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Digital Networks Act:

An Assessment of the Proposed Spectrum Reforms

A report by DotEcon Ltd

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The Digital Networks Act: An Assessment of the Proposed Spectrum Reforms

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DotEcon is an independent economics consultancy with more than 25 years' experience in spectrum management, having advised on more than 60 spectrum awards in over 20 jurisdictions. We have advised both regulators and operators, giving us a balanced perspective on how spectrum policy works in practice.

This report was commissioned by ComReg, the national regulatory authority for radio spectrum management in Ireland (www.comreg.ie) .

Executive Summary

New services using mobile networks

It is common ground that we need capable and ubiquitous mobile networks to support advanced new uses, especially growing machine-to-machine communications. This is a prerequisite to realising productivity gains from automation, robotics and AI, and ensuring that Europe can compete globally in new services and products using these frontier technologies.

Indefinite licences do not mean more investment

The Digital Networks Act (DNA) proposes radical changes to spectrum management – including indefinite licences by default – in the expectation that mobile network operators (MNOs) invest more and deliver the capabilities we will need. However, this would hand MNOs near-permanent control of a valuable scarce public resource in exchange for nothing more than the hope, and without an obligation, that they will make investments that reflect the right priorities for European competitiveness. National regulatory authorities (NRAs) would be deprived of their current tools to place obligations in spectrum licences to correct market failures such as insufficient coverage, resilience or other network capabilities and to safeguard and promote competition. Ultimately, this may lead to customers paying more for no benefit.

Affordability

Europe already has the most affordable mobile services of any comparative region, with quality that compares well internationally. Nevertheless, the European Commission, echoing the Draghi report, treats low prices as a problem that has "*reduced the industry profitability*" of MNOs. However, industry profitability is not an end in itself. Direct interventions to boost effective investments in better and more resilient networks may be needed if competition cannot deliver these. Such interventions must be based on a proper public policy assessment showing real net benefits for customers.

Spectrum prices are not excessive

The claim – explicitly advanced in the Draghi report and echoed in the DNA – that under the current framework Member States have treated spectrum auctions primarily as a tool for generating revenue is unsupported by evidence. The principle that charges for spectrum should promote efficient use of a scarce resource has been embedded in the legal framework under which NRAs operate going back to the 1997 Licensing Directive. This principle is reflected in the statutory objectives of most NRAs.

There is nothing to suggest that auctions in Europe have resulted in excessive spectrum costs. Prices are largely an outcome of competition between mobile networks for spectrum and so reflect both prices of services sustainable within a competitive marketplace and operators' costs, including investment in network capabilities and coverage. European spectrum prices are in line with global averages and well below those in North America.

Spurring investment

In any case, lower spectrum costs do not mean higher investment – as a recent study prepared for the Commission already found. The European Commission's Impact Assessment cites that study, but notably omits this finding.[1] Italy, heavily criticised for high 3.5 GHz prices, has the best coverage in that band in Europe, promoted through competition, licence coverage obligations and state-aid funding. Cheaper spectrum with no strings attached will not buy better networks – it will enrich shareholders. If the European Commission's aim is to boost the capabilities of networks through accelerated investment, indefinite spectrum licences and centralisation of spectrum awards are a side-show.

No evidence that longer licences or cheaper spectrum drive investment

The European Commission's Impact Assessment never tests whether licence duration affects investment but simply assumes a positive impact. However, in studies where duration has been tested, no effect on investment has been found. Investment follows a sound business case, not licence length. In the wider sphere of publicly-created rights and concessions, indefinite spectrum licences would become the outlier, with patents, extraction rights, wind energy sites (to name but a few) all being of finite length.

Interventions to drive investment

If we want to drive new frontier technologies needing better mobile networks, interventions may be needed. In a competitive marketplace, network operators are rightly cautious to invest in network capabilities that may initially be niche requirements needed by few customers. As with coverage, targeted interventions may be needed to drive forward network capabilities, including availability of services with latency guarantees (through 5G SA), reliability and more homogeneous coverage. Investments to improve resilience are similarly held back by the limited ability of MNOs to monetise the benefits of more resilient networks.

With existing policy and legal tools, spectrum receipts can be recycled to pay for obligations on networks to meet a variety of quality-of-service metrics, not just coverage, where there is a clear public policy case. NRAs need to be bolder to address the specific deficiencies of networks within their jurisdictions, in line with a strategic Europe-wide vision of the minimum capabilities needed to drive development of new advanced in services and products at the bloc level.

NRAs lose the tools that work; the safeguards will not be effective

The DNA impedes, rather than promotes this agenda. It substantially removes NRAs' ability to tailor licence terms to national conditions, to use licence expiry to promote competition and reallocate spectrum, and to update coverage and quality obligations at renewal. Departing from the default – even to impose a precautionary temporary spectrum cap – requires a burdensome assessment and navigating a process subject to a Commission veto.

[1] LS telcom, PolicyTracker and VVA (2023), cited in footnotes 244 and 247 of Part I of the Impact Assessment.

Use-it-or-lose-it conditions shift the burden of proof onto regulators and rest on revocation for cause, a far higher bar than the threat of non-renewal. Similarly, wholesale obligations would bring ongoing monitoring and enforcement burdens – contrary to the preference for structural over behavioural remedies that the Commission applies in merger control. Nor would it address asymmetries in existing spectrum holdings, which NRAs could no longer rebalance at renewal.

Uncertainties about how the multifactorial objectives of the DNA would be applied, including the vague competitiveness objective, are likely to lead to more disputes between network operators and NRAs. Greater legal uncertainty is not conducive to more investment.

The value of a public resource should benefit end users

Spectrum fees exist to ensure efficient use, not to raise money. But indefinite rights granted without payments that reflect the value of the spectrum, and without commitments in return, would transfer that value to existing licensees as a windfall, rather than ensuring that competition, efficient allocation and conditions attached to licences deliver benefits for end users.

Better instruments are available

The current framework already provides the tools needed (and allows issuance of indefinite licences or licences with a duration of more than 20 years and clear provisions in relation to renewal); targeted improvements would make them more effective:

1. **EU-level guidance to guard against revenue-oriented or inefficient awards**, developed with BEREC and the RSPG, including advice on effective award design and an agreed list of warning signs to guard against revenue-oriented or inefficient outcomes– such as artificial restriction of supply, avoidable delays in releasing spectrum, set-asides or a complete absence of caps– that could also inform an enhanced Peer Review process;
2. **Using award proceeds to support network deployment** – making it easier for Member States to commit award proceeds to supporting network deployment by explicitly procuring network capability funded by spectrum receipts where specific policy issues have been identified and sufficiently evidenced;
3. **Reducing deployment costs through easier access to passive infrastructure** based on the effective enforcement of the Gigabit Infrastructure Act (GIA) obligations;
4. **Tying specific investment obligations to licences** – for example attaching explicit investment or resilience requirements to spectrum licences, just as is already the case with coverage requirements; and
5. **Facilitating investment subsidies.** State aid rules that facilitate support intervention at levels beyond the value of spectrum to boost network capability and resilience as well as coverage.

Member States could use such interventions to work towards EU-wide targets for network capability to encourage investment in

frontier use cases in the way that best works, given national conditions. All these work with, rather than against, NRAs' ability to respond to national circumstances. The spectrum management proposals in the DNA, by contrast, would weaken that ability without addressing the underlying problem.

1 Introduction and background

Purpose of this report

This report, commissioned by ComReg[2], sets out DotEcon's views on the terrestrial spectrum management proposals in the Digital Networks Act (DNA). It provides new and updated information, analysis and perspectives to inform the European Parliament and the Council of the EU in their examination of these proposals as co-legislators of the DNA.

Drawing on more than 25 years of experience advising regulators and operators on spectrum management and spectrum awards in over 20 jurisdictions, we assess whether the proposals are likely to achieve the Commission's objectives. As in the Commission's analysis, we focus on the terrestrial use of spectrum for wireless broadband services.

We share the Commission's aim of ensuring that Europe's networks attract the investment needed for future technologies and for greater resilience. Alongside our assessment of the proposals, we set out alternative measures that we consider more likely to deliver this aim.

Proposed spectrum management changes

The DNA spectrum proposals would substantially change the regulatory framework and narrow Member States' discretion

The spectrum management proposals in the DNA would shift responsibility for key spectrum management decisions from Member States to the Commission. They would limit NRAs' ability to use many of the tools they currently rely on to manage this scarce public resource in the interests of citizens, consumers and spectrum users.

Under the DNA, indefinite licences will become the default for all spectrum rights (or in exceptional cases for wireless broadband spectrum rights, time-limited licences with a minimum term of 40 years and the right to automatic renewals with the same conditions). NRAs would have to go through a demanding and time-consuming assessment and approval process to implement any non-default measures, subject to a veto by the Commission. In practice, this will mean that:

- NRAs would no longer be able to set licence durations tailored to national conditions and to the investment cycle needed to earn a return on network investment;
- NRAs could not use licence expiry as a tool for safeguarding or promoting competition or responding to new technologies; and

[2] ComReg is the national regulatory authority for radio spectrum management in Ireland. www.comreg.ie

- NRAs would not be able to make renewal contingent on updated coverage, quality or resilience obligations reflecting current, not decades-old, needs.

The main regulatory safeguard against an inefficient allocation of resources would be a use-it-or-lose-it (or use-it-or-share-it) obligation on spectrum holders.[3] However, NRAs would need to enforce this by relying on the threat of formal revocation for cause – a much higher bar than the threat of non-renewal. This shifts the burden of proof onto regulators and would make such obligations much harder to enforce. Spectrum trading – another mechanism that could in theory correct misallocation – is unlikely to be effective either; spectrum trades are rare in practice and secondary markets are likely to remain thin (see Section 4).

Changed regulatory objective

These changes are accompanied by a change in the status of promoting competition, from a self-standing primary regulatory objective to a mere instrument of policy.

The DNA also introduces several new objectives, including a 'competitiveness' objective. Its meaning in relation to telecommunications markets, which remain national, is not clear, and there is a risk that it is interpreted as favouring the scale of operators over outcomes that benefit customers and end-users. This would hinder European competitiveness in industry at large if users are in innovative sectors in which mobile connectivity is an essential input. In the same vein, the objective to promote *efficient* investment, as set out in the EECC, would be turned into an objective to promote investment in general, regardless of net benefit.

Three fundamental questions

Proposals for such fundamental changes must pass three key tests checking for compliance with the principles of subsidiarity and proportionality

The proposed transfer of spectrum competence and powers to the Commission would significantly curtail the ability of Member States and their NRAs to take decisions on assignment, authorisation, award design (including auctions), fee-setting and enforcement. Such a transfer would have to be justified with reference to two important policy principles:

- except in areas where it has exclusive competence, the EU may act only if the objectives cannot be sufficiently achieved by

[3] Other safeguards are also envisaged in Article 32(2), including wholesale obligations, but these involve long-term behavioural intervention with significant downsides of their own (see Section 4).

Member States at national, regional or local level and can be better achieved at EU level (**subsidiarity**); and
- the content and form of EU action must not exceed what is necessary to achieve the objectives (**proportionality**).

In practice (and as also reflected in the Commission's impact assessment methodology[4]), checking compliance with these principles involves answering the following three questions:

- **First, is there a problem that Member State action has not been able to solve or that has been caused by Member State action?** Specifically, is there a problem with wireless broadband communications services in Europe that has been caused by the way in which spectrum has been managed so far, or that cannot be addressed by current spectrum management tools?
- **Second, are the proposed changes suitable to address the problem identified?** Specifically, assuming that the current regulatory framework has led to objectively deficient outcomes, are the proposed measures likely to remedy any such deficiencies? In particular, will indefinite licence terms or an automatic renewal right (including proposed retrospective renewals of existing spectrum holdings) lead to better outcomes?
- **Third, assuming that the proposed measures are likely to address the identified problems, are their benefits greater than their costs, including any side effects?** Could the solution have been achieved by less intrusive measures or policies that had fewer downsides?

To justify the proposed policy shift, each of these questions would have to be answered in the affirmative. As we explain in the remainder of this report, the evidence does not allow this.

Report structure

- In Section 2, we argue that there may be an investment challenge – particularly looking ahead to 6G and the growing importance of network resilience – but that it is not caused by the way in which spectrum is currently managed (nor well captured by focusing on 5G SA availability). Specifically, we explain that revenue generation – which the DNA proposals appear designed to curb – has never been a legitimate objective of spectrum awards within the EU and there is nothing to suggest that auctions in Europe have resulted in excessive spectrum costs.
- In Section 3, we explain why the proposed measures are highly unlikely to address this investment challenge. The real obstacles

[4] Better Regulation Guidelines, SWD (2021) 305 final, chapter IV.

are a challenging business case for network features that benefit niche uses which is unlikely to be caused by a lack of funds due to high spectrum costs or low consumer prices, or by uncertainty claimed by industry to arise due to time-limited licences.

- In Section 4, we consider the side effects of the proposals – above all, the loss of the tools NRAs need to address investment, competition and resilience needs in ways that reflect national circumstances – and the limits of the proposed safeguards.
- In Section 5, we set out measures that would be more effective in addressing an investment shortfall, including BEREC and RSPG guidance to guard against revenue-oriented or inefficient outcomes and measures facilitating the use of award proceeds to support network deployment and address the investment challenge directly.

