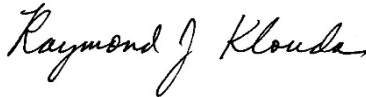




Engineering Test Report No. 2300550-02

Report Date	June 16, 2023	
Manufacturer Name	Winegard Company	
Manufacturer Address	2736 Mt Pleasant St Burlington, IA 52601	
Product Name Model Nos.	BLE Sensor HS-PIR1, HS-H2O1, HS-CC01, and HS-TMP1	
Date Received	June 12, 2023	
Test Dates	June 12, 2023 through June 16, 2023	
Specifications	FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B Innovation, Science, and Economic Development Canada, ICES-003 FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247 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		
Tested by	Javier Cardenas	
Signature		
Approved by	Raymond J. Klouda, Registered Professional Engineer of Illinois – 44894	
PO Number	P539046-00	

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

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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 C, Section 15.247 and Innovation, Science, and Economic Development Canada, RSS-247 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.

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1. Report Revision History

Revision	Date	Description
–	20 JUN 2023	Initial Release of Engineering Test Report No. 2300550-02

2. Introduction

2.1. Scope of Tests

This document presents the results of a limited series of radiated emissions and case spurious emissions and tests that were performed on four (4) Winegard Company BLE Sensors, Model Nos. HS-PIR1, HS-H2O1, HS-CC01, and HS-TMP1 (hereinafter referred to as the Equipment Under Test (EUT)). The EUTs were manufactured and submitted for testing by Winegard Company located in Burlington, IA.

2.2. Purpose

The test series was performed to determine if the EUTs meet the RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, §15.109 and Subpart C, §15.247 for a Digital Modulation intentional radiator operating within the 2400 – 2483.5MHz band.

The test series was also performed to determine if the EUTs meet the RF emission requirements of the ICES-003 specification, Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-Gen and Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-247 for a Digital Modulation intentional radiator operating within the 2400 – 2483.5MHz band.

Testing was performed in accordance with ANSI C63.4-2014 and ANSI C63.10-2013.

2.3. Identification of the EUT

The EUTs were identified as follows:

EUT Identification	
Product Description	BLE Sensor
Model/Part Nos.	HS-PIR1, HS-H2O1, HS-CC01, and HS-TMP1
Serial Nos.	Var1, Var2, Var3 and Var4
Size of EUT	4.5cm Length x 6.0cm Width x 2.0cm depth
Software/Firmware Version	Version 20230606
Device Type	Digitally Modulated Transmission Device
Band of Operation	2400 – 2483.5MHz

The EUTs listed above were used throughout the test series.

3. Power Input

The EUTs were powered by 3VDC from an internal lithium battery.

4. Grounding

The EUTs were not connected to ground.

5. Support Equipment

The EUTs were submitted for testing along with the following support equipment:

Description	Model #	S/N
Laptop	NA	NA

6. Interconnect Leads

The following interconnect cables were submitted with the test item:

Item	Description
UART to USB	Connects laptop to EUT for radio configuration

7. Modifications Made to the EUT

No modifications were made to the EUTs during the testing.

8. Modes of Operation

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

Mode	Description
Tx	Bluetooth: - Continuous Tx at 2402MHz, Power Setting = 4dBm - Continuous Tx at 2440MHz, Power Setting = 4dBm - Continuous Tx at 2480MHz, Power Setting = 4dBm
Standby	EUT was powered and the Bluetooth radio was configured to receive across the 2.4GHz to 2.4835GHz range.

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 A, Part 15, Subpart B
- Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter A, Part 15, Subpart C
- 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 9kHz to 40GHz"
- ANSI C63.10-2013, "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices"
- Federal Communications Commission Office of Engineering and Technology Laboratory Division, Guidance For Compliance Measurements On Digital Transmission Systems, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under Section 15.247 April 2, 2019 KDB 558074 D01v05r02
- RSS-Gen Issue 5, February 2020, Amendment 2, Innovation, Science, and Economic Development Canada, "General Requirements for Compliance of Radio Apparatus"
- RSS-247 Issue 2, February 2017, "Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices"

10. Test Plan

No test plan was provided. Instructions were provided by personnel from Winegard Company and used in conjunction with the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart B and Innovation, Science,

and Economic Development Canada, ICES-003, FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247, Innovation, Science, and Economic Development Canada, RSS-247, and ANSI C63.4-2014 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	23°C
Relative Humidity	29%
Atmospheric Pressure	1005mb

13. Summary

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

Test Description	Requirements	Test Method	Results
Part 15B Radiated Emissions	FCC 15.109 ICES-003	ANSI C63.4:2014	Conforms
Case Spurious Radiated Emissions	FCC 15.247 ISED 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).

$$\text{Formula 1: VL (dB}\mu\text{V)} = \text{MTR (dB}\mu\text{V)} + \text{CF (dB)}.$$

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.

$$\text{Formula 1: FS (dB}\mu\text{V/m)} = \text{MTR (dB}\mu\text{V)} + \text{AF (dB/m)} + \text{CF (dB)} + (-\text{PA (dB)}) + \text{DC (dB)}$$

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

$$\text{Formula 2: FS (}\mu\text{V/m)} = \text{AntiLog}[(\text{FS (dB}\mu\text{V/m)})/20]$$

15. Statement of Conformity

The Winegard Company BLE Sensors, Model Nos. HS-PIR1, HS-H2O1, HS-CC01 and HS-TMP1, did fully conform to the selected requirements of FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247 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 C, Section 15.247 and Innovation, Science, and Economic Development Canada, RSS-247 test specifications. The data presented in this test report pertains to the EUTs as received by the customer on the test date specified. Any electrical or mechanical modifications made to the EUTs subsequent to the specified test date will serve to invalidate the data and void this certification.

17. Photographs of EUTs

Photo removed for short-term confidentiality purposes.

HS-PIR1

Photo removed for short-term confidentiality purposes.

HS-H2O1

Photo removed for short-term confidentiality purposes.

HS-CC01

Photo removed for short-term confidentiality purposes.

HS-TMP1

18. Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW0	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-30-20G20R6G	PL2926/0646	20GHZ-26.5GHZ	9/21/2022	9/21/2023
APW14	PREAMPLIFIER	PLANAR	PE2-35-120-5R0-10-12-SFF	PL22671	1-20GHz	9/21/2022	9/21/2023
GSF0	VECTOR SIGNAL GENERATOR	ROHDE & SCHWARZ	SMBV100A	260452	9kHz to 6GHz	9/2/2022	9/2/2024
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NTA3	BILOG ANTENNA	TESEQ	6112D	32853	25-1000MHz	11/17/2022	11/17/2024
NWQ1	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS-LINDGREN	3117	66655	1GHZ-18GHZ	5/26/2022	5/26/2024
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
RBG4	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	103007	2HZ-44GHZ	12/8/2022	12/8/2023
SES0	24VDC POWER SUPPLY	P-TRANS	FS-32024-1M	001	18-27VDC	NOTE 1	
T1E19	10DB 25W ATTENUATOR	WEINSCHTEL	46-10-43	CM5687	DC-18GHZ	5/18/2022	5/18/2024
T2SG	20DB 25W ATTENUATOR	WEINSCHTEL	46-20-34	CD5016	DC-18GHZ	1/4/2022	1/4/2024
VBV2	CISPR EN FCC ICES RE.EXE	ELITE	CISPR EN FCC ICES RE.EXE	---	---	N/A	
WKA1	SOFTWARE, UNIVERSAL RCV EMI	ELITE	UNIV_RCV_EMI	1	---	I/O	
XPQ4	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/X20000-O/O	1	4.8-20GHZ	9/7/2021	9/7/2023

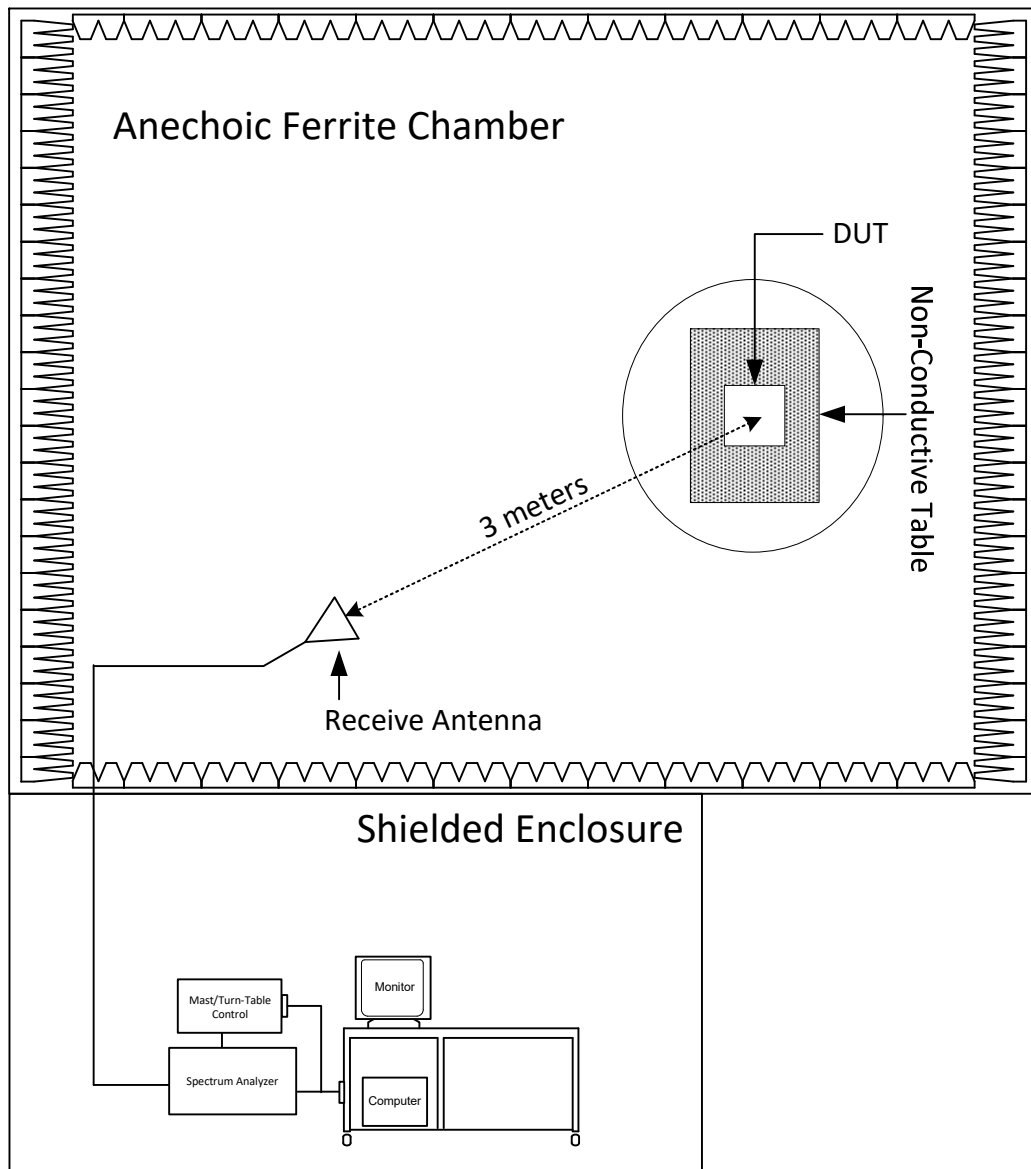
N/A: Not Applicable

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. Part 15B Radiated Emissions

EUT Information	
Manufacturer	Winegard Company
Product	BLE Sensor
Model No.	HS-PIR1, HS-H2O1, HS-CC01 and HS-TMP1
Serial No.	Var1, Var2, Var3 and Var4
Mode	Standby

Test Site Information	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test Site Used	R29F
Type of Antennas Used	Below 1GHz: Bilog (or equivalent) Above 1GHz: Double-ridged waveguide (or equivalent)
Highest Internal Frequency	2.4GHz
Highest Measurement Frequency	13GHz
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
Radiated disturbance (electric field strength on an open area test site or alternative test site) (18 GHz – 26.5 GHz)	3.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (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 ($\mu\text{V/m}$)	Field Strength ($\text{dB}\mu\text{V/m}$)
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 ($\text{dB}\mu\text{V/m}$)	Average Limit ($\text{dB}\mu\text{V/m}$)
Above 1000	74	54

ICES-003 Class B Radiated Emissions Limits (30MHz to 1GHz)		
Frequency Range (MHz)	Field Strength at 3 meters ($\text{dB}\mu\text{V/m}$)	Field Strength at 10 meters ($\text{dB}\mu\text{V/m}$)
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 ($\text{dB}\mu\text{V/m}$)	Peak ($\text{dB}\mu\text{V/m}$)
1 – F_M	54	74
F_M = highest measurement frequency		

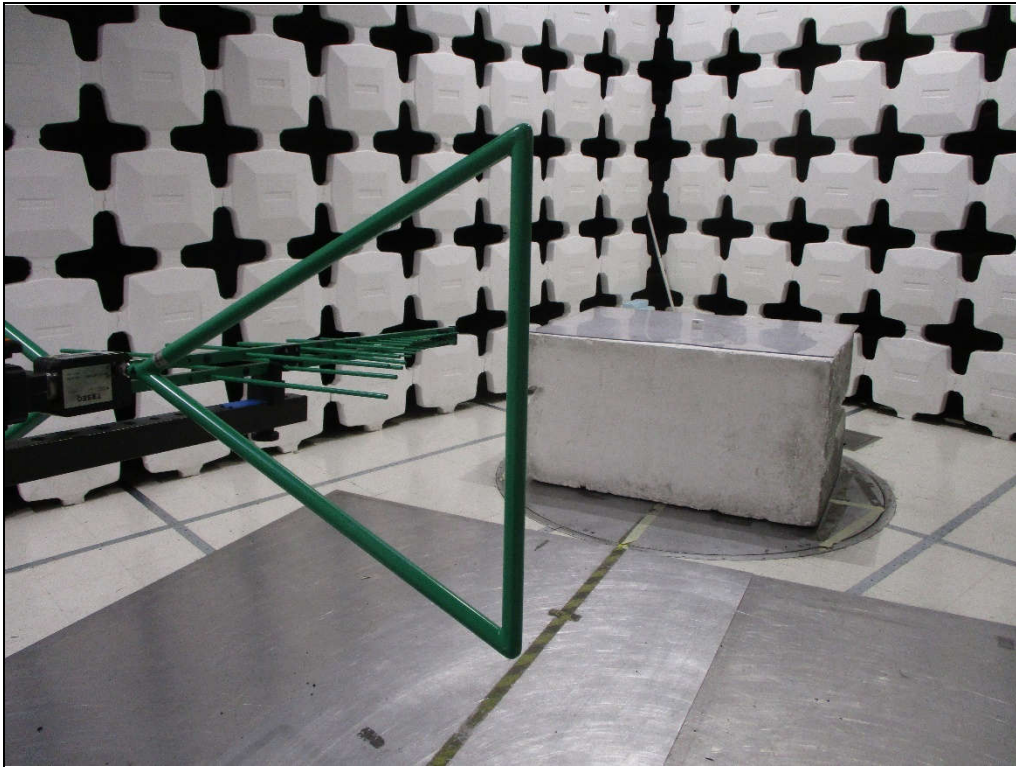
Procedure

Since a quasi-peak detector and an average detector requires 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.

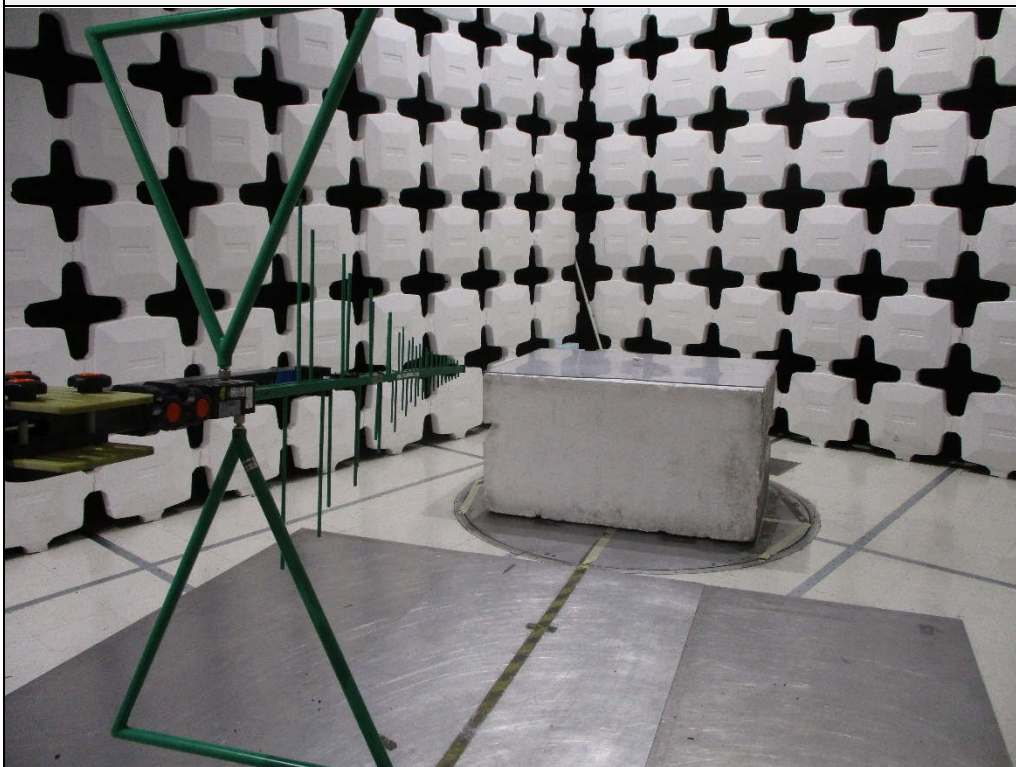
The EUT and all peripheral equipment were placed on an 80cm high non-conductive stand. The broadband measuring antenna was positioned at a 3-meter distance from the EUT. The frequency range from 30MHz to 1GHz was investigated using a peak detector function with the bilog antenna at several heights, horizontal and vertical polarization, and with several different orientations of the EUT with respect to the antenna. The frequency range from 1GHz to 13GHz 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:

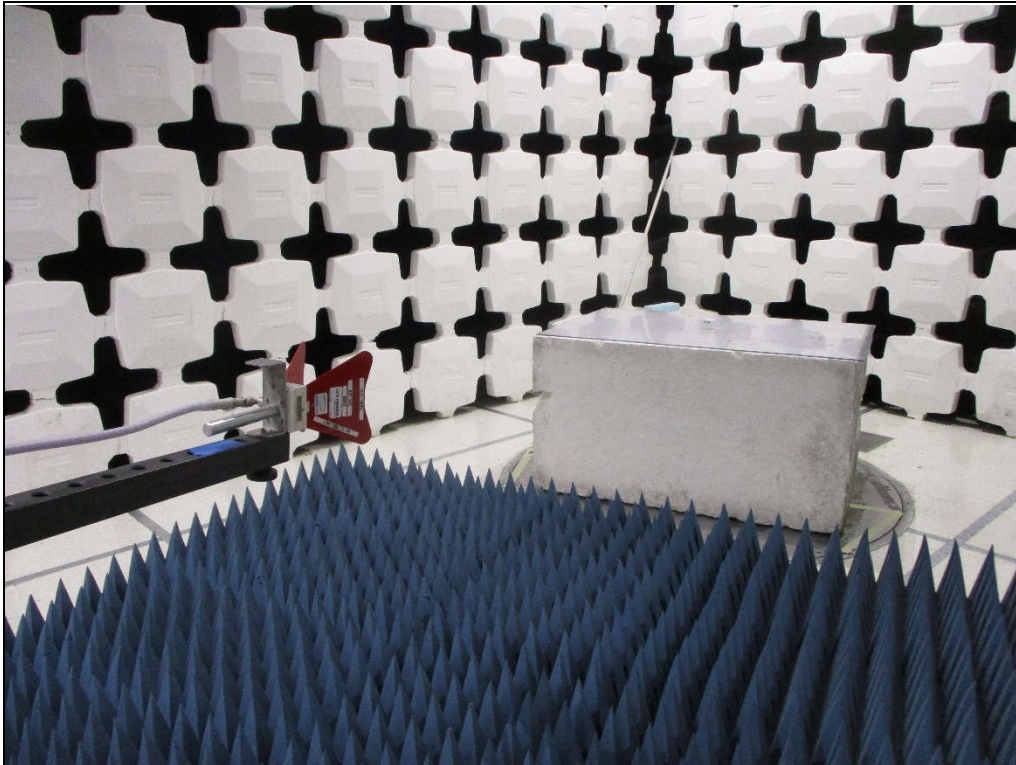
- 1) Measurements from 30MHz to 1GHz were made using a quasi-peak detector and a broadband bilog antenna. Measurements above 1GHz were made using an average detector and a broadband double ridged waveguide antenna.
- 2) To ensure that maximum or worst case, emission levels were measured, the following 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.



