Report Number:	14116837-E1V2FCCIC-Report
Issue Date: Revision Date:	2022-05-20 2022-06-07
Model Number:	M1004000
FCC ID:	2AM5N-ML2M1
IC ID:	23045-ML2M1

Electromagnetic Compatibility Test Report

For

Magic Leap Inc
7500 West Sunrise Blvd
Plantation, FL 33322 USA

Test Report Details

Tests Performed By:	UL LLC 12 LABORATORY DR. RESEARCH TRIANGLE PARK, NC 27709, U.S.A.
Tests Performed For:	**Magic Leap Inc** **7500 West Sunrise Blvd** **Plantation, FL 33322 USA**
Issue Date: Revision Date:	2022-05-20 2022-06-07
Model Number Tested:	M1004000
Sample Serial Numbers:	**P752X4N0000M** **P752X4N0000G** **G262XK700016**
Applicable Standards:	FCC 47 CFR PART 15 SUBPART B:2022 ICES-003 Issue 7:2020-10 ICES-Gen Issue 1:2021-02
Date Test Item Received:	**2021-08-20**
Testing Start Date:	**2021-08-30**
Date Testing Complete:	**2022-04-27**
Overall Results:	**Compliant**

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Report Directory

Report Revision History

Revision Date	Revision Version	Description	Revised By	Revision Reviewed By
2022-05-20	V1	Initial Issue		
2022-06-07	V2	Update model number from wildcard M1004XXX to singular model number M1004000.	Sarah Thomson	Michael Ferrer

1.0 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4:2014, FCC 47 CFR PART 15 SUBPART B:2022, ICES-003 Issue 7:2020-10, ICES-Gen Issue 1:2021-02.

1.1 Deviations from standard test methods

None

1.2 Device Modifications Necessary for Compliance

None

1.3 TEST RESULTS SUMMARY

This product is considered Class B

Requirement – Test	Result
CONDUCTED EMISSIONS	Compliant
RADIATED EMISSIONS	Compliant

Approved & Released For
UL LLC. By:

Michael Ferrer
Operations Leader
Consumer Technology Division
UL LLC.

Prepared By:

Sarah Thomson
Engineer
Consumer Technology Division
UL LLC.

2.0 DECISION RULES AND MEASUREMENT UNCERTAINTY

2.1 Metrological Traceability

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards

2.2 Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement).

2.3 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U_{lab}	U_{Cispr}
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 db	3.4 db
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.66 db	6.3 db
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 db	5.5
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 db	--
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 db	--

Uncertainty figures are valid to a confidence level of 95%.

2.4 Sample Calculation

RADIATED EMISSIONS
Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS
Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.

36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

3.0 GENERAL - Product Description

3.1 Equipment Description

The EUT is an augmented reality (AR) system consisting of a compute pack, headset, and handheld controller (covered in a separate report).

3.2 Device Configuration During Test

3.2.1 Equipment Used During Test:

Use	Product Type	Manufacturer	Model	Comments
EUT	Wearpack	Magic Leap	M1004000	Consists of the compute pack and headset connected by a non-removable cable FCC ID: 2AM5N-ML2M1; IC: 23045-ML2M1.
EUT	Power Supply	Magic Leap	M3013	ML-2 charger, Auto ranging power supply
AE	Laptop	HP	Zbook MLLL2701	Used for the Immunity Tool

Note: **EUT** - Equipment Under Test, **AE** - Auxiliary/Associated Equipment, or **SIM** - Simulator (Not Subjected to Test)

3.2.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
1	Mains	AC	N	N	AC mains to Power Supply
2	USB Type C	DC & I/O	N	N	Used for charging device, also can be for data transfer in developer mode.

*Note:
AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
I/O = Signal Input or Output Port (Not Involved in Process Control)
TP = Telecommunication Ports

3.2.3 EUT Highest Frequencies:

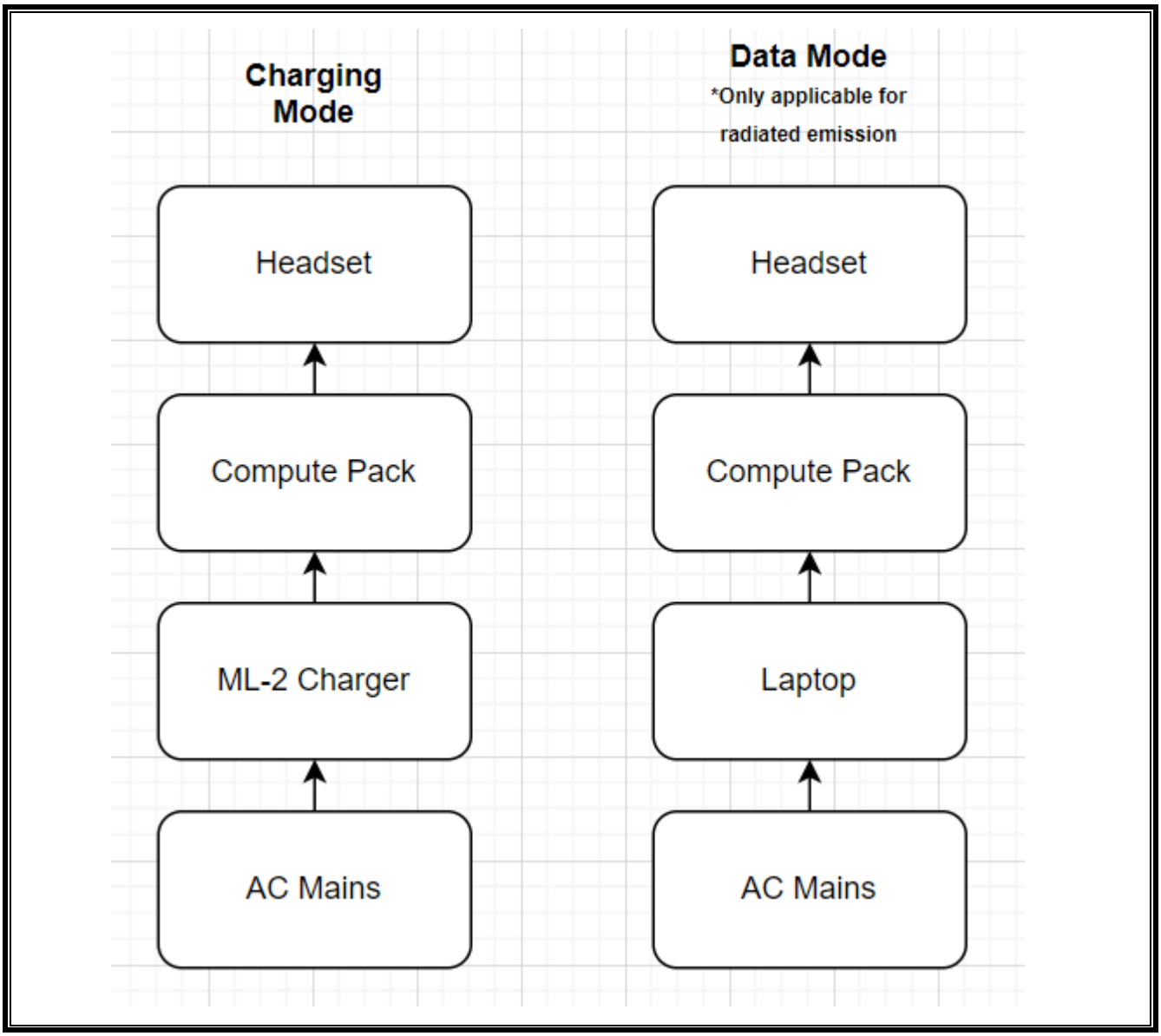
Frequency	Description
2.4 GHz	Bluetooth FHSS, BLE, WLAN
5 GHz	WLAN

3.2.4 Power Interface:

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	100-240	-	-	AC-50/60Hz	Single	None
1	120	-	-	AC-60Hz	Single	FCC/ICES testing
2	Battery	-	-	DC	-	Battery Mode

3.3 Block Diagram:

The diagram below illustrates the configuration of the equipment above.



3.4 EUT Configurations

Configuration #	Description
1	The headset and compute pack (wearpack) were configured as table top equipment. The wearpack was connected to the Magic Leap branded charger.
2	The headset and compute pack (wearpack) were configured as table top equipment. The wearpack was connected to a laptop.

3.5 EUT Operation Modes

Mode of Operation#	Description
1	The wearpack was charging with the ML-2 charger and the Bluetooth and Wi-fi radios were in receive mode.
2	The wearpack was running in battery mode connected to a laptop and transmitting data on the USB-C cable. The Bluetooth and Wi-fi radios were in receive mode.

