

Comments of Deutsche Telekom on the draft BEREC Common Position (BoR (18) 236)

Deutsche Telekom welcomes the opportunity to comment on the BEREC initiative on infrastructure sharing, which is part of the strategic priority number 3 of BEREC that address “*Enabling 5G and promoting innovation in network technologies*”. Therefore, it is crucial that this initiative takes into consideration the 5G specific developments and their impact on network sharing in order to be future proof.

Deutsche Telekom believes, that a swift and efficient 5G roll-out will be a key building block for a leading digital society. In the context of network sharing, to support this roll-out, there is need for technological and commercial flexibility in particular for 5G roll-out. Already the sharing of current technologies demonstrates the diversity of technological, commercial, organizational and geographical forms that sharing can take. This diversity will increase in the 5G ecosystem, where fixed, mobile and WiFi access technologies are growing together under one core network.

I. SCOPE OF THE REPORT

As a general remark, we are concerned with the unclear scope of the common position because BEREC suggests criteria for NRAs to assess mobile infrastructure sharing without differentiating between different contexts in which the common position would apply. The assessment of commercial agreements between operators on infrastructure sharing (usually carried out by National Competition Authorities, and in some cases by the National Regulatory Authority) should be subject to a different test than an imposition of infrastructure sharing obligations by a National Regulatory Authority.

The appraisal of a commercial agreement between operators should assess its effects on competition and other objectives such as efficient roll-out as well as benefits for end-users through enhanced coverage and/or better quality. On the other hand, the imposition of specific sharing obligation in an ex-ante context should, as regulatory intervention in a generally competitive market, be subject to a strict test, underpinned by criteria to assess the necessity to impose regulation and focus on a demonstrated market failure, which exceptionally does not allow for the achievement of the regulatory objectives.

II. 5G CONTEXT

In the BEREC Report published in June 2018 the importance of infrastructure sharing in the context of 5G deployment was rightly emphasized. Unfortunately the BEREC Common Position does not reflect this emphasis and neglects the positive impact of network sharing on future 5G roll-out.

Finding of the BEREC Report. In the earlier report BEREC draws attention to the significance of infrastructure sharing in the context of 5G deployment:

“There is a common view that infrastructure sharing is likely to be a key market aspect when 5G is introduced” (p.4)

“The future rollout of 5G is expected to ... result in an increase in the number of base stations relative to existing networks. Consequently, there might be a greater impetus for new (models of) infrastructure sharing arrangements and NRAs might need to reconsider their existing approach to infrastructure sharing.” (p.2)

“With regard to the future trend in infrastructure sharing, most NRAs expect there to be pressure for more sharing arrangements due to greater network densification driven by 5G, which will in turn place a greater emphasis on cost management.” (p.3)

“This network densification may create a greater incentive for infrastructure sharing. As such, NRAs might have to consider and/or revise their general approach to arrangements made by operators for infrastructure sharing (p.5, 21-22).

It stems from this report that many NRAs consider that, in the context of 5G, “sharing will be required in order to lower cost (Belgium, Czech Republic, Hungary), to increase coverage (Czech Republic) or to increase capacity (Belgium)”. The vast majority of NRAs “see an increase or an increased need of passive sharing (Bulgaria, Cyprus, Poland, Sweden, UK), active sharing (Bulgaria, Croatia, Poland, Turkey, UK), spectrum sharing (Belgium, Croatia), active indoor sharing (Finland, Malta, Slovenia), fronthaul (Malta), backhaul (Malta, Sweden, UK, Switzerland), dark fiber (Poland), ducts (Poland) and sharing through user authentication (UK). New types of sharing are also expected, including specific providers of connectivity cooperating with MNOs (Austria, Spain), municipalities or public services participating in sharing (Germany) or even verticals (Austria) may be involved in sharing”. Deutsche Telekom concurs with these findings that in the 5G era more network sharing will be necessary on a commercial basis to unlock the full opportunities of 5G.

The failure to address 5G appropriately in the draft Common Position. Surprisingly, the above statements and the importance of infrastructure sharing the 5G context are not elicited in the draft Common Position which merely contains two statements in relation to 5G.

The first relates to the fact that network virtualization in 5G that would allow for more network sharing:

“Furthermore, with transition to 5G, mobile networks would become more granular and virtualized so that operators are able to share complementary (hardware or software) components to build common network slices tailored to specific services.”(p.13)

As discussed below in section A, network virtualization is only one of the reasons why more network sharing opportunities would be necessary in a 5G environment.

