Engineering Test Report No. 2301081-02		
Report Date	December 21, 2023	
Manufacturer Name	Fleetwood Group Inc	
Manufacturer Address	11832 James Street Holland, MI 49424	
Product Name Brand/Model No.	Heel Collar HR350C-A	
Date Received	September 25, 2023	
Test Dates	September 25 – October 10, 2023	
Specifications	FCC "Code of Federal Regulations" Title 47 Part 15, Subpart B FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C Innovation, Science, and Economic Development Canada, ICES-003 Innovation, Science, and Economic Development Canada, RSS-GEN Innovation, Science, and Economic Development Canada, RSS-247	
Test Facility	Elite Electronic Engineering, Inc. 1516 Centre Circle, Downers Grove, IL 60515	FCC Reg. Number: 269750 IC Reg. Number: 2987A CAB Identifier: US0107
Signature	MARK E. LONGINOTTI	Tylar Jozefczyk
Tested by	Mark Longinotti	Tylar Jozefczyk
Signature	Raymond J Klouda	
Approved by	Raymond J. Klouda, Registered Professional Engineer of Illinois – 44894	
PO Number	P63458	

Table of Contents

1. Report Revision History

Revision	Date	Description
–	27 DEC 2023	Initial Release of Engineering Test Report No. 2301081-02

2. Introduction

This document presents the results of a series of electromagnetic compatibility (EMC) tests that were performed on one (1) Heel Collar (hereinafter referred to as the Equipment Under Test (EUT)).

Additionally, this document presents the results of limited spurious emissions measurements performed on the EUT. The Product is equipped with a pre-certified radio module (FCC ID: 2AQ33-DWM1001, IC: 23794-DWM1001) operating in the 2.4GHz band and the 6.5GHz band. The nature of these measurements is to ensure that the radio module and host remain in compliance with the emissions requirements of the FCC and the Innovation, Science, and Economic Development Canada after the integration process.

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The EUT was identified as follows and was used throughout the test series:

EUT Identification	
Description	Heel Collar
Model/Part No.	HR350C-A
Serial No.	N/A
Software/Firmware Version	N/A
Size of EUT	3.560 x 2.069 x 1.436 inch
Highest Internal Frequency of the EUT	6.5GHz

3. Power Input

The EUT was powered by 3.8VDC from an internal rechargeable battery. For the Charging mode, the EUT obtained 120VAC 60Hz power via a two prong, 1-meter, unshielded power cord.

4. Grounding

The EUT was not connected to ground.

5. Support Equipment

No support equipment was used during the tests.

6. Interconnect Leads

No interconnect leads were used during the tests.

7. Modifications Made to the EUT

No modifications were made to the EUT during the testing.

8. Modes of Operation

The EMC tests were performed with the EUT operating in one of the test modes described below. See the specific test section for the applicable test modes.

8.1. Charging + Rx

This mode was achieved by having the EUT charging on 120VAC power and setting the EUT to receive at 151.82MHz.

8.2. BLE

This mode was achieved by applying power to the device and setting it to the BLE transmit mode, which transmits at 2402MHz.

8.3. UBW

This mode was achieved by applying power to the device and setting it to the UBW transmit mode, which transmits at 6489MHz.

9. Test Specifications

The tests were performed to selected portions of, and in accordance with the following test specifications:

- Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter A, Part 15, Subpart B – “Unintentional Radiators”
- Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter A, Part 15, Subpart C, §15.247 – “Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz”
- Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter A, Part 15, Subpart C, §15.250 – “Operation of wideband systems within the band 5925–7250 MHz”
- ICES-003, Issue 7 (October 15, 2020) – “Information Technology Equipment (including Digital Apparatus)”
- Radio Standard Specification RSS-Gen Issue 5 (February 2021) Amendment 2 – “General Requirements for Compliance of Radio Apparatus”
- RSS-220 Issue 1 Amendment (July 2018) – “Devices Using Ultra-Wideband (UWB) Technology”
- RSS-247 Issue 3 (August 2023) – “Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices”
- ANSI C63.4-2014 – "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
- ANSI C63.10-2013 – "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices”
- KDB 996369 D04 v02 (October 13, 2020) – “Modular Transmitter Integration Guide Guidance for Host Product Manufacturers”

10. Test Plan

No test plan was provided. Instructions were provided by personnel from Fleetwood Group Inc and used in conjunction with the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart B, FCC “Code of Federal Regulations” Title 47, Part 15, Subpart C, Innovation, Science, and Economic Development Canada, ICES-003, Innovation, Science, and Economic Development Canada, RSS-GEN, Innovation, Science, and Economic Development Canada, RSS-220, Innovation, Science, and Economic Development Canada, RSS-247, ANSI C63.4-2014, and ANSI C63.10-2013 specifications.

11. Deviation, Additions to, or Exclusions from Test Specifications

There were no deviations, additions to, or exclusions from the test specifications during this test series.

12. Laboratory Conditions

The following were the laboratory conditions while the EMC tests were performed:

Ambient Parameters	Value
Temperature	22.6°C
Relative Humidity	31%
Atmospheric Pressure	1011.0mb

13. Summary

The following EMC tests were performed, and the results are shown below:

Test Description	Test Requirements	Test Method	Equipment Class	Result
RF Conducted Emissions (AC Mains)	FCC 15.107 ICES-003, Section 3.2.1	ANSI C63.4:2014	B	Conforms
RF Radiated Emissions	FCC 15.109 ICES-003, Section 3.2.2	ANSI C63.4:2014	B	Conforms
Module Integration – Emissions	FCC 15.247 FCC 15.250 RSS 220 RSS 247	ANSI C63.10:2013	-----	Conforms

14. Sample Calculations

For Powerline Conducted Emissions:

The resultant voltage level (VL) is a summation in decibels (dB) of the receiver meter reading (MTR) and the cable loss factor (CF).

Formula 1: VL (dBµV) = MTR (dBµV) + CF (dB).

For Radiated Emissions:

The resultant field strength (FS) is a summation in decibels (dB) of the receiver meter reading (MTR), the antenna correction factor (AF), and the cable loss factor (CF). If an external preamplifier is used, the total is reduced by its gain (-PA). If a distance correction (DC) is required, it is added to the total.

Formula 1: FS (dBµV/m) = MTR (dBµV) + AF (dB/m) + CF (dB) + (- PA (dB)) + DC (dB)

To convert the Field Strength dBµV/m term to µV/m, the dBµV/m is first divided by 20. The Base 10 AntiLog is taken of this quotient. The result is the Field Strength value in µV/m terms.

Formula 2: FS (µV/m) = AntiLog [(FS (dBµV/m))/20]

15. Statement of Conformity

The Fleetwood Group Inc Heel Collar (Model No. HR350C-A, Serial No. N/A) did fully conform to the selected requirements of FCC "Code of Federal Regulations" Title 47 Part 15, Subpart B, FCC “Code of Federal Regulations” Title 47, Part 15, Subpart C, Innovation, Science, and Economic Development Canada, ICES-003, Innovation, Science, and Economic Development Canada, RSS-GEN, Innovation, Science, and Economic Development Canada, RSS-220, and Innovation, Science, and Economic Development Canada, RSS-247.

16. Certification

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart B, FCC “Code of Federal Regulations” Title 47, Part 15, Subpart C, Innovation, Science, and Economic Development Canada, ICES-003, Innovation, Science, and Economic Development Canada, RSS-GEN, Innovation, Science, and Economic Development Canada, RSS-220, and Innovation, Science, and Economic Development Canada, RSS-247 test specifications. The data presented in this test report pertains to the EUT as received by the customer on the test date specified. Any electrical or mechanical modifications made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification.

