Astra Space Form 442 Attachment

March 4, 2019

Introduction

Astra Space Inc. is developing an orbital launch vehicle. The rocket has successfully launched from Kodiak, AK under an FAA launch license.

The purpose of this application is to obtain a long term license to test the rocket at test sites in California. Astra will be producing several development rockets over the next year and would like to do development testing by radiating over the air to our ground infrastructure.

Locations

There are 3 possible locations for Astra to do its testing

1. Orion. This is at the Astra facility in Alameda. Several rockets will be tested outside in a vertical position over the next 2 years.
2. Nimitz. This is the preferred location of the Astra static fire tests. In these tests the rocket will be fueled and a short duration firing will take place. Over the air telemetry is required for this testing.
3. Castle. This is a location at the Castle Airport in Atwater, California. This is a possible alternate or back up location to the Nimitz test site.

Table 1: Test Site Information

Parameter	Orion	Nimitz	Castle
Distance to nearest airplane landing area	7.4 km	10 km	1 km
Height above ground	9.6 meters	9.6 meters	9.6 meters
Link to location	https://goo.gl/maps/7hRXGGuoqvn	https://goo.gl/maps/YZSKQRrRSvB2	https://goo.gl/maps/huteGvs975K2
Latitude	37°46'34.7"N	37°47'07.8"N	37°21'30.5"N
Longitude	122°17'38.0"W	122°19'29.1"W	120°33'36.3"W
Radius (km)	1	2	1

Technical Details

The launch vehicle is rather short. The external antennas are 9.6 meters above ground when the rocket is vertical on its launch stool. The antennas are located along a ring and driven in pairs, for a semi-omni-directional pattern.

The "transmitter" consists of a Quasonix nanoTX transmitter and supporting circuitry, such as a telemetry encoder, output protection, and a switch matrix. The nanoTX model is capable of up to 10W

maximum RF power. The rocket will contain two (2) transmitters, each identical. Each transmitter has a number of rates that it will use.

The two frequencies we wish to use are 2211 MHz and 2215 MHz. Our modulation scheme is PCM/FM. The maximum baud rate that will be used is 4Mbps. The 2211 MHz carrier will have a baud rate that varies between 256 kbps and 2 Mbps. On the other hand, the 2215 MHz carrier will always be operated at 4 Mbps.