Engineering Test Report No. 2104193-01 Rev. A		
Report Date	August 2, 2022	
Manufacturer Name	Astronics CSC	
Manufacturer Address	804 S Northpoint Blvd, Dock 26-29 Waukegan, IL 60087	
Product Name Model No.	Cabin Wireless Access Point CabinAXe 700-00016-000	
Date Received	May 31, 2022	
Test Dates	May 31 – June 30, 2022	
Specifications	FCC “Code of Federal Regulations” Title 47, Part 15, Subpart B 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	Tylar Jozefczyk	
Tested by	Tylar Jozefczyk	
Signature	Raymond J Klouda	
Approved by	Raymond J. Klouda, Registered Professional Engineer of Illinois – 44894	
PO Number	47106	

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1. Report Revision History

Revision	Date	Description
–	2 AUG 2022	Initial Release of Engineering Test Report No. 2104193-01

A	3 AUG 2022 by TMJ	- Engineering Test Report No. updated from 2104193-01 to 2104193-01 Rev. A throughout report.
		- Mentions of “IC ID” have been updated to “ISED UPN” throughout report.
		- Section 2.2:
		  ○ FCC ID has been updated from “FCC ID: Z64-WL18DBMOD” to “FCC ID: 2AL4H-70000016”.
		  ○ ISED UPN has been updated from “ISED UPN: 451I-WL18DBMOD” to “ISED UPN: 22737-70000016”.
		- Section 8: notes added to combination table referencing Engineering Test Reports 2104193-02 and 2104193-03 for testing on the other radios.

2. Introduction

2.1. Scope of Tests

This document presents the results of a series of RF emissions tests that were performed on the Astronics CSC Cabin Wireless Access Point CabinAXe (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was manufactured and submitted for testing by Astronics CSC located in Waukegan, IL.

2.2. Purpose

The test series was performed to determine if the Astronics CSC Cabin Wireless Access Point CabinAXe, FCC ID: 2AL4H-70000016, meets the Class II Permissive Change requirements of the FCC "Code of Federal Regulations" Title 47, Chapter I, Subchapter A, §15.247.

The test series was also performed to determine if the Astronics CSC Cabin Wireless Access Point CabinAXe, ISED UPN: 451I-WL18DBMOD meets the Class II Permissive Change requirements of the Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-Gen and RSS-247 for Transmitters.

The following modification has been made to the original equipment:

- The EUT housing has changed.

Additionally, this document presents the results of limited spurious emissions measurements performed on the EUT. The EUT is equipped with the following pre-certified radio module:

- Aruba Networks IAP-635 (FCC ID Q9DAPIN0635, ISED UPN 4675A-APIN0635), operating in the 2400 – 2483.5MHz band.

The nature of these measurements is to ensure that the radio module and host remain in compliance with the emissions requirements of the FCC and Innovation, Science, and Economic Development Canada after the integration process. Testing was performed in accordance with ANSI C63.10-2013.

2.3. Identification of the EUT

The EUT was identified as follows:

EUT Identification	
Product Description	Cabin Wireless Access Point CabinAXe
Model/Part No.	700-00016-000
Serial No.	000005
Size of EUT	9.5” x 9.0” x 2.85”
Software/Firmware Version	1.0.0BL1
Device Type	Digitally Modulated Transmission Device
Band of Operation	2400 – 2483.5MHz
Modulation Type	802.11b: DSSS BLE: GFSK ZigBee: O-QPSK
Antenna Type	Integrated downtilt omni-directional
Antenna Gain (dBi) [1]	4.6
Rated Output Power	802.11b: 0.363W (25.6dBm) BLE: 0.009W (9.76dBm) ZigBee: 0.0125W (10.99dBm)
Emission Classification	802.11b: 18M9D1D BLE: 2M05F1D ZigBee: 2M22F1D
Product FCC ID & ISED UPN Number	FCC ID: 2AL4H-70000016 ISED UPN: 22737-70000016
Note 1 – Antenna gain is supplied by the manufacturer and Elite is not responsible for the accuracy of the antenna gain.	

The EUT listed above was used throughout the test series.

3. Power Input

The EUT obtained 115V 60Hz power via a 3 wire, 1 meter, unshielded power cord.

4. Grounding

The EUT was connected to ground through the third wire of its input power cord.

5. Support Equipment

The EUT was submitted for testing along with the following support equipment:

Description	Model #	S/N
Dell Laptop	7490	---
Serial Terminator - 9-Pin	E54-345	---

6. Interconnect Leads

The following interconnect cables were submitted with the test item:

Description	Model #	S/N
Mini USB Cable	B00NH11N5A	---
Ethernet Cable (5ft)	N201-005-WH	---
Micro USB to USB A cable	B0723M876	---
J1 (LAN1 UUT cable)	E54-331	---
USB to RJ45 Serial Rollover Cable	U209-006-RJ45-X	---

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
Wi-Fi – 802.11b 1Mbps	- 2412MHz, Power Setting = 18.5dBm - 2437MHz, Power Setting = 18.5dBm - 2462MHz, Power Setting = 18dBm
BLE – 1Mbps	- 2402MHz, Power Setting = 8dBm - 2442MHz, Power Setting = 8dBm - 2480MHz, Power Setting = 8dBm
ZigBee	- 2405MHz, Power Setting = 8dBm - 2442MHz, Power Setting = 8dBm - 2480MHz, Power Setting = 8dBm
Multi-Tx	The EUT had all radios set to transmit in one of the combinations below.

In addition to the above modes, for multi-Transmitter testing, the following combinations were used:

Combination	Description
1	- Bluetooth: 2402MHz - Wi-Fi: 802.11b – 2437MHz - Wi-Fi: 802.11ac-VHT80 – 5210MHz [1] - Wi-Fi: 802.11ax-HE20 – 6415MHz [2]
2	- ZigBee: 2480MHz - Wi-Fi: 802.11b – 2412MHz - Wi-Fi: 802.11ac-VHT80 – 5210MHz [1] - Wi-Fi: 802.11ax-HE20 – 6415MHz [2]
Note 1: For testing on the 5150 – 5850MHz radio, see Elite Electronic Engineering Test Report No. 2104193-02. Note 2: For testing on the 5955 – 7095MHz radio, see Elite Electronic Engineering Test Report No. 2104193-03.	

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 & 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”

- KDB 558074 D01v05r02, April 2, 2019, “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”

- 996369 D04 Module Integration Guide v02, October 13, 2020, “Modular Transmitter Integration Guide Guidance for Host Product Manufacturers”

- 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 Astronics CSC and used in conjunction with the 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	24.4°C
Relative Humidity	31%
Atmospheric Pressure	1013.2mb

13. Summary

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

Test Description	Requirements	Test Method	Results
Effective Isotropic Radiated Power (EIRP)	FCC 15.247 ISED RSS-247	ANSI C63.10:2013	Conforms
Case Spurious Radiated Emissions	FCC 15.247 ISED RSS-247	ANSI C63.10:2013	Conforms
Band-Edge Compliance	FCC 15.247 ISED RSS-247	ANSI C63.10:2013	Conforms
Module Integration – Emissions Test	---	KDB 996369 D04 ANSI C63.10:2013	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]

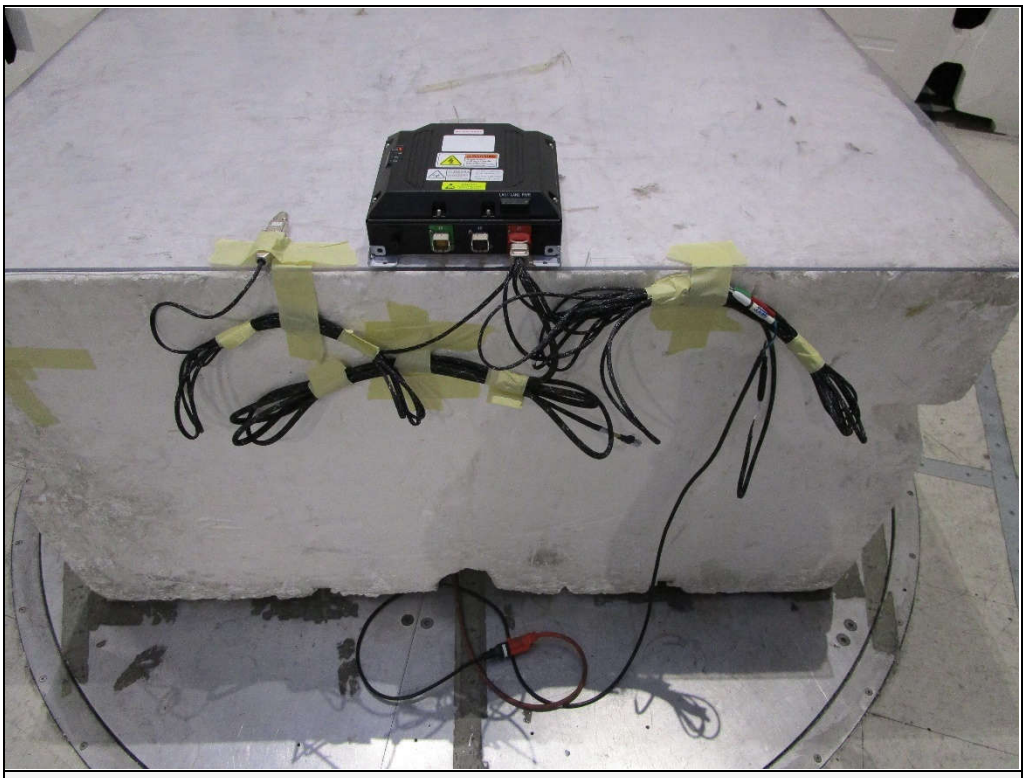
15. Statement of Conformity

The Astronics CSC Cabin Wireless Access Point CabinAXe (Model No. 700-00016-000, Serial No. 000005) 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 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

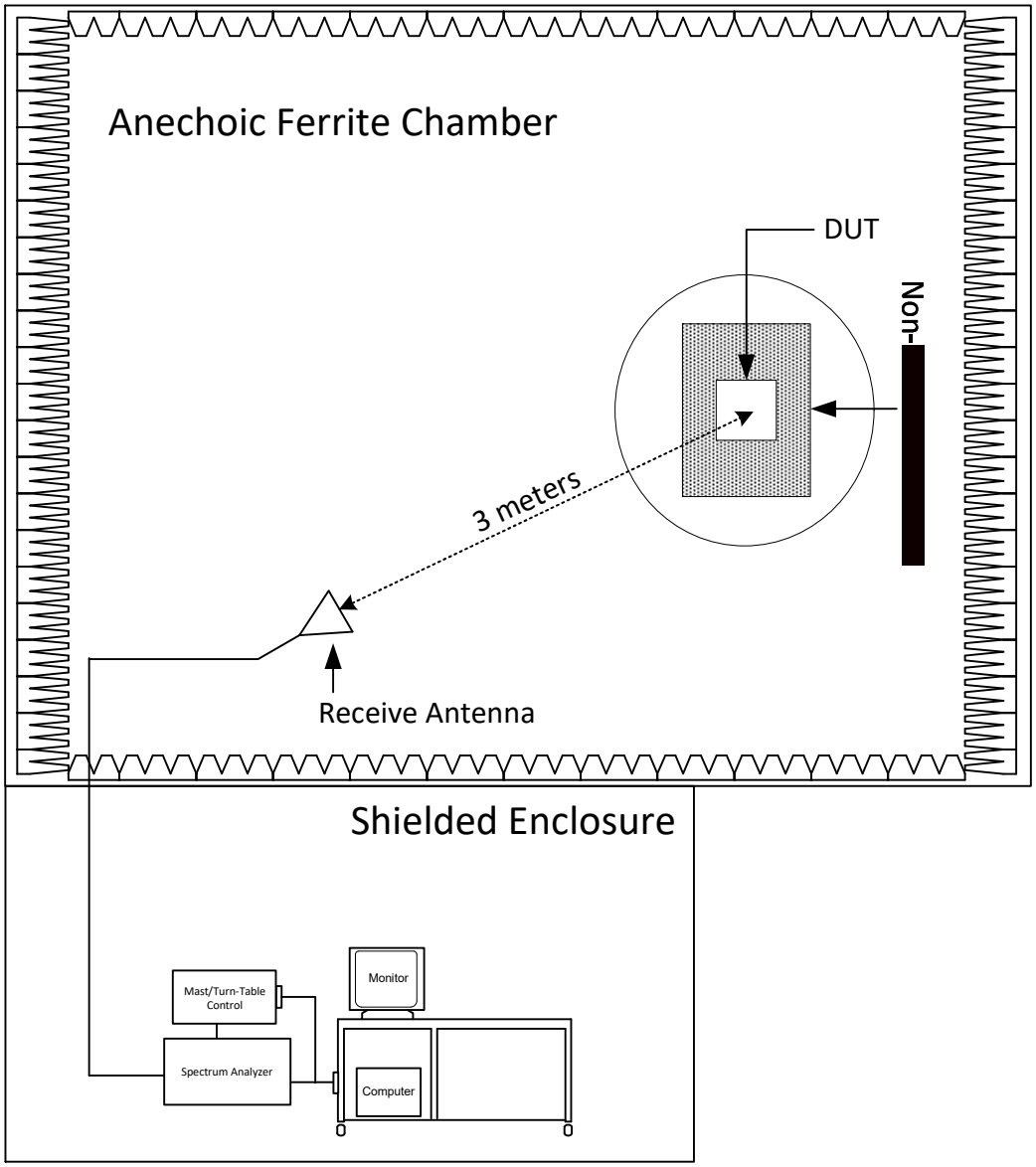


18. Equipment List

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	9/21/2021	9/21/2022
APW14	PREAMPLIFIER	PLANAR	PE2-35-120-5R0-10-12-SFF	PL22671	1-20GHz	9/21/2021	9/21/2022
CDZ3	LAB WORKSTATION	ELITE	LWS-10		WINDOWS 10	CNR	
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NTA3	BILOG ANTENNA	TESEQ	6112D	32853	25-1000MHz	10/20/2020	10/20/2022
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	3/31/2022	3/31/2023
SES0	24VDC POWER SUPPLY	P-TRANS	FS-32024-1M	001	18-27VDC	NOTE 1	
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
XPQ5	FILTER	K&L MICROWAVE	11SH10-9000/U2000-O/O	1	5000-5800 MHZ	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. Effective Isotropic Radiated Power (EIRP)

EUT Information	
Manufacturer	Astronics CSC
Product	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi, BLE, ZigBee

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Measurement Method	Radiated
Type of Test Site	Semi-Anechoic Chamber
Test Site Used	Room 29
Type of Antennas Used	Above 1GHz: Double-ridged waveguide (or equivalent)
Notes	None

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

Requirements
The output power shall not exceed 4W (36dBm).

Procedure
The EUT was placed on the non-conductive stand and set to transmit. A double ridged waveguide antenna was placed at a test distance of 3 meters from the EUT. The resolution bandwidth (RBW) of the spectrum analyzer was set to greater than the 6dB bandwidth. The EUT was maximized for worst case emissions (or maximum output power) at the measuring antenna. The maximum meter reading was recorded. The peak power output was measured for the low, middle, and high channels. The equivalent power was determined from the field intensity levels measured at 3 meters using the substitution method. To determine the emission power, a dipole antenna (double ridged waveguide antenna for all measurements above 1GHz) was then set in place of the EUT and connected to a calibrated signal generator. 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 then corrected to compensate for cable loss (and antenna gain for all measurements above 1GHz), as required. The peak power output was calculated for low, middle, and high hopping frequencies.

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi
Result	Max EIRP = 0.363W (25.6dBm)
Notes	None

Freq (MHz)	Ant Pol	Wide BW Meter Reading (dBµV)	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total (dBµV/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
2412.00	H	72.54	3.39	32.84	0.00	108.76	13.46	36.00	-22.54
	V	83.72	3.39	32.84	0.00	119.94	24.64	36.00	-11.36
2437.00	H	73.13	3.39	32.95	0.00	109.47	14.17	36.00	-21.83
	V	84.56	3.39	32.95	0.00	120.90	25.60	36.00	-10.40
2462.00	H	73.08	3.39	33.11	0.00	109.58	14.28	36.00	-21.72
	V	82.47	3.39	33.11	0.00	118.97	23.67	36.00	-12.33

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	BLE
Result	Max EIRP = 0.009W (9.76dBm)
Notes	None

Freq (MHz)	Ant Pol	Wide BW Meter Reading (dBµV)	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total (dBµV/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
2402.00	H	62.38	3.38	32.79	0.00	98.56	3.26	36.00	-32.74
	V	68.88	3.38	32.79	0.00	105.06	9.76	36.00	-26.24
2442.00	H	51.90	3.39	32.98	0.00	88.27	-7.03	36.00	-43.03
	V	60.94	3.39	32.98	0.00	97.31	2.01	36.00	-33.99
2480.00	H	61.61	3.40	33.25	0.00	98.26	2.96	36.00	-33.04
	V	67.77	3.40	33.25	0.00	104.42	9.12	36.00	-26.88

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	ZigBee
Result	Max EIRP = 0.0125W (10.99dBm)
Notes	None

Freq (MHz)	Ant Pol	Wide BW Meter Reading (dBµV)	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total (dBµV/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
2405.00	H	63.51	3.38	32.81	0.00	99.70	4.40	36.00	-31.60
	V	69.13	3.38	32.81	0.00	105.32	10.02	36.00	-25.98
2440.00	H	61.00	3.39	32.97	0.00	97.36	2.06	36.00	-33.94
	V	69.93	3.39	32.97	0.00	106.29	10.99	36.00	-25.01
2480.00	H	61.24	3.40	32.71	0.00	97.35	2.05	27.00	-24.95
	V	70.08	3.40	32.71	0.00	106.19	10.89	27.00	-16.11

21. Case Spurious Radiated Emissions

EUT Information	
Manufacturer	Astronics CSC
Product	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi, BLE, ZigBee

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test Site Used	Room 29
Type of Antennas Used	Below 1GHz: Bilog (or equivalent) 1 – 18GHz: Double-Ridged Waveguide (or equivalent) Above 18GHz: Horn (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

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 ranges from 30MHz to 26.5GHz was investigated using a peak detector function. The final open field emission tests were then manually performed over the frequency range of 30MHz to 26.5GHz. 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.

