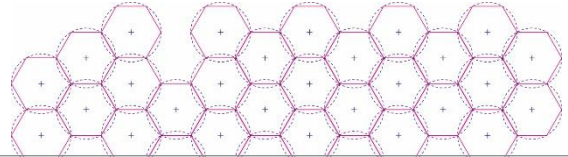


Regulating for full fibre rollout in the UK

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This paper provides a case study on how the UK is attempting to incentivise full fibre rollout (whereby every premises has a direct fibre connection), and the challenges which these proposals pose. In the past, the UK was the first to introduce the ideas of anchor product pricing and wholesale pricing freedoms. These were subsequently adopted by the European Commission¹ and have led to substantial investment in next-generation broadband access across the EU. As a result, new proposals from the UK should be of interest to regulators and operators in a wide range of developed countries, as well as to those in the UK.

The change in UK telecommunications policy

Until recently the UK's telecommunications regulator, Ofcom, was content to let commercial market players determine investment and deployment of broadband services subject to regulation which:

- prevents the dominant operator, BT, from abusing its market position to suppress competition;
- enables certain universal service objectives to be met; and
- protects consumers from unfair practices by the industry.

Recently, however, the UK Government established a policy for full fibre rollout (FFRO). In particular, it set targets for full fibre access by 15 million premises (out of 29 million in the UK) by 2025, and full fibre access for all by 2033². With these targets in mind, Ofcom is now in the process of developing regulations which will provide the telecommunications industry with incentives to make the investment needed to turn the government's targets into a reality. So far Ofcom has published several key documents:

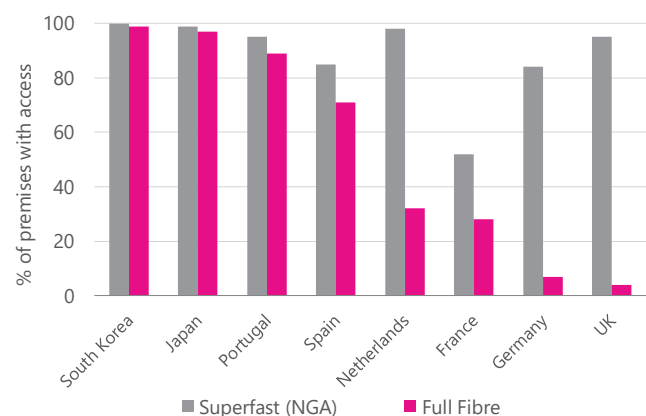
- Its broad strategy, published in July 2018³;
- More detailed proposals to promote investment and competition in fibre networks in December 2018⁴;
- Initial proposals on remedies in March 2019⁵; and
- Proposals on cost modelling in June 2019⁶.

The starting position in the UK

The supply of high-speed broadband in the UK has a number of important features. Compared with other developed countries, the UK lacks FFRO, as shown in Figure 1. However, BT has been

very successful in rolling out and selling high-speed broadband based on fibre to the cabinet (FTTC), with support from Government programmes such as Broadband Delivery UK (BDUK)⁷. These services, which typically offer data downlink speeds of around 24 Mbps plus, are now accessible to over 95% of premises in the UK. This means that the UK ranks highly in terms of end user access to superfast broadband, but poorly in terms of access to ultra high speed broadband⁸. With the BDUK programme expected to close in 2022, further development on FTTC build is expected to be limited, as focus shifts to FFRO.

Figure 1: The UK lagged in full fibre rollout in 2018⁹



To ensure non-discrimination in the supply of wholesale broadband access products, BT's access network business, Openreach, is legally separated from the rest of BT Group. Nevertheless, key Openreach decisions, such as on investment levels, are still subject to approval by the board of BT Group. Openreach now passes over 1 million premises with full fibre and is ramping up its fibre to the premises (FTTP) investment level from £1.3 billion to £2 billion pa.

Meanwhile, altnets (network providers other than the incumbent) – like CityFibre and Hyperoptic – are also investing significant amounts in FFRO. Some altnets offer open non-discriminatory access to retail service providers; others do not.

