FCC PART 18

TEST REPORT

For

Etherdyne Technologies, Inc.

2933 Bunker Hill Lane, STE 210
Santa Clara, CA 95054, USA

Model: Wire-free PowerZone 2’ by 4’

Report Type: Original Report	**Product Type:** Magnetic Resonant Wireless Power Transfer Transmitter and Power Receivers for Lighting
Prepared By	Devin Oppenheimer Test Engineer
Report Number	R2407011-18
Report Date	2024-07-23
Reviewed By	Steven Lianto EMC & RF Lead
Bay Area Compliance Laboratories Corp. 1274 Anvilwood Ave Sunnyvale, CA 94089, USA Tel: (408) 732-9162, Fax: (408) 732 9164	

ACCREDITED
CERTIFICATE #3297.02

Note: This test report was prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This test report **shall not** be used by the customer to claim product certification, approval, or endorsement by A2LA or any agency of the United States Government or any foreign government.

* This test report may contain data and test methods that are not covered by BACL’s scope of accreditation as of the test report date shown above. These items are marked within the test report text with an asterisk “*”

TABLE OF CONTENTS

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ATTESTATION OF TEST RESULTS

Date of Issue: 2024-07-23 Attestation Number: R2407011

Bay Area Compliance Laboratories Corp. (BACL) hereby declares that testing has been completed and is compliant for the product and standards below:

Product Name / Description:	Magnetic Resonant Wireless Power Transfer Transmitter and Power Receivers for Lighting
Model:	Wire-free PowerZone 2’ by 4’
Manufactured by:	Etherdyne Technologies, Inc.
Project Number:	R2407011

Standard	**Test Result**
FCC Part 18	Pass

BACL tested the above equipment in accordance with the requirement with the above Standards. The results were being documented in Test Report #R2407011-18 listed in above table apply only to the tested sample under the condition and modes of operation as described herein.

Attestation by: Steven Lianto
EMC & RF Lead

Signature

2024-07-23
Date

Document Revision History

Revision Number	Report Number	Description of Revision	Date
0	R2407011-18	Original Report	2024-07-23

1 General Information

1.1 General Statements

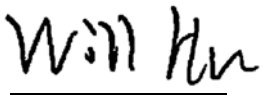
Bay Area Compliance Laboratory Corp. [BACL] hereby makes the following Statements:

- The Unit(s) described in this Test Report were received at BACL's facilities on 01 July 2024. Testing was performed on the Unit(s) described in this Test Report on 01 July 2024.
- The Test Results reported herein apply only to the Unit(s) actually tested, and to substantially identical Units.
- This Test Report must not be used to claim product endorsement by A2LA, or any agency of the U.S. Government, or by any other foreign government.
- This Test Report is the property of BACL, and shall not be reproduced, except in full, without prior written approval of BACL.

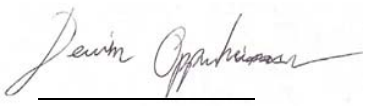
1.2 Purpose

This report was prepared on behalf of *Etherdyne Technologies, Inc.* and their product *Magnetic Resonant Wireless Power Transfer Transmitter and Power Receivers for Lighting,* Model: *Wire-free PowerZone 2' by 4'* in accordance with FCC Part 18, Industrial, Scientific, and Medical Equipment.

THE DATA CONTAINED IN THIS TEST REPORT WAS COLLECTED AND COMPILED BY:



Will Hu
[Test Engineer]



Devin Oppenheimer
[Test Engineer]

1.3 Agent for the Responsible Party

None

1.4 Responsible Party

Company Name:	Etherdyne Technologies, Inc.
Contact:	Jeff Yen
Street Address:	2933 Bunker Hill Lane, STE 210
City/State/Zip:	Santa Clara, CA 95054
Country:	USA
Telephone:	+1 (415) 867-6966
Email:	jeffyen@etherdyne.net
Web:	www.etherdyne.net

1.5 Product Description of the Equipment under Test (EUT)

The “EUT” (Equipment under Test) was a Magnetic Resonant Wireless Power Transfer Transmitter and Power Receivers for Lighting, Model: Wire-free PowerZone 2’ by 4’. The highest frequency used and/or generated was 6.78 MHz.

1.6 Mechanical Description of the EUT

Dimensions: approximately 23" +- 0.5" by 46" +- 0.5"
Weight: approximately RF generator box: 555g & Wire Loop: 5g
Serial Number: 013
EUT Photos: See Annex A of this Test Report.

The data gathered are from a production sample provided by the manufacturer.

1.7 EUT Input Power

The EUT was powered via a 120/240V 60Hz AC power source.

1.8 Related Submittal(s)/Grant(s)

No related submittals.

1.9 Test Facility Registrations

BACLs test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A-1, 3062A-2, and 3062A-3.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R.

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0403.

1.10 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

A- ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2017 by A2LA (Test Laboratory Accreditation Certificate Number 3297.02)*****,** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2017 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report.

BACL's ISO/IEC 17025:2017 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

B- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.03)*** to certify

- For the USA (Federal Communications Commission):
  - 1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
  - 2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
  - 3- All Telephone Terminal Equipment within FCC Scope C.
- For the Canada (Industry Canada):
  - 1 All Scope 1-Licence-Exempt Radio Frequency Devices;
  - 2 All Scope 2-Licensed Personal Mobile Radio Services;
  - 3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
  - 4 All Scope 4-Licensed Maritime & Aviation Radio Services;
  - 5 All Scope 5-Licensed Fixed Microwave Radio Services
  - 6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.
- For Singapore (Info-Communications Development Authority (IDA)):
  - 1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2

2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2

- For the Hong Kong Special Administrative Region:
  1 All Radio Equipment, per KHCA 10XX-series Specifications;
  2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
  3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.
- For Japan:
  1 MIC Telecommunication Business Law (Terminal Equipment):
  - All Scope A1 - Terminal Equipment for the Purpose of Calls;
  - All Scope A2 - Other Terminal Equipment
  2 Radio Law (Radio Equipment):
  - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
  - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
  - All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

C- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.01)*** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

1 Electronics and Office Equipment:
- for Telephony (ver. 3.0)
- for Audio/Video (ver. 3.0)
- for Battery Charging Systems (ver. 1.1)
- for Set-top Boxes & Cable Boxes (ver. 4.1)
- for Televisions (ver. 6.1)
- for Computers (ver. 6.0)
- for Displays (ver. 6.0)
- for Imaging Equipment (ver. 2.0)
- for Computer Servers (ver. 2.0)

2 Commercial Food Service Equipment
- for Commercial Dishwashers (ver. 2.0)
- for Commercial Ice Machines (ver. 2.0)
- for Commercial Ovens (ver. 2.1)
- for Commercial Refrigerators and Freezers

3 Lighting Products
- For Decorative Light Strings (ver. 1.5)
- For Luminaires (including sub-components) and Lamps (ver. 1.2)
- For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
- For Integral LED Lamps (ver. 1.4)

4 Heating, Ventilation, and AC Products
- for Residential Ceiling Fans (ver. 3.0)
- for Residential Ventilating Fans (ver. 3.2)

5 Other
- For Water Coolers (ver. 3.0)

D- ***A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:***

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Innovation, Science and Economic development Canada - ISEDC) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;

- Chinese Taipei (Republic of China – Taiwan):
  - BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
  - NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - EMC Directive 2014/30/EU US-EU EMC & Telecom MRA CAB (NB)
  - Radio Equipment (RE) Directive 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
  - Low Voltage Directive (LVD) 2014/35/EU
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA) APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Media Development Authority - IMDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - ENERGY STAR Recognized Test Laboratory – US EPA
  - Telecommunications Certification Body (TCB) – US FCC;
  - Nationally Recognized Test Laboratory (NRTL) – US OSHA
- Vietnam: APEC Tel MRA -Phase I;

1.11 Measurement Uncertainties

All measurements involve uncertainties. In the case of EMC Emissions tests, the influence quantities (factors) that make a significant contribution to the measurement uncertainties for most types of Emissions measurements are detailed in the latest version of CISPR 16-4-2 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Measurement instrumentation uncertainty" (i.e., in CISPR 16-4-2:2011-06 + C1:2013-04 +A1:2014-02).

Based on the uncertainty models given in the latest version of CISPR16-4-2, and, based on the calibration uncertainties of the specific instruments and facilities used at BACL to perform the measurements documented in this Test Report, the following estimates have been made of BACL's Measurement Uncertainties for the measurements documented in this Test Report.

(Note: in the Tables below, the phrase "Typical U_{LAB} values" means that the U_{LAB} values presented are the Expanded Measurement Uncertainty values that resulted from the use of the ordinary test processes that are employed on a daily basis in our Test Laboratory. Note that he smaller the value of Expanded Measurement Uncertainty, the better (i.e., the "less uncertain") the measurement is.

