

Variation to the Low Interference Potential Devices Class Licence Outcomes paper

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Executive summary

The ACMA regularly updates the Radiocommunications (Low Interference Potential Devices) Class Licence 2015 (the LIPD Class Licence) in response to changes in technology and requests to support new technology applications that align Australia with international arrangements and support standardised, efficient equipment supply arrangements.

In October 2022, we held a public consultation on a variation to the LIPD Class Licence that would introduce new, or update existing, arrangements for 5 different items. This paper provides a summary of submissions and the ACMA's responses.

Having considered the responses received to this consultation, we have decided to proceed with 3 of the proposed updates. We have concluded that the remaining 2 issues require further investigation before a decision can be reached, and so will not be implementing those changes at this time.

We have made a variation to the LIPD Class Licence to:

- > increase the existing power limit, and allow outdoor operation, for devices operating in the 5150–5250 MHz band
- > include a definition of 'indoors'
- > implement out-of-band emission limits for RLAN devices operating in the 5925–6425 MHz band (lower 6 GHz band).

The other 2 issues that are not included in the variation may be further considered under a future update to the class licence, if appropriate. These are:

- > the authorisation of earth station receivers in 2 non-satellite bands (the 900 MHz and 2.4 GHz bands)
- > the introduction of arrangements for frequency-hopping spread spectrum devices in the lower 6 GHz band.

Both of these matters require further consideration of regulatory issues and/or technical coexistence.

Three other issues were raised to gauge interest in the development of potential proposals for inclusion in a future update to the LIPD Class Licence. Arrangements for wireless multi-channel audio system (WMAS) were supported by the submissions, while use of wireless broadband spectrum in underground mines and expanded use of the previously mentioned 900 MHz and 2.4 GHz bands by satellite systems were not.

We will begin working towards a specific proposal for WMAS arrangements in a future LIPD Class Licence update, while the other issues will not be pursued further at this time.

Introduction

The ACMA [consulted on a proposed variation](#) to the LIPD Class Licence between October and December 2022. The proposed updates in the variation would support new technology applications and/or bring Australia into line with international arrangements that support standardised and efficient equipment supply arrangements.

In brief, the proposed updates would provide new arrangements for:

- > radiocommunications receivers communicating with satellites in the 915–928 MHz and 2400–2483.5 MHz bands
- > frequency-hopping radiocommunications transmitters in the 5925–6425 MHz band
- > radio local area network (RLAN) radiocommunications transmitters in the 5150–5250 MHz band.

The proposed variation also included a proposal to introduce a definition of ‘indoors’, and several other minor updates.

The paper also discussed potential future variations to facilitate:

- > wireless multi-channel audio system (WMAS) technologies for wireless microphones
- > use of wireless broadband spectrum underground mines
- > expanded use of radiocommunications receivers communicating with satellites in the 915–928 MHz and 2400–2483.5 MHz bands.

The proposed updates were contained in the draft Radiocommunications (Low Interference Potential Devices) Class Licence Variation 2022 (No.2).

The ACMA received submissions from 26 parties, one of which was in-confidence. Public submissions are listed in Appendix A and are available on the [ACMA website](#).

This outcomes paper provides a summary of the views submitted, our response to the main issues raised and how we have proceeded with updating the LIPD Class Licence.

Proposed updates to the LIPD Class Licence

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

As identified in the [Five-year spectrum outlook 2022–27](#), there is some interest in use of the 915–928 MHz band for satellite internet of things (IoT) applications where both the earth-to-space and space-to-earth communications links are contained within the 915–928 MHz band. We have also been approached regarding similar use of the 2400–2483.5 MHz band.

In general, there are currently 2 broad options for licensing space systems in Australia:

1. Obtain licences for each earth station (both transmitter and receiver) – in which case, a licence is generally not required for the space-borne devices.
2. Obtain apparatus licences for the space-borne devices – then have the related earth stations authorised by the Radiocommunications (Communication with Space Object) Class Licence 2015 (CSO Class Licence) (the CSO Class Licence authorises any earth stations that communicate with licensed space-borne devices in certain bands).

Noting that under the current regulatory framework, earth station receivers must be licensed as well as earth station transmitters, current arrangements do not allow use of space systems in the 915–928 MHz and 2400–2483.5 MHz bands under either of the 2 above options, because:

- > earth stations cannot be fully authorised under the LIPD Class Licence, as it currently covers the transmitters only, not receivers
- > space-based transmitters operated under the LIPD Class Licence will not have their related earth stations covered by the CSO Class Licence, as the CSO Class Licence does not cover associated earth stations in the 915–928 MHz or 2400–2483.5 MHz bands.

