IPLYTICS | Intellectual Property Analytics

Answering SEP market questions-Webinar Series Part 2:

How to gain the competitive edge for NB-IoT/LTE-M

Tim Pohlmann CEO @ IPlytics GmbH

Recording: https://youtu.be/7PS2rulULLs

IPlytics Webinar Series 2023

I. Part 1: "How to gain the competitive edge for V2X technology"
January 24th, 2023
Recording: https://www.iplytics.com/events/past/

II. Part 2: "How to gain the competitive edge for NB-IoT and LTE-M"
February 28th, 2023
Recording: https://www.iplytics.com/events/past/

III. Part 3: "How to gain the competitive edge for Wi-Fi and Video Codec"
March 28th, 2023
Register: https://www.iplytics.com/events/upcoming/

Today's Speaker

- **PhD & Post Doc.** TU Berlin, CERNA, MINES ParisTech.
- CEO and **founder of IPlytics**.
- **2022 IAM Strategist 300**. Panel speaker thought leader.
- **Economic expert** and author of studies for the EU Commission, WIPO and German government.
- Appointed **faculty lecturer** (TU Berlin, EPF Lausanne, CEIPI Strasbourg, Cleveland-Marshall College of Law)
- **Author** of over 50 industry articles published at IAM Magazine, IPWatchdog and Managing IP.

Today's Agenda

I. NB-IoT and LTE-M advancement for the IoT Industry

II. The market potential for NB-IoT/LTE-M technology

III. Standards development for NB-IoT/LTE-M technology

IV. SEP licensing in the IoT industry

V. How to identify NB-IoT/LTE-M SEPs

VI. How to get the right insights from your NB-IoT/LTE-M SEP analysis

VII. Takeaways.

I. NB-IoT and LTE-M and the IoT

NB-IoT / LTE-M advancements

- 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 cellular technologies such as narrowband IoT (**NB-IoT**) and long-term evolution for machines (**LTE-M**) have been developed. **NB-IoT** and **LTE-M** are both cellular technologies designed specifically for **IoT devices**.

- While they share some **similarities**, they also have some **distinct technical advancements** compared to traditional cellular networks.

NB-IoT advancements

NB-IoT technical advancements include:

1. **Low Power Consumption:** NB-IoT is designed to be low power, enabling IoT devices to operate for years on a single battery charge.

2. **Improved Network Coverage:** NB-IoT offers improved network coverage compared to traditional cellular networks, thanks to its narrowband frequency utilization that can penetrate walls and other obstacles.

NB-IoT advancements

NB-IoT technical advancements include:

3. **Cost-effective:** NB-IoT is a cost-effective solution for IoT devices, with low device costs and reduced operational costs.

4. **Enhanced Security:** NB-IoT provides enhanced security features to protect IoT devices and data from cyber threats.

5. **Scalability:** NB-IoT is designed to be highly scalable, enabling the deployment of large-scale IoT networks.

LTE-M advancements

LTE-M technical advancements include:

1. **High Data Rates:** LTE-M offers higher data rates than NB-IoT, which can be beneficial for applications such as video monitoring and streaming.

2. **Low Latency:** LTE-M offers lower latency than NB-IoT, making it suitable for applications that require real-time response, such as remote control of machines.

3. **Voice Support:** LTE-M supports voice, which can be useful for applications such as smart speakers and voice-activated devices.

LTE-M advancements

LTE-M technical advancements include:

4. **Roaming Support:** LTE-M supports roaming, enabling devices to connect to networks in other countries or regions.

5. **Network Quality of Service (QoS):** LTE-M offers advanced QoS features, such as priority access & quality differentiation, used for applications that require guaranteed network performance.

NB-IoT / LTE-M use cases

NB-IoT (Narrowband Internet of Things) and LTE-M (Long-Term Evolution for Machines) are both cellular technologies designed specifically for IoT devices.

Use Cases for NB-IoT:

1. **Smart Metering:** NB-IoT can be used for smart metering applications, such as monitoring water, gas, and electricity usage. The technology's low power consumption and improved network coverage make it well-suited for this application.

2. **Asset Tracking:** NB-IoT can be used for asset tracking applications, such as tracking the location of shipping containers, pallets, and other assets. The technology's low power consumption and cost-effectiveness make it an attractive option for large-scale deployments.

NB-IoT / LTE-M use cases

Use Cases for NB-IoT:

3. **Smart Parking:** NB-IoT can be used for smart parking applications, such as monitoring parking space availability and guiding drivers to available spots. The technology's improved network coverage and scalability make it well-suited for this application.

4. **Agriculture:** NB-IoT can be used in agriculture applications, such as monitoring soil moisture levels and controlling irrigation systems. The technology's low power consumption and improved network coverage make it an ideal solution for remote and rural areas.

5. **Healthcare:** NB-IoT can be used in healthcare applications, such as remote patient monitoring and tracking medical equipment. The technology's enhanced security features and low power consumption make it well-suited for this application.

NB-IoT / LTE-M use cases

Use Cases for LTE-M:

1. **Asset Tracking:** LTE-M can be used for asset tracking applications that require higher data rates and real-time response, such as tracking high-value assets like vehicles and machinery.

2. **Video Monitoring:** LTE-M can be used for video monitoring applications, such as security cameras and surveillance systems. The technology's higher data rates and low latency make it an ideal solution for real-time video streaming.

3. **Fleet Management:** LTE-M can be used for fleet management applications, such as monitoring the location and status of vehicles, optimizing routes, and reducing fuel consumption. The technology's high data rates and low latency make it well-suited for this application.

NB-IoT / LTE-M use cases

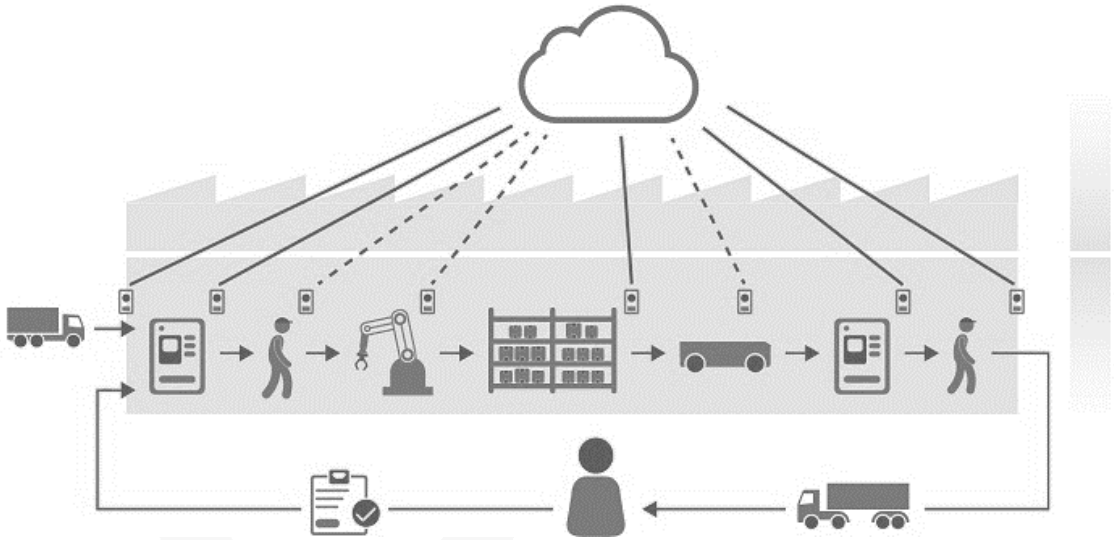
Use Cases for LTE-M:

4. **Smart Cities:** LTE-M can be used for smart city applications, such as traffic management, environmental monitoring, and public safety. The technology's advanced QoS features and roaming support make it an ideal solution for city-wide deployments.

5. **Industrial Automation:** LTE-M can be used for industrial automation applications, such as remote control and monitoring of machines and equipment. The technology's low latency and high reliability make it well-suited for this application.

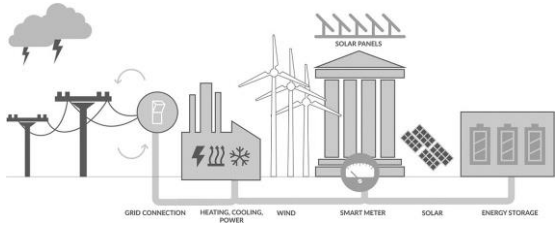
Standards in the connected world

Smart Factory

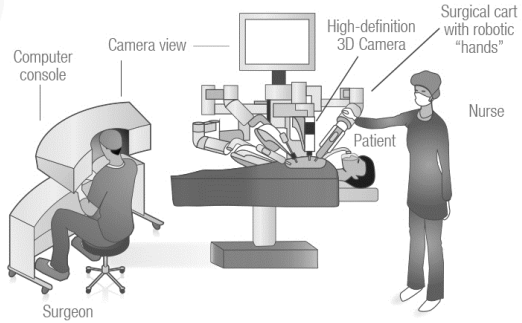


Smart City

Smart Energy



Smart Healthcare



Smart Home

Remote and off-site operational work

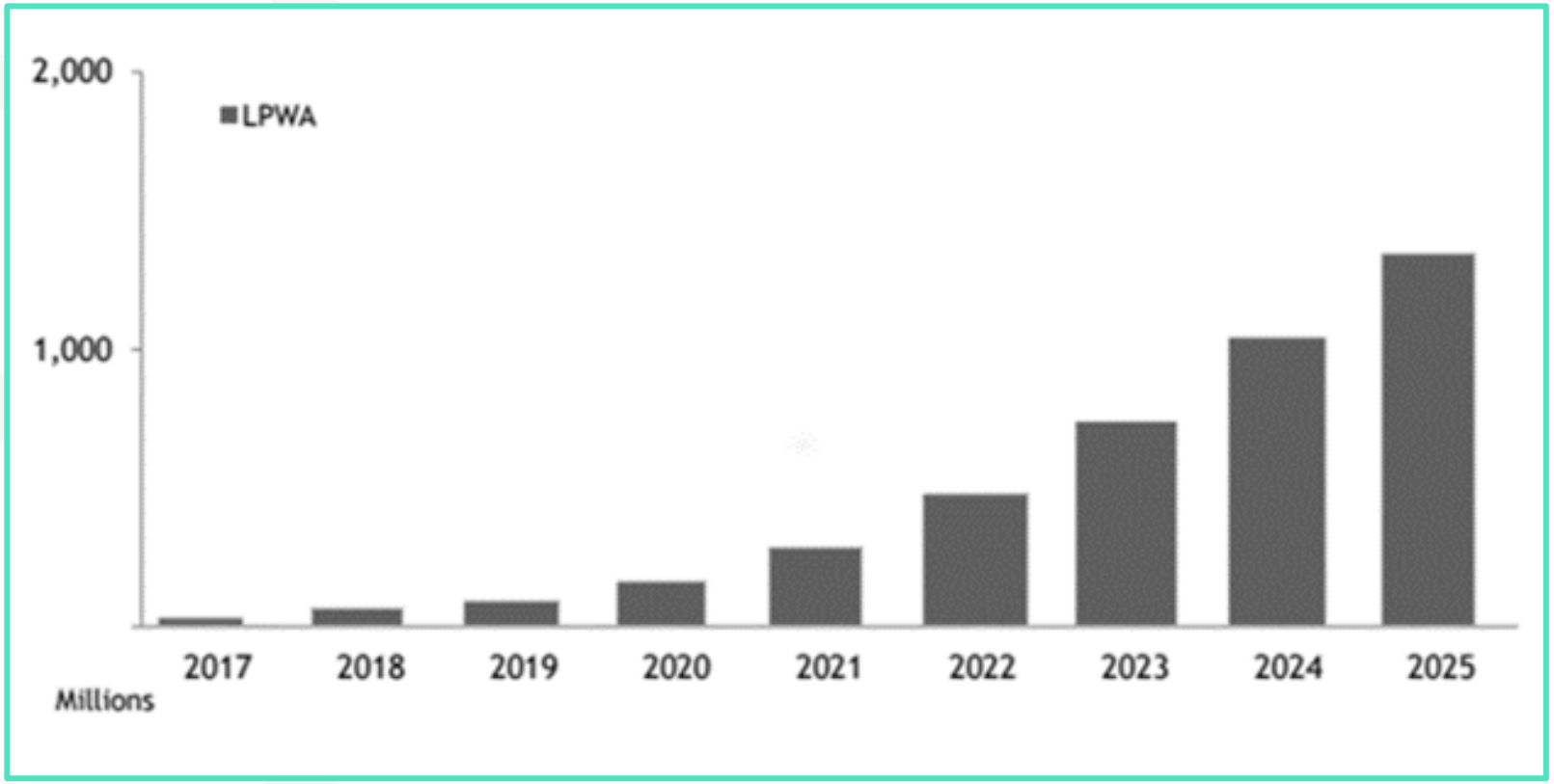
Disruptive technology trends enabled though industrial internet of things (IIoT):

- **Virtual Maintenance**
  - Utilizing technologies such as **virtual reality** and **augmented reality**, or **artificial intelligence** to allow multi-person collaboration, remote assistance or fully automated processes.
- **Machine Monitoring**
  - Making use of **sensors**, **connected devices**, advanced **video** surveillance enable real-time machine health monitoring as well early waring and condition projections.
- **Advanced Predictions**
  - The implementation of technologies like **edged computing** allow real time analysis of machine performance data for predicting maintenance for a proactive monitoring ensuring more efficiency and reduced downtimes.

