

# Request for Special Temporary Authority

Virgin Orbit, LLC

File Number: 1293-EX-ST-2017

## Explanation of Experiment:

Virgin Orbit LLC (“Virgin Orbit”) is requesting “Special Temporary Authority (STA)” to operate an S-Band Transmitter at 2225MHz. If 2225 MHz is unavailable Virgin Orbit is open to any frequency within 2200-2250MHz band. The purpose of the experiment is to test the ability of Virgin Orbit’s Long Beach ground station to track satellite launch vehicles. Long Beach ground station is receive only and is located at 4022 E Conant St., Long Beach, CA 90808. Virgin Orbit plans to use this ground station for tracking its satellite launch vehicles. The test plan is to fly a small manned aircraft with Quasonix transmitter and antennas around Long Beach, CA and Lompoc, CA, and track that aircraft using the ground station in Long Beach, CA. The transmitter inside the aircraft will transmit test data at the assigned frequency. Two different data rates will be tested at the same assigned frequency. Two Antennas might be used in order to get better coverage, in such a case the signal from the transmitter will be split between the antennas using a RF splitter.

Virgin Orbit is requesting an area of operation with a radius of 80 miles around Long Beach Airport (LGB) and 80 miles around the city of Lompoc, CA. The aircraft will fly within the requested area. Maximum altitude of the aircraft is 20,000 ft. The transmitter will stay on for the full duration of the flight, including takeoff and landing unless restricted by FAA. Virgin Orbit also plans to turn the transmitter on at its facility at 4022 E Conant St., Long Beach, CA 90808.

We plan to start the testing by Sept 29<sup>th</sup>, 2017, and the aircraft is expected to be flown multiple times during the six month period after the STA license is granted.

	Data Rate	
<b>Output Power</b>	43dBm	43dBm
<b>EIRP</b>	47.2 dBm	47.2 dBm
<b>Bandwidth</b>	7.02 MHz	3.51 MHz
<b>Modulation Scheme</b>	SOQPSK-TG	SOQPSK-TG
<b>Emission Designator</b>	7M02G2D	3M51G2D
<b>Carrier Frequency Tolerance</b>	+/- 20ppm	+/- 20ppm
<b>Transmitter Manufacturer</b>	Quasonix	
<b>Transmitter Part Number</b>	QSX-VSR4-1111-20-80-04AB-VP-WV	
<b>Antenna Manufacturer and Part Number</b>	South West Antennas (1065-028)	
<b>Antenna Gain</b>	4.2dBic	
<b>Antenna Horizontal (AZ) Beamwidth</b>	104 Degrees	
<b>Antenna Vertical (EL) Beamwidth</b>	88 Degrees	

Figure 1: Transmitter Specs

Location	Radius of Operation	Max Altitude
Long Beach Airport (LGB) (33.82, -118.151)	80 miles	20,000 ft
Lompoc, CA (34.639, -120.458)	80 miles	20,000 ft

Figure 2: Area of operation



Figure 3: Map showing area of operation

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