Consultation response form

Please complete this form in full and return to spectrum.management.strategy@ofcom.org.uk.

Consultation title	Supporting the UK's wireless future – Our spectrum management strategy for the 2020s
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Confidentiality

We ask for your contact details along with your response so that we can engage with you on this consultation. For further information about how Ofcom handles your personal information and your corresponding rights, see Ofcom's General Privacy Statement.

Your details: We will keep your contact number and email address confidential. Is there anything else you want to keep confidential? Delete as appropriate.	Nothing
Your response: Please indicate how much of your response you want to keep confidential. Delete as appropriate.	None
For confidential responses, can Ofcom publish a reference to the contents of your response?	N/A

Your response

Question	Your response
Question 1: Do you have comments on the overall approach to the review?	Confidential? – No
	DSA supports Ofcom's vision for enabling even greater benefits from use of radio spectrum and agrees that central to this vision is support for further innovation in wireless technologies and applications. DSA believes that spectrum sharing is fundamental to a modern spectrum policy framework and applauds Ofcom for its recognition of the importance of spectrum sharing in the spectrum management strategy.
	The DSA recognizes the forward-looking approach and the identified actions for the three main areas: Supporting wireless innovation, licensing to fit local and national services and promoting spectrum sharing. In terms of spectrum management, we agree with many of the stated principles, like for example that reducing the barriers for new entrants can also support greater competition in wireless technologies and services.
	Finally, we are pleased to see that the consultation document refers in multiple sections to the international scene. We welcome Ofcom's approach of promoting spectrum sharing internationally, harmonisation whilst retaining flexibility where possible is appropriate. The UK has been historically supporting flexible spectrum management frameworks and should share the

	good experiences and best practices internationally.
Question 2: Have we captured the major trends that are likely to impact spectrum management over the next ten years?	Confidential? – No Yes, Ofcom has captured the major trends that are likely to impact spectrum management over the next ten years.
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?	Confidential? – No The DSA will refer to the Automated spectrum management tools technologies. First, it worth to reinforce that this is an available technology, and Ofcom already makes use of databases to manage opportunistic spectrum access as part of its TV Whitespace approach. There are also a number of other benefits that have been highlighted in the consultation in sections 6 and 7. The DSA fully agrees with Ofcom that allowing automated spectrum management tools to schedule user resources could allow more efficient spectrum sharing. Frequency bands could more easily be shared between different types of user with a higher occupancy. Spectrum resources would be assigned on demand and released afterwards rather than being allocated but remaining unused for part of the time, thus increasing the number of users that can be served. The greater efficiency of spectrum use may mean that there is no excess demand in an area and spectrum access may still be able to be provided with more surety of access than opportunistic access of dynamic spectrum access databases today. DSA finds that automated tools such as geolocation databases have demonstrated to

work very well[1] and foresees that their use will greatly increase in the years to come.

Current sharing frameworks using geolocation databases assume that primary users are not aware of other users in the band. In many cases recently developed equipment is already spectrum aware and in the near future self-optimising networks would be able to make use of all the knowledge they can collect, including about spectrum activity. This means that in the future automatic coordination could be considerably improved as we expect that future spectrum sharing frameworks will incentivise coordination among users, including with primary users.

While coordination relying on an automated spectrum management tools may seem more complicated than traditional, manual frequency assignment, the inputs and algorithm that objectively determine the coordination will be completely transparent to the user, to incumbents, and to Ofcom. In 2019, the DSA released a study entitled *Automated Frequency Coordination: An Established Tool for Modern Spectrum Management*.[2] The report provides greater details on the advantages of AFCs and analysis of some of the perceived downsides.

DSA fully support Ofcom's efforts to move away from the binary lens through which regulators have historically viewed spectrum policy, where

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[1] The single most important functionality of these tools is to protect the incumbents. According to the information we have, to date no episode of real harmful interference has been recognised by Ofcom and by any regulator in the world that has adopted sharing frameworks based on geolocation databases.

[2] *See* Dynamic Spectrum Alliance, DSA Report, *Automated Frequency Coordination: An Established Tool for Modern Spectrum Management*, March 2019, available at http://dynamicspectrumalliance.org/wp-content/uploads/2019/03/DSA_DB-Report_Final_03122019.pdf

