



Enabling opportunities for innovation

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Executive Summary

1. BT¹ welcomes Ofcom's proposals to enable increased access to shared spectrum². We support Ofcom's aims to ensure spectrum is used efficiently and where there is scope for new business models to improve coverage, it is appropriate to ensure that spectrum access does not stand in the way of these. We support making available the three new bands suitable for mobile technology and are willing to explore the best way to facilitate potential shared use of spectrum assigned to MNOs beyond what is already permitted by existing regulations.
2. Ofcom's long standing policy to promote these outcomes has been to pursue market based spectrum management techniques through primary awards that are often auctions and the promotion of secondary markets. For example, Ofcom argues that ALFs are set to ensure MNOs have a strong incentive to trade spectrum with each other where it is not efficiently held. Ofcom has also put significant efforts into developing Dynamic Spectrum Access for TV White Spaces – an innovative spectrum management technique to enhance market based allocations.
3. We believe Ofcom's proposal to issue time-limited and local overlay licences in national licences for mobile spectrum goes back to a version of command-and-control spectrum management. We do not think that such a prescriptive approach is necessary to pursue Ofcom's objectives and we propose an alternative arrangement where existing licensees would issue 'certificates' to incoming sharers on the basis of which Ofcom could issue overlay licences. This leaves significantly greater flexibility for the types of overlay licences that the parties can agree and it overcomes the challenges that Ofcom identifies with spectrum leasing.
4. It appears to us that Ofcom has not considered the possibility that MNOs may be the main takers of the new overlay licences. Ofcom needs to consider this fully before implementing a scheme and opening up for the risk of a 'landgrab'. We would suggest that it includes careful consideration of at least the following aspects: i) if the scheme becomes very popular, it will impair the MNOs' licences and the prospect of MNOs trading clean, national allocations amongst each other; an outcome which Ofcom says ALFs reflecting 'full market value' is there to promote and ii) Ofcom needs to have a statutory basis for an ex-ante competition assessment of the issuance of overlay licences. In light of these potential challenges that very much depend on the take-up under the scheme (whether it be Ofcom's command-and-control version or our preferred certificate based approach), we suggest Ofcom consider running the arrangement for a 1-2 year pilot period at first.
5. Finally, we broadly agree with Ofcom's plans in relation to enabling new shared access to the new spectrum bands at 2.3GHz, 1800MHz and 3.8-4.2GHz but have comments on certain details. These bands can provide an important resource for new users and MNOs alike. We welcome Ofcom's plans to open these bands for use, initially on an administratively managed basis and with dynamic spectrum access in the longer term.

¹ BT including its subsidiary mobile operator EE Limited

² Consultation on "Enabling opportunities for innovation", Ofcom December 2018
https://www.ofcom.org.uk/_data/assets/pdf_file/0022/130747/Enabling-opportunities-for-innovation.pdf

1 Introduction

BT welcomes this consultation on enabling opportunities for innovation. We support Ofcom's aims in terms of enabling new users and uses to be supported through greater shared use of spectrum.

In **section 2** we provide an overview of BT's position on spectrum sharing and in particular the proposals that Ofcom has brought forward in this consultation. In **section 3** we explain our views in relation to the three new bands that Ofcom proposes to make available, including the proposed new arrangements for the 1800MHz concurrent spectrum access licence that we hold.

In relation to the proposals for shared access to existing spectrum used by national MNOs we set out our views, including our proposal for how this could be most effectively achieved, in **section 4**.

2 Our views on the three new shared access bands

2.1 1800 MHz

2.1.1 *Changes to existing concurrent spectrum access licences*

Proposed authorisation of new users

BT has used the 1800 MHz concurrent shared access spectrum for many years to deliver a converged fixed and mobile telephony solution to the business market. The existing spectrum management arrangement, whereby licensees record their deployments and cooperate to avoid interference problems, has worked well to date and ideally we would wish that to continue. We nevertheless acknowledge the possibility for additional users to access this spectrum and the potential benefits this may bring. We are therefore willing to help find a solution that meets the needs of additional potential users.

Our primary concern with the proposals is their potential impact to our continued ability to utilise the shared 1800 MHz band for the products that we deploy in this spectrum today as a result of the potential timeframes involved in Ofcom issuing licences.

While we appreciate Ofcom's desire for a single authorisation method for the three bands, the 1800 MHz shared spectrum band is unique as there is no high power concurrent use case in the band. We are concerned that the proposed new authorisation method could result in a lengthy authorisation process when compared to the current regime, which involves a database and direct coordination between parties, that is less costly and provides immediate response where there are no neighbouring deployments, as is the case for almost all sites. In contrast, an authorisation process taking more than one week would significantly reduce the deployments to smaller customers, where commercial lead times do not allow potentially lengthy authorisation processes that are not within the operators' control.

