

Comments on the Draft RSPG Opinion on Strategic Challenges Facing Europe in Addressing the Growing Spectrum Demand for Wireless Broadband

by VON Europe, April 2013

Preliminary Remarks

The Voice on the Net Coalition Europe ('VON') welcomes the opportunity to comment on the draft RSPG Opinion on strategic challenges facing Europe in addressing the growing spectrum demand for wireless broadband (hereafter the 'Opinion').

VON believes that the RSPG Opinion should build on three key principles, namely:

- 1) Prioritise making additional, harmonised bands available for wireless broadband – to meet pressing capacity and coverage requirements.**
- 2) Recognise that more intensive spectrum sharing will be key to achieving more efficient use of existing allocations, particularly when licence-exempt access is enabled. Sub 1 GHz spectrum is a particular priority for additional licence-exempt capacity, given its potential for coverage enhancement – in rural and urban areas.**
- 3) Strive toward rough harmonisation of bands both within Europe and internationally, when making spectrum available for licence-exempt access, but should also recognise that spectrum sharing can be extremely effective in making use of fragmented bands.**

Europe must provision greater spectrum capacity for the future to accommodate rapid growth in wireless data traffic and a multiplicity of emerging wireless applications. Regulators will need a variety of tools to address this spectrum shortage. Regulators should work to make new bands available for wireless broadband. As the RSPG recognises, spectrum sharing will help to make unused capacity available much more quickly than by clearing spectrum. However, we feel that there needs to be greater attention paid to ensuring that sufficient of the identified capacity will be made available on a licence-exempt basis.

More details can be found in VON's responses below.

Detailed Responses

Broadband access is a critical input for all sectors of the economy as well as being increasingly vital to enabling more effective and sustainable public services.

VON agrees that the demand for wireless data is likely to continue to grow strongly.¹ We see online content and service providers seeking to make the virtual worlds they offer ever more realistic and engaging, whilst consumers are adopting and using new mobile devices enthusiastically – for work as well as pleasure.

For this reason, VON believes that the European Commission should strive to make as much spectrum capacity available for wireless broadband as possible, applying both sharing and clearing approaches in parallel. It should also ensure that sufficient of the resulting spectrum is made available for licence-exempt access.

1 Harmonised, cleared spectrum for licensed access will be important

VON agrees with the RSPG that regulators should focus on making available additional bands with harmonisation potential, to improve licensed broadband Internet access. We also agree that these should be distributed across a range of frequencies, to suit the wide range of coverage requirements that we observe in the market.

2 Spectrum sharing will be an important part of the solution to the EU's spectrum crunch

Increasing the spectrum supply is only part of the solution to meeting the anticipated steep growth in data traffic to mobile devices.² It will also be necessary to increase spectrum re-use – using smaller cells/hotspots and dynamic spectrum sharing. Dynamic spectrum sharing technology permits a more sophisticated approach to sharing: facilitating licence-exempt access whilst allowing regulators to retain the flexibility to adapt to changes in market demand. For example, industry has developed a standard to deliver Wi-Fi over the vacant channels in the broadcast television spectrum. We encourage the European Commission to embrace this potential fully, by proceeding, as quickly as possible, to harmonise the enabling regulations across Europe.

¹ See, Wi-Fi Alliance. (2009). *Wi-Fi is now a must-have for mobile phones; User affinity to drive annual shipments to 300 million in 2011*. Available at, <http://www.wi-fi.org/media/press-releases/wi-fi-now-must-have-mobile-phones-user-affinity-drive-annual-shipments-300>; and, Juniper Research. (2013). *Mobile Data Offload & Onload*. Available at, http://www.juniperresearch.com/reports/mobile_data_offload_&_onload.

² We expect deeper optical fibre penetration of broadband access networks matching higher performance wireless tails – enabled by newer generations of wireless networking technology and using shorter range.

License-exempt access has been and will remain key to meeting our increased demand for wireless data. Because it enables end-users to deploy their own wireless hotspots, licence-exempt access will be essential in meeting the majority of the data demand from mobile device users – through future variants of Wi-Fi. Increasing licence-exempt capacity in the sub-1 GHz range should be a priority, given its potential for filling ‘not-spots’, and enabling lower power consumption (than is possible with the higher frequencies already used for Wi-Fi).

As Internet connectivity requirements continue to grow rapidly, we see in-home and in-office Wi-Fi continuing to shoulder much of the traffic.³ For this reason it is important to ensure that suitable additional licence-exempt spectrum capacity will be available to help carry the load.

