# Study on the interplay between standards and intellectual property rights (IPRs)

# Study on the Interplay between Standards and Intellectual Property Rights (IPRs)

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## Final Report

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# Content

## Acronyms

| | |
|---|---|
| 3GPP | 3rd Generation Partnership Project |
| ANSI | American National Standards Institute |
| BRAN | Broadband Radio Access Networks |
| CAFC | Court of Appeals for the Federal Circuit |
| CCSA | China Communications Standards Association |
| CEN | European Committee for Standardization |
| CENELEC | European Committee for Electrotechnical Standardization |
| DVB | Digital Video Broadcasting Project |
| DVB-H | Digital Video Broadcasting - Handheld |
| DSL | Digital Subscriber Line |
| ECMA | European Computer Manufacturers Association |
| EPO | European Patent Office |
| ETNO | European public Telecommunications Network Operators' |
| ETSI | European Telecommunications Standards Institute |
| EU | European Union |
| FDD | Frequency Division Duplexing |
| FP6 | Sixth Framework Programme |
| FRAND | Fair, Reasonable, and Non-Discriminatory |
| GERAN | GSM EDGE Radio Access Network |
| GMR | GEO-Mobile Radio Interface |
| GMS | Geostationary Meteorological Satellite |
| GPRS | General Packet Radio Service |
| GPS | Global Positioning System |
| GSM | Global System for Mobile Communications |

| | |
|---|---|
| ICS | International Classification of Standards |
| ICT | Information and Communication Technology |
| IEEE | Institute of Electrical and Electronics Engineers |
| IEC | International Electrotechnical Commission |
| IETF | Internet Engineering Task Force |
| INPADOC | International Patent Documentation Center |
| IPC | International Patent Classification |
| ISO | International Organisation for Standardization |
| ITU | International Telecommunication Union |
| IPR | Intellectual Property Right |
| JPEG | Joint Photographic Experts Group |
| JPTO | Japanese Patent and Trademark Office |
| JTC-1 | Joint Technical Committee 1 |
| LTE | 3GPP Long Term Evolution |
| MPEG | Moving Picture Experts Group |
| MPEG LA | MPEG Licensing Administration |
| NPE | Non-Producing Entities |
| OASIS | Organization for the Advancement of Structured Information Standards |
| OECD | Organisation for Economic Co-operation and Development |
| OMA | Open Mobile Alliance |
| OSS | Open Source Software |
| PATSTAT | EPO Worldwide Patent Statistical Database |
| RAND | Reasonable, and Non-Discriminatory |
| RF | Royalty Free |
| RFID | Radio-Frequency Identification |

| | |
|---|---|
| R&D | Research and Development |
| SAE | Society of Automotive Engineers |
| SIC | Standard Industry Classification |
| SME | Small and medium sized enterprises |
| SSO | Standard Setting Organisation |
| TETRA | Terrestrial Trunked Radio |
| TDD | Time Division Duplex |
| TS | Technical Specification |
| UICC | Universal Integrated Circuit Card |
| UMTS | Universal Mobile Telecommunications System |
| USPTO | United States Patent and Trademark Office |
| VESA | Video Electronics Standards Association |
| VITA | VME bus International Trade Association |
| W3C | The World Wide Web Consortium |
| WCDMA | Wideband Code Division Multiple Access |
| WG | Working Group |
| WPAN | Wireless Personal Area Network |

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# 0. Executive Summary

Intellectual property rights (IPRs) in standards have proven to be an intensively debated issue in industry bodies, in standard setting organisations (SSOs), in academic circles, and - increasingly - in court. While both standards and patents aim to promote innovation and market place adoption, there is little else that they have in common. Patents in standardised technology are one of the many issues that market players have to address during the development and implementation of standards. The phenomenon of patents in standards occurs in those areas where standards relate to innovative and therefore often patented technologies, e.g. in the information and communication technology (ICT) which is regarded as being crucial for the development and success in more and more industry and service sectors.

Based on this background the European Commission announced in the Communication COM(2008) 133 "Towards an increased contribution from standardisation to innovation" supported by Council Conclusions to "launch a fact-finding study to analyse the interplay of IPR and standards." Consequently, the study has to produce an up to date and quantitative picture of the interplay between IPRs and standards. Starting from a literature survey, this study implemented a multidimensional approach based on an analysis of IPR databases of important international and European SSOs and consortia, interviews with various stakeholders located all over the world, and an international survey among standards producing and standards implementing companies. In addition, we investigated the IPR policies of more than 20 SSOs and reviewed case law, industry views and trends.

The analysis of the essential IPR databases of eleven of the most important SSOs revealed that approximately 250 distinct standards include technologies that are covered by one or more declared IPRs, and many of these standards are successful and widely employed. Since there are several hundred thousands of standards available worldwide, this is a quite selective group. By far, patents are the most relevant type of essential IPR. Copyrights and other types of IPR are virtually not claimed. We also observe that the distribution of patents in standards is very skewed, both in terms of standards and in terms of owners. In other words, a few standards cover a large number of patents while most standards include only a few patents, or no patents at all. And a relatively small group of companies own a large number of essential patents in standards, while most companies own only a few or none of these patents. Most IPR owning companies are from the United States, Japan and Europe. We did also find essential patents among some small and medium sized enterprises (SMEs) including a number of Non-Producing Entities (NPEs). However, due to convergence of technologies and globalisation, more and more companies also in emerging economies, research

organisations, and NPEs have entered the game. Surprisingly, we observe a slightly decreasing inclusion of patents in standards in contrast to perceived growing importance of patents. Most patents in standards relate to telecommunications standards and to standards for consumer electronics products. However, we also observe that patents in standards extend to other fields and sectors, such as transport, logistics, energy, and health. This extension seems to be driven by ICT-type enabling technologies, though, and less by 'genuine' IPR in those areas.

Owning essential patents is seen as important and often even crucial. Yet, it serves multiple, different purposes like securing freedom to operate and signalling own technological competencies besides generating licensing revenues. In the telecommunications and the consumer electronics market, implementers ensure access to essential IPRs is most often via cross-licensing and - to a lesser extent - via general licensing-in and patent pools. Surprisingly, we learned that many smaller firms simply do not have formal license agreements at all because for many IPR owners the costs and resources to negotiate such a license are not justified by the income. In the IT field, firms that hold IPR often reciprocally and sometimes unilaterally agree not to assert them. In general, it is difficult to assess the value of essential patents, or the exact licensing terms (including fees).

The broad perception in the market is that while royalty-free regimes may facilitate the standardisation process and the implementation of standards, Fair Reasonable and Non-Discriminatory (FRAND) licensing regimes provide IPR owners with stronger incentives to invest in research and development, to patent, and to contribute to standardisation.

Despite the variety of IPR policies of SSOs, IPR owners perceive no significant impact of the heterogeneous framework conditions. Overall, companies expect SSOs to improve transparency related to essential IPRs and take care of possible problems with the implementation of standards already in the standardisation process on a voluntary and member driven basis, rather than to reform or extend their activities regarding IPRs in general.

Disputes about IPRs in standards have been an exception in the past, but can be expected to increase due to more players, transfers of IPRs and heterogeneous IPR regimes. However, these disputes are often privately settled between the parties. Nevertheless, the publication and cataloguing of European and foreign case law on intellectual property and competition policy rulings related to standardisation should be considered.

Regulatory solutions such as imposing mandatory ex-ante disclosure of licensing condition are not broadly supported. Allowing and promoting voluntary ex-ante disclosure of licensing terms is favoured by some, but particularly in the telecommunications sector, stakeholders are very pessimistic that such a mechanism would eventually work. However, there is a general perception confirmed by the study findings that issues with patents and standards are often the consequence of litigious patents, thus there is a positive correlation between a well functioning patent granting system and minimising issues with IPRs in standards. Legal uncertainty in cases of transfer of IPRs subject to a FRAND licensing commitment are becoming increasingly problematic and need to be further addressed by SSOs.

Our findings suggest that the globalisation of actors and the convergence of technologies call for a global perspective on the interplay between IPRs and standardisation. The policies of the European Union should continue to promote voluntary, market-led standardisation, whereas IPR policies should be set by the SSOs themselves. Competition policy guidelines should provide safe harbours for SSOs' IPR policies, while supporting flexible and different approaches and business models – provided these do not result in anti-competitive behaviour.

SSOs should be encouraged in their efforts to further consider:

- clear and binding IPR policies including irrevocable and worldwide licensing commitments;
- legal certainty in case of the transfer of essential patents to third parties;
- reasonable incentives for good faith IPR inquiries and disclosure;
- transparent, complete and accessible IPR databases;
- cooperation with patent offices on identifying prior art.

# 1. Introduction

Intellectual property rights (IPRs), especially patents, in standards have proven to be an intensively debated issue; in industry bodies, in standard setting organisations (SSOs), in academic circles, and - though surprisingly rarely - in court. Thousands of standards based on patented technology are successfully and widely deployed. While both standards and patents aim to promote innovation and market place adoption, there is little else that they have in common. Patents in standardised technology are one of the many issues that market players have to address during the development and implementation of standards.

The stakes are high: successful standards play a central role in large, sometimes multi-billion, markets. Owning essential patents can be a way to recoup research and development investments, e. g. by generating licensing revenue, and is sometimes a commercial imperative in order to access a market. From the perspective of the company contributing its technology to a standard, sound IPR policies are key to its licensing decisions. From the perspective of the implementer and the user of standards, IPR fees may translate into higher prices and may in some cases determine whether it is financially feasible to operate on a certain market or not; IPR licensing necessary to implement a standard is also often part of larger transactions among companies.

While patents in standards – like in markets in general – may act as obstacles, - and much more rarely create barriers for competition - patents also play an important and legitimate role in creating incentives for firms to invest in R&D. In this sense they promote scientific and technical progress. Within its eco-system, the market generally finds coordination mechanisms in order to deal with standards covered by large numbers of patents, through licensing solutions, and at times through patent pools, e.g. the patent pools set up by MPEG LA and its rival patent pool administrator Via Licensing. In most cases, there is no need for centralised mechanisms, or the downsides (such as delays, administrative overheads or commercial risk) outweigh the benefits.

The phenomenon of patents in standards occurs in all areas where standards relate to innovative technology (as opposed to safety type standards). An example is information and communication technology (ICT) which is regarded as being crucial for the development and success in more and more industry sectors, and telecommunications and video coding in particular. Increasingly there are also standards with implications on patents in other areas, such as machinery for agriculture, the transport sector, and financial services (see below). It is interesting to know whether there is a growing trend, and whether these are basically ICT patents applied in those areas, or patents that are not ICT-related.

Based on this background the European Commission announced in the Communication COM(2008) 133 "Towards an increased contribution from standardisation to innovation"[1] as supported by Council Conclusions on standardisation and innovation published in September 2008[2] to "launch a fact-finding study to analyse the interplay of IPR and standards." Consequently, the study has to produce an updated and also quantitative picture of the interplay between IPRs and standards and their impacts, including how often issues tend to arise, how important those issues are in terms of the global interplay of IPRs and standards, and how existing mechanisms at all levels help to solve the issues at hand. According to the IPR-Helpdesk established by the European Commission, IPRs are "legal rights, regardless of whether they are based on registration, that aim to protect creations and inventions resulting from intellectual activity in the industrial, scientific, literary or artistic fields", especially including patents, trademarks and copyrights. Standards are according to the "An Integrated Industrial Policy for the Globalisation Era - Putting Competitiveness and Sustainability at Centre Stage" published by the European Commission in 2010 not only fully harmonised international, European or national standards. However, we include also "the whole range of deliverables (specifications, workshop agreements)" also published by consortia and fora according to the White Paper on "Modernising ICT Standardisation in the EU - The Way Forward" published in 2009.

The aim of this fact-finding study is to provide a sound factual basis for possible policy development in the area of European standardisation and innovation. It includes the following tasks, with a strong focus on the first three tasks:

1. Fact-finding, quantification and descriptive analysis of the current situation and trends regarding the inclusion of IPR protected elements in standardisation from an international perspective.

2. Fact-finding, quantification and analysis of the current situation and trends of the economic impact of IPRs included in standards.

3. Fact-finding, quantification and analysis of the current situation and trends regarding actual issues arising from the introduction of IPR protected elements in standards and their use. These issues shall include situations where consensus in the standards making process was difficult or lacking, use of standards is lim-

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1 See http://ec.europa.eu/enterprise/policies/european-standards/standardisation-policy/policy-activities/innovation/index_en.htm.

2 See http://ec.europa.eu/enterprise/policies/european-standards/files/standards_policy/standardisation_innovation/doc/councilconclusions_20080925_en.pdf

ited, and in cases of commercial and legal dispute between different stakeholders.

4. Analysis of the current situation and trends in the IPR policies of governments, relevant standards organisations and businesses, as well as the legal practice of stakeholders in different sectors, economic areas and legal environments; develop an explanation for the variations in type and the recurrence of issues in 3 according to the elements in 4 where appropriate.

5. Further to the analysis in 4, identification of the main issues to be addressed by private and public stakeholders in order to improve the interplay of standards and IPRs, as well as solutions building on already observed practice.

The remainder of the report is structured as follows. In Chapter 2, the already existing literature on the relation between IPRs and standardisation focusing on empirical studies is listed and summarised. This review already makes obvious that among the different types of IPR, patents are most important for the interplay between IPRs and standards. Chapter 3 presents the database analysis based on the IPR databases of selected SSOs, which again are almost exclusively focused on patents, and the subsequent connection of the produced data with external information from patent and company databases. The results of open qualitative interviews with the stakeholders from industry and the quantitative analysis of the industry survey especially focused on illustrating the economic impacts of IPRs in standards are displayed in Chapter 4. In Chapter 5, the results of the legal analysis are displayed with a focus on the IPR policies of the SSOs, an overview on current positions of different stakeholders and future trends. Chapter 6 identifies the areas for future actions addressing different stakeholder groups, SSOs and – if necessary – governments.

# 2. Review of the literature

***Rudi Bekkers***

## 2.1 Introduction

The relation between standards and IPRs, especially patents, has received considerable attention in both academic and non-academic literature. This chapter aims to provide an overview of the main findings in that literature related to this study. It will start by introducing the main issues in Section 2.2, and then will continue by discussing literature on the presence of patents in standards (Section 2.3), on the impact of patents in standards (Section 2.4) and on market mechanisms in response to the interplay of IPRs and standards such as ex-ante licensing schemes and patent pools (Section 2.5). Finally, Section 2.6 addresses the literature on possible anticompetitive behaviour making use of essential patents in standards.

## 2.2 Studies on patents in standards

In the last decades, the economic importance of standards has increased considerably. Standards are now seen as one of the main alignment mechanisms which actors use to negotiate and coordinate their use of technology and the direction of technological change. Particularly in network industries, several large markets would not have come into existence absent successful standardisation.

Although the history of standards is very long[3], the phenomenon that standards include technologies (inventions) that are covered by intellectual property rights is of a more recent date. The impact and possible consequences of this phenomenon became first visible to a larger public with the standardisation of GSM, a standard for digital mobile telephony initiated in Europe and globally successful.[4] A first study by Blind et al. (2002) on behalf of DG Research of the European Commission provided a first empirical overview on the general relation between standardisation and IPR.

Firstly, we would like to stress that having parts of standards covered by IPRs is not necessarily bad. To the contrary, it might very well be worth to build a standard upon patented inventions. The patent system is designed to promote innovative behaviour,

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3 Standardisation of rifles in the US, and the standardisation of railway gauge are often mentioned as examples of early, formally administered standards.

4 There have been earlier cases where patents in standards resulted in discussions, though. These include the German stereo television standard, and the VL-bus (or VESA Local Bus) standard for PC graphic cards, among others (see Bekkers (2001) for more information on these cases).

and many valuable inventions are indeed patent (although quite a few others are not, see Cohen et al. (2002) for a discussion of the role of patenting). Such patented technologies might be the only feasible mean for realizing functional requirements of the standard in question. In other cases, the patented technology may not be the only solution but still be the best way to achieve the standard requirements, by offering a higher performance or making the implementations more cost-effective, etc. As long as the benefits of including patents outweigh their costs (in a broad sense[5]) then it is advantageous to include them. In a more indirect way, IPRs give incentives for firms to invest in the production of standards, and the absence of IPRs may result in an underproduction of standards and might deter investments in the research and development of products based on standards. Besides the incentive function, IPRs included in standards might be diffused much broader and faster compared to company-specific technology marketing efforts. Finally, pooling IPRs owned by numerous companies in a standard reduces also transaction costs and licensing fees for companies interested in implementing the standard. In summary, there strong arguments to integrate IPRs in standards (Blind 2009).

Although including patented technologies in standards can be advantageous, as explained above, the interplay between IPRs and standards raises several issues. One of them is the balance between benefits and the various types of direct and indirect costs. Here, particular attention goes to competition law (antitrust) issues that may rise when parties own essential IPRs for standards, as well as competition law issues related to collective mechanisms addressing IPRs in standards (including standard setting organisations (SSOs) IPR policies, collective actions, patent pools, etc.).

Finally, the discussion on IPRs in standards takes place in a broader policy debate concerning the optimal use of property rights (see Jaffe and Lerner (2006) among others) for a critical contribution).

It is outside the scope of this report to provide a detailed account of the complete field of studies addressing IPRs in standards. Instead, we provide an overview in Table 2-1 of main publications in the main areas that have attracted academic interest.[6]

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5 Here, we do not only refer to the licensing costs, but also the costs in a broader economic sense related to market access, costs of restricted competition, incentives for innovation, etc.

6 With the number of academic papers on standards, and the existence of journals dedicated to the subject, it is obviously impossible to include all relevant papers. Hence, we limit ourselves to the main contributions.

Table 2-1: Main studies on IPR and standards

| Topic | Main studies (selection) |
|---|---|
| **SSO IPR policies** | Chiao et al. 2007; Iversen 1999; Lemley 2002; Simcoe 2007 |
| **Case studies on patents in standards** | Bekkers et al. 2002; Bekkers, West 2009a; Bekkers, West 2009b; Kaufmann 2007; Layne-Farrar 2008; Martin, De Meyer 2006 |
| **Company strategies, market structure, and competition issues** | Blind, Thumm 2004; Denicoló et al. 2007; Drahos, Maher 2004; Farrell et al. 2007; Feldman et al. 2000; Hemphill 2005; Jensen, Thursby 1996; Lemley, Shapiro 2006; Lichtman 2006; Sidak 2009; Simcoe et al. 2009 |
| **Patent trolls, sharks** | Fischer, Henkel 2010; Lanjouw, Lerner 2001; Reitzig et al. 2007 |
| **Patent pools** | Aoki, Nagoka 2004; Bekkers et al. 2006; Blind 2003; Brenner 2009; Chiao et al. 2007; Colangelo et al. 2004; Eltzroth 2008; Gilbert 2009; Layne-Farrar et al. 2008; Lerner et al. 2003; Lerner, Tirole 2004; Lerner et al. 2007; Merges 1999 |

## 2.3 Empirical studies on the presence of patents in standards

From the 1990s, when it became increasingly clear that some standards were including dozens or more patented technologies, scholars studied several of such examples. Given the 'fact-finding' nature of our task, we will focus on empirical studies that aim to quantify the presence of patents in standards.

Most of the studies in this area focus on standards known for incorporating a large number of patents, such as the case of GSM. Bekkers et al. (2002) presented an analysis on the basis of essential patent declarations to ETSI regarding GSM by June 1998. The total number of declarations was 380, and after correcting for multiple declarations of patents that are member of the same patent family, 140 unique inventions were identified. In a follow-up study on GSM's successor, UMTS, Bekkers and West reported 6313 patent declarations related to that standard by 2005, and identified 1227 unique patents after ponderation in consideration of patent families (Bekkers, West 2009b).

Another empirical study on patents in the UMTS standard was conducted by Layne-Farrar (2008). In this study, she identifies 1247 US patents and 341 EPO patents, declared by 31 different entities.

It should be emphasized that all authors of empirical studies note that it is hard to identify the actual number of unique essential patents, as the declarations contain a lot of duplicates (either geographical or for different parts of the standard) and the information given by the patent owner that should identify the patent in question is often incomplete or inconsistent.

It has been assumed that the number of reported patents might give an inflated picture of how many patents are actually essential for a given standard, as firms may have incentives to issue declarations for patents that are not actually essential. An attempt to study such a degree of over-declaration was done by Goodman and Myers (2005). They found 6872 declarations to ETSI regarding UMTS by December 2003 corresponding to 732 unique patent families. Performing a 'light' technical assessment, they estimate that only 158 of these families are actually essential. Although this work was criticized by others (Martin, De Meyer 2006) it does include strong indications of over-declaring behaviour.[7]

Whereas the studies above all focus on a selected *standard*, Rysman and Simcoe (2008) published a study that compares the patent declarations at four different SSOs: ANSI, IEEE, IETF, and ITU. Most patents, which are mostly filed in the US, are disclosed related to IEEE and ITU standards (see Table 2-2). They also conclude that patents declared to SSOs are cited more frequently and for a longer time than other patents.

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7 Some of the critiques focused on patent counts being a bad indicator for patent portfolio value, but it should be noted that Goodman and Meyer explicitly note they do not address patent quality or value.

Table 2-2: Patent declarations at selected SSOs as identified by Rysman and Simcoe (2008).

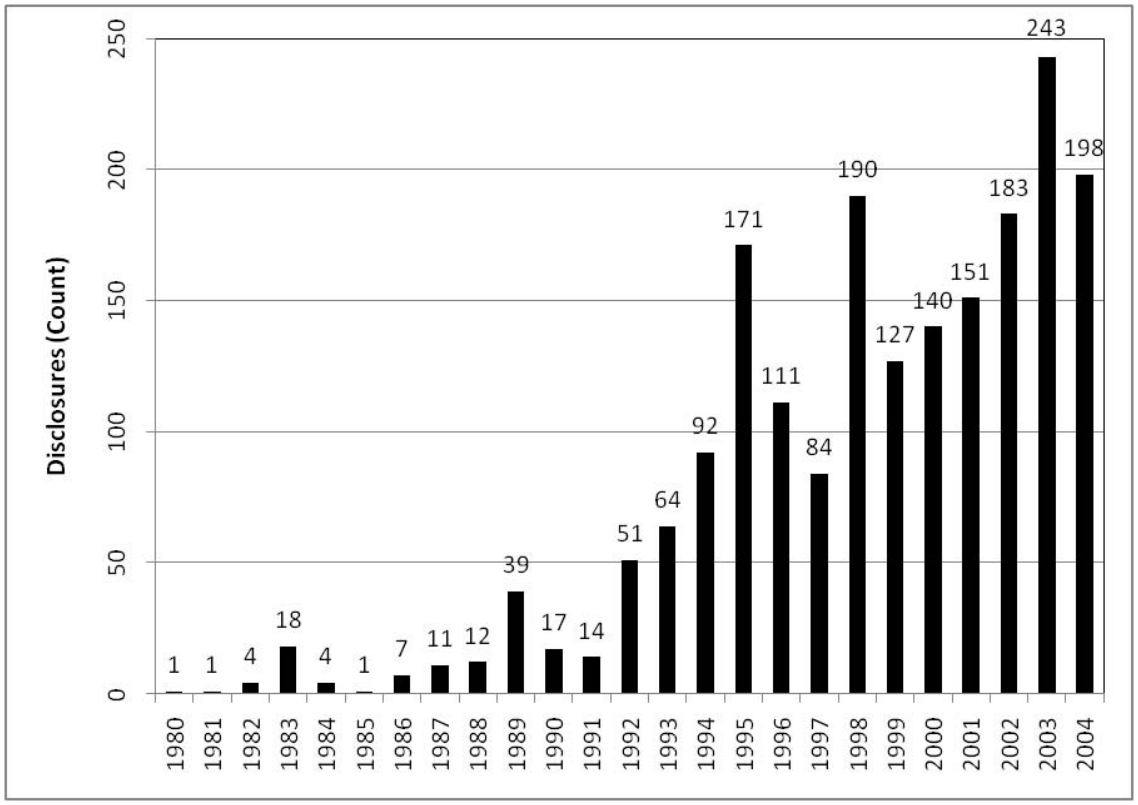
| | IPR disclosure summary | | | | Patent counts | |
|---|---|---|---|---|---|---|
| SSO | First disclosure | Total disclosure | Average size [a] | Lists U.S. patent [b] | U.S. patents | Total patents |
| ANSI | 1971 | 278 | 2.04 | 0.33 | 194 | 222 |
| IEEE | 1983 | 390 | 2.48 | 0.31 | 425 | 588 |
| IETF | 1995 | 353 | 1.20 | 0.24 | 151 | 169 |
| ITU | 1983 | 643 | 1.99 | 0.22 | 337 | 532 |

[a] Size is a count of the patent or application numbers listed in the disclosure.

[b] Equals 1 if the disclosure provides one or more U.S. patent numbers.

Yoshimatsu and his colleagues (2008) studied patent declarations at the ITU and identified 1407 of such statements made by July 2005. Note that a statement does not necessarily correspond to one single patent declared. The most comprehensive overview is produced by Simcoe et al. (2009) covering IPR disclosures of 13 SSOs and a time horizon of more than 20 years. Figure 2-1 summarises the results of their analysis.

Figure 2-1: Annual IPR disclosure at 13 SSOs (Simcoe et al. 2009)




One interesting questions is what types of patented technologies are included in standards. From a market perspective, it is clearly desirable that only those patents are included that represent a high value for the standard, by increasing its performance, improving its cost-effectiveness, or otherwise offer qualities that allow a standard to better meet the design requirements for the standard in question. At the same time, the strategic interests of participants in standardisation processes can result in attempts to include more trivial patents, which do not necessarily improve the standard.

To address the above question, several authors have studied the value of patents in standards. Rysman and Simcoe (2008) find that patents disclosed in the standard-setting process receive roughly twice as many citations as non disclosed patents from the same technology class and application year. They also find a significant increase in the citation rate of SSO patents following disclosure. Recent work by Bekkers et al. (2009) confirms such findings. They also find, however, that the involvement of the patent owner in the standards process is even a stronger determinant for patent inclusion than the patent's value. This raises concerns in instances where patents are included as the result of opportunistic, strategic behaviour of their owner and not because of their technical merit.

Summarising, we conclude that several studies aimed to qualify the number of IPRs claimed in standards or SSOs, that most studies focused on standards in the telecommunications sector (where the phenomenon was first identified), and that for recent standards in that sector, the number of claimed unique patents reaches or surpasses a thousand. We also conclude that SSOs identify and endorse patents incorporating important technologies, but that in addition to technical value, opportunistic behaviour can be another strong driver.

## 2.4 The impact of patents in standards

In a number of ways, patents in standards can have an impact on the market. Several phenomena may underlie such an impact:

- essential patents in standards may result in ex-post market power of their holders;
- multiple, overlapping rights may result in a complex IPR landscape;
- the valuation of the economic contribution of multiple patents to a standard and the corresponding compensation of their owners can be subject to controversy and dispute.

This section focuses on three scenarios where potential tensions between competing interests might arise. These are (1) the risk for patent hold-up, (2) the risk for patent ambush and trolling, and (3) the risk for royalty stacking. We will shortly discuss each of these scenarios below.

### 2.4.1 Risk for patent hold-up

A patent hold-up is a form of contractual hold-up. If an SSO selects a standard and its members make specific investments to implement this standard, an owner of an essential patent may engage in a ‘hold-up’ by demanding a higher royalty rate than he could have negotiated when the patent was not essential for the standard (Kobayashi, Wright 2010). In order to prevent his from happening, most SSOs have adopted FRAND-type IPR policies throughout the 1990s and 2000s. Also, many patent holders are repeated players and would voluntary forgo such strategies as the next time, SSOs will no longer consider their technologies. More recently, several SSOs have sought confirmation from competition or antitrust authorities that they would be allowed to adopt additional rules to further prevent patent hold-up, such as ex-ante disclosure of licensing terms (see below). Sidak, however, argued that ex ante disclosure can be anti-competitive (Sidak 2009).

### 2.4.2 Risk for patent ambush and trolling

A patent ambush occurs when a member of a standard-setting organisation withholds information, during participation in development and setting a standard, about a patent which is relevant to the standard, and subsequently this company asserts that this patent is infringed by use of the standard as adopted. As such, this is a case of deceptive conduct. There have been a number of cases where patent ambush was alleged, and these cases have been extensively documented. Examples are the Dell VESA Local-bus case (Bekkers 2001), and the RAMBUS and Broadcom (Hovenkamp 2008). Recently, Layne-Farrar (2010) presented empirical material, which indicates that essential patents are disclosed significantly after and not before the release of standards.

Additionally, there is a similar type of risk with patents of non-members. As long as patent holders are not member of an SSO, they are not obliged to respect any FRAND policy. As such, these companies may assert their patents after they have been widely implemented by companies that use the standard. In the most extreme cases, such companies are characterised as “sharks” or “trolls” (Reitzig et al. 2007).

### 2.4.3 Risk for royalty stacking

Royalty stacking refers to the aggregate burden of multiple royalties, to be paid to different right holders. Kobayashi and Wright (2010) conclude that royalty stacking creates two primary issues. Firstly, the aggregate royalty burden may be inefficient (or even obstructive) because of pricing externalities; individual right holders are not taking into account the negative effect that the price of their input has on the sales of the downstream product. Secondly, if a standard has substantial value (not attributable to the IPRs that cover it), the IPR holders may nevertheless be tempted to bargain over these rents, possible resulting in a substantial aggregate rent extraction.

Many authors have argued that, in the context of formal standards setting, the conditions for the creation of royalty stacking can be present (see, for instance Lemley and Shapiro (2006)). Others, however, stress that there is no direct evidence for royalty stacking and note that licensing rates are typically high in the industries in question and this is not necessarily a consequence of stacking (Geradin et al. 2008).

## 2.5 Mechanisms introduced to limit the impact of patents in standards

### 2.5.1 Ex-ante disclosure of licensing terms

Some of the potential negative impacts of patents in standards may be mitigated if information on the royalty fee that licensors will charge and / or other licensing terms are known prior to including certain pieces of technology in a standard. This is what ex-ante licensing policies aim at. The potential benefits of such practices have caught the attention of policy makers. In its recent White Paper on ICT, the European Commission suggests that SSOs should "consider a declaration of the most restrictive licensing terms, possibly including the (maximum) royalty rates before adoption of a standard as a potential route to providing more predictability and transparency".[8]

Uncertainty about licensing fees is reduced if IPR owners declare licensing conditions up front. In the words of ETSI: 'Ex ante disclosure of licensing terms is a mechanism about committing to licensing terms before the protected technology will be selected as part of a standard or in other words a mechanism about submitting anticipated licensing terms for a given standard draft before the contribution is locked-in as a standard.[9] Note that it is different from ex-post public licensing declarations issued after adoption of a standard.[10] Some have paraphrased ex-ante licensing schemes as 'patent auctions', thus emphasizing the opportunity that SSO members would have to select the option with the best price-performance ratio.

In recent years, the VITA Standards Organization adopted a compulsory ex-ante policy, whereas the IEEE introduced a voluntary ex-ante licensing policy (in addition to the existing RAND policy). At ETSI, ex-ante licensing declarations are allowed; such statements are collected by the ETSI secretariat and made public on the ETSI website. However, in both IEEE and ETSI, this option does not seem to be very popular; for the latter organisation, not a single declaration was to be found on the website per June 25, 2010. As such, there is little practical experience with how ex ante licensing works out in practice.

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8 European Commission (2009) White Paper Modernising ICT Standardisation in the EU – the Way forward, Brussels, 3.7. 2009.COM(2009) 324 final.

9 ETSI: http://www.etsi.org/WebSite/AboutETSI/IPRsInETSI/Ex-ante.aspx.

10 For illustrations, see http://www.nokiasiemensnetworks.com/es/Insight/network_efficiency/network_simplification/licensing_policy.htm?languagecode=en and http://www.ericsson.com/article/licencing_programs_20100215141653.

A few academic contributions have focused on ex ante licensing / patent auctioning. Geradin and Layne-Farrar (2007) argues that its introduction would lead to cause more difficulties and unintended consequences. Kobayashi and Wright (2010) point at possible anti-competitive consequences of ex-ante licensing, relating to information exchange and monopsony power. Simcoe[11] argues that it is hard to predict whether ex-ante licensing indeed results in a system where the possibility to chose the lowest bid maximises consumer surplus, or, instead, the 'proverbial smoky room" where prices are fixed. Another potential problem might be that many standards are regularly upgraded, in order to meet new demand for performance and functionality[12], changing the game from one-shot to multiple-round. In contrast, we did not come across contributions strongly supporting ex ante licensing.

### 2.5.2 Patent pools

Another mechanism that might avert problems with patents in standards is the creation of patent pools. A patent pool is an arrangement in which patents of different firms that are relevant to a certain standard or technology are licensed as a package, and the resulting royalties are distributed among those firms (called the licensors). In other words, it is an aggregation of patent rights for the purpose of joint licensing.

In contrast to ex-ante disclosure of licensing terms, patent pools are common. As shown in the literature table above, there is already an extensive literature on patent pools. Merges (1999) provides an authoritative account of patent pools in the past, and the report of the FP6 INTEREST project (Bekkers et al. 2006) provides an overview of recent more recent patent pools and the activities of the successful pool administrators (MPEG LA and ViaLicensing), who administer a considerable number of the recent pools.

Lerner and Tirole (2004) show that a pool is more likely to be welfare-enhancing if patents are more complementary. In fact, this is now a regular condition by competition authorities, and pool administrators use external evaluators to ensure that all the patents included in the pool are essential to the standard (and hence pure compliments). Baron and Delcamp (2010) find however that firms that are already member of the pool are able to include lower quality patents than 'newcomers'.

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11 Simcoe (2009). How much ex ante is enough? Retrieved from www.talkstandards.com/how-much-ex-ante-is-enough.

12 E.g. the UMTS standard, which receive a considerable upgrade with HSDPA technology, raising the maximum data transmission speed by a factor of 30 or more.

Finally, an extensive overview of pro- and anticompetitive sides is offered by Kobayashi and Wright (2010).

## 2.6 Possible anticompetitive behaviour

Both at the side of the patent owners as on the side of the SSO (and/or its members), there are several antitrust concerns, which will also be addressed later in the legal analysis. We list the most important ones:

- A patent holder may unjustly refuse to license an essential patent. Although the right not to license is inherent in intellectual property ownership, and firms may unilaterally refuse to license, it may be so that selective refusal to license constitutes a breach of competition law. (Kobayashi, Wright 2010, p. 21).
- The SSO (or its members) might unjustly refuse in include patented technology in a standard (see Kobayashi and Wright (2010, p. 13)..
- The SSO (or its members) may abuse their monopsony power. In a monopsony, there is only a single buyer, or a group of buyers that coordinates its behaviour and acts as a single buyer. Sidak concludes that oligopsonistic collusion among licensees in an SSO is a legitimate antitrust concern. He writes: *"Allowing an SSO the ability to request or demand maximum royalty rates from IPR holders and then to discuss those royalty rates during the standard-setting process is troubling when one considers that SSO members who are licensees of that technology may be oligopsonists possessing market power." (Sidak 2009)*

In addition, there might be anticompetitive concerns related to mechanisms such as patent pools. In fact, such pools are a complex combination of pro-competitive and anti-competitive effects (see Bekkers (2001) for an extensive overview). These various effects need to be weighted, and authorities will only allow pooling when the procompetitive effects outweigh the anticompetitive ones. Usually, pool administrators inform competition/antitrust authorities about the exact rules of the pool they propose, and seek clearance. Both in the Europe and in the US, several pools received such clearances, many of which actually involve pools based on standards.

# 3. Quantitative Study of Essentially-claimed Patents

***Rudi Bekkers, Stein Smeets, Jurgen Verweijen (Section 3.1 and Section 3.2)***

***Knut Blind, Florian Köhler, Tim Pohlmann (Section 3.3. and Section 3.4)***

## 3.1 Methodology of the database analyses

Many SSOs have IPR policies according to which members are obliged to notify essential IPR they own. They are urged to issue a declaration (often called 'claim') that they are willing to license at FRAND conditions. If one or more members refuse to do so, the SSO has to stop the standardisation activities, according to such policies.

Most SSOs make databases of such FRAND declarations by IPR owners public, and these databases allow us to identify, quantify and analyse the IPRs in standards – as far as claimed by their owners. Although these databases may not be a perfect representation of all existing essential IPR (as they may be subject to over claiming and under claiming, among other things), they are the most tangible manifestation of IPRs in standards. However, the study is not able to evaluate whether declared IPRs are actually essential. Furthermore, the presented number might be due to database inconsistencies not reflect perfectly the real IPR situation.

For the purpose of this study, our first aim was to collect and clean the databases of selected SSOs, ultimately linking their content to the EPO/OECD PATSTAT database. Not only does that allow us to analyze the database in a proper way; it also allows us to remove the numerous duplicate entries that are usually found in such databases as firms often claim many patents that concern one and the same invention (in different countries but also in the same country). The so-called INPADOC patent family information, which is included in PATSTAT, allows us to recognize such family members.

The second objective of the database analysis was focused on identifying the standards including essential IPRs and relating these subset of standards to the total number of standards in the selected SSOs, in the different technology classes and at specific points of time.

While we believe an analysis as presented here is the most tangible way to gain insight into quantitative data on patents in standards, it is also important to understand the limitations of such an exercise:

1. Some companies submit 'blanket claims', stating that they will license on FRAND conditions, but not providing any identity of their patents.

2. There is some degree of strategic over-claiming (declaring essential patents that are in fact not essential – see the insights from the interviews in Chapter 4.2 for more details). Such strategies are likely to differ between firms.

3. Declarations may be submitted before the patent is granted or before the standard is finalised. A granted patent may not be as broad any more as the original application and thus might not be essential anymore, and the final standard might be different from earlier draft versions, and disclosures that were appropriate for a certain draft version might not be essential for the final version of the standard. Since many SSOs do not require parties to update or withdraw earlier disclosures, such declarations remain in the IPR database.

4. Some IPR specified in declarations may not be identifiable because declarations are erroneous or because their applications have not been officially published yet.

5. IPR owned by non-members may be missing. Most SSOs are believe to be quite encompassing, so this issue might not affect the numbers a lot, but if a missing IPR is owned by a patent troll, it might certainly cause problems for implementors.

6. Finally, it goes beyond saying that patents vary greatly in value, and patent counting should not be seen as equivalent to value assessment (see also the literature survey in Chapter 2 and see the results of the company interviews in Chapter 4.3) for more information on this.

Chapter 3 is structured into the following subsections. First, we present the methodology we applied including the selection of databases and the cleaning of the data. Second, an overview of the results of the database analysis is given, followed by the differentiation of the results according to fields of technologies, countries and over time. Forth, we complement the list of owners of essential patents with additional company information in order get a better understanding on their size structure, country distribution and R&D performance. Then, we turn the view from the patent perspective and focus on the standards including essential patents to complete the database analysis.

### 3.1.1 Selection of SSOs and collecting their databases

In dialogue with the Services of the European Commission and the Steering Group accompanying the project, it was decided to analyse the IPR database for the following formal and other more informal SSOs:

- Broadband Forum[13]
- European Committee for Standardization (CEN)
- European Committee for Electrotechnical Standardization (CENELEC)
- European Telecommunications Standards Institute (ETSI)
- International Electrotechnical Commission (IEC)
- Institute of Electrical and Electronics Engineers (IEEE)
- Internet Engineering Task Force (IETF)
- International Organisation for Standardization (ISO) - excl. JTC-1
- International Telecommunication Union (ITU-T)
- ISO/IEC Joint Technical Committee 1 (JTC-1)
- Open Mobile Alliance (OMA)

The public databases as they were available by February 1, 2010, were used for the analysis. Some were available as a web search engine, others as PDF documents. Most SSOs were also asked whether they were able to provide other, possibly more consistent versions, but none was able to do so.

### 3.1.2 Cleaning and processing of the data

Below, we provide a brief introduction on the cleaning and processing of the data.[14] Basically, we aimed at identifying each specific patent identity at the EPO or the USPTO, and translated application numbers into patent/publication numbers using a harmonized format (as used in the EPO/OECD PATSTAT database), and identified patent family identities. Then we cleaned and/or corrected for geographic overlap, for standards overlap, and for SSO overlap, and for multiple owners where necessary.

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13 Originally known as the DSL forum, later united with the IP/MPLS forum.

14 More details are provided in Annex I.

Where necessary, we assigned claims to current ownership structures, reflecting known mergers and acquisitions (e.g. Lucent or Alcatel patents are now listed as Alcatel-Lucent, whereas patents of Nokia did not go into Nokia Siemens Networks unless this was listed as such in the database).

To deal with possible geographical overlap, we distinguish three different sets of numbers in this report: This section discusses several analysis of the database of claimed essential patents. Here, we distinguish between different sets of patent indicators in Table 3-1.

Table 3-1: Patent indicators

| | |
|---|---|
| Total patents claimed | include all claims concerning USPTO or EPO patents we could find, even if they failed to provide specific information such as patent or application number. |
| Identified patents in PATSTAT | those of the above patents or patent applications that could be identified within the PATSTAT database |
| Patents according to 'RealFamilies' | the same set as above, but filtered for duplicate patents filed in different legislations. As we believe that this number best represents the actual patent situation, we will refer to this one the most often.[15] |
| Unique patent families (INPADOC) | the number of unique patent families, according to the data of the International Patent Documentation Center (INPADOC); a database is produced and maintained by the European Patent Office (EPO). This is the number that comes closest to a 'single invention'. |

15 One challenge in the SSO databases is that companies may have provided a protection of the similar invention in several legislations. One can (quite safely) recognize this if one observes that these declarations have the same INPADOC family ID. However, it is also possible that companies have several patents in a single legislation which nevertheless have the same INPADOC family ID. This may be the case if a firm has been granted continuation patents, divisionals, divisionals in part, etc. Since the patent office in question decided to give separate protection for these applications, it would be best to see them (at least partly) as separate inventions. We deal with this issue in the our database in the following way: (1) If a company owns multiple patents in a family, and the number of EP patents in that family is larger than the number of US patents, we take all the EP patents and discard all the US patents; (2) If a company owns multiple patents in a family, and the number of US patents in that family is equal or larger than the number of EP patents, we take all the US patents and discard all the EP patents. This method provides an 'honest' view of the number of claimed inventions, as it corrects for overlap between countries, while at the same time recognizing patents that are given independent protection of their invention by the patent authorities. We call these groupings "REAL FAMILIES".

As our data is based on patents that are claimed by their respective owners, we do not differentiate by patents that are actually granted or patents that are only applied for. For 75.1% of the claimed patents or patent applications that could be identified in PATSTAT we were able to confirm they were granted. The reminder might include claims for patents that were never granted, but may also refer to applications that are still pending. For reasons of clarity, the reminder to this chapter will talk about 'patents' regardless of whether they are (already) granted or not.

## 3.2 Results of the database analyses

### 3.2.1 Claimed essential patents at the studied SSOs

In Table 3-2 the total number of claimed patents for the studied SSOs is shown. As follows from the previous section, the number of patents in the category "RealFamilies" is lower than the total of identified patents, because geographical overlap is removed. Similarly, the numbers for "Unique patent families" is even lower, as it combines all patents that are considered to be member of the same patent family (in between or across countries) into one single count. As explained above, the latter number is what comes to 'single inventions'.

The distribution is clearly very uneven: some SSOs 'attract' large numbers of patents, others hardly any. ISO and CEN show very low numbers, despite the wide breath of subjects they cover. The electrotechnical bodies IEC and CENELEC show somewhat higher numbers. ISO/IEC JTC 1, the Joint Technical Committee 1 of ISO and IEC that deals with all matters of information technology, attract higher numbers, which is due to the audio and video coding standards that are developed there. But, by any standard, the real high number of claimed essential patents can be found at the bodies that focus on telecommunications standards: ETSI, IEEE, ITU, IETF, and OMA.[16]

16 We note that IEEE covers more than mere telecommunications, but the lion's share of patents relates to telecommunications after all.

Table 3-2: Claimed essential patents by SSO[17]

| *SSO* | *Total patents claimed* | *Identified patents in PATSTAT* | *Patents according to 'RealFamilies'* | *Unique patent families (INPADOC)* |
|---|---|---|---|---|
| BBForum | 36 | 26 | 25 | 13 |
| CEN | 2 | 2 | 2 | 2 |
| CENELEC | 4 | 4 | 4 | 4 |
| ETSI | 5649 | 5054 | 4212 | 2715 |
| IEC | 96 | 91 | 91 | 88 |
| IEEE | 622 | 559 | 527 | 414 |
| IETF | 271 | 255 | 249 | 197 |
| ISO | 47 | 45 | 43 | 37 |
| ITU | 575 | 496 | 477 | 408 |
| ISO/IEC JTC 1 | 267 | 243 | 219 | 188 |
| OMA | 407 | 364 | 347 | 265 |
| Total (*) | 7976 | 7139 | 6196 /6152 | 4331/4095 |

### 3.2.2 Claimed essential patents by standard

Table 3-3 shows the number of claimed essential patents for specific standards or standards being part of a comprehensive standard. Here, standards documents are brought together to a level that generally seen as one single, complete set of standards (e.g. UMTS), although based on a set of numerous specific single standards. Again, we also show the number of patents in 'RealFamilies', as well as unique patent families we found.

One may only conclude that essential patent claims are very much focused on (1) telecommunications technologies, (2) object identification technologies (such as

17 The first number is the sum of the results of all the SSOs. The second number is the number of unique patents or patent families across all SSOs. As there are a few patents/families that are claimed within more than one SSO, this number is slightly lower.

RFID), (3) audio/video coding standards and (4) computer and consumer electronics technologies (such as busses). These are the technologies where standards sometimes incorporate large numbers of essential IPR. (This does not mean that patents are by definition less *relevant* for other standards; this might even be the case for a standard that is covered by a single, but extremely relevant / valuable patent.)

A possible explanation why we observe so many essential patents in the four areas identified above and fewer or none in other areas that are known to be research-intensive, e.g. medical or nanotechnology, might be that in these other areas, interoperability is less important and standards are not the key alignment mechanism for the technology in the field. For quite a few of these areas, this might change. However, ICT is more and more becoming an enabling technology in these sectors, and many new application areas, e.g. e-health, will require interoperability standards. In such cases, it is likely that such standards will cover IPR. In section 4.2.2, this will be discussed in more detail.

