Submission in response to ACMA Consultation Paper

Variation to the Low Interference Potential Devices Class Licence

Public Version

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EXECUTIVE SUMMARY

1. Optus welcomes the opportunity to provide feedback on the draft *Radiocommunications (Low Interference Potential Devices) Class Licence Variation 2022 (No.2)* (the draft variation) and consultation paper: *Variation to the Low Interference Potential Devices Class Licence* (the Consultation Paper).

2. The ACMA proposes to vary the LIPD Class Licence to accommodate new arrangements for:

   (a) Radiocommunications receivers communicating with satellites in the 915–928 MHz and 2400–2483.5 MHz bands;

   (b) Frequency-hopping radiocommunications transmitters in the 5925–6425 MHz band; and

   (c) Radio local area network (RLAN) radiocommunications transmitters in the 5150–5250 MHz band. In particular, to introduce a definition of 'indoor', and to include additional technical limitations on the use of RLAN devices in this band.

3. Optus submits that any new arrangements or radiocommunications devices authorised under the LIPD Class Licence must be conditional on ensuring that existing technical limitations, particularly for power limits and out-of-bound emissions, are not exceeded.

4. Importantly, we consider that any variation to the LIPD Class Licence should seek to avoid the unintended consequences of increased risk of interference to spectrum licensed services that may result from any proliferation in the number of class-licensed devices. Only devices that have a low potential to cause interference to other devices due to their technical and operational characteristics should be authorised under the LIPD Class Licence.

5. The Consultation Paper also seeks feedback on potential future updates to facilitate wireless multi-channel audio system technologies for wireless microphones, the use of wireless broadband spectrum in underground mines, and expanded use of radiocommunications receivers communicating with satellites in the 915–928 MHz and 2400–2483.5 MHz bands.

6. While Optus does not oppose the draft variation, we have some concerns regarding the scope of possible future updates to the LIPD Class Licence outlined in the Consultation Paper. Specifically, the risk of unintended consequences and potential scope creep where arrangements being considered increasingly include parameters outside the original intent of the LIPD class licensing scope, such as inclusion of devices operating at higher power and/or power density levels. This leads Optus to raise concerns about what we perceive to be an increasing willingness on the ACMA's behalf to accommodate new use cases in a manner that may dilute existing spectrum licence rights.

7. Optus agrees that a class licence "is an effective and efficient means of spectrum management for services where a limited set of common frequencies is employed, and where equipment is operated under a common set of conditions".[1] It is well recognised that class licences occupy a lower-order tier in the ACMA's licensing framework.[2]

[1] ACMA, Variation to the Low Interference Device Class Licence, Consultation Paper, October 2022, p.5

[2] Our approach to radiocommunications licensing and allocation – Implementing the *Radiocommunications Legislation Amendment (Reform and Modernisation) Act 2020* – March 2021, p.37

8. Devices operated under a class licence generally share spectrum on a “no interference protection” basis. The legitimate operation of a class licensed device is contingent on compliance with class licence conditions such as power limits which are designed to minimise the risk of interference to other radiocommunications. For example, a condition of operating a radiocommunications device under the LIPD Class Licence is that it does not cause interference to other radiocommunications services. Where such interference occurs, the user of radiocommunications device authorised by the LIPD Class Licence is required to take steps to resolve that interference.

9. Conversely, spectrum licensees are afforded rights of exclusive use of spectrum within the area and frequency range defined in the licence, subject to specified circumstances for co-existence with apparatus and class licensed services.[3] These spectrum licence rights provide spectrum licensees with the certainty needed to support long term investments such as required to deploy mobile networks. New arrangements to accommodate apparatus and class licences within or adjacent to spectrum licence frequencies increases the potential risks of interference, diluting spectrum licence rights and increasing the costs and resources required manage interference.

10. Expanding the scope of devices authorised to operate within or adjacent to spectrum licensed services will inevitably add complexity to the task of interference management. From Optus’ perspective, this places an unrealistic degree of reliance on existing interference management frameworks and processes as a means of ensuring reliable mobile services to our end-users.