Type of Measurement: **ANSI C63.4-2014 Conducted Emissions (on the BACL Ground Plane Test Site)** **Note: Measurements made using a n R&S ESCI EMI Receiver**	**BACL Typical U_{LAB} Value** **(for a k=2 Coverage Factor, equivalent to ~ 95% level of confidence)**	**U_{CISPR} Value** **worst-allowable values of the latest version of CISPR 16-4-2 (for a k=2 Coverage Factor, equivalent to ~ 95% level of confidence)**
Conducted Disturbance (Mains Port) 150 kHz to 30 MHz (i.e., AC/DC Line Conducted Emissions measurements made with a Fischer FCC-LISN-50-25-2-10 LISN)	**2.49 dB**	**3.44 dB**

Type of Measurement: **ANSI C63.4-2014 Radiated Emissions (in the BACL 10 m - 1 SAC)** **Note: Measurements up to 1 GHz made using an R&S ESCI EMI Receiver; Measurements from 1 GHz to 40 GHz made using an agilent E444XA series analyzer**	**BACL Typical U_{LAB} Value** **(for a k=2 Coverage Factor, equivalent to ~ 95% level of confidence)**	**U_{CISPR} Value** **worst-allowable values of the latest version of CISPR 16-4-2 (for a k=2 Coverage Factor, equivalent to ~ 95% level of confidence)**
Radiated Magnetic Field Disturbance – 9 kHz to 30 MHz (i.e., Radiated H-Field levels measured using a Single-axis Active Loop Antenna at a fixed height at either 3 or 10 meters distance)	**2.04 dB**	**U_{CISPR} Value is Not Specified**
Radiated Electric Field Disturbance – Horizontal Polarization, 30 MHz – 200 MHz (i.e., Radiated Emissions measured at 10 meters distance)	**3.83 dB**	**5.05 dB**
Radiated Electric Field Disturbance – Vertical Polarization, 30 MHz – 200 MHz (i.e., Radiated Emissions measured at 10 meters distance)	**3.93 dB**	**5.03 dB**
Radiated Electric Field Disturbance – Horizontal Polarization, 200 MHz – 1000 MHz (i.e., Radiated Emissions at 10 meters distance)	**3.83 dB**	**5.21 dB**
Radiated Electric Field Disturbance – Vertical Polarization, 200 MHz – 1000 MHz (i.e., Radiated Emissions measured at 10 meters distance)	**3.93 dB**	**5.22 dB**

2 EUT Test Configuration

2.1 Justification

The EUT was configured for testing in accordance with requirements of the FCC/OET MP–5 standard.

2.2 EUT Exercising Software

No exercising software was used during testing.

2.3 BACL EMI Measurement Software

The software used was EMISoft-Vasona 6.0 for EMI testing.

2.4 Equipment Modifications

No equipment modifications were made to the equipment during testing.

2.5 Special Equipment

No special equipment was used during testing.

2.6 EUT Mode of Operation

The EUT was tested on worst case mode: It was powered on and inductively powering two LED lights.

2.7 Method of Monitoring

The EUT was monitored visually via emitting light from the two LED lights receiving power. As long as the EUT continuously powering the lights without interruption the EUT was functioning as intended.

2.8 Local Support Equipment

None

2.9 Remote Support Equipment

None

2.10 EUT Internal Configuration Details

None

2.11 External I/O Cabling List and Details

Cable Description	Length (m)	From	To
Power Cable	1.5	EUT	AC/DC Switching Adapter

2.12 EUT Power Supply List and Details

Manufacturer	Description	Model	Serial Number
Mean Well	AC/DC Switching Adapter	GST00A4	-

3 Summary of Test Results

Standards	Test Description	Result
FCC §18.305	Radiated Emissions	Compliant
FCC §18.307	Conducted Emissions	Compliant

4 FCC §18.305 – Radiated Emissions

4.1 Applicable Standards

As per FCC §18.305 Field strength limits

(a) ISM equipment operating on a frequency specified in § 18.301 is permitted unlimited radiated energy in the band specified for that frequency.

ISM Frequency	Tolerance
6.78 MHz	± 15.0 kHz
13.56 MHz	± 7.0 kHz
27.12 MHz	± 163.0 kHz
40.68 MHz	± 20.0 kHz
915 MHz	± 13.0 MHz
2450 MHz	± 50.0 MHz
5800 MHz	± 75.0 MHz
24.125 GHz	± 125.0 MHz
61.25 GHz	± 250.0 MHz
122.50 GHz	± 500.0 MHz
245.00 GHz	± 1.0 GHz

(b) The field strength levels of emissions which lie outside the bands specified in § 18.301, unless otherwise indicated, shall not exceed the following:

Equipment	Operating Frequency	RF Power Generated by Equipment (watts)	Field Strength Limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500 500 or more	25 25 × SQRT(power/500)	300 [1]300
	Any non-ISM frequency	Below 500 500 or more	15 15 × SQRT(power/500)	300 [1]300
Industrial heaters and RF stabilized arc welders	On or below 5,725 MHz Above 5,725 MHz	Any Any	10 ([2])	1,600 ([2])
Medical diathermy	Any ISM frequency Any non-ISM frequency	Any Any	25 15	300 300
Ultrasonic	Below 490 kHz	Below 500 500 or more	2,400/F(kHz) 2,400/F(kHz) × SQRT(power/500)	300 [3]300
	490 to 1,600 kHz Above 1,600 kHz	Any Any	24,000/F(kHz) 15	30 30
Induction cooking ranges	Below 90 kHz On or above 90 kHz	Any Any	1,500 300	[4]30 [4]30

[1] Field strength may not exceed 10 μV/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.
[2] Reduced to the greatest extent possible.
[3] Field strength may not exceed 10 μV/m at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500 watts.
[4] Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment.

(c) The field strength limits for RF lighting devices shall be the following:

Frequency (MHz)	Field strength limit at 30 meters (μV/m)
Non-consumer equipment:	
30 – 88	30
88 – 216	50
216 – 1000	70
Consumer equipment:	
30 – 88	10
88 – 216	15
216 – 1000	20

Note 1: The tighter limit shall apply at the boundary between two frequency ranges.
Note 2: Testing for compliance with these limits may be made at closer distances, provided a sufficient number of measurements are taken to plot the radiation pattern, to determine the major lobes of radiation, and to determine the expected field strength level at 30, 300, or 1600 meters. Alternatively, if measurements are made at only one closer fixed distance, then the permissible field strength limits shall be adjusted using 1/d as an attenuation factor.

(d) If testing with a quasi-peak detector demonstrates that the equipment complies with the average limits specified in the appropriate table in this section, additional testing to demonstrate compliance using an average detector is not required.

(g) The tighter limits shall apply at the boundary between two frequency ranges.

4.2 EUT Setup

The radiated emissions tests were performed in the 10-meter test chamber, using the setup in accordance with FCC/OET MP–5 measurement procedures. The specifications used were in accordance with FCC 18 limits.

If applicable, the spacing between the peripherals was 10 cm.

If applicable, the external I/O cables were draped along the test table and bundled as required.

The EUT was connected to AC power source via AC/DC Switching Adapter.

4.3 Test Procedure

Maximization procedure was performed on the six (6) highest emissions readings to ensure the EUT is compliant with all installation combinations.

All data was recorded in the Quasi-Peak detection mode for below 1 GHz.

The bandwidth on the receving device was set to as follows:

Below 1000 MHz, the Resolution Bandwidth was set to 120 kHz and the Video Bandwidth was set to 300 kHz for each sweep. The receiver automatically sets to these values.

4.4 Corrected Amplitude and Margin Calculations

The Corrected Amplitude (CA) is calculated by adding the Correction Factor to the indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + Correction Factor

For example, the Corrected Amplitude (CA) of 40.3 dBµV/m = indicated Amplitude reading (Ai) 32.5 dBµV + Correction Factor 7.8 dB/m

The Correction Factor is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga). The calculation is done by the testing software, and the value is reported in the tabular results below. The basic equation is as follow,

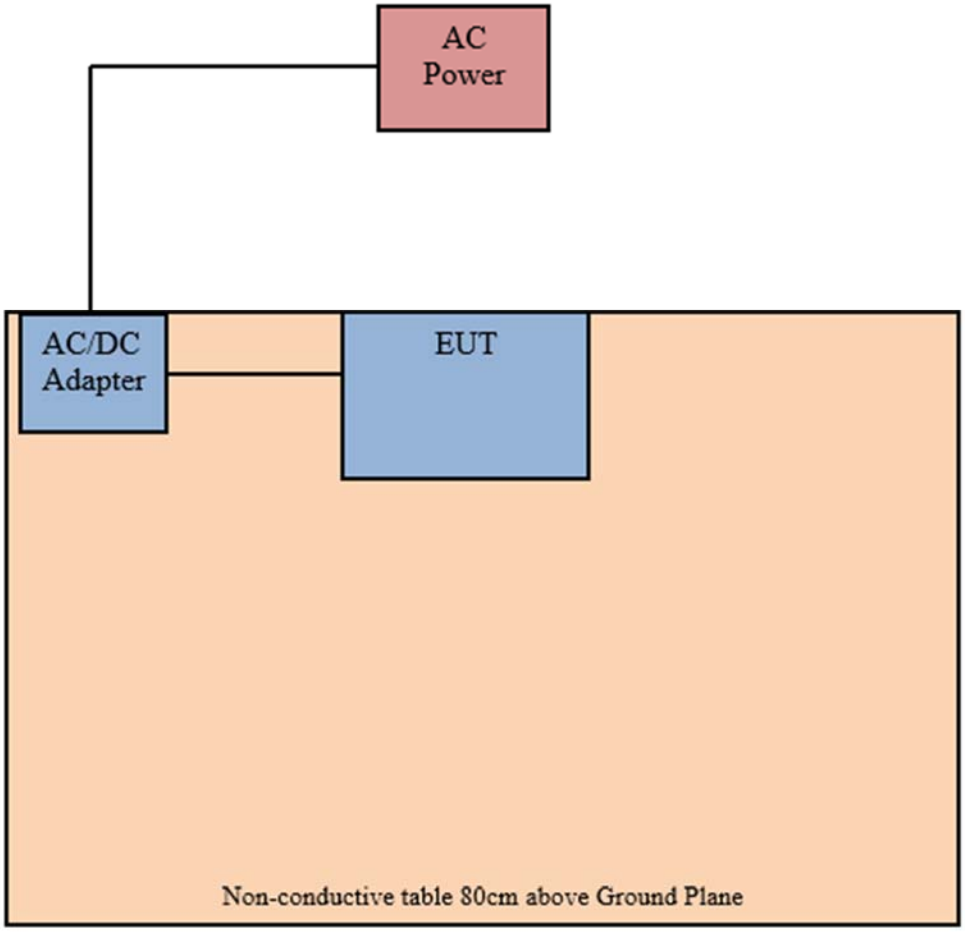
Correction Factor = AF + CL + Atten – Ga

