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Space Exploration Technologies Corp (SpaceX) appreciates the opportunity to share its comments to the Australian Communications & Media Authority (ACMA) on the Satellite direct-to-mobile services consultation.

About SpaceX

SpaceX is a privately-held company based in Hawthorne, California that is revolutionizing space technologies, with the ultimate goal of enabling humanity to become a multi-planetary species. As the world's leading provider of launch services – and the only provider with an orbital class reusable rocket – SpaceX has deep experience with both spacecraft and on-orbit operations and has now deployed a high-speed, low latency broadband network in space, Starlink.

Since its founding in 2002, SpaceX has achieved a series of historic milestones. In December 2010, SpaceX became the first private company ever to successfully launch and return a spacecraft (Dragon) from low-Earth orbit. In May 2012, the company again made history when Dragon berthed with the International Space Station ("ISS"), a more than \$100 billion multinational facility with human beings onboard, and delivered cargo, and returned safely to Earth—a technically challenging feat previously accomplished only by governments. In December 2015, SpaceX successfully returned a first-stage rocket booster to land after carrying a payload to space. SpaceX has since landed a first-stage booster more than 165 times and has re-flown over 135 boosters, including up to 16 re-flights of a single booster. In May 2020, SpaceX used its Crew Dragon capsule, the only U.S. human-rated orbital transport spacecraft, to become the first and only commercial operator to deliver astronauts to the ISS. With frequent, low-cost launches, SpaceX has launched over 5,000 of its Starlink satellites.

SpaceX maintains a strong commitment to ensuring safe and responsible operations by leveraging decades of space-based operations experience and comprehensive debris mitigation practices and by working closely with the domestic and international institutions tasked with ensuring the continued safety of space operations. SpaceX brings this commitment and experience to all aspects of its space-based operations.

Introduction

Over 60% of Australia's vast land mass and 90% of the Earth remain unconnected by wireless networks today. Despite tremendous investment and deployment of 5G and LTE terrestrial networks, enormous stretches of land and sea still cannot be reached by traditional terrestrial technology. But even for those that have connections, network resiliency has never been more critical to our communities in the face of a rapidly changing climate and the troubling rise of increasingly frequent natural disasters in Australia and around the globe.

To bridge these gaps, direct-to-mobile satellite providers including SpaceX are now integrating space and terrestrial networks to deliver truly ubiquitous cellular connectivity. For the first time, millions of people will be able to access mobile services in areas currently unserved by terrestrial wireless infrastructure alone. People in these areas will be offered the safety and peace of mind of a phone call or SMS message to first responders or loved ones during an emergency or natural disaster.

SpaceX has invested millions of dollars to design its Starlink Direct to Cell system with the capability to operate over a wide range of spectrum bands using commercially available mobile phones operating on the LTE standard.

After the announcement of its partnership with T-Mobile in 2022, SpaceX provided the ACMA with an update on its new technology. Since that time, SpaceX has received tremendous interest from mobile



partners around the world that are able and willing to leverage their authorized spectrum to enable satellite direct-to-cell capabilities. SpaceX has now announced exciting partnerships with major global telcos including Optus in Australia, One NZ in New Zealand, Rogers in Canada, KDDI in Japan, Entel in Chile and in Peru, and Salt in Switzerland. SpaceX and its growing list of partners are on the cusp of delivering this truly innovative direct-to-device capability with the potential to benefit millions across the nation and around the world.

The potential envisioned in these agreements is now taking form. SpaceX received authorizations from the FCC in December 2023 granting permissions to launch and test direct to satellite services. On January 2nd, 2024, SpaceX launched its first Direct to Cell enabled satellites onboard a Falcon 9 rocket. Just six days later, SpaceX successfully sent and received the first SMS messages to unmodified mobile phones using Starlink satellites. SpaceX plans to continue launching Direct to Cell-capable satellites throughout 2024 and to launch its commercial messaging services later in this year with voice and data service to be brought online in 2025.

With SpaceX and Optus's collaboration now in motion, we look forward to working closely with the ACMA to enable commercially delivered direct-to-cell capabilities to millions of Optus subscribers in Australia.

Global trends towards the integration of satellite and terrestrial networks

At the ITU World Radiocommunication Conference 2023, direct to device services were among the most widely discussed new technologies. The global interest in the promise of direct to device services culminated in an agenda item to study possible new allocations to the mobile-satellite service, including in bands between 694 MHz and 2.7 GHz for direct connectivity between space stations and IMT user equipment to augment IMT network coverage. The agenda item is an exciting endorsement by the ITU community of the growing importance of direct to device services.

But administrations around the world are recognizing the critical needs for this new technology now, including for safety of life. They have therefore begun work in parallel to take a more immediate view of these issues domestically. In Europe, for example, countries in the European Conference of Postal and Telecommunications Administrations (CEPT) have begun drafting a study exploring the regulatory and technical elements of satellite based Direct-to-Cell communications via existing smartphone. The objective of this study is to develop a common view on Direct-to-mobile satellite services among CEPT countries.

The Federal Communications Commission ("FCC") in the United States in March 2023 began a proceeding called the Single Network Future: Supplemental Coverage from Space. In it, the FCC proposed a flexible spectrum access framework for NGSO systems to provide service through access terrestrial to spectrum so long as certain requirements are met, including a lease from the terrestrial licensee within a specified geographic area. As mentioned above, while the framework proceeding is ongoing, the FCC has granted SpaceX authorization to launch direct-to-cell-capable satellites and to test them.

