

# Standards and the European patent system

Insights from a new EPO dataset linking patents and standards, with early perspectives into SEP litigation under the Unified Patent Court

May 2025 | Executive summary





# **Executive summary**

Technology standards are essential for enabling interoperability and driving innovation across digital economies. Standards for wireless connectivity (e.g. 3G, 4G, 5G, WiFi), audio/video compression (e.g. MPEG, HEVC/VVC, AVC, AV1, VP9), data storage and exchange, broadcasting, and home audio/video interoperability (e.g. NextGen TV, DVB) are particularly important. These standards have been widely adopted in the information and communication technology (ICT) sector, including in telecommunications equipment, mobile phones, computers, tablets and TV sets. They have also supported the expansion of Internet of Things (IoT) applications such as connected cars, drones and smart devices. Similar standardisation efforts may be required for emerging technologies like artificial intelligence and quantum communications.

Standards development organisations and similar bodies (hereafter both referred to as "SDOs" for simplicity) develop and standardise the best technical solutions to ensure standards meet real market needs. The resulting technology standards often incorporate patented innovations from multiple contributors. This has led to a close interconnection between standards and patent systems.

The patent system plays a key role in standardisation by promoting early disclosure of technical innovations, facilitating the exchange of knowledge needed to develop and refine standards. It also provides incentives for R&D and enables firms to recoup their investment and earn royalties that adequately reflect the value of their contributions through licensing agreements with standard implementers.

Patents that protect technology included in a standard and that must be used to comply with the standard are called standard-essential patents (SEPs). To avoid the holder of such an SEP from using its patent rights to prevent or restrict access to the standard, and to ensure wide dissemination and use of the standard, most SDOs have adopted Intellectual Property Rights (IPR) policies. While some of these IPR policies require standards participants to identify and declare their patents that they believe are or may become essential to a standard, they generally require participants who want their proprietary technology to be included in the standard to provide an undertaking to licensing their SEPs on fair, reasonable, and non-discriminatory (FRAND) terms and

conditions. However, these FRAND licensing undertakings made in the context of the standardisation process do not themselves grant implementers of the standard a right to use the patented technology.

SEP licensing agreements are negotiated privately between SEP holders and implementers, often involving complex patent portfolios that span multiple products. These negotiations can be complex because, among other things, views may diverge on technical issues such as the determination of essentiality, validity or infringement of asserted SEPs, or because the parties may disagree on what constitute FRAND terms and conditions. As a result, the licensing of SEPs can be contentious and may lead to litigation as a last resort if bilateral negotiations fail, although most agreements are reached without litigation.

Despite these complexities, industries that rely heavily on standards have experienced dynamic growth in recent decades, with standardisation enabling many new players to enter the market. Potential contributors have not been systematically discouraged from participating in standard development, nor have implementers been deterred from developing products based on standards involving potential SEPs. Nonetheless, continued efforts are needed to ensure a balanced, transparent, and predictable relationship between the patent and standardisation systems to support innovation and strengthen European competitiveness.

This study, conducted under the aegis of the EPO Observatory on Patents and Technology, is a first milestone in a broader agenda that seeks to improve transparency in the relationship between standards and patents in Europe. The focus on Europe is justified for two reasons. First, the extensive scope of the EPO's standard-related libraries and their integration into prior-art searches naturally create new links between patents and standards, offering valuable opportunities for empirical analysis. Second, the newly established Unified Patent Court (UPC) creates a new framework for the resolution of SEP-related disputes across Europe that merits attention.



The study unfolds in three main sections:

First, it describes the infrastructure and procedures in place at the EPO to improve the quality of search reports in areas where standardisation is important. When new technology is disclosed in standards development processes that are not subject to a secrecy obligation, this is considered to be a public disclosure. Standards documentation arising from such processes is therefore considered to be state of the art under the European Patent Convention (EPC Guidelines G-IV,7.6). The EPO has invested significantly since the early 2000s in incorporating standards-related documentation into its internal databases and utilising them as an integral part of the patent grant process (PGP) to enhance prior art searches. With its unique collection of over 5.5 million documents that have been produced during standards development processes, the EPO ensures that patents are only granted for inventions which are novel and involve an inventive step, and not for technology already openly disclosed in standards development proceedings or for minor further developments. In 2024, over 4% of all EPO search reports included at least one examiner citation to standard-related documents. These citations create a natural link between patents and standards.

