

From: David Goldman <David.Goldman@spacex.com>
Sent: Thursday, April 09, 2020 9:03 PM
To: Kal Krautkramer <Kal.Krautkramer@fcc.gov>
Cc: Jose Albuquerque <Jose.Albuquerque@fcc.gov>; Mihai Albulet <Mihai.Albulet@spacex.com>; Joe McMichael <Joseph.McMichael@spacex.com>
Subject: RE: Questions Regarding Greenville, PA (Callsign: E190724) and Merrilan, WI (Callsign: E190725) Gateway Earth Station Applications

Thanks for reaching out. I apologize for the delayed response. Please let me know if you need anything else.

- Question #1: We do not plan to increase EIRP to compensate for rain fade, so the fixed EIRP used in the analysis is representative of our system. It is actually conservative, because the fixed EIRP used is a worst-case that occurs only at max slant. During operation, the EIRP will be about 4dB lower when pointed toward zenith because of decreased path length.
- Question #2: We used a fixed -3 dBi sidelobe level for this analysis. FCC 25.209 contemplates a small amount of statistical exceedances. We expect these to be rare and reach at most -1 dBi at isolated points, mainly in the spill-over lobe. However, this case can be discounted because the exceedances occur in the spill-over lobe, at 85-90° off-axis. The only case where the spill-over lobes of all eight antennas simultaneously align is when all are pointed directly at zenith, in which case the operational power will be reduced by 4dB (see response to question #1).

From: Kal Krautkramer <Kal.Krautkramer@fcc.gov>
Sent: Thursday, March 26, 2020 11:39 AM
To: David Goldman <David.Goldman@spacex.com>
Cc: Jose Albuquerque <Jose.Albuquerque@fcc.gov>
Subject: Questions Regarding Greenville, PA (Callsign: E190724) and Merrilan, WI (Callsign: E190725) Gateway Earth Station Applications
Importance: High

In Re: Application No. SES-LIC-20190906-01170, and further amended by SES-AMD-20191129-01548 (Greenville, PA Gateway, Callsign: E190724)
Application No. SES-LIC-20190906-01171, and further amended by SES-AMD-20191129-01547 (Merrilan, WI Gateway, Callsign: E190725)

While coordinating the above-referenced applications with the Wireless Telecommunications Bureau (WTB), we had the following questions, which we seek further clarification:

- 1) As we understand it, your 25.136 analysis relies on the use of clear sky EIRP. Could you please elaborate on your assumptions for using clear sky in your analysis and explain why it is appropriate for the specific locations and conditions of your proposed earth stations? As part of your explanation, could you also please specify at what level above the clear sky EIRP will each earth station operate, as well as what percentage of time will they operate above clear sky EIRP, based on the system designs?

2) On page two of the Technical Attachment to your amendment applications, you stated the following:

“SpaceX also submits with this amendment updated antenna performance information for its gateway operations. SpaceX will comply with a mask similar to the one in Section 25.209(a)(3) applicable to earth station antennas operating in the 24.75-25.25 GHz and 28.35-30.0 GHz bands with geostationary satellites but will improve that pattern to -3 dBi (rather than 0 dBi) beyond 25 degrees off-axis. The mask can be stated as follows:

| | | |
|------------------------|-----|--|
| $29-25\log_{10}\theta$ | dBi | for $2^\circ \leq \theta \leq 7^\circ$. |
| 8 | dBi | for $7^\circ < \theta \leq 9.2^\circ$. |
| $32-25\log_{10}\theta$ | dBi | for $9.2^\circ < \theta \leq 25^\circ$. |
| -3 | dBi | for $25^\circ < \theta \leq 180^\circ$. |

Consistent with Section 25.209(a)(3), “[t]his envelope may be exceeded by up to 3 dB in 10% of the range of θ angles from ± 7 - 180° , and by up to 6 dB in the region of main reflector spillover energy.”

Could you please confirm whether you used the antenna pattern in the table above in the analysis/calculations that you provided in each of your applications? In particular, confirm that possible exceedances as contemplated in 25.209(a)(3) were not considered in the calculations.

Please provide us your response to these questions at your earliest convenience.

Thanks in advance for your time and attention.

Regards,

Kal Krautkramer
Electronics Engineer
Satellite Engineering Branch
Satellite Division
International Bureau
Federal Communications Commission