**Planning and Future Trends BEREC Working Group’s call for input on potential regulatory aspects of 5G, which could merit from further investigation by BEREC**

The Commission, BEREC and other stakeholders consider 5G as an enabler of improvements in three generic classes of services, namely: enhanced Mobile Broadband, Massive Machine Type Communications, and Ultra-reliable and Low Latency Communications.

The below table sets out a draft list of some items which could be studied further in order to assist BEREC to enable 5G. The high level table also sets out an example of why 5G could impact the proposed item(s), thus indicating why it might be useful to conduct further study. Please also refer to the cover letter for details how to respond to PFT’s early call for input.

This is an early call for input from stakeholders. Nothing in this document represents BEREC’s views, which have yet to be determined. The content of this document does not reflect the official opinion of BEREC nor of any NRA.

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| **Enhanced Mobile Broadband (focus: End-user perspective)** |
|  | **Draft list (some items identified)** | **An example of why 5G could impact this? (please note we would intend to consider ‘how’ 5G might impact in more detail in due course)**  | **Possible enquiry area (please provide views)**  | **What information may be available to us?**  |
| 1 | Privacy | Gigabit speeds and other enhanced capabilities may increase users ability to generate or disseminate private information and to generate more private information on the web  | Do you think BEREC EWG should examine end-users understanding of the impact of their internet usage and sharing their private information in terms of the data economy?Do you think BEREC EWG should conduct an analysis of a common policy for data portability in the context of GDPR and data economy reports. | GDPR legislationData economy reports etc.  |
| 2 | Security | Gigabit speeds may enable more ‘work and play in the cloud’ (ref ITU-R M.2083-0), which could increase security issues for end-users | Do you think BEREC EWG should conduct a study to map the stakeholders involved in different aspects of security and identify if end users are appropriately informed of security issues? | Operator Network resilience reportsENISA reports and recommendations  |
| 3 | Competition at retail level (i) Operators | Gigabit speeds may have influence on end-user choices in terms of service provider (MNO, MVNO, WISP, other micro operators (e.g. using a network slice) and / or Fixed operators | Do you think BEREC EWG should assess the impact of convergence in terms of ability of end users to switch service providers | Reports by NRAsOther analyst studies |
| 4 | Competition at the retail level (ii) Services | Gigabit speeds may have influence on end-user choices in terms of services | Do you think BEREC EWG should assess if there are barriers to new services reaching end users  | As above |
| 5 | Quality of Service  | Gigabit speeds may enable the introduction of new retail services, e.g. UHD video streams or 3D video systems, so Quality of Service (QoS) information may need to be clear and available to end users  | Do you think BEREC EWG should assess further how to improve information on coverage and QoS of 5G networks so that users can make informed choices | NRA coverage maps, Reports by NRAs  |
| 6 | Consumer information(i) Coverage maps | Gigabit speeds and certain quality parameters may not be available in all locations and at all times in a network, which rises the issue of transparent information about service availability | Do you think BEREC EWG should examine further how NRAs can assist consumers receive the information on 5G networks coverage, building upon the work already done by BEREC on this area,  | NRA coverage maps, Information from BEUC, consumer agenciesOther BEREC Working Groups (e.g. End User) |
| 7 | Consumer information(ii) Labelling | The introduction of 5G enables operators to differentiate products and services in much more complex ways, which makes clear the importance of information for end-users to make informed choices, or to switch between operators | Do you think BEREC EWG should examine further how best to present speeds, latency or other characteristics to consumers to prevent mis-labelling of products and services. | As above |
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| […] | [please add to draft list] | [please briefly define why 5G could impact this item]  | [please set out a possible line of enquiry]  | [please provide any relevant information] |
| **Massive Machine Type Communications and Ultra-reliable & Low latency communications (Focus: Verticals perspective)** |
|  | **Draft list (some items identified)** | **An example of why 5G could impact this? (please note we would intend to consider ‘how’ 5G might impact in more detail in due course)**  | **Possible enquiry area (please provide views)**  | **What information may be available to us?**  |
| 1 | Privacy  | Smart city use cases increase (harvesting data from different uses). Data processing actors in the 5G value chain develop but may not have a direct relationship with end users and therefore cannot request data processing consents directly.  | Do you think BEREC EWG should analyse the consequences of the e-privacy regulation for data exchange between parties in the vertical’s value chain in 5G. |  |