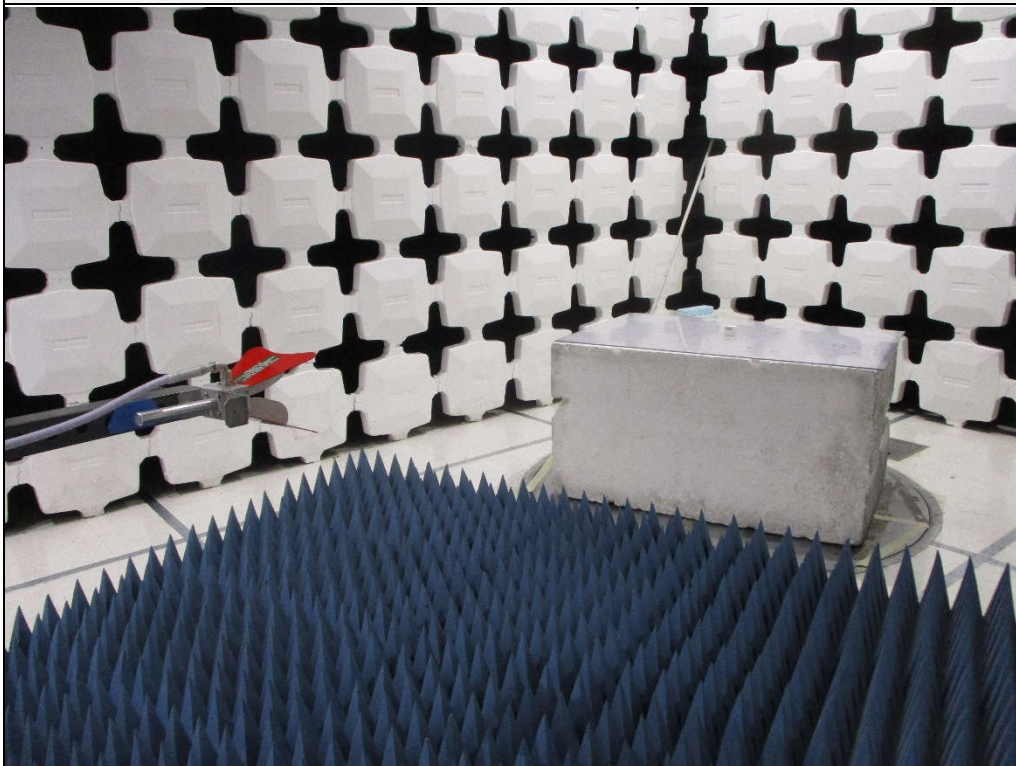
Test Setup for Radiated Emissions: 30MHz to 1GHz, Horizontal Polarization



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



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



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



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

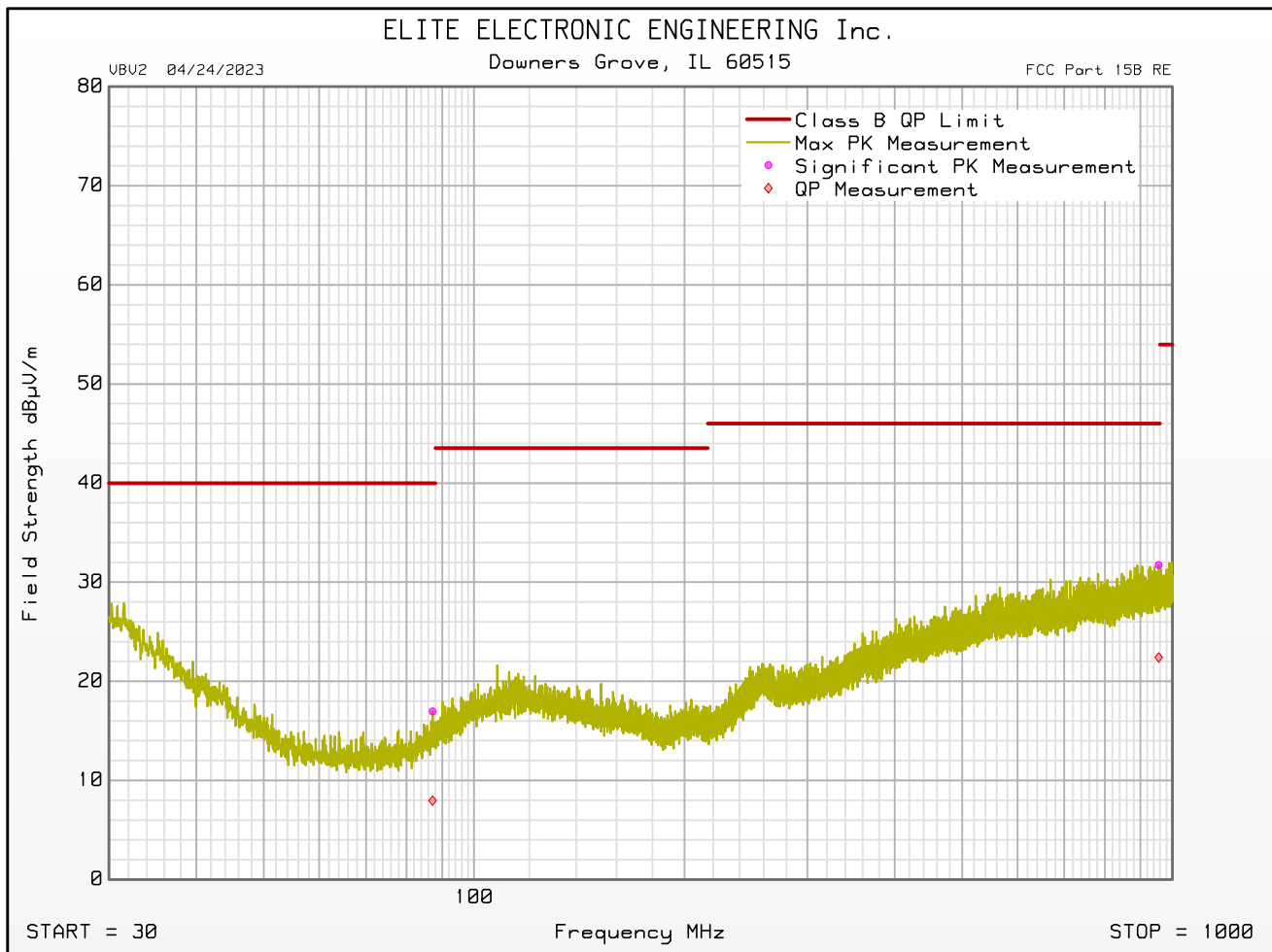
Manufacturer : Winegard Company
Model : HS-PIR1
Serial Number : Var1
DUT Mode : Standby
Turntable Step Angle (°): 45
Mast Positions (cm) : 120, 200, 340
Scan Type : Stepped Scan
Test RBW : 120 kHz
Prelim Dwell Time (s) : 0.0001
Notes : Rx - Sweep
Test Engineer : J. Cardenas
Test Date : Jun 16, 2023 08:30:44 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 dBuV/m	QP Total dBuV/m	QP Limit dBuV/m	QP Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive QP Level
30.180	4.8	-4.1	24.4	0.0	0.4	0.0	29.6	20.7	40.0	-19.3	Vertical	340	0	
87.180	2.4	-6.6	14.2	0.0	0.4	0.0	17.0	8.0	40.0	-32.0	Horizontal	120	45	
107.860	3.7	-2.8	17.8	0.0	0.4	0.0	22.0	15.4	43.5	-28.1	Vertical	340	270	
259.860	2.7	-6.4	19.5	0.0	0.8	0.0	23.0	13.9	46.0	-32.1	Vertical	340	45	
555.000	3.2	-6.0	24.7	0.0	1.1	0.0	29.1	19.8	46.0	-26.2	Vertical	200	90	
955.620	3.2	-6.1	27.0	0.0	1.5	0.0	31.7	22.4	46.0	-23.6	Horizontal	340	225	

FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

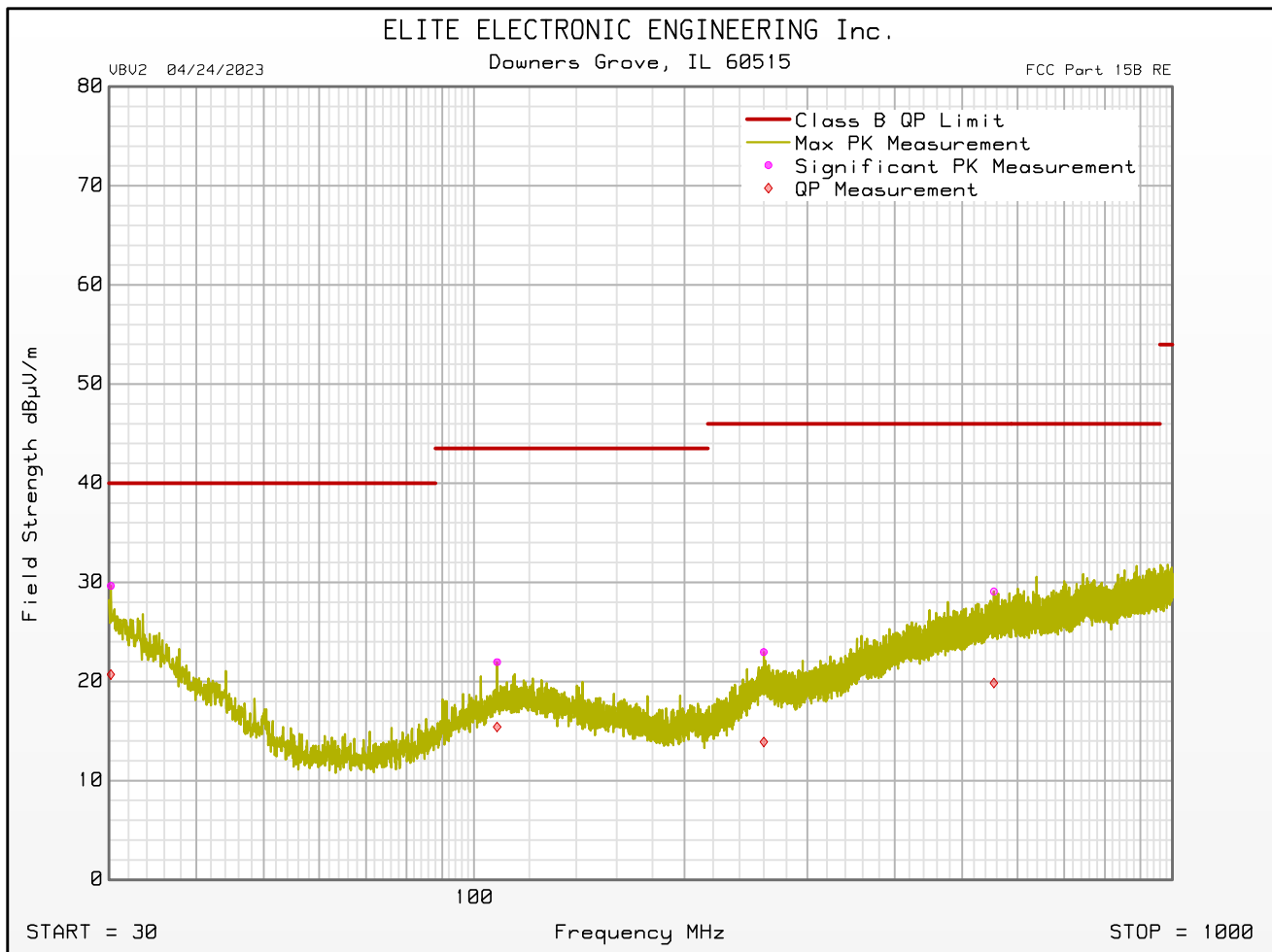
Manufacturer : Winegard Company
 Model : HS-PIR1
 Serial Number : Var1
 DUT Mode : Standby
 Turntable Step Angle (°): 45
 Mast Positions (cm) : 120, 200, 340
 Antenna Polarization : Horizontal
 Scan Type : Stepped Scan
 Test RBW : 120 kHz
 Prelim Dwell Time (s) : 0.0001
 Notes : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 16, 2023 08:30:44 AM



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

Manufacturer : Winegard Company
 Model : HS-PIR1
 Serial Number : Var1
 DUT Mode : Standby
 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 : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 16, 2023 08:30:44 AM





FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

Manufacturer : Winegard Company
Model : HS-PIR1
Serial Number : Var1
DUT Mode : Standby
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 : Rx - Sweep
Test Engineer : J. Cardenas
Test Date : Jun 15, 2023 12:38:24 PM

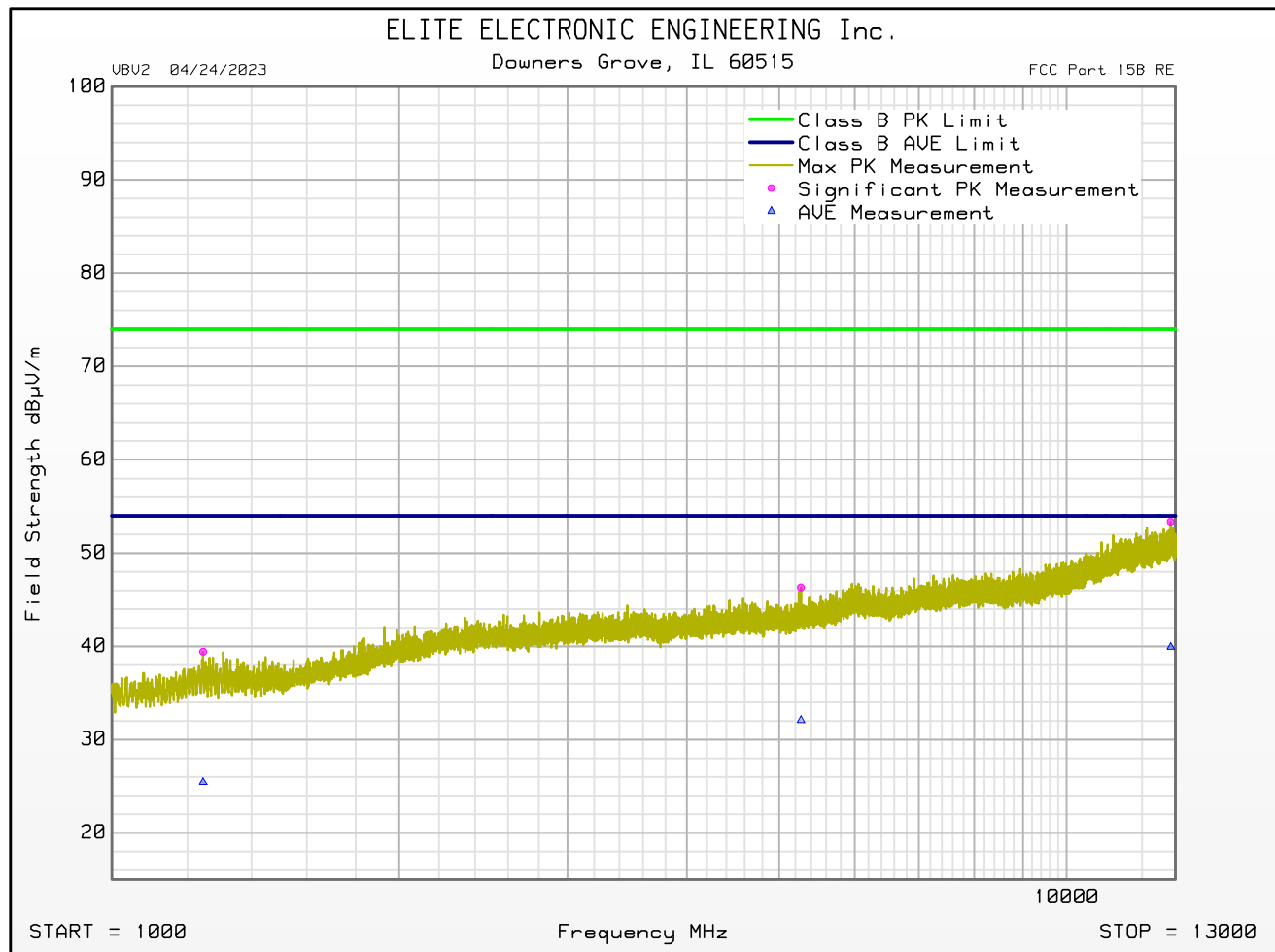
Freq MHz	Peak Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBuV/m	Peak Limit dBuV/m	Peak Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Peak Level
1246.000	49.6	28.8	-40.7	1.8	0.0	39.4	74.0	-34.6	Horizontal	120	90	
2251.000	49.1	32.3	-40.0	2.5	0.0	43.8	74.0	-30.1	Vertical	340	270	
2406.000	49.8	32.6	-40.2	2.6	0.0	44.8	74.0	-29.2	Vertical	120	135	
5267.500	47.4	34.6	-39.6	3.9	0.0	46.3	74.0	-27.7	Horizontal	200	45	
8287.500	46.4	36.8	-39.5	4.9	0.0	48.6	74.0	-25.3	Vertical	340	315	
12849.000	46.6	39.2	-38.5	6.1	0.0	53.4	74.0	-20.6	Horizontal	120	135	

Freq MHz	Average Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Average Total dBuV/m	Average Limit dBuV/m	Average Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Average Level
1246.000	35.6	28.8	-40.7	1.8	0.0	25.4	54.0	-28.6	Horizontal	120	90	
2251.000	34.9	32.3	-40.0	2.5	0.0	29.6	54.0	-24.3	Vertical	340	270	
2406.000	34.8	32.6	-40.2	2.6	0.0	29.8	54.0	-24.2	Vertical	120	135	
5267.500	33.1	34.6	-39.6	3.9	0.0	32.1	54.0	-21.9	Horizontal	200	45	
8287.500	32.7	36.8	-39.5	4.9	0.0	35.0	54.0	-19.0	Vertical	340	315	
12849.000	33.1	39.2	-38.5	6.1	0.0	39.9	54.0	-14.1	Horizontal	120	135	

FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

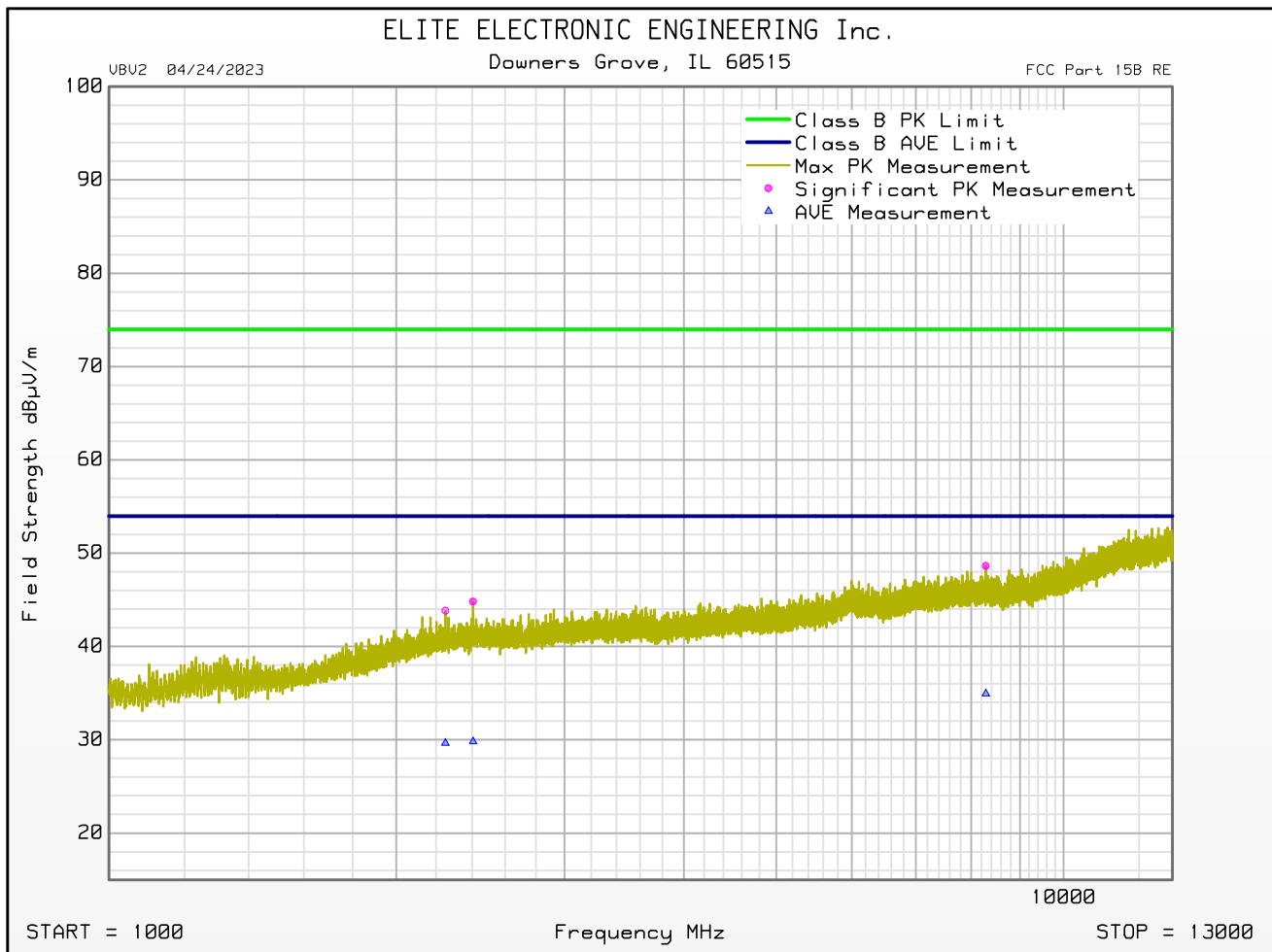
Manufacturer : Winegard Company
 Model : HS-PIR1
 Serial Number : Var1
 DUT Mode : Standby
 Turntable Step Angle (°): 45
 Mast Positions (cm) : 120, 200, 340
 Antenna Polarization : Horizontal
 Scan Type : Stepped Scan
 Test RBW : 1 MHz
 Prelim Dwell Time (s) : 0.0001
 Notes : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 15, 2023 12:38:24 PM



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

Manufacturer : Winegard Company
 Model : HS-PIR1
 Serial Number : Var1
 DUT Mode : Standby
 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 : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 15, 2023 12:38:24 PM



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

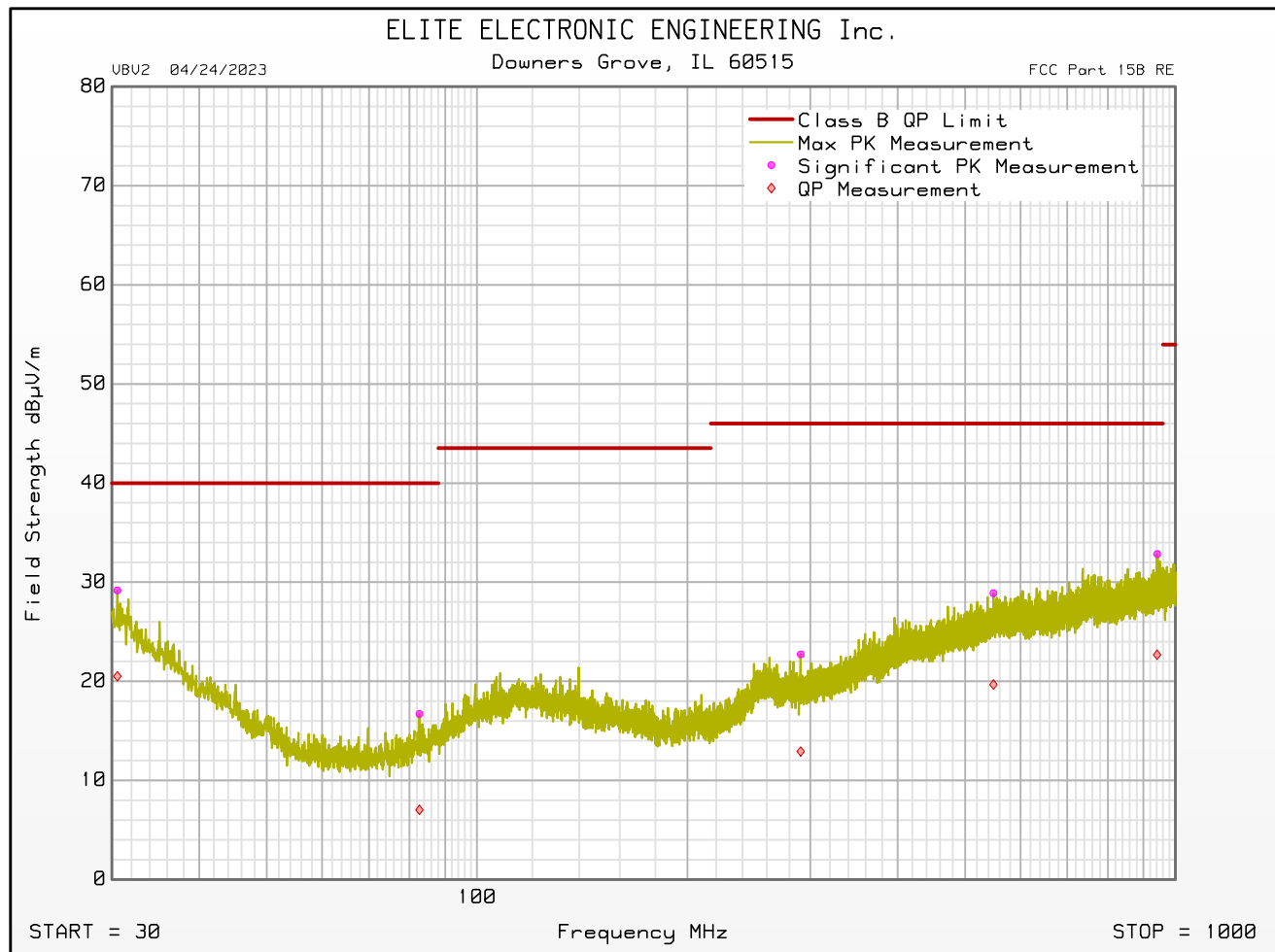
Manufacturer : Winegard Company
 Model : HS-H2O1
 Serial Number : Var2
 DUT Mode : Standby
 Turntable Step Angle (°): 45
 Mast Positions (cm) : 120, 200, 340
 Scan Type : Stepped Scan
 Test RBW : 120 kHz
 Prelim Dwell Time (s) : 0.0001
 Notes : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 16, 2023 08:51:41 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 dBuV/m	QP Total dBuV/m	QP Limit dBuV/m	QP Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive QP Level
30.540	4.6	-4.0	24.2	0.0	0.4	0.0	29.2	20.5	40.0	-19.5	Horizontal	200	45	
82.680	2.9	-6.7	13.4	0.0	0.4	0.0	16.7	7.0	40.0	-33.0	Horizontal	340	45	
107.980	3.9	-4.5	17.8	0.0	0.4	0.0	22.1	13.7	43.5	-29.8	Vertical	120	180	
290.640	3.2	-6.6	18.8	0.0	0.8	0.0	22.7	12.9	46.0	-33.1	Horizontal	200	270	
548.760	3.1	-6.1	24.7	0.0	1.1	0.0	28.9	19.7	46.0	-26.3	Horizontal	120	90	
941.220	4.4	-5.7	26.9	0.0	1.5	0.0	32.8	22.7	46.0	-23.3	Horizontal	120	90	

FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

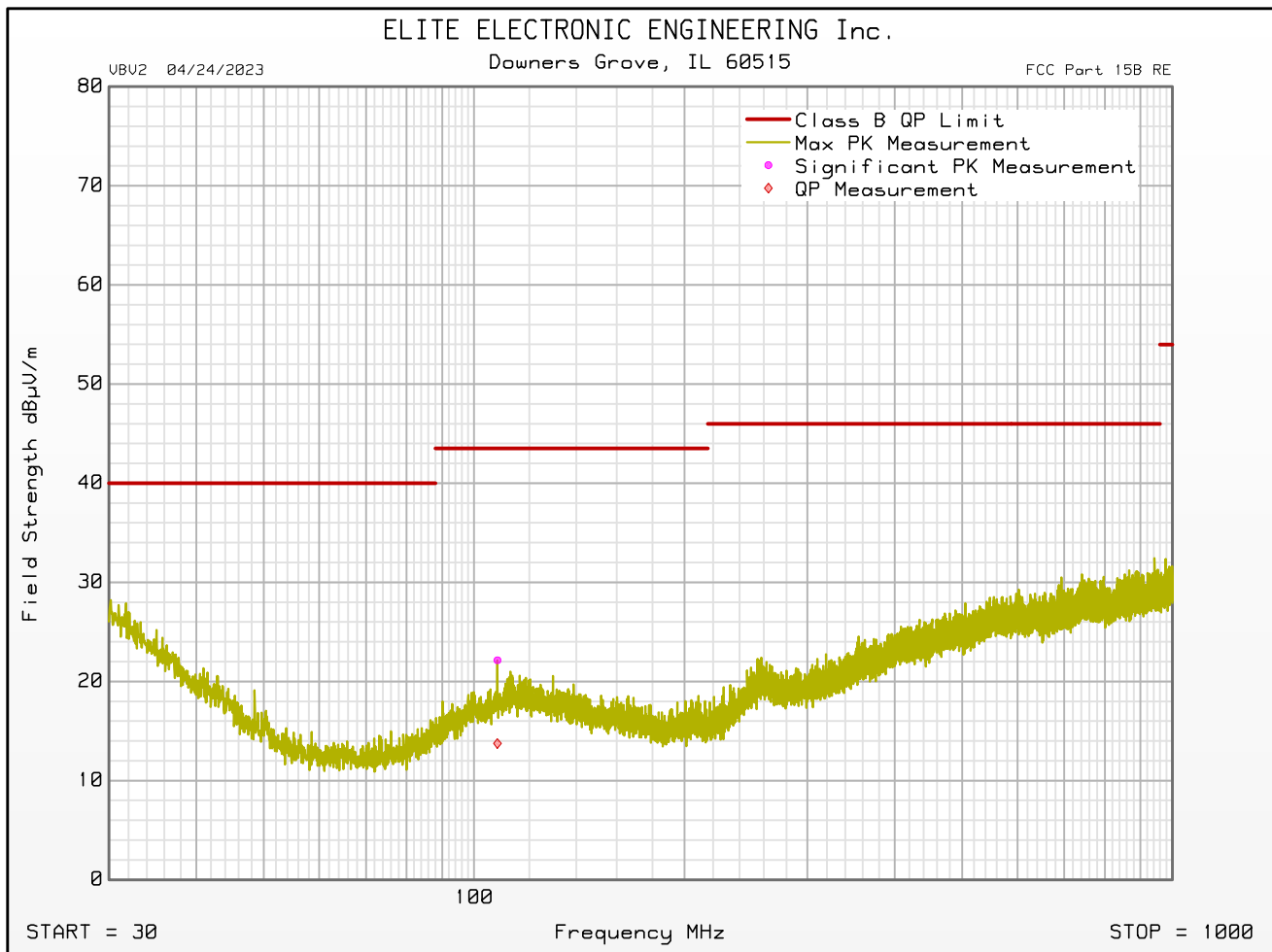
Manufacturer : Winegard Company
 Model : HS-H2O1
 Serial Number : Var2
 DUT Mode : Standby
 Turntable Step Angle (°): 45
 Mast Positions (cm) : 120, 200, 340
 Antenna Polarization : Horizontal
 Scan Type : Stepped Scan
 Test RBW : 120 kHz
 Prelim Dwell Time (s) : 0.0001
 Notes : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 16, 2023 08:51:41 AM



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

Manufacturer : Winegard Company
 Model : HS-H2O1
 Serial Number : Var2
 DUT Mode : Standby
 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 : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 16, 2023 08:51:41 AM





FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

Manufacturer : Winegard Company
Model : HS-H2O1
Serial Number : Var2
DUT Mode : Standby
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 : Rx - Sweep
Test Engineer : J. Cardenas
Test Date : Jun 15, 2023 12:10:17 PM

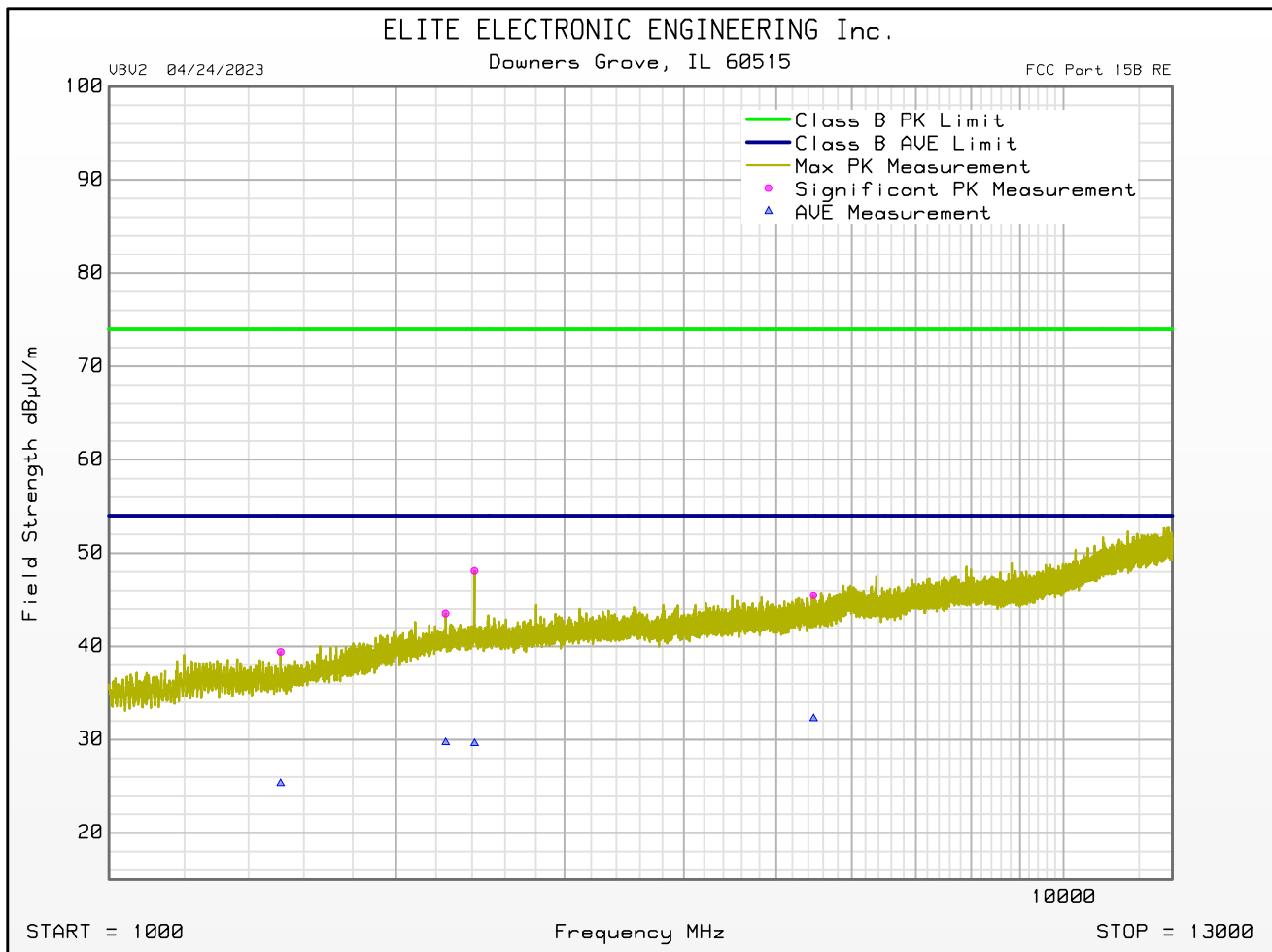
Freq MHz	Peak Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBuV/m	Peak Limit dBuV/m	Peak Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Peak Level
1513.000	49.2	28.5	-40.2	2.0	0.0	39.4	74.0	-34.6	Horizontal	120	270	
2252.000	48.8	32.3	-40.0	2.5	0.0	43.5	74.0	-30.5	Horizontal	200	0	
2411.000	52.4	32.6	-40.2	2.6	0.0	47.3	74.0	-26.6	Vertical	120	0	
2414.500	53.1	32.6	-40.2	2.6	0.0	48.1	74.0	-25.9	Horizontal	340	315	
5470.000	46.1	34.8	-39.4	4.0	0.0	45.5	74.0	-28.5	Horizontal	340	270	
8031.000	47.0	36.7	-39.6	4.9	0.0	49.0	74.0	-25.0	Vertical	120	90	
12873.000	46.2	39.2	-38.5	6.1	0.0	53.0	74.0	-21.0	Vertical	200	135	

Freq MHz	Average Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Average Total dBuV/m	Average Limit dBuV/m	Average Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Average Level
1513.000	35.1	28.5	-40.2	2.0	0.0	25.3	54.0	-28.7	Horizontal	120	270	
2252.000	34.9	32.3	-40.0	2.5	0.0	29.7	54.0	-24.3	Horizontal	200	0	
2411.000	35.0	32.6	-40.2	2.6	0.0	30.0	54.0	-24.0	Vertical	120	0	
2414.500	34.6	32.6	-40.2	2.6	0.0	29.6	54.0	-24.4	Horizontal	340	315	
5470.000	32.9	34.8	-39.4	4.0	0.0	32.3	54.0	-21.7	Horizontal	340	270	
8031.000	33.0	36.7	-39.6	4.9	0.0	35.0	54.0	-19.0	Vertical	120	90	
12873.000	33.2	39.2	-38.5	6.1	0.0	40.0	54.0	-14.0	Vertical	200	135	

FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

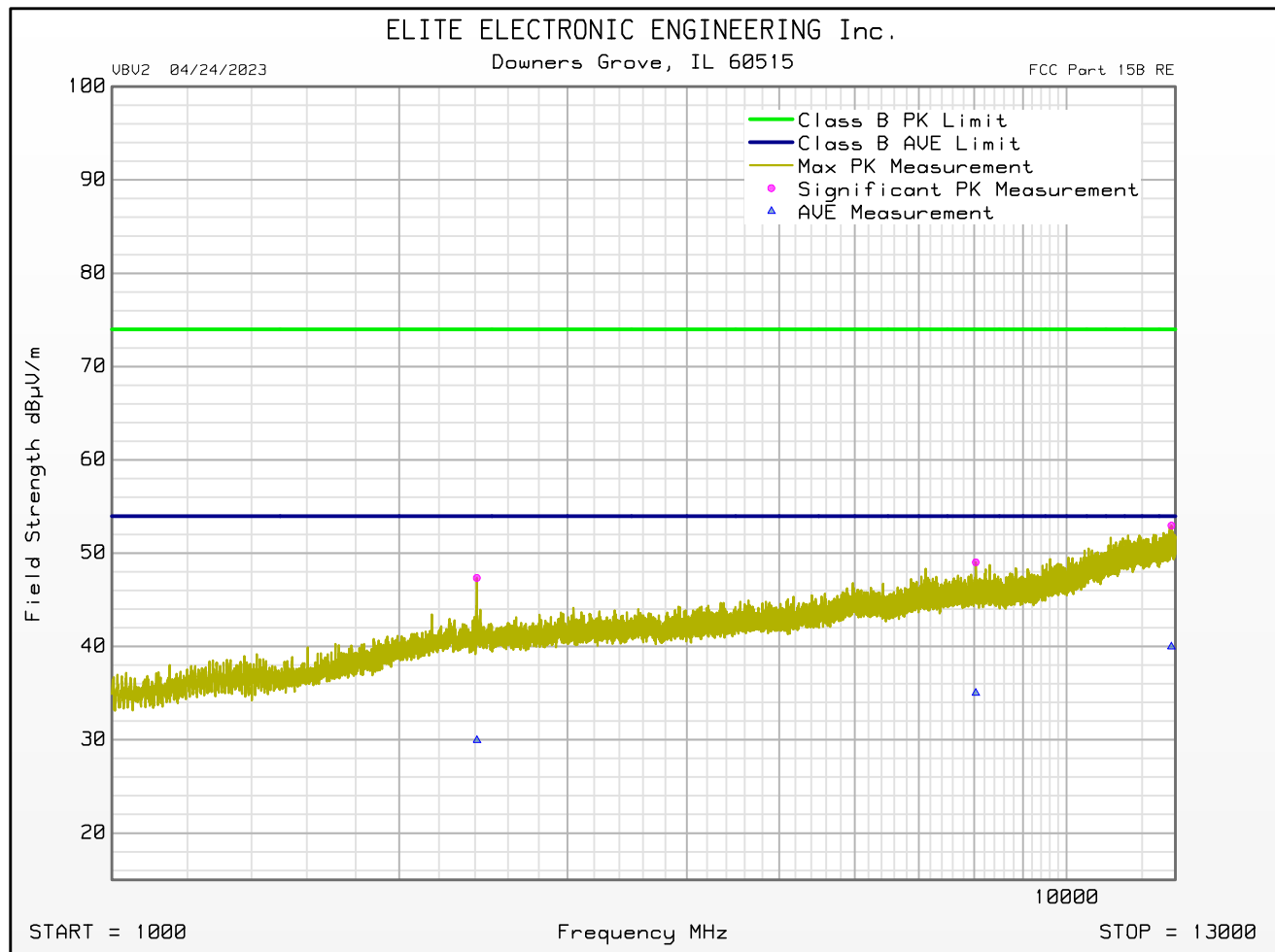
Manufacturer : Winegard Company
 Model : HS-H2O1
 Serial Number : Var2
 DUT Mode : Standby
 Turntable Step Angle (°): 45
 Mast Positions (cm) : 120, 200, 340
 Antenna Polarization : Horizontal
 Scan Type : Stepped Scan
 Test RBW : 1 MHz
 Prelim Dwell Time (s) : 0.0001
 Notes : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 15, 2023 12:10:17 PM



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

Manufacturer : Winegard Company
 Model : HS-H2O1
 Serial Number : Var2
 DUT Mode : Standby
 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 : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 15, 2023 12:10:17 PM



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

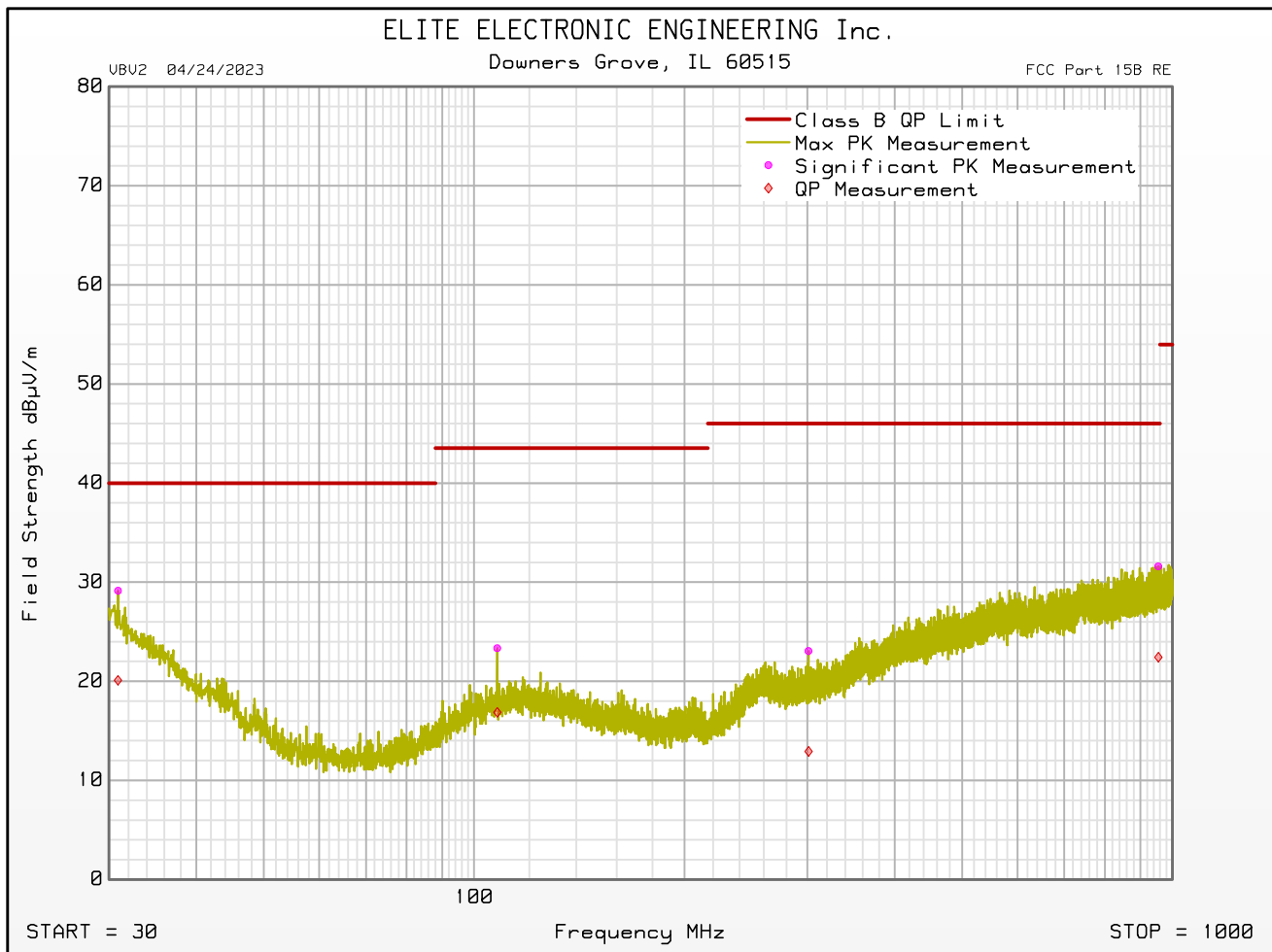
Manufacturer : Winegard Company
 Model : HS-CC01
 Serial Number : Var3
 DUT Mode : Standby
 Turntable Step Angle (°): 45
 Mast Positions (cm) : 120, 200, 340
 Scan Type : Stepped Scan
 Test RBW : 120 kHz
 Prelim Dwell Time (s) : 0.0001
 Notes : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 16, 2023 09:09:55 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 dBuV/m	QP Total dBuV/m	QP Limit dBuV/m	QP Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive QP Level
30.900	4.8	-4.2	23.9	0.0	0.4	0.0	29.1	20.1	40.0	-19.9	Horizontal	340	0	
90.100	4.8	-1.5	14.9	0.0	0.4	0.0	20.1	13.8	43.5	-29.7	Vertical	120	0	
107.920	5.1	-1.3	17.8	0.0	0.4	0.0	23.3	16.9	43.5	-26.6	Horizontal	200	315	
301.200	3.3	-6.8	19.0	0.0	0.8	0.0	23.0	12.9	46.0	-33.1	Horizontal	120	315	
557.040	3.5	-6.1	24.7	0.0	1.1	0.0	29.4	19.7	46.0	-26.3	Vertical	120	180	
954.480	3.1	-6.1	27.0	0.0	1.5	0.0	31.6	22.4	46.0	-23.6	Horizontal	340	270	

FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

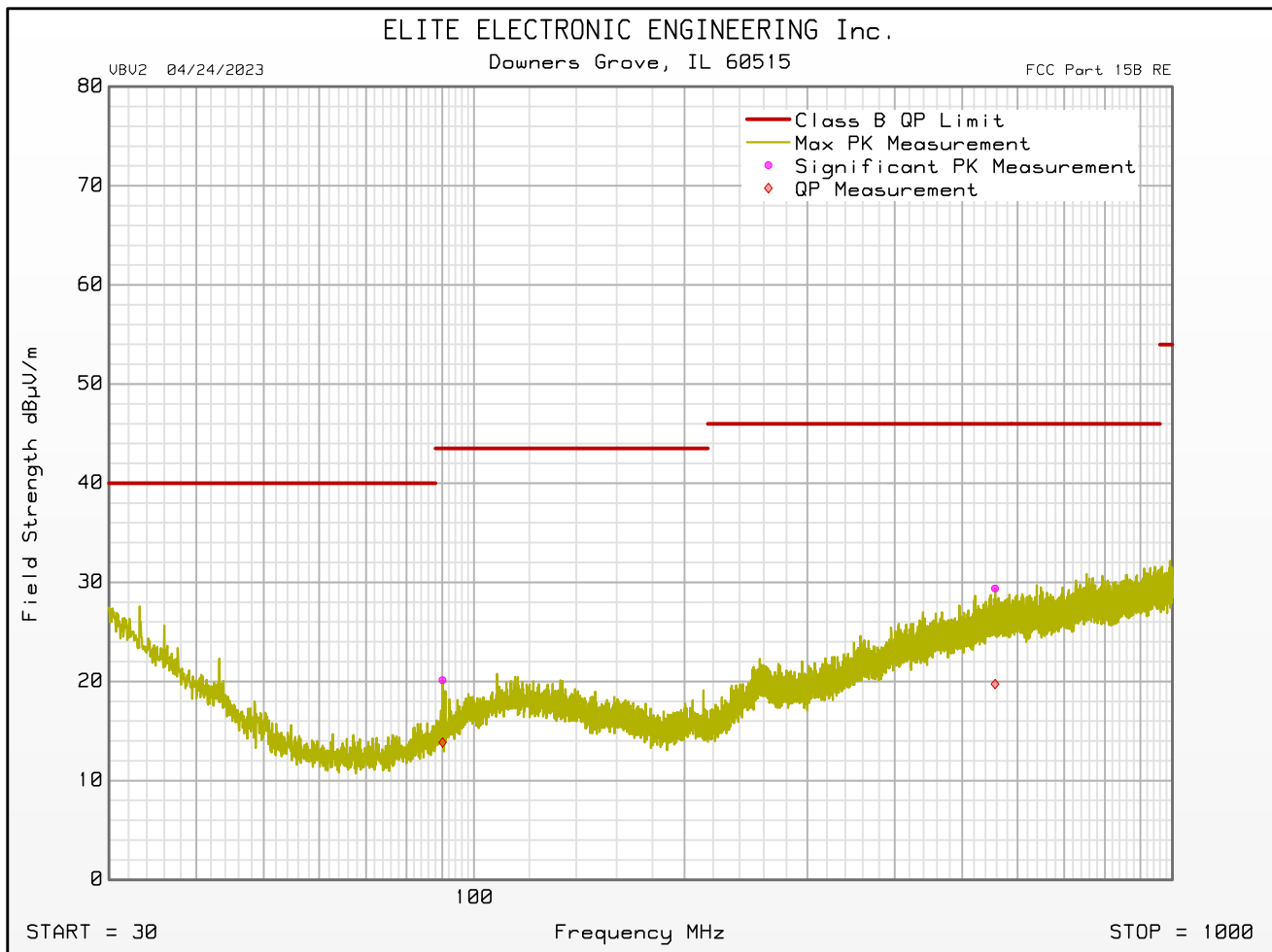
Manufacturer : Winegard Company
 Model : HS-CC01
 Serial Number : Var3
 DUT Mode : Standby
 Turntable Step Angle (°): 45
 Mast Positions (cm) : 120, 200, 340
 Antenna Polarization : Horizontal
 Scan Type : Stepped Scan
 Test RBW : 120 kHz
 Prelim Dwell Time (s) : 0.0001
 Notes : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 16, 2023 09:09:55 AM