2 Is there an investment problem, and is it caused by the current regulatory framework?

The Commission's diagnosis: Europe lags in 5G standalone deployment because of fragmented spectrum assignment conditions

The Commission's problem identification: lagging deployment of 5G standalone networks

The Commission focuses on one key indicator to identify a problem with the current way in which spectrum is managed: Europe is lagging in the deployment of 5G standalone (5G SA) networks (and a lower level of 5G midband coverage) compared with other regions. This is blamed on fragmented assignment conditions across Member States which '*continue to* ***enable revenue-oriented auction designs****, provide for insufficient licence duration and lack incentives to share spectrum*'.[5] These factors, so the Commission claims, discourage the investment that would be required to ensure that wireless networks in Europe are fit for the future. Although a lack of demand limiting the attractiveness of investment is also acknowledged, the Commission claims that '*the EECC has been unsuccessful in establishing a pro-investment spectrum assignment framework*'.[6]

Is lagging 5G SA deployment the right measure of the problem?

5G SA availability says little about service quality or value for money

The Commission is correct that 5G SA network availability is currently lower in Europe than in some other markets, but this is not in itself evidence of harm to users. The gap is likely to be temporary: the technical barriers that held back 5G SA deployment, such as the move to cloud-native core networks, are disappearing.[7] Indeed, looking at a snapshot misses the longer historical context of relatively early adoption of 5G within the EU, before 5G SA was widely commercially viable, with later adopters outside the EU having more opportunity to leapfrog directly to 5G SA.

Meanwhile, consumers continue to enjoy affordable, high-quality mobile services, and the harmonisation of the 3.8–4.2 GHz band for private 5G use in Europe should help resolve the regulatory challenges for private 5G networks noted in the Impact Assessment.

Further, there is no obvious reason why end users should care about the technology used to deliver the service. A focus on 5G SA deployment also sits uneasily with the principle of technology

[5] Executive Summary of the Impact Assessment Report, SWD (2026) 14 final; emphasis added.

[6] Executive Summary of the Impact Assessment Report, SWD (2026) 14 final.

[7] GSMA, "5G Standalone: Full Steam Ahead?", February 2026.

neutrality, which has been a guiding principle of spectrum management for some time.

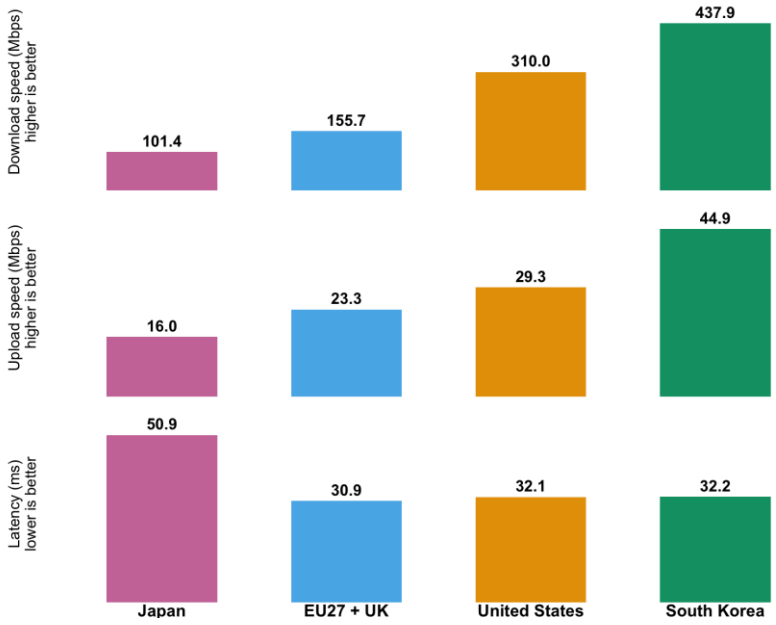
The relevant metrics for users are service quality and cost. On both counts, Europe is performing well: it has the most affordable mobile services of any region, with quality that compares well internationally.

5G SA availability promises greater raw download speeds, but has less impact on upload speeds and little effect on latency

Whilst the greater availability of 5G SA networks in the comparator countries (the USA and South Korea) appears to be associated with a higher raw download speed, the difference is much smaller when looking at upload speed. In relation to latency, Europe is leading, as Figure 1 shows.

The question some commentators are asking is whether the increase in speeds is worth paying for. [8]

Figure 1: Mobile speed and latency available in Europe and comparator jurisdictions



Test-weighted (and for the EU27 + UK population-weighted) averages
Source: Speedtest® by Ookla® Global Fixed and Mobile Network Performance Maps. Based on analysis by Ookla of Speedtest Intelligence® data for the first two quarters of 2026. Provided by Ookla and accessed 07/10/2026. Ookla trademarks used under license and reprinted with permission.

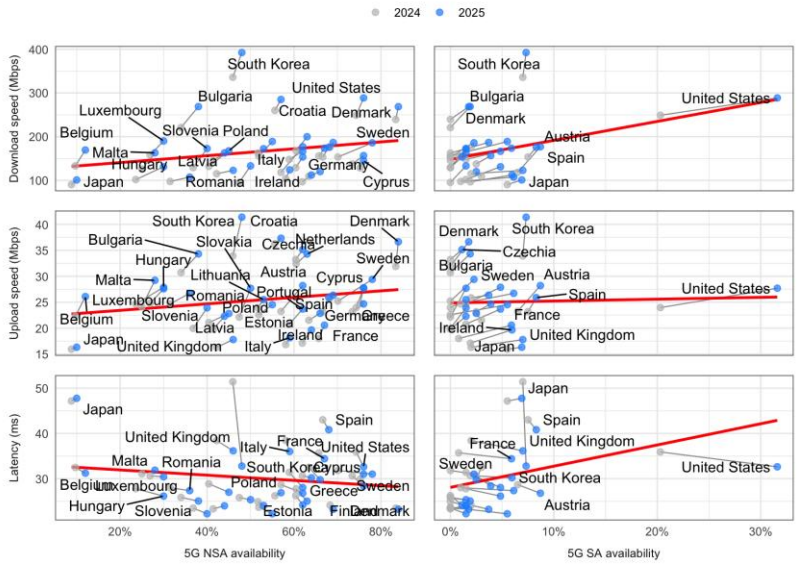
[8] As Richard Feasey put it in a recent paper, 'consistent with higher SA 5G coverage and adoption, Americans enjoy faster mobile speeds on average (160 Mb/s vs 100 Mb/s). But is another 60 Mb/s worth paying 80% more for when you are already getting 100 Mb/s to a smartphone?' (Richard Feasey, "Well done, Europe!", February 2026, using data from Connect Europe's State of Digital Communications Report) (https://www.fronfraithltd.com/).

… but 5G SA's impact varies significantly by market and operator

Indeed, combining information from the EU 5G Observatory and Ookla Speedtest results provides little support for a clear positive impact of 5G SA deployment on network quality, as shown in Box 1. Results vary significantly by market and operator: in the UK, for example, latency on 5G SA networks is about 9% lower than on 5G non-SA networks for EE and around 24% lower for Vodafone, but there is no difference for O2.[9] As OpenSignal concludes, '*at the country level, 5G SA deployment today is uncorrelated with overall network excellence*'.

Box 1: 5G SA availability and service quality

The diagram below combines information on download and upload speeds and latency collected by Ookla and data on 5G non-standalone (5G NSA) and 5G SA availability from the EU's 5G Observatory for the years 2024 and 2025. Within a country, from one year to the next, 5G NSA and 5G SA availability typically increase, speeds increase and latency decreases (grey lines connecting the 2024 and 2025 observations for each country), but across countries there is little correlation between 5G SA and network quality, particularly within Europe (with observations scattered widely around the red trend lines).



Source: Ookla Speedtest Intelligence as in Figure 1; 5G Observatory

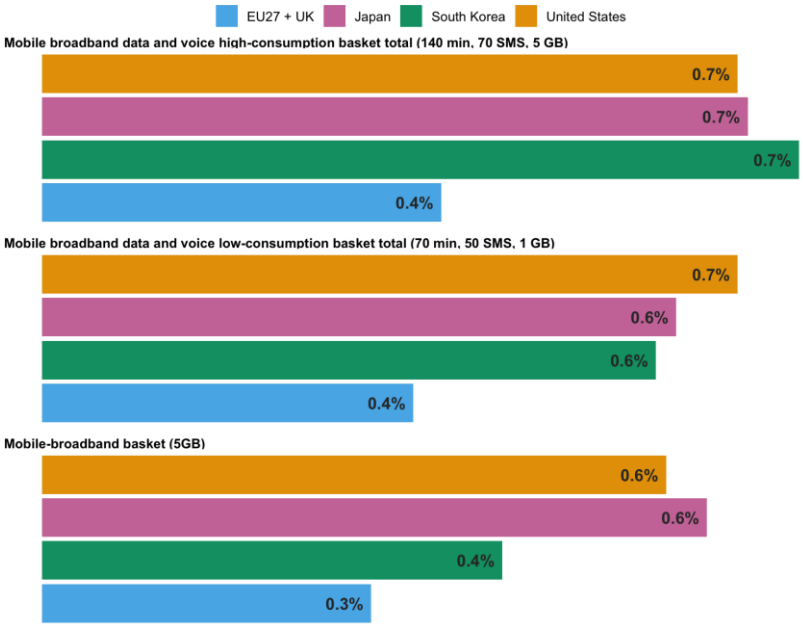
Prices must also be considered – European customers enjoy substantially better value for money

At the same time, the EU is the region with the most affordable mobile service prices (as the Commission acknowledges). As Figure 2 shows, the EU is leading on the prices of mobile service baskets compared with Japan, South Korea and the US. Across a range of service baskets, consumers in the US pay substantially more for their

[9] OpenSignal, "5G Standalone in Europe: Where deployment stands and what it means for consumers – June 2026", 18 June 2026

mobile services, and it is reasonable to ask whether higher speeds are worth this premium.

Figure 2: 2025 ICT basket prices as percentage of GNI



Source: ITU data hub

This is also consistent with BEREC's recent 'Europe's Telecom Reality Check', which notes that EU consumers benefit from some of the lowest fixed and mobile broadband prices among the jurisdictions examined, with prices significantly lower than in South Korea and the United States. European consumers generally enjoy significantly better value for money compared to other leading countries in telecommunications.[10]

Investment concerns may exist in relation to technology adoption and resilience

Insufficient investment may be a real concern because of 'chicken-and-egg' problems, but these are not caused by the current regulatory framework

We do not dismiss concerns about investment. It is common ground that we need capable and ubiquitous mobile networks to support advanced new uses, especially growing machine-to-machine communications. This is a prerequisite to realising productivity gains from automation, robotics and AI, and ensuring that Europe can compete globally in new services and products using these frontier technologies.

There may well be insufficient investment at present in the network capabilities that these new services require. This goes further than

[10] BEREC, "Europe's Telecom Reality Check: BEREC Fact finding report on connectivity, competition and regulatory highlights in different jurisdictions", BoR (26) 137

lagging 5G SA availability. However, it is not caused by the application of the current regulatory framework, but rather by rational commercial considerations in competitive marketplaces.

Investment decisions are driven by the underlying business case and expected returns, which depend on demand conditions and the ability of operators to monetise the benefits of their investments. This creates a particular challenge in relation to the adoption of new technologies, where network operators are rightly cautious to invest in network capabilities that may initially be niche requirements needed by few customers (see the example in Box 2). As with coverage, targeted interventions may be needed to drive forward network capabilities, including availability of services with latency guarantees (through 5G SA), reliability and more homogeneous coverage.

Box 2: Technology take-up is a co-ordination problem

5G can provide more than just greater speeds and additional capacity. Network slicing supporting different quality of service (QoS) tiers, ultra-reliable low-latency communication and support for so-called RedCap (reduced capability) devices are examples.[11] These innovations require 5G SA networks and lack of investment in such networks will indeed hold back such innovations. This is a well-known concern in the adoption of new technologies and is unrelated to current spectrum management practices.

The issue is that the development of services requires the availability of supporting infrastructure, but infrastructure investment is driven by expected revenues, which depend on the availability of services – the classic 'chicken-and-egg' co-ordination problem.

This co-ordination problem is well understood and common in relation to technology adoption in many contexts. Electric vehicles are another case in point: their wider adoption depends on sufficient charging infrastructure, which in turn only pays back the investment if there are enough electric vehicles on the road. Such 'chicken-and-egg' problems are linked to network effects, excess inertia and the need to achieve critical mass. They cannot be attributed to current spectrum management practices.

[11] RedCap strips down 5G NR (fewer antennas, lower bandwidth, simpler modem) to cut device cost, size and power consumption versus full eMBB 5G, while still delivering far higher throughput and lower latency than NB-IoT/LTE-M. Here, device availability appears to be the limiting factor at the moment. On the consumer side, only the latest generations of the Apple Watch and a few broadband dongles support the technology. The device ecosystem is somewhat wider on the enterprise/IoT side (routers, sensors, cameras) but device costs remain high while volumes are low and chipset/OEM vendors are unwilling to scale production (and bring prices down) without confirmed network coverage (for more detail, see Global Mobile Suppliers Association (GSA), 'State of the market', April 2026; GSA, Summary 'RedCap', March 2026)

These issues extend well beyond a narrow focus on 5G SA deployment.

