

Who owns IoT SEPs - A look into NB-IoT and LTE-M technologies

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Precis: The number of declared patents is increasing and also the demand for smart technology accelerates. Licensing of SEPs in IoT – especially those related to NB-IoT and LTE-M – will be a major challenge for industries looking to adapt connectivity technologies.

The Internet of Things (IoT) continues to influence and shape the future of technology development, with energy efficiency being crucial because many IoT devices need to operate without an external power supply. The right infrastructure is also necessary to enable IoT applications and sensors to communicate with one another over long distances in a way that conserves power.

Low-power wide-area (LPWA) is specifically designed for applications with low bandwidth requirements and low power consumption while providing wider and deeper network coverage. To meet these LPWA requirements, energy-efficient wireless technologies such as narrowband IoT (NB-IoT) and long-term evolution for machines (LTE-M) have been developed. Both technologies are based on 4G long-term evolution and connect things that could not be connected before.

NB-IoT technology

NB-IoT can be used to monitor and query various metrics and data points and is increasingly implemented in stationary applications and wherever simple sensors need to be efficiently networked. It can also be employed in a networked city (a so-called 'smart city') and has various uses. For example, electricity meters can be smart and digitized, with the ability to automatically report consumption data. Physical objects such as streetlamps, speed indicators, rubbish containers, parking meters and bus stops are already potentially networkable in practice and can thus transmit important information (eg, whether a rubbish bin needs to be emptied or if a carpark has free spaces). However, NB-IoT is a patented technology so to make use of it, standards implementers will need to license the underlying technology.



We used IPlytics Platform to identify NB-IoT patent holders by using a keyword approach for identifying declared SEPs, combined with the necessary information specifying which standardized technology (technical specifications) the patents were declared for. We then used a filter on priority dates of declared patents to capture the core standards development. We have not limited the search by jurisdiction, active or granted status.

NB-IoT or LTE-M patents can be mapped to specific sections of certain LTE technical specifications (TS). However, other patents essential to the same TS may not related to NB-IoT or LTE-M. A keyword-based analysis therefore only provides a broad result and can only be a first approach for a more in-depth analysis on the patent level. We want to highlight that other keywords or additional selected filters may result in other ranking positions and shares. Further, we refrain from making assessments of the technical relevance or essentiality of patent portfolios.

Figure 1 shows the cumulative number of declared NB-IoT patent families over time until 31 August 2022. The number of declared NB-IoT patents is increasing annually.

Figure 1. Cumulative number of declared NB-IoT patent families by year of first declaration (IPlytics Platform 2022)