17. Photographs of EUT

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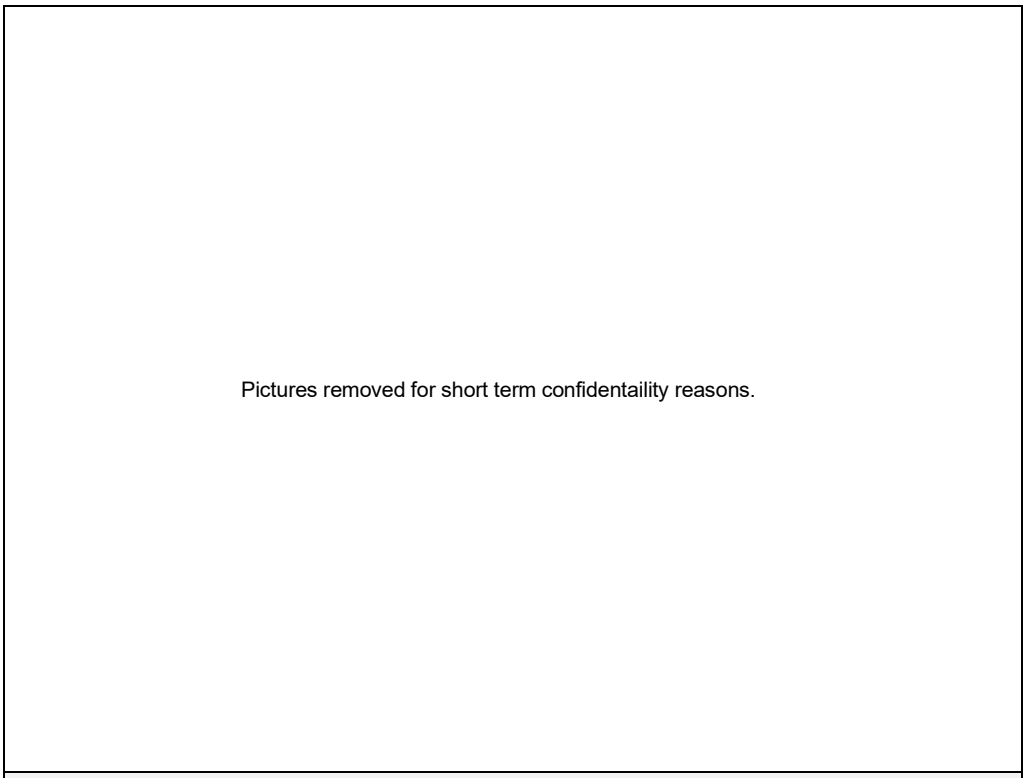
Pictures removed for short term confidentaility reasons.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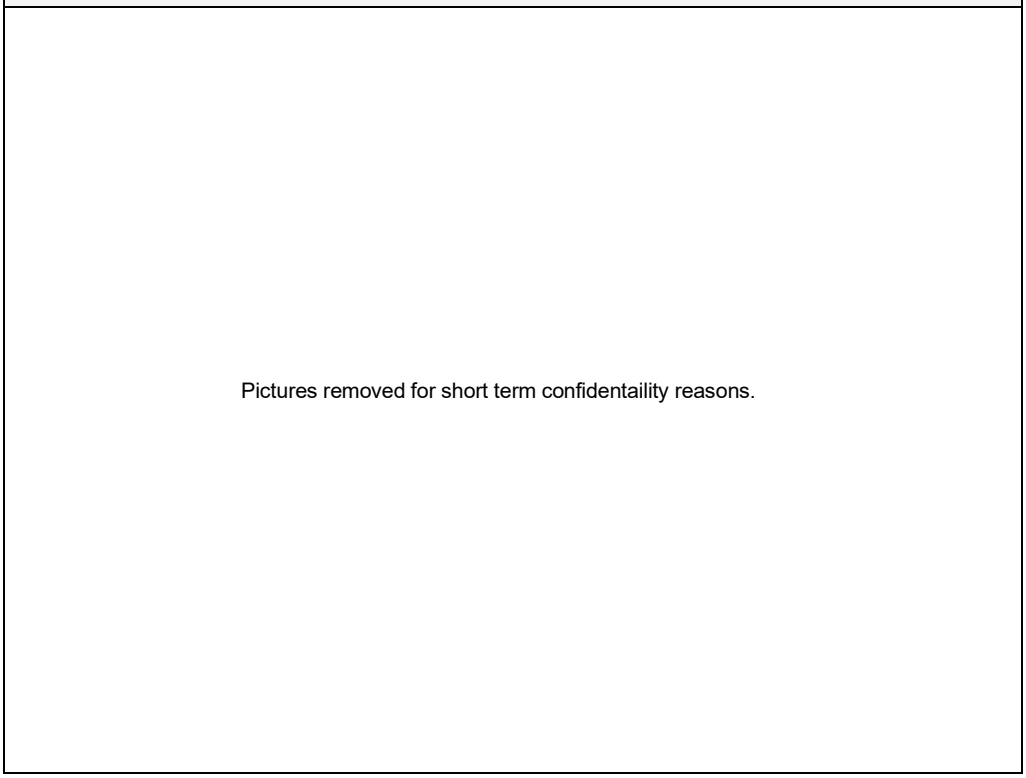
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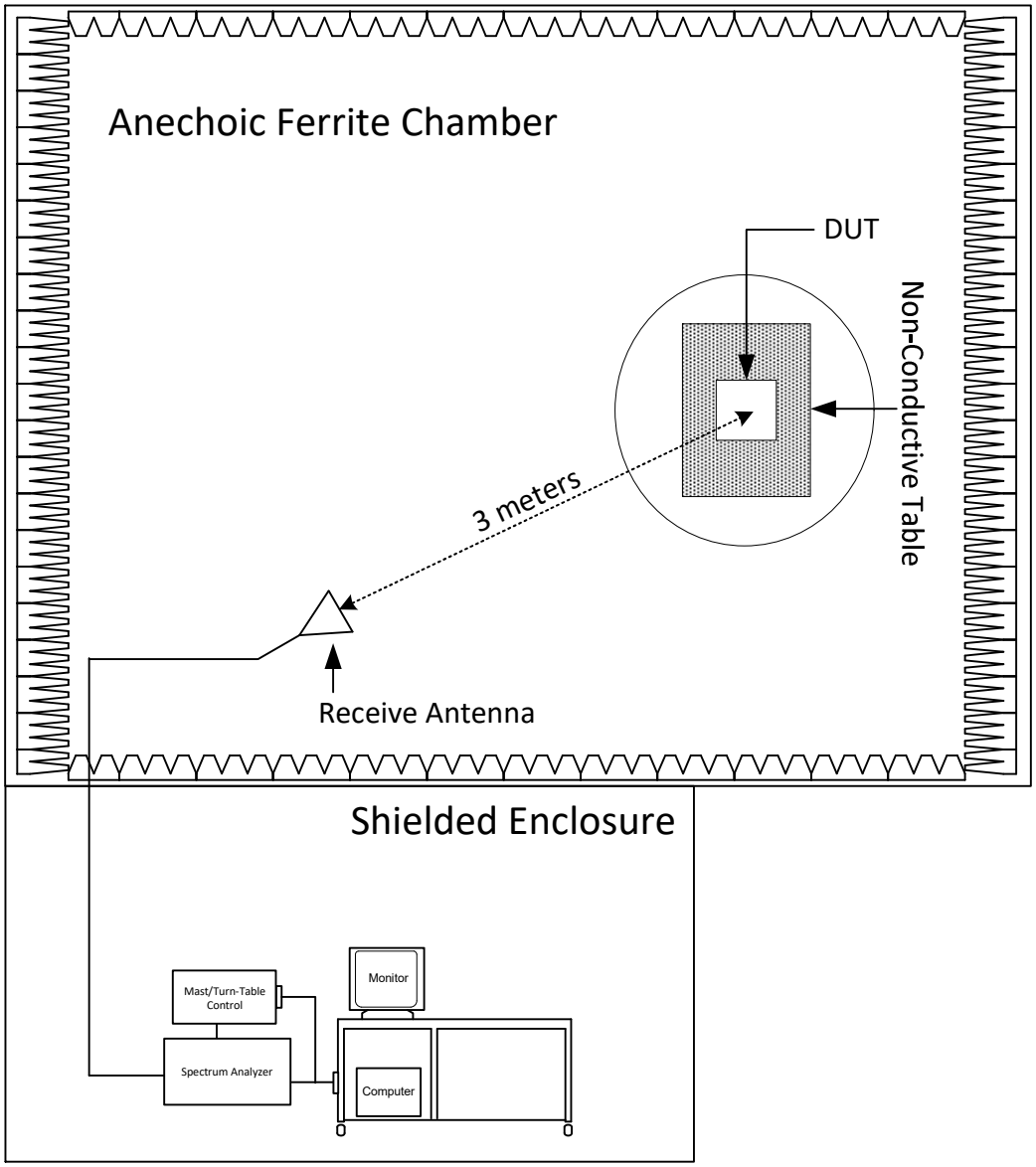
18. Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW10	PREAMPLIFIER	PMI	PE2-35-120-5R0-10-12-SFF	PL11685/1241	1GHZ-20GHZ	3/10/2023	3/10/2024
APW18	PREAMPLIFER	PLANAR	PE2-30-20G20RG6-3R0-10-12-SFF	PL34312/2148	18-26.5GHZ	1/19/2023	1/19/2024
APW5	PREAMPLIFIER	PLANAR	PE2-36-26D540G-5R0-1	PL3044/0651	26.5GHZ-40GHZ	10/27/2023	10/27/2024
CDZ3	LAB WORKSTATION	ELITE	LWS-10		WINDOWS 10	CNR	
GRE0	SIGNAL GENERATOR	AGILENT TECHNOLOGIES	E4438C	MY42083127	250KHZ-6GHZ	5/17/2023	5/17/2024
NDC0	88" DIPOLE ANTENNA - FL	ELITE	TD-88	1	---	NOTE 1	
NDP1	TUNED DIPOLE ANTENNA	EMCO	3121C-DB3	313	140-400MHZ	9/14/2022	9/14/2024
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NHH1	STANDARD GAIN HORN ANTENNA	NARDA	V637	---	26.5-40GHZ	NOTE 1	
NTA3	BILOG ANTENNA	TESEQ	6112D	32853	25-1000MHz	11/17/2022	11/17/2024
NWQ2	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66659	1GHZ-18GHZ	4/27/2022	4/27/2024
RBG2	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101591	2HZ-44GHZ	4/10/2023	4/10/2024
RBJ0	EMI ANALYZER	ROHDE & SCHWARZ	ESW8	100986	2HZ-8GHZ	12/26/2022	12/26/2023
VBR8	CISPR EN FCC CE VOLTAGE.exe					N/A	
VBV2	CISPR EN FCC ICES RE.EXE	ELITE	CISPR EN FCC ICES RE.EXE	---	---	N/A	
XPQ4	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/X20000-O/O	1	4.8-20GHZ	9/14/2023	9/14/2025
XPQ6	FILTER	K&L MICROWAVE	11SH10-9000/U2000-O/O	2	5000-5800 MHZ	9/14/2023	9/14/2025

N/A: Not Applicable I/O: Initial Only CNR: Calibration Not Required

NOTE 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

19. Block Diagram of Test Setup



Radiated Measurements Test Setup

20. RF Conducted Emissions (AC Mains)

EUT Information	
Manufacturer	Fleetwood Group Inc
Product	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Charging + Rx

Test Site Information	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Reverberation Chamber
Test Site Used	R28A
Note	N/A

Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Conducted disturbance (mains port) (150 kHz – 30 MHz)	2.7

Requirements
For equipment that is 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 within the band 150kHz to 30MHz shall not exceed the limits in the following table.

Conducted Emissions Class B Limits		
Frequency (MHz)	Conducted limit (dBµV)	
	Quasi-Peak	Average
0.15 – 0.5	66 decreasing with logarithm of frequency to 56	56 decreasing with logarithm of frequency to 46
0.5 – 5	56	46
5 – 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: If the levels measured using the QP detector meet both the QP and the Average limits, the EUT is considered to have met both requirements and measurements do not need to be performed using the Average detector.		

Procedure
The interference on each power lead of the EUT was measured by connecting the measuring equipment to the appropriate meter terminal of the Line Impedance Stabilization Network (LISN). The meter terminal of the LISN not under test was terminated with 50 ohms. 1) The EUT was operated in the Charging + Rx mode. 2) Measurements were first made on the 120VAC high line. 3) The frequency range from 150kHz to 30MHz was broken up into smaller frequency sub-bands. 4) Conducted emissions measurements were taken on the first frequency sub-band using a peak detector. 5) The data thus obtained was then searched by the computer for the highest levels. Any emissions levels that were within 10dB of the average limit were then measured again using both a quasi-peak detector and an average detector. (If no peak readings were within 10dB of the average limit, quasi-peak and average readings were taken on the highest emissions levels measured during the peak detector scan.) 6) Steps (4) and (5) were repeated for the remainder of the frequency sub-bands until the entire frequency range from 150kHz to 30MHz was investigated. The peak trace was automatically plotted. The plot also shows quasi-peak and average readings that were taken on discrete frequencies. A table showing the quasi-peak and average readings was also generated. This tabular data compares the quasi-peak and average conducted emissions to the applicable conducted emissions limits. The resultant voltage level (VL) is a summation in decibels (dB) of the receiver meter reading (MTR) and the cable loss factor (CF). Formula 1: VL (dBµV) = MTR (dBµV) + CF (dB) 7) Steps (3) through (6) were repeated on the 120VAC return line.

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Test Setup for RF Conducted Emissions (AC Mains)

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Test Setup for RF Conducted Emissions (AC Mains)

FCC Part 15 Subpart B 2017-2022 Conducted Emissions Test

Significant Emissions Data

VBR8 09/15/2023

Manufacturer	:	FLEETWOOD
Model	:	COLLAR
DUT Revision	:	1.0
Serial Number	:	4
DUT Mode	:	CHARGING (+ RX MODE)
Line Tested	:	120VAC 60HZ HIGH LINE
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	T. Jozefczyk
Limit	:	Class B
Test Date	:	Oct 04, 2023 02:40:50 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

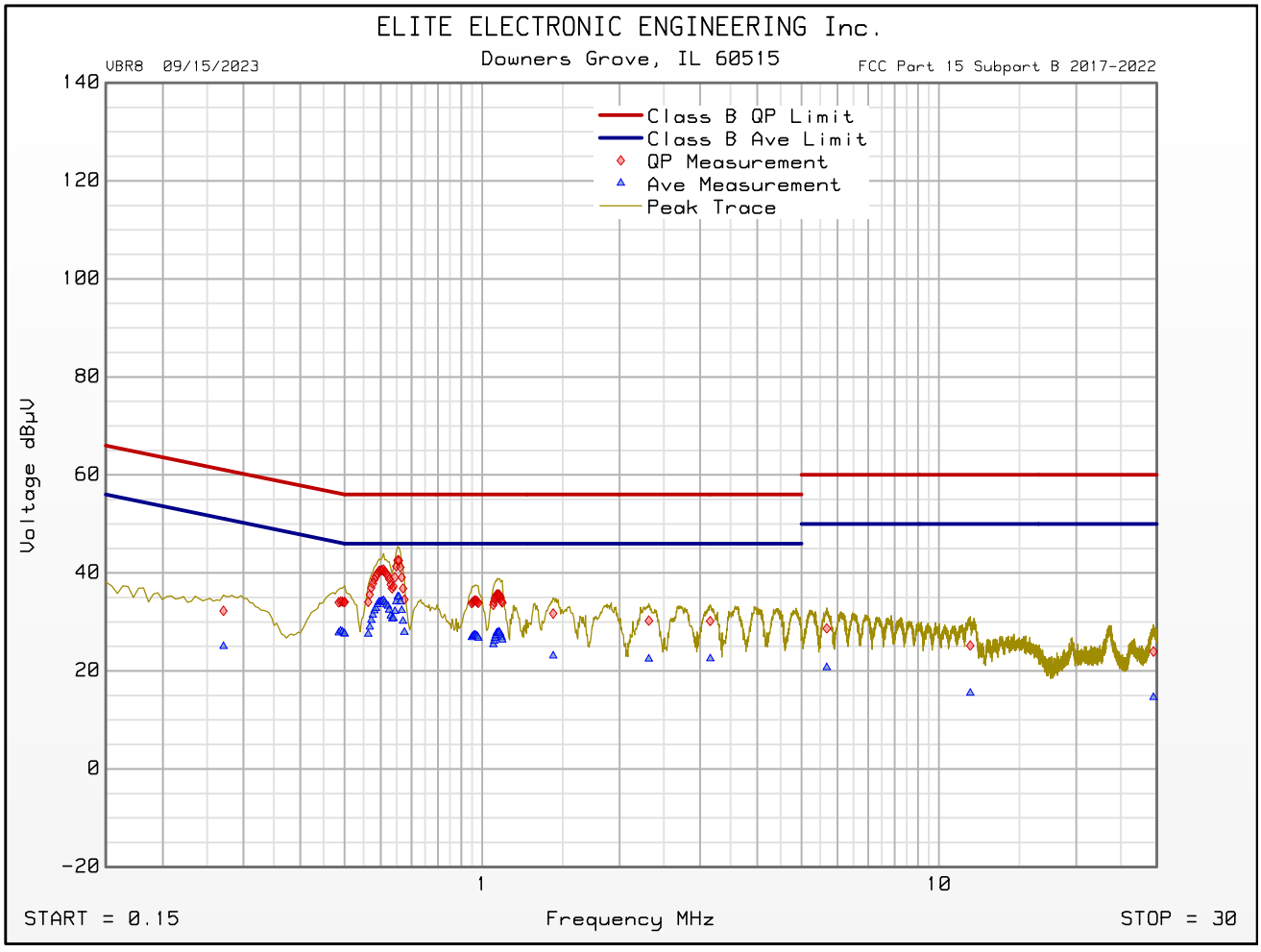
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.272	32.3	61.1		25.0	51.1	
0.500	34.1	56.0		27.6	46.0	
1.080	35.6	56.0		27.8	46.0	
1.431	31.7	56.0		23.1	46.0	
2.318	30.3	56.0		22.5	46.0	
3.157	30.2	56.0		22.5	46.0	
5.684	28.6	60.0		20.7	50.0	
11.714	25.2	60.0		15.5	50.0	
29.497	23.9	60.0		14.6	50.0	