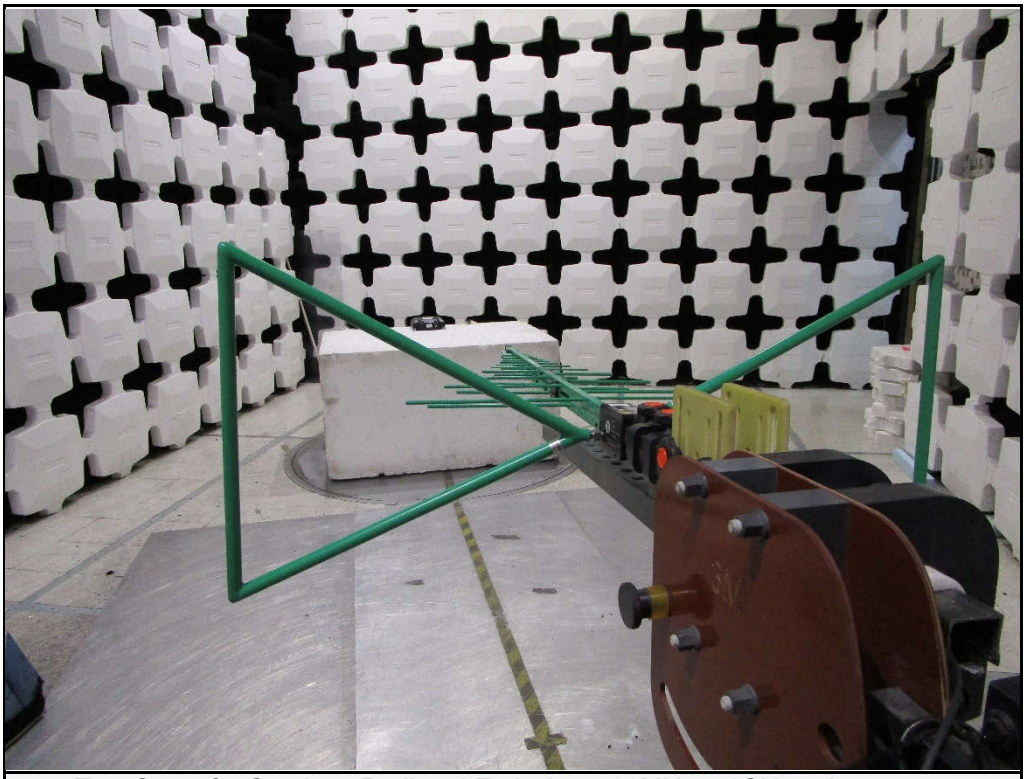
iii) The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.

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.

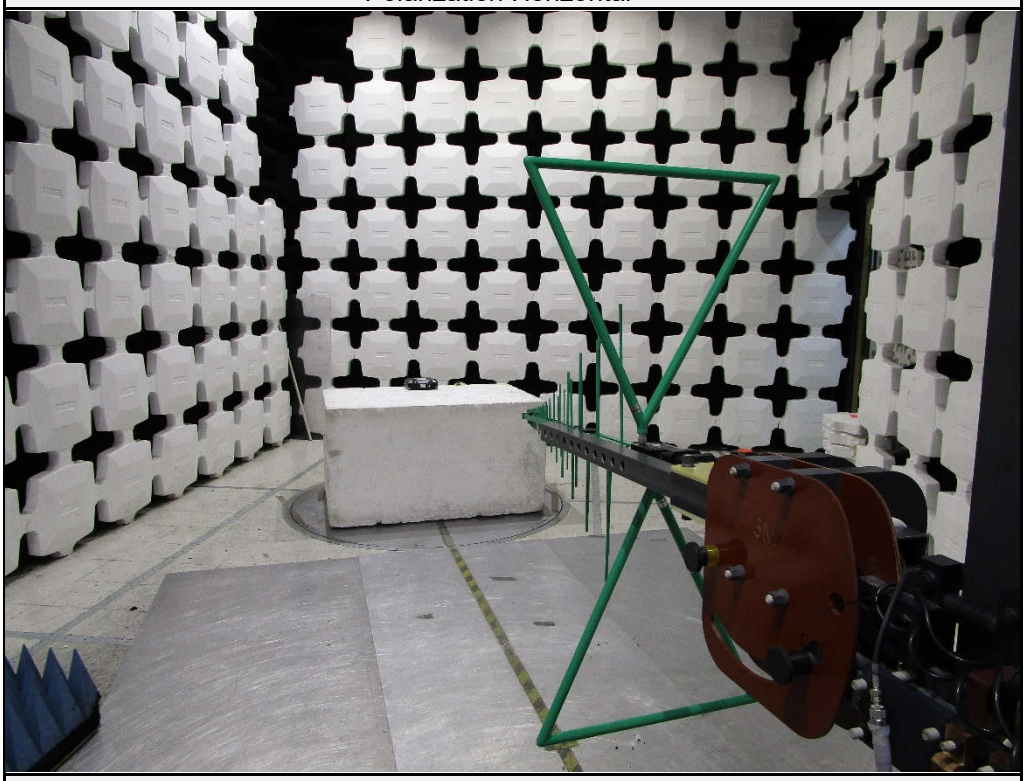
d) For all radiated emissions measurements below 1GHz, if the peak reading is below the limits listed in §15.209(a), no further measurements are required. If, however, the peak readings exceed the limits listed in §15.209(a), then the emissions are remeasured using a quasi-peak detector.

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).

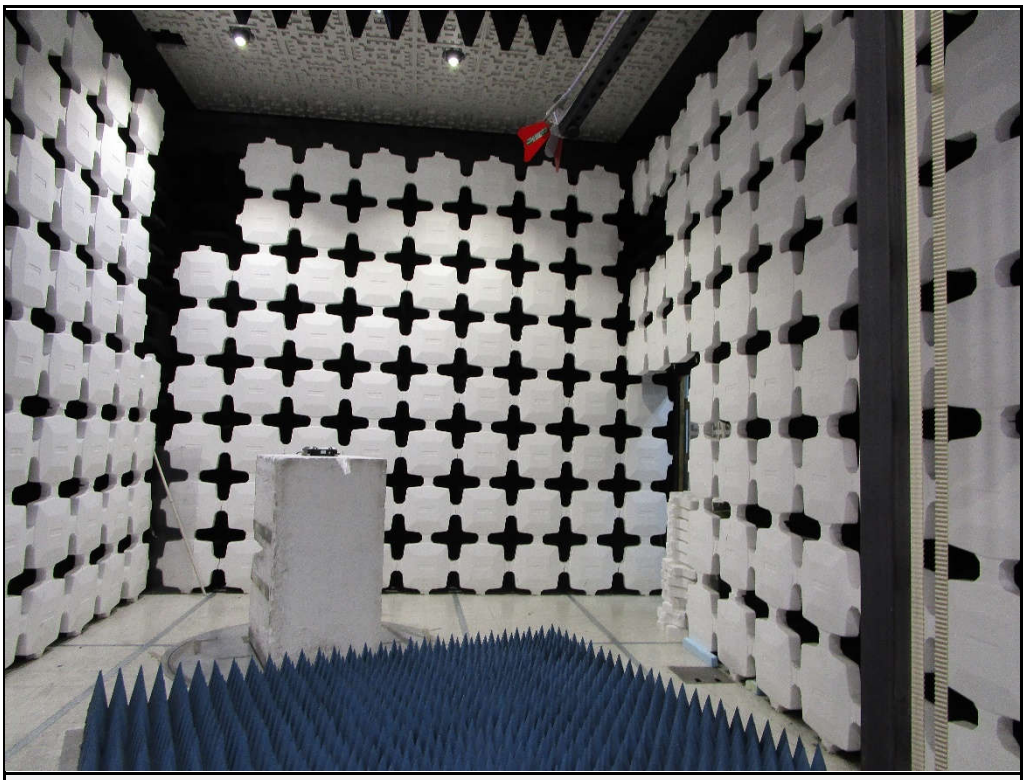
f) Next, for all radiated emissions measurements above 1GHz, the resolution bandwidth was set to 1MHz. The analyzer was set to linear mode with a 10Hz video bandwidth in order to simulate an average detector. An average reading was taken.



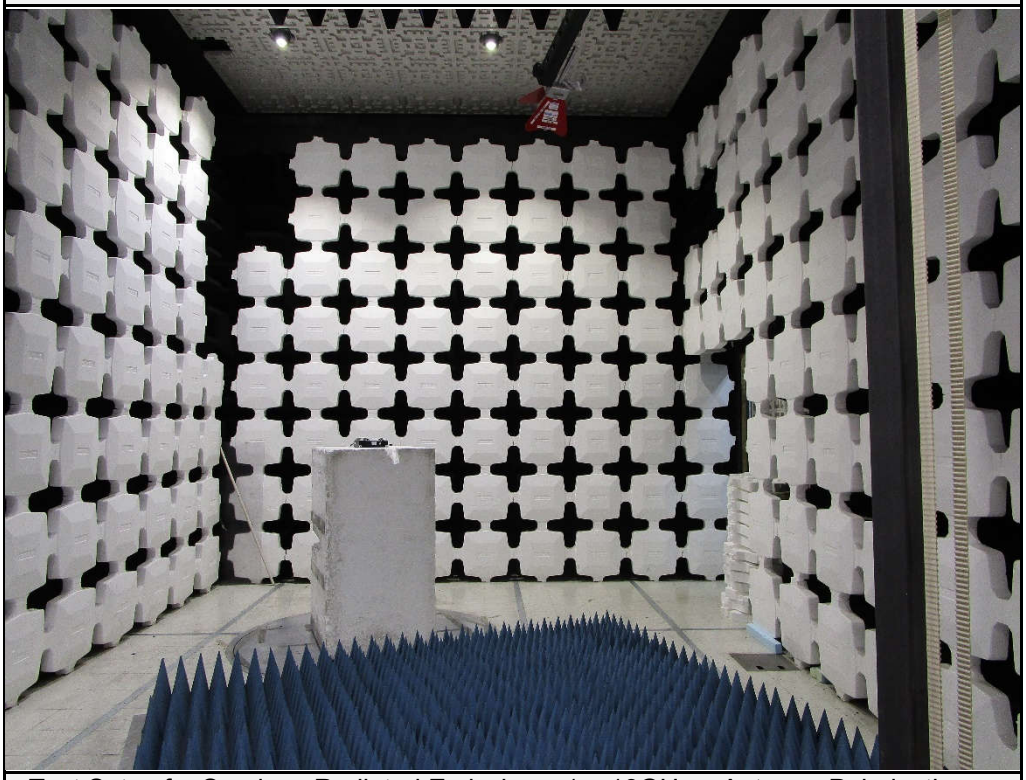
Test Setup for Spurious Radiated Emissions, 30MHz – 1GHz – Antenna Polarization Horizontal



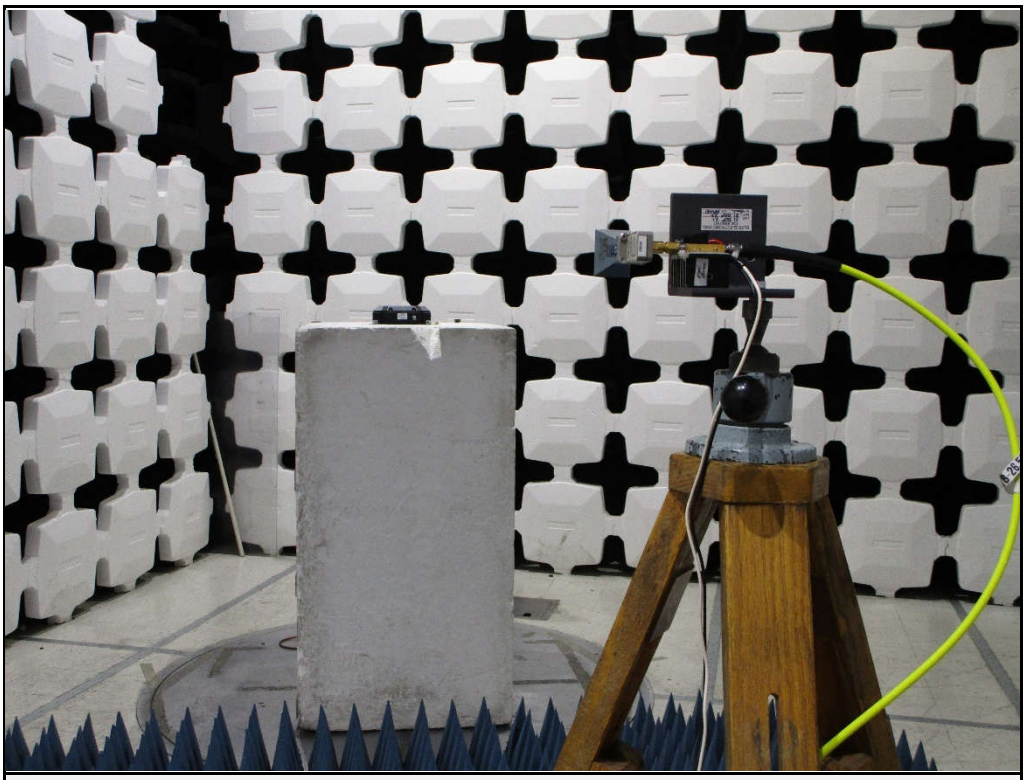
Test Setup for Spurious Radiated Emissions, 30MHz – 1GHz – Antenna Polarization Vertical



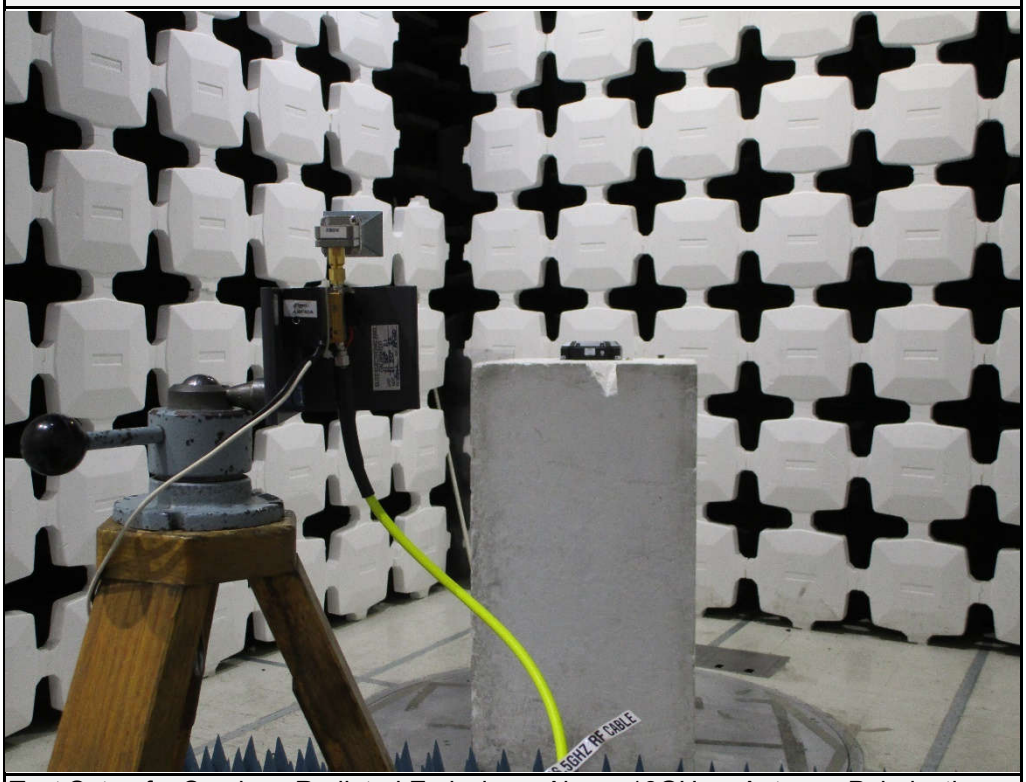
Test Setup for Spurious Radiated Emissions, 1 – 18GHz – Antenna Polarization Horizontal