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

Manufacturer : Winegard Company
 Model : HS-CC01
 Serial Number : Var3
 DUT Mode : Standby
 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 : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 16, 2023 09:09:55 AM





FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

Manufacturer : Winegard Company
Model : HS-CC01
Serial Number : Var3
DUT Mode : Standby
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 : Rx - Sweep
Test Engineer : J. Cardenas
Test Date : Jun 15, 2023 11:43:35 AM

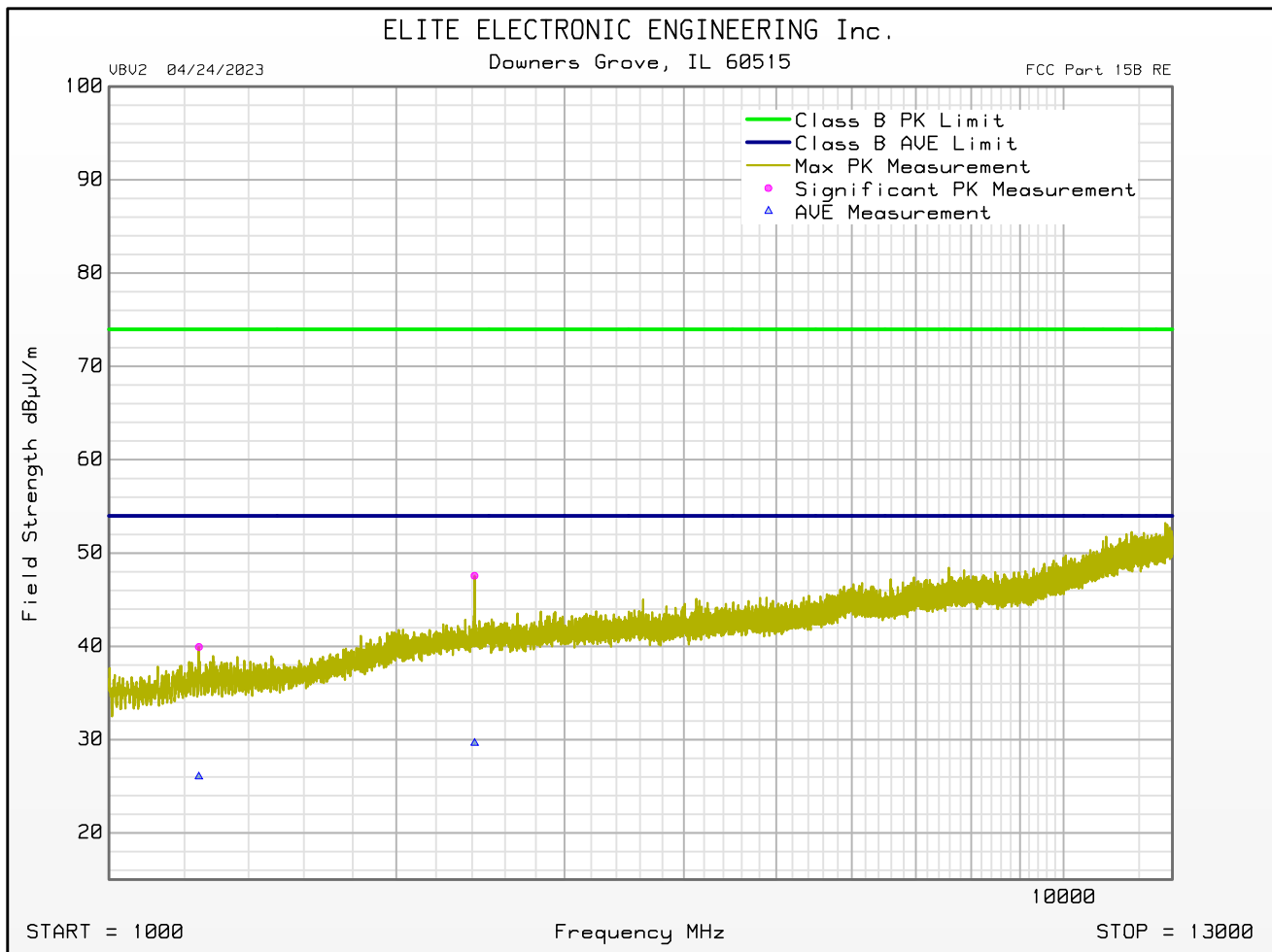
Freq MHz	Peak Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBuV/m	Peak Limit dBuV/m	Peak Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Peak Level
1242.000	50.1	28.8	-40.7	1.8	0.0	39.9	74.0	-34.1	Horizontal	200	225	
2265.500	48.3	32.3	-40.0	2.5	0.0	43.1	74.0	-30.9	Vertical	200	90	
2414.500	52.6	32.6	-40.2	2.6	0.0	47.6	74.0	-26.4	Horizontal	200	270	
5371.000	46.5	34.7	-39.5	3.9	0.0	45.7	74.0	-28.3	Vertical	200	270	
7896.000	46.8	36.6	-39.6	4.9	0.0	48.7	74.0	-25.2	Vertical	340	315	
12888.000	46.9	39.2	-38.5	6.1	0.0	53.7	74.0	-20.3	Vertical	340	90	

Freq MHz	Average Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Average Total dBuV/m	Average Limit dBuV/m	Average Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Average Level
1242.000	36.2	28.8	-40.7	1.8	0.0	26.0	54.0	-28.0	Horizontal	200	225	
2265.500	34.7	32.3	-40.0	2.5	0.0	29.5	54.0	-24.5	Vertical	200	90	
2414.500	34.6	32.6	-40.2	2.6	0.0	29.6	54.0	-24.4	Horizontal	200	270	
5371.000	33.0	34.7	-39.5	3.9	0.0	32.2	54.0	-21.8	Vertical	200	270	
7896.000	32.7	36.6	-39.6	4.9	0.0	34.7	54.0	-19.3	Vertical	340	315	
12888.000	33.3	39.2	-38.5	6.1	0.0	40.1	54.0	-13.9	Vertical	340	90	

FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

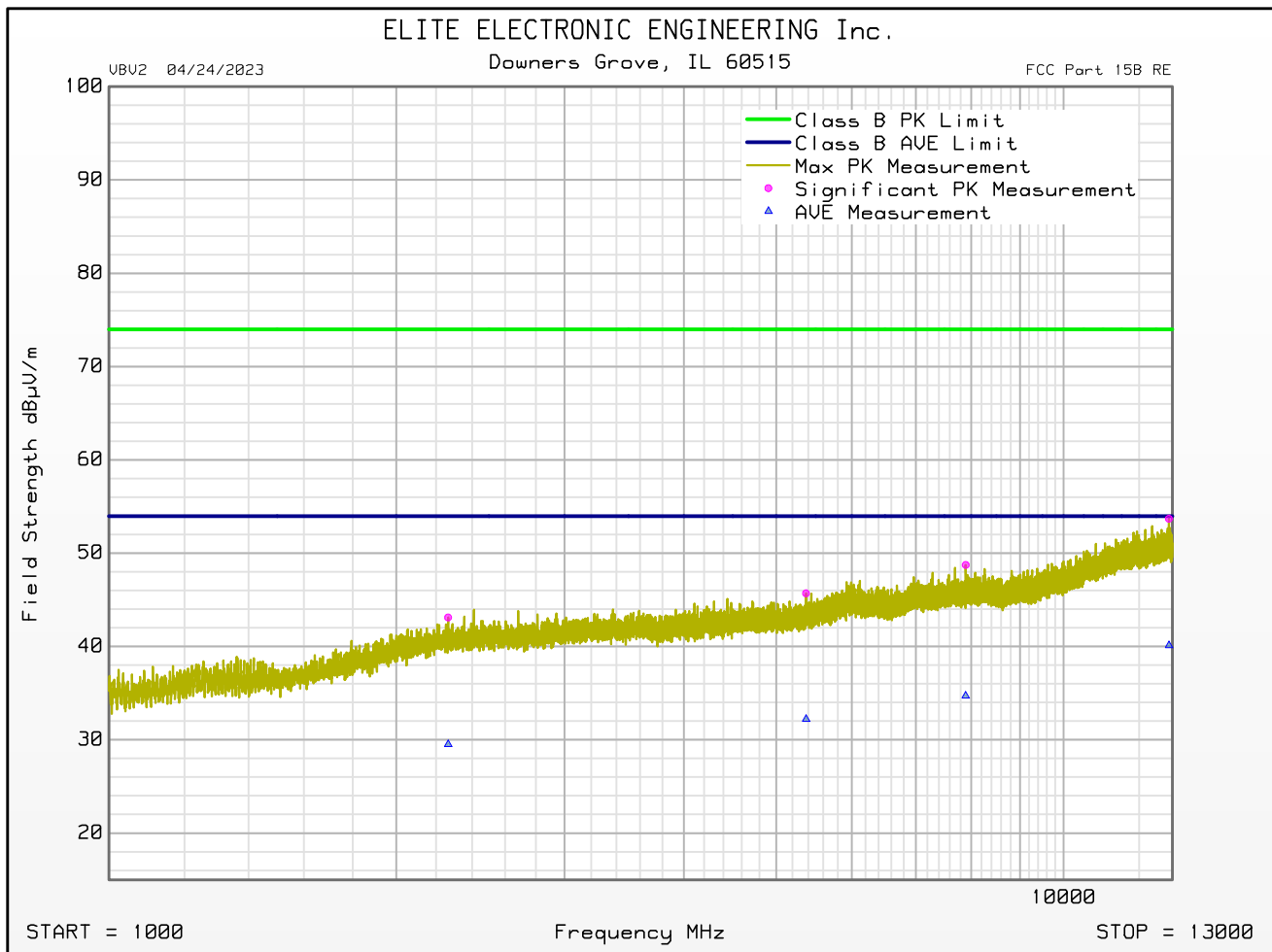
Manufacturer : Winegard Company
 Model : HS-CC01
 Serial Number : Var3
 DUT Mode : Standby
 Turntable Step Angle (°): 45
 Mast Positions (cm) : 120, 200, 340
 Antenna Polarization : Horizontal
 Scan Type : Stepped Scan
 Test RBW : 1 MHz
 Prelim Dwell Time (s) : 0.0001
 Notes : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 15, 2023 11:43:35 AM



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

Manufacturer : Winegard Company
 Model : HS-CC01
 Serial Number : Var3
 DUT Mode : Standby
 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 : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 15, 2023 11:43:35 AM





FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

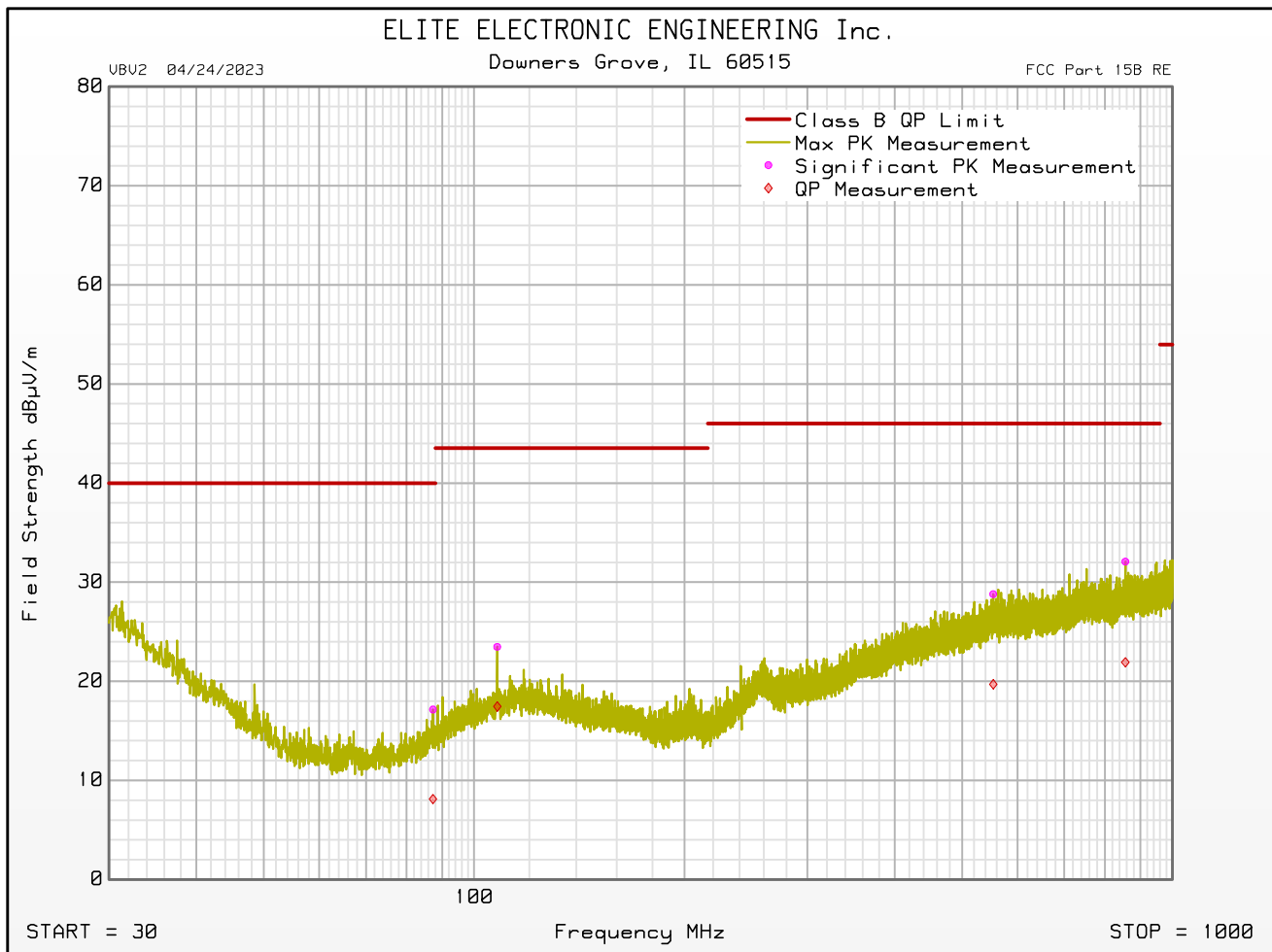
Manufacturer : Winegard Company
Model : HS-TMP1
Serial Number : Var4
DUT Mode : Standby
Turntable Step Angle (°): 45
Mast Positions (cm) : 120, 200, 340
Scan Type : Stepped Scan
Test RBW : 120 kHz
Prelim Dwell Time (s) : 0.0001
Notes : Rx - Sweep
Test Engineer : J. Cardenas
Test Date : Jun 16, 2023 09:28:07 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 dBuV/m	QP Total dBuV/m	QP Limit dBuV/m	QP Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive QP Level
30.420	4.9	-4.1	24.2	0.0	0.4	0.0	29.6	20.6	40.0	-19.4	Vertical	340	315	
87.300	2.6	-6.5	14.2	0.0	0.4	0.0	17.2	8.1	40.0	-31.9	Horizontal	340	90	
107.920	5.3	-0.8	17.8	0.0	0.4	0.0	23.5	17.5	43.5	-26.1	Horizontal	120	270	
262.080	2.8	-6.4	19.3	0.0	0.8	0.0	22.9	13.7	46.0	-32.3	Vertical	200	135	
553.800	2.9	-6.2	24.7	0.0	1.1	0.0	28.8	19.7	46.0	-26.3	Horizontal	340	180	
856.020	4.3	-5.9	26.3	0.0	1.5	0.0	32.1	21.9	46.0	-24.1	Horizontal	340	0	

FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

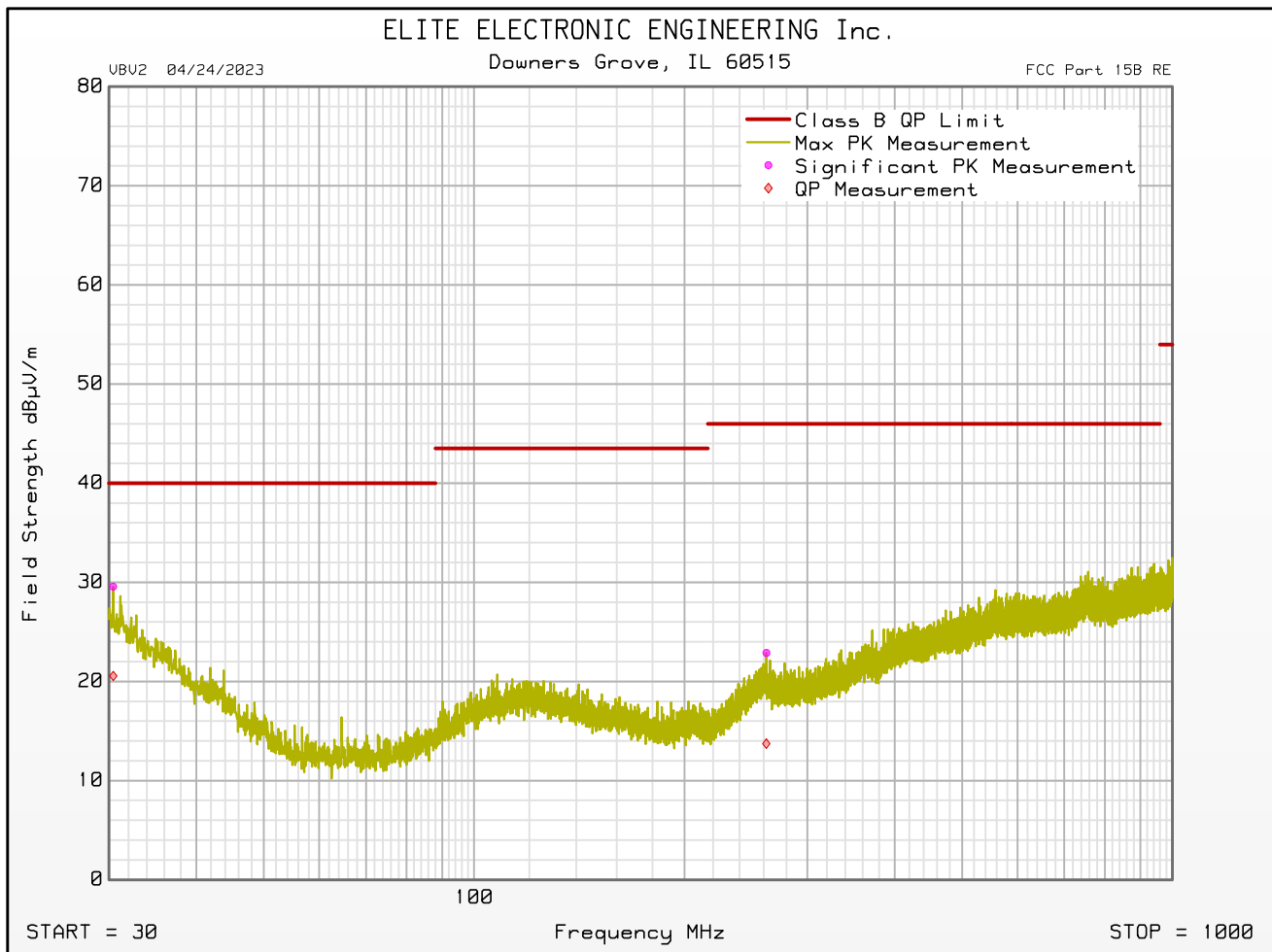
Manufacturer : Winegard Company
 Model : HS-TMP1
 Serial Number : Var4
 DUT Mode : Standby
 Turntable Step Angle (°): 45
 Mast Positions (cm) : 120, 200, 340
 Antenna Polarization : Horizontal
 Scan Type : Stepped Scan
 Test RBW : 120 kHz
 Prelim Dwell Time (s) : 0.0001
 Notes : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 16, 2023 09:28:07 AM



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

Manufacturer : Winegard Company
 Model : HS-TMP1
 Serial Number : Var4
 DUT Mode : Standby
 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 : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 16, 2023 09:28:07 AM





FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

Manufacturer : Winegard Company
Model : HS-TMP1
Serial Number : Var4
DUT Mode : Standby
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 : Rx - Sweep
Test Engineer : J. Cardenas
Test Date : Jun 15, 2023 11:12:01 AM

