



# Technical Brief for Airborne Wireless Network Experimental Test

March 28, 2017

ITC Document No:  
20170301m06v01.2\_AWN\_Tech\_Brief.docx



Prepared by  
**Intellicom Technologies, Inc.**

Approved by:

Paul Moller  
Vice-President, Intellicom Technologies Inc.

This document contains confidential Technical Data considered to be a commercially valuable resource. This data is provided strictly in support of obtaining an FCC license. The document is provided to terminal operators and the FCC in support of the licensing process. The document shall not be distributed to any party that is not supporting evaluation of the license application.



# 1 TABLE OF CONTENTS

1	TABLE OF CONTENTS.....	2
2	INTRODUCTION .....	4
3	SYSTEM DESCRIPTION.....	5
3.1	Network Configuration .....	5
3.2	Points of Communications .....	7
3.3	Coordination .....	8
3.4	Antennas .....	8
3.4.1	Ground antenna .....	8
3.4.2	Airborne Antenna.....	9
3.5	Transmission Plan .....	10
3.6	Schedule of Operation .....	10



## Revision History

Revision History:	Date	Document Revision Description
V01.2	2017 03 28	Submission to FCC



## 2 INTRODUCTION

Airborne Wireless Network (AWN) is developing an airborne communications system and would like to perform tests of radio links between two aircraft and from aircraft to ground. The testing will be performed within a limited geographic area and for a limited time period. The frequencies are chosen based on equipment availability. Future systems may be based on other frequencies.

AWN is seeking an FCC license with the following attributes:

- STA/Experimental license
- Operation limited to Roswell, New Mexico
- Short test duration – several hours per day for up to 2 weeks
- Frequency of operation – within 14.6-14.8 and 15.15-15.35 GHz

Intellicom Technologies, Inc. is representing AWN in this matter. Please contact the following for additional information, comments, or clarifications:

**Paul Moller**  
**Intellicom Technologies, Inc.**  
480-993-2220  
[PMoller@ITCcom.net](mailto:PMoller@ITCcom.net)  
[www.ITCcom.net](http://www.ITCcom.net)

### 3 SYSTEM DESCRIPTION

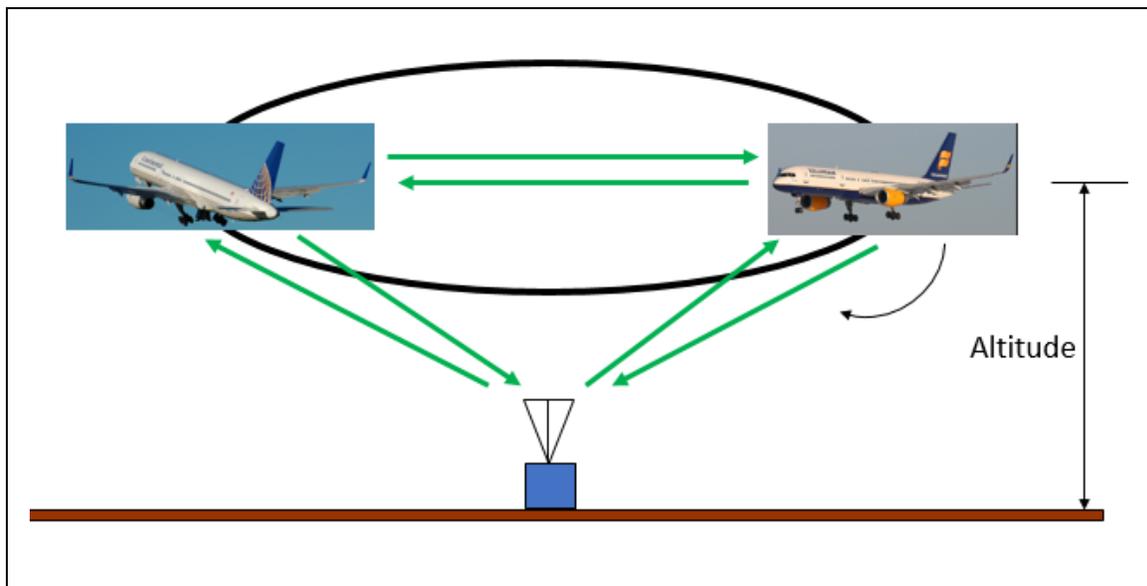
This section provides a description of the system. Key components are identified.

