 section 11.8.1	
Test mode:		Verdict: PASS	
Date(s):			
11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Figure 7.1.1 6 dB bandwidth test setup





Test specification: Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth			
Test procedure: ANSI C63.10 section 11.8.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Table 7.1.3 The 6 dB bandwidth and 99% bandwidth test results

ASSIGNED FREQUENCY BAND: 2400.0 – 2483.5 MHz
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH @ 6 dB: 100 kHz
 RESOLUTION BANDWIDTH @ 99 %: 300 kHz
 VIDEO BANDWIDTH: 1000 kHz
 MODULATION: DBPSK
 CHANNEL BANDWIDTH: 20 MHz
 BITRATE: 1 Mbps

Carrier frequency, MHz	6 dB bandwidth, kHz	99% bandwidth, kHz	Minimum bandwidth, kHz	Margin, kHz	Verdict
2412.0	9890	13100	500	9390	Pass
2437.0	9860	12990	500	9360	Pass
2462.0	9890	13200	500	9390	Pass

CHANNEL BANDWIDTH: 20 MHz
 BITRATE: 11 Mbps

Carrier frequency, MHz	6 dB bandwidth, kHz	99% bandwidth, kHz	Minimum bandwidth, kHz	Margin, kHz	Verdict
2412.0	9770	13.02	500	9270	Pass
2437.0	9830	12.92	500	9330	Pass
2462.0	9980	13.14	500	9480	Pass

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

Carrier frequency, MHz	6 dB bandwidth, kHz	99% bandwidth, kHz	Minimum bandwidth, kHz	Margin, kHz	Verdict
2412.0	16480	16430	500	15980	Pass
2437.0	16480	16420	500	15980	Pass
2462.0	16480	16450	500	15980	Pass

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

Carrier frequency, MHz	6 dB bandwidth, kHz	99% bandwidth, kHz	Minimum bandwidth, kHz	Margin, kHz	Verdict
2412.0	16480	16470	500	15980	Pass
2437.0	16480	16420	500	15980	Pass
2462.0	16480	16470	500	15980	Pass

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

Carrier frequency, MHz	6 dB bandwidth, kHz	99% bandwidth, kHz	Minimum bandwidth, kHz	Margin, kHz	Verdict
2412.0	17620	17480	500	17120	Pass
2437.0	17290	17400	500	16790	Pass
2462.0	17440	17460	500	16940	Pass



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Report ID: ESSRAD_FCC.55235_WiFi.docx
Date of Issue: 5-Jan-25

Test specification:		Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth	
Test procedure:		ANSI C63.10 section 11.8.1	
Test mode:		Verdict: PASS	
Date(s):			
11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			



Test specification: Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth			
Test procedure: ANSI C63.10 section 11.8.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Table 7.1.4 6 dB bandwidth test results (continuation)

ASSIGNED FREQUENCY BAND: 2400.0 – 2483.5 MHz
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH @ 6 dB: 100 kHz
 RESOLUTION BANDWIDTH @ 99 %: 300 kHz
 VIDEO BANDWIDTH: 1000 kHz
 MODULATION: 64-QAM
 CHANNEL BANDWIDTH: 20 MHz
 BITRATE: 65 Mbps

Carrier frequency, MHz	6 dB bandwidth, kHz	99% bandwidth, kHz	Minimum bandwidth, kHz	Margin, kHz	Verdict
2412.0	17440	17470	500	16940	Pass
2437.0	16960	17370	500	16460	Pass
2462.0	17440	17440	500	16940	Pass

MODULATION: BPSK
 CHANNEL BANDWIDTH: 40 MHz
 BITRATE: 6.5 Mbps

Carrier frequency, MHz	6 dB bandwidth, kHz	99% bandwidth, kHz	Minimum bandwidth, kHz	Margin, kHz	Verdict
2422.0	35900	35930	500	35400	Pass
2437	35370	36030	500	34870	Pass
2452	36380	36200	500	35880	Pass

MODULATION: 64-QAM
 CHANNEL BANDWIDTH: 40 MHz
 BITRATE: 65Mbps

Carrier frequency, MHz	6 dB bandwidth, kHz	99% bandwidth, kHz	Minimum bandwidth, kHz	Margin, kHz	Verdict
2422.0	35660	35980	500	35160	Pass
2437	33930	35920	500	33430	Pass
2462.0	36320	36490	500	35820	Pass

Reference numbers of test equipment used

HL 0393	HL 5902	HL 4114	HL 7585					
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Full description is given in Appendix A.



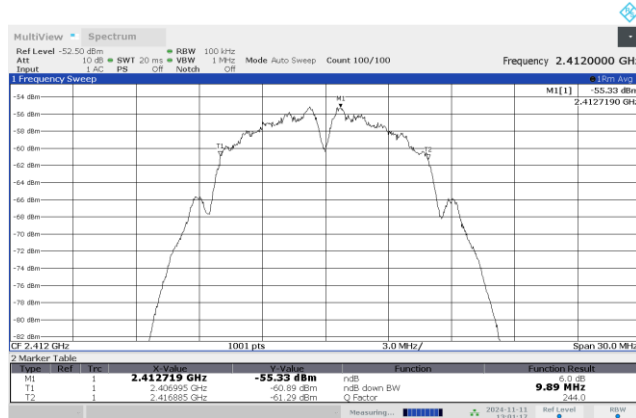
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Test specification: Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth			
Test procedure: ANSI C63.10 section 11.8.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

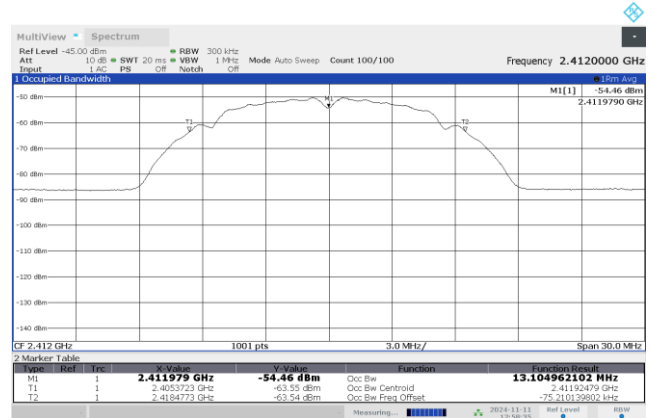
Plot 7.1.1 6 dB and 99% bandwidth test result at low frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

20 MHz
DBPSK / 1 Mbps



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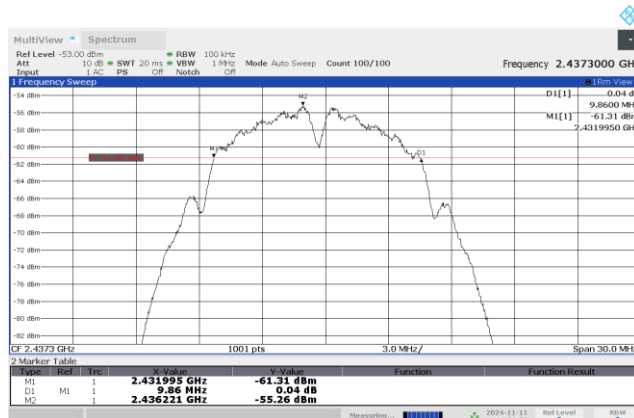


