Engineering Test Report No. 2301081-04

Report Date	December 21, 2023
Manufacturer Name	Fleetwood Group Inc
Manufacturer Address	11832 James Street Holland, MI 49424
Test Item Name 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 95, Subpart J
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
Tested by	Tylar Jozefczyk Mark Longinotti
Signature	Raymond J Klouda
Approved by	Raymond J. Klouda, Registered Professional Engineer of Illinois – 44894
PO Number	P63458

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 test specifications. The data presented in this test report pertains to the EUT on the test dates 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. This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the Federal Government.

Table of Contents

1. Report Revision History

Revision	Date	Description
–	27 DEC 2023	Initial Release of Engineering Test Report No. 2301081-04

2. Introduction

2.1. Scope of Tests

This document presents the results of a series of RF emissions tests that were performed on the Fleetwood Group Inc Heel Collar (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was manufactured and submitted for testing by Fleetwood Group Inc located in Holland, MI.

2.2. Purpose

The test series was performed to determine if the Fleetwood Group Inc Heel Collar meets the RF emission requirements of FCC "Code of Federal Regulations" Title 47 Part 95, Subpart J.

Testing was performed in accordance with ANSI C63.26-2015.

2.3. Identification of the EUT

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

EUT Identification	
Product Description	Heel Collar
Model/Part No.	HR350C-A
Serial No.	N/A
Size of EUT	3.560 x 2.069 x 1.436 inch
Software/Firmware Version	N/A
Device Type	MURS
Band of Operation	151.82MHz, 151.94MHz
Antenna Type	Ground Plane Dipole
Emission Classification	F1D

3. Power Input

The EUT was powered by 3.8VDC from an internal battery.

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 EUT and all peripheral equipment were energized. The unit was programmed to transmit in one of the following modes:

Mode	Description
Rx	The EUT was powered on and set to receive at 151.94MHz.
Tx	The EUT was powered on and set to transmit at one of the following frequencies: - 151.82MHz - 151.94MHz

9. Test Specifications

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

- Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter D, Part 95, Subpart J – "Multi-Use Radio Service"

- 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 C63.26-2015 – "American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services"

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 95, Subpart J and ANSI C63.26-2015 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 ambient parameters of the laboratory during testing were as follows:

Ambient Parameters	Value
Temperature	22.6°C
Relative Humidity	31%
Atmospheric Pressure	1008.2mb

13. Summary

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

Test Description	Requirements	Test Method	Result
Receiver Radiated Emissions	FCC 15.109	ANSI C63.4:2014	Conforms
26dB Bandwidth	FCC 2.1049 FCC 95.2773	ANSI C63.26:2015	Conforms
Maximum Peak Conducted Output Power	FCC 2.1046 FCC 95.2767	ANSI C63.26:2015	Conforms
Unwanted Spurious Emissions – Emission Mask	FCC 95.2779	ANSI C63.26:2015	Conforms
Antenna Conducted Spurious Emissions	FCC 2.1051 FCC 95.2779	ANSI C63.26:2015	Conforms
Case Spurious Radiated Emissions	FCC 2.1053 FCC 95.2779	ANSI C63.26:2015	Conforms
Frequency Stability	FCC 2.1055 FCC 95.2765	ANSI C63.26:2015	Conforms

14. Sample Calculations

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 95, Subpart J.

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 95, Subpart J test specifications. The data presented in this test report pertains to the EUT 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

Pictures removed for short term confidentaility reasons.

Pictures removed for short term confidentaility reasons.

Pictures removed for short term confidentaility reasons.
Pictures removed for short term confidentaility reasons.

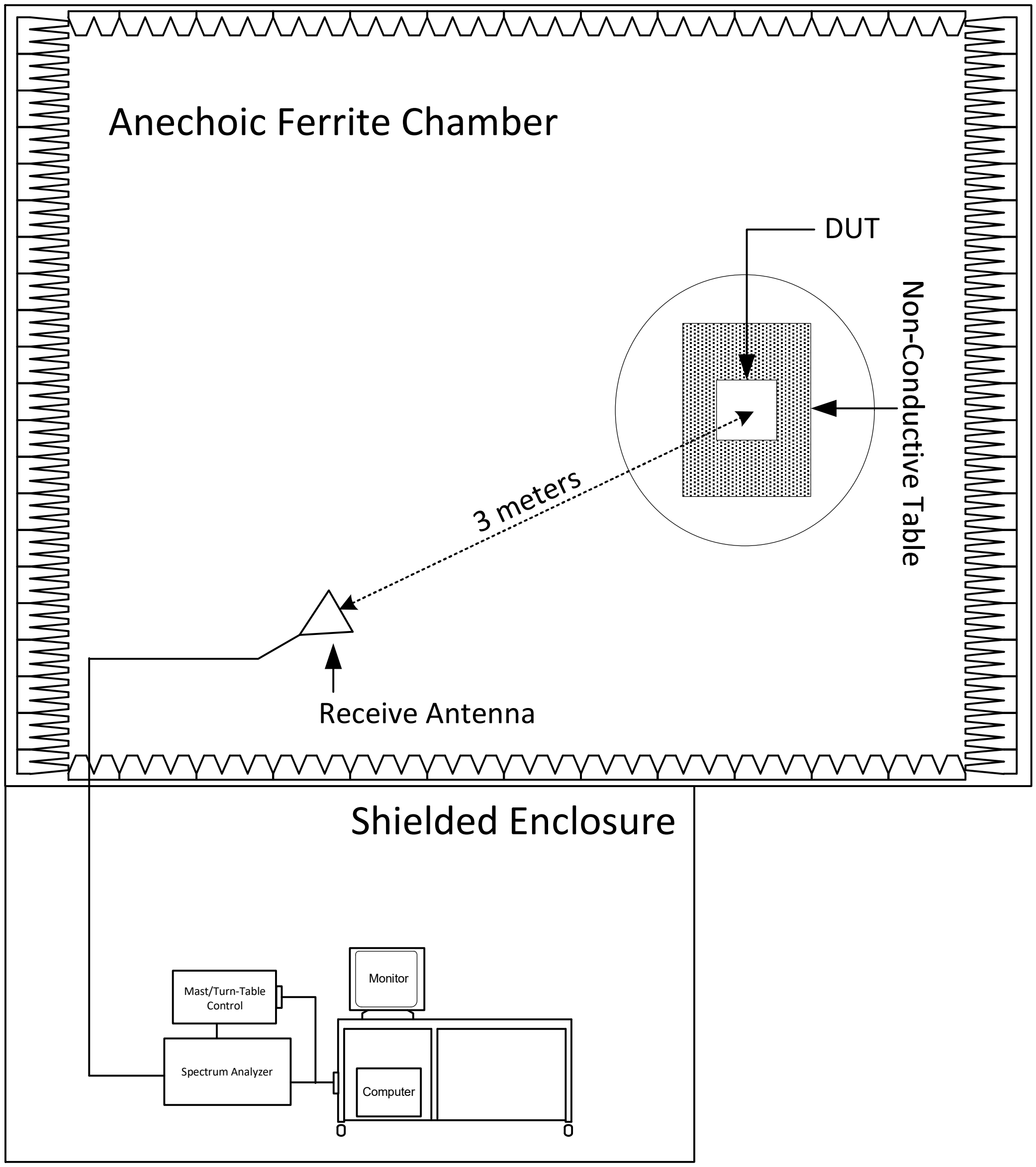
18. Equipment List

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
CDZ3	LAB WORKSTATION	ELITE	LWS-10		WINDOWS 10	CNR	
EMCE01	TEMPERATURE CHAMBER	THERMOTRON	S-4	34537	-70C to 180C	7/3/2023	7/3/2024
GRE0	SIGNAL GENERATOR	AGILENT TECHNOLOGIES	E4438C	MY42083127	250KHZ-6GHZ	5/17/2023	5/17/2024
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
SMA27	POWER SUPPLY	VOLTEQ	HY3030EX	180700221	30V/30A	NOTE 1	
VBV2	CISPR EN FCC ICES RE.EXE	ELITE	CISPR EN FCC ICES RE.EXE	---	---	N/A	
XOA1	WAVE-TO-COAX ADAPTER	HEWLETT PACKARD	R281A	02119	26.5-65GHZ	NOTE 1	
XOB2	ADAPTER	HEWLETT PACKARD	K281C,012	09407	18-26.5GHZ	NOTE 1	
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. Receiver Radiated Emissions

EUT Information	
Manufacturer	Fleetwood Group Inc
Product	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	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)
Highest Internal Frequency	151.94MHz
Highest Measurement Frequency	2GHz
Notes	The cables were manually maximized during the preliminary emissions sweeps. The cable arrangement which resulted in the worst-case emissions was utilized. One receive frequency (one located in the center of the transmitting band) was tested.

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

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

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
Radiated Emissions Limits (Above 1GHz)		
Frequency of Emission (MHz)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)
Above 1000	74	54

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 – 2GHz 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. 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.