11. The potential authorisation for underground mines to use spectrum licensed frequencies under the LIPD Class Licence helps illustrate this point. Ensuring that mining operators adhere to the conditions of the LIPD Class Licence and limit the impact on spectrum licensed services will likely involve a completely disproportionate level of oversight that, in Optus view, the ACMA is not sufficiently resourced to deliver. It follows that the impact of the proposal will be to irreversibly deteriorate the quality of service that mobile operators will be able to deliver in and around these sites. Such an outcome seems entirely inconsistent with the reasonable expectations of a spectrum licensees ability to enjoy relative exclusivity and freedom from interference in spectrum licensed areas.

12. Ongoing investment and mobile network planning requires sufficient certainty that mobile network operators will continue to be afforded the requisite degree of interference protection in spectrum licensed frequencies and areas. Optus understands that class and apparatus licences may be authorised to co-exist with spectrum licenced services under specified circumstances. However, such circumstances should be the exception, based on clear evidence that co-existence is in the public interest and will maximise the efficient use of the spectrum. Optus encourages the ACMA to continue to have regard to the impact its spectrum management decisions will have on existing spectrum licence rights and the investment case for national mobile network deployment.

13. Optus also refers the ACMA to the Australian Mobile Telecommunication Associations (AMTA) submission in response to the Consultation Paper. Optus supports the positions set out in the AMTA submission, other than to the extent that they differ to our specific comments set out below.

[3] Ibid, p.38

COMMENT ON PROPOSED VARIATIONS

14. Optus' comments on the proposed ACMA variations to the current LIPD Class Licence are set out below.

Radiocommunications receivers communicating with satellites in the 915-928 MHz and 2400-2483.5 MHz bands

15. The 915–928 MHz and 2400–2483.5 MHz bands are currently used for a range of class licensed devices in Australia, with the LIPD Class Licence already designating these sub-bands for industrial, scientific and medical (ISM) applications. Satellite services are generally not authorised in these bands, with the exception of the secondary allocation to the amateur satellite service in the 2400–2450 MHz band.

16. Radiocommunication devices operating within this band must accept harmful interference that may be caused by these applications.

17. The ACMA acknowledges industry interest in the use of the 915-928 MHz (and potentially the 2400-2483.5 MHz) bands for satellite internet of things (IoT) applications for earth-to-space and space-to-earth communications links. It similarly flags that despite the interference environment in the 915-928 MHz and 2400-2483.5 MHz bands, they are still proposing to support earth receive stations in these frequency ranges under the LIPD Class Licence, subject to operation under specified technical conditions in the relevant bands.

18. Under current regulatory arrangements for space-based communications systems, both earth-based transmitters (earth stations) and earth-based receivers (earth receive stations) are required to be licensed either by a spectrum, apparatus or class licence.

19. The draft variation therefore proposes to create a new schedule 1A to the LIPD Class Licence that authorises the operation of earth receiver stations in the specified bands without the need for an apparatus licence, provided the transmitter is operated consistently with the corresponding transmitter entry for the band in Schedule 1 of the LIPD Class Licence.

20. The ACMA considers that "this approach provides a regulatory framework commensurate with the interference risk. The risk of interference to a ground-based station from a transmitter on a satellite is less than, for example, a transmitter operating with the same power levels on an airborne platform."[4]

21. However, it is also important to note that the proposal to facilitate satellite services in these bands would be an arrangement unique to Australia.

22. While Optus does not oppose the proposed variation to allow for ground-based receivers, the operation of these stations should not be allowed to operate above existing power levels permitted under the LPID class licences for these bands.

23. Optus is also concerned that inclusion of any higher-powered space-based transmitters could lead to unintended consequences by causing undue interference to existing base stations in adjacent bands, e.g. 900 MHz and 2300 MHz bands. Optus provides further comment on the ACMA's proposals in this regard below.