3.6 Rationale for EUT Configurations and Modes of Operation

Configuration #	Description
1	EUT configurations and modes of operation were selected to maximize emissions and exercise all modes of operation.

4.0 APPLICABLE EMISSIONS LIMITS AND TEST RESULTS

4.1 Test Conditions and Results - MAINS TERMINAL - CONDUCTED EMISSIONS

Test Engineer	Phil Foote	
Test Date	2021-08-30	
Laboratory Parameters	Required prior to the test	During the test
Ambient Temperature	10 to 40 °C	23.3 °C
Humidity	10 % to 90 %	57.4 %
	Frequency range on each side of line	Measurement Point
Fully configured sample scanned over the following frequency range	150kHz to 30MHz	Mains

Limits - Class B

Frequency (MHz)	Limit (dBµV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Supplementary information: Please see the attached document 14116837-E1V1FCCIC-Photos for all test setup photos.

Conducted Emissions EUT Configuration Settings

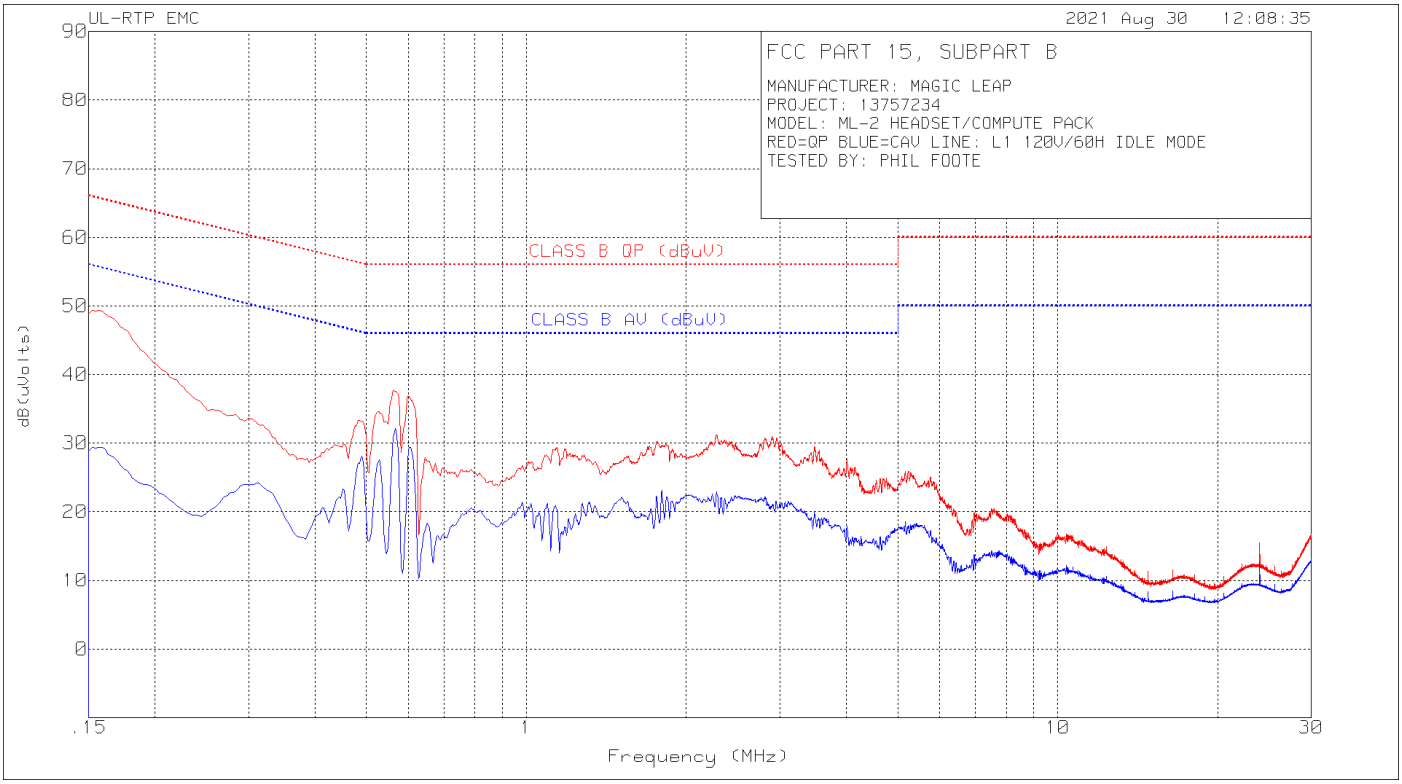
Power Interface #	EUT Configurations #	EUT Mode of Operation#
1 (120V/60Hz)	1	1 (radios idle)
Supplementary information: None		

Conducted Emissions Test Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Equipment – Ground Plane E				
85496	EMI Test Receiver 9kHz-3.6GHz	Rohde & Schwarz	ESR3	2021-08-17	2022-08-17
CBL004	Coaxial cable, 20 ft., BNC -male to BNC-male	UL	RG-223	2021-08-02	2022-08-02
207229	Temp/Humid/Pressure Meter	Extech	SD700	2021-04-20	2022-04-20
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Transient Limiter				
206212	Transient Limiter, 0.009 to 100 MHz	Electro-Metrics	EM 7600	2021-08-02	2022-08-02
	LISN (FCC & CISPR testing)				
LISN002	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2021-08-16	2022-08-16
	Artificial hand				
TN00135	Artificial Hand	UL	N/A	2020-08-20	2022-08-30

