FCC PART 15, SUBPART B
CLASS B TEST REPORT
TEST METHOD: ANSI C63.4

For

SENSOR
MODEL: AIRWARDEN

Prepared for

AERODEFENSE, LLC
101 CRAWFORDS CORNER ROAD SUITE 4-101R
HOLMDEL, NJ 07733

Prepared by: _____

HOWARD HUANG

Approved by: _____

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DATE: MARCH 4, 2020

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NVLAP TESTING
NVLAP LAB CODE 200527-0

ilac-MRA

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GENERAL REPORT SUMMARY

This electromagnetic emission report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form except in full, without the written permission of Compatible Electronics.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. government.

Device Tested:	Sensor Model: AirWarden S/N: None
Product Description:	The EUT is a drone detecting sensor. Clock Frequency: 61.44MHz, 4GHz, 4.5 GHz (Dimensions: 20” x 20” x 7”)
Modifications:	The EUT was not modified in order to comply with specifications.
Manufacturer:	AeroDefense, LLC 101 Crawfords Corner Road Suite 4-101R Holmdel, NJ 07733
Test Dates:	February 25, 28 & April 7-8, 2020

NVLAP TESTING
NVLAP LAB CODE 200527-0

Test Specifications Covered by Accreditation:

EMI requirements

FCC CFR Title 47, Part 15 Subpart B, **Class B**.

Test Procedure: ANSI C63.4: 2014.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz.	Complies with the **Class B** limits in FCC CFR Title 47, Part 15 Subpart B.
2	Radiated RF Emissions, 30 MHz – 40 GHz.	Complies with the **Class B** limits in FCC CFR Title 47, Part 15 Subpart B.

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Sensor Model: AirWarden. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined by FCC Code of Federal Regulations Title 47, part 15 subpart B.

1.1 Decision Rule & Risk

If a measured value exceeds a specification limit it implies non-compliance. If the value is below a specification limit it implies compliance. Measurement uncertainty of the laboratory is reported with all measurement results but generally not taken into consideration unless a standard, rule or law requires it to be considered.

Qualification test reports are only produced for products that are in compliance with the test requirements, therefore results are always in conformity. Otherwise, an engineering report or just the data is provided to the customer.

When performing a measurement and making a statement of conformity, in or out-of-specification to manufacturer's specifications or Pass/Fail against a requirement, there are two possible outcomes:

- The result is reported as conforming with the specification
- The result is reported as not conforming with the specification

The decision rule is defined below.

When the test result is found to be below the limit but within our measurement uncertainty of the limit, it is our policy that the final acceptance decision is left to the customer, after discussing the implications and potential risks of the decision.

When the test result is found to be exactly on the specification, it is our policy, in the case of unwanted emissions measurements to consider the result non-compliant, however, the final decision is left to the customer, after discussing the implications and potential risks of the decision.

When the test result is found to be over the specification limit under any condition, it is our policy to consider the result non-compliant.

In terms of uncertainty of measurement, the laboratory is a calibrated and tightly controlled environment and generally exceptionally stable, the measurement uncertainties are evaluated without the consideration of the test sample. When it comes to the test sample however, as most testing is performed on a single sample rather than a sample population, and that sample is often a pre-production representation of the final product, that test sample represents a significantly higher source of measurement uncertainty. We advise our customers of this and that when in doubt (small test to limit margins), they may wish to perform statistical sampling on a population to gain a higher confidence in the results. All lab reported results are that of a single sample in any event.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The emissions tests described herein were performed at the test facility of Compatible Electronics, 20621 Pascal Way, Lake Forest, California 92630.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

AeroDefense, LLC

Linda Ziemba	Founder and CEO

Compatible Electronics, Inc.

Howard Huang	Test Technician
Joey Madlangbayan	Product Safety Manager

2.4 Date Test Sample was Received

The test sample was received on February 25, 2020 as described in the Product Description.

2.5 Disposition of the Test Sample

The test sample remains at Compatible Electronics, Inc.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
NCR	No Calibration Required
PSU	Power Supply Unit
SDR	Software Defined Radio

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
FCC CFR Title 47, Subpart B.	FCC Rules - Radio frequency devices (including digital devices). Subpart B – Unintentional Radiators
ANSI C63.4 2014	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

The EUT was set up in a table-top configuration. The EUT was connected to an Omni-Directional Antenna. The EUT was operating in its highest platform speed which produced the highest emissions. The chassis contained two configurations. Configuration 1 has two SDR Cards B210 and B200mini while Configuration 2 has only two SDR cards B200minis. The two configurations were tested separately. The chassis was set up 55 centimeters away from the Omni-Directional Antenna as determined by normal operation of the EUT. The EUT is scanning continuously. The EUT was operated using software AirWarden 2.0.

The cables were moved to maximize the emissions. The final conducted and radiated data was taken in this mode of operation. All initial investigations were performed with EMI Receiver in manual mode scanning the frequency range continuously. The cables were routed as shown in the photographs in Appendix D.

4.1.1 Photograph of Test Configuration - EMI

4.1.2 Cable Construction and Termination

Cable 1 This is a 5 meter, unshielded, round cable that connects the EUT to the Omni-Directional Antenna. The cable has coaxial connectors at both ends. The cable was coiled to a length of 1 meter.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

#	EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER
1	SENSOR (EUT)	AERODEFENSE, LLC	AIRWARDEN	S/N: NONE FCC ID: 2AU4I-SEN601
2	OMNI-DIRECTIONAL ANTENNA	GENERIC	NONE	S/N: NONE

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Hydrometer & Thermometer	Control Company	4088	97080656	01/17/2020	01/17/2021
Computer	Compatible Electronics	NONE	NONE	NCR	NCR
EMI Receiver	Rohde & Schwarz	ESIB40	100219	09/25/2019	09/25/2020
Antenna, CombiLog	Com-Power	AC-220	10030000	04/05/2019	04/05/2021
Antenna, Horn 1-18GHz	Com-Power	AH-118	10050074	07/19/2019	07/19/2021
Antenna, Horn 18-26GHz	Com-Power	AH-826	081078	07/23/2019	07/23/2021
Antenna, Horn 26-40GHz	Com-Power	AH-640	091010	08/02/2019	08/02/2020
Pre-Amp 1-18GHz	Com-Power	PAM-118A	551034	01/10/2020	01/10/2021
Pre-Amp 18-40GHz	Com-Power	PA-840	181289	07/23/2019	07/23/2020
10 dB Attenuator	Aeroflex/Weinschel	2-10	BX9279	09/03/2019	09/03/2020
LISN (EUT)	Com-Power	LI-215	191944	08/08/2019	08/08/2020
Mast, Antenna Positioner	Sunol Science Corporation	TWR 95-4	081309-3	NCR	NCR
Turntable	Sunol Science Corporation	FM 2001VS	N/A	NCR	NCR
Mast and Turntable Controller	Sunol Science Corporation	SC104V	081309-1	NCR	NCR

5.3 Test Software

LAB(S)	SOFTWARE TITLE	MANUFACTURER	VERSION
P, R	Measurement and Automation Software	TDK TestLab	11.24

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1.2 of this report.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5-meter non-conductive table 0.8 meters above the ground plane.

The EUT was grounded through the AC power cord.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature and barometric pressure.

6.4 Measurement Uncertainty

"Compatible Electronics" U_{lab} value is less than U_{cispr}, thus based on this − compliance is deemed to occur if no measured disturbance exceeds the disturbance limit

$$u_c(y) = \sqrt{\sum_i c_i^2 \; u^2(x_i)}$$

Measurement		U_{cispr}	$U_{lab} = 2\,uc\,(y)$
Conducted disturbance (mains port)	(150 kHz – 30 MHz)	3,4 dB	2.88
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(30 MHz – 1 000 MHz)	6.3 dB	3.67
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(1 GHz – 6 GHz)	5,2 dB	3.59
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(6 GHz – 18 GHz)	5,5 dB	3.59
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(18 GHz – 40 GHz)	N/A	3.71

7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 RF Emissions

7.1.1 Conducted Emissions Test

The EMI Receiver was used as a measuring meter. A 10-dB attenuation pad was used for the protection of the EMI Receiver input stage. All factors associated with attenuator and cables were recorded into the EMI Software Program accordingly to display the actual corrected measured level. The LISN output was connected to the input of the EMI Receiver. The output of the second LISN was terminated with 50-ohm termination. The effective measurement bandwidth used for the conducted emissions test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The initial test data was taken in manual mode while scanning the frequency ranges of 0.15 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the spectrum analyzer span adjusted to 1 MHz.

The final data was collected under program control by the computer in several overlapping sweeps by running the EMI Receiver at a minimum scan rate of 10 seconds per octave. The six highest emissions are listed in Table 1 and 3.

7.1.2 Radiated Emissions Test

The EMI Receiver was used as the measuring meter. The EMI Receiver was used in the Analyzer mode feature activated. In this mode, the EMI receiver can then record the actual frequency to be measured. This final reading is then taken accurately in the EMI Receiver mode, which takes into account the cable loss, amplifier gain and antenna factors, so that a true reading is compared to the true limit. A quasi-peak reading was taken only for those readings, which are marked accordingly on the data sheets. The effective measurement bandwidth used for the radiated emissions test was according to the frequency measured (120 kHz for 30 MHz to 1 GHz and 1 MHz for 1 GHz and above).

A Broadband Combilog Antenna and Horn Antennas were used as transducers during the measurement. The Broadband Combilog Antenna was used from 30 MHz to 1 GHz and the Horn Antennas were used above 1 GHz. Furthermore, the frequency span was reduced during the preliminary investigations as deemed necessary.

