Ofcom proposals to enhance shared spectrum

A consultation on proposals to enhance the Shared Access framework to support a growing variety of spectrum users

About Ericsson

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Ericsson welcomes the opportunity to respond to Ofcom's document Supporting increased use of shared spectrum released 27 November 2023. Response is due by 2 February 2024.

Summary:

To realise the potential of a digital society, including smart cities, connecting the unconnected, IoT, and industry automation, multiple spectrum bands with sufficient bandwidths are needed for 5G and its evolution. The addition of mid-band spectrum is critical for improving the coverage and capacity of 5G services. The 3.8-4.2GHz band, currently available via the shared access regime, offers the potential to deliver on many of the proposed use cases that are best served by 5G mid-band spectrum.

There are some issues with the shared access regime that is likely to be contributing to the limited usage, particularly for the 400MHz in the 3.8-4.2GHz band. With potential changes to the current Shared Access licence conditions, it is anticipated that there could be wider usage, denser deployments in both rural and urban locations.

The challenge of a shared access scheme is to strike a balance between enabling high enough base station power for relevant use cases, the management of coexistence of licences as well as conditions that encourage investment in the eco-system and network deployments. There is a risk with the current licence regime that the UK will have wide geographical areas that will not have the opportunity to benefit from the shared access licence spectrum. The 3.8-4.2 GHz band is 400MHz of premium 5G mid-band spectrum that with updated licence conditions could serve many of the verticals looking to adopt 5G, resulting in many thousands of 5G shared access use case deployments across the whole of the UK and avoiding a scenario where the spectrum is not utilised.

Ofcom's proposals to evolve the Shared Access framework do address some of the barriers but in other instances are not addressing changes with regards to power levels as they wait for the outcome of CEPT work specifically on AAS and power levels for medium-power licences[1].

A clear synchronisation regime that protects mobile network operators (MNOs) spectrum in the 3.5GHz range and supports co-existence between users is critical to ensure the successful deployment of 3.8-4.2GHz shared access licences. Studies provided in ECC PT1 CG 4GHz[2] have shown that unsynchronised deployments can result in significant interference which puts at risk the reliability of the 5G use cases, or to mitigate the risk will require significant distances between licence deployments. When the band is fully utilised and there a many, possibly hundreds of shared access licences all within the same geographical area, TDD patterns will need to be synchronised.

The following suggestions may encourage 5G adoption across a wide range of verticals via the utilisation of the Shared Access Licence:

- Consider further increasing the power levels for both low and medium power deployments.
- Allow medium power deployments in urban areas.
- Consider creating a new licence or update the medium power licence to enable the deployment of active antenna systems (AAS). This will require higher power levels than are currently authorised. Many mid-spectrum deployments are anticipated to use AAS.
- Consider authorising licences in the 3.8-4.2GHz band that allow up to 200MHz of contiguous spectrum for use cases such as AR/VR & HD live video links.

[1] Refer to point 3.19 in Supporting increased use of shared spectrum (ofcom.org.uk)

[2] Studies provided in ECC PT1 CG 4GHz

- Extend the "use it or lose it" period to take into consideration the time it takes to deploy a network.
- Extend the licence term to at least 10 years to encourage investment and avoid the lack of business case.
- Avoid the need to move licenses within the 3.8–4.2 GHz band as generally the eco system does not support this and many use cases have deterministic spectrum needs.
- State a clear fallback position for uplink and down link TDD patterns for synchronisation purposes and ensure synchronisation is in place to protect the MNOs spectrum bands.

Ericsson responses: -

Question 1:
Do you have any comments on our proposals to gather additional antenna parameters, and would you prefer Ofcom to specify a small number of antenna pattern 'envelopes' or for users to provide details of the specific antenna parameters in use for Ofcom to assess? Please provide reasons for your views.

Ericsson support the disclosure of antenna patterns by licence applicants as a means to improve coexistence calculations. We advocate a distributed responsibility and coordination between license holders rather than a centralised coordination based on general planning tools. Ericsson is of the understanding that a centralised coordination based on general planning tools is likely to lead to inefficient utilisation of spectrum and less possibilities for innovations in this domain.

Question 2:
Do you have comments on the suggested approach to enable user-led coordination in certain circumstances?

Ericsson has no objection to this approach as applicants should be able to share antenna patterns and understand any potential interference to allow for user-led coordination. This should encourage a more efficient use of the available spectrum when an applicant 'fails' the Ofcom coordination but agreement can be reached by 'potential interferers & victims'. However, it is important to ensure the MNOs spectrum is protected by default and it may be appropriate to have a fallback position when an agreement cannot be reached.

Question 3:
Do you have any comments on our proposal to increase the power level of our Low Power product by 3dBm in the 3.8-4.2 GHz band?

Ericsson do not object to the current proposal for increasing power for Low Power outdoor and indoor licences. We would like to remind Ofcom that the power level for Medium Power Licence continues to restrict the spectrum efficiency due to the commercially viable equipment available. We would also like to comment that the impact on MFCN networks below 3800 MHz needs to be considered. Studies provided in ECC PT1 CG 4GHz[3] shows challenges in outdoor deployment of unsynchronized low/medium power BS.