Results – 120V/60Hz, Wearpack + ML-2 Charger, Radios Idle – Line 1

Conducted Emissions Graph



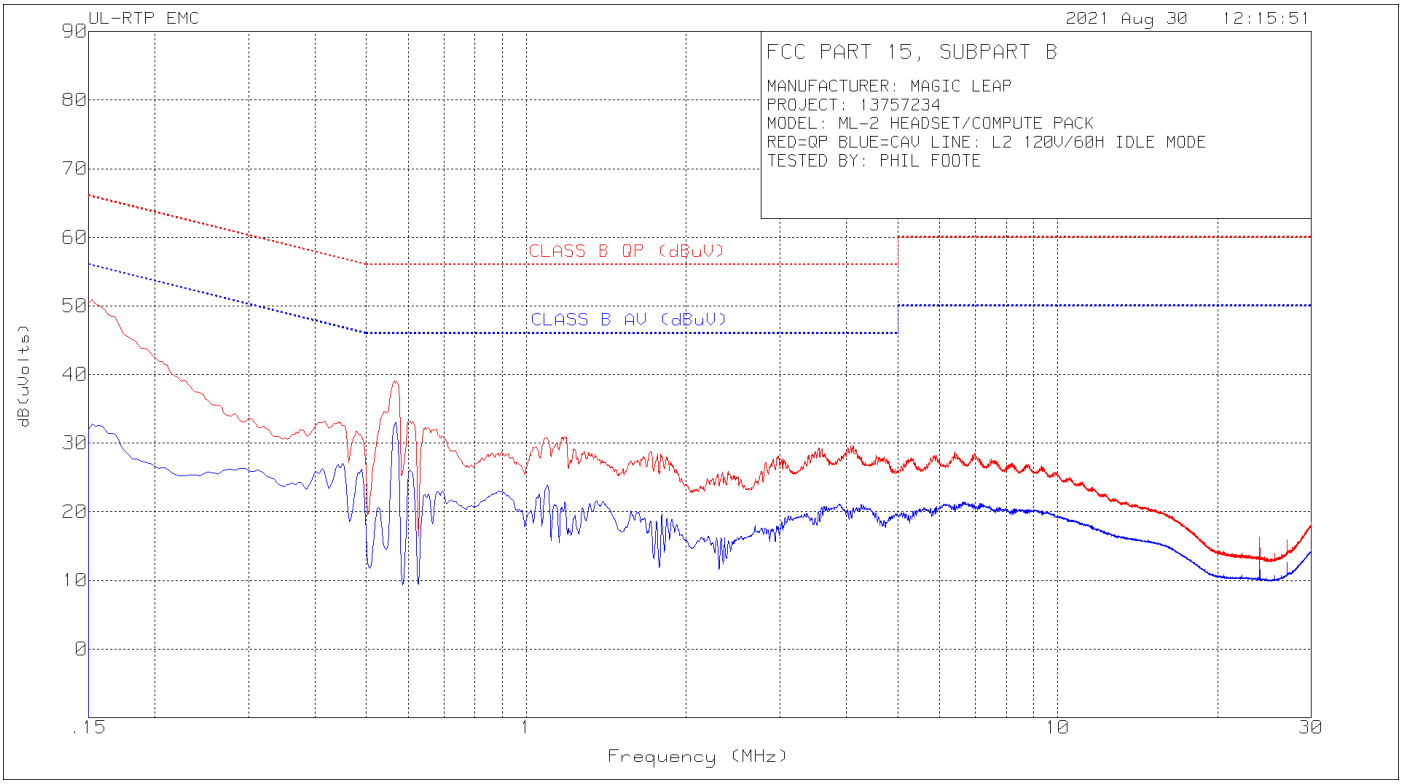
Conducted Emissions Data Points

Frequency (MHz)	Meter Reading (dBuV)	Det	LISN002 (dB)	CBL004_206212 (dB)	Corrected Reading dB(uVolts)	CLASS B QP (dBuV)	Margin (dB)	CLASS B AV (dBuV)	Margin (dB)
.15225	19.21	Ca	.4	9.8	29.41	-	-	55.88	-26.47
.312	14.31	Ca	.1	9.8	24.21	-	-	49.92	-25.71
.56625	22.28	Ca	.1	9.8	32.18	-	-	46	-13.82
.6045	19.61	Ca	0	9.8	29.41	-	-	46	-16.59
2.28075	13.02	Ca	0	9.9	22.92	-	-	46	-23.08
2.90625	11.16	Ca	0	9.9	21.06	-	-	46	-24.94
.15675	39.2	Qp	.4	9.8	49.4	65.63	-16.23	-	-
.30075	23.69	Qp	.1	9.8	33.59	60.22	-26.63	-	-
.56175	27.74	Qp	.1	9.8	37.64	56	-18.36	-	-
.6	26.89	Qp	.1	9.8	36.79	56	-19.21	-	-
2.283	21.31	Qp	0	9.9	31.21	56	-24.79	-	-
2.9085	20.78	Qp	0	9.9	30.68	56	-25.32	-	-

Qp - Quasi-Peak detector
Ca - CISPR average detection

Results – 120V/60Hz, Wearpack + ML-2 Charger, Radios Idle – Line 2

Conducted Emissions Graph



Conducted Emissions Data Points

Frequency (MHz)	Meter Reading (dBuV)	Det	LISN002 (dB)	CBL004_206212 (dB)	Corrected Reading dB(uVolts)	CLASS B QP (dBuV)	Margin (dB)	CLASS B AV (dBuV)	Margin (dB)
.15225	22.55	Ca	.4	9.8	32.75	-	-	55.88	-23.13
.1995	16.65	Ca	.2	9.8	26.65	-	-	53.63	-26.98
.41325	16.38	Ca	.1	9.8	26.28	-	-	47.58	-21.3
.56625	23.15	Ca	.1	9.8	33.05	-	-	46	-12.95
1.18275	11.64	Ca	0	9.8	21.44	-	-	46	-24.56
4.119	10.67	Ca	0	9.9	20.57	-	-	46	-25.43
.15225	40.71	Qp	.4	9.8	50.91	65.88	-14.97	-	-
.1995	32.52	Qp	.2	9.8	42.52	63.63	-21.11	-	-
.41775	23.3	Qp	.1	9.8	33.2	57.49	-24.29	-	-
.5685	29.12	Qp	.1	9.8	39.02	56	-16.98	-	-
1.18275	21.12	Qp	0	9.8	30.92	56	-25.08	-	-
4.119	19.75	Qp	0	9.9	29.65	56	-26.35	-	-

Qp - Quasi-Peak detector
Ca - CISPR average detection

4.2 Test Conditions and Results - RADIATED EMISSIONS

Test Engineer	Frank Lewis David Cox Richard Ramey	
Test Date	2022-03-17 2022-03-23 2022-03-24 2022-04-21 2022-04-20 2022-04-27	
Laboratory Parameters	Required prior to the test	During the test
Ambient Temperature	10 to 40 °C	22.4°C 22.8°C 22.4 °C 22.2 °C
Humidity	10 % to 90 %	47.3 % 53.7% 49.2% 36.5 %
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30MHz – 40GHz	3 m

Limits - Class B		
Frequency (MHz)	Limit (dBµV/m)	
FCC/ICES Limits for radiated disturbance of Class B ITE at measuring distance of 3 m		
	Quasi-Peak	Average
30-88	40	NA
88-216	43.5	NA
216-230	46	NA
230-960	46/47	NA
Above 960	54	NA
	Peak	Average
Above 1 GHz	74	54

Supplementary information: The peak scan is taken and then any points above or sufficiently close (within 6 dB) of the Quasi-peak limit are remeasured using the Qp detector. If no points on the plot are within 6dB of the limit then only peak data is shown as no Qp measurements are required to be taken.

For the 18-40GHz range testing only the compute pack was explored in both vertical and horizontal orientations because all of the radios and components operating at frequencies that could have harmonics in this frequency range are located in that piece of the EUT.

18-40GHz was not repeated for data transfer mode because the frequencies used for data transfer are lower than the 5th harmonic of 18GHz.

Please see the attached document 14116837-E1V1FCCIC-Photos for all test setup photos.

Radiated Emissions EUT Configuration Settings

Power Interface #	EUT Configurations #	EUT Mode of Operation#
1 (120V/60Hz)	1	1 (radios idle)
2 (battery)	2	2 (data transfer)
Supplementary information: None		

Radiated Emissions Test Equipment: 3m chamber (30MHz – 18GHz testing)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	30-1000 MHz				
AT0075	Hybrid Broadband Antenna	Sunar RF Motion	JB3	2021-11-04	2022-11-04
	1-18 GHz				
AT0062	HORN Antenna	ETS-Lindgren	3117	2022-02-23	2023-02-23
	Gain-Loss Chains				
C-SAC01	Gain-loss string: 0.009-1000MHz	Various	Various	2021-08-10	2022-08-10
C-SAC02 Port 3	Gain-loss string: 1-18GHz	Various	Various	2021-08-10	2022-08-10
C-SAC02 Port 7	Gain-loss string 1-7GHz	Various	Various	2021-08-10	2022-08-10
	Receiver & Software				
SA0018	Spectrum Analyzer	Agilent	PXA (N9030A)	2021-04-02	2022-04-30
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Additional Equipment used				
207229	Temp/Humid/Pressure Meter	Extech	SD700	2021-04-20	2022-04-30

Radiated Emissions Test Equipment: 10m chamber (18GHz – 40GHz testing)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	18-40GHz Range				
AT0076	18-26GHz	Antenna Research Associates	MWH-1826/B	2021-11-23	2022-11-23
AT0077	26-40GHz	Antenna Research Associates	MWH2640/B	2021-11-23	2022-11-23
AMP017, 202881, 202882	2 Cables / Preamp (18-40GHz)	UL	N/A	2022-01-26	2023-01-26
	Receiver & Software				
SA0016	Spectrum Analyzer	Agilent	PXA N9030A	2021-12-06	2022-12-06
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Additional Equipment used				
207229	Temp/Humid/Pressure Meter	Extech	SD700	2021-04-20	2022-04-20

RADIATED EMISSIONS 30 TO 1000 MHz, 120V/60Hz – Wearpack + ML-2 Charger, Horizontal Orientation – Charging Mode

Radiated Emissions Graph

Radiated Emissions Data Points

Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	FCC CLASS B (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
35.4569	41.54	Pk	22.9	-30.9	33.54	40	-6.46	0-360	100	V
142.8977	42.62	Pk	18.9	-29.6	31.92	43.52	-11.6	0-360	100	V
242.335	45.27	Pk	17.6	-28.5	34.37	46.02	-11.65	0-360	249	H
242.335	41.71	Pk	17.6	-28.5	30.81	46.02	-15.21	0-360	250	V
774.2033	37.79	Pk	26.9	-25.7	38.99	46.02	-7.03	0-360	100	H
774.2033	35.94	Pk	26.9	-25.7	37.14	46.02	-8.88	0-360	100	V
798.6988	38.68	Pk	27	-25.7	39.98	46.02	-6.04	0-360	100	H
798.6988	34.62	Pk	27	-25.7	35.92	46.02	-10.1	0-360	100	V

Pk - Peak Detector

Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	FCC CLASS B (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
798.7488	35.48	Qp	27	-25.7	36.78	46.02	-9.24	138	101	H

Pk - Peak Detector
Qp - Quasi-Peak Detector

RADIATED EMISSIONS 30 TO 1000 MHz, 120V/60Hz – Wearpack + ML-2 Charger, Vertical Orientation – Charging Mode