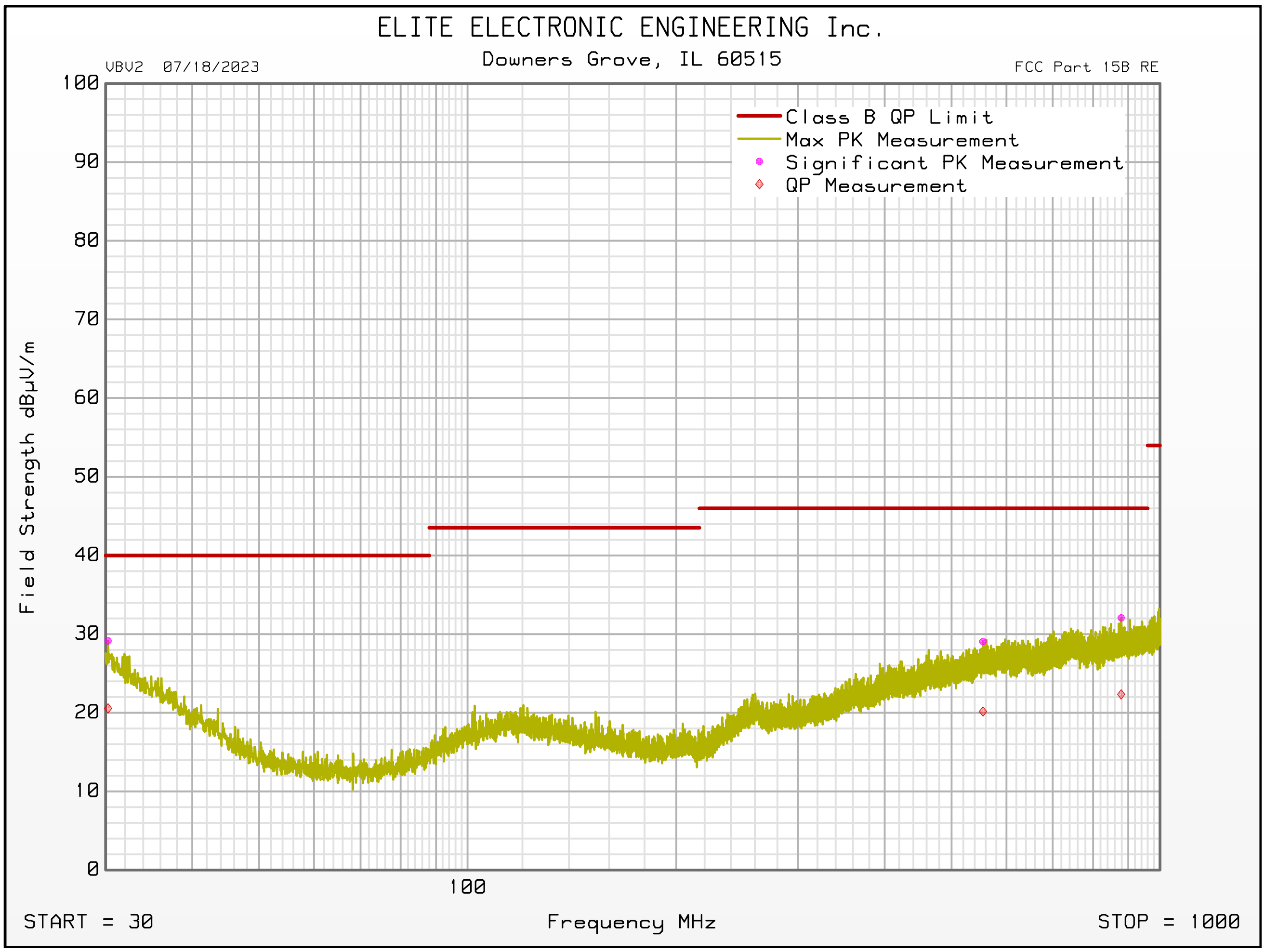
Pictures removed for short term confidentaility reasons.
Test Setup for Radiated Emissions: 30MHz to 1GHz, Horizontal Polarization
Pictures removed for short term confidentaility reasons.
Test Setup for Radiated Emissions: 30MHz to 1GHz, Vertical Polarization

Pictures removed for short term confidentaility reasons.
Test Setup for Radiated Emissions: 1 – 2GHz, Horizontal Polarization
Pictures removed for short term confidentaility reasons.
Test Setup for Radiated Emissions: 1 – 2GHz, Vertical Polarization

FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

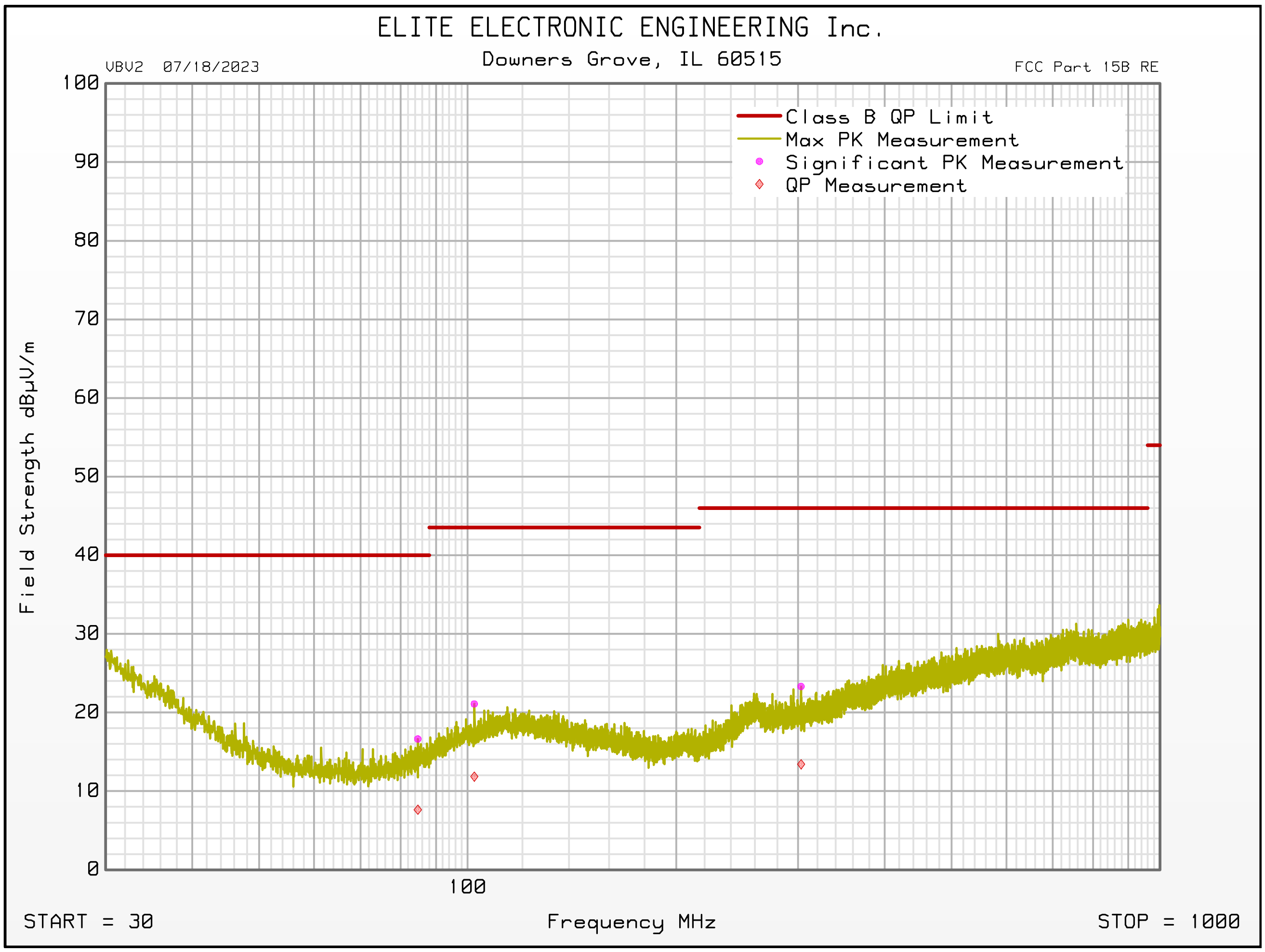
Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Rx at 151.820MHz
Turntable Step Angle (°)	:	45
Mast Positions (cm)	:	120, 200, 340
Antenna Polarization	:	Horizontal
Scan Type	:	Stepped Scan
Test RBW	:	120 kHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 25, 2023 08:29:21 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	:	Rx at 151.820MHz
Turntable Step Angle (°)	:	45
Mast Positions (cm)	:	120, 200, 340
Antenna Polarization	:	Vertical
Scan Type	:	Stepped Scan
Test RBW	:	120 kHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 25, 2023 08:29:21 AM



FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

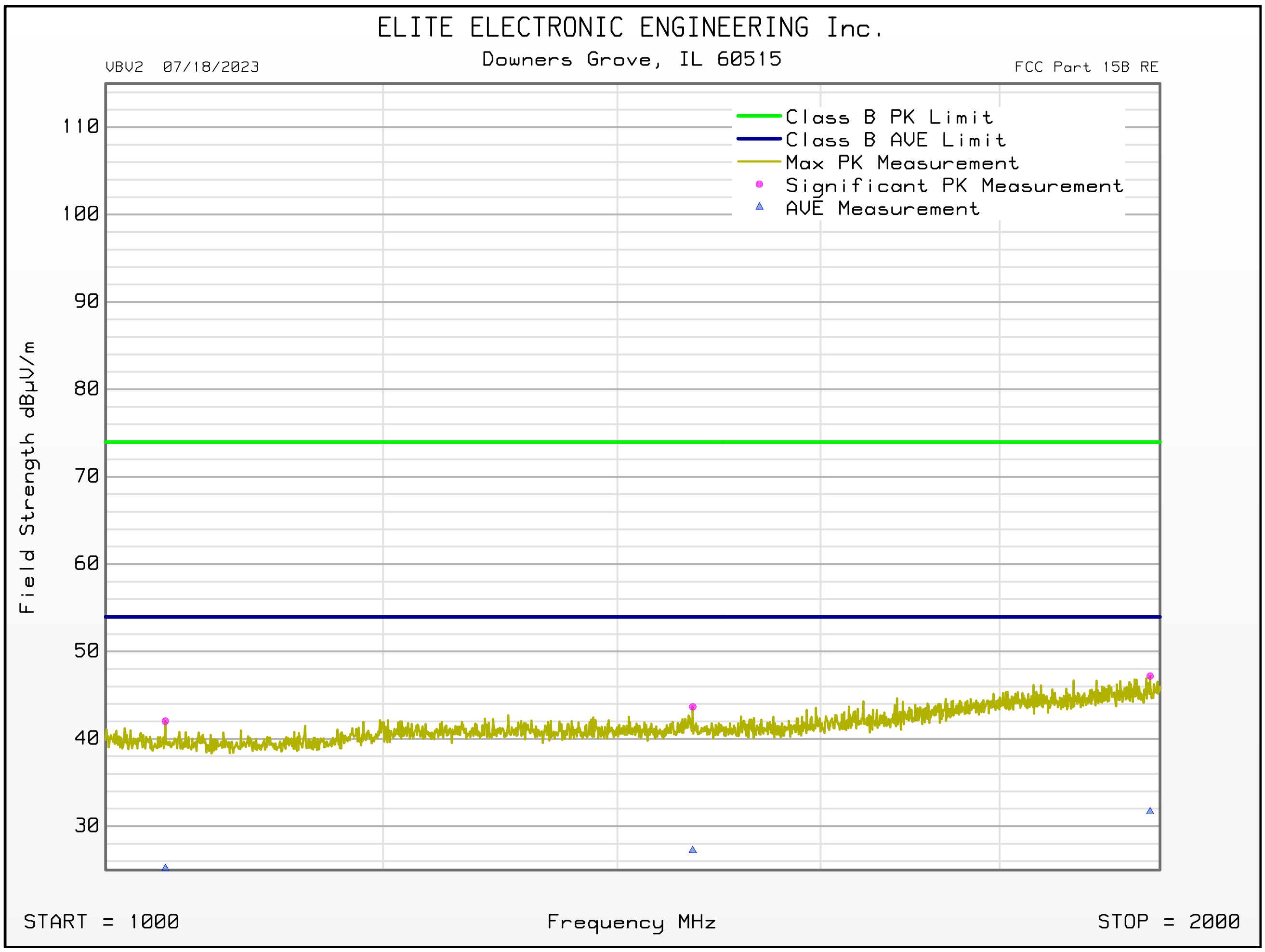
Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Rx at 151.820MHz
Turntable Step Angle (°)	:	45
Mast Positions (cm)	:	120, 200, 340
Scan Type	:	Stepped Scan
Test RBW	:	120 kHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 25, 2023 08:29:21 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
30.240	4.4	-4.2	24.4	0.0	0.3	0.0	29.1	20.6	40.0	-19.4	Horizontal	200	315	
84.720	2.3	-6.7	13.7	0.0	0.6	0.0	16.6	7.6	40.0	-32.4	Vertical	120	45	
102.220	3.3	-6.0	17.2	0.0	0.6	0.0	21.1	11.9	43.5	-31.7	Vertical	120	0	
303.060	3.2	-6.7	19.0	0.0	1.1	0.0	23.3	13.4	46.0	-32.6	Vertical	120	225	
554.760	2.9	-6.0	24.7	0.0	1.4	0.0	29.0	20.2	46.0	-25.8	Horizontal	200	225	
878.700	3.8	-6.0	26.5	0.0	1.8	0.0	32.1	22.3	46.0	-23.7	Horizontal	340	90	

FCC Part 15B Class B
Radiated RF Emissions Test

SW ID/Rev: VBV2 07/18/2023

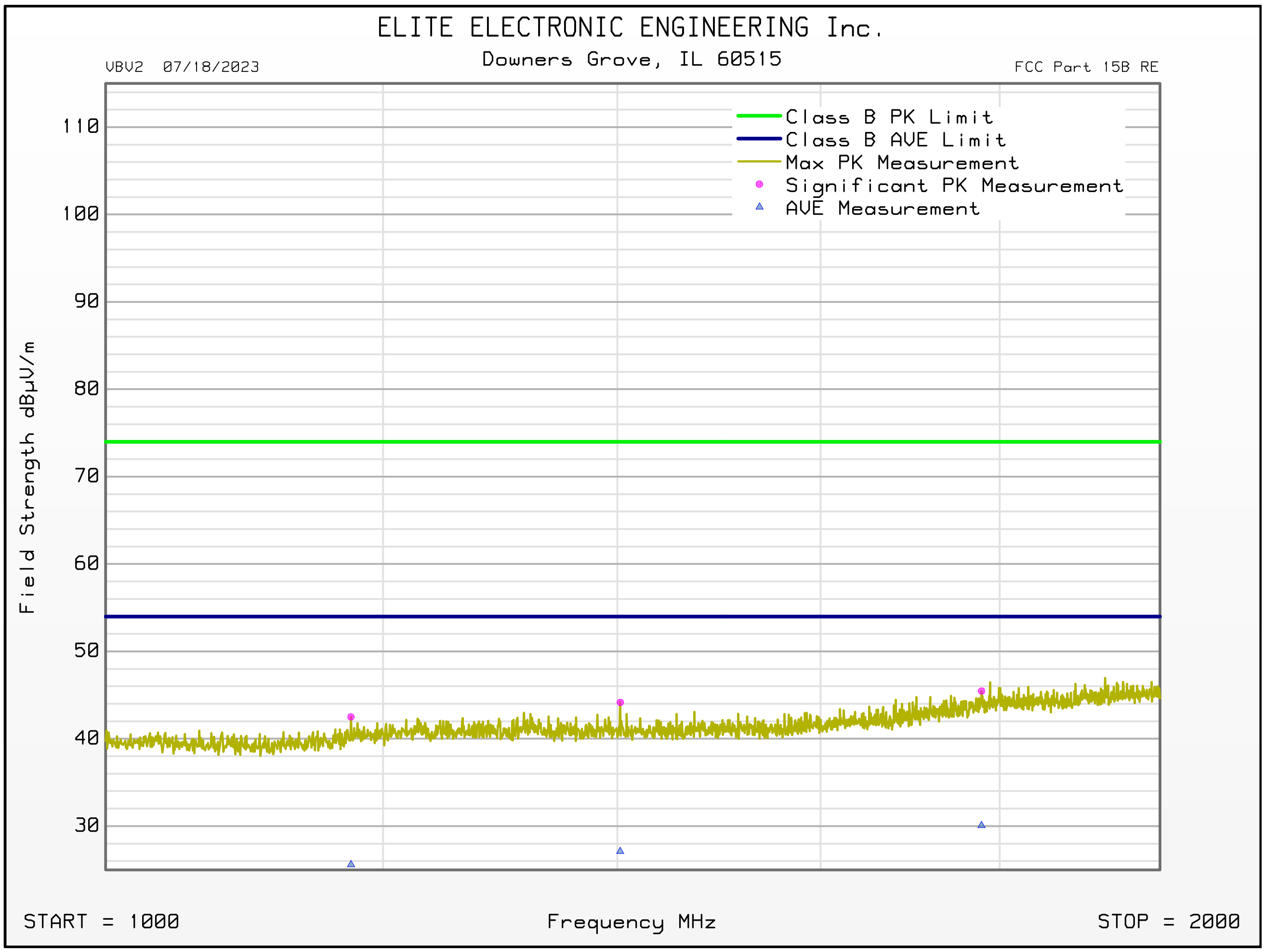
Manufacturer	:	Fleetwood Group
Model	:	Collar
Serial Number	:	
DUT Mode	:	Rx at 151.820MHz
Turntable Step Angle (°)	:	45
Mast Positions (cm)	:	120, 200, 340
Antenna Polarization	:	Horizontal
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 26, 2023 07:56:45 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	:	Rx at 151.820MHz
Turntable Step Angle (°)	:	45
Mast Positions (cm)	:	120, 200, 340
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 26, 2023 07:56:45 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	:	Rx at 151.820MHz
Turntable Step Angle (°)	:	45
Mast Positions (cm)	:	120, 200, 340
Scan Type	:	Stepped Scan
Test RBW	:	1 MHz
Prelim Dwell Time (s)	:	0.0001
Notes	:	
Test Engineer	:	M. Longinotti
Test Date	:	Sep 26, 2023 07:56:45 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
1040.000	12.9	27.3	0.0	1.9	0.0	42.0	74.0	-31.9	Horizontal	340	315	
1175.000	12.4	28.1	0.0	2.0	0.0	42.5	74.0	-31.5	Vertical	200	180	
1402.500	13.3	28.6	0.0	2.2	0.0	44.2	74.0	-29.8	Vertical	120	315	
1471.000	12.9	28.5	0.0	2.3	0.0	43.7	74.0	-30.3	Horizontal	200	0	
1778.500	12.7	30.2	0.0	2.5	0.0	45.5	74.0	-28.5	Vertical	200	135	
1987.000	13.1	31.4	0.0	2.7	0.0	47.2	74.0	-26.8	Horizontal	120	315	

