



**Engineering Test Report No. 2003336-01**

Report Date	May 25, 2021	
Manufacturer Name	Corteva Agriscience	
Manufacturer Address	9330 Zionsville Indianapolis, IN 46268	
Model No.	AIR1	
Date Received	October 7, 2020	
Test Dates	October 7, 2020 to May 24, 2021	
Specifications	FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247 FCC "Code of Federal Regulations" Title 47, Part15, Subpart 15B Innovation, Science, and Economic Development Canada, RSS-247 Innovation, Science, and Economic Development Canada, RSS-GEN	
Test Facility	Elite Electronic Engineering, Inc. 1516 Centre Circle, Downers Grove, IL 60515	FCC Reg. Number: 269750 IC Reg. Number: 2987A CAB Identifier: US0107
Signature		
Tested by	Javier Cardenas	
Signature		
Approved by	Raymond J. Klouda, Registered Professional Engineer of Illinois – 44894	
PO Number	4381155213	

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## 1. Report Revision History

Revision	Date	Description
–	28 May 2021	Initial Release of Engineering Test Report No. 2003336-01

## 2. Introduction

### 2.1. Scope of Tests

This document presents the results of a series of RF emissions tests that were performed on the Corteva Agriscience Remote Pest Monitoring Sensor (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was manufactured and submitted for testing by Corteva Agriscience located in Indianapolis, IN.

### 2.2. Purpose

The test series was performed to determine if the EUT meets the RF emission requirements of the FCC “Code of Federal Regulations” Title 47, Part15, Subpart 15B, Section 15.107 and 15.109 for Receivers and Part 15, Subpart C, Sections 15.247 for a Digital Modulation intentional radiator operating within the 902-928MHz, band.

The test series was also performed to determine if the EUT meets the RF emission requirements of the Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-Gen and Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-247 for a Digital Modulation intentional radiator operating within the 902-928MHz band.

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	Remote Pest Monitoring Sensor
Model/Part No.	AIR1
S/N	US-1: 323732385C376608
Device Type	Digitally Modulated Transmission Device
Band of Operation	902-928MHz
Modulation Type	LoRa
Software/Firmware Version	xRF_7v13a.ota
Maximum Declared Conducted Output Power*	902.3 – 914.9MHz: 74.6mW 903.0 – 914.2: 64.4mW
Antenna Type	Monopole Antenna
Antenna Gain (dBi) *	1.04
Product FCC ID	FCC ID: VPYCMABZ

\*Declared by the manufacturer.

The EUT listed above was used throughout the test series.

## 3. Power Input

The EUT was powered from internal batteries.

## 4. Grounding

The EUT was not connected to ground.

## 5. Support Equipment

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

Description	Model #	S/N
Mobile Wireless Device	S9	NA

## 6. Interconnect Leads

No interconnect leads were used during the tests.

## 7. Modifications Made to the EUT

No modifications were made to the EUT during the testing.

## 8. Modes of Operation

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

Mode	Description
Transmitting	LoRa: - 902.3MHz, 125kHz, DR0, Power Setting = 14dBm - 908.5MHz, 125kHz, DR0, Power Setting = 14dBm - 914.9MHz, 125kHz, DR0, Power Setting = 14dBm  - 903.0MHz, 500kHz, DR4, Power Setting = 20dBm - 907.8MHz, 500kHz, DR4, Power Setting = 20dBm - 914.2MHz, 500kHz, DR4, Power Setting = 20dBm
Online	The Accelerometer and AIR features are enabled. The normal network messaging is disabled.

## 9. Test Specifications

The tests were performed to selected portions of, and in accordance with the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247 test specifications.

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, Subpart C
- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, Subpart B
- 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 40 GHz"
- ANSI C63.10-2013, "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices"
- Federal Communications Commission Office of Engineering and Technology Laboratory Division, Guidance For Compliance Measurements On Digital Transmission Systems, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under Section 15.247 April 2, 2019 KDB 558074 D01v05r02
- RSS-247 Issue 2, February 2017, "Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices"
- RSS-Gen Issue 5, March 2019, Amendment 1, Innovation, Science, and Economic Development Canada, "Spectrum Management and Telecommunications, Radio Standards Specification, General Requirements for Compliance of Radio Apparatus"

## 10. Test Plan

No test plan was provided. Instructions were provided by personnel from Corteva Agriscience and used in conjunction with the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247 and 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

Ambient Parameters	Value
Temperature	22°C
Relative Humidity	33%
Atmospheric Pressure	1017.8mb

### 13. Summary

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

Test Description	Requirements	Test Methods	S/N	Results
Receiver Radiated Emissions Test	FCC 15B 15.107 ISED RSS-GEN	ANSI C63.4: 2014	US-1: 323732385C376608	Conforms
Effective Isotropic Radiated Power (EIRP)	FCC 15C 15.247 ISED RSS-247	ANSI C63.10: 2013	US-1: 323732385C376608	Conforms
Case Spurious Radiated Emissions	FCC 15C 15.247 ISED RSS-247	ANSI C63.10: 2013	US-1: 323732385C376608	Conforms
Band-Edge Compliance	FCC 15C 15.247 ISED RSS-247	ANSI C63.10: 2013	US-1: 323732385C376608	Conforms

### 14. Sample Calculations

For Powerline Conducted Emissions:

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

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

For Radiated Emissions:

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

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

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

$$\text{Formula 2: } FS \text{ (uV/m)} = \text{AntiLog} [(FS \text{ (dBuV/m)})/20]$$

### 15. Statement of Conformity

The Corteva Agriscience Remote Pest Monitoring Sensor, Model No. AIR1, Serial No. US-1: 323732385C376608, 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
APW1	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-30-20G20R6G-3R0-10-12-SFF	PL162015/1446	20GHZ-26.5GHZ	9/24/2020	9/24/2021
CDZ3	LAB WORKSTATION	ELITE	LWS-10		WINDOWS 10	CNR	
GRE0	SIGNAL GENERATOR	AGILENT TECHNOLOGIES	E4438C	MY42083127	250KHZ-6GHZ	3/5/2021	3/5/2022
MRJ0	TEMPERATURE-HUMIDITY THERMOMETER	EXTECH	445703	---	---	8/17/2020	8/17/2022
NHG0	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NSDS1	UNIVERSAL SPHERICAL DIPOLE SOURCE	AET	USDS-H	AET-1116		NOTE 1	
NTA2	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHZ	4/7/2021	4/7/2022
NWQ1	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS-LINDGREN	3117	66655	1GHZ-18GHZ	4/28/2020	4/28/2022
NWQ2	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66659	1GHZ-18GHZ	4/7/2020	4/7/2022
RBG0	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101533	2HZ-44GHZ	3/02/2021	3/02/2022
VBV2	CISPR EN FCC ICES RE.EXE	ELITE	CISPR EN FCC ICES RE.EXE	---	---	N/A	
XPQ3	HIGH PASS FILTER	K&L MICROWAVE	4IH30-1804/T10000-0	4	1.8GHZ-10GHZ	9/6/2019	9/6/2021

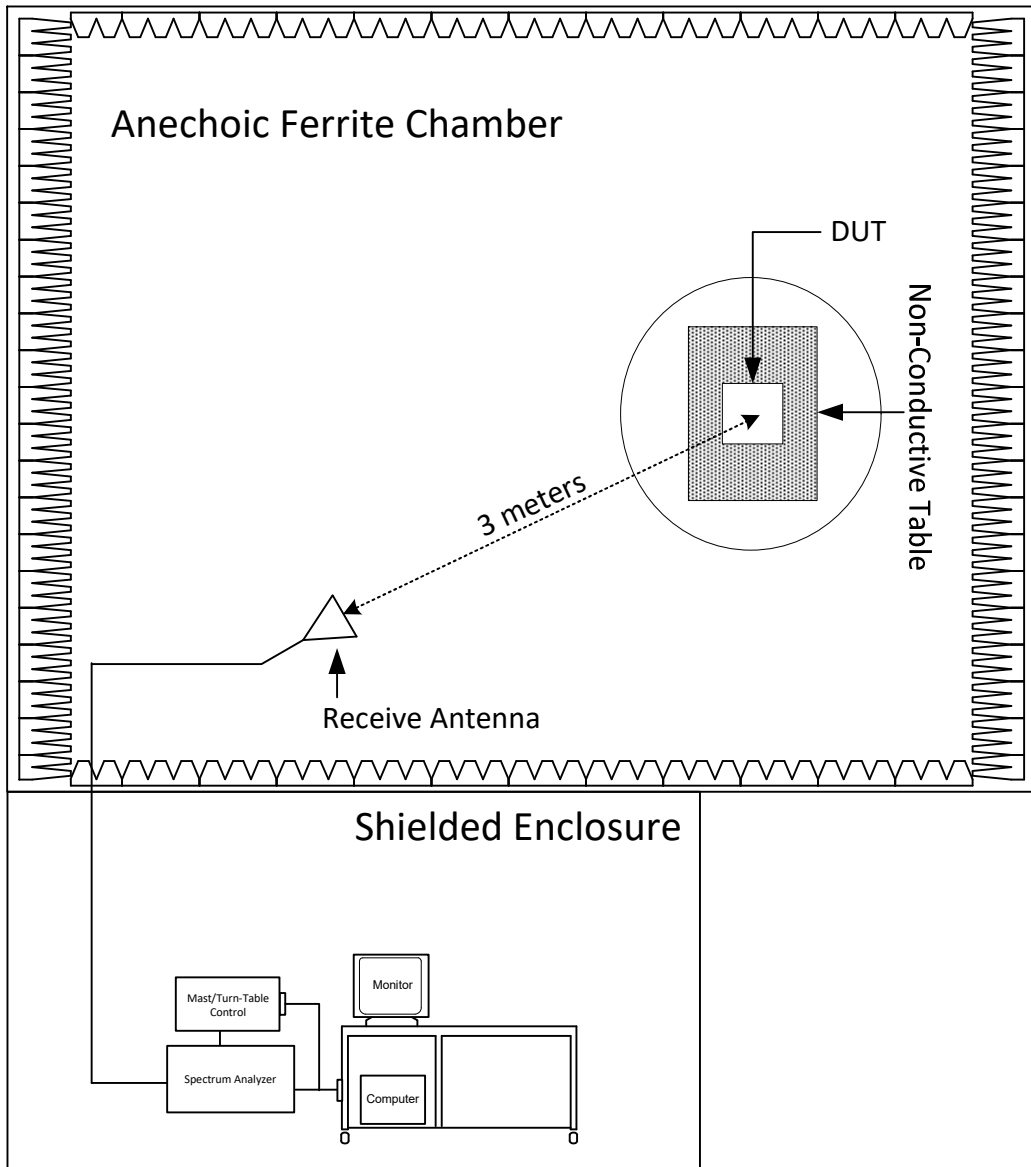
N/A: Not Applicable

I/O: Initial Only

CNR: Calibration Not Required

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

### 19. Block Diagram of Test Setup



Radiated Measurements Test Setup

20. Receiver Radiated Emissions Test

Test Information	
Manufacturer	Corteva Agriscience
Product	Remote Pest Monitoring Sensor
Model	AIR1
Serial No	US-1: 323732385C376608
Mode	Online

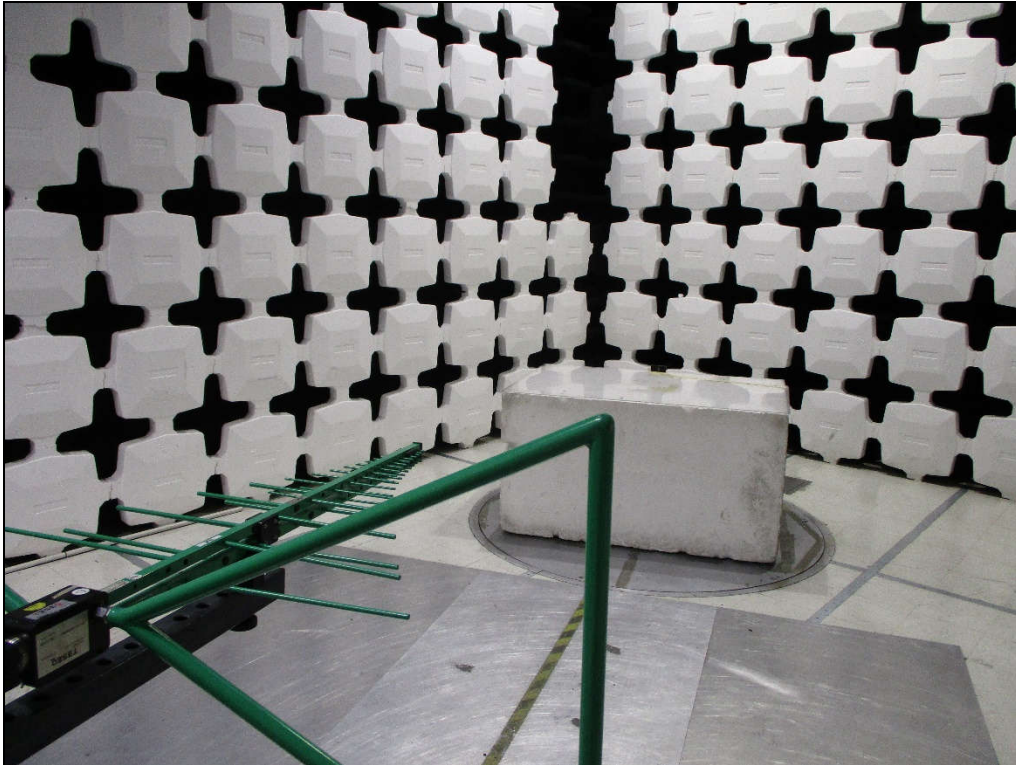
Test Setup Details	
Setup Format	Tabletop
Height of Support	NA
Type of Test Site	Semi-Anechoic Chamber
Type of Antennas Used	Below 1GHz: Bilog (or equivalent) Above 1GHz: Double-ridged waveguide (or equivalent)
Highest Internal Frequency of the EUT:	2.4GHz
Highest Measurement Frequency:	25GHz
Notes	The cables were manually maximized during the preliminary emissions sweeps. The cable arrangement which resulted in the worst-case emissions was utilized.

