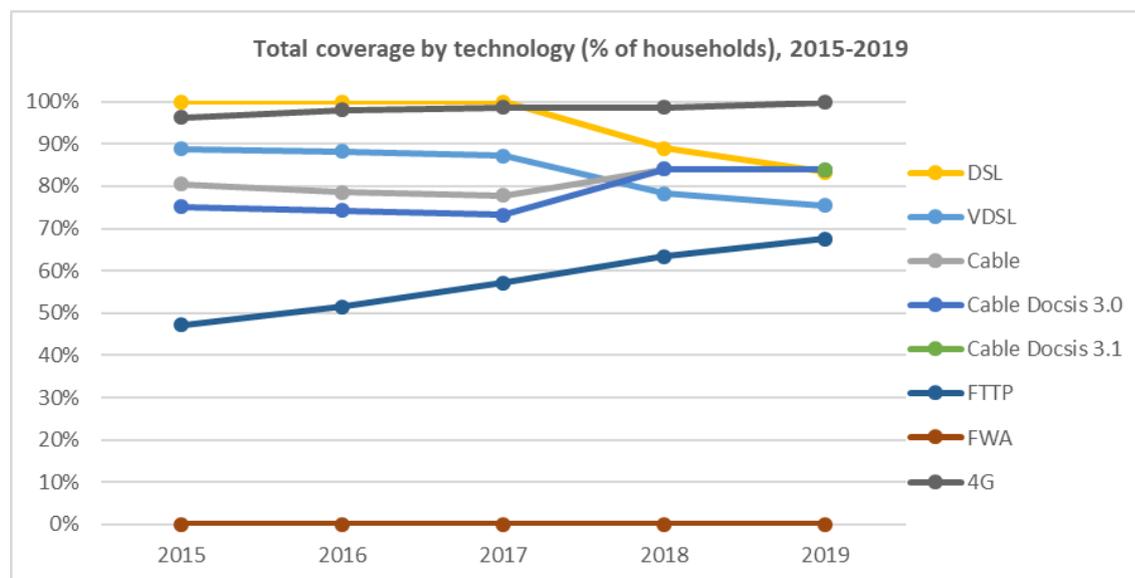
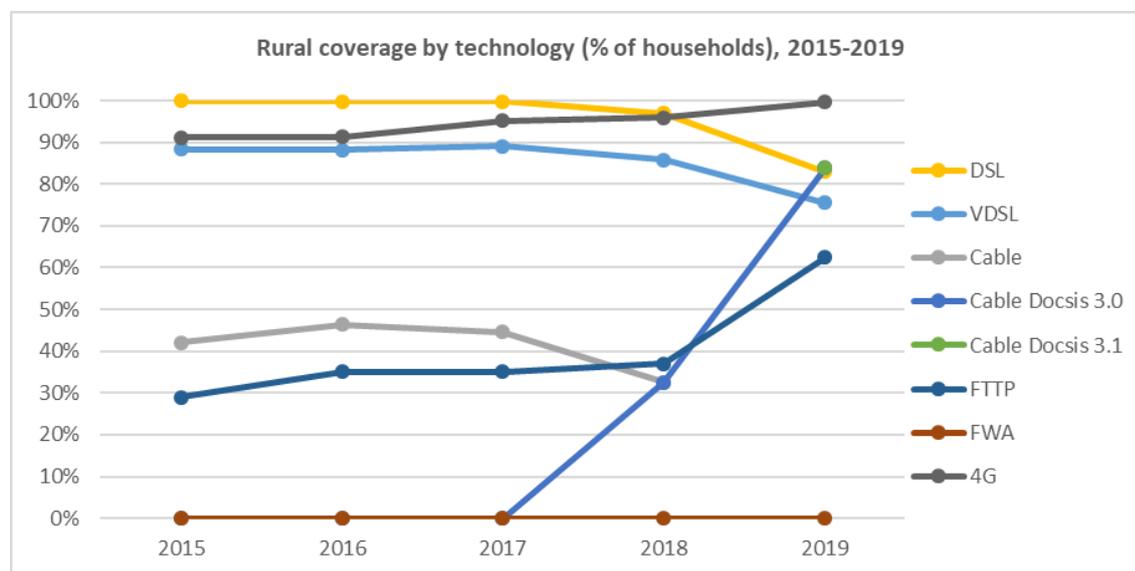