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
1040.000	-4.0	27.3	0.0	1.9	0.0	25.2	54.0	-28.8	Horizontal	340	315	
1175.000	-4.5	28.1	0.0	2.0	0.0	25.6	54.0	-28.4	Vertical	200	180	
1402.500	-3.7	28.6	0.0	2.2	0.0	27.1	54.0	-26.9	Vertical	120	315	
1471.000	-3.6	28.5	0.0	2.3	0.0	27.2	54.0	-26.8	Horizontal	200	0	
1778.500	-2.7	30.2	0.0	2.5	0.0	30.1	54.0	-23.9	Vertical	200	135	
1987.000	-2.4	31.4	0.0	2.7	0.0	31.7	54.0	-22.3	Horizontal	120	315	

21. 26dB Bandwidth

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

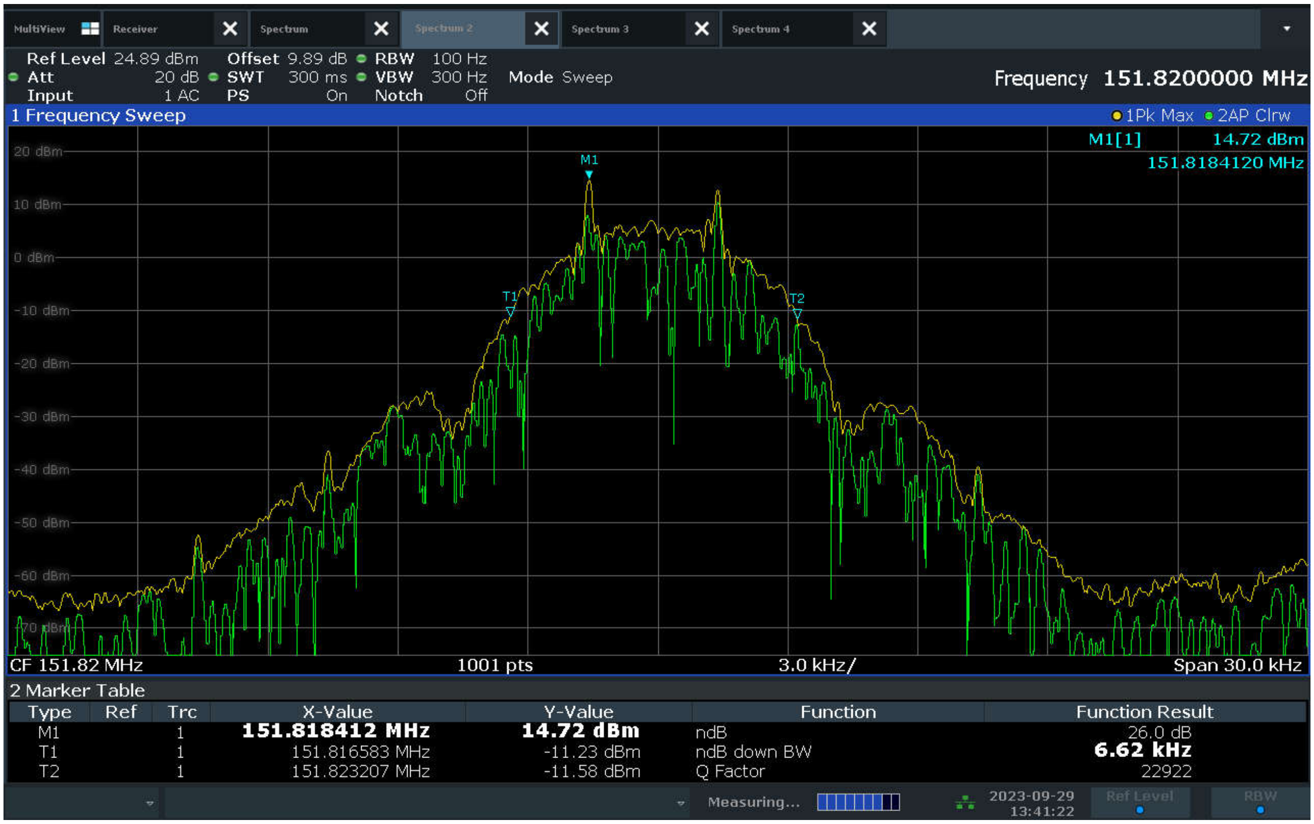
Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Measurement Method	Antenna Conducted
Type of Test Site	Tabletop
Test Site Used	N/A
Antenna Type Used	N/A
Notes	

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

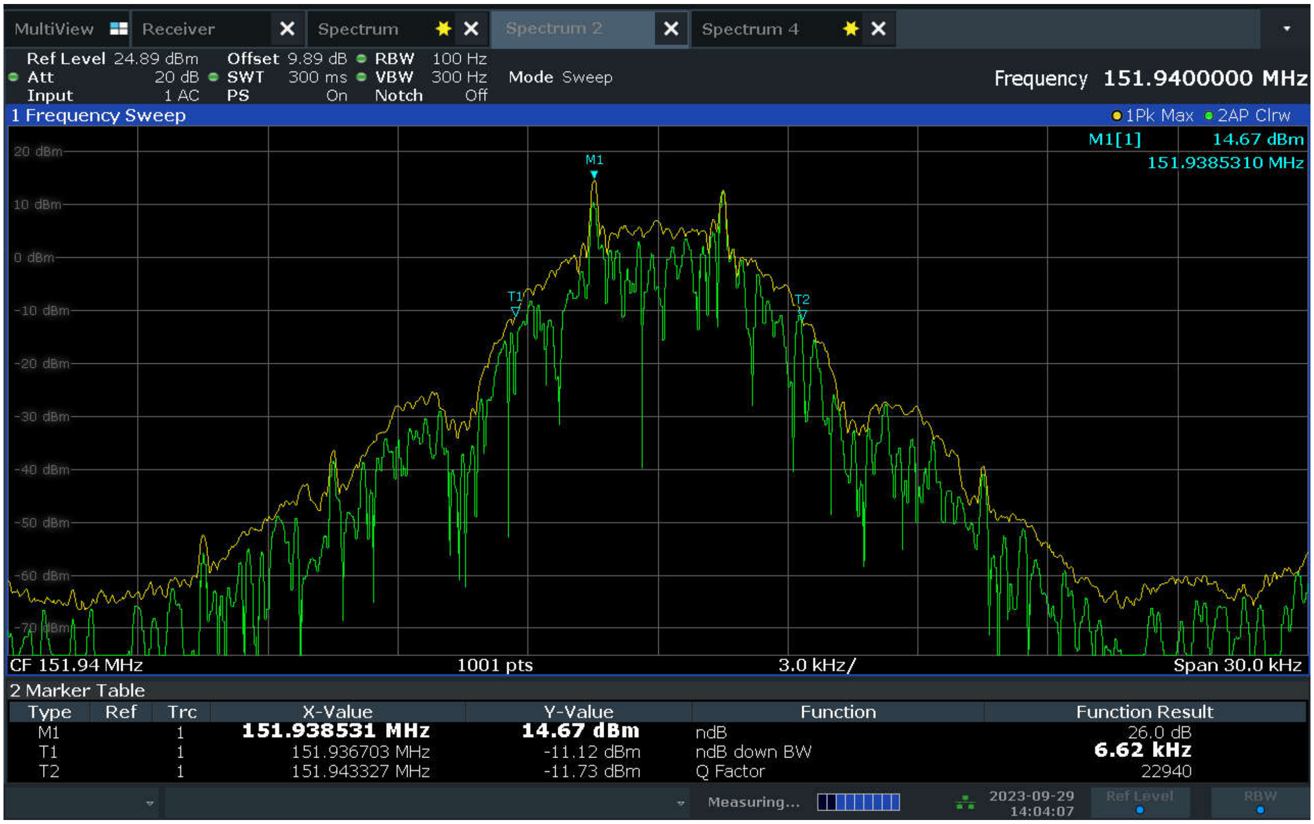
Requirement
Per FCC § 95.2773, the occupied bandwidth of emissions transmitted on the center frequencies 151.820MHz, 151.880MHz, and 151.940MHz must not exceed 11.25kHz

Procedure
The antenna port of the EUT was connected to the receiver through 10dB of attenuation. The EUT was allowed to transmit continuously. The transmit channel was set separately to the low and high channels. The resolution bandwidth (RBW) was set to 100Hz, the video bandwidth (VBW) was set to the same as or 3 times greater than the RBW, and the span was set to 3 times the RBW. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. The analyzer's display was then screenshot and saved.

