



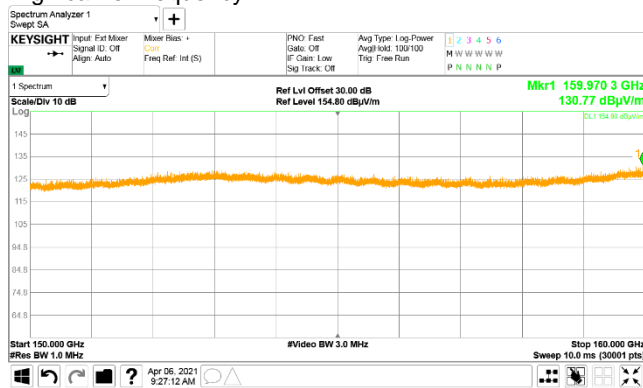
HERMON LABORATORIES

Test specification: FCC Section 15.255(d)(3), RSS-210 section J.3, Out of band radiated emissions above 40 GHz			
Test procedure: ANSI C63.10, Sections 9.9, 9.12			
Test mode: Compliance	Verdict: PASS		
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.4.45 Spurious emission measurements in 150 - 160 GHz range

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

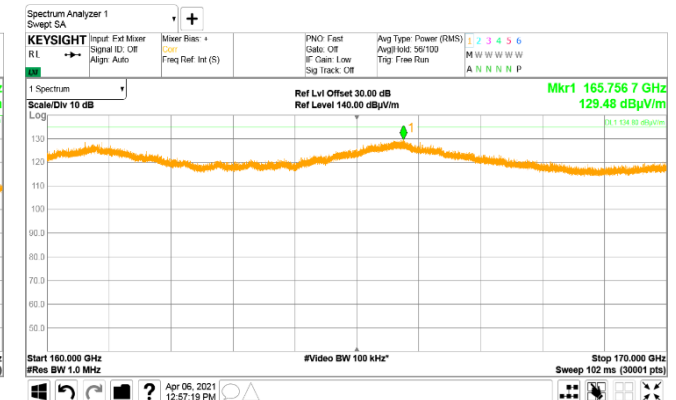
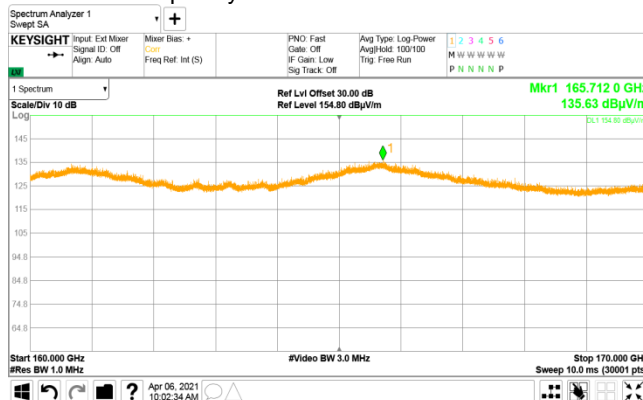
OATS
 0.01 m
 Vertical and Horizontal
 DETECTOR: Average RBW = 1 MHz; VBW = 100 kHz
 64800 MHz



Plot 7.4.46 Spurious emission measurements in 160 - 170 GHz range

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

OATS
 0.01 m
 16QAM
 Vertical and Horizontal
 DETECTOR: Average RBW = 1 MHz; VBW = 100 kHz
 58320 MHz





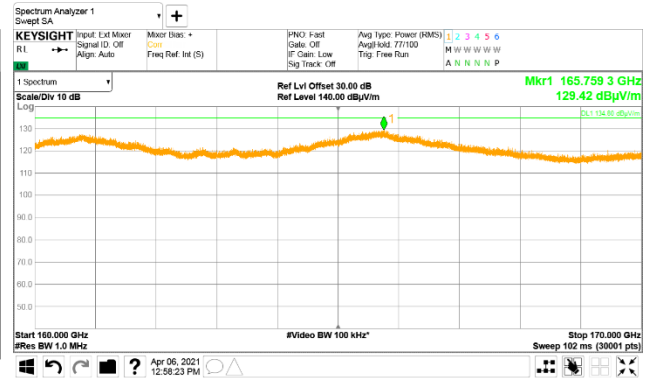
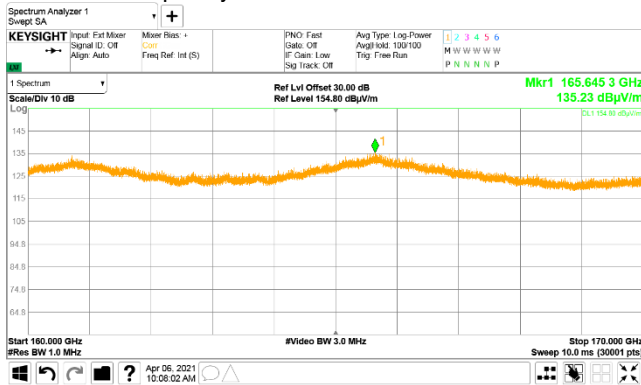
HERMON LABORATORIES

Test specification: FCC Section 15.255(d)(3), RSS-210 section J.3, Out of band radiated emissions above 40 GHz			
Test procedure: ANSI C63.10, Sections 9.9, 9.12			
Test mode: Compliance	Verdict: PASS		
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.4.47 Spurious emission measurements in 160 - 170 GHz range

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

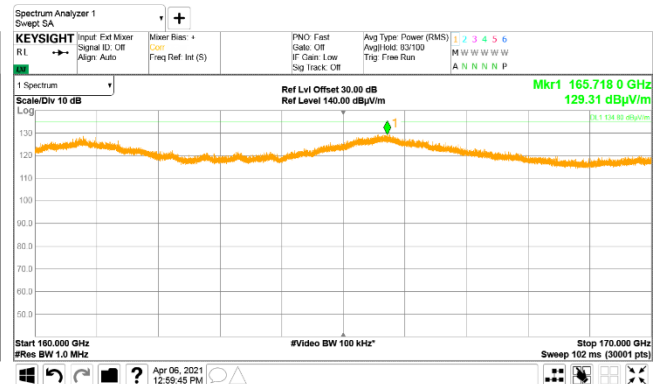
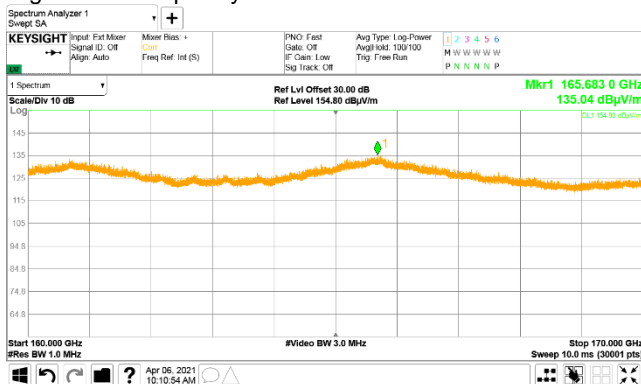
OATS
0.01 m
Vertical and Horizontal
DETECTOR: Average RBW = 1 MHz; VBW = 100 kHz
62640 MHz



Plot 7.4.48 Spurious emission measurements in 160 - 170 GHz range

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

OATS
0.01 m
Vertical and Horizontal
DETECTOR: Average RBW = 1 MHz; VBW = 100 kHz
64800 MHz





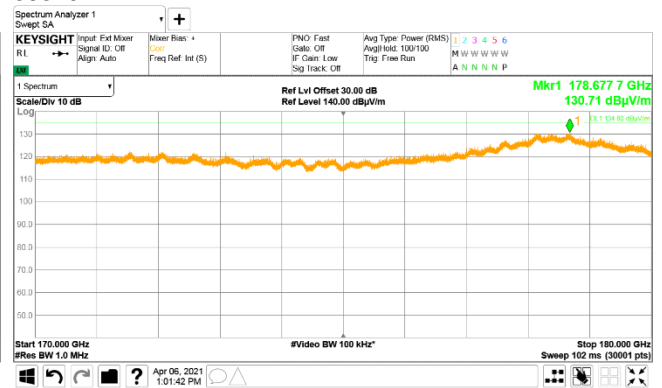
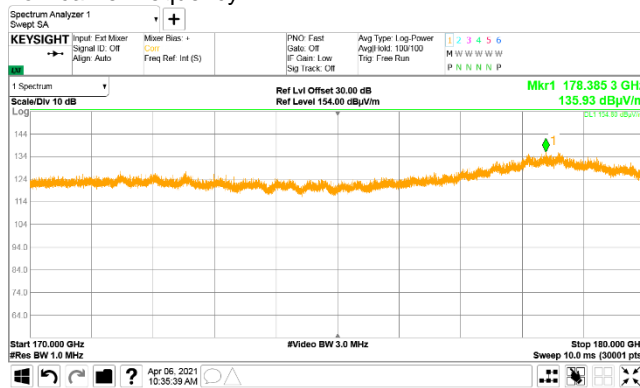
HERMON LABORATORIES

Test specification: FCC Section 15.255(d)(3), RSS-210 section J.3, Out of band radiated emissions above 40 GHz			
Test procedure: ANSI C63.10, Sections 9.9, 9.12			
Test mode: Compliance	Verdict: PASS		
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.4.49 Spurious emission measurements in 170 - 180 GHz range

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

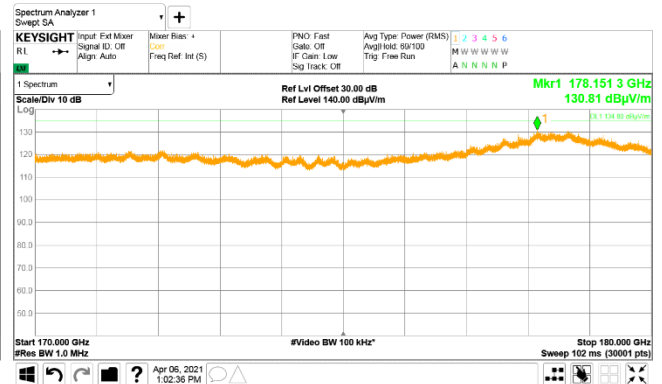
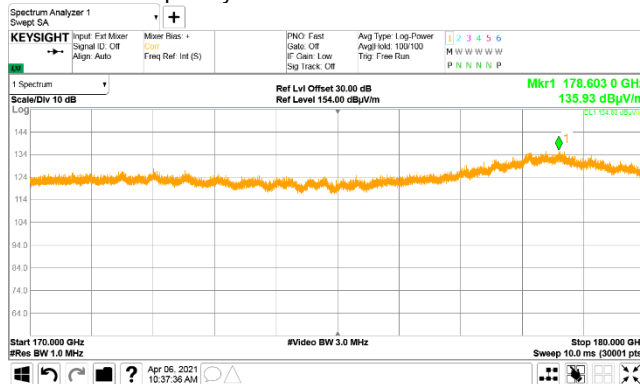
OATS
0.01 m
Vertical and Horizontal
DETECTOR: Average RBW = 1 MHz; VBW = 100 kHz
58320 MHz