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



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



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

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi
Frequency Tested	2412MHz
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)
4824.00	H	48.91	Ambient	4.87	36.61	-39.65	50.73	344.12	5000.00	-23.25
	V	48.92	Ambient	4.87	36.61	-39.65	50.74	344.52	5000.00	-23.24
12060.00	H	48.68	Ambient	7.05	41.50	-38.97	58.26	818.44	5000.00	-15.72
	V	48.07	Ambient	7.05	41.50	-38.97	57.65	762.93	5000.00	-16.33
14472.00	H	46.90	Ambient	7.43	42.06	-38.59	57.79	775.27	5000.00	-16.19
	V	47.12	Ambient	7.43	42.06	-38.59	58.01	795.16	5000.00	-15.97

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi
Frequency Tested	2412MHz
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)
4824.00	H	33.95	Ambient	4.87	36.61	-39.65	0.00	35.77	61.48	500.00	-18.21
	V	33.98	Ambient	4.87	36.61	-39.65	0.00	35.80	61.69	500.00	-18.18
12060.00	H	32.55	Ambient	7.05	41.50	-38.97	0.00	42.13	127.79	500.00	-11.85
	V	32.57	Ambient	7.05	41.50	-38.97	0.00	42.15	128.08	500.00	-11.83
14472.00	H	31.97	Ambient	7.43	42.06	-38.59	0.00	42.86	138.98	500.00	-11.12
	V	31.98	Ambient	7.43	42.06	-38.59	0.00	42.87	139.14	500.00	-11.11

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi
Frequency Tested	2412MHz
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)
2412.00	H	61.35		3.39	32.84	0.00	97.57	75638.85		
	V	72.43		3.39	32.84	0.00	108.65	270860.02		
7236.00	H	38.19	Ambient	5.87	37.75	-39.66	42.15	128.07	27086.00	-46.51
	V	38.09	Ambient	5.87	37.75	-39.66	42.05	126.60	27086.00	-46.61
9648.00	H	38.27		6.30	39.38	-39.29	44.65	170.90	27086.00	-44.00
	V	40.07		6.30	39.38	-39.29	46.45	210.25	27086.00	-42.20
16884.00	H	36.35	Ambient	7.73	44.83	-37.37	51.54	377.53	27086.00	-37.12
	V	37.39	Ambient	7.73	44.83	-37.37	52.58	425.55	27086.00	-36.08

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi
Frequency Tested	2437MHz
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)
4874.00	H	48.79	Ambient	4.99	36.45	-39.62	50.61	339.21	5000.00	-23.37
	V	49.33	Ambient	4.99	36.45	-39.62	51.15	360.97	5000.00	-22.83
7311.00	H	48.39	Ambient	5.84	37.83	-39.63	52.43	418.52	5000.00	-21.55
	V	48.49	Ambient	5.84	37.83	-39.63	52.53	423.36	5000.00	-21.45
12185.00	H	47.39	Ambient	7.13	41.64	-38.89	57.26	729.59	5000.00	-16.72
	V	47.22	Ambient	7.13	41.64	-38.89	57.09	715.45	5000.00	-16.89

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi
Frequency Tested	2437MHz
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)
4874.00	H	33.42	Ambient	4.99	36.45	-39.62	0.00	35.24	57.81	500.00	-18.74
	V	33.45	Ambient	4.99	36.45	-39.62	0.00	35.27	58.01	500.00	-18.71
7311.00	H	33.16	Ambient	5.84	37.83	-39.63	0.00	37.20	72.48	500.00	-16.78
	V	33.17	Ambient	5.84	37.83	-39.63	0.00	37.21	72.56	500.00	-16.77
12185.00	H	31.90	Ambient	7.13	41.64	-38.89	0.00	41.77	122.62	500.00	-12.21
	V	0.00	Ambient	7.13	41.64	-38.89	0.00	9.87	3.12	500.00	-44.11

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi
Frequency Tested	2437MHz
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)
2437.00	H	62.56		3.39	32.95	0.00	98.90	88150.21		
	V	73.57		3.39	32.95	0.00	109.91	313129.03		
9748.00	H	36.70		6.36	39.39	-39.27	43.17	144.08	31312.90	-46.74
	V	38.71		6.36	39.39	-39.27	45.18	181.59	31312.90	-44.73
14622.00	H	36.80	Ambient	7.30	42.38	-38.62	47.86	247.22	31312.90	-42.05
	V	37.06	Ambient	7.30	42.38	-38.62	48.12	254.73	31312.90	-41.79
17059.00	H	36.16	Ambient	7.66	44.81	-37.37	51.26	365.56	31312.90	-38.66
	V	36.06	Ambient	7.66	44.81	-37.37	51.16	361.37	31312.90	-38.76

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi
Frequency Tested	2462MHz
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)
4924.00	H	49.43	Ambient	5.12	36.34	-39.64	51.26	365.48	5000.00	-22.72
	V	49.21	Ambient	5.12	36.34	-39.64	51.04	356.34	5000.00	-22.94
7386.00	H	49.01	Ambient	5.87	37.85	-39.59	53.15	454.43	5000.00	-20.83
	V	48.42	Ambient	5.87	37.85	-39.59	52.56	424.59	5000.00	-21.42
12310.00	H	46.76	Ambient	7.25	41.76	-38.82	56.95	703.78	5000.00	-17.03
	V	47.56	Ambient	7.25	41.76	-38.82	57.75	771.68	5000.00	-16.23

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi
Frequency Tested	2462MHz
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)
4924.00	H	33.48	Ambient	5.12	36.34	-39.64	0.00	35.31	58.26	500.00	-18.67
	V	33.49	Ambient	5.12	36.34	-39.64	0.00	35.32	58.33	500.00	-18.66
7386.00	H	33.02	Ambient	5.87	37.85	-39.59	0.00	37.16	72.11	500.00	-16.82
	V	33.00	Ambient	5.87	37.85	-39.59	0.00	37.14	71.94	500.00	-16.84
12310.00	H	32.23	Ambient	7.25	41.76	-38.82	0.00	42.42	132.11	500.00	-11.56
	V	32.21	Ambient	7.25	41.76	-38.82	0.00	42.40	131.81	500.00	-11.58

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi
Frequency Tested	2462MHz
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)
2462.00	H	61.71		3.39	33.11	0.00	98.21	81400.94		
	V	71.16		3.39	33.11	0.00	107.66	241618.07		
9848.00	H	36.91		6.42	39.53	-39.25	43.61	151.54	24161.81	-44.05
	V	38.77		6.42	39.53	-39.25	45.47	187.72	24161.81	-42.19
14772.00	H	37.48	Ambient	7.49	42.59	-38.64	48.92	279.18	24161.81	-38.74
	V	37.25	Ambient	7.49	42.59	-38.64	48.69	271.89	24161.81	-38.97
17234.00	H	35.73	Ambient	7.52	44.46	-37.38	50.33	328.61	24161.81	-37.33
	V	36.38	Ambient	7.52	44.46	-37.38	50.98	354.14	24161.81	-36.68

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	BLE
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	49.43	Ambient	4.82	36.64	-39.71	51.18	362.40	5000.00	-22.80
	V	48.97	Ambient	4.82	36.64	-39.71	50.72	343.70	5000.00	-23.26
12010.00	H	48.43	Ambient	6.87	41.46	-39.00	57.75	771.93	5000.00	-16.23
	V	47.57	Ambient	6.87	41.46	-39.00	56.89	699.16	5000.00	-17.09

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	BLE
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	33.43	Ambient	4.82	36.64	-39.71	0.00	35.18	57.44	500.00	-18.80
	V	33.47	Ambient	4.82	36.64	-39.71	0.00	35.22	57.70	500.00	-18.76
12010.00	H	32.56	Ambient	6.87	41.46	-39.00	0.00	41.88	124.19	500.00	-12.10
	V	32.53	Ambient	6.87	41.46	-39.00	0.00	41.85	123.76	500.00	-12.13

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	BLE
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	57.94		3.38	32.79	0.00	94.12	50796.78		
	V	67.48		3.38	32.79	0.00	103.66	152347.79		
7206.00	H	42.68	Ambient	5.89	37.72	-39.66	46.63	214.51	15234.78	-37.03
	V	38.15	Ambient	5.89	37.72	-39.66	42.10	127.33	15234.78	-41.56
9608.00	H	37.65	Ambient	6.27	39.33	-39.30	43.95	157.55	15234.78	-39.71
	V	37.81	Ambient	6.27	39.33	-39.30	44.11	160.48	15234.78	-39.55
14412.00	H	36.97	Ambient	7.43	41.93	-38.58	47.75	244.01	15234.78	-35.91
	V	36.66	Ambient	7.43	41.93	-38.58	47.44	235.46	15234.78	-36.22
16814.00	H	36.64	Ambient	7.72	44.81	-37.37	51.79	388.70	15234.78	-31.86
	V	36.30	Ambient	7.72	44.81	-37.37	51.45	373.78	15234.78	-32.20

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	BLE
Frequency Tested	2442MHz
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)
4884.00	H	48.52	Ambient	5.02	36.40	-39.62	50.31	327.88	5000.00	-23.66
	V	49.04	Ambient	5.02	36.40	-39.62	50.83	348.11	5000.00	-23.14
7326.00	H	49.49		5.85	37.83	-39.62	53.55	475.81	5000.00	-20.43
	V	50.74		5.85	37.83	-39.62	54.80	549.46	5000.00	-19.18
12210.00	H	47.46	Ambient	7.33	41.66	-38.88	57.57	756.07	5000.00	-16.41
	V	47.45	Ambient	7.33	41.66	-38.88	57.56	755.20	5000.00	-16.42

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	BLE
Frequency Tested	2442MHz
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)
4884.00	H	33.24	Ambient	5.02	36.40	-39.62	0.00	35.03	56.46	500.00	-18.94
	V	33.26	Ambient	5.02	36.40	-39.62	0.00	35.05	56.59	500.00	-18.92
7326.00	H	33.12		5.85	37.83	-39.62	0.00	37.18	72.27	500.00	-16.80
	V	34.35		5.85	37.83	-39.62	0.00	38.41	83.26	500.00	-15.57
12210.00	H	32.50	Ambient	7.33	41.66	-38.88	0.00	42.61	135.07	500.00	-11.37
	V	32.51	Ambient	7.33	41.66	-38.88	0.00	42.62	135.23	500.00	-11.36

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	BLE
Frequency Tested	2442MHz
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)
2442.00	H	49.15		3.39	32.98	0.00	85.52	18876.07		
	V	57.37		3.39	32.98	0.00	93.74	48630.83		
9768.00	H	36.90	Ambient	6.37	39.41	-39.27	43.41	148.13	4863.08	-30.33
	V	36.71	Ambient	6.37	39.41	-39.27	43.22	144.93	4863.08	-30.52
14652.00	H	36.76	Ambient	7.34	42.43	-38.62	47.91	248.48	4863.08	-25.83
	V	36.38	Ambient	7.34	42.43	-38.62	47.53	237.84	4863.08	-26.21
17094.00	H	36.39	Ambient	7.63	44.79	-37.37	51.44	373.17	4863.08	-22.30
	V	36.41	Ambient	7.63	44.79	-37.37	51.46	374.03	4863.08	-22.28

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	BLE
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	49.01	Ambient	5.21	36.40	-39.65	50.97	353.56	5000.00	-23.01
	V	49.41	Ambient	5.21	36.40	-39.65	51.37	370.22	5000.00	-22.61
7440.00	H	48.69		5.90	37.84	-39.56	52.87	440.24	5000.00	-21.11
	V	51.83		5.90	37.84	-39.56	56.01	631.96	5000.00	-17.97
12400.00	H	46.73	Ambient	7.29	41.81	-38.76	57.06	713.17	5000.00	-16.92
	V	47.11	Ambient	7.29	41.81	-38.76	57.44	745.06	5000.00	-16.54
19840.00	H	22.68	Ambient	2.23	40.40	-28.04	37.28	73.08	5000.00	-36.70
	V	23.45	Ambient	2.23	40.40	-28.04	38.05	79.85	5000.00	-35.93
22320.00	H	20.37	Ambient	2.23	40.59	-28.84	34.34	52.14	5000.00	-39.64
	V	21.38	Ambient	2.23	40.59	-28.84	35.35	58.57	5000.00	-38.63

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	BLE
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	34.00	Ambient	5.21	36.40	-39.65	0.00	35.96	62.80	500.00	-18.02
	V	34.01	Ambient	5.21	36.40	-39.65	0.00	35.97	62.87	500.00	-18.01
7440.00	H	33.72		5.90	37.84	-39.56	0.00	37.90	78.56	500.00	-16.08
	V	34.67		5.90	37.84	-39.56	0.00	38.85	87.64	500.00	-15.13
12400.00	H	32.36	Ambient	7.29	41.81	-38.76	0.00	42.69	136.36	500.00	-11.29
	V	0.00	Ambient	7.29	41.81	-38.76	0.00	10.33	3.29	500.00	-43.65
19840.00	H	17.60	Ambient	2.23	40.40	-28.04	0.00	32.20	40.72	500.00	-21.78
	V	17.63	Ambient	2.23	40.40	-28.04	0.00	32.23	40.86	500.00	-21.75
22320.00	H	15.92	Ambient	2.23	40.59	-28.84	0.00	29.89	31.24	500.00	-24.09
	V	15.52	Ambient	2.23	40.59	-28.84	0.00	29.49	29.83	500.00	-24.49

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	BLE
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	59.27		3.40	33.25	0.00	95.92	62491.04		
	V	66.88		3.40	33.25	0.00	103.53	150078.25		
9920.00	H	36.67	Ambient	6.46	39.56	-39.23	43.46	149.01	15007.83	-40.06
	V	37.11	Ambient	6.46	39.56	-39.23	43.90	156.75	15007.83	-39.62
14880.00	H	36.43	Ambient	7.40	42.63	-38.54	47.91	248.60	15007.83	-35.62
	V	36.93	Ambient	7.40	42.63	-38.54	48.41	263.33	15007.83	-35.12
17360.00	H	36.11	Ambient	7.65	44.14	-37.42	50.47	333.86	15007.83	-33.06
	V	36.36	Ambient	7.65	44.14	-37.42	50.72	343.61	15007.83	-32.81
24800.00	H	20.32	Ambient	2.21	40.64	-29.32	33.85	49.25	15007.83	-49.68
	V	20.38	Ambient	2.21	40.64	-29.32	33.91	49.59	15007.83	-49.62

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	ZigBee
Frequency Tested	2405MHz
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)
4810.00	H	49.37	Ambient	4.83	36.63	-39.69	51.14	360.78	5000.00	-22.83
	V	49.54		4.83	36.63	-39.69	51.31	367.91	5000.00	-22.66
12025.00	H	47.40	Ambient	6.85	41.47	-38.99	56.73	686.27	5000.00	-17.25
	V	47.57	Ambient	6.85	41.47	-38.99	56.90	699.84	5000.00	-17.08

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	ZigBee
Frequency Tested	2405MHz
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)
4810.00	H	33.87	Ambient	4.83	36.63	-39.69	0.00	35.64	60.57	500.00	-18.33
	V	34.43		4.83	36.63	-39.69	0.00	36.20	64.60	500.00	-17.77
12025.00	H	32.41	Ambient	6.85	41.47	-38.99	0.00	41.74	122.18	500.00	-12.24
	V	32.45	Ambient	6.85	41.47	-38.99	0.00	41.78	122.74	500.00	-12.20

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	ZigBee
Frequency Tested	2405MHz
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)
2405.00	H	61.38		3.38	32.81	0.00	97.57	75606.62		
	V	67.80		3.38	32.81	0.00	103.99	158328.77		
7215.00	H	38.15	Ambient	5.89	37.73	-39.66	42.10	127.38	15832.88	-41.89
	V	38.17	Ambient	5.89	37.73	-39.66	42.12	127.67	15832.88	-41.87
9620.00	H	37.06	Ambient	6.28	39.35	-39.30	43.38	147.64	15832.88	-40.61
	V	36.94	Ambient	6.28	39.35	-39.30	43.26	145.62	15832.88	-40.73
14430.00	H	37.16	Ambient	7.44	41.97	-38.59	47.98	250.71	15832.88	-36.01
	V	37.57	Ambient	7.44	41.97	-38.59	48.39	262.82	15832.88	-35.60
16835.00	H	37.26	Ambient	7.73	44.81	-37.37	52.43	418.45	15832.88	-31.56
	V	37.42	Ambient	7.73	44.81	-37.37	52.59	426.22	15832.88	-31.40