The TDK FAC-3 shielded test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is set up according to CISPR 16. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength).

The EUT was tested at a 3-meter test distance from 30 MHz to 40 GHz to obtain final test data. The six highest emissions are listed in Table 2 and 4.

7.1.3 RF Emissions Test Results

Table 1 CONDUCTED EMISSION RESULTS
SENSOR MODEL: AIRWARDEN, CONFIGURATION #1

Frequency MHz	Emission Level* dBuV	Average Specification Limit dBuV	Delta (Emission level – Spec. Limit) dB
0.63 **L**	30.04 **A**	46.00	-15.96
0.62 **N**	29.72 **A**	46.00	-16.28
0.44 **L**	29.09 **A**	47.02	-17.93
0.44 **N**	28.71 **A**	47.02	-18.31
0.17 **L**	36.03 **A**	55.16	-19.13
0.16 **N**	36.06 **A**	55.57	-19.51

Table 2 RADIATED EMISSION RESULTS
SENSOR MODEL: AIRWARDEN, CONFIGURATION #1

Frequency MHz	Corrected Reading* dBµV/m	Specification Limit dBµV/m	Delta (Cor. Reading – Spec. Limit) dB
1210.00 **V**	51.09 **A**	53.98	-2.89
1190.00 **V**	45.54 **A**	53.98	-8.44
1500.00 **V**	44.86 **A**	53.98	-9.12
1249.00 **H**	44.55 **A**	53.98	-9.43
1170.00 **H**	42.47 **A**	53.98	-11.51
1290.00 **V**	40.66 **A**	53.98	-13.32

Notes: * The complete emissions data is given in Appendix E of this report.

** The antenna factors and preamplifier gain are attached in Appendix D of this report.
# Quasi-Peak Reading
A Average Reading
H Horizontal
V Vertical
N Neutral
L Line

7.1.3.1 RF Emissions Test Results (Continued)

Table 3 CONDUCTED EMISSION RESULTS
SENSOR MODEL: AIRWARDEN, CONFIGURATION #2

Frequency MHz	Emission Level* dBuV	Average Specification Limit dBuV	Delta (Emission level – Spec. Limit) dB
0.15 **L**	38.79 **A**	56.00	-17.21
0.44 **L**	28.30 **A**	47.10	-18.80
0.38 **L**	28.47 **A**	48.24	-19.77
0.45 **L**	26.96 **A**	46.80	-19.84
0.42 **L**	26.29 **A**	47.41	-21.12
0.40 **N**	25.21 **A**	47.81	-22.60

Table 4 RADIATED EMISSION RESULTS
SENSOR MODEL: AIRWARDEN, CONFIGURATION #2

Frequency MHz	Corrected Reading* dBµV/m	Specification Limit dBµV/m	Delta (Cor. Reading – Spec. Limit) dB
37.50 **V**	20.93 #	40.00	-19.07
360.00 **H**	19.80 #	46.00	-26.20
125.00 **V**	16.20 #	43.52	-27.32
200.00 **H**	15.56 #	43.52	-27.96
105.90 **V**	15.13 #	43.52	-28.39
1824.00 **H**	24.28 **A**	53.98	-29.70

Notes: * The complete emissions data is given in Appendix E of this report.

** The antenna factors and preamplifier gain are attached in Appendix D of this report.
# Quasi-Peak Reading
A Average Reading
H Horizontal
V Vertical
N Neutral
L Line

7.1.4 Sample Calculations

A correction factor for the antenna, cable and a distance factor (if any) must be applied to the meter reading before a true field strength reading can be obtained. This Corrected Meter Reading is then compared to the specification limit in order to determine compliance with the limits.

The equation can be derived in the following manner:

Specification limit (µV/m) log x 20 = Specification Limit in dBuV

(Specification distance / test distance) log x 40 = distance factor

Note: When using an Active Antenna, the Antenna factor shall be subtracted due to the combination of the internal amplification and antenna loss. At lower frequencies the cable loss is negligible.

OR

Corrected Meter Reading = meter reading + F – A + C

where:

F = antenna factor

A= amplifier gain

C = cable loss

The correction factors for the antenna and the amplifier gain are attached in Appendix D of this report. The data sheets are attached in Appendix E.

The distance factor D is 0 when the test is performed at the required specification distance.

8. TEST PROCEDURE DEVIATIONS

There were no deviations from the test procedures.

9. CONCLUSIONS

The Sensor Model: AirWarden as tested, meets all of the **Class B** specification limits defined by FCC Code of Federal Regulations Title 47, part 15 subpart B.

APPENDIX A

LABORATORY ACCREDITATIONS

LABORATORY ACCREDITATIONS AND RECOGNITIONS

For US, Canada, Australia/New Zealand, Japan, Taiwan, Korea, and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025.

For the most up-to-date version of our scopes and certificates please visit

http://celectronics.com/quality/scope/

Quote from ISO-ILAC-IAF Communiqué on 17025:

"A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 Quality Management Systems — Requirements."

Innovation, Science and Economic Development Canada Lab Code 2154C

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

There were no modifications made to the EUT.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Sensor
Model: AirWarden
S/N: None

There are no additional models covered under this report.

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APPENDIX D

DIAGRAMS, CHARTS AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

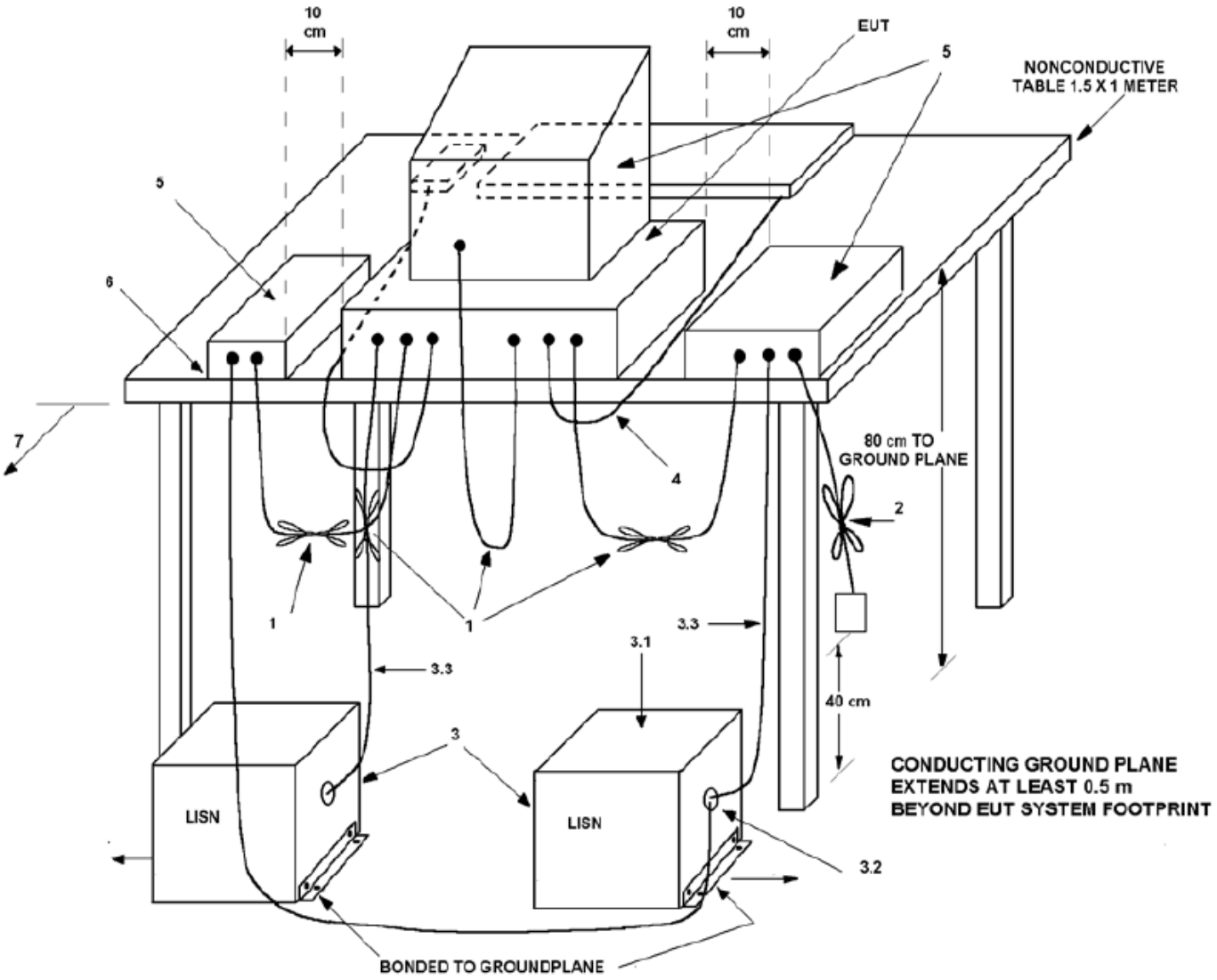
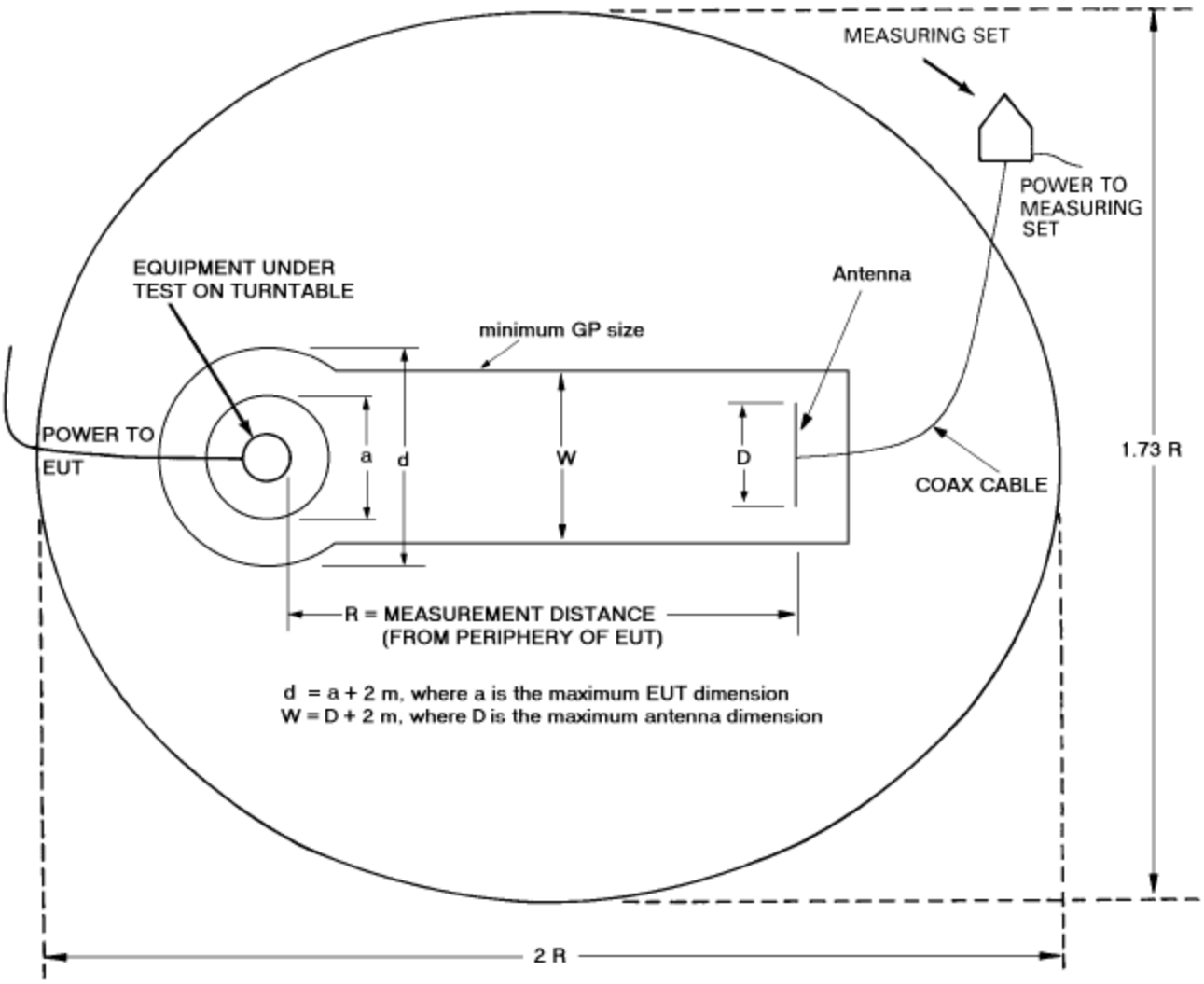