Plot 7.4.50 Spurious emission measurements in 170 - 180 GHz range

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

OATS
0.01 m
Vertical and Horizontal
DETECTOR: Average RBW = 1 MHz; VBW = 100 kHz
62640 MHz





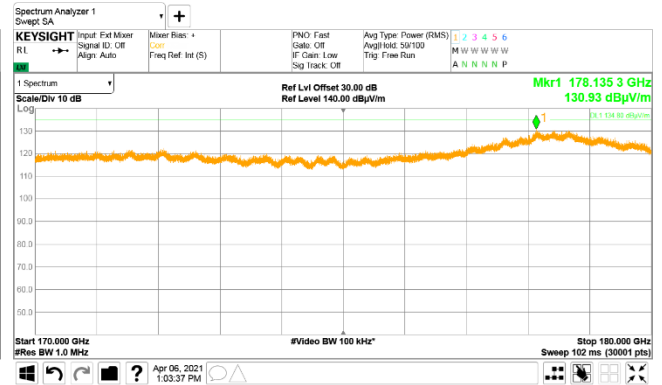
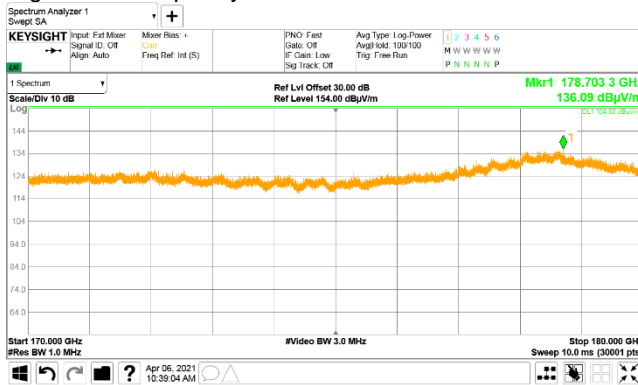
HERMON LABORATORIES

Test specification: FCC Section 15.255(d)(3), RSS-210 section J.3, Out of band radiated emissions above 40 GHz			
Test procedure: ANSI C63.10, Sections 9.9, 9.12			
Test mode: Compliance	Verdict: PASS		
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.4.51 Spurious emission measurements in 170 - 180 GHz range

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

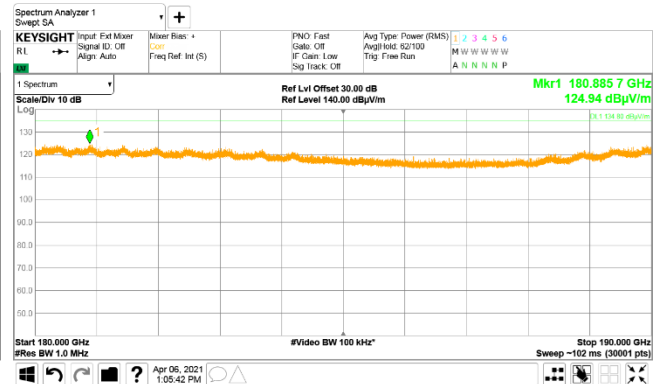
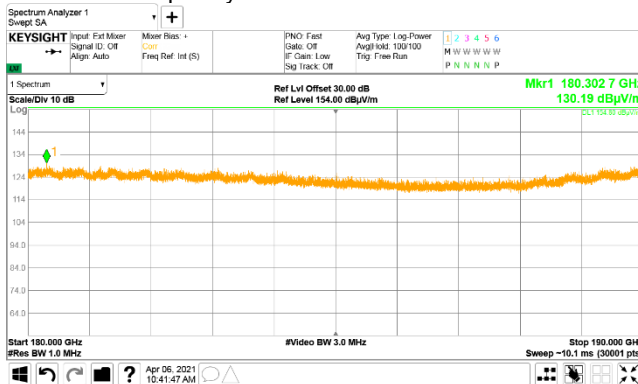
OATS
0.01 m
Vertical and Horizontal
DETECTOR: Average RBW = 1 MHz; VBW = 100 kHz
64800 MHz



Plot 7.4.52 Spurious emission measurements in 180 - 190 GHz range

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

OATS
0.01 m
Vertical and Horizontal
DETECTOR: Average RBW = 1 MHz; VBW = 10 kHz
58320 MHz





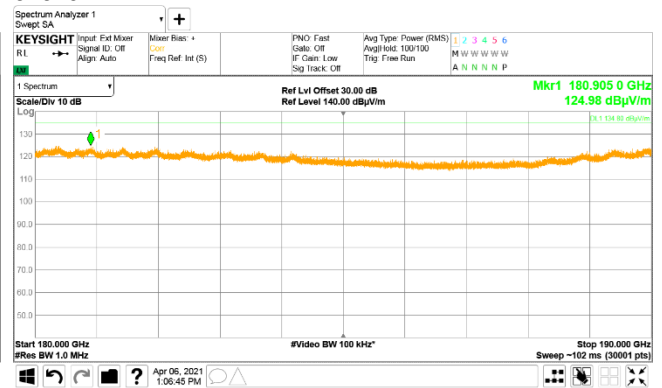
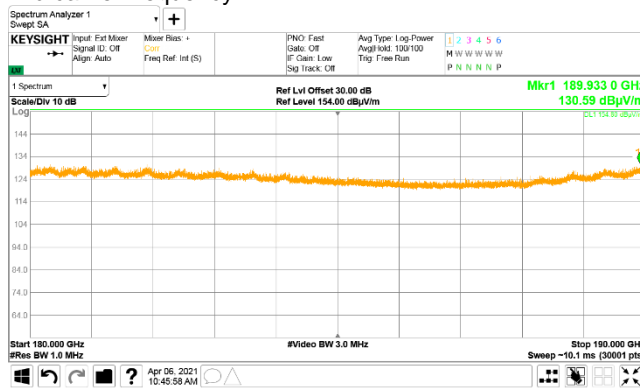
HERMON LABORATORIES

Test specification: FCC Section 15.255(d)(3), RSS-210 section J.3, Out of band radiated emissions above 40 GHz			
Test procedure: ANSI C63.10, Sections 9.9, 9.12			
Test mode: Compliance	Verdict: PASS		
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.4.53 Spurious emission measurements in 180 - 190 GHz range

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

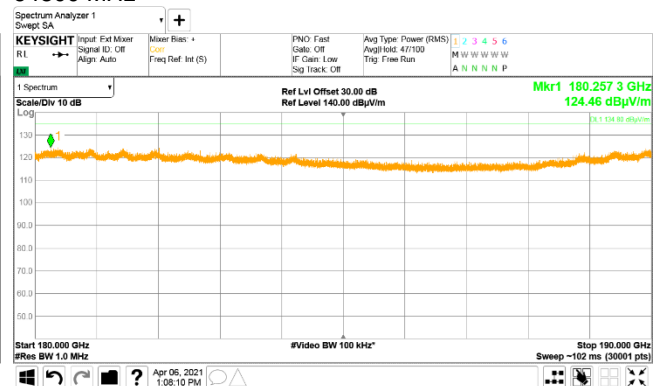
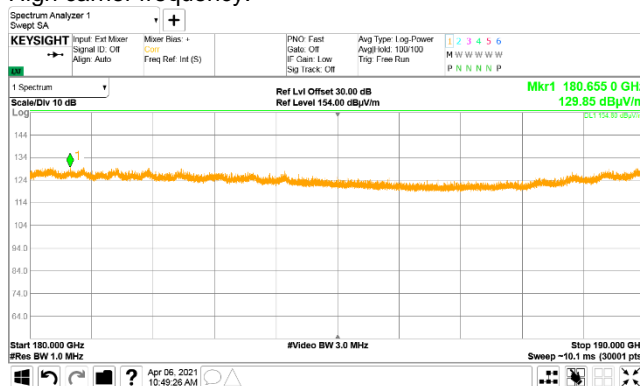
OATS
0.01 m
Vertical and Horizontal
DETECTOR: Average RBW = 1 MHz; VBW = 10 kHz
62640 MHz



Plot 7.4.54 Spurious emission measurements in 180 - 190 GHz range

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

OATS
0.01 m
Vertical and Horizontal
DETECTOR: Average RBW = 1 MHz; VBW = 10 kHz
64800 MHz





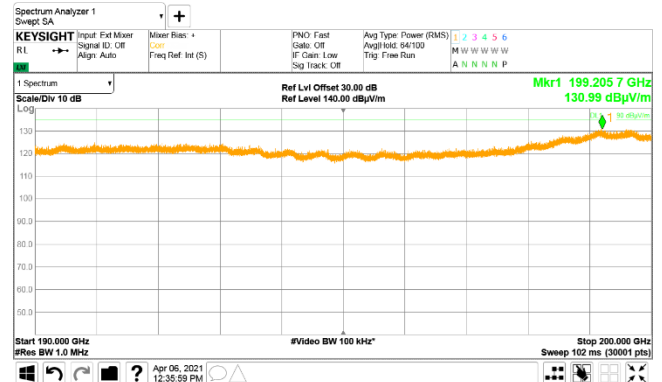
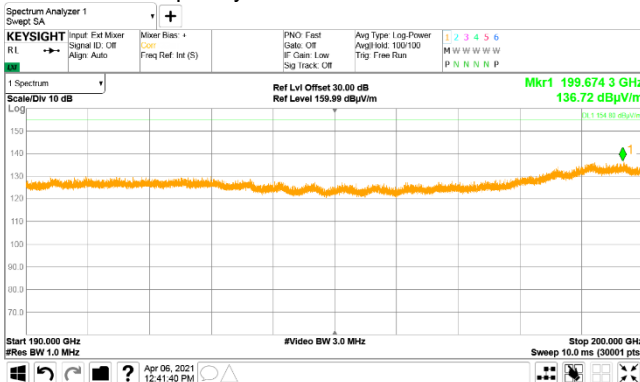
HERMON LABORATORIES

