

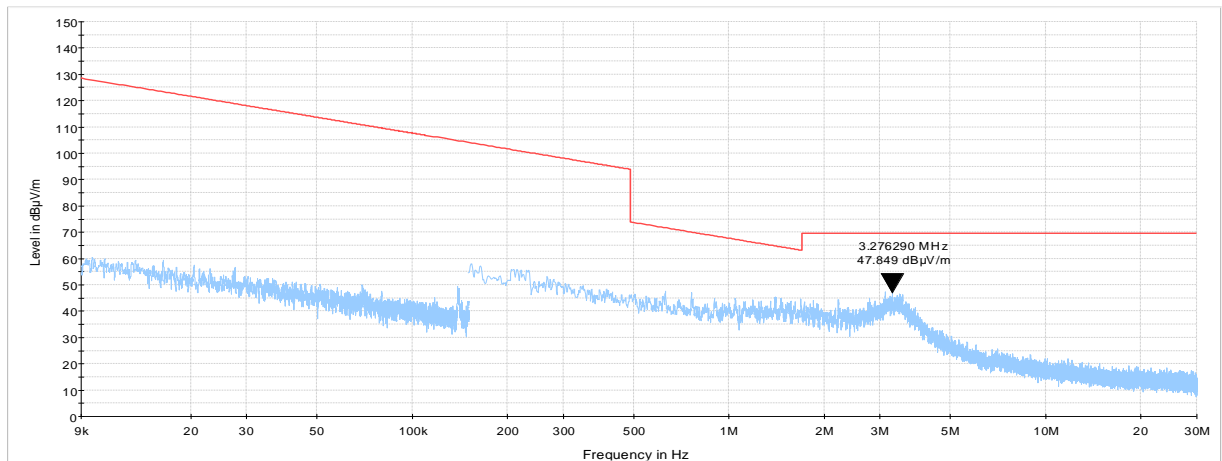


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Test specification: Section 15.258(c)(2), Out of band radiated emissions below 40 GHz			
Test procedure: ANSI C63.10, Section 9.13			
Test mode: Compliance		Verdict: PASS	
Date(s): 18-Jan-21			
Temperature: 24 °C	Relative Humidity: 48 %	Air Pressure: 1015 hPa	Power: 5 VDC
Remarks:			

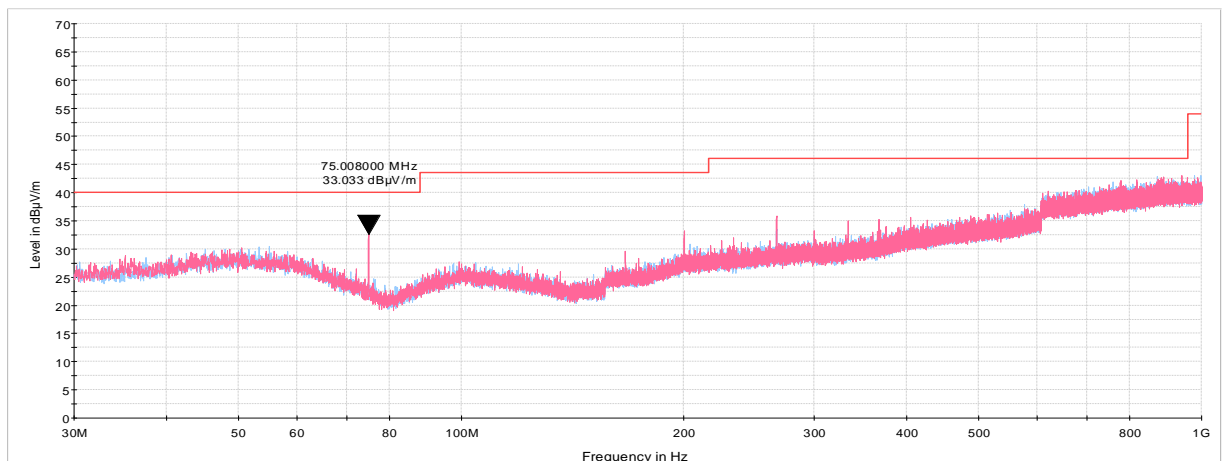
Plot 7.4.3 Radiated emission measurements from 9 KHz to 30 MHz at high frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
EUT POSITION: Typical (Vertical)



Plot 7.4.4 Radiated emission measurements from 30 to 1000 MHz at low frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
EUT POSITION: Typical (Vertical)

