



VODAFONE RESPONSE
TO BEREC PUBLIC CONSULTATION
ON
INTERNET OF THINGS INDICATORS

23 January, 2019



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Executive summary

Vodafone welcomes BEREC consultation paper on the Internet of Things Indicators (“**Consultation Paper**”). This as a timely discussion on the topic, and we are grateful of the opportunity to present our views on the questions put forward, as well as other related issues that we believe require BEREC’s and other stakeholders’ attention. Our views can be summarised as follows:

- Vodafone welcomes the emphasis on harmonisation, which should not be limited to collection of Internet of Things (IoT) indicators by NRAs only, but forward looking needs to cover the overall IoT regulatory treatment across EU; as a matter of fact, we consider that EU fragmentation on IoT is amongst the biggest inhibitors to the innovation and growth in this communication sector;
- All Low Power Wide Area (LPWA) proprietary connectivity solutions require equal monitoring and review, in order to ensure a level playing field between cellular and non-cellular IoT connectivity service providers, in a technology neutral manner.
- We support IoT categorisation to the extent that it is relevant from a regulatory perspective and correctly portrays the overall IoT service value chain;
- In order to promote technology neutral market development and efficient spectrum usage, as well as realise the benefits of 5G and IoT, BEREC should also monitor regulatory activities in ‘vertical’ markets (such as automotive, aviation and smart buildings), where digital policy is currently being developed by sector specific regulators;
- We support proportionate and harmonised collection of data indicators within the powers attributed to BEREC by the EEEEC and Regulation 2018/1971¹.

¹ Regulation (EU) 2018/1971 of the European Parliament and of the Council of 11 December 2018 establishing the Body of European Regulators for Electronic Communications (BEREC) and the Agency for Support for BEREC (BEREC Office), amending Regulation (EU) 2015/2120 and repealing Regulation (EC) No 1211/2009



General issues

Question 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?

Vodafone response:

We consider the European Commission definition² as too generic, and as such it cannot provide clear indications on how to collect relevant statistical information on the IoT market. This definition (of 2015) does not capture sufficiently the recent or future developments of IoT applications, such as inclusion of limited human interaction.

There is a wide array of M2M/IoT applications in the market which include limited human interaction and voice/SMS as ancillary services, for example:

- Business IoT applications that allows individual communication in the sense of a pre-defined point-to-point communication. Examples are eCall in cars, private emergency calls in elevators and/or vehicles, concierge services in vehicles;
- Consumer IoT smart plug (SIM connected) that can receive commands via SMS;

Furthermore, the 'limited human intervention' element finds support in:

- the European Electronic Communications Code (EECC)³, which defines machine-to-machine services, as [*involving an automated transfer of data and information between devices or software-based applications **with limited or no human interaction***]⁴. (emphasis added)
- OECD definition, which states that [*The Internet of Things includes all devices and objects whose state can be altered via the Internet, **with or without the active involvement of individuals...***]⁵, (emphasis added).

²Study prepared by IDC and TXT for the European Commission (2015) defines 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.*”

³ Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code (Recast)

⁴ EECC, Recital 249

⁵ OECD, *IOT Measurement and applications Report*, October 2018. It is worth mentioning that differently from its 2015 Report, OECD has revised its position with regard to laptops, routers, servers, tablets and smartphones, by excluding them from IoT definition.



Several NRA's have taken a step forward in acknowledging limited human involvement within M2M, such as BNetzA, Agcom⁶ and ComReg⁷. The 'IoT' definition provided by Gartner is also consistent with this approach⁸. Based on the above, Vodafone suggests that for future references the M2M/IoT definition referred to/used by BEREC should be wider and include:

- 1) limited human intervention, and
- 2) limited voice/SMS communication as an additional component of the M2M /IoT as long as they constitute an ancillary part of the main service (this is further elaborated on in our response).

Question 1.2:

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

Vodafone response:

Vodafone considers the following as useful resources to date:

- GSMA intelligence, which has just published the latest figures regarding the total licensed cellular IoT by type (cellular M2M and Licensed LPWA)⁹;
- OECD's most recent report of 2018¹⁰ provides a good overview of the IoT ecosystem, which provides a good overview of the market structure;
- International Data Corporation (IDC) taxonomy can support to understand the overall structure of the consumer IoT market¹¹.

⁶ COM (2016) 590 final

⁷ ComReg 18/46

⁸ The Internet of Things (IoT) is a network of dedicated physical objects (things) that contain embedded technology to communicate and sense or interact with their internal states or the external environment. The connecting of assets, processes and personnel enables the capture of data and events from which a company can learn behaviour and usage, react with preventive action, or augment or transform business processes. The IoT is a foundational capability for the creation of a digital business

⁹ GSMA Intelligence (2018)

¹⁰ OECD, *IOT Measurement and applications Report*, October 2018

¹¹ IDC's Worldwide Consumer Internet of Things Taxonomy, 2018



Internet of Things Universe

Question 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?