The second refers to the fact that network sharing would be more “critical” for 4G and 5G.

“The more a sharing agreement involves competitive technologies (4G, 5G...) that still require substantial investment, the more this sharing is critical”. (p.16)

As discussed below, this statement could be misinterpreted because (i) infrastructure sharing will be a prerequisite for 5G roll-out and thus enables 5G competition (see below).

Moreover to account for the characteristics of 5G, Deutsche Telekom believes that the Common Position should place greater emphasis on the facts that:

First, the development of 5G will increase costs (e.g., network densification), whilst revenues will remain under pressure (from, e.g., OTTs, regulatory constraints and environmental/public health policies), thereby increasing the need for network sharing;

Second, the technical evolution from 2G towards 4G and 5G is shifting the parameters of competition more and more outside of the RAN network, such that the effect of RAN sharing on competition becomes less important;

Ultimately, network sharing will be one of the key elements that will enable a fast and efficient 5G roll-out.

Impact of 5G on assessment of active network sharing

With the technological evolution towards 5G and fully IP based networks the remaining parameters of competition are shifting increasingly outside the access network. These parameters are not affected by active network sharing.

Technical evolution includes the development of:

- **Convergent networks** 5G is to provide true convergence of networks (fixed (WiFi), mobile, satellite) This means that access technologies are used interchangeably, converging from complements to substitutes. The provision of mobile services based on different technologies is also referred to as “HetNets” (Heterogenous Networks). As technology evolves, coverage for services will not be defined within the scope of just one network technology (e.g., only mobile). Service competition by way of coverage must take all potentially accessible networks into account. Thus, network sharing that is limited to a single network technology (e.g., mobile) is not so relevant to a competition assessment Furthermore, with convergence network functionalities, additional market players are emerging. Such new players offer mobile services over own-access technologies, regardless of the technology, (e.g. WiFi, satellite), or third party access networks (e.g. public hotspots).
- **Virtualization towards 5G and IP based networks:** With the evolution towards 5G, networks will increasingly rely on emerging technologies such as Self-Organising Networks (“SON”), Network Function Virtualisation (“NFV”) and Software Defined Networking (“SDN”). Such technologies decouple the hardware (“HW”) from the Software (“SW”). This enables the running of the SW entities required for a mobile network by way of COTS HW typically deployed in data centers. The move towards the decoupling of SW and HW will enable and foster new network sharing methods. Today’s network sharing configurations (with or without spectrum) consist of sharing mobile network specific HW and SW and allow for operator-independent SW configurations and parameterization. In the future, a shared network could consist of sharing a commercial off-the-shelf HW (*e.g.*, data center), while running operator-specific SW in an NFV environment in order to further increase operator independence. From a cost perspective, traditional and innovative network sharing setups are similar, but operator independence in the NFV environment is even higher, as each operator can use independent SW. Furthermore, NFV even allows each operator to independently decide on capacity by allocating additional off-the-shelf hardware resources. In conclusion, the potential for network sharing will be pushed even further, as technology will automatically set for the independence between the sharing partners. In a fully virtualized and cloudified network, an operator will order required processing capability from any potential company (MNO or others) and apply operator-specific SW and configuration to the allocated HW resources. In such an environment, it is not even necessary to exchange information such as traffic forecasts. With the evolution towards 5G, there will be increasing virtualization of networks, as they become software-defined and all-IP networks.
- **Services becoming access network agnostics:** The current trend in the evolution of service platforms relies increasingly less on RAN. Indeed, RAN adaptations were originally required to transmit circuit switched data (CSD) with GSM standards on 2G networks. However, since the move to OTT services with UMTS standards on 3G networks, and to IP-based services with LTE standards on 4G networks, RAN has mainly been used to provide mobile internet

connectivity. RAN only executes support functionality allowing users to access the desired services. It is the core network that actually differentiates services (e.g. voice, data, throughput, billing, etc.). With 5G we will see a full virtualization and services being agnostic to the access network. Other competitive parameters for operators are all dependent on network layers and functionality other than the local access network, which makes RAN sharing much more similar to the sharing of passive equipment.

Network slicing and dynamic networks. In the evolution towards 5G, networks are becoming more modular. 5G is the basis for so-called network slices, which can serve a wide range of use cases.

Separation of access technology from the network design / network slice also enables the network to become more dynamic and flexible, and thereby capable of serving different purposes at different points in time.