The real test is the next generation of networks

6G systems are expected to become available around 2030, and the RSPG sees the upper 6 GHz band as the primary new band for 6G in Europe by then.[12] 6G investment is likely to face a similar co-ordination problem, arguably in a more pronounced form. Many of its prospective use cases, such as integrated sensing and advanced industrial applications, are still emerging.

Resilience is becoming a key investment requirement

Network resilience is also moving up the agenda. Investments to improve resilience may similarly be held back by the limited ability of MNOs to monetise the benefits of more resilient networks.

In Ireland, Storm Éowyn in January 2025 had an unprecedented impact on telecommunications networks, particularly in rural areas in the north and west, prompting the establishment of a Telecommunications Response and Resilience Group and commitments by operators to add back-up battery and generator capacity and back-up routes to core networks.[13] During the Iberian blackout of 28 April 2025, mobile network performance in Spain and Portugal progressively deteriorated as battery back-up, where available, was exhausted.[14] Spain has since moved to require minimum back-up power autonomy for mobile base stations and network control centres.[15]

Resilience requires investment for which there may be limited direct willingness to pay. Customers value reliable service in an emergency, but this is difficult for operators to monetise, and some of the benefits – such as continued access to emergency services – accrue to society as a whole. The market alone may, therefore, under-provide resilience.

[12] RSPG, Draft Opinion on a 6G Spectrum Roadmap, RSPG26-004, published for consultation in February 2026; see also TelecomTV, 'Europe sets out its spectrum roadmap for 6G', 17 February 2026.

[13] Department of Culture, Communications and Sport, 'Telecommunications storm resilience', press release, 30 October 2025.

[14] TelecomTV, 'Iberian outage highlights power security challenges for network operators', 1 May 2025, citing analysis by Ookla.

[15] CircleID, 'Spain to Require Four Hours of Mobile Service During Power Blackouts', 26 June 2026. According to this report, base stations must be able to operate for at least four hours without grid power, regional network management centres for 12 hours and the most critical control centres for 24 hours. We understand that, at the time of writing, the relevant legislation has cleared EU review but has not been finally adopted.

Has the European approach to spectrum awards caused a lack of investment?

The Commission and MNOs claim European spectrum awards are deterring investment.

The Commission references 'revenue-oriented auction designs' and 'artificially inflated' spectrum costs, which it claims deters investments. Insufficiently long licence durations (which it claims creates uncertainty) mean that operators may be hit by such inflated costs repeatedly as spectrum is being re-auctioned.

The Commission's position closely reflects long-standing arguments from industry, which claims spectrum costs in Europe are contributing to '*a vicious cycle that constrains investment.*'[16]

These claims are not supported by the evidence, for two reasons.

First, spectrum costs are not higher in Europe than elsewhere. In Box 3 we present spectrum prices from competitive awards of 5G pioneer bands (600 MHz, 700 MHz, and 3.4-3.9 GHz). Spectrum in the EU is not more expensive than in the rest of the world and prices tend to be substantially lower than those in the US and Canada. This is consistent with the finding in the GSMA Global Spectrum Pricing report that *"prices in Europe, Latin America & the Caribbean and North America are generally closely aligned and sit close to the global mean."*[17]

Of course, spectrum award design can lead to high final prices. For example, Canadian 3500 MHz prices in 2021 would very likely not have been so high if the spectrum had been awarded in an integrated process with the adjacent 3800 MHz, awarded in 2023, which attracted much lower prices. However, poor design choices to prioritise revenue at the cost of efficiency of allocation are rarely the case in Europe. As Box 3 shows, European prices are generally in line with global averages, and the study prepared for the Commission by LS telcom, PolicyTracker and VVA (the 'LS telcom et al. study') found European 5G auctions to be '*more noticeable for their similarity in pricing*' than for wide variation.[18]

Box 3: An international comparison of spectrum costs

The spectrum prices from competitive awards of 5G pioneer bands (600 MHz, 700 MHz, and 3.4-3.9 GHz) shown below are based on data from our Spectrum Awards Database (SAD). We have:

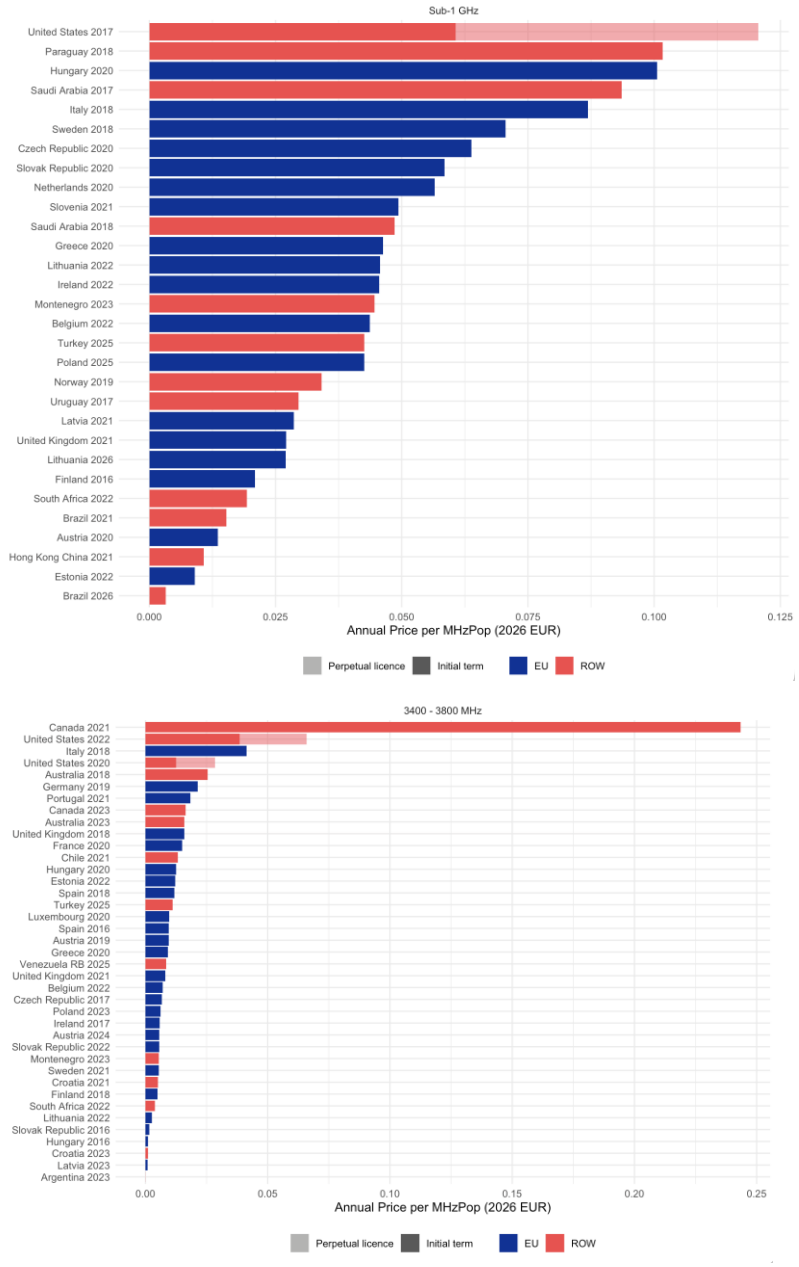
- only included awards where prices exceeded the reserve price – while there are a minority of awards where spectrum has sold at reserve, none of the EU spectrum costs included in this box are driven by reserve price decisions;

[16] GSMA, "Spectrum Pricing and Renewals in Europe", December 2025

[17] GSMA, Global Spectrum Pricing, May 2025

[18] LS telcom, PolicyTracker and VVA, "Study on assessing the efficiency of radio spectrum award processes in the Member States, including the effects of applying the European Electronic Communications Code", prepared for the Directorate-General for Communications Networks, Content and Technology, 2023, Final Report

- shown conservative estimates of the proportion of US licence value associated with the initial term only – EU spectrum prices are not high even after accounting for perceived limited licence duration.



Source: DotEcon's Spectrum Awards Database

Notes:

- *Prices shown are the total price of the spectrum, i.e. including ongoing fees where applicable and information is available, converted to 2026 Irish Euro using Purchasing Power Parity exchange rates from the IMF WEO and adjusted for duration using a discount rate of 6%.*
- *The Ireland 2022 price estimate is from a multiband award that used a combinatorial clock auction. In this format, prices paid are for a package and per band prices do not exist. The 700 MHz band was the only sub-1 GHz spectrum in the auction. The reported 700 MHz price is based on (i) dividing the total price paid by the three MNOs by the value of their*

packages at reserve prices and (ii) multiplying the 700 MHz reserve price by that ratio.

- *The FCC gives licensees an expectation of renewal for a nominal fee. This raises the value of the licence, but we can place an upper bound on the proportion of the licence value corresponding to the period beyond the end of the initial term, using the same discount rate and assuming the licences are perpetual with no additional fees beyond the initial term. For the US, we therefore show only the estimated share of the price attributable to the initial term. For UK licences, which are indefinite but subject to annual licence fees at the level of the market price after the initial term, the auction price is treated as relating to the initial term only.*

It is also important to recognise that revenue generation has never been a permissible objective of determining spectrum fees under EU law (see Box 4). The assertion in the Draghi report that spectrum auctions "*have not been harmonised across Member States and have been purely designed to command high prices*"[19] is not consistent with the legal framework nor with practice. Had Member States been running spectrum auctions in this fashion, EU law (and national transpositions) would have created clear opportunities – and commercial incentives – for spectrum users to litigate any such regulatory decisions successfully, which they have not.

Box 4: The position on using auctions to generate revenues

Going back to the Licensing Directive of 1997, spectrum fees were always intended to promote efficient use rather than providing a source of revenue. An efficient competitive award will generally generate revenue, as successful bidders pay a price reflecting the opportunity cost of the spectrum. But revenue is a by-product of efficient assignment, not an objective in its own right: award designs that sacrifice efficiency to raise revenue are not consistent with this framework.

The Licensing Directive required fees for individual licences to cover only administrative costs. The sole exception was that, where scarce resources were to be used, NRAs could impose charges '*which reflect the need to ensure the optimal use of these resources*', taking '*into particular account the need to foster the development of innovative services and competition*'.[20]

The Authorisation Directive of 2002 carried this principle forward. Fees for rights of use for radio frequencies could be imposed where they '*reflect the need to ensure the optimal use of these resources*' and had to be '*objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose*'. The Directive described usage fees as '*an instrument to ensure the optimal use*' of spectrum that '*should not hinder the development of innovative services and competition in the market*'. It required that payment arrangements in competitive or comparative selection procedures not lead to selection on the basis of '*criteria unrelated to the objective of ensuring optimal use of radio frequencies*'.[21]

[19] European Commission. (2024). The future of European competitiveness: A competitiveness strategy for Europe. Part B, p. 70.

[20] Directive 97/13/EC of the European Parliament and of the Council of 10 April 1997 on a common framework for general authorizations and individual licences in the field of telecommunications services (Licensing Directive), Article 11(1)–(2).

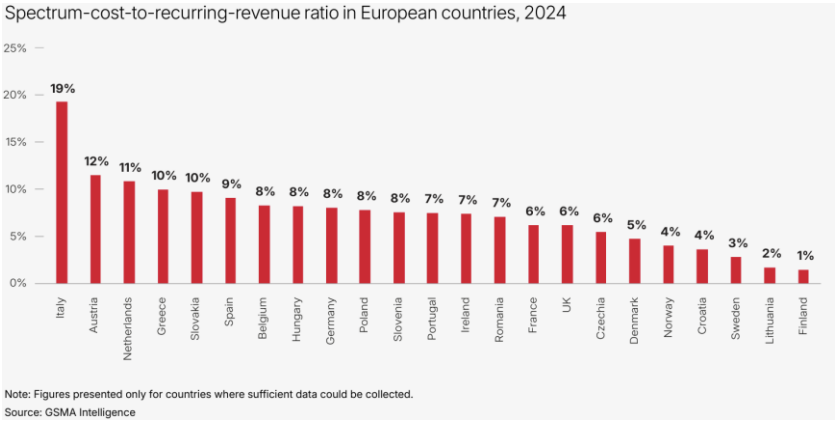
[21] Directive 2002/20/EC (Authorisation Directive), Article 13 and recital 32.

The EECC confirmed and sharpened this. Fees must be '*objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose*', and Member States must '*seek to ensure that applicable fees are set at a level which ensures efficient assignment and use of radio spectrum*', including by setting reserve prices having regard to the value of the rights in their possible alternative uses.[22] The recitals repeat that payment arrangements should not lead to selection on criteria unrelated to optimal use, and explain that reserve prices are to be set '*with a view to ensuring optimal use of radio spectrum*'.[23]

The RSPG report on efficient awards and efficient use of spectrum reports notes that *"[i]n some countries it is explicitly stated that an objective of a spectrum award is to ensure a reasonable return for the spectrum asset. In some cases this means that an objective of the award is to raise a certain level of revenues in return for the award of spectrum licences. In other countries, however, raising revenues is deliberately excluded as an objective of an award."*[24] The most common objectives are, however, efficient use of spectrum, efficient assignment of spectrum, enhancing or safeguarding competition, increasing broadband penetration and promoting roll-out; enhancing rural coverage and promoting innovation.