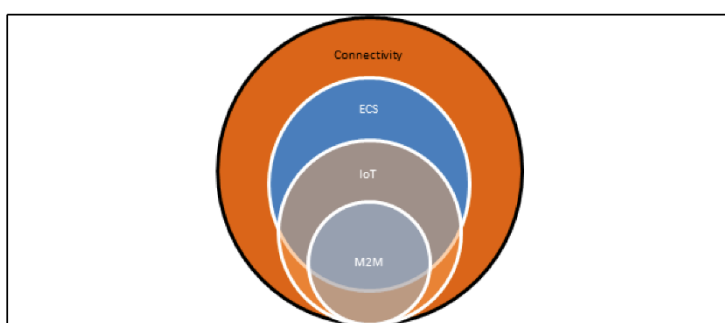


Figure 2: the boundaries of the Internet of Things. Source: BEREC.

Vodafone response:

Vodafone finds BEREC multi-layered approach is not sufficiently clear, for two reasons:

1. the positioning/treatment of connectivity technologies and ECS, and
2. the role of connectivity within the IoT service provision as a whole

Each of these reasons is elaborated on below.

Connectivity technologies and ECS

EECC considers any type of M2M connectivity to be part of the Electronic Communication Services¹² therefore commercial networks in unlicensed spectrum such as those referenced in the consultation document should be included within the scope of ECS. It is not sufficiently clear from Figure 2 of the BEREC consultation whether this is the case.

Instead, within the connectivity layer BEREC distinguishes between 1) 'traditional' communication services (i.e. in licensed cellular spectrum) and 2) commercial networks in unlicensed spectrum.

Cellular IoT connectivity represents only a small fraction of the IoT connected devices market, since the majority of IoT devices utilise unlicensed spectrum. Ericsson projects that by 2024

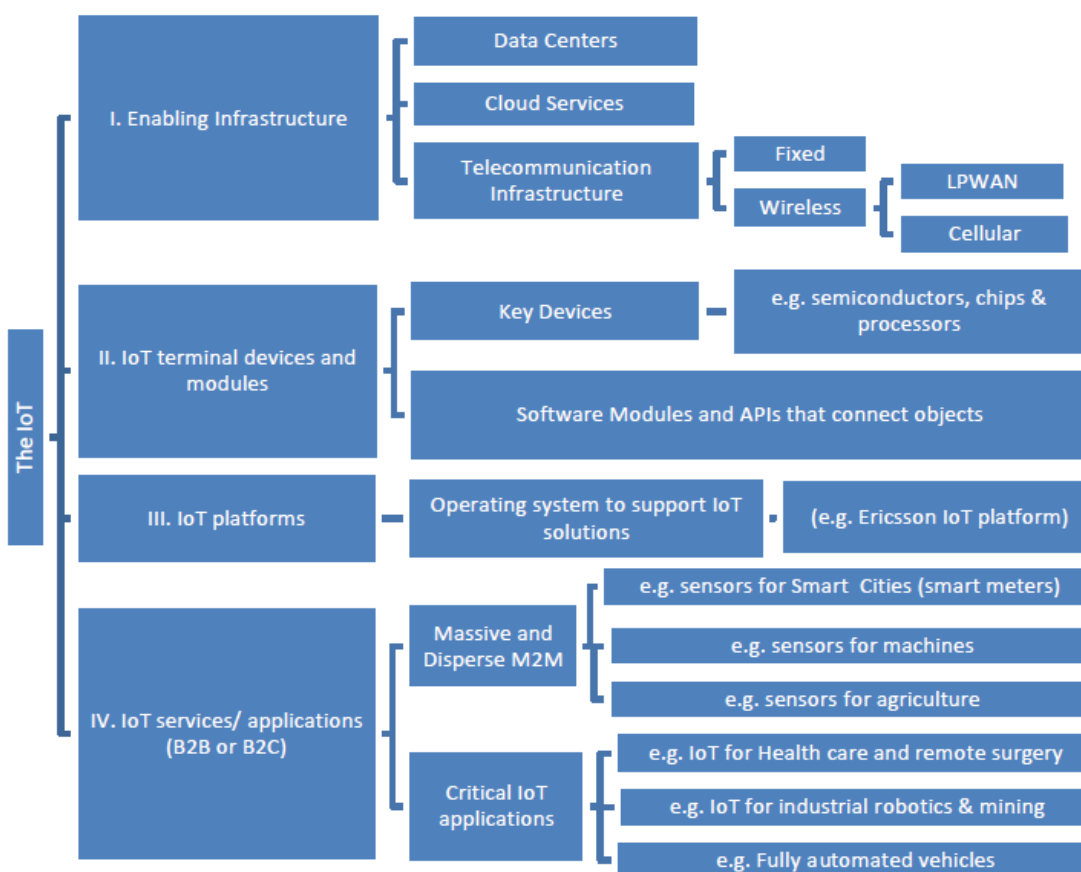
¹² Article 2 (definitions), paragraph (4)



