Exploring Future Use of the Unpaired 2100 MHz (1900 - 1920 MHz) Spectrum

Cellnex UK Response

May 2023

Overview of Cellnex UK

Cellnex Group

This response is submitted by Cellnex UK (link), part of Cellnex Group (link) which:

- Supports over 420 million mobile connections across Europe
- Operates >70,000 mobile sites today, which will grow to >130,000 by 2030
- Is Europe's leading neutral host mobile infrastructure provider, covering 12 countries: Austria, Denmark, France, Ireland, Italy, Netherlands, Poland, Portugal, Spain, Sweden, Switzerland and the UK
- Provides mobile infrastructure services, private and mission-critical networks, distributed antenna systems and small cells, and smart/IoT and innovative services
- Sixteen mission critical networks operated in Spain for Public Safety (emergency bodies)
- Forty private networks operated across Europe for Critical Business (enterprise)
- Had an annual turnover of €2.5bn in 2021
- Is listed on the main sustainability indices, and evaluated by highly reputable international analysts such as CDP, Sustainalytics, FTSE4Good, MSCI and Standard Ethics

Where possible, we have sought to provide international examples from the wider Cellnex Group in our response.

Cellnex UK

We are the trusted partner of all the major UK mobile network operators, hundreds of private businesses, the emergency services, as well as the UK Government, specifically Cellnex UK:

- Is the UK's leading independent wireless connectivity infrastructure company
- Operates >9,000 mobile sites today, which will grow to >13,000 by 2031
- Has deployed over 1,000 small cells to date
- Is a provider of private networks in campus and indoor environments
- Is an indoor mobile coverage provider, most notably in the Etihad stadium in Manchester
- Is deploying contiguous mobile coverage and capacity along the 81km Brighton to London Mainline and three major stations
- Has won three DCMS 5G competitions, working collaboratively with universities and start-ups to deliver 5G innovation
- Employs around 350 people across four major UK locations – Reading, Manchester, Scotland and Leamington Spa
- Has invested £6.1bn in the UK since 2016

Basis of Response

We have reviewed and commented on this consultation from the perspective of Cellnex UK being a neutral host infrastructure provider who is currently deploying contiguous high quality public mobile coverage along the railway between London and Brighton. In addition we have drawn upon wide Cellnex Group expertise and insights regarding the rail and utilities requirements across Europe.

1. Do you agree with our provisional view that the current non-use of the unpaired 2100 MHz spectrum for high power mobile services and potential future use of the 1900 – 1910 MHz spectrum for the ESN Gateway, may not be optimal given the possible alternative use cases of the spectrum?

Cellnex agrees with Ofcom's provisional view that there are other use cases which are likely to be optimal for this spectrum as compared to current non-usage for public mobile networks and potential, but not confirmed, usage for ESN Gateways.

2. Do you agree with our provisional view that of the alternative high power uses of the unpaired 2100 MHz spectrum, national infrastructure uses such as rail and utilities are likely to be the most optimal?

Cellnex agrees that these uses, specifically rail, are currently the most optimal future uses of this spectrum. However we note the revocation timescale of 5 years and as a result this could change, but given pan European activity to harmonise 1900 – 1910/1920 MHz for FRMCS this seems unlikely.

Cellnex has highlighted the pressing need for utilities spectrum in a number of its previous responses to Ofcom consultations. We note here, in a similar manner to the ESN Gateways, there are a number of viable spectrum options for the utilities. This contrasts with spectrum for the rail sector where harmonisation is occurring around a two bands band which the UK would need to align with to obtain economy of scale benefits; we expand on these points below.

2.1. Spectrum for Rail

Cellnex UK's believes the optimal use of this spectrum is to support FRMCS deployment across the railway industry as:

- The need to run GSM-R and FRMCS in parallel requires additional spectrum to be allocated for Railway Mobile Radio ('RMR')
- 1900 MHz – 1910 MHz has been harmonised by CEPT for RMR; hence a European wide ecosystem of testing, equipment, deployment and other associated services will emerge delivering significant economies of scale
- If the UK were to select an alternative spectrum band to deploy FRMCS it would incur considerable economic and operational disadvantages

In addition there are potential future requirement for higher capacity safety critical applications (e.g. live CCTV feeds from Level Crossings to trains) which may require up to 20 MHz of contiguous spectrum. Fortuitously in the UK this could be achieved by allocation of 1900 – 1920 MHz to RMR ensuring a 'future proofed' outcome and spectrum roadmap for the UK rail industry over the next 20 years.

Timing and Further Considerations

Although timescales for FRMCS deployment are not confirmed, the European Union has already mandated Member States to designate and make available on a non-exclusive basis the unpaired frequency Band 1 (1900-1 910 MHz) for Railway Mobile Radio at the latest by 1 January 2025 through the Commission implementing decision (EU) 2021/1730 (link) and there appears to be broad pan Europe industry consensus for:

- Tests and trials from early 2025 onwards following finalisation of standards
- Migration commencement from 2027 onwards

Given a revocation period of 5 years from 2024 this would be result in spectrum only being available in 2029, but we note Ofcom's view that licensees might return licences sooner enabling the UK to align to these timescales.

We note that GSM-R in the UK currently operates in 876.0 – 880.0 MHz and 921.0 – 925.0 MHz (i.e. 4 MHz channel). To enable required joint operation of GSM-R and FRMCS and associated successful migration these would need to be expanded to 874.4 – 880.0 MHz and 919.4 – 925.0 MHz (e.g. 5.6 MHz channel). Ofcom should take this requirement and the timescales above into account alongside its considerations of the 1900 – 1920 MHz spectrum.