II. The market potential for NB-IoT/LTE-M

LPWA industry trends

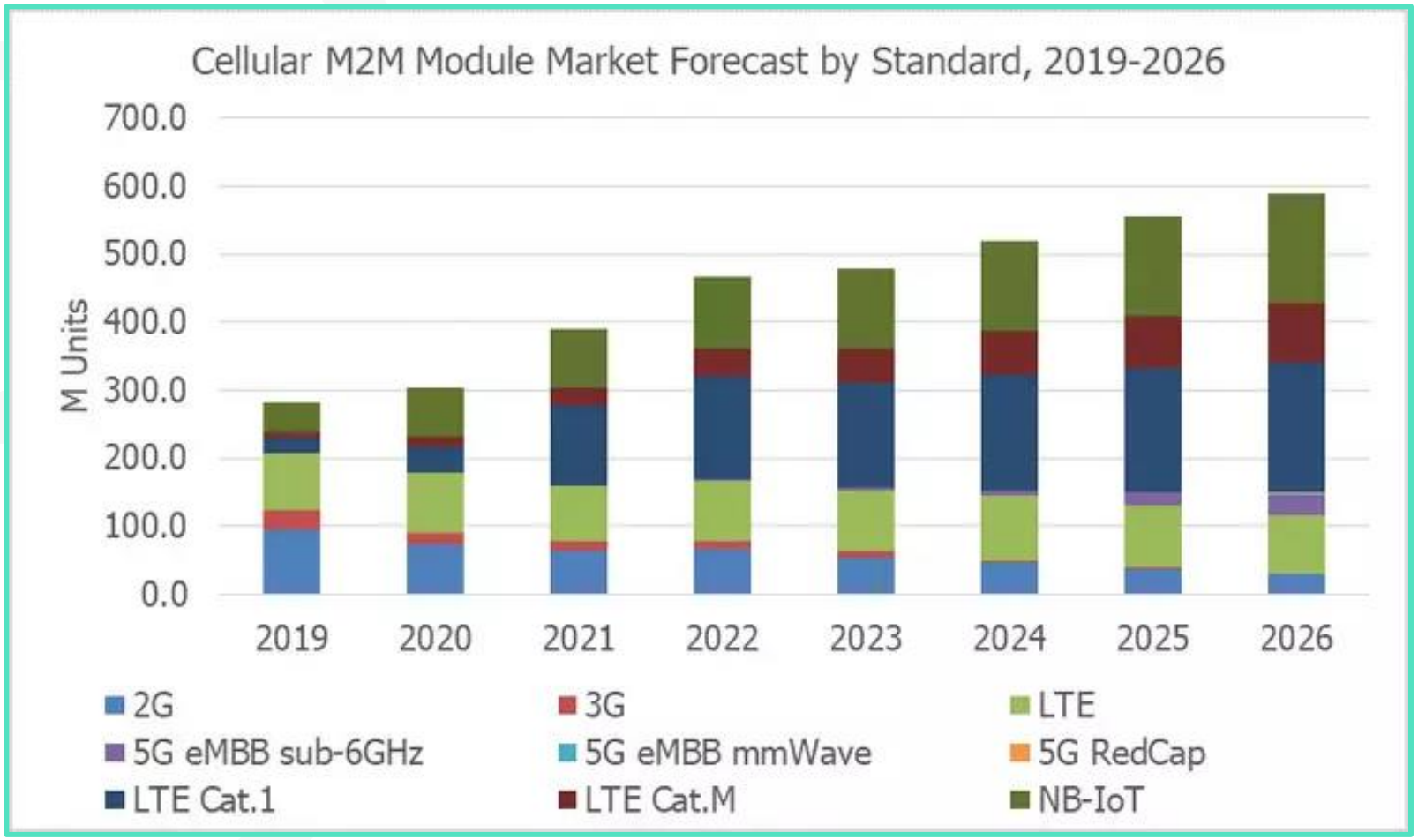
- **Market Synopsis**
  - It is estimated that by 2025, there will be over a **billion LPWA connections**



Source: https://www.precedenceresearch.com/automotive-v2x-market

M2M module market forecast

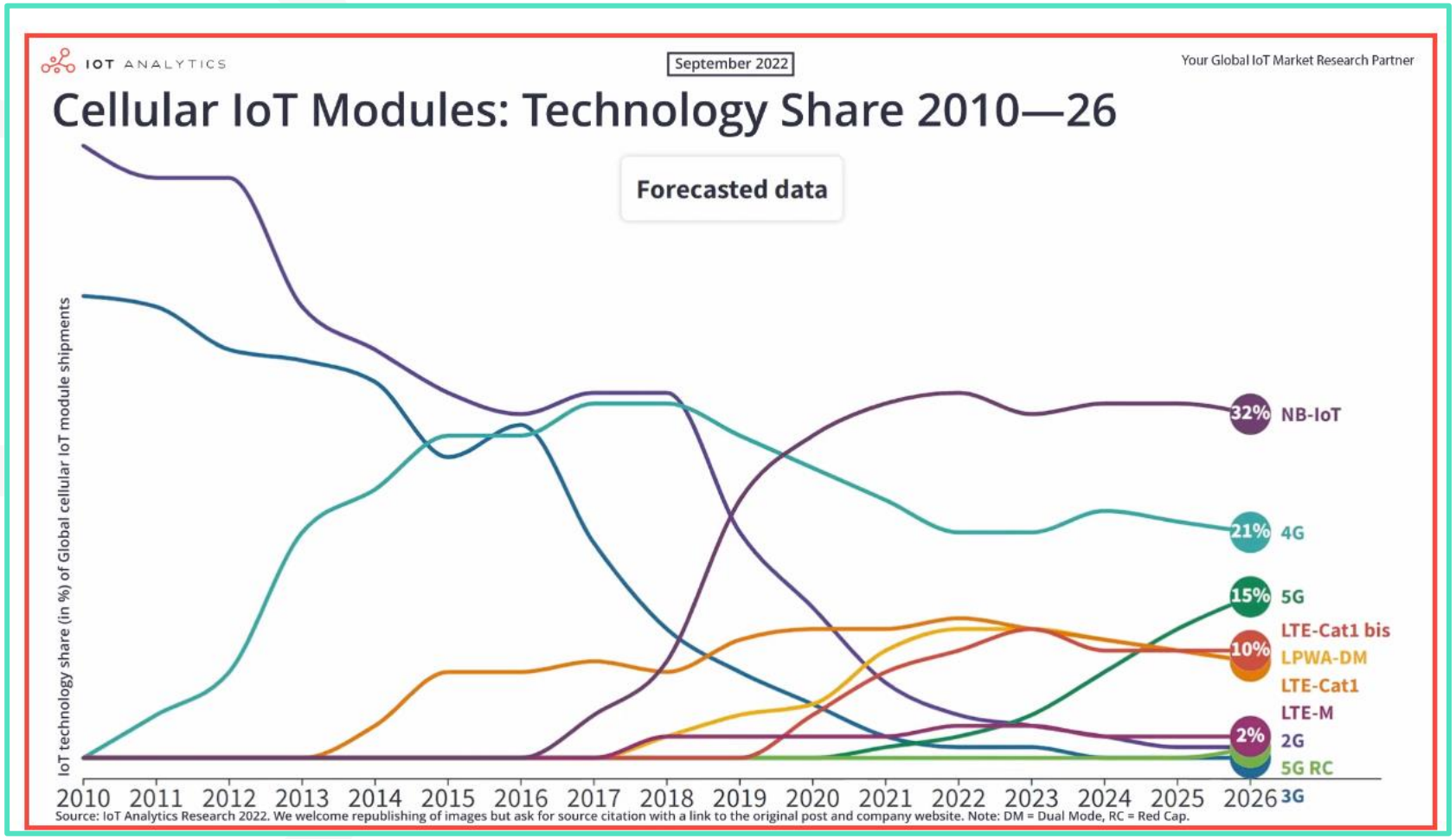
- **Market Synopsis**
  - Expected **M2M units** growth by cellular standard.
  - LTE Cat.1, LTE Cat.M, NB-IoT and 5G eMBB sub-6GHz with **increasing numbers**



Source: https://x.ua/p/cellular-iot-module-market-strong-demand-supply-constraint-possible-slowdown-in-2023-lte-cat1-rises-592156

IoT modules market share

- **Market Synopsis**
  - Share of global IoT module shipments by standard.
  - By 2026, **NB-IoT with highest share of 32%**

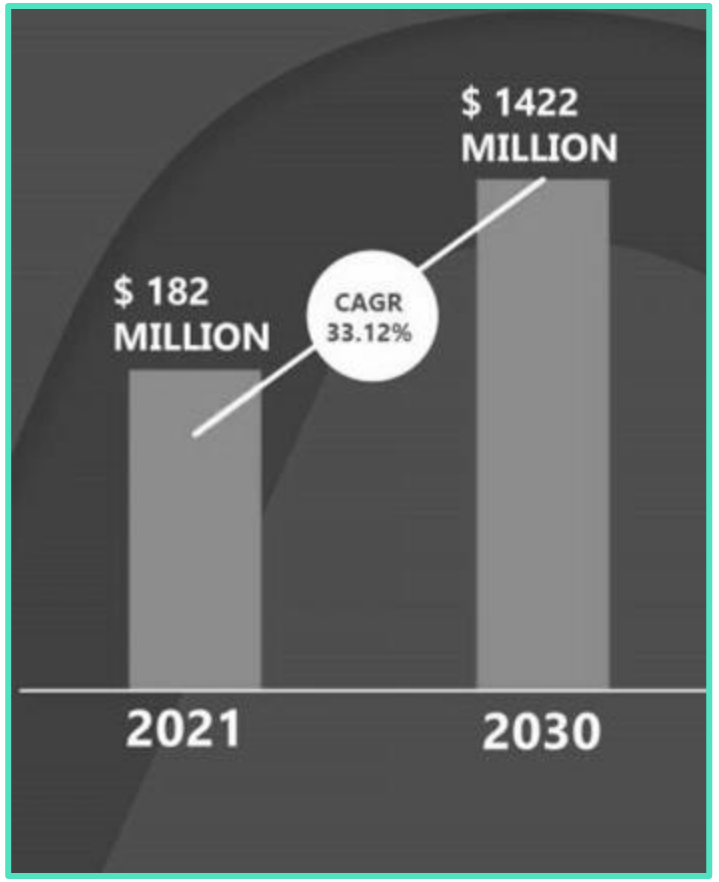


Source: https://iot-analytics.com/iot-modules/

NB-IoT industry size

➢ Market Synopsis

- Narrowband IoT Market size was valued at USD 182 Million in 2021 and is projected to reach USD 1422 Million by 2030, growing at a CAGR of 33.12% from 2022 to 2030.



Source: https://www.precedenceresearch.com/automotive-v2x-market

Module Market Trends

- **From two to 10 technologies**
  - In 2010, the **cellular IoT module market** consisted of only two connectivity technologies, 2G and 3G. Since then, **eight major** new technologies have been introduced to the market.
- **Adoption of NB-IoT and LTE-M**
  - Since 2019, we have seen mass adoption of the **LPWA dual mode module** (NB-IoT+ LTE-M), with adoption still growing at a higher rate in 2022.
- **The rise of LTE-CAT 1**
  - 2014 marked the beginning of the rise of the LTE-Cat 1 technology standard. The massive migration from 2G/3G to LTE-Cat 1 started in 2018

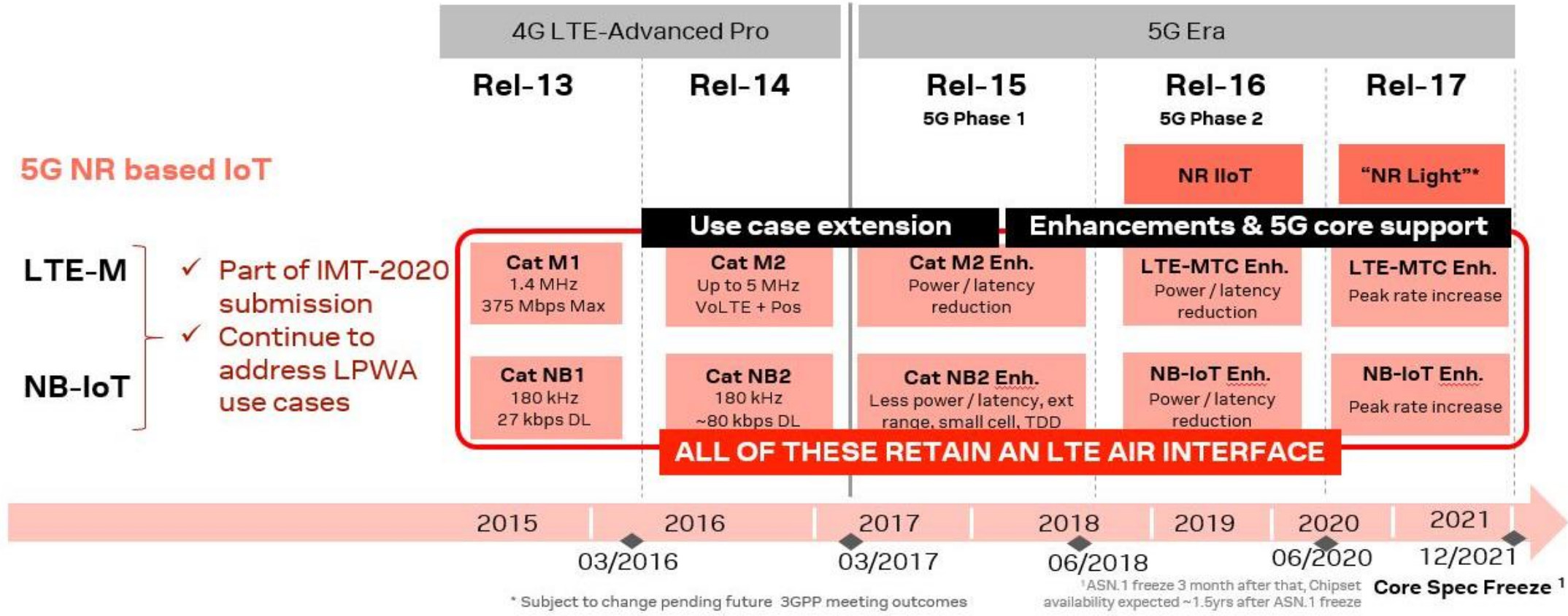
III. NB-IoT / LTE-M standards development

NB-IoT / LTE-M Standards Development

NB-IoT / LTE-M evolution in the 3GPP

- **NB-IoT and LTE-M Release 13**
  - Introduced by **3GPP in 2015** as part of Release 13, NB-IoT and LTE-M recognized the simplified requirements of the elemental IoT services which comprise the bulk of the IoT market.
- **NB-IoT /LTE-M Release 14-16 Enhancements**
  - Rel-16 specifies how **NB-IoT and LTE-M transmissions** will be incorporated directly into **5G NR** deployments, underpinning their future status as 5G standards, and ensuring compatibility with existing NB-IoT and LTE-M deployments.
  - Further LPWA developments in Rel-17 include enhancements to latency and power efficiency along with increases to peak transmission rates.