Finally, Virgin Media (VM), a cable operator owned by Liberty Global, will soon cover 57% of UK premises with its hybrid fibre coaxial network. Its owner is now also considering further expansion of the network into rural areas of the UK according to recent press reports¹⁰. This network offers average broadband speeds of 50 Mbps or more and has a retail market share of the broadband market of around 35%. In the areas to which its cable network reaches, Virgin Media is vertically integrated and does not offer access products to retail service providers.

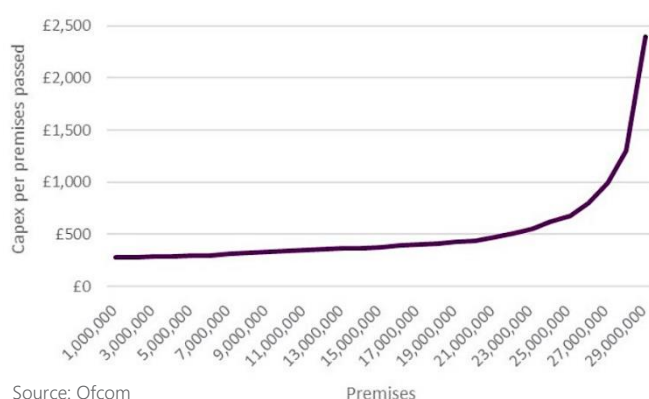
What is Ofcom proposing?

Ofcom has developed a number of proposals which are designed to maximise efficient investment in FFRO by both Openreach and the altnets:

First, Ofcom now requires Openreach to provide access to its ducts and poles (DPA) at cost oriented prices. This measure is designed to reduce the cost of FFRO by altnets. Prior to 2019, altnets were constrained in their use of DPA to rollout full fibre to residential customers only. Now there are no constraints on the use of DPA and it can be used to supply business customers, other fixed operators and mobile operators wanting fibre backhaul.

Second, Ofcom has set out proposals for regulating Openreach in the period 2021 to 2026. These proposals recognise that investment conditions, and hence the level of infrastructure-based competition in full fibre access which is viable, vary very significantly by geographic area. In particular, the cost of passing a premise with fibre rises rapidly as the density of premises drops, as Figure 2 illustrates.

Figure 2: How the cost of FFRO increases in rural areas



Ofcom has therefore defined three area types according to the competitive conditions that exist in those areas, and proposes very different regulations for each of them¹¹:

Competitive Area Type 1: where there is effective (infrastructure-based) competition. Ofcom defines this as where there are three or more network providers, expected to be Openreach, VM and one or more altnets and where broadband

market share data indicates that Openreach does not have significant market power¹². Typically these areas will be in large towns and cities where there will be multi-dwelling units, offices and/or business parks.

Competitive Area Type 2: prospectively competitive areas where “non-BT fibre networks are being built or where there are reasonable expectations of them being built”¹³. It is likely that BT and Virgin Media infrastructure will already cover most CAT2 areas.

Competitive Area Type 3: non-competitive areas where there is deemed little prospect of more than one network provider, presumed to be BT. This last area, CAT3, includes both areas where a single operator might invest commercially, and very rural areas where the unit cost of build is so high that government subsidy is required to stimulate connection. For purposes of price regulation, this latter type of area is excluded from Ofcom's proposals.

Ofcom estimates that CAT1 and CAT2 areas together might cover around two thirds of premises in the UK and it is likely that VM infrastructure will cover most of the CAT1 and CAT2 areas.

Third, Ofcom recognises that there are high levels of uncertainty over how, and how fast, FFRO will develop beyond 2026. It does however recognise the long-term need to:

- regulate in a way which promotes efficient closure of the copper network (copper switch off); and
- gradually move regulation of Openreach from regulation of its copper products (copper loops and FTTC) to regulation of its full fibre access products.

Given this uncertainty, we focus in the rest of this paper on describing and critiquing Ofcom's proposals for the period up to 2026. We also exclude:

- what constitutes efficient government subsidy of high-speed broadband in very rural areas¹⁴; and
- how best to regulate the quality of service offered by Openreach when providing full fibre wholesale products.

Ofcom's proposals for 2021-2026

Figure 3 summarises Ofcom's proposals for regulating Openreach in areas where it has significant market power (SMP).¹⁵ For simplicity we have excluded Ofcom's proposals for leased lines. We discuss key points for each defined area type below.