Brighton Mainline

Cellnex is deploying infrastructure to support contiguous high performance public mobile coverage along the c.81 km London and Brighton mainline, which will resulting in a significant number of new macro sites being built. The radio frequency planning has been undertaken assuming usage of sub 2 GHz MNO spectrum. As a result allocation of 1900 – 1920 MHz to the rail industry would enable re-use of this infrastructure as inter site distances and other factors will already be optimised to this type of spectrum.

We understand there are similar plans for the wider UK rail network, hence allocation of this spectrum to rail would increase the positive economic impact of these deployments via re-use of existing infrastructure.

2.2. Spectrum for Utilities

We note Ofcom's intention to consult on the *future communications needs of utilities* within its 2023/2024 work plan; this is encouraging given the pressing need for dedicated spectrum to be allocate to enable energy control/smart grid and associated achievement of the UK's net zero targets.

From our engagement with utilities and their associated bodies their focus is on achieving release of sub 1 GHz spectrum within harmonised 3GPP bands. This is seen as the most viable way of achieving their required wide geographic area coverage at a site count which is economic for closed group of users. There is a particular focus on the 400 MHz zone, where there are several potential options, alongside a secondary interest in the 700 MHz zone.

The potential for a range of spectrum solutions for utilities contrasts with rail where only 1900 – 1910 MHz is a harmonised across Europe for this purpose. As a result whilst use of this spectrum by utilities would be more optimal that its current non-use, we believe that usage by the rail industry would be more optimal than that of utilities.

As per our previous consultations responses Cellnex UK notes the considerable benefit that could be achieved if the same network(s) and spectrum were utilised by the Gas and Water industries as they seek to transform their operations and achieve their own environmental targets. This is something a neutral host operator, such as Cellnex, would be well placed to deliver for the utilities sector. We look forward to responding to Ofcom's consultation on the spectrum needs of the utilities sector.

3. Do you agree with our assessment that liberalising the spectrum and relying on trading is unlikely to be effective in securing optimal use of this spectrum?

As per our response to Question 2 it is important that any process realises contiguous spectrum with sufficient/harmonised bandwidth and channel sizes to enable the optimal use of this spectrum.

Given spectrum ownerships is currently split between three licensees who would all need to align on a transfer strategy and that negligible spectrum trades having been executed to date it would seem highly unlikely that a liberalise/trade approach would result in a successful transfer of spectrum for the most optimal use (i.e. utilisation by the railway industry for FRMCS).

4. Do you agree that revocation of the licences to enable reallocation may therefore be necessary to secure optimal use of the spectrum and that this is objectively justified and proportionate?

Given that a 'liberalise/trade' mechanism is unlikely to work and absent of Ofcom being able to enact any other mechanism to achieve transfer this would appear to Cellnex UK to be the least worst options for achieving the optimal use of this spectrum.

5. Do you have further views / comments that you wish to make in respect of this consultation?

Cellnex notes the following regarding FMRCS and rail spectrum across Europe based on its wide group experience.

Harmonizing the band using the same frequency in all Pan-European countries will improve interoperability, cost effectiveness and reliability which ultimately benefits railway operators and passengers as:

- It enables interoperability between different railways systems and countries, allowing seamless communication and exchange of data among the; this is particularly important as more railway systems become connected across borders.
- Harmonization promotes economies of scale, and cost-effectiveness; with standardised frequency bands, equipment manufacturers can produce communication devices in larger quantities, driving costs down
- Harmonizing frequency usage ensures that there is no interference with other nearby wireless communication systems, which can affect the performance and reliability of FRMCS and other systems.

UNIFE, released in September 2021 the paper: "Successful Transition to FRMCS" where, regarding frequency spectrum, it acknowledged that the spectrum harmonisation of 2 x 5.6 MHz FDD in the 900 MHz range (874.4-880 MHz uplink / 919.4-925 MHz downlink) and 1 x 10 MHz TDD in the 1900 MHz range (1900-1910 MHz) was a major milestone towards FRMCS but also pointed out that "the harmonised spectrum available to railways remains relatively small and may not be sufficient on its own for all the operational and business applications envisioned by railways in the FRMCS User Requirements Specifications" (link).

Cellnex notes key industry players and associations are cooperating with each other to move forward the digitalisation of railways and getting a consensus. The International Union of railways ('UIC') is leading the FRMCS standardization and implementation together with the European Rail Supply Industry ('UNIFE'), of which Cellnex is member. As a result of this several early FRMCS pilots and trials are being conducted across Europe:

- In Switzerland, SBB implemented field tests to carry out a feasibility study within the Smartrail 4.0 program during Q3-2020, considering different scenarios in the 900 MHz and 1900 MHz bands
- SBB tendered in 2022 the combined radio planning for GSM-R 900Mhz , FRMCS 1900 MHz and MNO in 3.5Ghz
- In 2023, SBB has announced the forthcoming installation of 43 antenna locations to set up FRMCS pilot operations along a corridor
- In Germany, DB has in place the Digitale Schiene Deutschland program, conducting FRMCS field tests with solutions based on the current 3GPP Release 16 mobile communications standard
- In France, SNCF Reseau as part of the 5G Rail project will conduct FRMCS field tests in aprox 7Km length in Future FRMCS Spectrum 1.9 GHz (5G band n39)