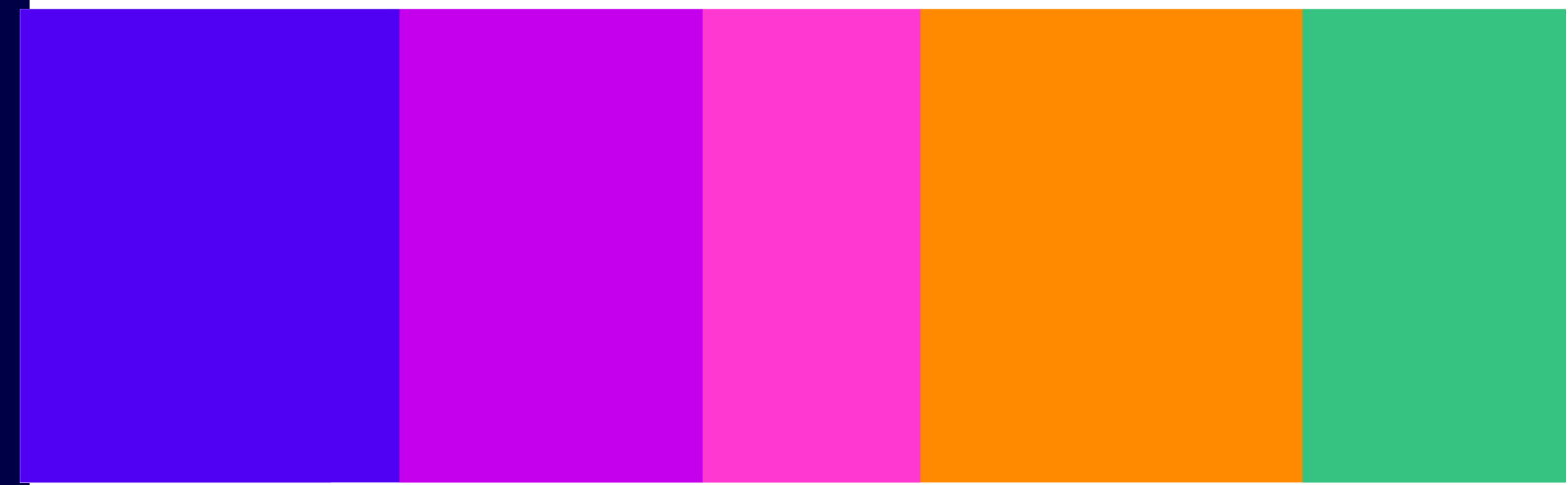Ofcom

Review of the use of fixed wireless links and spectrum implications

Call for inputs

Published 25 October 2023
Closing date for responses: 17 January 2024

Contents

1. Overview

1.1   This Call for Inputs (CFI) seeks input from stakeholders on their current and future potential use of fixed wireless links (fixed links), along with the decision factors that lead to the selection of a fixed wireless link instead of an alternative technology.

1.2   This CFI is designed to help us gain a deeper understanding of trends in fixed links and provide us with the information we need to effectively manage the finite radio spectrum resource and ensure it is used optimally across the UK.

What information we are providing and what we are seeking views on – in brief

In this document we provide an overview of current fixed links use in the UK and show how usage has changed since 2016. We also discuss market, technology and international developments as they relate to fixed links.

We are seeking input from stakeholders on the following topics:

•   The spectrum currently available for fixed links and how it is authorised;

•   The future demand for fixed links and factors that users consider when deciding to use fixed links over alternative connectivity solutions (e.g., fibre and satellite);

•   The wider market and technology developments affecting the market for fixed links;

•   International spectrum developments, including potential future use of bands above 92 GHz (W and D bands).

2. Introduction

2.1 In our Spectrum Roadmap discussion document, published in March 2022, we highlighted how market and technical developments were leading to a shifting role for the use of fixed wireless links (fixed links) to deliver communication solutions to a wide variety of users. In particular, we noted that the increased rollout of fibre (and to a lesser extent, low latency satellite networks) could impact the nature of demand for fixed links.

2.2 A large proportion of fixed links are currently used to deliver backhaul services for mobile networks. As a greater proportion of these backhaul services move to being delivered over fibre, we expect that the role fixed links will play in the future is more likely to be focused at the edges of the networks, rather than at the core.

2.3 More generally, demand for spectrum continues to grow, particularly in higher frequency bands which are currently extensively used by fixed links and satellite services. As new technologies are developed these higher bands are now becoming feasible for a much broader range of applications to deliver an ever-increasing variety and quantity of different wireless services. As set out in our 2021 Spectrum Strategy, it is therefore more important than ever for spectrum to be used efficiently and, where feasible, for it to be shared between users as much as practically possible. Over the 5 years since Ofcom's most recent review of fixed links spectrum in 2017-2018, a number of bands used for fixed links have been opened up and/or repurposed for new/additional uses.

2.4 In view of this and other market and technical developments, we have decided to undertake a new review of how demand for fixed links is changing across a wide range of users and industry sectors and across existing and new higher frequency bands.

2.5 This review is intended to inform our short and longer-term work on enabling access to spectrum for fixed links and to help us develop a more informed view of the way the fixed link market is now evolving and responding to wider changes in the marketplace. It should also provide us with the fixed link data we need to better inform our approach to future demand, from other services, for the spectrum which is currently used by fixed links.

2.6 In this Call for Input, we are seeking input and views from stakeholders on:

- The spectrum currently available for fixed links and how it is authorised;
- The future demand for fixed links from each of the various industry sectors that use this technology, including the factors that each industry sector considers when deciding to use fixed links (and the specific band) over alternative connectivity solutions (e.g., fibre and satellite);
- The wider market and technology developments affecting the market for fixed links;
- International spectrum developments, including potential future use of bands above 92 GHz (W and D bands)[1] for a much higher capacity.

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[1] W Band: 92-114.25 GHz and D Band: 130-174.8 GHz

3. Overview of fixed links in the UK

3.1   In this section we provide a high-level overview of the current fixed links use in the UK.

Spectrum used for fixed links in the UK

3.2   In the UK, a wide range of frequency bands, from 1.4 GHz to 86 GHz, are currently used for fixed wireless links to meet the connectivity needs of a wide variety of users. In most cases, bands are harmonised across Europe and shared with other services.

3.3   More recently, however, growing demand for spectrum from other sectors has resulted in changes to the amount of spectrum available for fixed links. Since our last review of fixed links spectrum in 2016-18, a number of bands have been closed to new fixed link use and are being cleared of existing fixed link use, including the 26 and 40 GHz bands.

3.4   The total amount of spectrum available for new fixed link assignments in the UK is now approximately 22.1 GHz, a decrease of around 5 GHz since 2016[2]. Figure 3.1 below shows spectrum which is currently used by fixed links in the UK[3].