Requirements	
The field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:	
Frequency of Emission (MHz)	Field Strength (μV/m)
30-88	100
88-216	150
216-960	200
Above 960	500

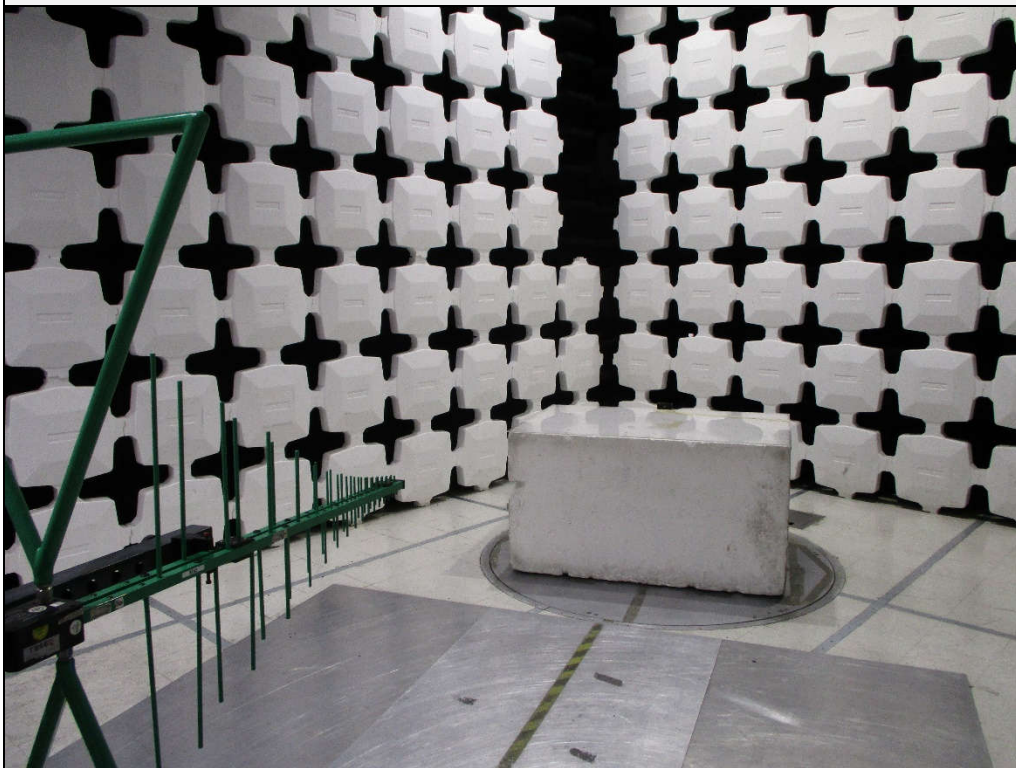
Procedures
<p>Since a quasi-peak detector and an average detector requires a long integration times, it is not practical to automatically sweep through the quasi-peak and average levels. Therefore, radiated emissions from the EUT were first scanned using a peak detector and automatically plotted. The frequencies where significant emission levels were noted were then remeasured using the quasi-peak detector or average detector.</p> <p>The EUT was placed on a non-conductive stand. The broadband measuring antenna was positioned at a 3 meter distance from the EUT. The frequency range from 30MHz to 1GHz was investigated using a peak detector function with the bilog antenna at several heights, horizontal and vertical polarization, and with several different orientations of the EUT with respect to the antenna. The frequency range from 1GHz to 25GHz was investigated using a peak detector function with the double ridged waveguide antenna at several heights, horizontal and vertical polarization, and with several different orientations of the EUT with respect to the antenna. The maximum levels for each antenna polarization were plotted.</p> <p>Final radiated emissions were performed on all significant broadband and narrowband emissions found in the exploratory sweeps using the following methods:</p> <ol style="list-style-type: none"> <li>1) Measurements from 30MHz to 1GHz were made using a quasi-peak detector and a broadband bilog</li> </ol>

Procedures
<p>antenna. Measurements above 1GHz were made using an average detector and a broadband double ridged waveguide antenna.</p> <p>2) To ensure that maximum or worst case, emission levels were measured, the following steps were taken:</p> <ul style="list-style-type: none"> <li>a) The EUT was rotated so that all sides were exposed to the receiving antenna.</li> <li>b) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.</li> <li>c) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.</li> <li>d) For hand-held or body-worn devices, the EUT was rotated through three orthogonal axes to determine which orientation produces the highest emission relative to the limit.</li> </ul>

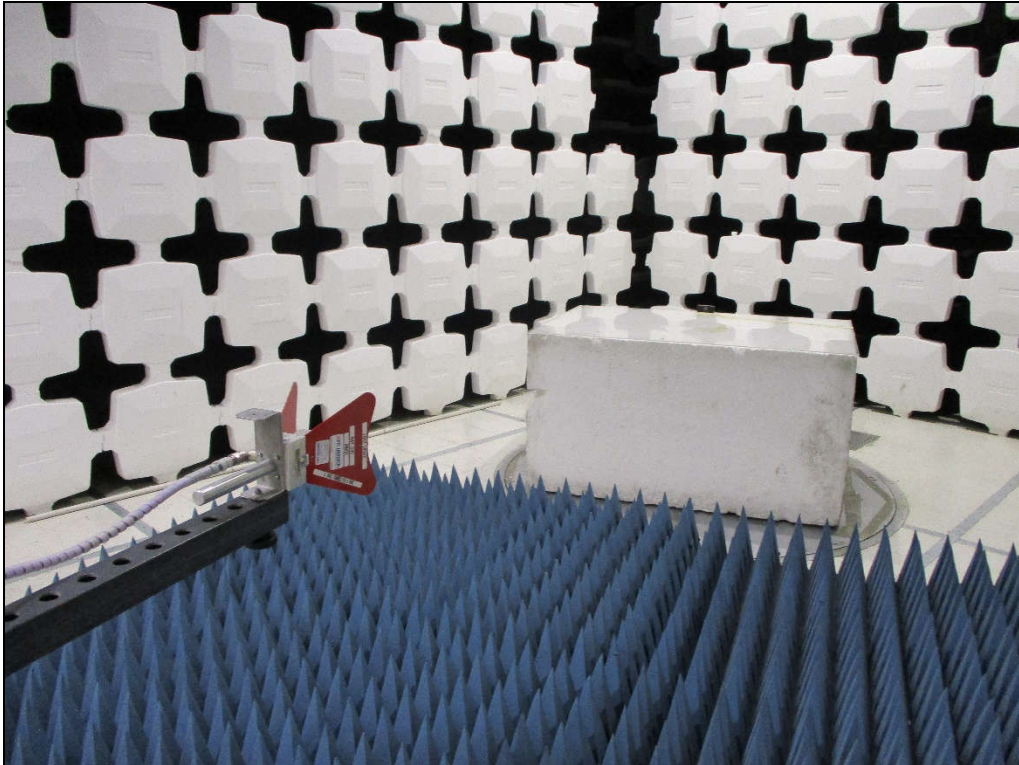
Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	4.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz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



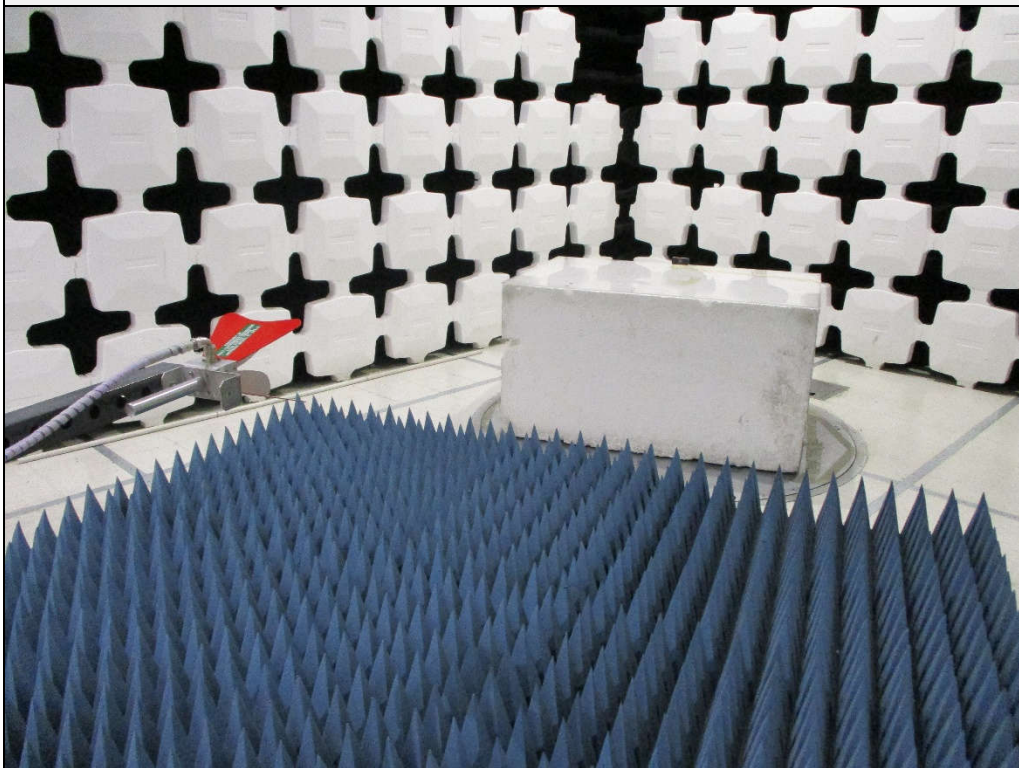
Test Setup for Radiated Emissions: 30MHz to 1GHz, Horizontal Polarization



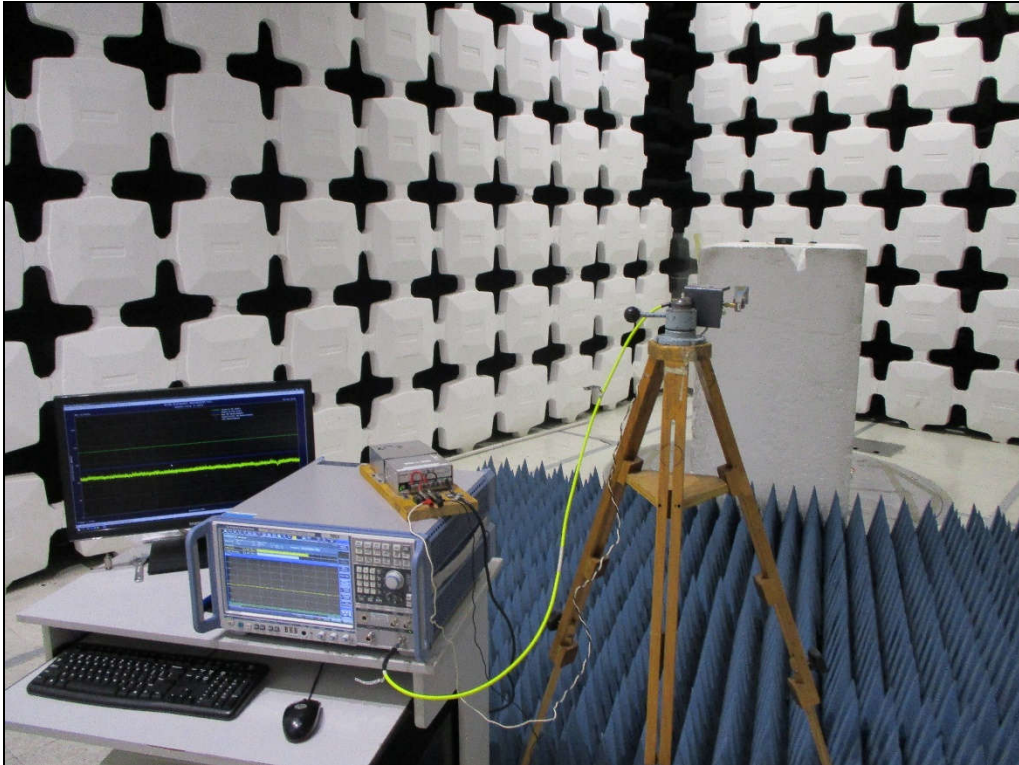
Test Setup for Radiated Emissions: 30MHz to 1GHz, Vertical Polarization



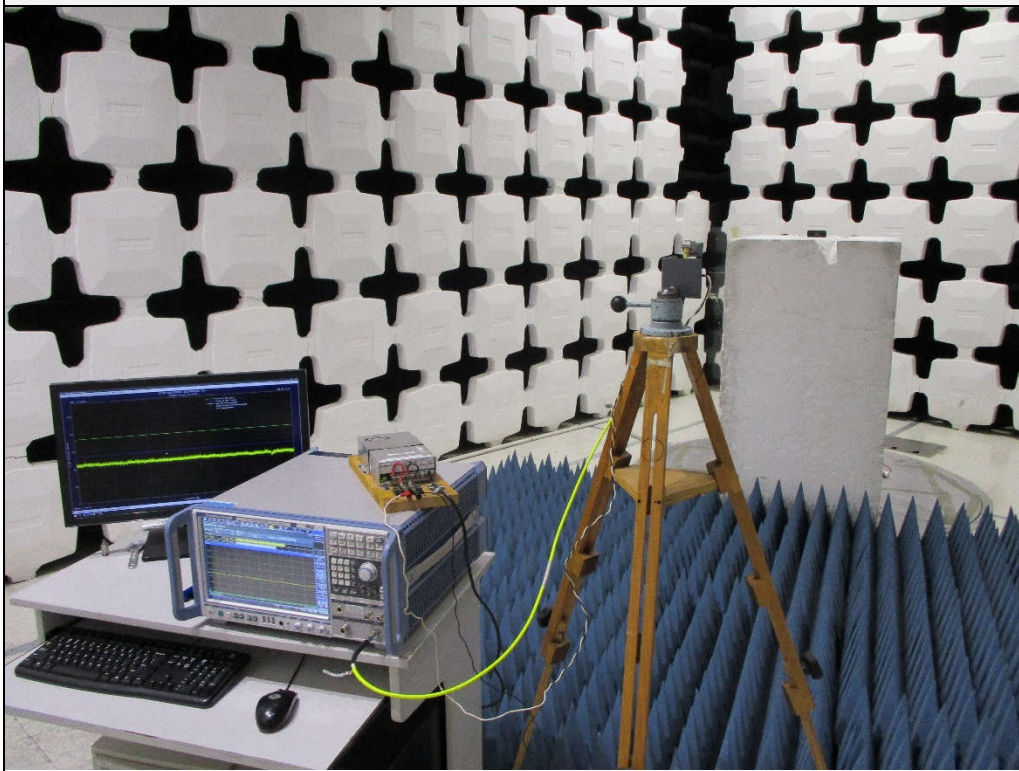
Test Setup for Radiated Emissions: 1GHz to 18GHz, Horizontal Polarization