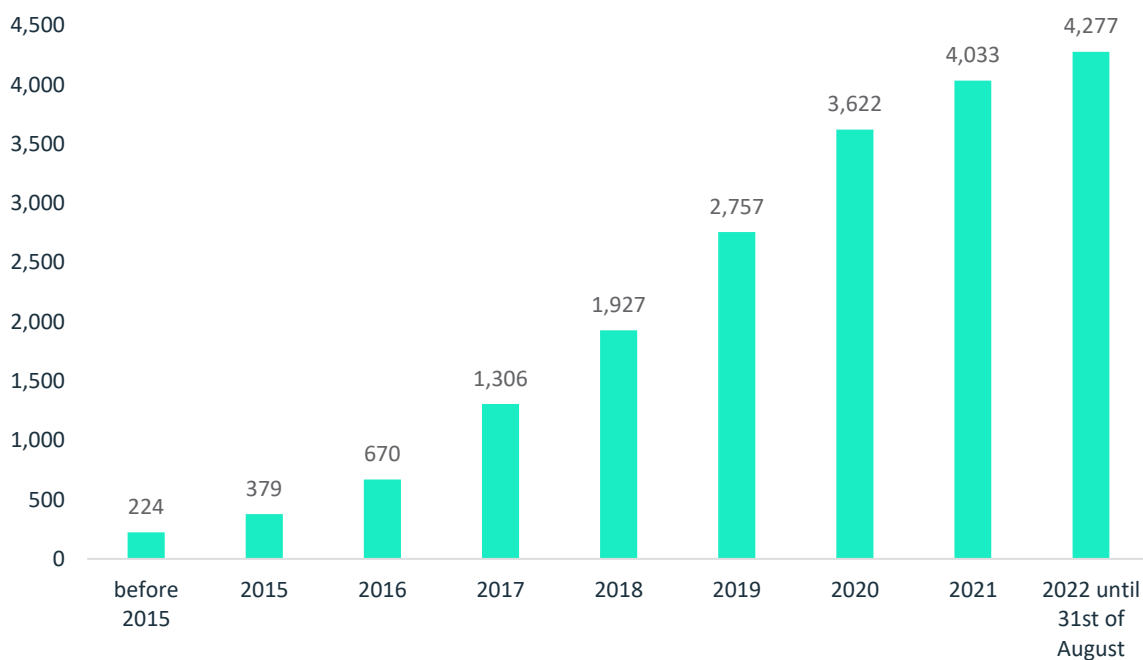
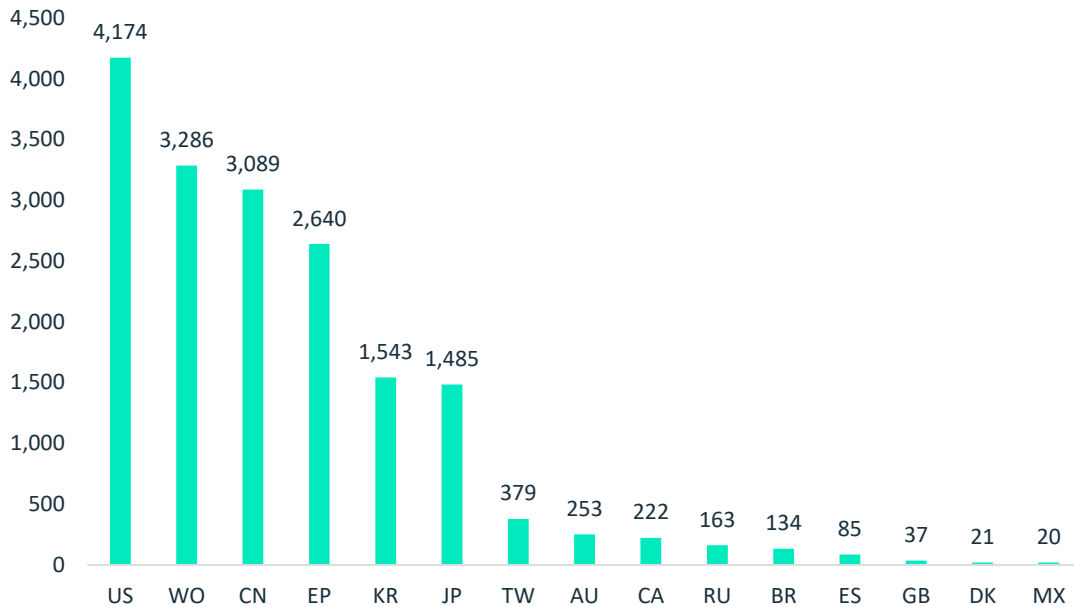




Figure 2 shows the number of NB-IoT-related patents per jurisdiction. The highest number of patents are filed in the USPTO, followed by WIPO, the Chinese Patent Office and EPO.

Figure 2. Number of declared NB-IoT patents per patent office (IPlytics Platform 2022)



Our keyword-based study provides an initial view on NB-IoT portfolios of different patent owners. According to our approach Qualcomm has the most declared SEPs in the space, Huawei has gathered the most patent families (INPADOC family definition). LG Electronics has the third largest NB-IoT portfolio, followed by ZTE, Ericsson and Samsung (table 1). Depending on the refinement of the patent declaration data, e.g. counting only granted and active families, or modifying the keyword search, these ranking positions change.



Table 1. Top 25 declaring companies as to cumulative number of declared patent families to the NB-IoT technology

The table content is heavily blurred, making the individual entries and columns illegible. It appears to be a list of companies and their corresponding patent family counts.