CAT1 areas

In CAT1 areas, where there is effective competition, Ofcom proposes to forbear from regulation to give Openreach maximum freedom to invest and innovate in competition with altnets. Here it is important to draw a distinction between access to Openreach's passive infrastructure of ducts and poles, where Ofcom has decided that there should be unrestricted access on a regulated basis¹⁶, and Openreach's other wholesale products, where Ofcom is proposing to forbear from ex-ante regulation in areas where there is effective competition in the supply of broadband access infrastructure.

CAT2 areas

In CAT2 areas, Ofcom does not propose to price regulate Openreach's fibre access products – only to require it to offer non-discriminatory access to all retail service providers. Ofcom believes that, at least up until 2026, the price of Openreach's fibre access products will be constrained and 'anchored' by the pricing of Openreach's copper products, together with competition expected from VM and altnets. This proposal is designed to increase Openreach's incentives for full fibre investment.

There is a prohibition on geographic discounts within CAT2 areas. This is designed to prevent Openreach from discounting prices for access products in areas where altnets might otherwise build. Such a constraint is important to stimulate altnet investment in CAT2 areas, where competition from altnets is anticipated. (In contrast, there is no similar prohibition in CAT3 areas where, by definition, Ofcom does not expect competition).

In these areas, Ofcom also proposes to ease price regulation on Openreach's copper products by allowing it to increase prices in

line with inflation. This proposal should give both Openreach and altnets improved incentives to invest in FFRO. In effect, Ofcom is making a trade-off: it is shifting the emphasis from keeping down end-user prices for copper broadband to increasing incentives for full fibre investment.¹⁷

CAT3 areas

In CAT3 areas, where Ofcom does not expect competition between Openreach and other full fibre networks, Ofcom proposes to rely on regulation of Openreach's copper access products to anchor the price of Openreach's full fibre access products until 2026. At the same time, Ofcom proposes to change the way it price regulates Openreach's copper products from cost oriented pricing based on TSLRIC and modern equivalent asset values to cost oriented pricing based on a regulated asset base (RAB).

The RAB approach is used in setting regulated prices in UK utilities. It requires the regulator and the industry to commit to rules for calculating the value of the regulated asset. This is then used, along with operating costs, to estimate what costs the regulated entity can recover through its prices.

A key advantage of a RAB approach to setting regulated prices is that it offers protection against retrospective 'asset taking' by the regulator, and so increases investment incentives. It is unclear what form of RAB Ofcom proposes or the extent to which this approach would protect Openreach. In CAT3 areas, Openreach will be able to recover its investments in full fibre through the sale of both its fibre and copper access products, provided that its return on its regulated asset base (copper and fibre assets in CAT3) is at, or below, an agreed rate.

Figure 3: Proposed regulation of Openreach to 2026

Area type	Wholesale product	Access required?	Price controls?	Non-discrimination required?	Geo discounts banned?
All areas	DPA	Yes	Yes	Yes	N/A
CAT1	All except DPA ¹⁸	No	No	No	No
CAT2	Basic copper (FTTC) access ¹⁹	Yes	Increase by up to inflation	Yes	Yes
CAT2	High speed copper (FTTC) access	Yes	No	Yes	Yes
CAT2	Full fibre broadband	Yes	No	Yes	Yes
CAT2	Dark Fibre	No	No	No	No
CAT3	Basic copper (FTTC) access	Yes	RAB based	Yes	No
CAT3	High speed copper (FTTC) access	Yes	RAB based	Yes	No
CAT3	Full fibre broadband	Yes	No	Yes	No
CAT3	Dark Fibre	Yes	Cost based	Yes	No

Ofcom proposes to require Openreach to offer access to dark fibre in CAT3 areas. However, it is important to note that this proposal is restricted to dark fibre used for leased lines and not for mass broadband access. Extending dark fibre access to the mass market would run the risk of undermining Openreach's incentives to invest in full fibre rollout in CAT3 areas by effectively removing its option for price-product differentiation.

Ofcom's proposals may well lead to geographic de-averaging of Openreach's wholesale access prices – with higher prices in the higher cost, more rural, CAT3 areas and hence higher retail broadband prices in CAT3 areas:

- Prices for Openreach's copper broadband products will be set using traditional price cap methods in CAT2 areas but using RAB-based pricing in CAT3 areas. This will almost certainly lead to price differences between the two areas.
- Openreach's full fibre broadband products will not be price regulated. The degree of price geographic de-averaging which takes place will instead be constrained (in both CAT2 and CAT3 areas) by the anchor pricing effects of the copper broadband products and the willingness to pay higher prices for full fibre access by end-users in rural areas.