Table 3-3: Claimed essential patents per standard or complete set of standards, all standards with 10 or more claimed USPTO and/or EPO patents

| *Standard (coded)* | *Total patents claimed* | *Identified patents in PATSTAT* | *Patents according to 'RealFamilies'* | *Unique patent families (INPADOC)* |
|---|---|---|---|---|
| ETSI-UMTS | 2864 | 2597 | 2128 | 1605 |
| ETSI-GSM | 1333 | 1259 | 966 | 756 |
| ETSI-LTE | 866 | 646 | 642 | 562 |
| OMA (all standards) | 408 | 365 | 348 | 266 |
| IETF (all standards) | 271 | 255 | 249 | 197 |
| IEEE 802.16 Broadband Wireless Metropolitan Area Network ("WiMax") | 165 | 152 | 137 | 105 |
| JTC RFID (Radio Frequency Identification for Item Management) | 143 | 133 | 116 | 78 |
| IEEE 802.11 Wireless LAN (aka "WiFi") | 136 | 126 | 116 | 98 |
| ETSI-SAE | 92 | 87 | 80 | 87 |
| ETSI-DBV | 92 | 87 | 64 | 51 |
| ITU-H.264/AVC/MPEG-4 Part 10 (Advanced Video Coding) video compression | 86 | 57 | 54 | 43 |
| ITU other standards in G series | 69 | 62 | 61 | 52 |
| JTC 1/SC 29/WG 11 Coding of moving pictures and audio (incl. MPEG) | 68 | 53 | 47 | 45 |
| ETSI-TETRA | 53 | 53 | 38 | 40 |
| IEEE 1363 Public Key Cryptography | 52 | 52 | 50 | 43 |
| IEEE 1394 "Firewire" | 46 | 38 | 38 | 30 |
| ETSI-GERAN | 44 | 33 | 33 | 26 |
| JTC 1/SC 25 Interconnection of information technology equipment ("Home Electronic System") | 36 | 36 | 36 | 30 |
| BroadBand Forum standards (DSL etc.) | 36 | 26 | 25 | 13 |
| IEEE 802.3 "Ethernet" | 35 | 32 | 32 | 26 |
| IEEE 802.1 series on Interworking, Security, Audio/Video Bridging and Data Center Bridging | 32 | 23 | 23 | 17 |
| ETSI-GMR | 31 | 31 | 31 | 23 |
| ETSI-BRAN | 31 | 28 | 22 | 19 |
| ETSI-UICC | 28 | 28 | 21 | 13 |
| JTC 1/SC 29/WG 1 Coding of still pictures (incl. JPEG, JPEG 2000) | 27 | 27 | 27 | 23 |
| ITU-H.262 MPEG-2 Video Encoding | 25 | 21 | 21 | 20 |
| IEC 65C Industrial networks | 24 | 23 | 23 | 23 |
| ETSI-GMPRS | 21 | 21 | 21 | 13 |
| ITU-T G.991.1(a.k.a HDSL) | 20 | 17 | 15 | 11 |
| ITU G.993.2 (a.k.a. VDSL2) | 20 | 17 | 16 | 16 |
| IEEE 802.21 Media Independent Handover Services | 20 | 16 | 16 | 10 |
| ETSI-DECT | 20 | 20 | 18 | 18 |
| ITU G 723.1 audio codec for voice (MPC- | 19 | 18 | 17 | 17 |

| | | | | |
|---|---|---|---|---|
| MLQ or ACELP) | | | | |
| JTC 1/SC 29 Coding of audio, picture, multi-media and hypermedia information | 17 | 16 | 16 | 15 |
| ETSI-MMB | 16 | 14 | 14 | 11 |
| ITU JPEG XR image coding system (T JXR-2; T JXR-5) | 16 | 14 | 14 | 10 |
| ETSI-Speech Recognition | 15 | 12 | 12 | 11 |
| IEEE 1149.4 Mixed-Signal Test Bus | 15 | 12 | 12 | 7 |
| IEEE 802.3af Power over Ethernet | 15 | 14 | 14 | 7 |
| ISO TC 23/SC 19 Agricultural electronics - identification | 14 | 13 | 12 | 12 |
| ITU G.VBR-EV Variable Bit-Rate speech coder | 14 | 14 | 13 | 14 |
| ITU G.992.3 (a.k.a. ADSL2) | 12 | 11 | 9 | 8 |
| ETSI-HSPA+ | 12 | 12 | 12 | 11 |
| ITU G 729 Coding of speech at 8 kbit/s (for VoIP) | 12 | 10 | 10 | 10 |
| ITU V 90 Telephone modem for 56 kbps | 11 | 11 | 11 | 9 |
| J 144 Objective perceptual video quality measurement techniques for digital cable television | 11 | 11 | 11 | 11 |
| J 161 Audio and Video codec requirements for the provision of bidirectional services over cable television networks | 11 | 11 | 11 | 5 |
| ETSI-ERM | 11 | 11 | 9 | 3 |
| ETSI-DTS | 10 | 10 | 7 | 4 |
| ITU H 222.0 MPEG-2/System | 10 | 8 | 8 | 7 |
| IEEE 1647 e-Functional Verification Language Working Group | 10 | 10 | 10 | 6 |
| ETSI-eCall | 10 | 10 | 10 | 2 |

### 3.2.3 Claimed essential patents by region or country

Among the organisations claiming essential patents, we find parties from all over the world. Table 3-4 shows the relative contribution of the different home countries / home regions.[18] These countries/regions were determined on the location of the headquarters or corporate offices of these organisations. We observe that, by far, most claiming firms have their headquarters or the unit responsible for claiming essential patents the US. Within the US, the majority of firms are based in the states California (Silicon Valley, San Diego region) or Texas (Dallas).

When looking at unique patent families, however, we see that the Europe is getting considerably closer to the US score, though does not match that score yet. This indi-

18 Note that there are a sizeable number of small IPR claimants that are hard to trace; these firms have names that are very hard to identify. Although the home base of some could be based using legal documents (patent infringement cases, etc.), some remained unidentified.

cates that, on the average, US firms claim more patents that are part of the same patent family.

Table 3-4: Claimed essential patents by home region or country of claiming firms

| | *Total patents claimed* | *Identified patents in PATSTAT* | *Patents according to 'RealFamilies'* | *Unique patent families (INPADOC)* | *Number of organisations* |
|---|---|---|---|---|---|
| United States | 3910 | 3441 | 3076 | 1732 | 156 |
| Europe | 2980 | 2751 | 2225 | 1707 | 72 |
| Japan | 369 | 356 | 303 | 234 | 21 |
| Asia (excl. Japan) | 359 | 273 | 256 | 209 | 10 |
| Canada | 265 | 241 | 222 | 152 | 9 |
| Israel | 25 | 20 | 19 | 16 | 10 |
| Other country | 15 | 15 | 13 | 8 | 4 |
| Unidentified organisation | 51 | 40 | 38 | 35 | 31 |

We also examined the size distribution of the claimants in the various world regions. The results are presented in Figure 3-1. In Figure 3-2, the same data is shown in percentages. The most remarkable facts here are that Israel hosts many small IPR claimants (with two to four patents), whereas Asian countries (other than Japan) host relatively large claimants.

Figure 3-1: Size categories of claimants by world region / country (absolute)[19]

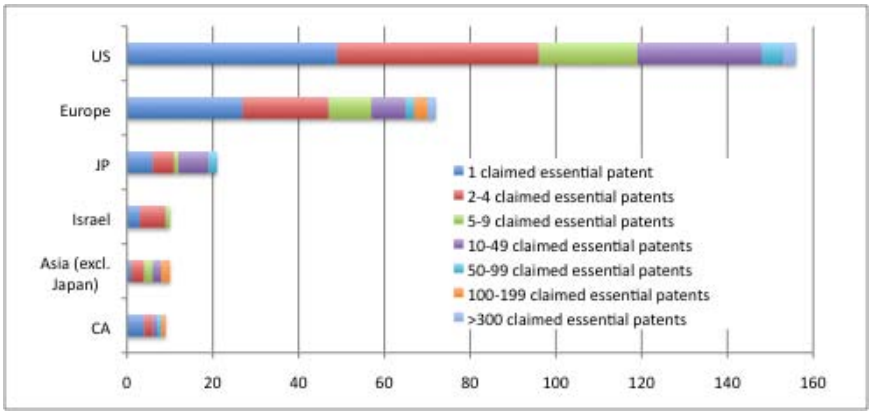
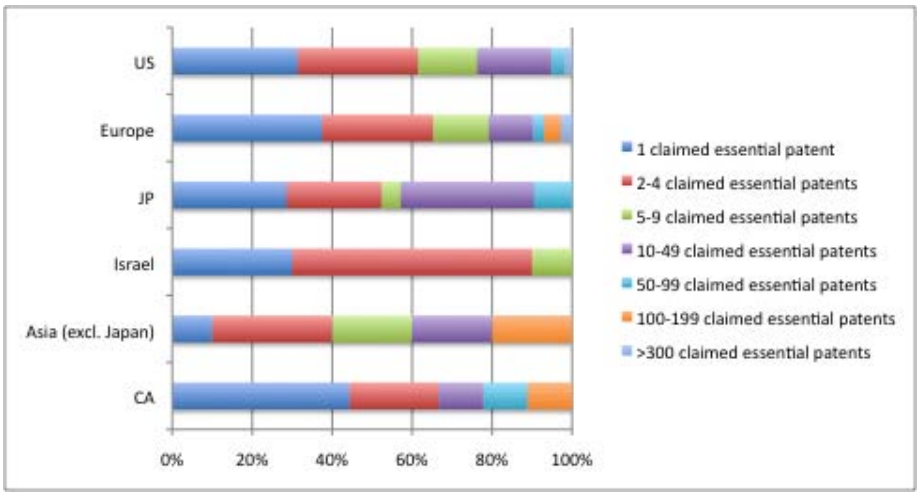



Figure 3-2: Size categories of claimants by world region / country (relative)

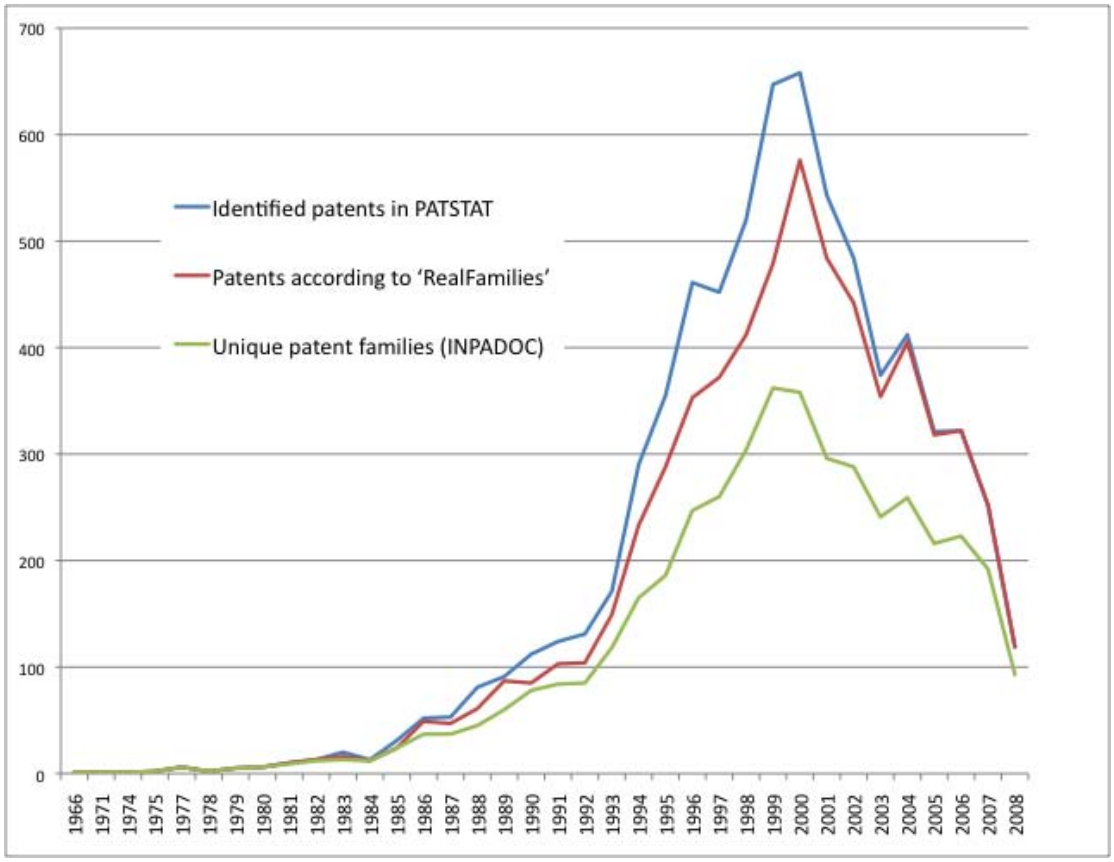



### 3.2.4 Claimed essential patents over time

We also looked at the way in which essential patent declarations developed over time. Figure 3-3 shows these timings. Again, we distinguish for different ways of measuring the patent stock. Obviously, we only have timing information for those patents we were able to identify. For the category ‘identified patents in PATSTAT, we show the filing date. For the patents in ‘RealFamilies’, we also show the filing date. For patent families, we show the filing date of the oldest patent within that family that is present in the data-base. As such, this date typically will be equal to the (oldest) priority date of the patents within that particular family.

19 Data based on total of USPTO and EPO patents claimed.

Figure 3-3: Filing date of claimed essential patents




Note that for the different categories, we find a decrease starting in approximately 2001. This may indicate a decrease in the filing of essential patents.[20] On the other hand, it may be related to the various ('patent-intensive') standards that are being drafted in certain periods of time. Therefore we also looked at the timing patterns for those standards that attracted most patents. The results are shown in Figure 3-4. It shows that the peaks in the overall patent stock are strongly linked with peaks within specific, patent-loaded standards. These peaks depend on the time frame in which they are developed, and the time frame of possible extensions to the standards (such as the packet mode GPRS extension to GSM). As the figure shows, GSM attracted a lot of patents filed between 1994 and 1999; UMTS attracted a lot of patents filed between 1997 and 2002, whereas LTE is starting to attract patents filed from approx. 2005 on. (Note that the drop for LTE from 2007 on is likely to be due to truncation in the available public data).

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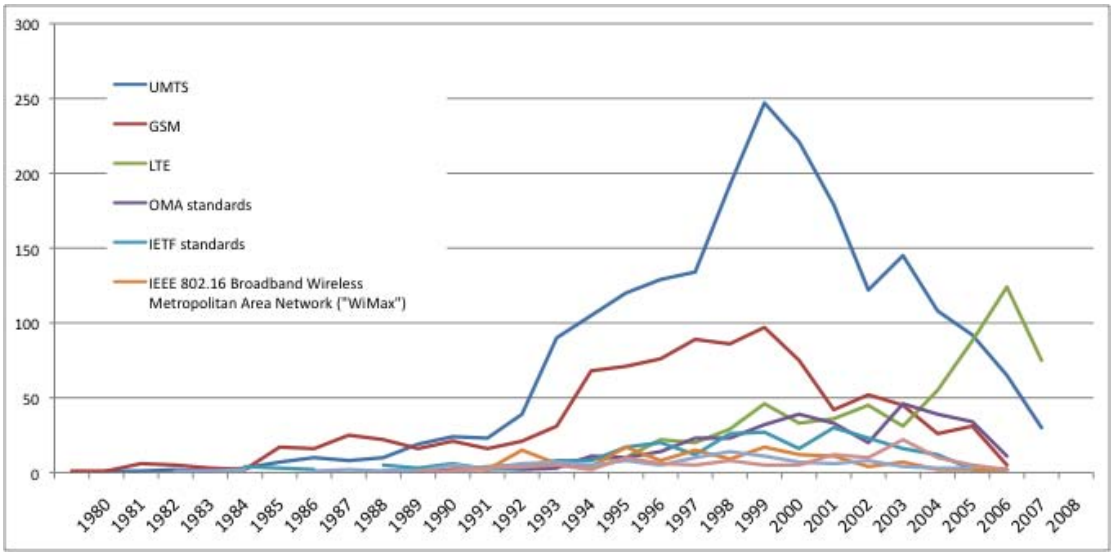
20 For recent patent filings, there will also be a truncation effect, because these recent patents may not yet be published, or we may not yet have been able to identify these patents in the PATSTAT version we used (which is updated up to April 2010). This effect will impact the years 2006 and further, but is unlikely to be the cause of the considerable drop starting in the year 2001.

Figure 3-4: Filing date of claimed essential patents by largest standards (on basis of RealFamilies)




### 3.2.5 Claimed essential patents by technology field

The technology fields of patents are indicated by the IPC code. Table 3-5 shows how the claimed essential patents are distributed over these classes (based on the 'primary class' or the first patent class mentioned in the patent). Not surprisingly, the largest classes are those related to telecommunications and audio/video coding techniques.

Table 3-5: International Patent Classification (IPC) classes of claimed essential patents (on basis of RealFamilies, 15 or more patents per category)

| *IPC Section and Class symbol; description* | *Total number of claimed patents* |
|---|---|
| H04 Electric communication technique | 4436 |
| G06 Computing; calculating; counting; AV coding | 637 |
| G10 Musical instruments; acoustics | 293 |
| G01 Measuring; testing | 237 |
| H03 Basic electronic circuitry | 234 |
| G09 Educating; cryptography; display; advertising; seals | 34 |
| H01 Basic electric elements | 33 |
| G08 Signalling | 28 |
| G07 Checking-devices | 22 |
| G05 Controlling; regulating | 18 |
| G02 Optics | 18 |
| G11 Information storage | 15 |

### 3.2.6 Claimed essential patents by ownership

In total, 292 firms (or organisations) claim ownership of essential IPR in the databases we examined.[21] The distribution of this ownership is very skewed: a handful of large firms own the lion's share of the patents, while the rest of the firms typically only claim less than five patents. Table 3-6 shows how the IPR ownership is distributed over the largest claiming firms.

Table 3-6: Claimed essential patents by firms (largest firms only)

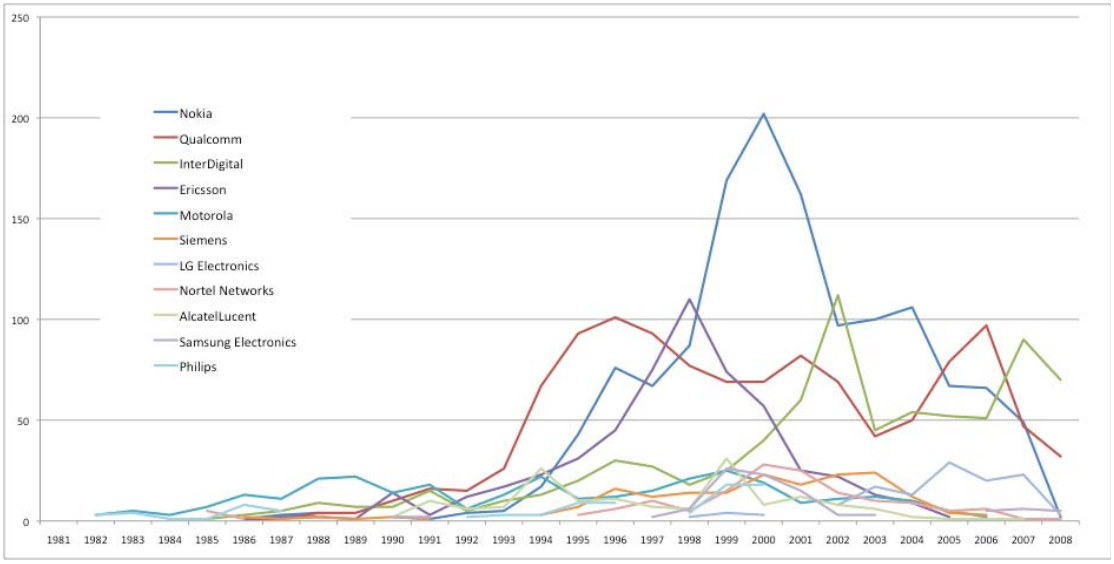
| *Claiming firm* | *Total patents claimed* | *Identified patents in PATSTAT* | *Patents according to 'RealFamilies'* | *Unique patent families (INPADOC)* |
|---|---|---|---|---|
| Nokia | 1480 | 1330 | 1076 | 776 |
| Qualcomm | 1284 | 1145 | 950 | 505 |
| InterDigital | 986 | 769 | 713 | 285 |
| Ericsson | 553 | 540 | 455 | 362 |
| Motorola | 319 | 310 | 250 | 180 |
| Siemens | 196 | 185 | 151 | 121 |
| LG Electronics | 188 | 128 | 126 | 107 |
| Nortel Networks | 170 | 152 | 136 | 94 |
| Alcatel-Lucent | 168 | 159 | 123 | 105 |
| Samsung Electronics | 115 | 100 | 88 | 70 |
| Philips | 102 | 100 | 73 | 60 |
| Texas Instruments | 96 | 82 | 82 | 65 |
| Cisco | 93 | 86 | 86 | 63 |
| NEC | 92 | 89 | 59 | 41 |
| Nokia Siemens Networks | 92 | 83 | 64 | 56 |
| Panasonic | 89 | 84 | 73 | 53 |
| Microsoft | 83 | 79 | 77 | 41 |
| Apple Computer | 82 | 74 | 68 | 43 |
| IBM | 72 | 69 | 69 | 54 |
| Research In Motion | 71 | 69 | 67 | 44 |
| France Telecom | 58 | 57 | 46 | 32 |
| Scanbuy | 49 | 43 | 43 | 15 |
| AT&T | 48 | 46 | 45 | 30 |

21 This data is based on the name of the organisation that claims the patent at the SSO. Given the regular occurrence of changes of ownership, and the fact that this is far from systematically captured in patent databases, we believe these claimants are the best indication. The names have been updated for know mergers, acquisitions and ownership.

| | | | | |
|---|---|---|---|---|
| Hughes Network Systems | 46 | 46 | 46 | 17 |
| Toshiba | 41 | 41 | 35 | 19 |
| Dolby Laboratories | 36 | 36 | 21 | 11 |
| Gemalto | 35 | 32 | 22 | 19 |
| Koninklijke KPN | 32 | 32 | 26 | 19 |
| Télédiffusion de France (TDF) | 31 | 31 | 25 | 17 |
| NTT DoCoMo | 30 | 30 | 30 | 30 |
| Sony | 28 | 28 | 28 | 25 |
| Thomson | 28 | 7 | 6 | 5 |
| British Telecommunications | 25 | 24 | 14 | 13 |
| Sun Microsystems | 25 | 20 | 18 | 10 |
| Hewlett Packard | 24 | 21 | 21 | 18 |
| ATMEL | 23 | 22 | 16 | 13 |
| Agere Systems | 21 | 20 | 20 | 16 |
| Intermec | 21 | 21 | 20 | 12 |
| Bellsouth | 20 | 17 | 17 | 6 |
| NTT | 20 | 18 | 15 | 9 |

We now turn to timing patterns of individual patent owners in Figure 3-5. Note, however, that this graph includes all standards we studied, old or new, so one should draw no conclusions here relating to the age of patents in respect to specific standards. We also stress that this graph shows the filing date of the patents, reflecting the ‘age’ of the invention, not the declaration date, which is the moment at which a firm notified a specific IPR to the SSO.

Figure 3-5: Filing date of claimed essential patents by largest claimants (on basis of RealFamilies) for all standards[22]

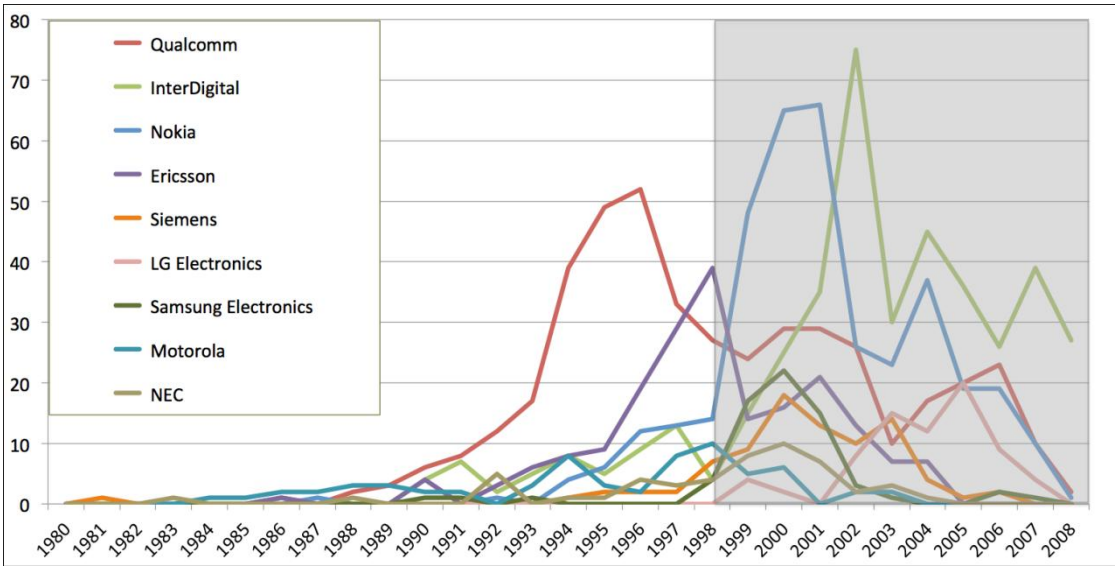



When we consider specific standards, we can also see how the age of the IPR of specific owners relates to the standardisation process. Figure 3-6 shows this for UMTS, the largest standard in our data set in terms of number of patents. The area shaded in grey represent the period when the actual drafting of the standard took place, starting at the January 1998, the event at which decisions were taken on the key technology on which UMTS was to be based.[23] From the graph, we can see that most of the IPR that Qualcomm claims to be essential predates the decision and the actual drafting work, In contrast, the patents claimed by Nokia, for instance, were mostly filed after the key technologies were already decided upon. These later patents can either refer to further improvements and implementation issues, or to technologies, that were incoporated only in a later version ('release') of the standard.

22 Figure 3-5 shows all the firms with 100 or more patents (on basis of RealFamilies). A total of 10 patents filed prior to 1980 are not shown in the figure.

23 For a detailed account, see Hillebrand (2002) or Bekkers (2001).

Figure 3-6: Filing date of claimed essential patents by largest claimants (on basis of RealFamilies). UMTS only.[24]




24 Figure 3-6 shows all the firms with 50 or more patents claimed for UMTS (on basis of RealFamilies). One patent filed prior to 1980 are not shown in the graph.

## 3.3 General characteristics of companies owning essential patents

To identify and characterize the companies that have declared essential patents included in a standard, from the 291 identified companies above 217 are still active today and could thus be used for an in depth analysis using also commercial data.

Figure 3-7 gives a vivid picture of the share of sectors where essential patent owning companies are active in, categorized with the SIC-code (Standard Industry Classification code). Companies are weighted as to number of patents, which reveals a strong domination of the Communication sector (72.5%) and especially the Radio, TV and Broadcasting sector (44%).

Figure 3-7: Share of sectors (SIC-code) as to number of patents in brackets (n=217)

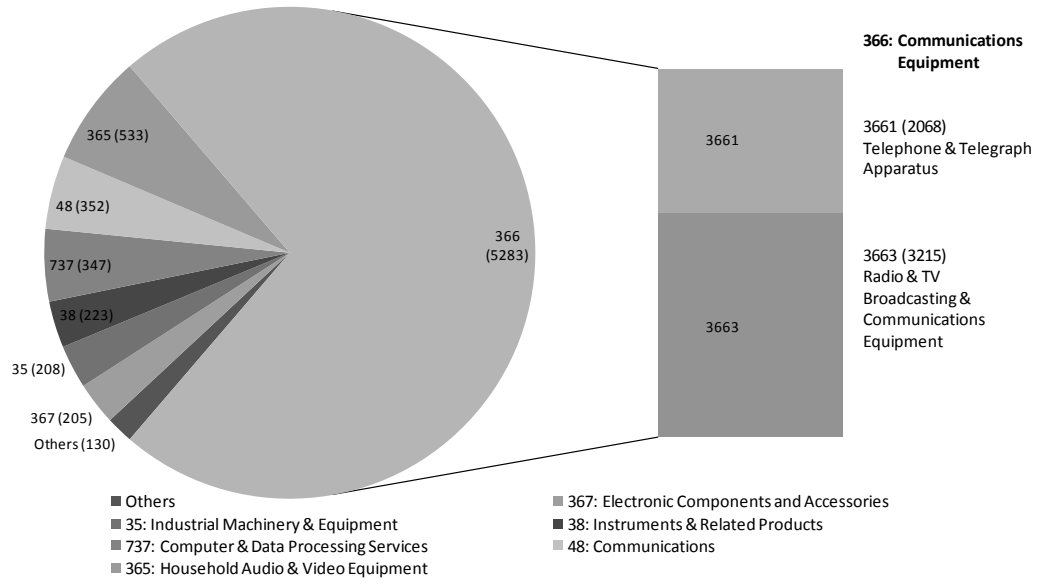
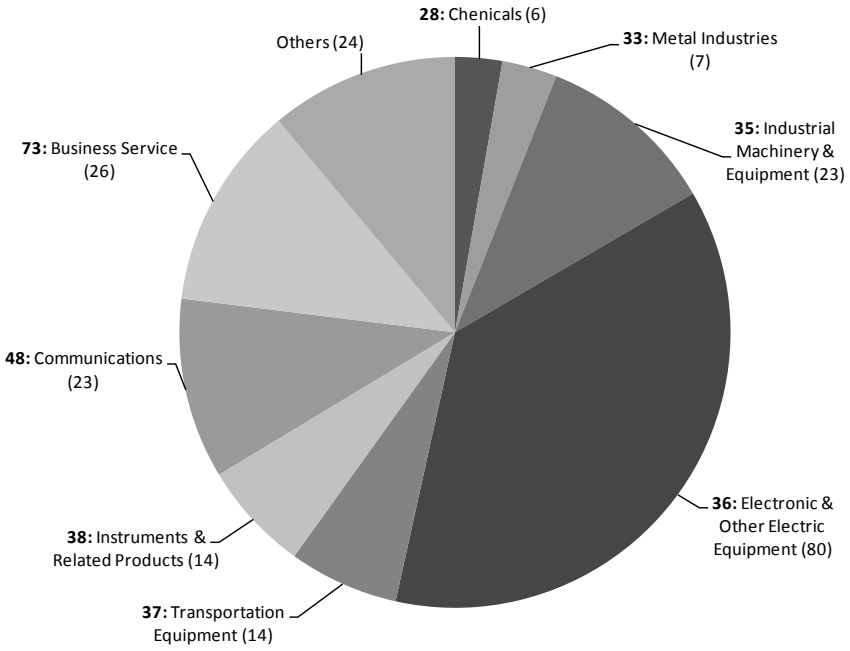



Figure 3-8 in comparison shows the sector distribution as to numbers of companies, without weighting the patents. Very interesting seems the considerably low share of only 11% in the communication sector. The comparison of the weighted and not weighted shares indicates that companies owning a high amount of essential patents are mostly found in the communication sector. Whereas the non communication related sectors have a lower sector concentration.

Figure 3-8: Sector distribution as to number of companies (N=217)




To assess the technological stage of the produced products that concern essential patents, the observed companies R&D expenditure is compared to their total turnover. In regard to the OECD classification almost all companies of the sample could be categorized as being in high tech industries. Around 47% of the companies have a very high R&D intensity with more than 8.5% and only one fourth of the companies have a R&D intensity that is below the benchmark of 3.5%. These results provide evidence that the owning of essential patents is accompanied by or only possible due to very high R&D expenditure shares.

Figure 3-9: Specific R&D-intensity levels; share of companies in brackets (N= 217)

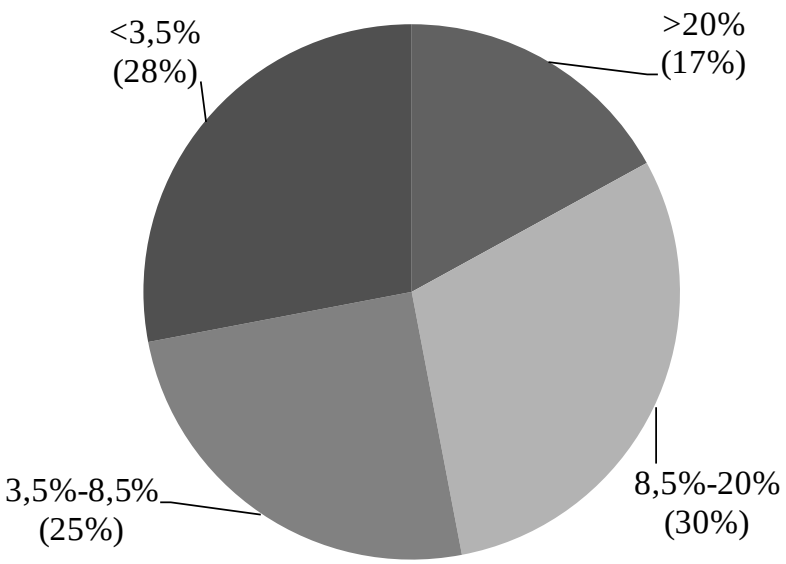
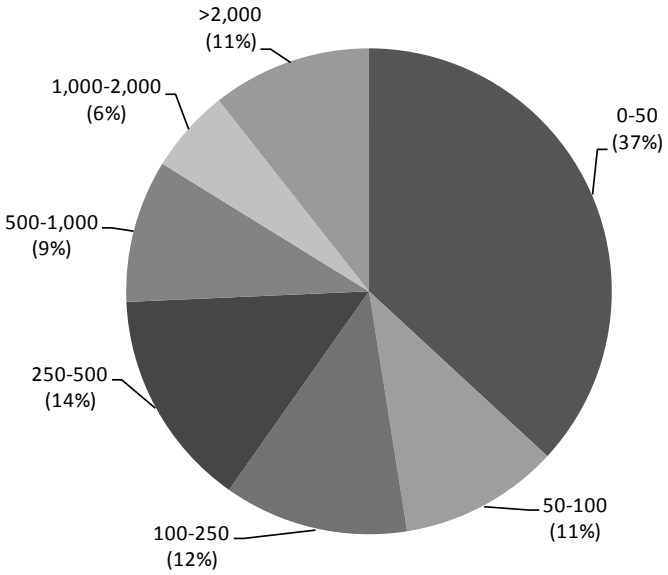


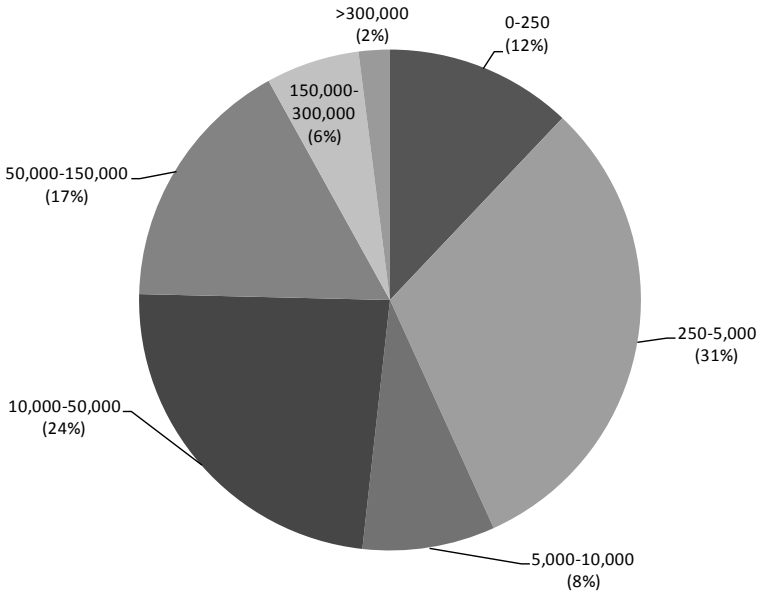

Figure 3-10 displays the total R&D expenditure in Mio. € per company to better range the particle size distribution of the values. 17% of the companies spend more than 1,000 Mio. € each year for R&D which can be considered as a very high value in a global comparison. Thus the R&D intensity pictured in Figure 3-9 in connection with the total values in Figure 3-10 reveals that companies that own essential IPR pursue a tremendous amount of R&D not only in shares of their turnover but also in total volumes.

Figure 3-10: R&D expenditure in Mio. € per company (N=217)



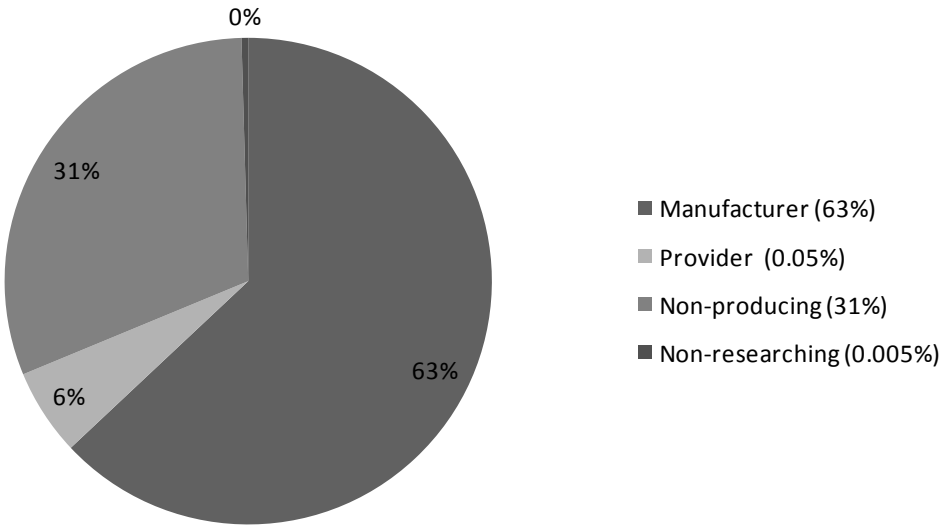

To better categorize the size of the companies, Figure 3-11 displays the total number of employees per company. SME (small and medium size entities) can hardly be found in the list, only having a share of 12%. Most of the companies can be considered as multinational companies where 41% have more than 10,000 employees. A share of 2% of the observed companies even belongs to the twenty biggest entities of the world.

Figure 3-11: Total number of employees per company (N=217)



Standard setting organisations not only participate to promote a technology for downstream markets, but also to exchange or trade their innovations and patents. Therefore companies were categorized in four types of business models (Figure 3-12). Only 63% of all essential patents are owned my manufacturing companies. A considerably high share of non-producing companies (31%), which only investigate in innovative activities, show that the question of IPR is discussed among quite heterogeneous parties. Non-producing and at the same time non-researching companies have the lowest share of only 0.005% of all essential patents.

Figure 3-12: Business model as to number of essential patents (N=217)




The analysis of the 271 essential patent owning companies revealed a high number of companies that can be considered as global players in the high tech industries. Only a few companies among them own a rather high share of the total number of essential patents, concentrating their activities in the sector of communication technologies and spending surpassingly in R&D each year. These companies almost exclusively come from the economic triad regions North America, Europe and Asia. Even though essential patent owning companies sum a tremendous amount of R&D expenditure, only two third are active in downstream markets, which creates different incentives to introduce patents into standards.

## 3.4 Distribution of standards including essential patents across SSOs, technologies and time

***Knut Blind, Tim Pohlmann***

To analyze the interplay of IPR and standards on a technological and time dimension from the perspective of standards and not IPRs or better patents, a second dataset was built up that revealed all existing formal standards containing essential IPRs. Initially declarations including more than 62,000 disclosures[25] were obtained from the seven major formal standard bodies such as ISO, IEC and JTC1 (JTC1 is a joint committee of ISO and IEC), CEN plus CENELEC, ITU, IEEE, and ETSI. As already pointed out, each of the selected SSOs has a separate patent statement database, where the disclosing company had to state the formal standard identification number, the date of registration and the patents affected. Each patent was counted as one disclosure and the registration date was counted as date of disclosure to the respective standard. A match of the different disclosure statements identified 736 distinct standards, whereas some standards were accredited in more than one standard body. If that was the case, the ISO or JTC1 standard was the dominant reference. An ETSI technical specification is the equivalent to a formal standard, however most standard projects such as GSM, UMTS or LTE sum up to over hundred specifications. Since ETSI mainly publishes technical specifications, the statements were aggregated to the project level. ETSI defines a project to be one technology with underlying specifications that work together. Most of the disclosures were made within the last twenty years and thus the data panel includes all half year periods between 1992 and 2010. To match standardisation activities such as standard release, version release or technological class, the database PERINORM was used. Figure 3-13 illustrates the number of standards including essential patents (i.e. the standard has at least one referring patent) per formal standard body.

25 This number is much higher than the number of patents identified in the patent focused approach (see Table 3-1), because we included also the numerous general declarations of companies which do not contain specific patents. However, this approach is complementary to the patent focused approach and provides a more precise picture about the standards including claims of essential IPRs in general.

Figure 3-13: Standards with at least one patent in the respective standard body

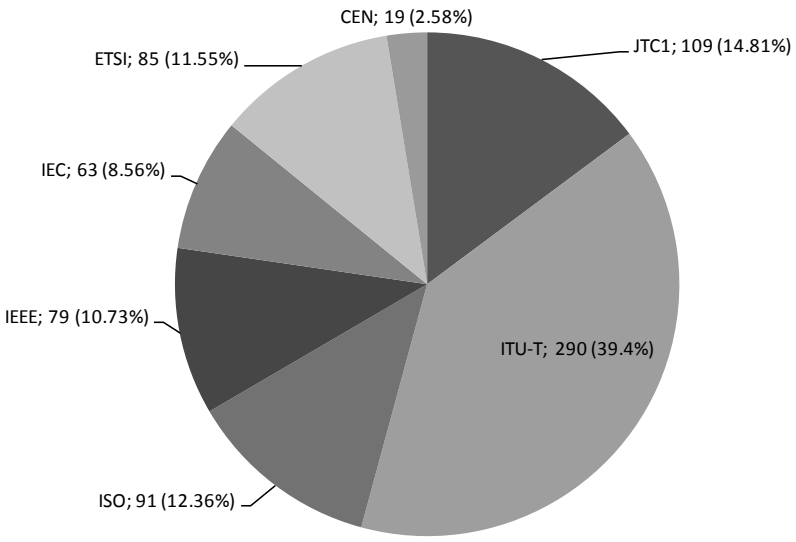
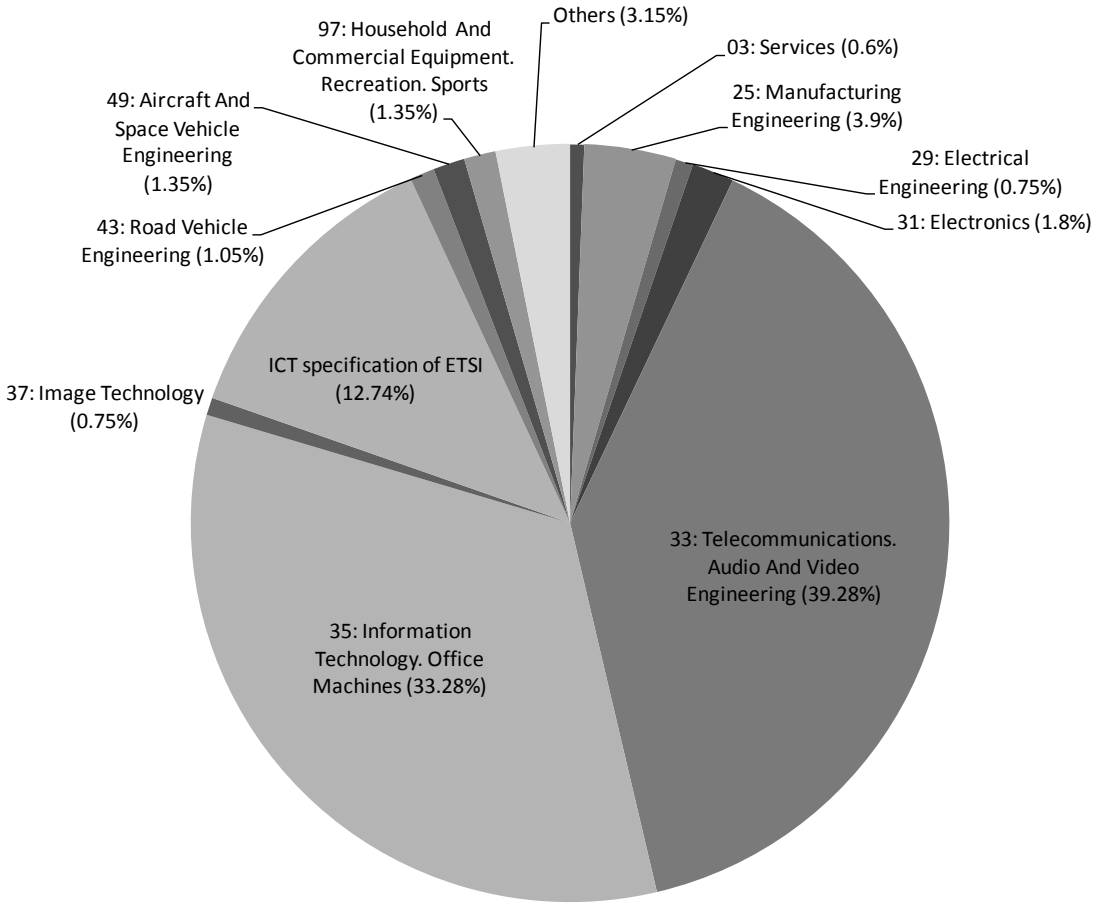



Figure 3-13 shows that ITU-T has the largest share of standards including essential IPRs summing up to almost 40% of all regarded standards of the sample. Since ETSI mainly states technical specifications the unit was aggregated to projects.[26] The patents per standard vary between the standards and the standard bodies. This fact makes a closer look on the patent perspective necessary and reveals that ETSI projects have 677 disclosures (based on information retrieved in 2010) on average, compared to all other standard bodies which have only 9.7 disclosures per standard in average. In an overall calculation ETSI stands for over 90% of all patent disclosures in formal standard bodies over the last twenty years.

To better estimate the technological layer, all standards were categorized by the international classification of standards (ICS). Figure 3-14 outlines the technological classes of the standards with at least one patent. More than 84% of the standards (ICS classes 33, 35 and 37 plus ETSI projects) can be identified as information and communication technologies (ICT).

