

OPTUS

Submission in response to
ACMA's draft Five-year
spectrum outlook 2022-27 and
2022-23 work program

Public Version

May 2022

EXECUTIVE SUMMARY

1. Optus welcomes the opportunity to provide feedback on the Australian Communications and Media Authority (ACMA) *draft Five-year spectrum outlook 2022-27 and 2022-23 work program* (FYSO).
2. The FYSO is a long-standing document that sets out the ACMA's work programme and highlights key activities to be undertaken during the next 12 months, as well as major spectrum forward allocation activities expected in the short term. The FYSO is also important as a document outlining how the ACMA's future work programme puts the promotion of the long-term public interest derived from the use of spectrum as the key aim of spectrum management.¹
3. Optus generally supports the ACMA's approach to spectrum management and appreciates the transparency afforded by the FYSO. In particular, the ACMA's recent prioritisation of work relating to the harmonisation and allocation of additional mid-band spectrum is to be commended.
4. Optus welcomes the inclusion of the spectrum licence renewals in the current FYSO. This is a significant piece of work for the ACMA to conduct, impacting the continuity of service for the vast majority of 4G/5G traffic carried in Australia today. The ACMA should consider this work to be of the very highest priority, with its own independent workstream and dedicated resources.
 - (a) Spectrum renewal activities for all the spectrum licensed bands should be conducted in a holistic and simultaneous way due to the interconnected nature of the way the bands are deployed as part of a mobile network's spectrum layering strategy.
 - (b) Investment decision making could be severely compromised for MNOs if a standalone, band-by-band approach is taken to renewals.
 - (c) Optus' suggested holistic approach is consistent with the previous spectrum licence renewal process, conducted with all the renewal prices simultaneously included in the Radiocommunications (Spectrum Access Charges Direction 2012) document.
 - (d) Optus welcomes the increased certainty provided by the recent amendments regarding licence renewal terms and the more structured timelines and approach that will underpin future investment.
 - (e) We suggest that the ACMA should eschew some of the more esoteric work items included in the FYSO (e.g THz band activities) to focus on the approach to renewals as outlined above.
5. It is well recognised that 5G, as the latest generation in mobile technology with faster speeds, low latency and improved capacity offers significant potential to transform business and the economy. There are a wide variety of new use cases that will be enabled by 5G, including IoT, edge computing and autonomous vehicles to name a few. The potential economic benefits from 5G are well recognised, with numerous studies undertaken on the positive productivity effects of improved connectivity for Australian

¹ Radiocommunications Legislation Amendment (Reform and Modernisation) Bill 2020, Explanatory Memorandum p.20

businesses and consumers computing and autonomous vehicles to name a few. The potential economic benefits from 5G are well recognised, with numerous studies undertaken on the positive productivity effects of improved connectivity for Australian businesses and consumers.²

6. The mobile industry continues to face financial pressures with the significant costs of network investment, including spectrum inputs, and competition from within and increasingly from outside (OTTs) the sector resulting in an ongoing decline in industry revenue. The ever-increasing demand for spectrum from high bandwidth services is set to continue. This will become a bigger issue as 5G networks mature.
7. Many 5G use cases are industry-specific, which is different to previous generations of mobile technology where uses were more economy wide. While individual localised use cases may be met by way of a variety of different network operators, only MNOs offer the economies of scale and scope necessary to provide national networks for all Australians.
8. It is thus vital that the mobile industry is provided with access to the spectrum needed to deliver on Australia's Digital Economy 2030 goals and realise the broader economic benefits of competitive 5G services for metro and regional Australia. The regulatory settings governing the management of spectrum must be sufficiently clear and certain to encourage investment.
9. As the leading satellite service provider in Australia, Optus also welcomes the ACMA's recognition of the significant technological innovation taking place in the sector and in particular the entry of non-geostationary satellite orbit (NGSO) systems. While Optus understands the ACMA's cautious approach to regulatory intervention in this area, Optus encourages the ACMA to investigate the impact of major NGSO/LEO operators on Ka-band operations in Australia. Given the level of activity and the likelihood of increasing potential for interference in the band, Optus urges the ACMA to consult Australian satellite operators on licence applications from prospective NGSO/LEO operators.
10. Optus commends the ACMA for the work program it has undertaken to implement the changes flowing from the Modernisation Act and appreciates that certain of these reforms contemplate a greater degree of autonomy for the ACMA in its spectrum decision making. Optus appreciates that the ACMA has to balance the interests of a very broad range of stakeholders in undertaking its spectrum management functions and responsibilities. Optus looks forward to engaging constructively with the ACMA to ensure that the processes for spectrum allocation and licensing for 5G services continue to be made in the public interest.
11. Optus sets out its response to the FYSO in further detail below. Optus also refers the ACMA to the Australian Mobile Telecommunication Associations (AMTA) submission. Optus generally supports the position set out in the AMTA submission, other than in relation to the issues set out in response to specific questions below.
12. Optus submits that spectrum management over the period of this FYSO must focus on the key issues confronting the mobile industry, including:

