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RE: IFC 7/2020 - Implementation of the Spectrum Pricing Review

Space Exploration Technologies Corp. (SpaceX) appreciates this opportunity to provide input to the Australian Communications and Media Authority (ACMA) in response to the discussion paper, "Implementation of the Spectrum Pricing Review (Consultation 7/2020)" (the Discussion Paper). Specifically, SpaceX urges the ACMA to marry spectrum taxes fees that are adjusted to encourage competition and new entrants with aggressive performance-based policies to spur spectral efficiency. This combination of actions maximizes choices for consumers both between and among different technologies, ultimately driving down prices and propelling the quality of consumer services.

Background

SpaceX is developing a Non-Geostationary Satellite (NGSO) system to provide Fixed-Satellite Service (FSS). The system will provide direct to consumer broadband for millions of users in Australia and around the world. In March 2018, the United States Federal Communications Commission (FCC) authorized SpaceX to construct, launch, and operate a constellation of 4,425 NGSO satellites operating close to the Earth.[i] That FCC license marked a major step in SpaceX's efforts to design, develop, and deploy an innovative and spectrum-efficient satellite system to deliver broadband service directly to consumers around the world. In May 2019, SpaceX launched the first 60 satellites in its broadband constellation. Since then, SpaceX has continued an aggressive launch cadence, putting 538 satellites into orbit.

SpaceX was authorized to utilize 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

ACMA granted SpaceX's application for inclusion in Australia's Foreign Space Object Determination on 30 January 2020.

ACMA is correct to explore ways to encourage efficient use of spectrum, including through a well-designed tax formula. Yet, ACMA's current formula does not fully account for technology updates or new more-efficient uses of technology. Hence, SpaceX supports any efforts to update the formula to reflect the current spectrum environment and couple it with policies that encourage more efficiency from all spectrum users.

Cost Recovery Model

ACMA is correct to respond to the ongoing explosion in demand for both satellite and terrestrial wireless services that is driving technological development and demand for spectrum. A successful spectrum policy must recognize that to accommodate this demand, all users—terrestrial and satellite—must find ways to design and deploy systems that increase efficiency and better share limited spectral resources. SpaceX therefore urges ACMA to consider policies and tax formulas that reward the use of advanced wireless technology that improves spectrum efficiency and enables sharing both within and across platforms.

While spectrum taxes and fees may have been an effective method of driving efficiency in the past, these structures are no longer well fitted to reflect innovations in the ways spectrum is used today. As recognized in ACMA's Consultation Paper, technology has evolved past the current tax structure. But efforts to tailor the tax model to technology available at any particular moment would prove similarly futile, as innovators develop new and exciting ways to serve consumers.

Advanced wireless technologies that are either already on the market or on the cusp of introduction are making current tax structures and policies even less productive. For instance, NGSO systems can use multiple antennas to track satellites without adding significant interference to other uses. And new adaptive antennas that allow sophisticated beam forming and steering combined with advanced filtering techniques make it possible for different users and different services to work more precisely and closer together than ever before—both physically and spectrally. Traditional technical rules geared to protect one technology at the expense of another no longer account for this kind of technological advancement. Instead, aging policies have become unnecessarily restrictive and are stalling the surge of innovation.

Without fine tuning its formula to reward innovative and efficient uses of spectrum, ACMA risks depriving Australian consumers of the benefits of cutting-edge technologies that can connect the unserved, even in the most remote areas of the country. In fact, the current methodology results in taxes so high that new entrants may choose to avoid the Australian market altogether. Ill-fitted tax policies could inadvertently lock in incumbent technologies while proving to be a barrier to entry to new innovators. For instance, the taxes for NGSO earth stations in urban environments could be prohibitively expensive even though they would cause little interference to surrounding services. In the end, these high taxes could deny Australian consumers the benefits of new competition. Or, if an NGSO did deploy, they may be forced to pass along these high costs, resulting in higher prices for consumers.

A better approach would be to adopt a price-recovery model tied with other policy incentives for efficiency. For example, in the United States the Federal Communications Commission employs a fixed application fee for spectrum use along with annual fees for upkeep. This pricing structure allows the government to recover expenses for processing applications but does not discourage new entrants or network expansion.

Spectrum Efficiency

Yet, as we have seen in the United States, a cost-recovery model alone is not sufficient as it does nothing to encourage efficiency. This efficiency is vital to ensure services keep up with consumer needs. Experts anticipate that wireless traffic will make up more than 70% of total internet traffic within five years. At the same time, wireless technology is no longer confined to traditional services—reliance on wireless connectivity is now ubiquitous across every industry, from manufacturing to farming and beyond. In fact, some project that in the next several years the total wireless market will consist of only 3% terrestrial 5G devices. The growth in these devices

will be vastly outpaced by machine-to-machine devices that will make up over half of all wireless devices. This rapid evolution in the way we use spectrum has the potential to strain and even break traditional terrestrial and satellite policy tools.

To accommodate this evolving demand, both government and industry needs to recognize that spectrum users act like other rational actors—they respond to economic and policy incentives. Therefore, because our shared goal is to increase spectrum access for all users, national policies must include inventive means to reward those who develop and use efficient technologies. Effective policies would move past traditional approaches and would instead favor policies that encourage sharing and reward efficient users. Policies like these would use the carrot of greater spectrum availability to reward efficient users and the stick of higher costs for inefficiency.

SpaceX has therefore proposed in the United States several new policies that encourage development of spectrally efficient technologies. For instance, SpaceX has proposed a band-splitting model for NGSOs that rewards the system that uses spectrum most efficiently. Critically, the proposals recognize that private coordination between operators is the gold standard for managing spectrum. Because operators themselves are best positioned to understand the capabilities of their systems and their business objectives, successful coordination ensures the most efficient use of shared spectrum. Towards that end, SpaceX's band-splitting proposals are designed to drive the best results from those negotiations. They are specifically tailored to encourage operators to use spectrum efficiently and to come to quick resolution in their coordination discussions. Ideally, any spectrum policies primarily set the terms for successful coordination between operators.

With that goal in mind, SpaceX has proposed a default rule under which—absent private coordination—operators split the spectrum during in-line events. To encourage all operators to develop systems better able to share spectrum, first choice of home spectrum should go to the operator that uses spectrum more efficiently. The current rule in the United States affords this right of first choice to the operator that is first to launch and operate in the frequencies in question. But this assignment of rights sets the wrong incentives—it encourages operators to launch a small number of satellites quickly and then operate an inefficient system that hinders anyone who follows, even if that delay was due to development of a more spectrally efficient system. Instead, a rule that assigns first choice of spectrum to the more efficient system creates a race-to-the-top in which operators compete to develop the most spectrally efficient technology. And ultimately, NGSOs that can share with each other are also better able to share with other technologies, such as terrestrial wireless services.

But underlying proposals such as these is a straightforward principle: the government should set an aggressive performance metric and industry should compete to meet that metric. This competition leads to more competition, meaning consumers accrue the benefits of more choices and lower costs. Given the rapid development of all wireless technologies—terrestrial and satellite—performance-based policies like the one described above will drive more competition than a tax-based system that risks deterring competition and becoming quickly outdated.

Very best regards,

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[i] The FCC subsequently approved a modification to that license to authorize SpaceX to operate 1,584 satellites at a lower altitude, with a corresponding reduction of the size of its system by 16 satellites.