Test specification: FCC Section 15.255(d)(3), RSS-210 section J.3, Out of band radiated emissions above 40 GHz			
Test procedure: ANSI C63.10, Sections 9.9, 9.12			
Test mode: Compliance	Verdict: PASS		
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.4.55 Spurious emission measurements in 190 - 200 GHz range

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

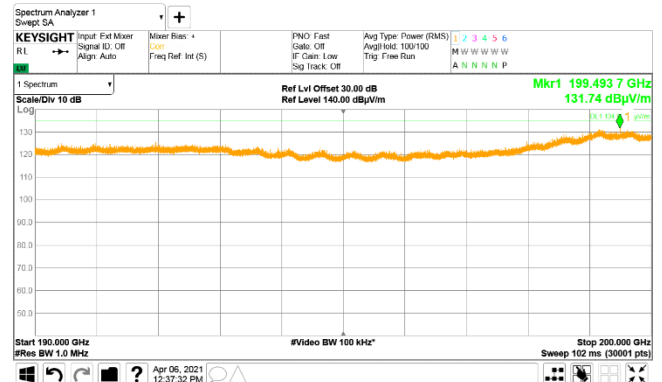
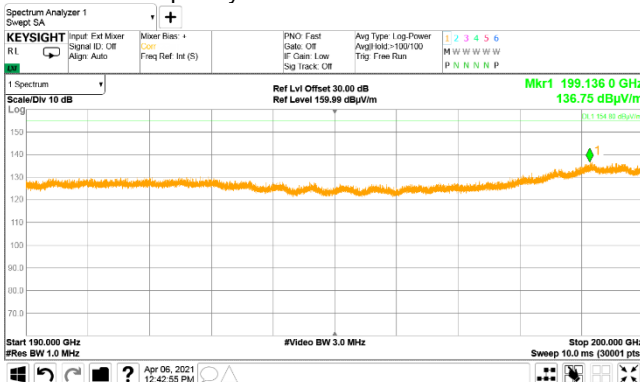
OATS
0.01 m
Vertical and Horizontal
DETECTOR: Average RBW = 1 MHz; VBW = 100 kHz
58320 MHz



Plot 7.4.56 Spurious emission measurements in 190 - 200 GHz range

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

OATS
0.01 m
Vertical and Horizontal
DETECTOR: Average RBW = 1 MHz; VBW = 100 kHz
62640 MHz





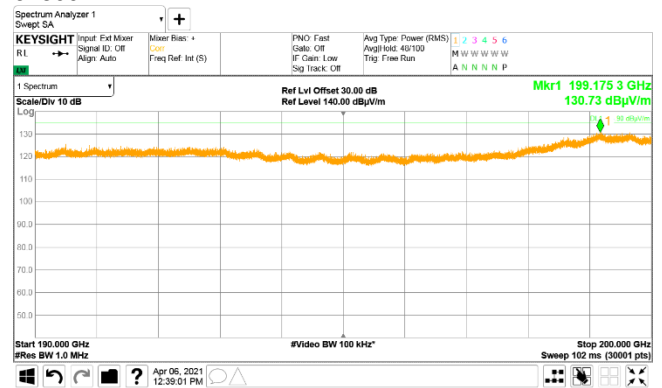
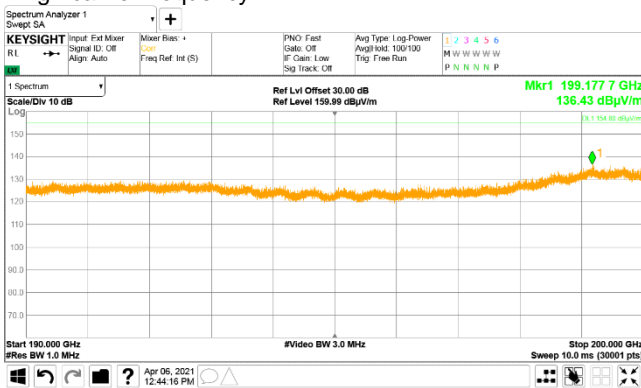
HERMON LABORATORIES

Test specification: FCC Section 15.255(d)(3), RSS-210 section J.3, Out of band radiated emissions above 40 GHz			
Test procedure: ANSI C63.10, Sections 9.9, 9.12			
Test mode: Compliance	Verdict: PASS		
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Plot 7.4.57 Spurious emission measurements in 190 - 200 GHz range

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

OATS
0.01 m
Vertical and Horizontal
DETECTOR: Average RBW = 1 MHz; VBW = 100 kHz
64800 MHz





Test specification: FCC section 15.255(f)/RSS-210 section J.6, Frequency stability			
Test procedure: ANSI C63.10, Section 9.14			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

7.5 Frequency stability test

7.5.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 7.5.1.

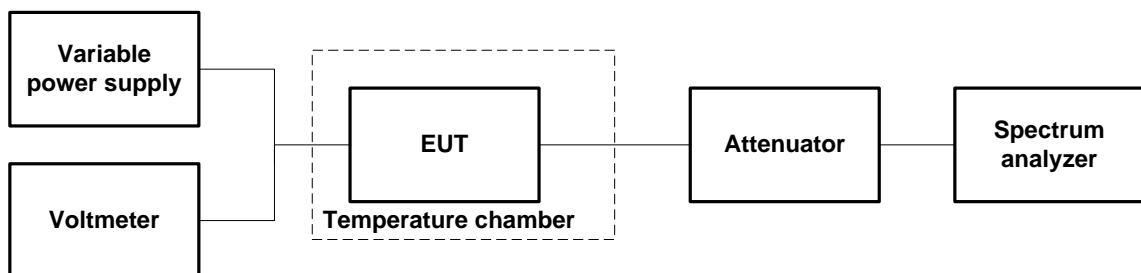
Table 7.5.1 Frequency stability limits

Assigned frequency, MHz	Maximum allowed frequency displacement
58320	NA
62640	
64800	

7.5.2 Test procedure

- 7.5.2.1 The EUT was set up as shown in Figure 7.5.1, energized and its proper operation was checked.
- 7.5.2.2 The EUT power was turned off. Temperature within test chamber was set to +30°C and a period of time sufficient to stabilize all of the oscillator circuit components was allowed.
- 7.5.2.3 The EUT was powered on and carrier frequency was measured at start up moment +30°C and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.
- 7.5.2.4 Frequency displacement was calculated and compared with the limit as provided in Table 7.5.2.and Table 7.5.3

Figure 7.5.1 Frequency stability test setup





HERMON LABORATORIES

Test specification: FCC section 15.255(f)/RSS-210 section J.6, Frequency stability			
Test procedure: ANSI C63.10, Section 9.14			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Table 7.5.2 Frequency stability test results

OPERATING FREQUENCY: 57000 – 71000 MHz
 NOMINAL POWER VOLTAGE: 48 V
 TEMPERATURE STABILIZATION PERIOD: 20 min
 POWER DURING TEMPERATURE TRANSITION: Off
 SPECTRUM ANALYZER MODE: Counter
 RESOLUTION BANDWIDTH: 3 kHz
 VIDEO BANDWIDTH: 10 kHz
 MODULATION: Unmodulated

T, °C	Voltage, V	Frequency, MHz							Max frequency drift, kHz	
		Start up	1 st min	2 nd min	3 rd min	4 th min	5 th min	10 th min	Positive	Negative
Low frequency 58320 MHz										
-45	nominal	58419.9221	NA	NA	NA	NA	NA	58419.9226	NA	12.5
-30	nominal	58419.9346	58419.9346	58419.9346	58419.9346	58419.9347	58419.9347	58419.9347	0.01	NA
-20	nominal	58419.9410	NA	NA	NA	NA	NA	58419.9459	11.3	NA
-10	nominal	58419.8965	NA	NA	NA	NA	NA	58419.8950	NA	39.6
0	nominal	58419.8985	58419.8965	58419.8920	58419.8955	58419.8935	58419.8935	58419.8935	NA	42.6
10	nominal	58419.8980	NA	NA	NA	NA	NA	58419.8955	NA	39.1
20	+15%	58419.9340	NA	NA	NA	NA	NA	58419.9344	NA	0.6
20	nominal	58419.9331	NA	NA	NA	NA	NA	58419.9346*	NA	1.5
20	-15%	58419.9339	NA	NA	NA	NA	NA	58419.9346	NA	0.7
30	nominal	58419.9080	58419.9080	58419.908	58419.9053	58419.9055	58419.9050	58419.9040	NA	30.6
40	nominal	58419.9411	NA	NA	NA	NA	NA	58419.9384	6.5	NA
50	nominal	58419.9453	NA	NA	NA	NA	NA	58419.9441	10.7	NA
55	nominal	58419.9440	NA	NA	NA	NA	NA	58419.9482	13.7	NA
Mid frequency 62640 MHz										
-45	nominal	62739.9235	NA	NA	NA	NA	NA	62739.9238	NA	13.9
-30	nominal	62739.9371	62739.9371	62739.9371	62739.9372	62739.9372	62739.9372	62739.9372	NA	0.3
-20	nominal	62739.9485	NA	NA	NA	NA	NA	62739.9390	11.2	NA
-10	nominal	62739.9065	NA	NA	NA	NA	NA	62739.9177	NA	30.9
0	nominal	62739.8995	62739.8645	62739.8935	62739.8990	62739.8965	62739.9010	62739.9050	NA	72.3
10	nominal	62739.8935	NA	NA	NA	NA	NA	62739.8915	NA	45.9
20	+15%	62739.9372	NA	NA	NA	NA	NA	62739.9373	NA	0.2
20	nominal	62739.9369	NA	NA	NA	NA	NA	62739.9373 *	NA	0.5
20	-15%	62739.9375	NA	NA	NA	NA	NA	62739.9377	0.4	0.1
30	nominal	62739.9128	62739.9128	62739.9000	62739.9000	62739.8960	62739.9035	62739.9010	NA	41.4
40	nominal	62739.9452	NA	NA	NA	NA	NA	62739.9412	7.9	NA
50	nominal	62739.9483	NA	NA	NA	NA	NA	62739.9478	10.9	NA
55	nominal	62739.9521	NA	NA	NA	NA	NA	62739.9482	14.8	NA



