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Building telecommunications infrastructure

Summary

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Ensuing the wide availability of high-speed broadband and mobile infrastructure is a central part of the Government's National Infrastructure Strategy and "levelling up" agenda. The Government has a target is that at least 85% of the UK will have a gigabit-capable broadband connection available by 2025 and that most the population has access to a 5G signal by 2027.

Enabling the fast and cost-effective roll-out of new infrastructure by industry is an important policy objective for the Government to achieve these targets.

This paper explains the rules and permissions needed to build broadband and mobile infrastructure and discusses proposals for reforms intended to make building infrastructure easier. Section 6 of this paper covers mobile masts and health concerns, including 5G.

UK broadband and mobile coverage

As of January 2021: 95% of UK premises had access to superfast broadband connections and 36% of UK premises had access to gigabit-capable broadband. In rural areas only 80% of premises have superfast broadband available. The Library's broadband data dashboard allows users to compare broadband coverage in different areas.

99% of UK premises have indoor 4G mobile coverage from at least one mobile operator, but 9% of the UK landmass has no mobile coverage from any operator. Around 8% of urban mobile base stations had 5G mobile broadband enabled.

Who decides where to build mobile and broadband infrastructure?

Broadband and mobile telecommunications (telecoms) networks in the UK are rolled out by private companies, often referred to as "operators".

Telecoms operators take decisions about where and when to roll-out infrastructure based on commercial considerations.

Detailed plans of where infrastructure is located, or future roll-out plans, are not generally publicly available.

What permissions are required to build telecoms infrastructure?

The same general rules for installing telecoms equipment apply to both broadband infrastructure (such as cables and cabinets) and mobile infrastructure (3G, 4G and 5G masts and antennae).

To install infrastructure, telecoms operators may require (see further below):

- planning permission; and
- an access agreement with the landowner/occupier to use the land (such as a wayleave or a lease).

Telecommunications is a reserved power but planning and building regulations are devolved responsibilities. Therefore, the rules on access agreements apply UK-wide but planning rules vary slightly in each nation.

Guidelines for the siting and appearance of mobile infrastructure are provided in the Code of Best Practice on Mobile Network Development in England (November 2016). The Code of Practice also covers expectations for community consultation regarding mobile infrastructure.

Planning issues

Designated communications network operators have certain permitted development rights. This means designated operators can build certain infrastructure without having to apply for separate planning permission from the local planning authority. Permitted development rights derive from a general planning permission granted by Parliament, rather than from permission granted by the local planning authority.

"Prior approval" from the local planning authority regarding the siting and appearance of the development is required in certain circumstances, including all ground-based mobile masts.

A full application for planning permission would be required for any infrastructure that does not meet the permitted development criteria.

The Government intends to bring reforms to planning rules for mobile masts in England, for example to allow taller masts within permitted development rights.

Access agreements and the Electronic Communications Code

Wayleaves and leases are the most common forms of access agreement for telecoms infrastructure. They are private legal agreements and the specific terms may differ in each case.

Access agreements are usually entered into consensually between the parties. Ofcom has published a Code of Practice for operators and landowners when negotiating agreements.

If an agreement cannot be reached consensually, the telecoms operator may apply to the court to seek an imposed agreement through powers contained in the Electronic Communications Code (ECC) (Schedule 3A to the Communications Act 2003, as amended).

Reforms to the Electronic Communications Code

The current ECC came into force in December 2017. On significant reform was the way that rent for hosting telecoms equipment on private land is calculated when the court is imposing an agreement: rent is now calculated based on the value of the land to the landowner.

Other changes to the ECC in 2017 included reforms intended to make it easier for telecoms companies to upgrade existing infrastructure and changes to dispute resolution procedures.

Commentators have highlighted that the 2017 changes to land valuation has in some cases led to rents for hosting infrastructure reduce dramatically, leading to an unwillingness for landowners to engage with operators and a 'freeze' in the market. There have been several court cases on the interpretation of the ECC since the 2017 reforms.

Further ECC reforms are to follow

In January 2021 the Government opened a consultation on potential further reforms to the ECC in light of these problems. These proposals do not include revisiting the position on land valuation. The changes aim to "encourage more collaborative negotiation" and address dispute resolutions procedures.

In the May 2021 Queen's Speech the Government said that it would bring legislation to reform the ECC to through a Product Security and Telecommunications Infrastructure Bill.

Reforms to the ECC have always been highly contested. The Government must strike a difficult balance between ensuring digital connectivity is widely available while property rights are respected. Both the mobile industry and property owner organisations have established campaign groups on the issue.

Other areas of reform to help build infrastructure

Other areas of potential reform to help speed-up infrastructure build include helping operators to access existing passive infrastructure (underground tunnels) including those of other utility providers such as water pipes.

The Department of Transport (DfT) has an ongoing programme of work to facilitate street works for utility providers including broadband, another area where operators say they face delays.

Reforms regarding fibre broadband to new build properties are covered in the Library paper, Gigabit-broadband: Government policy and targets.

1 How are telecoms networks built?

1.1 Who builds telecoms infrastructure?

Telecommunications networks include a complex range of different types of infrastructure including:

- Fixed-line broadband network infrastructure, such as cabinets and underground cables
- Mobile network infrastructure such as ground-based mobile masts and other base stations (e.g. antennae on buildings).
- A glossary of technical terms is provided at the end of this briefing.

Telecommunications networks in the UK are rolled out by private companies, here referred to as "operators" (Box 1).

Telecoms operators take decisions about where to build their network infrastructure based on commercial considerations. Section 1.2 provides examples regarding mobile masts.

Detailed plans of where network infrastructure is located or plans for future builds are not usually publicly available.

Box 1: Telecoms operators in the UK:

Mobile Network Operators (MNOs)

There are four Mobile Network Operators (MNOs) in the UK that own and operate mobile networks: Three, Vodafone, O2 and EE (owned by BT). Other mobile companies, such as Giff Gaff and Tesco Mobile, use the network infrastructure operated by one of the four MNOs.[1]

Mobile infrastructure is largely managed by two network sharing companies, which are each a joint venture between two MNOs: one between Vodafone and O2 and the other between EE and Three.[2]

[1] These companies are known as Virtual Mobile Network Operators (VMNOs).

[2] Cornerstone Telecommunications Infrastructure Limited (CTIL) is a joint venture between Telefonica (O2) and Vodafone. Mobile Broadband Network Limited (MBNL) is a joint venture between Three and EE (BT). Each MNO uses different frequency spectrum to deliver services, but the masts and physical infrastructure are shared between those two joint ventures.

There are also wholesale infrastructure providers that build and lease access to infrastructure but do not provide network services to customers, for example, Arqiva and Wireless Infrastructure Group.

Broadband operators

Openreach and Virgin Media are the largest broadband network operators in the UK.

Openreach is the infrastructure division of the BT Group.[3] Openreach maintains BT's existing network and builds new infrastructure. It does not provide services directly to consumers. Broadband service providers (including BT retail, TalkTalk, Vodafone and others) use the Openreach network to provide services to consumers.

Virgin media owns and operates its own separate network and sells services directly to customers.