FCC Part 15 Subpart B 2017-2022 Conducted Emissions Test

Cumulative Data

VBR8 09/15/2023

Manufacturer	:	FLEETWOOD
Model	:	COLLAR
DUT Revision	:	1.0
Serial Number	:	4
DUT Mode	:	CHARGING (+ RX MODE)
Line Tested	:	120VAC 60HZ HIGH LINE
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	T. Jozefczyk
Limit	:	Class B
Test Date	:	Oct 04, 2023 02:40:50 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B 2017-2022 Conducted Emissions Test

Significant Emissions Data

VBR8 09/15/2023

Manufacturer	:	FLEETWOOD
Model	:	COLLAR
DUT Revision	:	1.0
Serial Number	:	4
DUT Mode	:	CHARGING (+ RX MODE)
Line Tested	:	120VAC 60HZ NEUTRAL LINE
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	T. Jozefczyk
Limit	:	Class B
Test Date	:	Oct 04, 2023 02:47:38 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

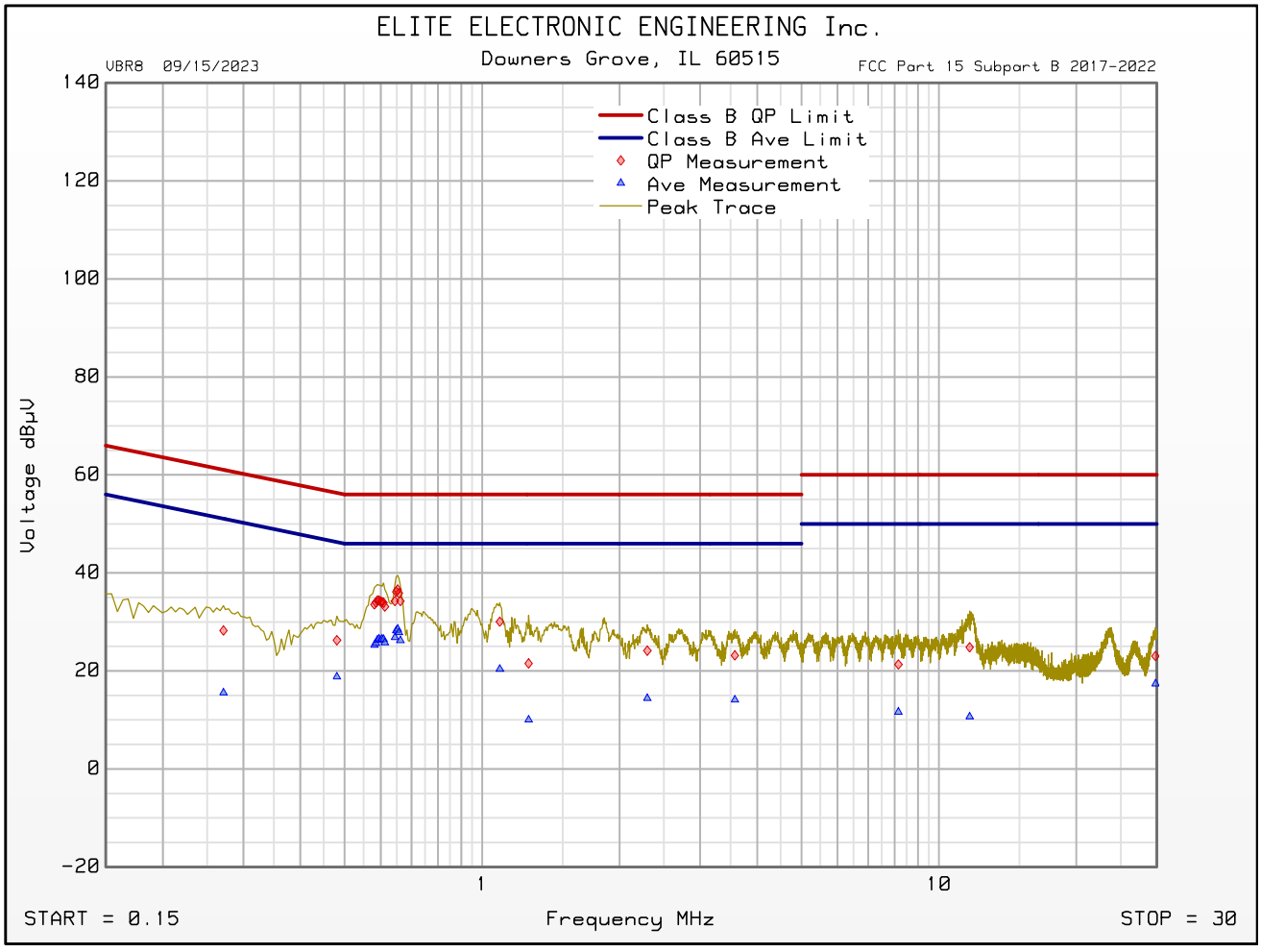
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.272	28.2	61.1		15.6	51.1	
0.481	26.3	56.3		18.8	46.3	
0.653	36.6	56.0		28.5	46.0	
1.094	30.0	56.0		20.4	46.0	
1.264	21.5	56.0		10.0	46.0	
2.300	24.1	56.0		14.4	46.0	
3.575	23.2	56.0		14.1	46.0	
8.155	21.3	60.0		11.6	50.0	
11.674	24.8	60.0		10.6	50.0	
29.790	23.0	60.0		17.4	50.0	

FCC Part 15 Subpart B 2017-2022 Conducted Emissions Test

Cumulative Data

VBR8 09/15/2023

Manufacturer	:	FLEETWOOD
Model	:	COLLAR
DUT Revision	:	1.0
Serial Number	:	4
DUT Mode	:	CHARGING (+ RX MODE)
Line Tested	:	120VAC 60HZ NEUTRAL LINE
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	T. Jozefczyk
Limit	:	Class B
Test Date	:	Oct 04, 2023 02:47:38 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

21. RF Radiated Emissions

EUT Information	
Manufacturer	Fleetwood Group Inc
Product	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Charging + Rx

Test Site Information	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test Site Used	R29F
Antenna Types Used	Below 1GHz: Bilog (or equivalent) 1 – 18GHz: Double-ridged waveguide (or equivalent) Above 18GHz: Horn (or equivalent)
Highest Internal Frequency	6.5GHz
Highest Measurement Frequency	30GHz
Notes	The cables were manually maximized during the preliminary emissions sweeps. The cable arrangement which resulted in the worst-case emissions was utilized.

Measurement Uncertainty	
Measurement Type – Radiated disturbance (electric field strength on an open area test site or alternative test site)	Expanded Measurement Uncertainty
30 MHz – 1000 MHz	4.3
1 GHz – 6 GHz	3.1
6 GHz – 18 GHz	3.2
18 GHz – 26.5 GHz	3.3
26.5 GHz – 40 GHz	3.4

Requirements
The field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the values in the following tables.

FCC Part 15 Class B Radiated Emissions Limits (30MHz to 1GHz)		
Frequency of Emission (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)
30 – 88	100	40
88 – 216	150	43.5
216 – 960	200	46
Above 960	500	54
FCC Part 15 Class B Radiated Emissions Limits (Above 1GHz)		
Frequency of Emission (MHz)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)
Above 1000	74	54

ICES-003 Class B Radiated Emissions Limits (30MHz to 1GHz)		
Frequency Range (MHz)	Field Strength at 3 meters (dBµV/m)	Field Strength at 10 meters (dBµV/m)
30 – 88	40	30
88 – 216	43.5	33.1
216 – 230	46	35.6
230 – 960	47	37
960 – 1000	54	43.5
ICES-003 Class B Radiated Emissions Limits (At and Above 1GHz)		
Frequency Range (GHz)	Average (dBµV/m)	Peak (dBµV/m)
1 – F_M	54	74
F_M = highest measurement frequency		

Procedure

Since a quasi-peak detector and an average detector require long integration times, it is not practical to automatically sweep through the quasi-peak and average levels. Therefore, radiated emissions from the EUT were first scanned using a peak detector and automatically plotted. The frequencies where significant emission levels were noted were then remeasured using the quasi-peak detector or average detector.

The EUT and all peripheral equipment were placed on an 80cm high non-conductive stand. The broadband measuring antenna was positioned at a 3-meter distance from the EUT. The frequency range from 30MHz to 1GHz was investigated using a peak detector function with the bilog antenna at several heights, horizontal and vertical polarization, and with several different orientations of the EUT with respect to the antenna. The frequency range from 1 – 30GHz was investigated using a peak detector function with the double ridged waveguide antenna at several heights, horizontal and vertical polarization, and with several different orientations of the EUT with respect to the antenna. The maximum levels for each antenna polarization were plotted.

Final radiated emissions were performed on all significant broadband and narrowband emissions found in the exploratory sweeps using the following methods:

1) Measurements from 30MHz to 1GHz were made using a quasi-peak detector and a broadband bilog antenna. Measurements above 1GHz were made using an average detector and a broadband double ridged waveguide antenna or a horn antenna (depending on the range being tested).
2) To ensure that maximum or worst case, emission levels were measured, the following steps were taken:
    a) The EUT was rotated so that all sides were exposed to the receiving antenna.
    b) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
    c) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.
    d) For hand-held or body-worn devices, the EUT was rotated through three orthogonal axes to determine which orientation produces the highest emission relative to the limit.

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Test Setup for Radiated Emissions: 30MHz to 1GHz, Horizontal Polarization

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Test Setup for Radiated Emissions: 30MHz to 1GHz, Vertical Polarization

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Test Setup for Radiated Emissions: 1 – 18GHz, Horizontal Polarization

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Test Setup for Radiated Emissions: 1 – 18GHz, Vertical Polarization

Pictures removed for short term confidentaility reasons.

Test Setup for Radiated Emissions: 18 – 26.5GHz, Horizontal Polarization

Pictures removed for short term confidentaility reasons.

Test Setup for Radiated Emissions: 18 – 26.5GHz, Vertical Polarization

Pictures removed for short term confidentaility reasons.

Test Setup for Radiated Emissions: Above 26.5GHz, Horizontal Polarization

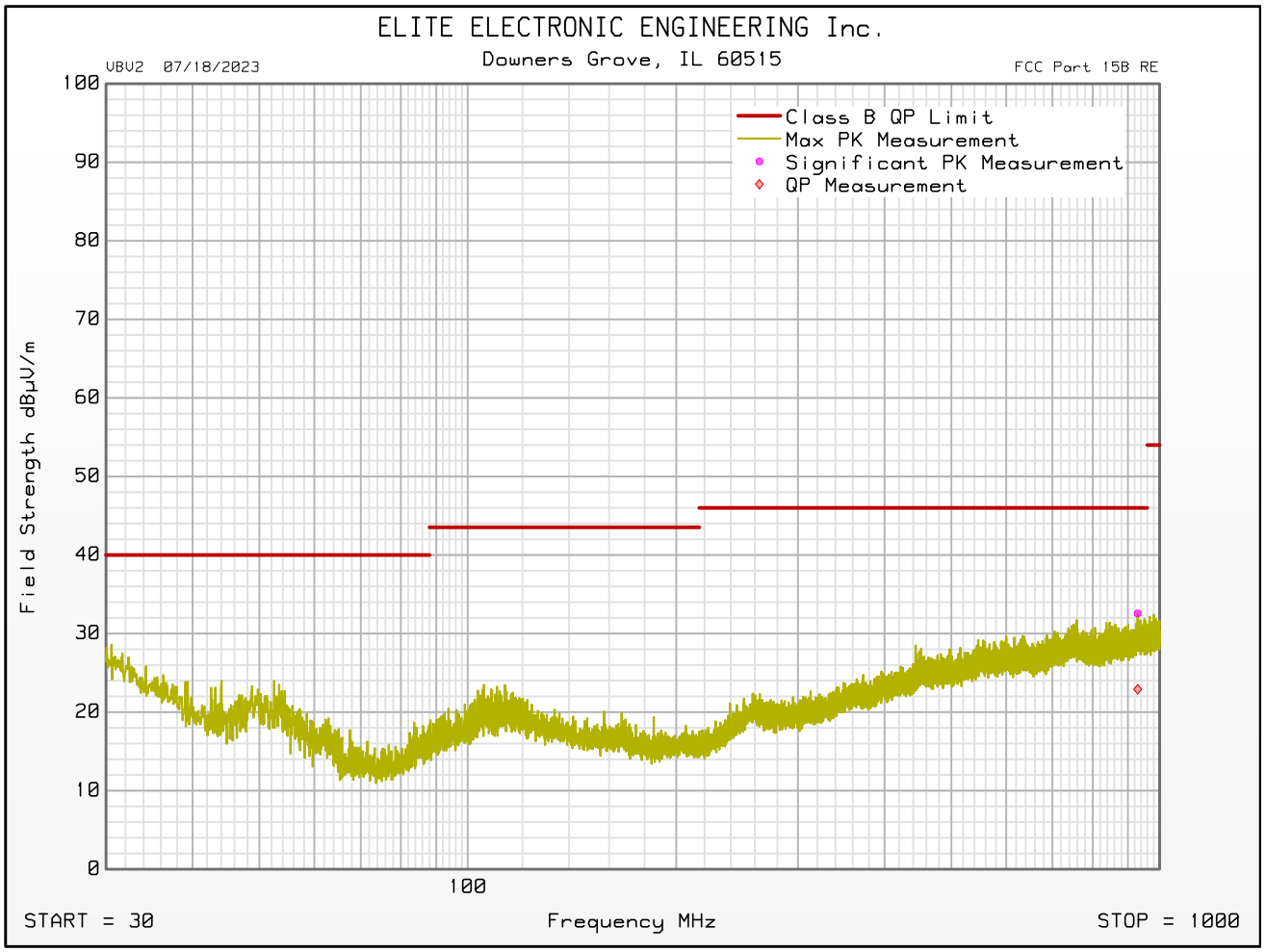
Pictures removed for short term confidentaility reasons.