HERMON LABORATORIES

Test specification: FCC section 15.255(f)/RSS-210 section J.6, Frequency stability			
Test procedure: ANSI C63.10, Section 9.14			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 48 VDC
Remarks:			

Table 7.5.3 Frequency stability test results

OPERATING FREQUENCY: 57000 – 71000 MHz
 NOMINAL POWER VOLTAGE: 48 V
 TEMPERATURE STABILIZATION PERIOD: 20 min
 POWER DURING TEMPERATURE TRANSITION: Off
 SPECTRUM ANALYZER MODE: Counter
 RESOLUTION BANDWIDTH: 3 kHz
 VIDEO BANDWIDTH: 10 kHz
 MODULATION: Unmodulated

High frequency 64800 MHz										
-45	nominal	64899.9262	NA	NA	NA	NA	NA	64899.9252	NA	13.5
-30	nominal	64899.9383	64899.9383	64899.9383	64899.9384	64899.9384	64899.9384	64899.9384	NA	0.4
-20	nominal	64899.9495	NA	NA	NA	NA	NA	64899.9495	10.8	NA
-10	nominal	64899.9075	NA	NA	NA	NA	NA	64899.9030	NA	35.7
0	nominal	64899.8955	64899.8935	64899.9010	64899.8975	64899.8955	64899.8950	64899.8950	NA	45.2
10	nominal	64899.8905	NA	NA	NA	NA	NA	64899.8965	NA	48.2
20	+15%	64899.9389	NA	NA	NA	NA	NA	64899.9387	0.1	0.03
20	nominal	64899.9389	NA	NA	NA	NA	NA	64899.9387*	0.2	NA
20	-15%	64899.9389	NA	NA	NA	NA	NA	64899.9388	0.1	NA
30	nominal	64899.8885	64899.9070	64899.9071	64899.8920	64899.9170	64899.9170	64899.8975	NA	50.2
40	nominal	64899.9432	NA	NA	NA	NA	NA	64899.9432	4.5	NA
50	nominal	64899.9496	NA	NA	NA	NA	NA	64899.9493	10.8	NA
55	nominal	64899.9536	NA	NA	NA	NA	NA	64899.9505	14.8	NA

* - Reference frequency

Reference numbers of test equipment used

HL 2909	HL 3305	HL 3433	HL 3434	HL 5391			
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Full description is given in Appendix A.



Test specification: FCC Section 15.207(a)/RSS-Gen 8.8, Conducted emission			
Test procedure: ANSI C63.4, Section 13.1.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 120 VAC, 60 Hz
Remarks:			

7.6 Conducted emissions

7.6.1 General

This test was performed to measure common mode conducted emissions at the EUT power port. The specification test limits are given in Table 7.6.1.

Table 7.6.1 Limits for conducted emissions

Frequency, MHz	Class B limit, dB(μV)	
	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5.0	56	46
5.0 - 30	60	50

* The limit decreases linearly with the logarithm of frequency.

7.6.2 Test procedure

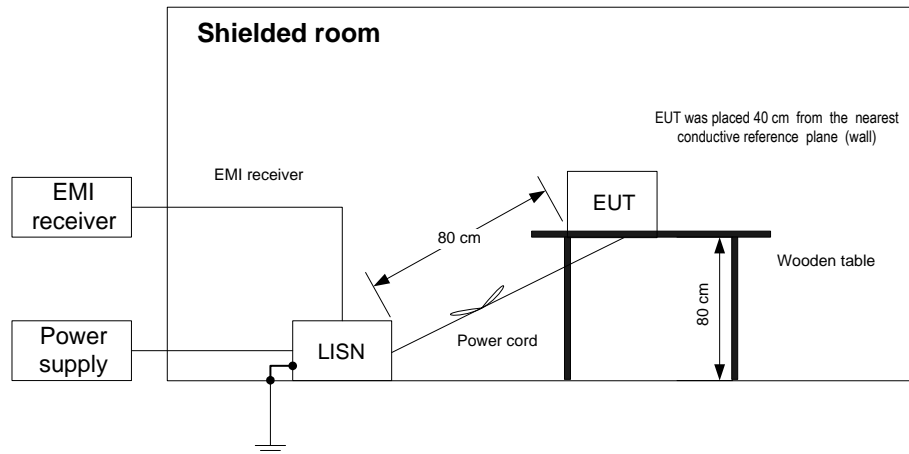
7.6.2.1 The EUT was set up as shown in Figure 7.6.1 and the associated photographs, energized and the EUT performance was checked.

7.6.2.2 The measurements were performed at the EUT mains terminals with the LISN, connected to the EMI receiver in the frequency range referred to in Table 7.6.2. The unused coaxial connector of the LISN was terminated with 50 Ohm.

7.6.2.3 The position of the EUT cables was varied to find the highest emission.

7.6.2.4 The worst test results with respect to the limits were recorded in Table 7.6.2 and shown in the associated plots.

Figure 7.6.1 Setup for conducted emission measurements, table-top EUT





Test specification: FCC Section 15.207(a)/RSS-Gen 8.8, Conducted emission			
Test procedure: ANSI C63.4, Section 13.1.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Table 7.6.2 Conducted emission test results

LINE: AC mains
EUT SET UP: TABLE-TOP
TEST SITE: SHIELDED ROOM
DETECTORS USED: PEAK / QUASI-PEAK / AVERAGE
FREQUENCY RANGE: 150 kHz - 30 MHz
RESOLUTION BANDWIDTH: 9 kHz

Frequency, MHz	Quasi-peak			Average			Line ID	Verdict
	Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*	Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*		
0.15000	53.22	66.00	-12.78	35.92	56.00	-20.08	L1	Pass
0.15409	50.30	65.78	-15.48	29.76	55.78	-26.02		
0.20726	43.45	63.31	-19.86	26.54	53.31	-26.77		
0.58968	40.31	56.00	-15.69	30.31	46.00	-15.69		
0.15000	52.97	66.00	-13.03	33.74	56.00	-22.26	L2	Pass
0.15409	47.91	65.78	-17.87	27.36	55.78	-28.42		
0.59377	40.72	56.00	-15.28	32.63	46.00	-13.37		

*- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

HL 0787	HL 3016	HL 5476	HL 5707				
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Full description is given in Appendix A.

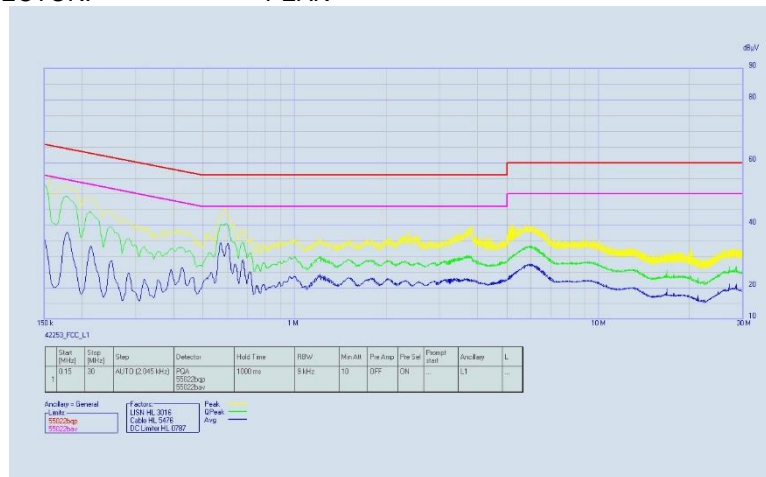


HERMON LABORATORIES

Test specification: FCC Section 15.207(a)/RSS-Gen 8.8, Conducted emission			
Test procedure: ANSI C63.4, Section 13.1.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 120 VAC, 60 Hz
Remarks:			

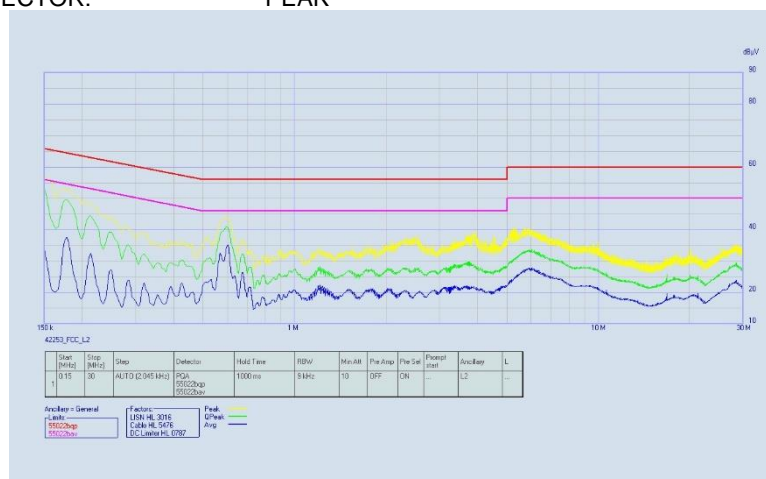
Plot 7.6.1 Conducted emission measurements

LINE: L1
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 7.6.2 Conducted emission measurements

LINE: L2
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK





Test specification: FCC section 15.203/ RSS-Gen, Section 6.8, Antenna requirement			
Test procedure: Visual inspection / supplier declaration			
Test mode: Compliance		Verdict:	
Date(s): 05-Apr-21			
Temperature: 24.2 °C	Relative Humidity: 48 %	Air Pressure: 1009 hPa	Power: 48 VDC
Remarks:			

7.7 Antenna requirements

The EUT was verified for compliance with antenna requirements. A transmitter shall be designed to ensure that no antenna other than that furnished by the responsible party will be used with the device. It may be either permanently attached or employs a unique antenna connector for every antenna proposed for use with the EUT. This requirement does not apply to professionally installed transmitters. The rationale for compliance with the above requirements was either visual inspection results or supplier declaration. The summary of results is provided in Table 7.7.1.

Table 7.7.1 Antenna requirements

Requirement	Rationale	Verdict
The transmitter antenna is permanently attached	NA	Comply
The transmitter employs a unique antenna connector	NA	
The transmitter requires professional installation	Supplier declaration	

Photograph 7.7.1 Antenna assembly





Test specification: FCC 47 CFR, Section 15.107 / ICES-003, Section 6.1, Class B, AC power lines conducted emissions			
Test procedure: ANSI C63.4, Section 7.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 120 VAC, 60 Hz
Remarks:			

8 Emission tests according to 47CFR part 15 subpart B requirements

8.1 Conducted emission

8.1.1 General

This test was performed to measure common mode conducted emissions at the EUT power port. The specification test limits are given in Table 8.1.1.