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	ZigBee
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	49.03	Ambient	5.01	36.42	-39.62	50.83	348.11	5000.00	-23.15
	V	48.91	Ambient	5.01	36.42	-39.62	50.71	343.34	5000.00	-23.27
7320.00	H	48.56	Ambient	5.84	37.83	-39.62	52.61	427.21	5000.00	-21.37
	V	49.50		5.84	37.83	-39.62	53.55	476.04	5000.00	-20.43
12200.00	H	48.01	Ambient	7.25	41.65	-38.89	58.03	796.74	5000.00	-15.95
	V	47.53	Ambient	7.25	41.65	-38.89	57.55	753.91	5000.00	-16.43
19520.00	H	29.56	Ambient	2.22	40.39	-27.76	44.41	166.18	5000.00	-29.57
	V	29.06	Ambient	2.22	40.39	-27.76	43.91	156.88	5000.00	-30.07

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	ZigBee
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	33.27	Ambient	5.01	36.42	-39.62	0.00	35.07	56.72	500.00	-18.91
	V	33.30	Ambient	5.01	36.42	-39.62	0.00	35.10	56.91	500.00	-18.88
7320.00	H	33.55	Ambient	5.84	37.83	-39.62	0.00	37.60	75.88	500.00	-16.38
	V	34.17		5.84	37.83	-39.62	0.00	38.22	81.50	500.00	-15.76
12200.00	H	32.38	Ambient	7.25	41.65	-38.89	0.00	42.40	131.77	500.00	-11.58
	V	32.39	Ambient	7.25	41.65	-38.89	0.00	42.41	131.92	500.00	-11.57
19520.00	H	14.27	Ambient	2.22	40.39	-27.76	0.00	29.12	28.58	500.00	-24.86
	V	14.41	Ambient	2.22	40.39	-27.76	0.00	29.26	29.05	500.00	-24.72

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	ZigBee
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	59.43		3.39	32.97	0.00	95.79	61579.56		
	V	68.83		3.39	32.97	0.00	105.19	181734.18		
9760.00	H	37.19	Ambient	6.37	39.40	-39.27	43.69	152.86	18173.42	-41.50
	V	36.59	Ambient	6.37	39.40	-39.27	43.09	142.66	18173.42	-42.10
14640.00	H	37.47	Ambient	7.32	42.41	-38.62	48.58	268.60	18173.42	-36.61
	V	36.91	Ambient	7.32	42.41	-38.62	48.02	251.83	18173.42	-37.17
17080.00	H	36.63	Ambient	7.64	44.80	-37.37	51.70	384.53	18173.42	-33.49
	V	36.34	Ambient	7.64	44.80	-37.37	51.41	371.90	18173.42	-33.78
21960.00	H	21.38	Ambient	2.20	40.58	-28.88	35.28	58.11	18173.42	-49.90
	V	19.50	Ambient	2.20	40.58	-28.88	33.40	46.80	18173.42	-51.78
24400.00	H	21.29	Ambient	2.22	40.63	-29.29	34.86	55.31	18173.42	-50.33
	V	21.68	Ambient	2.22	40.63	-29.29	35.25	57.85	18173.42	-49.94

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	ZigBee
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	49.25	Ambient	5.21	34.14	-39.65	48.96	280.43	5000.00	-25.02
	V	48.71	Ambient	5.21	34.14	-39.65	48.42	263.52	5000.00	-25.56
7440.00	H	48.17	Ambient	5.90	36.31	-39.56	50.82	347.56	5000.00	-23.16
	V	49.14	Ambient	5.90	36.31	-39.56	51.79	388.62	5000.00	-22.19
12400.00	H	47.67	Ambient	7.29	41.18	-38.76	57.38	739.21	5000.00	-16.60
	V	47.28	Ambient	7.29	41.18	-38.76	56.99	706.75	5000.00	-16.99

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	ZigBee
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	33.59	Ambient	5.21	34.14	-39.65	0.00	33.30	46.22	500.00	-20.68
	V	33.60	Ambient	5.21	34.14	-39.65	0.00	33.31	46.27	500.00	-20.67
7440.00	H	33.95	Ambient	5.90	36.31	-39.56	0.00	36.60	67.61	500.00	-17.38
	V	34.43	Ambient	5.90	36.31	-39.56	0.00	37.08	71.45	500.00	-16.90
12400.00	H	32.46	Ambient	7.29	41.18	-38.76	0.00	42.17	128.31	500.00	-11.81
	V	33.27	Ambient	7.29	41.18	-38.76	0.00	42.98	140.85	500.00	-11.00

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	ZigBee
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	58.50		3.40	32.71	0.00	94.61	53740.80		
	V	69.07		3.40	32.71	0.00	105.18	181469.71		
9920.00	H	37.55	Ambient	6.46	37.17	-39.23	41.95	125.14	18146.97	-43.23
	V	37.58	Ambient	6.46	37.17	-39.23	41.98	125.57	18146.97	-43.20
14880.00	H	36.67	Ambient	7.40	42.28	-38.54	47.80	245.59	18146.97	-37.37
	V	36.54	Ambient	7.40	42.28	-38.54	47.67	241.94	18146.97	-37.50
17360.00	H	35.64	Ambient	7.65	44.01	-37.42	49.87	311.53	18146.97	-35.31
	V	36.33	Ambient	7.65	44.01	-37.42	50.56	337.28	18146.97	-34.62

22. Band-Edge Compliance

EUT Information	
Manufacturer	Astronics CSC
Product	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi, BLE, ZigBee

Test Setup Details	
Setup Format	Tabletop
Measurement Method	Radiated
Type of Test Site	Semi-Anechoic Chamber
Test Site Used	Room 29
Type of Antennas Used	Above 1GHz: Double-Ridged Waveguide (or equivalent)
Notes	Per KDB 558074 D01, the average measurement was made by taking the peak measurement, then taking the operational duty cycle and subtracting it from the Peak reading to derive the RMS average value. Per MRT Technology report no. 2101TW0003-UT Section 2.7, the manufacturer declared that the ZigBee operation, when implemented, will be limited to a max duty cycle of 10% or less in any 100ms period. Therefore, a -20dB correction factor was used during band edge testing.

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

Procedure
1) Low Band Edge: a) The EUT was setup inside the test chamber on a non-conductive stand and a broadband measuring antenna was placed at a test distance of 3 meters from the EUT. b) The EUT was set to transmit continuously at the channel closest to the low band-edge. c) The EUT was maximized for worst case emissions at the measuring antenna and the maximum meter reading was recorded. d) To determine the band edge compliance, the following spectrum analyzer settings were used: o Center Frequency = 2400MHz (low band-edge frequency). o Span = Wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation. o Resolution Bandwidth (RBW) = ≥ 1% of the span. o 'Max-Hold' function was engaged. e) The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. f) The marker was set on the peak of the in-band emissions. A display line was placed 20dB down from the peak of the in-band emissions. All emissions which fall outside of the authorized band of operation must be below the 20dB down display line. (All emissions to the left of the center frequency (band-edge) must be below the display line.) g) The analyzer's display was then screenshot and saved. 2) High Band Edge: a) The EUT was setup inside the test chamber on a non-conductive stand and set to transmit continuously at the channel closest to the high band-edge. b) A broadband measuring antenna was placed at a test distance of 3 meters from the EUT. The antenna was connected to the input of a spectrum analyzer. c) The center frequency of the analyzer was set to the high band edge (2483.5MHz). d) The Resolution Bandwidth was set to 1MHz. e) To ensure that the maximum or worst case emission level was measured, the following steps were taken: o The EUT was rotated so that all of its sides were exposed to the receiving antenna. o Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured. o The EUT was rotated so that all of its sides were exposed to the receiving antenna. o The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings. o The highest measured peak reading and the highest measured average reading were recorded.

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi
Frequency Tested	2400MHz
Notes	Low Band Edge

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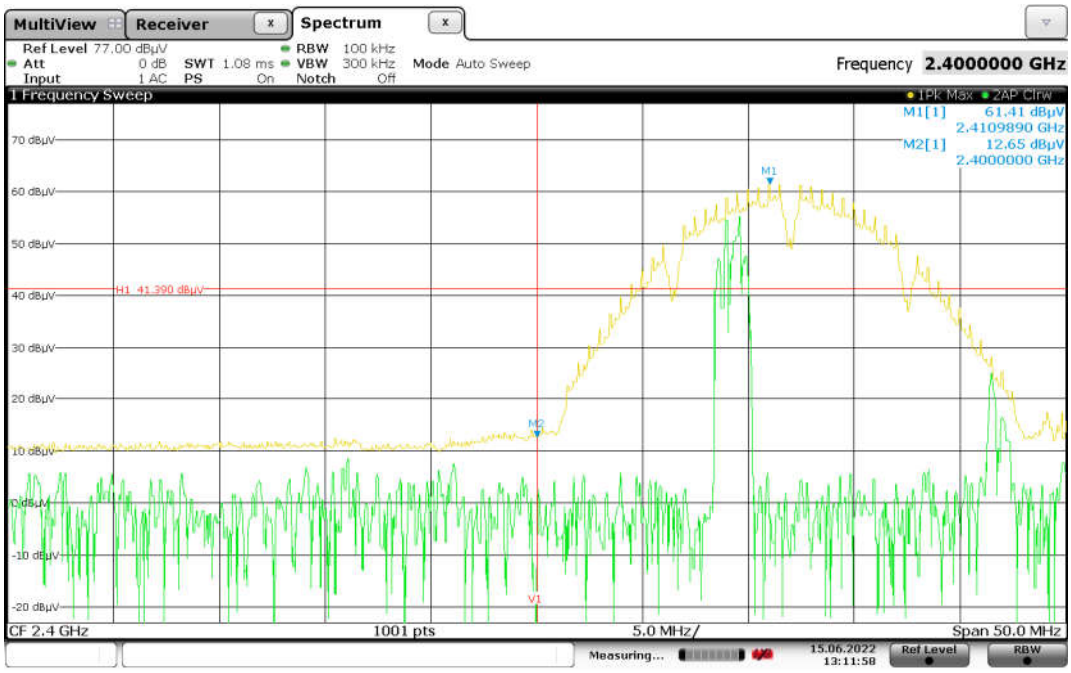

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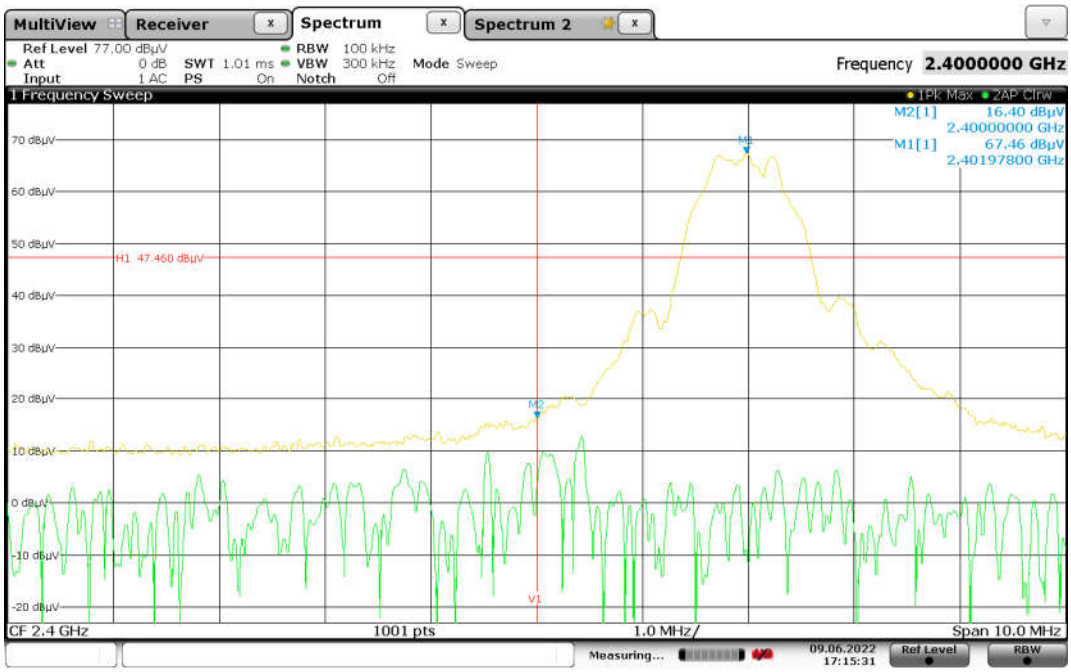
Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Wi-Fi
Frequency Tested	2480MHz
Notes	High Band Edge – Peak and Average Measurements

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)
2483.50	H	21.03		3.40	33.28	0.00	57.70	767.73	5000.00	-16.28
	V	24.80		3.40	33.28	0.00	61.47	1184.98	5000.00	-12.51

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)
2483.50	H	7.24		3.40	33.28	0.00	0.00	43.91	156.93	500.00	-10.07
	V	7.47		3.40	33.28	0.00	0.00	44.14	161.14	500.00	-9.84

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	BLE
Frequency Tested	2400MHz
Notes	Low Band Edge



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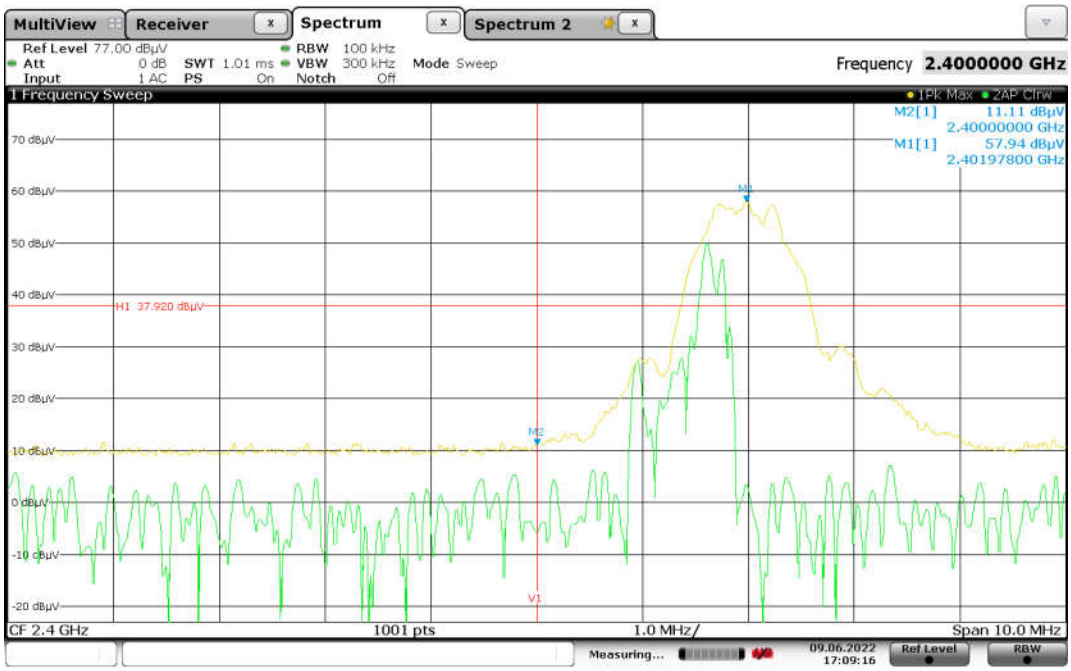

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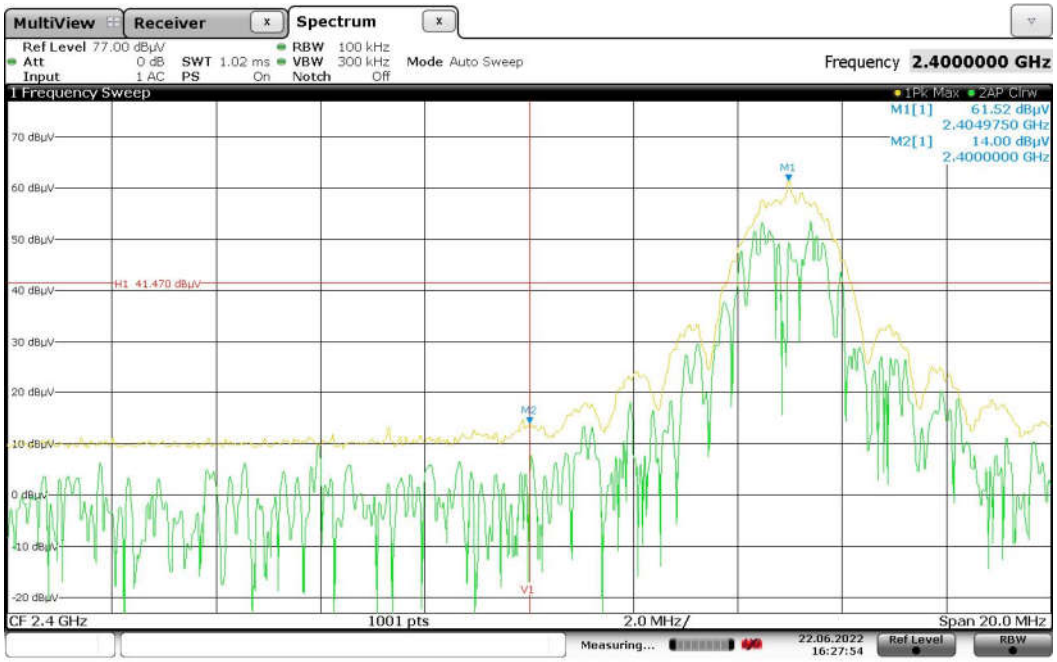
Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	BLE
Frequency Tested	2483.5MHz
Notes	High Band Edge – Peak and Average Measurements

