APPLIED TEST LAB INC.

EMISSION TEST REPORT

FCC15.247, RSS-247 Issue2

Report#:B002E026-51

Manufacturer: Blackline Safety

Model:G7EXO-NA2

Serial Number:N/A

EUT Received Date:2024-03-25

Test Start Date:2024-03-25

Test Completion Date:2024-03-28

Test Result:PASS

Report Issue Date:2024-06-20

Tested by	Approved by:
Jaeheon Yun, Test specialist	Adiseshu Nyshadham, Quality Prime
JaeHeon	AdiseshuN

Report Issued to	Report Issued by
Blackline Safety Unit 100, 803 24 Avenue SE Calgary, AB T2G 1P5	Applied Test Lab Inc. Unit 4174-3961 52 Ave NE Calgary, AB, T3J 0J8

Report Revision History

Rev	Description of Change	Date
Draft 01	Initial	2024-04-09
Release	Pg 1, 8,9,11,12,24,26,32,34,35,37,43,45,46,48.49	2024-06-20

This report contains **51** pages

EQUIPMENT DOCUMENTATION

The user documentation and/or manual shall contain details of any special measures required to be taken by the purchaser or user to ensure EMC compliance of the EUT with the requirements of this standard.

For example
Need to use shielded or special cables, such as category 5 F/UTP or category 6 U/UTP cabling as defined in ISO IEC 11801.

Equipment compliant with the class A requirements of this publication should have a warning notice in the user manual stating that it could cause radio interference.

For example
Warning: Operation of this equipment in a residential environment could cause radio interference.

LABELING INFORMATION – FCC 15.19

Products subject to authorization under Verification procedures shall be labeled as follows: "This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation."

Where a device is constructed in two or more sections connected by wires and marketed together, the statement is required to be affixed only to the main control unit. When the device is so small or for such use that it is not practicable to place the statement on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

INFORMATION TO THE USER - FCC

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class A digital device or peripheral, the instructions furnished in the user manual shall include the following or similar statement, placed in a prominent location in the text of the manual:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

For a Class B digital device or peripheral, the instructions furnished in the user manual shall include the following or similar statement, placed in a prominent location in the text of the manual:

NOTE : This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna
Increase the separation between the equipment and receiver
Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
Consult the dealer or an experienced radio TV technician for help

Table of Contents

1 General

1.1 Purpose

The purpose of this report is to document conformance assessment with **FCC15.247, RSS-247 Issue2** and to detail the results of testing performed on the test sample Model: **G7EXO-NA2** manufactured by **Blackline Safety**. The test sample was received in good condition. Testing began on **2024-03-25** and was completed on **2024-03-28**.

1.2 Relevant Standards and References

One or more of the following standards were used to evaluate the EUT:

1. **ANSI C63.4-2014**: American National Standard for Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9 kHz to 40 GHz
2. **CFR Title 47 FCC Part 15** - Radio Frequency Devices, Subpart B – Unintentional Radiators.
3. **CFR Title 47 FCC Part 15** - Radio Frequency Devices, Subpart C – Intentional Radiators.
    - 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz
4. **RSS-Gen: Issue 5 2019-03**: General Requirement for Compliance of Radio Apparatus
5. **RSS-247 Issue 2 2017-02–** Digital Transmission System(DTSs), Frequency Hopping System(FHSs) and Licence - Exempt Local Area Network(LE-LAN) Devices
6. **ICES-003 Issue 6** – Information Technology Equipment(Including Digital Apparatus) – Limits and Methods of Measurement
7. **ANSI C63.10-2013**, "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices"
8. **FCC KDB 558074** D01 DTS Meas Guidance v05, "GUIDANCE FOR PERFORMING COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEMS (DTS) OPERATING UNDER SECTION 15.247"

1.3 Performance Requirement

FCC15.247, RSS-247 Issue2 prescribes two Classes of limits of radio noise for ITE, Class A equipment and Class B equipment associated with two types of end-user environment.

The Class B requirements for equipment are intended to offer adequate protection to broadcast services within the residential environment.

Equipment intended primarily for use in a residential environment shall meet the Class B limits. All other equipment shall comply with the Class A limits.

Broadcast receiver equipment is class B equipment.

The EUT is marketed as **RSS-247 5.5** equipment and must comply with the **RSS-247 5.5** emission limits.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increase of emission levels should be checked and verified to ensure continuous compliance has

been maintained (i.e., printed circuit board layout changes, changes to filter performance, power supply changes, I/O cable and interface changes, critical component changes etc.)

1.4 Measurement Uncertainty

Test case	Measurement Uncertainty
Radiated Emission	+/- 3.44 dB

[NOTE] The measurement uncertainties are evaluated for tests performed on the EUT as per CISPR 16-4-2.
The measurement uncertainties reported above relates to the measurement setups and procedures.
It does not take into account EUT performance variations from sample to sample.

1.5 Test Results Summary

The test samples, as assessed, satisfied the relevant requirements of **FCC15.247, RSS-247 Issue2** detailed in this section below.

Test Case	Test Type	Basic Standard	Limit Applied	Modifications	Result
5.0	Radiated Spurious Emissions	FCC15.247, RSS-247 Issue2	RSS-247 5.5	No	PASS

1.6 Notes Relating to the Conformance Assessment

For Sec 4.0-5.0
The above judgment is only based on the measurement data and does not include the measurement uncertainty. Accordingly, the statement below is applied to the test result.

The EUT complies with the limit required in the standard in case that the margin is not less than the measurement uncertainty in the laboratory.

The compliance of the EUT is more probable than non-compliance in case that the margin is less than the measurement uncertainty in the laboratory.

The results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of the test samples and date of completion of the testing.

All testing was performed under the following environmental conditions:

Temperature	: 17 to 23 °C
Humidity	: 15 to 75%
Barometric Pressure	: 86 to 106 kPa

Note the actual temperature humidity conditions can be found in the relevant test results sections.
All dates used in this report are in the format yyyy/mm/dd

The assessment has been performed in accordance with the requirements of ISO/IEC 17025.

1.7 Deviations from Test Standards

There were no deviations from the test standard

1.8 Client Information

Name	**Blackline Safety**		
Address	Unit 100, 803 24 Avenue SE Calgary, AB T2G 1P5		
Telephone	403-451-0327	**Website**	www.blacklinesafety.com
Contact Name	Scott Jacobsen	**Contact Email**	sjacobsen@blacklinesafety.com

2 Test Sample Information

The G7EXO-NA2 was only operated and exercised in the mode(s) and configuration(s) described in this report. All inputs and outputs to and from support equipment associated with the G7EXO-NA2 were provided or simulated under the direction and responsibility of Blackline Safety. A description of these signals and their provision is included in Appendix A.

2.1 Equipment Under Test (EUT)

EUT Type	Host with ☐ an external module(EUT) or ☐ internal module(EUT) or ☐ plug-in module(EUT) or ☐ mounted module(EUT)	☒ Host (EUT) ☒ Single Unit ☐ Multiple Units
Product Description	G7 EXO is a cloud-connected area monitor that bundles industry leading gas detection with automated compliance and business analytics tools. For the first time ever, the days of manually collecting data from the field, reviewing spreadsheets and compiling reports are behind you. G7 EXO solves the challenges of continuous toxic and combustible gas monitoring for sites, facilities and fence lines. Automating long-term area monitoring and connected safety for streamlined efficiency, G7 EXO allows teams to focus on their work at hand. In the event of a safety incident or gas exposure, monitoring personnel can see what has happened and communicate with workers directly via text messaging or an optional two-way voice calling feature through their EXO.	
Manufacturer	Blackline Safety	
Trade Name	G7 EXO	
Model Number	G7EXO-NA2	
Serial Number	N/A	
Model discrepancy/Variations	N/A	
Power Supply and Requirements	3.0-3.6V, nominal 3.4VDC	
FCC ID	W77EXO	
IC ID	8255A-EXO	
Rated Power (W)	10Wfor AC/DC adapter	
Firmware Version	3.442S3_EXO	
Software Version	N/A	
Antenna Type and Gain	Ceramic Chip Antenna, 2.2dBi(peak), 1.9dBi(Band edges)	
Operation Frequency Range	2400MHz – 2483.5MHz	
Modulation type(s)	8-PSK	
Number of TX Chains	1	
Other Information	N/A	
Product Manufacturing Status	☐ Production Unit	☒ Pre-Production Unit

2.2 Support Equipment

Manufacturer	Description	Model No.	Serial Number	Other Info
				-

2.3 I/O Ports

Port Type	Description	Filter Info	Shielding Info	Other Info
Power port	Power	N/A	Unshielded	
Signal port	communication	N/A	Unshielded	

2.4 Exercising I/O Ports

Port Type	Procedure used to exercise the port	Justification for non-standard procedure

2.5 I/O Port's Testing Applicability

A justification is provided below when one or more measurements were not performed.

Port Type	Manufacturer's Justification for not Assessing the Port
N/A	N/A

2.6 Cables

Cable Description	Length (m)	Port From	Port To	Cable Type	Remarks
Power cable	1.5	EUT	Power outlet	Power	-
Signal cable	3	EUT	Termination	-	-

2.7 Primary Function(s)

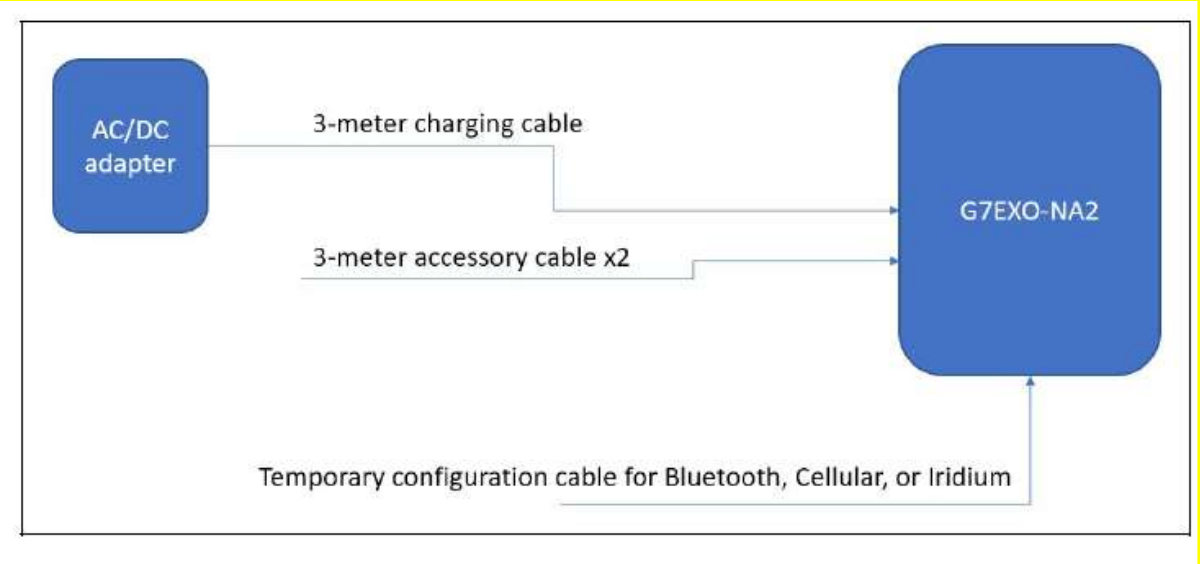
☐ Play Audio	☐ Pressure Measurement	☐ Printing
☐ Play Video	☐ Gas Detection	☐ Transfer Data
☐ Temperature Measurement	☐ Battery Charging	☐ Robotic Movement
☐ Humidity Measurement	☐ Scanning	☒ Other(Monitoring)
☐ Signal Processing	☐ Data Storage	

2.8 Modes of Operation and Conditions

☐ Color Pattern on Monitor	☐ USB Traffic	☐ Video Playback
☐ "H" Pattern on Monitor	☐ Audio Signal to Earphone	☐ Audio Playback
☐ "H" Pattern to Printer	☐ LAN Traffic	☐ R/W function with HDD
☐ "H" Pattern to Modem	☐ RS232 Traffic	☒ Other(Charging)

2.9 EUT System and Support Equipment Block Diagram

The EUT is to be installed in accordance with the manufacturer's instructions. The installation process includes, product assembly, connecting any support equipment, connecting power and configuration of the equipment under test. All unused ports should be terminated as instructed by the test standard. The EUT should indicate normal operation in accordance with the Operation Manual or manufacturer's instructions.



EUT functional setup Diagram

3 Test Facilities

3.1 Test Facility Information

Laboratory Location

The radiated and conducted emission test sites are located at the following address:

Name	Applied Test Lab Inc.		
Address	Unit 4174-3961 52nd Avenue NE, Calgary, Alberta, T3J 0J8, Canada		
Telephone	403 590 8701	**Fax**	403 590 8570
Email	emctesting@appliedtestlab.com	**Website**	www.appliedtestlab.com

Laboratory Accreditation/Recognitions/Certifications

The Semi-Anechoic Chamber Test Site and Conducted Emission Site have been fully described, submitted to, and accepted by the FCC and Industry Canada for testing Interference by information technology equipment. In addition, ATL has implemented an in-house quality system which is based on the ISO 17025 standard and is fully accredited. The following certification numbers have been issued in recognition of the certifications:

FCC Registration Number: **209928**
Industry Canada Lab Code: **IC 10988A**
ISO 17025**: ANAB AT-2694.** The latest accreditation scope can be found as listed on the ANAB website.

