



Response to Ofcom's Call for Inputs on:

**3.8 GHz to 4.2 GHz band:
Opportunities for Innovation**

(Issued by Ofcom on 14 April 2016)

**BT plc and EE Ltd
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Introduction

BT/EE welcomes the opportunity to provide views in response to Ofcom's call for inputs on the 3.8 – 4.2 GHz band. This band is currently unused across much of the UK, even though it offers tremendous potential for future mobile network capacity expansion and perhaps other uses. We therefore believe that it is timely for Ofcom to consult on the future opportunities for using this valuable spectrum, whilst continuing to provide protection to existing satellite earth stations in this band.

Summary of BT/EE views

1. As a first step and prior to developing a licensing regime, BT/EE considers that Ofcom should identify the likely uses of spectrum in the 3.8 – 4.2 GHz band and how the spectrum can be suitably awarded to enable this use. It is important to consider this also on a European-wide basis to ensure that the benefits of harmonisation and economies of scale can be achieved. The design of the licensing regime needs to be compatible with the likely use. The consequence of not doing this may be that the spectrum is not allocated or used in the most efficient way.
2. The 3.8 – 4.2 GHz band could be suitable for mobile network use in the future, however the associated investments that would be required to make the spectrum valuable for this use have pay back periods of typically 10 years or more. It is critical that any licencing regime provides the security of tenure for the spectrum that matches this investment profile. Therefore, if this spectrum is to be made suitable for mobile use, mobile operators will require long-term exclusive licences.
3. For the spectrum to be suitable for mobile use it will need to be awarded over the largest geographic area possible (ideally nationally¹) and with sufficiently large channel allocations for high capacity data services.
4. Within the framework Ofcom has suggested, the Tier 2 licence proposal could provide a basis for developing a suitable authorisation regime. An auction is the preferred method to assign the spectrum if there is competing demand and would be the best means to issue the Tier 2 licences (as proposed in §6.26 to §6.32 of the Statement on "A framework for spectrum sharing"). BT/EE considers that other methods of awarding the spectrum, such as a awarding on a "first-come-first-serve" are unlikely to facilitate efficient use of the spectrum, given that the spectrum is scarce.
5. The spectrum should be made available on a technology neutral basis with the possibility to use it for mobile service provision (including outdoor, indoor and backhaul) as well as fixed point-to-point or point-to-multipoint applications.
6. Whilst we recognise that there may be some merits in the proposed Tier 3 opportunistic access, we are unclear whether there would be a use case for such access in this band. We also note that the expected demand for opportunistic access in the TV white space band has not materialised, and hence we would question whether the studies required for the introduction of such Tier 3 access would be an efficient use of Ofcom's resources.
7. BT/EE advocates that any new Tier 1 use should where possible be constrained to a part of the frequency band (new fixed links) or existing geographic locations (satellite use).
8. The protection of existing Tier 1 use is important and the possibility to expand this use at existing satellite earth station sites is an important consideration. It is also important for Ofcom to continue to provide appropriate protection to the incumbent satellite earth

¹ Although we recognise that the need for protection of the incumbent services will result in licences offering slightly less than national coverage.

station users in this band, recognising the investments which have already been made in this band.

9. We would expect Ofcom to issue a Consultation Document with more detailed and specific proposals before we could give definitive responses to the questions raised.

Our responses to the consultation questions

Question 1: Given the nature of the incumbents and their use of the spectrum, what new types of applications do you foresee could access this spectrum on a shared basis? Please provide details on the potential applications and their characteristics of use as identified in the spectrum sharing framework.

BT/EE considers that the 3.8 – 4.2 GHz band could be suitable for mobile use in the future. The wide channels within the band and the propagation characteristics make it particularly attractive for mobile use. The band could be used to add network capacity, particularly in urban areas to support the roll out of 5G services. We also believe that it should be possible for mobile use of the band to coexist with incumbent users given that the band would primarily be deployed for macro and small cell mobile use in urban and possibly suburban rather than rural areas, although it could potentially also be used for indoor femtocells.

