ETNO response to the BEREC public consultation on
the BEREC Public Consultation on Internet of Things Indicators

1. General issues

1.1. *Do you consider that the European Commission's definition of the IoT is sufficiently appropriate to collect relevant statistical information on the IoT? If not, how should the definition be changed?*

- The European Commission defined the IoT as enabling *"objects sharing information with other objects/members in the network, recognizing events and changes so to react autonomously in an appropriate manner. The IoT therefore builds on communication between things (machines, buildings, cars, animals, etc.) that leads to action and value creation."*

- ETNO believes that the concept of IoT should also include the components at application level. The IoT builds not only on communication, but also on intelligent objects and IoT application platforms. Additionally, IoT services require humans to interact with objects and application platforms, so the IoT also entails communication between things and persons.

- Nonetheless, we call on BEREC to refrain from developing a new policy definition of IoT that would add on the existing definitions from the Commission and other policymakers. This would create more confusion with no clear value-add.

- Efforts should rather focus on striving for a similar approach to the one taken by the European Commission, in order to facilitate data gathering (if necessary), consistency, and common interpretation of indicators.

1.2. *Please suggest any available sources for information on measures/indicators of the IoT, in addition to the information mentioned above.*

- Every year, ETNO's Annual Economic Report provides relevant data on the IoT revenue forecasts and the number of active IoT connections by vertical industry sector:
    - ETNO "Annual Economic Report 2017", chart "IoT units by vertical" (p. 36). Available [here](#).
    - The 2018 edition will be release in the ETNO website on 31 January 2019.

2. BEREC's Internet of Things universe

2.1. *Do you agree with the multi-layered approach in Figure 2 above, which seeks to separate M2M/IoT from the underlying connectivity and shows the relationship to ECS?*

- ETNO agrees on the multi-layered approach in Figure 2. However, we note that the connectivity layer of IoT services is just one of the relevant components, which can be based on different networks, both public and private. They can be based either on traditional telecommunication networks or on other networks, including those of other utilities (e.g. electricity network for smart metering).

- M2M and IoT are also based on components at the application level (e.g. intelligent devices and application platforms) that would also need to be highlighted in the figure.

- In fact, the multi-layered diagram in Figure 2 does not properly represent the relative value of connectivity compared to other layers of the IoT ecosystem, such as the application layer. Connectivity actually accounts for a relatively small portion of the overall value (about 20% of the total value).

- The IoT value chain includes, in addition to connectivity providers, device providers, IoT platform providers, system integrators, IoT service providers, etc. Therefore, the IoT ecosystem should consider many other layers beyond connectivity.

- In light of the above, we suggest deleting the "Connectivity" ring from Figure 2, as it may lead to a misinterpretation of the connectivity layer.

2.2. *What is your opinion on the differentiation of IoT and M2M? Do you have any additional proposals regarding such differentiation?*

- ETNO agrees that IoT is broader than M2M. The Report could clarify that the IoT includes IoT platforms, in addition to IoT applications.

- ETNO agrees with BEREC´s approach to amend its definition of M2M (cfr. "BEREC report on convergent services", 2010) as it is not technology-neutral. The reference to exchanges "through a mobile or fixed network" should be removed.

- In accordance with Directive (EU) 2018/1972 establishing the European Electronic Communications Code, M2M services can be defined as *"services involving an automated transfer of data and information between devices or software-based applications with limited or no human interaction."*

2.3. *In relation to application solutions, do you see the three categories "Industrial", "Automotive" and "Consumer" as the most relevant? Would you suggest other categories? If so, please elaborate.*

- ETNO would suggest considering other relevant categories, such as "Utilities", "Agriculture", and "Smart Buildings". We expect application solutions in these areas to increase strongly in the next few years.

3. Effect of the IoT on NRAs' spectrum policies and allocation of scarce resources

3.1. *In your opinion, what effects on spectrum policy is the development of the IoT expected to have, and do you think it's necessary for NRAs to monitor, and BEREC to benchmark, these developments?*

- Mobile communications networks are already able to meet the various needs of users efficiently, and with 5G and network slicing mobile networks the specific needs of users could be served even better. In addition, spectrum policy includes tools such as spectrum leasing which could be used for catering to the local needs of vertical players. Therefore, ETNO believes that allocating spectrum for various use cases and/or niche players is not required as this would lead to spectrum fragmentation and will reduce the efficient use of spectrum. Technological choices, also related to spectrum, should be taken by the market based on the principle of technological neutrality and with the aim of satisfying the requirements of the different IoT services.

- Managing a mobile network is a complex process, and this is expected to become even more complex with the large-scale introduction of multiple-input and multiple-output (MIMO) and time-division duplexing (TDD). Adding more factors such as local licenses and various niche/vertical players to coexist with would not contribute to ensure the needed quality to meet the society's expectations for 5G. ETNO thus favors nationwide exclusive licenses that help reach the necessary economies of scales required for guaranteeing equipment and device availability. Wireless mobile technologies based on individual rights of use of the frequencies have characteristics in terms of performance (e.g., efficiency, reliability, security, privacy) higher than the solutions based on frequencies with shared use. The use of TDD requires co-ordination between licensees or the adoption of large guard bands. The proliferation of multiple local licenses and various niche/vertical players will enormously complicate the frequency management and likely cause inefficiencies, increased interference and complexity for frequency coordination.

- Furthermore, dedicating spectrum for verticals/IoT might distort competition, as spectrum resources might be used by the vertical industry at much lower prices than mobile operators, whereas competing in the same business and for the same customers.

- There is also a risk that the spectrum reserved for vertical/IoT use may remain underused and fragment the spectrum band for a long period, if the needs and capabilities of the vertical connectivity providers to run the network in the long term is not clearly defined beforehand.