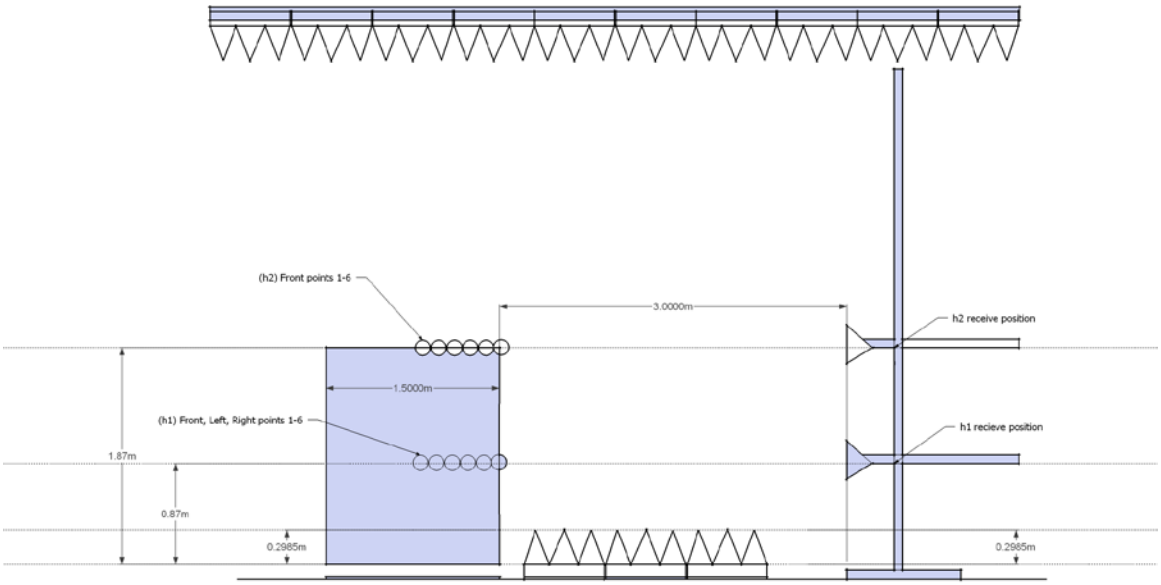
FIGURE 2: RADIATED EMISSIONS 3-METER SEMI -ANECHOIC TEST CHAMBER



AREA DIMENSIONS =

R = 3m	R = 10 m	R = 30 m
6 m x 5.2 m	20 m x 17.3 m	60 m x 52 m

FIGURE 3: PLOT MAP AND LAYOUT OF TEST SITE ABOVE 1GHZ



COM-POWER AC-220

COMBILOG ANTENNA

S/N: 10030000

CALIBRATION DATE: APRIL 5, 2019

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	22.0	**180**	14.7
35	21.0	**200**	15.1
40	20.4	**250**	16.7
45	19.6	**300**	18.2
50	18.4	**350**	19.1
60	14.9	**400**	20.7
70	11.7	**500**	22.0
80	11.6	**600**	24.5
90	13.2	**700**	24.5
100	14.3	**800**	26.1
120	15.6	**900**	27.0
140	14.3	**1000**	27.6
160	14.0		

COM-POWER AH-118

HORN ANTENNA

S/N: 10050074

CALIBRATION DATE: JULY 19, 2019

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
700	25.84	**7500**	37.73
750	25.46	**8000**	38.05
800	24.96	**8500**	38.29
850	24.51	**9000**	38.93
900	24.01	**9500**	39.64
950	23.73	**10000**	39.12
1000	23.83	**10500**	39.16
1250	24.81	**11000**	39.18
1500	25.32	**11500**	39.85
1750	26.30	**12000**	40.27
2000	27.94	**12500**	40.91
2250	28.16	**13000**	40.50
2500	29.07	**13500**	40.59
3000	30.07	**14000**	40.44
3500	30.81	**14500**	40.62
4000	31.68	**15000**	43.35
4500	32.64	**15500**	40.76
5000	33.79	**16000**	41.61
5500	34.20	**16500**	40.38
6000	35.24	**17000**	40.88
6500	35.74	**17500**	42.79
7000	37.17	**18000**	43.86

COM-POWER AH-826

HORN ANTENNA

S/N: 081078

CALIBRATION DATE: JULY 23, 2019

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18	32.83	**21.25**	33.71
18.1	32.74	**21.5**	33.58
18.2	32.68	**21.75**	33.70
18.3	32.67	**22**	33.88
18.4	32.73	**22.25**	33.88
18.5	32.83	**22.5**	34.00
18.6	32.90	**22.75**	33.91
18.7	32.95	**23**	33.93
18.8	33.00	**23.25**	34.07
18.9	33.06	**23.5**	34.17
19	33.08	**23.75**	34.36
19.1	33.12	**24**	34.35
19.2	33.17	**24.25**	34.29
19.3	33.18	**24.5**	34.34
19.4	33.15	**24.75**	34.40
19.5	33.10	**25**	34.58
19.75	33.07	**25.25**	34.65
20	33.21	**25.5**	34.60
20.25	33.31	**25.75**	34.61
20.5	33.64	**26**	34.64
20.75	33.65	**26.25**	34.74
21	33.58	**26.5**	35.08

COM-POWER AH-640

HORN ANTENNA

S/N: 091010

CALIBRATION DATE: AUGUST 2, 2019

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
26.00	34.40	**33.50**	36.20
26.50	32.80	**34.00**	36.40
27.00	35.30	**34.50**	35.40
27.50	35.80	**35.00**	35.50
28.00	36.40	**35.50**	35.90
28.50	36.40	**36.00**	37.20
29.00	35.90	**36.50**	37.90
29.50	35.50	**37.00**	38.50
30.00	36.20	**37.50**	38.00
30.50	36.30	**38.00**	38.10
31.00	37.10	**38.50**	39.30
31.50	36.20	**39.00**	39.50
32.00	37.40	**39.50**	40.30
32.50	37.80	**40.00**	40.20
33.00	37.40		