We recognise that the 3.8 – 4.2 GHz band is “prime” spectrum which is underused in many parts of the UK, and therefore we believe that there is a significant opportunity to take full advantage of the potential for an increased use of this band.

Ofcom noted in the Mobile Data Strategy (November 2013) and subsequent Statement (May 2014) that this band is a “Medium-High priority” for release, and we believe that this opportunity for mobile data should now be explored more pro-actively, in conjunction with other National Regulatory Authorities in Europe. We understand that there have already been informal discussions between administrations in ECC² about identifying this band for mobile use.

This band is not currently identified as a Mobile band (although it does have a secondary allocation in the Radio Regulations for Region 1), but we propose that it should be considered as a candidate IMT band in the (longer term) future. There was clearly insufficient traction for identification at WRC-15 but we would expect this to change as we approach WRC-19 when 5G technology will be nearing the first release of the standard, and operators/vendors/regulators are likely to begin looking beyond spectrum tranches of first 5G deployment. It is important to do this on a European basis to ensure that the benefits of harmonisation and economies of scale in both network equipment and devices can be achieved.

Those areas of the UK in which there is currently no incumbent use (for a given frequency channel) should be identified for mobile networks on a (near-national) geographic basis, providing a valuable extension to the 3.4 – 3.6 GHz and 3.6 – 3.8 GHz bands, offering a potentially lower cost of clearance for expansion of mobile services. Such licences should cover the largest possible geographical areas, ideally nationally rather than multiple regional licences (although recognising that the incumbent use will preclude use in some areas).

² ECC is the “Electronic Communications Committee”, which is the part of CEPT (European Conference of Post and Telecommunications) addressing radio regulations.

In accordance with Ofcom's usual policy, we consider that new licences in the band should be offered on a technology and service neutral basis, which would permit any appropriate mobile technology (e.g. LTE, "5G", etc) to be operated in the band, and also offering the potential for using the band for backhaul networks.

Recognising the investments that would be needed in this band, with payback periods of typically 10 years or more, it is critical that any licensing regime provides (as a minimum) the security of tenure required for such investments to be viable.

Question 2: Based on information provided in this Section, can you identify any barriers to enhanced sharing in the 3.8 GHz to 4.2 GHz band? Please use the Spectrum Sharing Framework, which identifies four types of barriers to spectrum sharing: lack of information; market barriers; technology barriers; and authorisation barriers.

Ofcom has already acknowledged the incumbent use of this band, and has provided a considerable amount of information about that use, and hence at first sight it would appear that there is no lack of information. However it will be important to determine the separation distances required between the existing licensees and any new users of the band, as well as any detailed coexistence requirements. This will in turn identify the regions within which mobile networks could operate (or more specifically, mobile base stations could be sited).

Whilst we do not have a problem in principle with a Tiered approach, in the absence of further details about how it would be applied to this band (see our response to question 3), it is difficult to identify whether or not the approach itself would be a barrier to spectrum sharing between mobile use and incumbent uses. For example, we would not want a situation whereby the Tier 2 licences are issued on a short term basis (e.g. for one or two years) and on a "first come first served" basis, as this would in our opinion clearly present a barrier to spectrum sharing for mobile networks. Our view is that for spectrum sharing in the band to be a viable option for mobile operators, exclusive licences need to be awarded via an auction with restrictions included in licences, prohibiting use in geographical locations where incumbents are using the spectrum. This would be a similar authorisation approach to that taken by Ofcom for the award of 2.3 GHz spectrum, whereby exclusive licences are to be awarded but with geographic areas excluded from the licence.

Looking more widely, we do understand that this is an important band for the Fixed Satellite Service in other parts of the world (in particular outside ITU Region 1), and therefore we recognise that it would be difficult to gain global harmonisation for the Mobile Service / IMT, but nevertheless this should not preclude such efforts, at least for Region 1.

Mobile systems are generally "listen before talk" and hence so long as the base stations are suitably coordinated with any existing services, this should avoid the risk of interference to incumbent/legacy systems in the band.

Question 3: Do you agree with our initial assessment of a potential application of a tiered authorisation approach in this band?

