

Ofcom consultation on

“2.3 and 3.4 GHz spectrum award: consultation on a 3.4 GHz band plan, varying UK Broadband Limited’s license and a call for inputs on other aspects of the award”

Qualcomm Response

November 2013

Qualcomm greatly appreciates the opportunity to provide its response to Ofcom public consultation on “2.3 and 3.4 GHz spectrum award: consultation on a 3.4 GHz band plan, varying UK Broadband Limited’s license and a call for inputs on other aspects of the award”. In the scope of this consultation, Qualcomm is focusing its response on technology and spectrum policy issues solely.

Mobile data traffic growth has been impressive over the past few years, globally and in the UK in particular. If this growth rate continues, we will see a 1000x increase in the future. Higher data throughput and thus larger channel bandwidths (e.g. up to 100MHz) would be of importance to accommodate this demand. The release of the 2.3GHz and the 3.4 GHz frequency bands, alongside other bands, is certainly an important step to meet this increasing market demand and avoid any spectrum crunch in the medium and long-term which would lead to higher prices, degraded quality and data caps, and missed industrial and innovation growth opportunities.

Moreover, Qualcomm do believe that access to additional spectrum in the 2.3GHz band, beyond the 40 MHz currently being considered, can be realized in the UK through LSA/ASA. The industry - highly committed to the implementation of LSA/ASA MBB timely – expects the first practical implementation of LSA in the 2.3GHz in Europe as early as in 2015. In the United States, ASA is also considered by the FCC for the use of 3.5GHz for mobile broadband on a shared basis with coastal radars¹.

¹ http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-12-148A1.pdf

The implementation of LSA responds to the need for additional prime harmonized spectrum, to be released in a timely manner to increase the capacity, ubiquity and affordability of mobile broadband access. In this form of implementation, i.e. for mobile broadband, LSA corresponds to Authorized Shared Access (ASA) which has been promoted and backed by the mobile industry^{2 3}.

The industry would see beneficial if Ofcom sets up and coordinate a dedicated LSA working group – which would include MoD and industry - with the objective to

1. **define the sharing framework (geography and time) applying to the entire 2.3 GHz frequency band use for mobile broadband under LSA;**
2. **determine, with appropriate government stakeholders, the LSA spectrum usage rights definition and ASA valuation mechanism, reflecting the dynamic use and the sharing framework.**

Furthermore, Qualcomm believes that LSA will be a key policy framework to enable the future availability and use of 3.6-4.2 GHz for mobile broadband on a shared basis with fixed satellite. This will extend and enhance the ecosystem in the 3.4-3.6 GHz band considered in this consultation.

Question 1: Do you agree with our proposal to award the 3.4 GHz band in a way that is consistent with an unpaired (TDD-compatible) band plan only, and to make this decision sooner rather than later? If not, please set out your reasons and any evidence for your view.

We appreciate Ofcom's efforts to use the 3.4 GHz band in the UK in accordance with the ECC harmonisation Decision. Harmonisation is critical for the development of an ecosystem for the band. The 3.4 - 3.6 GHz will be an important future resource to increase the capacity of mobile broadband networks in Europe, leveraging LTE heterogeneous networks topologies and the emergence of a broad and healthy ecosystem will depend on a certain number of factors including a band plan enabling global economies of scale.

At this stage, the support of 3.4 – 3.6 GHz band either for TDD and/or FDD on Qualcomm's chipsets will depend on future market demand and ecosystem readiness. This demand has not materialized yet. The support of FDD and/or TDD modes on our chipsets will also be subject to future market demand.

Question 6: Which of the two bands would you be interested in: 2.3 GHz, 3.4 GHz or both?