Radiated Emissions Graph

Radiated Emissions Data Points

Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	FCC CLASS B (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
34.6081	41.7	Pk	23.6	-31	34.3	40	-5.7	0-360	100	V
41.3989	43.06	Pk	18.5	-31	30.56	40	-9.44	0-360	100	V
132.1051	43.68	Pk	19.7	-29.7	33.68	43.52	-9.84	0-360	100	V
159.7536	42.99	Pk	18.5	-29.4	32.09	43.52	-11.43	0-360	100	V
323.2188	47.46	Pk	19.9	-28.2	39.16	46.02	-6.86	0-360	250	V
364.3276	43.23	Pk	20.8	-27.7	36.33	46.02	-9.69	0-360	100	V
774.082	36.59	Pk	26.9	-25.7	37.79	46.02	-8.23	0-360	100	V
798.6988	36.91	Pk	27	-25.7	38.21	46.02	-7.81	0-360	100	V
298.7232	42.21	Pk	19.3	-28.1	33.41	46.02	-12.61	0-360	100	H
774.2033	33.97	Pk	26.9	-25.7	35.17	46.02	-10.85	0-360	100	H
798.6988	35.42	Pk	27	-25.7	36.72	46.02	-9.3	0-360	100	H

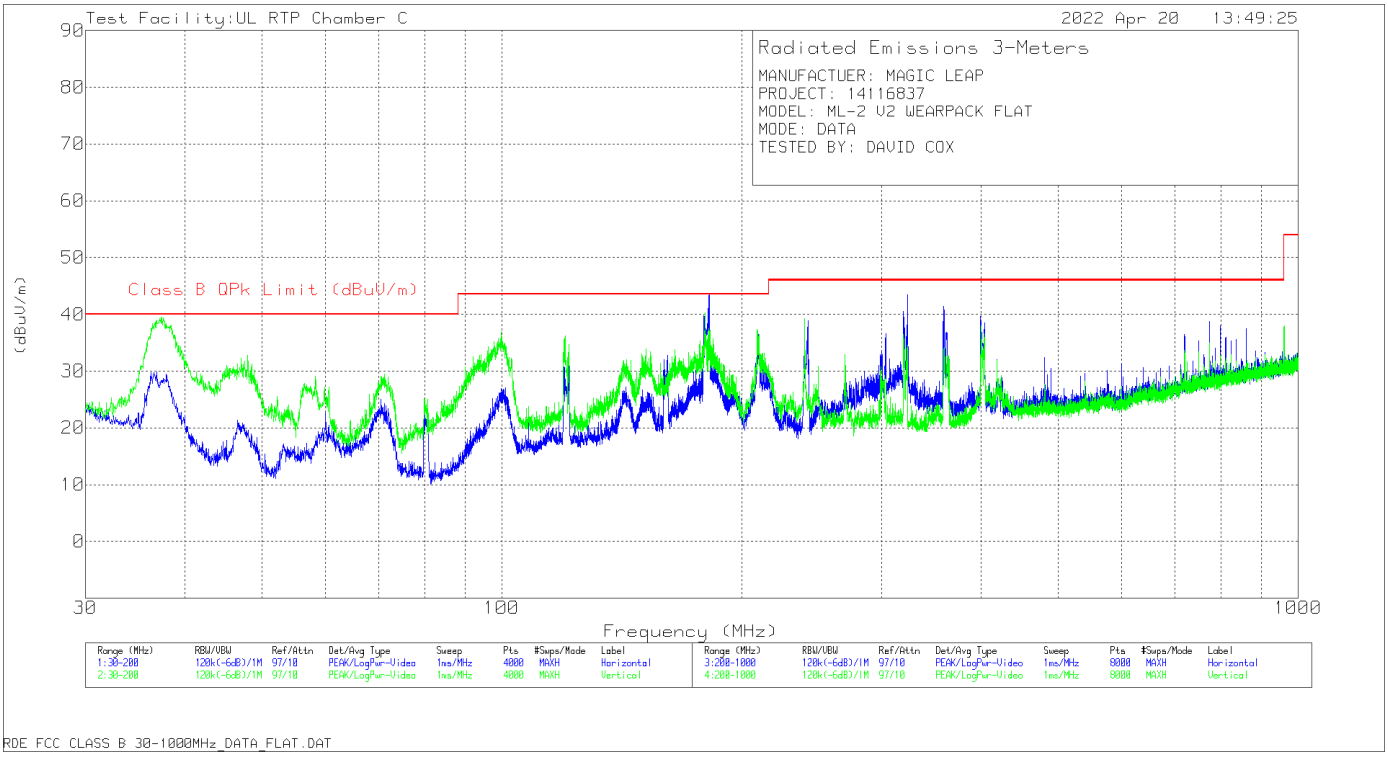
Pk - Peak Detector

Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	FCC CLASS B (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
35.3691	38.65	Qp	23	-30.9	30.75	40	-9.25	0	111	V

Pk - Peak Detector
Qp - Quasi-Peak Detector

RADIATED EMISSIONS 30 TO 1000 MHz, Battery – Wearpack, Horizontal Orientation – Data Transfer Mode

Radiated Emissions Graph



Radiated Emissions Data Points

Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
37.3544	48.92	Pk	21.5	-30.9	39.52	40	-.48	0-360	100	V
179.3837	51.32	Pk	17.5	-29.1	39.72	43.52	-3.8	0-360	300	H
180.0638	51.76	Pk	17.5	-29	40.26	43.52	-3.26	0-360	100	V
182.0618	55.19	Pk	17.4	-29.2	43.39	43.52	-.13	0-360	199	H
323.116	51.7	Pk	19.9	-28.2	43.4	46.02	-2.62	0-360	100	H
358.5206	48.49	Pk	20.7	-27.8	41.39	46.02	-4.63	0-360	100	H
399.2259	45.63	Pk	21.5	-27.5	39.63	46.02	-6.39	0-360	299	H

Pk - Peak detector

Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
38.1844	42.44	Qp	20.8	-31	32.24	40	-7.76	172	111	V
179.7457	47.94	Qp	17.5	-29	36.44	43.52	-7.08	228	198	H
182.0478	52	Qp	17.4	-29.2	40.2	43.52	-3.32	64	200	H
182.0638	43.28	Qp	17.4	-29.2	31.48	43.52	-12.04	221	114	V
323.211	48.19	Qp	19.9	-28.2	39.89	46.02	-6.13	358	101	H
364.281	45.29	Qp	20.8	-27.7	38.39	46.02	-7.63	321	108	H

Pk - Peak detector
Qp - Quasi-Peak detector

RADIATED EMISSIONS 30 TO 1000 MHz, Battery – Wearpack, Vertical Orientation – Data Transfer Mode

Radiated Emissions Graph

Radiated Emissions Data Points

Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
31.7004	40.54	Pk	25.7	-31.1	35.14	40	-4.86	0-360	100	V
59.8852	49.01	Pk	13.5	-30.5	32.01	40	-7.99	0-360	100	V
79.9079	58.15	Pk	13.8	-30.3	41.65	40	1.65	0-360	100	V
79.9504	46.69	Pk	13.8	-30.3	30.19	40	-9.81	0-360	200	H
121.3136	47.64	Pk	19.9	-29.7	37.84	43.52	-5.68	0-360	200	H
121.3561	51.62	Pk	19.9	-29.7	41.82	43.52	-1.7	0-360	100	V
159.7861	46.1	Pk	18.5	-29.4	35.2	43.52	-8.32	0-360	200	H
159.7861	51.44	Pk	18.5	-29.4	40.54	43.52	-2.98	0-360	100	V
182.0193	48.26	Pk	17.4	-29.2	36.46	43.52	-7.06	0-360	200	H
182.0618	52.95	Pk	17.4	-29.2	41.15	43.52	-2.37	0-360	100	V
242.4055	49.53	Pk	17.6	-28.5	38.63	46.02	-7.39	0-360	100	H
298.8128	46.93	Pk	19.3	-28.1	38.13	46.02	-7.89	0-360	100	H
323.116	46.28	Pk	19.9	-28.2	37.98	46.02	-8.04	0-360	100	V
399.1259	42.83	Pk	21.5	-27.5	36.83	46.02	-9.19	0-360	100	V
404.0265	49.48	Pk	21.6	-27.5	43.58	46.02	-2.44	0-360	100	H
798.6778	33.81	Pk	27	-25.7	35.11	46.02	-10.91	0-360	100	V
798.7778	37.06	Pk	27	-25.7	38.36	46.02	-7.66	0-360	100	H