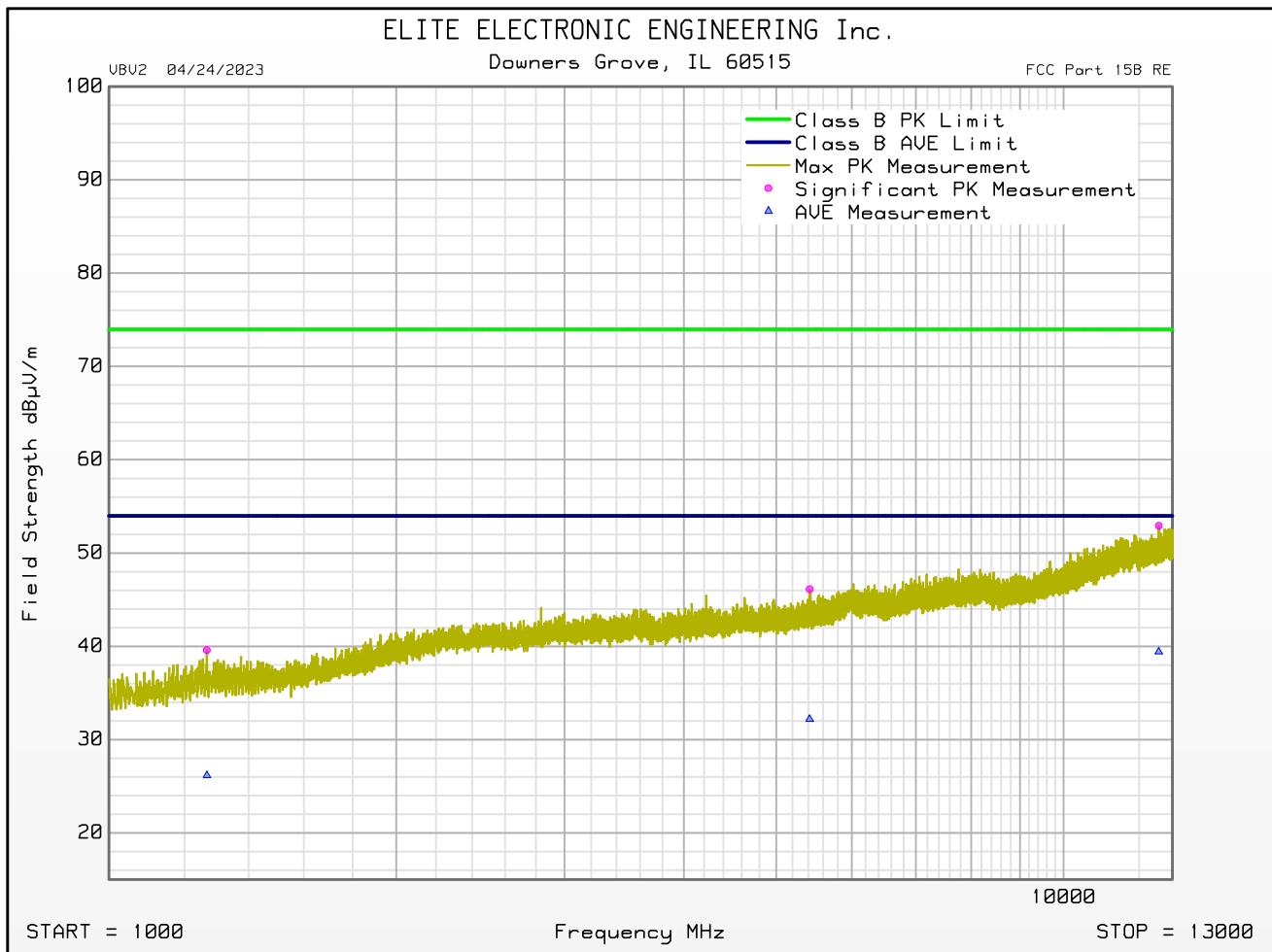
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1266.000	49.6	28.8	-40.7	1.8	0.0	39.6	74.0	-34.4	Horizontal	340	0	
2261.500	48.6	32.3	-40.0	2.5	0.0	43.4	74.0	-30.6	Vertical	340	270	
3190.500	47.9	33.1	-39.8	3.1	0.0	44.3	74.0	-29.7	Vertical	200	135	
5419.000	46.8	34.8	-39.5	4.0	0.0	46.1	74.0	-27.9	Horizontal	340	90	
7752.000	46.6	36.5	-39.5	4.9	0.0	48.5	74.0	-25.5	Vertical	120	45	
12577.000	46.5	39.0	-38.7	6.1	0.0	52.9	74.0	-21.1	Horizontal	340	225	

Freq MHz	Average Mtr Rdg dBuV	Ant Fac dB/m	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Average Total dBuV/m	Average Limit dBuV/m	Average Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °	Excessive Average Level
1266.000	36.2	28.8	-40.7	1.8	0.0	26.2	54.0	-27.8	Horizontal	340	0	
2261.500	34.7	32.3	-40.0	2.5	0.0	29.5	54.0	-24.5	Vertical	340	270	
3190.500	34.3	33.1	-39.8	3.1	0.0	30.7	54.0	-23.3	Vertical	200	135	
5419.000	32.9	34.8	-39.5	4.0	0.0	32.2	54.0	-21.8	Horizontal	340	90	
7752.000	32.8	36.5	-39.5	4.9	0.0	34.7	54.0	-19.2	Vertical	120	45	
12577.000	33.0	39.0	-38.7	6.1	0.0	39.4	54.0	-14.6	Horizontal	340	225	

FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

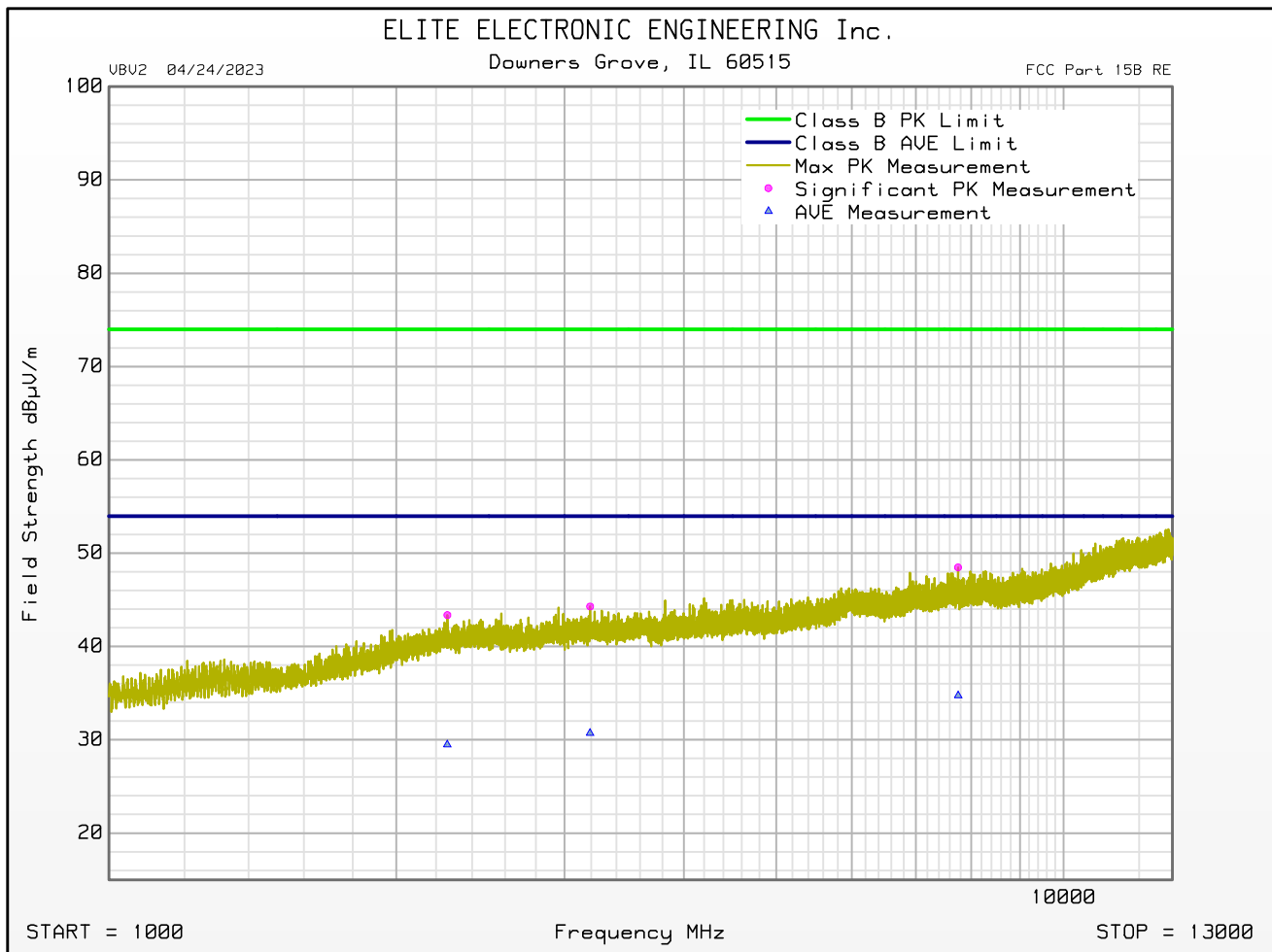
Manufacturer : Winegard Company
 Model : HS-TMP1
 Serial Number : Var4
 DUT Mode : Standby
 Turntable Step Angle (°): 45
 Mast Positions (cm) : 120, 200, 340
 Antenna Polarization : Horizontal
 Scan Type : Stepped Scan
 Test RBW : 1 MHz
 Prelim Dwell Time (s) : 0.0001
 Notes : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 15, 2023 11:12:01 AM



FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 04/24/2023

Manufacturer : Winegard Company
 Model : HS-TMP1
 Serial Number : Var4
 DUT Mode : Standby
 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 : Rx - Sweep
 Test Engineer : J. Cardenas
 Test Date : Jun 15, 2023 11:12:01 AM



22. Case Spurious Radiated Emissions

EUT Information	
Manufacturer	Winegard Company
Product	BLE Sensor
Model No.	HS-PIR1, HS-H2O1, HS-CC01, and HS-TMP1
Serial No.	Var1, Var2, Var3 and Var4
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	Below 1GHz: Bilog (or equivalent) 1 – 18GHz: 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
Radiated disturbance (electric field strength on an open area test site or alternative test site) (6 GHz – 18 GHz)	3.2
Radiated disturbance (electric field strength on an open area test site or alternative test site) (18 GHz – 26.5 GHz)	3.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (26.5 GHz – 40 GHz)	3.4

Procedure

Radiated measurements were performed in a 32ft. x 20ft. x 14ft. high shielded enclosure. 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 30MHz to 18GHz was investigated using a peak detector function.

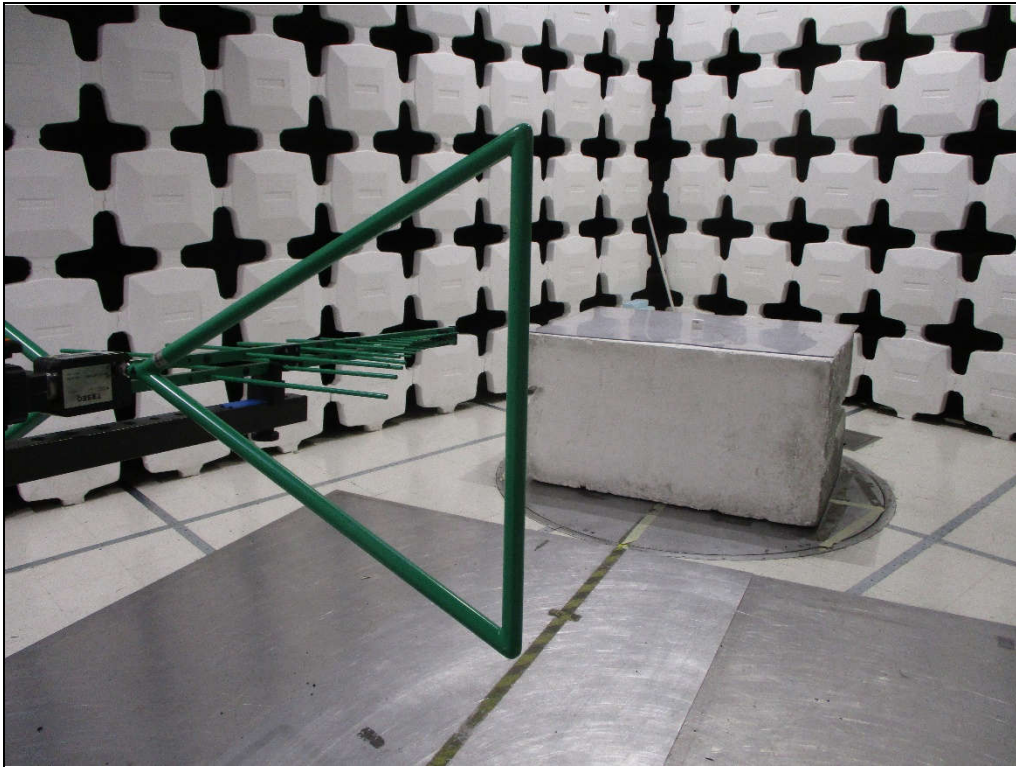
The final open field emission tests were then manually performed over the frequency range of 30MHz to 18GHz.

- 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 1.5-meter-high non-conductive stand. A peak detector with a resolution bandwidth of 100kHz 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.
 - iv) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer, the measuring antenna was not raised or lowered to ensure maximized readings. Instead, the EUT was rotated through all axis to ensure the maximum readings were recorded for the EUT.
 - 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 below 1GHz were measured using a bi-log antenna. The bi-log antenna was positioned at a 3-meter distance from the EUT. The EUT was placed on an 80cm 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 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.
 - c) 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

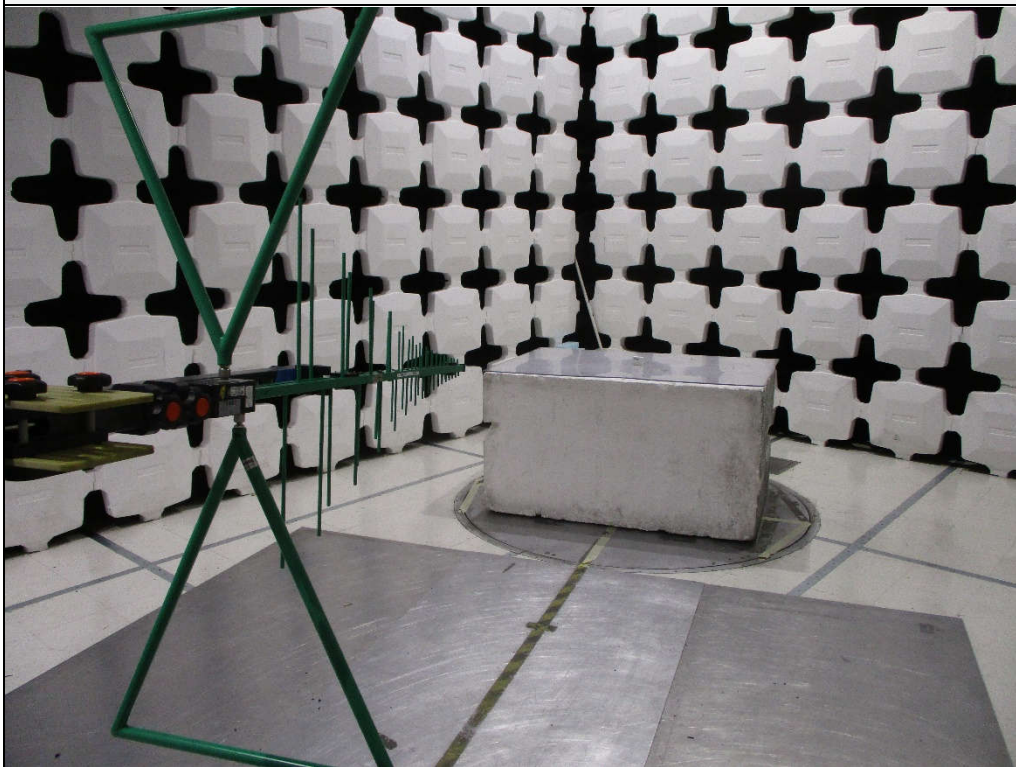
were measured.

- iii) The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.
- iv) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer, the measuring antenna was not raised or lowered to ensure maximized readings. Instead, the EUT was rotated through all axis to ensure the maximum readings were recorded for the EUT.
- d) For all radiated emissions measurements below 1GHz, if the peak reading is below the limits listed in §15.209(a), no further measurements are required. If, however, the peak readings exceed the limits listed in §15.209(a), then the emissions are remeasured using a quasi-peak detector.
- e) 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).

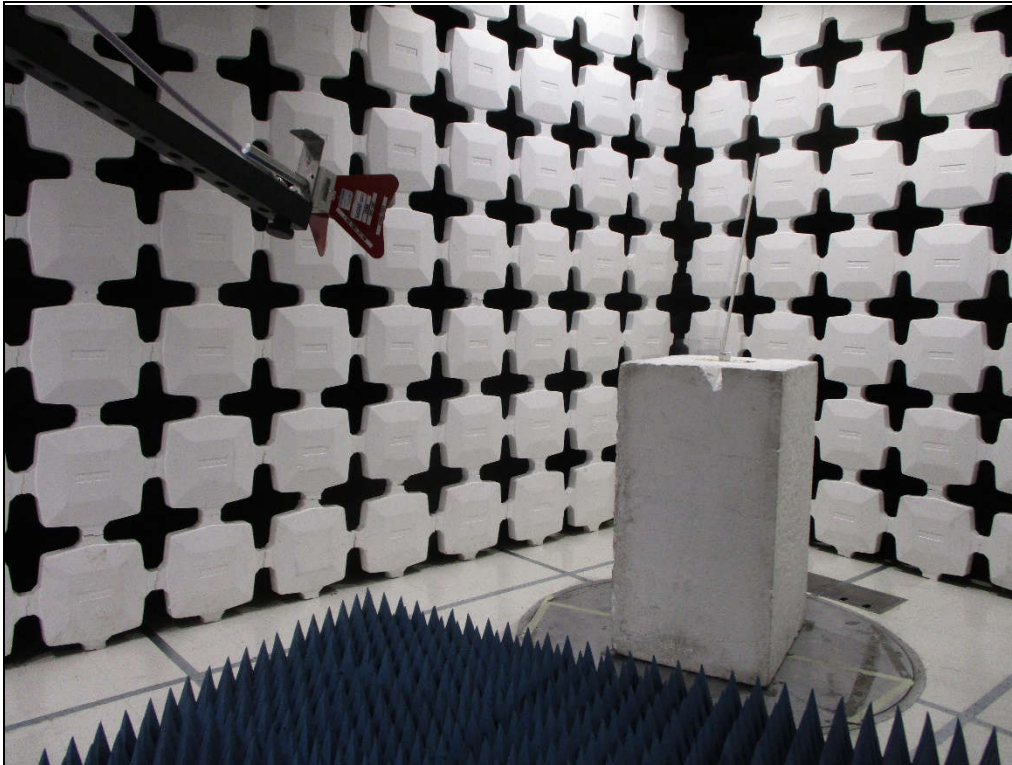
Next, for all radiated emissions measurements above 1GHz, the resolution bandwidth was set to 1MHz. The analyzer was set to linear mode with a 10Hz video bandwidth in order to simulate an average detector. An average reading was taken.



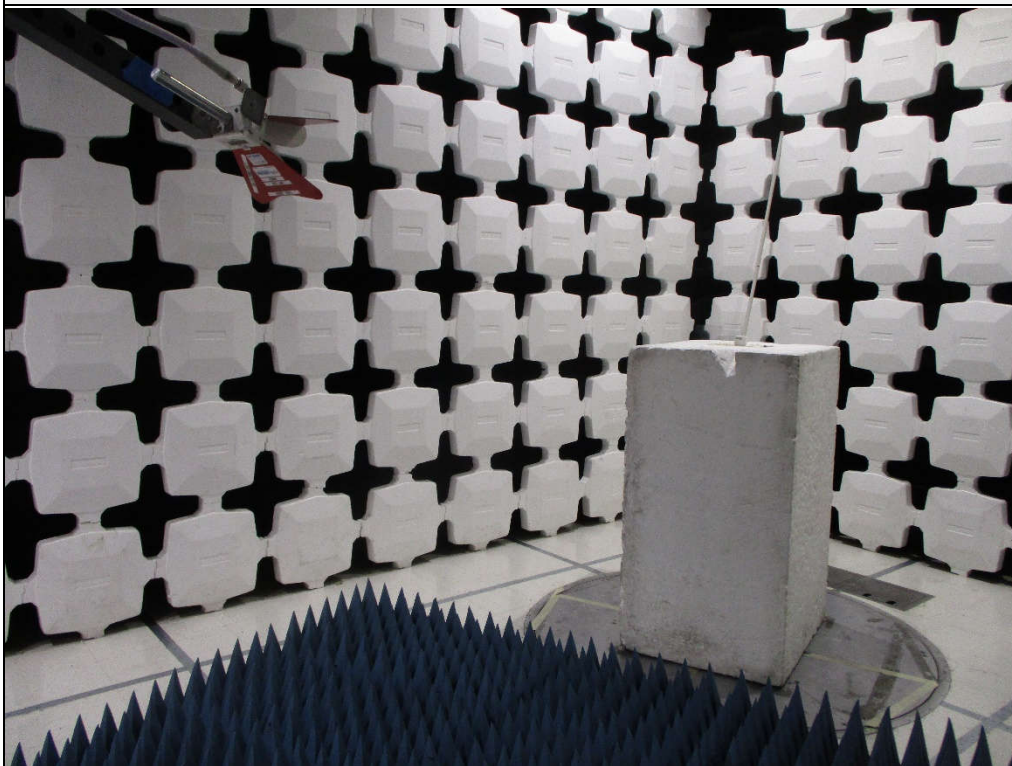
Test Setup for Spurious Radiated Emissions, 30MHz – 1GHz – Antenna
Polarization Horizontal



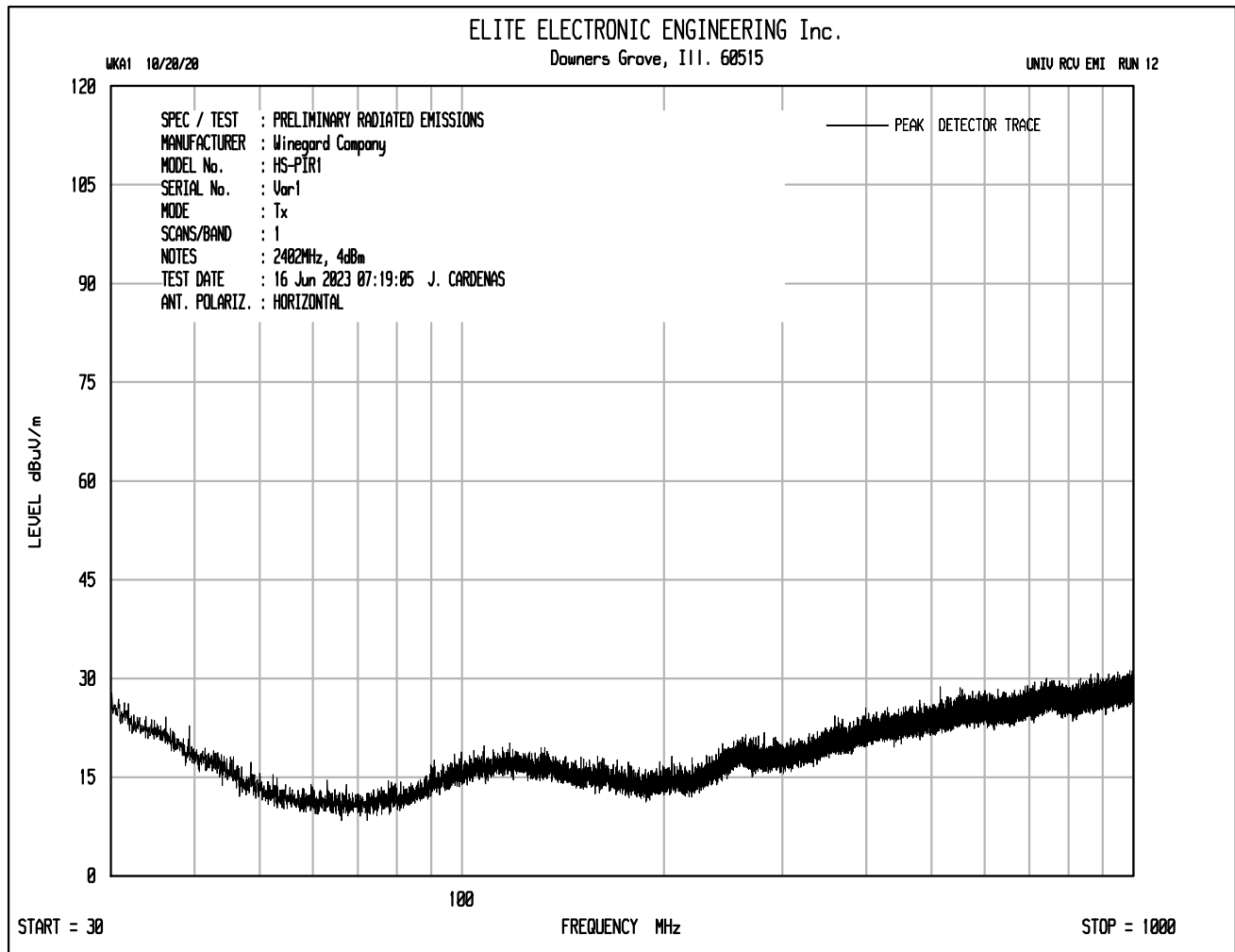
Test Setup for Spurious Radiated Emissions, 30MHz – 1GHz – Antenna
Polarization Vertical