Luxembourg



Source IHS and Point Topic, *Broadband coverage in Europe studies*

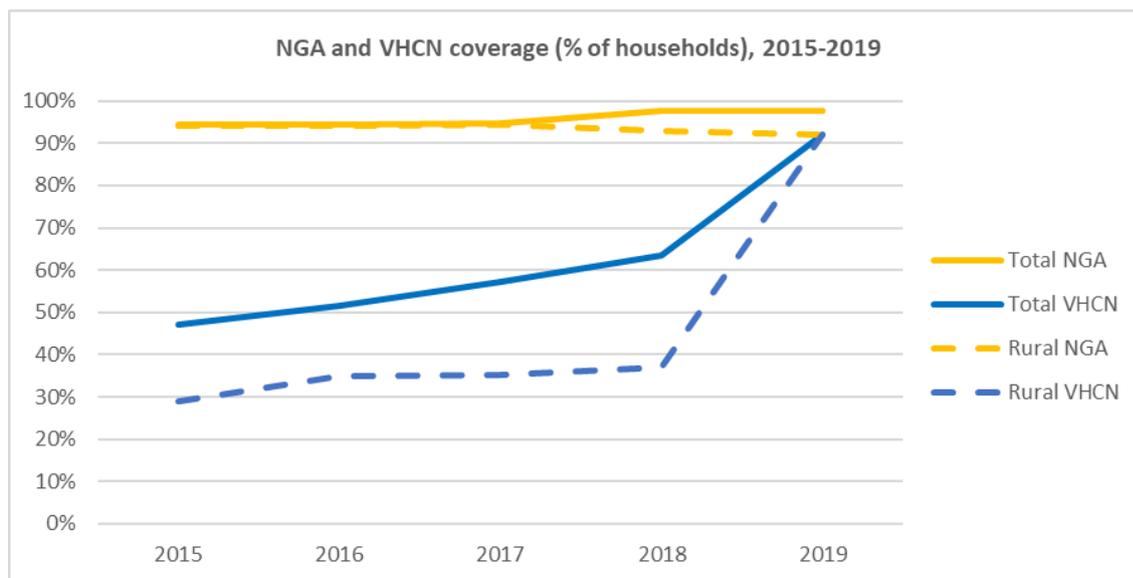
For 4G, cable and very high speed digital subscriber line (VDSL) total coverage is among the best in the EU, at 100%, 84% and 76% of households respectively. VDSL2 vectoring coverage (not included in the chart) stands at 42%, against an EU average of 28%. As fibre roll-out continues, fibre-to-the premises (FTTP) coverage has reached 68%. DSL coverage is decreasing, as connections are replaced by fibre.



Source IHS and Point Topic, *Broadband coverage in Europe studies*

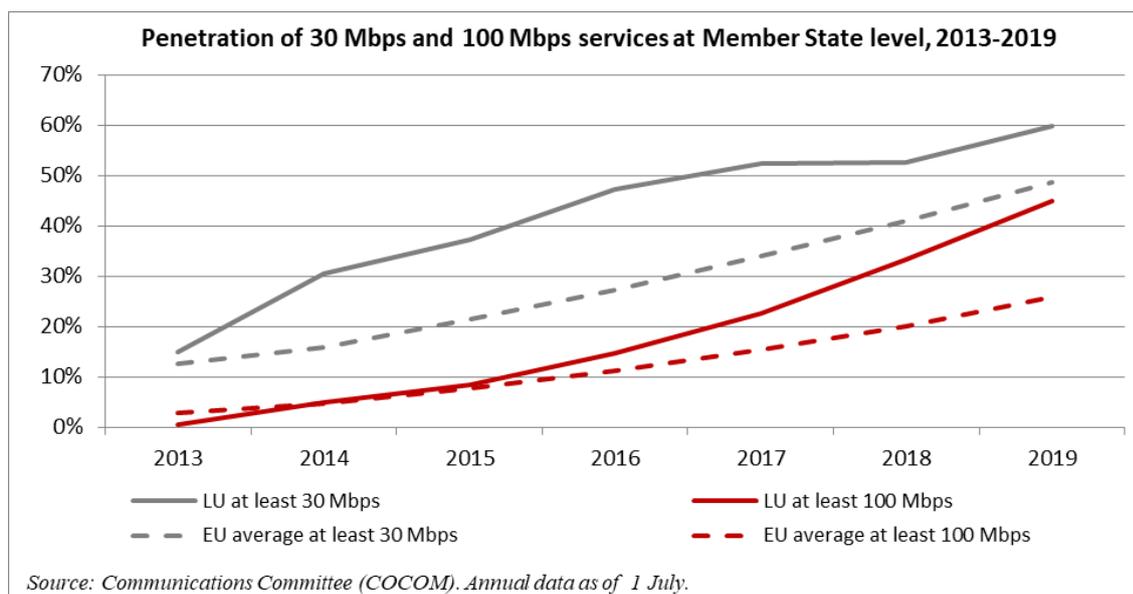
Rural FTTP coverage has improved significantly, standing at 62%. This is only slightly below total coverage of 68%. As coverage for both DSL and VDSL is declining and cable¹ only plays a minor role in take-up, rural fibre roll-out will play a crucial role in closing the small remaining rural-urban divide.