COM-POWER PAM-118A

1-18GHz - PREAMPLIFIER

S/N: 551034

CALIBRATION DATE: JANUARY 10, 2020

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
500	39.68	**6000**	41.31
600	39.94	**6500**	41.35
700	39.99	**7000**	41.61
800	40.24	**7500**	41.72
900	39.93	**8000**	41.73
1000	40.44	**8500**	40.82
1250	40.63	**9000**	40.78
1500	40.80	**9500**	42.10
1750	41.00	**10000**	42.62
2000	41.35	**10500**	41.43
2250	41.60	**11000**	41.00
2500	41.82	**11500**	41.26
2750	42.08	**12000**	41.50
3000	42.33	**12500**	41.01
3250	42.50	**13000**	40.50
3500	42.59	**13500**	40.28
3750	42.64	**14000**	40.32
4000	42.60	**14500**	40.55
4250	42.42	**15000**	40.62
4500	42.20	**15500**	40.74
4750	42.04	**16000**	40.69
5000	41.88	**16500**	40.98
5250	41.69	**17000**	40.16
5500	41.59	**17500**	39.29
5750	41.44	**18000**	39.52

COM-POWER PA-840

18-40GHz - PREAMPLIFIER

S/N: 181289

CALIBRATION DATE: JULY 23,2019

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
18.00	33.29	**29.50**	31.82
18.50	28.81	**30.00**	31.25
19.00	26.91	**30.50**	30.24
19.50	29.21	**31.00**	29.51
20.00	30.70	**31.50**	30.09
20.50	31.88	**32.00**	31.10
21.00	32.88	**32.50**	31.40
21.50	33.13	**33.00**	31.28
22.00	32.55	**33.50**	30.97
22.50	31.67	**34.00**	30.80
23.00	31.04	**34.50**	30.63
23.50	30.84	**35.00**	30.22
24.00	30.97	**35.50**	29.87
24.50	31.33	**36.00**	29.88
25.00	31.86	**36.50**	29.98
25.50	32.53	**37.00**	30.06
26.00	33.21	**37.50**	30.08
26.50	33.68	**38.00**	30.33
27.00	33.88	**38.50**	31.29
27.50	33.75	**39.00**	32.78
28.00	33.36	**39.50**	33.67
28.50	32.87	**40.00**	33.27
29.00	32.29		

FRONT VIEW

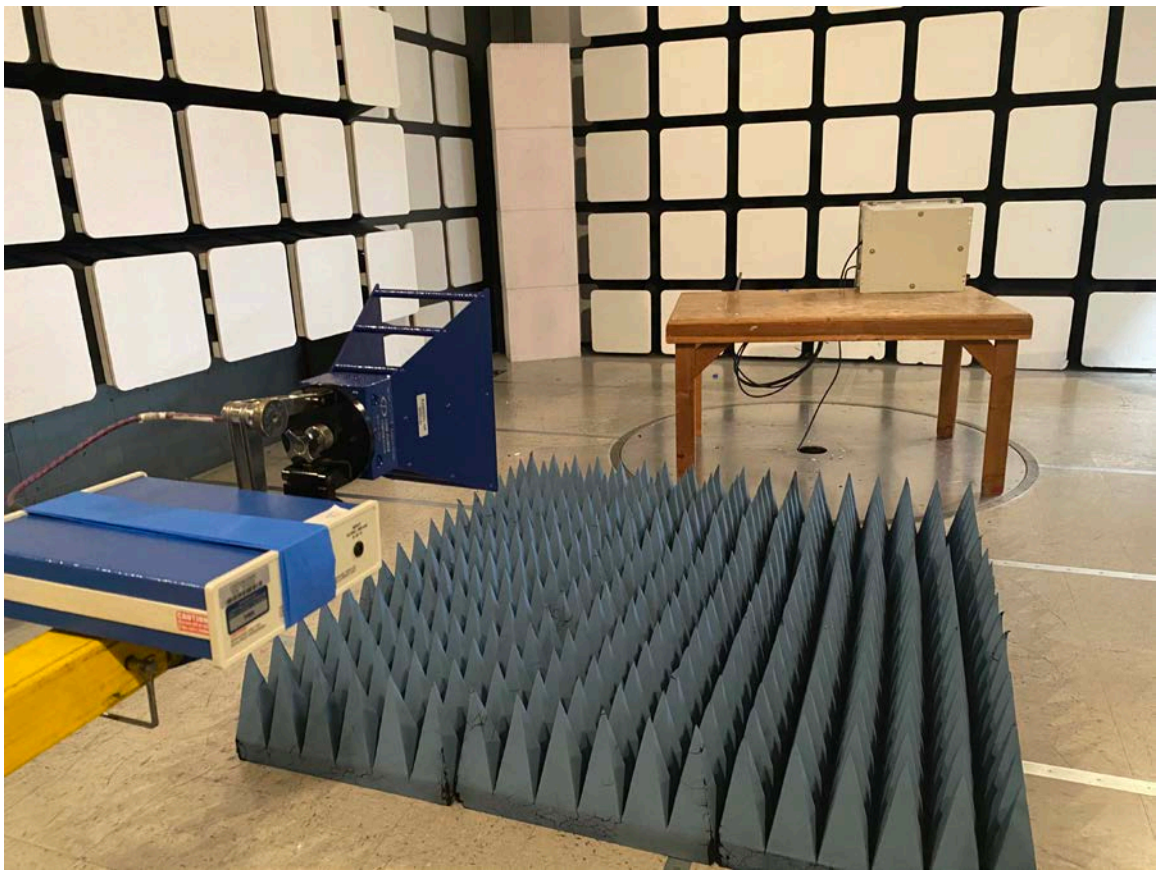
AERODEFENSE, LLC
SENSOR
MODEL: AIRWARDEN
FCC CLASS B - RADIATED EMISSIONS UNDER 1 GHz
CONFIGURATIONS 1 & 2

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

AERODEFENSE, LLC
SENSOR
MODEL: AIRWARDEN
FCC CLASS B - RADIATED EMISSIONS UNDER 1 GHz
CONFIGURATIONS 1 & 2

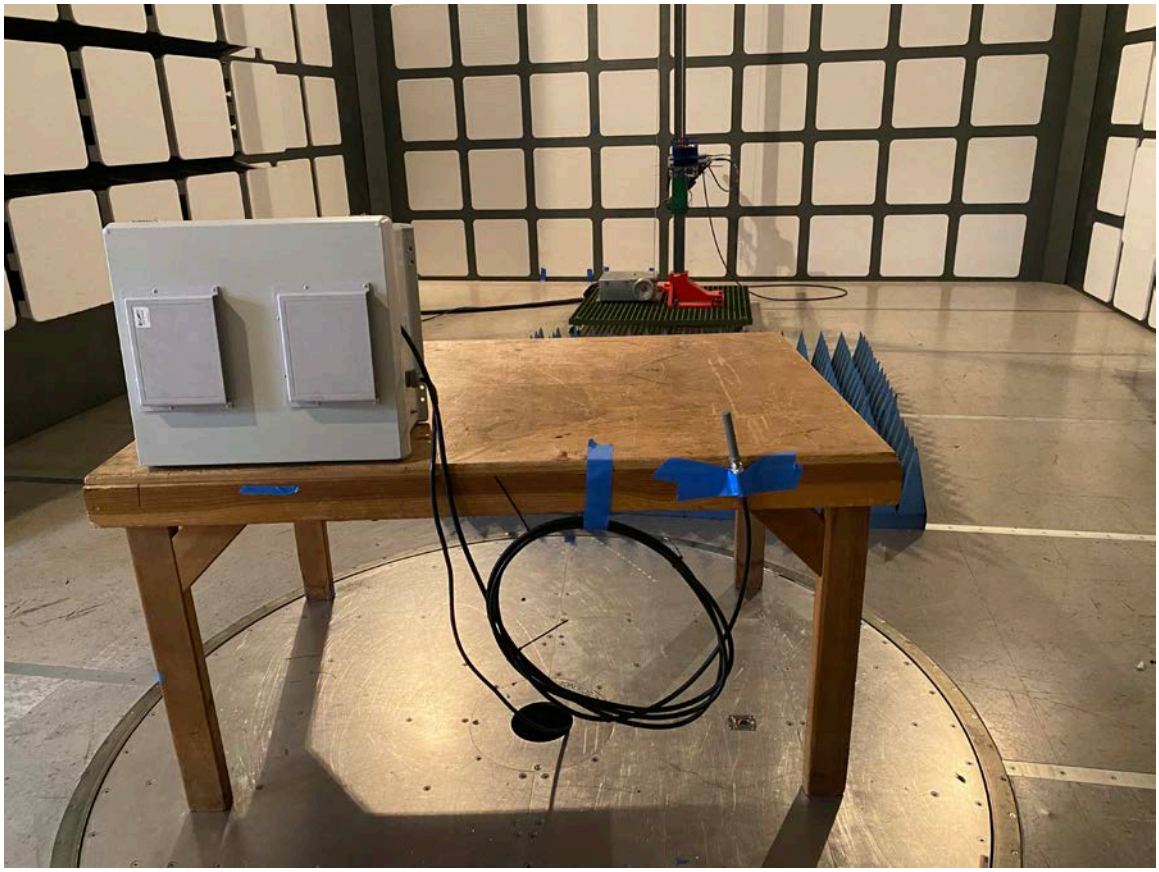
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

