5G Cybersecurity toolbox Strategic Measures 5 and 6
A market and regulatory perspective

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- Background and scope of BEREC's involvement

- BEREC Report(s) on the EU 5G Cybersecurity Toolbox Strategic Measures 5 and 6 (Diversification of suppliers and strengthening national resilience)

- Open issues and possible next steps

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Recommendation on 5G Cybersecurity COM(2019)2335

Market view and state of play of security requirements in 3G, 4G networks in Europe

- BEREC to support the NIS CG in establishing a toolbox of mitigating measures (3/2019)

- BEREC ad hoc 5G Cybersecurity WG initiated (4/2019)
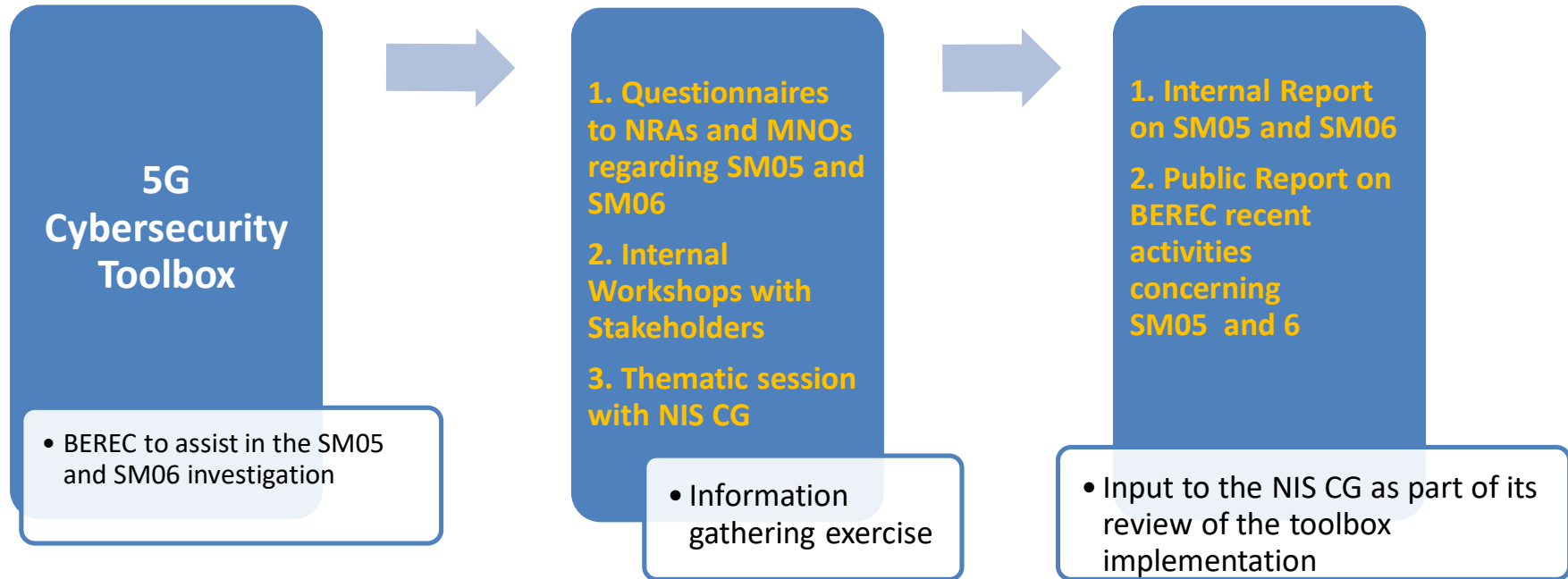- PRD adopted

BEREC ad hoc 5G Cybersecurity WG work during 2019 submitted to the NIS CG

Questionnaires for NRAs and MNOs

Internal Workshop with Stakeholders, DG Connect and ENISA

Internal Survey on the state of play for security requirements in 3G, 4G and 5G Electronic Communications Networks in Europe

Deliverable(s)	Time
Internal Survey on the state of play for security requirements in 3G, 4G and 5G Electronic Communication Networks in Europe	October 2019
Internal workshop on 5G Cybersecurity and the toolbox development progress	November 2019
Ad hoc 5G Cybersecurity WG Internal Stakeholder Workshop Report	March 2020