| 2 | New business models / intermediary operators (i) Bottlenecks, dominance and monopolies | Some key critical applications (e.g. e-health, and associated data) grow. Value added comes from network effects (e.g. more user data) resulting in dominant players who may have incentives to frustrate access / sharing of their data.  | Do you think BEREC EWG should assess how data economy, in terms of some key critical applications, may develop and possible measures to prevent bottlenecks, dominance and monopolies arising |  |
| 3 | New business models / intermediary operators (ii) Enabling new models  | Industry automation use case increase needs for access to radio spectrum by new micro-operators (plant wide operators), thus creating new business models.  | Do you think BEREC EWG should work further on studying the barriers to and benefits of enabling new business models (e.g. in terms of what new models may arise from 5G)  | Reports by NRAsOther analyst reports  |
| 4 | New business models / intermediary operators (iii) Network slices  | Industry automation and other use cases (health, gaming…) with specific URLL and bandwidth constraints) may increase demands for services with a specific QoS. Network slicing is a concept for providing well-defined QoS to address customer-specific requirements of verticals (and others). | Do you think BEREC EWG should examine Member States experiences with respect to issues around systems deployed using network slices, verticals demand and how mobile operators respond to it. | NRA coverage mapsReports by NRAsOther analyst reports  |
| 5 | Quality of Service (cross border issues / transnational services) | Self driving car (or new forms of track and trace services) use cases develop and require coherent and consistent application of regulation across borders.  | Do you think BEREC EWG should analyse application of relevant regulations for pan-EU operators (e.g. operating services flowing across borders) and cross-border interoperability  |  |
| 6 | Numbering (i) IoT/M2M related Numbering (E.164) | Massive Machine Type Communications increase. As a result demand for numbers for M2M communication increases (given the expected increase of number of connected devices). | Do you think BEREC EWG should examine implications on M2M of sufficient numbers being made available (e.g. providing clear definitions of the different numbering categories, which may be available to users) | CEPT Reports []BEREC Work Item 2019 |
| 7 | Numbering(ii) Mobile Network Codes (E.212) | Verticals and intermediary operators may want to provide own SIM cards, leading to increased demand for MNCs. Regulation should ensure that sufficient national MNCs are available. (context: for IoT/M2M applications when E.212 MNCs are used, and when there is a need for extra-territorial use, also global MNCs under MCC 90x could be applied)  | Engage CEPT. Do you think BEREC EWG should assess the necessity of assessing the possibility to increase the number of network codes available, as well as the possible role of eSIMS | CEPT and ITU-T SG2 as responsible for the E.212 IUT-T Recommendation.BEREC Work Item 2019 |
| 8 | Security | Smart city, industry automation, and some key critical applications (e.g. e-health) may develop use cases and have very different security requirements:* + Verticals’ security requirements
	+ End Users‘ security requirements
	+ Providers’ security requirements
	+ Other players’ security requirements (data aggregators, software vendors, …)
	+ Governmental security requirements
 | Do you think BEREC EWG should analyse how security issues may affect 5G value chains. | Reports by other competent authoritiesENISA reports |
| 9 | Interoperability(i) Different players / vendor lock in | Industry automation services develop, and which require defined Quality of Service. Lack of transparency around QoS could result in vendor lock in (e.g. can verticals switch to new service providers whether WISPs, MNOs, MVNOs, micro-operators or fixed providers) | Do you think BEREC EWG should consider potential interoperability issues in 5G having regard to convergence between fixed and wireless providers including new micro-operators (e.g. plant wide wireless providers). |  |
| 10 | Interoperability(ii) Societal perspectives from various use cases | Self driving cars from different manufactures need to communicate with each other for reasons of traffic safety. (Another example: Smart home/building use cases increase and data harvesting needs to be shared to improve energy efficiency)  | Do you think BEREC EWG should examine how traffic safety information from vehicles of different manufactures could be appropriately aggregated and made interoperable for the benefit of users and the system to work. |  |
| […] | [please add to draft list] | [please briefly define why 5G could impact this item]  | [please set out a possible line of enquiry]  | [please provide any relevant information] |

The Working Group considers that the above issues would also depend on the “Rollout” dimension. The table below sets out a draft list of items specifically related to rollout.