Qualcomm believes that while macro cells operating at lower frequencies have so far dominated the mobile network operators' rollouts, higher frequencies such as the 2.3GHz and 3.4GHz bands will be

² http://www.digitaleurope.org/DocumentDownload.aspx?Command=Core_Download&EntryId=593

³ <http://www.gsma.com/spectrum/wp-content/uploads/2013/04/GSMA-Policy-Position-on-LSA-ASA.pdf>

a key marker of the future. Given current traffic requirement trends, access providers are increasingly looking at heterogeneous networks (HetNets) in which the wide-area coverage layers are integrated with other layers of 'small cells' to provide additional capacity where needed and we do believe that these bands can play a key role in the future to enhance capacity requirements in urban areas.

Qualcomm believes that an optimum outcome of the process would be achieved with bandwidths of at least 20MHz enabling deployment of LTE-Advanced.

There is a lot of interest and activities in Europe in relation to the 2.3GHz band. Some of the reasons for such a high interest can be found when considering the social and economic benefits when implementing LSA in the band. A new study by Plum Consulting called "the economic benefits of LSA in the 2.3GHz in Europe" has shown that the net economic benefits for Europe derived from LSA implementation at 2.3 GHz could be as much as €22bn (Figure 1).

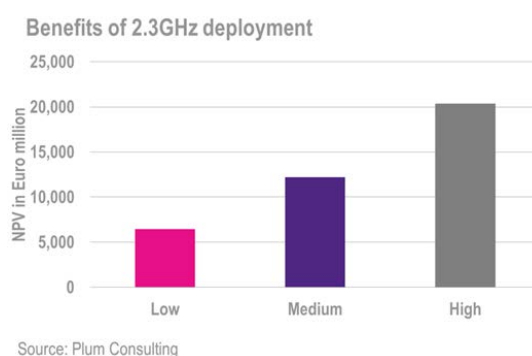


Figure 1: Benefits of 2.3GHz LSA in Europe (Source: Plum)

Moreover, there is a growing ecosystem in the 2.3GHz band (3GPP band 40) that is already used by mobile broadband networks around the world and implemented in many devices. According to GSA, 112 devices⁴ already support LTE in the 3GPP Band 40. Furthermore, CEPT, ETSI and the RSPG have all been working on the harmonised use of 2.3 GHz for mobile broadband under an LSA framework:

- An ECC Decision is planned for approval in June 2014. It provides the harmonised technical rules for mobile broadband use and guidelines for LSA implementation in the band.
- A draft ECC Report 205 was recently approved for public consultation by CEPT WG FM. It provides an overall definition and guidelines for the implementation of LSA.
- ETSI had also published a System Reference Document defining the criteria and operational features for LSA at 2.3 GHz⁵ and approved a work item on the requirements for LSA in the

⁴ Source GSA: http://www.gsacom.com/news/gsa_374.php

⁵ [http://docbox.etsi.org/RRS/RRS/05-CONTRIBUTIONS/2013/RRS\(13\)022025_TR_103_113_SRDoc_on_MBS_in_the_2300_MHz_2400_MHz_band_und.docx](http://docbox.etsi.org/RRS/RRS/05-CONTRIBUTIONS/2013/RRS(13)022025_TR_103_113_SRDoc_on_MBS_in_the_2300_MHz_2400_MHz_band_und.docx)

band: “System requirements for operation of Mobile Broadband Systems in the 2300-2400MHz band under LSA regime”.

- The RSPG recommended the European Commission to consider adopting complementary measures to further promote shared and flexible use of the 2.3 GHz band between wireless broadband applications and other services, based on LSA regulatory provisions, facilitating the long-term incumbent use of the band in the territory of those Member States that wish to maintain such use⁶.
- Furthermore, the RSPG released this month its opinion on LSA⁷ that is now endorsed by the 28 Regulators of EU Member States
- In France, a national committee involving all stakeholders (including Ministry of Defense, telecom regulator, MNOs, vendors) is working on the sharing framework between LTE and defense telemetry in the 2.3GHz band with results expected in June 2014 and a 6 months LSA mission – involving stakeholders’ hearing - was established by Mrs Fleur Pellerin (Minister of Digital Economy) tasking Professor Toledano to produce recommendations for the French Government to legislate on ASA/LSA usage rights⁸;

Qualcomm believes that LSA will enable Ofcom and MoD to make available additional spectrum in the 2.3 GHz, beyond the 40 MHz currently considered, in line with the harmonised framework being developed by CEPT. LSA can also play a role in future availability of the 3.6-4.2 GHz band.