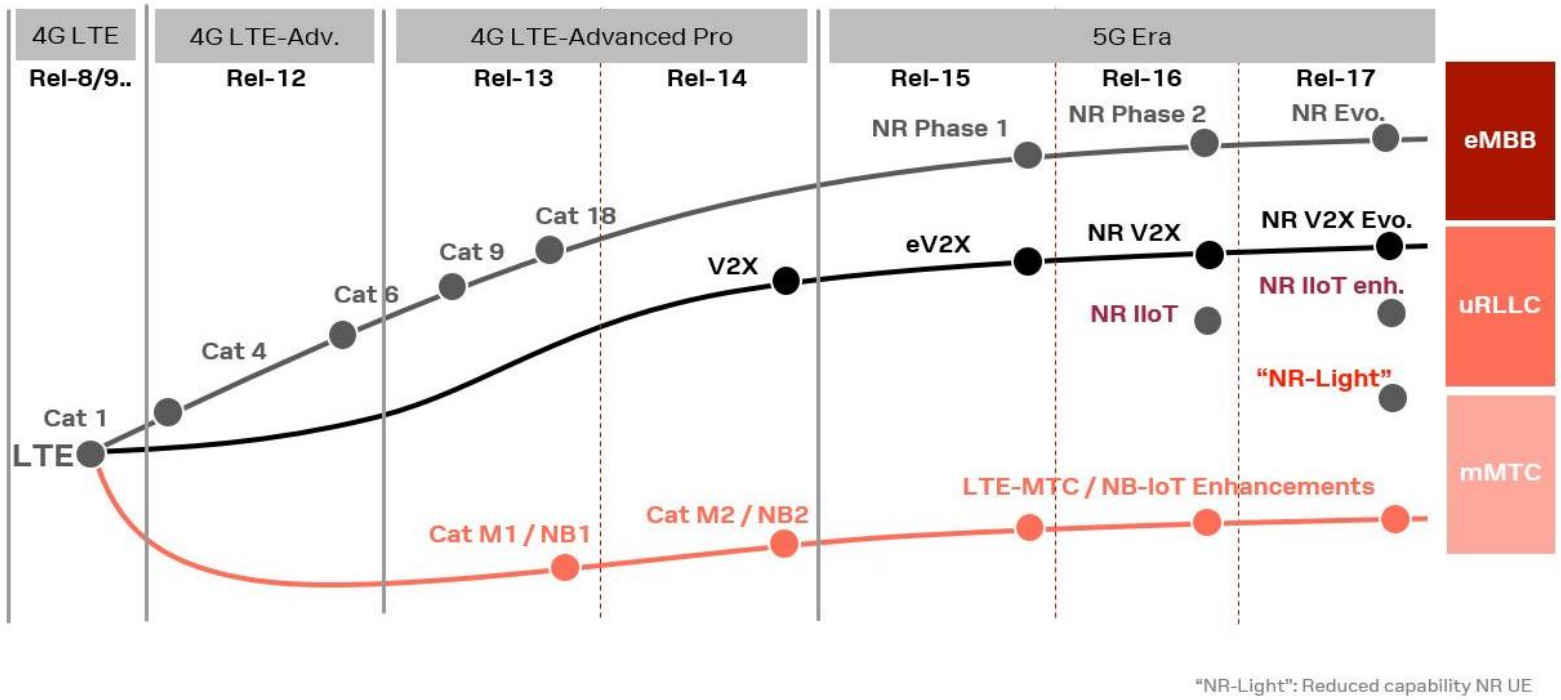
LPWA Evolution – NB-IoT and LTE-M



Source: https://www.embedded.com/5g-roll-out-a-marathon-not-a-sprint/

LPWA Evolution – NB-IoT and LTE-M

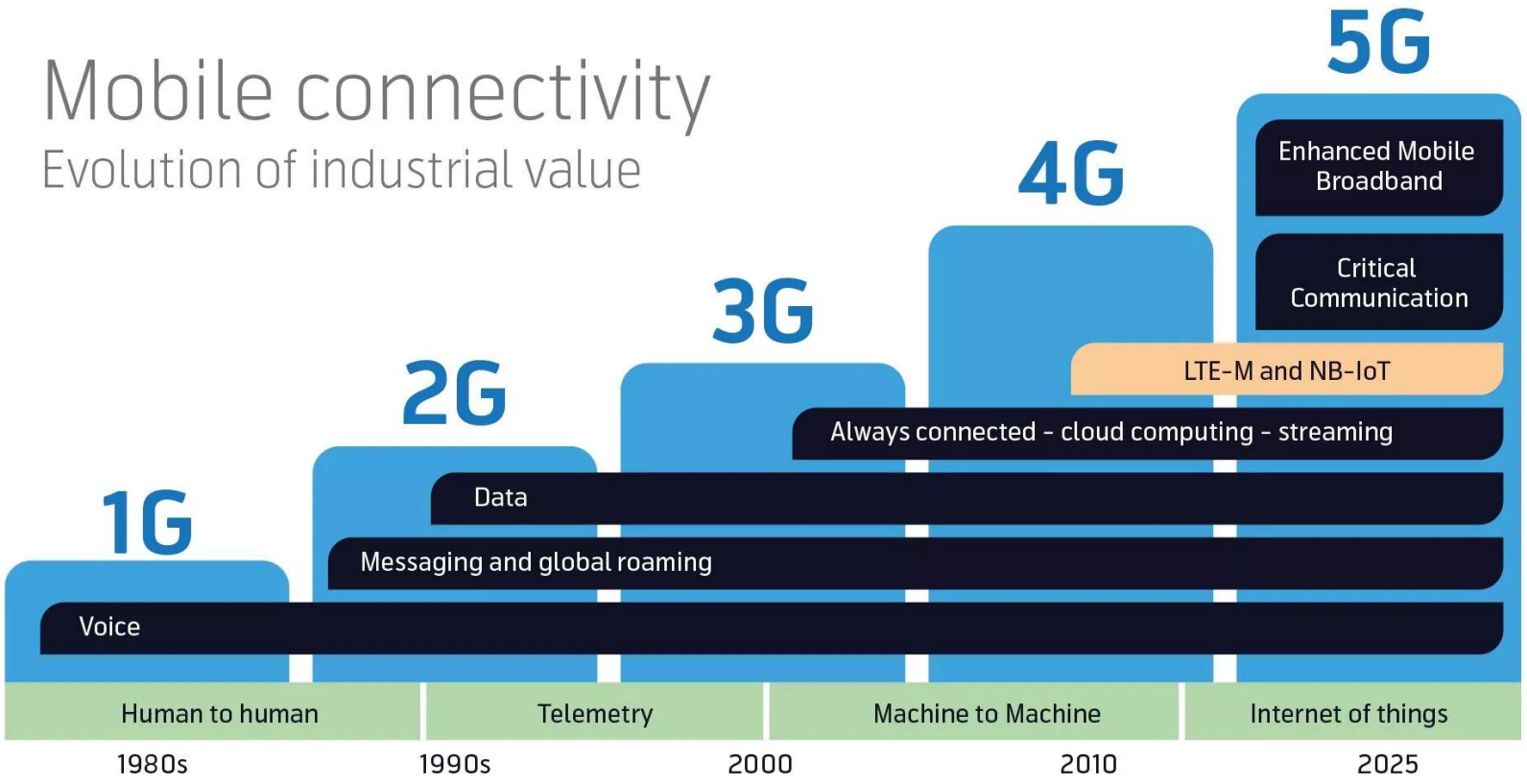
- **Connectivity - LTE-M vs NB-IoT, Coverage by Standard Generation**
  - With the current focus on realizing the Industry 4.0 vision, it is no surprise that IIoT technologies comprise a significant body of the work under Releases 16 and 17



Source: https://www.embedded.com/5g-roll-out-a-marathon-not-a-sprint/

NB-IoT / LTE-M Standards Development

- **Connectivity - LTE-M vs NB-IoT, Coverage by Standard Generation**
  - LTE-M/NB-IoT networks fall under the umbrella of 4G/5G - they are formally recognized under each category.



Source: https://support.digitalmatter.com/support/solutions/articles/16000103040-connectivity-lte-m-vs-nb-iot-coverage-providers-and-roaming

IoT Network Deployment 2023

- **GSMA list of all Mobile IoT Commercial Networks (2022):**
  - Number of LTE-M Networks = **60**
  - Number of NB-IoT Networks = **110**
  - Total Number of Mobile IoT Networks = **170**

Number of LTE-M Networks	Number of NB-IoT Networks	Total Number of Mobile IoT Networks
60	110	170

Last Update: Feb 2022

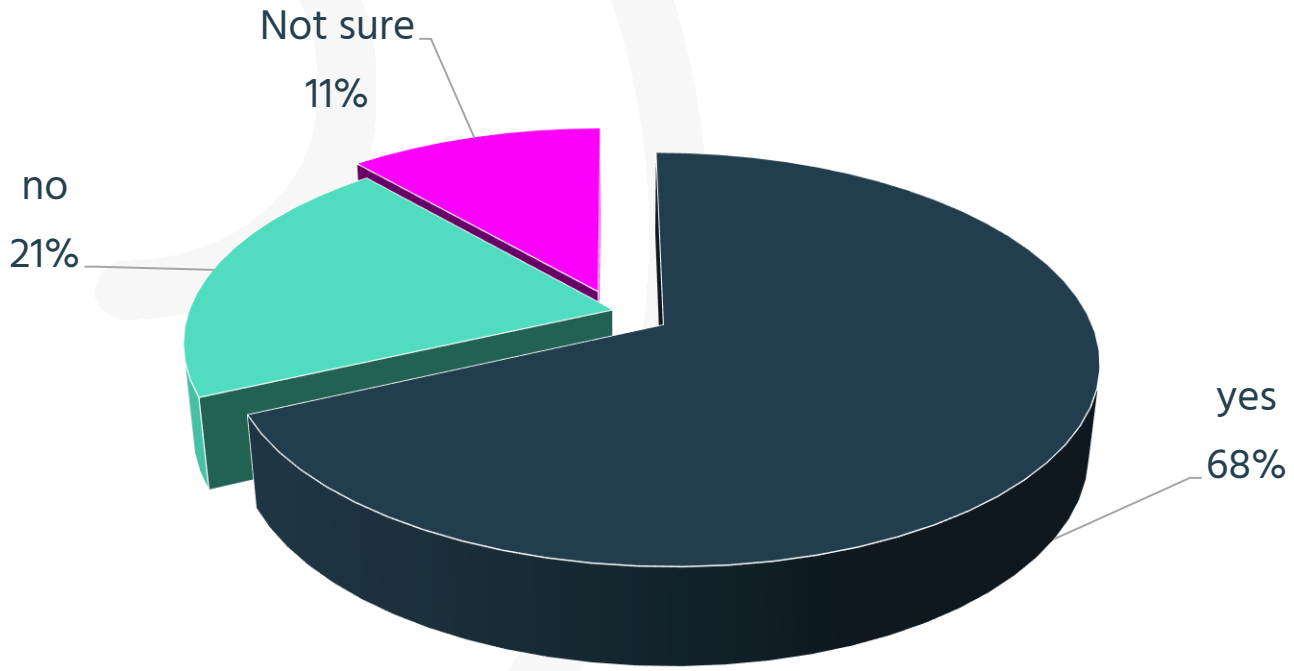
Operator	Country/Region	Technology
3	Hong Kong, SAR China	NB-IoT
A1	Austria Belarus Bulgaria Croatia Serbia	NB-IoT
	Slovenia	LTE-M & NB-IoT
AIS	Thailand	LTE-M & NB-IoT
América Móvil	Mexico	LTE-M
Antel	Uruguay	NB-IoT
APTG	Taiwan, Province of China	LTE-M & NB-IoT
Altice	Portugal	NB-IoT
AT&T	Mexico United States	LTE-M
	United States	NB-IoT
BASE (Telenet)	Belgium	NB-IoT
Bell	Canada	LTE-M

