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Exploring future use of the unpaired 2100 MHz (1900 - 1920 MHz) spectrum

CONSULTATION:

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Annex

1. Overview

In this document we set out our provisional view on the possible future use of the unpaired 2100 MHz spectrum.

Ofcom is responsible for managing the UK's radio spectrum, the finite resource crucial to delivering a wide range of valuable wireless applications benefitting different users, and Ofcom has the job of ensuring it is used in the best interests of all in the UK.

We want to secure optimal use of the unpaired 2100 MHz spectrum and to do so in an efficient and timely manner to enable citizens and consumers to benefit from new services in the spectrum.

In brief

Our provisional views are:

- The current non-use of the unpaired 2100 MHz spectrum for public mobile services and EE's potential use of its 4G licence for the ESN Gateway may not be optimal because there may be other higher value users of the spectrum.
- We consider there may be other spectrum frequencies capable of supporting the ESN Gateway and we are doing further technical work to assess this.
- There are potential complexities to achieving optimal use through trading in this band, such that we cannot rely on it to achieve our policy objective.
- Regulatory intervention by revoking the existing licences to enable Ofcom to reallocate the spectrum for new uses may be necessary to achieve our objective of optimal use.

We welcome stakeholder views on the points set out above and any other relevant considerations relating to this spectrum.

2. Introduction

Background

Licence history

2.1 The unpaired 2100 MHz spectrum[1] was auctioned together with the paired 2100 MHz spectrum[2] in April 2000 for the deployment of third generation (3G) national mobile networks. The licences were initially granted for a fixed period of 20 years.

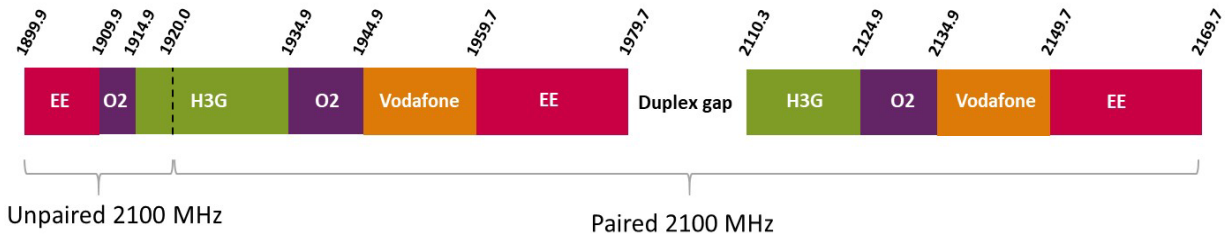
2.2 Since the auction, several mergers and acquisitions have occurred in the mobile market resulting in the current four mobile network operators (MNOs); three of these MNOs hold the unpaired 2100 MHz spectrum; Everything Everywhere Ltd[3] (EE), H3G and Telefónica UK Ltd[4] (O2).

2.3 The 2100 MHz spectrum holdings are shown in Table 1 and Figure 1 below.

Table 1: Spectrum holdings in the 2100 MHz spectrum

2100 MHz band	EE	H3G	O2	Vodafone
Paired spectrum	40 MHz	29.5 MHz	20 MHz	29.6 MHz
Unpaired spectrum	10 MHz	5.1 MHz	5 MHz	-

Figure 1: Spectrum holdings in the 2100 MHz spectrum



2.4 In June 2011, Ofcom varied[5] each of the 2100 MHz licences in order to give effect to a Government Direction (the Direction).[6] Amongst other things, each of the licences was made indefinite (subject to revocation by Ofcom or surrender by the licensee) and included a new provision requiring the payment of annual licence fees (ALF) from 1 January 2022.

[1] 1899.9 - 1920 MHz.
[2] 1920 - 1979.7 MHz paired with 2110.3 - 2169.7 MHz.
[3] Acquired by BT in 2016.
[4] Merged with Virgin Media in June 2021 and now known as Virgin Media 02 (VM02).
[5] Ofcom, Statement on variation of 2100 MHz Third Generation Mobile Wireless Telegraphy Act Licences, June 2011.
[6] The Wireless Telegraphy Act 2006 (Directions to OFCOM) Order 2010

2.5 In 2013, we consulted on and subsequently granted variation requests from mobile operators to liberalise their spectrum licences in several mobile bands, including the 3G licences for the 2100 MHz spectrum. We decided to remove the restriction on using 3G (UMTS) technology and allow the use of 4G technologies including WiMAX and LTE.[7] However, the liberalisation of these licences did not include the 2100 MHz unpaired (TDD[8]) frequencies at that time. This was because the unpaired frequency ranges included in the 2100 MHz licences were the subject of ongoing regulatory work in Europe to examine potential future uses and the technical conditions that might be required to enable such uses.[9]

2.6 In the absence of concrete plans to deploy services using the unpaired spectrum in these licences, we did not consider it sensible to vary the technical conditions for UK operators at that time. The 2100 MHz unpaired spectrum therefore remained as 3G only and was placed into a separate licence schedule (Schedule 2) of the 2100 MHz licences.[10]

2.7 We noted at the time, that an output of the work in Europe was a recommended set of technical conditions that would be appropriate for 4G use of these TDD frequencies. It recommended significantly lower power limits than in the current licences (with these power limits being different depending on where the frequency block is within the frequency range) in order to protect adjacent FDD use of the 2100 MHz band. In light of this we said at the time that if any of the operators made a formal application to vary their licences, the sole effect of which would be to reflect these technical conditions for 4G use of their TDD blocks, then we would consult on a proposal to make the appropriate licence variations.[11]

2.8 In 2017, following such an application by EE to vary it's licence, Ofcom consulted and decided to vary the terms of EE's licence to support the provision of a gateway for extended coverage of the new Emergency Services Network (ESN), using 4G (TD-LTE[12]) in the unpaired frequencies 1899.9 to 1909 MHz.[13] We did this by adding a schedule to EE's 2100 MHz licence (Schedule 3) which enables LTE at the specified power level,[14] with additional conditions specifically for the ESN network. We did not receive requests for the other two 2100 MHz unpaired TDD spectrum licences to be amended for 4G use.

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[7] Long Term Evolution (LTE) is a 4G mobile technology. Worldwide Interoperability for Microwave Access (WiMAX) is a wireless technology, similar to WiFi, but with a longer range which can cover many kilometres.
[8] TDD (also known as TD or Time-Division Duplexing) is used in networks where the downlink and uplink frequencies used to transmit are the same (i.e. unpaired spectrum), but the time slots for each are different.
[9] Ofcom, Statement on the Requests for Variation of 900 MHz, 1800 MHz and 2100 MHz Mobile Licences, July 2013, paragraph 3.8.
[10] Terms of the 2100 MHz licences can be found on Ofcom's website.
[11] Ofcom, Statement on the Requests for Variation of 900 MHz, 1800 MHz and 2100 MHz Mobile Licences, July 2013, paragraph 3.8
[12] TD-LTE means the TDD (time division) variant of LTE. TD-LTE uses unpaired spectrum.
[13] Ofcom, EE application for licence variations in support of enhanced mobile communications for the emergency services, January 2017.
[14] The licence permits 43 dBm EIRP in 1899.9 – 1904.9 MHz and 30 dBm in 1904.9 – 1909.9 MHz EIRP.

