



The Manager
Space Systems
Australian Communications and Media Authority
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C/o: satellite.coordination@acma.gov.au

20 February 2024

Dear Mark,

RE: 2 GHz MSS technical parameters and demand considerations consultation

EchoStar Global Australia Pty Ltd is an Australian mobile satellite service (MSS) low earth orbit satellite operator in the 1980-2010 MHz and 2170-2200 MHz band (2 GHz band).

We hold International Telecommunications Union (ITU) spectrum rights through our Australian Sirion-1 ITU filing. This filing is being brought into use for a non-geostationary orbit MSS S band satellite network named Lyra.

Lyra is currently in the manufacturing stage with plans for its deployment to begin in 2024. The network will bring global IoT including LoRa services to users across Australia.

EchoStar Global Australia's parent company, EchoStar Corporation, has extensive global experience in the operation of the 2 GHz band for the provision of Mobile Satellite Services (MSS).

EchoStar subsidiary, DISH Network, operates two 2 GHz band satellite networks (DBSD and TerreStar 1) over the United States as well as an Open-RAN AWS-4 network. A further affiliate is licensed to provide MSS with a terrestrial component in Mexico and provides LoRa based services.

EchoStar Mobile Limited (EML) has been authorised to provide 2 GHz band MSS with a terrestrial component using the EchoStar XXI satellite and provides a range of services including LoRa IoT and Direct-To-Mobile Services (DTM) applications to different sectors, including agriculture and railway.

EML is also working with its partners to test hybrid terrestrial-satellite solutions for the control and operation of unmanned electric multirotor helicopters with Volocopters in Germany.

For these reasons, EchoStar Global Australia Pty Ltd welcomes the opportunity to respond, as follows, to the 'Issues for Comment' that are outlined in the ACMA's consultation on 2 GHz MSS technical parameters and demand considerations.



1. *What are your views on the proposal to develop technical requirements for mobile earth stations and CGC systems based on the 2 GHz spectrum licensing technical framework. Are there alternative approaches that could be used on different resulting values for key parameters such as power and unwanted emissions that we should consider?*

Technical requirements should be based on the existing standards, such as 3GPP. This will ensure that licensed satellite systems will be globally compatible, use spectrum efficiency and minimise the potential for harmful interference.

Additionally, the use of global standards to set technical requirements will increase the economies of scales that Australian users will benefit from, including having greater consumer choice and lower costs.

Since 3GPP standards define co-existence based on various parameters such as power and unwanted emissions, any additional rules the ACMA might choose to adopt should still be consistent with these standards or there could be harmful interference to operators from adjacent band operations.

2. *Having arrangement bases on the 2 GHz spectrum licensing technical framework means including support for active antenna systems. We seek views about the inclusion of active antenna systems in the technical framework for 2 GHz MSS.*

Inclusion of requirements for active antenna systems in the technical framework (for the 2GHz band MSS) might hinder the development of other innovations for satellites or constellations. These constellations might be operating at various altitudes, LEO, MEO GSO.

The 3GPP standards already include guidelines for the NTN NR for the operation of fixed beams and non-fixed beams. Using 3GPP standards-based technology, the satellite operators will be required to use the spectrum efficiently by utilising state-of-the-art technology that is economically viable and allows a reasonable deployment schedule.

3. *What are your views on developing technical parameters for aeronautical transmitters in CGC/DA2GC systems based on ECC report 233? Are there alternative parameters that should be used?*

It is important to protect 2GHz MSS/CGC systems from interference from other systems such as DA2GC systems.

ECC Report 233 has been developed based on extensive interference analysis and studies of interference from DA2GC systems into MSS and CGC systems.

The report includes implementation of mitigation techniques to avoid interference between MSS and CGC. These technical requirements are necessary and should be maintained to ensure protection of the services operating in the adjacent bands (1920-1980 MHz, 2010-2025 MHz, 2110-2170 MHz, above 2200 MHz) and the CGCs of MSS systems in the 2 GHz MSS band.