Test Details	
Manufacturer	Fleetwood Group Inc
EUT	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx
Frequency Tested	151.82MHz
Result	26dB BW = 6.62kHz
Notes	



Test Details	
Manufacturer	Fleetwood Group Inc
EUT	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx
Frequency Tested	151.94MHz
Result	26dB BW = 6.62kHz
Notes	



22. Maximum Peak Conducted Output Power

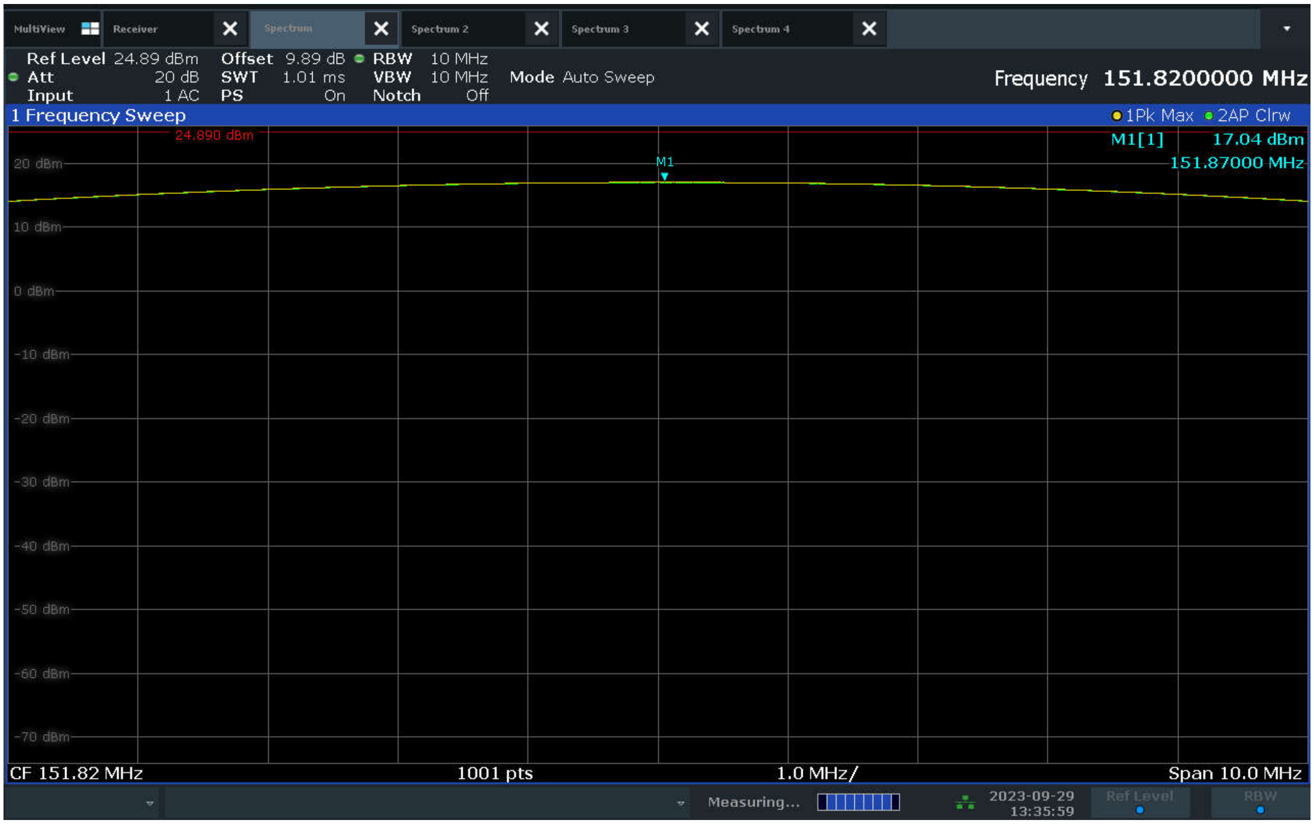
EUT Information	
Manufacturer	Fleetwood Group Inc
Product	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Measurement Method	Antenna Conducted
Type of Test Site	Tabletop
Test Site Used	N/A
Notes	

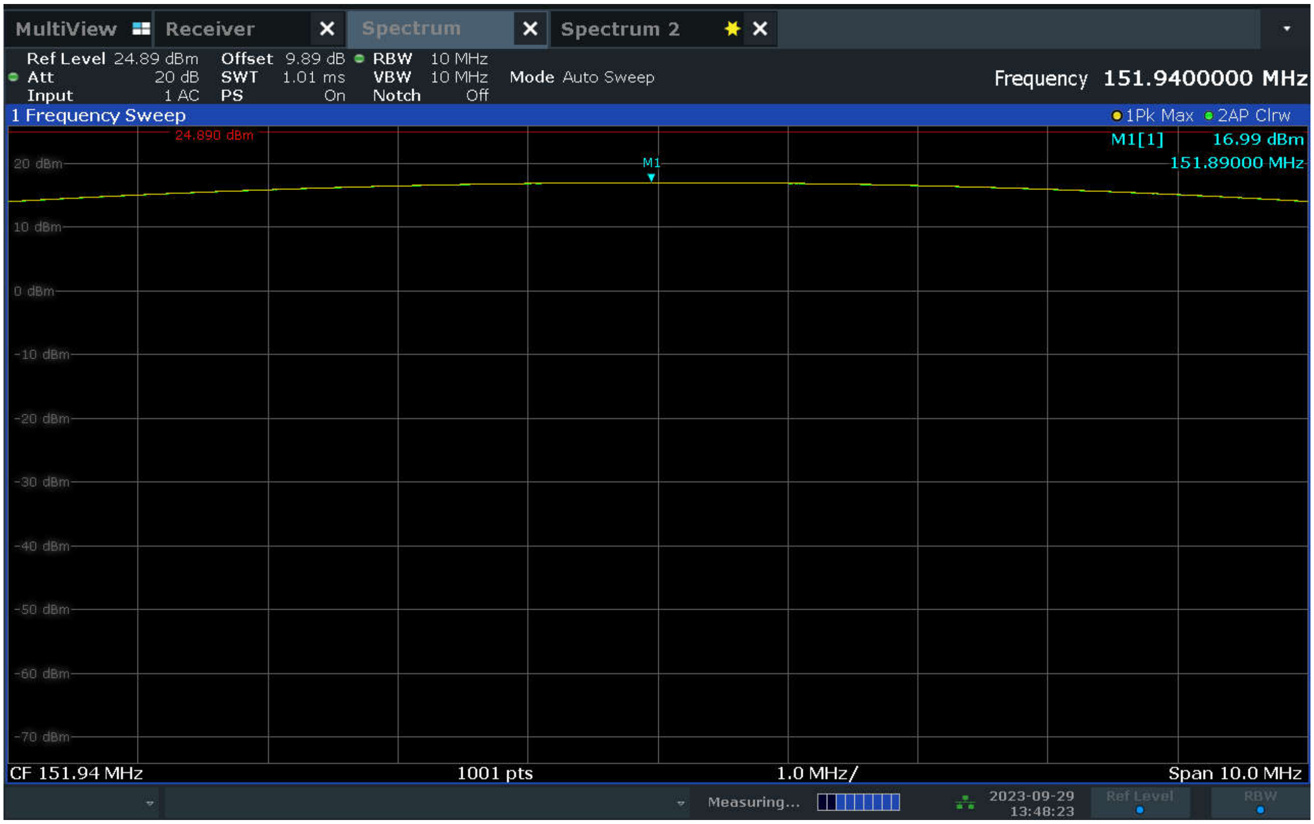
Requirement
Per FCC § 95.2767, the output power shall not exceed 2W (33dBm).

Procedure
The antenna port of the EUT was connected to the receiver through 10dB of attenuation. The EUT was set to transmit separately at the low and high channels. The resolution bandwidth (RBW) was set to greater than the 26dB bandwidth. The span was set to greater than 3 times the RBW. The 'Max-Hold' function was engaged. The maximum meter reading was recorded and the peak power output was calculated.

Test Details	
Manufacturer	Fleetwood Group Inc
EUT	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx
Frequency Tested	151.82MHz
Result	Output Power = 0.05W (17.04dBm)
Notes	



Test Details	
Manufacturer	Fleetwood Group Inc
EUT	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx
Frequency Tested	151.94MHz
Result	Output Power = 0.05W (16.99dBm)
Notes	



23. Unwanted Spurious Emissions – Emission Mask

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

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test Site Used	R29F
Type of Antennas Used	N/A
Notes	N/A

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

Requirements

FCC 95.2779(a)

On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5kHz: at least 50 + 10log(P) dB or 70dB, whichever is the lesser attenuation.