Question 4
Do you have any comments on our proposal to remove the requirement for licensees holding a Low Power 3.8-4.2 GHz licence to keep a record of the address at which mobile terminals connected to an indoor base station will be used?

Ericsson have no objection to remove this requirement.

[3] Studies provided in ECC PT1 CG 4GHz

Question 5:
Do you agree with our proposals to assume synchronisation between users, and coordinate base station to terminal instead of base station to base station in the 3.8-4.2GHz band? If no, please explain how other measures could increase sharing of the band.

Many of the current use cases of Shared access licence outdoor medium power deployments are 5G FWA in rural areas. The 5G FWA use case has a similar downlink heavy TDD pattern across all deployments as well as the MNOs networks. The synchronisation and coordination from base station to base station is beneficial and will improve spectrum efficiency. However, we have some concerns when new unsynchronised local area networks are in the surrounding areas. If Ofcom can gather and share the information on the TDD patterns in response to new applications then new users can make informed decisions about the risk of interference, alignment of their TDD patterns which in turn should increase the number of shared deployments.

Question 6.
Please indicate whether you support our preferred option of coordination at -88 dBm/20 MHz (based on I/N of + 3dB, at 1.5m) or a more conservative alternative of -91 dBm/20 MHz (based on I/N of 0dB at 3m), with reasons for your view.

It would be beneficial to have sight of the evidence Ofcom is using to determine interference to noise ratio values. It is key to understand whether all the use cases will have sufficient quality of services with this protection level at the UE side. To date Ericsson has not seen data relating to this option of coordination.

Question 7:
Do you agree with our proposals for an increase in building entry loss (BEL) in 3.8-4.2GHz? If no, are there alternatives which you consider could better achieve similar results?

Ericsson do not object to the proposal.

Question 8:
Do you agree with our proposal that adjacent band protection for Shared Access users is in future limited to considering only the first 5 MHz above and below UK Broadband assignments?

Studies provided in ECC PT1 CG 4GHz[4] show 5 MHz Guard band (GB) is not enough to protect Mobile/Fixed Communications Network (MFCN) below 3800 Mhz. Considering the UK broadband assignments uses similar TDD pattern and equipment as MFCN below 3800 MHz, 5 MHz GB will not provide sufficient protection in the case of an unsynchronized local area base station (BS) deployment in an adjacent channel. A fallback TTD pattern proposal is an option for Ofcom to consider or the synchronisation across licences will need to be handled on a case-by-case basis.

Question 9: Do you agree with our assessment that, in circumstances where localised shortages of spectrum have occurred, pricing can be used to influence requested spectrum amounts?

No comment at this time.

[4] Studies provided in ECC PT1 CG 4GHz

Question 10:
Do you agree that we should take measures to reflect the impact of bandwidth, power levels and urban/rural location in our pricing approach for the 3.8- 4.2 GHz band? Do you think there are other factors we should be taking into account?

No comment at this time.

Question 11:
How do you consider the illustrative prices would impact your spectrum requirements and future deployment plans in the 3.8-4.2 GHz band? Please provide evidence in support of your view.

No comment at this time.

Question 12:
Do you have any comments on our proposals to clarify the circumstances in which exceptions are available, the tests we will apply, and how this supports user flexibility outside our overarching rules?

No comment at this time.

Question 13:
Do you agree with our overall approach based around refining our existing coordination framework for Shared Access, whilst monitoring future opportunities for more user led and outcomes led coordination where evidence suggests it would be of benefit?

Ericsson supports Ofcom's approach to promote innovation in the band by making changes to the existing coordination framework. Information should be shared to ensure potential licence holders have appropriate radio planning knowledge to assess and understand the impact that synchronisation coordination will have on their preferred TDD patterns.

Question 14:
Do you agree with our assessment of the potential impact on specific groups of persons?

No comment at this time.

Question 15:
Do you agree with our assessment of the potential impact of our proposal on the Welsh language? Do you think our proposal could be formulated or revised to ensure, or increase, positive effects, or reduce/eliminate any negative effects, on opportunities to use the Welsh language and treating the Welsh language no less favourably than English?

No comment at this time.

Question 16:
Do you have any other comments on the proposals set out in this document?

As per the recommendations in the Analysys Mason report for UK Spectrum Policy Forum[5], Ericsson agrees that Ofcom needs to clarify technical conditions under the medium power licence to enable the use of AAS.

[5] https://www.techuk.org/resource/uk-spf-report-review-of-use-case-requirements-in-the-3-8-4-2ghz-band-via-ofcom-s-shared-access-licence-framework.html

There are potential innovative use cases that require AAS deployments to secure the economic viability of the business case.

Ericsson would like to request that the illustration 2.1[6] in the Ofcom Consultation, is expanded to include the number of licences and the band per each of the 5 use cases, i.e., how many licences and which band are granted for ports and construction. It would also be helpful to understand the typical TTD patterns for the use case deployments in the 3.8-4.3GHz range.

[6] Refer to figure 2.1 in Supporting increased use of shared spectrum (ofcom.org.uk)