

December 19, 2022

HP Inc.
Tony Griffiths
1501 Page Mill Road
Palo Alto CA 94304

Dear Tony Griffiths,

Enclosed is the Electromagnetic Compatibility for the HP Inc., P033, tested to the requirements of:

- FCC Part 15 Subpart B
- Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7

Thank you for using the services of Eurofins Electrical and Electronic Testing NA, Inc. Please contact me if you have any questions regarding these results or if Eurofins E&E can be of further service to you.

Sincerely,



Nancy LaBrecque
Documentation Department
Eurofins Electrical and Electronic Testing NA, Inc.

Reference: EMCA118717-FCC_ICES Rev 2



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Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	September 23, 2022	Initial Issue.
1	November 4, 2022	Change Customer's Name and Address
2	December 19, 2022	Corrections Requested by Customer

Table of Contents

1.0	Testing Summary	5
2.0	Overview	6
2.1	Test Site	6
2.2	Measurement Uncertainty	6
2.3	Equipment Overview and Test Configuration	7
2.4	Modifications to the EUT	8
2.5	Modifications to the Standard	8
2.6	Disposition of EUT	9
3.0	Electromagnetic Compatibility Emission Criteria	10
3.1	Limits for Conducted Disturbance at Mains Terminals	10
3.3	Radiated Emissions: Limits of Electromagnetic Radiation Disturbance	16

List of Tables

Table 1. Conducted Emissions, Line, Test Results	12
Table 2. Conducted Emissions, Neutral, Test Results.....	13
Table 3. Conducted Emissions, Test Equipment.....	15
Table 4. Radiated Emissions, FCC, 30 MHz – 1000 MHz, Quasi-Peak Test Results.....	19
Table 5. Radiated Emissions, ICES-003, 30 MHz – 1000 MHz, Quasi-Peak Test Results	19
Table 6. Radiated Emissions, FCC, 1 GHz – 18 GHz, Average Test Results.....	20
Table 7. Radiated Emissions, ICES-003, 1 GHz – 18 GHz, Average Test Results	20
Table 8. Radiated Emissions, FCC, 18 GHz – 30 GHz, Average Test Results.....	21
Table 9. Radiated Emissions, ICES-003, 18 GHz – 30 GHz, Average Test Results	21
Table 10. Radiated Emissions, Test Equipment.....	28

List of Figures

Figure 1. Conducted Emissions, Line Plot.....	12
Figure 2. Conducted Emissions, Neutral Plot	13
Figure 3. Radiated Emissions, 30 MHz – 1000 MHz, Peak Plot	19
Figure 4. Radiated Emissions, 1 GHz – 18 GHz, Peak Plot.....	20
Figure 5. Radiated Emissions, 18 GHz – 30 GHz, Horizontal Plot	22
Figure 6. Radiated Emissions, 18 GHz – 30 GHz, Vertical Plot.....	22

List of Photographs

Photograph 1. Conducted Emissions, AC Mains, Front View	14
Photograph 2. Conducted Emissions, AC Mains, LISN View	14
Photograph 3. Conducted Emissions, AC Mains, Side View.....	15
Photograph 4. Radiated Emissions, 30 MHz – 1000 MHz, Front View	23
Photograph 5. Radiated Emissions, 30 MHz – 1000 MHz, Rear View.....	23
Photograph 6. Radiated Emissions, 30 MHz – 1000 MHz, Antenna View.....	24
Photograph 7. Radiated Emissions, 1 GHz – 18 GHz, Front View.....	24
Photograph 8. Radiated Emissions, 1 GHz – 18 GHz, Rear View.....	25
Photograph 9. Radiated Emissions, 1 GHz – 18 GHz, Antenna View	25
Photograph 10. Radiated Emissions, 18 GHz – 30 GHz, Front View.....	26
Photograph 11. Radiated Emissions, 18 GHz – 30 GHz, Rear View	26
Photograph 12. Radiated Emissions, 18 GHz – 30 GHz, Antenna View	27
Photograph 13. Radiated Emissions, Support Equipment.....	27

1.0 Testing Summary

The HP Inc., P033 was found to be compliant to the following specification(s).

- FCC Part 15 Subpart B
- Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7



Sergio Gutierrez
EMC Laboratory Engineer

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements.



Matthew Hinojosa
EMC Laboratory Manager, Austin

2.0 Overview

Eurofins Electrical and Electronic Testing NA, Inc. was contracted by HP Inc. to perform testing on the P033, under purchase order number 10000013761.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of HP Inc., P033.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	P033
Equipment Emissions Class:	A

Test Standard	Test Description	Compliance
FCC Part 15 Subpart B (per ANSI C63.4: 2014), Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7	CE (Mains), Class A	Compliant
	CE (Telecommunication Ports), Class A	Compliant
	RE, Class A	Compliant

2.1 Test Site

All testing was performed at Eurofins Electrical and Electronic Testing NA, Inc., 13501 McCallen Pass, Austin, Texas 78753. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology. Eurofins Electrical and Electronic Testing NA, Inc. has been accredited by the American Association for Laboratory Accreditation (A2LA) (Certificate #: 0591.06) in accordance with ISO/IEC 17025:2017.

2.2 Measurement Uncertainty

Measurement uncertainty calculated as per NIST Technical Note (TN) 1297 and ANSI / NCSL Z540-2, as equivalent to EN 55016-4-2 / IEC CISPR 16-4-2.

Test Method	Typical Expanded Uncertainty (dB)	K	Confidence Level
Radiated Emissions, (30 MHz – 1 GHz)	±2.95	2	95%
Radiated Emissions, (1 GHz – 6 GHz)	±3.54	2	95%
Conducted Emission Voltage	±2.97	2	95%
Conducted Emission Telecom	±3.76	2	95%

