**Inmarsat response to the ACMA Discussion Paper  
  
Planning of the 3700–4200 MHz band**

**13 September 2019**

**1. Introduction**

Inmarsat is pleased to provide to the ACMA this response to the discussion paper: “Planning of the 3700–4200 MHz band”. Inmarsat is concerned that the proposed introduction of WBB systems in this band will negatively impact the use of this band by the FSS generally, including Inmarsat’s C-band operations in Australia.

**2. Existing use of the band 3700-4200 MHz and frequencies below**

Inmarsat operates C-band links to support our satellite network from the Landsdale Earth Station in Perth. Inmarsat operates several antennas which are used to receive the feeder downlinks of our MSS satellites, for which signals are received in the band 3600-3700 MHz. The earth station is also used for reception of TT&C links which are received in the band 3700-4200 MHz. The TT&C links support Inmarsat’s “Inmarsat-3”, “Inmarsat-4” and “Inmarsat-5” series of satellites.

Inmarsat also provides support to other satellite operators by providing telemetry communications in the band 3700-4200 MHz, during transfer orbit phase and during regular on-station operations. While the amount of spectrum required for spacecraft TT&C is relatively small, given that TT&C is used for the control and safe operation of the satellite in orbit, it is very important that telemetry signals are received without interruption due to interference. Also, the carrier frequencies used for TT&C vary depending on the satellite design, so the earth station may require to operate over a large range of frequencies to allow reception of telemetry from a variety of satellites.

Inmarsat is facing the need to terminate use of C-band in the band 3600-3700 MHz in early 2023, given the recent decision by ACMA to make this band available for mobile broadband and to cease protection for incumbent FSS users. This will not however impact the use of the band 3700-4200 MHz for TT&C for Inmarsat’s network and other operators, which will continue at Landsdale for the foreseeable future.

**3. Concern over potential interference to co-frequency use (including telemetry)**

If the ACMA does decide to introduce WBB in the band 3700-4200 MHz, it should be on a shared basis with respect to FSS earth station operations. C-band remains a vital band for Inmarsat and other operators, and the fact that ACMA has terminated FSS use below 3700 MHz strengthens the argument for long-term protection of FSS operations above 3700 MHz. As the ACMA has identified in the section “International Developments”, most countries which are considering making use of the band 3700-4200 MHz for WBB do so on the basis of shared use with the FSS. This requires exclusion areas to be established around earth station locations but given the spectrum available for WBB operators in the 3400-3700 MHz band and other mobile bands, this should be a manageable restriction for the mobile operators. Such an approach would not mean that the FSS operations in the band 3700-4200 MHz are not impacted, since allowing WBB to be deployed in an area would likely prevent any new earth stations from being deployed in the same area.

**4. Concern over adjacent band interference**

Inmarsat is concerned that any plans to introduce WBB in the band 3700-4200 MHz could cause interference to our operations in the band 3600-3700 MHz, at least for the period for which those operations are entitled to protection. If the ACMA plans to make available the 3700-4200 MHz band for WBB before March 2023, it could be necessary to provide some protection measures with respect to adjacent band interference. Interference could be caused by out-of-band emissions from the WBB equipment (user terminals or base stations), or by receiver overload at the earth station. For both cases, some exclusion area will be required, albeit a much smaller one than is the case for co-frequency use by the FSS and WBB.

If, as Inmarsat proposes, WBB systems would be subject to protection of the Landsdale earth station with respect to FSS operations in the band 3700-4200 MHz, this would in any case require exclusion zones based on co-frequency use, that would almost certainly adequately protect FSS operations in the band 3600-3700 MHz at the same location. Nonetheless, the principle to protect existing licensed operations in the band 3600-3700 MHz should be adopted.

Adjacent channel interference from WBB systems in the band 3700-4200 MHz to satellite downlink signals in the same band could also be an issue, whether by WBB out-of-band emissions or by earth station receiver overload. There is little scope for additional filtering in the earth station receiver, given the design limitations and the need to receive from a range of satellites which can change over time. Considering also the large number of earth stations at Landsdale, it seems reasonable for protection to be provided throughout the band 3700-4200 MHz

**5. Answers to Specific Questions**

Answers to some of the specific questions asked in the discussion document are provided.

2. What are the future requirements of point-to-point links and FSS earth stations in the 3700–4200 MHz band? Does this differ by geographical area and/or segment of the band?

Regarding FSS earth stations, Inmarsat will continue to require the use of this band at Landsdale at least. Considering the use of this earth station by other operators, and considering that operations below 3700 MHz have been terminated, Inmarsat is of the view that the entire band 3700-4200 MHz should be protected at Landsdale.

3. If licensed point-to-point links and FSS earth stations are affected by replanning activities in the 3700–4200 MHz band, what alternative deployment options could be considered?

There is no need for any of the existing licensed FSS earth station in Australia to be affected as protection measures can be developed to ensure their protection from WBB systems.

9. What services/applications should be accommodated in the 3700–4200 MHz band?

As outlined above, as a minimum, the existing FSS use in Australia in the 3700-4200 MHz band should be entitled to continue indefinitely. It should be possible to also introduce new FSS earth stations, subject to coordination with terrestrial services, including WBB if that is introduced.

10. Which frequencies ranges should be made available for these services/applications?

As explained above, the whole of the band 3700-4200 MHz should remain available for the FSS.

11. Which geographic areas should be made available for these services/applications?

Existing licensed earth stations should continue to be protected. It should also be possible to deploy new earth stations anywhere in Australia provided that coordination with terrestrial services is possible.

12. On what basis should access be provided? Should access be granted on an exclusive or shared basis, on a coordinated or uncoordinated basis, et cetera?

If access to all or part of the band 3700-4200 MHz is given to WBB systems, it should be on a secondary basis or a co-primary basis with the FSS, with some form of coordination necessary to provide compatibility.

13. What licensing mechanisms are appropriate (spectrum, apparatus or class licensing)?

Licensing of FSS earth stations should continue under the apparatus licensing regime. Regarding WBB systems, given the need for coordination with respect to FSS earth stations, apparatus licensing could be preferred, e.g. licensing of each base station. If this is not practical, spectrum licensing could be considered but a means to require coordination between earth stations and WBB stations would need to be developed as part of the spectrum licence conditions.

14. If arrangements for WBB specifically are implemented in the 3700–4200 MHz band, are the proposed interference management techniques with services in the 3.6 GHz band suitable? Are any other techniques proposed? Are there any other compatibility issues with the 3.6 GHz band the ACMA should consider?

Inmarsat is of the view that the current Radiocommunications Advisory Guidelines for the 3.4 GHz band are suitable for use in the band 3700-4200 MHz, with simple revisions to reflect the change of frequency band. It is highlighted that the additional protection requirements in section 4.4 of the Guidelines would be applicable also for the band 3700-4200 MHz and would need to be adopted for the new band.

As noted above, there is potential for interference from WBB operating in the band 3700-4200 MHz to FSS earth stations receiving in the band 3600-3700 MHz. Provided that adequate protection measures for FSS operations in the band 3700-4200 MHz are provided, there may be no need for any additional protection measures for FSS operations in the adjacent band, but this would need to be confirmed as the details of any new plans for WBB are developed.

**6. Concluding comments**

Inmarsat thanks the ACMA for this discussion paper and seeks that the ACMA provides for the ongoing operation of FSS earth stations in Australia in the band 3700-4200 MHz, in line with the comments and proposals described above.

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