We proposed to include a provision in the LIPD Class Licence to authorise earth station receivers (which would allow space systems to operate under option 1 above), providing they communicate with space-based devices whose transmissions meet the existing operating requirements in the LIPD Class Licence. In this model the satellite transmitter would not be explicitly authorised and hence operating on a ‘no interference’ basis with respect to other users of the spectrum (both domestically and internationally).

Submissions received

Several submitters suggested authorising use of the 2 frequency bands by these systems in the CSO Class Licence (option 2 above), rather than modifying the LIPD Class Licence.

There were concerns raised about the effect of satellite transmitters operating in these bands on other existing services or arrangements. Several of these related to terrestrial devices operating in the bands, particularly those that utilise listen-before-talk protocols such as RLANs. Some submitters from the wi-fi industry were concerned about the low power thresholds that some of these devices used when ‘listening’ to determine if a channel is available, and whether the operation of satellite transmitters

could raise the noise floor in those bands, decreasing the achievable throughputs of these devices.

Other concerns related to the potential impacts on frequency-adjacent services, including other satellite services.

There was also a question around how interference from class-licensed satellite downlinks in the [Australian Radio Quiet Zone \(Western Australia\)](#) (ARQZWA) would be managed.

Some of these concerns related to the current proposal to authorise earth station receivers in the bands, while others would only arise if the power limits for space-based transmitters were increased.

There were also suggestions as to how some of these concerns may be mitigated, including prescription of power flux density (PFD) limits and authorisation via a mechanism other than class licensing.

There was some support for the proposal, with several submitters noting that allowing satellite services in the band would be useful and would not present any higher interference potential than devices currently operating in the band, so long as the transmit power limits remained as they currently are. Two of the system proponents also stated that the current power limits would be sufficient for the likely uses of the systems.

ACMA response and decision

We consider that coexistence between potential space-based emissions in bands not allocated to space services requires further investigation; for example, the coexistence implications of satellite transmissions in these bands (even if not explicitly authorised by the class licence) with radioastronomy operations at the ARQZWA.

There is also a relationship between this issue and potential future direct-to-mobile services using bands without a satellite allocation. We consider it beneficial to further investigate the factors relating to both issues to form a consistent position to be applied across all similar systems.

Accordingly, we will not be making the proposed updates to the LIPD Class Licence relating to authorisation of earth station receivers at this time. However, we will continue to investigate the issue further.

Frequency-hopping radiocommunications transmitters in the 5925–6425 MHz band

During [previous consultations](#) on updates to the 6 GHz band, a suggestion was received to include frequency-hopping spread spectrum devices in the LIPD Class Licence in the band, which would be able to operate at higher power spectral densities than the 1 dBm/MHz already authorised for other devices.

In June 2021, the European Commission made the [Commission Implementing Decision 2021/1067](#), which includes a provision for the use of narrowband frequency-hopping devices. We proposed to include an entry in the LIPD Class Licence to allow such devices to operate in the 5945–6425 MHz band with a power spectral density limit of 10 dBm/MHz.

Submissions received

A common theme raised in relation to this issue was that the European studies referenced in the consultation paper are only preliminary, and that the European Telecommunications Standards Institute (ETSI) is still in the process of defining and finalising the practical coexistence requirements between RLAN/wi-fi and narrowband devices. A significant number of submissions from the RLAN industry were opposed to making these changes at this time. They collectively proposed:

- > waiting for those studies to be completed,
- > further studying the sharing requirements, and/or
- > applying appropriate additional spectrum access mechanisms to ensure fair spectrum sharing between different technologies,

before authorising narrowband devices in the 6 GHz band in Australia.

Concerns were raised not only about sharing with other LIPD devices in the band (for example, Wi-Fi 6e devices) whose throughput could be degraded due to the operation of FHSS devices, but also with other existing services, such as fixed point-to-point links, which could be negatively affected by the higher power spectral densities.

Several submitters also questioned the value of making another band available to FHSS devices, when multiple other bands are already available and the current demand for, and use of, FHSS spectrum does not indicate a need for more to be made available. An alternative view from one submitter argued that the 2.4 GHz band used for Bluetooth is too congested, and identified benefits of a new use-case for frequency-hopping devices in the 6 GHz band associated with high-quality, low-latency connections for audio devices and mobile game controllers.