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|  | **Draft list (some items identified)** | **An example of why 5G could impact this? (please note we would intend to consider ‘how’ 5G might impact in more detail in due course)**  | **Possible enquiry area (please provide views)**  | **What information may be available to us?**  |
| 1 | Roaming agreements | Roaming describes the various aspects of an agreement allowing access to another operator’s mobile network (or parts of). In the context of 5G it is expected that new services will become available requiring a high level of coverage and/or QoS which probably will not be possible to be served by a single network or operator alone.Therefore, several types of roaming may have increasing relevance in the 5G era: (1) Legacy international roaming; (2) Legacy national roaming; (3) 5G specific roaming, e.g. roaming between MNOs and verticals, or between networks slices.  | Do you think BEREC EWG should study this item?In a first step, BEREC EWG could analyse the various types of roaming and their expected impact on rollout and take-up of 5G.In a second step, BEREC EWG could evaluate the current roaming regulations with a view on 5G and analyse possible new 5G-specific roaming scenarios, e.g. verticals’ roaming or inter-slice roaming.BEREC EWG could consider to what extent different kinds of roaming agreements would be in line with competition requirements. | BEREC Common Position on Mobile Infrastructure Sharing |
| 2 | Planning | The 5G technology development implies an increasing deployment of network resources and infrastructure. Planning refers to all the private and public initiatives that foster access to infrastructure deployment facilities, in order to obtain an efficient and agile 5G network roll-out which extends the benefits of better and more innovative service to a larger population, under challenging business conditions for 5G deployment in terms of investment and uncertainty of revenues. 5G deployment will impact stakeholders and regulatory bodies strategies related with:* Access to spectrum (exclusive or shared licensed conditions, wholesale access)
* National/regional coverage obligations or/and wholesale obligations
* Upgrade of existing 2G/3G/4G sites to 5G
* Deployment of new sites (small cells)
* Access to public infrastructure facilities in urban areas for small cells deployment
* Network sharing by access to passive (masts, towers, buildings, ducts, dark fibre…) and active infrastructure (antennae, network equipment, backhaul links …), including the possibility of sharing the network resources through virtualisation (SDN/NFV) and network slicing.
* EMF/EMC potentially causes high public interest especially with regard to network densification and small cells. EMF/EMC issues have the potential of leading to longer rollout procedures, higher transaction costs and sub-optimal network design.
* Regarding small cell deployment, article 57 of the Code, tasks the European Commission, by means of implementing acts, to specify the physical and technical characteristics, such as the maximum size, weight and, where appropriate, emission power of Small Area Wireless Access points, that will be exempted from any individual town planning permit or other prior individual permits, except for environmental or historical reasons or public safety
 | Do you think BEREC EWG should study this item?BEREC EWG could identify Member States practices in relation to:* promoting 5G, availability of roadmaps of spectrum availability and licensing conditions
* providing testbed/pilot environments to stakeholders (MNOs, verticals, R&D entities, public administrations…) to analyse 5G use cases, technology and identify potential roll-out barriers or constraints.
* Enabling access conditions to public or private property with the objective of deploying 5G network.
* Enabling easy permission rules and access to the urban facilities including permit-free regime for small cells deployment (street lamps, traffic lights, billboards, etc).
* Allowing access to the backhaul infrastructure of other utility sectors (gas and electricity) and public companies.
* Monitoring tools to offer stakeholders an improved access to information about public infrastructure facilities, planned civil works and available infrastructure and permission requirements.
* Follow the 5G use case, pilot experiences and standardisation activities, especially regarding SDN/NFV and network slicing, in order to anticipate and properly plan the required regulatory safeguards.
