

Memo

Name: Mark Mills, Principal RF Engineer

Organization: Orbital Sciences Corporation

Date: 4 November 2013

Subject: Response to comments presented by AF related to application for STA 0845-EX-ST-2013

On 10/24/13, the following comments were received via FCC (Tony Serafini) regarding the application for STA 0845-EX-ST-2013:

AF comments:

It is not clear the location of the three transmitters/frequencies (e.g., First Stage or Second Stage of the launch vehicle" and the duration of transmission (turn on then off) for each transmitter/frequency. In order to assess any potential impact to AF ops based on the proposed use of the three transmitters/frequencies, 2239.76-2243.24 MHz & 2267.76-2271.24 MHz and 2286.76-2290.24 MHz, on this STA, AF would require the following clarification/information:

a. the location (e.g., 1st or 2nd Stage of the launch vehicle) for each of the three transmitters/frequencies identified above; and b. duration of transmission in seconds (e.g., first turn on thru completely turn off) for each of the three transmitters/frequencies identified above.

AFSMO POC for technical matters regarding this STA is Mr. Jimmy Nguyen, 301-225-3729.

Orbital Sciences Corporation response:

1. The locations of the 3 transmitters, and the associated on/off times are provided in the following table. The location of the designated Motor Cone transmitter is listed as the Motor Cone. This is considered to be part of the launch vehicle Interstage located between Stages 1 and 2. For the Antares Orb-1 mission, the sequence of events is that of the Stage 1 separating at $T = L + 239$ sec, Interstage separating at $T = L + 342$ sec, and the Stage 2 separating from the payload at $T = L + 594$ sec.

Xmitter Designation	Telemetry Designation	Operational Frequency Band	Xmitter Location	Xmitter On Time	Xmitter Off Time	Method Used for Determining Off Times
AV	Link 41	2239.76-2243.24 MHz	Stage 2	$T = L - 3$ hrs 33 min	$T = L + 60$ min	battery life estimate
MC	Link 69	2267.76-2271.24 MHz	Motor Cone	$T = L - 3$ hrs 33 min	$T = L + 14$ min	earth impact estimate
S1	Link 88	2286.76-2290.24 MHz	Stage 1	$T = L - 3$ hrs 33 min	$T = L + 15$ min	earth impact estimate

2. Xmitter On Time – A sequence of checks involving the transmitters begins on the launch pad approximately 3 hrs 33 minutes before launch. While on the pad, power is switch between external and internal (battery) as these various checks are performed.

3. Xmitter Off Time – After all checks have been performed on the pad prior to launch, transmitters remain powered on by internal batteries until their mission is completed. However, the 3 transmitters are not turned off by command. Rather, they cease to transmit when their battery supply is depleted, or as a result of operational failure during re-entry after a separation event or earth impact. Transmitter off times are estimated using battery life or earth impact calculations, based on worst case (longest duration of transmission).