Annual licence fee consultation for the 2100 MHz spectrum

2.9 Ofcom published a consultation in July 2021 seeking views on the proposed level of annual licence fees that should apply to the 2100 MHz spectrum, including the unpaired spectrum (the July 2021 consultation).[15] Although the unpaired spectrum was not being used at that time to provide mobile services, we considered that for several reasons it should be possible to use the unpaired 2100 MHz spectrum for the deployment of high-power mobile services in the future.

2.10 We therefore consulted on the view that the next highest value use case of the unpaired 2100 MHz spectrum also comes from mobile services, and we expected that the next highest value user for the spectrum would be another MNO. Subsequently, in line with the framework we set out in the Strategic Review of Spectrum Pricing (SRSP)[16] we proposed to set an annual licence fee of £0.290m per MHz for unpaired spectrum that would apply from 1st January 2022.

2.11 We received four stakeholder responses to this consultation: BT (parent company of EE), Three, Vodafone and Virgin Media O2 (VMO2). The non-confidential version of the responses are available to view on the Ofcom website.

2.12 Vodafone and VMO2 agreed that high power mobile services are likely to be the next highest value user case for the spectrum, while BT disagreed that this was the case in the near term and that the next highest value user could be other mobile applications.[17] Three was of the view that there was no excess demand currently or in the future for its 1914.9 - 1920 MHz spectrum as this spectrum would have to be a guard band to enable the high-power mobile services in the band that Ofcom envisaged.[18]

2.13 BT, Three and VM02 indicated that they had no plans to deploy high-power mobile services using their unpaired 2100 MHz spectrum in the foreseeable future and cited several barriers that prevent future economical deployment of high-power mobile services. The barriers cited by respondents were:

- **Lack of an equipment ecosystem.** No base stations are available which operate across the band and if developed would take years to become available (BT[19], VMO2[20]) and would be high cost due to lack of scale (VMO2). Mobile devices currently produced in China that support this band would need to be adapted which would take years to become available and even longer for a substantial number of users to have devices that support the band (VMO2[21]).
- **Compatibility with adjacent paired 2100 MHz spectrum and users below 1900 MHz**. A guard band may be needed to achieve compatibility with paired 2100 MHz spectrum.

[15] Ofcom, Proposed annual licence fees for 2100 MHz spectrum, July 2021.
[16] SRSP: A revised framework for Spectrum Pricing, 2010.
[17] Vodafone consultation response, p.4; VMO2 consultation response, p.4; BT consultation response, section 3.1.2.
[18] Three consultation response, paragraph 2.3.
[19] BT consultation response, p.6.
[20] VMO2 consultation response, p.6.
[21] VMO2 consultation response, p.7.

This limits the amount of spectrum available which in turn is less economical to deploy high-power mobile (BT[22]). Comparisons were drawn with guard bands used between paired and unpaired 2.6 GHz spectrum (VMO2[23], Three) and between 700 MHz SDL and FDD uplink spectrum (Three[24]). Compatibility with spectrum below 1900 MHz needs to be considered in the event that the 1900 - 1915 MHz unpaired spectrum is used to deploy high power mobile (VMO2).

- **Limited bandwidth.** Existing holdings by individual MNOs (5 MHz and 10 MHz) do not make it economically viable to deploy mobile services. A minimum of 10 MHz is needed for economically viable mobile deployment. The band can only support a maximum of two MNOs and requires effective interference management with adjacent paired 2100 MHz spectrum in the absence of a guard band (VMO2[25]).

2.14 Based on the responses we received, we were concerned in our Statement on Annual Licence fees for 2100 MHz Spectrum[26] that the unpaired 2100 MHz spectrum would continue to be unused by the current licensees. We explained that we would consider how we might enable this spectrum to be used more effectively in the future, noting potential emergency services gateway use, European harmonisation for railway services and other potential demands, including the utilities sector spectrum requirement for a secure network.

2.15 We said we would consult on the future use of the band, including on a proposal to revoke the unpaired licences and that it would be appropriate to reconsider the issue of fees for the unpaired portion of the band at that time and within that context.

2.16 This consultation is the next step in the process to decide the future use of the spectrum.

Relevant legal framework

2.17 Ofcom has a number of duties under the Communications Act 2003 (the "Communications Act") and the Wireless Telegraphy Act 2006 (the "Wireless Telegraphy Act"), which are relevant to its spectrum management functions.

2.18 The Communications Act sets out Ofcom's general duties, including its principal duty to further the interests of citizens in relation to communications matters and to further the interests of consumers in relevant markets, where appropriate by promoting competition[27]. By virtue of these duties, Ofcom is required to secure, among other things, the optimal use for wireless telegraphy of the electro-magnetic spectrum and the availability of a wide range of electronic communications services throughout the United Kingdom.[28]

[22] BT consultation response, p.7.
[23] VMO2 consultation response, p.8.
[24] Three consultation response, paragraphs 2.4.
[25] VMO2 consultation response, p.8.
[26] Ofcom, Annual licence fees for 2100 MHz spectrum, December 2021.
[27] Please refer to section 3(1) of the Communications Act.
[28] Please refer to section 3(2) of the Communications Act.

2.19 In performing its duties, Ofcom also has to have regard to a number of factors as it appears relevant in the circumstances, including the desirability of promoting competition and encouraging investment and innovation in relevant markets and the interests of everyone who may wish to use the spectrum for wireless telegraphy.[29]

2.20 The Communications Act further provides that, in performing its duties, Ofcom must in all cases have regard to the principles of transparency, accountability, proportionality, and consistency, as well as ensuring that its actions are targeted only at cases in which action is needed.[30]

2.21 The Wireless Telegraphy Act also imposes a number of further duties relating to spectrum management. These duties include having regard to:

a) the extent to which the electromagnetic spectrum is available for use, or further use, for wireless telegraphy;

b) the demand for use of the spectrum for wireless telegraphy;

c) the demand that is likely to arise in future for the use of the spectrum for wireless telegraphy; and

d) the desirability of promoting:

i) the efficient management and use of the part of the electromagnetic spectrum available for wireless telegraphy;

ii) the economic and other benefits that may arise from the use of wireless telegraphy;

iii) the development of innovative services; and

iv) competition in the provision of electronic communications services.[31]

2.22 Under the Wireless Telegraphy Act Ofcom may revoke or vary any wireless telegraphy licence, if: (a) the standards and procedures of Schedule 1 to the Wireless Telegraphy Act are met; and (b) the terms and condition of the licences do not curtail our ability to revoke/vary the licence.