Figure 3.1: Spectrum bands used for fixed links in the UK

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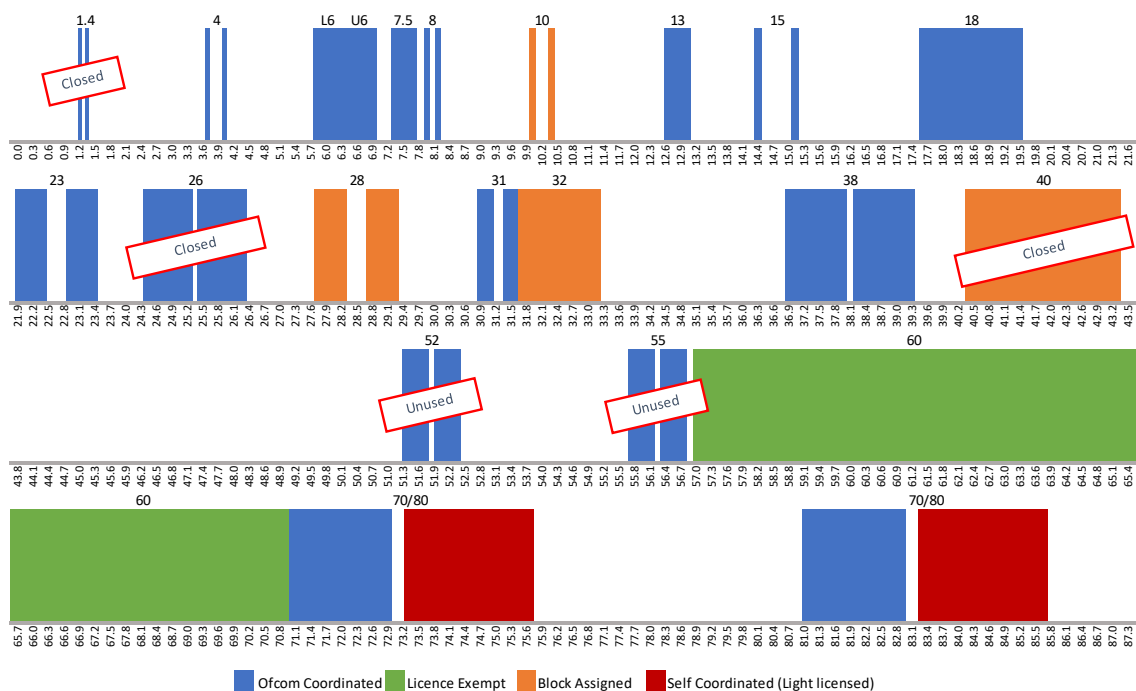
[2] Not including the 60 GHz band
[3] A more detailed listing (with frequency band edges) of the current Ofcom managed and assigned bands can be found in OFW48. Further details of the 10, 28, 32 & 40 GHz block assigned bands (which are also used for Fixed links) can be found here: Mobile and wireless broadband above 5 GHz - Ofcom. Note: Figure 3.1 does not show the much older closed legacy bands such as 2, 11, 14 and 22 GHz.

Authorisation of fixed links

3.5   As highlighted in Figure 3.1, spectrum used to deliver connectivity solutions via fixed links is authorised in a number of different ways: Ofcom coordinated (technically assigned), block assigned and self-coordinated (light licensed). Further information on these authorisation approaches was presented on page 10 of our Spectrum Roadmap discussion document.

Users of fixed links

3.6   Fixed links (also called fixed wireless links or microwave links) are used to convey voice or data traffic between two or more fixed locations. Such links provide an alternative or a complement to other transmission media such as fibre.

3.7   Fixed links are often considered as quicker, cheaper and easier to deploy than wired communications in certain circumstances, and can have lower latency compared to optical fibre cables. They form an integral part of many communication networks and are used by a number of sectors to support varying communication needs. Demand for fixed wireless links and the choice of frequency bands is therefore often very specific to the needs of the user and the nature of the application required.

3.8   As part of this Call for Input, we would like to refine our understanding of how fixed wireless links are now being used and planned, particularly in light of the wider market and technology changes. We have categorised existing licensees within Ofcom managed Fixed Service bands into "user types" (or sectors) shown in Table 3.1 based on what we understand to be the main business of the licensees. In the table, we also provide a brief description of our current understanding of the main use of fixed wireless links by these users.

Table 3.1: Fixed links user types

User Type	Application
Mobile network operators (MNOs)	Provision of backhaul between mobile base stations and core network.
Broadband providers	Links used by providers of broadband internet services.
Business telecoms	Providers of telecommunications services to business and commercial properties.
Public safety	Provision of communications networks for the police, fire and ambulance services, including video surveillance and backhaul.
Utilities	Provision of communications links for substation monitoring, network backup and security for energy, electricity, water and offshore windfarm companies.
Financial sector	Provision of communication links by the financial sector to support financial applications such as high frequency trading.
Broadcaster	Transmitter feeds for local and national digital TV/audio broadcasting and for connecting and interconnecting broadcast studios.
Public services	Provision of video surveillance or broadband connectivity used by local authorities. This category also includes links used by schools, universities and other public service-related organisations.

User Type	Application
Oil and gas	Provision of communication links between offshore oil rigs and land-based communication systems.
Transport	Provision of communication links for transport sector including airports, ports, trains, buses and taxis.
Other	Any other users of fixed links that do not fit the above categories, including industrial, commercial and overseas companies and enterprises.

3.9   Figure 3.2 below provides an overview of how fixed links are used by each of the main industry sectors that make use of fixed links[4]. As can be observed, MNOs are the biggest user of fixed links in the UK, with 58% of all current links. We provide further commentary on trends in fixed links by sector in section 4.

Figure 3.2: Proportion of fixed links by use type in 2023
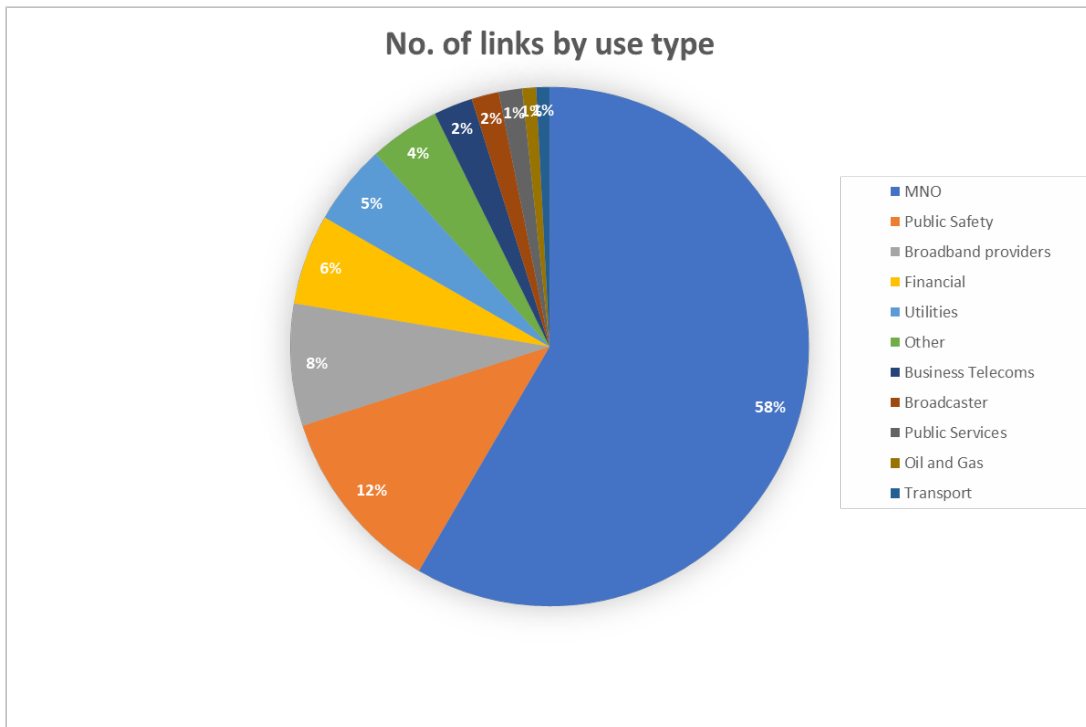
Question 1: Please provide a description of your current use of fixed links (or indicate which of the use types in Table 3.1 best describe your use type).