Table 8.1.1 Limits for conducted emissions

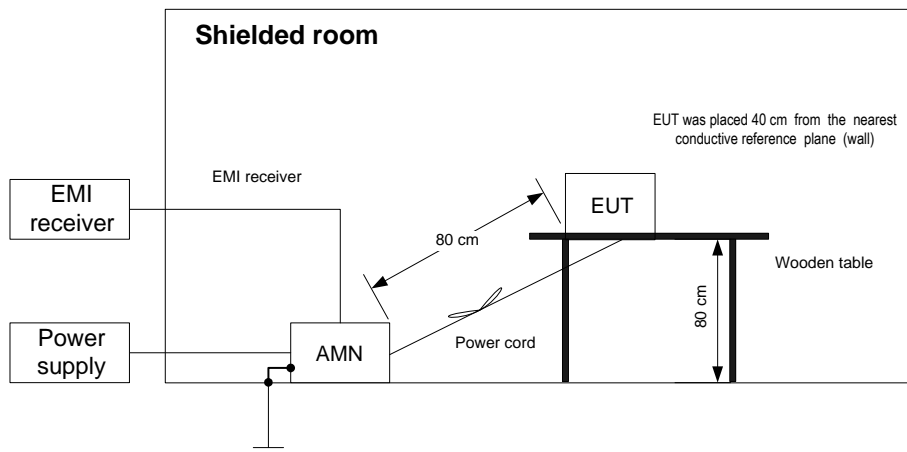
Frequency, MHz	Class B limit, dB(μV)	
	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5.0	56	46
5.0 - 30	60	50

* The limit decreases linearly with the logarithm of frequency.

8.1.2 Test procedure

- 8.1.2.1 The EUT was set up as shown in Figure 8.1.1 and the associated photographs, energized and the EUT performance was checked.
- 8.1.2.2 The measurements were performed at the EUT power terminals with the AMN, connected to the EMI receiver in the frequency range referred to in Table 8.1.2. The unused coaxial connector of the AMN was terminated with 50 Ohm.
- 8.1.2.3 The position of the EUT cables was varied to find the highest emission.
- 8.1.2.4 The worst test results with respect to the limits were recorded in Table 8.1.2 and shown in the associated plots.

Figure 8.1.1 Setup for conducted emission measurements, table-top EUT





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Test specification: FCC 47 CFR, Section 15.107 / ICES-003, Section 6.1, Class B, AC power lines conducted emissions			
Test procedure: ANSI C63.4, Section 7.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 120 VAC, 60 Hz
Remarks:			

Table 8.1.2 Conducted emissions at AC mains input / output port test results

LINE: AC mains input / output
 EUT SET UP: TABLE-TOP
 TEST SITE: SHIELDED ROOM
 DETECTORS USED: PEAK / QUASI-PEAK / AVERAGE
 FREQUENCY RANGE: 150 kHz - 30 MHz
 RESOLUTION BANDWIDTH: 9 kHz

Frequency, MHz	Quasi-peak			Average			Line ID	Verdict
	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.15000	50.49	66.00	-15.51	39.30	56.00	-16.70	L1	Pass
0.15409	49.78	65.78	-16.00	33.90	55.78	-21.88		
0.20317	44.14	63.48	-19.34	30.00	53.48	-23.48		
0.61831	40.74	56.00	-15.26	33.62	46.00	-12.38		
0.69806	32.80	56.00	-23.20	27.11	46.00	-18.89		
9.46089	35.84	60.00	-24.16	30.54	50.00	-19.46		
0.15205	50.90	65.89	-14.99	37.55	55.89	-18.34	L2	Pass
0.15409	49.85	65.78	-15.93	34.12	55.78	-21.66		
0.20113	45.17	63.56	-18.39	32.00	53.56	-21.56		
0.61626	40.73	56.00	-15.27	33.00	46.00	-13.00		

*- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

HL 0787	HL 3016	HL 5476	HL 5707				
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Full description is given in Appendix A.

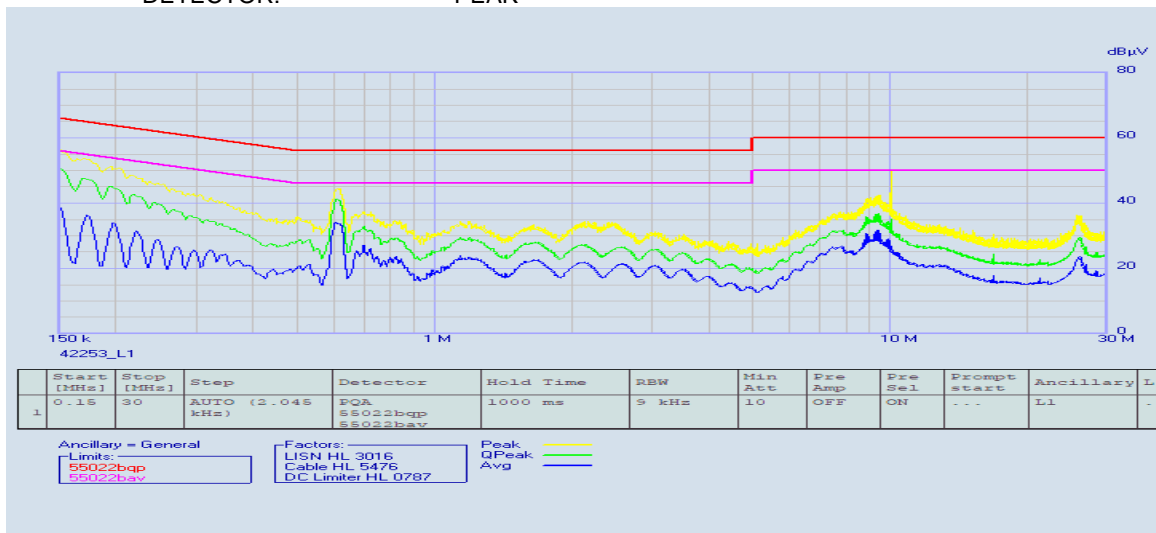


HERMON LABORATORIES

Test specification: FCC 47 CFR, Section 15.107 / ICES-003, Section 6.1, Class B, AC power lines conducted emissions			
Test procedure: ANSI C63.4, Section 7.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 04-Apr-21			
Temperature: 21 °C	Relative Humidity: 39 %	Air Pressure: 1010 hPa	Power: 120 VAC, 60 Hz
Remarks:			

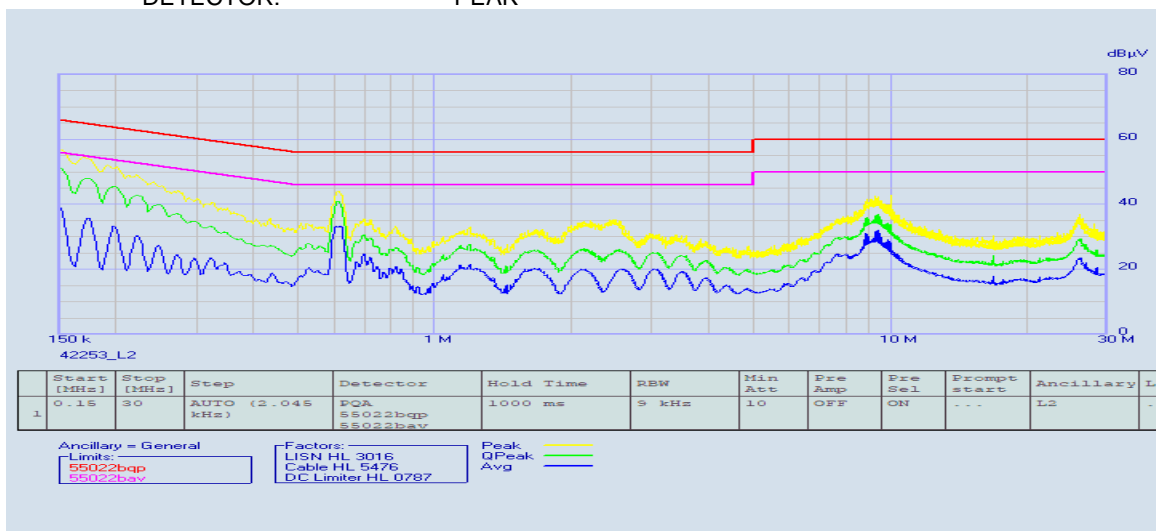
Plot 8.1.1 Conducted emissions at AC mains input / output port

LINE: L1
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 8.1.2 Conducted emissions at AC mains input / output port

LINE: L2
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK





Test specification: FCC 47 CFR, Section 15.109 / ICES-003, Section 6.2, Class B, Radiated emissions			
Test procedure: ANSI C63.4, Section 8.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 24-Nov-20			
Temperature: 24 °C	Relative Humidity: 49 %	Air Pressure: 1013 hPa	Power: 48 VDC
Remarks:			

8.2 Radiated emission measurements

8.2.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits are given in Table 8.2.1.