Ofcom is subject to the timescales set out in the WT Act 2006, which specifies a normal limit of six weeks for most licence types³. In light of this and the concerns that we have explained, we would welcome any assurances Ofcom is able to provide in terms of its proposed timescales to process such applications for shared access to 1800 MHz. Anything longer than 1-2 weeks would be a substantial hindrance to the continued rollout and use of the spectrum for the application that we

³ Wireless Telegraphy Act 2006, Schedule 1 section 2(1)(a)
https://www.legislation.gov.uk/ukpga/2006/36/pdfs/ukpga_20060036_en.pdf

use this spectrum for today and would be a substantial deterioration in the access to the spectrum that is available to us under the present arrangements.

Providing the time requirements can be met and there is sufficient transparency as to the coordination models and criteria and location of deployments that are authorised, we can agree to Ofcom's Option 3 but we would need transparency on calculation methods/criteria and the licences issued at given locations.

Licence fees

The proposed fees and coordination arrangements assume the full 2 x 3.3 MHz is in use by the licensee at a given location, whereas much of the current use is actually 200 kHz GSM carriers. The proposed fee of £80 per 2 x 3.3 MHz licence, based on recovering Ofcom's spectrum management costs across the range of new shared licence bandwidths as a whole, represents a considerable increase compared to the spectrum management costs we incur via FCS today.

We propose that the fee is reduced from the proposed level to (i) reflect this narrower 2 x 200 kHz bandwidth (that could be taken account of in coordination); and (ii) the fact that existing assignments did not involve costs to Ofcom in the original coordination work. We propose that Ofcom sets a lower figure for existing 2 x 200 kHz assignment to take these factors into account.

Whilst we understand that Ofcom primarily wants to recover its costs of issuing licences, it may be noted that the fee levels proposed are actually orders of magnitude higher than the equivalent existing 1800 MHz national licence fees, considering inhabited areas only, when scaled pro rata to a 50m radius area.

Power limits

The existing licences for the 1800 MHz shared spectrum band, as amended, have an in-block power limit expressed as 0 dBm/kHz EIRP. For the new proposed low-power base stations this is expressed differently, as 24 dBm per carrier per sector. While for a GSM 200 kHz carrier the power limit is similar, for wider carriers, such as LTE; the proposal substantially reduces the permitted power for the low power case compared to the 35 dBm under the existing licence.

In 5.23 of the consultation document Ofcom says it is not aware of "indoor products with carrier power greater than 24 dBm". It is not certain what that refers to, as it would appear to us that including antenna gain there are many products that can provide higher power than 24 dBm EIRP. We anyway propose that the existing power limits applicable to the 1800 MHz shared spectrum should not be reduced, in particular not for existing technologies GSM and LTE.

As the term 'carrier' is not defined we propose it is clarified further with "carrier per antenna" to cover the equivalent case of multiple antennas for one carrier (transmitter) instead of multiple antennas using multiple transmitters.

Available information

The information about low power deployments in the 1800 MHz concurrently licensed spectrum is not currently public, and rightly so as base stations are deployed on customer premises and therefore the site deployment list corresponds to a customer list. The continuous publication of this information may raise concerns for these customers and therefore we propose that precise location and end customer details shall not be published. This approach would be more consistent with the situation in relation to details and locations of femtocells that are in use with businesses and customers today.

2.2 2300 MHz

We are concerned about potential interference to WiFi hubs from 2.3 GHz mobile handsets that would operate without any guard band, potentially reducing wifi coverage. In the Annex 6 to the consultation Ofcom discusses the previous studies considered at the time of the 2.3 GHz auction in 2018 and it is concluded that the risks of interference to WiFi from LTE terminals would remain very low. However, that work assumed a 10 MHz guard band between LTE and WiFi/Bluetooth and in the present sharing scenario there would be no guard band. As the CEPT study that is also referenced in the Annex shows, the interference effects are 15 dB greater in the absence of a guard band and we recommend Ofcom consider this point further, ideally commissioning measurements, before authorising widespread use of the additional 2.3 GHz frequencies.

2.3 3.8 – 4.2 GHz

We welcome the opening of the 3.8 – 4.2GHz band for shared use. This band is identified in 3GPP specifications and is likely to become an important spectrum resource for new users and MNOs alike. We support Ofcom's plans to make the band available, initially in the manner proposed.

Finally, we emphasize the need to adequately protect BT's Earth station reception at Madley. We would welcome clarification of the detailed interference criteria and calculation methodologies to be used. We are open to working with Ofcom on practical measurements to help refine coordination models and interference criteria to ensure Earth station reception is sufficiently protected when new users and users are introduced into the 3.8 - 4.2 GHz band.

2.4 Licence fees

We agree that cost based fees would be appropriate for the new low power and medium power shared access licences in the 2.3 GHz, 1800 MHz and 3.8 - 4.2 GHz bands and , with the exception of existing narrowband 1800 MHz use addressed above, the figures Ofcom has come up with would be reasonable.