Additional capacity for wireless broadband networks will be needed in dense urban areas as well as in the most remote rural areas:

- In dense urban areas, wireless links to consumer devices will often be much shorter in range, offering a high capacity wireless ‘tail’ to high capacity fixed broadband access points in homes and offices. We expect that the great majority of the traffic to mobile devices will continue to flow over new and existing Wi-Fi networks. Licence-exempt access to sub 1 GHz, applied in standards such as 802.11af will help to banish ‘not-spots’ and enable lower power operation, conserving energy
- In rural areas, wireless links may form part of backhaul as well as access networks. Sub 1 GHz frequencies will be important to help deliver greater range in point to multipoint connections to end users, whilst higher frequencies serve to provide enhanced capacity on point-to-point links. As in urban areas, we would expect Wi-Fi to be the predominant distribution technology within rural premises.

Licence-exempt spectrum access has also been, and continues to be, a powerful catalyst for innovation. It is used by millions of devices, for many different applications, in millions of locations. It is in licence-exempt spectrum that we see new wireless technology breakthroughs emerging and being incubated: feeding into mainstream wireless network standards, when they have had a chance to prove themselves. For example, licence-exempt capacity is delivering broadband in novel ways and allowing emerging machine to machine (M2M) applications to reach their full potential.

³ See, Informa Telecoms & Media. (2012). *Understanding today's smartphone user: Demystifying data usage trends on cellular & Wi-Fi networks*. Available at, http://www.informatandm.com/wp-content/uploads/2012/02/Mobidia_final.pdf.

Dynamic spectrum technology enables licence-exemption to provide even greater value from spectrum. The economic value from sharing spectrum can be enhanced by enabling licence-exempt access to the shared bands. Dynamic spectrum access technology enables this to be done in such a way that regulators can retain the flexibility to respond to changing market needs. Much as licensing has secured investment for large-scale networks, we see licence-exemption enabling massive complementary investment in infrastructure, by large numbers of end users (consumers and businesses). Licence-exemption will be essential to delivering the much-needed improvements in wireless broadband network coverage and capacity, which could not easily be accommodated by conventional, centralised operator business models. Recent studies project that nearly half of all global IP traffic will flow over licence-exempt networks by 2015, compared to approximately 8 percent flowing over licensed mobile networks.⁴ Licence-exempt access is already a vital complement to licensed spectrum use, as mobile broadband providers increasingly rely on Wi-Fi networks to avoid overloading their licensed networks – allowing them to reduce or delay expensive capacity upgrades.

Dynamic spectrum sharing is a fast fix. Clearing spectrum is a slow process. For example, in bands currently allocated to broadcasting, the benefits of clearing and auctioning spectrum are not likely to be evident for many years. The process of reaching agreement to such changes is lengthy and costly, even before the auction process and network build-out are taken into consideration.

Dynamic spectrum sharing makes it possible to tap the capacity of underused bands much more quickly, without costly relocation of incumbents. It also enables faster and less costly adaption to changes, for example to exploit emerging harmonisation opportunities. We think that Member States should integrate dynamic spectrum access into their management approaches, to enable opportunistic and licence-exempt access to large amounts of unused spectrum capacity that we observe across a number of bands.⁵

3 While the EU should strive toward harmonising bands available for dynamic spectrum access, such access is a good fit with fragmented and changing availability/demand

It is important to prioritise harmonisation opportunities as they arise. Harmonizing the bands available for dynamic spectrum access within Europe and internationally will encourage investment

⁴ See, Informa Telecoms & Media. (2012). *Ibid*.

⁵ Microsoft's Spectrum observatory is a powerful online tool, with four sensing stations currently active, in the US and in Europe. See, <http://spectrum-observatory.cloudapp.net/>.

in these technologies by providing regulatory certainty and creating a world-wide market for standardised chipsets.

However, the complexity of making harmonised bands available across all member states means that the full benefits of harmonisation for both licensed and license-exempt spectrum might not be achieved for many years. Even when harmonisable spectrum has been cleared, as the RSPG notes, some of it has languished unused, in some member states: wasting valuable economic potential.

By making such unused spectrum available for sharing, using dynamic spectrum access, we believe that significant economic benefits will be gained. For example, geolocation databases can be used to signpost which spectrum is available in any given location at the time when users need it. This would allow value to be extracted from isolated pockets of non-harmonised spectrum and should incentivise radio manufacturers to build corresponding flexibility into their devices. Geolocation databases are a good fit with such fragmented capacity and access conditions: enabling single market economies of scale in end-user devices.