Furthermore, the LS telcom et al. study finds that *"If auction design was distorting fees we would expect to see wide variation in prices, with some very expensive auctions and some more reasonably priced. In fact, the auctions in the study period are more noticeable for their similarity in pricing."*[25] Except for outliers, this homogeneity in spectrum costs is also reflected in the GSMA's spectrum-costs-to-recurring-revenue ratio (see Figure 3).

Figure 3: Spectrum costs as a proportion of recurring revenues



[22] Directive (EU) 2018/1972 (EECC), Article 42(1)–(2)(a).

[23] EECC, recitals 100 and 101.

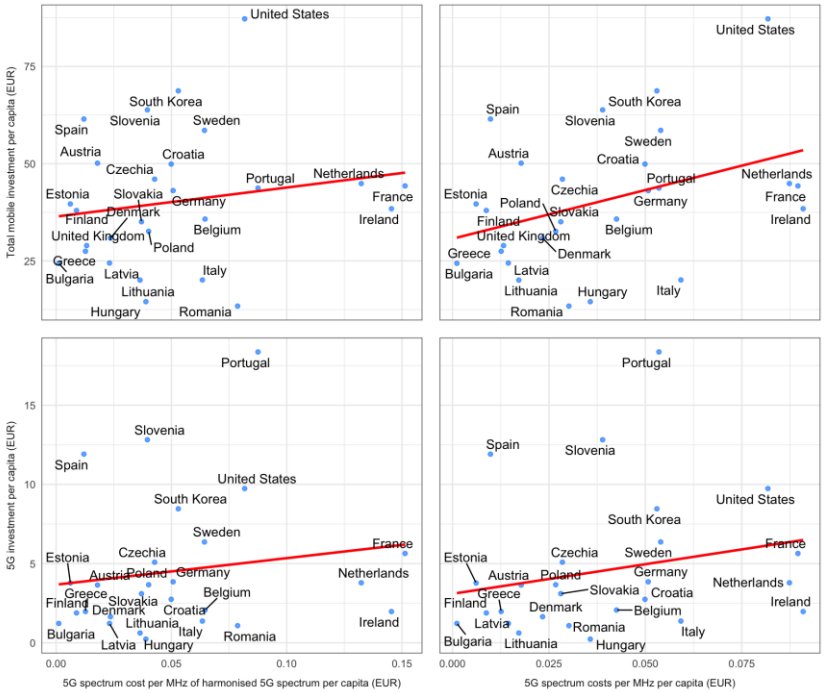
[24] RSPG, *RSPG Report on Efficient Awards and Efficient Use of Spectrum*, RSPG16-004 final, February 2016, sections 4.2 and 6.3.

[25] LS telcom et al. study, p. 251.

Higher spectrum costs do not imply lower investment

Second, higher spectrum costs are not associated with lower investment. There is no empirical evidence that spectrum costs are holding back investment. On the contrary, spectrum costs and mobile network investment (both 5G specific and total investment) appear to be *positively* correlated (see Figure 4).

Figure 4: Spectrum costs and investment



Source: 5G Observatory, using data on the reported spectrum auction proceeds (cumulative up to 2025), total mobile investment per capita (for the year 2025), the sum of low, mid and high band spectrum, the share of harmonised 5G spectrum and the percentage invested in 5G out of total mobile network investment
Population figures for the calculation of spectrum cost per MHz per capita are taken from the World Bank socio-economic dataset.
We exclude small countries (Malta, Luxembourg and Cyprus) where the low population figures are likely to distort per-capita metrics. Investment data is only available on an annual basis but should be a reasonable proxy for the ongoing level of network investment, which is incurred on a recurring basis

This is in line with the findings of the LS telcom et al. study, which finds '*a weak positive correlation between the investment per capita in the telecommunications sector and the relative price paid in individual auctions. The same was true using the investment as a share of revenues metric. This runs contrary to the frequent claim that lower spectrum prices stimulate greater investment in mobile networks.*'[26]

The authors also note that *"[n]o strong relationship was found between auction pricing and 5G coverage. Reserve prices were not*

[26] LS telcom et al. study, p 60.

correlated with 5G coverage and the relationship between award prices and 5G coverage was not strong enough to meet the threshold of statistical significance. …there was no statistically significant relationship between reserve prices and average download speeds, providing no evidence for the claim that high reserve prices impede network investment."

The LS telcom et al. study is referenced in the Commission's Impact Assessment in relation to the timing of 5G awards and roll-out. Its findings on prices, investment and the homogeneity of award outcomes – which do not support the view that the current spectrum management framework leads to fragmented outcomes, high auction prices and low investment – would have merited consideration alongside it.

The empirical support for the claim that spectrum costs are holding back investment is weak

We do not claim that higher spectrum prices cause higher investment. It is more likely that some markets are of higher value for a range of underlying reasons (e.g. having geography that is less costly to serve), and that these higher value markets attract both higher auction prices and greater flows of investment – in both cases because operators in that market can expect relatively better returns. Given this positive relationship between investment and spectrum costs, the empirical support for the claim that spectrum costs are holding back investment is at best weak.

Italy provides a further illustration that high spectrum costs need not deter investment or hinder roll-out: it has the highest EU prices (€/MHz/pop) for 3.6 GHz spectrum – reflecting the fact that only 50% of the spectrum in the band was available, offered in two large spectrum blocks of 80 MHz (in response to spectrum requirements stated by operators) and two smaller blocks of 20 MHz – yet it has the highest level of 5G coverage in Europe in this band (98.4% as of 2025, followed by the Netherlands (98.2%) and Finland (92.8%)) and is amongst the leaders on other coverage metrics except 5G indoor coverage (5G population and geographic coverage, coverage of rural households).[27] Italy has used various tools to promote coverage including competition, licence coverage obligations and state-aid funding.

Is the Commission right that regulatory fragmentation limits economies of scale and prevents operators from becoming more competitive?

The DNA introduces a 'competitiveness' objective to "*reinforce the competitiveness of the connectivity sector and industry at-large.*" As this objective is distinct from the promotion of competition (which is no longer a self-standing regulatory objective) one might reasonably ask what is meant by 'competitiveness'.

[27] Data from the EU 5G Observatory.

If the Commission means the ability to compete successfully with others (including non-EU operators), it is not at all obvious in what way facilitating scale-up of operators and "*the development of trans-European digital networks*" would make them more competitive.

Cross-border scale economies can already be achieved, but are fundamentally limited when markets are national

Telecoms operators compete mainly within national markets, and the most important economies of scale in telecoms are usually tied to a national market or network footprint. A mobile or fixed network must reach local customers, and many costs—like spectrum, sites, fibre access, permits, and network capacity—are incurred country by country. Some scale benefits can cross borders, especially for a multinational operator: IT, billing, procurement, cybersecurity, software platforms, etc. may be shared across countries. Similarly, there may be benefits from gaining greater buyer power in dealing with equipment manufacturers because of greater scale. However, the recent BEREC 'reality check' summarises the evidence and finds no clear support for the claim that telecom consolidation would boost investment or performance.[28]

But those benefits are limited and could in any case be realised through cross-border operations, co-operation or mergers. They are unlikely to be limited by national spectrum management within the existing regulatory framework. The LS telcom et al. study finds that *"looking at the licensing conditions used in spectrum awards for the 5G pioneer bands, the overwhelming impression is of homogeneity, not fragmentation."* There is no evidence that the lack of pan-European mobile networks is driven by fragmentation in spectrum licensing. Indeed, many operators are present in multiple jurisdictions, as the examples in Table 1 show, with Deutsche Telekom, Vodafone Group and Orange leading the charge.

Table 1: Examples of operators active in multiple European jurisdictions

Group	Number of Countries	Entities
Deutsche Telekom	10	Austria: Magenta Telekom (T-Mobile Austria) Croatia: Hrvatski Telekom Czech Republic: T-Mobile Czech Republic Germany: Telekom Deutschland Greece: Cosmote Hungary: Magyar Telekom Montenegro: Crnogorski Telekom North Macedonia: Makedonski Telekom Poland: T-Mobile Polska Slovakia: Slovak Telekom

[28] BEREC, "Europe's Telecom Reality Check: BEREC Fact finding report on connectivity, competition and regulatory highlights in different jurisdictions", BoR (26) 137, chapter 6.

Group	Number of Countries	Entities
Vodafone Group	8	Albania: Vodafone Albania Czech Republic: Vodafone Czech Republic Germany: Vodafone Germany Greece: Vodafone Greece Ireland: Vodafone Ireland Portugal: Vodafone Portugal Romania: Vodafone Romania United Kingdom: VodafoneThree
Orange	8	Belgium: Orange Belgium France: Orange France Luxembourg: Orange Luxembourg Moldova: Orange Moldova Poland: Orange Polska Romania: Orange Romania Slovakia: Orange Slovensko Spain: MasOrange
A1 Group	6	Austria: A1 Telekom Austria Bulgaria: A1 Bulgaria Croatia: A1 Hrvatska North Macedonia: A1 Makedonija Serbia: A1 Srbija Slovenia: A1 Slovenija
CK Hutchison	5	Austria: Drei Austria Denmark: 3 Denmark (Hi3G) Ireland: Three Ireland Italy: WindTre Sweden: 3 Sweden (Hi3G Access)
Telia Company	5	Estonia: Telia Eesti Finland: Telia Finland Lithuania: Telia Lietuva Norway: Telia Norge Sweden: Telia Sverige
Tele2	4	Estonia: Tele2 Eesti Latvia: Tele2 Latvia Lithuania: Tele2 Lithuania Sweden: Tele2 Sverige
Telenor	4	Denmark: Telenor Denmark Finland: DNA Norway: Telenor Norge Sweden: Telenor Sverige

Source: Own analysis based on data from the CEPT/ECO, EFIS database ECO reports and company websites; attribution to a group is based on a shareholding above 50%

There may be barriers to further Europe-wide consolidation (e.g. multinational operators may struggle to gain footholds in new markets and potentially replace national incumbents in these markets), but they are not rooted in regulatory fragmentation. It may also be the case that the purported economies of scale that could be achieved by trans-European networks are simply insufficient to justify any expansion.

Competitiveness of industries taking connectivity as an input depends on low-cost, high-quality networks

At the same time, the Draghi report emphasises that "*broadband connectivity (fibre, 4G and 5G) drives the competitiveness of industrial and service companies*", but this is different from claims that the connectivity sector itself needs to become more competitive internationally. It points to the importance of affordable, high-quality connectivity for users, rather than to measures – such as cheaper and longer or indefinite licences – that strengthen the position of connectivity providers.

Users of mobile broadband connectivity – the customers of telecoms services providers - take connectivity as an input. If they compete in international markets, then higher input costs or lower quality services make them less competitive. One might indeed be concerned about their competitiveness if they must pay high prices for poor service quality – but in this respect, Europe is not lagging, as we have shown above. Moreover, in the sectors where lower latency and more secure connections could make a competitive difference, firms are likely to rely on their own private networks rather than public mobile networks.[29]

Upstream of the MNOs, the EU already has champion equipment manufacturers, with Ericsson and Nokia being world leading. These upstream manufacturers are unlikely to benefit from consolidation of their customer base or become more competitive – i.e. better placed to compete with their non-European counterparts – as a result.

[29] In Europe, Commission Decision (EU) 2025/2425 has recently harmonised the 3800 – 4200 MHz frequency band for low to medium power wireless broadband systems, including use by 5G private networks.

3 Will the proposed measures address the underlying problem?

Will indefinite or longer duration licences increase investment?

The DNA would make indefinite licences the default, or at least a minimum duration of 40 years, with the aim of increasing investment. The evidence suggests that this is unlikely to be effective.

Investment depends on a solid business case, not licence duration

The fundamental point is that the case for investment depends on a solid business case. Licence duration would matter if it were shorter than the replacement cycle for spectrum-related assets (e.g. network equipment, etc.), but otherwise it is the latter that determines the period over which an investment needs to generate the required returns to justify the expenditure. Licence durations compliant with the EECC already clear this hurdle and neither longer-term licences nor lower spectrum costs will turn an unprofitable investment into a profitable one.

BEREC's recent 'reality check' confirms that the '*European framework has enabled operators to achieve sustainable risk-adjusted returns, as reflected by returns above the cost of capital on average, stable margins, improving cash-flow prospects, investment-grade credit ratings and positive shareholder returns.*'[30] If investment is lacking, it is most likely because expected demand and willingness to pay for the improved service is insufficient to justify the expenditure, potentially because of the underlying 'chicken-and-egg' problem between advanced network capability and frontier use cases. This is not something that would be addressed *at all* by longer licences or by lower spectrum costs. Nor would such measures increase the attractiveness of investment in resilience measures if consumers' willingness to pay is limited.