cellular IoT connections will reach 4.1 billion , out of a total market of 22.3 billion IoT devices¹³). On such basis, we consider important at this point for BEREC to establish and apply a technology and service-neutral discussion regarding IoT connectivity.

Role of connectivity within IoT service provision as a whole

Figure 2 of the BEREC consultation represents only a fragment of the IoT value chain, which is the connectivity dimension of IoT. The 2018 OECD Report referenced above provides a comprehensive view of the IoT enabling environment, i.e. the ecosystem and actors involved in the value chain, which range from the enabling infrastructure (that includes connectivity) to the IoT platforms and services¹⁴.



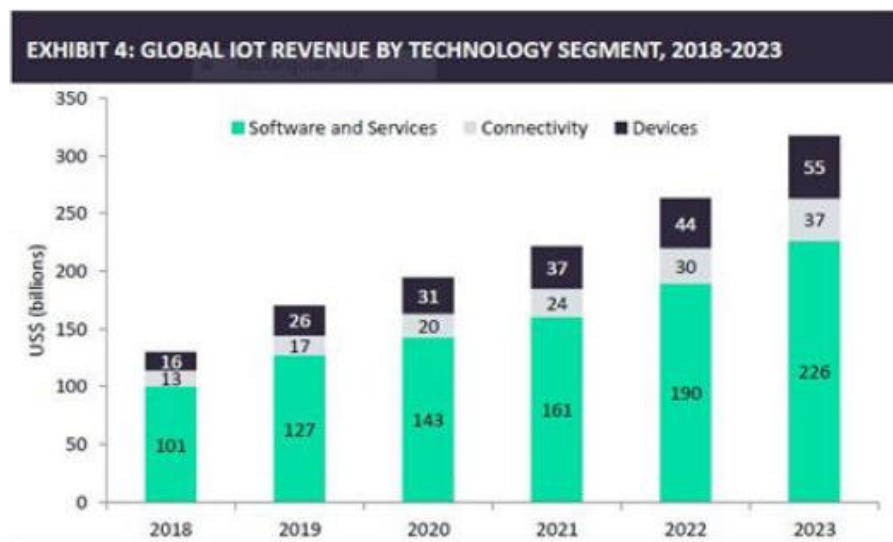
Source: OECD Report, 2018

¹³ Ericsson Mobility Report, 2018

¹⁴ OECD, *IoT Measurement and applications Report*, October 2018, pg.11.



Furthermore, as shown below, within the IoT ecosystem there is a gap in revenue distribution between connectivity and software/services and devices, with connectivity being the lowest revenue contributor in the value chain¹⁵.



Source: Global Data, 2018

This is important because a revenue driven assessment should influence how IoT is being defined for measurement purposes. Therefore, BEREC should take into account the presence of all the economic actors involved in each enabling layer of the IoT supply chain, proportionate to their revenue 'weight'.

Question 2.2:

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

Vodafone response:

Vodafone considers that formally differentiating between 'M2M' and 'IoT' is likely to add confusion and complexity to the topic, therefore, we suggest that for practical purposes M2M and IoT to be used interchangeably, both of them a) including limited human intervention and b) limited voice/SMS (closed user group communication) as an ancillary service¹⁶.

¹⁵ Global data, 2018

¹⁶ EECC, article 2 (definitions) paragraph acknowledges [interpersonal and interactive communication as a minor ancillary feature that is intrinsically linked to another service]



We also believe it will be necessary to be clearer on the concept of ‘limited human intervention’. This will provide certainty on where certain regulatory requirements should not apply, for example:

A smart gate alarm which has been mounted at the house front gate, allows visitors to communicate remotely with the owner. He/she (and a limited number of family members) can consecutively send an SMS command to the IoT device, or call and via IVR commands to deactivate the door lock).

Such clarification can contribute to the harmonised roll-out of IoT across the EU at scale, which we believe is critical to IoT development and adoption.

Question 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.

