BBC response to Ofcom consultation on Supporting the UK's wireless future – Our spectrum management strategy for the 2020s

26 February 2021

Introduction

The BBC is grateful for the opportunity to comment on Ofcom's developing thinking on its strategy for spectrum management in the 2020s. This is an important subject on which depends many of the advances in technology foreseen over the next decade, so it's important that Ofcom gives this serious consideration, and the BBC believes that Ofcom is adopting generally the right approach. Any spectrum management strategy must necessarily be abstract to some degree. The proposals set out in Ofcom's consultation document, while seeking to be generally applicable, sometimes draw unwarranted conclusions which seem to be based on considerations of certain services only. Given that, we would presume that, while the principles set out within the document would remain valid, further consideration needs to be given to how they are applied in particular circumstances and to particular services.

As the BBC has argued in previous responses[1] to similar consultations, Ofcom should, when considering strategic matters such as those in this consultation, also take into account the use of spectrum in furtherance of UK objectives outside the UK. These objectives may be either commercial or public-policy based, but are pursued to benefit the UK, and its citizens and consumers. We believe that Ofcom should be considering the wider range of benefits that spectrum use overseas brings back to the UK.

Question 1: Do you have comments on the overall approach to the review?

The BBC broadly welcomes Ofcom's spectrum strategy as laid out in this document. The three main themes identified by Ofcom seem important drivers where careful regulatory action will be required.

Wireless Innovation has never been more important. The wide range of new wireless technologies and anticipated demand for new applications demand that appropriate spectrum is identified for them. Ofcom has led international efforts in this area for some years and we look forward to continued collaboration on this important topic. The availability of new, higher-frequency bands above 100 GHz offers massive potential for new applications, and those bands lend themselves to spectrum sharing on a scale not seen before.

Ensuring **spectrum availability for local services** as well as for national services needs close attention. We welcome Ofcom's recent moves to provide flexibility in local spectrum access in some bands, but would argue that to maximise the benefits this approach could be harmonised internationally where this does not adversely impact UK interests in spectrum use outside the UK

The requirement for more, smarter **spectrum sharing** will become more important as services and applications proliferate. This must not, however, be done in a haphazard

[1] BBC Response to Ofcom BBC response to Ofcom's 'Space Spectrum Strategy' 10 May 2016
https://www.ofcom.org.uk/__data/assets/pdf_file/0025/55096/bbc.pdf
BBC response to Ofcom's 'Spectrum management strategy' 3 Jan 2014
https://www.ofcom.org.uk/__data/assets/pdf_file/0020/63263/bbc.pdf

way, so the BBC also welcomes the understanding by Ofcom that some services, such as universal access to broadcasting content, require protection to maximise the benefits they bring. Striking the right balance between the protection of existing services and allowing spectrum access for innovative services will not be easy, and we welcome Ofcom's recognition that there is no "one size fits all" solution. The experience gained in in the last decade of opening up access to the TV White Space spectrum shows the difficulties in determining an appropriate level of protection for incumbent services while at the same time not unnecessarily restricting access for new and innovative uses.

We do, however, have concerns about the detail of some of the approaches proposed by Ofcom to manage these tasks, which we set out in more detail below.

On a more general point, we do not believe that UK interest in spectrum use outside the UK has been adequately considered, and so repeat what we said in our response to Ofcom's 2014 consultation on spectrum management strategy. UK spectrum policy needs to reflect where there is UK interest in spectrum use outside the UK, in addition to spectrum use within the UK. International engagement should not be solely driven by the need to influence European or international decisions for the benefit of national spectrum issues.

The BBC is a broadcaster with global reach, using numerous national and international platforms and heavily reliant on global distribution via satellite and satellite communications both inside the UK and internationally for news-gathering and other programme contributions. We still, therefore, believe that where there is UK interest in spectrum use outside the UK, the international dimension of spectrum management is highly relevant.

