

TEST REPORT

ACCORDING TO:

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

FOR:

Maytronics Ltd.
Wireless Robotic Pool Cleaner
Model: LIBERTY600
FCC ID: WCHLIB600
IC: 29982-LIB600

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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Telephone: +972 4-6598113
Fax: +972 4-6522485
E-mail: Eugene.Plotnichenko@Maytronics.com
Contact name: Mr. Eugene Plotnichenko

2 Equipment under test attributes

Product name: Wireless Robotic Pool Cleaner
Product type: Transceiver
Model(s): Liberty600
Serial number: prototype
Hardware version: 5
Software release: 13.266
Receipt date 10-Jul-24

3 Manufacturer information

Manufacturer name: Maytronics Ltd.
Address: Kibbutz Yizre'el, 1935000, Israel
Telephone: +972 4-6598113
Fax: +972 4-6522485
E-Mail: Eugene.Plotnichenko@Maytronics.com
Contact name: Mr. Eugene Plotnichenko

4 Test details

Project ID: 54947
Location: Hermon Laboratories Ltd. 66 HaTachana str., P.O. Box 23, Binyamina 3055001, Israel
Test started: 21-Aug-24
Test completed: 10-Oct-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(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 15.207, Conducted emission	Pass
FCC section 15.203 / RSS-Gen section 6.8, Antenna requirement	Pass

This test report supersedes the previously issued test report identified by Doc ID: MAYRAD_FCC.54947

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. N. Lenkina, test engineer, EMC & Radio	21-Aug-24 – 10-Oct-24	
Reviewed by:	Mrs. S. Peysahov Sheynin, certification specialist, EMC & Radio	01-Dec-24	
Approved by:	Mr. M. Nikishin, group leader, EMC & Radio	10-Feb-25	

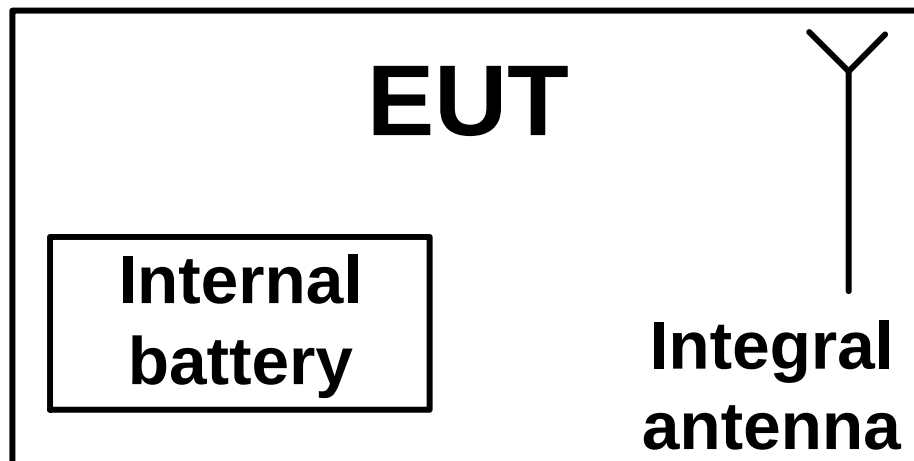
6 EUT description

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

6.1 General information

The EUT is a wireless robotic pool cleaner that contains motor unit and power pack. The motor unit contains 2 brushless motors (drive and impeller) and 1 servo motor. The power pack consists of Li-Ion battery pack (certified) and control board with RF module and charging circuit.

6.2 Test configuration



6.3 Changes made in EUT

No changes were performed in the EUT during testing.



6.4 Transmitter characteristics

Type of equipment					
V	Stand-alone (Equipment with or without its own control provisions)				
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)				
	Plug-in card (Equipment intended for a variety of host systems)				
Assigned frequency range		2400 -2483.5 MHz			
Operating frequencies		2402-2480 MHz			
Maximum rated output power		Peak output power 2.36 dBm			
Is transmitter output power variable?		V	No		
			Yes	continuous variable	
				stepped variable with stepsize dB	
				minimum RF power	dBm
				maximum RF power	dBm
Antenna connection					
unique coupling		standard connector		V	Integral
				V	with temporary RF connector without temporary RF connector
Antenna/s technical characteristics					
Type		Manufacturer		Model number	
Internal		Maytronics		N/A	
Gain		1.95 dBi			
Transmitter aggregate data rate/s		1 Mbps 2 Mbps			
Type of modulation		GFSK			
Modulating test signal (baseband)					
Transmitter power source					
V	Battery	Nominal rated voltage	25.5 VDC	Battery type	Lithium Ion
	DC	Nominal rated voltage			
V	AC mains	Nominal rated voltage	100-230 VAC	Frequency	50-60 Hz



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): 22-Sep-24 - 26-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1006 hPa	Power: 25.5 VDC
Remarks:			

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

7.1 Minimum 6 dB and 99% 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, MHz
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 7.1.2 and associated plot.

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): 22-Sep-24 - 26-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1006 hPa	Power: 25.5 VDC
Remarks:			

Table 7.1.3 6 dB bandwidth test results

ASSIGNED FREQUENCY BAND: 2400 – 2483.5 MHz
 DETECTOR USED: Peak
 SWEEP TIME: Auto
 RESOLUTION BANDWIDTH: 100 kHz
 VIDEO BANDWIDTH: 300 kHz
 MODULATION: GFSK
 MODULATING SIGNAL: PRBS

BIT RATE: 1 Mbps

Carrier frequency, MHz	99% bandwidth, kHz	6 dB bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2402	1047.2	675.1	500	175.1	Pass
2440	1053.7	678.4	500	178.4	Pass
2480	1051.4	677.9	500	177.9	Pass

BIT RATE: 2 Mbps

Carrier frequency, MHz	99% bandwidth, kHz	6 dB bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2402	2057.5	1145	500	645	Pass
2440	2051.9	1139	500	639	Pass
2480	2052.4	1144	500	644	Pass

Reference numbers of test equipment used

HL 5376	HL 5611	HL 5637						
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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): 22-Sep-24 - 26-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1006 hPa	Power: 25.5 VDC
Remarks:			

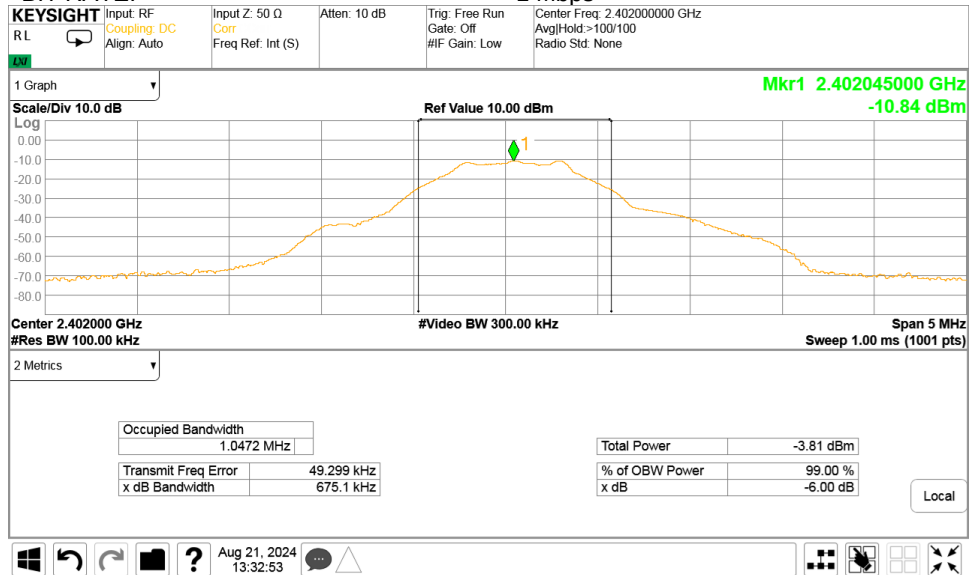
Plot 7.1.1 6 dB and 99% bandwidth test result at low frequency

MODULATION:

GFSK

BIT RATE:

1 Mbps

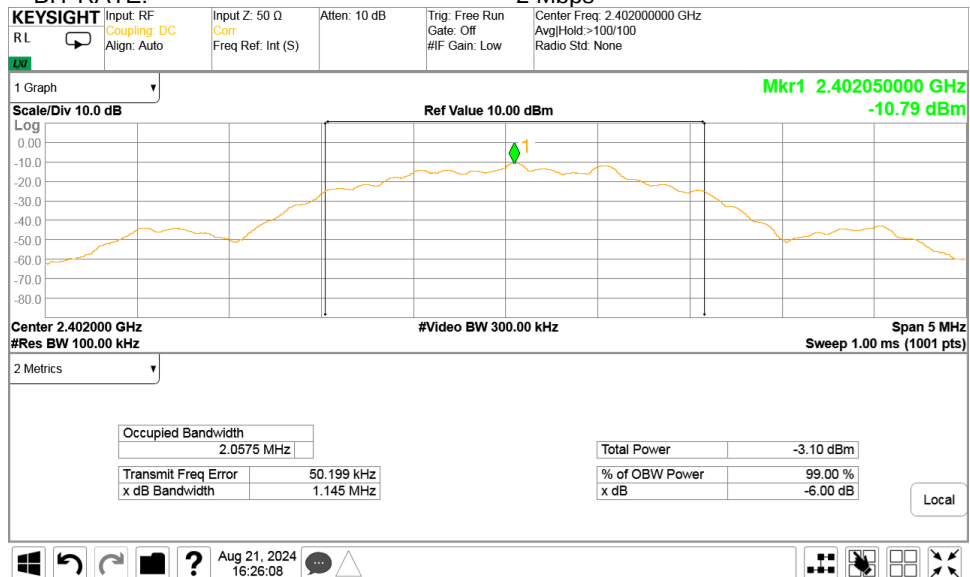


MODULATION:

GFSK

BIT RATE:

2 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): 22-Sep-24 - 26-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1006 hPa	Power: 25.5 VDC
Remarks:			

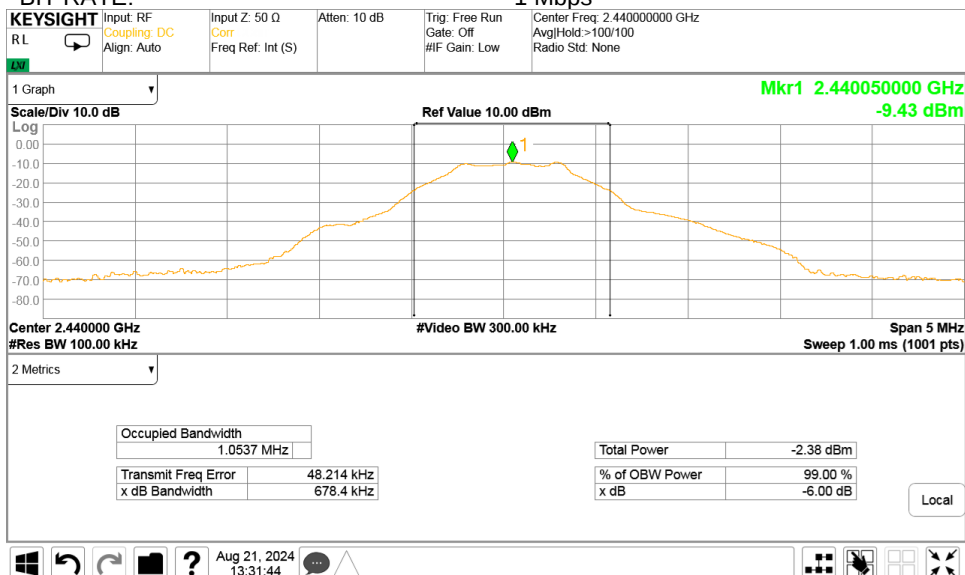
Plot 7.1.2 6 dB and 99% bandwidth test result at mid frequency

MODULATION:

GFSK

BIT RATE:

1 Mbps

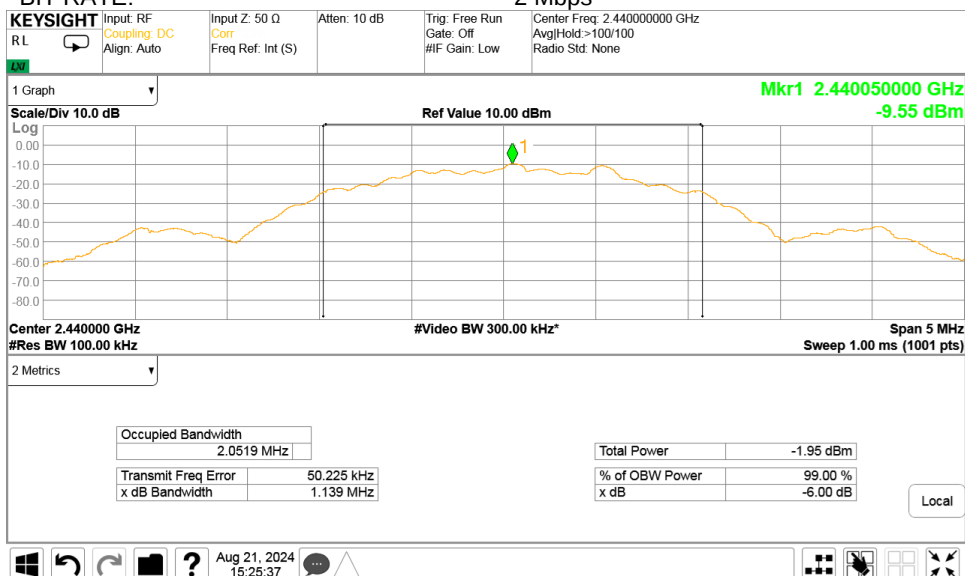


MODULATION:

GFSK

BIT RATE:

2 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): 22-Sep-24 - 26-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1006 hPa	Power: 25.5 VDC
Remarks:			

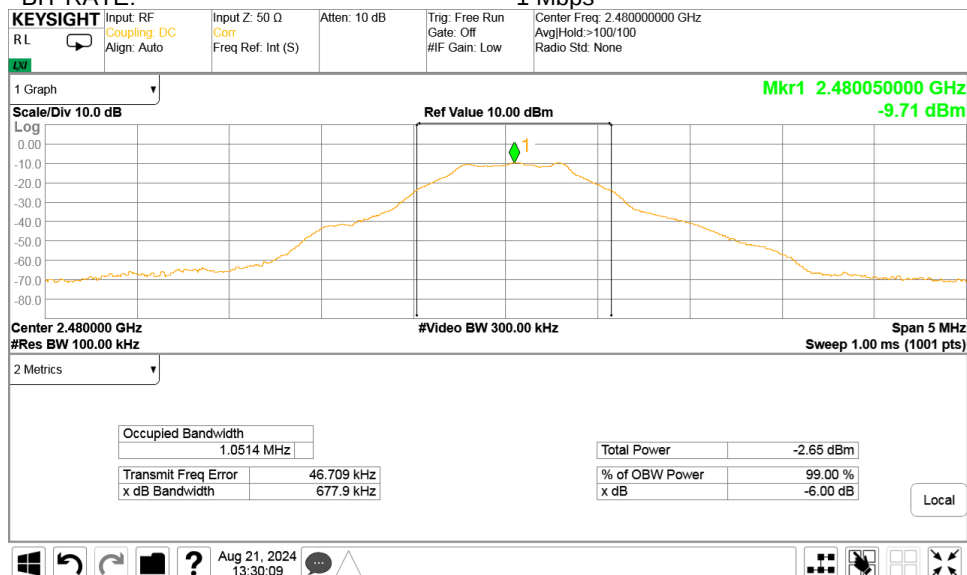
Plot 7.1.3 6 dB and 99% bandwidth test result at high frequency

MODULATION:

GFSK

BIT RATE:

1 Mbps

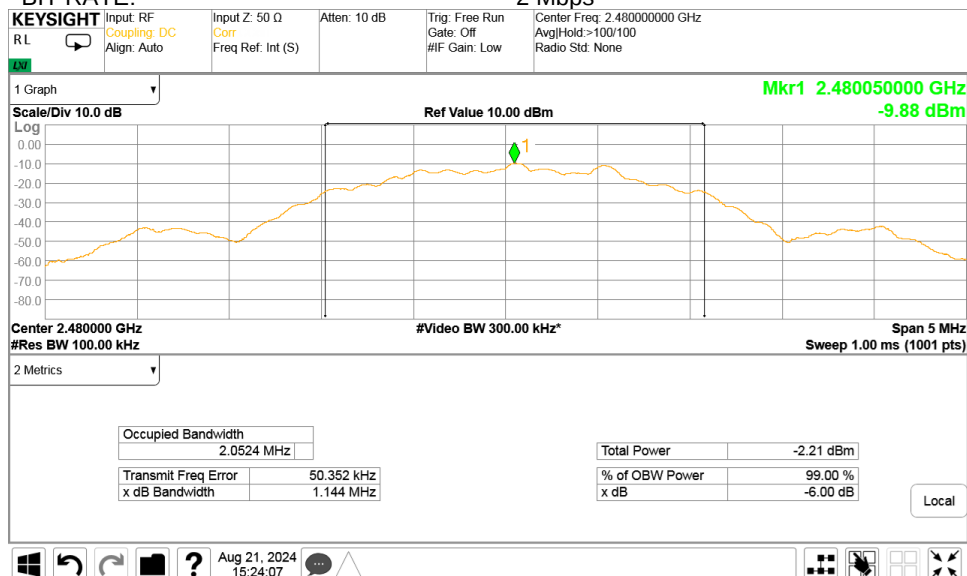


MODULATION:

GFSK

BIT RATE:

2 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: Compliance		Verdict: PASS	
Date(s): 22-Sep-24 - 22-Aug-24			
Temperature: 24 °C	Relative Humidity: 45 %	Air Pressure: 1004 hPa	Power: 25.5 VDC
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:

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

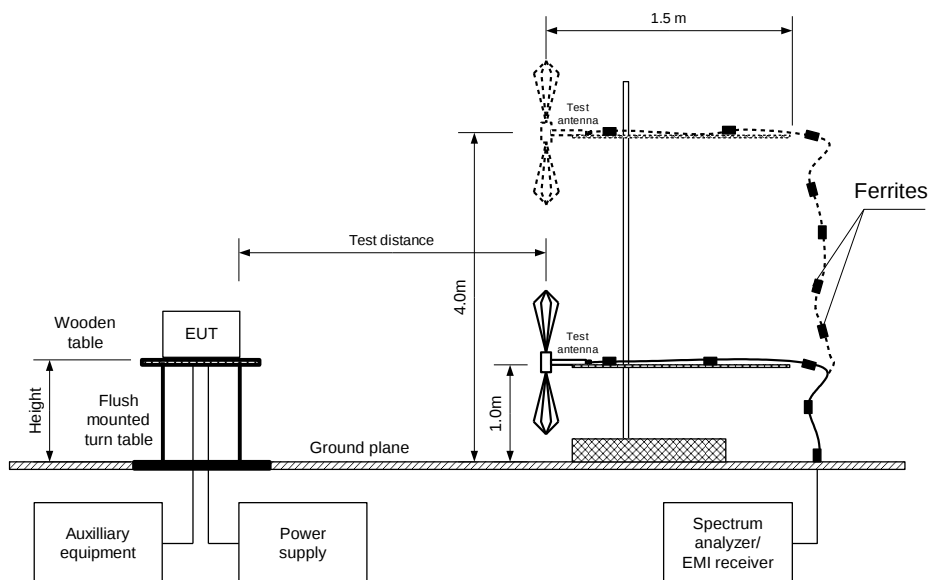
7.2.2.6 The worst test results (the lowest margins) were recorded in Table 7.2.2.



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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): 22-Sep-24 - 22-Aug-24			
Temperature: 24 °C	Relative Humidity: 45 %	Air Pressure: 1004 hPa	Power: 25.5 VDC
Remarks:			

Figure 7.2.1 Setup for carrier field strength measurements





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): 22-Sep-24 - 22-Aug-24			
Temperature: 24 °C	Relative Humidity: 45 %	Air Pressure: 1004 hPa	Power: 25.5 VDC
Remarks:			

Table 7.2.2 Peak output power test results

ASSIGNED FREQUENCY: 2400 – 2483.5 MHz
 TEST DISTANCE: 3 m
 TEST SITE: Semi anechoic chamber
 EUT HEIGHT: 1.5 m
 DETECTOR USED: Peak
 TEST ANTENNA TYPE: Double ridged guide (above 1000 MHz)
 MODULATION: GFSK
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 3 MHz
 VIDEO BANDWIDTH: 10 MHz

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
BIT RATE: 1 Mbps									
2402	99.51	H	2.10	-75	1.95	2.36	30	-27.64	Pass
2440	98.35	H	1.90	-75	1.95	1.2	30	-28.80	Pass
2480	95.54	H	2.38	-82	1.95	-1.61	30	-31.61	Pass
BIT RATE: 2 Mbps									
2402	99.35	H	2.30	-75	1.95	2.20	30	-27.80	Pass
2440	98.62	H	1.70	-80	1.95	1.47	30	-28.53	Pass
2480	95.23	H	2.38	-79	1.95	-1.92	30	-31.92	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 4114	HL 4360	HL 5902				
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Full description is given in Appendix A.



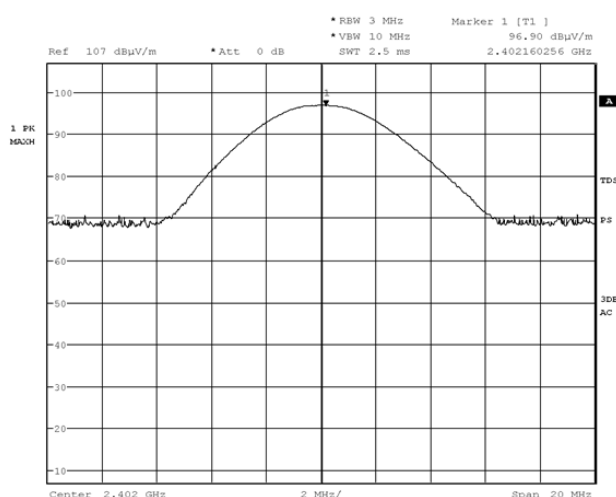
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Test specification: Section 15.247(b)3 / RSS-247 section 5.4(4), Maximum output power			
Test procedure: ANSI C63.10 sections 11.9.2.2.4			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24 - 22-Aug-24			
Temperature: 24 °C	Relative Humidity: 45 %	Air Pressure: 1004 hPa	Power: 25.5 VDC
Remarks:			

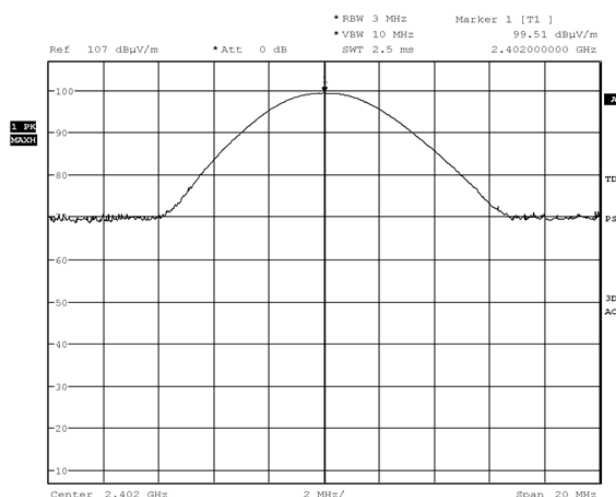
Plot 7.2.1 Field strength of carrier at the low frequency

BIT RATE 1 Mbps

Vertical antenna polarization



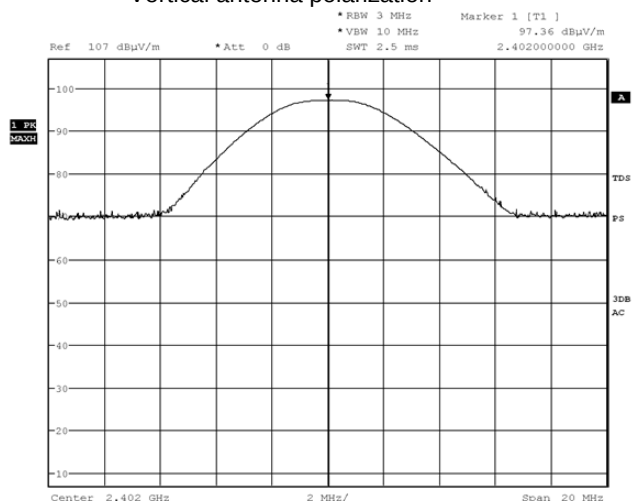
Horizontal antenna polarization



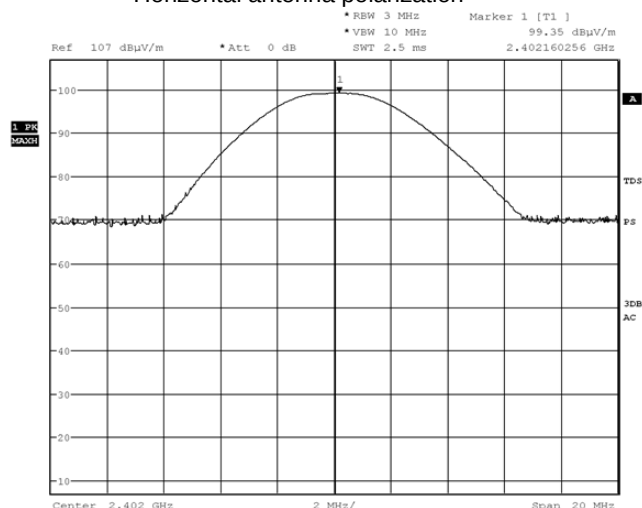
Plot 7.2.2 Field strength of carrier at the low frequency

