FCC FORM 442 - FEDERAL COMMUNICATIONS COMMISSION
APPLICATION FOR NEW OR MODIFIED RADIO STATION UNDER PART 5 OF FCC RULES - EXPERIMENTAL RADIO SERVICE (OTHER THAN BROADCAST)

Approved by OMB 3060 - 0065 Expires 09/30/98

Applicant's Name (company): AeroVironment, Inc. **File No.:**

Mailing Address

Attention: Bart Decker, Flight Standards Director
Street Address: 85 Moreland Road
P.O. Box: 93065
City: Simi Valley
State: CA
Country:
Zip Code: 93065
E-Mail Address: Decker@avinc.com

Application Purpose

Application is for: NEW LICENSE

For Modification indicate below

File No.: **Callsign:**

Government Contract

Is this authorization to be used for fulfilling the requirement of a government contract with an agency of the United States Government? If "YES", include as an exhibit a narrative statement describing the government project, agency and contract number. No

Foreign Government Use

Is this authorization to be used for the exclusive purpose of developing radio equipment for export to be employed by stations under the jurisdiction of a foreign government? If "YES", include the contract number and the name of the foreign government concerned as an exhibit. No

Research Project

Is this authorization to be used for providing communications essential to a research project? (The radio communication is not the objective of the research project)? If "YES", include as an exhibit the following information:

a. **A description of the nature of the research project being conducted.**
b. **A showing that the communications facilities requested are necessary for the research project involved.**
c. **A showing that existing communications facilities are inadequete.**

No

Exhibit Information

If all the answers to Items 4, 5, 6 are "NO", include as an exhibit a narrative statement describing in detail the following items:

a. **The complete program of research and experimentation proposed including description of equipment and theory of operation.**
b. **The specific objectives sought to be accomplished.**
c. **How the program of experimentation has a reasonable promise of contribution to the development, extension, expansion or utilization of the radio art, or is along line not already investigated.**

Estimated Duration

Give an estimate of the length of time that will be required to complete the program of experimentation proposed in this application: 24 Months

Environmental Impact

Would a commission grant of this application come within Section 1.1307 of the FCC Rules, such that it may have a significant environmental impact? If "YES", include as an exhibit an Environmental Assessment as required by Section 1.1311. No

Manufacturer

List below transmitting equipment to be installed (if experimental, so state) if additional rows are required, please submit equipment list as an exhibit :

Manufacturer	Model Number	No. Of Units	Experimental
.			
Persistent Systems LLC	RS-232	4	No
Persistent Systems LLC	2AG3J-RF2150	4	No

Station ID

Is the equipment listed in Item 10 capable of station identification pursuant to Section 5.115? No

Applicant Type

Applicant is: Corporation

Foreign Government

Is applicant a foreign government or a representative of a foreign government? No

License Denied or Revoked

Has applicant or any party to this application had any FCC station license or permit revoked or any application for permit, license or renewal denied by this Commission?
If "YES", include as an exhibit a statement giving call sign of license or permit revoked and relate circumstances. No

Owner and Operator

Will applicant be owner and operator of the station? Yes

Contact Information

Give the following information of person who can best handle inquiries pertaining to this application: First Name: John E
Last Name: Logan
Title: Attorney for AeroVironment
Phone Number: 2024948714
E-Mail Address: johnelogan@jelogan.com

Drug Abuse Question

APPLICANT ANTI-DRUG ABUSE CERTIFICATION: By checking "YES", the individual applicant certifies that he or she is eligible for this license. This requires that he or she is not subject to a denial of federal benefits, including FCC benefits, as a result of a drug offense conviction pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862. A non-individual applicant, e.g., corporation. partnership or other unincorporated association, certifies that no party to the application is subject to a denial of federal benefits, pursuant to that section. For definition of a "party" for these purposes, see 47CFR 1.2002(b). Yes

Certification

THE APPLICANT CERTIFIES THAT:

a. **Copies of the FCC Rule Parts 2 and 5 are on hand; and**
b. **Adequete financial appropriations have been made to carry on the program of experimentation which will be conducted by qualified personnel; and**
c. **All operations will be on an experimental basis in accordance with Part 5 and other applicable rules, and will be conducted in such a manner and at such a time as to preclude harmful interference to any authorized station; and**
d. **Grant of the authorization requested herein will not be construed as a finding on the part of the Commission:**
    1. **that the frequencies and other technical parameters specified in the authorization are the best suited for the proposed program of experimentation, and**
    2. **that the applicant will be authorized to operate on any basis other than experimental, and**
    3. **that the Comission is obligated by the results of the experimental program to make provision in its rules including its table of frequency allocations for applicant's type of operation on a regularly licensed basis.**

THE APPLICANT FURTHER CERTIFIES THAT:

e. **All the statements in the application and attached exhibits are true, complete and correct to the best of the applicant's knowledge; and**
f. **The applicant is willing to finance and conduct the experimental program with full knowledge and understanding of the above limitations; and**
g. **The applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the USA.**

Name of Applicant: AeroVironment, Inc.
Signature (Authorized person filing form): Bart Decker
Signature Date (Authorized person filing form):
Title of Person Signing Application: Flight Standards Director
Classification: Authorized employee

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(A)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).