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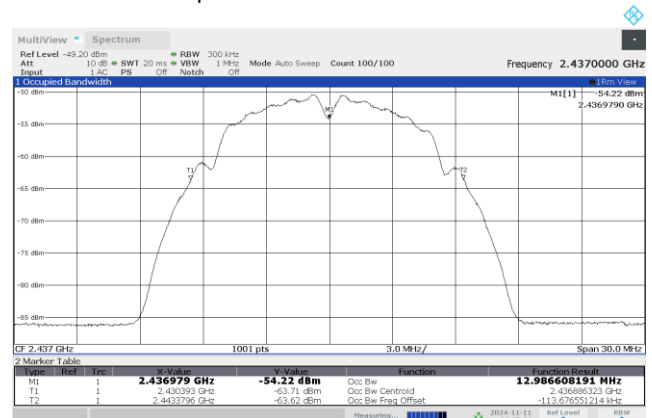
Plot 7.1.2 6 dB and 99% bandwidth test result at mid frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

20 MHz
DBPSK / 1 Mbps



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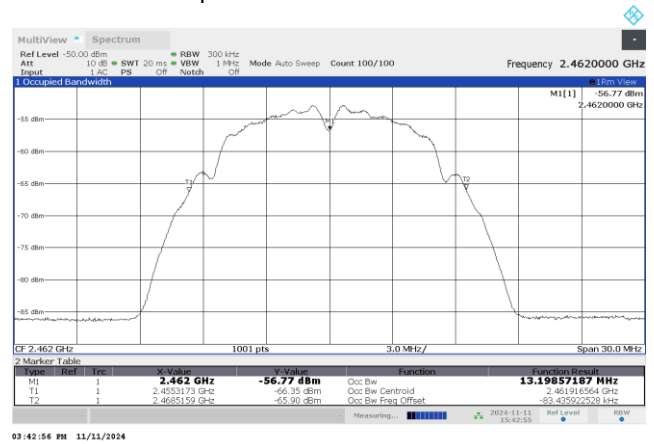
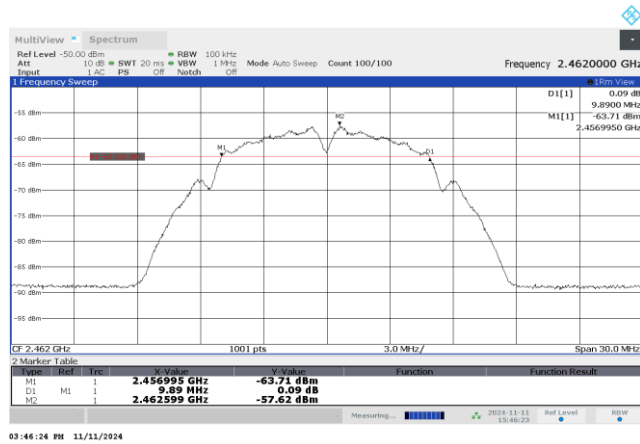
HERMON LABORATORIES

Test specification: Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth			
Test procedure: ANSI C63.10 section 11.8.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Plot 7.1.3 6 dB and 99% bandwidth test result at high frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

20 MHz
DBPSK / 1 Mbps





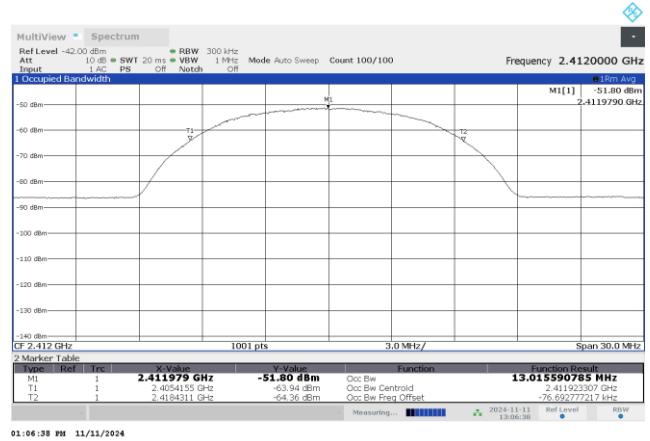
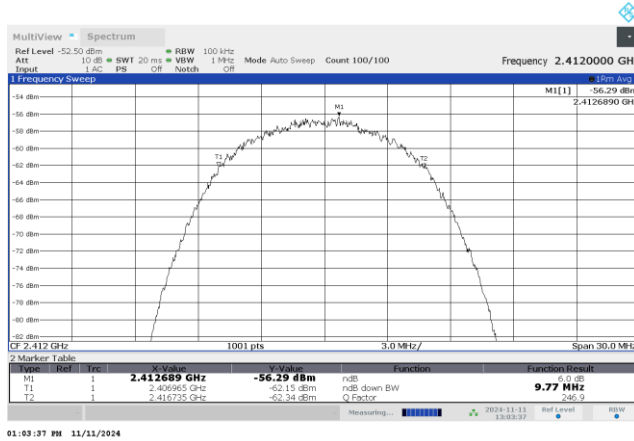
HERMON LABORATORIES

Test specification: Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth			
Test procedure: ANSI C63.10 section 11.8.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Plot 7.1.4 6 dB and 99% bandwidth test result at low frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

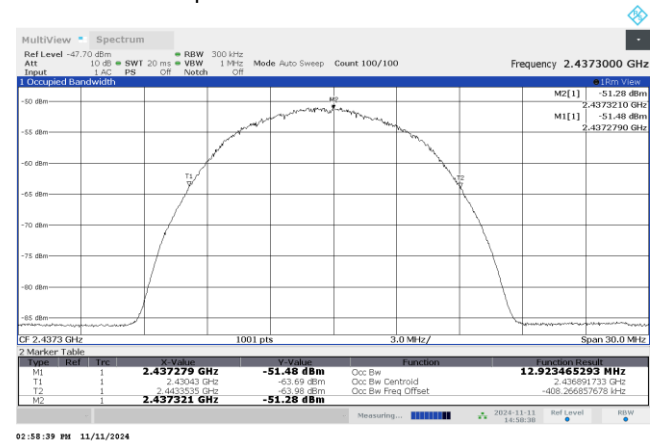
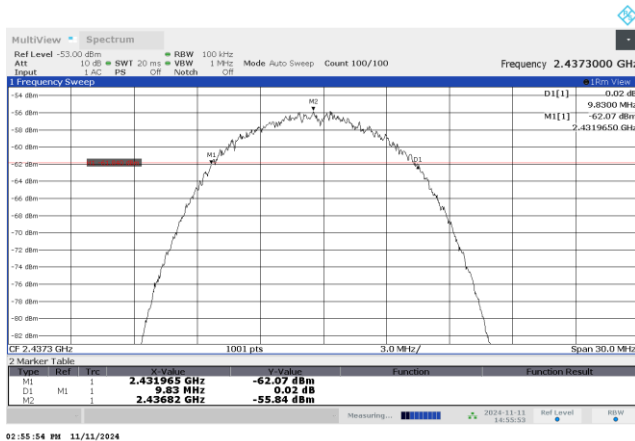
20 MHz
CCK / 11 Mbps



Plot 7.1.5 6 dB and 99% bandwidth test result at mid frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