2.5 Licence types

We have no comments on the types of licence proposed for the three new shared bands.

2.6 Future dynamic shared access

We agree with Ofcom's suggestion that dynamic shared access to spectrum could be pursued as a longer term possibility but consider this should be confined to the three new bands that Ofcom has identified. We in principle see benefits of dynamic assignments, but also recall the substantial efforts and considerable costs that Ofcom and stakeholders, including BT, committed to that activity compared with the very limited take up and benefits that have come from that opportunity so far.

3 Shared access to national spectrum licences held by MNOs

3.1 Methods to facilitate shared access to existing MNO bands

We share Ofcom's objectives to increase shared access to spectrum

Ofcom has set out proposals to enable new users to access existing awarded spectrum in locations where it does not adversely impact the incumbent licensee's planned use of that spectrum. Ofcom believes unused spectrum could be deployed in various ways, including for local mobile connectivity, industrial 5G IoT applications (such as automation and robotics), private networks mobile services in remote locations and broadband connectivity in rural communities.

We welcome Ofcom's focus on promoting such types of connectivity. Ofcom has already commenced a number of different consultations with similar objectives, including the Broadband Universal Service Obligation consultation and a review of geographic markets, which aim to maximise commercial deployment of fixed and mobile connectivity in the UK, including in rural and remote locations. We support Ofcom's objectives in delivering connectivity and would like to continue to work closely with Ofcom to ensure regulation promotes incentives to invest in networks and good outcomes for consumers in respect of connectivity.

A market-based approach to shared use of existing MNO bands is the more appropriate solution

Ofcom's proposals in this consultation represent a move away from spectrum being deployed based on market-based mechanisms to a more prescriptive approach reminiscent of the earlier 'command and control' approach to spectrum management. We believe such a prescriptive approach is only necessary in situations of market failure, where the market is not delivering connectivity in locations and/or uses that would be commercially viable if not for certain frictions. Such frictions could include asymmetric information between customers and suppliers or regulatory bottlenecks preventing deployment. However, the UK mobile market does not suffer from any such market failure generally.

Ofcom and the CMA have previously found the mobile market to be highly competitive. In its review of the BT EE merger, the CMA found that the UK mobile market was effectively competitive with 4 mature MNOs and a well-functioning MVNO market.⁴ Such competitive markets have driven EE to cover 90% of the UK with 4G networks and delivering the most extensive outdoor mobile coverage of the four national MNOs. Competition in the market is expanding the number of use cases for existing spectrum over time, and we see no reason for additional prescriptive policies that could undermine the outcomes achieved so far.

For any spectrum that continues to be unused, we have identified barriers to their use that Ofcom could remove without implementing a prescriptive 'use it or share it' policy. Ofcom currently does not allow spectrum leasing, which is a market-based approach to delivering the objectives that Ofcom wishes to achieve. Ofcom has previously rejected introducing spectrum leasing, on the grounds that it is difficult to identify any potential competition concerns.

In this response, we describe a market-based certification process, which achieves Ofcom's objective of furthering the deployment of unused spectrum, whilst addressing Ofcom's concerns about identifying competition issues. Under this regime, MNOs and new users negotiate to agree commercial terms for deploying spectrum in a localised setting and then the MNO would issue the new user with an access certificate, for which Ofcom would then issue an overlay licence allowing such use by the new user. If new users identify valuable opportunities to deploy spectrum that is

⁴ Competition and Markets Authority (15 January 2016): "BT Group plc and EE Limited - A report on the anticipated acquisition by BT Group plc of EE Limited", p5-7.

currently unused, our proposed certification process alongside competition will drive MNOs and new operators to take them. In some cases, new operators may have a different valuation of unused spectrum to existing MNOs (e.g. different risk appetite), and a market-based certification process would open up a mutually beneficial commercial agreement to deploy the unused spectrum in the manner Ofcom wishes to promote.

We note that in the Government's consultation on the Statement of Strategic Priorities, "The Government would like Ofcom to clarify, through amendments to its Spectrum Trading Guidance Notes, that leasing or pooling of spectrum is not prohibited".⁵ Our proposal for a certification regime offers the same benefits as a spectrum leasing arrangement, but with the added benefit that the licence conditions need to be met by the new user rather than the MNO, which means risk can be better managed by the user of that spectrum.

We therefore believe Ofcom should reconsider its proposal for a 'use it or share it' policy and instead achieve its goal of increasing shared use of national MNO spectrum bands by modifying its implementation approach to use the different solution that we have put forward. In the following section, we describe the certification process in more detail, and compare its suitability for increasing deployment of unused spectrum to Ofcom's proposed policy.