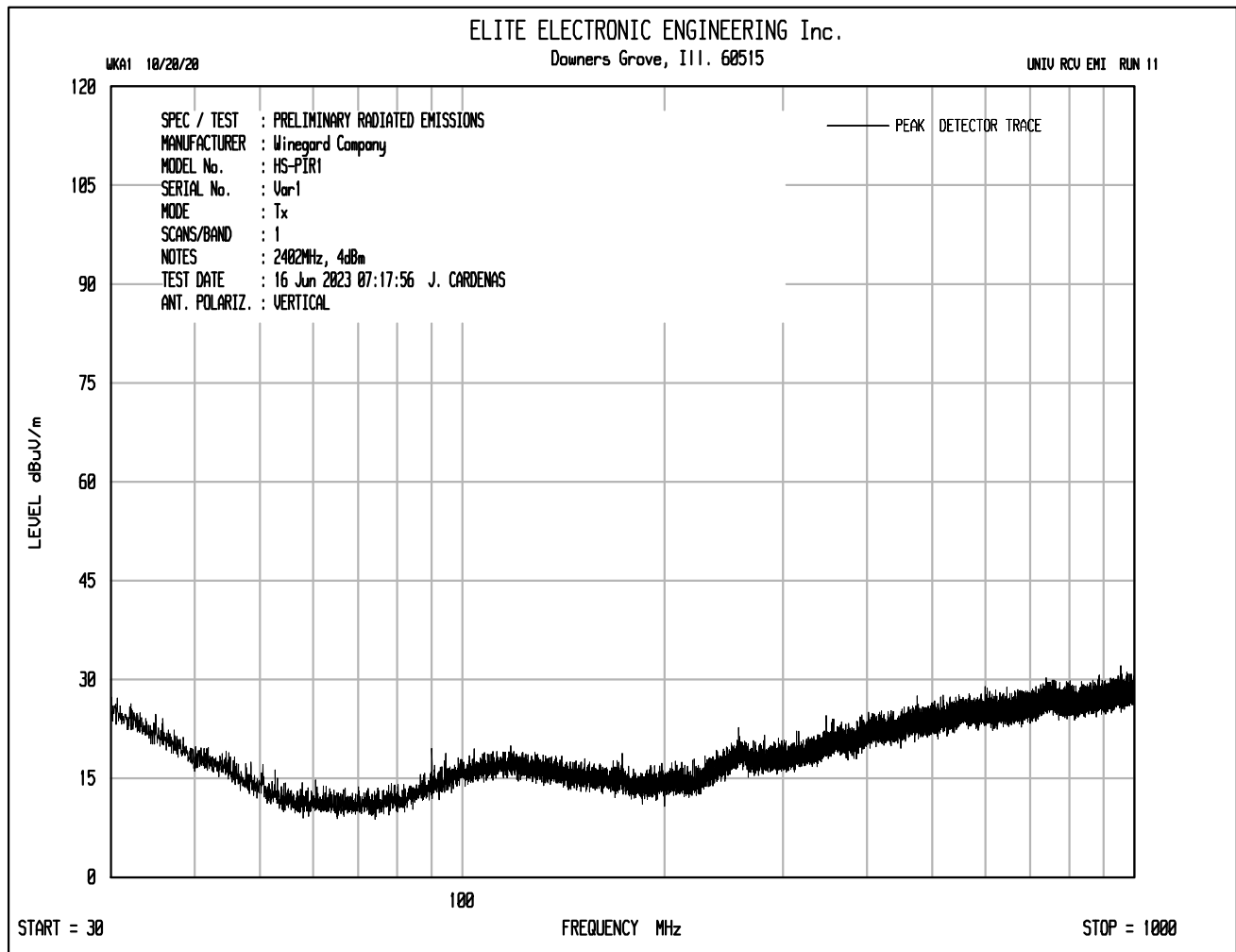


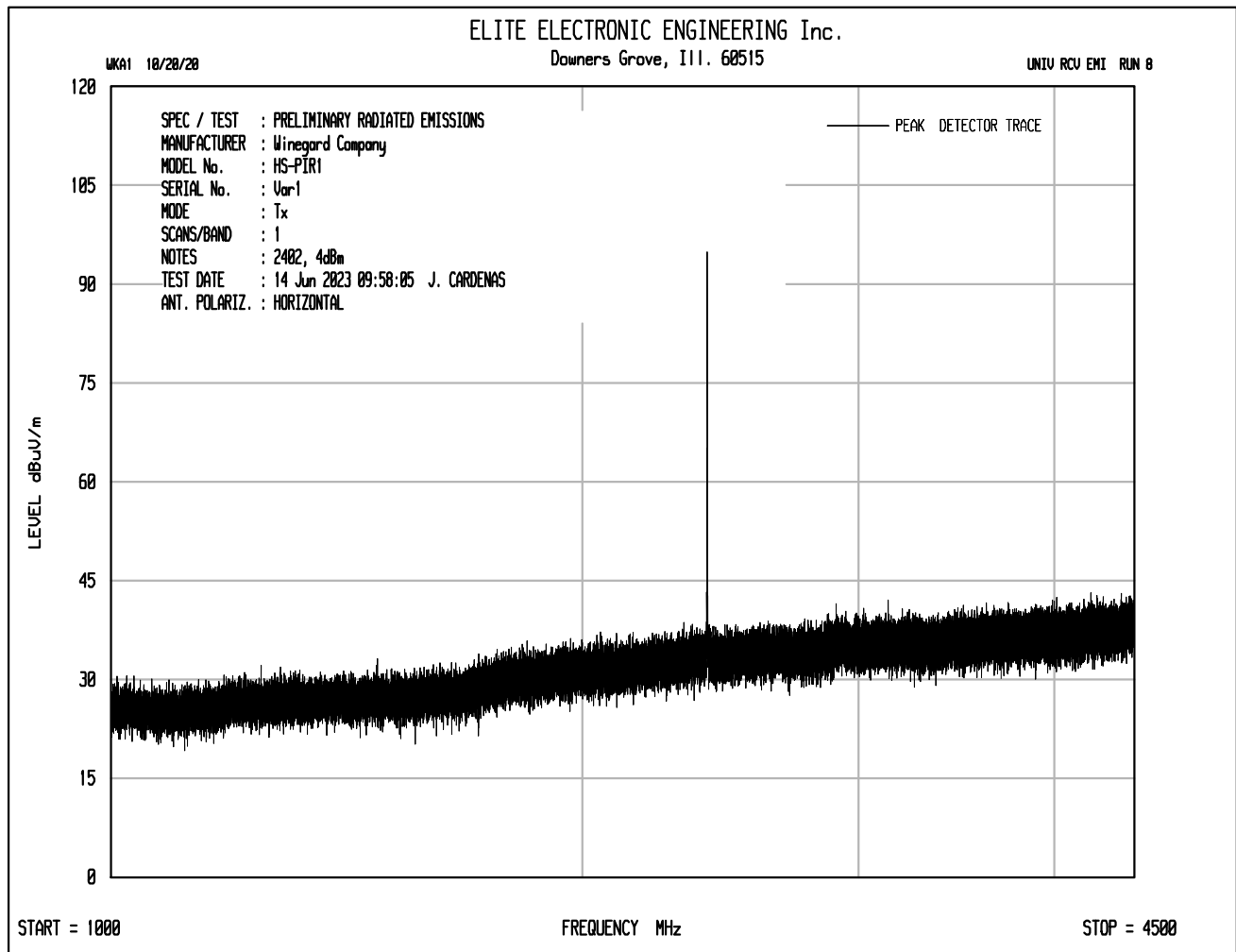
Test Setup for Spurious Radiated Emissions, 1 – 18GHz – Antenna Polarization
Horizontal

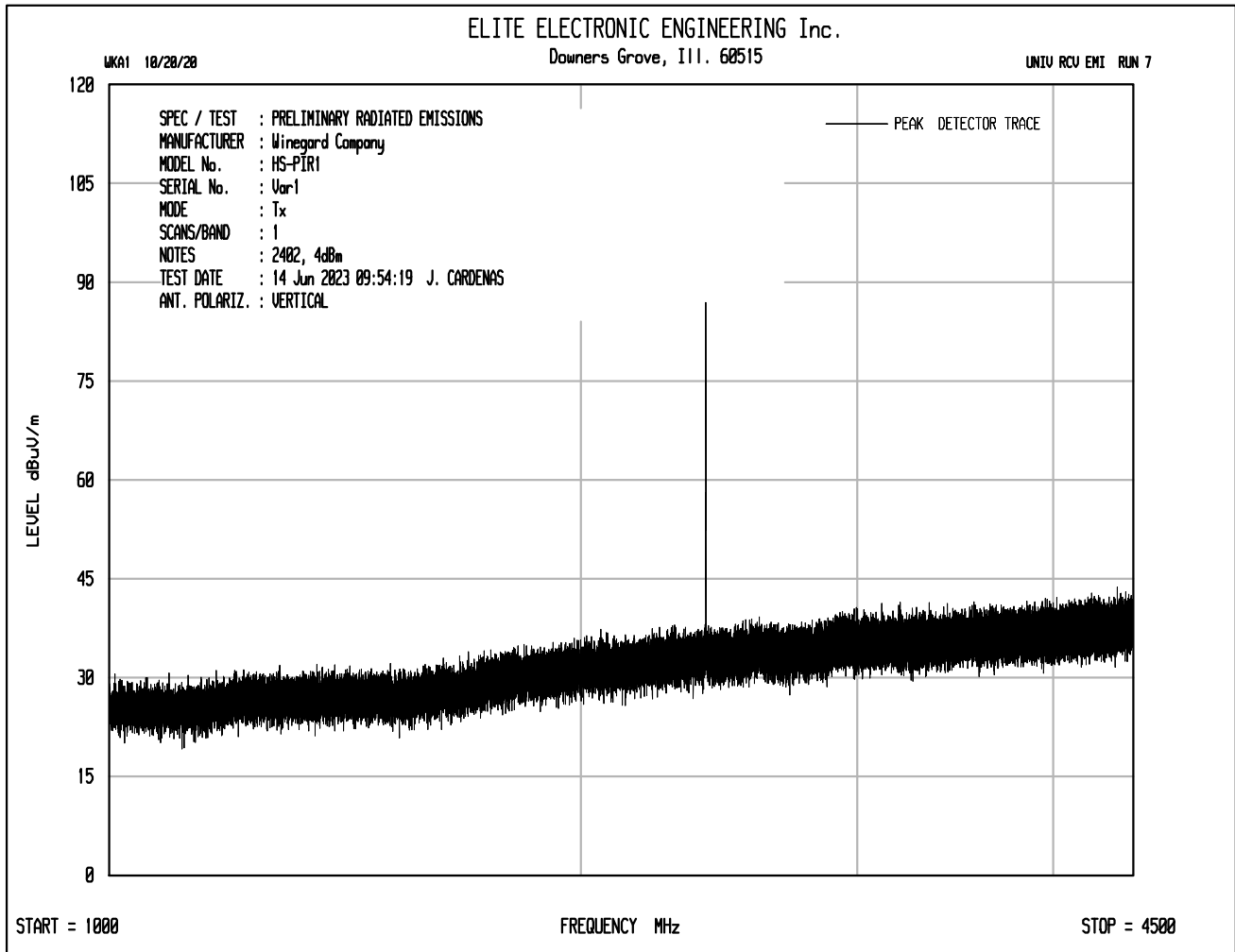


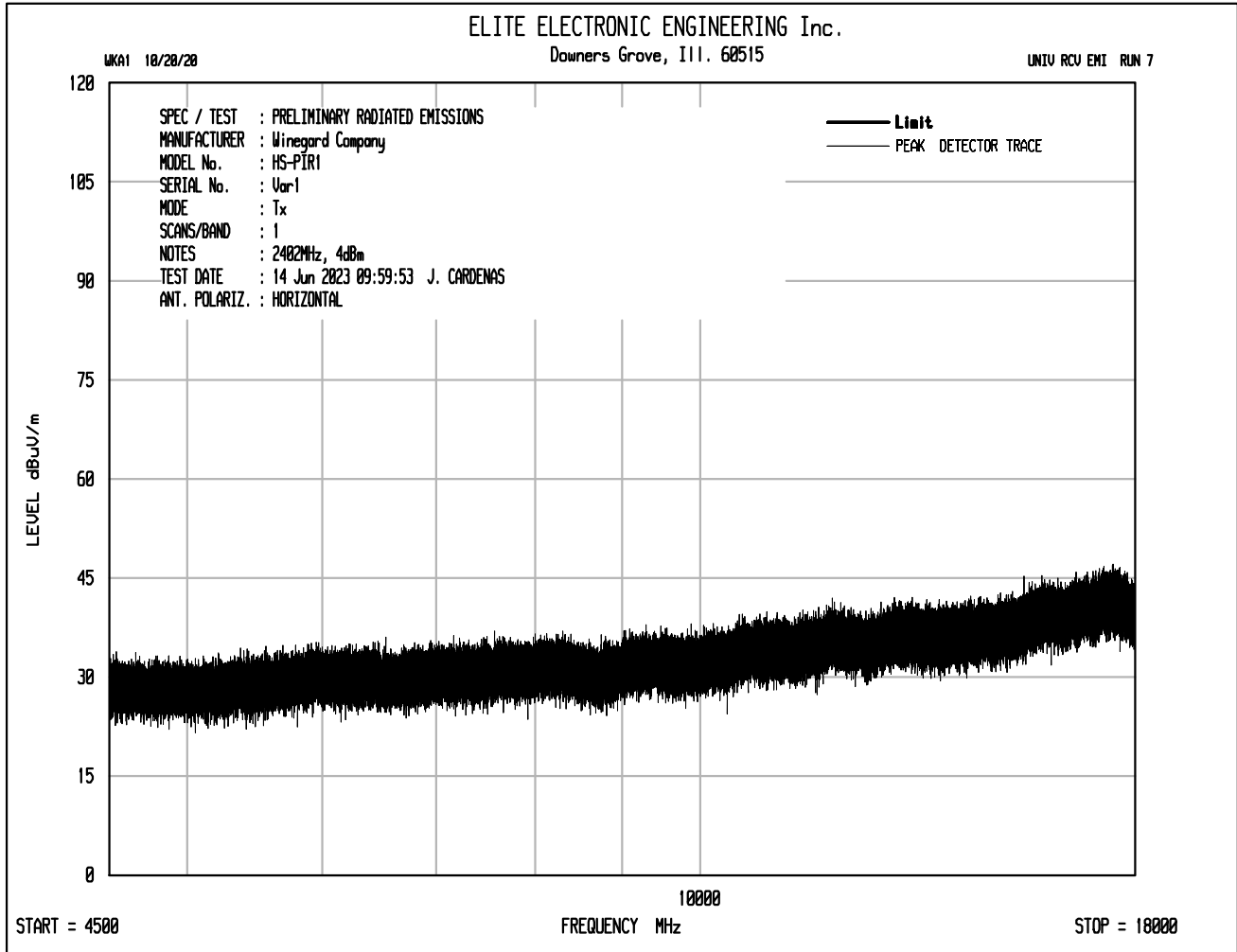
Test Setup for Spurious Radiated Emissions, 1 – 18GHz – Antenna Polarization
Vertical