**Please contact Emma Roubtsov
(emma@iplytics.com) in case you
are interested in the list of the top
declaring companies**



Figure 3. Cumulative number of declared LTE-M patent families by year of first declaration (IPlytics Platform, 2022)

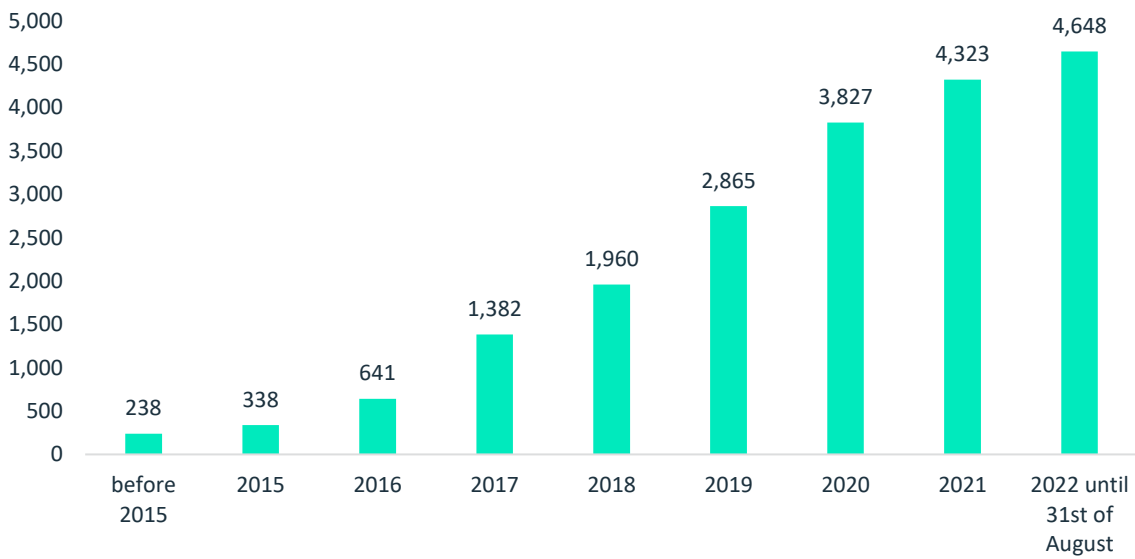
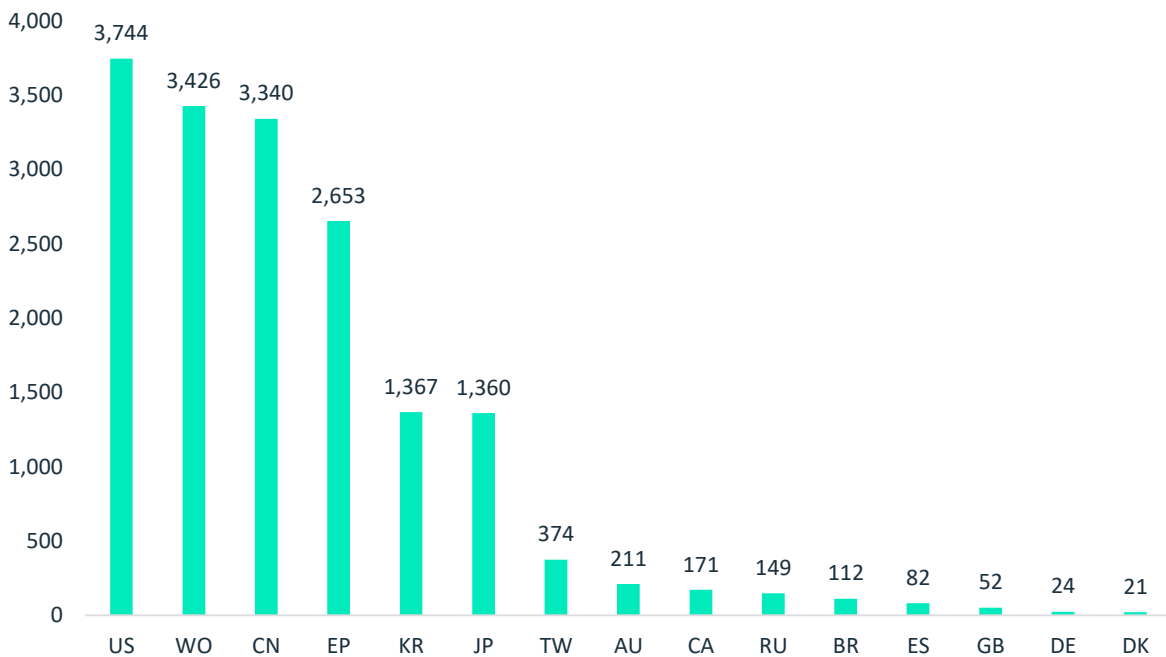


Figure 4 shows the number of LTE-M-related patents per jurisdiction. Similar to NB-IoT, the highest number of LTE-M-related patents are filed in the USPTO, WIPO and the Chinese and European patent offices.