NOTIFICATION TO INDIVIDUALS UNDER PRIVACY ACT OF 1974 AND THE PAPERWORK REDUCTION ACT OF 1980

Information requested through this form is authorized by the Communications Act of 1934, as amended, and specified by Section 308 therein. The information will be used by Federal Communications Commission staff to determine eligibility for issuing authorizations in the use of the frequency spectrum and to effect the provisions of regulatory responsibilities rendered by the Commission by the Act. Information requested by this form will be available to the public unless otherwise requested pursuant to 47 CFR 0.459 of the FCC Rules and Regulations. Your response is required to obtain this authorization.

Public reporting burden for this collection of information is estimated to average four (4) hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden to the Federal Communications Commission, Records Management Branch, Paperwork Reduction Project (3060-0065), Washington DC 20554. DO NOT send completed applications to this address. Individuals are not required to respond to this collection unless it displays a currently valid OMD control number.

THE FOREGOING NOTICE IS REQUIRED BY THE PRIVACY ACT OF 1974, P.L. 93-579, DECEMBER 31, 1974, 5 U.S.C. 552a(e)(3), AND THE PAPERWORK REDUCTION ACT OF 1980, P.L. 96-511, DECEMBER 11, 1980, 44 U.S.C. 3507.

Station Location

	City	State	Latitude	Longitude	Mobile	Street (or other indication of location)	County	Radius of Operation
0	Simi Valley	CA	North 34 18 40	West 118 48 36	Ground Based Locations within 30 km center	Simi-Filmore-Brennan	Ventura	30.00 km

Datum: NAD 83

Is a directional antenna (other than radar) used? Yes

Exhibit submitted: Yes

(a) Width of beam in degrees at the half-power point:

(b) Orientation in horizontal plane (degrees from True North):

(c) Orientation in vertical plane (degrees from horizontal):

Will the antenna extend more than 6 meters above the ground, or if mounted on an existing building, will it extend more than 6 meters above the building, or will the proposed antenna be mounted on an existing structure other than a building? No

(a) Overall height above ground to tip of antenna in meters:

(b) Elevation of ground at antenna site above mean sea level in meters:

(c) Distance to nearest aircraft landing area in kilometers:

(d) List any natural formations of existing man-made structures (hills, trees, water tanks, towers, etc.) which, in the opinion of the applicant, would tend to shield the antenna from aircraft:

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2212.00000000-2242.00000000 MHz	MO	10.000000 W 9.66 W	M	0.00004%	4M06D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	2212.00000000-22242.00000 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	2212.00000000-2242.00000000 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	17M8D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2247.00000000-2267.00000000 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	4M06D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	2247.00000000-2267.00000000 MHz	MO	10.000000 W 9.66W	M	0.0004000 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	2247.000-2267.0000MHz	MO	10.000000 W 9.66W	M	0.00004000 %	17M8D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2252.00000000-2272 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	4M06D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2252.00000000-2272 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2252.00000000-2272MHz	MO	10.000000 W 9,66 W	M	0.00004 %	17M8D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2277.00000000-2297 MHz	MO	10.000000 W 9.66 W	M	0.00004 %	4MO6D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2277.00000000-2297MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2277.00000000-2297 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	17M8D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
	2302.000000-2347 MHz	MO	10.000000 W 9.66 W	M	0.0004000 %	4MO6D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2302.00000000-2347 MHz	MO	10.000000 W 9.66 W	M	0.0004000 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2302.00000-2347MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	17M8D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2352.000000-2387 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	4M06D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2352.0000-2387 MHz	MO	10.000000 W 9.66 W	M	0.0004 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	2352.000-2387 MHz	MO	10.000000 W 9.66000 W	M	0.00004000 %	17M8D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	2402.00000-2472 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	4M06D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2402.00000-2472 MHz	MO	10.000000 W 9.66 W		0.00004000 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2402.000000-2472 MHz	MO	10.000000 W 9.66 W		0.0004000 %	17M8D1D	OFDM

	City	State	Latitude	Longitude	Mobile	Street (or other indication of location)	County	Radius of Operation
0	Simi Valley	CA	North 34 18 40	West 118 48 36	Airborne UAS VLOS Operations 30 km radius, 121.9 m AGL	Simi-Filmore-Brennan	Ventura	30.00 km

Datum: NAD 83

Is a directional antenna (other than radar) used? Yes

Exhibit submitted: Yes

(a) Width of beam in degrees at the half-power point:

(b) Orientation in horizontal plane (degrees from True North):

(c) Orientation in vertical plane (degrees from horizontal):
Will the antenna extend more than 6 meters above the ground, or if mounted on an existing building, will it extend more than 6 meters above the building, or will the proposed antenna be mounted on an existing structure other than a building? Yes

(a) Overall height above ground to tip of antenna in meters: 121.9 meters
(b) Elevation of ground at antenna site above mean sea level in meters: 331

(c) Distance to nearest aircraft landing area in kilometers:
(d) List any natural formations of existing man-made structures (hills, trees, water tanks, towers, etc.) which, in the opinion of the applicant, would tend to shield the antenna from aircraft: None