4. *What are your views on the proposal to reduce the current emission limits at the 2010 MHz boundary from -66 to -60 dBW/MHz EIRP intended to provide protection for TOB receivers operating above 2010 MHz?*

The change from -66 dBW/MHz to -60 dBW/MHz will enable increased utilisation and the introduction of commercial equipment that operates in this frequency range while still providing protection to TOB services.

5. *For 2 MHz MSS emission limits above 2010 and 2200 MHz, which are intended to protect TOB receivers, do these limits achieve that objective? If not, please explain why and outline what the limits should be.*

The proposed -66dBW/MHz levels to protect the TOB are acceptable.

6. *For 2 GHz MSS emission limits above 2010 MHz and 2200 MHz we seek views on the merits of applying more relaxed limits in areas of lower TOB usage and views on relevant emissions limits to apply in areas on low TOB usage.*

EchoStar Global Australia request that the ACMA provide additional time and information to complete studies on this issue. It would be useful to have a set of parameters that the ACMA proposes to base their studies on.

7. *Views are sought on the coordination requirements outlined in Section 3.*

MSS/CGC services meeting the technical requirements adopted by the ACMA, should not require operators to engage in coordination if they meet 3GPP standards. This should be considered as routine licensing.

However, systems operating outside the “Technical design features for 2GHz MMS” should be required to coordinate with the affected parties and should not be treated as ‘routine’.

The ACMA should also require, as a condition of licensing, that operation of secondary services should not cause interference into or claim protection from the primary MSS/CGC services. These services should be required with primary service providers in adjacent bands.

As is generally the case, MSS/CGC operators (as operators of primary services), should be required to take into consideration coordination requests from secondary service providers and evaluate these based on their technical merits.



8. *Views are sought on the approach of coordinating CGC transmitter operating in the 2170-2195 Hz with earth station receivers using the level of CGC unwanted emissions at the earth station receiver. What are appropriate earth station protection levels under such a methodology? Are there alternative approaches that we should consider?*

Coordination methodology of CGC transmitters with earth station receivers (based on CGC out-of-band emissions at the earth station receiver in accordance with Annex-1 of Recommendation (10)01) is appropriate and will simplify coordination.

CGC stations not meeting the following requirements should be required to complete coordination with earth stations.

“A coordination area around the EESS/SOS/SRS earth stations within which coordination should be achieved with those CGC base stations having a power level above a given threshold which is a function of the distance from the receiving earth station.”

9. *Views are sought on the suitability of the arrangement for coordination with the radio quiet zone and what requirements should apply for aeronautical transmitters in 1980-2005 MHz with respect to the radio quiet zone.*

EchoStar Global Australia has no response to this question.

10. *No coordination requirements are considered necessary between co-channel and adjacent channel MSS services. We are interested in views on this proposal, including views on any alternative coordination requirements considered necessary.*

EchoStar Global Australia support MSS operators using 3GPP standards which will negate the requirement for coordination.

If the requirements adopted allow an operator to choose not to rely on 3GPP standards, then it is critical that operators' complete coordination with co-channel and adjacent MSS operators before they begin operations and the parties file notice of this completion with the ACMA as soon as completed.

11. *We propose that the current emission limit at the 2010 MHz boundary could be reduced from -66 to -60 dBW/MHz EIRP. Are there other elements of arrangements for narrowband MSS that would be beneficial to review?*

The increase from -66dBW/MHz to -60 dBW/MHz is acceptable and should be implemented on a timely basis. EchoStar Global Australia recommend that the ACMA also consider the requirement that narrowband operators also utilise 3GPP standards. If they do not utilise 3GPP standards, narrowband operators should be required to engage in coordination with adjacent and near-adjacent band operators prior to starting operation.



12. We are considering whether ITU-R Recommendation P.1812 configured to 10% time (percentage of average year for which the calculated signal level is exceeded) and 10% location (percentage of locations for which the calculated signal level is exceeded) is an appropriate propagation model to use if arrangements are reviewed. What are your views on this proposal?