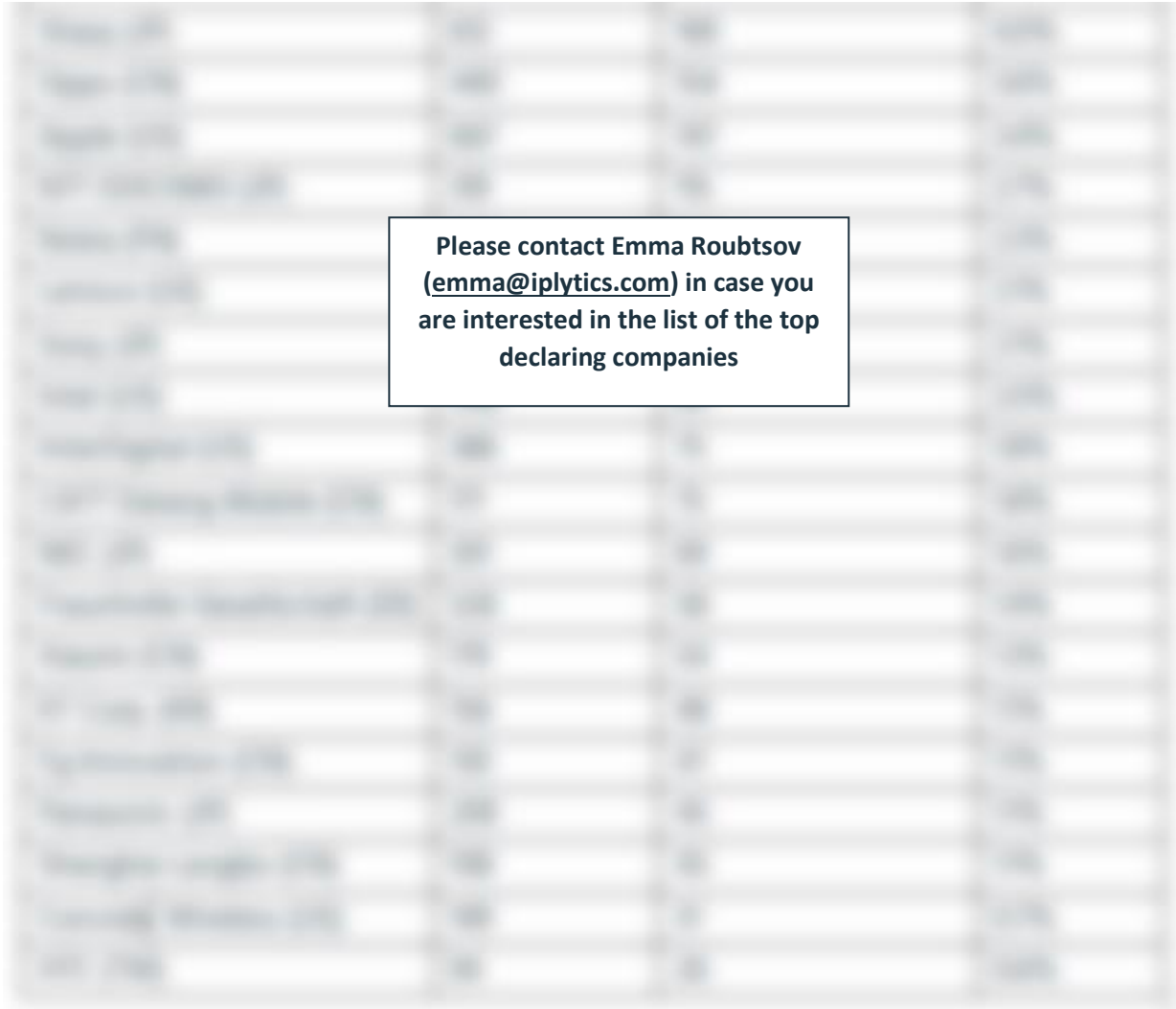
Figure 4. Number of declared LTE-M patents per patent office (IPlytics Platform, 2022)





