



NOMINET

Improving consumer access to mobile services at 3.6 to 3.8 GHz

Response to Ofcom's consultation

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Contacting us

Phone: +44 (0)1865 332259

Email: pasquale.cataldi@nominet.uk

Write to: Nominet UK, Minerva House, Edmund Halley Road,
Oxford Science Park, Oxford, OX4 4DQ

Web: www.nominet.uk

Introduction

Nominet welcomes the chance to comment on how the 3.6 to 3.8 GHz guard band is used and thanks Ofcom for consulting. As receipts from spectrum auctions have underperformed Office of Budget Responsibility projections and technology makes dynamic use of spectrum an easier proposition we welcome Ofcom's consultation and the opportunity to comment.

About Nominet

Nominet is a leading provider of internet registry services and provides essential infrastructure that makes the internet run smoothly. Since 1996, Nominet has managed the .UK registry domain and is now one of the world's largest country code registries. Nominet also provides domain registry and internet security services for major enterprises such as Comcast, Bentley and the BBC. Using proceeds from the business, Nominet set up and supports the Nominet Trust, an independent charitable foundation focussed on increasing access, safety and education on internet issues.

Besides its core activities, Nominet is using the technical expertise within the company to explore new technologies and services that can support the future internet infrastructure. In particular, Nominet is investing heavily in research and development in the fields of dynamic spectrum management, Internet of Things (IoT), cyber security, and smart cities.

Nominet's involvement in TV White Space

Nominet has been involved in the development of TV White Space (TVWS) for a number of years as we believe it has the potential to provide a range of opportunities and solutions to both increase access to the Internet at home and abroad, and to act as an enabler of the emerging Internet of Things technologies. Over the past three years, Nominet's R&D team has built a TVWS database and qualified for participation in Ofcom's pilot scheme as a White Spaces Database (WSDB) provider. The on-going collaboration between Nominet, Ofcom, and other stakeholders has helped inform Ofcom's development of the TVWS regulatory framework. Our WSDB has been used for academic research, for exhibits (e.g. at the Glasgow Science Centre during the Commonwealth Games), and in two live trial projects – the Oxford Flood Network and rural broadband on the Isle of Arran.

Nominet has deployed prototype TVWS hardware to enable real-time time measurement of Oxford's streams and rivers as part of a local community project called the [Oxford Flood Network](#). This has demonstrated a successful practical use of TVWS in enabling Internet of Things applications in rural locations, while providing us with real-life, operational experience of TVWS technologies. The Oxford Flood Network involves members of the community installing their own water-level monitoring sensors in order to share local information and knowledge about rivers, streams and groundwater to build a better, hyper-local picture of the flood risk at high-resolution and at street level on the streams, groundwater and the complex basin of the Thames and Cherwell rivers.

Following Ofcom's decision to release TV white spaces for use at the end of 2015, Nominet was the first company to successfully complete the qualification process for its WSDB. The TVWS database has since been used for academic and commercial activities. Most notably, Nominet is providing its expertise and access to the geo-location database for the first commercial broadband rollout that uses TVWS technology, on the Isle of Arran. Nominet is taking its TVWS expertise

outside of the UK to bring affordable internet to remote and rural communities to Africa, where the company is working in partnership with Microsoft to provide its TVWS database and dynamic spectrum-management technology.

These research projects have provided Nominet with practical experience of working with all the components of the TVWS framework and we expect these will be the basis of the frameworks for spectrum sharing in other bands.

Nominet's position about spectrum policy

Nominet believes that the adoption of dynamic spectrum sharing techniques is essential to avoid the impending wireless spectrum crunch, caused by the rapid growth of smartphones and IoT devices. This would be inline with Ofcom's commitment to see spectrum used in the most economically efficient manner. The existing static models used for allocating spectrum are inherently inefficient and unable to handle the explosion of wireless data traffic. The use of dynamic spectrum management for TV white space (TVWS) has shown that it can be successfully implemented and it is an important first step for using the technique more widely in other spectrum bands. We believe that Ofcom should take a strong position about the opportunity to share spectrum, and consider the approach when reviewing the allocation of any spectrum bands in the UK.