5G Cybersecurity Toolbox

- BEREC to assist in the SM05 and SM06 investigation

1. **Questionnaires to NRAs and MNOs regarding SM05 and SM06**

2. **Internal Workshops with Stakeholders**

3. **Thematic session with NIS CG**

- Information gathering exercise

1. **Internal Report on SM05 and SM06**

2. **Public Report on BEREC recent activities concerning SM05 and 6**

- Input to the NIS CG as part of its review of the toolbox implementation

- Gathering relevant information about the state of play and understanding of EU 5G Cybersecurity Toolbox SM 05 (diversification of suppliers) and SM 06 (ensuring national resilience), the WG compiled 2 questionnaires for: NRAs and MNOs

- Responses to the questionnaire were gathered between August and October 2020

- Also the WG organised series of webinars with stakeholders - September 2020- to have a deeper understanding of vendors/associations perception on SM05 and SM06 (Huawei, Ericsson, Nokia, ECTA, ETNO, O-Ran alliance, GSMA)

SM05	• Interpretation of the term "multi-vendor strategy" • Snapshot of existing (2G/3G/4G) networks footprints • Number of suppliers which operators use per type of network (radio access/core) and origin of the supplier (EU/non-EU) • Sustainability of "multi-vendor strategy" • Advantages and potential challenges/impacts: technical and economic aspects • Time scale for economic viability of implementation of SM05 for individual MNOs • National competences – BEREC surveyed whether NRAs or other national authorities have competences to assess any aspects of SM05
SM06	• Interpretations of "national resilience" • Diversity of mobile infrastructure • Identification of competitive pressures for the smaller MNOs

NRAs' part

MNO's part

BEREC investigated:

- national competent authorities' perception of the 5G Toolbox SM05 and SM06

- the existing or planned national activities concerning the legislation drafting for the implementation of the 5G Toolbox SM05 and SM06

- the perception of the European MNOs on SM05 and SM06

- the current situation about vendor diversification of the technical equipment and software in the MNOs networks (at the time answers were received)

- current MNOs criteria for vendor 5G equipment selection

- the open issues identified with this survey

- views of vendors/associations in webinars organised by WG during September 2020 – (Huawei, Ericsson, Nokia, ECTA, ETNO, O-Ran alliance, GSMA)

- The implementation varies across countries in the EU and EEA

- Each country has established its own procedures of cooperation involving all relevant State bodies that have a role in the Toolbox implementation

- NRAs´ roles range from being the lead authority in 5 countries to a supporting party

- To implement SM05, national measures have already been adopted in 6 countries and are planned or under consideration in 15 countries

- In 6 countries where measures already adopted, they aim at ensuring appropriate multi-vendor strategies (e.g. conducting a review of MNOs plans for sourcing equipment). Half of countries plan similar approaches regarding SM06, 7 countries have measures in place

- Finally, the NRAs highlighted the fact that implementing appropriate diversity of suppliers will assist in avoiding potential network failure or discontinuation of the MNOs services due to supply chain disruption, and minimize suppliers' lock-in scenarios

- At the time of the response, 5G networks and services were already commercially available from 27 MNOs, or approximately one third of MNOs active in the European electronic communications market. By the end of 2020, a further 14 European MNOs expected to have 5G networks and services commercially available, reaching approximately half the number of MNOs in Europe

- International developments affecting equipment suppliers are taken into account by MNOs when designing diversification measures

- **MNOs perceive that:**
  - multi-vendor strategies can be achieved in different ways, on different network levels such as in the whole network, in Radio Access Network (RAN) and/or in Core Network
  - main criteria for vendor selection are price, quality, performance and interoperability
  - main advantages in a multi-vendor strategy are:
    - avoiding vendor lock-in
    - maintaining a sustainable competitive environment for vendor equipment