The importance of international representation is acknowledged in enabling the provision of services that cross borders (3.18), and Ofcom's leading international role in relation to satellite communications is highlighted. However, when Ofcom's leading international role is expanded on in Section 4 (Continued improvements in the wireless communications used by everyone) the focus is very much on "securing increased benefits from spectrum use in the UK" (4.27).

The BBC has highlighted its interest in 3.8-4.2 GHz both inside and outside the UK in response to multiple Ofcom consultations. Whilst the UK sharing solution in this band might seem attractive as an example of good practise to export internationally, possibly bringing benefits from harmonisation, it is important to note that this approach may not be applicable in all countries and could have a significant negative impact on UK interests in this spectrum outside the UK.

Question 2: Have we captured the major trends that are likely to impact spectrum management over the next ten years?

We expect further growth of use of licence-exempt wireless technologies in some bands - for example, we predict that Wi-Fi for in-home distribution of audio-visual content will become increasingly important over the next decade and beyond as more in-home viewing moves to IP-based services. Making bands available for such applications, such

as Ofcom's recent decision to make available spectrum in the 6 GHz range, will have maximum benefits when harmonised globally. We believe it will be necessary that Ofcom not only continues to identify and enable such opportunities in the UK, but also engages in regional and global standardisation processes to maximise the benefits that arise from them.

Increasing incidences and levels of interference to radio communications services and equipment, together with increases in the radio noise floor, is a major trend which needs attention. Although implicitly recognised in much of this document, it is not explicitly acknowledged as a trend. The BBC believes that, in order to continue to manage interference effectively in future, Ofcom will need to do more than it does currently. Ofcom has an invaluable resource in its Spectrum Management Centre which is highly valued by stakeholders like BBC, but enhanced market surveillance and enforcement to resolve interference from radio and electrical equipment will be needed. It is not clear from this consultation document what impact the UK leaving the EU will have, given the Radio Equipment and the Electromagnetic Compatibility (EMC) Regulations are both still referenced in relation to enforcement.

The BBC would also like to see statistics on impacts of interference across all industries and markets and their resolution regularly published, including details where the receiving equipment or system is deemed to have insufficient immunity despite meeting the specified standards. Where interference case resolution shows a shortfall in the standards, we would like to understand what the process will be for resolving these standards issues.

This might be similar to the existing EU-run market surveillance campaigns, or Ofcom might set out an alternative approach to ensure compliance of equipment offered on the UK market with relevant standards.

Question 3: Could any of the future technologies we have identified in Annex 6, or any others, have disruptive implications for how spectrum is managed in the future? When might those implications emerge?

None of the future technologies identified are sufficiently mature to warrant changes in spectrum management processes yet. Ofcom should keep them under review and propose changes to its spectrum management toolkit to accommodate such requirements, while mitigating against the impact of any interference, if and when they emerge.

Question 4: Do you agree that there is likely to be greater demand for local access to spectrum in the future? Do you agree with our proposal to consider further options for localised spectrum access when authorising new access to spectrum?

The benefits of more converged technologies such as 5G are not limited to the national mobile operators offering services on a commercial basis to the public or to business customers. There will undoubtedly be a need for spectrum by users on a more localised basis, for example, within a factory or on a campus, which could best be met by the establishment of non-public networks (NPNs). For example, the BBC has been actively working on the use of 5G technology in production equipment for use in TV studios, such as radio microphones and wireless cameras for Programme Making and Special Events (PMSE), whose performance requirements cannot be supported by today's public 5G networks. Allocating spectrum for such networks in specific locations would be an effective way to meet this need. Different industries will start to take advantage of such networks at different times, depending on the availability of equipment and the economics of their particular circumstances, but we expect this to result in an increased requirement for spectrum for NPNs.

Such requirements might be long-term (for example, in a TV production centre) or short-term (such as at a sporting venue where TV coverage is required for a specific event). Ofcom does not currently consider short-term licences in its thinking on local spectrum access. We believe that Ofcom should offer flexibility in spectrum access duration as well as location.