20 MHz
CCK / 11 Mbps





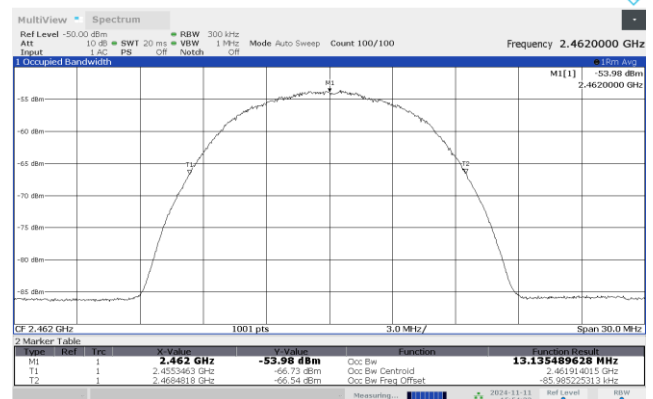
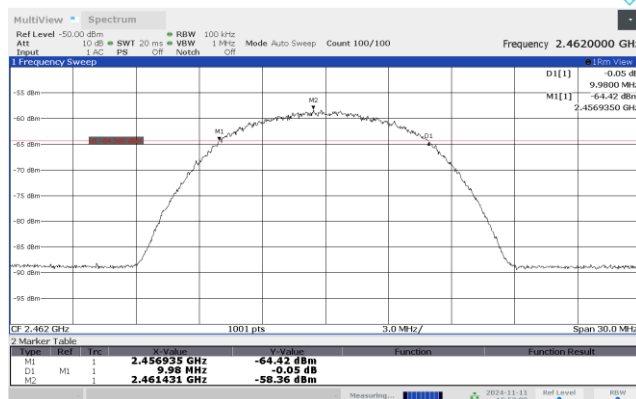
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Test specification:		Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth	
Test procedure:		ANSI C63.10 section 11.8.1	
Test mode:		Verdict: PASS	
Date(s):			
11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Plot 7.1.6 6 dB and 99% bandwidth test result at high frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

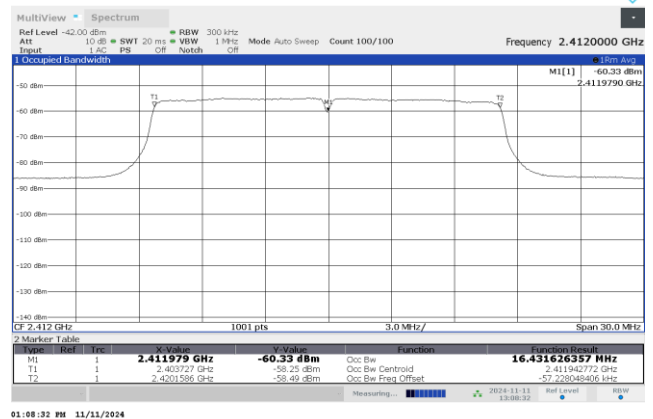
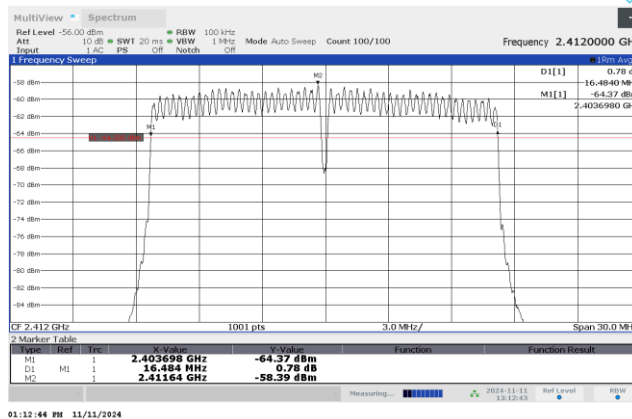
20 MHz
CCK / 11 Mbps



Plot 7.1.7 6 dB and 99% bandwidth test result at low frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

20 MHz
BPSK / 6 Mbps





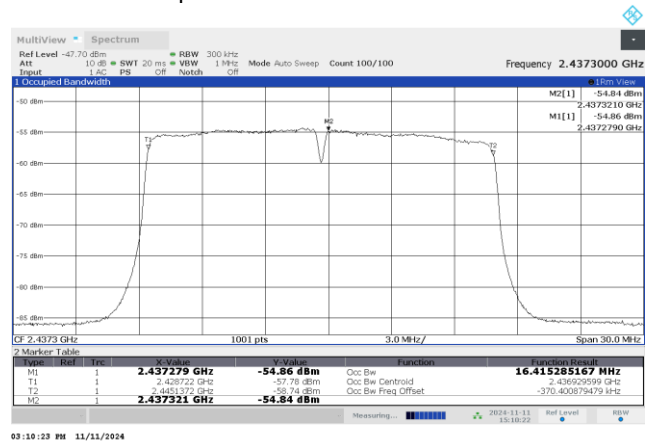
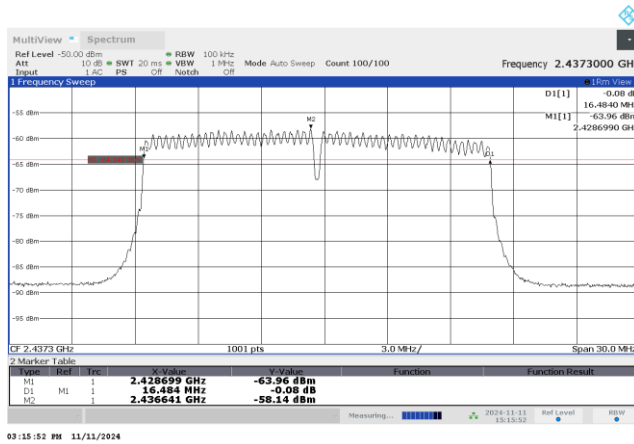
HERMON LABORATORIES

Test specification: Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth			
Test procedure: ANSI C63.10 section 11.8.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Plot 7.1.8 6 dB and 99% bandwidth test result at mid frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

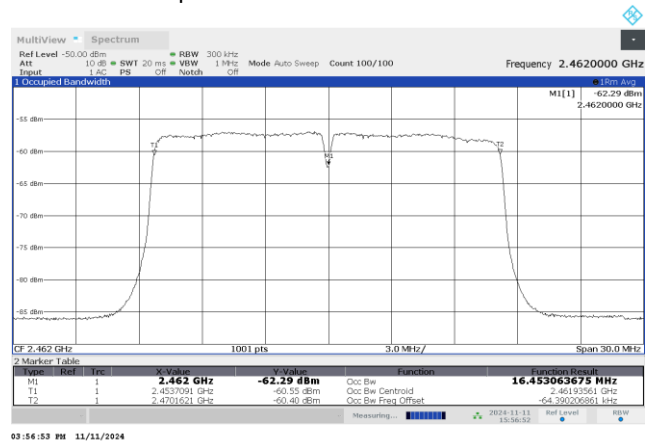
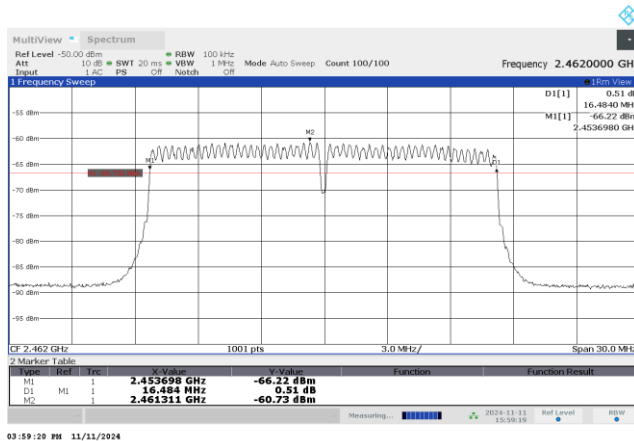
20 MHz
BPSK / 6 Mbps



