



nbn's submission on Draft spectrum reallocation recommendation for the 26 GHz band Consultation paper

13 June 2019



Thank you for the opportunity to comment on the issues set out in the ACMA's 'Draft spectrum reallocation recommendation for the 26 GHz band in cities and regional centres Consultation paper' (Paper). We set out our responses below and would be happy to provide further information.

1 Introduction

nbn's consideration of spectrum is focused on ensuring that it meets the federal government's expectation that all Australians have access to very fast broadband as soon as possible, at affordable prices, and at least cost to taxpayers, and that **nbn** will be able to ensure upgrade paths are available as required¹.

nbn's key business objectives are:

1. to ensure that it retains its ability to provide existing satellite services, and to secure an upgrade path for services at any location nationally, without the threat of terrestrial service interference related constraints; and
2. to identify and secure spectrum access opportunities to [C-I-C] [C-I-C] provide an upgrade path for its fixed wireless network. [C-I-C] [C-I-C]

nbn's submission is informed by the above objectives and based on information currently available.

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Key points

- **Protection of nbn's existing satellite services.** In **nbn's** view, given its use of the 27.0 – 27.5 GHz range for the SkyMuster™ satellite service, the potential for 5G mobile network interference to impact one third of **nbn's** existing satellite network remains despite the proposed conditions set out in the 26 GHz band planning decision paper². This interference would present as reductions in download speed, and/or network outages to end users. **nbn** therefore remains of the view that licensing arrangements as previously submitted should be implemented to proactively prevent the potential for 5G mobile networks to significantly interfere with its satellite service. (See 'Protection of **nbn** satellite network in 27.0 – 27.5 GHz', below, for further discussion).

¹ See page 1 of NBN Co Ltd Statement of Expectations 24 August 2016 at: <https://www1.nbnco.com.au/content/dam/nbnco2/2018/documents/Policies/soe-shareholder-minister-letter.pdf>

²See 'Future use of the 26 GHz band, Planning decisions and preliminary views' April 2019 (the **26 GHz Planning Decisions Paper**) at: <https://www.acma.gov.au/Home/theACMA/-/media/9C1539075B074218AE7A88578F8C9178.ashx>



- **Satellite upgrade path.** Greater certainty for **nbn**'s spectrum upgrade path is even more important given the risks above posed to existing satellite services from potential 5G mobile deployments. The provision of spectrum for both end user links and gateways in mmWave planning decisions is fundamental to this upgrade path, including in the 28 GHz band and the 37.0 – 43.5 GHz range among others. **nbn** seeks adoption of the arrangements proposed by it for the 28 GHz Band and consideration of the approach taken by the Electronic Communications Committee (ECC) of the European Conference of Postal and Telecommunications Administrations (CEPT) regarding band segmentation of 37.0-43.5 GHz³ as part of a more holistic approach to mmWave planning generally (See 'Implications of planning decision in 27.0 - 27.5 GHz for other critical satellite bands' below).
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Protection of nbn satellite network in 27.0-27.5 GHz

We note that the ACMA has, as part of the planning decision for the 26 GHz band, formed the preliminary view that licence conditions⁴ should be imposed in the 27.0 - 27.5 GHz range in areas surrounding affected **nbn** gateway sites, to mitigate interference into satellite receivers.

The 27.0 - 27.5 GHz range constitutes 500 MHz of the total of 1,500 MHz used by **nbn**'s SkyMuster™ gateway uplinks and **nbn** remains of the view that one third of existing satellite network services would be impacted from 5G mobile network interference even if the ACMA's proposed conditions are implemented.

nbn has previously submitted⁵ the results of a sensitivity analysis using the ACMA methodology, which show the potential for significant breaches of permissible interference levels of **nbn**'s satellite network. The currently proposed conditions are more permissive for 5G base stations than those assumed in **nbn**'s sensitivity analysis and critically do not address the impact of mobile 5G user equipment (UE) which poses the biggest interference risk to the satellite network.

nbn remains of the view that in the 27.0 – 27.5 GHz range exclusion of mobile network deployments and inclusions of conditions on Fixed Wireless deployments as previously proposed remain appropriate and would

³ [https://cept.org/files/18334/ECC\(19\)042%20Annex%2032_CEPT%20Roadmap%205G.docx](https://cept.org/files/18334/ECC(19)042%20Annex%2032_CEPT%20Roadmap%205G.docx) accessed 10 June 2019.

⁴ i.e. – that within the **nbn** FSS gateway footprint areas specified in Annex F of the 26 GHz Planning Decisions Paper:

- Outdoor base stations must have mechanical down tilt equal to or greater than 0°
- Outdoor base stations must not direct antenna beams (via electrical steering) to elevation angles greater than 5° above the horizon for more than 5% of time
- Outdoor fixed UEs must not direct their antenna beam (via electrical steering) to within 1.5° of the geostationary orbit arc;
- Reduced base station TRP limit of 25 dBm/200 MHz.

and noting that (a) power limitations are usually included in all spectrum licence technical frameworks; and (b) a further condition could be considered relating to limiting the number of outdoor base stations that can be deployed in any **nbn** gateway footprint area.