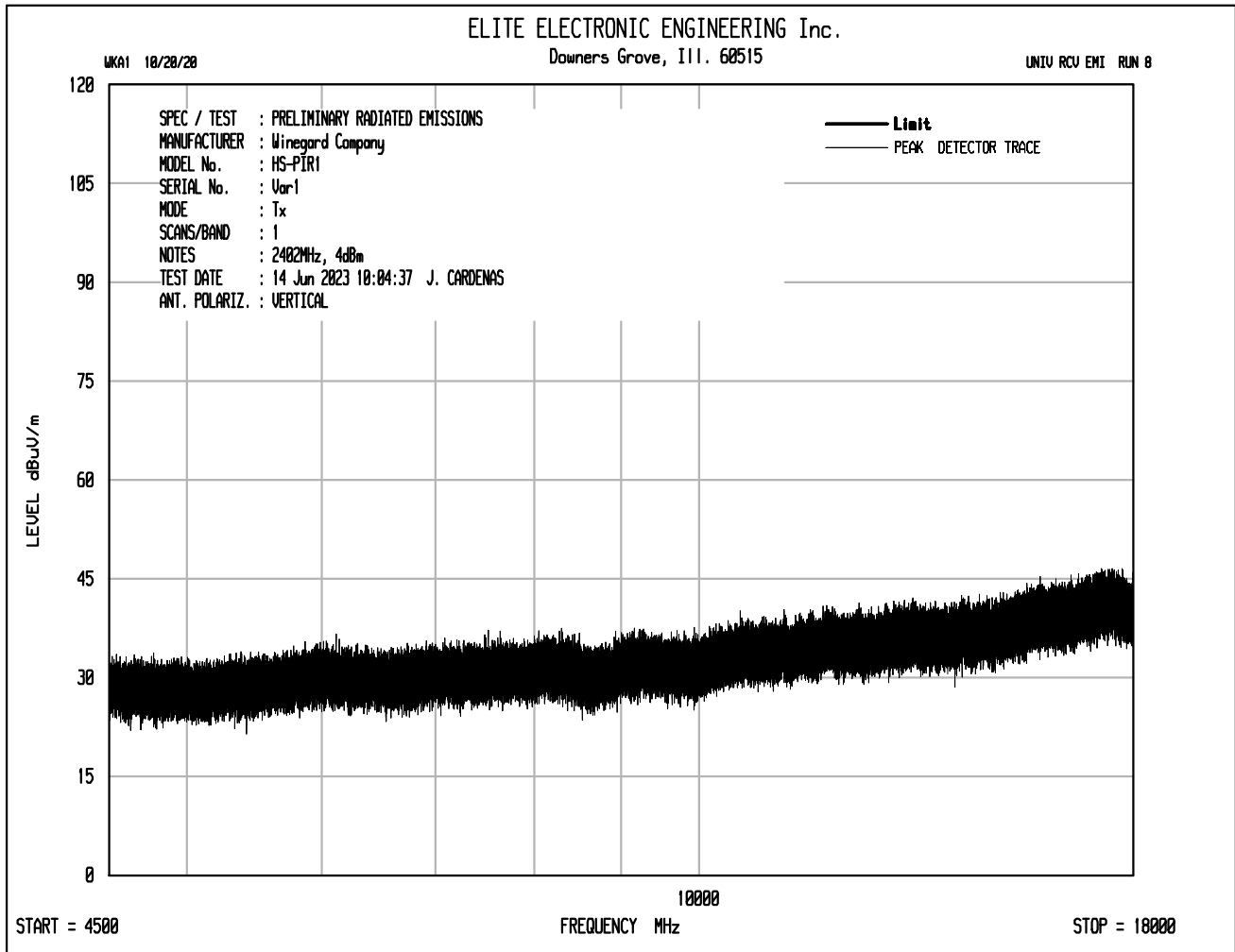


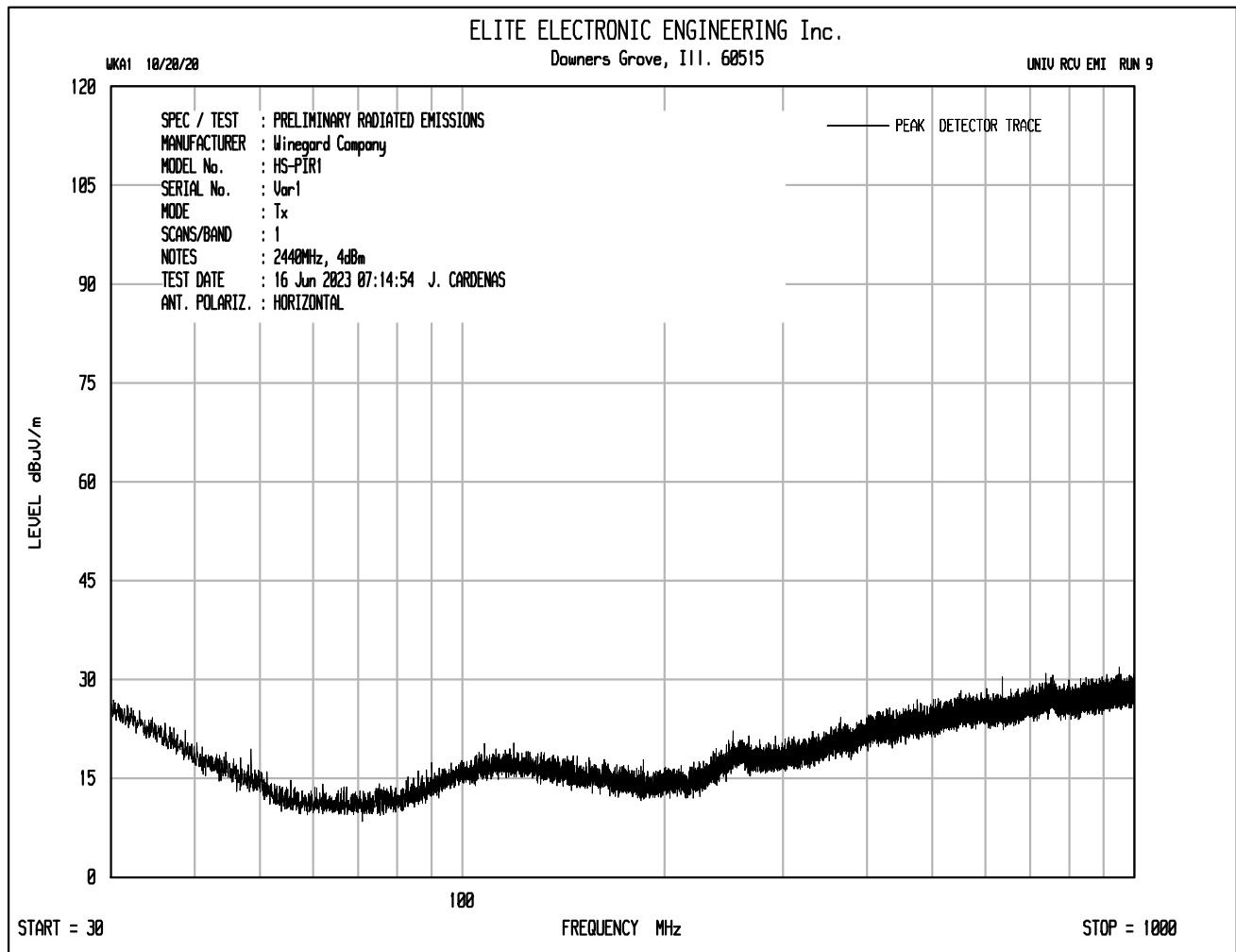


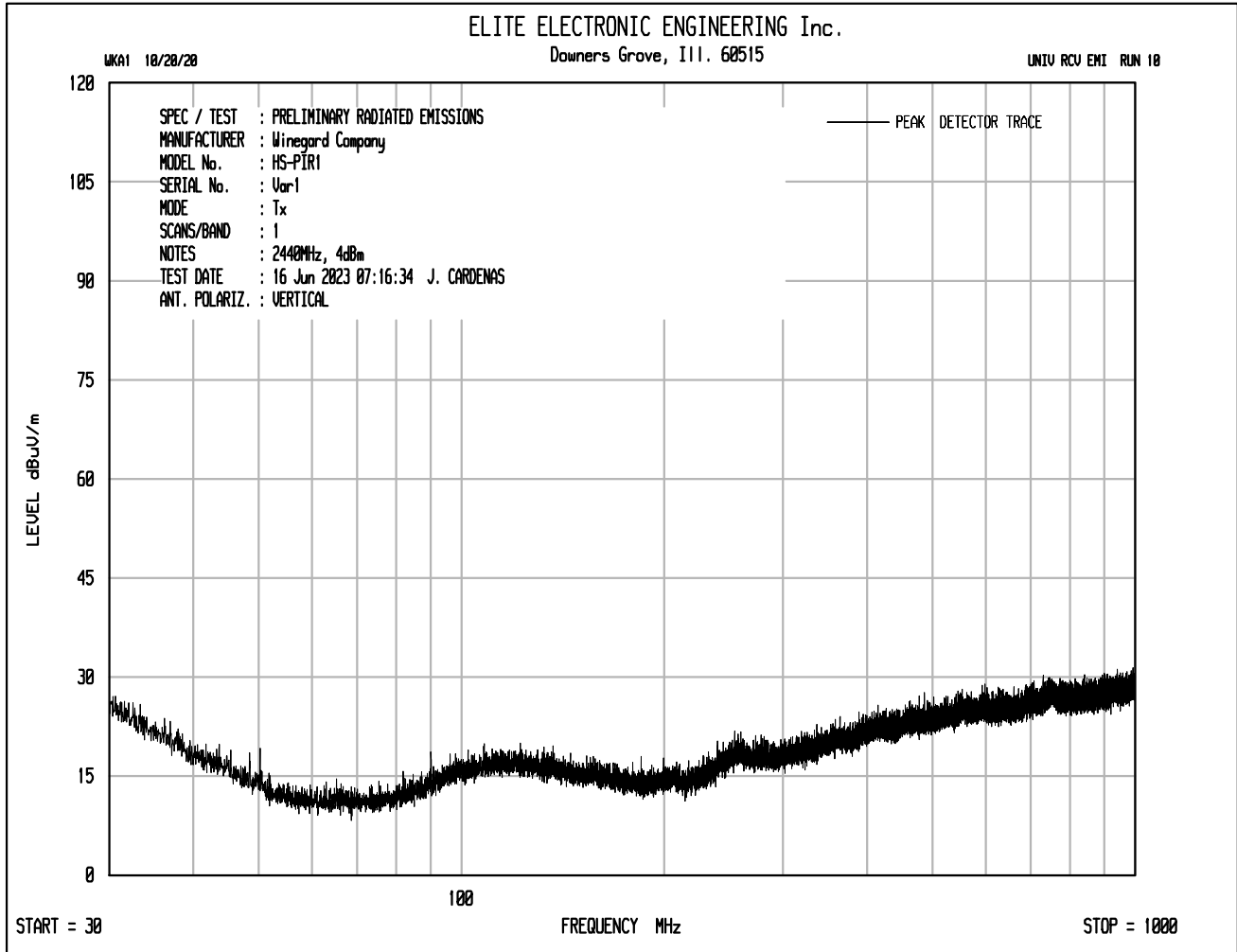


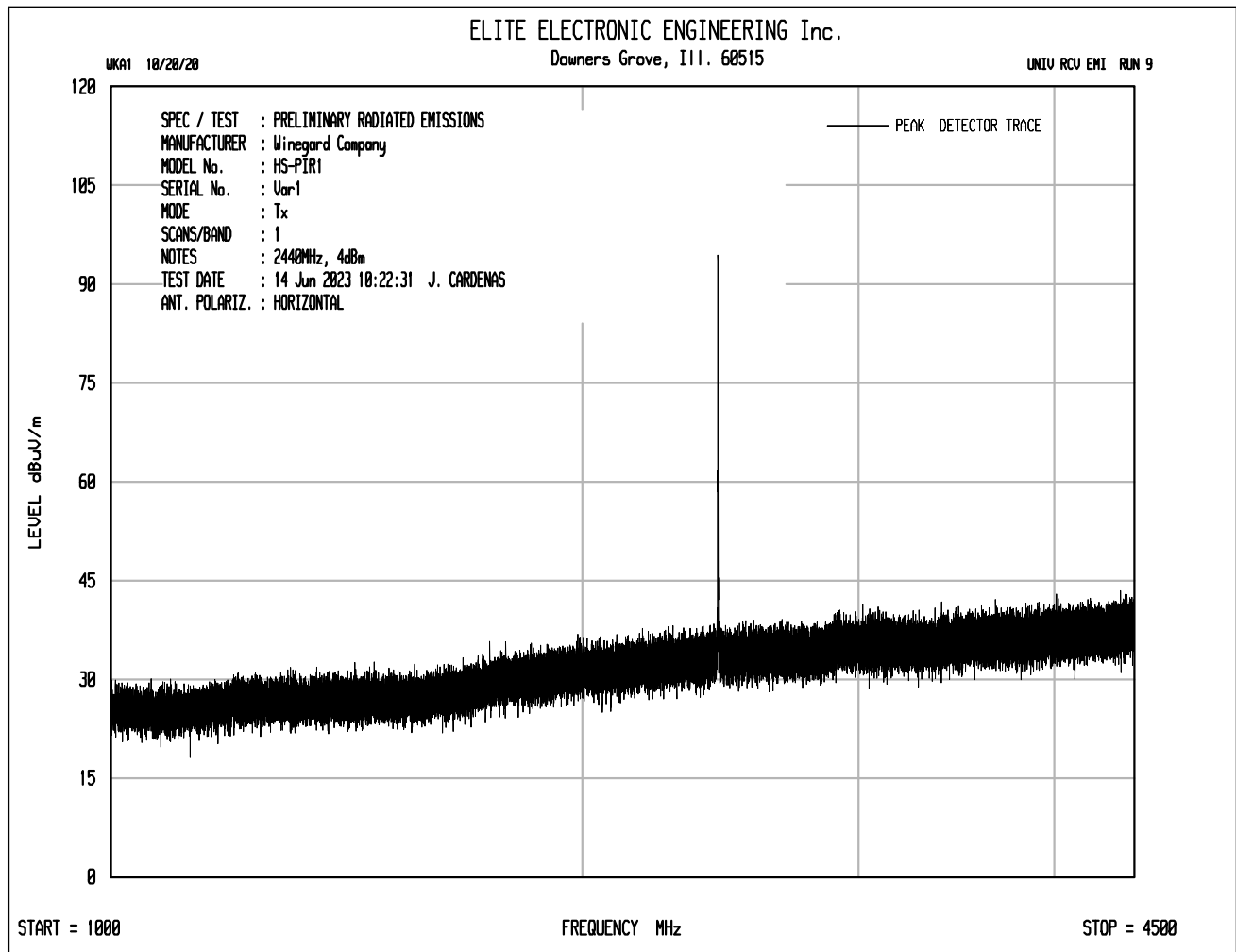


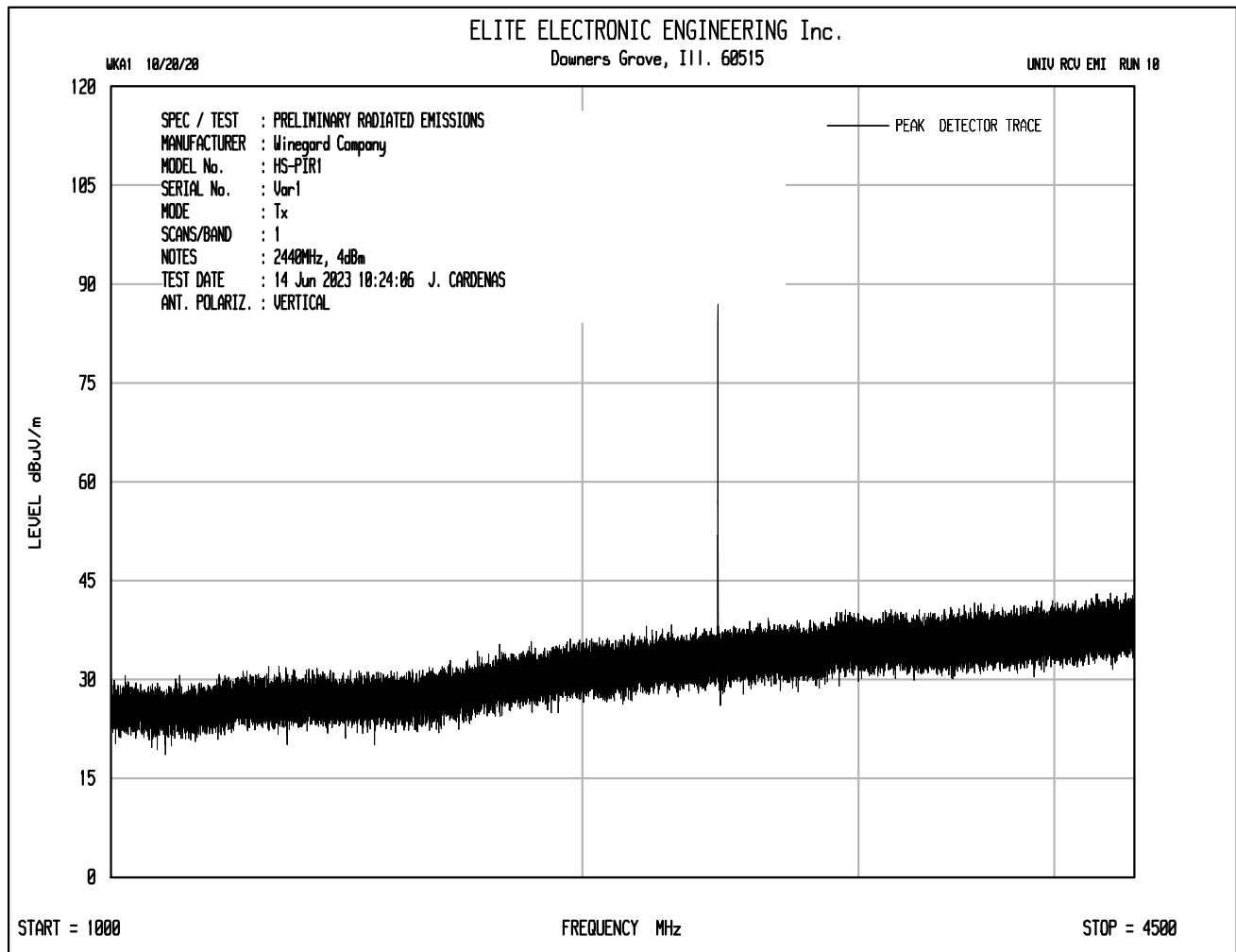


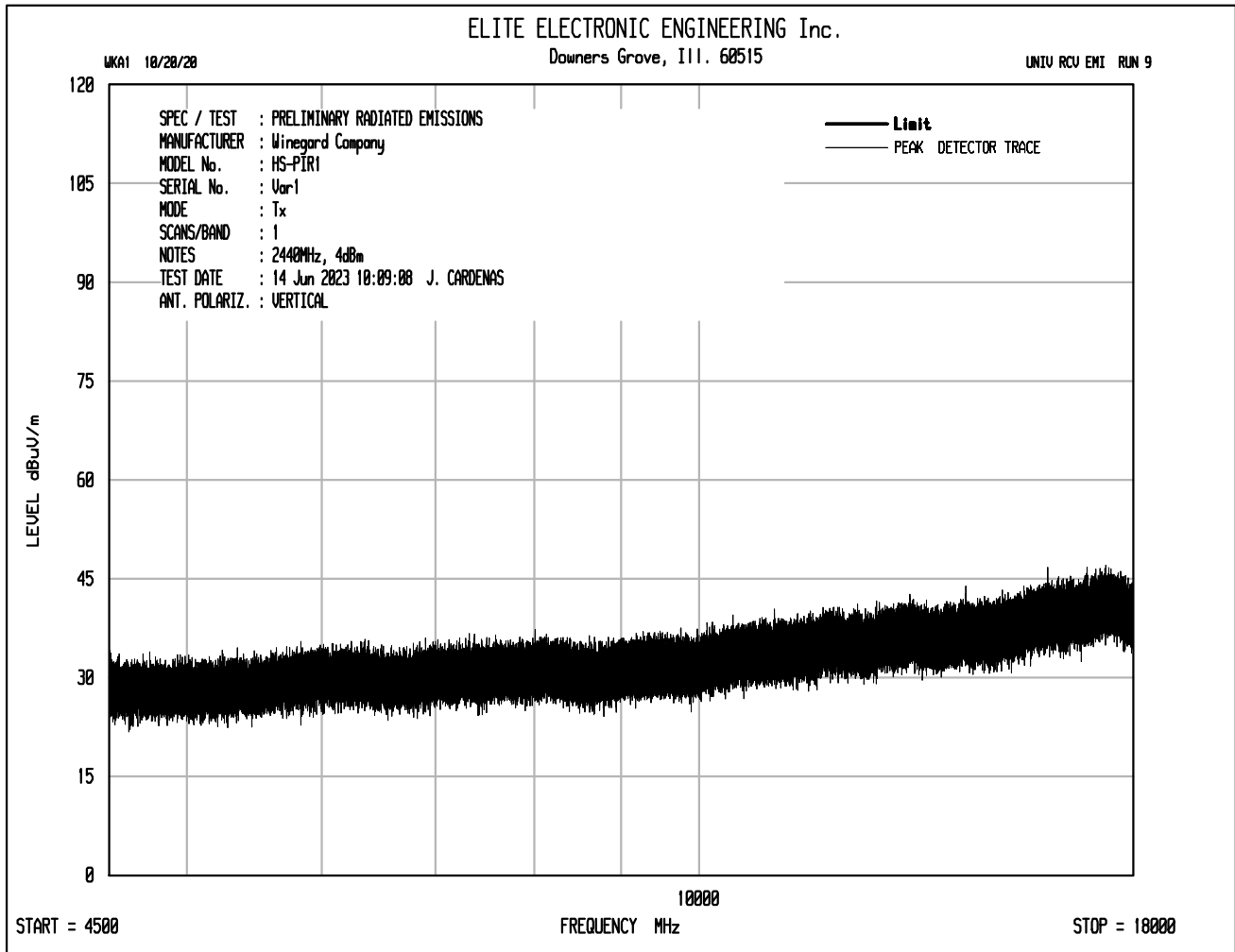


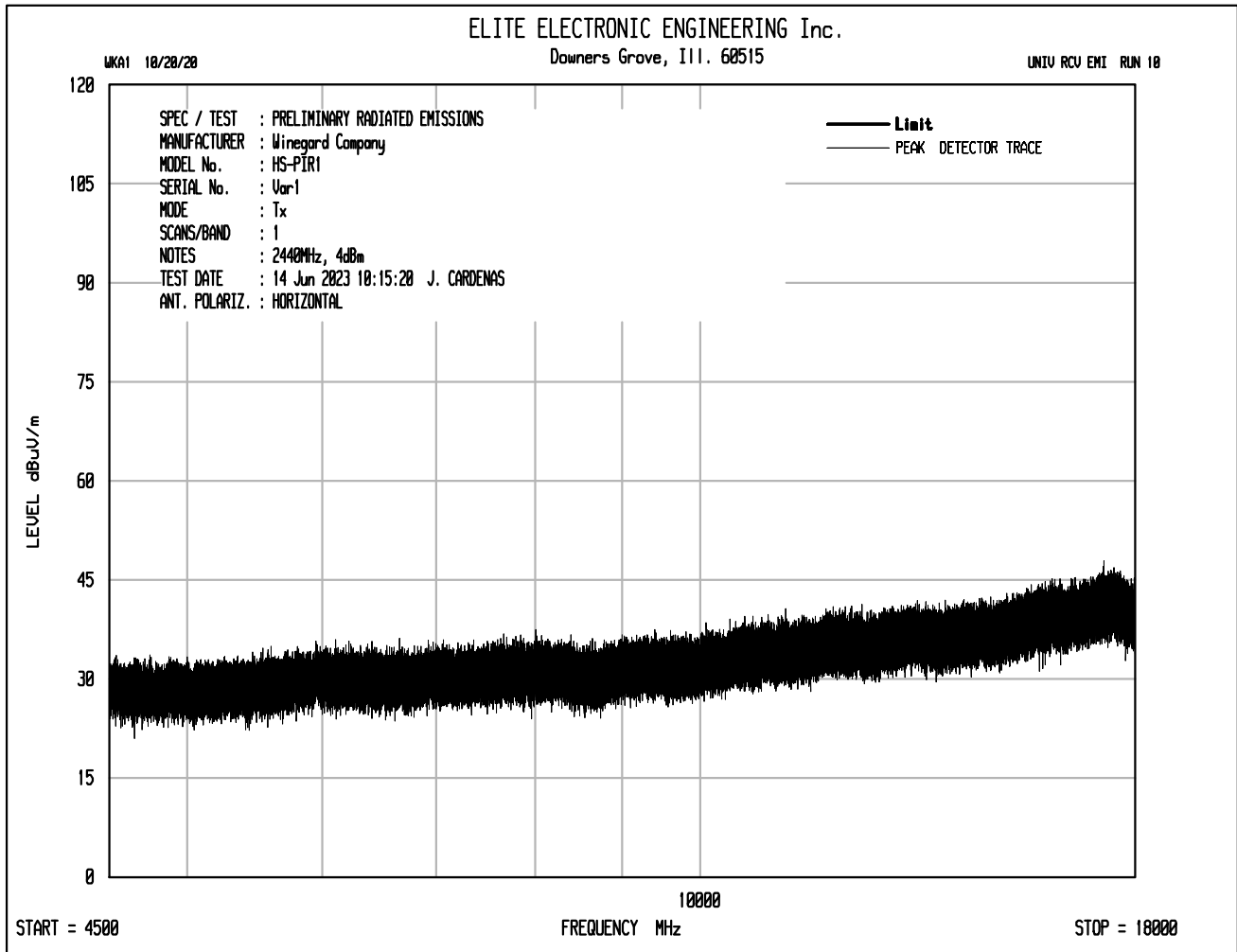


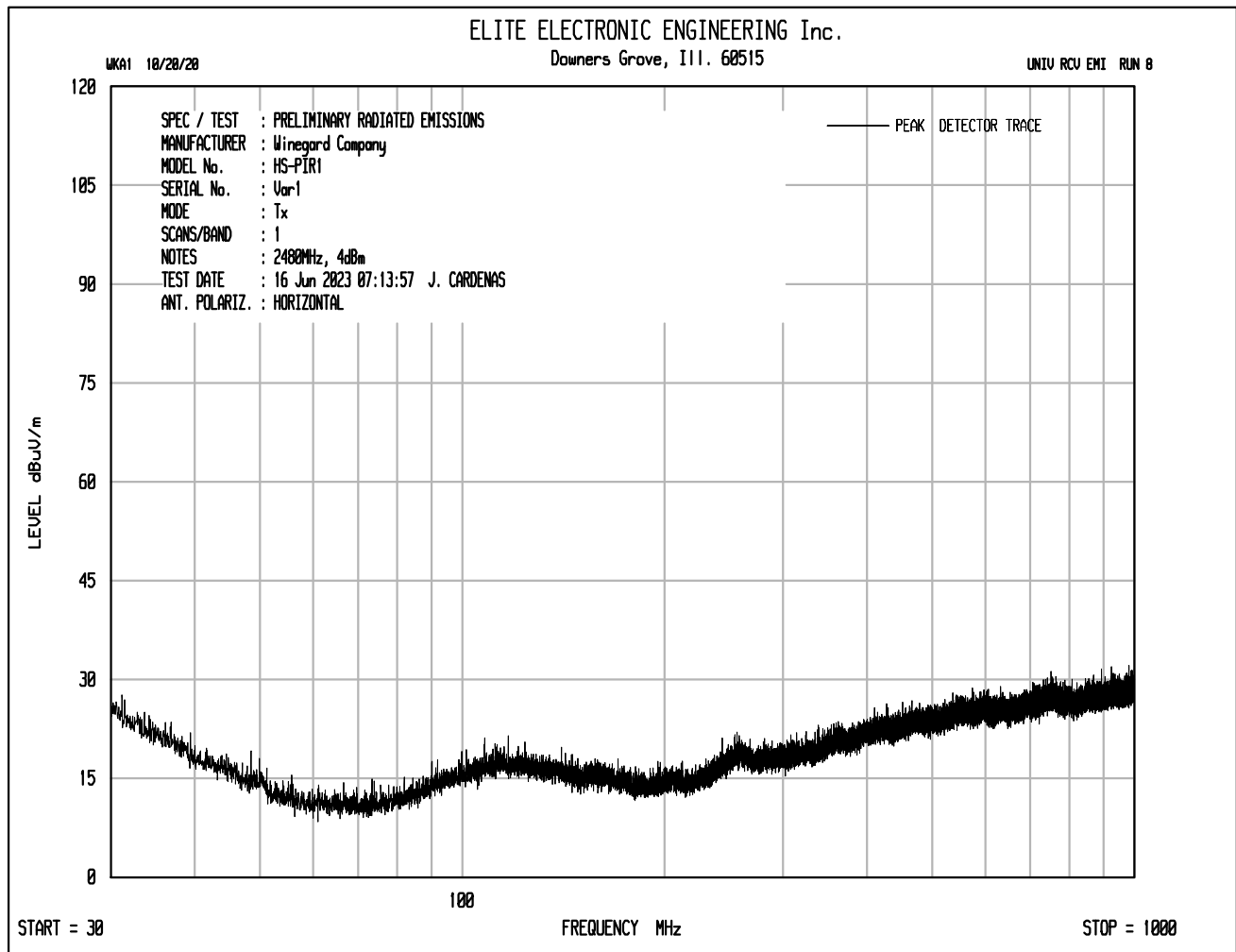


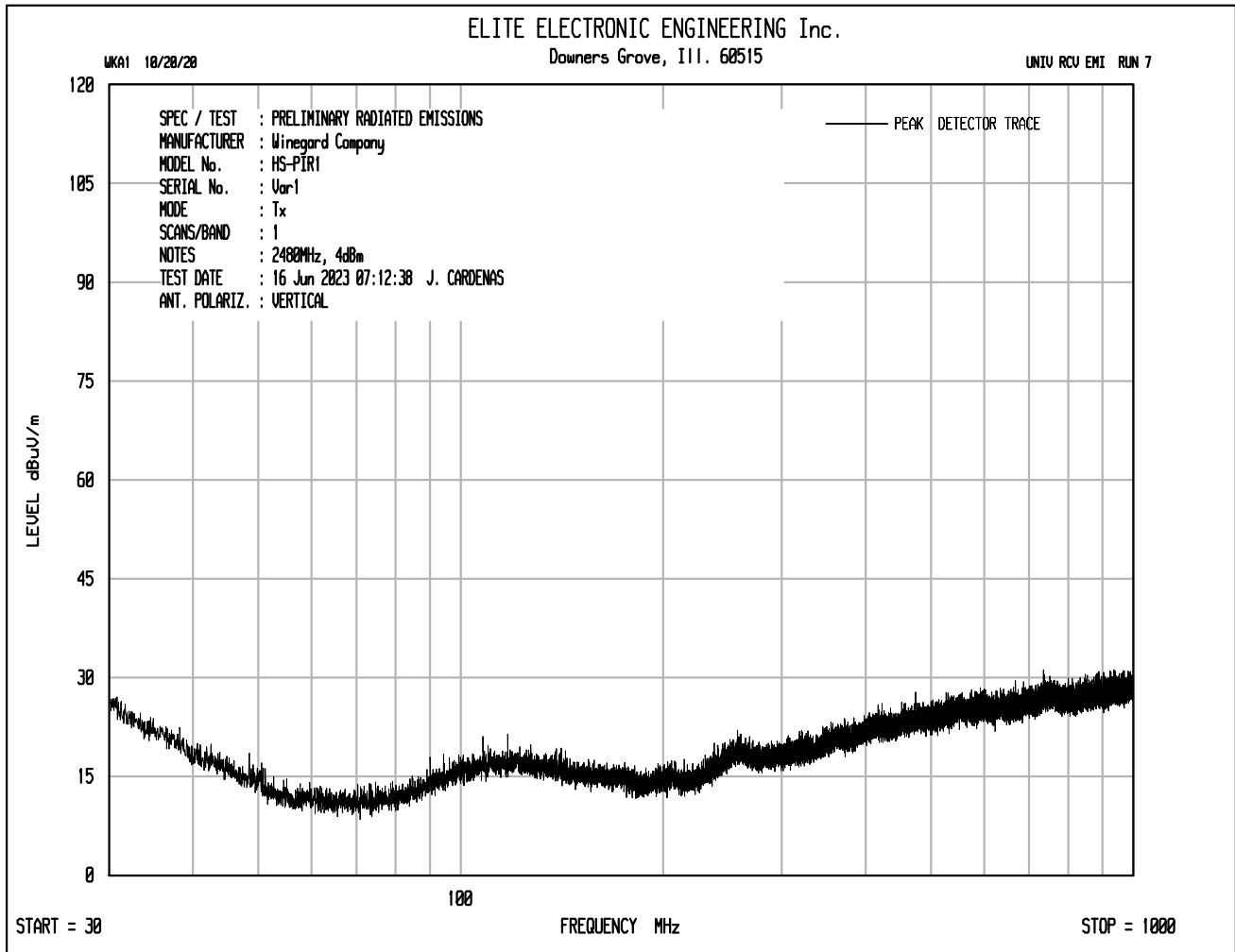


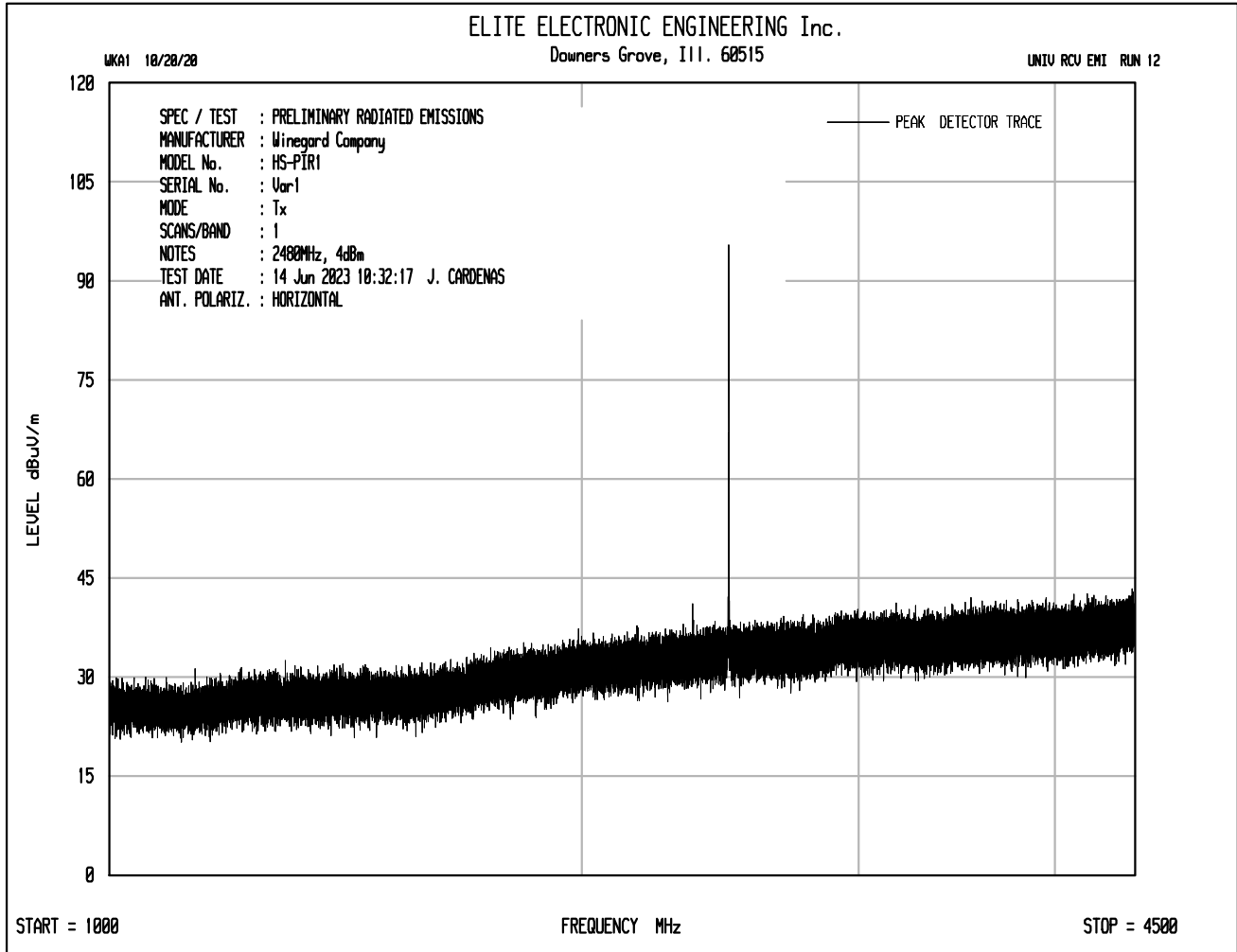


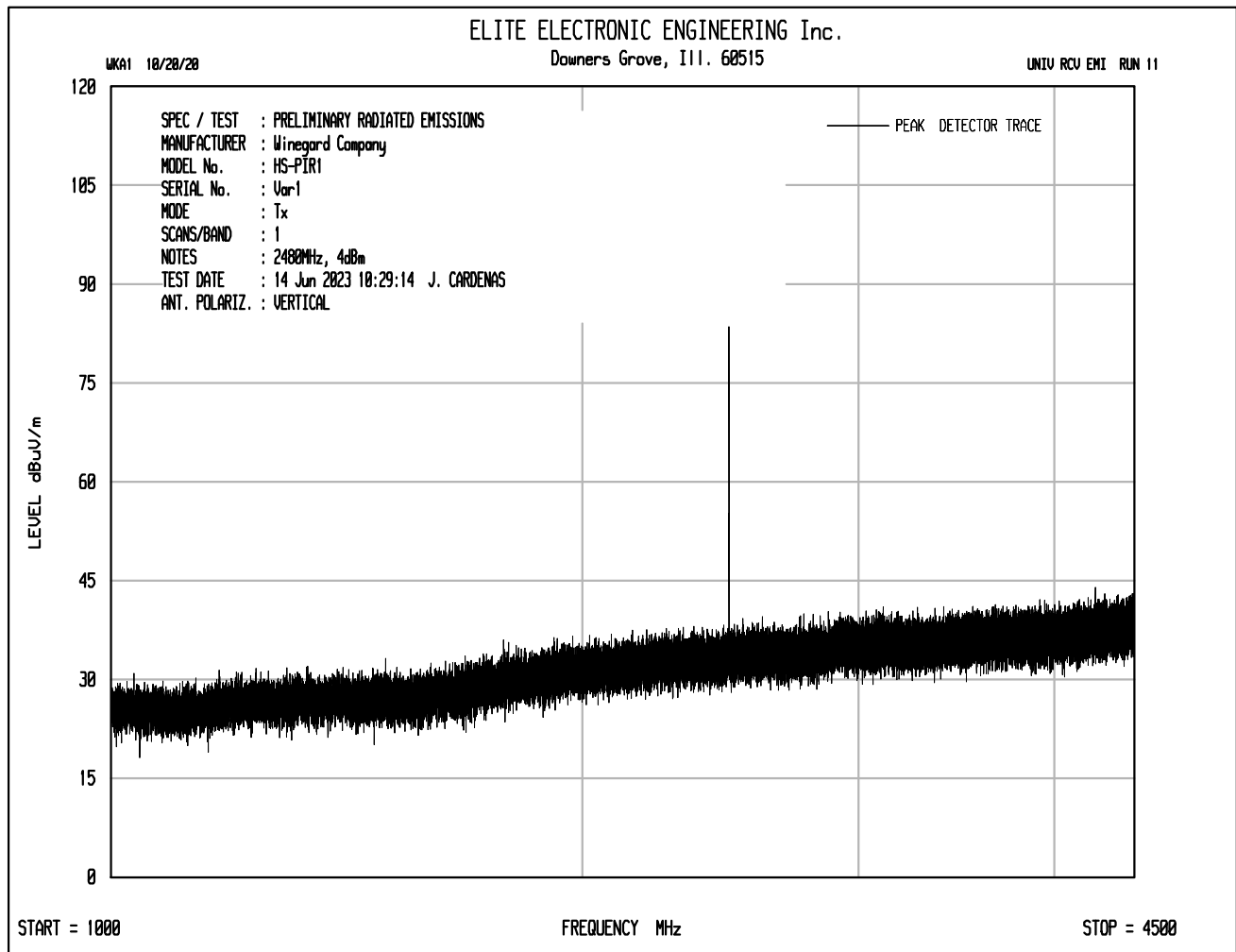


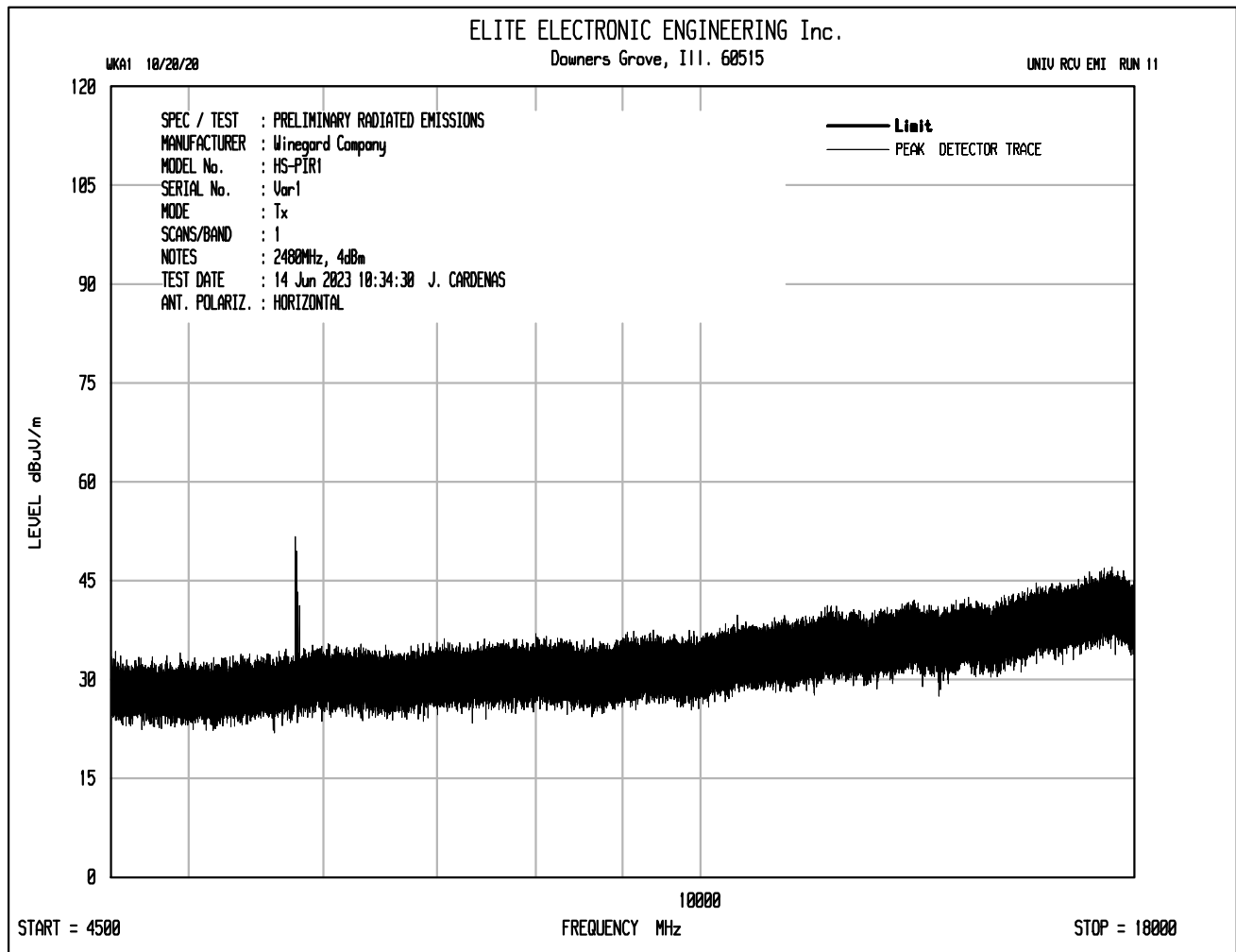


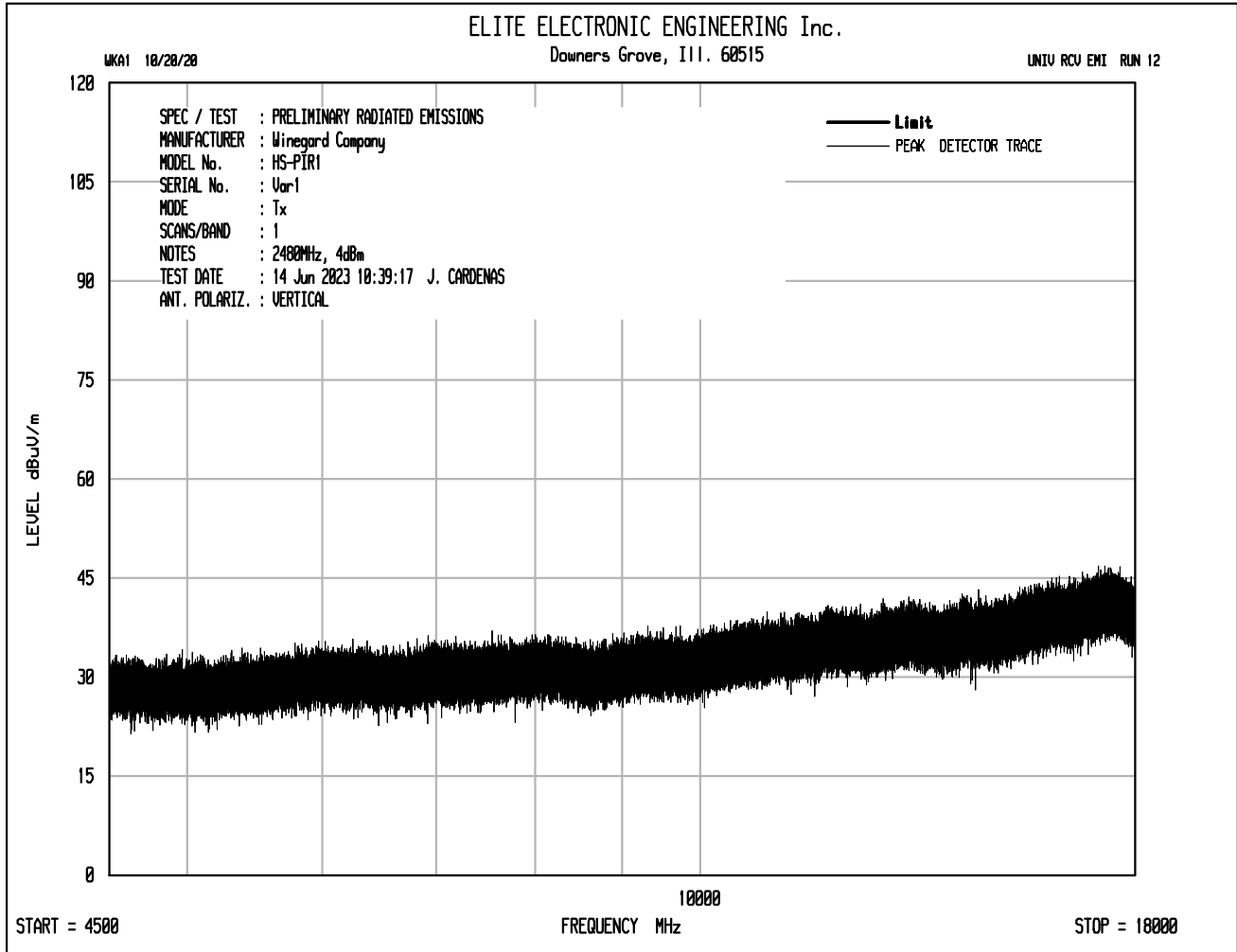












Test Details	
Manufacturer	Winegard Company
EUT	BLE Sensor
Model No.	HS-PIR1
Serial No.	Var1
Mode	Tx
Frequency Tested	2402MHz
Notes	Peak Measurements in the Restricted Bands

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 (dBm)
4804.00	H	48.6	*	3.7	34.3	-39.7	46.9	220.3	5000.0	-27.1
	V	47.6	*	3.7	34.3	-39.7	45.9	196.6	5000.0	-28.1
12010.00	H	48.1	*	6.1	38.8	-39.0	54.0	502.7	5000.0	-20.0
	V	48.7	*	6.1	38.8	-39.0	54.6	539.9	5000.0	-19.3

Test Details	
Manufacturer	Winegard Company
EUT	BLE Sensor
Model No.	HS-PIR1
Serial No.	Var1
Mode	Tx
Frequency Tested	2402MHz
Notes	Average Measurements in the Restricted Bands

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	34.44	*	3.7	34.3	-39.7	0.0	32.7	43.3	500.0	-21.3
	V	34.54	*	3.7	34.3	-39.7	0.0	32.8	43.8	500.0	-21.2
12010.00	H	34.70	*	6.1	38.8	-39.0	0.0	40.6	107.2	500.0	-13.4
	V	34.69	*	6.1	38.8	-39.0	0.0	40.6	107.1	500.0	-13.4

Test Details	
Manufacturer	Winegard Company
EUT	BLE Sensor
Model No.	HS-PIR1
Serial No.	Var1
Mode	Tx
Frequency Tested	2402MHz
Notes	Peak Measurements in Non-Restricted Bands

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 (dBm)
2402.00	H	65.23		2.6	32.6	0.0	100.4	104906.8	NA	NA
	V	61.24		2.6	32.6	0.0	96.4	66268.0	NA	NA
7206.00	H	38.62		4.6	36.3	-39.7	39.9	98.7	10490.7	-40.5
	V	37.90		4.6	36.3	-39.7	39.2	90.9	10490.7	-41.2
9608.00	H	39.80		5.2	37.1	-39.3	42.8	138.2	10490.7	-37.6
	V	37.11		5.2	37.1	-39.3	40.1	101.4	10490.7	-40.3

Test Details	
Manufacturer	Winegard Company
EUT	BLE Sensor
Model No.	HS-PIR1
Serial No.	Var1
Mode	Tx
Frequency Tested	2440MHz
Notes	Peak Measurements in the Restricted Bands

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 (dBm)
4880.00	H	48.8	*	3.7	34.2	-39.6	47.1	225.7	5000.0	-26.9
	V	48.1	*	3.7	34.2	-39.6	46.4	207.8	5000.0	-27.6
7320.00	H	48.3	*	4.7	36.3	-39.6	49.6	302.4	5000.0	-24.4
	V	47.9	*	4.7	36.3	-39.6	49.3	290.1	5000.0	-24.7
12200.00	H	47.5	*	6.1	38.9	-38.9	53.6	476.2	5000.0	-20.4
	V	47.6	*	6.1	38.9	-38.9	53.6	478.4	5000.0	-20.4