Question 2: What are the factors driving your choice of fixed links over alternative connectivity solutions, and which factors have the biggest impact on your decisions? Is this likely to change in the next 5 years? If so, what do you expect will change?

Question 3: Is the current spectrum available for fixed links in the UK suitable and sufficient for your needs? If not, what would you change and why? If you believe

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[4] Figure 3.2 includes links across all Ofcom-managed bands, block assigned bands and the self-coordinated links in the 70/80 GHz band.

changes are required, please give specific examples and reasons along with supporting evidence if available.

Question 4: Is there anything about Ofcom's current framework for authorising fixed links which you consider could be improved?

4. Changes in fixed links usage since 2016

4.1　In this section we provide information on trends in (and changes to) usage of fixed links across all spectrum bands since 2016. We then seek input on the potential implications of these trends and changes for fixed links over the next 5-10 years.

Figure 4.1: High level trends in fixed links usage across all bands between 2016 and 2023[5]

-27%

Change in number of fixed links

+51%

Change in total (aggregate) bandwidth across all links
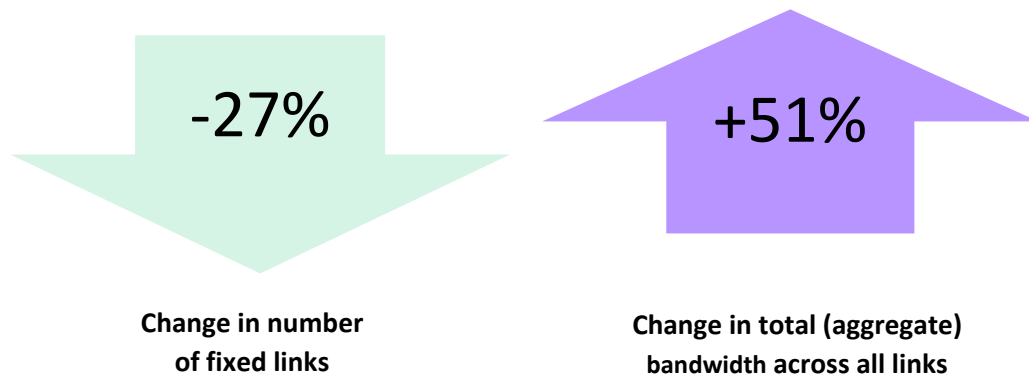
4.2　Overall, the total number of links in use has declined, from approximately **45k** in 2016 to around **32k** in 2023 – **a decrease of 27%** across all bands.

4.3　However, the average channel bandwidth used by fixed links has increased, with the total (aggregate) bandwidth[6] used by all fixed links **increasing by 54%**.
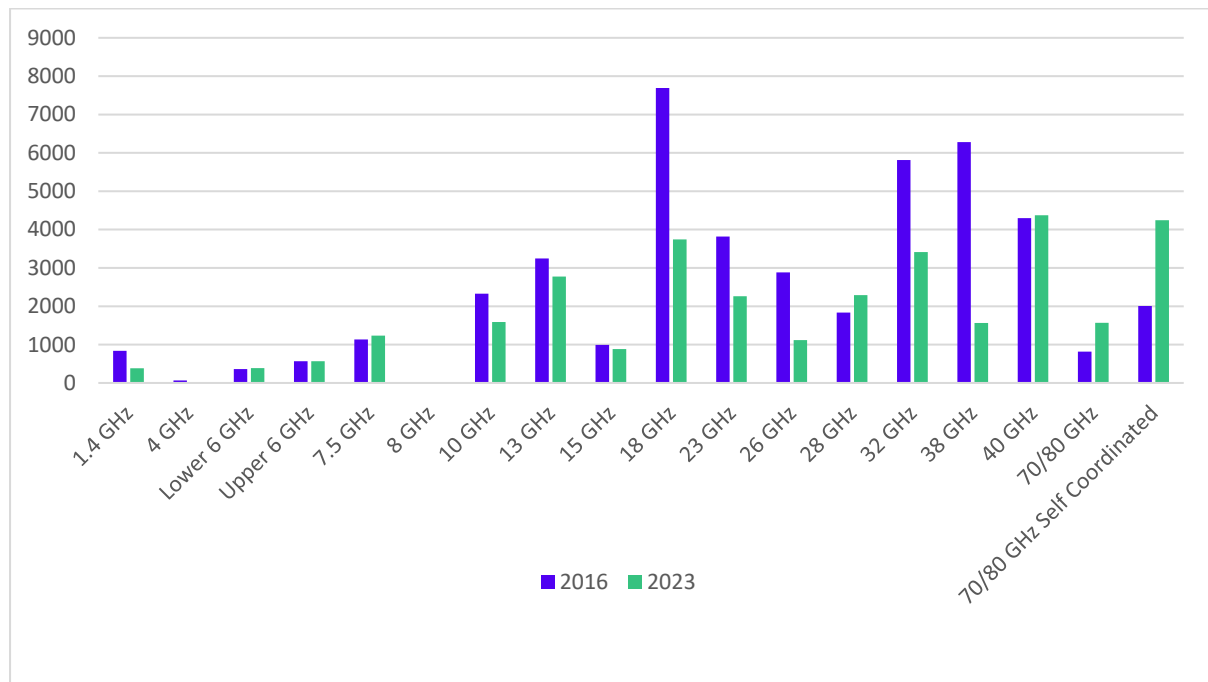
Changes by frequency band

4.4　Figure 4.2 shows all frequency bands currently used by fixed links[7], with each band shown individually.

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[5] The data in this figure, and subsequently in this section, still includes links in the 1.4, 26 and 40 GHz bands. We have recently commenced revocation processes for fixed links in these bands. Also, the data for block assigned bands included in these figures (i.e., 10, 28, 32 and 40 GHz) and subsequently in this section is from 2022. Data for all other bands is from 2023.

[6] This metric is calculated by performing a simple sum of the cumulative channel bandwidths of all links.

[7] Does not include the 60 GHz band, or the older closed legacy bands such as 2, 11, 14 and 22 GHz.

Figure 4.2: Change in number of fixed links by individual frequency bands, 2016 to 2023

4.5   In Figure 4.3 below, we show similar data to Figure 4.2 above but group the bands into ranges to more clearly illustrate the trends by frequency range.