Measurement Uncertainty

2.3 Equipment Overview and Test Configuration

Name of EUT/Model:	P033
Description of EUT and its intended use:	P033 (marketed as STUDIO X52) is a video conferencing video bar designed to act as an audio / video endpoint codec over LAN networks. The device is powered by a AC/DC mains adapter and contains 2.4GHz / 5Ghz Wifi and Bluetooth radio interfaces.
Selected Operation Mode(s):	Emissions pre-testing at 230VAC / 50Hz will be required in order to confirm the worst case mode for testing; Mode 1 - Video conference call active with local (4k) content added 5.0GHz wifi pings, BT remote paired Mode 2 - Video conference call active with local (4k) content added 2.4GHz wifi pings, BT remote paired. Mode 3 - Video conference call active with no local content added 5.0GHz wifi pings, BT remote paired. Mode 4 - No Video conference call active with local (4k) content added 5.0GHz wifi pings, BT remote paired. Mode 5 - No Video conference call active with no local content added 5.0GHz wifi pings, BT remote paired. Mode 6 - System idle mode 5.0GHz OFF, BT remote paired
Rationale for the selection of the Operation Mode(s):	The 6 modes identified are all valid use cases. In HP Inc. experience Modes 1 or 2 are normally worst case
Monitoring Method(s):	Video Call remains active, content is still being sent and audio is monitored for demodulation preferably as per the requirements of EN55035 Annex G
Emissions Class Declaration:	Class A
Configuration(s):	All ports except USB C to be loaded with typical equipment and cabling as per provided block diagram. USB C is only used in 'device' mode - this means that a laptop is connected via USB C and the EUT defaults to being a web cab and speaker for said laptop. In HP Inc. experience this is a v quiet mode for radiated emissions testing and therefore we do not recommend testing in it.
EUT Power Requirement	
Voltage:	100 - 240Vac 50 and 60Hz
AC or DC:	AC
Voltage Frequency:	50
Number of Phases:	1
Current:	See below
Uses an external AC/DC Adapter:	True
Physical Description	
Arrangement:	Table Top
System w/Multiple Chassis?	False
Size:	29inch/5inch/4inch
Weight:	<8kg
Other info	
Highest Frequency used in device (MHz):	2841.6 MHz - but system does use up to 5.8GHz wi-f
All Other Frequencies:	N/A
EUT Software (internal to EUT):	3.11.0.11255
Support Software (used by supportPC to exercise EUT):	N/A

EUT List

Ref. ID	Slot #	Name/Description	Model Number	Part Number	Serial Number	Rev. #
1		P033	P033	N/A	N/A	N/A

Ports and Cabling

Ref. Id	Port Name on EUT	Cable Description or reason for no cable	Qty	Length as tested (m)	Max Length (m)	Shielded? (Y/N)	Termination Box ID & Port Name
1	RJ 11 Mic	Mic Cable	1	7.62m	7.62m	No	External Microphone
2	USB 3.0 Type A	Incorporated into support kit				No	USB Mouse
3	USB 3.0 Type A	Incorporated into support kit				No	USB keyboard
4	GB Ethernet	Cat5e	1	5.08m		No	Network/Hub
5	DC Power					No	AC/DC adaptor
6	Aux HDMI Out		1	2.032m		No	4K Monitor
7	Main HDMI out		1	2.032m		No	4K monitor
8	HDMI input		1	2.032m		No	Laptop
9	USB C	Not required to be tested				No	

Support Equipment

Ref. ID	Name/Description	Manufacturer	Model Number	Customer Supplied Calibration Data
1	Microphone			
2	AC/DC PSU			
3	USB Mouse			
4	USB Keyboard			
5	4K Monitor			
6	4K monitor			
7	Laptop			
8	Bluetooth Remote Control			
9	2.4/5GHz Wi-fi router			

2.4 Modifications to the EUT

No modifications were made to the EUT.

2.5 Modifications to the Standard

No modifications were made to the Test Standard.

2.6 Disposition of EUT

The test sample including all support equipment (if any), submitted to the Electromagnetic Compatibility Lab for testing was returned to HP Inc. upon completion of testing.

3.0 Electromagnetic Compatibility Emission Criteria

3.1 Limits for Conducted Disturbance at Mains Terminals

Test Method: The following standards specified below are covered in the scope of this section of the test report:

- FCC Part 15 Subpart B
- Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7

Sample Calculation:

$$R_f - S = M$$

where:

R_f = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

Sample formula for calculating the Corrected Data for the Conducted Emissions Measurements:

Line	Freq (MHz)	Uncorrected QP** Amplitude (dBuV)	LISN IL (dB)	CBL (dB)	Corrected QP** Amplitude (dBuV)	QP** Limit (dBuV)	Delta (dB)	Results
XYZ	0.18	42.65	10	0.58	53.23	79	-25.77	Pass

Corrected QP** Amplitude (dBuV) = Uncorrected Amplitude (dBuV) + LISN IL (dB) + CBL (dB) = 42.65 + 10 + 0.58 = 53.23

** Same Calculation applies to Corrected Avg. amplitude as well.

Test Requirement(s): The EUT shall meet the Class A limits shown in the table below.

Frequency Range (MHz)	Class A Limits (dBuV)		Class B Limits (dBuV)	
	Quasi-Peak	Average	Quasi- Peak	Average
0.15 - 0.5	79	66	66 to 56	56 to 46
0.5 - 5	73	60	56	46
5 - 30	73	60	60	50
Note 1 – The lower limit shall apply at the transition frequencies.				
Note 2 – The limit decreases linearly with the logarithm if the frequency in the range 0.15 MHz to 0.5 MHz.				

Conducted Emissions - Limits

Test Procedure:

The EUT was placed on a non-metallic table, 80 cm above the ground plane and 40 cm away from the vertical reference ground plane. The method of testing, test conditions, and test procedures of ANSI C63.4-2014 were used. The EUT was powered through a 50 Ω /50 μ H LISN. An EMI receiver, connected to the measurement port of the LISN, scanned the frequency range from 150 kHz to 30 MHz in order to find the peak conducted emissions. All peak emissions within 6 dB of the limit were re-measured using a quasi-peak and/or average detector as appropriate. Any measured frequency that exhibits a margin of compliance that is less than 3 dB below the specification limit is marked. Eurofins E&E recommends that every emission measured, has at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process. Photographs of test setup are presented below.

Test Software Used: TILE 7.4.2.5 was used to perform this test.

Test Results:

Test Standard:	FCC Part 15 Subpart B Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7 Class A
Test Name	Conducted Emissions
Test Dates:	August 29, 2022
Laboratory	Eurofins Electrical and Electronic Testing NA, Inc.
Test Engineer:	Sergio Gutierrez
Test Results:	Compliant
Additional Notes:	

Test Summary

MET Job #	118717	Temperature	21.00°C
Date	08/29/2022	Humidity	54.00% RH
Test Engineer	SG	A. Pressure	98.57 kPa
Customer	HP Inc.	Mode/Configuration	In a call, 5G Pings, sending content
Customer Contact	Koby Rosenberg	EUT Voltage	120 VAC/60 Hz
Limit/Class	FCC/A	Modifications	None
Start Frequency	150 kHz	Latest Quality Check Date	08/29/2022
Stop Frequency	30 MHz	Test Status	Compliant

Test Data

Measurement Location	Measurement	Limit	Result
Bonding measurement from LISN ground to ground plane	0.515 mΩ	< 2.5 mΩ	Pass