Source: https://www.gsma.com/iot/mobile-iot-commercial-launches/

IV. SEP Licensing in the IoT Industry

TU Berlin Industry Survey

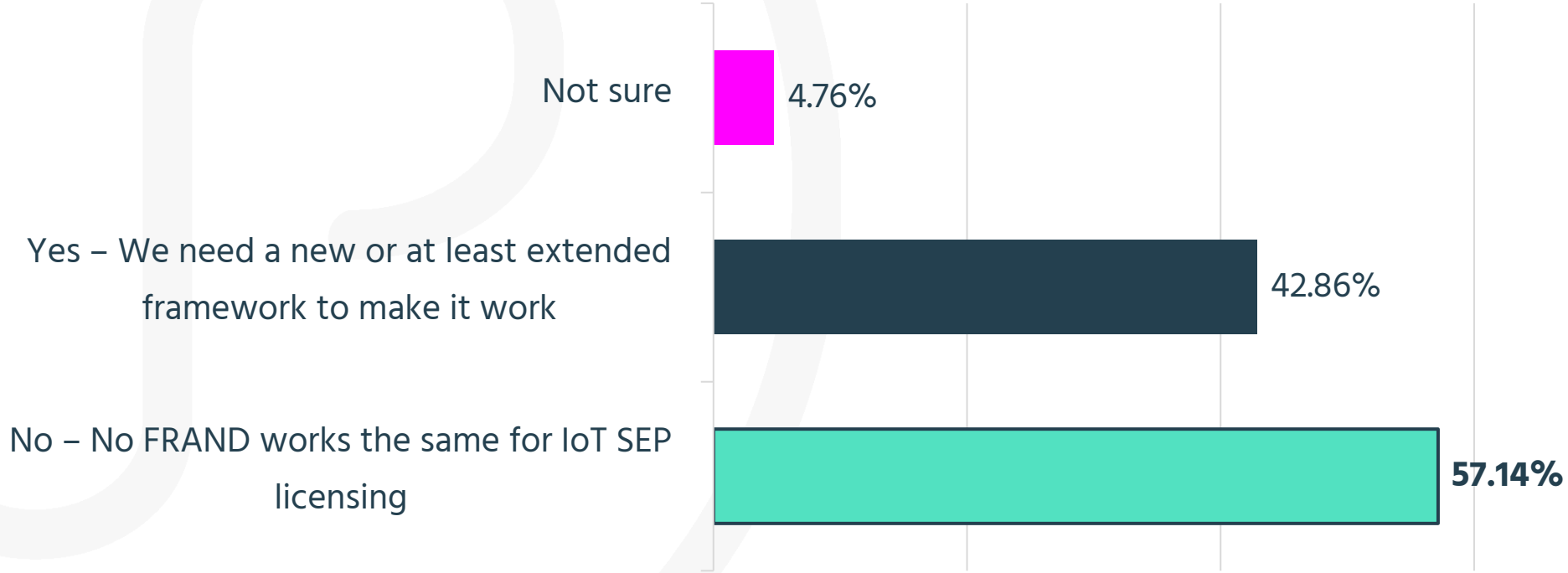
Q1: Do you think that SEP licensing will be more challenging for IoT applications compared to the smartphone market? (N=54)



Source: https://www.iplytics.com/report/video-recording-tu-berlin-virtual-conference-licensing-of-seps/

TU Berlin Industry Survey

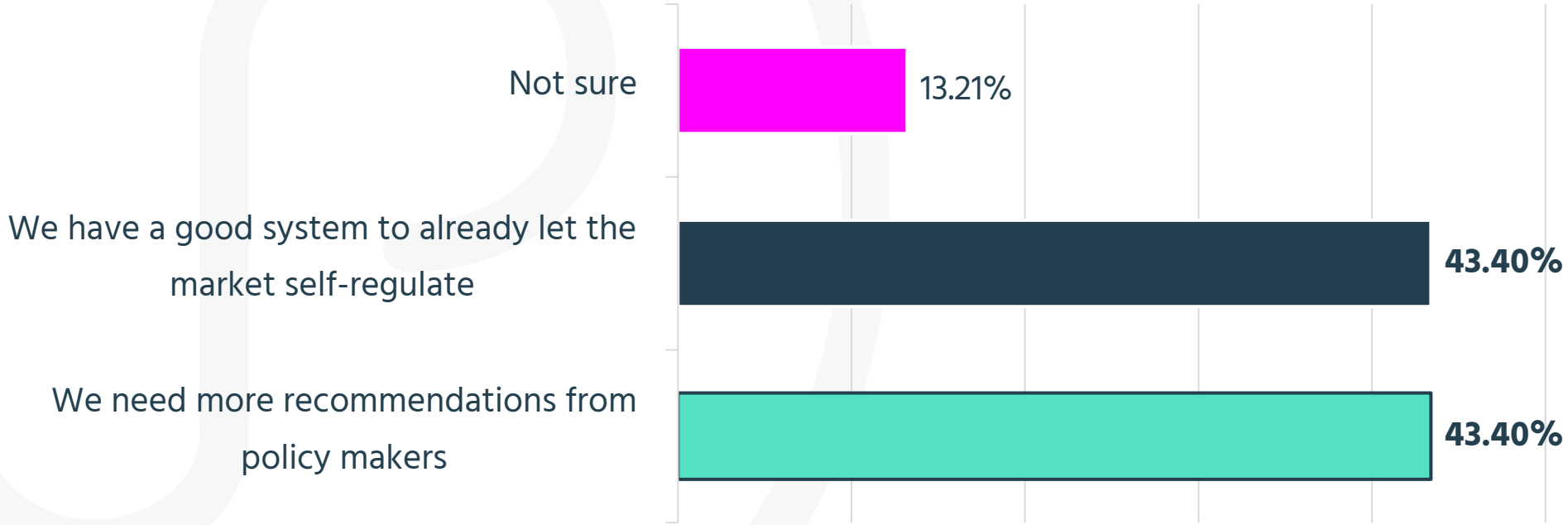
Q2: Do we have to rethink the FRAND framework for SEP licensing for IoT? (N=52)



Source: https://www.iplytics.com/report/video-recording-tu-berlin-virtual-conference-licensing-of-seps/

TU Berlin Industry Survey

Q3: Should policy makers provide solutions for FRAND or should the market self-regulate? (N=63)



Source: https://www.iplytics.com/report/video-recording-tu-berlin-virtual-conference-licensing-of-seps/

Thales IoT Modules for Smart Energy Solutions

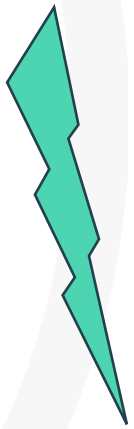
Thales IoT Modules	2G	NB-IoT	LTE CAT-M	LTE CAT 1	LTE CAT 1 bis	Key Differentiator
 EXS62		X	X			Remote update data rate
 EXS82	X	X	X			Remote update data rate
 TX62		X	X			Remote update data rate
 TX82	X	X	X			Remote update data rate
 TN23		X				Highest Power Efficiency
 PLS63	X			X		Global coverage
 ELS62	X				X	1 antenna

Source: https://www.thalesgroup.com/en/markets/digital-identity-and-security/iot/industries/energy-utilities/iot-modules

The clash of cultures for Smart Meter

Communication Industry

- SEPs are licensed on the **User Equipment level**
- Consequence: licensing negotiations always target the device manufacturer (**OEM**)
- Horizontal license negotiations
- **Result:** Potentially high licensing costs for OEMs without own SEP portfolios



Smart Meter Industry

- Patents are usually (cross --) licensed on **vertical levels**
- **Suppliers** typically incorporate IP rights into its component supply contracts
- License based on a component selling price
- **Result:** Minimum increase of car sales price

SEP licensing in the IoT industry

What is the basis of the license?

- The product/device vs. the component/module (SSPPU)

What is the mechanism?

- Percentage of the product/component vs. lump sum price per product/component

Who can take a license in the value chain?

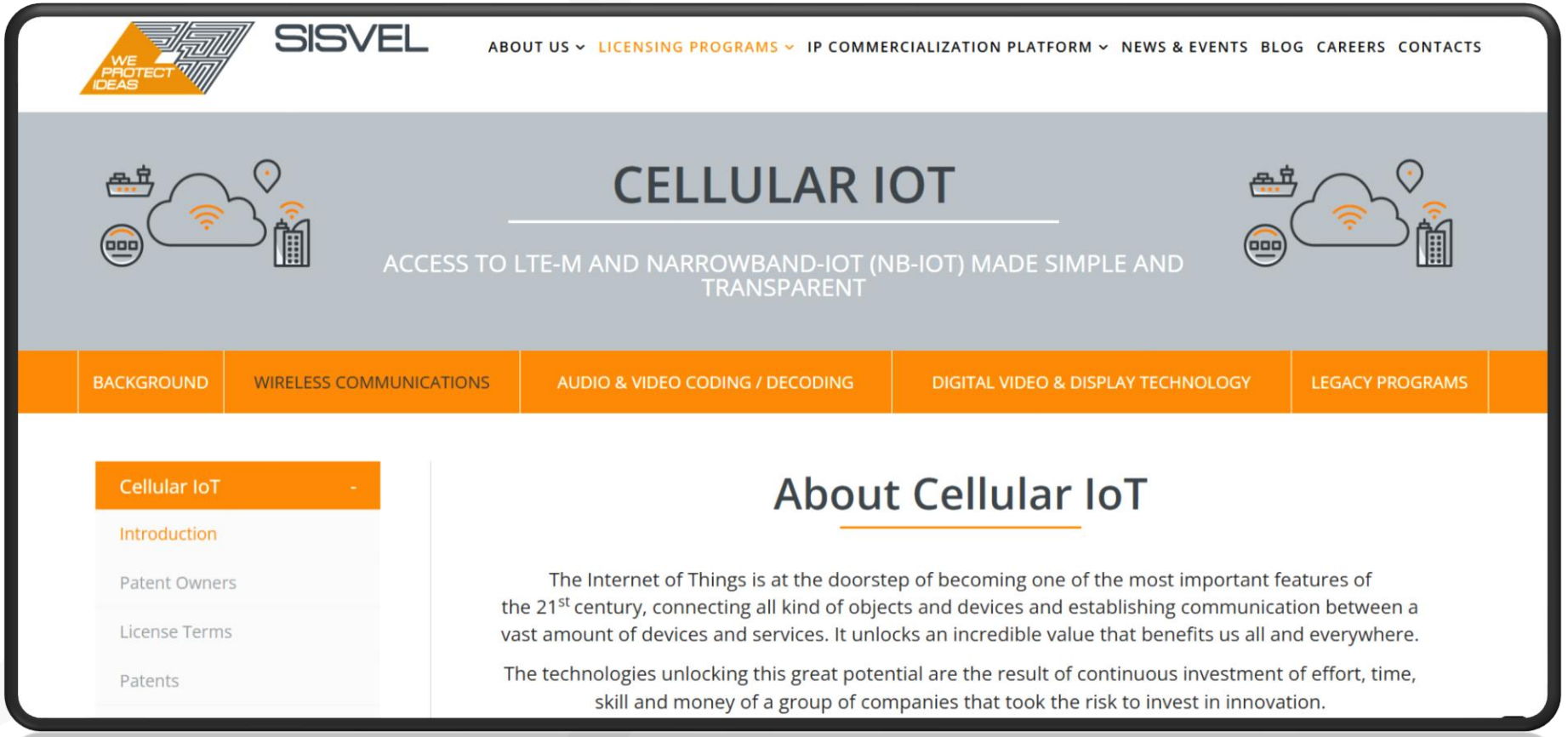
- OEM vs. Supplier

What is the model?

- Patent pools vs. Bilateral license

What is a reasonable royalty as to FRAND?

Nb-IoT / LTE Patent Pools –SISVEL Example



AVANCI Pool Member and Outsider

SISVEL pool member

1. ASUSTek Computer Inc.
2. Datang Mobile
3. Ericsson
4. ETRI
5. HFI Innovation Inc. (MediaTek)
6. Innovative Sonic Limited
7. JVCKENWOOD Corporation
8. KDDI Corporation
9. Mitsubishi Electric
10. NTT DOCOMO, Inc.
11. Optis Cellular
12. Optis Wireless
13. Orange S.A.
14. Pantech Corporation
15. Shanghai Langbo
16. Sisvel International S.A.
17. Sony Group Corporation
18. Telefónica S.A.
19. Unwired Planet

SISVEL pool outsider

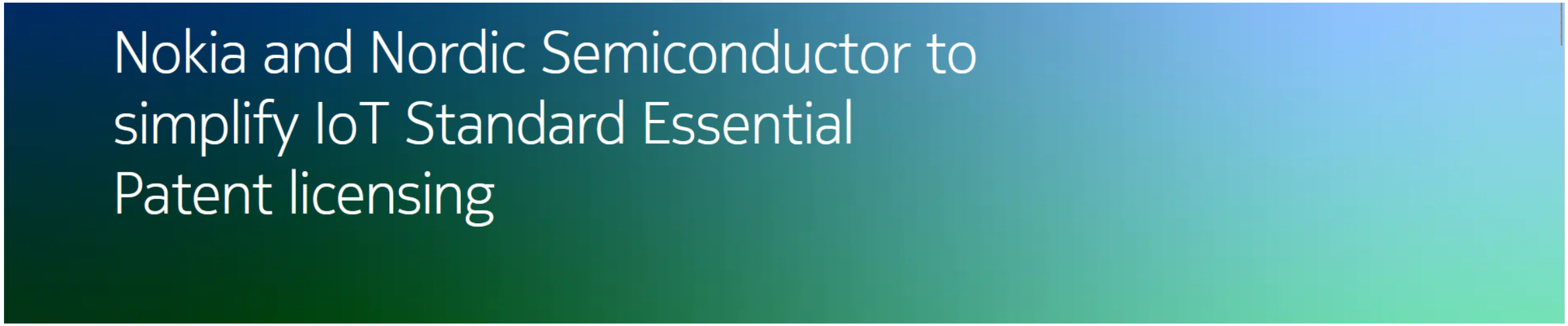
1. Samsung Electronics Co. Ltd.
2. Huawei Technologies
3. LG Electronics Inc.
4. QUALCOMM Incorporated
5. Nokia
6. ZTE Corp
7. Sharp Corporation
8. Apple Inc.
9. InterDigital
10. Oppo Mobile
11. NEC Corporation
12. Google Inc.
13. Sony
14. Panasonic Corporation
15. Kyocera
16. Sun Patent Trust
17. Fujitsu Limited
18. Xiaomi Inc.
19. ...and many more