Figure 4.3: Change in number of fixed links by frequency ranges, 2016 to 2023
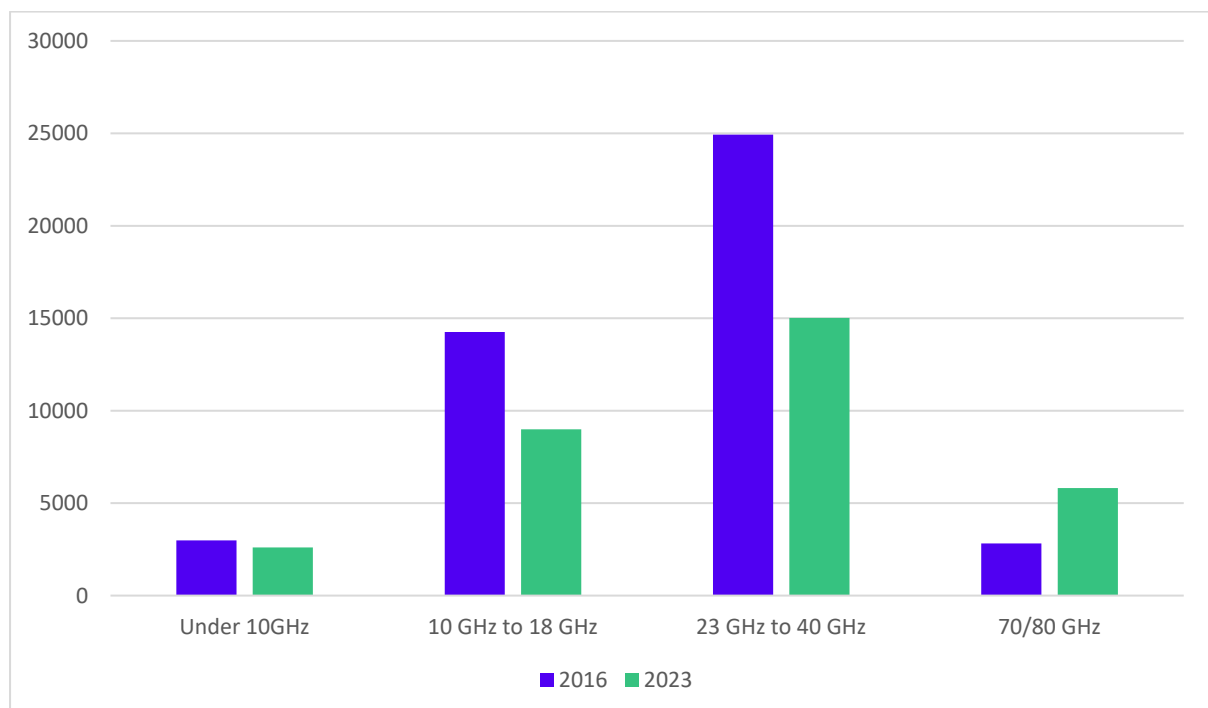
4.6   As can be seen in Figure 4.3, the decline in number of links is particularly pronounced in the mid-range frequency bands, i.e., between 10-38 GHz. There are a number of possible reasons behind this decline including, e.g., migration to fibre networks and a shift towards fewer but higher capacity links. This latter reason is supported by the increase in number of links in the 70/80 GHz band, which supports higher bandwidth, higher capacity links.

4.7   In contrast, the number of links in lower frequency bands (below 10 GHz) has remained relatively stable, with a small increase in the lower and upper 6 GHz bands and the 7.5 GHz band. Lower frequency bands are not rain-fade dominated and therefore support longer distance high availability links, which are important for connecting areas that are more difficult to reach using other technologies, e.g., fibre.

Changes by bandwidth

4.8   As noted above, the total (aggregate) bandwidth in use has increased.

4.9   Figure 4.4 below shows the number of links grouped by channel bandwidth (in MHz) for all bands.

Figure 4.4: Change in number of fixed links by channel bandwidth (MHz), 2016 to 2023

-56%	+73%	+105%
0-28 MHz	**29-112 MHz**	**> 112 MHz**
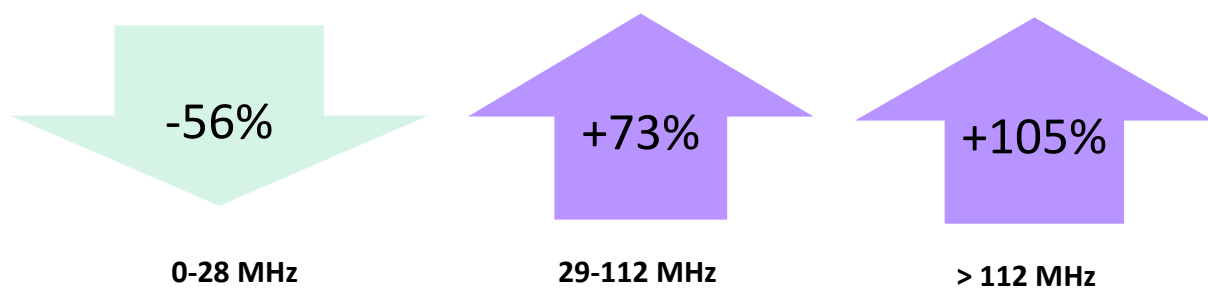
4.10   As can be seen, the decline in numbers of fixed links has mainly been focused on lower bandwidth links i.e., links with channel bandwidths of 28 MHz and below, with the numbers of links with higher channel bandwidths increasing.

Changes by sector

4.11   Figure 4.5 below shows the change in number of links by sector. Figure 4.6 shows the percentage change by sector.

4.12   This data shows that many sectors have seen an increase in the number of links; the largest increase was in the broadband providers sector, with a 97% increase in the number of links since 2016.

4.13   The overall decline in number of links (-27%) is mainly driven by a decline in the number of links deployed by mobile network operators (MNOs). If we exclude MNO links from this analysis, the overall number of links in use has **increased by 24%.**