¹ According to the national regulatory authority, the 'Institut Luxembourgeois de Régulation' (ILR), figures for Docsis 3.0 in 2017 and 2018 cannot be compared with those for 2019 as the data basis for rural cable connections is very small.



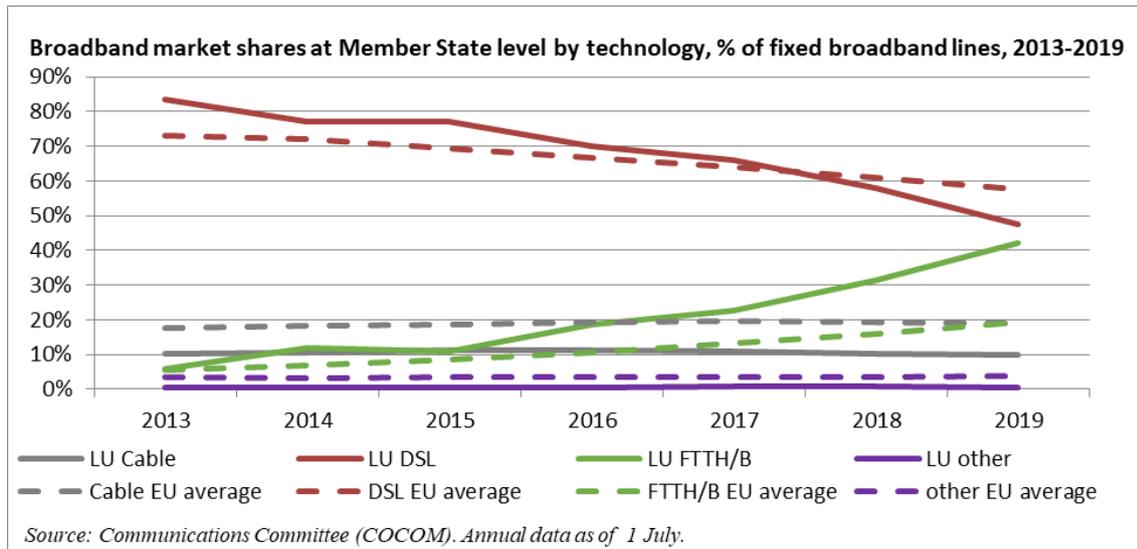
Source IHS and Point Topic, Broadband coverage in Europe studies

Total coverage of fixed very high capacity networks (VHCN) - including FTTP and DOCSIS 3.1 stands at 92%, higher than the EU average of 44%. Total next generation access (NGA) coverage (98%) also exceeds the EU average (86%). As VHCN figures for 2019 include DOCSIS 3.1 for the first time, they are not directly comparable to figures for previous years.