Test Setup for Radiated Emissions: Above 26.5GHz, Vertical Polarization

FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

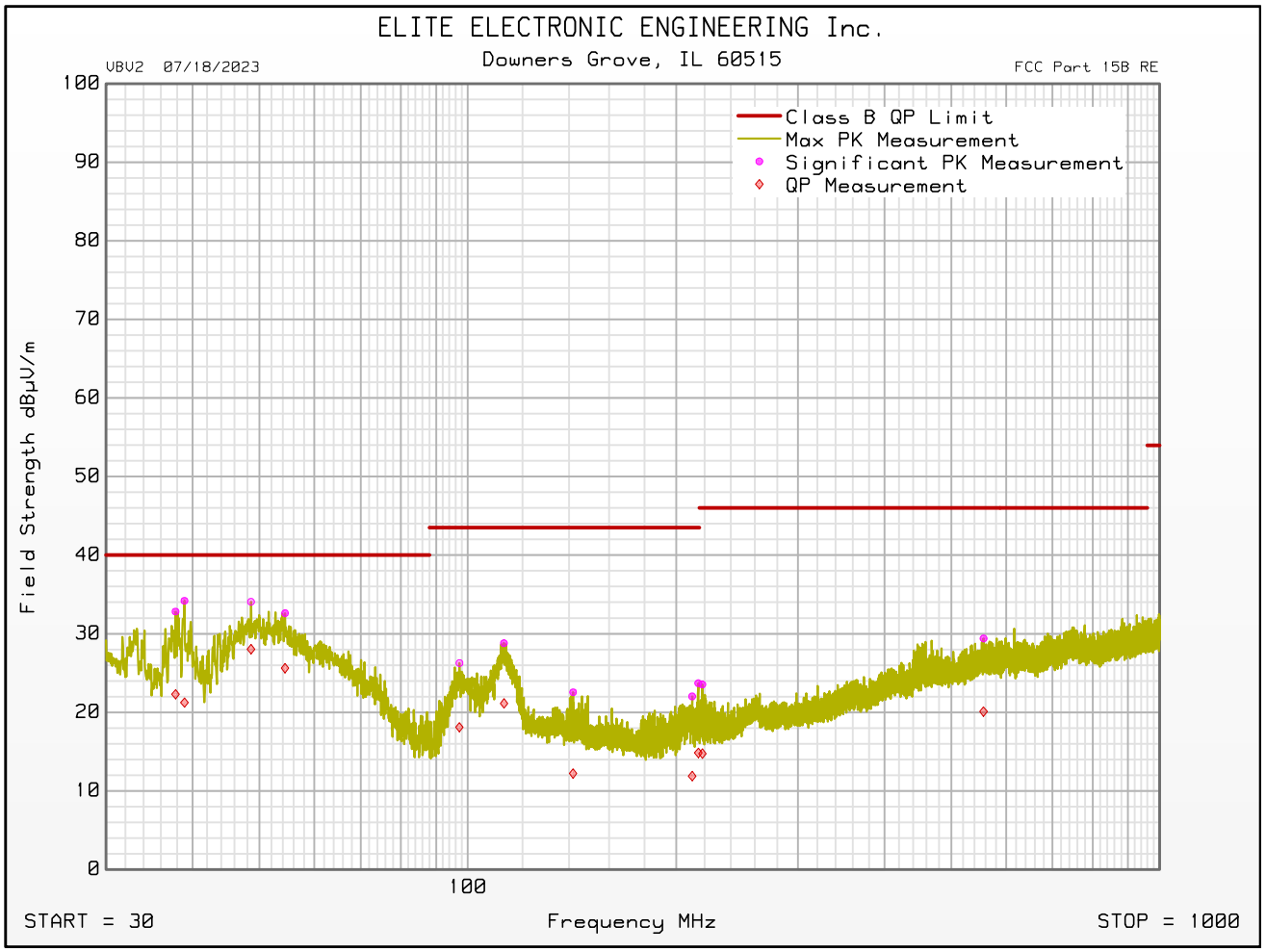
Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Antenna Polarization	:	Horizontal
Scan Type	:	Stepped Scan
Test RBW	:	120 kHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	Tested with XY-1304-2USB charger
Test Engineer	:	M. Longinotti
Test Date	:	Sep 25, 2023 08:57:03 AM



FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Antenna Polarization	:	Vertical
Scan Type	:	Stepped Scan
Test RBW	:	120 kHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	Tested with XY-1304-2USB charger
Test Engineer	:	M. Longinotti
Test Date	:	Sep 25, 2023 08:57:03 AM



FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

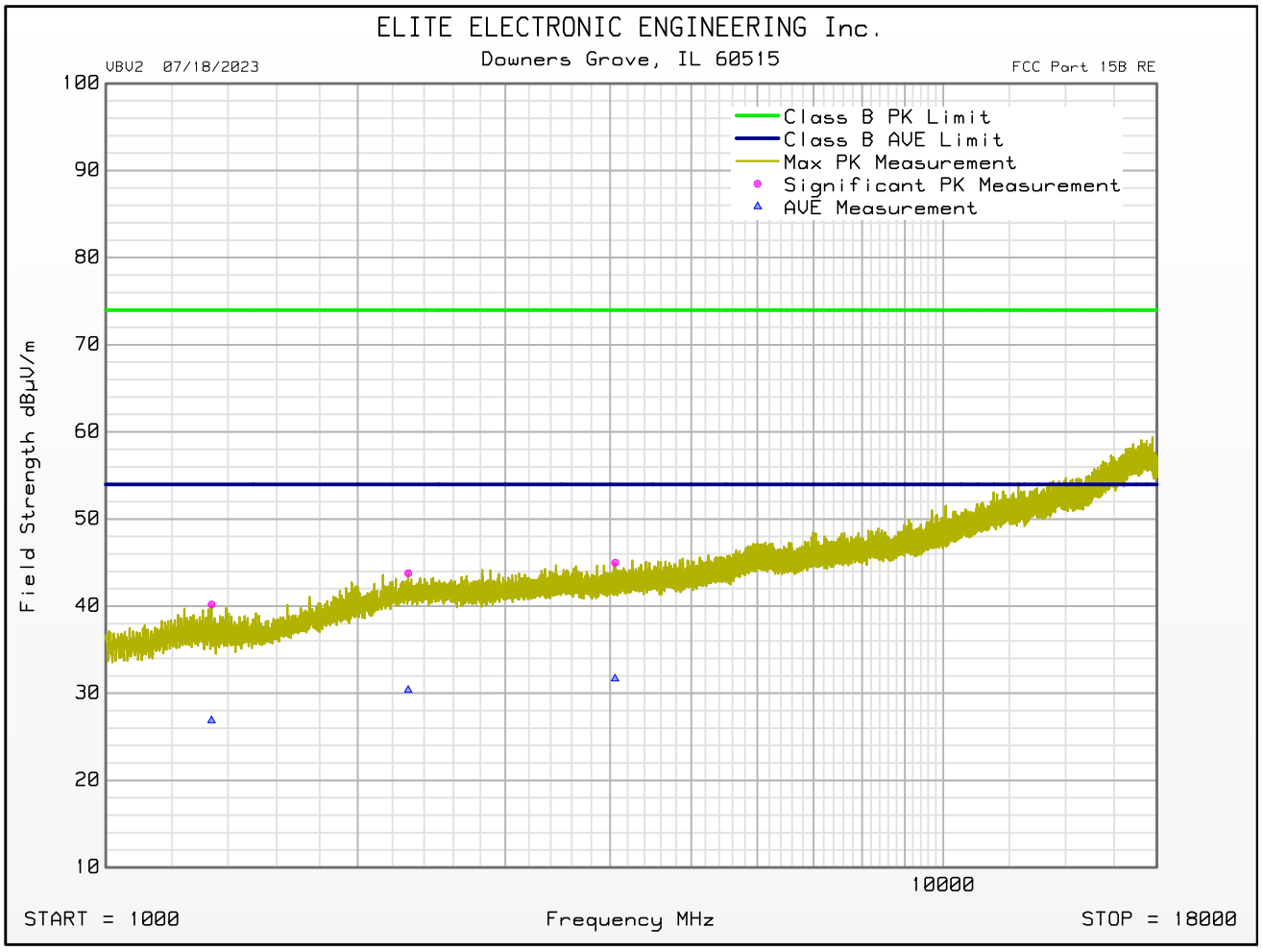
Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Scan Type	:	Stepped Scan
Test RBW	:	120 kHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	Tested with XY-1304-2USB charger
Test Engineer	:	M. Longinotti
Test Date	:	Sep 25, 2023 08:57:03 AM

Freq MHz	Peak Mtr Rdg dBuV	QP Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBµV/m	QP Total dBµV/m	QP Limit dBµV/m	QP Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive QP Level
37.800	12.2	1.7	20.3	0.0	0.4	0.0	32.8	22.3	40.0	-17.7	Vertical	120	315	
38.940	14.3	1.4	19.5	0.0	0.4	0.0	34.2	21.2	40.0	-18.8	Vertical	120	225	
48.600	19.1	13.0	14.6	0.0	0.4	0.0	34.1	28.0	40.0	-12.0	Vertical	120	90	
54.420	19.1	12.1	13.0	0.0	0.4	0.0	32.6	25.6	40.0	-14.4	Vertical	200	45	
97.240	9.3	1.1	16.4	0.0	0.6	0.0	26.3	18.1	43.5	-25.4	Vertical	120	315	
112.780	9.9	2.2	18.3	0.0	0.7	0.0	28.8	21.1	43.5	-22.4	Vertical	120	270	
141.940	4.8	-5.6	17.1	0.0	0.7	0.0	22.6	12.2	43.5	-31.3	Vertical	120	315	
211.000	5.9	-4.2	15.2	0.0	0.9	0.0	22.0	11.9	43.5	-31.6	Vertical	120	180	
215.320	7.8	-1.0	15.0	0.0	0.9	0.0	23.7	14.8	43.5	-28.7	Vertical	120	135	
218.280	7.5	-1.3	15.2	0.0	0.9	0.0	23.6	14.7	46.0	-31.3	Vertical	120	90	
556.440	3.3	-6.0	24.7	0.0	1.4	0.0	29.4	20.1	46.0	-25.9	Vertical	120	90	
929.160	4.1	-5.5	26.6	0.0	1.8	0.0	32.6	22.9	46.0	-23.1	Horizontal	120	315	

FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

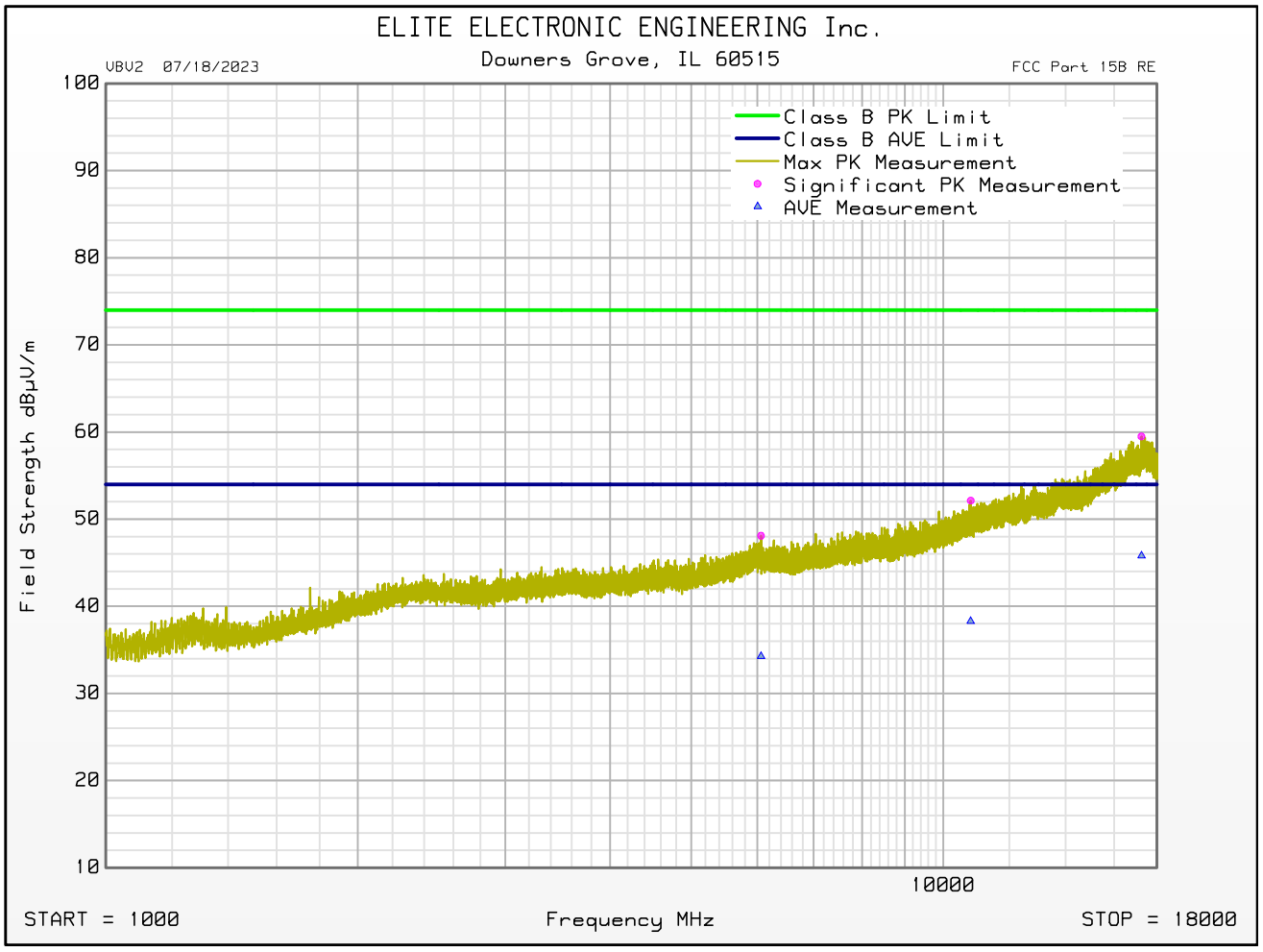
Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Antenna Polarization	:	Horizontal
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	Tested with XY-1304-2USB Charger
Test Engineer	:	M. Longinotti
Test Date	:	Sep 26, 2023 08:40:03 AM



FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Antenna Polarization	:	Vertical
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	Tested with XY-1304-2USB Charger
Test Engineer	:	M. Longinotti
Test Date	:	Sep 26, 2023 08:40:03 AM



FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	Tested with XY-1304-2USB Charger
Test Engineer	:	M. Longinotti
Test Date	:	Sep 26, 2023 08:40:03 AM

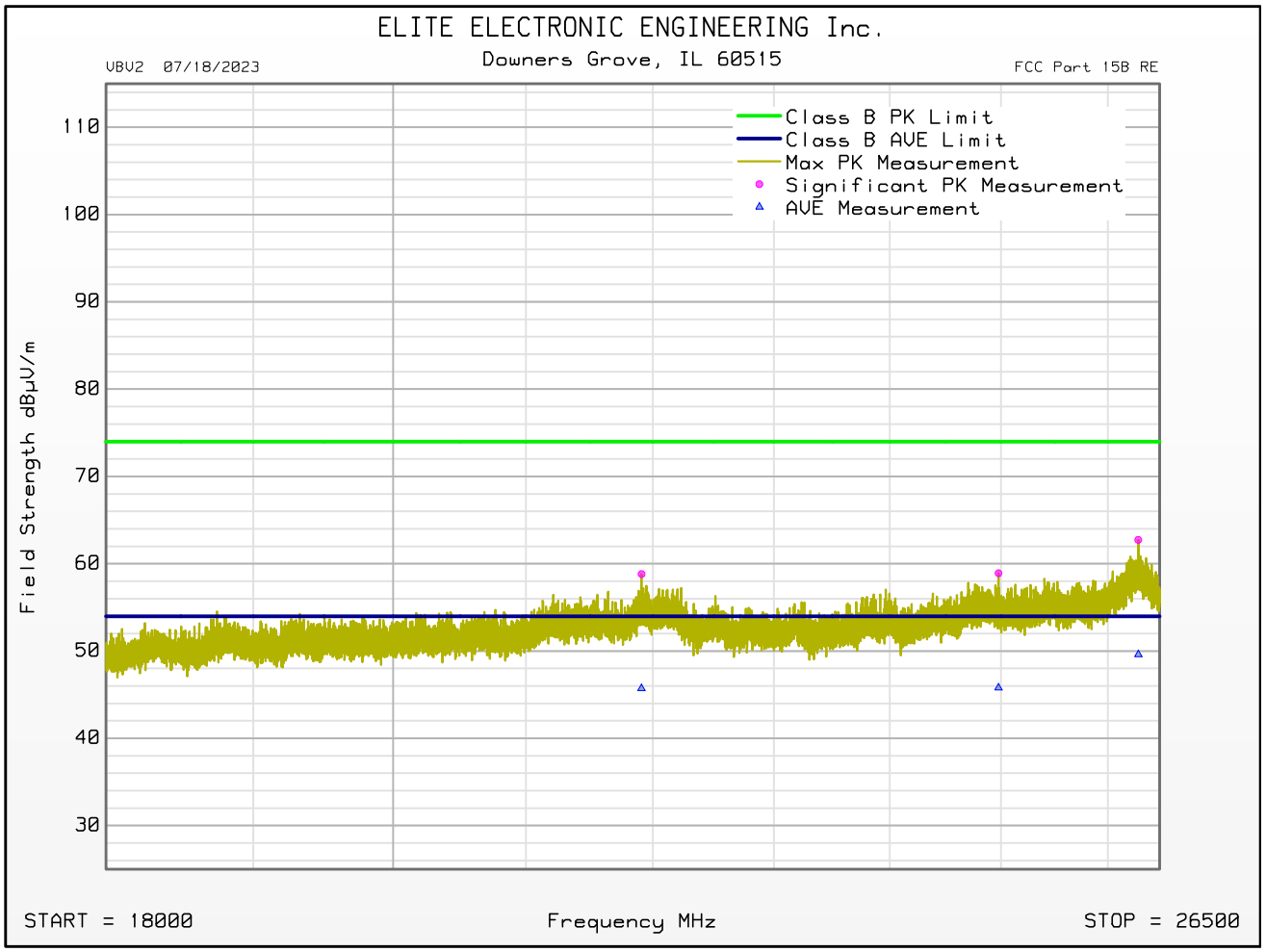
Freq MHz	Peak Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBµV/m	Peak Limit dBµV/m	Peak Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Peak Level
1337.500	50.2	28.8	-40.9	2.2	0.0	40.2	74.0	-33.8	Horizontal	340	180	
2297.000	49.0	32.4	-40.5	2.9	0.0	43.8	74.0	-30.2	Horizontal	200	45	
4057.000	47.8	33.8	-40.4	3.8	0.0	45.0	74.0	-29.0	Horizontal	120	0	
6059.500	47.6	36.2	-40.4	4.7	0.0	48.1	74.0	-25.9	Vertical	340	135	
10786.000	47.7	37.9	-39.9	6.4	0.0	52.1	74.0	-21.8	Vertical	120	0	
17248.000	47.4	42.5	-38.7	8.4	0.0	59.5	74.0	-14.5	Vertical	120	225	

Freq MHz	Average Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Average Total dBµV/m	Average Limit dBµV/m	Average Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Average Level
1337.500	36.9	28.8	-40.9	2.2	0.0	26.9	54.0	-27.1	Horizontal	340	180	
2297.000	35.6	32.4	-40.5	2.9	0.0	30.4	54.0	-23.6	Horizontal	200	45	
4057.000	34.5	33.8	-40.4	3.8	0.0	31.7	54.0	-22.3	Horizontal	120	0	
6059.500	33.8	36.2	-40.4	4.7	0.0	34.3	54.0	-19.7	Vertical	340	135	
10786.000	33.9	37.9	-39.9	6.4	0.0	38.3	54.0	-15.7	Vertical	120	0	
17248.000	33.7	42.5	-38.7	8.4	0.0	45.8	54.0	-8.2	Vertical	120	225	

FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Antenna Polarization	:	Horizontal
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 27, 2023 08:31:32 AM



FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 27, 2023 08:31:32 AM

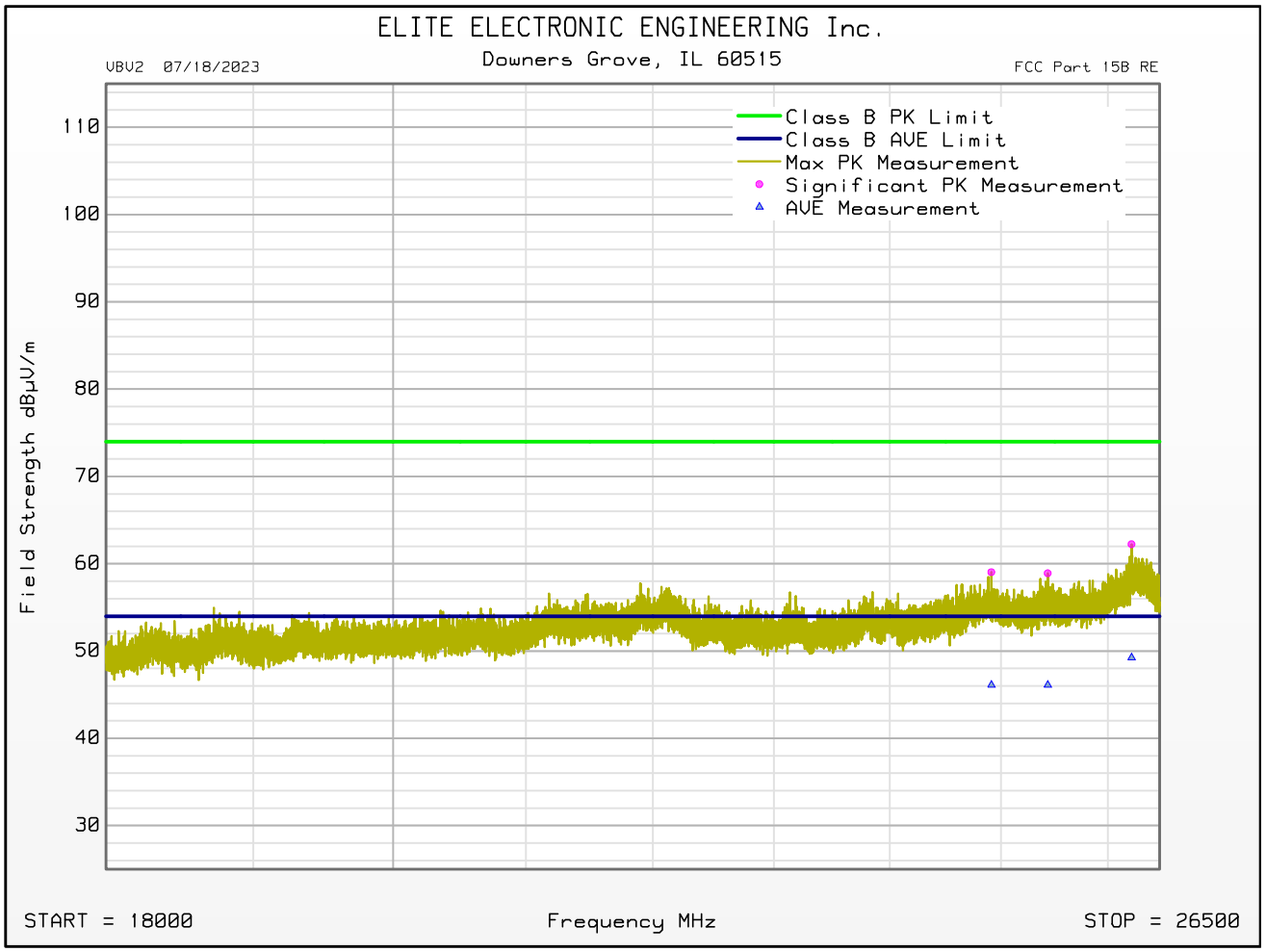
Freq MHz	Peak Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBµV/m	Peak Limit dBµV/m	Peak Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Peak Level
21910.000	40.5	40.6	-24.5	2.2	0.0	58.8	74.0	-15.2	Horizontal	100	0	
24977.500	41.3	40.6	-25.3	2.2	0.0	58.9	74.0	-15.1	Horizontal	100	0	
26293.000	43.2	40.7	-23.4	2.3	0.0	62.7	74.0	-11.2	Horizontal	100	0	

