



Submission in response to
ACMA's draft spectrum
management work programme

Draft Five Year Spectrum
Outlook 2021-2026

Public Version

May 2021

EXECUTIVE SUMMARY

1. Optus welcomes the opportunity to provide feedback on the Australian Communications and Media Authority (ACMA) *Draft five-year spectrum outlook 2021-2026* (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. Management of spectrum which promotes the public benefit of use should reflect the current market circumstances that the mobile industry is currently facing, namely: long term industry service revenue decline, which has fallen 25% over the last five years; mobile subscriber levels at their lowest since June 2017; continual increases in annual depreciation and amortisation costs, which have grown by 16% since 2016; and record low industry returns on capital down which have halved since 2017 at less than 5%.
4. Despite these industry headwinds, the efficient use of spectrum by the mobile industry will be key to Australian economic and job growth. Analysis undertaken by PwC 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.
5. Realising these benefits is dependent upon setting policies that encourage investment and a competitive environment – including enabling efficient use of spectrum for 5G. Without these settings, up to \$55 billion of the predicated benefits of 5G will be put at risk.²
6. This FYSO does not adequately focus on how to maximise the overall public benefit derived from the use of spectrum in the context of these industry challenges and the wider economic challenges.
7. In order to do this, Optus submits that the ACMA should continue to:
 - (a) Prioritise facilitating changes to current licensing arrangements in existing spectrum licensed bands to allow the transition to 5G.
 - (b) Finalise activities relating to the allocation of 850/900 MHz spectrum, to ensure long term certainty of access to low-band spectrum.
 - (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.

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

² <https://www.optus.com.au/connected/leaders-insights/digital-economy-critical-moment>

CONSIDERATIONS FOR SPECTRUM MANAGEMENT

8. 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.
9. 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.
10. 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.
11. Analysis undertaken by PwC demonstrates the potential economic gains from getting the correct policy settings for 5G investment in Australia. PwC has estimated, using their geo-spatial economic model, that the deployment of competitive 5G networks could boost the Australian economy by a cumulative \$130 billion over the decade to 2030 – and create 205,000 net new jobs.
12. Realising these benefits is dependent upon setting policies that encourage investment and a competitive environment – including enabling efficient use of spectrum for 5G. Without these up to \$55 billion of the predicated benefits of 5G will be put at risk.³ The enactment of the *Radiocommunications Legislation Amendment (Reform and Modernisation) Act 2020* (the Modernisation Act) which takes effect from 17 June 2021 will serve as a key focus of ACMA's activities for the coming months. It is important that the key functions and protections from the Act continue to exist, while still enabling the new reforms, including the new spectrum management arrangements, to be introduced and implemented once *the Modernisation Act* commences.
13. Nonetheless, Optus submits that spectrum needs to be managed in a manner which reflects this reality of the mobile communications industry and promotes the competitive investment required to achieve the potential extra \$130 billion of economic activity. 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.
14. 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

³ <https://www.optus.com.au/connected/leaders-insights/digital-economy-critical-moment>

the affordability of essential mobile communications services for consumers and subsequent benefits to the overall economy.

15. 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;⁴
 - (b) Mobile subscriber levels at their lowest since June 2017;⁵
 - (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%.
16. In summary, spectrum management over the period of this FYSO must focus on the key issues confronting the mobile industry, namely:
 - (a) The deployment of advanced 5G network in both metro and regional areas, in an environment of increasing network costs, declining revenue and uncertain incremental revenue opportunities; and
 - (b) Importance of clear property rights to provide the necessary security for MNOs to undertake the billions of dollars' worth of investment that underpin the deployment of mobile services.

Supporting 5G wireless technology

17. 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 5G networks. Analysis conducted by PwC estimates that the competitive national deployment of 5G has the potential to drive an extra 1.2% of economic growth in 2030, equating to \$130 billion over the decade. The deployment of 5G is estimated to result in 205,00 net new jobs across the economy. The same modelling shows that 5G could drive further economic development of regional Australia. Over the decade, the cumulative economic benefit would be \$38 billion – equal to 1.4% of GDP – with 45,000 net new jobs created.
18. But this assumes the competitive national deployment of 5G networks.
19. This imbalance creates the potential for a narrowing of choice for businesses and consumers along with impacts on pricing and new technology's rollout – especially in suburban and regional areas.
20. Optus appreciates there are many opportunities offered by 5G, including allocation of new spectrum to the mobile industry. However, the full benefits that are likely to arise from 5G will only be realised when supported by the commercial and technical environments in which these networks operate.

⁴ Mobile service revenue. Company financial results. Half yearly comparison Dec 2021 and Dec 2015.