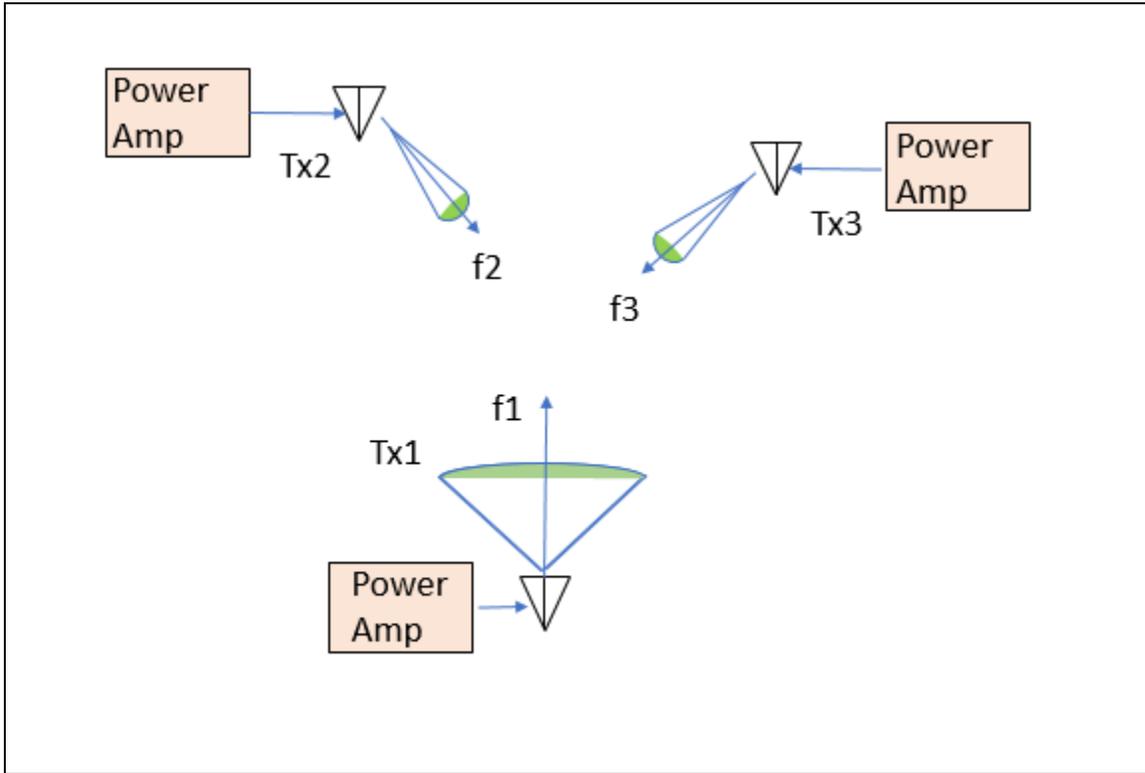
#### 3.1 Network Configuration

AWN is seeking an experimental license for testing air-air and air-ground radio links. Two aircraft will circle a fixed transceiver on the ground.