² PwC analysis demonstrates that the potential economic gains from getting the correct policy settings for 5G investment in Australia could amount to \$130 billion over the decade to 2030 – and create 205,000 net new jobs

- (a) Continue work on and prioritise facilitating changes to current licensing arrangements in existing spectrum licensed bands to allow the transition to 5G.
- (b) Carefully implement the proposed re-allocation of the 3.4-4.0 GHz band in a manner that will ensure the spectrum allocation process will promote competition in downstream services and the band can move towards its highest value use
- (c) Ensure the development of technical frameworks achieve outcomes that will enable operators to meet the needs of downstream users.
- (d) Maintain the primacy of spectrum licences over all other licence types to ensure that spectrum licensees have the necessary secure property rights to invest substantial amount of capital into national networks.
- (e) The deployment of advanced 5G networks in both metro and regional areas, in an environment of increasing network costs, declining revenue and uncertain incremental revenue opportunities.
- (f) The importance of clear property rights to provide the necessary certainty to MNOs to undertake the billions of dollars' worth of investment that underpin the development of mobile services.
- (g) Band planning and spectrum boundary design that maximises the ability of MNOs to provide ubiquitous customer experience and service quality by minimising spectrum dead zones and the risks of interference between licensees.
- (h) Mobile spectrum renewals, covering all eight spectrum bands up for renewal over the next decade, which support nearly all of 4G/5G traffic carried in Australia today.

CONSIDERATIONS FOR SPECTRUM MANAGEMENT

- 13. The *Radiocommunications Act 1992* (the Act) requires that spectrum be managed in order to maximise the overall public benefit derived from the use of spectrum. This is to be achieved by ensuring the efficient allocation and use of the spectrum.
- 14. In addition, spectrum must be managed to:
 - (a) Provide a flexible and responsive approach to meeting the needs of users;
 - (b) Encourage efficient radiocommunications technologies;
 - (c) Support the communications policy of the Government; and
 - (d) Maximise the opportunities for the communications industry.
- 15. Where trade-offs are required to meet the objectives, decisions should focus on ensuring the maximum benefit to the public is achieved. These objectives also require spectrum management decisions to be made within the overall context of the market and the wider economy. The events of 2020 have demonstrated that mobile communications are an essential service. Both public and government expectations have shifted to demand

extensive breadth and depth of coverage and continuity of service even during the most challenging of events; and these will only continue to be deeper entrenched over time.

16. Australia is a leader in 5G (deploying over 4000 operational 5G base stations already). In 2019-20 the Australian telecommunications industry invested 65.8% of total industry value added (approx. \$19.5 billion).⁴ However, the extent and speed of the 5G rollout has had financial impacts for mobile network operators (MNOs), with returns on investment declining from 10% to under 5%.
17. This FYSO is again setting longer term objectives during a period of challenging industry economics, reflecting;
 - (a) Long term industry service revenue decline, which has fallen 25% over the last five years;
 - (b) Mobile subscriber levels at their lowest since June 2017;
 - (c) Continual increases in annual depreciation and amortisation costs, which have grown by 16% since 2016; and
 - (d) Record low industry returns on capital down which have halved since 2017 at less than 5%.
18. Optus submits that the ACMA should ensure that spectrum is managed in a way that enables MNOs to efficiently use spectrum to continue to provide better coverage and more resilient services in periods of high demand, as well as in response to challenges to infrastructure. This includes recognising the market dynamics, economics and long-term sustainability of the telecommunications industry. The allocation of spectrum, together with the charging for access to spectrum, should reflect the impact it has on the economics of mobile networks – and directly through to the affordability of essential mobile communications services for consumers and subsequent benefits to the overall economy.

Supporting 5G wireless technology

19. Optus retains the strong view that the ACMA's focus during this FYSO period should be to ensure that existing spectrum assets are able to support or facilitate the roll-out of competitive 5G networks. The ACMA's approach to allocations and licensing must continue to foster competition in relevant downstream markets and be guided by ensuring this valuable resource moves to its highest value use.
20. The ACMA should, consistent with the objectives of the Act, retain its focus on facilitating changes to current licensing arrangements in existing spectrum licensed bands to best support the transition to a competitive 5G market. The ACMA should adopt a flexible and responsive approach to meeting the needs of users to ensure the opportunities of the industry are maximised.