Figure 4.5: Change in number of fixed links by sector, 2016 to 2023
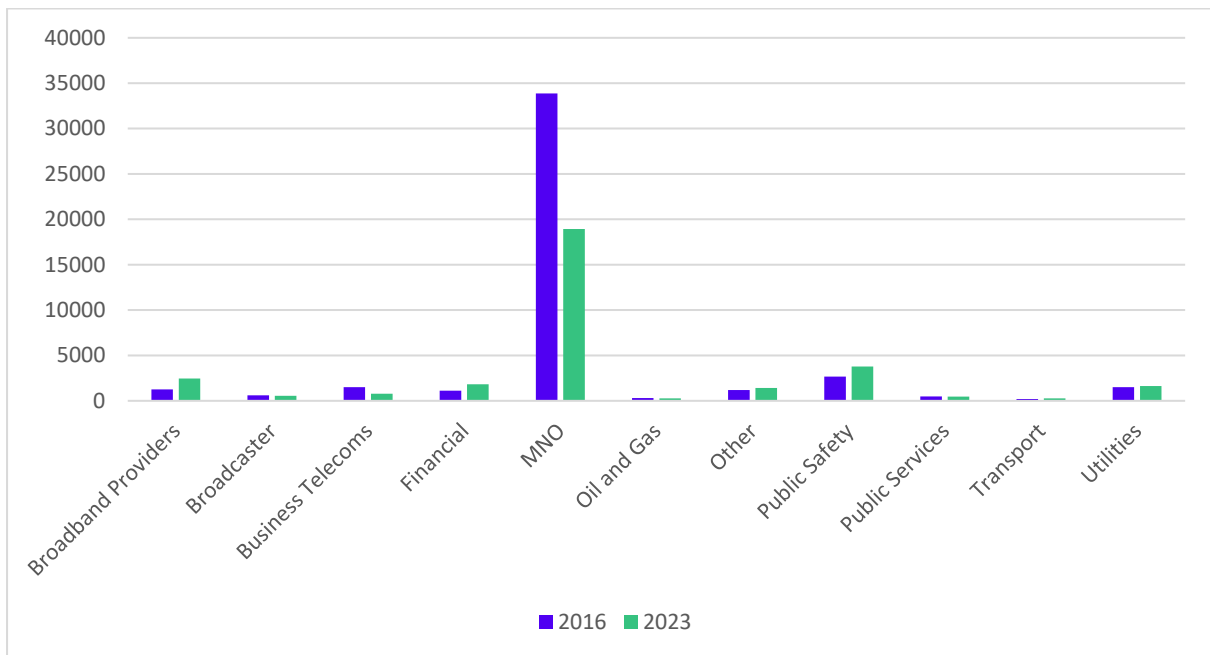
Figure 4.6: Percentage change in number of fixed links by sector, 2016 to 2023
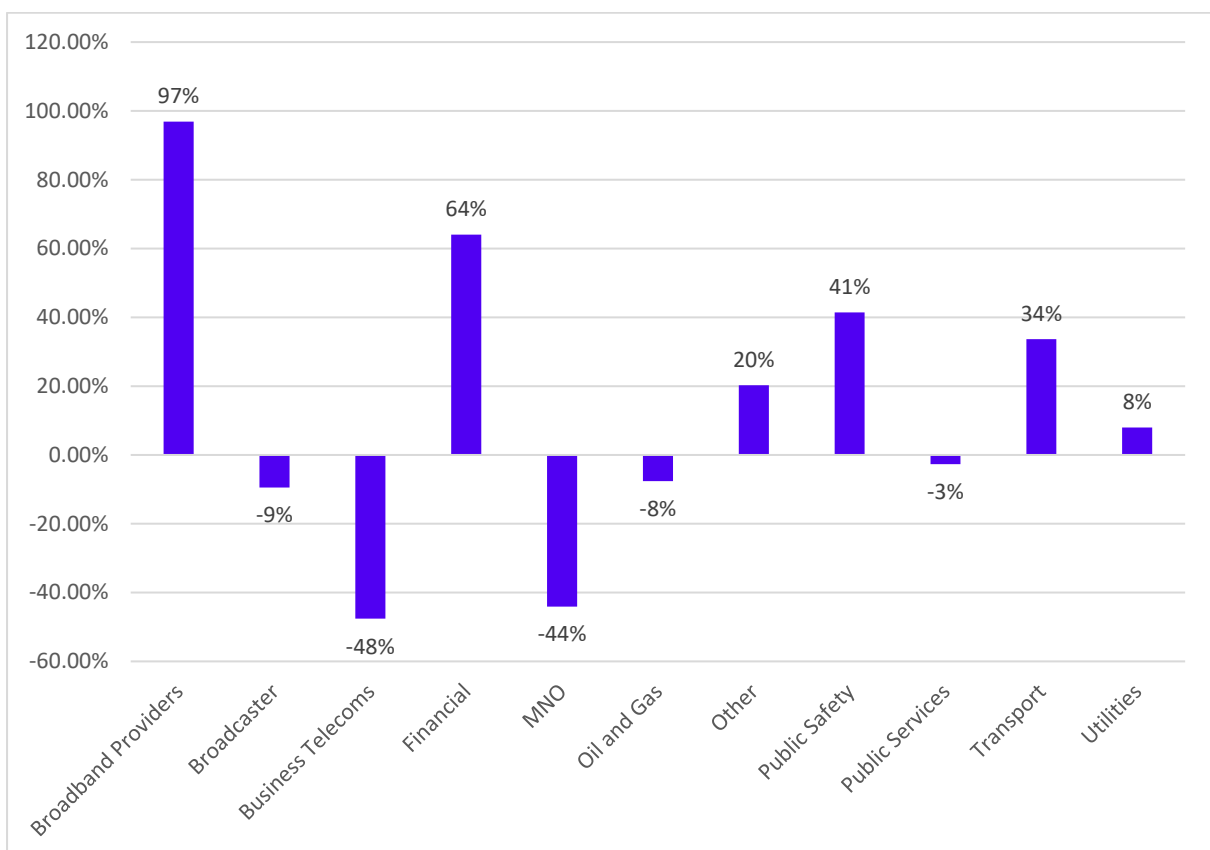
Changes by geography

4.14   The maps below in Figures 4.7 and 4.8 show how the geographical spread of fixed links has changed between 2016 and 2023 for all bands. Figure 4.7 shows areas with increases and Figure 4.8 shows areas with decreases.

Figure 4.7: Areas with increases in numbers of fixed links[8]

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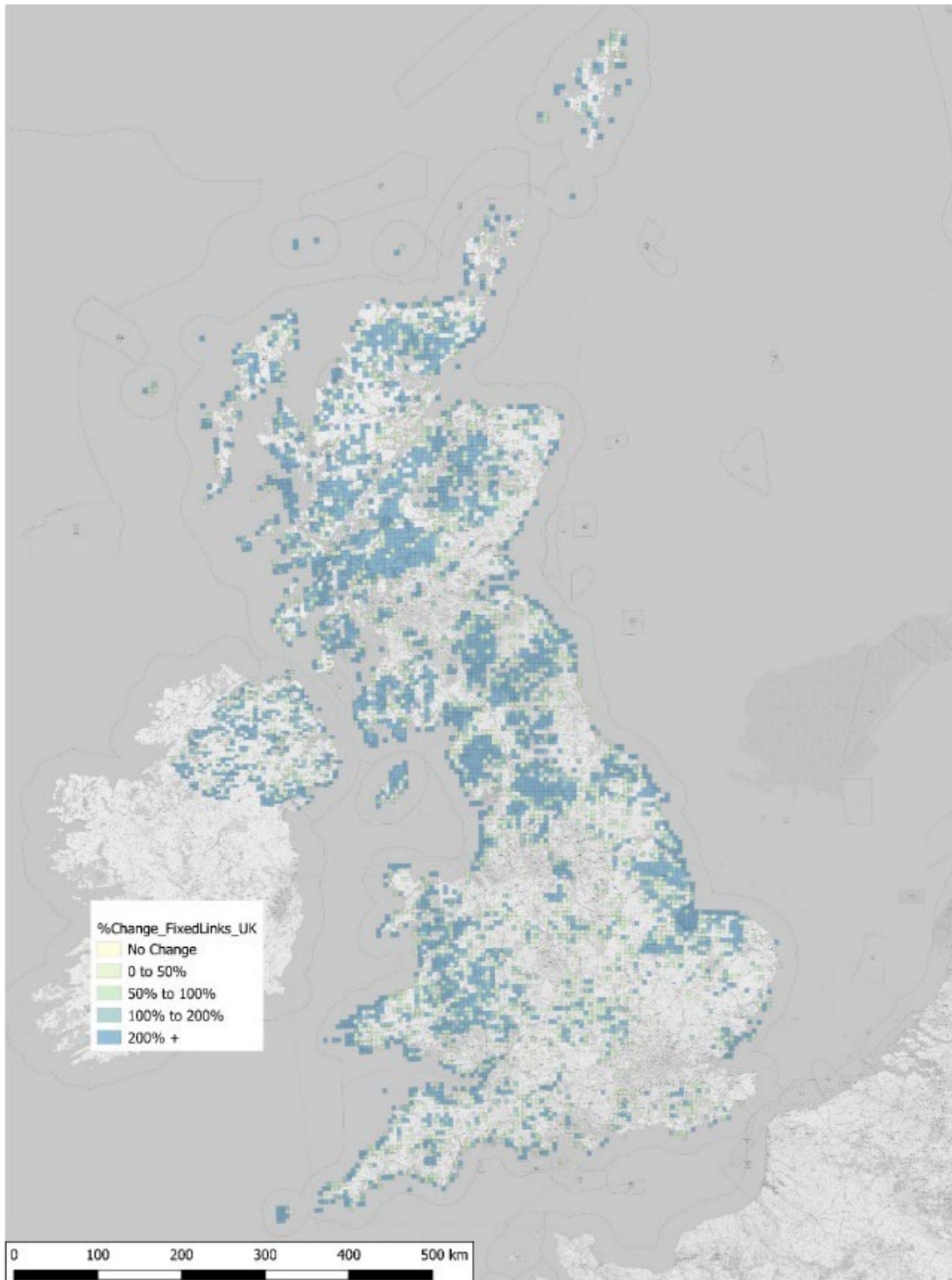
[8] Data Sources: Basemap – OpenStreetMap in QGIS, Grid for Great Britain – Ordnance Survey 5km Grid, Grid for Northern Ireland – OSNI 5km Grid, CRS – British National Grid.