AERODEFENSE, LLC
WIRELESS SECURITY SENSOR
MODEL: AIRWARDEN
FCC CLASS B - RADIATED EMISSIONS > 1GHz
CONFIGURATIONS 1 & 2

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

AERODEFENSE, LLC
SENSOR
MODEL: AIRWARDEN
FCC SUBPART B - RADIATED EMISSIONS > 1GHz
CONFIGURATIONS 1 & 2

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

AERODEFENSE, LLC
SENSOR
MODEL: AIRWARDEN
FCC CLASS B - CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

AERODEFENSE, LLC
SENSOR
MODEL: AIRWARDEN
FCC CLASS B - CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

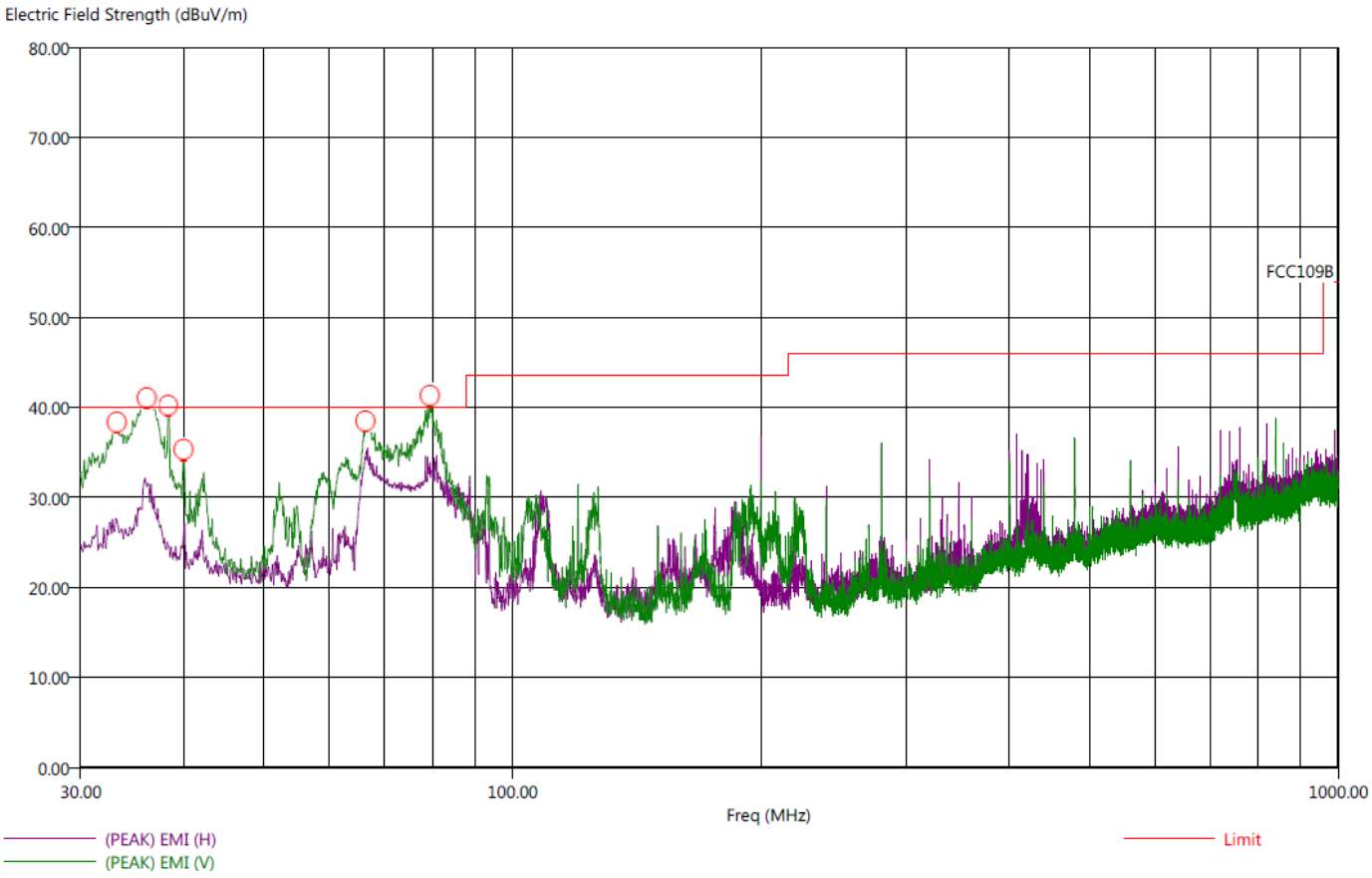
APPENDIX E

DATA SHEETS

Test title: FCC 15.109 Class B
File: Radiated Pre-Scan 30-1000Mhz
Operator name: Howard Huang
EUT type: Sensor/AirWarden
EUT condition: The EUT is set up to configuration #1 (B210 and B200mini)
Notes: Company: AeroDefense, LLC
Temp: 70f
Hum: 47%
120V 60Hz

2/25/2020 9:47:55 AM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB R)



Test title: FCC 15.109 Class B
File: Radiated Final-Scan 30-1000 MHz
Operator name: Howard Huang
EUT type: Sensor/AirWarden
EUT condition: The EUT is set up to configuration #1 (B210 and B200mini)
Notes: Company: AeroDefense, LLC
Temp:76f
Hum:47%
120V 60Hz

2/25/2020 10:10:50 AM
Sequence: Final Measurements

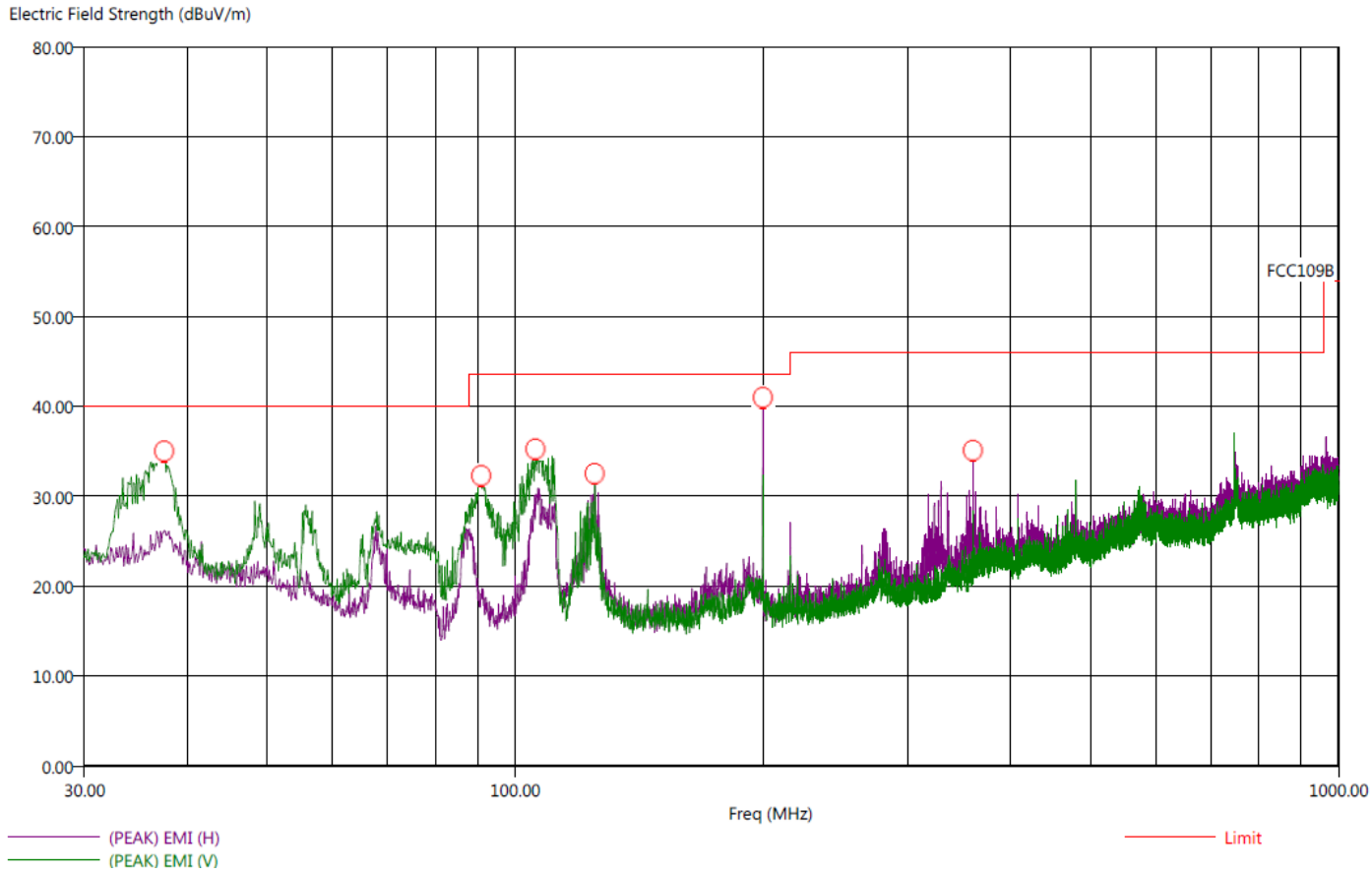
Compatible Electronics, Inc. FAC-3 (LAB R)

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(QP) Margin (dB)	Limit (dBµV/m)	Twr Ht (cm)	Ttbl Agl (deg)	Cable (dB)	Transducer (dB)
33.20	V	39.45	21.66	-18.34	40.00	168.05	359.50	0.15	21.52
36.10	V	41.65	21.14	-18.86	40.00	117.55	84.25	0.16	20.98
38.30	V	37.39	20.83	-19.17	40.00	118.38	103.75	0.17	20.66
40.00	V	37.62	20.58	-19.42	40.00	235.52	0.25	0.18	20.40
66.40	V	36.78	13.25	-26.75	40.00	154.32	186.75	0.60	12.65
79.50	V	39.66	12.11	-27.89	40.00	195.22	231.50	0.61	11.50

Test title: FCC 15.109 Class B
File: Radiated Pre-Scan 30-1000MHz-Config #2
Operator name: Howard Huang
EUT type: Sensor/AirWarden
EUT condition: The EUT is set up to configuration #2 (two B200mini)
Notes: Company: AeroDefense, LLC
Temp: 70f
Hum: 47%
120V 60Hz