ACMA response and decision

Numerous respondents raised issues with the potential introduction of FHSS into the band, and several submitters suggested we delay this decision until studies by the ETSI are complete. Although there were several submitters who stated support for the proposal, most simply noted that they were 'not objecting' to it, with no additional comments or arguments specifically in favour of the proposal, or mention of potential uses or plans for the technology.

Additionally, we understand no other major market has as yet fully endorsed and implemented the use of FHSS in the band. We note concerns around:

- > the lack of progress towards authorisation in the US
- > the currently inconclusive nature of studies on coexistence with RLANs
- > the immaturity of ETSI standards development in Europe – given the somewhat bespoke nature of the proposed devices and the compatibility concerns with respect to RLANs, we would be looking to reference a relevant standard in the LIPD if we were to proceed with authorisation.

As a result, we do not intend to proceed with the proposed update regarding FHSS devices in the 6 GHz band at this time. We will continue to follow regulatory developments and technical studies internationally and may revisit this issue in a future update to the LIPD Class Licence, if appropriate.

Out-of-band limits on RLAN transmitters in the 5925–6425 MHz band

In the [outcomes paper](#) for the previous consultation on RLAN use in the 6 GHz band, we undertook to implement out-of-band emission limits of -37 dBm/MHz EIRP for very low-power (VLP) devices and -27 dBm/MHz EIRP for low-power indoor (LPI) devices. We proposed to include these limits in this variation to the LIPD Class Licence, including for frequency-hopping devices, should provisions for them also be included.

Submissions received

There was no opposition to the inclusion of these proposed out-of-band emission limits, although there were some suggestions to slightly alter the proposed conditions or their wording.

One submitter noted that the limits in the draft variation should be written as power densities (dBm/MHz) rather than total power values (dBm). They also asked to include a second condition that requires devices to prioritise the use of channels above 6000 MHz. Another submission noted that we should clarify that the ‘emissions’ in question are ‘out-of-band’.

ACMA response and decision

With no opposition to the proposal in this consultation, and given the level of agreement when it was initially proposed during the 6 GHz RLAN consultation in October 2022, we have included these out-of-band limits in the LIPD Class Licence as proposed, with the units for power spectrum density corrected to show ‘dBm/MHz’, as intended.

RLAN radiocommunications transmitters in the 5150–5250 MHz band

At the 2019 World Radiocommunication Conference (WRC-19), changes were made to the ITU Radio Regulations regarding the use of RLAN devices in the 5150–5250 MHz band, allowing use of higher power devices and/or ‘controlled and/or limited’ outdoor operation.

We proposed to allow outdoor use with a maximum EIRP of 1 W (30 dBm) in line with *Resolution 229 (Rev. WRC-19)* (Resolution 229) and sought comment on which of the emission masks outlined in the Resolution would be most appropriate to implement in Australia.

While not convinced that additional measures, such as registration of devices, were necessary in Australia, we were open to feedback on the issue.

Submissions received

While a larger number of submitters supported this proposal, there was opposition from some in the satellite industry, who were concerned about aggregate interference into satellite uplinks in the band. They noted that a number of regulators internationally have held the same concerns when making decisions on this band, with the European Conference of Postal and Telecommunications Administrations (CEPT), and the UK regulator, OFCOM, both already deciding not to allow fixed outdoor RLANs.

They also cited measured increases in the noise floor detected by their satellite receivers over North America, where similar arrangements are in place (outdoor use, power limits up to 4 W and an elevation-based transmission mask). They questioned how the ACMA could ensure that only 2% of devices would be operating outdoors – as set out in Resolution 229 and, as they assert, is required to offer adequate protection

to satellite systems – if there was no registration system in place. They also asserted that the ‘125 mW above 30 degrees’ mask is insufficient for protecting satellite uplinks that can operate at elevations as low as 5 degrees and asked why the third mask option in Resolution 229 was not considered.

Other submitters, in support of the proposal, mostly favoured an update to the existing item 61 in the LIPD Class Licence, with some noting that the item can be modified without affecting any existing devices, which will already meet the new requirements due to their lower power. One submission, however, suggested that legacy devices would need to be retrofitted to meet the new requirements.