There are also several smaller fibre infrastructure providers building new networks, for example City Fibre, Hyperoptic, Gigaclear and others. The Library briefing paper on gigabit-capable broadband provides further information.[4]

1.2 What is a suitable location for a mobile mast?

There are several factors that impact a suitable location for a mobile mast and the challenges differ between urban and rural areas.

- Mobile masts must be in a location where it can provide coverage to a reasonable area.
- The land area must be large enough to support a mast and have access to a power supply and a high capacity fibre broadband or radio link to connect the mast to the main network (called backhaul).
- In rural areas, access to power and backhaul can be difficult and expensive.[5] In urban areas, finding a clear area of land to support a mast can be challenging.
- Low population densities in rural areas can diminish the commercial returns that operators receive from extending their network. This makes

[3] See the Library briefing on BT and Openreach for background information. [mention number and date]

[4] Commons Library briefing paper, Gigabit Capable broadband in the UK (CBP 8392), 4 March 2021.

[5] Mobile UK, Code of Best Practice for Mobile Network Development in England, November 2016.

the business case for investment in infrastructure more challenging for rural areas. [6]

Mobile UK (the trade body for mobile operators in the UK) highlight that building mobile infrastructure relies on partnerships between industry, landlords, local Government, central Government and regulators. [7]

1.3 What permissions are required to build infrastructure?

To install infrastructure, telecoms operators may require:

1. Planning permission
2. An access agreement with the landowner to use the land, such as a wayleave or a lease.

The following sections set out more detail on each of the above two points in turn.

In general, the same rules apply to both broadband infrastructure and mobile infrastructure. However, some rules will only be relevant to certain types of infrastructure and some specific conditions exist, for example specified infrastructure for permitted development rights (explained below).

The Government's Digital Connectivity Portal is a helpful resource for information about building digital infrastructure, targeted at local authorities and industry. The Portal provides practical guidance on topics such as digital infrastructure strategy and leadership, legislation and regulation, local planning policies and access to public sector assets.

1.4 Are the rules for telecoms infrastructure devolved or reserved?

Telecommunications is a reserved power but planning and building regulations are devolved responsibilities.

Therefore, the rules on access agreements apply UK-wide but planning rules may vary slightly in each devolved nation.

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[6] For more information, see Ofcom's analysis of factors that affect the level of 3G and 4G mobile coverage available to consumers in different areas: Ofcom, Economic Geography 2018, 18 December 2018.

[7] Mobile UK, Councils and Connectivity: how local government can help build mobile Britain, September 2018.

1.5 Reforms to make building infrastructure easier

The UK Government has set targets to deliver gigabit-capable broadband and 5G networks. The Government aims for:

- a "minimum of 85%"of UK premise to have gigabit-capable broadband coverage by 2025; [8] and
- for a "majority" of the population to have a 5G signal by 2027. [9]

The Library briefings on Gigabit-broadband in the UK and 5G provide more information on these targets. [10]

As of September 2020: 27% of UK premises had access to gigabit-capable broadband. The Library's broadband data dashboard allows users to explore where these premises are at postcode level.

99% of UK premises had indoor 4G mobile coverage from at least one mobile operator but 9% of the UK landmass has no mobile coverage from any operator. [11] Around 8% of urban mobile base stations had 5G enabled. [12] Generally speaking, mobile and broadband coverage in urban areas is better than in rural areas. [13]

The Government's targets require substantial new infrastructure deployments to be delivered by industry. Enabling the fast and cost-effective roll-out of new infrastructure by industry is an important policy objective for the Government to achieve its coverage targets. [14]

Broadband and mobile operators argue that they are ready and willing to invest in new infrastructure, but that there are "barriers" that are delaying their ability to roll-out infrastructure at the speed needed to meet the Government's targets.

Broadly, barriers relate to the ease of securing planning permissions, negotiating agreements to access private land, accessibility of existing infrastructure and coordinating with local authorities to conduct street works. [15] The specific issues facing broadband and mobile infrastructure roll-out are slightly different. [16] For example, planning rules place more

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8 HM Treasury, National Infrastructure Strategy, 25 November 2020

9 DCMS, Future Telecoms Infrastructure Review, 23 July 2018.

10 Gigabit-broadband in the UK (CBP 8392, 4 March 2021) and 5G (CBP 7783, 6 November 2019)

11 Ofcom, Connected Nations 2020, 17 December 2020.

12 Ofcom, Connected Nations 2020, 17 December 2020.

13 The Library briefing papers Mobile coverage in the UK (SN07069, 22 February 2019) and Superfast broadband in the UK (SN06643, 4 March 2021) provide further information.

14 DCMS, Future Telecoms Infrastructure Review, 23 July 2018.

15 DCMS, Future Telecoms Infrastructure Review, 23 July 2018.

16 See Library briefing papers Gigabit-broadband in the UK (CBP8392, 1 March 2021) and 5G (CBP7883, September 2019) for discussion of specific issues regarding each infrastructure.

restrictions on mobile masts than they do on broadband cables and cabinets.[17]

In 2018, the Department for Digital Culture Media and Sport (DCMS) established a "**Barrier Busting Task Force**", which is a cross-Government group working to address "barriers" to digital infrastructure deployment.[18] DCMS has developed a Digital Connectivity Portal that provides resources and practical advice for local authorities and commercial providers to help build digital infrastructure.

The following sections discuss several areas of recent and proposed reforms including on:

- permitted development rights for mobile masts
- access rights to land to host infrastructure (the Electronic Communications Code)
- facilitating street works; and
- facilitating access to existing infrastructure.
- The Task Force published a progress update in March 2021 including a timetable for next steps.[19]

The House of Commons Digital Culture Media and Sport (DCMS) Committee in its December 2020 report, Broadband and the Road to 5G, concluded that the Government's efforts to remove barriers to date had not yet "matched the scale of its ambition" for gigabit connectivity:

> Judging by the legislative measures to date, the scale of the Government's efforts to tackle the most serious barriers to roll-out does not match the scale of its ambition for gigabit connectivity. Despite the challenges of the 2025 target, the Government intends to "wait and see" about complex problems such as third-party access instead of addressing them as a matter of priority. We recommend that the Government reforms the wayleave regime for telecommunications infrastructure in the next Parliamentary session to address unresponsive and/or uncooperative landlords in urban and rural settings, including third-party land.[20]

The House of Commons Public Accounts Committee, in its December 2020 report Improving Broadband, concluded that DCMS had to date "failed to make meaningful progress to tackle the barriers faced by operators".[21]

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[17] For discussion of planning reforms called for by mobile operators, see Mobile UK: Planning Reform: Building Mobile Britain (accessed 17 February 2020).

[18] DCMS, Future Telecoms Infrastructure Review (July 2018), pages 5-6.

[19] DCMS, Barrier Busting Task Force: Next steps, 19 March 2021.

[20] DCMS Committee, Broadband and the Road to 5G, HC153, 2019-21, 22 December 2020, para 118.

[21] PAC, Improving Broadband, HC 688, 2019-21, 8 January 2021, para 2.

2 Planning issues

2.1 Is planning permission required?

The installation of telecoms infrastructure, such as a mobile mast or broadband cabinet, would normally count as a development and would therefore require planning permission.