Second, the study builds on the link between patents and standards created through examiner searches to produce a new dataset: the **EPO Cited SDO Documents Dataset**, available for download at <u>epo.org/standards</u>. This connects 190 116 patent applications to 168 620 SDO documents identified by XP number (a unique identifier assigned by the EPO to non-patent literature). This new PGP-based linkage connects the patent and standards worlds beyond traditional self-reported standardessentiality declarations. The dataset supports practical applications for both SEP holders and implementers, such as identifying potential commercial or technological relationships between authors of standard documents and owners of citing patents. It also enables academic research into the dynamics of standardisation and innovation. In addition, the dataset provides a valuable foundation for developing methods to predict essentiality based on observable patent-standard characteristics.

Third, the study examines litigation involving SEP in Europe, with a particular focus on the early impact of the Unified Patent Court (UPC). Historically, SEP litigation was fragmented in Europe across national courts. Since its launch in June 2023 the UPC has begun to centralise enforcement and validity challenges. By the end of 2024, 23 SEP-related disputes had been filed at the UPC, indicating its emergence as a key forum absorbing much of the caseload previously directed to national courts. The frequency of multi-jurisdictional SEP disputes in Europe has declined notably, suggesting the UPC is helping consolidate litigation in a single forum. In addition, the upcoming launch of the UPC's Patent Mediation and Arbitration Centre (PMAC) in late 2025 will provide a dedicated forum for resolving global SEP disputes through alternative dispute resolution and will include a dedicated procedural framework for disputes involving SEPs within its Arbitration, Mediation and Expert Determination Rules.





### **Key findings**

Figure E1

 The EPO has extensive standard development organisation databases used in prior art searches, now containing some 5.5 million standards-related documents.

To achieve the highest possible quality in the patentgranting process, the prior art search must identify documents relevant to novelty and inventive step from all pertinent sources. In areas where standardisation is important, such as information and communication technology (ICT), patent examiners must systematically consider standards-related prior art when assessing the patentability of an invention, ensuring that patents are granted only for truly novel and inventive contributions.

To enhance prior art searches, the EPO has invested significantly since the mid-2000s in incorporating standards-related documentation into its internal databases and utilising them as an integral part of the patent-granting process. The EPO follows a policy of close co-operation with standard-developing organisations (SDOs), which has led to the creation of 13 dedicated internal databases covering standards-related documents from 15 SDOs, including 3GPP, ETSI, the ITU-T, the IEEE-SA, the IETF, the IEC and others.

These EPO SDO databases now contain more than 5.5 million documents that have been produced during standards development processes, including technical contributions, drafts or meeting minutes. More than 2.7 million of these originate from the 3<sup>rd</sup> Generation Partnership Project (3GPP), which unites seven telecommunications SDOs from around the globe, highlighting the critical role of telecommunications standards, particularly those related to 4G and 5G. The next largest databases are XPITU, with 0.61 million documents and XPETSI, which holds 0.52 million documents. XPI3ES is close in size, with 0.52 million documents.



Number of documents in the EPO SDO databases

Note: The graph shows the cumulative number of documents (in millions) in EPO SDO databases, based on their date of inclusion in the database. The date of inclusion for documents published before the creation of the respective SDO database is the creation date of the database; for documents published afterward, the publication date.





 The integration of SDO databases into the patent grant process has led to a steady rise in examiner citations of these documents. In technology areas with intense standardisation activity, over 30% of search reports involve SDO-related dossiers.

SDO documents undergo bibliographic data extraction and are processed into the EPO's search tools to support efficient prior art searching. The integration of the SDO databases into the patent grant procedure (PGP) has translated into a steady increase in the number of examiner citations of such documents. This reflects both a move away from less systematic sources of information previously used by examiners and a net rise in the overall number of citations due to an increase in search efficiency. In 2024 nearly 12 000 EPO search reports included at least one citation of a document from the SDO databases, accounting for over 4% of the total. In examiner units focused on technologies with high levels of standardisation activity, this share is significantly higher. For example, in the Wireless and Data Networks unit, more than 30% of search reports involve SDO-related dossiers, and over 20% include at least one SDO citation. For specific examiner unit and patent application technology class combinations this percentage is considerably higher (these percentages are not presented in Figure E2, but can be found in other related figures in the study). For instance, patent applications in the International Patent Classification (IPC) technology class video compression and coding technologies (H04N19) handled by the examiner unit Image and Audio, video has a percentage of SDO dossiers close to 70%.