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2212.00000000-2242.00000000 MHz	MO	10.000000 W 9.66 W	M	0.00004%	4M06D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	2212.00000000-222.00000 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	2212.00000000-2242.00000000 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	17M8D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2247.00000000-2267.00000000 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	4M06D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	2247.00000000-2267.00000000 MHz	MO	10.000000 W 9.66 W	M	0.0004000 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	2247.000-2267.0000MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	17M8D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2252.00000000-2272 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	4M06D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2252.00000000-2272 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2252.00000000-2272MHz	MO	10.000000 W 9.66 W	M	0.00004 %	17M8D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2277.00000000-2297 MHz	MO	10.000000 W 9.66 W	M	0.00004 %	4MO6D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2277.00000000-2297MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2277.00000000-2297 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	17M8D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
	2302.000000-2347 MHz	MO	10.000000 W 9.66 W	M	0.0004000 %	4MO6D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2302.00000000-2347 MHz	MO	10.000000 W 9.66W	M	0.0004000 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2302.00000-2347MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	17M8D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2352.000000-2387 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	4M06D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2352.0000-2387 MHz	MO	10.000000 W 9.66 W	M	0.0004 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	2352.000-2387 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	17M8D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	2402.00000-2472 MHz	MO	10.000000 W 9.66 W	M	0.00004000 %	4M06D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2402.00000-2472 MHz	MO	10.000000 W 9.66 W		0.00004000 %	8M91D1D	OFDM

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
New	2402.00000-2472 MHz	MO	10.000000 W 9.66 W		0.00004000 %	17M8D1D	OFDM

AeroVironment, Inc.
Application for Experimental
License

Explanation of Experiments and Need for FCC Experimental License

AeroVironment, Inc. (AV) designs, develops, manufactures, supports and operates unmanned aircraft systems ("UAS"). As part of the engineering and production process AV tests UAS communications systems to make sure specifications are met and to learn how it can better serve its customers. These experimental operations are for testing UAS command and control, telemetry and payload systems. AV proposes a two-year experimental license.

The experiments will conduct Acceptance Test Procedures (ATP) in the 2 GHz spectrum segments addressing uplink command and control and downlink video and telemetry transmissions across the Persistent Technology MPU5 radio system. Systems are tested and retested as part of the production process. Tests include aerial reconnaissance, surveillance, route clearance, mapping, and payload delivery.

AV engineering and technical personnel conduct the tests. AV gathers feedback regarding the aircraft's radio communications to assist research and development to improve solutions based on evolving customer needs. The tests refine mission-oriented flight operations.

Purpose and Nature of Operations

The proposed channels will be engaged to send command and control data from and to the UAS aircraft and to transmit NTSC video and telemetry to the ground control station. Two separate radio transceivers operating in the Puma AE and Puma LE aircraft will be tested:

.

- Persistent Systems: LLC RS-232
- Persistent Systems: 2AG3J-RF2150

The operational objective of the tests will be to enable communication from UAS vehicle A to UAS vehicle B and to the Ground Control station with the Manet Mesh Network MPU5 radios.

Flights are confined to Visual Line of Sight (VLOS), 400 m AGL within a 30 km radius.

The VLOS operations across all frequency segments will be within 3 km of a center-point. The wider 30 km radius enables range testing via a Remote Viewing Terminal (RVT), flying the aircraft from the Simi Valley base site and taking an RVT out 30 km to see if the communications link can be maintained with the two aircraft and ground station. Command and control will never be taken from that RVT as the individual navigating the controls must maintain VLOS of the aircraft.

AeroVironment understands that access to the 2.2 GHz segment is limited to visual line of sight operations. *FCC Online Table of Frequency Allocations, 47 CFR 2.106. 2200- 2290 MHz, Manual of Regulations and Procedures for Federal Radio Frequency Management (Redbook), Chapter 4-39, 4.1.3 at page 37.* As the number of frequency channels available increase the quality and value of the testing, AeroVironment asks that the 2.2 GHz segment be available for its VLOS. AeroVironment commits to operations limited to visual line of site for all frequencies within the application.

Testing will be performed at intermittent intervals, 5 times per month for 4 hours daily.

Transmitting and Receiver Equipment

Manufacturer	Model	Quantity	Experimental
Persistent Systems	RS-232	4	No
Persistent Systems MPU5	2AG3J-RF2150	4	No

Emission Designators

Three emission designators will be used in the testing: 4M06D1D, 8M91D1D and 17M8D1D.

Antenna

A separate attachment addresses the antenna of each technology.

Restrictions on Operations and Interference Protection

AV understands that experimental operations must not cause harmful interference to authorized facilities. AV commits to operations respecting other users of the band and those in adjacent segments. The limited power levels proposed and the short-term intermittent use are part of this commitment. Should any interference occur, AeroVironment will take immediate steps to resolve the interference, including, discontinuing operations.

Waiver of Station Identification Requirements

AV requests a waiver of the station identification requirements stated in Section 5.115 of the Commission's rules.

Stop Buzzer

Bart Decker, AV's Director of Flight Standards, is available by telephone or electronic mail at 805 391-1335 and Decker@AVINC.com, respectively and will act as a stop buzzer if any matters involving interference arise during the testing.

Coordination

This application includes coordination with the Aerospace & Flight Test Radio Coordinating Council (AFTRCC), which is attached. AV agrees to abide by the conditions stated by AFTRCC

in its coordination.