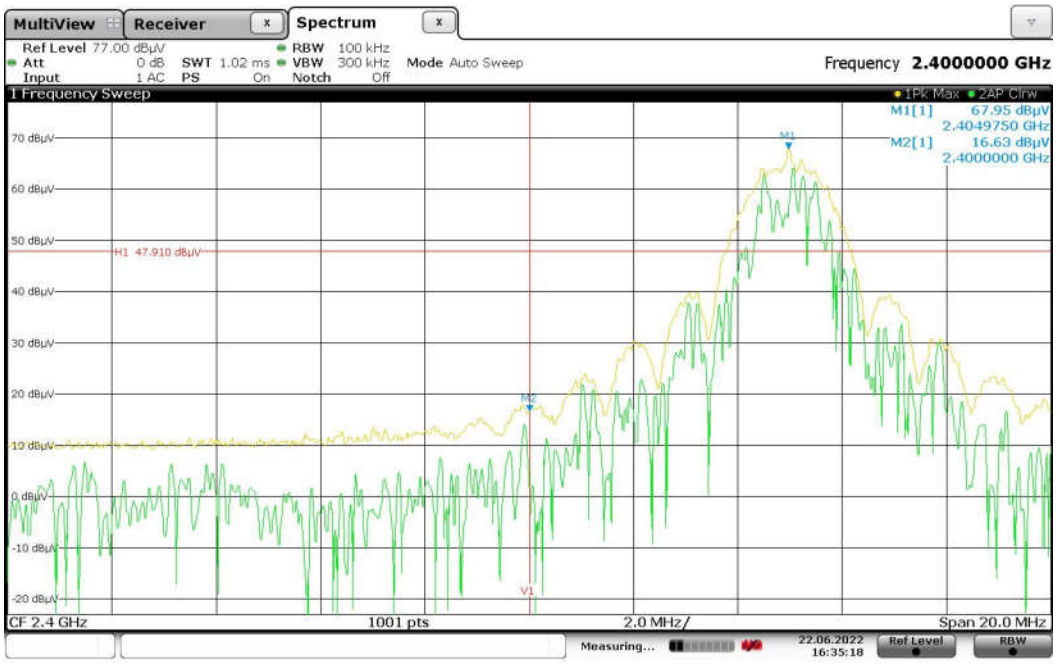
Freq (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBµV/m)	Peak Total at 3m (µV/m)	Peak Limit at 3m (µV/m)	Margin (dBm)
2483.50	H	21.60		3.40	33.28	0.00	58.27	819.80	5000.00	-15.71
	V	24.49		3.40	33.28	0.00	61.16	1143.43	5000.00	-12.82

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)
2483.50	H	7.33		3.40	33.28	0.00	0.00	44.00	158.57	500.00	-9.98
	V	7.57		3.40	33.28	0.00	0.00	44.24	163.01	500.00	-9.74

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	ZigBee
Frequency Tested	2400MHz
Notes	Low Band Edge



Date: 22.JUN.2022 16:27:54



Date: 22.JUN.2022 16:35:18

Test Details	
Manufacturer	Astronics CSC
EUT	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	ZigBee
Frequency Tested	2480MHz
Notes	High Band Edge – Peak and Average Measurements See note at beginning of section per the Duty Cycle factor.

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)
2483.50	H	27.03		3.40	32.72	0.00	63.14	1436.17	5000.00	-10.84
	V	36.10		3.40	32.72	0.00	72.21	4080.44	5000.00	-1.77

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)
2483.50	H	14.32		3.40	32.72	0.00	-20.00	30.43	33.24	500.00	-23.55
	V	36.10		3.40	32.72	0.00	-20.00	52.21	408.04	500.00	-1.77

23. Module Integration – Emissions Test

EUT Information	
Manufacturer	Astronics CSC
Product	Cabin Wireless Access Point CabinAXe
Model No.	700-00016-000
Serial No.	000005
Mode	Multi-Tx

Test Site Information	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test Site Used	Room 29
Type of Antennas Used	Below 1GHz: Bilog (or equivalent) Above 1GHz: Double-ridged waveguide (or equivalent)
Notes	The cables were manually maximized during the preliminary emissions sweeps. The cable arrangement which resulted in the worst-case emissions was utilized. Any peaks that are not annotated have been found to be from the base unit, not the radios.

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

Requirements
Per 996369 D04 Module Integration Guide v01: Testing of the host product with all the transmitters installed is recommended, to verify that the host product meets all the applicable FCC rules. The radio spectrum is to be investigated with all the transmitters in the final host product functioning to determine that no emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f). The testing shall also check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. No emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f).
Per FCC 15.247: In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30dB instead of 20dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
Per RSS-247: In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30dB instead of 20dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Procedure
Radiated measurements were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles and anechoic absorber material is installed over the ferrite tiles. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2014 for site attenuation. The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads. Preliminary radiated emissions tests were performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the EUT. The entire frequency range from 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 non-conductive stand. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer. c) To ensure that maximum or worst case emission levels at the fundamental and harmonics were measured, the following steps were taken when measuring the fundamental emissions and the spurious emissions: i. The EUT was rotated so that all of its sides were exposed to the receiving antenna. ii. Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured. iii. The measuring antenna was raised and lowered for each antenna polarization to maximize the readings. 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 bilog 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 100kHz 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.

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).

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

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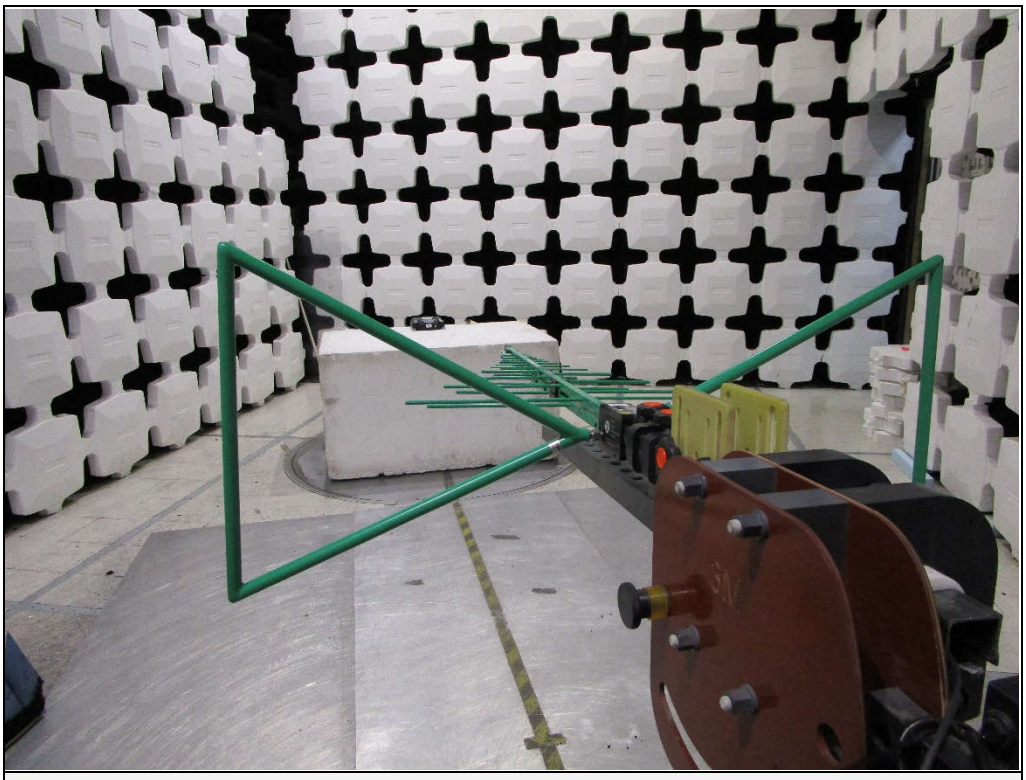
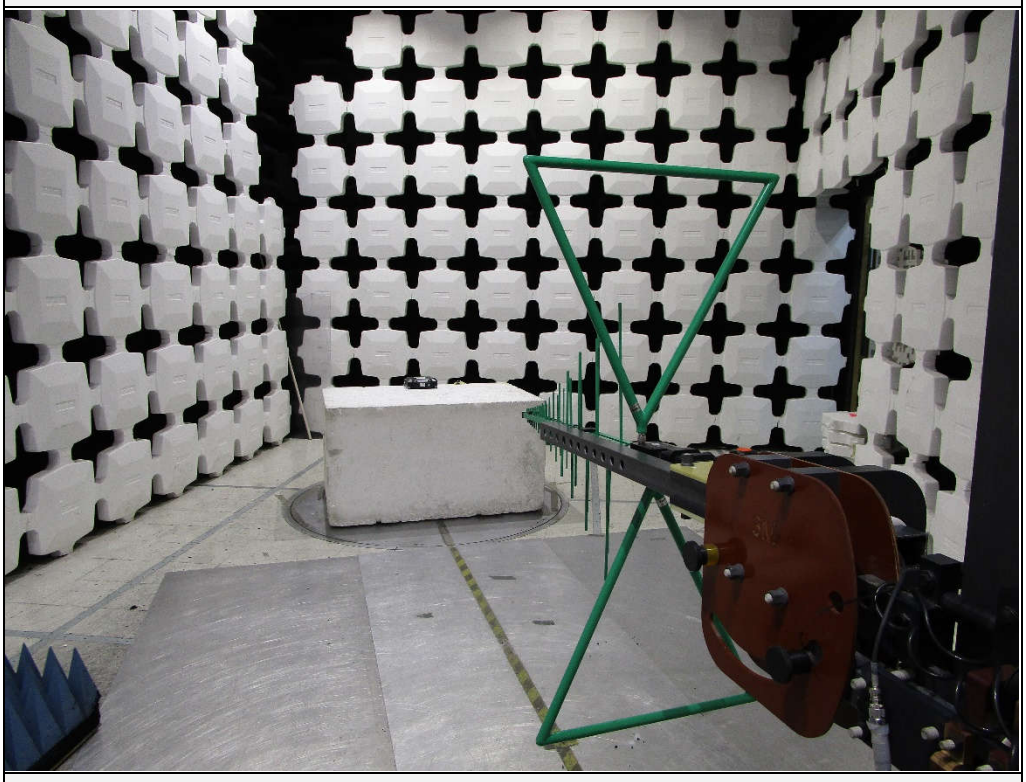
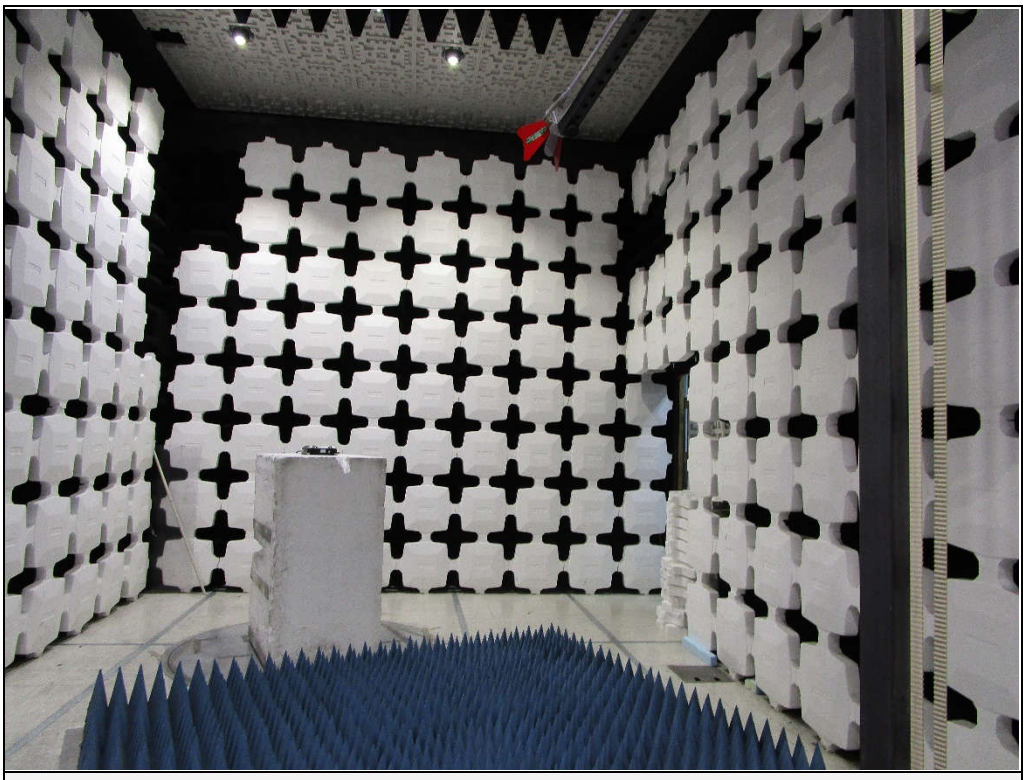


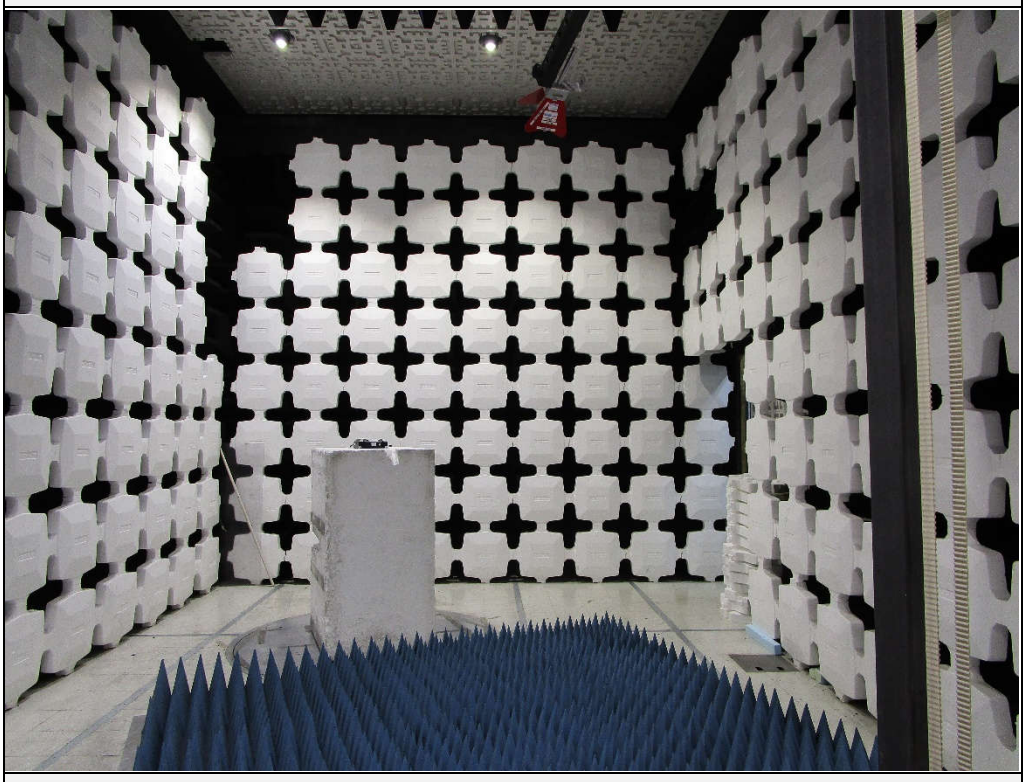
Test Setup for Spurious Emissions: 30MHz to 1GHz, Horizontal Polarization