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



Test Setup for Radiated Emissions: 18GHz to 25GHz, Horizontal Polarization



Test Setup for Radiated Emissions: 18GHz to 25GHz, Vertical Polarization



## FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 01/02/2019

Manufacturer : Corteva Agriscience  
 Model : AIR1  
 Serial Number : US-1: 323732385C376608  
 DUT Mode : Online  
 Turntable Step Angle (°): 45  
 Mast Positions (cm) : 120, 200, 340  
 Scan Type : Stepped Scan  
 Test RBW : 120 kHz  
 Prelim Dwell Time (s) : 0.0001  
 Notes : NA  
 Test Engineer : J. Cardenas  
 Test Date : Oct 07, 2020 01:16:27 PM

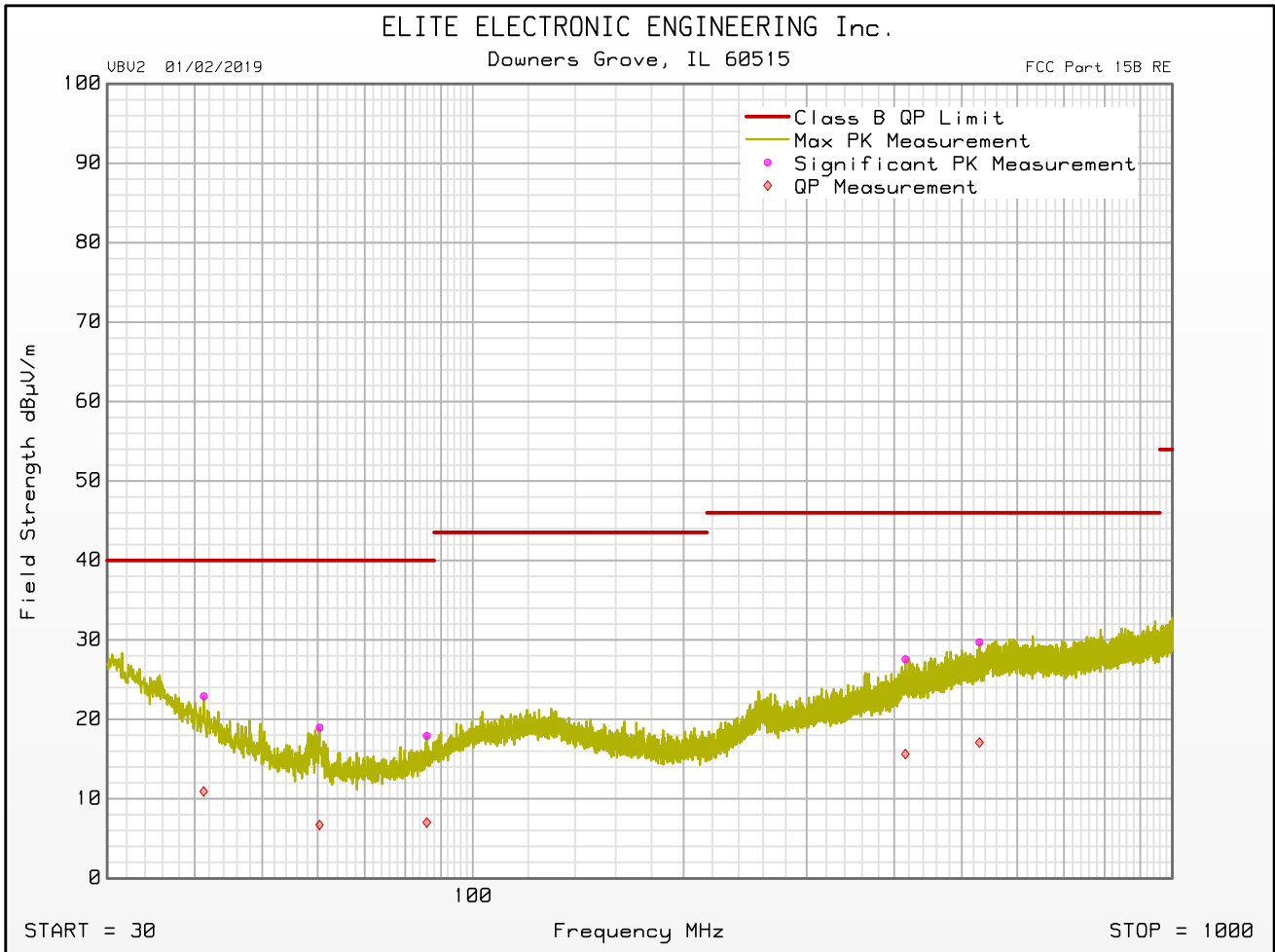
Freq MHz	Peak Mtr Rdg dBuV	QP Mtr Rdg dBuV	Ant Fac dB	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBµV/m	QP Total dBµV/m	QP Limit dBµV/m	QP Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °
30.720	5.1	-6.2	24.0	0.0	0.4	0.0	29.4	18.1	40.0	-21.9	H	340	0
41.220	4.4	-7.6	18.1	0.0	0.4	0.0	22.9	10.9	40.0	-29.1	V	120	270
60.360	6.2	-6.0	12.4	0.0	0.4	0.0	19.0	6.7	40.0	-33.3	V	200	270
85.920	3.3	-7.6	14.2	0.0	0.4	0.0	17.9	7.0	40.0	-33.0	V	340	90
107.860	3.7	-7.6	17.7	0.0	0.4	0.0	21.9	10.5	43.5	-33.0	H	120	225
133.780	3.0	-9.2	18.0	0.0	0.5	0.0	21.5	9.3	43.5	-34.2	H	340	135
213.700	3.4	-8.6	15.1	0.0	0.8	0.0	19.2	7.2	43.5	-36.3	H	340	315
308.280	3.2	-8.9	19.6	0.0	0.8	0.0	23.6	11.5	46.0	-34.5	H	340	135
415.320	3.9	-8.1	22.5	0.0	1.1	0.0	27.6	15.6	46.0	-30.4	V	340	180
529.860	4.7	-7.9	23.9	0.0	1.1	0.0	29.7	17.1	46.0	-28.9	V	200	0
602.340	4.5	-6.6	24.9	0.0	1.1	0.0	30.6	19.4	46.0	-26.6	H	340	225
954.900	4.3	-8.6	26.8	0.0	1.5	0.0	32.6	19.7	46.0	-26.3	H	120	180



# FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 01/02/2019

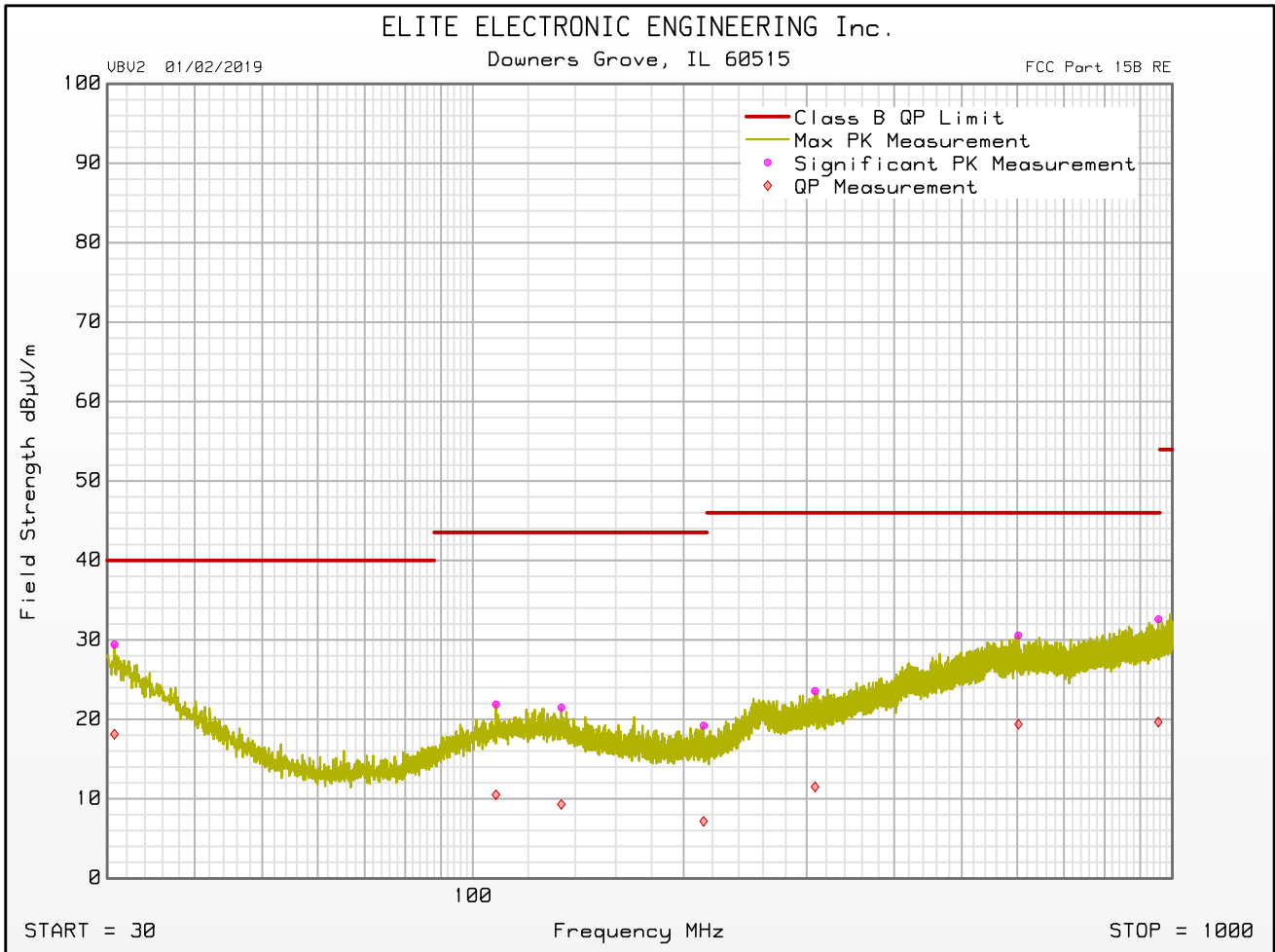
Manufacturer : Corteva Agriscience  
 Model : AIR1  
 Serial Number : US-1: 323732385C376608  
 DUT Mode : Online  
 Turntable Step Angle (°): 45  
 Mast Positions (cm) : 120, 200, 340  
 Ant. Polarization(s) : V  
 Scan Type : Stepped Scan  
 Test RBW : 120 kHz  
 Prelim Dwell Time (s) : 0.0001  
 Notes : NA  
 Test Engineer : J. Cardenas  
 Test Date : Oct 07, 2020 01:16:27 PM



# FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 01/02/2019

Manufacturer : Corteva Agriscience  
 Model : AIR1  
 Serial Number : US-1: 323732385C376608  
 DUT Mode : Online  
 Turntable Step Angle (°): 45  
 Mast Positions (cm) : 120, 200, 340  
 Ant. Polarization(s) : H  
 Scan Type : Stepped Scan  
 Test RBW : 120 kHz  
 Prelim Dwell Time (s) : 0.0001  
 Notes : NA  
 Test Engineer : J. Cardenas  
 Test Date : Oct 07, 2020 01:16:27 PM





## FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 01/02/2019

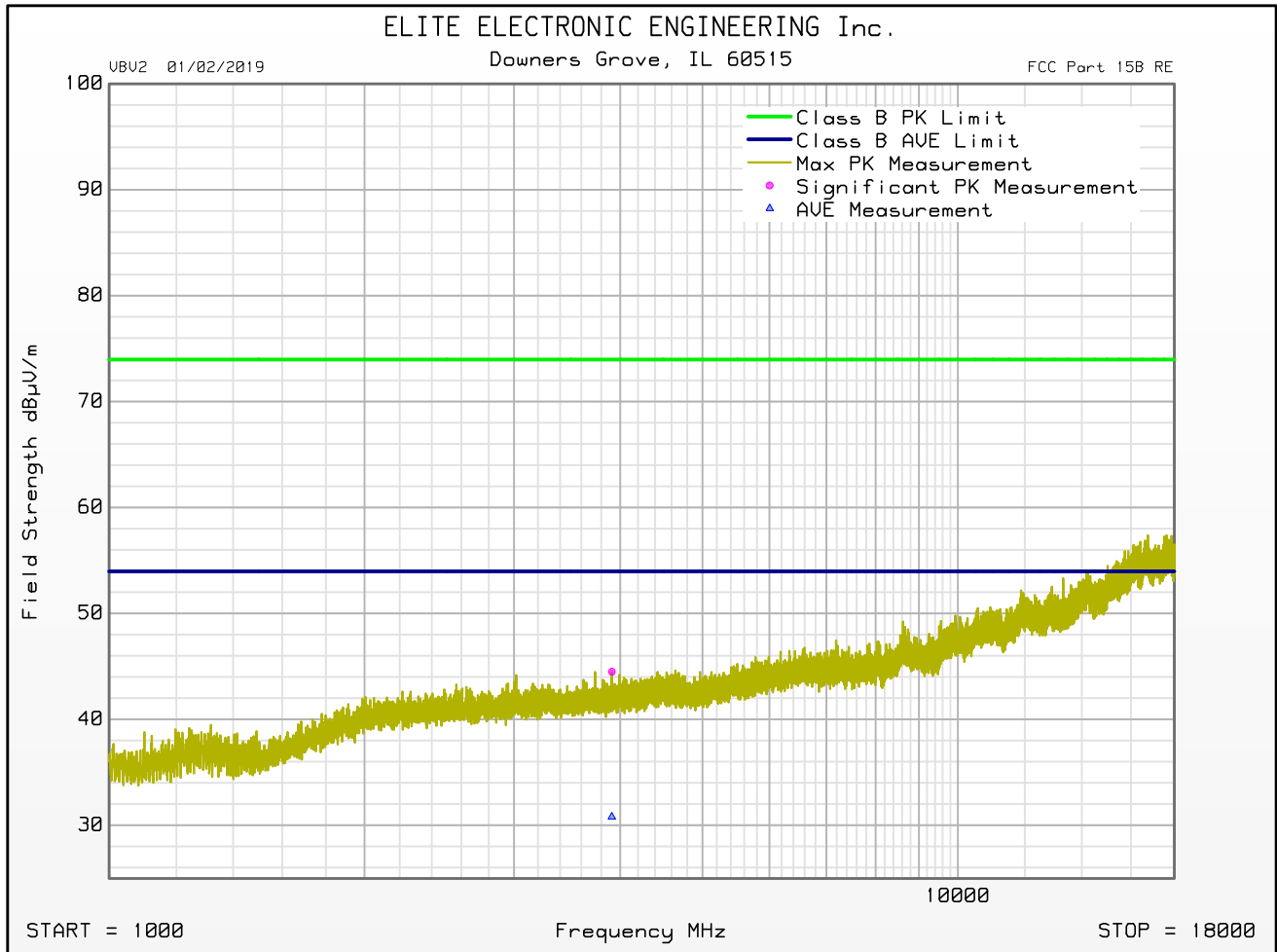
Manufacturer : Corteva Agriscience  
 Model : AIR1  
 Serial Number : US-1: 323732385C376608  
 DUT Mode : Online  
 Turntable Step Angle (°): 45  
 Mast Positions (cm) : 120, 200, 340  
 Scan Type : Stepped Scan  
 Test RBW : 1 MHz  
 Prelim Dwell Time (s) : 0.0001  
 Notes : NA  
 Test Engineer : J. Cardenas  
 Test Date : Oct 07, 2020 03:22:26 PM

Freq MHz	Peak Mtr Rdg dBuV	Average Mtr Rdg dBuV	Ant Fac dB	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBuV/m	Peak Limit dBuV/m	Peak Lim Mrg dB	Average Total dBuV/m	Average Limit dBuV/m	Average Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °
1306.000	50.0	37.2	29.0	-40.9	1.8	0.0	39.9	74.0	-34.0	27.1	54.0	-26.9	H	200	270
2458.000	49.1	35.8	32.3	-40.5	2.6	0.0	43.5	74.0	-30.5	30.2	54.0	-23.8	H	340	270
3911.500	48.1	34.4	33.4	-40.4	3.4	0.0	44.5	74.0	-29.5	30.8	54.0	-23.2	V	200	45
6559.500	47.4	33.7	36.0	-40.4	4.4	0.0	47.4	74.0	-26.6	33.7	54.0	-20.3	H	120	0
10669.500	47.7	33.9	37.7	-39.9	5.6	0.0	51.1	74.0	-22.9	37.3	54.0	-16.7	H	340	225
16624.500	46.8	33.5	41.8	-38.2	7.1	0.0	57.5	74.0	-16.5	44.3	54.0	-9.7	H	340	315

# FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 01/02/2019

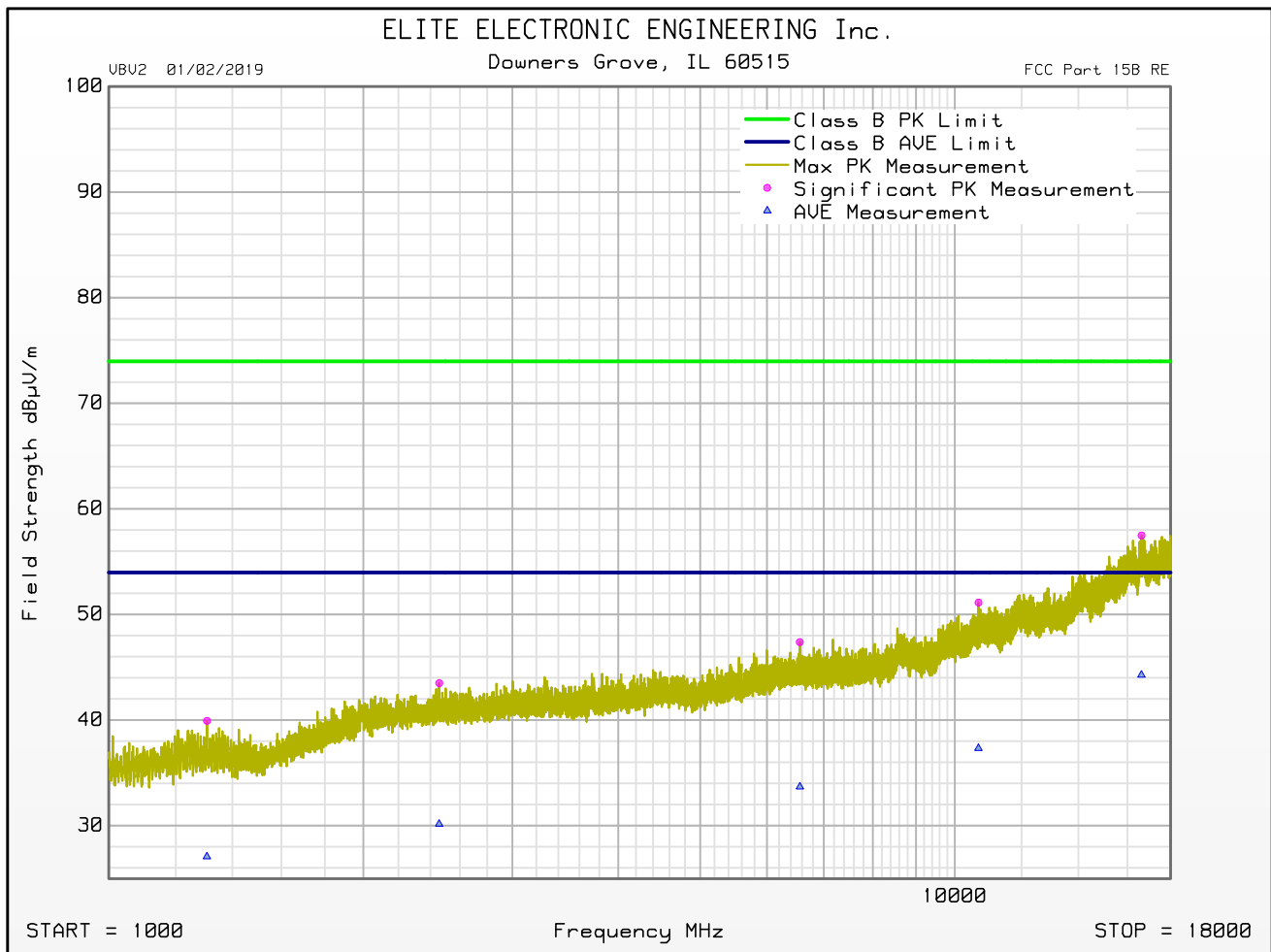
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 Test RBW : 1 MHz  
 Prelim Dwell Time (s) : 0.0001  
 Notes : NA  
 Test Engineer : J. Cardenas  
 Test Date : Oct 07, 2020 03:22:26 PM





# FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 01/02/2019

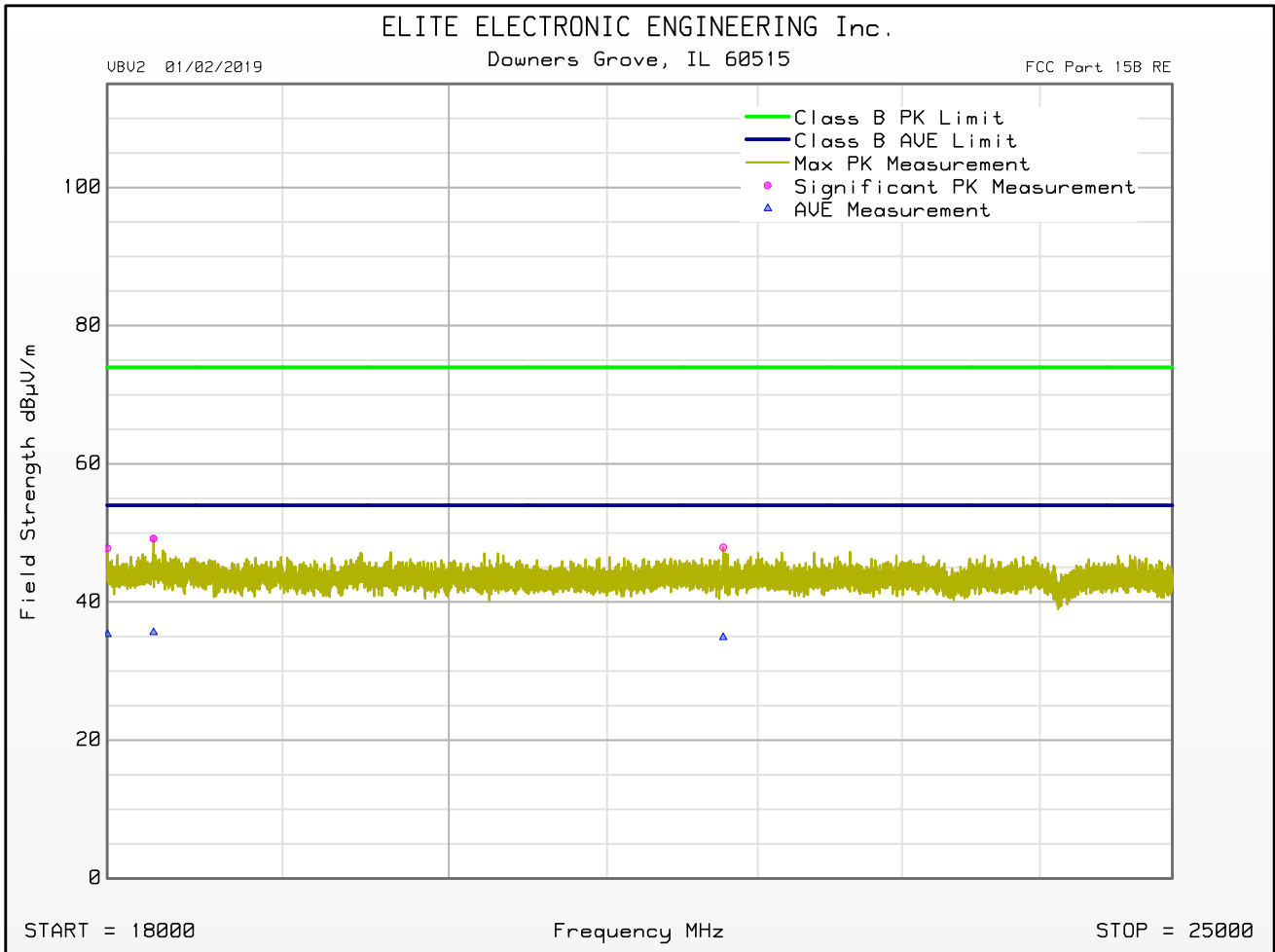
Manufacturer : Corteva Agriscience  
 Model : AIR1  
 Serial Number : US-1: 323732385C376608  
 DUT Mode : Online  
 Turntable Step Angle (°): 45  
 Mast Positions (cm) : 120, 200, 340  
 Scan Type : Stepped Scan  
 Test RBW : 1 MHz  
 Prelim Dwell Time (s) : 0.0001  
 Notes : NA  
 Test Engineer : J. Cardenas  
 Test Date : Oct 19, 2020 09:51:31 AM

Freq MHz	Peak Mtr Rdg dBuV	Average Mtr Rdg dBuV	Ant Fac dB	Amp Fac dB	Cbl Fac dB	Dist Corr dB	Peak Total dBµV/m	Peak Limit dBµV/m	Peak Lim Mrg dB	Average Total dBµV/m	Average Limit dBµV/m	Average Lim Mrg dB	Ant Pol	Mast Ht cm	Azim °
18001.000	34.8	22.4	40.3	-29.5	2.2	0.0	47.8	74.0	-26.2	35.3	54.0	-18.7	V	120	0
18258.500	36.4	22.8	40.3	-29.7	2.2	0.0	49.2	74.0	-24.8	35.6	54.0	-18.4	V	120	0
21766.000	33.9	20.8	40.6	-28.8	2.2	0.0	47.9	74.0	-26.1	34.9	54.0	-19.1	V	120	0
18232.500	35.5	22.4	40.3	-29.7	2.2	0.0	48.3	74.0	-25.7	35.2	54.0	-18.7	H	120	0
21600.500	33.4	20.7	40.6	-28.7	2.2	0.0	47.6	74.0	-26.4	34.9	54.0	-19.1	H	120	0
23895.500	33.8	21.1	40.6	-29.1	2.2	0.0	47.5	74.0	-26.5	34.8	54.0	-19.2	H	120	0

# FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 01/02/2019

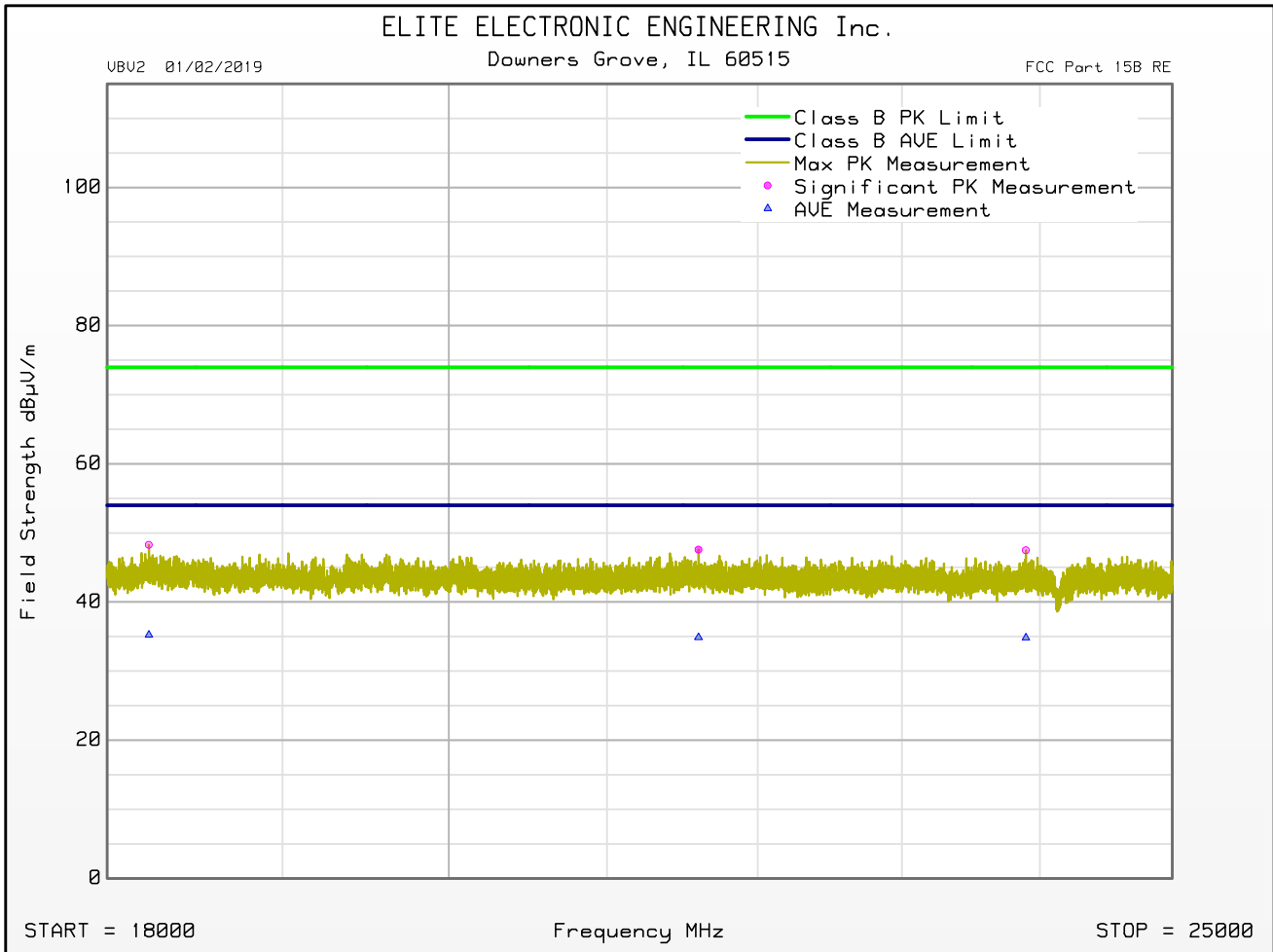
Manufacturer : Corteva Agriscience  
 Model : AIR1  
 Serial Number : US-1: 323732385C376608  
 DUT Mode : Online  
 Turntable Step Angle (°): 45  
 Mast Positions (cm) : 120, 200, 340  
 Ant. Polarization(s) : V  
 Scan Type : Stepped Scan  
 Test RBW : 1 MHz  
 Prelim Dwell Time (s) : 0.0001  
 Notes : NA  
 Test Engineer : J. Cardenas  
 Test Date : Oct 19, 2020 09:51:31 AM



# FCC Part 15B Class B Radiated RF Emissions Test

SW ID/Rev: VBV2 01/02/2019

Manufacturer : Corteva Agriscience  
 Model : AIR1  
 Serial Number : US-1: 323732385C376608  
 DUT Mode : Online  
 Turntable Step Angle (°): 45  
 Mast Positions (cm) : 120, 200, 340  
 Ant. Polarization(s) : H  
 Scan Type : Stepped Scan  
 Test RBW : 1 MHz  
 Prelim Dwell Time (s) : 0.0001  
 Notes : NA  
 Test Engineer : J. Cardenas  
 Test Date : Oct 19, 2020 09:53:54 AM





21. Effective Isotropic Radiated Power (EIRP)

Test Information	
Manufacturer	Corteva Agriscience
Product	Remote Pest Monitoring Sensor
Model	AIR1
Serial No	US-1: 323732385C376608
Mode	Transmitting

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

Requirements	
<p>FOR FREQUENCY HOPPING SYSTEMS IN THE 902-928 MHz, CHANNELS <math>\geq 50</math>: The output power shall not exceed 4W (36dBm).</p> <p>FOR A DTS: The output power shall not exceed 4W (36dBm).</p>	

Procedures	
<p><u>FOR FREQUENCY HOPPING SYSTEMS</u></p> <p>The EUT was placed on the non-conductive stand and set to transmit. A bilog 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 20dB bandwidth. The span was set to approximately 5 times the 20 dB 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 hopping frequencies.</p> <p>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.</p> <p><u>FOR DTS SYSTEMS</u></p> <p>The EUT was placed on the non-conductive stand and set to transmit. A bilog 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</p>	

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.

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

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	902.3MHz
Parameters	EIRP = 10.7mW (10.3dBm)
Notes	None

Freq. (MHz)	Ant Pol	Wide BW Meter Reading (dBuV)	Matched Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
902.30	H	80.2	10.2	2.2	2.0	10.3	36.0	-25.7
902.30	V	73.4	5.8	2.2	2.0	5.9	36.0	-30.1

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	908.5MHz
Parameters	EIRP = 10.5mW (10.2dBm)
Notes	None

Freq. (MHz)	Ant Pol	Wide BW Meter Reading (dBuV)	Matched Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
908.50	H	80.0	10.1	2.2	2.0	10.2	36.0	-25.8
908.50	V	73.4	5.3	2.2	2.0	5.4	36.0	-30.6

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	914.9MHz
Parameters	EIRP = 8.3mW (9.2dBm)
Notes	None

Freq. (MHz)	Ant Pol	Wide BW Meter Reading (dBuV)	Matched Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
914.90	H	79.2	9.1	2.2	2.1	9.2	36.0	-26.8
914.90	V	72.8	5.1	2.2	2.1	5.2	36.0	-30.8

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	903MHz
Parameters	EIRP = 34.7mW (15.4dBm)
Notes	None

Freq. (MHz)	Ant Pol	Wide BW Meter Reading (dBuV)	Matched Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
903.00	H	84.4	15.3	2.2	2.0	15.4	36.0	-20.6
903.00	V	76.8	7.2	2.2	2.0	7.3	36.0	-28.7

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	907.8MHz
Parameters	EIRP = 35.5mW (15.5dBm)
Notes	None

Freq. (MHz)	Ant Pol	Wide BW Meter Reading (dBuV)	Matched Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
907.80	H	84.6	15.4	2.2	2.0	15.5	36.0	-20.5
907.80	V	75.5	7.1	2.2	2.0	7.2	36.0	-28.8

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	914.2MHz
Parameters	EIRP = 27.5mW (14.4dBm)
Notes	None

Freq. (MHz)	Ant Pol	Wide BW Meter Reading (dBuV)	Matched Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
914.20	H	83.3	14.3	2.2	2.1	14.4	36.0	-21.6
914.20	V	75.9	7.8	2.2	2.1	7.9	36.0	-28.1



## 22. Case Spurious Radiated Emissions

Test Information	
Manufacturer	Corteva Agriscience
Product	Remote Pest Monitoring Sensor
Model	AIR1
Serial No	US-1: 323732385C376608
Mode	Transmitting

Test Setup Details	
Setup Format	Tabletop
Height of Support	NA
Measurement Method	Radiated
Type of Test Site	Semi-Anechoic Chamber
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.

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

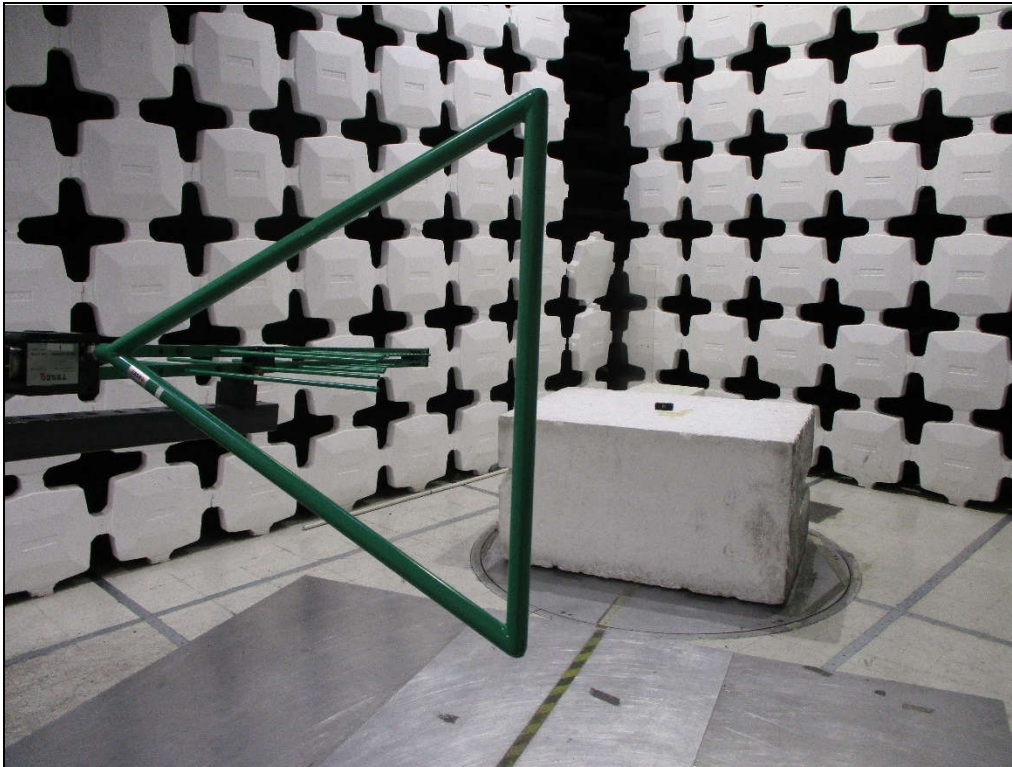
Procedures
<p>Radiated measurements were performed in a 32ft. x 20ft. x 14ft. high shielded enclosure. The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.</p> <p>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 10.0GHz was investigated using a peak detector function.</p> <p>The final open field emission tests were then manually performed over the frequency range of 30MHz to 10.0GHz.</p> <p>1) For all harmonics not in the restricted bands, the following procedure was used:</p> <ol style="list-style-type: none"> <li>a) The field strength of the fundamental was measured using a bilog antenna. The bilog antenna was positioned at a 3 meter distance from the EUT. The EUT was placed on a non-conductive stand. A</li> </ol>

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 20 dB 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 1 GHz 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 a 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 1 GHz 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 non-conductive stand. A peak detector with a resolution bandwidth of 1 MHz 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 1 GHz, 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 1 GHz, 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 20 dB above the maximum permitted average emission limit applicable to the equipment under test. Therefore, all peak readings above 1 GHz must be no greater than 20 dB above the limits

specified in 15.209(a).

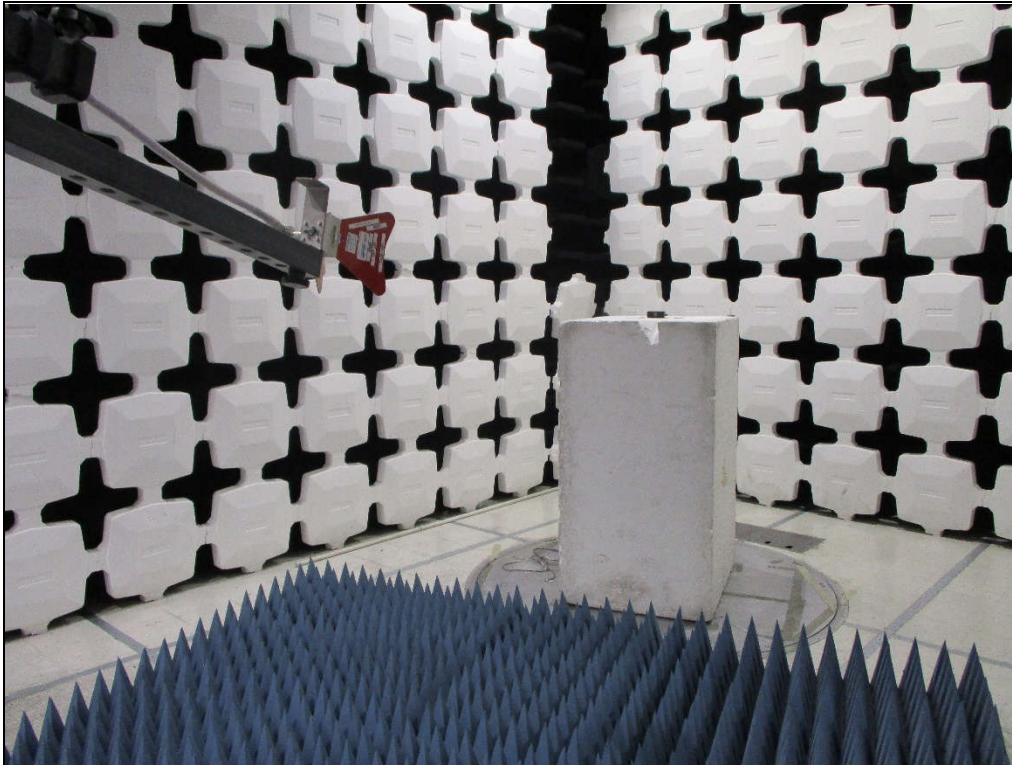
- f) Next, for all radiated emissions measurements above 1GHz, the resolution bandwidth was set to 1MHz. The analyzer was set to linear mode with a 10Hz video bandwidth in order to simulate an average detector. An average reading was taken.



