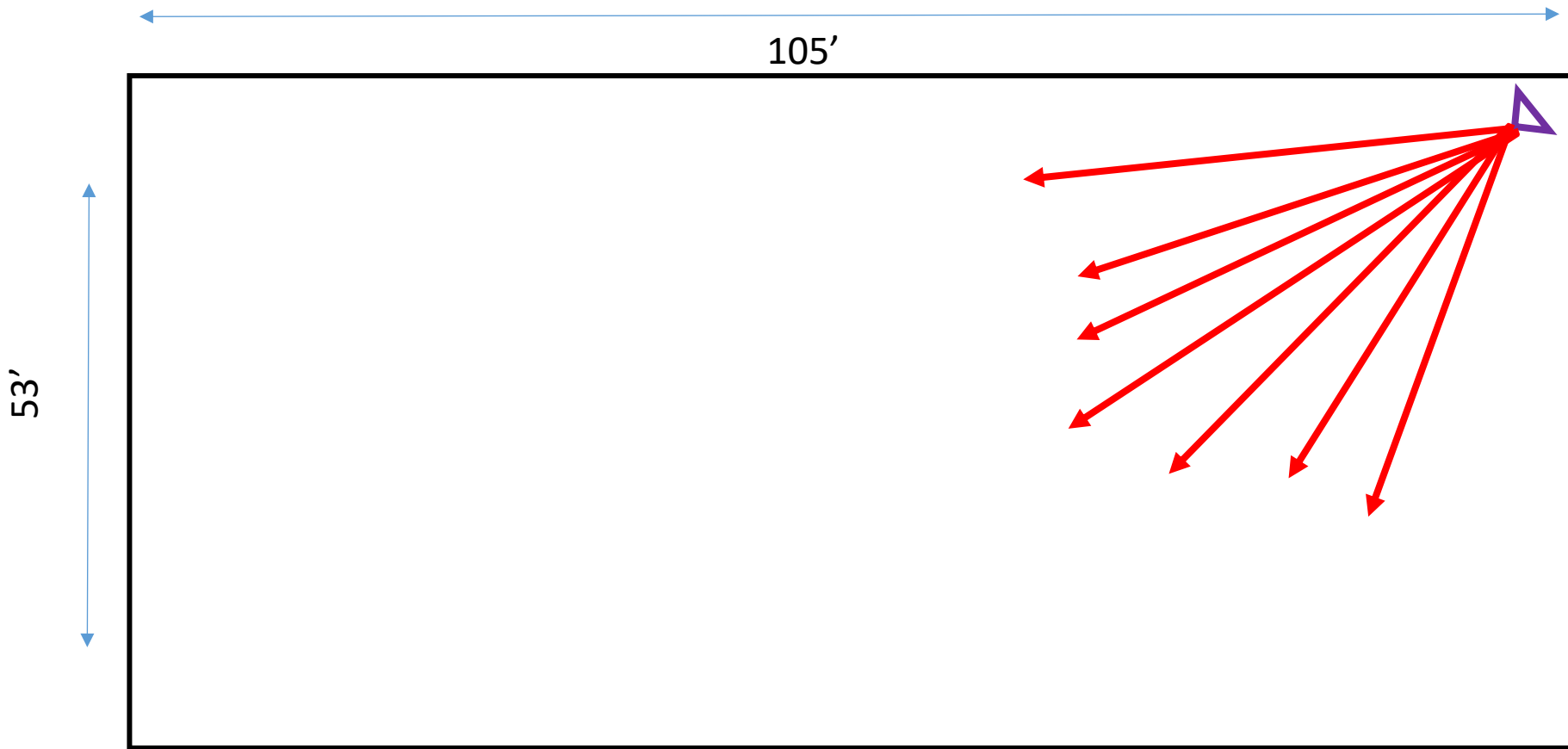


Request for Experimental License

Zipline International proposes to operate experimental RNSS GPS re-radiation test equipment within its manufacturing facility to support the indoor testing and development of its unmanned aircraft system (UAS) RNSS receivers. The system will enable controlled testing and evaluation of GPS technologies and support the development of new UAS prototypes that use GPS data for navigation and related functions.



*External Antenna
connected to amp via 100
ft. LMR-400

GPS Repeater: ERP / Free-Space Calculation @ 100'

INPUTS

Parameter	Value	Units
GPS Carrier Frequency	1176.45	MHz
Minimum L5 Received Signal Power	-127.9	dBm
Receive Antenna/LNA Gain	33	dB
Antenna Cable/Connector Loss	-6.95	dB
Repeater Amplifier Gain	24.11	dB
Repeater Antenna Gain	3	dBd
Free-Space Propagation Range	100	ft

CALCULATED SYSTEM VALUES

Parameter	Value	Units
Total System Gain	53.16	dB
Radiated Power	-74.74	dBm
Range	0.0189	miles
Range	30.48	meters
Range	0.03048	kilometers
Transmitter Output Power before Repeater Antenna	16.83	pW
Effective Radiated Power (ERP)	33.57	pW

FREE-SPACE PATH LOSS / RECEIVED POWER @ 100 FEET

Parameter	Value	Units
Free Space Loss with Isotropic Antennas	63.53	dB
Repeated Signal Power @ Range of 100 feet	-138.27	dBm
Total Signal Power @ Range of 100 feet	1.49E-17	W
Effective Radiated Power (ERP)	33.57	pW
Effective Isotropic Radiated Power (EIRP)	55.08	pW
Effective Radiated Power	-104.74	dBW

$FSPL (dB) = 32.44 + 20 \cdot \log_{10}(\text{distance in km}) + 20 \cdot \log_{10}(\text{frequency in MHz})$.

$\text{Repeated signal power at range} = \text{radiated power (dBm)} - FSPL (dB)$. $EIRP = ERP + 2.15 \text{ dB}$.

8.3.28 Use of Fixed Devices that Re-Radiate Signals Received from a GPS Antenna

8.3.28 Use of Fixed Devices That Re-Radiate Signals Received from the Global Positioning

System Except as otherwise authorized under Part 7.14, federal agencies and departments may, under the following conditions, operate fixed devices that re-radiate signals received from the Global Positioning System (GPS).

1. Individual authorization is for indoor use only, and is required for each device at a specific site. **YES**

2. Applications for frequency assignment should be applied for as an XT station class with a note indicating the device is to be used as an Experimental RNSS Test Equipment for the purpose of testing GPS receivers" and describing how the device will be used. **YES**

3. Approved applications for frequency assignment will be entered in the GMF. **YES**

4. The maximum length of the assignment will be two years, with possible renewal. **YES**

5. The area of potential interference to GPS reception (e.g., military or contractor facility) has to be under the control of the user. **YES**

6. The maximum equivalent isotropically radiated power (EIRP) must be such that the calculated emissions are no greater than -140 dBm/24 MHz as received by an isotropic antenna at a distance of 100 feet (30 meters) from the building where the test is being conducted. The calculations showing compliance with this requirement must be provided with the application for frequency assignment and should be based on free space propagation with no allowance for additional attenuation (e.g., building attenuation.)
SEE EXISTING EXHIBIT FOR EIRP CALCULATIONS

7. GPS users in the area of potential interference to GPS reception must be notified that GPS information may be impacted for periods of time. **YES**

8. The use is limited to activity for the purpose of testing RNSS equipment/systems. **YES**

9. A "Stop Buzzer" point of contact for the authorized device must be identified and available at all times during GPS re-radiation operation of the device under any condition. **YES—Contact Information is accurate and up-to-date.**

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