Processes to make licence changes need to promote objectives of the Act

21. Over recent years, the ACMA has undertaken processes to update spectrum band and licence conditions to enable deployment of 5G technologies. While the ACMA must

⁴ "5G Unleashed: Realising the potential of the next generation of mobile technology"; Deloitte Access Economics report for AMTA; 2022; p.12

follow the processes set out in the *Radiocommunications Act*, Optus submits that under the flexibility to be introduced under the *Modernisation Act*, there will be increased scope for the ACMA to improve the workings of the various committees and processes within the framework of the Act.

22. In particular, the ACMA should consider further optimising the structure of industry cooperation when addressing licensing issues. Optus acknowledges the ACMA's acceptance of previously provided TLG feedback from Optus and other members of AMTA.
- (a) Optus notes that the ACMA hosted a number moderated forums or exchanges as part of TLGs as a result of suggestions from the mobile industry. This is greatly appreciated.
 - (b) However, there have been instances where the lack of committed contribution by some TLG participants have hindered the natural debate of technical issues that are ideally canvassed in the closed technical forums. This means non-consensus is reached at the closure of the forum and the issues subsequently transitioned to public consultation for comment are again reintroduced. Optus has been particularly disappointed by the lack of cooperation or substantive technical contribution from the aviation industry in the recent 3.4 – 4.0GHz, amounting only to reference to highly contentious RTCA studies.
 - (c) As a result, the risk remains, for current and potential licensees in the band, that unfavourable licence conditions will materialise, regardless of the rigor or substance of their contributions to the TLG.
23. These technical processes, while often not getting the attention of other processes, are extremely important in setting the conditions under which licences are allocated. As such, one of the purposes of the TLG is to make the public consultation more efficient by enabling informal technical discussions and potential agreement to inform the contents of the ACMA's public consultation on these technical matters. Optus looks forward to working with the ACMA to ensure TLG outcomes receive the right level of technical contribution from all participants and promote the objectives of the Act.
24. Licence harmonisation and band reallocation and defragmentation are also key steps in enabling allocated spectrum to be used for new technologies. Consistent, manageable and rational licence conditions, structures and supporting instruments are critical to the success of such an activity. This is particularly the case for the deployment of 5G technology, which can be used over multiple spectrum bands.

Spectrum licensing and clear property rights

25. The deployment of 5G networks will involve substantial investment in new infrastructure and spectrum across the nation. This investment will be due during a period of low economic growth, declining industry revenue, record low industry returns, and uncertain demand for the new technology. In the context of high-cost investments and low and uncertain incremental revenue, spectrum licences must ensure that licensees have clear and strong property rights. MNOs will be reluctant to invest the required billions of dollars without secure property rights.
26. As we have noted in response to previous ACMA consultation processes, Optus urges caution where considering the use of AWLs as the use of the licence type remains somewhat experimental. We reiterate that the licence hierarchy and property rights associated with each licence type – spectrum licences, followed by AWL or apparatus

licences, then class licences – must be adhered to in relation to any interference resolution between licensees.

27. Most importantly, technical and administrative arrangements must be designed on the basis that spectrum licences have priority over AWLs in the hierarchy of spectrum rights. This is especially important in relation to proposal to allow both spectrum and apparatus licences to co-exist in the same spectrum band.
28. This should remain the case in operational terms even under the new licensing flexibility being afforded as part of the *Modernisation Act* changes. Any licence that is given the same rights as a spectrum licence should be subject to the same restrictions and requirements for the purposes of interference management, registration and other related obligations imposed on spectrum licensees.
29. The ACMA should ensure that property rights of spectrum licensees are not compromised, i.e. spectrum licences hold a primary use status above any other licence type. Tenure and ability to use spectrum as purchased should be upheld. The concept of 'equal status' arrangements do not apply insofar that use of an AWL impedes on the operational capability and licence conditions, including s145 requirements, set out for spectrum licences issued and operating within the same spectrum frequency ranges.
30. Furthermore, that any overlapping licensing arrangements need to be streamlined. However, a careful balance will need to be achieved to ensure:
 - (a) Costs for management of spectrum assets are recovered efficiently across the various licence types and do not fall solely on spectrum licence holders;
 - (b) The ongoing use of different licensing arrangements respect the formal licensing hierarchy, both in terms of pricing and technical constraints; and
 - (c) Any licence conditions imposed on licensees should be clearly defined, feasible, measurable, enforceable and monitored by the ACMA.
31. Issuing a new licence that invalidates the conditions placed on another spectrum user's existing licence, irrespective of licence type, is not an appropriate spectrum management practice and introduces retrospective commercial and operational risk to the provision of services to end users.