2.23 Further detail on the relevant legal framework is set out in Annex 1 of this consultation.

Impact assessment

2.24 The analysis presented in Section 3 of this consultation represents an impact assessment as defined in section 7 of the Communications Act 2003. Impact assessments provide a valuable way of assessing different options for regulation and considering the potential effects of our proposals. They form part of best practice policy making.[32] In this

[29] Please refer to section 3(4) of the Communications Act.
[30] Please refer to section 3(3) of the Communications Act.
[31] Please refer to section 3 of the Wireless Telegraphy Act.
[32] For more information on our approach to impact assessments, see our published guidelines

consultation we have considered the impact of our provisional view on affected licensees as well as more generally their likely impact on citizens and consumers.

2.25 We have also given careful consideration to whether our proposals will have a particular impact on persons sharing protected characteristics (broadly including race, age, disability, sex, sexual orientation, gender reassignment, pregnancy and maternity, marriage and civil partnership, and religion or belief in the UK, and in Northern Ireland also dependents and political opinion), and in particular whether they may discriminate against such persons or impact on equality of opportunity or good relations. This assessment helps us comply with our duties under the Equality Act 2010 and the Northern Ireland Act 1998.[33] We do not consider that our proposals have equality implications under the 2010 Act or the 1998 Act.

[33] Further detail is given in section 149 of the Equality Act 2010 and section 75 of the Northern Ireland Act 1998.

3. Our view on the unpaired 2100 MHz spectrum

Summary

3.1 In this section we explain our view that:

i) the current non-use of the unpaired 2100 MHz spectrum for public mobile services and EE's potential use of its 4G licence for the ESN Gateway for the future, may not be optimal because there could be other higher value users of the spectrum; and

ii) in light of potential complexities to achieving optimal use through trading, it may be more appropriate for Ofcom to intervene to achieve optimal use of the spectrum by revoking the current licences to enable us to reallocate the spectrum.

3.2 We are seeking stakeholder feedback on our assessment and any other relevant considerations for the future use of this spectrum.

Our policy objective

3.3 The unpaired 2100 MHz spectrum has remained unused since 2000 with no planned future use for public mobile services (except potentially for the ESN Gateway). In the context of our duties relevant to our spectrum management functions, we place particular weight on the duty to ensure optimal use for wireless telegraphy of the electro-magnetic spectrum.

3.4 We therefore consider that our policy objective when considering the future use of the band should be to assess optimal use. We interpret optimal use to mean spectrum is used in a way that maximises the benefits that people, businesses and other organisations derive from its use, including the wider social value of spectrum.[34]

3.5 In assessing this, we have had regard to the interests of everyone who may wish to use the spectrum for wireless telegraphy, including how optimal use can be achieved in an efficient and timely manner. We have also considered the desirability of encouraging investment to enable citizens and consumers to benefit from the development of/investment in new wireless services.

Assessment of optimal use of the unpaired 2100 MHz spectrum

Use by current licensees

High power mobile services

3.6 The unpaired 2100 MHz spectrum has remained unused for mobile services since its award in 2000. In response to the July 2021 consultation, the three MNOs holding the spectrum

[34] Ofcom's Spectrum management strategy for the 2020s, July 2021, paragraph 2.5.

have indicated they have no plans for future high power wide area mobile use in the band.[35]

3.7 The European Conference of Postal and Telecommunications Administrations (CEPT) studied the 1900 - 1920 MHz band in 2015 and noted in a report that although licensed in many countries, the spectrum has remained unused in Europe since being awarded. In some countries the licences have already been surrendered. Our understanding is that the situation has not changed since this report was produced in terms of mobile network use.[36]

The ESN Gateway

3.8 In 2015, the Home Office contracted EE to provide mobile services for a new ESN based on its LTE network as the Home Office transitions from the Airwave network using TETRA technology[37] to LTE.[38] The Home Office contracted with EE to provide an ESN Gateway device solution also based on an LTE air interface, that would be installed in emergency vehicles to extend the EE ESN coverage (using LTE) where needed.[39] As noted above in paragraph 2.8, EE has been exploring the use of its 1900 - 1910 MHz band to support the Home Office's ESN Gateway solution and in 2017 was granted a licence variation which enabled that spectrum[40] to be used for the ESN Gateway.

3.9 The Home Office is currently procuring a new supplier for the ESN, which means a change to the original timeline for ESN delivery. This means that EE's 2100 MHz unpaired spectrum usage is currently limited to testing and trials, until the transition to ESN begins. Related product and technology development and testing is ongoing.

3.10 The ESN Gateway solution is a niche application intended to provide an extension to mobile coverage if the emergency services are responding to an incident in an area or location which is beyond the normal coverage of EE's macro network or within a building where the signal level from the external network is insufficient to support reliable communications.[41] ESN terminal devices would connect to the ESN Gateway device using TD-LTE technology operating in EE's 2100 MHz unpaired spectrum, which will in turn connect to the main EE

[35] BT concluded that using the unpaired 2100 MHz spectrum for high-power mobile use is extremely unlikely, BT consultation response to 2100 MHz ALF consultation, p.7. Virgin O2 stated that there is no current use case for unpaired 2100 MHz spectrum, and that the (uncertain) potential of a future use case will be limited, Virgin O2's consultation response to 2100 MHz ALF consultation, p.10. Three stated that the only way the unpaired 2100 MHz spectrum could be used for high-power mobile services was if their block was unused, i.e. kept as a guard band. Three's consultation response to 2100 MHz ALF consultation, Paragraph 2.3.

[36] CEPT analysed alternative usage of the unpaired terrestrial 2 GHz bands (1900 - 1920 MHz and 2010 - 2025 MHz) other than public mobile services and noted the bands were unused for UMTS mobile services. CEPT Report 52. No other country (other than the UK) in CEPT stated they were using this spectrum when 1900 MHz was a candidate band for harmonisation for rail use.

[37] Terrestrial Trunked Radio (TETRA) is a digital two-way radio standard developed to take advantage of the benefits of digital technology over analogue systems. https://www.motorolasolutions.com/en_xu/solutions/what-is-tetra.html

[38] EE selected to deliver critical new 4G voice and data network for Britain's emergency services, December 2015

[39] Ofcom, EE application for licence variations in support of enhanced mobile communications for the emergency services, January 2017, Paragraph 2.1.

[40] As noted above, EE's licence permits 43 dBm EIRP in 1899.9 - 1904.9 and 30 dBm in 1904.0 - 1909.9 MHz.

