

Radio Spectrum Policy Group
DRAFT RSPG OPINION ON LICENSED SHARED ACCESS
(LSA)

Qualcomm Response

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Introduction

Qualcomm greatly appreciates the opportunity to contribute to the work of the Radio Spectrum Policy Group on Licensed Shared Access (LSA). We believe that this is very important endeavor as LSA is a major innovation in spectrum management which will help Europe meet the Radio Spectrum Policy Programme objectives and beyond.

Mobile data traffic has doubled every year over the past few years. If this growth rate continues for ten years, we will see a 1000x increase. More licensed spectrum is an essential component in meeting this 1000x growth. This spectrum should be in prime bands - meaning that the spectrum is harmonized, ideally globally. In addition, the spectrum needs to be released quickly as delaying access to spectrum has a direct impact on the quality of service that can be provided to consumers. The spectrum crunch, if unsolved, will lead to higher prices, degraded quality and data caps, and missed industrial and innovation growth opportunities. While individual rights of use awarding mechanism after spectrum clearance will remain the preferred approach to deliver mobile broadband electronic communication services (MBB ECS), this regulatory path is not always possible. Some spectrum rights of use holders, in particular government users, do not use their spectrum nationwide every hour of every day, but yet they are not in a position to vacate it because they still need it from time to time or in specific locations or situations. Additionally, repurposing their installed equipment entails significant costs that in the current economic situation (high sovereign debts) governments cannot always be afforded.

In such scenario, LSA is an appropriate dynamic approach to enable ultra-fast mobile broadband ECS provisioning by accessing the relevant needed portion of spectrum in a mutually beneficial way with incumbents. With LSA, an MNO can obtain “new” rights of use which allow him to share the spectrum with the incumbent in time or location or both. This is done on an “exclusive” basis, which means that either the incumbent “or” the commercial user access the spectrum at a given location at a given time. This also means that they do not

interfere with each other and they can still leverage the very best performance of their equipment. It is a win-win approach for all players. The incumbent can monetize its underutilized spectrum, MNOs can access new spectrum for exclusive use and ensure reliability and quality of services, and regulators can pragmatically address the ever increasing demand for more spectrum for mobile broadband. LSA can unlock hundreds of MHz of high-quality spectrum for mobile broadband ECS.

Industry is seizing the LSA spectrum opportunity somewhere around 500MHz of additional spectrum usable for MBB ECS. LSA should apply to bands that are harmonized or are earmarked for global harmonization in the future so that commercial devices will be readily available and the entire value chain can benefit from the widest possible economies of scale. LSA will not require any new radio access network (RAN) design for devices or modification of existing IMT and IMT-Advanced RAN standards; the devices will simply have to work on the selected spectrum which the infrastructure network software will manage (OAM). This aspect of LSA is important to note because it will enable MNOs to quickly start using the spectrum made available under LSA in conjunction with their other existing spectrum assets. In addition, LSA is particularly suited for higher bands as interference propagates less.

Industry is highly committed to the implementation of LSA MBB timely and believes that the first practical implementation of LSA in Europe can begin as early as 2014 in the targeted 2.3GHz candidate band.

Need for a clear LSA definition

There are a number of spectrum management tools and sharing policies options, which complement each other. For example, individual rights of use awards guarantee coverage and quality of services, while licensed exempt or general authorization are suitable for best effort services and localised services. In such context, it is important to clearly define the new regulatory notion (LSA) when introducing it, so that economic players can assess whether this specific model fulfils their business requirements or not. This is particularly relevant to LSA taking into account the various sharing mechanisms concepts and ideas floating around. Should the concept and associated definition remain unclear, investment by the industry in developing the corresponding technologies and business models would be hampered, and implementation of the concept would be delayed. In an even worse case, should the concept be interpreted differently, it would prevent economies of scale from emerging, and would remove the possibility for an internal market to exist.

Qualcomm and its partners have been developing and promoting ASA (Authorised Shared Access) as an innovative regulatory tool to make available more prime licensed spectrum on a shared basis with incumbents to foster the growth of mobile broadband. ASA has been recognized by the RSPG in its Report on “Collective Use of Spectrum and Other Sharing Approaches”. CEPT studied ASA and the concept is currently being considered and getting traction globally. The RSPG decided to widen the scope of the licensed shared access framework under LSA to be generically applicable to various kinds of applications and services. LSA being the generic concept, ASA can therefore be defined and understood as LSA for mobile broadband (MBB) ECS provision.

While we agree with many aspects of the RSPG Opinion and highly appreciate the work of the RSPG on LSA, we are offering in this response some refinements to the LSA definition and scope which would be beneficial for the concept to flourish and for the industry to develop the appropriate standards to enable the technical implementation of the corresponding architecture.