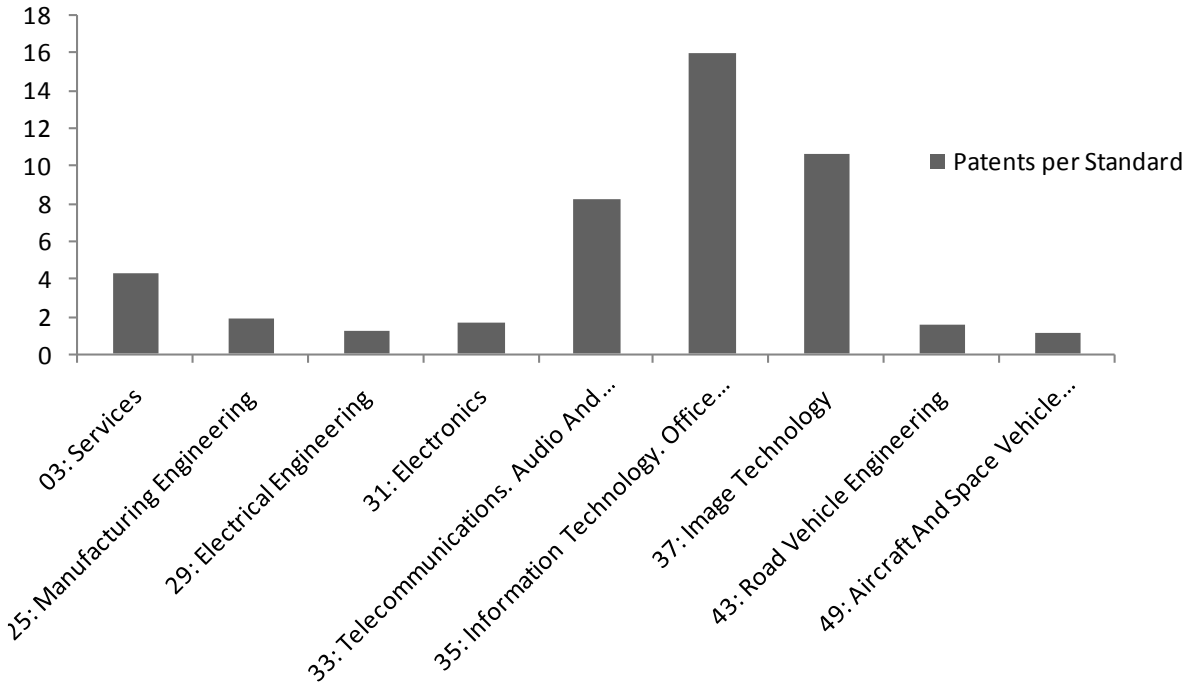
26 If we would use the number of ETSI specifications, we would have to consider more than 2,000 out of the more than 20,000 ETSI specifications, which would lead to a rather ETSI focused picture.

Figure 3-14: Standards with essential patents per technology class




Again changing from the standards to the patent perspective reveals that ICT standard have the highest average share of patent disclosures (Figure 3-15). In total 98% of all disclosures were stated on ICT standards. This underlines the relevance for patents in this technological field. Figure 3-15 does not include the ETSI disclosures, since the ETSI projects and technical specifications are not included in the PERINORM database and cannot be categorized due to data conformity. Looking at the ETSI projects indicates that they can be allocated to the ICT in most cases and thus would increase the share of ICT standards including essential IPRs even more.

Figure 3-15: Patents per standard as in technological class (ICS)




To better measure the share of standards that include essential IPRs related to the total number of standards, the constructed panel of standards was compared to all standards (including standards without essential IPRs) in the selected SSOs, in each time period, but only including ICT standards (classes: 33, 35 and 37) and excluding all ETSI specifications or projects.[27] Figure 3-16 shows the rise of all active ICT standards, whereas standards without essential IPRs increased by almost 30% over the last ten years until 2009, but the standards including essential IPRs increased by almost 150% in the same time period. This trend is not contradicting the recent decrease of claimed essential patents by filing date in Figure 3-3, because there are in general several years of delay between the first filing date and the publication of standards including disclosures of essential IPRs. However, we might see a delayed decrease of the share of standards including essential IPRs in the future.

27 The time series of the non-ICT standards including IPRs is due to the rather small number of standards including essential IPRs in relation to the total number of standards rather erratic and reveals no clear trend.

Figure 3-16: Total number of standards without and including IPR in the ICT field (1992-2010)

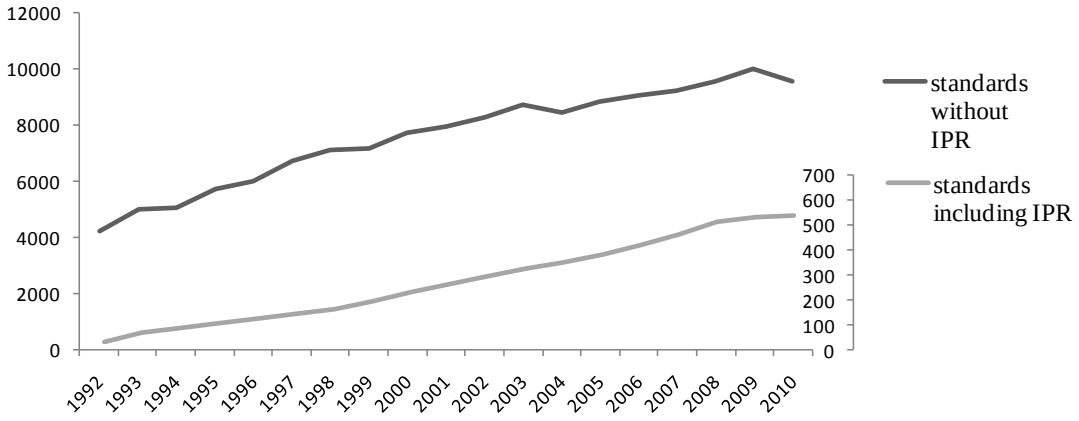
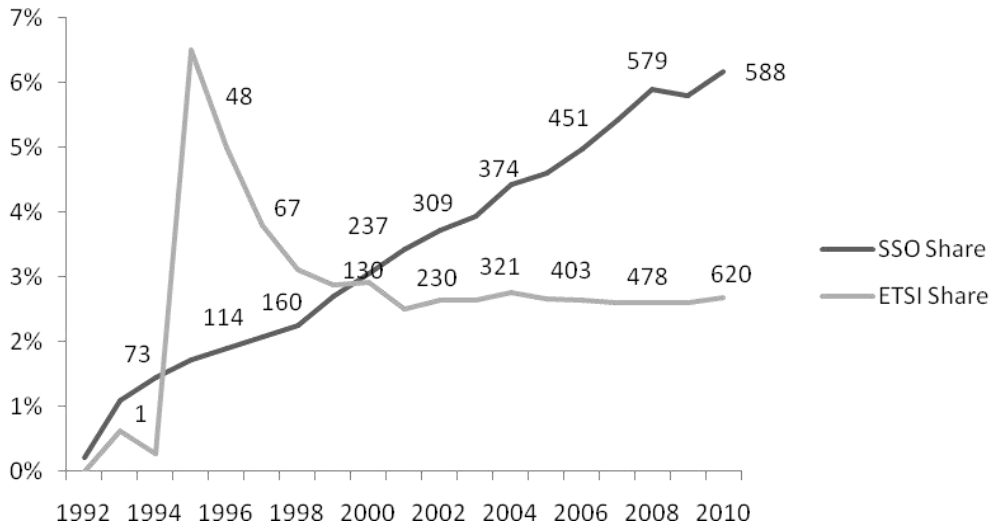



Figure 3-17 illustrates the share of standards with essential IPRs and implies an increase from 0.21% in 1992 to 6.17% in 2010. Since not all patent declarations are stated before a standard release, the truncation effect at the actual margin has to be kept in mind. Within ETSI the share of technical specifications TS remains rather constant at 3%. Since consortia do not maintain comprehensive and complete databases, we can only provide a similar figure for standards published by IETF, which reaches the level of 5%.

Figure 3-17: Share of standards including IPR in the ICT field (1992-2010)

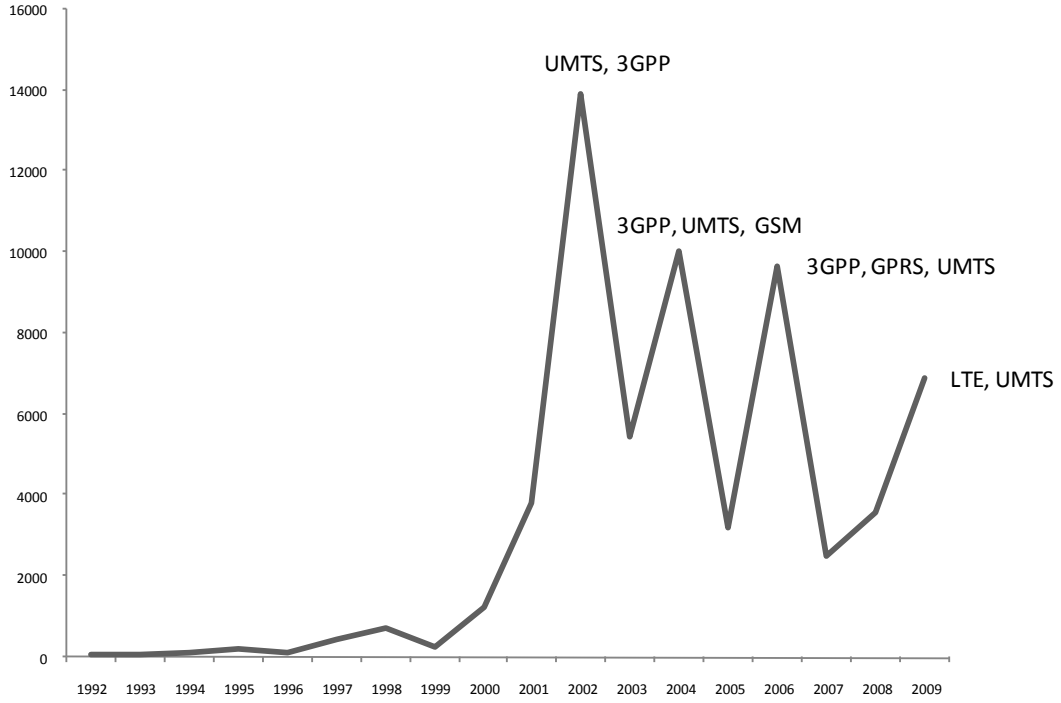



To better explain the increasing share in Figure 3-17, we analyzed the survival of the observed standards. Therefore we counted the number of releases and drawbacks for

each year to calculate the shares on the basis of the total number of standards from the previous year. An average of 4.5% of standards without patents is drawn back and an average of 6.8% is released each year. In comparison only 0.4% of the standards including patents are drawn back each year and an average of 7.1% are newly released. The share of new releases is roughly similar, but the share of standard draw backs is greatly lower for standard including patents. These results indicate that the share increase results from a longer survival of the standards with patents. Our descriptive findings indicate a different standard development when IPR is included and thus support our investigation to further evaluate the interplay of disclosures and standards.

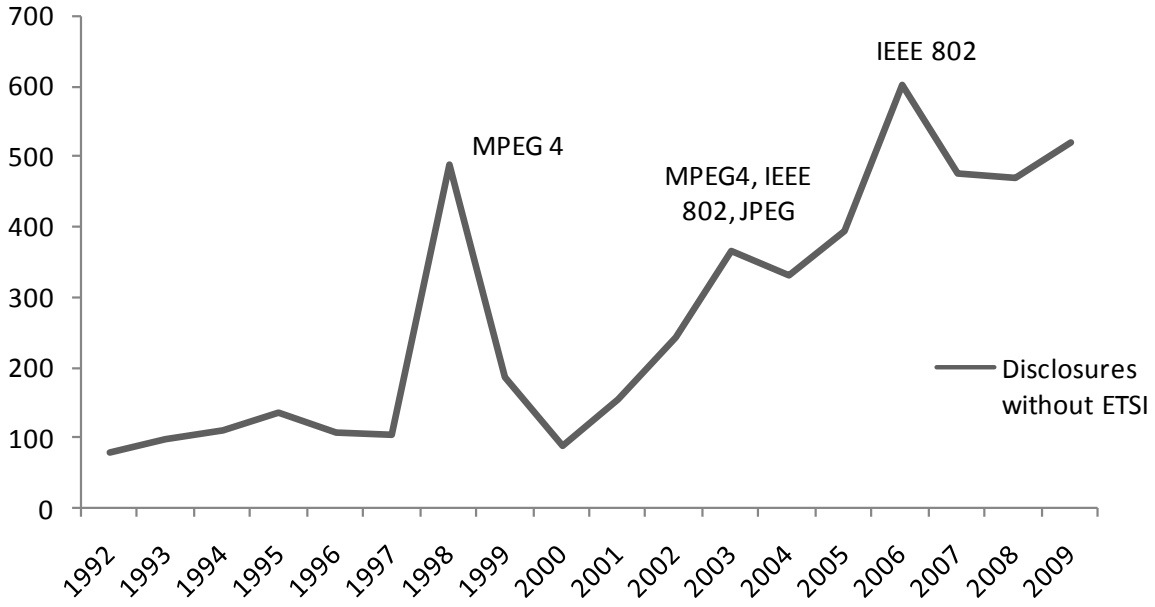
To better estimate the development of IPRs or better patents on standards, Figure 3-18 displays all disclosures on standards each year in a time period from 1992 to 2009. The first increase of disclosures starts in 2000 and peaks in 2002 having the highest number of disclosures per year that ever accrued in the observed time series. The graph illustrates the top standard projects in peak periods that have the highest share of disclosures and count more than 1,000 disclosures, which are a manifold of the number of patents identified based on the methodology described in Chapter 3.1. All projects in the graph are ETSI projects which again underlines the dominance of the ETSI standards including essential IPRs. Summing the ETSI project UMTS (Universal Mobile Telecommunications System) and 3GPP (3rd Generation Partnership Project) in the year 2002 results to more than 12,000 disclosures, which is around 86% of all disclosures in that specific year. In the peak year of 2004 the projects 3GPP, UMTS and GSM (Global System for Mobile Communications) sum almost 77% of all disclosures and in 2006 the projects 3GPP, GPRS (General Packet Radio Service) and UMTS sum almost 84% of all disclosures in that year. The latest peak in 2009 is strongly connected to declarations on the project LTE (Long Term Evolution a project within 3GPP) and UMTS, which makes a share of 55%. Looking at the top 150 standards sorted by disclosures per year reveals to 98% ETSI projects (see also Table 3-3). As already discussed earlier one has to keep in mind the difference of standard and standard project. For the ETSI data we count all disclosures to one project. The projects such as GSM or UMTS represent a much larger technology than for instance an ISO or IEC standard. Therefore it is more likely that we have a large number of disclosures per project as for example per ISO standard. Still ETSI has the largest share of patent disclosures and therefore strongly influences the development of disclosures as represented in Figure 3-18.

Figure 3-18: Disclosures per year and standard projects with over 1000 disclosures




The only noteworthy non ETSI standard projects are the IEEE 802 (Local Area Network Standards) that peaks in 2006 with almost 350 disclosures and in 2009 with almost 250 disclosures per year. To also identify standards with a high number of patents in the other standard bodies, Figure 3-19 shows the disclosure development excluding the ETSI standards. The first peak is in 1998 were the MPEG4 (Moving Picture Experts Group) standards ISO/IEC14496 (JTC1) sum over 45% of all disclosures. The next peak in 2003 is also caused by the MPEG4 disclosures but also from the IEEE 802 and the JPEG (Joint Photographic Experts Group) standards of JTC1 which sum around 43% of all disclosures. The last peak is again caused by the IEEE 802 standard that alone sums over 55% of all disclosures.

Figure 3-19: Disclosures per year and peak standard project over 200 disclosures




In summary, the data panel shows that the distribution of patents on standards is concentrated on only a few standards in the ICT field. Especially the ETSI projects UMTS, 3GPP and GSM include vast amounts of patents and strongly influence the number of disclosures each year. Since 2002 the number of disclosures seems to decrease, whereas the number of standards including patents increases. The ICT standard development over time indicates that the share of proprietary has been growing to 6.17%, which is not due to more releases of standards including patents, but to a longer survival of proprietary standards compared to non-proprietary standards.

## 3.5 Summary of database analysis

The previous sections have outlined the approaches and the results of the analysis of the IPR databases of the most important SSOs. Since only the claimed patents allow a quantitative analysis, we focus the statistical analysis solely on patents. The identification of specific patent families avoiding double counting of patents revealed a clear picture regarding trends of essential IPRs over time, distribution among technological fields and the countries of the patent owners. The list of companies declaring essential patents has been complemented by additional data. Here, we gained additional insights about the sectors the companies are active in, their R&D activities, their sizes and finally also their business models. The complementary approach starting from the standards database including the pure disclosure of essential IPRs in general allowed an analysis of the IPR-related standards over time in relation to all formal ICT stan-

dards, which are most relevant, and a differentiated analysis of the disclosure related to specific standards.

In summary, we find a strong concentration of essential patents in specific fields of technology, i.e. the information and communication technology (ICT), consequently in specific ICT standards and those SSOs, which focus their work on ICT. Besides the concentration on ICT, we also elucidate that essential patents are owned by a very limited number of companies from U.S., Europe and Japan. However, recently new players from emerging countries are entering the scene. It has to be noted though, that the pure numbers of patents do not equal to economic or commercial impact. The identified companies are in general rather large and mainly active in the ICT industry. The majority is spending large amounts of R&D both in absolute terms and relative to their turnover. Furthermore, they are not only conducting R&D, but also manufacturing the developed products. However, the still small share of non-producing entities claims to own almost a third of the essential patents by having large shares of essential patents in their own patent portfolio.

Over time we observe that after the peaks of claiming essential patents around the development of the GSM and UMTS standards, some kind of stagnation even reduction of declarations has been started.

# 4. Identification and Analysis of Stakeholder Views

***Rudi Bekkers; Stein Smeets (Section 4.2)***

***Knut Blind, Tim Pohlmann (Section 4.3)***

## 4.1 Introduction

Complementary to the analysis of the IPR databases, which allowed a quantification and description of the inclusion of IPRs, especially patents, in international and European standardisation bodies and consortia, the views of stakeholders had to be identified in order to analyse especially the economic impact of IPRs included in standards and actual issues arisen from the introduction of IPR protected elements in standards and their use. Finally, qualitative information about business strategies and legal practices of stakeholders could be collected and analysed.

The methodological approach to identify and analyse the views of stakeholders is twofolded. First, we conducted a set of interviews according a structured interview guideline in order to identify impact dimensions, issues and trends. Second, these insights were used to develop the interview guideline into a rather closed questionnaire addressing companies owning essential IPRs and implementing standards with and without essential IPRs.

The next section summarises first the interview results, whereas in the following section the responses of the company survey are presented as descriptive statistics. The chapter closes with a summary of the most important impacts, issues and trends.

## 4.2 Mains insights from company interviews

### 4.2.1 Methodology

This section presents the findings of a series of interviews with the industry conducted on the basis of a detailed format with topics and questions (see Annex II). Being able to provide much more in-depth views, these interviews complement on the one hand the quantitative data analysis and the survey results of this study. On the other hand, the number of such interviews is naturally limited and therefore do not necessary provide a representative view. We aimed at a selection of interview partners that comprised different industrial sectors[28], different home regions, different size, and different position-

[28] Given the fact that patents in standards is most prominent in telecommunications and in consumer electronics, most of the firms we talked to were form that field, but we also aimed at including other firms.

ing in the value chain. In total 15 firms were interviewed, plus one industry expert.[29] Alike the standardisation process the findings presented in this report are 'consensus-based'. That is, the views expressed in this report were found to be shared by our interviewees. Where we found discrepancies we discuss these, and specific statements by (single) interviewees are printed in italics.

It should be noted that companies indicated that they found it hard to generalise issues relating to IPRs or mainly patents in standards. Almost every standard and every SSO is in a somewhat different context and might be characterized by a different factual situation, different patenting strategy, diverse licensing behaviour, and different other issues. It is hard to identify a single, overarching problem or issue that is generally present for IPRs or patents in standards. In other words: issues are often context-based.

Another matter worth to address is that many questions in this area have a normative character, or are hard to answer conclusively. For instance, is a cumulative licensing fee of x% too high or not, in relation to the value of access to the technology in question and the efforts that the developers have invested in it? How can it be objectively established whether a certain licensing rate deters entry? Is if 'fair' if licensing levels are related to R&D efforts? Is it 'fair' if licensing levels are related to *past* R&D efforts, even when a firm currently does not invest anymore in the given technological field? Is if 'fair' if licensing levels are related to the efforts a company made to the standardisation process?

For the reasons above, we stress that the outcomes of the industry interviews should be regarded as an overview of different views and observations and will not necessarily lead us to decisive answers to all questions.

First we start with some more general comments and thoughts offered by the interviewees on the relation between IPR and standards.

The tension between IPRs and standards goes beyond pure legal issues and is linked to the major economic challenges faced by the industry to deliver innovative products whilst keeping R&D costs under control. On the one hand, standardisation helps lowering the cost of innovation and product development for product marketers by allowing reuse of assets or technology, on the other hand, IPR enforcement is vital for technical innovators to survive and continue investing in technical development.

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29 These are: Alcatel-Lucent, Cisco, Ericsson, Harting, Hitachi, IBM, Infineon, Microsoft, Mitsubishi, Nanotron, Nokia, Philips, Qualcomm, Siemens, Toshiba, and Eric Stasik (industry expert).

Patent questions often arise in fields that represent emerging, high technology areas where innovation, growth, and networked industries are involved.

### 4.2.2 Quantification of IPRs in standards

**Numbers of essential patent (families) for (various) standards**

Several respondents argue that standards that define full end-to-end functionality for large systems on many different layers, have a broad scope, and therefore necessarily encompass a wide range of specifications and are likely to be covered by large numbers of patents. Complex large standards include many features and, for that reason alone, will already cover many patented technologies. WCDMA is believed to include around 1000 patent families that are truly essential.[30] This number is now more or less stable. LTE is still in development and the therefore the number of families fluctuates a lot, but is expected to reach around 1000 families as well. For other, 'smaller' standards this is not the case and the number of essential patents is usually much lower. DVB-H, for instance, is believed to include around 30 families. The video coding standards MPEG-2 and MPEG-4 are believed to be somewhere in between with about 800 patents and 160 families. It was commented that the optical disc drive market contains around 2200 patent families.

Some respondents have noted that the development in the number of essential patents should be seen in the context the more general surge in patent applications and patents as seen in the last few decades. Here, the term 'global patent warming' was mentioned. Various patenting strategies, such as applying for numerous patents around a single invention, have started to inflate the number of applications, which is not necessarily contradicting the recent reduction of filings of essential patents (see section 3.2.4). Numbers have been going up in general, but some firms have more 'bloated' patent portfolio’s than others. As a consequence, other firms feel forced to adopt such strategies, even if they were originally opposed to such behaviour. Such inflation is visible in essential patents within standards released by SSOs, but also in relevant patents for proprietary company specific standards. It was argued that it would be desirable that patent offices should increase their focus on quality (by increasing the criteria for the inventive step), and also reduce opportunities for divisional and continuation

30 Note that in Chapter 3 the quantitative analysis resulted in slightly over 1600 essential patent families. The difference lies in the fact that the quantitative analysis is about patents claimed to be essential, whereas the statement (on basis of interviews) in this chapter is based on what is actually believed to be essential. The difference between these numbers is the result of over-claiming among other factors. Further on in this section, this phenomenon is discussed in more detail.

patents. If the patent offices and the applicants manage to do so, overall costs will decrease.

One respondent mentions one of the reasons for the increasing number of patents, is the decreasing quality of patents: *“Patent quality is the problem, and this quality differs by region. We see a 'suitable balance' at the JPTO and EPO. But further reform is needed at the USPTO to improve quality, although there already are some efforts in that direction (e.g. patent examination cooperation). On the other hand the Chinese PTO is seen as too strict in examining foreign applications*.” (Note that here we consider ‘patent quality’ as whether the patent is appropriately granted, e.g. whether it meets the criteria for patentability. The issue of ‘marginal patents’, patents that offer little of no value in a specific context but that are appropriately granted, was raised by other interviewees and will be discussed below).

Several respondents noted that analysis of trends in the number of patents, essential or not, reading on a standard or in the number of patent owners, whilst informative, may not help identifying the most severe problems: "A single *IPR in the hands of an isolated patent owner can cause great problems, while standards covered by many essential patents are often available under normal conditions and do not have patent problems."*

It was also argued *"that an increase in the trends may be a sign of increased competition between technology providers to have their technology retained in the standard, which can be positive."*

**Over-claiming and under-claiming**

It is well possible that not every essential patent is disclosed and accounted for, as most SSOs do not require patent searches from members. The disclosure of essential patent is in general done on a good faith basis. As a consequence, over-claiming or under-claiming will be difficult to detect, as both abuses are only really detected when litigated or when a controversial issue is raised.

Respondents argue there is a large amount of over-claiming. For instance, they believe that the number of essential patents for 3G mobile technologies is *“in the order of some hundreds, and very certainly not out of the three digit range*”. Another party mentioned 2:1 as a rule of the thumb. It is also believed that for other standards and for other SSOs there is substantial over claiming. Some companies commented that there was more over claiming in bodies with ‘weak’ IPR policies, and IEEE was mentioned as an example here, because of the many options offered. Another interviewee said*: "To*

*some extent, how clearly an SSO defines 'essential patent claims' can affect the likelihood of a party improperly claiming that a patent is or is not essential."*

Over-claiming and under-claiming result in uncertainties for potential adopters. Two quotes from different interviewees: *"One problem is that over claiming is really huge. For anyone wishing to adopt a standard, it is a daunting task to analyse all the claims and come up with an opinion which patents are truly essential." "There is a very large amount of uncertainty; nobody really knows what is actually essential or not…."*

An interesting issue is what causes firms to over-claim or under-claim patents in standards. A number of motivations were offered for this:

- Patent disclosures have inherent uncertainties. First, it is often hard to establish whether a certain technology is essential as it is not necessarily know whether there are alternative technologies that satisfy the specifications in the standard. Second, a granted patent may not be as broad any more as the original application and thus might not be essential anymore. Since many SSOs do not require one to withdraw earlier disclosures, these remain in the IPR database. Thirdly, the final standard might be different from earlier draft versions, and disclosures that were appropriate for a certain draft version might not be essential for the final version of the standard. From the above, we might argue there is a trade-off between early disclosures and (eventually) exact disclosures
- Some IPR owners have deliberate strategic behaviour or marketing, such as just trying out your luck and whether you get away with it. Especially markets with potentially high value might attract players with such strategies.
- Also, the SSOs policy often refers to patents that are 'believed to be essential', which is somewhat ambiguous. It allows firms to be 'generous' in their filing and also include grey cases. This can be for strategic reasons, but also because the firm feels it should definitely not under-claim and therefore be on the safe side: they like to by rather safe than sorry. The reason that risks of not claiming IPRs are substantial (some court cases have shown that failure to disclose may prevent these patents to be exploited in the future) and therefore it is better to claim all patents that are potentially essential, even in case of doubt.
- Unfamiliarity with the standard. Some declarations are done by parties that have not sufficiently studied the standard and assessed whether their IPR is factually essential.

Although some essential patents on standards are really on basic technologies, it was mentioned in several interviews that there are also many 'patents on futilities' or 'mar-

ginal patents'. These patents do not bring a standard forward with real innovations but are merely 'pushed' by their owner into the standard for its private benefits.[31] Even absent a real need to specify the technology in question the standard is nevertheless defined in such a way that it reads on the marginal patent in question. Obviously, an IPR owner that participates intensively in the standardisation process has opportunities to influence the exact specification and wording of a standard. The existence of marginal patents is undesirable and also complicates a fair distribution of the royalty payments. This can be the case for patents disclosed at SSOs, but also for patents that are part of a standards-based pool.

It was noted that patent pools are less prone to over-claiming than patent disclosure mechanisms in SSOs. Pools have stronger obligations and pressure to ensure all patents are actually essential. Patent pools typically require a careful patent examination process, to meet the concern of competition authorities that all patents are actually essential. Usually this examination is performed by an external, independent party. In the optical disc drive market, the majority of patents are concentrated in joint-ventures and a third-party verifies whether IPR claims are essential or not. Still, even in these cases there can be errors, and in cases of doubt, the independent parties tend to follow the claims of the patent owner.

**Number of distinct patent owners, number of implementers of the standard**

As with the number of essential patents, the number of distinct patent owners increases with the complexity of the standard. Also the number is higher for standards that allow for several implementations choices (such as UMTS that specifies both a so-called FDD and TDD radio interface option), and standards that include optional features. For WCDMA it was argued that there are around 20 companies declaring essential patents and truly contributing to the standard. For LTE there are argued to be around 50, for MPEG-2 nearly 25, and for DVB-H around 5 or 6. When a standard turns out to be successful, the number of distinct owners tends to grow with new generations being developed. That means ownership is becoming more fragmented. This was for instance the case in the market for optical disc drives, where new large IPR owners were attracted by a successful market.[32] In line with what was already argued

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31 Note that this is different from patents that should not have been granted in the first place ('low quality patents'). A patent that meets the criteria for patentability in a given legislation is justly granted but may nevertheless provide no real additional value or benefit for a standard.

32 *"The first large joint-venture was set up by two major players about a decade ago. A second joint-venture was later set up by two other major players. Together they account for just over 50 % of the market and hold the majority of patents. A third (Asian) actor also*

for the number of patents in a standard, it was also mentioned that fragmentation is not so much a problem in itself, the question is where the patent end up and what the owners are intending to do with them.

**Distribution of essential patent ownership according firm size**

Respondents mention that firm size is not a good predictor of patent ownership. It is better to look at the amount of R&D and involvement in the development of a standard to find companies with a large IPR portfolio. That at least holds for the first years of a standard's existence. One respondent mentions that with 802.11, there were originally a fair number of small IPR owners, while later on large firms became dominant among other things because they acquired smaller firms. Others indicated this also happened in the case of MPEG-2.

**Distribution of essential patent ownership according business model**

Again, the amount of R&D and involvement in the development of a standard is believed to be a better predictor of essential patent ownership. That being said, the role of universities as essential patent owners is growing (they have been contributing to MPEG-2 and BluRay technologies, among others). Although some universities tend to transfer such patents to companies (for instance to the highest bidder), more and more they decide to hold on to patents and declare ownership.

Several respondents mention the number of R&D-only patent holders (NPE: Non-Producing Entities) is rising, although the total number of patents they hold is relatively insignificant. Below we will elaborate more on the effects of this category of patent owners.

Others commented that the distribution of patent owners by type the type of patent follows the rather 'liquid' markets for high tech technologies. Some firms, both small and large, fail and file for bankruptcy – and their IPR portfolio is then for sale, either linked to other assets or as a separate asset in itself.

**Distribution of essential patent ownership according to world region**

For many decades, R&D has been performed all over the world, resulting in patent portfolios owned by companies all over the world. Standards, on the other hand, have long been regional in nature and their essential patents were usually owned by players from the same region. In recent days, however, standards have become more global and now typically combine ownership from all over the world.

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*holds a large number of essential patents in this market. Although the technology is mature, more and more players are turning up with patents."*

Over time, first of all Japan's share of essential patents has grown. This was later followed by South Korea. We now also see that Chinese companies file a lot of patents, particularly in China. The Chinese government puts a lot of effort in domestic innovation and promoting patents. One interviewee commented that China is now quite visible in LTE; two others noted that China is becoming more prominent in video coding and optical disk technologies. India is not very active, but this could change.

**Role of non-patent IPR**

While most discussions on IPR in standards focus on patenting, there can be other types of IPR that may turn to be essential to a standard. Some standards, especially in the ICT or telecommunications areas, comprise software source code either in a normative section to describe accurately how a system implementing the standard should behave, or in a non normative section of a standard as a reference implementation. It was mentioned that several SSOs have defined copyright policies (ECMA, ANSI and ITU have one), while ETSI is currently working on one.

Nevertheless, interviews confirmed that, by any means, patents are still the most relevant IPR in this context. Most interviewees indicated the role of copyright or open source licenses was not very significant, and most parties could not further comment on it. One respondent commented that copyright is not really visible at the moment.

One respondent did go in some more detail into copyright, but concluded no issue specifically linked to copyright or other non-patent IPRs requires legislative action at this point.

Trademarks are important in some consumer electronics fields, notably in CD, DVD and BluRay. Here, trademarked names and logos provide information to the end user, which devices successfully cooperate or which media can be used with which hardware. In licensing contracts, the use of trademarks is subject to certain conditions, one can assure that a product that is not (fully) compliant with the standard does not carry the trademarked name or logo. The issue was at stake, for instance, in the CD market, when some CD producers started to include far-reaching copy protection means on their disks, preventing such disks to work in some legitimate players, the trademark owner made it clear that such disks could not be sold as CDs and that the CD trademark could not be used. We note, however, that locally trademark owners do allow legitimate implementors to use this trademark, but we have not been told about substantial problems in this area.

**IPRs in standards in other areas than ICT**

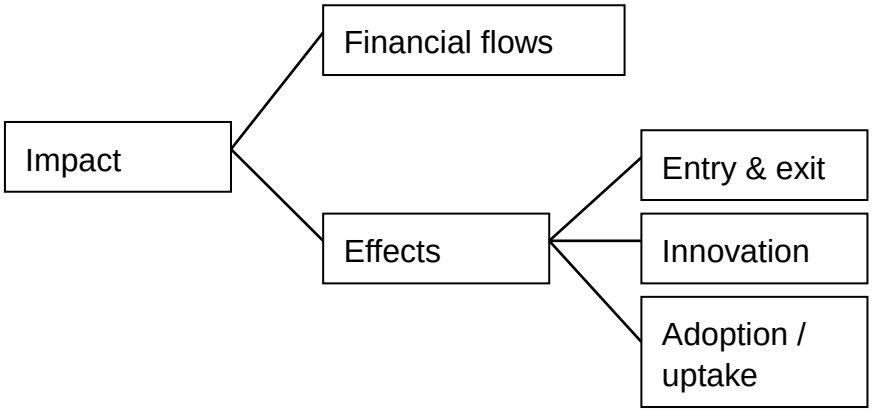
In general, patent questions often arise in fields that represent emerging, high technology areas where innovation, growth, and networked industries are involved. Often, people point at mobile telecommunications as the first area where standards covered essential IPR. It would be fair to say, that this was preceded by products such as Compact Cassette and the CD (and later DVD). Still, standards and IPR occur traditionally very prominent in consumer electronics and (mobile) ICT because of the interoperability character of these markets. Nonetheless, new areas are emerging in areas like:

- health care (including the necessary communications and interoperability);
- lighting (e.g. LED), where there will be more standardisation and likely more patents in such standards;
- powering of electric vehicles (e.g. charging stations, battery exchange stations), which is becoming increasingly important and there is a clear need for standardisation. Companies active in this area are currently preparing an technical committee within an SSO.
- smart grids, where detailed interoperability standards are needed. That means there exist many opportunities for patents to become essential. As one respondent put it: *"If a company owns an essential patent on smart grid technology mandated by a government, it could truly leverage its value, especially if there are no good IPR policies applicable."*

### 4.2.3 Impacts of IPRs in standards and licensing

Patents in standards can have different types of impact. On the one hand, there are the financial compensations that are often associated with this intellectual property; on the other hand, there are possible effects on market entry and exit, on innovation, and on the adoption and uptake of the standard (see Figure 4-1).

Figure 4-1: Types of impact




Below, we will first discuss financial flows, and then focus on what we learned in the interviews about the other effects.

**Financial flows**

One important but difficult issue is the one of patent valuation. For a given standard, many patents may be 'equally' essential, but that does not mean they should be considered 'equally' in value or in relevance to the standard. Some patents may be very basic, covering the most important working principles on which the standard relies. Other patents cover 'futile' contributions that are nevertheless essential in the literal sense of the word (and the literal definition of the standard) (see also above). It would be fair having to pay more for basic patents than for futile patents. One interviewee argued that also in litigation, judges should take into account the real contribution of a technology to a standard, instead of merely looking at the question whether they are essential.

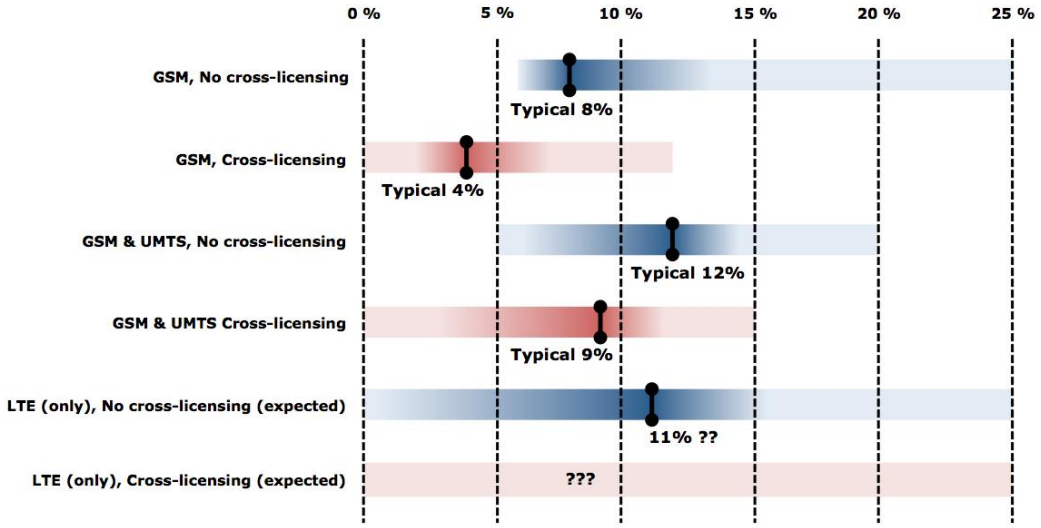
When searching on the internet for the aggregate licensing fee for a certain product, one can find many strongly contradicting claims. These sometimes range from less than 10, to over 25 per cent. While most of our interviews indicated the latter percentage is overstated, even these insiders found it hard to indicate typical aggregate licensing fees. There are several reasons for this:

- There exists a large variety in actual agreements. There are different types of agreements, such as cross licensing. Agreement can differ on several aspects, such as coverage, time period, capture period, etc.
- For a given product there is often no typical licensing rate; different companies pay different rates. What a company pays is strongly dependent on its bargain-

ing position (more on which below). As one respondent put it “Companies negotiate until an agreement on licensing conditions is found. These conditions are mostly very customized.

Nevertheless, a number of interviewees were able to provide more detailed information on the Common aggregate royalty rates for mobile telecommunications devices. Figure 4-2 shows the range of licensing fees for mobile devices as well as typical licensing fees, expressed as a percentage of the wholesale value of the terminal.

Figure 4-2: Range of licensing fees under specific conditions




It was also commented that currently, aggregate licensing fees in mobile telephony are higher than those in other product areas (such as WiFi modems), but this may change.

As explained, these rates could vary for different players involved, mainly depending on their bargaining power. The bargaining position of a patent holder depends on the number and the strength of its patents, among other characteristics. If the portfolio comprises only one or a few patents, a firm might run the risk that all patents are found invalid when challenged. A portfolio of, say, 10 or more patents does not have such risks.

Still, even a small player with a small patent portfolio can have considerable bargaining power in negotiations. Though its portfolio is very small, the exposure of its negotiation partner to its patents might still be substantial because of the production volume of the partner. As a result, such small owners might even derive net revenues from the licensing agreement despite of its portfolio being much smaller than that of the licensing partner.

Not surprisingly it was harder for our interviewees to comment on fee levels for other technologies. However, some other fees were mentioned: “for optical drives, US$ 6 per unit, regardless of the adopter”, and “10% fee for an IEEE 802.15.4 WPAN chip (wireless personal area network)".[33] These chips are worth approx. US$ 5 and no differentiation is made between existing players with substantial patent portfolio, new entrants with small or no patent portfolio or other relevant players.”

Independent of the interviews, we also would like to add that for those technologies that are served by patent pools, the licensing fees are often published (at least for those essential patents that are part of the pool). For instance, for DVD products, licensing rates of the two different pools are publicly available[34] (note that there are also known patent holders outside these two pools). Holders of patents relevant for DVD players charge a total of approximately US$ 9 or more per player depending on the features. For different technologies including MPEG-2, MPEG-4 and FireWire, fees of the patent included in the pools of MPEG LA are published in the website of that organisation. As an example, the MPEG-2 pool charges approximately US$ 2 for an encoder, decoder, or a consumer device. Also ViaLicensing, another large pool administrator, issues it rates publicly. This is also true for 3G Licensing, although it should be noted that this pool excludes the largest IPR holders in 3G technology.

In optical drives, respondents see the effect of the license rate change over time. On the one hand, essential patents expire, which drives the price down. On the other, new technologies are added (e.g. surround sound, HDMI), increasing the royalty fees. One respondent noted: "*Smaller patent-holders keep the licensing rate high. Licenses now account for maybe 35% of sales price. This makes it more difficult to sell products.*"

**Other types of impact**

The views concerning the impact of IPRs in standards on market entry differed widely. Interestingly, representatives from both sides usually refer to the same market – mobile telephone – as an example to make their case:

- Some argue that entry is surely not impeded. They stress that we have seen a considerable number of entrants in the last 10 years, and that some of these

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33 This IEEE standard is a low power, low cost communication standard and is used as a basis for the better known ZIGBEE for applications such as home and building automation, remote control (e.g. two-way interactive remote control), low power wireless sensors, remote lightening control and automated meter reading, and many other applications for light switches with lamps, electrical meters with in-home-displays, consumer electronics equipment via short-range radio.

34 See https://www.ip.philips.com/download_attachment/6620/PricelistEVE_2010_Q2.pdf and http://www.dvd6cla.com/royaltyrate.html, respectively.

entrants have been able to capture a considerable market share. They also point at the entry of several smaller parties. *"Such new outsiders are facing licensing costs, if they own no relevant patents themselves, but this is far from unreasonable as they benefit from research efforts done by others. The fact that we do observe entry should be seen as evidence that such aggregate licensing costs for outsiders are not prohibitive."*

- Others argue, however, that entry is very restricted. Players that are able to fight themselves in (1) are large an wealthy, being able to enter on the basis of their ability to pay licensing fees, or on the basis of either a current IPR position or the ability to quickly build a substantial IPR portfolio by putting in place substantial R&D activities, or (2) have a unique value offering, which enables them to generate larger margins than their competitors, with examples being Apple and Research in Motion, or (3) sell intermediate products for which their clients are expected to pay licensing fees, not themselves.[35] All in all, they argue that "*for new technologies, like LTE, a lot of potentially beneficial applications in the field of machine-to-machine communications will not see the light because of the prohibitive licensing costs. Current IPR policies give no confidence this will change*."

Concerning effects on innovation, one interviewee argued that this must be seen as a balance or trade-off. On the one hand, a strong patent protection may be necessary to stimulate the development and transfer of innovative technologies into standardisation and to provide adequate compensation for R&D activities, risk, and investment. On the other hand, when a community has determined the need for adopting one technology rather than maintaining competitive options, the community and public should have access to the selected consensus technology so that all interested parties can benefit from the innovative, quality solution without undue burden.

Only a few comments were given about the impact of patents on the adoption and uptake of standards. While several interviewees argued that there may be such an impact, no one could offer actual examples when asked for it. It was argued, however, that for mobile telecommunications, a possible uptake problem was looming. In this field, many licensing agreements are based on running fees (opposed to calculations on the basis of shipped units or other alternatives). This calculation model works as long as product categories are homogeneous, but create obstacles for integration in

35 One example here is for instance, those making modems or embedded modules (OEM) for laptops, vending machines or other telemetric purposes.

other devices (smart phones, tablet computers, laptops, machine-to-machine applications).

**Possible concerns about patents prohibiting standardisation processes**

In general, patents are believed to be a strong incentive for making technology available to standardisation processes. There have been a few instances, however, in which patents have delayed (though not prevented the uptake of standards. Our interviewees mention:

- "*One example is that of WCDMA, where one company initially stated it was not willing to license its patents for this technology. This was a very complex case, though, and one should not draw too easy conclusions from it.*"
- *"There are two specific events that I remember where there were issues about IPR availability at the time of the standards making. In the first event, participants to the standard said that they were concerned company X owned essential IPR, and they asked ETSI to ask that party to make a RAND statement. That eventually happened. In the second event, which concerned a security standard (or security aspects within a standard); a particular company came to ETSI and gave a presentation. The presented solution was adopted as an option in the standard, but in the end the company refused to make a RAND declaration. Eventually, the option which included this technology was removed from the standard. So, on both cases, concerns were adequately addressed."*

**Role of cross-licensing, non-assert agreement, and other mechanisms**

Apart from 'regular' licensing, where an implementer takes a license to one or more patents for financial compensation, there are a number of other mechanisms, including cross-licensing and non-assert agreements. The extent, to which these mechanisms are used, differs per industry. In some fields, patent licensing is less customary than in others. In the telecommunications industry, (big) players often tend to execute bilateral cross licenses. They prefer to have explicit legal agreements. It was commented that Japan has strong cross-licensing culture. In the IT industry, however, it is more common that parties simply do not bother each other and do not require others to take licenses (although there are also IT players that rather have formal licenses in place).

In case of regular licensing or cross-licensing, it was commented that IPR owners often will seek to execute licenses only with a relative limited set of licensees (implementers). The reason is that for many implementers, the licensing fees that could be collected are relatively low (because the implementer is only a small player, or it has an inexpensive product range) and the costs involved in reaching a license agreement cannot be

justified by these revenues. On top of that, the capacity of the licensing department is limited, so they focus on the most attractive licensees. The smaller firms know this and understand that, since there is no credible threat of litigation from many IPR owners, there is no need to pay. They simply stay below the radar and do not approach the IPR owner. To give an example: in the mobile telephony market, there are more than 50 claimed IPR owners, but a large implementer might be contacted by maybe 15 of them, and a small implementer by half of that.

**On cross-licenses**

A typical cross-licensing negotiation was described as follows. Parties start with an 'opening bid' which is usually overstated. They present a (small) subset of patents that are assumed to be valuable or infringed by the other party. The chosen patents are 'good' patents, for which there is clearly no prior art and who would safely to be found both valid and infringed in case of litigation. But the subset is not necessarily the 'golden eggs'; those might be kept for a later stage. An in-depth analysis of patents requires a substantial investment in efforts; parties typically do that for their own patents (to 'prove' their position, if necessary) but not for all patents they want to license in from other parties. Sometimes, parties involved in cross-licensing make use of so-called 'PICKS'. When two parties grant each other, for instance, 10 PICKS, they gain the right to use 10 of each other's implementation patents. Of course, the number does not have to be symmetrical. In fact, it could even be 0 to 10 in which case the PICKS are usually paid for by the receiving party. Although not unusual, we sometimes do see the exchange or sale of patents as part of the payment in a licensing agreement.