For example, the Correction Factor of 7.8 dB/m = Antenna Factor (AF) 23.5 dB/m + Cable Loss (CL) 3.7 dB + Attenuator (Atten) 10 dB - Amplifier Gain (Ga) 29.4 dB

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit at the measured frequency. The equation for margin calculation is as follows:

Margin (dB) = Corrected Amplitude (dBµV/m) - Limit (dBµV/m)

4.5 Test Setup Block Diagram



4.6 Test Equipment List and Details

BACL Asset #	Manufacturers	Descriptions	Models	Serial Numbers	Calibration Date	Calibration Due Date
01413	Rohde & Schwarz	ESR EMI Test Receiver 10Hz to 3.6GHz	ESR3 1316.3003K03	103191	2024-01-08	2025-01-08
00311	Sunol Sciences	Controller, System	SC104V	113005-1	Calibration not Required	Calibration not Required
00811	Keysight Technologies	RF Limiter	11867A	MY42242932	2024-02-13	2024-08-13
00393	Com-Power	Antenna, Loop Active	AL-130	17043	2023-05-26	2025-05-26
00307	Sunol Sciences	Antenna, BiConiLog	JB3	A020106-3; 01182018A	2024-03-18	2026-03-18
00445	Sonoma Instruments	Amplifier	315	303125	2024-01-22	2024-07-22
01200	Pasternack	N Shielded RF Cable	LMR 400 Coaxial Cable	1809041	2024-01-22	2024-07-22
01358	Pasternack	N 300in RF Cable	PE3496LF-300	-	2024-02-26	2024-08-26
01297	Pasternack	N 18m RF Cable	PE 360-12	1809042	2024-02-29	2024-08-29

***Statement of Traceability*:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA Policy P102 "A2LA Policy on Metrological Traceability".

4.7 Environmental Conditions

Testing Date:	2024-07-01
Testing Site:	10m Chamber 1
Temperature:	25 ºC
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa
Testing Personnel:	Will Hu

4.9 Summary of Test Results

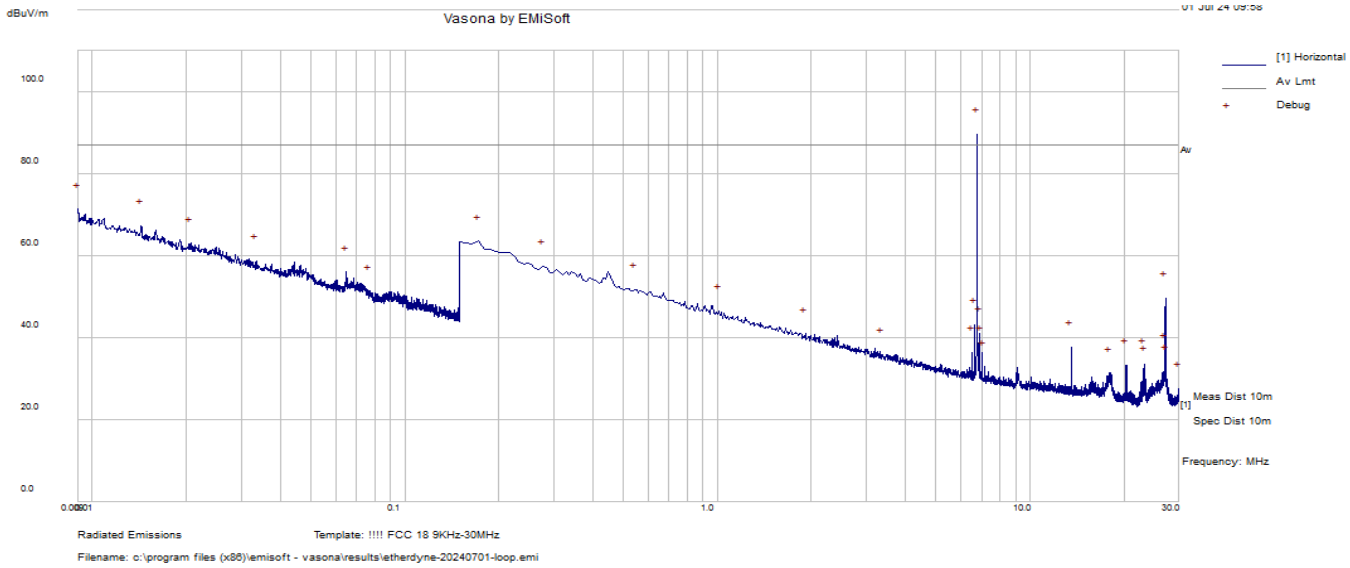
According to the recorded data, the EUT complied with FCC §18.305 limits, and had the worst margin reading of:

FCC 18 Radiated Emissions Worst Case (9 kHz to 30 MHz)			
Frequency (MHz)	**Highest Quasi-Peak Corrected Amplitude (dBµV/m)**	**Polarization (Parallel/Perpendicular/ Parallel-Ground)**	**Quasi-Peak Margin (dB)**
0.0090972	60.2	Parallel	-26.83

FCC 18 Radiated Emissions Worst Case (30 MHz to 400 MHz)			
Frequency (MHz)	**Highest Quasi-Peak Corrected Amplitude (dBµV/m)**	**Polarization (Horizontal / Vertical)**	**Quasi-Peak Margin (dB)**
54.2395	34.68	Horizontal	-22.82

4.10 Radiated Emissions Test Plot and Data

9 kHz to 30 MHz – Parallel polarization at 10m distance

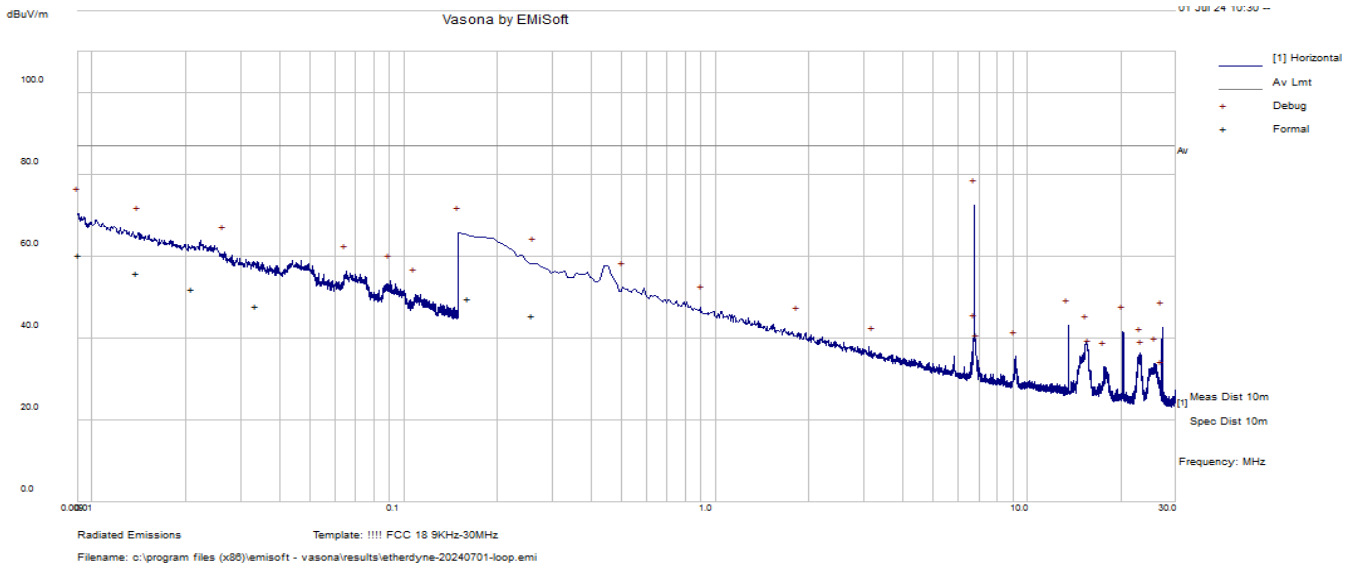


Note: The emissions at 6.78 MHz was the fundamental transmitted frequency of the EUT and not applicable for testing.