Class licensing and spectrum commons

32. Class licences authorise users of designated segments of spectrum to operate on a shared basis. For example, the low interference potential devices (LIPD) class licence authorises the widest range of class-licensed devices, including wi-fi and Bluetooth services. Given the shared nature of these spectrum arrangements, the protection of individual devices from interference in these bands cannot be guaranteed.
33. Regardless, it has been this flexibility, and the absence of licensing fees, which have enabled innovation both in technology use and deployment approaches in some class-licensed bands.
34. However, class licensing creates challenges for interference monitoring, management and enforcement – for example, adding exemption overlays will similarly compound this issue, particularly where it applies over a prolonged period or for undefined parameters. This highlights the lack of transparency and clarity regarding the approach to the assessment of exemption applications that seems to have taken place in recent times.

Spectrum sharing

35. Optus acknowledges the ACMA's openness to supporting industry-led trials of DSA or other non-traditional spectrum sharing methods, with a role for ACMA in facilitating discussions between affected/interested operators as the need arises. No such need is currently evident or envisaged.

PROPOSED 2022-23 SPECTRUM WORK PLAN AND FYSO

36. The ACMA has proposed a robust work plan of activities for the next 12 months that acknowledges major activities being undertaken in both the band planning and optimisation of existing frameworks workstreams.
37. Optus welcomes this distinction between the two workstreams but notes that when viewed in combination this can represent a significant workload and can lead to resourcing constraints among major stakeholders.
38. Optus supports the ACMA maintaining a balance between planning and optimisation activities, noting that planning of new bands is more resource intensive for all parties.
39. In summary, Optus considers the following band activities warrant further investigation:
 - (a) Finalise the preparations for the issue of AWLs and reallocation of the band in selected areas and frequency bands.
 - (b) Finalise the licence conditions in the 1.8GHz band and progress, 2.1 and 2.6 GHz bands with a view to harmonising those conditions to allow deployment of 5G.
 - (c) Progress spectrum related work, including technical research on restack channel planning and licensing, as a result of the Government's media policy reform green paper process, particularly in relation to freeing up use of the 600 MHz band.
 - (d) Progress implementation of the proposed reallocation of the 3.4-4.0GHz bands with a view to ensuring that the band is defragmented and ultimately competition in downstream mobile markets is promoted, particularly in regional areas.
 - (e) Spectrum renewal activities for all the spectrum licensed bands to be conducted in a holistic way rather than individually in future forward allocation work plans i.e. 700MHz, 800MHz, 1800MHz, 2100MHz, 2300MHz, 2600MHz, 3400-3600MHz. A holistic approach is consistent with the previous spectrum licence renewal process was conducted with all the renewal prices included the Radiocommunications (Spectrum Access Charges Direction 2012 document which included all the bands to be renewed.
40. Optus' views on the ACMA's plans for monitoring, initial investigation, preliminary replanning or re-farming of spectrum bands are summarised below.

Monitoring

41. In general, Optus supports the continued monitoring status of each of the bands listed by the ACMA with no immediate need for progression to the next stage. Optus reiterates its position that the ACMA should retain a balance of effort and return between allocating new bands and ensuring existing allocations are fit for purpose and 5G-ready.

600 MHz band

42. The release of additional low-band spectrum should be a priority for the medium term, therefore we continue to express interest in the 600 MHz as a future spectrum option to

be progressed with initial support for the 600 MHz band to be managed under MBB (i.e. proposed IMT arrangements) rather than broadcast arrangements.

43. The 600 MHz band has long been touted to form part of the second Digital Dividend. Given the experience and long lead times associated with the release of the original Digital Dividend, we consider that progression of the 600 MHz band should be considered in conjunction with processes set out in the Media Reform Green Paper.

Mid-band spectrum

44. Optus notes that the 3.3 GHz, 4.5 GHz and 4.8 GHz bands have been included in the FYSO for many years, and we welcome continued monitoring of these bands for international developments.