⁵ Excluding IOT

21. PwC modelling commissioned by Optus shows that a lack of network choice and a subsequent delay in rolling out competitive 5G networks has the potential to reduce the economic benefits of 5G services by 42% and cost the Australian economy \$55 billion over the decade.
22. 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.
23. The analysis undertaken by PwC clearly demonstrates the important role that timely and competitive roll-out of multiple 5G networks has on economic and employment growth. To support this, Optus submits more weight be placed on ensuring that currently allocated licences are able to technically support the deployment of 5G equipment rather than moving in advance of the global eco-system to deploy new spectrum bands not yet harmonised or supported. That is not to say such work is not needed, but rather that this work does not displace the work needed to modernise existing licences.

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

24. 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 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.
25. In particular, the ACMA should consider reviewing the structure of industry cooperation when addressing licensing issues. For example, the structure and working methods of Technical Liaison Groups (TLGs) need to be reviewed to be consultative forums rather than some of the recently concluded technical consultation process, where:
 - (a) The ACMA hosted no moderated forums or exchanges as part of the TLGs. As a result, the exchange of ideas is still taking place across industry *after* the formal conclusion of the TLG. This has resulted in insufficient liaison between different industry groups and significant gaps in knowledge and understanding of others positions and reasoning on behalf of the participants.
 - (b) 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.
 - (c) The result of this TLG approach is that the MNOs have been left with what is considered extremely unfavourable licence conditions – potentially limiting and slowing the deployment and viability of mobile deployment in those bands.
26. It is therefore not clear to Optus how the TLG process is achieving outcomes that are consistent with the *Radiocommunications Act*. 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. The ACMA need to ensure TLG outcomes promote the objectives of the Act.

27. Optus suggests that the TLG process should be punctuated with appropriately timed and scoped, ACMA-facilitated discussions to ensure that all participants, from multiple industries and spectrum use cases, have the opportunity to understand the ACMA's intent and objectives for any given TLG as well as the views of other participants. One suggestion would be a general discussion one week after the issue of a TLG to identify major issues, complemented by issue-specific discussions if enough participants feel that to be necessary.
28. 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

29. 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.
30. Secure property rights are fundamental to achieving the objects of the *Radiocommunications Act* and to ensuring the potential \$130 billion dollars and 205,000 net new jobs from new 5G services can be delivered.
31. The hierarchy of spectrum licence types remains central to the spectrum licensing framework. 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.
32. 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.
33. 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.
- 34. 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

- 35. 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.
- 36. 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.
- 37. However, class licencing 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

- 38. Optus reiterates that spectrum sharing in the non-traditional sense should be rejected and that spectrum licensees should retain the responsibility over the decision to 'share as they see fit'. Continued monitoring of international developments in this space is therefore prudent until such time that the spectrum licence holders are supportive and when the benefits of introducing such a system outweigh its cost.
- 39. In addition, where costs are to be incurred these should be fairly apportioned. Concerns remain that where dynamic spectrum sharing (DSA) approaches are being considered, it appears that operators foot the bill for the DSA system and other users get the benefit.
- 40. Optus therefore acknowledges the ACMA's openness to supporting industry-led trials of DSA, with role for ACMA to facilitate discussions between affected/interested operators as the need arises. No such need is currently evident or envisaged.

PROPOSED 2021-22 SPECTRUM WORK PLAN AND FYSO

41. 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.
42. 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.
43. 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.
44. In summary, Optus considers the following band activities warrant further investigation:
 - (a) Finalise activities relating to the allocation of 850/900 MHz spectrum, to ensure long term certainty of access to low-band spectrum.
 - (b) Progress the licence conditions in the 1.8, 2.1 and 2.6 GHz bands with a view to harmonising those conditions to allow deployment of 5G.
 - (c) Consideration for the progression of the 600 MHz band to align with any outcomes from the Department's Green Paper.
45. Optus' views on the ACMA's plans for monitoring, initial investigation, preliminary replanning or re-farming of spectrum bands are summarised below.

Monitoring

46. 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.

Encumbered bands

47. Many of these bands – 3.3 GHz, 4.5 GHz and 4.8 GHz – have been included in the FYSO for many years, and we welcome continued monitoring of these bands for international developments.

Other bands

48. 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).

Future bands

49. 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.
50. We welcome continued monitoring of these bands for international developments.

51. 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.
52. Optus 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

53. 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

54. 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.

2300 – 2302 MHz

55. 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.
56. 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.

600 MHz band

57. Optus welcomes the progression of the 600 MHz band to initial investigation. 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.
58. 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.

1.5 GHz (1427–1518 MHz)

59. Optus supports retaining this band at the initial investigation stage.
60. There continues to be a low level of short-term interest in the reallocation of this band, compared to other potential wireless broadband bands. Optus suggests that the ACMA awaits international developments and decisions in this band before proceeding beyond the current planning stage.