Test Details	
Manufacturer	Winegard Company
EUT	BLE Sensor
Model No.	HS-PIR1
Serial No.	Var1
Mode	Tx
Frequency Tested	2440MHz
Notes	Average Measurements in the Restricted Bands

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)
4880.00	H	34.91	*	3.7	34.2	-39.6	0.0	33.2	45.7	500.0	-20.8
	V	34.80	*	3.7	34.2	-39.6	0.0	33.1	45.1	500.0	-20.9
7320.00	H	34.64	*	4.7	36.3	-39.6	0.0	36.0	62.9	500.0	-18.0
	V	33.97	*	4.7	36.3	-39.6	0.0	35.3	58.2	500.0	-18.7
12200.00	H	34.12	*	6.1	38.9	-38.9	0.0	40.2	101.9	500.0	-13.8
	V	34.00	*	6.1	38.9	-38.9	0.0	40.0	100.5	500.0	-13.9

Test Details	
Manufacturer	Winegard Company
EUT	BLE Sensor
Model No.	HS-PIR1
Serial No.	Var1
Mode	Tx
Frequency Tested	2440MHz
Notes	Peak Measurements in Non-Restricted Bands

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 (dBm)
2440.00	H	64.52		2.6	32.6	0.0	99.8	97555.2	NA	NA
	V	58.23		2.6	32.6	0.0	93.5	47288.0	NA	NA
9760.00	H	39.31		5.2	37.2	-39.3	42.5	133.3	9755.5	-37.3
	V	37.82		5.2	37.2	-39.3	41.0	112.3	9755.5	-38.8

Test Details	
Manufacturer	Winegard Company
EUT	BLE Sensor
Model No.	HS-PIR1
Serial No.	Var1
Mode	Tx
Frequency Tested	2480MHz
Notes	Peak Measurements in the Restricted Bands

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 (dBm)
4960.00	H	48.9	*	3.7	34.1	-39.6	47.1	226.6	5000.0	-26.9
	V	49.5	*	3.7	34.1	-39.6	47.7	243.7	5000.0	-26.2
7440.00	H	48.6	*	4.7	36.3	-39.6	50.1	319.0	5000.0	-23.9
	V	47.6	*	4.7	36.3	-39.6	49.1	285.3	5000.0	-24.9
12400.00	H	47.5	*	6.1	38.9	-38.8	53.7	486.1	5000.0	-20.2
	V	47.6	*	6.1	38.9	-38.8	53.8	488.9	5000.0	-20.2

Test Details	
Manufacturer	Winegard Company
EUT	BLE Sensor
Model No.	HS-PIR1
Serial No.	Var1
Mode	Tx
Frequency Tested	2480MHz
Notes	Average Measurements in the Restricted Bands

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)
4960.00	H	34.84	*	3.7	34.1	-39.6	0.0	33.1	45.0	500.0	-20.9
	V	34.58	*	3.7	34.1	-39.6	0.0	32.8	43.7	500.0	-21.2
7440.00	H	34.34	*	4.7	36.3	-39.6	0.0	35.8	61.8	500.0	-18.2
	V	33.69	*	4.7	36.3	-39.6	0.0	35.2	57.4	500.0	-18.8
12400.00	H	33.64	*	6.1	38.9	-38.8	0.0	39.8	98.2	500.0	-14.1
	V	33.67	*	6.1	38.9	-38.8	0.0	39.9	98.6	500.0	-14.1

Test Details	
Manufacturer	Winegard Company
EUT	BLE Sensor
Model No.	HS-PIR1
Serial No.	Var1
Mode	Tx
Frequency Tested	2480MHz
Notes	Peak Measurements in Non-Restricted Bands

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 (dBm)
2480.00	H	64.38		2.7	32.7	0.0	99.7	97141.2	NA	NA
	V	61.30		2.7	32.7	0.0	96.7	68140.2	NA	NA
9920.00	H	38.04	*	5.3	37.2	-39.2	41.3	115.7	9714.1	-38.5
	V	36.81	*	5.3	37.2	-39.2	40.0	100.4	9714.1	-39.7