Plot 7.1.9 6 dB and 99% bandwidth test result at high frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

20 MHz
BPSK / 6 Mbps





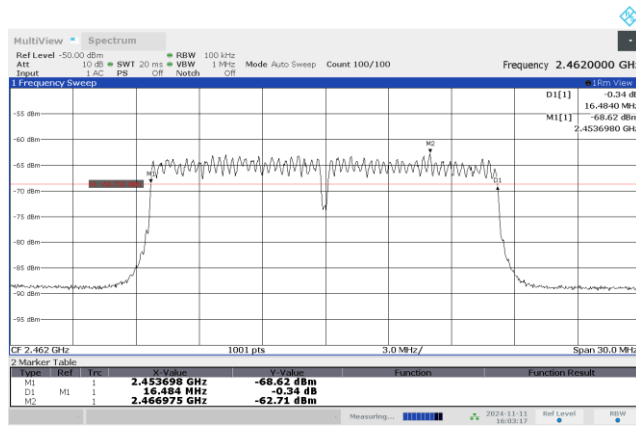
HERMON LABORATORIES

Test specification:		Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth	
Test procedure:		ANSI C63.10 section 11.8.1	
Test mode:		Verdict: PASS	
Date(s):			
11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

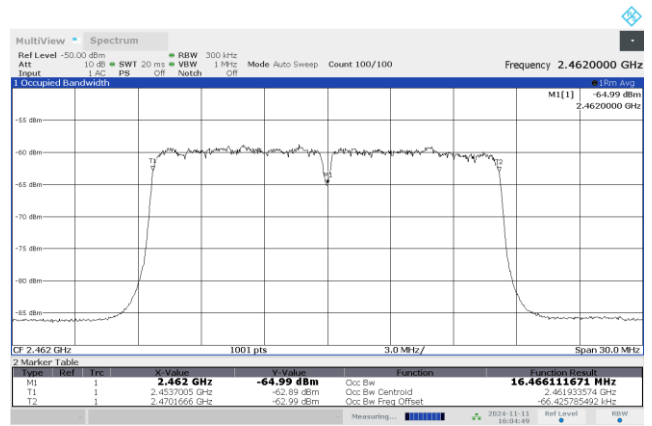
Plot 7.1.12 6 dB and 99% bandwidth test result at high frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

20 MHz
64-QAM /54 Mbps



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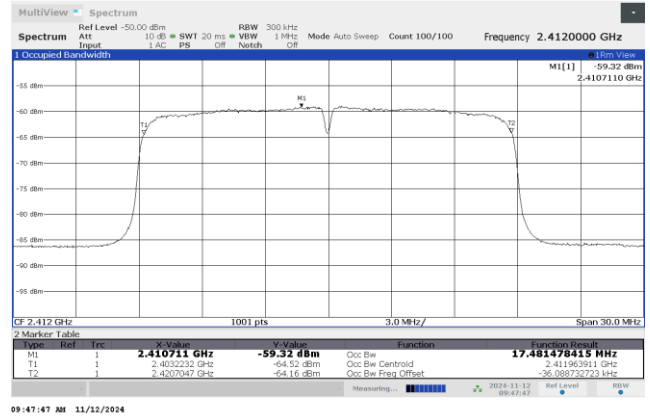
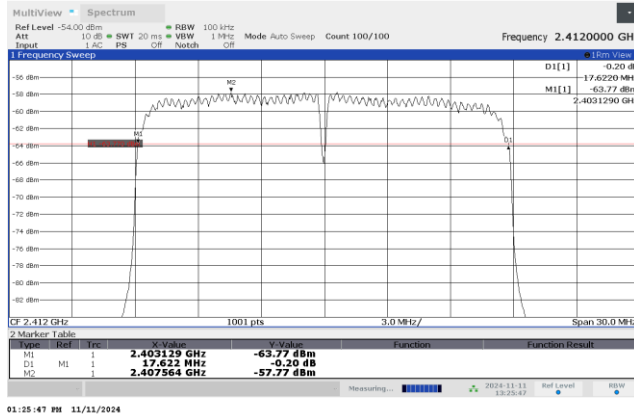
HERMON LABORATORIES

Test specification: Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth			
Test procedure: ANSI C63.10 section 11.8.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Plot 7.1.13 6 dB and 99% bandwidth test result at low frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

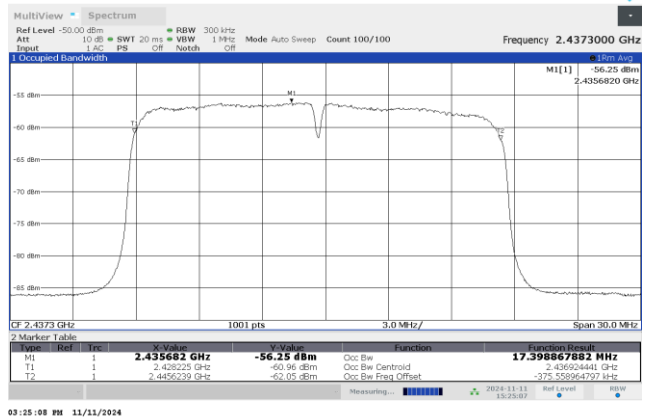
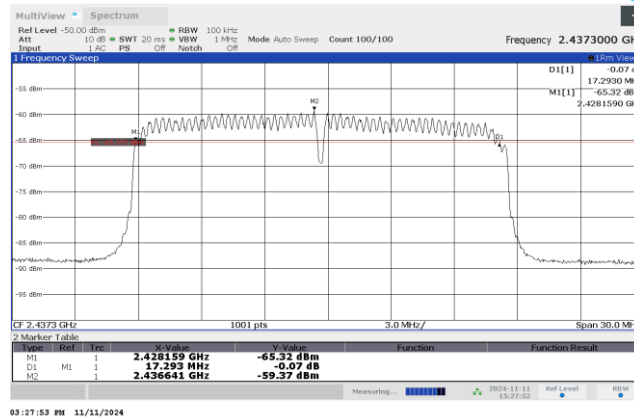
20 MHz
BPSK /6.5 Mbps



Plot 7.1.14 6 dB and 99% bandwidth test result at mid frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