Average Measurements

Frequency (MHz)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Detector	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
0.0090972	9.8	60.2	Average	150	53	87.03	-26.83
0.013979	9.92	55.87	Average	150	223	87.03	-31.16
0.021068	10.04	52.06	Average	150	264	87.03	-34.97
0.162226	10.19	49.65	Average	150	249	87.03	-37.38
0.033759	10.05	47.81	Average	150	240	87.03	-39.22
0.25977	10.19	45.58	Average	150	141	87.03	-41.45

9 kHz to 30 MHz – Perpendicular polarization at 10m distance

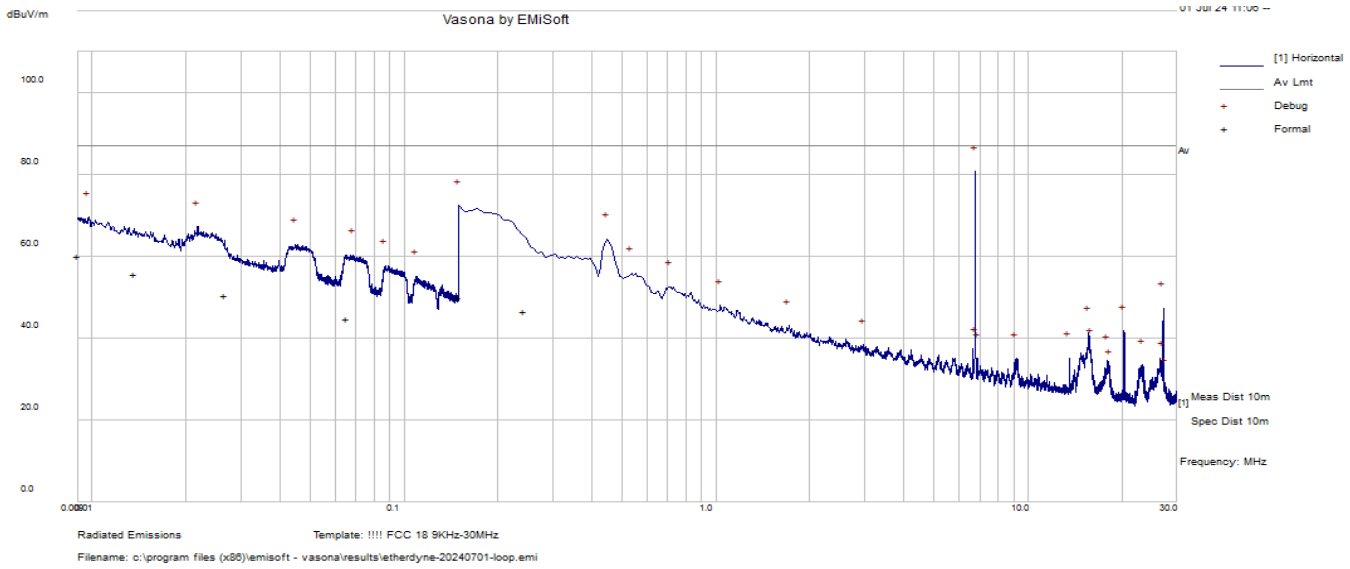


Note: The emissions at 6.78 MHz was the fundamental transmitted frequency of the EUT and not applicable for testing.

Average Measurements

Frequency (MHz)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Detector	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
0.0090525	9.8	59.98	Average	150	66	87.03	-27.05
0.013761	9.91	55.65	Average	150	127	87.03	-31.38
0.026718	10.05	50.46	Average	150	129	87.03	-36.57
0.150096	10.19	50.04	Average	150	165	87.03	-36.99
0.243422	10.19	46.5	Average	150	60	87.03	-40.53
0.06584	10.04	44.71	Average	150	318	87.03	-42.32

9 kHz to 30 MHz – Parallel-Ground polarization at 10m distance

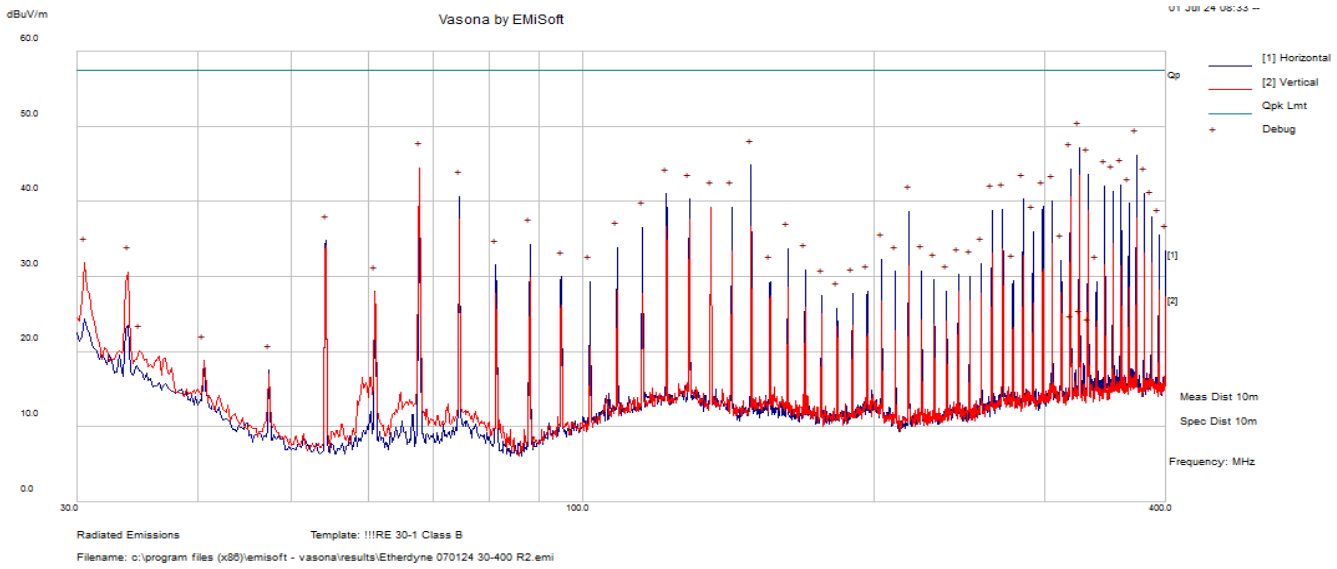


Note: The emissions at 6.78 MHz was the fundamental transmitted frequency of the EUT and not applicable for testing.

Average Measurements

Frequency (MHz)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Detector	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
0.0095844	9.8	59.25	Average	150	160	87.03	-27.78
0.021938	10.04	56.91	Average	150	344	87.03	-30.12
0.044501	10.05	53.56	Average	150	119	87.03	-33.47
0.150399	10.19	51.57	Average	150	103	87.03	-35.46
0.06855	10.04	50.01	Average	150	21	87.03	-37.02
0.452857	10.31	43.49	Average	150	194	87.03	-43.54

30 MHz to 400 MHz at 10m distance



Quasi-Peak Measurements

Frequency (MHz)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Polarity (H/V)	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
54.2395	-26.76	34.68	H	397	87	57.5	-22.82
30.61347	-13.93	25.76	V	250	360	57.5	-31.74
33.90199	-16.33	24.24	V	209	233	57.5	-33.26
34.97092	-17.05	20.87	V	157	59	57.5	-36.63
40.67668	-21.28	17.77	V	293	225	57.5	-39.73
47.46121	-25.25	17.34	H	399	91	57.5	-40.16

5 FCC §18.307 – Conducted Emissions

5.1 Applicable Standards

As per FCC §18.307: Conducted Emission Limits

For the following equipment, when designed to be connected to the public utility (AC) power line the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies shall not exceed the limits in the following tables. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal using a 50 μH/50 ohms line impedance stabilization network (LISN).

(b) All other part 18 consumer devices:

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with the logarithm of the frequency		

(d) If testing with a quasi-peak detector demonstrates that the equipment complies with the average limits specified in the appropriate table in this section, additional testing to demonstrate compliance using an average detector is not required.

(g) The tighter limits shall apply at the boundary between two frequency ranges.

5.2 EUT Setup

The conducted emissions tests were performed on the Ground Plane Test Site, using a test setup in accordance with FCC/OET MP–5 measurement procedures. The specifications used were in accordance with FCC 18 limits.

The spacing between the peripherals (if any) was 10 cm.

The external I/O cables (if any) were draped along the test table and bundled as required.

The EUT was connected (via LISN) to an EMI-filtered AC power source via AC/DC Switching Adapter.

5.3 Test Procedure

During the conducted emissions test, the power cord of the EUT was connected to the LISN.

The bandwidth on the receving device was set to as follows:

Below 1000 MHz, the Resolution Bandwidth was set to 120 kHz and the Video Bandwidth was set to 300 kHz for each sweep. The receiver automatically sets to these values.

5.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Total Loss to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + Total Loss

For example, a corrected amplitude of 46 dBµV = Indicated Reading (32.5 dBµV) + Total Loss (13.5 dB)

The Cable Loss, Attenuation (High-pass Filters, Impulse Limiters, Attenuators, etc.), and LISN calibration factors are referred to as Total Loss in the equation above and tabular data below. The basic equation is as follows:

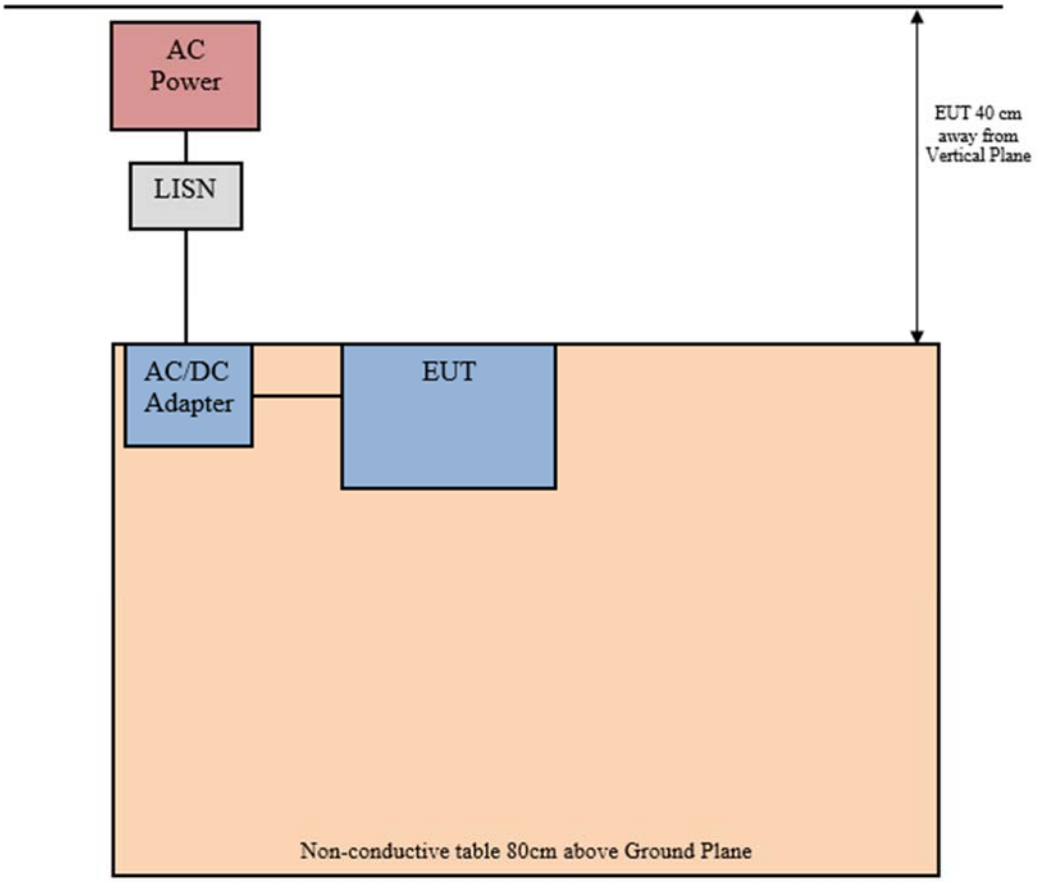
Total Loss (dB) = Cable Loss (dB) + Attenuation (dB) + LISN Factor (dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit at the measured frequency. The equation for margin calculation is as follows:

Margin (dB) = Corrected Amplitude (dBµV) – Limit (dBµV)

5.5 Test Setup Block Diagram

AC Line



5.6 Test Equipment List and Details

BACL Asset #	Manufacturers	Descriptions	Models	Serial Numbers	Calibration Date	Calibration Due Date
00124	Rohde & Schwarz	Receiver, EMI Test	ESCI 1166.5950K03	100044	2024-06-19	2025-06-19
00681	Rohde & Schwarz	Impulse Limiter	ESH3-Z2	101962	2024-02-12	2024-08-12
00725	Solar Electronics Company	High Pass Filter	Type 7930-100	7930150203	2024-03-22	2024-09-22
01425	Pasternack	Ground Plane RG58 Coaxial Cable	PE3441-500CM	NA	2024-01-12	2024-07-12
00732	Fischer Custom Communications, Inc.	LISN	FCC-LISN-50-25-2-10-CISPR16	160129	2023-09-12	2024-09-12
00348	California Instruments	AC Power Source	5001ix-208	57079	Calibration not Required	Calibration not Required

***Statement of Traceability*:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA Policy P102 "A2LA Policy on Metrological Traceability".

5.7 Environmental Conditions

Testing Date:	2024-07-01
Testing Site:	Ground Plane Test Site
Temperature:	25 ºC
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa
Testing Personnel:	Devin Oppenheimer

5.8 Summary of Test Results

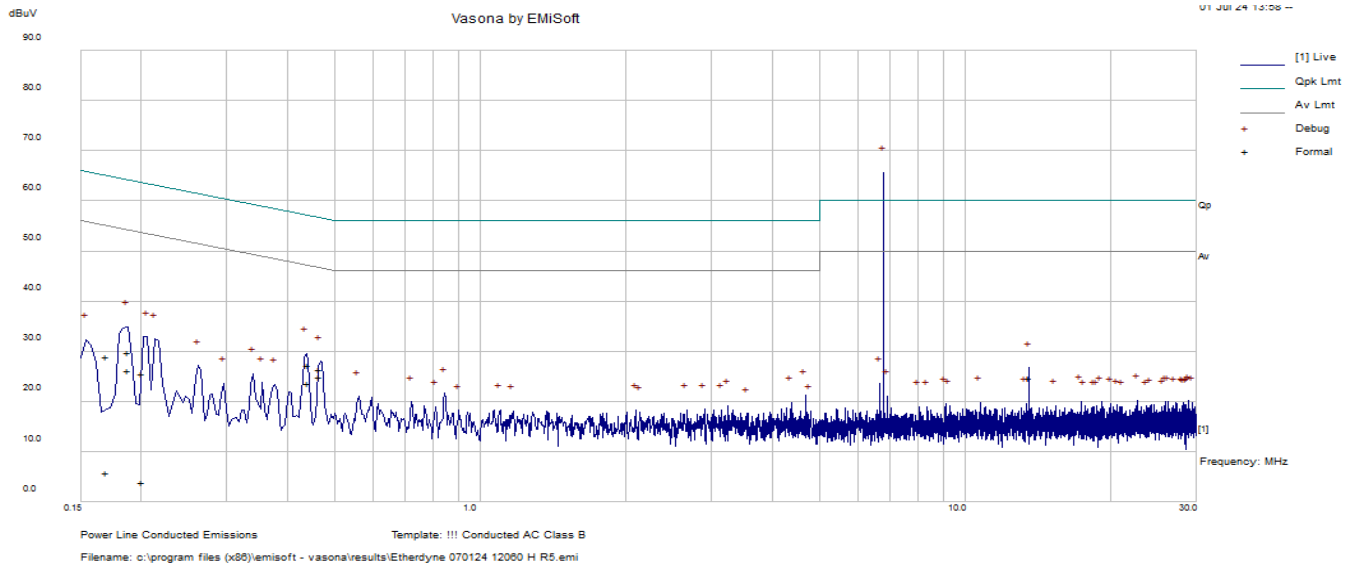
According to the recorded data, the EUT complied with FCC §18.307 limits, and had the worst margin reading of:

Worst Case: AC Line (via AC/DC Switching Adapter): 120V/60Hz						
Conductor (Hot/Neutral)	**Quasi- Peak Frequency (MHz)**	**Highest Quasi-Peak Corrected Amplitude (dBµV)**	**Worst-Case Quasi-Peak Margin (dB)**	**Average Frequency (MHz)**	**Highest Average Corrected Amplitude (dBµV)**	**Worst-Case Average Margin (dB)**
Hot	0.441394	27.34	-29.7	0.467988	24.97	-21.58
Neutral	13.560057	30.47	-29.53	13.560057	30.74	-19.26

Worst Case: AC Line (via AC/DC Switching Adapter): 240V/60Hz						
Conductor (Hot/Neutral)	**Quasi- Peak Frequency (MHz)**	**Highest Quasi-Peak Corrected Amplitude (dBµV)**	**Worst-Case Quasi-Peak Margin (dB)**	**Average Frequency (MHz)**	**Highest Average Corrected Amplitude (dBµV)**	**Worst-Case Average Margin (dB)**
Hot	0.442647	30.28	-26.73	0.442647	29.19	-17.82
Neutral	0.444027	29.48	-27.51	0.444027	28.11	-18.88

5.9 Conducted Emissions Test Plots and Data

AC Line (via AC/DC Switching Adapter): 120V/60Hz – Hot Conductor



Note: The emissions at 6.78 MHz was the fundamental transmitted frequency of the EUT and not applicable for testing.

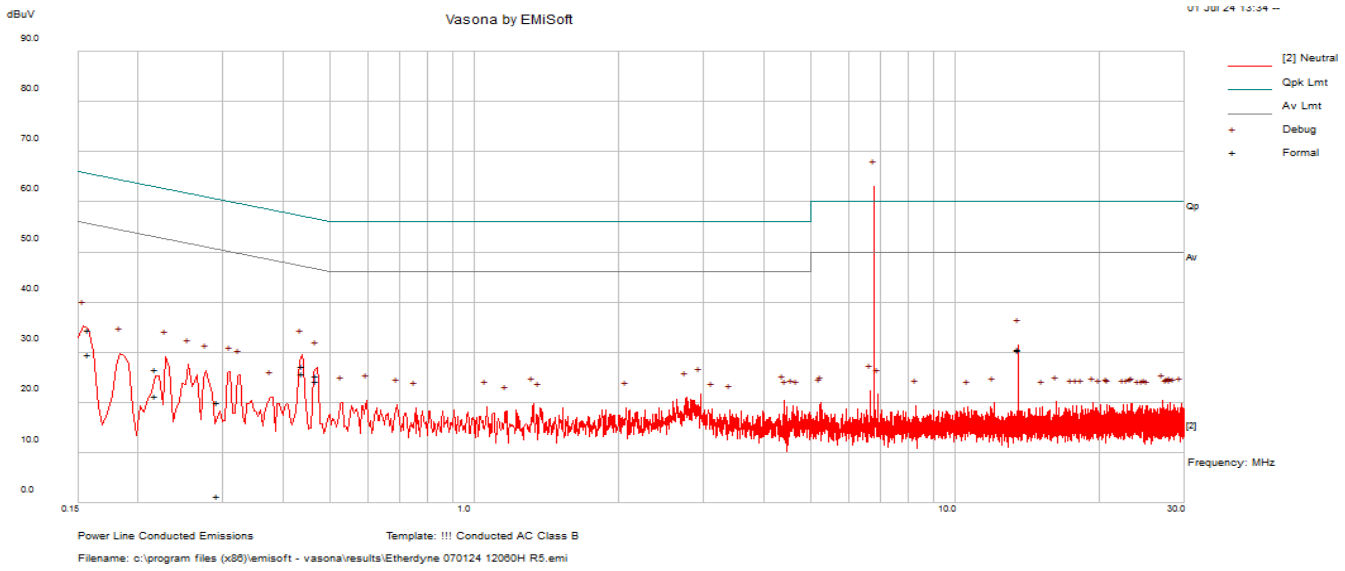
Quasi-Peak Measurements

Frequency (MHz)	Total Loss (dB)	Corrected Amplitude (dBµV)	Conductor	Limit (dBµV)	Margin (dB)
0.441394	10.3	27.34	Hot	57.04	-29.7
0.467988	10.2	26.3	Hot	56.55	-30.25
0.188153	11.78	29.83	Hot	64.12	-34.29
13.559823	10.23	24.61	Hot	60	-35.39
0.169819	11.84	28.83	Hot	64.97	-36.14
0.201538	11.73	25.59	Hot	63.55	-37.96

Average Measurements

Frequency (MHz)	Total Loss (dB)	Corrected Amplitude (dBµV)	Conductor	Limit (dBµV)	Margin (dB)
0.467988	10.2	24.97	Hot	46.55	-21.58
0.441394	10.3	23.69	Hot	47.04	-23.35
13.559823	10.23	24.72	Hot	50	-25.28
0.188153	11.78	26.15	Hot	54.12	-27.97
0.169819	11.84	5.69	Hot	54.97	-49.28
0.201538	11.73	3.95	Hot	53.55	-49.6

AC Line (via AC/DC Switching Adapter): 120V/60Hz – Neutral Conductor



Note: The emissions at 6.78 MHz was the fundamental transmitted frequency of the EUT and not applicable for testing.