Country	Agency	Accreditation/Certification	LOGO
USA	FCC	3m Semi-Anechoic Chamber to perform FCC Part 15B, C, D, E, F, G, H , 18, 22, 24, 25, 27, 30, 73, 74, 80, 87, 90, 95, 96, 97, and 101 related measurements	
Canada	Industry Canada	3 m Semi-Anechoic Chamber to perform ICES-003 and RSS standards related measurements	Industry Canada Industrie Canada
USA	RTCA	3m Semi-Anechoic Chamber and other facilities to perform DO-160 related measurements	
Europe		3m Semi-Anechoic Chamber and other facilities to perform ETSI, EN, CISPR, IEC standards related measurements	

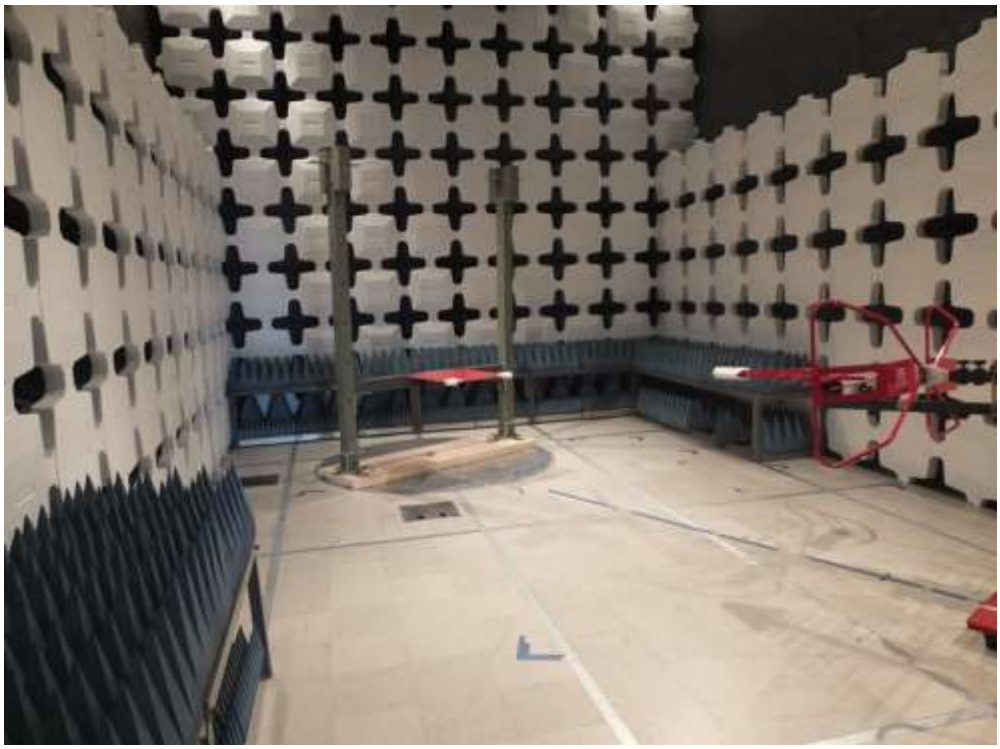
Note: Unless otherwise specified, ATL performs the tests using standard test methods to evaluate the EUT for compliance to the defined International standards. However, the report is not to be used to claim compliance, certification or endorsement by FCC or Industry Canada, or ATL or any other government agency unless specifically submitted to such agency for such purpose.

3.2 Semi-Anechoic Chamber Test Site Description

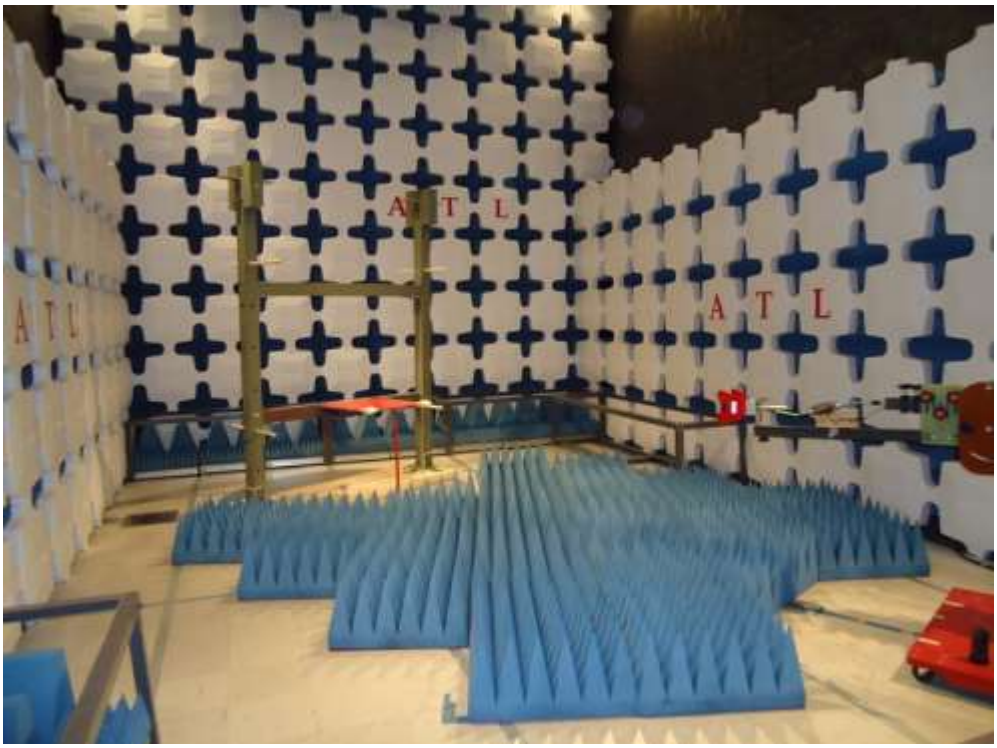
The Semi-Anechoic Chamber Test Site consists of a 6.24 x 9.144 x 5.79 (m) shielded enclosure. The chamber is lined with SAMWAH Ferrite Grid Absorber, model number SN-20. The ferrite tile grid is 100 x 100x 6.7 (mm) thick and weighs approximately 200 (grams). These tiles are mounted on steel panels and installed directly on the inner walls of the chamber. Inner side Wall is lined by 600H Foam Absorber with White Cap. Chamber is illuminated by set of 12 low EMI LED Bulbs.

The chamber is equipped with a multi speed, remotely controlled, flush mounted turntable. The turntable is 198 (cm) in diameter and is located 160 (cm) from the back wall of the chamber. The chamber is grounded via Utility Ground installed at the side of the back East wall, it is bound to the Chamber ground Stud using 1/2" copper braided cable.

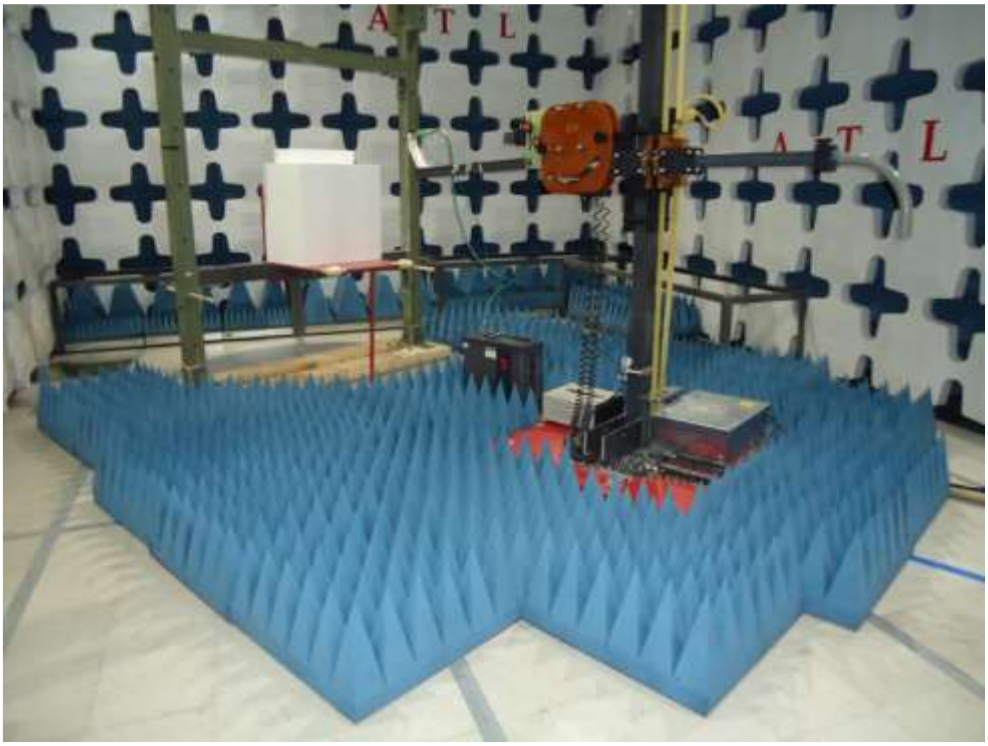
The 3 m Semi-Anechoic Chamber allows measurements on a EUT that has a maximum width or length of up to 2 m and a height of up to 3 m and can handle weight up to 2204 lbs.



Test Facility (Setup for Radiated Emission 30MHz – 1000MHz)



Test Facility (Setup for Radiated Emission above 1GHz – 18GHz)



Test Facility (Setup for Radiated Emission above 18GHz – 25GHz)

The turntable is all aluminum, flush mounted table installed in an all steel frame. The table is remotely operated from the control area located outside the Semi Anechoic Chamber. The turntable is electrically bonded to the surrounding ground plane via brass brush installed on the edge of the turn table. The brass brush makes constant contact with the ground plane during operation.

Three Meter Semi-Anechoic Chamber Manufactured by ETS Lindgren Model # S201 4x7 RW, Sr # 1 644.

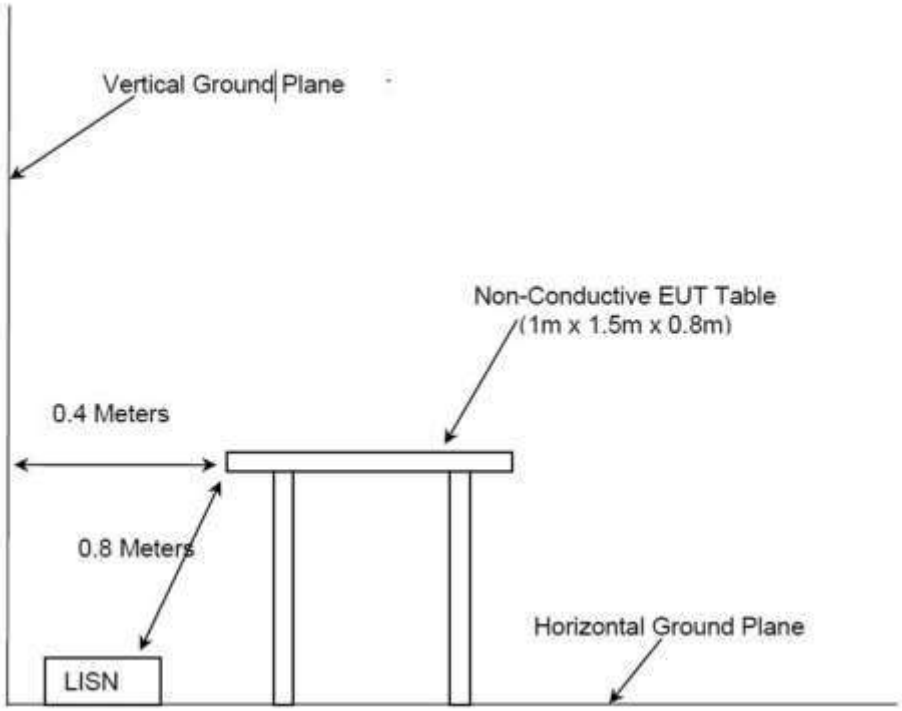
The facility is capable of testing products that are rated for both AC and DC. An AC power capability of 120Vac and 240Vac single phase or devices that are rated for a 208Vac 3 phase input is available. DC power capability is also available for testing using battery strings and DC power supplies.

The chamber is equipped with a multi speed, bore sight, and remotely controlled Mast that controls the polarization and height of the antenna. Control of the mast and turntable occurs in the control space adjoining to the Semi-Anechoic Chamber. Radiated emission measurements are performed using an Active Loop, Bi-Log antenna and a Horn antenna and Radiated Immunity measurements are performed using a Bi-Log antenna, Horn antenna and a Stripline where applicable.

3.3 Conducted Emission Test Site Description

The AC mains conducted EMI site is located in the main floor of Applied Test Lab Inc.'s (ATL) EMC department. It consists of a 2.66 x 2.04 meter 1/16 inch thick solid copper horizontal ground reference plane (GRP) bonded to an 2.46 x 3.04 meter vertical ground plane.

The Conducted Emissions Test site is of sufficient size to test table top and floor standing equipment in accordance with section 6 of ANSI C63.4 standard. A diagram of the test site is shown below:



The EUT shall be placed in the conducted emission area and will be plugged into the equipment under test (EUT) receptacle of a LISN/AMN. LISN is electrically bonded to the metallic ground floor. In a table top configuration, to evaluate conducted emission compliance, the EUT is placed on a wooden table of 80 cm high and is 40 cm from the vertical metallic wall. The vertical metallic wall is bonded to GRP. The phase or neutral 50-Ω output port will be connected to the EMI Receiver via a Limiter and a 20' coaxial cable. The EMI Receiver's bandwidths, sweep time, detectors and limits are computer software controlled and the Conducted Measurement test is done using an EMI Receiver.

Conducted Emission Test Setup-Side View

Conducted Emission Test Setup-Top View

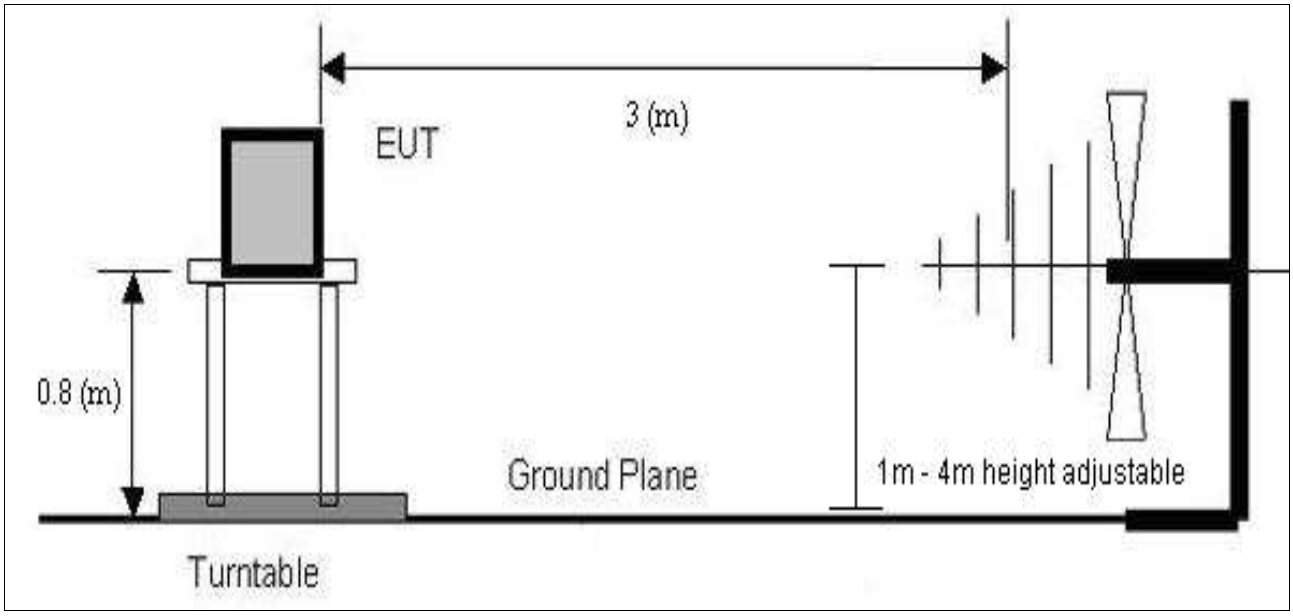
4 Radiated Emission (30MHz - 1000MHz)

4.1 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Next Cal
Bi-Log antenna	CHASE	CBL6111B	2261	2027/03/22
EMI Receiver & RF filter section	Hewlett Packard	8546A, 85460A	3448A00267, 3448A00245	2024/08/11
MXA Signal Analyzer	Keysight	N9020A	MY48011091	2025/01/15
Cable 1.5m+8.84m+2m	Micro Coax UTIFLEX	UFA200A+ UFB311A+ UFB205A	BUAO1G-0523+ 50224-H+ MFR 64639 210796-008	PV
Test SW	DVT Solutions Inc	REDvtAtlV3p42.exe - (20240321)		

Note: The equipment in the above table are within the valid calibration period.