20 MHz
BPSK /6.5 Mbps





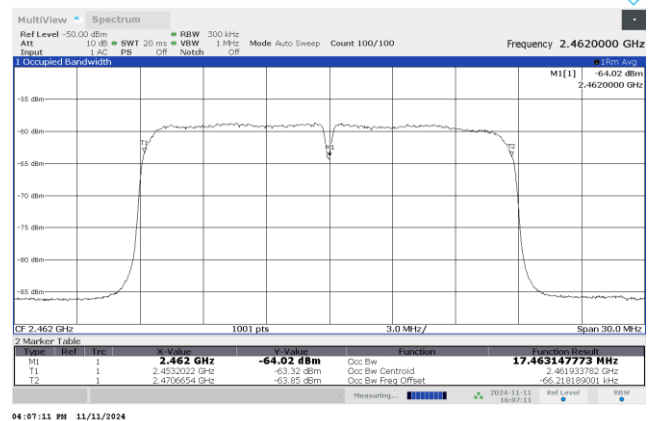
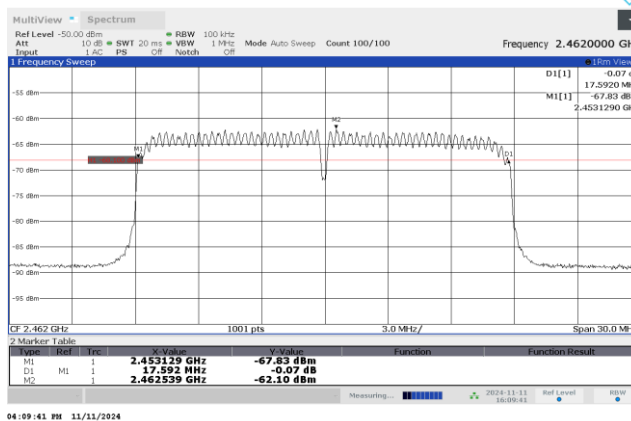
HERMON LABORATORIES

Test specification: Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth			
Test procedure: ANSI C63.10 section 11.8.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Plot 7.1.15 6 dB and 99% bandwidth test result at high frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

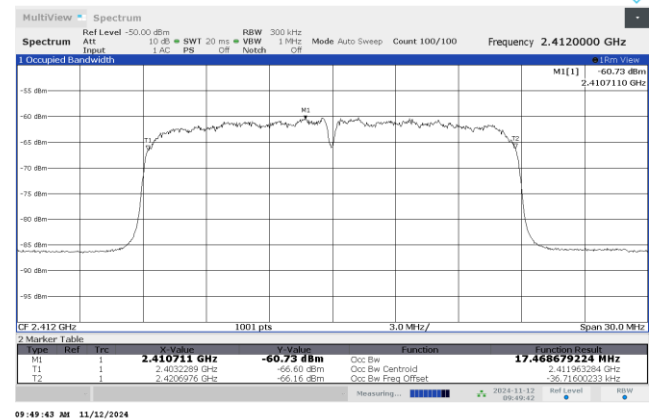
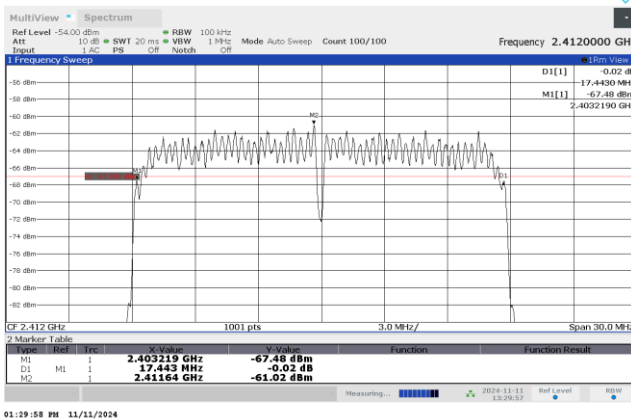
20 MHz
BPSK /6.5 Mbps



Plot 7.1.16 6 dB and 99% bandwidth test result at low frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

20 MHz
64-QAM /65 Mbps





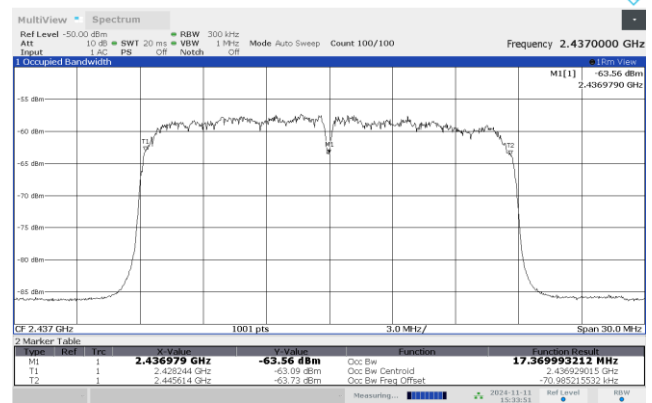
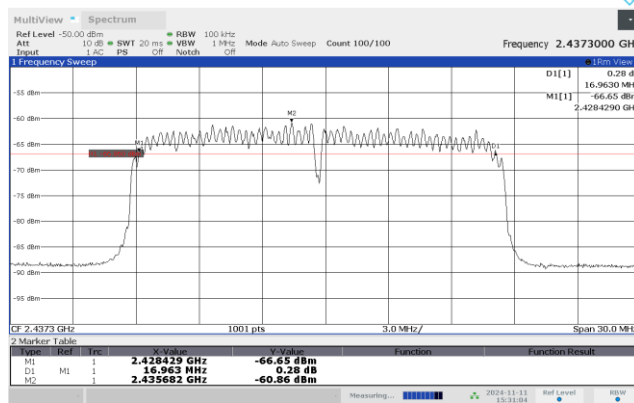
HERMON LABORATORIES

Test specification: Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth			
Test procedure: ANSI C63.10 section 11.8.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Plot 7.1.17 6 dB and 99% bandwidth test result at mid frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

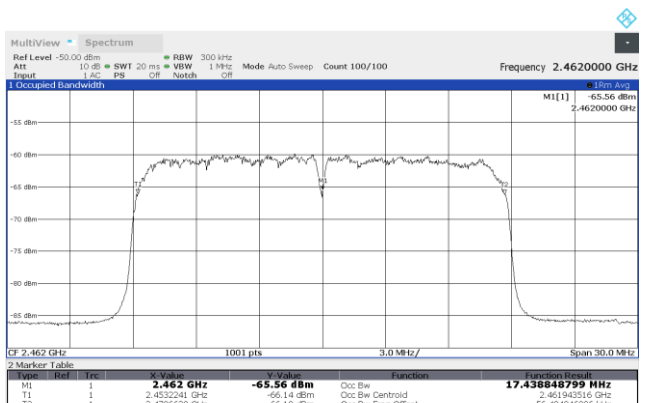
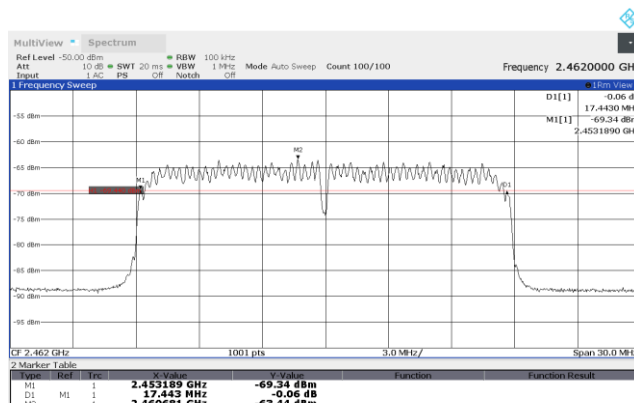
20 MHz
64-QAM /65 Mbps



Plot 7.1.18 6 dB and 99% bandwidth test result at high frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