[41] ESN coverage extender

network via EE's other spectrum holdings. [42] The ESN solution would be deployed at a particular location where and when required for a specific incident.[43]

Potential future uses of the spectrum

3.11 In considering potential future uses of the unpaired 2100 MHz spectrum, we have assessed the technical characteristics of the band and potential alternative uses, including where applicable European harmonisation measures. The latter may be relevant as it impacts the availability of an equipment ecosystem which in turn influences demand for the spectrum.

Technical characteristics of the unpaired 2100 MHz spectrum

3.12 The unpaired 2100 MHz spectrum supports mobile technology and could therefore be used for a range of applications, other than public mobile networks. We consider that the 1900 - 1915 MHz band could be used for other high power uses and that 1915 - 1920 MHz could be used for lower power use for the following reasons:

a) Various CEPT[44] and ECC[45] reports have looked at the coexistence of a high power TDD mobile base station transmitter (e.g. 61 dBm EIRP) immediately adjacent to a FDD mobile base station receiver, mainly in the 2.6 GHz mobile band, with one Chinese study submitted to the ITU[46] looking at 1.8 GHz. The summary conclusion for the coexistence of a high power TDD mobile base station transmitter adjacent to a FDD base station receiver is that either a 5 MHz guard band is required, or a lower TDD power of 25 dBm EIRP (i.e. a "restricted channel") with additional front-end filtering as well. For a TDD mobile service in 1915 - 1920 MHz, CEPT report 19[47] indicates that 25 dBm is the maximum power for coexistence with a FDD mobile base station receiver above 1920 MHz. CEPT also notes that deployment restrictions and special site engineering could also be effective interference mitigations.

b) We note that the CEPT studies highlighted above are based on public mobile service use. There may also be scope to increase the power level for future applications in the 1915 - 1920 MHz above 25 dBm depending on the specific future use case under consideration; for example for the ESN gateway which is occasional and transitory use, while still protecting the FDD mobile base station receiver above 1920 MHz.

[42] Ofcom, EE application for licence variations in support of enhanced mobile communications for the emergency services, January 2017.
[43] BT's response to Ofcom's proposed annual licence fees to 2100 MHz spectrum, September 2021, p.5.
[44] Report from CEPT to the European Commission in response to the Mandate to develop least restrictive technical conditions for frequency bands addressed in the context of WAPECS, CEPT Report 19, 30 October 2008.
[45] Coexistence between mobile systems in the 2.6 GHz frequency band at the FDD/TDD boundary, ECC Report 119, June 2008.
[46] Spectrum Management for 4G-LTE, October 2016, slides 44 and 45.
[47] Report from CEPT to the European Commission in response to the Mandate to develop least restrictive technical conditions for frequency bands addressed in the context of WAPECS, CEPT Report 19, 30 October 2008.

c) More recent CEPT studies such as ECC Report 314 considered coexistence between a Future Railway Mobile Communication System (FRMCS) at 65 dBm/10 MHz in 1900 - 1910 MHz with adjacent services.[48]

   i) On coexistence of FRMCS with DECT services below 1900 MHz, the report noted that there may be some risk of interference in worst case scenarios from FRMCS to DECT use outdoors (for programme making and special events) but it should be manageable in most cases, noting that DECT operates on a non-interference, non-protection basis.

   ii) On coexistence of FRMCS with mobile services above 1920 MHz, the report noted that mobile base station receivers above 1920 MHz could be at risk of being blocked by nearby FRMCS base stations and that one way that this risk could be mitigated was by improving the selectivity of mobile base stations above 1920 MHz as specified in ETSI TS 103 807.[49] ECC Report 318 also noted FRMCS is only considered in 1900 - 1910 MHz where the mobile base station blocking level is better.[50]

3.13 Our view from a technical coexistence perspective is that it should be feasible to deploy high power use in 1900 - 1915 MHz and lower power use in the 1915 - 1920 MHz band, assuming the mobile base station receivers above 1920 MHz have sufficient selectivity or geographical separation to prevent it being blocked by future high and low power services in 1900 - 1920 MHz.

Railway communications

3.14 European harmonisation measures could also mean that there is demand for the unpaired 2100 MHz spectrum to be used for railway communications.

3.15 In Europe, CEPT has been studying alternative uses of the unpaired 2100 MHz spectrum (other than for mobile electronic communications services through terrestrial cellular networks) since 2012.[51]

3.16 The European Commission[52] requested CEPT in July 2018 to investigate use of 874.4 - 880 MHz / 919.4 - 925 MHz and 1900 - 1910 MHz for existing and future critical railway applications, taking into account simultaneous operation requirements for existing Global System for Mobile Communications Railways (GSM-R) and during migration to its successor, the FRMCS as noted in the paragraph above.

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[48] Co-existence between Future Railway Mobile Communication System (FRMCS) in the frequency range 1900 - 1920 MHz and other applications in adjacent bands, 21 May 2020.
[49] IMT Cellular Networks Base Stations (BS) Additional Regulatory Requirements, ETSI TS 103 807, v1.1.1 (2021-10), Table 4.1.2-1.
[50] Compatibility between RMR and MFCN in the 900 MHz range, the 1900-1920 MHz band and the 2290-2300 MHz band, ECC Report 318, 3 July 2020.
[51] Mandate to CEPT to undertake studies on the harmonised technical conditions for the 1900 - 1920 MHz (and 2010 - 2025 MHz) frequency bands in the EU, in response to lack of use of the band for mobile broadband.
[52] Draft Mandate to CEPT on spectrum for the future railway mobile communications system.

3.17 GSM-R is a 2G based wireless technology specific for railway voice and data communications, used in the harmonised paired spectrum bands 876 - 880 MHz and 921 - 925 MHz. GSM-R is currently in use in Great Britain, Europe and other countries worldwide. Both Network Rail and Eurotunnel hold licences for use of GSM-R in the UK.[53] FRCMS based on 5G technology will replace GSM-R in the future as GSM-R end of life is expected around 2030 and will also be used to support the railway's growing data needs.

3.18 In November 2020, CEPT harmonised these two spectrum bands for Railway Mobile Radio (RMR), which encompasses GSM-R and FRMCS, to: fulfil railway interoperability requirements; to manage the migration without degradation to GSM-R; and to benefit from new railway critical applications (such as Automatic Train Operation, remote control of engine, train integrity and sensing).[54]

3.19 In June 2020, we amended the Wireless Telegraphy (Amendment and Exemption) Regulations 2010 to give full effect to the European Commission Decision 2018/1538[55] on the harmonisation of radio spectrum for use by short-range devices within the 874 - 876 MHz and 915 - 921 MHz frequency bands. This means that 2 x 1.6 MHz (874.4 - 876 MHz paired with 919.4 - 921 MHz) of the spectrum harmonised by CEPT for RMR is currently used by low power, short range devices applications in the UK.

