

ATTACHMENT A
Supplemental
Technical Description

A.1 SCOPE AND PURPOSE

This Supplemental Technical Description provides the Federal Communications Commission (“Commission”) with additional technical characteristics of the Arcturus satellite in the 19.3-19.4 GHz, 19.6-19.7 GHz, and 29.25-29.3 GHz bands, as required by 47 C.F.R. §25.114 and other relevant sections of the FCC Part 25 rules.¹

A.2 SPACE STATION TRANSMIT AND RECEIVE CAPABILITY

In addition to those frequencies specified in the Petition, Astranis Bermuda Ltd. (“Astranis Bermuda”) clarifies that its gateway channels will also use the uplink frequency segment 29.25-29.3 GHz, and the downlink frequency segments 19.3-19.4 and 19.6-19.7 GHz. Use of the uplink frequency segment is on a co-primary basis between GSO FSS and NGSO mobile-satellite service feeder links. Use of the downlink frequency segments will be on a co-primary basis with respect to fixed service operations licensed to provide services in the United States.

A.3 FREQUENCY AND POLARIZATION PLAN

An updated frequency and polarization plan (“Frequency Plan”) is provided for the Arcturus satellite in Figure 1, below. The Frequency Plan clarifies the Arcturus’ receive frequencies include the 29.25-29.3 GHz band. The Frequency Plan otherwise remains unchanged from the Petition and demonstrates the gateway downlink operations contemplated in the 19.3-19.4 GHz and 19.6-19.7 GHz bands.

¹ Other technical characteristics of the Arcturus satellite remain unchanged from the Petition and are incorporated by reference to the extent necessary to grant the requested amendment. *See* Astranis Bermuda, Ltd., File No. SAT-PPL-20210607-00075, Call Sign S3092 (filed June 7, 2021) (the “Petition”).