Table 8.2.1 Radiated emission test limits

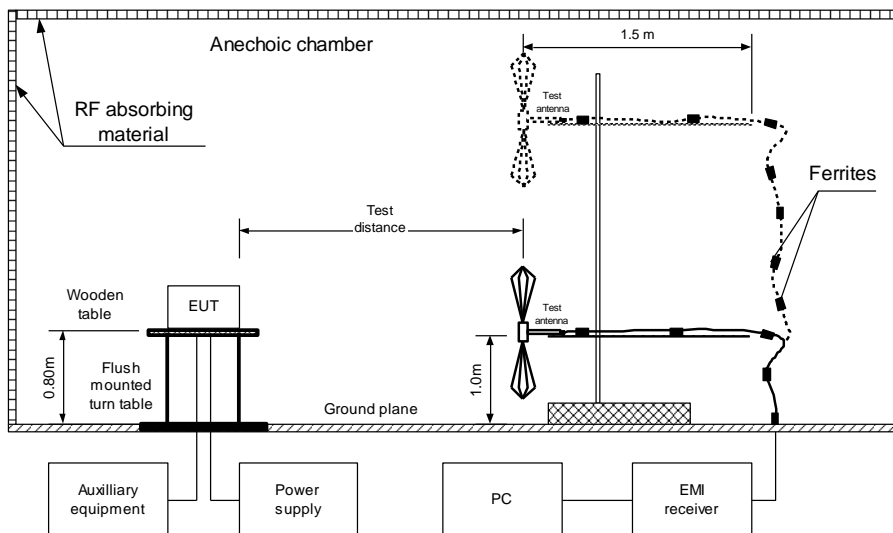
Frequency, MHz	Class B limit, dB(μV/m)		Class A limit, dB(μV/m)	
	10 m distance	3 m distance	10 m distance	3 m distance
30 - 88	29.5*	40.0	39.0	49.5*
88 - 216	33.0*	43.5	43.5	54.0*
216 - 960	35.5*	46.0	46.4	56.9*
Above 960	43.5*	54.0	49.5	60.0*

* The limit for test distance other than specified was calculated using the inverse linear distance extrapolation factor as follows: $Lims_2 = Lims_1 + 20 \log(S_1/S_2)$, where S_1 and S_2 – standard defined and test distance respectively in meters.

8.2.2 Test procedure for measurements in semi-anechoic chamber

- 8.2.2.1 The EUT was set up as shown in Figure 8.2.1 and associated photograph/s, energized and the performance check was conducted.
- 8.2.2.2 The specified frequency range was investigated with biconilog antenna connected to 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 and the EUT cables position was varied.
- 8.2.2.3 The worst test results (the lowest margins) were recorded in Table 8.2.2 and shown in the associated plots.

Figure 8.2.1 Setup for radiated emission measurements in anechoic chamber, table-top equipment





Test specification: FCC 47 CFR, Section 15.109 / ICES-003, Section 6.2, Class B, Radiated emissions			
Test procedure: ANSI C63.4, Section 8.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 24-Nov-20			
Temperature: 24 °C	Relative Humidity: 49 %	Air Pressure: 1013 hPa	Power: 48 VDC
Remarks:			

Table 8.2.2 Radiated emission test results

EUT SET UP: TABLE-TOP
LIMIT: Class B
EUT OPERATING MODE: Receive
TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / QUASI-PEAK
FREQUENCY RANGE: 30 MHz – 1000 MHz
RESOLUTION BANDWIDTH: 120 kHz

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*				
33.281697	38.16	31.20	40.0	-8.80	Vertical	1.02	0	Pass
62.531165	30.84	22.87	40.0	-17.13	Vertical	1.34	24	
106.656798	26.06	23.18	43.5	-20.32	Vertical	1.02	13	
188.134984	28.00	22.25	43.5	-21.25	Horizontal	1.02	60	
374.997917	33.09	29.93	46.0	-16.07	Vertical	1.02	162	
749.999748	40.41	37.87	46.0	-8.13	Horizontal	1.00	217	
950.037083	41.90	39.24	46.0	-6.76	Vertical	1.32	136	

TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / AVERAGE
FREQUENCY RANGE: 1000 MHz – 40000 MHz
RESOLUTION BANDWIDTH: 1000 kHz

Frequency, MHz	Peak			Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
	Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*	Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
All emission were found 20dB below the limit										Pass

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

Reference numbers of test equipment used

HL 4360	HL 3903	HL 4933	HL 4956	HL 5288	HL 5085	HL 5112	HL 5902
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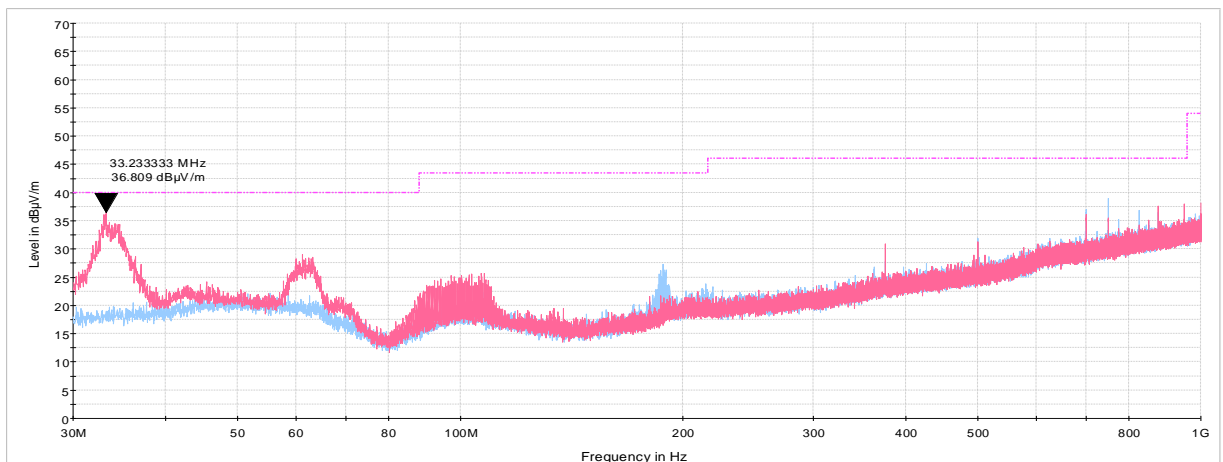
Full description is given in Appendix A.



Test specification: FCC 47 CFR, Section 15.109 / ICES-003, Section 6.2, Class B, Radiated emissions			
Test procedure: ANSI C63.4, Section 8.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 24-Nov-20			
Temperature: 24 °C	Relative Humidity: 49 %	Air Pressure: 1013 hPa	Power: 48 VDC
Remarks:			

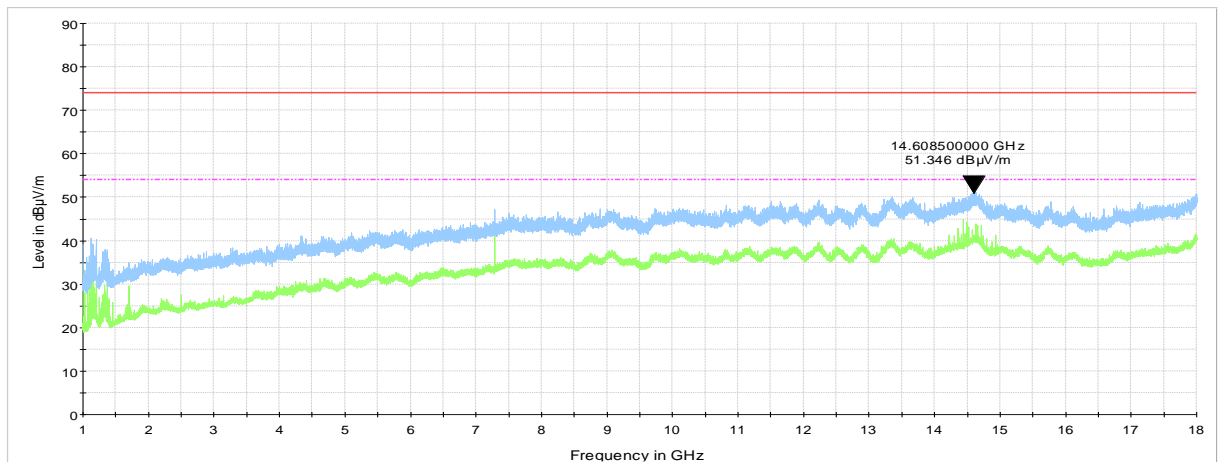
Plot 8.2.1 Radiated emission measurements in 30 - 1000 MHz range, vertical and horizontal antenna polarization

TEST SITE: Semi anechoic chamber
LIMIT: Class B
TEST DISTANCE: 3 m
EUT OPERATING MODE: Receive



Plot 8.2.2 Radiated emission measurements in 1000 - 18000 MHz range, vertical and horizontal antenna polarization

TEST SITE: Semi anechoic chamber
LIMIT: Class B
TEST DISTANCE: 3 m
EUT OPERATING MODE: Receive



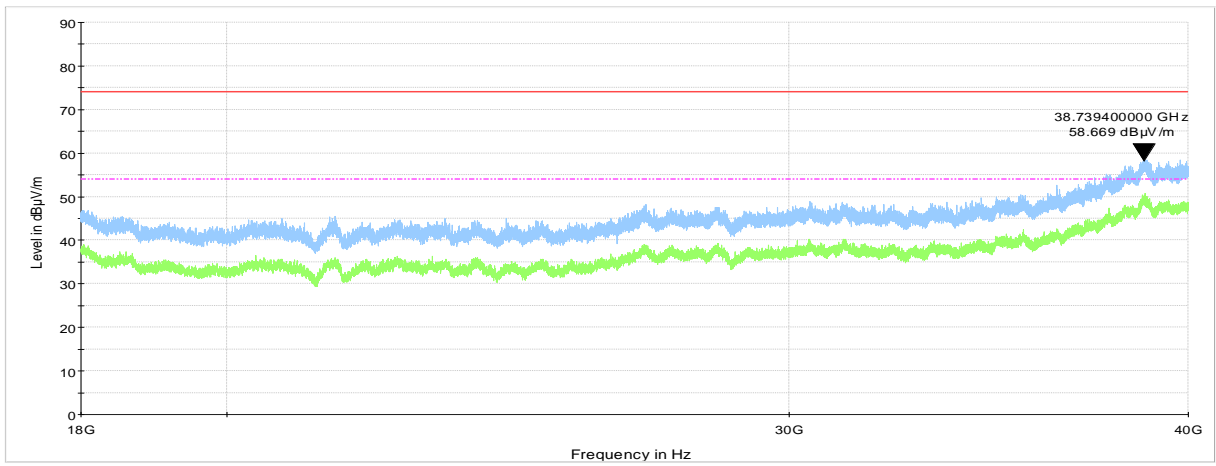


HERMON LABORATORIES

Test specification: FCC 47 CFR, Section 15.109 / ICES-003, Section 6.2, Class B, Radiated emissions			
Test procedure: ANSI C63.4, Section 8.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 24-Nov-20			
Temperature: 24 °C	Relative Humidity: 49 %	Air Pressure: 1013 hPa	Power: 48 VDC
Remarks:			

Plot 8.2.3 Radiated emission measurements in 18000 - 40000 MHz range, vertical and horizontal antenna polarization

TEST SITE: Semi anechoic chamber
LIMIT: Class B
TEST DISTANCE: 3 m
EUT OPERATING MODE: Receive