Other bands

45. Optus note that the 40 GHz band has been identified globally for IMT at WRC-19 and that the US has recently issued spectrum licences in band to support 5G, while the ECC intends to decide on fixed/mobile harmonisation in the band by November 2022.
46. While these developments are welcome, Optus notes that the whole band must be considered with a view to ensuring co-existence with satellite services, which also have a strong interest in the spectrum.
47. These bands are vital for the future development of FSS services that require wide bandwidth (10 GHz) for up to 50 Gbps data throughput. The high gain, narrow beamwidth directional nature of Q/V band antenna beams, together with high elevation angles for transmitting to satellites, results in small coordination zones that facilitate sharing with FS.
48. Optus notes that a large number of satellite network filings have been submitted to the ITU containing these Q/V bands. Optus considers that these Q/V bands are important for the future development of satellite services needed to provide high-capacity services to isolated regions of Australia
49. We also welcome retaining the 40 MHz, 46 GHz and 47 GHz bands in this monitoring stage. Again, noting there is no immediate need for the expedited progression of these new mmWave spectrum bands (i.e. 40 GHz and 47 GHz). Optus would not support the allocation of these bands in advance of the global eco-system to deploy new spectrum bands not yet harmonised or supported.
50. Optus also notes that any proposed allocation in the 40GHz band for satellite services should emphasise the coordination and coexistence requirements between land mobile IMT services and satellite services.

Future bands

51. Optus notes the bands being studied under WRC-23 agenda item 1.2 considers identification of the frequency bands 3600–3800 MHz, 6425–7025 MHz, 7025–7125 MHz and 10.0–10.5 GHz for IMT, including possible additional allocations in the RRs to the mobile service on a primary basis.
52. We welcome continued monitoring of these bands for international developments.

53. Optus notes that the 3300-3400 MHz band is currently occupied by Defence radar and there seems little to be gained in moving this band beyond the monitoring stage.
54. Optus looks forward to working with the ACMA in its preparation for WRC-23 and has no further comment on the remaining bands being studied at this time.

2100 MHz Apparatus Licences (1920-1960/2110-2150 MHz) in regional areas

55. Optus considers there to be a case for the introduction of this band to the monitoring stage, with a view for future licence conversion from apparatus to spectrum licensing or another licence type that delivers long term certainty for licensees. This band is primarily used by the three MNOs for the delivery of mobile services.

Initial investigation

56. Optus supports retaining the extended MSS L-band at initial investigation, but would welcome progression of the 2300-2302 MHz band to the next stage as a matter of priority.

1.5 GHz (1427–1518 MHz)

57. Optus supports retaining this band at the initial investigation stage and looks forward to participating in the recently released consultation.

Extended MSS L-band (1518–1525 MHz and 1668–1675 MHz)

58. Optus supports retaining this band at the initial investigation stage and looks forward to participating in the recently released consultation.

2300 – 2302 MHz

59. Optus welcomes the inclusion of 2300–2302 MHz as a band priority to support the inclusion of the bottom 2 MHz of the 2300 MHz band to mobile so that a contiguous 100 MHz can be deployed. As a result, Optus submits the ACMA should promote this band to the preliminary planning stage. We reiterate that efficient licencing of 5G-capable spectrum is key to delivering the \$130 billion of extra economic activity over the next decade.
60. Peculiar allocations that diverge from international standards and practices present significant challenges for operators and vendors alike. The provision of Australian-specific equipment or deployment constraints due to the use of additional filtering and other measures create inefficiencies and unnecessary cost. Reversion to a 100 MHz wide band will go some way to overcoming such issues by allowing the use of standard equipment and deployment practices. As such, Optus supports progressing this band to the next stage to increase the overall 5G efficiency and utility of the 2.3 GHz band.

1.9GHz (1880–1920 MHz)

61. The ACMA has acknowledged this is a project for the latest work plan, identifying the 1880-1920 MHz band as a potential candidate to support new technologies including LA WBB applications such as private networks. To address recent interest in this band, the ACMA has indicated it will develop a discussion paper in Q3. However, Optus notes there is limited need for any immediate progression of this band.

6 GHz

62. The ACMA recently made the 5925-6425 MHz (lower 6 GHz band) available for use by RLANs. The ACMA notes that it will continue to review class-licensing arrangements, including whether existing conditions, such as power levels, should be reviewed.
63. Optus notes that, while the availability of 3 additional 160 MHz channels is welcome, the current limitation of 250mW EIRP only allows the delivery of 1 Gbps services. Accordingly, Optus recommends that the lower 6GHz transmit EIRP be increased to the current 5GHz upper band limit of +30dBm with a +2dB allowance for FSPL to a new maximum limit of +32dBm or rounded to 1600mW.
64. Following two consultation processes in 2021, the ACMA has indicated that the upper 6GHz band remains under initial investigation as the ACMA continues to monitor developments in the ITU and internationally.
65. Optus welcomes this approach and reiterates that, there should be further consideration, at least in part, for IMT allocation in the upper 700 MHz of the band, pending the outcomes from WRC-23.