LSA is a form of vertical sharing

Vertical Sharing corresponds to the situation when an entity which is granted spectrum rights of use for a specific frequency resource (named thereafter the incumbent), allows another entity (named thereafter the “additional” user) to benefit from access to the said frequency resource to offer a different service and/or application, when and where the incumbent does not use its resources. Under the LSA sharing framework, the services and applications provided under the spectrum usage rights of the incumbent and the LSA licensees are and will remain different and thus “vertical”. As such, when a frequency band is made available for MBB ECS under an LSA/ASA framework, the incumbent will continue to offer the same services as per its original spectrum usage rights while the LSA licensee will be individually authorized to provide mobile broadband ECS services (thus to the public). The incumbent will not be entitled to offer any public mobile broadband services as an automatic consequence of the band being made available for commercial mobile broadband under an LSA scheme. This is a key feature to avoid market distortions especially as regard spectrum economic valuation mechanisms in the context of “sharing” negotiations {in practice the government permits the “change of use” of the incumbent user spectrum only and limited to the scope of the sharing framework and in this regard must make the information transparently known to the market ex ante to the grant of any new license}.

Unlike horizontal sharing (sharing between peers proposing the same service), vertical sharing is likely to provide benefits as the incumbent and the additional user frequency requirements are complementary, i.e. they are unlikely to require the spectrum at the same time, in the same geographical area. Incumbent and new user will, in an LSA clearly defined scenario, never compete against each other. They will rather tend to develop a cooperative constructive attitude which will benefit the wide value chain as a whole (infra market, device market, software, application, content and services market).

While the RSPG considered vertical sharing in its Opinion, we suggest the following changes to embed this very important aspect into the LSA framework definition: **“~~it is likely that the~~ Under the LSA concept ~~has more relevance in practice when~~ the incumbent user(s) and the LSA “licensees” are of different nature and subject to different legal and regulatory constraints. The incumbent of a band will not enjoy the right to offer the same services (e.g. MBB ECS) as the LSA “licensees” as a consequence of this band be made available under LSA”.**

Incumbent definition under LSA

The RSPG defines an incumbent as “*a current holder of spectrum rights of use*”. We believe that this definition is very wide and should be amended so as to provide greater certainty and predictability to the market players and the industry for the implementation of LSA. We thus propose to amend the current definition of an incumbent to read “*an incumbent is a current holder of spectrum rights of use which have not been granted through an award procedure (beauty contest, auction) for commercial use*”.

We believe that such definition is essential to preserve the rights of use granted under open, fair and transparent procedures, in accordance with the Framework and the Authorization Directives, through either beauty contests or auctions to market players. This gives confidence in the predictability of the legal and regulatory regime to the same market players who are invited to embrace LSA and invest in networks deployment and services under a LSA framework.

As a matter of fact because the incumbent rights of use have not gone through any competitive pre-market assessment, LSA cannot be seen as a form of secondary trading. This is because the “incumbent” rights, in a specific band, do not compare, even when the subject of a sharing agreement, to future usage rights for MBB ECS provisioning. The MBB usage “rights”, to the new user (LSA licensee), remain granted solely by the NRA.

The NRA shall remain the sole responsible entity to determine the most appropriate type of individual rights of use award and of conditions attached to operate and manage LSA networks, including for network deployment variations from the traditional mobile terrestrial topology (macro/micro/pico) like the case of small cells.

LSA is about binary and exclusive access

LSA is a licensed sharing implementation which is binary, as it admits spectrum use by either the incumbent or the ASA licensee. The LSA licensee enjoys exclusive spectrum rights of use where and when the spectrum is not used by the incumbent which maintains its allocation and assigned rights. Those are key aspects of the LSA definition. Quality of service predictability is linked to the exclusivity and the binary access to a given spectrum resource, at a given location and a given time.

The RSPG indicates that “*the objective of an LSA approach is to grant additional spectrum rights of use in specific bands on a shared basis allowing predictable QoS for all rights holders.*” QoS is directly linked to the presence of interference, i.e. the existence of another user for the same spectrum resource, said resource being specified in the frequency, space and time domain.

Therefore, ensuring predictability of QoS requires the possibility to identify, at any time, unequivocally, the unique rights of use holder for a specific spectrum resource. As such, LSA requires exclusivity among LSA licensee to access a spectrum resource. Similarly, the LSA

licensee and the incumbent never have joint access to a unique spectrum resource. At any location and any given in time, LSA defines precisely whether the incumbent holds spectrum access rights, or whether the LSA licensee holds spectrum access rights to the resource. As such, we would invite the RSPG to embed the notion of exclusivity in the definition of LSA.

In addition, investments in networks providing predictable Quality of Service require certainty on the predicted availability of spectrum resources. As such, we would invite the RSPG to reconsider its position that “*Regulators might also consider reviewing the conditions of use of certain services so that channel or geographic exclusivity can be re-evaluated if so justified*”, as it is not compatible with services/network providing QoS, and therefore could not be considered under LSA.

