Evolution of the shared access framework

BT's response to Ofcom's 'Call for input' issued 28 March 2023

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BT Group

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Executive summary

1. BT welcomes this call for inputs on the evolution of Ofcom's shared access framework. We have practical experience of various use cases; end customer requirements; the licence application process; the allowed technical parameters; and the practical deployment and operation of systems using shared access bands. We are happy to share our views on these aspects and contribute to the debate as to how the licensing framework might evolve.
2. A key issue to date has been the timescales for decisions on licence applications, including where an exceptions process needs to be used to address particular requirements and take account of mitigating factors that would support issuing authorisations outside of the standard guidelines. We encourage the move to a more automated application and decision process allowing quicker responses as soon as possible.
3. We would encourage Ofcom not to seek to ration access to the shared access spectrum and to remain flexible in use of the exceptions process in justified cases. Additional guidelines and templates for additional information might be helpful in this regard.
4. We would welcome further consideration of the details of how technical coordination is done and to look at the possibility of taking into account optional interference mitigation measures, such as TDD synchronisation, where this could achieve successful coordination and lead to efficient use of the spectrum.
5. We consider that the existing and planned shared access licence bands to be sufficient and note that the issue of licences has significantly slowed in recent months, although the reasons for that are unclear. Future demand is somewhat hard to predict at present and it is recommended that Ofcom keeps this under review as it further considers how the shared access framework should evolve.

1 Introduction

BT[1] welcomes this opportunity to provide its views in response to Ofcom's Call for input on the Evolution of the shared access framework[2].

BT has embraced the new opportunity that Ofcom created when it launched its shared access licence framework in 2019 and now has some practical experience of the licensing process and deployment of private networks in the 3.8 – 4.2 GHz band. We are pleased to share what we have learned and to highlight areas where we think Ofcom's framework could be improved, both from process and technical viewpoints.

In section 2 we provide information on our experiences to date in deploying private networks in the shared 3.8 – 4.2 GHz spectrum band.

In section 3 we highlight areas where we believe the shared access licence framework could be improved.

Finally, in section 4, we provide answers to the specific questions that Ofcom has posed.

2 Our experience to date with the shared access spectrum

Use cases

BT has, working with partners, deployed 3.8 – 4.2 GHz equipment {✂ redacted } and also holds shared access licences in a number of other UK locations. The shared access licence framework includes a large amount of spectrum, particularly in the 3.8 – 4.2 GHz ranges. It is lightly used at present in most of the UK and is of interest to BT for certain applications as a useful compliment to national spectrum licences, particularly in busy locations where other spectrum is heavily used.

The Shared Access licence framework has the advantage of a flexible frame structure, that enables low latency and various uplink/downlink ratios, as well as wide channel bandwidths of up to 100 MHz. On the other hand there are limitations, such as the typically quite lengthy timescales for obtaining licences, permitted maximum power levels and the potential need to move frequencies within the band if requested. The exceptions process is helpful, as it can provide some flexibility by considering mitigations that can enable Ofcom to flex its rules in properly justified cases.

An obstacle we have encountered is the limitation of allowing only low power licences in urban areas. We acknowledge, however, that the exceptions process may allow medium power licences in these areas in cases where there is technical justification to do so. However, given the technical complexities that must be considered, this can be a lengthy process with no guarantee of a successful outcome. We understand the reasons for the general limitation to low power in urban areas, given the intended purpose of the shared access framework, but the exceptions process is important as there will inevitably be scenarios where, given the specific scenario, higher power will secure optimal and efficient use of the spectrum.

To date BT has used, or evaluated, the shared access spectrum band at 3.8 – 4.2 GHz for a range of use cases {✂ redacted

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[1] BT, including our mobile subsidiary EE Ltd.
[2] https://www.ofcom.org.uk/__data/assets/pdf_file/0032/255965/call-for-inputs-evolution-of-shared-access.pdf

3 Potential improvements to the shared access framework

Licensing Process

BT and other stakeholders have previously flagged the concern that the licensing process currently takes too long, even for straightforward applications, and it is incompatible with some commercial opportunities, such as requirements to provide services at short notice or to meet deadlines to respond to invitations to tender. We are pleased that Ofcom has work in hand to automate the licensing process and enable users to submit applications and get licences much more rapidly than at present. This is welcome progress, although Ofcom's current timetable has this only scheduled for implementation sometime in 2024, which means the current process will remain an obstacle for some time yet.