Channel Center Frequencies (MHz)	Paragraphs
151.820, 151.880, and 151.940	(1), (2)
154.570 & 154.600, with audio filter	(3), (4), (7)
154.570 & 154.600, without audio filter	(5), (6), (7)

FCC 95.2779(b)(1)

7.27(f_d−2.88 kHz) dB on any frequency removed from the channel center frequency by a displacement frequency (f_d in kHz) that is more than 5.625kHz, but not more than 12.5kHz.

FCC 95.2779(b)(2)

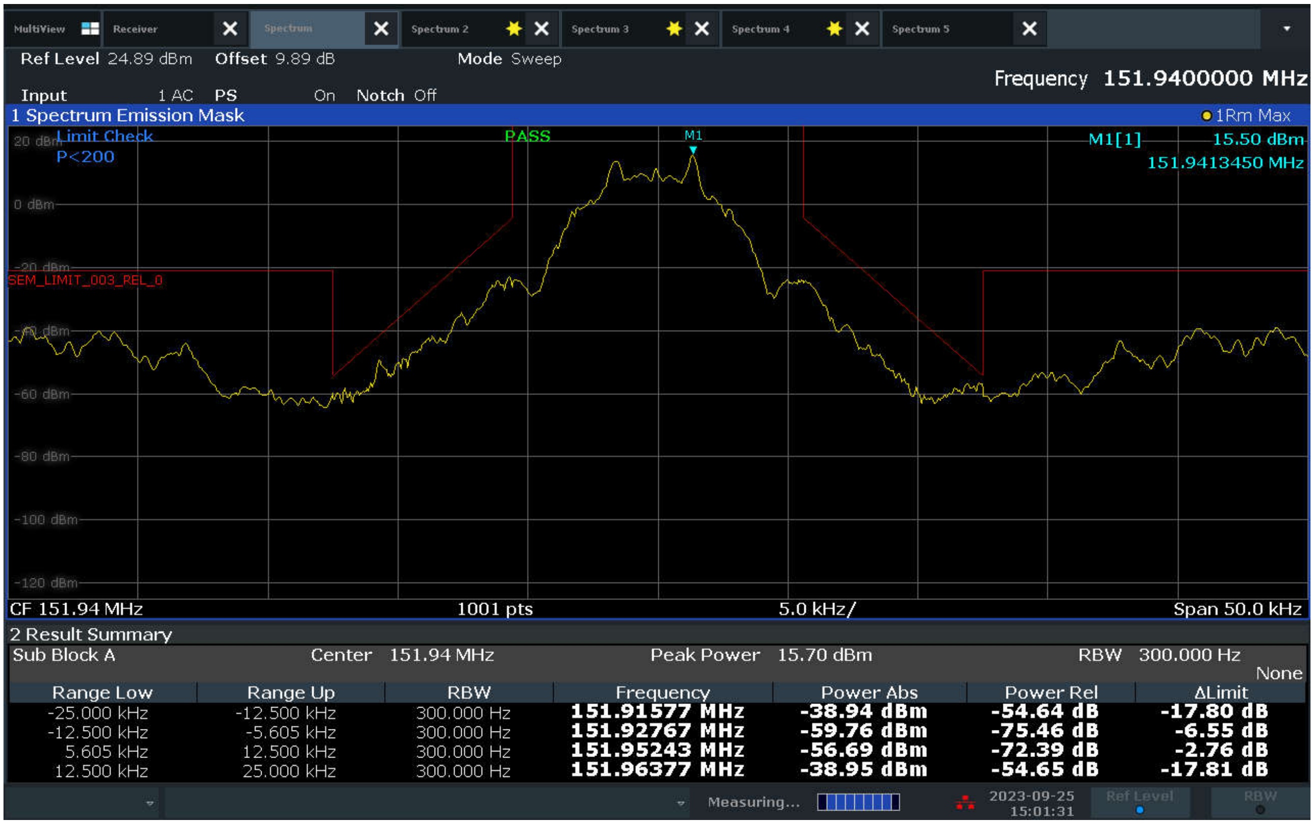
50 + 10log(P) dB or 70dB, whichever is the lesser attenuation, on any frequency removed from the channel center frequency by more than 12.5kHz.

Procedure

The antenna port of the EUT was connected to the spectrum analyzer through 10dB of attenuation. The EUT was set to transmit separately at the low and high channels. A spectrum mask was applied to the frequency (based off of the specific frequency). The resolution bandwidth (RBW) was set to greater than the 26dB bandwidth. The span was set to catch the frequency. The 'Max-Hold' function was engaged. The maximum meter reading was recorded and a screenshot was taken.

Test Details	
Manufacturer	Fleetwood Group Inc
EUT	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx
Frequency Tested	151.82MHz
Notes	

Test Details	
Manufacturer	Fleetwood Group Inc
EUT	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx
Frequency Tested	151.94MHz
Notes	



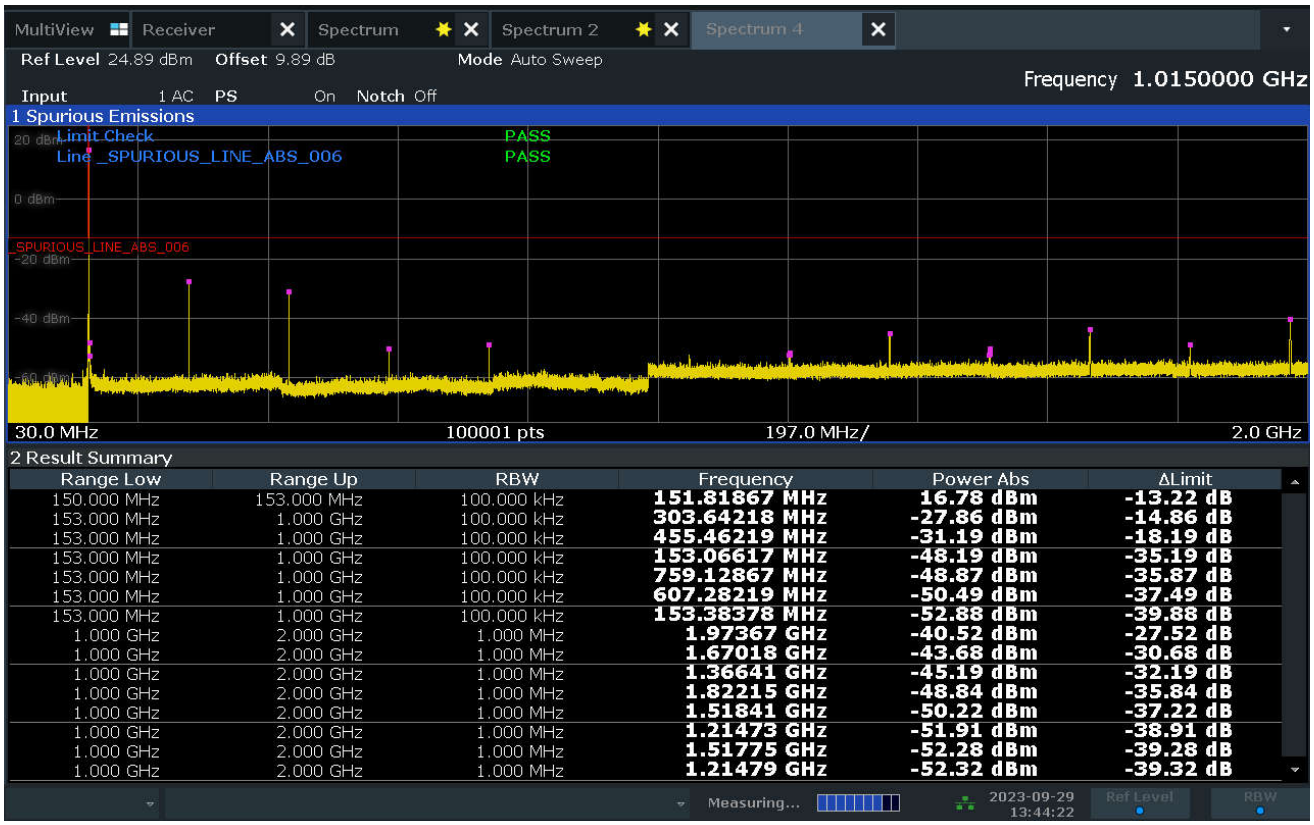
24. Antenna Conducted Spurious Emissions

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

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Measurement Method	Antenna Conducted
Type of Test Site	Elite Test Bench
Notes	N/A