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

61. Optus similarly supports retaining the extended MSS L-band at the initial investigation stage; and that this band be jointly considered with the adjacent 1.5 GHz band given the co-existence between the two bands.
62. The ACMA has acknowledged that coexistence with potential broadband use below 1518 MHz is likely to be a substantial consideration, Optus is therefore open to support the simultaneous review of the of the extended MSS L-band and the 1.5 GHz bands.

1880–1920 MHz

63. The ACMA has acknowledged this is a new project for 2021-22 identifying the 1880-1920 MHz band as a potential candidate to support new technologies include 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

64. The ACMA has acknowledged this is a new project for 2021-22 identifying potential new planning arrangements in the 6 GHz band, such as radio local area networks (RLAN) or wi-fi applications.
65. Optus recognises the need to allocate some of the 6 GHz band as class licences, but it would be premature to fully allocate this band for RLAN or Wi-Fi at this stage. There should be 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, in particular the 900 MHz band.

850 MHz expansion (809–824 MHz and 854–869 MHz)

68. Optus supports the continued progression of activities in the 850 MHz expansion band, with allocation timeframes tied to those of the 900 MHz band.
69. In addition to band clearance, Optus supports the proposed 1 MHz downshift of existing 850 MHz licences to support the long-term optimisation of the 800 MHz band (i.e. 809-844 MHz and 854-889 MHz).

900 MHz (890–915 MHz and 935–960 MHz)

70. Optus strongly supports the continued progression of activities in the 900 MHz band.
71. Given the high priority of this band, and the need for low-band certainty, it is important that the proposed timeframes are not inappropriately deferred.

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

- 72. Optus supports retaining this band at the planning stage.
- 73. We note that the ACMA plans to release a discussion paper in Q4 2021.

2 GHz (1980–2010 MHz and 2170–2200 MHz)

- 74. The ACMA released its Outcomes Paper on the 2 GHz band in January 2021.
- 75. While we do not consider this to be a priority at this stage, it is important that any changes to the arrangements in the 2 GHz band retain the protections offered to adjacent operators currently afforded by the guard bands within that allocation.

3400 – 3575 MHz

- 76. Optus strongly supports the continued progression of activities in the 3400–3575 MHz band, in particular the completion of the 3.4 GHz re-stack of incumbent services.
- 77. We also note the ongoing work relating to the 3.4 GHz technical framework to support urban excise, which will be combined with the 3700–4200 MHz implementation activities.

3700 – 4200 MHz

- 78. The ACMA released its Outcomes Paper on the 3700–4200 MHz band in January 2021.
- 79. Optus supports reallocation of C-band above 3700 MHz, however we are disappointed that only 100 MHz has been included for WA WBB. As discussed in numerous previous submissions on this and other bands, Optus believes that a spectrum licensed allocation delivers the best value outcome for the ACMA, licensees and customers and urges the ACMA to reconsider its decision on 3800–4000 MHz with a view to allocating more of this spectrum for IMT bands, making spectrum licences available, especially in metropolitan areas to minimise future fragmentation risks in the band.

Optimising established planning frameworks

- 80. 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.
- 81. 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

- 82. Optus strongly supports progression of these activities to ensure existing allocations are efficient and can cater for new technology developments such as 5G.
- 83. As noted in the FYSO, the 2.3 GHz band has recently been completed in April 2021, with work on the 1.8 GHz band planned to be completed in Q3 2021. Other bands in the work program include the 700 MHz, 800 MHz, 2.1 GHz and 2.6 GHz bands.

84. Optus welcomes the rapid progress and proactive approach that the ACMA has adopted in the 2.3 GHz TLG and looks forward to similarly ambitious timelines for other bands according the priorities above.
85. 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.
86. To further facilitate improved discussions within the TLG forums, Optus considers there may be merit in resurrecting elements of historic TLG approaches that are not simply reliant on commentary through written submissions over a limited consultation window.
87. TLG participants should also 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.
88. Optus suggests that the TLG process should be punctuated with appropriately timed and scoped ACMA-facilitated discussions to ensure that all participants, from multiple industries and spectrum use cases, can have the opportunity to understand the ACMA's intent and objectives for any given TLG as well as the views of other participants.

Satellite planning activities

89. 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.
90. 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

91. 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.

Implementing outcomes of the review of the 28 GHz band

92. One outcome from the review of the 28 GHz band includes expanding FSS use to ubiquitous FSS operating in the 27.5–28.3 GHz band Australia-wide. How this is implemented is subject to further investigation of coexistence measures.
93. Optus supports this priority as it expects to include at least portions of this band on its future satellites. In addition, Optus is looking at providing its existing Earth Station sites for GSO and NGSO Operators in this band.