Preliminary planning

66. Optus notes there are currently no activities listed in this stage.

Implementation

67. Optus acknowledges the bands currently listed at the implementation stage; but notes that focus should remain on the bands already listed in the forward allocation work plan.

1800 MHz (1710–1785 MHz and 1805–1880 MHz) in remote areas

68. Optus supports retaining this band at the planning stage.
69. We note that the ACMA plans to release a discussion paper in Q3/Q4 2022.

3400 – 3575 MHz

70. Optus continues to work with the ACMA and industry on optimising this band for use for 5G as part of the ongoing consultation process in preparation a late 2023 reallocation of parts of the band.

3700 – 4200 MHz

71. Optus continues to work with the ACMA and industry on optimising this band for use for 5G as part of the ongoing consultation process in preparation a late 2023 reallocation of parts of the band.

Optimising established planning frameworks

72. In summary, Optus considers that the ACMA should be prioritising the use of existing spectrum for 5G and supporting any enabling licensing variations. The inclusion of satellite planning activities also continues to be a welcome addition.
73. The ACMA should facilitate and drive outcomes that best facilitate the efficient use of spectrum across multiple industry groups. Consistent, manageable and rational licence

conditions, structures and supporting instruments are critical to the success of such an activity. This requires careful consideration of often competing uses and issues, with a view to best balance the needs of the various stakeholders.

Review of spectrum licence technical frameworks for 5G readiness

74. Optus strongly supports progression of these activities to ensure existing allocations are efficient and can cater for new technology developments such as 5G.
75. In order to provide a spectrum landscape that supports the efficient and effective deployment of 5G for current bands, Optus wishes to see the reviews and variations to the licence technical frameworks completed as soon as practicable.
76. TLG participants should be required to participate in good faith, with any issues raised to be ideally supported by quantitative evidence and that any requests for information be met in a timely fashion.

Satellite planning activities

77. Recognising the many difficulties of both balancing the terrestrial and satellite interests, while continuing to offer a spectrum product that is fit-for-purpose, Optus supports the ongoing role of the ACMA in facilitating discussions across multiple industry groups, and between affected/interested operators as the need arises.
78. The following sets out Optus' comments on several satellite issues set out in the FYSO and in general supports the continued progress on activities that have commenced.

Providing ongoing operational support for Australian-filed satellite networks

79. Optus supports the position that the ACMA will continue providing ongoing operational support for Australian-filed satellite networks, as well as look into updating procedures for related submissions to the ITU. This will be required as future satellites may operate in frequency bands not currently provided on its existing spacecraft.

Engaging existing licence holders on NGSO activities

80. As noted, Optus encourages the ACMA to investigate the impact of major NGSO/LEO operators on Ka-band operations in Australia. Given the level of activity and the likelihood of increasing potential for interference in the band, Optus urges the ACMA to consult Australian satellite operators on licence applications from prospective NGSO/LEO operators.

Improvements to licensing procedures for space-based communications

81. Optus supports this priority and encourages simplification to the maximum extent possible of the ACMA's licensing procedures for space-based communications.

Updating procedures for filing of satellite submissions

82. Optus supports the view of 'targeted updates' to the procedures for updating submissions of Australian satellite networks to the ITU.

Earth Station Protection Zones

83. Optus continues to support the principle of Earth Station Protection Zones (ESPZ) being established to ensure that earth stations can continue to operate over the long-term even as spectrum band arrangements may change. In particular, we support the establishment of two diverse ESPZs in Eastern Australia with initial consideration being given to areas around Moree, Quirindi and Roma.
84. Optus also considers there is still a need to establish a second geographically and connected infrastructure distinct ESPZ in Western Australia as a back-up to the current Mingenew site. Optus further considers, later, establishing an ESPZ in Northern Australia.