However, designated communications network operators,[22] like other operators of utilities, have certain **permitted development rights**. Permitted development rights are rights to make certain changes to a building or land without the need to apply for planning permission. They derive from a general planning permission granted by Parliament, rather than from permission granted by the local planning authority. Before some permitted development rights can be used, the developer must first obtain "prior approval" in relation to specified aspects of the development from the planning authority.[23] The prior approval process is much less restrictive than a full planning application.

Infrastructure falling within permitted development rights includes broadband cabinets and mobile masts up to a certain height (see further below). The exact rules are set out in legislation and may vary slightly between the devolved Administrations. For some telecoms infrastructure, "prior approval" from the local authority is required for the siting and appearance of the development, but not the principle of its installation.

A full application for planning permission would be required for any infrastructure that does not fall within the permitted development criteria. Any full application for planning permission would require a public consultation before being decided.

In England, the National Planning Policy Framework (NPPF) states that planning policies should support the expansion of electronic communications networks (see Box 2).[24] The NPPF is a material consideration in planning decisions.

[22] The rights only apply to network operators licenced under the Electronic Communications Code following a public consultation by Ofcom (see Section 3.2 below).

[23] For a wider discussion of permitted development in England, see the Commons Library briefing *Planning in England: permitted development and change of use* (SN 485, 12 February 2021). For information about permitted development in other parts of the UK, see section 8 of the joint Library briefing *Comparison of the planning systems in the four UK countries: 2016 update* (CBP 7459, 20 January 2016).

[24] MHCLG, National Planning Policy Framework, CP 48, February 2019, paragraph 112.

Interested parties with concerns about the development of telecoms infrastructure and related rights should approach their local planning authority.

Box 2: National Planning Policy Framework (NPPF) in England

The National Planning Policy Framework (revised July 2018 and February 2019) sets out expectations for local development plans in England regarding electronic communications (in Section 10) including that planning policies should support the expansion of electronic communications networks. Applications for planning permissions must be determined in accordance with the local development plan and the NPPF is a material consideration in planning decisions.

The NPPF states that planning policies should prioritise full-fibre connections to new and existing developments and provide access to services from a range of providers. The NPPF states that the number of mobile masts should be "kept to a minimum" and provide reasonable capacity for future expansion:

> 113. The number of radio and electronic communications masts, and the sites for such installations, should be kept to a minimum consistent with the needs of consumers, the efficient operation of the network and providing reasonable capacity for future expansion. Use of existing masts, buildings and other structures for new electronic communications capability (including wireless) should be encouraged. Where new sites are required (such as for new 5G networks, or for connected transport and smart city applications), equipment should be sympathetically designed and camouflaged where appropriate. [25]

The NPPF goes on to describe the evidence that should be provided along with applications for planning permission or prior approval, including consultations with relevant interested parties. [26]

The Government's Digital Connectivity Portal: considerations for the local planning authority provides information about how local plans can support digital infrastructure deployment.

[25] MHCLG, National Planning Policy Framework, CP 48, February 2019, paragraphs 112–113.
[26] MHCLG, National Planning Policy Framework, CP 48, February 2019, paragraph 115.

2.2 Permitted development rights in England: mobile masts

Permitted development rights for electronic communications infrastructure in England are set out in the 2015 Town and Country Planning Order[27] as amended by the *Town and Country Planning (General Permitted Development) (England) (Amendment) (No 2) Order 2016*.[28]

The 2016 Order brought in changes to increase the height of mobile masts allowed under permitted development. Broadly, ground based masts up to 25 metres in non-protected areas and 20 metres in protected areas fall within permitted development.[29] The 2016 reforms also included rights automatically to upgrade mast infrastructure within permitted development amongst other changes. The Government's written statement in March 2016 provides a brief description of what mobile infrastructure falls under permitted development following the 2016 reforms.[30]

The Code of Best Practice on Mobile Network Development in England provides guidelines for the siting and appearance of mobile masts and expectations for community consultation.

All new mobile masts require prior approval regarding the siting and appearance of the mast.

Guidelines for the siting and appearance of mobile infrastructure are provided in the Code of Best Practice on Mobile Network Development in England.[31] The Code was agreed by a working group consisting of representatives from the mobile industry, UK Government, local government and other bodies.

In April 2021, the Department for Digital Culture Media and Sport (DCMS) said it was leading on work to develop a new code of practice:

> This will provide updated guidance on how operators and local authorities can work together to build communications infrastructure the country needs. It will also contain best practice for the siting of new infrastructure, particularly in protected areas, and ensuring stakeholders are properly consulted.[32]

For more information, see the Government's planning practice guidance on permitted development.

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27 The Town and Country Planning (General Permitted Development) (England) Order 2015 SI 2015/596.

28 Town and Country Planning (General Permitted Development) (England) (Amendment) (No 2) Order 2016 SI 2016/1040.

29 There are height limitations on highways and residential areas. Unprotected land means land which is not a "site of special scientific interest" or land defined in Article 2(3) of the Town and Country Planning (General Permitted Development) (England) Order 2015, which includes conservation areas, areas of outstanding natural beauty, national parks and world heritage sites (amongst others).

30 HCWS631, 17 March 2016 [Boosting Mobile Connectivity: Written statement]

31 Mobile UK, Code of Best Practice on Mobile Network Development in England, 24 November 2016

32 DCMS, New laws to wipe out rural mobile 'not spots' and speed up rollout of next-generation 5G technology, 20 April 2021.

Devolved Administrations

Permitted development rights for telecommunications infrastructure exist in each of the four nations. However, the detail of the permitted development regulations – such as specifically which infrastructure falls under permitted development rights – may differ in each of the nations.

In Wales permitted development reforms similar to the 2016 reforms for England (on the height of mobile masts, described above) came into force in April 2019.[33] Changes were also made in December 2020 regarding antenna systems.[34]

In Scotland: permitted development rules for telecoms were reformed in 2017; a summary is provided on the Scottish Government website.[35] A consultation on further changes ran in October to November 2020.[36]

Northern Ireland: reformed permitted development rules for telecoms came into force on 21 December 2020.[37]

For general information about permitted development in each UK nation see section 8 of the joint Library briefing paper: Comparison of the planning systems in the four UK countries: 2016 update.[38]

2.3 Proposed changes to planning for mobile masts in England

In August 2019, the Government opened a consultation on changes to planning rules to aid efficient roll-out of 5G and extend mobile coverage in England. The consultation sought views on proposed changes to permitted development rights in the following areas:

- Enabling higher masts (subject to prior approval) to encourage the development of taller but fewer masts.
- Allowing existing masts to be widened without prior approval to enable sites to be strengthened and upgraded for 5G and increase sharing

[33] The Town and Country Planning (General Permitted Development) (Amendment) (Wales) Order 2019 (SI 2019 No. 330 (W. 80)); Welsh Government, Consultation Document WG33507, Subordinate Legislation Consolidation and Review, 31 May 2018.

[34] The Town and Country Planning (General Permitted Development) (Amendment) (No. 3) (Wales) Order 2020 (SI 2020 No. 1318 (W. 290)). See: Welsh Government, Changes to the Town and Country Planning (General Permitted Development) Order 1995, 17 December 2020.

[35] Scottish Government, Permitted development rights: class 67 changes, 12 June 2017.