	the only access choices are between licenced and unlicenced. Instead, Ofcom should continually leverage all available spectrum access schemes and technologies and consider the benefits of combining these access approaches in the same band to meet diverse needs. DSA applauds Ofcom's steps toward this worthy goal, but we encourage Ofcom to be less incremental in its approach in adopting dynamic spectrum access. Indeed, as mentioned before, technologies exist today to increase dramatically spectrum utilization through automated sharing tools. Dynamic databases, device-based sensing, simple electronic coordination, and smart radios are all available and deployed across the wireless ecosystem. There is no question that the technical ability exists to automate frequency coordination and thereby use spectrum more efficiently, protect incumbents from interference, speed time to market, lower transaction costs, and generally expand wireless connectivity that is fast becoming, like electricity, a critical input for industries and economic activity.
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?	Confidential? – No In 2019 Policy Impact Partners and the Dynamic Spectrum Alliance, published a report on spectrum sharing[3]. The study found significant interest among public sector officials and industry players in exploring new approaches to spectrum sharing in different frequency bands, including those identified for IMT. The analysis conducted in three populous economies in very different regions of the world –– Colombia, Malaysia and

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[3] Policy Impact Partners, "Enhancing Connectivity through Spectrum Sharing", September 2019 – Source.

South Africa – found that IMT spectrum could be exploited further than currently is and stakeholders recognised that more efficient use of this spectrum could help close the digital divide between urban and rural areas. Similar considerations could apply to the UK market. We believe that the increase demand for localised spectrum is a consequence of this need for more flexibility to access spectrum, particularly in the bands where the economies of scale that the 3GPP ecosystem brings can be leveraged.

We recognise that there is not a one-size fits-all in issuing licences based on geography size. Indeed, as economic and social dynamics might vary significantly in different areas of the country, Ofcom should pursue a flexible spectrum management strategy benefits from economies of scale of national and international markets, but that can deliver upon the local requirements. The recent proposal on 26 GHz presented at a techUK meeting[4] depicts ways to assign spectrum differently based on the different conditions that different areas of the country might have.

We believe that Localised Access Licences are a good tool to increase spectrum use efficiency. The DSA suggests to automate as much as possible the Licence Access Licence application process. This would significantly facilitate use of spectrum which requires short term licences, but also allow Ofcom to reduce the overhead of managing the presumably increasing volume of licence applications.

Finally, we observe that in the case of home entertainment, most of the traffic is and will

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[4] https://www.techuk.org/resource/a-new-approach-to-spectrum-licensing-the-26-ghz-band.html

	most likely be carried over Wi-Fi and we believe that Ofcom should ensure that enough licence-exempt spectrum is available allow the consumer market to grow. According to the report recently published by the Wi-Fi Alliance[5], the economic value of Wi-Fi in the UK is over £70 billion, and it is expected to grow by almost 10% by 2025.
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?	Confidential? – No In items 4.14 of section 4 Ofcom recognizes that "the increasing availability, take-up and speeds of fixed ultrafast and full-fibre connections is putting pressure on the wireless network in people's homes to deliver the full potential of the fixed connection. Wi-Fi is increasingly the way people connect to fixed broadband to support everyday activities. More and more office or home-based working is now done via a Wi-Fi connection making it an integral part of the modern way of working." Furthermore, it is mentioned in item 4.15 that higher speeds, growing numbers of connected devices and new applications are driving demand for faster, more reliable and lower/more consistent latency Wi-Fi. New applications include Augmented Reality (AR), Virtual Reality (VR) and Ultra High Definition video. The DSA encourages Ofcom to open access to the 6425-7125 MHz frequency range -- 'upper 6 GHz band' -- to licence-exempt Wi-Fi and to enable the use of standard power indoor / outdoor Wi-Fi. Wi-Fi remains the single most impactful technology to deliver connectivity, as

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[5] https://www.wi-fi.org/news-events/newsroom/wi-fi-global-economic-value-to-reach-5-trillion-in-2025

the vast majority of the internet traffic terminates over Wi-Fi. Both fixed and 5G networks rely on Wi-Fi to reach users within buildings, where the vast majority of traffic is generated and consumed. Maintaining the QoS of Wi-Fi is therefore critical to the success of both fixed and 5G UK initiatives.

Future WAS/RLAN applications still do not have access to a fully functional mid-band in the EU as the 5945-6425 MHz supports a single 320 MHz channel – or only three 160 MHz channels. Most other advanced regions (USA, Canada, South Korea, Brazil) have correctly identified the need for sufficient mid-band spectrum and are enabling WAS/RLAN in the full 5925-7125 MHz. DSA notes that the 6425-7125 MHz would bring little additional benefits for IMT connectivity given the possibility of the harmonised availability of the 3400-3800 MHz band. Furthermore, IMT networks would be severely constrained due to sharing requirements with satellite applications. Finally, IMT networks would require to remove fixed networks from the band, which is currently unrealistic.

The UK should encourage the new RSPP to adopt the opening of this band as a medium term goal, paving the way for a new European Mandate to CEPT on possible use of WAS/RLAN in upper 6 GHz (6425-7125 MHz) band.