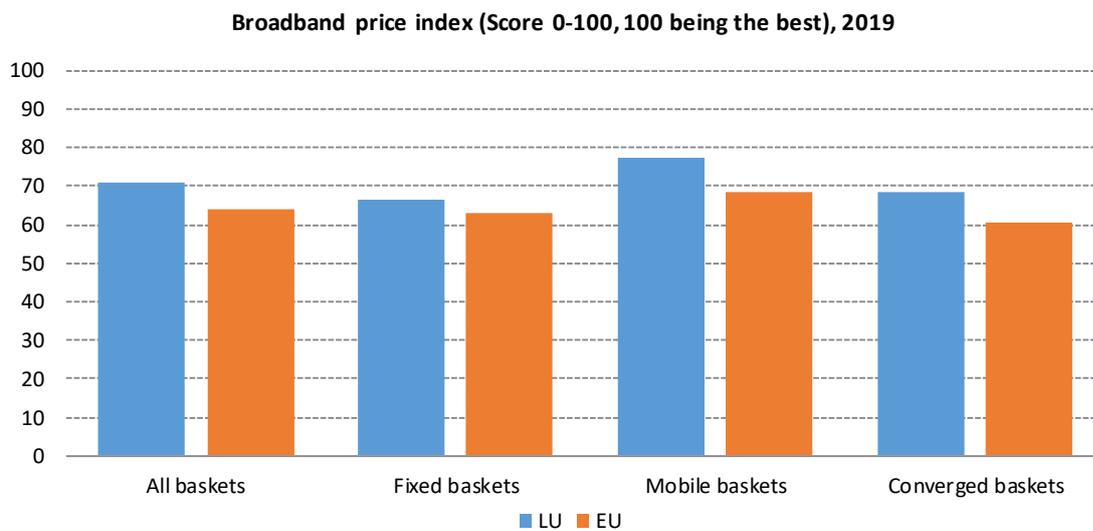


Source: Communications Committee (COCOM). Annual data as of 1 July.

Broadband take-up, both for capacities of at least 30 Mbps and for capacities of at least 100 Mbps continues to grow and is well above the EU average (60% compared to an EU average of 49% for at least 30 Mbps and 45% compared to an EU average of 26% for capacities of at least 100 Mbps). There were 122 subscriptions to mobile broadband services per 100 people, against an EU average of 100.



The shares of the different technologies in the broadband market show the continued trend of subscribers replacing DSL subscriptions with fibre while the market share of cable remains flat and relatively low, at 10% compared to that of DSL (48%) and fibre (42%). Despite widespread availability of cable, its market share is below the EU average. This is also the case for the DSL market share, while the market share of fibre to the home/building (FTTH/B) is more than double the EU average (42% compared to an EU average of 19%).



Source: European Commission services based on Empirica (Retail broadband price studies)

Price levels (taking account of purchasing power parity) for broadband access (both mobile and fixed) are slightly lower compared to the EU average. In particular, prices are lower for mobile baskets², as well as for fixed and converged baskets. Converged baskets include fixed and mobile calls, fixed and mobile data and TV.

² The index for mobile baskets aggregates 12 baskets combining packages of 0.5, 1, 2, 5 or 20 GB of data with no, 30, 100 or 300 calls. It is not related to average revenue per user (ARPU) figures.

1. Progress towards a Gigabit Society³

Luxembourg continues to be well on track to meeting the EU 2025 broadband targets. Its own revised and more ambitious targets of 1 Gbps downstream and 500 Mbps upstream for every household by 2020 would seem unrealistic and are being reconsidered by the Ministry. 5G is expected to play a significant role for households not connected to the fibre network.

Despite there being no public funding for broadband roll-out, the 100% state owned incumbent operator POST is the only significant contributor to fibre roll-out. At the same time, cable operators are investing in the upgrading of their networks to DOCSIS 3.1 technologies. Given the good FTTP coverage of households in Luxembourg, further roll-out targets households nationwide without fibre connections. POST is relying increasingly on opportunities for co-deployment with other infrastructure providers. It had only a slight decrease in the number of new connections in 2019 compared to those added in 2018, with a reduced investment budget in 2019. This opportunity-based rollout policy, driven by cost-cutting considerations, results in less predictability as to where exactly new fibre lines will be available and by when. At the same time, POST's GPON⁴ fibre infrastructure (28% of all fibre connections) is being upgraded to point to point with four fibres linking the sub-loops in the street cabinets with the main distribution frame. The migration concerns 1,200 street cabinets and is scheduled to be finalised over a 10-year period.

The upgrading of the radio access network's existing sites by mobile network operators and the setting up of new sites is challenging as various authorities at municipality level have to be consulted, environmental and town planning requirements have become stricter (e.g. negative visual impacts are a possible issue) and concerns about radiation emitted by electromagnetic fields are picking up in the general public. The various levels of permit granting are not only slowing down the roll-out of mobile radio access networks, but also of fibre, which is particularly important for mobile backhaul and FTTH roll-out.