Question 8: What do you envisage using the spectrum for (e.g. 4G services or other applications)?

Both frequency bands are set to play a substantial role in providing mobile broadband services leveraging LTE-Advanced features.

Question 9: Where would you expect to use the spectrum (Great Britain-wide or in specific geographical areas)?

We do not see any specific geographical area as having a greater interest over any other. That said, within a given geographical area, dense urban and urban areas could be of particular interest for access providers looking at these frequencies for network densification in a context of heterogeneous networks to support the explosive data growth.

⁶ “RSPG Opinion on Strategic Challenges facing Europe in addressing the Growing Spectrum Demand for Wireless Broadband”, https://circabc.europa.eu/d/a/workspace/SpacesStore/c7597ba6-f00b-44e8-b54d-f6f5d069b097/RSPG13-521_RSPG%20Opinion_on_WBB.pdf

⁷ https://circabc.europa.eu/sd/d/3958ecef-c25e-4e4f-8e3b-469d1db6bc07/RSPG13-538_RSPG-Opinion-on-LSA%20.pdf

⁸ <http://www.mission-spectre2014.fr/index.php?id=4>

Furthermore, should LSA be used by Ofcom and the Ministry of Defense to make available additional spectrum in the 2.3 GHz, beyond the 40 MHz currently considered, those additional frequencies are likely to be shared on a geographical or time basis between the LSA licensee and the incumbent.

Considering that greater social and economic benefits to UK consumers can be derived from the introduction of LSA in the 2.3GHz band to maximize the spectrum released for MBB in this band, Qualcomm invites Ofcom to establish a working group with the industry and MoD to investigate where and how much additional spectrum could be made available in the UK under LSA.

Question 10: What types of device would you want to use the spectrum for, and when would they be available?

A broad range of devices are already available for both frequency bands including handhelds and mobile CPE. According to GSA⁹, 112 devices already support LTE in the 3GPP Band 40. Most of the 2.3 GHz devices available at present are designed for the larger Asian market and thus in the future Europe and UK could benefit from global economies of scale. There are already some popular handsets in the market that support 2.3 GHz as well as other European bands.

Question 15: Do you have any views on the non-technical licence conditions discussed in this document, including coverage and roll-out and “use it or lose it”?

Qualcomm agrees with Ofcom that there might be legitimate reasons for spectrum remaining unused – the licensee may be holding back until it defines a suitable commercial opportunity or until the technology it wishes to use and associated ecosystem are ready. Imposing obligations such as “use it or lose it” would chill the incentives to invest and innovate in the spectrum and ultimately reduce the benefits for consumers and citizens. Furthermore, it should be noted that with LSA will enable the use of spectrum efficiently on a needed basis.

Question 17: Are there any reasons why these bands should be assigned for low-power use? Would such uses be appropriate even if purchasing a license for low-power use would cost the same as for high- power use?

Qualcomm expects that access providers will mostly use these bands, because of their favorable electromagnetic characteristics in interference management in high density urban areas, to deploy small cells in the context of heterogeneous networks (HetNets). This will be a market and business decision. Therefore, Qualcomm agrees with Ofcom that these frequency bands should not be reserved for low power use but should be assigned on a technology and service neutral basis allowing full flexibility to licensees to make the decision, subject to compliance with technical parameters and license conditions, on how best to use their spectrum assets and build their network to deliver to their target customers in their target market and geography the desired QoS.

⁹ Source GSA: http://www.gsacom.com/news/gsa_374.php