3.20 While Network Rail has not finalised its spectrum requirement plans on future railway use it has requested that Ofcom 'notes the CEPT ECC decision and the future requirement for railway network deployments in the 1900 - 1910 MHz band so as to align with the wider rail industry in Europe where FRMCS in the 1900 MHz band is planned'. It has noted that 'Whereas network equipment is not yet deployed for railway usage in the UK in the 1900 MHz band, there is a future requirement.'[56] We anticipate FRMCS deployment at high power to provide sufficient coverage across the rail network.

3.21 Prototype future rail equipment operating in the unpaired 2100 MHz spectrum is being developed and tested with planned European trials based on upgraded 5G equipment around 2024.[57]

3.22 We understand there are ongoing standardisation efforts to facilitate 5G in a 3 MHz channel bandwidth for railways, utilities and emergency services. We welcome stakeholder views on the potential for future rail usage, including information on the bandwidth requirement for future rail in the unpaired 2100 MHz spectrum.

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[53] Network Rail (national licence excluding Northern Ireland) and Eurotunnel (Channel tunnel UK portion and a geographical area outside tunnel exit).
[54] ECC Decision (20)02 on Harmonised use of the paired frequency bands 874.4 - 880.0 MHz and 919.4 - 925.0 MHz and of the unpaired frequency band 1900 - 1910 MHz for Railway Mobile Radio (RMR).
[55] Commission Implementing Decision (EU) 2018/1538 of 11 October 2018 on the harmonisation of radio spectrum for use by short-range devices within the 874 - 876 and 915 - 921 MHz frequency bands.
[56] Network Rail's response to the consultation 'Ofcom's response to Vodafone's and Telefónica's requests to update the technical conditions of their mobile licences to enable the deployment of newer technologies including 5G', July 2022.
[57] 5G Rail project newsletter, June 2022.

Spectrum for utilities sector

3.23 The unpaired 2100 MHz spectrum may also be considered suitable to support the utilities sector.

3.24 The electricity sector has a requirement for increased operational connectivity throughout the electricity network to support the shift to renewable power generation and the electrification of transport and heating, both of which underpin government objectives to deliver net zero. One of the benefits of this operational connectivity is to help to identify faults on the electricity network and to restore supplies more quickly when there is a fault by avoiding delays associated with sending field staff to sites. The gas and water sectors may also have changing connectivity requirements.

3.25 These future requirements may be best met by the deployment of private wireless networks, for which the availability of suitable and sufficient spectrum may be necessary. Spectrum may be needed to support nationwide coverage and hence would need to be at sufficiently high power to enable this.

3.26 With this in mind, we are currently undertaking a review of the role of spectrum in supporting utilities' future communication needs.[58] Unpaired 2100 MHz spectrum could potentially be one option to support these requirements nationwide. As part of this review, we will publish a document in summer 2023 on a number of spectrum options for utilities' future needs, including unpaired 2100 MHz spectrum.

Other potential uses of the spectrum

3.27 We are also aware of other potential uses of the unpaired 2100 MHz spectrum.

3.28 There is ongoing consideration at the European level for other potential future uses, such as governmental use of drones in the 1880 - 1900 MHz and 1910 - 1920 MHz bands.[59] Based on discussions with stakeholders we are not aware of plans in the UK to introduce drones in the 1900 - 1920 MHz band at this time.

3.29 In their response to Ofcom's Spectrum Roadmap consultation,[60] the DECT Forum and others suggested expanding DECT[61] into the 1900 - 1920 MHz.[62] The DECT Forum argued that DECT-2020 NR (or 'DECT NR+'), which is harmonised within ITU-R as an IMT-2020 technology, will enable new capabilities and applications, including smart cities, industrial Internet of Things (IoT) and PMSE and that as a result extending the band would provide high value to the economy.

3.30 We think it is unlikely that 1900 - 1910 MHz will become a DECT extension band within Europe now that the band is identified for railway communications – due to the risk of interference to railway safety-related communications from portable licence-exempt

[58] Ofcom's proposed plan of work 2023/24 (subject to consultation).
[59] CEPT working group FM59 on Unmanned Aircraft Systems (UAS).
[60] Spectrum roadmap: Delivering Ofcom's Spectrum Management Strategy, May 2022.
[61] Digital Enhanced Cordless Telecommunications (DECT) telephony.
[62] Responses to Ofcom's 2022 Spectrum roadmap: DECT Forum, Association of Professional Wireless Production Technologies (APWPT) and Shure Inc.

devices. The 1910 - 1920 MHz band may be able to accommodate DECT, however this would not provide the contiguous spectrum DECT stakeholders have stated they require (extending DECT use from 1880 - 1900 MHz to the entire 1800 - 1920 MHz band) and we are not aware of any work in Europe to harmonise the band for DECT use. Furthermore, there may be other suitable low power use cases for the top part of the band, for example ESN Gateway use which we consider in more detail below in paragraph 3.35.

Our view on the optimal use of the unpaired 2100 MHz spectrum

3.31 In reaching our provisional view on the optimal use of unpaired 2100 MHz spectrum, we note that the spectrum has not been used since its award in 2000 and current licensees have indicated they have no plans to deploy public mobile services in the foreseeable future (other than potentially for ESN Gateway use) due among other factors to the lack of equipment ecosystem. We do not consider spectrum lying unused (and it is not conceivable that it will be used in the future for public mobile services) as optimal when there are potential alternative uses for that spectrum.

3.32 Given our view, as noted in paragraph 3.13 above, that the 1900 - 1915 MHz band is suitable for high power use (other than for public mobile services), our provisional view is that national infrastructure uses, which are similarly focused on public safety, such as rail and utilities, may be the most optimal future use of the 1900 - 1915 MHz spectrum. We consider that these high power uses could use the spectrum more intensively and therefore are more likely than not to maximise benefits to society. This spectrum could be used to support key national infrastructure services that are important to almost all consumers and citizens in the UK and are therefore of high societal value. We also note that the 1900 - 1910 MHz band has been harmonised in Europe for railway communications which means that any future rail communication services deployed in the UK in this band would be able to draw from a developing equipment ecosystem.

3.33 For the 1900 - 1910 MHz spectrum, we note that EE has been exploring the use of its 4G licence to provide the Home Office's ESN Gateway solution.[63] The service is intended to support emergency services where they are responding to an incident in an area or location that has weak network coverage and is therefore an important critical service for public safety. However, use of the spectrum for the ESN Gateway will be for a medium power application on an ad-hoc temporary basis and confined to specific locations where required (where there is insufficient coverage from EE's public network) and using equipment specifically developed to meet the Home Office's requirements in the spectrum assigned (currently planned for the 1900 - 1910 MHz band[64]). Consequently, our provisional view is that while the potential ESN Gateway use of EE's 4G licence in the 1900 - 1910 MHz band could play an important future public safety role when required, it may not be the optimal use of this spectrum on its own.