SEP Licensing – Patent Pools

Sisvel NB-IoT / LTE-M:

- The patent pool Sisvel covers the portfolios of **19 SEP owners**.
- Sisvel offers a one-stop-shop offering a license to all Sisvel member patents that are essential to implement the LTE-M and Narrowband IoT (NB-IoT) standards
- It is yet not public, if SISVEL will also offer a **NB-IoT / LTE-M** SEP license to module manufacturers or only OEMs.
- By spring/summer of 2023, it is expected that **Sisvel will publish the list of pooled patents and licensing rates**

IoT SEP Licensing – Bilateral Agreements



Press Release

Nokia and Nordic Semiconductor to simplify IoT Standard Essential Patent licensing

- Nordic to give customers the opportunity to acquire licenses to Nokia's cellular IoT technology when they purchase IoT hardware
- Innovative new arrangement will facilitate amicable and efficient licensing
- Licenses will be available to Nordic's customers at the end device level

27 January 2022

IoT SEP Licensing – Bilateral Agreements

Huawei and Nordic Cellular IoT Enter into Licensing Deal

Agreement takes a big step towards industry-wide component-level licensing

Jun 17, 2022

[Shenzhen, China, June 17, 2022] Huawei Technologies has today entered into a patent license agreement with Nordic Semiconductor. The agreement grants a fair, reasonable and non-discriminatory (FRAND) royalty-bearing component-level license of Huawei's low power wide area (LPWA) cellular IoT standard essential patents (SEPs) to Nordic and its customers.

The clash of cultures for Smart Meter

Often, SEP holder or patent platforms will not license to component manufacturer

Component Manufacturer

Some tier 1 supplier indemnify OEMs

Supplies connectivity box

Smart meter connectivity module implements standards subject to SEPs

Negotiates SEP license with patent holder or patent platform

Original Equipment Manufacturer

IV. How to identify IoT SEPs and standards

NB-IoT /LTE-M SEPs and Standards

NB-IoT / LTE-M SEPs and standards

- LTE is subject to over **1,000 standards** speciation.
- However, NB-IoT /LTE-M applications will not need all LTE standards specifications and thus also **not all SEPs are relevant**.
- The number of SEPs relevant for licensing depends on the specific **implementation of standards**.

➢ To understand the key patent contributions to NB-IoT /LTE-M technology, one must identify **patent family declarations made against each NB-IoT and LTE-M relevant specification**.

Patent Declaration Practices

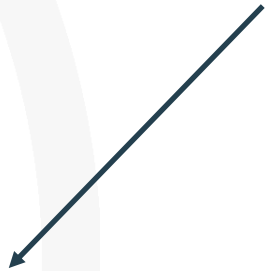
- **Patent declarations and standards specifications**

Publication Number	Declaring Company	Standard Document	Section Number	Declaration Date
US8837381B2	Ericsson	TS 38.213 v17.1.0	10.2A	19.05.2017
EP2208384B1	Panoptis	TS 38.213 v17.1.0	19.2	07.05.2020
EP1952549B2	Huawei Technologies	TS 38.212 v17.1.0	5.5	23.10.2018
EP2234452B2	ZTE	TS 23.292 v17.0.0	7.4.2.1.2	24.10.2019
EP3496334B1	InterDigital	TS 23.502 v17.4.0	4.15.2	30.09.2021
EP2124499B1	Innovative Sonic	TS 38.331 v17.0.0	8	09.07.2020
US8228827B2	Samsung Electronics	TS 38.321 v15.6.0	5.1.5	23.08.2019
EP3557938B1	Guangdong Oppo	TS 38.331 v17.0.0	5.7.10.5	25.05.2021
EP1705828B2	Nokia Technologies	TS 33.220 v15.3.0	3.2	29.10.2018
EP2289268B8	Xiaomi	TS 24.008 v17.6.0	4.4.4.5	05.06.2020
US8000717B2	QUALCOMM	TS 38.473 v17.0.0	9.3.1.271	16.03.2018
US7643456B2	Conversant Wireless	TS 24.008 v11.8.0	9.5.15a	21.08.2018
US9426697B2	BlackBerry UK Limited	TS 24.301 v17.6.0	5.5.1.2.5C	06.11.2014
US7782818B2	Core Wireless	TS 24.301 v8.8.0	5.3.2	09.06.2017

Patent Declaration Practices

- **Connecting patent declarations with standards specifications**

Publication Number	Declaring Company	Standard Document	Section Number	Declaration Date
US8837381B2	Ericsson	TS 38.213 v17.1.0	10.2A	19.05.2017

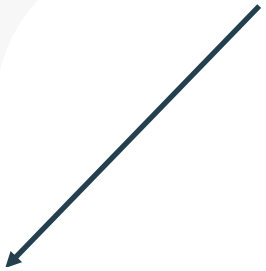


Standard Document ID	Standard Project	Technology Generation	Releases	Committee Groups	ISLD	Pooled?	FRAND	Reciprocity
TS 38.213 v17.1.0	3GPP NR Rel 17	5G	Release 17	RAN1	ISLD-201704-009	not true	true	true

Patent Declaration Practices

- **Connecting patent claims with standards sections**

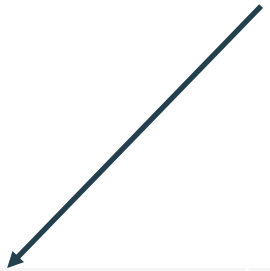
Publication Number	Declaring Company	Standard Document	Section Number	Declaration Date
US8837381B2	Ericsson	TS 38.213 v17.1.0	10.2A	19.05.2017



Publication Number	US8837381B2

CLAIM 13

13. A user equipment (UE) for providing channel state feedback from the UE to a base station, the UE comprising: a determining unit configured to determine whether the UE has received an up-link grant from the base station; and a transmitting unit configured to transmit a first type of channel state feedback information to the base station on the granted resource when the UE has received an uplink grant, wherein the first type of channel state feedback information is a high-resolution type, and a second type of channel state feedback information on a dedicated re-source when the UE has not received an uplink grant, wherein said second type of channel state feedback information is a low-resolution type, using a smaller number of bits than the first, high-resolution type.



Standard Document Id	TS 38.213 v17.1.0

SECTION 10.2A

A UE validates, for scheduling activation or scheduling release, a SL configured grant Type 2 PDCCH if - the CRC of a corresponding DCI format 3_0 is scrambled with a SL-CS-RNTI provided by sl-CS-RNTI, and - the new data indicator field in the DCI format 3_0 for the enabled transport block is set to '0' Validation of the DCI format 3_0 is achieved if all fields for the DCI format 3_0 are set according to Table 10.2A-1 or Table 10.2A-2. If validation is achieved, the UE considers the information in the DCI format 3_0 as a valid activation or valid release of SL configured grant Type 2. If validation is not achieved, the UE discards all the information in the DCI format 3_0. ETSI ETSI TS 138 213 V17.1.0 (2022-05)1603GPP TS 38.213 version 17.1.0 Release 17 Table 10.2A-1: Special fields for SL configured grant Type 2 scheduling activation PDCCH validation DCI format 3_0 HARQ process number set to all '0's Table 10.2A-2: Special fields for SL configured grant Type 2 scheduling release PDCCH validation DCI format 3_0 HARQ process number set to all '1's Frequency resource assignment (if present) set to all '1's

- **NB-IoT,**
- **LTE-M,**
- **LET Cat 1,** Technical Specification (TS)

S.No	Technology	3GPP Standard	4G/5G
1	NarrowBand-Internet of Things (NB-IoT)	TS 36.300	4G
2		TS 36.304	4G
3		TS 36.331	4G
4		TS 36.306	4G
5		TS 23.501	5G
6		TS 37.104	4G/5G
7		TS 36.104	4G
8		TS 36.141	4G
9		TS 37.141	4G/5G
10		TS 36.101	4G
11		TS 36.213	4G
12		TS 36.413	4G
13	LTE-Machine Type Communication (MTC) (LTE-M)	TS 22.368	4G
14		TS 29.368	4G
15		TS 33.187	4G
16		TS 29.274	4G/5G
17		TS 36.413	4G
18		TS 38.413	5G
19		TS 23.501	5G
20		TS 23.401	4G
21	Long Term Evolution Category 1 (LTE CAT 1)	TS 36.306	4G
22		TS 37.104	4G/5G
23		TS 37.141	4G/5G

NB-IoT and LTE-M
SEP search and analysis

Welcome

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Patents | Search

Patents SEPs Standards Companies

Search History

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Timestamp	Query	Collection
2023-02-28 10:16	(standard_document_id_harmonized_search:("TS 36.300" OR "TS 36.304" OR "TS 36.331" OR "TS 36.306" OR "TS 23.501" (	SEPs
2023-02-27 17:18	(standard_document_id_harmonized_search:("TS 36.300" OR "TS 36.304" OR "TS 36.331" OR "TS 36.306" OR "TS 23.501" (	SEPs
2023-02-27 17:16	(standard_document_id_harmonized_search:("TS 36.300" OR "TS 36.304" OR "TS 36.331" OR "TS 36.306" OR "TS 23.501" (	SEPs
2023-02-27 17:16	(standard_document_id_harmonized_search:("TS 36.300" OR "TS 36.304" OR "TS 36.331" OR "TS 36.306" OR "TS 23.501" (	SEPs
2023-02-27 17:16	(standard_document_id_harmonized_search:("TS 36.300" OR "TS 36.304" OR "TS 36.331" OR "TS 36.306" OR "TS 23.501" (	SEPs
2023-02-27 17:15	(standard_document_id_harmonized_search:("TS 36.300" OR "TS 36.304" OR "TS 36.331" OR "TS 36.306" OR "TS 23.501" (	SEPs
2023-02-27 15:54	(inpadoc_family_id_search:(20140625DE102014212138A OR 20140123DE102014201202A))	SEPs

Saved Queries

Your saved queries

Creation Date	Name	Collection
2021-04-29 13:19	Declared 5G SEPs	SEPs
2020-10-21 15:18	Declared 4G SEPs	SEPs
2020-10-21 15:17	Declared and pooled HEVC SEPs	SEPs
2020-10-21 15:15	5G 3GPP standards contributions	Standards
2020-10-21 15:14	4G 3GPP standards contributions	Standards
2020-10-13 11:34	WiFi 7 Contributions	Standards
2020-10-13 10:44	WiFi 6 Contributions	Standards

Data Sources

IPlytics makes use of publicly available data sources to ensure transparency and traceability. IPlytics imports all data sources and constantly updates changes to guarantee data actuality and data reliability.

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IPlytics leverages the use of patent and standards data by calculating statistical value and trend indicators. Our valuation measures are transparent, trustworthy and have been validated by scientific research.

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VI. How to get the right insights from your SEP analysis

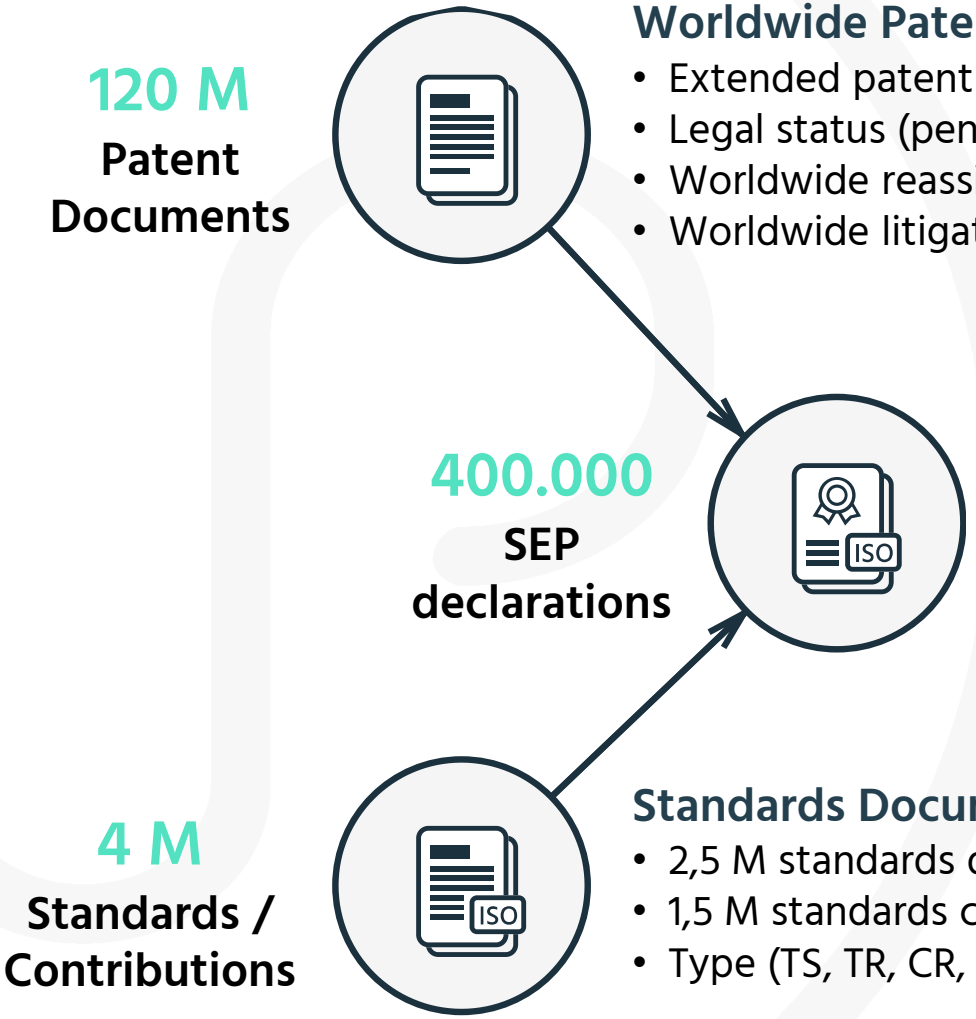
Increasing complexity

- **Connectivity is everywhere**, and it heavily relies on standards that are subject to SEPs.
- The number of IoT modules that **implement NB-IoT, LTE-M and LTE Cat 1,** technologies is set to drastically increase in the next years.
- It is challenging to keep up with technology trends, new standards projects as well as SEPs or new pool license programs.