2/25/2020 10:55:42 AM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB R)



Test title: FCC 15.109 Class B
File: Radiated Final-Scan 30-1000 MHz-Config #2
Operator name: Howard Huang
EUT type: Sensor/AirWarden
EUT condition: The EUT is set up to configuration #2 (Two B200mini)
Notes: Company: AeroDefense, LLC
Temp:76f
Hum:47%
120V 60Hz

2/25/2020 11:16:18 AM
Sequence: Final Measurements

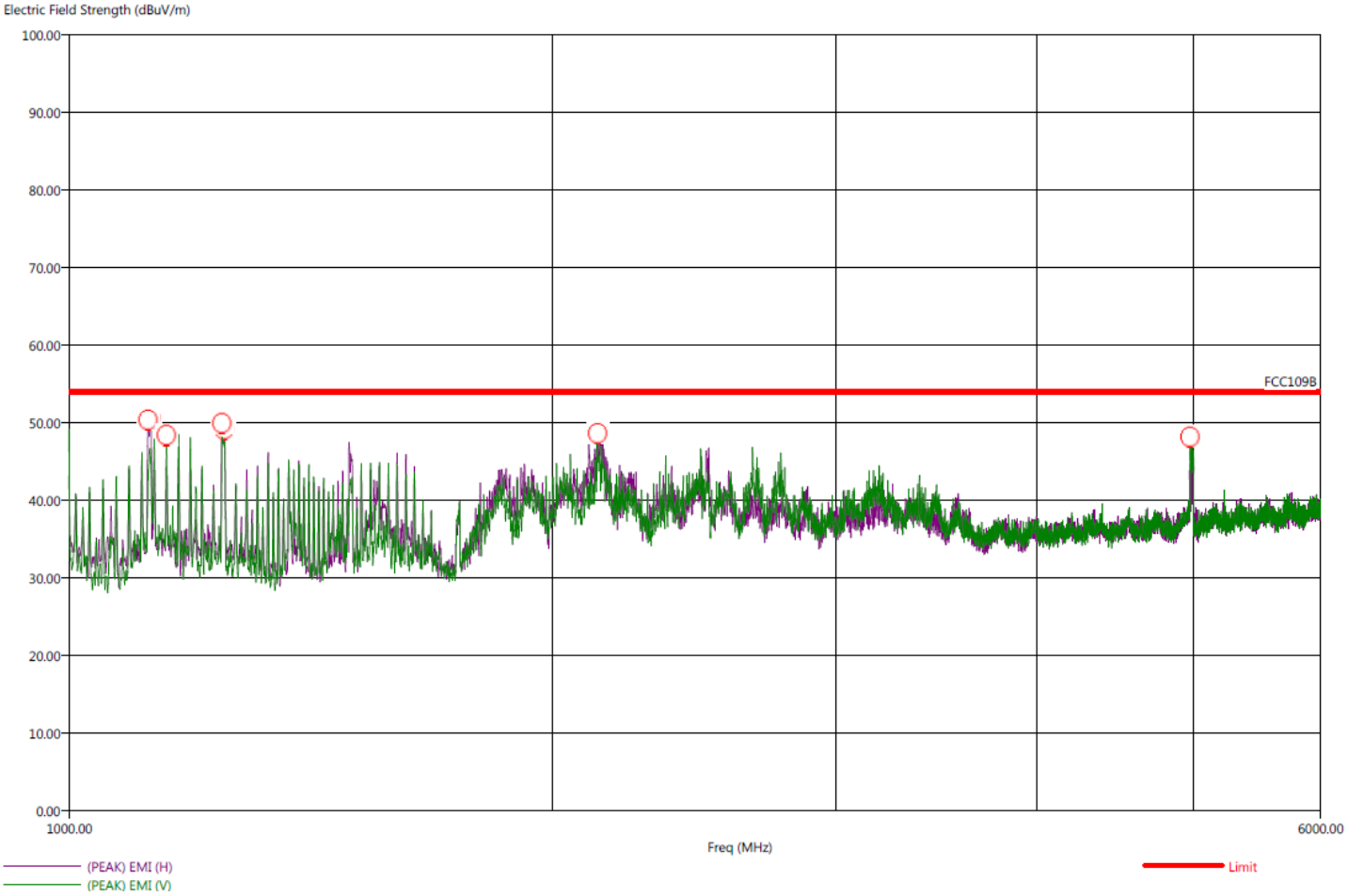
Compatible Electronics, Inc. FAC-3 (LAB R)

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(QP) Margin (dB)	Limit (dBµV/m)	Twr Ht (cm)	Ttbl Agl (deg)	Cable (dB)	Transducer (dB)
37.50	V	37.74	20.93	-19.07	40.00	120.41	184.00	0.17	20.76
91.00	V	34.80	13.64	-29.88	43.52	109.25	155.75	0.24	13.40
105.90	V	38.10	15.13	-28.39	43.52	140.11	58.00	0.43	14.70
125.00	V	35.28	16.20	-27.32	43.52	117.79	49.25	0.60	15.60
200.00	H	41.77	15.56	-27.96	43.52	221.13	16.75	0.46	15.10
360.00	H	38.79	19.80	-26.20	46.00	123.40	229.75	0.70	19.10

Test title: FCC 15.109 Class B
File: Radiated Pre-Scan 1-6 GHz-Config #1.set
Operator name: Howard Huang
EUT type: Sensor/B210 and B200mini
EUT condition: The EUT is set up to configuration #1 (B210 & B200mini)
Notes: Company: AeroDefense
Temp:69f
Hum:35%
120V 60Hz

4/7/2020 3:03:32 PM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB R)



No significant emissions found above 6 GHz.
The scan shows emissons with radios turned off and deemed to be worst case configuration.

Test title: FCC 15.109 Class B
File: Radiated Final-scan 1-6GHz-Config #1.set
Operator name: Howard Huang
EUT type: Sensor/B210 and B200mini
EUT condition: The EUT is set up to configuration #1 (B210 & B200mini)
Notes: Company: AeroDefense
Temp: 76f
Hum: 47%
120V 60Hz

4/8/2020 2:31:25 PM
Sequence: Final Measurements

Compatible Electronics, Inc. FAC-3 (LAB R)

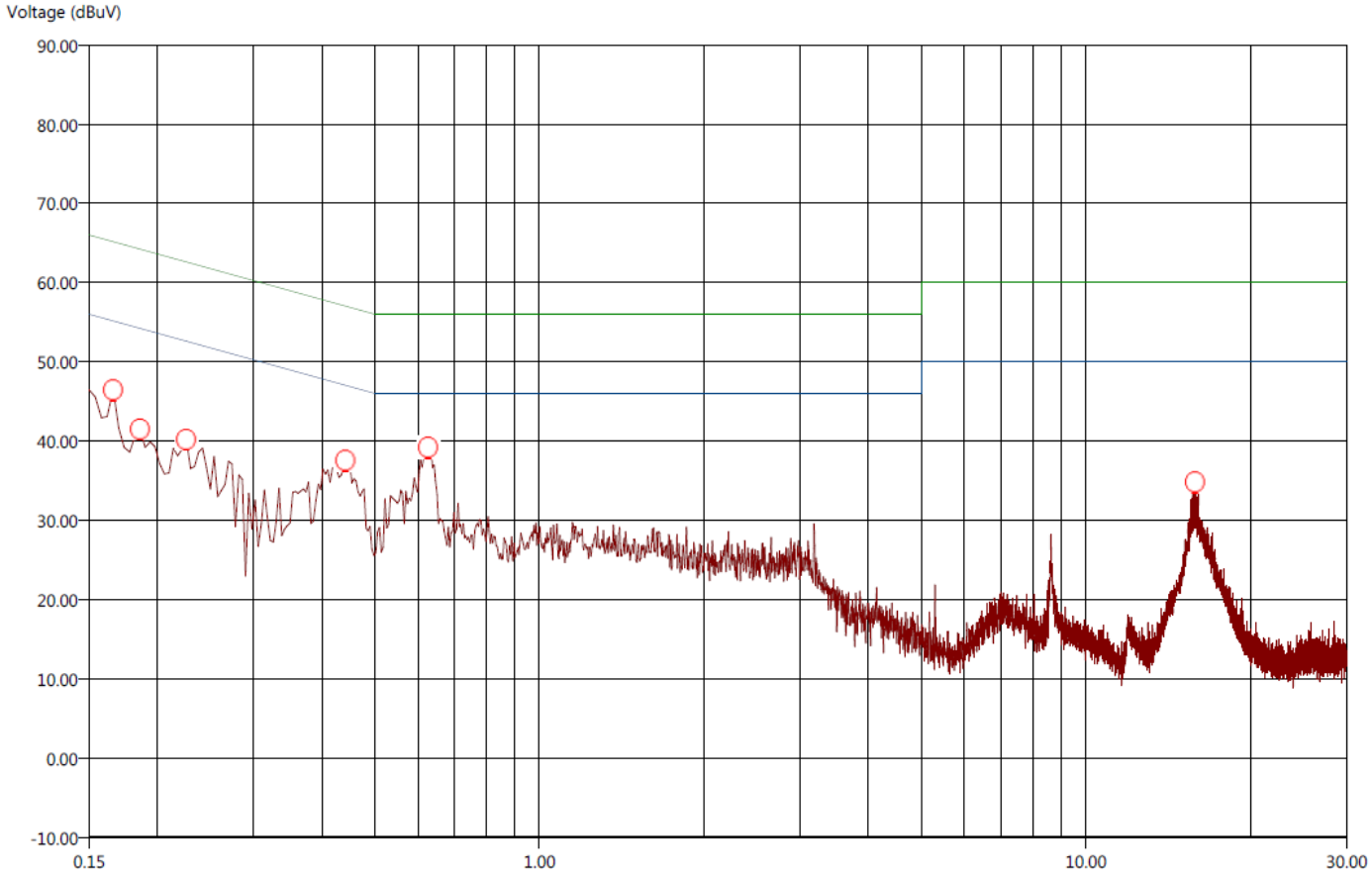
Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(AVG) EMI (dBµV/m)	(AVG) Margin (dB)	Limit (dBµV/m)	Twr Ht (cm)	Ttbl Agl (deg)	Cable (dB)	Transducer (dB)
1120.00	H	51.27	32.06	-21.92	53.98	166.88	236.75	3.10	24.33
1124.00	H	51.07	36.20	-17.78	53.98	168.05	238.50	3.09	24.31
1150.00	V	41.37	26.95	-27.03	53.98	104.11	169.00	3.10	24.32
1245.00	H	51.18	36.34	-17.64	53.98	143.64	156.25	3.26	24.79
1249.00	H	53.76	44.55	-9.43	53.98	132.82	155.25	3.26	24.80
2132.00	H	51.73	37.99	-15.99	53.98	121.29	213.50	4.31	28.06
4979.00	V	51.58	32.52	-21.46	53.98	267.82	164.00	6.72	33.78

No significant emissions found above 6 GHz.

