



**NOMINET**

# **5G spectrum access at 26 GHz and update on bands above 30 GHz**

**Response to Ofcom's consultation**

September 22, 2017

## About Nominet

[Nominet](#) is an internet company delivering public benefit and is the trusted guardian of the UK namespace – one of the world’s largest country code registries. Nominet manages and runs the infrastructure for over 10 million domain names that end in .uk as well as Welsh Top Level Domains (TLDs) .cymru and .wales and 35 other branded and generic TLDs, including .bbc and .london. Over 3 million businesses, and millions more consumers, rely on its domain registry services. It has a team of 160 people based in Oxford and London and over 2,500 members.

Through its work keeping the .UK namespace secure, Nominet’s R&D team is exploring the further potential of the Domain Names System (DNS) and the challenges and opportunities around emerging internet technologies. As a result, it operates in a number of business areas, from providing internet connectivity and analytics for Internet of Things (IoT) devices to selling complex data analytics software, including its ground-breaking network analytics tool called [turing](#), for tackling cyber threats. Nominet is also working with the UK government to protect its Public Service Network, in partnership with the National Cyber Security Centre. And, Nominet is a member of the [DRIVEN](#) consortium, exploring the provision of trusted and secure data exchange for real-time transactions, including a framework for security and privacy, vital to future development of autonomous vehicles.

With the proceeds of its successful registry business, Nominet set up and supports the charitable foundation [Nominet Trust](#), the UK’s leading social tech funder.

## Nominet’s involvement in TV White Space

Nominet has been actively involved in the development of TV White Space (TVWS) for a number of years as we believe it has the potential to provide and enhance access to the Internet at home and abroad, and to act as an enabler of the emerging Internet of Things technologies. Over the past four 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.

Most notably, Nominet has deployed prototype TVWS hardware to enable real-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 applied, operational experience of TVWS technologies.

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 WSDB has since been used for a mixture of academic and commercial activities. Most notably, Nominet is providing its expertise and access to the geo-location database to internet service providers (ISPs) enabling the first commercial broadband rollouts that use TVWS technology, on the Isle of Arran, Llanarth in Wales, and recently Loch Ness in Scotland.

These research projects have provided Nominet with significant 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 usage and IoT devices. This would be in line with any national spectrum regulator's commitment to see spectrum used in the most economically efficient manner. The existing static models used for allocating spectrum are inherently inefficient and are ill-suited when it comes to handling the continued rapid growth of wireless data traffic. The use of dynamic spectrum management for TVWS has shown that it can be successfully implemented and it is an important first step for using the approach more widely in other spectrum bands.

## **Response to the consultation**

We express our appreciation for the opportunity to respond to this consultation, and we are pleased to see Ofcom determined to enable next generation wireless networks while exploring modern spectrum management policies which can greatly increase the effectiveness of spectrum utilization and the development of new business models.

### **Question 3.3**

*Should a moratorium be placed on issuing new licences in the 26 GHz band for existing services? E.g. to ensure that the 26 GHz band is not unnecessarily encumbered prior to the development of a new authorisation / licensing approach for 5G services?*

We believe that placing a moratorium on issuing new licences for existing services would be beneficial only if the authorization framework can be delivered promptly (e.g. within 6-12 months from the beginning of the moratorium) and if there is a clear time to market for radios that can work under the new regulatory regime.

### **Question 4.2**

*Where in the UK would the 26 GHz spectrum be used to deliver services? For example, will deployments be focussed on:*

- a) Areas of existing high mobile broadband demand?*
- b) Rural areas?*
- c) Rail and road corridors?*
- d) Specific types of enterprise or industrial sites?*
- e) Indoors or outdoors?*
- f) Specific nations or regions of the UK?*

We expect the first services to be delivered to be the ones with the quickest return on investment and value added. Areas of existing high mobile broadband demand will likely be the first ones to see deployments, possibly followed by deployments for industrial sites including those in rural areas, provided there is good backbone infrastructure present. However, we do not think that this band will be widely used in rural areas because of the limited range and line-of-sight limitations.

The inherent limitations of propagation in the 26GHz band, combined with the limited number of areas and use cases that will be supported, at least initially, strengthens the argument that licensing approaches, even defined by area would be not only unnecessary, but would create another obstacle in successfully using this spectrum efficiently across the whole country.