3.2 Our proposed approach: a sharer certification process by the MNO

We propose a market-based certification process under which a new user can request shared access from MNOs to deploy their own networks for their own localised use/benefit. Once a commercial deal is agreed between the new user and the MNO and the MNO issues a sharing certificate to that new user setting out the key parameters to be put in the new user's licence (location, power, duration etc). Ofcom can then implement the certificate by issuing an overlay licence to the new user. The current spectrum trading arrangements already allow third parties to enter into agreements with MNOs and our certification proposal would simply extend this to support more flexible and streamlined process in which Ofcom can recover its costs.

Our proposed certification process is summarised in the following figure.

⁵ DCMS (15 February 2019): "Statement of Strategic Priorities for telecommunications, the management of radio spectrum and postal services", paragraph 40, p20.

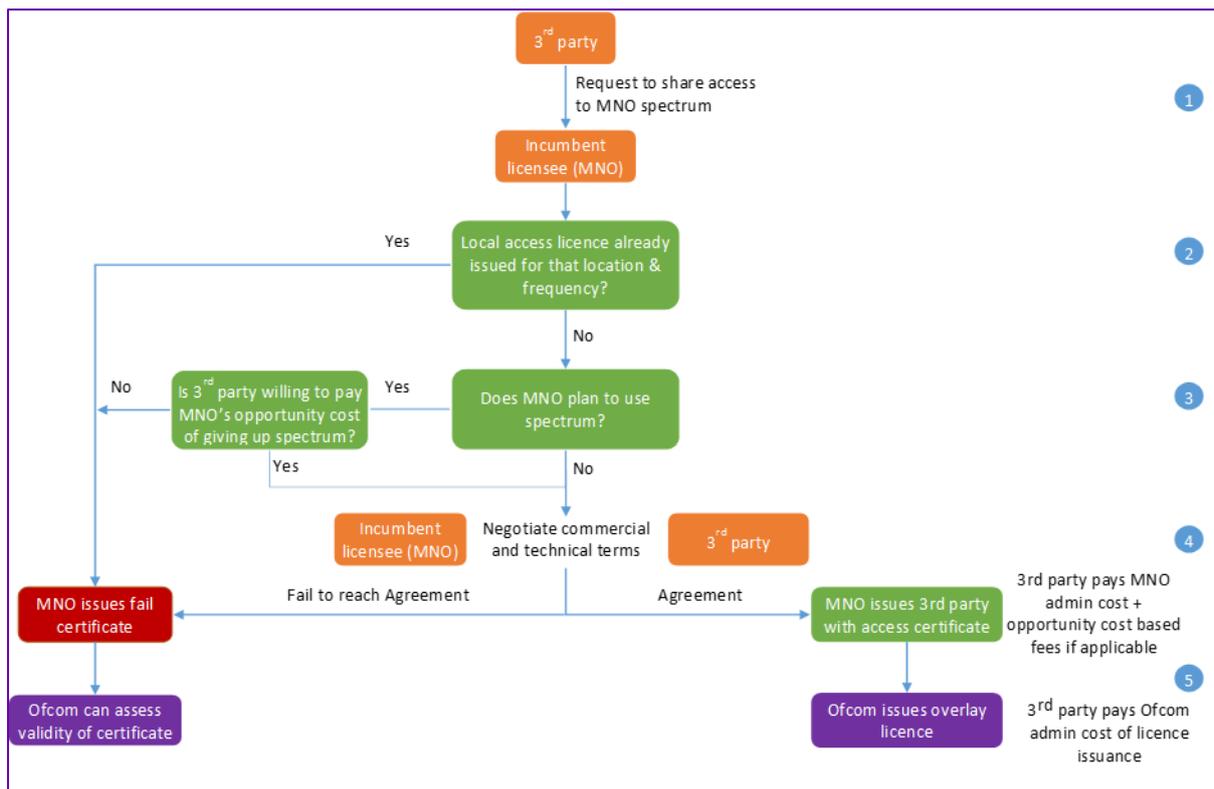


Figure 1: BT's proposed process for shared access to bands licensed nationally to MNO

Our proposed certification process can be described by the following steps:

- 3rd party requests to share access to MNO spectrum:** A 3rd party that has identified a use case for existing licensed spectrum, which it believes to be unused, applies to the MNO for use of that spectrum. The application includes a proposal for the duration of use.
- Local access licence already issued for that location & frequency:** The MNO checks whether there is already a local access licence in place. If so, it issues a 'fail' certificate stating that the application has been rejected because there is already a local access licence in place. If no such licence is already in place, the MNO moves on to the next step in the process.
- Does MNO plan to use spectrum:** The MNO checks its internal business planning to determine whether it plans to use the spectrum over the proposed duration of the licence. If not, it moves on to the next step in the process.

If the MNO plans to use the spectrum, it determines the opportunity cost of giving up the spectrum to the new user and asks the new user if they are willing to pay the opportunity cost. If yes, it moves on to the next step in the process.

If the new user is unwilling to pay the opportunity cost, the MNO issues a 'fail' certificate stating its planned use of the spectrum and that the new user is unwilling to pay its opportunity cost of giving up the spectrum.