[4] ACMA, Variation to the Low Interference Device Class Licence, Consultation Paper, October 2022, p.9

Frequency hopping radiocommunications transmitters in the 5925–6425 MHz band

24. The Consultation Paper notes that the ACMA's outcomes paper to its consultation on the 6 GHz band flagged potential LIPD changes for the "inclusion of frequency-hopping devices (subject to assessment of coexistence with RLANs)." [5]

25. While no specific coexistence studies have been provided, the ACMA has formed the view (informed by international studies) that low-power narrowband frequency-hopping transmitters can coexist with the existing FSS and FS primary users in the band. The ACMA also noted the existence of other examples in the LIPD Class Licence[6] where frequency hopping devices are authorised to operate alongside other transmitters, often at higher-power and/or power density levels, given a minimum number of hopping frequencies.

26. The draft variation therefore proposes to insert a new item 57A in Schedule 1 to authorise these transmitters. A maximum effective isotropic radiated power (EIRP) of 25 mW is also proposed in line with existing item 63AB in Schedule 1 of the LIPD Class Licence. However, a higher maximum spectral density of 10 mW, compared with 1.25 mW in item 63AB, a maximum channel bandwidth of 20 MHz, a maximum EIRP density for out-of-band emissions below 5925 MHz of -37 dBm/MHz and a minimum of 15 hopping frequencies are proposed to align with European arrangements.

27. Optus supports the proposed variation.

RLAN radiocommunications transmitters in the 5925-6425 MHz band

28. The ACMA previously undertook to implement out-of-band emission limits of -37 dBm/MHz for VLP (based on the proposed long-term European limit for VLP devices) and -27 dBm/MHz for LPI indoor devices (the US limit for all devices), further noting: "The lower -37 dBm/MHz limit is imposed on VLP devices as they can operate in any location, including outdoors. LPI devices will provide additional protection to (outdoor) ITS systems due to the requirement that they always be operated indoors."[7]

29. The draft variation therefore proposes to insert a new paragraph (c) at table item 63AA and new paragraph (c) at table item 63AB, to implement these out-of-band emission limits. That is, where maximum EIRP is:

    (a) 250 mW, Emissions below 5925 MHz must be no greater than –27 dBm EIRP

    (b) 25 mW, Emissions below 5925 MHz must be no greater than –37 dBm EIRP

30. The VLP limit is also proposed to be applied to the proposed new frequency-hopping class of transmitters discussed above.

31. Optus supports the proposed variation.

[5] ACMA, Proposed updates to the LIPD Class Licence for 6 GHz RLANs, Outcomes Paper, March 2022, p.11

[6] The LIPD Class Licence already authorises the use of frequency hopping transmitters, subject to limitations, across a number of bands. Refer to table items 54, 55, 56 and 57.

[7] ACMA, Proposed updates to the LIPD Class Licence for 6 GHz RLANs, Outcomes Paper, March 2022, p.4

RLAN radiocommunications transmitters in the 5150-5250 MHz band

32. At WRC-19, changes were made to the ITU Radio Regulations regarding the use of RLAN devices in the 5120-5250 MHz band to allow for the use of higher-power devices and/or 'controlled and/or limited' outdoor operation. The ACMA's outcomes paper acknowledged general support for implementation of the conclusions of WRC-19 in Australia, including to allow devices to operate outdoors, subject to limited conditions.

33. RLAN transmitters in the 5150-5250 MHz band are currently authorised in the LIPD Class Licence at table item 61, as shown in the table below.

Table 1 Current Authorisation for RLAN transmitters in the 5150–5250 MHz band

	Class of transmitter	Permitted operating frequency band (MHz)	Maximum EIRP	Limitations
61	Radio local area network transmitters	5150–5250	200 mW (averaged over the entire transmission burst)	(a) The transmitter must only be used indoors. (b) The power spectral density of the transmitter with a bandwidth greater than or equal to 1 MHz must not exceed 10 mW EIRP per MHz. (c) The power spectral density of a transmitter with a bandwidth less than 1 MHz must not exceed 40 µW EIRP per 4 kHz.

Source: LIPD Class Licence

34. The draft variation therefore proposes a choice of two options to give effect to the proposed changes.

    (a) Option 1 – to replace existing table item 61 in the LIPD Class Licence

    (b) Option 2 – to introduce a new table item 61A in the LIPD Class Licence

35. Specifically, the ACMA is seeking views on the proposed option and relevant emission mask to be adopted to give effect to the new arrangements as set out in the table below.