BIT RATE 2 Mbps

Vertical antenna polarization



Horizontal antenna polarization



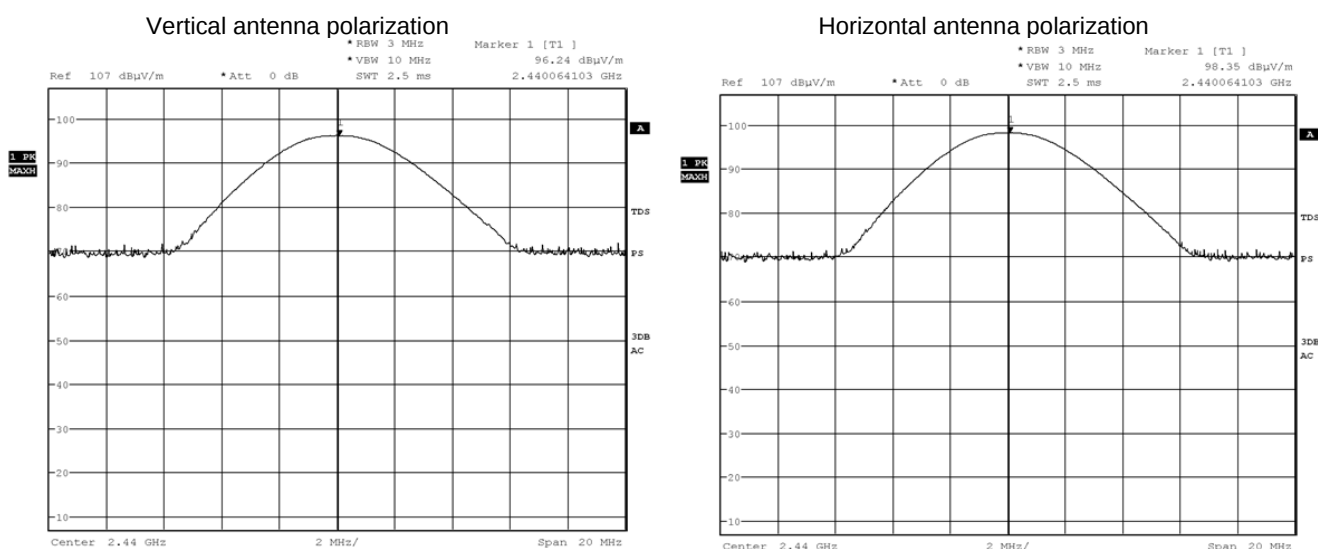


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Test specification: Section 15.247(b)3 / RSS-247 section 5.4(4), Maximum output power			
Test procedure: ANSI C63.10 sections 11.9.2.2.4			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24 - 22-Aug-24			
Temperature: 24 °C	Relative Humidity: 45 %	Air Pressure: 1004 hPa	Power: 25.5 VDC
Remarks:			

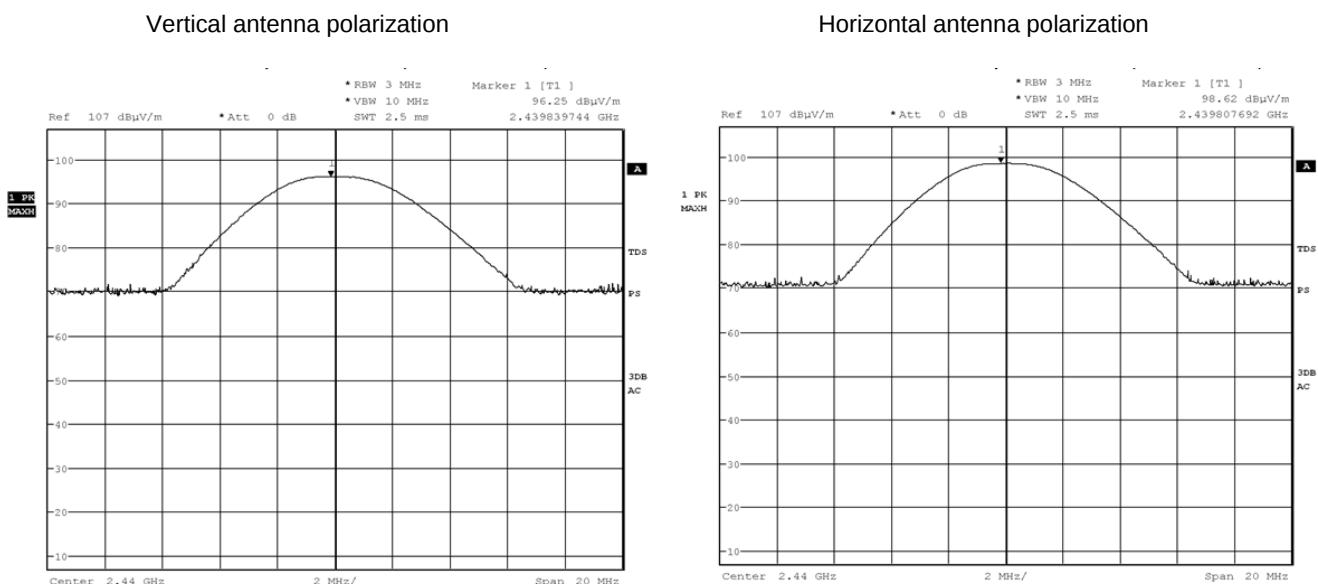
Plot 7.2.3 Field strength of carrier at the mid frequency

BIT RATE 1 Mbps



Plot 7.2.4 Field strength of carrier at the mid frequency

BIT RATE 2 Mbps



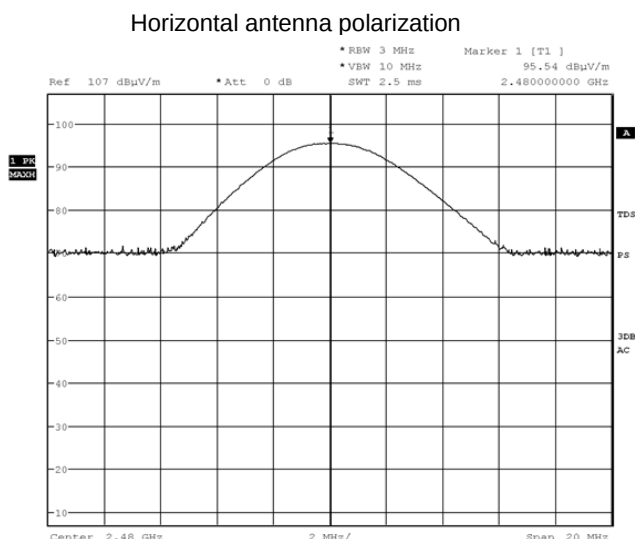
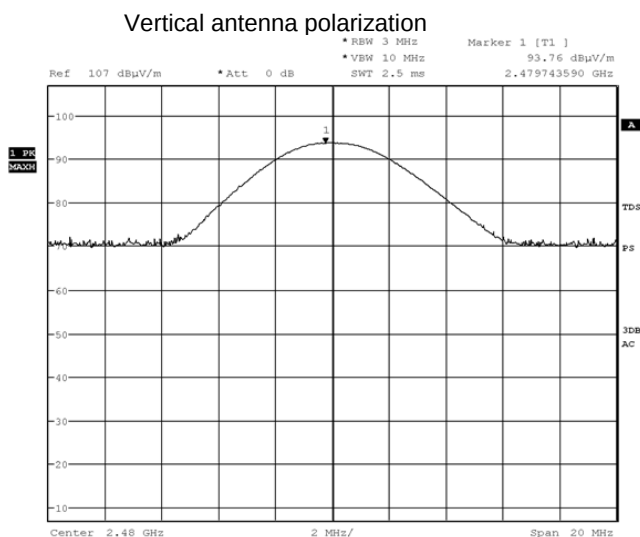


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Test specification: Section 15.247(b)3 / RSS-247 section 5.4(4), Maximum output power			
Test procedure: ANSI C63.10 sections 11.9.2.2.4			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24 - 22-Aug-24			
Temperature: 24 °C	Relative Humidity: 45 %	Air Pressure: 1004 hPa	Power: 25.5 VDC
Remarks:			