Test title: FCC 15.107 Class B
File: Conducted Pre-Line-120V-Config #1
Operator name: Howard Huang
EUT type: Sensor/AirWarden
EUT condition: The EUT is set up to configuration #1 (B210 & B200mini)
Notes: Company: AeroDefense, LLC
Temp:76f
Hum:47%
120V 60Hz

2/25/2020 3:46:18 PM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB R)



Test title: FCC 15.107 Class B
File: Conducted Final-Line-120V-Config #1
Operator name: Howard Huang
EUT type: Sensor/AirWarden
EUT condition: The EUT is set up to configuration #1 (B210 & B200mini)
Notes: Company: AeroDefense, LLC
Temp:76f
Hum:47%
120V 60Hz

2/25/2020 3:50:59 PM
Sequence: Final Measurements

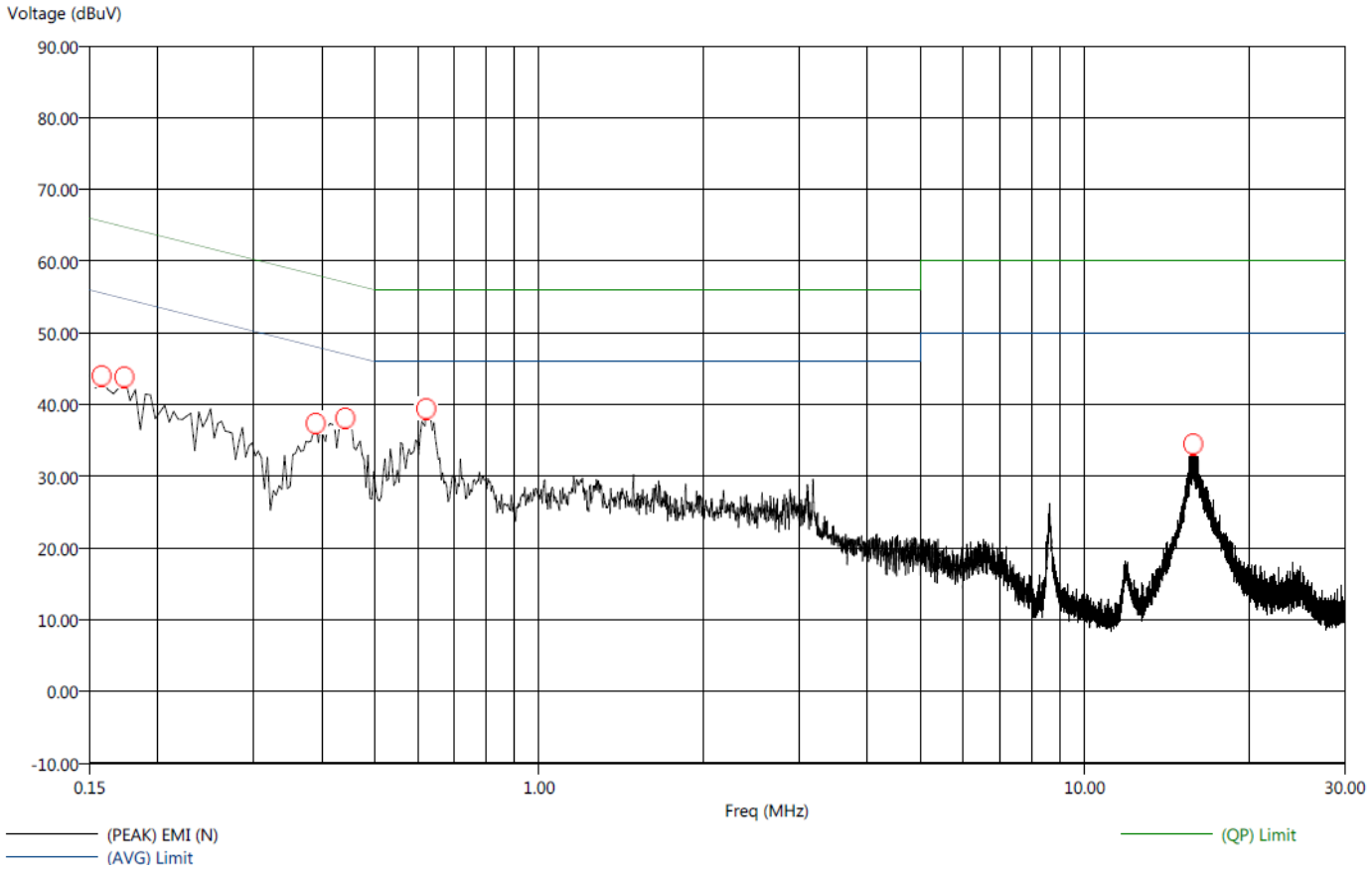
Compatible Electronics, Inc. FAC-3 (LAB R)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(PEAK) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)	Transducer (dB)	Cable (dB)
0.17	-19.13	-24.02	36.03	41.14	48.75	55.16	65.16	0.40	0.07
0.19	-22.87	-27.27	31.35	36.94	45.16	54.21	64.21	0.34	0.06
0.23	-25.33	-27.10	27.26	35.50	41.30	52.60	62.60	0.25	0.06
0.44	-17.94	-22.94	29.09	34.09	37.61	47.02	57.02	0.03	0.05
0.63	-15.96	-19.29	30.04	36.71	40.58	46.00	56.00	0.03	0.04
15.86	-26.38	-30.84	23.62	29.16	32.94	50.00	60.00	0.12	0.11

Test title: FCC 15.107 Class B
File: Conducted Pre-Neutral-120V-Config #1
Operator name: Howard Huang
EUT type: Sensor/AirWarden
EUT condition: The EUT is set up to configuration #1 (B210 & B200mini)
Notes: Company: AeroDefense, LLC
Temp:76f
Hum:47%
120V 60Hz

2/25/2020 3:58:27 PM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB R)



Test title: FCC 15.107 Class B
File: Conducted Final-Neutral-120V-Config #1
Operator name: Howard Huang
EUT type: Sensor/AirWarden
EUT condition: The EUT is set up to configuration #1 (B210 & B200mini)
Notes: Company: AeroDefense, LLC
Temp:76f
Hum:47%
120V 60Hz