Vodafone response:

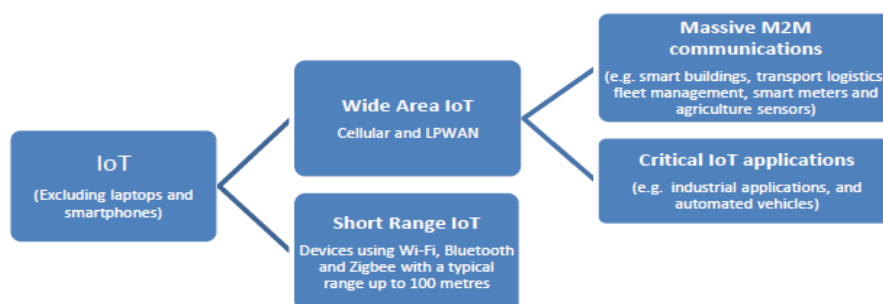
We consider that the proposed sectorial categorisation is not sufficiently relevant from a regulatory perspective. Furthermore, as more IoT applications develop, the boundaries between different sectors become more blurred. The use of drones (essentially an airborne IoT device) is a good example of a cross sectoral IoT use case, which is not confined within a specific industry sector.

We suggest considering the following methodologies, as of relevance for future regulatory considerations:

- categorisation based on **enabling connectivity technologies** – between 1) cellular and 2) non-cellular IoT connectivity technologies sub-divided accordingly (including fixed, private networks). This can help ensure a regulatory level playing between cellular and non-cellular technologies;
- categorisation from **a spectrum usage perspective** - between IoT applications: 1) operating in licensed spectrum, and 2) operating in unlicensed spectrum. This can help BEREC and NRAs optimise spectrum usage;
- categorisation based on **network performance needs** - this taxonomy would group IoT applications based on 1) ‘massive’ M2M, and 2) critical IoT, which beyond the assurance of message transmission, demand very low latency and availability of reasonable spectrum bandwidth to deliver. This taxonomy proposal has been analysed in detail by OECD as



described in the diagram below¹⁷. This is relevant to 5G development and will help to ensure network quality on a use-case dependent basis;



Source: OECD Report, 2018

Effect of the IoT on NRA's spectrum policies and allocation of scarce resources

Question 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?

Vodafone response:

- BEREC should identify and measure how many IoT connections/devices are operating in the licensed and unlicensed spectrum, in order to estimate their impact on spectrum usage/allocation.
- International coordination is also vital, so that spectrum authorities around the world ensure that mobile bands are widely harmonised, as they can enable mass market low cost cellular IoT devices by creating a large enough addressable market to support manufacturing economies of scale.

¹⁷ OECD taxonomy report, 2018



Question 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?

Vodafone response:

Vodafone does not foresee an immediate problem of scarcity of numbering resources caused by IoT. A key reason for this is that a number of global mobile operators deploy IoT services using the ITU assigned IoT supranational numbering ranges. However, this is still subject to national fragmentation. This is something that BEREC should continue to monitor and address.

Question 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.

Vodafone response:

No response.

Question 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**

Vodafone response:

European sector-specific policymakers are developing regulation that risks excluding usage of cellular IoT standards, limiting the potential of 5G. We have seen early examples of this in the automotive and drone sectors. We urge BEREC to take a proactive role in monitoring and



responding to these IoT spectrum policy discussions to ensure that technology neutrality principle is guaranteed and customers benefit from the most efficient and advanced technology that meets their needs.

The importance of IOT indicators for BEREC

Question 4.1:

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

Vodafone response:

Vodafone welcomes BEREC's initiative on a common approach regarding IoT because it provides further regulatory certainty and will help to ensure scale and quick adoption. Furthermore, we would welcome a wider regulatory harmonisation related to IoT (beyond data collection), because we consider fragmentation as a critical barrier that we need to overcome within EU.

Question 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?

Vodafone response:

BEREC proposes an extensive monitoring of many aspects of IoT in figure 4 and we are interested to understand better what the exact purpose(s) of such collection is. What we consider relevant at this stage to inform the regulatory debate are the following:

- data on IoT applications and devices that operate in licensed vs. unlicensed;
- data on cellular and non-cellular IoT devices and respective connectivity technologies;
- data on network impact indicators (e.g. signalling traffic generated from IoT devices)



Question 4.3:

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

Vodafone response:

Our opinion is that any information collection should serve a clear purpose, be proportionate and not excessively burdensome for information providers. For example, information related to IoT applications using roaming cellular connectivity can be very difficult to collect (e.g. revenues, number of connections, traffic volume). That is why we are interested to better understand the exact purpose(s) of such data collection. Otherwise, we consider that any additional data collection, beyond what is already taking place at national level, would be premature.

Other issues

Question 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?

Vodafone response:

No.

Stakeholder information

Please provide the name (and website, if available) of your organisation:
Vodafone Group Services Limited, www.vodafone.com

Contact information (name, e-mail and/or phone number) for a contact person.

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