11 October 2019

Instituto Federal de Telecomunicaciones (IFT)
Ciudad de Mexico, Mexico
Sent via email to consultapublica5G@ift.org.mx

Re: Public Consultation on Frequency Bands for 5G

Dear Sirs:

Space Exploration Technologies Corp (SpaceX) appreciates the opportunity to offer comments to the IFT on the "Public Consultation on Frequency Bands of Radio Spectrum for Fifth Generation (5G) Mobile Systems" (the Consultation), published on September 6, 2019. SpaceX looks forward to leveraging our innovative non-Geostationary Satellite Orbit (NGSO) satellite constellation to help connect all Mexicans to high-speed Internet. As the development of NGSO systems continues worldwide, it is important to take a broad view that considers the spectrum needs of both 5G and satellite services.

SpaceX is working to design, develop, and deploy an NGSO constellation to deliver broadband service directly to consumers around the world. These FCC licenses mark significant steps toward SpaceX's goal of deploying an innovative and spectrum-efficient satellite system to improve broadband connectivity to consumers globally.

Specifically, SpaceX is authorized to deploy its satellite constellation in the following bands:

- 10.7 – 12.7 GHz Downlink
- 14.0 – 14.5 GHz Uplink
- 17.8 – 18.55 GHz Downlink
- 18.8 – 19.3 GHz Downlink
- 27.5 – 29.1 GHz Uplink
- 29.5 – 30.0 GHz Uplink

SpaceX intends to seek approval to use these bands within Mexico as well to support the deployment of broadband services throughout the country.

In line with this, SpaceX welcomes the opportunity to provide input to IFT's public consultation. Our specific comments are presented in the required form below.

Respectfully submitted,

Patricia Cooper
Vice President, Satellite Government Affairs

Space Exploration Technologies Corp.
1155 F Street NW
Suite 475
Washington, DC 20004
United States

SPACEX

I. Respondent's Information	
Name or company name:	Patricia Cooper
Legal representative's name, if applicable:	N/A
Document to accredit representation: In the case of a legal representative, attach a digital copy of the document to accredit such representation to the email message.	N/A

II. Public Consultation for Integration Questionnaire

Note 1: The study "*Panorama del Espectro radioeléctrico en México para servicios móviles de quinta generación"* is a reference document to support the understanding of the questions listed below. The study itself is not subject to public consultation.

Note 2: Answering all the questions included in the following table is recommended, along with arguments and elements, as you may deem necessary to support the opinion, including supporting documents that you may want to attach.

Question no.	Question	Comment, opinion or contribution
1	Do you consider that the quantity of radio spectrum to implement fifth generation (5G) mobile systems provided in the reference document is adequate for the demand expected for the next 5, 10 and 20 years in Mexico? Justify your response with technical, economic or strategic reasons.	SpaceX does not have any comments.
2	Regarding the frequency bands identified in the reference document to implement fifth generation (5G) mobile systems in Mexico, what other frequency band(s) do you think should be considered for that purpose? Justify your response with technical (case studies, international experiences, etc.) economic or strategic reasons.	SpaceX does not have any comments.

Question no.	Question	Comment, opinion or contribution
3	Regarding the frequency bands identified in the reference document to implement fifth generation (5G) mobile systems in Mexico, which frequency band(s) do you consider viable/unfeasible or appropriate/not appropriate, for sharing or coexistence with other radio communication services? Do you consider that any of the identified frequency band(s) or segment(s) should not be used to implement fifth generation (5G) mobile systems in Mexico? For both cases, justify your response with technical (compatibility/coexistence studies, case studies, international experiences, etc.), economic or strategic reasons.	As noted in the reference document, the 28 GHz band has garnered considerable attention as a possible band for 5G deployments. While the IFT has not reached a decision on the use of the 28 GHz band for 5G services, when considering this band, it is critical for the IFT to take into account that the 28 GHz band will be a key input for a new generation of FSS systems. These systems rely upon the global primary allocation for FSS (earth-to-space) reflected in Mexico's current frequency allocations. The SpaceX system will use the 28 GHz band for gateway uplink (27.5-29.1 GHz) and gateway to satellite (29.5-30.0 GHz) transmissions. As such, it is crucial that the IFT ensures continued access to the 28 GHz band for FSS use. Additionally, as noted in the reference document, the 28 GHz band is not a candidate band for IMT identification at the ITU at the 2019 World Radiocommunication Conference (WRC-19), and is not likely to see global harmonization for IMT services in the near future. Furthermore, allocating the 28 GHz band to mobile services and subsequently assigning spectrum for 5G use has significant potential to hamper the deployment of FSS and curtail the ability of SpaceX's NGSO constellation or similar satellite services to provide next-generation broadband services in Mexico. We support the IFT´s plan of making available the 26 GHz band for terrestrial IMT services. At the same time, it is necessary to protect the current and future satellite deployments in the 28 GHz band. The IFT can always assess the need for allocating more spectrum for mobile services, but at this point, across all bands under consideration, there is a possible total increase of 11.19 GHz for 5G spectrum, with the majority coming from the Ka and V bands. This amount of spectrum should be more than enough to support the deployment of the IMT services in the short and mid-term.
4		

Question no.	Question	Comment, opinion or contribution
	Regarding the frequency band(s) that you consider appropriate to implement fifth generation (5G) mobile systems in Mexico, what mechanisms and/or sharing schemes, coexistence of services, isolation, geographical separation, or any other, do you think could be applicable to make efficient use of the radio spectrum?	SpaceX does not have any comments.
5	Regarding the frequency band(s) that you consider appropriate to implement fifth generation (5G) mobile systems in Mexico, which you deem the year or period that the Institute makes available to the market it(s) band(s) or some segment of it(s). Justify your response with technical (practical cases, international experiences, etc.), economic or strategic reasons.	SpaceX does not have any comments.
6	Regarding the frequency band(s) that you consider appropriate to implement fifth generation (5G) mobile systems in Mexico, do you consider appropriate that two or more frequency bands should be made available to the market simultaneously? In case of a positive response, which would be the frequency bands or, if applicable, frequency band segments that should be tendered? Justify your response with technical (case studies, international experiences, etc.), economic or strategic reasons.	SpaceX does not have any comments.
7		SpaceX does not have any comments.