[63] BT consultation response, p.5.
[64] This planned usage is unique to the UK within Europe.

3.34 Therefore, we have considered whether ESN Gateway use could co-exist with high power uses (other than for public mobile services) in the same frequency band (co-channel). Our view is this is not likely to be possible as we think the ad-hoc nature of the gateway use – and the importance of it functioning when needed, usually at very short notice – could make it impractical to coordinate with future high power public safety/infrastructure users and therefore may constrain the future deployment of new uses in the same band.

3.35 We also believe there may be other spectrum capable of supporting the ESN Gateway. As set out above in paragraph 3.13, our view is that 1915 - 1920 MHz could be suitable for lower power mobile applications. This means the 1915 - 1920 MHz band[65] may be an option for the ESN Gateway, subject to further consideration of coexistence with the FDD mobile base station receiver above 1920 MHz, taking into account the practical implementation considerations needed to meet the required out of band emission limits. Given the objective of the ESN Gateway is to extend coverage, spectrum below 1 GHz could also be an option. We are undertaking further work to assess the alternative spectrum options for the ESN Gateway beyond 1900 - 1915 MHz.

Question 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 uses of the spectrum?

Question 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?

How to secure optimal use of the unpaired 2100 MHz spectrum

Approach

3.36 As discussed, our view is that the current lack of use, or plans for future use except for the ESN Gateway, of the spectrum by existing licensees may not be optimal. We now explore how best to secure optimal use of the spectrum in an efficient and timely manner.

3.37 Since the publication of the spectrum strategy in 2005[66] and reiterated in our 2014[67] and 2021 spectrum strategy updates,[68] our approach to spectrum management has been guided by the general principle of relying on the use of market mechanisms to determine the use of spectrum, where possible and effective, whilst undertaking regulatory action where necessary.[69] This approach is consistent with adopting the least intrusive regulatory method to achieve our objective.

[65] Our understanding is that the ESN Gateway equipment that has been developed to date operates in a 5 MHz channel.
[66] Ofcom, Spectrum Framework Review, 2005.
[67] Spectrum management strategy, 2014
[68] Ofcom's Spectrum management strategy for the 2020s, July 2021.
[69] Ofcom's spectrum management strategy for the 2020s, July 2021, paragraph 2.17.

3.38 In this instance, the market mechanisms that are likely to be appropriate are greater licence flexibility ('liberalisation'), to enable types of use, to evolve where possible, without the need to request a technical licence variation from Ofcom; and enabling spectrum rights to change hands by allowing spectrum trading

3.39 Therefore, we set out below our assessment of how far these approaches can best secure optimal use of the unpaired 2100 MHz spectrum.

Assessment of liberalisation and trading to achieve our objective

3.40 This approach means we would rely on future new users to enter into commercial negotiations with the existing holders of the spectrum in order to acquire spectrum. We would liberalise the licences, set ALFs for the spectrum and rely on trading to enable the spectrum to transfer into the hands of those that can make best use of it. This may also entail the consideration of subsequent licence variation/liberalisation requests to facilitate trading.[70]

3.41 In this case, it is possible that optimal use could be achieved in this way. Existing licensees could have an incentive to trade, if there were more valuable uses of the band, and other users were willing to pay more than existing licensees' valuations of their licences.

3.42 However, our view is that there are potential complexities to achieving optimal use through trading in this band, and that we cannot rely on trading to achieve our policy objective for the reasons set out below:

a) A change of use can potentially involve changes to the interference environment that may affect users of adjacent spectrum or different users of the same spectrum in different geographic areas, meaning there may be potential constraints relating to coexistence between them. The extent to which new users could co-exist within the band may be dependent on what those different use cases are.[71] These issues can make it hard for the parties involved, who do not have access to regulatory levers, to coordinate and develop an appropriate solution.

b) Existing licensees may have an incentive to hold-out selling their spectrum if a new user needed to acquire adjacent blocks of spectrum from multiple current licensees. This could delay new users' access to the spectrum.

c) There may also be other reasons why existing licensees may be reluctant to trade even when there are higher value uses of the band. For example, EE may be reluctant to trade the unpaired 2100 MHz spectrum it plans to use to deliver the ESN Gateway given the wider strategic importance of the ESN contract; or H3G may be reluctant to trade its 2100 MHz unpaired spectrum given its proximity to its 2100 MHz paired uplink spectrum.

[70] Ofcom's spectrum management strategy for the 2020s, July 2021, paragraph 2.18.
[71] In addition, consideration would have to be given to out of band emissions to prevent interference with DECT (at the bottom end of the band) and the 2100 MHz paired band (at the top end of the band).

3.43 In light of the potential complexities discussed above that may make trading difficult, our view is that liberalising the licence and relying on trading is unlikely to secure the optimal use of the unpaired 2100 MHz spectrum in a timely manner, and therefore that we cannot rely on it to achieve our policy objective.

3.44 This is in line with our spectrum management strategy for the 2020s where we recognised there are limits to a market-based approach and that there is an important and complementary role for Ofcom to play in ensuring optimal use of spectrum when major changes (such as those being considered in this consultation) are being contemplated and frequencies need to be recycled.[72]

Revocation and reallocation of the unpaired 2100 MHz spectrum

3.45 Given the above arguments, we have considered whether regulatory intervention, in the form of revocation followed by a process of reallocating the spectrum, may be necessary to achieve optimal use of the unpaired 2100 MHz spectrum in a timely manner.

3.46 Revoking all the existing licences would enable us to consider the requirements of potential new users in the round and to reallocate the band for new uses in a more efficient and timely manner, while managing the constraints related to coexistence between adjacent users more effectively. This would also provide more certainty for new users to plan and invest in new services.

3.47 Revocation of all unpaired 2100 MHz licences would require giving five years' notice, although it is also possible that licensees may return their licences before the end of the notice period. We may consider enabling new users to deploy during the notice period, where the spectrum is not otherwise being used, such that the spectrum may be available for new uses before the end of the five-year notice period.

3.48 We therefore, believe that regulatory intervention by Ofcom, rather than liberalising the licences and relying on trading, may be necessary to achieve our objective of optimal use. If we are right in this view that revocation and reallocation is necessary, we consider that this could be proportionate as the least onerous effective option to achieve our objective.

Impact of revocation on existing spectrum users

3.49 We need to assess whether revocation and reallocation would produce adverse effects which are disproportionate to achieving optimal use. We do so by setting out our views on the likely impact of this approach, including costs of revoking all existing licences on the existing licensees.