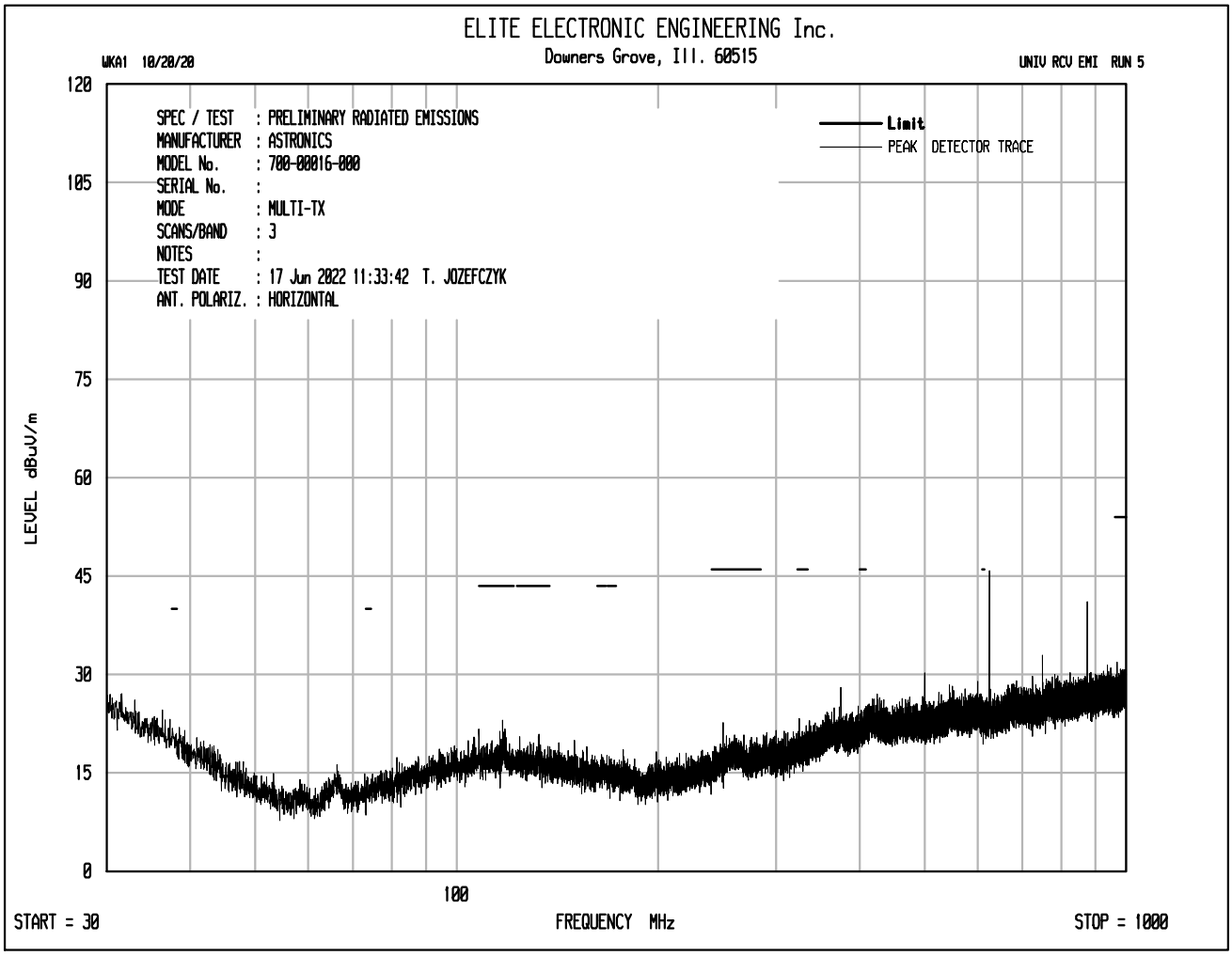
Test Setup for Spurious Emissions: 30MHz to 1GHz, Vertical Polarization

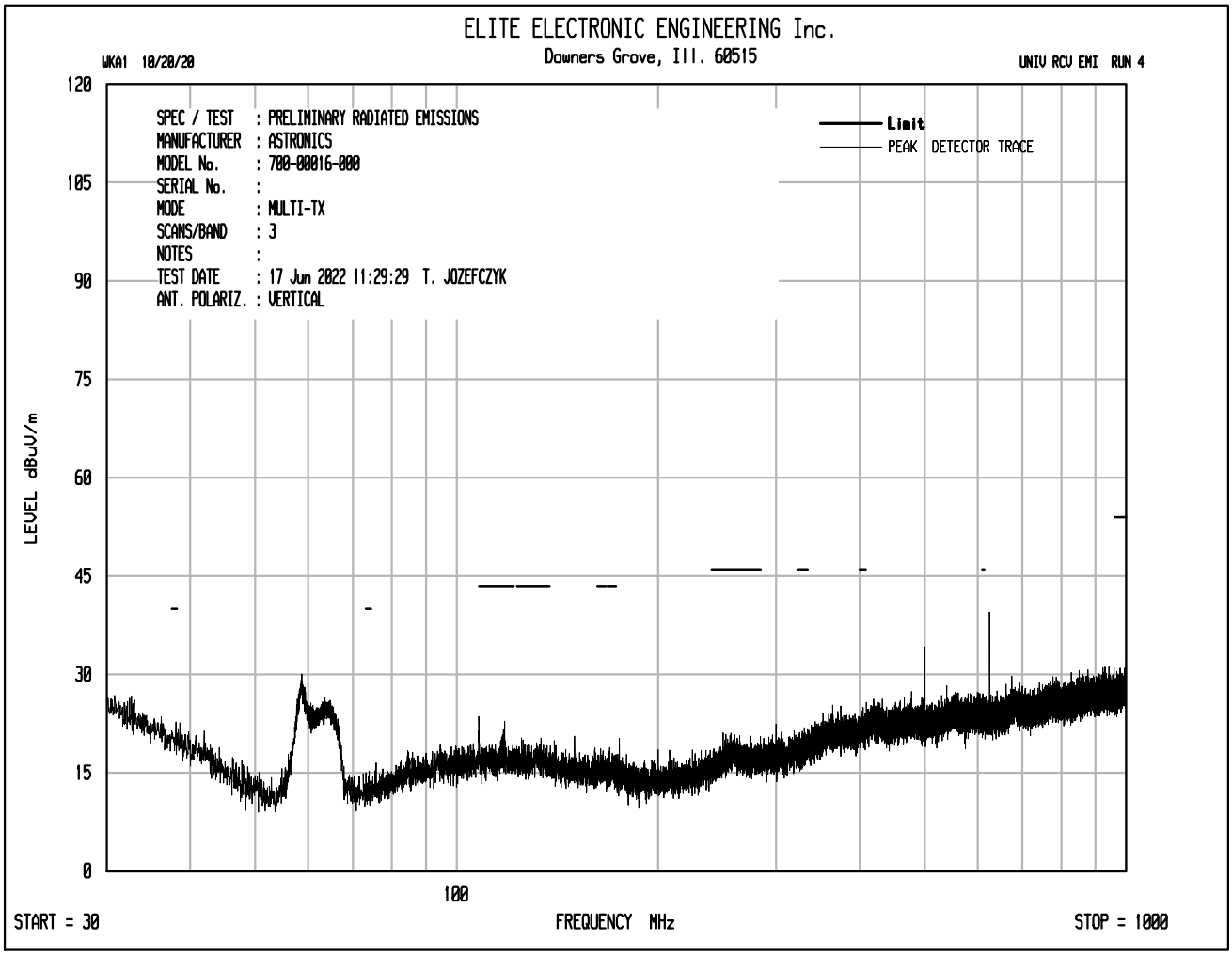


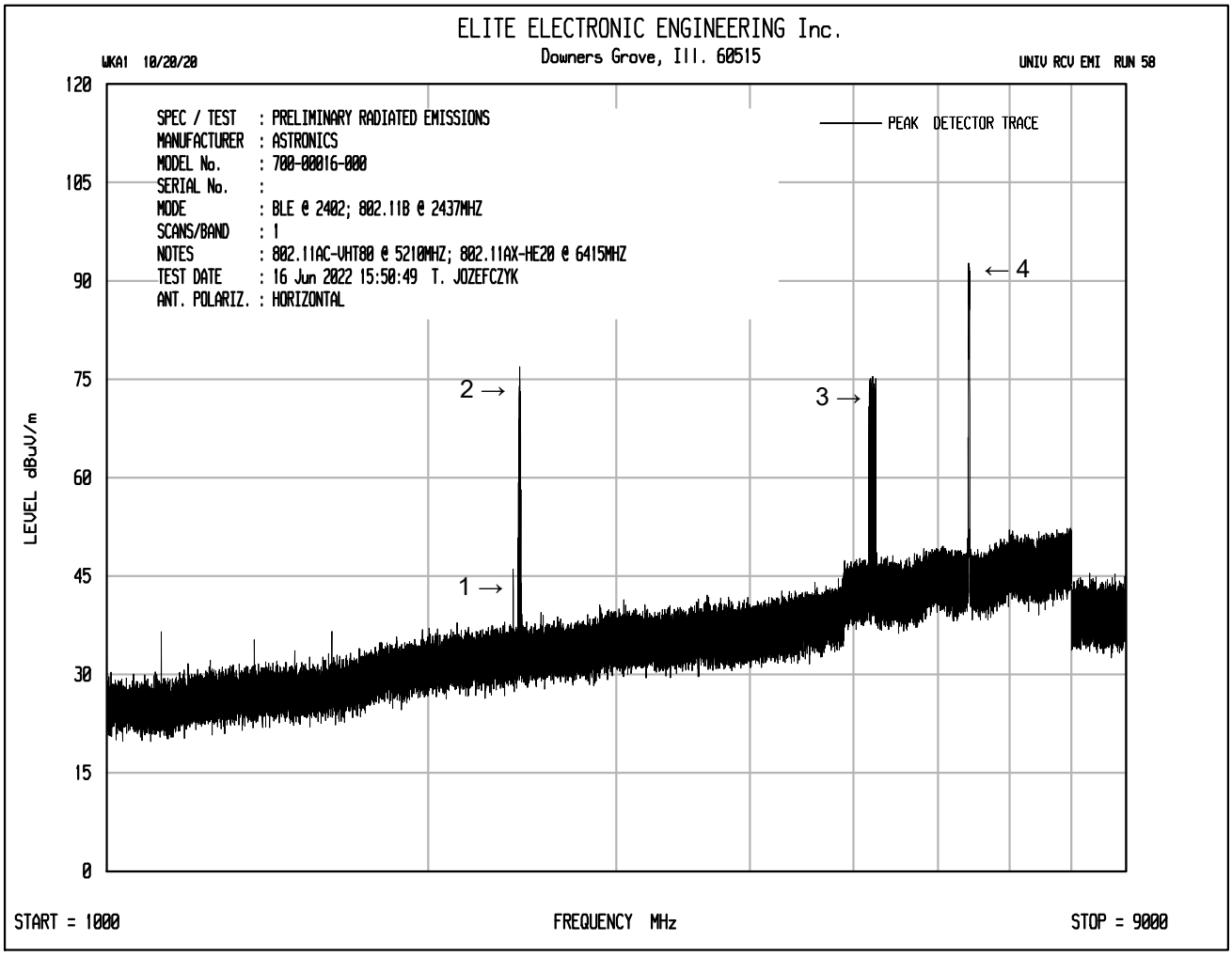
Test Setup for Spurious Emissions: Above 1GHz, Horizontal Polarization



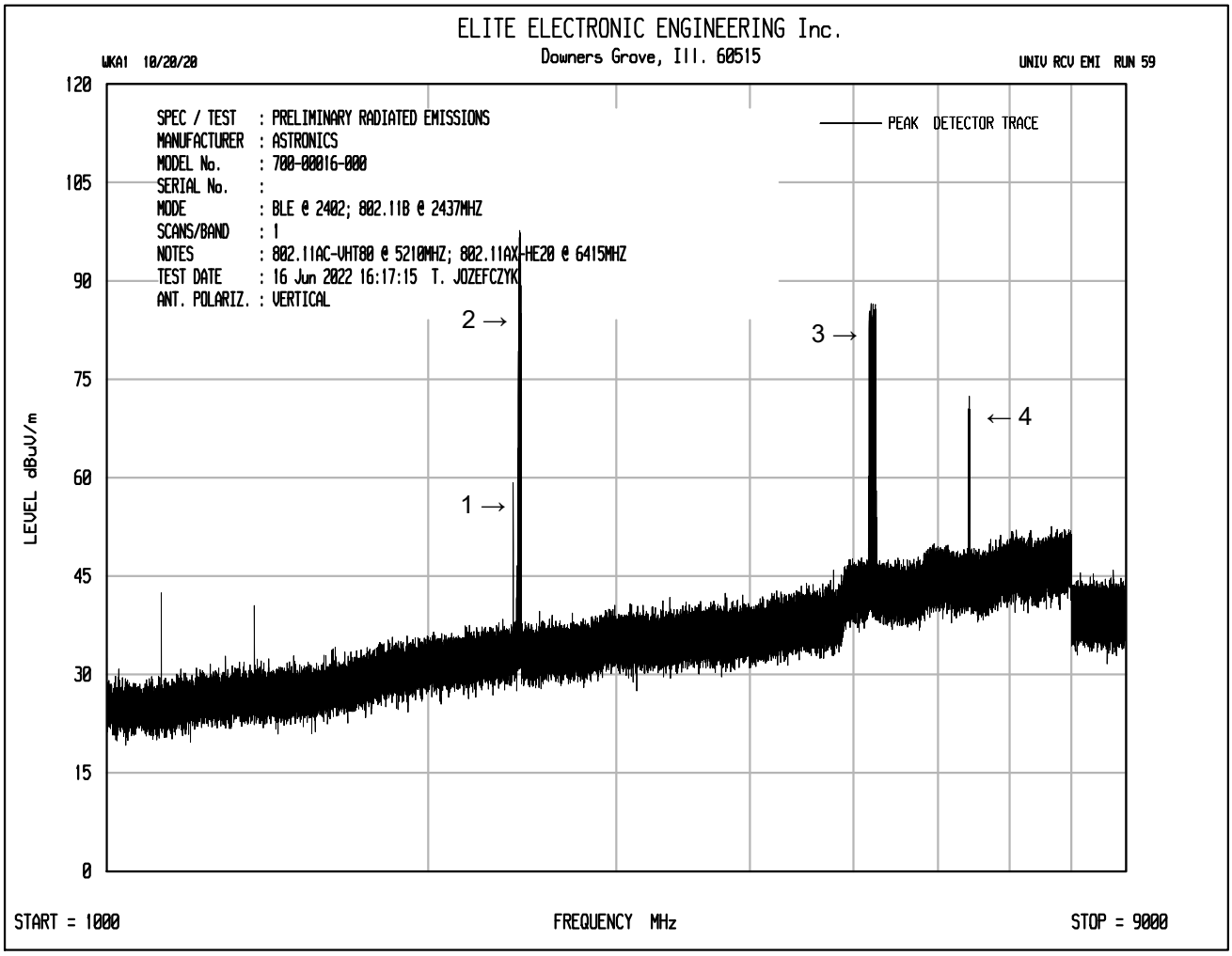
Test Setup for Spurious Emissions: Above 1GHz, Vertical Polarization


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 5
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : ASTRONICS
MODEL No. : 700-00016-000
SERIAL No. :
MODE : MULTI-TX
SCANS/BAND : 3
NOTES :
TEST DATE : 17 Jun 2022 11:33:42 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

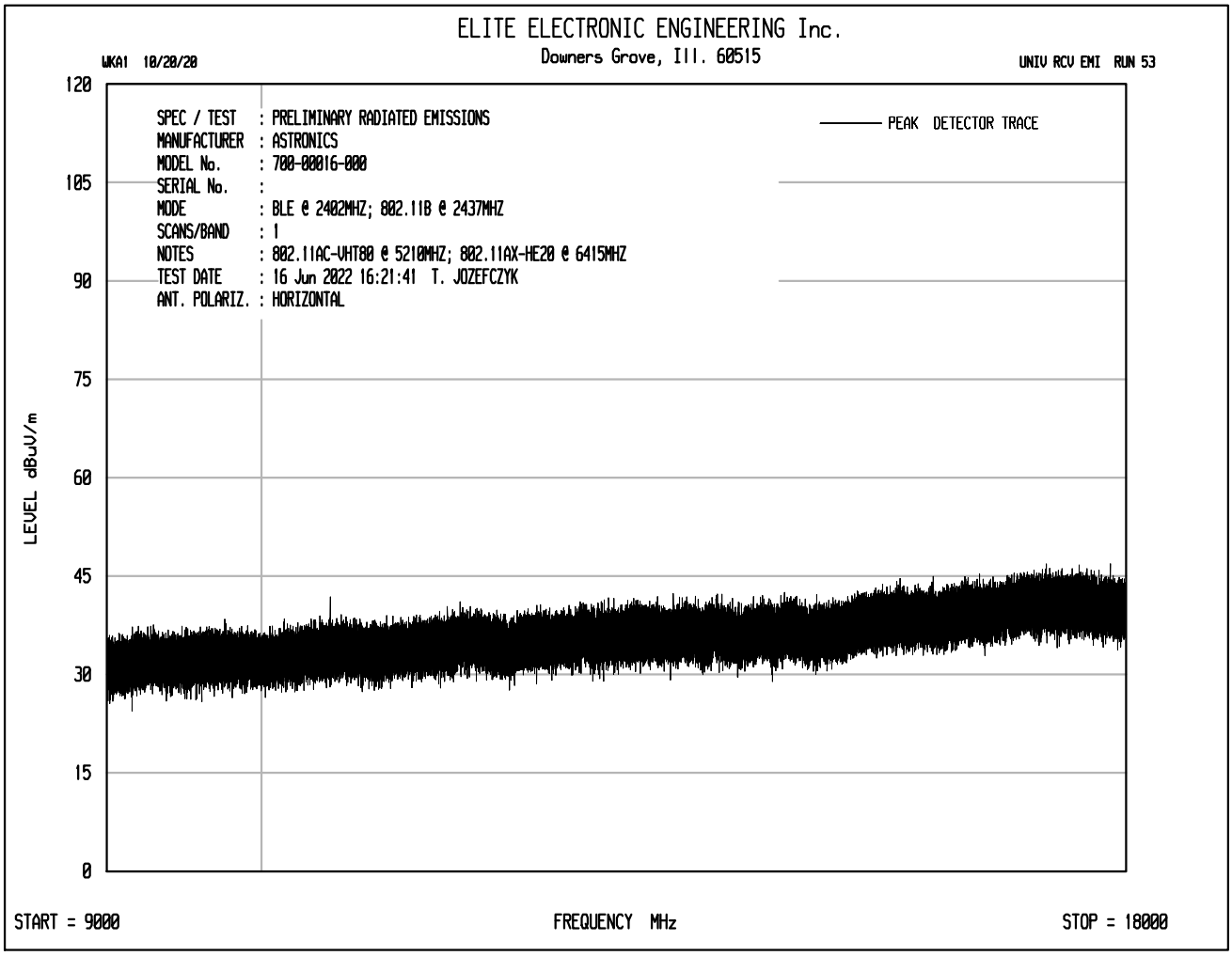

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : ASTRONICS
MODEL No. : 700-00016-000
SERIAL No. :
MODE : MULTI-TX
SCANS/BAND : 3
NOTES :
TEST DATE : 17 Jun 2022 11:29:29 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