4.2 Block Diagram of Test Configuration



4.3 Test Requirement for Class A Device

Radiated Emission Limits at 3m per Clause(s) FCC15.247, 15.109(a), RSS-247 Issue2 3.2.2

Frequency Range (MHz)	Quasi-peak Limit (dBuV/m)
	FCC15.247
30 - 88	48.54
88 - 216	53.98
216 - 230	56.9
230 - 960	60
960 - 1000	-

4.4 Test Procedure

Method of measurement of radiated disturbance

1. The radiated emission/ disturbance measurements are performed using the setup in accordance with ANSI C63.4/ Clause 7.3 of CISPR 16-2-3 radiated emission/ disturbance measurement procedure.
2. The EUT is arranged and connected with cables terminated in accordance with the product specification. The EUT with its various internal components was operated and exercised as per the instructions provided by the manufacturer.
3. Where a flexible mains cord is provided by the manufacturer, this shall be 100 cm long. If it is more, the excess cable is folded back and forth so as to form a bundle not exceeding 40cm in length.
4. Interconnecting cables that hang closer than 40cm to the ground plane are folded back and forth in the center forming a bundle 30 to 40 cm long.
5. I/O cables that are not connected to a peripheral are bundled in the center. The end of the cable is terminated, if required, using the correct terminating impedance. The overall length is not to exceed 100 cm
6. Where possible, loop-back cables are arranged so that outgoing line is not closely coupled to the return.
7. Radiated emission/ disturbance measurements are conducted with a quasi-peak detector instrument in the frequency range of 30 MHz to 1000 MHz
8. Before any testing is performed on EUT, the Ambient (measurement noise floor) is recorded, and a QA check is performed to show that the system is functioning correctly.
9. Measurements of the radiated emission/ disturbance were made with the antenna located at a distance of 3 meters from the EUT.
10. An inverse proportionality factor of 20 dB per decade was used to normalize the measured data to the specified distance for determining compliance.
11. The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.
12. The EUT azimuth is varied during the measurement to find the maximum field-strength readings.
13. The EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.
14. The EUT was placed on a non-conductive fiber glass/foam table 80cm above the ground plane and centered on the turntable.
15. A complete scan from 30-1000 MHz was made with antenna oriented horizontally and vertically.
16. The quasi-peak measuring receiver shall be in accordance with Clause 4 and 5 of CISPR 16-1-1.
17. Receivers with peak detectors shall be in accordance with Clause 6 of CISPR 16-1-1 and shall have a 6 (dB) bandwidth in accordance with Clause 4 of CISPR 16-1-1.
18. The antenna can be a tuned dipole or Bi-conical or log-periodic dipole array LPDA or hybrid type such as Bi-Log. Further detailed information is given in Clause 4.5 of CISPR 16-1-4.
19. The software is programmed to perform a peak sweep of the frequency band using the max hold function and peak detector.
20. This sweep is performed for every 22.5 deg with receiving antenna in both horizontal and vertical polarities and at receiving antenna heights of 100, 200, 300 and 400 (cm).
21. This type of scan provides emission data with a good indication of pass or fail.
22. During the peak detector scan a list of frequencies of interest is generated.
23. For each frequency of interest, the EUT is arranged to its worst case and then the antenna is adjusted to heights from 1 meter to 4 meters and turntable is turned from 0 to 360 degrees to find the maximum reading.

24. Quasi- Peak measurements are performed at the frequencies of interest with the Spectrum Analyzer/Receiver's 6dB resolution bandwidth set to 120 (kHz) and Video Bandwidth set to 300 (kHz).
25. For unintentional radiators, for each of the frequencies to which the device is tuned, the frequency and amplitude of the six highest radiated emissions relative to the limit and the operating frequency, or frequency to which the EUT is tuned (if appropriate), are reported unless such emissions are more than 10 (dB) below the limit.
26. If less than the specified number (less than six) emissions / disturbances are within 10 (dB) of the limit, the noise level of the measuring instrument at representative frequencies are reported.
27. The polarization of the measurement antenna (horizontal or vertical) is identified for each of the reported emissions / disturbances.
28. Radiated emission / disturbance measurements taken at alternative distances are to be converted to the limit distance using the inverse distance relationship, unless data can be presented to validate a different conversion.
29. Numbers with a minus sign in margin column indicates that disturbance levels are below the limit.

4.5 Sample Calculation

The calculation for the radiated emission field strength is as follows:

Corrected Reading (dBuV/m) = Analyzer/Receiver Reading (dBuV) + Correction Factor (dB/m)
Correction Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)
Margin (dB) = Corrected Reading (dBuV/m) - Applicable Limit (dBuV/m)

4.6 Test Arrangement

EUT arrangement

☒ Table-top EUT arrangement
☐ Floor-Standing arrangement due to a physical hazard in lieu of
☐ Wall Mount or ☐ Ceiling Mount or ☐ Handheld or ☐ Body Worn arrangement
Justification: N/A

☐ EUT is bonded to Chamber floor for a dedicated ground connection with a grounding connection specified by the manufacturer.

Auxiliary Equipment Arrangement

☐ Placed below the chamber floor;
☒ Placed on the chamber floor with an insulating support;
☐ Placed outside the measurement area and are routed to the remote location while being insulted from turntable with insulation thickness not more than 15cm

Cabling Arrangement

☒ Manufacturer-supplied or commercially available cabling as specified in the installation manual or user manual.
☐ Cables are bonded to the turntable in accordance with the manufacturer's recommendation.
☐ The effective length of all loop-back cables not routed overhead is longer than 2 m.
☐ The effective length of the mains cable is 100 cm ± 10 cm.
☐ Cables with mitigation features details (screening, tighter/more, twists per length, ferrite beads, etc)

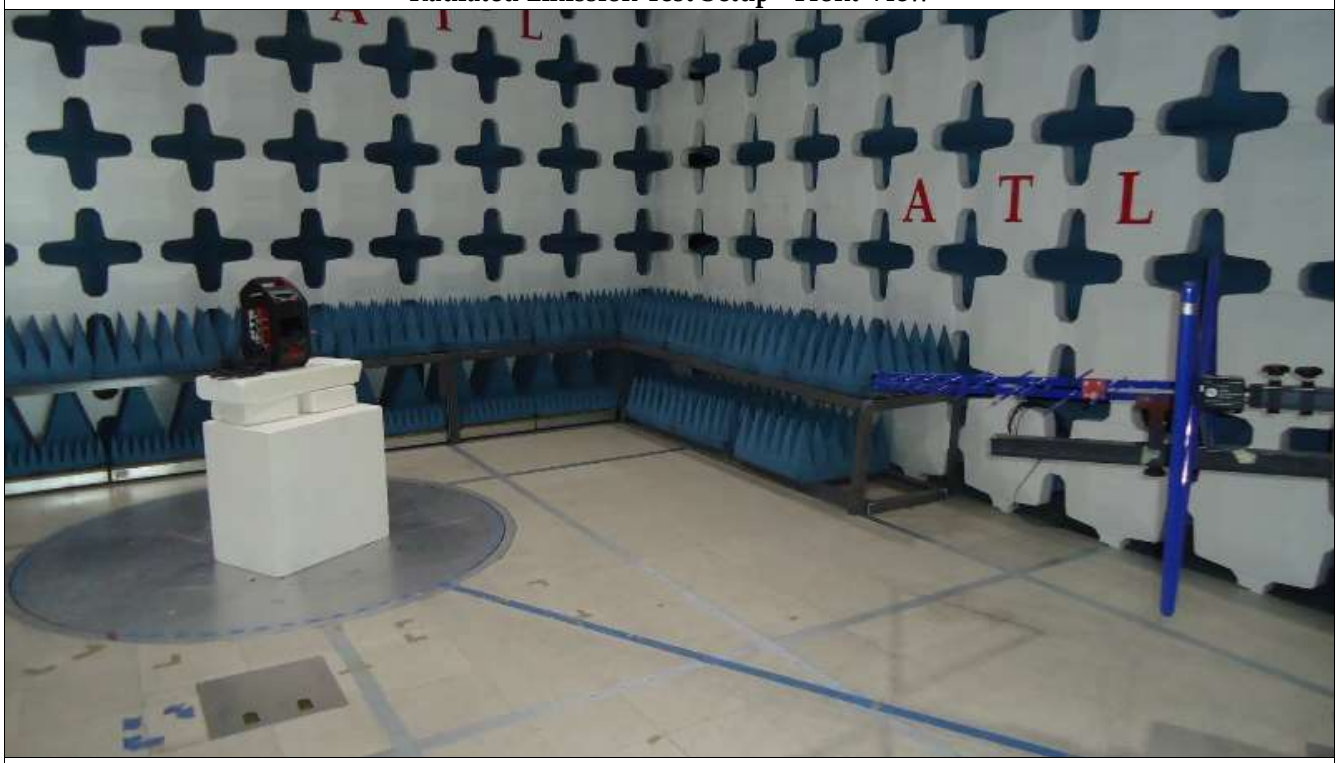
Cable Type	Details of Mitigation Features

Positions of cables

☒ The excess cable is bundled non-inductively on, but separated from, the chamber floor.
☐ Specify cable lengths if those defined cannot be achieved.

4.7 Test Setup Photographs

Radiated Emission Test Setup - Front View



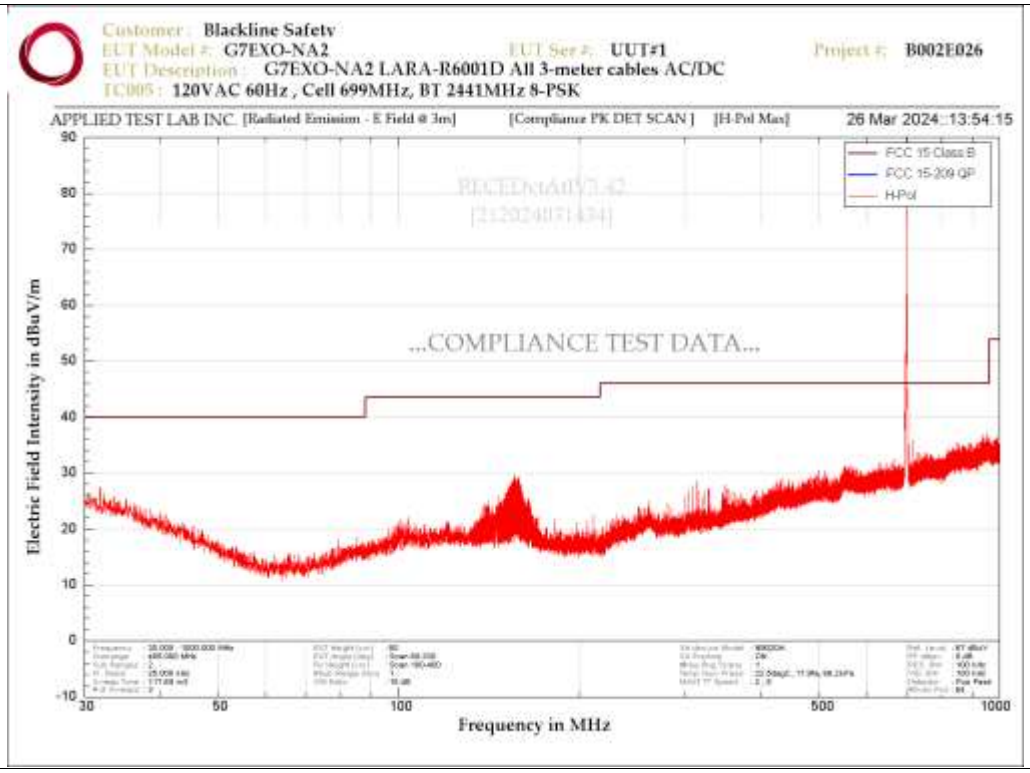
Radiated Emission Test Setup - Side View

4.8 Test Data – Horizontal Polarization

Client:	Blackline Safety	Test Standard:	FCC15.247, RSS-247 Issue2
Model No.:	G7EXO-NA2	Test Reference:	ANSI C63.4
Serial No.:	N/A	Product:	G7EXO-NA2
Test Voltage:	120VAC 60Hz	Class:	RSS-247 5.5
Test Distance:	3m	Line/Polarity	Horizontal
Temperature:	21.1°C	Humidity:	18%
Tested By:	Jaeheon Yun	Date of Test:	2024/03/26
Decision Rule-Supporting Evidence	☒ Data obtained ☐ Video	☐ Email conversation ☐ Inherent in the requested specification ☐ Other	

Frequency (MHz)	Azimuth Angle (deg)	Antenna Height (cm)	Measured Reading (dBuV)	Correction Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
155.9268	326.3	168.8	11.27	18.78	30.05	43.52	-13.47
158.856	330.6	176.9	10.43	18.77	29.2	43.52	-14.32

☐ Fewer than six emissions within 10 dB of the limit are observed.