Potential impact on holders of unpaired 2100 MHz 3G licences

3.50 In relation to the 3G licences held by each of the three mobile operators, we do not consider there would be any costs incurred in clearing the band or migrating services to

[72] Ofcom's spectrum management strategy for the 2020s, July 2021, paragraph 2.19.

other bands, given that the spectrum is currently unused and, as set out in their responses to the July 2021 consultation, the licensees have no plans to deploy public mobile services in the foreseeable future using these licences.

3.51 The existing licensees may obtain option value from the spectrum, but we believe that the societal benefits of the reallocation of the spectrum to enable potential high power users, such as rail and utilities, would likely outweigh this value.

Potential impact on EE as the holder of an unpaired 2100 MHz 4G licence

3.52 We consider there may be an impact on EE with regards to its 4G licence given they are exploring future use of its unpaired 2100 MHz spectrum for the ESN Gateway service. However, our view is that the planned ESN Gateway use of EE's 4G licence in 1900 - 1910 MHz, while it could play an important public safety role, may not be the optimal use of this spectrum on its own. In other words, we consider the societal value of potential alternative uses is likely to be greater than that which may arise from the spectrum being used for the ESN Gateway.

3.53 If alternative spectrum is found for the ESN Gateway, then the 'value' derived from the ESN Gateway would be maintained, although there would still be costs associated with using the ESN Gateway in another band. Our initial understanding is that these costs would be relatively small. This is on the basis that there has to date been no ESN Gateway-related deployment in 1900 - 1910 MHz and therefore the infrastructure and deployment costs have not yet been incurred. There may be some investment costs related to product development and testing that have been incurred to date that may have to be incurred again if the ESN Gateway migrates elsewhere. Our expectation is that these costs are unlikely to be significant in context of the overall ESN implementation.

3.54 We also note that EE holds its existing spectrum subject to Ofcom giving five years' notice of revocation and therefore, any investment decisions would have been taken subject to this risk.

Our view on the potential impact on existing licensees

3.55 It follows from the above that were we to revoke and reallocate the unpaired 2100 MHz spectrum, we don't think it would produce adverse effects which are disproportionate to achieving optimal use.

Provisional view on how to secure optimal use of the unpaired 2100 MHz spectrum

3.56 Our provisional view, based on the above, is that revocation of the unpaired 2100 MHz spectrum licences to enable reallocation of the spectrum to future users may be more likely to meet our objective to secure optimal use of the spectrum, which will in turn secure the greatest benefits to consumers and citizens by enabling the introduction of new services using the spectrum. We consider that were we to take such an approach, it would be objectively justified and proportionate.

Question 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?

Question 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?

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

Next steps

3.57 Subject to consideration of consultation responses, we plan to reach a conclusion on optimal use of the unpaired 2100 MHz spectrum and how best to achieve it in early 2024.

3.58 Should we conclude that spectrum liberalisation and trading would not achieve our objective to secure optimal use, we would consult with relevant licensees on a proposal to revoke the unpaired 2100 MHz spectrum licences. Licensees would have the opportunity to make representations as part of the statutory revocation process. Subject to any potential Ofcom decision to revoke, we would send notification of a final decision to revoke with 5 years notice within 30 days of receiving representations from licensees.

3.59 Should we decide to revoke the unpaired 2100 MHz spectrum licences, we would further consult in due course on the future allocation of the unpaired 2100 MHz spectrum.

A1. Legal framework

Ofcom's licensing regime

A1.1 Under the Wireless Telegraphy Act 2006, and subject to some exceptions, it is unlawful to establish or use a wireless telegraphy station or to instal or use wireless telegraphy apparatus, unless under and in accordance with a licence granted by Ofcom (also known as a "wireless telegraphy licence").[73] Ofcom has the power to grant a wireless telegraphy licence in relation to a particular station or particular apparatus or in relation to any station or apparatus described by the wireless telegraphy licence itself.[74]

A1.2 A wireless telegraphy licence may be granted by Ofcom subject to such terms, provisions, and limitations as Ofcom thinks fit.[75] In the case of a wireless telegraphy licence to establish a station, the limitation may in particular include limitations to position and nature of the station, the purpose for which the circumstances in which and the person by whom the station may be used and the apparatus that may be installed or used in the station.[76]

A1.3 In the case of other licences the limitations may, in particular, include limitations to the apparatus that may be installed or used and the places where, the purpose for which, the circumstances in which and the persons by whom the apparatus may be used.[77]

A1.4 Ofcom has the power to impose terms, provisions and limitations to the extent that it is satisfied that these are:[78]

- objectively justifiable in relation to the networks and services to which they relate;
- are not such to unduly discriminate against particular persons or a description of persons;
- proportionate to what we want to achieve; and
- transparent in relation to what they are intended to achieve.

A1.5 Further to the above, Ofcom's powers under the Wireless Telegraphy Act 2006 include the ability to revoke or vary any wireless telegraphy licence if:

- The terms and conditions of the licences do not curtail our ability to revoke and/or vary a wireless telegraphy licence; and
- The standards and procedures set out in Schedule 1 to the Wireless Telegraphy Act 2006 (please see below for further details).[79]

A1.6 In particular, Ofcom has the power to vary and/or revoke a wireless telegraphy licence where it considers the variation or revocation to be objectively justifiable.[80]

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[73] Please refer to section 8 of the Wireless Telegraphy Act 2006.
[74] Please refer to section 9(5) of the Wireless Telegraphy Act 2006.
[75] Please refer to section 9(1) of the Wireless Telegraphy Act 2006.
[76] Please refer to section 9(2) of the Wireless Telegraphy Act 2006.
[77] Please refer to section 9(3) of the Wireless Telegraphy Act 2006.
[78] Please refer to section 9(7) of the Wireless Telegraphy Act 2006.
[79] Please refer to section 10 of the Wireless Telegraphy Act 2006.
[80] Please refer to paragraph 6A of Schedule 1 of the Wireless Telegraphy Act 2006.

Legal framework for the grant, variation or revocation of a wireless telegraphy licence

A1.7 Schedule 1 to the Wireless Telegraphy Act sets out the framework for the grant, variation, and revocation of a wireless telegraphy licence.

A1.8 Where Ofcom is making provisions for the grant of a wireless telegraphy licence, on the application of a stakeholder, it must reach a decision:

- Within six weeks after the date of the receipt of the application, if the application relates to a frequency allocated in accordance with the United Kingdom Plan for Frequencies;[81] or
- As soon as possible in any other case, but in any event, within eight months.