The well-established and flexible way in which Ofcom manages existing PMSE spectrum is a good example from which to learn and a model for localised and short-term spectrum access. Much of the spectrum for PMSE currently shares with other services and a wide range of frequency bands is already locally co-ordinated and licensed every day, much of it automated via online tools. It is to be hoped that spectrum for NPNs can be accessed in a similar seamless manner in the future, including for PMSE applications as they transition to adopt new technologies.

Ofcom may also wish to draw upon the significant work in ETSI in support of greater spectrum utilisation and sharing. The Reconfigurable Radio Systems group has produced TS 103 652-2 which includes Licensed Shared Access (LSA) and eLSA (evolved LSA). LSA is already in use by the Dutch administration. It details the means to facilitate spectrum allocation and meet the demands and needs of local high-quality wireless networks.

Economies of scale for such NPN use would be maximised for UK citizens and consumers by adopting harmonised approaches internationally, for example, by agreeing common frequency ranges, and where possible, aligned authorisation regimes for their use internationally.

The different approaches taken to date by, for example, the UK and Germany in licensing local access to parts of the C band have not led to any economies of scale in equipment manufacture or portability.

To continue the same example, the authorisation of local licences in the UK in the 3.8-4.2 GHz band is only possible because of the system of Recognised Spectrum Access (RSA) put in place by Ofcom in respect of receiver-only satellite earth-stations, which allows clear identification of protection requirements for incumbent services. In frequency bands where such processes are not in place, effective sharing will be harder if not impossible. Similarly, processes adopted in the UK would not be "exportable" to territories where recognition of incumbent services is not in place. So while we argue that there are benefits to be gained by fostering harmonised approaches between administrations, these will depend on suitable processes for protection of incumbents being in place. Ofcom should aim to share best practice based on its experiences as part of its international engagement work.

Question 5: Do you agree with the actual and perceived barriers identified for innovation in new wireless technologies, and our proposed ways of tackling those?

The BBC believes that we all benefit from innovation and that implementing exemptions can be to everyone's benefit. We would make the point that as well as a significant benefit this can carry a higher risk of interference to existing services (broadcasting, broadband and so on) and it is essential that in addition to an effective system of exemptions to radio requirements there should be an equally rapid process to remove exemptions where interference with licensed services is seen to occur.

Care must be taken when using generic regulations to ensure that deployments of different technology under these provisions do not just meet any Radio Frequency criterion but that other factors that may have been used in compatibility analysis are in line with the particular conditions that apply. For example, some devices being brought onto the market under the provisions of SRD regulation have a higher duty cycle than was assumed in establishing the regulations, which gives rise to an increase in probability and duration of any interference from such devices.

Question 6: Do you agree with Ofcom's proposals to improve our outreach and reporting activities, and spectrum information tools?

a) Are there additional ways that Ofcom could better engage with existing and future users and providers of wireless communications?

b) Please explain any specific areas where you believe more or better provision of information could provide value to stakeholders

We welcome the proposed activities in reviewing and upgrading Ofcom's existing information tools to assist spectrum users. As part of that review it would be beneficial to all spectrum users if the information tools could include potential impacts to current or adjacent users of spectrum band with transparency on how the impacts on existing licence holders are determined now and in the future.

Question 7: Do you agree that it is important to make more spectrum available for innovation before its long-term use is certain? Do you have any comments about our proposed approach to doing this?

In our response to this question, we distinguish here between two different ways in which spectrum could be made available for innovation, namely through a process similar to current Innovation and Trial licences, where licensees have a clear understanding of the duration for which such licences will operate and the uses to which such spectrum can be put, and some sort of wider "pioneer" licences, through which innovators could seek to supply new services and applications, perhaps on a commercial basis, in frequency bands not yet subject to harmonised conditions of use.

While we support the ongoing use of Innovation and Trial licences, we have concerns about a wider pioneer licensing system. We understand that any such use would be subject to Ofcom varying the conditions of such licences, even to the point of revoking them, should that, in Ofcom's view, be necessary to foster more efficient spectrum use. Our concern is that the possibility of such changes to the licence conditions may in itself be a disincentive for innovative use of spectrum: provisions of innovative services would require investment, perhaps at a significant level, but an ever-present threat of licence insecurity would disincentivise such investment and actually penalise first-movers, who have taken the risk and made a market for new services.

