

# Request for Special Temporary Authority

Virgin Orbit, LLC

## Explanation of Experiment:

Virgin Orbit LLC (“Virgin Orbit”) is requesting “Special Temporary Authority (STA)” to operate an S-Band Transmitter at 2287.5MHz. If 2287.5 MHz is unavailable Virgin Orbit is open to any frequency within 2200-2290MHz band.

The objective of the experiment is the following.

- Receive Telemetry data from Launcher One’s S-Band Transmitter during Launcher One’s drop test (Drop test rocket will not be fueled or powered).
- Test the RF link between Launcher One’s S-Band telemetry transmitter and 747 aircraft’s S-Band receiver & receive only Long Beach Ground Station.

747 aircraft will take-off from either one of the two airports shown in Figure 3 with Launcher One rocket in captive carry. S-Band transmitter will be turned on in R2508, R2515, W289S and W291 airspaces (shown in Figure 2). Virgin Orbit is coordinating the use of the above mentioned airspaces with the concerned authorities. R2515 is being considered for rocket drop and we are coordinating with the concerned authorities.

Two different data rates will be tested at the same assigned frequency. Launcher One transmitter will only be turned on within the requested areas. Virgin Orbit will have the ability to turn the Launcher One transmitter on and off from the 747 Aircraft while in captive carry. The 747 might be flown to a maximum altitude of up to 40,000 ft. The transmitter will be turned on, at the ground at requested airport locations (Figure 3) for RF checkouts.

We plan to start the testing by July 23<sup>rd</sup> 2018, and the aircraft is expected to be flown multiple times during the six month period after the STA license is granted.

The S-Band Transmitter will not be turned on without prior co-ordination with DoD WAFC. Exact date and time of the testing will be flexible based on DoD coordination.

	Data Rate	
<b>Transmitter Output Power</b>	20 Watts	20 Watts
<b>EIRP</b>	49 dBm	49 dBm
<b>Bandwidth</b>	4.21 MHz	2.11 MHz
<b>Modulation Scheme</b>	SOQPSK-TG	SOQPSK-TG
<b>Emissions Designator</b>	4M21G1W	2M11G1W
<b>Carrier Frequency Tolerance</b>	+/- 20 ppm	+/- 20 ppm
<b>Transmitter Manufacturer</b>	Quasonix	
<b>Transmitter Partnumber</b>	QSX-VSR4-1111-20-80-04AB-VP-WV	
<b>Antenna Manufacturer</b>	Haigh Farr	
<b>Antenna Part Number</b>	13155	

Figure 1: Transmitter Specs

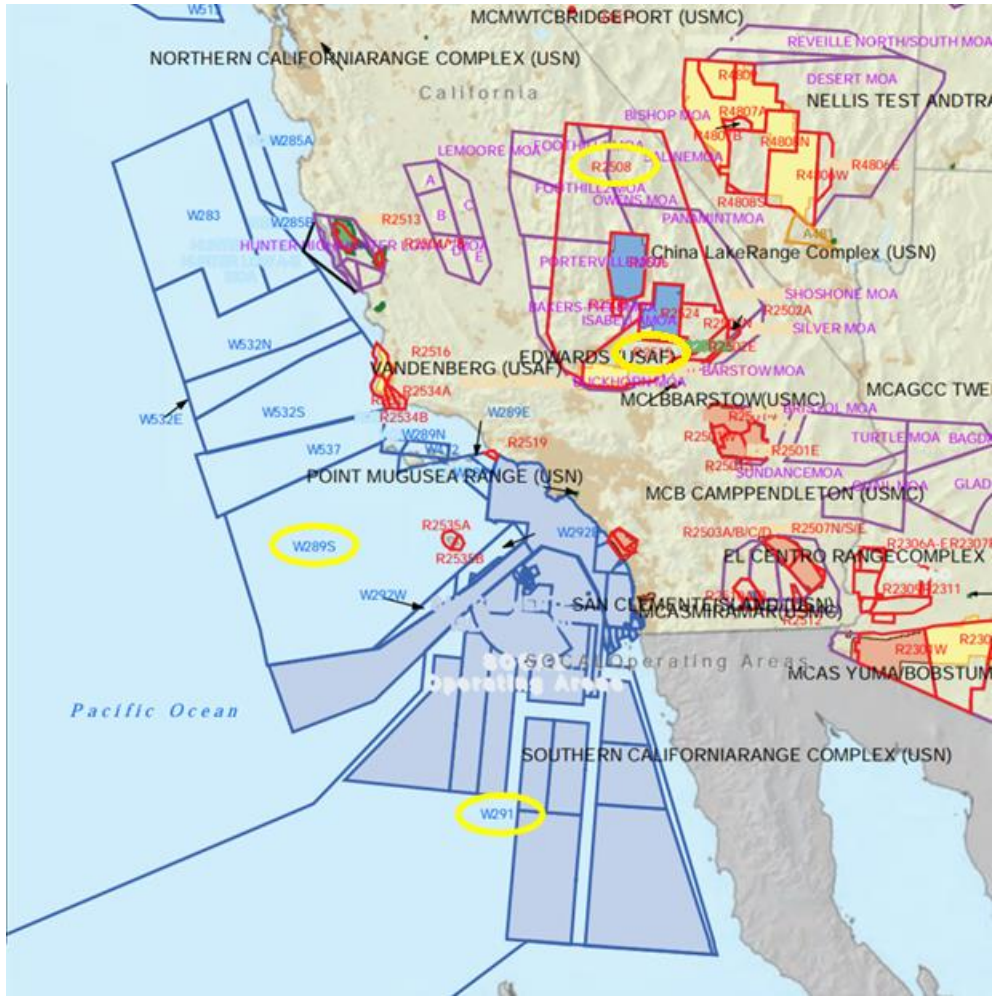


Figure 2: Map showing areas of requested operation circled in yellow

	Latitude	Longitude
Air and Space Port Mojave, Mojave, CA	35° 3' 24.4188"	-118° 9' 28.1304"
Southern California Logistics Airport, Victorville, CA	34° 35' 2.7594"	-117° 22' 44.1474"

Figure 3: Take-off and landing Airport locations for Captive Carry

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