Network slicing, furthermore, is not only an option to provide different network quality parameters to the customer. It also provides the option to allocate dedicated network resources to a group of customers or shared operators. With this in mind, network slicing is an option to provide operator-specific connectivity in terms of coverage and capacity, and network slicing is an additional technical solution for future network sharing setups.

Increasing costs and pressure on revenues, as well as environmental/public health goals, trigger the need for network sharing

The dramatically increased traffic carried over mobile networks and the technology evolution towards 5G increases costs and technological requirements while revenues of operators are already under extreme pressure from the so-called over-the-top operators (“OTT”) and other new competitors, as well as regulatory constraints. This combination of factors increases the need for cost cutting technologies like 5G together with network sharing.

Increased costs/technological requirements. The evolution towards 5G increases costs, including in relation to:

Technology enablers: The nature of the 5G technology enablers will dramatically increase network costs e.g., as regards (i) higher frequency bands, that would require building additional sites triggering additional infrastructure investments, as well as additional rental and power consumption costs; (ii) low latency and guaranteed services require a new network topology that would include deploying a higher number of mobile edge data centers across a country to limit the transmission delay between customer and service provider; and (iii) millimeter waves would need to be acquired and deployed e.g. for fixed wireless access (FWA).

Spectrum scarcity: in view of the high demand for capacity and the ability to effectively support the new antenna technologies(e.g. 3D MIMO and beamforming), 5G is most efficient with higher bandwidth allocations (100MHz expected to become mainstream) as compared to LTE. Yet, 100MHz continuous spectrum might not be available in the currently preferred frequency bands of 3.4 to 3.8 GHz for each operator in a country, as some parts of these bands are already licensed or reserved for local deployments. In order to efficiently use the remaining spectrum, spectrum sharing might be the only solution.

Densification of network. As 5G is largely aimed at enhancing capacity and given that spectrum is a scarce resource for capacity expansion, more cell sites will be needed, in particular for indoor coverage.¹ This was recognized by most NRAs in the BEREC Report.

Requirements to support new use cases: 5G is seen as a technology enabler for various new cases such as automotive, massive IOT, low latency or critical communications. Requirements from such use cases are different compared to traditional residual business, such as coverage in low/no populated area, mobile edge data centers, network slicing. To enable deployments fulfilling the new requirements for new use cases network sharing is a necessary option.

Regulatory obligations. Coverage obligations, including imposing priority deployment areas. (typically as part of license conditions) increase network operators' costs. To fulfill regulatory expectations in terms of 5G deployment, regulation must be more favorable to network sharing and cooperation models in order to give mobile operators the freedom to fight costs and to keep customer price trends stable.

Environment and public health concerns. The evolution towards 5G also triggers additional costs due to (i) increasingly complex sites acquisitions (due to sites densification, in particular in historic city neighborhoods), (ii) regulatory exposure limits imposed for higher radiated power (which could limit the deployment of 5G on some sites if spectrum sharing is not possible), and (iii) energy consumption (as energy efficiency improvements can be achieved by network sharing).

Pressure on revenues. While faced with high investments requirements, mobile network operators face constant revenue pressure from

OTTs: With 4G and 5G, the ongoing substitution between OTT and MNOs for services such as voice and messaging is becoming entirely symmetric, given that traditional telecoms services are becoming IP-based, just like OTT services. By taking away certain revenue potential from the network operators, OTTs impose high cost pressure on network operators to maintain profitability.

New connectivity providers: Outside the traditional mobile markets, different players are entering the connectivity market. For example, OTTs seek to provide mobile access over alternative wireless solution or WiFi hotspots, such as Facebook Aries or Google Fi. Google Fi, for example, switches seamlessly between its WiFi hotspots and the cellular networks. Additional players entering the connectivity market by providing alternative infrastructure include verticals and utilities.

Regulation: Besides increasing costs, regulation also restricts revenue opportunities for European operators. Indeed, the telecommunications sector is perhaps the sector where price regulation has been the most extensive of all with (i) the Roaming Regulation, (ii) MTR regulations, and (iii) Net neutrality obligations which prevent some forms of tariff differentiation.

¹ See e.g., HSBC, EEMEA telecoms, 5G: Threats or Opportunities, March 2017, page 32, available at http://pg.jrj.com.cn/acc/Res/CN_RES/INDUS/2017/3/16/e5d3de59-42e7-4a9f-a981-03417d27410b.pdf. GSMA, The 5G era: Age of boundless connectivity and intelligent automation, page 30, available at <https://www.gsmainelligence.com/research/2017/02/the-5g-era-age-of-boundless-connectivity-and-intelligent-automation/614/>.