- 26 GHz Planning Decisions Paper, page 14 and Annex C and F.

⁵ See **nbn** submission to Options for wireless broadband in the 26 GHz band dated 9 November 2018 and Attachment A.



prevent the potential for 5G mobile network deployment to significantly interfere with the SkyMuster™ satellite service⁶

nbn also notes that if, contrary to its submissions, mobile networks were permitted to operate in 27.0-27.5 GHz band under the conditions proposed in the 26 GHz Planning Decisions Paper, **nbn** could not ignore the uncontrollable risk of interference arising from mobile user equipment and not, in **nbn**'s view, addressed by the proposed conditions. In this regard, **nbn** has taken preliminary planning steps to avoid future use of the 27.0 - 27.5 GHz band as the only way to mitigate a risk that is anticipated to increase over time as mobile use of the band expands.

Implications of planning decision in 27.0 - 27.5 GHz for other critical satellite bands

From a technical perspective, the introduction of 5G mobile network deployments into other bands currently used for satellite uplinks such as 27.5 - 29.5 GHz would have similar implications to the ones already articulated for the 26 GHz band. That is, 5G mobile network deployments pose the same interference risks for existing **nbn** gateway links and a significantly higher risk to existing user links in 28.5 - 29.1 GHz. In the case of the 28 GHz band, the critical concern in addition to interference risk to incumbent gateways operating in part of the band is that all of 27.5 - 29.5 GHz is vital for future user uplink capacity expansion given ecosystem and performance requirements. A planning decision to allow 5G mobile deployments in the 27.0 - 27.5 GHz band would require future satellites to use higher frequencies instead of 27.0 - 27.5 GHz.

In the case of 5G mobile network sharing with ubiquitous FSS user links, the co-existence problems are significantly magnified relative to gateway sharing, and at face value sharing is simply not feasible. As such, timely prudent planning decisions must be made to enable an optimal outcome for all spectrum users and maximise the overall public benefit from use of the radiofrequency spectrum.

We acknowledge that the ACMA has made constructive preliminary efforts to place its decisions on the 26 GHz band in context with ongoing planning activities in the 28 GHz band, but believe that the broader consequences of the 26 GHz planning decision are yet to be sufficiently addressed and must be considered as elements of subsequent mmWave planning decisions. This highlights the importance of adopting a more holistic approach to mmWave planning generally, including the other bands required for **nbn**'s satellite upgrade path.

In this context, **nbn** strongly recommends that the ACMA follows the lead provided by the European Conference of Postal and Telecommunications Administrations (CEPT) by recognising the CEPT's Electronic Communications Committee (ECC) recent 26/28 GHz planning decisions and adopts substantially the same band plans, specifically the blanket exclusion of 5G mobile networks from 27.5 - 29.5 GHz and the global promotion of satellite

⁶ See **nbn** submission to the ACMA's Options Paper for wireless broadband in the 26 GHz band dated 9 November 2018, with further detail on **nbn**'s proposed conditions on page 30 of the 26 GHz Planning Decisions Paper.

'NBN Co proposed that the following conditions be applied to wireless broadband licences within 250 km of its gateway earth stations:

- UE antenna boresight elevation not to exceed 5°.
- UE antenna gain of at least 17 dBi.
- BS antenna boresight elevation not to exceed 0°.

In addition, NBN Co suggested that a maximum BS deployment density limit, in addition to the above conditions, should apply to fixed broadband services. NBN Co was of the view that the BS density limit is not a reliable proxy for ensuring the interference contribution from UEs aligns with the scenarios studied. Based on these proposed conditions, NBN Co maintained its view that only fixed broadband services could be viably deployed in the range 27–27.5 GHz.'



broadband and unconstrained ESIM. We further recommend consideration of following the CEPT ECC's lead in relation to their planning of 37.0-43.5 GHz as the best way to balance the needs of all services, particularly by way of band segmentation.⁷

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Matters relevant to an allocation

nbn's views should be considered in conjunction with the requirements to protect existing satellite services set out under 'Protection of nbn satellite network in 27.0-27.5 GHz'.

nbn understands that if a reallocation declaration is made, stakeholders will have additional opportunities to comment on the matters relevant to licence term, allocation methodology, and lot configuration, as part of the consultation process on the allocation instruments.

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⁷ [https://cept.org/files/18334/ECC\(19\)042%20Annex%2032_CEPT%20Roadmap%205G.docx](https://cept.org/files/18334/ECC(19)042%20Annex%2032_CEPT%20Roadmap%205G.docx) accessed 10 June 2019.