- Negotiate commercial and technical terms:** The MNO and new user negotiate the commercial terms of the arrangement, including the fees payable, the duration of the agreement and the technical conditions. If the parties reach agreement, the MNO issues the new user with an access certificate.

If the parties fail to reach agreement, the MNO issues a 'fail' certificate that states that commercial agreement could not be reached.

5. **MNO issues pass/fail certificate and Ofcom issues overlay licence if required:** If the MNO issues an access certificate, the 3rd party pays the MNO the commercial fees agreed, which are likely to include the MNO's admin costs and its opportunity cost of giving up the spectrum. Ofcom then issues an overlay licence for the duration agreed by the parties and specifying the localised use of that spectrum. The new user is now subject to those licence conditions. The new user also pays admin fees related to Ofcom processing the overlay licence. Ofcom can still review any competition concerns on an ex post basis after the commercial agreement has started.

If the MNO issues a 'fail' certificate, Ofcom can review the MNO's reasoning for rejecting the new user's application in the same manner that it proposes to review an MNO's use case under its 'use it or share it' policy. Under our certification process, Ofcom's review of the MNO's planned use occurs after the parties have attempted to negotiate commercially rather than Ofcom acting as the intermediary at the start of the process and it would give Ofcom fewer cases to review.

A market-based certification process delivers competitive market outcomes of promoting deployment, benefiting consumers in areas that are currently underserved by MNOs

Our proposed certification regime provides incentives for MNOs and new users to deploy spectrum. Under this market-based proposal, where the new operator and existing licensee negotiate a commercial contract for any unused spectrum, existing licensees will face market signals about the value of spectrum they are currently not deploying. MNOs will therefore face more immediate incentives to deploy their spectrum if the market signals it is commercially viable to do so.

Such a market will be competitive because a new user can negotiate with multiple MNOs for unused spectrum in a localised area to get the best possible commercial terms. For example, if a new user identifies a use for spectrum in a rural area that is currently not served by the MNOs, it can negotiate with all four MNOs to achieve the lowest cost for access. In such a competitive market, MNOs will face strong incentives to offer the best possible commercial terms in order to gain the new user as a customer.

We believe a certification process could build on the success of the MVNO market. MVNOs now comprise c.10% of the UK market in terms of mobile subscriptions and have been able to grow because MNOs see a positive business case from the wholesale revenues associated with MVNOs, even though part of their retail revenues may be cannibalised. Similarly, a certification process could enable existing licensees to benefit from wholesale spectrum access revenues, particularly in cases where the new operator may have different appetite for deployment in risky areas than the existing licensee does. In such cases, including venture arrangements, a certification process will enable a mutually beneficial commercial arrangement where the new operator has a greater appetite for risk or greater local knowledge than the existing licensee. As a result, MNOs and new users will reach more commercial deals that deliver Ofcom's objective of expanding mobile coverage. Our proposed approach facilitates and encourages a deeper dialogue between the national MNOs and potential new users that could enable more comprehensive and beneficial agreements for cooperation to be achieved that go beyond just sharing spectrum, for example agreement to radiate EE's PLMN with reward for the additional coverage this achieved.

We also note that a commercial certification regime will enable MNOs to recover their costs of providing access to spectrum, including their opportunity cost and any admin costs of the

certification process. Given the ability to fully recover costs, MNOs will be willing to engage in commercial negotiations with new users. Such commercial negotiations will take place even in instances where an MNO identifies a future use of spectrum, because the new user may be willing to pay the MNO more than its opportunity cost. MNOs will also have the security of knowing that under a certification regime the licence conditions will need to be met by the new user, and thus the MNO does not face any risk if the new user breaches the licence conditions. This contrasts with a spectrum leasing arrangement where the licence conditions would remain with the MNO, placing more risk on the MNO. A certification regime would therefore ensure MNOs are able to recover their cost and also bear an appropriate amount of risk for the spectrum they use.

Finally, MNOs will have a strong incentive to promote the certification process in the background of a future regulatory threat of 'use it or share it' policies. Ofcom's consultation provides existing licensees with the threat that if they do not support a certification process and hinder any commercial negotiations, they may face a 'use it or share it' policy. MNOs will have the incentive to negotiate a commercial deal with any new user that values the unused spectrum more highly than its own opportunity cost, in order to avoid Ofcom's more prescriptive intervention, which promotes efficient spectrum use in line with Ofcom's statutory objectives. Existing licensees are therefore likely to promote a well-functioning certification process.

We therefore believe a certification process offers the best opportunity for maximising deployment of currently unused spectrum, achieving better outcomes for consumers that are currently unserved and promoting efficient use of spectrum.