A1.9 Ofcom has the power to vary or revoke a wireless telegraphy licence if the proposed revocation or variation is objectively justifiable.[82] Furthermore, Ofcom is under a duty to notify the person holding the licence of its proposal and:[83]

- state the reasons for the proposal; and
- provide the licensee with an opportunity to make representations about the proposal within a defined period, which (barring defined circumstances) cannot be shorter than 30 days beginning with the day after the one on which the notification was given to the licensee.[84]

A1.10 Once the consultation period is expired, Ofcom has one month to decide whether or not to revoke or vary the wireless telegraphy licence and give notification of such decision to the licensee within one month.[85] The decision can be taken in accordance with Ofcom's original proposal or can contain modifications in light of the representations received.[86] In any event, Ofcom's decision must be given no later than one week after it has been taken and state the reasons for the decision.[87]

A1.11 Further to the above, Ofcom's powers to revoke and/or vary a licence can be restricted by the terms of the licence in question.[88]

[81] Please refer to paragraph 2(1)(a) of Schedule 1 of the Wireless Telegraphy Act 2006.
[82] Please refer to paragraph 6A of Schedule 1 of the Wireless Telegraphy Act 2006.
[83] Please refer to paragraph 7 of Schedule 1 of the Wireless Telegraphy Act 2006.
[84] Please refer to paragraph 8 of Schedule 1 of the Wireless Telegraphy Act 2006.
[85] Please refer to paragraph 10 of Schedule 1 of the Wireless Telegraphy Act 2006.
[86] Please refer to paragraph 10(a) of Schedule 1 of the Wireless Telegraphy Act 2006.
[87] Please refer to paragraph 11 of Schedule 1 of the Wireless Telegraphy Act 2006.
[88] Please refer to paragraph 8of Schedule 1 of the Wireless Telegraphy Act 2006.

A2. Responding to this consultation

How to respond

A2.1 Ofcom would like to receive views and comments on the issues raised in this document, by 5pm on 25th May 2023.

A2.2 You can download a response form from https://www.ofcom.org.uk/consultations-and-statements/category-1/future-use-of-the-unpaired-2100-MHz-spectrum. You can return this by email or post to the address provided in the response form.

A2.3 Responses may alternatively be posted to the address below, marked with the title of the consultation:

Spectrum Management and Authorisation team
Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA

A2.4 We welcome responses in formats other than print, for example an audio recording or a British Sign Language video. To respond in BSL:

- send us a recording of you signing your response. This should be no longer than 5 minutes. Suitable file formats are DVDs, wmv or QuickTime files; or
- upload a video of you signing your response directly to YouTube (or another hosting site) and send us the link.

A2.5 We will publish a transcript of any audio or video responses we receive (unless your response is confidential)

A2.6 We do not need a paper copy of your response as well as an electronic version. We will acknowledge receipt of a response submitted to us by email.

A2.7 You do not have to answer all the questions in the consultation if you do not have a view; a short response on just one point is fine. We also welcome joint responses.

A2.8 It would be helpful if your response could include direct answers to the questions asked in the consultation document. The questions are listed at Annex 5. It would also help if you could explain why you hold your views, and what you think the effect of Ofcom's proposals would be.

A2.9 If you want to discuss the issues and questions raised in this consultation, please contact Liz Hall on 020 79813000, or by email to liz.hall@ofcom.org.uk.

Confidentiality

A2.10 Consultations are more effective if we publish the responses before the consultation period closes. In particular, this can help people and organisations with limited resources or familiarity with the issues to respond in a more informed way. So, in the interests of transparency and good regulatory practice, and because we believe it is important that everyone who is interested in an issue can see other respondents' views, we usually publish responses on the Ofcom website at regular intervals during and after the consultation period.

A2.11 If you think your response should be kept confidential, please specify which part(s) this applies to, and explain why. Please send any confidential sections as a separate annex. If you want your name, address, other contact details or job title to remain confidential, please provide them only in the cover sheet, so that we don't have to edit your response.

A2.12 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and try to respect it. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.

A2.13 To fulfil our pre-disclosure duty, we may share a copy of your response with the relevant government department before we publish it on our website. This is the Department for Business, Energy and Industrial Strategy (BEIS) for postal matters, and the Department for Culture, Media and Sport (DCMS) for all other matters.

A2.14 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's intellectual property rights are explained further in our Terms of Use.

Next steps

A2.15 Following this consultation period, Ofcom plans to publish a statement in early 2024.

A2.16 If you wish, you can register to receive mail updates alerting you to new Ofcom publications.

Ofcom's consultation processes

A2.17 Ofcom aims to make responding to a consultation as easy as possible. For more information, please see our consultation principles in Annex 3.

A2.18 If you have any comments or suggestions on how we manage our consultations, please email us at consult@ofcom.org.uk. We particularly welcome ideas on how Ofcom could more effectively seek the views of groups or individuals, such as small businesses and residential consumers, who are less likely to give their opinions through a formal consultation.

A2.19 If you would like to discuss these issues, or Ofcom's consultation processes more generally, please contact the corporation secretary:

Corporation Secretary
Ofcom
Riverside House
2a Southwark Bridge Road
London SE1 9HA
Email: corporationsecretary@ofcom.org.uk

A3. Ofcom's consultation principles

Ofcom has seven principles that it follows for every public written consultation:

Before the consultation

A3.1 Wherever possible, we will hold informal talks with people and organisations before announcing a big consultation, to find out whether we are thinking along the right lines. If we do not have enough time to do this, we will hold an open meeting to explain our proposals, shortly after announcing the consultation.

During the consultation

A3.2 We will be clear about whom we are consulting, why, on what questions and for how long.

A3.3 We will make the consultation document as short and simple as possible, with an overview of no more than two pages. We will try to make it as easy as possible for people to give us a written response.

A3.4 We will consult for up to ten weeks, depending on the potential impact of our proposals.

A3.5 A person within Ofcom will be in charge of making sure we follow our own guidelines and aim to reach the largest possible number of people and organisations who may be interested in the outcome of our decisions. Ofcom's Consultation Champion is the main person to contact if you have views on the way we run our consultations.

A3.6 If we are not able to follow any of these seven principles, we will explain why.

After the consultation

A3.7 We think it is important that everyone who is interested in an issue can see other people's views, so we usually publish the responses on our website at regular intervals during and after the consultation period. After the consultation we will make our decisions and publish a statement explaining what we are going to do, and why, showing how respondents' views helped to shape these decisions.

A4. Consultation coversheet

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing ☐

Name/contact details/job title ☐

Whole response ☐

Organisation ☐

Part of the response ☐

If there is no separate annex, which parts? _____

_____

If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom aims to publish responses at regular intervals during and after the consultation period. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.

Name Signed (if hard copy)

A5. Consultation questions

A5.1 We invite responses to the questions listed on pages 17 and 21. We also welcome any other comments on our provisional views set out in this consultation.

Question 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 uses of the spectrum?

Question 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?

Question 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?

Question 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?

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

The overview section in this document is a simplified high-level summary only. The proposals we are consulting on and our reasoning are set out in the full document.