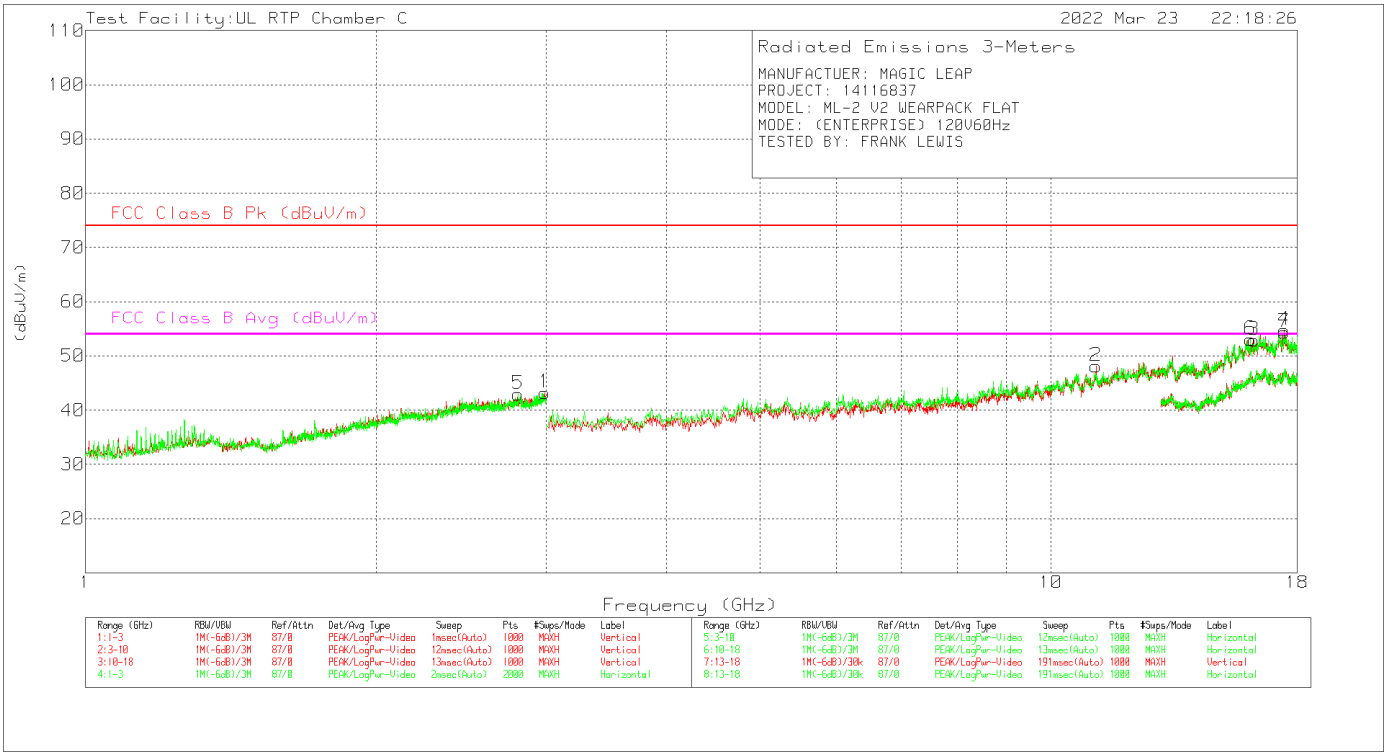
Pk - Peak detector

Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
32.076	36.32	Qp	25.4	-31.1	30.62	40	-9.38	36	102	V
80.7079	51.03	Qp	13.7	-30.3	34.43	40	-5.57	354	110	V
121.3372	42.98	Qp	19.9	-29.7	33.18	43.52	-10.34	181	349	H
121.3514	47.49	Qp	19.9	-29.7	37.69	43.52	-5.83	249	104	V
159.7387	40.47	Qp	18.5	-29.4	29.57	43.52	-13.95	354	147	H
159.7856	45.21	Qp	18.5	-29.4	34.31	43.52	-9.21	1	102	V
182.0435	47.9	Qp	17.4	-29.2	36.1	43.52	-7.42	344	104	V
182.0733	40.46	Qp	17.4	-29.2	28.66	43.52	-14.86	228	104	H
399.161	42.9	Qp	21.5	-27.5	36.9	46.02	-9.12	27	293	H

Pk - Peak Detector
Qp - Quasi-Peak Detector

RADIATED EMISSIONS 1000 TO 18,000 MHz, 120V/60Hz – Wearpack + ML-2 Charger, Horizontal Orientation – Charging Mode

Radiated Emissions Graph



Radiated Emissions Data Points

Frequency (GHz)	Meter Reading (dBuV)	Det	AT0062 (dB)	Amp/Cbl/ Fltr (dB)	Corrected Reading (dBuV/m)	FCC Class B Pk (dBuV/m)	Margin (dB)	FCC Class B Avg (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2.8059	26.78	Pk	32.4	-16.9	42.28	73.97	-31.69	53.97	-11.69	0-360	101	H
2.98999	26.59	Pk	32.8	-16.3	43.09	73.97	-30.88	53.97	-10.88	0-360	101	V
11.13714	49.2	Pk	37.9	-38.9	48.2	73.97	-25.77	53.97	-5.77	0-360	101	V
16.09409	46.28	Pk	41.1	-35.2	52.18	73.97	-21.79	53.97	-1.79	0-360	101	H
16.23023	46.14	Pk	41.1	-35.1	52.14	73.97	-21.83	53.97	-1.83	0-360	101	V
17.44745	45.97	Pk	41.6	-33.6	53.97	73.97	-20	53.97	0	0-360	101	H
17.46346	46.02	Pk	41.6	-33.3	54.32	73.97	-19.65	53.97	.35	0-360	101	V

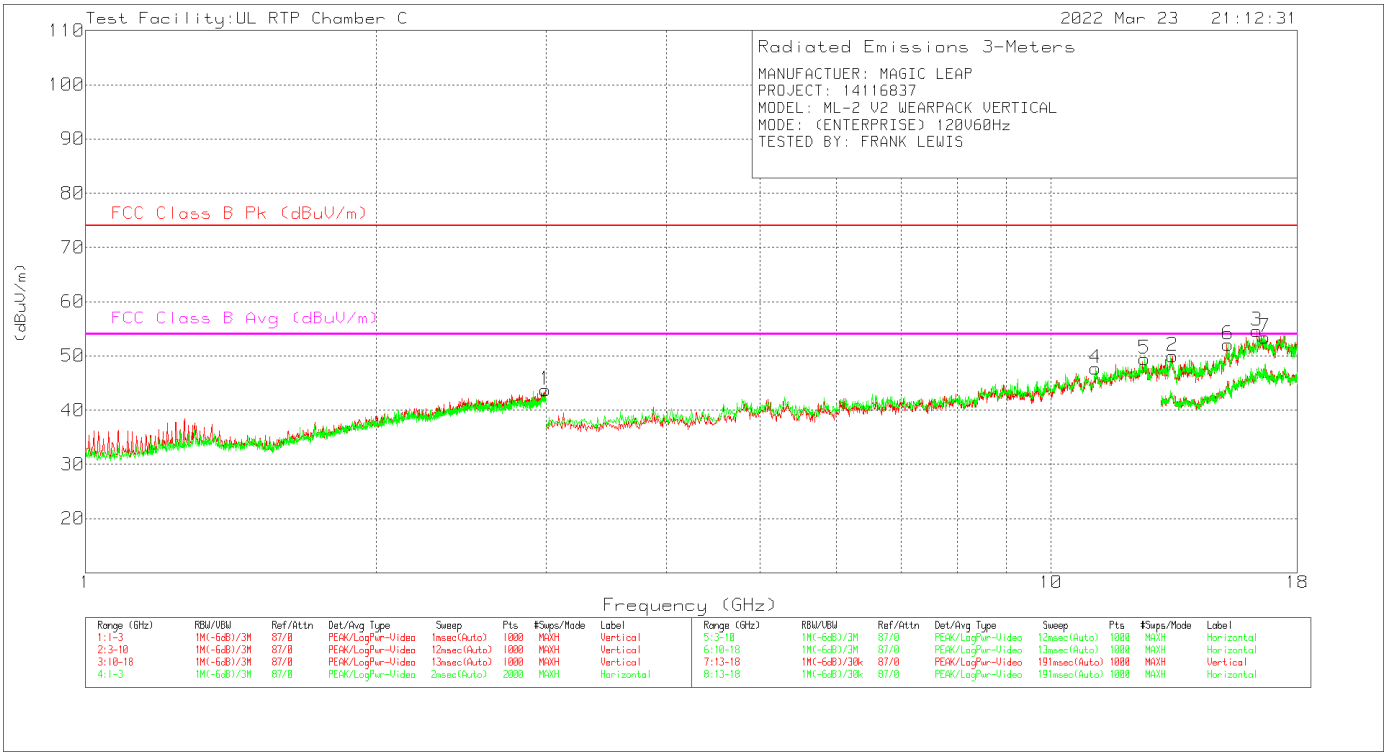
Pk - Peak Detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AT0062 (dB)	Amp/Cbl/ Fltr (dB)	Corrected Reading (dBuV/m)	FCC Class B Pk (dBuV/m)	Margin (dB)	FCC Class B Avg (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
11.13224	37.52	Av	37.9	-39.2	36.22	73.97	-37.75	53.97	-17.75	78	344	V
16.09987	34.04	Av	41.1	-35	40.14	73.97	-33.83	53.97	-13.83	160	209	H
16.23288	34.3	Av	41.1	-35.2	40.2	73.97	-33.77	53.97	-13.77	54	211	V
17.44913	33.43	Av	41.6	-33.5	41.53	73.97	-32.44	53.97	-12.44	24	227	H
17.46398	33.86	Av	41.6	-33.3	42.16	73.97	-31.81	53.97	-11.81	345	192	V