Figure 4.8: Areas with decreases in numbers of fixed links [9]
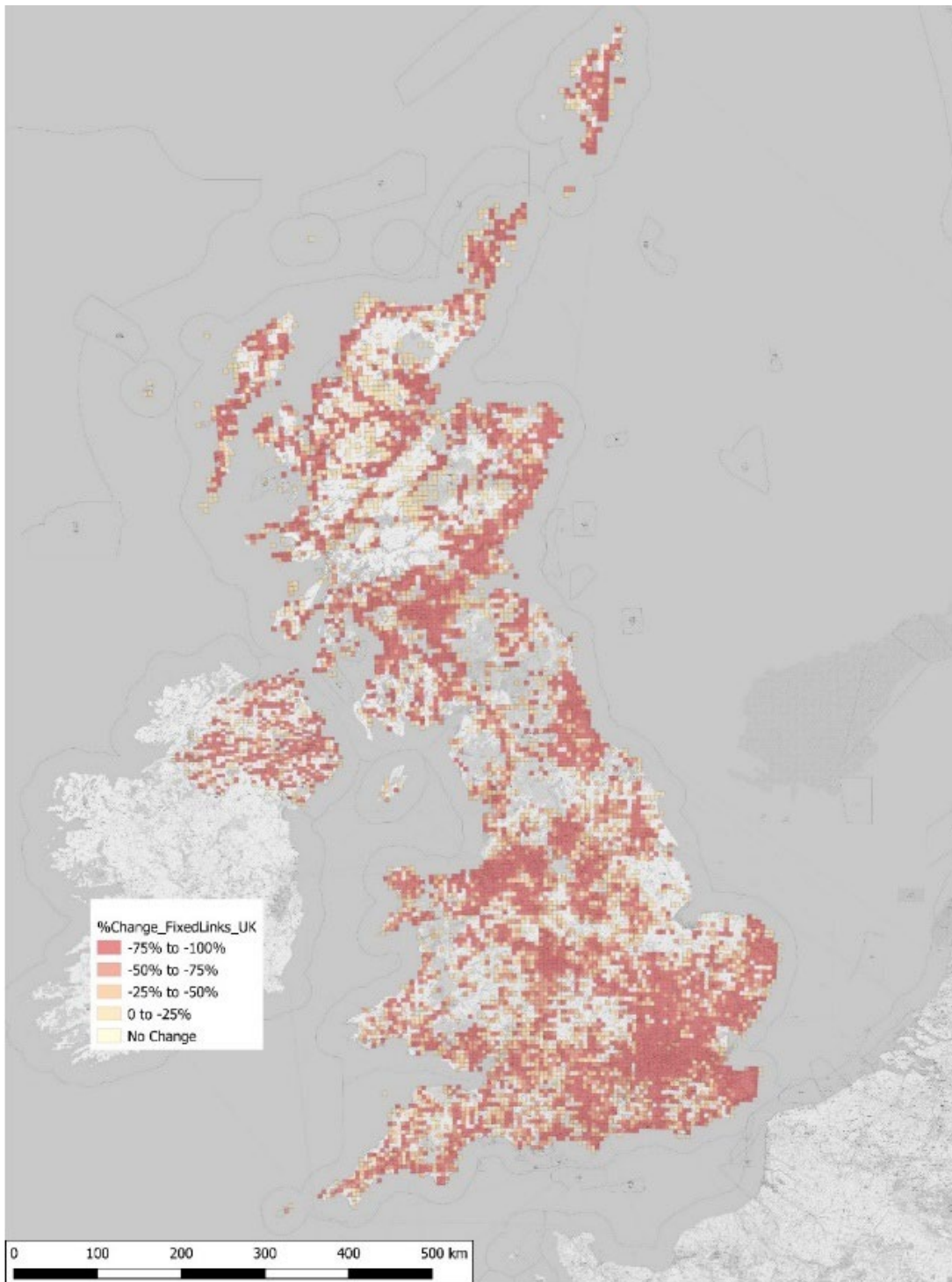
4.15   Declines in numbers of fixed links have been strongest in urban areas, with any increases predominantly occurring in rural areas. This is consistent with the trend highlighted in our Spectrum Roadmap[10] where we said that physical cables may connect an increasing proportion of the network infrastructure, with wireless fixed links playing a more focused role at the edges of networks.

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[9] Data Sources: Basemap – OpenStreetMap in QGIS, Grid for Great Britain – Ordnance Survey 5km Grid, Grid for Northern Ireland – OSNI 5km Grid, CRS – British National Grid.
[10] Spectrum Roadmap Discussion document, 31 March 2022

Summary of trends

4.16   In summary, our analysis of fixed links licensing data has highlighted the following trends:

- Declines in numbers of fixed links in bands between 10-38 GHz;
- A small increase in numbers of fixed links in bands below 10 GHz, and a larger increase in the number of fixed links in the 70/80 GHz band;
- A decrease in links using channel bandwidths of 0-28 MHz, but increases in links using higher bandwidths;
- A large decrease in the number of fixed links used by mobile network operators, but a moderate increase (24%) in the overall number of fixed links used by other sectors;
- Declines in fixed links occur across most geographies, but with stronger declines in urban areas and some growth (small number of links) in rural areas and at network edges.

4.17   To help us better understand the likely future trends in use of fixed links, we invite stakeholders to provide answers to the following questions.

Question 5: How has your use of fixed links changed between 2016 and now? Please provide information on:

- Reasons for increase or decrease in the number of your links since 2016;
- Changes in the capacity of your links since 2016, including how you have; delivered this capacity change, e.g., different channel bandwidths, different link technology (please specify), etc.

Question 6: How do you expect your usage to change over the next 5-10 years? Please provide information on:

- any increase/decrease in the number of links (by band) and bandwidth expected.
- likely changes in geographic distribution of links.
- likely changes in distribution of links by frequency band.
- likely changes in capacity of links and how you expect to deliver this capacity.
- other changes not covered above.

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5. Market, technology and international developments affecting the use of fixed links.

Market developments

5.1 Fixed links provide an alternative or a complement to other transmission media e.g., fibre and satellite. The market for fixed links is therefore affected by changes in the markets served by these alternative technologies. In this review we are keen to update our understanding of the factors that drive users to choose to deploy fixed links technology versus other connectivity solutions.