Disclaimer: As regards 5G, in a first phase, 5G deployment will consist primarily in 'Non-Standalone' networks, where only the radio access network is upgraded to 5G technology and otherwise still relies on existing 4G core networks. Moreover, as roll-out progresses and national regulatory frameworks are being defined, the market data related to 5G suppliers is still limited and constantly evolving. Non-EU in this survey means North America, Asian and Australian vendors

- MNOs expect multi-vendor strategy to have an impact in their development plans: more impact on the Capital Expenditure (CAPEX) and Operational Expenditure (OPEX) than in other network costs (e.g. administrative costs)

- **The majority of MNOs have indicated:**
  - They would need more than 5 years to replace a specific 5G vendor without significant economic impact
  - Disadvantages identified in a multi-vendor approach relate specifically to network management, interoperability and integration costs
  - The need for improved standardization and more regulation initiatives on interoperability
  - Open RAN and other such open-source initiatives are not yet mature enough for an operational network
  - Expecting better support to open initiatives by governmental and regulation bodies

RAN elements from 2G to and including 4G technologies	Two vendors across all mobile technology generations Equal distribution of EU and non-EU vendors
RAN elements in 5G networks	50% < MNOs single vendor 25% ~ MNOs two vendors EU vendors> 50%
CORE network equipment in 2G, 3G and 4G	50% < MNOs single vendor 25% ~ MNOs two vendors Non- EU vendors> 50%
CORE network equipment in 5G networks	75% ~MNOs single vendor

- BEREC has identified a requirement to establish a deeper understanding of specific risk scenarios related to the MNOs full supply chain. The risk scenarios would also take into account supply availability, as well as obstacles and the actions needed to adapt to the global situation in the case that there are disruptions in the supply market

- BEREC has identified the need for a greater understanding of the potential gains and limitations of OpenRAN, the likely timeplan for providing such an effective alternative, as well as the current status of other related pilot projects and schemes

- BEREC- generally speaking- has identified a need for possible further information gathering as well as for a more holistic understanding of the costs and impacts related to implementing various approaches of multi-vendor strategies by MNOs

- Report published
- https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/9726-report-of-berec-recent-activities-concerning-the-eu-5g-cybersecurity-toolbox-strategic-measures-5-and-6-diversification-of-suppliers-and-strengthening-national-resilience

BEREC will continue

- to play a supporting role regarding 5G and cybersecurity
- its close cooperation with the NIS Cooperation Group and ENISA
- to contribute to the implementation of the toolbox upon request
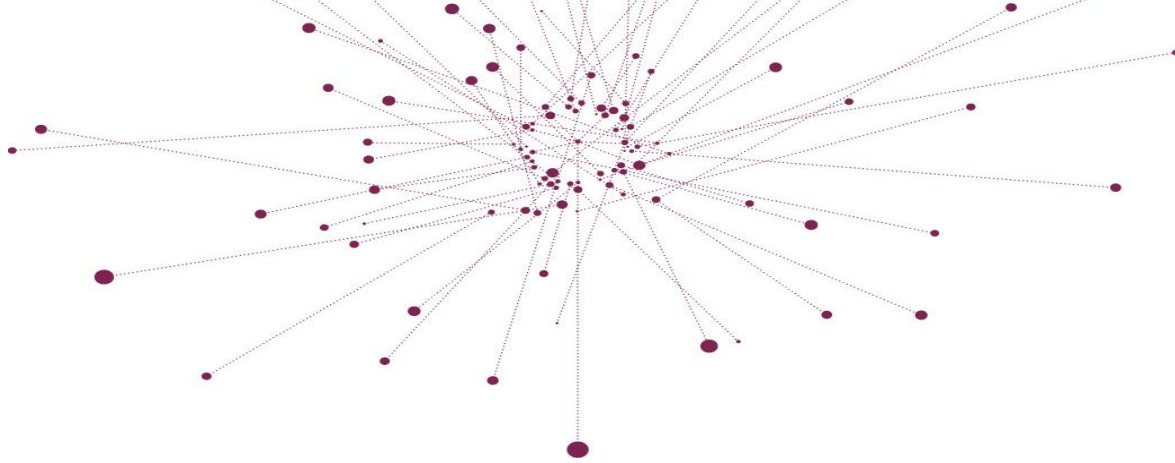
Thank you!

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