[36] Scottish Government, Permitted development rights - phase 1 priority development types: consultation, October 2020.

[37] The Planning (General Permitted Development) (Amendment) Order (Northern Ireland) 2020 (SI 2020 No. 292) inserted a new Schedule 3 (setting out the permitted development rules for electronic communications) into the 2015 Order.

[38] CBP 7459, 20 January 2016.

between operators. Currently, masts can be widened by up to one third without prior approval, this proposal would remove the one-third limit.
- Enabling deployment of radio equipment housing on land without prior approval, excluding sites of special scientific interest. Radio equipment housing means the cabinets containing equipment needed to support the mast such as the power source. Currently, equipment housing of more than 2.5 cubic meters and all equipment housing on protected land [39] and sites of special scientific interest require prior approval.
- Enabling the deployment of building-based masts nearer to highways.

Any changes would apply to all mobile infrastructure in England, not just 5G.

The Government's response to the consultation in July 2020 confirmed that it intended to bring forward the in-principle proposals put forward in the consultation, subject to a further technical consultation that would include detail on "appropriate environmental protections and other safeguards". [40]

The technical consultation on the above changes closed in June 2021. [41] It also included new proposals including permitting shorter masts on buildings and for monopoles up to 15 meters in height to be built without prior approval.

2.4 Additional requirements for consultation with local authorities (UK-wide)

Telecoms operators must also comply with the Electronic Communications Code (Conditions and Restrictions) Regulations 2003 as amended, [42] which apply UK-wide.

Amongst other general conditions, the regulations require operators to consult and cooperate with the local highways and planning authorities in certain circumstances. For example, operators are required to give notice to planning authorities in areas where they have not previously installed infrastructure (with some exceptions), and planning authorities can set reasonable requirements that they wish the operator to comply with. The

[39] Protected land means land defined in Article 2(3) of the *Town and Country Planning (General Permitted Development) (England) Order 2015*, which includes conservation areas, areas of outstanding natural beauty, national parks and world heritage sites (amongst others).

[40] DCMS, MHCLG, Proposed reforms to permitted development rights to support the deployment of 5G and extend mobile coverage: Government response, 22 July 2020.

[41] DCMS, MHCLG, Changes to permitted development rights for electronic communications infrastructure: technical consultation, 20 April 2021.

[42] Amending legislation includes: SI 2013/1403, SI 2016/1049 and SI 2017/753.

Regulations also include specific conditions relating to the installation of infrastructure in protected areas. [43]

[43] Electronic Communications Code (Conditions and Restrictions) Regulations 2003 as amended (SI 2003/2553 as amended e.g. by SI 2016/1049, SI 2013/1403 and SI 2009/584)

3 Access agreements

3.1 What is an access agreement?

A telecoms operator wishing to build infrastructure on public or private land will require an agreement with the landowner/occupier to use the land.

Access agreements may take different forms, the most common forms for digital infrastructure are wayleaves and leases.

- A **wayleave** is a contractual agreement whereby a landowner grants a communications provider a licence to, for example, install, access and maintain equipment on their land in return for a rental payment. Wayleaves are usually open-ended and rent is usually paid annually or as a one-off payment. [44]
- A **lease** confers occupational rights to a specific area of land or a building and is usually for a fixed period of time with periodic rental payments.

Wayleaves are usually used for fixed-line broadband infrastructure while leases are more commonly used for mobile masts. More information is provided on the Government's Digital Connectivity Portal: Guidance on access agreements. [45]

Wayleaves and leases are private legal agreements and the specific terms may differ in each case.

Access agreements are usually entered into consensually between the parties. If such an agreement cannot be reached however, the telecoms company may apply to the courts to impose an agreement through powers contained in the Electronic Communications Code (see Section 3.2 below).

A separate regime applies for building electronic communications infrastructure build on public roads, known as "street works" – see Section 4 below.

[44] DCMS, Guidance on access agreements, 20 December 2018, accessed 1 March 2021.
[45] DCMS, Guidance on access agreements, 20 December 2018, accessed 1 March 2021.

3.2 The Electronic Communications Code (ECC)

The Electronic Communications Code (ECC) is the main law that governs the rights of telecoms companies to install infrastructure on private and public land; it applies UK wide. It was first introduced in 1984 to regulate landline telephone provision. It is contained in Schedule 3A to the Communications Act 2003 (as amended) and is a complex piece of legislation.

The Electronic Communications Code (ECC) provides designated network operators with rights, called "code rights", to install, operate, maintain and upgrade electronic communications infrastructure (such as mobile masts or fibre broadband cables) on private and public land.

Code rights in respect of land may only be conferred on an operator by a written agreement between the occupier of the land and the operator[46] – e.g. a wayleave or a lease as described above.

Ofcom has published a Code of Practice that is intended to provide a framework for what the parties should expect from each other when negotiating agreements. In addition, Ofcom has also published examples of standard terms that might be included in an agreement.[47]

If an agreement cannot be agreed consensually, either party can apply to the Court to impose an agreement. The powers of the Court to impose an agreement are set out in Part 4 of the ECC. An agreement can only be imposed if the Court considers that:

- the prejudice caused to the landowner/occupier by an imposed agreement is capable of being adequately compensated by money; and
- that the public benefit likely to result from the making of the order outweighs the prejudice to the landowner/occupier.

Part 4 of the ECC includes powers for the Court to determine the compensation to be paid by the operator (see land valuation in section 3.3 below).

The ECC only applies to operators that have been granted Code Powers (called Code Operators) by Ofcom, following a public consultation.[48] Ofcom publishes a Register of operators with powers under the ECC which can be consulted for specific companies.

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[46] *Communications Act 2003* (as amended) Schedule 3A: Electronic Communications Code, Part 2, paragraphs 9 and 11.

[47] Ofcom, Electronic Communications Code, 11 May 2018, accessed 9 January 2018.

[48] Ofcom, Register of persons with powers under the Electronic Communications Code, 11 May 2018, accessed 31 August 2018.

3.3 Reforms to the ECC: Digital Economy Act 2017

A new Electronic Communications Code came into force on 29 December 2017, through the Digital Economy Act 2017.[49] The 2017 reforms follow several years of consultation and review, including several previous unsuccessful attempts at reform.[50]

The 2017 ECC is a redrafting of the old ECC and contains many of the same provisions. Significant changes in the new ECC include changes to land valuation for imposed agreements (see below), as well as reforms intended to make it easier for telecoms companies to upgrade existing infrastructure and changes to dispute resolution procedures. More detailed information about the reforms to the ECC is provided in a briefing note from law firm Eversheds Sutherland: the New Electronic Communications Code.[51]

The 2017 ECC reforms changed the way that rents are calculated making it cheaper for mobile operators to rent land to host masts.

Land valuation

One significant change is that the 2017 ECC changed the way that rent for hosting telecoms equipment on private land is calculated when the court is imposing an agreement.

Following the 2017 reforms, rent is now calculated based on the value of the land to the landowner, rather than to the operator. This is a system based on compulsory purchase principles ("no-scheme valuation") that is used for other utilities such as electricity.