The DSA believes that unlicensed access to the upper 6 GHz band would be align with Ofcom´s interpretation of optimal use of the radio spectrum stated in section 2, item 2.19: "we interpret 'optimal use' to mean that spectrum is used in a way that maximises the benefits

	that people and businesses derive from it, including the wider social value of spectrum use."
Question 6: Do you agree with Ofcom's proposals to improve our outreach and reporting activities, and spectrum information tools? • **Are there additional ways that Ofcom could better engage with existing and future users and providers of wireless communications?** • **Please explain any specific areas where you believe more or better provision of information could provide value to stakeholders**	Confidential? – No N/A
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?	Confidential? – No The UK has already opened access to the 3.8-4.2 GHz band for new applications on the basis of shared access licence. The benefits derived from new applications would be maximised through the adoption of an EU harmonised framework, rather than letting each individual country adopt its own solution, so the DSA supports Ofcom to continue to take a leading role internationally. The band is extremely valuable for new mobile applications based on local connectivity, including private networks and industry 4.0 applications. In general, the DSA agrees with Ofcom on the proposed approach to make spectrum available for innovation when its future is uncertain. In particular, at the early stages of innovation we believe that test & trial licences and light licences should provide enough basic flexibility. Afterwards, the Local & Shared Access Licences can play an additional and important role for

	commercial operations together with other more traditional licensing approaches (including licence-exemption, obviously). We are very familiar with the opportunities and challenges of automated spectrum management tools and geolocation databases[6] and we believe that especially in bands with a developed equipment ecosystem (such as the ones based on the 3GPP standards), these tools might prove very successful. We finally observe that these systems can only be as accurate as the data that they have. For this reason, the discussion in Section 5 of the consultation document is particularly relevant.

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?**
    b) **encourage spectrum users to be more resilient to interference?**
    c) **ensure an efficient balance between the level of interference protection given to one service and the flexibility for others to transmit?**
Do you have any comments on which of these will be the most important?
	Confidential? – No
	N/A

Question 9: Are there any other issues or potential future challenges that should be considered as part of this strategy?	Confidential? – No N/A

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[6] For more information about automatic frequency coordination, please see the report "Automated Frequency Coordination – An established tool for modern spectrum management", Dynamic Spectrum Alliance. March 2019 – Source.

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?	Confidential? – No DSA agrees with Ofcom and foresees that the use of automatic tools for spectrum sharing in various IMT identified bands will become more and more important in the next decades.
Question 11: Is there anything else we should be considering doing, or doing differently, to promote our objectives?	Confidential? – No The DSA encourages Ofcom to open access to the entire 5925-7125 MHz frequency range -- '6 GHz band' -- to licence-exempt Wi-Fi and to enable the use of standard power indoor / outdoor Wi-Fi. Ofcom should consider the use of Automated Frequency Coordination (AFC) mechanisms as a means for allowing higher-power indoor and outdoor Wi-Fi operations on the 6 GHz band. The AFC concept lies along the continuum of established spectrum management techniques. DSA believes that given the fixed nature of both band incumbents and Wi-Fi deployments, an AFC mechanism is particularly practical in the 5925-6425 MHz band. In the UK, there are fewer than 400 holders of point-to-point fixed link licences in the 5925-6425 MHz frequency band. Because incumbents in this band are fixed in location and static by design, an AFC would do nothing more than automate the process of manual spectrum coordination. The ability of geolocation databases to coordinate spectrum access is well enough proven that there should be little doubt that Ofcom can certify a system (whether agency-run or delegated to third parties) with the technical ability to automate frequency coordination, lower transaction costs, speed time to market, use the spectrum more efficiently, protect

incumbents from interference with certainty, and generally expand the supply of unlicenced Wi-Fi capacity that is fast becoming, like electricity, a critical input for most industries and economic activity.

Moreover, AFC systems in this band would be significantly less complicated than the commercial Spectrum Access Systems used to coordinate spectrum assignments for operators in the Citizens Band Radio Service (CBRS) in the U.S. while protecting the highest-priority user, the U.S. Navy. The DSA recognizes that it will take some time to develop, test and certify one or more AFCs – and that Ofcom could bear some cost for administering the process. However, even if Ofcom did not task this out to a multi-stakeholder industry group, the DSA believes the effort would be well worth the cost in the longer term. An AFC can allow higher power Wi-Fi networks that facilitate a wider variety of use cases than does low power indoor only use and will overall increase the spectrum utilization in the band. With sufficient separation from incumbent sites, these use cases include very high-capacity point-to-multipoint fixed wireless broadband networks in rural and other areas, as well as enterprise IoT networks both indoors (at a more robust power level) and across campuses and between facilities.

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