If higher power outdoor devices were to be authorised, most responses favoured mandating the second mask (125 mW above 30 degrees) rather than other options listed in Resolution 229, mostly due to this option aligning with arrangements already in place in other countries. One submission said this mask would allow users to make use of highly directional antennas, which would concentrate radiofrequency energy into the intended service area and reduce interference potential. They claimed that some such antennas would not be able to meet the limits of the other mask (200 mW above 5 degrees).

An argument in favour of the first proposed mask (200 mW above 5 degrees) was that it would allow all existing devices – which are limited to operating at 200 mW – to continue operation without modification. Another suggestion was to permit operation under either mask and leave it to manufacturers/users to choose which was most appropriate for their devices or applications.

There were numerous requests to have the masks only apply to devices operating outdoors, and indoor devices, even at 1 W, to be allowed to operate with no emission mask requirement.

Supporters of the changes argued that it was not necessary to implement a registration system. It was also noted in one submission from the RLAN industry that Resolution 229 does not mandate it and claimed there was no evidence of interference to satellites. Another submission, on the other hand, noted that under one of the options set out in Resolution 229, there should be some process in place to limit the percentage of devices that operate outdoors – for which registration is one option. It was also observed that the US and Canada currently allow 4 W devices and only require registration for large scale deployments, so allowing 1 W here should not require such a system.

It was also pointed out that Resolution 229 specifies EIRP rather than PSD, as was in the draft variation.

ACMA response and decision

Noting that the ‘125mW above 30 degrees’ mask option is more widely preferred among respondents, and that it would better align with existing international arrangements, we consider that this is the more appropriate mask and have decided to specify it in the LIPD Class Licence. The third mask mentioned in Resolution 229 is significantly more complex and (while it is referenced as an option for the 5150–5250 MHz band) it was devised for higher power and/or outdoor use in the 5250–5350 MHz band, so was not a preferred option from the outset.

The mask is intended to only apply to devices that are operating above 200 mW and/or outdoors. To avoid confusion regarding operation of existing devices, we have decided to leave current item 61 in the LIPD Class Licence unchanged and add a new item 61A to cover devices that are required to implement the specified mask.

We note that CEPT and OFCOM have both updated their regulations to allow outdoor use in this band but did not increase the power limits above 200 mW, and specifically exclude fixed outdoor use. These conditions are based on studies showing that 3% of WAS/RLAN devices can be deployed outdoors at 200 mW without harmful interference to MSS uplinks. We are satisfied that the prescribed emission masks obviate the need to limit deployments in this way.

We understand that the outdoor percentage metric was devised for more populous jurisdictions such as the US. In terms of aligning with the Radio Regulations (specifically Resolution 229), Article 4.4 of the Regulations provides the flexibility to decide whether or not to implement a 30-degree mask and limit outdoor deployments at a national level, regardless of how the relevant part of that Resolution is interpreted.

As to whether registration is mandated under Resolution 229, we note that the Resolution *resolves* that administrations should take appropriate measures ‘such as’ (among other things) registration to control the number of devices deployed under certain conditions.

As noted by several submissions, the wording will be altered to not to refer to ‘power spectral density’.

Definition of ‘indoors’

Periodically, the lack of an explicit definition of the word ‘indoors’ in the LIPD Class Licence has been raised. This includes confusion as to whether indoor use includes use inside vehicles such as cars and planes.

To rectify this issue, we proposed the insertion of a definition of indoors in the LIPD Class Licence based on the definition developed for items 63A and 63B of Schedule 1. This would clarify that the intention of indoor use is to limit use to within buildings, and not to include use in vehicles.

The proposed definition was:

A space on or above land that is:

- (a) enclosed by permanent walls on all sides, a permanent roof and a permanent floor; and
- (b) permanently fixed to the land.

Submissions received

There were differing views on the inclusion of the proposed definition of the term ‘indoors’. Some submitters supported the proposal, while others raised concerns with the proposed wording, or with the inclusion of a definition at all.

Some submitters were concerned that the proposed wording failed to capture some locations and situations that they believe should be, or are intended to be, considered ‘indoors’, which may overly restrict deployment of devices or inadvertently invalidate some existing uses. These included underground spaces (such as below-ground floors within buildings), sports stadiums, temporary or emergency installations, boats/ships, warehouses, school buses and hospitality spaces. Some of these submitters simply suggested re-thinking the wording of the definition, or leaving the class licence as is, without a specific definition.

There were also suggestions that a different method could be used to ensure devices were only able to operate indoors – by applying restrictions on the features of devices that would cause them to be incapable of operating outdoors. This would include

requirements such as the devices cannot be weather resistant, cannot operate on battery power, and/or cannot have external antennas attached to them.