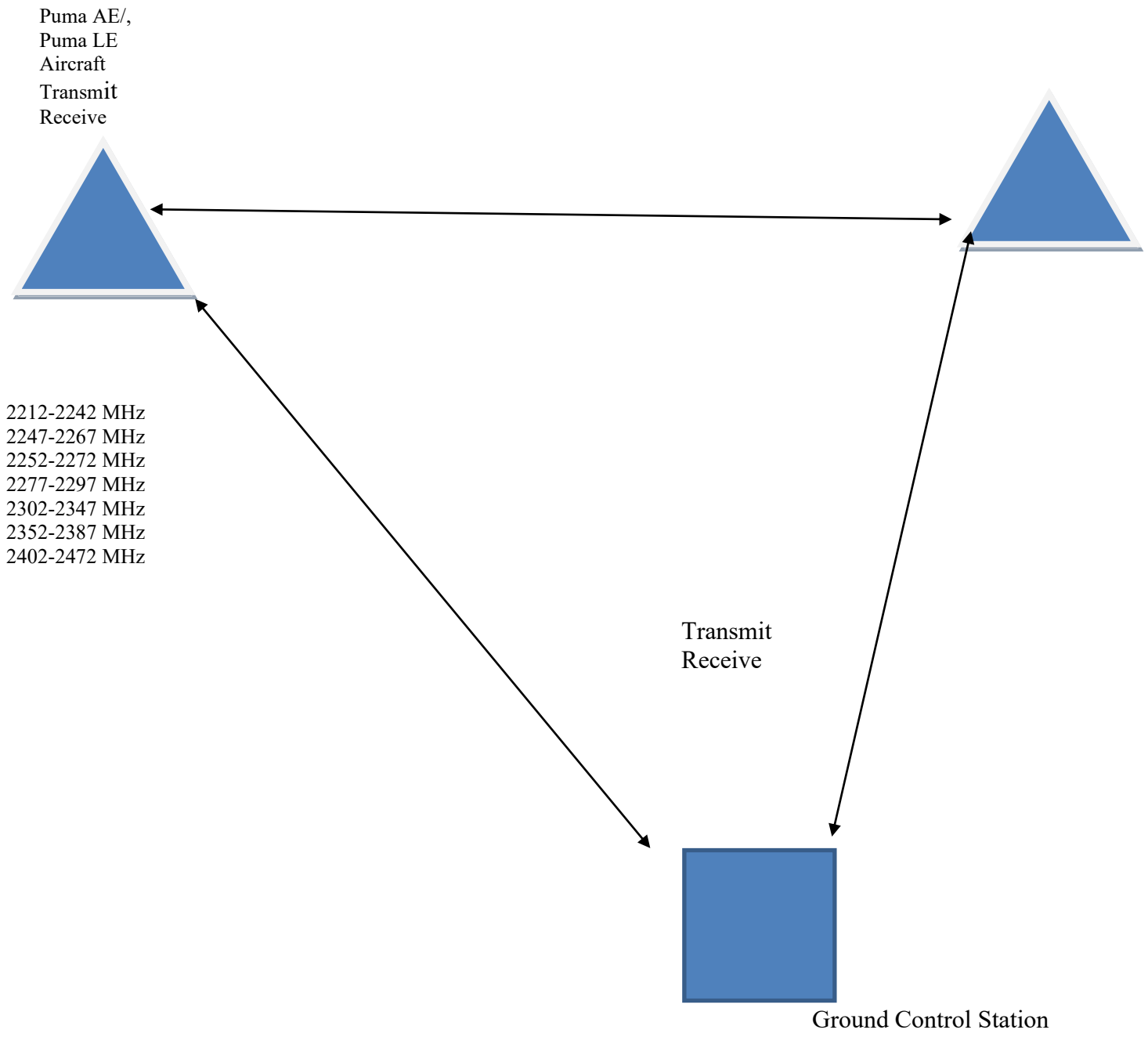
Diagram and Area of Operations

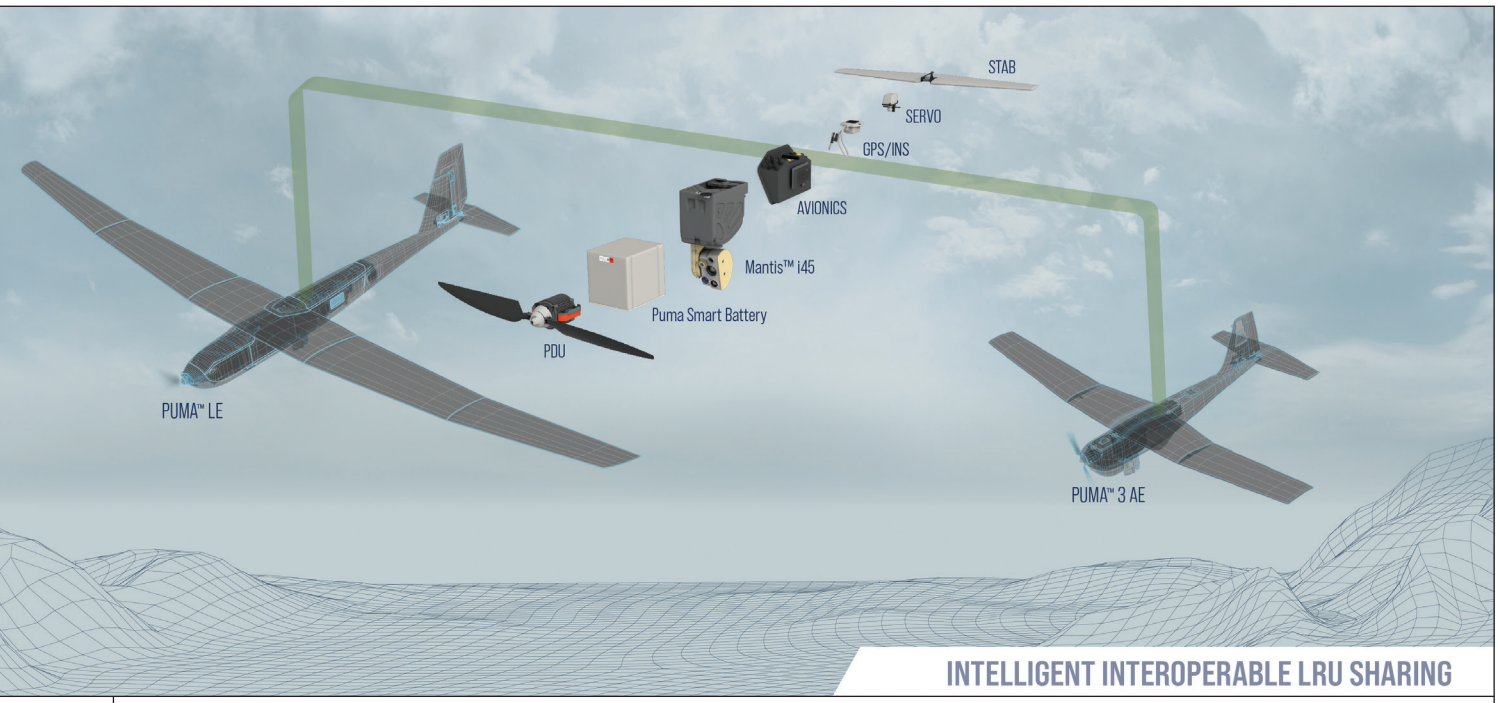
A diagram of the proposed operations is provided as an attachment.

Conclusion

AeroVironment appreciates the Commission's, NTIA's, and others agencies and AFTRCC's consideration in reviewing this Experimental Authorization application. Please call upon us if we can respond to any questions.

LINE DIAGRAM





INTELLIGENT INTEROPERABLE LRU SHARING

P

AeroVironment, Inc.
NASDAQ (AVAV)
900 Innovators Way
Simi Valley, CA 93065
www.avinc.com
Tel: 805.520.8350
Email: businessdev@avinc.com

AeroVironment™

PROCEED WITH CERTAINTY

Antenna Equipment Characteristics

Persistent Technology Wave Relay 10W RF-2150-MPUS

The Persistent Technology Wave Relay radio setup will use omni-directional antennas and will be the foundation of the antenna system. The ground antennas are omni antennas similar to those pictured below and are part of the Persistent MPU-5 radio kit. Up to 2 dBi gain is estimated and will cover the same frequency bands as the MPU5 radio transceiver and proposed in the application. The airborne MPU5 antennas will also to 3x omni antennas, but significantly smaller than that shown below.


WAVE RELAY

The experiments will also test 2 other antenna on the aircraft, 1) the SWA 1000-048 and 2) three custom antennas, each of which will be mounted on the aircraft.