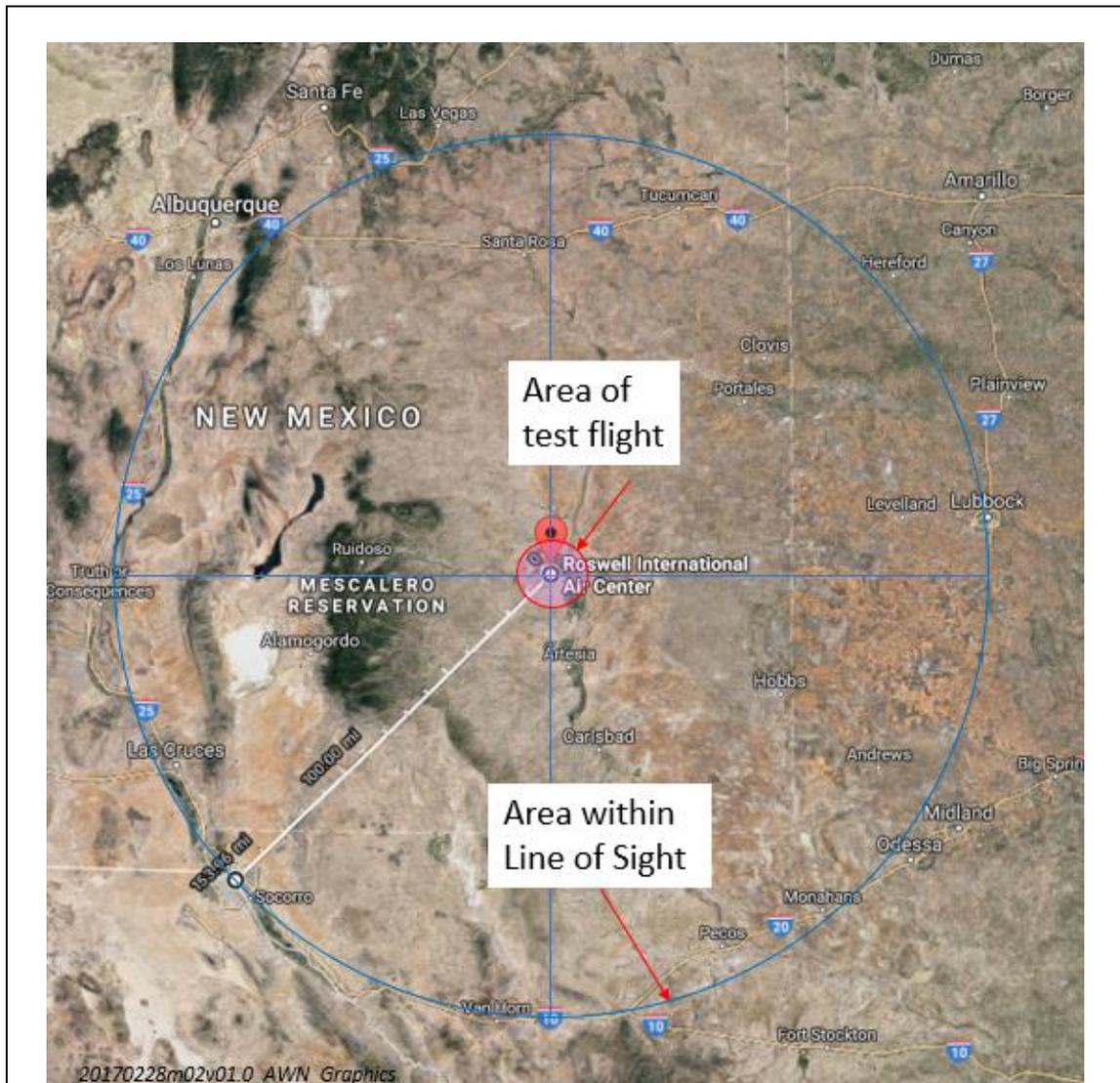
The test network consists of:

- Ground Transceiver (Tx1)
- Airborne Transceiver (Tx2)
- Airborne Transceiver (Tx3)





## 3.2 Points of Communications



### Points of Communications

#### Area of Flight

Roswell International Air Center  
 1 Jerry Smith Cir  
 Roswell, NM 88203  
 Chaves County

33.305562N, 104.517683W

33°18'17", 104°31'53"

Ground level at 1090 m ASL

Flight circle radius of 11 nautical miles (20 km)

Airborne transmitters point towards center of circle (11 nmi)

Altitude up to 13,500 ft

***iTELLICOM Technologies, Inc.***

PO Box 27056, San Diego, CA 92198  
 Tel: (858) 486-1115, [www.ITCcom.net](http://www.ITCcom.net)



