

Réponse de Nokia à la consultation de l'ARCEP sur l'utilisation de fréquences sur des « bandes libres »

Question 1.

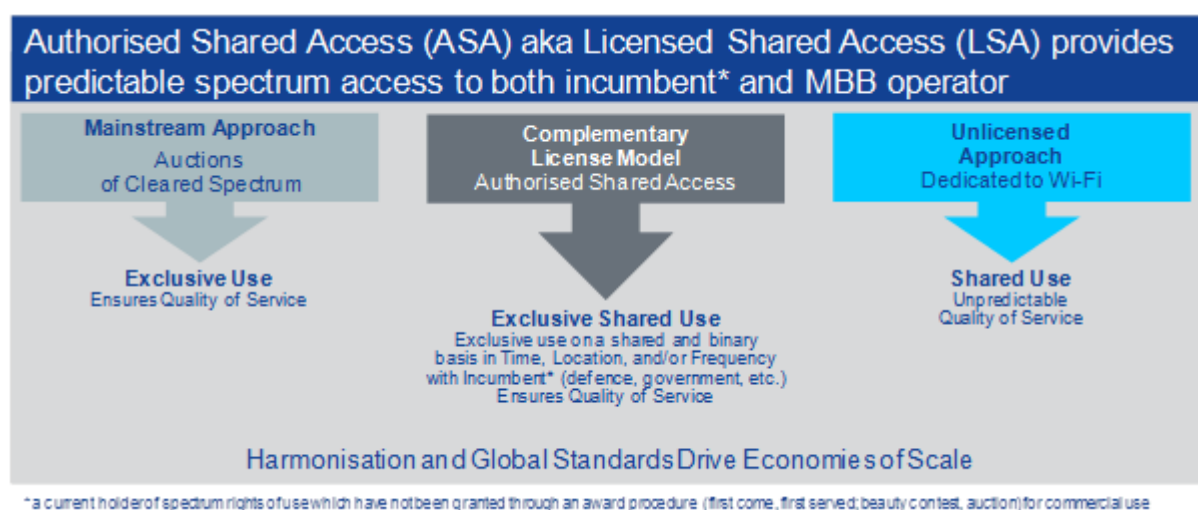
Avez-vous des commentaires à formuler sur la description des principes généraux du cadre réglementaires relatif aux « bandes libres » ? En particulier, le régime d'autorisation relatif aux « bandes libres » répond-il selon vous de façon satisfaisante aux besoins des dispositifs utilisant actuellement ce type de fréquences ?

Réponse de Nokia / Nokia answer :

Besides exclusive use and licence exempt use, Nokia sees the additional concept of Authorized Shared Access (ASA) or Licensed Shared Access (LSA), which permits sharing in a more controlled way than licence exempt access. ARCEP rightly stresses that licence exempt access works fine for Short-Range Devices (SRD), i.e. limited transmit powers and short ranges, often indoors with additional separation by walls and ceilings, all providing for sufficient isolation between different users to limit the impact of mutual interference and interference to other radio services.

However licence exempt based sharing hits its limits when applied to scenarios with higher transmit powers and/or in lower bands with better propagation to provide service in manner like cellular networks, e.g. in TV white spaces or in the 2.3 GHz band. Here, the unpredictable interference limits efficiency and makes it hard for network operators to justify investment in network equipment, both for the access layer as well as its backhaul. Furthermore, licence exempt access is more difficult to control in terms of interfering with legacy services in a band like the 2.3 GHz band. LSA, however, can both give the incumbent spectrum user control over use of his assets as well as provide for predictable conditions of use for an LSA licensee, i.e. a mobile operator, to allow for a business case for his investment and predictable QoS for his service.

Thus Nokia proposes to consider LSA as an additional tool in providing spectrum resources to the market.



This being said Nokia believes that the current ruling on Wi-Fi equipment in the 2.4 and 5 GHz bands is appropriate and well proven in mass deployments everywhere.

Question 2.

Avez-vous des commentaires à apporter au projet de décision de l'ARCEP annexé à la présente consultation publique ?