ACMA response and decision

We recognise that the inclusion of a definition will result in 'edge' cases, where it may be unclear whether a scenario should be considered 'indoors', but note that this will be the case for any definition that is used, and indeed is already the case with no definition included explicitly in the class licence.

The definition is not intended to cover vehicles, uncovered areas within larger structures (such as the playing area in open-air sports stadiums), or temporary installations. However, underground spaces are intended to be considered 'indoors' in this case. We have therefore modified the proposed definition to remove or change references to 'on or above ground' and 'fixed to the earth' to avoid excluding appropriate underground spaces.

We note that other international regulators (such as the FCC) have chosen to impose restrictions on device features (such as battery operation and weather proofing) rather than define indoor operation as a means of differentiating between indoor and outdoor use in the 6 GHz band. These kinds of restrictions have not been adopted in the Australian regulatory environment for that purpose before and we do not see a need to do so here.

We have proceeded with the inclusion of a definition of 'indoors', with wording modified from our original proposal. The new definition is:

A space ~~on or above land~~ that is:

- (c) enclosed by permanent walls on all sides, a permanent roof and a permanent floor; and
- (d) permanently fixed to ~~the land~~ a location.

Discussion of potential future updates to the LIPD Class Licence

The consultation paper also asked for views on possible inclusions which may be considered for future updates to the LIPD Class Licence.

WMAS technologies for wireless audio transmitters

Wireless multi-channel audio system (WMAS) is an emerging technology that offers spectral efficiency improvements for wireless audio devices such as wireless microphones, independent of the operating band. It operates 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. This is especially useful during large events.

Under current arrangements, WMAS devices may operate under items 30 and 31 (indoors only) of Schedule 1. However, the maximum emission bandwidth limitation of 330 kHz in items 28 and 29 precludes the operation of WMAS devices that support bandwidths up to 20 MHz.

We discussed current arrangements internationally and sought comment on possible operating parameters if new WMAS arrangements were to be introduced in the LIPD Class Licence in a future update, including limits on EIRP, bandwidth and minimum spectral efficiency.

Submissions received

Submitters considered the current power limits specified for wireless audio devices in the LIPD Class Licence as sufficient. There was some commentary that, if higher limits were to be introduced, further study on the impact they would have on other services should be undertaken. There was also a suggestion that higher power operation could be authorised under a different licence type.

Responses to the question about bandwidths for WMAS were split between the wireless audio industry supporting bandwidths of up to 20 MHz to be authorised, while TV broadcasters preferred to have WMAS systems contained within single channels of the current TV channel raster.

Respondents were in favour of mandating compliance with EN 300 422 – including in response to questions around spectral efficiency, where most respondents were in favour of adopting the FCC and EN 300 422 value of 3 channels per MHz. One respondent suggested that the efficiency value should be a design objective rather than a regulated limit.

ACMA response

Given the generally positive reception to the potential introduction of arrangements for WMAS, and the lack of specific opposition to the overall concept, we intend to give further consideration to developing regulatory arrangements for this technology in Australia. We may therefore develop a more detailed proposal for consideration and possible inclusion in a future update to the LIPD Class Licence.

Underground wireless broadband

As noted in our [Draft Five-year spectrum outlook 2023–28](#), there have been requests from some mining industry representatives to introduce arrangements that allow the use of wireless broadband in underground mines. In particular, proponents of these systems have been seeking access to sub-1 GHz bands that are internationally harmonised and standardised for wireless broadband use (for example, defined in 3GPP arrangements).

The bands of interest are currently licensed via Australia-wide spectrum licences. Third parties are able to approach the holders of spectrum licences to seek access to this spectrum. We sought comment on whether this method of access has been explored for underground communications and whether this mechanism is effective and efficient.

Section 138 of the Act allows for the issuing of a class licence in spectrum space allocated for spectrum licences, provided certain conditions are met. In this case, it could include a limitation to ensure a maximum EIRP at above-ground openings, as is already used for underground transmitters authorised by the LIPD Class Licence in other bands.

We sought comment on the potential introduction of class licence arrangements for underground communications in the 700 MHz, 800 MHz and/or 900 MHz bands in a future variation of the LIPD Class Licence.

