Comments on RSPG Opinion and spectrum roadmap for IoT

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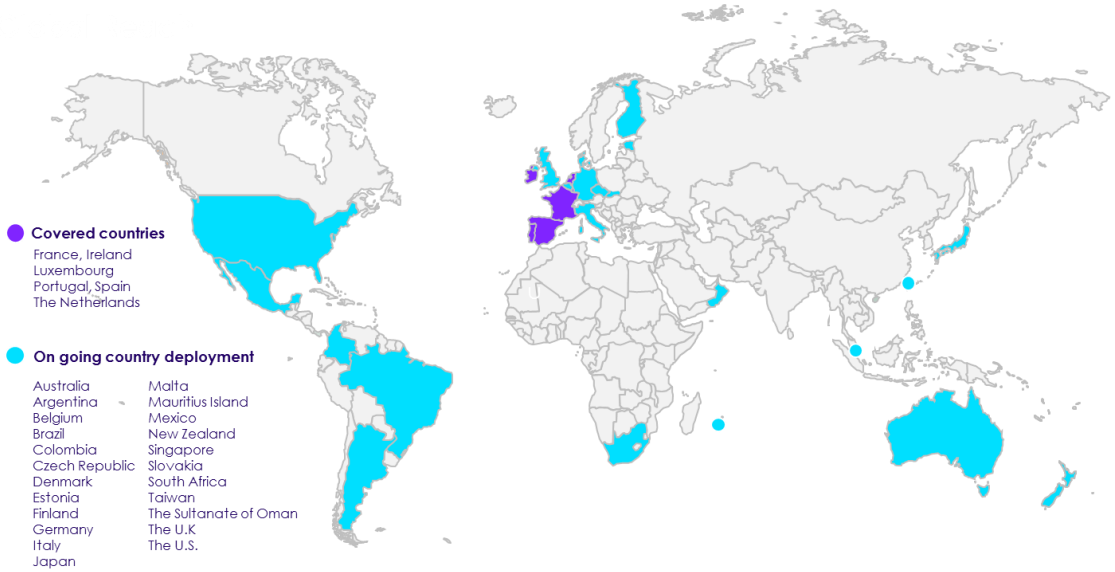
Sigfox presentation

Sigfox is the world's leading provider of connectivity for massive Internet of Things (IoT). Its unique approach to device-to-cloud connectivity allows the company to address the three greatest barriers to global IoT adoption: cost, energy consumption and global scalability.

The Sigfox footprint in European Union has reached 15 countries[1] amongst 29 countries covered worldwide (as of 2016). The company plans to expand its activity to at least 60 countries by 2018.



Sigfox worldwide footprint (December 2016)

Sigfox has developed its technology based on Low Power Wide Area (LPWA), one of the most promising innovations under the SRD umbrella because its deployment will be essential for the large-scale expansion the IoT connectivity beyond the existing short range applications.

[1] Belgium, Czech Republic, Denmark, Estonia, Finland, France (metropolitan and overseas), Germany, Ireland, Italy, Malta, Portugal, Slovakia, Spain, The Netherlands and UK

1. General Comments and proposals

Sigfox welcomes the public consultation on the RSPG spectrum roadmap for IoT and the considerable and accurate analysis provided in its draft opinion. Sigfox shares most of RSPG views on the IoT definition, the nature of the IoT spectrum demand and the regulatory and spectrum options to sustain industry development and innovation.

By nature, the IoT is almost totally based on wireless connectivity which in consequence put the spectrum availability as a vital parameter for its development. Detailed guidance and clear policy roadmap from administrations in charge of spectrum is a critical enabler for a IoT single market, consistent with European ICT goals, allowing economy of scales and supporting European industry in its worldwide competition challenges.