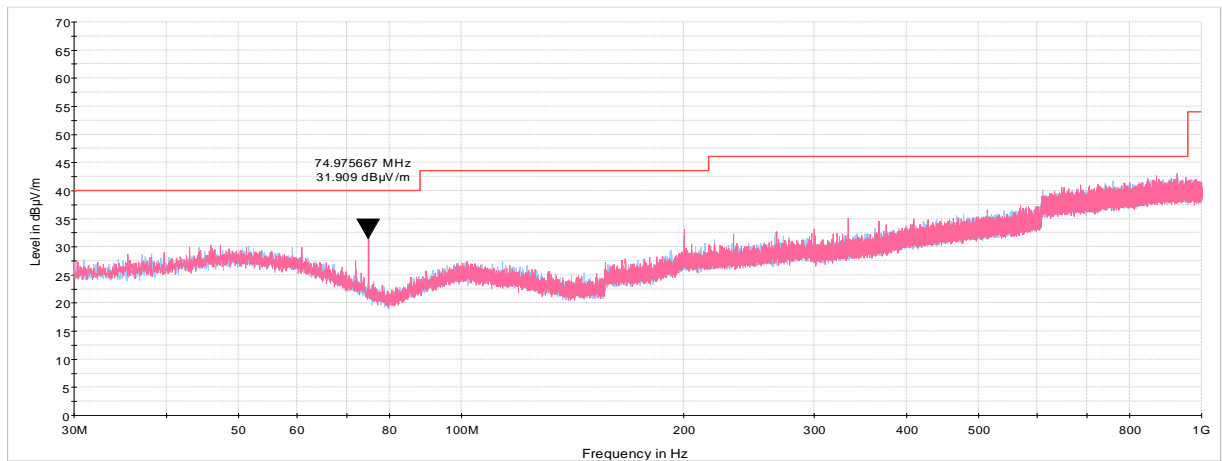




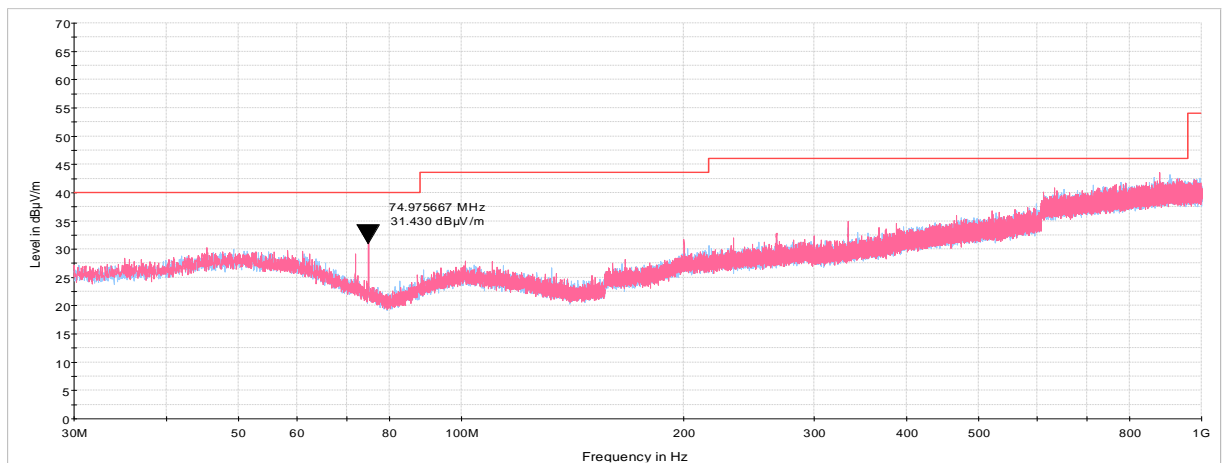
Test specification: Section 15.258(c)(2), Out of band radiated emissions below 40 GHz			
Test procedure: ANSI C63.10, Section 9.13			
Test mode: Compliance		Verdict: PASS	
Date(s): 18-Jan-21			
Temperature: 24 °C	Relative Humidity: 48 %	Air Pressure: 1015 hPa	Power: 5 VDC
Remarks:			

Plot 7.4.5 Radiated emission measurements from 30 to 1000 MHz at mid frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
EUT POSITION: Typical (Vertical)

**Plot 7.4.6 Radiated emission measurements from 30 to 1000 MHz at high frequency**

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
EUT POSITION: Typical (Vertical)

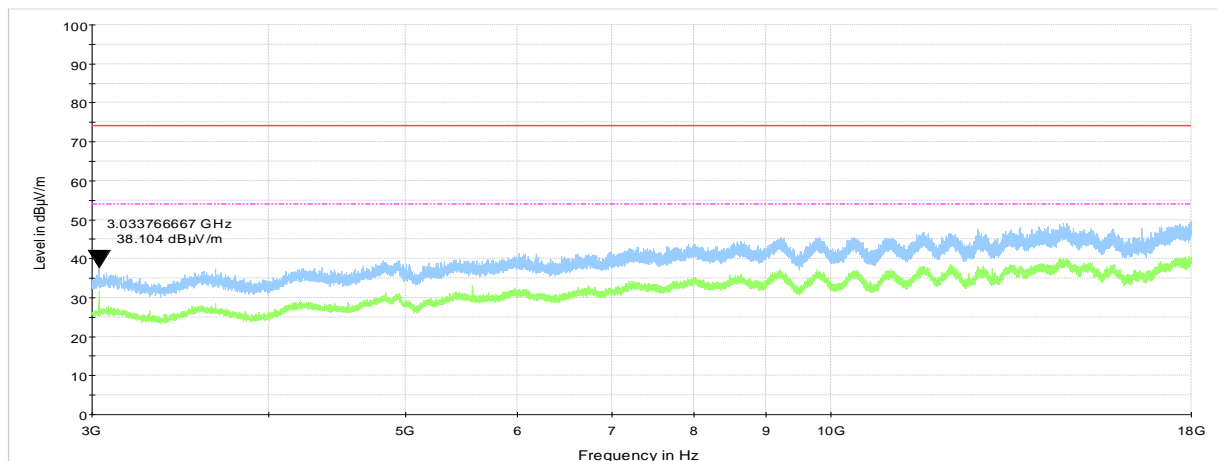




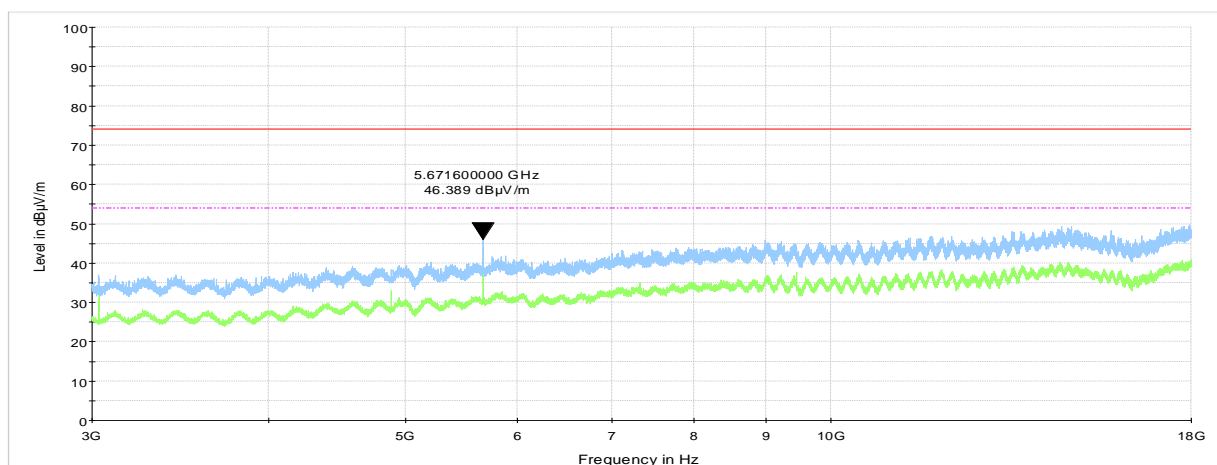
Test specification: Section 15.258(c)(2), Out of band radiated emissions below 40 GHz			
Test procedure: ANSI C63.10, Section 9.13			
Test mode: Compliance		Verdict: PASS	
Date(s): 18-Jan-21			
Temperature: 24 °C	Relative Humidity: 48 %	Air Pressure: 1015 hPa	Power: 5 VDC
Remarks:			

Plot 7.4.7 Radiated emission measurements from 1 to 18 MHz at low frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
EUT POSITION: Typical (Vertical)

**Plot 7.4.8 Radiated emission measurements from 1 to 18 MHz at mid frequency**

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
EUT POSITION: Typical (Vertical)

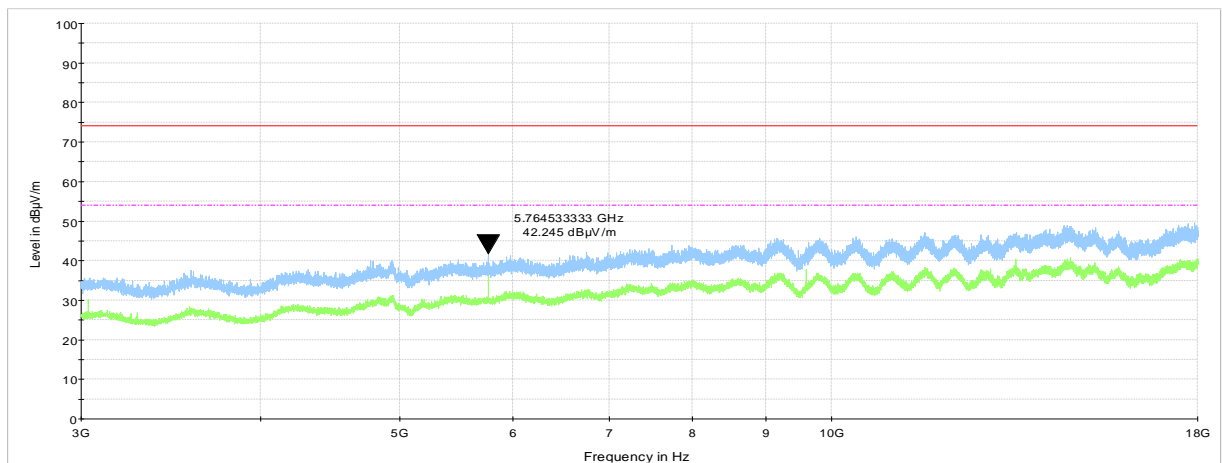




Test specification: Section 15.258(c)(2), Out of band radiated emissions below 40 GHz			
Test procedure: ANSI C63.10, Section 9.13			
Test mode: Compliance		Verdict: PASS	
Date(s): 18-Jan-21			
Temperature: 24 °C	Relative Humidity: 48 %	Air Pressure: 1015 hPa	Power: 5 VDC
Remarks:			