The Impact Assessment does not provide evidence of benefits from longer licence duration

The Impact Assessment does not provide evidence to support the view that longer licence duration has a positive impact on investment. The calculation of benefits in its GDP model in part 1 of the Impact Assessment simply assumes that its preferred policy option with indefinite licences (Option 2) and a more radical EU-level spectrum award option (Option 3) generate particular coverage and speed outcomes, which are not tied back to any established link between spectrum licensing and investment. The Commission's Regulatory Scrutiny Board expressed concern about this, stating that the Impact Assessment '*should substantiate or re-assess the same quantitative projection of Option 2 and Option 3 in terms of the coverage which directly drives the economic impact of the options and in turn their comparison. The assumptions, calculations and*

[30] BEREC, "Europe's Telecom Reality Check: BEREC Fact finding report on connectivity, competition and regulatory highlights in different jurisdictions", BoR (26) 137

related narratives need to be fully aligned through the report and annexes. The report should explain how different levels of economies of scale of various spectrum options were accounted for in the modelling'.[31] It is not clear that the published Impact Assessment, issued five weeks later, has resolved this concern.

Econometric analysis finds no link between licence duration and investment

Indeed, the Commission's own econometric analysis in Annex 4.3 of the Impact Assessment does not test licence duration as an explanatory variable at all, despite testing four other regulatory design variables (spectrum set-asides, spectrum caps, access obligations and coverage obligations) with statistical rigour – an important gap, given that indefinite duration is a central element of both options 2 and 3.

Where licence duration has been tested, it has been found to have no impact on investment. Ofcom commissioned an independent econometric study[32] that directly tested licence duration against investment, finding no evidence that longer or indefinite duration increases investment.

This result is not surprising. Clearly, investment in spectrum-related assets requires confidence that there will be access to the spectrum for long enough to see a return on that investment. However, this is *already* achieved under the EECC where regulatory certainty is provided for a minimum of 20 years. Even accepting that a mobile technology generation can remain in service for 20–30 years (3G, launched in the early 2000s, is only now being retired), operators refresh network equipment multiple times within a single licence term as technology and demand evolve. Each such investment needs to pay back over a period that is typically shorter than a 20-year licence term, so longer licences would do little to further improve investment incentives relative to the current situation.

Many instances in other sectors where substantial investments are made based on finite-tenure state-granted rights

As the examples in Box 5 show, there are many other instances in other sectors where substantial investments are made based on time-limited, rather than indefinite, rights in key inputs.

The Impact Assessment does not provide support for the assumption that indefinite licences (or substantially longer terms with automatic renewal rights) are necessary for or conducive to more investment.

[31] Regulatory Scrutiny Board Opinion SEC(2026) 14, December 2025

[32] Charles River Associates, "Spectrum Licence Duration and Capital Investment - An empirical assessment", prepared for Ofcom, September 2023.

Box 5: Industries with finite-tenure, state-granted rights

Comparative evidence from other **finite-tenure, state-granted rights** to exploit scarce resources shows large-scale, multi-decade capital investment is routinely sustained without indefinite tenure, provided the term comfortably exceeds the asset's payback period and renewal/relinquishment terms are clear:

- fixed, non-renewable 20-year patent terms sustain trillions in pharmaceutical and technology R&D;
- offshore oil and gas exploration/production licences (fixed-phase terms with relinquishment obligations) sustain billion-euro sunk capital commitments;
- offshore wind seabed leases (term-limited, not indefinite) have generated hundreds of millions in option fees ahead of billions in construction capex;
- public-private partnerships/infrastructure concessions (25–30-year terms) finance motorway, airport and water infrastructure at scale.

Finite licences/concessions are found across industries with a wide range of competitive conditions.

Some industries award local monopoly concessions; absent competition within the market, repeated competition for the market is clearly essential – possibly at much shorter intervals than the roughly 20-year terms of existing spectrum licences.

The mobile sector, while not a monopoly, is a concentrated industry by any reasonable standards. It has a demonstrated need for intervention e.g. to ensure sufficient coverage. In similar instances where the number of providers is potentially limited because of scarce natural resources or technical capacity, authorisations under Article 12 of the Services Directive must be granted for a limited period and cannot be renewed automatically (which has been applied to beach services, for example). Similarly, in airport ground handling, selected suppliers in restricted categories are limited to terms of at most seven years.[33]

Will the DNA direct funds from spectrum licence costs to investment?

For mobile services, setting spectrum fees at market levels is important to ensure the efficient use of spectrum

For mobile services, where demand for spectrum is greater than supply, setting fees at market levels is important to ensure that spectrum is used efficiently. In general, spectrum prices in Europe are determined by the market, through competitive award processes (i.e. auctions), while some fees are determined administratively.

As noted above, European spectrum auctions cannot have a revenue raising objective (see Box 4 above), other than as a side-effect of

[33] Article 12(1)–(2) of the Services Directive 2006/123/EC applies when the number of authorisations is limited because of scarce natural resources or technical capacity. It requires an impartial, transparent selection procedure; authorisations must be granted for an "appropriate limited period" and cannot be automatically renewed. The Commission has specifically applied this to beachside facilities in its answer to European Parliament question E-004502/2011.

Article 11(1)(d) of Directive 96/67/EC says that where the number of ground-handling suppliers is limited, selected suppliers "shall be selected for a maximum period of seven years." The provision concerns selected suppliers in restricted categories at an airport, not every ground-handling provider; the Directive's selection procedure applies in the cases specified in Articles 6(2) and 9.

achieving efficient allocation. ComReg, along with most European NRAs, designs awards with the *explicit* objective of securing the efficient use of spectrum. As shown in Box 3, European spectrum costs are not out of line with other developed economies and are materially lower than in North America.

To support an efficient allocation and use of spectrum, even countries offering automatic renewals tend not to allow operators to do so free of charge. Instead, they set spectrum fees at estimates of the opportunity cost, aiming to promote the efficient use of spectrum. For example:

- in the UK, licences are indefinite, but beyond their initial term Ofcom applies Annual Licence Fees (ALFs) that are estimates of market value[34];
- in Canada, ISED revised its annual licence fees in 2025[35] and, having considered renewal fees applied in comparable jurisdictions, including Europe, set its own renewal fees that are broadly aligned with market values;
- in Australia, the ACMA is planning to renew spectrum licences that expire between 2028 and 2032 and will apply renewal fees based on international market price benchmarks.[36]

Will the DNA lower spectrum costs?

It is unclear what effect the DNA will have on the level of spectrum fees, because the Commission has not yet formed recommendations on a methodology for annual spectrum fees or reserve prices. However, we expect that it will seek to lower spectrum fees, given Recital 109 where the *"high level of cost of radio spectrum"* is referenced as a cause of concern.

First, unless the Commission compromises the efficient-allocation function of spectrum fees, via the Commission's proposed fees methodology and veto powers, there is no logical reason for fees to be lower after the introduction of the DNA. Absent the setting of fees through an appropriately designed market mechanism, it is unclear how such fees would be determined, and the Commission has provided no clarity on the methodology or principles that would apply. Furthermore, any administrative approach to setting fees entails uncertainty over underlying market value, which in turn risks inefficient outcomes and distorting incentives for spectrum use.

Any material reduction in spectrum costs would, therefore, imply that fees are too low to support efficient use, resulting in a windfall gain for incumbents. Furthermore, one would naturally expect moving to longer licences would make them more valuable, suggesting that the Commission may eventually make a financial

[34] A long-standing framework that Ofcom last reviewed in 2025

[35] CPC-2-1-32 — Spectrum Licence Fees for certain Spectrum Licences used to provide Commercial Mobile Services below 10 GHz

[36] ACMA, Expiring spectrum licences stage 4: Preferred views on pricing, May 2026

transfer to incumbents through some subsequent rules that control prices at below opportunity cost; this is not clear within the DNA proposals, but appears to be its logical consequence.

If fees do fall, there is no guarantee the savings will fund investment

Second, there can be no guarantee that the savings from no-strings-attached reductions in spectrum costs would be spent on additional investment. This is the obvious deficiency of the Commission's proposals, entirely unaddressed within its Impact Assessment.

The explanation for the positive relationship between spectrum prices and investment put forward in the LS telcom et al. study (that is referenced in the Impact Assessment) is that both higher auction prices and greater investment are driven by more competition between operators. This suggests that it is competitive pressures, rather than the comfort provided by indefinite licences offered at low cost, that create the incentives for investment.

The presumption that spectrum fees simply come at the expense of investment also ignores that Member States and NRAs routinely use fee revenue (and/or other public funds) to procure coverage and quality outcomes beyond what the market would deliver commercially. For example, Ireland's National Broadband Plan and Spain[37] and Italy's[38] recovery and resilience plan funding to support 5G connectivity. Such schemes preserve Member State discretion to target the specific gaps that arise due to local circumstances.

Such schemes are required to comply with State aid rules and must therefore be designed to avoid distortions to competition. By contrast, indefinite licences and automatic renewals would clearly restrict competition from potential new entrants and distort competition between existing operators for already assigned spectrum bands.

Support schemes are also designed to promote investments the respective Member State considers to be needed, given local circumstances, rather than leaving the decision whether and where to invest to the discretion of the incumbent MNO.

Will the DNA create economies of scale and pan-European networks?

Would centralised spectrum allocations create pan-European operators?

One of the objectives of the DNA is the development of trans-European digital networks, but centralising spectrum assignments is unlikely to bring these about.

As noted above, there are no regulatory barriers to trans-European networks under the current framework. Many operators operate in multiple jurisdictions. The LS telcom et al. study shows that it is already common for European MNOs to operate in neighbouring

[37] Spain's recovery and resilience plan - Reforms and Investments

[38] Italy's recovery and resilience plan - Reforms and Investments

countries (especially in central Europe and Scandinavia). Licensing conditions in the awards of 5G pioneer bands were largely aligned across Europe. The fact that there are not more cross-border operators might simply reflect the limited benefits of operating across countries when markets for services are national.

The DNA proposals are unlikely to change this. As BEREC notes, there is also an opposite trend with operators 'rightsizing' their scope, leading to divestments allowing the operator to focus on core markets. [39] This suggests that achieving greater scale is not necessarily an objective that is currently stifled by the regulatory framework, nor one that would become a driving force following the changes proposed in the DNA.

Of course, operators active across borders in Europe tend not to hold the same specific frequencies in each country. However, precise frequency alignment is simply not needed. The same bands are available and equipment can be tuned to different specific frequency ranges within a band. Every commonly used mobile band has substitutes with similar propagation characteristics. Nor would alignment be guaranteed to be the case if Europe used North America style regional spectrum awards, where identical licences are assigned across all regions. Operators in the US and Canada must bid for their frequency position in the band region by region; whilst there is some alignment, this is not universal and there is variation across regions in practice.

Box 6: US C-band auctions (3.45 GHz - 3.98 GHz)

Even US auctions retain some fragmentation in spectrum assignments, though this does not hold back national operators.

The FCC awarded C-band spectrum in three different auctions:

- Auction 105 (ended August 2020) offered 10 MHz blocks in the 3550-3650 MHz range in each county
- Auction 107 (2021) offered 20 MHz blocks in the 3700 - 3980 MHz range in each Partial Economic Area (PEA)
- Auction 110 (January 2022) offered 10 MHz blocks in the 3450 – 3550 MHz range in each PEA

All of this is closely substitutable spectrum, but it was awarded at slightly different times. The regional basis for the awards is very different – there are 3,223 counties but only 406 PEAs.

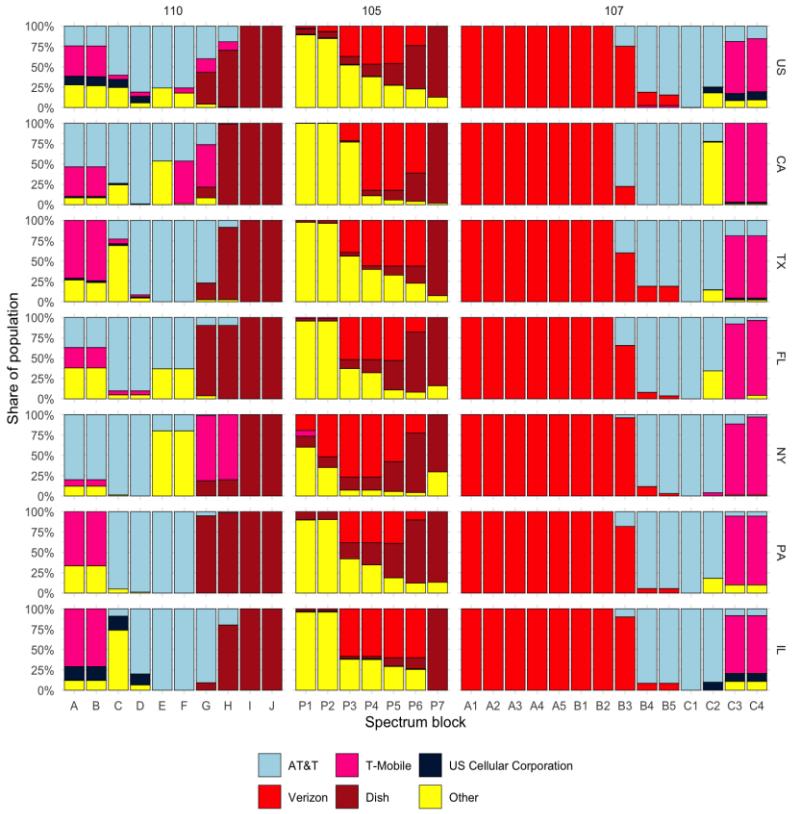
The diagram below shows for each block the population covered by a particular bidder for the US as a whole and for each of the six most populous states. This shows that only some operators held the same spectrum across the entire US, namely:

- Verizon blocks A1-A5 and B1-B2;
- Dish blocks I and J; and

[39] BEREC, "Europe's Telecom Reality Check: BEREC Fact finding report on connectivity, competition and regulatory highlights in different jurisdictions", BoR (26) 137, chapter 6.1.