Table 2 Proposed arrangement for RLAN transmitters in the 5150–5250 MHz band

	Class of transmitter	Permitted operating frequency band (MHz)	Maximum EIRP	Limitations
Replace existing item 61 **OR** Add as new item 61A	Radio local area network transmitters	5150–5250	1 W (averaged over the entire transmission burst)	The power spectral density of the transmitter must not exceed 200 mW (23 dBm) EIRP, in any direction, above 5 degrees of elevation. **OR** The power spectral density of the transmitter must not exceed 125 mW (21 dBm) EIRP, in any direction, above 30 degrees of elevation.

Source: Draft Variation

36. The ACMA has indicated a preference for Option 1, particularly where existing operation under current item 61 can continue under the proposed variation. If this is not the case, and the existing arrangements are not viewed to be captured under the new requirements, then the ACMA considers that a new table item 61A should be adopted.

37. These are further discussed below.

Preferred Option to implement new arrangements

Question 1 - Should a separate new item be introduced to facilitate higher-power RLAN transmitters in 5150–5250 MHz, or should existing item 61 be modified?

38. Optus considers the proposed Option 1 to replace current item 61 is appropriate as the emission mask limitation of 200 mW EIRP in any direction above 5 degrees of elevation sufficiently captures the existing operation of RLAN devices under this item.

Preferred emission mask

Question 2 - Which of the 2 simple emission masks outlined in ITU Resolution 229 (Rev. WRC-19) should be implemented in Australia for 1 W RLAN transmitters in the 5150–5250 MHz band?

39. To allow outdoor use with a maximum EIRP of 1 W (30 dBm) in line with ITU Resolution 229 (Rev. WRC-19), the ACMA is proposing to implement one of the following simple emission masks outlined in ITU Resolution 229 (Rev. WRC-19) in Australia:

    (a) the maximum EIRP at any elevation angle above 5 degrees, as measured from the horizon, shall not exceed 200 mW (23 dBm)

    (b) the maximum EIRP at any elevation angle above 30 degrees, as measured from the horizon shall not exceed 125 mW (21 dBm).

40. Optus considers the simple emission mask equivalent to Option (a) above be adopted, as it assists with meeting co-existence requirements with other systems.

Device registration for outdoor deployments

Question 3 - Subject to which emission mask is implemented (see Question 2), would a device registration system (or similar – see Canadian approach above) be needed for outdoor deployments exceeding 200 mW (23 dBm) transmission power? Note that such a regime would require further regulatory development. Accordingly, a decision to implement such a regime may delay access under those arrangements.

41. Optus does not have any comment on this issue.

Definition of 'indoor'

42. The ACMA is proposing to include a definition of indoor to clarify that the intention of indoor use is to limit use to within buildings, and not to include use within vehicles such as cars and planes.

43. The draft variation therefore proposes to:

    (a) Introduce a new definition of 'indoors' at Subsection 3A(1); and

    (b) Omit paragraph (g) at table items 63A and 63A to remove any duplication by the clarification of this definition at subsection 3A(1).

44. Optus supports the proposed clarification.

COMMENT ON POTENTIAL FUTURE UPDATES

45. The ACMA is also seeking comment on potential future updates for the implementation of new arrangements to support:

    (a) Wireless multi-channel audio system (WMAS) technologies for wireless microphones;

    (b) The use of wireless broadband spectrum in underground mines; and

    (c) Radiocommunications receivers communicating with satellites in the 915–928 MHz and 2400–2483.5 MHz bands at higher power than currently authorised under the LIPD Class Licence

46. Optus welcomes the early consultation on these potential future updates and provides some preliminary comments below.

WMAS technologies for wireless audio transmitters

47. WMAS technologies operate over broadband access, combining multiple microphone signals into a single transmission to allow more devices in the same amount of spectrum when compared to individual narrowband devices.[8]

48. Wireless audio transmitters are also already authorised to operate in the LIPD Class Licence across the 520-694 MHz and 1785-1800 MHz bands.[9] Under current arrangements, WMAS devices are generally required to:

    (a) Comply with ETSI Standard EN 300 422 to be permitted to operate; and

    (b) Limited to operation indoors.