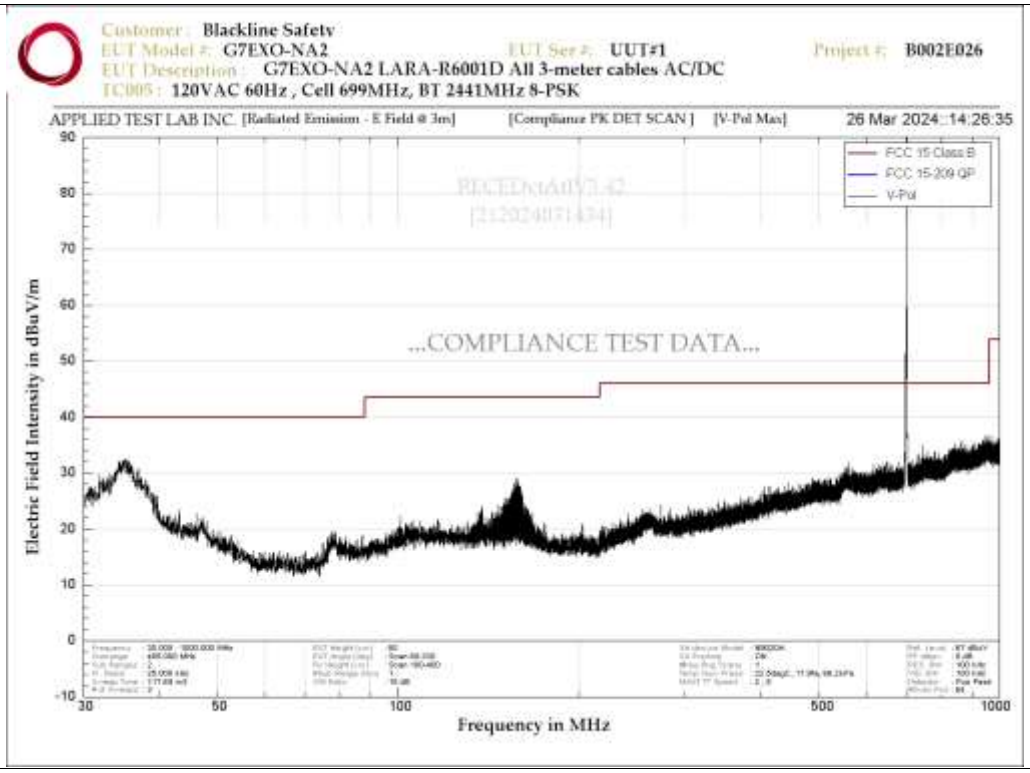
Radiated Emission - Scan Horizontal Polarization (30MHz - 1000MHz)

4.9 Test Data – Vertical Polarization

Client:	Blackline Safety	Test Standard:	FCC15.247, RSS-247 Issue2
Model No.:	G7EXO-NA2	Test Reference:	ANSI C63.4
Serial No.:	N/A	Product:	G7EXO-NA2
Test Voltage:	120VAC 60Hz	Class:	RSS-247 5.5
Test Distance:	3m	Line/Polarity	Vertical
Temperature:	21.1°C	Humidity:	18%
Tested By:	Jaeheon Yun	Date of Test:	2024/03/26
Decision Rule-Supporting Evidence	☒ Data obtained ☐ Video	☐ Email conversation ☐ Inherent in the requested specification ☐ Other	

Frequency (MHz)	Azimuth Angle (deg)	Antenna Height (cm)	Measured Reading (dBuV)	Correction Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
35.1065	311.9	100	6.59	23.62	30.21	40	-9.79
157.0523	17	106.7	9.44	18.77	28.21	43.52	-15.31

☐ Fewer than six emissions within 10 dB of the limit are observed.



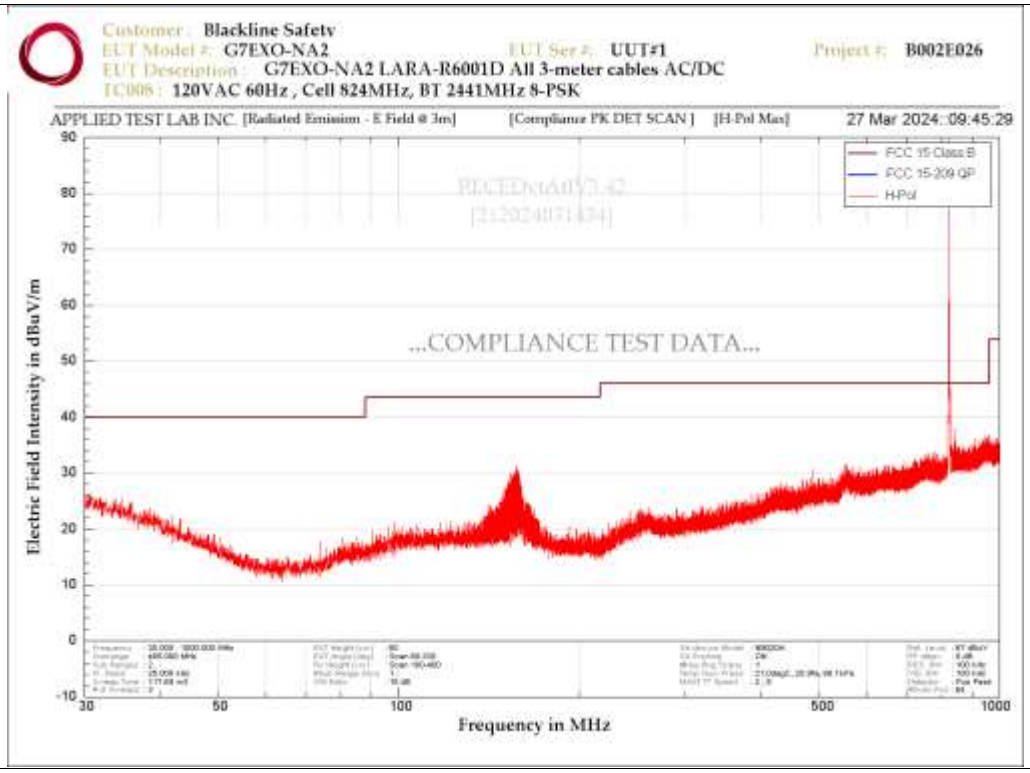
Radiated Emission - Scan Vertical Polarization (30MHz - 1000MHz)

4.10 Test Data – Horizontal Polarization

Client:	Blackline Safety	Test Standard:	FCC15.247, RSS-247 Issue2
Model No.:	G7EXO-NA2	Test Reference:	ANSI C63.4
Serial No.:	N/A	Product:	G7EXO-NA2
Test Voltage:	120VAC 60Hz	Class:	RSS-247 5.5
Test Distance:	3m	Line/Polarity	Horizontal
Temperature:	21.1°C	Humidity:	18%
Tested By:	Jaeheon Yun	Date of Test:	2024/03/27
Decision Rule-Supporting Evidence	☒ Data obtained ☐ Video	☐ Email conversation ☐ Inherent in the requested specification ☐ Other	

Frequency (MHz)	Azimuth Angle (deg)	Antenna Height (cm)	Measured Reading (dBuV)	Correction Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
157.0888	338	154	11.64	18.77	30.41	43.52	-13.11

☐ Fewer than six emissions within 10 dB of the limit are observed.



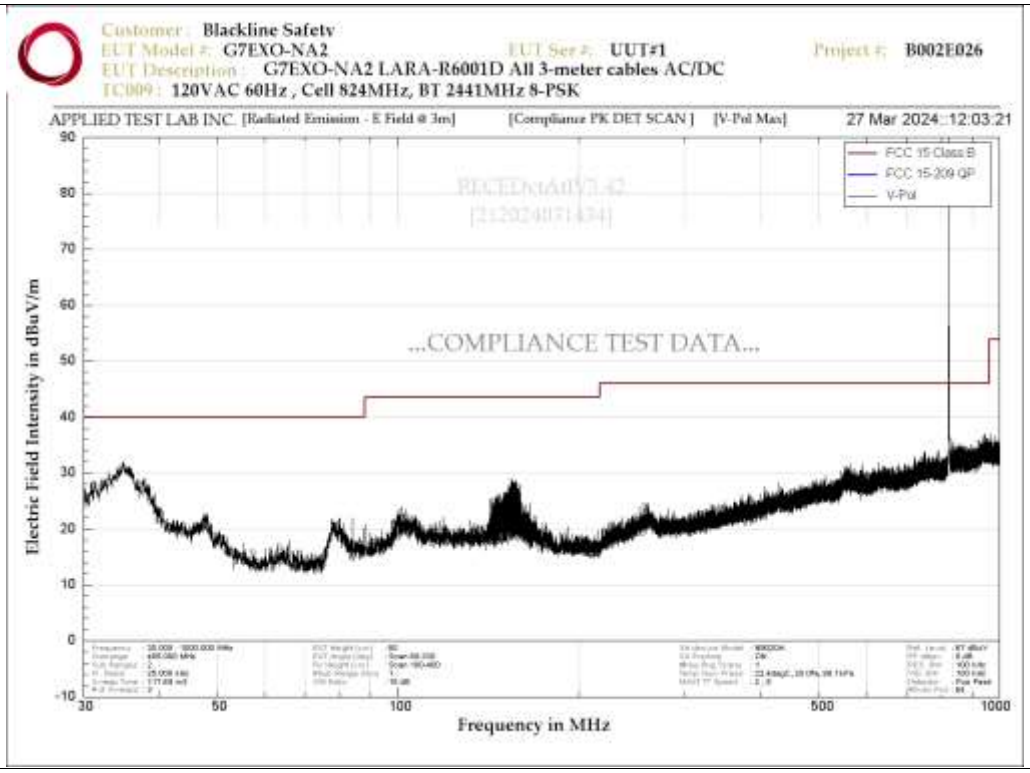
Radiated Emission - Scan Horizontal Polarization (30MHz - 1000MHz)

4.11 Test Data – Vertical Polarization

Client:	Blackline Safety	Test Standard:	FCC15.247, RSS-247 Issue2
Model No.:	G7EXO-NA2	Test Reference:	ANSI C63.4
Serial No.:	N/A	Product:	G7EXO-NA2
Test Voltage:	120VAC 60Hz	Class:	RSS-247 5.5
Test Distance:	3m	Line/Polarity	Vertical
Temperature:	21.1°C	Humidity:	18%
Tested By:	Jaeheon Yun	Date of Test:	2024/03/27
Decision Rule-Supporting Evidence	☒ Data obtained ☐ Video	☐ Email conversation ☐ Inherent in the requested specification ☐ Other	

Frequency (MHz)	Azimuth Angle (deg)	Antenna Height (cm)	Measured Reading (dBuV)	Correction Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
34.9128	65	100	6.12	23.68	29.8	40	-10.2
154.1308	46	100	8.15	18.95	27.1	43.52	-16.42

☐ Fewer than six emissions within 10 dB of the limit are observed.



Radiated Emission - Scan Vertical Polarization (30MHz - 1000MHz)

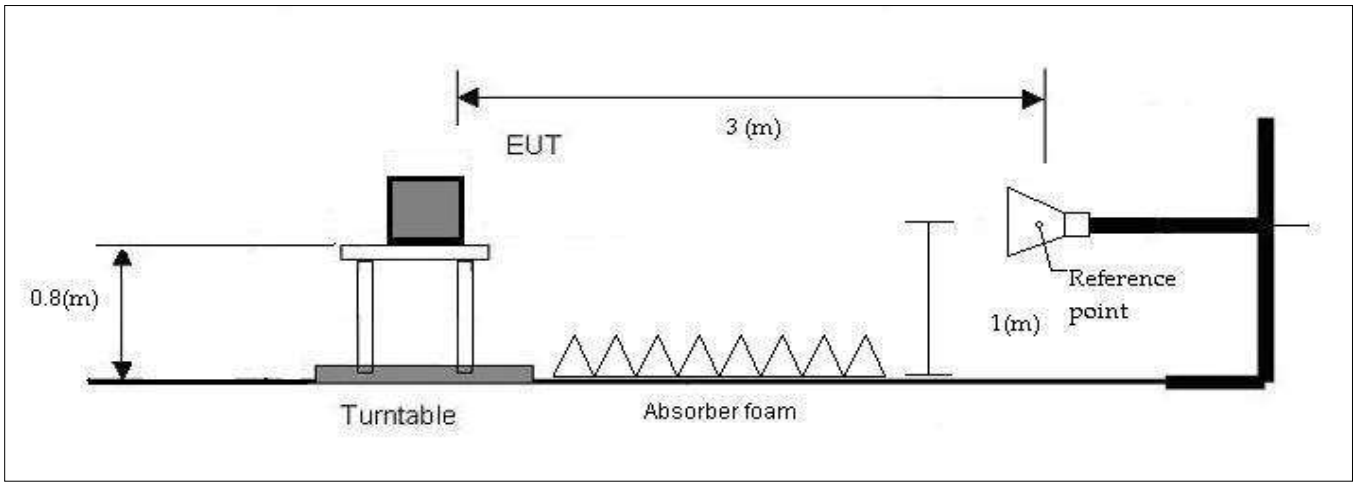
5 Radiated Emission above 1000MHz

5.1 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Next Cal
Double Ridged Horn	ETS Lindgren	3117	143094	2025/09/02
MXA Signal Analyzer	Keysight	N9020A	MY48011091	2025/01/15
Cable 1.5m+8.84m+2m	Micro Coax UTIFLEX	UFA200A+ UFB311A+ UFB205A	BUAO1G-0523+ 50224-H+ MFR 64639 210796-008	PV
LNA	MITEQ	AMF-7D-01001800-22-10P	1782797	PV
Test SW	DVT Solutions Inc	REDvtAtlV3p42.exe - (20240321)		

Note: The equipment in the above table are within the valid calibration period.

5.2 Block Diagram of Test Configuration



5.3 Test Requirement for Class B Device

Radiated Emission Limits at 3m per Clause(s) FCC15.247, 15.109(a), EN 55032 A2 Table A5, RSS-247 Issue2 3.2.2

Frequency Range (MHz)	Average Limit (dBuV/m)
	FCC15.247
1000 - 3000	53.98
3000 - 6000	53.98
Above 6000	53.98

5.4 Test Procedure

Method of measurement of radiated disturbance

The highest internal source of a EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes.

Highest internal source	Upper Frequency of Radiated Measurement
108 MHz - 500 MHz	2000 MHz
500 MHz - 1000 MHz	5000 MHz
Above 1000 MHz	5th harmonic of the highest frequency or 40GHz, whichever is lower.