Plot 7.4.9 Radiated emission measurements from 1 to 18 MHz at high frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
EUT POSITION: Typical (Vertical)

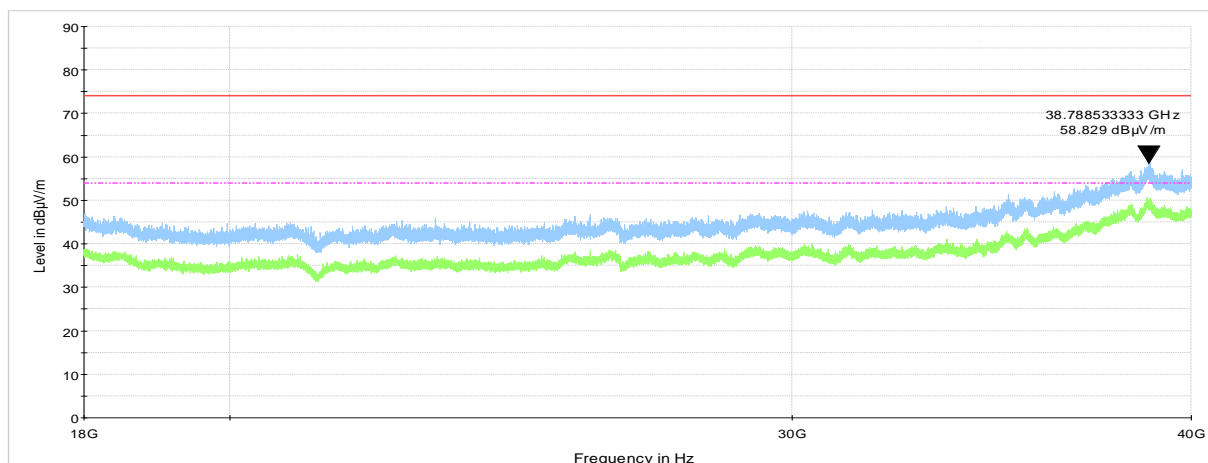




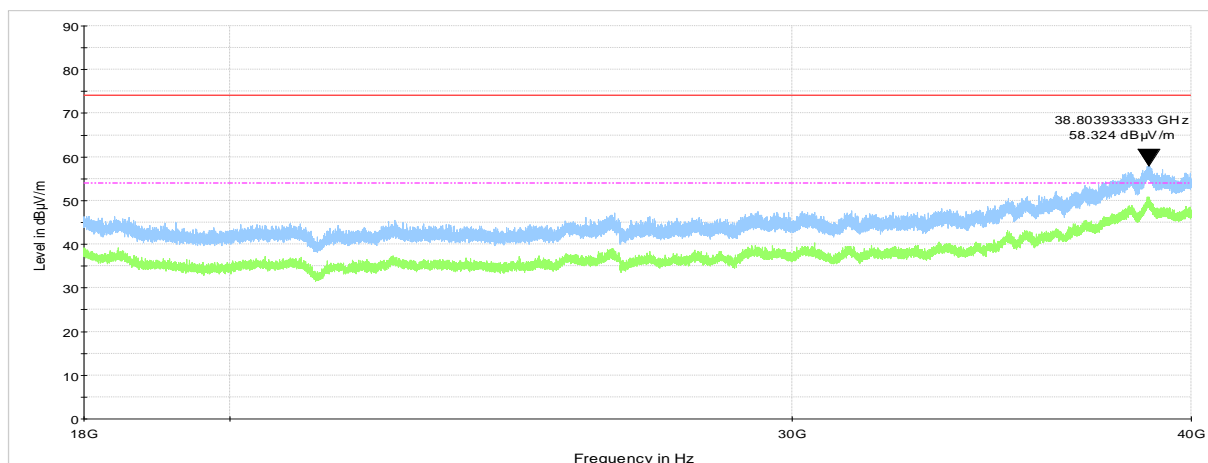
Test specification: Section 15.258(c)(2), Out of band radiated emissions below 40 GHz			
Test procedure: ANSI C63.10, Section 9.13			
Test mode: Compliance		Verdict: PASS	
Date(s): 18-Jan-21			
Temperature: 24 °C	Relative Humidity: 48 %	Air Pressure: 1015 hPa	Power: 5 VDC
Remarks:			

Plot 7.4.10 Radiated emission measurements from 18 to 40 GHz at low frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
EUT POSITION: Typical (Vertical)

**Plot 7.4.11 Radiated emission measurements from 18 to 40 GHz at mid frequency**

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
EUT POSITION: Typical (Vertical)





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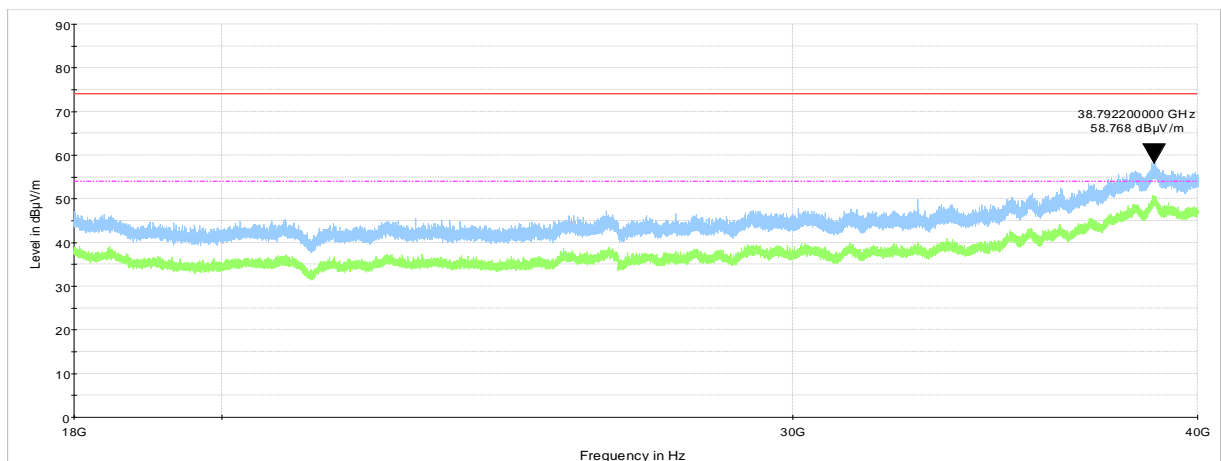
Report ID: NETRAD_FCC.41599_Rev2