The combination of increased costs, with pressure on revenues, highlights the need for network sharing. Indeed, network sharing allows operators to reduce costs while meeting regulatory and environmental/public health goals. In fact, the BEREC Report shows that all regulators have already recognized the need for expanded network sharing triggered by technological evolutions.

III. Legal Framework

Regarding the description of powers of NRAs under the EU legal framework referred to in paragraph 2.1.2. (i), it is important to note that whereas the EECC provides NRAs with the power to impose national and regional roaming obligations in the context of license conditions, such powers are not foreseen by the current Authorization Directive. NRAs may attach conditions on coverage and/or quality as foreseen in Annex B of the Authorization Directive, whereas access obligations such as national roaming under the current legal framework can be imposed following the process of Art. 16 Framework Directive and Art. 8 ff. Access Directive. The Radio Spectrum Policy Program quoted by BEREC did not materially change the EU Directives in this regard (s. Art. 1 (2) of Decision 243/2012/EU). Hence, it would be important that the final version of the Common Positions take this element into account.

IV. Regulatory objectives

Beyond that, the draft Common Position fails to duly acknowledge the overall regulatory objective to foster economically efficient investments and take-up of high-capacity networks, as well as to promote the sharing of spectrum and equipment, which are foreseen by the EU framework.

Article 8.5(d)1 of the Framework Directive provides that national regulatory authorities (NRAs) shall promote

“efficient investment and innovation in new and enhanced infrastructures, including by ensuring that any access obligation takes appropriate account of the risk-incurred by the investing undertakings and by permitting various cooperative arrangements between investors and parties seeking access to diversify the risk of investment, whilst ensuring that competition in the market and the principle of non-discrimination are preserved”.

Recital 23 of the Framework Directive states that *“Facility sharing [...] should be encouraged by national regulatory authorities on the basis of voluntary agreements”*. Recital 43 of Directive 2009/140/EC (“Better Regulation Directive”) states the following:

“[i]mproving facility sharing can significantly improve competition and lower the overall financial and environmental cost of deploying electronic communications infrastructure for undertakings, particularly of new access networks. National regulatory authorities should be empowered to require that the holders of the rights to install facilities on, over or under public or private property share such facilities or property (including physical co-location) in order to encourage efficient investment in infrastructure and the promotion of innovation.”

The European Electronic Communications Code (“Code”) has maintained the objective of fostering (economically efficient) investments and has further increased the support for infrastructure sharing, as per the below selection of recitals:

“(26) Both efficient investment and competition should be encouraged in tandem, in order to increase economic growth, innovation and consumer choice.”

(27) Competition can best be fostered through an economically efficient level of investment in new and existing infrastructure, complemented by regulation, where necessary, to achieve effective competition in retail services. An efficient level of infrastructure-based competition is the extent of infrastructure duplication at which investors can reasonably be expected to make a fair return based on reasonable expectations about the evolution of market shares.

(28) It is necessary to give appropriate incentives for investment in new very high capacity networks that support innovation in content-rich internet services and strengthen the international competitiveness of the Union. Such networks have enormous potential to deliver benefits to consumers and businesses across the Union. It is therefore vital to promote sustainable investment in the development of those new networks, while safeguarding competition, as bottlenecks and barriers to entry remain at the infrastructure level, and boosting consumer choice through regulatory predictability and consistency.”

(124) Network infrastructure sharing, and in some instances spectrum sharing, can allow for a more efficient and effective use of radio spectrum and ensure the rapid deployment of networks, especially in less densely populated areas.

The limited reference to fostering investments in the draft Common Position is even more surprising that the BEREC Report had highlighted that the purpose for NRAs when assessing network sharing was precisely to “*strike a reasonable balance between incentivizing investments and promoting competition*”.

V. Conclusion

In general, network sharing arrangements enable the operators a cost and technology efficient roll out of networks, free resources for investment in innovations and to bring benefits to consumers, such as enhanced coverage, better quality. The BEREC Common Position underestimates these positive effects, in particular with regard to 5G. In order to be able to ensure an efficient 5G roll-out, a larger extent network sharing will be required.

Therefore BEREC should be cautious not to set out restrictive recommendations that may create uncertainty or generate chilling effects on future innovation, thereby slowing down the introduction of 5G and the achievement of EU connectivity goals. The BEREC Common Position should rather set the right framework for efficient investments that avoid redundant infrastructure and result in consumer, environmental and public health benefits.