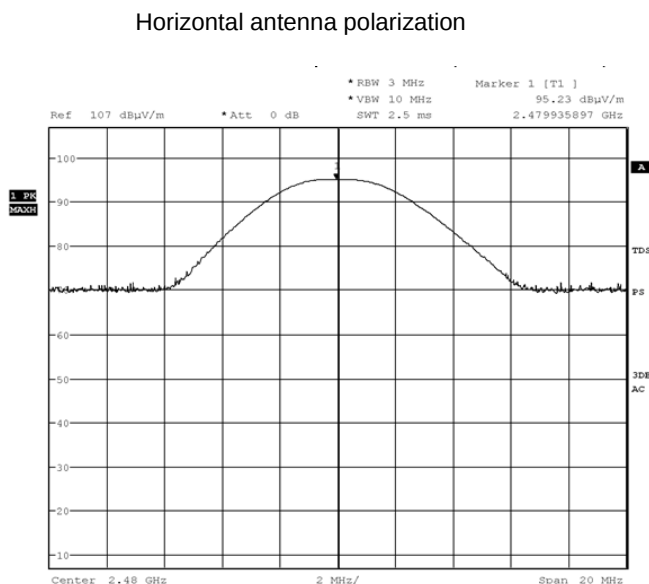
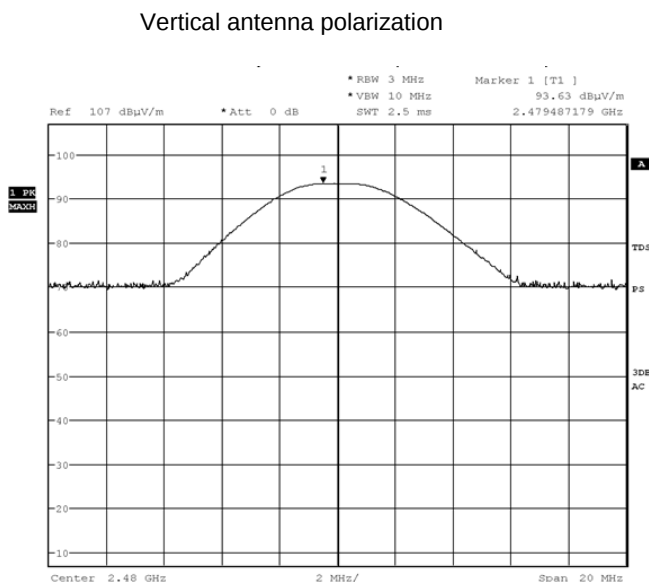
Plot 7.2.5 Field strength of carrier at the high frequency

BIT RATE 1 Mbps



Plot 7.2.6 Field strength of carrier at the high frequency

BIT RATE 2 Mbps





Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

7.3 Field strength of spurious emissions

7.3.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits are given in Table 7.3.1.

Table 7.3.1 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 th harmonic	74.0	NA	54.0	

*- The limit for 3 m test distance was calculated using the inverse square distance extrapolation factor as follows:

$$\text{Lim}_{S2} = \text{Lim}_{S1} + 40 \log (S_1/S_2),$$

where S₁ and S₂ – 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.

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

7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized and the performance check was conducted.

7.3.2.2 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.

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

7.3.3 Test procedure for spurious emission field strength measurements above 30 MHz

7.3.3.1 The EUT was set up as shown in Figure 7.3.2, Figure 1.1.3, energized and the performance check was conducted.

7.3.3.2 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.

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



Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Figure 7.3.1 Setup for spurious emission field strength measurements below 30 MHz

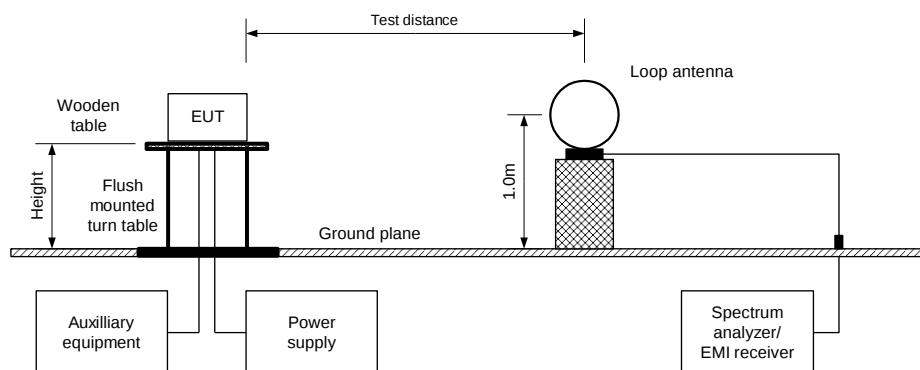
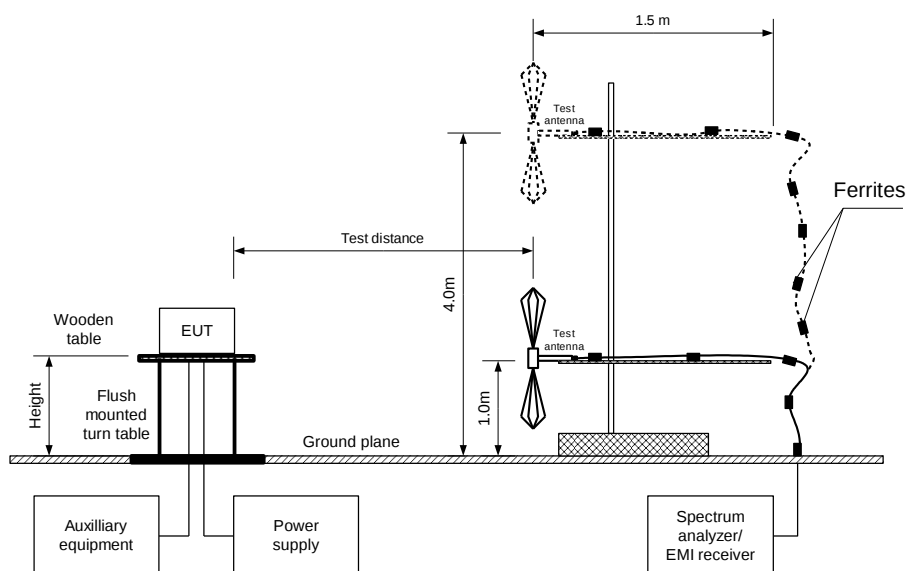


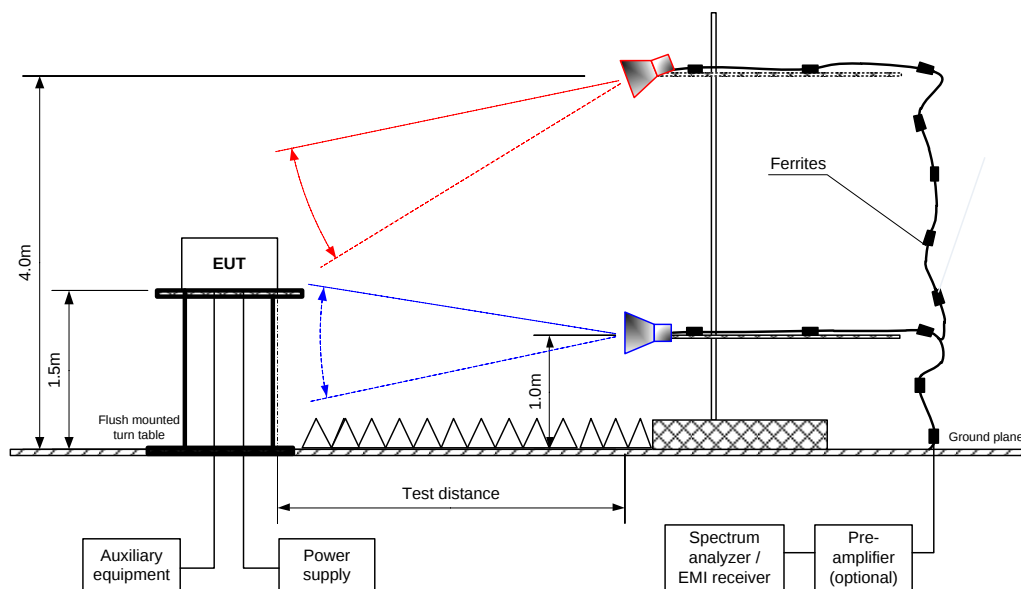
Figure 7.3.2 Setup for spurious emission field strength measurements in 30 – 1000 MHz





Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Figure 7.3.3 Setup for spurious emission field strength measurements above1000 MHz





Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Table 7.3.2 Field strength of emissions outside restricted bands

ASSIGNED FREQUENCY: 2480.0 – 2483.5 MHz
 INVESTIGATED FREQUENCY RANGE: 0.009 – 25000 MHz
 TEST DISTANCE: 3 m
 MODULATION: GFSK
 BIT RATE: 2 Mbps
 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)

Basic layout 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
Low carrier frequency 2402 MHz									
96.304	19.90	Vertical	1.02	-111	97.84	77.94	20.0	57.94	Pass
216.937	37.35	Horizontal	1.00	-180		60.49		40.49	
Mid carrier frequency 2440 MHz									
213.539	34.07	Horizontal	1.00	-172	96.15	62.08	20.0	42.08	Pass
High carrier frequency 2480 MHz									
213.496	33.58	Horizontal	1.00	-158	93.05	59.47	20.0	39.47	Pass

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

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



Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Table 7.3.3 Field strength of spurious emissions above 1 GHz within restricted bands

ASSIGNED FREQUENCY: 2480.0 – 2483.5 MHz
 INVESTIGATED FREQUENCY RANGE: 1000 – 25000 MHz
 TEST DISTANCE: 3 m
 MODULATION: GFSK
 BIT RATE: 2 Mbps
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 1000 kHz
 TEST ANTENNA TYPE: Double ridged guide

Frequency, MHz	Antenna		Azimuth, degrees*	Peak field strength			Average field strength				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***	
Low carrier frequency 2402 MHz											
No emissions were found											Pass
Mid carrier frequency 2440 MHz											
No emissions were found											Pass
High carrier frequency 2480 MHz											
No emissions were found											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.