While most agreements should be consensual between operators and landowners, rather than ones imposed by the court, this change in approach to valuation should strengthen the negotiating position of operators leading to reduced rents even in consensual agreements. The Government's 2016 impact assessment for the reformed ECC stated that it expected the reforms to reduce wayleave rents by 40%, with landowners' rents falling by £709 million over a 20-year period.[52]

The proposal for no-scheme valuation was initially suggested by the Law Commission when it reviewed the ECC in 2013. However, after a consultation, it ultimately proposed only minor changes to the valuation regime just to prevent excessive "ransom rents".[53] The Government decided to go ahead with the "no-scheme" valuation in the reformed ECC, stating that while landowners should receive fair payment for the use of their land, this should

[49] For background information, see the Library briefing paper on the Digital Economy Bill (CBP 7699, 9 September 2016).
[50] For background information, see the Library briefing paper: Reforming the Electronic Communications Code,CBP-7203, 1 June 2016.
[51] Eversheds Sutherland: the New Electronic Communications Code, 9 January 2018.
[52] DCMS, Government publishes proposals for a new Electronic Communications Code – Regulatory Impact Assessment, 17 May 2016.
[53] The Law Commission, 'The Electronic Communications Code', 27 February 2013.

not include a share of the economic value created by the demand for services provided by network operators. [54]

For background information and commentary, see the Library briefing papers on the Digital Economy Bill [55] and Reforming the Electronic Communications Code. [56]

What impact are the reforms having?

Several commentators have pointed towards problems in negotiating agreements following the 2017 reforms to the ECC. Farmers Guardian and ISP Review reported in 2018 that some telecommunications companies were dramatically reducing the rents that they were offering to pay landowners. It was reported that some reductions in rent offered were much greater than anticipated or intended by the reformed EEC. [57]

In August 2018, the Government along with Mobile UK (the trade body for mobile operators), the Country Land and Business Association, and the Royal Institution of Chartered Surveyors signed a Joint Statement on the reformed ECC. [58] The Statement recognised "problems with negotiations progressing" with the parties coming together to "reaffirm the commitments" made to the reformed ECC and to Ofcom's Code of Practice.

The Broadband Stakeholder Group [59] and think tank Centre for Cities [60] have both commented that one consequence of the reduced rents is that landowners are now less willing to engage with operators, resulting in a 'freeze' on the market. Mobile industry stakeholders argue that this is hampering the effectiveness of the reformed ECC and delaying infrastructure build through lengthy legal proceedings. [61] The British Property Federation argue that some of the reforms have given landlords "a complete lack of control over their building" and pointed to a "hostile environment between landlords and operators". [62]

Cases have reached the courts on the interpretation several parts of the ECC, such as the rights to upgrade and share apparatus and regarding renewal of

[54] DCMS, 'A New Electronic Communications Code', May 2016, pp 14-15.

[55] CBP 7699, 9 September 2016

[56] CBP 7203, 1 June 2016

[57] Digital Minister: Farmers being ripped off by telecoms providers an 'outrage', Abi Kay, Farmers Guardian, 4 October 2018, accessed 17 December 2018. Telecoms Disputes Over Wayleaves, Rents Threaten to Become Toxic, Mark Jackson, ISP Review, 17 December 2018, accessed 17 December 2018.

[58] DCMS, MobileUK, Country Land and Business Association, Royal Institution of Chartered Surveyors, Joint Statement on the reformed Electronic Communications Code, 22 August 2018.

[59] Lowing the Barriers to 5G Deployment, Report by Analyst Masons for the Broadband Stakeholder Group, Dr Matt Yardley, Janette Stewart, Ian Adkins, Dr Robert Woolfson, 20 July 2018.

[60] Centre for Cities, Delivering change How cities can make the most of digital connections, Simon Jeffrey and Lahari Ramuni, July 2018.

[61] Speed Up Britain, The Problem [accessed 29 April 2021]; Mobile UK, Future Telecoms Infrastructure Review is a positive step but it is deadlines that will achieve its goals, Gareth Elliot, July 2018.

[62] British Property Federation, BPF views on the progress of the Electronic Communications Code, Raja Hanna, 13 June 2018.

Code rights following an expired agreement.[63] Lawyers have commented that the drafting has created "frustration and confusion" among stakeholders.[64]

3.4 Reviewing the ECC: 2021

In January 2021 the Government opened a consultation on potential further reforms to the ECC to support their plans for digital infrastructure roll-out (both fixed-line broadband and 5G).[65]

The Government identified the following three main "problem areas" it seeks to address with potential reforms – each is discussed in detail in the consultation document along with a "range of potential means to address them":

- Issues relating to negotiations and the operation of completed agreements. These issues include failures to respond to requests from operators; failures to negotiate constructively and collaboratively; failures to comply with the Ofcom Code of Practice and / or the terms of concluded agreements; and the need for faster and cheaper dispute resolution;
- Rights to upgrade and share. Landowners, occupiers and operators all report that the current law in relation to these rights are not sufficiently clear to achieve their intended purpose; and
- Difficulties specifically relating to the renewal of expired agreements, due to a lack of clarity in the legislation, issues with the notice and procedural requirements, and problems with dispute resolution.[66]

On the first point regarding negotiation of agreements, the Government stated it did not intend to revisit the valuation framework that was reformed in 2017 [emphasis in original]:

> 2.13. The Government's policy position on this valuation regime has not changed. We still believe that underpinning negotiations with the valuation model (i.e. that set out in paragraph 24 of the Code) is appropriate for the installation and maintenance of digital

[63] Ashurst, The Electronic Communications Code - Are changes afoot?, 4 February 2021.

[64] Shoosmiths, Consultation announced on changes to the Electronic Communications Code, 4 February 2021; Property Litigation Association, Andrew Walker QC – Code operators as occupiers under the Electronic Communications Code – Solving the conundrum of Compton Beauchamp, 24 August 2020.

[65] DCMS, Consultation on changes to the Electronic Communications Code 27 January 2021; press release: Government reviews law on access to land for digital infrastructure.

[66] DCMS, Consultation on changes to the Electronic Communications Code, 27 January 2021, paragraph 1.18.

> communications infrastructure systems. **We do not intend to revisit the valuation framework contained in the Electronic Communications Code.**
>
> 2.14. We do not think that disagreements about financial terms are the **only** reason that negotiations are not progressing as smoothly as they could be. Other issues have been brought to our attention, including: non collaborative behaviour or poor communications by operators, occupiers and professional representatives; a lack of trust between negotiating parties; and concerns about ensuring both parties adhere to the terms of a completed agreement.
>
> 2.15. We think changes are needed that will encourage more collaborative negotiation and offer ways for disagreements to be dealt with quickly and cheaply.