If yes, please provide as much detailed information as possible of how you consider any tiered authorisation approach may enable greater spectrum sharing and how it could be implemented in practice.

If no, please describe the spectrum access method that you consider may best meet any requirements you have to access spectrum in the 3.8 GHz to 4.2 GHz band. Please give specific details of how you would envisage this working in practice, where appropriate with reference to the tools and enablers identified in the Spectrum Sharing Framework.

BT/EE has some reservations about Ofcom's proposed 3 level tiered authorisation approach. Firstly we are concerned that there appears to be a lack of clarity between the rights of what Ofcom defines as a Tier 1 user and a Tier 2 user. In our view, the rights of users in Tier 2 need to be more clearly defined³. Furthermore we question whether the Tier 3 approach is an appropriate authorisation regime for this band as it is unlikely to lead to an efficient use of licensing resources.

Crucially, as noted above in our response to question 2, we consider that the proposed three tiered authorisation approach could potentially be a barrier to, rather than an enabler of, spectrum sharing between mobile use and incumbent uses, depending on the specific details of how the tiers are applied, and particularly Tier 2. Given the long-term nature of investments required for mobile spectrum use and the need for flexibility around deployment (e.g. to support mobility, service reliability and to promote innovation in a wide area of mobile access applications), for spectrum sharing in the band to be a viable option for mobile operators, exclusive licences need to be awarded via an auction. In order to protect incumbent users, these licences could be awarded with restrictions, prohibiting use in geographical locations where incumbents are using the spectrum as Ofcom intends to do with the award of 2.3 GHz spectrum (which is not referred to as a tiered approach).

Whilst such a tiered authorisation basis might provide a conceptual model for the principle of band sharing, we believe that it is more important to focus on the specific services which are being considered. In the case of the 3.8 – 4.2 GHz band we only see the need for two tiers, namely

- incumbent users, and
- new technology and service neutral spectrum access licences operating on a (near-national) geographic basis,

and therefore the approach to be followed should be similar to the approach currently taken for introducing a new service in any other band which is to be shared with an incumbent user.

Whilst we recognise that there may be some merits in the proposed Tier 3 opportunistic access, we are unclear whether there would be a use case for such access in this band. We also note that the expected demand for opportunistic access in the TV white space band has not materialised, and hence we would question whether the studies required for the introduction of such Tier 3 access would be an efficient use of Ofcom's resources.

In conclusion, for the spectrum to be suitable for mobile use, any authorisation approach would need to include exclusive licences (covering a near-national geographic area), awarded via an auction, with restrictions prohibiting use in geographical locations where incumbents are using the

³ We note that in §3.7.2 of the CFI Ofcom refers stakeholders to "Section 3.3.1" for a description of "Geographic licences", however this section does not appear to be included in the CFI document.

spectrum. We encourage Ofcom to take this into account prior to and during the development of any detailed proposals for consultation.

Question 4: Should a potential future tiered authorisation approach to spectrum access in the 3.8 GHz to 4.2 GHz band accommodate changes from incumbent services of the spectrum? I.e. should new licences or variations to existing fixed link and satellite earth station licences be allowed to continue on a first-come-first-served co-ordinated basis?

Notwithstanding our responses above to Questions 1 to 3, we believe that it is important to provide appropriate protection to the incumbent users, recognising the investments which have already been made in this band.

In particular we note that Table 3 of the consultation document suggests that satellite earth station usage is static, because the number of links is hardly changing. However we believe that for operational reasons there have been and will be variations at the request of the satellite operator in the specific links operating into the earth stations, and as a consequence the actual frequencies being used within the band will vary. For the satellite earth stations, such changes are normally treated as variations to the existing licence, rather than a new licence.

We therefore propose that (at least in the case of the area around major satellite earth stations) *all* of the band should be protected for the FSS in order to allow the frequencies being used to be varied by the satellite operator. In practice this is unlikely to be a significant constraint, as the satellite links are already well distributed across the band, and hence it is likely that the major earth stations are already occupying (to some extent) all of the 12 frequency ranges shown in Figure 3, and therefore will already require protection across the whole band.

END