Date of Issue: 8-Apr-21

Test specification: Section 15.258(c)(2), Out of band radiated emissions below 40 GHz			
Test procedure: ANSI C63.10, Section 9.13			
Test mode: Compliance		Verdict: PASS	
Date(s): 18-Jan-21			
Temperature: 24 °C	Relative Humidity: 48 %	Air Pressure: 1015 hPa	Power: 5 VDC
Remarks:			

Plot 7.4.12 Radiated emission measurements from 18 to 40 GHz at high frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
EUT POSITION: Typical (Vertical)





Test specification:		Section 15.258(c)(3), Out of band radiated emissions above 40 GHz up to 370 GHz	
Test procedure:		ANSI C63.10, Sections 9.9, 9.12	
Test mode:		Verdict: PASS	
Date(s):			
04-Jan-21			
Temperature: 22 °C	Relative Humidity: 48 %	Air Pressure: 1014 hPa	Power: 5 VDC
Remarks:			

7.5 Out of band radiated emissions above 40 GHz up to 370 GHz

7.5.1 General

This test was performed to measure radiated spurious emissions from the EUT. Specification test limits are given in Table 7.5.1.

Table 7.5.1 Spurious emission field strength limits

Frequency, GHz	Power density at 3 m distance pW/cm ²	Distance, m	Field strength dB(μV/m)*, peak	Field strength dB(μV/m)*, average
40 – 370	90.0	3.0	105.30	85.30
90 - 140	90.0	0.10	134.80**	114.80**
140 - 220	90.0	0.01	154.80**	134.80**
220 - 370	90.0	1.0	114.84**	94.84**

*- The limit is provided in average values.

** - The limit for 1 m and other test distance was calculated using the inverse distance extrapolation factor as follows:

for far field: $\text{Lim}_{S_2} = \text{Lim}_{S_1} + 20 \log (S_1/S_2)$,

where S_1 – standard defined distance in meters;

S_2 – measurement distance in meters (according to ANSI C63.10)

7.5.2 Test procedure for spurious emission field strength measurements

7.5.2.1 The EUT was set up as shown in Figure 7.4.1, energized and the performance check was conducted.

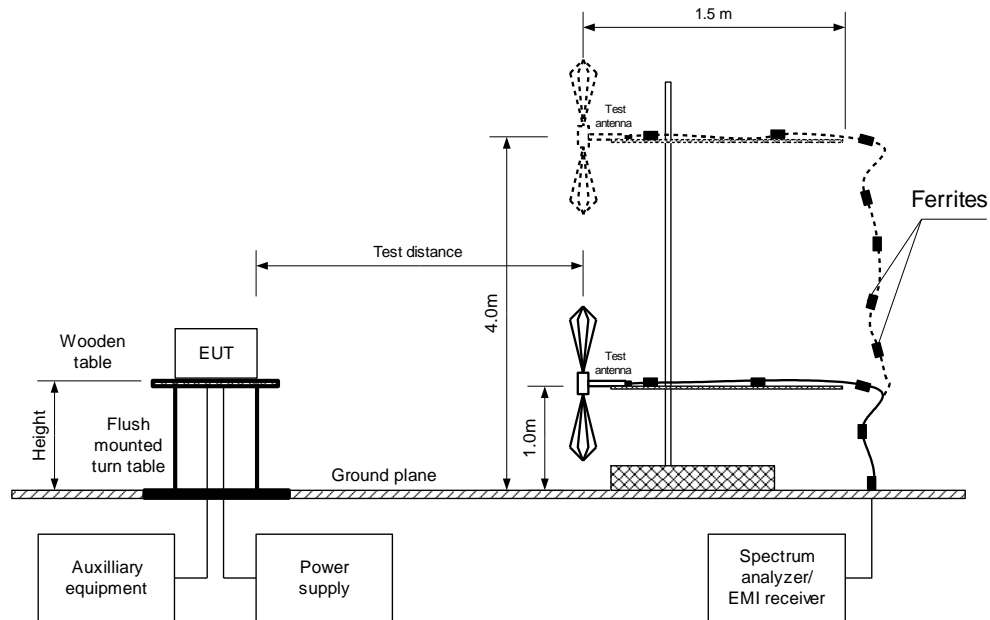
7.5.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360°, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal.

7.5.2.3 The test results were recorded in Table 7.4.2 and are shown in the associated plots.



Test specification:		Section 15.258(c)(3), Out of band radiated emissions above 40 GHz up to 370 GHz	
Test procedure:		ANSI C63.10, Sections 9.9, 9.12	
Test mode:		Verdict: PASS	
Date(s):			
Compliance			
04-Jan-21			
Temperature: 22 °C	Relative Humidity: 48 %	Air Pressure: 1014 hPa	Power: 5 VDC
Remarks:			

Figure 7.5.1 Spurious emission field strength above 40 GHz test set up





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Test specification:		Section 15.258(c)(3), Out of band radiated emissions above 40 GHz up to 370 GHz	
Test procedure:		ANSI C63.10, Sections 9.9, 9.12	
Test mode:		Verdict: PASS	
Date(s):			
Temperature: 22 °C	Relative Humidity: 48 %	Air Pressure: 1014 hPa	Power: 5 VDC
Remarks:			

Table 7.5.2 Spurious emission field strength test results

TEST DISTANCE: 0.01 - 3 m
EUT POSITION: Typical (Vertical)
MODULATION: CW
TRANSMITTER OUTPUT POWER: Maximum
INVESTIGATED FREQUENCY RANGE: 40 – 370 GHz
RESOLUTION BANDWIDTH: 1000 kHz
VIDEO BANDWIDTH: ≥ Resolution bandwidth
TEST ANTENNA TYPE: Standard Gain Horn 24dB (40-60 GHz)
Standard Gain Horn 24dB (50-75 GHz)
Standard Gain Horn 24dB (75-110 GHz)
Standard Gain Horn 24dB (90-140 GHz)
Standard Gain Horn 24dB (140-220 GHz)
Standard Gain Horn 24dB (220-330 GHz)...
Standard Gain Horn 24dB (330-370 GHz)...

Frequency, MHz	Antenna		Azimuth, degrees*	Peak field strength(VBW=3 MHz)			Average field strength(VBW=100 kHz)			Verdict
	Polariz.	Height, m		Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
Low frequency 119.000 GHz										
237998.0	V	1.0	0	83.09	114.84	-31.75	83.09	94.84	-11.75	Pass
237998.0	H	1.0	0	83.93	114.84	-30.91	83.93	94.84	-10.91	Pass
Mid frequency 121.000 GHz										
241998.7	V	1.0	0	84.78	114.84	-30.06	84.78	94.84	-10.06	Pass
241998.3	H	1.0	0	82.02	114.84	-32.82	82.02	94.84	-12.82	Pass
High frequency 122.980 GHz										
246957.3	V	1.0	0	79.89	114.84	-34.95	79.89	94.84	-14.95	Pass
245957.0	H	1.0	0	78.87	114.84	-35.97	78.87	94.84	-15.97	Pass

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

** - Margin = Measured emission - specification limit.

Reference numbers of test equipment used

HL 5376	HL 3433	HL 747	HL 3536	HL 1312	HL 3329	HL 3235	HL 770
HL 4023	HL 748	HL 771	HL 5380	HL 5409			

Full description is given in Appendix A.