2/25/2020 4:02:35 PM
Sequence: Final Measurements

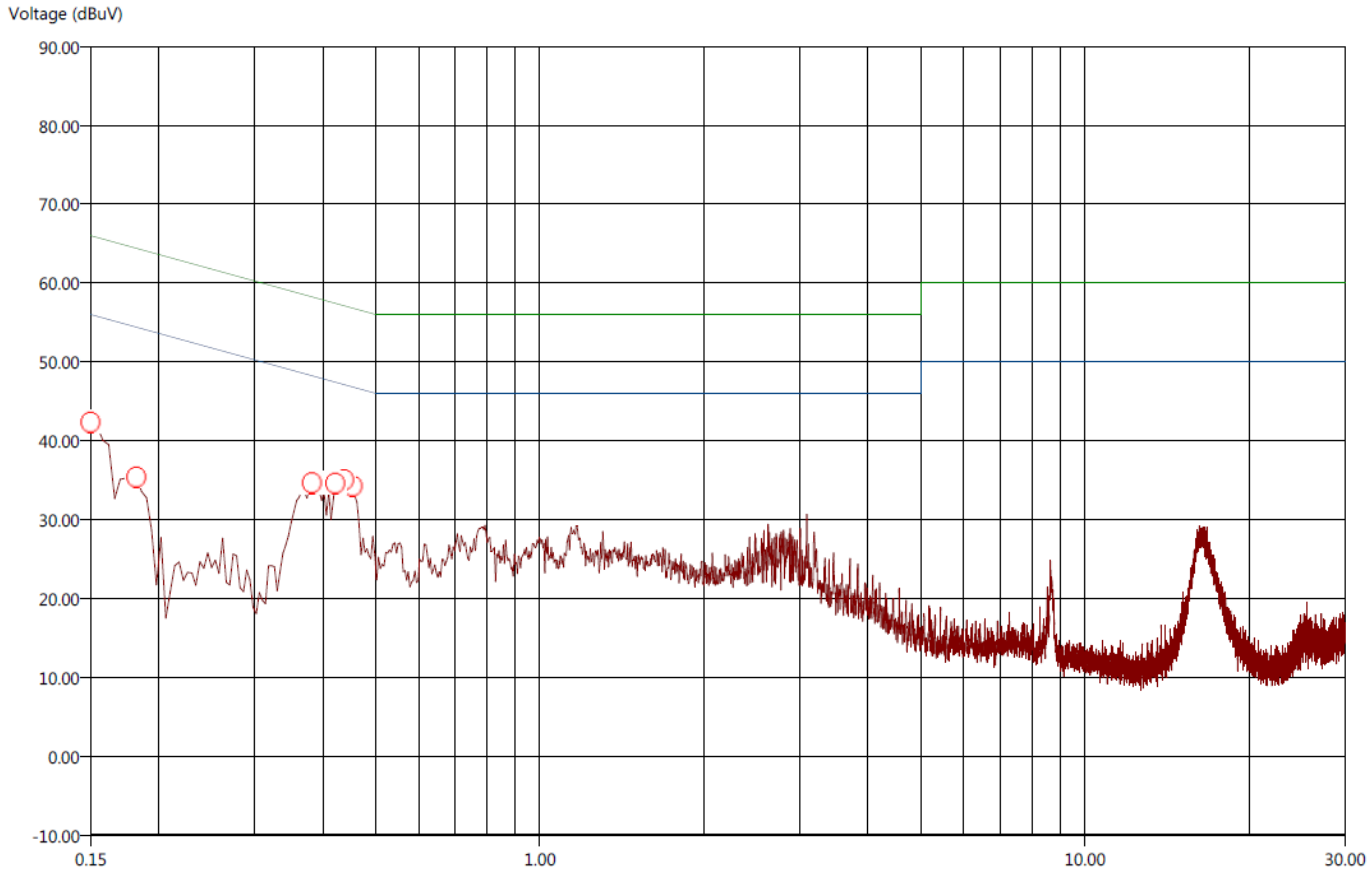
Compatible Electronics, Inc. FAC-3 (LAB R)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(PEAK) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)	Transducer (dB)	Cable (dB)
0.16	-19.51	-23.80	36.06	41.77	47.24	55.57	65.57	0.43	0.07
0.17	-24.16	-25.84	30.60	38.93	43.94	54.77	64.77	0.38	0.06
0.39	-24.85	-28.10	23.21	29.96	33.68	48.06	58.06	0.04	0.05
0.44	-18.31	-24.95	28.71	32.08	37.05	47.02	57.02	0.02	0.05
0.62	-16.28	-19.77	29.72	36.23	39.62	46.00	56.00	0.03	0.04
15.84	-26.92	-31.33	23.08	28.67	31.93	50.00	60.00	0.05	0.11

Test title: FCC 15.107 Class B
File: Conducted Pre-Line-120V-Config #2
Operator name: Howard Huang
EUT type: Sensor/AirWarden
EUT condition: The EUT is set up to configuration #2 (Two B200mini)
Notes: Company: AeroDefense, LLC
Temp:76f
Hum:47%
120V 60Hz

2/25/2020 4:18:09 PM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB R)



Test title: FCC 15.107 Class B
File: Conducted Final-Line-120V-Config #2
Operator name: Howard Huang
EUT type: Sensor/AirWarden
EUT condition: The EUT is set up to configuration #2 (Two B200mini)
Notes: Company: AeroDefense, LLC
Temp:76f
Hum:47%
120V 60Hz

2/25/2020 4:21:03 PM
Sequence: Final Measurements

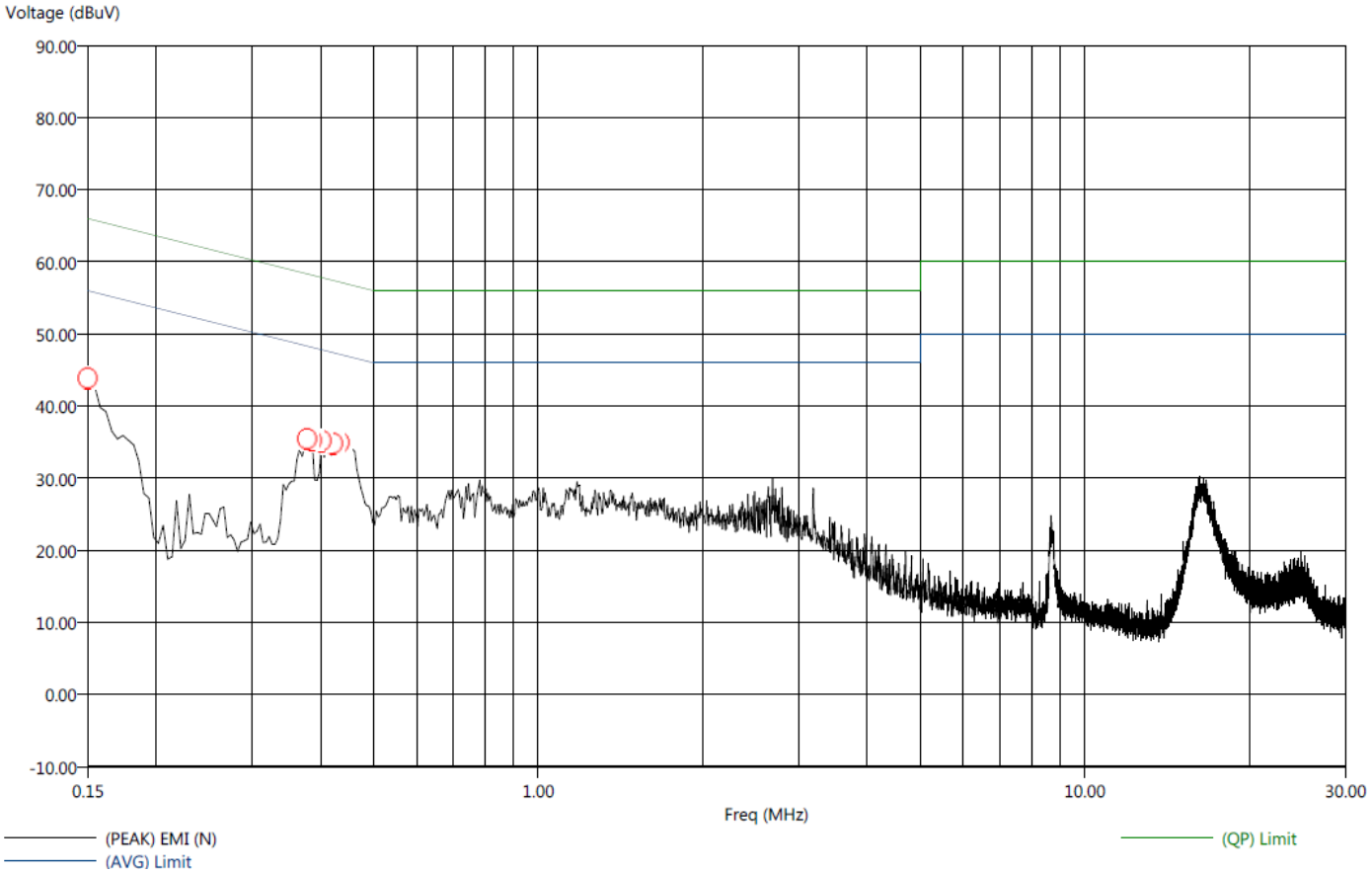
Compatible Electronics, Inc. FAC-3 (LAB R)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(PEAK) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)	Transducer (dB)	Cable (dB)
0.15	-17.21	-23.23	38.79	42.77	47.27	56.00	66.00	0.44	0.07
0.18	-25.65	-30.63	28.74	33.76	36.64	54.39	64.39	0.35	0.06
0.38	-19.76	-27.14	28.47	31.10	35.01	48.24	58.24	0.04	0.05
0.42	-21.12	-26.20	26.29	31.21	34.53	47.41	57.41	0.04	0.05
0.44	-18.80	-24.48	28.30	32.62	35.02	47.10	57.10	0.03	0.05
0.45	-19.84	-25.52	26.96	31.28	34.01	46.80	56.80	0.03	0.05

Test title: FCC 15.107 Class B
File: Conducted Pre-Neutral-120V-Config #2
Operator name: Howard Huang
EUT type: Sensor/AirWarden
EUT condition: The EUT is set up to configuration #2 (Two B200mini)
Notes: Company: AeroDefense, LLC
Temp:76f
Hum:47%
120V 60Hz

2/25/2020 4:11:46 PM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB R)



Test title: FCC 15.107 Class B
File: Conducted Final-Neutral-120V-Config #2
Operator name: Howard Huang
EUT type: Sensor/ AirWarden
EUT condition: The EUT is set up to configuration #2 (Two B200mini)
Notes: Company: AeroDefense, LLC
Temp:76f
Hum:47%
120V 60Hz

2/25/2020 4:15:23 PM
Sequence: Final Measurements

Compatible Electronics, Inc. FAC-3 (LAB R)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(PEAK) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)	Transducer (dB)	Cable (dB)
0.15	-29.96	-25.04	26.04	40.96	46.53	56.00	66.00	0.45	0.07
0.38	-26.32	-28.13	22.01	30.19	33.91	48.32	58.32	0.04	0.05
0.39	-25.64	-28.14	22.51	30.01	34.10	48.15	58.15	0.04	0.05
0.40	-22.61	-27.53	25.21	30.28	32.36	47.81	57.81	0.04	0.05
0.42	-25.11	-27.27	22.30	30.14	34.52	47.41	57.41	0.03	0.05
0.43	-22.97	-24.50	24.20	32.68	34.76	47.18	57.18	0.03	0.05