A certification process minimises the requirement for Ofcom intervention, whilst allowing Ofcom to address competition issues if they arise

Under our proposal, Ofcom will face less administrative burden than under its 'use it or share it' policy. Ofcom would not have to act as the intermediary between the new user and the MNO in assessing planned use of spectrum. Instead, Ofcom would only have to either:

- Issue an overlay licence when the parties have reached a commercial agreement for use of spectrum in a localised setting; or
- Review a 'fail' certificate to check whether the MNO has provided reasonable justification for why a commercial agreement could not be reached.

A certification regime therefore minimises the regulatory intervention, instead trusting market based mechanisms to promote efficient use of spectrum and greater deployment of spectrum in a competitive market with Ofcom only having to act as a reviewer in case of 'disputes'.

A certification process would also avoid the competition concerns that Ofcom has with a spectrum leasing arrangement, noting that the trading regulations don't currently address leasing, and the fact that leasing is anyway not currently allowed under the individual mobile licences. Since our proposal involves MNOs issuing certificates allowing Ofcom to review the terms agreed between the parties, it will retain the ability to monitor any competition issues that arise. Whilst leasing may lack transparency,⁶ a certification regime allows Ofcom to fully assess market dynamics and identify competition issues if and when they arise. We do not anticipate any such competition concerns

⁶ Ofcom has previously rejected spectrum leasing because of competition concerns, including its inability to monitor any competition issues in private commercial negotiations between the existing licensee and the new operator ("hinder market supervision and detract from market transparency"). Source: Ofcom (29 June 2011): "Simplifying Spectrum Trading – Spectrum leasing and other market enhancements", paragraph 6.16, p23.

arising given the prospect of a competitive market for MNOs supplying unused spectrum to new users.

It is possible that MNOs may themselves have the greatest interest in accessing one another's spectrum where it is not yet deployed. In this context Ofcom might wish to consider how it is able to address any competition issues that arise in this instance prior to granting licences for shared use. It will be important, regardless of whether Ofcom follows its proposed approach or the alternative suggested by BT, that it has the necessary statutory powers to perform ex-ante competition checks and where necessary decline to issue licences for shared spectrum.

In light of the potential challenges that very much depend on the take-up under the scheme (whether it be Ofcom's command-and-control version or our preferred certificate based approach), we suggest Ofcom consider running the arrangement for a 1-2 year pilot period at first.

We contrast our proposal for a certification regime with Ofcom's 'use it or share it' policy below.

3.3 Ofcom's proposed process

3.3.1 Comments on Ofcom's proposed approach

Ofcom's proposals could result in a wide range of harmful unintended consequences

Whilst Ofcom's proposals aim to increase deployment of spectrum, there could be unintended consequences that *limit* further spectrum deployment.

One unintended consequence of Ofcom's proposals is that MNOs could game the system to expand their holdings. Existing licensees are not prevented from applying for each other's spectrum under Ofcom's proposals. Existing MNOs could therefore apply for licenses simply to prevent their competitors from deploying spectrum in future for uses they cannot envisage today. At the extreme, this could lead to a 'land grab', with MNOs applying to Ofcom for all unused spectrum, with no specific intention to use it in the manner Ofcom wishes to promote. Our proposed certification process avoids such a land grab, because if an MNO requested to access another MNO's spectrum, it would have to pay the full opportunity cost. In addition, as mentioned above, our approach, depending on how exactly Ofcom implements it, is more easily aligned to the present ability to do ex-ante completion checks under the mobile trading regulations.

In addition, Ofcom's proposals could prevent commercial deployment of mobile networks within three years simply because some of the use cases for MNOs are not foreseeable three years in advance. While operators will typically have deployment business plans for their existing and new spectrum that extend up to 3 years, planning processes will always be subject to a high degree of uncertainty. We draw parallels here with Ofcom's current consultation on geographic markets for fixed telecoms, where Ofcom notes that even for operators' existing business plans, "*there may still be some changes to actual rollout so the network build may not be completed as planned*".⁷ In other words, operators retain flexibility to deploy networks as the market evolves, and so identifying a specific use case for spectrum three years in advance is often not feasible.

There are a number of examples of EE deploying spectrum at relatively short notice, which would be prevented under Ofcom's proposals because EE may not be able to prove use at the time when a new operator applies for it. These include BT's planned use of Fixed Wireless Access to deliver the Broadband USO, and EE temporary deployment of 4G networks for one-off events (e.g. sports events

⁷ Ofcom (11 December 2018): "Promoting investment and competition in fibre networks – Approach to geographic markets", paragraph 3.41, p21-22.

or a royal wedding). New operators may not have the expertise or incentive to deliver such services at short notice, even if they gain access to the spectrum, and hence the option value of existing MNOs holding on to the spectrum may be greater than handing it over to new operators.

Given these unintended consequences, Ofcom's proposals could hinder spectrum deployment in the long-run, by incentivising inefficient entry by new users and land grabs by MNOs who do not seek to deploy the spectrum immediately. We note that regardless of the final choice of policy Ofcom chooses to implement, we would advise Ofcom to implement a trial, for a set duration in a localised area, to evaluate the feasibility of the policy. If the trial is successful, the policy could then be rolled out more widely.

