



Hiber Inc.
8400 Baltimore Avenue, Suite 320
College Park, MD 20740

February 10, 2020

Alyssa Roberts
Federal Communications Commission
445 12th Street SW
Washington, DC 20554

Re: IBFS File Nos. SAT-PDR-20180910-00069

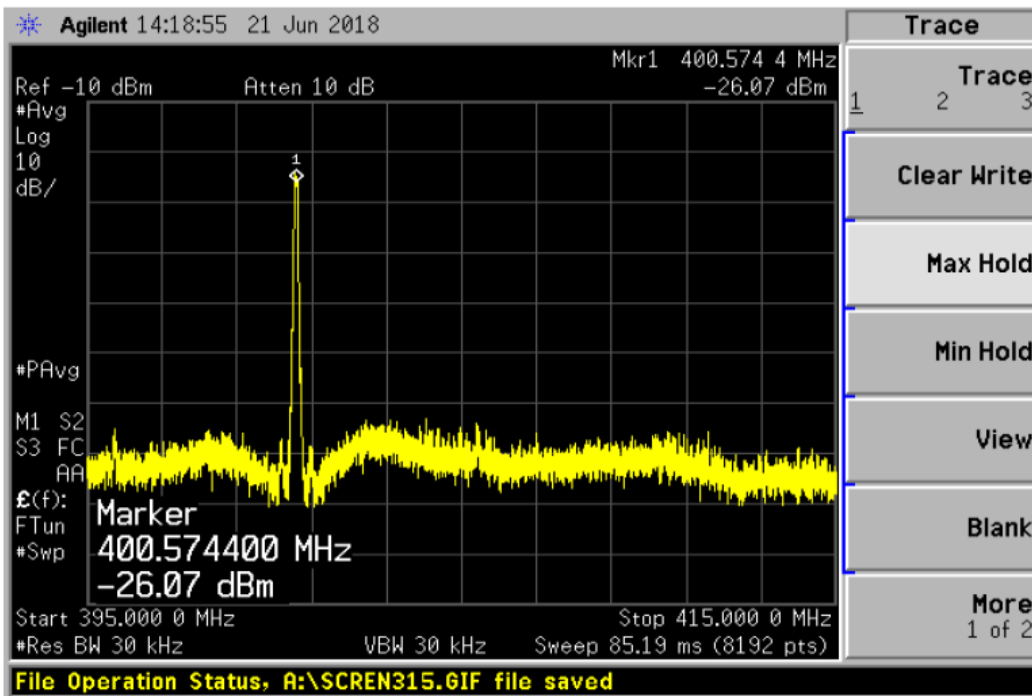
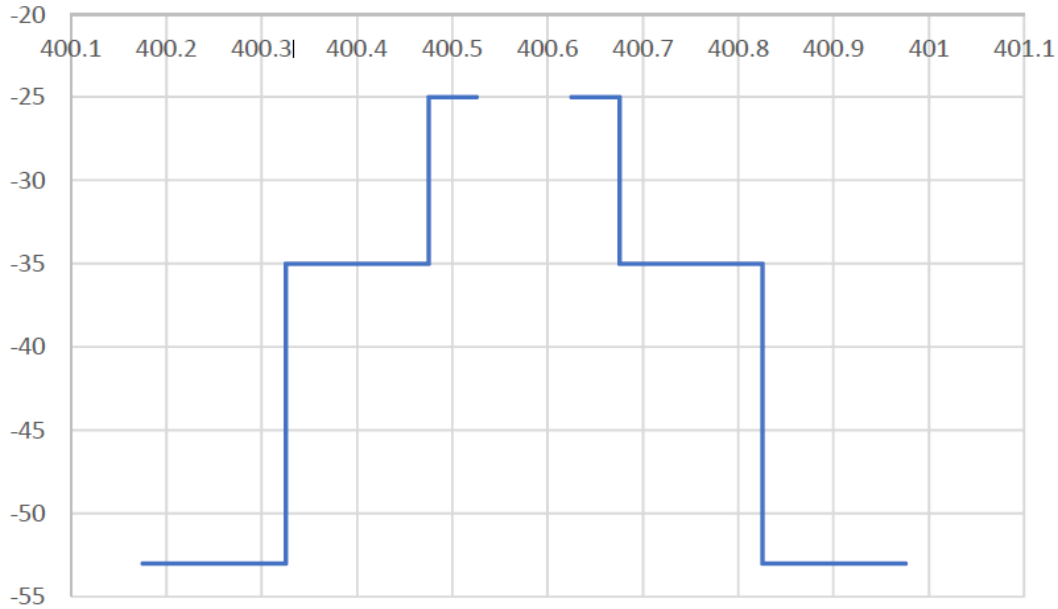
Dear Ms. Roberts:

By this letter, Hiber Inc. ("Hiber") provides additional information demonstrating its compliance with 47 C.F.R. § 25.142(a)(2), which requires that a party seeking U.S. market access for the UHF Mobile-Satellite Service frequencies discuss the measures it would employ to protect the Radio Astronomy Service ("RAS") in the 406.1-410 MHz band from harmful interference from unwanted emissions.¹

With respect to Hiber's downlinks, the out-of-band emissions associated with its downlink transmissions in the 400.15-401 MHz band are extremely low over the 406.1-410 MHz band and will not exceed the limit established pursuant to ITU-R RA.769-2 (2003) for protection of the RAS, *i.e.*, -255 dBW/m²/4 kHz. Below is the specified spectrum mask for the Hiber service downlink in the 400.15-401 MHz band. This spectrum mask demonstrates that Hiber's satellites comply with the out-of-band emission limitations required to protect the RAS, in accordance with ITU RR 5.208A (WRC-07), ITU-R Res. 739-4 (Rev. WRC-15) and ITU-R RA.769-2 (2003). The Y axis in the depicted chart is dBC/4 kHz while the X axis is megahertz:

¹ See also 47 C.F.R. § 2.106 n. US74 ("In the band 406.1-410 MHz, the radio astronomy service shall be protected from unwanted emissions only to the extent that such radiation exceeds the level which would be present if the offending station were operating in compliance with the technical standards or criteria applicable to the service in which it operates").

Attenuation



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The transmitter mask of the Hiber system shows that the maximum level of unwanted emissions is below -138.2 dB(W/Hz) in the frequency band 406.1-410 MHz. Assuming the worst case, *i.e.*, the satellite is located in the zenith of a RAS site, the maximum PFD produced by a Hiber satellite at an altitude of 500 km would be -263 dBW/m²/Hz.

$$\begin{aligned} \text{pfd} &= (\text{satellite EIRP}) - 10\log(4\pi r^2) \\ &= -138.2 \text{ dBW/Hz} - 10\log(4\pi(500\text{km})^2) \\ &= -263 \text{ dBW/m}^2/\text{Hz} \end{aligned}$$

This value yields a margin of 8 dB to the PFD limit of -255 dB(W/m²/Hz) specified in ITU-R RA.769-2 (2003), which means that the Hiber system will not cause harmful interference to the RAS in the 406.1-410 MHz frequency band.

Further, the duration of each downlink transmission to a terminal will be from 0.4 seconds to a maximum of 1 second every 10 seconds, corresponding to a duty cycle ranging from 0.02% to 10%. Accordingly, the average power received at a RAS location would be even further reduced.

With respect to Hiber's uplink transmissions in the 399.9-400.05 MHz band, Hiber will also take measures to protect RAS from harmful interference from unwanted emissions. RAS sites have lower antenna gain in the direction of terrestrial transmitters, which are generally at a very low elevation angle. Nonetheless, RAS sites, in theory, could be susceptible to interference from Hiber terminals that are operating in close proximity to a RAS site. This is very unlikely to be the case here for several reasons. First, Hiber terminals operate with an EIRP of no more than 5 dBW over the 399.9-400.05 MHz range. Hiber terminals also will operate with a low duty cycle (maximum of 0.44%), which further reduces the average power received at an RAS site.

Further, Hiber's terminals fully comply with ETSI EN 301 721, meaning that the terminals transmissions are controlled by the satellite network. Therefore, if a specific RAS site nonetheless experiences interference, Hiber can shut down nearby terminals by specifically sending messages instructing those specific terminals to cease transmissions until the interference issue is addressed. Accordingly, through the above measures, Hiber will comply with the requirement to protect RAS sites from harmful interference from unwanted emissions.

Please contact the undersigned if you have any questions.

Respectfully submitted,



Bruce A. Heno
General Counsel