Responses to questions

The 3.6 to 3.8 GHz band is part of a wider band spanning from 3.6 GHz to 4.2 GHz, which is currently used as a whole by fixed links and satellite earth stations. As Ofcom states in Section 4.4, changes to use in 3.6 to 3.8 GHz spectrum may have an impact on the higher part of the band. The consultation for 3.8-4.2 GHz that Ofcom published in April 2016 envisioned a tiered authorisation approach to sharing (see Section 3.6 of the [consultation](#)). Nominet encourages Ofcom to adopt the same approach for the band in this consultation. Below are answers to the questions we feel best placed to respond to.

Question 3

Do you agree with our high-level proposal to make 116 MHz within the 3.6 to 3.8 GHz band available for mobile and 5G services, bearing in mind our statutory duties and the high level trends we have identified?

We agree with Ofcom's proposal to provide access of the 3.6 to 3.8 GHz spectrum to mobile and 5G services, but we believe that, in order to make an efficient spectrum use and encourage innovation, Ofcom should set in place an authorisation and interference-management regulatory framework based on geo-location spectrum databases, as proposed by Ofcom for the 3.8 to 4.2 GHz band.

Question 4

Do you agree with our general approach regarding spectrum currently licensed to UK Broadband?

We support Ofcom's proposal to shift UK Broadband's allocation as it can potentially improve the the spectrum use efficiency, especially if the coordination for additional deployment will be performed through the use of geo-location database (see our response to Question 5).

Question 5

Do you agree with our assumptions, methodology, and conclusions with regards to potential coexistence between mobile and existing fixed links and satellite earth stations? Please refer to annex 5 for further details.

We believe that spectrum access is coordinated through a geo-location database, then impact of new radios on interference levels could be modelled and managed opportunely using well defined and yet tuneable rules, and ultimately avoid worst-case situations such as 145 km separation distances.

Question 6

Do you have a view on any of the two options we identified?

Nominet believes that neither of the two options would exploit the most advanced sharing techniques that Ofcom has introduced in other bands.

We believe that Ofcom should design a framework that allows modifications parameters of the rules based on which users share spectrum. These parameters could potentially change dynamically to make the most efficient use of the spectrum.

In the USA, the FCC is making parts of this band available on a dynamic shared basis, i.e. available for small cell mobile broadband services on a shared basis within the Citizen Band Radio Service (For more information, see <https://www.fcc.gov/rulemaking/12-354>)

On the consultation about 3.8-4.2 GHz, Ofcom declared their intention to enable greater sharing, and so that both geographically defined access and opportunistic access approaches to spectrum management can be used simultaneously. In particular Ofcom believes there is potential for a multi-tiered authorisation approach to shared access based on geo-location database which could also be appropriate for managing interference.

We observe that several stakeholders endorsed Ofcom's position. Google said: "Ofcom appears to be adopting a very different policy approach to this band relative to the adjacent bands (3.4-3.6 GHz and 3.6-3.8 GHz). We believe there is scope to extend database-driven sharing across this entire range. [...] Ofcom should now adopt a clear, consistent joined-up approach to spectrum sharing across this entire range (3.4-4.2 GHz)."

Nominet totally agrees with Google's position and believe that a geo-location database could be a good way to manage authorisation and handle interference also in the 3.6-3.8 GHz (and it would make it easier to coordinate with the 3.8-4.2 GHz future regulation).

Ofcom says: "A high-resolution analysis, indicates that small cells can be deployed nearer to fixed links in dense urban areas if base stations are deployed below clutter, outside the line of sight of the 'victim' and there is a significant degree of diffraction loss due to buildings. However, there could be a significant burden in terms of deployment optimisation at each individual site to ensure regulatory compliance with interference management criteria."

Question 8

Do you have any other suggestions that would allow widespread 5G availability using the 3.6 to 3.8 GHz band across the UK while allowing certainty for at least some existing users to continue to provide the benefits currently provided by use of the 3.6 to 3.8 GHz band?

Nominet believes that using a geo-location database would allow to make the most efficient use of the available spectrum. We refer Ofcom to our response to Question 5 and Question 6.