THE FORWARD ALLOCATION WORK PLAN

85. The objectives of the *Radiocommunications Act* are promoted not just by allocating additional spectrum assets to the market, but also through optimising established planning frameworks to ensure that already allocated spectrum can be utilised efficiently. For example, many spectrum licences and bands need upgrading to support the efficient deployment of 5G networks.
86. Existing technical frameworks will also need to change to support development for the rollout of 5G technology. Where bands, or sub-band arrangements, already exist within the identified 5G frequency ranges, it is clear changes need to be facilitated to address any co-ordination and interference issues that may arise due to the change or co-existence of technologies.
87. Optus reiterates our previous submissions that the ACMA should adopt a considered approach to allocating new spectrum bands. As a general consideration, the timing of allocations will have important implications for potential spectrum users, including business and network resourcing activities, as well as spectrum valuation activities.
88. The key challenge for future spectrum allocations is the need for alignment of domestic regulatory agenda, implementation of WRC-19 outcomes, and global ecosystem roadmaps with investment decision making processes.
89. Recent market conditions, as well as the ongoing COVID-19 pandemic, are also placing further financial strain on operators.
90. There is also merit for inclusion of the renewal activities relating to the spectrum licensed bands due for renewal from June 2028. As noted in submissions on proposed changes to the *Radiocommunications Act*, the mobile industry is keen to see that renewal activities commence around five years prior to licence expiry, with any renewal terms to be sorted by around two years prior to licence expiry to ensure investment certainty for network operators.
91. These are further discussed below.

3400 – 4000 MHz (remote areas)

92. Optus notes the ACMA's proposal to allocate this band via AWLs using an 'allocation window/allocation principles' approach in mid-2022.

3400 – 3575 MHz and 3700 – 3800 MHz

93. The ACMA indicates that it will conduct consultation on draft allocation instruments for spectrum licences in late 2022.
94. Optus will consider these instruments once issued.
95. Optus' overall position on this band is set out, in detail, in our response to the ACMA's recent *Proposed spectrum re-allocation declaration for the 3.4 GHz and 3.7 GHz bands* consultation paper.
96. Optus prefers that the ACMA adopt a modified version of Option 3, with the full 3400 – 3800MHz band made available for spectrum licencing in metro and regional areas.

97. The geographical inconsistencies in spectrum licence boundaries need to be addressed to facilitate a full de-fragmentation of the band to maximise utility for all users of this spectrum.
98. Optus maintains its position that any allocation of the 3400 – 3575 MHz band in the urban excision areas should be delayed. If the allocation does go ahead, then these areas should be spectrum licenced.

3400 – 3575 MHz and 3700 – 3800 MHz

99. Optus looks forward to further participation in technical and other discussions with the ACMA and other contributors within the indicated Q3 2022 timeframe.

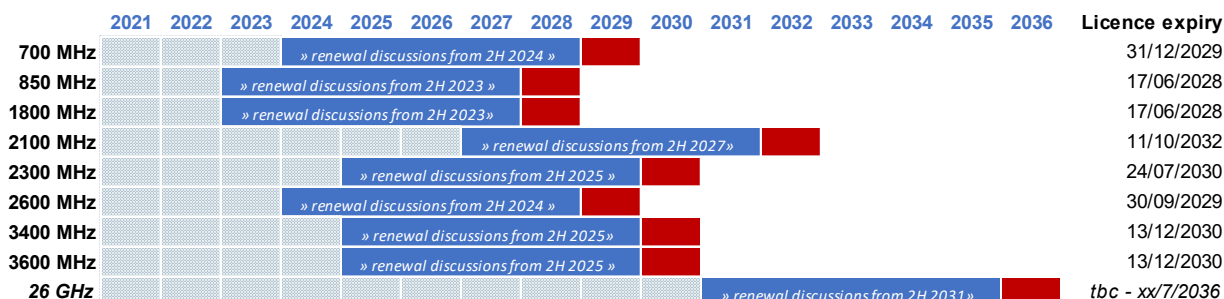
2 GHz (mobile satellite services)

100. Optus notes the inclusion of 2 GHz band in the forward allocation plan, and that this band remains subject to further consideration and replanning is likely to occur within 5 years for capital cities and 3 years for regional areas with minimal TOB usage.

Renewal of spectrum licences in spectrum licensed bands

101. Optus wishes to accelerate the discussion on spectrum licence renewals.
102. Optus welcomes the inclusion of the spectrum licence renewals in the current FYSO. This is a significant piece of work for the ACMA to conduct, impacting the continuity of service for the vast majority of 4G/5G traffic carried in Australia today. The ACMA should consider this work to be of the very highest priority, with its own independent workstream and dedicated resources.
103. Spectrum renewal activities for all the spectrum licensed bands should be conducted in a holistic and simultaneous way due to the interconnected nature of the way the bands are deployed as part of a mobile network's spectrum layering strategy.
104. Optus' suggested holistic approach is consistent with the previous spectrum licence renewal process, conducted with all the renewal prices simultaneously included in the Radiocommunications (Spectrum Access Charges Direction 2012) document.
105. We suggest that the ACMA should eschew some of the more esoteric work items included in the FYSO (e.g. THz band activities) to focus on the approach to renewals as detailed in this section.
106. We strongly support early engagement and consultation on renewal processes for all spectrum bands approaching renewal in the next decade or so (those being i.e. 700MHz, 800MHz, 1800MHz, 2100MHz, 2300MHz, 2600MHz, 3400-3600MHz), in 2022. ACMA has proposed to delay consultation until Q2 2023, and to release a discussion paper on renewal processes for expiring 850 MHz and 1800 MHz licences spectrum licences.
107. Optus considers it is essential that spectrum renewal activities in spectrum licensed bands approaching licence expiry are included in future forward allocation work plans. We remain strongly of the view that any discussion on spectrum renewals commence at least five years before licence expiry and any renewal terms completed a minimum of two years prior to licence expiry to ensure investment certainty for network operators.