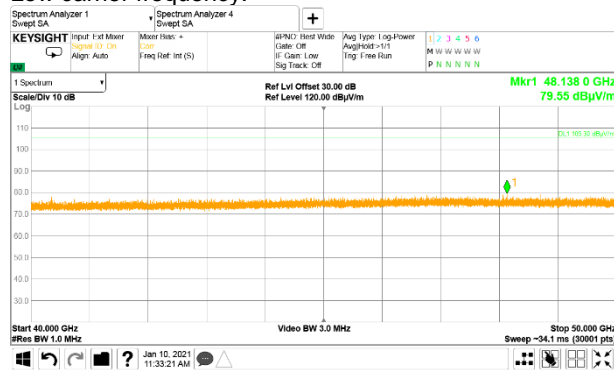


HERMON LABORATORIES

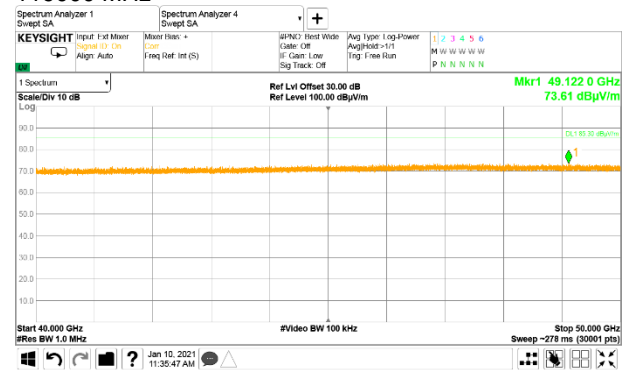
Test specification:		Section 15.258(c)(3), Out of band radiated emissions above 40 GHz up to 370 GHz	
Test procedure:		ANSI C63.10, Sections 9.9, 9.12	
Test mode:		Compliance	Verdict: PASS
Date(s):		04-Jan-21	
Temperature: 22 °C	Relative Humidity: 48 %	Air Pressure: 1014 hPa	Power: 5 VDC
Remarks:			

Plot 7.5.1 Spurious emission measurements in 40 - 50 GHz range

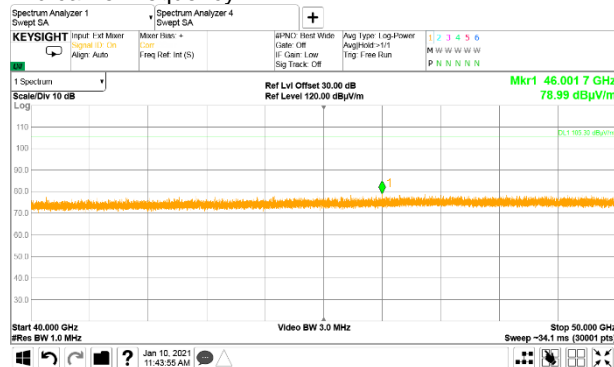
TEST SITE:
TEST DISTANCE:
MODULATION:
ANTENNA POLARIZATION:
DETECTOR: Peak RBW = 1 MHz; VBW = 3 MHz
Low carrier frequency:



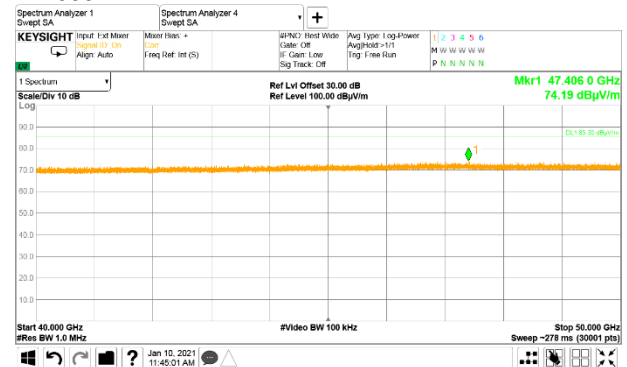
OATS
3 m
CW
Vertical and Horizontal
DETECTOR: Peak RBW = 1 MHz; VBW = 100 kHz
119000 MHz



Mid carrier frequency:



121000 MHz





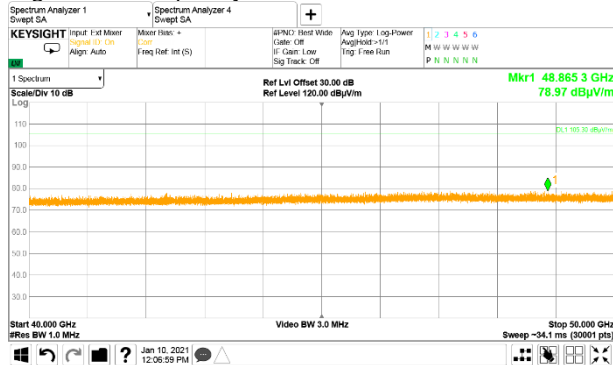
HERMON LABORATORIES

Report ID: NETRAD_FCC.41599_Rev2

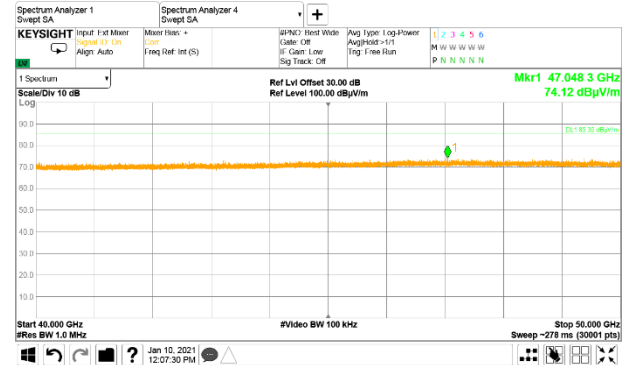
Date of Issue: 8-Apr-21

Test specification:		Section 15.258(c)(3), Out of band radiated emissions above 40 GHz up to 370 GHz	
Test procedure:		ANSI C63.10, Sections 9.9, 9.12	
Test mode:		Compliance	Verdict: PASS
Date(s):		04-Jan-21	
Temperature: 22 °C	Relative Humidity: 48 %	Air Pressure: 1014 hPa	Power: 5 VDC
Remarks:			

High carrier frequency:



122980 MHz



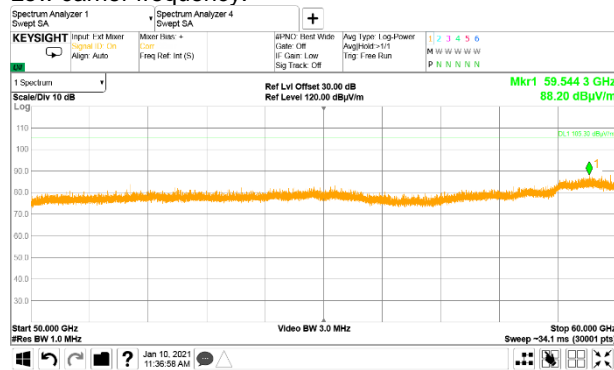


HERMON LABORATORIES

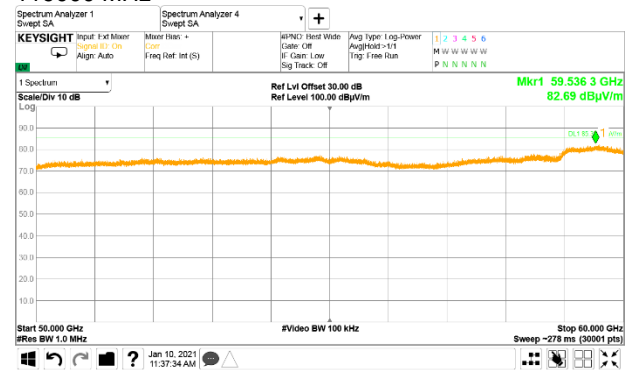
Test specification:		Section 15.258(c)(3), Out of band radiated emissions above 40 GHz up to 370 GHz	
Test procedure:		ANSI C63.10, Sections 9.9, 9.12	
Test mode:		Compliance	Verdict: PASS
Date(s):		04-Jan-21	
Temperature: 22 °C	Relative Humidity: 48 %	Air Pressure: 1014 hPa	Power: 5 VDC
Remarks:			

Plot 7.5.2 Spurious emission measurements in 50 - 60 GHz range

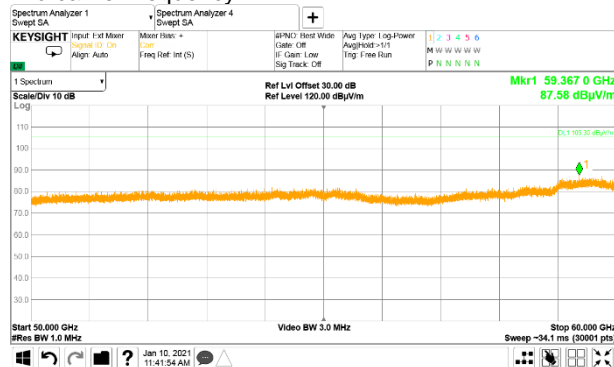
TEST SITE:
TEST DISTANCE:
MODULATION:
ANTENNA POLARIZATION:
DETECTOR: Peak RBW = 1 MHz; VBW = 3 MHz
Low carrier frequency:



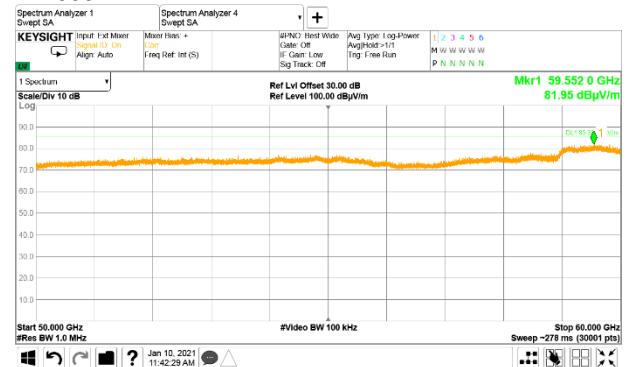
OATS
3 m
CW
Vertical and Horizontal
DETECTOR: Peak RBW = 1 MHz; VBW = 100 kHz
119000 MHz



Mid carrier frequency:



121000 MHz





The screenshot displays the Keysight Spectrum Analyzer 1 interface. The top panel shows the instrument name and various control buttons like 'Align Auto'. The main display area shows a spectrum plot with a peak at 59.587 GHz, labeled 'Mkr1'. The plot has a scale of 10 dB and a video bandwidth of 3.0 MHz. The bottom status bar shows the start frequency at 50.000 GHz, the date and time as Jan 10, 2021, 12:05:35 PM, and the sweep rate at 34.1 ms (30001 pts).

The screenshot displays a Keysight Spectrum Analyzer interface. At the top, the title bar indicates 'Spectrum Analyzer 1' and 'Divept SA'. The main display area shows a spectrum plot with a frequency range from 50.000 GHz to 60.000 GHz. A single peak is visible at 59.623 GHz, with a power level of 82.67 dBμV/m. The plot is labeled 'Mkr1' and '59.623 0 GHz' and '82.67 dBμV/m'. The x-axis is labeled 'FVideo BW 100 kHz' and the y-axis is labeled 'Scale/Div 10 dB'. The bottom status bar shows 'Start 50.000 GHz', 'IFVideo BW 100 kHz', 'Stop 60.000 GHz', and 'Sweep -278 ms (3000 pts)'. The interface also includes various control buttons and a toolbar at the bottom.



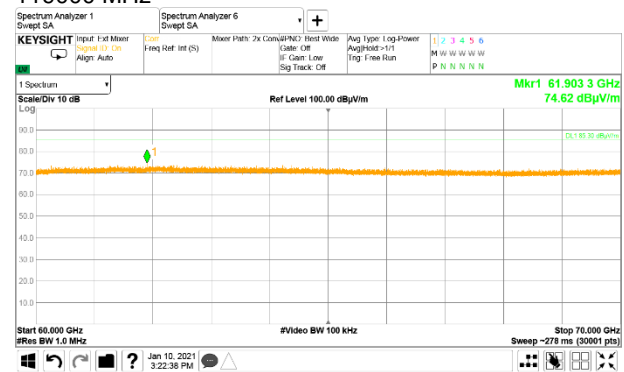
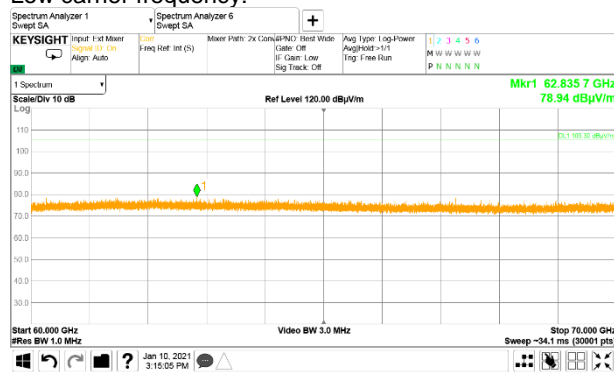
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Test specification:		Section 15.258(c)(3), Out of band radiated emissions above 40 GHz up to 370 GHz	
Test procedure:		ANSI C63.10, Sections 9.9, 9.12	
Test mode:		Compliance	Verdict: PASS
Date(s):		04-Jan-21	
Temperature: 22 °C	Relative Humidity: 48 %	Air Pressure: 1014 hPa	Power: 5 VDC
Remarks:			