9 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./ Check	Due Cal./ Check
0446	Antenna, Loop, Active, 10 (9) kHz - 30 MHz	EMCO	6502	2857	28-Feb-21	28-Feb-22
0747	Mixer, Millimeter Wave Harmonic 90 - 140 GHz	Oleson Microwave Labs	M08HW	F80429-1	19-May-20	19-May-23
0770	Antenna Standard Gain Horn, 40-60 GHz WR-19, U-band, 24 dB mid-band gain	Quinstar Technology	QWH-1900-AA	118	22-Nov-20	22-Nov-21
0771	Antenna Standard Gain Horn, 60-90 GHz, WR-12, 24 dB mid-band gain	Quinstar Technology	QWH-1200-AA	111	05-Aug-20	05-Aug-21
0772	Antenna Standard Gain Horn, 75-110 GHz, WR-10, 24 dB mid-band gain	Quinstar Technology	QWH-0800-AA	110	22-Nov-20	22-Nov-21
0787	Transient Limiter 9 kHz-200 MHz	Hewlett Packard	11947A	3107A01877	06-Oct-20	06-Oct-21
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY41444762	05-Apr-20	05-May-21
3016	LISN, Two-line V-network, 9 kHz to 30 MHz, (50 uH+5 Ohm), CISPR16-1, MIL-461E	Rohde & Schwarz	ESH 3-Z5	892239/002	09-Feb-21	09-Feb-22
3235	Harmonic mixer 40 to 60 GHz	Agilent Technologies	11970U	MY30030182	30-Jan-20	30-Jan-23
3290	Attenuator, direct reading, 40 to 60 GHz, 0.4 W	Quinstar Technology	QAD-U00000	10381008	24-Sep-19	24-Sep-21
3291	Attenuator, direct reading, 60 to 90 GHz, 0.2 W	Quinstar Technology	QAD-E00000	10381009	24-Sep-19	24-Sep-21
3293	Frequency multiplier, input 20-30 GHz, output 60-90 GHz	Quinstar Technology	QPM-75003E	10381003	17-Nov-20	17-Nov-21
3301	Power Meter, P-series, 50 MHz to 40 GHz	Agilent Technologies	N1911A	MY45101057	16-Apr-20	16-May-21
3302	Power sensor, P-Series, 50 MHz to 40 GHz, -35/30 to 20 dBm	Agilent Technologies	N1922A	MY45240586	16-Apr-20	16-May-21
3305	Harmonic mixer 50 to 75 GHz	Agilent Technologies	11970V	MY30030149	29-Jan-20	29-Jan-23
3306	Harmonic mixer 75 to 110 GHz	Agilent Technologies	11970W	MY25210273	30-Jan-20	30-Jan-23
3433	Test Cable , DC-18 GHz, 1.5 m, SMA - SMA	Mini-Circuits	CBL-5FT-SMSM+	25679	13-Apr-20	13-Apr-21
3434	Test Cable , DC-18 GHz, 1.5 m, SMA - SMA	Mini-Circuits	CBL-5FT-SMSM+	25683	13-Apr-20	13-Apr-21
3536	Antenna Standard Gain Horn, 90-140 GHz, WR-8, 24 dB mid-band gain	Quinstar Technology	QWH-FPRR00	11159004001	22-Nov-20	22-Nov-21
3903	Microwave Cable Assembly, 40.0 GHz, 1.5 m, SMA/SMA	Huber-Suhner	SUCOFL EX 102A	1226/2A	06-Apr-20	06-Apr-21
4023	Diplexer for use OML mixers with Agilent spectrum analyzer	Oleson Microwave Labs	DPL.26	NA	01-Apr-20	01-Apr-21
4339	High pass Filter, 50 Ohm, 1000 to 18000 MHz, SMA-FM / SMA-M	Micro-Tronics	HPM50115-02	001	05-Jun-19	05-Jun-21
4360	EMI Test Receiver, 20 Hz to 40 GHz.	Rohde & Schwarz	ESU40	100322	19-Jan-21	19-Jan-22

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./ Check	Due Cal./ Check
4856	Amplifier, solid state, 18 GHz to 40 GHz, 20 dBm output power	Quinstar Technology	QGW-18402023-JO	16779001001	27-May-20	27-May-21
4933	Active Horn Antenna, 1 GHz to 18 GHz	COM-POWER CORPORATION	AHA-118	701046	26-Jan-21	26-Jan-22
4956	Active horn antenna, 18 to 40 GHz	COM-POWER CORPORATION	AHA-840	105004	26-Jan-21	26-Jan-22
5085	Attenuator, 4 dB, DC - 6 GHz, 1 W	Mini-Circuits	UNAT-4+	NA	22-May-20	22-May-21
5112	RF cable, 40 GHz, 5.5 m, K-type	Huber-Suhner	SF102EA/11SK/11SK/5500MM	502494/2EA	19-Apr-20	19-Apr-21
5236	WR15 to WR12 Waveguide Transition. Freq. Range: 60.0 - 75.0 GHz	Quinstar Technology	NA	NA	18-Nov-20	18-Nov-21
5288	Trilog Antenna, 25 MHz - 8 GHz, 100W	Frankonia	ALX-8000E	00809	08-Feb-19	08-Feb-22
5371	EXG Analog Signal Generator, 9 kHz - 40 GHz	Keysight Technologies	N5173B	MY57280540	25-Aug-20	25-Aug-21
5377	USB Thermocouple Power Sensor, DC-120 GHz	Keysight Technologies	U8489A	US56430158	21-Oct-20	21-Oct-21
5380	Waveguide Harmonic Mixer 55-90GHz	Keysight Technologies	M1971E	MY56130239	13-Nov-20	13-Nov-22
5391	Temperature/Humidity Cycle Chamber, -77 - +177 deg., Humidity Range 20% RH to 95% RH	Thermotron	SM-8C	27737	19-Aug-20	19-Aug-21
5476	Cable, BNC/BNC, 10.5 m	Western wire	MIL-C-17G	NA	14-May-20	14-May-21
5663	Cable, 1. SF102EA/11SK(x2)/5.5M, 40 GHz	Huber-Suhner	SF102EA	505604/2EA	03-Nov-20	03-Nov-21
5707	EMI receiver	PMM / Narda	PMM 9010F	060WW91101	01-Feb-21	01-Feb-22
5714	Handheld Oscilloscope, 60 MHz, 4 channels	Rohde & Schwarz	RTH1004	104416	09-Feb-21	09-Feb-22
5902	RF cable, 18 GHz, 6.0m, N-type	Huber-Suhner	SF126EA/11N/11N/6000		01-Dec-20	01-Dec-21
5986	Piramidal Horn antenna, 60 - 90 GHz	Quinstar Technology	QWH-EPRR00	NA	22-Mar-21	22-Mar-22

10 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 10 m measuring distance Horizontal polarization Vertical polarization	Biconilog antenna: ± 5.0 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.1 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 5.5 dB Biconical antenna: ± 5.5 dB Log periodic antenna: ± 5.6 dB Double ridged horn antenna: ± 5.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization Vertical polarization	Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 6.0 dB Biconical antenna: ± 5.7 dB Log periodic antenna: ± 6.0 dB Double ridged horn antenna: ± 6.0 dB
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB

Hermon Laboratories is accredited by A2LA for calibration according to present requirements of ISO/IEC 17025 and NCSL Z540-1. The accreditation is granted to perform calibration of parameters that are listed in the Scope of Hermon Laboratories Accreditation.

Hermon Laboratories calibrates its reference and transfer standards by calibration laboratories accredited to ISO/IEC 17025 by a mutually recognized Accreditation Body or by a recognized national metrology institute. All reference and transfer standards used in the calibration system are traceable to national or international standards.

In-house calibration of all test and measurement equipment is performed on a regular basis according to Hermon Laboratories calibration procedures, manufacturer calibration/verification procedures or procedures defined in the relevant standards. The Hermon Laboratories test and measurement equipment is calibrated within the tolerances specified by the manufacturers and/or by the relevant standards.

11 APPENDIX C Test laboratory description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, Radio, Safety, Environmental and Telecommunication testing facility.

Hermon Laboratories is recognized and accredited by the Federal Communications Commission (USA) for relevant parts of Code of Federal Regulations 47 (CFR 47), Test Firm Registration Number is 927748, Designation Number is IL1001; Recognized by Innovation, Science and Economic Development Canada for wireless and terminal testing (ISED), ISED #2186A, CAB identifier is IL1001; Certified by VCCI, Japan (the registration numbers for OATS are R-10808 for RE measurements below 1 GHz, G-20112 for RE measurements above 1 GHz, R-11082 for anechoic chamber for RE measurements below 1 GHz, G-10869 for RE measurements above 1 GHz, C-10845 for conducted emissions site and T-11606 for conducted emissions at telecommunication ports).

The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing, environmental simulation and calibration (for exact scope please refer to Certificate No. 839.01, 839.03 and 839.04).

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12 APPENDIX D Specification references

47CFR part 15: 2019	Radio Frequency Devices.
ANSI C63.4: 2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10: 2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
RSS-210 Issue 10: 2019	Licence-Exempt Radio Apparatus: Category I Equipment
RSS-Gen Issue 5 with Am.1: 2019	General Requirements for Compliance of Radio Apparatus

13 APPENDIX E Test equipment correction factors

**Antenna factor
 loop antenna
 Model 6502, S/N 2857, HL 0446**

Frequency, MHz	Magnetic antenna factor, dB	Electric antenna factor, dB
0.009	-32.8	18.7
0.010	-33.8	17.7
0.020	-38.3	13.2
0.050	-41.1	10.4
0.075	-41.3	10.2
0.100	-41.6	9.9
0.150	-41.7	9.8
0.250	-41.6	9.9
0.500	-41.8	9.8
0.750	-41.9	9.7
1.000	-41.4	10.1
2.000	-41.5	10.0
3.000	-41.4	10.2
4.000	-41.4	10.1
5.000	-41.5	10.1
10.000	-41.9	9.6
15.000	-41.9	9.6
20.000	-42.2	9.3
25.000	-42.8	8.7
30.000	-44.0	7.5

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field strength in dB(μV/m).