A summary is provided below:

SWA 1001-048

Antenna	Gain (Main Beam)	Polarization	Orientation in Vertical Plane	Orientation in Horizontal Plane	Type
SWA	2.5 dbi	Vertical	70º- 83°	360°	Omni

The SWA 1001-048 data sheet is attached.

Three Custom Antenna

Three antenna will be placed on the left and right side and bottom of the aircraft.

The transmit power of 1 watt is equal to 30 dbm.

The Transmit power of 3.2 watt is equivalent to 35.5 dBm

Antennas peak gain:

- Left antenna Gl = 8.39 dbi
- Right antenna Gr = 8.54 dbi
- Bottom antenna Gb = 7.97 dbi

EIRP calculations at 1 watt

- Left antenna ERIP = 30 + 8.39 = 38. 4 dBm
- Right antenna ERIP = 30 + 8.54 = 38.5 dBm
- Bottom antenna ERIP = 30 + 7.97 = 38.0 dBm

EIRP calculations at 3.2 watt

- Left antenna ERIP = 35.5. + 8.39 = 43.9 dBM
- Right antenna ERIP = 35.5 + 8.54 = 44.0 dBm
- Bottom antenna ERIP = 35.5 + 7.97 = 43.5 dBm

Overview

Southwest Antennas Part # 1001-048 is a compact omni-directional antenna that features an operational frequency range of 2.1 - 2.5 GHz and offers 2.5 dBi of peak gain.

The compacy size of the antenna allows for easy integration onto small radio systems, unmanned vehicles, covert surveillance systems, or other installation scenarios which don't support larger antenna options.