**On non-assert agreements**

A non-assertion agreement can be a covenant in which a patent holder states publicly that it will not sue those who necessarily infringe a patent holder's essential patent claim when implementing a standard. The non-assert typically does not require a signed agreement, which facilitates its deployment. However, such non-asserts agreements are typically conditioned on reciprocity or defensive termination. A patent holder can withhold or revoke its non-assert as to another party who asserts a patent infringement claim. The scope of the defensive termination maybe limited to infringement actions involving the same standard or may extend to various standards developed by the SSO or maybe even broader.

Another type of non-assertion agreement is one that is specifically agreed between a patent holder and an implementer. To some degree, this situation resembles an actual licensing agreement, but there are differences as well. Most importantly, there is no patent exhaustion with a non-assertion agreement. A component supplier, that has

such an agreement with an IPR owner, may sell components that are covered by certain patents, but it must be aware that its client, who incorporates this component into a system, does not benefit from patent exhaustion and may also need to enter into an agreement with the patent owner. Some interviewees criticized such situations, while others argued that such arrangements can promote innovation and have proven to work well.

Yet another, third variant of non-assert agreement is that of a license that includes non-assert agreement with other licensees of the same IPR holders that chose to do so.

**On other arrangements**

In the IT industry, finally, the use of explicit legal agreements is more limited. Parties adhere to what we call “Mutual Assured Destruction”. For neither of two large patent owners it makes sense to engage a patent war because, in the end, it would be a destructive conflict with no real winner.

Some have argued that certain commercial interests may actually reduce the importance of royalties. For example, in achieving interoperability among software products, industry members might consider a royalty-free model, for a standard, more beneficial than a royalty-bearing model. By opening the market and expanding networking effects, foregoing royalties can result in more robust business opportunities fuelled by greater public access.

**Degree to which FRAND is fully complied with by patent owners**

One large IPR company commented that in general, they see that most companies comply well with SSOs' IPR policies. In principle, licenses are available, although sometimes issue do arise about what parties believe to be FRAND terms and conditions. Of course, there are always companies that refuse to take a license because they do not agree on the commercial terms. Legal cases in which companies are accused to be non-compliant should be seen as the exception to the rule.

One other interviewee mentioned that, while new entrants may be faced with a relatively high fee, may still be completely compatible with RAND. It is not unreasonable that they are required to compensate the parties that developed the technology. And by paying the license, they after all get access to a valuable market, which offers interesting opportunities. As put by one other interviewee: *“One of the main drivers for manufacturers to implement a standard is cost reduction. It is generally recognized that the negative effects of lack of technical competition between products implementing a particular standard are offset by the positive effects of standardisation which allow in-*

*creased interoperability between products, diffusion of technology at a lower cost and ability to compete at a higher level where customers benefit from differentiation."*

Success of standards depends heavily on the willingness of technology providers to bring the results of their efforts to the table for standardisation. *"The financial compensation expected from participants is a key driver for these undertakings to participate in the standardisation process and should not be discounted. Seeking to lower the price of such IPRs too much, may negatively impact standardisation activities, as this may turn technical contributors away from the standard setting arena, as they can feel that they would not be fairly compensated for their contribution."*

**Role of non-essential IPR**

Opinions on the importance of non-essential IPR differ. One respondent, a large equipment manufacturer, states that the costs related to getting all necessary licenses is very much about essential IPR, not about the rest. Others disagree. One company argued: *"In recent years, non-essential patents have become more important. The most visible examples are patents on the user interface of mobile phones, such as touch and multi-touch displays. Some firms that own essential IPR would like to leverage that position to get access to such non-essential IPR."* Another commented: *"Nowadays, you need both to make a commercial appealing product. We see more and more "commercially essential" patents, like the ones for an internal antenna."* In the same vain: "*For a manufacturer to make its product, it may require a license to more than just the 'essential patent claims'. It may wish to include features and functions beyond the standard or where the availability of alternative technologies preclude such functions from being 'essential'."*

**Impact of increasing convergence of markets**

Convergence is a fact, and all stakeholders have to deal with it. It means devices get more and more complex. Interviewees' opinions on the implications of convergence on licensing differ however. Some feel there is more financial pressure on implementers as a result of convergence:

- *"Where, in the past, having a GPS unit or WiFi connectivity in a mobile phone was a competitive advantage, allowing to market a mobile phone at a higher value, these functionalities have become commodities nowadays. They do not create additional revenue, but they do bring licensing costs and issues with them. There is only so much a company is willing to pay, and that has to be distributed in one way or another among these patent holders."*

- *"More and more devices incorporate different technologies that are expensive. This increases complexity concerning access to those technologies, and intensifies royalty stacking"*

Others feel this financial pressure should not be overstated. They do, however, see the licensing process becoming more complex:

- "*Converged devices contain more functionalities, and there is a price tag on anything, like with component costs. However, the prices of converged products are generally also higher, so there is a higher budget to pay for these extra features. But many of them are not governed by standards so the role of non-essential patents increases. This adds to the complexity of the licensing process.* "

One respondent mentions convergence is good for competition as it allows new players to enter the market. At the same time, however, it changes common practice: these new players might be less willing to enter into cross-licenses.

Finally, one respondent expresses that "*technology convergence makes specific rules for IPR regimes impossible*". In other words: with technology converging, IPR regimes of different SSOs should also converge.

### 4.2.4 IPR policies at SSOs and proposed changes

During the company interviews, proponents for different IPR policy regimes (RAND, Royalty Free) were found. Several companies stressed the attractiveness and good functioning of RAND; whereas other firms pointed out that the success story of W3C shows how royalty-free standards laid the grounds for the unprecedented boost of innovation triggered by the internet. There seems to be consensus the suitability of either regime differs strongly with the actual context of the technology, where RAND works better in the 'hardware-related' world, whereas royalty free regimes have a better fit in software and applications. Along that line, there was also support for a mixed model within a single SSO: *"OASIS, recognizing different needs and requirements for different standards efforts, allows its Working Groups to select between a RAND (with royalty), royalty-free licensing, and patent non-assert models."* Also some other SSOs have flexible models. For instance IETF could be characterised as "preference for IPR-free standards, otherwise RAND, and where appropriate, decisions may be made to divert to non-Rand conditions.

**Degree to which differences between RAND policies at SSOs matter**

Among our interviewees, there exist not much very substantial difference between the SSOs that stipulate (or support) (F)RAND policies. Even stronger, it is believed standard bodies are getting closer together. The above, however, does not mean there is agreement on how RAND should be interpreted. Some statements in this respect:

- *"RAND is an individual statement, but it also has to do with the total. What is reasonable for a licensor can be unreasonable for a licensee because of aggregation."*
- *"It is a fiction that RAND, as it is currently defined, is referring to the aggregate licensing fee, even though it seems that people often prefer such an interpretation. It relates to reasonableness considering the value of the patents in question."*
- *"The meaning of a (F)RAND license is unclear. Even if a small royalty rate is required, it can still lead to issues such as royalty stacking, where numerous patents and patent owners identify "essential patents" and where the total cost of IPRs can become a high percentage of total product cost."*
- "What might be considered fair and reasonable is different, because the nature of the players is different."

Several other interviewees offered more normative statements, like specific percentages that RAND should equal to.

**Views on proposed changes to IPR policies**

Respondents mention several relevant changes. It was argues that ETSI's IPR database is the best one around. *"At ETSI, we see better declarations and efforts to make declarations earlier in the standardisation process, as well as mandatory use of standard forms for IPR declarations, resulting in a more uniform presentation of information. Also there is a big reform of the database ongoing, which will make it much easier for companies (including SMEs) to find out what has been declared per standard, what the status of the patent is, its patent family, etc."*

It was also mentioned, however, that uncertainties on RAND commitments after patents get sold still need to be addressed in a satisfactory way. One party referred to attempts to set a maximum global royalty rate, but that the difficulty in implementing such an approach has prevented its adoption in practice.

Considerable attention went to voluntary ex-ante licensing, where parties elaborated both on some obligatory schemes (such as that adopted by VITA) as well as policies that explicitly or implicitly allow voluntary ex-ante disclosure of licensing terms. During the interviews, we observed that that there is considerable ambiguity – or possible different views – on what ex-ante disclosure of licensing terms exactly means. For instance, what does ex-ante exactly mean? Before *what* specific event is a disclosure ex-ante? How does it relate to the selection process within SSOs (like decisions to include certain technologies or not)?

The view of respondents on ex-ante licensing declarations was rather mixed. Some pointed out that these schemes do exist (mandatory in VITA, voluntary in IEEE, among others) and that they do work. It was argued that ex-ante would fit in certain environments, such as ex-post sort of standardisation processes (where a selection is made between relatively mature or finalized choices).

Opinions about the use of voluntary ex-ante disclosure of licensing terms in ex-ante standardisation processes, a development process where standards and technologies are actually created as a part of the standardisation process, were rather dim. People pointed out that it is exactly those large, ex-ante standardisation processes where one currently finds the largest numbers of IPRs in standards, such as mobile telecommunications. Several interviewees commented that this mechanism will simply not work in this context.

At the moment companies have to individually make an ex-ante declaration, they do not know how the market will develop (market volume, unit price, etc.) and thus do not know what other parties will demand for their IPR. As a result, everybody will go on the safe side and ask relatively high compensation. The sum of all these compensations results in an unreasonable amount. So the whole exercise results in non-information.

- Ex-ante declarations only work when there is a real choice between full alternatives (e.g. complete systems, or full, relatively independent units such as speech, audio or video coders). The wide-spread type of ex-ante standardisation that is commonplace in many SSOs is a development process, not a choice between finished alternatives, and for that reason ex-ante licensing declarations are ill fitted.

- At an early phase in the standardisation process, when you are just starting up and thinking what standards are needed, what solutions will work, and difficult and complex technical discussion on the technology and architecture are held, it is very hard for companies to determine what their essential portfolio actually is. In that sense, ex-ante declarations are very problematic. It may be only

working in those areas where the exact technology to be used is known upfront (e.g. codec selection, or selection of security mechanisms). There you could have competition between choices and choose on the basis of price/performance aspects.

It should be said, though, that not every 'telecommunications' company agrees here; one commented ex-ante licensing disclosures to be a 'sensible requirement".

Several interviewees either refer to LTE as an example where ex-ante licensing did not work, or mention there was no actual ex-ante licensing in the case of LTE:

- *"Operators have invited companies to publish their expected rate for LTE, but the result has not been positive: together the rates are far higher then what everyone seems to find likely and this resulted in non-information."*
- *"It should be clear that the recent declarations of maximum licensing fees for the LTE technology should not been seen as ex-ante licensing declarations, because they were made (long) after the technology in question was incorporated. That means they did not influence these decisions in any way."*
- Another firm described these declarations as a promise that 'we will clearly stay within the RAND area and our fees will not be prohibitive', and that the actual amounts mentioned are not that relevant .One could argue though, whether this adds anything to the RAND commitments already in place.

Since 2006, ETSI explicitly allows companies to make ex-ante declarations on a voluntary basis. In the ETSI IPR group there have been intense discussions on the issue, the final outcome being a company can include in its IPR declaration a reference to a website that explains its ex-ante declarations. However, ETSI's experience with ex-ante licensing can be described as not to be very positive. up to date, no single declaration seems to have been received by ETSI (compared to almost 30,000 RAND declarations). Some interviewees were also reporting negative experiences within VITA, arguing that the adoption of a mandatory ex-ante disclosure made the main players to leave this SSO. It was added that 'price is only one dimension and does not express all relevant aspects of licensing conditions'.

Finally, one respondent mentions ex-ante disclosure of royalty rates can be appropriate in some cases, but it should in any case be left up to the various SSOs and their members to decide when such an approach should be implemented and in which manner.

**Transparency**

Many interviewees believe there is a considerable lack of transparency, particularly in the following areas:

- The actual essentiality of patents, and the actual validity of the patents.[36] It was argued that patent quality is a responsibility of the patent offices, not SSOs.
- The actual value of essential patents and, consequently, of firms' essential IPR portfolio's. There is a wide divergence of patent value and simply counting the number of patents is often not appropriate. Then again, the big issue here is who has the authority to assess such value.
- The identity of claimed patents (or patent applications).
- The relation between the various claimed patents; many claims may actually refer to the same invention, but protected in different legislations, or protected by multiple patents in a single legislation (re-issued patents, continuations, continuations-in-part). It is often hard to identify these patent family members.

Transparency is said to be increased by external studies and reports, and also by efforts of some SSOs (see below). Still, some firms even called for 'radical improvements' when it comes to transparency, specifically on patent value.

Also SSO IPR databases of course play an important role in improving transparency. Having good references is a starting point for anyone that wants to study the matter several respondents, however, feel that many SSO databases are very confusing. The information is often inconsistent and incomplete:

- The IEEE database is said to be particularly confusing, as it does not require the companies to provide detailed information.
- The ETSI IPR database is currently undergoing several improvements, which are considered to be very welcome. Right now, the database is very cumbersome and difficult to work with. One main improvement would be to put a requirement on a patent holder to provide a reference to where the patent is relevant.
- More in general, IPR databases suffer from problems with (1) incomplete declarations, not allowing identification of patent(s) in question, (2) firms that do not

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36 The latter, of course, is a more general type of uncertainty associated with patent systems: actual validity within a given legislation will only be revealed if a patent is challenged and found to be valid by court.

declare (among which members that fail to declare) and (3) many instances where essentiality is unclear.

A particular problem is that was mentioned by several respondents was that of SSOs that apply 'automatic' RAND policies. Here, parties by default agree with RAND conditions, but do not have to provide specific information on their essential patents. As a result, implementers have no information on the actual patent owners or their patents. Some of these bodies are working in areas that can potentially become very significant; an example is the ZigBee Alliance that might become important for the smart grid market. Compared to this, even a database with blanked claims is more attractive, as it at least tells you who claim to own essential IPR (although you would not know which IPR exactly).

In conclusion, there is a high level of uncertainty surrounding IPR databases and this increases with (a) complex, large standards and (b) bodies that have 'weak' disclosure rules. Nevertheless, despite their limitations, IPR databases are still considered to be quite useful. At the very least, they provide a good idea on who are the main patent holders, and with which parties an implementer will have to start to negotiate licenses. Special attention goes out to 'unusual' owners such as NPEs; as these could possible constitute a business risk. If companies identify such firms in a database, they typically study these in more detail.

**Issues to be addressed by SSOs, by governmental organisations, or others**

First of all, there was a broad consensus among the respondents that even though there are issues and areas that could be improved, there is no need or desire for government intervention. To a large degree, issues can be taken on by SSOs themselves, and other issues are best addressed by firms and other organisations.

Then again, the role SSOs can and should play regarding IPRs should not be overestimated. SSOs are established to create or set technical standards. There was a broad consensus that it would be undesirable (and often not compatible with competition law) that SSOs deal with issues concerning the correctness of information provided by IPR owners, assessment of essentiality, issues of price and business models, implementation methods, and so on.

### 4.2.5 Patent pools

Respondents clearly see the advantages of pool formation. They enable the process of finding reasonable aggregate licensing levels, while still providing good return on in-

vestment for its licensors, and are thus helpful in situations where “patent stacking” may occur. Also the following aspects are mentioned as main advantages of pools:

- Pools are fully compatible with RAND;
- Pools allow for one-stop shopping and thus reduce transaction costs;
- Pools prevent double marginalisation, while providing a truly reasonably royalty rate;
- Pools can help to increase market size, particularly in very fragmented markets where pools can dramatically reduce transaction costs;
- Pools have good mechanisms to check for real essentiality;
- Pools are attractive for patent owners whose normal business is not to collect royalties (such as universities).

Disadvantages and issues that were mentioned concerning pools include the following:

- Pool formation is a difficult process and requires a lot of resources. That is why pools make most sense when the expected market size is large enough.
- Small pools do not make sense, the costs are too high. Pools make sense in fragmented markets, which have a lot of licensors and/or a lot of licensees.
- Pools that cover only a fraction of the actual IPR for a standard are not very useful. It is essential that the large licensees sign up. Examples of pools that have little impact are the 3G Licensing pool (which excludes the four largest IPR owners for 3G) and the 802.11 pool by ViaLicensing.
- In patent pools, it is usual that the royalties are divided on the basis of the number of essential patents per patent owner. However, if some patent owners have strongly inflated portfolios, this can be problematic.
- Patent holders can lose substantial control over their patents when joining a pool. Royalty algorithms, licensing terms, enforcement of licensing agreements, which is licensed, and administrative fees are subject to votes of all pool members. The group may wish to take actions that a member disagrees with or considers risky, but the member may have difficulty extricating itself. It was argued that the major players often believe they can leverage their bargaining power much better in bilateral licensing negotiations and have better opportunities (i.e. get better rewards) outside the pool. Other interviewees have noted though, that in some other pools, it is the smaller IPR owner that chose to stay out of

the pool, hoping to generate a bigger income from their patents (this was argued for the MPEG-2 pool).

Pools can hamper competition, although government agencies generally see the pro-competitive effects outweighing adverse effects of standards-related pools.

All in all, pools seem to work best in clear and well defined areas such as codecs. It is less likely for a pool to be successful in more complex technologies such as complete mobile telecommunications standards. There are more owners, more business models, and there are so many patents making it a time-consuming process to determine the essentiality of all these patents.

### 4.2.6 Disputes

**Occurrence of conflicts**

Legal cases in which companies are accused to be non-compliant should be seen as the exception to the rule, according to several interviewees. It is not common that firms end up in court. One large IPR owner commented that, in general, they see most companies complying well with IPR policies. Another respondent mentions that firms are usually able to solve problems between themselves. In case they do end up in court, there apparently was a specific reason or deep disagreement. An IPR owner might find it hard to legitimate a court case against a smaller infringer, as the costs may outweigh the actual damage.

That being said, respondents do see a rise in the number of disputes. One party believes the increasing number of disputes is mostly involving Asian companies and US patents.

**Role of settlement and arbitration**

It was confirmed by many interviewees that settlements are very common when it comes to conflicts on IPR in standards. It is quite usual that a case is settled before the judge comes to a conclusion. Arbitration, on the other hand, is rare. It is typically only used in case, in which parties already had a licensing agreement that stipulates that any disagreements about the interpretation of the agreement are addressed by arbitration.

**Impact of disputes on the overall market**

One respondent mentions that, to some degree, court cases have helped to reduce uncertainty about issues, for instance about the requirement to timely disclose patents. Others feel that courts have failed in clearly defining what RAND is; they should have

been more active. Finally, one respondent mentions possible delays of standardisation by disputes overly exaggerated: disputes have not prevented any progress in the SSOs.

**Differences between different legal regimes in world regions or countries**

Several differences between legal regimes were mentioned:

- *"Particularly in Asia, the damages infringers have to pay are far too low compared to the actual damages the patent holder suffers. In the US and in Europe, the damages are more realistic."*
- *"The U.K. is increasingly patent hostile. (Apart from this, legal differences are relatively insignificant…)"*
- *"Patent trolls and injunction are believed to be typical US issues."* Others, however pointed out that for various reasons specifically related to national law[37], Germany is an interesting arena for a patent troll to start a case against an implementer.
- German courts were said to be, generally speaking, preferable for litigation in terms of competence and cost.
- In certain countries, there is a lack of qualified lawyers, who are able to deal with these complex cases.

**Trends in disputes**

Several respondents expected the number of big disputes to increase in the future. Two reasons were offered:

- Companies that have poor quality portfolios more often have overambitious ideas about the value of their patents.
- Players – often newcomers from outside of the telecom industry – are increasingly unwilling to take essential licenses.

### 4.2.7 Summary of company interviews

The interview with company representatives revealed new insights, which complemented at first the results of the database analyses, because of the obvious overclaim-

37 One respondent pointed out that the German system has an unusual feature: patent infringement and patent validity are dealt with by different courts. This increases the threat of injunction.

ing of essential patents. Furthermore, other types of IPR play obviously only a very minor role. There are various impact dimensions of essential patents in standards. In addition to this variety, companies make obviously contradicting experiences. In summary, the companies report negative impacts only in very exceptional cases and circumstances. The controversial topic of licensing conditions is confirmed not only by rather broad ranges of rates, but also their dependence on very specific conditions, e.g. whether unilateral or multilateral agreements are negotiated. Although IPRs are in general no problem for standardisation processes, the IPR policies at SSOs should be improved especially towards more transparency about the relevant essential IPRs, more licensing options, but not necessarily the ex ante disclosure of licensing terms, and more restrictive inclusion of IPR protected technologies. However, the IPR policies should be not overstated and governmental intervention are not needed, whereas an improvement of the patent quality would certainly be helpful. Patent pools are perceived as an efficient instrument to find reasonable aggregate licensing rates and to reduce transaction costs both for licensors, but especially for licensees. However, setting up a patent pool requires significant resources with more success in small well defined areas, whereas rather challenging for large complex standards involving many players. Finally, disputes related to IPRs in standards are currently the exception and mostly settled outside courts (see Annex III for a quantitative analysis of Nokia's litigation experiences, which are certainly the exception at the present). However, due to an expected increase of new players from different world regions entering the scene with a broader variety of business models and heterogeneous legal regimes, the companies perceive consequently a higher number of court cases.

Overall, the company interviews underline that IPRs in standards are in general no problem and even positive for the quality of standards, but the challenges in the future will grow due to more companies and other organisations getting involved from different world regions with contradicting legal regimes and a broad range of business models.

## 4.3 The company survey

### 4.3.1 Methodology

Complementary to the detailed and broad range of insights from single companies or a small number of companies gained by the interviews, a survey was conducted to receive comparable insides from practitioners who are experts on the subject of standards and their interplay with IPR. Therefore a comprehensive questionnaire (see Annex IV) consisting of rather closed questions – in contrast to the open interview guideline – was prepared to construct a representative assessment on topics such as the importance of IPRs in standards, access to essential IPRs, impacts of IPRs in standards and on the standardisation process, the implementation of standards, SSO policies and future trends. The results consist of more than 140 answers collected by directly addressing companies declaring essential patents identified via the database analysis (see Chapter 3) and standards implementors using membership information of international, European and various national standardisation bodies in Europe. One third of the answers comes from outside Europe, especially Asia and the United States.

The response covers almost 30% of the top 100 essential patent owning companies ranked to the number of owned patents included in standards. Having a high share of responses from companies owning a great number of essential patents generates results that cover almost 70% of all essential patents that could be identified. Consequently, we have a representative sample of companies owning essential IPRs. The sample of the companies implementing standards, but not owning essential IPRs is a random sample of companies, but likely to be biased towards companies experiencing the relevance of IPRs in standards. Due to the rather low response to the open survey of standards implementors, the majority of companies' experiences obviously little relevance of IPRs in standards for their companies.

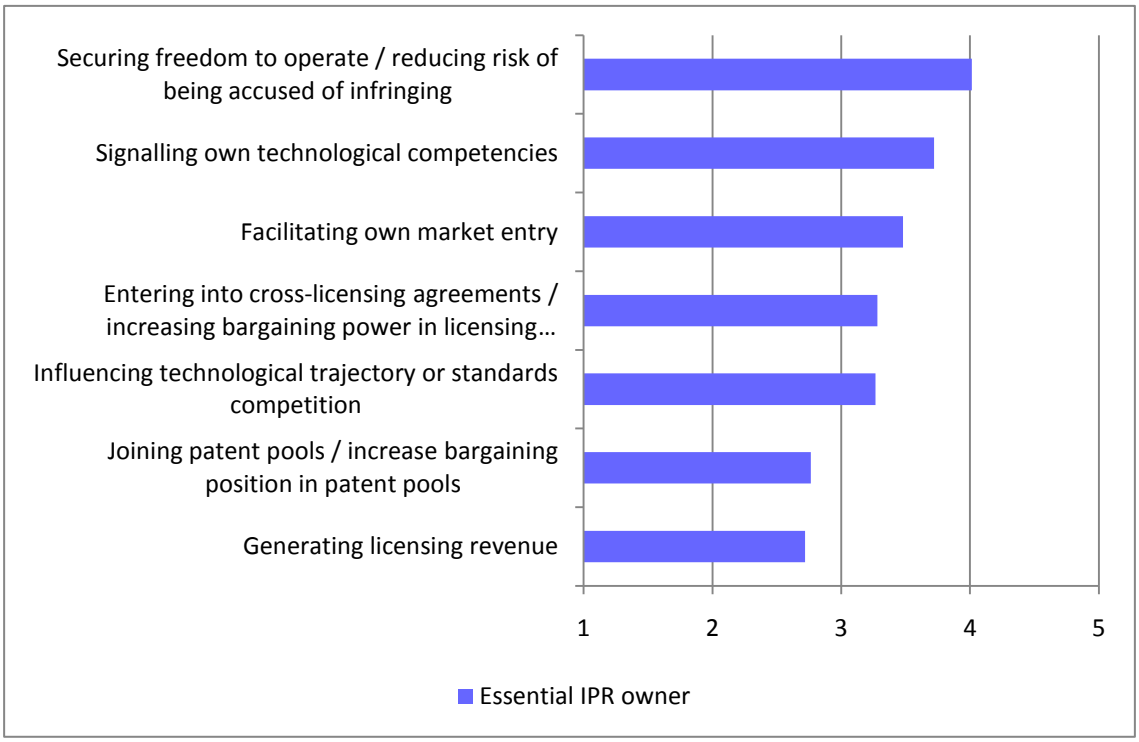
By dividing the groups of essential patent owners and companies that do not own patents included in a standard, the answers can always be differentiated according to the different points of view. In addition, we have divided the sample into companies active in the hardware and the software sector, because there are in some dimensions obvious differences, which will be reported if relevant.

### 4.3.2 Results

To evaluate possible incentives for companies to include their patented technologies into standards, only essential IPR owners were asked to rank aspects of importance to own essential IPRs (see Figure 4-3). Most debates that discuss patents included in

standards are about licenses or license commitments. However, the most important reason for companies to own essential IPRs is to secure their freedom to operate. By owning a share of essential IPRs this also reduces the risks of being accused of infringing. Generating profit from royalties was ranked the last and seems to be of less importance compared to technology signalling and market entry. Also joining patent pools is obviously not an important trigger to have patents on standards. Both of these results would suggest that patent files connected to standards in most cases target to secure a good market position or increase market shares and less likely needed to generate returns from earlier investments. However, an in-depth analysis revealed that the importance of these aspects is highly dependent on the degree of a company's vertical integration. Manufacturers generate their profits on downstream markets, whereas companies that only focus on innovation efforts have incentives to receive returns from IPRs included in standards. Finally, for companies active in the hardware sector all issues – especially entering cross-licensing agreement – are of higher relevance than for companies active in the software sector.

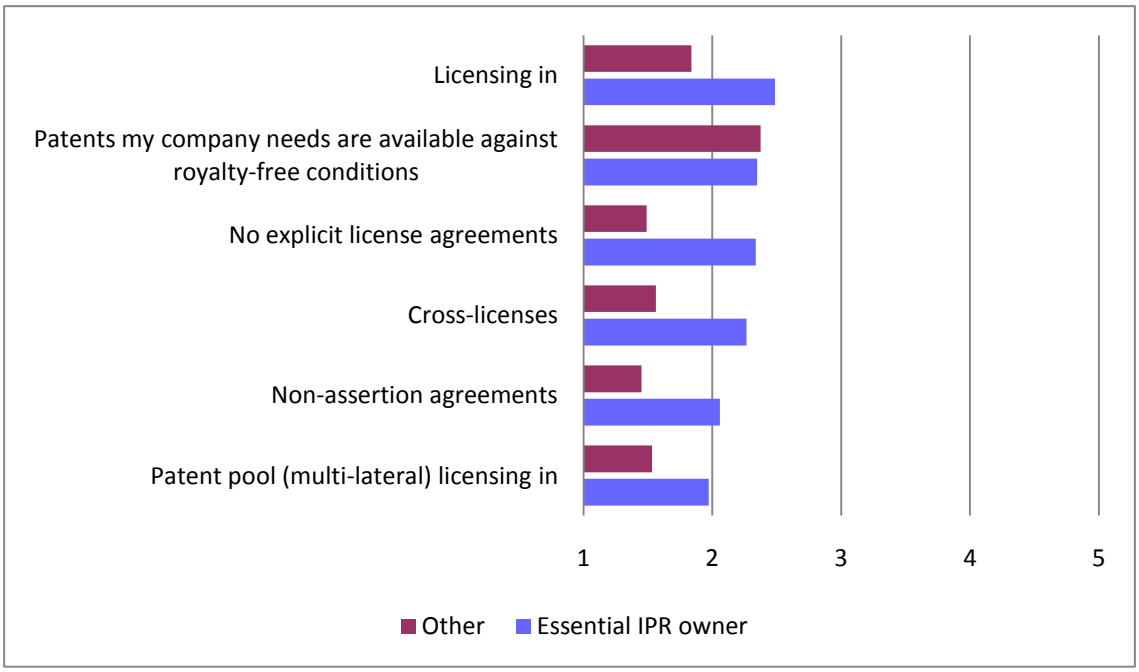
Figure 4-3: Importance of owning essential IPRs
(1 = very unimportant to 5 = very important)




To assess which license agreements are used when essential patents protect standardized technology, companies were asked to state offered licensing mechanisms when implementing a standard including IPR. Since this question concerns both sam-

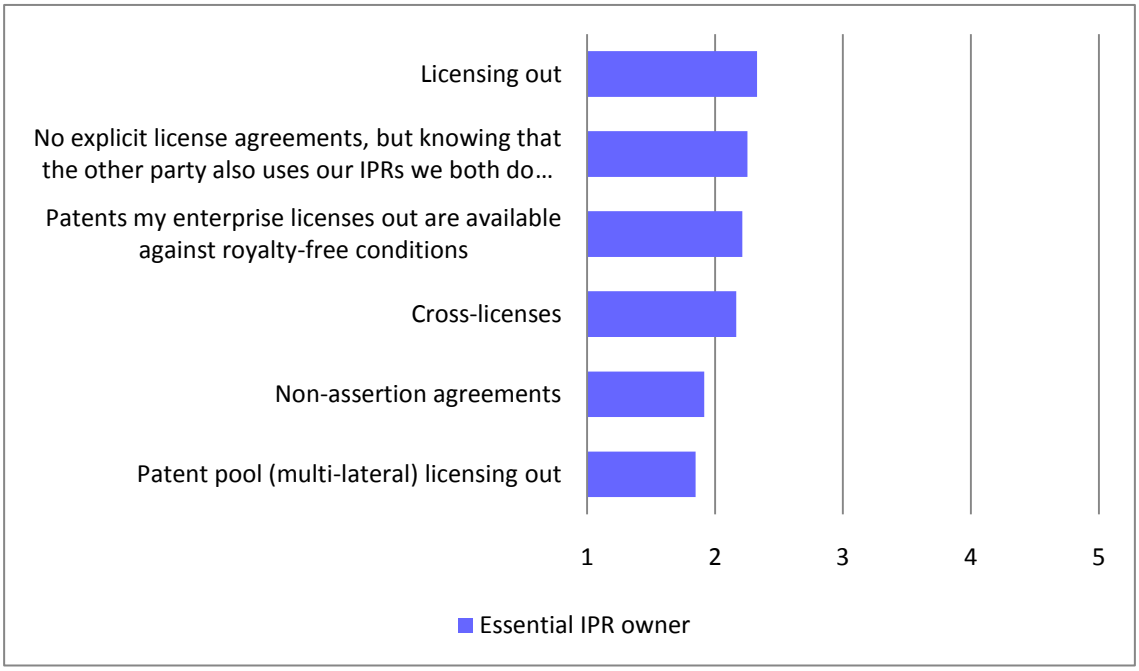
ple groups, answers are divided in essential IPR owners and other companies. The first analysis reveals that essential IPR owners have more license offers than companies that do not own essential IPR. The latter group is in most cases and especially in the software sector able to obtain licenses under royalty free conditions, which is overall the most offered licensing term. Essential IPR owners slightly more often need to agree to license-in compared to achieving royalty free conditions. Cross-license agreements are offered most likely to essential IPR owners, which is a straight forward result. No explicit agreements are also more likely for IPR owners and can be interpreted as a silent cross-license agreement, where both parties appear to approximately infringe the same share of IPRs and agree to not assert, which is the most important mechanism for the hardware sector. These agreements are especially common when companies' patent portfolios are strongly overlapping and it is difficult to identify mutual claims.

Figure 4-4: Mechanisms to get access to essential IPRs (1 = never to 5 = always)



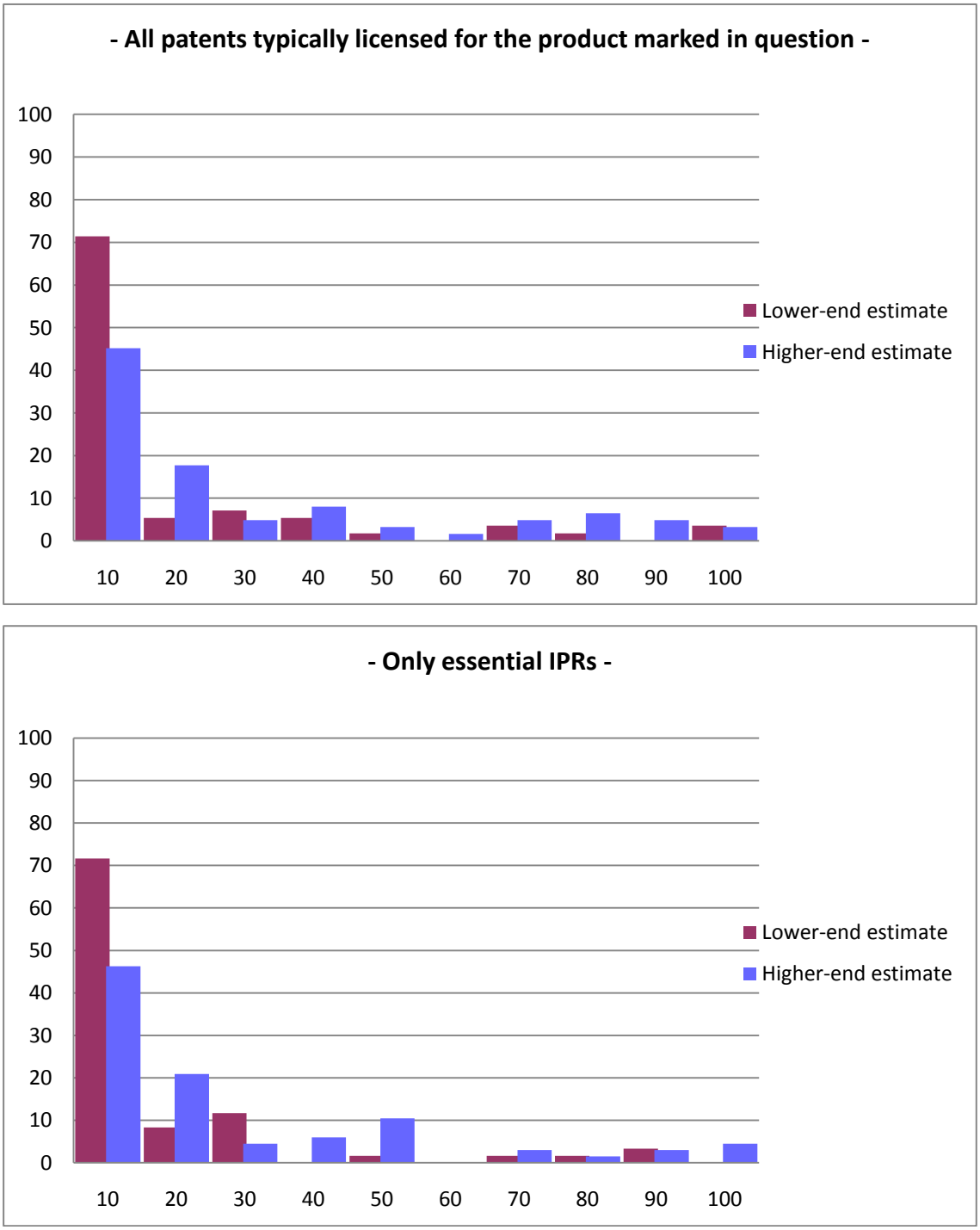

Essential IPR owners were further asked which license conditions they offer to implementers. Compared to the offered license mechanisms, companies of our sample seem to prefer licensing out or to conduct a mutual agreement to not assert when infringement seems to be balanced. However, companies would also comply with licensing out under royalty free conditions especially in the software sector. The first three answers just slightly differ in their level of importance. Non-assertion and patent pools are the least chosen to license out essential IPR.

Figure 4-5: Offered mechanisms to get access to essential IPRs (1 = never to 5 = always)




Since the results revealed a heterogeneous picture of several pursued mechanisms to license IPRs, companies were also asked about their estimation on royalty fees. The sample companies therefore needed to assume a situation of a hypothetical entrant into the market, which is an existing experienced medium-sized production enterprise not owning relevant (essential or non-essential) IPRs concerning the standard or respective market. Results are differentiated between an estimation of licensing conditions for all patents relevant for a product market and only IPRs that are essential for standards in the particular market. The assessment reveals no significant differences between all relevant patents in the market and only the essential IPRs. Most participants of the questionnaire estimated aggregated royalties to be around 10-20 % for both types of IPRs.

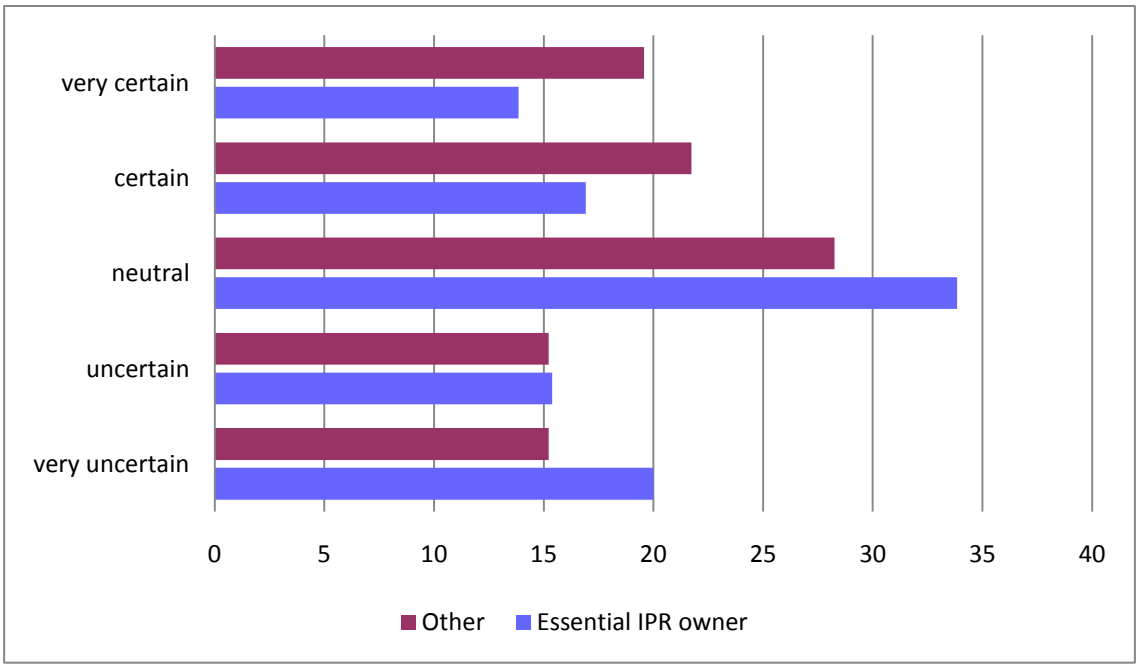
Figure 4-6: Assessment of licensing rates by percentiles for patents and essential IPRs for the product market in question in percentage of respondents




To better assess the above results and companies' estimations, participants had to state whether they are confident about their answers or not. The answers show that especially IPR owners are very uncertain in their estimations of license fees. The few answers assessing licensing fees above 50% indicate in addition a missing under-

standing of licensing schemes. In general the estimation of the share of aggregated royalties seems to be very vague, sometimes not well understood and highly dependent on sectors and industries. These outcomes might further show that in some industries ex ante license agreements might be very difficult to commit to.

Figure 4-7: Confidentiality of the assessment of licensing rates (in %)

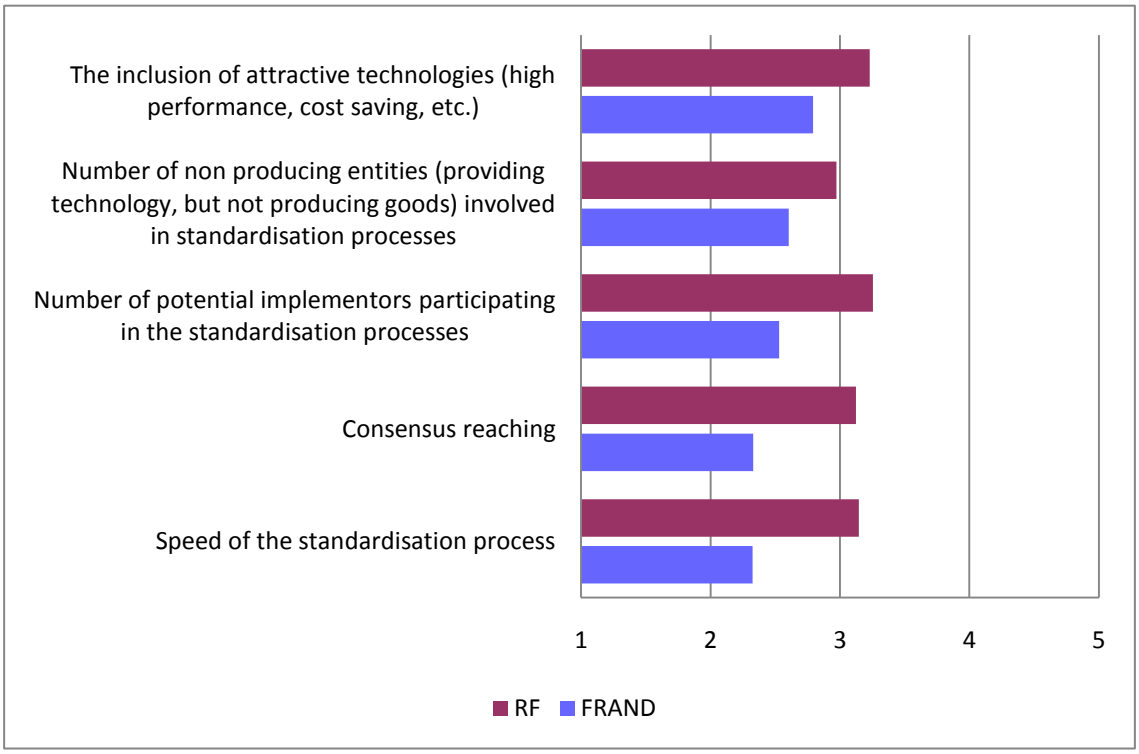



A common discussion in the field of standardisation concerns the economic impacts of essential IPRs. Since these effects are highly dependent on licensing conditions, the sample companies needed to differentiate their answers between royalty free (RF) or FRAND royalty regimes. The following three questions display the assessed effects of essential IPRs on standardisation processes, on the implementation of standards and on general company activities.

When comparing effects on standardisation processes, the survey answers give a clear picture that impacts are estimated to be rather critical under FRAND, while under royalty free conditions the impacts are in most cases assessed to be neutral or rather positive. Especially standardisation speed and performance in mutual agreement on standards are judged very critical by the respondents, when licensed under FRAND. The participation of non-producing entities is the only impact that is seen rather negative in both regimes. In-depth data analysis reveals that when dividing the sample into essential IPR owners and companies that do not own IPRs, the assessment do not differ related to royalty free conditions. When comparing these two subsamples under FRAND conditions, IPR owners estimate the situation less critical compared to compa-

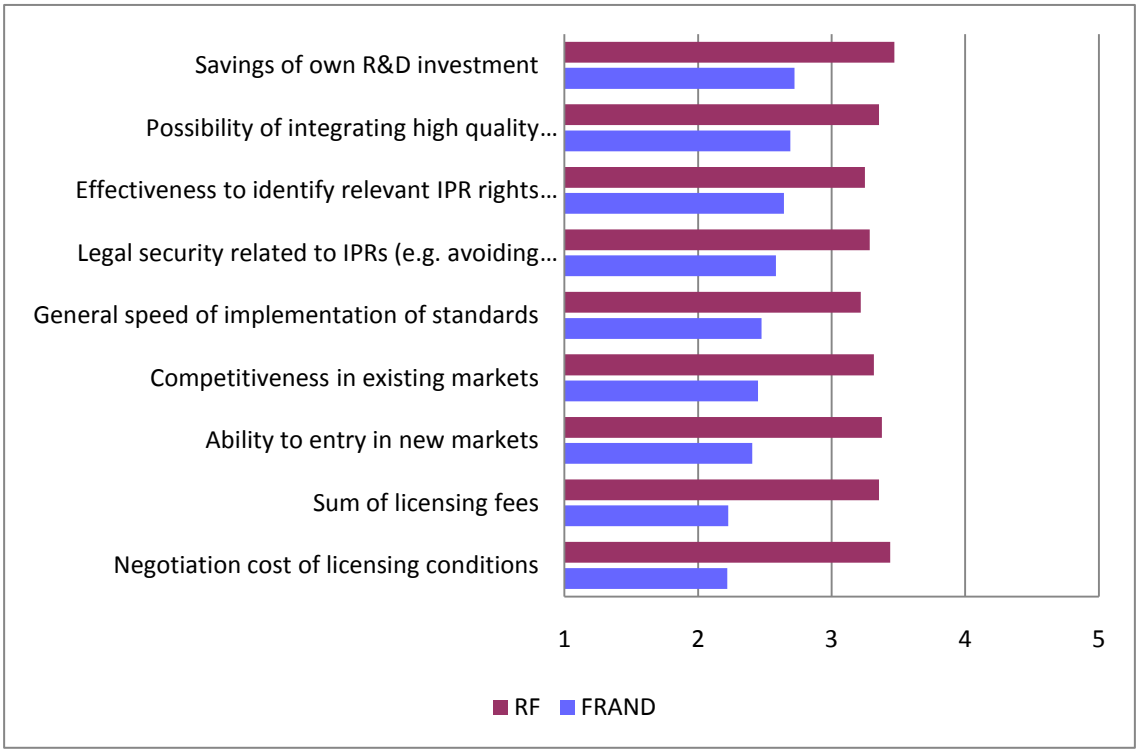
nies that do not own essential IPRs. Finally, it is important to stress that the IPR owning companies in the hardware sector perceive no significant differences between the two IPR regimes regarding the impact of essential IPRs on the standardisation process.