* BEREC EWG could assess to what extent issues around EMF/EMC could impact on the rollout of 5G and identify who might be the appropriate bodies to remove barriers to 5G rollout. In many cases, NRAs are not directly responsible for EMF/EMC issues
* Contingent on the completion of the Commission’s implementing act on small cells, BEREC EWG could study best practices in Member States with regard to facilitating the light deployment regime for small cells.
 | EC implementing act for small cells deployment (article 57 of EECC).Local and regional public institutions’ information.3GPP and ETSI ongoing activity on SDN/NFV and network slicing. |
| 5 | State aid/coverage obligations | Extension of broadband coverage to rural areas is one of the main objectives of national state aid rules and spectrum licensing conditions, because of the limited rural backhaul infrastructures. In the context of 5G, there are some potential use cases more oriented to rural coverage, such as mMTC for agricultural applications or remote healthcare in rural environments. The requirements associated to these 5G use cases could, in some EU countries, affect existing state aid plans for broadband extension, jointly with spectrum coverage obligations, in order to enhance the deployment of fibre based backhaul in rural areas in a cost-effective manner, avoiding a digital divide.  | Do you think BEREC EWG should study this item?To address the challenge of extending 5G coverage to rural areas, BEREC EWG could study:* Member States practices in relation to mandatory coverage conditions in rural areas (with the required QoS) in the spectrum licensing procedures.
* Member States practices in relation to broadband state aid and 5G plans.
* Other practices adopted at a local/regional level aimed at rolling out 5G in rural areas
 | EC state aid rules |
| 6 | Security | The application of EC recommendation of 26.03.2019 on Cybersecurity of 5G networks Recommendation at national level on 5G network will impact all the stakeholders and equipment providers. Regulatory bodies could include conditions for ensuring the security of public networks, especially when granting rights of use for radio frequencies in 5G bands.  | Do you think BEREC EWG should study this item? BEREC EWG could evaluate the measures taken by MS after the EC has published the 5G security tool box (expected end of 2019) as mentioned in the Commission Recommendation of 26 March 2019 on Cybersecurity of 5G networks. The national and union-wide risk assessments undertaken in the course of 2019 could be taken account of. | EC regulation related to Cybersecurity. European Agency for Cybersecurity (ENISA) |
| 7 | Infrastructure sharing | See also BEREC Common Position on Mobile infrastructure sharing (BoR (19) 110). BEREC notes that there are a number of relevant publications on infrastructure sharing and information on this topic published (including by RSPG and Competition Authorities). | BEREC EWG could support ongoing exchange of information in relation to sharing arrangements implemented in Member States  |  |
| 8 | Backhaul | In the context of 5G, backhaul describes the high-speed connection from 5G base stations to the core network. With the ever-increasing demand for bandwidth, backhaul will be mainly realised using fibre, with legacy radio links and 5G radio backhauling (using 5G spectrum) a further option.Broadcasters may require interworking/access and backhaul to meet their needs | BEREC EWG could study Member States practices in relation to ensuring that there are no barriers to backhauling in 5G (or a similar study)  |  |
| 9 | Convergence  | In the context of 5G, convergence could become an issue with advances in Release 14[[1]](#footnote-1) principally allowing improved support for national TV services to both mobile devices and stationary TV sets over eMBMS (enhanced multimedia broadcast and multicast system over LTE) and unicast. Beyond that, broadcasters are demanding access to 5G under a must carry rule to deliver broadcast signals. | Concerning convergence and the request for must carry rules via 5G, BEREC EWG should closely follow the development of both the telecoms and the media sector. As 5G could become the mobile multi-purpose technology of the next ten years it is of interest to attract as many users as possible to 5G. On the other hand, obligations like must carry rules have a strong impact on the market and need strict examination prior to any regulatory action. |  |

1. From <https://www.3gpp.org/news-events/1905-embms_r14>, 15.04.2019. [↑](#footnote-ref-1)