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Connectivity
Radio Spectrum Policy Group
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RADIO SPECTRUM POLICY GROUP

QUESTIONNAIRE on Mobile technology evolution, experiences and strategies

QUESTIONNAIRE on the development of 6G and possible implications for spectrum needs

Part I. Mobile technology evolution – experiences and strategies

Rationale

Over the course of the next 5-10 years, many of the core bands and licenses are up for rewards or reallocation in many member states. This comes in conjunction with the phasing out of both 2G and 3G technologies. There are some questions in relation with the implication of the technology neutrality principle, also in the context of the GSM Directive. Sharing experiences, lessons learned and strategies on an RSPG level will be a valuable tool for enabling and preparing for this mobile technology evolution.

Scope of RSPG activity

In the June 2021 RSPG Opinion on a Radio Spectrum Policy Programme this topic was introduced with the following wording:

"6.1. Migrating regulatory service obligations to the latest technologies

The RSPG recommends

- the European Commission, when deviating from the principle of technology neutrality, to promote a particular wireless technology supporting services responding to EU public policies (i.e. e-call), to analyse the possible impact and respond to arising challenges. Such an analysis has to take note of the different stages of development of wireless technologies in Member States including the reasoning behind, like their support of national policies (i.e. 4G coverage, 5G coverage).

- European Commission and Member States should anticipate any impact of possible future phasing out of some legacy systems (2G, 3G, and 4G) in the next decade."

This work item would be a relevant initiative for carrying the issue forward, with a focus on the latter bullet.

QUESTIONNAIRE on Mobile technology evolution, experiences and strategies

You are encouraged to consult operators for latest information about their plans

MIGRATION PLANS (phasing out of legacy technologies)

- What is the status of migration to newer technology generations in your country? Please specify technology and spectrum bands.

  - 2G
  - 3G
  - 4G

- What plans (including known plans by operators) are there in your country towards migration to newer technology generations? Please include schedule, technologies, spectrum bands.

  - 2G
  - 3G
  - 4G

- Can you observe differences between migration plans related to different generations (2G, 3G and 4G) and frequency bands and, if so, what are the reasons that explain those differences?

- Please provide information regarding migration plans for the core network. (e.g. Are there any implementations or plans for 5G standalone deployments? Are there any plans for switching off / phasing out 2G / 3G / 4G core networks?)

PROBLEMS AND SOLUTIONS IDENTIFIED

- What legacy use of 2G/3G technologies that might cause obstacles to migration to newer technologies have been identified in your country? e.g. eCall, electricity meters, wireless payment systems, home security alarms, 2G/3G terminals users, obligations linked to voice services, RAN-sharing agreements involving 2G/3G etc.?

- Can you specify the magnitude of the challenges, e.g. the number of subscriptions, length of M2M contracts, number of RAN-sharing agreements involving 2G/3G, extinction/migration costs?

- Have you identified or are you looking for technical solutions to overcome obstacles caused by applications using legacy technologies? Please specify, e.g. migration to newer technology or use of dedicated narrowband spectrum for legacy systems?

- What are the incentives/criteria triggering voluntary initiatives from mobile operators and other licensees?

- Have you planned incentives for MNOs to support phasing out for the end-user/firms, e.g., new terminals for users from operators, sufficiently advanced notification? How do you address technological neutrality in that context?

  - 2G

- 3G

- 4G

- Is there a need for some kind of regulatory intervention in order to extend the life span of 2G (and / or some other technology)? For example, would it be of any value to allow the MNOs to perform active sharing, or even to share some minimum amount of spectrum, or to introduce some kind of "2G universal service" obligation, where a single MNO would have to carry the burden of operating a 2G network with some minimum capacity?

- Please share your views on the technology neutrality principle. How do you understand technology neutrality? Is it still sensible? Where are its borders?

- As regards technology neutrality, please suggest how EU regulations could take into account evolving technologies

- Members States are assigning spectrum rights of use that have a typical duration of 20 years. Does the fast pace of technological advancements, rise any challenges in setting obligations (e.g. coverage obligations) that will remain relevant throughout the duration of the rights of use? What approaches could be used to cope with these challenges?

- Do you have requirements for a specific radio technology in any license? What is the duration of that license?

BENEFITS

- Have you identified benefits of technology upgrades, e.g., costs, spectrum bandwidth, data throughput, energy efficiency? Please specify.

BENCHMARKING OUTSIDE EU

- Do you have information of the migration to newer technologies in countries outside of European Union that could be of use to RSPG work?

Part 2. The development of 6G and possible implications for spectrum needs and guidance on the rollout of future wireless broadband networks, including non-terrestrial networks and license-exempt use

Scope

- The RSPG will conduct an evaluation of 5G in Europe (licensing strategies, auction design, deployment progress, etc.) with the aim to gain knowledge around what has been successful and what still needs to be addressed, thus providing valuable input when designing future 6G strategies.