1. The radiated emission/ disturbance measurements are performed using the setup in accordance with ANSI C63.4 / Clause 7.6 of CISPR 16-2-3 radiated emission/ disturbance measurement procedure.
2. The EUT is arranged and connected with cables terminated in accordance with the product specification. The EUT with its various internal components was operated and exercised as per the instructions provided by the manufacturer.
3. Where a flexible mains cord is provided by the manufacturer, this shall be 100 cm long. If it is more, the excess cable is folded back and forth so as to form a bundle not exceeding 40cm in length.
4. Interconnecting cables that hang closer than 40 cm to the ground plane are folded back and forth in the center forming a bundle 30 to 40 cm long.
5. I/O cables that are not connected to a peripheral are bundled in the center. The end of the cable is terminated, if required, using the correct terminating impedance. The overall length is not to exceed 100 cm
6. Where possible, loop-back cables are arranged so that outgoing line is not closely coupled to the return.
7. Radiated emission/ disturbance measurements are conducted with an Average/Peak detector instrument in the frequency range of 1000 MHz to 18000 MHz or the upper frequency (from the above table).
8. Before any testing is performed on EUT, the Ambient (measurement noise floor) is recorded, and a QA check is performed to show that the system is functioning correctly.
9. Measurements of the radiated emission/ disturbance were made with the antenna located at a distance of 3 meters from the EUT.
10. An inverse proportionality factor of 20 dB per decade was used to normalize the measured data to the specified distance for determining compliance.
11. The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.
12. The EUT azimuth is varied during the measurement to find the maximum field-strength readings.
13. The EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.
14. The EUT was placed on a non-conductive fiber glass/foam table 150cm above the ground plane and centered on the turntable.
15. A complete scan from 1000-18000 MHz or the upper frequency (from the above table) was made with antenna oriented horizontally and vertically.
16. Numbers with a minus sign in margin column indicates that disturbance levels are below the limit.
17. The Average measuring receiver shall be in accordance with Clause 7 of CISPR 16-1-1.
18. Receivers with peak detectors shall be in accordance with Clause 6 of CISPR 16-1-1 and shall have a 6 (dB) bandwidth in accordance with Clause 4 of CISPR 16-1-1.
19. The measuring antenna can be a LPDA, or double-ridged guide (DRG) horn, or standard gain horn

antenna. Further detailed information is given in Clause 4.6 of CISPR 16-1-4.

20. The measuring site shall be as specified in Clause 7 of CISPR 16-1-4.
21. The software is programmed to perform a peak sweep of the frequency band using the max hold function and peak detector.
22. This sweep is performed for every 15 deg with receiving antenna in both horizontal and vertical polarities and at receiving antenna height of 100 or 150 (cm).
23. The peak detector scan provides emission data with a good indication of pass or fail.
24. During the peak detector scan a list of frequencies of interest is generated.
25. For each frequency of interest, the EUT is arranged to its worst case and then the antenna is adjusted to heights from 1 meter to 4 meters and turntable is turned from 0 to 360 degrees to find the maximum reading.
26. The peak detector limits shall not be applied to disturbances produced by arcs or sparks that are high voltage breakdown events. Such disturbances arise when ITE devices contain or control mechanical switches that control current in inductors, or when ITE devices contain or control subsystems that create static electricity (such as paper handling devices).
27. The average limits apply to disturbances from arcs or sparks, and both peak and average limits will apply to other disturbances from such ITE devices.
28. Average measurements are performed at the frequencies of interest with the Spectrum Analyzer/Receiver's 6dB resolution bandwidth set to 1000 (kHz) and Video Bandwidth set to 1.6 (Hz).
29. For unintentional radiators, for each of the frequencies to which the device is tuned, the frequency and amplitude of the six highest radiated emissions relative to the limit and the operating frequency, or frequency to which the EUT is tuned (if appropriate), is reported unless such emissions are more than 10 (dB) below the limit.
30. If less than the specified number (less than six) emissions / disturbances are within 10 (dB) of the limit, the noise level of the measuring instrument at representative frequencies is reported.
31. The polarization of the measurement antenna (horizontal or vertical) is identified for each of the reported emissions / disturbances.
32. Radiated emission / disturbance measurements taken at alternative distances are to be converted to the limit distance using the inverse distance relationship, unless data can be presented to validate a different conversion.

5.5 Sample Calculation

The calculation for the radiated emission field strength is as follows:

Corrected Reading (dBuV/m) = Analyzer/Receiver Reading (dBuV) + Correction Factor (dB/m)
Correction Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)
Margin (dB) = Corrected Reading (dBuV/m) - Applicable Limit (dBuV/m)

5.6 Test Arrangement

EUT arrangement

☒ Table-top EUT arrangement
☐ Floor-Standing arrangement due to a physical hazard in lieu of
☐ Wall Mount or ☐ Ceiling Mount or ☐ Handheld or ☐ Body Worn arrangement
Justification: N/A

☐ EUT is bonded to Chamber floor for a dedicated ground connection with a grounding connection specified by the manufacturer.

Auxiliary Equipment Arrangement

☒ Placed below the chamber floor;
☐ Placed on the chamber floor with an insulating support;
☐ Placed outside the measurement area and are routed to the remote location while being insulted from turntable with insulation thickness not more than 15cm

Cabling Arrangement

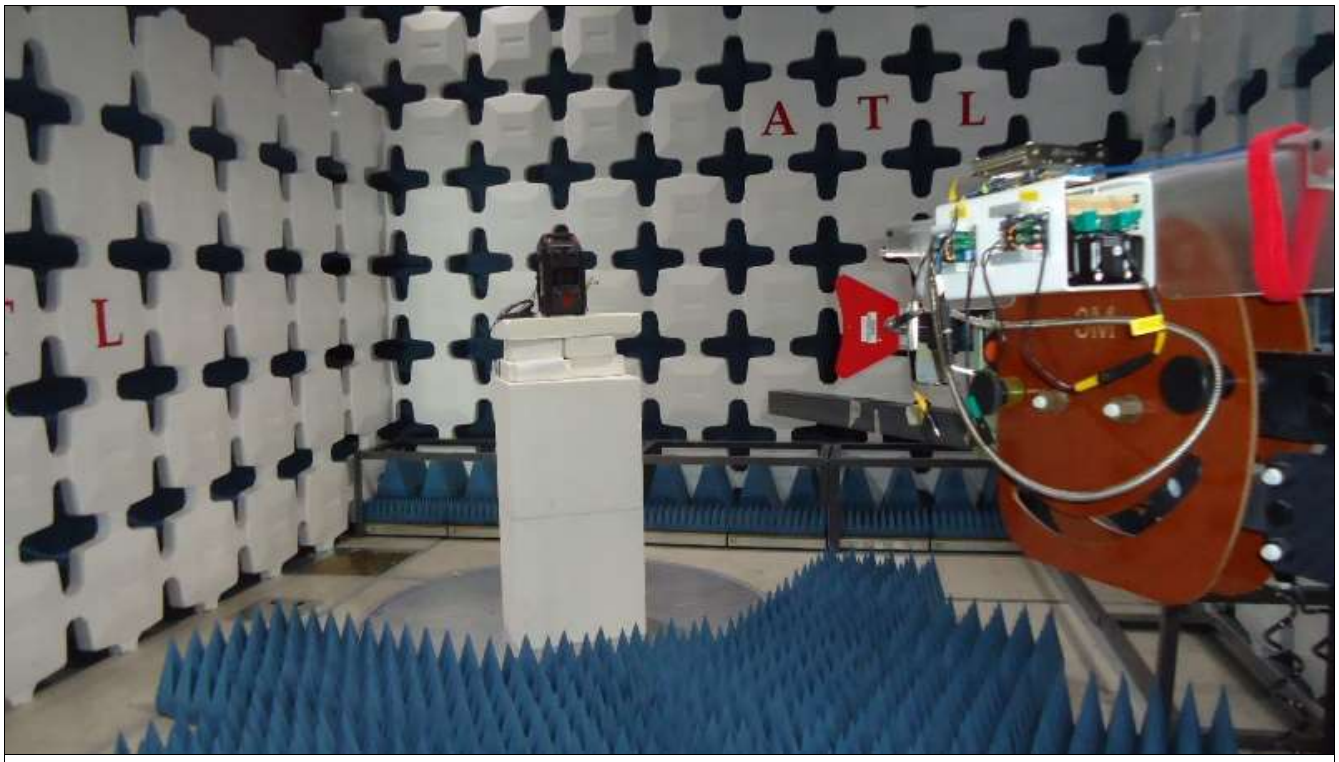
☒ Manufacturer-supplied or commercially available cabling as specified in the installation manual or user manual.
☐ Cables are bonded to the turntable in accordance with the manufacturer's recommendation.
☐ The effective length of all loop-back cables not routed overhead is longer than 2 m.
☐ The effective length of the mains cable is 100 cm ± 10 cm.
☐ Cables with mitigation features details (screening, tighter/more, twists per length, ferrite beads, etc)

Cable Type	Details of Mitigation Features

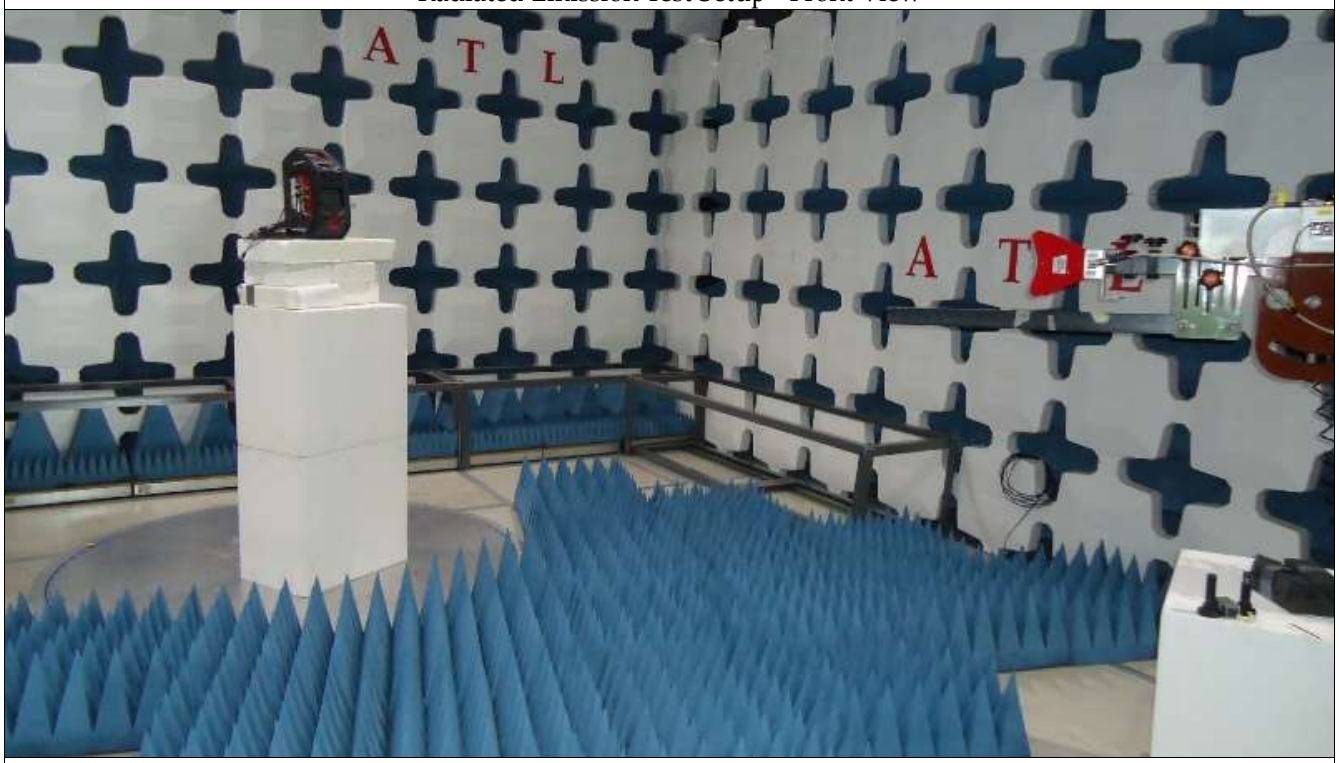
Positions of cables

☐ The excess cable is bundled non-inductively on, but separated from, the chamber floor.
☐ Specify cable lengths if those defined cannot be achieved.

5.7 Test Setup Photographs



Radiated Emission Test Setup - Front View



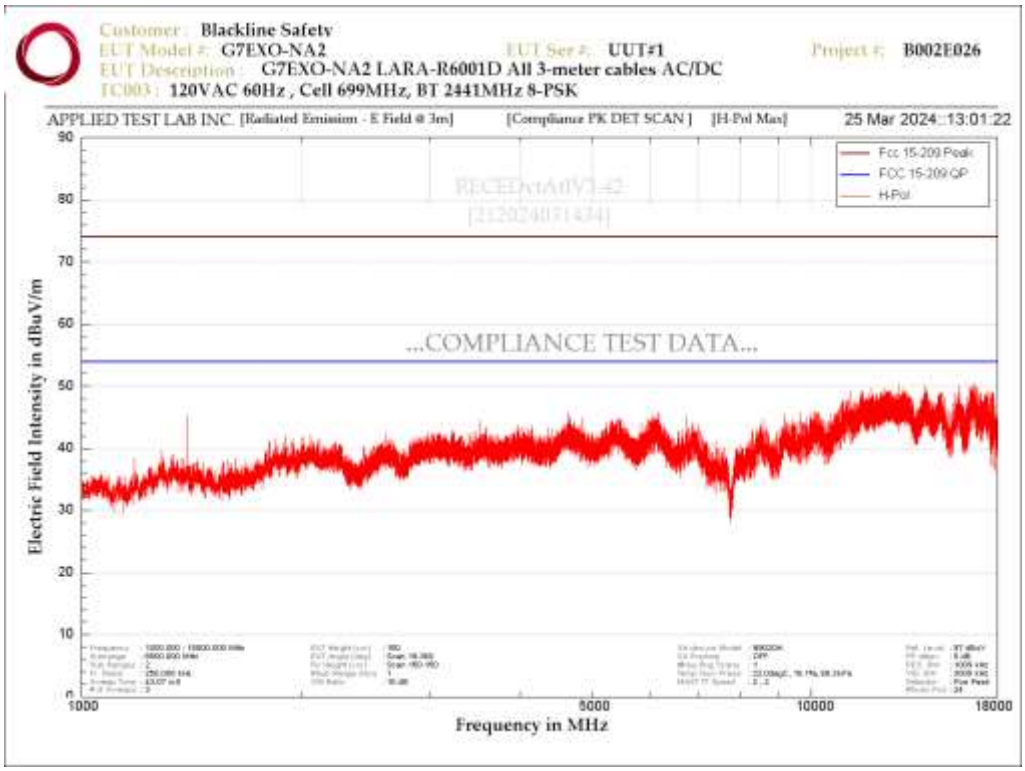
Radiated Emission Test Setup - Side View

5.8 Test Data – Horizontal Polarization

Client:	Blackline Safety	Test Standard:	FCC15.247. EN 55032, RSS-247 Issue2
Model No.:	G7EXO-NA2	Test Reference:	ANSI C63.4
Serial No.:	N/A	Product:	G7EXO-NA2
Test Voltage:	120VAC 60Hz	Class:	RSS-247 5.5
Test Distance:	3m	Line/Polarity	Horizontal
Temperature:	22.1°C	Humidity:	18%
Tested By:	Jaeheon Yun	Date of Test:	2024/03/25
Decision Rule-Supporting Evidence	☒ Data obtained ☐ Video	☐ Email conversation ☐ Inherent in the requested specification ☐ Other	

Frequency (MHz)	Azimuth Angle (deg)	Antenna Height (cm)	Measured Reading (dBuV)	Correction Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)

☒ Fewer than six emissions within 10 dB of the limit are observed.