➢ **Multidimension access** to patents and standards data is crucial to be part of the discussion and have a seat at the table where standards are developed, patents are licensed, and pools are formed.

Source: https://www.marketresearchfuture.com/reports/in-car-wireless-charging-market-5746

IPlytics Data Source



Worldwide Patents (USA, Europe, Korea, Japan, China, etc.)

- Extended patent families
- Legal status (pending/granted, lapsed/revoked/active/expired)
- Worldwide reassignment information
- Worldwide litigation information

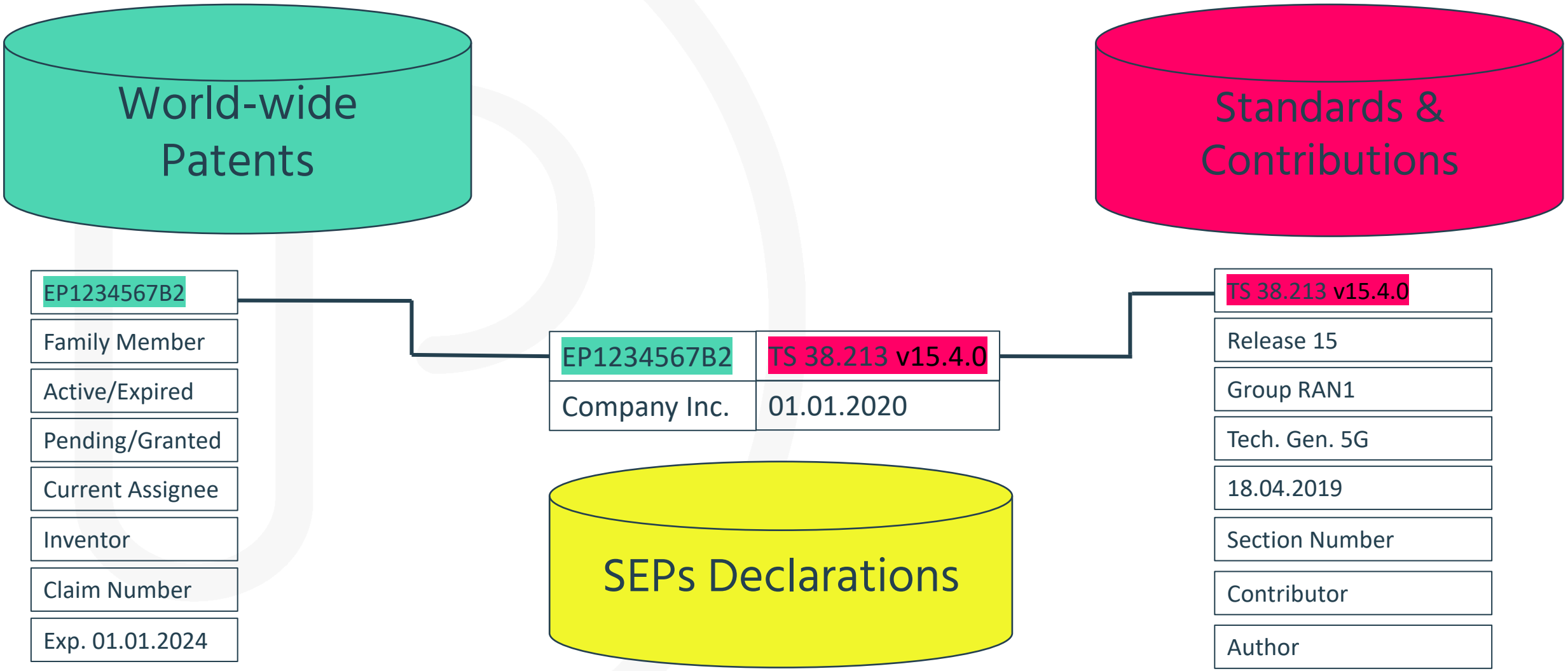
Declared Patents

- 25 SDOs and 11 patent pools
- Patent and standards document ID
- Licensing commitments (e.g. FRAND, reciprocity)
- Patent Pools

Standards Documents

- 2,5 M standards documents (Full text, author, supporting company)
- 1,5 M standards contributions (Full text, author, contributing company)
- Type (TS, TR, CR, WI), Status (revised, agreed, approved, noted)

Data Sources



IPlytics Platform

Access multiple data sources on One Platform

Patents

Patents are a window into technology competition and legal risks.

SEPs

SEPs provide ownership information of essential assets for standards.

Standards Contribution

Standards contributions show companies' technology investments in standards.

Litigation Cases

Litigation cases indicate market disputes on patented technology.

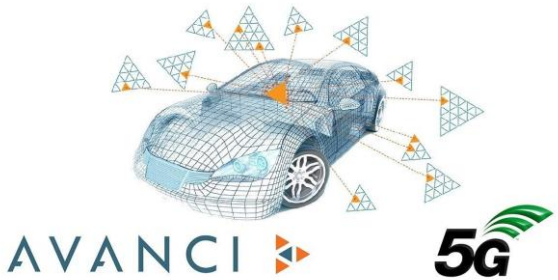
Patent Pools

Patent pools provide information about access to SEP protected technology.

Patent Pool Data (1990-2023)

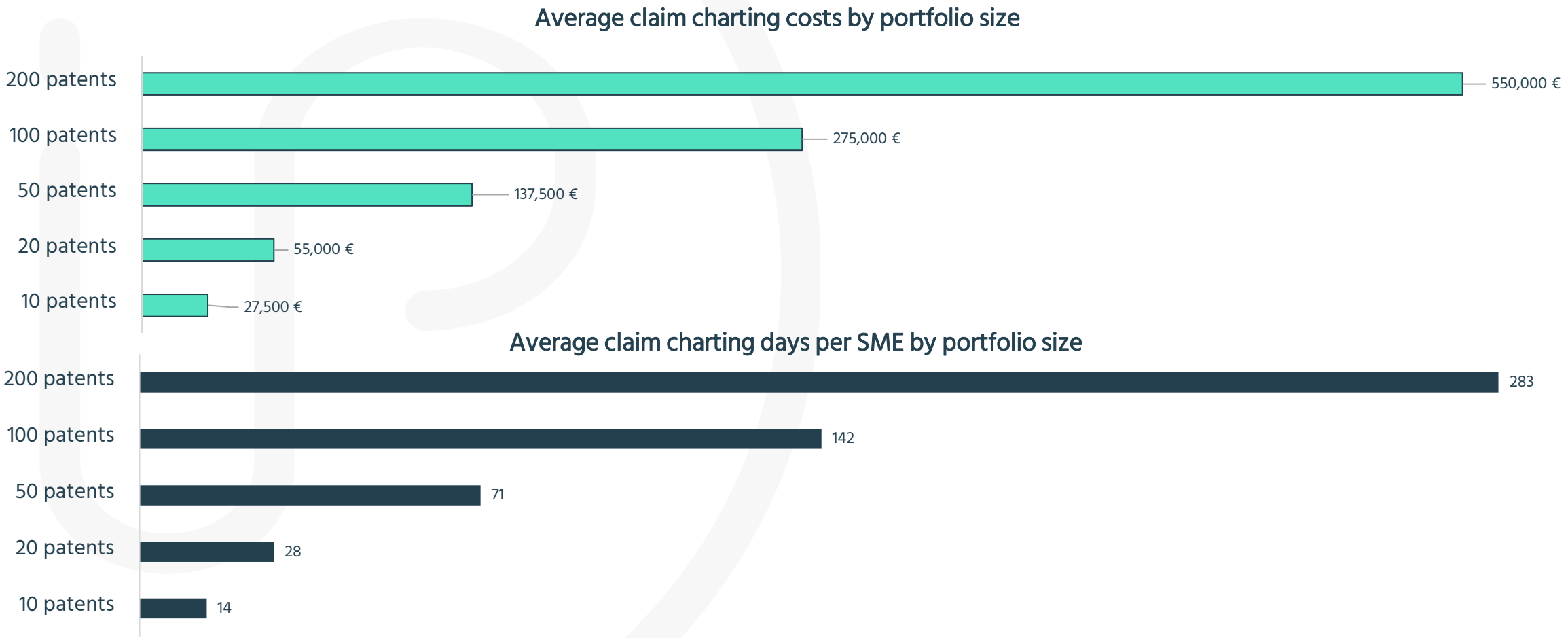
Patent pools listing verified standard essential patents. Among others:

- MPEG LA
- Via Licensing
- SISVEL
- AVANCI
- Access Advance
- ULDAGE
- France Brevets NFC

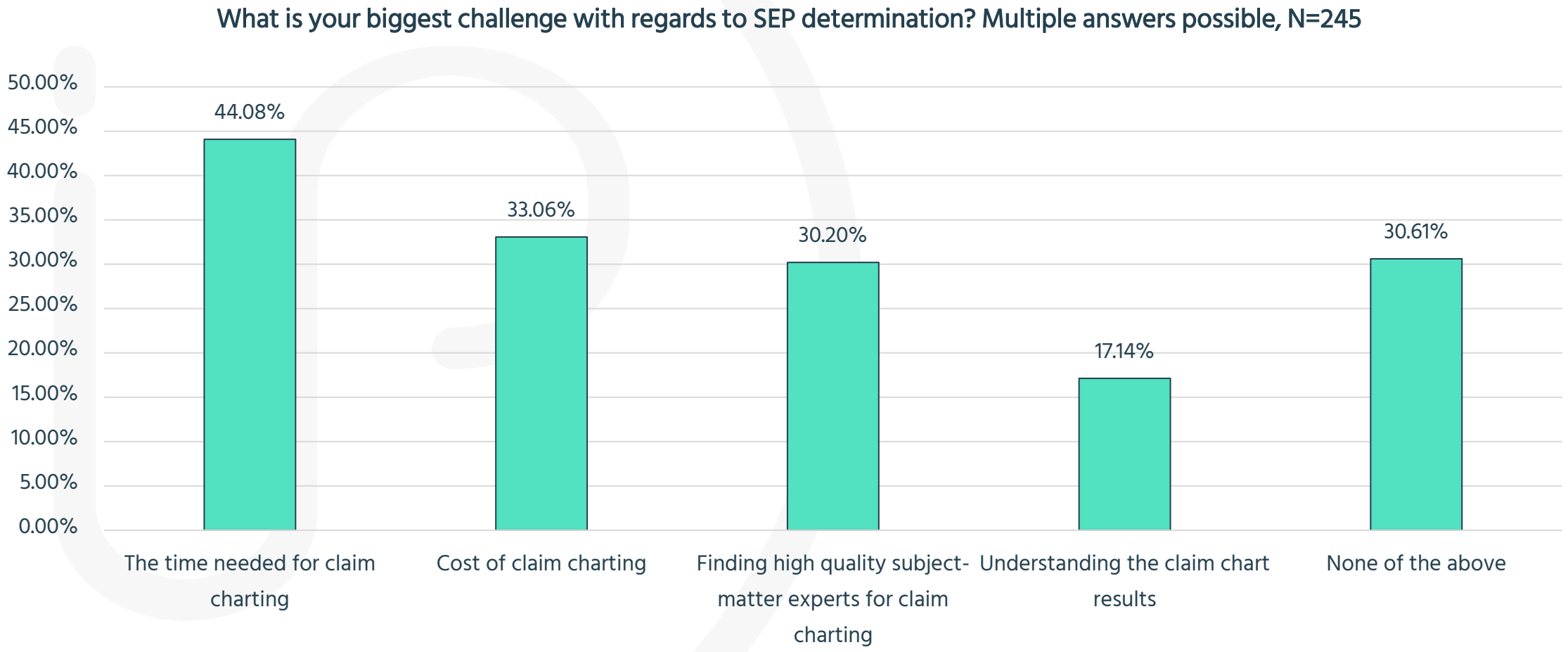


"The question about which patents are essential and which are not, is one of the most debated when negotiating SEP portfolio value, royalties or infringement claims."