5.2 In our Spectrum Roadmap discussion document published in March 2022, we highlighted a number of recent market developments which we considered could have an impact on future usage of fixed links across a variety of sectors.

5.3 For example, there have been significant developments in relation to investment and roll-out of fibre to the premises by a large number of companies offering a range of commercial models. The UK Government has a target that at least 85% of premises should have access to gigabit broadband by 2025, rising to 99% by 2030. By September 2023, 75% of UK homes had access to Gigabit-capable broadband, driven by the continued rollout of full-fibre broadband. Over half of UK homes (52%), equating to 15.4 million households, now have access to full-fibre services[11].

5.4 This increased availability of fibre is likely to especially impact choices of connectivity solution for users who need to carry large amounts of data over their networks.

5.5 For example, mobile operators prefer to use fibre connections where available as these provide higher capacity than standard fixed links. Increased fibre roll-out could therefore be expected to result in an increased proportion of mobile backhaul networks delivered over fibre. However, some mobile operators have told us that increased fibre roll-out may not necessarily translate into a big move from fixed links to fibre in all cases. For example, some noted that Government fibre rollout targets were focused on homes and that the additional costs of digging fibre to base stations often meant that it was not economically attractive to switch to fibre. Others noted that wayleave or physical issues prevent the delivery of fibre connections in some urban areas.

5.6 Fixed links users from other sectors, including utilities and emergency services, have also told us that increased fibre roll-out will not necessarily result in a move to fibre. They noted that their networks are focused on providing geographic coverage rather than high capacity, with sites often located in remote areas, far from fibre points of presence (PoP).

5.7 Other developments identified in the Spectrum Roadmap which could impact future demand for fixed links, with the potential to particularly impact MNOs use of fixed links, include:

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[11] Faster full-fibre broadband now available to over half of UK homes

- a move to centralised radio signal processing in datacentres, rather than mast sites;
- densification of mobile networks using small cells;
- in mobile networks, physical cables may connect an increasing proportion of the network infrastructure, with wireless fixed links playing a more focused role at the edges of the network;
- the increase in use of higher capacity NGSO satellites which offer lower latency compared to traditional geostationary satellites[12].

5.8   We recognise that there are likely to be additional developments which we have not listed here but which could also impact future demand for fixed links, and welcome feedback.

> **Question 7:** Which of the developments listed above are expected to have the biggest impact on your use of fixed links? Are there other developments to be aware of that have not been listed? Please explain the reasons for your answer.
>
> **Question 7a:** Are you considering using NGSO satellites to provide backhaul for your network? If so, please provides details of the capacity requirements/expectations and the locations where delivery of this type of backhaul would be likely.
>
> **Question 8:** If you already use alternative transport options for delivering your services, please:
>
> -   Provide an indication of the proportion of your services delivered over fixed links vs each alternative that you currently use. Is this proportion likely to change over the next 5-10 years? Is so please provide details;
> -   Explain how your business rationale for use of fixed links vs alternative connectivity solutions is changing over time;
> -   If possible, provide examples of your decision-making process for recently deployed connections.

Technology and equipment developments

5.9   In addition to broader market developments, improvements in fixed links and backhaul technology may also impact demand for spectrum and how fixed links are used in the future. Some of the key fixed links' technologies that are likely to have an impact on the spectrum requirements for the future include:

- **Co-Channel Dual Polar (CCDP) technology** – this is used to increase capacity on a given link i.e., where both vertical and horizontal polarisations are used simultaneously and cross polarisation interference cancellation (XPIC) is implemented to manage the interference between the two polarisations;

- **Dual-band operation (band and carrier aggregation or BCA)** – this uses dual band technology to extend the reach of high capacity (e.g., E-Band) links under favourable propagation conditions by operating an additional separate link in a lower frequency band, run in parallel to the E-band link, designed and configured as a fall back (at a lower capacity / data rate) under heavy rain fade conditions;

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[12] [Vodafone teams up with Amazon's Project Kuiper to extend 5G reach | Reuters](#)

- **Adaptive Coding and Modulation (ACM)** – this technology allows a link to increase its capacity capability under favourable propagation conditions by dynamically selecting a higher order modulation;

- **Integrated access backhaul (IAB)** – this technology uses 'in-band' mobile technology which is configured, adapted and optimised for point to point / multipoint backhaul applications;

- **Technology capability moving to higher bands above 90 GHz** – advances in technology are now starting to make access to the higher bands feasible; this will allow for much higher capacity short hop links (~nx10 Gbits/sec) e.g., W & D bands (see paragraphs 5.11 to 5.14 below).

> **Question 9:** Which of the listed technologies are you already using or do you plan to use in the future? For each that you are using/plan to use, please explain:
>
> - the current extent of your use, whether you expect to expand or shrink your use over the next 5-10 years, and how availability of these capabilities might impact your choice to deploy fixed links vs an alternative.
>
> Estimates of numbers or percentage of links deployed with each capability now and in the future would be valuable. We are particularly interested in feedback on future use of BCA.
>
> **Question 9a:** If you plan to use BCA would you plan to use this primarily for new links, upgrades to existing links or a mix? What factors affect your decision to deploy (or not deploy) BCA today? Please provide whatever detail you can.

International developments

5.10   Most spectrum bands used for fixed links are harmonised across Europe and are shared with other services. There are a number of bands where ongoing international discussions could result in changes to spectrum that is currently available for fixed links.

W and D bands

5.11   The 92-114.25 GHz and 130-174.8 GHz bands, commonly referred to as the 'W & D' Bands, have seen increased interest over the last few years from both manufacturers and operators.

5.12   Since the publication of our Fixed links review in 2018 there has been further international standards activity and focus on both of these bands, as well as on the technology development and trials, with the greatest activity in the D band[13] where there is more spectrum available. In addition, the bands have also been studied in CEPT, with an ECC information report published on the suitability of both bands for fixed wireless services[14] along with two harmonised channel plans[15] to facilitate ultra-high capacity, fibre like speeds

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[13] NEC successfully demonstrates 10Gbps outdoor transmission in the 150GHz-band: Press Releases | NEC
[14] **ECC Report 282** - Point-to-Point Radio Links in the Frequency Ranges 92-114.25 GHz and 130-174.8 GHz
[15] **ECC Recommendation (18)01** – Radio frequency channel/block arrangements for Fixed Service systems operating in the bands 130-134 GHz, 141-148.5 GHz, 151.5-164 GHz and 167-174.8 GHz

in the future. ETSI (the European standards body) has also been active on these bands where a draft of a new harmonised fixed link equipment standard for both W and D Band is being prepared.

5.13 Work is also currently under way in the ITU-R to establish the international technical framework, including channel plans and the necessary protection measures for the adjacent band passive services.

5.14 These bands are currently unallocated in the UK and, while we note the advanced work being undertaken by the fixed link sector, we also note there is also interest in these bands from other sectors, particularly the mobile sector for next generation 6G type services.

> **Question 10:** Do you have a need for W and D bands for fixed links use (or alternative uses)? If so, in what timescale?
>
> Please provide further details, including any evidence you have to support your response.

Upper 6 GHz band

5.15 The upper 6 GHz band (6425-7125 MHz) is currently a focus for industry interest, including in the debate leading up the World Radiocommunications Conference (WRC-23). Much of this interest has focused on approaches that would support the exclusive introduction of either:

- higher power licensed mobile; or
- lower power licence exempt uses such as Wi-Fi.