Freq (MHz)	QP (dBμV)	QP Lim (dBμV)	QP Margin (dB)	Avg (dBμV)	Avg Lim (dBμV)	Avg Margin (dB)	Result
0.1500	48.665	79.00	30.335	31.740	66.00	34.260	Pass
0.1545	48.077	79.00	30.923	30.873	66.00	35.127	Pass
0.1590	47.431	79.00	31.569	30.501	66.00	35.499	Pass
0.1680	46.034	79.00	32.966	29.573	66.00	36.427	Pass
0.1815	44.184	79.00	34.816	28.691	66.00	37.309	Pass
0.5145	29.269	73.00	43.731	23.782	60.00	36.218	Pass
0.6135	30.734	73.00	42.266	22.862	60.00	37.138	Pass
14.8080	28.931	73.00	44.069	23.707	60.00	36.293	Pass
18.5100	27.068	73.00	45.932	22.400	60.00	37.600	Pass
23.2005	27.062	73.00	45.938	22.558	60.00	37.442	Pass
25.9200	31.135	73.00	41.865	24.513	60.00	35.487	Pass

Table 1. Conducted Emissions, Line, Test Results

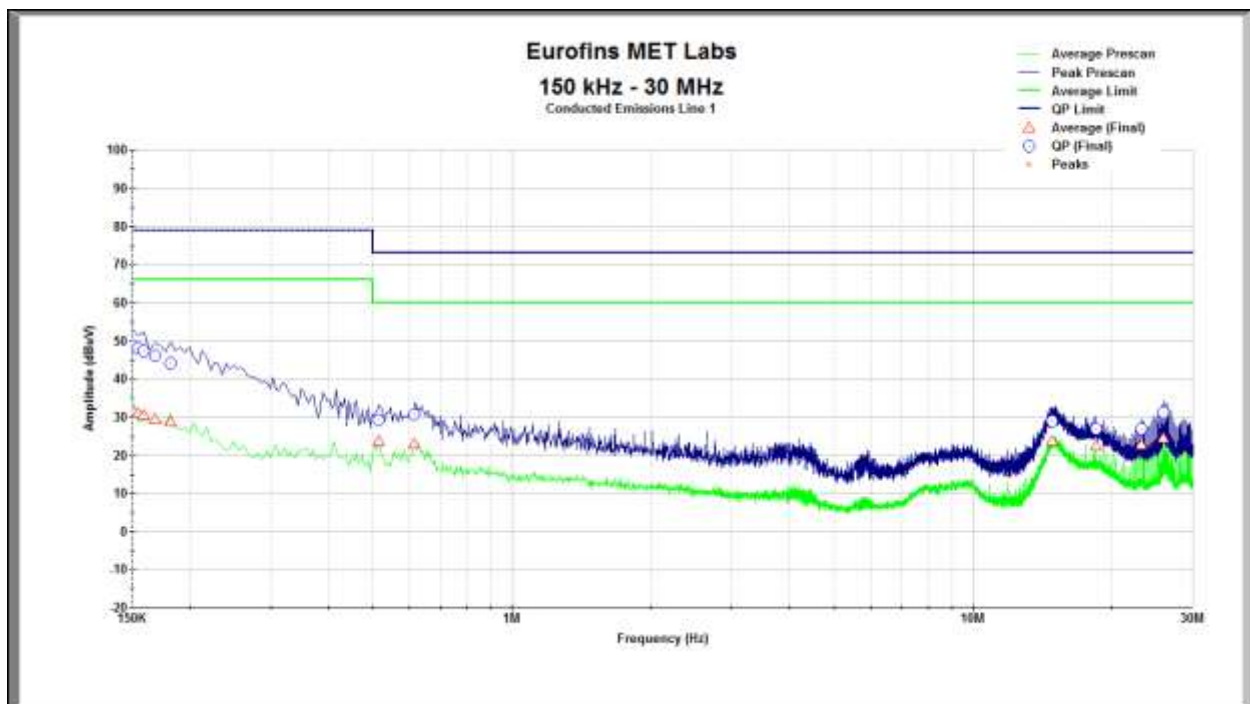


Figure 1. Conducted Emissions, Line Plot

Freq (MHz)	QP (dBμV)	QP Lim (dBμV)	QP Margin (dB)	Avg (dBμV)	Avg Lim (dBμV)	Avg Margin (dB)	Result
0.163	46.908	79.00	32.092	30.242	66.00	35.758	Pass
0.172	45.564	79.00	33.436	29.436	66.00	36.564	Pass
0.627	33.304	73.00	39.696	24.995	60.00	35.005	Pass
14.821	32.675	73.00	40.325	27.321	60.00	32.679	Pass
18.510	27.374	73.00	45.626	23.638	60.00	36.362	Pass
23.200	24.462	73.00	48.538	20.594	60.00	39.406	Pass
26.163	28.955	73.00	44.045	24.255	60.00	35.745	Pass
28.630	27.230	73.00	45.770	22.723	60.00	37.277	Pass