### 3.3 Coordination

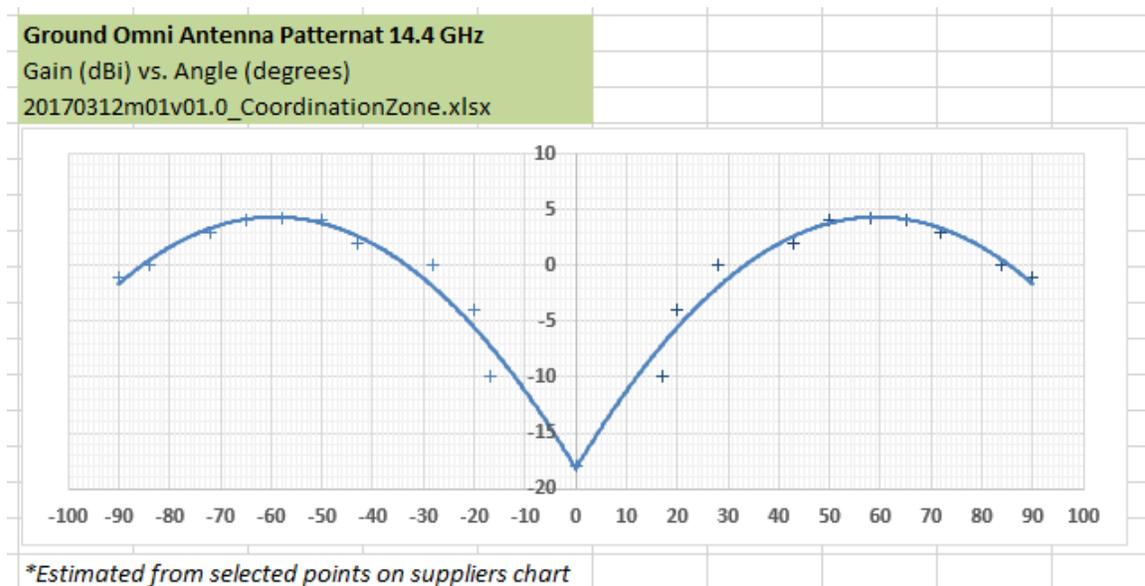
- No other non-government users operate within line of sight (per FCC Universal Licensing System)
- NASA TDRSS terminals within New Mexico operate in a different frequency band 13.4 to 14.2 GHz, are 134 miles (216 km) away, and are beyond their stated coordination zone of 160 km.
- NSF terminals within New Mexico operate in a different frequency band of 14.47 to 14.5 GHz, are beyond line of sight, are 182 miles (293 km) away, and are beyond their stated coordination zone of 125 km.

### 3.4 Antennas

#### 3.4.1 Ground antenna

The ground antenna will provide coverage of the circling aircraft transceivers. Maximum gain is 4.2 dBi.

The ground antenna will be fixed and not tracking.



A base station will be on the ground and is an omni-directional antenna.



### 3.4.2 Airborne Antenna

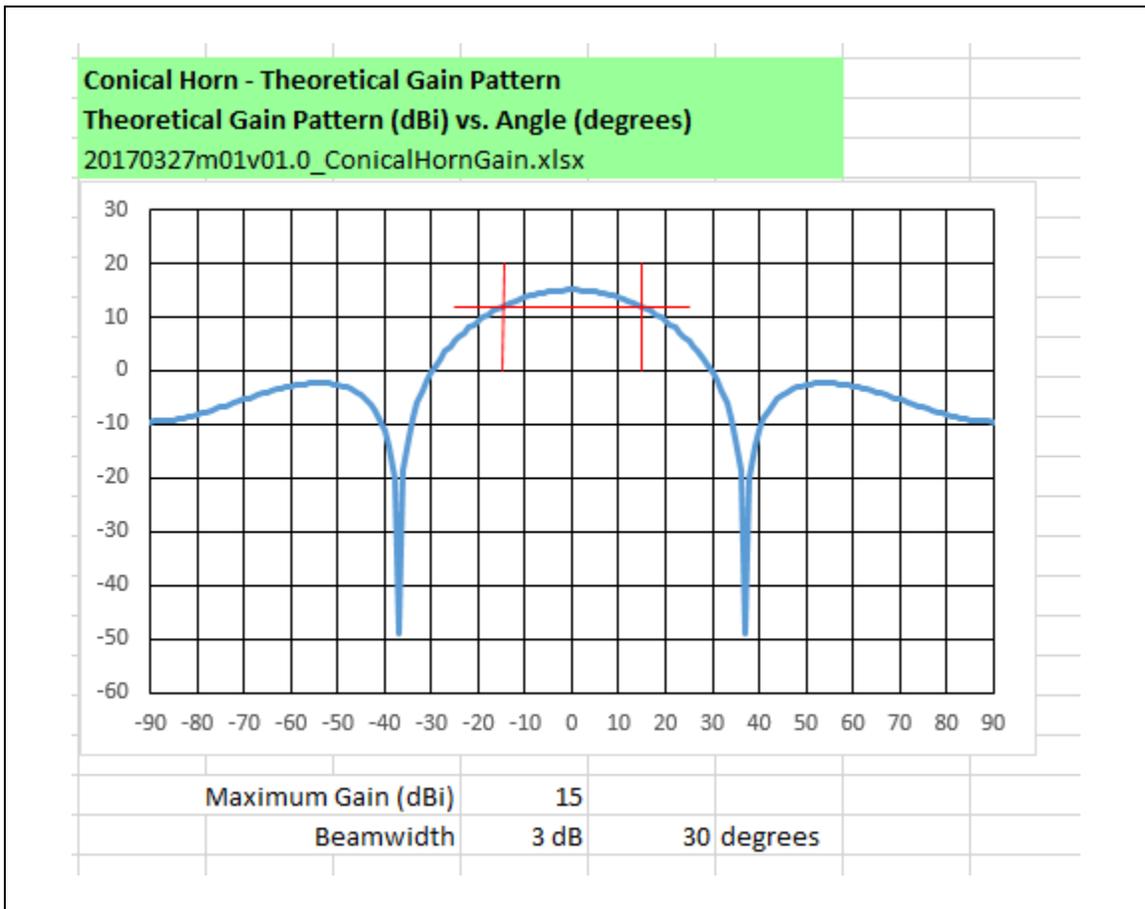
The airborne antenna will provide air-air and air to ground coverage.