LSA should be incentive and market based

LSA is likely to produce benefits if it is applied on a voluntary basis both by national administrations and on a voluntary incentive basis by the incumbent and prospective LSA licensees:

- The national regulator authority (NRA) is the sole entity delivering individual right of use authorizations, and has further responsibilities under the EU telecom regulatory framework, in particular the Authorization Directive.
- The incumbent must provide accurate information on its planned future use of the band to NRA and prospective LSA licensees during the definition of the sharing framework. Therefore, the incumbent’s proactive involvement in the implementation of LSA is critical. Furthermore, throughout the life of the LSA licensee’s individual rights of use authorization, the incumbent must inform the LSA licensee of its actual use of spectrum. The incumbent is incentivized by the fact that the spectrum ownership will remain intact in the longer term and by the adequate compensation for the sustained sharing efforts in its underutilized spectrum.
- The LSA licensee is incentivised by an attractive sharing framework and the timely access to spectrum with supportive economies of scale and at a lower cost, such as the absence of coverage obligations and of auctions entry fees.

We therefore encourage the RSPG to emphasize the voluntary nature of LSA by striking out the possibility for LSA to be mandated “*the LSA could be initiated on a voluntary basis, ~~but it also may be imposed by the regulator in order to ensure efficient spectrum use~~*”.

Benefits of the LSA model

LSA, as characterized above, is defined in order to fulfill the requirements of specific users that request predictability of the QoS for the services and from the networks they operate. The benefits of LSA, compared to other sharing mechanisms, are specified below.

The incumbent user benefits from guarantees for its protection due to two main reasons:

- the incumbent is expected to be a party to the definition of the sharing framework,

- the individual license, providing exclusivity among LSA licensees for a specific frequency resource, ensures that the incumbent always has a direct knowledge of the LSA licensee having access to a given frequency resource.

As such, the incumbent benefits from clarity on the sharing framework, which provides him a good level of certainty for the enforcement of the sharing framework.

On the other hand, the LSA licensee benefits also from guarantees for its access to spectrum resources, due to two main reasons:

- The sharing framework is defined precisely before individual authorizations are granted by the NRA. The prospective LSA licensees are expected to be a party to the definition of the sharing framework. As such, they can ensure that the sharing framework contains terms that provides them adequate control over the availability of the spectrum resource.
- Thanks to the individual authorization, the LSA licensee has an adequate control over the quality of the spectrum resource (no unexpected interference).
- Under LSA, an LSA licensee has control over the availability and quality of the spectrum resource, enabling him to invest in infrastructure leveraging these spectrum resources.

LSA is an enabler of spectrum harmonisation

We fully agree with the RSPG that *“access to harmonised spectrum and its use for wireless broadband services remain a pre-requisite for the achievement of the Digital Single Market while its non-commercial uses (e.g. aeronautical, space observation, meteorological, military) remain as important as ever for Europe”*.

Based on this background, it is clear that the scope of LSA is to improve the possibilities of vertical sharing, and in particular of sharing between mobile broadband services and other incumbent uses in order to make available harmonised spectrum available for mobile broadband to the market as soon as possible while maintaining important incumbent use where and when it is needed.

LSA and cognitive radios should not be confused

Qualcomm would share the view of RSPG that *“In addition to conventional planning methods, cognitive radio technologies and their capabilities (geolocation databases, sensing, etc.) may have a role as enablers for sharing under the LSA approach”*.

However, while it is unclear what is meant by cognitive radio technologies, it is clear that sensing is not related in any way to LSA. Sharing under LSA defines precisely who owns access rights to a specific frequency resource at any point in time, in any location. As such, ‘sensing’, which is only required if the information about who owns spectrum access rights to a specific resource is not available, doesn’t have a role to play in LSA.

LSA should support investment certainty

Qualcomm stresses that regulatory certainty is required to enable investment in networks providing predictable QoS. An individual right of use that would not define precisely the exact limits of the right of use would hamper investment in the corresponding band.

As such, the following proposal “*Under the LSA framework, the case of bands expected to be assigned to one or more incumbent users refers to the case of vacant bands or bands with expired rights of use, in which the Administration/NRA could include terms in the licences granted to the incumbent/s in order to facilitate future LSA arrangements with prospective LSA users.*” may prove to be disruptive by impacting the ability of the incumbent from investing in a network providing predictable QoS. Qualcomm recommends removing this consideration of future incumbents from the definition. LSA should be applied with incumbent having existing statutory rights of use (e.g. defense).

Proposed changes to the definition of LSA

Taking into account the aforementioned reasons, we would like to offer the following amendments to the LSA definition with the hope that those will enable a greater clarity of the concept which in return will foster investment and technology development by the industry:

*“A regulatory **vertical sharing** approach aiming to facilitate the introduction of **land mobile** radiocommunication systems operated by a limited number of licensees under an individual licensing regime in a frequency band already assigned ~~or expected to be assigned~~ to one or more incumbent users. Under the LSA framework, the additional users **are granted, by the NRA, an individual right of use authorization are allowed** to use the spectrum (or part of the spectrum) in accordance with **(i) the sharing rules framework conditions**, included in their rights of use of spectrum, thereby allowing all the authorized users, including incumbents, to provide a certain QoS and with **(ii) the new usage identification (e.g. MBB ECS) as set forth in the National Table of Frequency Allocation.** **Under LSA, the individual right of use authorization provides exclusivity among LSA licensees for a specific frequency resource**”.*