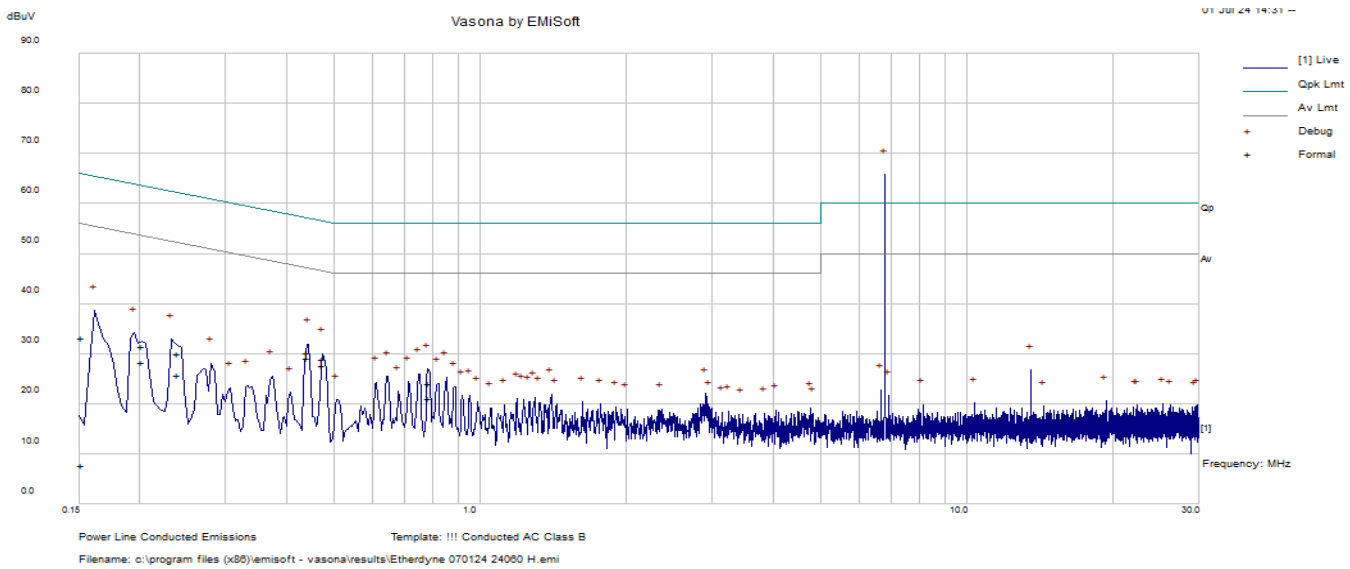
Quasi-Peak Measurements

Frequency (MHz)	Total Loss (dB)	Corrected Amplitude (dBµV)	Conductor	Limit (dBµV)	Margin (dB)
13.560057	10.23	30.47	Neutral	60	-29.53
0.43828	10.31	27.25	Neutral	57.09	-29.84
0.157476	11.9	34.47	Neutral	65.6	-31.12
0.469505	10.19	25.34	Neutral	56.52	-31.18
0.21794	11.61	26.65	Neutral	62.9	-36.25
0.293337	10.91	20	Neutral	60.43	-40.43

Average Measurements

Frequency (MHz)	Total Loss (dB)	Corrected Amplitude (dBµV)	Conductor	Limit (dBµV)	Margin (dB)
13.560057	10.23	30.74	Neutral	50	-19.26
0.43828	10.31	25.82	Neutral	47.09	-21.27
0.469505	10.19	24.28	Neutral	46.52	-22.24
0.157476	11.9	29.65	Neutral	55.6	-25.95
0.21794	11.61	21.27	Neutral	52.9	-31.63
0.293337	10.91	1.34	Neutral	50.43	-49.09

AC Line (via AC/DC Switching Adapter): 240V/60Hz – Hot Conductor



Note: The emissions at 6.78 MHz was the fundamental transmitted frequency of the EUT and not applicable for testing.

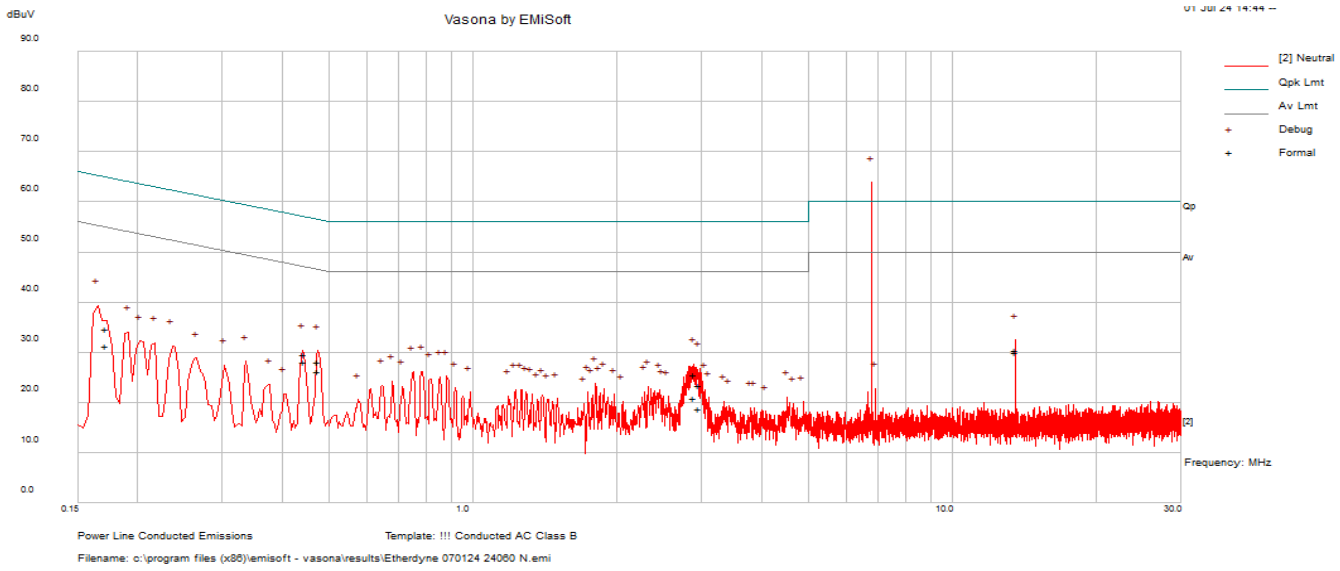
Quasi-Peak Measurements

Frequency (MHz)	Total Loss (dB)	Corrected Amplitude (dBµV)	Conductor	Limit (dBµV)	Margin (dB)
0.442647	10.3	30.28	Hot	57.01	-26.73
0.475541	10.18	28.97	Hot	56.42	-27.45
0.202446	11.73	31.58	Hot	63.51	-31.93
0.784962	10.3	23.99	Hot	56	-32.01
0.239707	11.39	29.91	Hot	62.11	-32.2
0.151781	11.93	33.19	Hot	65.9	-32.71

Average Measurements

Frequency (MHz)	Total Loss (dB)	Corrected Amplitude (dBµV)	Conductor	Limit (dBµV)	Margin (dB)
0.442647	10.3	29.19	Hot	47.01	-17.82
0.475541	10.18	27.59	Hot	46.42	-18.82
0.784962	10.3	20.96	Hot	46	-25.04
0.202446	11.73	28.4	Hot	53.51	-25.11
0.239707	11.39	25.84	Hot	52.11	-26.27
0.151781	11.93	7.78	Hot	55.9	-48.12

AC Line (via AC/DC Switching Adapter): 240V/60Hz – Neutral Conductor



Note: The emissions at 6.78 MHz was the fundamental transmitted frequency of the EUT and not applicable for testing.