- AT&T block C1 (with the exception of one PEA in Iowa).

All other holdings are fragmented and do not cover the whole of the US.



Source: FCC; Note: Auction order represents increasing frequencies rather than chronology

4 Could the side effects of the proposed measures outweigh their benefits?

Introduction

Some important side effects merit fuller consideration

The Impact Assessment falls well short of best practice. It discusses some of the side effects and downsides of the different policy options considered by the Commission, but the depth of treatment differs considerably between options. For example, the most serious risks – market exit, consolidation to three or four operators, inefficient spectrum use given thin secondary markets, transitional disruption and litigation – are considered in detail only for the option of strong harmonisation with EU-level awards (Option 3, which the Commission rejected). For the preferred Option 2 the competition risks of indefinite licence duration are acknowledged in a single paragraph and addressed by reference to safeguards - use-it-or-lose-it conditions, revocation powers, spectrum trading - whose limited use and effectiveness the Impact Assessment acknowledges elsewhere. Some effects are not discussed, notably the transfer of spectrum rents from Member States to licensees, which the cost–benefit tables record only as an operator benefit.

The Regulatory Scrutiny Board twice found the assessment of costs, their distribution across stakeholder groups and the robustness of the option comparison deficient (opinions of 22 October and 17 December 2025).

In the remainder of this section, we look in more detail at side effects that, in our view, merit further consideration by the co-legislators. We start with the most important: the loss of the tools that NRAs need to address investment, competition and resilience needs in ways that reflect national circumstances and bring genuine societal benefits.

Loss of the tools NRAs need to address the underlying problem

The proposals do not address the underlying problem but remove the tools to deal with it

As discussed in Section 2, to the extent that investment is insufficient, the underlying causes are co-ordination problems in technology adoption and – increasingly – resilience needs that the market alone may under-provide. Neither is caused by the current framework. Addressing investment gaps requires instruments that can be tailored to the specific gap within its national circumstances, and potentially adjusted over time.

The DNA's central measures – indefinite licences or long-term licences with automatic renewal on similar conditions, and high hurdles before NRAs can attach conditions or depart from the default – do not solve the problem of investment gaps. Instead, they take away the tools NRAs would need to deal with them in the way that

best reflects national circumstances: setting licence terms, using renewal to update obligations and rebalance spectrum holdings, and attaching specific conditions on investment, coverage, quality and resilience.

The Commission claims in its Impact Assessment that its preferred Option 2 *'[b]y maintaining a degree of flexibility in spectrum assignment, this option ensures a balanced solution that strengthens predictability and enhances legal certainty, improves financing access, reduces capital costs, and boosts investment. It avoids a rigid, uniform approach, allowing Member States to address specific national circumstances, such as geographical and population density-related coverage obligations*'.[40]

Harmonised defaults remove the ability of NRAs to tailor licence terms to national conditions

However, these benefits are measured against Option 3 – centralised spectrum management – rather than against the status quo. It is not clear how the proposals in the DNA take account of the heterogeneity of market conditions across Europe. National spectrum valuation and optimal licence design depend on many factors including population density and distribution, existing infrastructure, industrial and defence/public protection and disaster relief (PPDR) needs. Proposals which further harmonise licence conditions, including a uniform EU default duration, remove the ability of NRAs to tailor duration/renewal terms to this variation and to revisit problems with new solutions.

National circumstances differ for good reasons. They are shaped by history – for example, the sequence in which bands were released, past mergers and the resulting fragmentation of holdings, and whether a market has three or four operators – and by geography, including population dispersion, terrain, and exposure to storms and other extreme weather. An approach to licensing that suits a densely populated Member State with a limited threat to its power grid may be inappropriate for one with a dispersed rural population and an exposed Atlantic coastline.

NRA decisions that are targeted and consistent with well-established regulatory principles bring genuine social benefits. This has already been the case in relation to improving coverage of mobile networks, an issue that always needs to be tailored to country demographics. Further intervention might be needed in the future in individual Member States, including to improve quality or resilience. There is a social and economic cost to compromising the ability of NRAs to design such interventions.

If cross-border externalities are comparatively narrow, there is no sizeable benefit from imposing wide-ranging harmonisation requirements. In contrast, forcing Member States to adopt licence

[40] Impact Assessment Part 1/3, SWD (2026) 13 final, p 151.

terms that might not be in their national interest will likely have downsides.

The Commission consultation record clearly states that "*Member States and NRAs see no need for harmonised spectrum authorisation and oppose common authorisation procedures and conditions*" and that "*the RSPG expressed a view against a mandatory single market procedure with veto*". Such clear opposition from the bodies whose competence the proposed measure supplants suggests that the case has not yet been made for imposing harmonisation requirements that take away the ability of NRAs to respond flexibly to their national circumstances.

Loss of the recurring competitive reallocation moment

In a similar way, the proposals do not take account of the fact that optimal licensing conditions and spectrum allocation will vary over time.

Under the current regulatory framework, periodic licence expiry is a key mechanism by which spectrum is retained or moved to a more efficient user as market conditions and technology change. Automatic renewal removes this without a demonstrated, functioning substitute. Because secondary markets perform poorly (see below), trading – the "safety valve" alternative to periodic reallocation – is unlikely to compensate for the loss of the primary reallocation mechanism. This compounds, rather than offsets, the flexibility loss.

This matters particularly for 6G. Creating the very wide contiguous channels that 6G is likely to need in existing bands may require holdings to be rearranged; licence expiry gives NRAs a natural point at which to do so, possibly in combination with the award of new spectrum and with new licence conditions. Under automatic renewal, such rearrangement would depend on voluntary agreement between operators – which, as we discuss below, is rare.

Loss of the ability to update licence obligations

In some cases, NRAs are actively choosing to administratively renew or extend (rather than re-auction) licences, but this is an active choice of the NRA and still provides it leverage to seek commitments and update licence conditions, even if the spectrum is to be assigned directly to the same operator. The DNA's automatic renewal *"for a similar duration and with similar conditions"* removes this leverage and the ability to condition renewal on updated coverage/quality obligations or to use non-renewal as the practical point for use-it-or-lose-it discipline – the alternative, formal revocation for cause, is a materially higher evidentiary bar, rarely used even today.

The proposal's retrospective renewal mechanism (Article 25(5)) compounds this: applying the presumption of renewal to licences already in issue removes the negotiating leverage NRAs currently hold over incumbents, without any offsetting demonstration that retrospective application is necessary to secure the claimed investment benefit.

This includes resilience. Resilience requirements can be imposed through several routes – security obligations under the NIS2 Directive, or national legislation, as in Spain – but licence conditions set at award or renewal have a particular advantage: the cost of meeting them is automatically reflected in what operators are willing to pay for the spectrum. In effect, part of the value of the spectrum funds the obligation, rather than imposing an unfunded mandate on operators or relying on public subsidy. Automatic renewal on similar conditions would remove this option for existing bands, and the hurdles for attaching non-default conditions would make it difficult to use even in new awards.

Loss of evidence on fees market value

While Commission, BEREC or RSPG recommendations or opinions on spectrum pricing has not yet been produced, it is difficult to see how it could reliably keep prices in line with market values. If widespread automatic renewal means there are few spectrum auctions, fresh information on market values is lost. At different points in time, spectrum prices have increased in line with demand or fallen following increases in spectrum supply, yet automatic renewal forgoes this new information. In the long run, administratively set licence prices would lose their anchor in market evidence.

Loss of competition

The proposals risk trading lower competition for uncertain gains in investment

Even on the most generous assessment of the DNA's proposals – assuming they will successfully increase investment and innovation – they would do so at the expense of competition. The EU enjoys much more affordable mobile broadband than comparable countries, yet the Commission, while recognising this as a benefit to consumers, also appears to regard it as a concern, echoing the Draghi report's view that low prices *"undoubtedly benefitted citizens and businesses but, over time, they have also reduced the industry profitability and, as a consequence, investment levels in Europe."*[41] This line of argument assumes a trade-off between competition and investment, in which less competition might be regarded as an acceptable price for more investment fuelled by higher profits in a more concentrated market.

The Commission's Impact Assessment acknowledges the downside of less competitive markets, but only in relation to the more radical Option 3 (centralised assignments), under which only three or four undertakings would likely retain sufficient spectrum at EU level,

[41] Draghi report, Part B, p 69; The Commission notes in its impact assessment that "*European mobile markets continue to generate considerably lower average revenue per user (ARPU) than major international peers, possibly due to highly competitive, low-price European markets. The Draghi Report similarly notes that revenues per subscriber are less than half of the levels observed in the US and Japan*." (Impact Assessment Part 1/3, SWD (2026) 13 final, p 45).

forcing most current operators to sell assets, exit the market, or become virtual operators.

However, if the current proposals, following Option 2, are expected to produce scale benefits by encouraging the development of trans-European networks (which is unlikely, as we have argued above), they will create similar risks of increasing market concentration and potential foreclosure. Indeed, any policy addressing the complaint in the Draghi report about there being too many MNOs will inevitably create risks for competition and potentially harm customers.

Indefinite licences and automatic renewals would weaken competition over time

The loss of competition becomes even more problematic in the long run, because the underlying mechanism – removal of periodic competitive spectrum reallocations – eliminates the opportunity to recalibrate spectrum between existing operators and any credible threat of new entry.

The retrospective application of the renewal presumption to spectrum already assigned (Article 25(5)) reinforces this effect and removes even the residual leverage NRAs currently have over sitting incumbents, entrenching current holdings before any of the Commission's claimed "safeguards" discussed below have been assessed or tested in practice. These effects merit a fuller assessment.

Competition drives investment

Even if one accepted less competition in the hope for more investment, it would be far from clear that the DNA measures will induce enough investment to offset the loss of competition. Moreover, as competition can also drive investment and innovation, there is a distinct possibility that the DNA will harm both. The relationship between competition and innovation driven by investments has been the subject of debate in economics – what is clear is that claims of investment being threatened by the erosion of profits through competition are overly simplistic.

Box 7: Economic theory of competition and innovation

The effects of competition on innovation have been extensively discussed in economics, with the two opposite sides of the debate linked to the works of Joseph Schumpeter and Kenneth Arrow.

Schumpeter claimed that large firms with market power innovate more as their profits enable them to fund innovation and they are less concerned about being displaced and therefore failing to reap the benefits of their investment in research and development.[42]

But while they might have the ability to do so, monopolists do not necessarily have an incentive to innovate – as Hicks famously said, the best of all monopoly profits is a quiet life.[43] Arrow argued that the presence of monopoly profits

[42] Schumpeter, J A, *Theorie der wirtschaftlichen Entwicklung*, Leipzig: Duncker & Humblot 1911 [1912]; and *Capitalism, Socialism and Democracy*, New York: Harper & Brothers 1942.

[43] Hicks, J, "Annual Survey of Economic Theory: The Theory of Monopoly", *Econometrica*, 1935.

disincentivises firms from innovating, as any innovation would necessarily detract from their current profits. Entry, on the other hand, is fundamental to the innovative process, as entrants look to innovation as a way to take away profits from competitors.[44]

Aghion et al[45] found an inverted-U relationship. Innovation rises with competition from low levels, because firms innovate to escape competition, then falls at high levels, because laggards are discouraged from catching up.

Houngbonon & Jeanjean confirmed an inverted-U between competition intensity and investment in mobile.[46]. Genakos, Valletti & Verboven found that 4-to-3 mergers raised prices and had no clear increase in industry-level investment (though investment per operator rose).[47]

In addition, it may be the case that monopolists undertake research and development, but withhold or restrict the dispersion of their innovation (so-called 'captured' innovation) so as not to disrupt the market structure that they dominate, as observed in recent technology markets.[48] And, as a complement to these arguments, Reksulak et al examine this relationship from the opposite direction, arguing that highly innovative industries raise the stakes when it comes to the value of competition as innovation "raises the deadweight cost of monopoly."[49]

This means that the relationship between competition and innovation is complex and that the Commission's implicitly Schumpeterian view that greater profits will lead to more investment and innovation is not supported by the economic literature as a general proposition.

[44] Arrow K, "Economic Welfare and the Allocation of Resources", in Universities-National Bureau Committee for Economic Research (ed.) *The Rate and Direction of Inventive Activity: Economic and Social Factors*, Princeton University Press, 1962.