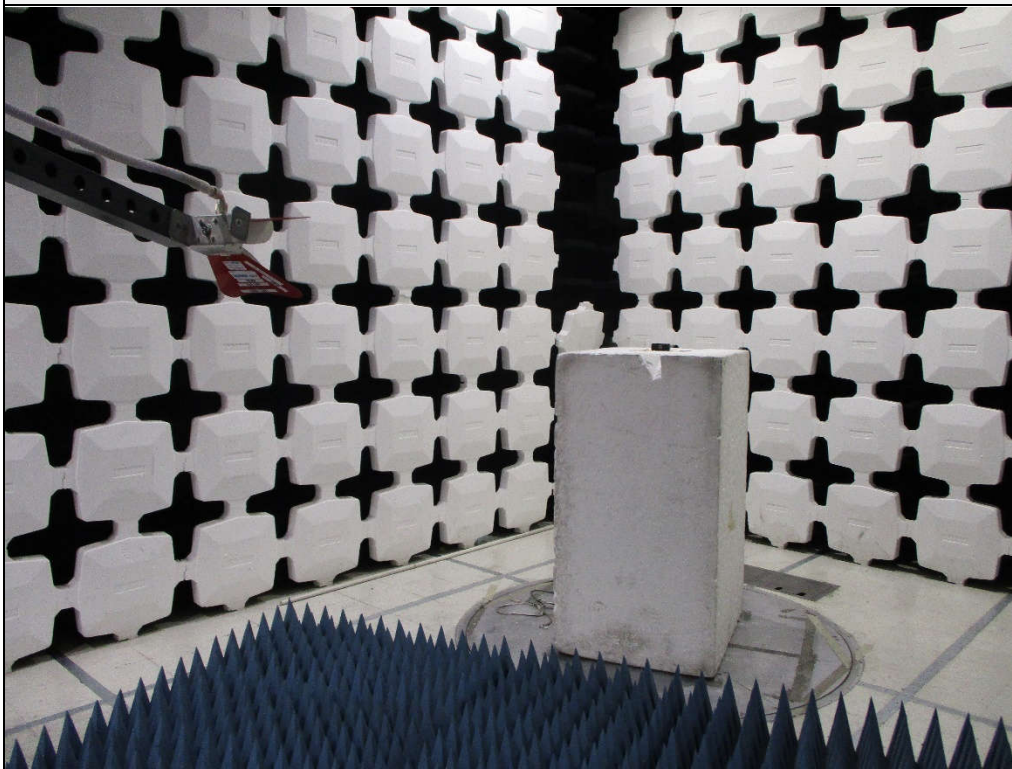
Test Setup for Spurious Radiated Emissions, 30-1000MHz – Antenna Polarization Horizontal



Test Setup for Spurious Radiated Emissions, 30-1000MHz – Antenna Polarization Vertical



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



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

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	902.3MHz
Parameters	Peak Measurements in the Restricted Bands
Notes	None

Frequency (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBµV/m at 3m	Peak Total µV/m at 3 m	Peak Limit µV/m at 3 m	Margin (dB)
2706.90	H	49.8		2.8	33.6	-40.9	45.3	184.8	5000.0	-28.6
2706.90	V	49.6		2.8	33.6	-40.9	45.1	180.4	5000.0	-28.9
3609.20	H	50.8		3.2	34.1	-40.3	47.9	248.0	5000.0	-26.1
3609.20	V	53.2		3.2	34.1	-40.3	50.3	326.5	5000.0	-23.7
4511.50	H	49.4		3.6	35.8	-40.7	48.1	255.5	5000.0	-25.8
4511.50	V	49.1		3.6	35.8	-40.7	47.8	246.3	5000.0	-26.2
5413.80	H	49.5		3.9	36.8	-40.0	50.2	321.9	5000.0	-23.8
5413.80	V	49.7		3.9	36.8	-40.0	50.4	331.7	5000.0	-23.6
8120.70	H	50.5		4.9	38.6	-40.4	53.6	480.2	5000.0	-20.4
8120.70	V	50.8		4.9	38.6	-40.4	53.9	498.3	5000.0	-20.0
9023.00	H	49.4	*	4.9	39.3	-40.3	53.3	460.6	5000.0	-20.7
9023.00	V	50.1	*	4.9	39.3	-40.3	53.9	498.1	5000.0	-20.0

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	902.3MHz
Parameters	Average Measurements in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
2706.90	H	35.05		2.8	33.6	-40.9	0.0	30.5	33.7	500.0	-23.4
2706.90	V	36.0		2.8	33.6	-40.9	0.0	31.4	37.3	500.0	-22.5
3609.20	H	38.2		3.2	34.1	-40.3	0.0	35.3	58.5	500.0	-18.6
3609.20	V	36.0		3.2	34.1	-40.3	0.0	33.1	45.2	500.0	-20.9
4511.50	H	37.3		3.6	35.8	-40.7	0.0	36.0	63.4	500.0	-17.9
4511.50	V	34.3		3.6	35.8	-40.7	0.0	33.0	44.5	500.0	-21.0
5413.80	H	35.3		3.9	36.8	-40.0	0.0	36.0	63.1	500.0	-18.0
5413.80	V	34.6		3.9	36.8	-40.0	0.0	35.3	58.4	500.0	-18.7
8120.70	H	40.7		4.9	38.6	-40.4	0.0	43.8	155.4	500.0	-10.2
8120.70	V	42.3		4.9	38.6	-40.4	0.0	45.4	187.3	500.0	-8.5
9023.00	H	34.3	*	4.9	39.3	-40.3	0.0	38.1	80.7	500.0	-15.8
9023.00	V	35.1	*	4.9	39.3	-40.3	0.0	39.0	88.9	500.0	-15.0

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	902.3
Parameters	Peak Measurements not in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
902.30	H	80.2		1.5	26.5	0.0	108.2	256190.5		
902.30	V	72.8		1.5	26.5	0.0	100.8	109537.6		
1804.60	H	58.6		2.2	31.4	-41.1	51.2	363.1	25619.1	-37.0
1804.60	V	52.9		2.2	31.4	-41.1	45.5	188.4	25619.1	-42.7
6316.10	H	49.8		4.3	38.4	-40.2	52.3	412.3	25619.1	-35.9
6316.10	V	44.8		4.3	38.4	-40.2	47.3	232.1	25619.1	-40.9
7218.40	H	38.7		4.6	37.7	-40.3	40.8	109.5	25619.1	-47.4
7218.40	V	38.5		4.6	37.7	-40.3	40.6	106.9	25619.1	-47.6



Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	908.5MHz
Parameters	Peak Measurements in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
2725.50	H	49.9		2.8	33.7	-40.9	45.5	189.1	5000.0	-28.4
2725.50	V	51.9		2.8	33.7	-40.9	47.5	237.6	5000.0	-26.5
3634.00	H	49.9		3.2	34.5	-40.3	47.4	233.2	5000.0	-26.6
3634.00	V	49.7		3.2	34.5	-40.3	47.1	227.4	5000.0	-26.8
4542.50	H	50.5		3.6	35.8	-40.6	49.3	293.3	5000.0	-24.6
4542.50	V	49.8		3.6	35.8	-40.6	48.6	268.2	5000.0	-25.4
5451.00	H	49.5		3.9	36.7	-40.0	50.1	318.4	5000.0	-23.9
5451.00	V	49.7		3.9	36.7	-40.0	50.3	326.9	5000.0	-23.7
7268.00	H	49.9		4.7	37.8	-40.3	52.0	400.0	5000.0	-21.9
7268.00	V	49.3		4.7	37.8	-40.3	51.4	371.2	5000.0	-22.6
8176.50	H	50.5		4.9	38.5	-40.4	53.6	476.6	5000.0	-20.4
8176.50	V	49.5		4.9	38.5	-40.4	52.6	424.8	5000.0	-21.4
9085.00	H	50.2		5.0	39.3	-40.3	54.2	510.2	5000.0	-19.8
9085.00	V	49.5		5.0	39.3	-40.3	53.5	472.3	5000.0	-20.5

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	908.5MHz
Parameters	Average Measurements in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
2725.50	H	35.75		2.8	33.7	-40.9	0.0	31.4	37.0	500.0	-22.6
2725.50	V	40.5		2.8	33.7	-40.9	0.0	36.1	64.1	500.0	-17.8
3634.00	H	37.9		3.2	34.5	-40.3	0.0	35.4	58.6	500.0	-18.6
3634.00	V	36.6		3.2	34.5	-40.3	0.0	34.0	50.2	500.0	-20.0
4542.50	H	38.6		3.6	35.8	-40.6	0.0	37.4	73.9	500.0	-16.6
4542.50	V	35.1		3.6	35.8	-40.6	0.0	33.9	49.4	500.0	-20.1
5451.00	H	37.2		3.9	36.7	-40.0	0.0	37.7	77.0	500.0	-16.3
5451.00	V	35.2		3.9	36.7	-40.0	0.0	35.8	61.4	500.0	-18.2
7268.00	H	39.1		4.7	37.8	-40.3	0.0	41.3	115.6	500.0	-12.7
7268.00	V	36.8		4.7	37.8	-40.3	0.0	38.9	88.5	500.0	-15.0
8176.50	H	38.0		4.9	38.5	-40.4	0.0	41.1	113.2	500.0	-12.9
8176.50	V	36.6		4.9	38.5	-40.4	0.0	39.6	96.0	500.0	-14.3
9085.00	H	35.5		5.0	39.3	-40.3	0.0	39.4	93.8	500.0	-14.5
9085.00	V	34.8		5.0	39.3	-40.3	0.0	38.7	86.3	500.0	-15.3

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	908.5MHz
Parameters	Peak Measurements not in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
908.50	H	79.5		1.6	26.4	0.0	107.5	237327.2		
908.50	V	73.1		1.6	26.4	0.0	101.1	113200.3		
1817.00	H	56.8		2.2	31.5	-41.1	49.5	298.3	23732.7	-38.0
1817.00	V	53.0		2.2	31.5	-41.1	45.7	193.2	23732.7	-41.8
6359.50	H	44.8		4.3	38.4	-40.2	47.3	231.6	23732.7	-40.2
6359.50	V	41.5		4.3	38.4	-40.2	43.9	157.3	23732.7	-43.6

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	914.9MHz
Parameters	Peak Measurements in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
914.90	H	79.1		1.6	26.4	0.0	107.0	223653.7		
914.90	V	72.5		1.6	26.4	0.0	100.4	105214.6		
1829.80	H	55.0		2.2	31.7	-41.1	47.8	246.8	22365.4	-39.1
1829.80	V	51.3		2.2	31.7	-41.1	44.1	159.7	22365.4	-42.9
5489.40	H	41.7		3.9	36.7	-40.1	42.2	129.5	22365.4	-44.7
5489.40	V	41.2		3.9	36.7	-40.1	41.7	122.3	22365.4	-45.2
6404.30	H	39.7		4.3	38.3	-40.2	42.1	127.5	22365.4	-44.9
6404.30	V	43.2		4.3	38.3	-40.2	45.6	189.8	22365.4	-41.4

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	914.9MHz
Parameters	Average Measurements in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
2744.70	H	36.04		2.8	33.8	-40.9	0.0	31.8	38.8	500.0	-22.2
2744.70	V	34.9		2.8	33.8	-40.9	0.0	30.6	33.9	500.0	-23.4
3659.60	H	34.9		3.3	34.6	-40.3	0.0	32.5	41.9	500.0	-21.5
3659.60	V	35.3		3.3	34.6	-40.3	0.0	32.8	43.8	500.0	-21.2
4574.50	H	43.3		3.6	36.1	-40.6	0.0	42.4	131.9	500.0	-11.6
4574.50	V	39.9		3.6	36.1	-40.6	0.0	39.1	89.9	500.0	-14.9
7319.20	H	33.6		4.7	37.8	-40.3	0.0	35.8	62.0	500.0	-18.1
7319.20	V	41.2		4.7	37.8	-40.3	0.0	43.4	147.9	500.0	-10.6
8234.10	H	34.9		4.9	38.5	-40.4	0.0	38.0	79.8	500.0	-15.9
8234.10	V	34.5		4.9	38.5	-40.4	0.0	37.6	75.6	500.0	-16.4
9149.00	H	36.1		5.0	39.3	-40.3	0.0	40.0	100.6	500.0	-13.9
9149.00	V	36.1		5.0	39.3	-40.3	0.0	40.1	100.7	500.0	-13.9

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	914.9MHz
Parameters	Peak Measurements not in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
914.90	H	79.1		1.6	26.4	0.0	107.0	223653.7		
914.90	V	72.5		1.6	26.4	0.0	100.4	105214.6		
1829.80	H	55.0		2.2	31.7	-41.1	47.8	246.8	22365.4	-39.1
1829.80	V	51.3		2.2	31.7	-41.1	44.1	159.7	22365.4	-42.9
5489.40	H	41.7		3.9	36.7	-40.1	42.2	129.5	22365.4	-44.7
5489.40	V	41.2		3.9	36.7	-40.1	41.7	122.3	22365.4	-45.2
6404.30	H	39.7		4.3	38.3	-40.2	42.1	127.5	22365.4	-44.9
6404.30	V	43.2		4.3	38.3	-40.2	45.6	189.8	22365.4	-41.4

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	903MHz
Parameters	Peak Measurements in the Restricted Bands
Notes	None