- Regarding the pivotal role of wireless broadband, the RSPG will consider early signals of demand for additional spectrum as well as the necessity to make a certain amount of harmonised spectrum available in a timely manner including in spectrum bands targeted for 5G including low and mid bands. This may involve continuing the move further up to higher bands, thus enabling early exploratory work in the sub-THz bands.

- RSPG will continue to engage in the sharing of information and experience in support of a successful development and future roll-out of 6G in the EU, and will provide targeted guidance on authorisation and implementation issues, if such a need is identified. This activity will include inviting presentations and/or organising stakeholders workshop, including to address the issue of spectrum demand for unlicensed devices, including WiFi, and of non-terrestrial networks to maximize 6G coverage.

- This work may form the basis for and may lead to future 6G spectrum roadmaps of the RSPG later on (beyond 2023). This activity will not address WRC-23 agenda item 10 which remains to be addressed solely under the activity regarding the preparation of EU position for WRC-23.

QUESTIONNAIRE on the development of 6G and possible implications for spectrum needs

5G DEVELOPMENT EVALUATION

- What are your reflections on new regulatory practices related to 5G, e.g. installations of base stations and equipment, light licensing, spectrum sharing, other good practices, introduction of TDD (including synchronisation)?

- What is your feedback further to the EU initiatives of small cells regulation[1] and Connectivity Toolbox[2]? In particular, what is your feedback concerning sharing agreements for small cells? What is the situation with neutral hosts? Please describe the concept used for neutral hosts.

- Are mmWave 5G bands used/authorised in your country (26 GHz, 42 GHz, 66-71 GHz)? If not, have you identified any reasons (e.g. absence of equipment or business models)? What actions should NRAs take towards the use of mmWave bands?

- Have you identified any risks of not reaching the connectivity goals set by EU for 2025[3]?

- Are there any regulatory provisions specifically for local spectrum markets? Have verticals in your country implemented their own private networks in local spectrum bands? If yes, in which frequency bands, what kind of technology is used?

6G RESEARCH

- Indicate any research projects in your country regarding the use of spectrum by new technologies for providing broadband and innovative services.
    - Which are the spectrum bands under research?
    - For what kind of service?
- Have you identified any gaps or need for research towards 6G related to spectrum and regulation?

SPECTRUM BANDS FOR 6G

- Do you allow or do you plan to allow mobile trials in the Terahertz band? Are there/have there been any trials already in these bands?
- Have you already issued spectrum rights of use for mobile service in the Terahertz band?

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[1] COMMISSION IMPLEMENTING REGULATION (EU) 2020/1070 of 20 July 2020 on specifying the characteristics of small-area wireless access points pursuant to Article 57 paragraph 2 of Directive (EU) 2018/1972 of the European Parliament and the Council establishing the European Electronic Communications Code (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2020.234.01.0011.01.ENG&toc=OJ:L:2020:234:TOC)

[2] COMMISSION RECOMMENDATION of 18.9.2020 on a common Union toolbox for reducing the cost of deploying very high capacity networks and ensuring timely and investment-friendly access to 5G radio spectrum, to foster connectivity in support of economic recovery from the COVID-19 crisis in the Union (https://digital-strategy.ec.europa.eu/en/library/commission-recommendation-common-union-toolbox-reducing-cost-deploying-very-high-capacity-networks)

[3] COMMUNICATION (COM) 2016/588 of 14 September 2016 FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS 5G for Europe: An Action Plan (https://digital-strategy.ec.europa.eu/en/policies/5g-action-plan)

- Has there been already any demand in your country for additional spectrum bands for deployment of 5G networks and beyond?
- Do you expect that 6G will need access to low bands, mid bands or mmwave bands other than those already harmonised for wireless broadband?
  - Which are the spectrum bands of interest?
  - Who are the users interested (e.g. Satellite, Mobile, unlicensed etc.)?
- What can be the role of non-terrestrial networks in 5G and 6G?
- What can be the role of unlicensed spectrum use in 5G and 6G?

LICENSING AND REGULATORY ASPECTS

- What is your experience with the provision of wireless broadband services using unlicensed spectrum in your country including management of interferences?

- Has there been any demands or needs for spectrum sharing in the bands that are already licensed?
  - If no, what are the reasons?
  - If yes, how have you adressed this demand?

- Have you already identified needs for new regulatory models in the 6G era especially for services/usages based on opportunistic use (eg. special events, temporal activities without ex-ante geographical delimitation) of the spectrum? If yes, please specify the needs.

- Do you see a need to merge the mobile bands below 1 GHz into one band of ubiquitous spectrum?

- Do you see any demand for migration from FDD technology to TDD technology in bands currently harmonised for FDD technologies (please specify which bands)? If yes, would it be needed to review the technical conditions for the use of FDD spectrum by TDD technologies?