Réponse de Nokia / Nokia answer :

Yes, we wish to insist on the fact that SRD use in 870-876 & 915-921 MHz shall not interfere mobile broadband transmissions in 900 MHz band nor GSM Rail in 873-880 & 918-925 MHz.

Indeed in the frequency range 870-876 MHz and 915-921 MHz there are still concerns on interference with GSM Rail in 873-880 MHz and 918-925 MHz and E-GSM. Concerns remain within RTE GSM-R group in ECC Report 200 "Co-existence studies for proposed SRD and RFID applications" and the ERC/REC 70-03 "Relating to the use of Short Range Devices (SRD)".

Question 3.

Disposez-vous de sources d'informations, bases de données ou études, permettant de quantifier les utilisations actuelles des bandes libres ?

Réponse de Nokia / Nokia answer :

Nokia primarily looks into demand for exclusive use of frequencies for mobile broadband to provide predictable QoS over large areas. Hence there are no own studies available on the projected use of licence exempt bands.

Question 4.

Quels sont selon vous, parmi les différentes utilisations de bandes libres, les usages qui seraient amenés à se développer, ou au contraire à diminuer ?

Réponse de Nokia / Nokia answer :

Nokia sees licence exempt use via Wi-Fi and in future possibly also via LTE providing excellent offload capacities to mobile broadband networks. Such capacity stems less from very large RF bandwidths but rather from the SRD characteristics to operate in close proximity of an access point under favorable link budget conditions and hence high data rates. Consequently, the existing bands at 2.4 GHz and 5 GHz together with options to gain access to further parts of the 5 GHz bands provide ample capacity for mobile broadband network offload.

Question 5.

Dans quelle mesure les besoins futurs des dispositifs à courte portée seraient amenés à s'appuyer sur des technologies standard, comme le Wi-Fi ou le Bluetooth, plutôt que sur des systèmes « ad-hoc » développés pour des besoins spécifiques ? Quels sont les normes qui vous paraissent être amenées à se développer ?

Réponse de Nokia / Nokia answer :

Nokia sees Wi-Fi as the currently dominating standard for licence exempt bands, possibly complemented by LAA (Licence Assisted Access)/LTE-Unlicensed in future. LAA integrates excellently into the operator network with best possible efficiency in spectrum use as it can fully rely on LTE interference mitigation and scheduler based radio resource managements with detailed knowledge on channel conditions. Thus, LAA is expected to provide for an attractive alternative to Wi-Fi e.g. in operator managed public hotspots scenarios, whereas in personal and enterprise environments, Wi-Fi may maintain its leading role.

Bluetooth complements Wi-Fi and LAA for purposes like connecting mobile phones with headsets or hands free solution in cars etc. without requiring distinct spectrum. Further specific standards may evolve, especially in the context of ultra-low power consumption for extreme battery life in a M2M context. Due to the ISM nature of the 2.4 GHz and 5 GHz bands, Nokia expects continued use of these also by proprietary solutions, e.g. garage door openers.

Question 6.

Quelle est votre vision prospective du développement de l'Internet des objets ? Dans quelle mesure le développement de l'Internet des objets nécessiterait-il de s'appuyer sur l'utilisation de bandes libres?

Réponse de Nokia / Nokia answer :

Internet of Things is the major technology growth area related to and enabling many high level trends such as Environmental aspects, Smart Cities, Traffic safety, Better healthcare, Industrial Internet and many other.

Nokia expects a need for reliable connectivity over very large areas for at least parts of the Machine-to-Machine (M2M) or Internet-of-Things (IoT) connectivity, while the demand for capacity may be low for many of these. Consequently, Nokia sees operator based networks relying on exclusive spectrum playing a key role also for M2M and IoT. Highly reliable and efficient communication w.r.t. to spectrum and energy are subject to 5G research.

There is, however, opportunity for M2M and IoT connectivity also in the unlicensed space, especially in the SRD context, where a hub with connectivity over licensed spectrum can provide internet access to many small devices in its vicinity over licence exempt spectrum. Based on earlier experience with Wi-Fi, Bluetooth, Zigbee and similar other technologies, unlicensed bands were proven particularly suitable in short range communication applications. As we already said, in short range communication the frequency use and re-use is relatively easy to manage because long distance interference is less probable due to the low power levels of the radio transmitters defined for these technologies. Because of the reuse there is less need for additional frequency allocation for such license free bands.