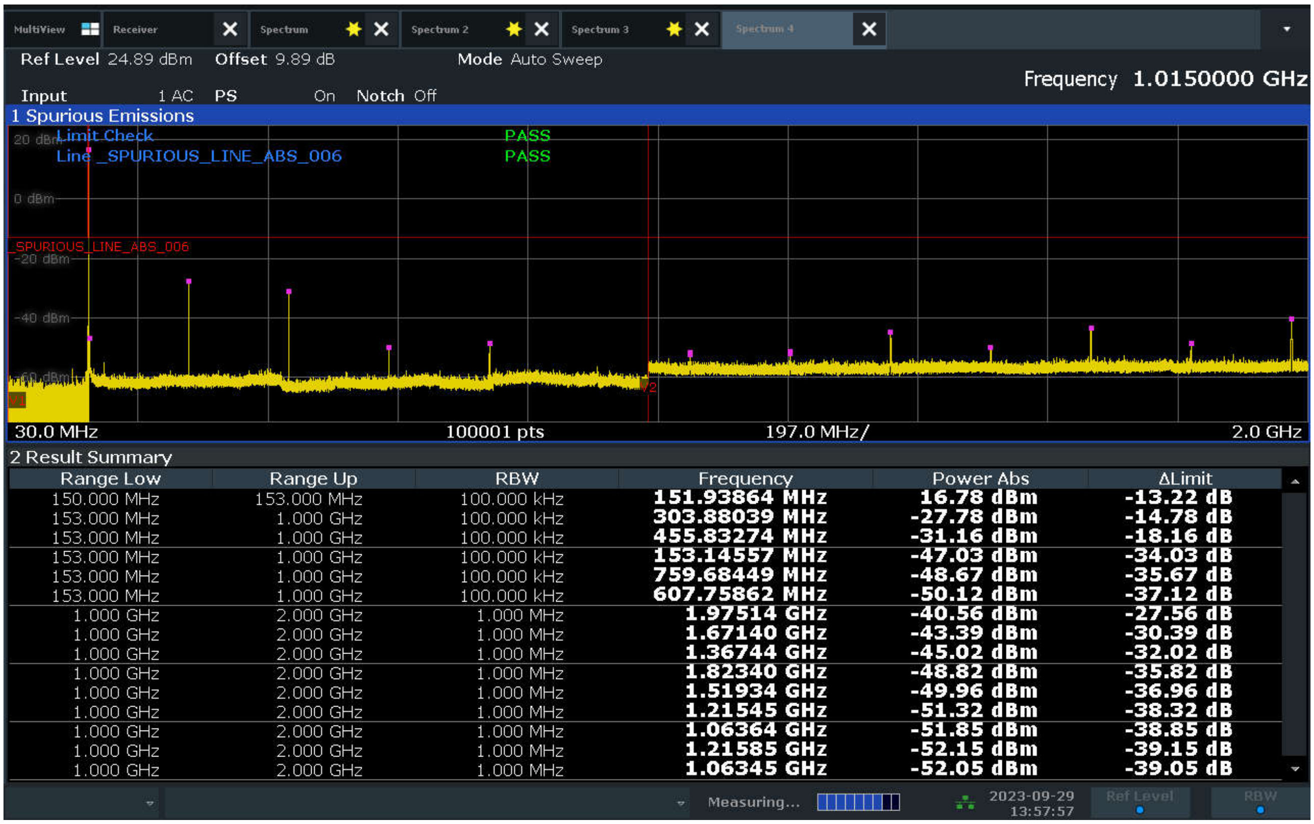
Procedure
The antenna port of the EUT was connected to the spectrum analyzer through 10dB of attenuation. The resolution bandwidth (RBW) was set to 100kHz. The peak detector and 'Max-Hold' function were engaged. The emissions in the frequency range from 30MHz to 2GHz were observed and plotted.

Test Details	
Manufacturer	Fleetwood Group Inc
EUT	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx
Frequency Tested	151.82MHz
Notes	



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
150.000 MHz	153.000 MHz	100.000 kHz	151.81867 MHz	16.78 dBm	-13.22 dB
153.000 MHz	1.000 GHz	100.000 kHz	303.64218 MHz	-27.86 dBm	-14.86 dB
153.000 MHz	1.000 GHz	100.000 kHz	455.46219 MHz	-31.19 dBm	-18.19 dB
153.000 MHz	1.000 GHz	100.000 kHz	153.06617 MHz	-48.19 dBm	-35.19 dB
153.000 MHz	1.000 GHz	100.000 kHz	759.12867 MHz	-48.87 dBm	-35.87 dB
153.000 MHz	1.000 GHz	100.000 kHz	607.28219 MHz	-50.49 dBm	-37.49 dB
153.000 MHz	1.000 GHz	100.000 kHz	153.38378 MHz	-52.88 dBm	-39.88 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.97367 GHz	-40.52 dBm	-27.52 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.67018 GHz	-43.68 dBm	-30.68 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.36641 GHz	-45.19 dBm	-32.19 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.82215 GHz	-48.84 dBm	-35.84 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.51841 GHz	-50.22 dBm	-37.22 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.21473 GHz	-51.91 dBm	-38.91 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.51775 GHz	-52.28 dBm	-39.28 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.21479 GHz	-52.32 dBm	-39.32 dB

Test Details	
Manufacturer	Fleetwood Group Inc
EUT	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx
Frequency Tested	151.94MHz
Notes	



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
150.000 MHz	153.000 MHz	100.000 kHz	151.93864 MHz	16.78 dBm	-13.22 dB
153.000 MHz	1.000 GHz	100.000 kHz	303.88039 MHz	-27.78 dBm	-14.78 dB
153.000 MHz	1.000 GHz	100.000 kHz	455.83274 MHz	-31.16 dBm	-18.16 dB
153.000 MHz	1.000 GHz	100.000 kHz	153.14557 MHz	-47.03 dBm	-34.03 dB
153.000 MHz	1.000 GHz	100.000 kHz	759.68449 MHz	-48.67 dBm	-35.67 dB
153.000 MHz	1.000 GHz	100.000 kHz	607.75862 MHz	-50.12 dBm	-37.12 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.97514 GHz	-40.56 dBm	-27.56 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.67140 GHz	-43.39 dBm	-30.39 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.36744 GHz	-45.02 dBm	-32.02 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.82340 GHz	-48.82 dBm	-35.82 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.51934 GHz	-49.96 dBm	-36.96 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.21545 GHz	-51.32 dBm	-38.32 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.06364 GHz	-51.85 dBm	-38.85 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.21585 GHz	-52.15 dBm	-39.15 dB
1.000 GHz	2.000 GHz	1.000 MHz	1.06345 GHz	-52.05 dBm	-39.05 dB

25. Case Spurious Radiated Emissions

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

Test Setup Details	
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	N/A

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

Requirements
FCC 95.2779(b)(3) The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) by at least 50 + 10log(P) dB or 70dB, whichever is the lesser attenuation, on any frequency removed from the channel center frequency by more than 12.5kHz.

Procedure
All tests 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. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with CISPR 16 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. 1) Preliminary radiated measurements were performed to determine the frequencies where the significant emissions might be found. The EUT was placed on an 80cm meter high, non-conductive stand and set to transmit. With the EUT at one set position and the measurement antenna at a set height (i.e., without maximizing), the radiated emissions were measured using a peak detector and automatically plotted. The broadband measuring antenna was positioned at a 3-meter distance from the EUT. This data was then automatically plotted up through the tenth harmonic of the transmit frequency of the EUT. All preliminary tests were performed separately with the EUT operating in the modes listed in paragraph 3.2. 2) All significant broadband and narrowband signals found in the preliminary sweeps were then maximized. For all measurements below 1GHz, a bilog antenna was used as the measurement antenna. For all measurements above 1GHz, a horn antenna was used as the measurement antenna. For all tests, a peak detector was used. 3) 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. 4) To determine the emission power, another antenna was set in place of the EUT and connected to a calibrated signal generator. (A tuned dipole was used for all measurements below 1GHz, and a double ridged waveguide antenna was used for all measurements above 1GHz.) The output of the signal generator was adjusted to match the received level at the spectrum analyzer. The signal level was recorded. The reading was corrected to compensate for cable loss, as required, and for frequencies above 1GHz, increased by the gain of the waveguide.

Pictures removed for short term confidentaility reasons.
Test Setup for Spurious Radiated Emissions, 30MHz – 1GHz – Antenna Polarization Horizontal
Pictures removed for short term confidentaility reasons.
Test Setup for Spurious Radiated Emissions, 30MHz – 1GHz – Antenna Polarization Vertical

Pictures removed for short term confidentaility reasons.
Test Setup for Spurious Radiated Emissions, Above 1GHz – Antenna Polarization Horizontal
Pictures removed for short term confidentaility reasons.
Test Setup for Spurious Radiated Emissions, Above 1GHz – Antenna Polarization Vertical

Test Details	
Manufacturer	Fleetwood Group Inc
EUT	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx
Frequency Tested	151.82MHz
Notes	