Table 2. Conducted Emissions, Neutral, Test Results

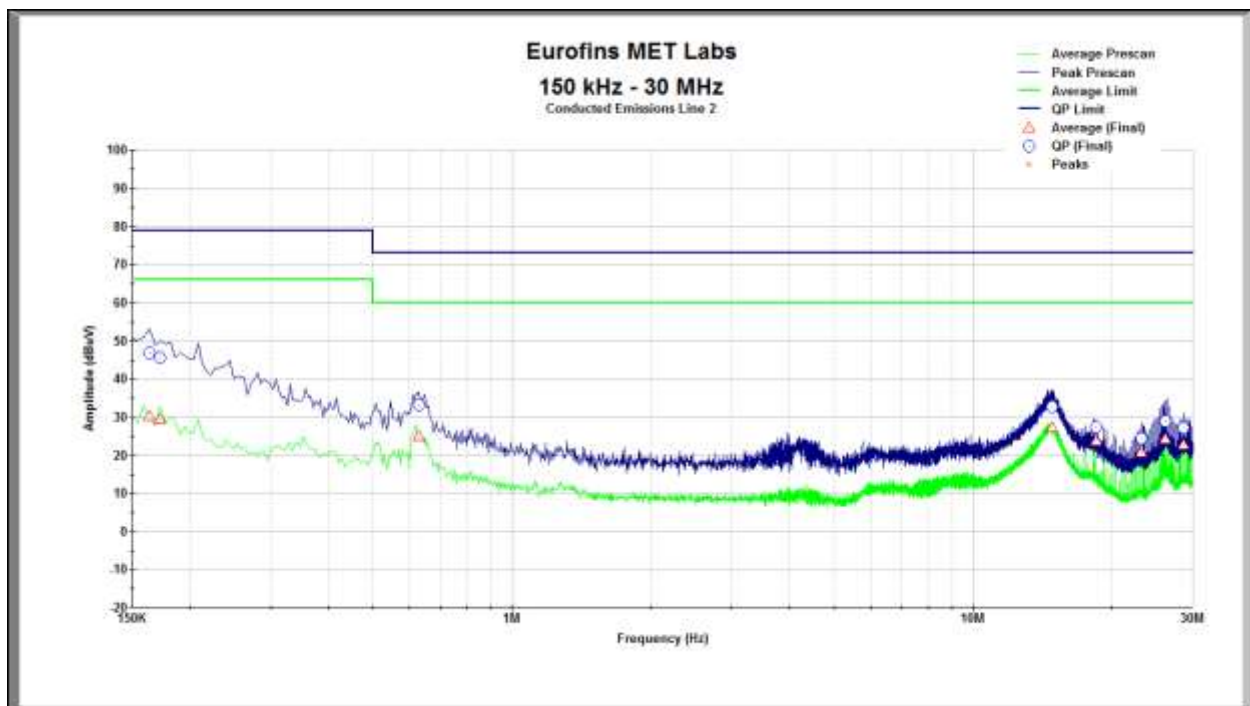


Figure 2. Conducted Emissions, Neutral Plot



Photograph 1. Conducted Emissions, AC Mains, Front View



Photograph 2. Conducted Emissions, AC Mains, LISN View



Photograph 3. Conducted Emissions, AC Mains, Side View

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

Test Name: CEV				Test Date(s):	08/29/2022
MET Asset #	Nomenclature	Manufacturer	Model	Last Cal Date	Cal Due Date
1A1065	EMI Test Receiver	Rohde & Schwarz	ESCI	08/04/2022	08/04/2023
1A1177	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	11/23/2021	11/23/2022
3A3215	ATC Digital Ohmmeter	Valhalla Scientific	4150	05/12/2022	05/12/2023
3A3118	Temperature, Humidity and Pressure Recorder	Omega Engineering	OM-CP-PRHTEMP2000	10/22/2021	10/22/2022
1A1164	True-RMS Multimeter	Fluke	117	10/19/2021	10/19/2022
1A1122	LISN	TESEQ	NNB 51	09/13/2021	09/13/2022
1A1079	Conducted Comb Generator	COM-Power Corp	CGC-255	See Note	
1A1123	LISN	TESEQ	NNB 51	11/29/2021	11/29/2022
Note:	Functionally tested equipment is verified using calibrated instrumentation at the time of testing.				

Table 3. Conducted Emissions, Test Equipment

3.3 Radiated Emissions: Limits of Electromagnetic Radiation Disturbance

Test Method: The following standards specified below are covered in the scope of this section of the test report:

- FCC Part 15 Subpart B
- Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7

Test Requirement(s): **§15.109 (b)** The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

Frequency (MHz)	Field Strength (dBµV/m)	
	§15.109 (b), Class A Limit (dBµV/m) @ 10 m	§15.109 (a), Class B Limit (dBµV/m) @ 3 m
30 to 88	39.00	40.00
88 to 216	43.50	43.50
216 to 960	46.40	46.00
Above 960	49.50	54.00
If the highest frequency generated or used in the device or on which the device operates or tunes is: • less than 108 MHz, the upper frequency of measurement range is 1000 MHz • between 108 MHz – 500 MHz, the upper frequency of measurement range is 2000 MHz • between 500 – 1000 MHz, the upper frequency of measurement range is 5000 MHz • above 1000 MHz, the upper frequency of measurement range is the 5th harmonic of the highest frequency or 40 GHz, whichever is lower		

Radiated Emissions Limits calculated per FCC Part 15, §15.109 (a) (b)

Frequency (MHz)	Field Strength (dBµV/m)	
	Class A Limit (dBµV/m) @ 10 m	Class B Limit (dBµV/m) @ 10 m
30 to 88	40.00	30.00
88 to 216	43.50	33.10
216 to 230	46.40	35.60
230 to 960	47.00	37.00
960 to 1000	49.50	43.50
Frequency (MHz)	Class A Average Limit (dBµV/m) @ 3 m	Class B Average Limit (dBµV/m) @ 3 m
Above 1000	60.00	54.00
If the highest frequency generated or used in the device or on which the device operates or tunes is: • less than 108 MHz, the upper frequency of measurement range is 1000 MHz • between 108 MHz – 500 MHz, the upper frequency of measurement range is 2000 MHz • between 500 – 1000 MHz, the upper frequency of measurement range is 5000 MHz • above 1000 MHz, the upper frequency of measurement range is the 5th harmonic of the highest frequency or 40 GHz, whichever is lower		

Radiated Emissions Limits calculated per ICES-003 Issue 7

Sample Calculation for Distance Correction factor (DCF) measurement:

$$F_d = 20 \cdot \log_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

Sample formula for calculating the Corrected Data for the Radiated Emissions Measurements:

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBμV)	ACF (dB/m) (+)	Pre Amp Gain (dB)(-)	CBL (dB) (+)	DCF (dB) (+)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
249.99	V	359.9	240.7	55.46	11.4	28.335	0	0	38.505	47	-8.495

$$\begin{aligned} \text{Corrected Amplitude (dBμV/m)} &= \text{Uncorrected Amplitude (dBμV)} + \text{ACF (dB/m)} - \text{Preamp Gain (dB)} + \text{CBL (dB)} + \text{DCF (dB)} \\ &= 55.46 + 11.4 - 28.335 + 0 + 0 = \mathbf{38.505} \end{aligned}$$

Test Procedure:

The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. The method of testing, test conditions, and test procedures of ANSI C63.4-2014 were used. Any measured frequency that exhibits a margin of compliance that is less than 3 dB below the specification limit is marked. Eurofins E&E recommends that every emission measured, has at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process.

For emissions between 30 MHz and 1000 MHz, a biconilog antenna was located 10 m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz resolution bandwidth.

For emission between 1 GHz and 18 GHz, a double ridged guide horn was located 3 m from the EUT on an adjustable mast. A pre-scan was performed and used to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied depending on the geometry of the EUT. In order to ensure maximized emissions, the horn antenna was positioned both vertically and laterally. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a peak and average detector with a 1 MHz resolution bandwidth.

For emissions between 18 GHz and 30 GHz, a double ridged horn was used as a measurement antenna at the measurement distance as listed under Radiated Emissions Test Results, on an adjustable mast. A pre-scan was performed and used to find prominent radiated emissions. The pre-scan method includes investigation of the cone(s) of radiation output from the EUT using a bore-sighting antenna or with manual investigation by hand. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied depending on the geometry of the EUT and previously investigated cone(s) of radiation. In order to ensure maximized emissions, the horn antenna was positioned both vertically and horizontally. Measurements in both horizontal and

vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using an average and peak (for CISPR >1 GHz) detector with a 1 MHz resolution bandwidth.

All peak emissions, within 20 dB of the limit, were reviewed and the six highest peaks were remeasured using a quasi-peak or average detector as appropriate

Test Software Used: Jamila RE Rev 1.002 was used to perform this test.