Question no.	Question	Comment, opinion or contribution
	Regarding the frequency band(s) that you consider appropriate to implement fifth generation (5G) mobile systems in Mexico, what are the potential uses and benefits in the next 5, 10 and 20 years of that frequency band(s) in Mexico? Justify your response with technical (compatibility/coexistence studies, case studies, international experiences, etc.), economic or strategic reasons.	
8	Regarding the frequency band(s) that you consider appropriate to implement fifth generation (5G) mobile systems in Mexico, how much contiguous radio spectrum do you consider? What segmentation and/or channeling do you consider appropriate for each frequency band(s)? Justify your response with technical (case studies, international experiences, etc.), economic or strategic reasons.	SpaceX does not have any comments.
9	Regarding the frequency band(s) that you consider appropriate to implement fifth generation (5G) mobile systems in Mexico: - Which of them do you think should be used exclusively for indoor use? - Which of them do you think should be used exclusively for outdoor use? - Which of them do you think could be used either for indoor and outdoor uses?	SpaceX does not have any comments.

Question no.	Question	Comment, opinion or contribution
	Justify your response with technical (compatibility/coexistence studies, case studies, international experiences, etc.), economic or strategic reasons.	
10	Do you have additional considerations regarding radio spectrum that the IFT should take into account to satisfy the radio spectrum demand for fifth generation (5G) mobile systems in Mexico? Justify your response with technical (compatibility/coexistence studies, case studies, international experiences, etc.), economic or strategic reasons.	SpaceX does not have any comments.
11	Regarding the frequency bands proposed in the reference document, do you identify potential specific services to be implemented on these frequency band(s) (IoT, short-range device applications, backhaul, WiFi evolution, satellite services, or others)? Justify your response and specify the frequency band(s).	SpaceX does not have any comments.

III. General comments, opinions and contributions by the respondent

Note 3: This section may be used to freely offer comments, opinions and contributions related to fifth generation (5G) mobile systems in Mexico. If you have any comments about the study *"Panorama del Espectro radioeléctrico en México para servicios móviles de quinta generación"*, introduce them in the second column below. If applicable, you can specify the page of the study in the first column.

Note 4: Add as many lines as necessary.

Number of page in the Study	Comment, opinion or contribution
P. 39-40	As the development of NGSO satellite systems continues worldwide, telecom regulatory authorities are encouraged to take a broad view that considers the spectrum needs of both the emerging 5G services as well as the established and growing satellite services that will connect all of Mexico. As noted in the reference document, the IFT has not reached a decision on the use of the 28 GHz band for 5G services. However, if in the future the IFT chooses to make the 28 GHz band available for 5G, due to SpaceX's planned operations in this band, we are concerned at drawing the correct boundary for the protection of FSS services from adjacent terrestrial services and the creation of technical and operational measures to protect FSS operations (e.g., guard bands, coordination distance, exclusion zones). It is critical to assess the potential for aggregate interference from terrestrial broadband networks into FSS space receivers in the 27.0-27.5 GHz range. This issue is of increasing importance as both satellite and terrestrial operators intensify interest and build-outs in the Ka-band, as evidenced by recent studies within the International Telecommunication Union's Task Group 5/1 (TG 5/1). In designing the studies to help the IFT answer this important question, the IFT should consider a few additional factors: • What are the appropriate protection levels and other tests based on the type of interference mitigation selected – such as geographic separation or antenna shielding? • SpaceX notes that it is possible for satellite services and 5G to share spectrum but doing so requires that we avoid overly broad exclusion areas or poorly defined protection standards. • Failure to carefully calibrate the specific details of a sharing arrangement can erode the feasibility of the sharing arrangement. This can lead to a situation where sharing is technically impossible and the good intent of the policy decision to share is undermined by the details of the arrangement. • Likewise, because the details of these sharing arrangements are so crucial and the technology supporting them evolves so quickly, the sharing arrangements must be reviewed and amended frequently to ensure they reflect the latest engineering developments and frequency sharing technologies. The work of ITU-R TG 5/1 and the upcoming discussions at WRC-19 will be critical to determining the appropriate spectrum sharing approaches for mobile and FSS services. The IFT should monitor ITU-R activities related to coexistence between IMT and FSS as they move forward and take into account global developments on this issue—notably decisions taken at WRC-19—before settling on a course of action. Permitting terrestrial systems to operate all the way up to 27.5 GHz without any technical/operational measure may create harmful interference in the FSS bands above 27 GHz, with a chilling result for nascent satellite-based broadband systems evolving in the Ka-band, a platform that will improve the availability of broadband access to Mexicans throughout the country, and increase

Number of page in the Study	Comment, opinion or contribution
	competition in the ICT sector in Mexico for the benefit of end users. Forward-thinking spectrum policy that enables the operation of FSS NGSO systems without any harmful interference will maximize the reach of broadband services in Mexico.