Table 7.3.4 Average factor calculation

Transmission pulse		Transmission burst		Transmission train duration, ms	Average factor, dB
Duration, ms	Period, ms	Duration, ms	Period, ms		
1.107	2.508	NA	NA	NA	-7.1

*- Average factor was calculated as follows
for pulse train shorter than 100 ms:

$$\text{Average factor} = 20 \times \log_{10} \left(\frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{Burst duration}}{\text{Train duration}} \times \text{Number of bursts within pulse train} \right)$$

for pulse train longer than 100 ms:

$$\text{Average factor} = 20 \times \log_{10} \left(\frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{Burst duration}}{100 \text{ ms}} \times \text{Number of bursts within 100 ms} \right)$$



Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Table 7.3.5 Field strength of spurious emissions below 1 GHz within restricted bands

ASSIGNED FREQUENCY: 2400.0 – 2383.5 MHz
 INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz
 TEST DISTANCE: 3 m
 MODULATION: GFSK
 BIT RATE: 2 Mbps
 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*				
Low carrier frequency 2402 MHz								
127.214	25.62	20.25	43.50	-23.25	Horizontal	1.44	53	Pass
Mid carrier frequency 2440 MHz								
128.292	25.52	19.80	43.50	-23.70	Horizontal	1.40	40	Pass
High carrier frequency 2480 MHz								
No emissions were found								Pass

*- Margin = Measured emission - specification limit.

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



HERMON LABORATORIES

Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Table 7.3.6 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 7.3.7 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 3903	HL 4338	HL 4360	HL 4933	HL 4956	HL 5209	HL 5288	HL 5376
HL 7585							

Full description is given in Appendix A.

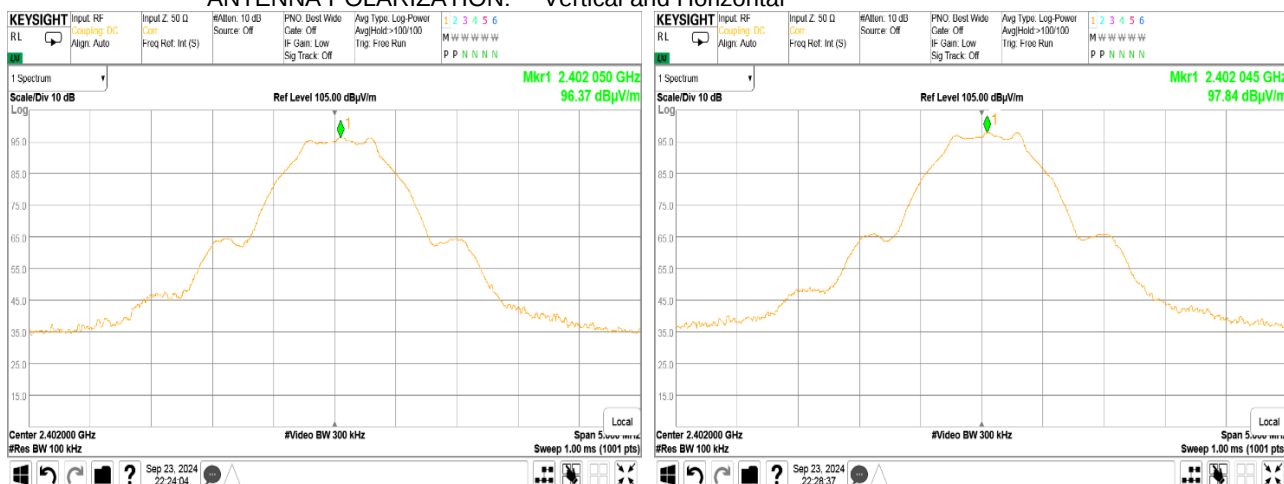


HERMON LABORATORIES

Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

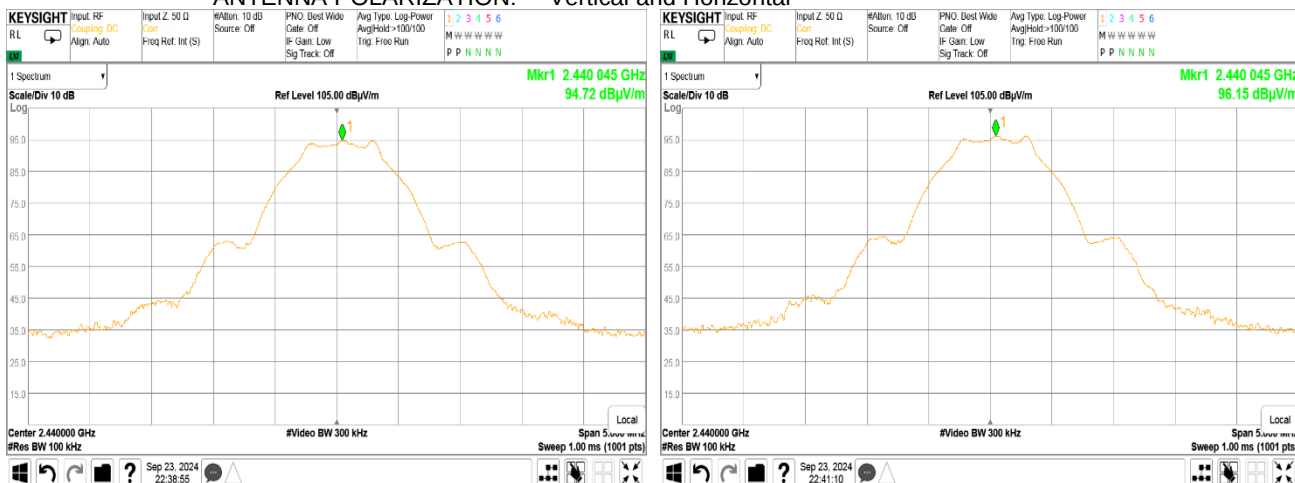
Plot 7.3.1 Radiated emission measurements at the low carrier frequency

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



Plot 7.3.2 Radiated emission measurements at the mid carrier frequency

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



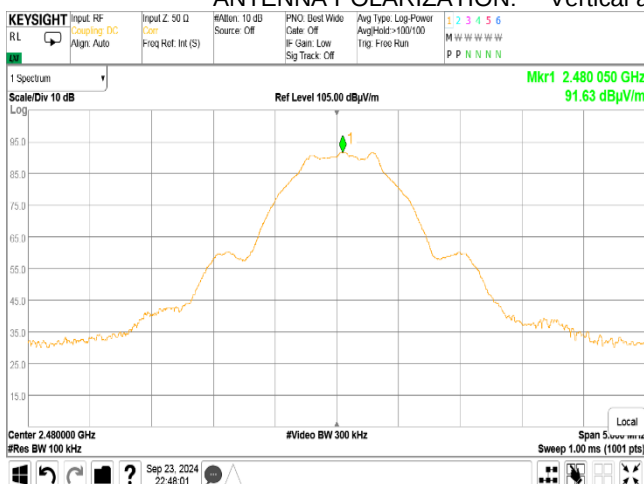


HERMON LABORATORIES

Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Plot 7.3.3 Radiated emission measurements at the high carrier frequency