Pk - Peak Detector
Av - Average Detection

RADIATED EMISSIONS 1000 TO 18,000 MHz, 120V/60Hz – Wearpack + ML-2 Charger, Vertical Orientation – Charging Mode

Radiated Emissions Graph



Radiated Emissions Data Points

Frequency (GHz)	Meter Reading (dBuV)	Det	AT0062 (dB)	Amp/Cbl/ Fltr (dB)	Corrected Reading (dBuV/m)	FCC Class B Pk (dBuV/m)	Margin (dB)	FCC Class B Avg (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2.99399	27.16	Pk	32.8	-16.3	43.66	73.97	-30.31	53.97	-10.31	0-360	199	V
11.12112	49.21	Pk	37.9	-39.3	47.81	73.97	-26.16	53.97	-6.16	0-360	101	H
12.50651	48.67	Pk	39	-38.2	49.47	73.97	-24.5	53.97	-4.5	0-360	101	H
13.36336	47.02	Pk	39.2	-36.5	49.72	73.97	-24.25	53.97	-4.25	0-360	199	V
15.25325	47.14	Pk	40	-35.6	51.54	73.97	-22.43	53.97	-2.43	0-360	101	H
16.35836	46.28	Pk	41.4	-33.6	54.08	73.97	-19.89	53.97	.11	0-360	101	V
16.67067	45.22	Pk	42.2	-34.1	53.32	73.97	-20.65	53.97	-.65	0-360	199	H

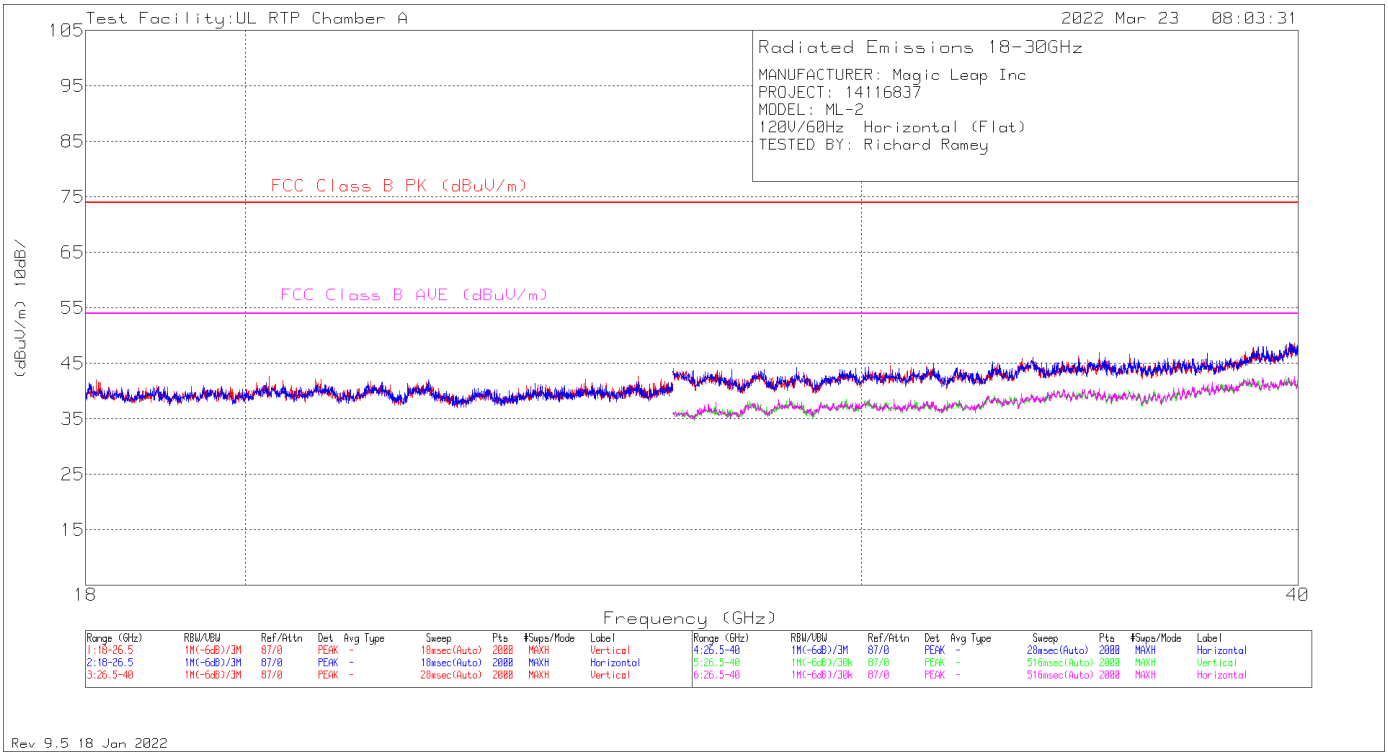
Pk - Peak Detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AT0062 (dB)	Amp/Cbl/ Fltr (dB)	Corrected Reading (dBuV/m)	FCC Class B Pk (dBuV/m)	Margin (dB)	FCC Class B Avg (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
12.50531	36.24	Av	39	-38.1	37.14	73.97	-36.83	53.97	-16.83	9	155	H
13.35646	36.08	Av	39.2	-36.6	38.68	73.97	-35.29	53.97	-15.29	112	371	V
15.25024	35.21	Av	40	-35.8	39.41	73.97	-34.56	53.97	-14.56	125	138	H
16.36427	34.33	Av	41.4	-33.8	41.93	73.97	-32.04	53.97	-12.04	191	145	V
16.67568	34.95	Av	42.3	-34.1	43.15	73.97	-30.82	53.97	-10.82	0	284	H

Pk - Peak Detector
Av - Average Detection

RADIATED EMISSIONS 18,000 TO 40,000 MHz (FCC), 120V/60Hz – Wearpack, Horizontal Orientation – Charging Mode

Radiated Emissions Graph



Radiated Emissions Data Points

Frequency (GHz)	Meter Reading (dBuV)	Det	AT0076 AF (dB/m)	18-40GHz G/L (dB)	Corrected Reading (dBuV/m)	FCC Class B PK (dBuV/m)	Margin (dB)	FCC Class B AVE (dBuV/m)	Margin (dB)	Polarity
20.313157	43.12	Pk	33	-33.4	42.72	74	-31.28	54	-11.28	V
20.98074	41.55	Pk	33.2	-33.3	41.45	74	-32.55	54	-12.55	V
25.921711	40.5	Pk	34.5	-33.8	41.2	74	-32.8	54	-12.8	V
30.572286	40.46	Pk	36.5	-32.3	44.66	74	-29.34	54	-9.34	V
35.7994	41.9	Pk	37.9	-33	46.8	74	-27.2	54	-7.2	V
39.095048	41.54	Pk	38.7	-32.2	48.04	74	-25.96	54	-5.96	V
39.777139	41.75	Pk	38.5	-31.4	48.85	74	-25.15	54	-5.15	H