49. In line with changes in international arrangements, the ACMA is seeking views on whether any technical changes should be considered or implemented for WMAS devices in Australia. These are discussed below.

Maximum EIRP

Question 4 - What should be the maximum EIRP for WMAS devices in the 520–694 MHz and 1785–1800 MHz bands?

50. The ACMA has acknowledged that WMAS devices are currently allowed to operate at different power levels in different jurisdictions, for example:

    (a) In the US, the FCC is currently proposing to allow WMAS devices to operate at the same maximum power as other wireless audio devices (i.e. the maximum EIRP is 250 mW).

    (b) While the European arrangements similarly allow WMAS devices to operate at the same maximum power as other wireless audio devices, the permitted maximum ERP is 50 mW (82 mW EIRP), less than permitted by the LIPD

[8] ACMA, Variation to the Low Interference Potential Device Class Licence, Consultation Paper, October 2022, p.15

[9] The LIPD Class Licence already authorises the use of wireless audio transmitters, subject to limitations, across a number of bands. Refer to table items 28, 29, 30 and 31.

Class Licence, which is equivalent to approximately 60.95 mW ERP (100 mW EIRP).

51. As noted by the ACMA, any increase in the maximum EIRP above current levels would need to be supported by studies on the impact on existing services.

52. Without the necessary co-existence studies, Optus considers it premature to comment definitively on whether any increase in the maximum EIRP may be warranted. Therefore, we consider there should be no change to the existing maximum EIRP for the proposed bands for WMAS devices at this stage.

Maximum bandwidth

Question 5 - Should a maximum bandwidth limitation be implemented for WMAS devices? If so, what should the maximum emission bandwidth be?

Question 6 - Should a WMAS emission in 520–694 MHz be limited to fall entirely within a single TV channel? For emissions greater than a single TV channel, should a whole number of TV channels be required (for example, emission bandwidths of 7 MHz or 14 MHz)? Should any other limitations regarding the relative positioning of WMAS emissions with respect to the TV channel raster be implemented?

53. The ACMA notes that the maximum emission bandwidth limitation of 330 kHz in items 28 and 29 preclude the operation of WMAS devices that support bandwidths up to 20 MHz.

54. Optus has no comment on this issue at this stage.

Spectral efficiency

Question 7 - Should a minimum spectral efficiency limitation be implemented for WMAS devices? If so, what should the minimum spectral efficiency be?

55. Optus has no comment on this issue at this stage.

Compliance with ETSI EN 300 422

Question 8 - Should WMAS devices be required to comply with ETSI Standard EN 300 422?

56. Both European and proposed US arrangements include the requirement of compliance with ETSI Standard EN 300 422. Optus has no comment on this issue at this stage.

Coexistence with other services

57. As noted above, Optus considers there should be no change to the maximum EIRP allowed for WMAS devices at this stage.

Implementation issues

Question 9 - Should new items be added to Schedule 1 of the LIPD Class Licence to facilitate WMAS, or should existing items be modified?

58. Optus has no comment on this issue at this stage.

Underground wireless broadband

59. The ACMA notes that mining industry representatives have requested that arrangements be introduced to allow the use of wireless broadband in underground mines, particularly with respect to access to spectrum in the sub-1 GHz bands.

60. Under current arrangements, Item 47 of Schedule 1 of the LIPD Class Licence authorises transmitters for underground communications in several VHF and UHF bands below 520 MHz (for non-broadcast related activities). This includes the 450–520 MHz band.

61. Sub-1GHz bands such as the 700 MHz, 800 MHz and 900 MHz are already currently licensed via Australia-wide spectrum licences. Arrangements for third-party access to spectrum licensed bands already exist.

Question 10 - Have third-party access arrangements to spectrum-licensed bands been explored?

Should we consider the introduction of arrangements in the LIPD Class Licence to facilitate underground communications in the 700 MHz, 800 MHz and/or 900 MHz bands? What technical limitations should be included in these arrangements if they are introduced?