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

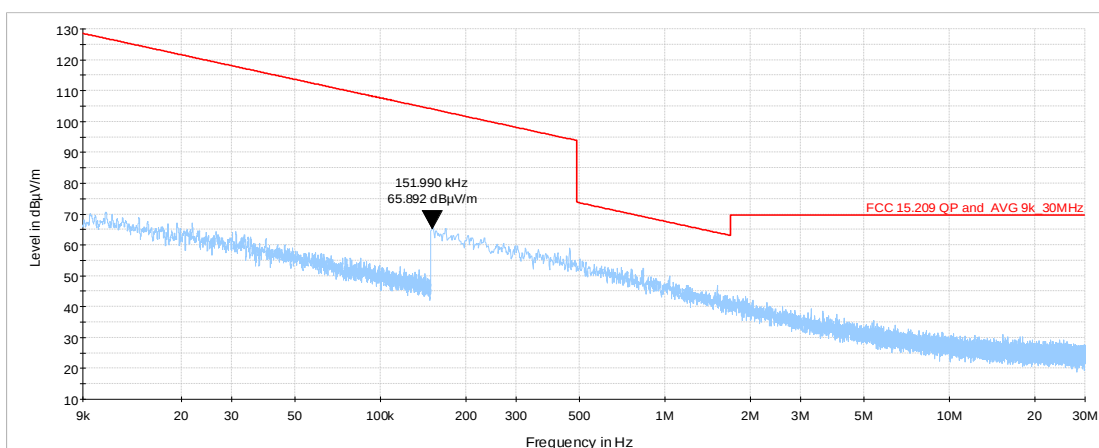




Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

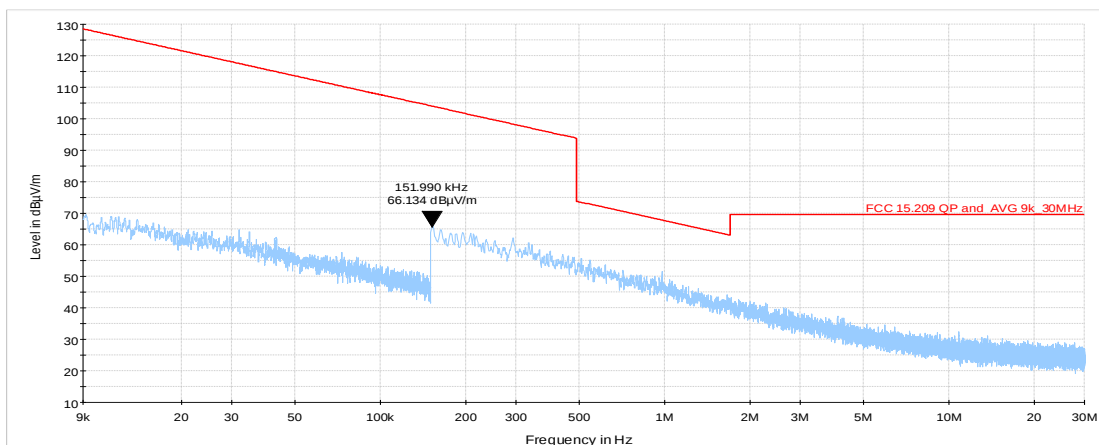
Plot 7.3.4 Radiated emission measurements from 0.009 to 30 MHz at the low carrier frequency

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



Plot 7.3.5 Radiated emission measurements from 0.009 to 30 MHz at the mid carrier frequency

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



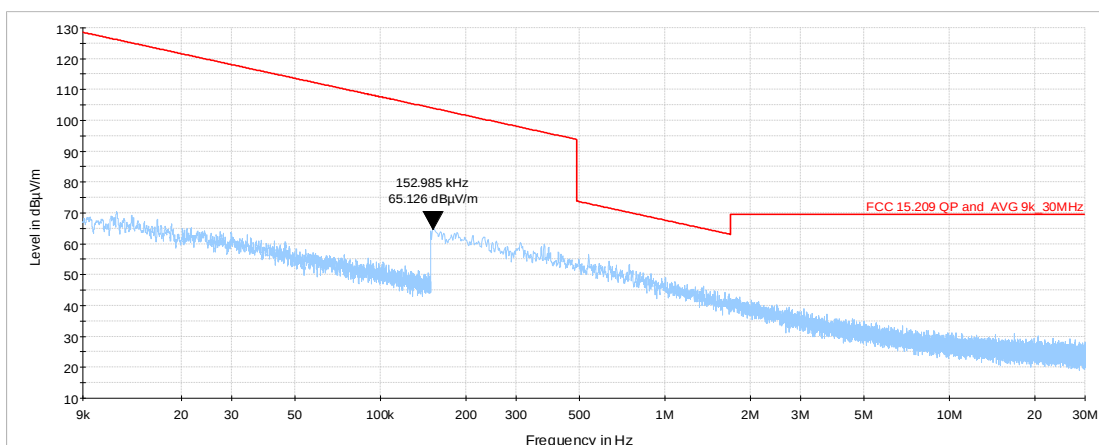


HERMON LABORATORIES

Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Plot 7.3.6 Radiated emission measurements from 0.009 to 30 MHz at the high carrier frequency

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



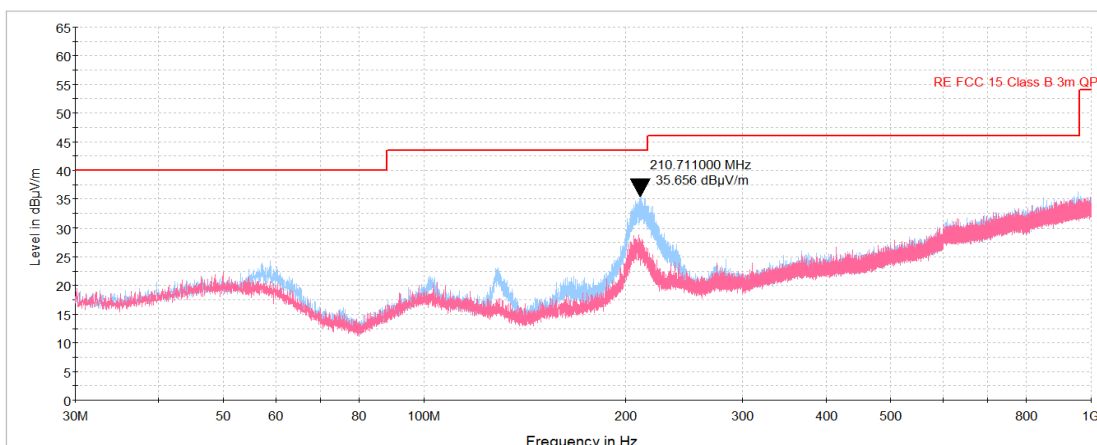


HERMON LABORATORIES

Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

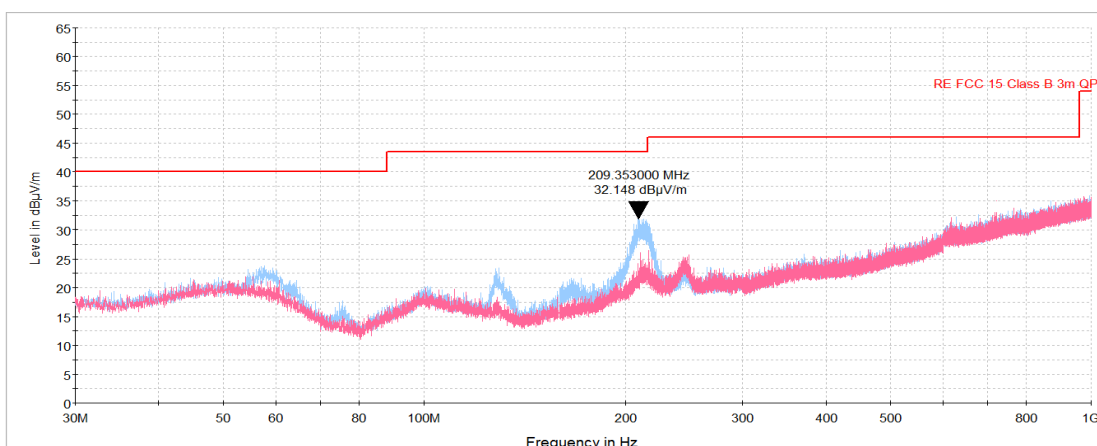
Plot 7.3.7 Radiated emission measurements from 30 to 1000 MHz at the low carrier frequency

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



Plot 7.3.8 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



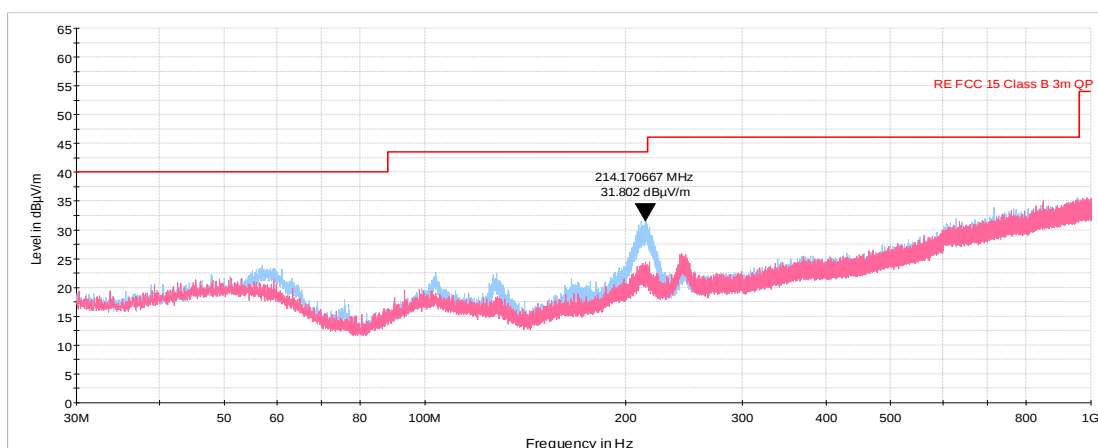


HERMON LABORATORIES

Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Plot 7.3.9 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