[45] Aghion, P, Bloom, N, Blundell, R, Griffith, R and Howitt, P, "Competition and Innovation: An Inverted-U Relationship", Quarterly Journal of Economics, 2005.

[46] Houngbonon, G V and Jeanjean, F, "What Level of Competition Intensity Maximises Investment in the Wireless Industry?", *Telecommunications Policy*, 2016

[47] Genakos, C, Valletti, T and Verboven, F, "Evaluating Market Consolidation in Mobile Communications", *Economic Policy*, 2018.

[48] Showalter R and Edelson L, "Captured Innovation: Technology Monopoly Response to Transformational Development", *The University of Chicago Business Law Review, Volume 4.1*, https://businesslawreview.uchicago.edu/print-archive/captured-innovation-technology-monopoly-response-transformational-development

[49] Reksulak M, Shughart W and Tollison R, "Innovation and the Opportunity Cost of Monopoly", *Managerial and Decision Economics, vol. 29*, 2008, https://www.researchgate.net/publication/46509531_Innovation_and_the_opportunity_cost_of_monopoly

Will secondary markets maintain efficient spectrum assignments?

Are secondary markets able to perform the rebalancing between existing holders and between incumbents and new?

Periodic competitive awards of spectrum can correct allocations that have become inefficient as technology and market conditions have evolved. This option is lost under the DNA proposals and correction of any misallocation locked in under indefinite primary licences – in terms of both changing the distribution of spectrum between incumbent users and allowing new entrants offering novel services – would fall to secondary markets.

There is of course the question what level of secondary trading would be needed to rectify misallocations. Absent a comparable competitive award, we do not gain new information on what constitutes an efficient allocation of spectrum and how this might have changed.

It would be a strong assumption that the efficient allocation of spectrum never changes

However, it would be a strong assumption that the efficient allocation of spectrum never changes – for example, it may become efficient for operators to concentrate holdings rather than spread them across substitutable bands (an outcome that reflects the sequential harmonisation and allocation of bands rather than necessarily operator demand). There are some scenarios that appear ripe for trades and yet they do not occur: even like-for-like spectrum swaps to achieve fully contiguous spectrum for both operators are slow to happen or may fail, as the example of the UK 3.4 – 3.8 GHz band shows.

Box 8: Trades failing to defragment the 3.4 – 3.8 GHz holdings in the UK

Before the 2021 award of spectrum in the 3.6 – 3.8 GHz band, Three held 140 MHz in the 3.4–3.8 GHz band, including a contiguous 100 MHz at 3580–3680 MHz, mostly through its UK Broadband acquisition. EE, Vodafone and O2 each held 40–50 MHz. Ofcom considered whether the award could be used to produce an outcome in which all operators would hold contiguous spectrum, which it considered to be desirable, but ruled out mandatory reassignment. Instead, it relied on trading[50] and added a negotiation window to the auction's assignment stage to help trades along.[51]

The result was a single swap: O2 obtained a contiguous 80 MHz and Vodafone's holdings were brought closer together but remain fragmented.[52] EE's 80 MHz stayed split, with Three's 100 MHz block in between.[53]

[50] Ofcom, Defragmentation of spectrum holdings in the 3.4-3.8 GHz band, consultation, 11 June 2019.

[51] Ofcom, Award of the 700 MHz and 3.6-3.8 GHz spectrum bands, statement, 13 March 2020.

[52] Telecoms.com, "O2 and Vodafone trade UK 5G spectrum", 27 April 2021.

[53] The Mobile Network, "UK operators trade 5G midband spectrum", April 2021.

In 2022 Ofcom recorded that differences between UK Broadband's licence terms and those of the auctioned licences had hindered trades. It aligned the terms by licence variation and a lump-sum payment of £577.2m (July 2022 prices).[54]

Following the merger between Vodafone and Three, 20 MHz of their combined spectrum was acquired by O2, which was non-contiguous with O2's existing holdings.

To date, the band remains fragmented with no operator having contiguous holdings (though Vodafone/Three's two blocks each include more than 100 MHz).[55]

There are good reasons for spectrum trades being rare. The economics literature documents that such markets are *inherently* thin – and not simply because limited remaining licence duration holds back trades.

Factors responsible for thin secondary markets will not disappear if licence durations are extended or indefinite

The reasons for secondary market thinness include:

- multi-dimensional heterogeneity of spectrum assets, limiting the likelihood that buyer's and seller's needs align;
- incumbents' weak incentive to sell to rivals; and
- valuation opacity – the lack of a continuous market price means each deal must independently establish value, which raises negotiation costs and increases the risk of breakdown.

These obstacles will not go away with indefinite licences.

Jurisdictions with indefinite licences, tradeable licences and public information on trading show that spectrum trades are rare. Historical UK spectrum trading register data shows very low transaction volumes, and in its own review of spectrum management in 2024, Ofcom found that *"despite the multiple different approaches to spectrum management and fees policy used internationally, we are not aware of any country where a dynamic spectrum trading market has emerged. Indeed, other than like-for-like spectrum swaps, there has only ever been one mobile spectrum trade in the UK".*[56] This "safety valve" relied upon by the indefinite-duration model has limited practical function.

[54] Ofcom, Aligning licence terms in the 3.4-3.8 GHz band, statement, 10 October 2022.

[55] See Ofcom, Mobile and wireless broadband below 5 GHz (licence table) and https://pedroc.co.uk/content/uk-commercial-mobile-spectrum

[56] https://www.ofcom.org.uk/siteassets/resources/documents/spectrum/spectrum-management/review-of-ofcoms-market-based-approach-to-mobile-spectrum-management?v=330689

Will the Commission's suggested safeguards be effective?

To the extent that the Commission recognises there are downsides to entrenching spectrum allocation, it relies on safeguards in the form of 'use-it-or-lose-it' or 'use-it-or-share-it' conditions to remedy these and on wholesale obligations to address competition concerns. However, there are reasons to doubt that these safeguards would be effective in practice.

Use-it-or-lose-it and use-it-or-share-it obligations shift the burden of proof making their enforcement difficult

Compared with the existing set-up, the DNA proposals shift the burden of proof from the operators to regulators. Today, an operator has no right to keep its spectrum beyond licence expiry (though there is a reasonable expectation that spectrum that is used can be won back in any reallocation process); under the DNA, the NRA would have to prove non-compliance to take it away. Enforcing use-it-or-lose-it or use-it-or-share-it obligations will therefore be difficult in practice.

- First, proving non-compliance with such obligations will be challenging. There is no bright line definition of what constitutes 'use' and any claim over non-use will be contentious. Operators may put forward justifications for failing to share spectrum resources and NRAs will be in a poor position to prove that such claims are invalid. 'Gaming', which introduces further inefficiencies, has been observed in other contexts (see Box 9) and it would be prudent to expect operators to deploy similar strategies to retain control over spectrum access.
- Second, apart from the evidentiary burden and the scope for arguments about the validity of claims made by either side, enforcement will be complicated through complex interactions with Member States', as well as European, legal frameworks. For example, ComReg already faces legal hurdles to imposing fines (arising from the Irish Constitution), and requires a quasi-judicial process. These challenges would persist and even increase when more severe sanctions such as revoking an existing spectrum right are contemplated. Ireland will not be unique in facing enforcement complexities.

Both factors raise monitoring and enforcement costs and reduce the likelihood of successful enforcement. In practice, this blunts the threat that such obligations are meant to pose. One should expect them to be enforced only very rarely, only in cases where the failure of operators to comply is blatant and long after the event when substantial damage has been done.

Box 9: Airport slots and use-it-or-lose-it conditions

While use-it-or-lose-it conditions might incentivise licence holders nominally to use the resource in question, there is no guarantee that this use would be efficient or welfare-enhancing, as seen in the air travel industry.

Airport landing and take-off slots are operated with grandfathered rights, with licence holders retaining rights on an ongoing basis if they meet certain

operational standards, effectively operating as an indefinite duration licence. To prevent slot hoarding, the EU introduced use-it-or-lose-it conditions by establishing a minimum use threshold of 80% in 1993. If airline use falls below 80%, airlines risk losing the rights to these highly coveted slots.[57]

This dynamic creates an incentive problem when efficient use for the airline might be below the 80% threshold, but the claim to the slot is so valuable that airlines are not willing to relinquish their indefinite rights. Airlines might anticipate that they can extract value from these slots in the future, even if they are not financially viable now, or see value in denying the slots to competitors. Regardless of the reason, slots might be occupied by a less efficient incumbent at a time when a competitor could use the resource more effectively. These conditions can result in so-called "ghost flights": unnecessary, unprofitable and potentially empty flights flown solely for the purpose of maintaining grandfathered rights to slots.

Ghost flights have been widely criticised as inefficient and environmentally wasteful, including in the Commission's own materials on the slot use waiver during COVID-19.[58] Airlines are not required to, and do not routinely disclose the strategic purpose of all flights, which makes it difficult to assess the prevalence of ghost flights. But in 2022, Lufthansa Group, and its subsidiary Brussels Airlines, publicly claimed the companies would need to fly thousands of unnecessary flights to maintain their slots.[59] And Sun et al. take a methodical approach to identifying "abnormal market service" which peaked during the pandemic and argue that "abnormal flights might indeed have been unprofitable for these airlines."[60]

These issues have sparked calls for a more competitive system of slot allocation, with periodic auctions proposed as a pro-competitive, efficient alternative.[61]

Current enforcement experience is limited

As the Impact Assessment itself acknowledges in various places, current enforcement of such obligations is limited. It is not clear that this would change if such obligations were explicitly written into every licence: monitoring and enforcement will remain key to their

[57] Council Regulation (EEC) No 95/93 of 18 January 1993 on common rules for the allocation of slots at Community airports, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31993R0095

[58] Regulation (EU) 2020/459 amending Council Regulation (EEC) No 95/93, 30 March 2020, https://data.consilium.europa.eu/doc/document/PE-4-2020-REV-1/en/pdf

[59] "Brussels Airlines operates 3,000 empty planes to keep airport slots", 5 January 2022, https://www.independent.co.uk/travel/news-and-advice/brussels-airlines-empty-flights-lufthansa-b1987187.html

[60] Sun X, Wandelt S, Zhang A, "Ghostbusters: Hunting abnormal flights in Europe during COVID-19*", Transport Policy vol. 127,* 2022, https://pmc.ncbi.nlm.nih.gov/articles/PMC9444478/

[61]See, for example, Ball M, Ausubel L, Berardino F, Cramton P, Donohue G, Hansen M, Hoffman, K, "Market-Based Alternatives for Managing at New York's LaGuardia Airport", https://www.cramton.umd.edu/papers2005-2009/ball-et-al-managing-congestion-at-laguardia.pdf; Maldoom D, "Auctioning capacity at airports", *Utilities Policy vol. 11*, 2003; Auction procedures for Allocating Slots at LaGuardia, John F. Kennedy International, Federal Register, 16 Sept 2008, https://www.federalregister.gov/documents/2008/09/16/E8-21592/auction-procedures-for-allocating-slots-at-laguardia-john-f-kennedy-international-and-newark-liberty

effectiveness, and neither will become easier or less costly by the stroke of a pen. Box 10 provides an example.

Box 10: US federal coal leases – an example of ineffective use-it-or-lose-it obligations

For most of the twentieth century, the US government leased federal land for coal extraction under the terms of the Mineral Leasing Act of 1920. These leases granted the holder an indeterminate right to extract coal in the area as long as certain conditions were met, including the requirement that the site be diligently developed and continuously operated.[62] Despite these requirements being written into law and applying to every licence issued, a 1970 review conducted by the Bureau of Land Management found that less than ten percent of all actively leased sites were producing coal.[63] Despite a rapid increase in the number of leases granted, actual coal production had fallen between 1945 and 1970.[64] Despite this failure of development, no licences were cancelled in the five decades up to 1970.[65]

The initial legislation and licence conditions did not clearly define diligent development and continuous operation. While the act allowed for minimum production standards, specific guidance on what constituted a violation of continuous activity was not made clear, making it difficult to build a case for licence cancellation.[66] The program also suffered from a long and difficult cancellation process. If a lessee was thought to have failed to meet licence conditions, the Secretary of the Interior had to ask the Justice Department to sue the lessee in federal court and prove non-compliance without running afoul of constitutional protections against seizure of property without due process.[67]

In the 1970s, the Department attempted to clarify production requirements and streamline the cancellation process, turning it into an administrative process triggered automatically after ten years of nonproduction. Even so, any cancellation would be subject to judicial review, and the cancellation process could be lengthy and difficult.[68]

[62] Mineral Leasing Act of 1920 as Amended, Bureau of Land Management, https://www.blm.gov/sites/blm.gov/files/MineralLeasingAct1920.pdf

[63] Squillace M, "The Tragic Story of the Federal Coal Leasing Program", *Nat Resources & Environment, Winter 2013*, 20, https://scholar.law.colorado.edu/cgi/viewcontent.cgi?params=/context/faculty-articles/article/1463/&path_info=2013_Squillace_The_Tragic_Story_of_the_Federal_Coal_Leasing_Program.pdf

[64] Natural Resources Defense Council v. Hughes, 437 F. Supp 981, U.S. District Court for the District of Columbia, 1977, https://law.justia.com/cases/federal/district-courts/FSupp/437/981/1572310

[65] Lappen J, A Policy History of Federal Coal Leasing: Past and Present Challenges, *Wyoming Law Review, vol. 19*, 2019, https://scholarship.law.uwyo.edu/cgi/viewcontent.cgi?article=1403&context=wlr

[66] "Background and Introduction (Chapter 2)", from **"**An Assessment of Development and Potential of Federal Coal Leases", Office of Technology Assessment, 1981, https://www.princeton.edu/~ota/disk3/1981/8103/810304.PDF

[67] "Federal Coal Lease Management (Chapter 9)", from "An Assessment of Development and Potential of Federal Coal Leases", Office of Technology Assessment, 1981, https://www.princeton.edu/~ota/disk3/1981/8103/810311.PDF

[68] "Federal Coal Lease Management (Chapter 9)", from "An Assessment of Development and Potential of Federal Coal Leases"

Competition safeguards within spectrum awards will be compromised

Effective safeguards are also lacking where NRAs need to intervene to address competition concerns.