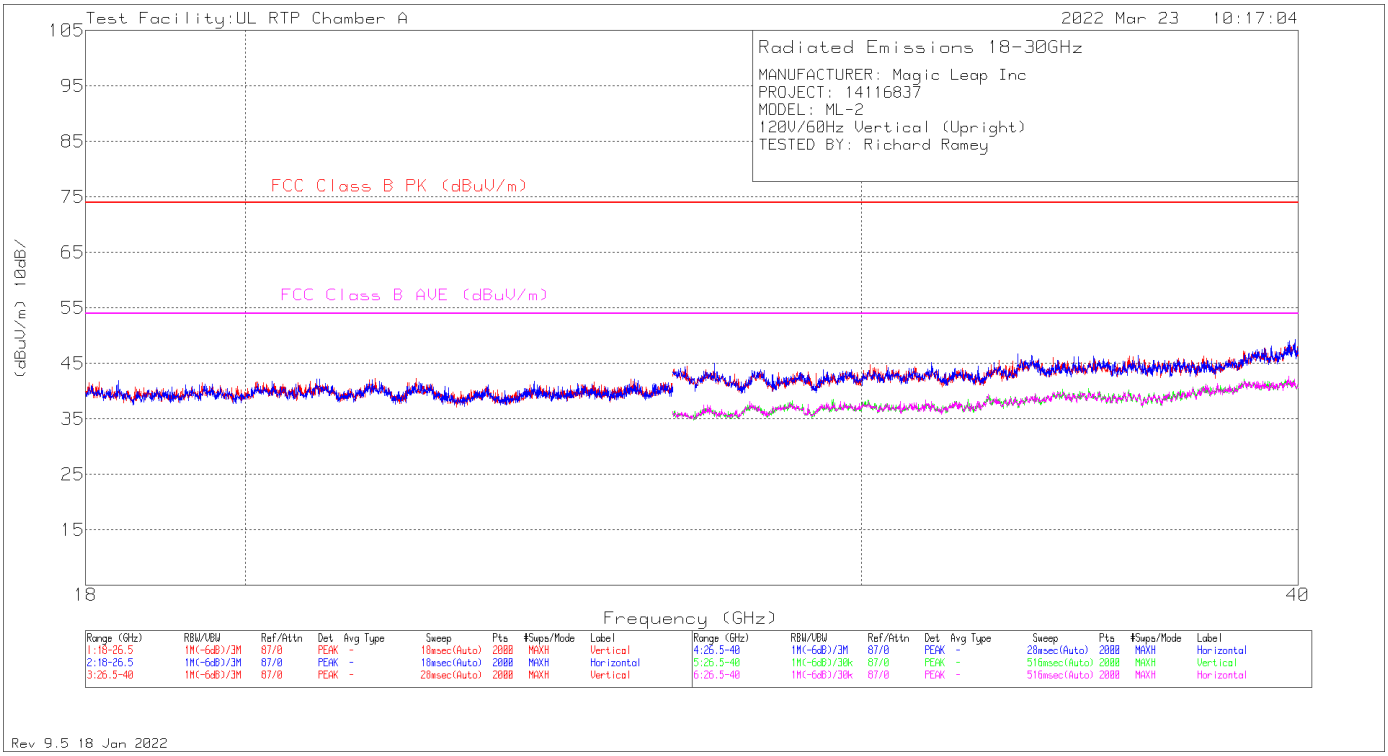
Pk - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AT0077 AF (dB/m)	18-40GHz G/L (dB)	Corrected Reading (dBuV/m)	FCC Class B PK (dBuV/m)	Margin (dB)	FCC Class B AVE (dBuV/m)	Margin (dB)	Polarity
39.093168	30.25	Av	38.7	-32.2	36.75	74	-37.25	54	-17.25	V
39.777441	30.17	Av	38.5	-31.4	37.27	74	-36.73	54	-16.73	H

Pk - Peak detector, Av - Average detection

RADIATED EMISSIONS 18,000 TO 40,000 MHz, 120V/60Hz – Wearpack, Vertical Orientation – Charging Mode

Radiated Emissions Graph



Radiated Emissions Data Points

Frequency (GHz)	Meter Reading (dBuV)	Det	AT0076 AF (dB/m)	18-40GHz G/L (dB)	Corrected Reading (dBuV/m)	FCC Class B PK (dBuV/m)	Margin (dB)	FCC Class B AVE (dBuV/m)	Margin (dB)	Polarity
22.37969	42.96	Pk	33.6	-34.2	42.36	74	-31.64	54	-11.64	V
25.186093	40.09	Pk	34.4	-33.8	40.69	74	-33.31	54	-13.31	V
26.743122	41.94	Pk	35.9	-33.3	44.54	74	-29.46	54	-9.46	V
30.173837	40.53	Pk	36.4	-32.2	44.73	74	-29.27	54	-9.27	V
35.887194	41.45	Pk	37.7	-32.9	46.25	74	-27.75	54	-7.75	V
38.615558	41.29	Pk	38.6	-32.7	47.19	74	-26.81	54	-6.81	V
39.763632	42.04	Pk	38.6	-31.5	49.14	74	-24.86	54	-4.86	H

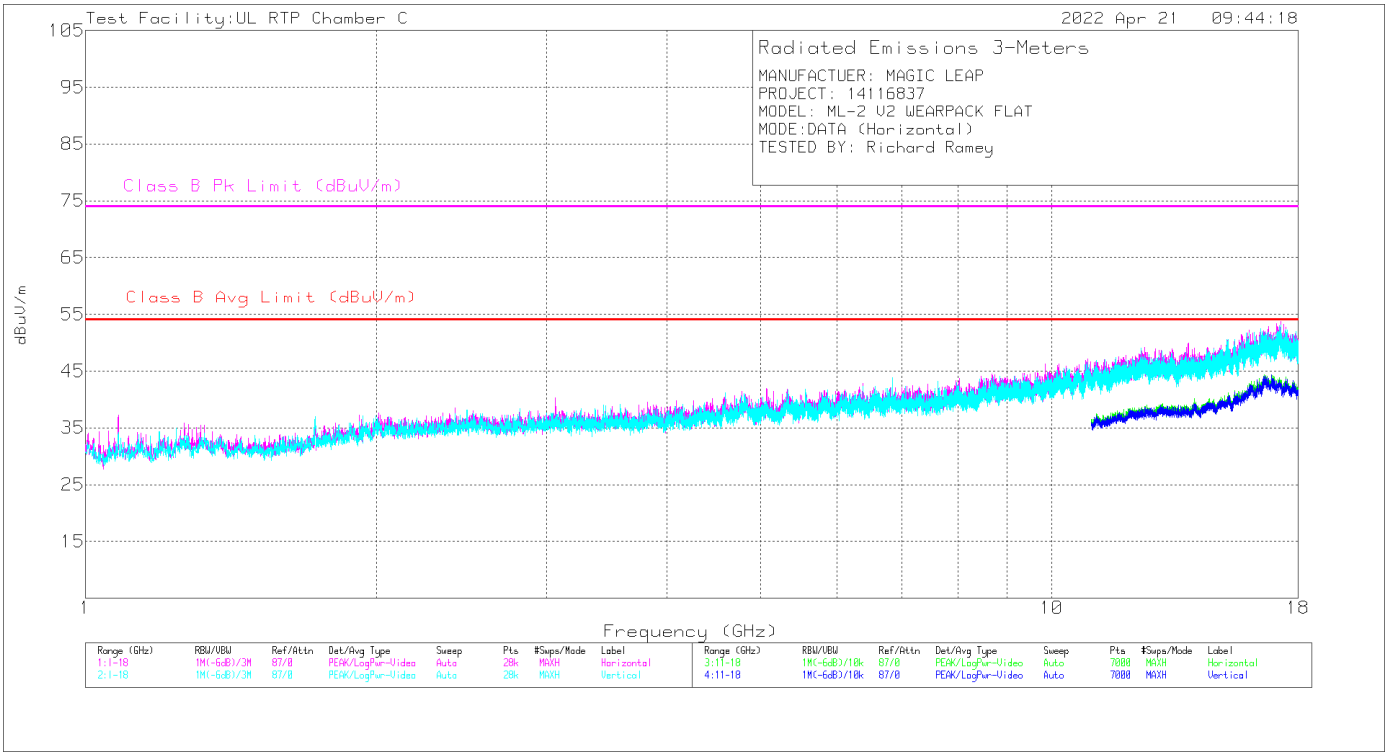
Pk - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AT0077 AF (dB/m)	18-40GHz G/L (dB)	Corrected Reading (dBuV/m)	FCC Class B PK (dBuV/m)	Margin (dB)	FCC Class B AVE (dBuV/m)	Margin (dB)	Polarity
38.617506	31.02	Av	38.6	-32.7	36.92	74	-37.08	54	-17.08	V
38.617506	31.04	Av	38.6	-32.7	36.94	74	-37.06	54	-17.06	H

Pk - Peak detector
Av - Average detection

RADIATED EMISSIONS 1000 TO 18,000 MHz, Battery – Wearpack, Horizontal Orientation – Data Transfer Mode