Two aircraft will fly in a 20 km radius circle around the base station at 13,500' (4115m). Each aircraft will have a directional antenna pointing towards the base station.

The antenna planned for the test is a circularly polarized conical horn. Only theoretical gain patterns are available at this time (see chart below). Maximum gain is 15 dBi and the 3 dB beamwidth is 30 degrees.

The antenna will point down towards the base station from 0 to 15 degrees.

The airborne antenna will be fixed and not tracking.





### 3.5 Transmission Plan

Emission attributes:

- Three emissions
  - Tx1 – ground to air
  - Tx2 – air to air, air to ground
  - Tx3 – air to air, air to ground
- Modulation BPSK or QPSK
- Emission Designators
  - 1M0G7D
  - 10M0G7D
- The minimum carrier bandwidth is 1 MHz and the maximum bandwidth is 10 MHz.
- The maximum EIRP density is as follows:
  - Ground to air: -12 dBW/4kHz
  - Air-Ground, Air-Air: -1 dBW/4kHz
- The spectrum will be used by only one transmitter at a time (N=1). No TDMA or CDMA will be used.
- Occupied bandwidth is 1.2 times the symbol rate.
- Personnel will be present during transmissions for control and monitoring.
- The carrier attributes will be configured locally and manually.

AWN Transmission Plan																	
20170306m01v01.0_AWN_Calculations.xlsx																	
ID	Transmitter	Tx	Frequency Band (MHz)	Freq ID	Emission Designator	Proposed Frequency (MHz)	Amplifier Power (Watts)	Amplifier Power (dBm)	OBO (dB)	Tx Losses (dB)	Ant Gain (dBi)	EIRP (dBm)	EIRP (dBW)	EIRP (Watts)	Bandwidth (MHz)	Maximum EIRP Density (dBW/Hz)	Maximum EIRP Density (dBW/4kHz)
1	Ground	1	14600 to 14800	1	1M0G7D 10M0G7D	14700	20	43.0	0	4.7	4	42	12	17	1 10	-48	-12
2	Airborne	2	15150 to 15350	2	1M0G7D 10M0G7D	15200	20	43.0	0	4.7	15	53	23	214	1 10	-37	-1
3	Airborne	3	15150 to 15350	3	1M0G7D 10M0G7D	15250	20	43.0	0	4.7	15	53	23	214	1 10	-37	-1

### 3.6 Schedule of Operation

One successful flight test of 1-4 hours is sufficient for the purpose of our testing. As the equipment and the testing are experimental we are anticipating the need to perform the test 1-4 times over a period of a few weeks.

Airborne testing will be performed once the equipment is installed and checked out successfully.

We have requested the license for the period from April to September 2017.