Test Results:

Test Standard:	FCC Part 15 Subpart B Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7 Class A
Test Name	Radiated Emissions
Test Dates:	August 29, 2022
Laboratory	Eurofins Electrical and Electronic Testing NA, Inc.
Test Engineer:	Sergio Gutierrez
Test Results:	Compliant
Additional Notes:	

Test Summary

Test Date	08/29/2022	Temperature	21.00°C
Engineer	SG	Humidity	54.00% RH
Customer	HP Inc.	A. Pressure	98.58 kPa
MET#	118717	Mode	In a call, 5G Pings, sending content
EUT	P033	Doors	No
Limit/Class	FCC / A	EUT Voltage	230 VAC/50 Hz
Highest Clock	5.8 GHz	Setup V./Date	08/29/2022/ SG
Start Frequency	30 MHz	Setup Picture	See below
Stop Frequency	30 GHz	Pass Date	08/29/2022----10:41:09 AM

Test Data

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBμV)	ACF (dB/m)	Pre-Amp Gain & CBL (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
43.104	V	113.10	400.00	38.06	14.248	24.462	27.846	39.00	-11.154
891.000	H	258.10	100.00	29.91	24.700	19.649	34.961	46.40	-11.439
48.143	V	343.10	102.50	37.01	12.343	24.373	24.980	39.00	-14.020
297.000	H	202.10	288.70	40.65	17.200	22.539	35.311	46.40	-11.089
297.000	V	338.40	100.00	40.03	17.400	22.539	34.891	46.40	-11.509
110.570	V	101.00	126.20	28.85	15.700	23.614	20.936	43.50	-22.564

Table 4. Radiated Emissions, FCC, 30 MHz – 1000 MHz, Quasi-Peak Test Results

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBμV)	ACF (dB/m)	Pre-Amp Gain & CBL (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
43.104	V	113.10	400.00	38.06	14.248	24.462	27.846	40.00	-12.154
891.000	H	258.10	100.00	29.91	24.700	19.649	34.961	47.00	-12.039
48.143	V	343.10	102.50	37.01	12.343	24.373	24.980	40.00	-15.020
297.000	H	202.10	288.70	40.65	17.200	22.539	35.311	47.00	-11.689
297.000	V	338.40	100.00	40.03	17.400	22.539	34.891	47.00	-12.109
110.570	V	101.00	126.20	28.85	15.700	23.614	20.936	43.50	-22.564

Table 5. Radiated Emissions, ICES-003, 30 MHz – 1000 MHz, Quasi-Peak Test Results

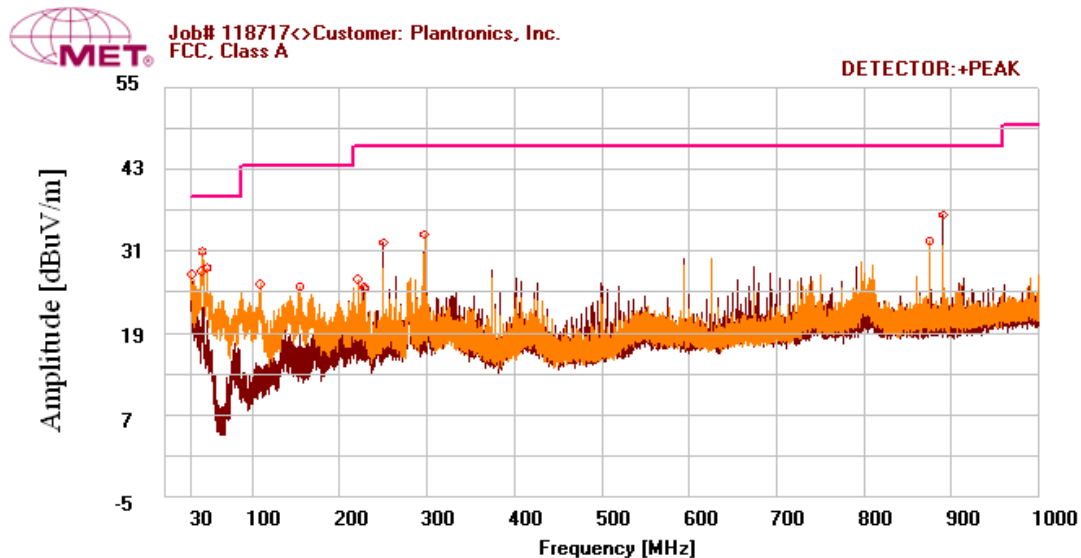


Figure 3. Radiated Emissions, 30 MHz – 1000 MHz, Peak Plot

Frequency (GHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBμV)	ACF (dB/m)	Pre-Amp Gain & CBL (dB)	DCF (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1.484	V	91.80	129.70	52.10	28.248	30.749	-10.46	39.129	49.50	-10.371
1.484	H	89.10	145.50	53.21	28.386	30.745	-10.46	40.391	49.50	-9.109
1.782	H	40.40	194.00	52.88	30.117	32.667	-10.46	39.870	49.50	-9.630
1.782	V	218.90	159.60	50.11	30.259	32.667	-10.46	37.242	49.50	-12.258
3.199	V	270.20	130.50	36.20	33.411	36.315	-10.46	22.836	49.50	-26.664
3.000	V	153.00	186.90	44.98	33.108	36.420	-10.46	31.208	49.50	-18.292

Table 6. Radiated Emissions, FCC, 1 GHz – 18 GHz, Average Test Results

Frequency (GHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBμV)	ACF (dB/m)	Pre-Amp Gain & CBL (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1.484	V	91.80	129.70	52.10	28.248	30.749	49.589	60.00	-10.411
1.484	H	89.10	145.50	53.21	28.386	30.745	50.851	60.00	-9.149
1.782	H	40.40	194.00	52.88	30.117	32.667	50.330	60.00	-9.670
1.782	V	218.90	159.60	50.11	30.259	32.667	47.702	60.00	-12.298
3.199	V	270.20	130.50	36.20	33.411	36.315	33.296	60.00	-26.704
3.000	V	153.00	186.90	44.98	33.108	36.420	41.668	60.00	-18.332