In the May 2021 Queen's Speech the Government said that it would bring legislation to reform the ECC to through a Product Security and Telecommunications Infrastructure Bill. The Government said that the Bill would

> support faster and more collaborative negotiations for the use of private and public land for telecommunications deployment, and to put the right framework in place for the use of installed apparatus. [67]

Reforms to the ECC have always been highly contested. [68] The Government must strike a difficult balance between ensuring digital connectivity is widely available while property rights are respected. Both the mobile industry and property owner organisations have established campaign groups to address the new proposals for reform, including:

- Speed Up Britain is a "cross-industry, non-partisan organisation campaigning for better mobile connectivity in every part of the UK". It says that the 2017 ECC reforms have "encouraged disagreements" and led to "lengthy legal proceedings" causing delays to the roll-out and upgrades of existing telecoms sites. It calls on the Government to make changes to the ECC including to allow enable upgrading and sharing of sites and to allow an efficient renewal process for expired pre-Code Agreements.
- Protect and Connect is a campaign led by land and property owners who lease their land to telecoms companies, including "farmers, churches and community groups". They argue that telecoms operators are using the reformed ECC to push down rents such that property owners are not getting a "fair deal". They are calling for the Government to reconsider

[67] PM's Office, Queen's Speech 2021: background briefing notes, 11 May 2021.
[68] See first paragraph of section 3.3 above and corresponding footnotes.

the 'no scheme' valuation approach and adopt the Law Commission's 2013 proposals (discussed at page 21 above).

The Law Society has commented that the Government's proposals for ECC reform focus more on "symptoms" of the problems encountered, rather than addressing the "root causes", which they say stem from the balance of rights in the ECC being "too heavily in favour of operators". [69] They said that changes to dispute resolution procedures and adjustments to some code provisions would only provide "part of the answer".

3.5 Fibre-broadband to tenanted properties

Even with ECC rights, operators reported that they face administrative barriers getting access to land, particularly for properties with unknown or unresponsive landlords. Broadband operators have said this often occurs when trying to connect blocks of flats, office blocks and business parks to new full-fibre broadband. [70] This can result in delays in properties getting connected or properties being left out of build plans.

The Telecommunications Infrastructure (Leasehold Property) Act 2021 received Royal Assent in March 2021. The Act aims to address the issue of unresponsive landlords for multi-dwelling residential properties.

The Act introduces a new process for telecoms operators to access multi-dwelling residential buildings through the Lands Tribunals. The new process would only apply where a tenant has requested a connection from a telecoms operator, but the landowner has repeatedly failed to respond to formal requests from the operator to negotiate access. The rights would be for an interim period of no more than 18 months. [71] The Library briefing paper on the Act provides further information.

The Act will not come into force until a date specified in legislation. A consultation on the regulations to implement the Act opened in June and will close on 4 August 2021. [72]

[69] The Law Society, Changes to the Electronic Communications Code – Law Society response, 20 April 2021.

[70] DCMS, Future Telecoms Infrastructure Review, 23 July 2018, para 52-53; Openreach, The blueprint for a full-fibre future, October 2019 [accessed 10 January 2020].

[71] The Telecommunications Infrastructure (Leasehold Property) Bill 2019-20 clause 27G

[72] DCMS, Barrier Busting Task Force: Next steps, 19 March 2021.

4 Street works: installing infrastructure on public roads

Part 8 of Electronic Communications Code (ECC) provides designated telecoms companies with rights to install telecommunications infrastructure on or under public roads and to carry out the necessary associated street works to do so. This provides the legal basis for those telecoms companies to be considered statutory undertakers (along with other utility companies) under Parts III and IV of the New Roads and Street Works Act 1991 in England, Wales and Scotland (the 1991 Act), and under the *Street Works (Northern Ireland) Order 1995* (SI 1995/3210) in Northern Ireland. [73] [74]

The 1991 Act and associated regulations allows statutory undertakers to carry out street works on public roads without the prior consent of the local highway authority. This means that telecoms companies do not need to agree a wayleave to install infrastructure on/under a public road. [75]

The 1991 Act provides some powers to local highway authorities to manage **how** companies conduct works and requires utility companies to provide advance notice of the works to the authority. Some areas have introduced permit or lane rental schemes, which give the highway authority more control over works. More information on street works generally is provided in the Library briefing paper: Street works in England. [76]

Telecoms operators must also comply with the Electronic Communications Code (Conditions and Restrictions) Regulations 2003 (as amended), [77] which apply UK-wide that includes provisions regarding consolation with highways authorities (see Section 2.4 above).

Calls for reform

Telecoms companies have raised concerns about inconsistent approaches between local authorities to the management of street works and

[73] In England and Wales the 1991 Act was heavily amended by Parts 3 and 4 of the *Traffic Management Act 2004*; in Scotland by Part 2 of the *Transport (Scotland) Act 2005.*

[74] A comparison of street works and planning legislation relevant to building telecoms infrastructure in each nation is provided in a report by Analyst Masons, commissioned by the Broadband Infrastructure Group, Lowering barriers to telecoms infrastructure deployment, Dr Matt Yardley, Ian Adkins, Dr Robert Woolfson, May 2017.

[75] A wayleave would however be required for a private road, see section 3.1 above

[76] CBP 8500, 19 February 2019.

[77] Amending legislation includes: SI 2013/1403, SI 2016/1049 and SI 2017/753.

interpretation of street works legislation, arguing that this inconsistency has created uncertainties and inefficiencies when seeking to build infrastructure. [78] The Government has stated that road and street works account for 70% of the cost of fibre broadband deployment. [79]

On the other hand, local highway authorities have argued that telecoms companies take an inconsistent approach to sharing information about their deployment plans, which makes it difficult for them to coordinate works (across multiple utilities – not just telecoms companies) effectively. [80]

In its 2018 Future Telecoms Infrastructure Review (FTIR), the Government noted that there was a "culture of mistrust" between local authorities and operators. [81] The FTIR stated that the Government's aim is to "ensure a uniform approach" to street works across the country with both local authorities and undertakers "promoting a collaborative and flexible approach".

The National Infrastructure Commission recommended that local authorities appoint a 'digital champion' with responsibility for engaging with telecoms providers. [82] Similar calls have been made by the Broadband Stakeholder Group and the thinktank Centre for Cities. [83]

The Department of Transport (DfT) has an ongoing programme of work on facilitating street works across all utilities, not just broadband. In July 2018, DCMS and DfT published a Street Works Toolkit (for England and Wales) that provides practical guidance for managing street and road works for the deployment of broadband infrastructure. The Toolkit was agreed between the Government and Street Works UK (on behalf of operators), the Joint Authorities Group (on behalf of local authorities) and the Highway Authorities and Utilities Committee.

[78] DCMS, Future Telecoms Infrastructure Review, 23 July 2018, para 60. See also for example, a report by Analyst Masons, commissioned by the Broadband Infrastructure Group, Lowering barriers to telecoms infrastructure deployment, Dr Matt Yardley, Ian Adkins, Dr Robert Woolfson, May 2017.

[79] DCMS, DfT, Street Works Toolkit, 23 May 2019.

[80] DCMS, Future Telecoms Infrastructure Review, 23 July 2018, para 61.

[81] DCMS, Future Telecoms Infrastructure Review, 23 July 2018, para 61.

[82] National infrastructure Commission, National Infrastructure Assessment, 10 July 2018, page 30.

[83] Analyst Masons, commissioned by the Broadband Infrastructure Group, Lowering barriers to 5G deployment, Dr Matt Yardley, Janette Stewart, Ian Adkins, Dr Robert Woolfson, July 2018; Delivering change: How cities can make the most of digital connections, Simon Jeffrey and Lahari Ramuni, Centre for Cities, July 2018.