#### Figure E2



Percentage of SDO search reports and SDO citations by examiner unit

Note: The graph shows the percentage of SDO search reports (search reports that cite at least one document in the EPO SDO databases) and SDO citations by examiner unit. The sample covers examiner units handling applications where standard-related invention is more frequent and is restricted to search reports completed during the period 2015-2024.





3. Examiner citations of documents in the SDO databases establish a natural link between standards and patent applications. We have extracted, documented and shared this information in a new dataset: the EPO Cited SDO Documents Dataset.

Examiner citations through the PGP establish a natural link between patents and standards. We have created a new dataset identifying all examiner-cited documents in the SDO databases. We document and describe the dataset, offering a guide for interested users. The dataset is available for download from epo.org/standards.

The resulting dataset includes 168 620 distinct XP numbers (a unique identifier assigned by the EPO to

non-patent literature) identifying documents in the SDO databases (level of observation of the dataset), referenced in 417 951 distinct citations by 190 116 distinct patent applications. The dataset offers a linkage between patents and standards, connecting PATSTAT patent data (through XP numbers) and SDO documents.

This PGP-based linkage provides a novel perspective on the relationship between patents and standards, moving beyond traditional datasets based on self-reported standard-essentiality declarations. The linkage has applications of potential interest to practitioners. It could help implementers assess potential essentiality. It might also help SEP holders track citations to standard contributions, uncovering commercial or technological relationships, and assist SEP implementers in clarifying the potential essentiality of a patent.. Beyond practice, it opens new avenues for research into how standards and patents interact to drive innovation and growth.

Figure E3





Note: The graph shows the number of distinct standard documents cited by published applications, by type of standard document. Contributions are inputs submitted by members in the standardisation process that bring new technical material to a working group; specifications are the normative text of the technical standard approved through the SDO's ballot or consensus process; change requests specify detailed changes that are proposed to a specification; reports include feasibility studies, technical studies and reports submitted to working groups for informational purposes; other includes minutes, liaisons, white papers, unknown document types and other document types.





 There is considerable overlap between the presence and number of citations of SDO documents and the likelihood of a patent being declared a standard-essential patent (SEP).

There is considerable overlap between SDO-citing patents and declared SEPs. Among patents that either cite SDO literature or are declared SEPs, 17.4% fall into both categories. Focusing on the subset of SDO-citing patents, 25% of these are declared SEPs. Alternatively, focusing on declared SEPs, 37% cite at least one SDO document. It is important to note that not all SDOs require participants to declare potential SEPs, which implies that the actual overlap between SDO-citing patents and potential SEPs may be even higher than observed.

A positive and statistically significant relationship is also found between the intensity of citations of SDO documents and the likelihood of a patent being declared an SEP. This relationship holds even after accounting for patent-level, citation-related and company-specific characteristics in a logistic regression analysis. Characteristics of the relationship between the citing and cited parties, the citation or the cited SDO document also help predict the likelihood of SEP declarations. In particular, patents citing contributions are more likely to be declared SEPs than those citing technical specifications. This likely reflects two factors. First, contributions have identifiable authors with incentives to assert ownership, while technical specifications are issued collectively by SDOs. Second, technical specifications are enablers of innovation and more influential for technological development than contributions. Citations of technical specifications likely reflect follow-on innovation by implementers or firms advancing the next generation of the standard.

The positive correlation between citations of SDO documents and SEP declarations suggests that the new linkage between patents and SDO documents could serve as a useful indicator for assessing potential essentiality. This approach may support the development of datadriven tools to predict essentiality based on observable patent and standard-related characteristics.

Figure E4



Overlap between SDO-citing published applications and SEP declarations

Note: The graph is based on a sample of 125 143 published patent applications resulting from the union of the following two samples: a) PATSTAT applications that cite documents in the EPO SDO databases and b) patent Orbis IP applications that are declared SEPs. Only applications published by the EPO or WIPO between 2010 and 2019, years in which both sources are comparable, are included.