Radiated Emission - Scan Horizontal Polarization above 1000MHz

RSS-247 Issue2 Test Data – Horizontal Polarization (ref chart on the previous page)							
Frequency (MHz)	**Azimuth Angle (deg)**	**Antenna Height (cm)**	**Measured Reading (dBuV)**	**Correction Factor (dB)**	**Corrected Reading (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
☒ Fewer than six emissions within 10 dB of the limit are observed.							
EN 55032 Test Data – Horizontal Polarization(ref chart on the previous page)							
☒ Fewer than six emissions within 10 dB of the limit are observed.							

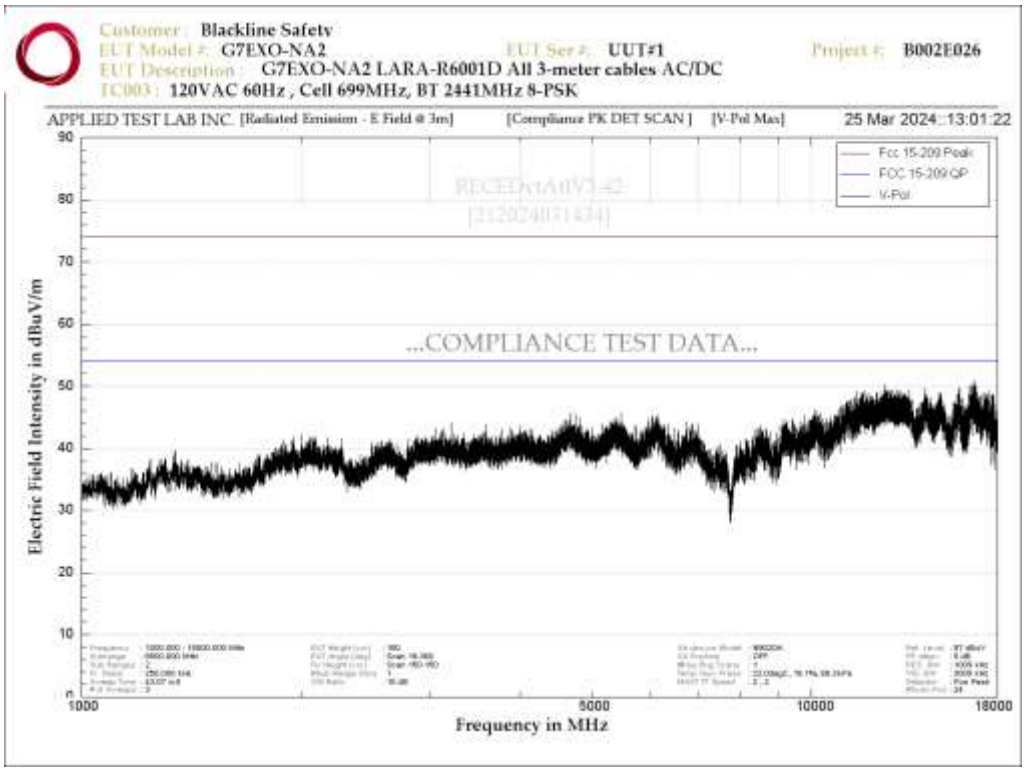
RSS-247 Issue2 Test Data – Vertical Polarization (ref chart on the next page)							
Frequency (MHz)	**Azimuth Angle (deg)**	**Antenna Height (cm)**	**Measured Reading (dBuV)**	**Correction Factor (dB)**	**Corrected Reading (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
☒ Fewer than six emissions within 10 dB of the limit are observed.							
EN 55032 Test Data – Vertical Polarization(ref chart on the next page)							
☒ Fewer than six emissions within 10 dB of the limit are observed.							

5.9 Test Data – Vertical Polarization

Client:	Blackline Safety	Test Standard:	FCC15.247, EN 55032, RSS-247 Issue2
Model No.:	G7EXO-NA2	Test Reference:	ANSI C63.4
Serial No.:	N/A	Product:	G7EXO-NA2
Test Voltage:	120VAC 60Hz	Class:	RSS-247 5.5
Test Distance:	3m	Line/Polarity	Vertical
Temperature:	22.1°C	Humidity:	18%
Tested By:	Jaeheon Yun	Date of Test:	2024/03/25
Decision Rule-Supporting Evidence	☒ Data obtained ☐ Video	☐ Email conversation ☐ Inherent in the requested specification ☐ Other	

Frequency (MHz)	Azimuth Angle (deg)	Antenna Height (cm)	Measured Reading (dBuV)	Correction Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)

☒ Fewer than six emissions within 10 dB of the limit are observed.



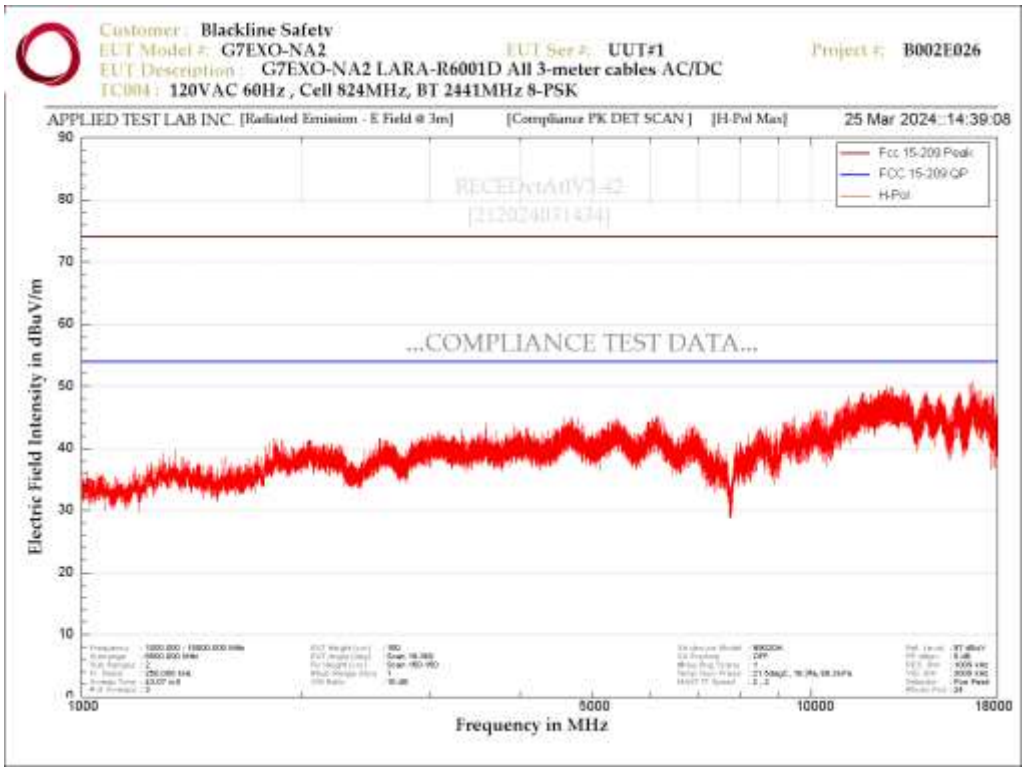
Radiated Emission - Scan Vertical Polarization above 1000MHz

5.10 Test Data – Horizontal Polarization

Client:	Blackline Safety	Test Standard:	FCC15.247. EN 55032, RSS-247 Issue2
Model No.:	G7EXO-NA2	Test Reference:	ANSI C63.4
Serial No.:	N/A	Product:	G7EXO-NA2
Test Voltage:	120VAC 60Hz	Class:	RSS-247 5.5
Test Distance:	3m	Line/Polarity	Horizontal
Temperature:	22.1°C	Humidity:	18%
Tested By:	Jaeheon Yun	Date of Test:	2024/03/25
Decision Rule-Supporting Evidence	☒ Data obtained ☐ Video	☐ Email conversation ☐ Inherent in the requested specification ☐ Other	

Frequency (MHz)	Azimuth Angle (deg)	Antenna Height (cm)	Measured Reading (dBuV)	Correction Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)

☒ Fewer than six emissions within 10 dB of the limit are observed.



Radiated Emission - Scan Horizontal Polarization above 1000MHz

RSS-247 Issue2 Test Data – Horizontal Polarization (ref chart on the previous page)							
Frequency (MHz)	**Azimuth Angle (deg)**	**Antenna Height (cm)**	**Measured Reading (dBuV)**	**Correction Factor (dB)**	**Corrected Reading (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
☒ Fewer than six emissions within 10 dB of the limit are observed.							
EN 55032 Test Data – Horizontal Polarization(ref chart on the previous page)							
☒ Fewer than six emissions within 10 dB of the limit are observed.							

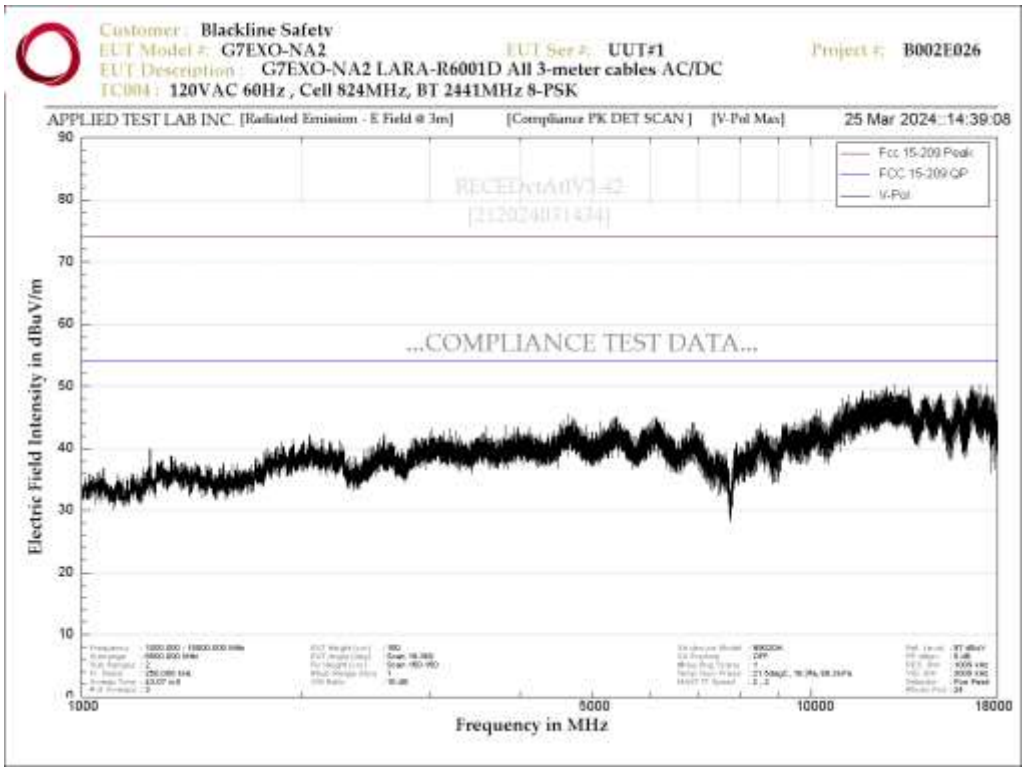
RSS-247 Issue2 Test Data – Vertical Polarization (ref chart on the next page)							
Frequency (MHz)	**Azimuth Angle (deg)**	**Antenna Height (cm)**	**Measured Reading (dBuV)**	**Correction Factor (dB)**	**Corrected Reading (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
☒ Fewer than six emissions within 10 dB of the limit are observed.							
EN 55032 Test Data – Vertical Polarization(ref chart on the next page)							
☒ Fewer than six emissions within 10 dB of the limit are observed.							

5.11 Test Data – Vertical Polarization

Client:	Blackline Safety	Test Standard:	FCC15.247, EN 55032, RSS-247 Issue2
Model No.:	G7EXO-NA2	Test Reference:	ANSI C63.4
Serial No.:	N/A	Product:	G7EXO-NA2
Test Voltage:	120VAC 60Hz	Class:	RSS-247 5.5
Test Distance:	3m	Line/Polarity	Vertical
Temperature:	22.1°C	Humidity:	18%
Tested By:	Jaeheon Yun	Date of Test:	2024/03/25
Decision Rule-Supporting Evidence	☒ Data obtained ☐ Video	☐ Email conversation ☐ Inherent in the requested specification ☐ Other	

Frequency (MHz)	Azimuth Angle (deg)	Antenna Height (cm)	Measured Reading (dBuV)	Correction Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)

☒ Fewer than six emissions within 10 dB of the limit are observed.