On wide area / long range we see major growth for communication because of the need to process IoT data by cloud based applications, typically majority of locally generated data would be transmitted to a central

processing Cloud. Due to this it is likely that there will be long term congestion in the long distance communication, and thus it would be advisable to allocate more frequencies for wide area. In wide area the proven and dominating radio technologies are on licensed bands because of the need to control interference for ensuring quality and reliability.

There are many new mobility related IoT and M2M use cases in e.g. traffic, agriculture and health which would promote use of cellular as the bearer between smart objects and the cloud based applications. Also fixed IoT use cases (utilities) can be implemented cost effectively based on the new development of LTE in the standardization (3GPP MTC communication), and it is likely that also short range radios would be aggregated to wide area via Gateways, and from Gateways over to Cloud applications using cellular.

However, it is likely that at least in the medium timeframe (next 5 years) mobile broadband applications will be dominating the capacity needs over IoT, thus frequency allocations should be primarily considered related to mobile broadband Consumer and Enterprise applications and use cases rather than Machine type communication use. We can foresee that such IoT use cases like Smart City Intelligent Traffic or Surveillance would persistently consume so much bandwidth that they would make a difference, but major takeoff of those applications would be most probably beyond 2020.

Question 7.

Avez-vous des remarques à formuler sur les travaux européens en cours visant à étudier la mise à disposition de fréquences supplémentaires pour les systèmes Wi-Fi dans la bande 5 GHz ?

Réponse de Nokia / Nokia answer :

Nokia welcomes additional licence exempt spectrum where it does not conflict with current or future bands for exclusive use for mobile broadband. Additional licence exempt spectrum can provide local capacity offload for mobile broadband networks via Wi-Fi or in future via LAA.

Question 8.

Avez-vous des remarques à formuler concernant le processus de révision de la décision d'harmonisation européenne pour les dispositifs à courte portée ? En particulier, quels sont vos commentaires sur les bandes de fréquences qu'il est prévu à ce stade d'étudier dans le cadre de cette révision ? Etes-vous intéressé par un usage libre de ces fréquences ?

Réponse de Nokia / Nokia answer :

Again, Nokia sees potential interference issues with SRDs in bands 870-876 MHz and 915-921 MHz with GSM Rail in 873-880 and 918-925 MHz and E-GSM. Concerns remain within RTE GSM-R group in ECC Report 200 "Co-existence studies for proposed SRD and RFID applications ..." and the ERC/REC 70-03 "Relating to the use of Short Range Devices (SRD)"

Unlicensed use leads to unpredictable conditions of use of spectrum. This is well workable in higher bands and low power scenarios like in the 2.4 GHz and 5 GHz bands typically used for unlicensed Wi-Fi operation, i.e. the SRD conditions mentioned above by ARCEP. Unlicensed TV white space use is significantly more difficult with much better propagation conditions for both signals and interference and possibly higher transmit

powers for larger coverage areas again also spreading interference wider. With the resulting uncertainty on the ability to use spectrum, there are difficulties to justify significant investment into network infrastructure both for the access layer and the backhaul layer. Nokia pursues the idea of Supplemental Downlink (SDL) in 470-694 MHz to allow for well planned use of parts of the band not used for DTT.

Question 9.

Voyez-vous par ailleurs des bandes de fréquences alternatives dont il serait pertinent d'envisager l'utilisation selon un régime de « bande libre » ?

Réponse de Nokia / Nokia answer :

Nokia rather promote the use of any new available bands through licenced exclusive or shared access (ASA) use, for the reasons already mentioned in above answers.

Question 10.

Avez-vous d'autres remarques à formuler sur le thème de la présente consultation publique ?

Réponse de Nokia / Nokia answer :

We would like to add on the Internet-of-Things specific topic that to allow a healthy ecosystem development it is advisable to pursue for expansion and global harmonization on the sub 1 Gigahertz cellular bands. This is key to favor high compatible IoT device volumes and low device associated costs (sub 1 GHz bands are the most suitable for IoT in coverage aspects which is very important for IoT).