Questions arising from Ofcom's proposals

Ofcom's proposals represent a well thought out regulatory framework to increase investment in full fibre broadband in a country which is at an early stage of FFRO. The proposals recognise both the need to regulate differently in areas exhibiting different competition conditions and the considerable uncertainty which exists over how the market for full fibre will develop. For example, they recognise uncertainties over:

- the overall investment case for full fibre: whether the bulk of end-users are willing to pay the premium required for full fibre to justify the investment costs;
- the speed with which the investment case will strengthen over time as barriers to full fibre rollout are lowered²⁰ and as the ecosystem of applications which requires ultra high-speed broadband develops so as to increase demand for ultra high-speed broadband;
- the extent to which Ofcom's DPA remedies will be effective and increase altnet investments in full fibre. Practical and reliable access to DPA is currently questioned by many industry players; and
- the extent to which we will see infrastructure-based competition in the supply of full fibre develop –

especially in CAT2 areas. See below for more discussion on this point.

Ofcom's proposals also raise questions which will need to be answered if they are to achieve their policy objectives:

In CAT1 areas, what does Ofcom have to say about access to in-building wiring?

The UK government recognises the importance of enabling open access to in building wiring as an enabler of full fibre rollout²¹. At the same time, BEREC has identified three EU member states, Spain, Portugal and France, which require such access²². Ofcom seems to be silent on this point. Yet without open access to in-building wiring in the UK there are significant barriers to competition in the provision of full fibre broadband infrastructure and, in some cases, major problems in terms of lack of end-user choice of service provider.

In CAT2 areas, will Ofcom's proposals lead to substantial infrastructure-based competition in the supply of full fibre access?

Ofcom's proposals will certainly create strong incentives for both Openreach and altnets to invest in full fibre rollout. For example, we note that Openreach is ramping up its workforce and levels of investment for full fibre rollout while INCA reports substantial investment by altnets²³. But early cost modelling by WIK²⁴ and Plum's own cost modelling indicate that, once fibre is rolled out in a local area by one operator, then the business case for a second operator investing as well is very weak. There seems to be a consensus amongst many industry players in the UK that *"the next 5 to 6 years will be a period of intensive investment and 'landgrab' for BT and altnets, seeking to be the first to deploy new fibre infrastructure in as many locations as possible²⁵"*. Ofcom will need to explore the validity of this argument as it carries out its own cost modelling over the next few months. In parallel, Ofcom will need to collect information about what is happening in terms of the number of areas in which full fibre investment is being made by altnets alone, by Openreach alone, and by both.

What impact will the presence of Virgin Media have on incentives for full fibre investment?

Virgin Media has a substantial market share of broadband markets in CAT1 and CAT2 areas. It does not typically offer full fibre. It does, however, offer an effective broadband substitute in terms of speed and quality of service for many end-users. This means that Virgin Media's presence in CAT2 areas further weakens the case for investment by a second full fibre access provider. Ofcom's analysis so far is silent on this effect.

What happens if, as seems likely, there is a geographic patchwork of SMP suppliers of local full fibre access?

Ofcom's proposals only address regulation of Openreach, should it be found to have SMP in an area. But what about areas where altnets acquire SMP? Will Ofcom impose requirements for

them to offer (say) fair reasonable and non-discriminatory access to retail service providers. At the moment some altnets offer such access but others do not. Stakeholders say that they want regulatory certainty to maximise their FFRO investments. Should Ofcom provide greater certainty on this issue now?

How will Ofcom define the boundary between CATs and how will it take account of how these boundaries change over time?

The boundary between CAT2 and CAT3 is particularly important, given that the regulatory remedies in CAT3 areas require quantification of Openreach's regulatory asset base there. Presumably, Ofcom will initially define CAT2 as areas where altnets have already invested in FFRO plus areas where market conditions are similar. Yet we know that in some cases there are rural areas of the UK, areas which we might reasonably presume fall into CAT3, where altnets have already rolled out full fibre on a commercial basis. This raises the possibility that the boundary between CAT2 and CAT3 will be difficult to define with any certainty and brings into question some of the regulatory remedies proposed in Figure 3.