Radiated Emission - Scan Vertical Polarization above 1000MHz

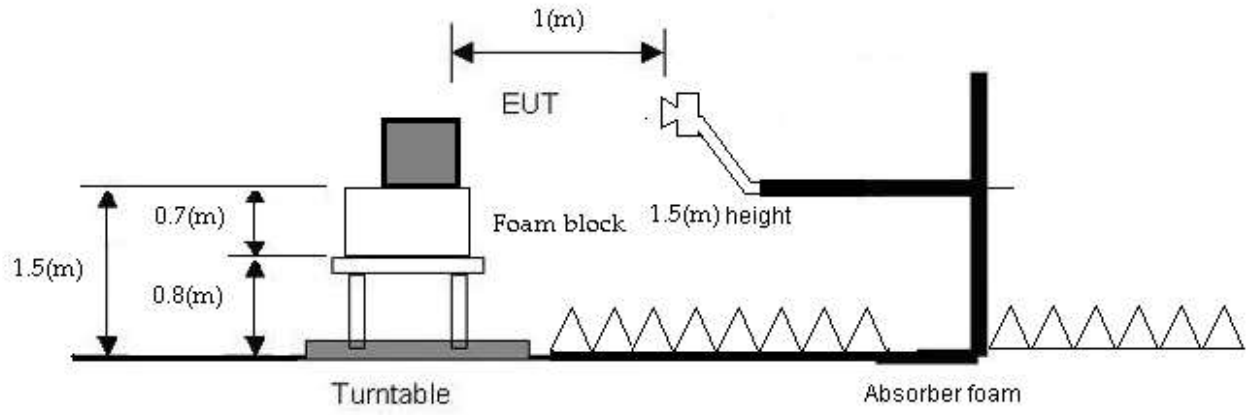
6 Radiated Emission above 18000MHz

6.1 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Next Cal
Standard gain Horn	ETS Lindgren	3117	143094	NCR
MXA Signal Analyzer	Keysight	N9020A	MY48011091	2025/01/15
Cable 1.5m+8.84m+2m	Micro Coax UTIFLEX	UFA200A+ UFB311A+ UFB205A	BUAO1G-0523+ 50224-H+ MFR 64639 210796-008	PV
LNA	HD Communication Corp.	HD30172	N/A	PV
Test SW	DVT Solutions Inc	REDvtAtlV3p42.exe - (20240321)		

Note: The equipment in the above table are within the valid calibration period.

6.2 Block Diagram of Test Configuration



6.3 Test Requirement for Class B Device

Radiated Emission Limits at 3m per Clause(s) FCC15.247

Frequency Range (MHz)	Average Limit (dBuV/m)
	FCC15.247
1000 - 3000	53.98
3000 - 6000	53.98
Above 6000	53.98

6.4 Test Procedure

Method of measurement of radiated disturbance

The highest internal source of a EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes.

Highest internal source	Upper Frequency of Radiated Measurement
108 MHz - 500 MHz	2000 MHz
500 MHz - 1000 MHz	5000 MHz
Above 1000 MHz	5th harmonic of the highest frequency or 40GHz, whichever is lower.

33. The radiated emission/ disturbance measurements are performed using the setup in accordance with ANSI C63.4 / Clause 7.6 of CISPR 16-2-3 radiated emission/ disturbance measurement procedure.
34. The EUT is arranged and connected with cables terminated in accordance with the product specification. The EUT with its various internal components was operated and exercised as per the instructions provided by the manufacturer.
35. Where a flexible mains cord is provided by the manufacturer, this shall be 100 cm long. If it is more, the excess cable is folded back and forth so as to form a bundle not exceeding 40cm in length.
36. Interconnecting cables that hang closer than 40 cm to the ground plane are folded back and forth in the center forming a bundle 30 to 40 cm long.
37. I/O cables that are not connected to a peripheral are bundled in the center. The end of the cable is terminated, if required, using the correct terminating impedance. The overall length is not to exceed 100 cm
38. Where possible, loop-back cables are arranged so that outgoing line is not closely coupled to the return.
39. Radiated emission/ disturbance measurements are conducted with an Average/Peak detector instrument in the frequency range of 18000 MHz to 25000 MHz or the upper frequency (from the above table).
40. Before any testing is performed on EUT, the Ambient (measurement noise floor) is recorded, and a QA check is performed to show that the system is functioning correctly.
41. Measurements of the radiated emission/ disturbance were made with the antenna located at a distance of 1 meters from the EUT.
42. An inverse proportionality factor of 20 dB per decade was used to normalize the measured data to the specified distance for determining compliance.
43. The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.
44. The EUT azimuth is varied during the measurement to find the maximum field-strength readings.
45. The EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.
46. The EUT was placed on a non-conductive fiber glass/foam table 150cm above the ground plane and centered on the turntable.
47. A complete scan from 18000-25000 MHz or the upper frequency (from the above table) was made with antenna oriented horizontally and vertically.
48. Numbers with a minus sign in margin column indicates that disturbance levels are below the limit.
49. The Average measuring receiver shall be in accordance with Clause 7 of CISPR 16-1-1.
50. Receivers with peak detectors shall be in accordance with Clause 6 of CISPR 16-1-1 and shall have a 6 (dB) bandwidth in accordance with Clause 4 of CISPR 16-1-1.
51. The measuring antenna can be a LPDA, or double-ridged guide (DRG) horn, or standard gain horn

antenna. Further detailed information is given in Clause 4.6 of CISPR 16-1-4.

52. The measuring site shall be as specified in Clause 7 of CISPR 16-1-4.
53. The software is programmed to perform a peak sweep of the frequency band using the max hold function and peak detector.
54. This sweep is performed for every 15 deg with receiving antenna in both horizontal and vertical polarities and at receiving antenna height of 100 or 150 (cm).
55. The peak detector scan provides emission data with a good indication of pass or fail.
56. During the peak detector scan a list of frequencies of interest is generated.
57. For each frequency of interest, the EUT is arranged to its worst case and then the antenna is adjusted to heights from 1 meter to 4 meters and turntable is turned from 0 to 360 degrees to find the maximum reading.
58. The peak detector limits shall not be applied to disturbances produced by arcs or sparks that are high voltage breakdown events. Such disturbances arise when ITE devices contain or control mechanical switches that control current in inductors, or when ITE devices contain or control subsystems that create static electricity (such as paper handling devices).
59. The average limits apply to disturbances from arcs or sparks, and both peak and average limits will apply to other disturbances from such ITE devices.
60. Average measurements are performed at the frequencies of interest with the Spectrum Analyzer/Receiver's 6dB resolution bandwidth set to 1000 (kHz) and Video Bandwidth set to 1.6 (Hz).
61. For unintentional radiators, for each of the frequencies to which the device is tuned, the frequency and amplitude of the six highest radiated emissions relative to the limit and the operating frequency, or frequency to which the EUT is tuned (if appropriate), is reported unless such emissions are more than 10 (dB) below the limit.
62. If less than the specified number (less than six) emissions / disturbances are within 10 (dB) of the limit, the noise level of the measuring instrument at representative frequencies is reported.
63. The polarization of the measurement antenna (horizontal or vertical) is identified for each of the reported emissions / disturbances.
64. Radiated emission / disturbance measurements taken at alternative distances are to be converted to the limit distance using the inverse distance relationship, unless data can be presented to validate a different conversion.

6.5 Sample Calculation

The calculation for the radiated emission field strength is as follows:

Corrected Reading (dBuV/m) = Analyzer/Receiver Reading (dBuV) + Correction Factor (dB/m)
Correction Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)
Margin (dB) = Corrected Reading (dBuV/m) - Applicable Limit (dBuV/m)

6.6 Test Arrangement

EUT arrangement

☒ Table-top EUT arrangement
☐ Floor-Standing arrangement due to a physical hazard in lieu of
☐ Wall Mount or ☐ Ceiling Mount or ☐ Handheld or ☐ Body Worn arrangement
Justification: N/A

☐ EUT is bonded to Chamber floor for a dedicated ground connection with a grounding connection specified by the manufacturer.

Auxiliary Equipment Arrangement

☒ Placed below the chamber floor;
☐ Placed on the chamber floor with an insulating support;
☐ Placed outside the measurement area and are routed to the remote location while being insulted from turntable with insulation thickness not more than 15cm

Cabling Arrangement

☒ Manufacturer-supplied or commercially available cabling as specified in the installation manual or user manual.
☐ Cables are bonded to the turntable in accordance with the manufacturer's recommendation.
☐ The effective length of all loop-back cables not routed overhead is longer than 2 m.
☐ The effective length of the mains cable is 100 cm ± 10 cm.
☐ Cables with mitigation features details (screening, tighter/more, twists per length, ferrite beads, etc)

Cable Type	Details of Mitigation Features

Positions of cables

☐ The excess cable is bundled non-inductively on, but separated from, the chamber floor.
☐ Specify cable lengths if those defined cannot be achieved.

6.7 Test Setup Photographs

Radiated Emission Test Setup - Front View

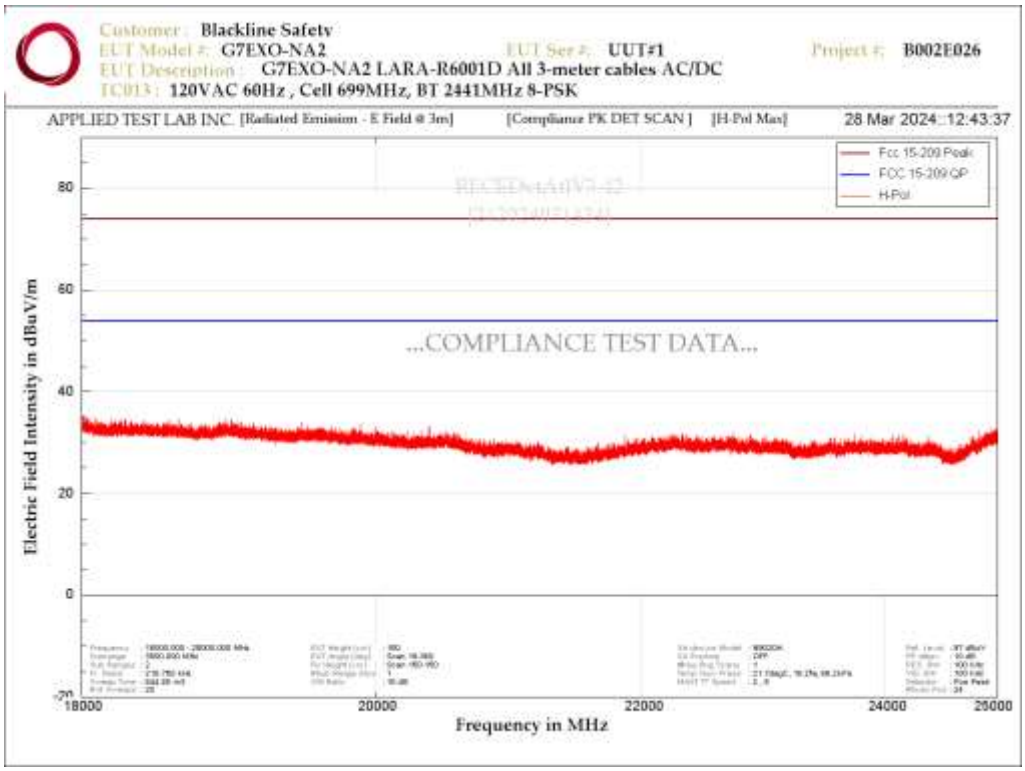
Radiated Emission Test Setup - Side View

6.8 Test Data – Horizontal Polarization

Client:	Blackline Safety	Test Standard:	FCC15.247. EN 55032, RSS-247 Issue2
Model No.:	G7EXO-NA2	Test Reference:	ANSI C63.4
Serial No.:	N/A	Product:	G7EXO-NA2
Test Voltage:	120VAC 60Hz	Class:	RSS-247 5.5
Test Distance:	3m	Line/Polarity	Horizontal
Temperature:	22°C	Humidity:	18%
Tested By:	Jaeheon Yun	Date of Test:	2024/03/28
Decision Rule-Supporting Evidence	☒ Data obtained ☐ Video	☐ Email conversation ☐ Inherent in the requested specification ☐ Other	

Frequency (MHz)	Azimuth Angle (deg)	Antenna Height (cm)	Measured Reading (dBuV)	Correction Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)

☒ Fewer than six emissions within 10 dB of the limit are observed.



Radiated Emission - Scan Horizontal Polarization above 18000MHz

RSS-247 Issue2 Test Data – Horizontal Polarization (ref chart on the previous page)							
Frequency (MHz)	**Azimuth Angle (deg)**	**Antenna Height (cm)**	**Measured Reading (dBuV)**	**Correction Factor (dB)**	**Corrected Reading (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
☒ Fewer than six emissions within 10 dB of the limit are observed.							
EN 55032 Test Data – Horizontal Polarization(ref chart on the previous page)							
☒ Fewer than six emissions within 10 dB of the limit are observed.							

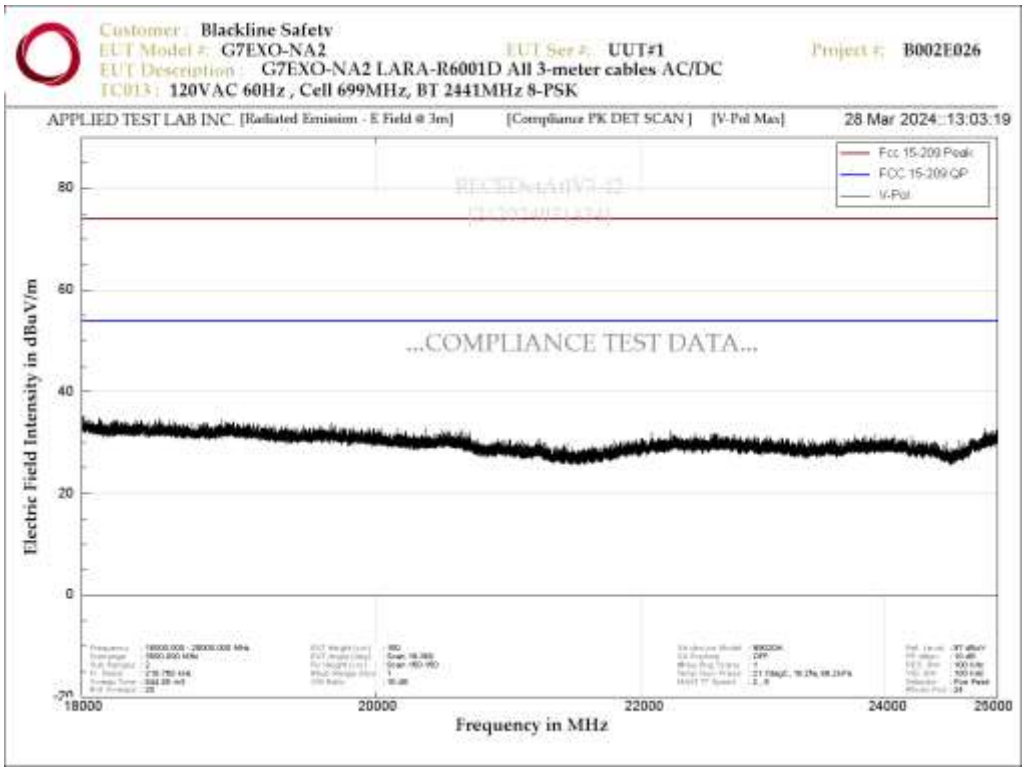
RSS-247 Issue2 Test Data – Vertical Polarization (ref chart on the next page)							
Frequency (MHz)	**Azimuth Angle (deg)**	**Antenna Height (cm)**	**Measured Reading (dBuV)**	**Correction Factor (dB)**	**Corrected Reading (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
☒ Fewer than six emissions within 10 dB of the limit are observed.							
EN 55032 Test Data – Vertical Polarization(ref chart on the next page)							
☒ Fewer than six emissions within 10 dB of the limit are observed.							