Quasi-Peak Measurements

Frequency (MHz)	Total Loss (dB)	Corrected Amplitude (dBµV)	Conductor	Limit (dBµV)	Margin (dB)
0.444027	10.29	29.48	Neutral	56.99	-27.51
0.474767	10.18	28.05	Neutral	56.43	-28.38
13.559139	10.23	30.01	Neutral	60	-29.99
0.172072	11.84	34.68	Neutral	64.86	-30.18
2.893823	10.11	25.55	Neutral	56	-30.45
2.96115	10.11	23.45	Neutral	56	-32.55

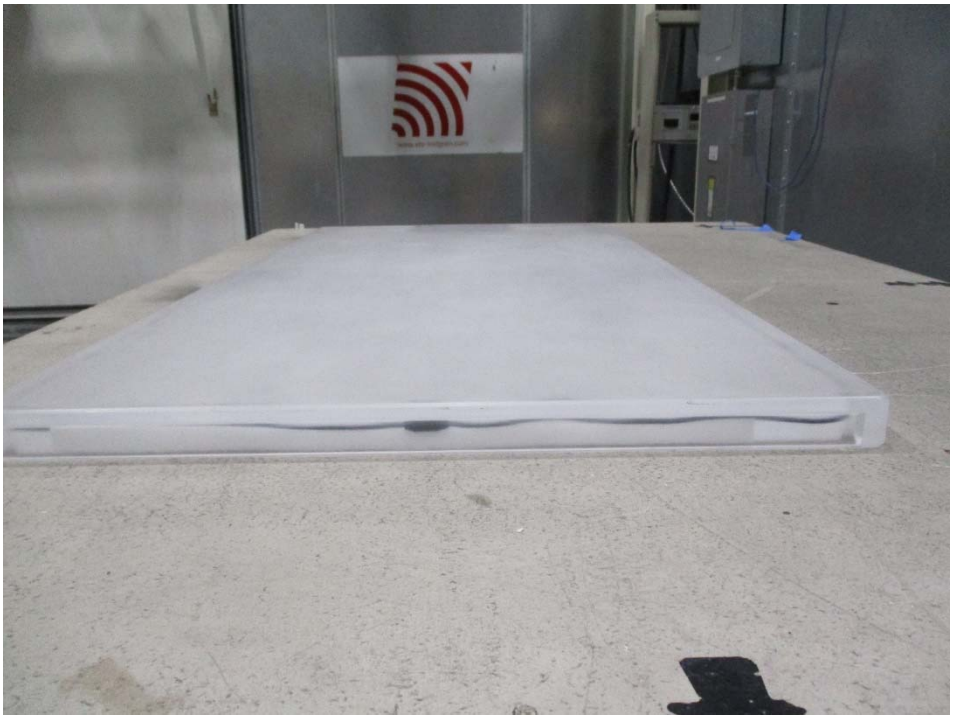
Average Measurements

Frequency (MHz)	Total Loss (dB)	Corrected Amplitude (dBµV)	Conductor	Limit (dBµV)	Margin (dB)
0.444027	10.29	28.11	Neutral	46.99	-18.88
13.559139	10.23	30.34	Neutral	50	-19.66
0.474767	10.18	26.19	Neutral	46.43	-20.24
0.172072	11.84	31.31	Neutral	54.86	-23.55
2.893823	10.11	20.86	Neutral	46	-25.14
2.96115	10.11	18.65	Neutral	46	-27.35

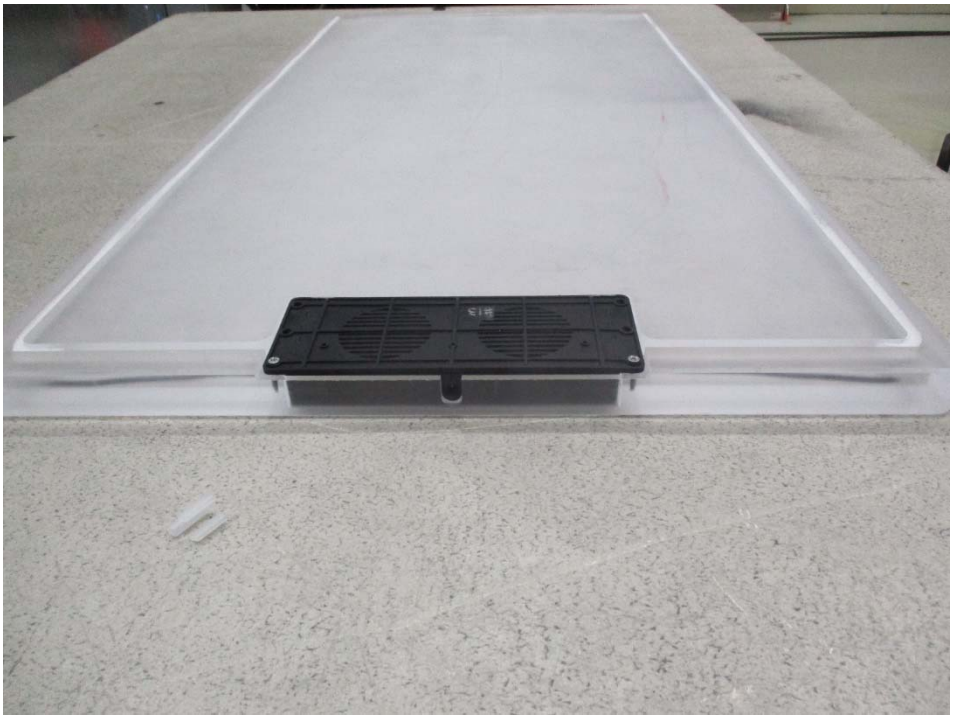
6 Annex A (Normative) – EUT Photographs

6.1 EUT – Top View

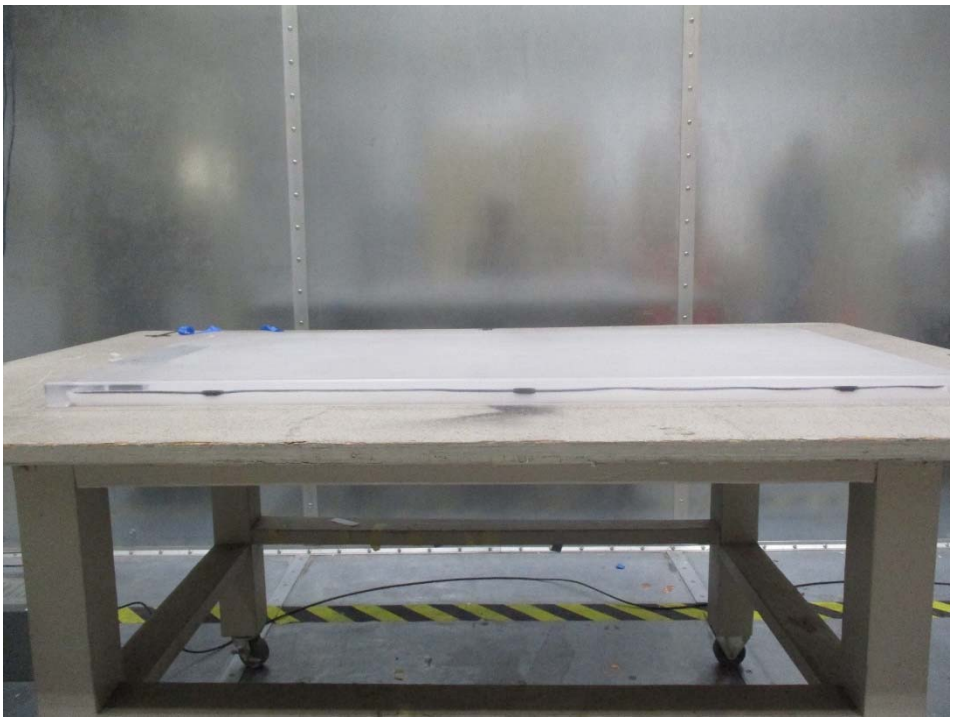
6.2 EUT – Front View



6.3 EUT – Rear View



6.4 EUT – Side View



7 Annex B (Normative) – Labeling Information

7.1 FCC Labeling Information

As per FCC §18.209: Identification of authorized equipment

Each device for which a grant of equipment authorization is issued under this part shall be identified pursuant to the applicable provisions of subpart J of part 2 of this chapter.

As per FCC §2.1074: Identification

(a) Devices subject only to Supplier's Declaration of Conformity shall be uniquely identified by the party responsible for marketing or importing the equipment within the United States. However, the identification shall not be of a format which could be confused with the FCC Identifier required on certified equipment. The responsible party shall maintain adequate identification records to facilitate positive identification for each device.

(b) Devices subject to authorization under Supplier's Declaration of Conformity may be labeled with the following logo on a voluntary basis as a visual indication that the product complies with the applicable FCC requirements. The use of the logo on the device does not alleviate the requirement to provide the compliance information required by § 2.1077.

As per FCC §18.212: Compliance information

(a) Equipment authorized under Supplier's Declaration of Conformity shall include a compliance statement that contains the information set forth in § 2.1077 of this chapter and a statement identical or similar to the following: “*This device complies with part 18 of the FCC Rules.*”

(a) The compliance information may be placed in the instruction manual, on a separate sheet, on the packaging, or electronically as permitted under § 2.935 of this chapter. There is no specific format for this information.