As well as long-term requirements, there are also short duration licences needed for 'pop up' private networks, for example Glastonbury festival, military/police events, temporary construction. These may need a fast decision process and the licences may be needed for a relatively short duration.

The exceptions process is a welcome component of the Ofcom process, rather than just relying on simple computer based decisions. This provides for a degree of discretion after taking into account information that the computer based decision process may not include. Again the timescales for this can be protracted and we would encourage Ofcom to dedicate resources to this were needed if it would accelerate the decision making process.

BT understands that in assessing applications for shared access licences, in particular when applying the exceptions process, Ofcom is concerned to ensure that in any location a number of licensees can be accommodated and will consider how the use in one location could prevent others accessing the spectrum in adjacent areas. Our concern is that this could lead to a mindset of rationing access to spectrum rather than promoting use of spectrum.

The solution, if concerns over spectrum congestion do materialise, is to review the technical coordination process to see how more systems can be packed in. This could be through inviting new applicants to synchronise with existing deployments and considering more detailed information in the coordination calculations such as exact antenna patterns and bearings.

Automation of the licence application and coordination process

The ability to apply for licences online and get an immediate (even if provisional) decision would be a very valuable improvement to the process and would greatly improve the ability to consider use of shared access licences in some scenarios and applications.

Technical parameters

The low power limits used in urban areas are difficult to achieve with some existing available base station products and should be reviewed.

The medium power limits are reasonable in terms of balancing useful coverage without excessive impact on ability to re-use the frequencies in adjacent areas by other systems, so long as sensible coordination parameters are used to avoid excessive interference protection distances.

Coordination process

It might be appropriate to require applicants for licences to provide more detailed technical information that can be used in the coordination process, such as antenna patterns and bearings.

Ofcom should be able to include in the coordination calculation whether the licensee will synchronise and align its frame structure with nearby existing users, so that coordination may be successful where otherwise it would not.

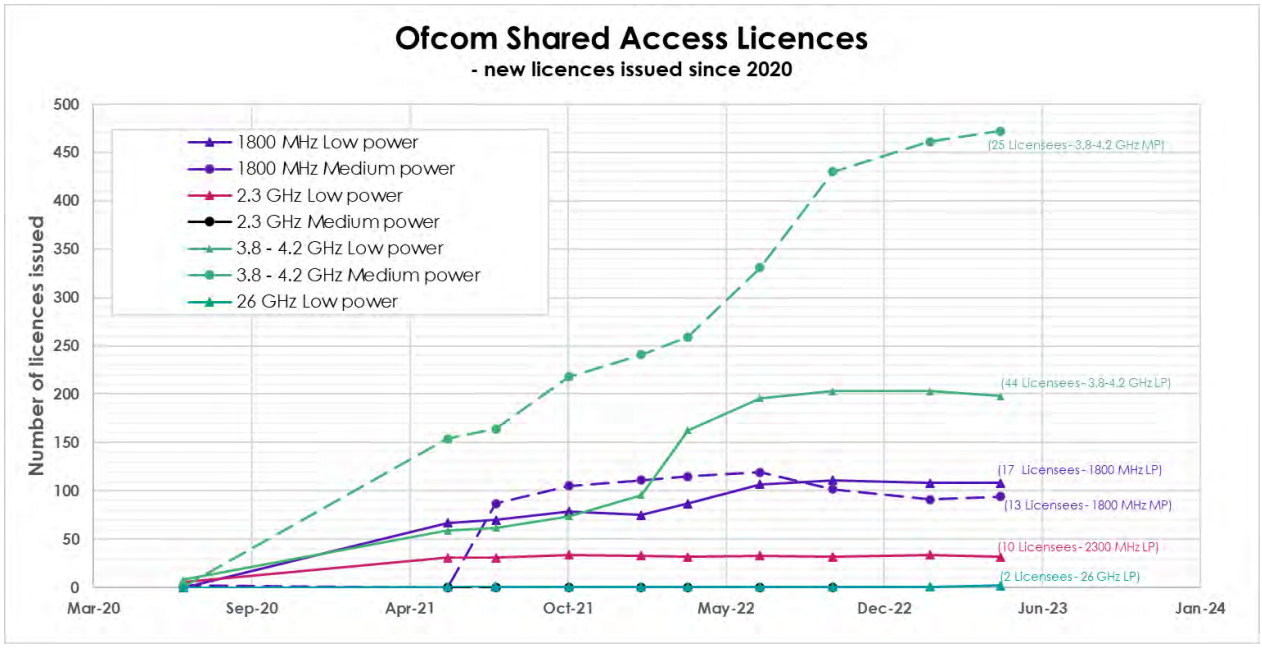
If Ofcom envisages that there could be a general requirement to mandate synchronisation of new adjacent network deployments at some point in the future, recommending a given number of radio frame patterns that suit popular applications such as I-IoT and digital vision now might be helpful in preparing for this. e.g., UL/DL ratios 3:7. This would limit flexibility, but could make future introduction of future synchronisation requirements easier. This is perhaps something to consider at a later point in time if the demand for shared access licences has grown to a point where it frequently becomes difficult to coordinate additional systems.