5 Access to existing infrastructure

The biggest cost for fibre broadband deployment is the civil engineering works required – physically digging trenches and laying cables. This is also important for mobile networks because fibre-broadband cables connect mobile masts to the core network (called backhaul).

Accessing existing infrastructure to host telecoms cables can help reduce these civil engineering costs. The main policy measure in place to facilitate access to existing infrastructure is to open access to Openreach's network of ducts (underground tunnels) and poles for use by competitors. [84] The Government is also looking at trying to improve sharing of infrastructure between different utilities (e.g. water and energy).

5.1 Accessing infrastructure of other utilities

The Communications (Access to Infrastructure) Regulations 2016 (the ATI regulations) were introduced in 2016 to implement certain requirements of the EU Broadband Cost Reduction Directive and apply UK-wide. [85]

The regulations include a requirement for operators of utilities (including gas, electricity and water as well as telecoms) to share physical infrastructure with competing network operators. The Government has noted that the ATI regulations have so far had limited success regarding infrastructure sharing. [86]

In June 2020 the Government launched a Call for Evidence as part of a review of the ATI Regulations to assess whether further improvements could be made to encourage infrastructure sharing and boost infrastructure investment. [87] In March 2021 the Government said it would publish its response to the Call for Evidence in Spring 2021. [88]

The Call for Evidence document included some case studies of examples where telecoms operators had used infrastructure of other utilities (e.g. water pipes).

[84] Background information is provided in the POST briefing paper: Telecommunications Infrastructure: Cables, Ducts and Poles (March 2017).

[85] Directive 2014/61/EU on measures to reduce the cost of deploying high-speed electronic communications networks (the Broadband Cost Reduction Directive).

[86] DCMS, Future Telecoms Infrastructure Review, 23 July 2018, para 69.

[87] DCMS, Review of the Access to Infrastructure Regulations - call for evidence, June 2020.

[88] DCMS, Barrier Busting Task Force: Next steps, 19 March 2021.

In August 2021 the Government launched the Fibre in the Water competition.[89] The competition will award £4 million R&D funding to trial installing fibre cables via water mains pipes to connect very rural premises to broadband and/or mobile services. The aim is to enable these normally very hard to reach premises to be connected at lower cost by reducing engineering work, while also helping to detect leaks in water pipes.

5.2 Access to Openreach duct and poles

Openreach has been required to allow competitors (telecoms companies other than BT) to rent access to its ducts and poles since 2010 for the purpose of laying fibre cables for high-speed broadband services but not, for example, fibre for the purposes of supporting mobile networks.

Ofcom introduced reforms to duct and pole access in March 2018, having found low take up by operators of access to Openreach infrastructure, despite the ATI Regulations being introduced in 2016.[90] The reforms included introducing a non-discrimination requirement, meaning that Openreach must provide access nationally to other providers as easily as to BT, including the same service levels. Ofcom stated that the reforms could cut the cost of laying fibre cables by 50% and reduce the time taken from days to hours.[91]

In May 2019, Ofcom announced further reforms to open up access to Openreach's ducts and poles for all telecoms services, including business lines and lines used to support mobile broadband networks.[92]

In January 2020, Ofcom reported uptake of duct and pole access had increased since May 2019, with over 80 companies taking advantage of Openreach's infrastructure with plans to use over 40,000 poles and 5,000km of duct, up from around 12,000 and 2,500km respectively in May.[93]

In March 2021 Ofcom confirmed it would continue its approach to regulating accessing Openreach's ducts and poles over the period April 2021–2026. It said that now over 100 customers were making use of the infrastructure comprising around 23,000km of duct and around 140,000 poles.[94]

The Government and the National Infrastructure Commission have both strongly supported opening access to Openreach's ducts and poles, framing it as one of the most important reforms that could quickly enhance

[89] DCMS, Broadband rollout trial to target hard-to-reach homes through UK's water pipes, 9 August 2021; DCMS Guidance, Fibre in Water: Improving access to advanced broadband and mobile services via drinking water mains, 9 August 2021.
[90] Ofcom, Wholesale Local Access Review, Volume 3, 28 March 2018, para 2.11-2.19.
[91] Ofcom, Opening up BT's infrastructure for new fibre broadband, 20 April 2017, accessed 17 August 2018.
[92] Ofcom, Further Ofcom rules to support fibre investment, 24 May 2019.
[93] Ofcom, Supercharging investment in fibre broadband, 8 January 2020, accessed 9 January 2020.
[94] Ofcom, Ramping up the rollout of full-fibre broadband, 18 March 2021.

infrastructure build. Both stressed the importance of monitoring the success of this approach, and to consider further intervention if take up is low. [95]

5.3 Using churches to host telecoms infrastructure

In February 2018, Government and the Church of England signed an Accord to encourage the use of church spires to host telecoms equipment. [96] The Accord covers all digital communications infrastructure, including broadband, mobile and WiFi services.

The short Accord (3 pages) sets out that the purpose of the document is to encourage churches to consider installation of broadband and mobile infrastructure, but stresses that each Church entity should take its own steps and decisions – there is no programme to encompass all churches as such, and no specific funding is allocated.

A PQ from March 2018 explained that intention of the Accord was to indicate that there is "no institutional barrier" to broadband and mobile technology being used in churches "to promote connectivity in a manner appropriate for the community". The Government stated that the Church of England was setting up a working group with interested dioceses. [97]

The Church of England and Historic England have both published guidance regarding the installation of telecommunications equipment in church buildings which should be reviewed by interested dioceses. The Historic England guidance focuses on the impact on the buildings whereas the Church of England guidance also covers the process of negotiating an agreement with a telecommunications provider. Individual dioceses also may also publish their own guidance.

By way of example, projects where churches have been used for telecommunications equipment include in Norwich where internet service provider WiSpire has partnered with the Diocese of Norwich and media company Archant to provide broadband services. A similar scheme exists in Chelmsford, operated by County Broadband.

[95] DCMS, Future Telecoms Infrastructure Review, 23 July 2018, para 68. National infrastructure Commission, National Infrastructure Assessment, 10 July 2018, page 28.
[96] DCMS, Defra, Church spires to boost digital connectivity in rural areas, 18 February 2018.
[97] PQ131600, 13 March 2018 [Churches: Broadband and WiFi].

6 Mobile masts and health concerns

Concerns about radio waves emitted from communications technology such as mobile masts are longstanding. More recently there have been specific concerns expressed relating to the roll out of 5G. For example, a Parliament and Government petition that called for an independent investigation into the health implications of 5G received over 55,000 signatures before closing in June 2020. [98]

Public Health England (PHE), an executive agency to the Department of Health and Social Care, provides advice to the Government on public health issues. Its guidance document: Mobile phone base stations: radio waves and health provides an overview of radio waves from mobile phone base stations, different generations of mobile technology and the research that has been undertaken internationally on this issue. [99]

PHE's main advice about radio waves from mobile base stations is that the guidelines of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) should be adopted for limiting exposures (see Box 3). PHE states that international and UK expert groups have examined the accumulated independent evidence and that "their conclusions support the view that health effects are unlikely to occur if exposures [to radio waves] are below international guideline levels". [100]

PHE states that it continues to monitor the health-related evidence on radio waves and commits to updating its advice as required. [101]

3 International Guidelines

Public Health England endorses the international guidelines on electromagnetic field exposure that are set by the International Commission on Non-Ionising Radiation (ICNIRP).