Although Article 32 of the DNA attempts to clarify that NRAs will continue to play a role in the promotion of effective competition, the hurdles they have to clear to implement pro-competitive measures on licensing - such as decisions on non-renewal and finite licence conditions, temporary spectrum caps, spectrum reservations and transfer restrictions - risk making these provisions ineffective in practice. Substantial work will need to be undertaken upfront with long lead times before such safeguards can be proposed and implemented.

BEREC has set out in detail how the requirements in the DNA create very significant practical challenges for NRAs (e.g. the requirement to assess the number of competing infrastructures that can be sustained in the market). This will undermine the effectiveness of such safeguards.[69]

Further, all pro-competitive measures taken by a national competent authority are subject to the Commission's approval process laid out in Article 31. Not only would this process complicate and delay NRA's ability to respond to competitive concerns or worrying developments in their national markets, but this provision could block an NRA's pro-competitive measures altogether. Proposed pro-competitive measures must be justified as promoting the internal market, raising questions as to whether that objective can conflict with the NRA's objective of responding to genuine competition concerns within national markets.

Furthermore, spectrum caps - or more accurately 'spectrum competition caps', one of the pro-competitive measures named in the DNA - only apply for the duration of the spectrum competition and are often loose and non-constraining when set at relatively high levels. Such caps often act only as a backstop against significant market concentration, precluding potential spectrum accumulation outcomes that would raise obvious market power concerns. The conditions for being able to propose even precautionary caps (i.e. to avoid extreme spectrum outcomes that could distort competition), their review and the veto process, as proposed, seem disproportionate.

The reference to wholesale obligations as a less intrusive safeguard sits uneasily with the general preference for structural remedies (e.g. in merger proceedings). Such obligations are often difficult to define. Monitoring compliance is costly and enforcement – especially if delayed through legal challenges – may be ineffective in preventing competitive damage. Again, the requirement for NRAs to demonstrate that retail markets would not be effectively competitive

[69]See BEREC's position on the General Spectrum issues of the DNA, BoR (26) 104, p 6.

in the absence of wholesale obligations imposes a substantial burden.

Transfer of the value and loss of control of a public resource

As discussed above, spectrum fees exist to ensure efficient use, not to raise revenue. But indefinite duration would, in effect, place a scarce public resource permanently in the hands of incumbent operators. Unless payments for such indefinite rights reflect the value of the spectrum – or are matched by commitments in return – the value of this valuable Member State resource is transferred to existing licensees as a windfall, rather than benefit accruing to end users through competition and conditions attached to licences aimed at correcting under-provision of quality, coverage or other service attributes.

Moreover, Member States' loss of control of this public asset also limits their ability to protect competition through appropriate safeguards, especially given the onerous requirements with which they would need to comply under the DNA proposals. Accepting a loss of competition in the hope that incumbent operators will increase investment and improve quality of service means accepting the risk that consumers will face more concentrated markets and higher prices.

A secondary consideration is fiscal. Where public funds are needed – for example, to support resilience or coverage in areas that are not commercially viable – spectrum value that is foregone would need to be replaced by revenue raised in other ways, which typically creates greater distortions.[70]

[70] For more detail, see DotEcon, *Collecting revenue from Spectrum,* A report for GSMA, February 2012

5 What measures would address an investment shortfall more effectively?

The current framework provides a sound basis; targeted improvements would help

The current framework has delivered well on promoting competition and supporting a vibrant electronic communications ecosystem. It provides the tools – including issuing indefinite licences if considered appropriate by an NRA – to promote competition, encourage investment and deliver good coverage and high bandwidth to end users. It works well not least because it allows Member States and NRAs to tailor spectrum rights to national circumstances.

This does not mean that nothing should change. The EU can add value by providing guidance and sharing information that improves NRA decision-making, and by making existing instruments more effective. But there is no need for the far-reaching changes to spectrum licensing that the DNA proposes, which are unlikely to generate the intended benefits, and risk doing more harm than good.

There may well be an investment shortfall – today, and more importantly looking ahead to 6G, growing requirements for resilience and support for frontier use cases – that warrants policy attention. But this shortfall is unlikely to be caused by a lack of funds due to high spectrum costs or low consumer prices, or by claimed uncertainty due to time-limited licences. The spectrum management changes proposed in the DNA would make little difference. The real obstacles are a challenging business case for network features that benefit niche uses, co-ordination problems in technology adoption and the limited commercial return on resilience. Measures that improve operators' financial position without commitments in return are unlikely to overcome any of these problems.

What, then, could be done? We see five complementary options. The first two directly address the concerns that underlie the DNA's spectrum proposals – the risk of revenue-oriented or inefficient outcomes, and the concern that spectrum payments divert funds away from investment – without removing NRA discretion to respond to local circumstances. The remaining three target investment gaps directly.

Measure 1: EU-level guidance to guard against revenue-oriented or inefficient awards

The concern that some award designs may be revenue-oriented is best addressed directly – by clarifying and reinforcing the existing legal principle that fees must serve efficient assignment and use – rather than indirectly, by restricting NRAs' discretion over licence duration and conditions. Guidance developed by BEREC and the RSPG could set out a common understanding of good practice in award

design, building on the RSPG's earlier work on efficient awards,[71] and could provide information to support NRA decisions, such as benchmarks for spectrum valuations.

A central element could be an agreed list of warning signs: design features that, individually or in combination, may indicate that an award is geared towards generating revenue rather than efficient assignment. These could include:

- artificial restriction of supply – making available less spectrum than could otherwise be released, or packaging it in a way that creates scarcity;
- delays in making harmonised spectrum available, which build up demand and can raise prices when the spectrum is eventually released;
- set-asides that withhold a substantial share of the spectrum on offer from some bidders, intensifying competition for the remainder;
- a complete absence of spectrum caps, which allows bidders to compete for spectrum in order to deny it to rivals, raising prices as well as the risk of excessive concentration; or
- reserve prices set well above benchmark values or the value of the spectrum in alternative uses, contrary to the approach required by Article 42(2)(a) of the EECC.

None of these features are unambiguously and necessarily problematic in themselves. Set-asides can be a proportionate way to facilitate entry, and caps are not always needed. The guidance could therefore operate on an 'explain and peer review' basis: where an award includes one or more of these features, the NRA would explain why it is needed to achieve efficient assignment or another legitimate objective, such as promoting competition. The existing RSPG peer review of draft measures for competitive selection procedures provides a natural starting point.[72] This would increase transparency and peer scrutiny while preserving NRAs' ability to reflect national circumstances.

Measure 2: Using award proceeds to support network deployment

The second option addresses the concern that spectrum payments divert funds away from network investment. Where specific policy issues have been identified and sufficiently evidenced, Member States could commit the proceeds of spectrum awards, in whole or in part, to supporting network deployment – in effect, a hypothecated

[71] RSPG16-004 final, op. cit.

[72] Article 35 EECC provides for a peer review by the RSPG of draft national measures relating to competitive or comparative selection procedures for harmonised spectrum.

tax. Proceeds could, for example, fund coverage in areas that are not commercially viable and resilience upgrades such as back-up power at critical sites, or support for the early deployment of new capabilities. The legal framework already allows this, as it is '*without prejudice to the purpose for which fees for rights of use and rights to install facilities are employed*',[73] and several Member States already use public funds in this way.

This approach preserves the efficient-allocation function of market-based spectrum pricing while ensuring that the value of the spectrum flows back into the networks that users rely on. Unlike lower spectrum fees with no strings attached, it directs support to the investments that a Member State considers necessary given national circumstances, rather than leaving the decision whether and where to invest to incumbent operators.

Hypothecation also has limitations and may conflict with national laws, which suggest that it should be an option for Member States rather than an EU-level requirement. It reduces fiscal flexibility, earmarked funds may simply displace other public spending, and funded schemes must comply with State aid rules. Its main value lies in transparency and in providing a credible commitment that spectrum value is reinvested in connectivity.

Measure 3: Reducing deployment costs through easier access to passive infrastructure

The third option aims to lower deployment costs by making access to passive infrastructure easier. This is the approach taken in the Gigabit Infrastructure Act (GIA)[74], which obliges network operators and public sector bodies to meet reasonable requests for access to passive infrastructure such as rooftops, towers and poles. Member States are also empowered to extend access obligations to owners of private commercial buildings under certain conditions.[75]

The GIA impact assessment's review of its predecessor, the Broadband Cost Reduction Directive (BCRD)[76], shows that such obligations can substantially reduce deployment costs if applied

[73] EECC, recital 100.

[74] Regulation (EU) 2024/1309

[75] Pursuant to Article 3 (3) of the GIA, such obligations may be imposed on owners of private commercial buildings in rural or remote areas where there is currently no very high-capacity network of the same type and where no alternative infrastructure controlled by network operators or public sector bodies is available.

[76] Directive 2014/61/EU

consistently.[77] Effective enforcement of the GIA obligations should, therefore, stimulate investment.

Measure 4: Tying specific investment obligations to licences

The fourth option is for NRAs to attach explicit investment or resilience requirements to spectrum licences, just as they already do with coverage requirements. These obligations would need to be specific rather than vaguely defined (e.g. as just a commitment to spend a certain amount of money, left at the discretion of the operators). They should be carefully designed to procure features and capabilities in networks that the competitive market is not providing. They could be tailored to the specific requirements in a particular national market and address the specific problems that have been identified as the cause for insufficient investment.

Attaching such obligations is easiest when spectrum is re-licensed periodically, as obligations can then reflect the technology and requirements appropriate at the time – including the requirements of 6G and evolving resilience standards. With indefinite or very long licences, such obligations would be much harder to define and impose effectively, and difficult to adjust as requirements change.

Investment obligations would, of course, reduce what operators are willing to pay for spectrum. The crucial point however is that MNOs would have to commit to investing to provide specified outputs in exchange for paying less, rather than simply receiving indefinite spectrum rights in the hope that they will make the investments policymakers want. The value of spectrum is still realised for the benefit of the public – just some part of the benefits come through investment commitments rather than auction revenues.

Measure 5: Facilitating investment subsidies

The fifth option is direct support in the form of state subsidies. This option decouples investment from spectrum licensing and applies even where the cost of investment obligations exceeds the value of the supporting spectrum. Any such support must comply with State aid rules – and here the Commission could do more.

The 2023 amendment to the General Block Exemption Regulation (GBER) made it easier to support 4G and 5G deployment that extends coverage: aid meeting certain conditions is deemed compatible and exempt from notification.[78] However, there are no equivalent provisions for investment aimed at improving quality of service (QoS)

[77] SWD (2023) 46 final.

[78] Article 52a of Commission Regulation (EU) No 651/2014 as amended by Commission Regulation (EU) 2023/1315.

enabling certain functionalities (e.g. network slicing or Ultra-Reliable Low Latency Communication) rather than coverage, nor for investment in network resilience.

The Commission could introduce further amendments similarly to facilitate support for QoS and resilience investment. This would require the Commission to be clear about its objectives, and might expose a tension between promoting investment in a specific technology – namely 5G SA networks – and the principle of technology-neutrality that is central to the Commission's Guidelines for State aid for broadband networks.[79] That would be no bad thing: supported investment would have to be specified in terms of capabilities and performance rather than technology – which is what ultimately matters to users.

Conclusion

In short, if insufficient investment is indeed a problem – now or looking ahead to 6G and growing resilience requirements – there are effective ways to address it:

1. EU guidance that guards against revenue-oriented or inefficient awards;
2. the option of reinvesting award proceeds into network deployment where specific policy issues have been identified and sufficiently evidenced;
3. easier access to passive infrastructure;
4. specific investment and resilience obligations attached to licences; and
5. targeted subsidies made easier through further amendments to the State aid rules.

All these can be used to pursue EU-wide targets for network capability to encourage investment in frontier use cases in the way that best works, given national conditions. They work with, rather than against, the NRAs' ability to respond to national circumstances. The spectrum management proposals in the DNA, by contrast, would weaken that ability without addressing the underlying problem.

[79] Communication from the Commission 2023/C 36/01.