Freq MHz	Average Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Average Total dBµV/m	Average Limit dBµV/m	Average Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Average Level
21910.000	27.4	40.6	-24.5	2.2	0.0	45.7	54.0	-8.2	Horizontal	100	0	
24977.500	28.2	40.6	-25.3	2.2	0.0	45.8	54.0	-8.2	Horizontal	100	0	
26293.000	30.0	40.7	-23.4	2.3	0.0	49.6	54.0	-4.4	Horizontal	100	0	

FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Antenna Polarization	:	Vertical
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 27, 2023 08:29:46 AM



FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 27, 2023 08:29:46 AM

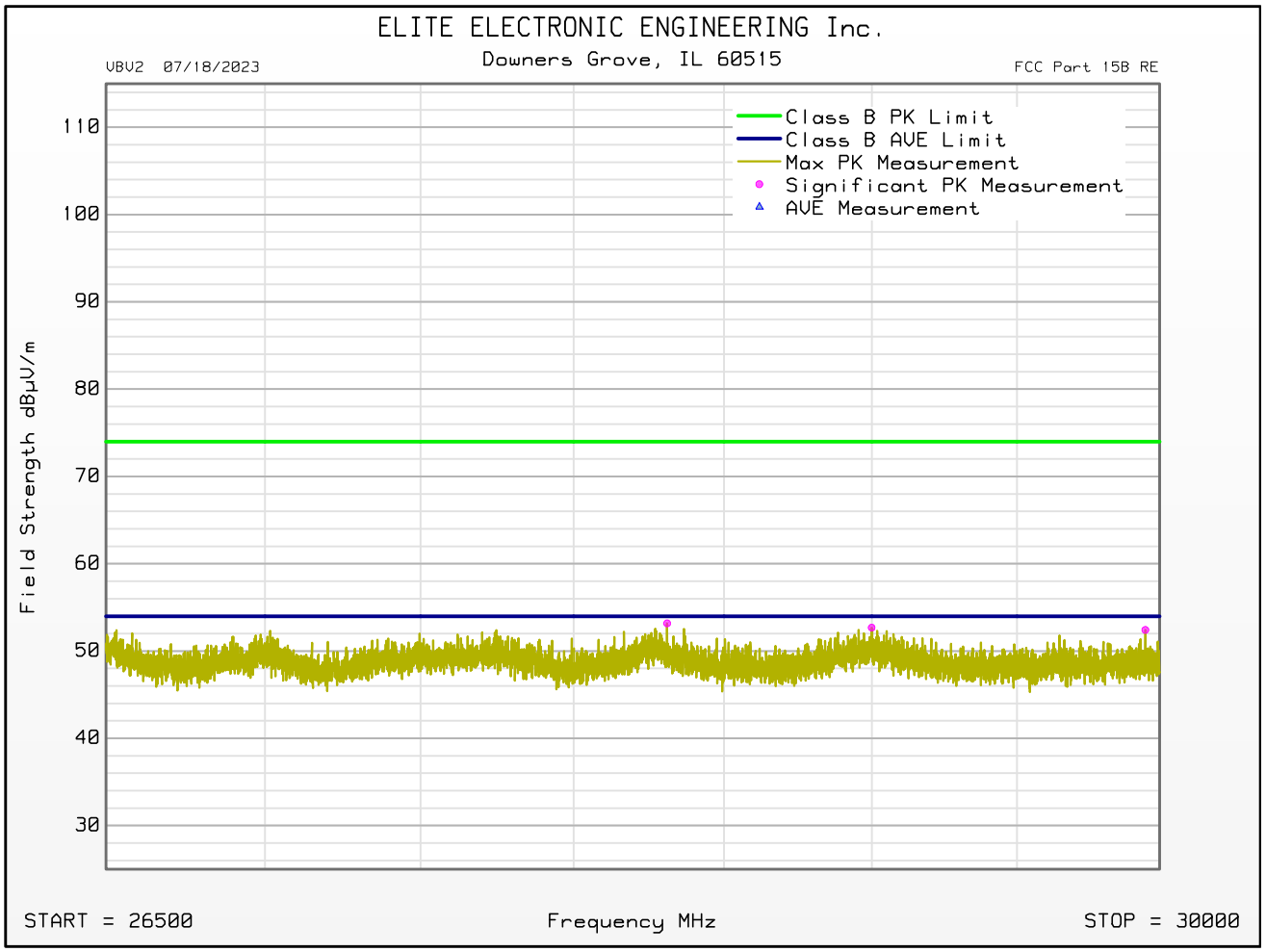
Freq MHz	Peak Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBµV/m	Peak Limit dBµV/m	Peak Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Peak Level
24911.500	41.2	40.6	-25.0	2.2	0.0	59.0	74.0	-14.9	Vertical	100	0	
25433.000	41.4	40.7	-25.4	2.2	0.0	58.9	74.0	-15.1	Vertical	100	0	
26227.500	42.7	40.7	-23.4	2.3	0.0	62.2	74.0	-11.7	Vertical	100	0	

Freq MHz	Average Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Average Total dBµV/m	Average Limit dBµV/m	Average Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Average Level
24911.500	28.3	40.6	-25.0	2.2	0.0	46.1	54.0	-7.9	Vertical	100	0	
25433.000	28.6	40.7	-25.4	2.2	0.0	46.1	54.0	-7.9	Vertical	100	0	
26227.500	29.7	40.7	-23.4	2.3	0.0	49.2	54.0	-4.8	Vertical	100	0	

FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Antenna Polarization	:	Horizontal
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 27, 2023 08:46:26 AM



FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 27, 2023 08:46:26 AM

Freq MHz	Peak Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBµV/m	Peak Limit dBµV/m	Peak Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Peak Level
28309.500	42.3	43.8	-34.9	2.0	0.0	53.2	74.0	-20.8	Horizontal	100	0	
28999.500	41.0	43.8	-34.1	2.0	0.0	52.7	74.0	-21.3	Horizontal	100	0	
29949.500	42.5	43.9	-36.0	2.0	0.0	52.4	74.0	-21.6	Horizontal	100	0	

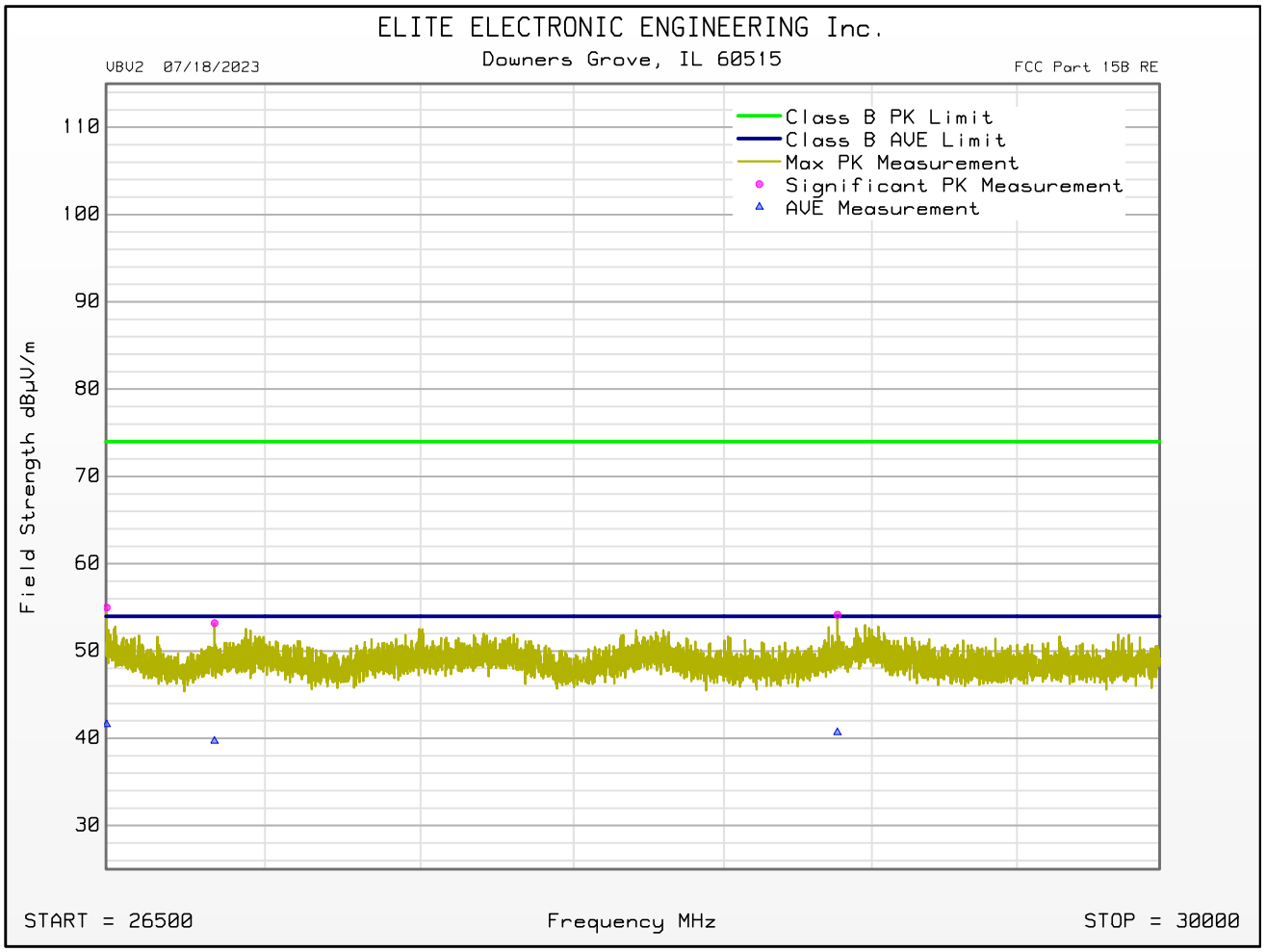
Freq MHz	Average Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Average Total dBµV/m	Average Limit dBµV/m	Average Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Average Level
28309.500		43.8	-34.9	2.0	0.0		54.0		Horizontal	100	0	Yes
28999.500		43.8	-34.1	2.0	0.0		54.0		Horizontal	100	0	Yes
29949.500		43.9	-36.0	2.0	0.0		54.0		Horizontal	100	0	Yes

* - All peak readings were below the average limit; therefore, no average readings were taken.

FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Antenna Polarization	:	Vertical
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 27, 2023 08:43:20 AM



FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Charging, Rx at 151.820MHz
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 27, 2023 08:43:20 AM

Freq MHz	Peak Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBµV/m	Peak Limit dBµV/m	Peak Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Peak Level
26502.000	44.0	43.7	-34.7	1.9	0.0	55.0	74.0	-19.0	Vertical	100	0	
26840.500	43.9	43.7	-36.3	1.9	0.0	53.2	74.0	-20.8	Vertical	100	0	
28883.000	43.5	43.8	-35.2	2.0	0.0	54.2	74.0	-19.8	Vertical	100	0	

Freq MHz	Average Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Average Total dBµV/m	Average Limit dBµV/m	Average Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Average Level
26502.000	30.7	43.7	-34.7	1.9	0.0	41.6	54.0	-12.4	Vertical	100	0	
26840.500	30.4	43.7	-36.3	1.9	0.0	39.7	54.0	-14.3	Vertical	100	0	
28883.000	30.0	43.8	-35.2	2.0	0.0	40.7	54.0	-13.3	Vertical	100	0	

22. Module Integration – Emissions

EUT Information	
Manufacturer	Fleetwood Group Inc
Product	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Charging + Rx

Test Site Information	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test Site Used	R29F
Antenna Types Used	Below 1GHz: Bilog (or equivalent) Above 1GHz: Double-ridged waveguide (or equivalent)
Notes	The cables were manually maximized during the preliminary emissions sweeps. The cable arrangement which resulted in the worst-case emissions was utilized.

Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	4.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 6 GHz)	3.1
Radiated disturbance (electric field strength on an open area test site or alternative test site) (6 GHz – 18 GHz)	3.2

Requirements
Per 996369 D04 Module Integration Guide v01: Testing of the host product with all the transmitters installed is recommended, to verify that the host product meets all the applicable FCC rules. The radio spectrum is to be investigated with all the transmitters in the final host product functioning to determine that no emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f). The testing shall also check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. No emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f).
FCC 15.247: In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30dB instead of 20dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).
FCC 15.250: Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in §15.209 provided it can be clearly demonstrated that those emissions are due solely to emissions from digital circuitry contained within the transmitter and the emissions are not intended to be radiated from the transmitter's antenna. Emissions from associated digital devices, as defined in § 15.3(k), e.g., emissions from digital circuitry used to control additional functions or capabilities other than the operation of the transmitter, are subject to the limits contained in subpart B of this part. Emissions from these digital circuits shall not be employed in determining the −10 dB bandwidth of the fundamental emission or the frequency at which the highest emission level occurs.
RSS-247: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30dB instead of 20dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Procedures

Radiated measurements were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles and anechoic absorber material is installed over the ferrite tiles. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2014 for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

Preliminary radiated emissions tests were performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3-meter distance from the EUT. The entire frequency range from 1 – 18GHz was investigated using a peak detector function.

The final open field emission tests were then manually performed over the frequency range of 1 – 18GHz.

1) For all harmonics not in the restricted bands, the following procedure was used:
   a) The field strength of the fundamental was measured using a double ridged waveguide antenna. The waveguide antenna was positioned at a 3-meter distance from the EUT. The EUT was placed on a 1.5-meter-high non-conductive stand. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.
   b) The field strengths of all of the harmonics not in the restricted band were then measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3-meter distance from the EUT. The EUT was placed on a non-conductive stand. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.
   c) To ensure that maximum or worst-case emission levels at the fundamental and harmonics were measured, the following steps were taken when measuring the fundamental emissions and the spurious emissions:
      i. The EUT was rotated so that all of its sides were exposed to the receiving antenna.
      ii. Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
      iii. The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.
   d) All harmonics not in the restricted bands must be at least 20dB below levels measured at the fundamental. However, attenuation below the general limits specified in §15.209(a) is not required.
2) For all emissions in the restricted bands, the following procedure was used:
   a) The field strengths of all emissions above 1GHz were measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3-meter distance from the EUT. The EUT was placed on a 1.5-meter-high non-conductive stand. A peak detector with a resolution bandwidth of 1MHz was used on the spectrum analyzer.
   b) To ensure that maximum (or worst case) emission levels were measured, the following steps were taken when taking all measurements:
      i. The EUT was rotated so that all of its sides were exposed to the receiving antenna.
      ii. Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
      iii. The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.

c) For all radiated emissions measurements above 1GHz, the peak readings must comply with the §15.35(b) limits. §15.35(b) states that when average radiated emissions measurements are specified, there also is a limit on the peak level of the radiated emissions. The limit on the peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. Therefore, all peak readings above 1GHz must be no greater than 20dB above the limits specified in §15.209(a).

d) Next, for all radiated emissions measurements above 1GHz, the resolution bandwidth was set to 1MHz. The analyzer was set to linear mode with a 10Hz video bandwidth in order to simulate an average detector and an average reading was taken.

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Pictures removed for short term confidentaility reasons.

Test Setup for Spurious Emissions: Above 1GHz, Horizontal Polarization

Pictures removed for short term confidentaility reasons.

Test Setup for Spurious Emissions: Above 1GHz, Vertical Polarization

Test Details	
Manufacturer	Fleetwood Group Inc
Model No.	HR350C-A
Serial No.	N/A
Test	Host Product Testing – Case Spurious Emissions
Mode	BLE
Frequency Tested	2402MHz
Notes	

Spurious Emissions in the Restricted Bands – Peak

Freq (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBµV/m)	Peak Total at 3m (µV/m)	Peak Limit at 3m (µV/m)	Margin (dB)
4804.00	H	49.26		4.82	35.92	-39.31	50.69	342.44	5000.00	-23.29
	V	49.23	Ambient	4.82	35.92	-39.31	50.66	341.26	5000.00	-23.32
12010.00	H	50.95	Ambient	6.87	41.08	-39.16	59.74	971.07	5000.00	-14.23
	V	49.49	Ambient	6.87	41.08	-39.16	58.28	820.82	5000.00	-15.69

Spurious Emissions in the Restricted Bands – Average

Freq (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle Factor (dB)	Average Total at 3m (dBµV/m)	Average Total at 3m (µV/m)	Average Limit at 3m (µV/m)	Margin (dB)
4804.00	H	35.81		4.82	35.92	-39.31	0.00	37.24	72.79	500.00	-16.74
	V	34.43	Ambient	4.82	35.92	-39.31	0.00	35.86	62.10	500.00	-18.12
12010.00	H	34.74	Ambient	6.87	41.08	-39.16	0.00	43.53	150.23	500.00	-10.44
	V	34.72	Ambient	6.87	41.08	-39.16	0.00	43.51	149.88	500.00	-10.46

Spurious Emissions in the Non-Restricted Bands – Peak

Freq (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBµV/m)	Peak Total at 3m (µV/m)	Peak Limit at 3m (µV/m)	Margin (dB)
2402.00	H	46.50		3.38	32.49	0.00	82.38	13145.62		
	V	54.06		3.38	32.49	0.00	89.94	31389.26		
7206.00	H	41.51		5.89	37.74	-39.42	45.72	193.23	3138.93	-24.21
	V	43.25		5.89	37.74	-39.42	47.46	236.09	3138.93	-22.47
9608.00	H	38.65	Ambient	6.27	39.18	-39.27	44.83	174.47	3138.93	-25.10
	V	39.05	Ambient	6.27	39.18	-39.27	45.23	182.69	3138.93	-24.70

Test Details	
Manufacturer	Fleetwood Group Inc
Model No.	HR350C-A
Serial No.	N/A
Test	Host Product Testing – Case Spurious Emissions
Mode	UBW
Frequency Tested	6489MHz
Notes	

Spurious Emissions in the Non-Restricted Bands – Peak

Freq (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBµV/m)	Peak Total at 3m (µV/m)	Peak Limit at 3m (µV/m)	Margin (dB)
6489.00	H	27.87		5.60	37.67	-39.40	31.73	38.60		
	V	30.50		5.60	37.67	-39.40	34.36	52.26		
12978.00	H	38.31	Ambient	7.01	41.66	-38.81	48.17	256.03	500.00	-5.81
	V	38.57	Ambient	7.01	41.66	-38.81	48.43	263.81	500.00	-5.55

23. Scope of Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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ELECTRICAL

Valid To: June 30, 2025 Certificate Number: 1786.01

In recognition of the successful completion of the A2LA Accreditation Program evaluation process, accreditation is granted to this laboratory to perform the following automotive electromagnetic compatibility and other electrical tests:

Test Technology:	Test Method(s)[1]:
Transient Immunity *(Max Voltage 60V/Max current 100A)*	ISO 7637-2 (including emissions); ISO 7637-3; ISO 16750-2:2012, Sections 4.6.3 and 4.6.4; CS-11979, Section 6.4; CS.00054, Section 5.9; EMC-CS-2009.1 (CI220); FMC1278 (CI220, CI221, CI222); GMW 3097, Section 3.5; SAE J1113-11; SAE J1113-12; ECE Regulation 10.06 Annex 10
Electrostatic Discharge (ESD) *(Up to +/-25kV)*	ISO 10605 (2001, 2008); CS-11979 Section 7.0; CS.00054, Section 5.10; EMC-CS-2009.1 (CI 280); FMC1278 (CI280); SAE J1113-13; GMW 3097 Section 3.6
Conducted Emissions	CISPR 25 (2002, 2008), Sections 6.2 and 6.3; CISPR 25 (2016), Sections 6.3 and 6.4; CS-11979, Section 5.1; CS.00054, Sections 5.6.1 and 5.6.2; GMW 3097, Section 3.3.2; EMC-CS-2009.1 (CE 420); FMC1278 (CE420, CE421, CE 430, CE440)

Test Technology:	Test Method(s)[1]:
Radiated Emissions Anechoic *(Up to 6GHz)*	CISPR 25 (2002, 2008), Section 6.4; CISPR 25 (2016), Section 6.5; CS-11979, Section 5.3; CS.00054, Section 5.6.3; GMW 3097, Section 3.3.1; EMC-CS-2009.1 (RE 310); FMC1278 (RE310, RE320);
Vehicle Radiated Emissions	CISPR 12; CISPR 36; ICES-002; ECE Regulation 10.06 Annex 5
Bulk Current Injection (BCI) *(1 to 400MHz 500mA)*	ISO 11452-4; CS-11979, Section 6.1; CS.00054, Section 5.8.1; GMW 3097, Section 3.4.1; SAE J1113-4; EMC-CS-2009.1 (RI112); FMC1278 (RI112); ECE Regulation 10.06 Annex 9
Radiated Immunity Anechoic *(Up to 6GHz and 200V/m)* *(Including Radar Pulse 600V/m)*	ISO 11452-2; CS-11979, Section 6.2; CS.00054, Section 5.8.2; GMW 3097, Section 3.4.2; EMC-CS-2009.1 (RI114); FMC1278 (RI114); SAE J1113-21; ECE Regulation 10.06 Annex 9
Radiated Immunity Magnetic Field	ISO 11452-8; FMC 1278 (RI140)
Radiated Immunity Reverb *(360MHz to 6GHz and 100V/m)*	ISO/IEC 61000-4-21; GMW 3097, Section 3.4.3; EMC-CS-2009.1 (RI114); FMC1278 (RI114); ISO 11452-11
Radiated Immunity *(Portable Transmitters)* *(Up to 6GHz and 20W)*	ISO 11452-9; EMC-CS-2009.1 (RI115); FMC1278 (RI115); GMW 3097, Sec 3.4.4
Vehicle Radiated Immunity (ALSE)	ISO 11451-2; ECE Regulation 10.06 Annex 6
Vehicle Product Specific EMC Standards	EN 14982; EN ISO 13309; ISO 13766; EN 50498; EC Regulation No. 2015/208; EN 55012
Electrical Loads	ISO 16750-2
Stripline	ISO 11452-5
Transverse Electromagnetic (TEM) Cell	ISO 11452-3

Test Technology:	Test Method(s)[1]:
Emissions	
Radiated and Conducted (3m Semi-anechoic chamber, up to 40 GHz)	47 CFR, FCC Part 15 B (using ANSI C63.4:2014); 47 CFR, FCC Part 18 (using FCC MP-5:1986); ICES-001; ICES-003; ICES-005; IEC/CISPR 11, Ed. 4.1 (2004-06); AS/NZS CISPR 11 (2004); IEC/CISPR 11 Ed 5 (2009-05) + A1 (2010); KN 11 (2008-5) with RRL Notice No. 2008-3 (May 20, 2008); CISPR 11; EN 55011; KS C 9811; CNS 13803 (1997, 2003); CISPR 14-1; EN 55014-1; AS/NZS CISPR 14.1; CISPR 16-2-1 (2008); CISPR 16-2-1; KS C 9814-1; KN 14-1; IEC/CISPR 22 (1997); EN 55022 (1998) + A1(2000); EN 55022 (1998) + A1(2000) + A2(2003); EN 55022 (2006); IEC/CISPR 22 (2008-09); AS/NZS CISPR 22 (2004); AS/NZS CISPR 22, 3rd Edition (2006); KN 22 (up to 6 GHz); CNS 13438 (up to 6 GHz); VCCI V-3 (up to 6 GHz); CISPR 32; EN 55032; KS C 9832; KN 32; ECE Regulation 10.06 Annex 7 (Broadband); ECE Regulation 10.06 Annex 8 (Narrowband); ECE Regulation 10.06 Annex 14 (Conducted)
Cellular Radiated Spurious Emissions	ETSI TS 151 010-1 GSM; 3GPP TS 51.010-1, Sec 12; ETSI TS 134 124 UMTS; 3GPP TS 34.124; ETSI TS 136 124 LTE; E-UTRA; 3GPP TS 36.124
Current Harmonics	IEC 61000-3-2; IEC 61000-3-12; EN 61000-3-2; KN 61000-3-2; KS C 9610-3-2; ECE Regulation 10.06 Annex 11
Flicker and Fluctuations	IEC 61000-3-3; IEC 61000-3-11; EN 61000-3-3; KN 61000-3-3; KS C 9610-3-3; ECE Regulation 10.06 Annex 12
Immunity	
Electrostatic Discharge	IEC 61000-4-2, Ed. 1.2 (2001); IEC 61000-4-2 (1995) + A1(1998) + A2(2000); EN 61000-4-2 (1995); EN 61000-4-2 (2009-05); KN 61000-4-2 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); IEC 61000-4-2; EN 61000-4-2; KN 61000-4-2; KS C 9610-4-2; IEEE C37.90.3 2001
Radiated Immunity	IEC 61000-4-3 (1995) + A1(1998) + A2(2000); IEC 61000-4-3, Ed. 3.0 (2006-02); IEC 61000-4-3, Ed. 3.2 (2010); KN 61000-4-3 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); IEC 61000-4-3; EN 61000-4-3; KN 61000-4-3; KS C 9610-4-3; IEEE C37.90.2 2004