Problem: Claim charting takes time and is expensive

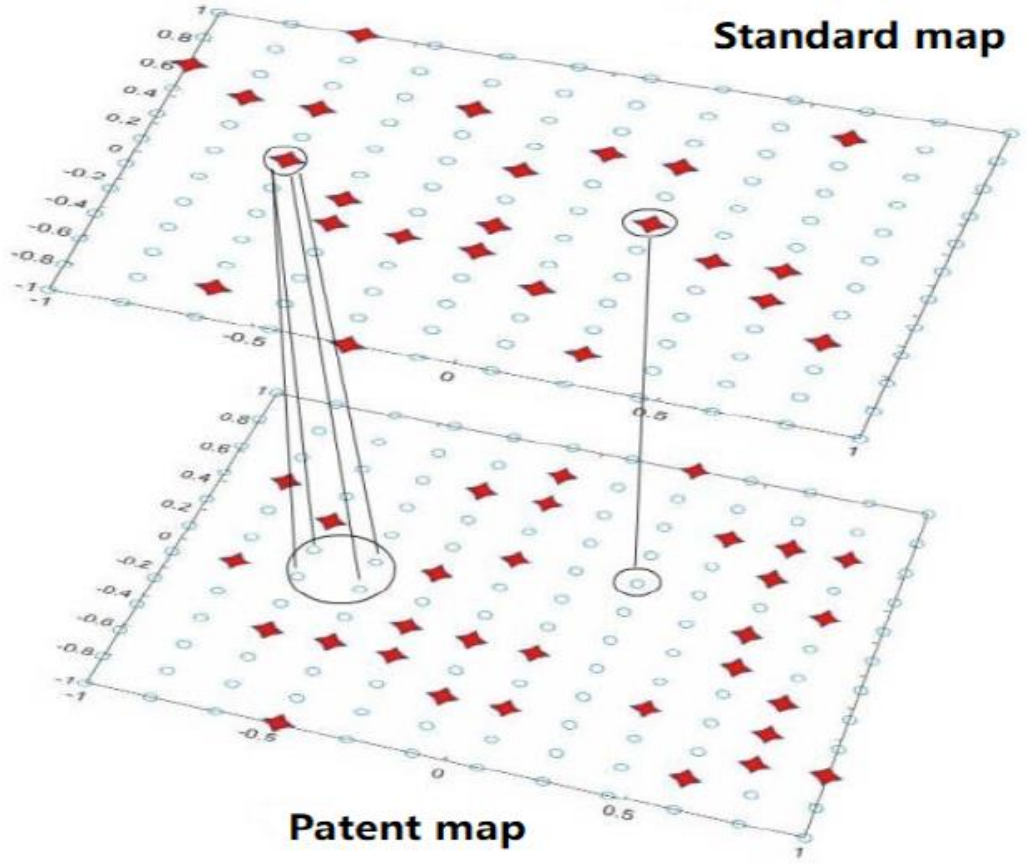


Problem: Claim charting takes time and is expensive



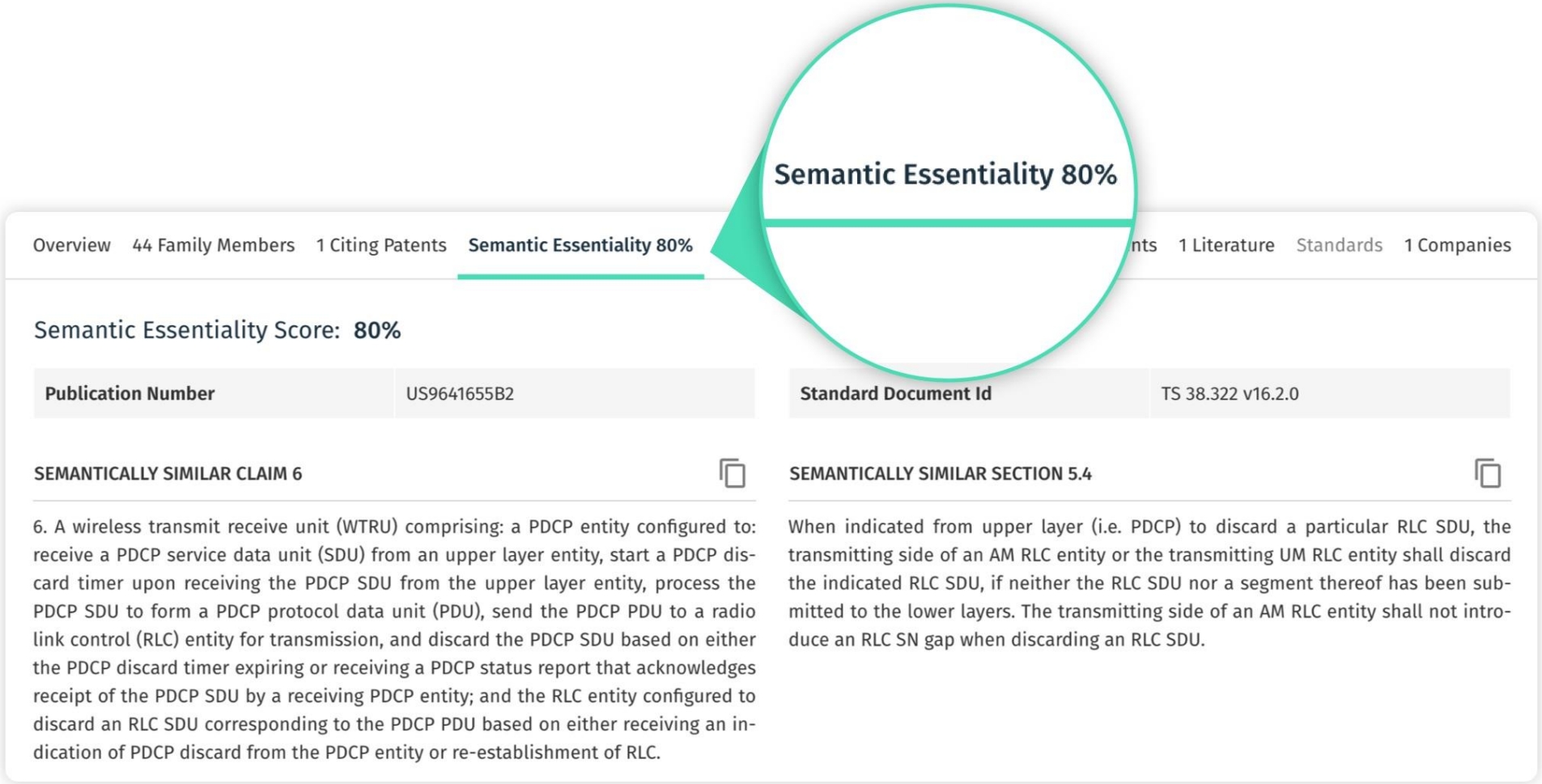
Semantic Essentiality Scores (SES) can be a first efficient step towards SEP portfolio determination

Semantic analysis of patent claims and standards

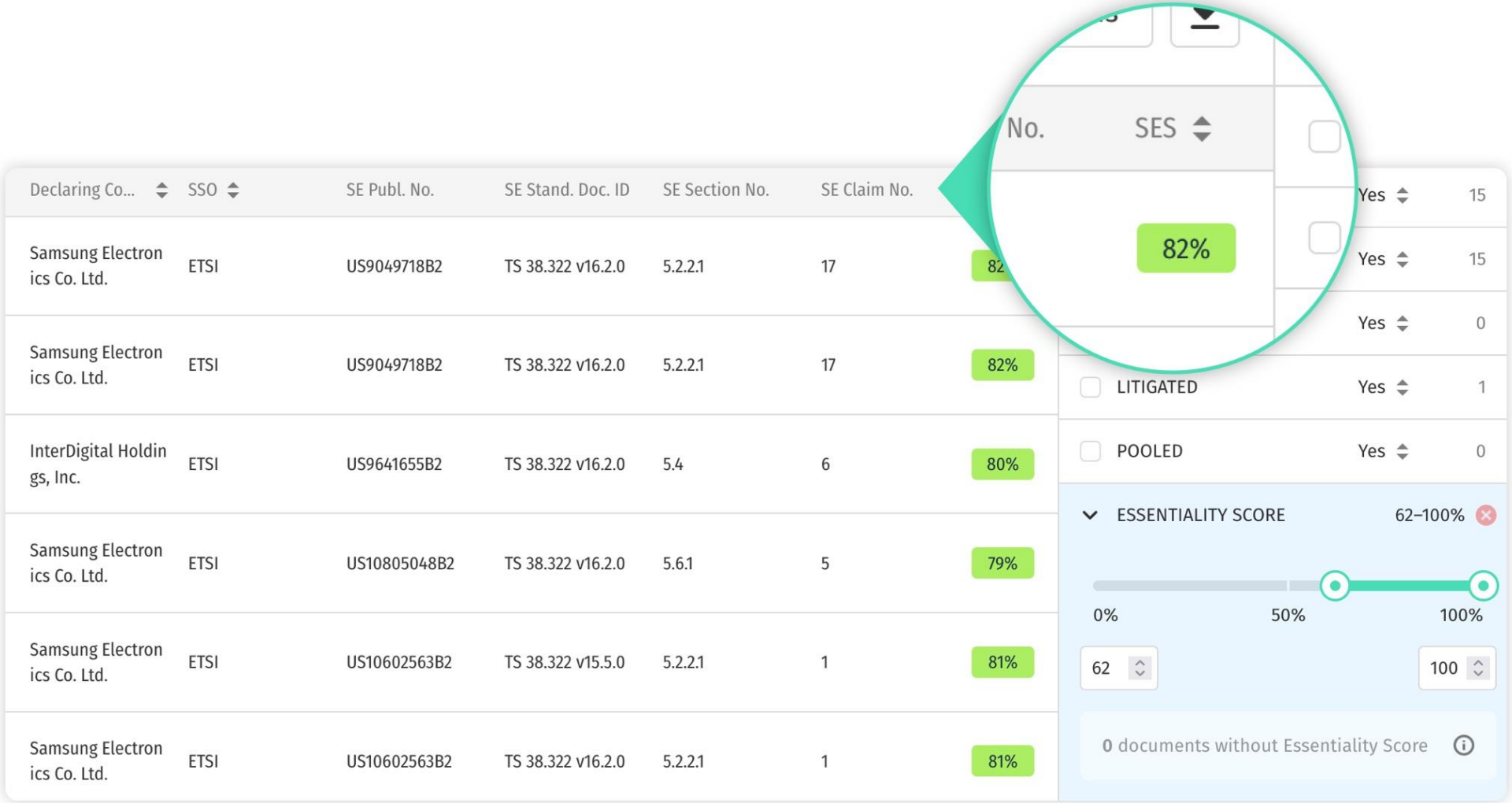


- While claims and standards describe the very same topic and thus can be mapped and charted by experts – the **actual language used can be very different**.
- To overcome this, we **train a semantic model** that understands the context of claims and standards and recognizes the use of different expressions for certain concepts to identify claim elements.
- We use **claim charts** manually created by experts as **training data**.

SES – Patent claim and standard section **side by side**



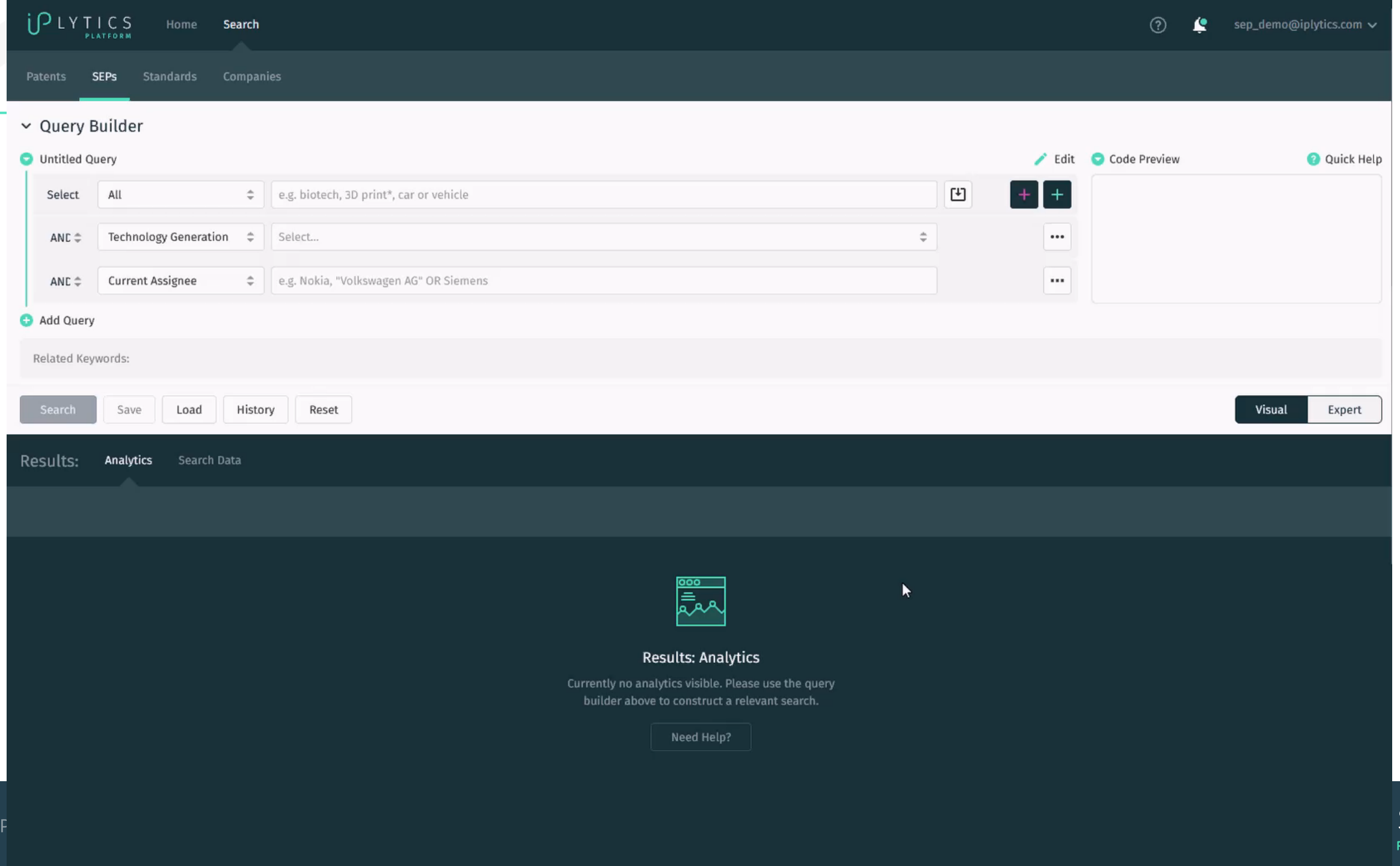
SES – **Sort and refine** patents as to essentiality score



Connecting the data points

Scoreboard to **valuate** declared patents:

- Claim sections similarity, inventor attendee overlap, first applicant contribution overlap, FWD citation, NPL citation, timing and classification.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VII. Takeaways

Why information is key!