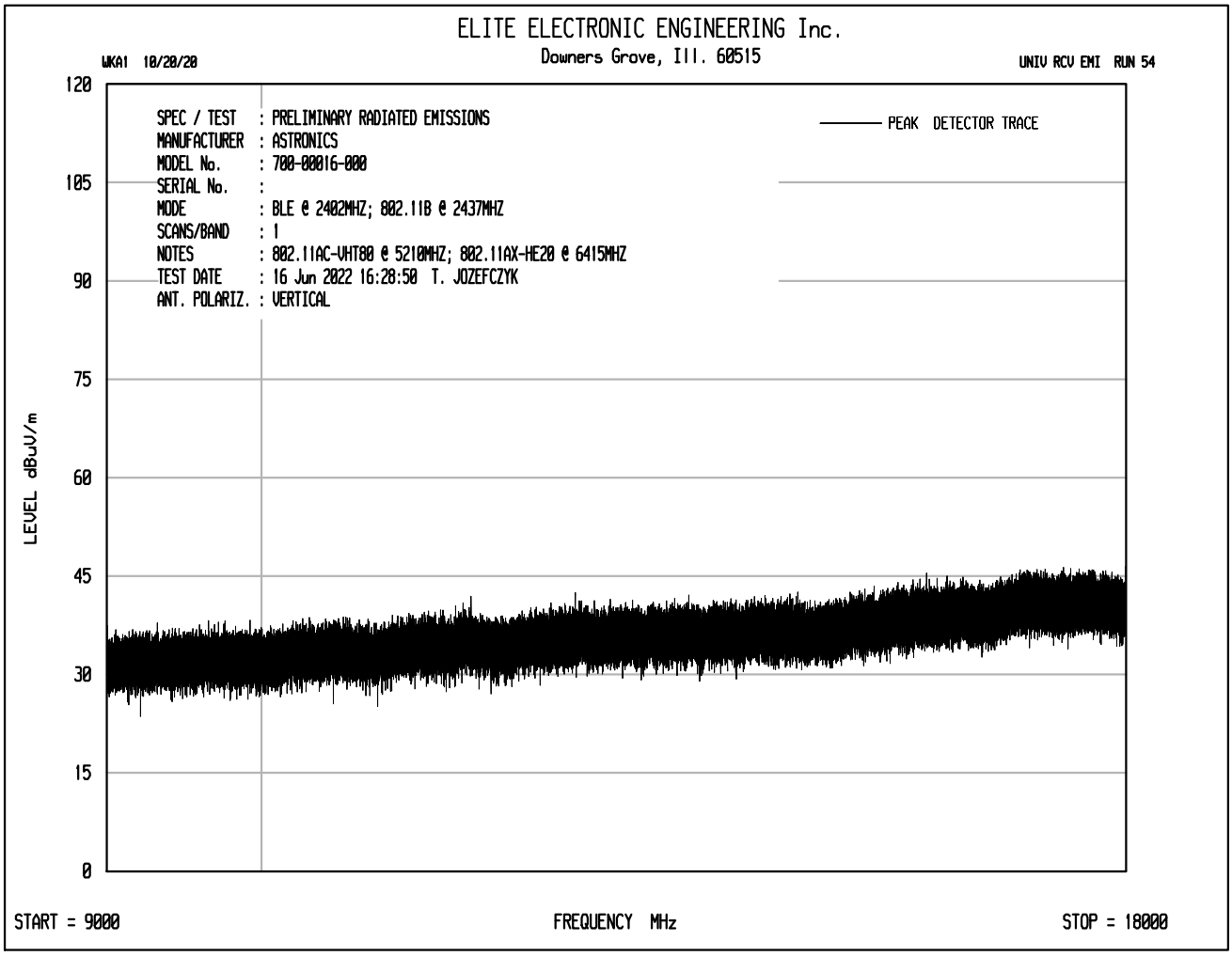


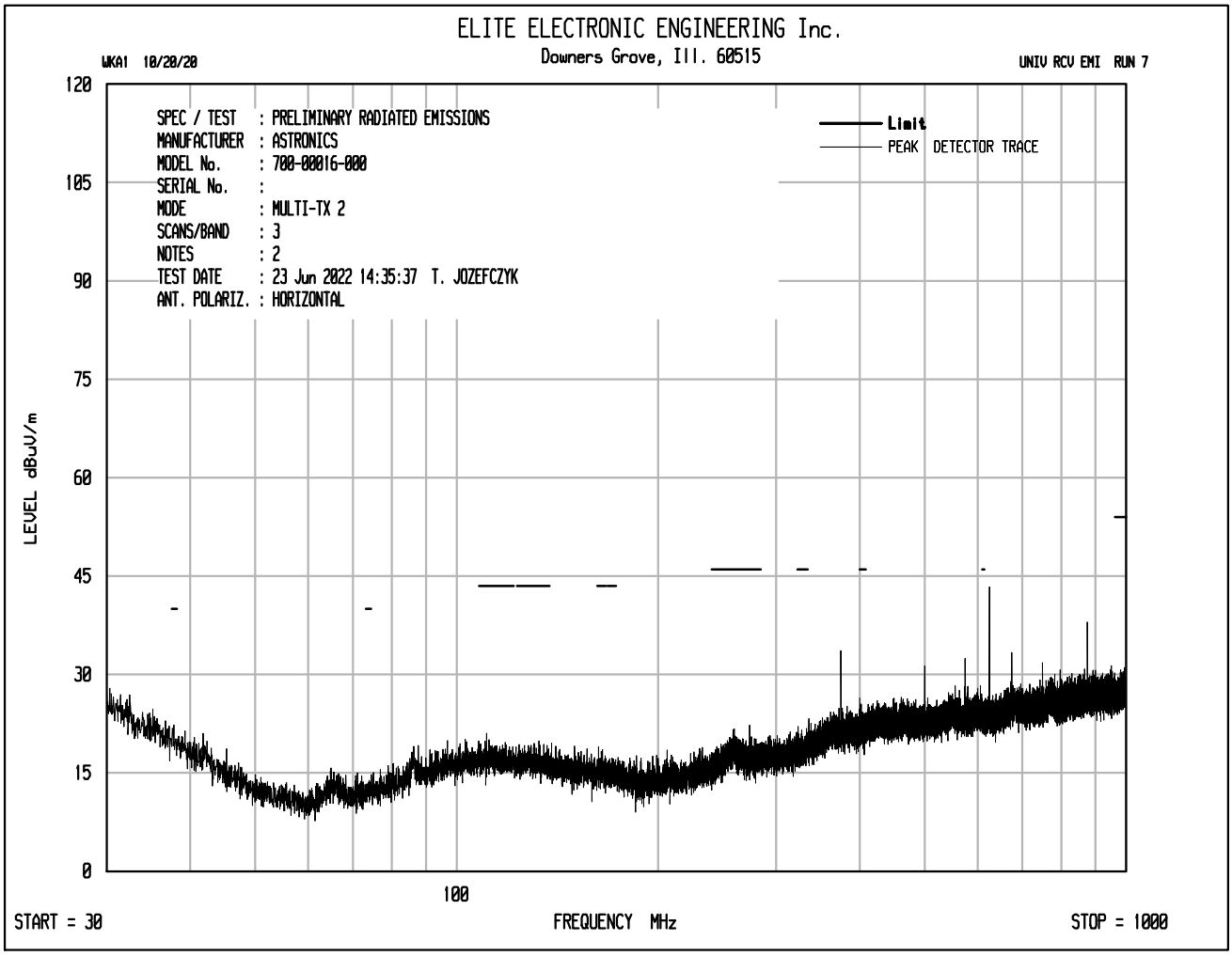
Note	Description
1	Plot shows emissions at BLE frequency 2402MHz.
2	Plot shows emissions at Wi-Fi frequency 2437MHz.
3	Plot shows emissions at Wi-Fi frequency 5210MHz.
4	Plot shows emissions at Wi-Fi frequency 6415MHz.

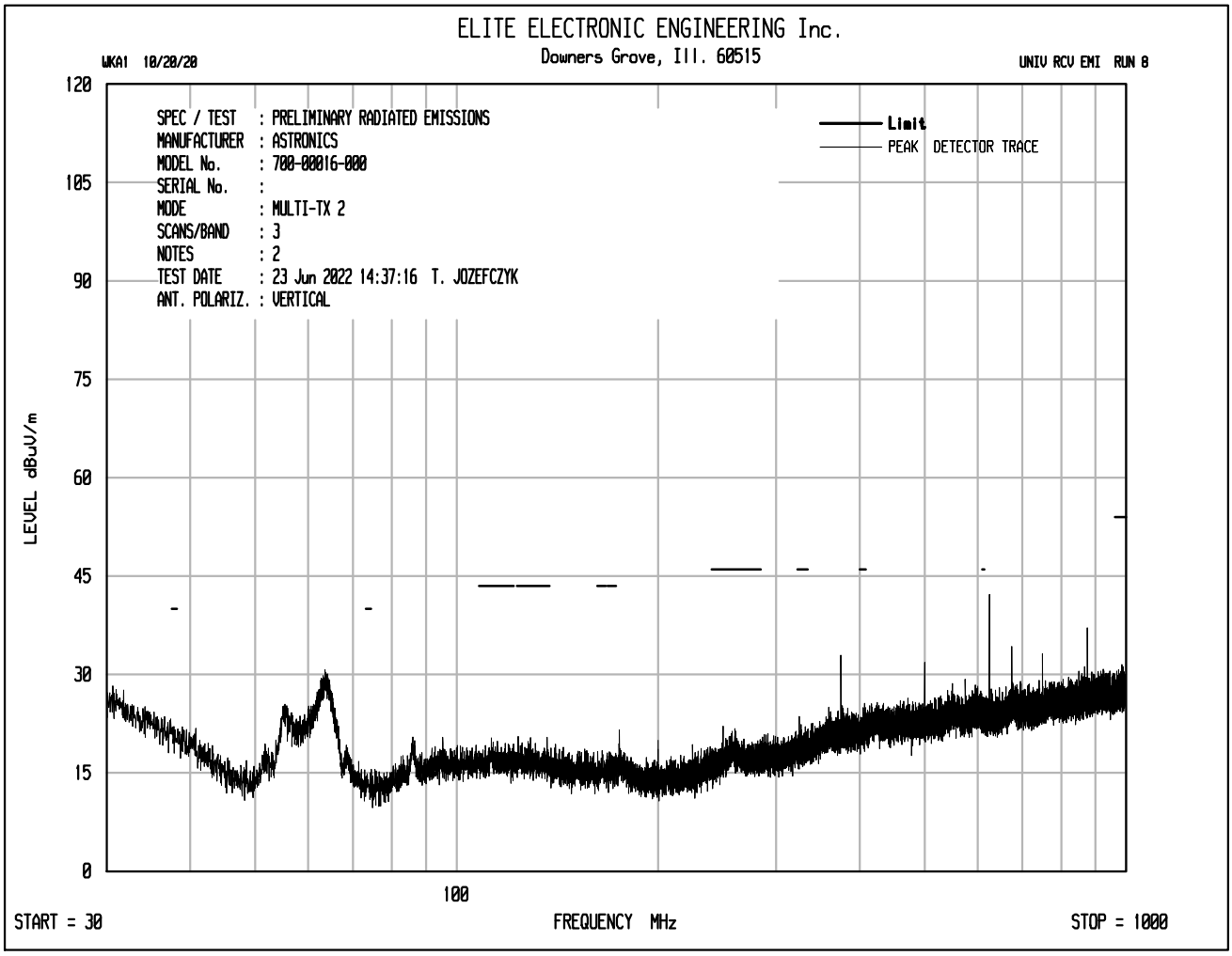


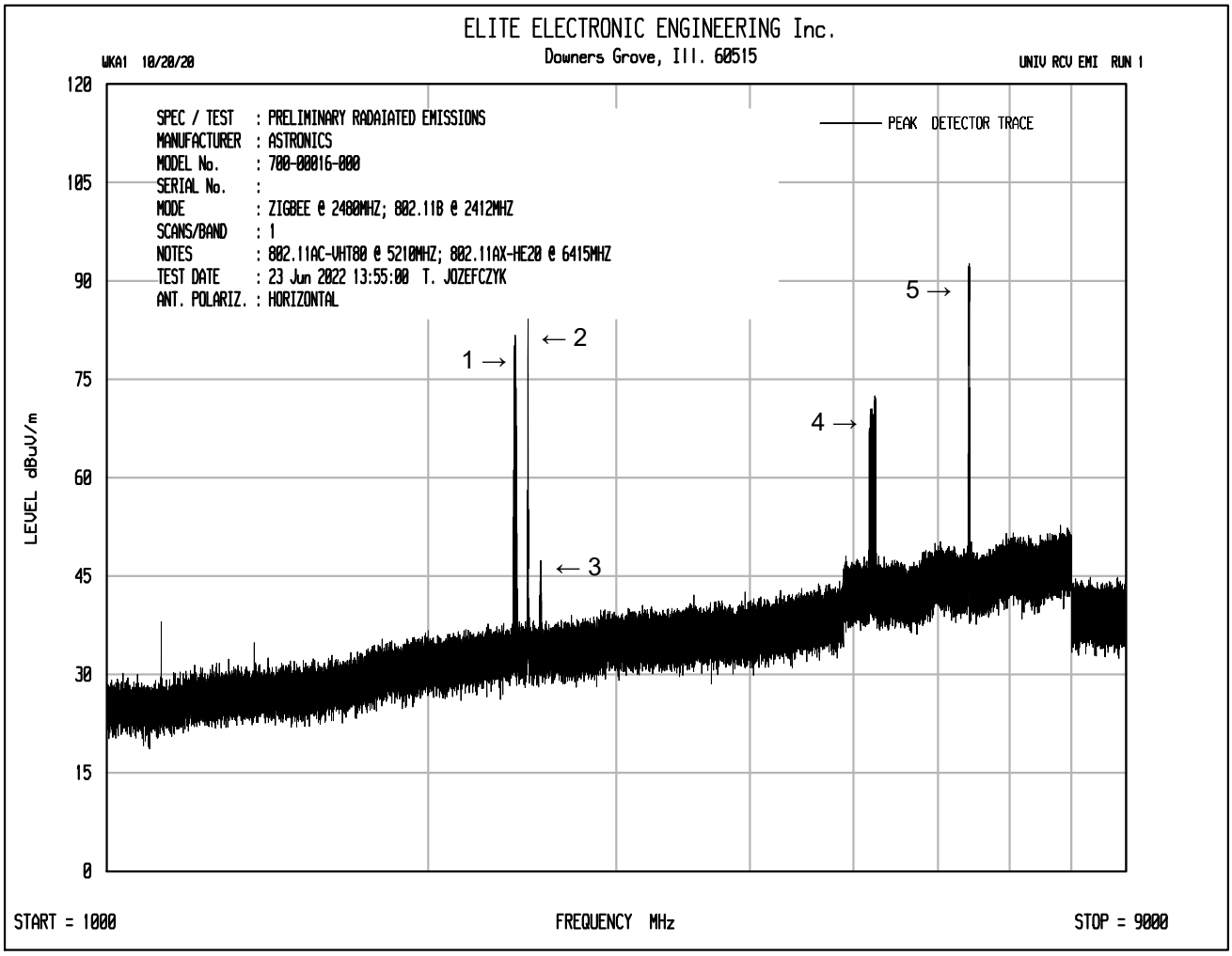
Note	Description
1	Plot shows emissions at BLE frequency 2402MHz.
2	Plot shows emissions at Wi-Fi frequency 2437MHz.
3	Plot shows emissions at Wi-Fi frequency 5210MHz.
4	Plot shows emissions at Wi-Fi frequency 6415MHz.