4 Answers to consultation questions

Questions: 1. How do you think demand for Shared Access is likely to change in future and why; Which use cases do you think are likely to emerge or grow, and which decline? Please provide a view on the bandwidth you would consider the minimum and optimal requirement for growth use cases, and timelines you would expect for their development.

We note from analysis of Ofcom's Wireless Telegraphy Register that the growth in number of Shared Access licences has significantly slowed in the last 6 months compared to the rapid growth seen when the licences were first available, as illustrated in the Figure 1 below.

Figure 1: Growth in Shared Access Licences since licence product launch



Source: Ofcom's Wireless Telegraphy Register (WTR)

We can only speculate as to why this levelling off in demand (or more precisely, licences issued) has occurred. It could be for various reasons, but perhaps it has been found that the initial commercial or technical results from early deployments have not encouraged much further investment – for example Fixed Wireless Access deployments might not have had the expected take up or share of the market that was expected, or demand for Private networks may have slowed. We have no evidence as to what may be the reason, but perhaps others will be able to shed light on this matter.

From BT's perspective we anticipate continued additional demand for Shared Access licences, particularly if Ofcom is able to further develop the licensing process as we have outlined in section 3 above. As the capabilities of the public mobile networks change, particularly with roll out of 5G Stand Alone (SA) capabilities, some demand for private networks might be

supported on public mobile networks using other spectrum; however we would not anticipate that this would eliminate need for shared access spectrum.

We would expect that a requirement for 100 MHz channels would become the norm for the applications we would envisage.

One of the key factors affecting demand is the maturity of the ecosystem which in turn affects costs. A favourable regulatory approach that enables the important early use cases for private networks that are emerging, such as ports, airports and campuses, will help drive volumes. This should in turn support development of the ecosystem (devices, features in 3GPP standards, IoT solutions) and reduce costs.

2. Are there elements of the current framework that complicate the use of Shared Access licences for specific use cases? If so, please provide specific examples and indicate the changes that would be required to facilitate this and how this might co-exist with other use cases.

The timescales to issue licences can be an impediment to facilitating applications that may require deployment at short notice, such as uploading content from cameras at a hastily arranged event. Also when responding to tenders, the licensing timescales may not deliver a decision in time as to whether a licence would be granted, meaning a respondent could not commit to providing the customer with a solution that relies on a shared access licence. To solve these issues an online application system with immediate decisions would be needed.