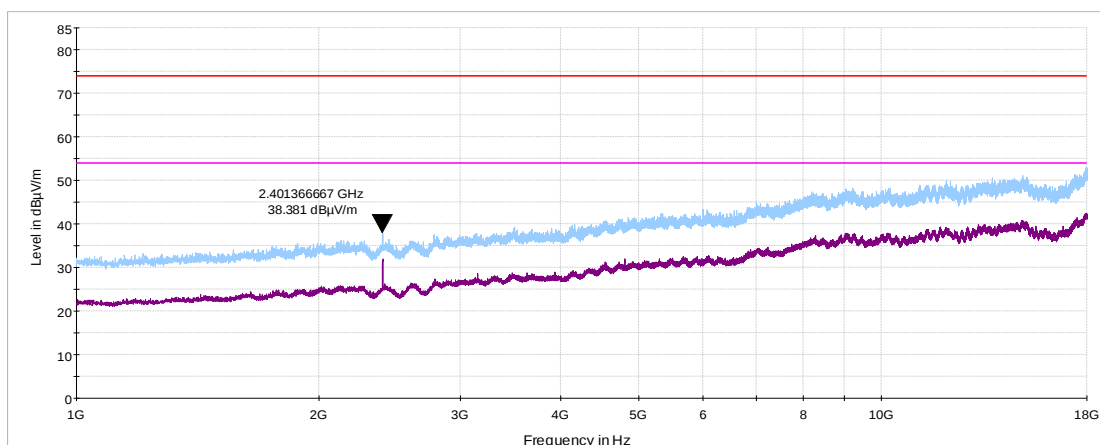


HERMON LABORATORIES

Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Plot 7.3.10 Radiated emission measurements from 1000 to 18000 MHz at the low carrier frequency

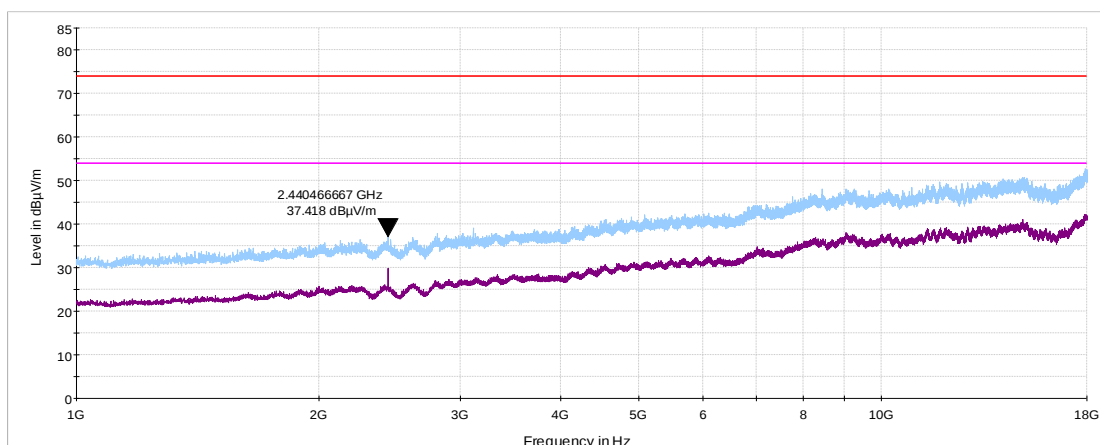
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



With filter HL 4338 (Stop band 2170-3000 MHz)

Plot 7.3.11 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



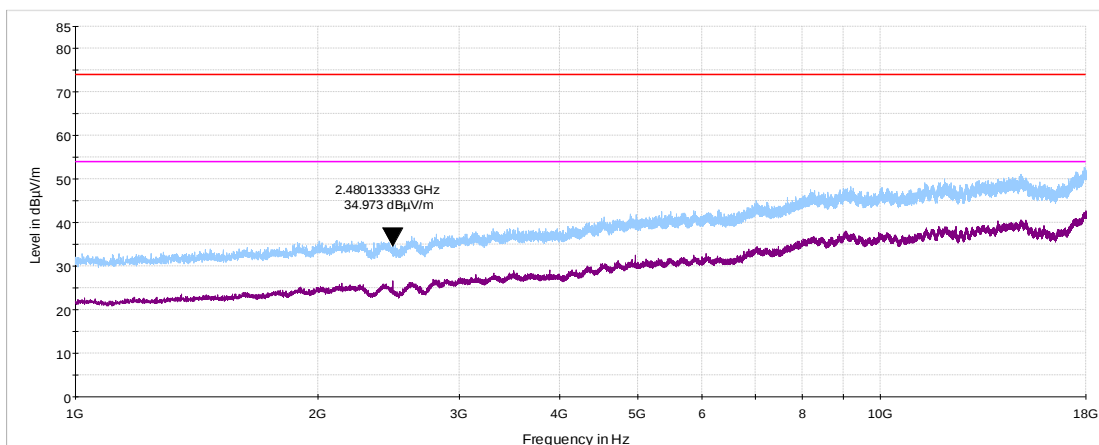
With filter HL 4338 (Stop band 2170-3000 MHz)



Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Plot 7.3.12 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



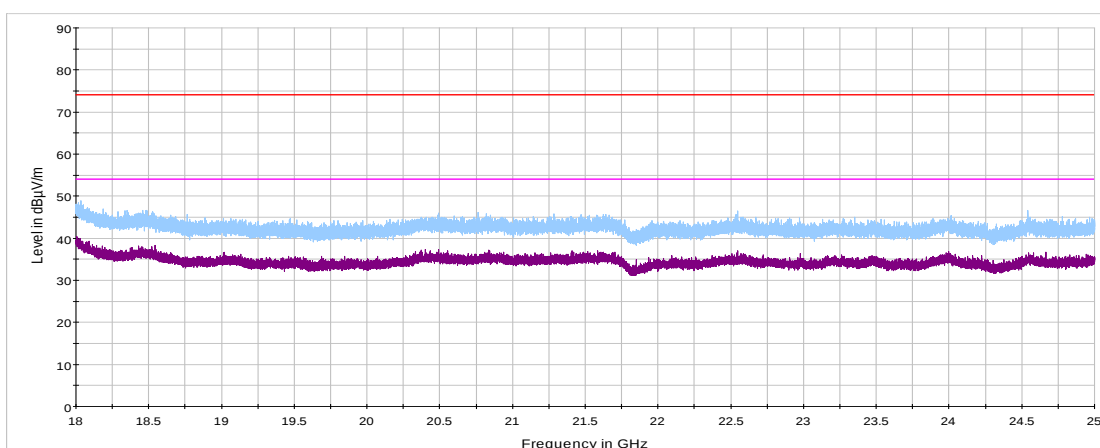
With filter HL 4338 (Stop band 2170-3000 MHz)



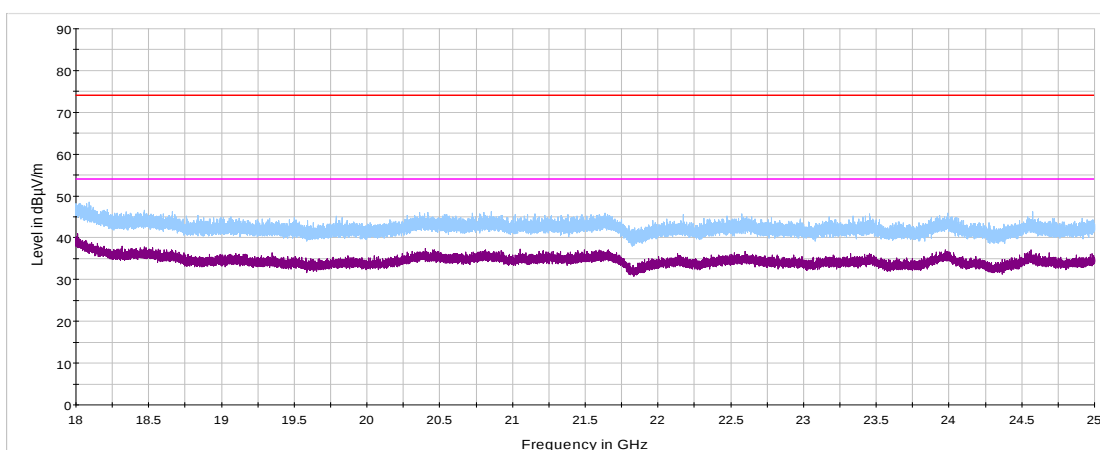
Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Plot 7.3.13 Radiated emission measurements from 18000 to 25000 MHz at the low carrier frequency

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

**Plot 7.3.14 Radiated emission measurements from 18000 to 25000 MHz at the mid carrier frequency**

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





HERMON LABORATORIES

Test specification: Section 15.247(d) / RSS-247 section 5.5, Band edge emissions			
Test procedure: ANSI C63.10 section 11.12.1			
Test mode: Compliance		Verdict: PASS	
Date(s): 22-Sep-24			
Temperature: 24 °C	Relative Humidity: 42 %	Air Pressure: 1005 hPa	Power: 25.5 VDC
Remarks:			

Plot 7.3.25 Radiated emission measurements from 18000 to 25000 MHz at the high carrier frequency

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