Submissions received

A number of submissions, including from current holders of spectrum licences, were opposed to the idea of allowing underground communications within spectrum-licensed space. They were concerned about possible interference to spectrum-licensed systems and undermining spectrum licence holders' rights.

It was noted that authorising class-licensed services in spectrum-licensed space must be 'in the public interest' and submissions questioned whether this would be the case in this instance.

There was also a question about whether the spectrum was fit for purpose, as there are other low band frequencies that the mining industry already has access to that are not restricted to underground operation. One submission also pointed out that there may be unintended consequences for spectrum-licensed systems if 'underground' operation was class licensed, as spectrum licence holders already have infrastructure in underground locations that are not mining related, such as in traffic tunnels.

Several submitters believe the LIPD is not the appropriate place for such arrangements due to different equipment standards that would apply to devices that are both in the LIPD and mobile telephone bands. They would, however, support exploration of creating a new, separate class licence for this purpose.

ACMA response

We note that there was little demand for access to these services evident in the received responses. The ACMA is, therefore, unlikely to pursue this concept in its current form in the near term. However, we remain open to further discussion on the issue, and will continue to monitor developments in terms of both domestic demand and international deployments, including potential consideration of alternative regulatory options and/or frequency bands to enable these applications.

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

In addition to the changes being proposed for earth station receivers in this update to the LIPD Class Licence, we are aware that there are other systems proposed for these bands that utilise space-based transmitters operating at higher power levels than currently permitted under the LIPD Class Licence. We have been approached to consider authorisation of these services in Australia.

As with the current proposed updates, facilitation of satellite services in these bands at higher power levels would be an arrangement unique to Australia.

We sought comment on the possible future introduction of arrangements to facilitate systems that utilise space-based transmitters operating in the 915–928 MHz and 2400–2483.5 MHz bands at power levels higher than currently permitted under the LIPD Class Licence.

Submissions received

As discussed in the earlier section regarding authorisation of earth station receivers, there were questions surrounding increases in noise floor affecting devices with low threshold listen-before-talk protocols in place, and around the impact on adjacent services and the radio quiet zone. There was no support for permitting higher power levels than currently in the LIPD Class Licence, even among those who supported the inclusion of authorisation provisions for ground-based satellite network receivers.

ACMA response

We are not proceeding with the proposal to authorise satellite receivers in these bands, therefore discussion around potential higher power devices is not applicable now.

Next steps and future updates

We have proceeded with making a variation to the LIPD Class Licence, including the following items that were contained in the draft variation that was consulted on:

- > out-of-band limits on RLAN transmitters in the 5925–6425 MHz band
- > updates to RLAN arrangements in the 5150–5250 MHz band, allowing devices to operate outdoors and at powers up to 1 W with an appropriate elevation mask
- > definition of ‘indoors’.

The other updates that were proposed will not be made at this time, but we intend to continue investigating the issues themconsider making arrangements for these services and technologies. The issues in question are:

1. radiocommunications receivers communicating with satellites in the 915–928 MHz and 2400–2483.5 MHz bands
2. frequency-hopping radiocommunications transmitters in the 5925–6425 MHz band.

Of the 3 issues discussed for possible future updates, sufficient support was shown for only one of these through the submissions to this consultation. Submissions showed little or no support for the issues relating to underground communications and higher power levels for class-licenced satellites in the 900 MHz and 2.4 GHz bands. At this stage, we will not be investigating these issues further.

However, we intend to proceed with the development of proposals to support WMAS technology, as discussed in this consultation process. We will look to include a specific proposal for arrangements for this technology in a future update to the LIPD Class Licence.

Appendix A

Twenty-five public submissions were received from the following organisations. They are available on the [ACMA website](#):

- > Apple
- > Aqura Technologies
- > Australian Mobile Telecommunications Association (AMTA)
- > Bluetooth Special Interest Group
- > Blulen
- > Cambium Networks
- > Communications Alliance
- > CSIRO
- > Dynamic Spectrum Alliance (DSA)
- > Free TV
- > Hewlett Packard Enterprise
- > IEE 802 LAN/MAN Standards Committee (LMSC)
- > Intel
- > Japan Electronics and Information Technology Industries Association (JEITA)
- > Lacuna Space
- > LoRa Alliance
- > Meta
- > Mobile Satellite Services Australia (MSSA) and Pivotel (joint submission)
- > Optus
- > Profiles Resource Management (PRM)
- > Qualcomm
- > Sennheiser
- > Shure
- > Telstra
- > Wi-Fi Alliance.