Improvements to licensing procedures for space-based communications

94. 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

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

Earth Station Protection Zones

96. 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.
97. 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

98. 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.
99. 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.
100. 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.
101. 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.
102. Recent market conditions, as well as the ongoing COVID-19 pandemic, are also placing further financial strain on operators.
103. In summary, Optus supports the current forward allocation work plan focused primarily on progressing activities in the 850/900 MHz band.
104. 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.
105. These are further discussed below.

850/900 MHz

106. Certainty of access to low-band spectrum is a key priority for mobile operators.
107. The ACMA is currently consulting on the draft allocation and technical instruments for spectrum in the 850 expansion and 900 MHz bands, with proposed auction to be held in Q4 2021 (Oct-Dec). Optus will be responding to this consultation package in due course.

26/28 GHz apparatus licences

108. The 26 GHz spectrum auction recently concluded in April 2021. This completes one in a suite of licensing arrangements for the 26 GHz and 28 GHz bands.
109. This will be followed by the release of Round 2 of AWLs in the 26 GHz band outside spectrum licensed areas, as well as any other unallocated AWLs from Round 1.

3400 – 3575 MHz and 3700 – 4200 MHz bands

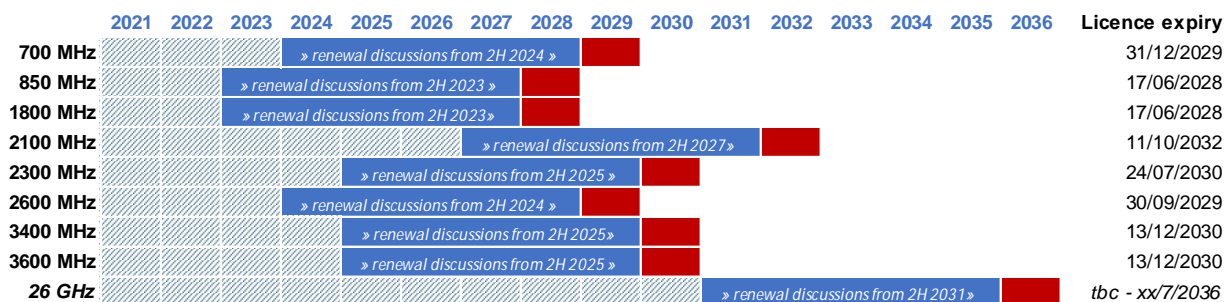
110. The ACMA acknowledges that the allocation of any additional frequencies and areas designated for spectrum licensing could occur in first half of 2023.
111. These include the development of apparatus- and spectrum-licensing frameworks for the various band scenarios under consideration, including remote and low demand regional areas and high demand metro and regional areas.
112. As noted above, Optus is disappointed that only the lower 100 MHz has been considered for spectrum-licensing in the high demand metro and regional areas at this stage. Further consideration should be given to enable greater licence certainty for spectrum in the 3800-4000 MHz frequency range in metropolitan areas. It is not clear how the ACMA has reached the conclusion that use other than IMT results in a more efficient highset value use (HVV). Optus welcomes further clarification from the ACMA on how criteria like the HVV are considered in future ACMA decision making processes.
113. The ACMA similarly acknowledges that the remaining outcomes from work identified as part of its implementation of the 3400-3575 MHz band (i.e. arrangements for urban excise areas and apparatus-licensed use of relevant portions of the band) will form part of the licensing arrangement discussions as part of the 3700-4200 MHz band review.
114. We will therefore consider these band issues in due course.

2 GHz (mobile satellite services)

115. Optus notes the inclusion of 2 GHz band in the forward allocation plan, and that this band remains subject to further consideration and is unlikely to occur before mid-2023.

Renewal of spectrum licences in spectrum licensed bands

116. Optus considers there is considerable merit for inclusion of spectrum renewal activities in spectrum licensed bands approaching licence expiry in future forward allocation work plans. We remain strongly of the view that any discussion on spectrum renewals commence five years before licence expiry and any renewal terms completed around two years prior to ensure investment certainty for network operators.
117. 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.



118. 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.
119. 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.
120. We have learned from past experience that spectrum renewal discussions are a protracted event and while we appreciate the Draft Instruments for the 850/900 MHz auction currently propose the new renewal statement timeframes envisioned under the *Modernisation Act*, this same certainty is currently not enshrined for existing spectrum licences. 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

121. Once the reallocation of the 850/900 MHz band is completed in late 2021, Optus acknowledges that there will be significant work required to get the 3700–4200 MHz ready for allocation in 2023. This will form the backbone for some of the work undertaken via TLG and consultation in 2022.
122. 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.
123. 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

124. 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.
125. These are discussed below.

Implementation of the Spectrum Pricing Review

126. 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.
127. 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.
128. 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
129. We welcome further information on the progression of these implementation activities.

Compliance priorities

130. Optus supports the ongoing compliance focus for 5G EME compliance and interference activities to continue in 2021-22.
131. 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

132. 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.
133. 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)