## 5. The Unified Patent Court has established itself as an important venue in SEP litigation

Over the past decade, SEP litigation in Europe was predominantly handled by national courts in Germany and the UK, and to a lesser extent the Netherlands and France. However, with the inception of the Unified Patent Court (UPC) in June 2023 a new venue has emerged, offering a uniform, specialised and efficient framework for patent litigation at a European level enhancing legal certainty for all users. The UPC has exclusive jurisdiction over European patents with unitary effect (Unitary Patents) and "classic" European patents. The exclusive jurisdiction over "classic" European patents is, however, shared with competent national courts or authorities during a transitional period of seven years running initially to 2030. Furthermore,"classic" European patents can be opted out from the UPC's jurisdiction. However, despite this option for patent holders to exclude UPCs jurisdiction, 74% of European patents (and 71% of declared

SEPs) remain within the competence of the UPC. This underscores the UPC's role in driving a significant shift in the European patent litigation landscape.

Analysis of recent SEP litigation disputes documents the first emerging trends as the system remains in its ramp-up phase. The UPC is rapidly establishing itself as a key forum for resolving SEP-related patent disputes in the EU. As of 14 March 2025, 23 SEP-related disputes have been initiated at the UPC, averaging more than 13 cases per year since launch in mid-2023. This is a considerable number, also by comparison to the number of disputes brought to national courts in different European jurisdictions. The UPC appears to have absorbed a significant share of disputes that would previously have been brought before the national courts of the member states participating in the UPC, in particular Germany. It should be noted that counts for recent years are affected by pendency and publication lags, both in the filing of patent applications and disputes associated with these applications. The results must be interpreted with caution as we are still in the early days of the UPC.



#### Number of SEP disputes by jurisdiction and decision year

Note: This figure reports a unique number of disputes involving declared SEPs, collapsed by European jurisdiction and decision year related to European SEP disputes in the sample. The unit of observation is at the dispute level. In the case of parallel disputes, collapsing is done by the decision year with the highest priority. Importantly, in the case of the UPC, settled and pending cases are included to reflect harmonization effects of the UPC and consider the amount of cases where decisions will likely be taken in 2025, while this is not done for other jurisdictions.

Figure E5





# 6. The UPC is harmonising SEP litigation across Europe

The UPC is rapidly establishing itself as a key forum for resolving SEP-related patent disputes in the EU, absorbing a share of disputes that would previously have been brought before courts of EU Member States. Another margin through which the UPC could be harmonising SEP litigation is by reducing the incidence of "parallel litigation", as measured by the number of SEP disputes spanning multiple European jurisdictions or the jurisdictional combinations observed in such disputes. The incidence of parallel litigation is rather low, with only one fifth of SEP-related disputes involving decisions from courts in multiple European jurisdictions, most involving just two jurisdictions. This figure has been approximately constant over the past years, including those following the establishment of the UPC. In terms of combinations of jurisdictions, in the years immediately preceding the UPC's creation, most cross-jurisdictional SEP disputes involved combinations of UK and EU national courts

(e.g. UK-FR in 2019 and 2021, UK-DE-NL in 2020, and UK-DE in multiple years). Since the UPC opened its doors in June 2023 these combinations have shifted, with new disputes often involving the UPC and the UK. This reflects the fact that although the UK is not an EU Member State and as such cannot participate in the new system, the UPC has often substituted for the national courts of the participating Member States in the UPC Agreement for patents under its jurisdiction.

The UPC's Patent Mediation and Arbitration Centre (PMAC), set to launch in late 2025, has announced its intention to provide a dedicated forum for resolving SEP disputes through alternative dispute resolution (ADR). The PMAC will include a specific procedural framework for SEP cases within its Arbitration, Mediation and Expert Determination Rules. ADR can offer a flexible and efficient approach in resolving global SEP disputes, allowing parties to avoid the territorial limitations and high costs of litigation while benefiting from specialised expertise, confidentiality and the ability to address complex, cross-border issues in a single procedure.



Number of SEP disputes spanning multiple European jurisdictions, by combinations of jurisdictions involved

Note: This figure shows the number of SEP disputes spanning multiple European jurisdictions by jurisdiction combination and year of decision date related to this dispute in the data. The figure excludes disputes that do not result in court decisions (e.g. settled or pending cases). The figure includes 22 disputes spanning more than one jurisdiction.

The full report is available for download at: epo.org/patents-standards-study © 2025 EPO

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Figure E6