108. As shown in the figure below, there will be at least eight spectrum licensed bands with licence expiry warranting the commencement of spectrum licence renewal discussions within the timeframe of this FYSO period. It is clear these spectrum management activities will take place over the next couple of years and therefore should be included within the FYSO work plan.



109. These represent significant work streams for incumbent spectrum licensees, which will encompass long lead times for the discussion of technical frameworks and allocation processes relating to the various spectrum bands.
110. As with any new investment decision, such as new spectrum allocations, spectrum renewal will also require commensurate corporate governance, due diligence, strategic planning and investment planning. More importantly, should the loss of spectrum assets that underpin existing mobile networks occur, then this would detrimentally impact on overall network operations and without sufficient contingency planning, lead time for changes to take place, and access to additional funds for network reconfiguration, this could result in the significant loss of services to consumers.
111. Optus welcomes the increased certainty provided by the recent amendments regarding licence renewal terms and the more structured timelines and approach that will underpin future investment.

General forward allocation comments and Optus priorities

112. Optus also wishes to reiterate that the readiness of existing bands to accommodate the latest and future technologies is as important as new allocations to accommodate the relentless and rapid growth in demand experienced by licensees.
113. Optus presents a general view of priorities for each band or band type for the forward allocation, noting that it is expected that new allocations, existing band modifications and renewal can be undertaken in parallel. These views are outlined in the table below.

Priority	New allocations	Harmonisation
1	Mid band (6 GHz)	1.8 GHz
2	Low band (e.g. 600 MHz)	2.1 GHz
3	mmWave (e.g. 40 GHz)	700 MHz
4		2.6 GHz

OTHER ISSUES: PRICING AND COMPLIANCE PRIORITIES

114. Optus welcomes the continued focus on implementing the outcomes of the pricing review; and spectrum-related compliance priorities. Optus also provides comments in response to the ACMA's specific questions on the format of the FYSO document.
115. These are discussed below.

Implementation of the Spectrum Pricing Review

116. There is no one-size-fits-all approach that suits all spectrum bands today or would fit the uses for different spectrum bands that change over time; therefore it is important that transparency over the arrangements to be applied in each pricing decision should be encouraged. This will also have important implications, with particular regard to continuity of service, price, and investment incentives for existing licensees.
117. Optus supports the ongoing implementation of the recommendations of the Spectrum Pricing Review, including the implementation of the first round of proposed changes to apparatus licence taxes that are due to take effect in Q2 2021.
118. We also acknowledge the ACMA's intent *"to publish a series of short papers/presentations considering matters like the consistency of our pricing approach across different bands, geographic areas, and services."*⁶
119. We welcome further information on the progression of these implementation activities.

Compliance priorities

120. Optus supports the ongoing compliance focus for 5G EME compliance and interference activities to continue in 2021-22.
121. With the recent award of spectrum in the millimetre wave spectrum bands, and the rollout of 5G networks, there will be continued need for public awareness on the safety of 5G technology. We acknowledge the current links to EME information on the ACMA's website⁷ and hope to see this continue to be maintained as 5G rollouts continue.

Comments on the format of the FYSO document

122. Optus supports the requirement for the ACMA to produce an annual work program in relation to its spectrum management functions on the basis that it will improve certainty, accountability and transparency. Optus also suggests that the utility of such information for industry will be improved if variations and updates are made in real time, via a streamlined consultation process or provision of six-monthly updates.
123. As spectrum is a significant regulated business input for Optus, having a clear roadmap of what, when and how spectrum will be allocated is critical.

⁶ ACMA, Five-year spectrum outlook 2021-26 work program, Consultation Draft, March 2021, p.60

⁷ See, for example, <https://www.acma.gov.au/eme-5g-and-you> (accessed 26/4/21)