Features:

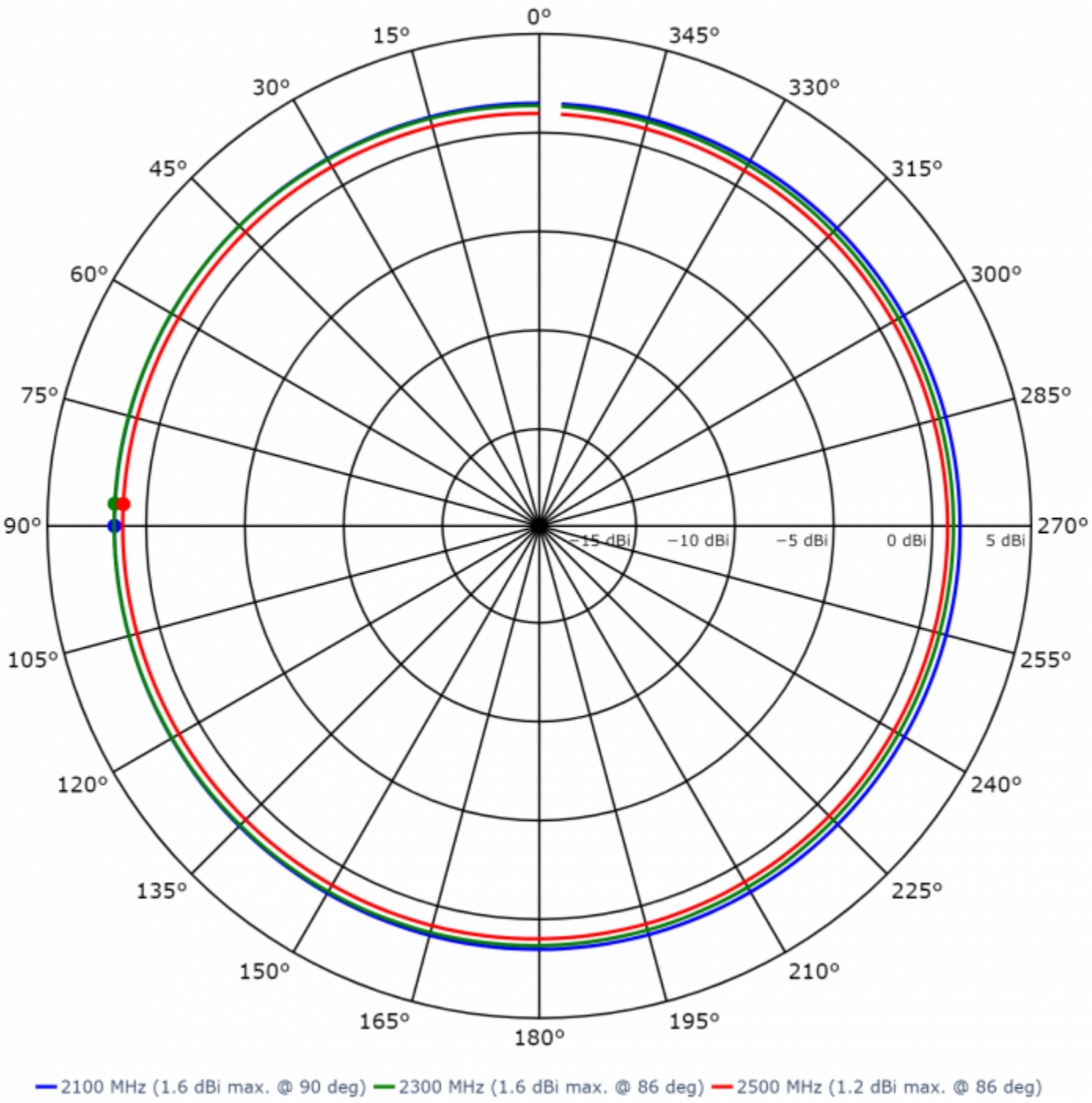
- Broad Band Coverage
- 2.1 - 2.5 GHz
- Half Wave Dipole
- 2.5 dBi Omni Radiation Pattern
- 50W Power Handling
- Recessed SMA(m) RF Connector
- The connector should be torqued to 3 - 5 in-lbs maximum

10939 Technology Place • San Diego, CA 92127
PH: (858) 381-4197 • Email: sales@southwestantennas.com
southwestantennas.com

Antenna Specifications

Parameter	Value	Units	Tolerance
Antenna Pattern	Omni Antenna		
Frequency Band	S		
Impedance	50	Ohms	
Minimum Frequency	2.1 / 2,100	GHz / MHz	
Maximum Frequency	2.5 / 2,500	GHz / MHz	
Frequency Bandwidth	0.4 / 400	GHz / MHz	
Maximum VSWR	2:1	Ratio	
Maximum Gain	2.5	dBi	
Polarization	Vertical		
Maximum RF Input Power	50	Watts	
Horizontal (AZ) Beamwidth	360	Degrees	
Vertical (EL) Beamwidth	70 - 83	Degrees	
Ground Plane Required	No		
Color	Flat Black		
Maximum Wind Velocity	124 / 200	mph / kph	
RF Connector Type	SMA(m)		
Product Height	3.50 / 88.90	inches / mm	±0.13"
Product Diameter	0.56 / 14.27	inches / mm	+0.02" / -.000"
Product Weight	0.8 / 21.5	oz / grams	