The ACMA continues to be a forward-looking regulatory authority and SpaceX welcomes the views set out in its recent Five-Year Spectrum Outlook (FYSO) on the extent to which the current radiocommunications regulatory regime for space objects and the technology flexible nature of the spectrum-licensing regime enable the supply of IMT Sat DTM services within Australia.^[1] SpaceX considers that the flexibility of Australia's spectrum licensing regime supports exactly this kind of innovation thereby providing the citizens of Australia with an early opportunity to benefit from the potentially significant expansion of coverage it entails.

I. Response:



Australia is uniquely positioned to benefit from and contribute to the global development of direct-to-mobile satellite services. Its sprawling land mass, diverse terrain, and distance from nearby neighbors are all features that make Australia ideally suited to lead the world's first deployments of satellite direct-to-mobile services. The ACMA's proactive and balanced approach to spectrum management has established Australia as an authoritative voice on the deployment of innovative satellite technologies, including Starlink Direct to Cell.

SpaceX is pleased to provide its position on satellite direct-to-mobile regulatory issues to the ACMA:

1. Is the current spectrum management framework fit-for-purpose to manage these new satellite services?

The operational model of Direct-to-Cell is fully supported through the ACMA's current spectrum licensing framework. Under current rules, spectrum licensees are entrusted to freely use, sub-divide, and share licensed frequencies so long as license conditions are met, and any third-party use falls under a spectrum use agreement. This flexibility is appropriately balanced with the need to ensure compliance with applicable regulations and effectively manage the risk of harmful interference.

This framework designs clear incentives for spectrum license holders to balance commercial, legal, and regulatory implication of additional services deployed in its band, such as Starlink Direct-to-Cell. By doing so with minimal regulatory intervention, the spectrum license requirements properly set incentives for commercial operators to leverage their own due diligence and contractual obligations to manage compliance centered on the consumer, rather than on which technology is connecting them. This technology-flexible licensing framework enables expedient, commercial deployment of valuable and cutting-edge technologies while establishing safeguards to protect the incumbent users of spectrum.

[\[1\]](#) ACMA FYSO 2023-28, p.22

2. If not considered fit-for-purpose: What are your concerns? What is your proposed solution? What next steps should be taken?

The ACMA's flexible approach that leverages terrestrial operator's licenses is ideally suited and fit-for-purpose to allow rapid deployment of service for consumers and first responders. The ACMA's approach requires satellite operators to partner with a terrestrial operator and operate on spectrum that's been licensed for exclusive use. As with any deployment of radiocommunication devices in its licensed band, terrestrial partners are expected to consider coexistence issues and coordination arrangements to ensure compliance with conditions in its spectrum license. Accordingly for direct-to-mobile, terrestrial and satellite service partners will also protect relevant in-band and out-of-band users.

Starlink Direct to Cell will operate under a non-interference, non-protection basis under ITU Radio Regulations Article 4.4 ("RR 4.4"). Operation using RR 4.4 enables new satellite technologies while providing assurances to incumbent users until international studies and discussions are able to be undertaken at the ITU.

The use of RR 4.4 in this context is consistent with the guidance given by the ITU at the recent World Radiocommunication Conference. While the ITU's Radio Regulation Board urges sparing use of this article, it specifically mentions its use in situations like that of the direct-to-mobile service. This application of ITU R.R. 4.4 is similar to the approach taken by the ACMA to enable the expedient roll-out of Ku-band NGSO ESIMs in 2022.

SpaceX also encourages the ACMA to support ITU studies on direct-to-mobile satellite services per the future agenda item 1.13 adopted at WRC-23. While these studies are not a prerequisite to initiate a considered and thoughtful roll-out of direct-to-mobile services in Australia, the work undertaken by the ITU



working parties can explore the need for improved satellite and terrestrial coexistence standards and support the development of direct-to-mobile technologies around the world.

SpaceX is also expanding its productive collaboration with Australian radio astronomers on the deployment of its direct-to-mobile service. SpaceX is proud of its ongoing and successful coordination with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) within the Ku and Ka bands that are utilized by SpaceX's satellite internet service. SpaceX has already started similar coordination with CSIRO for its direct-to-mobile spectrum bands to develop new spectrum sharing methods that make coexistence between radio astronomy and NGSO operators feasible. In fact, these new sharing methods can protect, and even expand, frequency bands that are important for scientific research while launching new services, such as direct-to-mobile, that are also in the public interest.

3. Are there any other commercial, regulatory or public-benefit implications we should take into account?

Direct-to-mobile services are not only important to help people stay connected no matter where they go in Australia, they are essential in life-threatening situations when other technologies are not available. Starlink Direct to Cell will enable seamless connectivity to connect hikers, sailors, and the hundreds of thousands who travel through or live in mobile dead zones. The type of ubiquitous coverage provided by the first time through direct-to-mobile services will connect millions of Australians around the country, especially when someone finds themselves in an emergency situation when outside of current mobile coverage areas. During natural disasters and emergencies, this service will support first responders, while providing peace of mind to friends and families.

Future direct-to-mobile services will also bring IoT capabilities to remote sensors, creating exciting use cases in agriculture and livestock support, environmental monitoring, remote energy, and ground transportation tracking. Given Australia's unique geographic suitability for direct-to-mobile and the imminent commercial readiness of the technology, the ACMA should consider compiling guidance and learnings for other countries seeking to enable direct-to-mobile services and for international discussions such as those beginning now in the ITU working parties.

Conclusion

SpaceX values the opportunity to provide its comments to the ACMA and applauds the ACMA for its continued leadership to introduce innovative satellite applications to Australian communities. SpaceX welcomes the opportunity to further discuss its feedback above with the ACMA.

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