6.9 Test Data – Vertical Polarization

Client:	Blackline Safety	Test Standard:	FCC15.247, EN 55032, RSS-247 Issue2
Model No.:	G7EXO-NA2	Test Reference:	ANSI C63.4
Serial No.:	N/A	Product:	G7EXO-NA2
Test Voltage:	120VAC 60Hz	Class:	RSS-247 5.5
Test Distance:	3m	Line/Polarity	Vertical
Temperature:	22°C	Humidity:	18%
Tested By:	Jaeheon Yun	Date of Test:	2024/03/28
Decision Rule-Supporting Evidence	☒ Data obtained ☐ Video	☐ Email conversation ☐ Inherent in the requested specification ☐ Other	

Frequency (MHz)	Azimuth Angle (deg)	Antenna Height (cm)	Measured Reading (dBuV)	Correction Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)

☒ Fewer than six emissions within 10 dB of the limit are observed.



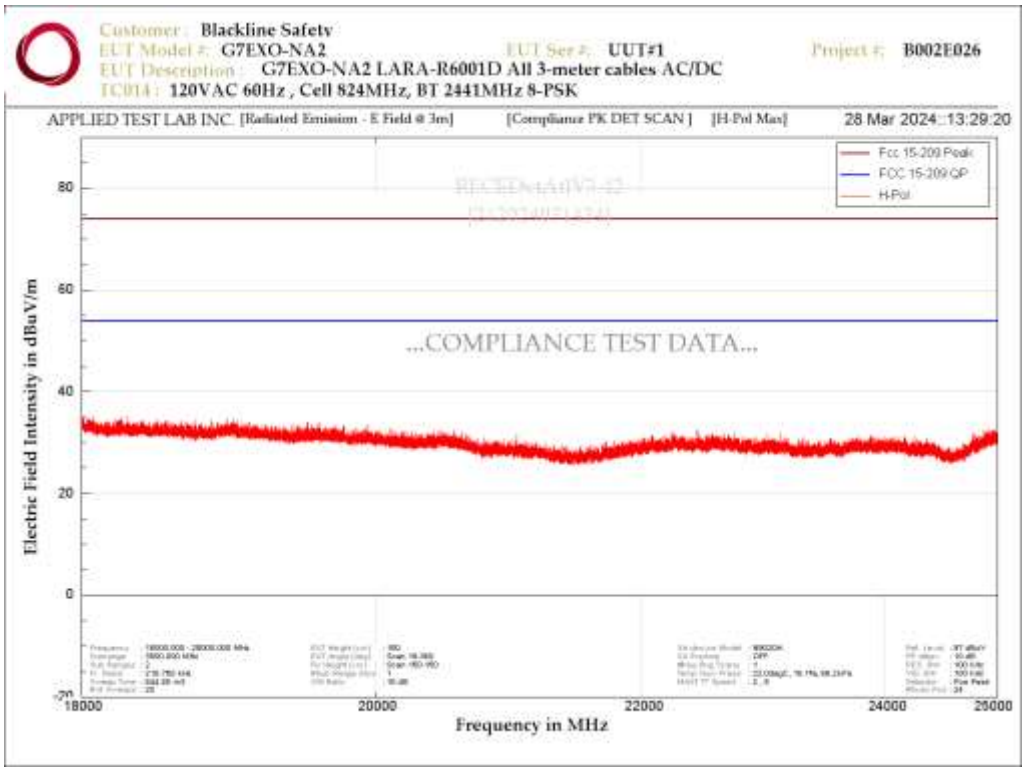
Radiated Emission - Scan Vertical Polarization above 18000MHz

6.10 Test Data – Horizontal Polarization

Client:	Blackline Safety	Test Standard:	FCC15.247. EN 55032, RSS-247 Issue2
Model No.:	G7EXO-NA2	Test Reference:	ANSI C63.4
Serial No.:	N/A	Product:	G7EXO-NA2
Test Voltage:	120VAC 60Hz	Class:	RSS-247 5.5
Test Distance:	3m	Line/Polarity	Horizontal
Temperature:	22°C	Humidity:	18%
Tested By:	Jaeheon Yun	Date of Test:	2024/03/28
Decision Rule-Supporting Evidence	☒ Data obtained ☐ Video	☐ Email conversation ☐ Inherent in the requested specification ☐ Other	

Frequency (MHz)	Azimuth Angle (deg)	Antenna Height (cm)	Measured Reading (dBuV)	Correction Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)

☒ Fewer than six emissions within 10 dB of the limit are observed.



Radiated Emission - Scan Horizontal Polarization above 18000MHz

RSS-247 Issue2 Test Data – Horizontal Polarization (ref chart on the previous page)							
Frequency (MHz)	**Azimuth Angle (deg)**	**Antenna Height (cm)**	**Measured Reading (dBuV)**	**Correction Factor (dB)**	**Corrected Reading (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
☒ Fewer than six emissions within 10 dB of the limit are observed.							
EN 55032 Test Data – Horizontal Polarization(ref chart on the previous page)							
☒ Fewer than six emissions within 10 dB of the limit are observed.							

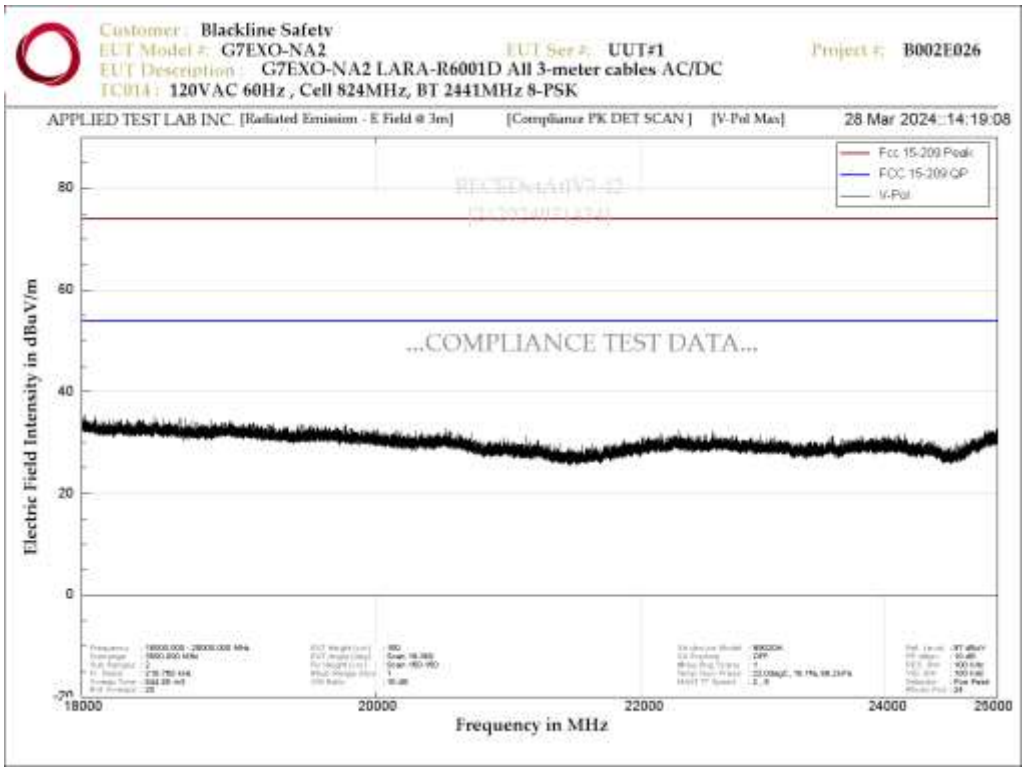
RSS-247 Issue2 Test Data – Vertical Polarization (ref chart on the next page)							
Frequency (MHz)	**Azimuth Angle (deg)**	**Antenna Height (cm)**	**Measured Reading (dBuV)**	**Correction Factor (dB)**	**Corrected Reading (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
☒ Fewer than six emissions within 10 dB of the limit are observed.							
EN 55032 Test Data – Vertical Polarization(ref chart on the next page)							
☒ Fewer than six emissions within 10 dB of the limit are observed.							

6.11 Test Data – Vertical Polarization

Client:	Blackline Safety	Test Standard:	FCC15.247, EN 55032, RSS-247 Issue2
Model No.:	G7EXO-NA2	Test Reference:	ANSI C63.4
Serial No.:	N/A	Product:	G7EXO-NA2
Test Voltage:	120VAC 60Hz	Class:	RSS-247 5.5
Test Distance:	3m	Line/Polarity	Vertical
Temperature:	22°C	Humidity:	18%
Tested By:	Jaeheon Yun	Date of Test:	2024/03/28
Decision Rule-Supporting Evidence	☒ Data obtained ☐ Video	☐ Email conversation ☐ Inherent in the requested specification ☐ Other	

Frequency (MHz)	Azimuth Angle (deg)	Antenna Height (cm)	Measured Reading (dBuV)	Correction Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)

☒ Fewer than six emissions within 10 dB of the limit are observed.



Radiated Emission - Scan Vertical Polarization above 18000MHz

Appendix A – Test Sample Description

(From Data Provided by the Customer)

EUT Information

Description
G7 EXO is a cloud-connected area monitor that bundles industry leading gas detection with automated compliance and business analytics tools. For the first time ever, the days of manually collecting data from the field, reviewing spreadsheets and compiling reports are behind you.

G7 EXO solves the challenges of continuous toxic and combustible gas monitoring for sites, facilities and fence lines. Automating long-term area monitoring and connected safety for streamlined efficiency, G7 EXO allows teams to focus on their work at hand.

In the event of a safety incident or gas exposure, monitoring personnel can see what has happened and communicate with workers directly via text messaging or an optional two-way voice calling feature through their EXO.

Manufacturer: Blackline Safety Corp.
Trade name: G7 EXO
Model Number: G7EXO-NA2
Serial Number: N/A
Firmware Version: 3.467R1
SW Version: N/A

Appendix B – List of Abbreviations and Acronyms

A	Ampere	
AC	Alternating Current	
AE	Associated Equipment or Auxiliary Equipment	
AAN	Asymmetric Artificial Network	
AM	Amplitude Modulation	ANSI C63.14-2014
AMN	Artificial Mains Network	ANSI C63.14-2014
ANSI	American National Standards Institute	ANSI C63.14-2014
ATL	Applied Test Lab Inc.	
Av	Average Detector	
BCI	Bulk Current Injection	ANSI C63.14-2014
°C	Degree Centigrade	
CB	Citizens' Band	
CENELEC	Committee for Electrotechnical Standardization	
CFR	Code of Federal Regulations	
CISPR	International Special Committee on Radio Interference	
cm	Centimeter	
CDN	Coupling Decoupling Network	
CW	Continuous Wave	ANSI C63.14-2014
dB	Decibel	ANSI C63.14-2014
dBuV	Decibels (voltage level) referenced to 1 microvolt across 50 ohms	ANSI C63.14-2014
dBuV/m	Decibels (voltage level) referenced to 1 microvolt per meter	ANSI C63.14-2014
DoD	Department of Defense	
DRG	Double Ridged Guide	
DSA	Dynamic Spectrum Access	
E	Earth Power Line	
EFT	Electrical Fast Transients	
EIRP	Equivalent Isotropically Radiated Power	ANSI C63.14-2014
ESD	Electro-Static Discharge	ANSI C63.14-2014
EMC	ElectroMagnetic Compatibility	ANSI C63.14-2014
EMI	Electro-Magnetic Interference	ANSI C63.14-2014
EN	European Standards	
ERP	Equivalent Radiated Power	ANSI C63.14-2014
ETSI	European Telecommunications Standards Institute	
EUT	Equipment Under Test	ANSI C63.14-2014
FCC	Federal Communication Commission	ANSI C63.14-2014
FM	Frequency Modulation	ANSI C63.14-2014
GHz	Gigahertz	
GPS	Global Positioning System	
GRP	Ground Reference Plane	
H	Horizontal Polarization	
HCP	Horizontal Coupling Plane	
HDD	Hard disk drive	
Hz	Hertz	
I/O	Input / Output	
IEC	International Electrotechnical Commission	ANSI C63.14-2014
ISM	Industrial, Scientific, and Medical	ANSI C63.14-2014
ISN	Impedance Stabilization Network	
ISO	International Organization for Standardization	ANSI C63.14-2014
ITE	Information Technology Equipment	ANSI C63.14-2014

kHz	Kilohertz	
kPa	Kilopascal	
LAN	Local Area Network	
lb	Pound	
LCL	Longitudinal Conversion Loss	
LED	Light Emitting Diode	
LF	Low Frequency	
Line L	Live Power Line	
Line N	Neutral Power Line	
LISN	Line Impedance Stabilization Network	ANSI C63.14-2014
LPDA	Log-Periodic Dipole Array	
MHz	Megahertz	
MME	Multimedia Equipment	
N/A	Not Applicable	
NCR	No Calibration Required	
NSA	Normalized Site Attenuation	ANSI C63.14-2014
PC	Personal Computer	
PCS	Personal Communication Services	
Pk	Peak Detector	
Pol	Polarization	
PV	Periodic Verification	
QA	Quality Assurance	
QP	Quasi Peak Detector	
R/W	Read / Write	
RF	Radio Frequency	ANSI C63.14-2014
RFID	Radio Frequency Identification	
RGP	Reference Ground Plane	
RS232	Recommended Standard 232 for a type of serial communication used for transmission of data	
RTCA	Radio Technical Commission For Aeronautics	
SAMWAH	Manufacturer of Flt type Ferrite tile absorber	
SE	Support Equipment	
TCF	Technical Construction File	
TV	Television	
USB	Universal Serial Bus	
UTP	Unshielded Twisted Pair	
V	Vertical Polarization	
VAC	AC Voltage	
VCP	Vertical Coupling Plane	
WiMAX	Worldwide Interoperability for Microwave Access	
WLAN	Wireless Local Area Network	
WRAN	Wireless Regional Area Network	
WUSB	W**ireless** USB	

End of document