Frequency (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBµV/m at 3m	Peak Total µV/m at 3 m	Peak Limit µV/m at 3 m	Margin (dB)
2709.00	H	62.0		3.7	32.6	-40.2	58.1	799.6	5000.0	-15.9
2709.00	V	64.0		3.7	32.6	-40.2	60.0	1004.4	5000.0	-13.9
3612.00	H	48.2	*	4.3	33.2	-39.5	46.1	202.7	5000.0	-27.8
3612.00	V	49.0	*	4.3	33.2	-39.5	46.9	222.2	5000.0	-27.0
4515.00	H	49.4	*	4.7	34.2	-39.6	48.7	272.1	5000.0	-25.3
4515.00	V	49.0	*	4.7	34.2	-39.6	48.3	260.5	5000.0	-25.7
5418.00	H	48.6		5.1	35.0	-39.5	49.3	290.3	5000.0	-24.7
5418.00	V	48.6		5.1	35.0	-39.5	49.3	292.7	5000.0	-24.7
8127.00	H	67.5		6.5	35.8	-39.6	70.2	3242.7	5000.0	-3.8
8127.00	V	68.2		6.5	35.8	-39.6	70.9	3518.9	5000.0	-3.1
9030.00	H	52.2		6.5	36.3	-39.4	55.6	599.8	5000.0	-18.4
9030.00	V	52.1		6.5	36.3	-39.4	55.5	595.7	5000.0	-18.5

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	903MHz
Parameters	Average Measurements in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
2709.00	H	35.87		3.7	32.6	-40.2	0.0	31.9	39.4	500.0	-22.1
2709.00	V	36.7		3.7	32.6	-40.2	0.0	32.7	43.3	500.0	-21.3
3612.00	H	33.7	*	4.3	33.2	-39.5	0.0	31.7	38.3	500.0	-22.3
3612.00	V	34.0	*	4.3	33.2	-39.5	0.0	31.9	39.4	500.0	-22.1
4515.00	H	34.5	*	4.7	34.2	-39.6	0.0	33.8	49.1	500.0	-20.2
4515.00	V	34.3	*	4.7	34.2	-39.6	0.0	33.6	48.0	500.0	-20.4
5418.00	H	33.4		5.1	35.0	-39.5	0.0	34.1	50.6	500.0	-19.9
5418.00	V	33.3		5.1	35.0	-39.5	0.0	34.0	50.2	500.0	-20.0
8127.00	H	48.6		6.5	35.8	-39.6	0.0	51.3	368.9	500.0	-2.6
8127.00	V	50.3		6.5	35.8	-39.6	0.0	53.0	449.2	500.0	-0.9
9030.00	H	35.1		6.5	36.3	-39.4	0.0	38.5	84.0	500.0	-15.5
9030.00	V	34.9		6.5	36.3	-39.4	0.0	38.3	82.0	500.0	-15.7



Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	903MHz
Parameters	Peak Measurements not in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
903.00	H	83.9		2.0	26.5	0.0	112.4	414552.4		
903.00	V	76.3		2.0	26.5	0.0	104.8	173611.9		
1806.00	H	62.7		2.9	30.9	-40.1	56.5	665.7	41455.2	-35.9
1806.00	V	59.3		2.9	30.9	-40.1	53.0	448.0	41455.2	-39.3
6321.00	H	44.2		5.6	35.5	-39.6	45.7	192.7	41455.2	-46.7
6321.00	V	44.3		5.6	35.5	-39.6	45.8	195.4	41455.2	-46.5
7224.00	H	52.2		6.1	35.7	-39.7	54.3	520.9	41455.2	-38.0
7224.00	V	55.9		6.1	35.7	-39.7	58.1	800.3	41455.2	-34.3

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	907.8MHz
Parameters	Peak Measurements in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBUV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBUV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
2723.40	H	57.1		3.7	32.6	-40.2	53.1	453.2	5000.0	-20.9
2723.40	V	61.4		3.7	32.6	-40.2	57.5	747.7	5000.0	-16.5
3631.20	H	49.4	*	4.3	33.2	-39.6	47.3	231.7	5000.0	-26.7
3631.20	V	49.4	*	4.3	33.2	-39.6	47.3	232.8	5000.0	-26.6
4539.00	H	50.0	*	4.7	34.2	-39.6	49.4	293.8	5000.0	-24.6
4539.00	V	50.2	*	4.7	34.2	-39.6	49.6	301.4	5000.0	-24.4
5446.80	H	48.8	*	5.2	35.0	-39.4	49.5	297.9	5000.0	-24.5
5446.80	V	49.6	*	5.2	35.0	-39.4	50.4	329.3	5000.0	-23.6
7262.40	H	57.4		6.1	35.7	-39.7	59.6	953.2	5000.0	-14.4
7262.40	V	57.7		6.1	35.7	-39.7	59.8	979.9	5000.0	-14.2
8170.20	H	64.6		6.5	35.8	-39.6	67.4	2335.8	5000.0	-6.6
8170.20	V	66.3		6.5	35.8	-39.6	69.0	2834.3	5000.0	-4.9
9078.00	H	52.9		6.5	36.3	-39.4	56.3	655.8	5000.0	-17.6
9078.00	V	52.0		6.5	36.3	-39.4	55.5	593.3	5000.0	-18.5

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	907.8MHz
Parameters	Average Measurements in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
2723.40	H	35.26		3.7	32.6	-40.2	0.0	31.3	36.9	500.0	-22.6
2723.40	V	35.6		3.7	32.6	-40.2	0.0	31.6	38.2	500.0	-22.3
3631.20	H	33.7	*	4.3	33.2	-39.6	0.0	31.6	38.1	500.0	-22.4
3631.20	V	33.8	*	4.3	33.2	-39.6	0.0	31.7	38.6	500.0	-22.2
4539.00	H	34.4	*	4.7	34.2	-39.6	0.0	33.8	49.1	500.0	-20.2
4539.00	V	34.2	*	4.7	34.2	-39.6	0.0	33.6	48.0	500.0	-20.4
5446.80	H	33.1	*	5.2	35.0	-39.4	0.0	33.8	49.2	500.0	-20.1
5446.80	V	33.5	*	5.2	35.0	-39.4	0.0	34.2	51.2	500.0	-19.8
7262.40	H	38.8		6.1	35.7	-39.7	0.0	41.0	112.0	500.0	-13.0
7262.40	V	39.1		6.1	35.7	-39.7	0.0	41.2	115.4	500.0	-12.7
8170.20	H	45.7		6.5	35.8	-39.6	0.0	48.5	265.4	500.0	-5.5
8170.20	V	47.8		6.5	35.8	-39.6	0.0	50.5	336.9	500.0	-3.4
9078.00	H	35.8		6.5	36.3	-39.4	0.0	39.2	91.5	500.0	-14.8
9078.00	V	35.3		6.5	36.3	-39.4	0.0	38.8	86.7	500.0	-15.2

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	907.8MHz
Parameters	Peak Measurements not in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
907.80	H	85.5		2.0	26.3	0.0	113.9	494016.3		
907.80	V	76.6		2.0	26.3	0.0	105.0	177313.3		
1815.60	H	63.3		2.9	30.9	-40.1	57.0	710.9	49401.6	-36.8
1815.60	V	61.4		2.9	30.9	-40.1	55.1	568.6	49401.6	-38.8
6354.60	H	43.2		5.6	35.5	-39.5	44.9	175.5	49401.6	-49.0
6354.60	V	43.3		5.6	35.5	-39.5	44.9	176.1	49401.6	-49.0

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	914.2MHz
Parameters	Peak Measurements in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
2742.60	H	56.0		3.7	32.6	-40.2	52.2	405.7	5000.0	-21.8
2742.60	V	53.9		3.7	32.6	-40.2	50.0	316.7	5000.0	-24.0
3656.80	H	48.7	*	4.3	33.2	-39.6	46.6	214.2	5000.0	-27.4
3656.80	V	49.0	*	4.3	33.2	-39.6	47.0	222.8	5000.0	-27.0
4571.00	H	49.6	*	4.7	34.3	-39.7	48.9	279.4	5000.0	-25.1
4571.00	V	48.9	*	4.7	34.3	-39.7	48.3	259.3	5000.0	-25.7
7313.60	H	58.0		6.2	35.7	-39.6	60.2	1023.2	5000.0	-13.8
7313.60	V	57.3		6.2	35.7	-39.6	59.5	949.4	5000.0	-14.4
8227.80	H	61.4		6.5	35.9	-39.5	64.3	1637.5	5000.0	-9.7
8227.80	V	63.8		6.5	35.9	-39.5	66.7	2153.7	5000.0	-7.3
9142.00	H	49.6		6.6	36.3	-39.4	53.1	451.6	5000.0	-20.9
9142.00	V	48.4		6.6	36.3	-39.4	51.9	394.2	5000.0	-22.1

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	914.2MHz
Parameters	Average Measurements in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
2742.60	H	35.82		3.7	32.6	-40.2	0.0	31.9	39.6	500.0	-22.0
2742.60	V	35.0		3.7	32.6	-40.2	0.0	31.1	36.1	500.0	-22.8
3656.80	H	34.3	*	4.3	33.2	-39.6	0.0	32.2	40.8	500.0	-21.8
3656.80	V	34.1	*	4.3	33.2	-39.6	0.0	32.0	40.0	500.0	-21.9
4571.00	H	34.3	*	4.7	34.3	-39.7	0.0	33.6	48.0	500.0	-20.4
4571.00	V	34.1	*	4.7	34.3	-39.7	0.0	33.4	46.9	500.0	-20.6
7313.60	H	39.5		6.2	35.7	-39.6	0.0	41.7	121.9	500.0	-12.3
7313.60	V	39.4		6.2	35.7	-39.6	0.0	41.6	120.3	500.0	-12.4
8227.80	H	43.7		6.5	35.9	-39.5	0.0	46.6	213.4	500.0	-7.4
8227.80	V	45.8		6.5	35.9	-39.5	0.0	48.6	270.2	500.0	-5.3
9142.00	H	33.3		6.6	36.3	-39.4	0.0	36.8	68.8	500.0	-17.2
9142.00	V	33.1		6.6	36.3	-39.4	0.0	36.6	67.4	500.0	-17.4

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	914.2MHz
Parameters	Peak Measurements not in the Restricted Bands
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
914.20	H	82.4		2.1	26.3	0.0	110.8	345330.2		
914.20	V	75.8		2.1	26.3	0.0	104.2	161709.2		
1828.40	H	65.0		2.9	30.9	-40.1	58.8	866.4	34533.0	-32.0
1828.40	V	61.4		2.9	30.9	-40.1	55.2	576.4	34533.0	-35.6
5485.20	H	38.3	*	5.2	35.0	-39.4	39.1	89.8	34533.0	-51.7
5485.20	V	37.9	*	5.2	35.0	-39.4	38.6	85.0	34533.0	-52.2
6399.40	H	43.6		5.7	35.5	-39.5	45.2	182.9	34533.0	-45.5
6399.40	V	42.3		5.7	35.5	-39.5	44.0	158.4	34533.0	-46.8

### 23. Band-Edge Compliance

Test Information	
Manufacturer	Corteva Agriscience
Product	Remote Pest Monitoring Sensor
Model	AIR1
Serial No	US-1: 323732385C376608
Mode	Transmitting

Test Setup Details	
Setup Format	Tabletop
Height of Support	NA
Measurement Method	Radiated
Type of Test Site	Semi-Anechoic Chamber
Notes	None

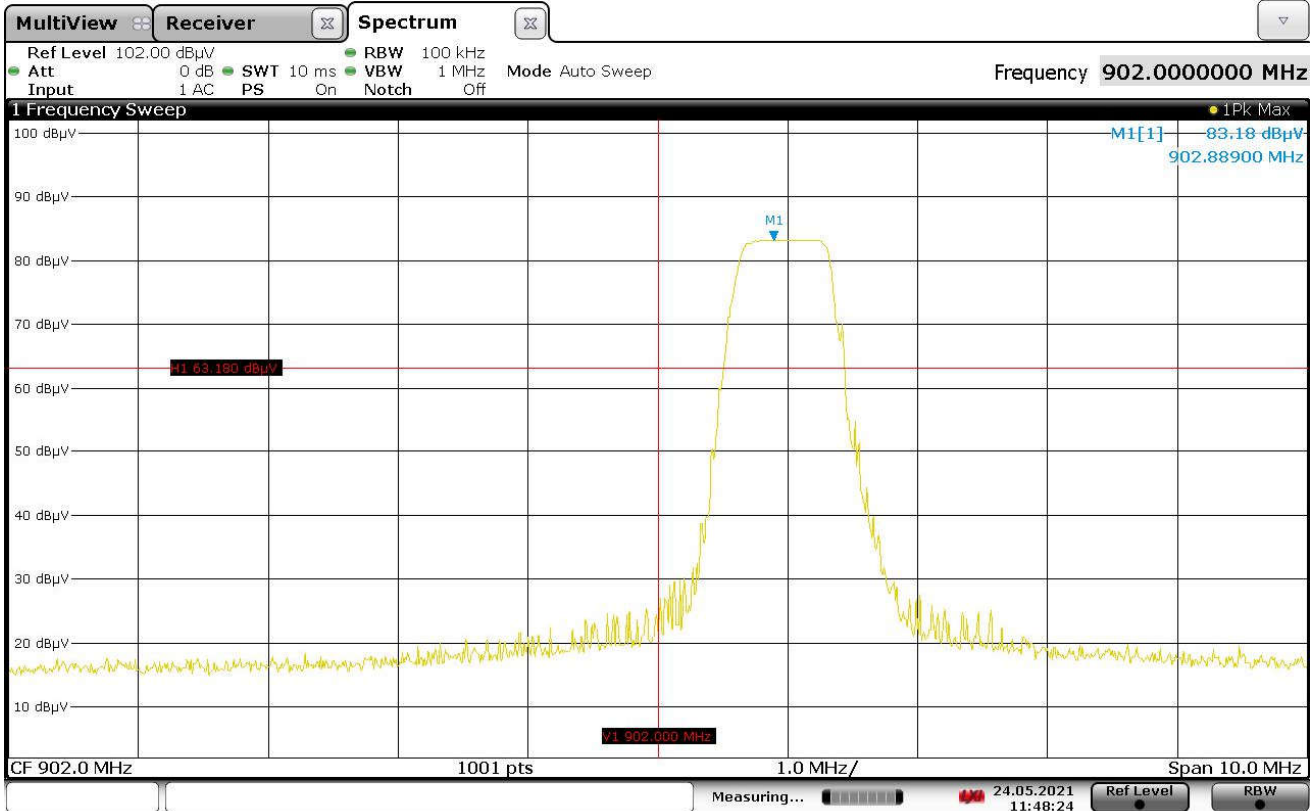
Procedures	
<p>Low Band Edge</p> <ol style="list-style-type: none"> <li>1) The EUT was setup inside the test chamber on a non-conductive stand.</li> <li>2) A broadband measuring antenna was placed at a test distance of 3 meters from the EUT.</li> <li>3) The EUT was set to transmit continuously at the channel closest to the low band-edge.</li> <li>4) The EUT was maximized for worst case emissions at the measuring antenna. The maximum meter reading was recorded.</li> <li>5) To determine the band edge compliance, the following spectrum analyzer settings were used:               <ol style="list-style-type: none"> <li>a. Center frequency = low band-edge frequency.</li> <li>b. 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.</li> <li>c. Resolution bandwidth (RBW) <math>\geq</math> 1% of the span.</li> <li>d. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined.</li> <li>e. 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.)</li> <li>f. The analyzer's display was plotted using a 'screen dump' utility.</li> </ol> </li> </ol> <p>High Band Edge</p> <ol style="list-style-type: none"> <li>1) The EUT was setup inside the test chamber on a non-conductive stand.</li> <li>2) A broadband measuring antenna was placed at a test distance of 3 meters from the EUT.</li> <li>3) The EUT was set to transmit continuously at the channel closest to the high band-edge.</li> <li>4) The EUT was maximized for worst case emissions at the measuring antenna.</li> <li>5) To determine the band edge compliance, the following spectrum analyzer settings were used:               <ol style="list-style-type: none"> <li>a. Center frequency = high band-edge frequency.</li> <li>b. 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.</li> <li>c. Resolution bandwidth (RBW) <math>\geq</math> 1% of the span.</li> <li>d. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined.</li> </ol> </li> </ol>	



- e. 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 right of the center frequency (band-edge) must be below the display line.)
- f. The analyzer's display was plotted using a 'screen dump' utility.