**Antenna factor
 Standard gain horn antenna
 Quinstar Technology
 Model QWH
 Ser.No.112, HL 0768, 0769, 0770, 0771, 0772**

Frequency min, GHz	Frequency max, GHz	Antenna factor, dB(1/m)
18.000	26.500	32.01
26.500	40.000	35.48
40.000	60.000	39.03
60.000	90.000	42.55
90.000	140.000	46.23
140.000	220.000	50.11

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

**Antenna factor
 Trilog antenna
 Model ALX-8000E, Frankonia, S/N 00809, HL 5288, 30-1000 MHz**

Frequency, MHz	Antenna factor, dB/m		
	Vert Up	Vert Down	Delta
30	-51.19	-51.28	0.09
35	-44.03	-44.12	0.09
40	-43.07	-43.12	0.05
45	-39.61	-39.79	0.18
50	-37.84	-38.14	0.3
60	-34.93	-34.9	0.03
70	-29.76	-29.66	0.1
80	-27.69	-27.82	0.13
90	-29.05	-29.07	0.02
100	-31.19	-31.19	0
120	-31.61	-31.6	0.01
140	-28.13	-28.06	0.07
160	-27.71	-27.75	0.04
180	-26.19	-26.15	0.04
200	-28.2	-28.15	0.05
250	-27.45	-27.47	0.02
300	-29.61	-29.63	0.02
400	-31.77	-31.78	0.01
500	-32.81	-32.81	0
600	-33.64	-33.61	0.03
700	-34.21	-34.21	0
800	-35.66	-35.66	0
900	-36.99	-36.91	0.08
1000	-38	-37.91	0.09

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μ V) to convert it into field intensity in dB(μ V/m).

Antenna factor
Active Horn Antenna,
Com-Power Corporation, model: AHA-118, s/n 701046, HL 4933

Frequency, MHz	Measured antenna factor (with preamplifier), dB/m
1000	-16.1
1500	-15.1
2000	-10.9
2500	-11.9
3000	-11.1
3500	-10.6
4000	-8.6
4500	-8.3
5000	-5.9
5500	-5.7
6000	-3.3
6500	-4.0
7000	-2.2
7500	-1.7
8000	1.1
8500	-0.8
9000	-1.5
9500	-0.2

Frequency, MHz	Measured antenna factor (with preamplifier), dB/m
10000	1.8
10500	1.0
11000	0.3
11500	-0.5
12000	3.1
12500	1.4
13000	-0.3
13500	-0.4
14000	2.5
14500	2.2
15000	1.9
15500	0.5
16000	2.1
16500	1.2
17000	0.6
17500	3.1
18000	4.2

The antenna factor shall be added to receiver reading in dB μ V to obtain field strength in dB μ V/m.

Antenna factor
Active Horn Antenna,
Com-Power Corporation, model: AHA-840, s/n 105004, HL 4956

Frequency, MHz	Measured antenna factor (with preamplifier), dB/m
18000	2.5
18500	0.5
19000	-1.0
19500	-2.4
20000	-2.5
20500	-2.2
21000	-2.0
21500	-2.7
22000	-3.7
22500	-3.8
23000	-3.7
23500	-5.0
24000	-4.5
24500	-5.0
25000	-4.7
25500	-4.4
26000	-4.3
26500	-5.6
27000	-4.3
27500	-4.9
28000	-5.2
28500	-4.4

Frequency, MHz	Measured antenna factor (with preamplifier), dB/m
29000	-2.7
29500	-2.6
30000	-1.4
30500	-1.5
31000	-1.0
31500	-2.6
32000	-3.3
32500	-3.3
33000	-5.1
33500	-5.2
34000	-1.5
34500	-5.4
35000	-3.3
35500	-4.2
36000	-2.8
36500	-2.6
37000	-1.0
38000	1.8
38500	2.8
39000	1.3
39500	1.3
40000	0.3

The antenna factor shall be added to receiver reading in dB μ V to obtain field strength in dB μ V/m.

Cable loss
Microwave Cable Assembly, Huber-Suhner, 40 GHz, 1.5 m, SMA-SMA, S/N 1226/2A
HL 3903

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	-0.02	9500	1.84	21000	2.98
100	0.15	10000	1.86	22000	3.07
500	0.38	10500	1.93	23000	3.13
1000	0.56	11000	1.99	24000	3.21
1500	0.69	11500	2.04	25000	3.26
2000	0.82	12000	2.10	26000	3.48
2500	0.90	12500	2.15	27000	3.44
3000	0.98	13000	2.21	28000	3.53
3500	1.06	13500	2.25	29000	3.59
4000	1.11	14000	2.29	30000	3.66
4500	1.17	14500	2.34	31000	3.70
5000	1.24	15000	2.36	32000	3.79
5500	1.32	15500	2.40	33000	3.88
6000	1.40	16000	2.45	34000	3.94
6500	1.50	16500	2.48	35000	3.91
7000	1.56	17000	2.56	36000	4.05
7500	1.62	17500	2.58	37000	4.22
8000	1.68	18000	2.60	38000	4.25
8500	1.74	19000	2.84	39000	4.27
9000	1.78	20000	2.88	40000	4.33

RF cable, 40 GHz, 5.5 m, K-type,
 Huber-Suhner, SF102EA/11SK/11SK/5500MM, s/n 502494/2EA, HL 5112

Insertion loss

Set / Applied, MHz	Measured, dB	Uncertainty, dB
100	0.70	±0.07
200	0.99	±0.08
300	1.21	±0.08
500	1.55	±0.08
1000	2.18	±0.08
1500	2.67	±0.08
2000	3.09	±0.08
2500	3.46	±0.10
3000	3.80	±0.10
3500	4.12	±0.10
4000	4.41	±0.10
4500	4.69	±0.10
5000	4.95	±0.10
5500	5.20	±0.10
6000	5.45	±0.10
6500	5.68	±0.10
7000	5.91	±0.10
7500	6.13	±0.10
8000	6.34	±0.10
8500	6.56	±0.10
9000	6.76	±0.10
9500	6.95	±0.10
10000	7.16	±0.10
10500	7.33	±0.10
11000	7.51	±0.10
11500	7.68	±0.10
12000	7.85	±0.10
12500	8.02	±0.13
13000	8.17	±0.13
13500	8.31	±0.13
14000	8.46	±0.13
14500	8.61	±0.18
15000	8.76	±0.18
15500	8.91	±0.18
16000	9.07	±0.18
16500	9.22	±0.18
17000	9.36	±0.18
17500	9.51	±0.18
18000	9.66	±0.18
18500	9.81	±0.23
19000	9.95	±0.23
19500	10.10	±0.23

Set / Applied, MHz	Measured, dB	Uncertainty, dB
20000	10.25	±0.23
20500	10.38	±0.23
21000	10.52	±0.23
21500	10.67	±0.23
22000	10.84	±0.23
22500	11.00	±0.29
23000	11.10	±0.29
23500	11.20	±0.29
24000	11.32	±0.29
24500	11.42	±0.29
25000	11.59	±0.23
25500	11.70	±0.23
26000	11.85	±0.23
26500	11.97	±0.23
27000	12.07	±0.33
27500	12.17	±0.33
28000	12.26	±0.40
28500	12.38	±0.40
29000	12.50	±0.40
29500	12.63	±0.40
30000	12.75	±0.40
30500	12.82	±0.33
31000	12.93	±0.33
31500	13.09	±0.33
32000	13.22	±0.33
32500	13.35	±0.33
33000	13.48	±0.33
33500	13.60	±0.33
34000	13.72	±0.33
34500	13.80	±0.40
35000	13.92	±0.40
35500	14.01	±0.40
36000	14.12	±0.40
36500	14.23	±0.40
37000	14.34	±0.33
37500	14.44	±0.33
38000	14.57	±0.33
38500	14.72	±0.33
39000	14.82	±0.33
39500	14.94	±0.33
40000	15.08	±0.47

Trilog Antenna
Frankonia, model: ALX-8000E, s/n: 00809
30-1000 MHz , HL 5288

Frequency, MHz	Antenna factor, dB/m
30	14.96
35	15.33
40	16.37
45	17.56
50	17.95
60	16.87
70	13.22
80	10.56
90	13.61
100	15.46
120	14.03
140	12.23

Frequency, MHz	Antenna factor, dB/m
160	12.67
180	13.34
200	15.40
250	16.42
300	17.28
400	19.98
500	21.11
600	22.90
700	24.13
800	25.25
900	26.35
1000	27.18

The antenna factor shall be added to receiver reading in dB μ V to obtain field strength in dB μ V/m.
above 1000 MHz

Frequency, MHz	Antenna factor, dB/m
1000	26.9
1100	28.1
1200	28.4
1300	29.6
1400	29.1
1500	30.4
1600	30.7
1700	31.5
1800	32.3
1900	32.6
2000	32.5
2100	32.9
2200	33.5
2300	33.2
2400	33.7
2500	34.6
2600	34.7
2700	34.6
2800	35.0
2900	35.5
3000	36.2
3100	36.8
3200	36.8
3300	37.0
3400	37.5
3500	38.2

Frequency, MHz	Antenna factor, dB/m
3600	38.9
3700	39.4
3800	39.4
3900	39.6
4000	39.7
4100	39.8
4200	40.5
4300	40.9
4400	41.1
4500	41.4
4600	41.3
4700	41.6
4800	41.9
4900	42.3
5000	42.7
5100	43.0
5200	42.9
5300	43.5
5400	43.6
5500	44.3
5600	44.7
5700	45.0
5800	45.0
5900	45.3
6000	45.9

The antenna factor shall be added to receiver reading in dB μ V to obtain field strength in dB μ V/m.

Cable loss
Cable, BNC/BNC, 10.5 m MIL-C-17G
Western wire, HL 5476

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
0.01	0.12	270	3.07
10	0.56	280	3.13
20	0.79	290	3.19
30	0.97	300	3.26
40	1.11	310	3.32
50	1.25	320	3.40
60	1.37	330	3.46
70	1.48	340	3.52
80	1.58	350	3.58
90	1.68	360	3.62
100	1.79	370	3.70
110	1.88	380	3.75
120	1.96	390	3.82
130	2.05	400	3.87
140	2.12	410	3.93
150	2.20	420	3.98
160	2.29	430	4.06
170	2.37	440	4.11
180	2.44	450	4.18
190	2.51	460	4.22
200	2.58	470	4.27
210	2.66	480	4.35
220	2.74	490	4.39
230	2.80	500	4.45
240	2.87		
250	2.93		
260	3.01		