Question 8: Do you agree that it is important to encourage spectrum users to be 'good neighbours' to ensure more efficient use of the spectrum? Do you agree with our proposals to:

a) increase realism in coexistence analysis at a national and international level?

The use of "realistic" equipment performance in coexistence analysis is only sensible if the more realistic performance achieved in tests, and subsequently used in the analyses, is incorporated into relevant equipment standards to ensure that future equipment will continue to perform in the same way as that used in the coexistence analyses. The risk otherwise is that subsequent users may bring into use equipment which, while meeting the relevant specifications, does not meet the assumptions made in the coexistence analyses, and would therefore increase the risk of interference being caused and suffered.

When determining "realistic" parameters to use in co-existence analysis, we find it helpful to distinguish between static and dynamic sharing situations. In the former case, it is necessary to understand how performance levels of what is, by definition, new and innovative equipment that has not yet come to market can be determined. If it is to be based on manufacturers' expectations of performance, and sharing conditions are subsequently based on those expectations, manufacturers should be held to them by including them in specifications and standards.

In the dynamic sharing case, where improvements of equipment performance after establishment of a service can readily be included in sharing parameters (for example, in algorithms applied by spectrum sharing databases), such improvements should only be applied to classes of equipment which have the improved performance assumed and/or the specifications of equipment that are required to access the spectrum should be improved, thus driving continued improvements in spectrum efficiency. This approach however will entail an ongoing overhead in equipment monitoring, updating algorithms and standardisation work. Only if Ofcom is prepared to commit to resourcing that overhead should they proceed in this way.

b) encourage spectrum users to be more resilient to interference?

We have concerns that Ofcom appears to drawing general conclusions from specific services – the illustration on page 72 of the consultation document makes assumptions about, for example, possible improvements in receiving antennas and the impact that could have on spectrum sharing. It is important to remember that not all services benefit from antenna directivity and it's not always possible to make improvement even when they do. Other factors shown in the diagram, such as accounting for obstacles, may be applied in a general way (for example, by making a general allowance of some dB for clutter loss in link budgets), or in a specific way, applicable in only one situation, and not therefore generally beneficial in co-existence studies. In our experience general allowance for such factors is already taken into account in planning and co-existence studies where applicable. Where they are not, we agree they should be.

Such proposals can only be taken so far, however. We argue that for services aimed at the general public in a horizontal market such as broadcasting[2], where equipment generally has a long expected lifetime and is not directly controlled by the spectrum user, only general assumptions can be used in co-existence studies.

Ofcom should also weigh up concerns about interference with the risk that tighter specifications might push prices up for consumer devices without resulting in tangible spectrum efficiency gains. Using tighter equipment specifications (whether "more realistic" or not) would only be a valid approach when standards and specifications are altered to match the assumptions used, and then allowing sufficient time for such equipment to become ubiquitously deployed.

The BBC supports the proposal to make the technical detail of Ofcom's interference assessment more available but would like to better understand the intent behind not taking action when the cause is determined to be poor receiver performance. Will a definition of a "good quality" receiver be provided for each service and will be this be different to the existing standards that allow the sale of products?

[2] Some broadcasting service planning already takes account of receiving antenna directivity (e.g. DTT or DTH satellite reception), but these can only be applied in a general way. Unlike other radio services, the broadcasters cannot have control over the performance of the receiving equipment used. Other broadcasting services, such as FM radio or DAB, are generally received on portable equipment and no account can be taken of antenna directivity in co-existence studies.

c) ensure an efficient balance between the level of interference protection given to one service and the flexibility for others to transmit?