Will full fibre investment by altnets in a CAT3 area immediately trigger its reclassification as a CAT2 area (where there is a prohibition on geographic discounting by Openreach)?

Without such a mechanism the case for altnets investing in CAT3 areas is significantly weakened, since Openreach would then be free to undermine such investment by offering geographic discounts.

Naturally, with such an innovative change to the current approach to regulating access, Ofcom's proposal prompts these and other questions. The authors welcome inquiries.

About Plum

We are a leading independent consulting firm, focused on the telecommunications, media, technology, and adjacent sectors. We apply extensive industry knowledge, consulting experience, and rigorous analysis to address challenges and opportunities across regulatory, radio spectrum, economic, commercial, and technology domains.

For more information contact Plum at info@plumconsulting.co.uk

¹ European Commission, September 2013, *COMMISSION RECOMMENDATION of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment*

² <https://www.gov.uk/government/publications/future-telecoms-infrastructure-review>

³ Ofcom (July 2018), *Regulatory certainty to support investment in full-fibre broadband – Ofcom's approach to future regulation*

⁴ Ofcom (December 2018), *Promoting investment and competition in fibre networks*, consultation, https://www.ofcom.org.uk/_data/assets/pdf_file/0005/130001/Consultation-Promoting-investment-and-competition-in-fibre-networks.pdf

⁵ Ofcom (March 2019), *Promoting competition and investment in fibre networks – Initial proposals – Approach to remedies*

⁶ Ofcom (June 2019), *Promoting competition and investment in fibre networks – Initial consultation on the approach to modelling the costs of a fibre network*

⁷ See: <https://www.gov.uk/guidance/building-digital-uk>

⁸ Definitions of what is meant by superfast and ultrafast broadband vary. We define "superfast broadband" as offering speeds of 24 to 100 Mbps and "ultrafast broadband" as offering speeds in excess of 100 Mbps. See for example <https://www.cswbroadband.org.uk/the-project/frequently-asked-questions/difference-superfast-ultrafast-broadband/>

⁹ Source: *UK Government's Future Telecoms Infrastructure Review*. By mid-2019 full fibre passed around 7% of UK premises.

¹⁰ Total Telecom (July 2019), *Liberty Global eyes Virgin Media expansion in the UK*

¹¹ First defined in Ofcom (December 2018) Paragraph 1.10

¹² Interestingly, while Ofcom sets three fixed networks as sufficient for effective competition, it recently declined to accept a reduction in mobile network operators from four to three.

¹³ Ofcom (March 2019) Paragraph 1.11 and Ofcom (December 2019)

¹⁴ This was the subject of previous work that Plum undertook for the Broadband Stakeholders Group (BSG) in the UK. Plum (April 2017), *The impact of a broadband USO in the UK*.

¹⁵ Ofcom notes in its March 2019 consultation, that "For the purposes of the discussion in this document, we have assumed that we find BT to have SMP in relevant access markets " (Footnote 3, page 6)

¹⁶ Ofcom (June 2019), *Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets*,

¹⁷ It is generally accepted in the UK that copper-based broadband, superfast and ultrafast broadband are all part of a single economic market because of chain of substitution effects. Increases in the retail market price for copper broadband products should, all else being equal, increase take-up of FFRO and thus strengthen the investment case for full fibre.

¹⁸ Active and passive wholesale access products based on copper or fibre other than DPA.

¹⁹ Copper loops and low speed FTTC VDSL.

²⁰ For example by making changes to the taxation regime so that access providers pay tax when premises are connected rather than when they are passed by fibre and by making it easier to obtain rights-of-way and permission for street works.

²¹ DCMS (2018), *Future telecommunications infrastructure review*, Annex A p32

²² BEREC (October 2016), *Challenges and drivers of NGA rollout and infrastructure competition*

²³ INCA (2019), *Response to Ofcom's Consultation: Promoting competition and investment in fibre networks Initial proposals – Approach to remedies*

²⁴ WIK (September 2008), *The Economics of Next Generation Access – Final Report*,

²⁵ INCA (2019)