[98] See, for example, Written question 176373 and Written Question 176372 [5G: health hazards] 16 October 2018, DCMS,The Future Telecoms Infrastructure Review: Call for Evidence Responses, July 2018.

[99] PHE, Mobile phone base stations: radio waves and health, updated 24 September 2020.

[100] Government and Parliament Petitions, Launch an independent enquiry into the health and safety risks of 5G [accessed on 21 June 2019]

[101] PHE, Mobile phone base stations: radio waves and health, updated 24 September 2020.

ICNIRP is an independent organisation that provides scientific advice and guidance on the health and environmental effects of non-ionising radiation. It is formally recognised as an official collaborating non-governmental organisation by the World Health Organization (WHO) and the International Labour Organisation (ILO).

The ICNIRP guidelines were first published in 1998 and have undergone a series of reviews since then (explained in the PHE guidance linked above). The ICNIRP guidelines were most recently revised in March 2020 to reflect new 5G technology.[102] The ICNIRP webpage on 5G provides further information about the 2020 changes. The changes are technical and relate to radio wave frequencies above 6 GHz (which are not currently used in commercial UK mobile networks).

During the Coronavirus pandemic, misinformation has been shared on social media claiming that the 5G roll out is connected to the pandemic. A number of scientific and fact checking sources, Ofcom and the Government have all set out there is no evidence for these claims, and they have no scientific basis.[103]

Information on 5G and health more specifically is provided in the following sources:

- The Government and Ofcom's Guide to 5G mobile technology provides information about 5G technology and safety tailored for politicians and local authorities.[104]
- Public Health England guidance on 5G technologies: radio waves and health.[105]
- Parliamentary Office of Science and Technology POSTbrief on 5G technology on page 18.[106]
- The Institute of Engineering and Technology, Allaying health concerns regarding 5G and exposure to radio waves (July 2020)

[102] ICNIRP, New Guidelines Released by the International Commission on Non-Ionizing Radiation Protection (ICNIRP)(PDF), 11 March 2020.
[103] DCMS, 5G and coronavirus (COVID-19), May 2020
[104] DCMS and Ofcom, Guide to 5G mobile technology, 27 August 2020.
[105] PHE, 5G technologies: radio waves and health, 3 October 2019.
[106] POST, 5G technology, PB 0032, 24 July 2019.

Ofcom testing of mobile base stations

Ofcom is the UK telecommunications regulator responsible for managing radio frequency spectrum in the UK. It does this by licencing and monitoring radio spectrum use.

Ofcom does not make recommendations about exposure to radio waves and public health but does play a role in testing electromagnetic field emissions from mobile base stations. Ofcom's webpage on exposure to electromagnetic fields explains its role in this area.

In February 2020, Ofcom published the results of its testing radio frequency electromagnetic field (EMF) emissions at sixteen 5G base stations across the UK. Ofcom confirmed that the EMF emissions from all base stations tested were well within the ICNIRP guideline exposure level limits. Masts that Ofcom has tested are listed on Ofcom's website and is updated as Ofcom continues to test and monitor masts. [107]

Licence conditions for mobile masts and radio wave emissions

In 2021 Ofcom formally changed the conditions of the licences that authorise mobile operators to use radio spectrum for mobile communications to add a legal obligation regarding radio wave emissions.

It is now a legal requirement of most radio communications licences (issued under the Wireless Telegraphy Act 2006) to comply with the ICNIRP Guidelines for the projection of the general public from electromagnetic fields. [108]

Ofcom's final decision on the change was made on 18 May 2021. [109] This followed two consultations in 2020 and a statutory notice procedure. [110] Licensees will need to comply with the new rules from November 2021 (or later depending on the EMF frequency used). [111]

Previously, operators voluntarily committed to ensuring that base stations operated below ICNIRP guideline levels. They were expected to self-certify that masts will operate below guidelines levels when applying for planning permissions.

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[107] Ofcom, Mobile base station audit results: 2020.

[108] Ofcom, Electromagnetic fields (EMF), accessed 19 July 2021.

[109] Ofcom, Electromagnetic fields (EMF), accessed 19 July 2021.

[110] Ofcom, Statement and further consultation: Proposed measures to require compliance with international guidelines for limiting exposure to electromagnetic fields (EMF), February 2020; General Notice Of Proposal To Vary Wireless Telegraphy Act Licences, 1 March 2021.

[111] Ofcom, General Notice of Final Decision on Variation (PDF), 18 May 2021.

7 Glossary

Base stations: mobile base stations contain radio communications equipment that sends and receives mobile voice/data signals over an area surrounding the station and connects them to a mobile operator's network. Mobile masts, macro cells and small cells are all types of base stations. Mobile base stations require access to power and a backhaul connection.

Macro cell: a mobile base station that provides wide-area coverage for a mobile network. The antennas for macro cells can be mounted on ground-based masts, rooftops or other existing structures.

Small cell: a low-powered base station that provides coverage over a smaller area than macro cells. Small cells are used to boost mobile network capacity and coverage in localised areas e.g. dense urban areas where there are large numbers of users. They are smaller and lighter than macro cells so can be mounted in more places.[112] Small cells are already used for 4G networks in some busy areas and will be important for future 5G networks.

Backhaul: the link that connects a mobile base station to the core internet and phone network. Backhaul is usually provided by full-fibre broadband cables or fixed-radio links.

Fibre optic cable: Fibre optic cables are made of glass or plastic. They transmit data using light. Fibre optic cables can transmit more data with faster speeds and significantly less signal loss with distance compared to copper wires.

Full-fibre (Fibre to the Premises/Home, FTTP/FTTH): In a full-fibre connection, a fibre optic cable runs from the exchange directly to the premises or home. Full-fibre connections can provide download and upload speeds in excess of 1 Gbps (1000 Mbps). Full-fibre is also called Fibre-to-the-Premises (FTTP) or Fibre-to-the-Home (FTTH).

5G: 5G is the next generation of wireless networks. 5G is expected to support fast download speeds and near instant response times, with the capacity to support many devices operating at the same time. 5G is expected to offer advantages beyond mobile broadband, supporting a wide array of internet connected devices and services, for example, from healthcare to manufacturing. For more information, see the Library briefing paper on 5G (CBP7883).

[112] GMSA, Improving wireless connectivity through small cell deployment (pdf) December 2016.

Mobile Network Operator (MNO): a provider of mobile wireless communications services that owns or controls all the elements necessary to sell and deliver services to an end user, including spectrum allocation, infrastructure, and customer services. There are four MNOs in the UK: EE (owned by BT), Vodafone, O2 (owned by Telefonica) and Three (owned by Hutchinson 3G). Contact details and spectrum allocations for each of the MNOs are provided on Ofcom's webpage: Mobile and Wireless Broadband below 5 GHz.

Mobile Virtual Network Operator (MVNO): a mobile service provider that does not own the infrastructure which is uses to deliver services. MVNOs have agreements with the MNOs to deliver services using the MNOs infrastructure. There are many MVNOs in the UK.

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