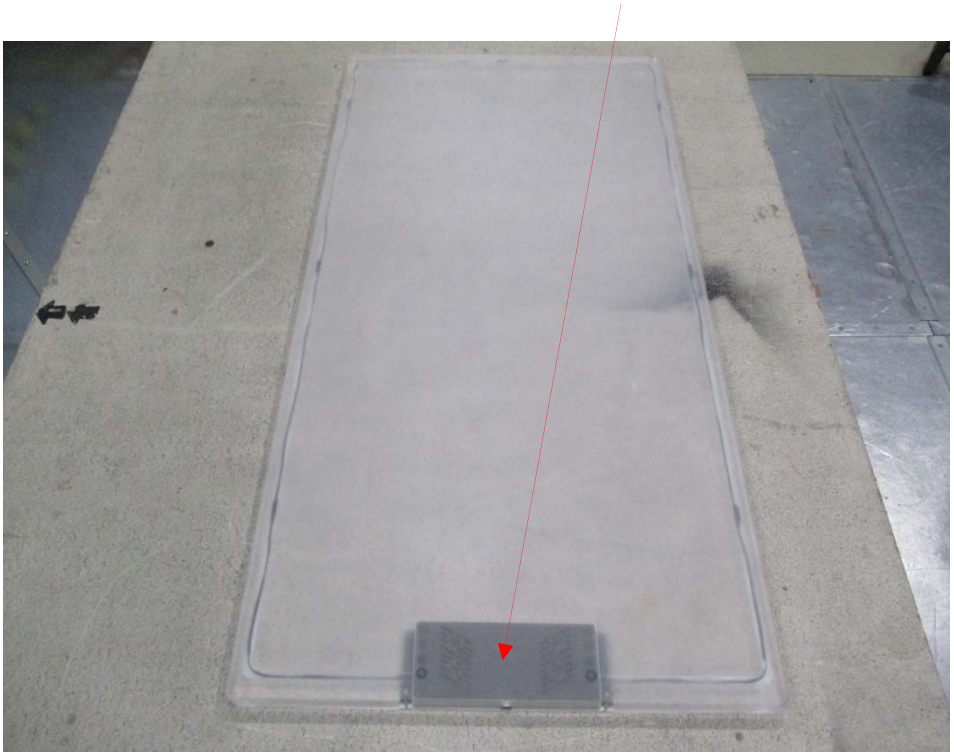
As per FCC §18.213: Information to the User

Information on the following matters shall be provided to the user in the instruction manual or on the packaging if an instruction manual is not provided for any type of ISM equipment:

a. The interference potential of the device or system
b. Maintenance of the system
c. Simple measures that can be taken by the user to correct interference.
d. Manufacturers of RF lighting devices must provide an advisory statement, either on the product packaging or with other user documentation, similar to the following: This product may cause interference to radio equipment and should not be installed near maritime safety communications equipment or other critical navigation or communication equipment operating between 0.45–30 MHz. Variations of this language are permitted provided all the points of the statement are addressed and may be presented in any legible font or text style.

8 Annex C (Normative) – Product Label

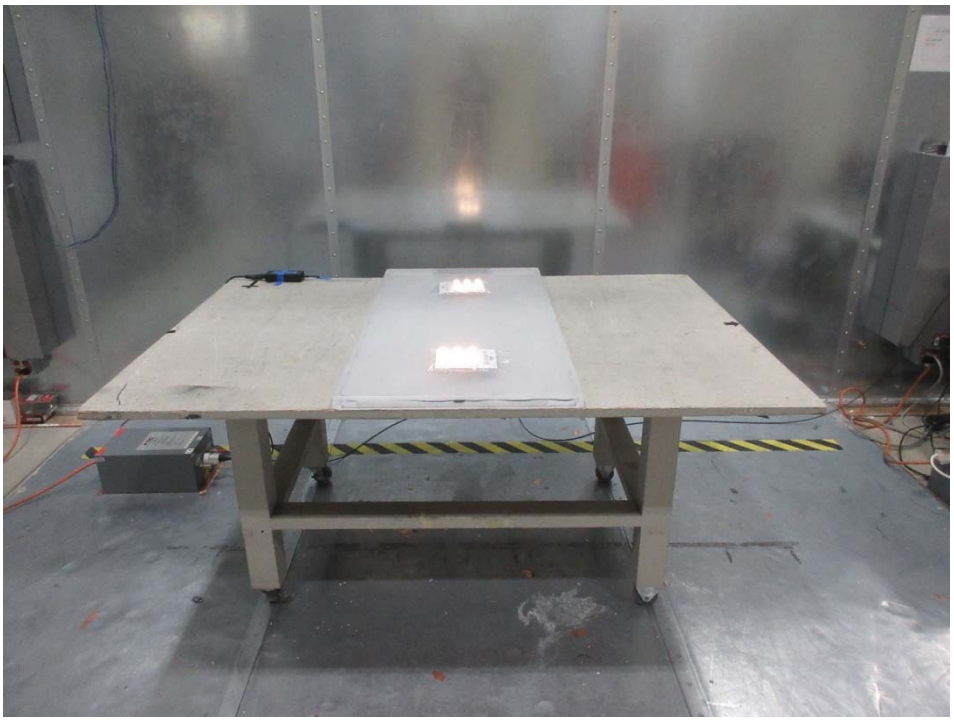
8.1 Suggested Label Location on EUT



9 Annex D (Normative) – Test Setup Photographs

9.1 Conducted Emissions

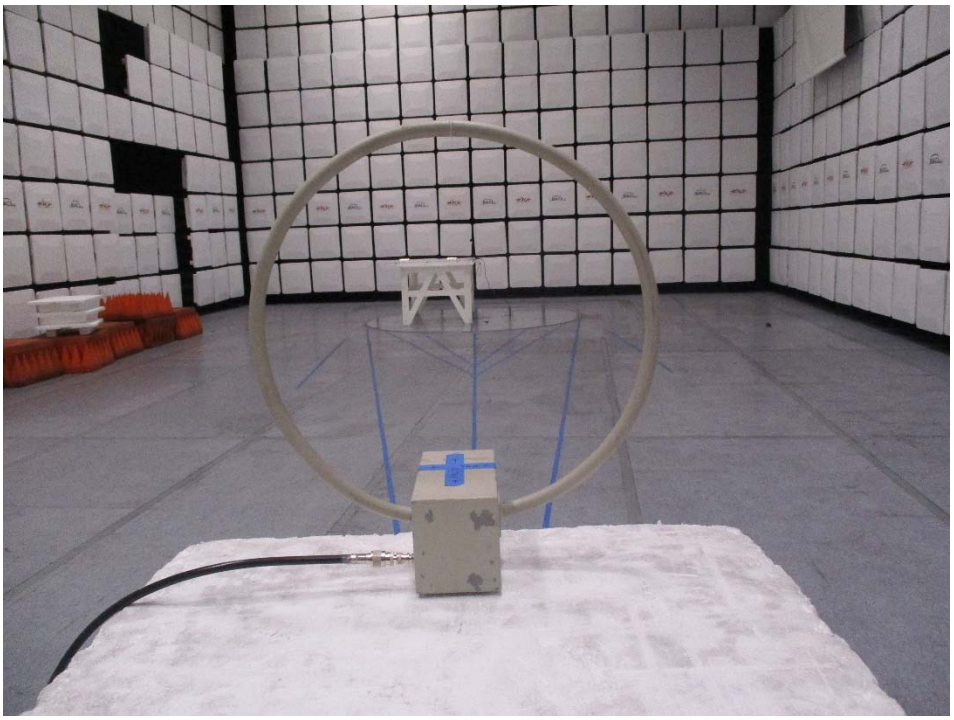
AC Line, Front View



AC Line, Side View

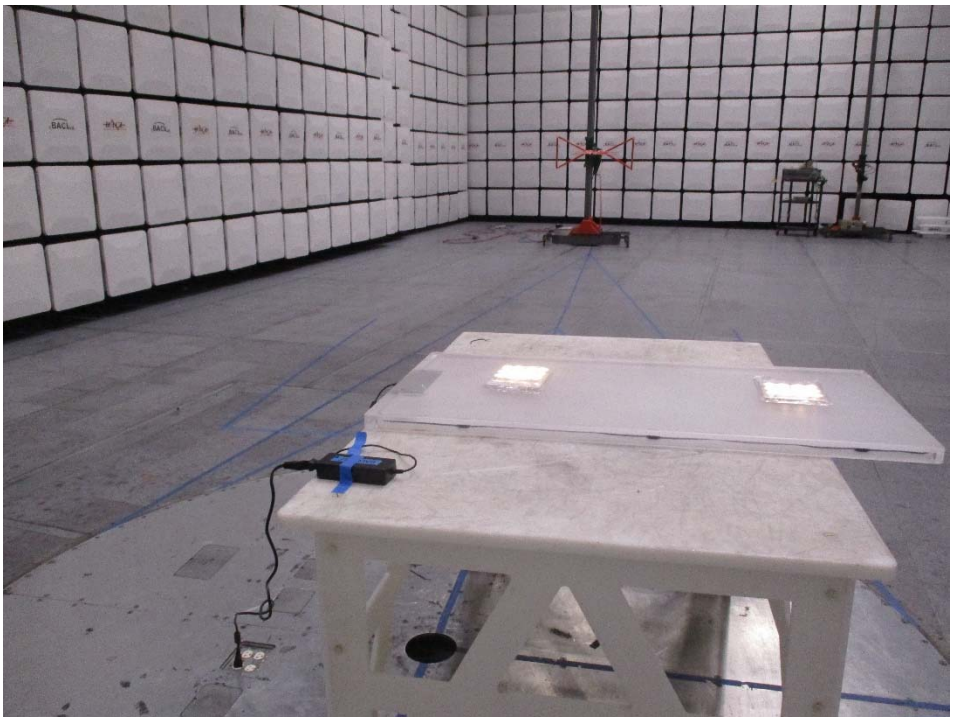
9.2 Radiated Emissions

9 kHz to 30 MHz, Front View



30 MHz to 400 MHz, Front View

30 MHz to 400 MHz, Rear View



10 Annex E (Normative) – ISO/IEC 17025 Certificate and Scope of Accreditation

Accredited Laboratory

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets A2LA R222 - *Specific Requirements EPA ENERGY STAR Accreditation Program*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 21st day of December 2022.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2024

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

Please follow the web link below for a full ISO 17025 scope

https://www.a2la.org/scopepdf/3297-02.pdf

--- END OF REPORT ---