With the intent to provide additional inputs from one of the key operator of IoT connectivity in Europe and beyond, we are pleased to submit to the RSPG the following remarks:

- **The prominent value of unlicensed spectrum based on general authorization regime should be mentioned in the opinion between the § 5 and 6 and in the § 5 of the annex. Indeed, this unique regime has participated to the worldwide development of IoT, and more generally to the Internet. Many international studies recognized the role of this regime and keep unlicensed spectrum (Wi-Fi, Bluetooth, RFID, LPWA, etc.) as the main contributor to the IoT**

- **The need to specify and adopt a flexible framework with appropriate Pan-European authorization models should be encouraged in the § 5 in order to ensure the development of all business models along with IoT innovations**

Proposal

5. A complementary mix of general and individual authorisation for spectrum access will be needed to ensure that IoT has access to spectrum. There is no single authorisation framework and no single set of technical conditions for access to spectrum, which would cater for all possible demands. The chosen modality to access spectrum should be implemented similarly in all the European countries in order to avoid complexity and market fragmentation. 5a. Beyond the need to respond to specific use cases, it could be noted that the unlicensed regime for IoT has and will continue to be a key enabler for innovation. As of today this regime is essential for the most part of the wireless data traffic (71% in Europe in 2012[2]) and a wide range of wireless communication systems wordlwide.

6. IoT encompasses a broader set of applications and use cases than those enabled by 5G. However, new IoT use cases will be enabled by 5G since some specific IoT functionality will be designed into 5G from the start, with features including network slicing, low energy consumption and scalability.

- **The significant role played by Low Power Wide Area technologies in unlicensed band should be mentioned as one of the key area in the § 3 of the opinion, aside the three others**

Proposal

[2] Study on impact of traffic off-loading and related technological trends on the demand for wireless broadband spectrum

3. Global economies of scale are important for emerging technologies, and Europe can benefit from these in four principle areas where spectrum is already available: bands for Short Range Devices, Low power wide area solutions, Mobile bands and those for WiFi (WAS/RLAN) and for LPWA.

- **The need for a rapid attribution and harmonization of the frequency band 915-921MHz for Low Power Wide Area systems and Short Range Devices should be mentioned in the §2 of the opinion and the § 5.a of its Annex. Indeed, this European alignment with ITU Region 2 will support economy of scale and global harmonization.**

- **New developments of applications based on primary services in the 920-925 MHz range should be discouraged in order to ensure resource availability for the rising IoT economy during the next decade. Indeed, this frequency range 920-925MHz is already available globally in ITU Region 2 and more particularly in ITU Region 3 for low power devices. This information could be added into the § 5 of the Annex and the RSPG opinion about ITS**

- **The need to review periodically legal and regulatory terminology to ensure consistency with technology developments and to reflect appropriately the reality of new networks and services. In this perspective "Short Range Devices" term should be replaced by "Low Power Devices" as it reflects more the reality of the technical requirements for sharing the spectrum, in particular for the general authorization regime in Europe**

- **At last, the CEPT work under way regarding new opportunities for satellite unlicensed applications in the range 862-863MHz could be usefully mentioned in the § 6.d of the Annex**

Those comments and proposals are detailed in the following sections.

2. IoT heterogeneity and authorization models

Sigfox shares the consensus around the fact that there is no one solution fitting all the requirements for IoT.

It may be valuable, nonetheless, to mention that most of the IoT market (around 75% depending on the studies) relies and will continue to rely on Low Power Devices (LPD) and Short Range devices (SRD) technologies. Those technologies use unlicensed spectrum and these frequency bands will play a key role in the development of the Internet of Things, maybe more striking than with the contribution of Wi-Fi to broadband communications.

The growing and important part played by LPD within the digital economy makes necessary to ensure that the spectrum and authorization frameworks are suitable. A move towards more innovative authorization models such as a mix between individual and general, having in mind that LPD have always had a non-priority access to spectrum compared to radio services.

As a result of the comments here-above, the § 1 and § 5 of the RSPG opinion could be updated to encourage administration to support unlicensed spectrum bands usages and developments as a prominent enabler for IoT.