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 53
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : ASTRONICS
MODEL No. : 700-00016-000
SERIAL No. :
MODE : BLE @ 2402MHZ; 802.11B @ 2437MHZ
SCANS/BAND : 1
NOTES : 802.11AC-VHT80 @ 5210MHZ; 802.11AX-HE20 @ 6415MHZ
TEST DATE : 16 Jun 2022 16:21:41 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 9000
FREQUENCY MHz
STOP = 18000

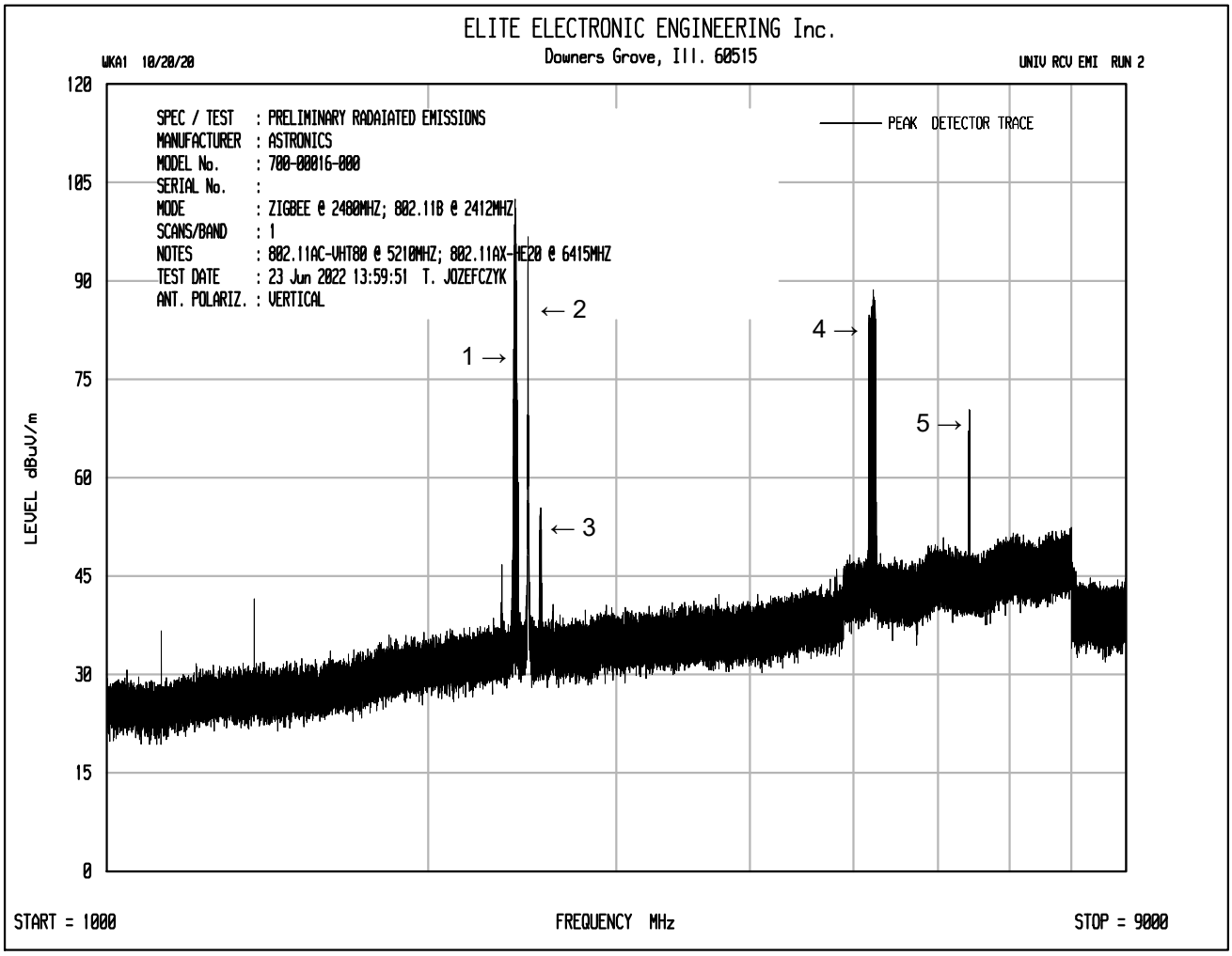

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 54
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : ASTRONICS
MODEL No. : 700-00016-000
SERIAL No. :
MODE : BLE @ 2402MHZ; 802.11B @ 2437MHZ
SCANS/BAND : 1
NOTES : 802.11AC-VHT80 @ 5210MHZ; 802.11AX-HE20 @ 6415MHZ
TEST DATE : 16 Jun 2022 16:28:50 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 9000
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 7
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : ASTRONICS
MODEL No. : 700-00016-000
SERIAL No. :
MODE : MULTI-TX 2
SCANS/BAND : 3
NOTES : 2
TEST DATE : 23 Jun 2022 14:35:37 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

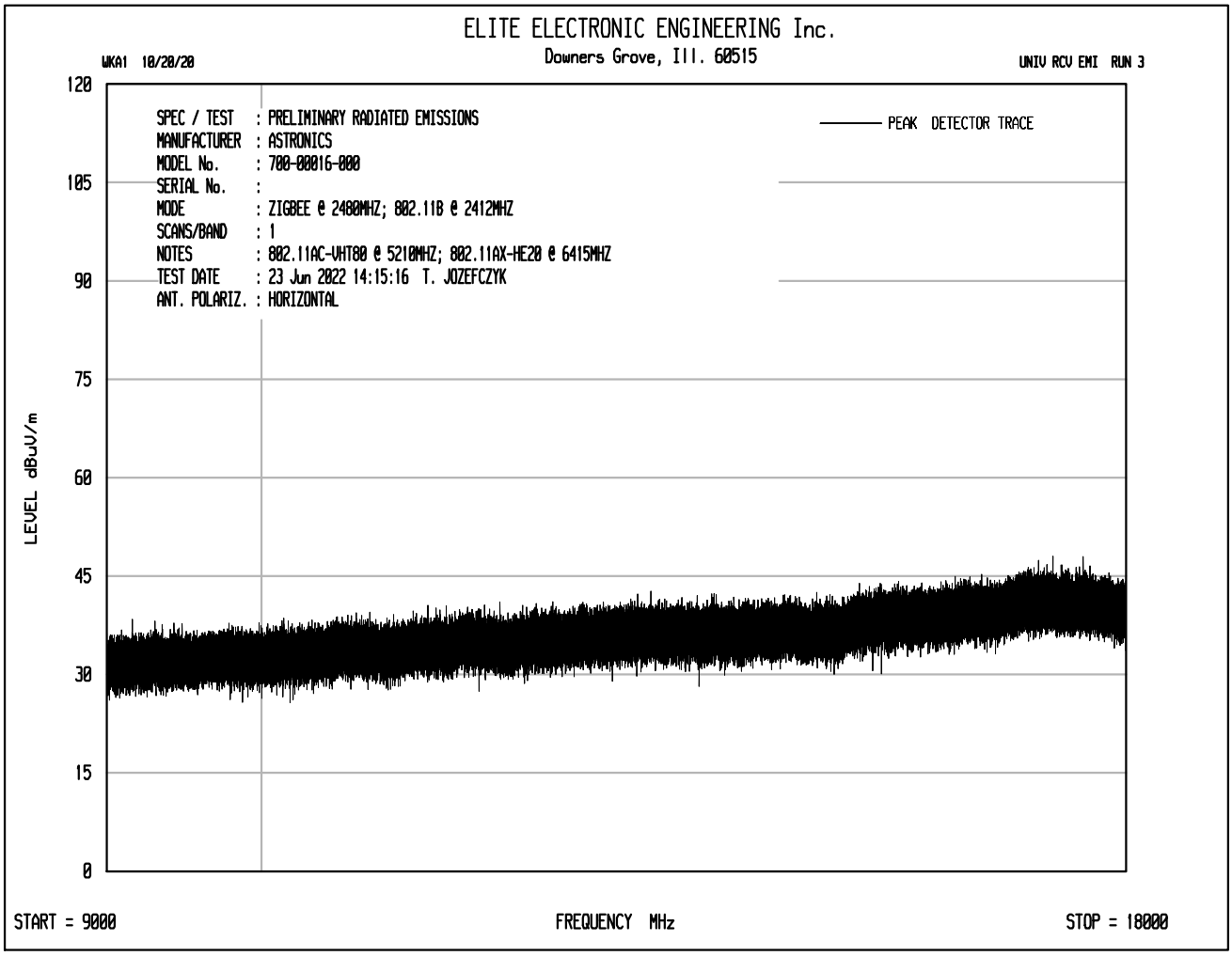

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 8
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : ASTRONICS
MODEL No. : 700-00016-000
SERIAL No. :
MODE : MULTI-TX 2
SCANS/BAND : 3
NOTES : 2
TEST DATE : 23 Jun 2022 14:37:16 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

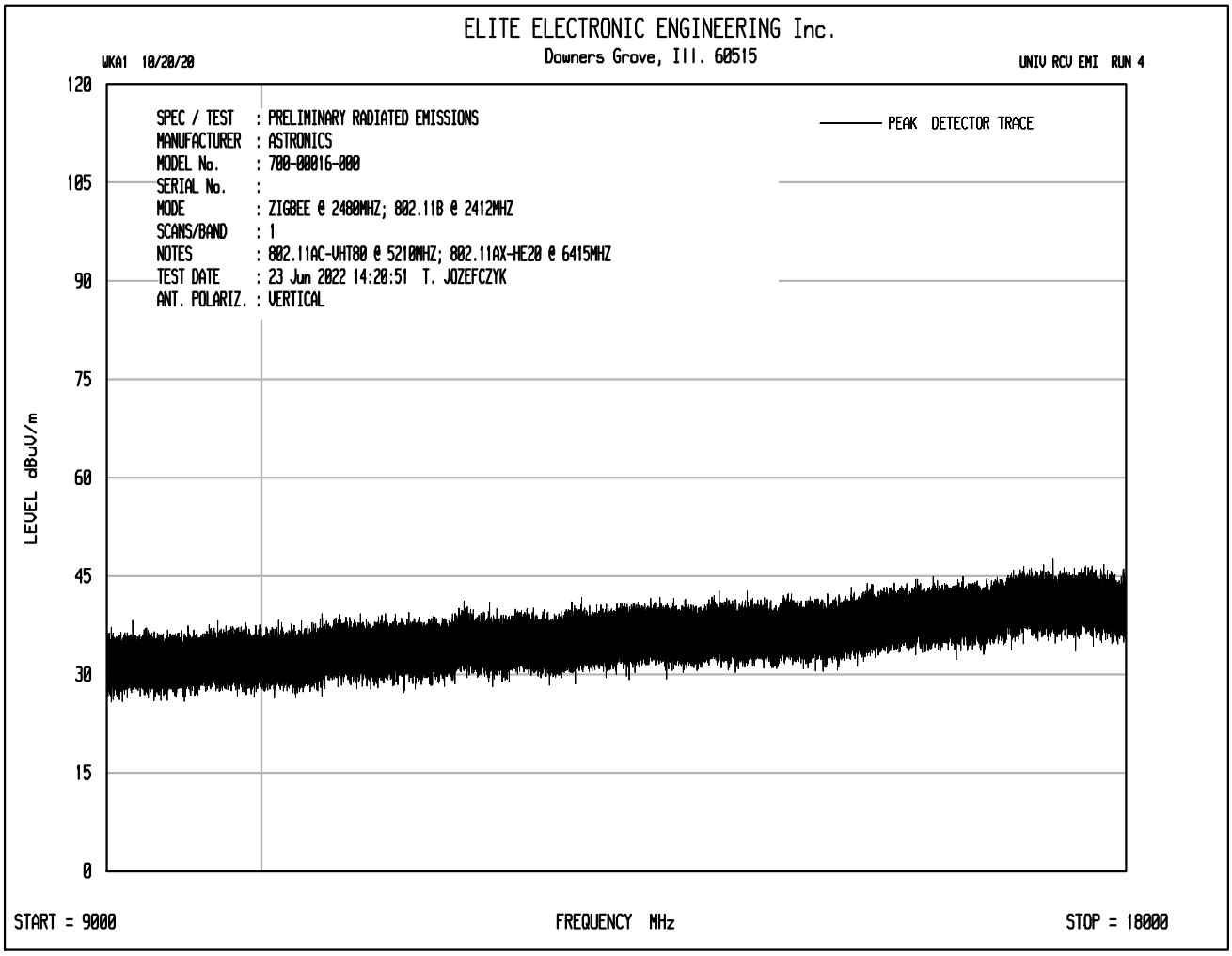


Note	Description
1	Plot shows emissions at Wi-Fi frequency 2412MHz.
2	Plot shows emissions at BLE frequency 2480MHz.
3	Plot shows an intermodulation frequency at 2548MHz. (2nd harmonic of 2480MHz – Fundamental 2.4GHzWi-Fi (2412) = 4960MHz – 2412MHz = 2548MHz)
4	Plot shows emissions at Wi-Fi frequency 5210MHz.
5	Plot shows emissions at Wi-Fi frequency 6415MHz.



Note	Description
1	Plot shows emissions at Wi-Fi frequency 2412MHz.
2	Plot shows emissions at BLE frequency 2480MHz.
3	Plot shows an intermodulation frequency at 2548MHz. (2nd harmonic of 2480MHz – Fundamental 2.4GHzWi-Fi (2412) = 4960MHz – 2412MHz = 2548MHz)
4	Plot shows emissions at Wi-Fi frequency 5210MHz.
5	Plot shows emissions at Wi-Fi frequency 6415MHz.


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 3
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : ASTRONICS
MODEL No. : 700-00016-000
SERIAL No. :
MODE : ZIGBEE @ 2480MHZ; 802.11B @ 2412MHZ
SCANS/BAND : 1
NOTES : 802.11AC-VHT80 @ 5210MHZ; 802.11AX-HE20 @ 6415MHZ
TEST DATE : 23 Jun 2022 14:15:16 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 9000
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : ASTRONICS
MODEL No. : 700-00016-000
SERIAL No. :
MODE : ZIGBEE @ 2480MHZ; 802.11B @ 2412MHZ
SCANS/BAND : 1
NOTES : 802.11AC-VHT80 @ 5210MHZ; 802.11AX-HE20 @ 6415MHZ
TEST DATE : 23 Jun 2022 14:20:51 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 9000
FREQUENCY MHz
STOP = 18000

Test Details	
Manufacturer	Astronics CSC
Model No.	700-00016-000
Serial No.	000005
Test	Host Product Testing – Intermodulation Case Spurious Emissions
Mode	Multi-Tx – Combination 2
Frequency Tested	ZigBee @ 2480MHz
Notes	

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)
2548.00	H	17.25		3.41	32.77	0.00	53.43	469.60	18146.97	-31.74
	V	26.37		3.41	32.77	0.00	62.55	1341.92	18146.97	-22.62

24. Scope of Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ELITE ELECTRONIC ENGINEERING, INC.
1516 Centre Circle
Downers Grove, IL 60515
Robert Bugielski (QA Manager) Phone: 630 495 9770 ext. 168
Email: rbugielski@elitetest.com
Craig Fanning (EMC Lab Manager) Phone: 630 495 9770 ext. 112
Email: cfanning@elitetest.com
Brandon Lugo (Automotive Team Leader) Phone: 630 495 9770 ext. 163
Email: blugo@elitetest.com
Richard King (FCC/Commercial Team Leader) Phone: 630 495 9770 ext. 123
Email: reking@elitetest.com
Website: www.elitetest.com

ELECTRICAL

Valid To: June 30, 2023 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	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)	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)
Radiated Emissions Anechoic	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); ECE Regulation 10.06 Annex 7 (Broadband) ECE Regulation 10.06 Annex 8 (Narrowband)

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Test Technology:	Test Method(s) [1]:
Vehicle Radiated Emissions	CISPR 12; CISPR 36; ICES-002; ECE Regulation 10.06 Annex 5
Bulk Current Injection (BCI)	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 *(Including Radar Pulse)*	ISO 11452-2; ISO 11452-5; 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
Radiated Immunity Reverb	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)*	ISO 11452-9; EMC-CS-2009.1 (RI115); FMC1278 (RI115)
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
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; 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 14
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

Test Technology:	Test Method(s) [1]:
Emissions (cont'd)	
Current Harmonics	IEC 61000-3-2; 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; 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
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

Test Technology:	Test Method(s) [1]:
Immunity (cont'd)	
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
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

Test Technology:	Test Method(s) [1]:
Canadian Radio Tests	RSS-102 (RF Exposure Evaluation only); 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-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)
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)

Test Technology:	Test Method(s) [1]:
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
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 DC Voltage / Current (1mV to 15-kV) / (1µA to 10A) Power Factor / Efficiency / Crest Factor (Power to 30kW) Resistance (1mΩ to 4000MΩ) Surge (Up to 10 kV / 5 kA) (Combination Wave and Ring Wave)	 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 FAA EB 67D

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

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)
Industrial, Scientific, and Medical Equipment Part 18	FCC MP-5 (February 1986)	40000
Intentional Radiators Part 15C	ANSI C63.10:2013	40000
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

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

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

Accredited Laboratory

A2LA has accredited

ELITE ELECTRONIC ENGINEERING INC.

Downers Grove, IL

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories.* This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 19th day of May 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1786.01
Valid to June 30, 2023

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