Plot 7.5.3 Spurious emission measurements in 60 - 70 GHz range

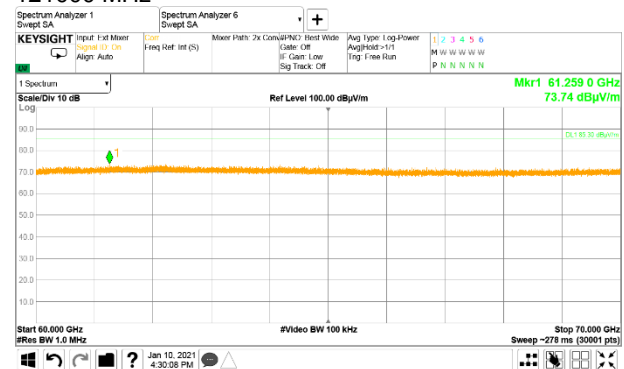
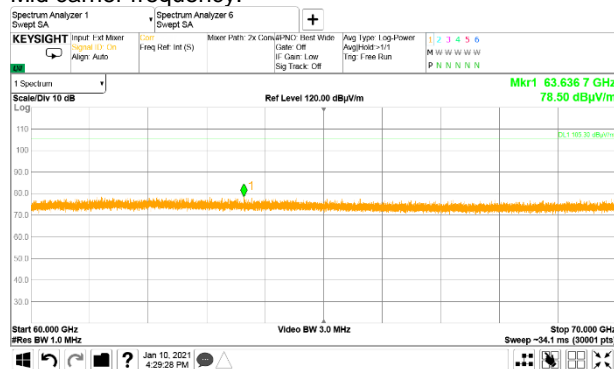
TEST SITE:
TEST DISTANCE:
MODULATION:
ANTENNA POLARIZATION:
DETECTOR: Peak RBW = 1 MHz; VBW = 3 MHz
Low carrier frequency:

OATS
3 m
CW
Vertical and Horizontal
DETECTOR: Peak RBW = 1 MHz; VBW = 100 kHz
119000 MHz



Mid carrier frequency:

121000 MHz





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Report ID: NETRAD_FCC.41599_Rev2

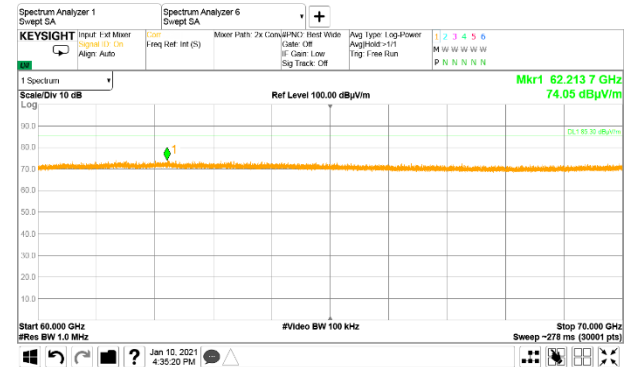
Date of Issue: 8-Apr-21

Test specification:		Section 15.258(c)(3), Out of band radiated emissions above 40 GHz up to 370 GHz	
Test procedure:		ANSI C63.10, Sections 9.9, 9.12	
Test mode:		Compliance	Verdict: PASS
Date(s):		04-Jan-21	
Temperature: 22 °C	Relative Humidity: 48 %	Air Pressure: 1014 hPa	Power: 5 VDC
Remarks:			

High carrier frequency:



122980 MHz



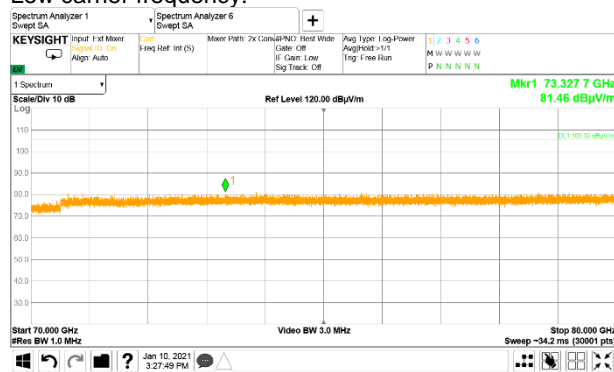


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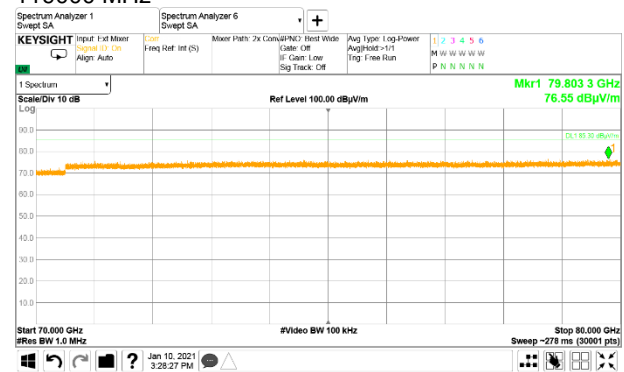
Test specification:		Section 15.258(c)(3), Out of band radiated emissions above 40 GHz up to 370 GHz	
Test procedure:		ANSI C63.10, Sections 9.9, 9.12	
Test mode:		Compliance	Verdict: PASS
Date(s):		04-Jan-21	
Temperature: 22 °C	Relative Humidity: 48 %	Air Pressure: 1014 hPa	Power: 5 VDC
Remarks:			

Plot 7.5.4 Spurious emission measurements in 70 - 80 GHz range

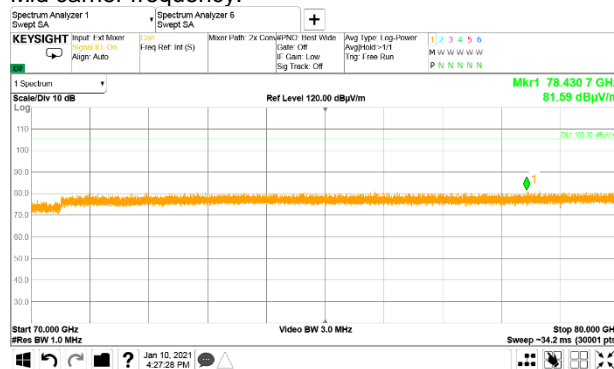
TEST SITE:
TEST DISTANCE:
MODULATION:
ANTENNA POLARIZATION:
DETECTOR: Peak RBW = 1 MHz; VBW = 3 MHz
Low carrier frequency:



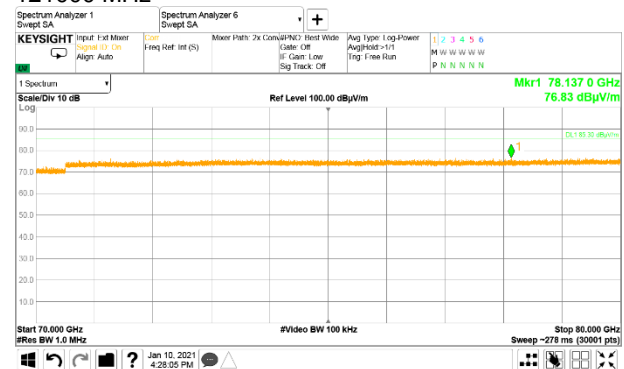
OATS
3 m
CW
Vertical and Horizontal
DETECTOR: Peak RBW = 1 MHz; VBW = 100 kHz
119000 MHz



Mid carrier frequency:



121000 MHz



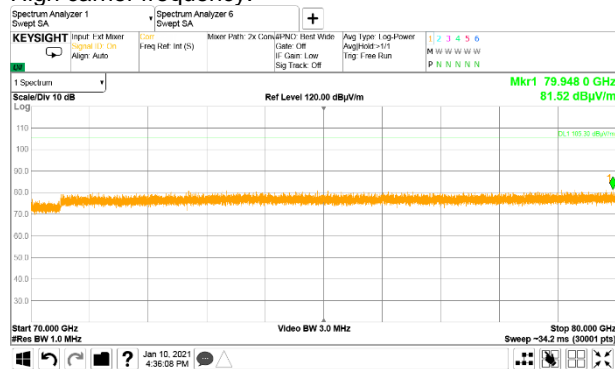


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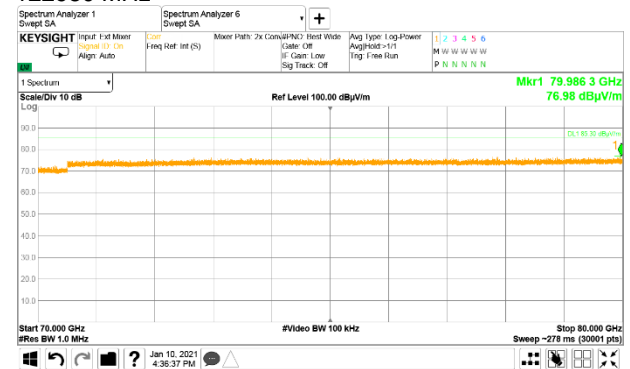
Report ID: NETRAD_FCC.41599_Rev2
Date of Issue: 8-Apr-21

Test specification:		Section 15.258(c)(3), Out of band radiated emissions above 40 GHz up to 370 GHz	
Test procedure:		ANSI C63.10, Sections 9.9, 9.12	
Test mode:		Compliance	Verdict: PASS
Date(s):		04-Jan-21	
Temperature: 22 °C	Relative Humidity: 48 %	Air Pressure: 1014 hPa	Power: 5 VDC
Remarks:			

High carrier frequency:



122980 MHz





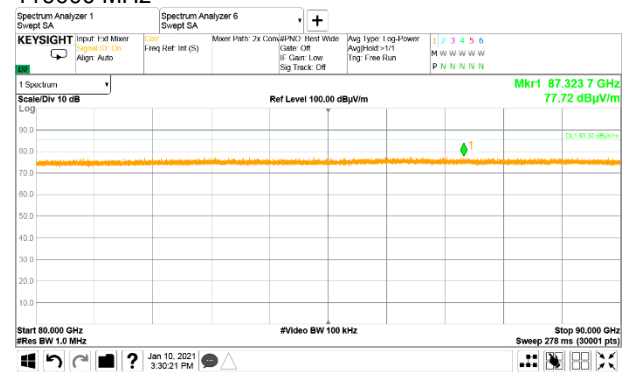
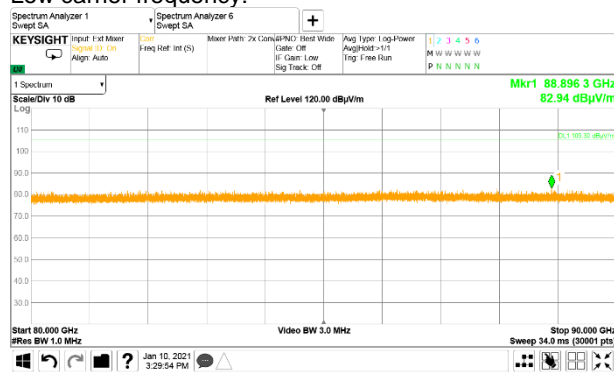
HERMON LABORATORIES

Test specification:		Section 15.258(c)(3), Out of band radiated emissions above 40 GHz up to 370 GHz	
Test procedure:		ANSI C63.10, Sections 9.9, 9.12	
Test mode:		Compliance	Verdict: PASS
Date(s):		04-Jan-21	
Temperature: 22 °C	Relative Humidity: 48 %	Air Pressure: 1014 hPa	Power: 5 VDC
Remarks:			

Plot 7.5.5 Spurious emission measurements in 80 - 90 GHz range

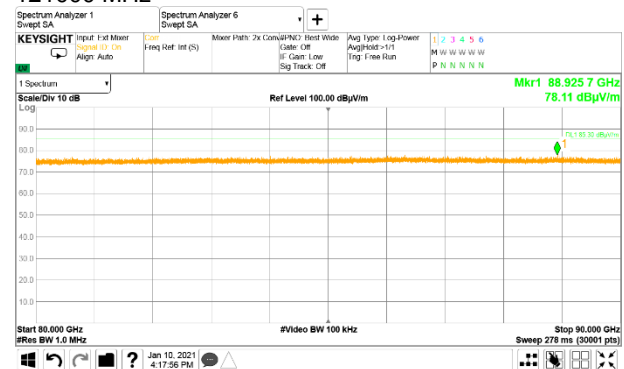
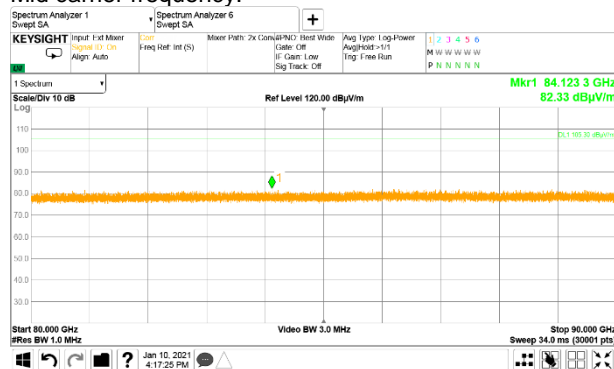
TEST SITE:
TEST DISTANCE:
MODULATION:
ANTENNA POLARIZATION:
DETECTOR: Peak RBW = 1 MHz; VBW = 3 MHz
Low carrier frequency:

OATS
3 m
CW
Vertical and Horizontal
DETECTOR: Peak RBW = 1 MHz; VBW = 100 kHz
119000 MHz



Mid carrier frequency:

121000 MHz



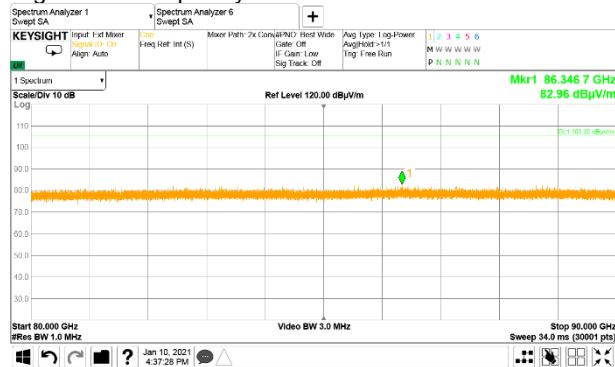


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Report ID: NETRAD_FCC.41599_Rev2
Date of Issue: 8-Apr-21

Test specification:		Section 15.258(c)(3), Out of band radiated emissions above 40 GHz up to 370 GHz	
Test procedure:		ANSI C63.10, Sections 9.9, 9.12	
Test mode:		Compliance	Verdict: PASS
Date(s):		04-Jan-21	
Temperature: 22 °C	Relative Humidity: 48 %	Air Pressure: 1014 hPa	Power: 5 VDC
Remarks:			

High carrier frequency:



122980 MHz