#### **Question 4.5**

*What quality of service is required? How sensitive is the service being offered to variations in radio interference from other operator's 5G cells and other spectrum users?*

The quality of service that can be provided is highly dependent on each particular use case. The propagation characteristics of mmWave transmissions and the high likelihood of having directional antennas will mean that any risk that the quality of service will be affected by other transmissions in the 26GHz band can be managed effectively without the need to enforce licenses.

#### **Question 4.6**

*Will end users be fixed or mobile?*

We believe that at least initially, and most likely in the majority of cases, end users will be fixed. However, we do not have any further specific information to support our statement.

#### **Question 5.1**

*Should Ofcom consider licensing options other than the 3 examples set out above (licence exempt, shared coordinated and area defined) for the 26 GHz band? If so, what other options do you consider should be included?*

We believe that the licensing options set out are the correct ones and that analysis of each option correctly carried out.

We believe that given the characteristics of the band and the foreseen use cases, there is no reason to believe that a non-shared option would bring any benefit, and we are pleased to see that the most conservative approach is area-defined licensing.

We believe that access to the 26GHz band could be made licence exempt. Since the policy regarding spectrum usage should be technology-neutral, we believe that Ofcom would have the means to push self-coordination to standards that are currently in development.

However, we recognise that there is a balance to be sought between requirements, cost of developing networks, and enabling new players and business models. We therefore encourage Ofcom to implement the shared coordinated approach based on a combination of database and sensing technologies which would enable a more flexible and dynamic authorization framework.

Thanks to database technologies it will be possible to obtain accurate information about the use of spectrum and its trend over time, therefore allowing Ofcom to plan for future policies from an informed position.

In fact, the development of a framework based on the combination of database and sensing technologies would allow the use of different radio technologies to be accommodated as well as the additional necessary requirements to be kept to a minimum.

Moreover, by using a shared coordinated approach Ofcom would be able to review its policy following the initial phase (i.e. 5 years) and potentially opt for a licence exempt or a hybrid system as needed, avoiding the need for any significant regulatory disruptions.

## **Question 5.2**

*What methodologies could be used to pre-define 'high demand areas' for area-defined licences?*

We believe that there is no need to use area-defined licences as we explained in our response to Question 5.1 above. However, if Ofcom were to adopt a hybrid authorization based approach, then the scope of the licences needs to be determined accurately so that it can deliver the highest spectrum utilization.

We believe that licences, if adopted, should be limited to high-demand areas. We suggest Ofcom closely examine each use case identified in the consultation and the (loosely-defined) areas where deployments are expected within a determined period (e.g. five years). Each

identified area should also be scored according to a set of parameters, such as the probability of having radios deployed, the expected benefit for the community, etc.

Ofcom could then rank all areas taking into account the probability of each use case to be deployed (it could initially be assumed that all use cases are equally likely to be deployed) and select as candidate areas the ones within a determined percentile. Based on these results a decision could then be made that would deliver the most efficient usage of spectrum.

Finally, we strongly believe that no licence should span across the entire 26GHz band. Where they are granted it should be for a limited period of time that ensures investment, and that there is a mechanism to allow Ofcom to monitor whether the spectrum is been used – and if not, then the licences should not be renewed. This should be clearly set out in the policy to each licence issued.

### Question 5.3

*What mechanism could be used to coordinate cell deployments by different operators in shared spectrum?*

We believe that a combination of database and sensing technologies can be efficiently used for coordination. We also believe that most of the deployments will use directional antennas, so the risk of interference can be effectively reduced.

### Question 5.4

*What methodologies could be used for determining the proportion of spectrum to allocate using area defined licences and coordinated deployment?*

We believe that the coordination approach is the most suited in this instance, at least in the first instance. However, if licences are adopted, e.g. as part of a hybrid approach, the amount of spectrum that is reserved in each area should be such that:

- There is always enough licence-exempt spectrum available to support any of the identified use cases (e.g. 500 MHz); and
- More licences should be granted in each area.

It might be worth investigating whether the maximum amount of spectrum for each licence should be different based on the intended use of the operator.

### Question 5.5

*Do you agree that the 26 GHz band should be released progressively? What risks do you envisage with such an approach and how can these be best mitigated?*

We agree with Ofcom that the band should be released progressively. We also believe that if area-defined licences are issued immediately they could stifle innovation which should be avoided.

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