Table 7. Radiated Emissions, ICES-003, 1 GHz – 18 GHz, Average Test Results

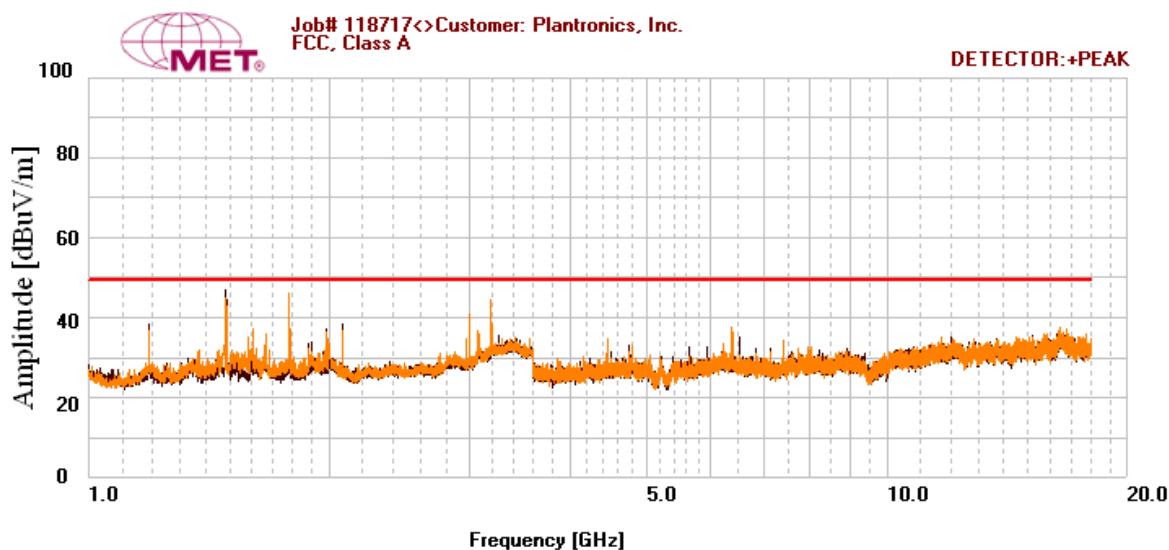


Figure 4. Radiated Emissions, 1 GHz – 18 GHz, Peak Plot

Frequency (GHz)	Antenna Polarity	Antenna Height (cm)	EUT Azimuth (Degrees)	Uncorrected Amplitude (dBμV)	ACF (dB/m)	CBL (dB)	Pre-amp Factor (dB)	DCF (dB)	Corrected Amplitude (dBμV/m)	Limit, (dBμV/m)	Margin (dB)
28.0000	V	185.20	245.10	37.85	46.30	10.22	-40.51	-10.460	43.400	49.50	-6.10
28.0192	H	35.30	115.20	38.26	46.37	10.02	-40.49	-10.460	43.700	49.50	-5.80
28.5000	V	229.00	105.30	36.59	46.56	10.80	-40.44	-10.460	43.050	49.50	-6.45
28.5000	H	78.10	110.00	36.57	46.51	10.80	-40.44	-10.460	42.980	49.50	-6.52
29.0192	H	335.70	138.90	34.18	46.71	11.47	-39.52	-10.460	42.370	49.50	-7.13
29.7692	V	78.30	118.40	34.26	47.31	11.60	-39.41	-10.460	43.300	49.50	-6.20

Table 8. Radiated Emissions, FCC, 18 GHz – 30 GHz, Average Test Results

Frequency (GHz)	Antenna Polarity	Antenna Height (cm)	EUT Azimuth (Degrees)	Uncorrected Amplitude (dBμV)	ACF (dB/m)	CBL (dB)	Pre-amp Factor (dB)	Corrected Amplitude (dBμV/m)	Limit, (dBμV/m)	Margin (dB)
28.0000	V	185.20	245.10	37.85	46.30	10.22	-40.51	53.860	60.00	-6.140
28.0192	H	35.30	115.20	38.26	46.37	10.02	-40.49	54.160	60.00	-5.840
28.5000	V	229.00	105.30	36.59	46.56	10.80	-40.44	53.510	60.00	-6.490
28.5000	H	78.10	110.00	36.57	46.51	10.80	-40.44	53.440	60.00	-6.560
29.0192	H	335.70	138.90	34.18	46.71	11.47	-39.52	52.830	60.00	-7.170
29.7692	V	78.30	118.40	34.26	47.31	11.60	-39.41	53.760	60.00	-6.240