Test Technology:	Test Method(s)[1]:
Immunity (cont'd)	
Electrical Fast Transient/Burst	IEC 61000-4-4, Ed. 2.0 (2004-07); IEC 61000-4-4, Ed. 2.1 (2011); IEC 61000-4-4 (1995) + A1(2000) + A2(2001); KN 61000-4-4 (2008-5); RRL Notice No. 2008-5 (May 20, 2008); IEC 61000-4-4; EN 61000-4-4; KN 61000-4-4; KS C 9610-4-4; ECE Regulation 10.06 Annex 15
Surge	IEC 61000-4-5 (1995) + A1(2000); IEC 61000-4-5, Ed 1.1 (2005-11); EN 61000-4-5 (1995) + A1(2001); KN 61000-4-5 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); IEC 61000-4-5; EN 61000-4-5; KN 61000-4-5; KS C 9610-4-5; IEEE C37.90.1 2012; IEEE STD C62.41.2 2002; ECE Regulation 10.06 Annex 16
Conducted Immunity	IEC 61000-4-6 (1996) + A1(2000); IEC 61000-4-6, Ed 2.0 (2006-05); IEC 61000-4-6 Ed. 3.0 (2008); KN 61000-4-6 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); EN 61000-4-6 (1996) + A1(2001); IEC 61000-4-6; EN 61000-4-6; KN 61000-4-6; KS C 9610-4-6
Power Frequency Magnetic Field Immunity (*Down to 3 A/m*)	IEC 61000-4-8 (1993) + A1(2000); IEC 61000-4-8 (2009); EN 61000-4-8 (1994) + A1(2000); KN 61000-4-8 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); IEC 61000-4-8; EN 61000-4-8; KN 61000-4-8; KS C 9610-4-8
Voltage Dips, Short Interrupts, and Line Voltage Variations	IEC 61000-4-11, Ed. 2 (2004-03); KN 61000-4-11 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); IEC 61000-4-11; EN 61000-4-11; KN 61000-4-11; KS C 9610-4-11
Ring Wave	IEC 61000-4-12, Ed. 2 (2006-09); EN 61000-4-12:2006; IEC 61000-4-12; EN 61000-4-12; KN 61000-4-12; IEEE STD C62.41.2 2002

Test Technology:	Test Method(s)[1]:
Generic and Product Specific EMC Standards	IEC/EN 61000-6-1; AS/NZS 61000-6-1; KN 61000-6-1; KS C 9610-6-1; IEC/EN 61000-6-2; AS/NZS 61000-6-2; KN 61000-6-2; KS C 9610-6-2; IEC/EN 61000-6-3; AS/NZS 61000-6-3; KN 61000-6-3; KS C 9610-6-3; IEC/EN 61000-6-4; AS/NZS 61000-6-4; KN 61000-6-4; KS C 9610-6-4; EN 50130-4; EN 61326-1; EN 50121-3-2; EN 12895; EN 50270; EN 50491-1; EN 50491-2; EN 50491-3; EN 55015; EN 60730-1; EN 60945; IEC 60533; EN 61326-2-6; EN 61800-3; IEC/CISPR 14-2; EN 55014-2; AS/NZS CISPR 14.2; KN 14-2; KS C 9814-2; IEC/CISPR 24; AS/NZS CISPR 24; EN 55024; KN 24; IEC/CISPR 35; AS/NZS CISPR 35; EN 55035; KN 35; KS C 9835; IEC 60601-1-2; JIS T0601-1-2
TxRx EMC Requirements	EN 301 489-1; EN 301 489-3; EN 301 489-9; EN 301 489-17; EN 301 489-19; EN 301 489-20
European Radio Test Standards	ETSI EN 300 086-1; ETSI EN 300 086-2; ETSI EN 300 113-1; ETSI EN 300 113-2; ETSI EN 300 220-1; ETSI EN 300 220-2; ETSI EN 300 220-3-1; ETSI EN 300 220-3-2; ETSI EN 300 330-1; ETSI EN 300 330-2; ETSI EN 300 440-1; ETSI EN 300 440-2; ETSI EN 300 422-1; ETSI EN 300 422-2; ETSI EN 300 328; ETSI EN 301 893; ETSI EN 301 511; ETSI EN 301 908-1; ETSI EN 908-2; ETSI EN 908-13; ETSI EN 303 413; ETSI EN 302 502; EN 303 340; EN 303 345-2; EN 303 345-3; EN 303 345-4
Canadian Radio Tests	RSS-102 measurement (RF Exposure Evaluation); RSS-102 measurement (Nerve Stimulation); SPR-002; RSS-111; RSS-112; RSS-117; RSS-119; RSS-123; RSS-125; RSS-127; RSS-130; RSS-131; RSS-132; RSS-133; RSS-134; RSS-135; RSS-137; RSS-139; RSS-140; RSS-141; RSS-142; RSS-170; RSS-181; RSS-182; RSS-191; RSS-192; RSS-194; RSS-195; RSS-196; RSS-197; RSS-199; RSS-210; RSS-211; RSS-213; RSS-215; RSS-216; RSS-220; RSS-222; RSS-236; RSS-238; RSS-243; RSS-244; RSS-247; RSS-248; RSS-251; RSS-252; RSS-287; RSS-288; RSS-310; RSS-GEN
Mexico Radio Tests	IFT-008-2015; NOM-208-SCFI-2016
Japan Radio Tests	Radio Law No. 131, Ordinance of MPT No. 37, 1981, MIC Notification No. 88:2004, Table No. 22-11; ARIB STD-T66, Regulation 18
Taiwan Radio Tests	LP-0002 (July 15, 2020)

Test Technology:	Test Method(s)[1]:
Australia/New Zealand Radio Tests	AS/NZS 4268; Radiocommunications (Short Range Devices) Standard (2014)
Hong Kong Radio Tests	HKCA 1039 Issue 6; HKCA 1042; HKCA 1033 Issue 7; HKCA 1061; HKCA 1008; HKCA 1043; HKCA 1057; HKCA 1073
Korean Radio Test Standards	KN 301 489-1; KN 301 489-3; KN 301 489-9; KN 301 489-17; KN 301 489-52; KS X 3124; KS X 3125; KS X 3130; KS X 3126; KS X 3129
Vietnam Radio Test Standards	QCVN 47:2015/BTTTT; QCVN 54:2020/BTTTT; QCVN 55:2011/BTTTT; QCVN 65:2013/BTTTT; QCVN 73:2013/BTTTT; QCVN 74:2020/BTTTT; QCVN 112:2017/BTTTT; QCVN 117:2020//BTTTT
Vietnam EMC Test Standards	QCVN 18:2014/BTTTT; QCVN 86:2019/BTTTT; QCVN 96:2015/BTTTT; QCVN 118:2018/BTTTT
Unlicensed Radio Frequency Devices *(3 Meter Semi-Anechoic Room)*	47 CFR FCC Part 15C, 15D, 15E, 15F, 15G, 15H (using ANSI C63.10:2013, ANSI C63.17:2013 and FCC KDB 905462 D02 (v02))
Licensed Radio Service Equipment	47 CFR FCC Parts 20, 22, 24, 25, 27, 30, 73, 74, 80, 87, 90, 95, 96, 97, 101 (using ANSI/TIA-603-E, TIA-102.CAAA-E, ANSI C63.26:2015)
OTA (Over the Air) Performance GSM, GPRS, EGPRS UMTS (W-CDMA) LTE including CAT M1 A-GPS for UMTS/GSM LTS A-GPS, A-GLONASS, SIB8/SIB16 Large Device/Laptop/Tablet Testing Integrated Device Testing WiFi 802.11 a/b/g/n/a	CTIA Test Plan for Wireless Device Over-the-Air Performance (Method for Measurement for Radiated Power and Receiver Performance) V3.8.2; CTIA Test Plan for RF Performance Evaluation of WiFi Mobile Converged Devices V2.1.0

Test Technology:	Test Method(s)[1]:
Electrical Measurements and Simulation	
AC Voltage / Current (1mV to 5kV) 60 Hz (0.1V to 250V) up to 500 MHz (1μA to 150A) 60 Hz	FAA AC 150/5345-10H; FAA AC 150/5345-43J; FAA AC 150/5345-44K; FAA AC 150/5345-46E; FAA AC 150/5345-47C;
DC Voltage / Current (1mV to 15 kV) / (1μA to 10A)	FAA EB 67D
Power Factor / Efficiency / Crest Factor (Power to 30kW)	
Resistance (1mΩ to 4000MΩ)	
Surge (Up to 10 kV / 5 kA) (Combination Wave and Ring Wave)	

On the following products and materials:
Telecommunications Terminal Equipment (TTE), Radio Equipment, Network Equipment, Information Technology Equipment (ITE), Automotive Electronic Equipment, Automotive Hybrid Electronic Devices, Maritime Navigation and Radio Communication Equipment and Systems, Vehicles, Boats and Internal Combustion Engine Driven Devices, Automotive, Aviation, and General Lighting Products, Medical Electrical Equipment, Motors, Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment, Household Appliances, Electric Tools, Low-voltage Switchgear and Control gear, Programmable Controllers, Electrical Equipment for Measurement, Control and Laboratory Use, Base Materials, Power and Data Transmission Cables and Connectors

[1] When the date, edition, version, etc. is not identified in the scope of accreditation, laboratories may use the version that immediately precedes the current version for a period of one year from the date of publication of the standard measurement method, per part C., Section 1 of A2LA *R101 - General Requirements - Accreditation of ISO-IEC 17025 Laboratories*.

Testing Activities Performed in Support of FCC Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1[2]

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
Unintentional Radiators Part 15B	ANSI C63.4:2014	40000
Industrial, Scientific, and Medical Equipment Part 18	FCC MP-5 (February 1986)	40000
Intentional Radiators Part 15C	ANSI C63.10:2013	40000

Testing Activities Performed in Support of FCC Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1[2]

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
Unlicensed Personal Communication Systems Devices Part 15D	ANSI C63.17:2013	40000
U-NII without DFS Intentional Radiators Part 15E	ANSI C63.10:2013	40000
U-NII with DFS Intentional Radiators Part 15E	FCC KDB 905462 D02 (v02)	40000
UWB Intentional Radiators Part 15F	ANSI C63.10:2013	40000
BPL Intentional Radiators Part 15G	ANSI C63.10:2013	40000
White Space Device Intentional Radiators Part 15H	ANSI C63.10:2013	40000
Commercial Mobile Services (FCC Licensed Radio Service Equipment) Parts 22 (cellular), 24, 25 (below 3 GHz), and 27	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
General Mobile Radio Services (FCC Licensed Radio Service Equipment) Parts 22 (non-cellular), 90 (below 3 GHz), 95, 97, and 101 (below 3 GHz)	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
Citizens Broadband Radio Services (FCC Licensed Radio Service Equipment) Part 96	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
Maritime and Aviation Radio Services Parts 80 and 87	ANSI/TIA-603-E; ANSI C63.26:2015	40000
Microwave and Millimeter Bands Radio Services Parts 25, 30, 74, 90 (above 3 GHz), 97 (above 3 GHz), and 101	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000

Testing Activities Performed in Support of FCC Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1[2]

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
Broadcast Radio Services		
Parts 73 and 74 (below 3 GHz)	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
Signal Boosters		
Part 20 (Wideband Consumer Signal Boosters, Provider-specific signal boosters, and Industrial Signal Boosters) Section 90.219	ANSI C63.26:2015	40000

[2] Accreditation does not imply acceptance to the FCC equipment authorization program. Please see the FCC website (https://apps.fcc.gov/oetcf/eas/) for a listing of FCC approved laboratories.

Accredited Laboratory

A2LA has accredited

ELITE ELECTRONIC ENGINEERING INC.

Downers Grove, IL

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 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 15th day of August 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1786.01
Valid to June 30, 2025

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