20 MHz
64-QAM /65 Mbps





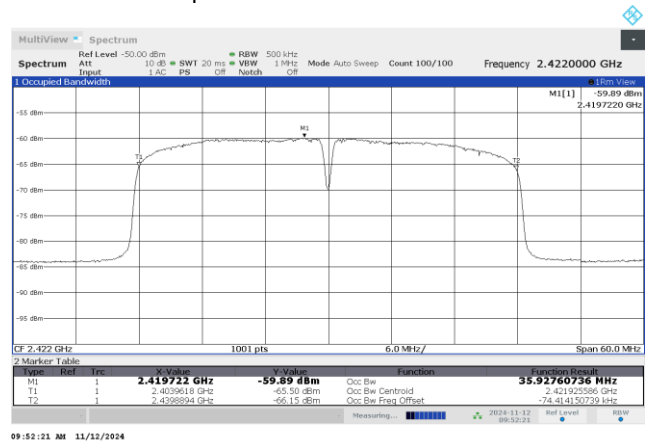
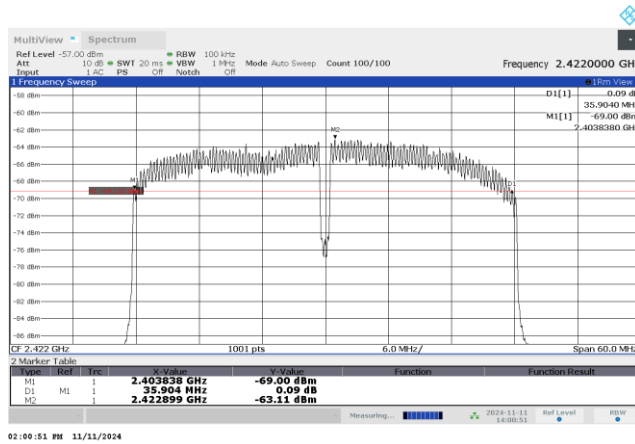
HERMON LABORATORIES

Test specification: Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth			
Test procedure: ANSI C63.10 section 11.8.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Plot 7.1.19 6 dB and 99% bandwidth test result at low frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

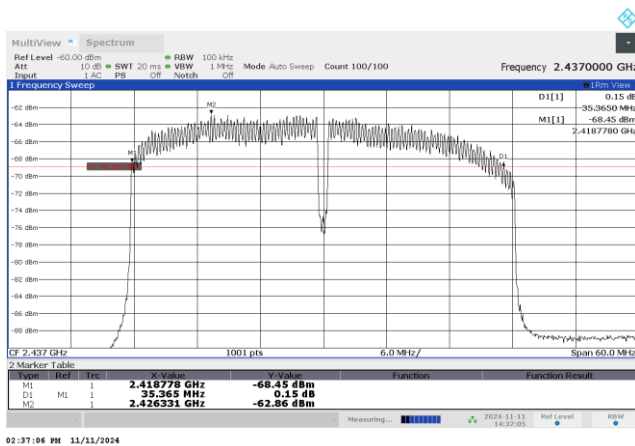
40 MHz
BPSK /6.5 Mbps



Plot 7.1.20 6 dB and 99% bandwidth test result at mid frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

40 MHz
BPSK /6.5 Mbps





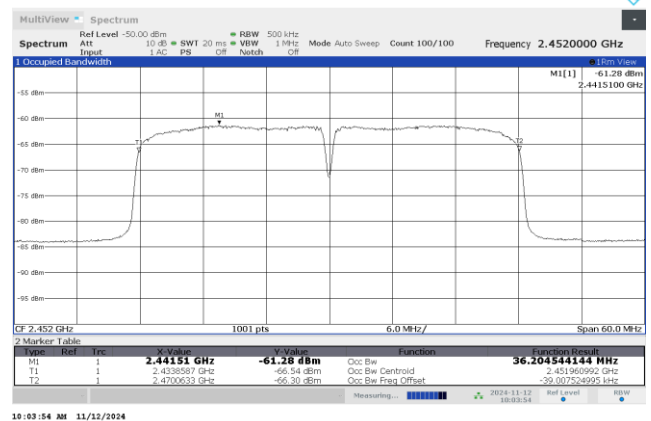
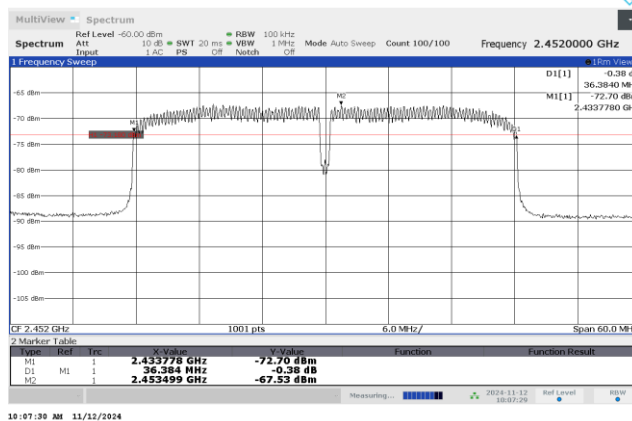
HERMON LABORATORIES

Test specification: Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth			
Test procedure: ANSI C63.10 section 11.8.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Plot 7.1.21 6 dB and 99% bandwidth test result at high frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

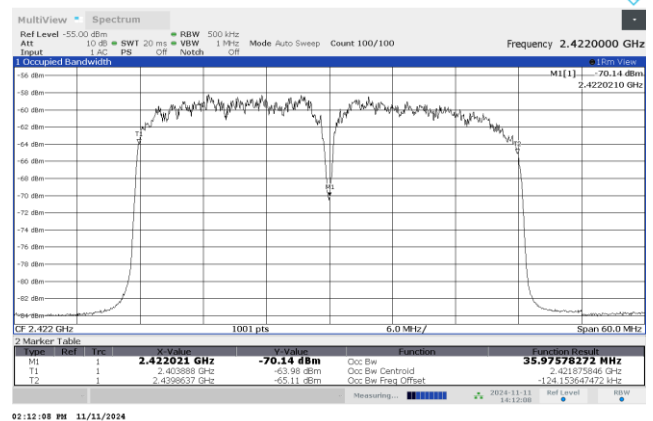
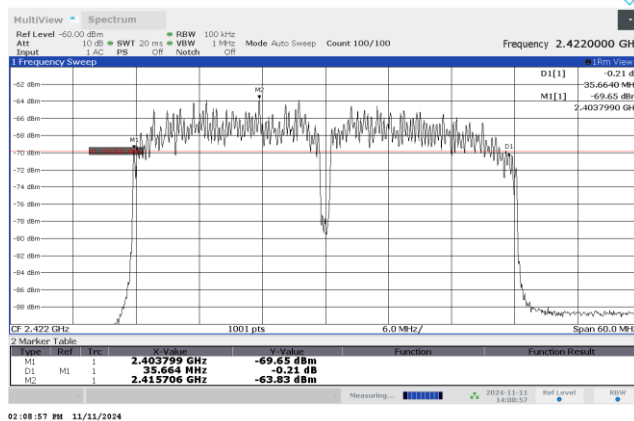
40 MHz
BPSK /6.5 Mbps



Plot 7.1.22 6 dB and 99% bandwidth test result at low frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