Table 9. Radiated Emissions, ICES-003, 18 GHz – 30 GHz, Average Test Results

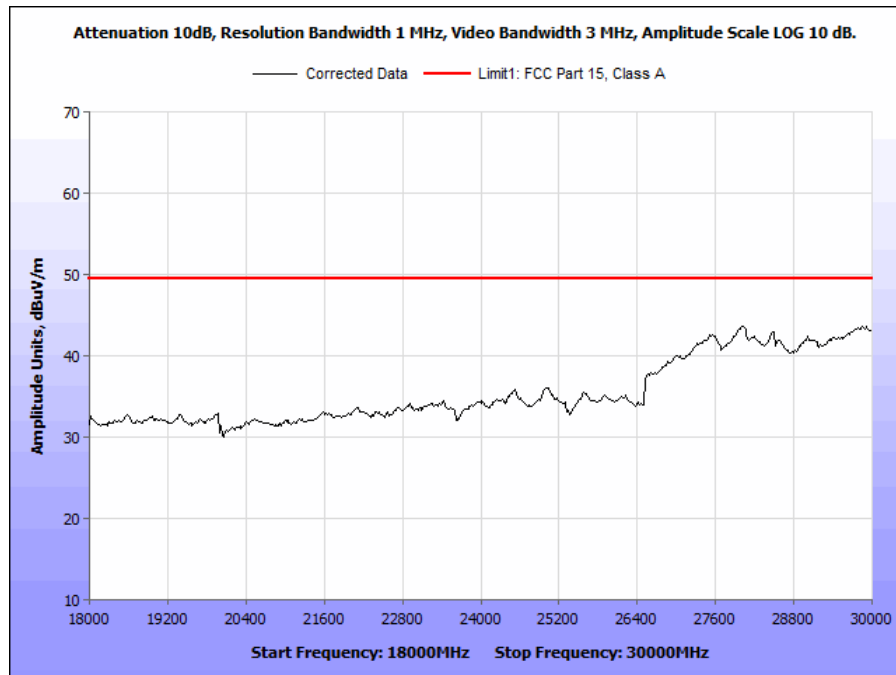


Figure 5. Radiated Emissions, 18 GHz – 30 GHz, Horizontal Plot

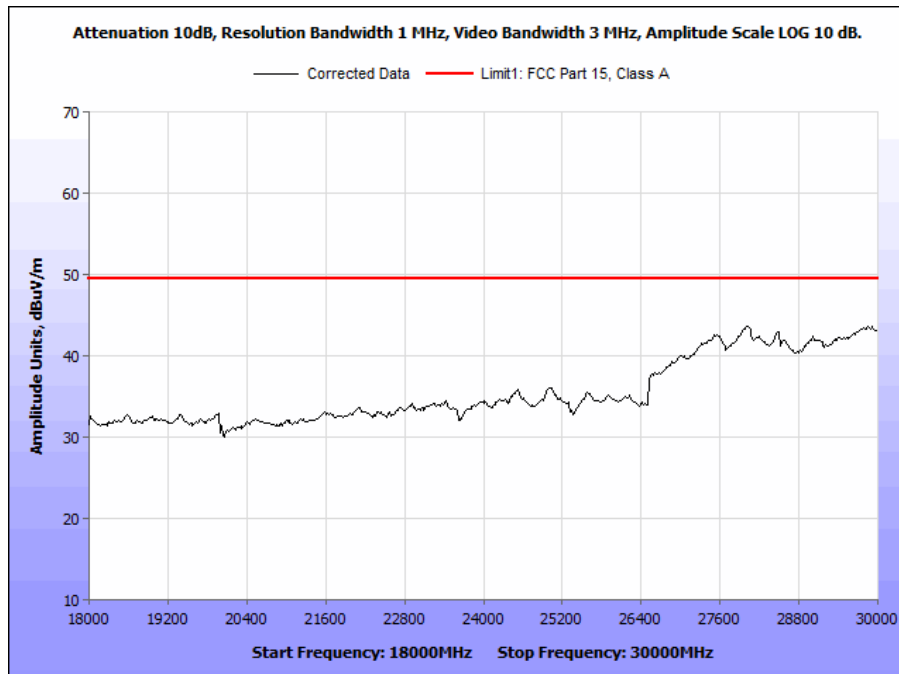
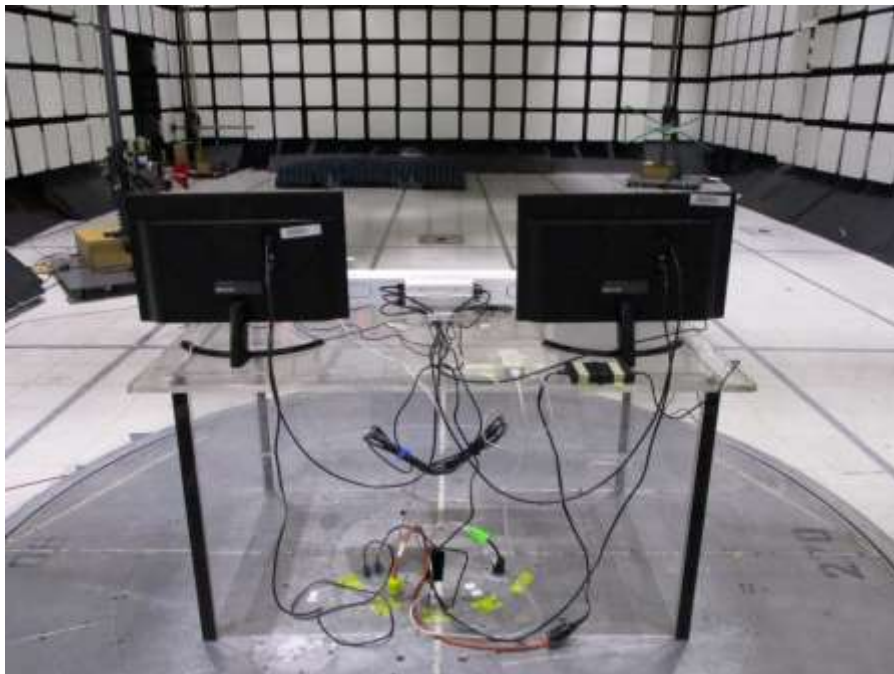


Figure 6. Radiated Emissions, 18 GHz – 30 GHz, Vertical Plot



Photograph 4. Radiated Emissions, 30 MHz – 1000 MHz, Front View



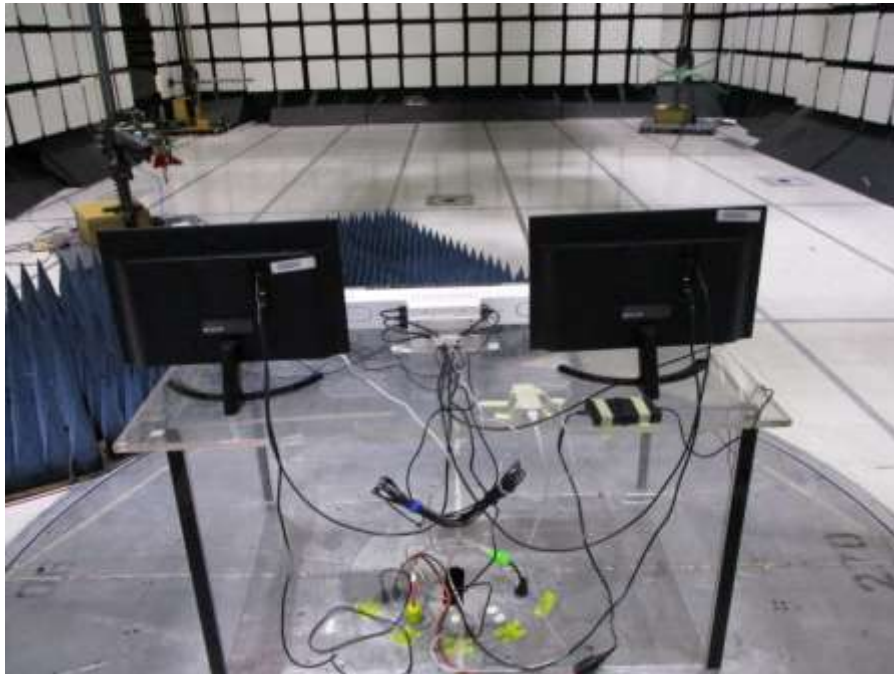
Photograph 5. Radiated Emissions, 30 MHz – 1000 MHz, Rear View



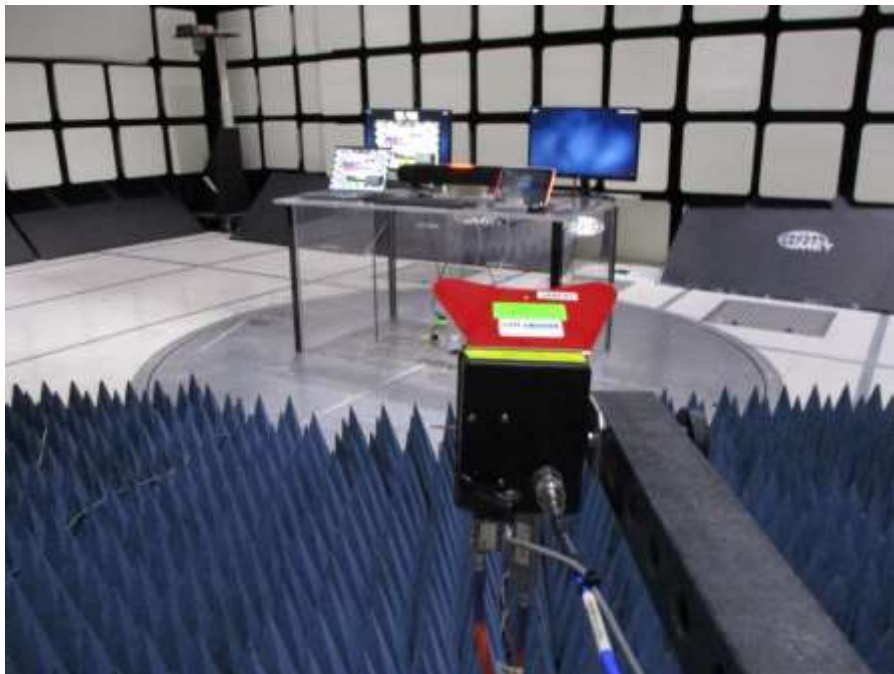
Photograph 6. Radiated Emissions, 30 MHz – 1000 MHz, Antenna View