Ofcom's proposals could undermine other spectrum policies, including ALFs and spectrum trading

We believe Ofcom's proposals undermine its reasoning that Annual Licence Fees (ALFs) provide the correct incentives to use spectrum efficiently. Ofcom implemented ALFs to ensure MNOs pay for the market value of spectrum, so that operators have incentives to invest efficiently in mobile networks. By paying the market value of spectrum through ALFs, MNOs would base their investment decisions on the true cost of the spectrum input. Ofcom's 'use it or share it' policy could undermine these incentives to invest because spectrum could be valued differently by new operators compared to existing licensees. New operators would base their investment decisions on Ofcom's proposed admin fee for shared access, instead of the market value of the spectrum as reflected in opportunity costs for the MNOs, and hence their decisions to invest will be based on different input costs to the existing MNOs. This distortion in investment incentives could lead to inefficient allocation of spectrum between MNOs and new users, undermining sustainable spectrum deployment in the long run.

Ofcom has previously argued that localised shared spectrum access, where there is no planned use, will have no impact on market value of spectrum (and hence no impact on the ALF fee calculation). However, localised access might impact on ALFs by imposing opportunity costs on the incumbent MNO and lowering its value in own use below the level of the ALF. MNOs will have previously enjoyed the option value to deploy networks exclusively and in perpetuity as well as future unplanned uses that require temporary or movable localised network access. This risks undermining the stated policy purpose of ALFs - i.e. an explicit fee to spur trading - by lowering value in own use *below* the ALF. As an illustration, if an MNO has numerous instances of other new users sharing its spectrum in multiple geographic locations, the value of the licence will be impaired and would surely affect its tradable value. The overlay use by new users, for which the MNO is not compensated under Ofcom's proposal, will have reduced the market value and yet Ofcom's current ALFs do not account for this situation and would risk charging the MNO above the market value.

Ofcom's proposals could also reduce the incentive to trade spectrum. Under Ofcom's proposals, new operators would only have to pay an admin cost-based licence fee for any unused spectrum. This fee in many cases is likely to be below the value existing licensees place on the spectrum they hold. Existing licensees value the real option associated with holding spectrum, which they could choose to deploy at any time in the future when demand arises. Since Ofcom's proposed licence fee does not capture the value of this real option, operators will have no incentive to purchase spectrum through trading. Spectrum trading could therefore become redundant, removing a market-based tool for encouraging further mobile deployment. Spectrum trading remains a useful tool for spectrum deployment, particularly if other barriers to deployment, such as local planning right restrictions, are removed.

In summary, our review of Ofcom's proposals highlights potential unintended consequences in constraining future sustainable spectrum deployment and undermining other policies such as ALFs and spectrum trading. Our proposals for a certification regimes overcome these unintended

consequences by allowing a market-based process based on direct negotiations between MNOs and new users. Commercial negotiations will enable MNOs to recover their opportunity cost of giving up spectrum, and will therefore incentivise MNOs to engage in such deals. As a result, consumers will benefit from more sustainable deployment of spectrum whilst minimising the regulatory burden for Ofcom in overseeing the deployment process.

3.4 Licence conditions and fees

On the technical licence conditions for the shared access to MNO spectrum Ofcom provides no details (e.g. envisaged power levels) and it is difficult to understand what the impact may be in terms of interference potential and distances, further confirming our view that each specific application is best considered by the existing national MNO and agreed on commercial terms.

We don't agree with the 5 year notice of revocation in the new licences in bands shared with existing national MNOs. We propose this issue be linked to the agreement with the MNO as part of the alternative process we have set out above. But in case Ofcom should instead follow its consultation proposal we consider that a much shorter notice period is appropriate so that Ofcom can revoke the new licence should the plans of the national MNO (existing licensee change) after an initial decision by Ofcom to allow shared access.

The proposed fees for new licences in bands shared by MNOs that Ofcom has proposed may be appropriate to cover Ofcom's administrative costs. But in accordance with our proposals it is necessary to also cover the costs of the MNOs (both costs to examine the sharing proposal and potential opportunity costs to reflect the impact that such sharing may give rise to in relation to the existing rights of the affected existing MNO).