Growing challenges:

- The **volume and complexity** of worldwide patents, standards and SEPs is growing daily, making it difficult to manually **identify, analyze and understand** relevant information on connected technologies.
- **Digitization** of products and services is forcing companies to **build expertise** in new technology fields.
- As a result, there is a growing demand for **IP analytics** in many departments like **strategic product planning, R&D, standards development, licensing, M&A, IP Asset Management and legal divisions**.

SEP licensors (patent owners)

SEP licensors use of IPlytics Platform:

- Align R&D investments, standards development, patent prosecution, patent portfolio management and licensing/monetarization strategy to **file valid and essential patents** and to **commercialize SEPs** in world-wide licensing campaigns.
- Compare SEP portfolios for **cross-license** negotiations and **monitor competition** making sure to sustain revenues both on the downstream product market as well as upstream licensing market.
- Monitor **competitors' standards development** investments (contribution count) and identify new standards groups to maintain leading positions in standards development.

Use Cases

Patent portfolio manager:

- Compare and value your portfolios against competitors
- Identify strength and weaknesses to further develop your portfolio
- Support keep/kill decisions in patent portfolio pruning analysis

Licensing executives / deal maker:

- Find gold nuggets in your portfolio to prepare licensing negotiations
- Identify patent portfolios to commercialize/license or use for acquisition
- Use SES to weed out ‘weaker’ patents, focusing resources on higher ranked patents

SEP licensees (standards implementers)

SEP licensees use of IPlytics Platform:

- Value and determine SEP portfolios offered for license. Prepare for **FRAND negotiation**. Identify the numerator and denominator to measure the patent holder's market share.
- **Identify standards subject to SEPs** in the complex value chain of suppliers as SEP holder approach OEMs or at least module supplier
- Monitor SEP filing, SEP change of ownership and litigation to **quantify risks and plan royalty payments**.
- **Identify** industry related (e.g. M2M, IoT, IIoT) **standards development initiatives** to have a seat at the table when future connectivity technology is developed.

Use Cases

Strategic IP attorneys / legal divisions:

- Use IPlytics in discovery
- Use SES before claim charting/review to focus on most important patents first
- Make use of objective data to consider for FRAND preparation, negotiations, argument formulation

Licensing executives / deal maker:

- Use IPlytics to prepare for FRAND negotiations
- Use IPlytics to understand the share of third-party SEP portfolios
- Identify litigation trends in your industry for standards you integrate

IPlytics Europe and US

For more information on IPlytics Products and Services, please contact us on:

https://www.iplytics.com/request-a-demo/

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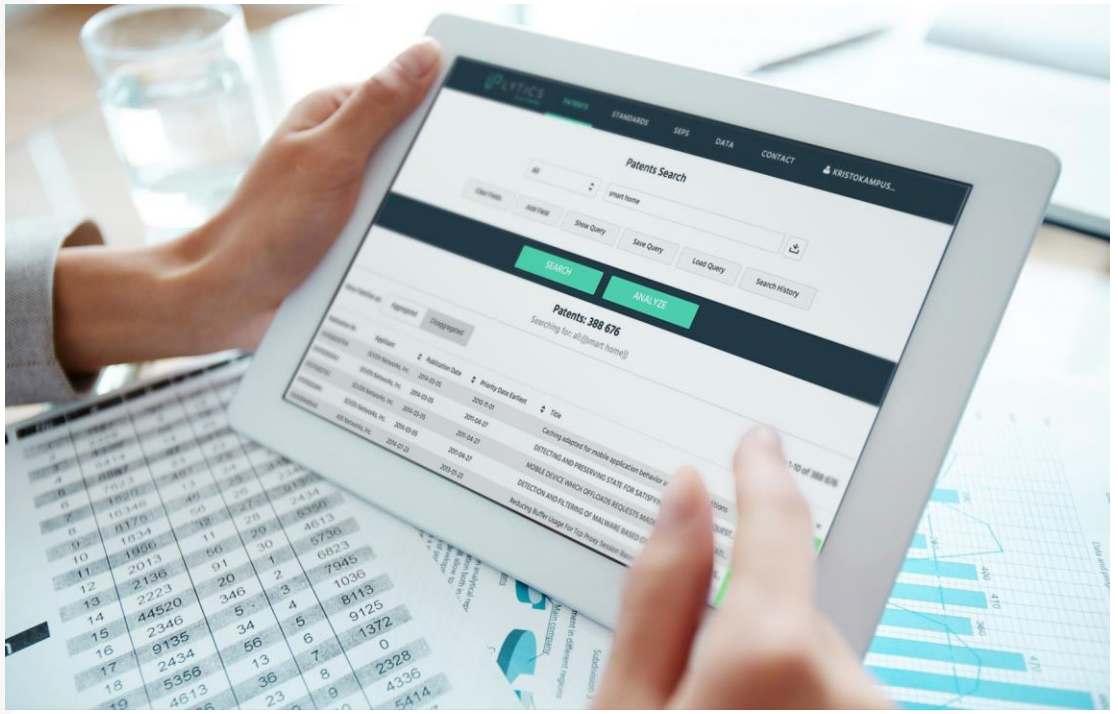
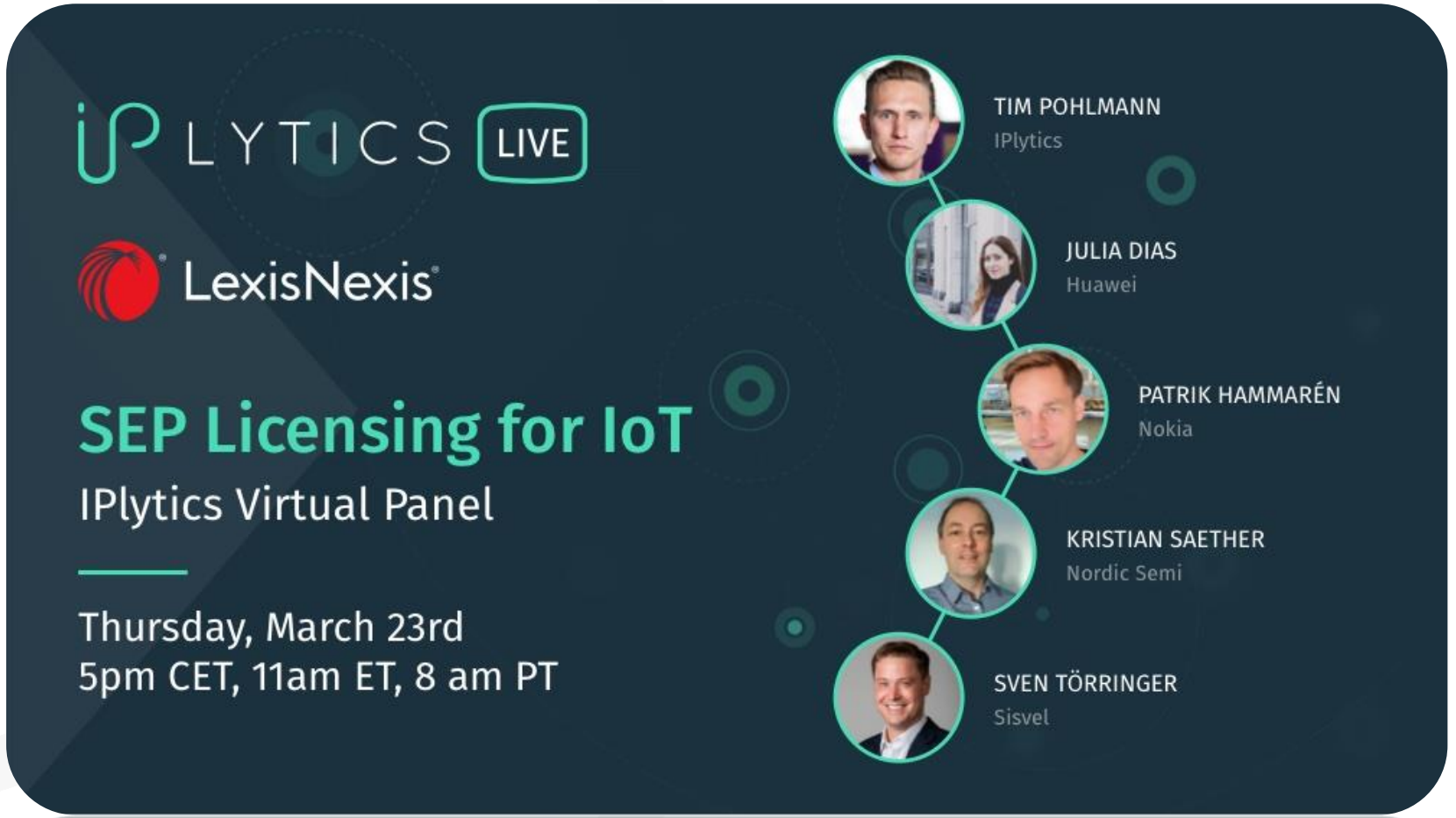


IPlytics Podcast

IPlytics Virtual Panel on SEP Licensing for IoT



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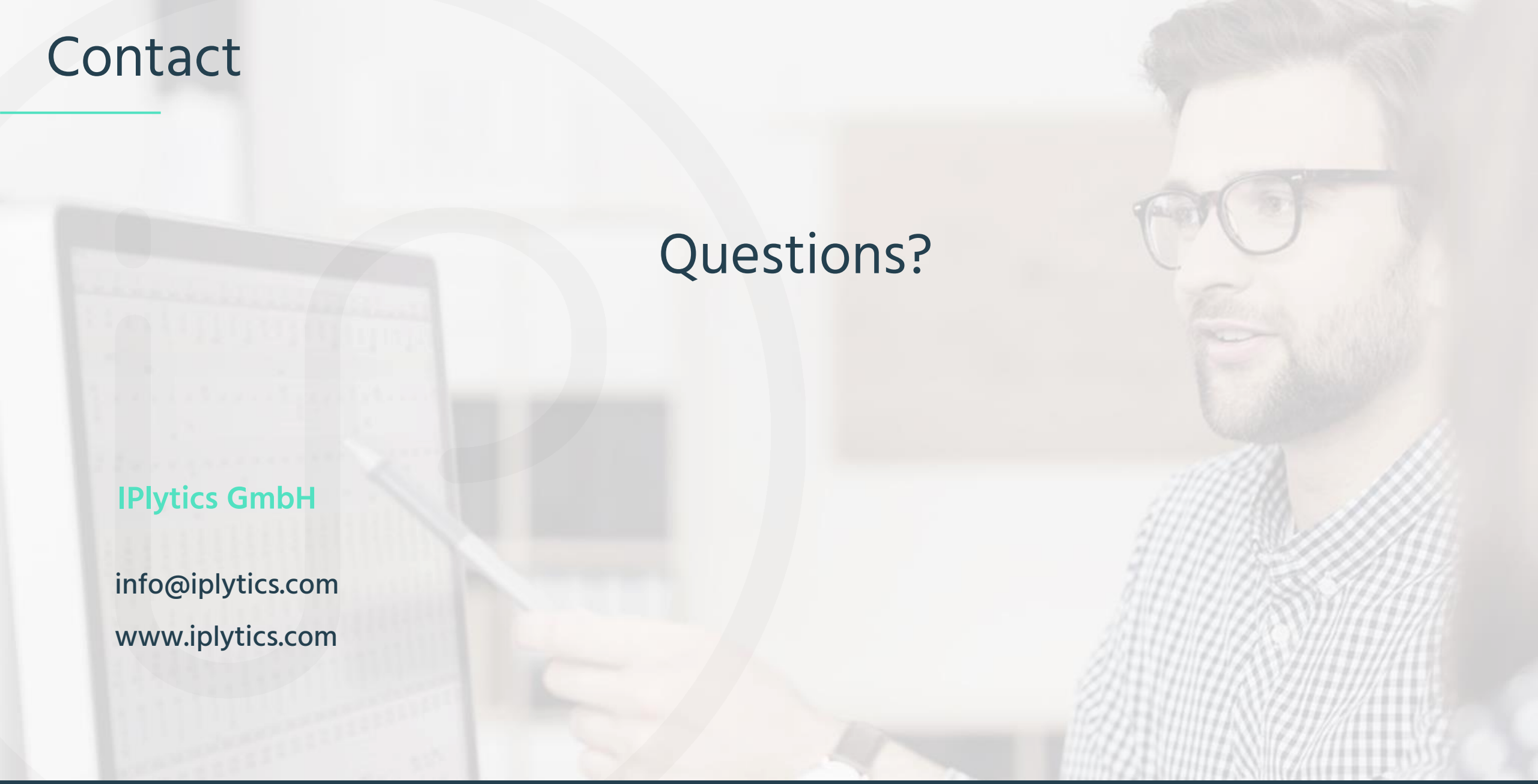

Questions?

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