Figure 4-8: Impacts of essential IPRs on the standardisation process under RF or FRAND (1 = very negative to 5 = very positive)




Furthermore companies were asked to assess possible effects of essential IPRs on the implementation of standards. A general and consensual opinion is again that under royalty free conditions the impacts of essential IPRs are valued to be neutral or slightly positive. In comparison under FRAND conditions especially the companies not owning essential IPRs perceive problems regarding negotiating licensing fees and royalty aggregation. The ability to stay competitive in the market as well as entering new markets is also estimated to be more difficult, when IPRs are included in standards. In general, companies active in the hardware sector owning essential IPRs perceive no difference between FRAND and RF, whereas in the software sector the RF regime is perceived as much more favourable also by the companies owning essential IPRs.

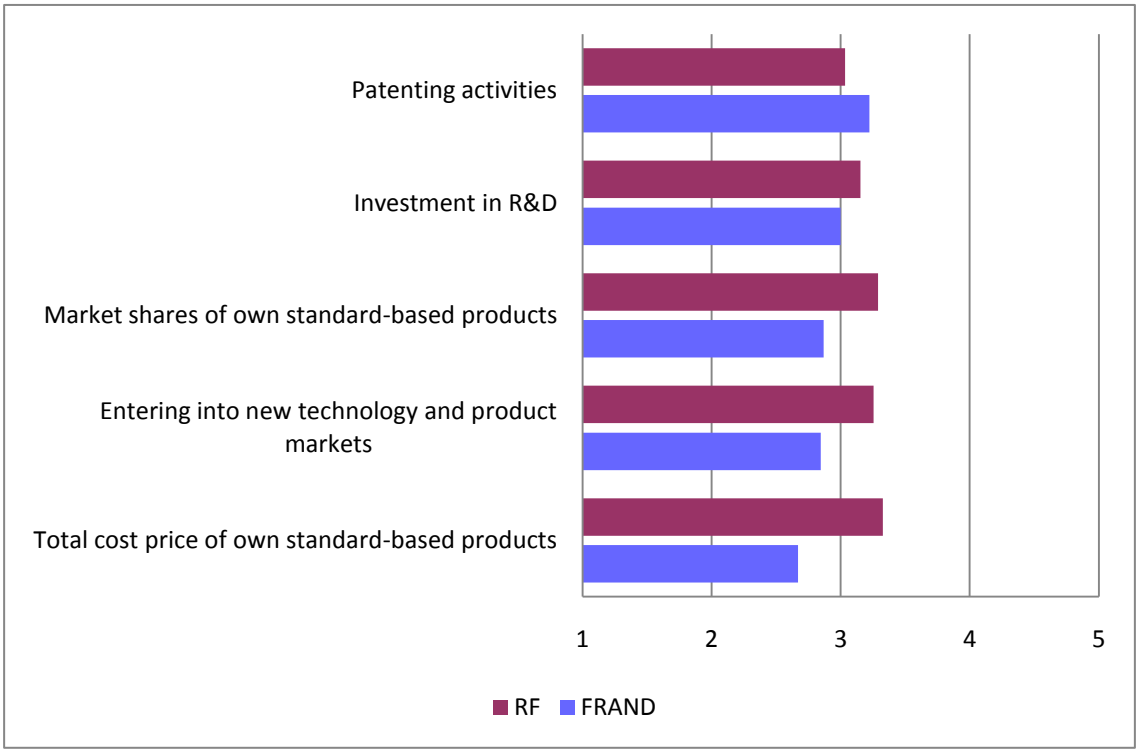
Figure 4-9: Impacts of essential IPRs on the implementation of standards under RF or FRAND (1 = very negative to 5 = very positive)




Companies were finally asked to evaluate the impacts of the inclusion of essential IPRs on general company activities. The FRAND regime and the connected payment of licensing fees is – compared to RF – increasing the total cost of standards based products, consequently negative for entering into new markets and for market shares. There are on the other hand no significant differences between FRAND and RF for investments in R&D or patenting activities. Especially, companies in the hardware sector owning essential IPRs assess FRAND for these aspects more positively than RF.

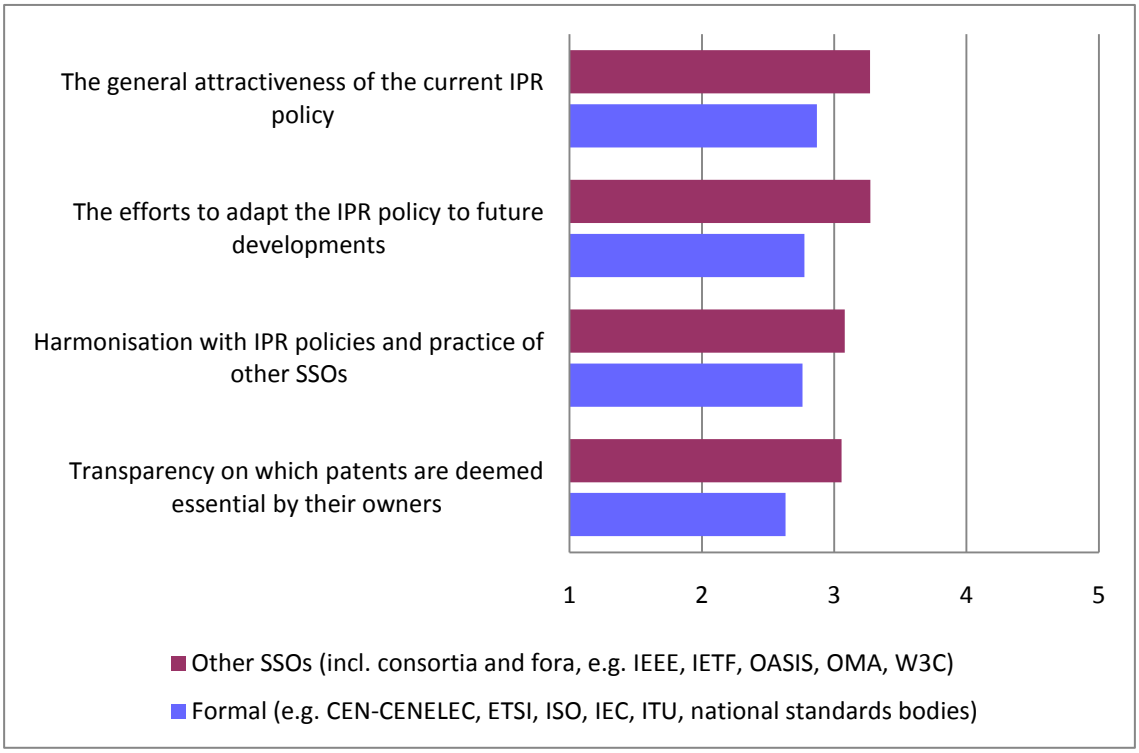
If we summarise the assessments of the influence of essential IPRs on standardisation processes, the implementation of standards and some generic company specific assets, we come to the following conclusion. Under the neutral RF regime, the companies perceive neither negative nor really positive impacts of essential IPRs, and this irrespective whether companies own essential IPRs or not. Since FRAND is per se connected with more intensive negotiations, especially company without essential IPRs perceive some problems in the standardisation process, the implementation of standards and related to costs and market success.

Figure 4-10: Impacts of essential IPRs on company specific aspects under RF or FRAND (1 = very negative to 5 = very positive)



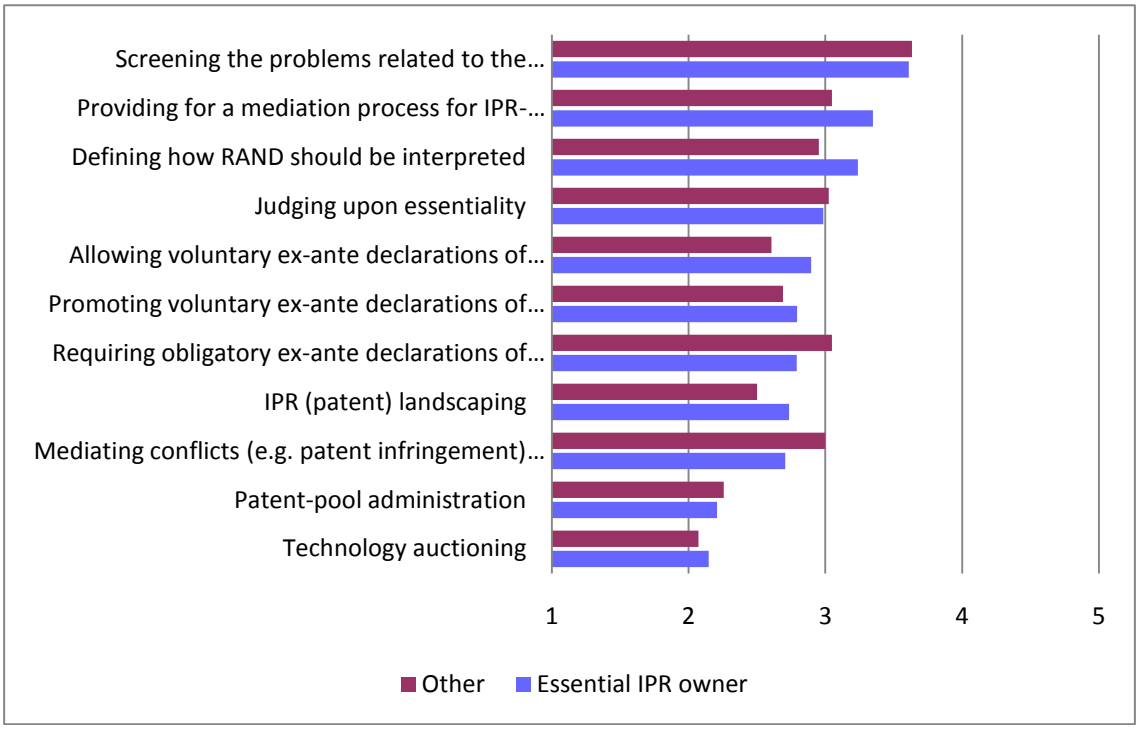

After the assessment of the different impact dimensions, the companies had to further rate the performance of SSOs differentiated in formal (ISO, IEC, ITU, ETSI, CEN-CENELEC) and other more informal SSOs, i.e. consortia and fora, like IEEE, IETF, OASIS, OMA, W3C). The general results reveal that for most aspects, the more informal SSOs are rated to be more satisfactory than formal SSOs. While characteristics of informal SSOs are mostly valued to be rather neutral, formal SSOs are seen to be slightly unsatisfactory in topics such as transparency or harmonisation. When dividing between essential patent owners and non owners, results are the same for informal SSOs. In comparison formal SSOs are rated more critical from companies that do not own essential IPRs. However, companies from the hardware sector are rather satisfied with the formal bodies and see no better performance of informal SSOs.

Figure 4-11: Assessment of SSOs according to IPRs
(1 = very unsatisfactory to 5= very satisfactory)



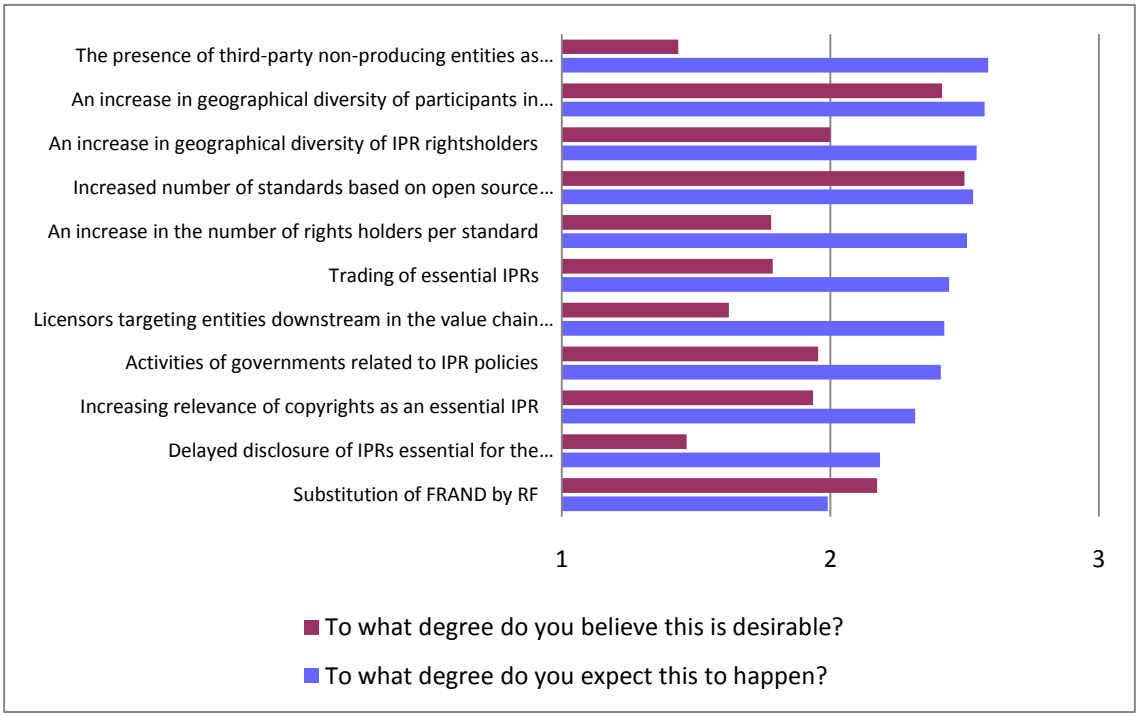

In the last section companies were ask to give their statements on future trends in standard setting and the interplay of IPR. In a first question future tasks of SSOs needed to be valued in their importance. Therefore the sample was again divided into companies owning and not owning essential IPRs. However, results display consensus among participants of both sample groups when suggesting futures tasks. The most important issues that experts stated were the screening of possible problems of standard implementation and a mediation role for SSOs to solve conflicts on the topic of essential IPRs. Furthermore SSOs are expected to also solve problems in defining FRAND and judging essentiality of patents. Especially the sample group of companies that do not own essential IPRs suggest that SSOs need to require obligatory ex-ante declaration of licensing fees. IPR landscaping, patent pool administration and technology auctioning are tasks which participants suggest to be not of the responsibility of SSOs.

Figure 4-12: Future activities of SSOs (1 = totally disagree to 5 = totally agree)




In the last question companies needed to state their opinion on future trends. The question lists a choice of multiple future scenarios and participants of the survey had to estimate the possibility of development for the upcoming 5 years, as well as their estimation whether this development is desirable or not. Most listed scenarios are valued to be rather negative but quite certain to happen. Especially the presence of third party non-producing entities is estimated to be more frequent in the future, but valued as a development that is not desired. Also an increase of delayed disclosures and an increase of licensors that target entities on downstream markets are seen to be a very negative development. Only the increasing geographical diversity of IPR holders such as an increased number of standards on open source software is estimated to be a positive trend.

Figure 4-13: Expectations and preference of future developments (1 = unlikely /undesirable to 3 = likely/ desirable)




### 4.3.3 Summary

In order to derive the main conclusions of the survey among companies, we would like to point to the following confirmed existing or new insights.

From the analysis in Chapter 3 we know that only a small share of standards implemented is covered by essential IPRs. However, in some industries these few standards have a crucial function. A new insight is the high relevance of the freedom to operate and the signalling function for owning essential IPRs not denying that for some companies the generation of licensing revenues based on essential IPRs is the core of their business model.

Besides licensing contracts, no agreements at all or RF use of IPRs in standards are most common for accessing and offering essential IPRs. There has also only little change in the last years. Furthermore, companies have large difficulties to assess average licensing conditions and see also no differences between essential and other IPRs.

Essential IPRs have under the RF regime no impact on the standardisation process, whereas especially the companies without IPRs perceive some critical impacts of FRAND. Again all the companies experience neutral or even slightly positive impacts

related to the implementation of standards under RF, but those without essential IPRs observe slightly critical and disputable impacts under FRAND. Finally, essential IPRs have no significant impacts under the RF regime on companies' activities, like R&D and patenting, and success, e.g. market shares, etc. under RF. Under FRAND, companies without essential IPRs have concerns related to market entry, market shares and total product costs. In summary: RF is obviously preferred by companies without essential IPRs, whereas IPR owners have overall no specific favourite regime.

In the assessment of the SSOs, we observe a slightly critical and controversial assessment of IPR policies of formal SSOs by non IPR owners, but a consensus on average performance of other SSOs. Nevertheless, the companies do – in general – not postulate major changes related to the future tasks of SSOs. However, there is a request to become more active role in screening the possible problems with the implementation of standards, to mediate processes in case of IPR-related conflicts and finally to help in the interpretation of FRAND.

Looking into the future, the companies expect the most severe problems with the entry of non-producing entities, the increase of rights-holders per standard and more licensors setting up their claims. Finally, more standards will and should be based on open source software, which will certainly lead to the establishment of a new paradigm.

Summarising all main results, it has to be stated that the current system works in general. However, details have to be improved and fixed. The biggest challenge is certainly to find the right 'price' for IPRs in standards in an environment with an increasing number of players following more heterogeneous business models, even within the same company.

# 5. Legal Analysis

***Yann Dietrich (Section 5.2)***

***Benoît Müller (Section 5.3)***

## 5.1 Introduction

Complementing the database analysis, the interviews and the stakeholder survey, we reviewed and analysed SSO IPR policies and identified and analysed specific stakeholder views and trends.

## 5.2 IPR policy mapping

Within the legal analysis, we investigated the IPR policies of various SSOs including consortia with the objective to understand the main features of such IPR policies as well as the potential issues to be addressed and solved.

This analysis has been made only on a sample of IPR policies without being exhaustive and without the weight of such organisation being taken into consideration, both in terms of number of standards or specifications produced by such organisations but as well in terms of importance in the market of such standards, e.g. number of implementations or products. Accordingly, the figures shall be read and understood with such limitation in mind. Any organisation has been counted as one unit, except for organisations covering multiple technical fields which have been counted as 0.5 for each technical field covered by such an organisation.

The following IPR policies have been analyzed: ANSI (American National Standards Institute), Broadband Forum, CCSA (China Communication Standards Association), CEN/CENELEC, DVB, ECMA, ETSI, IEC, IEEE, IETF, ISO, ITU-T, JEDEC, MIPI (Mobile Industry Process Interface), OASIS[38], OMA, TIA, UN/CEFACT, VESA, W3C, WiFi Alliance, ZigBee.

In general, we identified that the very large majority of IPR policies are built on very similar principles, while certain specific features may require further attention, such as transfer of essential patents to a third party.

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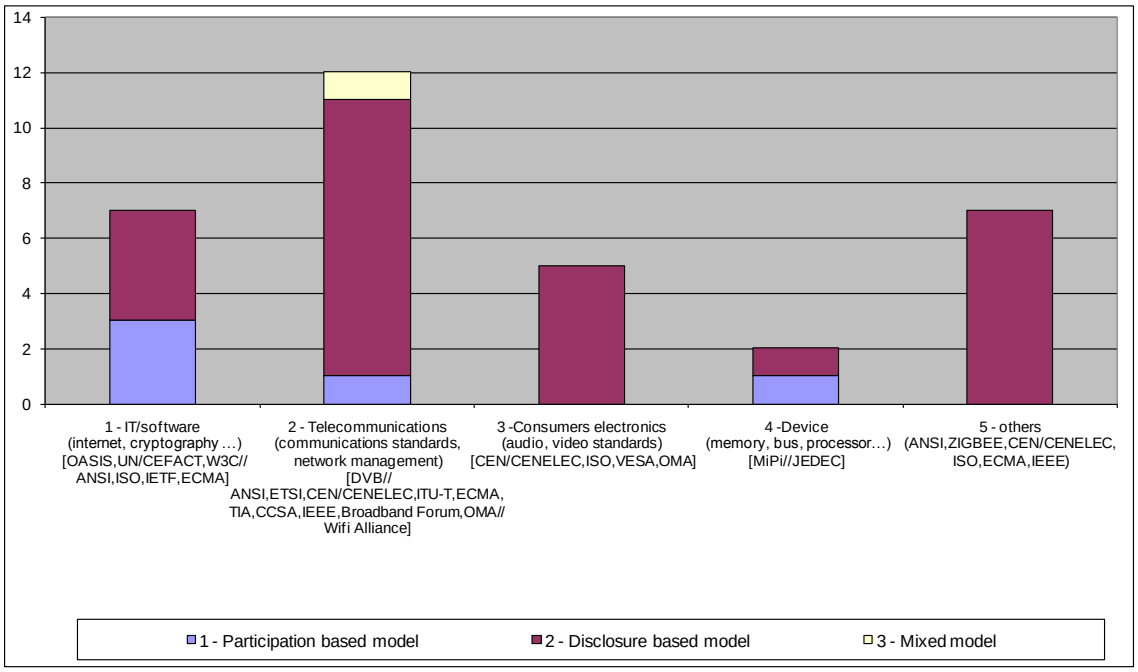
38 For OASIS, the analysis has only considered the model RF on limited terms given that out of 75 live projects, only 17 are not licensing using this mode (14 are licensed on RF on RAND which is giving the possibility to add reciprocity/defensive suspension provisions, two using non assertion mode, and only one using RAND).

### 5.2.1 Patent disclosure

We analyzed first the disclosure model of the various organisations. Here, we distinguish between the participation based model which consists in requiring from all participants to license all essential patents under given conditions (some of them being RAND such as DVB other being royalty-free such as W3C) and the disclosure based model which relies upon the disclosure of the patents by the members or participants to the SSO without any blanket obligation to license. Additionally, only one organisation, the WiFi Alliance has a mixed model differentiating between participants of working groups and other members.

For participation-based model IPR policies, out of five SSOs (W3C, MIPI, UN/CEFACT, OASIS, DVB), only OASIS has no opt-out provision, meaning that for other policies, any member can refuse to license at the given conditions provided such member make a declaration in a given timeframe with generally a complete identification of the patents.

Figure 5-1: Patent disclosure models




With all the limitation of such study being understood, we can notice that the participation based model is more present in the software and IT area.

Among the disclosure-based organisation, we analysed how many of them are imposing a mandatory requirement to disclose essential patents (such classification being granted only to IPR policies in the presence of words such as shall, must …).

Figure 5-2: Nature of the obligation of disclosure in disclosure-based organisation

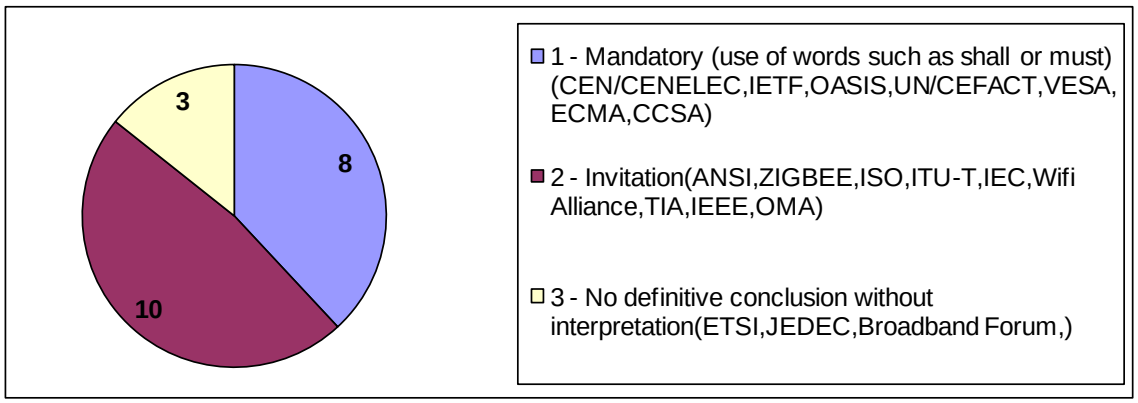



Figure 5-3: Presence of a disclaimer of corporate patent searches, when patent disclosure is mandatory

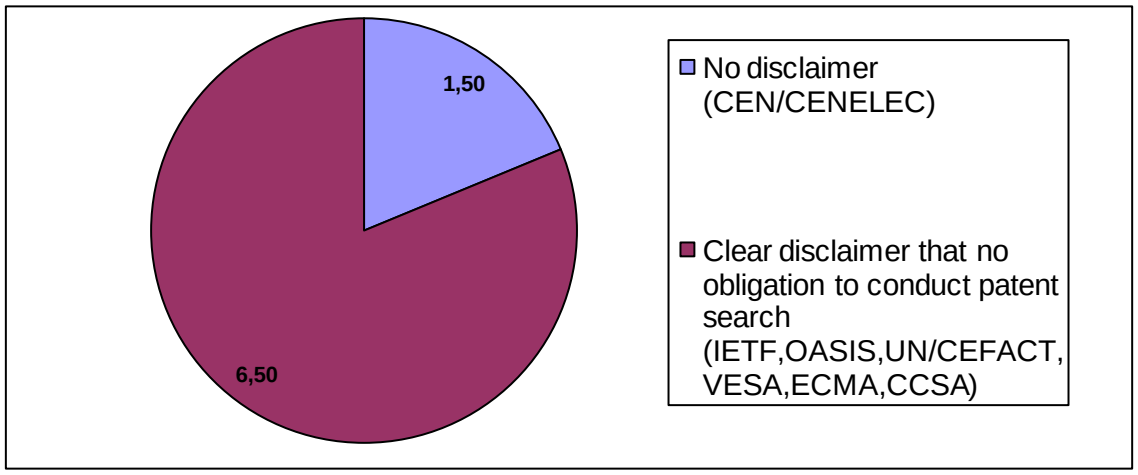
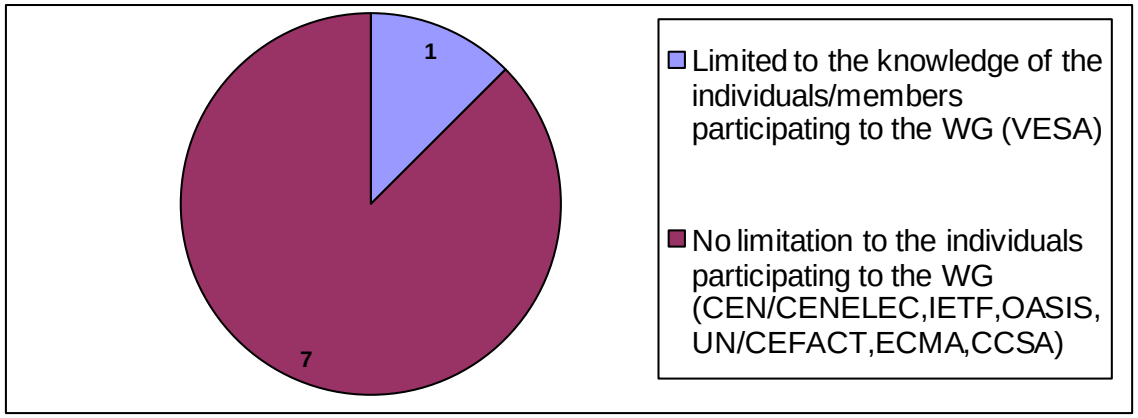



Figure 5-4: Scope of disclosure, when the patent disclosure is mandatory

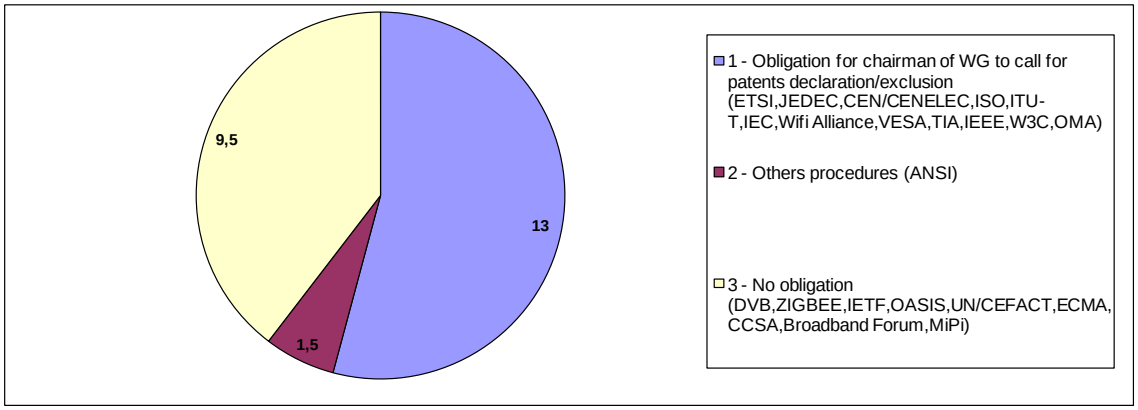



The presence of mandatory requirements remains limited as highlighted in Figure 5-2 and when present, we need to put them in context. A clear disclaimer of any corporate

wide patent searches is being present in more than 75% of such IPR policies (see Figure 5-3), and in some proportion of the IPR policies, the disclosure is limited to the knowledge of the individuals/members participating to the working group (WG) (see Figure 5-4).

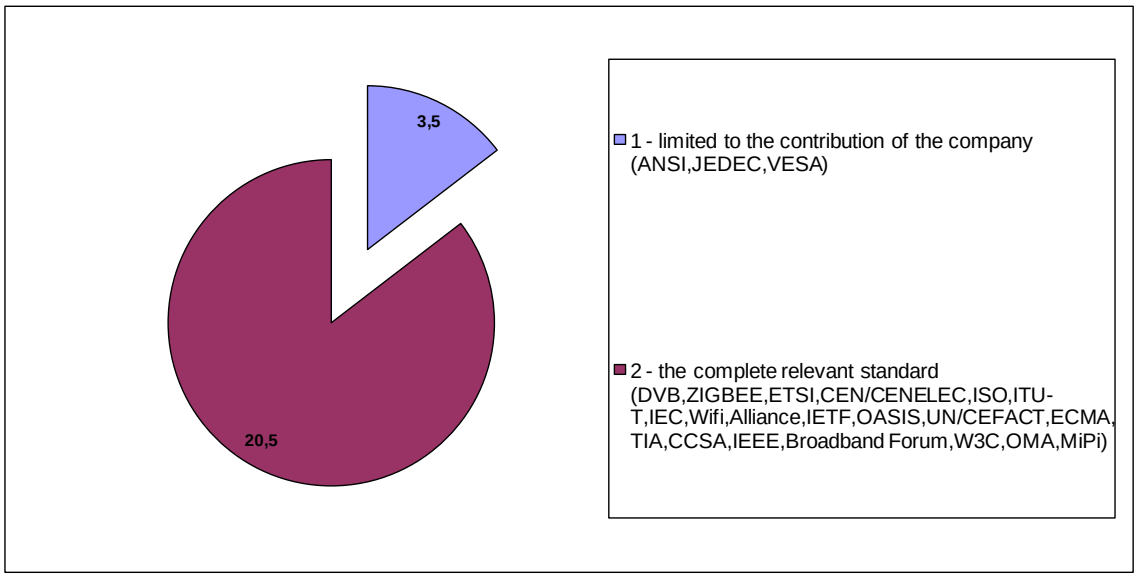
Interestingly, most of the organisations are asking the chairmen of working groups to remind all participants of the rules related to patent disclosure before any meeting or the start of any other procedures to foster more patent disclosure (see Figure 5-5). Having said that, around 40% of the organisations has not defined similar procedures.

Figure 5-5: Procedure to foster patent disclosure in all organisation




An important dimension of the disclosure obligation is the technical scope. We defined two categories: the complete relevant standard when the obligation of disclosure is wide and covered all the work of the relevant organisation or disclosure limited to the technologies contributed by the organisation. As illustrated in Figure 5-6 below, a wide obligation related to the complete standard seems to be the most usual model.

Figure 5-6: Technical scope of the disclosure obligation

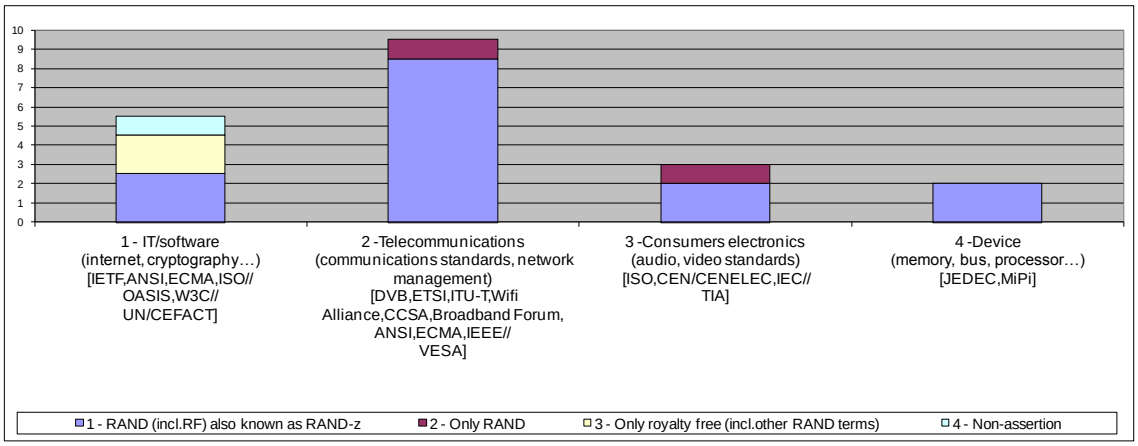



### 5.2.2 Patent licensing

We analysed also the licensing commitments required under the various IPR policies. Obviously, we first looked at the primary licensing terms making the distinction between non assertion (when the patentee commits to not assert its essential patents), the royalty free scheme imposing royalty free license in addition to other traditional RAND terms, only FRAND meaning that the essential patents should be licensed at fair, reasonable and non-discriminatory terms without any other reference to alternative licensing scheme, and, the policy offering an option for patentees between RAND and royalty-free.

It needs to be strongly reminded here of the inherent limitation of such analysis which is only based on a sample of IPR policies and does not take into account the importance of any organisation in terms of standards or specification production and their economic impacts.

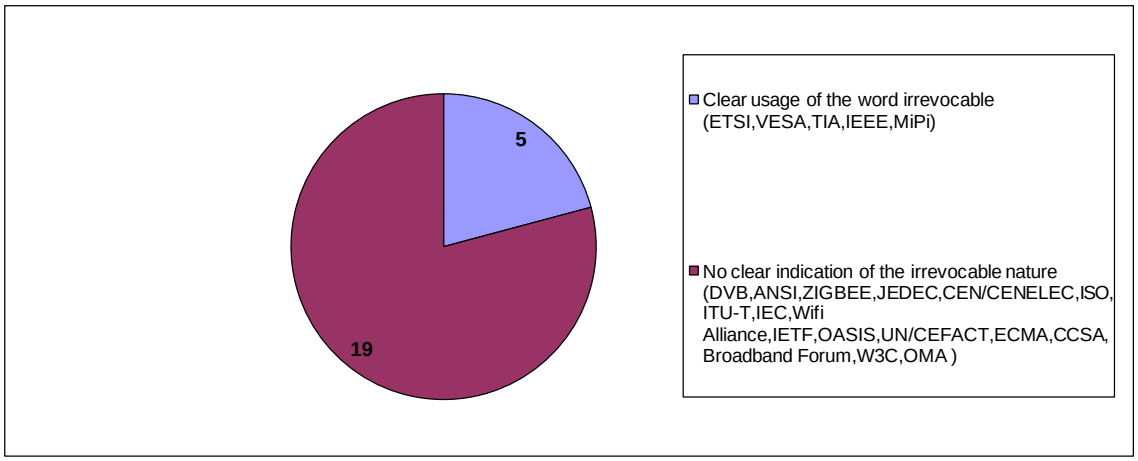
Figure 5-7: Patent licensing conditions by technical field




This Figure 5-7 is representing the repartition of the various provisions in various technical fields.

We also looked at the irrevocability of the licensing commitments and more precisely on the usage of the word “irrevocable” in the IPR policy.

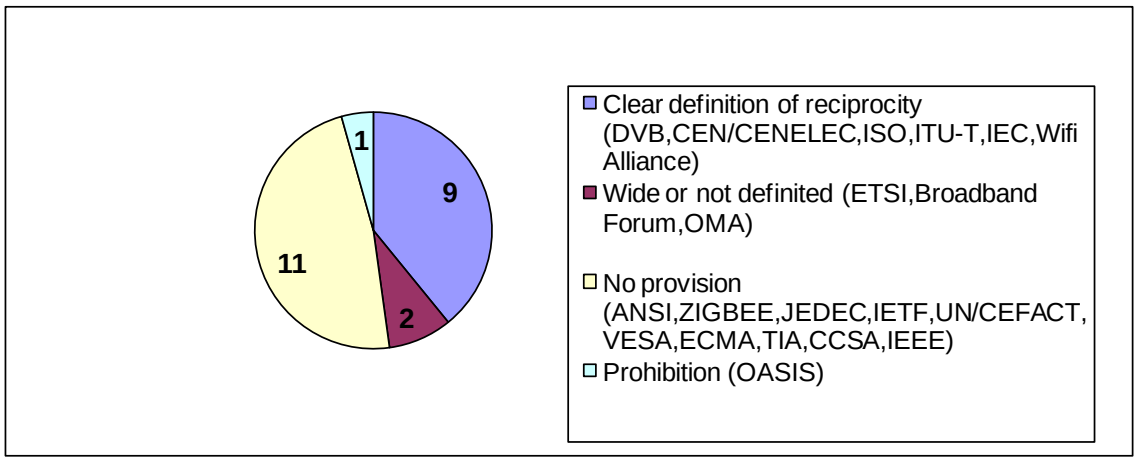
Figure 5-8: Irrevocability of the licensing commitments




Quite surprisingly, most of the IPR policies are not addressing this aspect and hopefully without any consequence as of today, but this may create potential issues about whether a patentee which commits to license their patents can withdraw their licensing commitments and/or modify it.

Reciprocity is also an important feature of any IPR policy and question has been raised about the scope of such obligation.

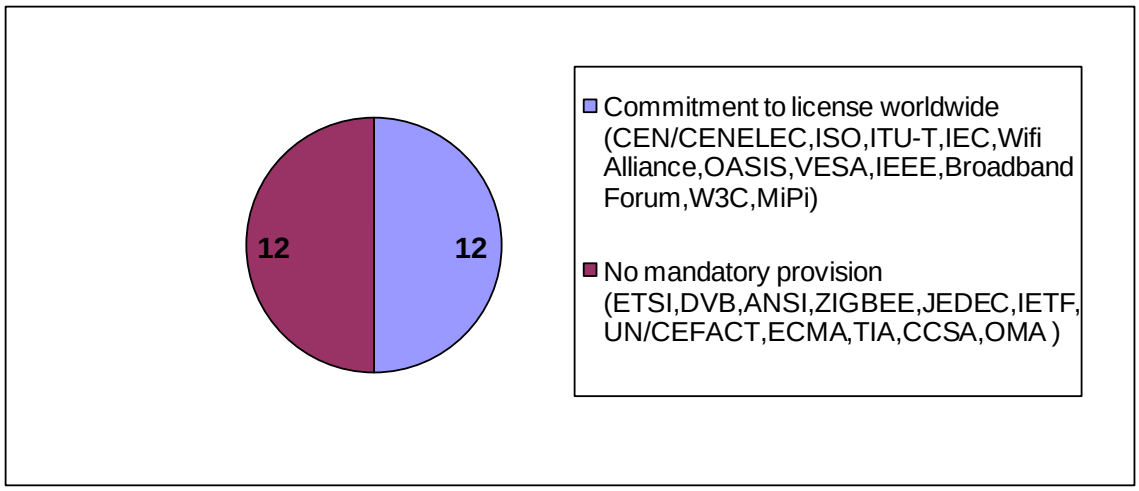
Figure 5-9: Definition of reciprocity




Again, while this is potentially an area of discussions and even disputes between companies, most of the IPR policies have not properly defined the exact scope of such obligation.

In this analysis, we investigated whether the various IPR policies have detailed wording clarifying the geographical scope of the licensing commitment. Recently, an issue occurred at ETSI, when a member owning essential patents limited its licensing commitment to the European Union.

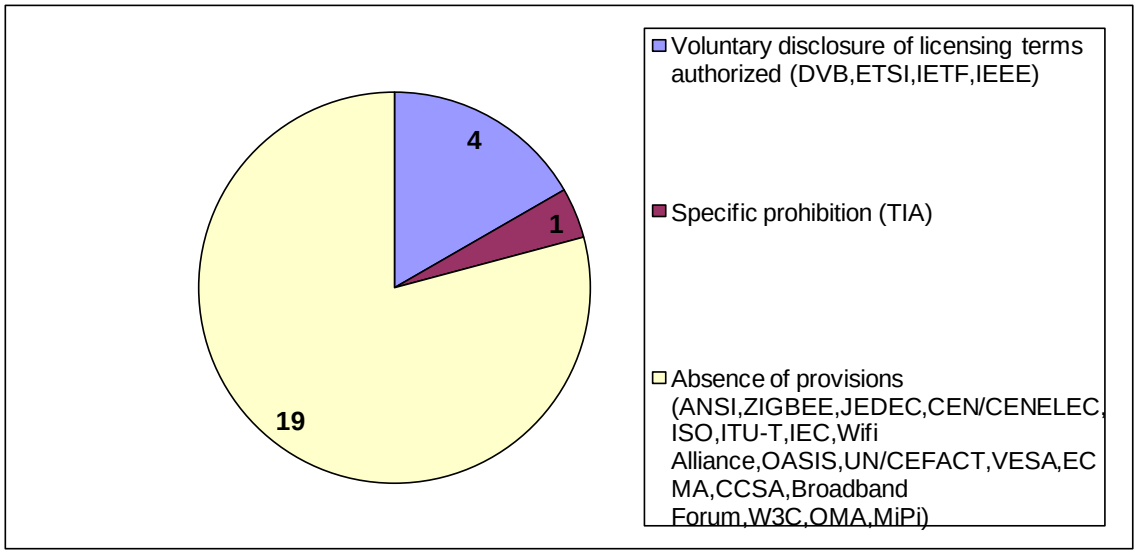
Figure 5-10: Geographical scope of the licensing obligation




Surprisingly, only 50 percent of the IPR policies we analyzed are clearly indicating that the licensing commitment should be worldwide, surprisingly in our context of global and worldwide standards.

About the presence of provisions related to the disclosure of the licensing terms, we analyzed only whether there is a specific provision allowing them, a specific prohibition or an absence of provision (without it meaning necessarily that the organisation does not prohibit them based on their antitrust policy).

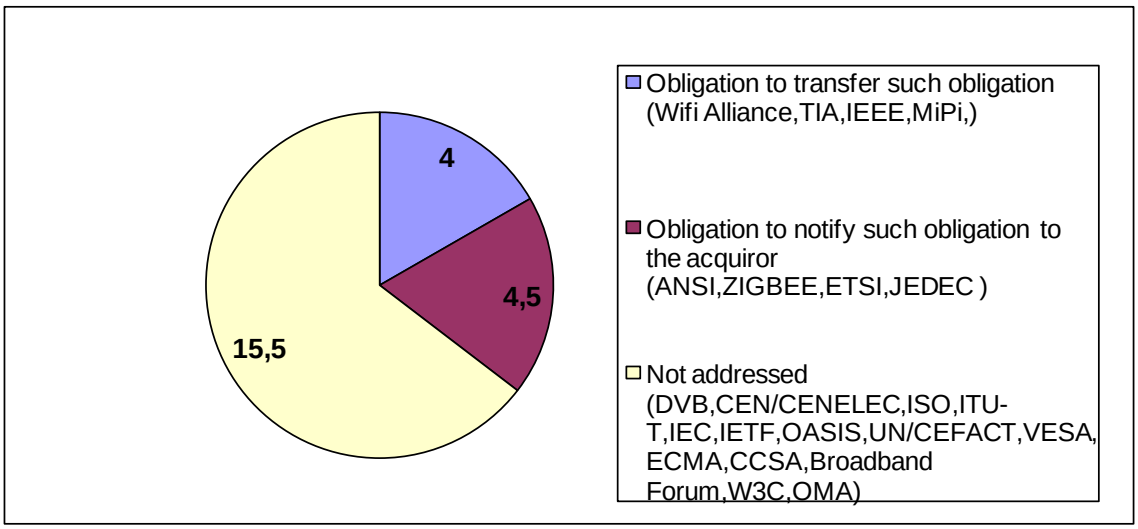
Figure 5-11: Disclosure of licensing terms




The disclosure of licensing terms as a way to increase transparency on royalties and potentially more competition on such royalties is a very recent trend with ETSI and IEEE leading here with recent changes of their IPR policies adopted. Here, we can notice that many SSOs have not yet followed their paths while only one is actually expressing prohibiting such disclosure.

Very recently, the IP.Com situation illustrates the issues which may occur through the assignments of essential patents to non-members of an organisation. There is indeed a question whether a company acquiring a patent will be bound by the commitment made by the original owner of the patent towards a standard organisation, e.g. I contribute a patent to a standard organisation on a royalty-free basis, I sell this patent to a third party and will such third party be bound by the original commitment? We looked at specific provisions in our sample of IPR policies.

Figure 5-12: Transfer of essential patents to a third party




Only a very small number of IPR policies are including a clear obligation for any member transferring some of their essential patents to ensure that the transferees will be bound by the licensing obligations of such member. Another small number is simply asking to their member to notify the existence of such commitment made by the member about such patent. Finally, the majority of the IPR policies are silent on this point.

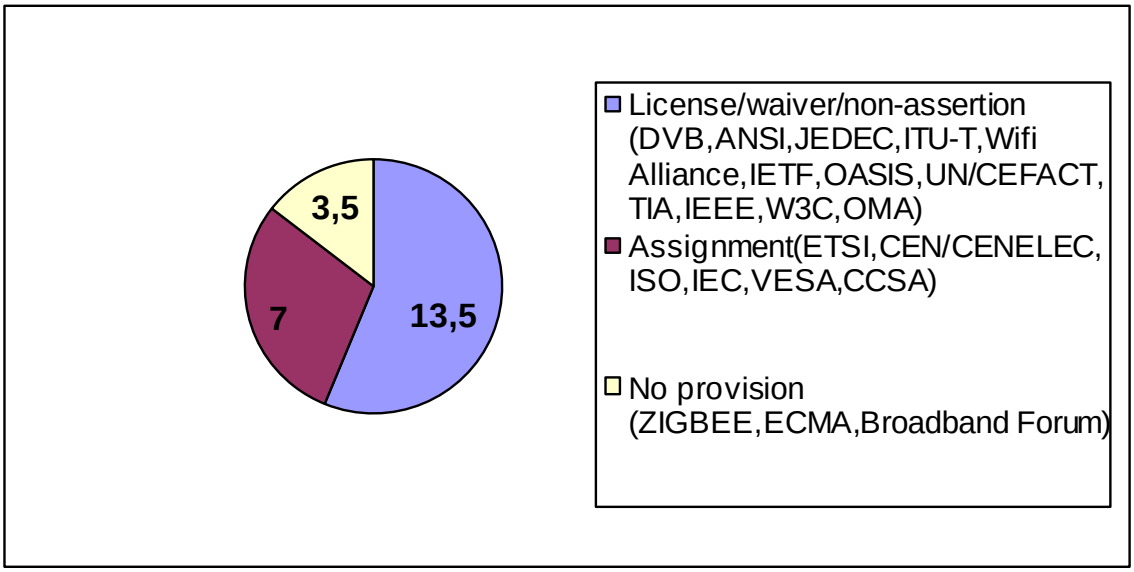
Finally, we looked at their relationships with patent pools and we only found two SSOs mentioning patent pools in their IPR policies and then promoting them to a certain extent (DVB, ZigBee) and IEEE has set up a partnership with Via Licensing, a patent pool agent, to investigate further opportunities.[39].