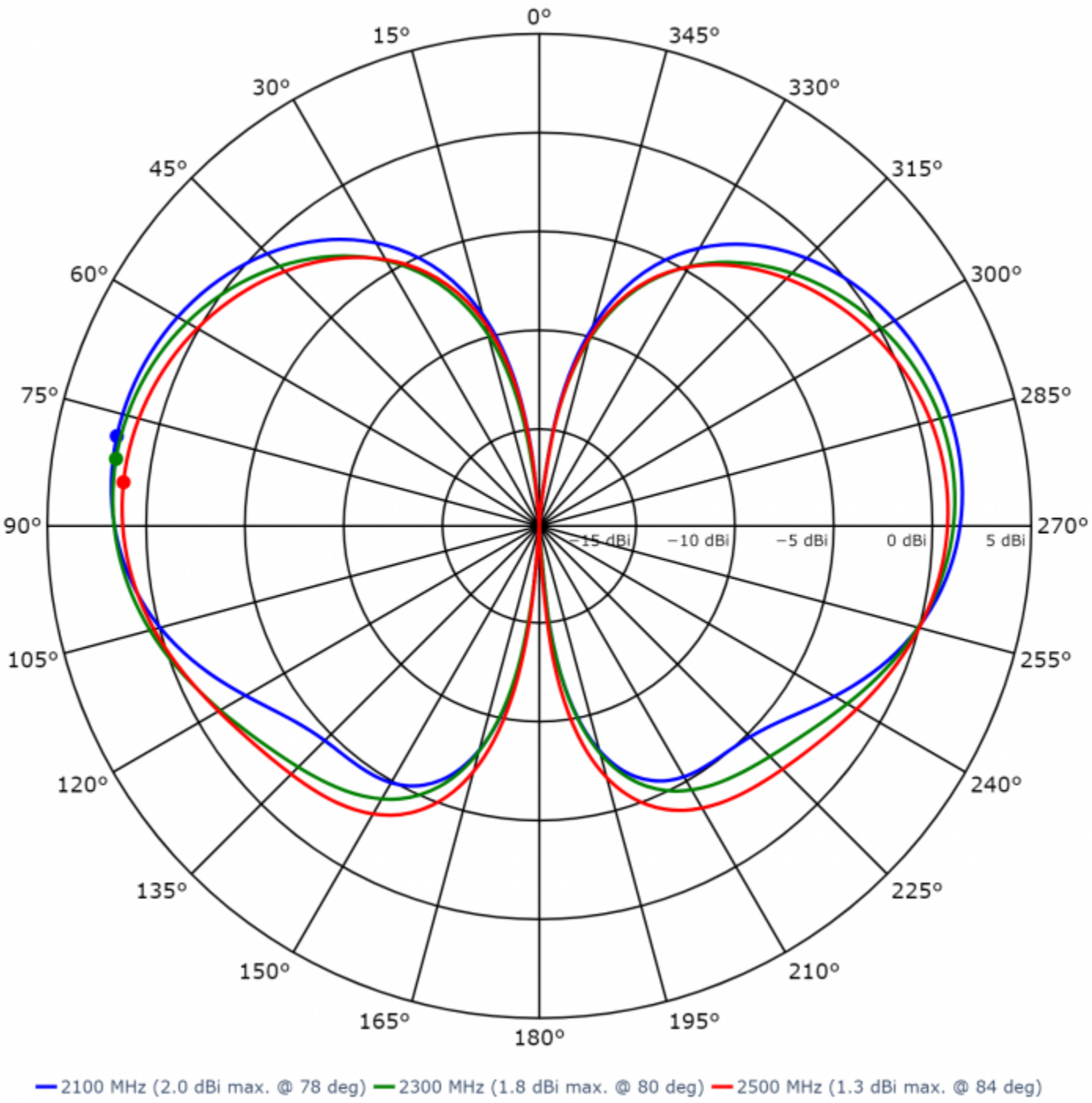
10939 Technology Place • San Diego, CA 92127
PH: (858) 381-4197 • Email: sales@southwestantennas.com
southwestantennas.com