Consideration of this proposal would require extensive analysis to consider various parameters and the associated implication of such an approach. Therefore, it should not be adopted at this time.

13. We are interested in views about the intended uses of the 2 GHz MSS spectrum, as well as the availability of suitable equipment.

EchoStar Global Australia and its affiliates are already making important use of the 2 GHz band globally by providing conventional MSS services, LoRa and more recently 3GPP-NTN DTM services. With the adoption of 3GPP Release 18, the standards will see increased growth of these services.

There are a wide variety of current and future planned uses of the 2 GHz band in Australia and globally.

Common through all use cases is the ability to provide connectivity to small, or relatively small, battery powered devices that can be hand carried or installed in vehicles, fixed site locations, aircraft or boats and used while in motion.

Conventional Mobile Satellite Service (MSS) such as Hughes GMR1-3G have, for several years, offered up to 200 KbpS data connections ¹.

Typically, MSS services have been developed using proprietary technologies - there are many examples of these technologies being deployed globally.

EchoStar Mobile, an affiliate of EchoStar Global, is a pioneer in bringing standards-based connectivity service to the marketplace. In 2022, it launched the first commercial LoRa satellite service in Europe using the 2GHz band. This service is accessed using the commercially available EM2050 Module ².

Since the 2 GHz band is close to frequencies that are used for terrestrial communications and use standardized 3GPP cellular technologies, recent updates to the 3GPP standards (Release 17) have enabled the use of NB-NTN for IoT and messaging applications. These applications use standard, commercial off-the-shelf chipsets, and antennas.

Chipsets from Sony and Mediatek are already Release 17 compatible and modules that incorporate those chipsets are available from Quectel, Semtech (formerly Sierra Wireless) and Murata.

¹ www.echostarmobile.com/mss-terminals/

² www.echostarmobile.com/product/em2050-oem-module/



Additionally, Bullit, a UK handset manufacturer, is commercially marketing an Android based handset with satellite-based messaging capability.

Further market penetration and deployment of NB-NTN based products is expected as companies realise the benefits of satellite network integration at the chip set and network level. This enables lower costs and more seamless integration. Such applications range from IoT for smart asset tracking to smart watches.

Beyond NB-NTN, the next step is the development of 5G NR-NTN which first requires the adoption of new 3GPP standards in Release 18 then in Release 19.

5G NR-NTN will improve on Release 17 capabilities and provide new capabilities with a focus on satellite capabilities for handsets. Such improvements will include faster data rates, more reliable connections, and the ability to make voice calls.

14. What is the minimum viable amount of spectrum for 2 GHz MSS services? Is a 2x5 MHz allocation useable or is a minimum of 2x10 MHz required?

While 3GPP is based on 5x5 MHz channels, EchoStar Global Australia has significant concerns about the limited amount of capacity this enables. Based on current demand forecasts (and the types of services that will be provided - texting / voice / email /video), it will be important to have at least 10x10 MHz of capacity available. However, to future proof the network, 15x15 MHz of spectrum is preferred.

15. Which of the following options is the most appropriate frequency lot configuration for the 2 GHz MSS spectrum?

Based on EchoStar Global Australia's experience, Configuration 1, [2 x 15 MHz paired (1980-1995 MHz with 2170–2185 MHz); 2 x 10 MHz paired (1995–2005 MHz with 2185–2195 MHz)], makes the most sense:

To provide a commercially viable service there needs to be adequate spectrum. By breaking this into five generic 2x5 MHz paired lots, it could result in stranded or inefficiently used spectrum.

This is especially true since the ACMA has already made available a standalone 5x5 MHz block of spectrum for IoT.

Therefore, to meet the promise of 3GPP-NTN services in the 2 GHz band, the ACMA should allocate the band in one 10x10 MHz and one 15x15 MHz block of spectrum for licensing as proposed.

Yours sincerely,

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