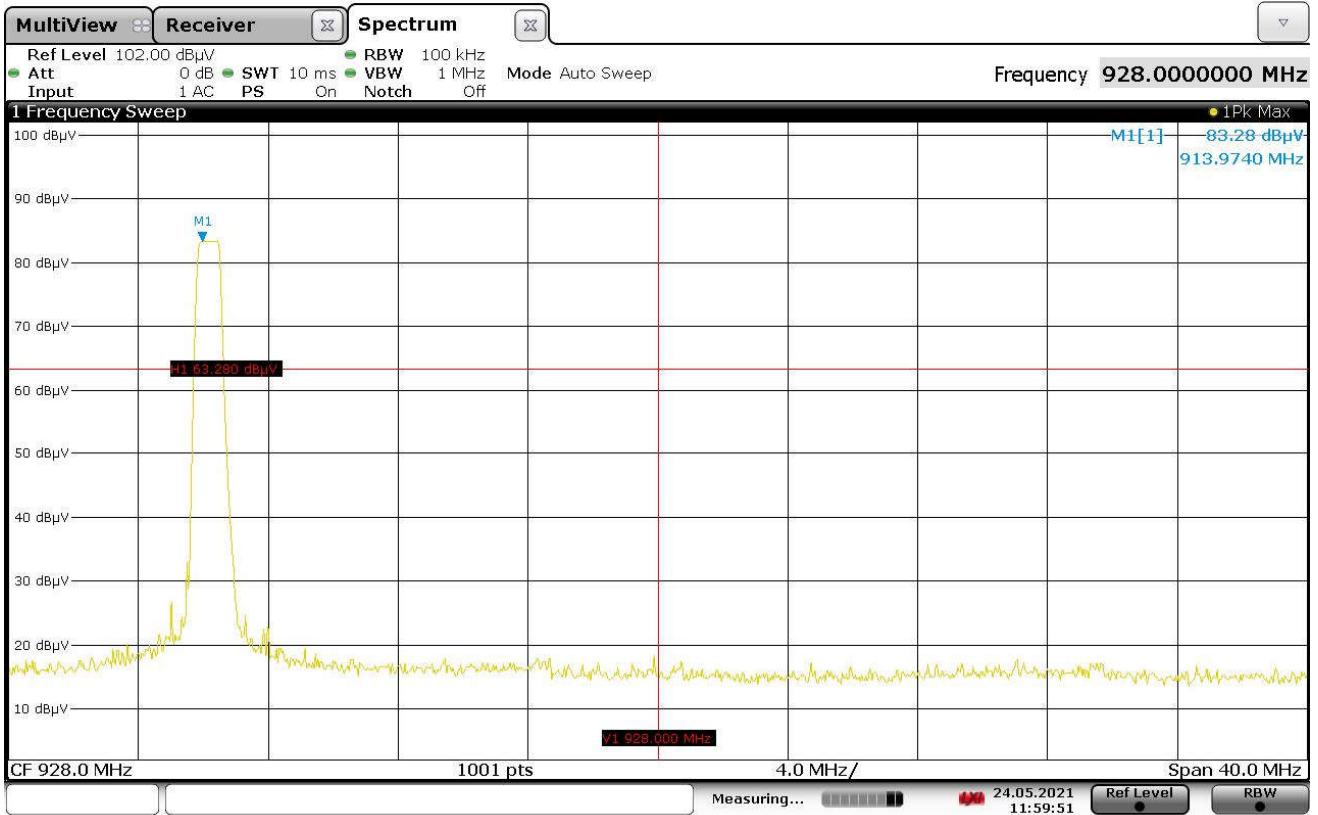
Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	4.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz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

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	903MHz
Parameters	Low Band-Edge
Notes	None



11:48:25 24.05.2021

Test Details	
Manufacturer	Corteva Agriscience
Model	AIR1
S/N	US-1: 323732385C376608
Mode	Transmitting
Carrier Frequency	914.2MHz
Parameters	High Band-Edge
Notes	None



11:59:52 24.05.2021

## 24. Scope of Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ELITE ELECTRONIC ENGINEERING, INC.  
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Downers Grove, IL 60515  
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## ELECTRICAL

Valid to: June 30, 2021

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) <sup>1</sup>:***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

*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)

*Vehicle Radiated Emissions*

CISPR 12; ICES-002

(A2LA Cert. No. 1786.01) Revised 01/10/2020



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

<b><u>Test Technology:</u></b>	<b><u>Test Method(s) <sup>1</sup>:</u></b>
<i>Bulk Current Injection (BCI)</i>	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)
<i>Bulk Current Injections (BCI) (Closed Loop Method)</i>	ISO 11452-4; SAE J1113-4
<i>Radiated Immunity Anechoic (Including Radar Pulse)</i>	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
<i>Radiated Immunity Magnetic Field</i>	ISO 11452-8
<i>Radiated Immunity Reverb</i>	ISO/IEC 61000-4-21; GMW 3097, Section 3.4.3; EMC-CS-2009.1 (RI114); FMC1278 (RI114); ISO 11452-11
<i>Radiated Immunity (Portable Transmitters)</i>	ISO 11452-9; EMC-CS-2009.1 (RI115); FMC1278 (RI115)
<i>Vehicle Radiated Immunity (ALSE)</i>	ISO 11451-2
<i>Electrical Loads</i>	ISO 16750-2, Sections 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.11, and 4.12
<i>Dielectric Withstand Voltage</i>	MIL-STD-202, Method 301; EIA-364-20D
<i>Insulation Resistance</i>	MIL-STD-202, Method 302; SAE/USCAR-2, Revision 6, Section 5.5.1; EIA-364-21D
<i>Contact Resistance</i>	MIL-STD-202, Method 307; SAE/USCAR-2, Revision 6, Section 5.3.1; EIA/ECA-364-23C; USCAR21-3 Section 4.5.3
<i>DC Resistance</i>	MIL-STD-202, Method 303
<i>Contact Chatter</i>	MIL-STD-202, Method 310; SAE/USCAR-2, Revision 6, Section 5.1.9
<i>Voltage Drop</i>	SAE/USCAR-2, Revision 6, Section 5.3.2; USCAR21-3 Section 4.5.6

**Test Technology:****Test Method(s) <sup>1</sup>:****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; KN 11; CNS 13803 (1997, 2003);  
CISPR 14-1; EN 55014-1; AS/NZS CISPR 14.1; 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; KN 32

Current Harmonics

IEC 61000-3-2; EN 61000-3-2; KN 61000-3-2

Flicker and Fluctuations

IEC 61000-3-3; EN 61000-3-3; KN 61000-3-3

**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;  
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;  
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

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;  
IEEE C37.90.1 2012

<b><u>Test Technology:</u></b>	<b><u>Test Method(s) <sup>1</sup>:</u></b>
<b>Immunity (cont'd)</b> 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
Power Frequency Magnetic Field Immunity	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
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
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
Generic and Product Specific EMC Standards	IEC/EN 61000-6-1; AS/NZS 61000-6-1; KN 61000-6-1; IEC/EN 61000-6-2; AS/NZS 61000-6-2; KN 61000-6-2; IEC/EN 61000-6-3; AS/NZS 61000-6-3; KN 61000-6-3; IEC/EN 61000-6-4; AS/NZS 61000-6-4; KN 61000-6-4; EN 50130-4; IEC 61326-1; IEC/CISPR 14-2; EN 55014-2; AS/NZS CISPR 14.2; KN 14-2; IEC/CISPR 24; AS/NZS CISPR 24; EN 55024; KN 24; IEC 60601-1-2; JIS T0601-1-2
<i>TxRx EMC Requirements</i>	EN 301 489-1; EN 301 489-3; EN 301 489-9; EN 301 489-17; EN 301 489-19; EN 301 489-52;
<i>European Radio Test Standards</i>	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 300 330-1; 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 301 413; ETSI EN 302 502

**Test Technology:**

**Test Method(s) <sup>1</sup>:**

*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-246; RSS-247; RSS-251; RSS-252; RSS-287; RSS-288; RSS-310; RSS-GEN

*Mexico Radio Tests*

IFT-008; NOM-208-SCFI

*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

*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

*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; ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015;

*OTA (Over the Air) Performance*

GSM, GPRS, EGPRS  
UMTS (W-CDMA)  
LTE including CAT M1  
A-GPS for UMTS/GSM  
LTS A-GPS, A-GLONASS,  
SIB8/SIB16  
Large Device/Laptop/Tablet Testing  
Integrated Device Testing  
WiFi 802.11 a/b/g/n/ac

CTIA Test Plan for Wireless Device Over-the-Air Performance (Method for Measurement for Radiated Power and Receiver Performance) V3.8.2;  
CTIA Test Plan for RF Performance Evaluation of WiFi Mobile Converged Devices V2.1.0



**Test Technology:**

**Test Method(s)<sup>1</sup>:**

*Electrical Measurements and Simulation*

AC Voltage / Current

(1mV to 5kV) 60 Hz  
(0.1V to 250V) up to 500 MHz  
(1µA to 150A) 60 Hz

FAA AC 150/5345-10H

FAA AC 150/5345-43J

FAA AC 150/5345-44K

FAA AC 150/5345-46E

DC Voltage / Current

(1mV to 15-kV) / (1µA to 10A)

FAA AC 150/5345-47C

FAA EB 67D

Power Factor / Efficiency / Crest Factor

(Power to 30kW)

Resistance

(1mΩ to 4000MΩ)

Surge

(Up to 10 kV / 5 kA) (Combination Wave and Ring Wave)

On the following products and materials:

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

<sup>1</sup> When the date, revision or edition of a test method standard is not identified on the scope of accreditation, the laboratory is expected to be using the current version within one year of the date of publication, per part C., Section 1 of A2LA R101 - *General Requirements - Accreditation of ISO-IEC 17025 Laboratories.*

Testing Activities Performed in Support of FCC Declaration of Conformity and Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1<sup>2</sup>

<b>Rule Subpart/Technology</b>	<b>Test Method</b>	<b>Maximum Frequency (MHz)</b>
<u>Unintentional Radiators</u> Part 15B	ANSI C63.4:2014	40000
<u>Industrial, Scientific, and Medical Equipment</u> Part 18	FCC MP-5 (February 1986)	40000
<u>Intentional Radiators</u> Part 15C	ANSI C63.10:2013	40000
<u>Unlicensed Personal Communication Systems Devices</u> Part 15D	ANSI C63.17:2013	40000



Testing Activities Performed in Support of FCC Declaration of Conformity and Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1<sup>2</sup>

<b>Rule Subpart/Technology</b>	<b>Test Method</b>	<b>Maximum Frequency (MHz)</b>
<u>U-NII without DFS Intentional Radiators</u> Part 15E	ANSI C63.10:2013	40000
<u>U-NII with DFS Intentional Radiators</u> Part 15E	FCC KDB 905462 D02 (v02)	40000
<u>UWB Intentional Radiators</u> Part 15F	ANSI C63.10:2013	40000
<u>BPL Intentional Radiators</u> Part 15G	ANSI C63.10:2013	40000
<u>White Space Device Intentional Radiators</u> Part 15H	ANSI C63.10:2013	40000
<u>Commercial Mobile Services (FCC Licensed Radio Service Equipment)</u> Parts 22 (cellular), 24, 25 (below 3 GHz), and 27	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>General Mobile Radio Services (FCC Licensed Radio Service Equipment)</u> 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
<u>Citizens Broadband Radio Services (FCC Licensed Radio Service Equipment)</u> Part 96	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>Maritime and Aviation Radio Services</u> Parts 80 and 87	ANSI/TIA-603-E; ANSI C63.26:2015	40000
<u>Microwave and Millimeter Bands Radio Services</u> 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
<u>Broadcast Radio Services</u> Parts 73 and 74 (below 3 GHz)	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000



Testing Activities Performed in Support of FCC Declaration of Conformity and Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1<sup>2</sup>

<b>Rule Subpart/Technology</b>	<b>Test Method</b>	<b>Maximum Frequency (MHz)</b>
<u>Signal Boosters</u> Part 20 (Wideband Consumer Signal Boosters, Provider-specific signal boosters, and Industrial Signal Boosters) Section 90.219	ANSI C63.26:2015	40000

<sup>2</sup>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.

A handwritten signature in blue ink.



## 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 8<sup>th</sup> day of August 2019.



Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 1786.01  
Valid to June 30, 2021

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