62. **[CiC]**

63. Notwithstanding the ACMA's power to issue a class licence in spectrum space allocated to spectrum licences, Optus submit that any decision to do so must be based on objective and transparent assessment of the merits. This must include a thorough consideration of the impact of such a proposal on existing spectrum licensed services and the suitability, or otherwise, of alternative means of access.

64. Market-based mechanisms such as third-party authorisations generally provide the most efficient means of allocating spectrum towards its highest value use. An authorisation arrangement, as opposed to operation under a class licence, also provides for greater transparency over the use of devices in licensed spectrum space which in turn promotes more effective management of any resulting interference.

65. Accordingly, no new arrangements to the LIPD Class Licence to facilitate underground communications in spectrum licensed bands should be allowed. Introducing this arrangement, regardless of any technical limitations imposed may lead to unintended consequences, such as undue interference on networks operating using existing spectrum licences within the same coverage area. This includes existing services supplied by Optus and other carriers below ground, such as in tunnels, where heightened risk of interference may compromise the operation of emergency call services.

Radiocommunications receivers communicating with satellites in the 915–928 MHz and 2400–2483.5 MHz bands

66. The ACMA recognises that:

> The LIPD Class Licence authorises devices that do not require individual frequency coordination for interference management purposes. Devices currently authorised under the LIPD Class Licence are generally envisaged to be terrestrial services and not space services.[10]

67. The ACMA also flags that where the proposal to allow earth receive stations is accepted (as discussed in previous section), a similar approach may be considered for other systems proposed for these bands that utilise space-based transmitters operating at power levels higher than currently permitted under the LIPD Class Licence.

[10] ACMA, Variation to the Low Interference Potential Device Class Licence, Consultation Paper, October 2022, p.22

68. Again, to the ACMA notes that the proposal to facilitate satellite services at higher power levels in these bands would be an arrangement unique to Australia.

Question 11 – Should we consider the introduction of arrangements to facilitate systems that utilise space-based transmitters that operate in the bands 915–928 MHz and 2400–2483.5 MHz at power levels higher than currently permitted under the LIPD Class Licence? If so, what matters should be considered in the regulatory framework? In particular, comment is sought on:

> What is an appropriate power for such services so that there is no impact on other services? While some might operate at power levels slightly higher than those currently supported under the LIPD Class Licence, others could at operate higher levels. The impact also depends on other technical parameters such the orbital characteristics, number of satellites and what types of services are sharing the band. Such considerations suggest a case-by-case approach (more akin to an apparatus licensing regime) may be required.

> What effect, if any, will the proposed use have on existing services such as the amateur-satellite services and services authorised under the LIPD Class Licence? For example, Wi-Fi, Bluetooth and radio frequency identification devices (RFID).

> Do systems need to be brought under the scope of the Radiocommunications Act via variations to the Radiocommunications (Australian Space Objects) Determination 2014 or the Radiocommunications (Foreign Space Objects) Determination 2014?

> Is the LIPD Class Licence or the communication with space objects (CSO) class licence the appropriate legislative instrument to be used to facilitate such systems?

> If apparatus licensing is used, are the current apparatus licence fees and taxes appropriate? (Assuming the entire band is licensed, for the 915–928 MHz band, the annual tax for an Australia-wide space licence is estimated as $36,673; for the 2400–2483.5 MHz band, the annual tax for an Australia-wide space licence is $235,194.)

69. Optus reiterates concerns that the inclusion of any higher-powered space-based transmitters could lead to unintended consequences by causing undue interference to existing base stations in adjacent bands, e.g. 900 MHz and 2300 MHz bands.

70. In particular, the out-of-band emissions from these higher-powered space-based transmitters could cause interference to many mobile base stations at a time. Optus therefore considers that consideration of any out-of-band emissions should not exceed current limitations already set out in the LIPD Class Licence for other existing devices in this band.

71. Therefore, as noted in the AMTA submission, the ACMA should continue to adopt a more regulated approach based on a combination of apparatus licensing (Space/Space Receive for the satellite transmitters/receivers) and class licensing (earth stations authorised by the CSO Class Licence).