40 MHz
64-QAM /65 Mbps





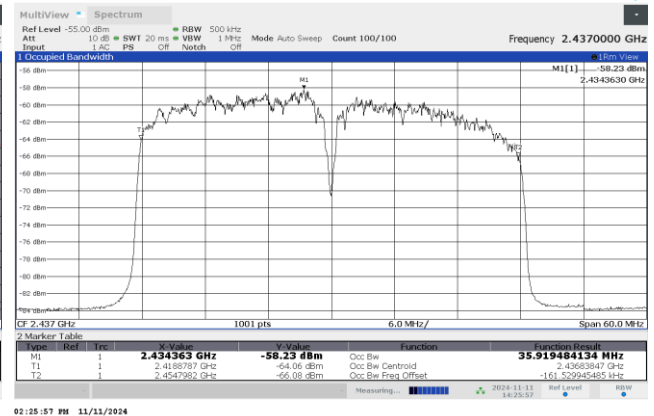
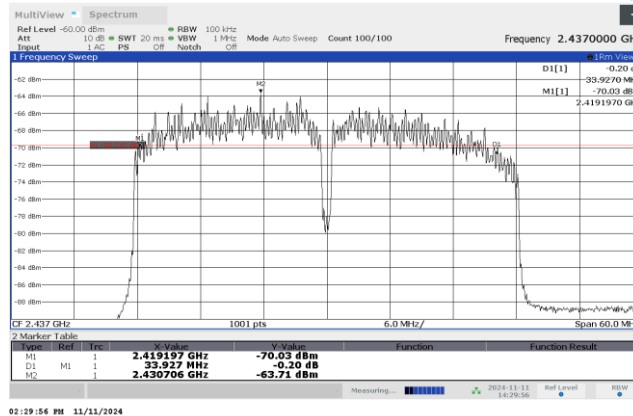
HERMON LABORATORIES

Test specification: Section 15.247(a)2 / RSS-247 section 5.2(1), 6 dB bandwidth			
Test procedure: ANSI C63.10 section 11.8.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 11-Nov-24 - 12-Nov-24			
Temperature: 24 °C	Relative Humidity: 56 %	Air Pressure: 1012 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Plot 7.1.23 6 dB bandwidth test result at mid frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

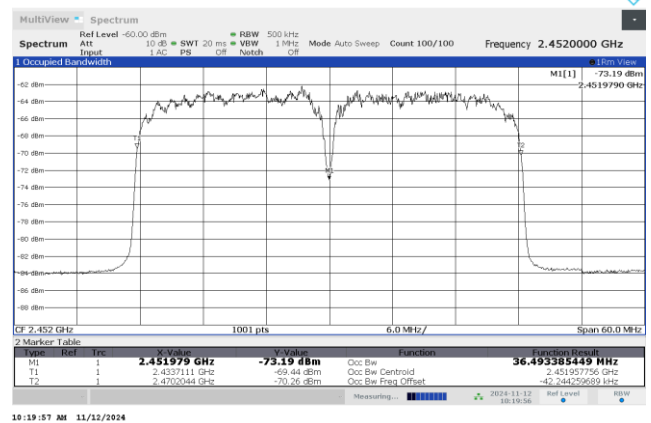
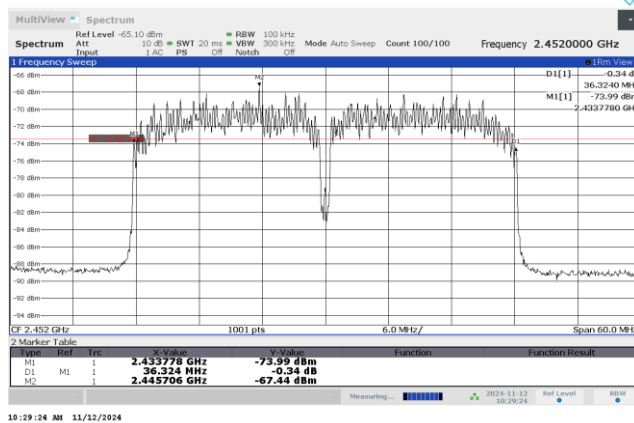
40 MHz
64-QAM /65 Mbps



Plot 7.1.24 6 dB bandwidth test result at high frequency

CHANNEL BANDWIDTH:
MODULATION/BITRATE:

40 MHz
64-QAM /65 Mbps





Test specification:		Section 15.247(b)3 / RSS-247 section 5.4(4), Maximum output power	
Test procedure:		ANSI C63.10 sections 11.9.2.2.4	
Test mode:		Verdict: PASS	
Date(s):			
06-Nov-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1003 hPa	Power: 120 VAC, 60 Hz
Remarks:			

7.2 Peak output power

7.2.1 General

This test was performed to measure the maximum peak output power radiated by transmitter. Specification test limits are given in Table 7.2.1.

Table 7.2.1 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	
2400.0 – 2483.5	6.0	1.0	30.0	131.2

*- 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.

7.2.2 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 end user RF output power.

7.2.2.3 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.

7.2.2.4 The maximum field strength of the EUT carrier frequency was measured as provided in Table 7.2.2 and associated plots.

7.2.2.5 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:

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

7.2.2.6 The worst test results (the lowest margins) were recorded in Table 7.2.2.



Test specification: Section 15.247(b)3 / RSS-247 section 5.4(4), Maximum output power			
Test procedure: ANSI C63.10 sections 11.9.2.2.4			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Nov-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1003 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Figure 7.2.1 Setup for carrier field strength measurements in 30 -1000 MHz

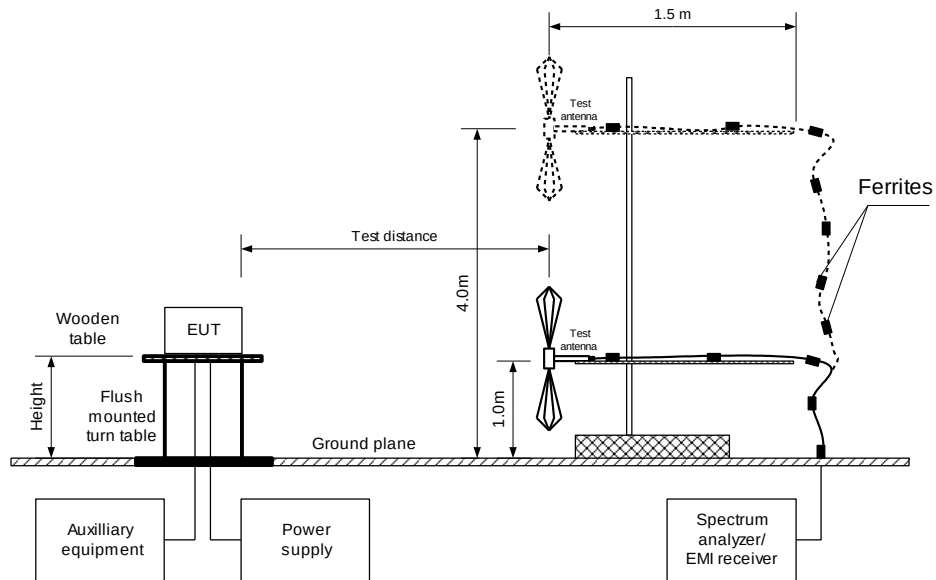
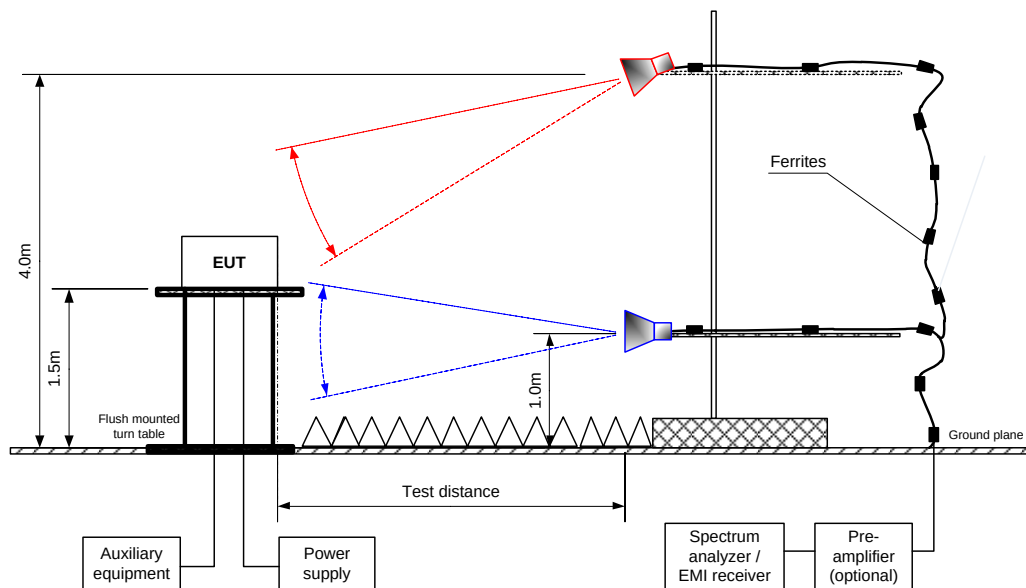