Radiated Emissions Graph



Radiated Emissions Data Points

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0062 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Polarity
1	1.08136	64.6	Pk	27.1	-54.5	37.2	-	-	74	-36.8	H
7	1.72799	60.84	Pk	29.5	-53.3	37.04	-	-	74	-36.96	V
2	3.06618	57.19	Pk	33	-49.9	40.29	-	-	74	-33.71	H
8	6.84639	53.93	Pk	35.8	-45.9	43.83	-	-	74	-30.17	V
12	12.48621	38.52	Avg	39	-38.8	38.72	54	-15.28	-	-	H
3	12.48817	48.94	Pk	39	-38.7	49.24	-	-	74	-24.76	H
4	13.85186	49.64	Pk	38.9	-38.6	49.94	-	-	74	-24.06	H
13	13.85541	37.87	Avg	38.9	-38.4	38.37	54	-15.63	-	-	H
9	15.19309	47.15	Pk	40	-36.6	50.55	-	-	74	-23.45	V
16	15.1936	35.96	Avg	40	-36.6	39.36	54	-14.64	-	-	V
14	16.01972	38.08	Avg	41	-36.2	42.88	54	-11.12	-	-	H
5	16.02065	47.42	Pk	41	-36.2	52.22	-	-	74	-21.78	H
10	16.46874	46.84	Pk	41.7	-36.1	52.44	-	-	74	-21.56	V
17	16.47278	36.96	Avg	41.7	-36.1	42.56	54	-11.44	-	-	V
15	17.09087	37.49	Avg	42.1	-36.3	43.29	54	-10.71	-	-	H
6	17.10869	48.08	Pk	42	-36.7	53.38	-	-	74	-20.62	H
11	17.53432	46.66	Pk	41.5	-35.9	52.26	-	-	74	-21.74	V
18	17.53493	37.83	Avg	41.5	-35.8	43.53	54	-10.47	-	-	V

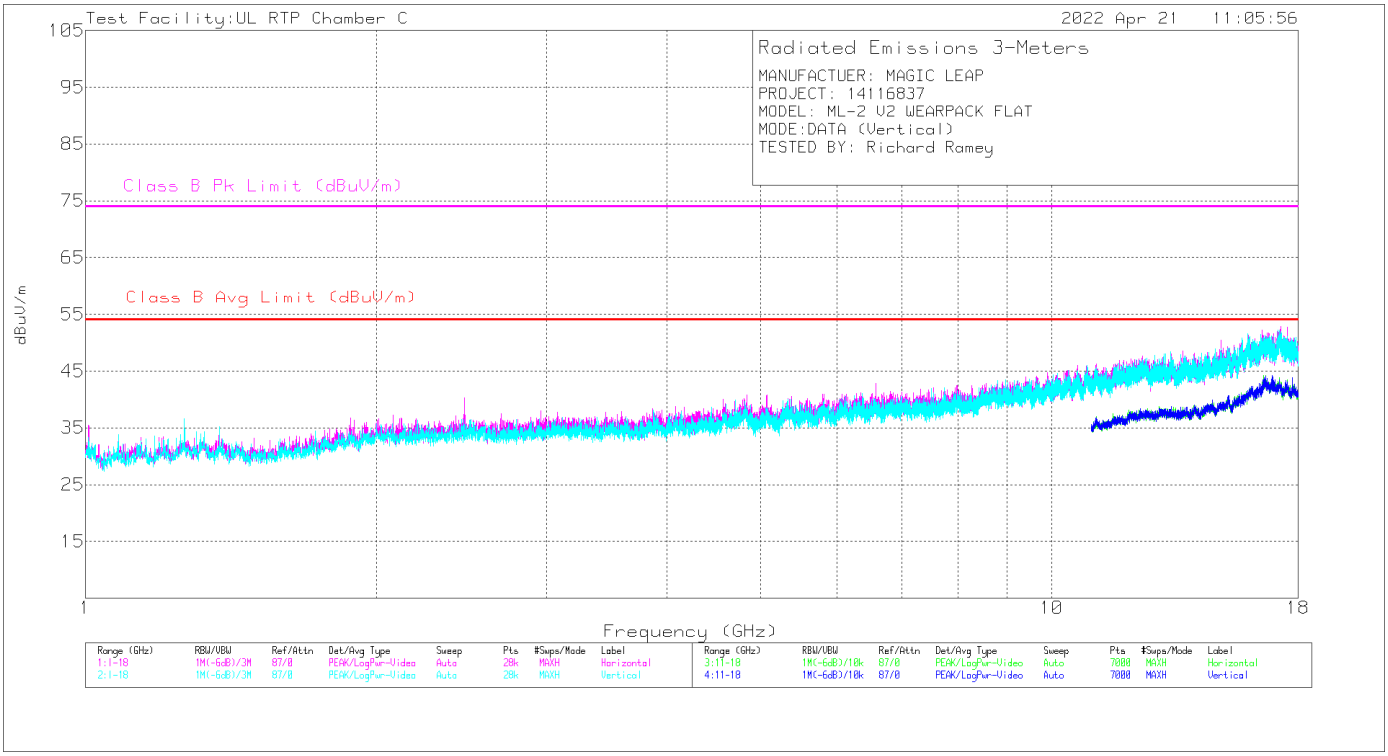
Pk - Peak detector, Avg - Video bandwidth < Resolution bandwidth

Frequency (GHz)	Meter Reading (dBuV)	Det	AT0062 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Polarity
12.48634	36.25	Av	39	-38.8	36.45	54	-17.55	-	-	H
13.85629	35.43	Av	38.9	-38.4	35.93	54	-18.07	-	-	H
15.19733	34.17	Av	40	-36.6	37.57	54	-16.43	-	-	V
16.02094	34.47	Av	41	-36.2	39.27	54	-14.73	-	-	H
16.46891	34.81	Av	41.7	-36.1	40.41	54	-13.59	-	-	V
17.10488	34.68	Av	42	-36.5	40.18	54	-13.82	-	-	H
17.53378	34.77	Av	41.5	-35.9	40.37	54	-13.63	-	-	V

Pk - Peak detector, Av - Average detection

RADIATED EMISSIONS 1000 TO 18,000 MHz, Battery – Wearpack, Vertical Orientation – Data Transfer Mode

Radiated Emissions Graph



Radiated Emissions Data Points

Frequency (GHz)	Meter Reading (dBuV)	Det	AT0062 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Polarity
1.00729	62.71	Pk	27.4	-54.6	35.51	-	-	74	-38.49	H
2.4663	59.09	Pk	32.3	-51.1	40.29	-	-	74	-33.71	H
5.07165	54.65	Pk	34.3	-48.1	40.85	-	-	74	-33.15	H
14.97512	48.01	Pk	39.8	-37.3	50.51	-	-	74	-23.49	H
14.98057	37.15	Avg	39.8	-37.4	39.55	54	-14.45	-	-	H
15.95771	37.21	Avg	40.9	-36.7	41.41	54	-12.59	-	-	V
15.95994	47.26	Pk	40.9	-36.6	51.56	-	-	74	-22.44	V
16.50699	46.98	Pk	41.8	-36.6	52.18	-	-	74	-21.82	H
16.51179	37.01	Avg	41.8	-36.7	42.11	54	-11.89	-	-	H
17.2799	36.88	Avg	41.7	-35.5	43.08	54	-10.92	-	-	H
17.28659	46.52	Pk	41.7	-35.3	52.92	-	-	74	-21.08	H
17.8889	44.13	Pk	41.2	-34.9	50.43	-	-	74	-23.57	V
17.89299	36.1	Avg	41.2	-35.1	42.2	54	-11.8	-	-	V

Pk - Peak detector, Avg - Video bandwidth < Resolution bandwidth

Frequency (GHz)	Meter Reading (dBuV)	Det	AT0062 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Polarity
14.97883	35.11	Av	39.8	-37.4	37.51	54	-16.49	-	-	H
15.95544	35.11	Av	40.9	-36.8	39.21	54	-14.79	-	-	V
16.50642	34.42	Av	41.8	-36.5	39.72	54	-14.28	-	-	H
17.28735	34.09	Av	41.7	-35.4	40.39	54	-13.61	-	-	H
17.88779	34.32	Av	41.3	-34.9	40.72	54	-13.28	-	-	V

Pk - Peak detector, Av - Average detection

5.0 Setup Photos

Refer to 14116837-E1V1FCCIC-Photos for setup photos.

Appendix A

Facilities, Accreditations and Authorizations

UL LLC is accredited by A2LA, Certificate Number 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	703469

BSMI Laboratory Code is SL2-IN-E-1033 (US0067).

The UL LLC, RTP VCCI laboratory facility registration number is A-0046.

END OF TEST REPORT