5.16 In our July 2023 consultation relating to this band, we explained that we were exploring options that would enable the introduction of both Wi-Fi and licensed mobile use of the band in relatively close proximity – "hybrid sharing". We noted that coexistence between fixed links and outdoor mobile base stations is likely to be a challenge and that there is a risk that at least a partial clearance of fixed links from the band may be needed if we were to allow licensed full power mobile use in particular areas. We therefore proposed to conduct a more comprehensive analysis once we are ready to consult on specific allocation proposals for the upper 6 GHz band.

5.17 The July 2023 consultation is now closed and we have published a summary of responses on our website.

> **Question 11:** Do you expect to apply for new fixed links in the upper 6 GHz band in the future, and if so, in which geographical areas? What are the reasons for choosing this band over other available bands or alternative technologies? Is there a technical reason why you would choose the upper 6 GHz band?

IMT-2030 & beyond

5.18 A significant amount of research is underway globally, including within the EU and CEPT[16], on 6G/IMT-2030. Some mobile industry stakeholders have also called for a future World Radiocommunications Conference (WRC) agenda item for IMT identification in additional

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ECC Recommendation (18)02 - Radio frequency channel/block arrangements for Fixed Service systems operating in the bands 92-94 GHz, 94.1-100 GHz, 102-109.5 GHz and 111.8-114.25 GHz
[16] CEPT: European Conference of Postal and Telecommunications Administrations

frequency bands, including between approximately 7 GHz and 20 to 24 GHz. This frequency range covers a number of frequency bands currently used by fixed links and could impact available fixed link capacity given the coexistence challenges between mobile IMT and fixed links.

> **Question 12:** Are there other international developments that you are aware of that could affect availability and utility of fixed links in the next 5-10 years?

A1. Responding to this CFI

How to respond

A1.1   Ofcom would like to receive responses to the questions raised in this document, by 5pm on 17 January 2024.

A1.2   You can download a response form from http://www.ofcom.org.uk/__data/assets/file/0027/270189/consultation-response-form.odt You can return this by email or post to the address provided in the response form.

A1.3   If your response is a large file, or has supporting charts, tables or other data, please email it to fixedlinks.review@ofcom.org.uk, as an attachment in Microsoft Word format, together with the cover sheet.

A1.4   Responses may alternatively be posted to the address below, marked with the title of the call for inputs:

Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA

A1.5   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.

A1.6   We will publish a transcript of any audio or video responses we receive (unless your response is confidential)

A1.7   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.

A1.8   You do not have to answer all the questions in the CFI if you do not have a view; a short response on just one point is fine. We also welcome joint responses.

A1.9   It would be helpful if your response could include direct answers to the questions asked in the CFI. The questions are listed at Annex 4. 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.

A1.10   If you want to discuss the questions raised in this CFI, please contact the Fixed Links Review team by email at fixedlinks.review@ofcom.org.uk.

Confidentiality

A1.11   Consultations are more effective if we publish the responses before the consultation period closes. 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.

A1.12   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.

A1.13   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.

A1.14   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.

A1.15   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

A1.16   Following the consultation period, we will consider all responses received, after which we will consider whether further work is required and publish further updates as appropriate.

A1.17   If you wish, you can register to receive mail updates alerting you to new Ofcom publications.

Ofcom's consultation processes

A1.18   Ofcom aims to make responding to a consultation/CFI as easy as possible. For more information, please see our consultation principles in Annex 2.

A1.19   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.

A1.20   If you would like to discuss these issues, or Ofcom's consultation processes more generally, please contact the corporation secretary:

A1.21   Corporation Secretary
Ofcom
Riverside House
2a Southwark Bridge Road
London SE1 9HA
Email: corporationsecretary@ofcom.org.uk

A2. Ofcom's consultation principles

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

Before the consultation

A2.1   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

A2.2   We will be clear about whom we are consulting, why, on what questions and for how long.

A2.3   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.

A2.4   We will consult for up to ten weeks, depending on the potential impact of our proposals.

A2.5   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.

A2.6   If we are not able to follow any of these seven principles, we will explain why.

After the consultation

A2.7   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.

A3. 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 you selected 'Part of the response', please specify 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)?

Yes ☐   No ☐

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)

A4. Consultation questions

A4.1   We invite responses to the following questions we have asked in this CFI:

Question 1: Please provide a description of your current use of fixed links (or indicate which of the use types in Table 3.1 best describe your use type).

Question 2: What are the factors driving your choice of fixed links over alternative connectivity solutions, and which factors have the biggest impact on your decisions? Is this likely to change in the next 5 years? If so, what do you expect will change?

Question 3: Is the current spectrum available for fixed links in the UK suitable and sufficient for your needs? If not, what would you change and why? If you believe changes are required, please give specific examples and reasons along with supporting evidence if available.

Question 4: Is there anything about Ofcom's current framework for authorising fixed links which you consider could be improved?

Question 5: How has your use of fixed links changed between 2016 and now? Please provide information on:

- Reasons for increase or decrease in the number of your links since 2016;
- Changes in the capacity of your links since 2016, including how you have; delivered this capacity change, e.g., different channel bandwidths, different link technology (please specify), etc.

Question 6: How do you expect your usage to change over the next 5-10 years? Please provide information on:

- any increase/decrease in the number of links (by band) and bandwidth expected;
- likely changes in geographic distribution of links;
- likely changes in distribution of links by frequency band;
- likely changes in capacity of links and how you expect to deliver this capacity;
- other changes not covered above.

Question 7: Which of the developments listed above are expected to have the biggest impact on your use of fixed links? Are there other developments to be aware of that have not been listed? Please explain the reasons for your answer.

Question 7a: Are you considering using NGSO satellites to provide backhaul for your network? If so, please provides details of the capacity requirements/expectations and the locations where delivery of this type of backhaul would be likely.

Question 8: If you already use alternative transport options for delivering your services, please:

- Provide an indication of the proportion of your services delivered over fixed links vs each alternative that you currently use. Is this proportion likely to change over the next 5-10 years? Is so please provide details;
- Explain how your business rationale for use of fixed links vs alternative connectivity solutions is changing over time;

- If possible, provide examples of your decision-making process for recently deployed connections.

Question 9: Which of the listed technologies are you already using or do you plan to use in the future? For each that you are using/plan to use, please explain:

- the current extent of your use, whether you expect to expand or shrink your use over the next 5-10 years, and how availability of these capabilities might impact your choice to deploy fixed links vs an alternative.

Estimates of numbers or percentage of links deployed with each capability now and in the future would be valuable. We are particularly interested in feedback on future use of BCA.

Question 9a: If you plan to use BCA would you plan to use this primarily for new links, upgrades to existing links or a mix? What factors affect your decision to deploy (or not deploy) BCA today? Please provide whatever detail you can.

Question 10: Do you have a need for W and D bands for fixed links use (or alternative uses)? If so, in what timescale?

Please provide further details, including any evidence you have to support your response.

Question 11: Do you expect to apply for new fixed links in the upper 6 GHz band in the future, and if so, in which geographical areas? What are the reasons for choosing this band over other available bands or alternative technologies? Is there a technical reason why you would choose the upper 6 GHz band?

Question 12: Are there other international developments that you are aware of that could affect availability and utility of fixed links in the next 5-10 years?