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Matched Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
303.64	H	19.22		-62.10	0.00	0.95	-63.05	79.90	36.85
303.64	V	14.48		-62.54	0.00	0.95	-63.49	80.34	36.85
455.46	H	17.72		-59.82	0.00	1.17	-60.99	77.84	36.85
455.46	V	14.62		-60.84	0.00	1.17	-62.01	78.86	36.85
607.28	H	12.58		-51.12	0.00	1.34	-52.46	69.31	36.85
607.28	V	10.93	Ambient	-69.50	0.00	1.34	-70.84	87.69	36.85
759.10	H	12.33		-67.30	0.00	1.50	-68.80	85.65	36.85
759.10	V	13.15		-68.24	0.00	1.50	-69.74	86.59	36.85
910.92	H	12.69		-55.30	0.00	1.64	-56.94	73.79	36.85
910.92	V	11.15	Ambient	-70.20	0.00	1.64	-71.84	88.69	36.85
1062.74	H	24.45		-55.12	0.54	1.78	-56.36	73.21	36.85
1062.74	V	23.45		-55.68	0.54	1.78	-56.92	73.77	36.85
1214.56	H	22.44		-49.74	1.19	1.92	-50.47	67.32	36.85
1214.56	V	21.44		-58.34	1.19	1.92	-59.07	75.92	36.85
1366.38	H	25.26		-47.70	2.15	2.05	-47.60	64.45	36.85
1366.38	V	24.79		-45.94	2.15	2.05	-45.84	62.69	36.85
1518.20	H	24.55		-52.78	3.68	2.16	-51.26	68.11	36.85
1518.20	V	22.92		-56.20	3.68	2.16	-54.68	71.53	36.85

Test Details	
Manufacturer	Fleetwood Group Inc
EUT	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx
Frequency Tested	151.94MHz
Notes	

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Matched Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
303.88	H	18.78		-63.10	0.00	0.95	-64.05	80.90	36.85
303.88	V	15.02		-61.66	0.00	0.95	-62.61	79.46	36.85
455.82	H	17.55		-59.46	0.00	1.17	-60.63	77.48	36.85
455.82	V	14.63		-61.26	0.00	1.17	-62.43	79.28	36.85
607.76	H	13.17		-58.94	0.00	1.34	-60.28	77.13	36.85
607.76	V	11.24	Ambient	-68.78	0.00	1.34	-70.12	86.97	36.85
759.70	H	13.16		-65.80	0.00	1.50	-67.30	84.15	36.85
759.70	V	13.25		-59.48	0.00	1.50	-60.98	77.83	36.85
911.64	H	12.85		-57.40	0.00	1.64	-59.04	75.89	36.85
911.64	V	11.26	Ambient	-70.10	0.00	1.64	-71.74	88.59	36.85
1063.58	H	23.88		-56.40	0.55	1.78	-57.63	74.48	36.85
1063.58	V	23.19		-55.46	0.55	1.78	-56.69	73.54	36.85
1215.52	H	21.75		-57.30	1.18	1.92	-58.04	74.89	36.85
1215.52	V	22.00		-54.30	1.18	1.92	-55.04	71.89	36.85
1367.46	H	25.16		-47.88	2.16	2.05	-47.76	64.61	36.85
1367.46	V	23.94		-48.10	2.16	2.05	-47.98	64.83	36.85
1519.40	H	24.52		-53.60	3.68	2.16	-52.08	68.93	36.85
1519.40	V	22.60		-54.40	3.68	2.16	-52.88	69.73	36.85

26. Frequency Stability

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

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Measurement Method	Antenna Conducted
Type of Test Site	Temperature Chamber
Test Site Used	N/A
Notes	

Requirement
Per FCC § 95.2765, for MURS transmitters that operate with an emission bandwidth greater than 6.25kHz, the carrier frequencies must remain within ±5.0ppm of the channel center frequencies during normal operating conditions. Per C63.26-2015, the EUT was tested at 10°C intervals between -30°C to +50°C at the manufacturers rated supply voltage. For handheld equipment only capable of operating from internal batteries and the supply voltage cannot be varied, the tests were performed at the nominal battery voltage and the battery end point voltage as specified by the manufacturer.

Procedure

1) The antenna port of the EUT was connected to the receiver through 10dB of attenuation.
2) The temperature chamber was set to +50°C and the EUT was allowed to soak for 15 minutes.
3) The EUT was then powered up at nominal battery voltage and set to transmit at the low channel. The 'Max-Hold' function was engaged and the max peak marker was utilized. The center frequency of the carrier channel was then recorded.
4) Step (3) was repeated with the EUT powered at the battery end point voltage.
5) Steps (3) and (4) were repeated with the EUT transmitting at the high channel.
6) The EUT was then powered off.
7) The temperature chamber was set to the next 10°C interval and the EUT was allowed to soak for 15 minutes.
8) Steps (3) through (7) were repeated until the final temperature test point of -30°C was reached.

Test Details	
Manufacturer	Fleetwood Group Inc
EUT	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx
Frequency Tested	151.82MHz
Notes	V_N = Nominal Voltage = 3.8VDC V_{BE} = Battery End Point Voltage = 3.6VDC

Temp. (⁰C)	Input Voltage (VDC)	Nominal Frequency (Hz)	Measured Frequency (Hz)	Frequency Variation in ppm			Pass/Fail
				Lower Limit (ppm)	Measured Variation (ppm)	Upper Limit (ppm)	
-30	3.8	151,820,000	151,819,761	-5.0000000	-1.574233	5.0000000	Pass
	3.6	151,820,000	151,819,716	-5.0000000	-1.870636	5.0000000	Pass
-20	3.8	151,820,000	151,819,959	-5.0000000	-0.270057	5.0000000	Pass
	3.6	151,820,000	151,819,952	-5.0000000	-0.316164	5.0000000	Pass
-10	3.8	151,820,000	151,820,017	-5.0000000	0.111975	5.0000000	Pass
	3.6	151,820,000	151,820,012	-5.0000000	0.079041	5.0000000	Pass
0	3.8	151,820,000	151,820,139	-5.0000000	0.915558	5.0000000	Pass
	3.6	151,820,000	151,820,134	-5.0000000	0.882624	5.0000000	Pass
+10	3.8	151,820,000	151,820,079	-5.0000000	0.520353	5.0000000	Pass
	3.6	151,820,000	151,820,058	-5.0000000	0.382031	5.0000000	Pass
+20	3.8	151,820,000	151,820,037	-5.0000000	0.243710	5.0000000	Pass
	3.6	151,820,000	151,820,012	-5.0000000	0.079041	5.0000000	Pass
+30	3.8	151,820,000	151,820,017	-5.0000000	0.111975	5.0000000	Pass
	3.6	151,820,000	151,819,939	-5.0000000	-0.401792	5.0000000	Pass
+40	3.8	151,820,000	151,820,007	-5.0000000	0.046107	5.0000000	Pass
	3.6	151,820,000	151,819,980	-5.0000000	-0.131735	5.0000000	Pass
+50	3.8	151,820,000	151,819,952	-5.0000000	-0.316164	5.0000000	Pass
	3.6	151,820,000	151,819,929	-5.0000000	-0.467659	5.0000000	Pass

Test Details	
Manufacturer	Fleetwood Group Inc
EUT	Heel Collar
Model No.	HR350C-A
Serial No.	N/A
Mode	Tx
Frequency Tested	151.94MHz
Notes	V_N = Nominal Voltage = 3.8VDC V_{BE} = Battery End Point Voltage = 3.6VDC

Temp. (⁰C)	Input Voltage (VDC)	Nominal Frequency (Hz)	Measured Frequency (Hz)	Frequency Variation in ppm			Pass/Fail
				Lower Limit (ppm)	Measured Variation (ppm)	Upper Limit (ppm)	
-30	3.8	151,940,000	151,939,859	-5.0000000	-0.927998	5.0000000	Pass
-30	3.6	151,940,000	151,940,017	-5.0000000	0.111886	5.0000000	Pass
-20	3.8	151,940,000	151,940,061	-5.0000000	0.401474	5.0000000	Pass
-20	3.6	151,940,000	151,939,999	-5.0000000	-0.006582	5.0000000	Pass
-10	3.8	151,940,000	151,940,116	-5.0000000	0.763459	5.0000000	Pass
-10	3.6	151,940,000	151,940,123	-5.0000000	0.809530	5.0000000	Pass
0	3.8	151,940,000	151,940,207	-5.0000000	1.362380	5.0000000	Pass
0	3.6	151,940,000	151,940,214	-5.0000000	1.408451	5.0000000	Pass
+10	3.8	151,940,000	151,940,216	-5.0000000	1.421614	5.0000000	Pass
+10	3.6	151,940,000	151,940,229	-5.0000000	1.507174	5.0000000	Pass
+20	3.8	151,940,000	151,940,111	-5.0000000	0.730552	5.0000000	Pass
+20	3.6	151,940,000	151,940,121	-5.0000000	0.796367	5.0000000	Pass
+30	3.8	151,940,000	151,940,049	-5.0000000	0.322496	5.0000000	Pass
+30	3.6	151,940,000	151,940,063	-5.0000000	0.414637	5.0000000	Pass
+40	3.8	151,940,000	151,940,049	-5.0000000	0.322496	5.0000000	Pass
+40	3.6	151,940,000	151,940,032	-5.0000000	0.210609	5.0000000	Pass
+50	3.8	151,940,000	151,940,060	-5.0000000	0.394235	5.0000000	Pass
+50	3.6	151,940,000	151,940,062	-5.0000000	0.407398	5.0000000	Pass

27. 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)

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5202 Presidents Court, Suite 220 | Frederick, MD 21703-8515 | Phone: 301 644 3248 | Fax: 240 454 9449 | www.A2LA.org

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

(A2LA Cert. No. 1786.01) 08/15/2023 Page 2 of 9

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

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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)

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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

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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

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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.

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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.