3. Do you have any comments on the power restrictions currently in place, particularly in urban/high density areas, under the Shared Access licence? Please explain what benefits could be delivered using a higher operating power (e.g. medium power in urban areas), or any concerns you sharing with such operations.

As outlined in section 2, the division of the UK into urban and other areas for the purpose of whether low or medium power licences are permitted can be a barrier to fulfilling some customer requirements. There are a number of examples of large industrial areas that fall within Ofcom's urban areas, yet these may be places where medium power licences are necessary for the particular use case. Moreover, such locations might form areas of privately owned land for which there is a requirement to only accommodate the owner's appointed service provider and adequate bandwidth and power levels would be a priority and would remain consistent with an objective to secure efficient use of spectrum.

We suggest that Ofcom indicates its willingness to be flexible on use of medium power in these areas where this supports efficient use of the spectrum in those areas and nearby. The exceptions process might be sufficient for this, but needs to be transparent as to how decisions would be arrived at and consistently applied (we are not suggesting that it has not been to date).

Similarly, if there are any restrictions on allowed bandwidths or number of channels that a licensee can be assigned in a given location, that should also be made visible (although an exceptions process could again be applied).

4. Do you have any comments on the exceptions process, and how some of its benefits could be maintained within more standardised and automated assessments?

Ofcom could issue guidelines and templates as to what additional information would be helpful in enabling it to arrive at decisions more rapidly, for example antenna patterns and down tilts / pointing and any mitigating factors such as local shielding. Please also see our further comments on the exceptions process in section 3 above.

5. Do you have any views whether and how the coordination approach should be modified? If yes, please provide comments in light of the issues set out above.

The greatest gains would probably come from taking into account whether adjacent networks are synchronised as taking into account the possibility of one base station transmitting while the other is receiving could lead to relatively large separation distances between systems. This might be an option to consider where an incoming system would not otherwise be able to coexist with an existing deployed system.

6. Do you have views on whether newer or emerging technologies can support coexistence between additional users in the band, and if so, how?

We have no comments on this question.

7. Please outline any comments on the current licensing process (e.g. ease of application, time taken, the information we require). If relevant, please note aspects you are currently content with and areas which could be improved.

We have no concerns with the existing application process and the information required. It would be easier however if this was an online form. The time taken to process the application can typically take 6 weeks or more, and the exceptions process even longer. Anything that could be done to shorten this would be welcomed.

8. Do you have any comments on the suitability of available spectrum for your use cases? Please consider the relevance of the additional bands we are proposing for the framework, and the impact of any limitations on existing bands.

We are content with the bands that are available and do not favour addition of further bands to the Shared Access Framework as the opportunity cost of doing so would be high compared to the benefits.

9. Do you have any comments on equipment availability limiting deployment options in 3.8-4.2 GHz? Please comment on the impact of any experiences you have had, and where relevant, your expectations for when more equipment will be broadly available across the band.

Two major vendors have radio products that support only a subsection of the n77 upper band. For one, 3.9 to 4.1 GHz, and for the other 3.8 to 4.1 GHz. As major RAN providers in the UK, this means for anyone deploying these vendors, they may be impacted by reduced overall bandwidth available. There is no view of when or if these vendors will produce new or additional radios to cover the full 390 MHz BW available[3].

Bandwidth supported by RAN equipment is a field that should be included in the application process, and something to note when developing automation.

Newer vendors entering the UK 4G/5G Private Networks market (particularly US focussed vendors) are slow in building out their RAN portfolio, particularly for n77, making entry into the UK more challenging. A movement towards apparent harmonisation in Europe is helping to slowly alleviate the issue moving forward, by generating greater demand in Europe and incentivising vendor development.0. Do you have any other general comments on the Shared Access framework? Please consider any areas where future innovations could further support Ofcom's policy objectives for this spectrum, and/or improve the experience for users.

We support efforts to enhance the existing framework and automate the licensing process as a priority. This reflects our currently foreseen requirements that mostly require static licences rather than a more dynamic access to spectrum.

[3] Part of which is anyway unavailable for shared use, other than under Local Access licences, as it is nationally assigned to UK Broadband Ltd.

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