Azimuth Pattern

Referenced to +5 dBi

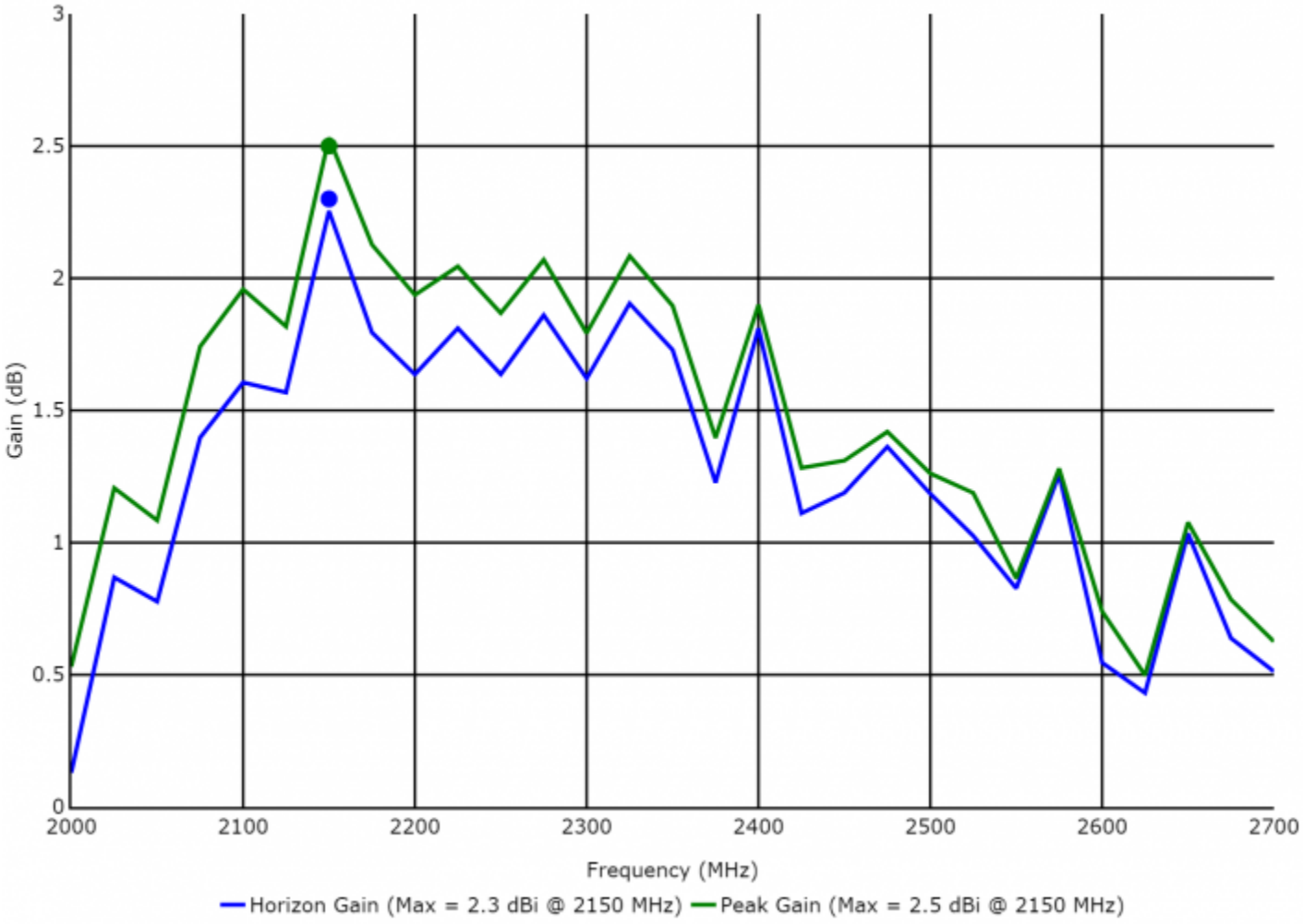
10939 Technology Place • San Diego, CA 92127
PH: (858) 381-4197 • Email: sales@southwestantennas.com
southwestantennas.com



Elevation Pattern

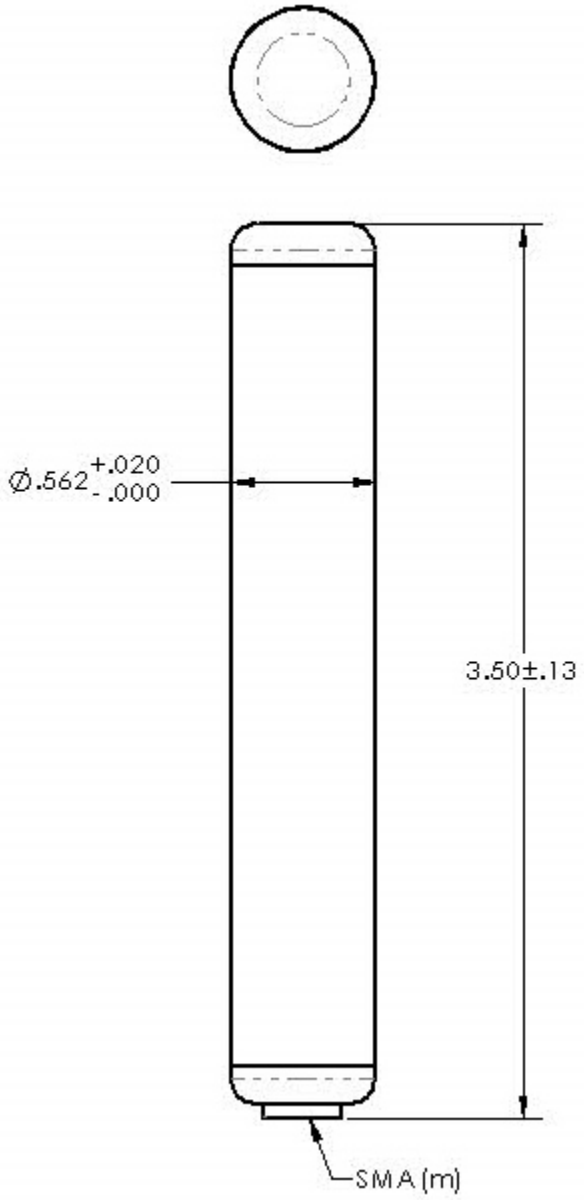
Referenced to +5 dBi

10939 Technology Place • San Diego, CA 92127
PH: (858) 381-4197 • Email: sales@southwestantennas.com
southwestantennas.com



Gain vs. Frequency Plot

10939 Technology Place • San Diego, CA 92127
PH: (858) 381-4197 • Email: sales@southwestantennas.com
southwestantennas.com



Engineering Drawing

Dimensions are in inches

10939 Technology Place • San Diego, CA 92127
PH: (858) 381-4197 • Email: sales@southwestantennas.com
southwestantennas.com