4 Other points

- Shorter connections do indeed promote greater reuse/spectrum efficiency – wider availability of fibre should assist in reducing average connection distances and thus improve spectrum efficiency, through enabling smaller cells/hotspots. (see page 9)
- We agree that Wi-Fi has a significant role in offloading traffic from mobile networks and agree that Wi-Fi is likely to have an even greater role in the future, as increasing numbers of Wi-Fi-only tablets and similar devices become even more prevalent. (see page 9)
- Although operators sometimes express concerns about ‘*quality of service*’ with Wi-Fi, users often perceive a higher quality of service when using Wi-Fi than they get with mobile broadband. Distance from the mobile base-station and variable demand from other users in the same cell are both factors in the performance of the latter.⁶ (see page 9)
- Geolocation databases can be used to administer licensed as well as licence-exempt access and indeed can enable hybrid access arrangements to develop in the future, as network businesses evolve. (see page 11)

⁶ User research shows that 77 percent of users of Wi-Fi-enabled mobile phones are completely or very satisfied with their device - higher than reported by users of phones without Wi-Fi. Seventy-four percent of people who have Wi-Fi on their mobile phone use it, and 77 percent say they will seek Wi-Fi in their next phone as well. See See, Wi-Fi Alliance. (2009). *Ibid*.

- On the asymmetry of uplink and downlink, we note that growing use of cloud based services and real time voice/video chat services will increase demand for better quality performance on uplinks as well as downlinks. However, in our view, dynamically adjustable arrangements, such as time domain duplexing (TDD), are likely to enable the most efficient use of spectrum for a wide range of applications. TDD will also enable new spectrum fragments to be aggregated effectively, when they become available. (See page 22)
- It is not clear to us why spectrum sharing between mobile broadband and DTT services would not be feasible. This might be based on assumptions of LTE use, which does not provide the flexibility we see in TV white spaces (TVWS) technology to use the full range of available spectrum capacity effectively, in the face of varying levels of interference and noise. A number of trials have shown the effectiveness of white space technology in extending wireless broadband coverage in rural and urban areas, without disrupting licensed services.⁷ (See page 23)

5 Specific bands

- We note that sub 1 GHz frequencies have an important role in achieving ubiquitous coverage, whilst higher frequency bands are more useful for adding capacity. Licence-exempt access is needed across a wide of frequencies, to enable future generations of Wi-Fi to shoulder the anticipated increase in data traffic to mobile devices and deliver the seamless connectivity that consumers desire.
- Increasing the capacity available for licence-exempt access in the 5 GHz band should also be a priority, with less onerous restrictions on end-user devices. We think that the FCC's plans to make additional 195 MHz available in this band, for licence-exempt use, will be vital to ensure Wi-Fi's ability to serve rapidly growing consumer requirements.
- We recommend urgently looking at how dynamic spectrum access technology could be applied to the 3.5 GHz band, facilitating licence-exempt access. Noting FCC proposals on future management of this band, we believe there is encouraging global harmonisation potential.

⁷ See, Cambridge White Spaces Consortium. (2012). *Recommendations for Implementing the Use of White Spaces: Conclusions from the Cambridge TV White Spaces Trial*. Available at, <http://research.microsoft.com/en-us/projects/spectrum/cambridge-tv-white-spaces-trial-recomms.pdf>; and, Cambridge White Spaces Consortium. (2012). *Cambridge TV White Spaces Trial – A Summary of the Technical Findings*. Available at, <http://research.microsoft.com/en-us/projects/spectrum/cambridge-tv-white-spaces-trial-findings.pdf>.

- In considering the future of the 700 MHz, the European Commission should look at the potential for dynamic spectrum access to enable new applications (including wireless broadband) to share spectrum with television services, allowing the costly disruption from clearing the band to be delayed or even avoided.
- Finally, we suggest that the 2.3 GHz band also be considered for licence-exempt access or a hybrid light-licensed/licence-exempt approach. This would enable a greater variety of applications and greater innovation potential than current proposals allow.

We thank you in advance for taking consideration of these views. Feel free to contact Herman Rucic, VON Europe, by phone (+32 (0)478 966701) or email (hrucic@voneurope.eu) should you need further information.

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About the VON Coalition Europe

The Voice on the Net (VON) Coalition Europe was launched in December 2007 by leading Internet communications and technology companies, on the cutting edge to create an authoritative voice for the Internet-enabled communications industry. Its current members are Google, Microsoft, Skype, Viber, Vonage, Voxbone and WeePee.

The VON Coalition Europe notably focuses on educating and informing policymakers in the European Union and abroad in order to promote responsible government policies that enable innovation and the many benefits that Internet voice innovations can deliver.