Ofcom's proposals in this part of the consultation appear to be based on abstracted examples without indicating how they might be generally applied. The example illustrated by Figure 7 (page 81), and the conclusions drawn from it, don't lend themself to all services and applications – not all services have "throughput" that can be quantified in the way shown in the figure. We are particularly concerned by the following points:

- Under Figure 7, Ofcom concludes "If we increase A's protection threshold from 10% to 25%, then its throughput does not fall much, only by 7%, but the throughput of B doubles. **This is a significant increase in spectrum efficiency.**" (our emphasis) We are not at all clear how Ofcom reaches this conclusion, which would surely depend on the overall throughput of each service, as well as the "value" of each.

- Proposals in 7.97 and 7.98 suggest introducing "tiered spectrum pricing" depending on the "level of protection required". We welcome Ofcom's position that this should only be introduced "where appropriate". It would clearly not be appropriate for public service broadcasting, for example.. As Ofcom is well aware, the benefits of public service broadcasting are delivered by being universal - widely available to all. This is achieved in practice through a horizonal consumer device market with varying price points to accommodate consumer choice. But the broadcasters themselves have little to no control over receiver quality. Applying a 'tiered spectrum pricing' policy for the spectrum used by PSBs would therefore result in:

  i. money coming out of UK originated content investment - as a result of UK's PSBs paying across-the-board for consumer devices requiring a higher level of protection; or

  ii. poor consumer outcomes e.g. interference for consumers with lower end / lower performing devices– if the PSBs relied on a lower level of protection for receiving devices.

  Option (ii) is also likely to result in more expensive devices for consumers, and a reduction in price point choice as manufactures invest more in receiver performance to deal with the noisier environment. We strongly suggest that that the proposed "level of protection required" approach would not be suitable for public service broadcasting.

Do you have any comments on which of these will be the most important?

All the mechanisms Ofcom propose have failings, as described above. To the extent that they are to be applied, they should be used moderately, if at all.

Question 9: Are there any other issues or potential future challenges that should be considered as part of this strategy?

No comment

Question 10: Do you agree that continued use of our existing spectrum management tools (as set out in sections 4-7) will be relevant and important for promoting our objectives in the future, in light of future trends?

No comment

Question 11: Is there anything else we should be considering doing, or doing differently, to promote our objectives?

The BBC is encouraged by the emphasis placed on Ofcom's involvement in the development of international recommendations and standards to support spectrum sharing, and the commitment to continue measurements and scientific work in the UK to feed into studies on ITU-R propagation models and their data sets.

In addition to attendance at service-specific Study Groups, Ofcom's continued and active engagement in ITU-R Study Groups Study Group 1 and 3 is essential. Developments in telecommunications equipment can also severely impact spectrum use, even though this may be unintentional. The BBC has found it beneficial to attend a number of ITU-T Study Groups in order to ensure standards developed there do not result in interference to terrestrial broadcasting services. We welcome close working with Ofcom on these matters and would encourage Ofcom to ensure ongoing monitoring of the work in ITU-T to maximise the impact and mitigate risks of spectrum sharing.

Ofcom mentions a number of international institutions and standardisation bodies which it attends. However, there are other standards development organisations whose work will also impact on Ofcom's assumptions around spectrum sharing. In the context of electromagnetic compatibility and interference from non-radio communications service devices, international standards developed by CISPR (International Special Committee on Radio Interference) carry significant influence internationally and in Europe. Ofcom, however, does not attend CISPR and UK representation is typically via UK industry. The BBC urges Ofcom to investigate and assess relevant bodies not referenced here and assess the value of more active UK engagement in order to enable more comprehensive influence. If this is not within Ofcom's remit, then the BBC urges Ofcom to discuss this further with Government.

Finally, UK stakeholders like the BBC benefit from the UK having a strong position in international regulatory fora and influencing international decisions, recommendations and standards. Many of the objectives and reforms outlined in the consultation document, however, may be more suited to the UK or European context. Many are offered as local and national solutions and therefore, in some cases specifically to the UK environment. Whilst these may offer benefit to others, the BBC would urge caution in any assumption that if they suit the UK they should be more widely accepted and implemented. A strong and influential UK also needs to respect that other countries and regions require different solutions for different problems.