

06 December 2019

Mr. Koichi Katagiri
 Division Director
 Fixed and Satellite Radio Communication Division
 Ministry of Internal Affairs and Communication
 JAPAN

Re: NGSO System Licensing in Japan

Dear Mr. Katagiri:

It was a pleasure to speak with you this morning. Thank you very much for reaching out to SpaceX to learn more about the Starlink program. We would be honored to come to Japan to give you a more detailed briefing at your office or by phone.

With respect to your request for immediate action on a few pieces of information before your meeting on December 12, you asked that SpaceX provide answers to the following questions:

1. Which frequencies will Starlink use?
2. When will Starlink provide service in Japan?
3. A diagram of our basic network architecture
4. When we would like to have a license to serve Japan
5. The technical methods we have for sharing spectrum (steerable beams etc)
6. Our schedule for deployment in Japan

The rest of this letter provides these answers.

1. Which Frequencies Will Starlink Use?

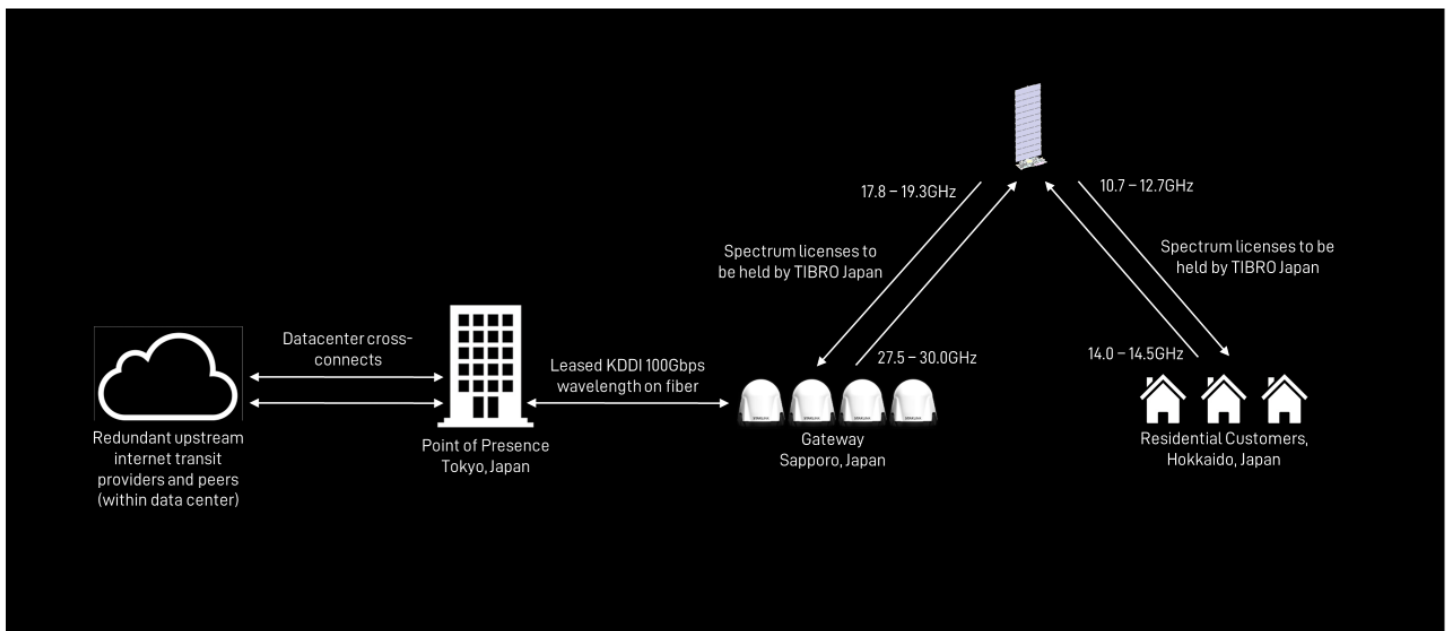
<u>Type of Link and Transmission Direction</u>	<u>Frequency Ranges</u>
Ku-band User Downlink: Satellite to User Terminal	10.7 – 12.7 GHz
Ku-band User Uplink: User Terminal to Satellite	14.0 – 14.5 GHz
Ka-band Gateway Downlink: Satellite to Gateway	17.8 – 18.6 GHz 18.8 – 19.3 GHz
Ka-band Gateway Uplink: Gateway to Satellite	27.5 – 29.1 GHz 29.5 – 30.0 GHz

2. When will Starlink provide service in Japan?

We expect to offer global coverage after 24 launches. We are targeting up to 24 launches by the end of 2020. Providing service in Japan will depend on how quickly we can be licensed to provide that service, as well as other business readiness steps. With cooperation of the MIC, we plan to provide service to Japanese consumers by the end of 2020 or early 2021.

3. Diagram of our Starlink network architecture

EXAMPLE DIAGRAM OF TRANSMISSION FACILITIES, LOCATIONS, AND INTERCONNECTION POINTS.
Specific locations and configuration will be contingent on Japanese partners selected, site availability, and licensing restrictions.



4. When we would like to have a license to serve Japan

We plan to apply for licensing in next 30 days and have begun the required local corporate establishment work to that end. Grant of approvals would be appreciated by mid-2020 to ensure readiness. It is our understanding that the steps toward licensing a satellite broadband service in Japan are as follows:

- a. Establish a Japanese company
- b. Register as a Telecommunications Service Provider
- c. License gateway antennas
- d. Certify and License User Terminals

5. The technical methods we have for sharing spectrum

- We share spectrum with Geo-Synchronous Orbit (GSO) satellites by avoiding the GSO arc (pointing beams at least 18 degrees away from the GSO arc) and complying with the EPFD limits established by the International Telecommunications Union.
- We share spectrum with terrestrial users by complying with the ITU's PFD limits.
- We share spectrum with other NGSOs by using steerable beams, dynamic frequency allocation and transmit power control to limit the frequency and duration of in-line events.

6 Starlink Schedule for Deployment in Japan

We are launching 60 Starlink satellites with every launch. We expect to offer global coverage after 24 launches. We are targeting up to 24 launches by the end of 2020. We are designing and manufacturing our own user terminals. We expect to have these ready for type approval and certification in 2Q 2020. We would like to have them licensed for sale in Japan by 3Q 2020 to allow us to start service in Japan at the end of 2020 or early 2021.

One further item worth mentioning, given our conversation about "first comers and late comers" is the issue of "priority spectrum." The Report of the Director of the ITU Radiocommunications Bureau to the WRC-19 makes clear that there is no such thing in the Radio Regulations of the ITU. In fact, section 2.2 of the Directors Report, notes that the obligation to coordinate falls equally on all administrations and all satellite systems, regardless of the date filed at the ITU.

Conclusion

SpaceX is excited to build the world's most advanced satellite broadband system and provide increased Internet access to the citizens of Japan. This letter has been prepared to quickly answer your specific questions ahead of the MIC meeting on NGSO licensing. We would be pleased to continue this conversation in greater detail after your meeting on December 12.

Please do not hesitate to contact me via email at matt.botwin@spacex.com or telephone at +1.202.412.1696 for any additional information or clarifications.

Sincerely,



Matt Botwin
Director, Global Satellite Government Affairs