3.5 Conclusion on Ofcom's spectrum sharing proposals

BT recognises and supports Ofcom's policy objective of promoting innovation and extending mobile connectivity through shared access to spectrum that is licensed on a national basis to MNOs but is not yet in use in a given geographic location. However, we have some concerns with the exact solution that Ofcom proposes as we believe there is another approach that is better for Ofcom, for existing MNOs and for new users. We have highlighted some issues that Ofcom may not have fully considered including how competition issues would be addressed, the impact on spectrum trading and other policies and potential unintended consequences. Our proposed certification regime overcomes the unintended consequences, deals with the drawbacks and risks that we see with Ofcom's proposed approach. If more than one MNO has suitable spectrum available, a certification regime will provide a degree of competition to help achieve the best deal for any new user. If an MNO refuses to agree a commercial sharing arrangement without reasonable justification on technical or commercial grounds, the matter could then still be referred to Ofcom who could use back-stop powers to issue an overlay licence of the form Ofcom currently envisages. Our proposed approach will provide greater benefit for consumers because MNOs would have strong incentives to support the certification regime, given the prospect of commercial revenues from new users that enable the MNO to recover costs and pass the licence conditions to the new user. It would allow more useful and potentially longer term agreements to be reached. Our approach would also ease the regulatory burden for Ofcom because the process for arranging new uses of spectrum remains with the market. The proposal is also superior even to conventional leasing because the existing MNO would not be responsible for the new sharer complying with its licence conditions.

4 Suggested way forward

We propose that Ofcom convenes meetings to which the existing national MNOs are invited to discuss the merits of the Ofcom approach, BT's proposed approach and any other proposals that the consultation may have elicited. This will enable a constructive dialogue to take place and for Ofcom to better gauge industry views on the best way forward.

Appendix 1 – Response to consultation questions

Question 1: (Section 3) Do you agree with our proposal for a single authorisation approach for new users to access the three shared access bands and that this will be coordinated by Ofcom and authorised through individual licensing on a per location, first come first served basis? Please give reasons supported by evidence for your views.

Please refer to section 4 of this response.

Question 2: (Section 3) Are there other potential uses in the three shared access bands that we have not identified?

No comments.

Question 3: (Section 3) Do you have any other comments on our authorisation proposal for the three shared access bands?

Please see section 4 of this response.

Question 4: (Section 3) What is your view on the status of equipment availability that could support DSA and how should DSA be implemented?

We have no information to share.

Question 5: (Section 4) Do you agree with our proposal for the low power and medium power licence? Please give reasons supported by evidence for your views.

Please see section 4 of this response.

Question 6: (Section 4) Are there potential uses that may not be enabled by our proposals? Please give reasons supported by evidence for your views.

No comments.

Question 7: (Section 4) Do you agree with our proposal to limit the locations in which medium power licences are available? Please give reasons supported by evidence for your views.

Yes.

Question 8: (Section 4) Do you have other comments on our proposed new licence for the three shared access bands?

Please see section 4.1.1 of our response

Question 9: (Section 4) Do you agree that our standard approach to non-technical licence conditions is appropriate? Please give reasons supported by evidence for your views.

Yes.

Question 10: (Section 4) Are you aware of any issues regarding numbering resources and Mobile Network Codes raised by our proposals which we have not considered here?

No.

Question 11: (Section 5) Do you agree with the proposed technical licence conditions for the three shared access bands? Please give reasons supported by evidence for your views.

Please see section 4.1.1 of this response.

Question 12: (Section 5) Are there other uses that these bands could enable which could not be facilitated by the proposed technical licence conditions? Please give reasons supported by evidence for your views.

No comments.

Question 13: (Section 5) Do you agree with our proposed coordination parameters and methodology? Please give reasons supported by evidence for your views.

Please see section 4.3 of this response.

Question 14: (Section 5) What is your view on the potential use of equipment with adaptive antenna technology (AAS) in the 3.8-4.2 GHz band? What additional considerations would we need to take into account in the technical conditions and coordination methodology to support this technology and to ensure that incumbent users remain protected?

We have no comments.

Question 15: (Section 5) Do you agree with our proposal not to assign spectrum to new users in the 3800-3805 MHz band and the 4195-4200 MHz band?

Yes.

Question 16: (Section 6) Do you agree with our fee proposal for the new shared access licence? Please give reasons supported by evidence for your views.

Please refer to section 4.1.1 and section 4.4 of this response.

Question 17: (Section 7) Do you agree with our proposal to change the approach to authorising existing CSA licensees in the 1800 MHz shared spectrum? Please give reasons supported by evidence for your views.

Please refer to section 4.1 of this response.

Question 18: (Section 8) Do you agree with our proposal for the Local Access licence? Please give reasons supported by evidence for your views.

We do not agree and have provided alternative proposals. Please see section 5.

Question 19: (Section 8) Do you have any other comments on our proposal?

See section 5 of this response.

Question 20: (Section 8) What information should Ofcom consider providing for potential applicants in the future and why would this be of use?

We propose an alternative approach. Ofcom would provide the contact details for the existing national licensees. See section 5 of our response.

Question 21: (Section 8) Do you agree with our proposal to have a defined licence period and do you have any comments on the proposed licence term of three years?

See section 5 of our response.

Question 22: (Section 8) Do you have any other comments on the proposed Local Access licence terms and conditions?

See section 5.4 of our response.

Question 23: (Section 8) Do you agree with our fee proposal for the new local access licence? Please give reasons supported by evidence for your views.

See section 5.4 of our response.

Offices worldwide

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