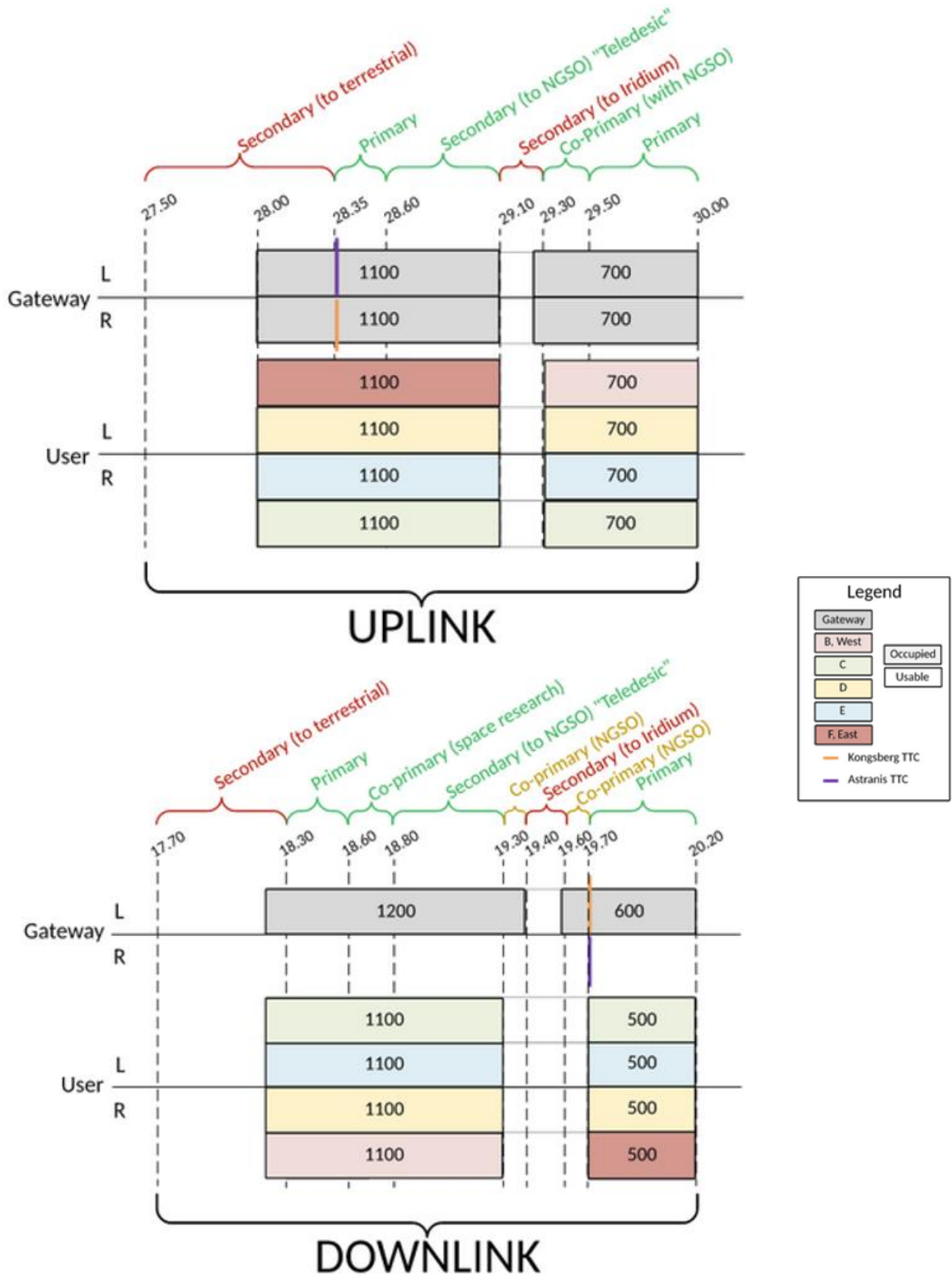


Figure 1. Arcturus Frequency and Polarization Plan

A.4 POWER FLUX DENSITY AT THE EARTH'S SURFACE

The maximum PFD transmitted towards U.S. territory by the Arcturus satellite will be compliant with the 47 C.F.R. §25.208(c) PFD limits that apply to the 19.3-19.4 GHz and 19.6-19.7 GHz bands, which are identical to the limits described in the Petition. The PFD limits of 47 C.F.R. §25.208(c) are as follows:

- $-115 \text{ dB(W/m}^2\text{)}$ in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
- $-115 + 0.5 (\delta - 5) \text{ dB(W/m}^2\text{)}$ in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and
- $-105 \text{ dB(W/m}^2\text{)}$ in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

The maximum downlink EIRP that the Arcturus satellite can transmit in the Ka-band frequencies is 42.6 dBW in 1 MHz. The shortest distance from the satellite to the Earth is 35,786 km, corresponding to a spreading loss of 162.06 dB. Therefore, the maximum possible PFD at the Earth's surface will not exceed $-119.5 \text{ dBW/m}^2\text{/MHz}$ at an elevation angle of 90° . This level is less than the $-115 \text{ dBW/m}^2\text{/MHz}$ PFD limit value that applies at elevation angles of 5° and below, and consequently compliance with the PFD limits in Section 25.208(c) is assured in these additional frequency bands.

A.5 KA-BAND TWO-DEGREE COMPATIBILITY

The Arcturus satellite will meet the Commission's two-degree spacing requirements in the 19.3-19.4 GHz and 19.6-19.7 GHz bands. The Arcturus satellite seeks to operate in spectrum that may be subject to Section 25.140(a)(3)(vi). The two-degree spacing compatibility analysis provided in the Petition included the 19.3-19.4 GHz and 19.6-19.7 GHz bands and is incorporated by reference.² Since there are no commercial satellites operating within two degrees of Arcturus and providing coverage of CONUS, the analysis demonstrates the impact from the operations of hypothetical satellites having the same or worst case two-degree spacing operating characteristics as Arcturus located at 161° W.L. and 165° W.L.

² See *Petition*, Attachment A, § A.8; *id.* at Exhibit 1 & 2.

CERTIFICATION OF PERSON RESPONSIBLE FOR PREPARING
ENGINEERING INFORMATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this application and that it is complete and accurate to the best of my knowledge and belief.

_____/s/_____
Steve Joseph

September 21, 2021