Figure 7.2.2 Setup for spurious emission field strength measurements above 1000 MHz





Test specification: Section 15.247(b)3 / RSS-247 section 5.4(4), Maximum output power			
Test procedure: ANSI C63.10 sections 11.9.2.2.4			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Nov-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1003 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Table 7.2.2 Peak output power test results

ASSIGNED FREQUENCY: 2400.0 – 2483.5MHz
 TEST DISTANCE: 3 m
 TEST SITE: Semi anechoic chamber
 EUT HEIGHT: 1.5 m
 DETECTOR USED: Peak
 TEST ANTENNA TYPE: Double ridged guide
 CHANNEL BANDWIDTH: 20 MHz
 MODULATION: DBPSK
 BITRATE: 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	107.83	Horizontal	1.5	-48	2.5	10.13	30	-19.87	Pass
2437	107.06	Horizontal	1.5	-60	2.5	9.36	30	-20.64	Pass
2462	107.01	Horizontal	1.5	-51	2.5	9.31	30	-20.69	Pass

CHANNEL BANDWIDTH: 20 MHz
 MODULATION: CCK
 BITRATE: 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	107.84	Horizontal	1.5	-40	2.5	10.14	30	-19.86	Pass
2437	110.26	Horizontal	1.5	-50	2.5	12.56	30	-17.44	Pass
2462	108.09	Horizontal	1.5	-50	2.5	10.39	30	-19.61	Pass

CHANNEL BANDWIDTH: 20 MHz
 MODULATION: BPSK
 BITRATE: 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	110.55	Horizontal	1.5	-45	2.5	12.85	30	-17.15	Pass
2437	110.39	Horizontal	1.5	-48	2.5	12.69	30	-17.31	Pass
2462	109.78	Horizontal	1.5	-50	2.5	12.08	30	-17.92	Pass

CHANNEL BANDWIDTH: 20 MHz
 MODULATION: 64-QAM
 BITRATE: 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	110.51	Horizontal	1.5	-44	2.5	12.81	30	-17.19	Pass
2437	110.44	Horizontal	1.5	-60	2.5	12.74	30	-17.26	Pass
2462	109.29	Horizontal	1.5	-56	2.5	11.59	30	-18.41	Pass



Test specification: Section 15.247(b)3 / RSS-247 section 5.4(4), Maximum output power			
Test procedure: ANSI C63.10 sections 11.9.2.2.4			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Nov-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1003 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Table 7.2.3 Peak output power test results (continuation)

ASSIGNED FREQUENCY: 2400.0 – 2483.5MHz
 TEST DISTANCE: 3 m
 TEST SITE: Semi anechoic chamber
 EUT HEIGHT: 1.5 m
 DETECTOR USED: Peak
 TEST ANTENNA TYPE: Double ridged guide
 DETECTOR USED: Peak
 CHANNEL BANDWIDTH: 20 MHz
 MODULATION: BPSK
 BITRATE: 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	110.44	Horizontal	1.5	-50	2.5	12.74	30	-17.26	Pass
2437	110.39	Horizontal	1.5	-50	2.5	12.69	30	-17.31	Pass
2462	109.00	Horizontal	1.5	-57	2.5	11.3	30	-18.7	Pass

CHANNEL BANDWIDTH: 20 MHz
 MODULATION: 64-QAM
 BITRATE: 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	110.48	Horizontal	1.5	-49	2.5	12.78	30	-17.22	Pass
2437	110.42	Horizontal	1.5	-55	2.5	12.72	30	-17.28	Pass
2462	109.26	Horizontal	1.5	-52	2.5	11.56	30	-18.44	Pass

CHANNEL BANDWIDTH: 40 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
2422	110.56	Horizontal	1.5	-40	2.5	12.86	30	-17.14	Pass
2437	108.74	Horizontal	2.78	-38	2.5	11.04	30	-18.96	Pass
2452	108.67	Horizontal	2.05	-50	2.5	10.97	30	-19.03	Pass

CHANNEL BANDWIDTH: 40 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
2422	110.61	Horizontal	1.50	-40	2.5	12.91	30	-17.09	Pass
2437	108.23	Horizontal	1.93	-40	2.5	10.53	30	-19.47	Pass
2452	108.49	Horizontal	2.07	-50	2.5	10.79	30	-19.21	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.

Reference numbers of test equipment used

HL 3903	HL 4933	HL 3440	HL 5902	HL 7585			
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Full description is given in Appendix A.

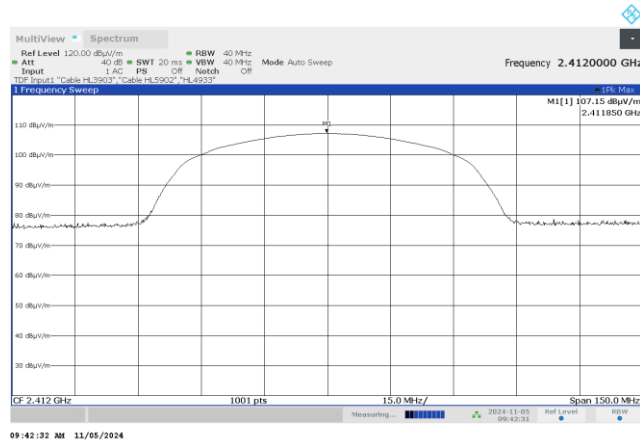


HERMON LABORATORIES

Test specification:		Section 15.247(b)3 / RSS-247 section 5.4(4), Maximum output power	
Test procedure:		ANSI C63.10 sections 11.9.2.2.4	
Test mode:		Verdict: PASS	
Date(s):			
06-Nov-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1003 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Plot 7.2.1 Field strength of carrier at low frequency

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



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