2. Market developments

In the fixed telephony market, alternative operators increased their retail market share from 32% of subscribers in 2018 to 34% in 2019⁵. For fixed internet access it remains at 37%.

In the mobile market, POST has a retail market share of less than 50%, which had slightly decreased in 2019. The ARPU was €23.5 per month in 2019 (without M2M cards).

In roaming, there are both inbounders and outbounders among the operators in Luxembourg.

3. Regulatory developments

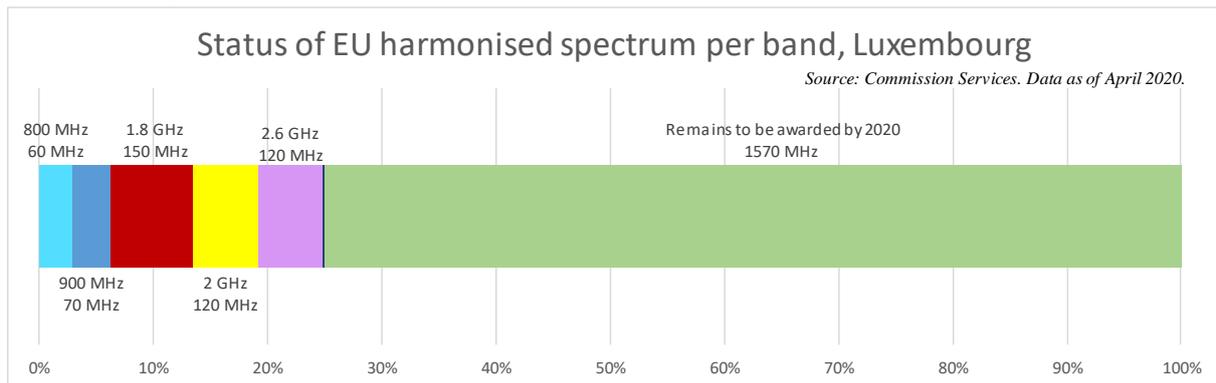
The Ministry finalised a first legislative draft for the transposition of the European Electronic Communications Code (EECC). National law does not require a public consultation. However, it is envisaged that main stakeholders would be consulted informally. Furthermore, it would be possible to contact the Ministry once the draft has been submitted to Parliament. Adoption is planned for the end of 2020.

³ It is noted that statements regarding planned or potential State aid measures record intentions declared by Member States and do not pre-judge or pre-empt the assessment of such measures by the Commission under the relevant state aid rules. The DESI report is not meant to provide any assessment of the compliance of such measures with state aid rules and procedures.

⁴ Gigabit passive optical network: it has a point-to-multipoint architecture where passive splitters in the fibre distribution network enable one single feeding fibre to serve multiple subscribers.

⁵ ILR figures for 2019 will become available by mid-2020.

3.1. Spectrum assignment



In Luxembourg, 25% of the total 2,090 MHz spectrum harmonised at EU level for wireless broadband has been assigned. Luxembourg scores 0 on the 5G readiness indicator⁶, as by the end of 2019, no spectrum in the 700 MHz, 3.6 GHz and 26 GHz bands was yet available for 5G use. However, assignments of the 700 MHz and 3.6 GHz wireless broadband bands are planned for mid-2020.

Following a first public consultation, which revealed that demand exceeded supply (six operators showing interest in the 700 MHz band, eight in the 3.6 GHz band), the ILR prepared the auction design and usage requirements on coverage (in the 700 MHz band) and on roll-out (in the 3.6 GHz band) and launched a second public consultation on 13 March 2020. In the 3.6 GHz band, 330 MHz will be made available.

In the guard band in the upper part of the 3.6 GHz band (3750-3800 MHz), some spectrum could be granted in a second step for local use. So far, interest in the 26 GHz spectrum seems to be limited. Luxembourg has to protect other primary services (those already deployed and those expected to be launched in the future), i.e. fixed service links, and the uplink for fixed satellite services. While Luxembourg has not completed its analyses on the exact amount of spectrum to be released, it seems realistic to allow 1 GHz to be used for mobile broadband by the end of 2020. The ILR plans to run a public consultation on the 26 GHz band during the second half of 2020 to assess the market demand for this band.