- Therefore, ETNO would not recommend spectrum policy to focus specifically on verticals/IoT by identifying specific spectrum for them, especially in 5G bands. Spectrum policy already has the tools to tackle vertical/IoT spectrum needs locally and in the millimeter wave (mmWave) range there already exists room for experimentation. Supporting technology and service neutrality will guarantee a future-proof approach to the needs of IoT connectivity growth.

- It is important to consider in this respect that the use of solutions based on international standards fosters interoperable solutions and allows to operate on a large scale, with evident economies of scale that will benefit end-users. The IoT standardization activity in the mobile radio environment, which involves the entire industry at international level, is able to define stable, durable, and future-proof solutions. The 5G standard has the advantage of including appropriate solutions for all types of IoT services.

- In light of all the above-mentioned considerations, which focus on IoT using licensed spectrum, ETNO does not believe that NRAs should monitor the development of verticals and IoT for the purpose of spectrum management. However, we would suggest that BEREC

observes the ongoing and future initiatives to afford verticals/IoT with dedicated spectrum, to assess whether they do not distort competition and resources are used fairly.

- Concerning the IoT or M2M on license exempt spectrum, ETNO expresses its concern on the growing risk of both in-band and out-of-band harmful interferences in radio equipment-assuming its growth is as massive as expected - for the following reasons related to a soon inadequate license exempt spectrum regulatory framework:

    o No visibility currently on the number of equipment in place. The technical conditions of spectrum use have been specified based on assumptions including a maximum density of users that may be exceeded by reality at some point. This requires monitoring the number of such devices, to anticipate the need to revise those specifications and to assess more in general the future spectrum needs.

    o Some difficult or impossible to verify requirements: some key features in the existing specifications, such as "duty cycle" or "Listen Before Talk" mechanisms are difficult to control in practice on the equipment in the market, which is consequently prone to non-compliance and a source of interferences. Several administrations have already identified a number of non-compliant equipment.

    o Need to reinforce public efforts on market survey and spectrum use control. These tasks carried out at national level appear under-dimensioned as regard to the amount of products on the market whose compliance with the regulatory framework needs to be ensured.

3.2. With regard to the expected growth in the use of IoT devices, do you see the necessity for NRAs to monitor, and BEREC to benchmark, these developments, particularly with respect to numbering? If so, why?

- Monitoring the use of IoT devices is an extremely challenging task, due to the enormous variety of IoT devices that are and will be deployed worldwide with different technological solutions. In addition, monitoring the use of IoT devices will also pose a huge challenge on connectivity providers, as they are not aware of the use of these devices.

- National numbering resources are already under the responsibility of national regulators, which are constantly monitoring and evolving their National Numbering Plans according to evolutions in their national markets. At this moment the usage and impact of IoT/M2M services on national numbers is not clear. Therefore, we do not see the direct necessity for NRAs to monitor, and BEREC to benchmark, these developments.

3.3. Do you see the need for NRAs to monitor which national numbers for IoT devices are used outside their domestic market/territory (and vice-versa, which numbers assigned in other countries are used in the NRA's territory)? If so, please elaborate.

- Yes, since IoT is a global market. For security and legal reasons, information on national numbers used abroad in an extra-territorial way should be available to NRAs. In this regard, BEREC should align with the obligations deriving from Directive (EU) 2018/1972 establishing the European Electronic Communications Code.

3.4. ***In your opinion, in addition to NRAs, for which entities (EU and non-EU) are the following individual matters relevant:***
   a) The effect of IoT on spectrum policy
   b) The effect of IoT on scarce resources, i.e. numbering
   c) The monitoring of national numbers for IoT devices used on an extraterritorial basis

N/A.

4. The importance of IoT indicators for BEREC

4.1. ***What is your opinion on the benefit of a BEREC common approach regarding the IoT?***

- To date, BEREC's approach to IoT has been based on the 2016 "Report on Enabling the Internet of Things", which is a comprehensive overview of the IoT market and its regulatory challenges. This has been a praiseworthy approach that remain flexible to this nascent and global market. It is not clear if and how a BEREC common approach will build on the 2016 Report, and if that would bring an added value.

- BEREC refers to increased transparency and contribution to the development of the IoT market as main drivers for a common approach. ETNO does not share BEREC's views on the need for intervention, especially considering that IoT is a global and not only an EU market.

- We advise against a common approach that pursue the objective of setting EU indicators for a global market. Achieving quality data, beyond the telecoms sector, would be impossible. These indicators would then be limited in practice to telecommunications operators and could be easily misunderstood and pave the way for regulatory intervention at some stage, while ignoring a vast amount of data beyond connectivity and telecom players.

- As a conclusion, ETNO cautions against systematic data collection from stakeholders due to the lack of data access and oversight across the value chain, as well as to the considerable administrative costs this would put on providers. At the same time, we encourage BEREC to assess IoT markets in collaboration with external market industry analysts that have more available information across the value chain at a global level.

4.2. ***Do you agree with the general areas of interest for future indicators (to be collected), presented in Figure 4 above? Could you suggest any specific IoT indicators that BEREC should consider for collection?***

- The potential economic impact of IoT goes beyond connectivity. To improve the IoT market and the related economic sectors, it can be useful to collect indicators beyond those related to telecommunications services that are normally already monitored by NRAs. Furthermore, information on the demand side is missing, although it will be as important as the supply side's information.

4.3. ***Do you support the gathering of statistical information on IoT by BEREC? Please substantiate your answer.***

- The collection of information by BEREC should take into account that connectivity is just a component of IoT services and that a focus on the other components of the value chain is really needed.
- See our response to questions 4.1 and 4.2.

5. Other issues

5.1 ***Are there any additional issues relating to collection of statistical information on the IoT which have not been included in previous questions that you would like to address?***

N/A.