3. Spectrum demand for IoT

In its opinion [§2] RSPG mentions "*the availability of frequencies is not currently constraining the growth of IoT*" and thanks to the work under way for further frequency attribution "*RSPG does not foresee a scarcity of spectrum for IoT, but will continue to review the evolution of spectrum demand for IoT*".

Sigfox agreed with the previous statement regarding the immediate and overall frequency availability, however regarding sub-GHz spectrum, shared by multiple users under general authorization, its seems important to mention that the current availability varies significantly between remote areas and specific locations such as airports, city centers, train stations and even between countries.

Sigfox recommends to mention as of today the need for additional frequency attribution in sub-GHz bands in particular for Low Power Devices in some urban dense areas. Indeed, this points of interest are also key areas for the development of IoT markets.

In this respect, the 900 MHz range, in particular the cellular gap 915-921MHz, offers the unprecedented opportunity of low power device harmonization between the three ITU regions.

4. Global economies of scale and spectrum harmonization

Sigfox agrees with the RSPG comments on the importance of economies of scale. The role played by spectrum harmonization on this topic is well known. Even if there is no need for spectrum harmonization dedicated to IoT as a whole, it seems however important to ensure the harmonization of the frequency bands used by the most important technologies for IoT.

In addition to the three principle areas identified (SRD, Cellular and Wi-Fi) in the §4 of the opinion, Low Power Wide Area (LPWA) technologies should be mentioned as a forth key solution. Indeed, LPWA is complementary to the others areas and provides as of now new opportunities of connectivity for IoT applications and thus economic development.

5. 915-925MHz band for SRD and LPWA

As it is mentioned in the § 3 and 5.a of the Annex, the frequency range 915-921MHz offer a unique opportunity to move towards more harmonization between ITU regions for SRD and LPWA solutions

Beyond the foreseen need for additional spectrum, allowing safe operation for those systems in Europe in a near future, harmonization in Europe and ITU Region 1 of frequency bands in the so-called GSM gap is also a critical requirement to support export growth and international expansion which will boost the European IoT industries.

To date, most of the countries in ITU Regions 2 and 3 and several countries in Region 1, in particular in Europe, have already authorized parts of this frequency range for LPDs.

In summary,

- the band 915-928MHz is authorized in almost all ITU Region 2 countries,
- the sub-band 920-925MHz is authorized in most prominent countries in ITU Region 3 (China, Japan, South Korea, Australia, New Zealand, Taiwan, Singapore, Malaysia, Thailand, etc.),
- In Europe, the replies received to a CEPT questionnaire on the use of the 915-921MHz showed that this band was not used or partly not used by more than 30 CEPT countries, whereas only 5 countries had planned to authorized E-GSM-R.

It therefore seems fundamental that the European ecosystem benefits from an appropriate framework ensuring its development on the continent and offering growth opportunities beyond borders.

In the short term, Sigfox encourages the implementation of the technical and regulatory proposals made by CEPT in its draft addendum to the Report 59 for the next 3 years.

On the long run, building on the future options for railway communications and a better harmonization for other governmental applications, Sigfox is of the opinion that the whole 915-925MHz band should be secured for IoT applications on a general authorization or on light licensing basis.

This spectrum liberalization up to 925MHz would allow Europe, and in particular its IoT ecosystem, to catch-up with Northern American region, where 26 MHz are already available for low power devices in the sub-GHz spectrum, and would create a 5 MHz of common spectrum for unlicensed IoT applications with key Asian economies.

6. Regulatory terminology

Sigfox takes the opportunity of this consultation to advocate for a revision of the "Short Range Devices" (SRD) terminology in European regulation to cope with the recent radio technology developments. During the last decade, Software Design Radio became more and more used and affordable, making Low Power Devices able to provide long range connectivity, sometime up to several tens of kilometers or even more for the equipment using Ultra Narrow Band technology designed by Sigfox.

Sigfox is of the opinion that Low Power Devices (LPD) used in CITEL recommendations or Low Interference Potential Devices (LIPD) used in Australia, are more appropriate terms and would avoid misinterpretation by non-specialist stakeholders.