3.2. Regulated access

In 2019, the ILR reviewed the market for wholesale central and local access (markets 3a and 3b of the 2014 Decision on Relevant Markets). Given the lack of demand for regulated access to ducts and the implementation of the Cost Reduction Directive, the Commission did not object to the withdrawal of regulated access to ducts, but asked ILR to monitor the situation.

The ILR also fixed the methods for the supervision of the equivalence of inputs obligations imposed on POST as well as the methods for applying the economic replicability test (ERT). On this basis the ILR fixed the wholesale prices for copper local loop unbundling (LLU) and sub-loop unbundling. The European Commission expressed concerns that the proposed ERT assumes there would be an efficient operator with a market share of 15%, which no alternative operator was able to reach when the decision was issued.

⁶ The 5G spectrum readiness indicator is based on the amount of spectrum already assigned and available for 5G use by 2020 within the 5G pioneer bands in each EU Member State. For the 3.4-3.8 band, this means that only licences aligned with the technical conditions in the Annex to Commission Decision (EU) 2019/235 are considered 5G-ready. For the 26 GHz band, only assignments aligned with the technical conditions in the Annex to Commission Implementing Decision (EU) 2019/784 are taken into account. By contrast, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

The ILR plans to notify the draft decisions on the markets for fixed and mobile termination and for terminating segments of leased lines (markets 1, 2 and 4 of the 2014 Decision on relevant markets) to the European Commission in the second half of 2020.

The operators expect a significant cut in revenue once the European maximum rates for fixed and mobile termination are set⁷ by the European Commission.

There is increasing demand for fibre LLU from several operators.

Fibre virtual unbundled local access (VULA) is part of market 3a and is included in POST's reference offer and has been available as of 1 January 2020. Fibre VULA is only available if a fibre access cannot be unbundled due to a lack of sufficient fibre lines between the sub-loop and the main distribution frame or point of presence (in a point-to-multipoint infrastructure). Operators have to ask for an unbundled fibre line and have to change from fibre VULA to full fibre unbundling as soon as the missing fibre links become available, thanks to the roll out by POST. Copper VULA is also envisaged if the sub-loop cannot be unbundled. However, due to a lack of demand such an access product has yet to be specified. Bitstream access is still the most significant wholesale product (39,300 connections⁸), followed by fibre unbundling (17,100 connections, 14.8% more than in the previous year) and copper unbundling (7,700 connections, 13.5% less than in the previous year), while there is no regulation and almost no commercial wholesale access on cable TV networks.

4. End-user matters

a. Complaints

The number of mediations decreased by almost 20% compared to the previous year. By 21 November 2019, the ILR had received 89 requests for mediations. Some 38 cases could be resolved through mediation (43%). In addition, the ILR received 12 other written complaints from consumers. Main sources of consumer complaints in 2019 were pricing & billing (23 complaints), quality of service and installation (17), contract terms and termination (32), premium service numbers, including sms and voice calls (17), and roaming (9). Some 18 complaints concerned bundled services.

b. Open Internet

Zero rating offers were launched by Tango (Proximus) in October 2018. Services included social media, music and videos. POST has also a zero rating offer with streaming and social media content. The ILR assessed the new offer of Tango and monitors its development on a monthly basis. For this purpose, detailed technical and commercial data have to be provided by Tango to the ILR. Evaluating the measurement data from the publicly available broadband speed measurement tool (Checkmynet.lu), the ILR detected that Tango subscribers were limited in mobile broadband speed in roaming because of a technical misconfiguration. The operator rectified the configuration immediately.

⁷ Scheduled for the end of 2020.

⁸ ILR data as of end 2019

5. Conclusion

Luxembourg's authorities might consider improving the transparency and openness of the legal drafting process to ensure that all interested parties have an equal chance to be heard and to express their views. This would enable the broadening of the information on which decisions, particularly on the EECC transposition, will be taken. Luxembourg's authorities will need to make timely preparations to assign additional spectrum which can be used for 5G services to meet the EU target for 5G. Framing a strategy to streamline permit procedures and to facilitate access to public property to extend and densify mobile networks would further stimulate and accelerate the roll-out of both fixed and mobile infrastructure.