### 5.2.3 Copyright licensing

We decided to investigate also the copyright provisions considering the increasing discussion about potential software implementation of various standards.

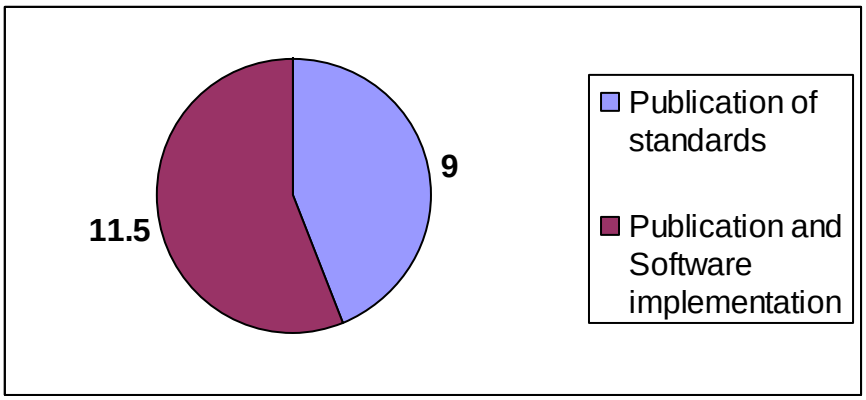
39 See the press announcement : http://standards.ieee.org/announcements/patentlicensingprograms.html

Figure 5-13: Copyright provisions



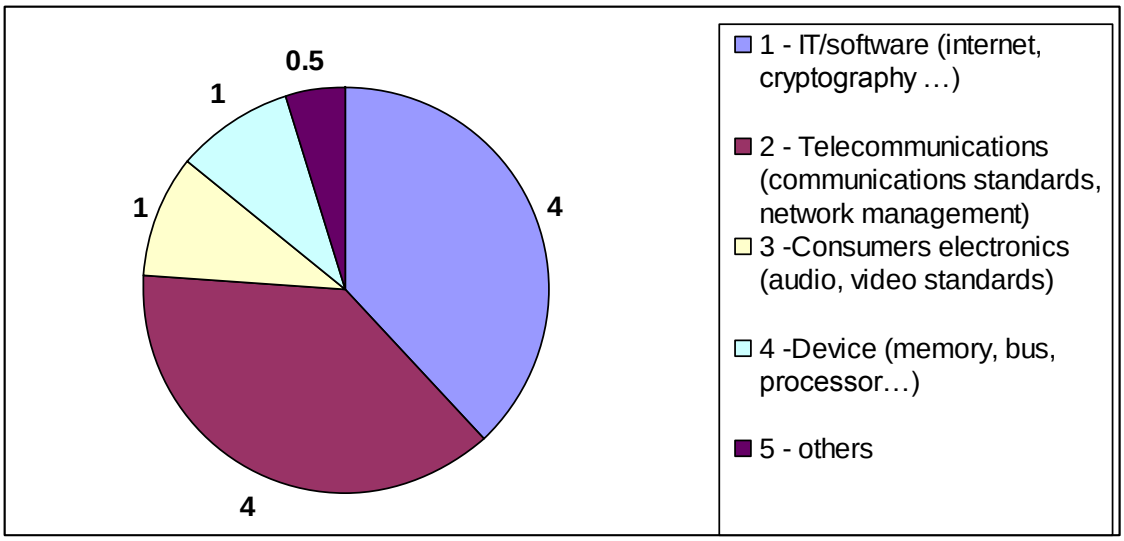

Only a very limited number of organisations have no provision related to copyright, most of them organising it through licensing and/or non-assertion vs. assignment.

Figure 5-14: Scope of the licensing/assignment of copyright




The majority of the IPR policies we analyzed are imposing a scope sufficiently broad to cover both publication of the standards, the very traditional activities of SSOs, but also allowing software implementation of such standard/specification and/or the inclusion of copyrighted software into standards (e.g. the ITU-T IPR policy is only covering such aspect).

Figure 5-15: Technical fields of IPR policies including copyright license/assignment for software implementations




Interestingly, we found IPR policies including licensing arrangement for software implementation and/or the inclusion of copyrighted software into the standard in all technical fields and not only in IT/software. Another interesting observation is the strong presence of telecommunications there.

### 5.2.4 Conclusions

While the limitations of such study need to be emphasized again, such work being made only on a sample of IPR policies and not taking into account the importance of any SSO in terms of standards/specification production and/or the economic impacts of such standards/specifications, these data may be helpful to illustrate certain trends and/or potential issues to be addressed:

- About patent disclosure, a balanced approach seems to have been found with strong requirement to disclose all essential patents related to the standard/specification (and not limited to those related to the contribution) tempered by a disclaimer that no corporate search is required and/or a limitation of such obligation to individual/members participating to the working group.
- About patent licensing commitments, it would been interesting to raise awareness within SSOs, consortia and fora about certain results related to the irrevocability of the licensing commitment, the geographical scope, the definition of reciprocity, the transfer to a 3rd party of essential patents to collect further thoughts about their importance in the context of their IPR policies and investigate further whether they should consider evolutions of such policies.

- About the copyright licensing commitments, it is interesting to notice that some IPR policies have already comprehensive policies addressing all aspects, including software implementations and/or inclusion of copyrighted software into a standard.

## 5.3 Standards and IPRs: Views and trends

### 5.3.1 Methodology

Based on a review of industry, SSOs and other stakeholders' contributions in recent debates on standards and IPRs[40] and in consideration of the results of the literature review (Chapter 2), the database analysis (Chapter 3), the company interviews and survey (Chapter 4) and the IPR policy analysis (Section 5.2), we drew up a list of stakeholder views and trends.

We identified trends and views in the following categories:

- voluntary, market-led standardisation
- (F)RAND predictability
- IPR licensing efficiency
- dispute resolution
- open standards and open source software
- standards and copyright
- standards and trademarks
- standardisation and prior art
- referencing standards in legislation, public policies and public procurement
- government intervention in standardisation

Goal of our review is to present a structured overview of standardisation stakeholders' views and trends on IPR-related issues. We have aimed to proceed objectively, listing

40 Including contributions to the November 2008 and 2010 DG Enterprise workshops on ICT standards and IPRs; the public consultation on the Commission White Paper on ICT standardisation policy; the public consultation on Revised Rules for the assessment of horizontal cooperation agreements under EU competition law; recent EU and international policies and initiatives; literature; case law; other relevant public information.

for each view its source, rationale and counter-arguments. We do not evaluate the merit of arguments in favour or against a view or a trend

The resulting list of stakeholder views and trends is part of the study's input to the overall assessment of study findings and recommendations. Annex V provides the complete and detailed overview of our findings.

Our research revealed many divergent views and opposite trends, thus demonstrating the complexity of the landscape and different views from standardisation actors with competing business models and interests. Yet we identified some overarching, major trends or possible prospects for future developments in the interplay between standards and IPRs, as well as areas of divergences and open questions.

In the sections below, we present and discuss major trends, divergent views and open questions. Please refer to Annex V for the complete overview of stakeholders' views and trends revealed in our research.

## 5.3.2 Major trends

### 5.3.2.1 IPRs in standards is reality

IPRs, especially patents, in standards are reality in particular in information and communication technologies driven industry sectors.

Various SSO IPR policies prevail for various sectors and standards, but they are all voluntary, market-driven and set by standardisation stakeholders. SSOs IPR policies include: non assertion; RAND-RF; RAND; RAND-Z (= zero royalty).

Although there are certain similarities, each SSO IPR policy is different as decided by its members. Different industry sectors and standardisation projects tend to adopt different rules. IPR policies often balance competing interests of standardisation actors following different business models.

While some stakeholders indicate or promote clarifications or evolutions, there is overwhelming consensus to maintain the voluntary and market-based setting of SSOs IPR policies and avoid changes that would lead to commercial issues, like price fixing in SSOs.

A broad range of stakeholders expressed support for (F)RAND including RF policies as providing an adequate balance between the interests of technology innovators and standards implementers. Some qualified (F)RAND policies and adequate compensation for essential IPRs as conditions for companies inventing in innovative technologies

to participate in standardisation. IPR holders stressed the importance to protect IPRs also in the context of standardisation, in Europe and abroad.

According to many views, different situations require different solutions: reality is SSOs do and should continue to follow different IPR policies that correspond to market and competition requirements, as determined by their members. Among the formal SSOs, the common ISO-IEC-ITU policy is providing a general guideline. Stakeholders are generally content with the state-of-play while indicating trends or seeking developments on certain aspects of SSOs IPR policies. Some stakeholders advocate in favour of a broader level of harmonisation.

#### 5.3.2.2 Clear and binding SSO IPR policies

There is agreement in principle among standardisation stakeholders that SSO IPR policies have to be clear and binding.

Sufficient clarity is necessary for actors to invest and participate in a standardisation project, and for competition authorities to determine the a priori pro-competitive nature of a policy. At the same time, many caution about the need to maintain sufficient flexibility and uphold contractual freedom.

It is further undisputed in principle that IPR policies should be binding on members of an SSO or participants in a standardisation project. Standardisation being a voluntary undertaking, the inapplicability of IPR policies to non-members is tempered by incentives to participate in standardisation, including benefits arising from a technology included in a standard and the prospect of royalties.

Stakeholders welcome SSO cooperation with competition authorities, including to provide, at the request of an SSO, an a priori assessment or guidelines with respect its IPR policy, but also observe that a posteriori monitoring of, and when required intervention against anti-competitive practices, will still be required. Several stakeholders further caution about the importance of the indicative rather than prescriptive nature of such guidelines, so as to allow and encourage different terms and conditions in different situations and the evolution of SSO IPR policies in response to new market demands, provided their application does not result in anti-competitive effects.

#### 5.3.2.3 Up-to-date and searchable IPR databases

Up-to-date and searchable SSO IPR databases are useful tools in support of the transparency of standardisation. But several sources emphasize such databases' limita-

tions, given licensing occurs outside SSOs and SSOs do not and cannot assume any liability for essential IPR searches and determination.

To the extent SSOs operate IPR databases, these should be up-to-date. Some level of cooperation between patent offices and SSOs to help improve the quality of SSO IPR databases is generally welcomed, especially by SMEs who often lack the resources to conduct expensive patent searches.

#### 5.3.2.4 Voluntary ex ante disclosure of licensing terms

Many consider that SDO IPR policies have found ways to balance competing interests in ensuring appropriate IPR disclosure, and that the promotion of ex ante disclosure is neither required nor warranted. Other views call for additional incentives to disclose essential IPRs before a technology is chosen for a standard.

Stakeholder views diverge as to whether SSOs should adopt a mandatory requirement to disclose licensing terms ex ante, i.e. before a standard is adopted. Standards implementers tend to favour such a mandatory requirement; IPR owners indicate they might not participate in standardisation projects subject to mandatory ex ante disclosure rules. Only one SSO (VITA) adopted such mandatory rules.

On the other hand, stakeholders and competition authorities generally concur about benefits of SSO IPR policies providing for the voluntary ex ante disclosure of licensing terms, as e.g. adopted by ETSI. Some stakeholders point to the practical limitations of such rules, considering licensing terms often can only be established ex post i.e. after the standard is adopted.

#### 5.3.2.5 Licensing options

The licensing of IPRs essential to implement standards occurs through a wide range of different mechanisms, including patent pools, cross-licensing, technology auctions, non-assert commitments and frequently as part of larger business transactions. Different licensing mechanisms are adapted to and used in different situations. Stakeholders generally welcome these options and point to a dynamic environment with innovative business solutions in response to market demand.

Royalty Free licensing offers an alternative to IPR licensing involving the determination of a reasonable royalty for using technology essential to implement a standard. Whereas stakeholders agree on the benefits of the Royalty Free model for certain standards (e.g. most W3C standards), only a limited number of stakeholders advocate in favour of requiring SSOs to follow RF only policies. Most views concur that RF – in

fact a subset of (F)RAND – is and should continue to co-exist with (F)RAND, and the market is best placed to choose the model for a given standardisation project.

Participation based models, i.e. SSOs requiring their members to license any essential IPRs safe opting out, is yet another alternative favouring IPR clearance in certain situations. Participation-based models should continue to coexist with disclosure-based models.

#### 5.3.2.6. Quality patents and global perspective

It is undisputed that a well functioning patent system resulting in quality patents benefits standardisation, whereas a dysfunctional system granting patents that should have been rejected has a damaging impact.

The European patent system is generally considered to offer among the best quality patents globally, but could be further improved. In particular, the introduction of the Unitary EU patent would contribute to a more efficient and cost-effective system, thus also facilitating the protection and licensing of IPRs in the context of standardisation, especially benefiting SMEs.

Further harmonisation of patent law and systems at the international level could equally benefit standardisation, considering the territorial scope of standards is increasingly global.

The globalisation of standardisation and stakeholders views suggest a global perspective to the interplay between standardisation and IPRs, including in response to increased participation by and competition from stakeholders from emerging markets, protection of European IPRs abroad and the role of international organisations.

### 5.3.3 Divergent views and open questions

#### 5.3.3.1 The meaning of “(F)RAND” and “essential”

Whereas especially standards implementers favour further clarifying SSO IPR policies concepts and terms such as “(F)RAND” or “essential”, others observe that in practice it is more often than not impossible to determine IPR licensing terms and conditions before a standard is sufficiently developed and implementation conditions are known.

In practice, the relatively rare disputes are either settled or subject to litigation. In some cases, parties have opted to submit their dispute to mediation or expert determination, which offer useful alternatives to court proceedings, but by their confidential nature do not contribute to publicly available jurisprudence.

#### 5.3.3.2 Transferability and geographic scope of (F)RAND licensing commitments

Several sources point to likely grey zones in the predictability and enforceability of SSO IPR policies in cases of IPR transfer to a third party not member of the SSO and with respect to the geographical scope of licensing commitments.

These issues were manifested in recent disputes, but are generally considered to be solvable by SSOs and the market. Some suggest increased cooperation with patent offices, possibly a public register of standardisation-related IPR licensing commitments.

#### 5.3.3.3 SSO cooperation with patent offices

Beyond a possible role in assisting SSOs with updating and improving their IPR databases, patent offices are interested in cooperating with SSOs also in identifying prior art revealed in standardisation projects before a patent is granted. Yet no clear scenario of how this would work in practice has emerged from our research.

Whereas some welcome such efforts as a contribution to improving the quality of patents, others question whether SSOs should engage and assume the costs of tasks under the responsibility and authority of patent offices.

#### 5.3.3.4 Patent law evolution

Beyond the positive correlation between quality patents, the Unitary EU patent and international patent harmonisation, some stakeholders refer to the debate in the US about injunctions in the context of standardisation, and welcome recent case law according to which injunctive relief is possible but not automatic.

Some consider once a (F)RAND licensing commitment is made, injunctions should no longer be available, or else the implementation of standards is at risk. They suggest a possible “license of rights” regime, to complement the existing patent system with an optional regime affording the right to RAND compensation but not to authorise or prevent the use of a patent. Others doubt such a regime would be used, are concerned about a possible erosion of patents, and suggest to focus on improving the existing system and favouring market-based solutions. Some European governments further intervened through domestic innovation and/or government procurement rules requiring IPR free or below market licensing for government mandated standards.

Since China is meanwhile making strong progress in investing in research and development, increasing its domestic, but also international patent applications and finally expanding its engagement in international standardisation bodies, we have to be aware

of China's policy initiatives related to the interaction between IPRs and standards. Consequently, the "Draft Regulation for the Administration of the Formulation and Revision of Patent-Related National Standards" published in 2009 has to be mentioned explicitly. This initiative proposes in Article 9 that a patentee agrees "to license its patents only either on a RAND-RF or amount of royalties paid must be significantly lower than a normal royalty. Furthermore, it allows the option of a compulsory license if patents are unavoidable for the implementation of compulsory national standards.

## 5.4 Summary of the legal analysis

The legal analysis generated and contributed to a comprehensive overview of SSOs' IPR policies (Task 4 of the Terms of Reference), an analysis of the consensus making and disputes in standardisation processes related to IPRs (Task 3) and the identification of the main issues to be addressed by private and public stakeholders in order to improve the interplay of standards and IPRs (Task 5).

# 6. Areas for Future Actions

Before we address the areas that should be addressed by policy makers, SSOs and the stakeholders from industry in the future, we summarise the main results of the fact finding study.

The database analysis has revealed a very strong concentration of patents, as the most and mainly only important IPR, in several hundreds of standards focusing on specific technologies, i.e. mainly ICT with wireless communication, owned by very few companies, which are mostly large players and some selected SMEs incl. NPEs. Surprisingly, we observe a slightly decreasing inclusion of patents in standards in contrast to perceived general growing importance of patents. An extension of the phenomena to other fields outside ICT is mainly driven by ICT in other sectors, like cars, energy, and health, whereas only single other cases can be observed. However, more companies due to the globalisation of R&D and organisations, like research organisations and NPEs, have entered the game.

Currently almost only patents are relevant. Nevertheless, possible extensions to other IPRs, like copyright in the software area, might play a more prominent role in the future, but already addressed by some SSOs. However, further SSOs are currently discussing the inclusion of software in standards and also the implementation of such standards through software.

Owning essential patents is - like protecting IPR in general – important and even crucial for some of the companies, but serves multiple purposes like securing freedom to operate and signalling own technological competencies besides generating licensing revenues. The access to essential IPRs is mainly realised via cross-licensing, but also via general licensing-in and patent pools, whereas other forms are rather exceptions and have not become more important recently. Specifically in the information technology, firms that hold IPR simply do not assert others, expecting not to be asserted themselves in turn. In general, it is difficult to assess the value of essential patents or the exact terms (including licensing fees), on which they are licensed.

On average the perception is that royalty-free regime may facilitate the standardisation process and the implementation of such standards, but that FRAND-based regimes provides IPR owners with stronger incentives to invest in R&D, to patent and to contribute to standardisation. There is a broad agreement that the system works, but a balance for licensing conditions has to be found for certain IPR sensitive standards.

Looking at the rather heterogeneous IPR policies of SSOs, IPR owners perceive no significant differences. However, standards users without IPR are general comfortable with the policies of informal SSOs.

Overall companies expect SSOs to improve transparency, but not necessarily to extend their activities regarding IPR in general. It is important to note, however, that SSOs should take care of implementation problems already in the standardisation process on a voluntary and member driven basis.

Disputes about IPRs in standards are an exception, but might increase due to more players, transfers of IPRs and heterogeneous IPR regimes. However, these disputes are often not specific to standardisation and are generally settled between the parties. Consequently, a direct involvement of governments is not perceived as solution, e.g. imposing a mandatory ex ante disclosure of licensing condition is not perceived as being helpful by the telecommunication industry, but favoured by parties in other industries. Exertion of indirect influence of governments via public procurement and legislation is controversial among companies, but considered by governments. However, there is a general perception confirmed by our study findings that issues with patents and standards are often the consequence of litigious patents, thus there is a positive correlation between a well functioning patent granting system and minimizing issues with IPRs in standards.

In the following we differentiate the area of actions according to general legal frameworks and policies, SSOs IPR policies and implementation issues.

## 6.1 General legal frameworks and policies

The globalisation of actors and technology convergence require a global perspective on the interplay between IPRs and standardisation.

Firstly, the improvement of the quality of granted IPRs, especially of patents, is also beneficial for the interplay between patents and standardisation. The harmonisation of the patent system in Europe via the introduction of the European patent, but also worldwide especially involving the Asian countries with strongly increasing patenting activities via additional alignment efforts would also improve the quality of granted IPRs.

The enforcement of IPRs in the context of standardisation should not be treated differently than IPRs without a link to standards. Consequently, no special enforcement rules are required in the field of standardisation; e.g. no compulsory licensing provisions like discussed in China and an adequate and proportionate but no automatic injunctive re-

lief. However, progress in achieving legal certainty in case of transfer of IPRs subject to a FRAND licensing commitment has to be realised.

Finally, the publication and cataloguing of European and foreign case law on IP and competition policy rulings related to standardisation should be established to improve transparency.

## 6.2 SSOs IPR policies

Besides general public policies, SSOs IPR policies have to be considered as possible area for action. However, EU policies should continue to promote voluntary, market-led standardisation, whereas IPR policies should be set by the SSOs themselves.

Competition policy guidelines should provide safe harbours for SSO IPR policies, while supporting flexible and different approaches provided these do not result in anti-competitive behaviours. Furthermore, a variety of business models and licensing options should not be restricted, but supported.

Without interfering in the voluntary, market-driven nature of standardisation, non-prescriptive SSO best practices in the following areas should be encouraged:

- reasonable incentives for good faith IPR inquiries;
- timely and precise disclosure of essential IPRs under participation-based models;
- reliable and accessible IPR databases;
- irrevocable and worldwide applicable licensing commitment;
- rules to address the transfer of essential patents to third parties;
- copyright, also including open source aspects, and trademark licensing guidelines.

## 6.3 Implementation issues

Even after improving existing IPR policies of SSOs, there is some room for improvement in the actual implementation of general and SSOs IPR policies.

At first, the transparency, completeness and actuality of the IPR databases have to be improved and assured. Consequently, the started cooperation with patent offices should be continued and improved. When appropriate and in the mutual interests of SSOs and patent offices, voluntary company and SSO cooperation with patent offices

should also be promoted in identifying essential patents and prior art. Due to obviously existing delays related to some of the IPR disclosures, guidelines should be developed, implemented and enforced, which encourage IPR disclosure as early after the initiation of standardisation processes, but also not restricting the selection and choice of the most appropriate technological opportunities. In this context, general statements on IPR disclosures should only be allowed, if they are followed by explicit declarations in a timely manner, because general statements do not provide precise information, but increase only insecurity and additional efforts among those involved in standardisation processes and those interested in implementing the standards. Finally, the IPR owners should be encouraged to update their submitted information.

At second, it should be ensured that given licensing commitments should also be enforced. Here, it makes sense to collect systematically feedback from standards implementation in order to detect possible problems and conflicts.

Finally, the special situation of SMEs should be acknowledged by the promotion of measures to support SMEs developing, protecting, identifying and licensing IPRs in the context of standardisation without interfering in the voluntary, market-driven nature of standardisation.

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# Annex I: Technical Guide about Database Analysis

***Rudi Bekkers, Jurgen Verwijen***

This annex provides additional information on how the database for the Quantitative Study of Essentially-claimed Patents (Chapter 3) was prepared.

Patent declaration databases, as made available by SSOs, are the most tangible manifestation of IPRs in standards. Yet, however attractive as a data source, they need careful consideration and extensive processing in order to be used for analysis. Our overall goals was to create a database of all disclosed EPO or USPTO patents that could be properly identified, and link these to the EPO/OECD PATSTAT database, one of the most comprehensive patent databases currently available. Given this goal, we have not considered 'blanket claims'.[41] The selection of SSOs and the various data sets we have created have already been introduced in Chapter 3.

Below, we will discuss the steps we followed in detail:

1. Retrieving data from the IPR databases provided by the SSOs
2. Identification of patent identity
3. Matching data with the PATSTAT database
4. Determining the patent owner and name cleaning
5. Determining the relevant standard
6. Addressing overlap
7. Collecting additional data for the claimants

### Retrieving data from the IPR databases provided by SSOs

The source databases which we have used do have a rather different formatting. These differences are sometimes related to legal differences between the IPR regimes, or to the different concepts of what 'disclosure', 'declaration' or 'claims' exactly means. While all SSOs have their information structured in what can be called 'records', some of these records may include multiple patent identities, others not, some records may refer to more than one standard, other not, some records are associated with 'FRAND'

41 Blanket claims are declarations that do not provide any specific patent identity but merely state that the firm believes to own essential patents and/or states that firms would license at RAND conditions should it own essential patents

commitments per default, others not, et cetera. Some SSOs provide web search engines; others list tables on their web pages, while others again provide their information in (sometimes huge numbers of) of PDFs.

Below we provide a brief description of the way we retrieved data from the various SSO databases and how we processed that data in order to include it in what we call our 'source database', which includes the raw (uncleaned) data.

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| **Broadband forum** | **General description.** The Broadband Forum offers an online list of IP declarations provided to the Broadband Forum. It does not ensure the accuracy or completeness of the IP declarations. Each declaration has been scanned and put online in the form of a PDF. This online list consists of a number of (relatively limited amount of) links to these PDF's.<br><br>**Source URL.** The list with the links to the separate IPR disclosures is available at http://www.broadband-forum.org/technical/ipdeclarations.php . We retrieved the data on February 14th 2010.<br><br>**Available data.** The Broadband Forum data consists of a set of 'declarations', which take the form of a scanned PDF file, typically referring to one or more specific patents. Each declaration is identified by its owner and by the submission data; some companies have submitted multiple declarations over time. Given the nature of the data, we needed to analyze each PDF manually, but since there only were 24 declarations in total this was feasible. For each declaration, we extracted the patent number (or numbers, if more than one) and identified the relevant standard, by using the 'DSL Forum report or working text' field. The resulting data was added to our source database. |
| **CEN/CENELEC** | **General description.** Standards bodies CEN and CENELEC together maintain one list of patent declaration they received. This list consists of a PDF document including a table with the declarations. CEN and CENELEC give no guarantee with respect to the completeness or correctness of the information supplied.<br><br>**Source URL.** The data is available from ftp://ftp.cenorm.be/CEN/WorkArea/IPR/Patents.pdf. The data was downloaded on February 14th 2010. The version of the retrieved document was dated December 14th 2009.<br><br>**Available data.** The table in the PDF has three 5 patent fields: date, company, the technical body the declaration concerns and patent number. Because of the size of this source, the data was sorted en converted manually. There are thirteen claims, including seven blanked claims. The latter were ignored as well as one claim only mentioning a non-US/non-EP patent. One of the remaining claims concerned two patents, which did not point back to the same invention. This declaration was therefore split up into two separate records in our database. The data in the 'technical body'-field was used in our database for the name of the standard. The resulting data was added to our source database. |
| **ETSI** | **General description.** ETSI offers and advanced web-based access to its IPR database. Like many other SSO's, it explicitly mentions that '*the present database provides data that is based on the information received. ETSI has not checked the validity of the information, nor the relevance of the identified patents/patent applications to the ETSI Standards and cannot confirm, or deny, that the patents/patent applications are, in fact, essential, or potentially essential. No investigation, or IPR searches, have been carried out by ETSI and therefore no guarantee can be given concerning the existence of other IPRs which are, or may become, essential.*'<br><br>**Source URL.** The ETSI IPR database is available at http://webapp.etsi.org/IPR/home.asp. We retrieved the data on February 14th 2010.<br><br>**Available data.** The ETSI database allows searches on the basis of a number of criteria. Our starting point was a search that did not include any limiting criterion, thus downloading all existing records (and we take into consideration that this will lead to certain types of overlap that later need to be dealt with). While it was appealing to use the ETSI-provided 'Country or Registration' and |

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| | 'Countries Applicable' filters, we decided against doing so because earlier tests shown that there quite a few records that in fact listed USPTO or EPO patents yet did not have the corresponding countries in either field. We downloaded all records, without the use of these filters, and on the basis of the provided patent identification (using available prefixes and sometimes recognizing the number formatting and ranges – and double-checking these in external databases) we determined whether the claim referred to US or EPO patents.<br><br>The ETSI database includes 'project' definition. In total, 95 different project names appear. While being quite useful, we felt that is was appropriate to group a number of such projects. More specifically, we used the following groupings:<br><br>GSM (including the following project identifiers: 'GSM'; 'GPRS'; 'GSM - Release 7'; 'GSM/AMR-NB'; 'DCS 1800')<br>UMTS ('UMTS'; '3GPP'; '3GPP/AMR-WB+'; '3GPP/AMR-WB'; 'UMTS/CDMA'; 'UMTS Release 8'; 'UMTS Release 7'; '3GPP Release 7'; 'WCDMA'; 'UMTS FDD')<br>LTE ('LTE'; 'LTE Release 8')<br>DVB ('DVB'; 'DVB-H'; 'DVB-SH'; 'DVB-T2'; 'DVB-S2')<br><br>The resulting data was added to our source database. |
| **IEC** | **General description.** Standards body IEC maintains one list of patent declaration they received. This list consists of an excel file or PDF document including a table with the declarations. IEC Central Office makes no guarantee as to the completeness or correctness of the information supplied. However, if information is not included (for example, the patent number, or the IEC standard concerned), one has to assume that the information is not available.<br>**Source URL.** For the IEC documents, we used the database under http://patents.iec.ch/.<br>**Available data.** The data includes the date of declarations, the company, the committee, the related IEC Standard and the patent number. We screened the PDFs for the patents numbers. If an EP patent was found, the last column contains the corresponding application number (format: EP - four-digit year - seven digit application number: EPYYYYXXXXXX) If no EP was found, the corresponding EP application number was searched in INPADOC patent family via espacenet. This is what you find in the last column (appnumber). The file contains all declarations for which we could identify EP applications, but this closely covers all declarations. The resulting data was added to our source database. |
| **IEEE** | **General description.** The IEEE Patent Committee (PatCom) provides oversight for the use of any patents and patent information in IEEE standards. It lists IEEE Standards for which Letters of Assurance (LOA) have been received from patent owners in accordance with its Patent Policy. On https://development.standards.ieee.org/myproject/Public/mytools/mob/flowchart.pdf, an informative flowchart of the procedure is available.<br><br>**Source URL.** IEEE IPR declarations were extracted from http://standards.ieee.org/db/patents/index.html on February 14th, 2010 (Note that this URL was later changed to http://standards.ieee.org/about/sasb/patcom/index.html and http://standards.ieee.org/about/sasb/patcom/patents.html).<br><br>**Available data.** IEEE provides 14 HTML-formatted tables, that each lists patent declarations for a certain 'group' of standards (for instance: "IEEE Stds C37.60 - C57.127". The following tables consists of the fields 'Std No.', 'Patent Owner', 'Contact for license', 'Patent Serial No', 'Letter Date', and an indication whether the assurance is received. For a given record, the 'Patent Serial No' field often mentions multiple patents. Different from the situation at some other SSO's, these patents may refer to different, unrelated inventions. These different patents/inventions refer to the same standard, though, and share the same letter of assurance (LOA), if given. Some firms provided multiple records (and thus multiple LOA's) for one single standard, though. All HTML-tables have been imported and integrated into one spreadsheet. The first subsequent step was to filter out all records that contained no references to identifiable patents. Subsequently, all records were selected that referred to USPTO or EPO patents. The records with more than one patent or application number were then split up in separate records. From the available HTML-tables, 789 raw records could be retrieved. After processing, we extracted 690 US publication numbers and 103 EP publication numbers. The resulting data was added to our source database. |
| **IETF** | **General description.** The IETF website has a special page for IPR disclosures. It 'provides a mechanism for filing disclosures about intellectual property rights (IPR) and for finding out what IPR disclosures have been filed'. The IETF also states that it 'takes no position regarding the |

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| | validity or scope' of the IPRs disclosed. The page contains three separate HTML-tables. One for 'Generic IPR Disclosures', one for 'specific IPR Disclosures and one for 'third party disclosures' (the latter is rather unique for SSO). Each record in the tables corresponds with a disclosure and hence has a 'date submitted', an ID# and a 'Title of IPR Disclosure'. The latter is also a link to a separate page with the literal disclosure and licensing declaration as received by the IETF from the disclosing organisation.<br><br>**Source URL.** The page for IPR disclosures mentioned above is available at https://datatracker.ietf.org/ipr/. This page has links to more than 600 separate pages with disclosures, and while these underlying pages do share a certain structure, the actual information provided by the patent holders displays wide diversity and requires full manual processing. We retrieved the IETF data on April 20th 2010. We contacted IETF to inform whether there is a more accessible database available. Unfortunately this was not the case.<br><br>**Available data.** As mentioned above, the records in the three tables contained links to the literal letter as received. As a result the possible patent numbers are somewhere 'hidden' in the text of each separate letter. We only considered declarations that were made by the patent holder and did not include 'third party' declarations: while this category is interesting; these patents are not claimed by their respective owners and is thus outside the scope of our analysis, which is about claimed patents.<br>The 'generic disclosures' were relatively low in numbers, so each page has been studied individually. This was not a feasible route for the 'specific disclosures' because of the large number of such records (1009 individual letters). To overcome this problem, we developed a 'spider' that automated the loading of each individual page referred to in the 'specific' table and that put the contents in a database. This spider was made to recognize specific, harmonized page elements in the IETF web pages and output that data in separate database fields. Unfortunately, this worked for 333 pages only. In the remaining 676 pages, patent numbers were often 'hidden' in some other text elements on the pages while the appropriate patent number field was left empty. We studied these 676 pages manually and extracted the relevant patent numbers. After these steps, records were split if they contained references to more than one patent. The resulting data was added to our source database. |
| **ISO** | **General description.** ISO has two Patents 'databases' online. It distinguishes between ISO/IEC JTC 1 patents and all others. It states that it holds all applications as they were notified to the ISO Central Secretariat by patent holders. It furthermore states that it "not verified the veracity or accuracy of the information nor the relevance of the identified patents/patent applications to ISO Standards."<br><br>**Source URL.** ISO Patents database (without ISO/IEC JTC 1 Standards): http://isotc.iso.org/livelink/livelink/fetch/2000/2122/3770791/ISO_Patents_database_(without_JTC1_Standards).html?nodeid=4630277&vernum=-2; ISO/IEC JTC 1 Patents database: http://isotc.iso.org/livelink/livelink/fetch/2000/2122/3770791/JTC1_Patents_database.html?nodeid=3777806&vernum=-2. Both databases were downloaded in February 14th 2010. We contacted ISO whether any additional data was available. A reply from an ISO representative pointed out that this was not the case.<br><br>**Available data.** The ISO data is made available as HTML-documents with distinct (HTML) tables for each record of the database. These records correspond with the claims (having a unique identifier: 'ID Number') as received by the ISO. Some records are related to each other and have the same 'ISO document reference'. Records hold furthermore, amongst others, fields for committee reference and title (the actual ISO standard the claim concerns), organisation of applicant, contact information, license declarations (e.g. RAND), patent information (#, status, version, country and date). Investigation pointed out however that all patents within one record, all relate to the same invention. The HTML-file was imported in Excel. Using some tailored coding, the data was converted into a usable format. From the ISO HTML table we were able to extract 245 raw records, and from the JTC HTML table we extracted 1963 raw records. The next step was to remove all claims that hold no patent number at all (blanket claims). Subsequently, we selected only those records that had a patent number starting with a 'US' or 'EP' or that have the value 'US' or 'EPO' in the 'Patent country' field. The final step was to transform the remaining patent numbers and patent application numbers into a harmonized format (removing spaces, commas or semicolons, etc.). Because each ISO record refers to a single invention, we took one patent number in case more than one US or EP patent number was available in the 'patent number'-field. In total, we were able to identify 61 US patent numbers and 17 EPO patent numbers from the ISO database. From the |

| | |
|---|---|
| | JTC database we identified 393 US numbers and 83 EPO numbers. Eventually the data in the field 'committee reference' was used for the standard's name in our database and the field 'Organisation' was used to describe the Patent holder. The resulting data was added to our source database. |
| **ITU** | **General description.** The ITU discloses the patent declarations they receive by means of an advanced online interactive database search system.<br><br>**Source URL.** ITU IPR declarations were extracted from http://www.itu.int/ipr/IPRSearch.aspx?iprtype=PS on February 14th, 2010.<br><br>**Available data.** The total number of published claims (2230) worldwide was determined by querying the database without any conditions. There were 950 publication numbers and 473 application numbers among the 2230 records. In the query output each record represents at maximum one patent. In other words, there were no multiple patents per declaration. However, in one single record two distinct EP patents were referred to. They were processed by splitting them up in two. One record had a publication as well as an application number. All other records neither had a publication nor application number and therefore had an empty patent number field. Because of the quality of the query tool of the online database, we used the database by creating queries to filter out the US en EPO records. All filters were set to 'not specified' or 'All'; only Patent Country was set to either 'European Patent Office (EPO)' and 'United States'. In the query output there was a 'Patent Number' field as well as a 'Patent Application Number' field. The data in these fields were not consistently formatted however. By alphabetically sorting the data, we could identify groups of patent numbers with similar formats. These groups could then be processed through tailored coding techniques into the final patent number format. Some publication and application numbers could however not be converted into usable patent numbers. The database queries returned 179 (126 publication numbers + 53 application numbers) EPO records. After processing we were able to retrieve 170 usable publication numbers. With the US query we found 764 (591 publication numbers + 172 application numbers + 1 record without any numbers) records, from which we were able to retrieve 581 usable patent numbers. We used the data in the field 'Recommendation No.' for the name of the standard and the field 'Organisation' for 'Patent Holder'. The resulting data was added to our source database. |
| **OMA** | **General description.** The Open Mobile Alliance maintains and makes publicly available lists of IPR declarations that it receives from its members as a result of the members' agreement to use reasonable endeavours to inform OMA of Essential IPR as it becomes aware of it. OMA gives no warranties regarding any of the IPR with respect to the accuracy, completeness, validity, applicability or relevance of the information or whether or not such rights are essential or non-essential.<br><br>**Source URL.** The OMA provides a publicly available page with links to separate pages with the declarations in HTML-tables. The declarations are grouped alphabetically by organisation over the different pages. The list with the links is available at http://www.openmobilealliance.org/AboutOMA/IPR.aspx. The declarations were downloaded February 14th 2010.<br><br>**Available data.** Each declaration has a 'declaration date', the 'countries applicable', 'specification reference' (name of the standard), 'patent #', 'appl #', 'country/province', 'title' and 'company'. One single declaration can concern multiple standards as well as multiple patents. In the majority of the cases a declaration relates to one patent and one standard. In other cases retrieving all different patent numbers was our main goal. All non-EU and non-EP publication or application numbers were filtered out. A total number of 561 declarations served as input. From these declarations we were able to extract 48 EP publication numbers and 178 US publication numbers, plus a number of application numbers. |

## Identification of patent identity

Each patent office has its own way of numbering publications, be it applications or patents. This is reflected in the data that is provided by the patent owners, which is a mix of 'real' patent numbers, publication numbers of patent applications, and serial numbers of applications (which are not necessarily published). On top of this, the information provided by the patent owners varies enormously in completeness, formatting, and consistency, and numbers were regularly listed in the wrong field (e.g. patent number in 'application number' field). As a matter of illustration, we provide a random set of USPTO-related patents as we found them in the ETSI database:

| Country of registration | Application No. | Publication No. | Countries applicable to App./Publication |
|---|---|---|---|
| UNITED STATES | 06/562383 | 4633509 | UNITED STATES |
| UNITED STATES | 08/639,036 | 5,708,713 | |
| UNITED STATES | 08/095708 | US 5,511,081 | UNITED STATES |
| UNITED STATES | 861,725 | 5,282,222 | UNITED STATES |
| UNITED STATES | 09/913893 | | |
| UNITED STATES | 08/976322 | | |
| UNITED STATES | 08/976322CPA | | |
| UNITED STATES | US09/744180 | US6931253 | |
| UNITED STATES | 09/253,157 | 6.663.984 | UNITED STATES |
| UNITED STATES | 2003-0070092-A1 | | |
| UNITED STATES | | US 5,699,431 | UNITED STATES |
| UNITED STATES | 10213 | 6304562 | UNITED STATES |
| UNITED STATES | 989,233 | | UNITED STATES |
| UNITED STATES | 273,948 | | UNITED STATES |
| UNITED STATES | 972814 | | UNITED STATES |
| UNITED STATES | 2002-0058482 | | |
| UNITED STATES | 61/173,457 | | |
| UNITED STATES | 61/181,811 | | |
| UNITED STATES | | 6.337.973 | |
| UNITED STATES | 09/938216 | 6549759 | UNITED STATES |
| UNITED STATES | 08/575,049 | 5,857,147 | UNITED STATES |
| UNITED STATES | 08/575,304 | | UNITED STATES |
| UNITED STATES | 08/288,413 | 5,742,734 | UNITED STATES |
| UNITED STATES | 09/159,246 | 6,148,283 | UNITED STATES |
| UNITED STATES | 10/354,977 (derived from PCT Application no. PCT/EP01/08/854) | | UNITED STATES |
| UNITED STATES | | 4,816,820 | AUSTRALIA, FRANCE, GERMANY, HONG KONG, JAPAN, NETHERLANDS, SINGAPORE, SWEDEN, UNITED KINGDOM, UNITED STATES |
| UNITED STATES | 09/882,313 | 6,542,821 | |
| UNITED STATES | US-2003-0139879-A1 | | |
| UNITED STATES | 08/708,176 | 6,131,067 | |
| UNITED STATES | 2003-0069692 | | |
| UNITED STATES | 2003-0210656 | | |
| UNITED STATES | 10/097,040 | | |
| UNITED STATES | 10/097,040 | | |
| UNITED STATES | 09/387,102 | 6,542,743 | |
| UNITED STATES | 10/353,303 | | |
| UNITED STATES | | 5,577,046 | |
| UNITED STATES | | 5,467,381 | |
| UNITED STATES | | US7,218,634 | |
| UNITED STATES | 10/514,651 | | |
| UNITED STATES | | US6233458 | |
| UNITED STATES | 08/824469 | 6189123 | |
| UNITED STATES | 12205530 | | |
| UNITED STATES | 2008-045970 | | |
| UNITED STATES | 2000484169 | | |
| UNITED STATES | 1999409698 | | |
| UNITED STATES | 790 | US20070259651A1 | |
| UNITED STATES | 160,542 | | |
| UNITED STATES | 609,357 | | |
| UNITED STATES | 564,13 | | |
| UNITED STATES | PCT/EP2008/053225 | | |
| UNITED STATES | US1995000532918 | US5,784,597 | |

In order to come to a consistent coding of patents, we undertook the following steps:

1. We assigned any identity to any of the following categories: 'real' patent numbers, publication numbers of patent applications, and serial numbers of applications;

2. For each of the categories, the formatting was harmonised and it was tested whether the results were within valid ranges; all suspected entries were manually studied and completed where possible. Obvious errors were removed (such as numbers that we found to refer to totally unrelated patents and owned by entirely different firms);

3. All entries – where possible – were translated into the publication number in the formatting used by PATSTAT (see below). In many cases, this meant that the application serial number had to be 'translated' into a publication number. Unfortunately, translating US application numbers into publications numbers is not a trivial task. USPTO applications numbers are serial numbers that are grouped into series codes (e.g. 09/123,456). To resolve these codes in patent databases such as PATSTAT, one needs to identify the application year. To do so, we based ourselves on the publications issued by the USPTO in which correspondence tables are published. These tables help to identify most patents applications numbers, but not all. In unresolved cases, we also tried the same code for the preceding and the succeeding application years. This increased our hit rate but still a number of application numbers remain unsolved. (Random checks at the online search engine of the USPTO also showed that many of these claimed application numbers could not be found there either.) Note that provisional applications at the USPTO (e.g. the 60/ and 61/ series) were not taken into account.

**Matching data with the PATSTAT database**

As a next step, we tried to link ('match') all the patent identities we found with the EPO/OECD PATSTAT database. Officially called the EPO Worldwide Patent Statistical Database, it was specifically made for use by government/intergovernmental organisations and academic institutions. It has been developed by the European Patent Office, in close cooperation with the OECD. It covers patents and patent-related data from almost all patent offices world-wide, provide relations between these legislation (by the means of INPADOC patent family[42] identities), and has a well-defined structure and

42 A patent family aims to gather all patents (within and in-between countries) that protect the same invention. There are several definitions (or ways to define such families), but most of

formatting. As a relation database, it provides a well-thought relation between application identities and the various types of publications by patent offices. With over 70 million records, and requiring around 120 GB storage space for an unpacked and indexed version, it is one of the most extensive patent databases currently available. We used the April 2009 distribution of PATSTAT for our analysis.

As shown in Table 3-2 in Chapter 3, we were able to find the correct PATSTAT record for 7139 of all the 7976 SSO-claimed patent identities we found during the previous step (which is around 90%). Considering the lack of consistence in our raw data, and the fact that by definition not all patent identities can be found[43], we consider this to be a very satisfactory score. As far as we were able to see, there were no large, structural differences between firms when it came to resolving patent identities.[44]

For all matched patents, we retrieved relevant patent metadata, such as patent filing data, INPADOC family identity, IPC class, first applicant listed on the patent, first inventor listed on the patent. Using the patent family identity, it is also possible to recover the priority date of the patents in question. We also recorded the three PATSTAT fields tagged “appln_auth“, “appln_nr“ and “appln_kind“; the specific combination of these three fields provide a unique identity to each PATSTAT application record that will remain stable, even for other PATSTAT releases.[45]

**Determining the patent owner and name cleaning**

For our work, we have use the name of the claimant (the name provided by the party that submitted the IPR declaration) as a starting point. Although our patent database also includes the name of the assignee of the patent, this data is much less appropriate for our purpose: many patents have multiple assignees (quite often with an individual person listed as first assignee), firms use many different legal names as assignee (sometimes more than one hundred), and ownership changes are often not reflected,

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them group patents or patent applications from a single company that share a certain priority date.

43 There are at least three reasons for t his: (1) some firms disclosed serial numbers of patent applications that are not yet officially published, (2) we were not able to match USPTO provisional applications (/60 and /61 series) and (3) PATSTAT is an offline database and it distribution will always somehow lag a bit in time.

44 It needs to be pointed out, though, that a company that only started to end in declarations in very recent years, including many yet unpublished patent applications, obviously will have a higher degree of missing patents.

45 Note that several other PATSTAT identities are not designed to be stable and will be completely newly calculated for every new release.

and for many patents in our dataset.[46] The claimant name, however, provides a quite good insight into the party that believes to have actual economic ownership of the patent.

Also for the claimant names, data cleaning was required.