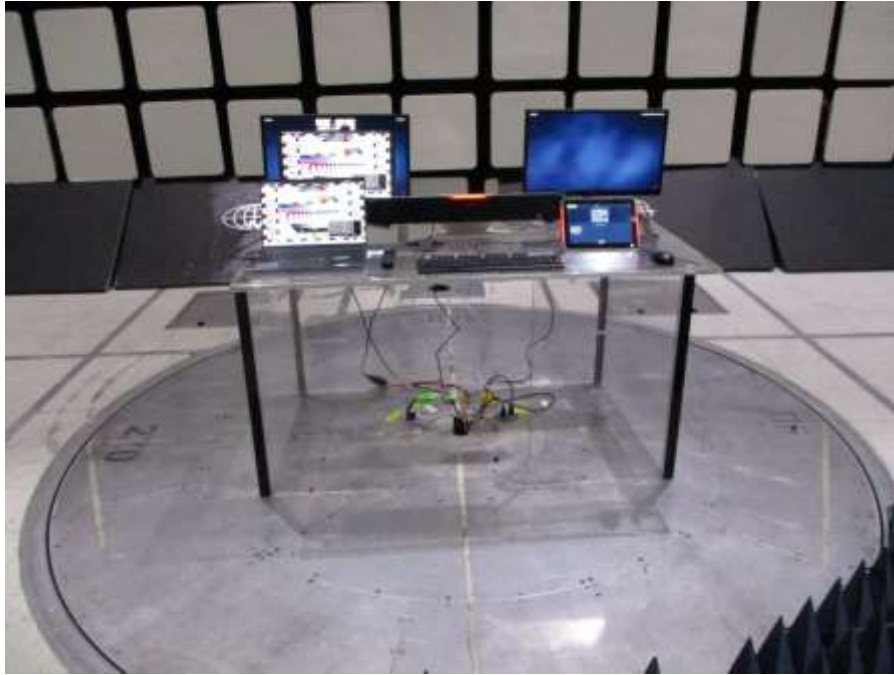
Photograph 7. Radiated Emissions, 1 GHz – 18 GHz, Front View



Photograph 8. Radiated Emissions, 1 GHz – 18 GHz, Rear View



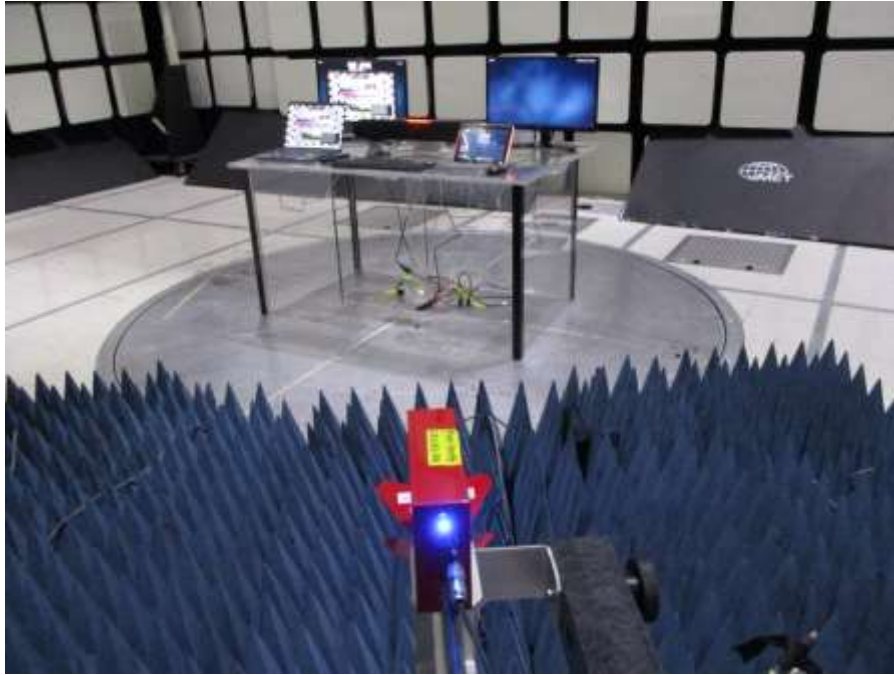
Photograph 9. Radiated Emissions, 1 GHz – 18 GHz, Antenna View



Photograph 10. Radiated Emissions, 18 GHz – 30 GHz, Front View



Photograph 11. Radiated Emissions, 18 GHz – 30 GHz, Rear View



Photograph 12. Radiated Emissions, 18 GHz – 30 GHz, Antenna View



Photograph 13. Radiated Emissions, Support Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

Test Name: Radiated Emissions				Test Date(s):	08/29/2022
MET Asset #	Nomenclature	Manufacturer	Model	Last Cal Date	Cal Due Date
30 MHz – 1 GHz					
1A1083	Test Receiver	Rohde & Schwarz	ESU40	10/12/2021	10/12/2022
1A1088	Preamplifier	Rohde & Schwarz	TS-PR1	See Note	
1A1050	Bi-Log Antenna	Schaffner	CBL 6112D	12/01/2020	12/01/2022
3A3118	Temperature, Humidity and Pressure Recorder	Omega Engineering	OM-CP-PRHTEMP2000	10/22/2021	10/22/2022
1A1044	Generator	COM-Power Corp	CG- 520	See Note	
1A1073	Multi Device Controller	ETS EMCO	2090	See Note	
1A1106	10 M Semi-Anechoic Chamber (NSA)	ETS - Lindgren	04X07	01/06/2022	01/06/2025
1 GHz – 18 GHz					
1A1180	Amplifier	Miteq	AMF-7D-01001800-22-10P	See Note	
1A1047	Horn Antenna	ETS - Lindgren	3117	06/16/2022	06/16/2024
1A1099	Generator	COM-Power Corp	CGO 51000	See Note	
1A1080	Multi Device Controller	ETS EMCO	2090	See Note	
18 GHz – 30 GHz					
1A1161	DRG Horn Antenna with Pre-Amplifier	ETS Lindgren	3116C-PA	06/03/2020	06/03/2022
1A1080	Multi Device Controller	ETS EMCO	2090	See Note	
Note:	Functionally tested equipment is verified using calibrated instrumentation at the time of testing.				

Table 10. Radiated Emissions, Test Equipment

END OF REPORT