Our keyword-based study provides an initial view on LTE-M portfolios of different patent owners. While Qualcomm has the most SEPs filed in the LTE-M space, Huawei has gathered the most patent families (INPADOC family definition). LG Electronics has the third largest LTE-M portfolio, followed by ZTE, Ericsson and Samsung (table 2). Depending on the refinement of the patent declaration data, e.g. counting only granted and active families, or changing the keywords, these ranking positions change.

Table 2. Top 25 declaring companies as to cumulative number of declared patent families to the LTE-M technology



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Key considerations

The SEP-related global royalty income was estimated at \$20 billion in 2021, but market researchers foresee a strong increase in the compound annual growth rate over the next few years due to wide implementation of the next generation of IoT standards. Market researchers also predict that most SEP holders will actively monetize and enforce their SEP portfolios covering standardized technologies such as NB-IoT and LTE-M technologies. The increasing need for wide implementation of standards is shaping the market for SEP licensees and holders alike. Licensing of SEPs in IoT will be a major challenge for any industry looking to adapt connectivity technologies. Senior patent directors, licensing executives or legal counsel should bear the following points in mind:

- future connectivity technologies will increasingly rely on patented technology standards, such as NB-IoT and LTE-M.
- the number of SEP declarations as well as the number of SEP owners is constantly increasing, so licensees must consider royalty costs and appropriate security payments in advance.
- patent directors and licensing executives ought to not only consider patent data information, but also monitor and consider stakeholders leading in patent declarations, look at SEP claims and standards section comparisons, as well as consider data such as technical contributions to understand the landscape of SEP holders.
- this study was intended to showcase a keyword based initial analysis of declaration or standard contribution data, but the authors are aware of the challenges and limitations related to the keyword approach especially in the context of the NB-IoT and LTE-M related studies.
- keyword based analysis can only ever show part of the picture. Patent level analysis is required to determine the true relative strengths of different SEP holders' portfolios
- other 4G LTE categories are relevant for the various IoT vertical industries, but these are not covered in this report; and



- the essentiality rate differs across self-declared patent portfolios. SEP determination is crucial to make accurate assumptions about SEP market shares. Further refinement and analysis are needed to identify essentiality rates.

Limitation

We used a keyword approach without additional filters for the active or granted status of a patent or patent family. We want to highlight that other keywords or additional selected filters might result in other ranking positions and shares. Further, we refrain from making assessments of the technical relevance of patent portfolios. Consequently, this report showcases the keyword-based study of declaration or standard contribution data, but the results should not be used as validated evidence for SEP ownership.

For further information, please contact us.



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Empowering professionals to overcome complexity in data-led decisions where standards and patents matter by being the transparent, accessible source of wisdom

IPlytics is the first solution on the market to bring together comprehensive and highly indexed information on technical standards, declared SEPs, patent pools, global patents and standards contribution data. Using all these data points, IPlytics produces an industry-leading analysis into the past, present and future of standards-essential technology. IPlytics provides fast, intuitive access to patents and standards that can help empower the user to:

- ✓ align patent portfolio strategy to protect innovations.
- ✓ engage in continuous strategic portfolio development as it relates to SEP assets.
- ✓ understand the competitive landscape and strategies; accordingly, and
- ✓ help in initiatives such as licensing, acquisitions and joining patent pools.

The next technology revolution will connect everything from different realms of technology, making it even more challenging to understand how technologies relate to connectivity standards. IP professionals must rethink – even revolutionize – how to approach both patent and standards data. To navigate the highly complex and ever-changing IP world, the only way to stay ahead of the competition is to gain business-ready, actionable insights quickly and use them for decision making across organizations. IPlytics gives you those business-ready insights in a matter of seconds and serves them with intuitive visualizations so you can leverage them right away.

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