First of all, the various ways in which firm were written was harmonised (while this was mostly consistent within an SSO, it was often not consistent between SSOs). With each name we carefully considered whether this was really the same firm or not (especially for Japanese firms this is not always trivial). In cases of doubt, we consulted the internet site of the companies, Wikipedia, as well as the Who-owns-who database. We tried to adopt 'simple' names that clearly reflect who the owner is, and removed suffixes such as those reflecting general terms and legal entities and so on (unless the removal created ambiguity, e.g. for Mitsubishi Electric). Also name changes were considered.[47]

Secondly, as our database covers a quite extensive period of time, we also needed to consider ownership changes and changes in firm structure. As much as possible, we tried to assign records to the *current* economic owners of the patent. In case of doubt or duplicate patents, the INPADOC Legal Status was consulted. In case of known sales, mergers or acquisitions, we reflected these in our data. For instance, patents that were formally claimed by either Alcatel or by Lucent are now assigned to Alcatel-Lucent, a firm created by the full merger of these two firms. For joint ventures, however, we kept ownership as it was reflected by the claimant name and did not 'move' patents to the joint venture (or to either parent) unless this was reflected by (new) declarations.

Thirdly, we were confronted with quite some duplicate claims (more than 400, in fact). In a few cases, this could be traced back to patents that had more than one assignee. Each of these may then (rightful) make a declaration. Given the aim of our exercise was to provide a good overview to what degree patents read on standards, we strived for one single registered claimant per patent and selected the 'economically most active' owner.[48] However, in the majority of the cases, such duplicate claims were believed to be erroneous. One category concerned patents that were sold to a new party.

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46 We did use the registered assignee name, however, to be able to race errors or address concerns in individual cases.

47 For instance, in October 2008, Matsushita Electric Industrial Corp. changed its name into Panasonic Corporation, with the main brand name being Panasonic. In our database, all patents claimed by this entity appears as 'Panasonic'.

48 For instance, for patents both (independently) claimed by 'France Telecom' and by 'L'Etat Français', we selected the former. Similarly, if a one and the same patent was both claimed by a university and by a firm, we chose the latter.

While this new party submitted a declaration, the old owner did not withdraw its earlier declaration. When we could confirm that such a transfer actually took place, we removed the old declarations. Another category concerned firms that simply sent in claims for the same patent (and for the same standard) twice or more. Inspecting such records showed that these two claims did not differ in any respect apart from their filing data. All duplicate claims that were found to be erroneous were removed. We were also surprised to find several cases in which the declarant itself seemed to have misspelled their own name.

**Determining the relevant standard**

As much as possible, we determined the specific standard for which patents were believed to be essential. Here we had both the challenge that the available information at some SSOs was too detailed (distinguishing between many versions or elements of a standard), while data from other SSOs was too limited. Some SSOs specifically include references to standards, while others mention the relevant Committees, from which one might imply what standards are affected. In the table with each of the individual SSOs above we already provided some detail on how standards were determined.

Overall, we aimed at 'harmonised' and recognisable standards names. For reasons of clarity, we sometimes refer to the popular name under which standards are known.[49]

**Addressing patent overlap**

In several ways, overlap between patent claims can occur. While we did not want an *a priori* removal of any type of overlap, we did want to have the means to recognise this, allowing us the make appropriate decisions during the analysis. Below, we will briefly discuss different types of overlap and how we dealt with it.

1. Patent overlap between SSO. Obviously, one single patent may be believed to be essential for different standards at different SSO's. We left such entries intact, allowing us the recognise these by their patent identity. Being able to identify such overlap allowed us to report correct numbers in Table 3-2 in Chapter 3, where the total number of essential patents is not simply the addition of all patents at all SSOs.

2. Patent overlap between different standards within a single SSO. Similar to the above, we left these entries intact, while their identities allowed us to recognise

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49 For instance we use 'WiFi', which strictly speaking refers to a trademark by the WiFi Alliance, an organisation that oversees device certification of a certain category of IEEE 802.11 devices. However, over time, the term WiFi has became synonymous to IEEE 802.11 and started to replace that it in the commercial market.

them. This approach allows us to recognise patents that are essential to multiple standards (e.g. GSM, UMTS, and LTE).

3. Patent overlap between patent legislations. Patent systems are national in nature, and a firm can seek protection for a single invention in multiple legislations. The applications or the granted patents are not necessarily identical between countries (the patent examiners in one country may refuse a claim, while the examiners in another country might accept it). Still, patents filed in multiple legislations can result in an undesired inflation of the database. It might also lead to considerable bias, in cases in which some firms systematically submit claims for all patents in all legislations, while others believe it suffices to submit claims for one or a few key legislations. The INPADOC Family ID, which is part of the PATSTAT database, allows us to recognise such geographical overlap.

4. Patent overlap within patent legislations. In many patent legislations, an applicant may receive more than one patent for a single invention. In the US, for instance, these might be re-issued patents, continuations, or continuations-in-part (in our database there are a few inventions that have been given dozens of patents in the same legislation). Especially for very valuable patents, owners might seek an extension of its reach, or extend the life time of protection. Also here, the INPADOC family ID's allows us to recognise such patents. How one wants to treat with them is a question of preference and belief: some argue that one should only consider a single invention, others believe that the fact that the patent office granted multiple protections it should be counted as such, and also add that the fact that the assignee is willing to carry the substantial costs of such extra protection signals a high commercial value, which legitimates higher counts.

In Section 3.1.2 of this report we show how we created different patent sets, allowing us to deal with the sorts of overlap described in (3) and (4) above.

**Collecting additional data for the claimants**

Finally, we completed the data set with additional data on the companies involved. For each company, we determined the home country / home region. Categories were chosen on the respective share in the database and include (1) United States, (2) Europe, (3) Japan, (4) Asia (excl. Japan), (5) Canada, (6) Israel and (7) Other country.

For each firm we determined the country/region on the basis of the headquarters or corporate offices of these organisations. For this, we used the website of the firms, and sometimes Wikipedia or other Internet sources. For the large majority of firms this is

not difficult, but there are also some small IPR claimants that are hard to trace; these firms have names that are very hard to identify. Although the home base of some could be based using legal documents (patent infringement cases, etc.), some remained unidentified.

Finally, we used information from the database Thomson ONE Banker to match data on company size, research and development and business models to more than 200 companies owning essential patents. These results are displayed in Section 3.3. of the report.

# Annex II: Interview Guideline for Company Interviews

***Rudi Bekkers, Knut Blind***

## Introduction

This study is a fact-finding exercise concerning IPRs in standards. Please refer to the invitation letter and the EC Letter of Recommendation for more general information on our study.

In this interview we will not ask you specifically about your own company's situation (like IP ownership, licensing, barriers) but rather about the IPR situation in relevant product markets. We hope that you are willing to be frank on these questions, answering them as an expert in the field, instead of a representative of your company.

In the report we will prepare, we will not attribute any specific point you mention to you or your firm, or present it in a way that indirectly reveals you or your firm's identity. You will be mentioned, though, in the list of interviewees (which is planned to include >10 names for industry and >15 names for SSO's and governments).

The list of topics below is meant to be indicative. Please focus on these areas you are most knowledgeable about, and feel free to add topics.

## 1. Factual information and quantification if IPRs in standards. If you are knowledgeable about more than one technical area / economic area please elaborate on that.

Numbers of essential patent (families) for (various) standards you are knowledgeable about.

How does this number correspond to the declarations of patents to SSO's (is there over-claiming, is there under-claiming)?

Number of distinct patent owners, number of implementors of the standard.

Distribution of essential patent ownership according firm size. Trends?

Distribution of essential patent ownership according business model (e.g. vertical integrated firms, technology development firms, investment firms). Trends?

Distribution of essential patent ownership according to world region. Trends?

Role of non-patent IPR (e.g. copyrights, open source licenses). Trends?

Situation of IPRs in standards in other areas than ICT... Trends? Limited to sectors where ICT is 'enabling technology' (transport, logistics, etc.) or not?

## 2. Impact of IPRs in standards. Again, if you are knowledgeable about more than one technical area / economic area please elaborate on that.

Range of typical aggregate licensing rates for:

- existing players with substantial patent portfolio (vertical integrated);
- new entrants with small or no patent portfolio;
- other relevant players?

Distribution of licensing fees according business model of IPR owners. Trends?

Effect of licensing rates (or possible failure to obtain licenses) on entry and continued participation in industry.

Role of cross-licensing, non-assert agreement, and other mechanisms.

Degree to which implementers fail or refuse to license essential IPR.

Degree to which FRAND is fully complied with by patent owners.

Role of non-essential IPR in conjunction with essential IPR.

Are there concerns about patents prohibiting the uptake of standardisation processes?

Impact of increasing convergence of markets (e.g. converging functionality in end user devices).

## 3. IPR policies at SSOs and proposed changes

To what degree are there differences between RAND policies at SSO's that really matter?

What is your view on non-RAND or 'mixed' IPR policies at SSO's (think of IETF, but also hardware RAND combined with software RF or Open Source)?

Which main changes have been proposed to IPR policies and what are your views on such changes?

In particular, to what degree have parties picked up the opportunity for declaring voluntary ex-ante licensing conditions?

Is there sufficient transparency for market players about patents and essential patents (e.g. patent databases at SSO's, information at patent offices)?

What main issues should be addressed by SSO's, by governmental organisations, or others?

## 4. Patent pools, non-assert agreement, etc.

In which cases have patent pools emerged? What determines their changes of establishment and of success (coverage)? Are they desirable? What is their effect on impact such as licensing fees?

Idem, for non-assert agreements.

## 5. Disputes

How often do they occur? To what degree are they visible (information in public domain)?

What are the main issues at stake in litigation?

What is the role of arbitration / settlement vs. court cases?

To what degree do disputes have an impact on the overall market (possible delays in standard-setting, adoption, market entry, etc.)?

To what degree are there significantly relevant differences between different legal regimes in world regions or countries?

Trends in disputes.

## 6. Trends

What are the main current trends (not yet discussed), and what do you expect for the coming years?

Is there any quantitative study about the interplay of standards and IPRs, or other material, you would like to share or draw our attention to?

# Annex III: Excursus: Patent litigation

***Yann Dietrich***

## AIII.1 Introduction

A patent being defined by nature as a right to prohibit someone from "using" what is protected by the claims of a patent, litigation is essential to understand the dynamics of such right. We did not found any specific data about patent litigation involving essential patents and this is why we decided, first, to put things back in context considering data we have about patent litigation in general. Secondly, we analyzed the most recent decisions to extract the most recent trends. Thirdly, we used a database developed by the University of Stanford called "Lex Machina"[50] to analyze in further details the data we can collect specifically in relation with essential patents. A generic study on all US litigation would have not produced tangible results, the identification of essential patents being difficult in a context of litigation for various reasons we focused on one of the major players in Europe, Nokia and analyzed its patent litigation profile. Using the example Nokia patent litigation in US, we looked at data which may be helpful to understand the specifics of litigation involving non-essential patents vs. litigation involving potential essential patents, and especially whether we assist to an increase of litigation between what we called traditional companies vs. other types of opponents such as Non-practising entities, universities and individual inventors.

## AIII.2 Main trends about patent litigation

Very little data exist in Europe about patent litigation with the exception of the work done by Harhoff (2009) in the context of the discussions about the European Patent litigation system, and other data collected in the context of the evaluation of the feasibility of a patent litigation insurance. Another very recent study has been conducted based on an also very recent patent litigation database built in Europe: Darts-IP, which identified around 1000 cases per year (see Table AIII-1).

50 http://lexmachina.com/about

Table AIII-1: Estimated volume and availability of actual litigation cases in selected European countries (Source: Van Zeebroeck, Graham 2010)[51]

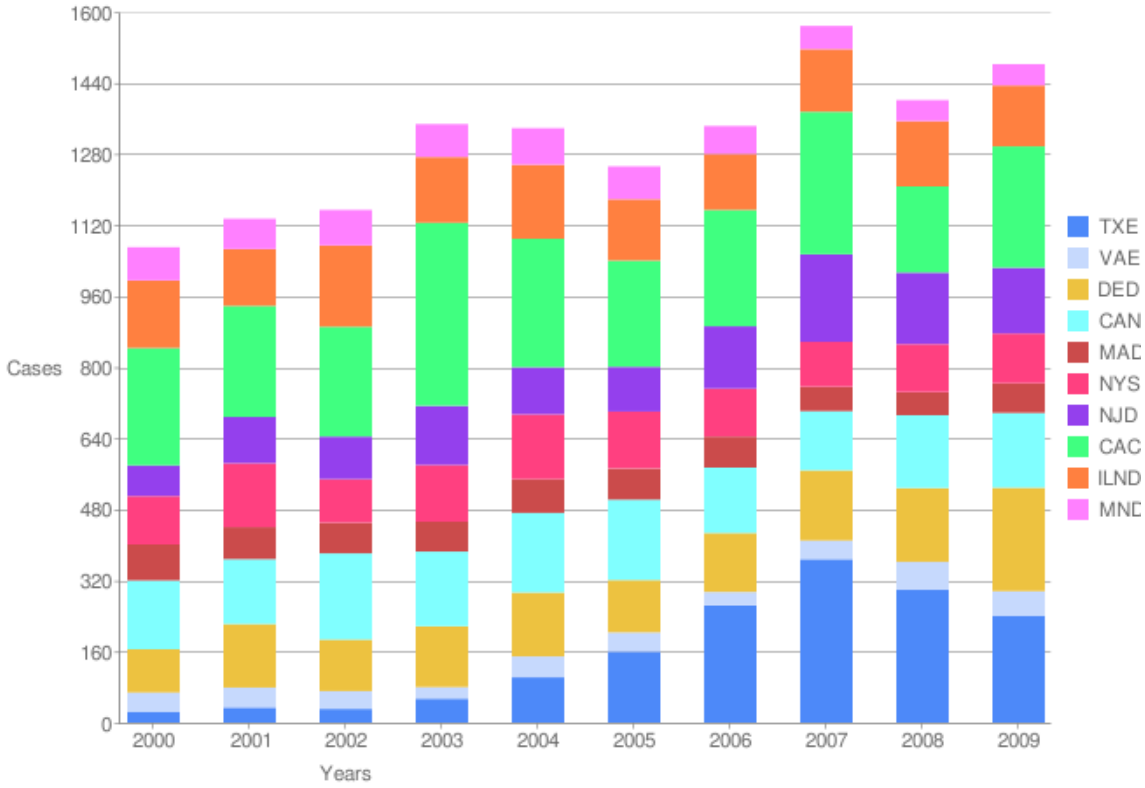
| **Availability rates for 2004-2009** | **BE** | **DE** | **ES** | **FR** | **GB** | **IT** | **NL** | **TOTAL** |
|---|---|---|---|---|---|---|---|---|
| Mean cases per year in 2004-2009 | 29 | 351 | 116 | 321 | 46 | 85 | 73 | 1020 |
| including cases with no dates | 30 | 399 | 131 | 328 | 49 | 106 | 78 | 1119 |
| Practitioners estimates | | 700 | | 200 | 85 | | 70 | 1055 |
| Availability rate according to practitioners | | 57.0 | | 100.0 | 57.1 | | 100.0 | 80.8 |
| Availability rate according to data provider | 60 | 50.0 | 60.0 | 90.0 | 90.0 | 70.0 | 90.0 | 65.0 |
| Theoretical cases per year according to official availability rate | 50 | 798 | 218 | 364 | 54 | 151 | 86 | 1720 |
| Country share in EU7 total | 2.9 | 46.4 | 12.6 | 21.2 | 3.1 | 8.8 | 5.0 | |

More analysis and data exist in US primarily because the procedure were mere available through centralized database earlier and investments have been made to build more intelligence using such data. This is why we primarily used US sources to better understand the main trends in patent litigation.

In general, the volume of patent litigation increased in the US, with a similar evolution in Europe.

51 This paper is based on Data from Darts-IP and also Harhoff (2009).

Figure AIII-1: Development of patent litigations by state (Source Lex Machina (2010))

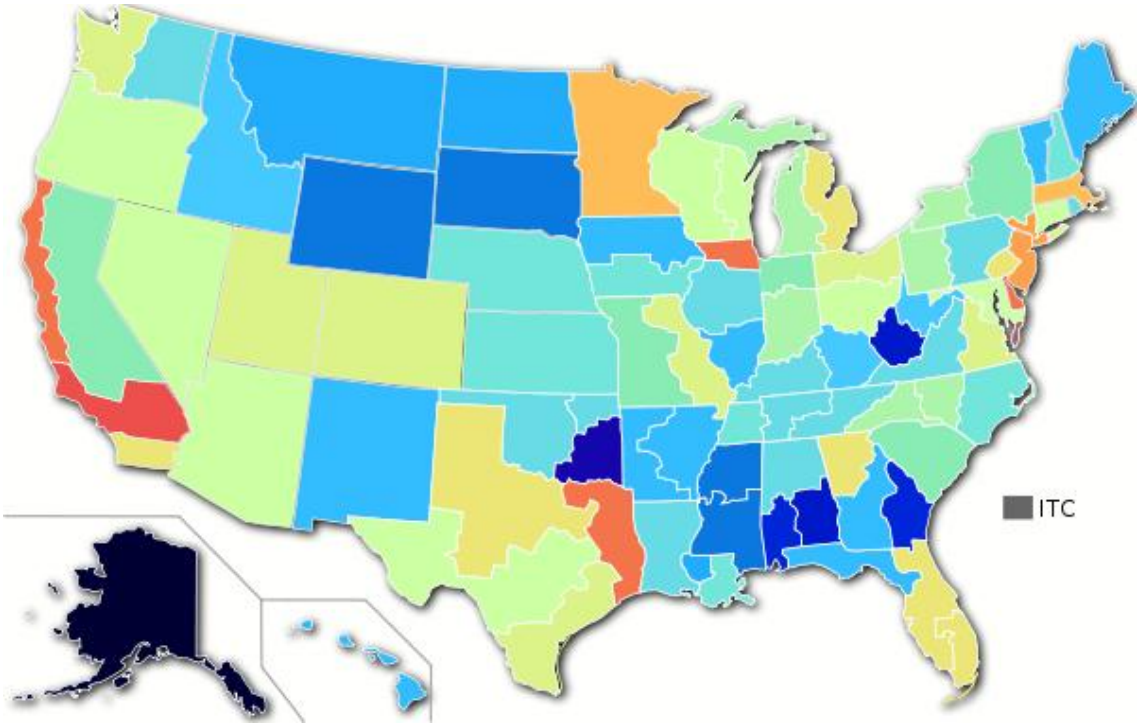



**The effect of uncertainty**

Companies in general enter into litigation when the outcome of a dispute is not predictable meaning that each company believes that they can have serious legal arguments justifying a reasonable expectation to win. As explained by Prof. Dietmar Harhoff, “uncertainty favours asymmetric information and divergent expectations, two key drivers of litigation activity”.

While it is true that in US, the introduction of the CAFC has in general contributed to reduce uncertainty, the large discrepancies of chances to win a patent litigation cases in the US has probably created an incentive to sue first and negotiate after rather than negotiating first.

Figure AIII-2: Distribution of litigation in the US (Source: Lex Machina 2010)




In the heat map above, it is clear that most of the litigation occurs in Northern and Central District of California and Eastern District of Texas. This is further confirmed if you consider the Figure AIII-2 and the proportion of litigation in the Eastern District of Texas.

According to a study by PriceWaterHouseCooper (2009), in Texas Eastern District Court, the median time to trial will be 1.79 years, the success rate will be 51.6% and the median damages awarded will be around 20 millions USD. In California Central District Court, the time to trial will be 1.99 years, the success rate will be 48.3%, and the median damages only around 2 millions USD. Now, looking at the Northern District of California, the time to trial is 2.72 years, the success rate is 34% and the median damages around 4 millions USD.

These differences also exist at an international level. Finnegan, a law firm specialized in Intellectual Property realized a comparative patentee win rate chart by countries.[52]. Their results are the win rate for a patent litigation will be in

- United States 35% with 63% to win with a permanent injunction
- Germany 28% with automatic permanent injunction

52 Finnegan, Michael Elmer, August, 2009, US and Global Patent litigation forum shopping, http://www.ipsectioncolorado.org/.../08-27-2009_-_Global_Patent_Litigation_Strategy.ppt

- France 39% to win with 80% to win with a permanent injunction
- England 22% to win.

These data for Europe are confirmed by a very recent study conducted based on the European patent litigation database Darts-IP.

Table AIII-2: Overall outcome of infringement and invalidity actions by jurisdiction (Source: Van Zeebroeck, Graham 2010)

| | Decisions on Infringement | | Decisions on validity | |
|---|---|---|---|---|
| **Country** | **Infringement found** | **Ambiguous** | **Patent invalid** | **Ambiguous** |
| France | 41.8% | 8.7% | 23.4% | 20.9% |
| Germany | 52.3% | 4.0% | 37.0% | 20.4% |
| Spain | 41.3% | 1.3% | 48.3% | 3.5% |
| The Netherlands | 31.0% | 1.1% | 50.7% | 11.3% |
| United Kingdoms | 44.9% | 11.8% | 32.8% | 31.9% |
| **Total** | **44.8%** | **6.7%** | **30.7%** | **20.3%** |

Other data exist about these, the point being more that uncertainty as defined above influence potentially behaviour of companies and increase patent litigation.

**Development of licensing activities by companies outside direct competitive interests**

In general, in the 90's, most of the major companies started to look at their patent portfolio and develop licensing to extract value from their patents portfolio with especially some objectives to identify applications of their technologies outside their own business.

This development, and the effect it had on litigation, seems to be confirmed by some studies.

In Bessen and Meurer (2005), their conclusion is "Thus although many suits, probably the majority, occur between firms that are close either in the market place or in their patent portfolios, a substantial percentage also occurs between firms that are distant"..

In Hall and Ziedonis (2007), with a focus on the semiconductor industry, they concluded that "while the majority of lawsuits launched against sample firms are made by

rivals in semiconductor product markets, our estimates suggest that the probability that these firms will be sued by non-rivals nonetheless has increased over the past decade".

More controversial, the development of non-practising entities has certainly contributed to an increase of patent litigation. A comprehensive study has been realized by PriceWaterHouseCooper (2009) about these phenomena. They collected data explaining the usage of some of the specific aspects of US procedures such as jury trial in the development of such activities.

**Most of the cases are settled, patentees rarely win**

While our perception may be affected by certain very large cases or specific litigation practices in the US leveraging certain jurisdiction and jury trials, in average, a patentee has low chances to enforce its patents.

In a study by UHLC, Institute for Intellectual Property and Information law[53], their conclusions are that the win rate for a literal infringement is 29%, only 13% for infringement on the basis of the doctrine of equivalent, and the win rate for invalidity claims will be 48% for lack of novelty and 49% for obviousness. In summary, it means that a patentee has more chance to see its patent invalidated than to win its case.

Another very essential point to keep in mind is that most of the cases are very generally settled. Using the same three districts discussed before and on the basis of data from Lex Machina database, the conclusions are that between 60 and 70% of all patent litigation cases are settled.

## AIII.3 Contemporary issues about patent litigation and standards

In this section, we summarized some of the most relevant recent decisions involving essential patents without addressing some of the less recent decisions which have been already commented.

**Essential patents and commitment to license at RAND conditions**

Two recent European decisions have shed some light on a very fundamental question about the ability of the owner of an essential patent to seek an injunction or not. The patent being only the right to exclude somebody from doing something, the right to ask for injunctive is at the very core such right. At the same time, when a patent owner commits to license its patents at RAND conditions, what does it mean? Does it mean

53 Jeffrey L. Johnson, Patent litigation trends, UHLC, Patent litigation Trend/ Some Statistical observations, http://www.ipadvocate.org/forum/pdf/statistical_observations.pdf

that the patent owner will be entitled to seek royalties from the use of its essential patents or will it be still entitled to ask for injunctive relief in the case of an infringer has not taken a license?

In the Orange Book decision, June 5th 2009, the German Federal Supreme Court develops a new type of defence to an injunction based on a RAND commitment.[54] A defendant will be able to challenge an injunction if:

- the defendant has made to the patent holder an unconditional offer to conclude a license agreement to which he stays bound and which the patent holder cannot reject without entering into some violations of its non-discrimination obligation or anti-competitive behaviour
- if the defendant complies with the obligations of such agreement to be concluded especially by paying the royalties to the patent holder or into escrow.

In a more recent case, Philips vs. Kassetten, March, 17th 2010[55], a Dutch court decided that such defence is not consistent with patent laws, create uncertainty and is not necessary to protect defendant, considering that as long as the patent owner has not properly licensed its patents, he should be free to enforce its patents, while a judge may offer a temporary license if it was not necessary to protect defendant' interests.

**Essential patents and transfer to a 3rd party**

In Europe, we have faced such a situation in relation with essential patents to GSM. Bosch which participated to the development of the GSM standard transferred some of its essential patents to IPCom which then sued Nokia for patent infringement.[56] Nokia defended itself especially by claiming that the royalties claimed by IPCom were not FRAND. More recently, IPCom finally agree to honour the commitment to license such patents at FRAND conditions, after the European Commission got involved in this matter.[57] In section 5.2 about SSOs IPR policies, we observe that only a limited number of standards organisations have developed IPR policies addressing the transfer of essential patents to a 3rd party.

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54 http://www.boek9.nl/www.delex-backoffice.nl/uploads/file/Boek9%20/Boek%209%20Uitspraken/Octrooirecht/EN%20Translation%20BGH%20Orange%20Book%20Standard%20-%20eng.pdf

55 http://www.eplawpatentblog.com/eplaw/2010/03/nl-philips-v-sk-kasetten-frand.html

56 http://ipfinance.blogspot.com/2008/02/nokia-sued-by-german-patent-holding.html

57 http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/549&format=HTML&aged=0&language=EN&guiLanguage=en

**Specifications/Standards as Prior art**

While we do not have a lot of decisions, this is a recurrent and important issue. Only a document properly publicly accessible will be able to constitute a prior art making it impossible to file a patent after such publication on the basis on what is disclosed in the paper. This is indeed important in the context of standardisation. In SRI International Inc v. Internet Security Systems Inc, the availability of a document on a server but such server not being accessible by the public and solely for peer review was not considered as sufficient to constitute a prior art.

**Essential patents and FRAND**

None of the recent investigations have shed more light on what is a reasonable and non-discriminatory, most of them being settled with the Commission as in the Rambus case[58], stopped at an early stage as in the IPCom case[59] or closed without any finding.[60]

The dispute between Apple and Nokia, if not settled, may offer an opportunity to hear more from judges about FRAND and especially a question raised by Apple about grant-back licensing practices. In general, when considering patents, traditional companies are not only addressing essential patents but consider a product or one of their business, and then essential and non-essential patents. Licensing some of your patents is indeed a dangerous activity meaning that you accept to put a value on some of your patents without knowing if your licensee will not enforce some of its patents against you and using other financial valuation. Having said that, we can obviously easily understand the issue it may raised, these two types of patents being by nature different, essential patents being part of standards required for interoperability and then shared within a community of market players and non-essential patents being part of technologies companies are developing to differentiate their products from their competitors.

**Essential patents and declaration of non-essentiality**

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58 DG Competition, 12/06/2009, Antitrust: Commission market tests commitments proposed by Rambus concerning memory chips http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/273&format=HTML&aged=0&language=EN&guiLanguage=en

59 DG Competition, 10/12/2009, Antitrust: Commission welcomes IPCom's public FRAND declaration http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/549&format=HTML&aged=0&language=EN

60 DG Competition, 29/11/2009, Antitrust: Commission closes formal proceedings against Qualcomm http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/516&format=HTML&aged=0&language=EN&guiLanguage=en

In 2007, in the context of the various disputes between Nokia and Interdigital, a new type of legal action emerged: the declaration of non-essentiality. The purpose is here to require from patent holders declaring to a standard organisation that certain of their patents may be essential to substantiate such declaration by describing how such patent may be considered as such. Indeed, if you set up a highest burden on patent holders to declare potential essential patents, then you may except companies to over-declare to be on the safe side (the lack of disclosure may impair the enforceability of such patents). Now, the question is whether there is an obligation especially in the context of a negotiation of a license to provide the prospective licensee with detailed information describing how such any of such patents declared may be considered as essential. This is why Nokia asked to an English court to judge the essentiality of several patents declared as such by Interdigital to ETSI in 2006. The English judges considered that such matter could be tested in Court and then any patent holder making a declaration of essentiality should be ready to have the substance of such declaration challenged in a court[61]

## AIII.4 Nokia patent litigation profile in US

We analyzed all the patent litigation in which Nokia was involved using the data available using the database created by Stanford University called Lex Machina as of June 1st 2010 (90 cases) and 43 cases in Europe (data were provided by Nokia directly by Richard Vary).

In the Figures AIII-3 and AIII-4 below, before analyzing all other data, it needs to be understood that in a very large majority of cases, Nokia is a defendant, this means that Nokia is defending itself against a litigation initiated by a third party and in only limited circumstances, Nokia is offensively asserting its patent or seeking to invalidate a patent or to get a decision recognizing that Nokia is infringing a certain patent.

61 http://www.kirkland.com/files/techno.pdf - http://www.ipeg.com/_UPLOAD%20BLOG/Cook_Standards_FRAND%20or%20FOE_article.pdf

Figure AIII-3: Nokia as plaintiff or defendant in the US

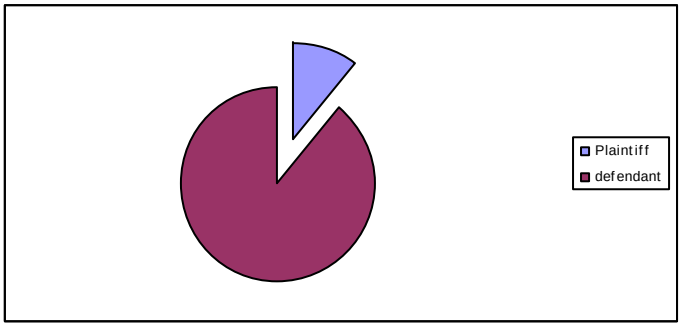
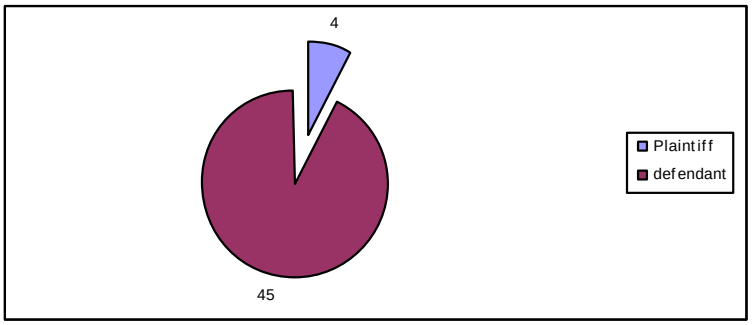



Figure AIII-4: Nokia as plaintiff or defendant in Europe




In the Figure AIII-5 and Figure AIII-6, we analyzed the number of cases per year making the distinction between litigation involving traditional companies within the same business of Nokia or not and litigation involved non-practising entities (NPE), universities and/or individual inventors. The objective was there to understand whether we have seen in general an increase of patent litigation for Nokia and whether it is directly related to an increased competition between market players or for other reasons.

Figure AIII-5: Patent litigation per year and per type of opponents in the US

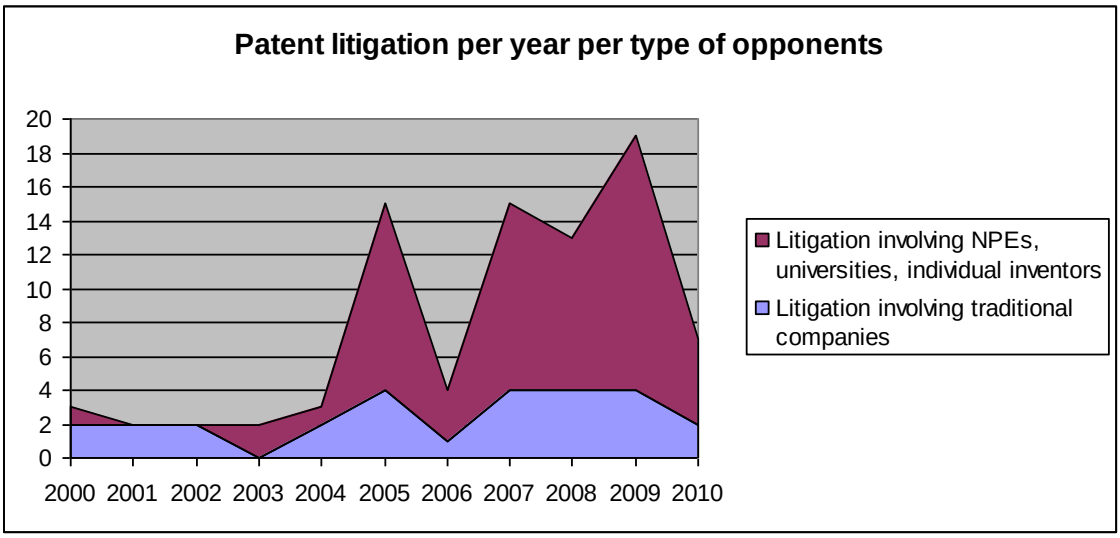



Figure AIII-6: Patent litigation per year and per type of opponents in Europe

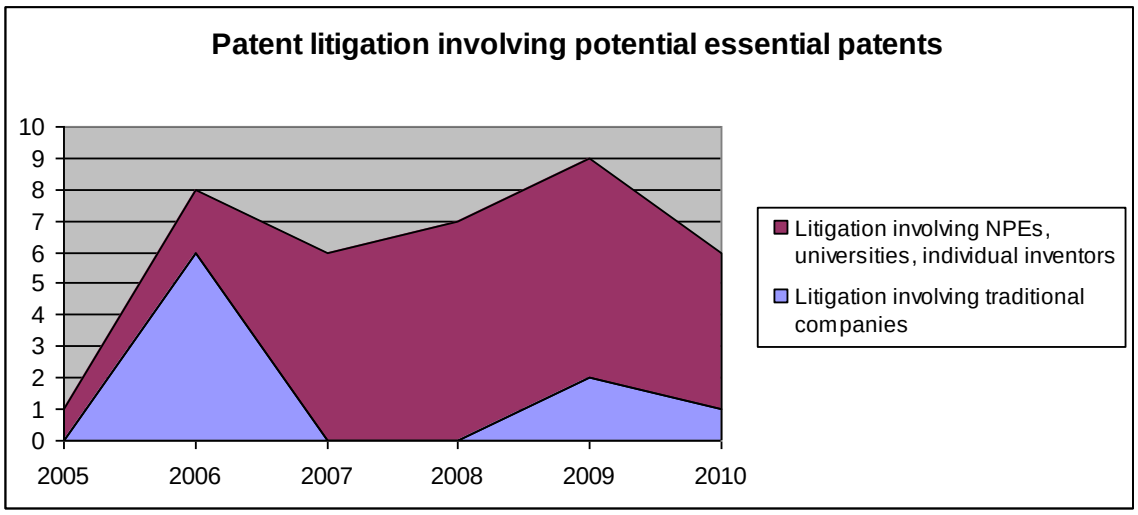



Figure AIII-5 and Figure AIII-6 clearly demonstrate that the primary factor of the increase of the patent litigation involving Nokia is the increase of the litigation involving NPEs, universities and individual inventors and not traditional competition between companies involved in the same business. It may be subject to personal interpretation but this tends to demonstrate that the increase of litigation is not caused by an increased use of patent litigation between competitors but more for reason outside the traditional business of Nokia.

Finally, we looked at the outcomes of such litigation in the US and Europe excluding various cases which are not relevant to consider: pending litigation, unclear outcome and/or consolidated cases.

Figure AIII-7: Patent litigation per type of outcomes (excluding pending litigation, unclear outcome, and consolidated cases) in the US

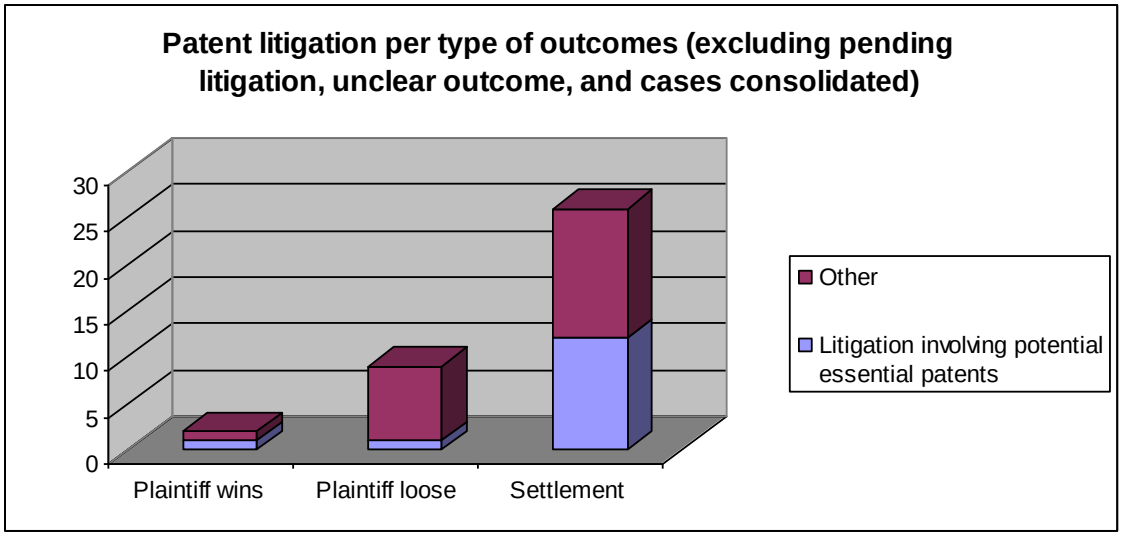
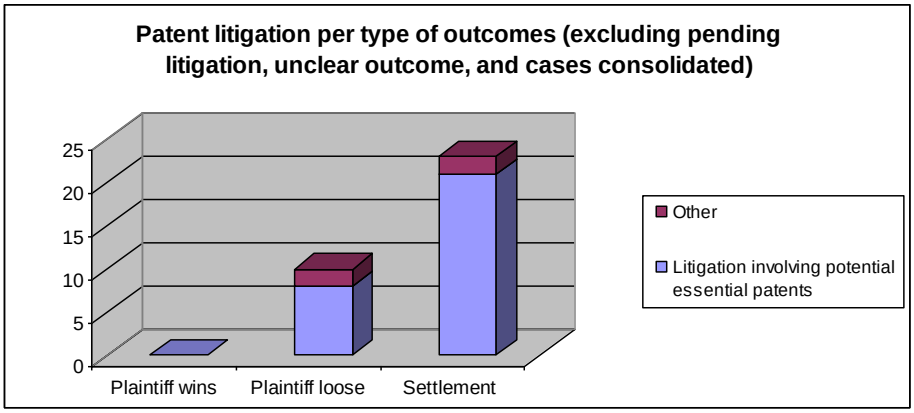



Figure AIII-8: Patent litigation per type of outcomes (excluding pending litigation, unclear outcome, and consolidated cases) in the EU




It is clearly apparent that the win rates of plaintiffs are pretty limited and that most of the cases are settled and/or the plaintiff loose, meaning that companies prefer to settle rather than litigating for very long period of time.

## Annex IV: Company Survey


EUROPEAN COMMISSION

# Study on the Interplay between Standards and Intellectual Property Rights (IPRs)

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## Introduction

The Study on the Interplay between Standards and Intellectual Property Rights (IPRs) was commissioned in December 2009 by the Enterprise and Industry Directorate General to a consortium under the coordination of the Fraunhofer-Society in Germany. The aim of this fact-finding study is to provide a sound factual basis on the above interplay for possible policy development in the area of European standardisation and innovation. In the context of the study, we conduct a survey among enterprises owning IPRs (intellectual property rights) as well as enterprises implementing standards. The copyright on the standardisation documents as such is not considered.

In the survey, we focus on essential IPRs, in general patents, which disclose and claim inventions that are required to implement a given standard. It can be either used according to Fair Reasonable And Non-Discriminatory (FRAND) licensing conditions or Royalty Free (RF; understood as royalty free licensing that may be subject to other FRAND conditions). We cover standards, which are released either by formal standardisation bodies, like ISO, IEC, ITU, CEN-CENELEC, ETSI and the various national standardisation bodies, or by standardisation consortia, like IEEE, IETF, OASIS, OMA or W3C. In general, we cover all such organisations under the term standards setting organisations (SSOs).

We have identified your enterprise based on public available information as either owning essential IPRs or having implemented especially standards containing IPRs. Your participation will take about 20 minutes and will help to produce an objective and representative picture of the issue and also a benchmarking of your company's behaviour in relation to the other companies active in the market.

We also would like to ask you to answer the questionnaire by **November 30th, 2010**.

**Please note that we will treat your answers to our questions absolutely confidentially!**

## Part 1: Importance of IPRs in standards

**1. What approximate share of the standards, relevant for your enterprise, is covered by essential IPRs?**

| | 0% | 1%-25% | 26-50% | 51%-75% | 76%-100% |
|---|---|---|---|---|---|
| **Standards implemented by your enterprise** | ○ | ○ | ○ | ○ | ○ |
| **Standards to which your enterprise has actively contributed in the standardisation process** | ○ | ○ | ○ | ○ | ○ |

**2. Does your company own essential IPRs?**

Yes: __ No: __, then please go to question 4!

**3. How important are the following aspects of owning essential IPRs to your enterprise?**

| | Very unimportant | Unimportant | Neutral | Important | Very important |
|---|---|---|---|---|---|
| **Generate licensing revenue** | ○ | ○ | ○ | ○ | ○ |
| **Entering into cross-licensing agreements / increasing bargaining power in licensing negotiations (e.g. for lowering or eliminating license fees)** | ○ | ○ | ○ | ○ | ○ |
| **Joining patent pools / increase bargaining position in patent pools** | ○ | ○ | ○ | ○ | ○ |
| **Securing freedom to operate / reducing risk of being accused of infringing** | ○ | ○ | ○ | ○ | ○ |
| **Influencing technological trajectory or standards competition** | ○ | ○ | ○ | ○ | ○ |
| **Signalling own technological competencies** | ○ | ○ | ○ | ○ | ○ |
| **Facilitate own market entry** | ○ | ○ | ○ | ○ | ○ |
| **Other:** | ○ | ○ | ○ | ○ | ○ |

## Part 2: Access to essential IPRs

**4. How often, if at all, are the following mechanisms offered to you by other organisations and actually accepted by you regarding access to their essential IPRs? Please also indicate how the importance of this mechanism has developed over the last ten years.**

| | Never | Hardly ever | Sometimes | Most of the time | Always | Occurrence in the last ten years is... | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | decreasing | constant | increasing |
| **Licensing in** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **Cross-licenses** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **Patent pool (multi-lateral) licensing in** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **Non-assertion agreements** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **No explicit license agreements, but knowing that the other party also uses our IPR we both do not assert** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **Patents my company needs are available against royalty-free conditions** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **Other:** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**5. How often do <u>you successfully</u> offer the following mechanisms <u>to other organisations</u> regarding your own essential IPRs? Please also indicate how the importance of this mechanism has developed over the last ten year.**

| | Never | Hardly ever | Sometimes | Often | Always | Occurrence in the last ten years is ... | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Decreasing | Constant | Increasing |
| **Licensing out** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **Cross-licenses** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **Patent pool (multi-lateral) licensing out** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **Non-assertion agreements** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **No explicit license agreements, but knowing that the other party also uses our IPR we both do not assert** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **Patents my enterprise licenses out are available against royalty-free conditions** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **Other:** | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**6. We would like to ask you two questions about a product market you are knowledgeable about in terms of licensing. Please indicate which of the markets, e.g. Mobile phone (dual mode 2G + 3G), RFID tags, MP3 player, Digital video camera, TV with DVB receiver, or other markets do you know best:**

**7. Please assume a (hypothetical) entrant into the market you have chosen above. This party is an existing, experienced medium-sized production enterprise, but does not own relevant (essential or non-essential) IPRs concerning the standard or market you indicated. Given reasonable bargaining skills, what aggregate licensing fee would such an enterprise have to pay?**

Only essential IPRs

Lower-end estimate: ___%

Higher-end estimate: ___%

All patents typically licensed for the product market in question

Lower-end estimate: ___%

Higher-end estimate: ___%

**8. Can you indicate how certain you are of your answer to the above question?**

| Very uncertain | Uncertain | Neutral | Certain | Very certain |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

**9. Do you want to share additional comments on the above questions of Part 2, e.g. on differences between industries, or type of rights holders, or the SSO that published the standard in question?**

## Part 3: Impact of IPRs in standards on the standardisation process, on the implementation of standards and on general aspects of your enterprise

**10. How does or would (in case of not owning essential IPRs) the inclusion of essential IPRs in standards affect the following aspects of the standardisation process? Please differentiate between FRAND and RF settings!**

| | FRAND/RF | Very negative | Negative | Neutral (no effect) | Positive | Very positive |
|---|---|---|---|---|---|---|
| Speed of the standardisation process | FRAND | ○ | ○ | ○ | ○ | ○ |
| | RF | ○ | ○ | ○ | ○ | ○ |
| Number of non producing entities (providing technology, but not producing goods) involved in standardisation processes | FRAND | ○ | ○ | ○ | ○ | ○ |
| | RF | ○ | ○ | ○ | ○ | ○ |
| Number of potential implementers participating in the standardisation processes | FRAND | ○ | ○ | ○ | ○ | ○ |
| | RF | ○ | ○ | ○ | ○ | ○ |
| The inclusion of attractive technologies (high performance, cost saving, etc.) | FRAND | ○ | ○ | ○ | ○ | ○ |
| | RF | ○ | ○ | ○ | ○ | ○ |
| Consensus reaching | FRAND | ○ | ○ | ○ | ○ | ○ |
| | RF | ○ | ○ | ○ | ○ | ○ |
| Other: | FRAND | ○ | ○ | ○ | ○ | ○ |
| | RF | ○ | ○ | ○ | ○ | ○ |

**11. How does the inclusion of essential IPRs in a standard by other enterprises affect the following aspects of the implementation of that standard by your enterprise? Please differentiate between FRAND and RF settings!**

(If your enterprise does not implement standards including essential IPRs, you can skip this question.)

| | FRAND/RF | Very negative | Negative | Neutral (no effect) | Positive | Very positive |
|---|---|---|---|---|---|---|
| **Effectiveness to identify relevant IPR rights owners** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Negotiation cost of licensing conditions** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Sum of licensing fees** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Possibility of integrating high quality technologies in own products** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Savings of own R&D investment** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Competitiveness in existing markets** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Ability to entry in new markets** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **General speed of implementation of standards** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Legal security related to IPRs (e.g. avoiding unintended infringements)** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Other:** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |

**12. How does the inclusion of your essential IPRs in standards affect the following general aspects of your enterprise? Please differentiate between FRAND and RF settings!**

(If your enterprise does not own essential IPRs for standards, you can skip this question.)

| | FRAND/RF | Very negative | Negative | Neutral (no effect) | Positive | Very positive |
|---|---|---|---|---|---|---|
| **Investment in R&D** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Patenting activities** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Entering into new technology and product markets** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Total cost price of own standard-based products** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Market shares of own standard-based products** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |
| **Other:** | **FRAND** | ○ | ○ | ○ | ○ | ○ |
| | **RF** | ○ | ○ | ○ | ○ | ○ |

**13. Do you want to share additional comments on the above questions of Part 3, e.g. on differences between SSOs, sectors, or type of rights holders?**

## Part 4: SSO policies and mechanisms

**14. How do you rate the different types of SSOs regarding the following aspects:**

**(Answering categories 1 to 5, very unsatisfactory (1), unsatisfactory (2), neutral (3), satisfactory (4), very satisfactory (5))**

| | Formal (e.g. CEN-CENELEC, ETSI, ISO, IEC, ITU, NSBs) | | | | | Other SSOs (incl. consortia and fora, e.g. IEEE, IETF OASIS, OMA, W3C) please specify: | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| The general attractiveness of the current IPR policy | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Transparency on which patents are deemed essential by their owners | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Harmonisation with IPR policies and practice of other SSOs | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| The efforts to adapt the IPR policy to future developments | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**15. Do you want to share additional comments on the above questions, e.g. on differences between SSOs, sectors, or type of rights holders?**

**16. Please indicate whether SSOs should perform the following activities in the future?**

| | Totally disagree | Disagree | Neutral | Agree | Totally agree |
|---|---|---|---|---|---|
| **IPR (patent) landscaping** | ○ | ○ | ○ | ○ | ○ |
| **Technology auctioning** | ○ | ○ | ○ | ○ | ○ |
| **Allowing voluntary ex-ante declarations of licensing fees** | ○ | ○ | ○ | ○ | ○ |
| **Promoting voluntary ex-ante declarations of licensing fees** | ○ | ○ | ○ | ○ | ○ |
| **Requiring obligatory ex-ante declarations of licensing fees** | ○ | ○ | ○ | ○ | ○ |
| **Defining how RAND should be interpreted** | ○ | ○ | ○ | ○ | ○ |
| **Judging upon essentiality** | ○ | ○ | ○ | ○ | ○ |
| **Patent-pool administration** | ○ | ○ | ○ | ○ | ○ |
| **Screening the problems related to the implementation of standards during the process** | ○ | ○ | ○ | ○ | ○ |
| **Providing for a mediation process for IPR-related conflicts during the standardisation process** | ○ | ○ | ○ | ○ | ○ |
| **Mediating conflicts (e.g. patent infringement) on the implementation of standards** | ○ | ○ | ○ | ○ | ○ |
| **Other, namely:** | ○ | ○ | ○ | ○ | ○ |

**17. Do you want to share additional comments on the above questions on Part 4, e.g. on differences between SSOs, sectors, or type of rights holders?**

## Part 5: Future Trends

**18. To what degree do you expect the following trends to develop within the next 5 years and how desirable do you think they are?**

| | To what degree do you expect this to happen? | | | To what degree do you believe this is desirable? | | |
|---|---|---|---|---|---|---|
| | Unlikely | Neutral | Likely | Undesirable | neutral | desirable |
| Delayed disclosure of IPRs essential for the implementation of standards | ○ | ○ | ○ | ○ | ○ | ○ |
| The presence of third-party non-producing entities as owners of essential IPRs | ○ | ○ | ○ | ○ | ○ | ○ |
| Licensors targeting entities downstream in the value chain (e.g. operators, system- integrators) | ○ | ○ | ○ | ○ | ○ | ○ |
| Trading of essential IPRs | ○ | ○ | ○ | ○ | ○ | ○ |
| An increase in the number of rights holders per standard | ○ | ○ | ○ | ○ | ○ | ○ |
| An increase in geographical diversity of IPR rights holders | ○ | ○ | ○ | ○ | ○ | ○ |
| An increase in geographical diversity of participants in standardisation | ○ | ○ | ○ | ○ | ○ | ○ |
| Increasing relevance of copyrights as an essential IPR | ○ | ○ | ○ | ○ | ○ | ○ |
| Activities of governments related to IPR policies | ○ | ○ | ○ | ○ | ○ | ○ |
| Substitution of FRAND by RF | ○ | ○ | ○ | ○ | ○ | ○ |
| Increased number of standards based on open source software | ○ | ○ | ○ | ○ | ○ | ○ |
| Other: | ○ | ○ | ○ | ○ | ○ | ○ |

**19. Could you elaborate on the main problems and challenges you foresee in the near future?**

## Background information on your enterprise

**Name of Enterprise:**

**Main Activity:**

**Country of Headquarter:**

**Is your enterprise part of an enterprise group?**

(A group consists of two or more legally defined enterprises under common ownership. Each enterprise in the group may serve different markets, as with national or regional subsidiaries, or serve different product markets. The head office is also part of an enterprise group)

Yes __ (In which country – if different to the answer above – is the head office of your group located?)

No __

**Note: If your enterprise is part of an enterprise group, please answer all further questions only for your enterprise in your country. Do not include results for subsidiaries or parent enterprises outside of your country.**

**What was your enterprise's total turnover for 2009? (Give turnover in 1000 of national currency units to nine digits)**

Turnover is defined as the market sales of goods and services (include all taxes except VAT).

Turnover in 2009: _____

**What was the share of turnover with goods and services your enterprise realised in the following markets in 2009?**

| | |
|---|---|
| Europe | _____ |
| North America | _____ |
| Asia | _____ |
| Rest of the world | _____ |
| Total of turnover | 100% |

**What was your enterprise's total number of employees in 2009? (Annual average: If not available, give the number of employees at the end of each year. Give figures up to six digits)**

Employees in 2009: _____

**Please indicate the general business model of your enterprise:**

| | **Yes** | **No** |
|---|---|---|
| Pure manufacturer of products or software | __ | __ |
| Manufacturer plus technology provider to third enterprises | __ | __ |
| Technology provider without own production | __ | __ |

**Please estimate the amount of expenditure for each of the following four innovation activities in 2009 only? (Give expenditure data in 1000s of national currency units up to eight digits, leave blank if no expenditure)**

| | |
|---|---|
| Intramural (in-house) R&D | _____ |
| Acquisition of R&D (external) | _____ |
| Acquisition of machinery, equipment and software | _____ |
| Acquisition of external knowledge | _____ |
| Total of these four innovation expenditure categories | _____ |

## Intellectual property rights

**During the three years 2007 to 2009 did your enterprise:**

**Yes No**

Apply for a patent __ __

Register an industrial design __ __

Register a trademark __ __

Claim copyright __ __

**If your enterprise has applied for patents, how many identical patents (or patent families) have you applied for either at the American, Japanese or European Patent Office in the year 2009?**

_____

## Involvement in standardisation

**How many personnel (full time) did your enterprise employ in 2009 in standardisation activities?**

_____

**Does your enterprise have a standardisation department?**

Yes ____No ____

**Was your enterprise involved in any standardisation activities in 2009?**

Yes ____No ____

**If so, please indicate in how many technical committees (TCs) your enterprise participated:**
**(0 or number of TCs)**

| | Formal SSOs (ISO, CEN-CENELEC, ETSI; ANSI) | Other SSOs, incl. consortia and fora |
|---|---|---|
| **International level** | | |
| **European level** | | |
| **National level** | | |

## Implementation of standards

**Did your enterprise implement any standard in your products or services in 2009?**

Yes ___ No ___

**If so, please indicate how many of the different types of standards were implemented by your enterprise: (0 or number of standards)**

| | Formal standards (ISO, CEN-CENELEC, ETSI; ANSI) | Other SSOs, incl. consortia and fora |
|---|---|---|
| **International level** | | |
| **European level** | | |
| **National level** | | |

**In order to be able to send you an executive summary of the survey results, please provide us with your email address. Also we would like you to provide us with the position you hold inside your enterprise.**

Email:

Position in the enterprise:

# Thank you for your support!

# Annex V: Views and Trends with Respect to Standards and IPRs

***Benoît Müller***

## Voluntary, market-led standardisation

| Trend or view | Proponent's rationale | Source | Counter-arguments |
|---|---|---|---|
| Various SSO IPR policies prevail for various sectors and standards | SSO IPR policies can be ranged in four categories: non assertion; RAND/RF; RAND; RAND-Z<br><br>Although there are certain similitudes, each SSO IPR policy is different, as decided by its members<br><br>Different industry sectors tend to adopt different rules | Nov 2008 DG Entr workshop<br><br>Danish Government commissioned studies on SSO IPR policies<br><br>Chapter 3; 4; 5.2.<br><br>DG Competition | Harmonisation is warranted |
| No changes that | SSO to focus on technology; commercial | Chapter 3; 4 | Can lead to incorporating essential technol- |

| | | | |
|---|---|---|---|
| would lead to commercial issues / price fixing in SSOs | issues best addressed outside SSO following marketplace dynamics | DG Competition | ogy in a standard without knowledge of licensing terms; if these terms then prove prohibitive for potential licensees, may impede the standard's implementation and success |
| Maintain and promote RAND SSO IPR policies | RAND offers an adequate balance between the interests of technology innovators and standards implementers; often a condition for companies inventing in innovative technologies to participate in standardisation<br><br>Most if not all SSOs including RF policies are a form of RAND as they contain other restrictions such as field of use, restrictions on sub-licensing or reciprocity requirements | Nov 2008 and 2010 DG Entr workshops<br><br>Chapter 3 and 4 | RAND does not correspond to the OSS philosophy and makes it difficult to implement the standard in products running software licensed under restrictive OSS licenses<br><br>RAND-based standardisation leads to market failures and requires Government intervention |
| Compensation for essential IPRs | Contribution of innovative, state-of-the-art technologies to standardisation should be encouraged and compensated | Reasonable royalty at the discretion of the right holder possible under most SSOs' IPR policies | Generates complexities for OSS implementations; maybe a problem in case of mandatory standards under e.g. eGovernment policies; trade barriers (China) |

| | | | |
|---|---|---|---|
| | | Chapter 3; 4; 5.2 | |
| Different situations require different solutions | No one-size-fits-all approach to SSO IPR policies and marketplace solutions to essential IPR licensing; reality is SSOs do and should continue to follow different IPR policies that correspond to market requirements | Nov 2008 DG Entr workshop<br><br>Chapter 3; 4; 5.2<br><br>DG Competition | Landscape is too complex especially for SMEs; Government / EU Commission should step in and harmonize SSOs' IPR policies and market practices |
| SSO IPR policies to be determined by voluntary, market-led standardisation | Market best placed to strike the balance between competing interests among different business models and interests, according to respective technologies and standardisation projects | Nov 2008 DG Entr workshop<br><br>Chapter 3 and 4<br><br>DG Competition | Landscape is too complex especially for SMEs; Government / EU Commission should step in and harmonize SSOs' IPR policies and market practices |
| Royalties to be paid by licensee to licensor should be determined by the market | Safe clearly demonstrated abuse of dominant position, competition authorities should avoid interfering in commercial negotiations between licensees and licensors; need to | McGuill case; IMS case; Microsoft case; Rambus case; Qualcomm case | Competition authorities should take a proactive role and help licensees / standards implementers by taking preventive measures to avoid patent hold-up and excessive |

| | | | |
|---|---|---|---|
| | fund R&D and get access to others' technologies through cross-licensing | Damien Geradin<br><br>Chapter 4 | royalty claims |
| Patents in standards is a reality, and marketplace has responded with SSO IPR policies and business practices | While in greater number for certain standards in certain sectors , patents have been declared in relation to standards from all major SSOs | Chapter 3; 4; 5.2<br>. | Certain disputes (especially in the United States) illustrate the need for action or intervention |
| Few disputes compared to number of patents in standards | Few court cases, most of which in the United States, indicates system is not broken; disputes are frequently part of a negotiation strategy and in most cases are settled by transaction | Chapter 3 and 4; | Court cases are just the tip of iceberg of tensions that arise; the importance of standardisation requires monitoring and if required intervention |
| Standards and IPRs is mainly a market issue; licensing options depend on whether they fit for the purpose | Companies' innovation, patenting, standardisation and litigation strategies are closely linked to their business model | Chapter 3; 4; 5.2 | Standardisation has a public interest dimension justifying monitoring and if required intervention; need to support open source software based business models to re-establish a level playing field |
| IPR licensing occurs | Marketplace has developed solutions | Chapter 3 and 4 | In particular SMEs may not have access to |

| | | | |
|---|---|---|---|
| outside SSOs and more often than not is part of larger transactions; SSOs' role should not be over-estimated | (cross-licensing, non-assert, pools, licensing essential and non-essential patents etc.) in response to growing number of patents; marketplace benefits from manufacturing-or-buy-component option; over-regulation would be ineffective and counter-productive | | complex business processes controlled by established players |

## IPR licensing transparency and predictability

| Trend or view | Proponent's rationale | Source | Counter-arguments |
|---|---|---|---|
| **Essential IPR identification** | | | |
| SSO to conduct patent searches | Burden on companies, especially SMEs, to conduct patent searches themselves is too high | Nov 2008 and 2010 DG Entr workshops | SSOs are not equipped to conduct patent searches<br><br>SSOs cannot assume resulting liability<br><br>Patent landscaping can only be approximative until the standard is finalized and the implementation conditions known |

| | | | |
|---|---|---|---|
| | | | |
| SSO IPR policies to require members to conduct reasonable IPR inquiries | In SSOs with both declaration-based and participation-based models, companies should be requested to undertake good faith efforts to determine the availability of essential patents | Chapter 5.2<br><br>DG Competition | "Reasonable inquiry" or "good faith efforts" should not result in mandatory search requirements, and must be limited to the individual participating in the SSO working group's knowledge about his company's granted patents |
| SSOs to cooperate with patent offices to facilitate patent landscaping | Patent offices, especially EPO, USPTO, JPO and WIPO, manage databases that can help SSOs and their members determine patents and patent applications of relevance to a standard in development; should there be specific registries for patents related to standards? | Nov 2010 DG Entr workshops<br><br>Chapter 4<br><br>ETSI<br><br>EPO<br><br>WIPO | SSOs should not get involved in patent landscaping<br><br>SSOs cannot assume resulting liability<br><br>Patent landscaping can only be approximative until the standard is finalized and the implementation conditions known |

| | | | |
|---|---|---|---|
| | | | |
| **IPR disclosure and licensing** | | | |
| SSO IPR disclosure policies have found ways to balance competing interests | Participation based / opt out option; disclosure based / mandatory disclosure / no disclaimer or search obligation / reasonable inquiry; scope of disclosure | Chapter 3; 4; 5.2 | Tensions are increasing as there are more and more patents in standards |
| Promotion of ex ante disclosure is neither required nor warranted | Most disclosure takes place ex post; lack of disclosure does not necessarily result in deceptive or misleading behaviour | Nov 2010 DG Entr workshops<br><br>Chapter 3; 4; 5.2<br><br>Actividentity v Intercede<br><br>Qualcomm v Broadcom | Even if ex post disclosure functions well in a number of cases, specific abuses established by courts require attention |

| | | | |
|---|---|---|---|
| | | Rambus<br><br>Anne Layne-Farrar | |
| Voluntary ex-ante disclosure of licensing terms | Balance contribution of state-of-the art technology / predictability of essential IPR licensing terms / flexible solution consistent with the voluntary nature of standardisation<br><br>Can be decided by members of a standards organisation; not deemed anti-competitive per se | Nov 2010 DG Entr workshops<br><br>Chapter 4<br><br>ETSI; IEEE<br><br>Nov 2008 DG Entr workshop<br><br>DG Competition; FTC | Licensing terms may be impossible to determine until the standard has reached sufficient maturity<br><br>Ex ante commercial negotiations may be anti-competitive<br><br>Does not go far enough – ex ante disclosure should be mandatory |
| Mandatory ex ante disclosure of licensing | Respond to growing number of patents and ensure predictability for implementations | Nov 2008 and 2010 DG Entr workshops | Disincentive to participation in standardisation; in many cases would result in compa- |

| | | | |
|---|---|---|---|
| terms | Can be decided by members of a standards organisation; not deemed anti-competitive per se | Chapter 4<br><br>VITA<br><br>China SAC regulations<br><br>DG Competition; FTC | nies owning state-of-the-art technologies to boycott SSO and turn to other cooperation venues; unduly favours implementers over innovators and may be anti-competitive; in any case should not be imposed by government and left to market determination |
| Incentives to disclose essential IPRs before a technology is chosen for inclusion in a standard | Balance selection of best technology / commercial viability of the standard in the marketplace<br><br>Put pressure on licensors and secure licensing terms and aggregated royalty rates favourable for deployment of the standard | Chapter 3,4, 5.2<br><br>ETSI<br><br>Most SSOs | If too restrictive, disincentive for participation in standardisation and can lead to patent hold-out / submarine patents<br><br>Should be voluntary and not interfere in commercial negotiations between licensors and licensees |

| | | | |
|---|---|---|---|
| IPR disclosure and licensing best practice guidelines | Foster timely disclosures and avoid intentional delays that could lead to patent hold-up | Chapter 4<br><br>ETSI | Such guidelines should be purely voluntary or they would discourage IPR holding firms from participating in standardisation |
| Cumulative royalty caps / Aggregated Reasonable Terms / Proportionality | In particular in the telecommunications sector, patent thickets as a result of ever more registered patents in technologies essential for standards lead to prohibitively high cumulative royalties<br><br>Ensure predictability for the deployment of standards | Chapter 3 and 4<br><br>Nov 2008 DG Entr workshop | The market is best placed to determine reasonable royalty rates; royalty disputes between licensors and licensees are rare, can and are being solved: does not take into account the interests of innovators; practical difficulties of determining the value and aggregation of IPRs; may be anti-competitive.<br><br>Royalty stacking is theoretical and not supported by evidence justifying policy change (Geradin, Layne-Farrar, Padilla) |
| Ex ante declarations for ex ante standardisation | It is often impossible to determine licensing terms until the specification is agreed and implementation offers known, especially for standards that create a new market | Chapter 3, 4 and 5.2 | The benefits of choosing a technology in a standard knowing implementation costs outweighs potential anti-competitive effects of commercial discussions during the standardisation process |
| Improve transparency of IPR disclosures | SSO IPR databases not always up-to-date and / or transparent | Nov 2010 DG Entr. workshop | Companies should not rely on SSO and conduct patent searches themselves |

| | | | |
|---|---|---|---|
| and FRAND licensing commitments | | Chapter 4<br><br>ETSI<br><br>DG Competition | |
| Stop standardisation in case of refusal to license essential IPRs, or work around the patents | Avoid standards that could not be implemented | Nov 2010 DG Entr. workshop<br><br>Chapter 4<br><br>ETSI | SSOs should focus on technology and not get involved at all in commercial issues – avoid standardation on inferior technology<br><br>In some cases, the cost of stopping standardisation would be prohibitively high |
| Promote Royalty Free licensing | Avoids problems and costs associated with identifying and licensing essential IPRs | Nov 2008 DG Entr workshop | Works for certain sectors / standards, but not for many others; disincentive for companies to contribute IPR protected tech- |

| | | | |
|---|---|---|---|
| | | Chapter 4 | nologies to standardisation; whether or not to charge royalties should be left to the market/SSOs, with neither model imposed |
| IPR non-assert commitments as an alternative to IPR disclosure | IPR non-assert commitments facilitate implementation, including in solutions running OSS<br><br>Voluntary, market-driven non-assert commitments can be an appropriate solution in specific circumstances | Chapter 4 and 5.2<br><br>OASIS; ECMA | IPR non-assert commitments are unilateral declarations and subject to the conditions imposed by IPR holders<br><br>Commitments could be withdrawn, or unenforceable if IPRs are transferred to a third party<br><br>Computer Implemented Inventions should not be patentable at all |
| Existing contractual and competition law rules and remedies are adequate | The relatively low number of cases on IPR licensing in the context of standardisation have been satisfactorily settled or solved.<br><br>No change is warranted. | Nov 2008 DG Entr workshop<br><br>Chapter 4 | Disputes over IPR licensing can have a disruptive effect on standardisation and deployment of standards, and should be addressed; low number of cases but issues are real and tensions on the rise. |
| **Meaning of (F)RAND** | | | |
| (F)RAND can only be | Any attempts to define (F)RAND or "rea- | US Georgia Pacific | Prohibitive cumulative royalties result in |

| | | | |
|---|---|---|---|
| determined in consideration of the full context including aggregated licensing fees | sonable royalty" in the abstract or ex ante are doomed to fail; must consider the full commercial context | case<br><br>Damien Geradin<br><br>Chapter 3 and 4 | market failure and calls for government intervention to define F)RAND including "reasonable royalty" (see e.g. Shapiro) |
| FRAND needs to be defined | "Fair" and "reasonable" are not precise enough, so FRAND commitments are too imprecise to be valuable | Chapter 4 and 5.2<br>Lucent v Microsoft<br><br>Apple v Nokia<br><br>Rambus case<br><br>Qualcomm case | FRAND cannot and precisely should not be defined, as the term needs to leave flexibility for different solutions to different situations<br><br>FRAND cannot be determined in a vacuum and only in consideration of full context in which a license is being negotiated<br><br>Disputes over the meaning of FRAND in a particular situation can and are subject to satisfactory settlement or resolution |
| Competition policy guidelines should set benchmarks; market | FRAND benchmarks: ex ante situation; expert assessment of IP portfolio; compare with IP licensed in other contexts | Chapter 4<br>DG Competition | Over-regulation may create imbalances in the market; intervention only if established competition law violation |

| | | | |
|---|---|---|---|
| should determine FRAND | | | |
| Business Review Letters specifying joint ex ante consideration of licensing terms per se not a violation | Provide ex ante guidance based on individual assessment | FTC/DoJ 2007 IP2 report<br><br>FTC Business Review Letters in VITA and IEEE<br><br>Chapter 4 | Over-regulation may create imbalances in the market; intervention only if established competition law violation<br><br>Individual ex ante assessment is insufficient; there is a need for horizontal guidelines |
| **Legal certainty** | | | |
| Essentiality test prior to SSO decision to include a technology in a standard under development | Increase predictability and maximize chances for a standard's success, establish mechanisms to test a claimed IPR's essentiality before inclusion of the technology in a standard | Chapter 4<br><br>EPO; WIPO | Not required; too complex; against voluntary and market-led standardisation;<br><br>essentiality can only be determined with certainty once a standard is completely developed and in consideration of implementation conditions |
| Some key terms in IPR policies require clarification | Key terms that are typically not defined: essentiality; irrevocability; reciprocity; RAND; geographical scope | Chapter 4 and 5.2 | General terms are necessary to capture different situations |

| | | | |
|---|---|---|---|
| | | EPC Global; Netgear | Definitions would not help and be very difficult to agree on in the abstract |
| FRAND licensing commitments to be passed on to third parties succeeding the IPR owner who made the commitment | If an IPR is passed on to a third party, there is an uncertainty as to the continued validity and enforceability of the FRAND commitment<br><br>Ensure predictability and prevent patent hold-up | Nov 2010 Dg Entr. workshop<br><br>Nokia v IPCom; ETSI<br><br>Chapter 4 and 5.2<br><br>FTC in N-Data<br><br>Rembrandt<br><br>CSIRO v Buffalo | (F)RAND commitment is contractual and thus cannot and should not be passed on by law to patent transferee<br><br>A legal obligation to pass on the licensing commitment would be incompatible with patent law<br><br>Such obligation could be counter-productive and result is less FRAND commitments |
| Competition policy | DG Competition should not tell SSOs what | Chapter 4 | Guidelines that suggest what SSOs should |

| | | | |
|---|---|---|---|
| guidelines should create a safe harbour if transparent process, unrestricted participation and standard is available to all for implementation | to do, but should tell them what they can do; standardisation outside the safe harbour is not necessarily anti-competitive and subject to individual assessment | DG Competition | do on incorporating IPRs in standards, ex ante disclosure of licensing terms etc. would be counter-productive; market place needs legal certainty that its IPRs will be protected in the standardisation context; SSOs should have maximum freedom to set their IPR policies |
| SSO IPR policies must be “clear” and “binding” | Whereas SSO should be responsible for setting their governance rules, their IPR policies should be sufficiently clear and binding on SSO members | Chapter 4<br><br>DG Competition | “clear” should not be construed as requiring any specific provision; determination of “binding” should be left to the parties and the courts<br><br>Will not impact IPR owners that are not members of the SSO |

## IPR licensing efficiency

| Trend or view | Proponent's rationale | Source | Counter-arguments |
|---|---|---|---|
| Joint negotiations / collective licensing arrangements / patent pools / technology auctions to be encouraged | Offer efficient licensing solutions in cases of numerous essential IPR holders | DVB; MPEG LA; VIALicensing | No need to re-establish the balance; collective licensing / patent pools should occur outside SSOs and following market dynamics (often part of larger business transactions / cross-licensing) |
| | Re-establish a balance between the interests of licensors and licensees, avoid prohibitive royalties on technologies essential to implement a standard | US FTC / Department of Justice 1995 Guidelines for Licensing of Intellectual Property | Patent pools and technology auctions can be anti-competitive and lead to unreasonably low royalties for innovative technologies |
| | Reduces transaction costs; improves transparency; reduces uncertainty; select essential technologies for inclusion in standard in consideration of licensing conditions | Various literature | If forced upon the marketplace, may deter innovative firms from contributing their technologies to standardisation |
| | | Chapter 2, 4, 5.2 | Promote alternative solutions, see (see Layne-Farrar, Llobet, Padilla, Schmalensee) |

| | | | |
|---|---|---|---|
| Establish an IPR experts body within the SSO | SSO IPR policies needs to be monitored and adapted on a regular basis<br><br>Create a forum within the SSO to discuss IPR issues; seek participation of IPR lawyers in such a body to advise executives and technical experts | ETSI<br><br>DVB<br><br>Carter Elzroth<br><br>Chapter 5.2 | May not be justified for all SSOs<br><br>It should be up to SSO members to determine the structure and rules of the SSO<br><br>SSOs should not get involved in commercial and legal issues; such a body may complicate rather than simplify standardisation; may work for certain SSOs but not for other fields of standardisation |
| (F)RAND territoriality: commitment to be deemed worldwide and under any jurisdiction and applicable law | To ensure fair, reasonable and non-discriminatory implementation of a standard globally; respond to the increasingly global scope of technology standards | Tetra case<br><br>Chapter 5.2 | IPR territoriality determined by TRIPS and national law; worldwide application of (F)RAND commitment has to be contractual and explicit; (F)RAND licensing commitments are only applicable to implementation of the relevant standard, and unless explicitly stated, do not extend to national transpositions of an international standard (see China) |
| Licensing conditions | Encourage licensing and patent pooling to | DVB | Impact not demonstrated; SSO should stay |

| | | | |
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| excluded from SSOs IPR policy enforcement / arbitration of licensing / patent pooling | clear IPRs essential for implementing the standard | Carter Elzroth<br><br>Chapter 2 and 5.2 | neutral and neither promote nor discourage any form of licensing among members and non-members; may work for DVB but not for other fields of standardisation |
| Facilitate SSO / companies access to EPO, national patent offices and / or WIPO patent information | Help SSOs / companies determine essential IPRs | EPO; WIPO; ETSI; NGM<br><br>Nov 2008 and 2010 DG Entr workshops<br><br>Chapter 4 | SSOs should not get involved in determining essential IPRs; companies already have access to and make use of patent information databases |
| SSO IPR databases well maintained and consider consequences of IPR ownership change on (F)RAND commitments | Ensure transparency and predictability, including in the case of IPR ownership change | ETSI<br><br>Nov 2008 and 2010 DG Entr workshops | SSOs should not at all get involved in IPR landscaping<br><br>Consequences of (F)RAND commitments and IPR ownership change should be left to the commercial negotiations / dispute reso- |

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| | | DG Competition<br><br>Chapter 4 | lution between affected companies<br><br>Practically impossible for SSO IPR databases to warrant accuracy |
| Participation in standardisation deemed as commitment to license: negative disclosure of essential IPRs policy coupled with a right to withdraw essential IPRs | Prevent patent ambushes and submarine patents and provide greater commercial certainty for implementers | DVB; Other participation-based SSOs<br><br>Carter Elzroth<br><br>Chapter 5.2 | May work in DVB context but may not be adapted to other fields of standardisation; does not solve issues with respect to patents owned by non-members |
| Royalty Free IPR policies, in particular in the area of Internet standardisation | Simpler, in particular for open source software implementations; encourages a standard's wide implementation<br><br>Transparency and predictability; avoids ex ante problem; level playing field for open source software<br><br>Some SSOs encourage Royalty Free as a | W3C<br><br>OASIS<br><br>Nov 2008 and 2010 DG Entr workshop | Standardisation should continue to be market-led, including IPR policies to be set by the market to reflect a balance between competing interests; while appropriate for certain standards / technologies, in many other cases if imposed would deter participation in standardisation and lead to low technology standards without market value; not required for implementations in products running OSS code; if followed and imposed in emerging markets, risks expropriating |

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| | default policy, while allowing (F)RAND as an alternative<br><br>Standards mandated by public administrations should not be royalty bearing | IDABC; Netherlands; Denmark; Belgium<br><br>Chapter 3, 4 and 5.2 | European IPRs |
| SMEs require balanced and efficient IPR policies | SMEs are both licensor and licensee of technology essential for standards<br><br>Some SMEs rely on licensing their IPRs on essential technologies to standards implementers; other SMEs rely on licensing IPRs on essential technologies from other companies to implement standards in their products | Chapter 3, 4 and 5.2 | SMEs from a particular sector / with a specific business model should be advantaged to re-establish a level playing field with large companies<br><br>Specific measures to help SMEs in the context of IPRs in standards are needed |

## Dispute resolution

| Trend or view | Proponent's rationale | Source | Counter-arguments |
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| SSOs should facilitate alternative dispute resolution mechanisms | Litigation can be prohibitively expensive, especially for SMEs | DVB / ICC | SSOs should not get involved in dispute resolution |
| | SSOs could play a role in streamlining dispute resolution rules and procedures and by promoting arbitration and mediation as an alternative or precondition to court proceedings | ETSI / WIPO | Licenses when appropriate already subject disputes to arbitration and mediation |
| | Some SSO IPR policies refer disputes to mediation / expert determination | MPEG-LA | Mediation and arbitration usually is provided for in a contract between companies with a larger scope than standardisation |
| | There are successful examples of mediation / expert determination on e.g. determination of essentiality or royalty rates | Chapter 4 and 5.2 | Arbitration and mediation by definition are private and confidential, hence the public does not learn from solutions - no case law |
| | | | There is no reason to limit contractual freedom, neither by law nor by SSO rules man- |

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| | | | dating or prohibiting arbitration or mediation |
| Binding arbitration as part of an SSO's IPR policy | Speedy dispute resolution; settles procedure, venue and applicable law | DVB<br><br>Carter Elzroth<br><br>Work Package 1.0 | Does not and should not cover licensing arrangements concluded in application of the SSO's IPR policies, which is where disputes usually arise; does not apply to non-members; arbitration may be even more expensive than court proceedings |
| Promote alternative dispute settlement on a voluntary basis | Solve disputes between licensors and licensees in a fast and cost effective manner while preserving confidentiality | WIPO<br><br>Chapter 4 | In consideration of the voluntary and market-led nature of standardisation, alternative dispute settlement should be neither encouraged nor discouraged, whether by governments or SSOs |
| Injunctive relief in the US is no longer automatic | Change of US case law alleviates many concerns with respect to alleged market failures for IPRs in standardisation | Nov 2010 DG Entr workshop<br><br>US eBay case; US patent reform<br><br>Damien Geradin | eBay case does not go far enough; injunctive relief should never be available for patents subject of a (F)RAND commitment in the context of standardisation; a license of rights regime should be imposed on the market |

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| | | Chapter 3 and 4 | |
| Should injunctions be available in case of RAND commitments? | Only damages / running royalty should be available if parties cannot agree on RAND licence | Orange Book (German case): no<br><br>Philips v Kasseten (Dutch case): yes<br><br>Chapter 4 | Possibility to award injuction should follow generally applicable rules and not be excluded systematically |
| Case law could contribute to legal certainty | Relatively low number of cases, and sometimes with diverging outcomes under different jurisdictions, result in little case law<br><br>More and consistent case law in the EU would contribute to legal certainty | Chapter 4 | Conflicts should be avoided; better to prevent than to heal; consistent case law in the EU won't be possible without a European Patent and common jurisdiction; consistent case law internationally will take even more time and would require global patent harmonisation |

## Open Standards and open source software

| Trend or view | Proponent's rationale | Source | Counter-arguments |
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| Define "open standard" and / or "international standard" as free of any IP constraints | Required to allow open source software implementations; avoid lock-in; avoid trade barriers<br><br>Supports technology transfer to developing countries | EIF version 1.0; Netherlands; Belgium<br><br>China / WTO<br><br>Nov 2008 and 2010 DG Entr workshops | Products that run OSS can and do implement RAND-based standards<br><br>All open standards, even those that are Royalty Free-based, do contain some form of RAND-type restrictions on implementation and re-use<br><br>RAND-based standards do not create barriers to trade; on the contrary, requiring IPRs to be waived in standards creates market entry barriers |
| A large number of standards in various industry sectors are implemented in software under different | Marketplace has found ways to implement RAND-based standards in products running proprietary, open source and mixed code software | Chapter 3, 4 and 5.2<br><br>Microsoft case | Does not correspond to OSS philosophy and may not be possible to implement RAND-based standards in products running software under the most restrictive OSS licenses, such as GPL version 3.0 |

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| business model | Solutions include payment of an up-front fee; dual licensing; smart engineering | Nov 2008 and 2010 DG Entr workshops | |
| "Open Standards" to require no more than (F)RAND | Most if not all most relevant open standards are (F)RAND-based, which may include, at the discretion of the right holder, a reasonable royalty; even RF-based standards are subject to other RAND restrictions<br><br>Do not confuse open standards and open source software. Open standards can be implemented under any business and licensing model. | GSC resolutions 13/22 and 13/24<br><br>ITU/IEC/ISO<br><br>ETSI/CEN/CENELEC<br><br>IETF/W3C<br><br>Nov 2008 DG Entr workshop<br><br>Chapter 4 and 5.2 | To re-establish a level playing field between proprietary and open source software, "open standards" should be defined as "free of any IPR restraints"<br><br>Public administrations should mandate open standards; mandating royalty-bearing standards would unduly advantage companies holding essential IPRs in such standards |

## Standards and copyright

| Trend or view | Proponent's rationale | Source | Counter-arguments |
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| DRM standards to protect and manage copyright | Need for standards as part of Digital Rights Management technologies to protect content from being used online without permission<br><br>DRM standards implemented in rights management information and technical measures protection | Chapter 4 | Access to content should be free of any DRMs and allow unrestricted data portability<br><br>Consumer resistance has led many companies to distribute content without DRMs |
| Standards specifications including software code or reference implementations | Increasingly a reality in various standardisation fields; no legislative intervention is warranted | Nov 2010 DG Entr workshop<br><br>Chapter 4 and 5.2 | Restrictive OSS licences cannot cope with RAND standards<br><br>Reference implementations should be purely optional; innovation and competition in the area of implementations should be fostered |
| SSO to adopt a specific copyright policy | Legal certainty with respect to the use of SSO members' copyrighted works in speci- | DVB | Does not apply to copyrighted works owned by non-members; considering copyright |

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| | fications; facilitate cooperation with other SSOs and referencing of the a specification in other SSOs' specifications | Carter Elzroth<br><br>Chapter 4 and 5.2 | protection is not subject to registration but to the originality test, existence and applicability of copyright remains undefined until tested in court; detailed copyright policy may complicate, rather than facilitate, cooperation with other SSOs; if its terms are unattractive, it may be a disincentive to reference copyrighted works including other standards |
| SSO to adopt software guidelines | Increasingly standards include software as part of their specifications, which is raising patent as well as copyright issues which have to be addressed<br><br>Legal certainty with respect to the use of SSO members' copyrighted works in specifications; facilitate cooperation with other SSOs and referencing of the a specification in other SSOs' specifications | ITU-T<br><br>ANSI<br><br>ETSI<br><br>Chapter 4 and 5.2 | Whenever possible standards should not contain any software and focus on specifications that leave maximum choice for implementation<br><br>If subject to restrictive OSS licenses, then the standard could not be implemented in products or elements that contain proprietary code |
| ESOs and SSOs should harmonize their copyright policies | Divergences between an SSO's copyright policy and that of the ESOs may complicate if not prevent the SSO's standards to be | Responses to ICT standardisation policy White Paper | Transposition of an industry standard into a European Norm is and should remain an exception; |

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| to allow transposition of informal standards into official European standards | transposed into European Norms | | In cases where transposition took place, divergences in the SSO and ESOs' copy-right policy were not a major issue nor a deterrent factor |

## Standards and trademarks

| Trend or view | Proponent's rationale | Source | Counter-arguments |
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| Reference trademarks in standards | Required and appropriate if: reference to another standard that is trademarked; reference to technology that is trademarked and freely available; in other cases if followed by the words "or equivalent" | ANSI<br><br>ITU-T<br><br>Chapter 4 and 5.2 | Whenever possible, reference to trademarks in standards should be avoided; when impossible to avoid, has to be done cautiously and subject to appropriate safeguards; risks resulting in undue competitive advantages for trademark holders |

## Standardisation and prior art

| Trend or view | Proponent's rationale | Source | Counter-arguments |
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| SSOs to cooperate with patent offices to facilitate identification of prior art | Standardisation can lead to and / or reveal prior art, which should be taken into consideration by patent offices to avoid the granting of patents on claimed inventions that in fact are not novel | Nov 2010 DG Entr workshop | SSOs and their members are not responsible for determining the patentability of inventions |
| | | ETSI | SSOs are not really in a position to help and should concentrate on standardisation |
| | | EPO / WIPO | Patent offices should continue to be responsible and in charge of evaluating patent applications |
| | | Chapter 4 | Confidentiality of SSO processes is essential for trust and participation |

## Referencing standards in legislation, public policies and public procurement

| Trend or view | Proponent's rationale | Source | Counter-arguments |
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| SSO cooperation with ESOs or ISO/IEC/ITU | Allow formalizing consortia and fora specifications as international or European standards; allow referencing of relevant formalized consortia and fora standards in EU legislation, policy or public procurement while preserving the formal standardisation and Transparency Directive requirements | ESOs; EXPRESS expert panel<br><br>ISO/IEC/ITU; WTO TBT Agreement<br><br>DVB – ETSI – CENELEC<br><br>MPEG – ISO<br><br>OASIS / ODF – ISO<br><br>ECMA / OXML – ISO | Raises potential issues of compatibility between the fora / consortia and ESO or ISO/IEC/ITU IPR policies and ownership of the copyright on the standard's specification; may be too cumbersome and slow; use of and direct referencing to consortia and fora standards should be promoted as a more straight-forward solution |

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| | | VITA / PDF - ISO<br><br>Carter Elzroth | |
| Reference to standards in EU policies and public procurement should be to RAND-based standards only | EU policies and public procurement should refer to RAND-based standards and not to proprietary standards | Responses to ICT standardisation policy White Paper | EU regulations should also be able to reference proprietary standards that meet eligibility attributes based on WTO criteria |
| Reference to standards in EU regulation, legislation, policies and public procurement should be to formal standards only, and preferably to RF-based standards | No need to reference informal standards; preference for referencing RF-based standards to be considered to avoid essential IPR holders to gain advantages | Responses to ICT standardisation policy White Paper | EU regulations, legislation, policies and public procurements should also be able to reference informal standards that meet eligibility attributes based on WTO criteria and including RAND condition; no preference for RF-based standards; avoid standards mandates rather than imposing RF to avoid essential IPR holders from gaining undue advantages |
| Reference to standards in EU legisla- | Especially in the ICT domain, standards from consortia and fora are increasingly | ICT standardisation policy White Paper | Referencing in particular in legislation / regulation but also in policies and public |

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| tion, policies and public procurement should be to formal or informal standards, provided eligibility criteria including RAND are met | important and can also be relevant for Governments / EU Commission; most if not all of these standards are RAND-based | Responses to ICT standardisation policy White Paper | procurement should be preferably or exclusively to formal standards; a special policy for referencing ICT standards is not justified<br><br>Referencing should be to IPR-free standards only to avoid lock-in and IPR holder advantage |
| Royalty Free software standardized interfaces to be mandated in public procurement | Promote interoperability; avoid lock-in with legacy software; promote OSS<br><br>For Governments, especially important in the area of document formats | Responses to ICT standardisation policy White Paper<br><br>IDABC; Netherlands; Norway; Belgium | Special treatment for 'software interfaces' neither warranted nor possible; RF should be at the discretion of the right holder / marketplace; standards mandates should be avoided and would violate EU public procurement legislation and WTO rules, except when justified for major public interests such as public health or safety; public procurement should focus on a tender's functional and technical requirements and allow competition among equivalent solutions, irrespective of whether or not RF-based |
| Standards referenced in legislation to become public domain | Since laws and regulations are in the public domain, standards that are referenced in laws and regulations should become public domain | US Weeck case<br><br>China | Would result in expropriation of essential IPRs and SSOs copyright in the specification; not justified nor required; would conflict with TRIPS and TBT; would deter participa- |

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| | Technology essential for implementating the standard to become public domain<br><br>Standards in a development of which a Government official has participated and technologies essential for its implementation to become public domain | | tion in standardisation where Government officials participate and / or whose deliver-ables are envisaged for referencing in laws or regulations; raises trade concerns |

## Government intervention in standardisation

| Trend or view | Proponent's rationale | Source | Counter-arguments |
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| Compulsory licensing | Remedy to correct and sanction abuse of dominant position in the context of standardisation<br><br>Public interest of widely implementing relevant standards<br><br>Avoid barriers to trade | Chapter 4<br><br>China<br><br>TBT Committee and Nov 2008 and 2010 DG Entr workshops<br><br>Rambus case<br><br>DG Competition<br><br>See also Damien Geradin | Safe situations where a justified and proportionate remedy to an established abuse of a dominant position, compulsory licensing of essential IPRs would be in conflict with TRIPS Article 31<br><br>Standardisation should continue to be market-led and avoid being subject to a regime that would deter contribution of state-of-the-art technologies to standardisation and undermine IPR protection essential to encourage innovation |
| Obligation to disclose essential IPRs and | Interoperability is public interest issue justifying compulsory licensing | WAPI / China 802.11 | FRAND commitments are subject to the standard's field of use restrictions and do |

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| license on RF or (below market) FRAND terms (compulsory licensing) for national transposition of international standards | Avoid trade barriers<br><br>Promote technology transfer and indigenous innovation | Nov 2008 and 2010 DG Entr workshops | not extend to the transposition of an international standard into national standards; would violate TRIPS and TBT<br><br>Problem is not IPRs in standards but Government mandated standards; solution is not IPR free standards, but to avoid mandates |
| Government / Commission intervention in ICT standardisation IPR policies (prescriptive guidelines) | Convergence and innovation leads to more essential IPRs which risks to suffocate standardisation<br><br>IPR policies have led to market failure | Responses to ICT standardisation policy White Paper<br><br>Work Package 2.0 | More patent registrations around the world is a reality but ICT standardisation continues to function well; no proven market failure; voluntary, market-led standardisation to be upheld and promoted |
| Government intervention against trolls / patent ambush | Proliferation of trolls / patent ambush risks killing standardisation | Rambus case<br><br>Lemley and Shapiro<br><br>Chapter 4 | No proven market failure; in the few instances where a problem occurred, existing legal remedies proved efficient to solve the problem; impossible to differentiate on a general and abstract level between illegitimate trolls and legitimate, innovative non-producing entities with a licensing-based business model (see e.g. Anne Layne-Farrar) |

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| Patent anti-commons, patent thickets, patent hold-up and hold-out and royalty stacking require Government intervention | Too many patents block standardisation and/or lead to too expensive standards | Heller and Eisenberg<br><br>Shapiro<br><br>Janice Mueller<br><br>Lemley and Shapiro | No proven market failure (see e.g. Geradin; Layne-Farrar and Padilla)<br><br>Issues have to do with patent quality and automatic injuctions in the US before eBay case |
| SMEs to be exempted from royalties on essential IPRs | SMEs are at a competitive disadvantage in standardisation and should benefit from preferential conditions for implementing standards | NORMAPME at Nov 2008 DG Entr workshop | No proven market failure including for SMEs; all economic operators to be treated equally and no preferential treatments even for SMEs; other support measures for SMEs can be envisaged but no intrusion in SSO IPR policies and licensing |
| "Soft IP" / license of rights | Facilitate and promote patent applications that only grant a right to a reasonable remuneration but not to prohibit use of the patent, including to facilitate standardisation in areas covered by many patents | Nov 2008 and 2010 DG Entr workshop<br><br>Responses to ICT standardisation policy White Paper | Should not and cannot (TRIPS) be imposed; exists in the UK but has not led to influence the behaviour of right holders with respect to standardisation; reflects attempt to undermine the patent system and to tilt the balance in favour of service companies / standards implementers |

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| | | EPO bluesky scenario<br><br>Chapter 4 | |
| Injunctions should be available only when justified | Automatic injunctions can be disproportion-ate and contrary to economic interest | Nov 2010 DG Entr workshop<br><br>Chapter 4<br><br>eBay case; US patent reform | Smaller actors such as individual inventors or universities may not have the resources to negotiate in the absence of automatic injunctions |
| Global trade requires robust IPR protection including for standard-ized technologies | If EU wants its IPRs to be protected abroad, it needs to lead by example and protect IPRs in standards / support RAND | Industry comments on Chinese indigenous innovation policy pro-posal<br><br>Chapter 4 | RAND-based standards represent trade barriers; international standards should be free of any IPR restrictions |
| Quality of patents | Patent quality is key to well-functioning | Nov 2010 DG Entr | A well-functioning patent system could lead |

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| should be further promoted, including through a European Patent and international harmonisation | standardisation; fewer illegitimate patents and patent law harmonisation would lead to fewer problems and disputes, also in relation to standardisation<br><br>Most disputes in the standardisation context are in relation to patents found invalid by the courts; better quality patents contribute to less disputes | workshop<br><br>Chapter 3 and 4<br><br>EPO Raising the Bar initiative<br><br>WIPO<br><br>DG Competition<br><br>FTC 2009 hearings on the evolving IP marketplace | to more patents<br><br>Standardisation should be based on freely available technologies, so they can easily be implemented in open source software / domestic companies |

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| Globalisation of actors and convergence of technologies require global perspective; may challenge established industry practices | IPR holders and standardisation actors are increasingly located across the world; policies and decisions increasingly have implications in other jurisdictions | Chapter 4 and 5.2 | Europe should promote European Standards |